

## Wavetek Stabilock Power Supply Notes - SMG4032

The SMG4032 PSU is completely different from SMG 4031 units, but they are interchangeable.

The SMG4032, normally fitted to the Stabilock 4032 test set consists of a single PC Board with everything on it.

Although the circuit diagram and notes for this unit remain totally elusive, the basic operation and layout can be deduced and with the aid of some notes, many if not most faults can be found.

**A WORD OF WARNING! THERE ARE LETHAL VOLTAGES PRESENT IN THIS UNIT EVEN WHEN IN STANDBY MODE. LOOK OUT FOR THE 300 VOLTS HT ON THE CAPACITORS AND CHOPPER TRANSISTOR!**

The principle of operation appears to be as follows:

The AC mains input, either 230 volts 50hz or 110 volts 60hz passes through some filtering chokes and capacitors and is applied to a bridge rectifier that produces about 300 volts DC.

Interestingly, operation on 110 volts AC results in the relay operating and altering the action of the bridge rectifier into a voltage doubler, so that the 300 volts HT is maintained at the lower AC input voltage. There is an automatic voltage sensing chip, type AVS1 that triggers a triac, type BTW134W to operate the relay on 110 volt AC input. In my SMG4032, the Triac was open circuit and had blown a small hole in the case, also taking the 330R gate feed resistor. The AVS1 chip was replaced along with the triac and gate resistor restoring 110 volt operation.

The 300 volts HT is applied to a chopper transistor type BUZ357. This is controlled by a pulse width modulated drive signal from a PWM chip type UC3825N. The BUZ357 feeds the primary of the chopper transformer and the secondary's feed fast recovery diodes type FEP16DT and pass transistors. In the case of the + / - 15 volt supplies these are D44VH10 silicon types. The 5 volt supply uses a BUZ11as a regulator.

The detail around the PWM circuitry is not critical for first line faulting, but it would help!

Each supply line has its own regulator and for the +15 and -15 volt lines, there are two heat sinks that stand up from the board and have BUZ11 transistors that are controlled by TL431C adjustable zener voltage reference chips. Faults on these supply lines should be fairly straightforward, voltage comparisons with the working supply can help locate the fault. The 5 volt regulator seems to be on the main heat sink block along with the diodes and pass transistors.

There are preset pots to adjust the supply lines but without more information these are best left alone. The supply line will either be there or not.

The operation of the Standby to ON circuitry has not been explored in any detail. On the bench, with the board covers removed, the unit can be powered with a temporary jumper lead connected across pins 21 & 22 on the edge connector. This should start or stop the supply. The edge connector is 32 way in two rows of 16 pins. The end of the connector closest to the main heat sink block relates to pins 31 & 32. Pins 21/22 are the 6th pair of pins back from the heat sink end. The power on/off switch on the main frame loops these pins.

**AC Powered - unit in Standby mode**, The HT (300 + volts) should be present on the main electrolytic which is a 150uF at 350 volts wkg. Half the HT voltage will be present on the bridge capacitors, 330uF at 200 volts wkg.

Low voltage measurement reference to Pin 2-4-6 on edge connector.

There should also be voltages present on the diodes and transistors on the main heatsink. Some DVM meters will pick up stray RF from the chopper supply and may display higher than expected voltages when taking measurements around the heatsink area. The +5 volt rail will be around +3 volts on standby. The 15 volt rails will be very low. There should be a +30 volt supply up and running which can be found on a small power transistor near to the orange or brown mains filter choke. There is an SOT TL431C regulator chip between the transistor and the board edge. There are 3 preset pots marked Ia3, Ia2 & Ia1, the transistor is between them and the TL431C chip. Look for 29 - 30 volts on the centre collector pin. If it is missing on standby then there is a more basic fault in the supply line somewhere.

If the 29 volts is present but the unit will not power up, look for signs of electrolyte leakage around the PMW chip UC325N, located between the 150uF 350vdc capacitor and the 15 volt regulator heat sinks. Beside these regulators there are four 1500uF 25 Vdc capacitors that may be leaking onto the board.

In my case one had leaked around the PWM chip area and this shut down the PWM supply. Isopropyl Alcohol and a toothbrush will clean it off the board and restore operation, hopefully. It is recommended that these 4 capacitors be replaced, preferably with 35 volt rating.

When the unit starts up, the fan should run and the 3 rail voltages should be present and correct.

There are other electrolytics that should be replaced as a precaution especially if the unit is more than 10 years old. The main HT capacitors in my unit all tested correct with fairly typical ESR values. However, as you will know from experience with the Stabilock RF units, the 10uF 16 volt SMD capacitors are a disaster and every one should be replaced. The same goes for aluminium can electrolytics over 10 years old, generally the HT ones are OK but the lower voltage caps are a continued source of faults. Larger value SMD caps are more reliable but if in doubt look for signs of leakage and corrosion around the tabs!

Observation is a key factor in faulting these units if you do not have a circuit diagram. Time spent with a magnifier is time well spent!

With the unit powered on the bench, the voltages on the edge connector pins have been measured and listed below. I fitted tiny led's on each supply line + - 15 and +5 and mounted them on the rear of the 4032 panel. This is useful when the Stabilock fails to start up, the 3 voltage rails are easily verified and can save time looking for non-existent PSU problems.

#### EDGE CONNECTOR VOLTAGES:

+5 volts on Pins 5/6 and also Pins 17/18

+15 volts on Pins 13/14

-15 volts on Pins 9/10

On standby, the +5 rail will be around +3 volts and the +15 rail may be around 1.5 volts.

I hope these few notes might help you to get your 4032 PSU working.

Good luck.

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