

Keithley Instruments
28775 Aurora Road
Cleveland, Ohio 44139
1-800-935-5595
tek.com/keithley

Introduction

Thank you for choosing a Keithley Instruments product. This document provides information about using the DMM6500 as a drop-in replacement in an existing Keithley Instruments Model 2000 test system application.

The DMM6500 provides greater functionality and improved accuracy over the Model 2000. However, established customer test systems can be sustained after replacement without significant reconfiguration and code changes by using emulation mode.

You can use the DMM6500 SCPI 2000 command set to emulate a Model 2000, but you will not have access to the full range of features available in its native mode. In addition, the options that you can set from the front panel are more limited than the front-panel options on the DMM6500. Emulation mode is intended primarily for remote command operation.

This guide describes:

- How to configure the DMM6500 for emulation mode.
- The hardware interface differences between the Model 2000 and the DMM6500.
- The software differences between SCPI 2000 on the DMM6500 and the standard SCPI command set available on the Model 2000 product.
- Application examples that provide insight as to what you can expect from the DMM6500 in the SCPI 2000 emulation mode.

NOTE

The SCPI 2000 command sets is designed to emulate the following instrument with the listed firmware version:

- **SCPI 2000:** Model 2000, A20

If your Model 2000 has a previous firmware revision installed, the code examples in this document may not run or could produce unexpected results. To upgrade the firmware, please contact your local Keithley Instruments office, sales partner, or distributor. You can also call the corporate headquarters of Keithley Instruments (toll-free inside the U.S. and Canada only) at 1-800-935-5595, or from outside the U.S. at +1-440-248-0400. For worldwide contact numbers, visit tek.com/keithley.

Comparison of key features

While in emulation mode, the DMM6500 will mimic the operation of the Model 2000. You can remotely control the instrument measurement functions using your existing SCPI command programs. More than 90% of the Model 2000 SCPI commands are supported. While new functions and features are supported in native mode, the emulation mode will restrict you to legacy instrument features.



The following table is a comparison of key features between the instruments.

	DMM6500	Model 2000
Resolution	6 ½ digits	6 ½ digits
DMM input terminals	Front and rear	Front and rear
Plug-in module slots and channels	Single slot, up to 10 independent channels	Single slot, up to 10 independent channels
Module cards supported	Same	
Reading capacity	7M	1024
Non-volatile memory	No	Yes
Basic DCV accuracy	25 ppm / 1 year; 30 ppm / 2 year	30 ppm / 1 year
Measurements		
DCV, ACV (ranges)	Same	
DCI (ranges)	10 µA, 100 µA, 1 mA, 10 mA, 100 mA, 1 A, 3 A, 10 A	10 mA, 100 mA, 1 A, 3 A
ACI (ranges)	100 µA, 1 mA, 10 mA, 100 mA, 1 A, 3 A, 10 A	1 A, 3 A
Temperature	Same	
Diode	10 V clamp (10 µA, 100 µA, 1 mA, and 10 mA test currents)	3 V clamp (1 mA), 10 V Clamp (10 µA, 100 µA)
Capacitance	1 nF, 10 nF, 100 nF, 1 µF, 10 µF, 100 µF	N/A
Digitizer	Up to 1MS/s voltage or current	N/A
Resistance (lowest ranges)	1 Ω, 10 Ω, 100 Ω	100 Ω
PC interfaces	USB/LAN-LXI (standard) GPIB/RS-232/TSP-Link (optional)	GPIB/RS-232 (standard)
USB flash drive support	Yes	No
Mechanical size (for rack mounting)	2U, ½ rack	
	14.039 in. (356.6 mm) deep	14.563 in. (370 mm) deep
Measurement accuracy and resolution	The datasheet for each model provides specifications. See the Keithley Instruments website.	
SCPI compatibility	Greater than 90% coverage of the Model 2000 standard command set.	

Select the SCPI command set for emulation mode

To use the DMM6500 as a drop-in replacement in an existing 2000 application, you must use the SCPI 2000 command set. This command set includes most of the commands that are available in the Model 2000 product.

