MICROWAVE TEST SET

6200B SERIES

6200B 10 MHz to 20 GHz
6201B 10 MHz to 8 GHz
6202B 10 MHz to 2 GHz
6203B 10 MHz to 26.5 GHz
6204B 10 MHz to 46 GHz

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Preface

CONVENTIONS

The following conventions apply throughout this manual:

CAPS	Capitals are used to identify names of controls and panel markings, or system functions where no direct reference to an associated key is intended.
[CAPS]	Capitals in square brackets indicate hard key titles.
[Italics]	Italics in square brackets indicate soft key titles.

SOFTWARE STATUS

The operating software for this instrument is contained in EEPROMs fitted inside the unit. The software issue number can be determined by pressing [UTILITY]*[Service][Status][Display Build State]*.

PATENT PROTECTION

The 6200B Series Microwave Test Sets are protected by the following Patents:

US4609881
US5237291
and others

PRECAUTIONS

WARNINGS, CAUTIONS and NOTES

The following terms have specific meanings in this manual:

WARNINGS contain information to prevent personal injury.
CAUTIONS contain information to prevent damage to the equipment.
Notes contain important general information.

Symbols

The meaning of hazard symbols appearing on the equipment is as follows:-

Symbol	Description
	General hazard
	Dangerous voltage
	Toxic hazard
	Static sensitive components

General conditions of use

This product is designed and tested to comply with the requirements of EN61010-1/IEC1010-1 'Safety requirements for electrical equipment for measurement, control and laboratory use', for Class I portable equipment and is for use in a pollution degree 2 environment. The equipment is designed to operate from an installation category II supply.

Equipment should be protected from the ingress of liquids and precipitation such as rain, snow, etc. When moving the equipment from a cold to a hot environment, it is important to allow the temperature of the equipment to stabilise before it is connected to the supply to avoid condensation forming. The equipment must only be operated within the environmental conditions specified in Chapter 1 'Performance data' in the Operating manual, otherwise the protection provided by the equipment may be impaired.

This product is not approved for use in hazardous atmospheres or medical applications. If the equipment is to be used in a safety-related application, e.g. avionics or military applications, the suitability of the product must be assessed and approved for use by a competent person.

WARNING - Electrical hazards (AC supply voltage)

This equipment conforms with IEC Safety Class I, meaning that it is provided with a protective grounding lead. To maintain this protection the supply lead must always be connected to the source of supply via a socket with a grounded contact.

Be aware that the supply filter contains capacitors that may remain charged after the equipment is disconnected from the supply. Although the stored energy is within the approved safety requirements, a slight shock may be felt if the plug pins are touched immediately after removal.

Fuses

Note that there are supply fuses in both the live and neutral wires of the supply lead. If only one of these fuses should rupture, certain parts of the equipment could remain at supply potential.

Removal of covers

Disconnect the supply before removing the covers so as to avoid the risk of exposing high voltage parts. If any internal adjustment or servicing has to be carried out with the supply on, it must only be performed by a skilled person who is aware of the hazard involved.

WARNING - Toxic hazards

Some of the components used in this equipment may include resins and other materials which give off toxic fumes if incinerated. Take appropriate precautions, therefore, in the disposal of these items.

WARNING - Beryllia

Beryllia (beryllium oxide) is used in the construction of the following components in this equipment:

RF Board, A2 (44829/780): IC502, TR204 and TR206.
Microwave chassis: YIG tuned oscillators.

This material, when in the form of fine dust or vapour and inhaled into the lungs, can cause a respiratory disease. In its solid form, as used here, it can be handled quite safely although it is prudent to avoid handling conditions which promote dust formation by surface abrasion.

Because of this hazard, you are advised to be very careful in removing and disposing of these components. Do not put them in the general industrial or domestic waste or despatch them by post. They should be separately and securely packed and clearly identified to show the nature of the hazard and then disposed of in a safe manner by an authorized toxic waste contractor.

WARNING - Lithium

A Lithium battery (or a Lithium battery contained within an IC) is used in the following components in this equipment:

Rear panel battery compartment

Lithium batteries present two types of hazards:

As Lithium is a toxic substance, the battery should in no circumstances be crushed, incinerated or disposed of in normal waste.

Do not attempt to recharge this type of battery. Do not short circuit or force discharge since this might cause the battery to vent, overheat or explode.

WARNING - Beryllium copper

Some mechanical components within this instrument are manufactured from beryllium copper. This is an alloy with a beryllium content of approximately 5%. It represents no risk in normal use.

The material should not be machined, welded or subjected to any process where heat is involved.

It must be disposed of as "special waste".

It must NOT be disposed of by incineration.

CAUTION - STATIC SENSITIVE COMPONENTS

The presence of static sensitive devices is indicated in the equipment by labels bearing the appropriate symbol (see page iv). Certain handling precautions must be observed to prevent these components being permanently damaged by static charges or fast surges.

(1) If a printed circuit board containing static sensitive components (as indicated by a warning label) is removed, it must be temporarily stored in a conductive plastic bag.

(2) If a static sensitive component is to be removed or replaced the following anti-static equipment must be used:

A work bench with a grounded conductive surface.

Metallic tools grounded either permanently or by repeated discharges.

A low-voltage grounded soldering iron.

A grounded wrist strap and a conductive grounded seat cover for the operator, whose outer clothing must not be of man-made fibre.

(3) As a general precaution avoid touching the leads of a static sensitive component. When handling a new one, leave it in its conducting mount until it is required for use.

(4) If using a freezer aerosol in fault finding, take care not to spray programmable ICs as this may affect their contents.

CAUTION - IC REMOVAL

Damage can be caused if an IC mounted in a PLCC (plastic leaded chip carrier) is removed without the use of a special tool. This tool is available from Marconi Instruments Service Division (address on rear cover), part no. WP02.

CAUTION - CLEANING OF LCD WINDOW

The LCD window should be cleaned by wiping a slightly damp, soft, lint-free cloth gently over the surface. To remove grease or smears, use a clean, cotton cloth moistened with Heptane. No other cleaning agents should be used. Clean the window using either horizontal or vertical strokes, NEVER a circular action.

CAUTION - TILT FACILITY

When the instrument is in the tilt position, it is advisable, for stability reasons, not to stack other instruments on top of it.

CAUTION - FAN FILTER CLEANING

This instrument is cooled by a fan whose filters are fabricated from wire gauze. The fan must be removed and cleaned periodically. Clean with a suction cleaner and, if necessary, with hot soapy water. Do not use a solvent cleaner.

CAUTION - PRECISION CONNECTOR

The precision connectors fitted to this equipment may be damaged by mating with a non-precision type. Damage to the connectors may also occur if the connector interface parameters are not within specification. This should be checked with an appropriate gauging tool. Refer to Chapter 2 of the Operating Manual for further information on connector care.

Chapter 1
TECHNICAL DESCRIPTION

CONTENTS

LIST OF FIGURES

INTRODUCTION

The description which follows is intended as an overview of the 6200B Series MTS hardware, and relates to the functional blocks of the instrument as shown in Figs. 1-1 to 1-3, which are simplified block schematic diagrams of the instrument. Fig. 1-1 illustrates the 6203B (10 MHz - 26.5 GHz) MTS; the 6201B (10 MHz - 8 GHz) and 6200B (10 MHz - 20 GHz) are subsets of this structure. The 6204B is illustrated in Fig. 1-2, which differs mainly in the microwave chassis. The 6202B is an RF Test Set, designed to operate up to 2 GHz. Most of the Microwave components are not therefore required, as reflected in the block diagram of Fig. 1-3.

Synthesizer

The synthesizer module is responsible for generating the RF signals in the range 10 MHz to 2 GHz, and also provides the means of controlling and phase-locking the YIG tuned oscillators (YTO) which generate signals above 2 GHz. In addition, it contains the frequency standard circuitry, the power level control circuitry and the frequency counter hardware. The synthesizer functions are carried out by the RF PCB, Control PCB, Timebase PCB and Frequency Standard PCB, but the operation of the synthesizer can be explained more effectively by not representing them separately on the block diagram.

The output of a 30 MHz voltage controlled crystal oscillator (VCXO) is divided down to give the various clock frequencies used within the synthesizer. This oscillator is phase-locked to a 10 MHz oven-controlled crystal oscillator (OCXO). If a 1 or 10 MHz external standard is selected, the VCXO is phase locked to that instead.

Two voltage controlled oscillators provide the coverage between 1 and 2 GHz. These are divided by 2 or 4 to give signals down to 250 MHz, and the 10 MHz to 250 MHz range is generated by a beat frequency oscillator (down converter). The synthesizer uses a programmable divider (using the Marconi Instruments patented fractional-N architecture) to allow high resolution whilst maintaining a high phase detector frequency. This permits a higher loop bandwidth and hence a faster settling time. A variable attenuator is used to control the level of the 10 MHz to 2 GHz signal, and the following amplifier boosts the signal to the required level.

The YTOs which generate signals above 2 GHz within the microwave chassis are sampled by a sampling gate mixer. The mixer is driven by a local oscillator signal provided by the divide-by-2 synthesizer path. The resultant IF signal is processed by a phase-locked loop circuit, whose output is used to drive the FM coils of the YTOs. This does not apply to the 6202B since there are no YTOs.

The sampling gate mixer is also used during frequency counter operation to generate an IF which is counted by the counter circuitry. If the signal is below 400 MHz direct frequency counting is employed (via the sampling gate).

Microwave Chassis

The microwave chassis is responsible for signal generation above 2 GHz by means of one or more YTOs. The number of YTOs depends on the instrument version; one for the 6201B, three for the 6200B and four for the 6203B and 6204B. The 8-12 GHz and 12-20 GHz oscillators are followed by discrete low pass filters to reduce harmonics. The 2-8 GHz oscillator contains an integral tracking filter.

A PIN switch (SP4T for 6200B/6201B, SP5T for 6203B/6204B) selects one of its inputs, which includes the 10 MHz to 2 GHz signal generated by the synthesizer. The switch can be set so that none of the inputs are selected, and no RF signal appears at the output connector. A broadband directional coupler separates out part of the signal from the YTOs (i.e. frequencies above 2 GHz), which is sampled by the sampling gate mixer and used for phase locking as described earlier. The through path of the coupler is followed by a broadband modulator which, together with the resistive pickoff (coupler on 6204B), diode detector and control circuitry in the synthesizer, form the levelling circuit. The modulator is set to minimum attenuation for frequencies less than 2 GHz, generated by the synthesizer. If fitted, the optional step attenuator is situated between the matching resistor and the RF OUTPUT connector.

When the frequency counter is in use, an SP2T switch routes the COUNTER input signal to the sampling gate, instead of the coupled YTO signal.

In the 6204B instrument (Fig. 1-2), the microwave chassis has additional components for the generation of signals between 26.5 and 46 GHz, i.e. a 13.25 - 23 GHz amplifier, a 23 GHz low pass filter and a frequency doubler. A DPDT PIN switch is used to switch these components into the RF path when RF signals in the range 26.5 - 46 GHz are required. A 46 GHz coupler and diode detector provide a levelling signal for outputs in the range 2 to 46 GHz; a resistive pickoff/detector is used for outputs below 2 GHz.

The 6202B is not required to generate frequencies above 2 GHz, so the microwave chassis does not contain any YTOs. The microwave chassis contains only a pickoff/switch assembly and a step attenuator, if this option is fitted. The pickoff/switch assembly contains a PIN diode switch to isolate the RF signal from the output connector when no RF output is required. This function is carried out by the SP4T (SP5T) switch in the other variants. A second PIN switch is used to isolate the COUNTER input from the sampling gate mixer when the counter function is not being used. The assembly also contains a resistive pickoff and diode detector, which provides a sample of the RF signal for use in the levelling circuit.

Digital PCB

The Digital PCB provides all the main control and processing functions of the MTS. The processor used is the T805 transputer which is a 32-bit floating point processor operating at 20 MHz. Associated with this are 4 MBytes of dynamic RAM. The instrument's firmware is located in a block of EPROM. Non-volatile memory is provided by a block of battery backed static RAM (NOVRAM) which contains such things as instrument settings stores, and a block of EEROM which contains the fundamental calibration data for the MTS. A battery backed real-time clock is also located on this board.

Other functional blocks provide the necessary control for the synthesizer module, Analogue PCB, Auxiliary Interface PCB and the keyboard.

Also located on the Digital PCB is the clock synchronisation circuitry. This consists of two phase-locked loops which lock the 20 MHz transputer clock and a 22 MHz clock for the data acquisition system to the 1 MHz reference clock generated from the frequency standard within the synthesizer.

Various input/output functions are handled by the Digital PCB including GPIB, PARALLEL PRINTER and VOLTAGE/CURRENT OUTPUT.

Analogue PCB

The Analogue PCB contains two main areas of circuitry; the data acquisition and the graphics.

The data acquisition consists of four differential amplifier chains for inputs A, B, C and D. Each chain has two gain stages with eight ranges, the range changing being under hardware control. A reference and calibration DAC allows automatic calibration of each gain combination on each of the four amplifier chains. A noise reduction filter is used for slow sweeps. Sample-and-hold circuits for each chain allow simultaneous sampling of data on all four inputs. Each sample-and-hold is then multiplexed in turn to a 16-bit audio ADC whose output is fed to the Digital board. The circuitry for input D is slightly different in that it also generates the necessary power sensor chopper amplifier and zero drive circuitry. The AUX INPUT connection is used to receive detector inputs from the 6210 Reflection Analyzer.

The graphics circuitry is based around the 82786 graphics processor which has three main functions. Firstly, its drawing processor implements a range of drawing commands. Secondly, its DRAM controller manages all the timing and refresh signals for the 1 MByte of video memory associated with the graphics system. Thirdly, its video controller generates the video sync signals for the optional external CRT monitor. Associated with the graphics processor is a second T805 floating point transputer and a further 1 MByte of DRAM. In addition to controlling the graphics processor the transputer performs many other processing functions. The colour palette and video drivers provide the RGB signals required by the external colour monitor.

The AUX DATA connection is used to transfer digital data between the MTS and the AUX DATA port of the 6210 Reflection Analyzer.

Auxiliary Interface PCB

The Auxiliary Interface PCB consists of three functional blocks under the control of the Digital PCB. It provides control circuitry for the microwave chassis PIN switches (SP2T and SP4(5)T) and the optional step attenuator; provides power for the 40 GHz amplifier in the 6204B; contains the interface circuitry for the external keyboard.

Dynamic Calibrator PCB

The Dynamic Calibrator PCB consists essentially of a variable gain amplifier in a digitally controlled levelling loop. This provides a variable power output that is used for calibrating the 6230A/L series EEPROM detectors. It can also generate the 50 MHz, 1 mW POWER REF signal used for calibrating the power meter sensors.

Floppy Drive Controller PCB

This PCB interfaces with the Digital PCB and the floppy disk drive, and is used to control floppy disk functions, such as motor on/off and reading/writing data.

LCD Interface PCB

The LCD Interface PCB contains an EPROM whose address inputs are provided by the graphics controller on the Analogue PCB. The EPROM contains the colour information required by the LCD module. The board also contains a crystal oscillator which provides a 25 MHz video clock for the graphics processor IC on the Analogue PCB.

Keyboard PCB

The purpose of the Keyboard PCB is to handle the keypad and rotary control interfaces. An 8031 microcontroller is used for the following: Detect keypresses and rotary control movement; handle multiple keypresses and key bounce; pre-process rotary control information; communicate the information to the Digital PCB transputer via a serial link. The keyboard software is contained in EPROM.

Colour Display

The display is a VGA TFT colour liquid crystal display, with a resolution of 640 by 480 pixels. A PCB mounted on the rear of the display converts a low voltage supply from the PSU into a high voltage, low current supply for driving the LCD backlight.

Power Supply Unit

The power supply is a switched mode unit and runs directly from the AC supply. After passing through a filter network the incoming AC supply is rectified and smoothed. The AC supply is also passed through a transformer to derive the power for the control circuitry. A PSU controller IC is used to generate a pulse width modulated waveform which drives the switching FETs. These FETs in turn switch the rectified mains line to the switching transformer. The outputs from the transformer secondaries are rectified and smoothed to provide the required output supplies for the instrument. Various status conditions are monitored within the PSU which drive status LEDs on the rear panel of the MTS. The AUX POWER connection is used to supply 25 V DC to the 6210 Reflection Analyzer.

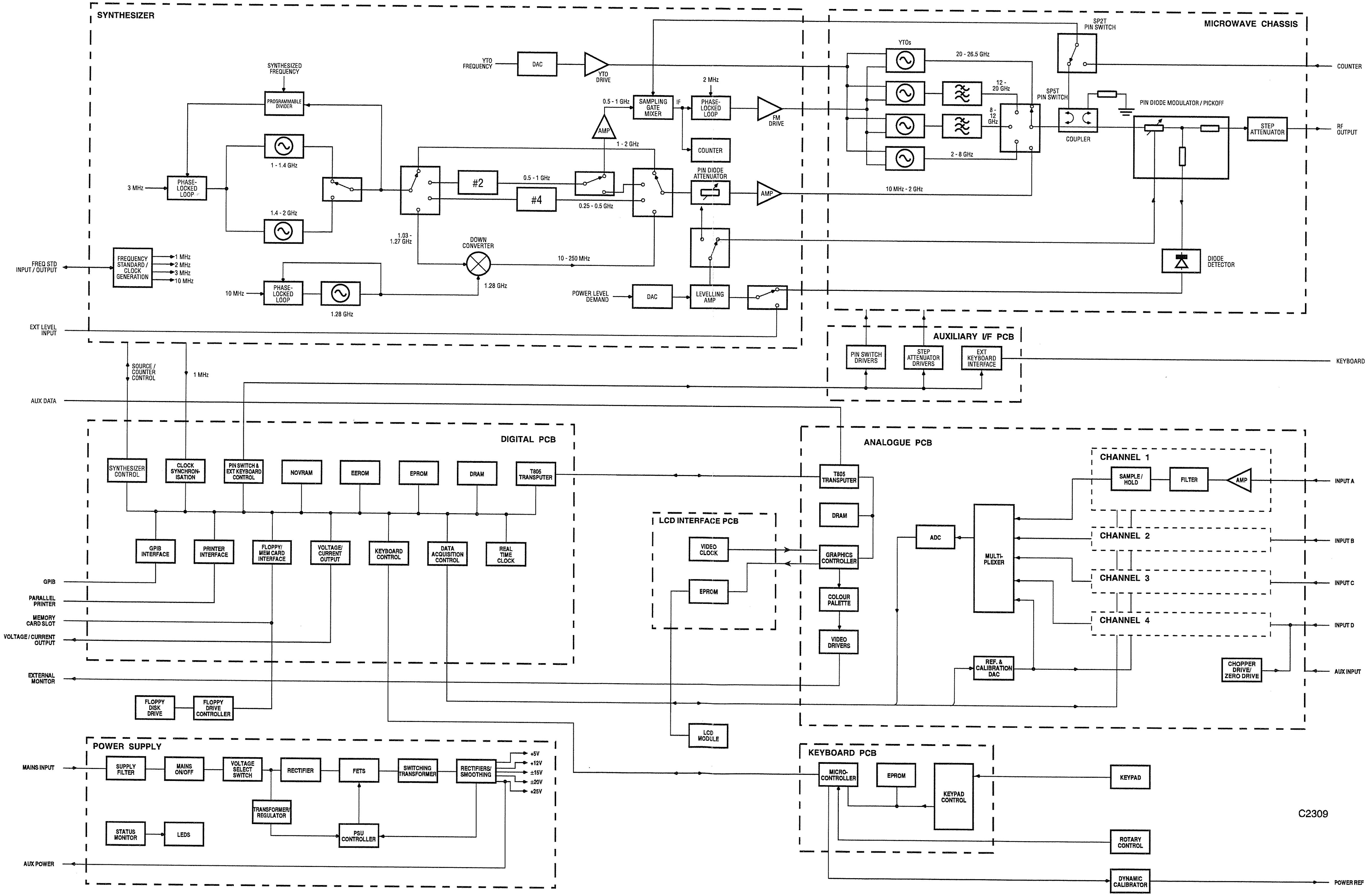


Fig. 1-1 Block Schematic Diagram of the MTS (6200B/6201B/6203B)

Block Schematic Diagram of the MTS 6200B/6201B/6203B

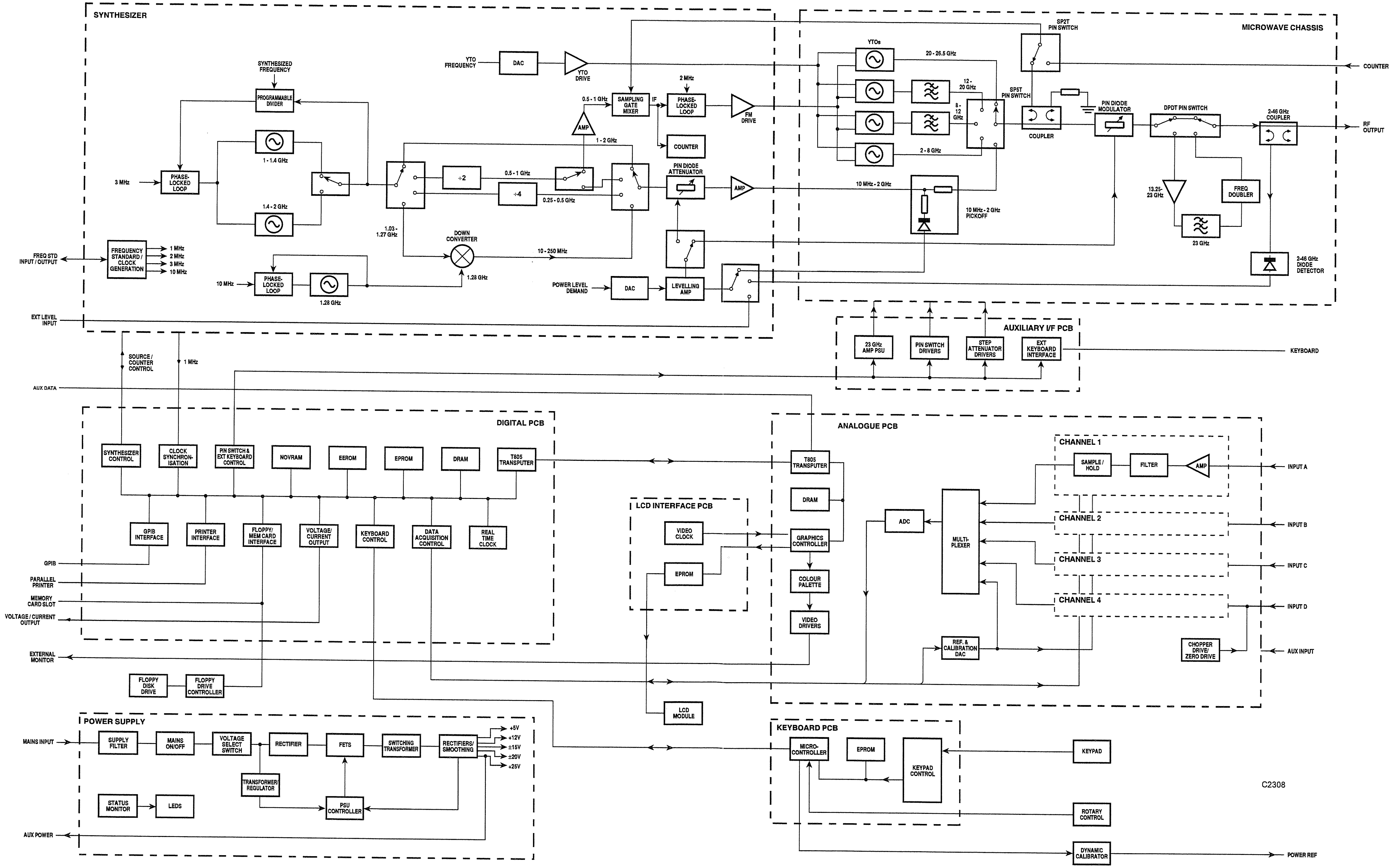


Fig. 1-2 Block Schematic Diagram of the MTS (6204B)

Block Schematic Diagram of the MTS 6204B

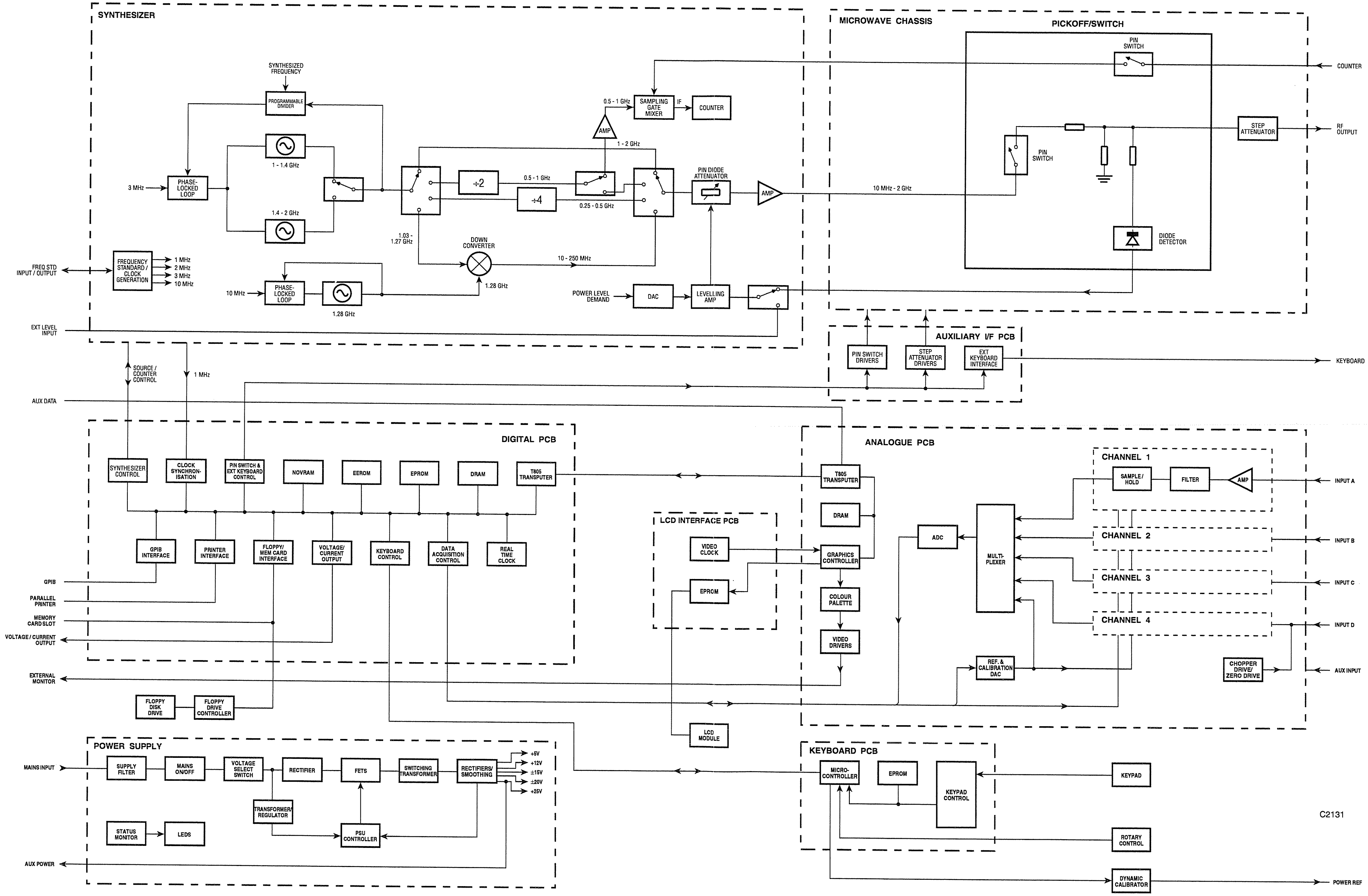


Fig. 1-3 Block Schematic Diagram of the 6202B RF Test Set

Block Schematic Diagram of the 6202B RF Test Set

SYNTHESIZER

Introduction

The synthesizer, together with the microwave chassis, forms the MTS source. The synthesizer performs the following functions:

(a) Signal generation in the range 10 MHz to 2 GHz.

(b) YTO tuning and phase-locking in the range 2 - 8 GHz, 2 to 20 GHz or 2 to 26.5 GHz, depending on the instrument. This does not apply to the 6202B, which does not contain YIG oscillators.

(c) Output level control.

(d) Frequency counter.

The synthesizer module comprises four PCBs: RF, Control, Timebase and Synthesizer Power Supply Filter. The first three boards are inside the synthesizer tray; the Synthesizer Power Supply Filter board is mounted on the outside of the tray. Although not physically part of the synthesizer module, the Frequency Standard PCB will be described in this section since it is part of the synthesizer function.

The RF and Control boards are mounted either side of a floor in the synthesizer tray, and power and control connections are made via a 26-way ribbon cable which passes through a slot in the floor. Coaxial connections are used for the two RF signals, and the BFO tuning voltage passes through a feedthrough capacitor. The Timebase board is mounted above the Control board; all interconnections are via a 34-way ribbon cable.

In addition to the four boards, there is a microwave sampling gate mounted on the synthesizer tray. This is used as a down-converter for phase-locking the YTOs and also when the source is used as a frequency counter.

Overall Description

Figs. 1-1 to 1-3 show the functional connections to the synthesizer. All YTO supplies and tuning signals come from the Control board, but the SP5T and SP2T switches are driven by the Auxiliary Interface board. The Auxiliary Interface board also supplies the drive signals for the pickoff/switch assembly in the 6202B.

The detector which is connected to the pick/mod (combined PIN diode modulator and pickoff) is used for levelling over the full frequency range of the instrument. In a 6204B instrument, a 46 GHz diode detector is used for levelling above 2 GHz, and a 2 GHz pickoff is used below 2 GHz. Alternatively, the source can be levelled remotely using an external detector or power meter. The modulator in the pick/mod is only used above 2 GHz as it would generate excessive harmonics at lower frequencies. Below 2 GHz it is reverse-biased and a modulator on the RF board is used. This modulator is used for levelling in a 6202B instrument.

The SP2T switch connects a sampling gate mixer to either the 16 dB coupler for YIG locking, or a front panel connector (COUNTER) for frequency counting. In the 6202B, a switch within the pickoff/switch assembly isolates the sampling gate from the COUNTER input when the frequency counter is not required.

Fig. 1-4 is a simplified block diagram of the synthesizer tray, showing the main functions performed on each board. Nearly all connections with the rest of the instrument are via the Control board, the exceptions being the RF output from the RF board, the sampler RF input and the +5.1 V and +15 V supplies via the Synthesizer Power Supply Filter board.

The RF board generates output signals in the range 0.01 - 2 GHz, and also provides 0.5 - 1 GHz LO drive for the sampling gate. Two 1/2-octave VCOs cover the range 1 - 2 GHz. The VCOs' output is divided by 2 or 4 to extend the range down to 250 MHz. Coverage down to 10 MHz is achieved by mixing 1.03 - 1.27 GHz with the output from a 1.28 GHz BFO (beat frequency oscillator). A PIN diode modulator is followed by the output amplifier. The sampler drive is provided by a separate amplifier in the divide-by-2 path.

The dividers and phase comparators used to lock the VCOs are located on the Control board. The 1 - 2 GHz synthesizer uses fractional-N division to give high resolution with a single loop. A single YIG tune DAC is used; its output is switched into one of four drive amplifiers.

The level DAC output is compared with the voltage from either a detector on the microwave chassis or an external detector/power meter. The levelling loop is completed by either the modulator on the microwave chassis, or the modulator on the RF board for output frequencies below 2 GHz.

The YTOs are locked to harmonics of the sampler drive frequency. The IF signal from the sampler is filtered, amplified and divided by 64, then compared with a 2 MHz reference. The resultant error signal is amplified and applied to the YTO FM coils. The frequency counter works by counting IF frequencies derived from the sampler drive and input frequencies.

The control interface for the synthesizer tray is between the Control board and the Digital board, via a 34-way ribbon cable. The Control board also monitors a number of voltages and status lines for calibration and diagnostic purposes.

The synthesizer tray uses 1, 2, 3 and 10 MHz as reference frequencies. These are derived from a 30 MHz VCXO on the Timebase board. When the MTS is set to internal standard, the VCXO is locked to an oven-controlled crystal oscillator (OCXO) on the Frequency Standard PCB, and a 10 MHz output is provided on the rear panel (FREQ STD INPUT/OUTPUT). Alternatively, the VCXO can be locked to a 1 or 10 MHz external standard. A 1 MHz signal is sent to the Digital board, to lock the other frequencies used in the instrument.

RF PCB

Introduction

The RF board is required to generate signals between 10 MHz and 2 GHz at levels between -10 dBm and +7 dBm (+6 dBm for 6204B) at the front panel RF OUTPUT connector. Between the RF board and the instrument front panel there is the microwave chassis, which is used to generate signals above 2 GHz. The microwave chassis has an insertion loss of between 3 dB and 8 dB for signals between 10 MHz and 2 GHz. To ensure the correct front panel output level, the RF board must be capable of compensating for this loss. This gives a required RF board output power level between -7 dBm (-10+3) and +15 dBm (+7+8). The harmonic requirement of the output is -30 dBc, and this must be met over all of the previously derived output power level range. The simplified block diagram of Fig. 1-4 illustrates the various blocks which comprise the RF board.

The frequency range of the RF board is divided into a number of bands as shown below:

Mixer band	10 MHz - 250 MHz
÷4	250 MHz - 500 MHz
÷2	500 MHz - 1 GHz
Direct	1 GHz - 2 GHz

With the exception of the mixer band, each of these bands is again split into two bands each covering a half octave. This is because there are two VCOs on the RF board, each covering a half octave instead of a single VCO covering a whole octave, which would be harder to achieve. The ÷2 and ÷4 bands use pre-scalers to divide the 1 - 2 GHz signal from the VCOs by 2 or 4 to produce frequencies between 250 MHz and 1 GHz. Within the mixer band a signal from the lower 1/2 octave VCO is down converted by a mixer and local oscillator (BFO); filtering is then used to remove unwanted mixer products.

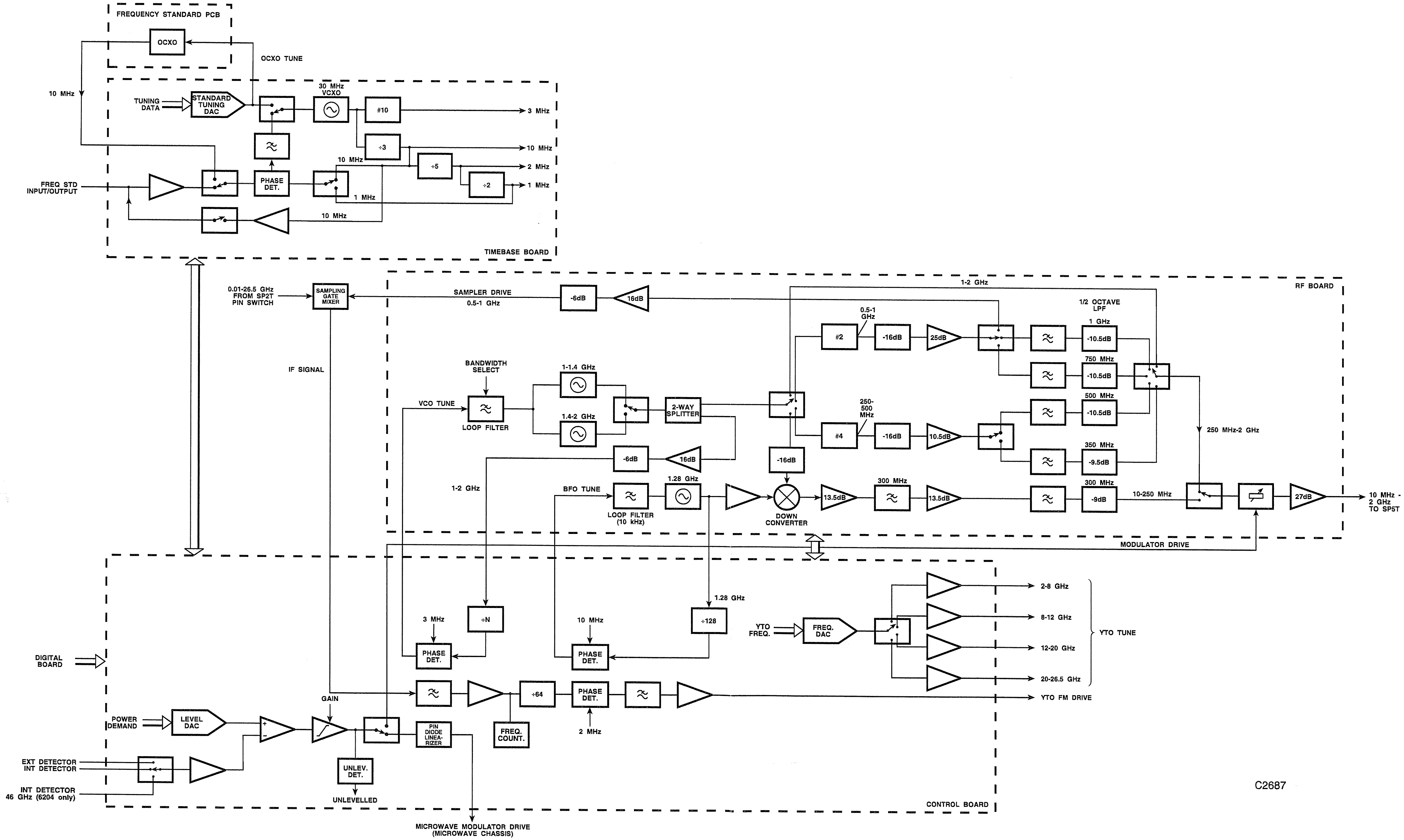


Fig. 1-4 Synthesizer

Synthesizer

Hence the total number of bands is shown below:

Mixer band	10 MHz - 250 MHz
÷4 lower 1/2 octave	250 MHz - 350 MHz
÷4 upper 1/2 octave	350 MHz - 500 MHz
÷2 lower 1/2 octave	500 MHz - 700 MHz
÷2 upper 1/2 octave	700 MHz - 1.0 GHz
Direct lower 1/2 octave	1.0 GHz - 1.4 GHz
Direct upper 1/2 octave	1.4 GHz - 2.0 GHz

VCOs

Circuit diagram: Fig. 7-9.

Two VCOs are used to give the required coverage of 1 - 2 GHz. Microwave amplifiers are used to increase the output level of the VCOs, and each oscillator has a low-pass filter to reduce unwanted harmonics.

Oscillators

In order to achieve the required coverage of an octave, two VCOs are used which together produce a signal between 1 GHz and 2 GHz, each VCO operating over half an octave. The first VCO, consisting of TR101 and associated circuitry, covers 1 GHz to 1.4 GHz, while the second, consisting of TR102 and its associated circuitry, covers 1.4 GHz to 2 GHz. These oscillators use a negative resistance technique to produce a sustained oscillation.

The base inductance L101 combined with internal transistor feedback makes the resistive component of the impedance looking into the emitter appear negative above a certain frequency. Hence power gain is available above this frequency. The tuned circuit consisting of L104, C105 and varactor D101 determine the frequency of oscillation. R106 to R108 form a 12 dB pad which helps to buffer the VCO from the following circuitry.

A microwave amplifier (IC101) running into compression is used to produce a constant output level over the VCO's operating frequency range. This level is reduced by the 3 dB pad (R136 to R138) to the required level. A printed low-pass filter (FL101) reduces harmonics of the wanted frequency to less than -40 dBc.

The second VCO, which consists of TR102 etc., is very similar to the first, but requires two varactor diodes to give the necessary frequency coverage.

These oscillators are referred to as the lower and upper half octave respectively. Only one of these oscillators is required to be on at a particular time. Transistors TR103/105 (for the lower half octave) and TR104/106 (for the upper half octave) are used to switch on the appropriate oscillator, as required by the Control board. D104 and R122 form a simple change-over switch which is used to route the signal from the selected oscillator through to the following common circuitry. This circuitry consists of a power splitter (R125 etc.), amplifier (IC105) and 6 dB pad (R142 etc.).

The output from R126, labelled "1-2 GHz RF", represents the major output, which is used by following circuitry to produce signals between 10 MHz and 2 GHz. The output from the 6 dB pad is routed via SKD to the Fractional-N loop on the Control board for locking purposes.

Direct and Divider Bands

Circuit diagram: Fig. 7-11.

To produce signals between 1 and 2 GHz, the output of the appropriate VCO is simply amplified/attenuated to the correct level.

To produce signals between 250 MHz and 1 GHz, two frequency dividers are used on the 1 - 2 GHz signal from the oscillators; a divide-by-2 and a divide-by-4. Four low-pass filters are used to reduce the level of harmonics on the output of these dividers; PIN diode switches are used to select the appropriate filter. Individual pads after each filter provide flexibility in setting the output levels of each of the divided frequency bands.

Direct Band Path

PIN diode package D302 is used to switch between the mixer band and the direct band; D301 is used to switch between the divide-by-2 band and the divide-by-4 band. Only one of these four bands can be selected at any one time, hence only one diode in these two diode packages can be biased on; the other three will be biased off. (One diode in each of these two packages is unused and has simply been bypassed.) The output of IC306 goes to almost +15 V to select the direct band path, which is via forward biased diodes in each of packages D302, D310, D311 and D304.

When the mixer or divider bands are selected, the isolation of this path is critical in determining the spurious or harmonic performance of the output respectively. Also, because of the large physical separation of D310 and D311 (approx. 11 cm), the microstripline which forms this path will have a resonance somewhere between 1 and 2 GHz.

To de-select this path, the output of IC306 goes to -15 V, which switches on shunt diodes D303 and D304. The previously forward biased diodes will now be reverse biased and vice-versa, hence a large amount of isolation will be provided. R333 and R334 are designed to terminate the microstripline when de-selected so that resonances are suppressed.

Dividers

IC301 divides the 1 - 2 GHz signal by two when selected by IC203D, TR303 and TR304, which close the switch consisting of 1/2 D301. IC203D is required to decode the control lines 1/2-1GHzX and SAMPLER DRIVE, because this divider is used in the 0.5 - 1 GHz band and also for production of the drive signal required by the sampling gate, which is used for YIG locking and frequency counting. R304, R337 and R338 form a 6 dB pad which ensures that the input level to the divider is within its limits. When these dividers have no input signal it is possible for self-oscillation to occur; this is prevented by TR304 and R304, which bias the input stage of the divider into a stable region when not in use.

IC302 divides the 1 - 2 GHz input signal by four when selected solely by the 250-500 MHz control line. Baluns T301 and T302 are used to convert the balanced ECL output of these dividers into a single ended output. The level of this output is approximately -8 dBm. The baluns are followed by microwave amplifiers running into compression to both raise and flatten the signal level as the output of the dividers reduces with increasing frequency. These amplifiers are switched off when not in use in order to reduce power consumption and heat generation.

Filters

The circuitry between D308 and D306 consists of two Chebyschev low-pass filters each terminated with a 10.5 dB pad. These filters form the path for signals between 500 MHz and 1 GHz, each used over half an octave. These filters are necessary in order to reduce harmonics of the chosen frequency. Similarly, the filters between D307 and D305 form the path for signals between 250 MHz and 500 MHz. However, the pads following these filters are only 9.5 dB as the output level of IC304 is lower than that of IC303.

IC203, 305 and associated circuitry provide decoding of the control lines and buffering to switch in the appropriate filter. The diodes at each end of the filter/attenuator constitute switches which are switched on/off together. The capacitors in series with the shunt arms of each pad are necessary for decoupling at RF since the DC control signal for the switches is injected here.

Mixer Band.

Circuit diagram: Fig. 7-12.

To generate signals between 10 MHz and 250 MHz, a down converter is used, which consists of a mixer and a beat frequency oscillator (BFO). A signal between 1.03 GHz and 1.27 GHz, supplied by the lower half octave VCO, is mixed with a fixed 1.28 GHz signal supplied by the BFO, to produce an IF signal between 10 MHz and 250 MHz. Filtering of this IF signal reduces unwanted spurious signals to acceptable levels.

Beat Frequency Oscillator

TR401 is the oscillator transistor tuned by the tank circuit consisting of L404, D401 and C403. This oscillator is similar to those described in 'VCOs', and functions in a similar fashion. The output level at TR401 collector is approximately +7 dBm. Unlike the VCOs, this oscillator is locked at a constant 1.28 GHz by a conventional phase locked loop resident on the Control board.

The loop filter consists of R418, C423 and C424 to give a loop bandwidth of approx. 10 kHz. A Zener diode D402 limits the tuning voltage to 12 V. This prevents the oscillator from oscillating much above 1.35 GHz, ensuring correct operation of the frequency divider in the phase locked loop on the Control board. A splitter consisting of R405 to R409 is used to provide the Control board with a small amount of the output - approximately -17 dBm. This is used to lock the BFO to the correct frequency. The major output of approximately -3 dBm is amplified by IC401 to provide the mixer X401 with approximately +8 dBm.

Down Converter.

The mixer X401 is used to down convert the 1.03 - 1.27 GHz input down to 10 - 250 MHz by mixing it with a fixed 1.28 GHz. The conversion loss of this process is approx. 8 dB. The source of the 1.03 - 1.27 GHz is the lower half octave VCO delivering approximately +2 dBm just before the -16 dB pad provided by R422-R424. TR412 and associated components form a 13.5 dB amplifier.

A 300 MHz low-pass filter immediately follows this amplifier to reduce spurious mixer products and breakthrough of mixer input signals. This is followed by another identical amplifier and filter to provide additional amplification and rejection. The final output of the down converter (10-250 MHz RF) goes to the attenuator and output amplifier. To reduce heat and power consumption, the BFO and down converter are only switched on when required. This is accomplished by TR409/410 etc., whenever the control signal 10-250 MHz is true.

Attenuator and Output Amplifier.

Circuit diagram: Fig. 7-10.

A voltage controlled attenuator is used before the amplifier in order to deliver the correct amount of power to the load. This attenuator provides typically 45 dB of range up to 2 GHz, and introduces less than -40 dBc of distortion at 10 MHz and -5 dBm.

The output amplifier is required to provide a substantial amount of gain and output power with low distortion. This amplifier's gain is typically 27 dB ±1 dB up to 2 GHz and distortion less than -30 dBc for output levels up to +15 dBm.

Input Selection

There are two inputs to the attenuator/amplifier; one is from the down converter (10-250 MHz RF) and the other is the combined outputs of the direct and divider bands (1/4-2 GHz RF). A PIN diode changeover switch (D206,207) is used to route the appropriate signal through to the attenuator and amplifier. IC204 is used as a comparator to level shift the output of IC203b, which represents 1/4-2 GHz valid, and to switch on the appropriate diodes which comprise this switch. The 10-250 MHz input has a 9 dB pad before the switch, which is required to terminate the filter in the down converter.

Voltage Controlled Attenuator

The attenuator uses PIN diodes D208 and D209 as current controlled variable resistors in a PI configuration. (The PI configuration exhibits much lower distortion and more range than a T configuration.) IC205 and IC206 etc. ensure that each PIN diode in the attenuator has the correct current and hence the correct RF resistance for any given input control voltage (LEVEL). The insertion loss of the attenuator at minimum attenuation is approximately 3 dB (flat) up to 1 GHz, increasing to 4 dB at 2 GHz.

Output Amplifier

In order to give the required gain and gain flatness to 2 GHz the amplifier consists of four gain stages. These four stages of gain are provided by IC202, TR202, TR204 and TR206. The gain of each of these stages is given below:

IC202:	8 dB
TR202:	6 dB
TR204:	6 dB
TR206:	7 dB
TOTAL:	27 dB

IC202 is a standard microwave amplifier, and the three transistor stages are standard feedback amplifier configurations. A 1 pF capacitor on the base of TR206 and a short/open circuit stub on the collector output line of TR206 help to improve the gain flatness at the top of the frequency range. The output of the amplifier is routed to the microwave chassis via SKF.

To reduce power dissipation, the amplifier is switched off when not in use. Transistors TR213, 201, 203, 205 are used to switch the individual stages on. IC203a,b,c is used to decode the control lines for each of the bands so that the amplifier can be switched on whenever any one of these control lines is true.

Sampler Drive Amplifier

Circuit diagram: Fig. 7-12.

This amplifier produces the necessary gain and output power for the drive signal between 500 MHz and 1 GHz as required by the sampling gate, which is used for locking YIGs and for frequency counting. The drive signal is derived from the divide-by-2 pre-scaler (Fig. 7-11). An input level of more than +10 dBm ensures that the first amplifier, IC501, is well into compression (gain > 10 dB, 1 dB gain compression level < 18 dBm).

The second stage, IC502, has only 8.5 dB gain typically and 23 dBm compressed output level. Again, this stage is well into compression. Resistors R508 and R509 form an inverted-L attenuator, which helps to match the output of IC502 to the input of the sampling gate and also ensures that the correct power level reaches the sampling gate.

To conserve energy and reduce heat, this amplifier is switched off when not used. TR501-503 are used to switch the amplifiers on and off as required by the SAMPLER DRIVE RF line, which carries both the RF signal and the DC control signal.

UHF Reference and Loop Filters

Circuit diagram: Fig. 7-9.

The UHF PLL (Phase Locked Loop) operates with a 3 MHz reference frequency; this is the highest easily-derived frequency which allows all frequencies above 1 GHz to be generated by the Fractional-N synthesizer. In sweep mode the loop bandwidth is about 50 kHz, for fast settling. In CW mode the loop bandwidth is about 2 kHz, to reduce fractional-N products.

Filters and Loop Bandwidth Switching

The phase comparator drives a switched current source, located on the Control board. When the loop is locked the current source output is a square wave: ±2.5-5 mA in sweep mode and ±250-500 µA in CW mode.

In sweep mode, the reference filter (bounded by C601 and C603) has 415 kHz bandwidth. The loop filter is formed by R603 and C604. In CW mode the VCO tuning signal also passes through the 8 kHz filter bounded by C605 and C608, and the loop filter comprising R604, C609 and C610. Two electrolytic capacitors, connected back-to-back, are used in case the tune line goes negative. Two inductors are used for each filter element, fitted back-to-back to minimise magnetic pick-up from the PSU and display. IC602b, IC602c and IC602d select or bypass the 8 kHz low-pass filter for low or high bandwidth respectively.

Force VCO Tune

The programmable divider on the Control board is not guaranteed to work for input frequencies above 2 GHz. Also, it can oscillate if it has no input signal. However the VCOs may stop oscillating if the tuning voltage is too low, and the 1.4 - 2 GHz VCO can oscillate above 2 GHz. Both of these conditions must be avoided or the loop may latch up and fail to lock.

To prevent this happening, the VCO varactor voltage is forced to a value in the middle of its range (about 10 V) for a short period every time a byte is written to the fractional-N ULA. This is done by IC601a and IC602a, and the period is set by IC603. For high bandwidth the pulse width is 10 µs and for low bandwidth it is 1 ms. The longer period is needed to charge C609 and C610.

Loop Gain Compensation

The PLL bandwidth is proportional to the VCO sensitivity and inversely proportional to the frequency. Over the half-octave tuning range the sensitivity of each oscillator reduces by about 1.4. Thus without any compensation the loop bandwidth at the top of each VCO band would be about half what it was at the bottom.

The nominal tuning voltage range for the VCOs is from 2 to 15 V. IC601b and its associated resistors produce -7.8 to -10.1 V for 2 to 15 V input. This is fed back to the tail of the switched current source (Control PCB, Sheet 7), varying its current output by a factor of two and hence maintaining a roughly constant loop bandwidth.

VCO Tuning Monitor

IC601c, etc. gives an output in the range 0 to +5 V for varactor voltages in the range 0 to +25 V. This is routed to the ADC on the Control board for diagnostic purposes.

CONTROL PCB

Introduction

The Control board performs the following functions:

- YIG tuning and bias switching.
- Output levelling in both synth. and YIG bands.
- Fractional-N division, locking and control of the UHF synthesizer.
- Locking the BFO.
- Sampler IF processing (amplification, ALC, filtering, switching, etc.).
- YTO locking.
- Frequency counting.
- Bi-directional interface with the digital board; decoding source control instructions, monitoring and reporting various voltages and status signals.

References to YIG oscillators and associated circuitry do not apply to the 6202B, since it does not contain any YIG oscillators. The functional blocks of the Control board are shown in Fig. 1-4.

YIG Tuning and Bias Switching

Circuit diagram: Fig. 7-52, 7-54, 7-59.

The YIG oscillators are current tuned. For the 2 - 8 GHz, 8 - 12 GHz and 12 - 20 GHz oscillators, the sensitivity is approximately 20 MHz/mA. For the 20 - 26.5 GHz YTO it is about 30 MHz/mA.

A P-channel/N-channel MOSFET pair is used as the output stage of the YTO driver. R207 is a current sense resistor; the transconductance of the driver is defined by R201, R205 and R207. Low temperature coefficient resistors are used to minimise tuning current variation with temperature. IC213 is a 16-bit DAC; thus the nominal tuning sensitivity is 1 LSB = 500 kHz below 20 GHz, and 750 kHz above 20 GHz.

C213 is connected across the YIG tuning coil (the CW filter) to reduce residual FM due to noise on the tuning current. It slows down the driver however, so it can only be used in CW mode or with very slow sweeps.

Component numbers in the following description refer to the 2 - 8 GHz driver; all drivers are identical. The driver is selected by IC203. When not selected, the tuning current is zero, due to R208. D204 and D205 limit the back e.m.f. when the driver is switched off. The 36 V Zener (D205) speeds up the collapse of tuning current, during retrace, etc.

A logic high at R210 turns on the CW filter. TR201 and TR202 act as a level shifter to provide gate bias to switch TR207 and TR208 on and off. D208 limits V_{gs} on TR207 and TR208.

All tuning currents are returned via the current sense resistor R207.

The circuitry round IC221 and TR220 provides a regulated -18 V supply for the YTO drivers. The drivers need a clean supply because of the tuning sensitivity of the YIGs; it should also be as high a voltage as is practical, as the current slew rate and hence the sweep speed, are limited by the available voltage and the tuning coil inductance.

In order for the YIG loop to lock, only one YTO at a time must be powered (the heaters are powered continuously to maintain the YIG temperature). The +15 V bias is switched by TR951-TR954. Quad comparator IC952 is used as a level shifter to derive gate bias voltage from the logic-level band select lines. The 2 - 8 GHz YTO also requires -5 V bias; this is supplied by IC951.

Output Levelling

Circuit diagram: Fig. 7-53, 7-54.

A simplified representation of the levelling loop circuitry is shown in Fig. 1-4. IC218 selects internal or external detector; either polarity of external input can be selected. IC219 and IC220 are connected as a differential amplifier with a gain of 19 and a high CMRR. This configuration is used in order to minimise residual AM at low power levels, when the detector voltage is very small.

IC220 output is compared with the output of the 16-bit level DAC IC214 to produce an error voltage, which is amplified by IC204. A small offset voltage is applied via R235. This ensures that the output of IC204 will be negative if the DAC voltage and detector voltage are zero, and therefore guarantees that a DAC code of zero will give maximum attenuation.

IC210 is an integrator with different switched gains, controlled by IC209. The settling time is determined by the loop bandwidth, which is the frequency at which the open-loop gain equals 1. There is considerable variation in maximum output power, even within each band, so the slower the loop settles, the more ripple there will be on fast sweeps. It is therefore important to keep the loop gain as high as possible. In general, settling is slowest at low output powers.

Normally C232 is not connected. Below 2 GHz R242 is selected. Above 2 GHz or with an external detector, R243 and R241 are selected (the FET TR104 is only present on later instruments). R243 is adjusted for the fastest settling consistent with loop stability. If a power meter is used for external levelling, it will have a much longer response time than a detector, so the overall loop bandwidth must be reduced to prevent instability. R240 and C232 are then selected.

In between points in a sweep, the input is disconnected from IC210 to hold the modulator setting until the frequency has almost settled. This is done by a logic high on the LEVEL HOLD input, which sets pin 9 of IC205 high. IC205 decodes the control lines which determine the levelling loop mode.

IC211 selects the appropriate modulator. In the YIG bands the modulator on the RF board is driven with +15 V via R249, which gives maximum attenuation. Below 2 GHz the input to IC216a is pulled negative by R247. This sets the microwave modulator to minimum attenuation, hence giving minimum distortion on the low frequency signals passing through it. When maximum attenuation is required (for AC detection, etc.), IC216a input is pulled positive by R248.

IC216b and its associated circuitry is used to compensate for the non-linearity of the microwave modulator, and hence to reduce the worst-case settling time. The P-N junction (IC222b) gives IC216b an exponential gain characteristic, which increases the gain as the input becomes more positive, ie. when more attenuation is required. IC222c, IC216c, etc. produce an offset which matches the voltage drop across IC222b.

The microwave modulator is current driven; this gives less non-linearity than voltage drive. IC216d is connected as a unity-gain differential amplifier to feed back the voltage developed across the sense resistor R290. This configuration enables a grounded load to be current driven.

The 'unlevelled' detector is a window detector. If IC210 output goes outside the range ±9.9 V, the output of IC212b goes high.

Fractional-N Synthesizer

Circuit diagram: Fig. 7-57, 7-58.

Fig. 1-5 is a block diagram of the fractional-N synthesizer. The system used provides fine frequency resolution without needing analogue correction or compromising the phase detector speed.

The 1 - 2 GHz input at SKK passes through a 6 dB pad, a buffer amplifier (IC509) and a 6 dB pad to provide reverse isolation, before reaching the pre-scaler, IC510. This, in conjunction with buffering on the RF board, ensures that sub-harmonics, etc. generated by IC510 are kept below -60 dBc on the output signal. IC510 divides the input frequency by four, since IC511 is only specified to 500 MHz.

IC502 and IC503 are connected to form a 5-bit programmable counter (/N1), and IC504 is a 3-bit programmable counter (/N2). N1 and N2 are set by the fractional-N controller ULA, IC501. R502-509, R511 and R512 convert the CMOS output levels from IC501 to the ECL voltages needed for the load inputs of IC502-504.

At the start of a count, IC511 divides by 9. When IC504 reaches terminal count, it disables itself and sets IC511 to divide by 8. The count continues until IC502 and IC503 reach terminal count, at which point the new values of N1 and N2 are loaded via IC505d. The overall division ratio is therefore 4(8N1 + N2). The terminal count of IC502 and IC503 also clocks the phase comparator input IC507 pin 11, via the level shifter formed by TR501, TR502, etc. When the new value of N1 is loaded, IC501 is clocked via IC505b, IC505c, TR503 and TR504 to output the next values of N1 and N2.

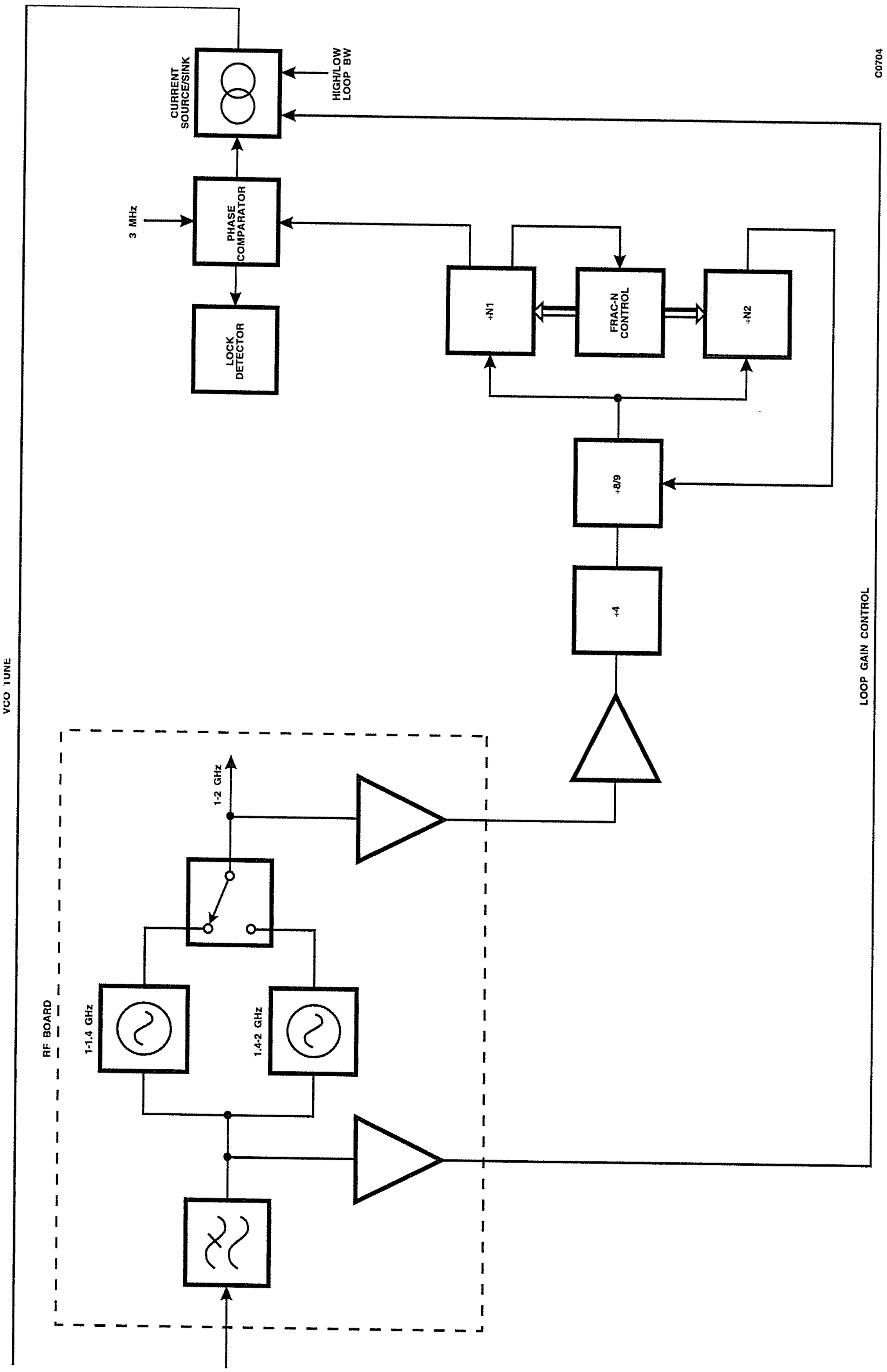


Fig. 1-5 Fractional-N Synthesizer

IC506a, IC507b and IC508 form a 4-state phase comparator which is run at 3 MHz. The synthesizer produces fractional-N related phase noise which increases in amplitude with increasing offset from the carrier, and whose spectrum is proportional to the loop reference frequency. It is removed by means of a low-pass filter on the VCO TUNE line. The higher the reference frequency, the higher the loop bandwidth can be made (giving faster settling) without incurring significant fractional-N products. 3 MHz is the highest simple frequency which gives full coverage of the 1 - 2 GHz range with the divider configuration used.

The circuitry comprising IC506b, IC507a and TR505 forms a lock detector. If more than π radians of phase error accumulates, TR505 is switched on.

TR506, TR507, TR508 and their associated components act as a symmetrical current source/sink, which is switched by the complementary phase detector outputs. IC512 switches the magnitude of the sourced/sunk current, and hence the loop gain, by a factor of 10. A negative voltage derived from the VCO tuning voltage is fed back at PLB pin 8. This causes the output current to increase with increasing VCO voltage, and helps to compensate for the effect on loop bandwidth of divider ratio and variation in VCO sensitivity. For 5 - 15 V tuning voltage, the current is ±(250 - 500) µA or ±(2. 5- 5) mA. The switched-current output is filtered on the RF board to derive the VCO tuning voltage.

The loop gain switching, combined with further gain and filter switching on the RF board, gives a loop bandwidth of either 1 - 2 kHz or about 50 kHz. Low loop bandwidth is used in CW mode to give reasonable phase noise. In swept mode, high loop bandwidth is selected to give fast settling (within 100 kHz in 250 µs at all frequencies up to 26.5 GHz).

BFO Phase-Locked Loop

Circuit diagram: Fig. 7-53.

The BFO is a VCO on the RF board, which is locked to 1.28 GHz by circuitry on the Control board. The RF input frequency at SKL is divided by 64 by IC401, to give 20 MHz. When the BFO is turned off, the input to IC401 is biased via D401 to prevent self-oscillation. TR401 and TR402 convert the differential ECL output from IC401 to a CMOS compatible level. IC402a divides the 20 MHz by two.

IC403 and IC404 form a 4-state phase comparator which is run at 10 MHz. When the BFO is locked, IC404 pin 6 and IC404 pin 8 give complementary 10 MHz outputs, whose mark/space ratio depends on the phase relationship between the two inputs to the phase comparator. The circuitry comprising IC405 and TR406 forms a lock detector, which gives a logic high output if more than π radians of phase error is accumulated.

TR403-405 and their associated components act as a switched current source/sink, giving +3 mA output at SKM. This is filtered on the RF board to derive the BFO tuning voltage. The loop bandwidth is about 10 kHz, which gives the best compromise between VCO noise and divider noise.

When the BFO is turned off, TR403 base is pulled low via D401, forcing the tuning voltage down to 3 V. This ensures that when the BFO is turned on, it starts oscillating at a low frequency. This prevents the latch-up which could otherwise occur, as IC401 is only guaranteed to work up to 1.3 GHz.

Sampler IF Amplifier and Filters

Circuit diagram: Fig. 7-60.

The sampling gate is used in source mode above 2 GHz and also in frequency counter mode. In source mode the SAMPLER IF signal clocks the input divider in the YIG PLL. In counter mode, LO frequencies in the range 0.5 - 1 GHz are used to produce an IF frequency of about 100 MHz, and the software performs cross checks to eliminate errors. Input frequencies below 400 MHz are counted directly, with the LO set to 1 GHz. The sampler includes an IF amplifier stage which requires bias current; this is provided via R701 and R702.

C703, L701, C704, L702 and C705 form a 410 MHz low-pass filter which rejects LO breakthrough, and images (>600 MHz) when in direct count mode. LO filtering is needed at the input because the LO level may be higher than the wanted signal. Without an input filter the following ALC amplifier could therefore level on the LO rather than the IF.

For the frequency counter the IF input level may be anywhere in the range -50 to 0 dBm. The IF amplifier must therefore have sufficient gain and a wide dynamic range. The amplifier used has wide-range automatic level control, and comprises IC701-703 and associated components. The overall gain is about 60 dB at 410 MHz and higher at lower frequencies. (The amplifier bandwidth must be at least 410 MHz, but in IF count mode image frequencies can fall within this band. A limiter cannot therefore be used at this stage as it would generate in-band intermodulation products which would affect counter operation.)

D703, R716 and C717 form a peak detector. The levelling loop is completed by IC704 and PIN modulators D701 and D702. The levelled output is between +5 and +10 dBm over the range 10 - 400 MHz.

IC706d provides an IF level monitor output to the ADC. This is used in counter mode when the software is trying to determine whether it has got any input signal to count. If there is no input the amplifier will be at maximum gain and the monitor output voltage will be about 4.5 V. As the input level is increased the amplifier gain, and hence the IF monitor voltage, will be reduced.

In direct count mode the IF bandwidth must be at least 400 MHz. In YIG lock mode and most of the time in counter mode, further filtering is needed to reject images generated by LO frequencies down to 500 MHz. This is provided by the 280 MHz low-pass filter comprising C724-726, L703 and L704, and the path switching for the counter is done by D704 and D705, driven by IC706a and IC706c.

C728-732 and L705-708 form a 66 - 256 MHz band-pass filter. The level out of the filter is compared with a fixed threshold voltage by D707, D708, IC706b, etc. As the IF is levelled, the comparator acts as a frequency window detector and gives a logic high output if the IF frequency is in the range 65 - 265 MHz. This is used in counter mode to aid IF acquisition. The YTO phase-locked loop IF input (YIG PLL IF) is taken from after the band-pass filter via a 6 dB pad.

The signal to be counted passes from D705 via a 3 dB pad to IC705. The filtered path between D704 and D705 has about 8 dB more loss than the "straight through" path. As the counter's front end has only a 6 dB guaranteed operating window, more gain and level control are needed. By this time, non-harmonically related frequencies (LO and image) should have been sufficiently attenuated, so a limiter can be used. IC705/D706 acts as the limiting amplifier.

IC701-703 and IC705 are turned off by TR701 and TR702 when the sampler is not in use, to reduce heat generation and spurious products.

YTO Phase-Locked Loop

Circuit diagram: Fig. 7-59.

Fig. 1-6 shows the overall operation of the YTO PLL. The selected oscillator is tuned to the nominal required frequency using the tuning coil and pulled to the exact frequency by means of the FM coil.

The YTO output frequency is fed via a coupler into the sampler, which generates sum and difference products of the YIG frequency and all harmonics of the LO frequency. The LO frequency, f_L, is in the range 600 - 800 MHz. After being amplified and filtered, the IF is divided by 64 and compared with a 2 MHz reference. The loop locks when the YTO frequency = Nf_L + 128 MHz.

The phase comparator output passes through the reference filter and loop filter to the FM drive amplifier. The multiplying DAC compensates for the difference in FM sensitivity between YTOs to maintain a constant loop bandwidth.

IC601 divides the IF frequency by 64. R601 biases its input to prevent self-oscillation when there is no input signal. TR601 and TR602 convert the differential ECL output to CMOS compatible levels.

IC602 and IC603, together with R610-614 and C606, form a 4-state phase comparator which is run at 2 MHz. Incorporating the outputs from IC602 pin 6 and IC602 pin 9 gives the phase comparator a linear range of $\pm 3\pi$ radians and increases the loop's slew rate by a factor of about two.

IC606b, IC607b, IC607a, etc. act as a window detector which detects when the loop is out of lock. When it is in lock, the integrator input voltage is zero. If the loop fails to lock, this voltage will be in the range ±(0.7 - 2.1) V. The lock detector gives a logic high output if its input voltage is outside the range -0.27/+0.2 V.

C608, L601, L602 and C609 form a 400 kHz reference filter. The loop filter comprises IC606a and its associated components. In normal operation the YIG PLL has about 50 kHz loop bandwidth and 13 kHz integrator break frequency. The software sets the required loop bandwidth by adjusting the digital inputs of the multiplying DAC, IC608, to give an FM sensitivity of 4 MHz/V at its V_{ref} input. IC606c and the associated resistors provide an FM drive monitor signal which is used during YTO frequency calibration and FM sensitivity calibration.

YIG FM sensitivity calibration is performed with lower loop bandwidth to ensure loop stability, so the integrator break frequency is reduced to 4.6 kHz by switching in C610.

At band changes and when changing frequency in CW mode, the FM drive is momentarily set to zero to stop the loop latching up. This is done by shorting the integrator feedback network via IC605b.

In between successive frequency points in a sweep, the FM drive is held constant for about 140 µs by opening IC605c and IC605d. The integrator is left holding the voltage on C611. This allows the YTO and the UHF synthesizer to settle before the loop is closed, and hence reduces the loop slewing time (assuming very little difference in YIG cal error between successive points). The time constant is produced by IC604a, which is triggered by writing to the YIG frequency DAC.

In AC detection mode the FM drive is also held during the "power off" periods, by means of the FM HOLD signal which is set by software.

The FM drive amplifier consists of IC608, IC606d and IC609. The digital inputs of multiplying DAC IC608 set the amplifier's gain. The DAC has current output and therefore needs an op amp to follow it. IC609 is a high-power unity-gain buffer and is included within the DAC feedback loop. The YTO FM coils are connected in series, and the voltage across current-sensing resistors R630 and R631 is fed back to the DAC. D602 and D603 limit the output current to ±150 mA.

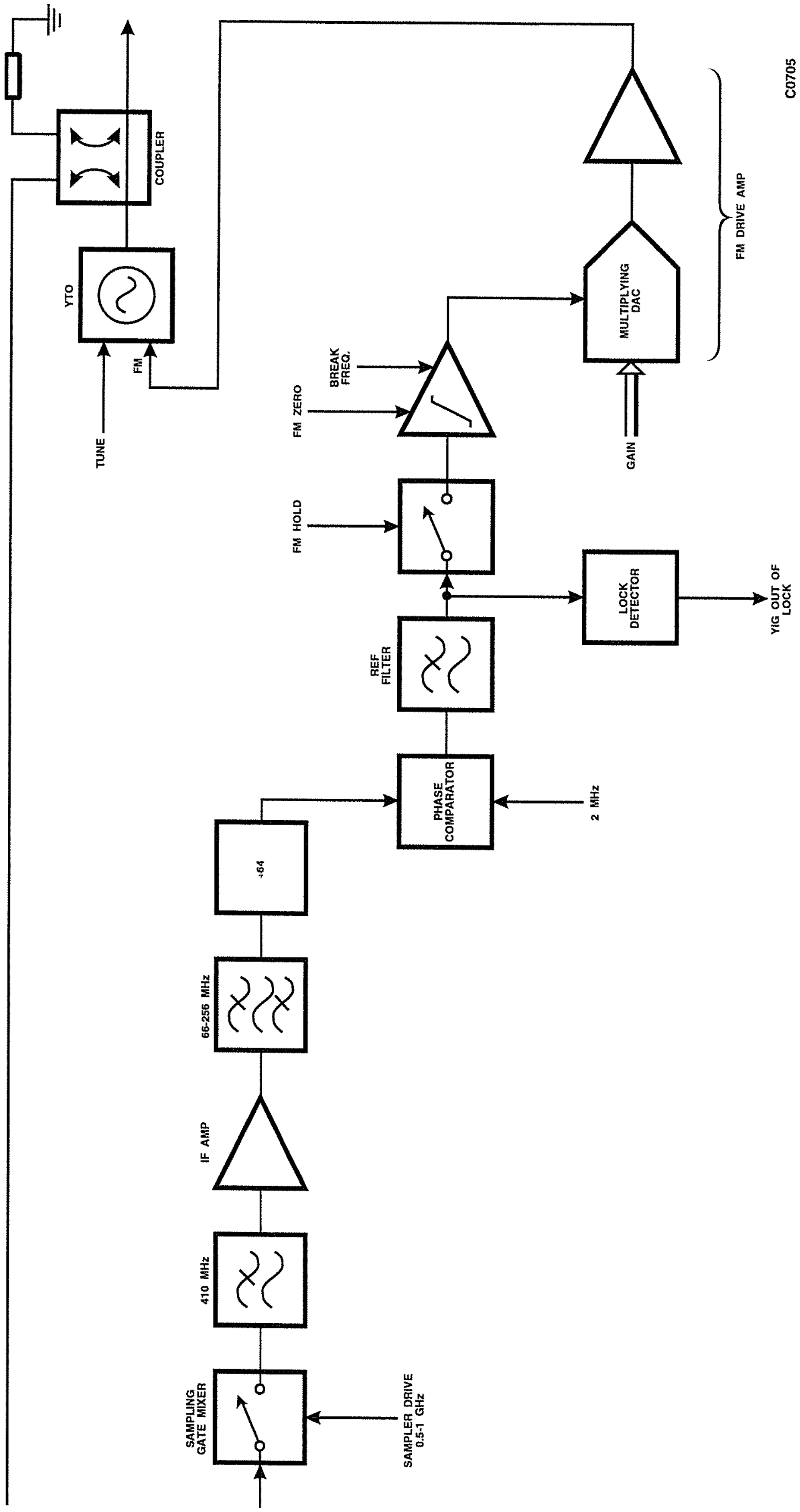


Fig. 1-6 YTO Phase-Locked Loop

Frequency Counter

Circuit diagram: Fig. 7-55.

The counter section of the board is required to count frequencies in the range 10 - 400 MHz. It consists of a counter with serial input and parallel output, and a gate timer which sets the duration of the count.

The gate timer is a 24-bit programmable counter comprising IC101-103. The gate time is loaded as an LS word and an MS byte. The timer is clocked at 1 MHz, which gives a maximum possible gate time of 16.7 s. As the longest gate time set is 1 s, the top four bits are not used.

The timer is started by a rising edge on IC105 pin 3, which causes IC105 pin 5 to go low. On the next rising edge of the 1 MHz clock, IC104 pin 6 goes low, enabling IC103 and IC107 to start counting and setting IC105 pin 5 high again. When the timer reaches terminal count, IC104 pin 9 goes high on the next falling edge of the 1 MHz clock, and on the next rising edge IC104 pin 6 goes high, disabling IC103 and IC107. The actual gate time is therefore 1 μs longer than the value loaded into IC101-103.

The gate timer control as described above is needed to de-glitch the terminal count output of IC101, and also to minimise the skew between delays in opening and closing the gate, which could cause significant inaccuracy when counting 400 MHz.

The counter proper consists of a 4-bit BCD counter (IC107) and a 28-bit binary counter (IC108, IC110-112). The carry output of IC107 is used to clock IC108, and IC105(b) pin 9 clocks IC110-112, which are connected as a 24-bit synchronous counter. Diode D105 is used as an OR gate. The outputs of IC107 and IC108 are output to the data bus by tri-state buffer IC109. IC110-112 incorporate tri-state output registers. The count value is read as two 16-bit words. After it has been read, the counter is cleared by setting the TRIGGER/RESET line low again.

Apart from the inhibit input, all IC107's inputs and outputs are level shifted to interface with CMOS logic. TR101 and TR102 provide the fast interface needed to clock IC108 at up to 40 MHz. Speed is not important for the other outputs.

The actual count sequence output to the data bus for the LS nibble looks like this:

Count	Output
0	1000 (8)
1	1001 (9)
2	1010 (10)
3	1011 (11)
4	0100 (4)
5	0101 (5)
6	0110 (6)
7	0111 (7)
8	0000 (0)
9	0001 (1)

IC108 is clocked on the count of 4, i.e. 6 counts too early, but since all codes in the sequence are unique, the software is able to determine the correct frequency count.

Digital Board Interface

Circuit diagram: Fig. 7-56.

The interface with the Digital board is via PLA, and consists of a 16-bit bi-directional data bus (SD0-SD15), an 8-bit address bus (SAD0-SAD7), write and read strobes (SWR and SRD) and a synthesizer select line (SSEL). SWR, SRD and SSEL are active low. SD0 - SD15 and SAD0 - SAD7 correspond to D16 - D31 and A2 - A9 respectively, on the Digital board. There is also a 1 MHz reference output from the synthesizer; all the other clocks in the instrument are locked back to it. The software interface is as follows:

SAD7 and SAD6 define the general type of write or read operation.

0000XXXX	Write to synth tray (except frac-N ULA)
01XXXXXX	Write to frac-N ULA
100000XX	Read from synth tray (except ADC)
11000000	Read ADC

Note...

Unless otherwise stated, data is +ve logic, i.e. 1 = true.

WRITE OPERATIONS

Address	Function	Remarks		
00H	YIG frequency	16 bits.	LSB SD0	
		Scale:	2 - 20 GHz LSB = 500 kHz nominal	
			20 - 26.5 GHz LSB = 750 kHz nominal	
01H	level	16 bits. LSB SD0		
02H	mode byte 1	8 bits		
		SD0-SD2	timebase control	
		SD3	int/ext detector	0 = int
		SD4	+ve/-ve detector	0 = +ve
		SD5	detector/power meter	0 = detector
		SD6	counter reset/trigger	0 = reset
		SD7	YIG loop break freq	0 = high

break freq

Timebase control codes:	
000	OCXO internal standard
001	1 MHz external standard
010	not used
011	10 MHz external standard
100	MTS internal standard (VCXO) (not used in 6200B)
101	MTS standard cal
110	not used
111	not used

03H	mode byte 2	6 bits		
		SD0	CW filter	1 = filter on
		SD1	UHF loop bandwidth	1 = low BW
		SD2	max attenuation	1 = max atten
		SD3	level hold	1 = level held
		SD4	FM hold	1 = FM held
		SD5	FM zero	1 = FM zeroed
04H	band select	14 bits		
		SD0	10 - 250 MHz	
		SD1	250 - 500 MHz	
		SD2	0.5 - 1 GHz	
		SD3	1 - 2 GHz	
		SD4	sampler drive	
		SD5	2 - 8 GHz	
		SD6	8 - 12 GHz	
		SD7	12 - 20 GHz	
		SD8	20 - 26.5 GHz	
		SD9	26.5 - 46 GHz	
		SD10	lower 1/2 octave	
		SD11	upper 1/2 octave	
		SD12	direct count	
		SD13	count/YIG lock	

05H	FM gain	8 bits. LSB SD0.	
06H	counter gate time (LS word)	16 bits. LSB SD0. LSB = 1 µs	Set gate time to required time - 1 µs
07H	counter gate time (MS byte)	8 bits. LSB SD0 LSB = 1 µs $\times 2^{16}$	
08H	freq std tune (coarse byte)	8 bits. LSB SD0	
18H	freq std tune (fine byte)	8 bits. LSB SD0	

FRAC-N ULA

Address	Function	Remarks
40H-7FH	all ULA functions	8 bits. LSB SD0 All ULA functions can be set by software.

READ OPERATIONS

Address	**Function**	**Remarks**	
80H	freq counter (LS word)	16 bits. LSB SD0	
81H	freq counter (MS word)	16 bits. LSB SD0	
82H	status	10 bits	
		SD0	unlevelled
		SD1	UHF out of lock
		SD2	YIG out of lock
		SD3	not used
		SD4	BFO out of lock
		SD5	freq std out of lock
		SD6	no std.
		SD7	timebase phase detector output 1 = int std freq high
		SD8	freq counter IF valid
		SD9	count finished. Goes to 0 <1 μs after counter trigger (mode byte 1)

ADC

Address C016

Sequence:

1. Write cycle to load MUX code
2. Dummy read cycle to start conversion
3. Wait >2.5 μs
4. Read cycle to read ADC

MUX codes:

3 bits. SD0-SD2

000	not used
001	VCO tuning voltage
010	YIG FM drive
011	freq. counter IF level
100	not used
101	VCXO tuning voltage
110	not used
111	not used

All the Digital board outputs to the synthesizer are via tri-state buffers, which are only enabled when the synthesizer is addressed. This reduces the level of digital interference on the source output. The Control board has pull-up resistors on all these lines.

SAD7 and SAD6, which define the write/read mode, are decoded by IC901a. The decoded outputs are ANDed (negative logic) with SWR or SRD to produce local write and read strobes. IC901 pin 4, in conjunction with SWR, enables IC903, which decodes SAD0 - SAD3 to generate most of the write strobes used in the synthesizer tray.

IC901/5 selects the Fractional-N control ULA, and SWR strobes data into it. IC901/5 is also ANDed with SWR to give the signal FORCE VCO TUNE. This forces the selected VCO to the middle of its tuning range whenever any fractional-N parameter is changed, ensuring that it oscillates at a sensible frequency and avoiding the possibility of the loop latching up.

IC901/6 enables IC901b, which decodes SAD1 and SAD0 to read the frequency counter and the status word.

IC901/7 selects ADC operations. IC910 is an 8-bit ADC with a built-in 8-channel analogue multiplexer. IC901 pin 7 in conjunction with SWR loads the MUX address into IC908. When ANDed with SRD it starts the conversion and then reads the data (two read cycles are needed).

TIMEBASE PCB

Circuit diagram: Fig. 7-65.

Introduction

The Timebase board generates the reference frequencies used in the source, as follows:

1 MHz	Clock for gate timer in frequency counter. Also used as a sync signal by the Digital board.
2 MHz	Phase comparator reference frequency in YIG PLL.
3 MHz	Phase comparator reference frequency in fractional-N PLL.
10 MHz	Phase comparator reference frequency in BFO PLL.

These frequencies are produced by dividing down the output of a DAC-tuned 30 MHz voltage controlled crystal oscillator (VCXO). This oscillator can be phase-locked to either an internal 10 MHz oven-controlled crystal oscillator or to an external 1 MHz or 10 MHz standard. When the instrument is operating on internal standard a 10 MHz output is provided at the rear panel.

Operating Modes

The mode of operation is determined by a 3-bit code, TBC0 - TBC2. The modes are as follows:

TBC	**2 1 0**	
	0 0 0	OCXO internal standard
	0 0 1	1 MHz external standard
	0 1 0	not used
	0 1 1	10 MHz external standard
	1 0 0	MTS internal standard (VCXO)
	1 0 1	MTS standard cal.
	1 1 0	not used
	1 1 1	not used

The VCXO is locked in modes 000, 001 and 011, but not in modes 100 and 101. Thus TBC2 determines whether the VCXO is DAC-tuned, or or phase locked to the OCXO or an external standard. In locked modes the loop bandwidth is about 50 Hz.

In the cal mode the phase comparator is used as a frequency comparator between a 10 MHz external standard and 10 MHz derived from the internal standard. The internal standard is tuned by successive approximation under software control. When the VCXO is locked to an external standard the phase comparator is operated at the external standard frequency, i.e. 1 MHz or 10 MHz.

IC11 provides a 10 MHz output when the instrument is locked to its internal standard, selected by code 100. IC10b provides additional isolation.

Instruments prior to the 6200B series did not contain an OCXO so mode 000 was unused; mode 100 was used when operating on the internal standard (DAC-tuned VCXO). In the 6200B the DAC-tuned OCXO (mode 000) is used instead because of the improved performance.

Oscillator Tuning

IC1 is a dual 8-bit DAC, configured to give coarse and fine bytes with a weighting of 43:1. This is the optimum ratio for the cal. routine. The 0 to +5 V output provided by IC2d is used for tuning the OCXO. IC2c gives 0 to +12.5 V to tune the VCXO.

IC3a, R8 and R9 provide an attenuated version of the tuning voltage to the ADC for diagnostic purposes. IC3b, TR1, etc. close the PLL when TBC2 is 0, overriding the DAC output.

30 MHz VCXO

TR2, XL1, D2 and the associated components form a Colpitts oscillator with a pulling range of about ±3 kHz. TR3 buffers the oscillator output and amplifies it to a level sufficient to drive IC4a, a Schmitt inverter.

Frequency Division

IC5 divides the 30 MHz by 10. The counter is synchronously loaded with 6 when the TC output goes high, so it counts from 6 to 15. IC6 is configured as a synchronous divide-by-3, to give 10 MHz. IC7a divides the 10 MHz by 5 and 2 to give 2 MHz and 1 MHz.

Phase/Frequency Comparator and PLL

IC12 and IC13 form a 4-state phase comparator. When the loop is in lock the output at IC13/8 is at the reference frequency, with a mark/space ratio dependent on the phase relationship between the input signals. Advancing the phase at IC12/11 increases the mark/space ratio. If the frequency at IC12/11 is higher than that at IC12/3, IC13/8 will be permanently high (with glitches). The output at IC13/6 is the complement of that at IC13/8.

The phase comparator input signals are selected by IC10a and IC8. IC10a selects either 10 MHz OCXO or external standard. IC8 selects either 1 MHz or 10 MHz derived from the VCXO, or 10 MHz from the OCXO. In modes where the phase comparator is not used, IC12/11 is held low. IC9a and IC9d are differential receivers for the external frequency standard inputs. The receiver inputs are internally biased to ensure stability in the absence of a signal. With no input, the output is high.

IC14a and its associated components form the loop filter and provide the VCXO tuning voltage. When locking to a 1 MHz external standard TR4 is turned off, increasing the gain to compensate for the increased division ratio. IC14c decodes the control inputs, to turn TR4 off only when the control code is 001.

IC14b, IC14d, D7, etc. act as a lock detector. When the loop is locked the loop filter input will be at 0 V; if it is out of lock it will be +1 V or -1 V. The window detector gives a high output if its input is outside the range ±0.5 V.

IC9b is used when calibrating the internal standard. It gives a high output when the internal standard frequency is high, i.e. when IC13/6 is low. A two cycle delay at the difference frequency (w.r.t. 10 MHz) is required before reading IC9b, as the phase comparator can accumulate up to 3π radians of phase error and has a linear range of $\pm\pi$ radians.

D4, C11 and R2 4 form a peak detector. In the absence of an external standard input, IC9/5 is high; IC9/5 goes low for input frequencies above about 150 kHz.

SYNTHESIZER POWER SUPPLY FILTER PCB

Circuit diagram: Fig. 7-67.

This board provides some extra filtering on the +5.1 V and +15 V supplies, to help reduce the level of supply sidebands on the source output. Extra filtering on the other supply rails is not needed.

FREQUENCY STANDARD PCB

Circuit diagram: Fig. 7-78

This board contains the 10 MHz oven-controlled crystal oscillator (OCXO) which provides an accurate internal frequency standard for the instrument. Overall operation of the frequency standard (both internal and external) is explained earlier in this chapter.

The +15 V power for the board is derived from the PSU via the Synthesizer Power Supply Filter PCB, with additional smoothing provided by C1. The supply to the OCXO is via 12 V regulator IC1 and associated components.

PLRL pin 9 carries the OCXO TUNE signal from the Timebase PCB (via the Control PCB). The output at TTL levels to the SMB connector PLRM supplies the OCXO standard to the Timebase PCB. The relay control line on PLRL pin 2 is not used, and the relay contacts are permanently closed during operation.

ANALOGUE PCB

Introduction

Referring to Fig. 1-7, it can be seen that the MTS data acquisition system comprises four fully differential amplifier chains. One of these can be configured as either a differential DC amplifier or a chopper amplifier front end compatible with 6900 series power sensors. All differential amplifiers are software zeroed via a 12-bit DAC; the chopper amplifier (part of which is within the sensor) is zeroed by a voltage passed to the power sensor derived from a 16-bit DAC.

Each amplifier chain has two gain stages with eight settable ranges, followed by a switched filter and discrete sample and hold. All channels then pass through a 16 channel multiplexer into a 16-bit A to D converter, the serial output of which is fed to the Digital board for decoding and processing.

Calibration of the data acquisition system (DASystem) is performed by the same 16-bit DAC that is used for power sensor zeroing. All control signals are derived from the Digital board and are buffered on the Analogue board for noise reduction.

In addition to the data acquisition system, the Analogue board also contains the graphics processing circuits.

In the following description, some component references will appear as ICn12, Rn27, for example. This is because there are four DASystem channels whose components are numbered in a similar way; the "n" identifies the channel (1 to 4).

Front End Amplifiers - Scalar Detector

Circuit diagram: Fig. 7-22.

The fully differential amplifier used in the MTS comprises ICn02-n04 and their associated components. ICn02 and Rn20-n22 provide two differential gain settings of x99.9 (±0.1%) and x1, the common-mode gain of the amplifier for both cases being unity. ICn01 performs front end multiplexing between the Front Panel connector and the system calibration DAC (see 'Gain Calibration').

Front End Amplifiers - Power Sensor Amplifier

Circuit diagram: Fig. 7-21.

Channel D of the data acquisition system is universal in that it may be configured to accept any MI detector/sensor. To this end a power meter type chopper amplifier is placed in parallel with a fully differential amplifier. The chopper amplifier gain stage is distributed between the sensor head and the Analogue board. IC1 and IC401 are used to direct the signal through the tuned amplifier formed by IC2a and its associated components to provide a pass band gain of approximately 1000. IC2b and TR1 form a driven ground system which supplies a reference ground to the chopper drive stages and the zeroing circuitry. The reference ground is passed along with the AC coupled, DC restored (C81,R12) amplifier signal to the second gain stage via multiplexer IC405.

Chopper Drive

Circuit diagram: Fig. 7-29.

The DASystem sequence lasts approximately 343 μs (including software overhead) for a sequence comprising one autorange per frequency point. In order to be able to use power sensors with a designed chop rate of 925 Hz this "data acquisition rate" needs to be divided down by a factor of four by IC25 to derive a chop rate of 773 Hz which would be far too low for MI power sensors. To this end the DASystem sequence time is reduced to 265 μs during power meter measurements (since the software overhead is negligible), providing a chop rate of 925 Hz.

The trigger point for the chopper cycle is taken as the rising edge of TRKL/HLD, i.e. when the Sample/Hold amplifiers are transferred to the hold mode, in order to ensure that valid data is presented to the ADC. IC28a,b are used to phase split the chopper signal whilst maintaining constant gate delay between its outputs, and IC28c,d level shifts the two signals. The chopper drive signals CHOPSEF and CHOPSUF are generated by IC29a,c and IC29b,d, whose outputs are tied together by R56, 57 and R54, 55 respectively.

Note that Slow Sweep Filter may not be used in this mode since the time per point and hence the chop rate would be altered (see 'Filtering, Detection Modes and Averaging').

Sensor Zeroing

Circuit diagram: Fig. 7-20.

The power sensor zero voltage is generated by 16-bit DAC IC11, differentially buffered by IC15c,d and associated components. The DAC is loaded in two bytes from octal latches IC13 and IC14. The zero voltage is derived by analysing the channel output during a power meter zero measurement and varying the code loaded to IC13 and 14 (using an SAR algorithm) until the signal amplitude is minimised. IC15a and R13-16 form a precision attenuator which reduces the amplitude of the zero voltage to a suitable level to be passed down to bias the front end chopper via connector PLD. IC12 provides a ±5 V tracking reference voltage for the 16-bit DAC and other areas in the Data Acquisition System.

Sensor/Detector Identification

Circuit diagram: Fig. 7-28.

The type of device which is connected to a front panel analogue input determines the correction that must be applied in order to give a true power reading. This is accomplished by means of a fixed current source per channel formed by IC43 and associated components. When a scalar detector is connected to any front panel input channel, -20 μA is passed to the detector where a resistor/potentiometer arrangement and a diode junction formed by the base-emitter junction of a BC107 chip produce a temperature dependent voltage drop. This is accessed via multiplexer IC44 placed before the ADC multiplexer IC7, and measured by 16-bit ADC IC9. The appropriate input channel is automatically routed through IC44 as and when the relevant ADC multiplexer channel is selected. If no detector is present then a negative full scale voltage will result on the ADC input.

When a power sensor is connected to channel D, the base-emitter junction is replaced by a Zener diode; the current sink now slightly reverse biases the zener and so the resulting voltage out of the ID circuitry will therefore be close to zero. This condition causes the software to select power meter state on the Alternate Input Multiplexer (see below), and to modify the current sink to a 5 mA current source. The latter is achieved by analogue switch IC20 routeing the 5 mA from the sensor ID current source (TR403) through to the sensor. The 5 mA forces the Zener into conduction, the voltage again being measured by the ADC. If a sensor is not present or a scalar detector is connected to the front panel in this situation then a positive full scale voltage will result on the ADC input.

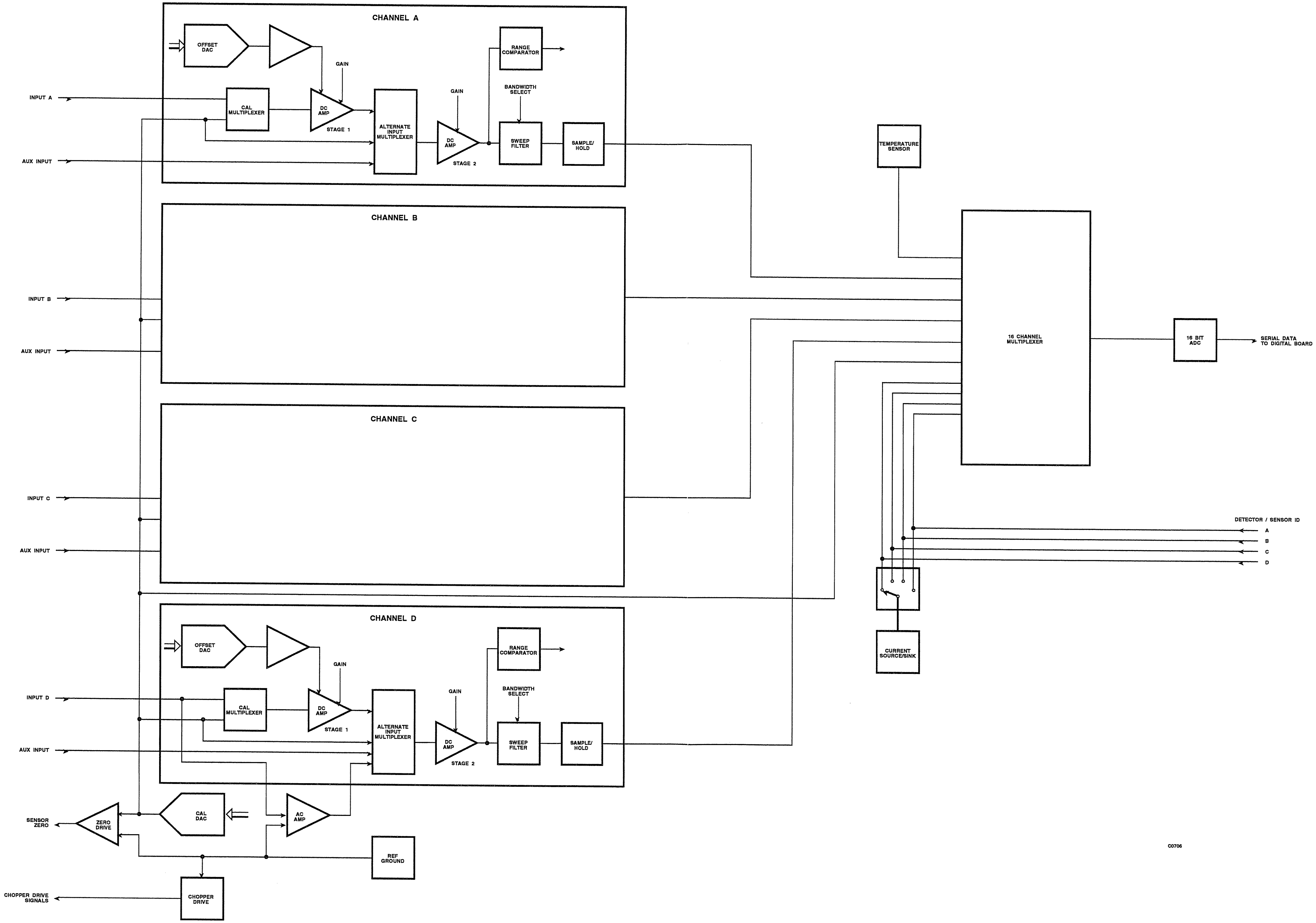


Fig. 1-7 Data Acquisition System

Data Acquisition System

The ID voltages for the various devices supported by the MTS are listed below:

Device	ID Voltage
6510 Series detectors	-0.6 V
MI Autotester	-0.85 V
Direct voltage measurement cable	-1 V
6230 Series detectors	-1.5 V
6230A/L Series detectors	-2.0 V
6240 Series Fault Locators	-2.2, -2.4, -2.6, -2.8, -3.0 (dependent on device)
6900 Series Power Sensors:	
6910	5.6
6911	5.6
6913	5.6
6914	6.8
6912	6.8
6919	6.8
6920	2.7
6923	2.7
6924	2.7
6930	8.2
6932	8.2
6934	8.2

Alternate Input Multiplexer

Circuit diagram: Fig. 7-21, 7-23.

