7854 ROM CARD

User Manual V1 – December 2022

Content

1. Introduction

The vintageTEK 7854 ROM card can be used as a replacement for defective ROM cards - a very common source of error with the 7854. The special feature of this new development is that in addition to the normal operating system, the diagnostic ROM is also located on the board. The diagnostic mode provides various test patterns and is used for calibration and troubleshooting. A special keyboard overlay is included with the vintageTEK ROM card to handle the different keyboard layout in diagnostic mode.

A DIP switch is used to select between the regular and the diagnostics firmware.

The 7854 ROM card replacement is compatible to every 7854. The installation procedure differs on units below and above serial number B100000. The two device generations can be distinguished most quickly by looking at the back side:

7854 serial number below B100000

These units have two female banana jacks for providing memory backup power.

Continue with Chapter 2.1 on the following page

7854 serial number B100000 and above

These units have an internal battery for memory backup. So there are no female banana jacks at the rear of the unit.

Continue with Chapter 2.2 on the following page

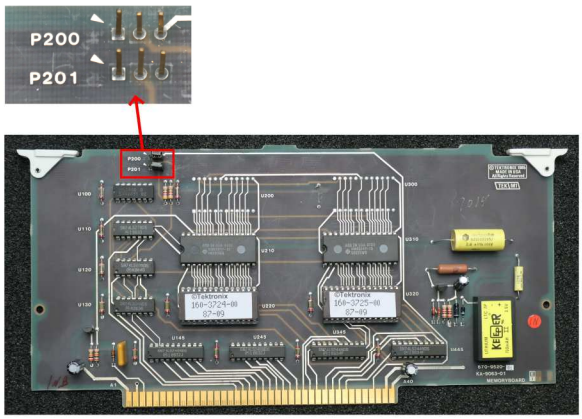
2.1. Installation procedure for serial numbers below B100000

- ensure all DIP switches of the new ROM board are in off position
- remove the panel on the right side of the scope
- remove the shielding around the cards of the digital section
- remove the GPIB interface board A30 (*)
- remove the old ROM board A31
- install the replacement ROM board
- reinstall the GPIB interface board A30 (*)
- reinstall the shielding of the digital section

- continue with section 3 - DIP Switch settings on next page

(*) Instruments with option 0D might not have a GPIB interface board

2.2. Installation procedure for serial numbers B100000 and above



- ensure all DIP switches of the new ROM board are in off position
- remove the panel on the right side of the scope
- remove the shielding above the cards of the digital section
- remove the GPIB interface board A30 (*)
- remove the memory board A28
- Move the jumpers on the A28 memory board P200 and P201 to position 1-2. This disables the ROM portion of the board
- reinstall the memory board A28
- install the replacement ROM board in the empty A31 slot right to the RAM/ROM board
- reinstall the GPIB interface board A30 (*)
- reinstall the shielding of the digital section

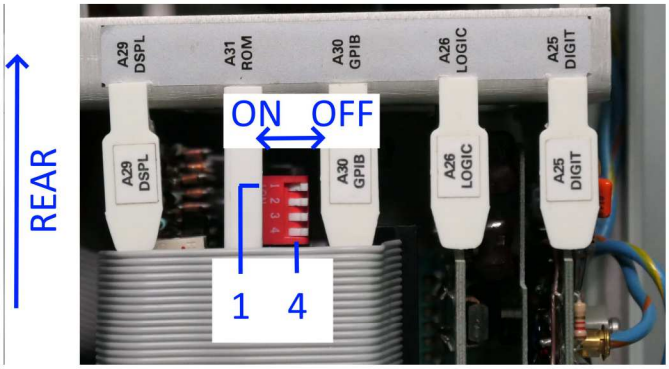
- continue with section 3 - DIP Switch settings on next page

(*) Instruments with option 0D might not have a GPIB interface board

3. DIP Switch settings

IMPORTANT – turn off the power before changing the DIP Switch settings

The replacement ROM board has four dip switches. These can be easily accessed after removing the panel on the right side of the scope:



	OFF	ON
1	Regular firmware	Diagnostics
2	Reserved for future use	
3	No function	
4	No function	

3.1. Using the regular firmware

The replacement ROM card will be delivered with the latest regular firmware version for your scope. This is V1.03 for units below B100000 and V2.0 for units B100000 and above. When selecting the regular firmware, the unit should behave as usual.