You can select the SCPI 2000 command set from the front panel or over the remote interface.

When you change to the SCPI 2000 command set, you must reboot the instrument. You will be prompted by the front panel to reboot, but you will not be prompted if using remote commands.

Using the front panel:

1. Press the **MENU** key.
2. Under System, select **Settings**.
3. Select the button next to Command Set.
4. Select **SCPI 2000**. You will be prompted to reboot.
5. Select **OK**.

Using SCPI or TSP remote commands:

For SCPI 2000, send the command:

```
*lang SCPI2000
```

Reboot the instrument.

Front-panel operation with the SCPI 2000 command set

When the SCPI 2000 command set is selected, the options available through the front panel are limited. Emulation mode is intended primarily for remote command operation.

The following topics describe the options that are available when the SCPI 2000 command set is selected.

Home screen display

When the SCPI 2000 command set is selected, the Home screen is the only main screen available. The User, Channel, and Functions swipe screens are also available in the swipe screen area.

The options available on the Home screen are described here.

Figure 1: Home screen when the SCPI 2000 command set is selected



#	Screen element	Description
1	System status and event indicators	Located at the top of the Home screen. These indicators provide information about the present state of the instrument. Some of the indicators open up a dialog box with more information or a settings menu when selected.
2	MEASURE view area	Green part of the Home screen; displays the value of the present measurement.
3	Swipe screen area	Blue part of the Home screen. It displays the User and Functions options. If the rear terminals are selected, Channel options are available.

Status and error indicators when the SCPI 2000 command set is selected

The indicators at the top of the Home screen contain information about instrument settings and states. Some of the indicators also provide access to instrument settings.

Figure 2: Status and error indicators — SCPI 2000



The communications indicator is at the left. The options you might see here include:

Indicator	Meaning
Local	Instrument is controlled from the front panel.
GPIB	Instrument is communicating through a GPIB interface.
RS-232	Instrument is communicating through an RS-232 interface.
TCPIP	Instrument is communicating through a LAN interface.
VXI-11	Instrument is communicating using VXI-11.
USBTMC	Instrument is communicating through a USB interface.
Telnet	Instrument is communicating through Telnet.

The communications indicator displays the type of communications the instrument is using. Select the indicator to display the present communications settings. Select **Change Settings** at the bottom of the dialog box to open the System Communications screen, where you can change the settings.

There is an activity indicator next to the communications indicator. When the instrument is communicating with a remote interface, the up and down arrows flash.

If a service request has been generated, **SRQ** is displayed to the right of the up and down arrows. You can instruct the instrument to generate a service request (SRQ) when one or more errors or conditions occur. When this indicator is on, a service request has been generated. This indicator stays on until the serial poll byte is read or all the conditions that caused SRQ are cleared.

The system event indicator is on the far right side of the instrument status indicator bar. This indicator changes based on the type of event that occurred.

Press the indicator to open a message screen with a brief description of the error, warning, or event. Press the Event Log button to see the System Events screen, which contains more detailed descriptions of the events and options for controlling the types of error events that are displayed on the front panel.

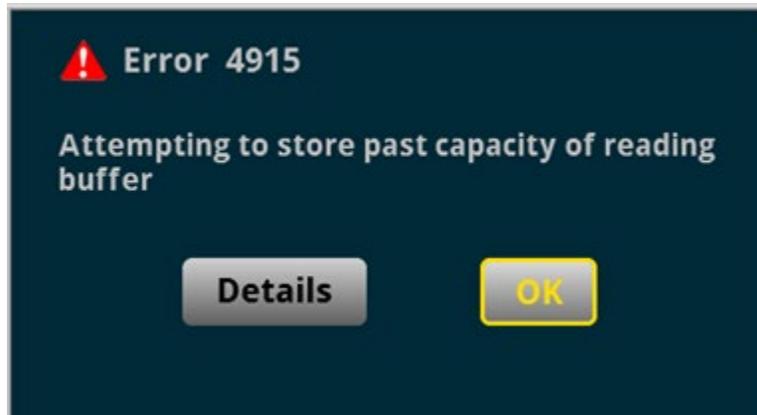
The following table describes the different event indicators and what they mean.