Four multiplexers are used to route up to four available input signals to each signal channel, i.e. amplified scalar detector channel, calibration DAC, alternate input (e.g. when a 6210 Reflection Analyzer is fitted to the MTS), and in the case of channel D, power sensor input. ICn05 controlled by CHnGMA0, CHnGMA1 achieves this function. The alternate input channel on the multiplexer has 10 kΩ source impedance to avoid amplifier saturation should the alternate input be selected without the adaptor being fitted.

Input	CHnGMA1	CHnGMA0	When used
Scalar channels	0	0	Swept measurement
External adaptor	0	1	Reflection analyzer measurement
Scalar channels	1	0	Channels A,B,C only
Power meter channel	1	0	Channel D only; engages chopper drive.
Calibration DAC	1	1	DASystem calibration

Second Stage Amplifier

Circuit diagram: Fig. 7-21, 7-23.

The output of the first gain stage, or any alternate input selected from multiplexer ICn05, passes to the second gain stage formed by ICn06-n08 and associated components. ICn06 and Rn23-n29 provide four differential gain settings of ×94.5, ×22.7, ×4.61 and ×1, the common-mode gain again being unity regardless of differential gain. Following the second gain stage a differential to single-ended converter formed by ICn08 is used to ground reference the amplifier output to the local ADC ground.

Since the entire amplifier chain common-mode performance is that of a voltage follower, extremely large ground potentials at the signal input can be tolerated without being visible at the amplifier output. This will guarantee that noise floor "creeping" will be minimised when connecting/ disconnecting detectors to external hardware which may not be at the same ground potential as the MTS. Also, noise floor level shifts due to return currents down the detector cable will be minimized using this amplifier arrangement.

The gain settings are related to the control signals as follows.

CH(n)_A2	CH(n)_A1	CH(n)_A0	Selected gain
0	0	0	x1
0	0	1	x4.61
0	1	0	x22.7
0	1	1	x94.5
1	0	0	x100
1	0	1	x461
1	1	0	x2270
1	1	1	x9450

The CH(n)_A2 signals control the gain of the front end amplifiers (Fig. 7-21 and 7-22).

Amplifier Nulling

Circuit diagram: Fig. 7-20, 7-22.

Since the input offset of the front end amplifier is ±500 μV and the maximum gain is x9500, the output offset of the whole amplifier chain would be ±5 V if no offset correction were used. To this end a digital offset nulling scheme is used whereby the front end amplifier is nulled to ±500 nV RTI using a 12-bit DAC ICn16, amplifier ICn15 and associated components. The 12-bit DAC is loaded in a two byte fashion via control lines CH(n)OM_L and CH(n)OL_L, avoiding the need for a 12 or 16 bit data bus. The resistive network Rn36-n38 serves to bias the offset nulling pins of ICn03 in order to set the collector current and hence the offset voltage of the front end transistor pair of ICn03. Input offset voltage drift, white noise and 1/f noise are uncompromised by this arrangement.

During the offset nulling operation, the amplifier gain is set to maximum (i.e. ×9500) and a successive approximation trim is performed on the DAC to reduce the amplifier output offset to less than ±50 mV (via the 16-bit ADC). The 200 Hz slow sweep filter is switched in during this nulling cycle to reduce the amount of averaging required to resolve ±1 mV on the ADC, since the peak noise produced without the filter in would be of the order of ±150 mV resulting in a longer zeroing time.

Gain Calibration

Circuit diagram: Fig. 7-20

The DASystem calibration DAC, IC11 is a 16-bit DAC loaded via two latches IC13 and IC14. The voltage output from the DAC is settable within the range ±5 V in increments of 152 μV, and can be routed to any signal channel within the DASystem. As can be seen in the block diagram, this permits the gain settings of all signal channels to be "calibrated" using the DAC as a precise,stable reference. (See also 'Sensor Zeroing'.)

Sweep Filter

Circuit diagram: Fig. 7-24 and 7-25.

Three amplifier bandwidths are needed during normal MTS operation. Bandwidth reduction such that full speed sweeps have minimal noise but can still autorange and settle to 16 bits are achieved by switching in a filter formed by IC109, IC112a, R145, R146, C143 and C144. This operation reduces the amplifier bandwidth from 80 kHz to approximately 8 kHz.

During "slow sweeps" a second filter (IC109, IC112a, R147, R148, C143 and C144) can be switched in which reduces the amplifier bandwidth still further to 200 Hz. However, this operation will also slow down the time per frequency point to approximately 4 ms (8 ms for AC detection).

Sample and Hold Amplifier

Circuit diagram: Fig. 7-24 and 7-25.

Following filter amplifier ICn12a the signal is passed through buffer ICn12b to a discrete sample/hold amplifier comprising ICn13, ICn14, Cn44, Cn45 and Cn46. Cn46 provides some reduction of charge injection onto the hold capacitor Cn44; Cn45 and the corresponding switch gate of ICn13 provide leakage current cancellation to reduce droop rate during the hold mode.

Track and hold driver TR2 (Fig. 7-24) inverts and delays the main TRK_L/HLD signal to ground the input to the sample/hold during the hold mode; this reduces analogue feedthrough on 16-bit ADC IC9 (Fig. 7-28) to better than one LSB.

Autoranging

In the Microwave Test Set a single range change cycle per frequency point is implemented by default such that range "hunting" will not occur should the RF input be on the border of two ranges. There is a maximum of six range cycles per frequency point to ensure that DC power excursions can be successfully ranged. Should any "traffic" be present on the RF signal then a further ranging loop will be triggered which will only allow up-ranging (i.e. ranging to lesser gain ranges). Sufficient hysteresis between ranges is allowed to prevent noise on any range from causing range hunting.

The default range is Range 7 (i.e. maximum gain), and range changing will occur when a signal exceeding 94% of full scale or less than 0.024% of full scale (12 bits) is apparent on the ADC.

In the 6210 Reflection Analyzer sub-system the range change levels will be shifted such that the minimum accuracy on the converter will be 13 bits (0.012%).

Range Comparators

Circuit diagram: Fig. 7-24 to 7-27.

Following the differential to single-ended converter (IC108a,b, IC308a,b) and prior to any analogue filtering the amplifier signal is fed into a window comparator comprising ICn10,n11,TRn01,n02 etc. The upper threshold level for the window is set by Rn53,n54, setting an overrange trap at 4.24 V. IC20 and associated components form a software programmable underrange trap at either 0.5 V or 0.85 V, conditional on the HIRES_L control line. Should an accessory be connected (such as a 6210 Reflection Analyzer), HIRES_L will be toggled selecting the 0.85 V trap; otherwise the default 0.5 V trap is selected during normal MTS operation.

An out of range condition is indicated by a logic 1 on either the TFB(n) or TFL(n) range lines, and appropriate action is taken by the Digital board as mentioned above during an autorange sequence.

The autorange comparators may be disabled via software (for example during calibration) by toggling the DIS_COMP line which disables the comparator output stages via TRn01,n02 forcing the outputs high regardless of an overrange condition.

A to D Converter

Circuit diagram: Fig. 7-28.

Input Multiplexer

The sixteen channel ADC multiplexer is basically two 8-channel devices, IC6 and IC7 connected in parallel. The required channel is selected on both devices via control lines MUX_A0 to MUX_A2; MUX_A3 is used to select the required device output. The channel arrangement is as follows:

Input signal	A3	A2	A1	A0	When used
Channel A	0	0	0	0	
Channel B	0	0	0	1	During measurement
Channel C	0	0	1	0	Sequencing
Channel D	0	0	1	1	
Reference (4.5 V)	0	1	0	0	During Cals, diagnostics
Ref. ground	0	1	0	1	During diagnostics
Calibration DAC	0	1	1	0	During diagnostics
Test input	0	1	1	1	During Cals,diagnostics
Sensor ID A	1	0	0	0	
Sensor ID B	1	0	0	1	Background task to
Sensor ID C	1	0	1	0	Identify sensor type
Sensor ID D	1	0	1	1	
Temp Sensor	1	1	0	0	Used to initiate DASystem re-cal

A settling time of approximately 8 µs is allowed between selecting the required channel and initiating an ADC conversion to guarantee multiplexer settling to 16 bits. Protection is provided on the TEST input to prevent device damage should a signal greater than ±15 V be connected to this channel.

ADC Operation.

The ADC used in the MTS is primarily designed for digital audio applications whereby the converter is allowed to free-run, continuously clocking serial data out into a digital filter. In the DASystem, however, ADC conversions need to occur in packets of four every 250 µs or so, the total conversion sequence lasting about 68 µs. To this end, the serial clock to the device is disabled after the conversion sequence has finished to ensure that the ADC is in an idle state, the clock being enabled and the HOLD line strobed to initiate the next conversion sequence.

IC8a provides a high load impedance for the multiplexer output and a low source impedance for the ADC input at high frequency. R43 and C30 form a low-pass filter to ensure that no serial clock appears on the ADC input.

Following a system power-up and after a time such that the temperature transducer (discussed above) indicates a ±2°C change in ambient temperature, the ADC is recalibrated by setting the RESADC line low for approximately 2 s. This is achieved by displaying a message on the screen encouraging the user to perform a detector zero. This operation will automatically correct for any temperature dependent linearity errors in the ADC, effectively maintaining 16-bit accuracy with temperature.

Graphics Processing

The graphics hardware accepts data from the main processor on the Digital board and presents it in a suitable form to be displayed by the internal LCD or an optional external monitor. The graphics processing circuitry comprises:

The graphics processor IC.

A transputer interface.

The colour palette and video output stage (for driving an external monitor).

Contrast control.

Graphics Processor

Circuit diagram: Fig. 7-31.

The graphics processor used is an Intel 82786. This IC has three main functional areas: a drawing processor, a DRAM controller and a video controller

Drawing processor. This part of the IC implements drawing commands that are passed from the transputer. Functions are provided to control the drawing of lines, circles, etc., and control of windows (overlap, clipping etc). The pixel data generated by the drawing processor is output in the form of an 8-bit digital signal which is then passed to the colour palette IC and the LCD Interface PCB.

DRAM controller. The graphics processor uses eight 256K x 4 DRAM chips (IC509 - 516) organised as 512K x 16. The DRAM controller generates all the necessary control lines for these chips. The timing for the various signals is controlled internally to the graphics processor by software.

Video controller. The 82786 generates the sync signals, VSYNCH and HSYNCH, which are required by the LCD and the optional external monitor. The BLANK signal is used by the colour palette IC. The video timings are set internally by software.

Transputer Interface

Circuit diagram: Fig. 7-30.

The T805 transputer acts as the overall controller for the graphics processing system, accepting data from the main processor on the Digital board via the three serial links (LINKIN1/LINKOUT1, LINKIN2/LINKOUT2 and LINKIN3/LINKOUT3). The T805 has eight 256K x 4 DRAMs (IC501 to 508) organised as 256K x 32. The T805 can be configured to drive various types of memory device, allowing T805 lines MEMS0 - MEMS3 to act as DRAM control lines (ALE, BTRAS, MUXSEL and TCAS).

As the T805 address/data bus is multiplexed, the T805 address lines are latched by IC537 - 540 using ALE as a control. These latched address lines are used to communicate to the graphics processor IC, the colour palette IC and the transputer DRAMs. The address space for these devices is allocated by IC541. All control and address lines to the transputer DRAMs have series resistors to minimise ringing.

The T805 memory configuration and link speeds are selected at power-on by a programmable logic device (IC542), which is connected to transputer pins MEMCNFIG, LNK0SPC, LNK123 and LINKSPC.

As the cycle time on the T805 is different to that of the graphics processor, a circuit is used to assert MEMWAIT on the T805, which causes it to execute wait states (i.e. slow down). This circuit uses the graphic processor SEN line (Slave ENable, i.e. ready for data) in conjunction with ICs 552, 553, 555 and some logic contained in the PLD.

ICs 546 and 547 act as bi-directional data buffers between the T805 and the 82786 to allow the 82786 to have control of its own data bus when not communicating with the T805.

Colour Palette and Video Outputs

Circuit diagram: Fig. 7-32.

The colour palette and video output circuit is only used for driving an external colour CRT monitor. The circuitry for driving the internal LCD is contained on the LCD Interface PCB.

The colour palette IC (IC 550) consists of a 256 x 18 bit static ram (SRAM) and three 6-bit DACs. The SRAM can be read from or written to by the transputer; this allows software selection of which colour relates to which pixel code sent by the graphics processor. When the pixel code is presented to the colour Palette it acts as an address; the 18-bit data is then decoded internally and drives the 6-bit DACs, which produces the red, green and blue analogue video signals. This allows 256 display colours to be produced from a palette of 262144 available colours.

The RGB outputs of colour palette chip IC550 are terminated with 75 Ω, buffered by video amplifiers IC38 - 40, then passed to the external monitor via PLJ and the EXT MONITOR connector on the instrument rear panel.

LCD Control

Circuit diagram: Fig. 7-69.

Data from the data bus is latched into IC33 on the falling edge of CONTSTL. Latch outputs PAL0 and PAL1 are palette select lines which are intended for future use. The ACCA signal determines whether the LCD is at full or half brightness, and BLOFFO turns the LCD backlight on or off.

DIGITAL PCB

Introduction

The Digital board provides the processing and control functions for the MTS. A functional block diagram of the board is shown in Fig. 1-8. (Apart from the select lines, control signals have been omitted for clarity.)

In the following description of the Digital board, five types of busses are referred to:

BUS 1 - Transputer data bus, D0 to D31.

BUS 2 - Address bus, AD2 to AD26 and AD31.

BUS 3 - Decode bus (device select lines).

BUS 4 - Control bus (transputer control strobes, interrupts).

BUS 5 - Switch bus (switched signals).

Note that some signal names appear in brackets in the circuit diagrams; the name in brackets is a functional name given to the signal which is relevant to its context at that point in the circuit. For example the signal that helps protect the memory card during power-up and power-down is RESETL, and this signal is connected directly to the active high device enable of the memory card. At the memory card interface, however, this signal is marked as (MCPROT).

Memory Map and Address Ranges

This section describes how the devices shown in Figs. 1-8 are memory mapped on to the transputer bus. There are two levels of decoding; the top level maps all devices shown in the diagams, whilst the lower level maps the control of the data acquisition system.

High Level Address Decode

The device select lines are decoded from the address bus as follows:

AD31	AD25	AD24	AD23	AD22	Select Line
0	0	0	0	0	KINTCLR
0	0	0	0	1	KEYBOARD
0	0	0	1	0	RTC
0	0	0	1	1	STATUS
0	0	1	0	0	CENTRON
0	0	1	0	1	IDROM
0	0	1	1	0	CALATOR
0	0	1	1	1	DACS
0	1	0	0	0	INTERRPT
0	1	0	0	1	PROGOUT
0	1	0	1	0	SOURCE
0	1	0	1	1	MEMCARD
0	1	1	0	0	NVRAM
0	1	1	0	1	GPIB
0	1	1	1	0	EEROM
0	1	1	1	1	EPROM

The address ranges corresponding to these select lines is as follows:

Select Line	Address Range	Description
DRAM	80000000H to 8FFFFFFFH	Selected when AD31 is high, DRAM is mapped from the beginning of internal memory, top address is dependent on the amount of DRAM populated.
EPROM	7FC00000H to 7FFFFFFFH	Select line used to enable a second level of decode dependent on the size of EPROM used.
EEROM	7F800000H to 7FBFFFFFH	Select line used to enable the EEROM devices.
GPIB	7F400000H to 7F7FFFFFH	Select line used to enable the GPIB controller device.
NVRAM	7F000000H to 7F3FFFFFH	Select line used to enable non volatile static RAM, via an isolating switch to guard against corruption during power up and down.
MEMCARD	7EC00000H to 7EFFFFFFH	Select line used to enable the memory card, via an isolating switch to guard against corruption during power up or down.
SOURCE	7E800000H to 7EBFFFFFH	Select line used to control the interface to the source, and validate the address lines that are passed to it.
PROGOUT	7E400000H to 7E7FFFFFH	Select line to enable loading of the DAC used for the programmable voltage/current output.
INTERRPT	7E000000H to 7E3FFFFFH	Select line to enable writing of the interrupt mask, and reading of interrupt status, for the EVENT handler.
DACS	7DC00000H to 7DFFFFFFH	Select line to enable the lower level address decoding for data acquisition control and sequencing.
CALATOR	7D800000H to 7DBFFFFFH	Select line used to control the interface to the Auxiliary Interface board, and validate the addresses that are passed to it.
IDROM	7D400000H to 7D7FFFFFH	Select line used to enable the PLD which is used to read/write calibration data from/to EEPROM detectors.
CENTRON	7D000000H to 7D3FFFFFH	Select line used to write data to the Centronics interface output latch and trigger the timing sequence, and to enable reading of the printer status and clearing of printer interrupts.
STATUS	7CC00000H to 7CFFFFFFH	Select line used to read a 16-bit status buffer giving information about the build state of the Digital board, Auxiliary Interface board and any adapter, as well as power supply status and the state of the front panel interface link.
RTC	7C800000H to 7CBFFFFFH	Select line used to enable the real-time clock, via an isolating switch to guard against corruption during power up or down.
KEYBOARD	7C400000H to 7C7FFFFFH	Select line to enable writing data bound for the front panel to the output shift register, and to enable reading of data from the input shift register.

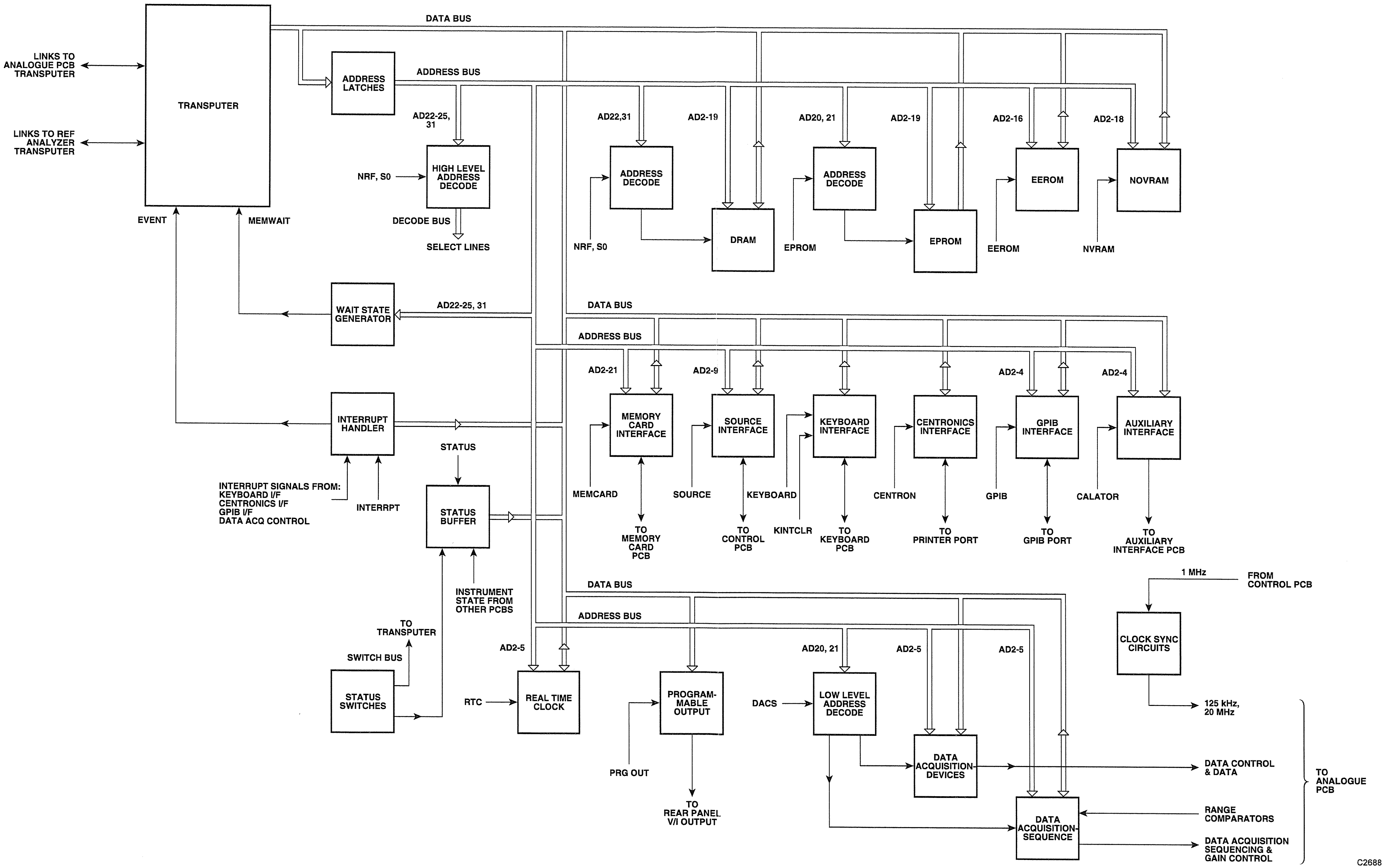


Fig. 1-8 Block Diagram of the Digital PCB

Block Diagram of the Digital PCB

Low Level Address Decode

Low level decode is derived from the address range corresponding to DACS (7DC00000H to 7DFFFFFFH); this is then split into two groups by decoding as follows:

DACS	AD21	AD20	Function
0	0	0	Spare
0	0	1	Spare
0	1	0	Data acquisition control - devices
0	1	1	Data acquisition control - sequence

The functions of these two groups of control signals is as follows:

Data acquisition control - sequence. Controls the sequencing and range changing of the data acquisition system, using further decodes from AD2 to AD5 to generate the relevant strobes.

Data acquisition control - devices. This memory space, when decoded from AD2 to AD5, gives write strobes to enable loading of various DACs on the Analogue board.

The exact addresses of these strobes are given below:

Data Acquisition control - sequence

Read strobes		Write strobes	
7DF0003CH	COMP-RD	7DF0001CH	LOAD_RNG
7DF00038H	RNG_RD	7DF00018H	FRQLD_L
7DF00034H	FIFO_RD	7DF00014H	MUXLD_L
7DF00030H	DAQ_GO	7DF00010H	FIF0_DIS
7DF0002CH	INT_CLR	7DF0000CH	AVLD_L
7DF00028H	Spare	7DF00008H	DAQ_CONT
7DF00024H	Spare	7DF00004H	RNG_DIS
7DF00020H	Spare	7DF00000H	Spare

Data acquisition control - devices

Write strobes		Write strobes	
7DE0003CH	CH1OM_L	7DE0001CH	CDACLS_L
7DE00038H	CH1OL_L	7DE00018H	CDACMS_L
7DE00034H	CH2OM_L	7DE00014H	CONTST_L
7DE00030H	CH2OL_L	7DE00010H	SPARE_L
7DE0002CH	CH3OM_L	7DE0000CH	Spare
7DE00028H	CH3OL_L	7DE00008H	Spare
7DE00024H	CH4OM_L	7DE00004H	Spare
7DE00020H	CH4OL_L	7DE00000H	Spare

Main Processor, Address Latches, Decoding and Support

Circuit diagram: Fig. 7-36.

Main Processor

The processor used is an Inmos T805 Transputer (IC1), running at 20 MHz, from an external clock input of 5 MHz. Control and diagnostics are provided by RESET, ERROR and ANALYSE, which are derived from MERRORL, MANALL, MRESL and SRESETL, using ICs 2, 3 and 4. This logic is required so that the Digital board may be used as a transputer sub-system and be booted via an external link for debugging. In addition, the logic is required to control the graphics transputer (on the Analogue board) and transputers in any adaptor that may be fitted to the MTS. (With an adaptor fitted, access to the transputer sub-system, and thus the Digital board, will be via the adaptor.) MERRORL is an open-collector signal, comprising the wired-or of the ERROR and GRERROR signals of the Digital board transputer and the graphics transputer respectively.

The transputer provides a number of configurable strobes (see 'Memconfig') which are used to control the address cycles:

S0	-	Used as address latch enable
S1	-	Used as RAS for DRAM
S2	-	Used to multiplex row and column addresses for DRAM
S3	-	Used as CAS for DRAM
S4	-	Used to control bi-directional tri-state buffers on the data bus

Graphics Transputer and Adapter Interface

Communication between the Digital board transputer and the graphics transputer on the Analogue board are provided by serial links ALINKIN/OUT, BLINKIN/OUT and CLINKIN/OUT. DLINKIN/OUT is reserved for connection to adaptors connected to the MTS. Link speeds may be set at 10 or 20 MBits/s. Link D speed may be set independently, whilst links A, B and C must be set collectively.

Output links to the graphics transputer are series terminated via 47 Ω resistors, and input links are protected from static by a diode-resistor network. Links to the adapter are also buffered by AC logic (IC5), as recommended by Inmos for links travelling over relatively large distances.

Address Latches

Address latches are required to capture the valid address from the multiplexed address/data bus. 74AC573 octal transparent latches are used (ICs 14, 15, 16 and 17). Their transparency means that addresses may settle at peripherals and memory before validation and thus chip or device selects. The transputer strobe S0 is used to control the latch, and thus hold the address during the access cycle.

D0 to D26, D31, ND1 and ND0 are latched to give AD0 to AD26, AD31, NRF ('not refresh') and NWR ('not write'), respectively. (ND1 and ND0 are the inverts of D1 and D0.)

Address Decoding

The address mapping is described in 'Memory Map and Address Ranges'; the following deals with the hardware required to decode the top level select lines.

EPROM, peripherals and memory are mapped at the most significant area of address space, with the exception of DRAM which is mapped at the least significant area of address space so as to be contiguous to transputer internal memory. (The decoding of DRAM is described later.)

Since the transputer uses a multiplexed address/data bus, it is essential to validate all addresses so that data on the bus cannot be interpreted as an address. To do this three signals are used:

AD31 - must be low
NRF - must be low
S0 - must be low

These signals are gated by a IC5 to produce the VALID signal, which enables the decode logic. Decoding is provided by IC18 and IC19, which decodes address lines AD22 - AD25 to produce active low select lines.

Event Handler

An event handler is required to control five possible interrupting sources and generate a single active high EVENT signal. Following an EVENT being received by the transputer, the interrupting device also needs to be identified. This task is performed by a programmable logic device (IC8). The function of this PLD is to generate an active high EVENT signal if one or more interrupts are active. Once an interrupt has been detected, the interrupting device may be identified by reading the output of the PLD. Although the interrupts are not latched at the PLD there is no danger of losing them as they are all latched at source and require a separate operation to clear them.

The interrupt status buffer is resident at the address range 7E000000H to 7E3FFFFFH

Data bits used by this register are:

D31	GPIB INT	GPIB Interrupt
D30	KEY INT	Keyboard Interrupt
D29	CENT INT	Centronics Interrupt
D28	FIFO INT	Data Acquisition Interrupt
D27	FRQ INT	Data Acquisition Interrupt
D26	Always Low	
D25	Always Low	
D24	Always Low	

All interrupts are active high.

Wait State Generator

A wait state generator is required to stretch address cycles for slow peripherals and memory, whilst maintaining fast address cycles for latches, DRAM and static RAM. ICs 10, 11 and 12 collectively perform this function. The fastest address cycle is set at three processor cycles (150 ns). This is determined by 'Memconfig' which is dealt with later. The wait state generator, however allows the total cycle time to be increased up to 550 ns, in 50 ns steps.

All the high level address decode lines are fed into a PLD (IC11) so the number of wait states inserted is dependent upon the selected address. The signal RFD1 is also fed into the PLD; this enables refresh cycles to be performed as fast as possible.

Wait states are inserted by holding the transputer MEMWAIT pin high. MEMWAIT is set high by an SR latch (IC12) when the S0 strobe goes low, and an inverted S0 is fed to shift register IC10. This shift register is clocked from the processor output clock, and therefore runs synchronously with the processor. All eight outputs of the shift register are fed to the PLD. An active high pulse (OUT) is generated by the PLD when the inverted S0 pulse has been shifted a specified number of times. This is determined by the address present at the other PLD inputs.

Memconfig

Memconfig or memory configuration is the method of shaping the transputer strobes S1 to S4, and thus the timing of address cycles. In this system the memory configuration data is held in EPROM and loaded after a reset of the transputer. To ensure that an external configuration is loaded, rather than a preset internal configuration, the MEMCONFIG pin of the transputer is tied to the inverse of D0. This causes the transputer to expect an external configuration and to read the most significant locations of EPROM, from 7FFFFF6CH to 7FFFFFF8H, where the configuration data is held at data bit 0. This enables the external address cycles to be changed by modifying the EPROM code.

Buffering

By careful distribution of devices across the 32-bit data bus it is unnecessary to buffer the data bus, and AC address latches provide adequate drive for the address bus. It is, however, necessary to buffer the RD line due to the large loading. It is split into two signals, RD1 and RD2; these are identical in timing but serve different areas of circuitry. These signals are buffered by IC20.

EPROM and Dynamic RAM

Circuit diagram: Fig. 7-37.

EPROM Size Selector

Two MBytes of EPROM are required for the Digital board, organised as 512K x 32; this requires two blocks of four 256K x 8 EPROMs. If required, 4 MBit (512K x 8) devices can be fitted instead. As EPROM is to be mapped at the most significant address range, a method is required to keep the EPROM continuous between blocks, and at the top address range whether 2 MBit or 4 MBit devices are fitted. This is achieved by ICs 2, 21 and 22.

Decoding for the two blocks is provided by 2-to-4 decoder IC21. It is enabled by the high level decode signal EPROM, and provides four select lines decoded from AD20 and AD21. The select lines are gated by IC2 to produce select lines for 2 MBit devices, whilst the two most significant select lines from the decoder are select lines for 1 MBit devices. IC22 then multiplexes these select lines dependent on the setting of a switch that selects the device type (Fig. 7-40).

EPROM

The two blocks of EPROM are selected by the signals SEL0 and SEL1, which are the outputs of multiplexer IC22. These select lines enable ICs 28 to 31 and ICs 32 to 35 respectively. Address lines AD2 to AD20 are routed to the devices.

The top address for EPROM is 7FFFFFFFH

The start address for 2 MByte is 7FE00000H

The start address for 4 MByte is 7FC00000H

The full data bus width of 32 bits is used for these devices.

DRAM

The Digital board is fitted with eight 1 MB x 4 DRAM devices, giving 4 MBytes of memory. The DRAM is required as program workspace and must therefore be contiguous with the internal RAM of the transputer. This means it must reside in the least significant address area.

In earlier instruments, decoding was provided by IC23 and address lines AD20 to AD22, to allow for different memory configurations. In the 6200B only AD22 is used, resulting in one select line, DR0. DR1 is not used.

Three signals are used to select the decoder IC, and therefore the DRAM:

AD31 - must be high
NRF - must be low
S0 - must be low

Note that DRAM is also disabled during refresh addressing; this is because the select lines DR0 and DR1 generate CAS, which is not needed for refresh.

Row and column addresses are provided by three multiplexers, IC25 to 27, which take transputer addresses AD2 to AD19. The multiplexer select is provided by transputer strobe S2. DR0 is gated with S3 to give CAS0, which selects the DRAM. 47 Ω resistors are used to damp undershoot and overshoot of signals which drive the highly capacitive DRAM.

EEROM, GPIB, Centronics and Keyboard

Circuit diagram: Fig. 7-38.

EEROM

Two EEROM devices are provided on the Digital board, which may be either 8K x 8 (X2864) or 32K x 8 (X28256). The devices (IC52 and 53) are decoded from the top level address decode and organised as a 16-bit block. Addresses AD2 to AD16 are used, which allows for the use of 32K devices. The devices are mapped on to data lines D16 to D31 of the transputer bus. The devices are mapped within the range 7F800000H to 7FBFFFFFH

GPIB Interface

This interface is implemented using the NEC 7210 GPIB interface controller (IC57) and buffers IC58 and 59. Decoding is from the top level and address lines AD2 to AD4 are provided for access to internal registers. The 7210 connects to an 8-bit data bus and is mapped onto bits D8 to D15. The active high interrupt (GPIB INT) is routed to the EVENT handler, which has been described earlier. The address range of the GPIB interface is 7F400000H to 7F7FFFFFH.

Keyboard Interface

A 9-wire fast serial link is used to transfer data between the processor on the Digital board and the micro-controller on the Keyboard PCB. Two shift registers are used, one for input from the front panel (IC56), and the other for output to the front panel (IC55). Output handshake lines RACK (Receipt ACKnowledge) and RRQST (Receipt ReQueST) are derived from reading the input and writing to the output shift registers respectively.

Input handshake line BTF provides the source for KEYINT, the keyboard interrupt, which indicates the transfer of a byte across the serial interface. This interrupt is latched by SR latch IC 54a/b, and is routed to the EVENT handler (described earlier). The interrupt is cleared by KINTCLR which, along with the keyboard interface shift registers, is mapped at the top level of decode.

After receiving an interrupt from the front panel, the action to be taken depends upon the status of the RX/TX line, which is controlled by the 8031 micro-controller on the Keyboard PCB. This signal is latched by IC60a and the output fed to a software readable status buffer (see 'Digital Board Status Buffer').

The shift registers are mapped on to data bus bits D16 to D23. The address ranges are:

KEYBOARD - 7C400000H to 7C7FFFFFH
KINTCLR - 7C000000H to 7C3FFFFFH

Centronics Interface

The Centronics interface uses an output latch (IC63) to send parallel data bytes, a dual monostable (IC62) to generate a valid data signal called STROBE, and a status buffer (IC64) to read the printer status.

The interface is decoded at the top level, and the output latch and status register are mapped at the same location. It is enabled by the signal CENTRON when strobed with read or write. Data is latched into the output byte by the write strobe. This strobe also starts the timing sequence for STROBE, an active low signal that must be high for 50 µs after data becomes valid, then go low for at least 1 µs. This is accomplished with dual monostable IC62.

If the printer receives the byte, it sends back an acknowledge pulse, ACK. This pulse sets SR latch IC54c/d and creates an interrupt. This interrupt is dealt with by the EVENT handler, discussed previously. This interrupt may be cleared by reading the status register, which determines whether another byte may be sent.

Both the output latch and status register are mapped at the same location, and use bits D24 to D31 on the data bus. The address range is 7D000000H to 7D3FFFFFH

The status register outputs the printer status onto the data bus as follows:

D31	ACK	Printer acknowledge - active low
D30	BUSY	Printer busy - active high
D29	PAPER	Paper empty - active high
D28	SELECT	Printer selected - active high
D27	ERROR	Printer error - active low
D26	Always low	
D25	Always low	
D24	Always low	

Non-Volatile Circuits, Source, and Memory Card / Disk Drive Interfaces

Circuit diagram: Fig. 7-39.

Non-Volatile Circuits

Non-volatile circuits includes a real-time clock and 512 KBytes of low power static RAM, which are powered from the same battery and use the same control circuitry. The battery is a long life 1800 mAH Lithium Thionyl Chloride which is mounted on the rear panel, connection being made via PLK.

Battery Back-Up and Protection

The battery back-up circuit has two parts: control of the switching from battery to the +5 V supply rail, and the isolation switch which prevents the non-volatile devices from being selected during power-up or power-down transitions.

The power switching circuit operates upon the principle of supplying the non-volatile devices from the same +5 V supply as the rest of the components on the board, but from a separate 0 V supply, which is connected to the battery. During power-up the 0 V supply to the non-volatile devices (called GROUND) is connected, via transistor TR2, to the 0 V supply for the rest of the board. As power fails, however, the two circuits are isolated as TR2 turns off.

The positive terminal of the battery is connected to the +5 V line via resistor R64 and low forward-drop diode D5. The diode prevents reverse charging of the battery, while the resistor provides a guard against discharge and also a method of measuring battery supply current. When the supply rail rises to just over 4 V, TR1 is biased on, which in turn biases TR2 into conduction, and the main power supply is reconnected. TR1 is necessary to prevent leakage through R67 during power down.

In addition to maintaining a continuous supply to the real-time clock and static RAM, it is necessary to prevent them from being selected by random addresses on the bus during power-up and power-down. Quad bilateral switch IC65 is used for this purpose, by isolating the select lines for the real-time clock, static RAM and memory card. (The memory card has its own internal battery.) Pull-up resistors are provided on the device side of the switch to keep the chip select inputs high relative to the power supplies of the devices.

The battery is held in a battery holder at the rear of the instrument. A transient suppressor is connected between the battery positive terminal and ground to prevent problems due to electrostatic discharge.

Real-Time Clock

A 58274 real-time clock is used (IC66), taking its reference from a free-running 32.768 kHz crystal oscillator (XL1). All connections to the real-time clock are buffered due to the high input leakage current of its metal gate inputs. This is done using transceivers IC67 and 68. The data bus is also buffered for another reason; this is because the tri-state enable time at the end of a read cycle is so long as to possibly overlap with the next processor cycle and cause bus contention.

The real-time clock uses data bits D16 to D19, and is supplied with four address lines AD2 to AD5 for access to the internal counting registers. The real-time clock is mapped at the top level decode and occupies the address range 7C800000H - 7CBFFFFFH.

Static RAM

Static RAM is provided for calibration and instrument set-up stores. It is protected against corruption as described earlier ('Battery Back-Up and Protection'). Four 128K x 8 devices are provided (IC74 to 77), organised as 128K x 32 bit, giving a total of 512 KBytes.

The static RAM is mapped at the top level of decode and has an address range of 7F000000H to 7F3FFFFFH. It is mapped across the full width of the bus, and uses addresses lines AD2 to AD18.

Memory Card / Disk Drive Interface

The interface circuitry for the memory card and floppy disk drive comprises a set of tri-state buffers and transceivers, enabled only when the memory card or disk drive s selected. The 8-bit data bus is connected via IC70 and bits D8 to D15 are used. Addresses lines AD2 to AD21, and read and write signals, are connected through buffers IC71 to 73).

The transputer strobe S4 is used to control the flow of data to and from the memory card or disk drive. (S4 is low during the data phase of the transputer address cycle). The signal (MCPROT) is actually RESETL, and means that the active high device select of the memory card is always low during a reset condition, i.e. power-up or power-down. The signal MCDET is not used.

The interface is connected to both the memory card (via the Memory Card PCB) and the Floppy Drive Controller PCB via a special cable that has three connectors. Address line AD21 determines which device is to be read from or written to. The address range of the interface is 7EC00000H to 7EFFFFFFH.

Source Interface

This interface is similar to that of the memory card in that it consists of a set of tri-state buffers and transceivers, enabled only during access to the source. A 16-bit bi-directional data bus is used, and is mapped onto bits D16 to D31. These signals are handled by bus transceivers IC79 and 80. Transputer strobe S4 is used to control data flow through the data transceivers.

Addresses AD2 to AD9, and the read and write signals SRD and SWR, are routed to the source via tri-state buffers IC78 and 81. The address range is 7E800000H to 7EBFFFFFH.

Data Acquisition Control and Status

Circuit diagram: Fig. 7-40.

Auxiliary Interface

This interface is similar to both the memory card / disk drive and source interfaces. Three addresses, AD2 to AD4, are sent to the Auxiliary Interface board, along with a write strobe, CALSTB; these are buffered by IC84. The data bus is only used for writes to the Auxiliary Interface board, which is buffered by IC85. The Auxiliary Interface is mapped at the top level of decode, and onto bits D16 to D23. The address range is 7D800000H to 7DBFFFFFH

Power for the Auxiliary Interface board is routed via the Digital board, and taken down the same cable as the above signals.

Digital Board Status Buffer

A status buffer is provided to allow the state of the Digital board, and other PCBs within the instrument, to be monitored by software. This buffer is mapped at the top level of decode and is mapped across bits D16 to D31. IC82 and 83 are used for this purpose. The address range for the status buffer is 7CC00000H to 7CFFFFFFH

The bit assignments are as follows:

D31	TOG3	Three lines available to decode up to eight possible types of adaptor
D30	TOG2	
D29	TOG1	
D28	GUZPRESL	Adaptor present if low
D27	HOTL	PSU is hot if low
D26	CALOPT1	Build state of Auxiliary Interface PCB
D25	CALOPT2	DATA OUT signal from Auxiliary Interface PCB
D24	CALOPT3	DATA READY signal from Auxiliary Interface PCB
D23	DIRSTATE	Keyboard in TX mode if high
D22	MCDET	Not used
D21	LINK0	Adaptor speed 10 MBits/s if low
D20	not used	
D19	not used	
D18	Always low	

D17	Always low
D16	Always low

Select Switches

Eight SPST switches are provided to allow for debug, contingencies and future products. The switch lines are pulled high when the switches are open, and are pulled low by closing the switch. The switches control the following options:

BFROM	Open to allow boot from ROM
LINK123	Open for 20 MBits, closed for 10 MBits
LINK0	Open for 20 MBits, closed for 10 MBits
OPTION3	not used
OPTION4	not used
ROMMUX	Open for 256K x 8, closed for 512K x 8
OPTIONS1	not used
OPTIONS2	not used

The OPTIONS switch settings represented the build state of older instruments (6200, 6200A). Build state information in the 6200B is held in firmware and the switch settings are disregarded by the MTS.

Data Acquisition Control

This consists of two areas, as described in the 'Low Level Address Decode' section. The two areas, "sequence" and "devices" are decoded from the top level decode signal DACS. This select signals are provided by IC21b, using AD20 and AD21. The "sequence" area is decoded at the most significant level and the "devices" area at the next level down, leaving two spare decodes at this level. The DACS address range is 7DC00000H to 7DFFFFFFH

Data Acquisition - Sequence

A set of strobes are required to read and write values to latches and counters that provide the data acquisition sequencing and range changing. IC89 and 90 are used to decode the write and read strobes respectively, using AD2 to AD5 as the decoding addresses. The devices in this range are mapped onto data bus bits D0 to D15. For the address ranges and lower level memory map refer to 'Low Level Address Decode'.

Data Acquisition - Devices

A set of strobes are required to load values into DACs on the Analogue board. These write strobes are generated by IC87 and 88 using AD2 to AD5 to decode the various strobes. A write only tri-state data bus is connected to the Analogue board by buffer IC91. The devices are mapped onto data bus bits D16 to D23. For the address ranges and lower level memory map refer to 'Low Level Address Decode'.

EEPROM Detector Calibration Reader

IC86, IC401 to 403 provide a bi-directional serial interface that is used to control the reading and writing of calibration data held in EEPROM in the 6230A/L Series detectors. The PLD IC86 provides a clock signal (ID_SCL) that is used for clocking the serial data (ID_SDA) into and out of the EEPROM. The 0 to +5 V clock output from IC86 is inverted by IC402c to provide a 0 to –5 V clock signal for the detector. In addition to clocking data, this signal is also applied to a charge pump circuit within the detector in order to provide a –5 V supply for the EEPROM.

The logic level at IC86 pin 17 is used to control the direction of data transmission, via the analogue switches IC401, 403. When data is to be written to the detector EEPROM, the PLD output is routed through

IC402a which inverts the logic levels, as for the clock output. Incoming data from the detector is routed through IC402b, which converts the data back to positive logic levels.

Clock Synchronisation Circuits

Circuit diagram: Fig. 7-41.

This part of the board consists of two phase-locked loops (PLLs) which generate 22 MHz and 20 MHz clocks, phase-locked to a 1 MHz reference from the synthesizer. As the two frequencies are so close to each other, the PLLs are essentially identical, but with different division factors in the feedback loop. Only the circuit that generates 22 MHz will be explained, with the differences in the 20 MHz PLL subsequently being mentioned.

22 MHz PLL

The basic blocks of this circuit are: phase detector, charge-pump, low-pass filter, VCO and divider chain.

Phase Detector. The 1 MHz reference from the synthesizer is first buffered by IC201a. IC202 and IC203a then form a type 2 phase detector, responding only to clock edges and so insensitive to variations in duty cycle of the reference frequency. This stage produces positive or negative going voltage pulses depending on whether the VCO's frequency needs to be raised or lowered.

Charge Pump. TR201, TR202 and associated components form a charge pump to convert the voltage pulses from the phase detector into current pulses, which are smoothed by a low-pass filter.

Low-Pass Filter. R203 and C216 may also be regarded as a charge store, holding a potential to drive the VCO, the frequency of which may be raised or lowered by pulses received from the charge pump.

VCO. This is based around TR203 and associated components. The frequency of oscillation is set by the parallel resonant circuit formed by L201 + L202 and the capacitance of D203. This changes from about 40 pF to 10 pF as the diode's reverse bias increases from 1 V to 10 V. Component values are chosen so that with the diode in approximately the middle of its capacitance range the VCO oscillates at 44 MHz. The output of the VCO is level shifted and converted to a square wave by IC204a and preceding components.

The VCO operates at twice the nominal clock frequency so that a simple divide-by-2 stage will yield a 22 MHz square wave with a 50% duty cycle. This is achieved by IC205a, which is a 74AC type device for minimum skew. The VCO has a pulling range about its nominal lock frequency of ±8 MHz and the PLL in general can acquire lock onto a reference signal of 1 MHz ±150 kHz. From the time power is applied the loop is locked within 5 ms, i.e. well before SYSRESET goes high.

Divider Chain. This part of the circuit divides the output frequency of the PLL and feeds the result back to the phase detector for comparison with the 1 MHz reference. IC205b, 6 and 7a perform the divide-by-22 function.

20 MHz PLL

The VCO in this circuit (TR206 etc.) is designed to run at 40 MHz with the output again divided by 2 to provide a 50% duty cycle square wave at 20 MHz. IC210b and 11 form the divide-by-20 chain.

Programmable Output

Circuit diagram: Fig. 7-42.

The Programmable Output is a precision bipolar voltage/current source with various software controlled functions, as follows:

Volts/GHz. This is an output voltage proportional to frequency. It is selected by the user to be either 1 V or 0.5 V/GHz, giving a maximum 20 V output in the 1 V/GHz mode, with the scaling handled by software.

Constant Voltage/Current Source. This is a user programmable voltage/current source for bias measurements. In voltage mode the range available is ±15 V; in current mode the range available is ±150 mA.

Chart Recorder Output. This is an analogue output for chart recorders, used when making power meter measurements and required to operate in both log and linear modes. The linear (Watt) mode gives an output of 0 to 5 V, and the log mode an output of 0 to 7 V (1 V per decade).

Swept Voltage/current Source. This enables voltage or current (within the range specified by the constant V/I source) to be swept as a user-defined function.

The circuit may be split into four main areas:

Voltage Reference and DAC

DAC Voltage Amplifier

Output Stage

Current Sensing

Voltage Reference and DAC

IC213 provides a precision 5 V reference (±3 mV) to IC214, a 16-bit DAC. This is configured to give a bipolar voltage output in the range -5 V to +5 V.

The programmable output is set to voltage or current mode using the MSB of the data bus. This is latched into IC254a when the DAC is written to, and controls analogue switch IC218. When the MSB is set high, current mode is selected; a low level corresponds to voltage mode. The remaining 15 bits of the data bus set the magnitude of the DAC output voltage, the LSB input being tied to ground. Thus an LSB on the data bus corresponds to a DAC output voltage of 305 µV.

The code table for the DAC is as follows:

D14 - Data Bus - D0	Analogue Output (Volts)
111 1111 1111 1111	+5 × (32766/32768)
100 0000 0000 0001	+5 × (2/32768)
100 0000 0000 0000	0
011 1111 1111 1111	-5 × (2/32768)
000 0000 0000 0000	-5 × (32768/32768)

This is followed by an amplifier with a fixed gain of 4 to provide the necessary voltage swing. The overall scaling is such that the same DAC code provides full scale output whether in voltage or current mode, i.e.

0111 0000 0000 0000	+15 V
1111 0000 0000 0000	+150 mA
0011 0111 1111 1111	-2.5 V
1011 0111 1111 1111	-25 mA

DAC Voltage Amplifier

IC216 provides the gain of 4 required after the DAC to give a maximum 20 V output when the 1 V/GHz mode is selected. A drawback of this high voltage op-amp is its large input offset voltage (appearing at the output multiplied by 4). To counter this, IC215 and associated components are used to bias the offset nulling pins of IC216 with the effect that the overall offset voltage of the amplifier stage is set by that of IC215 (multiplied by 4), whilst still maintaining the output swing of IC216. Note that the feedback to this amplifier is taken after the output stage, reducing distortion there.

Output Stage

Transistors TR209 and TR210 form a class AB amplifier to achieve the current drive requirements of the constant V/I source mode. Transistors TR207 and TR208 with resistors R239-244 form an overcurrent protection circuit. If too great a load, including a short-circuit, is placed on the programmable output whilst in voltage mode then this will limit the current drawn to approximately ±300 mA, preventing overheating and failure of the output stage.

Current Sensing

R229 is a high precision (0.02%) resistor which appears in series with any load connected to the programmable output. In voltage mode, feedback to IC216 is derived across the load, whilst in current mode a sense voltage is detected across R229. This is then buffered by differential amplifier IC217, which provides the feedback to IC216.

The same code on the data bus gives full scale values whether in voltage or current mode. 150 mA flowing through R229 produces a 1.5 V drop which is sensed by IC217 and maintained for full scale current output. In order for this to be the same code that gives 15 V output, the voltage from the DAC is reduced by a factor of 10 in current mode, achieved by R228.

Data Acquisition Sequence Control

Circuit diagram: Fig. 7-43, 7-44.

The data acquisition sequence control is responsible for the control of the following modules:

Fend (front end) Amplifier Range.

16-bit ADC.

Track and Hold.

Averaging.

ADC Multiplexer.

Frequency Step Counter.

Data Acquisition Control Register.

The data acquisition sequence control uses the following programmable logic devices (PLDs):

IC No.	Function
IC105	Total sequence Control
IC124	ADC Sequence Counter

IC125	ADC Sequence Decoder
IC101	Fend Autorange Control
IC118	Range Control, CH1/2
IC119	Range Control, CH3/4

IC118 and IC119 are internally identical and serve the same purpose but for different Fend amplifier channels.

Fend Range Control

This can operate in three modes:

Mode (1):	Range Up/Down, maximum of six times/autorange.
Mode (2):	Range Up only, maximum of six times/autorange.
Mode (3):	Preset directly under control of the main processor.

Modes (1) and (2) range control occur during an autorange sequence. Each range control channel changes range, one range at a time, dependent upon the state of that channels range comparators. The ICs that control the range for each channel are as follows:

IC No.	Function
IC112	Range Counter Channel 1
IC113	Range Counter Channel 2
IC114	Range Counter Channel 3
IC115	Range Counter Channel 4
IC 118	Range Comparator Decoder, CH1/2
IC 119	Range Comparator Decoder, CH3/4

If the range comparator for a channel indicates that the Fend amplifier is now within range, the autoranging for that channel stops. When all channels are within range or six range change sequences have taken place then the data acquisition sequence continues on to its next task.

After a mode (1) autorange has taken place, there is a delay of 106 µs and then the range comparators are re-examined. If any of the channels are found to be out of range then a mode (2) autorange sequence takes place. This is the same as a mode (1) autorange sequence but only allows the ranges to decrement, not increment.

The mode (3) range control allows the main processor to directly set the range of each Fend amplifier. This can be used to force the autorange sequence to stay on one range during a data acquisition sequence. This is used for calibration or during a power meter measurement.

The range value and range comparator value of each channel can be read from the data bus by the main processor using IC120, 121 and 123:

Fend Amplifier Range Value			Range Comparator Value		
CH1_A0	D0		TFB_1	D3	
CH1_A1	D1		TFL_1	D2	
CH1_A2	D2		TFB_2	D1	
CH2_A0	D3		TFL_2	D0	
CH2_A1	D4	IC120	TFB_3	D4	IC123
CH2_A2	D5		TFL_3	D5	
CH3_A0	D6		TFB_4	D6	
CH3_A1	D7		TFL_4	D7	
CH3_A2	D8				
CH4_A0	D9	IC121			
CH4_A1	D10				
CH4_A2	D11				

ICs 120 and 121 are read using the RNG_RD strobe; IC123 is read using the COMP_RD strobe.

16-Bit ADC Control

This is responsible for the control of the 16-bit ADC resident on the Analogue Board. The following signals are used to control the ADC :

HOLD_L

SCLK

RES_ADC

HOLD_L and SCLK are generated by the ADC sequence decoder IC125 in conjunction with the ADC sequence counter IC124. RES_ADC is generated by the data acquisition control register IC130. The falling edge of HOLD_L initiates an ADC conversion and SCLK shifts the 16-bit serial data out of the ADC into two 8-bit serial-to-parallel shift registers (IC126, 127) to produce a 16-bit parallel word. This word is then stored in the lower 8 data bits of two 512 x 9 FIFOs (IC128, 129). The store function is also controlled by the ADC sequence decoder IC125.

The FIFO store/interrupt function can be disabled directly from the main processor by using the FIFO_DIS strobe and D0 (IC117b and 100c):

D0 = 1 enable FIFO store/interrupt.

D0 = 0 disable FIFO store/interrupt.

RES_ADC is controlled by the main processor using the DAQ_CONT strobe and D6:

D6 = 1 ADC normal operation.

D6 = 0 ADC reset.

RES_ADC needs to be held low for a minimum of 150 ns, but the ADC will not resume normal operation until 1.6 s after RES_ADC is taken high again.

Track and Hold

The TRK_HLD signal controls the sample and hold circuit on the Analogue board. The signal is generated by the ADC sequence decoder PLD (IC125). At the beginning of each ADC autosequence the signal is driven low for 5 µs to enable the sample and hold circuit to track the input signal; it then returns to the Hold state.

ADC Multiplexer

The ADC multiplexer on the Analogue board is controlled by a 4-bit pre-loadable up counter (IC116). The counter can be preset or disabled by the main processor. To preset the ADC multiplexer, channel data is written to the counter using D0 - D3 and the MUXLD_L strobe. The counter can be disabled using the MUX_DIS signal from the data acquisition control register (bit D4 of the data bus):

MUX_DIS =	1	enable counter.
MUX_DIS =	0	disable counter.

Using the preset and disable functions, the ADC multiplexer can be held on one particular channel for an entire sweep. During an autosequence, the counter is cleared at the beginning of each ADC sequence, then incremented near the end of each ADC conversion (to allow for multiplexer settling).

The control signals from the counter to the ADC multiplexer are as follows:

MUX_A0	(LSB)
MUX_A1	
MUX_A2	
MUX_A3	(MSB)

Averaging

This uses two 4-bit down counters (IC108, 109) giving a maximum of 256 ADC autosequences. Due to the design of the circuit the actual number of average sequences done is one plus the number set by the main processor. The counters load the count value from an 8-bit latch (IC106) at the beginning of each new average sequence. The latch is set from the main processor using D0 - D7 and the AVLD_L strobe. The counters are decremented at the end of each ADC sequence. At the beginning of the last ADC sequence (or first if count = 1) a step source interrupt is issued using IC131b. This can be cleared by the main processor using the INT_CLR strobe.

Frequency Point Counter

The data acquisition system can be set to automatically run through its sequence up to 65535 times. This is preset by loading two 8-bit down counters (IC103, 104) with the number required. These are set by the main processor using D0 - D15 and the FRQLD_L strobe (D0 - D7 is the most significant byte; D8 - D15 is the least significant byte). When the count reaches zero, detected by IC98c, the signal STOPIT is asserted which halts the Total Sequence Control PLD (IC105).

Data Acquisition Control Register

This comprises two 8-bit latches (IC130, 107) which are controlled by the main processor using D0 - D15 and the DAQ_CONT strobe. The following signals are controlled by this function:

Data	Signal	Function
D0	GMUX_A0	Not used
D1	GMUX_A1	Not used
D2	FEND_CAL	Controls FEND Amplifiers Cal Switch (cal = high).
D3	FILTER_2	Controls Slow Sweep Filter.

D4	DIS_MUX	Disables ADC Multiplexer (disable = low).
D5	DEL_CHNG	Changes sweep time for power meters (fast = high).
D6	RES_ADC	Reset of 16-bit ADC and FIFOs (reset = low).
D7	HIRES_L	Modifies comparator thresholds for Reflection Analyzer
D8	CH1GMA0	Controls Alt Input Multiplexers
D9	CH1GMA1	
D10	CH2GMA0	
D11	CH2GMA1	
D12	CH3GMA0	
D13	CH3GMA1	
D14	CH4GMA0	
D15	CH4GMA1	

TOT_CTRL PLD

This PLD (IC105) is responsible for the control and timing of the data acquisition sequence. It initiates autorange and ADC sequences and controls the source settling delay.

The device is configured as a 7-bit up counter with programmable end point and decoded state outputs. The PLD can be represented as a 128 state truth table. Each line in the truth table is separated by one clock pulse (1.45 μs). This allows the timings to be easily modified to increase or decrease system timings. At preset points in the count sequence the following signals are asserted:

Signal	Function
RNG_GO	Trigger autorange (IC105 pin 20).
ADC_GO	Trigger ADC sequence (IC105 pin 21).
UP_ONLY	Direction of autorange (IC105 pin 19).

When the PLD issues a RNG_GO or ADC_GO signal the device halts until that task is complete. UP_ONLY is driven if a second autorange sequence is required. After the ADC sequence is complete the TOT_CTRL PLD waits a preset time to allow the source to settle, giving a total sequence time of 323 μs.

If a power meter measurement is being made then the DEL_CHNG input to the PLD is driven to modify the delay to give a total sequence time of 267 μs. This is because the chopper rate is an exact multiple of the total sequence time and should be 925 Hz ideally.

The TOT_CTRL PLD is triggered by the Main Processor using the DAQ_GO strobe.

ADC Sequence Control

This consists of two PLDs: the ADC sequence counter (IC124) and the.ADC sequence decoder (IC125). The ADC sequence counter PLD is resetable 8-bit up counter. The PLD will count from zero to a count set by the decoder PLD then back to zero etc. The counter is enabled by ADC_GO from the TOT_CTRL PLD, then triggered by HSYNC (from the Analogue board). It will continue running until the average counter has reached zero (indicated by the STOP signal from IC117a).

The ADC sequence decoder is implemented as a 256 state truth table with the following decoded outputs:

Signal	Function.
TRK_HLD	Sample/hold control.
HOLD_L	Initiate 16-bit ADC conversion.
SCLK	Serial clock for 16-bit ADC.
STORE	FIFO store control.
MUX_INC	Increments ADC multiplexer channel.
TOP_COUNT	Resets ADC counter PLD.

STORE can be disabled by the main processor using the FIFO_DIS strobe. This disables the FIFO_STORE signal using IC117b and 100c. TOP_COUNT also generates the FIFO_INT signal using IC131a. This interrupt can be reset from the main processor using the INT_CLR strobe.

FEND Autorange Control

This is controlled by the CLK_CTRL PLD in conjunction with a 4-bit counter (IC97) and associated logic. It is responsible for producing up to six RNG_CLK pulses to drive IC112 to 115, and controlling the autorange filter (FILTER_1).

When triggered by a RNG_GO signal from the TOT_CTRL PLD, the CLK_CTRL PLD halts the TOT_CTRL PLD using the HALT_RNG signal, then drives the FILTER_1 signal low. After allowing the filter to settle for 16 µs the PLD then enables IC97. The RCLK_FIN pin on the PLD (pin 14) is then driven by IC97 causing the PLD to halt. IC97 will then produce up to six RNG_CLK pulses dependent on the range comparators. When IC97 has finished it then releases the RCLK_FIN line and allows the PLD to resume its sequence. The FILTER_1 signal then goes high. After allowing the filter to settle for 106 µs, the PLD returns control to the TOT_CTRL PLD .

The sequence timings are as follows:

Start

  Filter out

  Wait 16 µs (settling time)

  Start range change - each change = 23 µs
no change = 0 µs,

  Filter in

  Wait 106 µs (settling time

Return control to TOT_CTRL PLD

Range Control

The RNG_CONT PLDs (IC118, 119) are responsible for controlling the range counter ICs (IC112 to 115) and supplying signals to the CLK_CTRL PLD. Each RNG_CONT PLD decodes its various input signals to provide control signals for two range counter ICs. The PLDs also produce a composite line (INRANGE) which indicates when all the range comparators are in range.

KEYBOARD PCB

Circuit diagram: Fig. 7-62, 7-63.

Introduction

The Keyboard is used to detect keypresses from a 6 x 8 matrix keypad, and movement from a rotary encoder. It also performs some degree of computation on this data (i.e. handling multiple keypresses, and working out average values for rotary encoder movement) and then passes the information to the Digital board (which contains the main processor) via a dedicated serial link. The Keyboard is controlled by an 80C31 microcontroller, executing code from an on-board EPROM.

Memory Map

The 80C31 has a 16-bit address bus and is thus able to address up to 64K locations. It also has the ability to execute EPROM code from 64K locations, so EPROM code space does not intrude in the memory mapping of the device.

The system is designed so that the keypad is mapped as external memory, and so may be read just like an area of RAM. Two control strobes (BTFL and RACKCLRL) are required for the interface to the main processor and these also are memory mapped. The memory map is divided into 11 sections, six for the keypad rows (an 8-bit byte is read back for the columns) and the rest for control signals. To access this external memory map the following signals from the 80C31 are required:

ALEL	Valid address	- must be low
PSENL	EPROM read	- must be high
A15	Address 15	- must be high

Addresses A11, A12, A13 and A14 are decoded as follows:

8000H - 87FFH	Keyboard Row 5
8800H - 8FFFH	Keyboard Row 4
9000H - 97FFH	Keyboard Row 3
9800H - 9FFFH	Keyboard Row 2
A000H - A7FFH	Keyboard Row 1
A800H - AFFFH	Keyboard Row 0
B000H - B7FFH	BTFL (byte transferred)
B800H - BFFFH	RACKCLRL
C000H - C7FFH	DYCAL1
C800H - CFFFH	DYCAL2
D000H - D7FFH	RRQSTCLRL

Processor and EPROM

As described previously, an 80C31 microcontroller (IC1) is used to control the front panel keyboard. This executes code contained in a 64K x 8 EPROM (IC3). Address latching is performed by a IC2 to provide the least significant addresses for the EPROM. The 80C31 is clocked at 10 MHz, which is derived from the same reference used for the Digital board. The reset signal for the keyboard is also shared with the Digital board.

Keypad and Rotary Encoder

The keypad is memory mapped within the keyboard processor address space. It is therefore controlled simply by 1 of 16 decoder IC4, which holds the addressed keypad row low, while the status may be read by the keypad column latch, IC5.

The tri-state buffers IC8 and 9 are included between the address decoder and the keypad so that only one row is actively driven at any one time. This solves the problem of several keys on the same column being pressed simultaneously, which would effectively connect multiple active outputs together. The address locations of the keypad rows may be found in the previous memory map section.

Rotary encoder movement is detected by using a dedicated interrupt. The hardware is configured using IC6 as a programmable inverter, such that when the 'A' output of the rotary encoder is equal to the value of the programmable output line PROGINV an interrupt is created. By reading the value of the 'A' output of the rotary encoder the direction of rotation may be determined, and the interrupt cleared by changing the state of the PROGINV line. The process may then be repeated. The software averages the number of left and right rotations over a small period of time and then sends the data with an identifying prefix to the host processor, via the serial link.

Host Processor Interface

The main processor interface links the 80C31 on the Keyboard to the T805 transputer on the Digital board. The 80C31 is used in "shift register" mode (Mode 1), and outputs serial data using the signal Tx(8031),together with a reference serial clock, SCL, which is used to load the data into a shift register on the Digital board. The frequency of the serial clock is set at one twelfth of the processor clock frequency, so runs at approximately 833 kHz.

The 80C31 is the controller for the interface and uses just two control lines for transfer of data (BTFL and RACKL). BTFL is an active low memory mapped signal which is an output of the Keyboard to signify that a byte has been sent down the serial interface, and that the transputer may read its input shift register. RACKL is an active low input to the Keyboard, which signifies that the transputer has read the data sent down the serial link and is ready to accept another byte. RACKL is an active low pulse which generates an active low interrupt to inform the 80C31 of this state. RACKINTL is cleared by the active low memory mapped strobe RACKCLRL.

For the shift registers on the Digital board to perform properly the signal Rx/Tx must be held high to denote that the Keyboard is in transmit mode, and held low when in receive mode. The keyboard is in receive mode when it is required to turn the 'RF ON' LED on and off, via IC10 and TR1.

The micrcontroller IC1 provides data and control signals for the Dynamic Calibrator board, via buffers IC10 and 11.

AUXILIARY INTERFACE PCB

Circuit diagram: Fig. 7-47, 7-48.

Introduction

The Auxiliary Interface board provides the following:

- Constant current source biasing for SP5T and SP2T switches on the microwave chassis of the 6200/6201/6203/6204. Similar control signals are required for the PIN switches within the pickoff/switch assembly of the 6202.
- Control of the step attenuator on the microwave chassis (if this option is fitted).
- External keyboard interface.

For the 46 GHz version of the MTS, the following additional functions are required:

- Control of the two PIN switches used to switch the 46 GHz amplifier in and out of the RF path.
- To provide a power supply for the 46 GHz amplifier, and a means of turning the amplifier on and off.

SP5T/SP2T Switches

SP5T

Five identical circuits are used to provide constant current biasing (±40 mA) to each arm of the switch. Negative bias switches an arm in whilst positive bias switches it out. Although all arms may be switched out simultaneously, only one will ever be switched in at any time, each being controlled by a separate data bit.

For example, data bit 0 determines whether the 10 MHz to 2 GHz oscillator is switched in. When the bit is set low, TR9 is turned on causing TR11 to source a positive current to the SP5T. The magnitude of this current is determined by the voltage drop across R11, set by D9. When data bit 0 is high, TR10 is turned on and the circuit sinks current from the SP5T, switching that arm in.

SP2T

These circuits occupy the same address as those for the SP5T and use two more data bits to switch in either the Coupler or Counter Test Port to the sampler in the synthesizer tray. The circuit operates in the same way as the SP5T driver, but with a biasing current of ±20 mA. The bias current for each switch arm is accurate to ±5%. Speed of switching is 2 µS maximum.

SP5T/SP2T Addressing

Addressing is accomplished using three address lines (CALAD2, CALAD1, CALAD0) and an active-low write strobe, CALSEL. (Signal names reflect the build state of earlier instruments, in which PIN diode and attenuator control circuitry was located on the Calibrator PCB.)

The data byte is written to address:

CALAD2	CALAD1	CALAD0
0	0	1

Summary of data byte:

Data bit	Function
CALD0	10 MHz - 2 GHz osc. in
CALD1	2 GHz - 8 GHz osc. in
CALD2	8 GHz - 12 GHz osc in
CALD3	12 GHz - 20 GHz osc. in

CALD4	20 GHz - 26.5 GHz osc. in
CALD5	Sampler to Coupler
CALD6	Sampler to COUNTER input
CALD7	Switches 46 GHz amp. in/out (46 GHz version MTS)

Each function above is achieved by setting the corresponding data bit to 1.

PIN Switches for the Pickoff/Switch Assembly (6202)

The 6202 does not contain SP5T/SP2T switches, but instead has a pickoff/switch assembly containing two PIN diode switches. These are controlled using the same data byte as for the SP5T/SP2T switches; only two data bits are used:

Data bit	Function
CALD0	RF on/off
CALD3	Connects COUNTER input to sampler

Step Attenuator

The 4-stage step attenuator in the MTS source uses eight control lines to pulse each stage either up or down. This is achieved by writing a data byte to address:

CALAD2	CALAD1	CALAD0
0	0	0

A stage is switched over by setting the appropriate bit high for 20 ms. The duration of this pulse is controlled in hardware, i.e. it is not necessary for software to reset the same bit 20 ms later. Only one stage is switched at a time to avoid overloading the +5 V supply. The circuitry which is responsible for this is IC3, TR1 to 8 and associated components.

Summary of data byte:

Data bit	Function
CALD0	20 dB out
CALD1	20 dB in
CALD2	10 dB out
CALD3	10 dB in
CALD4	20 dB out
CALD5	20 dB in
CALD6	20 dB out
CALD7	20 dB in

PIN Switches for 46 GHz Amplifier (6204)

For the 46 GHz version of the MTS (6204), the amplifier used is switched in or out by PIN diodes on its input and output. The circuit used to bias these is identical to that used for the SP2T, and occupy the same address. As both switches operate together the remaining data bit, CALD7, is used to select the amplifier.

Address summary:

CALAD2	CALAD1	CALAD0
0	0	1

Data bit	Function
CALD7	46 GHz amplifier (switched in when bit high)

Power Supply for 46 GHz Amplifier (6204)

The 46 GHz amplifier runs from a +12 V supply at approximately 370 mA. This is regulated down from +20 V using IC9, TR45 and associated components.

The supply can be disabled by setting the MSB high at address:

CALAD2	CALAD1	CALAD0
1	0	1

which brings the rail down to +1.2 V. This is done only when the amplifier has already been switched out of the RF path. Similarly, the amplifier is only switched in after the supply has been enabled.

External Keyboard Interface

The PAL device IC16 contains a counter, shift register and other logic that is used to control reading of the keypresses on an external keyboard connected to the rear panel of the MTS. The DATA OUT and DATA READY signals are sent to the Digital PCB where the keypress data is read by the microprocessor. (These signals are called CALOPT2 and CALOPT3 on the Digital PCB.)

DYNAMIC CALIBRATOR PCB

Circuit diagram: Fig. 7-71, 7-72.

Introduction

The Dynamic Calibrator board provides the following:

- A 0 dBm 50 MHz power reference for calibrating power sensors.
- Characterisation of the non-linearity of 6230A and 6230L Series detectors. The 'A' detectors require characterisation from −30 dBm to +20 dBm, the 'L' detectors from −24 dBm to +26 dBm.

Detector non-linearity is characterised by measuring a repeatable and linear attenuation step across the detector's non-linear dynamic range. Since the attenuation step is constant with power level, the measurements contain the necessary information to describe the detector's non-linear behaviour. The measurements are processed by the MTS software to provide linearity correction data that is stored in the detector's EEPROM.

A block diagram of the dynamic calibrator is shown in Fig. 1-9. A 50.326 MHz crystal oscillator is followed by a variable gain amplifier and a further fixed gain stage to produce the desired output power. A diode detector provides a DC signal proportional to the power level, which is compared to an adjustable voltage reference. The difference signal generated is used to adjust the variable gain amplifier.

A switching network allows selection of a 3 dB calibration step, a 10 dB verification step or a low-loss through state. The final 6 dB pad and through states are selected depending on which type of detector is being calibrated.

Crystal Oscillator / Amplifier

The 50 MHz oscillator is a Hartley type controlled by crystal XL1, providing a stable frequency of 50.326 MHz. The output is AC coupled into amplifier TR3, which is a dual-gate FET for gain control, with over 50 dB of adjustment. This is further amplified by the fixed gain microwave amplifier IC1.

A single transistor (TR5) operating as a class C amplifier is the output device and the oscillator/amplifier combination delivers >+29 dB output power.

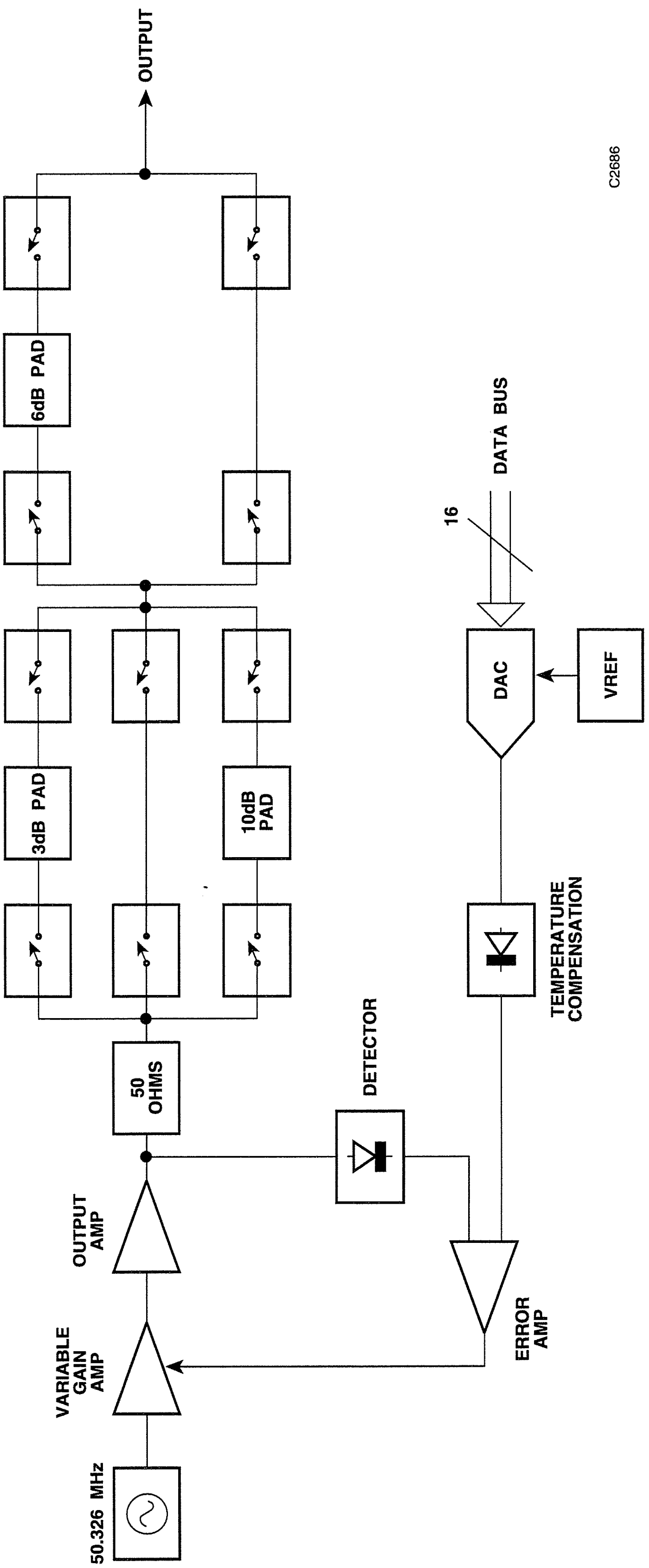
The power supply to the oscillator is switched on and off by TR1, TR2 and associated components, allowing the dynamic calibrator to be enabled/disabled.

Levelling Loop

D1 is a diode detector which produces a DC voltage at its cathode in proportion to the power level. The diode is forward biased via R17,18,48 to improve tangential sensitivity and hence reduce amplitude noise at the lowest output power (-24 dBm).

IC2 acts as an integrator whose inputs are the output of the levelling detector and the output of the levelling DAC IC4, buffered by IC3. IC2 then applies bias to the FET TR4, to force the loop to a power level determined by the code loaded into the levelling DAC.

When no power is applied there is a DC offset voltage equal to the diode's forward voltage, which is temperature dependent. Temperature changes around the detector diode would cause drifting, so thermal compensation is provided by placing a diode of the same type (D2), under similar biasing conditions, between the voltage reference and the non-inverting input of the error amplifier IC2.



Fig, 1-9 Dynamic Calibrator

The adjustable voltage reference comprises a 16-bit DAC (IC4) which is used to set the discrete power levels over the 50 dB dynamic range. The digital input to the DAC is derived from a microcontroller on the Keyboard PCB, and is loaded in two parts by means of latch IC6. The reason for the use of a high resolution DAC is the requirement for 12-bit resolution at 0 dBm output power where the calibrator is used as power reference standard.

Source Match

When levelled, the junction at the diode detector acts as a voltage source and exhibits zero output impedance. A series 50 Ω resistor (R15/R16) immediately following the levelling junction is used to achieve a source match > 40 dB. The 50 Ω resistor comprises two parallel connected 100 Ω resistors; this minimises resistance changes due to self-heating at high output powers.

Attenuation Steps

The source matching resistors are followed by an arrangement of passive attenuators and low-loss through states controlled by solid-state switches. The 3 dB step is switched in at each power level set and is measured by the detector being calibrated. Once the calibration is complete the 10 dB verification step is used to provide a confidence check that the calibration has been successful. The verification step is measured by the detector, with non-linearity correction applied, at different power levels and the measurements then checked for consistency, The 6 dB attenuation stage is switched in or out throughout these measurements depending on whether a standard ('A' version) or low VSWR ('L' version) detector is being calibrated.

The switching function is achieved using PIN diodes with current source biasing, and have very low ON resistance, low distortion and fast switching speed. Low ON resistance is necessary to maintain good source match and minimise self-heating in the diodes themselves; this could otherwise adversely affect the calibration procedure. The diodes also have low capacitance so that maximum isolation is provided when the devices are reverse biased.

Power Supplies

The board receives a +12 V supply from the PSU which is fed to the inputs of switching voltage regulators IC11 and 14 to produce regulated supplies of +20 V and −15 V. The +12 V input also goes to linear regulator IC13 which provides a +5 V regulated output. IC12 uses the +20 V output of IC11 to provide +15 V.

Calibration Process

A check is first performed to ensure that the detector to be calibrated has been connected to the POWER REF output of the MTS. This is done by measuring the voltage obtained from the detector with the RF turned off and then with the RF set to 0 dBm. The voltage of the 0 dBm measurement is retained and is used to determine the detector sensitivity.

The 6 dB pad is switched in or out depending on the detector type. Setting it in this way allows the remainder of the calibration to proceed in the same way irrespective of the type of detector connected.

The repeatable attenuation step is measured at power levels from −24 dBm to +26 dBm at the output of the levelling loop, at intervals of approximately 1 dB. This provides 51 measurements of the repeatable step. Neither the power levels nor the attenuation step need be precisely known; the only conditions are that the attenuation step is constant with power level and that a sufficient number of power levels are used. The process always starts at low power levels so that calibration can be aborted if any problems are encountered, before the power levels become too high.

Once all the measurements of the repeatable step have been made, an additional five attenuator measurements are generated by quadratic extrapolation at the high power end of the data. The coefficients of a

20th order polynomial are then solved for, using a least squares fit. The extrapolated points are necessary to ensure that the polynomial generated does not contain significant ripple, and hence inaccuracy, at high powers. The sensitivity of the detector is then determined by linearity correcting the previously obtained 0 dBm measurement to give the sensitivity of the detector (V/mW).

The polynomial obtained is used in a verification stage whereby the 10 dB verification step is measured at 4 dB intervals over a −20 to +26 dBm levelled power range. The measurements obtained are checked to ensure that the linearity correction is performing within specification. Finally, the polynomial coefficients and sensitivity figure are stored in an EEPROM within the detector. This data is read automatically by the MTS whenever a detector is connected to it.

LCD INTERFACE PCB

Circuit diagram: Fig. 7-69

The colour data for each pixel of the LCD is generated by the graphics processor on the Analogue PCB in the form of 8-bit words; these are used to address the EPROM devices IC1 and IC2. The EPROMs decode this data to produce the red, green and blue digital outputs for driving the LCD. Each output consists of four bits, allowing a total of 4096 different colours to be displayed. the PAL0 and PAL1 control lines are used as the two most significant address inputs, and are intended for use in future versions of the MTS in order to select alternative colour palettes.

A crystal oscillator provides a 50 MHz signal which is divided by two using IC5a. This is used as a video clock for the LCD and the graphics processor on the Analogue PCB.

A +5 V regulated supply for the LCD interface circuitry is derived from the regulated +12 V input from the PSU Secondary PCB, using voltage regulator IC6. The +12 V supply is filtered using L1/C11 and routed to the LCD via PLB.

FLOPPY DRIVE CONTROLLER PCB

Circuit diagram: Fig. 7-74

This board is an interface between the Digital PCB and the floppy disk drive, and contains only two ICs. IC1 is a dedicated floppy disk drive controller, and controls functions such as motor on/off and reading/writing data. IC2 is a PAL device for setting up various inputs to IC1.

POWER SUPPLY

Introduction

The power supply consists of a metal sub-frame, a discrete RFI filter and two printed circuit boards (Input and Secondary). The Input board is populated with purely conventional components; the Secondary board contains a mixture of conventional and surface mount components.

The power supply is an off-line switched mode type, utilising a half bridge forward converter arrangement. The unit can be operated from either 110 V mains (90 to 132 V) or 240 V mains (188 to 265 V), the selection being carried out by a voltage select switch on the rear panel. The frequency of operation is 45 - 440 Hz.

When in operation the power supply is designed to deliver the following currents from the respective voltage lines :

+5.1 V	@	8.5 A
+12 V	@	2.4 A (generated from +14 V)
+15 V	@	1.9 A (generated from +20 V)
+20 V	@	0.4 A
+25 V	@	3.1 A
-20 V	@	1 6 A
-15 V	@	0.6 A (generated from -20 V)

In the 6202 MTS a 1.5 kΩ 1.5 W resistor is connected between the +25 V and 0 V pins of the AUX POWER Connector. This compensates for the reduced loading on the power supply due to removal of the YIG oscillators, which could cause regulation problems.

Mains Input and RFI Filter

The metal panel that forms the rear of the power supply has mounted on it a number of components which are an integral part to the power supply. The AC supply is connected to the instrument via an IEC type mains input connector. The live and neutral lines are routed from here to the mains RFI filter via rear panel mounted fuses (one for each line). The RFI filter is mounted on the right hand side panel (looking from the back of the instrument). It is designed to attenuate both internally and externally generated electromagnetic interference over the frequency band 10 kHz to 30 MHz, and thereby minimizes spurious emissions or receptions in this band by the supply line. The ground terminal of the IEC connector is connected to the chassis of the filter, which is in turn connected to the chassis of the instrument via its mounting flanges. The load end of the filter is then connected to the AC supply on/off switch mounted on the front panel of the power supply.

The above components are encased in a metal shield to further enhance the EMC (electromagnetic compatibility) of the PSU (power supply unit).

The AC supply switch is connected to the Input board via a cableform passing through a rubber grommet in the shield.

INPUT PCB

Circuit diagram: Fig. 7-16.

Overall Function

The Input board comprises the high voltage switching circuits, the auxiliary supply and the switching controller. The line supply from the mains switch is rectified to give a nominal 170 V and -170 V HT supply. These rectified lines are then switched alternately by the MOSFET switching transistors (TR1, TR2) into the switching transformer (situated on the Secondary board) under the control of the switched mode power supply controller IC2.

The duty cycle (on time/off time ratio) of the switching MOSFETs is adjusted by IC2 to regulate the low voltage outputs of the supply against variations in line voltages and line currents. This is achieved by feeding back one of the secondary outputs and comparing it to a stable reference (IC3). Additional inputs to IC2 protect both the load and the supply from overload by sensing the output voltage and the power transformer primary current.

Soft-Start Circuit

R1 and RLA (in parallel) form the soft-start circuit. This is designed to limit the maximum line current taken at switch-on due to the capacitive load of high voltage reservoir capacitors C5 and C6.

A delay circuit on the Secondary board leaves RLA de-energized (pin 1 = 5 V) for approximately 0.5 s after switch-on. During this time, C5 and C6 can only charge via R1. R1 limits the initial charging current to less than 3.7 A, even under worse case conditions of maximum line input voltage, and at switch-on when the supply input waveform is at peak voltage. After the time delay the relay RLA is energized, thus by-passing the resistor R1 and connecting the supply directly to the bridge rectifier D3.

Rectifiers and Reservoirs

Switch SA selects either 110 V (90 to 132 V) or 240 V (188 to 265 V) line input voltage. It changes the primary tap on T1, the auxiliary supply transformer, and reconfigures D3 from a full-wave rectifier in the 240 V position, to a voltage doubler in the 110 V position. This effectively maintains an HT supply of nominally ±170 V.

R5 and R6 across capacitors C5 and C6 discharge the HT supply after switch-off, while a relaxation oscillator, C7, R7 and LP1, give optical warning of the presence of voltages greater than 90 V across the HT rails; the frequency (between 1 and 5 Hz) is proportional to voltage.

Diodes D4 and D5 protect the MOSFET transistors from high transient voltages by conducting in the event of either rail exceeding 220 V. Fuses FS1 and FS2 isolate TR1, TR2 and associated circuitry in the event of a fault which would draw heavy currents from the reservoir capacitors, possibly damaging the board. Inductors L1 and L2 filter high frequency switching currents from the HT supply lines.

Auxiliary Power Supply

An auxiliary 12 V supply, derived from T1, D10, C11, IC1 and C12, is used to power the control circuit. It is also further regulated to +5 V (±2%) by IC2, TR3, R19 and C14. TR3 buffers the +5 V reference within IC2 (pin 18); R19 supplies IC2 regulator while C14 provides decoupling of the supply lines. This stabilized +5 V is used on the Secondary board to supply the monitoring circuits.

Phase Splitter and Half Bridge Switching Circuit

IC2 drives two power MOSFETs via the transformer T2. This transformer provides isolation between the control electronics and the high voltage circuitry, and also functions as a phase splitter. During the first cycle of switching, pin 13 of IC2 is driven high (12 V) while pin 16 is held at 0 V for a time 't'. During this period, the gate of TR1 is driven to +12 V, while the gate of TR2 is driven to -12 V. Consequently, TR1 rapidly conducts since its 'turn on threshold' has been exceeded. The transition period of conduction is determined by the time constant of R8, R10 and the MOSFET internal gate-source capacitance. The effects of this are arranged such as to minimize the noise generated by the fast slew rate of the transition against the power dissipated in the device due to longer transition time.

While TR1 is conducting, current flows in the primary of the power transformer (situated on Secondary board) via a DC blocking capacitor, C10, and the primary of the current sense transformer T3. Current is reversed when TR2 is switched on and TR1 is off. This occurs in the second half cycle when IC2 pin 16 is at +12 V and pin 13 is held at 0 V for a second period 't'.

Simultaneous conduction of the two MOSFET devices would lead to an effective short circuit across the HT lines. To prevent this, diode D6 (shunting R8) and D7 (shunting R9) reduce the discharge time of the MOSFETs junction capacitance, thus achieving rapid turn off. Snubbers comprising of C8, R12 and C9, R13 damp any oscillation of the primary circuit during the time when TR1 and TR2 are not conducting.

Switched Mode Power Supply Controller

The 'on' period 't' is dependent on the feedback voltage from the 5.1 V supply rail on the Secondary board (PLC pin 15). The variation of this, as a result of line or load variation, is attenuated by R31 and R22 and compared with a reference, IC3, by the controller IC2.

The amplified and inverted difference is compared with a ramp generated by the internal oscillator in IC2. Its output controls the logic and output buffers such that, at the start of the switching cycle, one output is enabled and remains asserted (+12 V) until the output level from the ramp generator is equal to the amplified error voltage, whereupon the pulse is terminated. In this way, as the power supply output increases (leading to a reduction in error voltage), 't' is reduced in duration. This reduces the power transferred to the secondaries. C18, C19, R28 and R29, in conjunction with the 5.1 V rail filter components on the Secondary board, reduce the loop gain of the system above 150 Hz to maintain stability whilst giving an acceptable transient response.

The free-running frequency of the oscillator is inversely proportional to the product of C16 and R27, and is approximately 120 kHz. When the supply is synchronized, however, this is increased to 125 kHz by means of the external sync input on PLC pin 4. The positive-going edge of the sync (at 125 kHz) is AC coupled and then differentiated by C15 and R24. Negative transitions are removed by the clipping action of D11.

TR5 is wire-ORed to IC2 pin 12 sync input, and on driving this low, discharges the timing capacitor. This terminates the oscillator cycle prematurely, effectively synchronizing the controller by restarting the charging sequence.

To prevent spurious sync inputs upsetting the controller during power-up, a sync inhibit pulse, asserted for 930 ms after the supply is turned on, drives TR4 into saturation and grounds any signals arriving at the base of TR5. By linking PLD pins 2 and 3 together the external sync may be disabled manually. (This assists the testing of the instrument's Digital board when the sync integrity might be affected, resulting in supply malfunction or shut-down.)

Shut-down Inhibit Line

There are three possible methods of shutting down the PSU via the controller IC2 during operation, i.e. SHUTDOWN, RESET and CURRENT SENSE inputs. The SHUTDOWN input, IC2 pin 8, terminates the output drive when at logic 'low', and is wire-ORed with the output of the current sense amplifier output. It is used to drive the 'OVERLOAD SAMPLER' (on the Secondary board), which monitors overloads on the PSU, eventually shutting it down if necessary.

Reset Inhibit Line

The RESET input to IC2 (pin 5) is driven from the Secondary board and when asserted 'low' resets the controller. After 520 ms from switch-on, (the 'soft start' interval), the RESET input is released and the controller itself executes a 'soft-start'. Then, under the control of the soft-start timing capacitor C17, the output duty cycle increases from zero until the error amplifier assumes control and regulation is maintained. This method of starting prevents supply output voltage overshoot which would otherwise occur at switch-on due to the delay inherent in the regulator feedback loop. The RESET input is released as the soft-start relay RLA is energized.

R23 ensures that should the supply be switched on without PLC connected, the controller remains reset until PLC is reconnected, whereupon the supply soft-starts safely. (Otherwise, with PLC open circuit and no feedback present at the error amplifier, maximum duty cycle would be applied to the power MOSFETs, giving excessive voltages at the secondaries.)

Current Limit Detector

The current limit detector, comprising T3, R14-R16, C21, D8 and D9, protect the switching power MOSFETs from damage caused by excessive primary current. This may be brought about by the shorting of any of the Secondary board transformer secondaries or a general overload exceeding 350 W. T3 is a current-to-voltage transformer giving 2 V across R14 for each amp flowing in the primary. D8 and D9 rectify the signal, while divider R15 and R16 give an input to IC2 pin 7 of 100 mV (the current sense threshold) at a primary current of 8 A.

SECONDARY PCB

Circuit diagram: Fig. 7-14.

The Secondary board contains the main switching transformer, all the low voltage rectifiers and filter components, output voltage monitoring, and power-up sequencing.

Low Voltage Supplies

Five supplies are produced directly from transformer T1: 5.1 V, +14 V, +20 V, +25 V and -20 V. They are all derived in the same manner, whereby a centre-tapped secondary is full-wave rectified by either two fast recovery diodes, for a single positive or negative output, or by four diodes for a balanced positive and negative output.

The series RC connection across each secondary winding form a snubber to critically damp oscillations produced during switching. This is caused by the junction capacitance of the diodes reacting with the leakage reactance of the transformer secondaries.

The square wave output from the rectifiers (D4, D5, D7-D10, D11, D12 and D14) is smoothed by the storage chokes (L3, L5-L8) and capacitors (C11, C12, C15-C22). Resistors (R9, R11-R14) slightly load the outputs to prevent them from rising to an unacceptably high level should the supply load be removed. With high supply line inputs, the amplitudes of the square wave outputs to the rectifiers are in excess of the average loaded output from the filters. Consequently, on no-load the capacitors would charge up to this peak voltage which may exceed their working voltage. The bleed resistors also ensure that any charge on the smoothing capacitors is quickly dissipated when the instrument is switched off.

5.1 V Supply

The 5.1 V supply is derived from diode D14, which is a dual centre-tapped Schottky rectifier mounted on a heatsink. This supply, which is used as the feedback supply to the controller on the Input board, is loaded by R14. Without sufficient load here, e.g. with the supply operating open circuit, peak detection at C21 will produce a sufficiently high feedback voltage to cause the controller to reduce the duty cycle to zero until the feedback decreases below 5.1 V. D15 prevents any high voltage transients on the output, by conducting at approximately 7 V. D15 also provides fast overvoltage protection under more permanent fault conditions, when the controller would be shut down by the active overvoltage detection circuit, IC1-b.

+15 V and -15 V Supplies

The +15 V supply is derived from a regulator IC mounted on the front panel of the power supply. The regulator is supplied from the +20 V rail, mentioned previously. Resistors R1 and R2 set the voltage level to 15 V and capacitors C1 and C2 act as reservoirs. The -15 V supply is derived from three-terminal regulator IC7, driven by the -20 V rail.

+2.5 V Reference Voltage

The auxiliary +5 V supply from the Input board is fed via PLA pins 10 and 14, and decoupled by C23, C24; the supply is used to power the monitoring circuit on the Secondary board. R16 and R17 divide the +5 V supply to provide a stable 2.5 V reference for IC1 temperature status comparators and voltage detectors.

+12 V Supply

The +12 V/2.4 A supply is derived from the +14 V rail using an off-board LM350 regulator mounted on the PSU chassis. PLL serves to connect the LM350 to the other components associated with the regulator. Resistors R52-54 determine the voltage output from the regulator; D26 and D27 protect the regulator against back-biasing during short circuit conditions; C46-48 are smoothing capacitors. The supply is routed to the LCD Interface PCB where it is further regulated down to +5 V for use by the LCD..

Temperature Status Comparators

Dual rectifier D14, which is used to derive the 5.1 V supply rail, is mounted on a heatsink to which is attached thermistor R15. A potential divider is formed by R15 and R18 across the auxiliary +5 V supply. As the temperature rises, the voltage at this junction rises; this voltage is monitored by two comparators in IC1.

IC1c output reduces when the voltage at pin 10 rises above that at pin 11 (1.62 V), as set by the potential divider R19-21. This corresponds to a heat sink temperature of 74°C. This output goes to the Analogue board, and is used to warn the operator of excessive rise in temperature in the instrument (achieved by a message on the display). Should the heatsink temperature continue to rise to more than 85°C, the second threshold of +2.04 V will be exceeded and detected by IC1a. As IC1a output falls, R-S latch IC6b will be set and the supply controller will be shut down, via the RESET line, by IC4e. A visual indication of this condition is provided by LED D24 (OVERHEAT), located at the rear of the instrument. A flag SRESETL is also sent to the Analogue board, so as to save necessary data.

5.1 V and 25 V Overvoltage Detector

The 5.1 V line is monitored by IC1b and IC1d. If the output exceeds 5.5 V then IC1b sets the latch IC6c which resets the controller. This condition is indicated by LED D22 (OVERVOLTAGE), located at the rear of the instrument. A secondary sense for overvoltage, D16 and D17, detects a voltage on the 25 V line of greater than 33 V, again tripping the overvoltage latch. If the supply line is interrupted or falls below the specification (<90 V or <188 V), IC1d sets IC6a illuminating LED D23 (LOW LINE). During power-up, IC1d buffered by IC4b holds the reset inputs to the Analogue board low until the 5.1 V line has stabilized.

Overload Sampler

The line input from the Input board is squared by IC3b, and the output used as a sampling period for the overload sampler IC5. C37 and R41 differentiate the line frequency square wave, and after an inversion by IC3d produce a 100 μs positive pulse to reset IC5. The overload sampler totalizes the transitions on the SHUTDOWN line from the Input board, and sets the overload latch IC6d if more than 127 pulses are received in 1 sampling period (2.2 - 22 ms depending on the line frequency). D25 (OVERLOAD) gives a visual indication of why the power supply has reset. This arrangement protects the power supply against overload (short circuits) without being susceptible to transient disturbances (e.g. whilst locking to the external sync input).

Power-Up Sequence (Soft Start)

Two monostable circuits IC2a and IC2b provide start-up sequencing when the supply is first switched on. When the 5 V auxiliary supply is active, C30 charges through R37 and triggers the monostable circuits in IC2 to a high state. IC2a via IC3c and IC4f hold the RESET line low for approximately 520 ms during the soft start period, and also resets the overload and overvoltage latches. After this delay the soft start circuit on the Input board is bypassed and the converter begins operation. While the supply is stabilizing, IC2b, via IC3a, holds the low line and overheat latches reset and inhibits the external sync for a further 410 ms following the start of the delay.

Chapter 2
MAINTENANCE

CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This chapter gives instructions for gaining access to the various sub-assemblies in order that fault diagnosis, repair or replacement can be carried out, and also provides other relevant servicing support information.

PRECAUTIONS

Although this equipment has been designed and constructed in accordance with international safety standards, it is important that the advice given under 'Precautions' at the front of this manual should be observed in all maintenance procedures to ensure safe working practices. In addition to these precautions, special handling techniques are required for certain items, as described below.

Surface-mounted components. Numerous surface-mounted components are fitted in this instrument. When soldering these devices the following precautions should be observed.

(a) Use a low melting point solder, and a soldering iron set to 315°C (600°F). The use of a high wattage soldering iron will minimize the time taken to solder the device.

(b) Take care to avoid mechanical damage from flexing the PCB.

Static sensitive components. The CMOS integrated circuits used in this instrument have extremely high input resistance and can be damaged by accumulation of static charges (see preliminary pages, 'Precautions'). Boards that have such integrated circuits all carry labels warning against damage by static discharge. Take care also when using freezer sprays to aid fault finding; these can create a static discharge which can corrupt the data stored in programmed devices (EPROMS or EEPROMS).

Handling cables and RF sub-assemblies. Wherever possible cable connectors are polarized but care should still be taken that these are not misplaced.

There are mechanical adjustments on the fixing points of various sub-assemblies of the microwave chassis. These have been set to give optimum performance and it should be stressed that any repositioning of the sub-assemblies or couplings is likely to degrade the performance of the instrument.

Bulkhead connectors and gaskets. To ensure that no RF leakage occurs, all bulkhead connectors and lid sealing gaskets must be securely fitted.

Torque setting. When replacing semi-rigid cable assemblies and RF components, it is imperative that SMA connectors are tightened to a torque of 1.2 Nm.

TEST EQUIPMENT

The test equipment required for adjustment and calibration (Chapter 3) fault finding (Chapter 5) and for performance testing (Operating Manual, Chapter 6) is shown in Table 2-1. Alternative equipment may be used provided it complies with the stated minimum specification.

TABLE 2-1 TEST EQUIPMENT

Description	Minimum Specification	Example	Use **
10 MHz frequency standard	Accuracy better than 1 in 10^8	'Off Air' atomic standard	A
50 MHz, 1 mW power reference standard	Calibrated to National Standards.	Available in: 6200B series MTS MI 6950, 6960, 6960A, 6960B and 6970 Power Meters	A
Oscilloscope	Bandwidth 1 MHz	Tektronix 2235	A
Oscilloscope	Bandwidth 350 MHz	Tektronix 2465	F
Coaxial detector	For 6200B/6201B For 6203B/6204B	HP 8470B HP 8473C	A
50 Ω through termination			A
Power sensor	Calibrated to National Standards Frequency range to match range of UUT.	**For 6200B/6201B/6202B:** MI 6910 **For 6203B:** MI 6913 **For 6204B:** MI 6914	A, P

(contd.)

TABLE 2-1 TEST EQUIPMENT (contd.)