3.2. Using the diagnostics firmware

The diagnostics firmware needs the calibration keyboard overlay to be placed on the 7854. After starting up the 7854 runs in a silent loop – each diagnostic function has to be started with a keypress.

3.2.1. Calibration procedure of the 7854 display system

The diagnostics ROM contains a test pattern to align the display system of the 7854. See chapter GA in the 7854 service manual (070-2874-01) for further instructions.

3.2.2. Diagnostic functions

The diagnostics ROM also contains routines to test various hardware portions of the 7854. These routines are explained on the following pages.

SELF TESTS

Prior to performing any detailed testing of the digital portion of the 7854 Oscilloscope, any problem should be isolated to a functional section of the instrument. This is done primarily through a self-test feature designed into the 7854's power-up routine firmware. This feature provides that, each time power is applied to the 7854, a self test sequence is automatically performed. The status of the various functional blocks within the oscilloscope is denoted on the various front-panel indicators upon completion of the sequence. These power-up tests are not all-inclusive but are meant to provide an indication as to where a fault may lie. The sequence of the power-up test is as follows.

Step 1: When power is applied the following indicators will light: POWER, selected positions of the A and B TRIGGER SOURCE switches, and all selected indicators on the plug-in units. The following indicators will remain off for approximately three seconds after power-up; all positions of the VERTICAL and HORIZONTAL MODE switches, all intensity indicators, and all red, front panel (measurement keyboard) and Waveform Calculator indicators.

Step 2: All positions of the VERTICAL and HORIZONTAL MODE switches, all INTENSITY indicators, and all red front panel and Waveform Calculator indicators will now light.

Step 3: A fault condition found through any of the four tests is indicated with the lights of the VERTICAL and HORIZONTAL MODE switches. Fault condition codes are listed in Table 2-2.

If a fault code occurs, press any button of the VERTICAL or HORIZONTAL MODE switches and the self-testing will continue.

TABLE 2-2
Self-Test Fault Codes

VERTICAL MODE Indicator Status	HORIZONTAL MODE Indicator Status	Circuitry With Fault
All lights on.	B light on.	RAM
All lights on.	CHOP light on.	ROM
All lights on.	CHOP and B lights on.	Real time Clock
All lights on.	ALT light on.	Display

Step 4: Successful completion of the self tests is indicated by the issuance of the audible warning tone (if the rear panel AUDIBLE WARNING switch is ON), and the extinguishing of all red indicators, the Stored Int and A Intensity indicators, all VERTICAL MODE lights except LEFT, and all HORIZONTAL MODE switch lights except B. In addition, if the READOUT intensity control is set to at least midrange, the message **SELF TEST COMPLETE**, will be displayed on the crt.

Refer to the Maintenance section of the 7854 Service Manual if an analog problem appears to be present.

POWER-UP PRESET CONDITIONS

After successful completion of the processor self tests, several parameters of the 7854 are set to predetermined conditions (only when using 7854's normal ROM). These power-up conditions are:

CRT DISPLAY mode ..... Set to SCOPE
Program Mode ..... Set to EXECUTE
Program Memory ..... Cleared
VERTICAL MODE ..... Set to LEFT
HORIZONTAL MODE ..... Set to B
Stored Waveform Display ..... Not displayed; set to VECTors
P/W (Points/Waveform) ..... Set to 512
Stack Registers ..... Cleared to 0
OPW (Operational Waveform) ..... Set to 0
All waveform memory points ..... Set to the zero value (center horizontal graticule line)
VZR (Vertical Zero Reference ..... Set to 0 (all waveform memories)
Vertical Scale Factor ..... Set to 1 (all waveform memories)
Vertical Scale Factor Unit ..... Set to V (all waveform memories)
Horizontal Scale Factor ..... Set to 1 (all waveform memories)
Horizontal Scale Factor Unit ..... Set to S (all waveform memories)
Constant Registers ..... Set to 0
TTL Output ..... Set HIGH
rsv control flags ..... Set ON