Icon	Description
	An empty triangle means that no new events were logged in the event log since the last time you viewed the event log.
	A blue circle means that an informational event message was logged. The message is for information only. This indicates status changes or information that may be helpful. If the Log Command option is on, it also includes commands.
	A yellow triangle means that a warning event message was logged. This message indicates that a change occurred that could affect operation.
	A red triangle means that an error event message was logged. This may indicate that a command was sent incorrectly.

Event messages

During operation and programming, front-panel messages may be displayed. Messages are information, warning, or error notifications.

Figure 3: Example front-panel error message



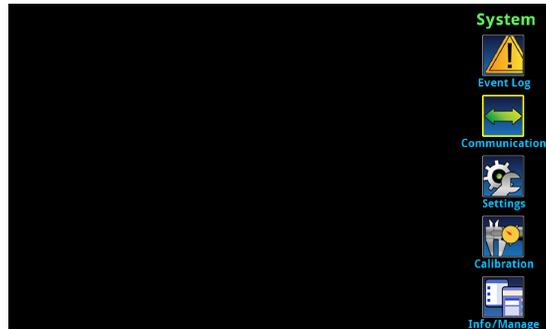
Menus when the SCPI 2000 command set is selected

When the SCPI 2000 command set is selected, the only menu available from the front panel is the System Settings menu.

System Settings menu when the SCPI 2000 command set is selected

The System Settings menu is available when the SCPI 2000 command set is selected. The options are the same as the options when the other command sets are selected, except that the TSP-Link options in the Communication menu are not available.

Figure 4: Main menu when the SCPI 2000 command set is selected



Model 2000 to DMM6500 hardware interface differences

The following topics detail the differences between the hardware connections used for the Model 2000 and the interfaces provided for the DMM6500.

Remote interfaces

The Model 2000 was supplied with both GPIB and RS-232 as standard interfaces. The DMM6500 is supplied with USB and Ethernet connectors as standard interfaces. The instrument also supports GPIB, RS-232, and TSP-Link® with optional communication accessory modules.

The following communication accessory modules are available for the DMM6500. These modules are designed for user installation, and do not require the DMM6500 to be shipped to Keithley Instruments for service or adjustment.

- KTTI-GPIB – Communication and Digital I/O Accessory
- KTTI-RS232 – Communication and Digital I/O Accessory
- KTTI-TSP – Communication and Digital I/O Accessory

For more information about the communication accessory cards (such as configuration through the front panel and over the remote interface), visit tek.com/keithley.

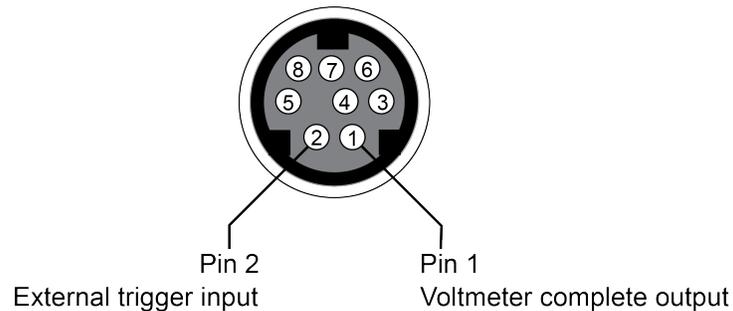
Digital I/O interface

The Model 2000 does not provide a digital I/O port. A standard female DB-9 connector is available if you install one of the KTTI communications accessory cards (see [Remote interfaces](#) (on page 6)), but no SCPI commands are available to control the port.

Trigger Link and external trigger and voltmeter support

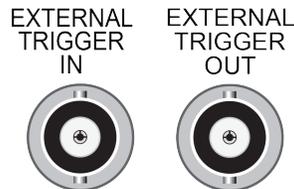
An 8-pin, micro-DIN connector is provided on the rear panel of the Model 2000 for sending and receiving trigger pulses. The voltmeter complete output and external trigger input signals are supported by pin 1 and pin 2, respectively. See the next figure.