Power sensor	0.5 W at 50 MHz	MI 6930 or 6932	A. F
Frequency counter	Frequency range to match range of UUT Accuracy ±25 Hz or better	MI 6200B, 6201B/6202B, 6203B **For 6204B:** EIP 538B with Option 6 plus remote sensor 097	P
Power meter	Worst case accuracy not greater than ±0.2 dB excluding mismatch error	MI 6200B Series	P
Signal Generator Calibrator	**For 6200B:** Range 10 MHz to 18 GHz 0 to -80 dBm **For 6201B:** Range 10 MHz to 8 GHz 0 to -80 dBm **For 6202B:** Range 10 MHz to 2 GHz 0 to -80 dBm **For 6203B:** Range 10 MHz to 18 GHz 0 to -80 dBm Range 18 MHz to 26.5 GHz 0 to -70 dBm	Weinschel VM-4B Weinschel VM-4B Weinschel VM-4B Weinschel VM-4B 1611 Frequency Extension Unit	P
Scalar detector	Frequency range to match range of UUT	6230 series	P
Digital multimeter	Voltage accuracy ±0.01% Current accuracy ±0.02%	Solartron 7150plus	P
Milliwatt power meter	Meter error ±0.015 dB at 50 MHz 23°C ±3°C 50 Ω N-type probe connector Input VSWR < 1.01:1 Calibrated to National Standards	W & G EPM-1	P
Synthesized generator	Frequency range to match range of UUT -10 to 0 dBm	MI 6200B, 6201B, 6202B, 6203B option 001	P
*Attenuator (optional for standard instrument)	**For 6200B/6201B/6202B:** 10 dB, N-type connectors flatness < ±1 dB **For 6203B/6204B:** 10 dB, 3.5mm connectors flatness < ±1 dB	Weinschel model 44-10 Weinschel model 9-10	P
Power splitter 2-resistor type	**For 6200B/6201B/6202B:** 20 GHz / N-type **For 6203B/6204B:** 26.5 GHz / PC-3.5	MI 54311-123S MI 54311-124W	P
Logic analyzer		HP 1631D	F

** P = Performance testing A = Adjustment and calibration F = Fault finding

ACCESS TO UNITS AND BOARDS

Removal of Outer Covers

All servicing operations require removal of both the top and bottom outer covers; the exception to this is the Analogue board, which requires only the bottom cover to be removed. Each cover can be lifted off after removing 8 self-tapping screws.

On instruments with the floppy disk drive option fitted, the cable to the Floppy Drive Controller board must be disconnected before the top cover can be completely removed.

Digital Board

The Digital board is removed from the top of the instrument. It is held in place by a retainer plate (see Fig. 2-1).

(1) Remove the screw that secures the retainer plate to the top of the PSU, and loosen the two screws that secure the plate to the top of the synthesizer tray. The retainer plate can now be removed by sliding it towards the PSU and lifting off.

(2) Remove all cable connectors from the board. The coaxial cable between the Digital and Analogue boards should be removed by disconnecting the cable from PLP on the Analogue board.

Note...

Do not remove the cable from PLK; this supplies the Digital board non-volatile memory with power from the battery situated on the rear panel. If this connection is removed the stored data will be lost. However, the extra long battery connection enables the board to be removed for servicing while still retaining the battery supply. If this is done, ensure that the board is not placed on a conductive surface.

(3) With the aid of the two extractors fitted to the top of the board, carefully remove the board from the instrument.

Analogue Board

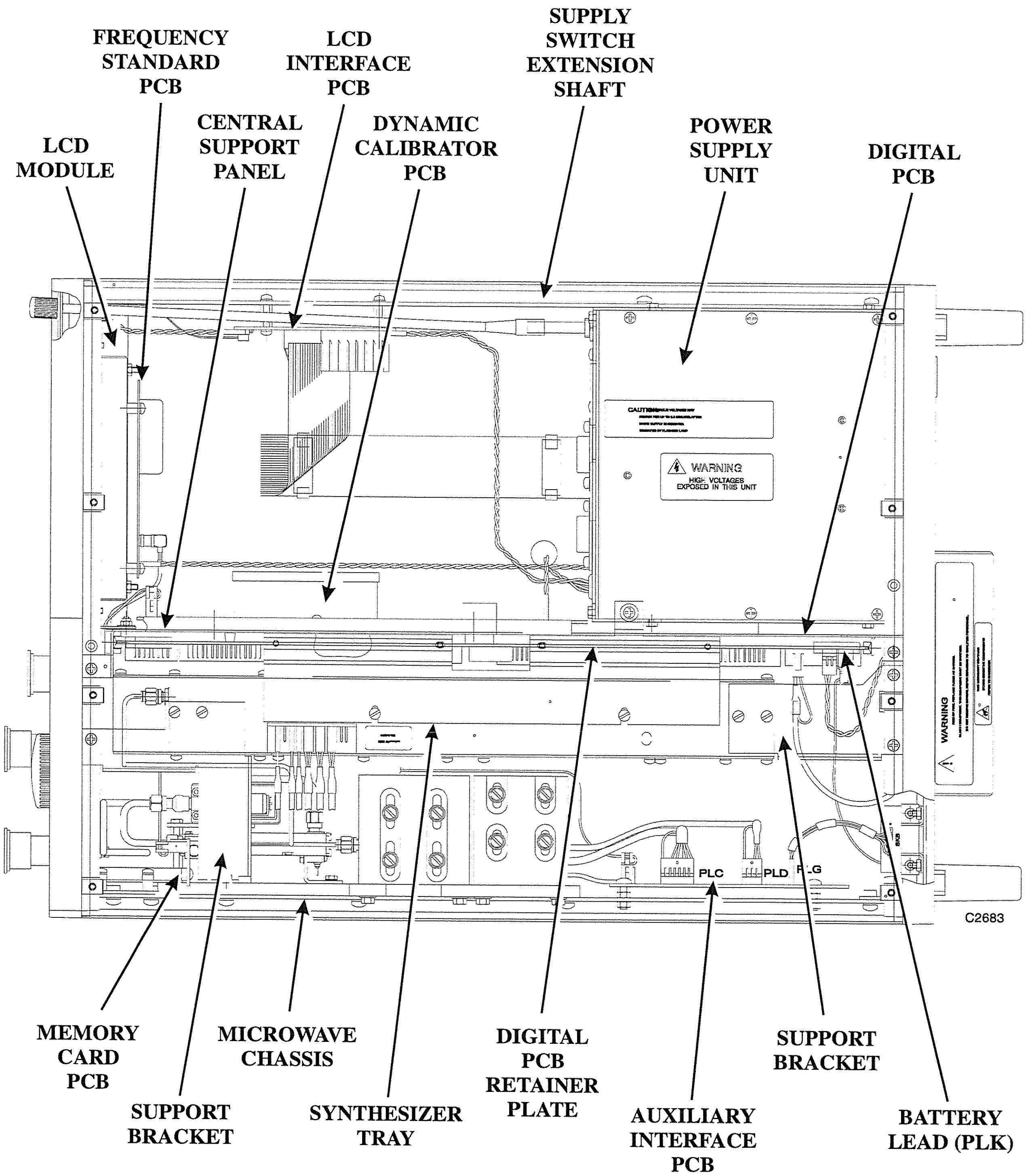
The Analogue board is located at the bottom of the instrument (see Fig. 2-2).

(1) Two of the Analogue board multi-way connectors, SKA and SKB, mate directly with connectors on the Digital board. To prevent flexing of the Analogue board when it is removed, these connectores must be detached by withdrawing the Digital board slightly while the Analogue board is still fixed in place. (See 'Digital Board', steps (1) and (3).

(2) Pull off all the cable connectors from the board, and also the coaxial cable PLP on the underside of the board.

(3) Remove the 9 screws that secure the board to the chassis and lift out the board.

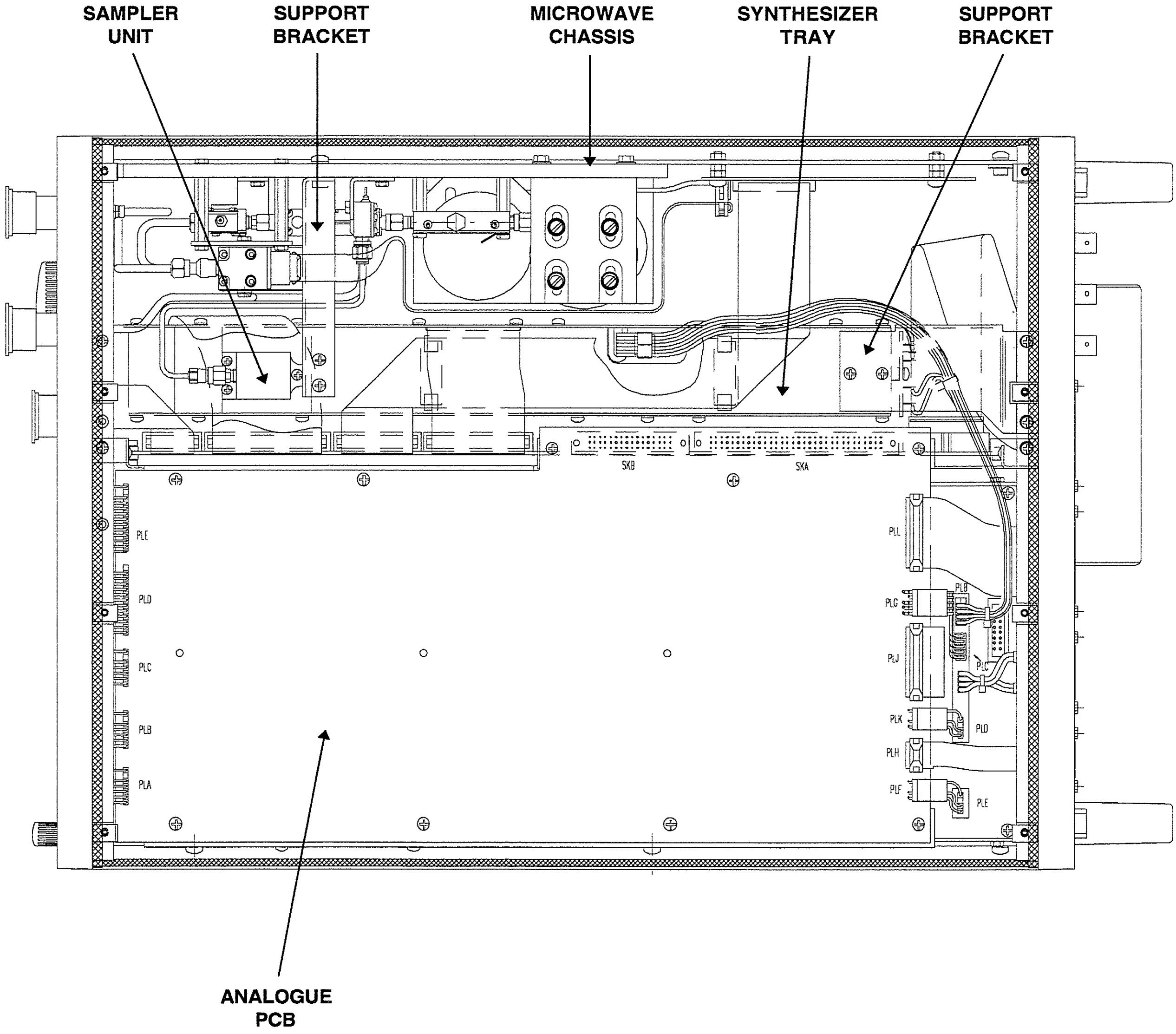
Before replacing the Analogue PCB, the Digital board must be fixed back in position, together with its retainer plate. This is to ensure that SKA and SKB are mated correctly with the Digital board connectors before the Analogue board is secured to the chassis.



NOTE: IN THE 6204B MTS THE MICROWAVE CHASSIS IS LONGER TO ACCOMMODATE THE EXTRA COMPONENTS, AND THE AUXILIARY INTERFACE PCB IS ATTACHED TO IT VIA HEXAGONAL PILLARS.0

THE 6202B HAS A SIMPLIFIED MICROWAVE CHASSIS, CONTAINING ONLY A PICKOFF/SWITCH ASSEMBLY.

Fig. 2-1 MTS With Top Cover Removed



NOTE: IN THE 6204B MTS THE MICROWAVE CHASSIS IS LONGER TO ACCOMMODATE THE EXTRA COMPONENTS, AND THE AUXILIARY INTERFACE PCB IS ATTACHED TO IT VIA HEXAGONAL PILLARS.0

THE 6202B HAS A SIMPLIFIED MICROWAVE CHASSIS, CONTAINING ONLY A PICKOFF/SWITCH ASSEMBLY

Fig. 2-2 MTS With Bottom Cover Removed

Also ensure that any fixing screws that are lost are replaced with screws not exceeding 6 mm in length. If longer screws are used, damage to the chassis will result when they are tightened.

Auxiliary interface Board

In the 6200B, 6201B, 6202B and 6203B versions of the MTS, the Auxiliary Interface board is attached to the right hand side rail of the instrument (see Fig. 2-1).

(1) Pull off all connectors from the board. The ribbon cable that goes to the Digital board can be left connected if required and the Auxiliary Interface board removed from the bottom of the instrument.

(2) Remove the 4 nuts that secure the board to the right hand side rail and remove the board.

In the 6204B MTS, the Auxiliary Interface board is attached to the microwave chassis using 4 hexagonal pillars. To gain access to the board, the microwave chassis must first be removed (refer to 'Microwave Chassis (6204B instruments)'). The board can then be removed from the 4 pillars.

LCD Interface Board

(1) Pull off all connectors from the board.

(2) Remove the 4 M3x8 mm screws with washers that secure the board to the left hand side rail.

When replacing the board, note that the front fixing screws should be located in the ninth hole of the side rail, counting from the front. Also note that connector PLA must be opened out before it will accept the ribbon cable connector. This is done by gripping the sides of PLA, pulling forwards, then away from the board.

Dynamic Calibrator Board

The Dynamic Calibrator board is attached to the left hand side of the centre partition (see Fig. 2-1).

(1) Pull off cable connectors PLA and PLC from the board. Disconnect the coaxial connector from the board by pulling off SMB connector PLB.

(2) Remove the 4 M3 x 6 mm screws that secure the board to the centre partition and remove the board.

Frequency Standard Board

The Frequency Standard board is mounted on four pillars at the rear of the LCD.

(1) Pull off cable connectors PLRM and PLRL from the board.

(2) Remove the 4 M3 x 6 mm screws that secure the board to the mounting pillars on the LCD inverter cover.

Floppy Drive Controller Board

The board is attached via four pillars to the underside of the floppy disk drive mounting plate.

(1) Disconnect the ribbon cable that connects the board to the drive mechanism.

(2) Remove the 4 M3 x 6 mm screws that secure the board to the pillars on the mounting plate.

Floppy Disk Drive Mechanism

The disk drive is attached to its mounting plate with three screws.

(1) Disconnect the ribbon cable that connects the drive to the Floppy Drive Controller board.

(2) Remove the 3 M2.5 x 5 mm screws, plain wahers and crinkle wahers that secure the drive to the mounting plate.

When replacing the drive, adjust its position so that the front bezel protrudes through the aperture in the cover by 2 mm. The screws should be tightened to a torque of 0.2 Nm.

Power Supply Unit

The PSU and rear panel of the instrument form a complete assembly and are removed as a whole. This will not be required for fault finding on the component sides of the boards, since only the PSU top cover needs to be removed. However, the complete rear panel assembly will have to be removed if access to the track side of the Secondary board (at the bottom of the PSU) is required for repair purposes.

WARNING

Do not attempt to service the Power Supply Unit without first disconnecting the AC supply, and ensuring that the neon lamp on the Input board at the top of the PSU has stopped flashing. The state of the lamp can be observed via the holes in the front of the PSU. (See label on top of the PSU.)

(1) Remove the Digital board retainer plate (see 'Digital Board', step (1)).

(2) Loosen the 6 hex head screws located at the top of the left hand, right hand and front sides of the PSU (2 on each side).

(3) The top cover, containing the Input board, can now be hinged upwards towards the rear of the instrument. If fault finding is to be carried out with the top cover in this position, re-tighten the two hinge-fixing screws to prevent accidental movement. Fig. 2-3 shows a top view of the PSU with the top cover removed.

(4) If access to both sides of the Input board is required for repair purposes, remove the top cover by removing the 6 screws which secure it to the two tie bars (the tie bars remain hinged to the PSU case).

(5) To remove the Input board completely, remove the 6 screws which secure it to the tie bars. Disconnect the cables from PLA, PLC and PLE.

Note...

The complete assembly comprising the Input board, tie bars and top cover plate can be removed as a unit by disconecting PLA, PLC and PLE.

If it is necessary to repair or replace the Secondary board, further disassembly is required; continue as follows:

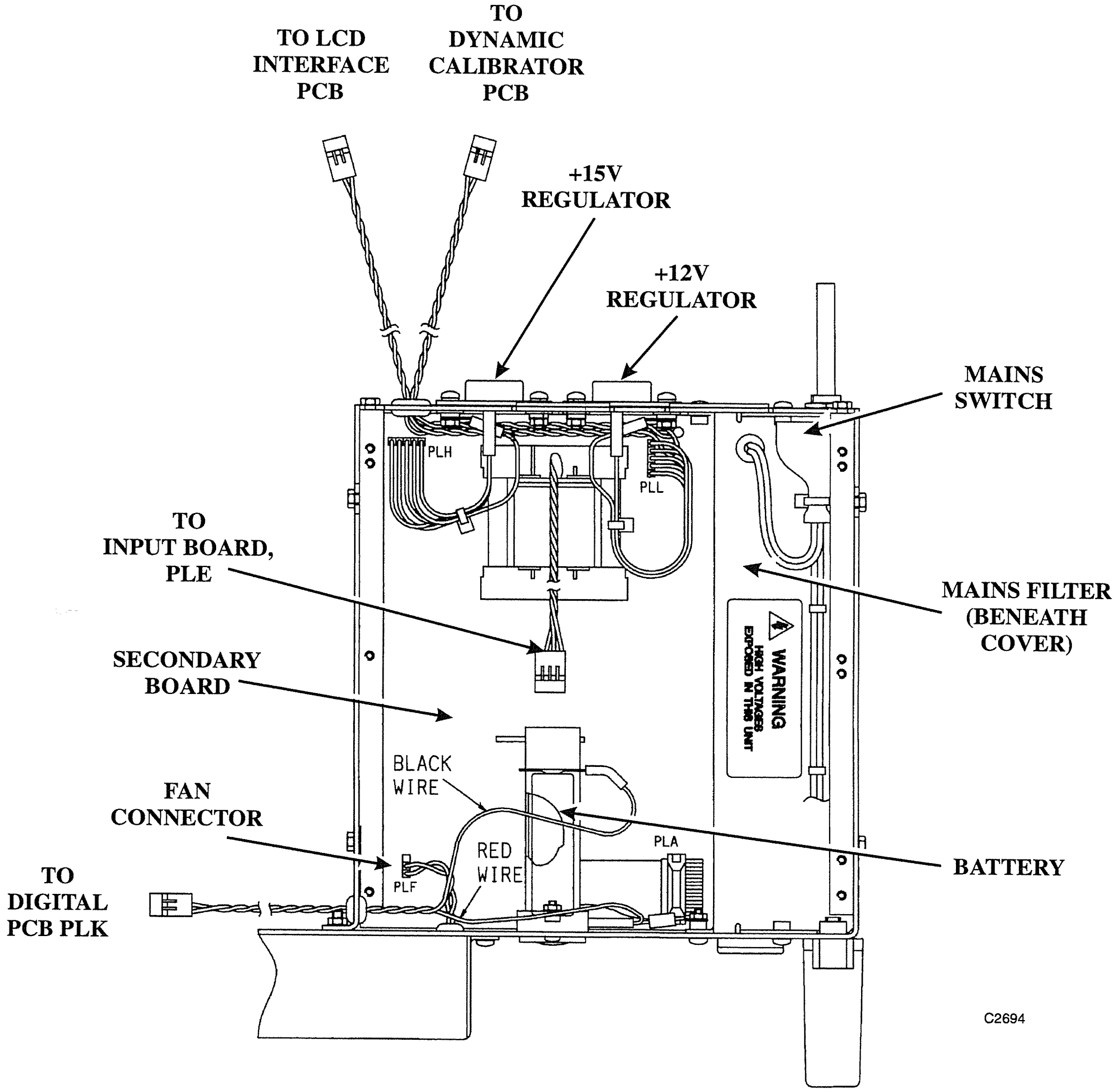


Fig. 2-3 PSU From Above With Top Cover Removed

(6) Pull off the 4 connectors from underneath the PSU (PLB, PLC, PLD, PLE).

(7) Disconnect the following cables:

The flying leads that go from the front of the PSU to PLC on the LCD Interface board and PLC on the Dynamic Calibrator PCB.

PLG on the Auxiliary Interface board.

PLL on the Analogue board (AUX DATA).

PLH on the Analogue board (EXT MONITOR).

PLC on the Digital board (GPIB).

PLD on the Digital board (PARALLEL PRINTER).

PLK on the Digital board (battery back-up supply). Removal of this connector is necessary to prevent damage when the rear panel/PSU is pulled out. Note that this will cause loss of stored data on the Digital board. If it is essential to retain this data, an alternative battery supply must be connected before disconnecting PLK, using a suitable connector.

Coaxial cable from PLH at the top, right hand side of the synthesizer tray.

Coaxial cable from PLL on the Digital board (VOLTAGE/CURRENT OUTPUT).

(8) Remove the complete top cover assembly containing the Input board, as described in step (5).

(9) Remove the 4 screws that secure the rear panel/PSU to the left hand side rail, and the 2 screws that secure it to the right hand side rail.

(10) Remove the 4 screws that secure the rear panel to the rear of the chassis. These screws arre located on the upper and lower edges of the rear panel, near the corners.

(11) The rear panel assembly can now be withdrawn from the rear of the instrument.

(12) To gain access to the track side of the Secondary board, remove the bottom cover plate, which is attached by 6 screws.

Replacement of the PSU is generally a reversal of the above removal procedure. Reconnect the mains switch shaft before the assembly is finally pushed home.

Front Panel Assembly

The front panel assembly must be removed in order to gain access to the following:

Keyboard PCB.

Memory Card PCB.

Input connectors.

Optical shaft encoder (rotary control).

LCD unit.

Note that the keypad, which is situated between the front panel and the Keyboard PCB, is part of the front panel assembly. If the keypad is faulty, the complete front panel must be replaced.

(1) Using a suitable Allen key, remove the supply switch knob from the extension shaft.

(2) Disconnect the following cables:

PLA - PLE on the front of the Analogue board, which go to the front panel connectors.

PLH on the Digital board, which goes to the Keyboard PCB.

The Memory Card PCB cable.

PLD on the Keyboard PCB, which goes to the Dynamic Calibrator PCB.

PLA and PLB on the LCD Interface board, which go to the LCD.

PLRL and PLRM on the Frequency Standard PCB.

The front panel 'Power On' LED connector (top, left .corner of front panel).

(3) Use a 5.5 mm box spanner to remove the hexagonal pillar which secures the lower edge of the front panel to the chassis; this is located between the INPUT D and AUX INPUT connectors on the front panel. (The pillar is actually 5 mm, but the use of a 5.5 mm box spanner enables the required angle to be achieved when removing the pillar.)

(4) Loosen the 2 nuts that secure the LCD mounting plate to the top and bottom of the central partition.

(5) For instruments fitted with Option 002 (field replaceable RF connectors), remove the adaptors fitted to the RF OUTPUT and COUNTER connectors.

(6) Remove the screws that secure the front panel to the right hand side rail (2 at the top of the side rail, 1 at the bottom).

(7) Remove the 2 screws that secure the front panel to the left hand side rail.

(8) The front panel assembly can now be removed from the instrument.

Replacement of the front panel assembly is generally a reversal of the above removal procedure. Take care to prevent damage to the input connector cables. It may be found easier to push the RF connectors through the front panel grommets if the grommets are first of all lubricated slightly with water.

Note...

When re-assembling the front panel, ensure that it sits tight on the RF gasket, along the top and bottom.

Removal of Keyboard PCB

(1) To remove the Keyboard PCB for repair or to enable removal of the encoder, disconnect the ribbon cable from the keypad and remove the nuts that secure the Keyboard PCB to the front panel.

Removal of Memory Card PCB

(1) The Memory Card PCB and card guide can be removed by removing the 4 screws that secure it to the mounting bracket.

Removal of Front Panel Input Connectors

(1) If a front panel input connector is to be replaced, insert a sensor/detector cable so that the connector can be held in place while the securing nut is tightened. After tightening, apply a small amount of low/medium strength threadlocking Loctite.

Removal of LCD

CAUTION - CLEANING OF FRONT PANEL WINDOW

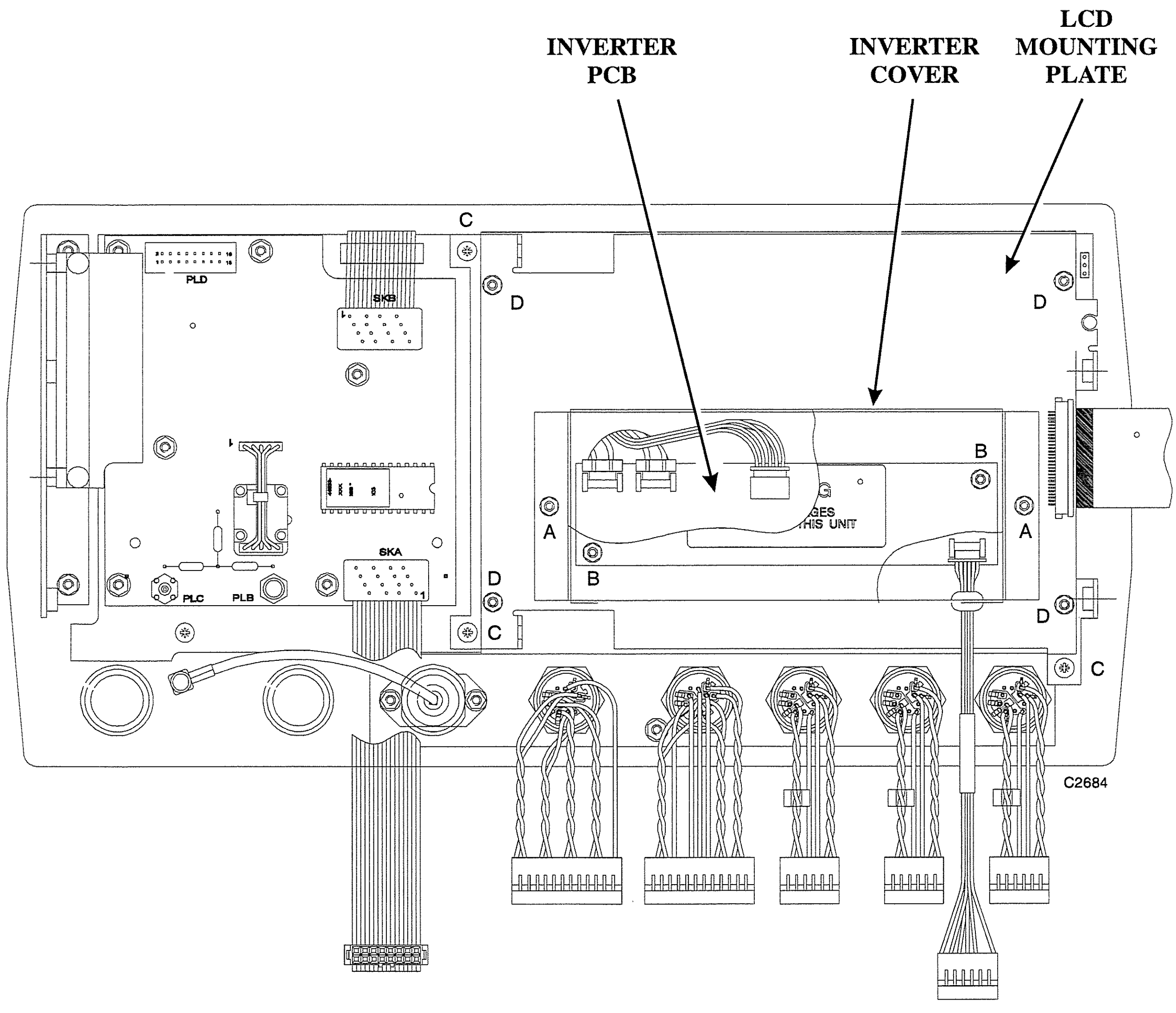
Once the LCD has been removed from the front panel, the inside surface of the front panel window will be exposed. This does not have a hard coat finish, and contact with it should be avoided. Any cleaning must be undertaken with great care, preferably with the use of pressurized air only. Use an aerosol can of pressurized air, since air lines can leave oil/water deposits which are difficult to remove without damaging the surface.

CAUTION - LCD HANDLING

(a) Static electricity can damage LCD units, and the normal handling precautions for static sensitive devices should be observed.

(b) Since the LCD contains glass, do not allow the unit to be dropped or otherwise roughly handled.

(c) The front polarizer of the unit is easily damaged; take care to prevent scratches. If it becomes necessary to clean it, wipe it with a soft, dry cloth; do not use any chemicals.



NOTE: THE FREQUENCY STANDARD PCB HAS BEEN REMOVED IN THIS FIGURE.

Fig. 2-4 View of Front Panel Showing LCD Fixings

Refer to Fig, 2-4.

(1) Remove the 2 nuts (A) that secure the Inverter board cover to the LCD mounting plate. Lift away the cover, which contains the Inverter board, connected by cables to the LCD unit.

(2) Remove the 2 M3 nuts and washers (B) that secure the Inverter board to its cover. Remove the board from the cover and disconnect all leads from the board. Remove the remainder of the board fixings (M3x6 screw, washer, hexagonal pillar and grub screw).

(3) Remove the 3 M3x8 screws (C) that attach the LCD mounting plate to three round pillars (which are part of the front panel assembly).

(4) Remove the 4 M3 nuts and washers (D) that secure the mounting plate to the LCD, then remove the mounting plate.

(5) Remove the hexagonal pillar from the stud on the front panel adjacent to the 'Power On' LED. The LCD unit can now be lifted away from the front panel.

(6) Remove the LCD fixings located at three positions on the LCD unit (M3x6 screw, washer, hexagonal pillar and grub screw).

Replacement of the LCD is generally a reversal of the above removal procedure. Before fitting the LCD, remove any dust that may be present on the glass front of the LCD and on the inside surface of the front panel window, observing the precautions given at the start of this procedure.

Synthesizer

The synthesizer tray must be removed in order to gain access to the Control, RF, Timebase and Synthesizer Power Supply Filter boards. Refer to Fig. 2-5. To remove the synthesizer proceed as follows:

(1) Remove the Digital board, as described previously, to prevent damage to it when removing the synthesizer tray.

(2) Disconnect cables PLC to PLJ and PLX from the top, right hand side of the synthesizer tray (the number of cables depends on the variant of the MTS). Disconnect the synthesizer power supply cable from PLB of the PSU.

(3) Remove the semi-rigid cable between the sampler at the bottom of the synthesizer tray and the SP2T switch on the microwave chassis (pickoff/switch assembly on the 6202B).

(4) Remove the semi-rigid cable between the SMA connector at the top of the synthesizer tray and the SP4T (SP5T) switch on the microwave chassis (pickoff/switch assembly on the 6202B).

(5) Remove the lower support bracket between the synthesizer tray and the microwave chassis (Fig. 2-2).

(6) Remove the top, front support bracket by removing 4 screws (Fig. 2-1).

(7) Remove either the upper or lower rear support bracket, depending on whether the synthesizer tray is to be removed from the top or the bottom of the instrument. The synthesizer tray can now be removed.

Replacement of the synthesizer tray is generally a reversal of the above removal procedure.

Removal of Timebase Board

(1) Remove the cover from the right hand side of the synthesizer tray. Note that there are 11 M3x8 mm screws plus 4 M3x25 mm screws which also go through the internal partition.

(2) Remove the 4 slot head screws and washers which secure the Timebase board to the mounting pillars. The board can be removed after disconnecting the Timebase board ribbon cable from PLP on the Control board.

Removal of Control Board

(1) Remove the cover from the right hand side of the synthesizer tray. Note that there are 11 M3x8 mm screws plus 4 M3x25 mm screws which also go through the internal partition.

(2) Remove the partition adjacent to the row of connectors PLC - PLX (2 M3x20 mm screws). Remove the internal partition towards the rear of the synthesizer tray (3 M3x16 mm screws)

(3) Remove the 4 M3x6 mm slot head screws and washers which secure the Timebase board to the mounting pillars. The board can be removed after disconnecting the Timebase board ribbon cable from PLP on the Control board.

(4) Disconnect the ribbon cable from PLB.

(5) Pull off the two SMB connectors at the top, rear of the Control board.

(6) Disconnect the wire link between the feedthrough capacitor (just below the SMB connectors) and SKM on the Control board.

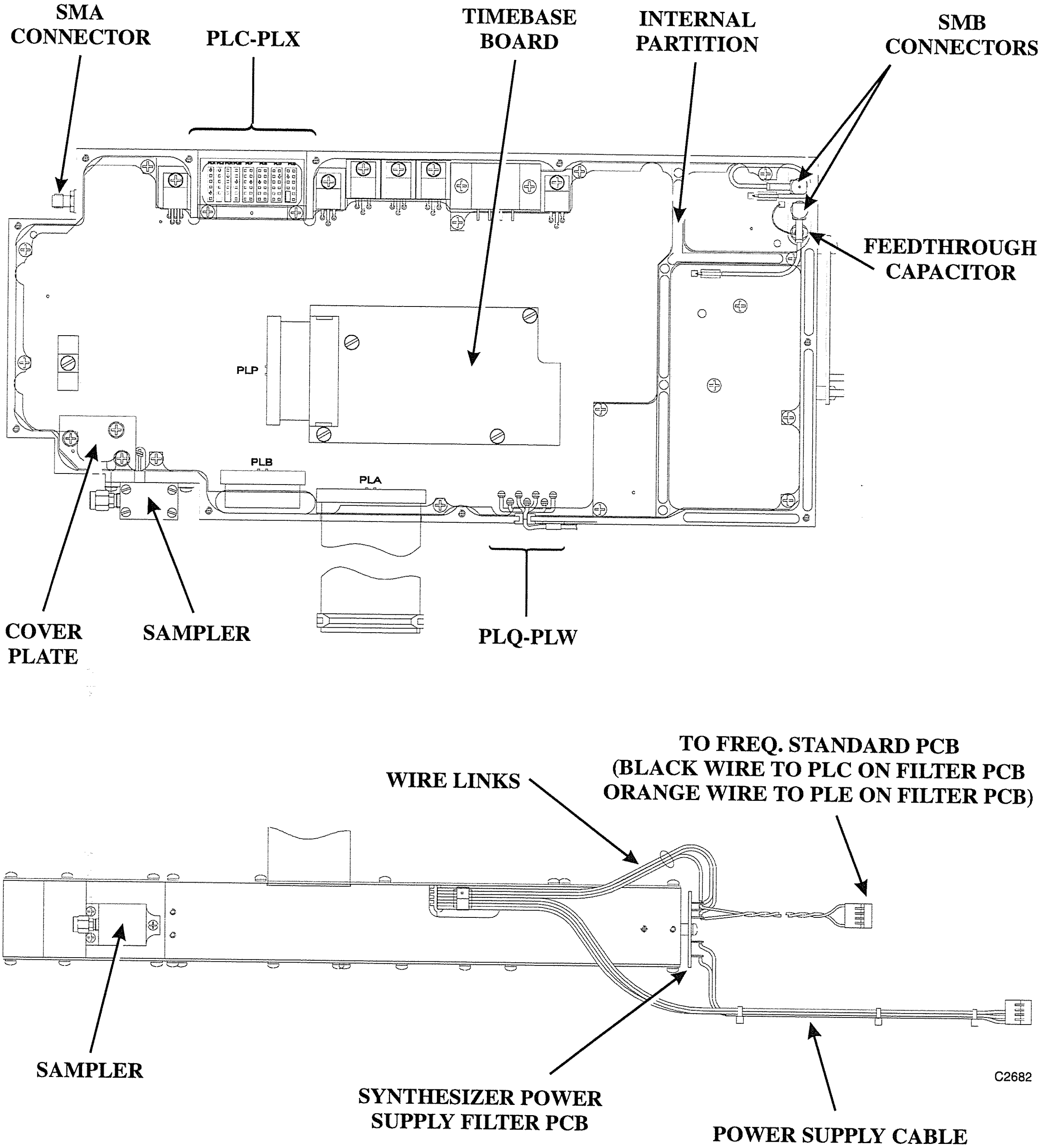
(7) Remove the small cover plate, which is secured by 3 screws.

(8) Unsolder the connection between the sampler (at the bottom of the synthesizer) and the Control board.

(9) Remove all the fixing screws (noting where the spring and pillar is fitted) and lift out the Control board. Note that there are 8 screws along the top of the board which mount some power components to the chassis.

(10) The Control board can now be removed. If the board is to be replaced, unsolder the supply wires to PLQ - PLW.

When replacing the Control board, ensure that the insulating washers and bushes are fitted correctly to the five power transistors and IC609. New bushes should be fitted if possible. Note that the washers with trimmed corners go under TR206 and IC609. When fitted, measure the resistance between the mounting face of these components and the synthesizer chassis; this should be greater than 1 kΩ. Also ensure that the spring and pillar are re-fitted.



POWER SUPPLY CABLE CONNECTIONS		
WIRE COLOUR	FILTER PCB TERMINAL	CONTROL PCB TERMINAL
RED	PLB	-
ORANGE	PLA	-
PINK	-	PLQ
VOILET	-	PLV
WHITE	-	PLW
BLACK	-	PLU

WIRE LINKS BETWEEN FILTER PCB & CONTROL PCB		
WIRE COLOUR	FILTER PCB TERMINAL	CONTROL PCB TERMINAL
RED	PLD	PLS
ORANGE	PLE	PLR
BLACK	PLC	PLT

Fig. 2-5 Synthesizer Tray - View From Control Side and Below

Removal of RF Board

If the RF board is to be removed for repair, the sampler must first be removed.

(1) Remove the cover from the left hand side of the synthesizer tray. There are 12 M3x8 mm screws plus 10 M3x20 mm screws which also go through the internal partition.

(2) Remove the internal partition (3 M3x16 mm screws) and the internal RF cover (7 M3x16 mm screws plus 2 springs).

(3) Perform steps (1), (6) and (7) of the previous procedure.

(4) Remove the 3 M2.5x6 mm screws with washers which attach the sampler to the underside of the synthesizer tray. The sampler can now be disconnected from SKE on the RF board by pulling carefully.

(5) Disconnect the ribbon cable from PLB on the Control board.

(6) Pull off the two SMB connectors at the top, rear of the RF board.

(7) Disconnect the wire link between the feedthrough capacitor (just below the SMB connectors) and SKC on the RF board.

(8) Remove the SMA connector (SKF) at the top, front of the synthesizer tray.

(9) Remove 15 M3x8 mm and 2 M2.5x8 mm screws (plus pillar and spring) and lift out the RF board.

When replacing the RF board, ensure that the 3 springs are re-fitted, and that the cables from the SMB connectors are not trapped under the cover plate when it is replaced.

Removal of Synthesizer Power Supply Filter Board

(1) The board is fixed to the rear of the synthesizer tray with 2 screws and spacers. Remove these screws and unsolder the 5 wires.

Microwave Chassis

On 6202B instruments, this is called the RF chassis, and contains only a pickoff/switch assembly and an optional step attenuator.

(1) Remove the Auxiliary Interface board, as described earlier.

(2) Disconnect cables PLC to PLX from the top, right hand side of the synthesizer tray (the number of cables depends on the variant of the MTS).

(3) Remove the semi-rigid cable between the sampler at the bottom of the synthesizer tray and the SP2T switch on the microwave chassis (pickoff/switch assembly on the 6202AB

(4) Remove the semi-rigid cable between the top of the synthesizer tray and the SP4T (SP5T) switch on the microwave chassis (pickoff/switch assembly on the 6202B).

(5) Remove the lower support bracket between the synthesizer tray and the microwave chassis (Fig. 2-2).

(6) Remove the countersunk screw and nut that secures the bracket on the bottom of the microwave chassis to the front panel (below the COUNTER connector).

(7) For instruments fitted with the step attenuator option, disconnect one end of the ribbon cable between the Memory Card and Digital PCBs. Move the cable into a suitable position so that it will not obstruct removal of the microwave chassis.

(8) For instruments fitted with Option 002 (field replaceable RF connectors), remove the adaptors fitted to the RF OUTPUT and COUNTER connectors.

(9) Disconnect the ribbon cable between PLH on the Digital board and the Keyboard PCB. Remove the Digital PCB retaining plate and withdraw the board about 1/2 in. This prevents fouling of the microwave chassis when it is removed.

(10) Stand the instrument on its rear. While supporting the microwave chassis, remove the 5 screws that secure the chassis to the right hand side rail (2 on the top, 3 on the bottom).

(11) Withdraw the microwave chassis from the bottom of the instrument, holding it at an angle so that it clears the front panel.

Replacement of the microwave chassis is generally a reversal of the above removal procedure. When re-fitting the chassis, it may be found easier to push the RF connectors through the front panel grommets if the grommets are first of all lubricated slightly with water.

Microwave Chassis (6204B instruments)

(1) Pull off all connectors from the Auxiliary Interface board.

(2) Disconnect cables PLC to PLX from the top, right hand side of the synthesizer tray.

(3) Remove the semi-rigid cable between the sampler at the bottom of the synthesizer tray and the SP2T switch on the microwave chassis.

(4) Remove the semi-rigid cable between the top of the synthesizer tray and the 2 GHz pick-off on the microwave chassis.

(5) Remove the lower support bracket between the synthesizer tray and the microwave chassis (Fig. 2-2).

(6) Remove the countersunk screw and nut that secures the bracket on the bottom of the microwave chassis to the front panel (below the COUNTER connector).

(7) Disconnect the ribbon cable between PLH on the Digital board and the Keyboard PCB. Remove the Digital PCB retaining plate and withdraw the board about 1/2 in. This prevents fouling of the microwave chassis when it is removed.

(8) Stand the instrument on its rear. While supporting the microwave chassis, remove the 6 screws that secure the chassis to the right hand side rail (3 on the top, 3 on the bottom).

(9) Withdraw the microwave chassis from the bottom of the instrument, holding it at an angle so that it clears the front panel.

(10) If necessary, the Auxiliary Interface board can be removed from the chassis, by removing the screws that secure it to the 4 hexagonal pillars.

Replacement of the microwave chassis is generally a reversal of the above removal procedure. When re-fitting the chassis, it may be found easier to push the RF connectors through the front panel grommets if the grommets are first of all lubricated slightly with water.

Microwave Sub-assemblies

Figs. 2-7 to 2-10 show the arrangement of the microwave sub-assemblies on the microwave chassis. Assemblies are connected by fittings which allow a degree of mechanical adjustment. This allows the positions of the assemblies to be adjusted for optimum performance during calibration. It should be emphasized that disconnection/reconnection of couplings/assemblies on the microwave chassis is particularly likely to affect the performance of the instrument. It is therefore **not** recommended that repairs be attempted on the microwave chassis unless very accurate test equipment is available and the correct calibration procedure can be carried out after repair (see Chapter 3, Adjustment and Calibration).

If repairs are to be carried out, the following precautions should be taken:

- The position of assemblies should be adjusted so that minimum stress is experienced by the connector joints.
- Use a torque spanner set to 1.2 Nm when tightening any of the SMA connectors. If several components have been removed, initially tighten the SMA connectors to a torque of 1 Nm; when assembly is completed the connectors should be tightened further to 1.2 Nm.
- Restrict to a minimum the number of times any connection is disturbed, as gradual degradation of performance is unavoidable.

Replacement of a Faulty Oscillator

(1) Remove the microwave chassis, as described previously.

(2) Stand the chassis in its normal vertical position.

(3) Supporting the faulty oscillator with one hand, loosen the 2 M4x16 mm hex head screws which connect the oscillator mounting bracket to the chassis.

(4) Still supporting the oscillator, stand the chassis horizontally, i.e. on its right hand side as viewed from the front.

(5) Using an 8 mm torque spanner set to 1.2 Nm, disconnect the SMA connector which links the oscillator to its filter or the PIN switch assembly.

(6) Remove the four 6-32 UNC x 3/8 in screws which hold the oscillator to its mounting bracket.

(7) With the oscillator conveniently supported, unsolder all connecting wires.

(8) Solder the connecting wires to the new oscillator, according to the following wiring information.

(9) Loosely attach the new oscillator to the mounting bracket. Adjust the position of the bracket with respect to the chassis and the oscillator with respect to the bracket so that the RF output connector of the oscillator is correctly aligned with the connector on the associated filter or PIN switch assembly.

(10) Holding the oscillator in place, use the 8 mm torque spanner to tighten the SMA connection to 1.2 Nm.

(11) Still holding the oscillator in place, tighten the chassis/bracket and bracket/oscillator screws.

WIRING DETAILS FOR OSCILLATOR 1		
WIRE COLOUR	**PIN INDENT**	**PIN INDENT AVANTEK ONLY**
VIOLET	+TUNE	
GREY	-TUNE	-
WHITE	+HEATER	
YELLOW	-HEATER	
RED	+15V BIAS	
BLACK	GROUND	
WHITE/GREY	-5V BIAS	
ORANGE	+FM	+FM FILTER
GREEN	-FM	-FM OSC
PINK	GROUND	

WIRING DETAILS FOR OSCILLATORS 2, 3 & 4	
WIRE COLOUR	**PIN IDENT**
VIOLET	+TUNE
GREY	-TUNE
WHITE	+HEATER
YELLOW	-HEATER
RED	+15V BIAS
BLACK	GROUND
ORANGE	+FM
GREEN	-FM
PINK	GROUND

FOR AVANTEK OSCILLATORS, CONNECT WIRE LINK BETWEEN -FM FILTER AND +FM OSC

REPLACEMENT OF THE BAIL ARM

The bail arm is removed as follows (refer to Fig. 2-6:

(1) Unclip both end caps and loosen the screws at both sides.

(2) Remove one screw and pull the bail arm away from the indexing mechanism. Remove the remaining ssrew and remove the bail arm.

Note...

When fitting the replacement bail arm, use a small quantity of Loctite 270 on the ends of the screws before inserting them.

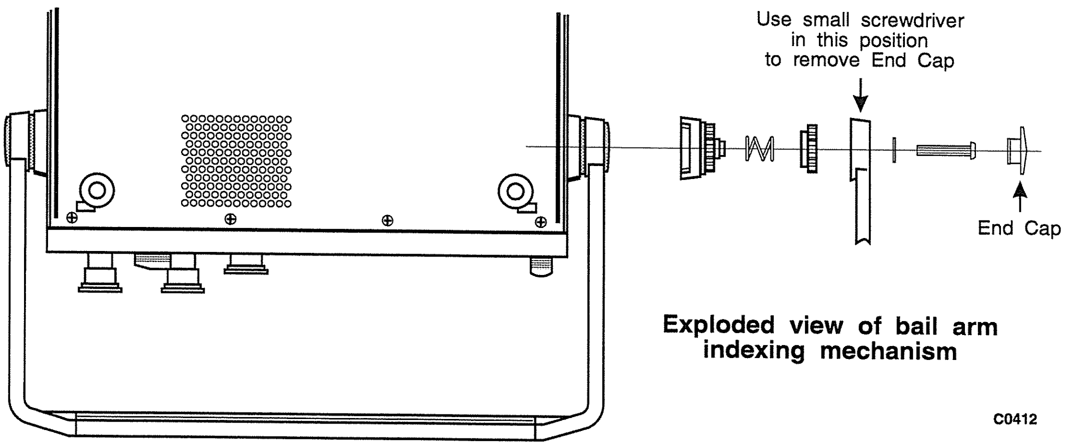


Fig. 2-6 Removal of Bail Arm

ROUTINE SAFETY TESTING AND INSPECTION

In the UK the 'Electricity at Work Regulations" (1989) section 4(2) places a requirement on the users of equipment to maintain it in a safe condition. The explanatory notes call for regular inspections and tests together with a need to keep records.

The following electrical tests and inspection information is provided for guidance purposes and involves the use of voltages and currents that can cause injury. It is important that these tests are only performed by competent personnel.

Prior to carrying out any inspection and tests the instruments must be disconnected from the mains supply and all external signal connections removed. All tests should include the instrument's own supply lead, all covers must be fitted and the supply switch must be in the 'ON' position.

The recommended inspection and tests fall into three categories and should be carried out in the following sequence:

1. Visual inspection
2. Earth Bonding Test (Class I equipment only)
3. Insulation Resistance test.

1. Visual Inspection

A visual inspection should be carried out on a periodic basis. This interval is dependant on the operating environment, maintenance and use, and should be assessed in accordance with guidelines issued by the Health and Safety Executive (HSE). As a guide, this instrument when used indoors in a relatively clean environment would be classified as 'low risk' equipment and hence should be subject to safety inspections on an annual basis. If the use of the equipment is contrary to the conditions specified, you should review the safety re-test interval.

As a guide, the visual inspection should include the following where appropriate:

Check that the equipment has been installed in accordance with the instructions provided (e.g. that ventilation is adequate, supply isolators are accessible, supply wiring is adequate and properly routed).

The condition of the mains supply lead and supply connector(s).

Check that the mains supply switch isolates the instrument from the supply.

The correct rating and type of supply fuses.

Security and condition of covers and handles.

Check the supply indicator functions (if fitted).

Check the presence and condition of all warning labels and markings and supplied safety information.

Check the wiring in re-wireable plugs and appliance connectors.

If any defect is noted this should be rectified before proceeding with the following electrical tests.

2. Earth Bonding Tests (Class I Equipment only)

Earth bonding tests should be carried out using a 25A (12V maximum open circuit voltage) DC source. Tests should be limited to a maximum duration of 5 seconds and have a pass limit of 0.1 Ω after allowing for the resistance of the supply lead. Exceeding the test duration can cause damage to the equipment. The tests should be carried out between the supply earth and exposed case metalwork, no attempt should be made to perform the tests on functional earths (e.g. signal carrying connector shells or screen connections) as this will result in damage to the equipment.

3. Insulation Tests

A 500 VDC test should be applied between the protective earth connection and combined live and neutral supply connections with the equipment supply switch in the 'on' position. It is advisable to make the live/neutral link on the appliance tester or its connector to avoid the possibility of returning the instrument to the user with the live and neutral poles linked with an ad-hoc strap. The test voltage should be applied for 5 seconds before taking the measurement. Marconi Instruments products employ reinforced insulation in their construction and hence a minimum pass limit of 7 MΩ should be achieved during this test.

Where a DC power adapter is provided with the instrument the adapter must pass the 7 MΩ test limit.

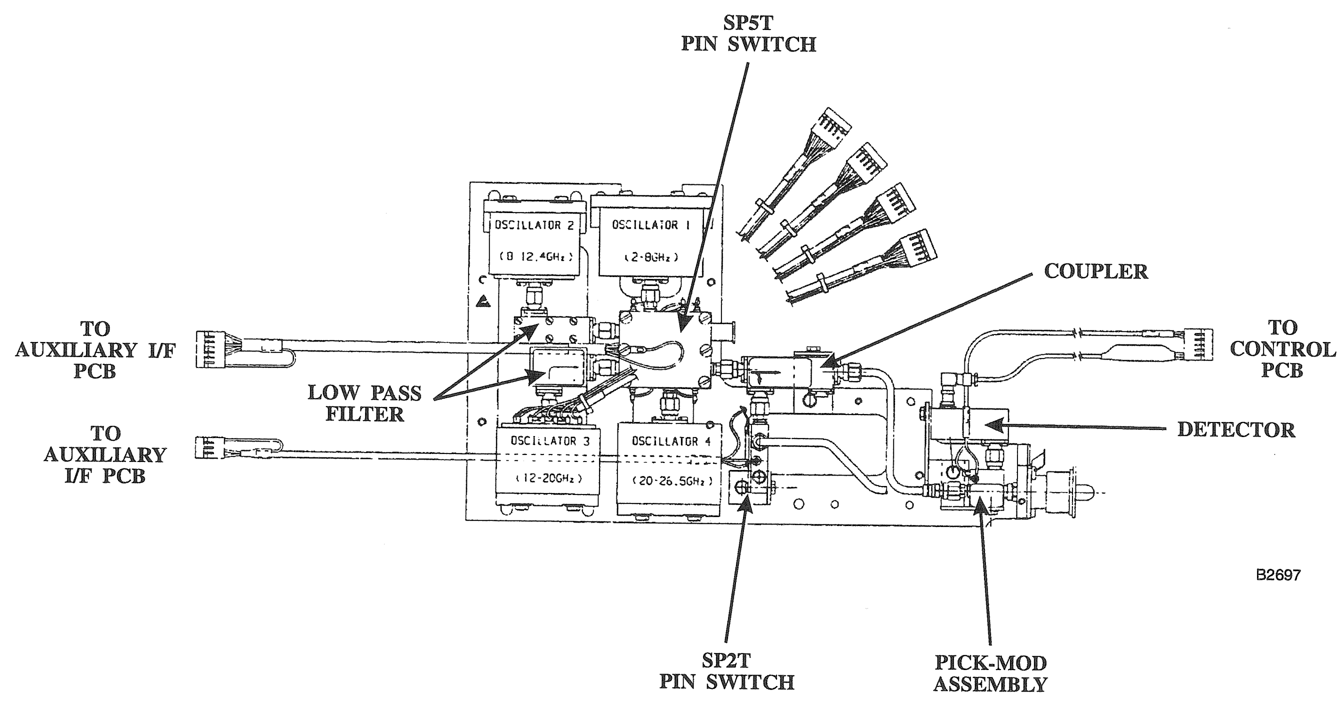
We do not recommend dielectric flash testing during routine safety tests. Most portable appliance testers use AC for the dielectric strength test which can cause damage to the supply input filter capacitors.

It is recommended that the results from the above tests are recorded and checked during each repeat test. Significant differences between the previous readings and measured values should be investigated.

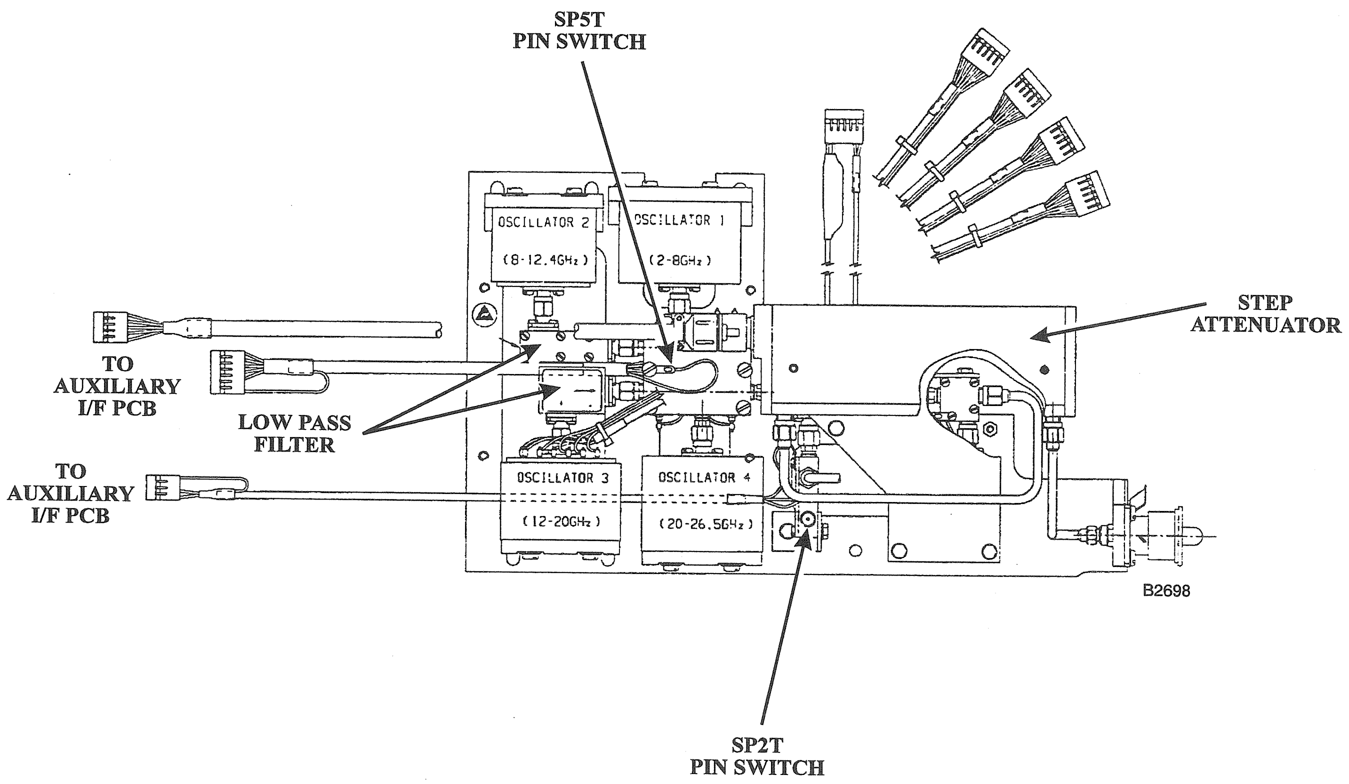
If any failure is detected during the above visual inspection or tests, the instrument should be disabled and the fault should be rectified by an experienced Service Engineer who is familiar with the hazards involved in carrying out such repairs.

Safety critical components should only be replaced with equivalent parts, using techniques and procedures recommended by Marconi Instruments Ltd.

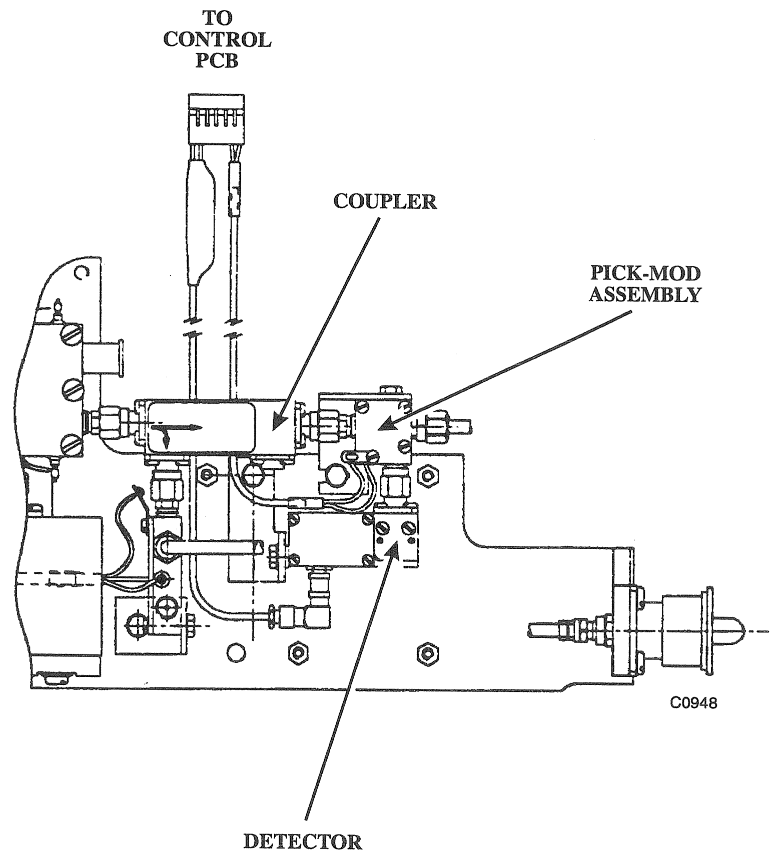
The above information is provided for guidance only. Marconi Instruments products are designed and constructed in accordance with International Safety Standards such that in normal use they represent no hazard to the operator. Marconi Instruments Ltd reserve the right to amend the above information in the course of continuing its commitment to product safety.



6203B Microwave chassis



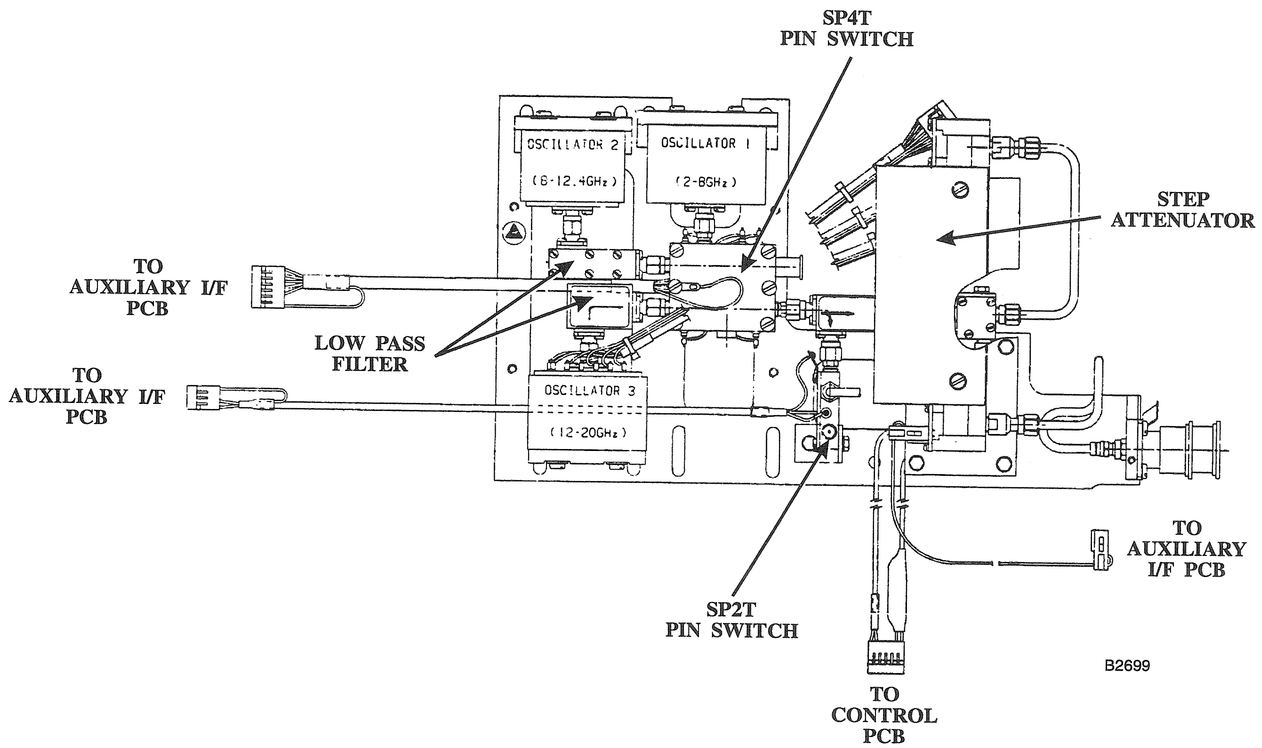
6203B Microwave chassis with step attenuator



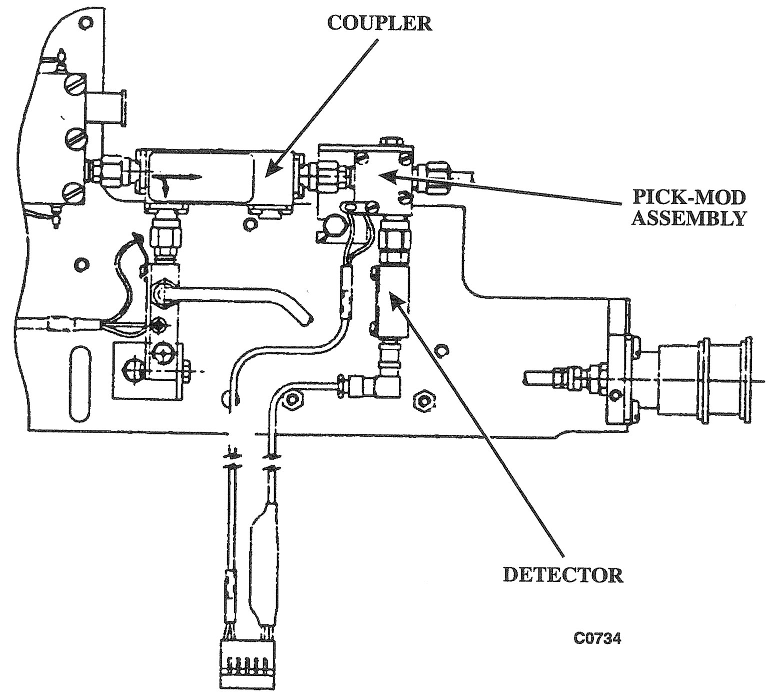
Part view with step attenuator omitted for clarity

Fig. 2-7 6203B Microwave Chassis

6203B Microwave Chassis



6200B Microwave chassis with step attenuator



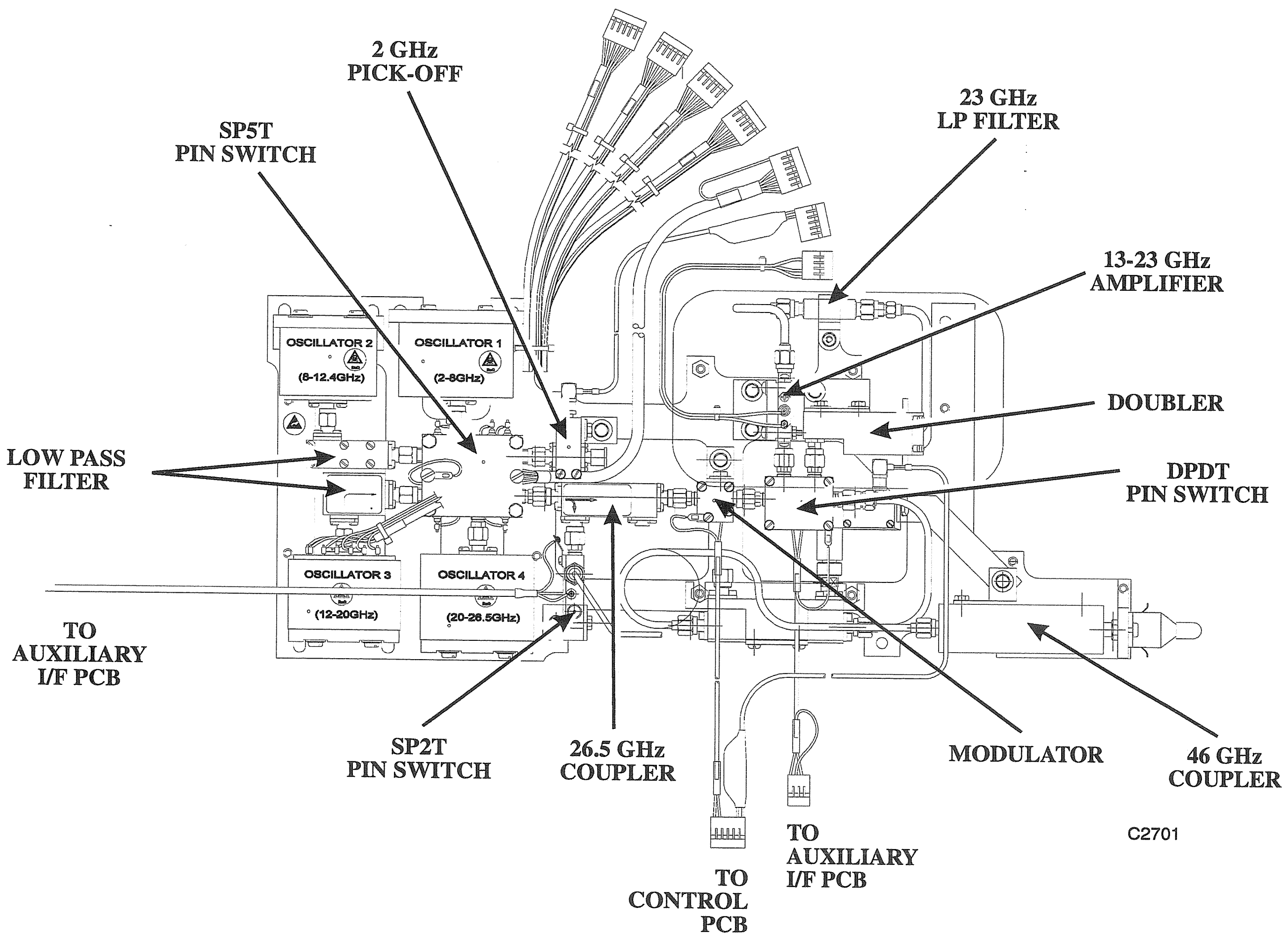
Part view with step attenuator omitted for clarity

NOTES: **The 6200B chassis without step attenuator is similar to the 6203B chassis, but only oscillators 1, 2 and 3 are present.**

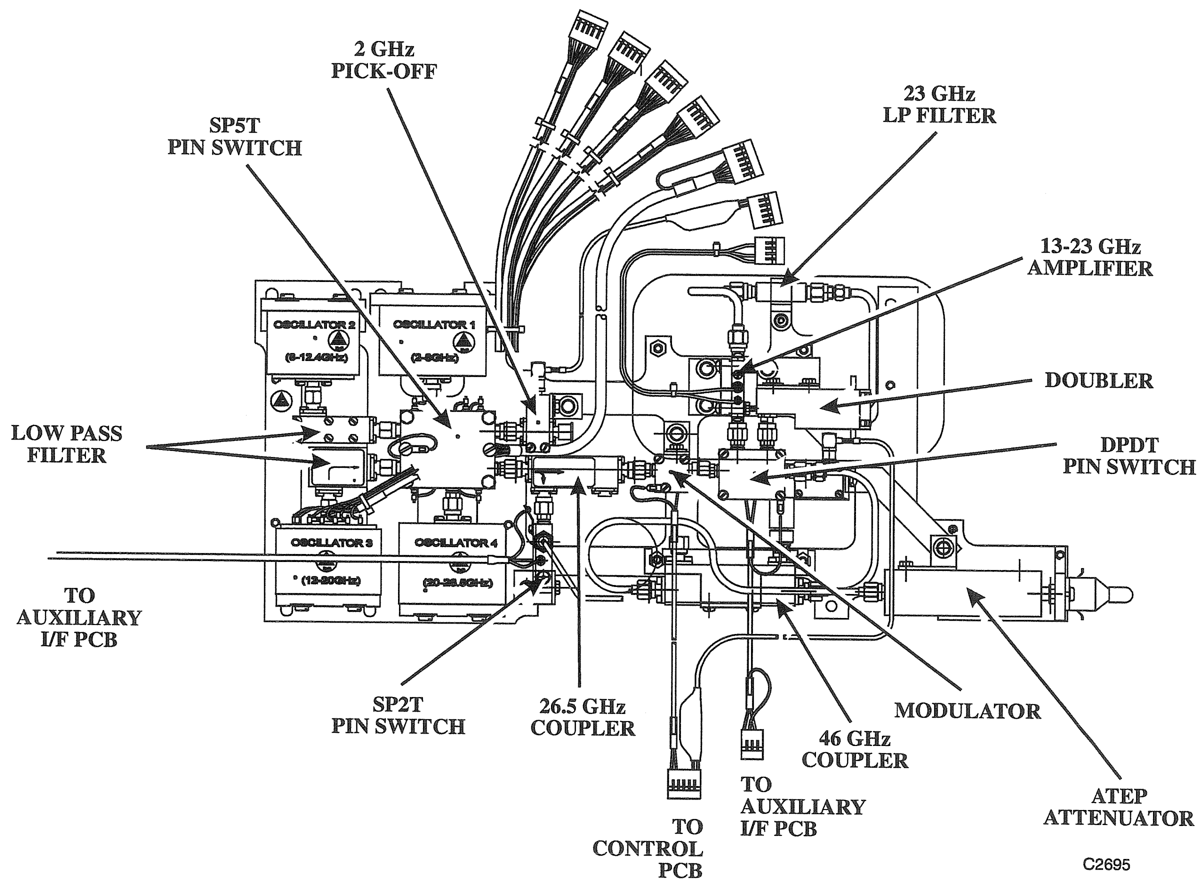
The 6201B chassis (with and without step attenuator) is similar to the 6200B chassis, but only oscillator 1 is present.

Fig. 2-8 6200B/6201B Microwave Chassis

6200B/6201B Microwave Chassis



6204B Microwave chassis



6204B Microwave chassis with step attenuator

Fig. 2-9 6204B Microwave Chassis

6204B Microwave Chassis

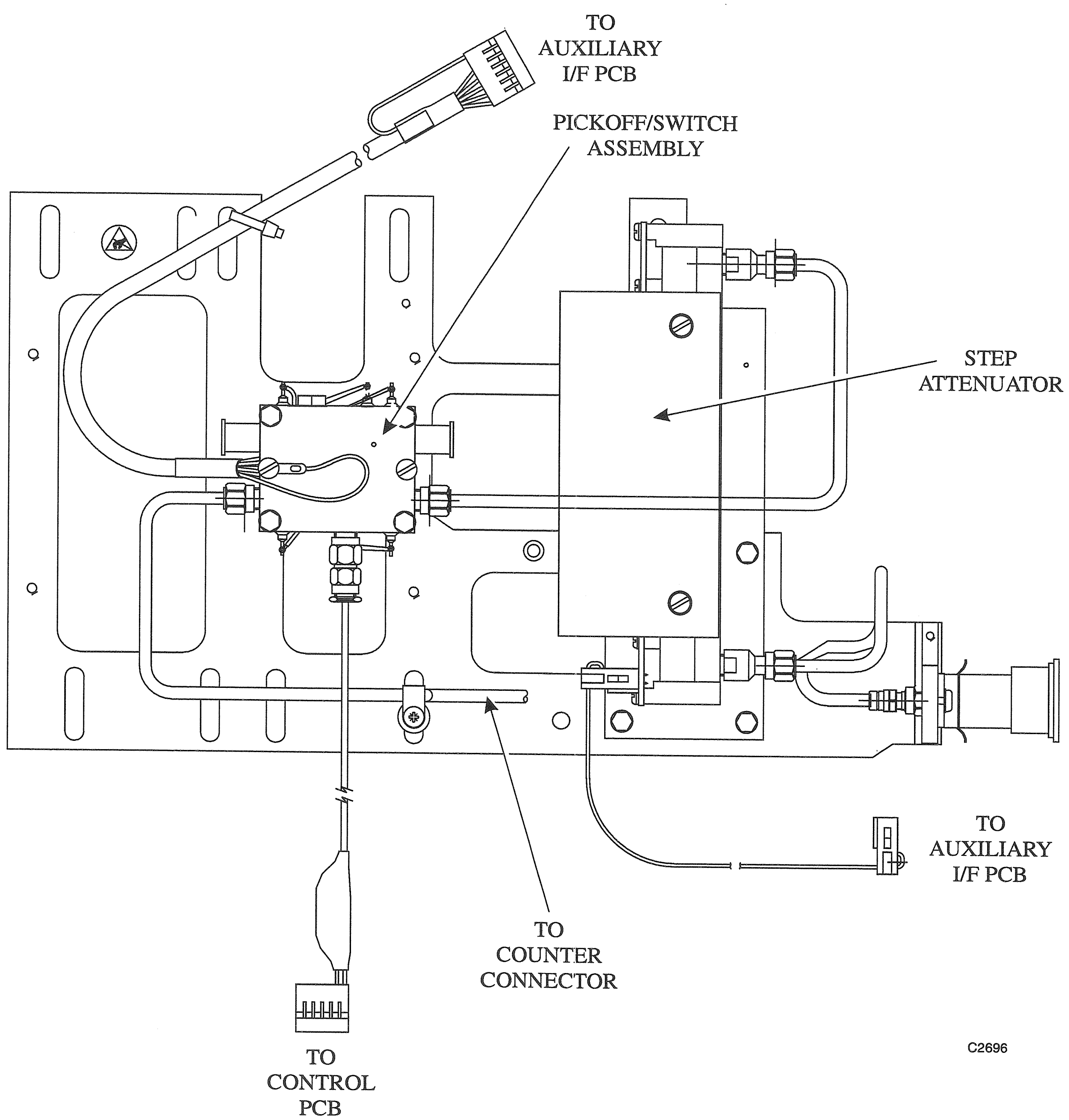


Fig. 2-10 6202B RF Chassis

6202B Microwave Chassis

Chapter 3
ADJUSTMENT AND CALIBRATION

CONTENTS

LIST OF FIGURES

INTRODUCTION

This chapter describes procedures and adjustments to maintain the 6200B Series Microwave Test Set in peak operating condition.

Most of the adjustments are performed automatically by the instrument's built-in calibration routines and only require the operator to connect any appropriate test equipment and initiate the routine. Any manually adjustable (preset) components are indicated on the appropriate location drawing (Fig. 3-2).

In the procedures that follow, the Unit Under Test is abbreviated as UUT.

Note...

A warm-up period of at least one hour should be allowed before performing any of the procedures in this chapter. During this time the source should be configured for a full-band sweep, with the RF on.

Status Switch Setting

If, after carrying out repairs, the correct setting of any of the status switches on the Digital PCB has been lost, these should be set as follows (the switch is designated SA, and is located at the top, centre of the Digital PCB):

Switch position	Setting
1	OPEN
2	CLOSED
3	CLOSED
4	*not used*
5	*not used*
6	CLOSED
7	*not used*
8	*not used*

Note...

A switch is closed when it is pushed in towards the board. Switch 1 is defined as the one nearest the front of the instrument.

INSTRUMENT CALIBRATIONS

Instrument calibrations are either password protected to Level 1 or Level 2, or unprotected. The Level 1 and Level 2 passwords are factory set to 9999 and 999999 respectively, but may have been changed by the user. If these passwords are not known, they can be over-ridden by the Primary password (a six-digit code unique to the instrument). See Operating Manual, Chapter 3 for more details.

The instrument calibrations should be performed in the order presented. To access the instrument calibration menus, press:

[PRESET]
[Default Settings]
[UTILITY]
[Service]
[Instrument Calibrations]

The procedures which follow are based on instrument firmware issue 5.02. Slight differences may be noticed when performing the procedures with other firmware issues.

Calibration Failure Report

If any of the automatic source frequency or power calibration routines fail, information on the failure is logged, and can be displayed by pressing:

[UTILITY]
[Service]
[Status]
[Display Test Results]

The information that is available is as follows:

(a) Frequency of source output at which the failure occurred

(b) Frequency band in which the failure occurred; this is coded as follows:

Band	Frequency Range	
0	10 MHz - 250 MHz	BFO (mixer) band
1	250 MHz - 350 MHz	÷4 lower ½ octave
2	350 MHz - 500 MHz	÷4 upper ½ octave
3	500 MHz - 700 MHz	÷2 lower ½ octave
4	700 MHz - 1 GHz	÷2 upper ½ octave
5	1 GHz - 1.4 GHz	Direct lower ½ octave
6	1.4 GHz - 2 GHz	Direct upper ½ octave
7	2 GHz - 8 GHz	YIG bands
8	8 GHz - 12.4 GHz	YIG bands
9	12.4 GHz - 20 GHz	YIG bands
10	20 GHz - 26.5 GHz	YIG bands
11	26.5 GHz - 40 GHz	doubler band (6204)
12	40 GHz - 46 GHz	doubler band (6204)

(c) DAC value. For frequency cal failures this is the tuning DAC value; for power cal failures this is the level DAC setting at the time of failure.

(d) An Error Code, as follows:

CAL Failure Codes

Code	Meaning
1	YIG lag out of range. Sensible results were not obtained when attempting to find the frequency lag.
2	YIG FM sensitivity out of range. Normally caused by an undetected false lock or an FM gain DAC fault.
3	Unexpected lock failure. The instrument became unlocked during the calibration, normally due to the previous lock being a false lock.
4	Less than 0 dBm during peak search. Minimum levelled power must be > 0 dBm.
5	Unlocked during power measurement. Source became unlocked during the power calibration, caused by bad or no frequency calibration.
6	Unlocked during flatness calibration. Source must be levelled during the flatness cal.
7	Failed to lock. The source failed to lock at a particular frequency during the frequency cal.

FREQUENCY STANDARD CALIBRATION

TEST EQUIPMENT

Description	Minimum specification	Example
10 MHz frequency standard	Accuracy better than 1 in 10^8	'Off Air' atomic standard

(1) Connect the frequency standard to the rear panel FREQ STD INPUT/OUTPUT connector.

(2) To perform the frequency standard calibration, select:

[Frequency Standard Cal]
...enter level 2 password
[x1]
[Continue]

(3) The UUT uses its internal counter circuits to align the internal timebase to the frequency standard. Check that the UUT reports *Calibration complete* when the procedure has finished.

POWER REFERENCE CALIBRATION AND CHARACTERISATION

TEST EQUIPMENT

Description	Minimum specification	Example
50 Mhz, 1 mW power reference standard	Calibrated to National Standards	Available in: 6200 series MTS MI 6959. 6960. 6960A, 6960B and 6970 Power Meters
6910 Power Sensor	Current calibration certificate	
6930 or 6932 Power Sensor	Current calibration certificate	

(1) Power reference calibration consists of a 0 dBm calibration and a maximum output power characterisation. Enter the Power Reference Cals sub-menu by pressing:

[Power Ref Cal]

(2) Connect the 6910 power sensor to input D via a power sensor cable. Do not connect the sensor to an RF source.

(3) Perform the 0 dBm calibration by selecting:

[0 dBm Power Ref Cal]
...enter level 2 password
[x1]
[Continue]

A sensor zero will now be performed.

(4) Following the instructions on the UUT display, first connect the sensor to the power reference standard, then to the POWER REF output on the UUT. The UUT power reference is internally adjusted to give the same output power as the power reference standard.

(5) Check that the UUT reports *Calibration Complete* when the procedure has finished.

(6) Now perform the maximum power characterisation by selecting:

[Characterise Dynamic Cal]
...enter level 2 password
[x1]

(7) Replace the 6910 power sensor with the 6930 or 6932 power sensor and connect to the POWER REF output. When ready press *[Continue]*.

(8) Enter the 50 Mhz Cal Factor and Linearity factor for the 6930 or 6932 sensor being used. When ready press *[Continue]*.

(9) Check that the UUT reports *Calibration Complete* when the procedure has finished.

SOURCE FREQUENCY CALIBRATION

TEST EQUIPMENT

Description	Minimum specification	Example
None		

(1) Source frequency calibration is a self-calibration routine performed by the MTS. Its internal counter circuits are used to measure the frequency output from the YIG oscillators, from which correction data is generated to "pre-steer" the oscillators to within phase-lock range.

(2) To perform the frequency calibration, press:

[Perform Freq Cal]

(3) Check that the UUT reports Calibration complete when the procedure has finished.

SOURCE LEVELLING CHECK AND ADJUSTMENT

Note...

This step will normally only be necessary when the levelling system in the synthesizer module is suspected faulty, or if repairs have been carried out.

TEST EQUIPMENT

Description	Minimum specification	Example
Oscilloscope	Bandwidth 1 MHz	Tektronix 2235
Coaxial detector	For 6200/6201 For 6203/6204	HP 8470B HP 8473C
50~~W~~Ω through termination		

(1) Connect the detector to the UUT RF OUTPUT. Connect the detector output to the oscilloscope via the 50 Ω through termination.

(2) Set up the UUT as follows:

[PRESET]
[Default Settings]
[CAL]
[Det/Sensor Zero]
[Detector Autozeroing] (OFF)
[SOURCE]
[Set Start Frequency...]
4 GHz
[Set Stop Frequency...]
4 GHz

[Set Number of Points...]
2 points
[Sweep Time
[User Set Sweep Time]
40 ms
[Return to Source]
[RF] (ON)

(3) Set up the oscilloscope as follows:

Sweep time:	20 µs/div
Trigger slope:	Falling edge
Trigger:	Normal

(4) Adjust the oscilloscope settings until the waveform is similar to the one shown in Fig 3-1. The waveform should have approximately 20% overshoot and no ringing present.

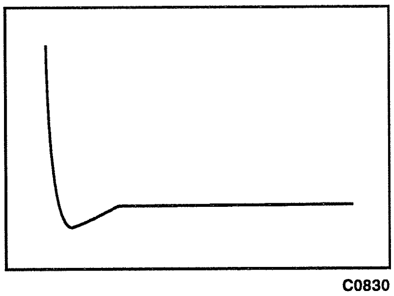


Fig. 3-1 Levelling Set-up Waveform

(5) This setting should not normally require adjustment. However, if the waveform is not as shown, adjust LEVELLING SET (R243) on the Synthesizer Control board, until the correct waveform is produced. The adjustment potentiometer can be accessed via a hole at the top rear of the Synthesizer Module (Fig. 3-2).

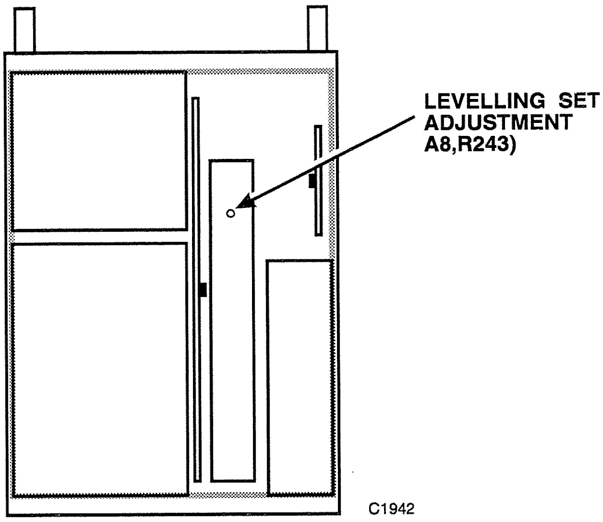


Fig. 3-2 Location of Levelling Set Adjustment (Top View of Instrument)

SOURCE POWER CALIBRATION

TEST EQUIPMENT

Description	Minimum specification	Example
Power sensor	Calibrated to National Standards	**For 6200/6201:** MI 6910 **For 6203:** MI 6913 **For 6204:** MI 6914

The source power calibration requires that the power sensor to be used has a current calibration which is traceable to National Standards.

Calibration data for the power sensor must be accessible to the UUT. This may be entered into one of the UUT's Cal Factor Table memory stores, or can be recalled from a memory card.

(1) Connect the power sensor to Input D and the POWER REF output.

Note...

The Power Reference must be calibrated according to 'Power Reference Calibration'.

(2) Set up the UUT as follows:

[PRESET]
[Default settings]
[UTILITY]
[Service]
[Instrument Calibrations]
[Source Power Cal]
[Broadband Power Cal]
...enter level 1 password
[x1]

(3) The Cal Factor Table must now be selected. The data may be entered into memory via the *[Edit Sensor Cal Data]* soft key, or if already stored, may be recalled either from instrument memory or from memory card. To select the correct data store press:

[Select Cal Fact Table...]

(4) Connect the sensor to the POWER REF output, and calibrate the sensor:

[Sensor Cal]
[Continue]

(5) When the sensor calibration is complete, connect the sensor to the RF OUTPUT. Proceed with the source power calibration by selecting:

[Continue]

(6) The UUT will initially indicate *Acquiring linearity data,* followed after a few minutes by *Acquiring flatness data.* Following completion of the calibration, after approximately 10 minutes, a window will appear containing a summary of the previous contents of user calibration store 1. It is now possible to select either store 1 or store 2, by pressing

[Select store...]

and save the current calibration in either of these by pressing

[Save]

When *[Save]* is pressed, a confirmation prompt appears, and at this point it is possible to change the calibration identification for the selected calibration store. Selecting *[No]* will retain the Cal Id unchanged, but will automatically write the present date and time onto the calibration store. Selecting [Yes] will invoke the Set Cal Id text editor. When *[Done]* is pressed, the calibration is automatically stored along with the Cal Id, date and time. Check that the confirmation message *Calibration saved* is displayed.

(7) Return to the Instrument Cals sub-menu by pressing:

[Return to Inst Cals]

Transfer to Primary

(8) It will now be necessary to transfer the calibration into the Primary EEPROM store. From the Instrument Cals sub-menu, select:

[Transfer to Primary]
...enter level 2 password
[x1]

A window will now be displayed containing a summary of the current primary calibration and a summary of user calibration store 1. *[Select Store...]* will allow user store 2 to be selected if required. To initiate the transfer, press:

[Transfer]

When complete, the selected user calibration store will be duplicated in the Primary window. Source power calibration is now complete.

Chapter 4
INITIAL REPAIR

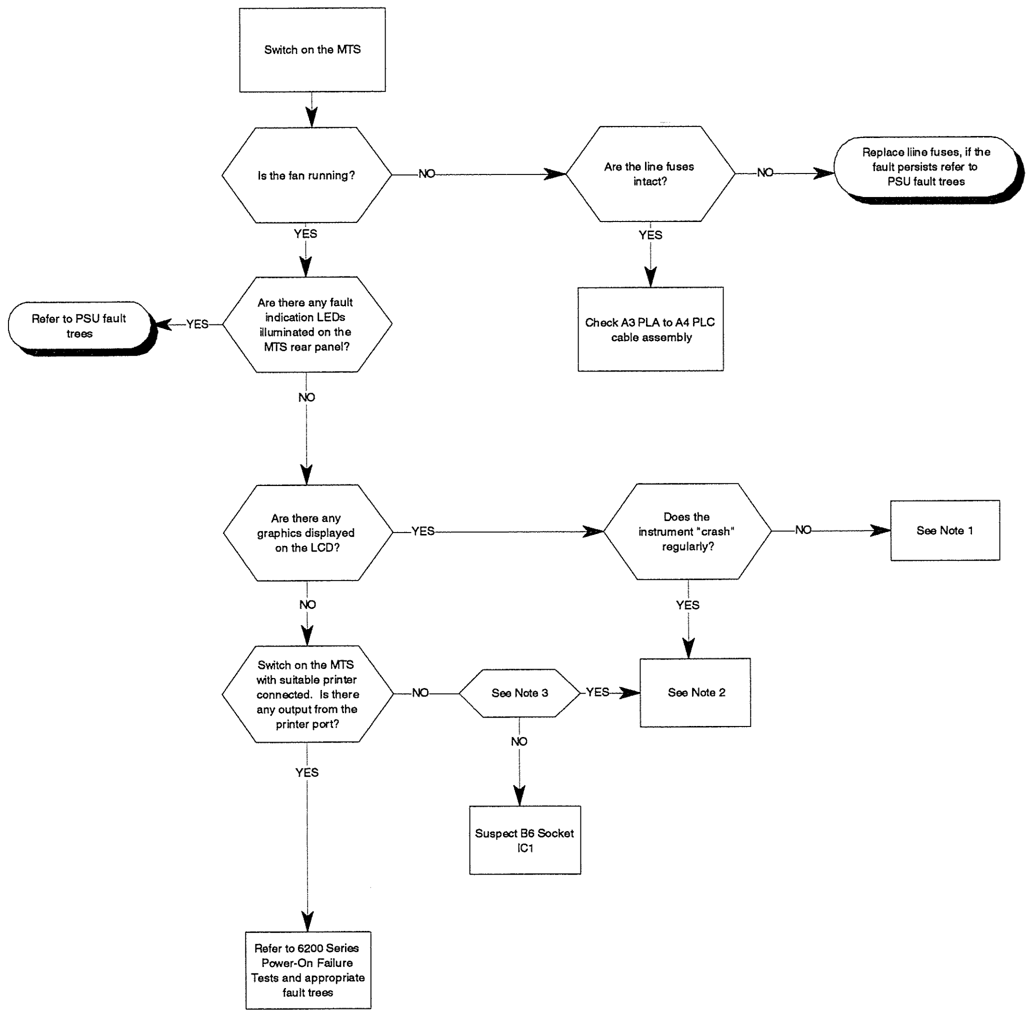
INTRODUCTION

The following flow chart describes the action that should be taken if the instrument fails to power-up correctly following delivery or during the normal course of operation. Only a screwdriver is required, and no test equipment is necessary, unless the user is directed to more comprehensive fault-finding in Chapter 5.

If the supply fuses need to be replaced, ensure that they both have the following value:

90 to 132 V operation : 4 A, time lag
188 to 265 V operation : 2.5 A, time lag

6200 SERIES INITIAL REPAIR



Note 1: If there is a specific fault, refer to the appropriate fault finding tree. For more general faults, check the cable assemblies between the B6 DIGITAL PCB and the following sub-assemblies: SYNTHESIZER unit, A13 AUXILIARY INTERFACE PCB, B9 KEYBOARD PCB, B1 MEMORY CARD PCB.

Note 2: Suspect the following: A5 to B6 PCB DIN interconnections. IC543 on A5 PCB, connection between A5 ANALOGUE PCB and B12 LCD INTERFACE PCB, connection between A3 PSU Secondary PCB and B12, connections between B12 and LCD, power connection between A3 PSU Secondary PCB (PLC) to A5 ANALOGUE PCB (PLG).

Note 3: Switch on the MTS with suitable printer connected while holding down the [COPY] key. Is the instrument build state output from the printer port? (Software versions 1.04 and above).
Printers suitable for use with the MTS are:
Epson FX series, or printer with Epson FX emulation.
HP Deskjet 500/500C/550C.
HP LaserJet 4L or 4P.

Chapter 5
FAULT DIAGNOSIS

CONTENTS

contd./...

CONTENTS *(contd.)*

INTRODUCTION

Information given in this chapter should enable a service engineer to locate the cause of a fault down to a relatively small group of components. Fault finding instructions are given in the form of a flow chart that describe the basic problems that might arise (Level 1), and indicate which board or functional area could be causing the problem. This leads the user to one or more lower level flow charts (Levels 2 and 3) to perform the fault-finding steps for that particular board or function.

The level 2 flow charts are grouped together in alphabetical order as follows:

Analogue PCB tests
Auxiliary Interface PCB tests
Digital PCB tests
Dynamic Calibrator PCB Tests
Keyboard tests
Power-on failure tests
PSU tests
Scalar/power meter tests
Source/counter tests

These are followed by the level 3 flow charts, again in alphabetical order.

When fault-finding a particular function, it may be found that the function is spread over two boards, e.g. keyboard operation is controlled by the Keyboard PCB and the keyboard interface circuit on the Digital PCB.

Some of the fault-finding procedures make use of the built-in diagnostics facilities of the MTS. The diagnostics menus are described in the MTS Operating Manual.

It is recommended that the relevant part of the technical description given in Chapter 1 be read, and the circuit diagram for the board. (Chapter 7) studied before starting any fault finding routine.

Test equipment recommended for fault diagnosis is listed in Table 2-1, Chapter 2.

POWER-ON SELF TESTS AND ERROR MESSAGES

At power-on, the MTS performs a sequence of self tests to check out the hardware. A record of the test results is stored in non-volatile memory. If a failure has been identified as a result of these tests, the message *Self test failed* is displayed advising the user to examine the self test results. This can be done using

[UTILITY]*[Service][Status][Display Test Results]*

This should indicate the functional area at fault and the user can then proceed to he relevant fault-finding section.

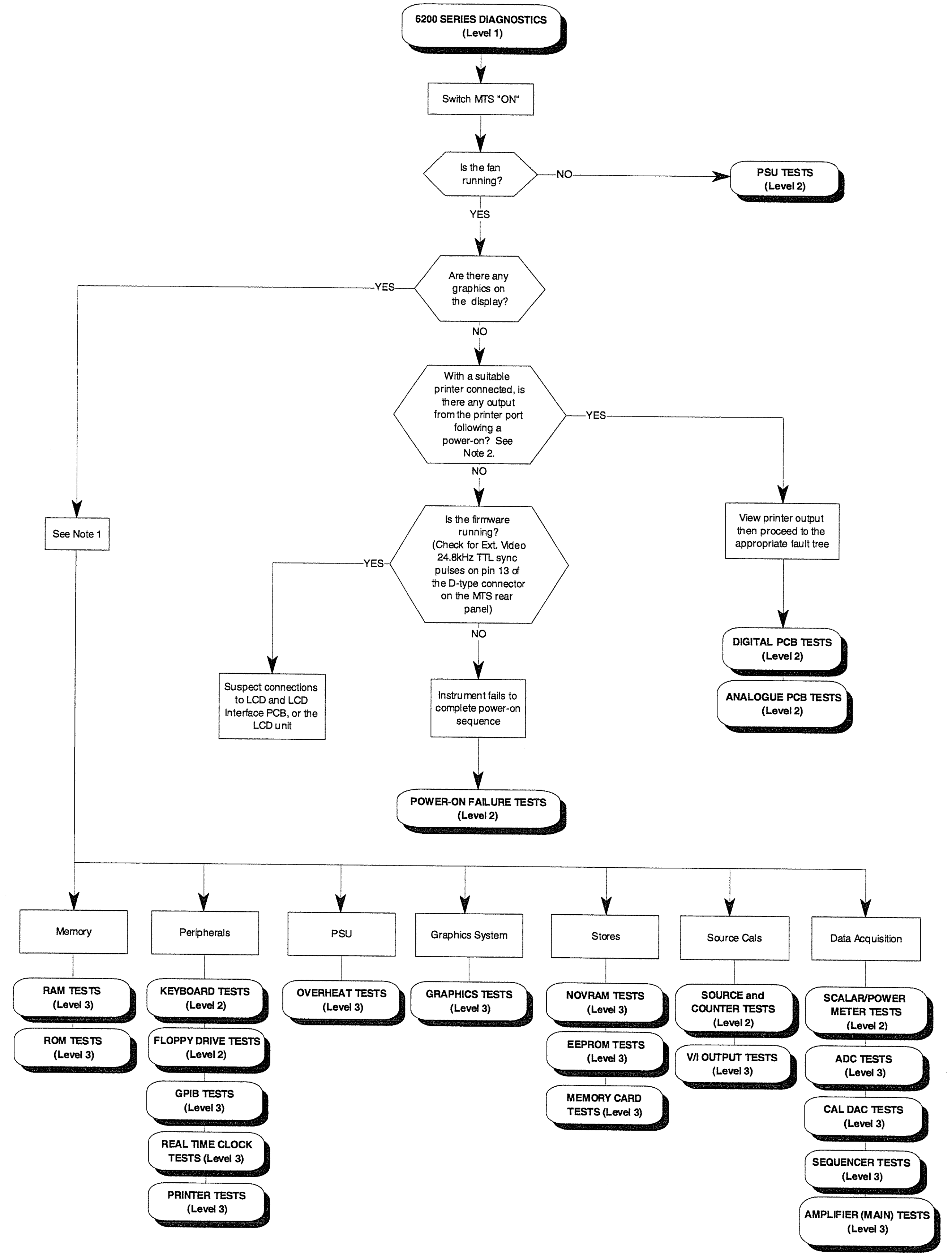
If certain hardware faults occur during the course of normal operation, a system failure error message will be displayed, indicating the area at fault, as follows:

Data acquisition calibration failure	-	Scalar/Power Meter tests ADC Tests Cal DAC Tests Sequencer Tests Amplifier (Main) Tests
Data acquisition main amp failed	-	Amplifier (Main) Tests
Data acquisition zero operation failed	-	Offset DAC Tests
Frequency standard calibration failure	-	Frequency Standard I/O Tests
Power supply overheating	-	PSU Tests
Source cal failure	-	This error will not occur during normal operation, only if a fault is detected during source calibration. See Chapter 3 for a description of the calibration failure report, then refer to 'Source and Counter Tests'.

6200 SERIES DIAGNOSTIC
(Level 1)

46882-240W

6200 SERIES DIAGNOSTICS (Level 1)



Note 1: Instrument completes power-on sequence but Power-on Self Tests have failed OR a warning box has been issued on the display during normal operation.