USING THE CALIBRATION FIRMWARE

Part of the firmware contained on the 067-0961-XX Diagnostic Memory Board produces waveform and character information that may be displayed on the crt of the 7854 Oscilloscope for a separate Display calibration procedure. This procedure is included in the 7854 Service manual. (Early manuals do not have this procedure.)

With 067-0961-XX Diagnostic Memory Board installed in the 7854 without any other test equipment attached and with the calibration keyboard overlay in place, the calibration displays may be invoked from the 7854 front-panel keyboard as described below. With the remainder of the test equipment connected as shown in Figure 2-1, use of the calibration firmware is initiated by typing CA <CR> on the terminal keyboard. Invocation of the individual calibration displays now follows identically to the "stand-alone" configuration mentioned above. These individual displays are invoked as follows (refer to Figure 2-2, Keyboard Overlay or to the overlay itself for keynames):

SCOPE—Causes realtime waveform to be displayed. Press SCOPE key to invoke.

STORED—causes stored waveform to be displayed. Press STORED key to invoke.

BOTH—causes both the stored and realtime waveforms to be displayed. Press BOTH key to invoke.

DOT—sets the display to dot mode for matching specific points to the crt graticule. Press DOT key to invoke.

VECT—sets the display to vector mode for adjusting vector display circuitry. Press VECT key to invoke.

128, 256, 512, 1024—sets waveform resolution to the corresponding number of points. Press either 128, 256, 512 or 1024 key to invoke.

LED—sounds the audible warning (if rear panel AUDIBLE ERROR/WARNING switch is on) and lights all front-panel indicators for functionality check. Press LED key to invoke. Press any other key to terminate.