Figure 5: Model 2000 external trigger connections



The DMM6500 also supports the external trigger input and voltmeter complete signals, but each trigger line is routed to a dedicated BNC connection on the rear panel of the DMM6500.

Figure 6: DMM6500 external trigger connections



When using the SCPI 2000 command set, the DMM6500 trigger signal for voltmeter complete output is sent to the EXTERNAL TRIGGER OUT connector. External trigger input signals are received through the EXTERNAL TRIGGER IN connector.

Scan card support

The Model 2000 supports multi-channel scanning using existing Keithley Instruments scan cards. The DMM6500 supports two scan cards in both emulation and standard modes:

- Model 2000-SCAN 10-channel Scanner Card
- Model 2001-TCSCAN 9-channel Thermocouple Scanner Card

Visit tek.com/keithley for more information on these switching modules.

Model 2000 to DMM6500 software differences

You can use existing code from a Model 2000 application with a DMM6500 — many of the commands are the same. Apart from the exceptions noted in this section, Model 2000 emulation for the DMM6500 supports all SCPI commands that are supported by the Model 2000.

Details about these differences and other commands that operate differently are described in the following sections.

If a command is not listed in this section, you can use the command in the same way that you did for the 2000. The descriptions of the commands are provided in the *Model 2000 User's Manual*.

SCPI 2000 overview and general exceptions

When you apply the SCPI 2000 command set, the DMM6500 operation matches Model 2000 operation. Commands run as described and have the same defaults as listed in the original Model 2000 User Manual. However, the following exceptions may affect your test system performance:

- Commands run faster than on the Model 2000.
- Measurements are acquired at the same speed or faster than on a Model 2000.
- Error numbers generated in emulation mode (using the SCPI 2000 command set) may not match the original product.

The following items are additional general exceptions when you select the SCPI 2000 command set.

Item	Exception
Buffer	The minimum reading buffer size is 10. The TRAC:POIN command will accept values less than 10, and you can scan less than 10 channels, but the buffer size will be adjusted to 10. The Model 2000 product default is 2.
AC aperture	The DMM6500 has a fixed aperture for AC voltage and AC current measurements regardless of the detector bandwidth setting. The Model 2000 allowed NPLC and aperture settings with the detector bandwidth set to 300 Hz.
Frequency and period aperture	The DMM6500 will only accept values up to 250 ms. The Model 2000 product default is 1 s.
Auto delay	The auto delay times are derived from hardware design and therefore may not be the same as on the Model 2000. Querying the auto delay duration is not supported, and will return zero seconds.
Integration time (NPLC)	At a 60 Hz line frequency, NPLC values up to 15 are supported. At a 50 Hz line frequency, NPLC values up to 12 are supported. Larger values will be accepted and stored, but the DMM6500 will use 15 (60 Hz) or 12 (50 Hz).
Key clicks and presses	Not supported.
Frequency and period threshold range	The Model 2000 maximum range value is 1010 V. The DMM6500 maximum is 700 V.
Calibration	Not supported. You must change the command set to use SCPI or TSP to perform calibration.
Front panel defaults	The DMM6500 does not support front panel defaults that differ from remote bus command defaults.
Display text data	When selected, this will appear on the User swipe screen of the Home screen.
Status model	The following bits are not supported: <ul style="list-style-type: none"> ▪ User Request (URQ) ▪ Device-Dependent Error (DDE) ▪ Hardware Limit Event (HL) ▪ Calibration Summary (Cal) ▪ Command Warning (Warn) ▪ Temperature Summary (Temp)
Limits	The beeper is not supported for limit testing. Limit annunciators (indicators on the front panel display) are not implemented.
Annunciators	The following annunciators are not supported: <ul style="list-style-type: none"> ▪ HIGH (Reading has reached or exceeded the enabled high limit) ▪ LOW (Reading has reached or exceeded the enabled low limit) ▪ MATH (mX+b, percent, or reciprocal (1/X) calculation enabled)

SCPI 2000 command set exceptions

The following are command set exceptions for the SCPI 2000 command set when used on the DMM6500.