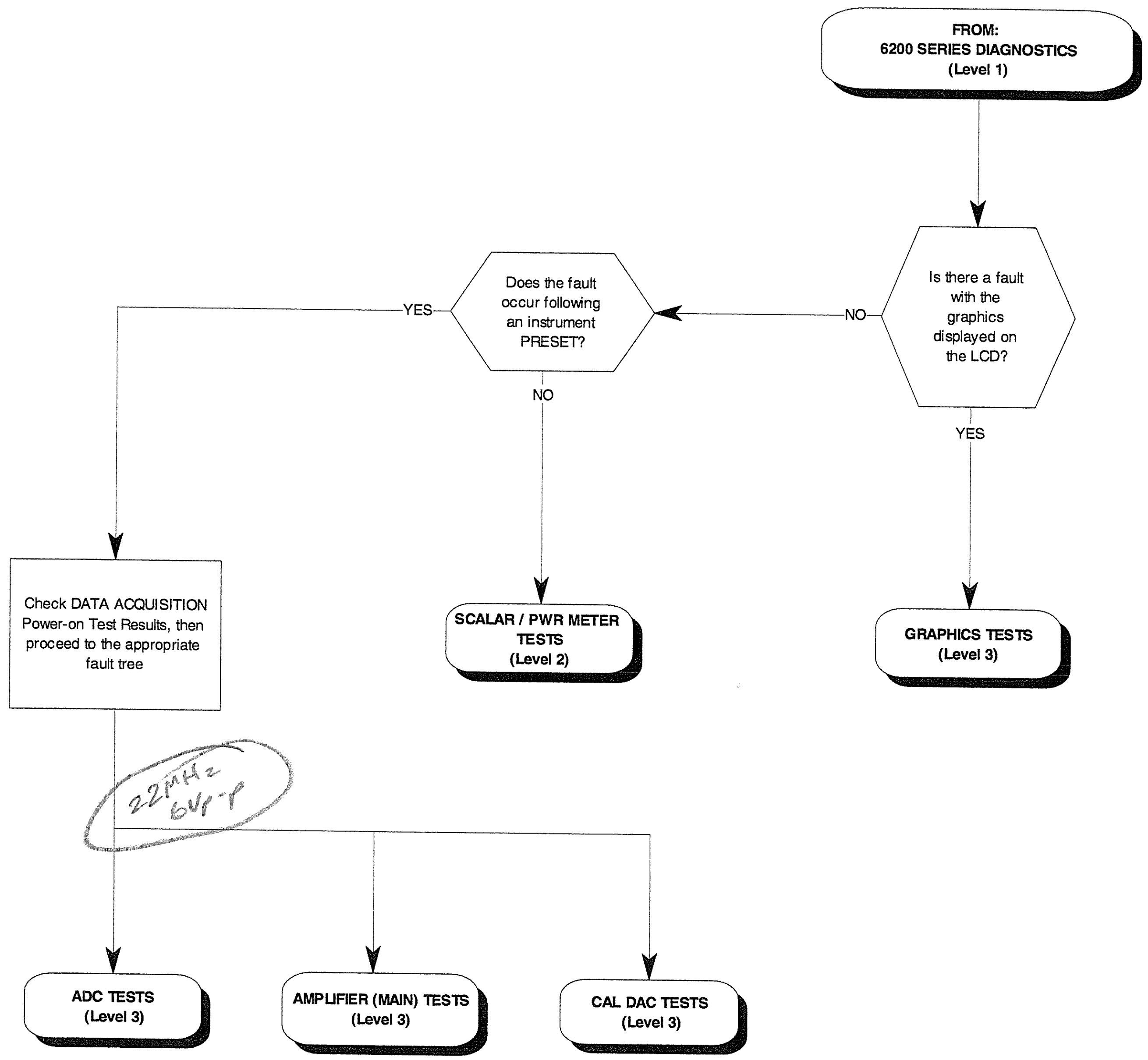
View Power-on Test Results:
[UTILITY][Service][Status] [Display Test Results] then proceed to the appropriate fault tree. If no power-on test is reported but a warning box has been issued on the display, or there is an unreported fault with the instrument, proceed directly to the appropriate diagnostic section.

Note 2: Printers suitable for use with the MTS are Epson FX series, or printers with Epson FX emulation.

Later instruments can also drive HP DeskJet/LaserJet printers. The printer type is selected using [COPY]*[Select Printer]*.

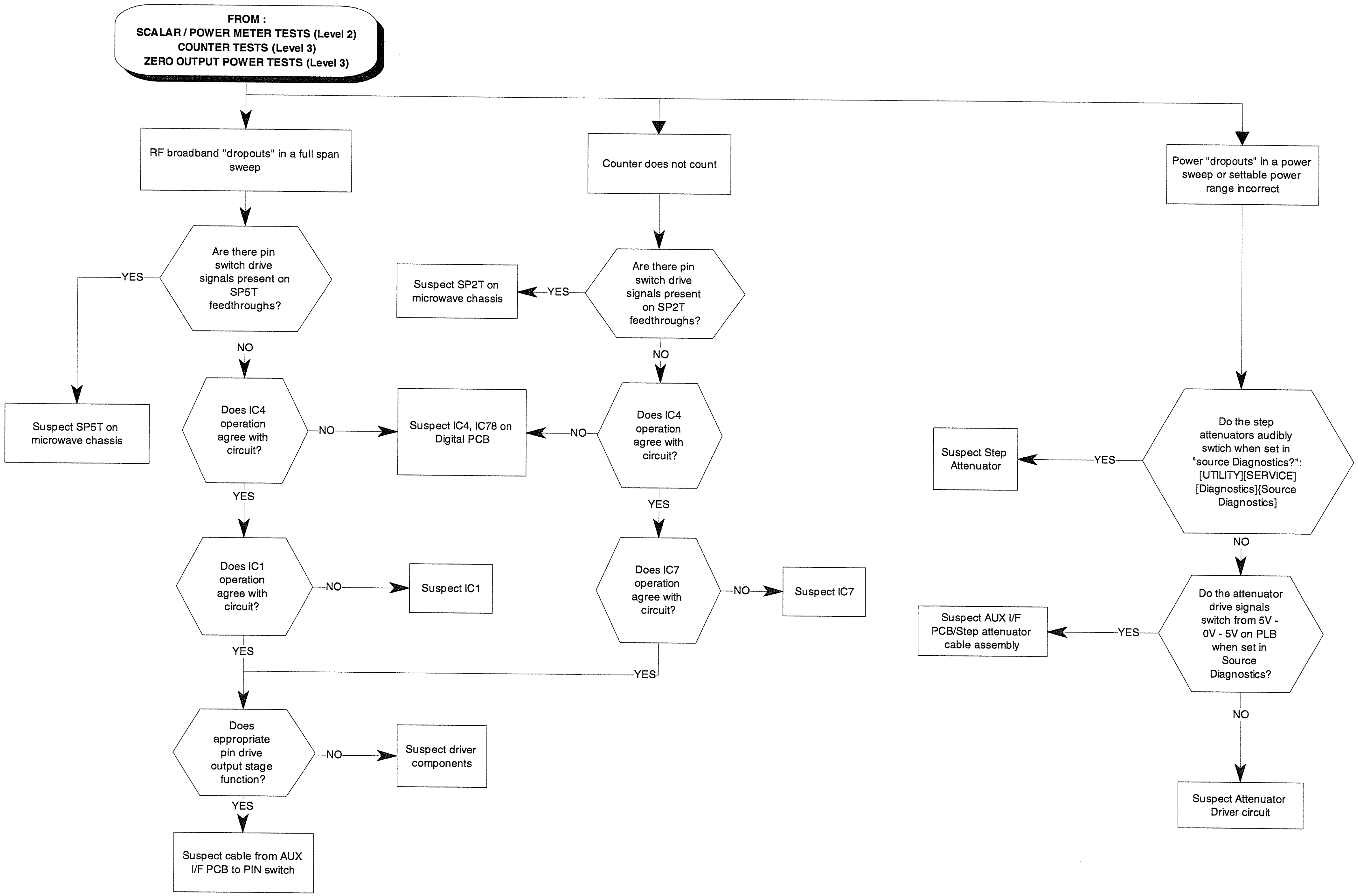
6200 SERIES DIAGNOSTIC
(Level 1)

ANALOGUE PCB TESTS
(Level 2)



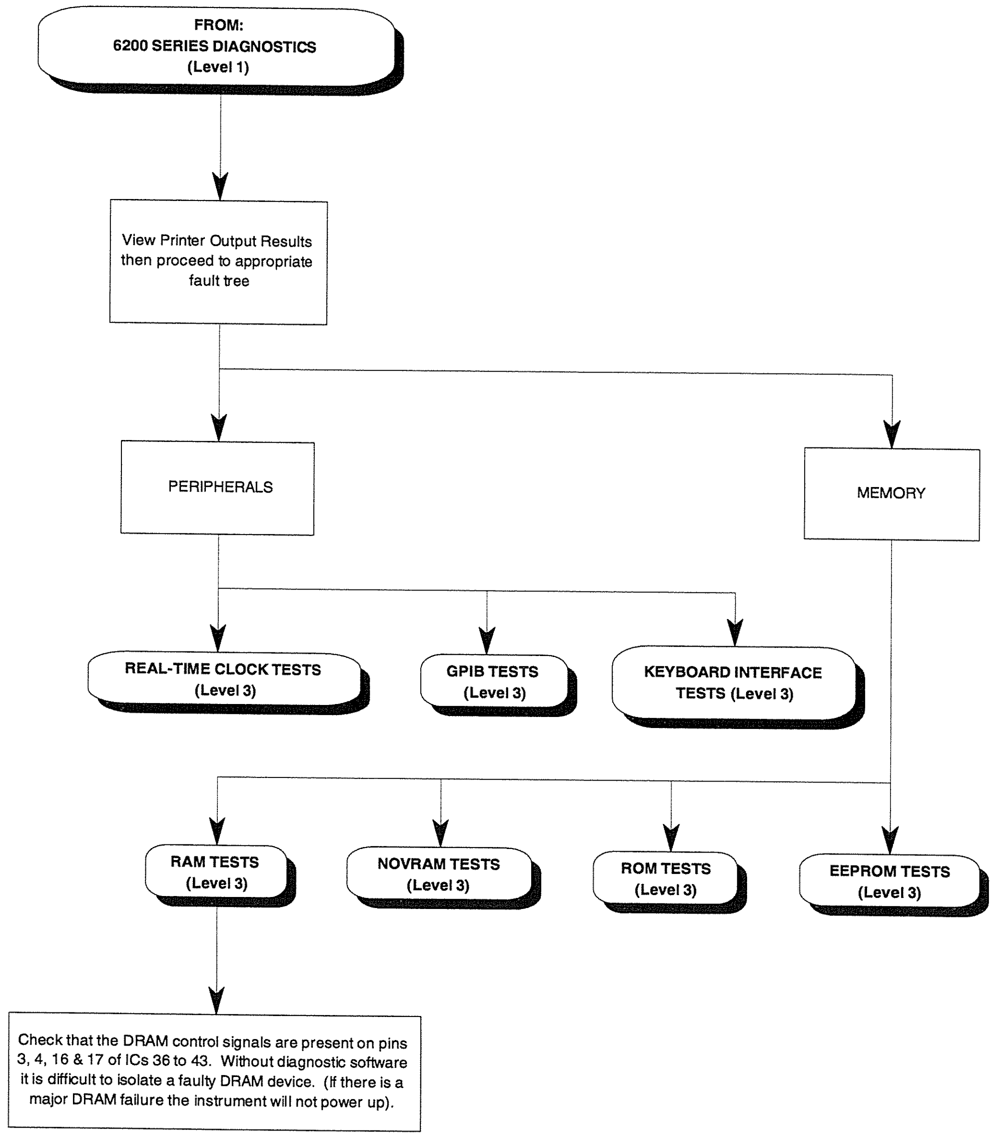
ANALOGUE PCB TESTS
(Level 2)

AUXILIARY INTERFACE PCB TESTS (Level 2)



AUXILIARY INTERFACE PCB TESTS (Level 2)

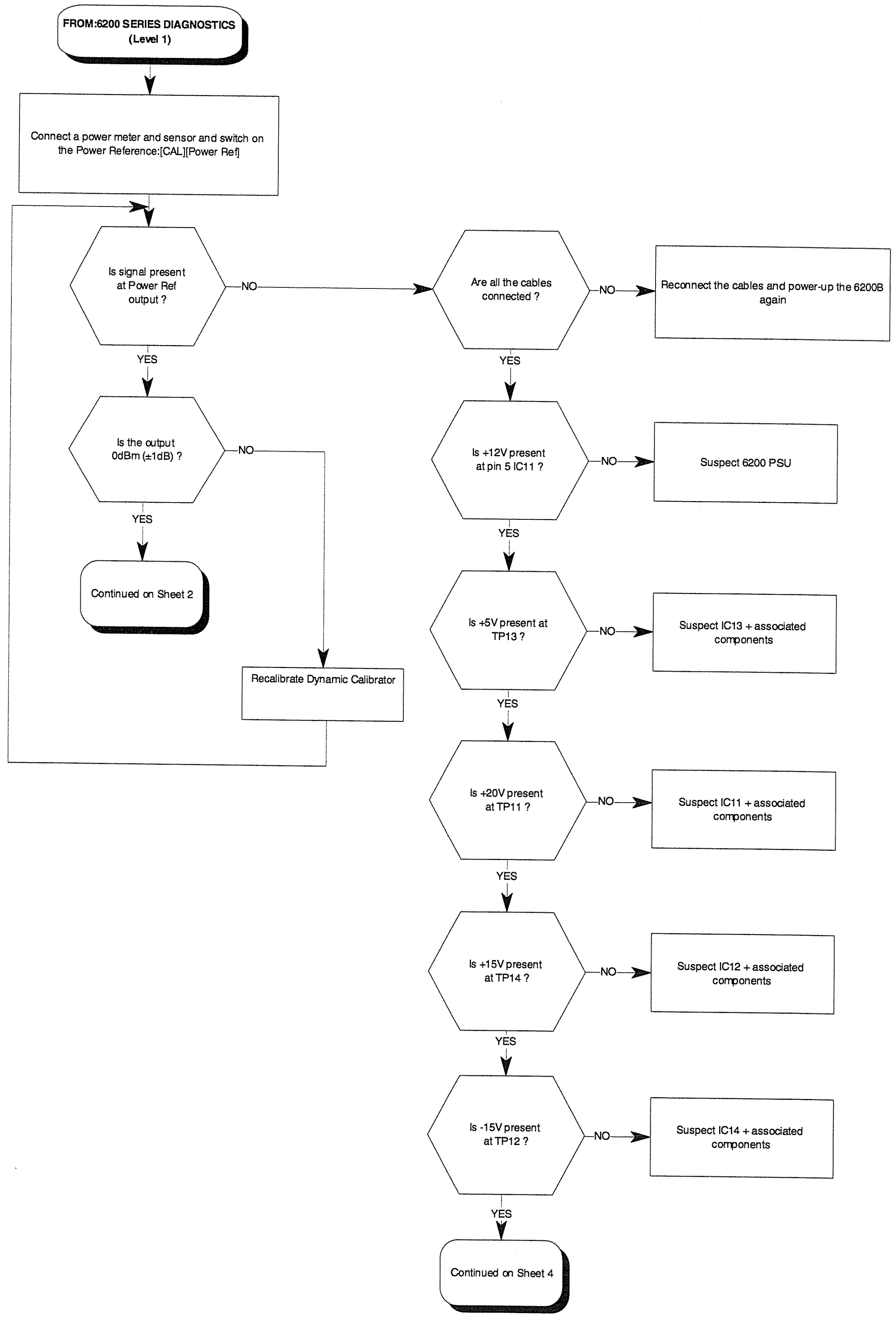
DIGITAL PCB TESTS
(Level 2)



DIGITAL PCB TESTS
(Level 2)

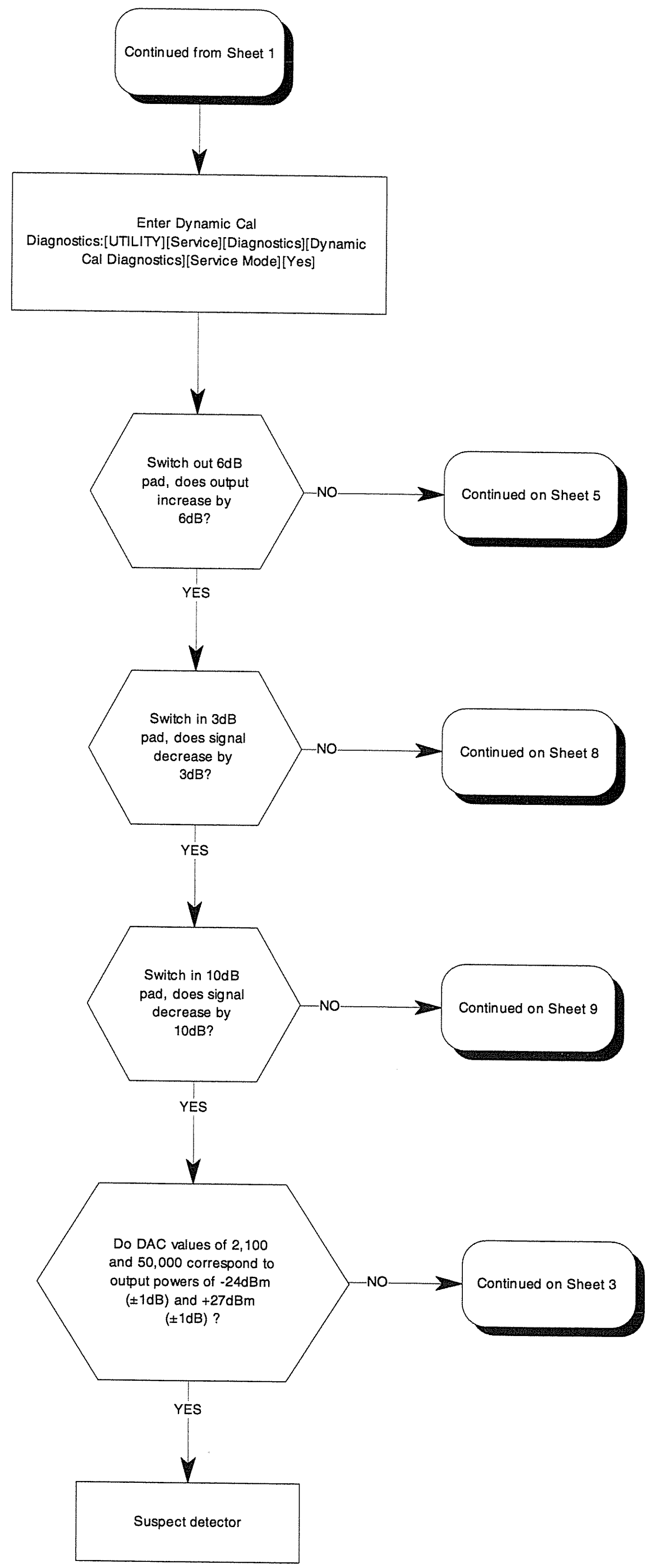
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 1

Note: Refer to Keyboard PCB (A9).



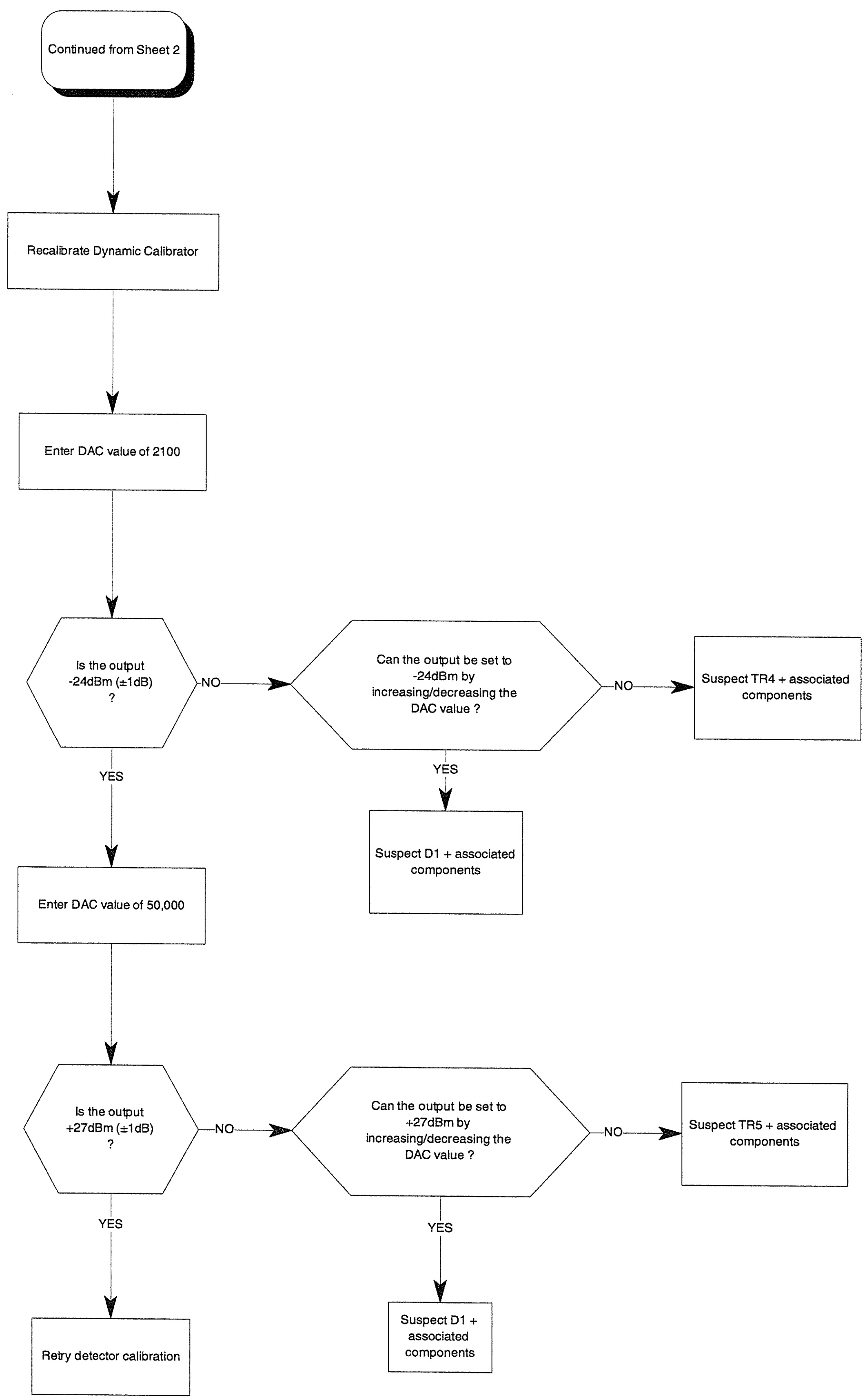
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 1

DYNAMIC CALIBRATOR PCB TESTS (Level 2) Sheet 2



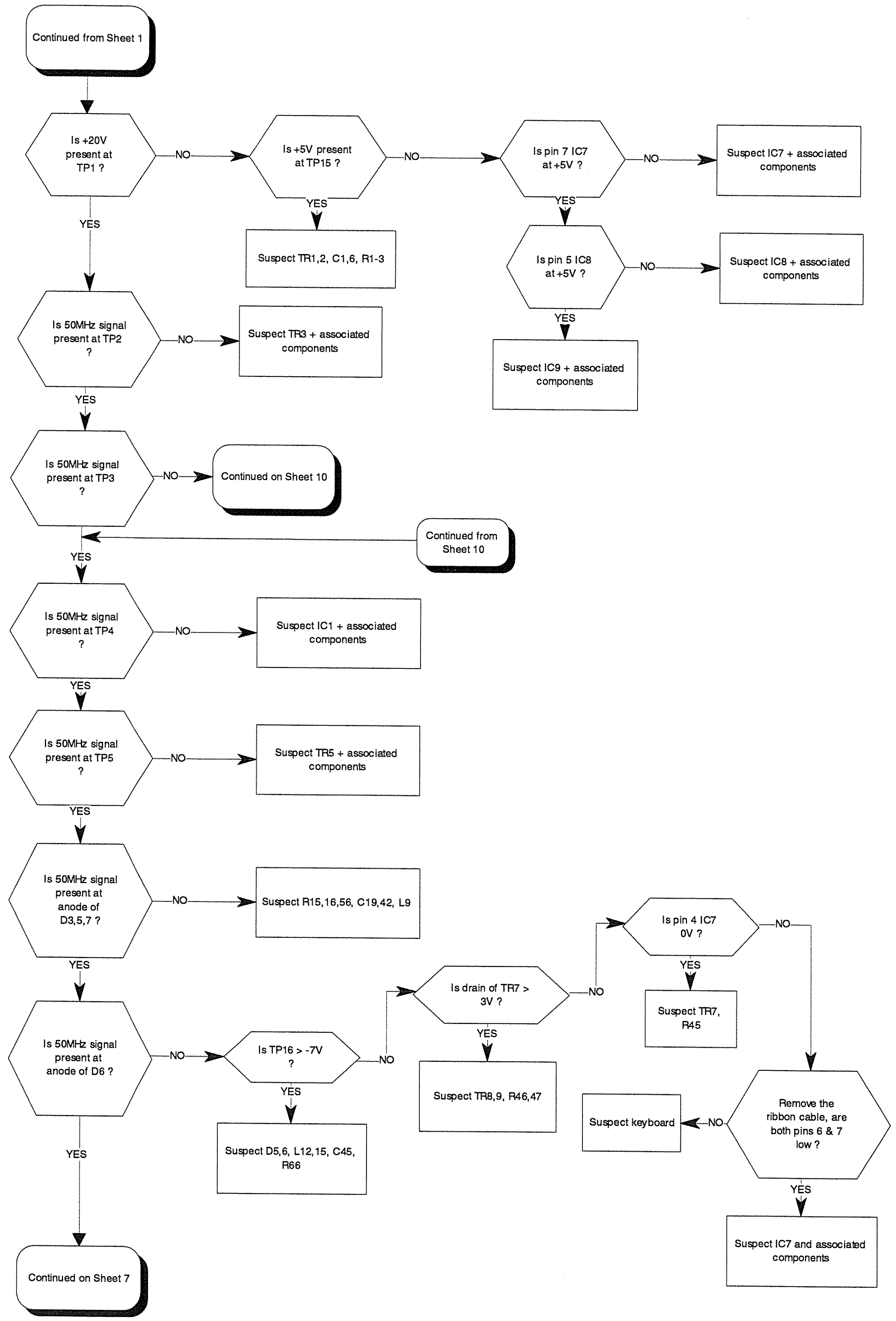
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 2

DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 3



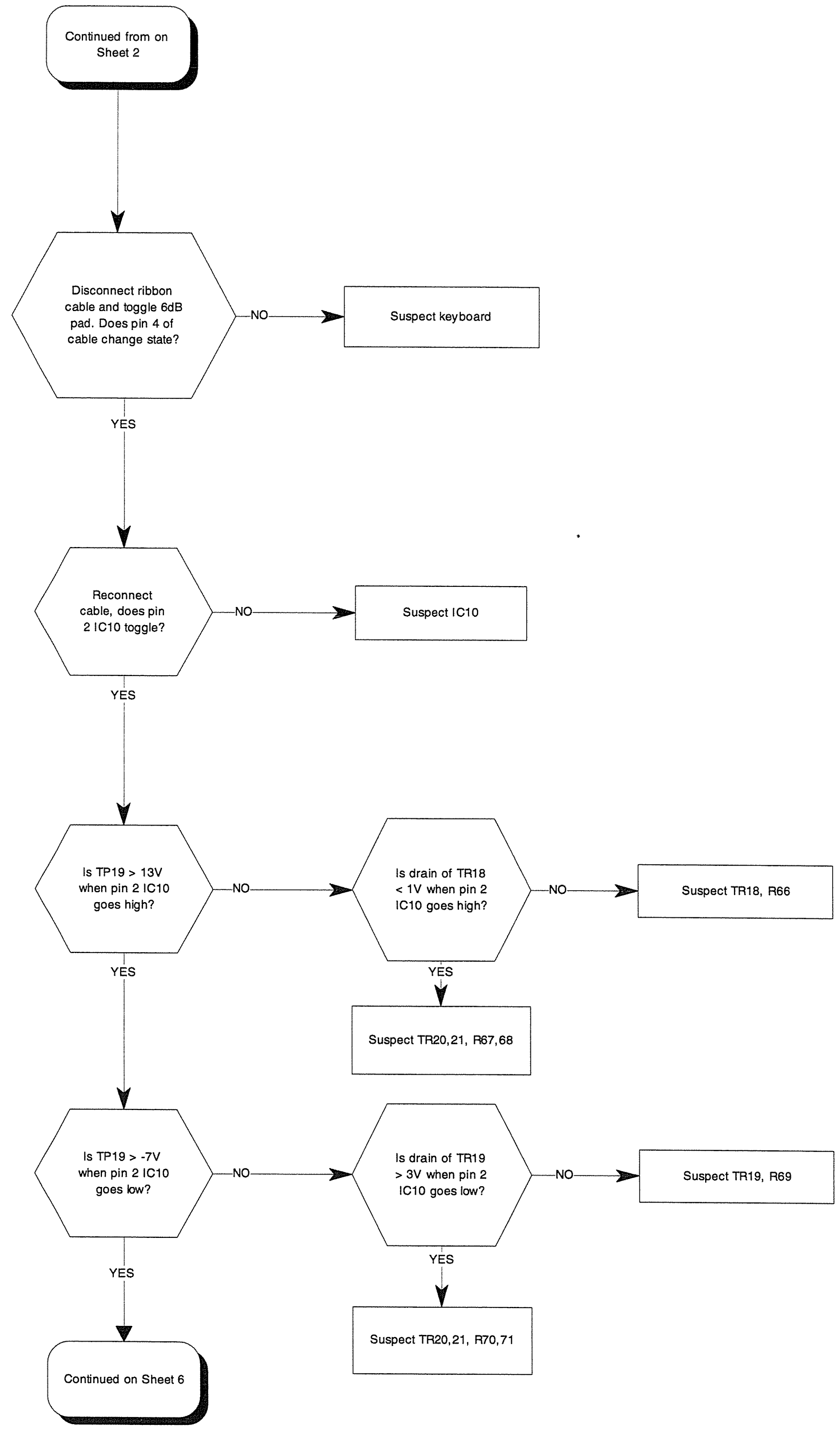
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 3

DYNAMIC CALIBRATOR PCB TESTS (Level 2) Sheet 4



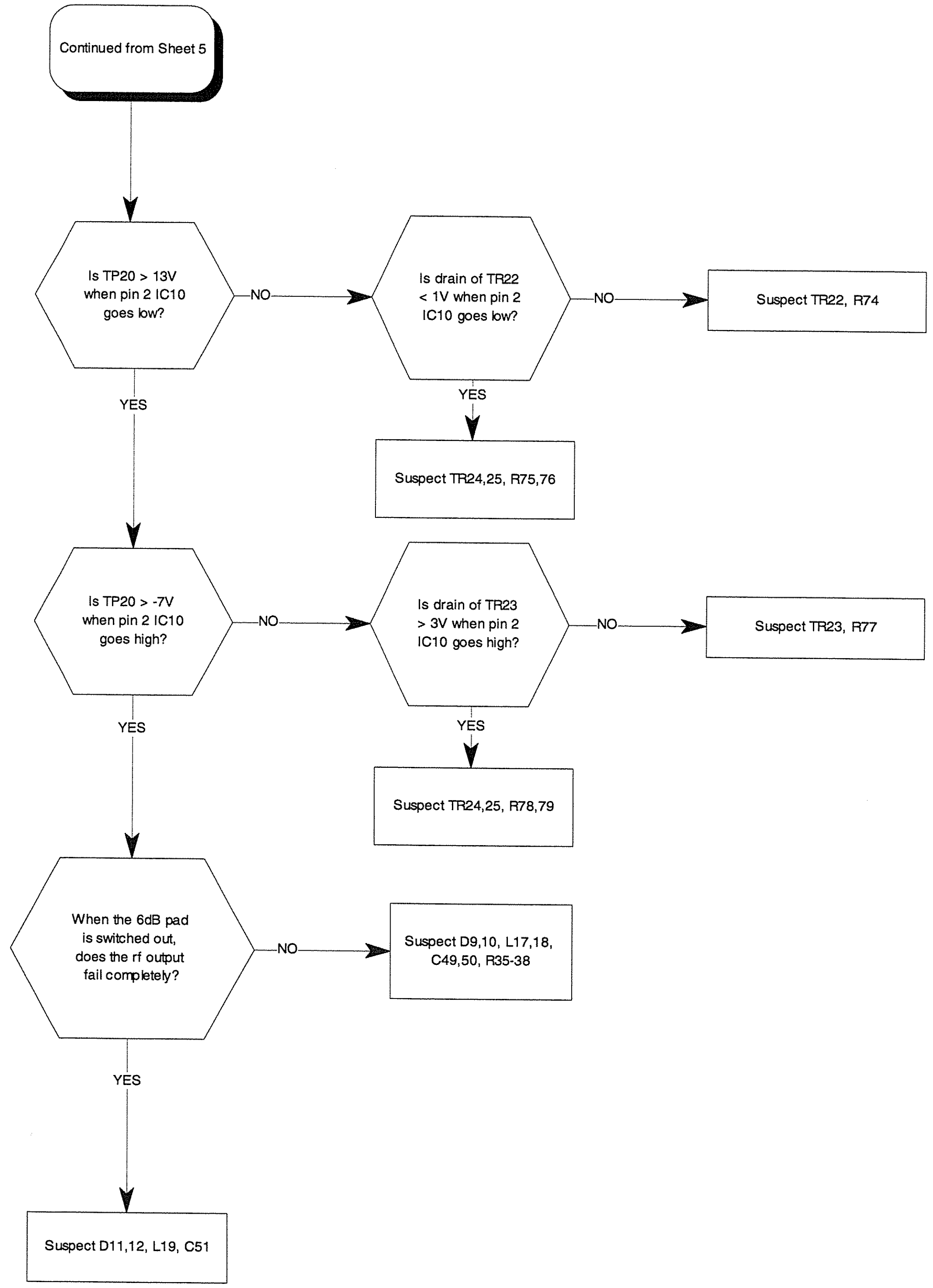
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 4

DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 5



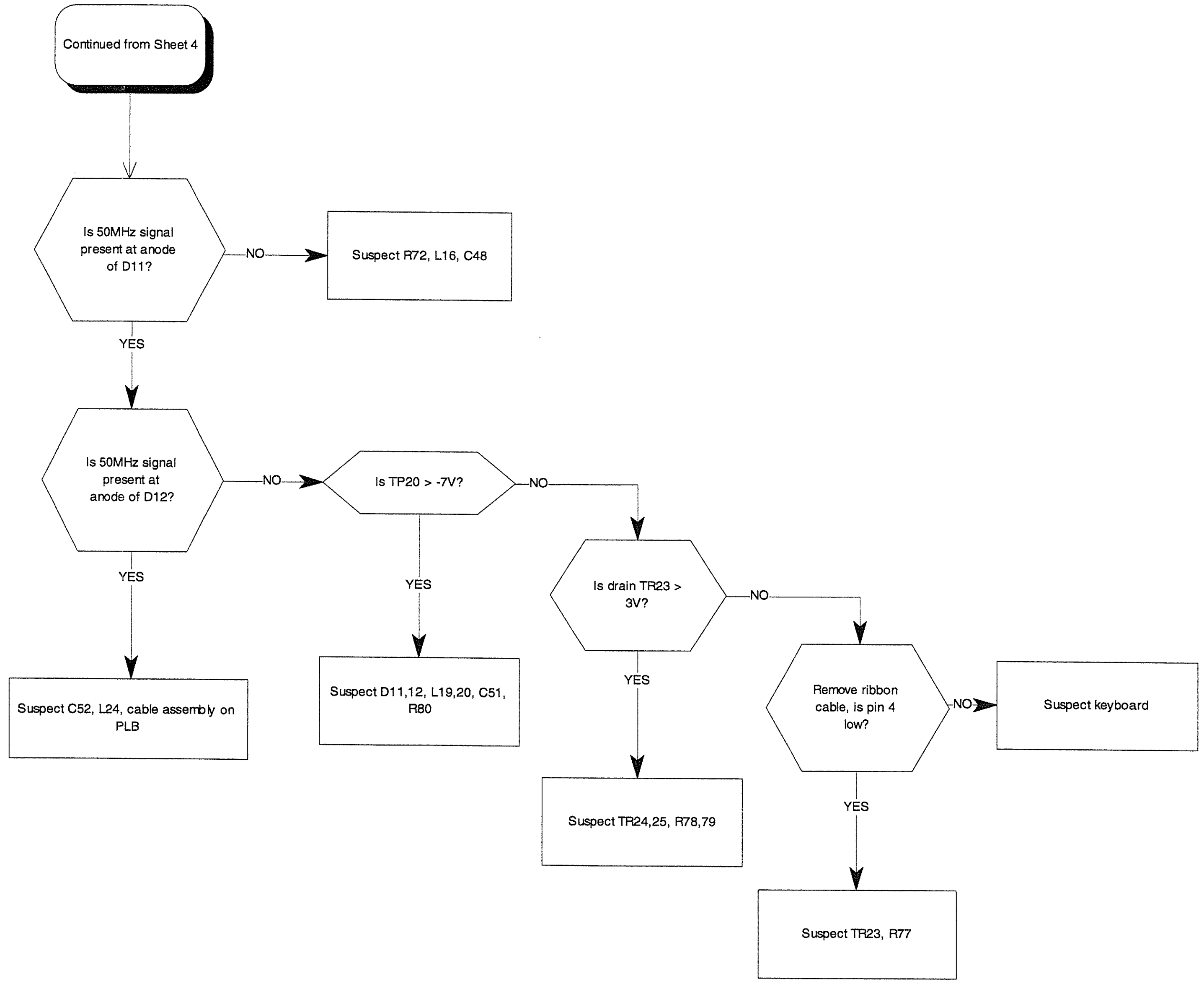
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 5

DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 6



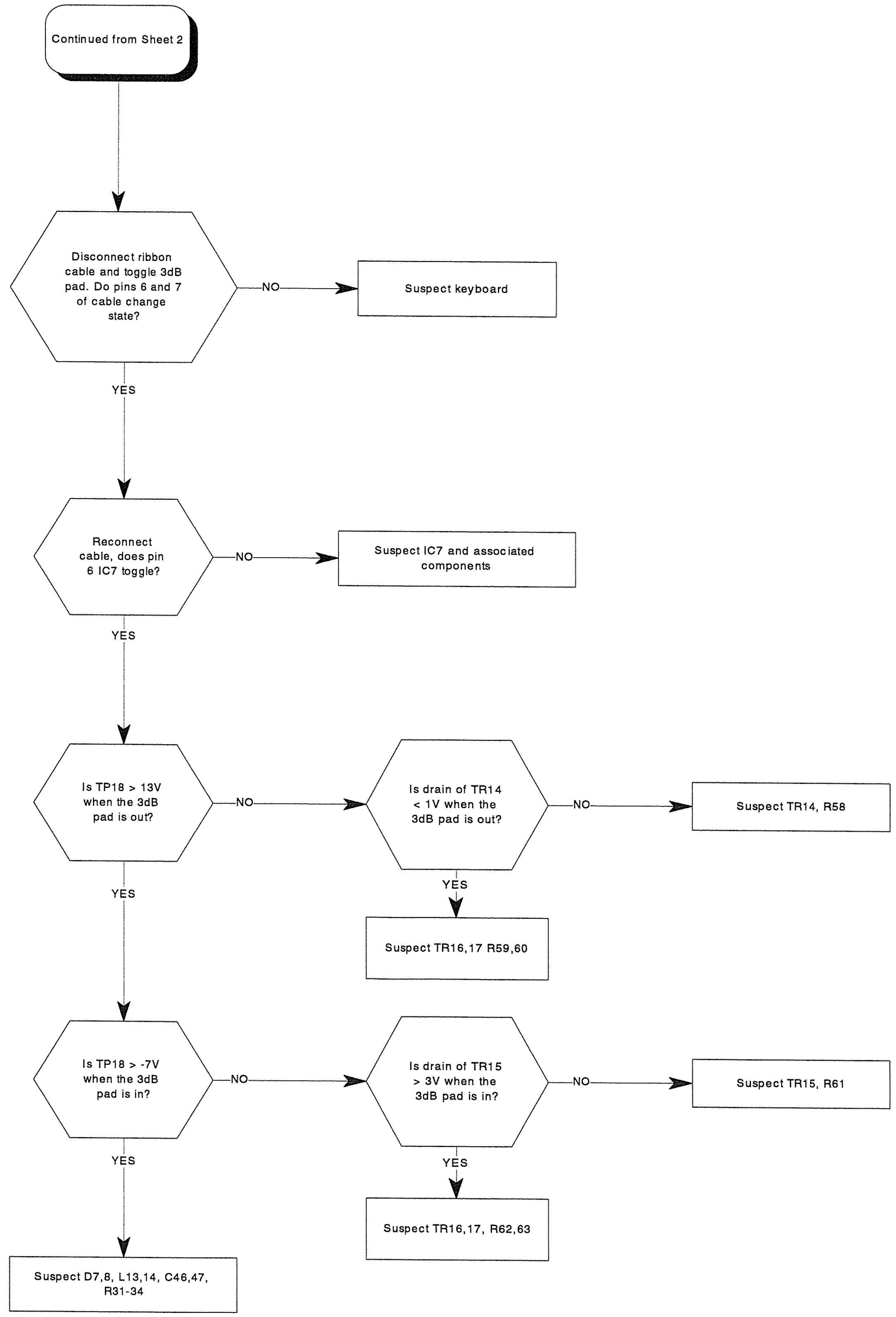
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 6

DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 7



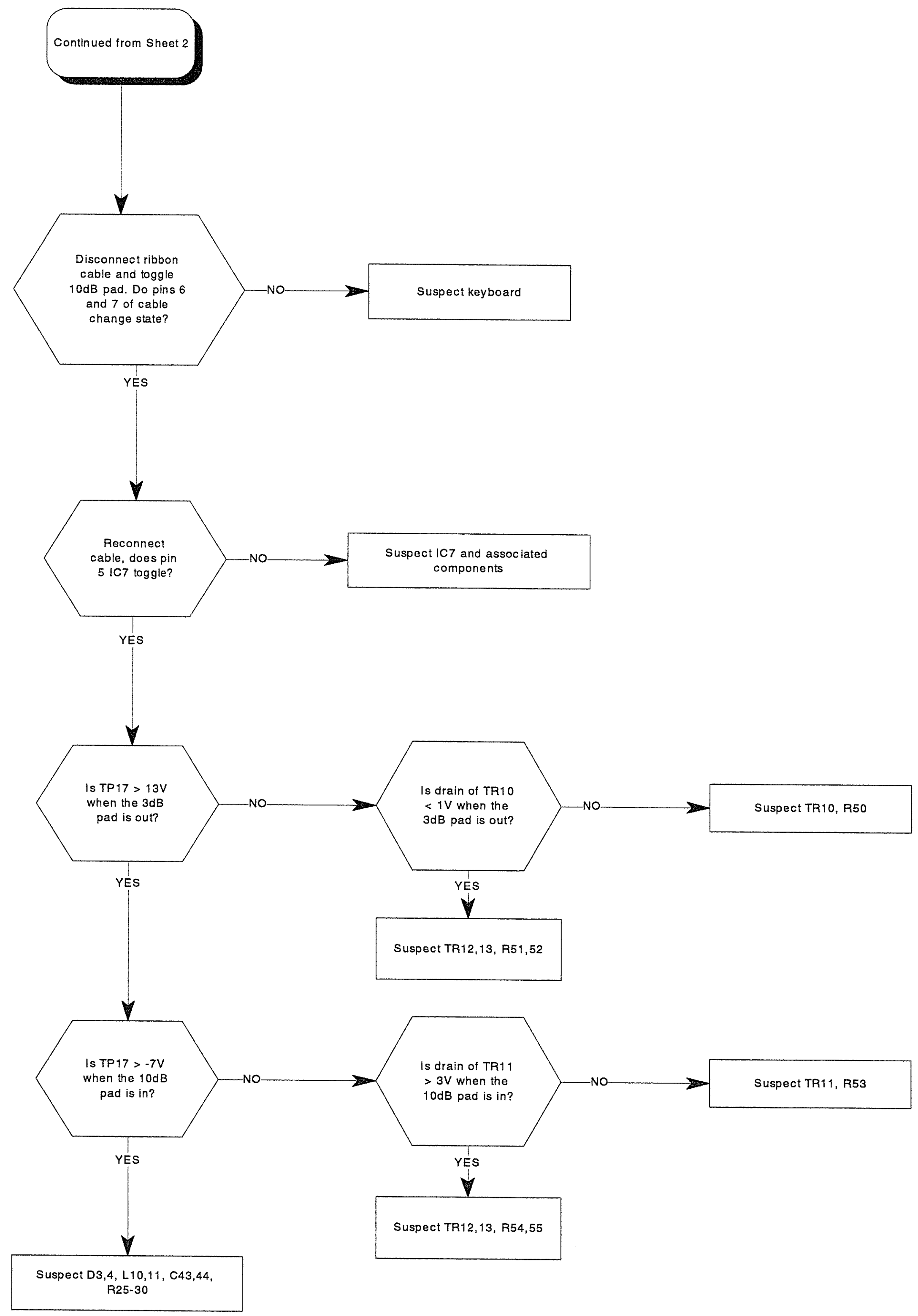
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 7

DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 8



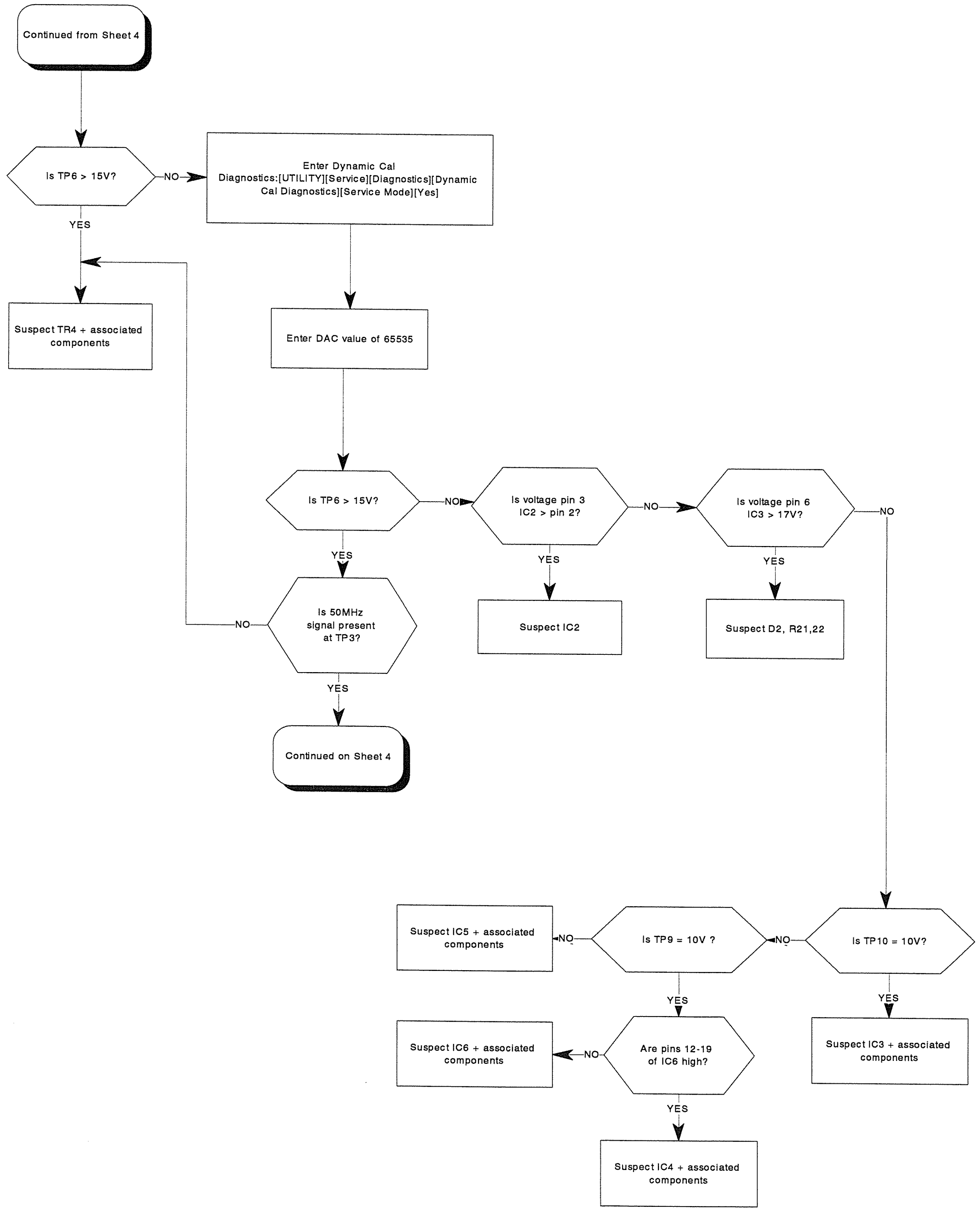
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 8

DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 9



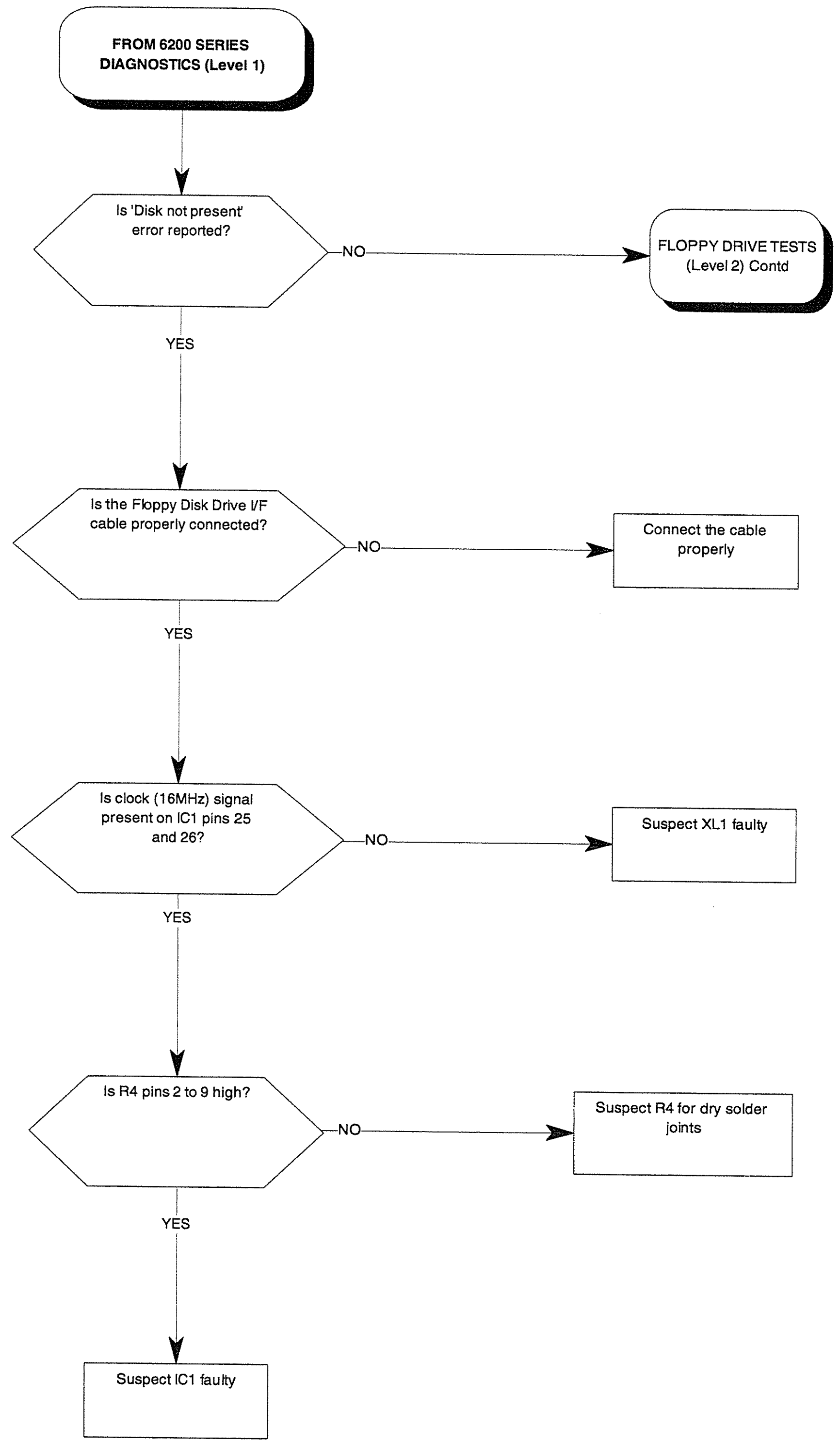
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 9

DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 10



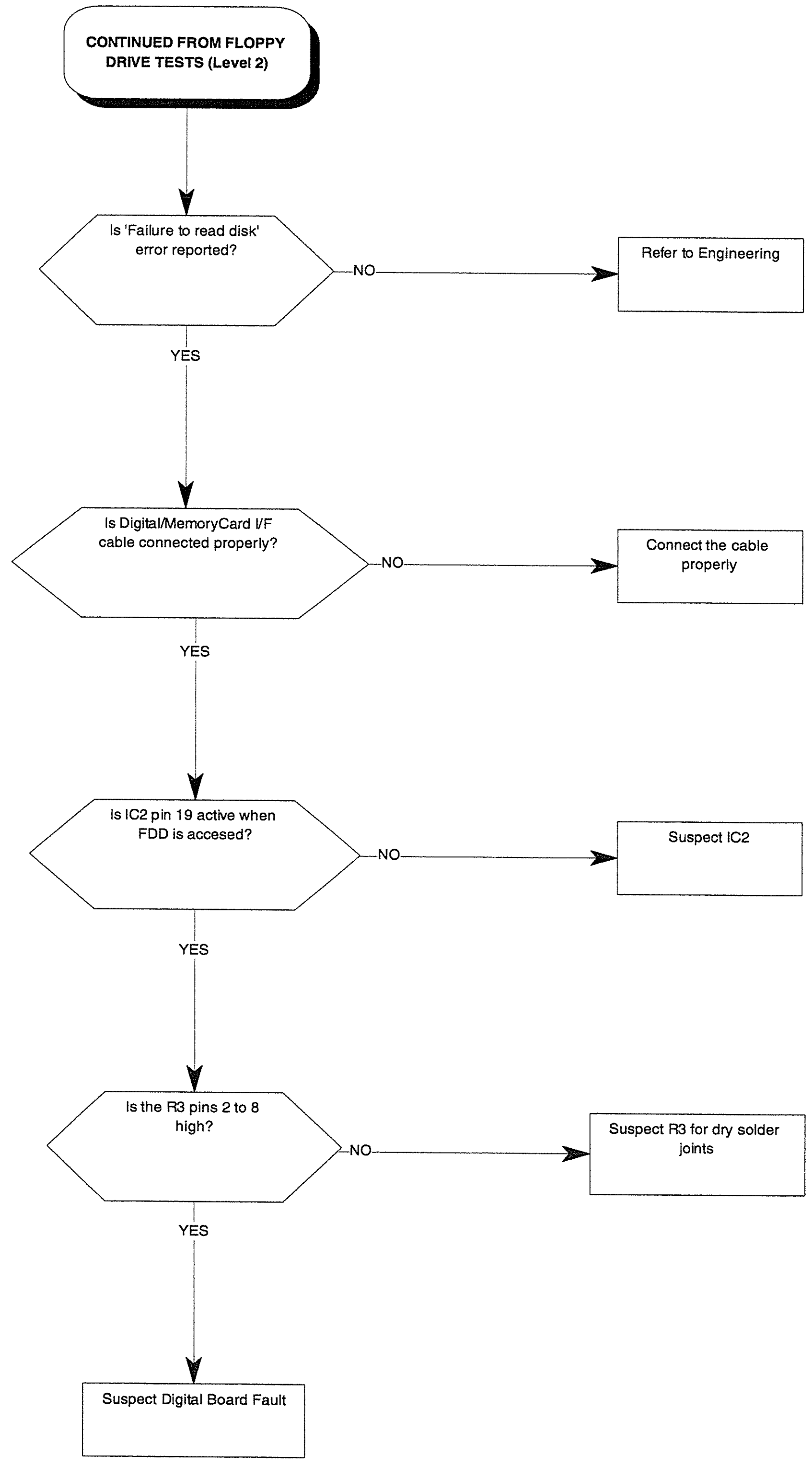
DYNAMIC CALIBRATOR PCB TESTS
(Level 2) Sheet 10

FLOPPY DRIVE TESTS (Level 2)



FLOPPY DRIVE TESTS
(Level 2)

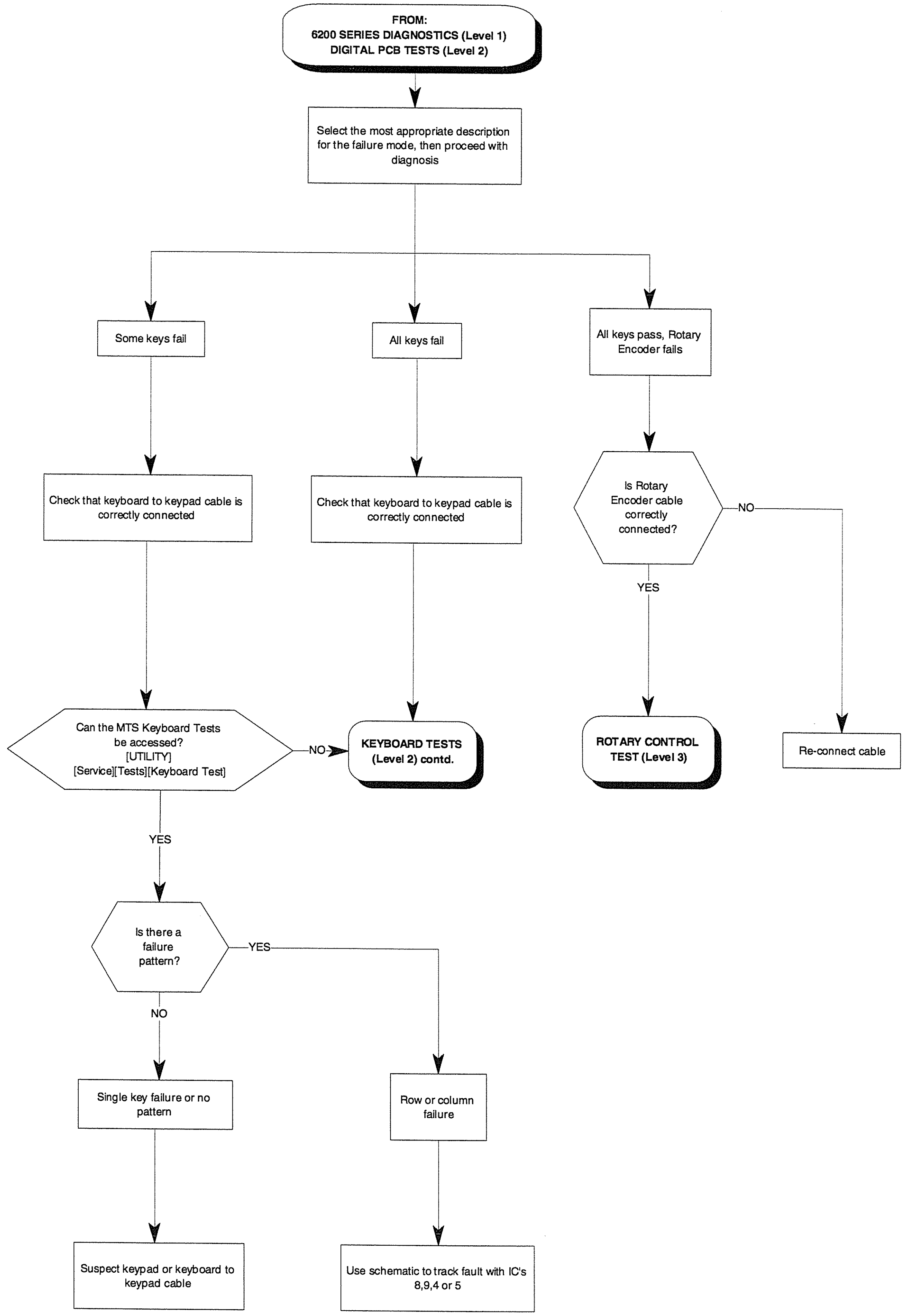
FLOPPY DRIVE TESTS (Level 2) contd.



FLOPPY DRIVE TESTS
(Level 2) contd.

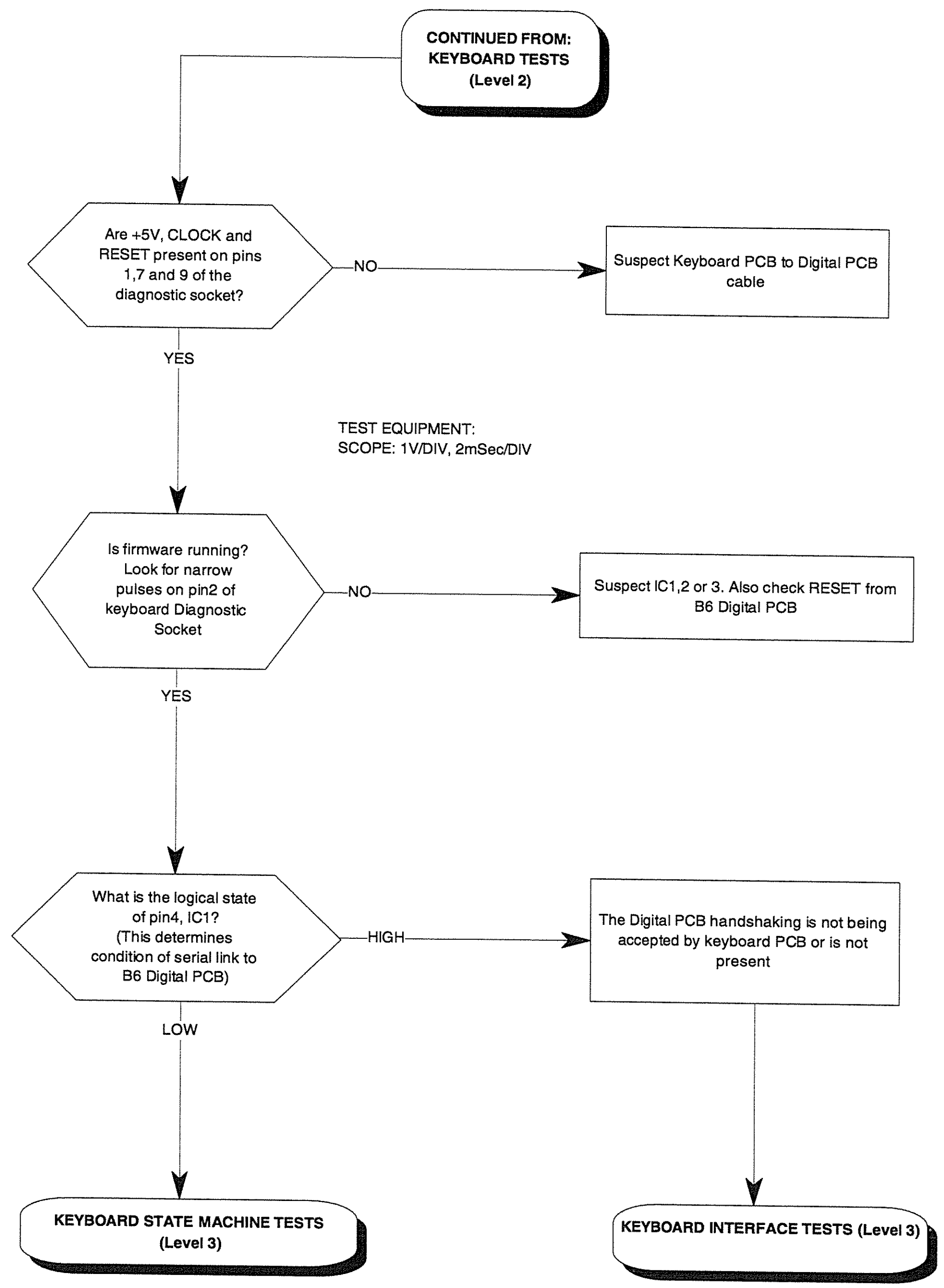
KEYBOARD TESTS
(Level 2)

Note: Refer to Keyboard PCB (B9).



KEYBOARD TESTS
(Level 2)

KEYBOARD TESTS (Level 2) contd.



KEYBOARD TESTS (Level 2) contd.

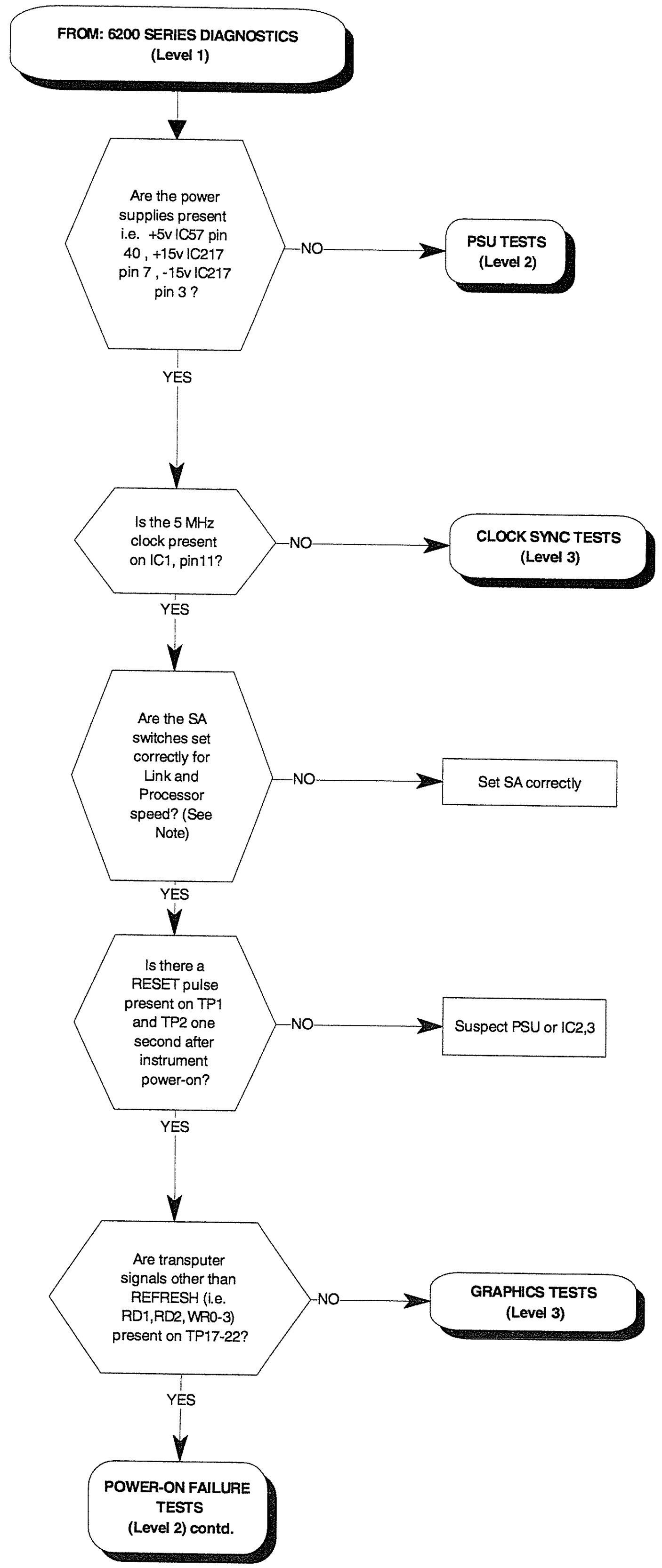
POWER-ON FAILURE TESTS (Level 2)

Note: Refer to Digital PCB (B6)

TABLE A

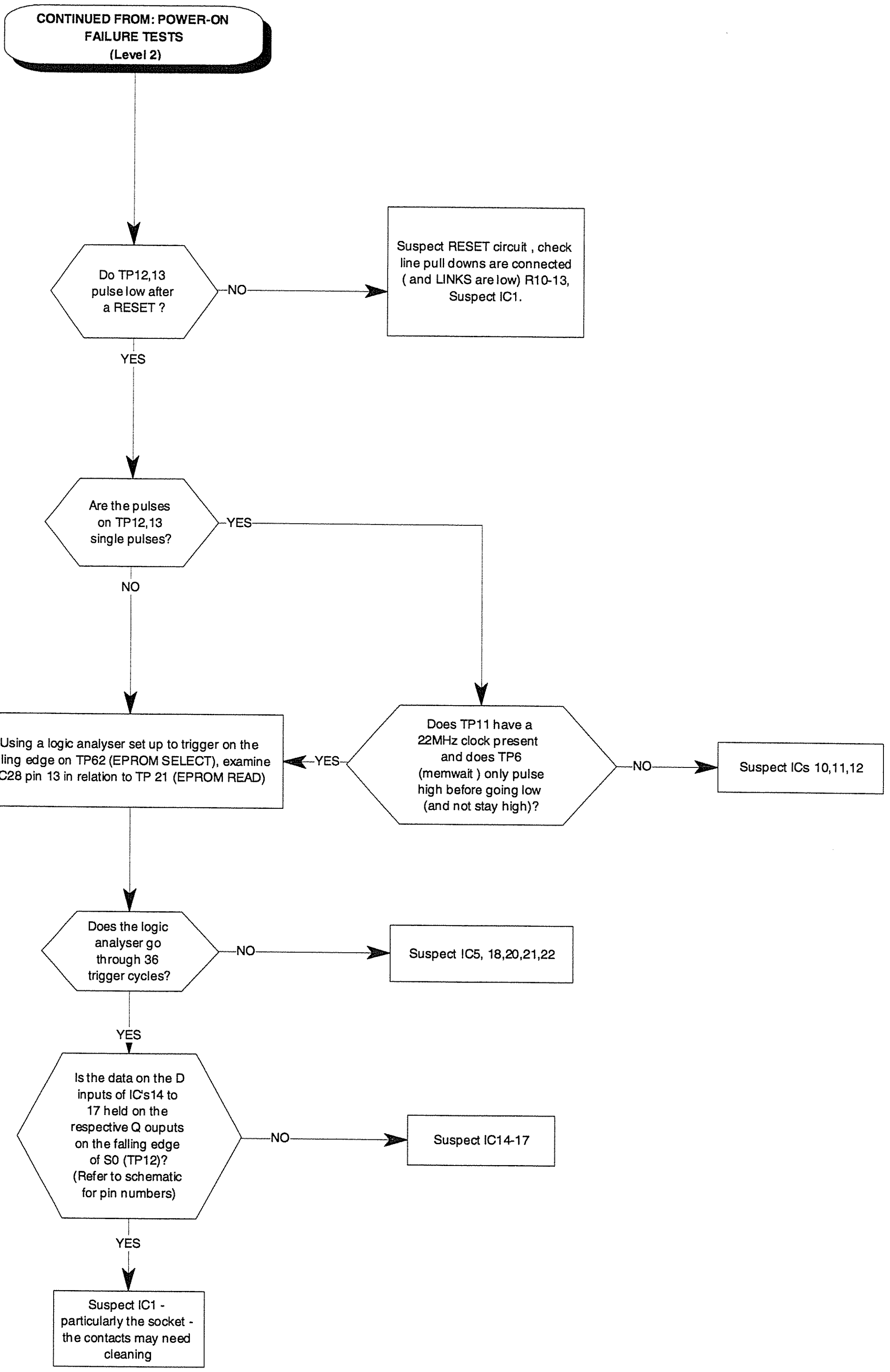
Switch Number	Setting
1	OPEN
2	CLOSED
3	CLOSED
4	NOT USED
5	NOT USED
6	CLOSED
7	NOT USED
8	NOT USED

Switch 1 is positioned nearest the front of the instrument



POWER-ON FAILURE TESTS
(Level 2)

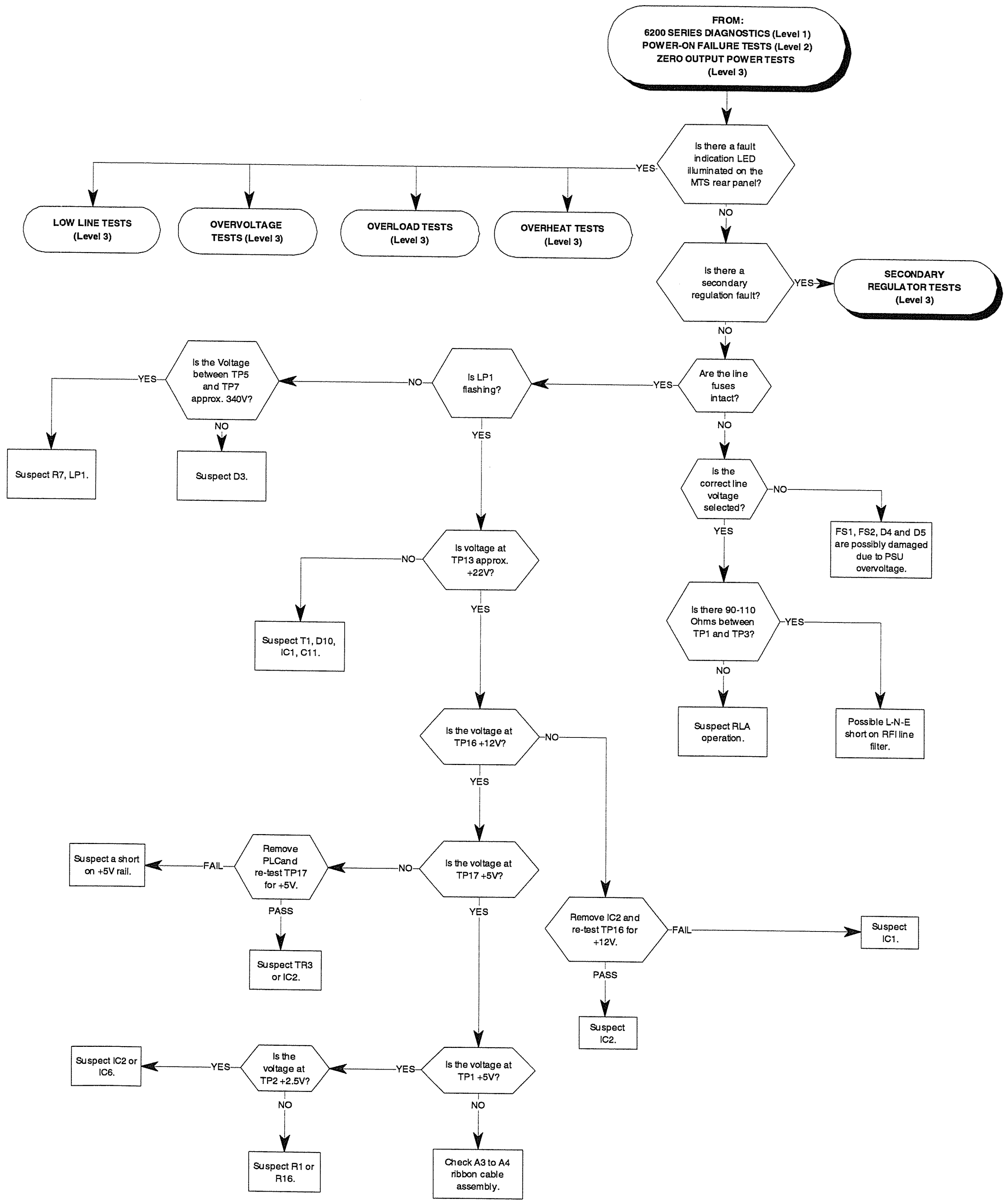
POWER-ON FAILURE TESTS (Level 2) contd.



POWER-ON FAILURE TESTS
(Level 2) contd.

PSU TESTS (Level 2)

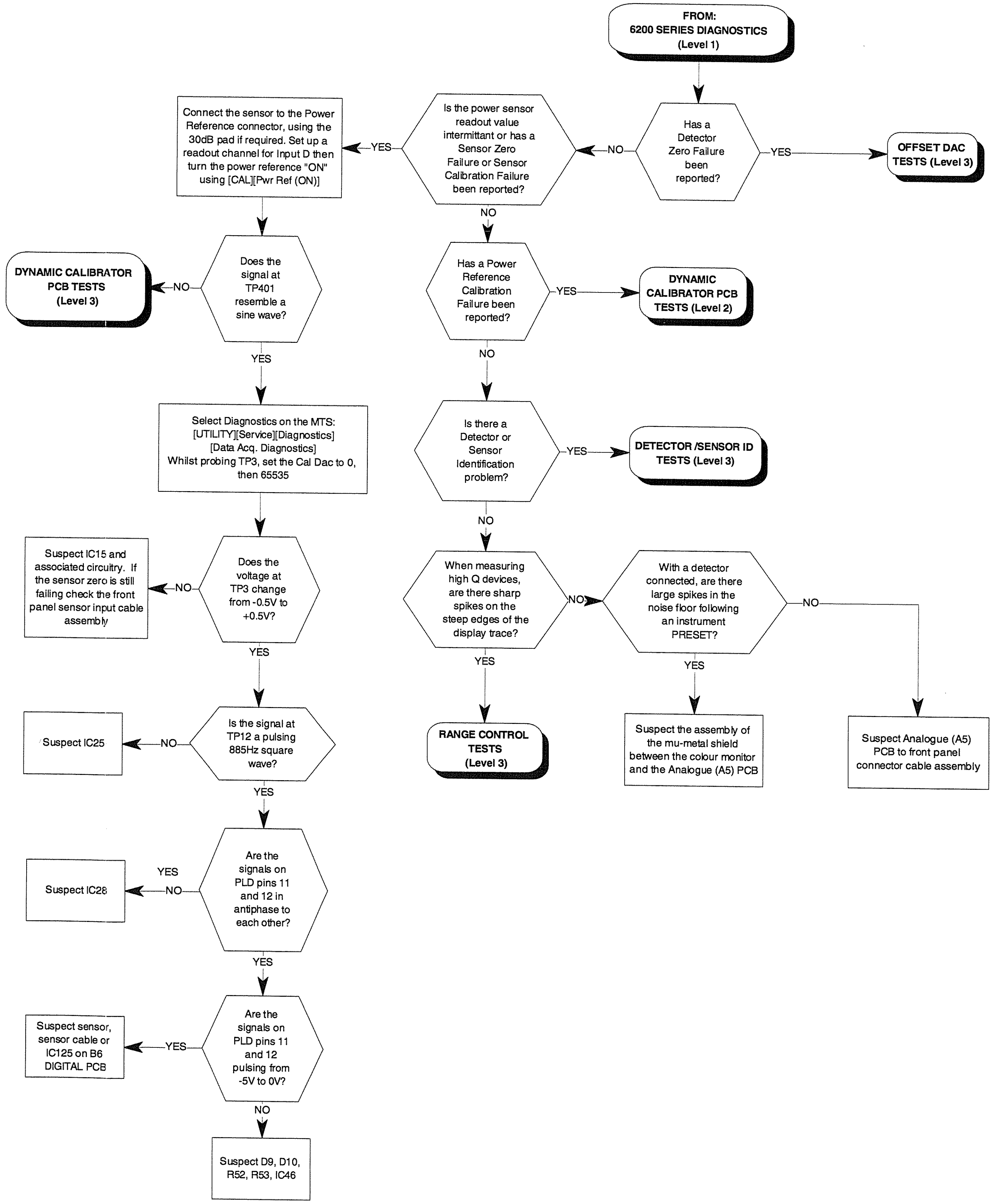
NOTE: Refer to PSU Input PCB (A4) and schematics



PSU TESTS
(Level 2)

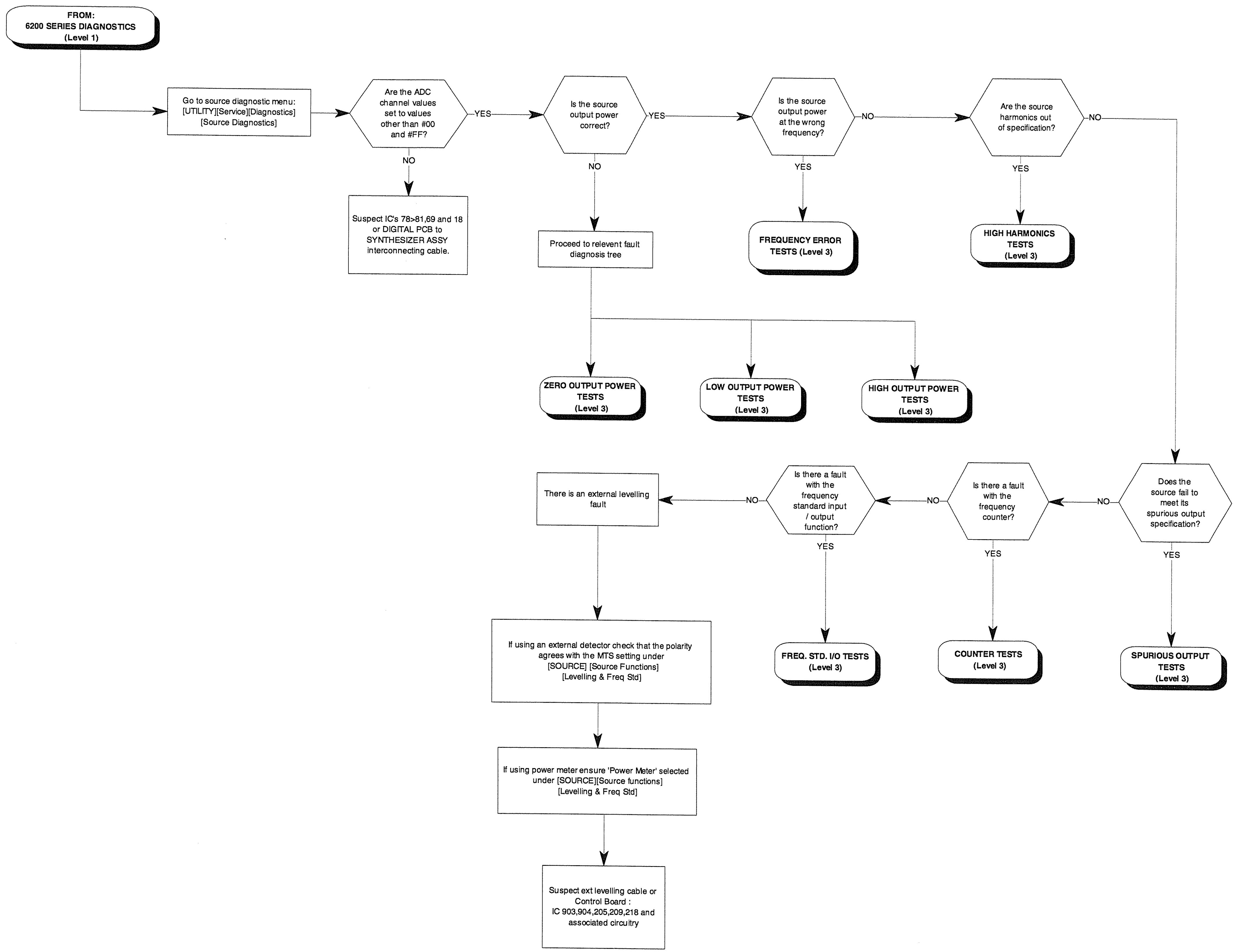
SCALAR/PWR METER TESTS (Level 2)

Note: **Refer to Analogue PCB (A5) and schematics**



SCALAR/PWR METER TESTS
(Level 2)

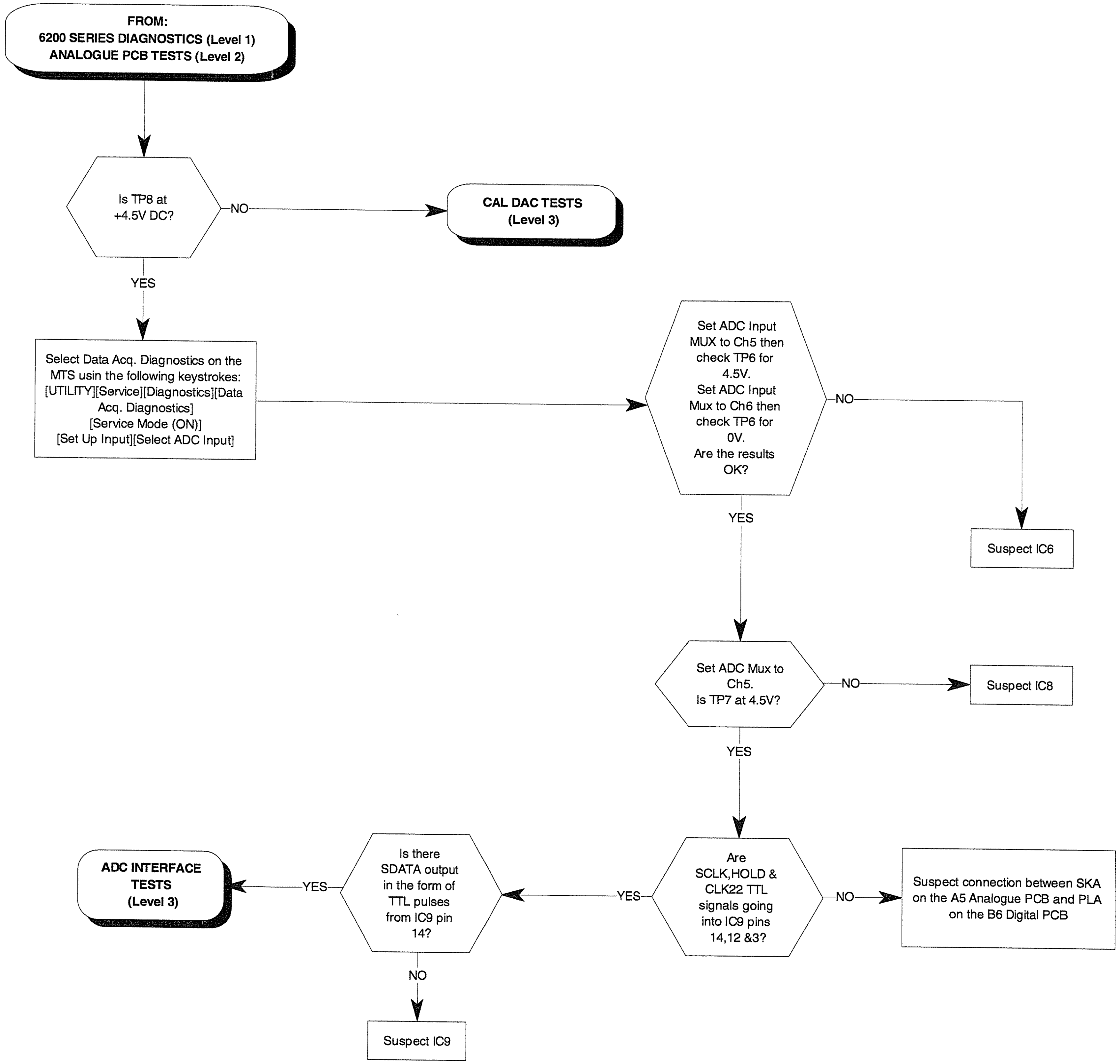
SOURCE & COUNTER TESTS (Level 2)



Note: Refer to Control PCB (A8) and schematics

SOURCE & COUNTER TESTS
(Level 2)

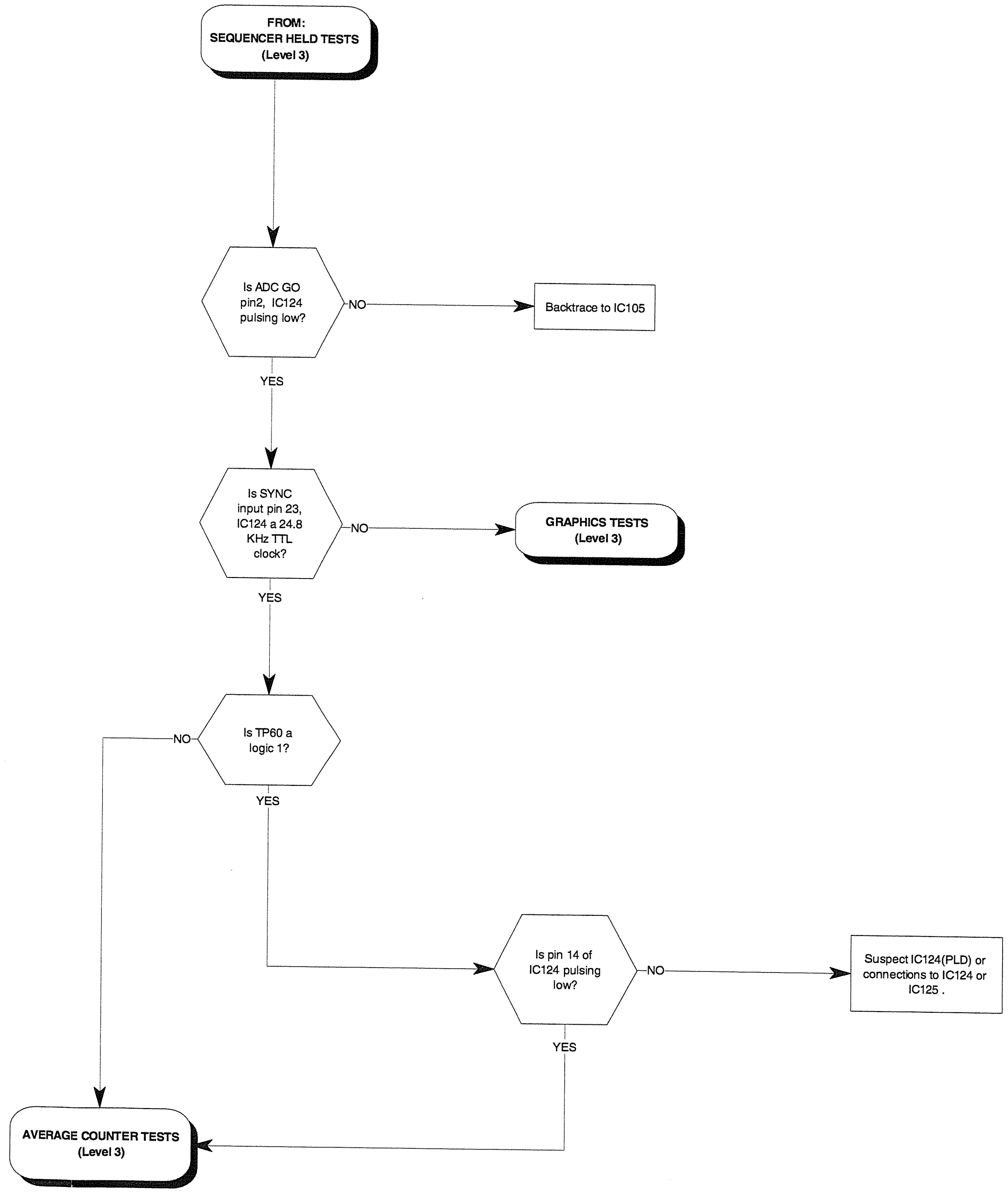
ADC TESTS (Level 3)



Note: Refer to Analogue PCB (A5) and schematics

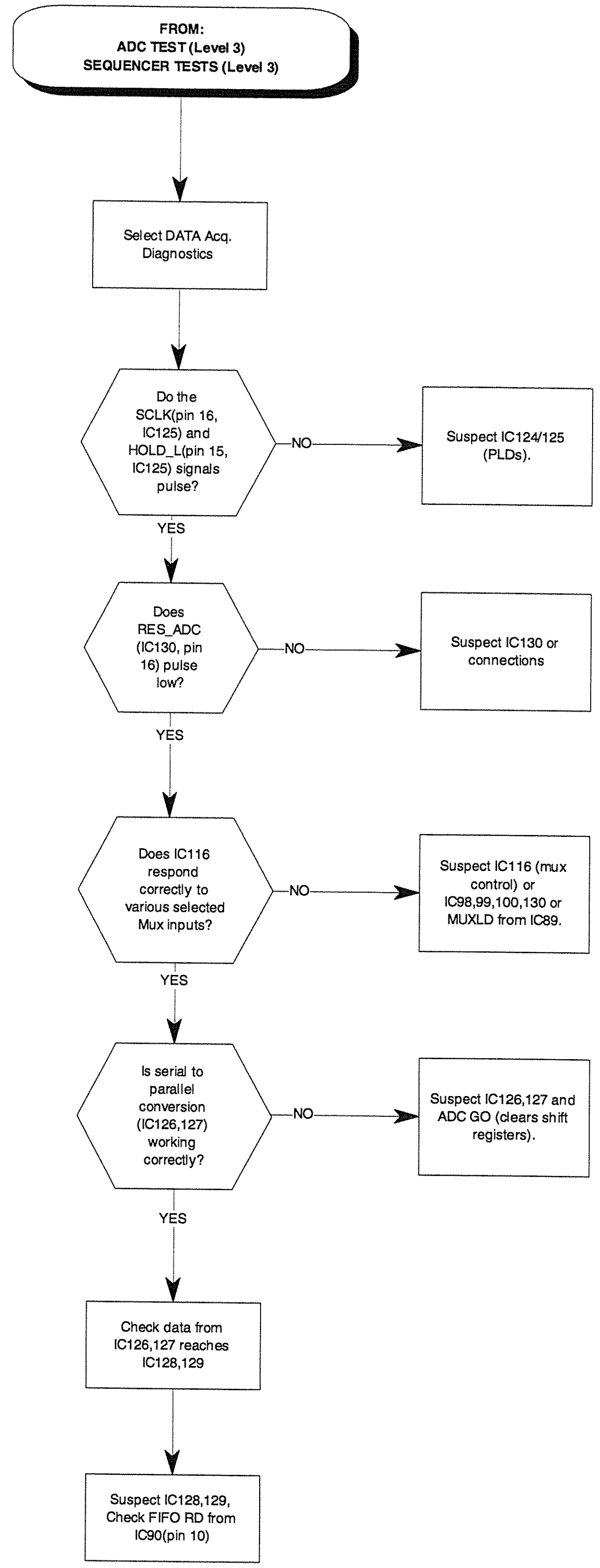
ADC TESTS
(Level 3)

ADC CONVERSION CONTROLLER TESTS
(Level 3)



ADC CONVERSION CONTROLLER TESTS (Level 3)

ADC INTERFACE TESTS (Level 3)



ADC INTERFACE TESTS
(Level 3)

AMPLIFIER (MAIN) TESTS (Level 3)

TABLE A

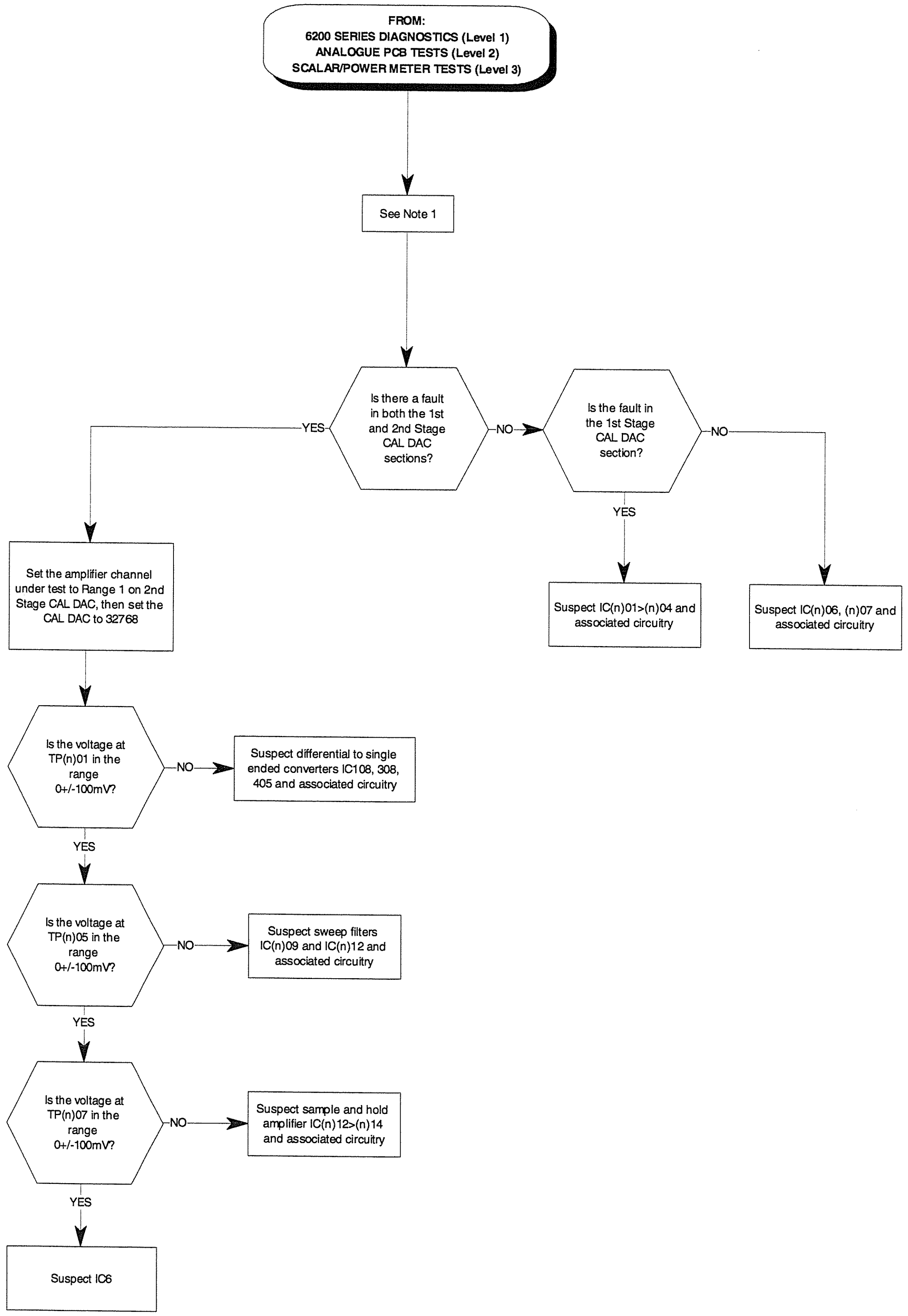
Cal DAC setting	Range	Channel ABC marker voltage	Input D marker voltage	Input configuration
61894	1	4.5	2.5	2nd Stage Cal DAC
38666	2	4.15	1.95	2nd Stage Cal DAC
33948	3	4.1	1.9	2nd Stage Cal DAC
33030	4	3.85	1.75	2nd Stage Cal DAC
33030	5	-4.05 -3.85	-1.85	1st Stage Cal DAC

Note: All marker voltages are ±50 mV

Note.1: **With a 6230 series detector connected to the input under test, set up a voltage format using [PRESET][Default Settings][FORMAT][Volts][SCALING][Set Scale] - 1V/div [Set Ref. level] -5V. Proceed to Data Acquisition Diagnostics using the following keystrokes: [UTILITY][Service] [Diagnostics][Data Acq. Diagnostics][Service Mode (ON)][Gain Correction (OFF)]**

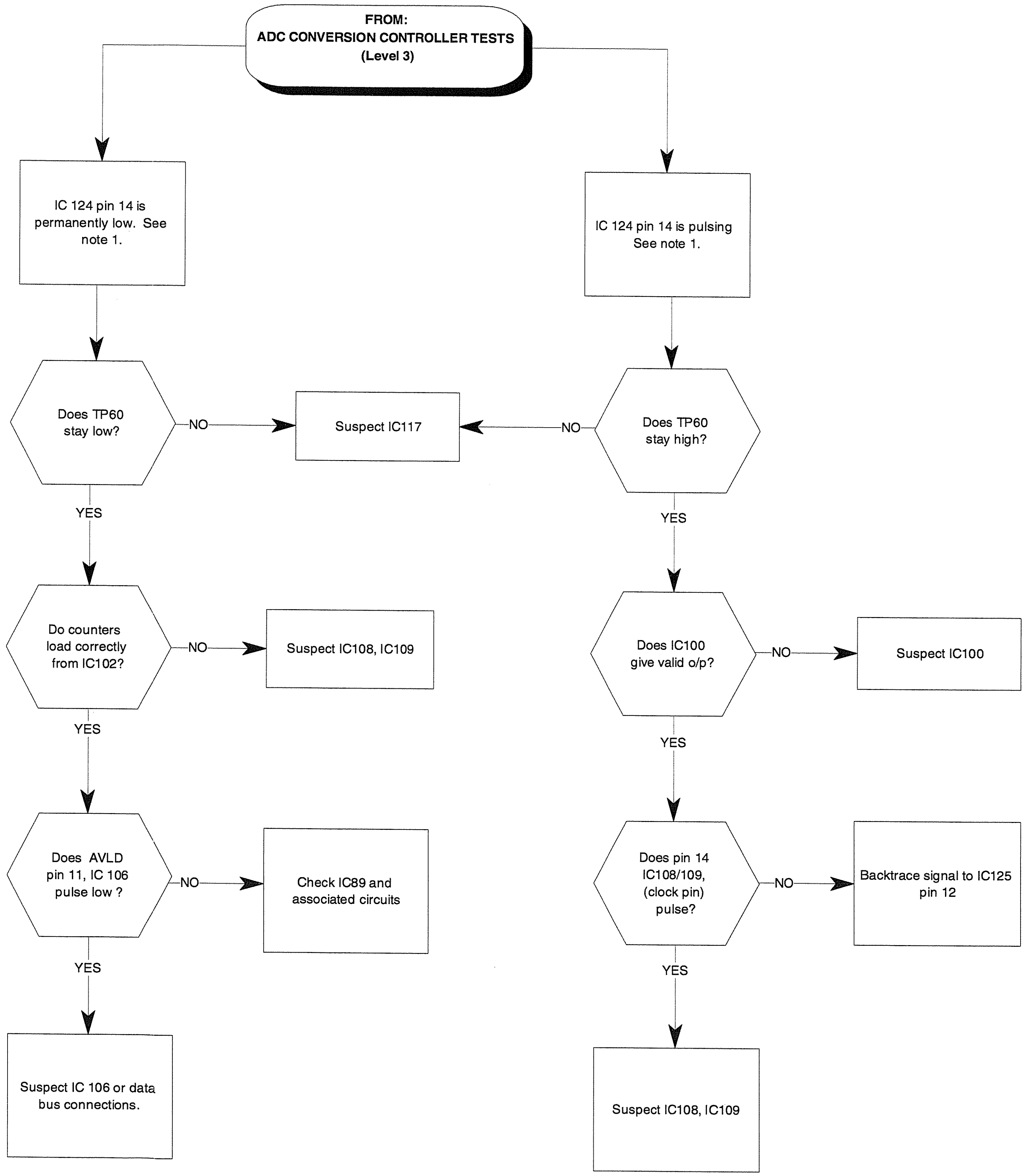
Set up the amplifier range, CAL DAC setting and input configuration according to Table A then check for the correct channel marker voltages. Proceed when a discrepancy is found.