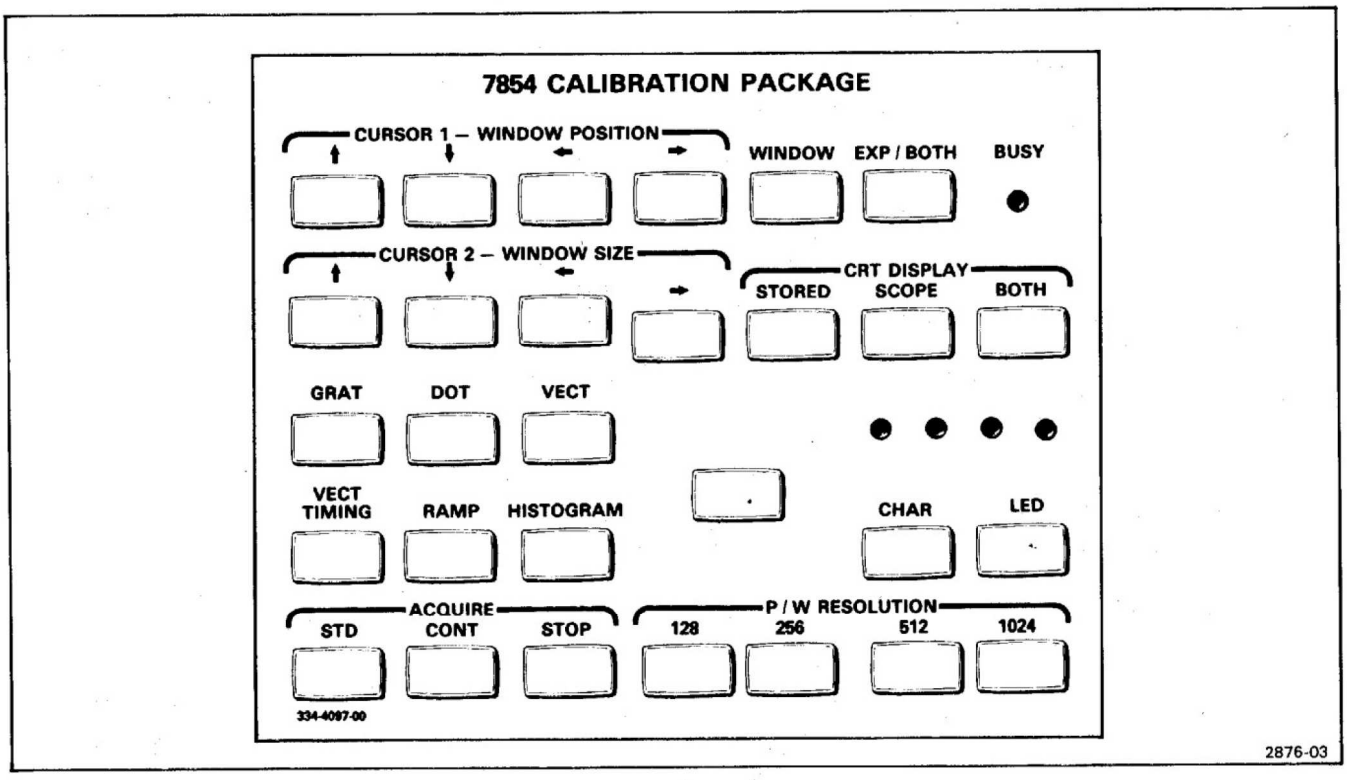


Figure 2-2. Keyboard Overlay.

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CHAR—causes a full-screen display of characters as they are sequentially read from the display systems character ROM. Used to check proper writing of each character and for setting alphanumeric readout boundries. Press CHAR key to invoke.

SAMP—generates a histogram showing how many times each horizontal point is sampled. Press the SAMP key to invoke.

GRAT—generates a display similar to the crt graticule. In VECTor mode, the display should be superimposed on the graticule. In DOT mode, dots should appear at each intersection of the graticule lines. Press GRAT key to invoke.

RAMP—generates a 45 degree ramp containing 512 points for checking display linearity, gain and centering. Press the RAMP key to invoke.

VECT TIMING—generates a rectangular waveform subdivided into four smaller rectangles for adjustment of the 7854 vector display circuitry. In VECTor mode, the display should be super-imposed on crt graticule lines. In DOT mode, dots appear on crt graticule lines. Press VECT TIMING key to invoke.

STD ACQUIRE—performs one complete standard acquire cycle for observing signals applied to oscilloscope inputs. Non-acquired points are held offscreen (7854 firmware interpolates points into waveform). Press STD ACQUIRE key to invoke.

CONT ACQUIRE—performs a continuous acquisition of signals applied to oscilloscope inputs for adjusting portions of the display circuitry. Press CONT ACQUIRE key to invoke.

STOP ACQUIRE—terminates a continuous acquisition. Press STOP ACQUIRE key to invoke.

WINDOW (ON/OFF)—either enables or disables a display window that may be moved to any location on the crt display. Area inside window is magnified to full screen and displayed as continously updated stored information. CONT AQR must be invoked for the window to be functional. In addition, the READOUT intensity control must be on for the window to be visible. Press WINDOW (ON/OFF) (after pressing CONT AQR) to invoke.

EXP/BOTH—displays either expanded display only or expanded display, realtime display and expansion window all simultaneously. The expansion WINDOW must have been previously invoked. Press EXP/BOTH key to invoke other display format.

CURSOR 1—POSITION ↑, ↓, ←, and → moves expansion window on crt. Press POSITION ↑, ↓, ←, or → to move window in desired direction.

CURSOR 2—SIZE ↑, ↓, ←, and → moves cursor 2 with respect to cursor 1 resulting in a change in size of the expansion window. Cursor 2 may "cross over" the position of cursor 1 in either the horizontal or vertical direction. Press SIZE ↑, ↓, ← or → to change window size.

Blue Key—no function assigned.