Model 2000 command	Exceptions
*TST?	Not supported. This command will return 0 (passed).
[:SENSe[1]] :FREQuency:THReshold : VOLTage:RANGe <n> [, <clist>]	The maximum range is 700 V. Will accept higher values, but the range will be set to 700 V. The set value is accepted and stored for later query.
[:SENSe[1]] :PERiod:THReshold: VOLTage:RANGe <n> [, <clist>]	The maximum range is 700 V. Will accept higher values, but the range will be set to 700 V. The set value is accepted and stored for later query.
[:SENSe[1]] :VOLTage:AC: REFerence <n> [, <clist>]	The maximum range is ± 700 V. Will accept higher values, but the range will be set to ± 700 V. The set value is accepted and stored for later query. The Model 2000 product maximum is ± 757.5 V.
[:SENSe[1]] :VOLTage:AC:RANGe [:UPPer] <n> [, <clist>]	The maximum range is 700 V. Will accept higher values, but the range will be set to 700 V. The set value is accepted and stored for later query. The Model 2000 product maximum is ± 757.5 V.
DISPlay:TEXT:DATA <a> DISPlay:TEXT:STATe ON OFF	When enabled, text will appear on line 1 of the user swipe screen.
FORM:ELEM?	The Model 2000 returns additional commas when fewer than the maximum amount of elements was set. The DMM6500 will not return commas unless more than one element is set.
ROUTE:CLOSe?	If there is an invalid parameter in the channel list, this command will generate an error instead of returning 0.
ROUTE:MULTiple:OPEN	If there is an invalid parameter in the channel list, this command will generate an error instead of being ignored.
ROUTE:OPEN:ALL	If you do not have a switch or control module installed, this command generates an error.
ROUTE:SCAN:EXT	This command will only accept two-digit channel numbers (1 through 99); the maximum channel number is 99. The Model 2000 accepted channel numbers from 1 to 800.
SENS:TEMP:TC:RJUN:REAL:TCO SENS:TEMP:TC:RJUN:REAL:OFF	These commands will be accepted and a query will return the programmed value, but the values will not be applied to the reference junction measurement. The default TCO (0.0002) and OFF (0.05463) will be used when measuring REAL RJUN on Channel 1 of the 2001-TCSCAN card.
SYSTem:KCLick SYSTem:KCLick?	The set value is accepted and stored for later query, but is not supported. You can configure key click only from the front panel.
SYSTem:KEY <NRf> SYSTem:KEY?	Not supported. The query will return -1.
SYSTem:RWLock	Not supported.

SYSTem:TIME <hr, min, sec>	The minimum second specification is 1 s. Hours can be set to 23. The maximum second and minute specification is 59. The Model 2000 default is 0.01 s resolution, 24 maximum hours, and 60 maximum minutes and seconds.
TRACe:POINts <NRf>	Minimum buffer size is 10. The Model 2000 product minimum is 2.
TRIGger[:SEQuence[1]]:SOURce MANual	Not supported.
UNIT:VOLTage:AC:DB:REFerence <n>	Maximum reference is 700. The Model 2000 product maximum is 1000.

Trigger model and status model

The DMM6500 will emulate the trigger model of the Model 2000 when the SCPI 2000 emulation mode is selected. For details on trigger model behavior in this mode, refer to the trigger model information in the *Model 2000 User's Manual*.

The DMM6500 will also emulate a portion of the status model operation for the Model 2000 when the SCPI 2000 emulation mode is selected. See the previous topics in this section for more information. For details on the status model behavior in this mode, refer to the status model information in the *Model 2000 User's Manual*.

Model DMM6500 application examples using SCPI 2000 emulation

The following series of examples use the DMM6500 in SCPI 2000 emulation mode. These applications were designed using commands in the *Model 2000 User Manual*.