Note that all devices are numbered as per the Input channel, such as IC(n)01 where n= channel 1 to channel 4 corresponds to Input A to Input D.



AMPLIFIER (MAIN) TESTS
(Level 3)

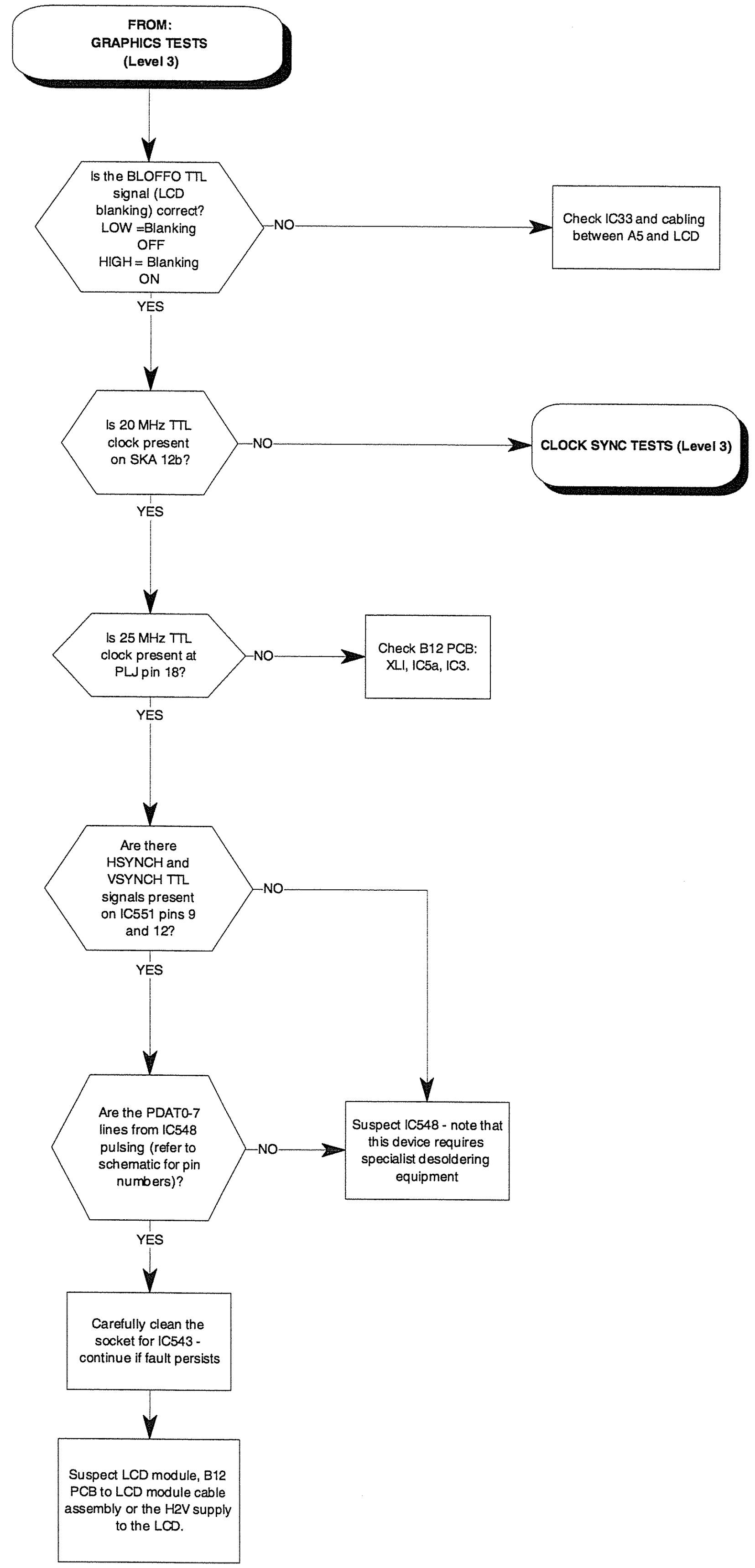
AVERAGE COUNTER TESTS
(Level 3)



Note.1: **If pin 14 of IC124 is permanently low or pulsing it can mean that the average counters are not being loaded (no ADC conversions) or not being decremented (continous ADC conversions). Both of these will cause a Sequencer Failure.**

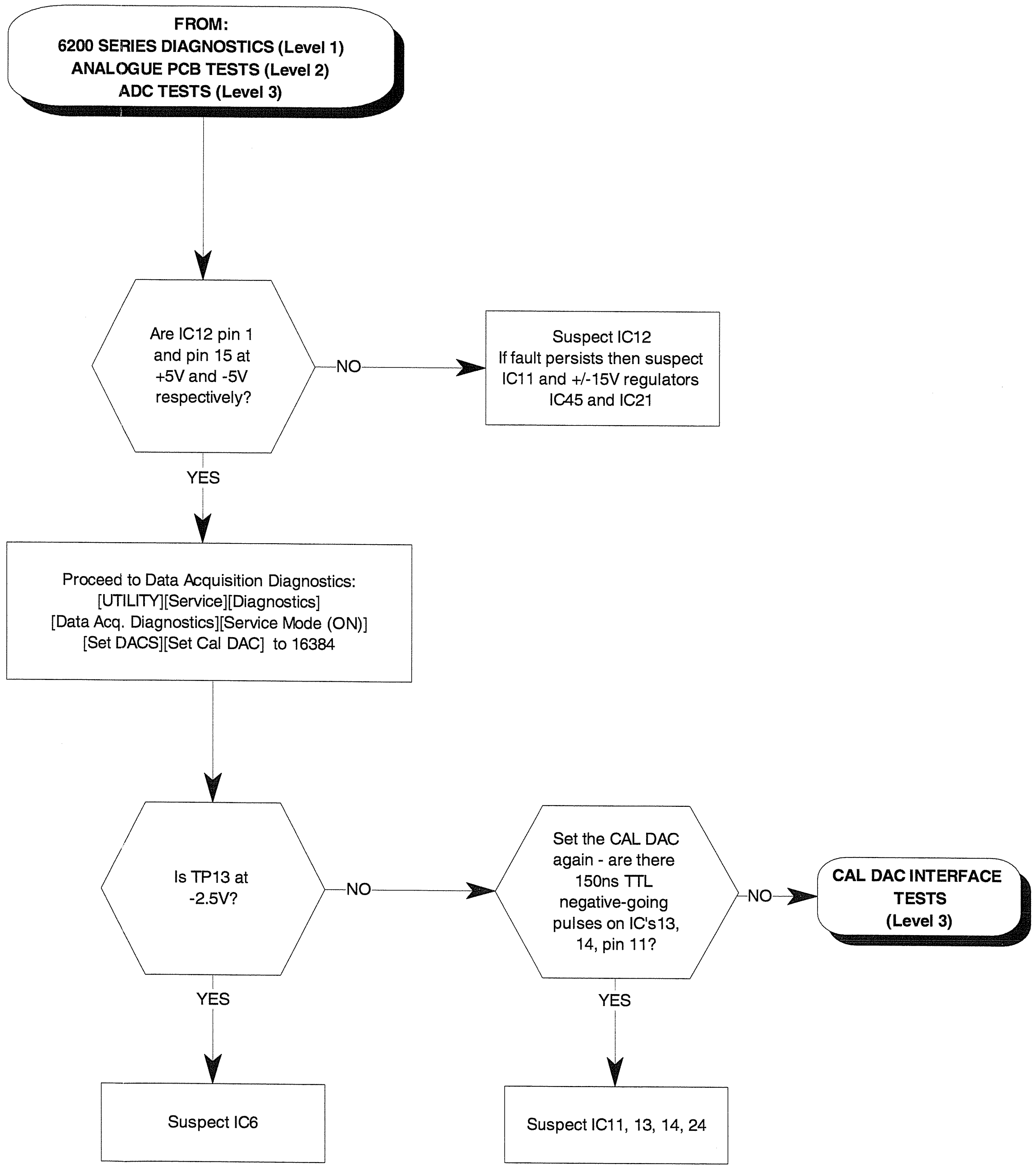
AVERAGE COUNTER TESTS
(Level 3)

BLANK SCREEN TESTS
(Level 3)



BLANK SCREEN TESTS
(Level 3)

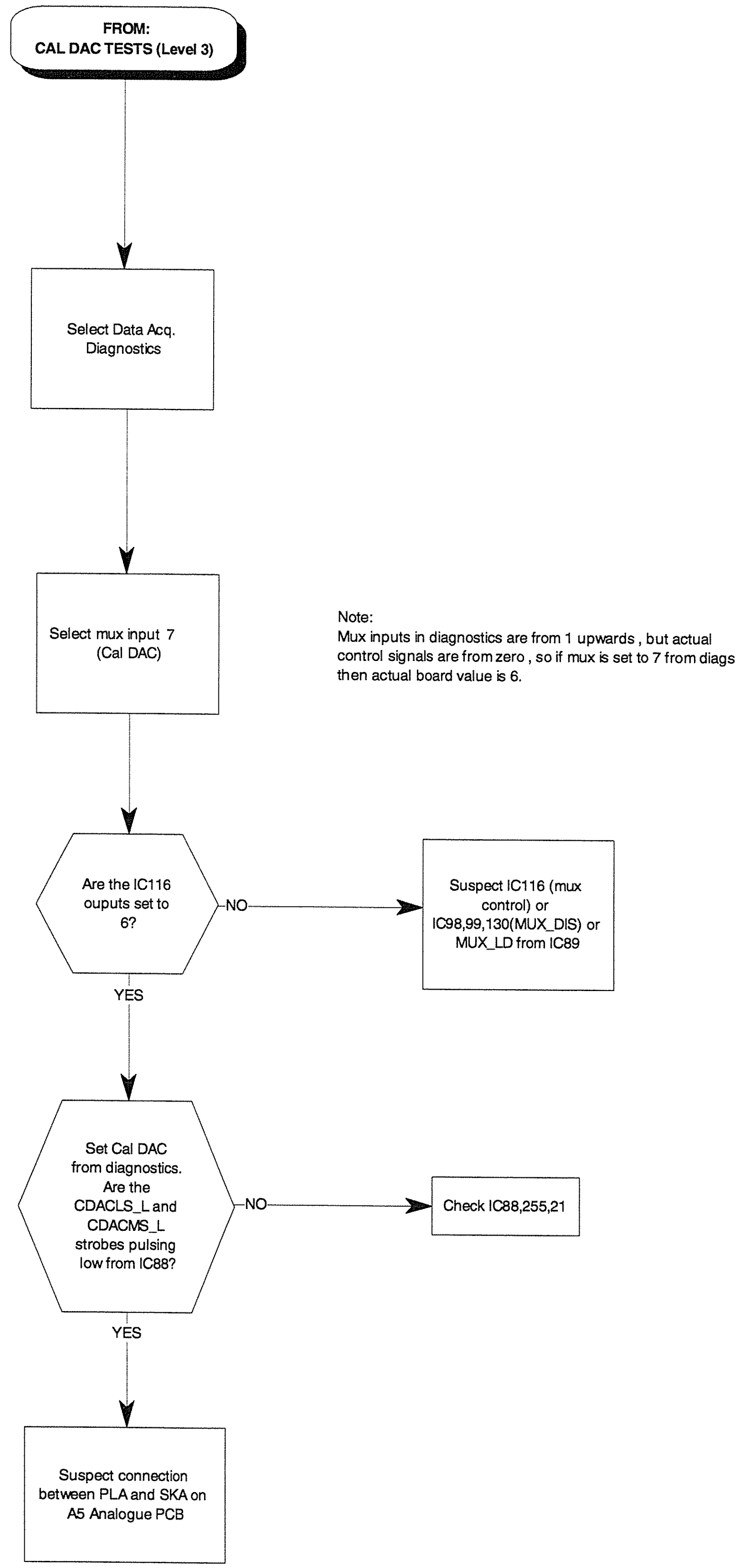
CAL DAC TESTS
(Level 3)



CAL DAC TESTS
(Level 3)

CAL DAC INTERFACE TESTS (Level 3)

Note: Refer to Digital PCB (B6) and schematics



CAL DAC INTERFACE TESTS
(Level 3)

CLOCK SYNC TESTS
(Level 3)

Note: Refer to Digital PCB (B6) and schematics

Figure 1 TP30 and TP31 waveforms Pulses are at 1us intervals

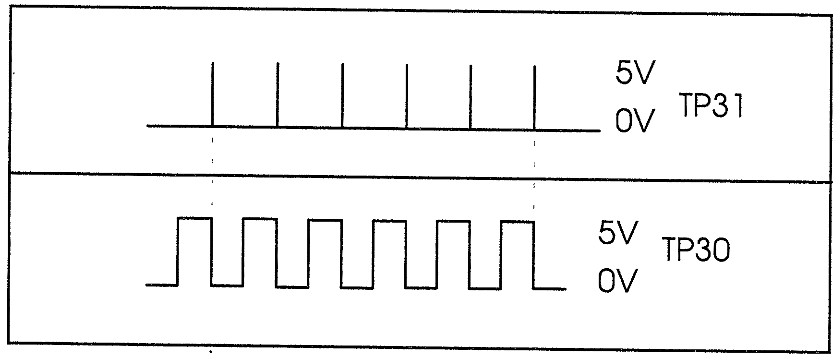
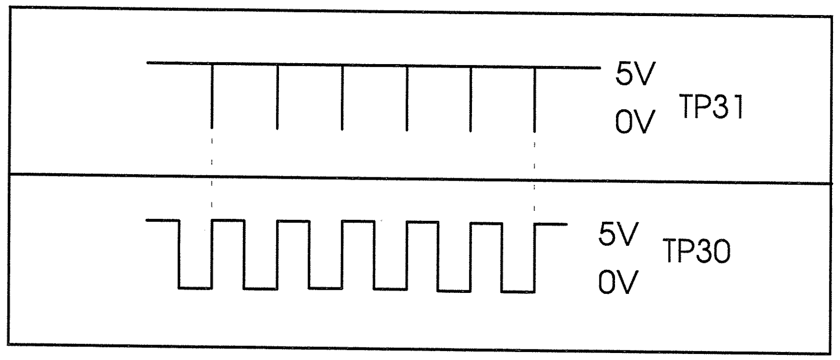
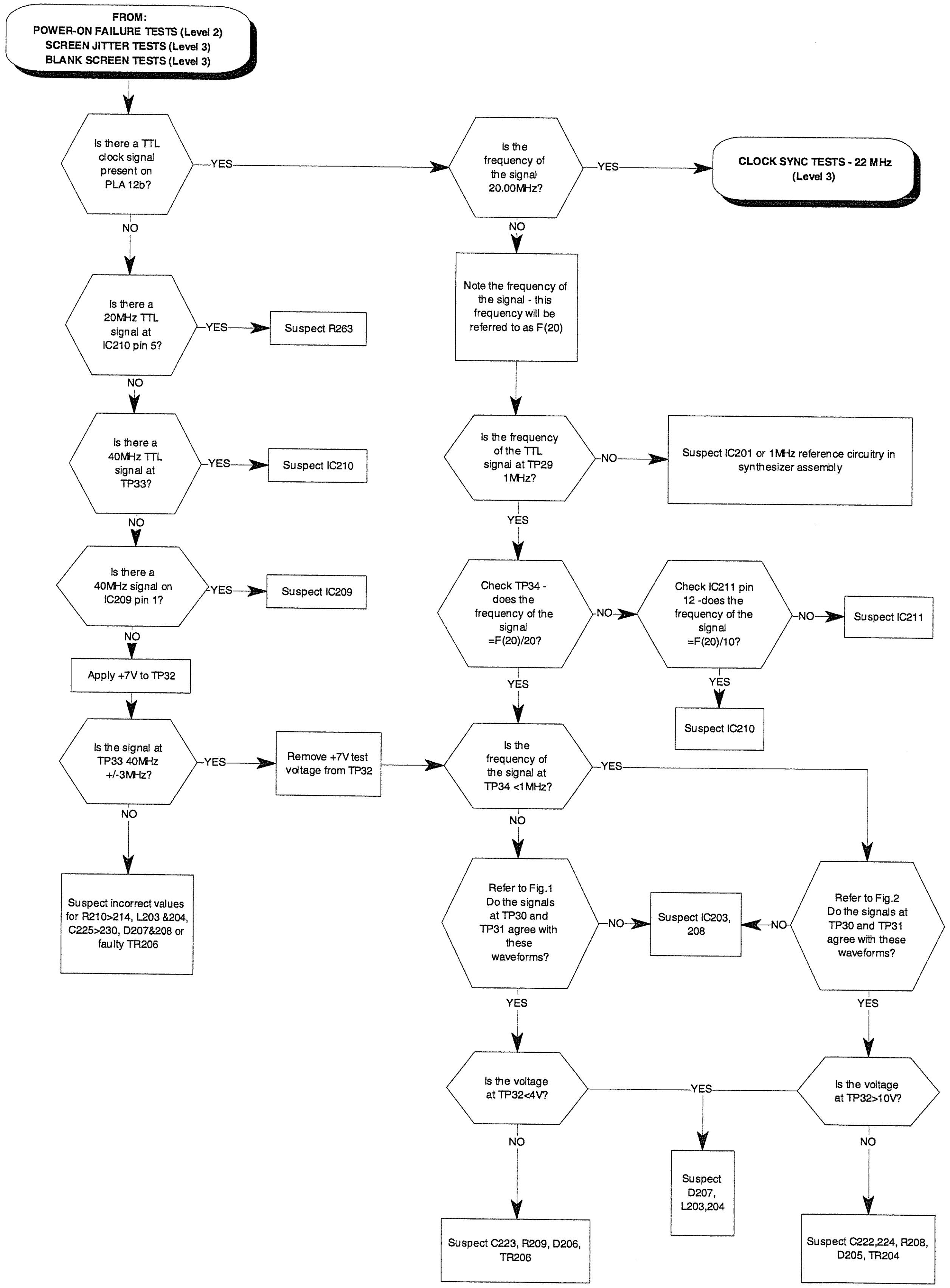


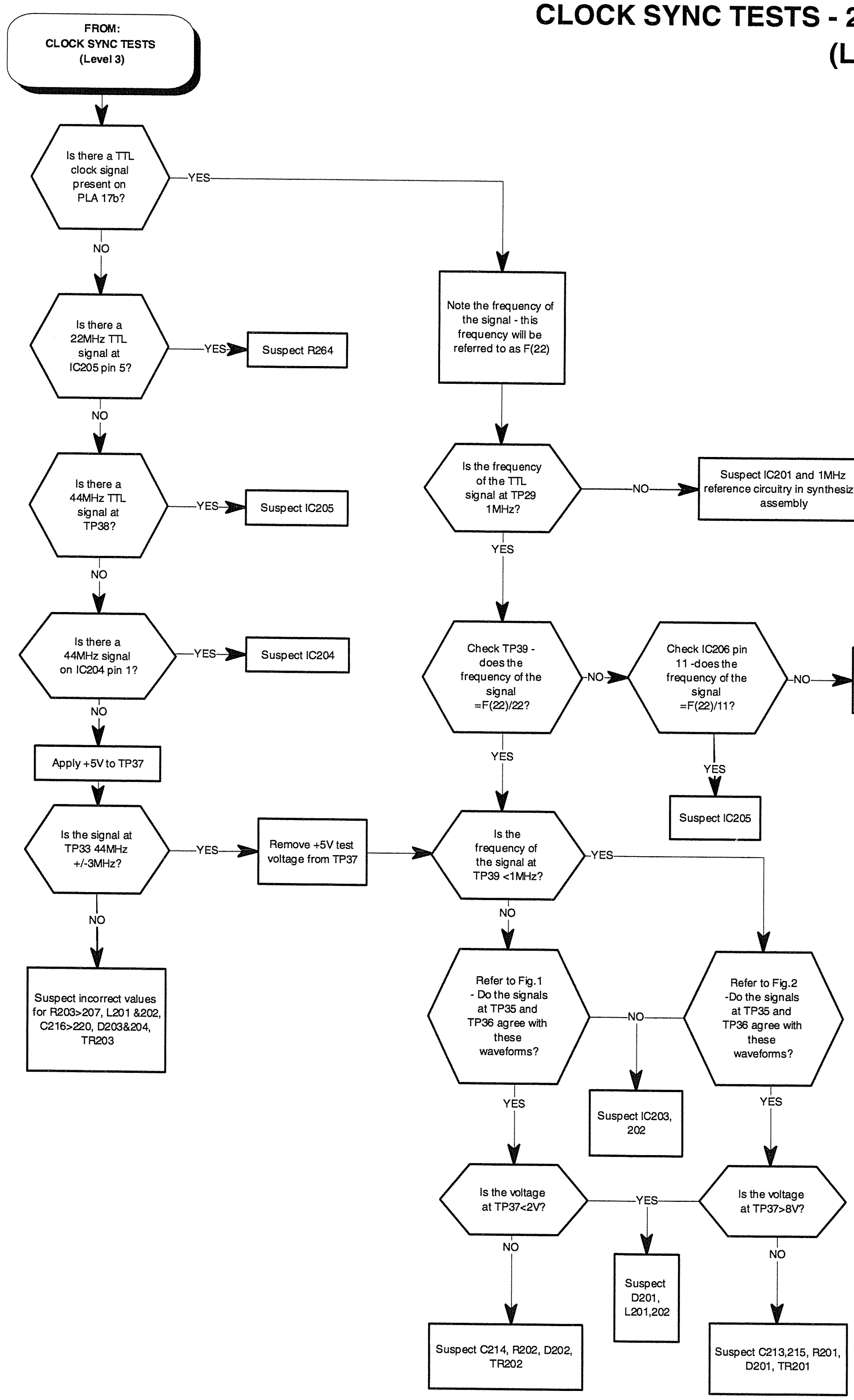
Figure 2 TP30 and TP31 waveforms Pulses are at 1us intervals





CLOCK SYNC TESTS
(Level 3)

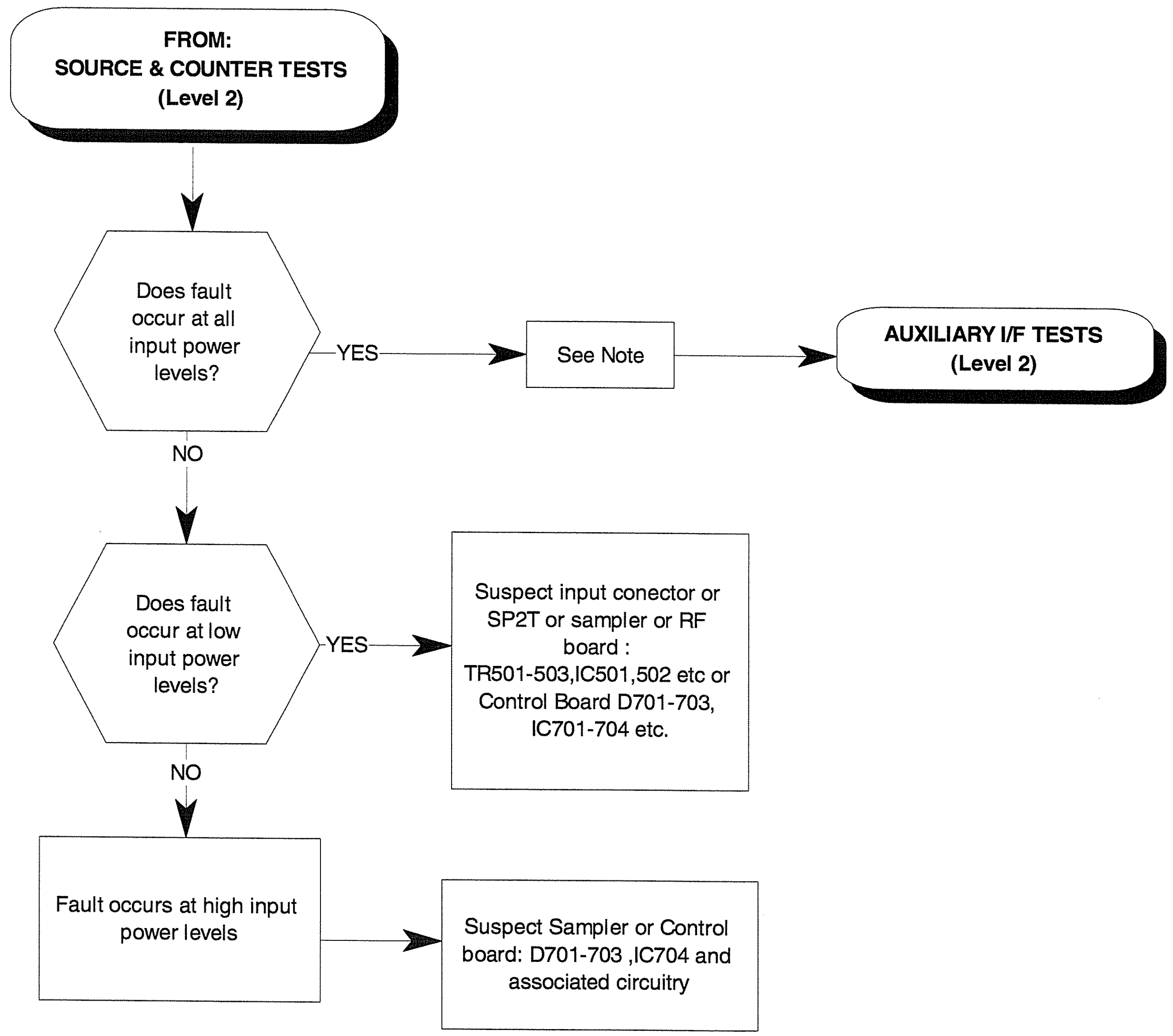
CLOCK SYNC TESTS - 22 MHz (Level 3)



22 MHZ CLOCK SYNC TESTS
(Level 3)

COUNTER TESTS
(Level 3)

Note: **Suspect COUNTER input connector or sampler module or RF board : TR310,D309,TR501-503,IC501,502 etc or Control board: all circuitry on sheet 9 (particularly Filters) or sheet 4 , IC906,907 and associated circuitry. If the fault persists then continue.**



COUNTER TESTS
(Level 3)

DETECTOR/SENSOR ID TESTS (Level 3)

NOTE 1: Set up a linear screen format on the MTS using the following keystrokes: [FORMAT][Volts][SCALING][Set Scale] - 1V/div [Set Ref] - 5v Select Data Acquisition Diagnostics: [UTILITY][Service][Diagnostics][Data Acq. Diagnostics][Service Mode (ON)][Set up Input][Select ADC Input]. Select ADC input corresponding to the faulty detector input then refer to Table A for the correct Detector ID voltages

NOTE 2: The serial clock is only active when the EEPROM is being written to or read from. In order to test EEPROM corrected detectors the clock must be active. This can be achieved by doing a detector zero in the following manner. Select [CAL][Det / Sensor Zero][Zero Detector]. If the detector has not been changed since the last zero, the clock will only be active for about 16 clock cycles, while the i/d block in the EEPROM is read. Everytime the clock line SCL needs to be exercised, a [Zero Detector] operation must be performed.

TABLE A

Sensor type	ADC Voltage (Volts)	TP410 Voltage (Volts)
6910	2.74	5.6
6920	1.4	2.8
6930	4.2	8.2
6511/13	-0.65	-
6230/33	-1.5	-
Direct Voltage Cable	-1.0	-

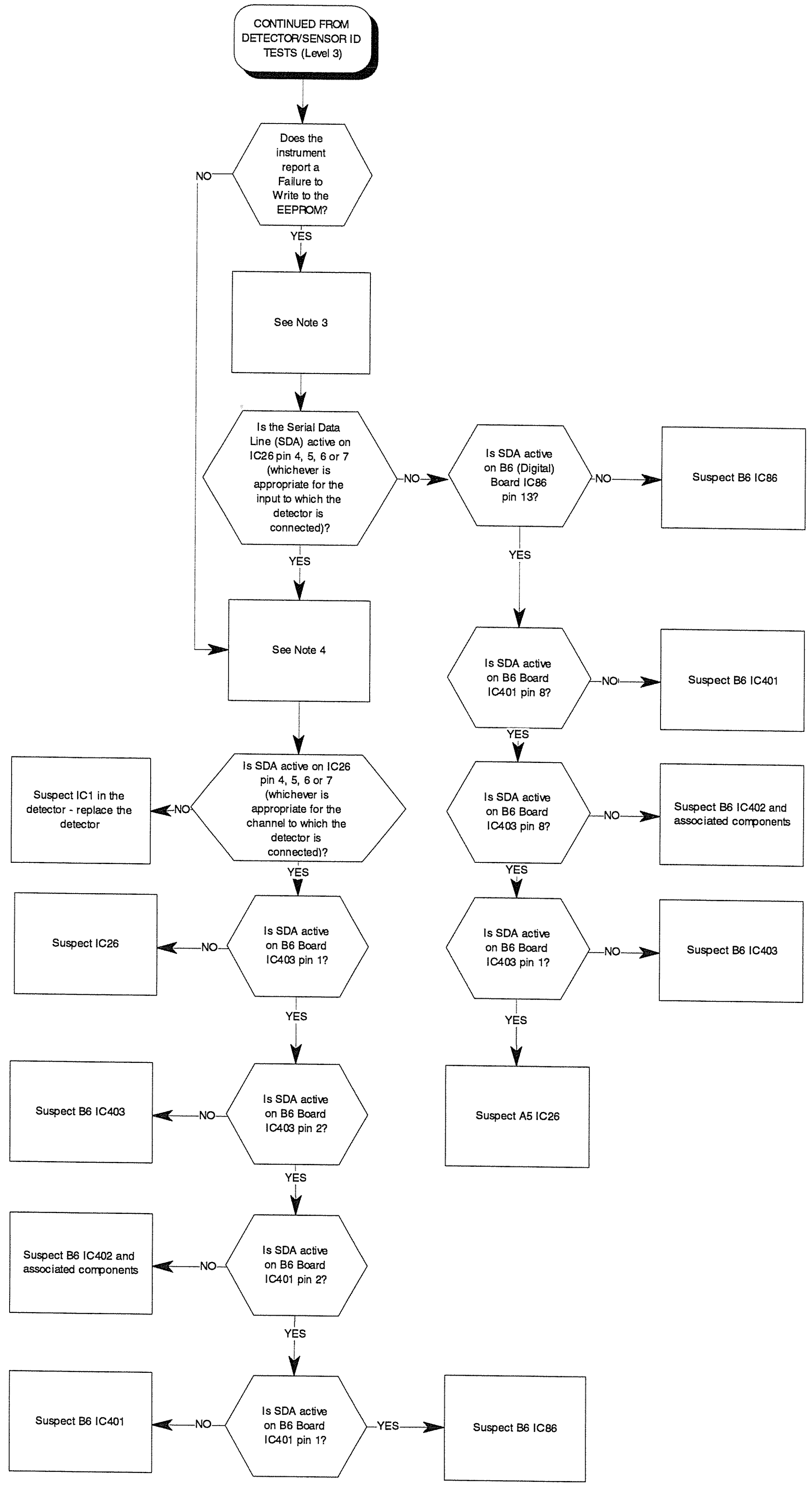
Note: All Detector ID voltages are ±100 mV, sensor ID voltages are ±200 mV

DETECTOR/SENSOR ID TESTS
(Level 3)

DETECTOR/SENSOR ID TESTS (Level 3) Contd

NOTE 3: Using the analog channels of the logic analyzer, EEPROM write operations can be monitored by triggering on the rising edge of DIR_CONT (B6 Board IC86 pin 17). When DIR_CONT is high, the serial data line SDA will configured by the instrument for EEPROM write operations.

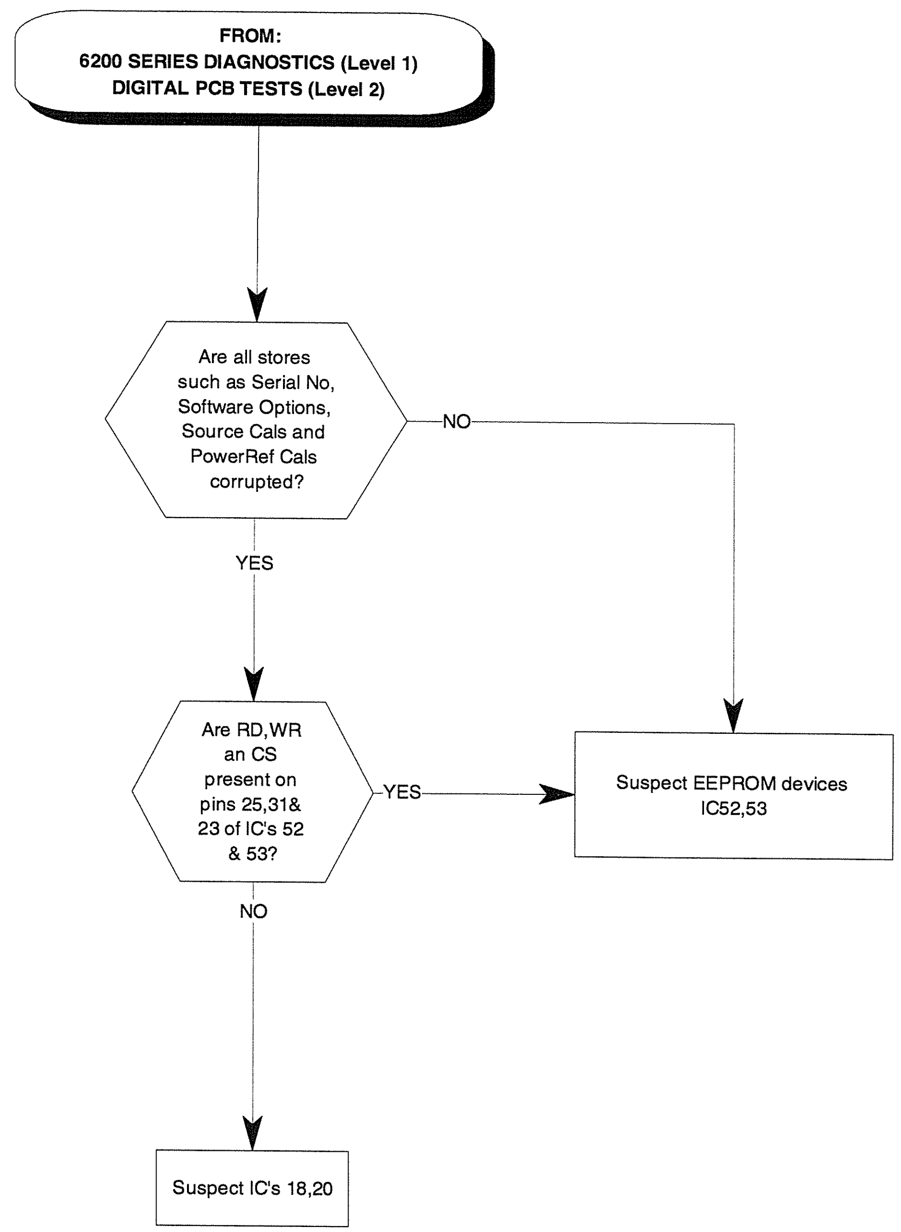
NOTE 4: Using the analog channels of the logic analyer, EEPROM read operations can be monitored by triggering on the falling edge of DIR_CONT (B6 Board IC86 pin 17). When DIR_CONT is low, the serial data line SDA will be configured by the instrument for EEPROM read operations.



DETECTOR/SENSOR ID TESTS (Level 3) Contd

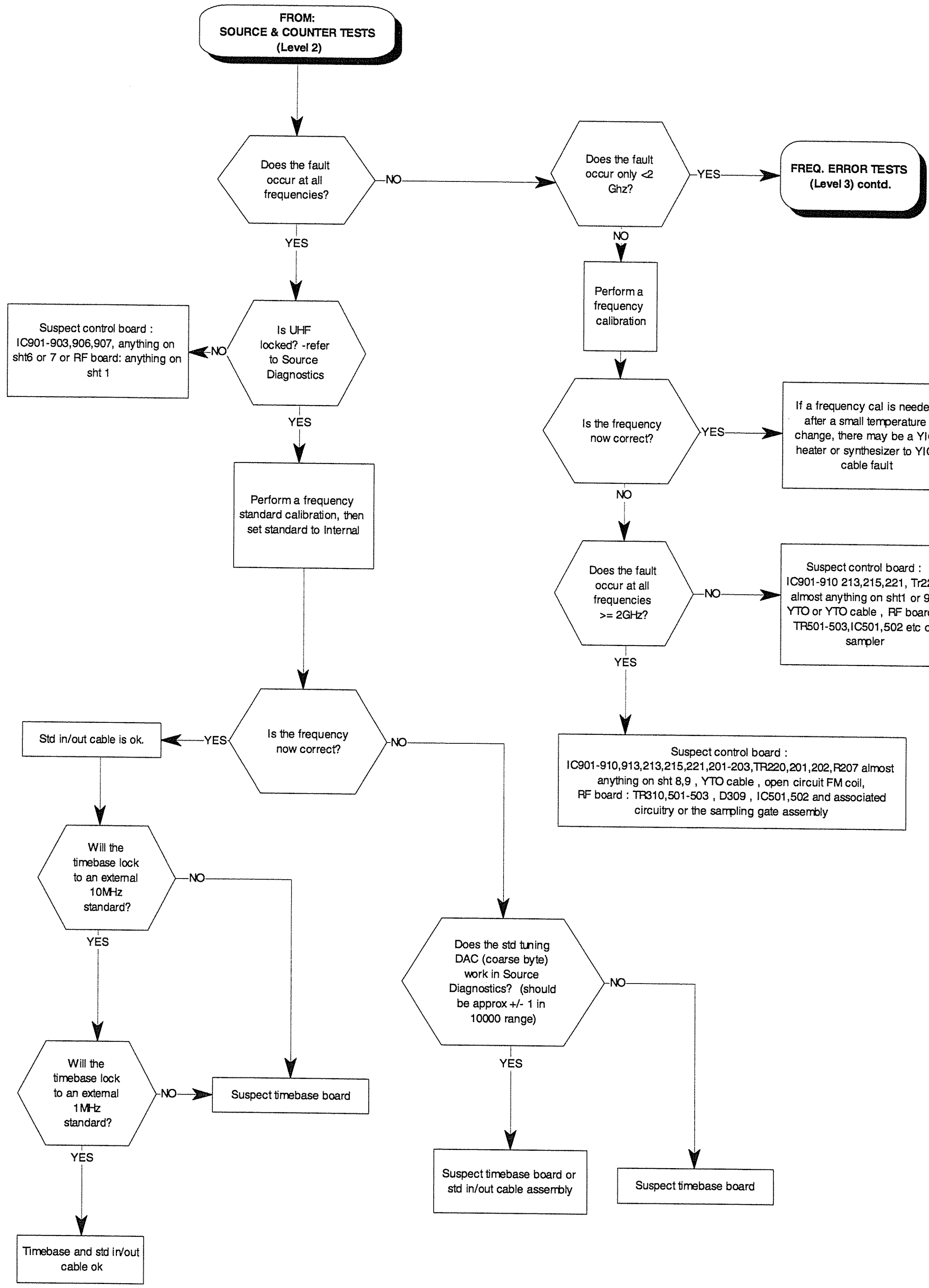
EEPROM TESTS
(Level 3)

Note: Refer to Digital PCB (B8) and schematics



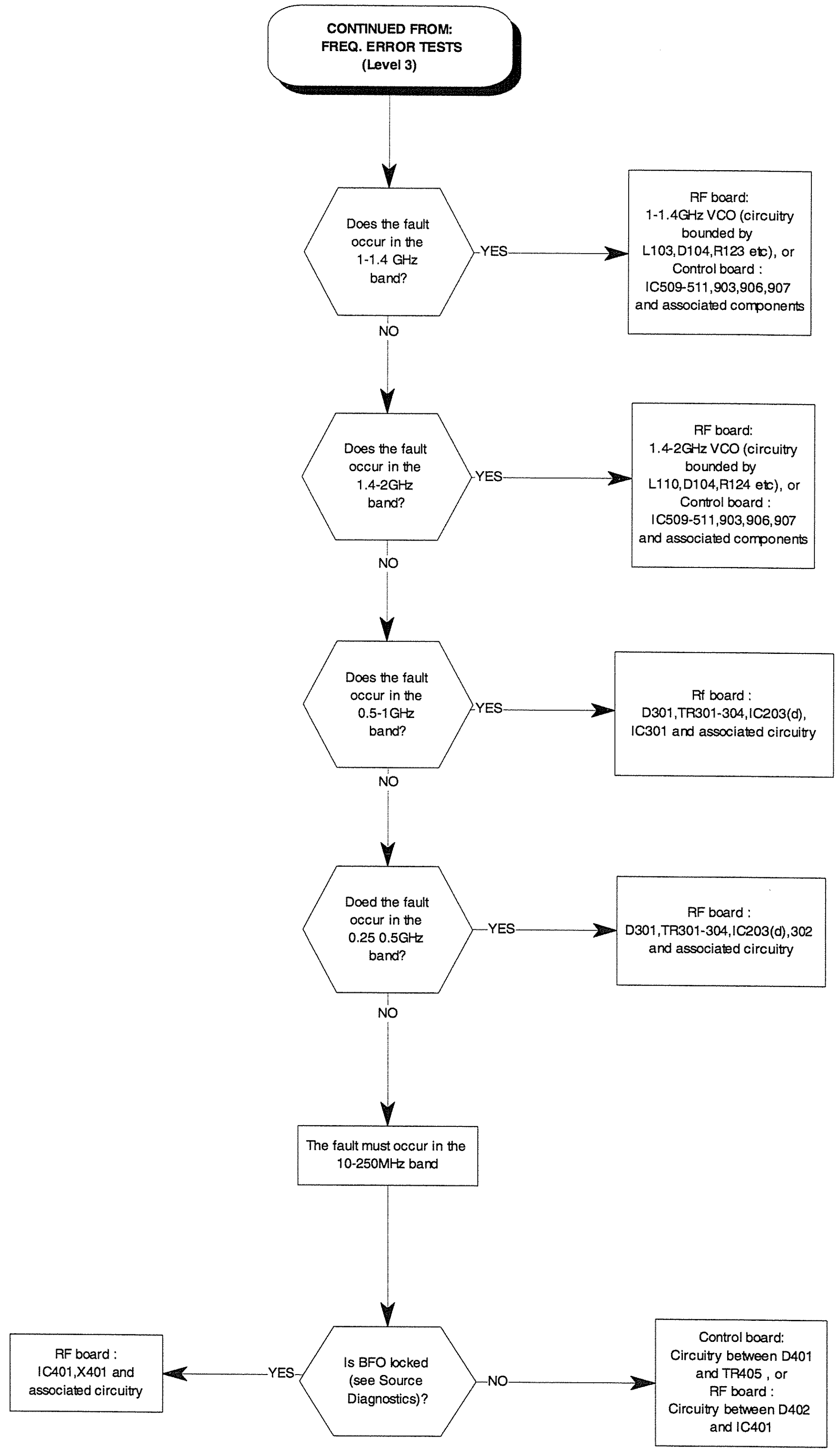
EEPROM TESTS
(Level 3)

FREQUENCY ERROR TESTS
(Level 3)



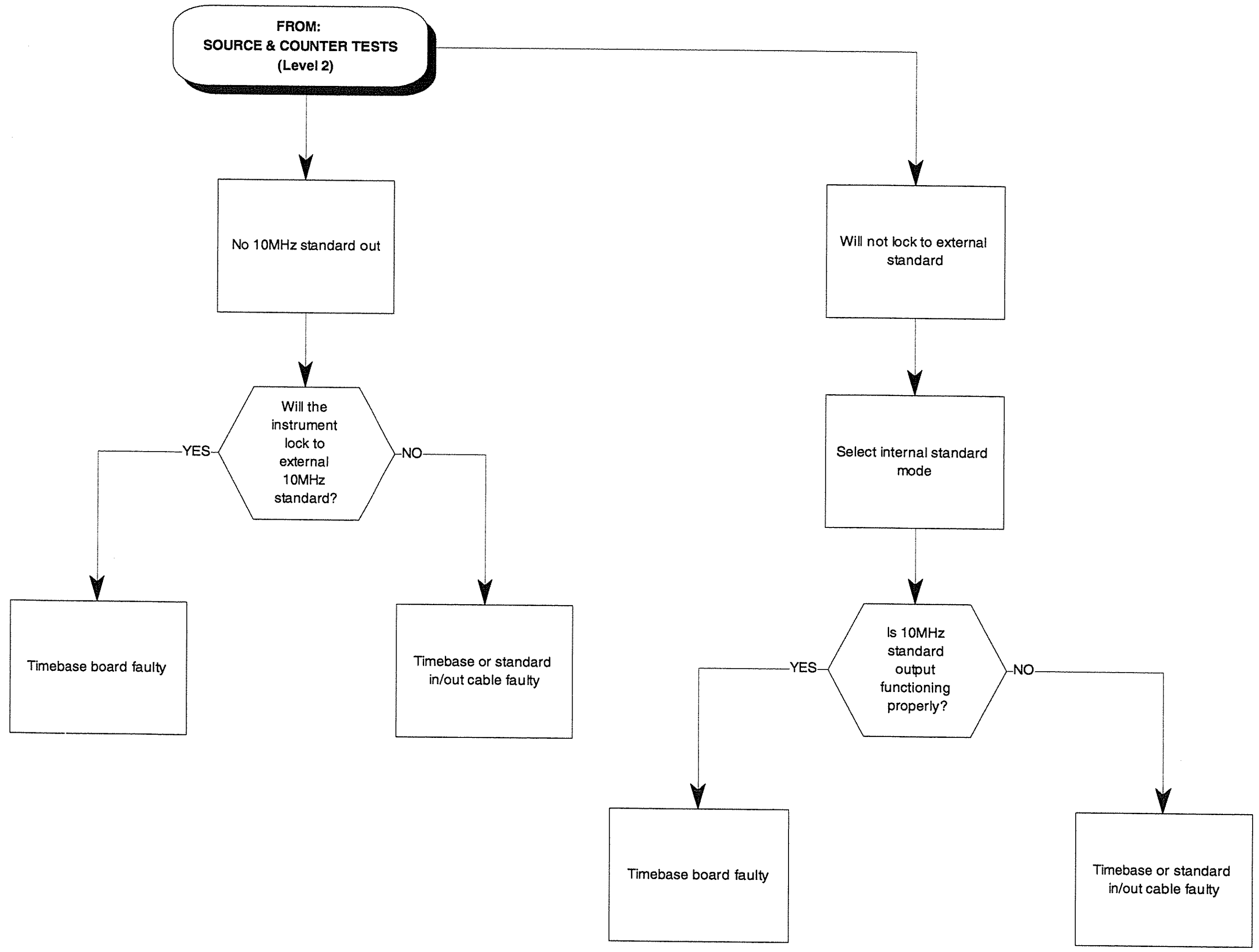
FREQUENCY ERROR TESTS
(Level 3)

FREQUENCY ERROR TESTS (Level 3) contd.



FREQUENCY ERROR TESTS (Level 3) contd.

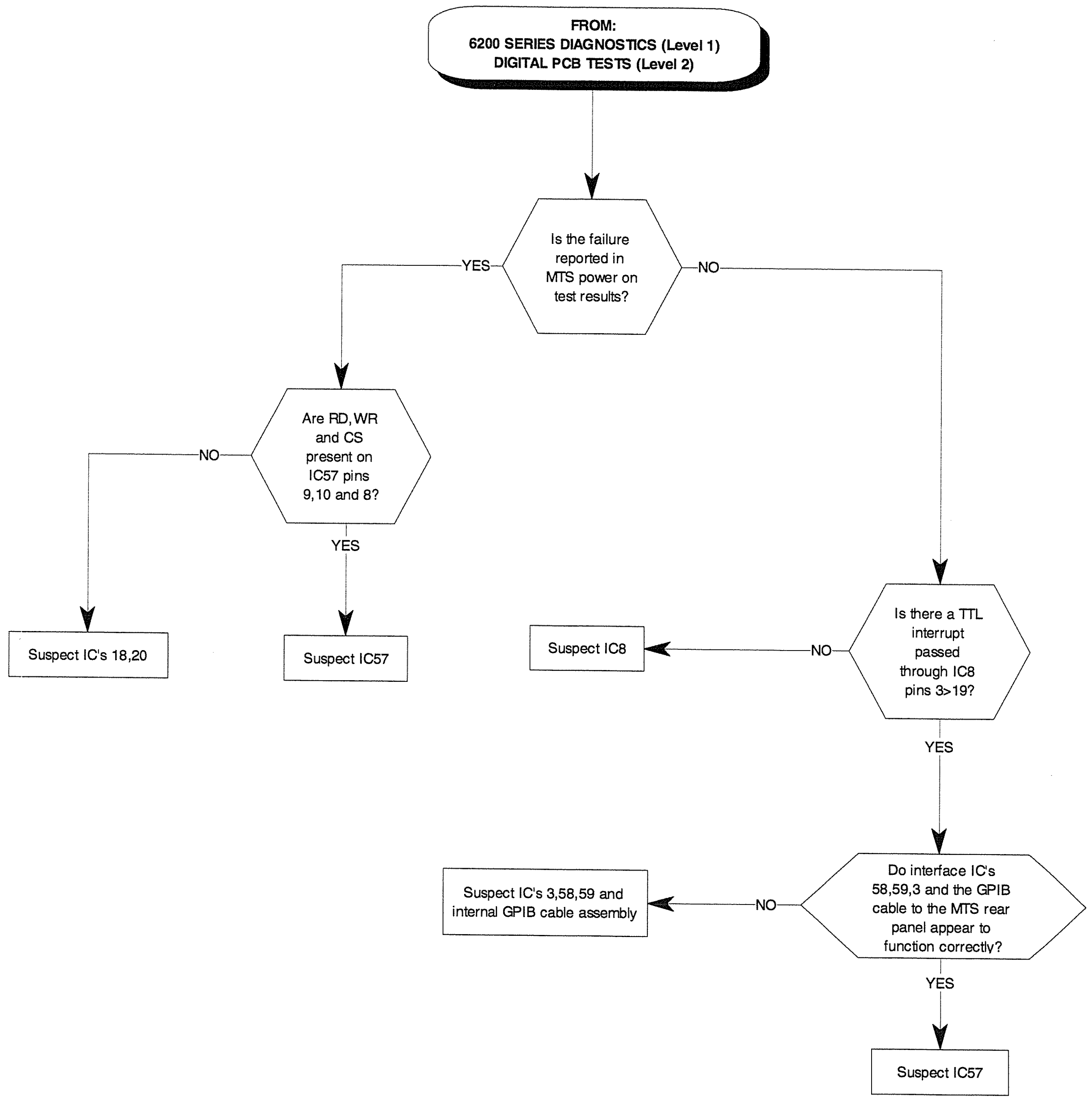
FREQUENCY STANDARD I/O TESTS (Level 3)



FREQUENCY STANDARD I/O TESTS
(Level 3)

GPIB TESTS
(Level 3)

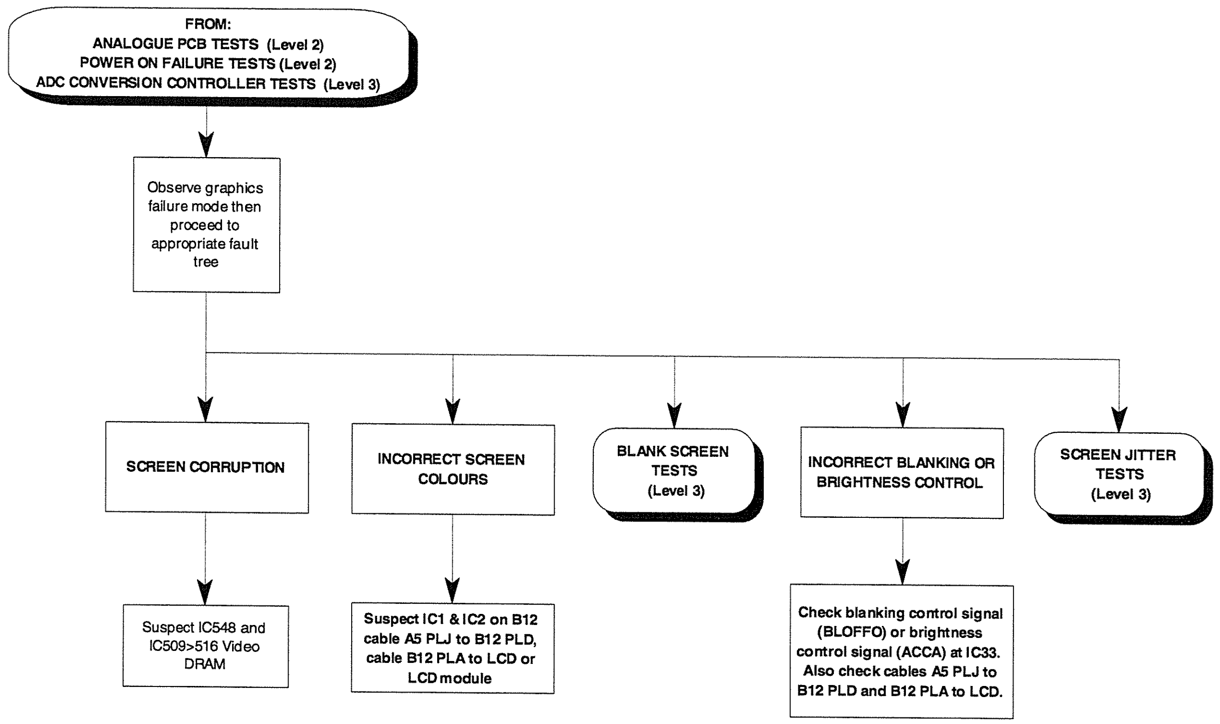
Note: Refer to Digital PCB (B6) and schematics



GPIB TESTS
(Level 3)

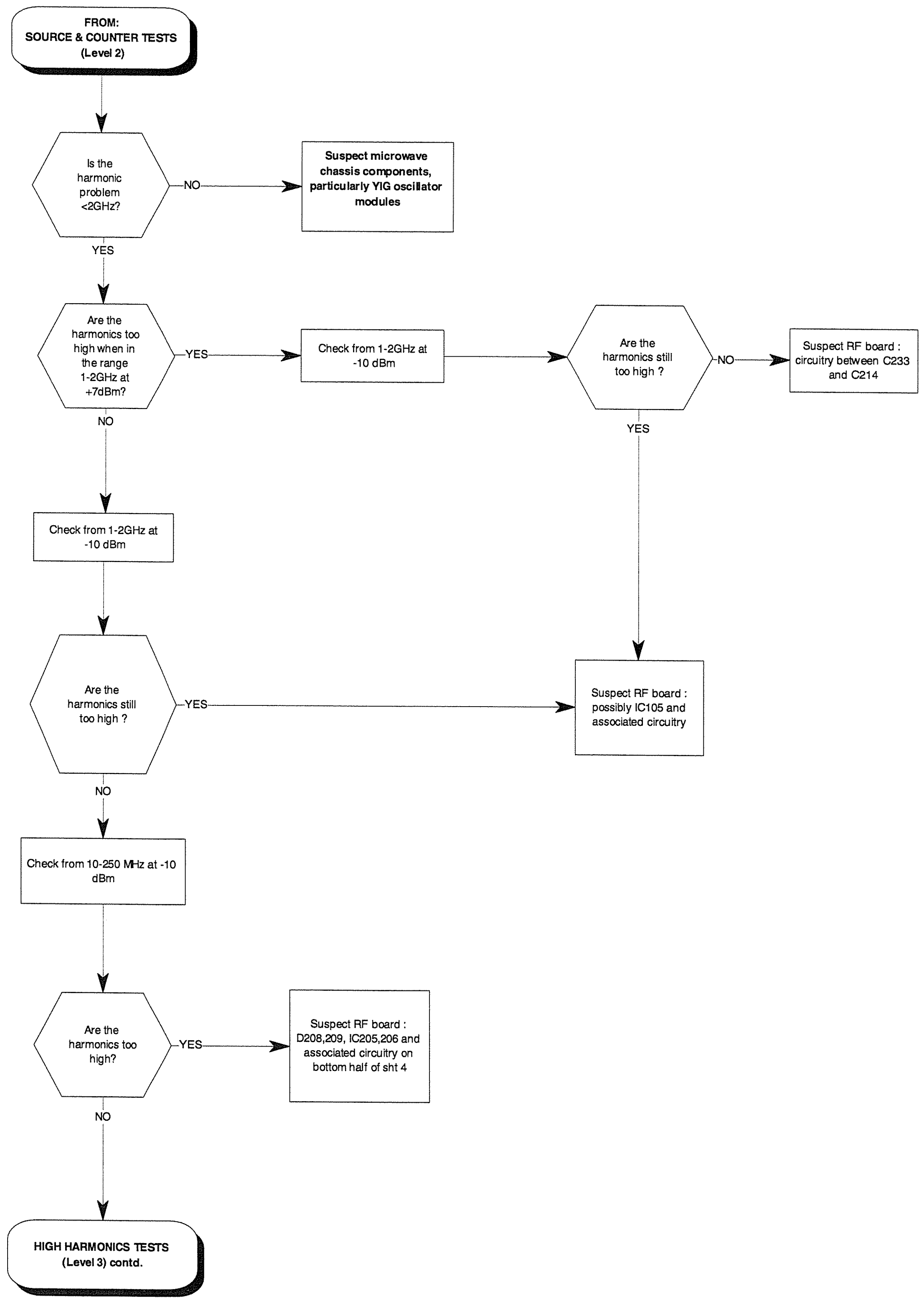
GRAPHICS TESTS (Level 3)

Note: Refer to Analogue PCB (A5) and schematics



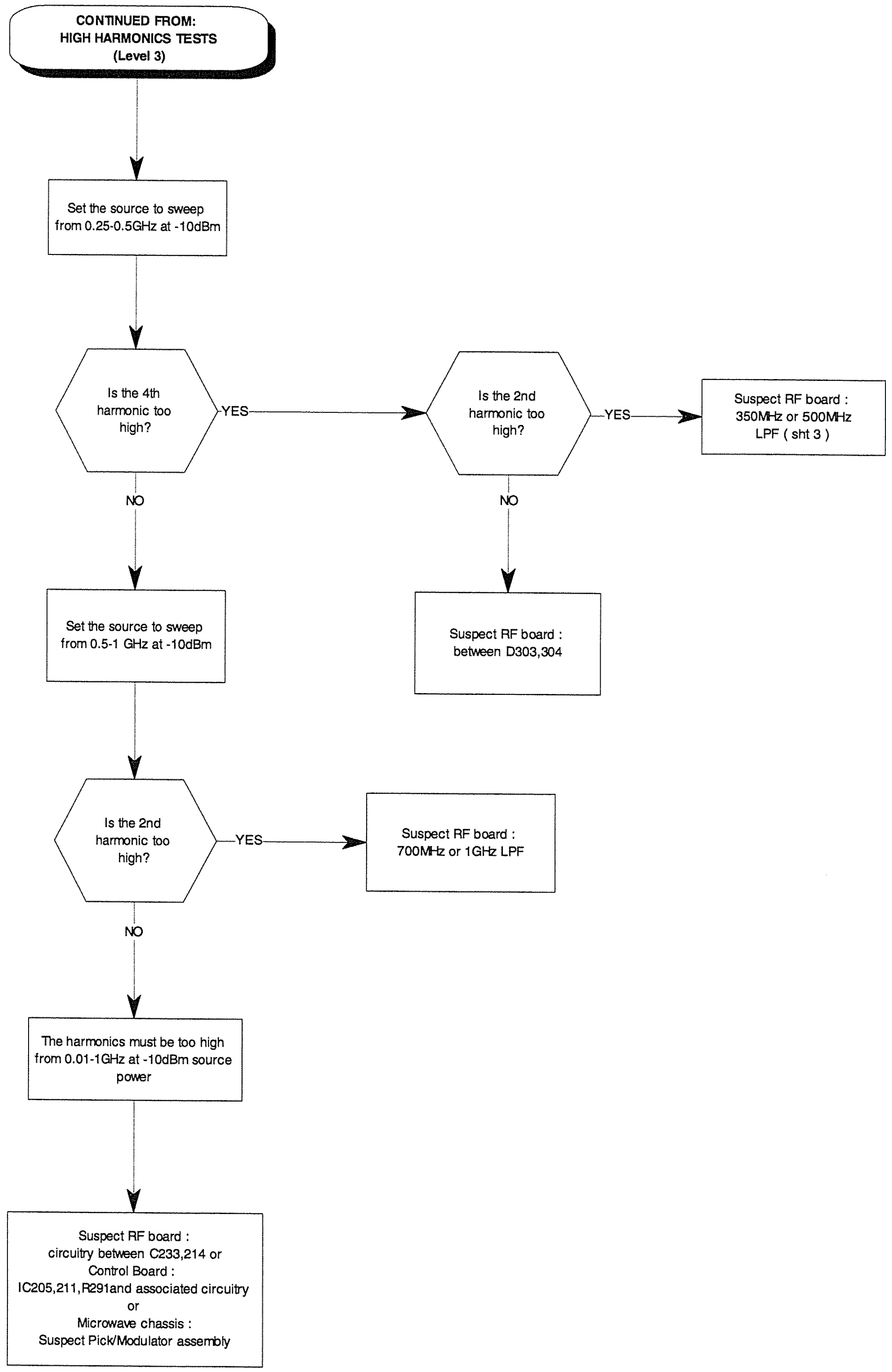
GRAPHICS TESTS
(Level 3)

HIGH HARMONICS TESTS
(Level 3)



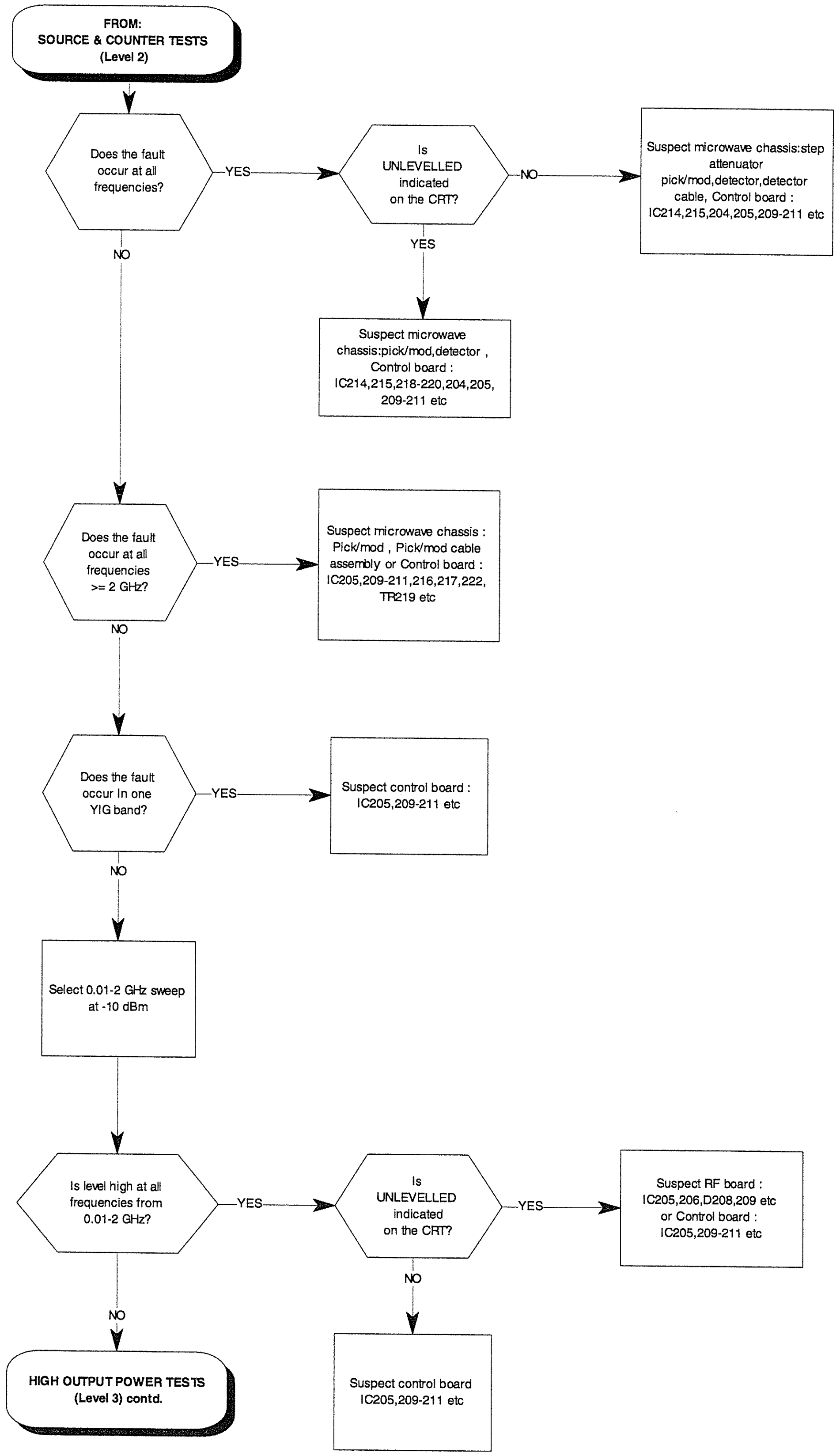
HIGH HARMONICS TESTS
(Level 3)

HIGH HARMONICS TESTS (Level 3) contd.



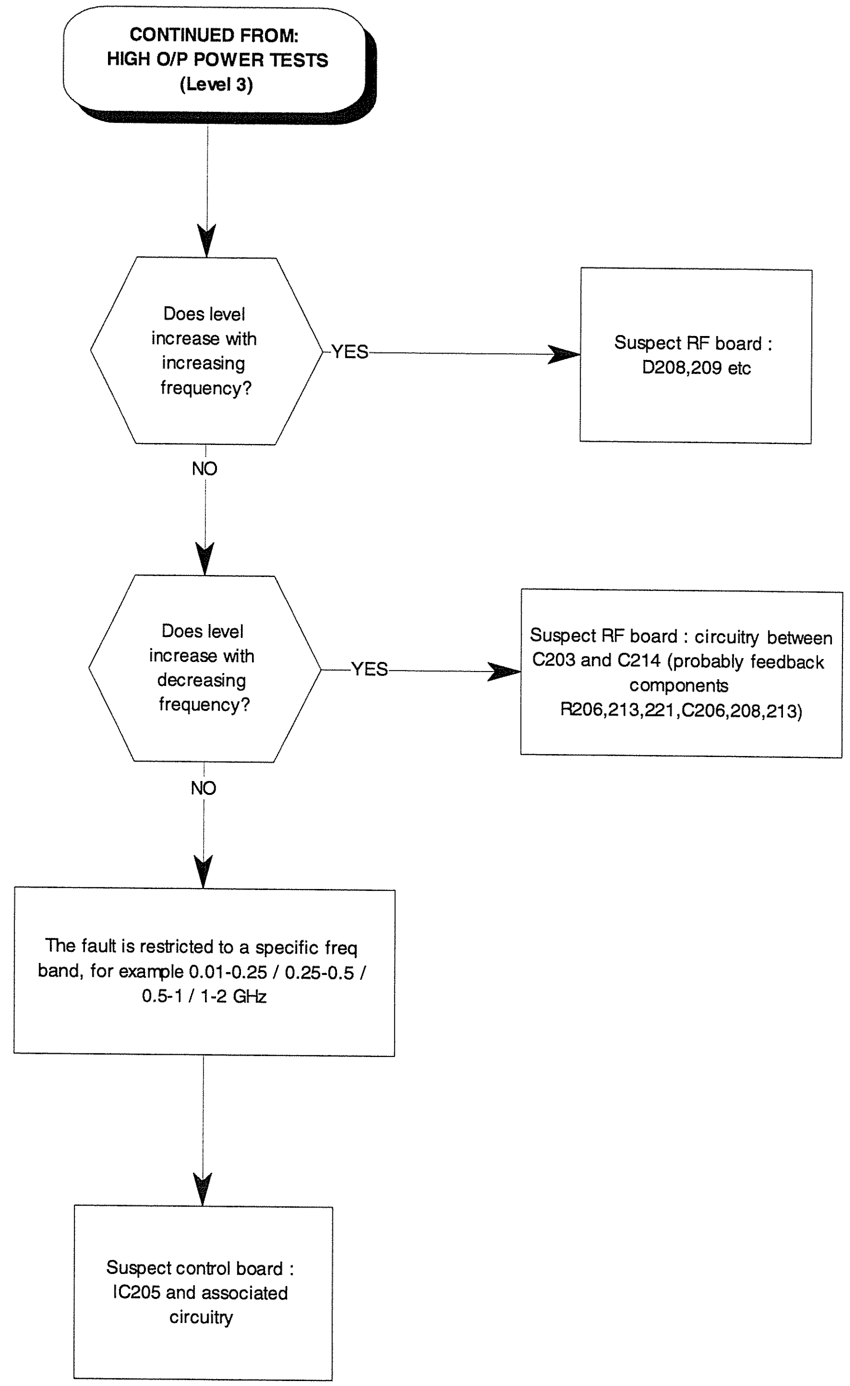
HIGH HARMONICS TESTS (Level 3) contd.

HIGH O/P POWER TESTS (Level 3)



HIGH O/P POWER TESTS
(Level 3)

HIGH O/P POWER TESTS (Level 3) contd.

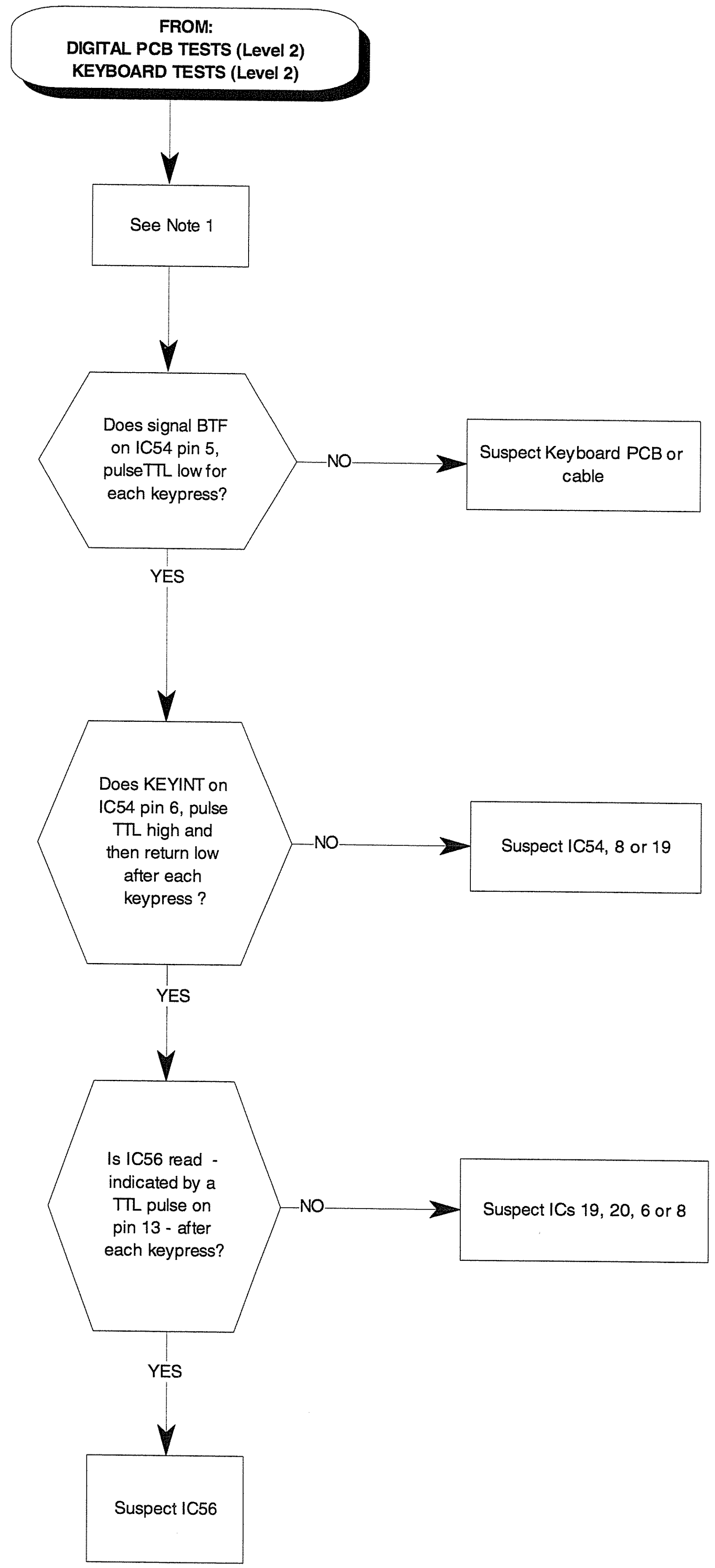


HIGH O/P POWER TESTS
(Level 3) contd.

KEYBOARD INTERFACE TESTS
(Level 3)

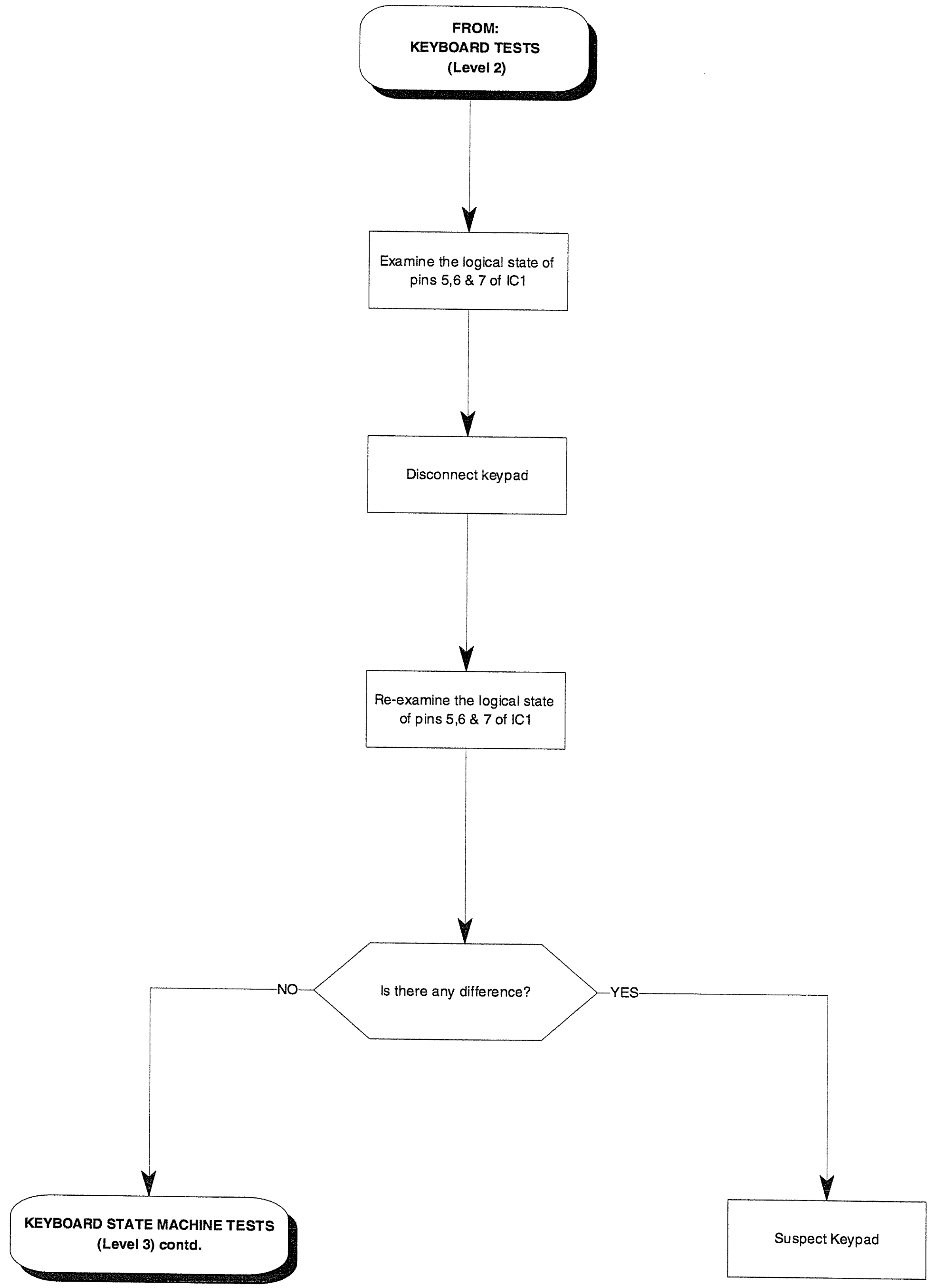
Note: Refer to digital PCB (B6) and schematics

Note 1: Ideally a digital storage scope or logic analyser is required for these tests - but an analogue scope that shows a trigger has taken place may be sufficient



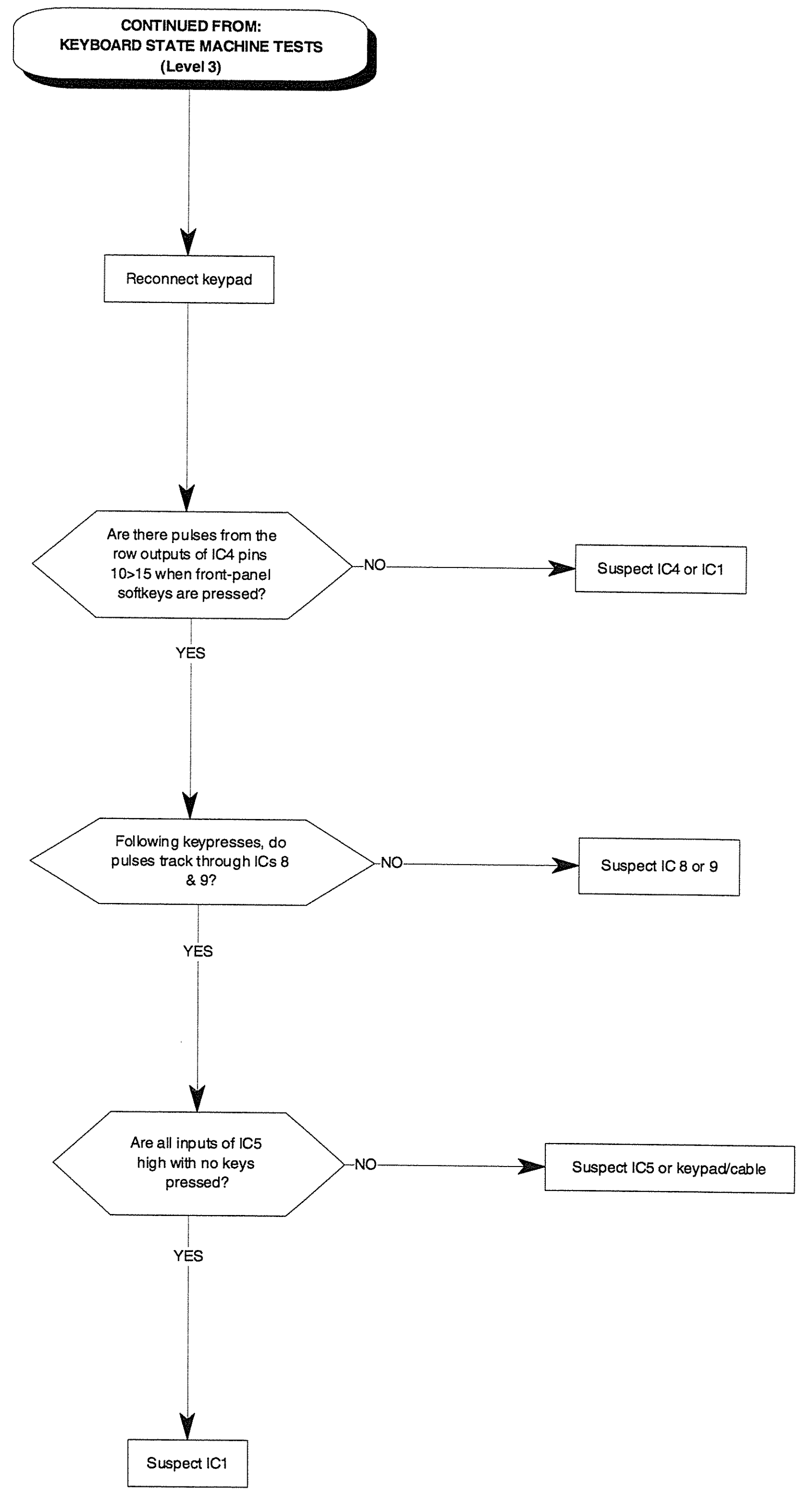
KEYBOARD INTERFACE TESTS
(Level 3)

KEYBOARD STATE MACHINE TESTS (Level 3)



KEYBOARD STATE MACHINE TESTS
(Level 3)

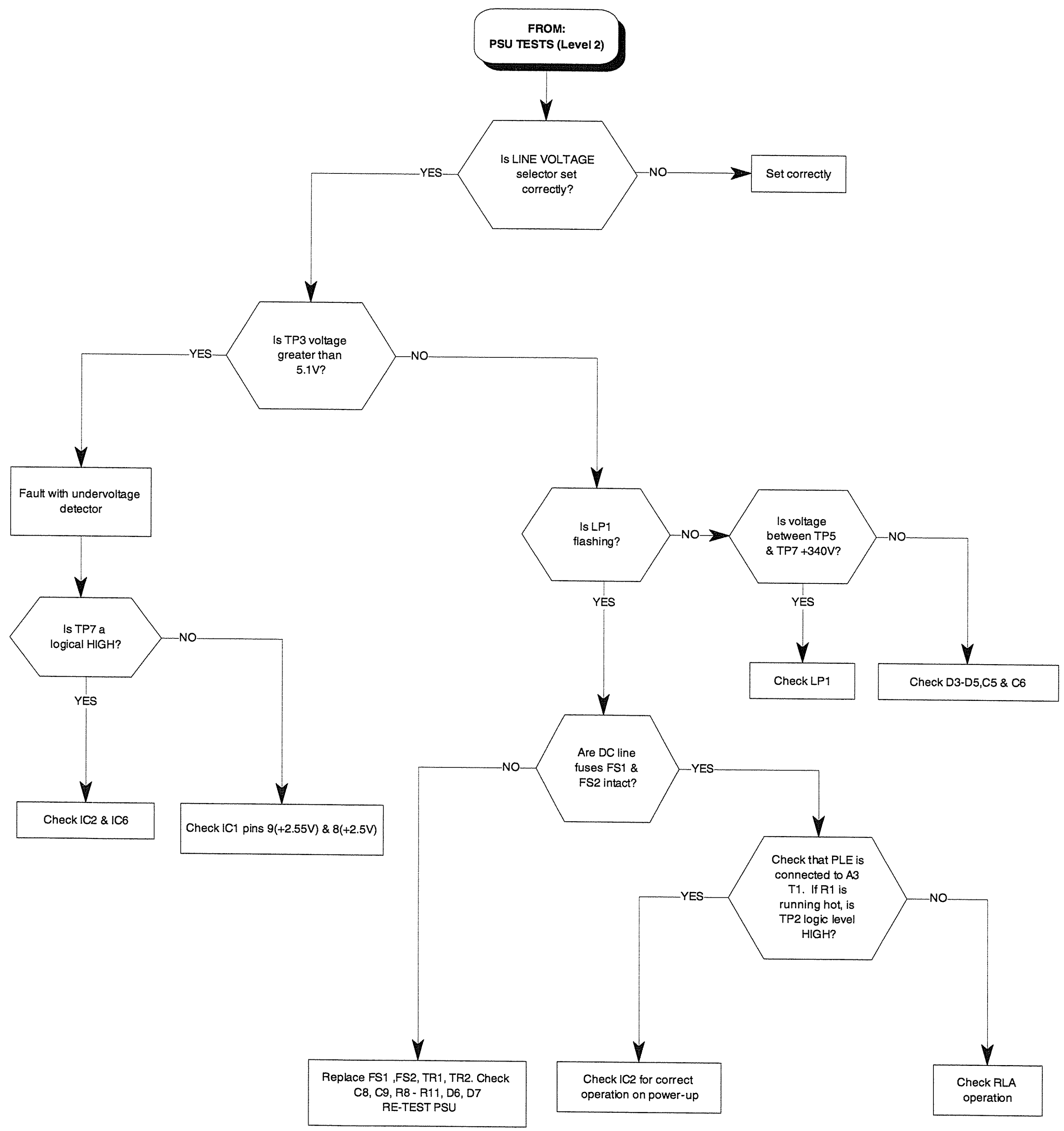
KEYBOARD STATE MACHINE TESTS (Level 3) contd.



KEYBOARD STATE MACHINE TESTS (Level 3) contd.

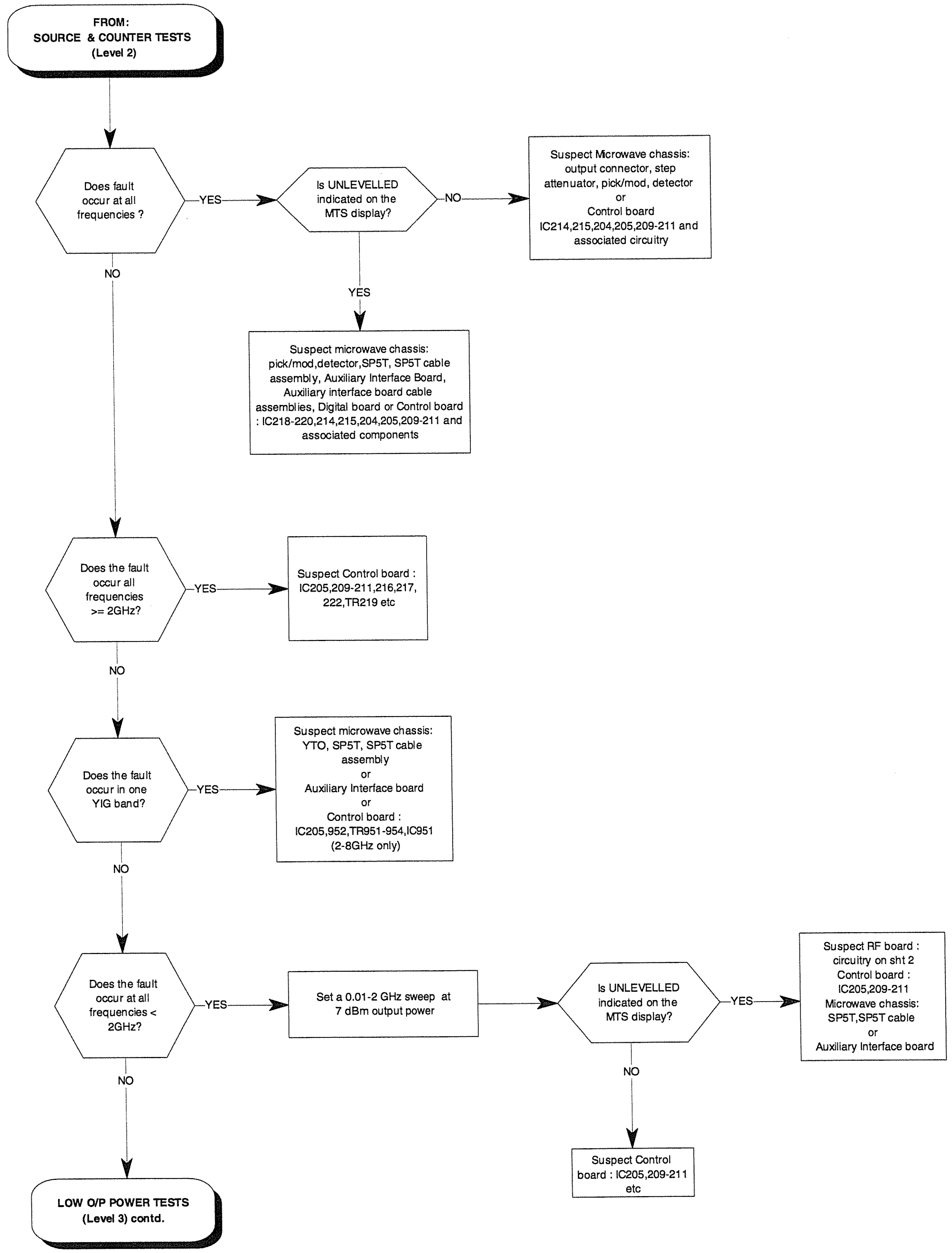
LOW LINE TESTS
(Level 3)

Note: Refer to PSU input PCB (A4) and associated schematics



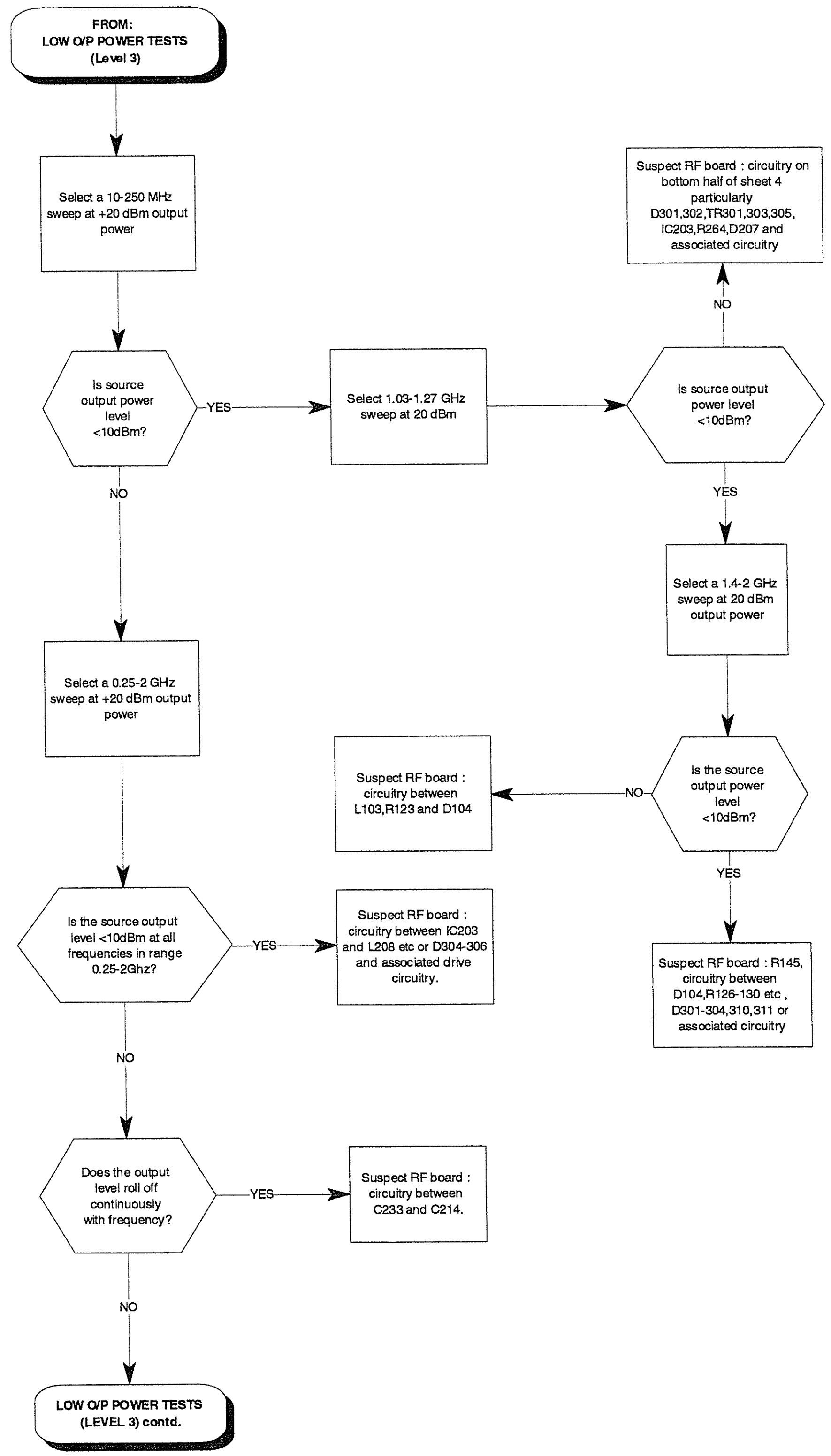
LOW LINE TESTS
(Level 3)

LOW OUTPUT POWER TESTS
(Level 3)



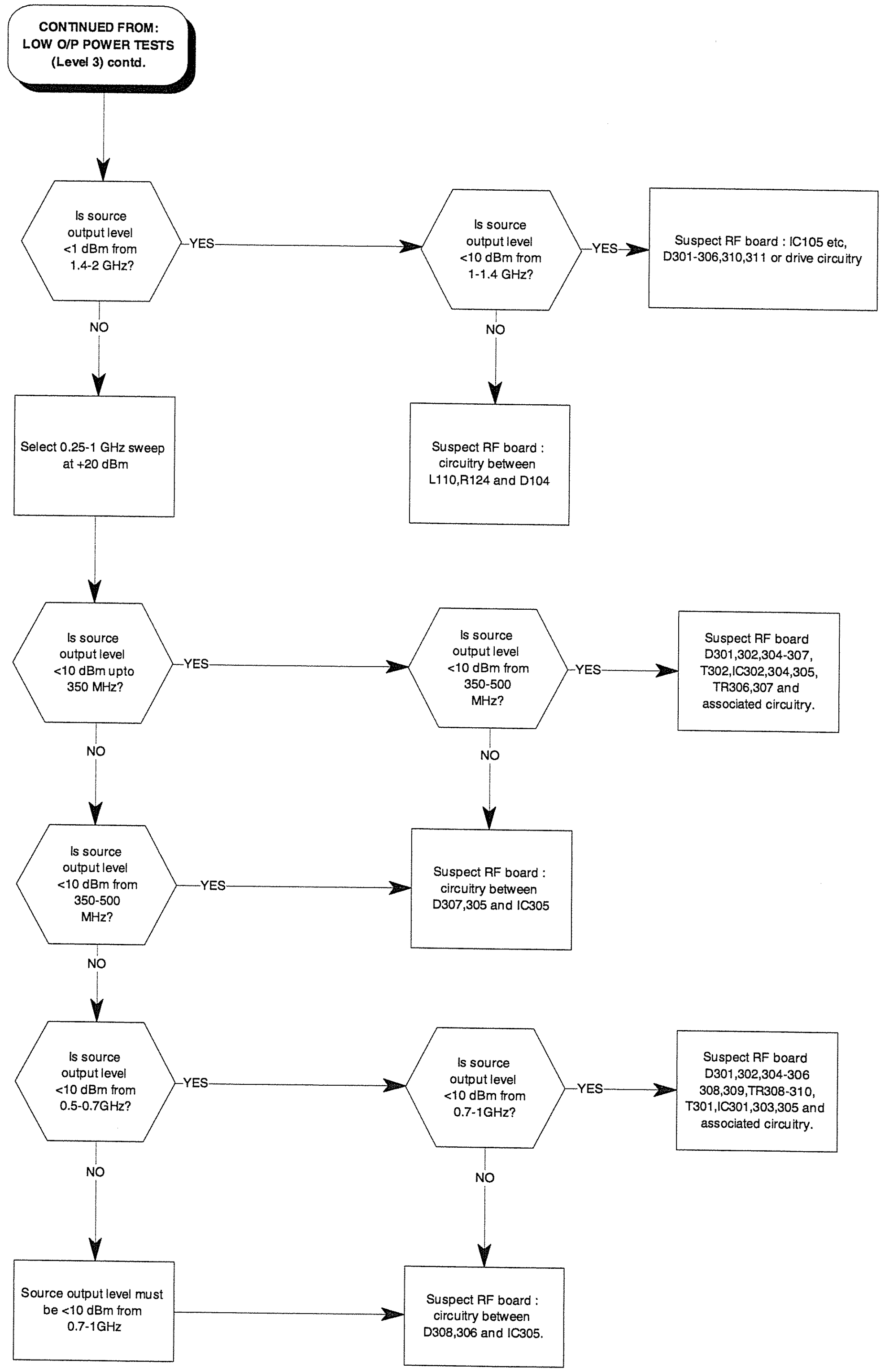
LOW OUTPUT POWER TESTS
(Level 3)

LOW OUTPUT POWER TESTS
(Level 3) contd.