You may need to make changes so that this code will run in your programming environment. In the following command tables, the SCPI commands have a light gray background. The light green shaded code represents pseudocode that will vary depending on the programming environment you use.

Example 1 - Single-point DC voltage measurement

This example performs the following operations:

- Resets the unit
- Places the unit in DC voltage measurement mode in the fixed 10 V range using a lengthy integration time
- Displays 6 ½ digits on the front panel and returns the reading with units and the timestamp
- Extracts readings with the READ? command (which triggers and retrieves the measurement), then uses the INIT + FETCH? combination for trigger and measurement extraction

Model 2000 commands executed on the DMM6500	Description
*RST	Place the instrument into a known state
SENS:FUNC 'VOLT:DC'	Set function to DC volts
SENS:VOLT:RANG 10	Set fixed range of 10 V
SENS:VOLT:DIG 7	Set display digits to 6 ½
SENS:VOLT:NPLC 10	Set slow integration rate
FORM:ELEM READ, TST, UNIT, RNUM	Return readings and timestamps with units
TRAC:CLE	Clear the reading buffer
READ?	Trigger and return a single reading
Delay 5000	Wait 5 s to change source voltage
INIT	Initiate the trigger model
FETCH?	Return the latest reading

Example 2 - Multi-point 2-wire resistance measurement with external triggering

This example performs the following operations:

- Halts continuous triggering and sets the function to 2-wire resistance
- Scans ten times across channels 1 through 10 with autoranging applied, with a 1 PLC integration time
- Disables filtering and the REL value, and displays 6 ½ digits
- Configures the status register so that it can be polled to indicate when the buffer is full
- Waits for the EXTERNAL TRIGGER IN port to receive a starting pulse before scanning
- Extracts the data

Model 2000 SCPI commands executed on the DMM6500	Comments
*RST	Place the instrument into a known state
INIT:CONT OFF	Disable continuous triggering
SENS:FUNC 'RES'	Set the function to 2W resistance
SENS:RES:RANG:AUTO ON	Enable auto ranging
SENS:RES:NPLC 1	Set the integration rate to 1 PLC
SENS:RES:DIG 7	Set the number of display digits to 6 ½
SENS:RES:AVER:STAT OFF	Disable filtering
SENS:RES:REF:STAT OFF	Disable the relative value application
ROUT:SCAN:LSEL INT	Set the instrument for internal scanning
TRAC:CLE	Clear the reading buffer
TRIG:COUN 10	Set the instrument to trigger 10 times
SAMP:COUN 10	Capture 10 readings for each trigger
TRAC:POIN 100	Size the buffer to capture 100 total readings
TRAC:FEED:CONT NEXT	Stop filling when the buffer is full
FORM:ELEM READ, CHAN	Return both readings and channel numbers
ROUT:SCAN (@1:10)	Scan all ten channels of the 2000-SCAN card
STAT:MEAS:ENAB 512	Enable the status register to indicate buffer full
*SRE 1	Enable the MSB bit in the status register
TRIG:SOUR EXT	Respond to external trigger events
INIT	Start the scan
tracker = 0 do	Initialize a placeholder variable... Loop to check for buffer full...
tracker = STAT:MEAS? & 512	Mask the measurement status to look for the buffer full condition
while (tracker != 512)	
TRAC:DATA?	Get all the readings from the buffer
ROUT:SCAN:LSEL NONE	Disable the scanning operation

Example 3 - Using a scan card for temperature measurement

This example demonstrates how to use the DMM6500 to scan a set of channels, measuring temperature at fixed time intervals and sending the data back to the controlling computer as the scan progresses.