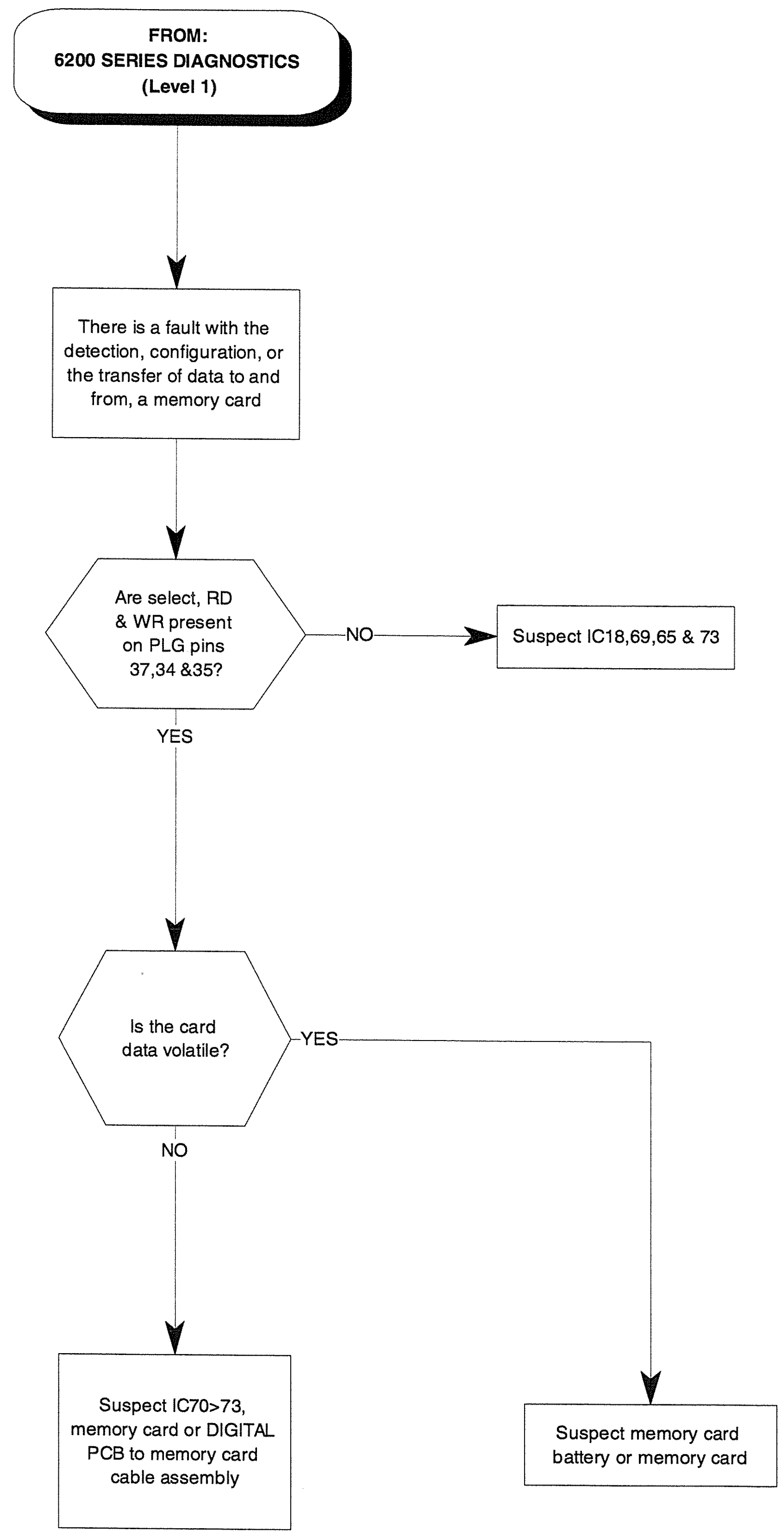
LOW OUTPUT POWER TESTS (Level 3) contd.

LOW OUTPUT POWER TESTS
(Level 3) contd.



LOW OUTPUT POWER TESTS
(Level 3) contd.

MEMORY CARD TESTS (Level 3)

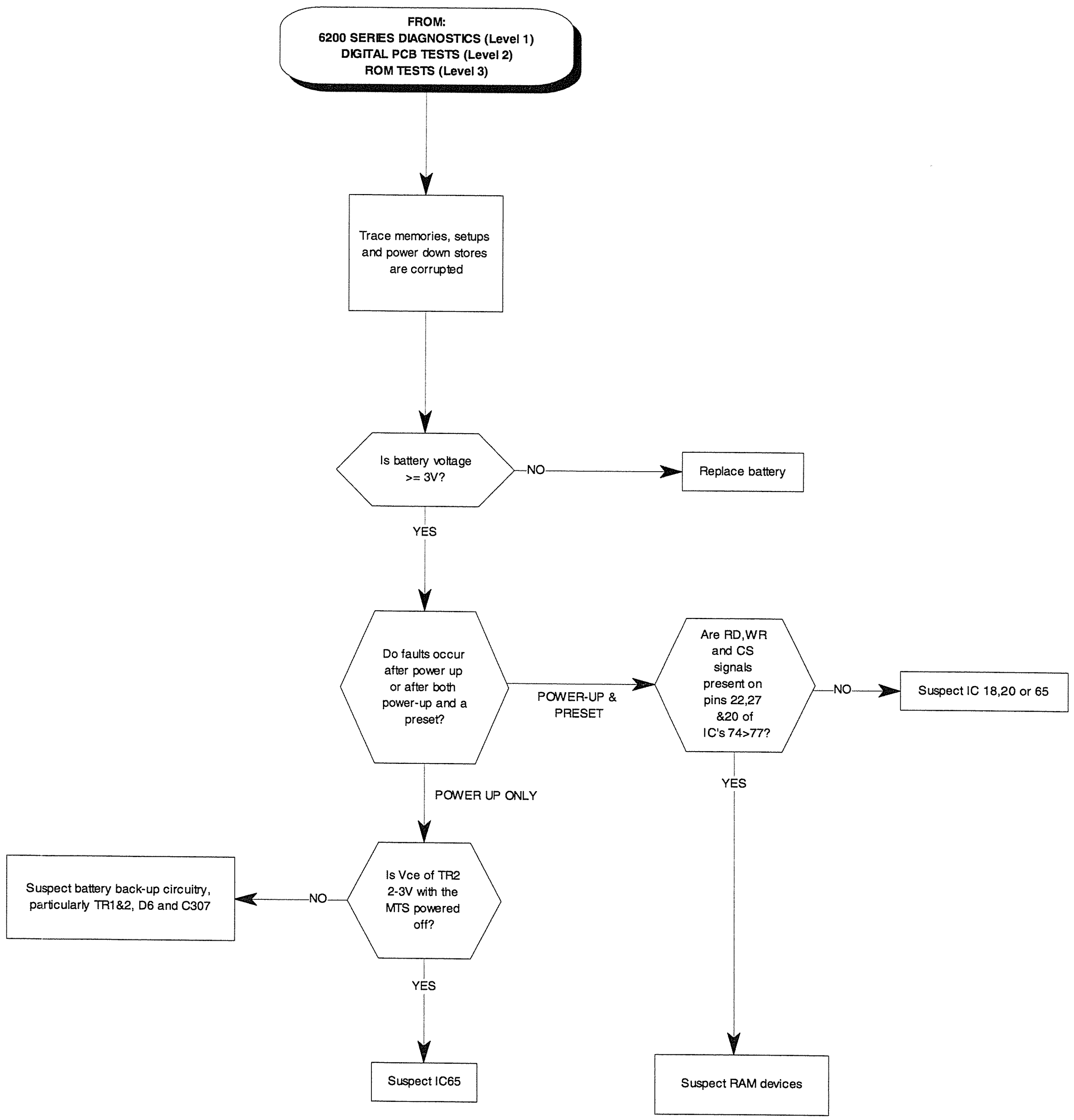


Note: Refer to Digital PCB (B6) and schematics

MEMORY CARD TESTS
(Level 3)

NOVRAM TESTS
(Level 3)

Note: Refer to Digital PCB (B6) and schematics

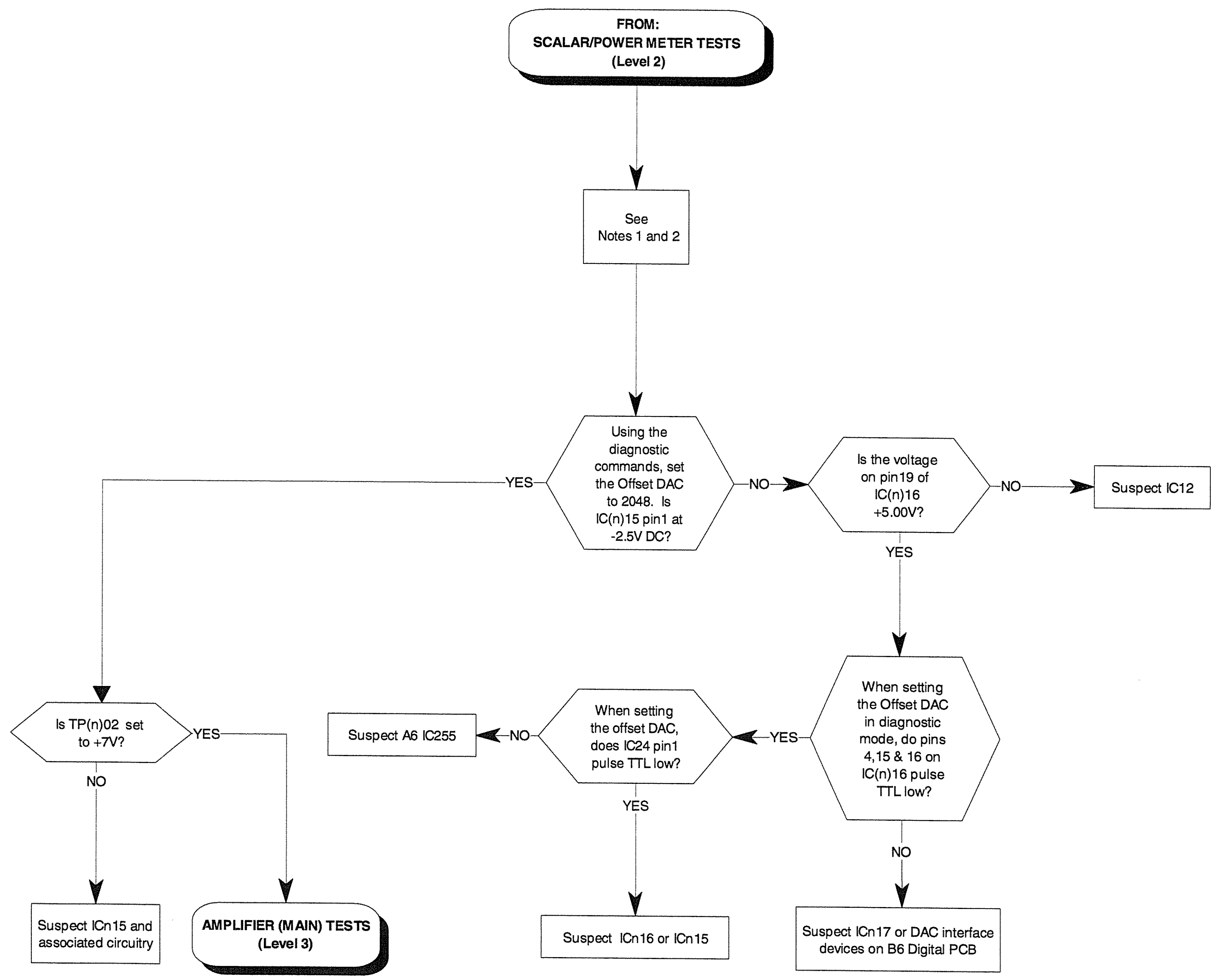


NOVRAM TESTS
(Level 3)

OFFSET DAC TESTS
(Level 3)

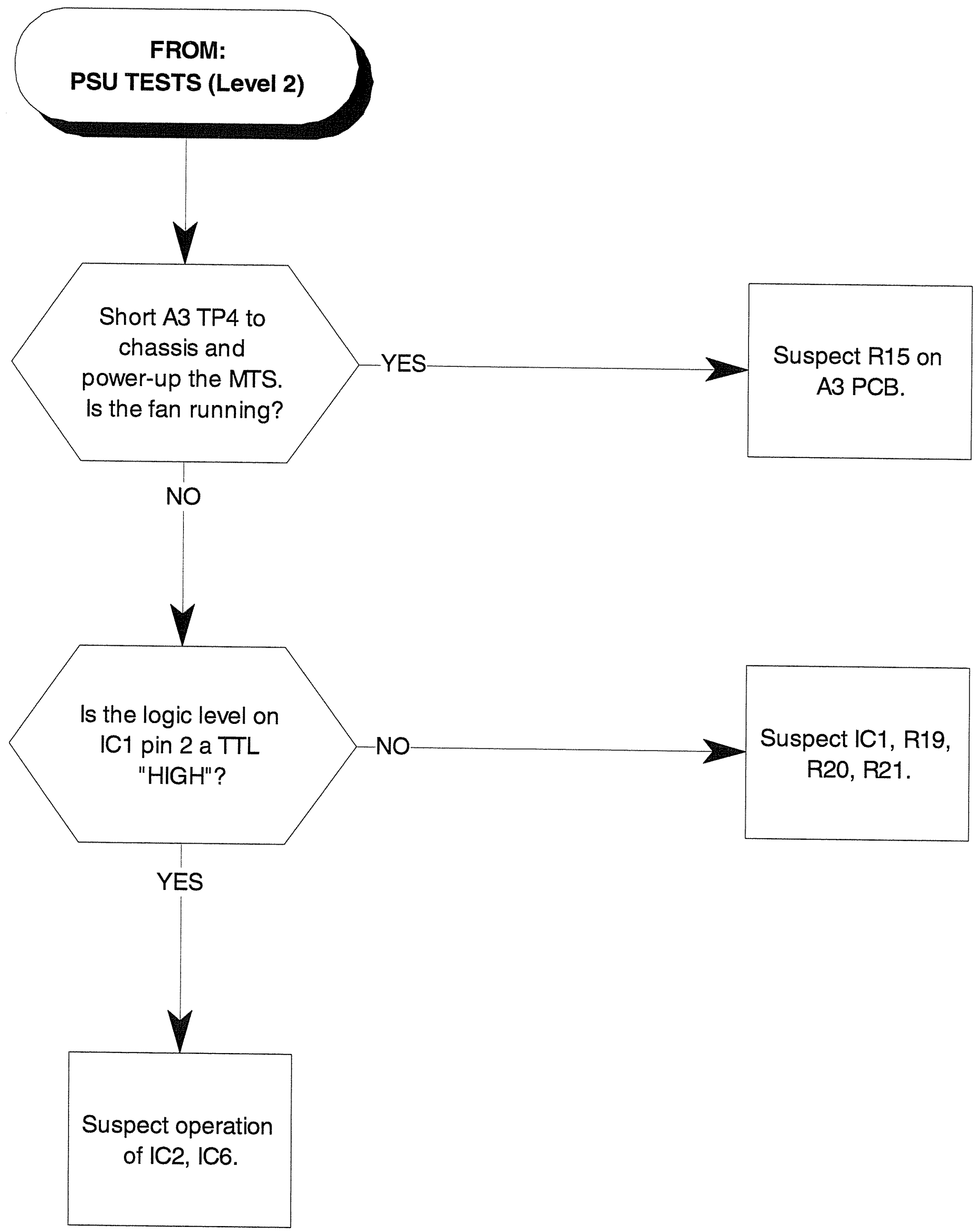
Note 1: **Connect a known working 6230 Series scalar detector to the Channel Input under test. Remove any RF source from the detector input Select Data Acq. Diagnostics: [UTILITY][Service][Diagnostics][Data Acq. Diagnostics][Service Mode (ON)][Set up Input][All Detectors] Select the ADC input for the Channel under test**

Note 2: **For the diagnostic tests shown below, IC(n)15 should be interpreted as IC115 if in channel A, IC15 if in channel B and so on.**



OFFSET DAC TESTS
(Level 3)

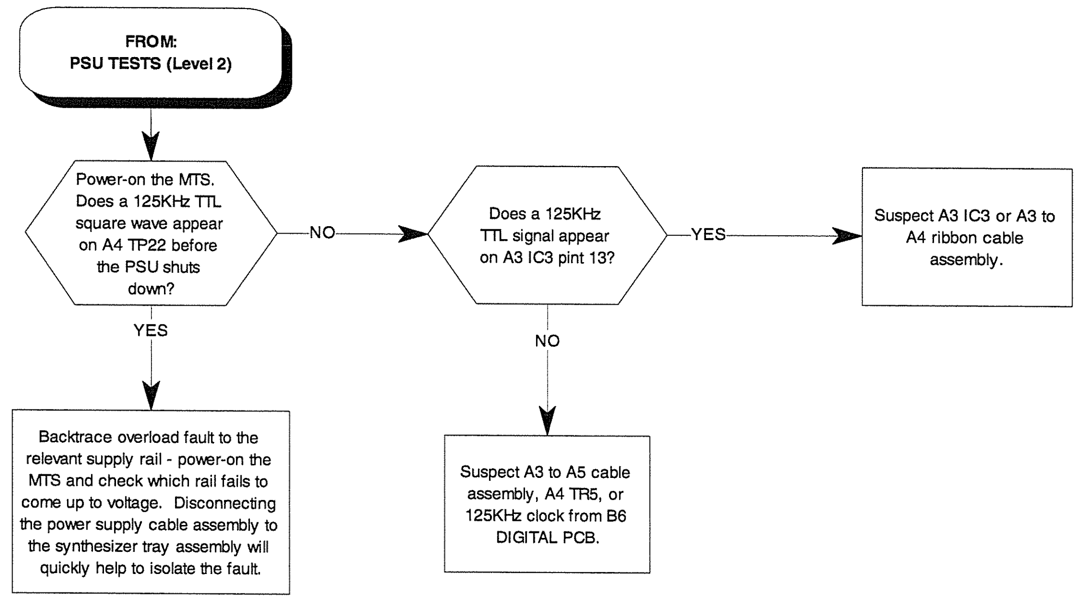
OVERHEAT TESTS
(Level 3)



Note: Refer to PSU Secondary PCB(A3) and schematics

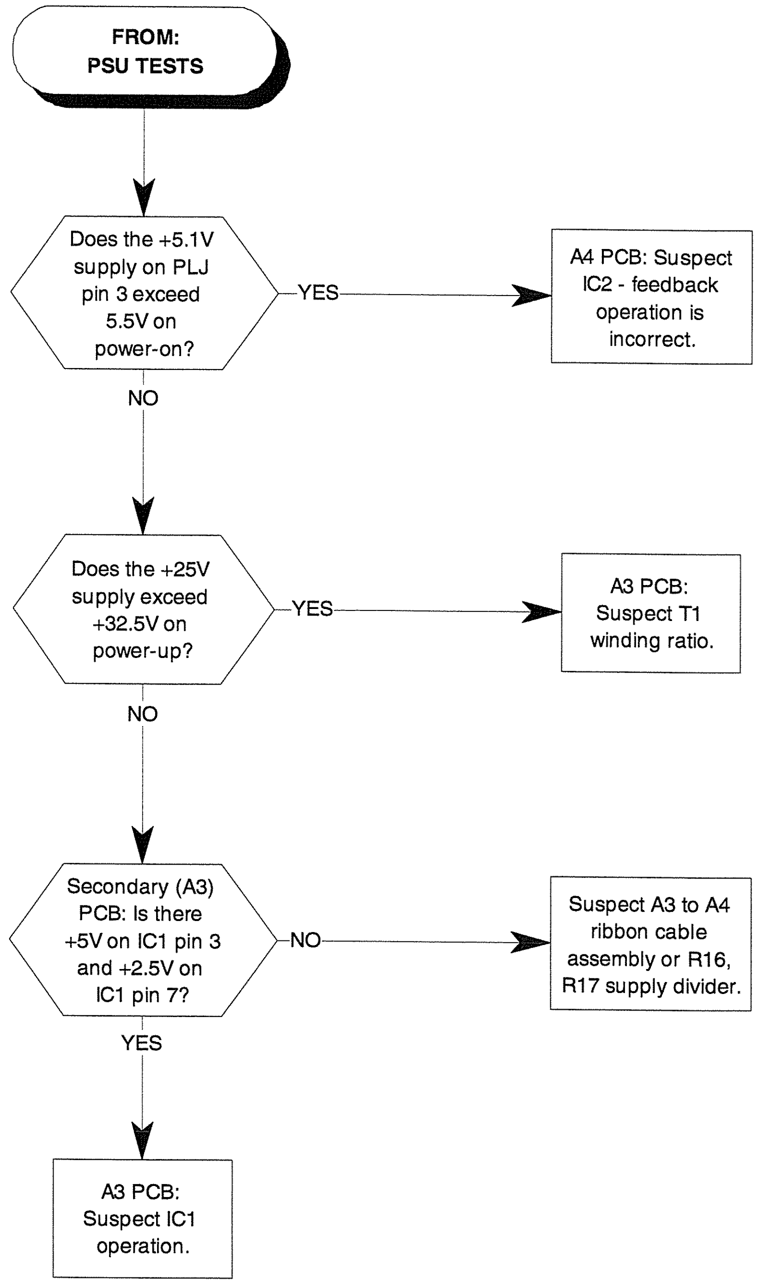
OVERHEAT TESTS
(Level 3)

OVERLOAD TESTS
(Level 3)



OVERLOAD TESTS
(Level 3)

OVERVOLTAGE TESTS (Level 3)

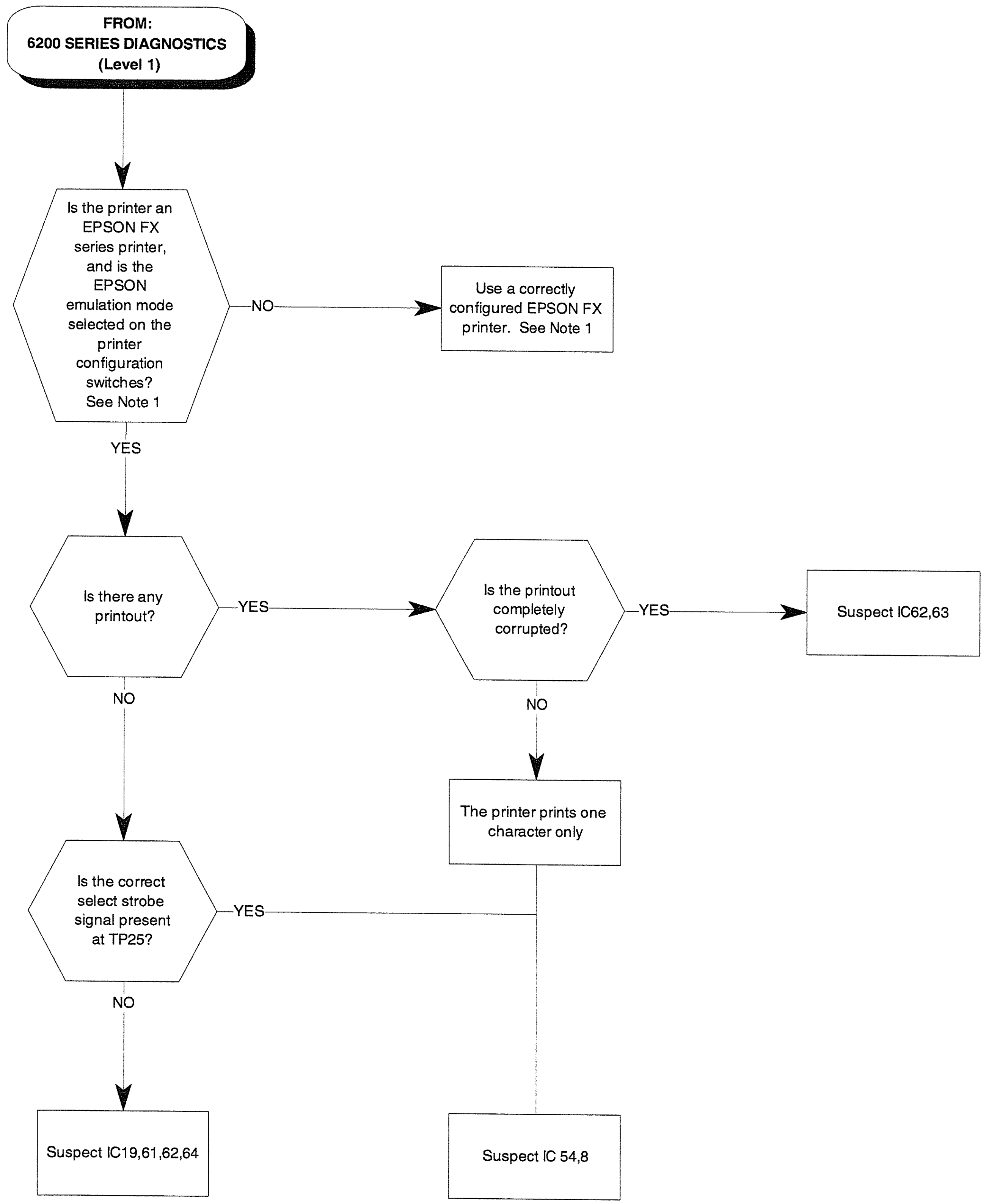


OVERVOLTAGE TESTS
(Level 3)

PRINTER TESTS
(Level 3)

Note: Refer to Digital PCB (B6) and schematics

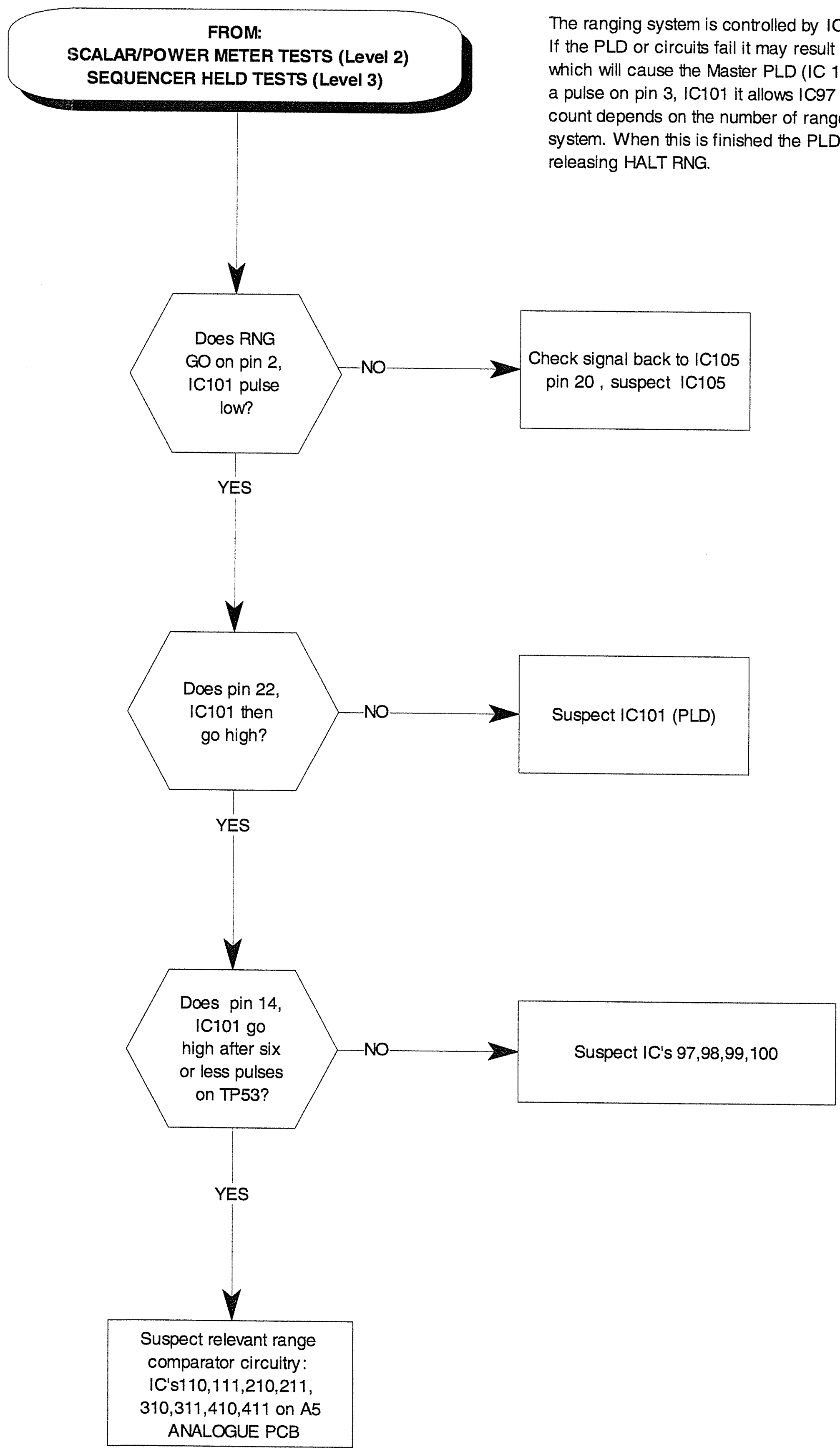
Note 1: Later instruments can also drive HP DeskJet/LaserJet printers. The printer type is selected using [COPY[Select Printer].



PRINTER TESTS
(Level 3)

RANGE CONTROL TESTS (Level 3)

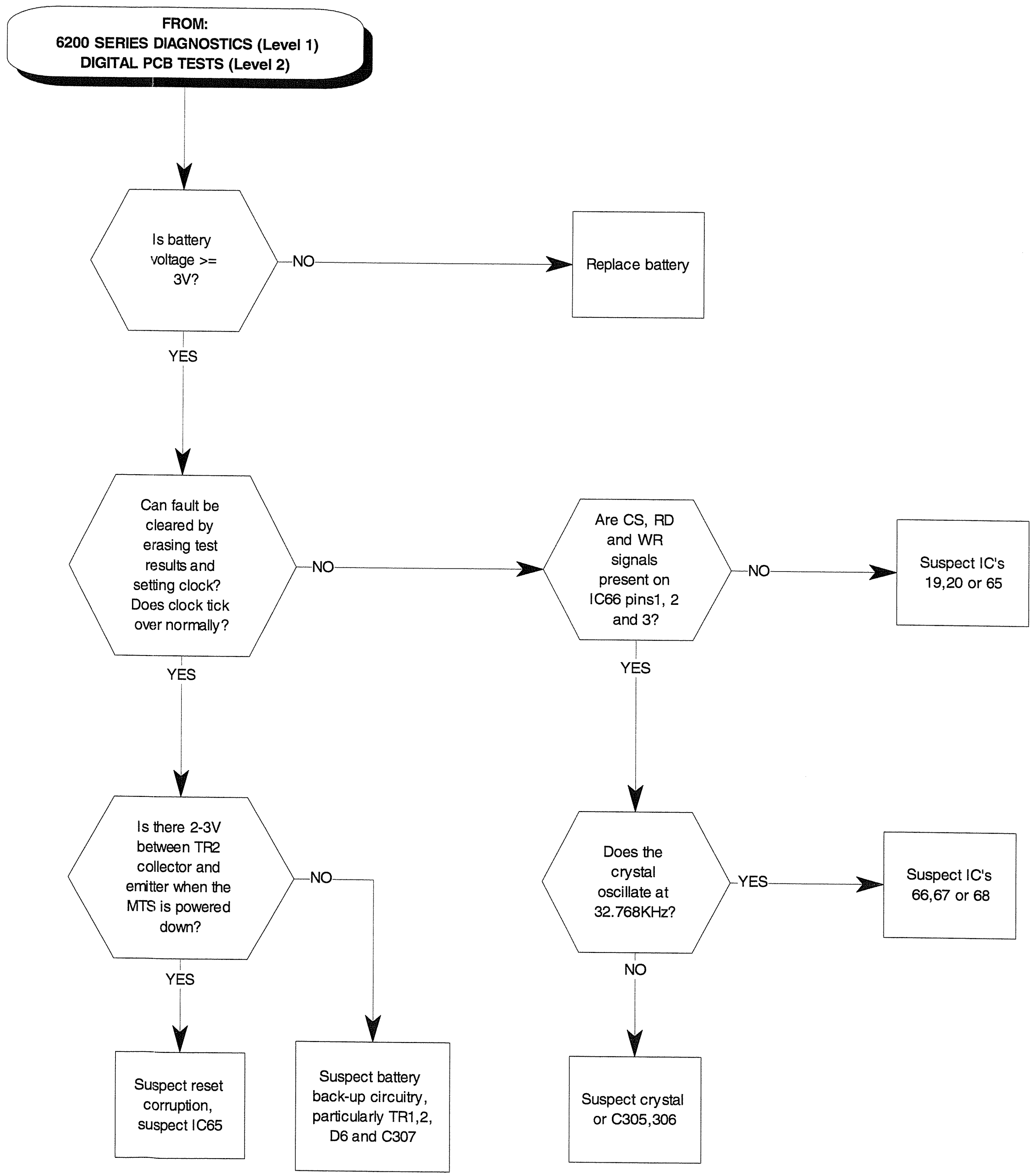
The ranging system is controlled by IC101 (a PLD) and associated circuits. If the PLD or circuits fail it may result in the HALT RNG not being released which will cause the Master PLD (IC 105) to halt.When ranging is started by a pulse on pin 3, IC101 it allows IC97 to count to a maximum of six ,The count depends on the number of range changes required by the analog system. When this is finished the PLD waits for approx 105 µs before releasing HALT RNG.



Note: Refer to Digital PCB (B6) and schematics

RANGE CONTROL TESTS
(Level 3)

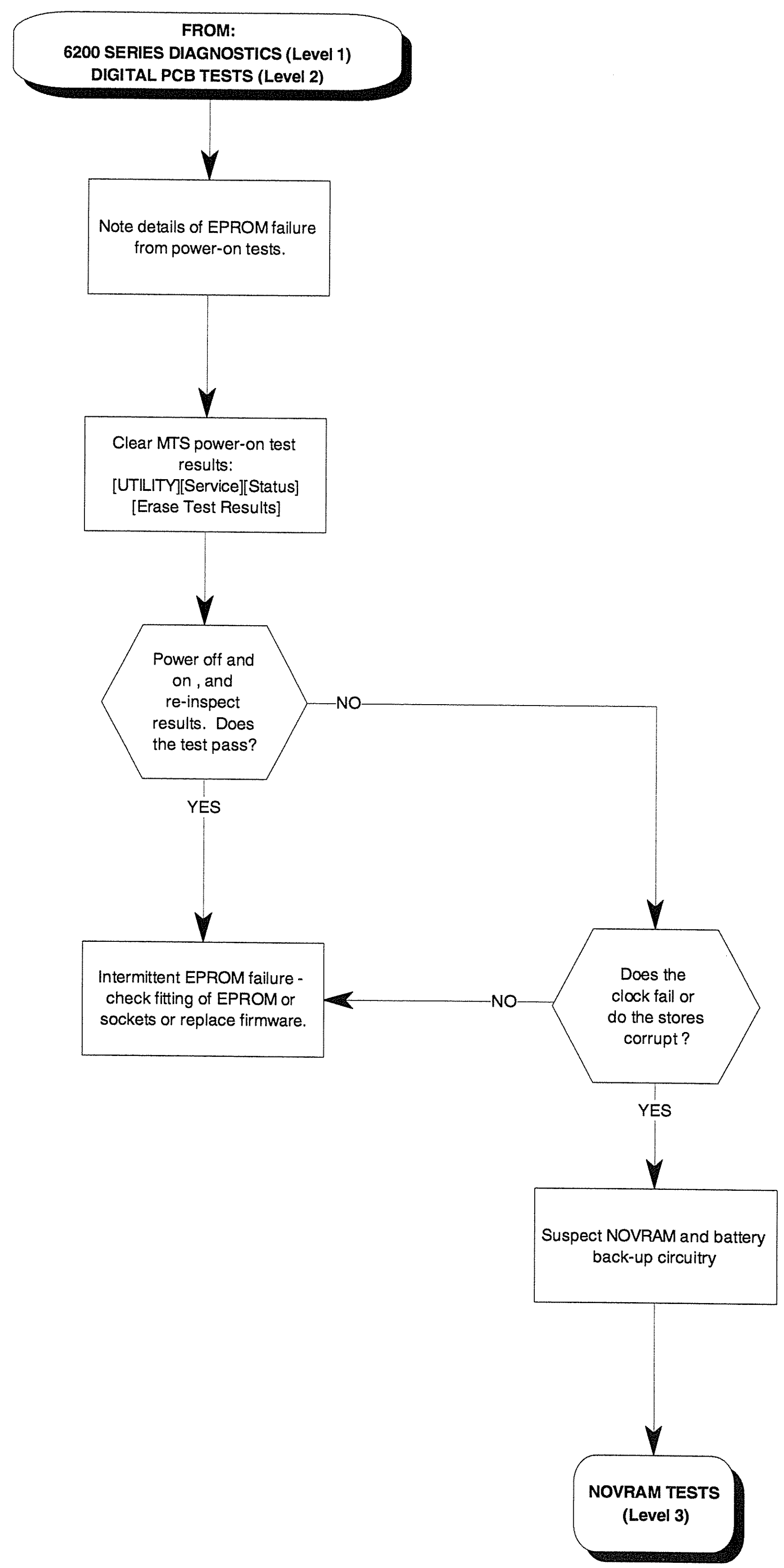
REAL-TIME CLOCK TESTS (Level 3)



Note: Refer to Digital PCB (B6) and schematics

REAL-TIME CLOCK TESTS
(Level 3)

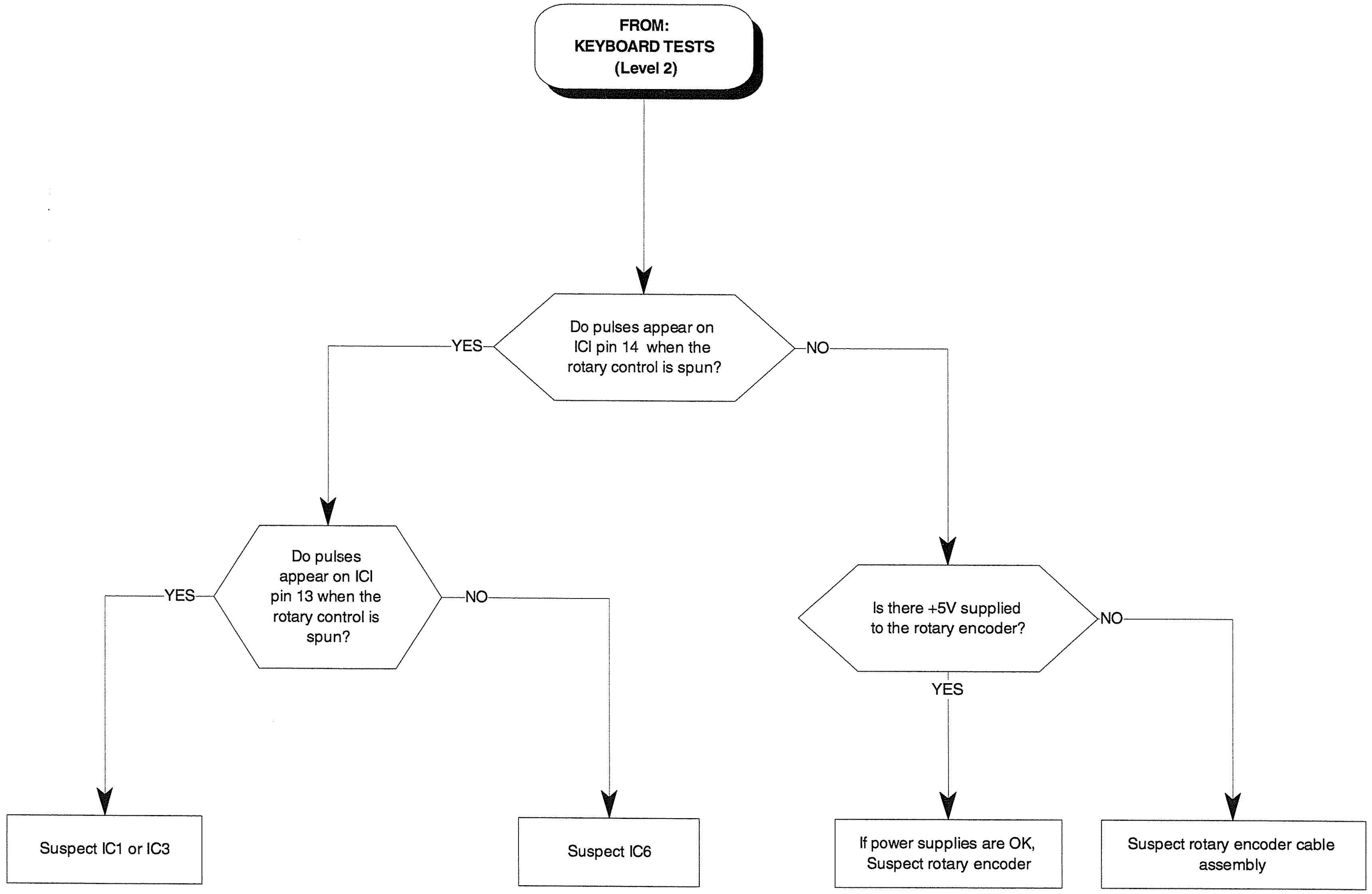
ROM TESTS
(Level 3)



Note: Refer to Digital PCB (B6) and schematics

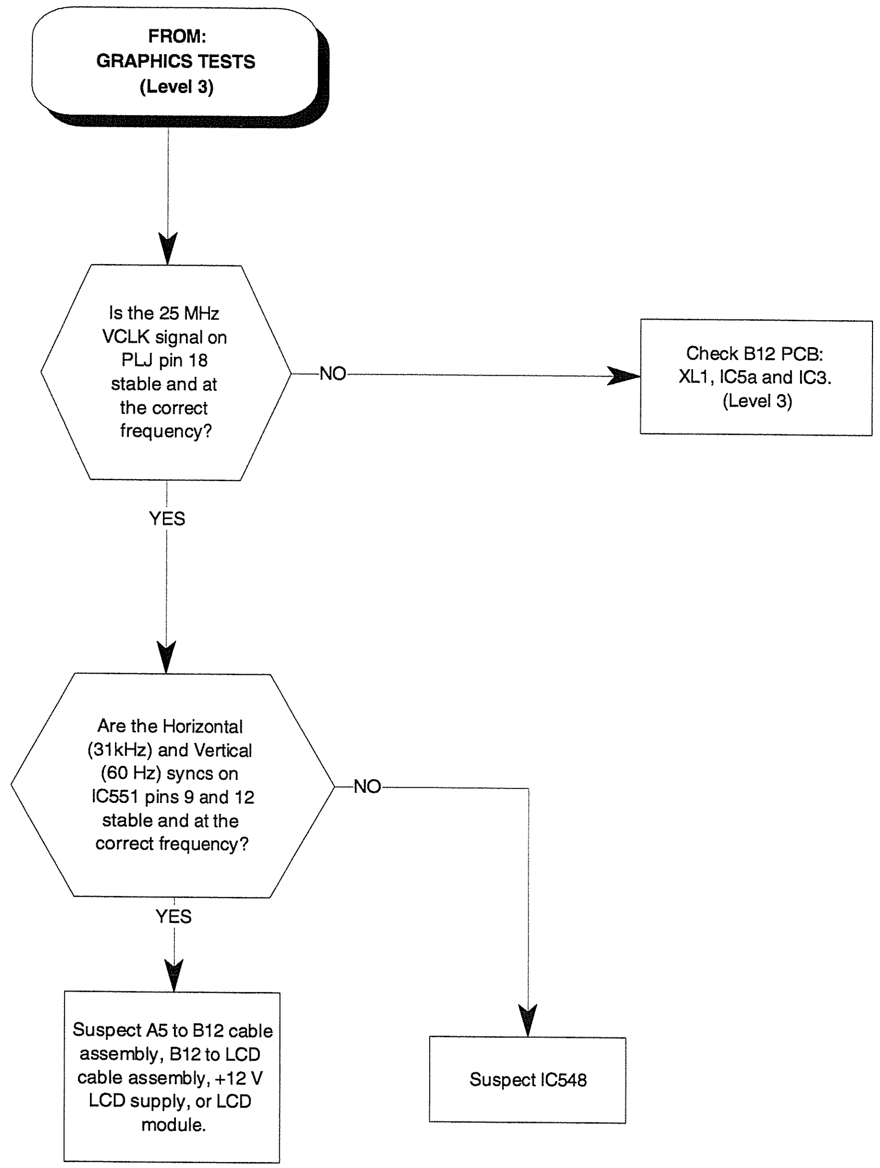
ROM TESTS
(Level 3)

ROTARY CONTROL TEST
(Level 3)



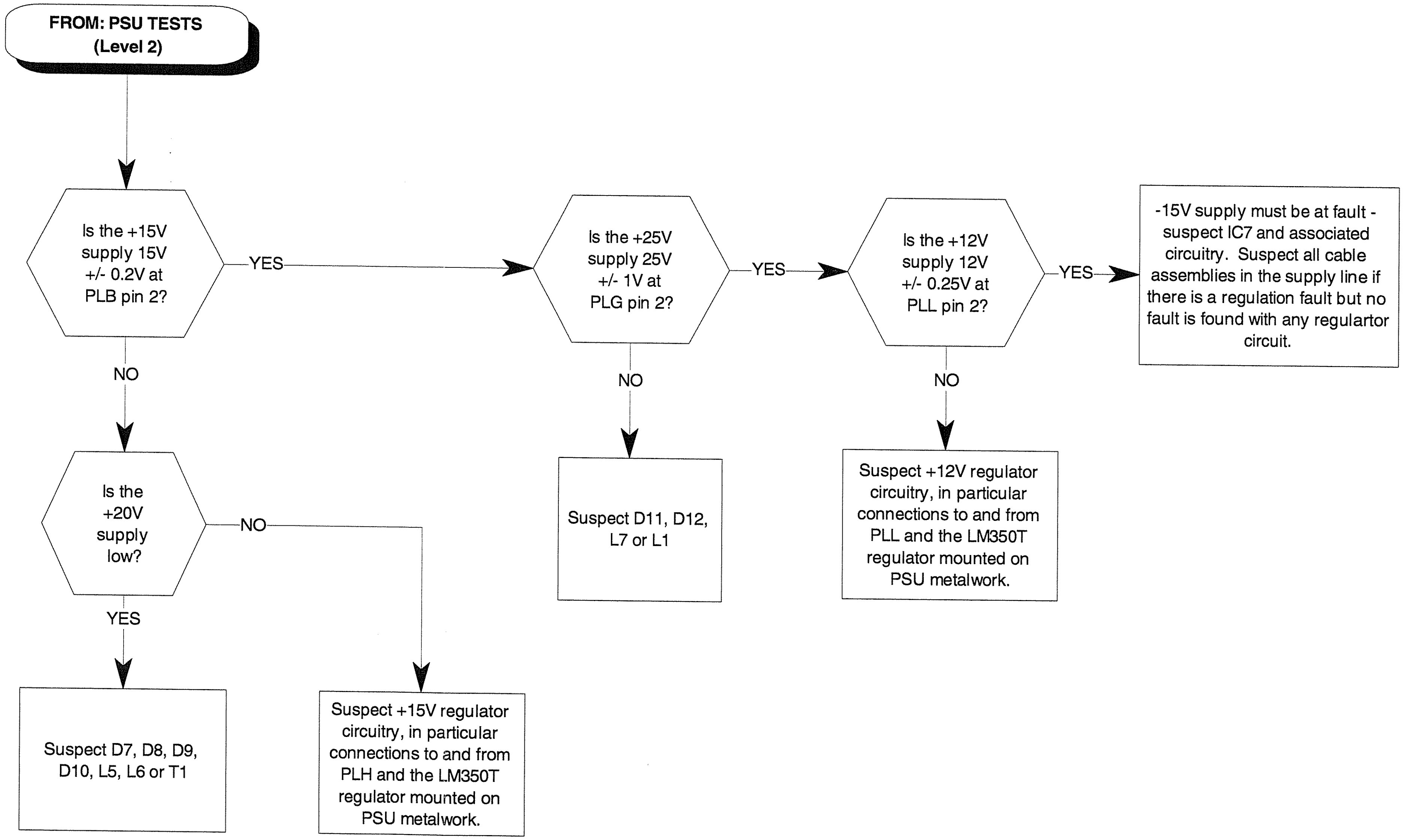
ROTARY CONTROL TEST
(Level 3)

SCREEN JITTER TESTS
(Level 3)



SCREEN JITTER TESTS
(Level 3)

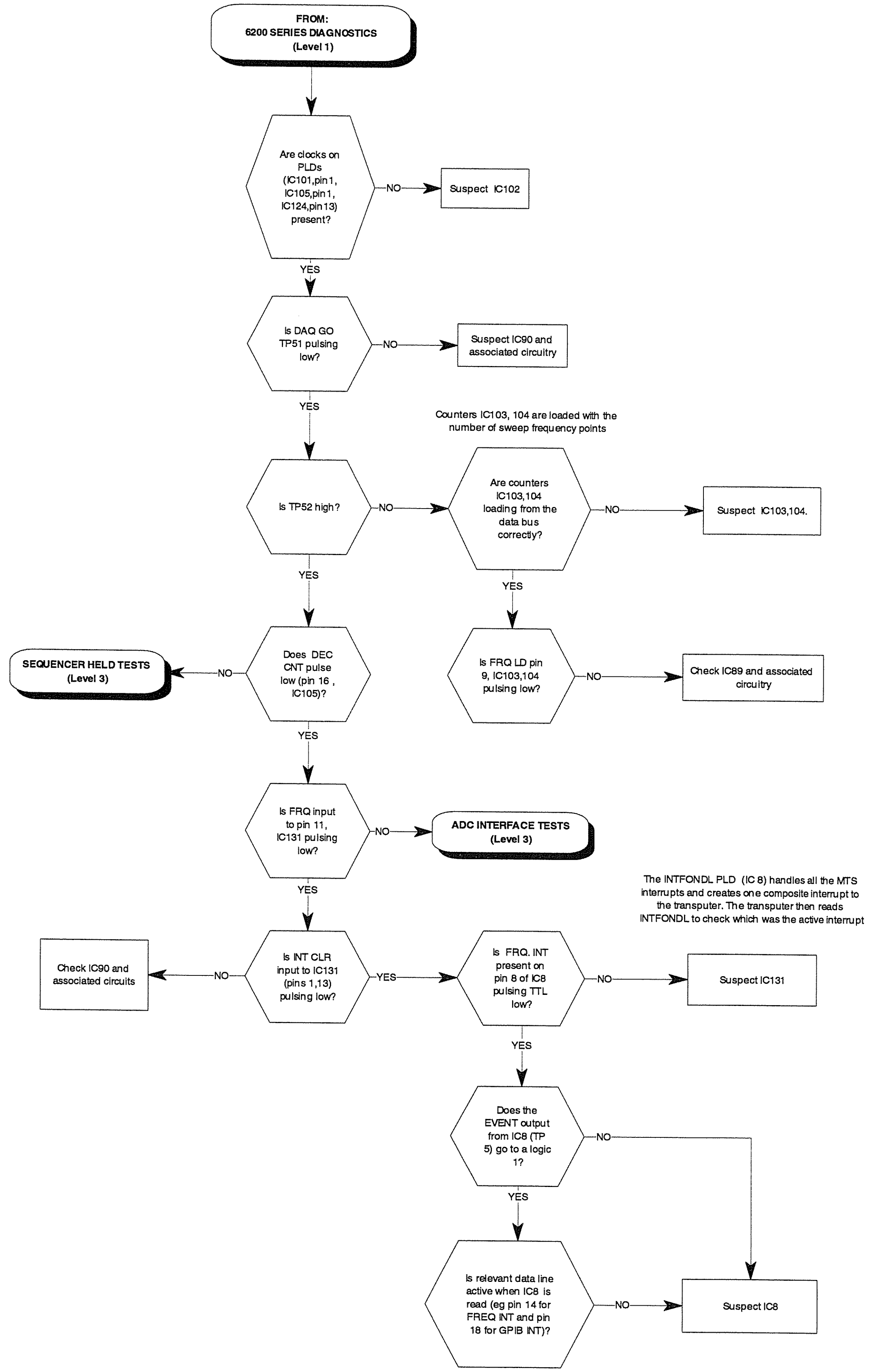
SECONDARY REGULATION TESTS (Level 3)



SECONDARY REGULATION TESTS
(Level 3)

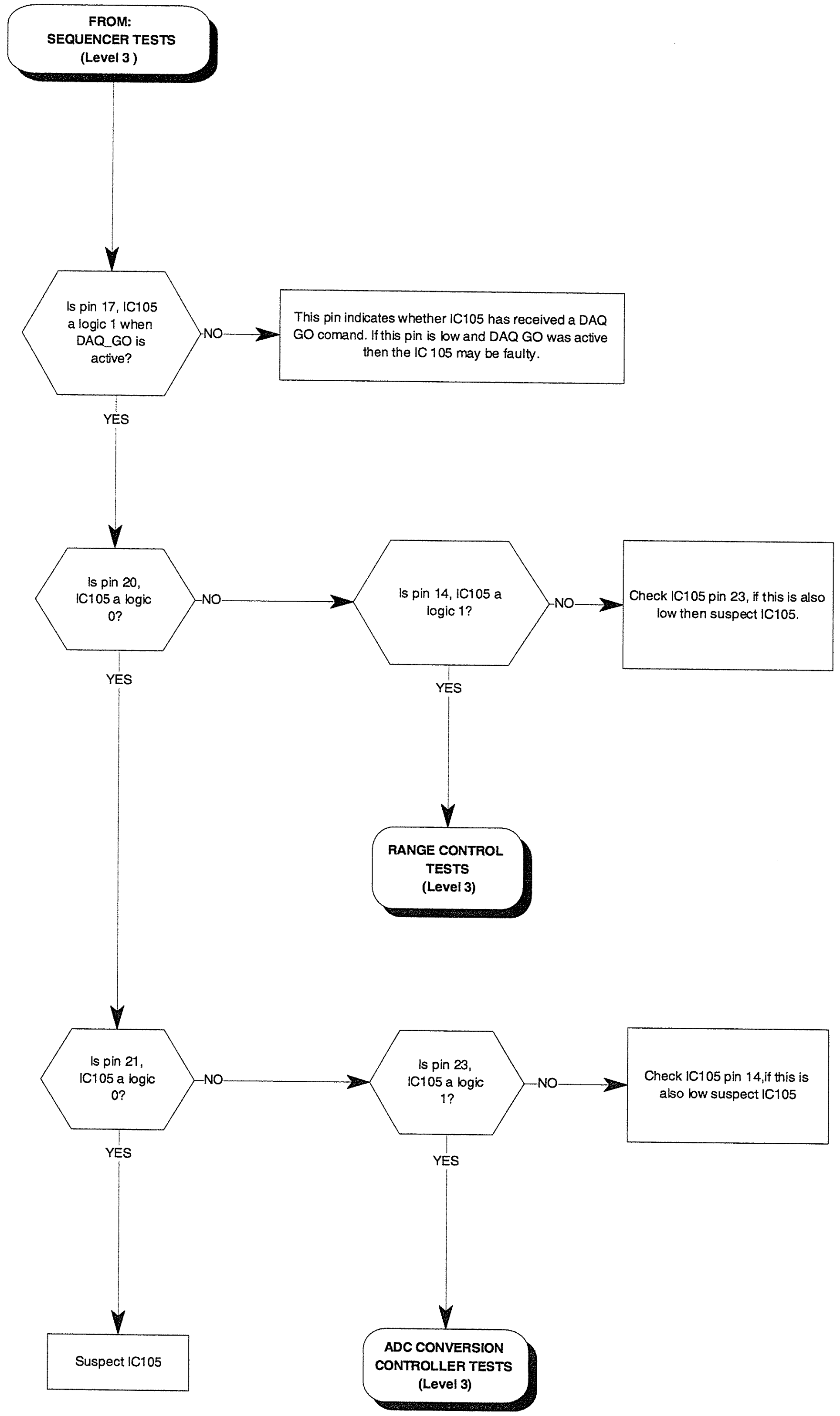
SEQUENCER TESTS
(Level 3)

Note: Refer to Digital PCB (B6) and schematics



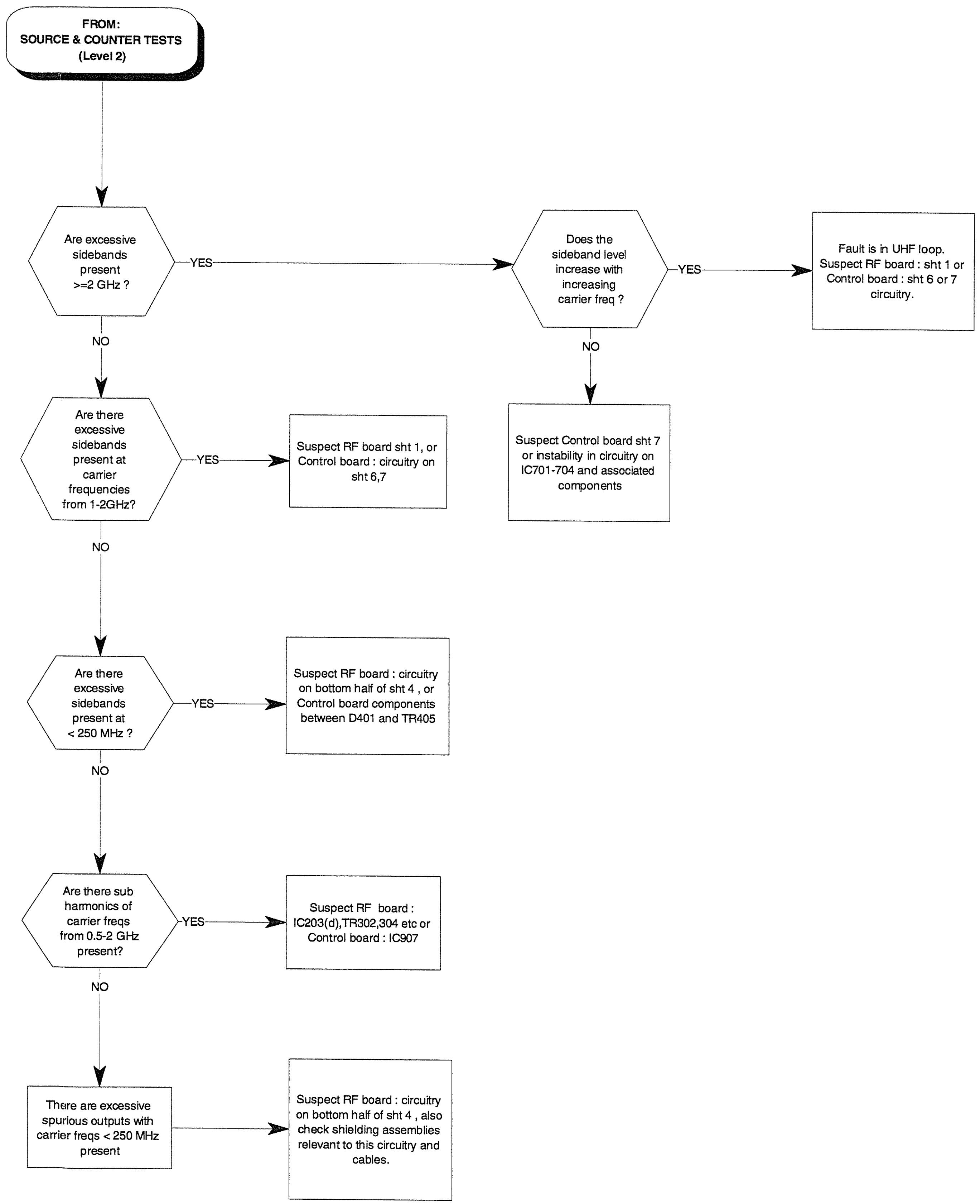
SEQUENCER TESTS
(Level 3)

SEQUENCER HELD TESTS
(Level 3)



SEQUENCER HELD TESTS
(Level 3)

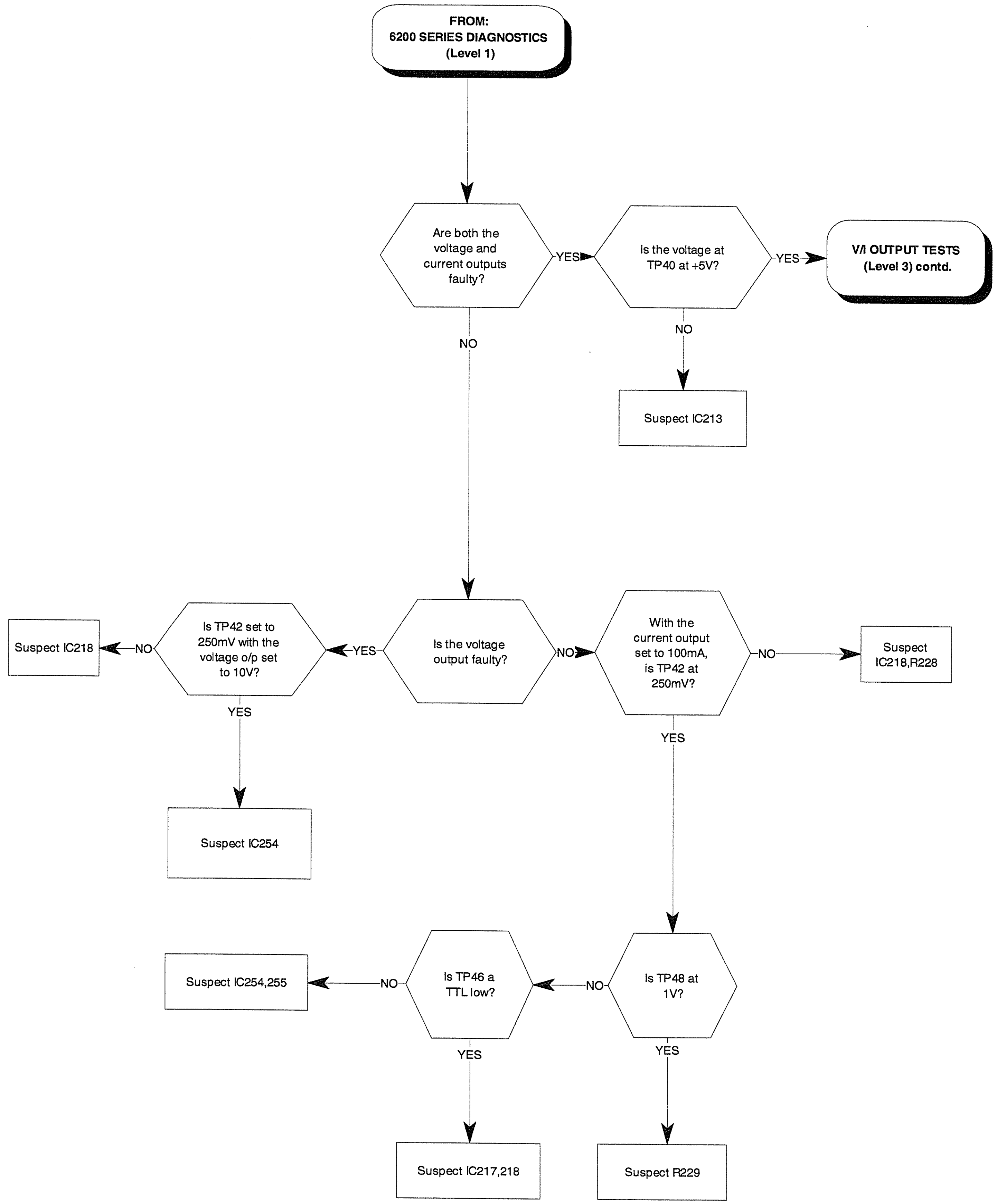
SPURIOUS OUTPUT TESTS (Level 3)



SPURIOUS OUTPUT TESTS
(Level 3)

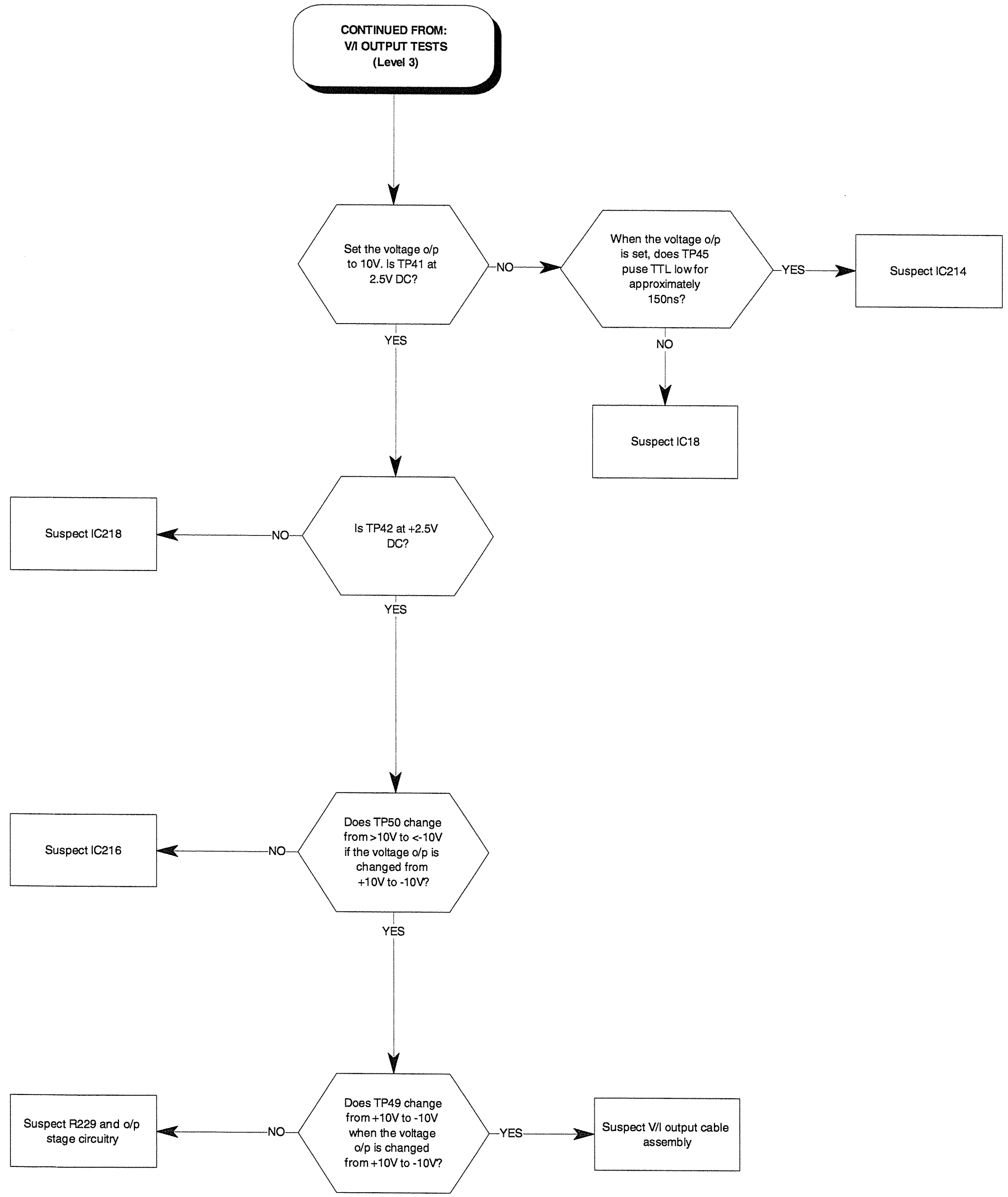
V/I OUTPUT TESTS (Level 3)

Note: Refer to Digital PCB (B6) and schematics



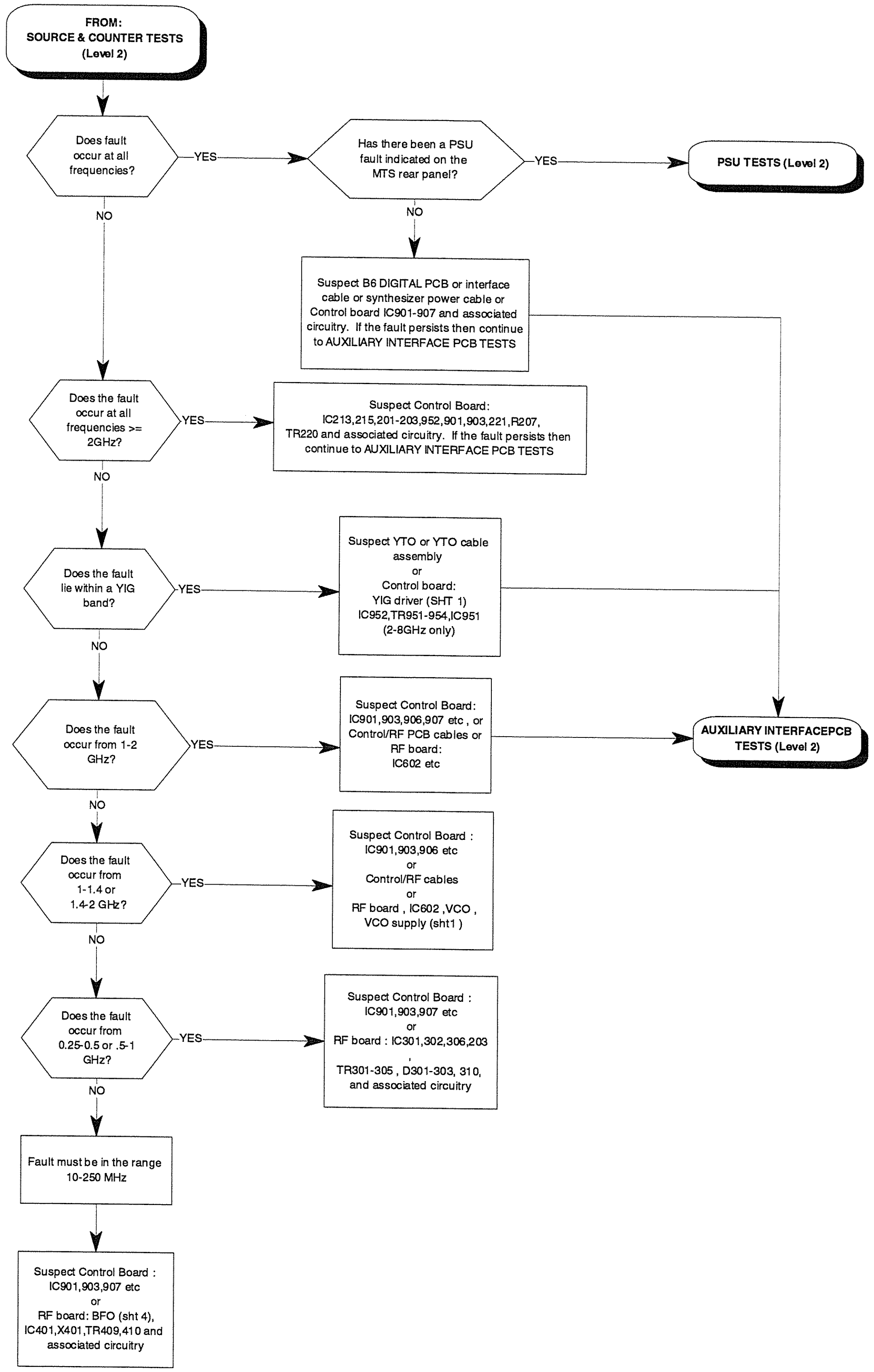
V/I OUTPUT TESTS
(Level 3)

V/I OUTPUT TESTS (Level 3) contd.



V/I OUTPUT TESTS
(Level 3) contd.

ZERO O/P POWER TESTS (Level 3)



ZERO O/P POWER TESTS
(Level 3)

Chapter 6
REPLACEABLE PARTS

CONTENTS

LIST OF FIGURES

INTRODUCTION

Each sub-assembly or printed circuit board (PCB) in this equipment has been allocated a reference designator code, e.g. A0, A1, A2 etc.

The complete component reference includes its reference designator as a prefix, e.g. A2C1 (capacitor C1 on sub-assembly A2, but, for convenience in the text and diagrams, the prefix is omitted unless it is needed to avoid confusion. However, when ordering replacements or in correspondence, the complete component reference should be quoted.

PARTS LISTS

The replaceable parts for the 6200B series Microwave Test Sets are arranged in the following order:

(a) A top level parts list showing parts common to all instruments in the series.

(b) Lists of the microwave parts used to make the different instruments (e.g. the 6203B microwave parts are used in addition to the common parts to produce the 6203B instrument).

(c) Lists of kits of parts providing the various options.

(d) Lists of components for the printed circuit boards.

Note...

Electrical components in the following parts lists, other than PCB components, can be identified by referring to the diagrams in Chapter 2. Mechanical parts are illustrated in Fig. 6-1.

COMPONENT VALUES

One or more of the components fitted in the equipment may differ from those listed in this chapter (see *Supply statement* below).

Components indicated by an * (or SIC) have their values selected during test to achieve particular performance limits.

When there is a difference between the component fitted and the one listed, always use as a replacement the same type and value of component as that found in the equipment.

COMPONENT SPARES AND ASSEMBLIES

Supply statement

(a) Marconi Instruments satisfy their material requirements by purchasing components from leading suppliers, who may manufacture in many countries. In most instances, components with different identities and slightly different specifications will be acceptable to us and will be identified under a single Marconi Instrument part number regardless of manufacturer.

The Marconi part number is the definitive reference. Service manuals and recommended service parts lists will give an example of one of the manufacturer's devices that meets our specification requirement.

We reserve the right to supply in manufactured equipment or for service spares any item that meets the requirements of our part number.

(b) It may be necessary (due for example to obsolescence) to supply an item with a different Marconi Instruments Ltd part number from that identified in our published documentation. Supply of such an alternative item is deemed to satisfy, in full, the requirements of any order or contract.

Marconi Instruments Ltd warrant that the devices supplied under our part numbers will function correctly when placed in the correctly identified circuit locations for such devices in the relevant product.

ORDERING

When ordering replacements, address the order to our Service Division (address at rear of manual) or nearest agent and specify the following for each component required:-

- Type and serial number of equipment, as given on the serial number label at the rear of the equipment. If this is superseded by a model number label, quote the model number instead of the type number.
- Complete circuit reference.
- Description.
- Part number.

ELECTRICAL COMPONENTS

6200B Series Common Parts

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	23448/899	RF CABLE ASSY, A14 PLB TO POWER REF O/P	ROSENBERGER GERMANY	L02-185-95
	43138/535	CABLE ASSY - A5 PLA TO INPUT A, A5 PLB TO INPUT B, A5 PLC TO INPUT C	MARCONI INSTRUMENTS LTD.	
	43137/890	CABLE ASSY - A5 PLE TO AUX INPUT	MARCONI INSTRUMENTS LTD.	
	43137/891	CABLE ASSY - A5 PLH TO EXT MON	MARCONI INSTRUMENTS LTD.	
	43137/892	CABLE ASSY - A5 PLK TO A3 PLD, A5 PLF TO A3 PLE	MARCONI INSTRUMENTS LTD.	
	43138/530	CABLE ASSY - A5 PLJ TO B12 PLD	MARCONI INSTRUMENTS LTD.	
	43137/900	CABLE ASSY - A3 TO B12 PLC	MARCONI INSTRUMENTS LTD.	
	43138/653	CABLE ASSY - A3 TO A14 PLC	MARCONI INSTRUMENTS LTD.	
	43137/895	CABLE ASSY - A5 PLL TO AUX DATA	MARCONI INSTRUMENTS LTD.	
	43137/896	CABLE ASSY - ROT CNTRL TO A9 PLA	MARCONI INSTRUMENTS LTD.	
	43137/897	CABLE ASSY - B6 PLC TO GPIB	MARCONI INSTRUMENTS LTD.	
	43137/898	CABLE ASSY - B6 PLD TO PRINTER	MARCONI INSTRUMENTS LTD.	
	43137/900	CABLE ASSY - B6 PLK TO BATTERY	MARCONI INSTRUMENTS LTD.	
	43137/901	CABLE ASSY - B6 PLG TO B1 (not fitted for Option 003)	MARCONI INSTRUMENTS LTD	
	43137/906	CABLE ASSY - B6 PLL TO V/I O/P	MARCONI INSTRUMENTS LTD.	
	43137/908	CABLE ASSY - B6 PLE TO A8 PLA	MARCONI INSTRUMENTS LTD.	
	43137/909	CABLE ASSY - A3 PLB TO A11, A8	MARCONI INSTRUMENTS LTD.	
	43137/911	CABLE ASSY - A8 PLH TO FREQ STD INPUT/OUTPUT, EXT LEVEL INPUT	MARCONI INSTRUMENTS LTD.	
	43137/932	CABLE ASSY - A5 PLG TO A3 PLC	MARCONI INSTRUMENTS LTD.	
	43137/936	CABLE ASSY - A5 PLD TO INPUT D	MARCONI INSTRUMENTS LTD.	
	43137/907	CABLE ASSY, A13 PLD TO SP2T	MARCONI INSTRUMENTS LTD.	
	43137/920	CABLE ASSY, A13 PLC TO SP4T(SP5T) (6200/6201/6203/6204).	MARCONI INSTRUMENTS LTD.	
	43137/920	CABLE ASSY, A13 TO PICKOFF/SWITCH ASSY (6202B).	MARCONI INSTRUMENTS LTD.	
	43137/910	CABLE ASSY, A8 PLG TO PICK-MOD & DETECTOR (6200/6201/6203).	MARCONI INSTRUMENTS LTD.	
	43137/910	CABLE ASSY, A8 PLG TO MODULATOR & 46 GHz DETECTOR (6204).	MARCONI INSTRUMENTS LTD.	
	23435/670	CABLE ASSY, B12 PLA TO LCD	SUMITOMO ELECTRIC	
	43138/534	CABLE ASSY, B12 PLB TO LCD	MARCONI INSTRUMENTS LTD.	
	43138/532	CABLE ASSY, B12 PLE TO F/PANEL	MARCONI INSTRUMENTS LTD.	
	43138/382	CABLE ASSY - A3 PLG TO AUX POWER	MARCONI INSTRUMENTS LTD.	
	43138/381	CABLE ASSY - A4 PLA TO SUPPLY SW	MARCONI INSTRUMENTS LTD.	
	43138/380	CABLE ASSY - A3 PLH TO +15V REG, A3 PLL TO 12V REG	MARCONI INSTRUMENTS LTD.	
	43138/651	CABLE ASSY - AR2/1 TO A11 PLC, PLE	MARCONI INSTRUMENTS LTD	
	43138/652	CABLE ASSY - AR2/1 TO A8, PLX	MARCONI INSTRUMENTS LTD	
	43138/658	CABLE ASSY - B9 PLD TO A14 PLA	MARCONI INSTRUMENTS LTD	
	43129/779	CABLE ASSY - A13 PLG TO A16 (6200/6201/6202/6203)	MARCONI INSTRUMENTS LTD	

REPLACEABLE PARTS

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
		6200B Series Common Parts (contd.)		
	43138/703	CABLE ASSY - A13 PLG TO A16 (6204)	MARCONI INSTRUMENTS LTD	
	28624/313	LCD UNIT (includes Inverter PCB)	NEC ELECTRONICS LTD	NL 6448AC20-02 ✓
	44830/095	B1, MEMORY CARD PCB	MARCONI INSTRUMENTS LTD.	
	44829/780	A2, RF PCB	MARCONI INSTRUMENTS LTD.	
	44829/982	A3, PSU SECONDARY PCB	MARCONI INSTRUMENTS LTD.	
	44829/983	A4, PSU INPUT PCB	MARCONI INSTRUMENTS LTD.	
	44829/996	A5, ANALOGUE PCB	MARCONI INSTRUMENTS LTD.	
	44830/008	B6, DIGITAL PCB	MARCONI INSTRUMENTS LTD.	
	44830/115	A8/1 CONTROL PCB	MARCONI INSTRUMENTS LTD	
	44829/949	A8, CONTROL PCB (earlier instruments)	MARCONI INSTRUMENTS LTD.	
	44830/034	B9, KEYBOARD PCB	MARCONI INSTRUMENTS LTD.	
	44829/866	A10, TIMEBASE PCB	MARCONI INSTRUMENTS LTD.	
	44829/913	A11, SYNTH POWER SUPPLY FILTER PCB	MARCONI INSTRUMENTS LTD.	
	44830/093	B12, LCD INTERFACE PCB	MARCONI INSTRUMENTS LTD.	
	44830/096	A13 AUXILIARY INTERFACE PCB	MARCONI INSTRUMENTS LTD	
	44830/047	A14 DYNAMIC CALIBRATOR PCB	MARCONI INSTRUMENTS LTD	
	44830/068	A16 KEYBOARD CONNECTOR PCB	MARCONI INSTRUMENTS LTD	
	44829/958	AR2/1 FREQUENCY STANDARD PCB	MARCONI INSTRUMENTS LTD	
	23411/061	FUSE, TIME LAG, 2.5A (2 OFF)	LITTELFUSE TRACOR	21302.5
	23411/063	FUSE, TIME LAG, 4A (2 OFF)	LITTELFUSE TRACOR	213004
	23416/192	FUSE HOLDER (2 OFF)	SCHURTER SWITZERLAND	FEB-0031-1401
	23423/159	MAINS CONNECTOR	CLIFF ELECTRONIC LTD	MS-1-S
	23443/442	CONN, FREQ STD INPUT/OUTPUT	GREENPAR (DUBILIER)	B35M53H999X02
	23443/449	CONN, EXT LEVEL I/P, V/I OUTPUT	AMPHENOL LTD	31-10
	44991/047	CONN FOR INPUT A TO D & AUX I/P	MARCONI INSTRUMENTS LTD.	
	23462/354	SUPPLY SWITCH	LORLIN ELECTRONICS	RMS-1127
	23467/260	ROTARY CONTROL	BOURNS ELECTRONICS	ENA1J-B20-L00064
	23535/135	FAN	SANYO DENKI (JAPAN)	109P-1224H-4021
	23642/926	MAINS FILTER	CORCOM	6EQ1
	23711/106	LITHIUM BATTERY, 3.5V	SAFT (UK) LTD	LS6 AA (STD.CONTACT)
	23711/194	BATTERY HOLDER	A.F. BULGIN & CO PLC	BX0011/1
	26373/609	CAPACITOR FIXED CERAMIC 500 pF +/-25% 500V , K1200, FEEDTHROUGH CAP (SYNTH TRAY)	MIDLAND CAPACITORS	361/K1200-500pF
	26386/987	CAPACITOR FIXED CERAMIC 10 nF +/-10% 50V X7R, (ext level input & voltage/current output connectors)	PHILIPS	C41C103K-DRM
	28461/722	VOLTAGE REG FOR PSU (2 OFF)	MOTOROLA INC.	LM350K

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

6200B Series Common Parts (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	25123/080	RESISTOR-FIXED WIREWOUND, 1K +/-5% 1.5W 100V	MEGGITT ELECTRONICS	74EV-IK0-J
	28383/968	DIODE TRANSIENT SUPPRESSOR, P6KE24C 5W 24V10% BI-DIRECTIONAL, (BATTERY HOLDER CONNECTION)	MOTOROLA INC	P6KE24C

6200B Instrument (20 GHz) Microwave Parts

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	43137/841	RF CABLE S/R,COUPLER TO PICK-MOD (NOT FITTED FOR STEP ATTENUATOR OPTION)	MARCONI INSTRUMENTS LTD.	
	43137/844	RF CABLE S/R - SP2T TO SAMPLER	MARCONI INSTRUMENTS LTD.	
	43138/327	RF CABLE S/R - SYNTH TO SP4T(SP5T).	MARCONI INSTRUMENTS LTD.	
	43137/846	RF CABLE S/R,SP2T TO COUNTER (NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	43137/917	CABLE ASSY - OSC 3 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	43137/918	CABLE ASSY - OSC 2 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	43137/919	CABLE ASSY - OSC 1 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	44990/951	20 GHz LP FILTER	MARCONI INSTRUMENTS LTD.	
	44991/006	RF OUTPUT CONNECTOR (NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	44991/023	COUNTER CONNECTOR NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	44991/030	12 GHz LP FILTER	MARCONI INSTRUMENTS LTD.	
	44991/033	PICK-MOD ASSY	MARCONI INSTRUMENTS LTD.	
	44991/043	SP4T PIN SWITCH	MARCONI INSTRUMENTS LTD.	
	44991/045	20 GHz DETECTOR	MARCONI INSTRUMENTS LTD.	
	44991/066	20 GHz SAMPLER UNIT	MARCONI INSTRUMENTS LTD.	
	28313/850	2-8 GHz YTO (OSC 1).	WATKINS-JOHNSON INC.	WJ-6720-39F
	28313/851	8-12.4 GHz YTO (OSC 2)	WATKINS-JOHNSON INC.	WJ-6804-39F
	28313/852	12-20 GHz YTO (OSC 3)	WATKINS-JOHNSON INC.	WJ-6805-39F
	44991/029	26.5 GHz DIRECTIONAL COUPLER	MARCONI INSTRUMENTS LTD.	
	44991/031	SP2T PIN SWITCH	MARCONI INSTRUMENTS LTD.	

6201B Instrument (8 GHz) Microwave Parts

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	43137/841	RF CABLE S/R, COUPLER TO PICK-MOD (NOT FITTTED FOR STEP ATTENUATOR OPTION)	MARCONI INSTRUMENTS LTD.	
	43137/846	RF CABLE S/R, SP2T TO COUNTER (NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	43137/844	RF CABLE S/R - SP2T TO SAMPLER	MARCONI INSTRUMENTS LTD.	
	43138/327	RF CABLE S/R - SYNTH TO SP4T (SP5T).	MARCONI INSTRUMENTS LTD.	
	43137/919	CABLE ASSY - OSC 1 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	44991/006	RF OUTPUT CONNECTOR (NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	44991/023	COUNTER CONNECTOR (NOT FITTED FOR OPTION 002).	MARCONI INSTRUMENTS LTD.	
	44991/033	PICK-MOD ASSY	MARCONI INSTRUMENTS LTD.	
	44991/043	SP4T PIN SWITCH	MARCONI INSTRUMENTS LTD.	

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

6201B Instrument (8 GHz) Microwave Parts (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44991/045	20 GHz DETECTOR	MARCONI INSTRUMENTS LTD.	
	44991/066	20 GHz SAMPLER UNIT	MARCONI INSTRUMENTS LTD.	
	44991/029	26.5 GHz DIRECTIONAL COUPLER	MARCONI INSTRUMENTS LTD.	
	44991/031	SP2T PIN SWITCH	MARCONI INSTRUMENTS LTD.	
	28313/850	2-8 GHz YTO (OSC 1).	WATKINS-JOHNSON INC.	WJ-6720-39F

6202B Instrument (2 GHz) Microwave Parts

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	43138/637	RF CABLE S/R - PICKOFF/SWITCH TO COUNTER (NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	43138/635	RF CABLE S/R - PICKOFF/SWITCH TO RF OUTPUT (NOT FITTED FOR STEP ATTENUATOR OPTION)	MARCONI INSTRUMENTS LTD.	
	43138/638	RF CABLE S/R - PICKOFF/SWITCH TO SAMPLER	MARCONI INSTRUMENTS LTD.	
	43138/640	RF CABLE S/R - PICKOFF/SWITCH TO A8, PLG	MARCONI INSTRUMENTS LTD.	
	44991/006	RF OUTPUT CONNECTOR (NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	44991/023	COUNTER CONNECTOR (NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	44991/184	PICKOFF/SWITCH ASSY (INC. CONTROL CABLE)	MARCONI INSTRUMENTS LTD.	
	44991/066	20 GHz SAMPLER UNIT	MARCONI INSTRUMENTS LTD.	

6203B Instrument (26.5 GHz) Microwave Parts

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	43137/841	RF CABLE S/R, COUPLER TO PICK-MOD (NOT FITTED FOR STEP ATTENUATOR OPITOIN)	MARCONI INSTRUMENTS LTD.	
	43137/846	RF CABLE S/R, SP2T TO COUNTER (NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	43137/844	RF CABLE S/R - SP2T TO SAMPLER	MARCONI INSTRUMENTS LTD.	
	43138/327	RF CABLE S/R - SYNTH TO SP4T (SP5T).	MARCONI INSTRUMENTS LTD.	
	43137/905	CABLE ASSY - OSC 4 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	43137/917	CABLE ASSY - OSC 3 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	43137/918	CABLE ASSY - OSC 2 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	43137/919	CABLE ASSY - OSC 1 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	44990/951	20 GHz LP FILTER	MARCONI INSTRUMENTS LTD.	
	44991/022	RF OUTPUT CONNECTOR (NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	44991/028	COUNTER CONNECTOR (NOT FITTED FOR OPTION 002)	MARCONI INSTRUMENTS LTD.	
	44991/030	12 GHz LP FILTER	MARCONI INSTRUMENTS LTD.	
	44991/032	SP5T PIN SWITCH	MARCONI INSTRUMENTS LTD.	
	44991/033	PICK-MOD ASSY	MARCONI INSTRUMENTS LTD.	
	44991/040	26.5 GHz DETECTOR	MARCONI INSTRUMENTS LTD.	
	44991/067	26.5 GHz SAMPLER UNIT	MARCONI INSTRUMENTS LTD.	
	28313/850	2-8 GHz YTO (OSC 1).	WATKINS-JOHNSON INC.	WJ-6720-39F
	28313/851	8-12.4 GHz YTO (OSC 2)	WATKINS-JOHNSON INC.	WJ-6804-39F
	28313/852	12-20 GHz YTO (OSC 3)	WATKINS-JOHNSON INC.	WJ-6805-39F

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

6203B Instrument (26.5 GHz) Microwave Parts (contd)

	28313/853	20-26.5 GHz YTO (OSC 4)	WATKINS-JOHNSON INC.	WJ-6840-101F
	44991/029	26.5 GHz DIRECTIONAL COUPLER	MARCONI INSTRUMENTS LTD.	
	44991/031	SP2T PIN SWITCH	MARCONI INSTRUMENTS LTD.	

6204B Instrument (46 GHz) Microwave Parts

	43138/265	RF CABLE S/R - DPDT TO COUPLER (Not fitted for Step Attenuator Option)	MARCONI INSTRUMENTS LTD.	
	43138/272	RF CABLE S/R - SP2T TO SAMPLER	MARCONI INSTRUMENTS LTD.	
	43138/273	RF CABLE S/R - SYNTH TO PICK OFF	MARCONI INSTRUMENTS LTD.	
	43138/274	RF CABLE S/R-SP2T TO COUNTER I/P	MARCONI INSTRUMENTS LTD.	
	43138/275	RF CABLE S/R - AMP TO LP FILTER	MARCONI INSTRUMENTS LTD.	
	43138/276	RF CABLE S/R - LP FILTER TO DOUBLER	MARCONI INSTRUMENTS LTD.	
	43138/288	CABLE ASSY - OSC 4 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	43138/289	CABLE ASSY - OSC 3 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	43138/290	CABLE ASSY - OSC 2 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	43138/291	CABLE ASSY - OSC 1 TO SYNTH	MARCONI INSTRUMENTS LTD.	
	43138/297	RF CABLE - SYNTH TO PICK-OFF	MARCONI INSTRUMENTS LTD.	
	43138/298	CABLE ASSY, DPDT PIN SWITCH TO A7 PLE	MARCONI INSTRUMENTS LTD.	
	43138/299	CABLE ASSY - AMP TO A7 PLF	MARCONI INSTRUMENTS LTD.	
	44990/951	20 GHz LP FILTER	MARCONI INSTRUMENTS LTD.	
	44991/028	COUNTER CONN	MARCONI INSTRUMENTS LTD.	
	44991/030	12 GHz LP FILTER	MARCONI INSTRUMENTS LTD.	
	44991/032	SP5T PIN SWITCH	MARCONI INSTRUMENTS LTD.	
	44991/042	RF OUTPUT CONN ✓	MARCONI INSTRUMENTS LTD.	
	44991/067	26.5 GHz SAMPLER UNIT	MARCONI INSTRUMENTS LTD.	
	44991/107	2GHz PICK-OFF	MARCONI INSTRUMENTS LTD.	
	44991/108	DPDT PIN SWITCH	MARCONI INSTRUMENTS LTD.	
	44991/110	MODULATOR	MARCONI INSTRUMENTS LTD.	
	44991/111	46 GHz DETECTOR	MARCONI INSTRUMENTS LTD.	
	23451/008	2-46 GHz COUPLER	MERRIMAC	CWK-16R-21G/69470
	23451/009	23 GHz DOUBLER	SPACEK LABS INC	2646-2X-FK
	23642/928	0.01-23 GHz LP FILTER	ROSENBERGER GERMANY	02FK 230 S00
	28313/850	2-8 GHz YTO (OSC 1).	WATKINS-JOHNSON INC.	WJ-6720-39F
	28313/851	8-12.4 GHz YTO (OSC 2)	WATKINS-JOHNSON INC.	WJ-6804-39F
	28313/852	12-20 GHz YTO (OSC 3)	WATKINS-JOHNSON INC.	WJ-6805-39F
	28313/853	20-26.5 GHz YTO (OSC 4)	WATKINS-JOHNSON INC.	WJ-6840-101F
	28531/024	13-23 GHz AMPLIFIER	VERITECH	VMA S712
	44991/029	26.5 GHz DIRECTIONAL COUPLER	MARCONI INSTRUMENTS LTD.	
	44991/031	SP2T PIN SWITCH	MARCONI INSTRUMENTS LTD.	

Option 001, Step Attenuator for 6200B/6201B

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44429/065	ATTENUATOR, 0-70 dB IN 10 dB STEPS	MARCONI INSTRUMENTS LTD.	
	43137/926	CABLE ASSY, A13 PLB TO ATTENUATOR	MARCONI INSTRUMENTS LTD.	
	43137/929	RF CABLE S/R, PICK-MOD TO ATTENUATOR I/P.	MARCONI INSTRUMENTS LTD.	
	43137/930	RF CABLE S/R, ATTENUATOR O/P TO RF OUTPUT CONNECTOR	MARCONI INSTRUMENTS LTD.	

Option 001, Step Attenuator for 6202B

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44429/065	ATTENUATOR, 0-70 dB IN 10 dB STEPS	MARCONI INSTRUMENTS LTD.	
	43137/926	CABLE ASSY, A13 PLB TO ATTENUATOR	MARCONI INSTRUMENTS LTD.	
	43138/636	RF CABLE S/R, PICKOFF/SWITCH TO ATTENUATOR I/P.	MARCONI INSTRUMENTS LTD.	
	43137/930	RF CABLE S/R, ATTENUATOR O/P TO RF OUTPUT	MARCONI INSTRUMENTS LTD.	

Option 001, Step Attenuator for 6203B

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	23448/860	ATTENUATOR, 0-70 dB IN 10 dB STEPS (includes control cable)	LUCAS WEINSCHEL.	152-70-2
	43138/300	RF CABLE S/R, PICK-MOD TO ATTENUATOR I/P.	MARCONI INSTRUMENTS LTD.	
	43138/301	RF CABLE S/R, ATTENUATOR O/P TO RF OUTPUT CONNECTOR	MARCONI INSTRUMENTS LTD.	

Option 001, Step Attenuator for 6204B

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	23448/879	ATTENUATOR, 0-70 dB IN 10 dB STEPS	HEWLETT-PACKARD	33327L+ OPT 006 & 011
	43138/677	CABLE ASSY, A13 PLB TO ATTENUATOR	MARCONI INSTRUMENTS LTD.	
	43138/661	RF CABLE S/R, DPDT SWITCH TO COUPLER	MARCONI INSTRUMENTS LTD.	
	43138/662	RF CABLE S/R, COUPLER TO ATTENUATOR I/P	MARCONI INSTRUMENTS LTD.	

Option 002, Field Replaceable RF Connectors (6200B/6201B/6203B)

When this option is fitted, the following items replace the RF OUTPUT and COUNTER connectors and the RF cable assembly 43137/846, as listed in the microwave parts lists.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	23443/847	CONNECTOR-RF ADAPTOR 50 OHMS, TYPE 3.5mm MALE FLANGED, SPRING CONTACT TO CROWN PLANAR	LUCAS WEINSCHEL	5657
	23443/848	CONNECTOR-RF ADAPTOR 50 OHMS, TYPE 3.5mm FEMALE TO, SPRING CONTACT.	LUCAS WEINSCHEL	7005A-6
	23443/849	CONNECTOR-RF ADAPTOR 50 OHMS, TYPE N FEMALE TO, SPRING CONTACT.	LUCAS WEINSCHEL	7005A-3
	43138/098	RF CABLE, S/R, SP2T TO COUNTER CONNECTOR	MARCONI INSTRUMENTS LTD.	

This is the connector that is bolted to the inside of front panel that the adaptor mounts on to.