This example performs the following operations:

- Resets the instrument and configures a temperature scan on channels 2 through 10, while using the transducer fixed at channel 1 as the reference junction
- Sets all channels are to use Type K thermocouples and returns readings in degrees Fahrenheit
- Spaces each triggered reading (18 total) 1 second apart based on an internal timer event
- Disables continuous trigger, then sizes the buffer for a target number of points
- Sets the data output to return readings, channel numbers, and units for each channel measurement
- Configures the status register so that it can be polled to indicate when the buffer is full
- Extracts the data

Model 2000 SCPI commands executed on the DMM6500	Comments
*RST	Place instrument in a known state
INIT:CONT OFF	Disable continuous initiation
FUNC 'TEMP'	Set function to temperature
UNIT:TEMP F	Set units to Fahrenheit
TEMP:TC:TYPE K	Set thermocouples to Type K
TEMP:RJUN:RSEL REAL	Set reference junction to external
TRAC:CLE	Clear the data buffer
TRIG:COUN 6	Trigger six times
SAMP:COUN 10	Take nine samples (one for each channel) per scan
TRAC:POIN 60	Set the buffer size: 6 trig at 9 readings each = 54 pts
TRAC:FEED:CONT NEXT	Start the storage process, fills the buffer, then stops
FORM:ELEM READ, CHAN, UNIT	Include units and channel numbers with the reading
ROUT:SCAN (@1:10)	Configure the scan list for Channels 1 though 10; even though it is the reference junction, Channel 1 is included as part of the scan to assure measurement accuracy for temperature measurement Channels 2 through 10
ROUT:SCAN:LSEL INT	Enable the scan
STAT:MEAS:ENAB 512	Enable the status register to indicate buffer full
*SRE 1	Enable the MSB bit in the status register
TRIG:SOUR TIM TRIG:TIM 10	Select Timer and sets it for 10 seconds. This is the delay period between scanned channels.

INIT	Initiate the scan
tracker = 0 do	Initialize a placeholder variable... Loop to check for buffer full...
tracker = STAT:MEAS? & 512	Mask the measurement status to look for the buffer full condition
while (tracker != 512)	
TRAC:DATA?	Get all the readings from the buffer
ROUT:SCAN:LSEL NONE	Disable the scanning operation

Updating your code to use DMM6500 SCPI commands

The DMM6500 standard SCPI command set lets you access new measurement functions, ranges, and data analysis tools. However, these new features are not available when using the SCPI 2000 command set, and you cannot run more than one command set at once.

To access these new features, you can modify your existing SCPI code to use the DMM6500 standard mode SCPI commands. The examples in this section detail the code changes you can make to the SCPI 2000 command set applications in the previous section.

You may need to make changes so that this code will run in your programming environment. In the following command tables, the SCPI commands have a light gray background. The light green shaded code represents pseudocode that will vary depending on the programming environment you use.

For more information on the functions and features available on the DMM6500, see the DMM6500 specification, available from [tek.com/keithley](http://www.tek.com/keithley) (<http://www.tek.com/keithley>).

Example 1 - Single-point DC voltage measurement

This example performs the following operations:

- Resets the unit
- Places the unit in DC voltage measurement mode in the fixed 10 V range using a lengthy integration time
- Displays 6 ½ digits on the front panel and returns the reading with units and the timestamp
- Extracts readings with the READ? command (which triggers and retrieves the measurement), then uses the INIT + FETCH? combination for trigger and measurement extraction

Model 2000 SCPI commands	DMM6500 SCPI commands
*RST	*RST
SENS:FUNC 'VOLT:DC'	SENS:FUNC 'VOLT:DC'
SENS:VOLT:RANG 10	SENS:VOLT:RANG 10
SENS:VOLT:DIG 7	DISP:VOLT:DC:DIG 6
SENS:VOLT:NPLC 10	SENS:VOLT:NPLC 10
TRAC:CLE	TRAC:CLE
READ?	READ?
Delay 5000	
INIT	INIT
FETCH?	FETCH?