~~23443/847 connector RF adapter (2.92mm to [illegible] bolt)~~

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

Option 002, Field Replaceable RF Connectors (6202B)

When this option is fitted, the following items replace the RF OUTPUT and COUNTER connectors and the RF cable assembly 43138/637, as listed in the microwave parts lists.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	23443/847	CONNECTOR-RF ADAPTOR 50 OHMS, TYPE 3.5mm MALE FLANGED, SPRING CONTACT TO CROWN PLANAR	LUCAS WEINSCHEL	5657
	23443/848	CONNECTOR-RF ADAPTOR 50 OHMS, TYPE 3.5mm FEMALE TO, SPRING CONTACT.	LUCAS WEINSCHEL	7005A-6
	23443/849	CONNECTOR-RF ADAPTOR 50 OHMS, TYPE N FEMALE TO, SPRING CONTACT.	LUCAS WEINSCHEL	7005A-3
	43138/643	RF CABLE S/R, PICKOFF/SWITCH TO COUNTER	MARCONI INSTRUMENTS LTD.	

Option 003, Floppy Disk Drive

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	28541/064	3.5 in FLOPPY DISK DRIVE	TEAC	FD-04HF-2300
	43830/057	A15 FLOPPY DRIVE CONTROLLER PCB	MARCONI INSTRUMENTS LTD.	
	43138/645	CABLE-ASSY - A6 PLG TO A1 AND A15	MARCONI INSTRUMENTS LTD.	
	23436/130	CABLE ASSY - A15 TO FLOPPY DISK DRIVE	AXON CABLE.	

B1 Memory Card PCB

When ordering, prefix circuit reference with B1.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44830/095	Complete unit Issue: 001		
C1	26582/430	CAPACITOR FIXED POLYESTER 220nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	THOMSON COMPONENTS	BF024 D 0224 KDC
SKA	23436/714	CONNECTOR EDGE, SINGLE-SIDED, 38 WAY, 1.27mm PITCH, RH POLARIZED, PCB MOUNTING, CONTACTS GOLD	FUJISOKU ELECTRIC	BLISFSK

A2 RF PCB

When ordering, prefix circuit reference with A2.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44829/780	Complete unit Issue: 018		
C101	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-330-JAT-00-J
C102	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C103	26386/762	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-5K-220-JAW
C104	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-330-JAT-00-J
C105	26386/766	CAPACITOR-FIXED CERAMIC 15pF +/-5% 100V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-1K-150-JAW-TR
C106	26386/766	CAPACITOR-FIXED CERAMIC 15pF +/-5% 100V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-1K-150-JAW-TR
C108	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C109	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C110	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C111 to C117	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C118	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C119	26386/956	CAPACITOR-FIXED CERAMIC 12pF +/-5% 100V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-1K-120-JAW-TR
C120	26386/897	CAPACITOR-FIXED CERAMIC 4.7pF +/-0.1pF 50V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-5K4R7-BAW-TR
C122	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C125	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C127	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C130	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C131	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C132	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C133 to	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER,.SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C137 to C140	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-K-220-B
C203	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C204	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C205 to C208	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C209	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C210	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C211	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C212	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C213	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C214	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C216	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C224	26386/800	CAPACITOR-FIXED CERAMIC 1pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-1R0-DAT-00-J
C225	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C226	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C227 to C229	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C230	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C231	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C232	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C233	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C234 to C236	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C237 to C245	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C246 to C248	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C301 to C304	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C305 to C307	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C308	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C309	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C310	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C311	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C312	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C313 to C316	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C318	26343/757	CAPACITOR-FIXED CERAMIC 3.3pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-3R3-DAT-00-J
C319	26343/758	CAPACITOR-FIXED CERAMIC 3.9pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-3R9-DAT-00-J
C320	26386/808	CAPACITOR-FIXED CERAMIC 4.7pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-4R7-DAT-00-J
C321	26386/811	CAPACITOR-FIXED CERAMIC 8.2pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-8R2-DAT-00-J
C322	26386/808	CAPACITOR-FIXED CERAMIC 4.7pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-4R7-DAT-00-J
C323	26386/811	CAPACITOR-FIXED CERAMIC 8.2pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-8R2-DAT-00-J
C324	26343/758	CAPACITOR-FIXED CERAMIC 3.9pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-3R9-DAT-00-J
C325	26343/757	CAPACITOR-FIXED CERAMIC 3.3pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-3R3-DAT-00-J
C326	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-100-JAT-00-J
C327	26386/815	CAPACITOR-FIXED CERAMIC 18pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-180-JAT-00-J
C328	26386/815	CAPACITOR-FIXED CERAMIC 18pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-180-JAT-00-J
C329	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-100-JAT-00-J
C330 to C333	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C334	26386/804	CAPACITOR-FIXED CERAMIC 2.2pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-2R2-DAT-00-J
C335	26386/803	CAPACITOR-FIXED CERAMIC 1.8pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-1R8-DAT-00-J
C336	26343/756	CAPACITOR-FIXED CERAMIC 2.7pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-2R7-DAT-00-J
C337	26386/809	CAPACITOR-FIXED CERAMIC 5.6pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-5R6-DAT-00-J
C338	26386/809	CAPACITOR-FIXED CERAMIC 5.6pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-5R6-DAT-00-J
C339	26343/756	CAPACITOR-FIXED CERAMIC 2.7pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-2R7-DAT-00-J
C340	26386/804	CAPACITOR-FIXED CERAMIC 2.2pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-2R2-DAT-00-J
C341	26386/803	CAPACITOR-FIXED CERAMIC 1.8pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-1R8-DAT-00-J
C342	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C343	26343/757	CAPACITOR-FIXED CERAMIC 3.3pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-3R3-DAT-00-J
C345	26343/756	CAPACITOR-FIXED CERAMIC 2.7pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-2R7-DAT-00-J
C346	26343/757	CAPACITOR-FIXED CERAMIC 3.3pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-3R3-DAT-00-J
C347	26343/757	CAPACITOR-FIXED CERAMIC 3.3pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-3R3-DAT-00-J

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C348	26343/756	CAPACITOR-FIXED CERAMIC 2.7pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-2R7-DAT-00-J
C349	26343/757	CAPACITOR-FIXED CERAMIC 3.3pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-3R3-DAT-00-J
C351 to C362	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C363	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C364 to C366	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C368	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C369	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C401	26386/762	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-5K-220-JAW
C402	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C403	26386/975	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.1pF 50V 60 ppm/DEG.C, HIGH Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-5K-6R8-BAW-TR
C404	26386/766	CAPACITOR-FIXED CERAMIC 15pF +/-5% 100V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-1K-150-JAW-TR
C406	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C407	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C408	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C409	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C410 to C418	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C419	26386/871	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-472-KAT-00-J
C423	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C424	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C425	26343/753	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-6R8-DAT-00-J
C426	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C427	26343/753	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-6R8-DAT-00-J
C428	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C433	26343/753	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-6R8-DAT-00-J
C434	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C435	26343/753	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-6R8-DAT-00-J

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C436	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C438	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C439	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C440	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C441	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C442	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C443	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C444	26386/819	CAPACITOR-FIXED CERAMIC 39pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-390-JAT-00-J
C445	26386/819	CAPACITOR-FIXED CERAMIC 39pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-390-JAT-00-J
C446	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-K-220-B
C501	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C502	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-100-JAT-00-J
C503	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C504	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-100-JAT-00-J
C505	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C506	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C507	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C508	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-100-JAT-00-J
C601	26386/867	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-222-KAT-00-J
C602	26386/869	CAPACITOR-FIXED CERAMIC 3.3nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-332-KAT-00-J
C603	26386/865	CAPACITOR-FIXED CERAMIC 1.5nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-152-KAT-00-J
C604	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C605	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C606	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C607	26582/427	CAPACITOR-FIXED POLYESTER 470nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-447/065
C608	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C609	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C610	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C611	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C612	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C613	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C616 to C620	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C621	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C622	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C701	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C702	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C703	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C704	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C705	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C706	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C707	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C708	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C709 to C715	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
D101	28381/530	DIODE VARIABLE CAPACITNCE, BB215... 30V 20mA 2.2pF @ 28V, CAPAC RATIO 7.6 MIN, MARKING GREEN, SURFACE	PHILIPS	BB215
D102	28381/530	DIODE VARIABLE CAPACITNCE, BB215... 30V 20mA 2.2pF @ 28V, CAPAC RATIO 7.6 MIN, MARKING GREEN, SURFACE	PHILIPS	BB215
D103	28381/529	DIODE VARIABLE CAPACITNCE, BB811... 30V 20mA 11pF @ 28V, CAPAC RATIO 7.8 MIN, MARKING CODES ST/TP,	PHILIPS	BB811
D104	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D203 to D205	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D206 to D311	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D401	28381/530	DIODE VARIABLE CAPACITNCE, BB215... 30V 20mA 2.2pF @ 28V, CAPAC RATIO 7.6 MIN, MARKING GREEN, SURFACE	PHILIPS	BB215
D402	28372/215	DIODE ZENER, BZX84-C12... 350mW 12V 5% 250mA MARKING CODE Y2, SURFACE MOUNTED, SOT-23, (TAPED).	PHILIPS	BZX84-C12 (Y2)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
D501	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D601	28373/273	DIODE ZENER, BZX84-C22... 350mW 22V 5% 250mA MARKING CODE Y8, SURFACE MOUNTED, SOT-23, (TAPED).	PHILIPS	BZX84-C22
D602	28373/062	DIODE ZENER, BZX84-C20... 350mW 20V 5% 250mA MARKING CODE Y7, SURFACE MOUNTED, SOT-23, (TAPED).	PHILIPS	BZX84-C20
IC101 to IC105	28461/447	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0886... 7.8V 36mA GAIN 22.5dB @ 1.0GHz, 25dB BANDWIDTH DC -	HEWLETT-PACKARD	MSA-0886
IC202	28461/450	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0486... 5.25V 50mA GAIN 8dB @ 1.0GHz, 3dB BANDWIDTH DC - 3.2GHz,	HEWLETT-PACKARD	MSA-0486
IC203	28466/120	IC-DIGITAL OR-GATE 74HC32... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC32D
IC204 to IC206	28461/437	IC-ANALOGUE OPERATIONAL AMP 5534... 2 INPUT, SINGLE, 10V 16mA LOW NOISE, 10MHz, BIPOLAR, 8 PIN,	PHILIPS	NE5534D
IC301	28469/522	IC-DIGITAL DIVIDER SP4902... DIVIDE BY 2, 2.54GHz, PRESCALER, ECL, 8 PIN, DUAL-IN-LINE.	GEC PLESSEY SEMICOND	SP4902DPB
IC302	28469/521	IC-DIGITAL DIVIDER SP4904... DIVIDE BY 4, 2.54GHz, PRESCALER, ECL, 8 PIN, DUAL-IN-LINE.	GEC PLESSEY SEMICOND	SP4904DP
IC303	28461/456	IC-ANALOGUE MICROWAVE-AMPLIFIER INA-10386... 6V 45mA GAIN 26dB @ 1.5GHz, 3dB BANDWIDTH DC -	HEWLETT-PACKARD	INA-10386
IC304	28461/448	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0386... 5V 35mA GAIN 12dB @ 1.0GHz, 3dB BANDWIDTH DC -	HEWLETT-PACKARD	MSA-0386
IC305	28466/033	IC-DIGITAL AND-GATE 74AC08... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC08SC
IC306	28461/437	IC-ANALOGUE OPERATIONAL AMP 5534... 2 INPUT, SINGLE, 10V 16mA LOW NOISE, 10MHz, BIPOLAR, 8 PIN,	PHILIPS	NE5534D
IC401	28461/448	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0386... 5V 35mA GAIN 12dB @ 1.0GHz, 3dB BANDWIDTH DC -	HEWLETT-PACKARD	MSA-0386
IC501	28461/801	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-1105... 5.5V 60mA GAIN 10.5dB @ 1.0GHz, 3dB BANDWIDTH 50MHz -	HEWLETT-PACKARD	MSA-1105
IC502	28461/887	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0520... 12V 165mA GAIN 8.5dB @ 1.0GHz, 3dB BANDWIDTH 100MHz -	HEWLETT-PACKARD	MSA-0520
IC601	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC602	28461/874	IC-ANALOGUE SWITCH DG411... QUAD, 15V SPST, ON-RESISTANCE<35R, 4 x N/O @ LOGIC 1, TTL	SILICONIX LTD	DG411DY
IC603	28468/321	IC-DIGITAL FLIP-FLOP/MONOSTABLE 74HC123... DUAL, RETRIGGERABLE, tW = 0.45RC, WITH RESET,	PHILIPS	74HC123D
IC604	28466/241	IC-DIGITAL NOR-GATE 74HC02... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC02D
L103	44291/017	WOUND-PART INDUCTOR, BEAD-CORE, 7 TURNS, UNMOUNTED, VARNISHED.	AMETHYST DESIGNS LTD	AD5033
L110	44291/017	WOUND-PART INDUCTOR, BEAD-CORE, 7 TURNS, UNMOUNTED, VARNISHED.	AMETHYST DESIGNS LTD	AD5033
L203 to L208	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L301 to L307	23642/418	INDUCTOR-FIXED 0.1uH +/- 10% MOULDED-EPOXY, MINIATURE, 1.24A 0R08 MAX, 35 Q @ 25 MHz, 625 MHz	INTERCONNECTION PROD	550-3399-01-02-00

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
L321 to L323	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L402	23642/708	INDUCTOR-FIXED 0.01uH +/- 10% MOULDED-EPOXY, 450mA 0R13 MAX, 15 Q @ 100 MHz, 2.5K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-010-K
L403	44291/017	WOUND-PART INDUCTOR, BEAD-CORE, 7 TURNS, UNMOUNTED, VARNISHED.	AMETHYST DESIGNS LTD	AD5033
L405	23642/559	INDUCTOR-FIXED 47uH +/- 10% COATED-LACQUER, MINIATURE, 140mA 9R6 MAX, 55 Q @ 2.5 MHz, 15 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/014
L406 to L409	23642/043	INDUCTOR-FIXED 0.039uH +/- 10% MOULDED-EPOXY, 2.32A 0R033 MAX, 33 Q @ 50 MHz, 1.13K MHz SRF,	INTERCONNECTION PROD	551-5172-04-02
L410 to L413	23642/423	INDUCTOR-FIXED 10uH +/- 10% MOULDED-EPOXY, MINIATURE, 180mA 3R7 MAX, 55 Q @ 7.9 MHz, 46 MHz	INTERCONNECTION PROD	550-3399-25-02-00
L414	23642/559	INDUCTOR-FIXED 47uH +/- 10% COATED-LACQUER, MINIATURE, 140mA 9R6 MAX, 55 Q @ 2.5 MHz, 15 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/014
L501	23642/418	INDUCTOR-FIXED 0.1uH +/- 10% MOULDED-EPOXY, MINIATURE, 1.24A 0R08 MAX, 35 Q @ 25 MHz, 625 MHz	INTERCONNECTION PROD	550-3399-01-02-00
L502	23642/418	INDUCTOR-FIXED 0.1uH +/- 10% MOULDED-EPOXY, MINIATURE, 1.24A 0R08 MAX, 35 Q @ 25 MHz, 625 MHz	INTERCONNECTION PROD	550-3399-01-02-00
L601 to L604	23642/560	INDUCTOR-FIXED 68uH +/- 10% COATED-LACQUER, MINIATURE, 150mA 9R MAX, 55 Q @ 2.5 MHz, 10 MHz	MEGGITT ELECTRONICS	C12-406/8/27471/002
L605	23642/717	INDUCTOR-FIXED 2.2mH +/- 10% SCREENED, COATED-EPOXY, 50mA 33R8 MAX, 45 Q @ 0.25 MHz, 0.97	MEGGITT ELECTRONICS	C40S-406/8/27507/021
L606	23642/717	INDUCTOR-FIXED 2.2mH +/- 10% SCREENED, COATED-EPOXY, 50mA 33R8 MAX, 45 Q @ 0.25 MHz, 0.97	MEGGITT ELECTRONICS	C40S-406/8/27507/021
L701 to L711	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
R102	24321/787	RESISTOR-FIXED METAL-GLAZE 3K9 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K92-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3921-FT
R103	24321/775	RESISTOR-FIXED METAL-GLAZE 1K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1211-FT
R104	24321/759	RESISTOR-FIXED METAL-GLAZE 270R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-274R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2740-FT
R105	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R106	24321/736	RESISTOR-FIXED METAL-GLAZE 30R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-30R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-30R1-FT
R107	24321/736	RESISTOR-FIXED METAL-GLAZE 30R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-30R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-30R1-FT
R108	24321/735	RESISTOR-FIXED METAL-GLAZE 27R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-27R4-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-27R4-FT
R109	24338/004	RESISTOR-FIXED METAL-GLAZE 150R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-150R-5%-P4
R111	24321/787	RESISTOR-FIXED METAL-GLAZE 3K9 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K92-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3921-FT
R112	24321/775	RESISTOR-FIXED METAL-GLAZE 1K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1211-FT
R113	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R114	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R115	24321/735	RESISTOR-FIXED METAL-GLAZE 27R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-27R4-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-27R4-FT
R116	24321/735	RESISTOR-FIXED METAL-GLAZE 27R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-27R4-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-27R4-FT
R117	24321/738	RESISTOR-FIXED METAL-GLAZE 36R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-36R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-36R5-FT
R119	24338/004	RESISTOR-FIXED METAL-GLAZE 150R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-150R-5%-P4
R120	24321/785	RESISTOR-FIXED METAL-GLAZE 3K3 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K32-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3321-FT
R121	24321/785	RESISTOR-FIXED METAL-GLAZE 3K3 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K32-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3321-FT
R122	24321/769	RESISTOR-FIXED METAL-GLAZE 680R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-681R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6810-FT
R123	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R124	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R125	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R126	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R129	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R130	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R131	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R132	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R135	24338/006	RESISTOR-FIXED METAL-GLAZE 220R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-220R-5%-P4
R136	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R137	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R138	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R142	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R143	24321/739	RESISTOR-FIXED METAL-GLAZE 39R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-39R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-39R2-FT
R144	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R145	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R203	24338/005	RESISTOR-FIXED METAL-GLAZE 180R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-180R-5%-P4
R204	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R205	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R206	24764/701	RESISTOR-FIXED METAL-FILM 100R +/- 2% 400mW 200V 500ppm/DEG.C, LOW INDUCTANCE.	VISHAY COMPONENTS	SMA0204HF-50-100R-2%
R207	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R208	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R209	24338/004	RESISTOR-FIXED METAL-GLAZE 150R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-150R-5%-P4
R210	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R211	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R212	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R213	24331/997	RESISTOR-FIXED METAL-FILM 100R +/- 2% 400mW 200V 500ppm/DEG.C, LOW INDUCTANCE.	VISHAY COMPONENTS	SMA0204HF-50-100R-2%
R214	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R215	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R216	24338/002	RESISTOR-FIXED METAL-GLAZE 100R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-100R-5%-P4
R217	24321/767	RESISTOR-FIXED METAL-GLAZE 560R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-562R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5620-FT
R218	24321/785	RESISTOR-FIXED METAL-GLAZE 3K3 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K32-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3321-FT
R219	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R220	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R221	24764/704	RESISTOR-FIXED METAL-FILM 75R +/- 2% 400mW 200V 50ppm/DEG.C, LOW-INDUCTANCE.	VISHAY COMPONENTS	SMA0204HF-50-75R-2%
R222	24681/086	RESISTOR-FIXED METAL-GLAZE 8R2 +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CRCW-2512-8R2-J-RT2
R224	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R227	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R235 to R238	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R239	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R240	24811/101	RESISTOR-FIXED METAL-FILM 1R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1R-1%-50ppm
R241 to R243	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R247	24321/805	RESISTOR-FIXED METAL-GLAZE 22K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2212-FT
R248	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R249	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R250 to R253	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R254	24338/010	RESISTOR-FIXED METAL-GLAZE 470R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-470R-5%-P4
R255	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R256	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R257	24321/801	RESISTOR-FIXED METAL-GLAZE 15K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1502-FT
R258	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R259	24321/801	RESISTOR-FIXED METAL-GLAZE 15K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1502-FT
R260	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R261	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R262	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R263	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R264	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R265	24321/744	RESISTOR-FIXED METAL-GLAZE 62R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-61R9-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-61R9-FT
R266	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R301	24321/761	RESISTOR-FIXED METAL-GLAZE 330R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3320-FT
R302	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R303	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R304	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R305	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R306	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R307	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R308	24321/785	RESISTOR-FIXED METAL-GLAZE 3K3 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K32-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3321-FT
R309	24338/007	RESISTOR-FIXED METAL-GLAZE 270R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-270R-5%-P4
R310	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R311	24321/785	RESISTOR-FIXED METAL-GLAZE 3K3 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K32-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3321-FT
R312	24338/006	RESISTOR-FIXED METAL-GLAZE 220R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-220R-5%-P4

REPLACEABLE PARTS

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R313	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R314	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R315	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R316	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R317	24773/261	RESISTOR-FIXED METAL-FILM 330R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-330R-G-T-1
R318	24321/761	RESISTOR-FIXED METAL-GLAZE 330R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3320-FT
R319	24321/761	RESISTOR-FIXED METAL-GLAZE 330R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3320-FT
R320 to R325	24321/748	RESISTOR-FIXED METAL-GLAZE 91R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-90R9-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-90R9-FT
R326	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R327	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R328	24321/744	RESISTOR-FIXED METAL-GLAZE 62R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-61R9-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-61R9-FT
R329	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R330	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R331	24321/744	RESISTOR-FIXED METAL-GLAZE 62R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-61R9-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-61R9-FT
R332	24321/761	RESISTOR-FIXED METAL-GLAZE 330R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3320-FT
R333 to R335	24321/739	RESISTOR-FIXED METAL-GLAZE 39R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-39R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-39R2-FT
R336	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R337	24321/739	RESISTOR-FIXED METAL-GLAZE 39R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-39R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-39R2-FT
R338	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R401	24321/761	RESISTOR-FIXED METAL-GLAZE 330R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3320-FT
R402	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R403	24321/775	RESISTOR-FIXED METAL-GLAZE 1K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1211-FT
R404	24321/755	RESISTOR-FIXED METAL-GLAZE 180R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-182R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1820-FT
R405	24321/735	RESISTOR-FIXED METAL-GLAZE 27R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-27R4-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-27R4-FT
R406	24321/735	RESISTOR-FIXED METAL-GLAZE 27R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-27R4-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-27R4-FT
R407	24321/754	RESISTOR-FIXED METAL-GLAZE 160R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-162R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1620-FT

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R408	24321/740	RESISTOR-FIXED METAL-GLAZE 43R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-43R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-43R2-FT
R409	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R410	24338/008	RESISTOR-FIXED METAL-GLAZE 330R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-330R-5%-P4
R418	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R422	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R423	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R424	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R426	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R434	24338/004	RESISTOR-FIXED METAL-GLAZE 150R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-150R-5%-P4
R435	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R436	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R437	24321/729	RESISTOR-FIXED METAL-GLAZE 15R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-15R0-FT
R440	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R441	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R443	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R444	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R445	24338/004	RESISTOR-FIXED METAL-GLAZE 150R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-150R-5%-P4
R447	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R448	24321/729	RESISTOR-FIXED METAL-GLAZE 15R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-15R0-FT
R449	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R451	24321/729	RESISTOR-FIXED METAL-GLAZE 15R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-15R0-FT
R452	24321/729	RESISTOR-FIXED METAL-GLAZE 15R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-15R0-FT
R453	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R501	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R502	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R503	24338/005	RESISTOR-FIXED METAL-GLAZE 180R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-180R-5%-P4

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R504	24321/735	RESISTOR-FIXED METAL-GLAZE 27R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-27R4-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-27R4-FT
R505	24338/010	RESISTOR-FIXED METAL-GLAZE 470R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-470R-5%-P4
R506	24321/733	RESISTOR-FIXED METAL-GLAZE 22R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-22R1-FT
R507	24321/733	RESISTOR-FIXED METAL-GLAZE 22R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-22R1-FT
R508	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R509	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R511	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R601	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R602	24321/805	RESISTOR-FIXED METAL-GLAZE 22K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2212-FT
R603	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R604	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R605	24321/805	RESISTOR-FIXED METAL-GLAZE 22K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2212-FT
R606	24321/805	RESISTOR-FIXED METAL-GLAZE 22K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2212-FT
R607	24321/841	RESISTOR-FIXED METAL-GLAZE 1M +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1M00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1004-FT
R608	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R609	24321/833	RESISTOR-FIXED METAL-GLAZE 330K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3323-FT
R610	24811/227	RESISTOR-FIXED METAL-FILM 182K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-182K-1%50ppm
R611	24321/814	RESISTOR-FIXED METAL-GLAZE 51K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5112-FT
R612	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R613	24321/829	RESISTOR-FIXED METAL-GLAZE 220K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2213-FT
R614	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R615	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R616	24321/795	RESISTOR-FIXED METAL-GLAZE 8K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-8K25-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8251-FT
R617	24321/805	RESISTOR-FIXED METAL-GLAZE 22K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2212-FT
R618	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R619	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R620	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R621	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R702	24681/671	RESISTOR-NETWORK BUSSED, THICK-FILM, 10K 2% 1W 50V 100 ppm/DEG.C, 9 RESISTORS, LOW PROFILE, 10 PIN,	VISHAY COMPONENTS	LC0-001-1002G
R703	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R704	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
SKE	23421/081	CONNECTOR SINGLE-POLE, SOCKET, RIGHT ANGLED, PCB MOUNTING, HORIZONTAL STAKE TO BOARD, GOLD PLATED	BERG ELECTRONICS	75121-006
T301	43590/143	WOUND-PART TRANSFORMER, BEAD-CORE, 1.5:1.5 TURNS, TWISTED BIFILAR WOUND, UNMOUNTED, VARNISHED.	AMETHYST DESIGNS LTD	AD5159
T302	43590/143	WOUND-PART TRANSFORMER, BEAD-CORE, 1.5:1.5 TURNS, TWISTED BIFILAR WOUND, UNMOUNTED, VARNISHED.	AMETHYST DESIGNS LTD	AD5159
TR101	28487/824	TRANSISTOR NPN BIPOLAR BFQ67... 10V 7.5GHz 180mW 50mA 100hFE @ 15mA, MARKING CODE V2, SURFACE	PHILIPS	BFQ67
TR102	28487/824	TRANSISTOR NPN BIPOLAR BFQ67... 10V 7.5GHz 180mW 50mA 100hFE @ 15mA, MARKING CODE V2, SURFACE	PHILIPS	BFQ67
TR103	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR104	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR105	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR106	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR201	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR202	28457/867	TRANSISTOR NPN BIPOLAR 42086... 12V 6GHz 500mW 80mA 30hFE @ 35mA, 20dBm, SURFACE MOUNTED,	HEWLETT-PACKARD	AT-42086 Can use AT-42085 28487-807
TR203	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR204	28487/823	TRANSISTOR NPN BIPOLAR AT-64020... 20V 4.0GHz 200mA GAIN 10dB @ 2GHz, 28dBm O/P POWR, SURFACE	HEWLETT-PACKARD	AT-64020
TR205	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR206	28487/821	TRANSISTOR NPN BIPOLAR LTE21015R... 20V 2.1GHz 1.6W 450mA GAIN 8dB @ 2.1GHz, SURFACE MOUNTED,	PHILIPS	LTE21015R
TR208	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR213	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR301	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B

A2 RF PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
TR302	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR303	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR304	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR305	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR306	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR307	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR308	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR309	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR310	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR401	28487/809	TRANSISTOR NPN BIPOLAR BFR93A... 12V 5GHz 250mW 35mA MARKING CODE R2, SURFACE MOUNTED, SOT-23,	PHILIPS	BFR93A
TR408	28452/172	TRANSISTOR NPN BIPOLAR BFR96S... 15V 5GHz 700mW 100mA 25hFE @ 70mA, SURFACE MOUNTED, SOT-37.	PHILIPS	BFR96S
TR409	28435/241	TRANSISTOR PNP BIPOLAR BCX17... 45V 100MHz 425mW 500mA 100hFE MIN @ 100mA, MARKING CODE T1, SURFACE	PHILIPS	BCX17
TR410	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR412	28452/172	TRANSISTOR NPN BIPOLAR BFR96S... 15V 5GHz 700mW 100mA 25hFE @ 70mA, SURFACE MOUNTED, SOT-37.	PHILIPS	BFR96S
TR501	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR502	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR503	28487/819	TRANSISTOR PNP BIPOLAR BC869... 20V 60MHz 1W 1A 85-375hFE @ 0.5A, MARKING CODE CEC, SURFACE	PHILIPS	BC869
X401	28531/014	RF-MIXER DOUBLE-BALANCED, DIODE RING, TFM-5... 5-1500MHz, 1 dBm RF-1dB COMPRESS, 6.5 dB LOSS, 35	MINI-CIRCUITS	TFM-5

A3 PSU Secondary PCB

When ordering, prefix circuit reference with A3.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44829/982	Complete unit Issue: 003		
C1	26421/130	CAPACITOR-FIXED ALUMINIUM 1000uF +/-20% 35V ELECTROLYTIC, RADIAL, 7.5mm PWP, (LOOSE).	PHILIPS	2222-035-90006
C2	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C3 to C5	26383/134	CAPACITOR-FIXED CERAMIC 220pF +/-20% 400V D2000 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RIZ-221-M-AP-BF0-K
C6	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-310/015
C7	26421/123	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-U-101-B
C8	26421/123	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-U-101-B
C9	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C11	26421/130	CAPACITOR-FIXED ALUMINIUM 1000uF +/-20% 35V ELECTROLYTIC, RADIAL, 7.5mm PWP, (LOOSE).	PHILIPS	2222-035-90006
C12	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C15	26421/130	CAPACITOR-FIXED ALUMINIUM 1000uF +/-20% 35V ELECTROLYTIC, RADIAL, 7.5mm PWP, (LOOSE).	PHILIPS	2222-035-90006
C16	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C17	26421/130	CAPACITOR-FIXED ALUMINIUM 1000uF +/-20% 35V ELECTROLYTIC, RADIAL, 7.5mm PWP, (LOOSE).	PHILIPS	2222-035-90006
C18	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C19	26421/130	CAPACITOR-FIXED ALUMINIUM 1000uF +/-20% 35V ELECTROLYTIC, RADIAL, 7.5mm PWP, (LOOSE).	PHILIPS	2222-035-90006
C20	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C21	26422/326	CAPACITOR-FIXED ALUMINIUM 10000uF -10/+30% 10V ELECTROLYTIC, PCB PIN TERMINATION, 4 RADIAL PINS,	PHILIPS	2222-050-54103
C22	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C23	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C24	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C25	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C26	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C27	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C28	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C29	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C30	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C31	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C32	26421/116	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	PANASONIC INDUSTRIAL	ECE-A-1C-K-470-B
C33	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C34	26421/116	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	PANASONIC INDUSTRIAL	ECE-A-1C-K-470-B
C35	26343/437	CAPACITOR-FIXED CERAMIC 100pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-101-GAK-ACR-J
C36	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C37	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C40 to C45	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C46	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C47	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C48	26421/130	CAPACITOR-FIXED ALUMINIUM 1000uF +/-20% 35V ELECTROLYTIC, RADIAL, 7.5mm PWP, (LOOSE).	PHILIPS	2222-035-90006
D1 to D3	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D4 to D12	28356/019	DIODE RECTIFIER, BYV28-200... 200V 3.5A 30nS, AXIAL, SOD-64, (LOOSE).	PHILIPS	BYV28-200
D14	28355/165	DIODE RECTIFIER, SCHOTTKY, 20CTQ045... DUAL, 45V 16A COMMON CATHODE, PLASTIC PACKAGE, TO-220AB.	INTERNAT RECTIFIER	20CTQ045
D15	28383/994	DIODE TRANSIENT SUPPRESSR, ICT-5... 1.5KW 5V 200A 0.5 CYCLE FORWARD SURGE CURRENT, UNI-DIRECTIONAL,	GENERAL SEMICONDUCTR	1N5907
D16	28374/112	DIODE ZENER, BZX79-C30... 500mW 30V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C30
D17 to D21	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D26	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D27	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
IC1	28461/673	IC-ANALOGUE COMPARATOR LM339... QUAD, SINGLE SUPPLY, BIPOLAR, 14 PIN, SMALL-OUTLINE.	PHILIPS	LM339D
IC2	28468/312	IC-ANALOGUE TIMER NE556... DUAL, 16V ASTABLE & MONOSTABLE MODES, MONOLITHIC, 14 PIN,	PHILIPS	NE556N
IC3	28469/027	IC-DIGITAL INVERTER 74HCT14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-H/SPEED+TTL, 14	PHILIPS	74HCT14D

A3 PSU Secondary PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC4	28469/036	IC-DIGITAL BUFFER/LINE-DRIVER 7407... HEX, OPEN-COLLECTOR, NON-INVERTING, TTL, 14 PIN,	TEXAS INSTRUMENTS	SN7407D
IC5	28464/172	IC-DIGITAL COUNTER 74HCT393... 4 BIT, DUAL, BINARY RIPPLE, CMOS-H/SPEED+TTL, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HCT393D
IC6	28462/435	IC-DIGITAL LATCH 74LS279... QUAD, SET-RESET WITH EXTRA SET ON TWO ELEMENTS, TTL-SCHOTTKY-L/PWR, 16	NAT. SEMICONDUCTOR	DM74LS279M
IC7	28461/735	IC-ANALOGUE VOLTAGE-REGULATOR 7915... SINGLE, 15V 1A NEGATIVE, LINEAR, MONOLITHIC, 3 PIN, TO-220.	NAT. SEMICONDUCTOR	LM7915CT
L3 to L6	6310/063	WOUND-PART INDUCTOR, 250uH, RING-CORE, 40 TURNS, UNMOUNTED.	AMETHYST DESIGNS LTD	AD5019
L7	6310/065	WOUND-PART INDUCTOR, 900uH, RING-CORE, 80 TURNS, UNMOUNTED.	AMETHYST DESIGNS LTD	AD5020
L8	44291/038	WOUND-PART INDUCTOR, 35uH, RING-CORE, 15 TURNS, UNMOUNTED.	AMETHYST DESIGNS LTD	AD5230
LP22 to LP25	28624/151	LED RED, RIGHT-ANGLED, 5mm DIA, HLMP-3001... 2.2 Vf TYP, 35 mA If MAX, 3 mcd @ 10mA - PCB MOUNTED.	HEWLETT-PACKARD	HLMP-3001 OPTION 010
PLA	23436/780	CONNECTOR MULTIWAY, PCB HEADER, 16 WAY, STRAIGHT, 2-ROW, 2.54mm GRID, SOLDER PIN TERMS, SIDE	FUJITSU LTD	FCN-744PO16-AU/R
R1	24753/431	RESISTOR-FIXED METAL-FILM 100R +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-100R-D-T-2
R2	24723/414	RESISTOR-FIXED METAL-FILM 1K1 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K1-B-T-10
R3	24573/057	RESISTOR-FIXED METAL-OXIDE 220R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-220R-2%
R4	24573/057	RESISTOR-FIXED METAL-OXIDE 220R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-220R-2%
R5	24573/059	RESISTOR-FIXED METAL-OXIDE 270R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-270R-2%
R6	24573/025	RESISTOR-FIXED METAL-OXIDE 10R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-10R-2%
R9 to R12	24573/079	RESISTOR-FIXED METAL-OXIDE 1K8 +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-1K8-2%
R13	24573/081	RESISTOR-FIXED METAL-OXIDE 2K2 +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-2K2-2%
R14	25123/037	RESISTOR-FIXED WIREWOUND 47R +/- 5% 1.5W 100V 200 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	W21-47R-5%
R15	25685/249	THERMISTOR NEGATIVE-TC BEAD, 10mm 100K @ 25 DEG.C, 4.3 %/DEG.C +/- 1 DEG.C FROM 20-90 DEG.C, 45mm LNG	VISHAY COMPONENTS	A3034
R16	24753/431	RESISTOR-FIXED METAL-FILM 100R +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-100R-D-T-2
R17	24753/431	RESISTOR-FIXED METAL-FILM 100R +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-100R-D-T-2
R18	24811/190	RESISTOR-FIXED METAL-FILM 5K11 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-5K11-1%50ppm
R19	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm

A3 PSU Secondary PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R20	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R21	24811/179	RESISTOR-FIXED METAL-FILM 1K82 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-1K82-1%50ppm
R22	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R23	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R24	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R25	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R26	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R27	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R28	24811/159	RESISTOR-FIXED METAL-FILM 274R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-274R-1%50ppm
R29	24753/390	RESISTOR-FIXED METAL-FILM 1K91 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K91-D-T-2
R30	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R31	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R32	24811/166	RESISTOR-FIXED METAL-FILM 511R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-511R-1%50ppm
R33	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R34	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R35 to R37	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R38	24811/203	RESISTOR-FIXED METAL-FILM 18K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-18K2-1%50ppm
R39	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R40	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R41	24811/195	RESISTOR-FIXED METAL-FILM 8K25 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-8K25-1%50ppm
R42	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R44 to R47	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R48	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R49 to R51	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R52	24811/159	RESISTOR-FIXED METAL-FILM 274R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-274R-1%50ppm
R53	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A3 PSU Secondary PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R54	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
T1	44991/119	WOUND-PART TRANSFORMER, HF POWER SMPS, E-CORE, 27:7+7:6+6:9+9:2+2 TURNS, WITH SCREENS, 4-WAY		
TR1	28435/227	TRANSISTOR PNP BIPOLAR BC307A,B... 45V 130MHz 200mW 100mA 180hFE @ 2mA, TO-92, (LOOSE).	NAT. SEMICONDUCTOR	BC307A OR B
TR2	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B

A4 PSU Input PCB

When ordering, prefix circuit reference with A4.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44829/983	Complete unit Issue: 001		
C5	26422/306	CAPACITOR-FIXED ALUMINIUM 470uF -10/+30% 250V ELECTROLYTIC, PCB PIN TERMINATION, 5 RADIAL PINS,	PHILIPS	2222-052-43471
C6	26422/306	CAPACITOR-FIXED ALUMINIUM 470uF -10/+30% 250V ELECTROLYTIC, PCB PIN TERMINATION, 5 RADIAL PINS,	PHILIPS	2222-052-43471
C7	26582/226	CAPACITOR-FIXED POLYESTER 220nF +/-10% 100V 250 ppm/DEG.C, RADIAL, 10.2mm PWP, (LOOSE).	VISHAY COMPONENTS	MKT-1822-422/015
C8	26582/491	CAPACITOR-FIXED POLYPROPYLENE 470pF +/-10% 630V AXIAL, (TAPED).	SUFLEX LTD	SUF-820/470p-10%-630
C9	26582/491	CAPACITOR-FIXED POLYPROPYLENE 470pF +/-10% 630V AXIAL, (TAPED).	SUFLEX LTD	SUF-820/470p-10%-630
C10	26582/433	CAPACITOR-FIXED POLYESTER 2.2uF +/-20% 250V AXIAL, AC RATED 4A RMS FOR 20 - 60KHz, (LOOSE).	INDUST CAPAC WREXHAM	TW 2u2 M 250V
C11	26421/130	CAPACITOR-FIXED ALUMINIUM 1000uF +/-20% 35V ELECTROLYTIC, RADIAL, 7.5mm PWP, (LOOSE).	PHILIPS	2222-035-90006
C12	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C14	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C15	26343/432	CAPACITOR-FIXED CERAMIC 150pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	RPO-151-GAK-ACR-J
C16	26538/904	CAPACITOR-FIXED POLYSTYRENE 1.2nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	SUFLEX LTD	SUF-710/1.2nF-1%-63V
C17	26421/011	CAPACITOR-FIXED ALUMINIUM 4.7uF +/-20% 50V ELECTROLYTIC, RADIAL, 2.5mm PWP, LOW LEAKAGE,	PANASONIC INDUSTRIAL	ECE-A-50-M-4R7
C18	26538/918	CAPACITOR-FIXED POLYSTYRENE 4.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	SUFLEX LTD	SUF-710/4.7nF-1%-63V
C19	26538/918	CAPACITOR-FIXED POLYSTYRENE 4.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	SUFLEX LTD	SUF-710/4.7nF-1%-63V
C20	26582/226	CAPACITOR-FIXED POLYESTER 220nF +/-10% 100V 250 ppm/DEG.C, RADIAL, 10.2mm PWP, (LOOSE).	VISHAY COMPONENTS	MKT-1822-422/015
C21	26582/438	CAPACITOR-FIXED POLYESTER 330nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-433/065
D1	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D3	28359/199	DIODE RECTIFIER, KBPC608... BRIDGE, 800V 8A 1Vf @ 8A, ENCAPSULATED, 16mm SQUARE.	GENERAL INSTRUMENT	KBPC608
D4	28383/989	DIODE TRANSIENT SUPPRESSR, 1.5KE220A... 185V CLAMPING VOLTAGE 328V MAX @ 4.6A, AXIAL, CASE-1,	SGS-THOMSON	1.5KE220A
D5	28383/989	DIODE TRANSIENT SUPPRESSR, 1.5KE220A... 185V CLAMPING VOLTAGE 328V MAX @ 4.6A, AXIAL, CASE-1,	SGS-THOMSON	1.5KE220A
D6 to D9	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D10	28359/189	DIODE RECTIFIER, 2KBB20R... BRIDGE, 200V 1.9A 80Vrms @ 1.9A, LEADS ON 5mm PITCH, ENCAPSULATED,	INTERNAT RECTIFIER	2KBB20R
D11	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A4 PSU Input PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
D13	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
FS1	23411/008	FUSE QUICK-ACTING 3.15A RATING, 20mm LONG x 5mm DIA, 250V AC, GLASS CASE, BS.4265.	BLP COMPONENTS LTD	L1427B/3.15A
FS2	23411/008	FUSE QUICK-ACTING 3.15A RATING, 20mm LONG x 5mm DIA, 250V AC, GLASS CASE, BS.4265.	BLP COMPONENTS LTD	L1427B/3.15A
IC1	28461/708	IC-ANALOGUE VOLTAGE-REGULATOR 7812... 12V 1A POSITIVE, LINEAR, MONOLITHIC, 3 PIN, TO-220.	NAT. SEMICONDUCTOR	uA7812UC
IC2	28461/731	IC-ANALOGUE PULSE-WIDTH-MODULATR SG3526... 35V MONOLITHIC, 18 PIN, DUAL-IN-LINE.	SILICON GENERAL LTD	SG3526N
IC3	28461/974	IC-ANALOGUE VOLTAGE-REFERENCE REF-02HP... 5V PRECISION, 3ppm/DEG.C, MONOLITHIC, 8 PIN,	ANALOG DEVICES LTD	REF-02HP
LP1	23733/103	LAMP NEON, 90V 500uA WIRE-ENDED, 10mm LONG, 4mm DIA, SIZE T1.1/4, STANDARD BRIGHTNESS.	VCH LTD	2ML
PLC	43138/460	RIBBON-LEAD 16 WAY, SOCKET 16 WAY, - PCB TRANSITION 16 WAY, FLAT MULTICOLOUR CABLE, 250mm		
R1	25125/048	RESISTOR-FIXED WIREWOUND 100R +/- 5% 6W 100V 200 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	W22-100R-5%
R5	24587/269	RESISTOR-FIXED METAL-OXIDE 56K +/- 5% 2W 700V 200 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	FP2-56K-5%
R6	24587/269	RESISTOR-FIXED METAL-OXIDE 56K +/- 5% 2W 700V 200 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	FP2-56K-5%
R7	24321/885	RESISTOR-FIXED METAL-GLAZE 10M +/- 5% 250mW 1.6KV 200 ppm/DEG.C, AXIAL, (TAPED).	PHILIPS	VR25-10M-5
R8	24773/249	RESISTOR-FIXED METAL-FILM 100R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-100R-G-T-1
R9	24773/249	RESISTOR-FIXED METAL-FILM 100R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-100R-G-T-1
R10	24773/226	RESISTOR-FIXED METAL-FILM 11R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-11R-G-T-1
R11	24773/226	RESISTOR-FIXED METAL-FILM 11R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-11R-G-T-1
R12	25123/054	RESISTOR-FIXED WIREWOUND 150R +/- 5% 1.5W 100V 200 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	W21-150R-5%
R13	25123/054	RESISTOR-FIXED WIREWOUND 150R +/- 5% 1.5W 100V 200 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	W21-150R-5%
R14	24773/273	RESISTOR-FIXED METAL-FILM 1K +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K-G-T-1
R15	24772/087	RESISTOR-FIXED METAL-FILM 3K9 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K9-2%
R16	24773/249	RESISTOR-FIXED METAL-FILM 100R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-100R-G-T-1

A4 PSU Input PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R17	24773/273	RESISTOR-FIXED METAL-FILM 1K +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K-G-T-1
R19	24773/235	RESISTOR-FIXED METAL-FILM 27R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-27R-G-T-1
R20	24773/273	RESISTOR-FIXED METAL-FILM 1K +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K-G-T-1
R21	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R22	24753/676	RESISTOR-FIXED METAL-FILM 4K87 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K87-D-T-2
R23	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R24	24773/273	RESISTOR-FIXED METAL-FILM 1K +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K-G-T-1
R25	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R26	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R27	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R28	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R29	24773/321	RESISTOR-FIXED METAL-FILM 100K +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-100K-G-T-1
R30	24773/249	RESISTOR-FIXED METAL-FILM 100R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-100R-G-T-1
R31	24753/431	RESISTOR-FIXED METAL-FILM 100R +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-100R-D-T-2
RLA	23486/158	RELAY MAGNETIC, DOUBLE-POLE N/O, 5V COIL, 110R - POLARISED, CONTACTS 8A, 380V, MAX LOAD 150W, 4kV	MATSUSHITA CONTROLS	ST2-5V
SA	23467/152	SWITCH SLIDE, DOUBLE-POLE CHANGEOVER, 250V 5A - PCB-MOUNTING, RIGHT-ANGLED, BLACK NYLON BODY, RED	AMF INC (USA)	SE1022-SDCEPR-HKRA-A
T1	43490/081	TRANSFORMER MAINS, LAMINATION TYPE, 12 VA, 2 x 120V PRIMARY, 15V SECONDARY, 52mm x 44mm.		
T2	43590/155	WOUND-PART TRANSFORMER, HF DRIVER, E-CORE, 23:23:23 TURNS, WITH 2-SCREENS, SLEEVING FITTED.	AMETHYST DESIGNS LTD	AD5018
T3	43590/133	WOUND-PART TRANSFORMER, HF, POT-CORE, RM7, 1:200+200 TURNS, WITH SCREEN, LABELLED.	AMETHYST DESIGNS LTD	AD5165
TR1	28459/052	TRANSISTOR N-CHANNEL-ENHANCE MOSFET IRF841... 450V 125W 8A 0R85 TO-220.	INTERNAT RECTIFIER	IRF840
TR2	28459/052	TRANSISTOR N-CHANNEL-ENHANCE MOSFET IRF841... 450V 125W 8A 0R85 TO-220.	INTERNAT RECTIFIER	IRF840
TR3	28435/239	TRANSISTOR PNP BIPOLAR BD676... DARLINGTON, 45V 60KHz 40W 4A hFE>750 @ 1.5A, TO-126.	PHILIPS	BD676

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A4 PSU Input PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
TR4	28452/771	TRANSISTOR NPN BIPOLAR BC209C... 20V 150MHz 200mW 100mA 420hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC549C
TR5	28452/771	TRANSISTOR NPN BIPOLAR BC209C... 20V 150MHz 200mW 100mA 420hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC549C

	Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB

When ordering, prefix circuit reference with A5.

	Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
		44829/996	Complete unit Issue: 008		
7	C1 to C7	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C8	26421/121	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 63V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	WAYCOM ELECTRONICS	WHT-47-63
	C9	26421/121	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 63V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	WAYCOM ELECTRONICS	WHT-47-63
	C10	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
	C11	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
	C12	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-221-JP
	C13	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
5	C18 to C22	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C23 to C29	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
	C30	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
	C31	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP
	C32 to C40	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
3	C41 to C43	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C44	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
4	C45 to C48	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C49	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
	C50	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
	C51	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-221-JP
	C52	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-221-JP
1	C53	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
1	C55	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C66 to C71	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
	C72	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP

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A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C73	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C74 to C77	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C78	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C79	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C80	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-331-JP
C81 to C112	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C113 to C120	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C121	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP
C122	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP
C123	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C125	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C126	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C127	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C128	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C132 to C137	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C141	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C142	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C143	26538/925	CAPACITOR-FIXED POLYSTYRENE 9.1nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-9100pF-63V
C144	26538/925	CAPACITOR-FIXED POLYSTYRENE 9.1nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-9100pF-63V
C145 to C147	26538/912	CAPACITOR-FIXED POLYSTYRENE 2.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2700pF-63V
C148	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C150 to C153	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C154	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C158	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C169	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C170	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP

A5 Analogue PCB (contd.)

	Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	C171	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C172	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C173	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
	C174	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
12	C201 to C212	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C213 to C220	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
	C221	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP
	C222	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP
	C223	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
6	C232 to C237	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C241	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
	C242	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
	C243	26538/925	CAPACITOR-FIXED POLYSTYRENE 9.1nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-9100pF-63V
	C244	26538/925	CAPACITOR-FIXED POLYSTYRENE 9.1nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-9100pF-63V
	C245 to C247	26538/912	CAPACITOR-FIXED POLYSTYRENE 2.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2700pF-63V
	C248	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
	C250 to C253	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
	C254	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
	C258	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C269	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
	C270	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
	C271	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C272	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
	C273	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
	C274	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
12	C301 to C312	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP

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Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C313 to C320	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C321	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP
C322	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP
C323	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C325	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C326	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
6 C332 to C337	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C341	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C342	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C343	26538/925	CAPACITOR-FIXED POLYSTYRENE 9.1nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-9100pF-63V
C344	26538/925	CAPACITOR-FIXED POLYSTYRENE 9.1nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-9100pF-63V
C345 to C347	26538/912	CAPACITOR-FIXED POLYSTYRENE 2.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2700pF-63V
C348	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C350 to C353	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C354	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C358	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C369	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C370	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C371	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C372	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C373	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
C374	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
C401 to C412	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C417 to C420	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C421	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP
C422	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP

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Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C423 to C428	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C432 to C437	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C441	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C442	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C443	26538/925	CAPACITOR-FIXED POLYSTYRENE 9.1nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-9100pF-63V
C444	26538/925	CAPACITOR-FIXED POLYSTYRENE 9.1nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-9100pF-63V
C445 to C447	26538/912	CAPACITOR-FIXED POLYSTYRENE 2.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2700pF-63V
C448	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C450 to C453	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C454	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C458	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C469	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C470	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C471	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C472	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C473	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
C474	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
C480	26343/432	CAPACITOR-FIXED CERAMIC 150pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	RPO-151-GAK-ACR-J
C501 to C558	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C560 to C565	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C580	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C581	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C582	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C583	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C598	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C599	26421/118	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-0J-KA-101-B

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C602 to C611	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
D1 to D8	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D9	28371/401	DIODE ZENER, BZX79-C5V1... 500mW 5.1V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C5V1
D10	28371/401	DIODE ZENER, BZX79-C5V1... 500mW 5.1V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C5V1
D11 to D13	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D14	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D15 to D401	28383/903	DIODE SMALL-SIGNAL, BAV99... DUAL, 70V 100mA 1.1Vf @ 50mA, IN SERIES, MARKING CODE A7, SURFACE	PHILIPS	BAV99 (A7)
D501	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D502	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
IC1	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC2	28461/443	IC-ANALOGUE OPERATIONAL AMP OP270GP... DUAL, 15V I/P OFFSET 250uV MAX, SLEW-RATE 1.7V/uS MIN, DRIFT	ANALOG DEVICES LTD	OP270GP
IC6	28469/767	IC-ANALOGUE MULTIPLEXER DG408... 8 INPUT, SINGLE, 15V 70uA RDS(ON) 100 OHM, 150ns SWITCHNG TIME,	SILICONIX LTD	DG408DJ
IC7	28469/767	IC-ANALOGUE MULTIPLEXER DG408... 8 INPUT, SINGLE, 15V 70uA RDS(ON) 100 OHM, 150ns SWITCHNG TIME,	SILICONIX LTD	DG408DJ
IC8	28461/407	IC-ANALOGUE OPERATIONAL AMP AD712... DUAL, 15V PWR BANDWDTH 200kHz, SLEW-RATE 20V/uS TYP, I/P OFFSET	ANALOG DEVICES LTD	AD712JN
IC9	28461/873	IC-ANALOGUE A/D CONVERTER CS5126KP... SINGLE, 5V 70mA 16 BIT SARADC, CMOS, 28 PIN, DUAL-IN-LINE.	CRYSTAL SEMICONDUCTR	CS5126KP
IC10	28461/980	IC-ANALOGUE TEMPERATURE-SENSOR LM35DZ... 30V +/-1.5 DEG.C VOLTAGE PROPORTIONAL, MONOLITHIC, 3	NAT. SEMICONDUCTOR	LM35DZ
IC11	28461/872	IC-ANALOGUE D/A-CONVERTER AD7846JN... SINGLE, 15V 11mA 16 BIT, VOLTAGE O/P, CMOS, 28 PIN,	ANALOG DEVICES LTD	AD7846AD
IC12	28461/773	IC-ANALOGUE VOLTAGE-REFERENCE AD588AD... 15V PRECISION, 3ppm/DEG.C, MONOLITHIC, 16 PIN,	ANALOG DEVICES LTD	AD588AQ
IC13	28462/151	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC374... 1 INPUT, OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	PHILIPS	74HC374D
IC14	28462/151	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC374... 1 INPUT, OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	PHILIPS	74HC374D
IC15	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC20	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC21	28461/735	IC-ANALOGUE VOLTAGE-REGULATOR 7915... SINGLE, 15V 1A NEGATIVE, LINEAR, MONOLITHIC, 3 PIN, TO-220.	NAT. SEMICONDUCTOR	LM7915CT
IC22	28461/707	IC-ANALOGUE VOLTAGE-REGULATOR 7805... 5V 1A POSITIVE, LINEAR, MONOLITHIC, 3 PIN, TO-220.	NAT. SEMICONDUCTOR	uA7805UC

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21 + 36 + 35 + 10 + 17 + 10 = 129

REPLACEABLE PARTS

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC23	28461/736	IC-ANALOGUE VOLTAGE-REGULATOR 79L05AC... 5V 100mA NEGATIVE, OUTPUT VOLTAGE ERROR <5% OVERLOAD,	NAT. SEMICONDUCTOR	LM79L05ACZ
IC24	28462/438	IC-DIGITAL LATCH 74HC373... OCTAL, TRANSPARENT WITH TRI-STATE BUS, CMOS-H/SPEED, 20 PIN,	PHILIPS	74HC373D
IC25	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC26	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	SILICONIX LTD	DG409DY
IC27	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC28	28466/413	IC-DIGITAL EXCLUSIVE-OR 74AC86... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC86SC
IC29	28466/413	IC-DIGITAL EXCLUSIVE-OR 74AC86... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC86SC
IC32	28461/852	IC-ANALOGUE TIMER ICM7555... SINGLE, 16V ASTABLE & MONOSTABLE MODES, CMOS, 8 PIN, DUAL-IN-LINE.	PHILIPS	ICM7555IN
IC33	28462/151	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC374... 1 INPUT, OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	PHILIPS	74HC374D
IC38 to IC40	28469/053	IC-ANALOGUE BUFFER-AMPLIFIER EL2001... 18V UNITY GAIN, SLEW-RATE 1200 V/uS MIN, BANDWIDTH 70MHz @	ELANTEC INC	EL2001CN
IC41	28466/413	IC-DIGITAL EXCLUSIVE-OR 74AC86... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC86SC
IC42	28466/032	IC-DIGITAL AND-GATE 74HC08... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC08D
IC43	28461/435	IC-ANALOGUE OPERATIONAL AMP AD712... DUAL, 15V PWR BANDWDTH 200KHz, SLEW-RATE 20V/uS TYP, I/P OFFSET	ANALOG DEVICES LTD	AD712AQ
IC44	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	SILICONIX LTD	DG409DY
IC45	28461/709	IC-ANALOGUE VOLTAGE-REGULATOR 7815... 15V 1A POSITIVE, LINEAR, MONOLITHIC, 3 PIN, TO-220.	NAT. SEMICONDUCTOR	uA7815UC
IC46	28461/736	IC-ANALOGUE VOLTAGE-REGULATOR 79L05AC... 5V 100mA NEGATIVE, OUTPUT VOLTAGE ERROR <5% OVERLOAD,	NAT. SEMICONDUCTOR	LM79L05ACZ
IC101	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC102	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC103	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC104	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC105	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	SILICONIX LTD	DG409DY
IC106	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	SILICONIX LTD	DG409DY
IC107	28461/443	IC-ANALOGUE OPERATIONAL AMP OP270GP... DUAL, 15V I/P OFFSET 250uV MAX, SLEW-RATE 1.7V/uS MIN, DRIFT	ANALOG DEVICES LTD	OP270GP
IC108	28461/443	IC-ANALOGUE OPERATIONAL AMP OP270GP... DUAL, 15V I/P OFFSET 250uV MAX, SLEW-RATE 1.7V/uS MIN, DRIFT	ANALOG DEVICES LTD	OP270GP
IC109	28461/999	IC-ANALOGUE SWITCH DG441... QUAD, 15V SPST, ON-RESISTANCE<85R, 4 x N/O @ LOGIC 1, TTL	SILICONIX LTD	DG441DY
IC110	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC111	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D
IC112	28461/407	IC-ANALOGUE OPERATIONAL AMP AD712... DUAL, 15V PWR BANDWDTH 200kHz, SLEW-RATE 20V/uS TYP, I/P OFFSET	ANALOG DEVICES LTD	AD712JN
IC113	28461/999	IC-ANALOGUE SWITCH DG441... QUAD, 15V SPST, ON-RESISTANCE<85R, 4 x N/O @ LOGIC 1, TTL	SILICONIX LTD	DG441DY
IC114	28461/399	IC-ANALOGUE OPERATIONAL AMP OP42FZ... HIGH SPEED, FAST SETTLING 1uS, SLEW-RATE 50V/uS TYP, CERAMIC,	ANALOG DEVICES LTD	OP42EZ
IC115	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD
IC116	28461/871	IC-ANALOGUE D/A-CONVERTER AD7548JP... SINGLE, 15V 5mA 12 BIT, 8 BIT LOAD, DIFF NON-LIN +/-1 LSB,	ANALOG DEVICES LTD	AD7548JP
IC117	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC201	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC202	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC203	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC204	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC205	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	SILICONIX LTD	DG409DY
IC206	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	SILICONIX LTD	DG409DY
IC207	28461/443	IC-ANALOGUE OPERATIONAL AMP OP270GP... DUAL, 15V I/P OFFSET 250uV MAX, SLEW-RATE 1.7V/uS MIN, DRIFT	ANALOG DEVICES LTD	OP270GP
IC209	28461/999	IC-ANALOGUE SWITCH DG441... QUAD, 15V SPST, ON-RESISTANCE<85R, 4 x N/O @ LOGIC 1, TTL	SILICONIX LTD	DG441DY
IC210	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D
IC211	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D
IC212	28461/407	IC-ANALOGUE OPERATIONAL AMP AD712... DUAL, 15V PWR BANDWDTH 200kHz, SLEW-RATE 20V/uS TYP, I/P OFFSET	ANALOG DEVICES LTD	AD712JN
IC213	28461/999	IC-ANALOGUE SWITCH DG441... QUAD, 15V SPST, ON-RESISTANCE<85R, 4 x N/O @ LOGIC 1, TTL	SILICONIX LTD	DG441DY
IC214	28461/399	IC-ANALOGUE OPERATIONAL AMP OP42FZ... HIGH SPEED, FAST SETTLING 1uS, SLEW-RATE 50V/uS TYP, CERAMIC,	ANALOG DEVICES LTD	OP42EZ
IC215	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD
IC216	28461/871	IC-ANALOGUE D/A-CONVERTER AD7548JP... SINGLE, 15V 5mA 12 BIT, 8 BIT LOAD, DIFF NON-LIN +/-1 LSB,	ANALOG DEVICES LTD	AD7548JP
IC217	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC301	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC302	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC303	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC304	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC305	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	SILICONIX LTD	DG409DY
IC306	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	SILICONIX LTD	DG409DY
IC307	28461/443	IC-ANALOGUE OPERATIONAL AMP OP270GP... DUAL, 15V I/P OFFSET 250uV MAX, SLEW-RATE 1.7V/uS MIN, DRIFT	ANALOG DEVICES LTD	OP270GP
IC308	28461/443	IC-ANALOGUE OPERATIONAL AMP OP270GP... DUAL, 15V I/P OFFSET 250uV MAX, SLEW-RATE 1.7V/uS MIN, DRIFT	ANALOG DEVICES LTD	OP270GP
IC309	28461/999	IC-ANALOGUE SWITCH DG441... QUAD, 15V SPST, ON-RESISTANCE<85R, 4 x N/O @ LOGIC 1, TTL	SILICONIX LTD	DG441DY
IC310	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D
IC311	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D
IC312	28461/407	IC-ANALOGUE OPERATIONAL AMP AD712... DUAL, 15V PWR BANDWDTH 200kHz, SLEW-RATE 20V/uS TYP, I/P OFFSET	ANALOG DEVICES LTD	AD712JN
IC313	28461/999	IC-ANALOGUE SWITCH DG441... QUAD, 15V SPST, ON-RESISTANCE<85R, 4 x N/O @ LOGIC 1, TTL	SILICONIX LTD	DG441DY
IC314	28461/399	IC-ANALOGUE OPERATIONAL AMP OP42FZ... HIGH SPEED, FAST SETTLING 1uS, SLEW-RATE 50V/uS TYP, CERAMIC,	ANALOG DEVICES LTD	OP42EZ
IC315	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD
IC316	28461/871	IC-ANALOGUE D/A-CONVERTER AD7548JP... SINGLE, 15V 5mA 12 BIT, 8 BIT LOAD, DIFF NON-LIN +/-1 LSB,	ANALOG DEVICES LTD	AD7548JP
IC317	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC401	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC402	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC403	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC404	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC405	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	SILICONIX LTD	DG409DY
IC406	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	SILICONIX LTD	DG409DY
IC407	28461/443	IC-ANALOGUE OPERATIONAL AMP OP270GP... DUAL, 15V I/P OFFSET 250uV MAX, SLEW-RATE 1.7V/uS MIN, DRIFT	ANALOG DEVICES LTD	OP270GP
IC409	28461/999	IC-ANALOGUE SWITCH DG441... QUAD, 15V SPST, ON-RESISTANCE<85R, 4 x N/O @ LOGIC 1, TTL	SILICONIX LTD	DG441DY
IC410	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D
IC411	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D
IC412	28461/407	IC-ANALOGUE OPERATIONAL AMP AD712... DUAL, 15V PWR BANDWDTH 200kHz, SLEW-RATE 20V/uS TYP, I/P OFFSET	ANALOG DEVICES LTD	AD712JN
IC413	28461/999	IC-ANALOGUE SWITCH DG441... QUAD, 15V SPST, ON-RESISTANCE<85R, 4 x N/O @ LOGIC 1, TTL	SILICONIX LTD	DG441DY

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC414	28461/399	IC-ANALOGUE OPERATIONAL AMP OP42FZ... HIGH SPEED, FAST SETTLING 1uS, SLEW-RATE 50V/uS TYP, CERAMIC,	ANALOG DEVICES LTD	OP42EZ
IC415	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD
IC416	28461/871	IC-ANALOGUE D/A-CONVERTER AD7548JP... SINGLE, 15V 5mA 12 BIT, 8 BIT LOAD, DIFF NON-LIN +/-1 LSB,	ANALOG DEVICES LTD	AD7548JP
IC417	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC501 to IC516	28471/032	IC-MICRO DYNAMIC-RAM, 256K x 4BIT, 514256... 70nS, 600mW, STANDBY CURRENT 1mA, CMOS, 20 PIN, ZIP.	TOSHIBA (UK) LTD	TC514256AZ-70
IC533 to IC535	28469/769	IC-DIGITAL MULTIPLEXER 74AC157... 2 INPUT, 4 BIT, SINGLE, NON-INVERTING DATA-SELECTION,	NAT. SEMICONDUCTOR	74AC157SC
IC537 to IC540	28462/644	IC-DIGITAL LATCH 74AC373... OCTAL, TRANSPARENT WITH TRI-STATE BUS, CMOS-ADVANCED, 20 PIN,	NAT. SEMICONDUCTOR	74AC373SC
IC541	28465/061	IC-DIGITAL DECODER/DEMULTIPLEX 74AC138... 3 INPUT, 8 BIT, SINGLE, 3 TO 8, CMOS-ADVANCED, 16 PIN,	NAT. SEMICONDUCTOR	74AC138SC
IC543	28467/103	IC-MICRO PROCESSOR, TRANSPUTER, T805... 64 BIT FLOATING POINT UNIT, 20MHz, CMOS, 84 PIN, PLCC.	SGS-THOMSON	IMST805-J20S
IC546	28469/060	IC-DIGITAL TRANSCEIVER 74AC245... OCTAL, TRI-STATE, NON-INVERTING, BI-DIRECTIONAL,	NAT. SEMICONDUCTOR	74AC245SC
IC547	28469/060	IC-DIGITAL TRANSCEIVER 74AC245... OCTAL, TRI-STATE, NON-INVERTING, BI-DIRECTIONAL,	NAT. SEMICONDUCTOR	74AC245SC
IC548	28467/063	IC-MICRO GRAPHICS, A82786... CO-PROCESSOR, 25MHz, 88 PIN, PIN-GRID-ARRAY.	INTEL CORP (UK) LTD	A82786-SX365
IC549	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	NAT. SEMICONDUCTOR	74AC74SC
IC550	28467/099	IC-MICRO GRAPHICS, 476... COLOUR PALETTE, 256 x 18 RAM, SINGLE, RS343A/RS170 OUTPUTS, STANDARD MPU	ANALOG DEVICES LTD	ADV476KP35
IC551	28466/119	IC-DIGITAL OR-GATE 74AC32... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC32SC
IC552	28466/119	IC-DIGITAL OR-GATE 74AC32... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC32SC
IC553	28466/394	IC-DIGITAL NAND-GATE 74AC00... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC00SC
IC555	28469/503	IC-DIGITAL DELAY LINE EP8304... SINGLE, 10 TAPS, 20nS/TAP, 200nS TOTAL DELAY, TTL-SCHOTTKY, 14 PIN,	NEWPORT COMPONENTS	50A-10201
IC558	28469/051	IC-DIGITAL INVERTER 74AC04... HEX, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC04SC
IC560	28461/762	IC-ANALOGUE VOLTAGE-REFERENCE LM385... SINGLE, 1.2V 8uA LINEAR, MONOLITHIC, 8 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	LM385M-1.2
L1 to L4	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L5	23642/549	INDUCTOR-FIXED 1uH +/- 10% COATED-LACQUER, MINIATURE, 820mA 0R3 MAX, 45 Q @ 25 MHz, 210 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/010
L500	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
PLF	23435/120	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, RIGHT ANGLED, 2.54mm PITCH, PINS GOLD PLATED TO CLASS 2,	BERG ELECTRONICS	75168-101-36
PLG	23435/976	CONNECTOR MULTIWAY, PCB HEADER, 72 WAY, RIGHT ANGLED, 2-ROW, 2.54mm GRID, PINS 0.64mm SQUARE,	BERG ELECTRONICS	76345-104-72

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
PLK	23435/120	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, RIGHT ANGLED, 2.54mm PITCH, PINS GOLD PLATED TO CLASS 2,	BERG ELECTRONICS	75168-101-36
R1	24811/213	RESISTOR-FIXED METAL-FILM 47K5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47K5-1%50ppm
R2	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R3	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R4	24811/211	RESISTOR-FIXED METAL-FILM 39K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-39K2-1%50ppm
R5	24753/569	RESISTOR-FIXED METAL-FILM 4K75 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K75-D-T-2
R6	24811/215	RESISTOR-FIXED METAL-FILM 56K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-56K2-1%50ppm
R7	24753/349	RESISTOR-FIXED METAL-FILM 80K6 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-80K6-D-T-2
R8	24811/245	RESISTOR-FIXED METAL-FILM 1M +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1M0-1%50ppm
R9	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R10	24811/177	RESISTOR-FIXED METAL-FILM 1K5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K5-1%50ppm
R11	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R12	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R13	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R14	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R15	24811/211	RESISTOR-FIXED METAL-FILM 39K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-39K2-1%50ppm
R16	24811/211	RESISTOR-FIXED METAL-FILM 39K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-39K2-1%50ppm
R17	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R18	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R19	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R20	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R21	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R22	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R23	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R24 to R29	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R33	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R34	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R36	24753/665	RESISTOR-FIXED METAL-FILM 47R +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-47R-D-T-2
R37	24753/337	RESISTOR-FIXED METAL-FILM 1M +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1M0-D-T-2
R38	24753/337	RESISTOR-FIXED METAL-FILM 1M +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1M0-D-T-2
R39 to R42	24811/125	RESISTOR-FIXED METAL-FILM 10R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10R-1%-50ppm
R43	24753/650	RESISTOR-FIXED METAL-FILM 600R +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-600R-D-T-2
R44	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R45	24681/590	RESISTOR-NETWORK DIVIDER, METAL-FOIL, 9K 1K 0.1% 200mW 40V 0.5 ppm/DEG.C, 1 RESISTOR PAIRS, 0.05%	VISHAY COMPONENTS	RE11C-9K1K/0.1%/.01%
R47	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R48	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R50	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm
R51	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm
R52	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R53	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R54 to R57	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R58	24811/245	RESISTOR-FIXED METAL-FILM 1M +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1M0-1%50ppm
R73 to R80	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R81 to R85	24811/125	RESISTOR-FIXED METAL-FILM 10R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10R-1%-50ppm
R86	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R87	24811/139	RESISTOR-FIXED METAL-FILM 39R2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-39R2-1%50ppm
R89	24811/146	RESISTOR-FIXED METAL-FILM 75R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-75R0-1%50ppm
R90	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R91	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R92	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R93	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R98	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R100 to R118	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R120	24723/484	RESISTOR-FIXED METAL-FILM 93R8 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C93R8-B
R121	24723/463	RESISTOR-FIXED METAL-FILM 4K64 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K64-B-T-10
R122	24723/463	RESISTOR-FIXED METAL-FILM 4K64 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K64-B-T-10
R123	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R124	24723/365	RESISTOR-FIXED METAL-FILM 1K602 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K602-B-T-2
R125	24723/365	RESISTOR-FIXED METAL-FILM 1K602 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K602-B-T-2
R126	24723/460	RESISTOR-FIXED METAL-FILM 8K25 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8K25-B-T-10
R127	24723/460	RESISTOR-FIXED METAL-FILM 8K25 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8K25-B-T-10
R128	24753/214	RESISTOR-FIXED METAL-FILM 37K4 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	MEGGITT ELECTRONICS	H8-37K4-0.5%-50ppm
R129	24753/214	RESISTOR-FIXED METAL-FILM 37K4 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	MEGGITT ELECTRONICS	H8-37K4-0.5%-50ppm
R130 to R133	24723/373	RESISTOR-FIXED METAL-FILM 10K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-10K-B-T-10
R136	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R137	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R138	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R139	24811/205	RESISTOR-FIXED METAL-FILM 22K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22K1-1%50ppm
R140	24811/229	RESISTOR-FIXED METAL-FILM 221K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221K-1%50ppm
R141	24811/205	RESISTOR-FIXED METAL-FILM 22K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22K1-1%50ppm
R142	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R145	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R146	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R147	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R148	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R149	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R150	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R151	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R152	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R153	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R154	24732/302	RESISTOR-FIXED METAL-FILM 6K81 +/- 0.25% 250mW 200V 25 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-6K81-C-T-9
R157	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R158	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R159	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R160	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R161	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R162	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R170	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R171	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R180 to R218	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R220	24723/484	RESISTOR-FIXED METAL-FILM 93R8 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C93R8-B
R221	24723/463	RESISTOR-FIXED METAL-FILM 4K64 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K64-B-T-10
R222	24723/463	RESISTOR-FIXED METAL-FILM 4K64 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K64-B-T-10
R223	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R224	24723/365	RESISTOR-FIXED METAL-FILM 1K602 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K602-B-T-2
R225	24723/365	RESISTOR-FIXED METAL-FILM 1K602 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K602-B-T-2
R226	24723/460	RESISTOR-FIXED METAL-FILM 8K25 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8K25-B-T-10
R227	24723/460	RESISTOR-FIXED METAL-FILM 8K25 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8K25-B-T-10
R228	24753/214	RESISTOR-FIXED METAL-FILM 37K4 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	MEGGITT ELECTRONICS	H8-37K4-0.5%-50ppm
R229	24753/214	RESISTOR-FIXED METAL-FILM 37K4 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	MEGGITT ELECTRONICS	H8-37K4-0.5%-50ppm
R230 to R233	24723/373	RESISTOR-FIXED METAL-FILM 10K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-10K-B-T-10
R236	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R237	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R238	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R239	24811/205	RESISTOR-FIXED METAL-FILM 22K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22K1-1%50ppm
R240	24811/229	RESISTOR-FIXED METAL-FILM 221K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221K-1%50ppm
R241	24811/205	RESISTOR-FIXED METAL-FILM 22K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22K1-1%50ppm
R242	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R245	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R246	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R247	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R248	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R249	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R250	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R251	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R252	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R253	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R254	24732/302	RESISTOR-FIXED METAL-FILM 6K81 +/- 0.25% 250mW 200V 25 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-6K81-C-T-9
R257	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R258	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R259	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R260	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R261	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R262	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R270	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R271	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R301 to R318	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R320	24723/484	RESISTOR-FIXED METAL-FILM 93R8 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C93R8-B
R321	24723/463	RESISTOR-FIXED METAL-FILM 4K64 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K64-B-T-10

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R322	24723/463	RESISTOR-FIXED METAL-FILM 4K64 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K64-B-T-10
R323	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R324	24723/365	RESISTOR-FIXED METAL-FILM 1K602 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K602-B-T-2
R325	24723/365	RESISTOR-FIXED METAL-FILM 1K602 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K602-B-T-2
R326	24723/460	RESISTOR-FIXED METAL-FILM 8K25 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8K25-B-T-10
R327	24723/460	RESISTOR-FIXED METAL-FILM 8K25 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8K25-B-T-10
R328	24753/214	RESISTOR-FIXED METAL-FILM 37K4 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	MEGGITT ELECTRONICS	H8-37K4-0.5%-50ppm
R329	24753/214	RESISTOR-FIXED METAL-FILM 37K4 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	MEGGITT ELECTRONICS	H8-37K4-0.5%-50ppm
R330 to R333	24723/373	RESISTOR-FIXED METAL-FILM 10K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-10K-B-T-10
R336	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R337	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K21-1%50ppm
R338	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R339	24811/205	RESISTOR-FIXED METAL-FILM 22K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22K1-1%50ppm
R340	24811/229	RESISTOR-FIXED METAL-FILM 221K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221K-1%50ppm
R341	24811/205	RESISTOR-FIXED METAL-FILM 22K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22K1-1%50ppm
R342	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R345	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R346	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R347	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R348	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R349	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R350	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R351	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R352	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R353	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R354	24732/302	RESISTOR-FIXED METAL-FILM 6K81 +/- 0.25% 250mW 200V 25 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-6K81-C-T-9

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R357	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R358	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R359	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R360	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R361	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R362	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R370	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R371	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R380 to R418	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R420	24723/484	RESISTOR-FIXED METAL-FILM 93R8 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C93R8-B
R421	24723/463	RESISTOR-FIXED METAL-FILM 4K64 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K64-B-T-10
R422	24723/463	RESISTOR-FIXED METAL-FILM 4K64 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K64-B-T-10
R423	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R424	24723/365	RESISTOR-FIXED METAL-FILM 1K602 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K602-B-T-2
R425	24723/365	RESISTOR-FIXED METAL-FILM 1K602 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K602-B-T-2
R426	24723/460	RESISTOR-FIXED METAL-FILM 8K25 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8K25-B-T-10
R427	24723/460	RESISTOR-FIXED METAL-FILM 8K25 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8K25-B-T-10
R428	24753/214	RESISTOR-FIXED METAL-FILM 37K4 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	MEGGITT ELECTRONICS	H8-37K4-0.5%-50ppm
R429	24753/214	RESISTOR-FIXED METAL-FILM 37K4 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	MEGGITT ELECTRONICS	H8-37K4-0.5%-50ppm
R430	24723/373	RESISTOR-FIXED METAL-FILM 10K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-10K-B-T-10
R431	24723/373	RESISTOR-FIXED METAL-FILM 10K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-10K-B-T-10
R432	24723/463	RESISTOR-FIXED METAL-FILM 4K64 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K64-B-T-10
R433	24723/463	RESISTOR-FIXED METAL-FILM 4K64 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-4K64-B-T-10
R436	24811/183	RESISTOR-FIXED METAL-FILM 2K74 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K74-1%50ppm
R437	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R438	24811/229	RESISTOR-FIXED METAL-FILM 221K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221K-1%50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R439	24811/205	RESISTOR-FIXED METAL-FILM 22K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22K1-1%50ppm
R440	24811/229	RESISTOR-FIXED METAL-FILM 221K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221K-1%50ppm
R441	24811/205	RESISTOR-FIXED METAL-FILM 22K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22K1-1%50ppm
R442	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R445	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R446	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R447	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R448	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R449	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R450	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R451	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R452	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R453	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R454	24732/302	RESISTOR-FIXED METAL-FILM 6K81 +/- 0.25% 250mW 200V 25 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-6K81-C-T-9
R455	24811/151	RESISTOR-FIXED METAL-FILM 121R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-121R-1%50ppm
R456 to R458	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R459	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R460	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R461	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R462	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R470	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R471	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R480	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R501 to R518	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R520 to R531	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R534 to R540	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A5 Analogue PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R541	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R542	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R543	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R544	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R545 to R550	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R551 to R602	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R603	24753/492	RESISTOR-FIXED METAL-FILM 8K2 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8K2-D-T-2
R604	24753/650	RESISTOR-FIXED METAL-FILM 600R +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-600R-D-T-2
R606	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R607	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R610	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R611	24723/440	RESISTOR-FIXED METAL-FILM 250K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-250K-B-T-10
R612	24723/375	RESISTOR-FIXED METAL-FILM 40K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-40K-B-T-10
R613	24723/440	RESISTOR-FIXED METAL-FILM 250K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-250K-B-T-10
R614	24723/375	RESISTOR-FIXED METAL-FILM 40K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-40K-B-T-10
R615	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R616	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R617	24811/125	RESISTOR-FIXED METAL-FILM 10R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10R-1%-50ppm
R618 to R623	24811/146	RESISTOR-FIXED METAL-FILM 75R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-75R0-1%50ppm
R624	24811/180	RESISTOR-FIXED METAL-FILM 2K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-2K0-1%50ppm
SKA	23436/201	CONNECTOR DIN41612, SOCKET, 96 WAY, STRAIGHT, 3-ROW, 2.54mm GRID, PCB MOUNTING, GOLD PLATED	ITT CANNON (UK)	E2P-F-960-AA-T5-C-00
SKB	23436/226	CONNECTOR DIN41612, SOCKET, 48 WAY, STRAIGHT, 3-ROW, 2.54mm GRID, PCB MOUNTING, GOLD PLATED	FRAMATOME	8609-3488314745000E1
TR1 to TR402	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR403	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

B6 Digital PCB

When ordering, prefix circuit reference with B6.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44830/008	Complete Unit Issue: 005		
C1 to C131	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C200	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-331-JP
C201 to C212	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C213 to C215	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C216	26451/001	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, SURFACE-MOUNTED	PANASONIC INDUSTRIAL	ECE-V-1HA-010R
C217	26386/867	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-222-KP
C218	26538/557	CAPACITOR-FIXED POLYSTYRENE 100pF +/-2% 63V 150 ppm/DEG.C, RADIAL, 7.6mm PWP, (TAPED).	LCR COMPONENTS	EP9-100pF-2%-63V
C219	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C220	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C221	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C222 to C224	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C225	26451/001	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, SURFACE-MOUNTED	PANASONIC INDUSTRIAL	ECE-V-1HA-010R
C226	26386/867	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-222-KP
C227	26538/557	CAPACITOR-FIXED POLYSTYRENE 100pF +/-2% 63V 150 ppm/DEG.C, RADIAL, 7.6mm PWP, (TAPED).	LCR COMPONENTS	EP9-100pF-2%-63V
C228	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C229	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C230	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C231	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C232	26451/001	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, SURFACE-MOUNTED	PANASONIC INDUSTRIAL	ECE-V-1HA-010R
C233	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C234	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED	RUBYCON CAPACITORS	35-REV-10
C235	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C236	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED	RUBYCON CAPACITORS	35-REV-10

B6 Digital PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C237	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C238	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED	RUBYCON CAPACITORS	35-REV-10
C239	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C240	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C241	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED	RUBYCON CAPACITORS	35-REV-10
C242	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED	RUBYCON CAPACITORS	35-REV-10
C243	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C244	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED	RUBYCON CAPACITORS	35-REV-10
C245	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C246	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
C247	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED	RUBYCON CAPACITORS	35-REV-10
C248	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED	RUBYCON CAPACITORS	35-REV-10
C249	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C250	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED	RUBYCON CAPACITORS	35-REV-10
C251 to C253	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C254 to C256	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C257	26386/871	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-472-KP
C258	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C259 to C261	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-331-JP
C301	26451/001	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, SURFACE-MOUNTED	PANASONIC INDUSTRIAL	ECE-V-1HA-010R
C302	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C303	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C304	26386/826	CAPACITOR-FIXED CERAMIC 150pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-151-JP
C305	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-220-JP
C306	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-220-JP
C307	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP

B6 Digital PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C308	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C309 to C311	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C312 to C408	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C411 to C416	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP
D1 to D4	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D5	28349/007	DIODE SMALL-SIGNAL, SCHOTTKY, 1N5711... 250mW 70V 1Vf @ 15mA, AXIAL, HP-OUTLINE-15, (LOOSE).	HEWLETT-PACKARD	1N5711
D6	28371/241	DIODE ZENER, BZX84-C3V6... 350mW 3.6V 5% 250mA MARKING CODE Z15/W7, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C3V6
D7	28371/241	DIODE ZENER, BZX84-C3V6... 350mW 3.6V 5% 250mA MARKING CODE Z15/W7, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C3V6
D201	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D202	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D203	28381/132	DIODE VARIABLE CAPACITNCE, BB809... 28V 20mA 29pF @ 3V, CAPAC RATIO 5.0 MIN, AXIAL, DO-34, (TAPED).	PHILIPS	BB809
D204	28349/014	DIODE SMALL-SIGNAL, SCHOTTKY, BAT29... 100mW 5V 1pF 0.55Vf @ 10mA, STORED CHARGE 3pC MAX, AXIAL,	SGS-THOMSON	BAT29
D205	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D206	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D207	28381/132	DIODE VARIABLE CAPACITNCE, BB809... 28V 20mA 29pF @ 3V, CAPAC RATIO 5.0 MIN, AXIAL, DO-34, (TAPED).	PHILIPS	BB809
D208	28349/014	DIODE SMALL-SIGNAL, SCHOTTKY, BAT29... 100mW 5V 1pF 0.55Vf @ 10mA, STORED CHARGE 3pC MAX, AXIAL,	SGS-THOMSON	BAT29
D209	28383/903	DIODE SMALL-SIGNAL, BAV99... DUAL, 70V 100mA 1.1Vf @ 50mA, IN SERIES, MARKING CODE A7, SURFACE	PHILIPS	BAV99 (A7)
D210	28383/903	DIODE SMALL-SIGNAL, BAV99... DUAL, 70V 100mA 1.1Vf @ 50mA, IN SERIES, MARKING CODE A7, SURFACE	PHILIPS	BAV99 (A7)
IC1	28467/103	IC-MICRO PROCESSOR, TRANSPUTER, T805... 64 BIT FLOATING POINT UNIT, 20MHz, CMOS, 84 PIN, PLCC.	SGS-THOMSON	IMST805-J20S
IC2	28466/033	IC-DIGITAL AND-GATE 74AC08... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC08SC
IC3	28469/057	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC04D
IC4	28469/059	IC-DIGITAL INVERTER 74LS05... HEX, OPEN COLLECTOR, TTL-SCHOTTKY-L/PWR, 14 PIN, SMALL-OUTLINE.	MOTOROLA INC.	SN74LS05D
IC5	28466/119	IC-DIGITAL OR-GATE 74AC32... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC32SC
IC6	28466/120	IC-DIGITAL OR-GATE 74HC32... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC32D

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

B6 Digital PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC8	44535/289	IC-PROGRAMMED PAL, SET OF 9 COMPRISING IC8, 11, 86, 101, 105, 118, 119, 124, 125	MARCONI INSTRUMENTS LTD	
IC10	28467/556	IC-DIGITAL SHIFT-REGISTER 74AC164... 1 INPUT, 8 BIT, SINGLE, SERIAL-IN, PARALLEL-OUT,	NAT. SEMICONDUCTOR	74AC164SC
IC11	44535/289	IC-PROGRAMMED PAL, SET OF 9 COMPRISING IC8, 11, 86, 101, 105, 118, 119, 124, 125	MARCONI INSTRUMENTS LTD	
IC12	28466/394	IC-DIGITAL NAND-GATE 74AC00... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC00SC
IC13	28469/051	IC-DIGITAL INVERTER 74AC04... HEX, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC04SC
IC14 to IC17	28462/439	IC-DIGITAL LATCH 74AC573... OCTAL, TRI-STATE, NON-INVERTING, TRANSPARENT, D-TYPE, CMOS-ADVANCED,	NAT. SEMICONDUCTOR	74AC573SC
IC18	28465/061	IC-DIGITAL DECODER/DEMULTIPLEX 74AC138... 3 INPUT, 8 BIT, SINGLE, 3 TO 8, CMOS-ADVANCED, 16 PIN,	NAT. SEMICONDUCTOR	74AC138SC
IC19	28465/061	IC-DIGITAL DECODER/DEMULTIPLEX 74AC138... 3 INPUT, 8 BIT, SINGLE, 3 TO 8, CMOS-ADVANCED, 16 PIN,	NAT. SEMICONDUCTOR	74AC138SC
IC20	28466/119	IC-DIGITAL OR-GATE 74AC32... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC32SC
IC21	28465/062	IC-DIGITAL DECODER/DEMULTIPLEX 74AC139... 2 INPUT, 4 BIT, DUAL, 1 OF 4, CMOS-ADVANCED, 16 PIN,	NAT. SEMICONDUCTOR	74AC139SC
IC22	28469/769	IC-DIGITAL MULTIPLEXER 74AC157... 2 INPUT, 4 BIT, SINGLE, NON-INVERTING DATA-SELECTION,	NAT. SEMICONDUCTOR	74AC157SC
IC23	28465/061	IC-DIGITAL DECODER/DEMULTIPLEX 74AC138... 3 INPUT, 8 BIT, SINGLE, 3 TO 8, CMOS-ADVANCED, 16 PIN,	NAT. SEMICONDUCTOR	74AC138SC
IC24	28466/119	IC-DIGITAL OR-GATE 74AC32... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC32SC
IC25 to IC27	28469/769	IC-DIGITAL MULTIPLEXER 74AC157... 2 INPUT, 4 BIT, SINGLE, NON-INVERTING DATA-SELECTION,	NAT. SEMICONDUCTOR	74AC157SC
IC28 to IC35	44533/450	IC-PROGRAMMED EPROM, SET OF 8	MARCONI INSTRUMENTS LTD	
IC36 to IC43	28469/906	IC-MICRO DYNAMIC-RAM, 1M x 4BIT, 514400... 70nS, 1mA STANDBY CURRENT, PAGE MODE, 0.3in PITCH, CMOS,	TOSHIBA (UK) LTD	TC514400ASJ
IC52	28471/044	IC-MICRO EEPROM, 8K x 8 BIT, 28C64... 200nS, 64 BYTE PAGE WRITE MODE, CMOS, 32 PIN, PLCC.	ATMEL CORPORATION	AT28C64B-20JC
IC53	28471/044	IC-MICRO EEPROM, 8K x 8 BIT, 28C64... 200nS, 64 BYTE PAGE WRITE MODE, CMOS, 32 PIN, PLCC.	ATMEL CORPORATION	AT28C64B-20JC
IC54	28466/390	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC00D
IC55	28467/552	IC-DIGITAL SHIFT-REGISTER 74HC165... 8 INPUT, 8 BIT, SINGLE, PARALLEL-IN SERIAL-OUT, CMOS-H/SPEED,	PHILIPS	74HC165D
IC56	28467/554	IC-DIGITAL SHIFT-REGISTER 74HC595... 1 INPUT, 8 BIT, SINGLE, SERIAL-IN, PARALLEL OR SERIAL-OUT,	NAT. SEMICONDUCTOR	MM74HC595M
IC57	28467/025	IC-MICRO CONTROLLER, 7210... INTERFACE BUS TALK/LISTEN/CONTROL, NMOS, 40 PIN, DUAL-IN-LINE.	NEC ELECTRONICS LTD	uPD7210C
IC58	28469/114	IC-DIGITAL TRANSCEIVER 75160... OCTAL, GPIB DATA, TTL-SCHOTTKY-L/PWR, 20 PIN, DUAL-IN-LINE.	NAT. SEMICONDUCTOR	DS75160AN
IC59	28469/115	IC-DIGITAL TRANSCEIVER 75161... OCTAL, GPIB-CONTROLLER, TTL-SCHOTTKY-L/PWR, 20 PIN,	NAT. SEMICONDUCTOR	DS75161AN
IC60	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC61	28466/120	IC-DIGITAL OR-GATE 74HC32... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC32D

B6 Digital PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC62	28468/321	IC-DIGITAL FLIP-FLOP/MONOSTABLE 74HC123... DUAL, RETRIGGERABLE, tW = 0.45RC, WITH RESET,	PHILIPS	74HC123D
IC63	28462/438	IC-DIGITAL LATCH 74HC373... OCTAL, TRANSPARENT WITH TRI-STATE BUS, CMOS-H/SPEED, 20 PIN,	PHILIPS	74HC373D
IC64	28462/431	IC-DIGITAL LATCH 74HCT373... OCTAL, TRANSPARENT WITH TRI-STATE BUS, CMOS-H/SPEED+TTL, 20 PIN,	PHILIPS	74HCT373D
IC65	28461/862	IC-ANALOGUE SWITCH 74HC4066... QUAD, BILATERAL SWITCH, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC4066D
IC66	28467/094	IC-MICRO REAL-TIME-CLOCK, 58274... WITH CALENDAR, CMOS, 16 PIN, DUAL-IN-LINE.	NAT. SEMICONDUCTOR	MM58274CN
IC67	28469/055	IC-DIGITAL TRANSCEIVER 74HC243... 1 INPUT, 1 BIT, QUAD, BUS, TRI-STATE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC243D
IC68	28469/055	IC-DIGITAL TRANSCEIVER 74HC243... 1 INPUT, 1 BIT, QUAD, BUS, TRI-STATE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC243D
IC69	28466/119	IC-DIGITAL OR-GATE 74AC32... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC32SC
IC70	28469/049	IC-DIGITAL TRANSCEIVER 74HCT245... OCTAL, BI-DIRECTIONAL, TRI-STATE BUS, CMOS-H/SPEED+TTL,	PHILIPS	74HCT245D
IC71 to IC73	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC74 to IC77	28467/117	IC-MICRO STATIC-RAM, 128K x 8 BIT, HM628128... 5V, 100nS, 50uA MAX STANDBY CURRENT, CMOS, 32 PIN,	TOSHIBA (UK) LTD	TC551001BFL-10L
IC78	28469/055	IC-DIGITAL TRANSCEIVER 74HC243... 1 INPUT, 1 BIT, QUAD, BUS, TRI-STATE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC243D
IC79	28469/049	IC-DIGITAL TRANSCEIVER 74HCT245... OCTAL, BI-DIRECTIONAL, TRI-STATE BUS, CMOS-H/SPEED+TTL,	PHILIPS	74HCT245D
IC80	28469/049	IC-DIGITAL TRANSCEIVER 74HCT245... OCTAL, BI-DIRECTIONAL, TRI-STATE BUS, CMOS-H/SPEED+TTL,	PHILIPS	74HCT245D
IC81 to IC83	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC84	28469/055	IC-DIGITAL TRANSCEIVER 74HC243... 1 INPUT, 1 BIT, QUAD, BUS, TRI-STATE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC243D
IC85	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC86	44535/289	IC-PROGRAMMED PAL, SET OF 9 COMPRISING IC8, 11, 86, 101, 105, 118, 119, 124, 125	MARCONI INSTRUMENTS LTD	
IC87 to IC90	28465/061	IC-DIGITAL DECODER/DEMULTIPLEX 74AC138... 3 INPUT, 8 BIT, SINGLE, 3 TO 8, CMOS-ADVANCED, 16 PIN,	NAT. SEMICONDUCTOR	74AC138SC
IC91	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC97	28464/184	IC-DIGITAL COUNTER 74HC161... 4 INPUT, 4 BIT, SINGLE, BINARY, PRESETTABLE, SYNCHRONOUS,	PHILIPS	74HC161D
IC98	28466/120	IC-DIGITAL OR-GATE 74HC32... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC32D
IC99	28469/057	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC04D
IC100	28466/032	IC-DIGITAL AND-GATE 74HC08... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC08D
IC101	44535/289	IC-PROGRAMMED PAL, SET OF 9 COMPRISING IC8, 11, 86, 101, 105, 118, 119, 124, 125	MARCONI INSTRUMENTS LTD	
IC102	28464/183	IC-DIGITAL COUNTER 74HC4040... 1 INPUT, 12 BIT, SINGLE, 12 STAGE BINARY RIPPLE & RESET, NEG EDGE	PHILIPS	74HC4040D

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
		B6 Digital PCB (contd.)		
IC103	28464/182	IC-DIGITAL COUNTER 74HC40103... 8 INPUT, 8 BIT, SINGLE, SYNCHRONOUS BINARY DOWN COUNTER, POS EDGE	PHILIPS	74HC40103D
IC104	28464/182	IC-DIGITAL COUNTER 74HC40103... 8 INPUT, 8 BIT, SINGLE, SYNCHRONOUS BINARY DOWN COUNTER, POS EDGE	PHILIPS	74HC40103D
IC105	44535/289	IC-PROGRAMMED PAL, SET OF 9 COMPRISING IC8, 11, 86, 101, 105, 118, 119, 124, 125	MARCONI INSTRUMENTS LTD	
IC106	28462/151	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC374... 1 INPUT, OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	PHILIPS	74HC374D
IC107	28462/151	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC374... 1 INPUT, OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	PHILIPS	74HC374D
IC108 to IC115	28464/175	IC-DIGITAL COUNTER 74HC191... 4 BIT, SINGLE, BINARY UP/DOWN, SYNCHRONOUS, PRESETTABLE,	PHILIPS	74HC191D
IC116	28464/040	IC-DIGITAL COUNTER 74HC193... 4 BIT, BINARY, UP/DOWN, SYNCHRONOUS, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC193D
IC117	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC118	44535/289	IC-PROGRAMMED PAL, SET OF 9 COMPRISING IC8, 11, 86, 101, 105, 118, 119, 124, 125	MARCONI INSTRUMENTS LTD	
IC119	44535/289	IC-PROGRAMMED PAL, SET OF 9 COMPRISING IC8, 11, 86, 101, 105, 118, 119, 124, 125	MARCONI INSTRUMENTS LTD	
IC120	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC121	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC123	28462/151	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC374... 1 INPUT, OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	PHILIPS	74HC374D
IC124	44535/289	IC-PROGRAMMED PAL, SET OF 9 COMPRISING IC8, 11, 86, 101, 105, 118, 119, 124, 125	MARCONI INSTRUMENTS LTD	
IC125	44535/289	IC-PROGRAMMED PAL, SET OF 9 COMPRISING IC8, 11, 86, 101, 105, 118, 119, 124, 125	MARCONI INSTRUMENTS LTD	
IC126	28467/555	IC-DIGITAL SHIFT-REGISTER 74HC164... 1 INPUT, 8 BIT, SINGLE, SERIAL-IN, PARALLEL-OUT,	PHILIPS	74HC164D
IC127	28467/555	IC-DIGITAL SHIFT-REGISTER 74HC164... 1 INPUT, 8 BIT, SINGLE, SERIAL-IN, PARALLEL-OUT,	PHILIPS	74HC164D
IC128	28469/534	IC-DIGITAL REGISTER CY7C421... 9 BIT, SINGLE, FIFO 512 WORD, ASYNCHRONOUS MODE, TRI-STATE OUTPUTS,	ADVANCED MICRO DEV	AM7201-50JC
IC129	28469/534	IC-DIGITAL REGISTER CY7C421... 9 BIT, SINGLE, FIFO 512 WORD, ASYNCHRONOUS MODE, TRI-STATE OUTPUTS,	ADVANCED MICRO DEV	AM7201-50JC
IC130	28462/151	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC374... 1 INPUT, OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	PHILIPS	74HC374D
IC131	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC201	28469/032	IC-DIGITAL INVERTER 74HC14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC14D
IC202	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC203	28466/390	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC00D
IC204	28469/056	IC-DIGITAL INVERTER 74AC14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC14SC
IC205	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	NAT. SEMICONDUCTOR	74AC74SC

B6 Digital PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC206	28464/184	IC-DIGITAL COUNTER 74HC161... 4 INPUT, 4 BIT, SINGLE, BINARY, PRESETTABLE, SYNCHRONOUS,	PHILIPS	74HC161D
IC207	28469/057	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC04D
IC208	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC209	28469/056	IC-DIGITAL INVERTER 74AC14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC14SC
IC210	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	NAT. SEMICONDUCTOR	74AC74SC
IC211	28464/185	IC-DIGITAL COUNTER 74HC160... 4 INPUT, 4 BIT, SINGLE, BCD, PRESETTABLE, SYNCHRONOUS,	PHILIPS	74HC160D
IC212	28464/184	IC-DIGITAL COUNTER 74HC161... 4 INPUT, 4 BIT, SINGLE, BINARY, PRESETTABLE, SYNCHRONOUS,	PHILIPS	74HC161D
IC213	28461/773	IC-ANALOGUE VOLTAGE-REFERENCE AD588AD... 15V PRECISION, 3ppm/DEG.C, MONOLITHIC, 16 PIN,	ANALOG DEVICES LTD	AD588AQ
IC214	28461/802	IC-ANALOGUE D/A-CONVERTER AD7846... SINGLE, 15V 11mA 16 BIT, VOLTAGE O/P, CMOS, 28 PIN, PLCC.	ANALOG DEVICES LTD	AD7846JP
IC215	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC216	28461/445	IC-ANALOGUE OPERATIONAL AMP HA7-2645... SINGLE, 40V HIGH VOLTAGE, MONOLITHIC, 8 PIN, DUAL-IN-LINE.	HARRIS SEMICONDUCTOR	HA7-2645-5
IC217	28461/444	IC-ANALOGUE OPERATIONAL AMP AMP03... SINGLE, 18V INSTRUMENTATION, UNITY GAIN, SLEW-RATE 6V/uS MIN,	ANALOG DEVICES LTD	AMP03GP
IC218	28461/982	IC-ANALOGUE SWITCH DG403... DUAL, 15V SPDT, ON-RESISTANCE<35R, 2 x CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG403DY
IC220	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC221	28469/057	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC04D
IC254	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC255	28466/119	IC-DIGITAL OR-GATE 74AC32... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC32SC
IC256	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC401	28461/888	IC-ANALOGUE SWITCH DG419... SINGLE, 15V SPDT, ON-RESISTANCE<35R, CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG419DY
IC402	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC403	28461/888	IC-ANALOGUE SWITCH DG419... SINGLE, 15V SPDT, ON-RESISTANCE<35R, CHANGEOVER, TTL COMPATIBLE,	SILICONIX LTD	DG419DY
L201	23642/532	INDUCTOR-FIXED 0.22uH +/- 20% MOULDED-EPOXY, 450mA 0R32 MAX, 30 Q @ 25 MHz, SURFACE-MOUNTED	MEGGITT ELECTRONICS	3612-T-R22-M
L202	23642/532	INDUCTOR-FIXED 0.22uH +/- 20% MOULDED-EPOXY, 450mA 0R32 MAX, 30 Q @ 25 MHz, SURFACE-MOUNTED	MEGGITT ELECTRONICS	3612-T-R22-M
L203	23642/536	INDUCTOR-FIXED 0.33uH +/- 20% MOULDED-EPOXY, 450mA 0R4 MAX, 30 Q @ 25 MHz, SURFACE-MUNTED	MEGGITT ELECTRONICS	3612-T-R33-M
L204	23642/536	INDUCTOR-FIXED 0.33uH +/- 20% MOULDED-EPOXY, 450mA 0R4 MAX, 30 Q @ 25 MHz, SURFACE-MUNTED	MEGGITT ELECTRONICS	3612-T-R33-M

B6 Digital PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
L205	23642/557	INDUCTOR-FIXED 22uH +/- 10% COATED-LACQUER, MINIATURE, 260mA 3R MAX, 55 Q @ 2.5 MHz, 25 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/010
PLA	23436/203	CONNECTOR DIN41612, PLUG, 96 WAY, RIGHT ANGLED, 3-ROW, 2.54mm GRID, PCB MOUNTING, GOLD PLATED	ITT CANNON (UK)	E2P-M-960-AA-L3-C-00
PLB	23436/229	CONNECTOR DIN41612, PLUG, 48 WAY, RIGHT ANGLED, 3-ROW, 2.54mm GRID, PCB MOUNTING, GOLD PLATED	HARTING ELECTRONIK	0923-148-6921
PLC	23435/952	CONNECTOR MULTIWAY, PCB HEADER, 26 WAY, STRAIGHT, 2-ROW, 2.54mm GRID, POLARISED, SHROUDED.	THOMAS & BETTS LTD	609-2627
PLD	23435/952	CONNECTOR MULTIWAY, PCB HEADER, 26 WAY, STRAIGHT, 2-ROW, 2.54mm GRID, POLARISED, SHROUDED.	THOMAS & BETTS LTD	609-2627
PLE	23436/970	CONNECTOR MULTIWAY, PCB HEADER, 34 WAY, RIGHT ANGLED, 2-ROW, 2.54mm GRID, POLARISED, SHROUDED,	MOLEX ELECTRONICS	39-26-7348
PLF	23436/902	CONNECTOR MULTIWAY, PCB HEADER, 26 WAY, RIGHT ANGLED, 2-ROW, 2.54mm GRID, POLARISED, SHROUDED,	MOLEX ELECTRONICS	39-26-7268
PLG	23436/774	CONNECTOR MULTIWAY, PCB HEADER, 40 WAY, RIGHT ANGLED, 2-ROW, 2.54mm GRID, POLARISED, SHROUDED,	MOLEX ELECTRONICS	39-26-7408
PLH	23436/901	CONNECTOR MULTIWAY, PCB HEADER, 16 WAY, RIGHT ANGLED, 2-ROW, 2.54mm GRID, POLARISED, SHROUDED,	THOMAS & BETTS LTD	609-1607
PLL	23435/877	CONNECTOR MULTIWAY, PCB HEADER, 2 WAY, STRAIGHT, 2.54mm PITCH, WITH FRICTION LOCK, TIN PLATED PINS,	MOLEX ELECTRONICS	22-27-2021
R1	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R2	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R3	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R4	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R5	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R6 to R9	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R10 to R13	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R14	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R16 to R26	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R27	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R28	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R29	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R30	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R31 to R34	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm

B6 Digital PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R35	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R36 to R39	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R40	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R41 to R44	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R45	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R46	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R47	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R48	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R49	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R50	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R51 to R55	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R56	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R57 to R59	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R60 to R64	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R65	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R66	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R67 to R70	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R71	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R72	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R73	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R74 to R78	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R82	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R85	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R86 to R95	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R96	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R97	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

B6 Digital PCB (contd.)