Example 2 - Multi-point 2-wire resistance measurement with external triggering

This example performs the following operations:

- Halts continuous triggering and sets the function to 2-wire resistance
- Scans ten times across channels 1 through 10 with autoranging applied, with a 1 PLC integration time
- Disables filtering and the REL value, and displays 6 ½ digits
- Configures the status register so that it can be polled to indicate when the buffer is full
- Waits for the EXTERNAL TRIGGER IN port to receive a starting pulse before scanning
- Extracts the data

Model 2000 SCPI commands	DMM6500 SCPI commands
*RST	*RST
INIT:CONT OFF	
SENS:FUNC 'RES'	SENS:FUNC "RES", (@1:10)
SENS:RES:RANG:AUTO ON	SENS:RES:RANG:AUTO ON, (@1:10)
SENS:RES:NPLC 1	SENS:RES:NPLC 1, (@1:10)
SENS:RES:DIG 7	DISP:RES:DIG 6, (@1:10)
SENS:RES:AVER:STAT OFF	SENS:RES:AVER:STAT OFF, (@1:10)
SENS:RES:REF:STAT OFF	SENS:RES:REL:STAT OFF, (@1:10)
ROUT:SCAN:LSEL INT	
TRAC:CLE	TRAC:CLE
TRIG:COUN 10	ROUT:SCAN:COUN:SCAN 10
SAMP:COUN 10	
TRAC:POIN 100	TRAC:POIN 100
TRAC:FEED:CONT NEXT	TRAC:FILL:MODE ONCE
FORM:ELEM READ, CHAN	
ROUT:SCAN (@1:10)	ROUT:SCAN:CRE (@1:10)
STAT:MEAS:ENAB 512	STAT:OPER:MAP 0, 4917, 4918
*SRE 1	*SRE 128
TRIG:SOUR EXT	ROUT:SCAN:STAR:STIM EXT
INIT	INIT
tracker = 0	tracker = 0
do	do
tracker = STAT:MEAS? & 512	tracker = STAT:OPER? & 1
while (tracker != 512)	while (tracker == 0)
TRAC:DATA?	TRAC:DATA? 1, 100
ROUT:SCAN:LSEL NONE	

Example 3 - Using a scan card for temperature measurement

This example demonstrates how to use the DMM6500 to scan a set of channels, measuring temperature at fixed time intervals and sending the data back to the controlling computer as the scan progresses.

This example performs the following operations:

- Resets the instrument and configures a temperature scan on channels 2 through 10, while using the transducer fixed at channel 1 as the reference junction
- Sets all channels are to use Type K thermocouples and returns readings in degrees Fahrenheit
- Spaces each triggered reading (18 total) 1 second apart based on an internal timer event
- Disables continuous trigger, then sizes the buffer for a target number of points
- Sets the data output to return readings, channel numbers, and units for each channel measurement
- Configures the status register so that it can be polled to indicate when the buffer is full
- Extracts the data

Model 2000 SCPI commands	DMM6500 SCPI commands
*RST	*RST
INIT:CONT OFF	
FUNC "TEMP"	FUNC "TEMP", (@1:10)
UNIT:TEMP F	TEMP:UNIT FAHR, (@2:10)
	TEMP:TRAN TC, (@2:10)
TEMP:TC:TYPE K	TEMP:TC:TYPE K, (@2:10)
	TEMP:TRAN CJC2001, (@1)
TEMP:RJUN:RSEL REAL	TEMP:TC:RJUN:RSEL EXT, (@2:10)
TRAC:CLE	TRAC:CLE
TRIG:COUN 6	ROUT:SCAN:COUN:SCAN 6
SAMP:COUN 10	
TRAC:POIN 60	TRAC:POIN 60
TRAC:FEED:CONT NEXT	
FORM:ELEM READ, CHAN, UNIT	
ROUT:SCAN (@1:10)	ROUT:SCAN:CRE (@1:10)
ROUT:SCAN:LSEL INT	
STAT:MEAS:ENAB 512	STAT:OPER:MAP 0, 4917, 4918
*SRE 1	*SRE 128
TRIG:SOUR TIM	ROUT:SCAN:INT 10
TRIG:TIM 10	
INIT	INIT
tracker = 0	tracker = 0
do	do
tracker = STAT:MEAS? & 512	tracker = STAT:OPER? & 1
while (tracker != 512)	while (tracker == 0)
TRAC:DATA?	TRAC:DATA? 1,60,"defbuffer1", READ,CHAN,UNIT
ROUT:SCAN:LSEL NONE	