R98 to R110	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R201	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R202	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R203	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R204	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R205	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R206	24811/178	RESISTOR-FIXED METAL-FILM 1K62 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-1K62-1%50ppm
R207	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R208	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R209	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R210	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R211	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R212	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R213	24811/178	RESISTOR-FIXED METAL-FILM 1K62 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-1K62-1%50ppm
R214	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R215 to R227	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R228	24681/590	RESISTOR-NETWORK DIVIDER, METAL-FOIL, 9K 1K 0.1% 200mW 40V 0.5 ppm/DEG.C, 1 RESISTOR PAIRS, 0.05%	VISHAY COMPONENTS	RE11C-9K1K/0.1%/.01%
R229	24722/018	RESISTOR-FIXED METAL-FOIL 10R +/- 0.02% 190mW 150V 5 ppm/DEG.C, RADIAL, 0.2in PWP, (LOOSE OR TAPED).	VISHAY COMPONENTS	RCK-02-10R0-0.02%
R230	24772/128	RESISTOR-FIXED METAL-FILM 200K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-200K-2%
R231	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R232	24722/004	RESISTOR-FIXED METAL-FOIL 20K +/- 0.01% 500mW 300V 5 ppm/DEG.C, RADIAL, 0.2in PWP, (LOOSE OR TAPED).	VISHAY COMPONENTS	RCK-02-20K-0.01%
R233	24811/117	RESISTOR-FIXED METAL-FILM 4R75 +/- 1% 250mW 200V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	SMM0204-4R75-1%
R234	24722/017	RESISTOR-FIXED METAL-FOIL 60K +/- 0.01% 500mW 150V 5 ppm/DEG.C, RADIAL, 0.2in PWP, (LOOSE OR TAPED).	VISHAY COMPONENTS	RCK-02-60K-0.01%
R235	24811/220	RESISTOR-FIXED METAL-FILM 90K9 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-90K9-1%50ppm
R237	24811/201	RESISTOR-FIXED METAL-FILM 15K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-15K-1%50ppm
R238	24811/199	RESISTOR-FIXED METAL-FILM 12K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-12K1-1%50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

B6 Digital PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R239	24811/195	RESISTOR-FIXED METAL-FILM 8K25 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-8K25-1%50ppm
R240	24811/167	RESISTOR-FIXED METAL-FILM 562R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-562R-1%50ppm
R241	24811/167	RESISTOR-FIXED METAL-FILM 562R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-562R-1%50ppm
R242	24811/195	RESISTOR-FIXED METAL-FILM 8K25 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-8K25-1%50ppm
R243	24811/143	RESISTOR-FIXED METAL-FILM 56R2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-56R2-1%50ppm
R244	24811/143	RESISTOR-FIXED METAL-FILM 56R2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-56R2-1%50ppm
R245	24811/109	RESISTOR-FIXED METAL-FILM 2R21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE-MOUNTED, SIZE MINI-MELF	VISHAY COMPONENTS	SMM0204-2R21-1%50pmm
R246	24811/109	RESISTOR-FIXED METAL-FILM 2R2 +/- 2% 250mW 200V 50 ppm/DEG.C, SURFACE-MOUNTED, SIZE MINI-MELF	VISHAY COMPONENTS	SMM0204-2R21-1%50pmm
R247	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R249 to R254	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R257	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R258	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R259 to R261	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R262 to R264	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R265	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R266	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R267	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R270	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R401 to R407	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R410	24811/201	RESISTOR-FIXED METAL-FILM 15K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-15K-1%50ppm
R411	24811/203	RESISTOR-FIXED METAL-FILM 18K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-18K2-1%50ppm
R412	24811/125	RESISTOR-FIXED METAL-FILM 10R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10R-1%-50ppm
R413	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R414	24811/182	RESISTOR-FIXED METAL-FILM 2K43 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K43-1%50ppm
R415	24811/201	RESISTOR-FIXED METAL-FILM 15K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-15K-1%50ppm
R416	24811/203	RESISTOR-FIXED METAL-FILM 18K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-18K2-1%50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

B6 Digital PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R417	24811/125	RESISTOR-FIXED METAL-FILM 10R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10R-1%-50ppm
SA	23465/891	SWITCH ROCKER, SINGLE-POLE 8 SWITCHES, 30V 150mA - ON-OFF, PCB-MOUNTING, PIANO KEY TYPE, 16 PIN,	GRAYHILL (USA)	76PSB08
SKA to SKH	28488/187	SOCKET INTEGRATED-CIRCUIT, 32 WAY, DUAL-IN-LINE, 15.24mm ROW PITCH, LOW-PROFILE, TURNED PIN,	AUGAT LTD	1832-AG111D
TR1	28435/821	TRANSISTOR PNP BIPOLAR P2N2907A... 60V 200MHz 400mW 100mA 100hFE @ 10mA, TO-92, (LOOSE).	PHILIPS	PH2907A/TO18
TR2	28454/802	TRANSISTOR NPN BIPOLAR 2N2222A... 40V 300MHz 400mW 800mA 35hFE @ 10mA, TO-18.	NAT. SEMICONDUCTOR	2N2222A
TR3	28435/821	TRANSISTOR PNP BIPOLAR P2N2907A... 60V 200MHz 400mW 100mA 100hFE @ 10mA, TO-92, (LOOSE).	PHILIPS	PH2907A/TO18
TR4	28454/802	TRANSISTOR NPN BIPOLAR 2N2222A... 40V 300MHz 400mW 800mA 35hFE @ 10mA, TO-18.	NAT. SEMICONDUCTOR	2N2222A
TR201	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR202	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR203	28452/167	TRANSISTOR NPN BIPOLAR BFR90... 15V 5GHz 180mW 25mA 40hFE @ 14mA, SURFACE MOUNTED, SOT-37.	PHILIPS	BFR90
TR204	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR205	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR206	28452/167	TRANSISTOR NPN BIPOLAR BFR90... 15V 5GHz 180mW 25mA 40hFE @ 14mA, SURFACE MOUNTED, SOT-37.	PHILIPS	BFR90
TR207	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR208	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR209	28487/815	TRANSISTOR NPN BIPOLAR TIP120... DARLINGTON, 60V 65W 5A 1000hFE @ 3A, TO-220.	PHILIPS	TIP120
TR210	28487/816	TRANSISTOR PNP BIPOLAR TIP125... DARLINGTON, 60V 65W 5A 1000hFE @ 3A, TO-220.	MOTOROLA INC.	TIP125
XL1	28312/050	CRYSTAL 0.032768 MHz +/- 20 ppm, 12.5pF PARALLEL RESONANCE, 35K ESR MAX, WATCH-TYPE, MIN	MOTOROLA INC.	MTF32 CL12 32.768KHZ

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB

When ordering, prefix circuit reference with A8.

44830/115	Complete unit	Issue: 003	

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C101 to C116	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C201	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C202	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C203	26386/871	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-472-KP
C204	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C205	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C206	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C207	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C208	26486/101	CAPACITOR-FIXED TANTALUM 1uF +/-20% 16V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 1206, (8mm	VISHAY COMPONENTS	293D-105-X0-016-A-2T
C209	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C210	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C211	26486/101	CAPACITOR-FIXED TANTALUM 1uF +/-20% 16V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 1206, (8mm	VISHAY COMPONENTS	293D-105-X0-016-A-2T
C212	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C213	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEBM-100/63
C214	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEBM-100/63
C215	26486/101	CAPACITOR-FIXED TANTALUM 1uF +/-20% 16V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 1206, (8mm	VISHAY COMPONENTS	293D-105-X0-016-A-2T
C216	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C217	26486/101	CAPACITOR-FIXED TANTALUM 1uF +/-20% 16V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 1206, (8mm	VISHAY COMPONENTS	293D-105-X0-016-A-2T
C218	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C219	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEBM-100/63
C220	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEBM-100/63
C221	26386/808	CAPACITOR-FIXED CERAMIC 4.7pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-4R7D-XAT
C222	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C223	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C224	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C225	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C226 to C228	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C229 to C231	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C232	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C233	26386/865	CAPACITOR-FIXED CERAMIC 1.5nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-152K-XAT
C235	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C236	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C237	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-220J-XAT
C239 to C241	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C243	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C246	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C247	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C248	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C249	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C250	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C251	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C252	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C253	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C254	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C255	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C256	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C257	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C258	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C259	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C260	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C261	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-KA-220-B
C262	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C263	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C266	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C267	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C268	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C269	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C270	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C271	26386/826	CAPACITOR-FIXED CERAMIC 150pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-151J-XAT
C272	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C274	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C275	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C276	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C277	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C278 to C282	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C283	26386/867	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-222K-XAT
C284	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C285	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C286	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-KA-220-B
C287 to C289	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C293	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C294	26386/826	CAPACITOR-FIXED CERAMIC 150pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-151J-XAT
C295	26386/826	CAPACITOR-FIXED CERAMIC 150pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-151J-XAT
C401	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C402	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C403	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C404	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C405 to C408	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C409	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C410	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C411	26421/118	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-0J-KA-101-B
C501 to C508	26386/820	CAPACITOR-FIXED CERAMIC 47pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-470J-XAT
C509	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C510	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C511	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	DUBILIER CAPACITORS	MMP-10nF-K-63V-T/R
C512	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEBM-470/16
C513	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEBM-470/16
C514 to C516	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C517	26421/109	CAPACITOR-FIXED ALUMINIUM 3.3uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-KA-3R3-B
C518	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C519	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	DUBILIER CAPACITORS	MMP-10nF-K-63V-T/R
C520	26343/437	CAPACITOR-FIXED CERAMIC 100pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-101-GAK-ACR-J
C521	26421/118	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-0J-KA-101-B
C522	26343/433	CAPACITOR-FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-470-GAK-ACR-J
C523	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C524	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C525	26386/867	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-222K-XAT
C526 to C529	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C530	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C531	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C532	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-101J-XAT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

C533 to C536	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C537	26386/833	CAPACITOR-FIXED CERAMIC 560pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-561J-XAT
C538 to C543	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C544	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C545 to C557	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C558	26421/118	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-0J-KA-101-B
C601 to C604	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C605	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C606	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C607	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C608	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C609	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C610	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C611	26386/871	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-472-KP
C612	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-220J-XAT
C613 to C615	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C616	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C617 to C621	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C622	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C623 to C625	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C626	26421/118	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-0J-KA-101-B
C627	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-KA-220-B
C628	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-KA-220-B
C629	26386/826	CAPACITOR-FIXED CERAMIC 150pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-151J-XAT
C701	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C702	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C703	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-100J-XAT
C704	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-150J-XAT
C705	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-100J-XAT
C706	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C707	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C708	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-101J-XAT
C709	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C710	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C711	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C712	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-101J-XAT
C713 to C716	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C717	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-101J-XAT
C718	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C719	26386/826	CAPACITOR-FIXED CERAMIC 150pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-151J-XAT
C720	26386/832	CAPACITOR-FIXED CERAMIC 470pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-471J-XAT
C721	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-220J-XAT
C722	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C723	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C724	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-150J-XAT
C725	26386/817	CAPACITOR-FIXED CERAMIC 27pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-270J-XAT
C726	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-150J-XAT
C727	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C728	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-220J-XAT
C729	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-100J-XAT
C730	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-100J-XAT
C731	26386/826	CAPACITOR-FIXED CERAMIC 150pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-151J-XAT

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C732	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-220J-XAT
C733	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C734 to C736	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C737 to C739	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-101J-XAT
C740	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C741	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C742	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C743	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C744	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C745	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C746	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C747	26386/826	CAPACITOR-FIXED CERAMIC 150pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-151J-XAT
C901 to C913	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C914	26386/826	CAPACITOR-FIXED CERAMIC 150pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-151J-XAT
C951	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C952	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C953	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C954	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C955	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-KA-220-B
C956	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C957	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C958	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEBM-470/16
C959	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEBM-470/16
C960	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C961	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-KA-010-B
C962	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
		A8/1 Control PCB (contd.)		
C963	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C964	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-KA-220-B
C965	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C966	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C967	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C968	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEBM-100/63
C969	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C970	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C971	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEBM-100/63
C972	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
D101	28371/301	DIODE ZENER, BZX84-C4V3... 250mW 4.3V 5% 250mA MARKING CODE Z17/W9, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C4V3
D102	28371/301	DIODE ZENER, BZX84-C4V3... 250mW 4.3V 5% 250mA MARKING CODE Z17/W9, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C4V3
D103 to D203	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D204	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D205	28374/120	DIODE ZENER, 1N5365B... 5W 36V 5% AXIAL, CASE-17, (TAPED).	MOTOROLA INC.	1N5365BRL
D206	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D207	28374/120	DIODE ZENER, 1N5365B... 5W 36V 5% AXIAL, CASE-17, (TAPED).	MOTOROLA INC.	1N5365BRL
D208	28372/471	DIODE ZENER, BZX84-C15... 250mW 15V 5% 250mA MARKING CODE Y4, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C15
D209	28372/471	DIODE ZENER, BZX84-C15... 250mW 15V 5% 250mA MARKING CODE Y4, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C15
D210	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D211	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D212	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D213	28374/120	DIODE ZENER, 1N5365B... 5W 36V 5% AXIAL, CASE-17, (TAPED).	MOTOROLA INC.	1N5365BRL
D214	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D215	28374/120	DIODE ZENER, 1N5365B... 5W 36V 5% AXIAL, CASE-17, (TAPED).	MOTOROLA INC.	1N5365BRL

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
D216	28372/471	DIODE ZENER, BZX84-C15... 250mW 15V 5% 250mA MARKING CODE Y4, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C15
D217	28372/471	DIODE ZENER, BZX84-C15... 250mW 15V 5% 250mA MARKING CODE Y4, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C15
D218	28372/032	DIODE ZENER, BZX84-C10... 250mW 10V 5% 250mA MARKING CODE Z9, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C10
D219	28372/032	DIODE ZENER, BZX84-C10... 250mW 10V 5% 250mA MARKING CODE Z9, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C10
D220	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D283 to D286	28383/903	DIODE SMALL-SIGNAL, BAV99... DUAL, 70V 100mA 1.1Vf @ 50mA, IN SERIES, MARKING CODE A7, SURFACE	PHILIPS	BAV99 (A7)
D401	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D501 to D503	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D504 to D601	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D602	28371/555	DIODE ZENER, BZX84-C6V8... 250mW 6.8V 5% 250mA MARKING CODE Z5, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C6V8
D603	28371/555	DIODE ZENER, BZX84-C6V8... 250mW 6.8V 5% 250mA MARKING CODE Z5, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C6V8
D701	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D702	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D703	28383/909	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2822... DUAL, 8V 1pF 340mVf @ 1mA, IN SERIES, MARKING CODE C2L,	HEWLETT-PACKARD	HSMS-2822-TR1
D704	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D705	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D706 to D708	28383/909	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2822... DUAL, 8V 1pF 340mVf @ 1mA, IN SERIES, MARKING CODE C2L,	HEWLETT-PACKARD	HSMS-2822-TR1
D709	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D951	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
IC101 to IC103	28464/182	IC-DIGITAL COUNTER 74HC40103... 8 INPUT, 8 BIT, SINGLE, SYNCHRONOUS BINARY DOWN COUNTER, POS EDGE	PHILIPS	74HC40103D
IC104	28462/153	IC-DIGITAL FLIP-FLOP/J-K 74AC109... DUAL, POS EDGE TRIGGER, PLUS SET AND RESET, CMOS-ADVANCED, 16	MOTOROLA INC.	MC74AC109D
IC105	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	MOTOROLA INC.	MC74AC74D
IC106	28469/057	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC04D
IC107	28464/199	IC-DIGITAL COUNTER SP8735... SINGLE, 5V, 600MHz, DIVIDE BY 8, OPEN COLLECTOR OUTPUTS, ECL, 16 PIN,		
IC108	28464/173	IC-DIGITAL COUNTER 74AC161... 4 INPUT, 4 BIT, SINGLE, BINARY, SYNCHRONOUS, PRESETTABLE + RESET,	MOTOROLA INC.	MC74AC161D

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC109	28469/058	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 4 INPUT, 4 BIT, DUAL, NON-INVERTING, TRI-STATE BUS,	PHILIPS	74HC244D
IC110 to IC112	28464/148	IC-DIGITAL COUNTER 74HC590... 8 BIT, BINARY TRI-STATE, CMOS-H/SPEED, 16 PIN, DUAL-IN-LINE.	TEXAS INSTRUMENTS	SN74HC590N
IC201	28461/390	IC-ANALOGUE OPERATIONAL AMP OP-37GP... SINGLE, LOW-NOISE, HI-SPEED, PRECISION, SLEW-RATE 17V/uS	ANALOG DEVICES LTD	OP-37GP
IC202	28469/032	IC-DIGITAL INVERTER 74HC14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC14D
IC203	28461/874	IC-ANALOGUE SWITCH DG411... QUAD, 15V SPST, ON-RESISTANCE<35R, 4 x N/O @ LOGIC 1, TTL	ANALOG DEVICES LTD	ADG411BR
IC204	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC205	44533/427	IC PROGRAMMED PAL	MARCONI INSTRUMENTS LTD	
IC209	28461/874	IC-ANALOGUE SWITCH DG411... QUAD, 15V SPST, ON-RESISTANCE<35R, 4 x N/O @ LOGIC 1, TTL	ANALOG DEVICES LTD	ADG411BR
IC210	28461/411	IC-ANALOGUE OPERATIONAL AMP TL071... SINGLE, JFET INPUT, LOW NOISE, 8 PIN, SMALL-OUTLINE.	MOTOROLA INC.	TL071CD
IC211	28461/874	IC-ANALOGUE SWITCH DG411... QUAD, 15V SPST, ON-RESISTANCE<35R, 4 x N/O @ LOGIC 1, TTL	ANALOG DEVICES LTD	ADG411BR
IC212	28461/673	IC-ANALOGUE COMPARATOR LM339... QUAD, SINGLE SUPPLY, BIPOLAR, 14 PIN, SMALL-OUTLINE.	PHILIPS	LM339D
IC213	28461/802	IC-ANALOGUE D/A-CONVERTER AD7846... SINGLE, 15V 11mA 16 BIT, VOLTAGE O/P, CMOS, 28 PIN, PLCC.	ANALOG DEVICES LTD	AD7846JP
IC214	28461/802	IC-ANALOGUE D/A-CONVERTER AD7846... SINGLE, 15V 11mA 16 BIT, VOLTAGE O/P, CMOS, 28 PIN, PLCC.	ANALOG DEVICES LTD	AD7846JP
IC215	28461/757	IC-ANALOGUE VOLTAGE-REFERENCE AD586... 36V 5V REF +/- 20mV, OUTPUT DRIFT 25ppm/DEG.C, MONOLITHIC, 8	ANALOG DEVICES LTD	AD586JN
IC216	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC217	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD
IC218	28469/762	IC-ANALOGUE MULTIPLEXER DG409... 8 INPUT, DUAL, 15V 35uA DIFFERENTIAL 4 CHANNEL, RDS<100R, CMOS,	TEMIC UK LTD	DG409DY
IC219	28461/443	IC-ANALOGUE OPERATIONAL AMP OP270GP... DUAL, 15V I/P OFFSET 250uV MAX, SLEW-RATE 1.7V/uS MIN, DRIFT	ANALOG DEVICES LTD	OP270GP
IC220	28461/444	IC-ANALOGUE OPERATIONAL AMP AMP03... SINGLE, 18V INSTRUMENTATION, UNITY GAIN, SLEW-RATE 6V/uS MIN,	ANALOG DEVICES LTD	AMP03GP
IC221	28461/411	IC-ANALOGUE OPERATIONAL AMP TL071... SINGLE, JFET INPUT, LOW NOISE, 8 PIN, SMALL-OUTLINE.	MOTOROLA INC.	TL071CD
IC222	28461/864	TRANSISTOR NPN BIPOLAR 3046... ARRAY, 20V 50mA 5-TRANSISTORS, 3-SINGLES & 1-PAIR, SURFACE	HARRIS SEMICONDUCTOR	CA3046M
IC401	28464/039	IC-DIGITAL DIVIDER SP4731... DIVIDE BY 64, 1.3GHz, PRESCALER, ECL, 8 PIN, DUAL-IN-LINE.		
IC402	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	MOTOROLA INC.	MC74AC74D
IC403	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	MOTOROLA INC.	MC74AC74D
IC404	28466/394	IC-DIGITAL NAND-GATE 74AC00... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	MOTOROLA INC.	MC74AC00D
IC405	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC501	28469/621	IC-DIGITAL ARRAY-LOGIC L5A1579... FRACTIONAL N CONTROL CHIP, 28 BIT BINARY, TO MI CUSTOM SPEC,		

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC502 to IC504	28464/159	IC-DIGITAL COUNTER MC10H016... 4 BIT, BINARY, ECL, 16 PIN, DUAL-IN-LINE.	MOTOROLA INC.	MC10H016P
IC505	28466/219	IC-DIGITAL NOR-GATE 10102... 2 INPUT, QUAD, ECL, 16 PIN, DUAL-IN-LINE.	MOTOROLA INC.	MC10102P
IC506	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC507	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC508	28466/390	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC00D
IC509	28461/449	IC-ANALOGUE MICROWAVE-AMP MSA-0686... 3.5V 16mA GAIN 18.5dB @0.5GHz, 3dB B/WTH DC-0.8GHz, BIPOLAR,	HEWLETT-PACKARD	MSA-0686-TR1
IC510	28469/521	IC-DIGITAL DIVIDER SP4904... DIVIDE BY 4, 2.54GHz, PRESCALER, ECL, 8 PIN, DUAL-IN-LINE.		
IC511	28464/035	IC-DIGITAL DIVIDER SP8743BDG... DIVIDE BY 8/9, 500MHz ECL, 16 PIN, DUAL-IN-LINE.		
IC512	28461/874	IC-ANALOGUE SWITCH DG411... QUAD, 15V SPST, ON-RESISTANCE<35R, 4 x N/O @ LOGIC 1, TTL	ANALOG DEVICES LTD	ADG411BR
IC601	28464/039	IC-DIGITAL DIVIDER SP4731... DIVIDE BY 64, 1.3GHz, PRESCALER, ECL, 8 PIN, DUAL-IN-LINE.		
IC602	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC603	28466/390	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC00D
IC604	28468/321	IC-DIGITAL FLIP-FLOP/MONOSTABLE 74HC123... DUAL, RETRIGGERABLE, tW = 0.45RC, WITH RESET,	PHILIPS	74HC123D
IC605	28461/874	IC-ANALOGUE SWITCH DG411... QUAD, 15V SPST, ON-RESISTANCE<35R, 4 x N/O @ LOGIC 1, TTL	ANALOG DEVICES LTD	ADG411BR
IC606	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC607	28461/673	IC-ANALOGUE COMPARATOR LM339... QUAD, SINGLE SUPPLY, BIPOLAR, 14 PIN, SMALL-OUTLINE.	PHILIPS	LM339D
IC608	28461/808	IC-ANALOGUE D/A-CONVERTER 7524... 15V 8 BIT, BUFFERED, MULTIPLYING, REL-ACC +/-1/2 LSB,	TEXAS INSTRUMENTS	AD7524JFN
IC609	28461/494	IC-ANALOGUE BUFFER-AMPLIFIER LT1010... 22V UNITY GAIN, SLEW-RATE 75 V/uS MIN, BANDWIDTH 20MHz @	LINEAR TECHNOLOGY	LT1010CT
IC701	28461/447	IC-ANALOGUE MICROWAVE-AMP MSA-0886... 7.8V 36mA GAIN 22.5dB @1GHz, 25dB BNDWIDTH DC-5GHz, BIPOLAR,	HEWLETT-PACKARD	MSA-0886-TR1
IC702	28461/449	IC-ANALOGUE MICROWAVE-AMP MSA-0686... 3.5V 16mA GAIN 18.5dB @0.5GHz, 3dB B/WTH DC-0.8GHz, BIPOLAR,	HEWLETT-PACKARD	MSA-0686-TR1
IC703	28461/447	IC-ANALOGUE MICROWAVE-AMP MSA-0886... 7.8V 36mA GAIN 22.5dB @1GHz, 25dB BNDWIDTH DC-5GHz, BIPOLAR,	HEWLETT-PACKARD	MSA-0886-TR1
IC704	28461/437	IC-ANALOGUE OPERATIONAL AMP 5534... 2 INPUT, SINGLE, 10V 16mA LOW NOISE, 10MHz, BIPOLAR, 8 PIN,	PHILIPS	NE5534D
IC705	28461/456	IC-ANALOGUE MICROWAVE-AMP INA-10386... 6V 45mA GAIN 26dB @1.5GHz, 3dB BNDWDTH DC-1.8GHz, BIPOLAR,	HEWLETT-PACKARD	INA-10386-TR1
IC706	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC901	28465/056	IC-DIGITAL DECODER/DEMULTIPLEX 74HC139... 2 INPUT, 4 BIT, DUAL, INVERTING, 1 BIT ADDRESS,	PHILIPS	74HC139D
IC902	28466/120	IC-DIGITAL OR-GATE 74HC32... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC32D

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC903	28465/065	IC-DIGITAL DECODER/DEMULTIPLEX 74HC154... 4-TO-16 LINE, CMOS-H/SPEED, 24 PIN, SMALL-OUTLINE.	PHILIPS	74HC154D
IC904 to IC906	28462/151	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC374... 1 INPUT, OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	PHILIPS	74HC374D
IC907	28462/639	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC374... OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	MOTOROLA INC.	MC74AC374DW
IC908	28462/640	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC175... QUAD, POS EDGE TRIGGER, RESET, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC175D
IC909	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD
IC910	28461/899	IC-ANALOGUE A/D CONVERTER 7828... 8 INPUT, 5V HIGH SPEED, 8-BIT, 1/2 LSB ACCURACY, CMOS, 28 PIN,	ANALOG DEVICES LTD	AD7828KP
IC912	28469/052	IC-DIGITAL BUFFER 74HC365... HEX, TRI-STATE, NON-INVERTING, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC365D
IC913	28469/052	IC-DIGITAL BUFFER 74HC365... HEX, TRI-STATE, NON-INVERTING, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC365D
IC951	28461/736	IC-ANALOGUE VOLTAGE-REGULATOR 79L05AC... 5V 100mA NEGATIVE, OUTPUT VOLTAGE ERROR <5% OVERLOAD,	MOTOROLA INC.	MC79L05ACP
IC952	28461/673	IC-ANALOGUE COMPARATOR LM339... QUAD, SINGLE SUPPLY, BIPOLAR, 14 PIN, SMALL-OUTLINE.	PHILIPS	LM339D
L501	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L502	23642/549	INDUCTOR-FIXED 1uH +/- 10% COATED-LACQUER, MINIATURE, 820mA 0R3 MAX, 45 Q @ 25 MHz, 210 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/010
L503	23642/549	INDUCTOR-FIXED 1uH +/- 10% COATED-LACQUER, MINIATURE, 820mA 0R3 MAX, 45 Q @ 25 MHz, 210 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/010
L601	23642/562	INDUCTOR-FIXED 150uH +/- 10% COATED-LACQUER, MINIATURE, 130mA 13R MAX, 40 Q @ 0.79 MHz, 5.5 MHz	MEGGITT ELECTRONICS	C12-406/8/27471/006
L602	23642/562	INDUCTOR-FIXED 150uH +/- 10% COATED-LACQUER, MINIATURE, 130mA 13R MAX, 40 Q @ 0.79 MHz, 5.5 MHz	MEGGITT ELECTRONICS	C12-406/8/27471/006
L701	23642/516	INDUCTOR-FIXED 0.022uH +/- 10% EPOXY-MOULD, 450mA 0R2 MAX, 23 Q @ 100 MHz, 1.7K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-022-K
L702	23642/516	INDUCTOR-FIXED 0.022uH +/- 10% EPOXY-MOULD, 450mA 0R2 MAX, 23 Q @ 100 MHz, 1.7K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-022-K
L703	23642/515	INDUCTOR-FIXED 0.033uH +/- 5% EPOXY-MOULD, 450mA 0R24 MAX, 25 Q @ 100 MHz, 1.4K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-033-J
L704	23642/515	INDUCTOR-FIXED 0.033uH +/- 5% EPOXY-MOULD, 450mA 0R24 MAX, 25 Q @ 100 MHz, 1.4K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-033-J
L705	23642/713	INDUCTOR-FIXED 0.056uH +/- 5% EPOXY-MOULD, 450mA 0R33 MAX, 26 Q @ 100 MHz, 1.1K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-056-J
L706	23642/708	INDUCTOR-FIXED 0.01uH +/- 10% EPOXY-MOULD, 450mA 0R13 MAX, 15 Q @ 100 MHz, 2.5K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-010-K
L707	23642/517	INDUCTOR-FIXED 0.047uH +/- 5% EPOXY-MOULD, 450mA 0R3 MAX, 26 Q @ 100 MHz, 1.2K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-047-J
L708	23642/713	INDUCTOR-FIXED 0.056uH +/- 5% EPOXY-MOULD, 450mA 0R33 MAX, 26 Q @ 100 MHz, 1.1K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-056-J
L951 to L953	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
PLQ to PLW	23233/270	TERMINAL CONNECTOR-PIN, LOOP ASSEMBLY, 2 mm DIA, PCB-MOUNTING, WITH BORO-SILICATE GLASS INSULATOR,	VERO ELECTRONICS	20-002136J

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R101	24321/817	RESISTOR-FIXED METAL-GLAZE 68K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6812-FT
R102	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R103	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R104	24321/786	RESISTOR-FIXED METAL-GLAZE 3K6 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K65-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3651-FT
R105	24321/758	RESISTOR-FIXED METAL-GLAZE 240R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-243R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2430-FT
R106	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R107	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R108	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R109	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R110	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R111	24811/174	RESISTOR-FIXED METAL-FILM 1K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K1-1%50ppm
R112	24321/785	RESISTOR-FIXED METAL-GLAZE 3K3 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K32-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3321-FT
R113	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R114 to R134	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R137	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R201	24753/487	RESISTOR-FIXED METAL-FILM 5K8 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-5K8-D-T-2
R202	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R203	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R204	24811/192	RESISTOR-FIXED METAL-FILM 6K19 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-6K19-1%50ppm
R205	24753/390	RESISTOR-FIXED METAL-FILM 1K91 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K91-D-T-2
R206	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R207	24724/106	RESISTOR-FIXED METAL-FOIL 2R +/- 1% 10W 350V 8 ppm/DEG.C, LOW-INDUCTANCE, CURRENT SENSOR, FOUR	VISHAY COMPONENTS	VFP-4-2R0-1%
R208	24321/813	RESISTOR-FIXED METAL-GLAZE 47K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47K5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4752-FT
R209	24321/795	RESISTOR-FIXED METAL-GLAZE 8K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-8K25-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8251-FT
R210	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R211	24321/787	RESISTOR-FIXED METAL-GLAZE 3K9 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K92-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3921-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R212	24321/821	RESISTOR-FIXED METAL-GLAZE 100K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1003-FT
R213	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R214	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R215	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R216	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R217	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R218	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R219	24321/813	RESISTOR-FIXED METAL-GLAZE 47K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47K5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4752-FT
R220	24321/795	RESISTOR-FIXED METAL-GLAZE 8K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-8K25-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8251-FT
R221	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R222	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R223	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R224	24321/813	RESISTOR-FIXED METAL-GLAZE 47K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47K5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4752-FT
R225	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R226	24321/795	RESISTOR-FIXED METAL-GLAZE 8K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-8K25-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8251-FT
R227	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R228	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R229	24321/813	RESISTOR-FIXED METAL-GLAZE 47K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47K5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4752-FT
R230	24321/795	RESISTOR-FIXED METAL-GLAZE 8K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-8K25-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8251-FT
R231	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R232	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R233	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R234	24723/373	RESISTOR-FIXED METAL-FILM 10K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-10K-B-T-10
R235	24321/841	RESISTOR-FIXED METAL-GLAZE 1M +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1M00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1004-FT
R236	24723/373	RESISTOR-FIXED METAL-FILM 10K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-10K-B-T-10
R237	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R238	24321/803	RESISTOR-FIXED METAL-GLAZE 18K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1822-FT
R239	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R240	24321/841	RESISTOR-FIXED METAL-GLAZE 1M +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1M00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1004-FT
R241	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R242	24321/795	RESISTOR-FIXED METAL-GLAZE 8K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-8K25-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8251-FT
R243	25748/507	RESISTOR-VARIABLE CERMET LINEAR, 10K 10% 300mW 200V 100 ppm/DEG.C, MULTI-TURN, HORIZONTAL-PCB,	VISHAY COMPONENTS	784I-10K-10%
R246	24321/769	RESISTOR-FIXED METAL-GLAZE 680R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-681R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6810-FT
R247	24321/825	RESISTOR-FIXED METAL-GLAZE 150K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1503-FT
R248	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R249	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R250 to R252	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R253	24321/811	RESISTOR-FIXED METAL-GLAZE 39K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-39K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3922-FT
R254 to R258	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R259	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R260 to R262	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R263	24321/791	RESISTOR-FIXED METAL-GLAZE 5K6 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-5K62-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5621-FT
R264	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R265	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R266	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R267	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R268	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R269	24321/841	RESISTOR-FIXED METAL-GLAZE 1M +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1M00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1004-FT
R270	24681/528	RESISTOR-NETWORK ISOLATED, THICK-FILM, 10K 2% 600mW 50V 200 ppm/DEG.C, 8 RESISTORS, SURFACE	VISHAY COMPONENTS	SOMC16-03-103-G-REEL
R271	24321/841	RESISTOR-FIXED METAL-GLAZE 1M +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1M00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1004-FT
R274	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R275	24321/782	RESISTOR-FIXED METAL-GLAZE 2K4 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K43-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2431-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R276	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R278	24321/829	RESISTOR-FIXED METAL-GLAZE 220K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2213-FT
R279	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R280	24321/793	RESISTOR-FIXED METAL-GLAZE 6K8 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-6K81-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6811-FT
R283	24321/811	RESISTOR-FIXED METAL-GLAZE 39K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-39K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3922-FT
R284	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R285	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R286	24321/804	RESISTOR-FIXED METAL-GLAZE 20K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-20K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2002-FT
R287	24321/799	RESISTOR-FIXED METAL-GLAZE 12K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-12K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1212-FT
R288	24321/804	RESISTOR-FIXED METAL-GLAZE 20K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-20K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2002-FT
R289	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R290	24338/002	RESISTOR-FIXED METAL-GLAZE 100R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-100R-5%-P4
R291	24321/801	RESISTOR-FIXED METAL-GLAZE 15K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1502-FT
R292	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R293	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R294	24723/421	RESISTOR-FIXED METAL-FILM 2K1 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-2K10-B-T-10
R295	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R296	24723/421	RESISTOR-FIXED METAL-FILM 2K1 +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-2K10-B-T-10
R297	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R299	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R300	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R301	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R302	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R303	24321/787	RESISTOR-FIXED METAL-GLAZE 3K9 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K92-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3921-FT
R304 to R318	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R401	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R402	24321/771	RESISTOR-FIXED METAL-GLAZE 820R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-825R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8250-FT
R403	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R404	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R405 to R407	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R410	24321/763	RESISTOR-FIXED METAL-GLAZE 390R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-392R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3920-FT
R411	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R412	24321/777	RESISTOR-FIXED METAL-GLAZE 1K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1501-FT
R413	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R414	24321/763	RESISTOR-FIXED METAL-GLAZE 390R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-392R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3920-FT
R415	24321/767	RESISTOR-FIXED METAL-GLAZE 560R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-562R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5620-FT
R416	24321/761	RESISTOR-FIXED METAL-GLAZE 330R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3320-FT
R419 to R421	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R422	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R423	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R501	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R502 to R509	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R510	24681/671	RESISTOR-NETWORK BUSSED, THICK-FILM, 10K 2% 1W 50V 100 ppm/DEG.C, 9 RESISTORS, LOW PROFILE, 10 PIN,	VISHAY COMPONENTS	LC0-001-1002G
R511	24681/666	RESISTOR-NETWORK BUSSED, THICK-FILM, 680R 2% 1W 50V 100 ppm/DEG.C, 9 RESISTORS, LOW PROFILE, 10	VISHAY COMPONENTS	LC0-001-6800G
R512	24681/691	RESISTOR-NETWORK BUSSED, THICK-FILM, 3K9 2% 1W 100V 200 ppm/DEG.C, 9 RESISTORS, LOW PROFILE, 10	MEGGITT ELECTRONICS	SIL10E392G
R513 to R521	24772/061	RESISTOR-FIXED METAL-FILM 330R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-330R-2%
R522	24772/069	RESISTOR-FIXED METAL-FILM 680R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-680R-2%
R523	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R524	24772/069	RESISTOR-FIXED METAL-FILM 680R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-680R-2%
R525	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R526	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R527 to R529	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R530 to R533	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R534	24321/761	RESISTOR-FIXED METAL-GLAZE 330R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3320-FT
R535	24321/761	RESISTOR-FIXED METAL-GLAZE 330R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3320-FT
R536	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R537	24321/795	RESISTOR-FIXED METAL-GLAZE 8K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-8K25-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8251-FT
R538	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R539	24321/775	RESISTOR-FIXED METAL-GLAZE 1K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1211-FT
R540	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R541	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R542	24321/775	RESISTOR-FIXED METAL-GLAZE 1K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1211-FT
R543	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R544	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R545	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R546	24321/739	RESISTOR-FIXED METAL-GLAZE 39R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-39R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-39R2-FT
R547	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R548	24338/010	RESISTOR-FIXED METAL-GLAZE 470R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-470R-5%-P4
R549	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R550	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R551	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R552	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R553	24772/101	RESISTOR-FIXED METAL-FILM 15K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-15K-2%
R554	24772/061	RESISTOR-FIXED METAL-FILM 330R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-330R-2%
R555	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R556	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R557	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R558 to R561	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
		A8/1 Control PCB (contd.)		
R562	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R563	24321/755	RESISTOR-FIXED METAL-GLAZE 180R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-182R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1820-FT
R564	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R565	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R566	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R601	24321/813	RESISTOR-FIXED METAL-GLAZE 47K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47K5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4752-FT
R602	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R603	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R604	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R605	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R606	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R607	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R610 to R612	24321/777	RESISTOR-FIXED METAL-GLAZE 1K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1501-FT
R613	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R614	24321/771	RESISTOR-FIXED METAL-GLAZE 820R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-825R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8250-FT
R615	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R617	24321/793	RESISTOR-FIXED METAL-GLAZE 6K8 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-6K81-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6811-FT
R620	24321/763	RESISTOR-FIXED METAL-GLAZE 390R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-392R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3920-FT
R621	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R622	24681/528	RESISTOR-NETWORK ISOLATED, THICK-FILM, 10K 2% 600mW 50V 200 ppm/DEG.C, 8 RESISTORS, SURFACE	VISHAY COMPONENTS	SOMC16-03-103-G-REEL
R623	24321/803	RESISTOR-FIXED METAL-GLAZE 18K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1822-FT
R624	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R625	24321/794	RESISTOR-FIXED METAL-GLAZE 7K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-7K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-7501-FT
R626	24321/784	RESISTOR-FIXED METAL-GLAZE 3K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K01-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3011-FT
R627	24321/787	RESISTOR-FIXED METAL-GLAZE 3K9 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K92-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3921-FT
R628	24321/799	RESISTOR-FIXED METAL-GLAZE 12K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-12K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1212-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R629	24321/801	RESISTOR-FIXED METAL-GLAZE 15K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1502-FT
R630	24338/002	RESISTOR-FIXED METAL-GLAZE 100R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-100R-5%-P4
R631	24338/002	RESISTOR-FIXED METAL-GLAZE 100R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-100R-5%-P4
R632	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R633 to R635	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R701	24321/755	RESISTOR-FIXED METAL-GLAZE 180R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-182R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1820-FT
R702	24321/771	RESISTOR-FIXED METAL-GLAZE 820R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-825R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8250-FT
R703	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R704	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R705	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R706	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R707	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R708	24338/004	RESISTOR-FIXED METAL-GLAZE 150R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-150R-5%-P4
R709	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R710	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R711	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R712	24321/755	RESISTOR-FIXED METAL-GLAZE 180R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-182R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1820-FT
R713	24338/010	RESISTOR-FIXED METAL-GLAZE 470R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-470R-5%-P4
R714	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R715	24338/004	RESISTOR-FIXED METAL-GLAZE 150R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-150R-5%-P4
R716	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R717	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R718	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R719	24321/837	RESISTOR-FIXED METAL-GLAZE 470K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4753-FT
R720	24321/791	RESISTOR-FIXED METAL-GLAZE 5K6 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-5K62-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5621-FT
R721	24321/803	RESISTOR-FIXED METAL-GLAZE 18K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1822-FT

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R722	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R723	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R724	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R725	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R726	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R727 to R729	24321/730	RESISTOR-FIXED METAL-GLAZE 16R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-16R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-16R2-FT
R730	24811/224	RESISTOR-FIXED METAL-FILM 130K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-130K-1%50ppm
R731	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R732	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R733	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R734	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R735	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R736	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R737	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R738 to R740	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R741	24321/837	RESISTOR-FIXED METAL-GLAZE 470K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4753-FT
R742	24321/837	RESISTOR-FIXED METAL-GLAZE 470K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4753-FT
R743	24321/805	RESISTOR-FIXED METAL-GLAZE 22K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2212-FT
R744	24321/793	RESISTOR-FIXED METAL-GLAZE 6K8 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-6K81-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6811-FT
R745	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R746	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R747	24321/739	RESISTOR-FIXED METAL-GLAZE 39R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-39R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-39R2-FT
R748	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R749	24338/004	RESISTOR-FIXED METAL-GLAZE 150R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-150R-5%-P4
R750	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R751	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R752	24321/805	RESISTOR-FIXED METAL-GLAZE 22K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2212-FT
R753	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R754	24321/755	RESISTOR-FIXED METAL-GLAZE 180R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-182R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1820-FT
R901 to R911	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R912 to R914	24681/691	RESISTOR-NETWORK BUSSED, THICK-FILM, 3K9 2% 1W 100V 200 ppm/DEG.C, 9 RESISTORS, LOW PROFILE, 10	MEGGITT ELECTRONICS	SIL10E392G
R915	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R951	24338/002	RESISTOR-FIXED METAL-GLAZE 100R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-100R-5%-P4
R952 to R957	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
TR101	28431/767	TRANSISTOR PNP BIPOLAR MPS4258... 12V 700MHz 1W 80mA 30hFE @ 50mA, TO-92, (LOOSE).	MOTOROLA INC.	MPS4258
TR102	28431/767	TRANSISTOR PNP BIPOLAR MPS4258... 12V 700MHz 1W 80mA 30hFE @ 50mA, TO-92, (LOOSE).	MOTOROLA INC.	MPS4258
TR103	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR104	28459/068	TRANSISTOR N-CHANNEL-ENHANCE MOSFET BST70A... 80V 1W 500mA 2R TO-92, (LOOSE).	PHILIPS	BST70A
TR201	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR202	28455/302	TRANSISTOR NPN BIPOLAR BCX54... 45V 130MHz 1W 1A 40hFE MIN @ 150mA, MARKING CODE BA, SURFACE	PHILIPS	BCX54
TR203	28459/075	TRANSISTOR P-CHANNEL-ENHANCE MOSFET ZVP2106A... 60V 700mW 5R TO-92, (LOOSE).	ZETEX PLC	ZVP2106A
TR204	28459/069	TRANSISTOR N-CHANNEL-ENHANCE MOSFET IRF540... 100V 125W 27A 0R085 INPUT CAPACITANCE 1600pF MAX,	INTERNAT RECTIFIER	IRF540
TR205	28459/075	TRANSISTOR P-CHANNEL-ENHANCE MOSFET ZVP2106A... 60V 700mW 5R TO-92, (LOOSE).	ZETEX PLC	ZVP2106A
TR206	28459/069	TRANSISTOR N-CHANNEL-ENHANCE MOSFET IRF540... 100V 125W 27A 0R085 INPUT CAPACITANCE 1600pF MAX,	INTERNAT RECTIFIER	IRF540
TR207 to TR210	28459/045	TRANSISTOR N-CHANNEL-ENHANCE MOSFET IRFD110... 60V 1W 1A 0R6 4 PIN, DUAL-IN-LINE.	INTERNAT RECTIFIER	IRFD110
TR211	28459/069	TRANSISTOR N-CHANNEL-ENHANCE MOSFET IRF540... 100V 125W 27A 0R085 INPUT CAPACITANCE 1600pF MAX,	INTERNAT RECTIFIER	IRF540
TR212	28459/069	TRANSISTOR N-CHANNEL-ENHANCE MOSFET IRF540... 100V 125W 27A 0R085 INPUT CAPACITANCE 1600pF MAX,	INTERNAT RECTIFIER	IRF540
TR213 to TR216	28459/045	TRANSISTOR N-CHANNEL-ENHANCE MOSFET IRFD110... 60V 1W 1A 0R6 4 PIN, DUAL-IN-LINE.	INTERNAT RECTIFIER	IRFD110
TR217	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR219	28455/302	TRANSISTOR NPN BIPOLAR BCX54... 45V 130MHz 1W 1A 40hFE MIN @ 150mA, MARKING CODE BA, SURFACE	PHILIPS	BCX54
TR220	28459/069	TRANSISTOR N-CHANNEL-ENHANCE MOSFET IRF540... 100V 125W 27A 0R085 INPUT CAPACITANCE 1600pF MAX,	INTERNAT RECTIFIER	IRF540

A8/1 Control PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
TR221	28459/075	TRANSISTOR P-CHANNEL-ENHANCE MOSFET ZVP2106A... 60V 700mW 5R TO-92, (LOOSE).	ZETEX PLC	ZVP2106A
TR222	28459/075	TRANSISTOR P-CHANNEL-ENHANCE MOSFET ZVP2106A... 60V 700mW 5R TO-92, (LOOSE).	ZETEX PLC	ZVP2106A
TR401	28487/817	TRANSISTOR PNP BIPOLAR BF569... 35V 900MHz 200mW 30mA 25hFE MIN @ 3mA, MARKING CODE G6 OR LH,	PHILIPS	BF569
TR402	28487/817	TRANSISTOR PNP BIPOLAR BF569... 35V 900MHz 200mW 30mA 25hFE MIN @ 3mA, MARKING CODE G6 OR LH,	PHILIPS	BF569
TR403	28487/818	TRANSISTOR NPN BIPOLAR BFS20... 20V 450MHz 200mW 25mA 40hFE MIN @ 7mA, MARKING CODE G1, SURFACE	PHILIPS	BFS20
TR404	28487/818	TRANSISTOR NPN BIPOLAR BFS20... 20V 450MHz 200mW 25mA 40hFE MIN @ 7mA, MARKING CODE G1, SURFACE	PHILIPS	BFS20
TR405	28487/817	TRANSISTOR PNP BIPOLAR BF569... 35V 900MHz 200mW 30mA 25hFE MIN @ 3mA, MARKING CODE G6 OR LH,	PHILIPS	BF569
TR406	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR501 to TR504	28431/767	TRANSISTOR PNP BIPOLAR MPS4258... TR50412V 700MHz 1W 80mA 30hFE @ 50mA, TO-92, (LOOSE).	MOTOROLA INC.	MPS4258
TR505	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR506	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR507	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR508	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR601	28487/817	TRANSISTOR PNP BIPOLAR BF569... 35V 900MHz 200mW 30mA 25hFE MIN @ 3mA, MARKING CODE G6 OR LH,	PHILIPS	BF569
TR602	28487/817	TRANSISTOR PNP BIPOLAR BF569... 35V 900MHz 200mW 30mA 25hFE MIN @ 3mA, MARKING CODE G6 OR LH,	PHILIPS	BF569
TR701	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR702	28487/819	TRANSISTOR PNP BIPOLAR BC869... 20V 60MHz 1W 1A 85-375hFE @ 0.5A, MARKING CODE CEC, SURFACE	PHILIPS	BC869
TR951 to TR954	28459/045	TRANSISTOR N-CHANNEL-ENHANCE MOSFET IRFD110... 60V 1W 1A 0R6 4 PIN, DUAL-IN-LINE.	INTERNAT RECTIFIER	IRFD110

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

B9 Keyboard PCB

When ordering, prefix circuit reference with B9.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44830/034	Complete unit Issue: 002		
C1 to C9	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C10	26421/118	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-0J-K-101-B
C11	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C12 to C15	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
IC1	28467/080	IC-MICRO CONTROLLER, 80C31... 8 BIT, 12MHz, 128 BYTE RAM, ZERO ROM, DUPLEX UART/SERIAL PORT, 4 x 8	PHILIPS	PCB80C31BH2-12P
IC2	28469/554	IC-DIGITAL LATCH 74HC573... OCTAL, TRI-STATE, NON-INVERTING, TRANSPARENT, D-TYPE, CMOS-H/SPEED,	PHILIPS	74HC573D
IC3	44533/437	IC PROGRAMMED EPROM.	MARCONI INSTRUMENTS LTD	
IC4	28465/065	IC-DIGITAL DECODER/DEMULTIPLEX 74HC154... 4-TO-16 LINE, CMOS-H/SPEED, 24 PIN, SMALL-OUTLINE.	PHILIPS	74HC154D
IC5	28469/554	IC-DIGITAL LATCH 74HC573... OCTAL, TRI-STATE, NON-INVERTING, TRANSPARENT, D-TYPE, CMOS-H/SPEED,	PHILIPS	74HC573D
IC6	28466/414	IC-DIGITAL EXCLUSIVE-OR 74HC86... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC86D
IC7	28466/390	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC00D
IC8	28469/063	IC-DIGITAL BUFFER/LINE-DRIVER 74HC125... QUAD, TRI-STATE, LOW ENABLE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC125D
IC9	28469/063	IC-DIGITAL BUFFER/LINE-DRIVER 74HC125... QUAD, TRI-STATE, LOW ENABLE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC125D
IC10	28469/553	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	PHILIPS	74HC574D
IC11	28469/553	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	PHILIPS	74HC574D
IC12	28466/390	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC00D
IC13	28466/120	IC-DIGITAL OR-GATE 74HC32... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC32D
L1	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
PLB	23444/334	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS, PCB-MOUNTING, NICKEL PLATED BODY.	ITT CANNON (UK)	051-051-0000-C90
PLC	23444/334	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS, PCB-MOUNTING, NICKEL PLATED BODY.	ITT CANNON (UK)	051-051-0000-C90

B9 Keyboard PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R1 to R3	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R4	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R5	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R6	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R7 to R12	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R13	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R14	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R15 to R22	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R23	24753/407	RESISTOR-FIXED METAL-FILM 8R6 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8R6-D-T-2
R24	24753/407	RESISTOR-FIXED METAL-FILM 8R6 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-8R6-D-T-2
R25	24753/437	RESISTOR-FIXED METAL-FILM 141R +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-141R-D-T-2
R26	24811/159	RESISTOR-FIXED METAL-FILM 274R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-274R-1%50ppm
R27 to R29	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
SKA	43137/899	RIBBON-LEAD 16 WAY, SOCKET 16 WAY, - PCB TRANSITION 16 WAY, FLAT MULTICOLOUR CABLE, 140mm	MARCONI INSTRUMENTS LTD	
SKB	43137/933	RIBBON-LEAD 16 WAY, SOCKET 16 WAY, - PCB TRANSITION 16 WAY, FLAT MULTICOLOUR CABLE, 55mm	MARCONI INSTRUMENTS LTD	
TR1	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A10 Timebase PCB

When ordering, prefix circuit reference with A10.

	44829/866	Complete unit Issue: 011		
C1	26421/141	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1VU-101B
C2	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C3	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
C4	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-330-JP
C5	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C6	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C7	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C8	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C9	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C10	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C11	26386/867	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-222-KP
C12	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C13	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C14	26386/871	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-472-KP
C15	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C16	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C17 to C33	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C34	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C35	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C36	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C37	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C38 to C40	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C41	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP

A10 Timebase PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C42 to C45	26386/826	CAPACITOR-FIXED CERAMIC 150pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-151-JP
C46	26383/582	CAPACITOR-FIXED CERAMIC 470pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51471
D1	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D2	28381/341	DIODE VARIABLE CAPACITNCE, BBY40... 350mW 28V 20mA 26pF @ 3V, CAPAC RATIO 5.0 MIN, MARKING CODE S2,	PHILIPS	BBY40
D3 to D7	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
IC1	28461/898	IC-ANALOGUE D/A-CONVERTER 7528... 8 INPUT, DUAL, 8-BIT, BUFFERED, MULTIPLYING, CMOS, 20 PIN,	ANALOG DEVICES LTD	AD7528JR
IC2	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC3	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD
IC4	28469/056	IC-DIGITAL INVERTER 74AC14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC14SC
IC5	28464/173	IC-DIGITAL COUNTER 74AC161... 4 INPUT, 4 BIT, SINGLE, BINARY, SYNCHRONOUS, PRESETTABLE + RESET,	NAT. SEMICONDUCTOR	74AC161SC
IC6	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	NAT. SEMICONDUCTOR	74AC74SC
IC7	28469/543	IC-DIGITAL COUNTER 74HC390... 4 BIT, DUAL, DECADE RIPPLE, CMOS-H/SPEED, 16 PIN, SMALL-OUTLINE.	PHILIPS	74HC390D
IC8	28469/773	IC-DIGITAL MULTIPLEXER 74HC151... 8 INPUT, 8 BIT, SINGLE, 8 TO 1, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC151D
IC9	28469/067	IC-DIGITAL RECEIVER DS26C32... QUAD, DIFFERENTIAL, RS-422/V11, FOR BAL/UNBALANCED TRANSMISSION LINES,	NAT. SEMICONDUCTOR	DS26C32ACM
IC10	28469/772	IC-DIGITAL MULTIPLEXER 74HC153... 4 INPUT, 1 BIT, DUAL, NON-INVERTING, 4 TO 1, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC153D
IC11	28469/052	IC-DIGITAL BUFFER 74HC365... HEX, TRI-STATE, NON-INVERTING, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC365D
IC12	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	NAT. SEMICONDUCTOR	74AC74SC
IC13	28466/394	IC-DIGITAL NAND-GATE 74AC00... 2 INPUT, QUAD, CMOS-ADVANCED, 14 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	74AC00SC
IC14	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
L1	23642/555	INDUCTOR-FIXED 10uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 45 Q @ 7.9 MHz, 45 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/006
L2	23642/548	INDUCTOR-FIXED 0.68uH +/- 10% COATED-LACQUER, MINIATURE, 1.12A 0R16 MAX, 45 Q @ 25 MHz, 260 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/008
R1	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A10 Timebase PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R2	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R3	24321/812	RESISTOR-FIXED METAL-GLAZE 43K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-43K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4322-FT
R4	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R5	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R6	24321/801	RESISTOR-FIXED METAL-GLAZE 15K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1502-FT
R7	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R8	24321/804	RESISTOR-FIXED METAL-GLAZE 20K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-20K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2002-FT
R9	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R10	24321/821	RESISTOR-FIXED METAL-GLAZE 100K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1003-FT
R11	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R12	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R13	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R14	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R15	24321/785	RESISTOR-FIXED METAL-GLAZE 3K3 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K32-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3321-FT
R16	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R17	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R18 to R20	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R21	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R22	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R23	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R24	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R25	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R26	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R27	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R28	24321/829	RESISTOR-FIXED METAL-GLAZE 220K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2213-FT
R29	24321/841	RESISTOR-FIXED METAL-GLAZE 1M +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1M00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1004-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A10 Timebase PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R30	24321/833	RESISTOR-FIXED METAL-GLAZE 330K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3323-FT
R31	24321/829	RESISTOR-FIXED METAL-GLAZE 220K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2213-FT
R32	24321/819	RESISTOR-FIXED METAL-GLAZE 82K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-82K5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8252-FT
R33	24321/839	RESISTOR-FIXED METAL-GLAZE 680K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-681K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6813-FT
R34	24321/821	RESISTOR-FIXED METAL-GLAZE 100K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1003-FT
R35 to R39	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R40	24321/801	RESISTOR-FIXED METAL-GLAZE 15K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1502-FT
R41	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R42	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R43	24321/801	RESISTOR-FIXED METAL-GLAZE 15K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1502-FT
R44	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R45	24321/791	RESISTOR-FIXED METAL-GLAZE 5K6 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-5K62-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5621-FT
R46	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R47	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
TR1	28459/061	TRANSISTOR N-CHANNEL-DEPLETION JFET BSR56... 40V 250mW 50mA MARKING CODE M4, SURFACE MOUNTED,	PHILIPS	BSR56
TR2	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR3	28487/818	TRANSISTOR NPN BIPOLAR BFS20... 20V 450MHz 200mW 25mA 40hFE MIN @ 7mA, MARKING CODE G1, SURFACE	PHILIPS	BFS20
TR4	28459/061	TRANSISTOR N-CHANNEL-DEPLETION JFET BSR56... 40V 250mW 50mA MARKING CODE M4, SURFACE MOUNTED,	PHILIPS	BSR56
XL1	28312/130	CRYSTAL 30 MHz +/- 10 ppm, FUNDAMENTAL, 30pF PARALLEL RESONANCE, 1mH - 25R ESR MAX, +/-10ppm	SALFORD ELECTRICAL	QC8538A

A11 Synthesizer Power Supply Filter PCB

When ordering, prefix circuit reference with A11.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44829/913	Complete unit Issue: 004		
C1	26421/141	CAPACITOR FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	RUBYCON CAPACITORS	35TWSS100M (TAPE)
C2	26421/141	CAPACITOR FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	RUBYCON CAPACITORS	35TWSS100M (TAPE)
C3	26421/143	CAPACITOR FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	RUBYCON CAPACITORS	6.3TWSS470M (TAPE)
L1 to L5	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
PLA to PLE	35901/604	TERMINAL PRINTED BOARD TAG, CLOSED-END, 6.3mm x 3mm TAG, 4mm LONG TAIL, BRASS, 0.6mm THK, HOT TIN	MARCONI INSTRUMENTS LTD.	

B12 LCD interface PCB

When ordering, prefix circuit reference with B12.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44830/093	Complete unit Issue: 004		
C1 to C6	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C8	26421/139	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 63V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1JU-470B
C10	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C11	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
D1	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
IC1	44531/157	IC-PROGRAMMED EPROM, SET OF 2, 6200B, LCD INTERFACE.	MARCONI INSTRUMENTS LTD	
IC2	44531/157	IC-PROGRAMMED EPROM, SET OF 2, 6200B, LCD INTERFACE.	MARCONI INSTRUMENTS LTD	
IC3	28469/055	IC-DIGITAL TRANSCEIVER 74HC243... 1 INPUT, 1 BIT, QUAD, BUS, TRI-STATE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC243D
IC4	28469/057	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC04D
IC5	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	NAT. SEMICONDUCTOR	74AC74SC
IC6	28461/707	IC-ANALOGUE VOLTAGE-REGULATOR 7805... 5V 1A POSITIVE, LINEAR, MONOLITHIC, 3 PIN, TO-220.	NAT. SEMICONDUCTOR	uA7805UC
L1	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
PLA	23437/516	CONNECTOR MULTIWAY, SOCKET, 29 WAY, SINGLE SIDED, 1mm PITCH, ZERO INSERTION FORCE, SURFACE MOUNTING,	JAE ELECTRONICS	IL-402-29S-SIL-SA
PLC	23435/120	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, RIGHT ANGLED, 2.54mm PITCH, PINS GOLD PLATED TO CLASS 2,	BERG ELECTRONICS	75168-101-36
PLE	23435/120	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, RIGHT ANGLED, 2.54mm PITCH, PINS GOLD PLATED TO CLASS 2,	BERG ELECTRONICS	75168-101-36
R1 to R6	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R10	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R11	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

B12 LCD interface PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R20	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
XL1	28312/118	OSCILLATOR CRYSTAL, 50 MHz +/- 100 ppm, 20.8mm LONG, 12.65mm WIDE, 4.93mm HIGH, TTL OUTPUT, 4	SALFORD ELECTRICAL	QC2001/8D (50MHz)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A13 Auxiliary interface PCB

When ordering, prefix circuit reference with A13.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44830/096	Complete unit Issue: 002		
C5	26386/869	CAPACITOR-FIXED CERAMIC 3.3nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-332-KP
C6	26878/402	CAPACITOR-VARIABLE PTFE 2pF to 15pF 200 ppm/DEG.C, VERTICAL-PCB MOUNT, 5mm DIA, 5mm PWP, 2 PIN, CODED	DAU COMPONENTS LTD	105-3901-015
C7	26878/402	CAPACITOR-VARIABLE PTFE 2pF to 15pF 200 ppm/DEG.C, VERTICAL-PCB MOUNT, 5mm DIA, 5mm PWP, 2 PIN, CODED	DAU COMPONENTS LTD	105-3901-015
C8	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
C9	26386/808	CAPACITOR-FIXED CERAMIC 4.7pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-4R7-DP
C10	26386/827	CAPACITOR-FIXED CERAMIC 180pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-181-JP
C11	26386/808	CAPACITOR-FIXED CERAMIC 4.7pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-4R7-DP
C12 to C14	26878/402	CAPACITOR-VARIABLE PTFE 2pF to 15pF 200 ppm/DEG.C, VERTICAL-PCB MOUNT, 5mm DIA, 5mm PWP, 2 PIN, CODED	DAU COMPONENTS LTD	105-3901-015
C15	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-680-JP
C16 to C18	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C19	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C20	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C21	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C22 to C26	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C27 to C29	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C30	26421/116	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	PANASONIC INDUSTRIAL	ECE-A-1C-KA-470-B
C31	26421/116	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	PANASONIC INDUSTRIAL	ECE-A-1C-KA-470-B
C32	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C33	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-330-JP
C34	26386/820	CAPACITOR-FIXED CERAMIC 47pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-470-JP
D1	28371/735	DIODE ZENER, BZX84-C8V2... 350mW 8.2V 5% 250mA MARKING CODE Z7, SURFACE MOUNTED, SOT-23, (8mm	PHILIPS	BZX84-C8V2

A13 Auxiliary interface PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
IC1	28461/447	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0886... 7.8V 36mA GAIN 22.5dB @ 1GHz, 25dB BANDWIDTH DC-5GHz,	HEWLETT-PACKARD	MSA-0886
IC2	28531/007	RF-MIXER DOUBLE-BALANCED, DIODE RING, SRA220... 0.05-2000MHz, 50R 4 dBm RF-1dB COMPRESS, 6 dB	MINI-CIRCUITS	SRA-220
IC3	28531/021	RF-MIXER DOUBLE-BALANCED, SL6440C... 150MHz MAX, 15 dBm RF-1dB COMPRESS, +30dBM INTERCEPT,	GEC PLESSEY SEMICOND	SL6440C
L5	23642/518	INDUCTOR-FIXED 0.56uH +/- 20% MOULDED-EPOXY, 450mA 0R55 MAX, 30 Q @ 25.2 MHz, 180 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-R56-M
L6	44291/045	WOUND-PART INDUCTOR, 0.9uH, AIR-CORE, ON M4 x 0.5mm FORMER, 22.75 TURNS.	AMETHYST DESIGNS LTD	AD5317
L7	44291/045	WOUND-PART INDUCTOR, 0.9uH, AIR-CORE, ON M4 x 0.5mm FORMER, 22.75 TURNS.	AMETHYST DESIGNS LTD	AD5317
L8	23642/539	INDUCTOR-FIXED 0.03uH +/- 10% UNSCREENED, AIR-CORED, 2 PIN, 135 Q @ 100 MHz, 6.7mm x 4.3mm	TOKO (UK) LTD	E514GNE-150024S12
L9	23642/540	INDUCTOR-FIXED 0.05uH +/- 10% UNSCREENED, AIR-CORED, 2 PIN, 155 Q @ 100 MHz, 6.7mm x 4.3mm	TOKO (UK) LTD	E514GNE-150014S14
L10	23642/540	INDUCTOR-FIXED 0.05uH +/- 10% UNSCREENED, AIR-CORED, 2 PIN, 155 Q @ 100 MHz, 6.7mm x 4.3mm	TOKO (UK) LTD	E514GNE-150014S14
L11	23642/533	INDUCTOR-FIXED 10uH +/- 5% MOULDED-EPOXY, 150mA 2R1 MAX, 30 Q @ 2.52 MHz, 36 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-100-J
L12	23642/537	INDUCTOR-FIXED 4.7uH +/- 5% MOULDED-EPOXY, 220mA 1R5 MAX, 30 Q @ 7.96 MHz, 50 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-4R7-J
R1	24811/901	RESISTOR-FIXED METAL-FILM 10R +/- 1% 250mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, SURFACE MOUNTED, SIZE	VISHAY COMPONENTS	SMM0204-HF-10R-1%
R2	24811/147	RESISTOR-FIXED METAL-FILM 82R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-82R5-1%50ppm
R3	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R4	24811/142	RESISTOR-FIXED METAL-FILM 51R1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-51R1-1%50ppm
R5	24811/183	RESISTOR-FIXED METAL-FILM 2K74 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K74-1%50ppm
R6	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R7	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R8	24811/167	RESISTOR-FIXED METAL-FILM 562R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-562R-1%50ppm
R9	24811/137	RESISTOR-FIXED METAL-FILM 33R2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-33R2-1%50ppm
R10	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R11	24811/201	RESISTOR-FIXED METAL-FILM 15K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-15K-1%50ppm
R12	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm
R13	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm

A13 Auxiliary interface PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R14	24811/156	RESISTOR-FIXED METAL-FILM 200R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-200R-1%50ppm
R15	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R16	24811/199	RESISTOR-FIXED METAL-FILM 12K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-12K1-1%50ppm
R17	24811/169	RESISTOR-FIXED METAL-FILM 681R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-681R-1%50ppm
R19	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R20	24811/199	RESISTOR-FIXED METAL-FILM 12K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-12K1-1%50ppm
R21	24811/169	RESISTOR-FIXED METAL-FILM 681R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-681R-1%50ppm
R22	24811/101	RESISTOR-FIXED METAL-FILM 1R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1R-1%-50ppm
R23	24772/039	RESISTOR-FIXED METAL-FILM 39R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-39R-2%
R24	24811/125	RESISTOR-FIXED METAL-FILM 10R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10R-1%-50ppm
TR1	28457/851	TRANSISTOR NPN BIPOLAR BFS17... 15V 1.3GHz 250mW 50mA 20hFE MIN @ 2mA, MARKING CODE E1, SURFACE	PHILIPS	BFS17
TR2	28457/850	TRANSISTOR NPN BIPOLAR FMMT2369... 40V 600MHz 300mW 500mA 40hFE MIN @ 10mA, MARKING CODE *1J,	PHILIPS	PMBT2369
TR3	28457/850	TRANSISTOR NPN BIPOLAR FMMT2369... 40V 600MHz 300mW 500mA 40hFE MIN @ 10mA, MARKING CODE *1J,	PHILIPS	PMBT2369

A14 Dynamic calibrator PCB

When ordering, prefix circuit reference with A14.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44830/047	Complete unit Issue: 008		
C1	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C2	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-680J-XAT
C3	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-330J-XAT
C4	26386/817	CAPACITOR-FIXED CERAMIC 27pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-270J-XAT
C5	26386/777	CAPACITOR-FIXED CERAMIC 47nF +/-20% 63V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	PHILIPS	1206-2R-473-K9-BBC
C6 to C9	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C10	26386/827	CAPACITOR-FIXED CERAMIC 180pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-181J-XAT
C11	26386/831	CAPACITOR-FIXED CERAMIC 390pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-391J-XAT
C12 to C15	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C16	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-150J-XAT
C17	26386/820	CAPACITOR-FIXED CERAMIC 47pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-470J-XAT
C18	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-220J-XAT
C19 to C21	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C22	26451/001	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 4.3 x 4.3mm,	PANASONIC INDUSTRIAL	ECE-V-1HA-010R
C23	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-Y-102K-XAT
C24	26386/759	CAPACITOR-FIXED CERAMIC 22nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	PHILIPS	1206-2R-223-K9-BBC
C25	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C26	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C27	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C28	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C29	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C30	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C31	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP

A14 Dynamic calibrator PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C32	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C33	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C34	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C35	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C36	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C37	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C38	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C39	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C40	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C41	26386/815	CAPACITOR-FIXED CERAMIC 18pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	VISHAY COMPONENTS	VJ0805-A-180J-XAT
C42 to C52	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C53 to C57	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C58	26422/346	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, ESR<0.078R @	RUBYCON CAPACITORS	35-YXF-470-M
C59	26422/346	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, ESR<0.078R @	RUBYCON CAPACITORS	35-YXF-470-M
C60	26422/348	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 3.5mm PWP, 8mm DIA, 13mm	RUBYCON CAPACITORS	35-YXF-100-M
C61	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C62	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C63	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C64	26386/992	CAPACITOR-FIXED CERAMIC 330nF +/-10% 50V X7R, MULTILAYER, SURFACE-MOUNTED, SIZE 1812, NICKEL	PHILIPS	1812-2B-334-K9BB
C65	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C66	26422/346	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, ESR<0.078R @	RUBYCON CAPACITORS	35-YXF-470-M
C67	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C68	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C69	26422/346	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, ESR<0.078R @	RUBYCON CAPACITORS	35-YXF-470-M
C70	26422/348	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 3.5mm PWP, 8mm DIA, 13mm	RUBYCON CAPACITORS	35-YXF-100-M
C71 to C73	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A14 Dynamic calibrator PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
C74	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
D1	28349/007	DIODE SMALL-SIGNAL, SCHOTTKY, 1N5711... 250mW 70V 1Vf @ 15mA, AXIAL, HP-OUTLINE-15, (LOOSE).	HEWLETT-PACKARD	1N5711
D2	28349/007	DIODE SMALL-SIGNAL, SCHOTTKY, 1N5711... 250mW 70V 1Vf @ 15mA, AXIAL, HP-OUTLINE-15, (LOOSE).	HEWLETT-PACKARD	1N5711
D3 to D12	28383/941	DIODE BAND SWITCHING, BA682... 35V 100mA 1.2pF MAX @ 3V, RED BAND MARKING, SURFACE MOUNTED, SOD-80,	PHILIPS	BA682
D13	28383/903	DIODE SMALL-SIGNAL, BAV99... DUAL, 70V 100mA 1.1Vf @ 50mA, IN SERIES, MARKING CODE A7, SURFACE	PHILIPS	BAV99 (A7)
D14	28355/197	DIODE RECTIFIER, SCHOTTKY, 1N5817... 20V 1A 0.45Vf @ 1A, AXIAL, DO-41, (TAPED OR LOOSE).	MOTOROLA INC.	1N5817
D15	28355/197	DIODE RECTIFIER, SCHOTTKY, 1N5817... 20V 1A 0.45Vf @ 1A, AXIAL, DO-41, (TAPED OR LOOSE).	MOTOROLA INC.	1N5817
D16	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D17	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
IC1	28461/450	IC-ANALOGUE MICROWAVE-AMP MSA-0486... 5.25V 50mA GAIN 8dB @ 1GHz, 3dB BANDWIDTH DC-3.2GHz, BIPOLAR,	HEWLETT-PACKARD	MSA-0486-TR1
IC2	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC3	28461/368	IC-ANALOGUE OPERATIONAL AMP OP27... SINGLE, ULTRA LOW NOISE, SLEW-RATE 2.8V/uS TYP, MONOLITHIC, 8	HARRIS SEMICONDUCTOR	HA3-5127-5
IC4	28461/802	IC-ANALOGUE D/A-CONVERTER AD7846... SINGLE, 15V 11mA 16 BIT, VOLTAGE O/P, CMOS, 28 PIN, PLCC.	ANALOG DEVICES LTD	AD7846JP
IC5	28461/811	IC-ANALOGUE VOLTAGE-REFERENCE LT1019... 10V PRECISION, OUTPUT VOLTAGE DRIFT 20ppm/DEG.C MAX,	LINEAR TECHNOLOGY	LT1019CS8-10
IC6	28469/554	IC-DIGITAL LATCH 74HC573... OCTAL, TRI-STATE, NON-INVERTING, TRANSPARENT, D-TYPE, CMOS-H/SPEED,	PHILIPS	74HC573D
IC7	28465/056	IC-DIGITAL DECODER/DEMULTIPLEX 74HC139... 2 INPUT, 4 BIT, DUAL, INVERTING, 1 BIT ADDRESS,	PHILIPS	74HC139D
IC8	28462/148	IC-DIGITAL FLIP-FLOP/J-K 74HC112... 2 INPUT, DUAL, SET/RESET, NEG EDGE TRIGGER, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC112D
IC9	28466/032	IC-DIGITAL AND-GATE 74HC08... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC08D
IC10	28469/057	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC04D
IC11	28461/782	IC-ANALOGUE VOLTAGE-REGULATOR LT1070... 40V 5A SWITCHING, UP TO 45KHz, IN-LINE, 5 PIN, TO-220.	TEXAS INSTRUMENTS	LT1070CKV
IC12	28461/709	IC-ANALOGUE VOLTAGE-REGULATOR 7815... 15V 1A POSITIVE, LINEAR, MONOLITHIC, 3 PIN, TO-220.	MOTOROLA INC.	MC7815CT
IC13	28461/734	IC-ANALOGUE VOLTAGE-REGULATOR 78L05AC... 5V 100mA POSITIVE, LINEAR, 5% REGULATION, MONOLITHIC, 3	TEXAS INSTRUMENTS	uA78L05ACLP
IC14	28461/840	IC-ANALOGUE VOLTAGE-REGULATOR LT1074... 45V 8.5A SWITCH CURRENT LIMIT, 100KHz ON CHIP OSCILLATOR,	MAXIM INTEG PRODUCTS	MAX724CCK

A14 Dynamic calibrator PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
L1	23642/500	INDUCTOR-FIXED 0.22uH +/- 20% EPOXY-MOULD, 710mA 0R1 MAX, 40 Q @ 25.2 MHz, 150 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3613-A-R22-M
L2	23642/528	INDUCTOR-FIXED 47uH +/- 5% EPOXY-MOULD, 60mA 7R MAX, 30 Q @ 2.52 MHz, 15 MHz SRF, SURFACE MOUNTED,	MEGGITT ELECTRONICS	3612-T-470-J
L3	23642/519	INDUCTOR-FIXED 0.068uH +/- 5% EPOXY-MOULD, 450mA 0R36 MAX, 27 Q @ 100 MHz, 1K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-068-J
L4	23642/535	INDUCTOR-FIXED 1uH +/- 5% EPOXY-MOULD, 400mA 0R7 MAX, 30 Q @ 7.96 MHz, 120 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-1R0-J
L5	23642/559	INDUCTOR-FIXED 47uH +/- 10% COATED-LACQUER, MINIATURE, 140mA 9R6 MAX, 55 Q @ 2.5 MHz, 15 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/014
L6	23642/703	INDUCTOR-FIXED 0.47uH +/- 10% EPOXY-MOULD, 450mA 0R5 MAX, 30 Q @ 25.2 MHz, 220 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-R47-K
L7	23642/500	INDUCTOR-FIXED 0.22uH +/- 20% EPOXY-MOULD, 710mA 0R1 MAX, 40 Q @ 25.2 MHz, 150 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3613-A-R22-M
L8	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L9 to L11	23642/526	INDUCTOR-FIXED 470uH +/- 10% EPOXY-MOULD, 62mA 26R MAX, 40 Q @ 0.796 MHz, 3 MHz SRF, SURFACE MOUNTED,	MEGGITT ELECTRONICS	3613-T-471-K
L12	23642/512	INDUCTOR-FIXED 22uH +/- 5% EPOXY-MOULD, 110mA 3R7 MAX, 30 Q @ 2.5 MHz, 25 MHz SRF, SURFACE MOUNTED,	MEGGITT ELECTRONICS	3612-T-220-J
L13 to L18	23642/526	INDUCTOR-FIXED 470uH +/- 10% EPOXY-MOULD, 62mA 26R MAX, 40 Q @ 0.796 MHz, 3 MHz SRF, SURFACE MOUNTED,	MEGGITT ELECTRONICS	3613-T-471-K
L19	23642/512	INDUCTOR-FIXED 22uH +/- 5% EPOXY-MOULD, 110mA 3R7 MAX, 30 Q @ 2.5 MHz, 25 MHz SRF, SURFACE MOUNTED,	MEGGITT ELECTRONICS	3612-T-220-J
L20	23642/526	INDUCTOR-FIXED 470uH +/- 10% EPOXY-MOULD, 62mA 26R MAX, 40 Q @ 0.796 MHz, 3 MHz SRF, SURFACE MOUNTED,	MEGGITT ELECTRONICS	3613-T-471-K
L21	44291/036	WOUND-PART INDUCTOR, 110uH, RING-CORE, 40 TURNS, UNMOUNTED.	AMETHYST DESIGNS LTD	AD5276
L22	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L23	44291/036	WOUND-PART INDUCTOR, 110uH, RING-CORE, 40 TURNS, UNMOUNTED.	AMETHYST DESIGNS LTD	AD5276
L24	23642/704	INDUCTOR-FIXED 0.015uH +/- 10% EPOXY-MOULD, 450mA 0R14 MAX, 19 Q @ 100 MHz, 2.1K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-015-K
L25	23642/519	INDUCTOR-FIXED 0.068uH +/- 5% EPOXY-MOULD, 450mA 0R36 MAX, 27 Q @ 100 MHz, 1K MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-068-J
PLB	23444/334	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS, PCB-MOUNTING, NICKEL PLATED BODY.	ITT CANNON (UK)	B51-351-0000-C90
R1 to R4	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R5	24811/167	RESISTOR-FIXED METAL-FILM 562R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-562R-1%50ppm
R6	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R7	24811/167	RESISTOR-FIXED METAL-FILM 562R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-562R-1%50ppm
R8	24811/229	RESISTOR-FIXED METAL-FILM 221K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221K-1%50ppm
R9	24811/229	RESISTOR-FIXED METAL-FILM 221K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221K-1%50ppm

A14 Dynamic calibrator PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R10	24811/204	RESISTOR-FIXED METAL-FILM 20K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-20K-1%50ppm
R11	24811/172	RESISTOR-FIXED METAL-FILM 909R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-909R-1%50ppm
R12	24681/085	RESISTOR-FIXED METAL-GLAZE 68R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-68R-5%-P4
R13	24811/139	RESISTOR-FIXED METAL-FILM 39R2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-39R2-1%50ppm
R14	24811/133	RESISTOR-FIXED METAL-FILM 22R1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22R1-1%50ppm
R15	24811/618	RESISTOR-FIXED METAL-FILM 100R +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-0.1%-15
R16	24811/618	RESISTOR-FIXED METAL-FILM 100R +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-0.1%-15
R17	24811/215	RESISTOR-FIXED METAL-FILM 56K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-56K2-1%50ppm
R18	24811/183	RESISTOR-FIXED METAL-FILM 2K74 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K74-1%50ppm
R19	24811/229	RESISTOR-FIXED METAL-FILM 221K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221K-1%50ppm
R20	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R21	24811/229	RESISTOR-FIXED METAL-FILM 221K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221K-1%50ppm
R22	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R23	24811/602	RESISTOR-FIXED METAL-FILM 10K +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-10K0-0.1%-15
R24	24811/602	RESISTOR-FIXED METAL-FILM 10K +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-10K0-0.1%-15
R25 to R28	24811/660	RESISTOR-FIXED METAL-FILM 200R +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-200R-0.1%-15
R29	24811/659	RESISTOR-FIXED METAL-FILM 133R +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-133R-0.1%-15
R30	24811/659	RESISTOR-FIXED METAL-FILM 133R +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-133R-0.1%-15
R31	24811/662	RESISTOR-FIXED METAL-FILM 309R +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-309R-0.1%-15
R32	24811/662	RESISTOR-FIXED METAL-FILM 309R +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-309R-0.1%-15
R33	24811/657	RESISTOR-FIXED METAL-FILM 33R2 +/- 0.25% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE	VISHAY COMPONENTS	SMM0204-33R2-.25%-15
R34	24811/657	RESISTOR-FIXED METAL-FILM 33R2 +/- 0.25% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE	VISHAY COMPONENTS	SMM0204-33R2-.25%-15
R35 to R38	24811/661	RESISTOR-FIXED METAL-FILM 300R +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-300R-0.1%-15
R39	24811/658	RESISTOR-FIXED METAL-FILM 75R +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-75R-0.1%-15
R40	24811/658	RESISTOR-FIXED METAL-FILM 75R +/- 0.1% 250mW 200V 15 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-75R-0.1%-15
R41 to R43	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm

A14 Dynamic calibrator PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R44	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R45	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R46	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R47	24681/085	RESISTOR-FIXED METAL-GLAZE 68R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-68R-5%-P4
R48	24811/212	RESISTOR-FIXED METAL-FILM 43K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-43K2-1%50ppm
R49 to R51	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R52	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R53	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R54	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R55	24681/085	RESISTOR-FIXED METAL-GLAZE 68R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-68R-5%-P4
R56	24338/005	RESISTOR-FIXED METAL-GLAZE 180R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-180R-5%-P4
R57 to R59	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R60	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R61	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R62	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R63	24681/085	RESISTOR-FIXED METAL-GLAZE 68R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-68R-5%-P4
R64	24338/005	RESISTOR-FIXED METAL-GLAZE 180R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-180R-5%-P4
R65 to R67	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R68	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R69	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R70	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R71	24681/085	RESISTOR-FIXED METAL-GLAZE 68R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-68R-5%-P4
R72	24338/005	RESISTOR-FIXED METAL-GLAZE 180R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-180R-5%-P4
R73 to R75	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R76	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R77	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A14 Dynamic calibrator PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
R78	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R79	24681/085	RESISTOR-FIXED METAL-GLAZE 68R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-68R-5%-P4
R80	24338/005	RESISTOR-FIXED METAL-GLAZE 180R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-180R-5%-P4
R81 to R83	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R84	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R85	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R86	24811/203	RESISTOR-FIXED METAL-FILM 18K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-18K2-1%50ppm
R87	24811/175	RESISTOR-FIXED METAL-FILM 1K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-1K21-1%50ppm
R88	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R89	24811/206	RESISTOR-FIXED METAL-FILM 24K3 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-24K3-1%50ppm
R90	24811/213	RESISTOR-FIXED METAL-FILM 47K5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47K5-1%50ppm
R91	24811/200	RESISTOR-FIXED METAL-FILM 13K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-13K-1%50ppm
R92	24811/179	RESISTOR-FIXED METAL-FILM 1K82 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-1K82-1%50ppm
R93 to R107	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R108	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R109	24811/155	RESISTOR-FIXED METAL-FILM 182R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-182R-1%50ppm
R110	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R111	24772/091	RESISTOR-FIXED METAL-FILM 5K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-5K6-2%
TR1	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR2	28459/075	TRANSISTOR P-CHANNEL-ENHANCE MOSFET ZVP2106A... 60V 700mW 5R TO-92, (LOOSE).	ZETEX PLC	ZVP2106A
TR3	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR4	28459/210G	TRANSISTOR N-CHANNEL-DEPLETION MOSFET BFR84... DUAL-GATE, 20V 200MHz, 300mW 50mA TO-72.		
TR5	28453/866	TRANSISTOR NPN BIPOLAR 2N3866... 30V 500MHz 1W 400mA 10hFE @ 50mA, TO-39.	PHILIPS	2N3866
TR6	28459/055	TRANSISTOR N-CHANNEL-ENHANCE MOSFET ZVN2106A... 60V 700mW 450mA 2R TO-92, (LOOSE).	ZETEX PLC	ZVN2106A
TR7	28459/075	TRANSISTOR P-CHANNEL-ENHANCE MOSFET ZVP2106A... 60V 700mW 5R TO-92, (LOOSE).	ZETEX PLC	ZVP2106A

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A14 Dynamic calibrator PCB (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
TR8	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR9	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR10	28459/055	TRANSISTOR N-CHANNEL-ENHANCE MOSFET ZVN2106A... 60V 700mW 450mA 2R TO-92, (LOOSE).	ZETEX PLC	ZVN2106A
TR11	28459/075	TRANSISTOR P-CHANNEL-ENHANCE MOSFET ZVP2106A... 60V 700mW 5R TO-92, (LOOSE).	ZETEX PLC	ZVP2106A
TR12	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR13	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR14	28459/055	TRANSISTOR N-CHANNEL-ENHANCE MOSFET ZVN2106A... 60V 700mW 450mA 2R TO-92, (LOOSE).	ZETEX PLC	ZVN2106A
TR15	28459/075	TRANSISTOR P-CHANNEL-ENHANCE MOSFET ZVP2106A... 60V 700mW 5R TO-92, (LOOSE).	ZETEX PLC	ZVP2106A
TR16	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR17	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR18	28459/055	TRANSISTOR N-CHANNEL-ENHANCE MOSFET ZVN2106A... 60V 700mW 450mA 2R TO-92, (LOOSE).	ZETEX PLC	ZVN2106A
TR19	28459/075	TRANSISTOR P-CHANNEL-ENHANCE MOSFET ZVP2106A... 60V 700mW 5R TO-92, (LOOSE).	ZETEX PLC	ZVP2106A
TR20	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR21	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR22	28459/055	TRANSISTOR N-CHANNEL-ENHANCE MOSFET ZVN2106A... 60V 700mW 450mA 2R TO-92, (LOOSE).	ZETEX PLC	ZVN2106A
TR23	28459/075	TRANSISTOR P-CHANNEL-ENHANCE MOSFET ZVP2106A... 60V 700mW 5R TO-92, (LOOSE).	ZETEX PLC	ZVP2106A
TR24	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR25	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
XL1	28312/160	CRYSTAL 50.326 MHz +/- 20 ppm, 3rd OVERTONE, 30pF PARALLEL RESONANCE, HC-49/U, WIRE LEADS.	IQD LTD	50.3260MHz/IQX-353

A15 Floppy drive controller PCB

When ordering, prefix circuit reference with A15.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44830/057	Complete unit Issue: 001		
C1	26451/001	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 4.3 x 4.3mm,	PANASONIC INDUSTRIAL	ECE-V-1HA-010R
C2	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C3	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C4	26386/820	CAPACITOR-FIXED CERAMIC 47pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-470-JP
C5	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-150-JP
IC1	28467/164	IC-MICROCONTROLLER, 37C65C, FLOPPY DISK FORMATTER, IBM PC/AT COMPATIBLE	STANDARD MICROSYSTEMS	FDC37C65C-LJP
IC2	44535/308	IC-PROGRAMMED PAL, SET OF 1, 6200B, FLOPPY INTERFACE LOGIC.	MARCONI INSTRUMENTS LTD	
R1 to R4	24681/671	RESISTOR-NETWORK BUSSED, THICK-FILM, 10K 2% 1W 50V 100 ppm/DEG.C, 9 RESISTORS, LOW PROFILE, 10 PIN,	VISHAY COMPONENTS	LC0-001-1002G
SKA	23436/774	CONNECTOR MULTIWAY, PCB HEADER, 40 WAY, RIGHT ANGLED, 2-ROW, 2.54mm GRID, POLARISED, SHROUDED,	MOLEX ELECTRONICS	39-26-7408
SKB	23437/521	CONNECTOR MULTIWAY, SOCKET, 26 WAY, SINGLE SIDED, 1mm PITCH, ZERO INSERTION FORCE, SURFACE MOUNTING,	MOLEX ELECTRONICS	52271-2617
XL1	28312/100	CRYSTAL 16 MHz +/- 20 ppm, 30pF PARALLEL RESONANCE, 25R ESR MAX, FREQ STABILITY +/-75ppm	SALFORD ELECTRICAL	P01600AB2

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

AR2/1 Frequency standard PCB

When ordering, prefix circuit reference with AR2/1.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44829/958	Complete unit Issue: 004		
C1	26421/108	CAPACITOR-FIXED ALUMINIUM 4.7uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-4R7-B
C2	26582/428	CAPACITOR-FIXED POLYESTER 47nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-347/065TA18
C3	26582/427	CAPACITOR-FIXED POLYESTER 470nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-447/065
C4	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-KA-010-B
C5	26582/427	CAPACITOR-FIXED POLYESTER 470nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-447/065
D1	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
IC1	28461/708	IC-ANALOGUE VOLTAGE-REGULATOR 7812... 12V 1A POSITIVE, LINEAR, MONOLITHIC, 3 PIN, TO-220.	NAT. SEMICONDUCTOR	LM340T-12
L1	23642/555	INDUCTOR-FIXED 10uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 45 Q @ 7.9 MHz, 45 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/006
PLRM	23444/334	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS, PCB-MOUNTING, NICKEL PLATED BODY.	ITT CANNON (UK)	051-051-0000-C90
R1	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R2	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R3	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R4	24772/055	RESISTOR-FIXED METAL-FILM 180R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-180R-2%
R5	24772/109	RESISTOR-FIXED METAL-FILM 33K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-33K-2%
R6	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
RLA	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
TR1	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR2	28435/227	TRANSISTOR PNP BIPOLAR BC307A,B... 45V 130MHz 200mW 100mA 180hFE @ 2mA, TO-92, (LOOSE).	NAT. SEMICONDUCTOR	BC307A OR B
X1	28313/883	OSCILLATOR CRYSTAL, 10 MHz +/- 0.1 ppm, OCXO, 12V, 30mm LONG, 30mm WIDE, 26mm HIGH, 5 PIN, MODULE.	NDK CO LTD	END3032A

MISCELLANEOUS MECHANICAL PARTS

Fig. 6-1 Ref.	Description	Part No.
1	TOP COVER	35907/019
	TOP COVER - FLOPPY DISK VERSION	35907/529
2	CAPTIVE NUT, SELF TAPPING (16 OFF)	35901/352
3	FRONT PANEL ASSY, INCLUDING KEYPAD.	46662/547
4	KNOB, ROTARY CONTROL	37591/397
5	CAP FOR AUX INPUT CONNECTOR	6950/069
6	KNOB, SUPPLY SWITCH.	37591/599
7	FOOT (4 OFF)	37591/593
8	NYLON STUD (4 OFF)	37591/642
9	CARRYING HANDLE BAIL ARM TYPE.	41590/279
10	BOTTOM COVER	35907/020
11	SUPPLY SWITCH EXTENSION SHAFT	37590/741
12	REAR SUPPORT (4 OFF)	37591/590
13	FAN GUARD	35906/891

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

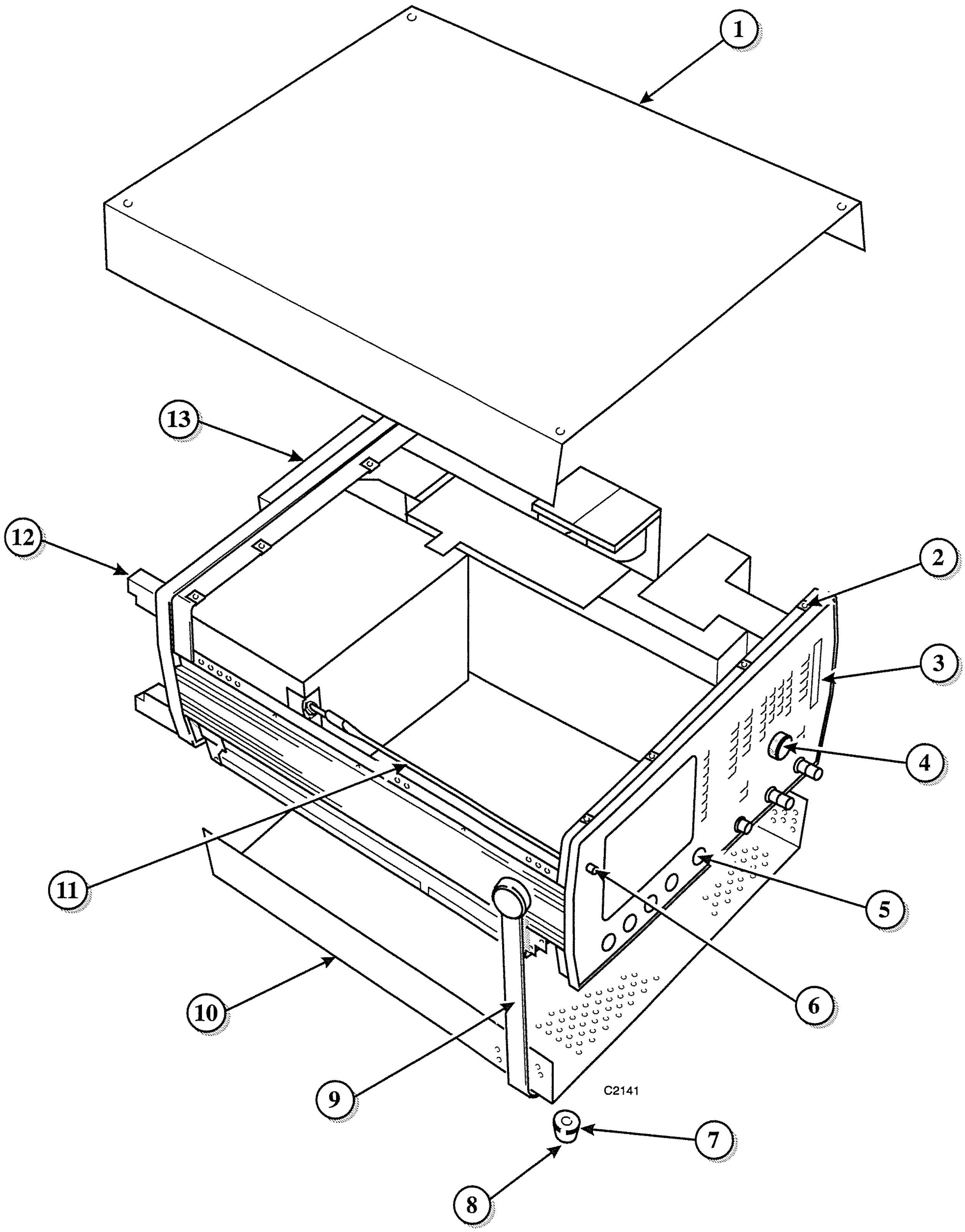

Fig. 6-1 Miscellaneous Mechanical Parts

Chapter 7
Servicing Diagrams

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