Instructions

Tektronix

050-3610-01 and above
Touch Panel Replacement
VM700T Video Measurement Set

075-0854-01

www.tektronix.com

Contacting Tektronix

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For product information, sales, service, and technical support:
- In North America, call 1-800-833-9200.
- Worldwide, visit www.tektronix.com to find contacts in your area.

General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

To avoid potential hazards, use this product only as specified.

To Avoid Fire or Personal Injury

Use Proper Power Cord. Use only the power cord specified for this product and certified for the country of use.

Use Proper Voltage Setting. Before applying power, ensure that the line selector is in the proper position for the power source being used.

Ground the Product. This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Use Proper Fuse. Use only the fuse type and rating specified for this product.

Avoid Exposed Circuitry. Do not touch exposed connections and components when power is present.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Provide Proper Ventilation. Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

Symbols and Terms

Terms in this Manual. These terms may appear in this manual:

WARNING. Warning statements identify conditions or practices that could result in injury or loss of life.

CAUTION. Caution statements identify conditions or practices that could result in damage to this product or other property.

Terms on the Product. These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

Symbols on the Product. The following symbols may appear on the product:

WARNING
High Voltage

Protective Ground
(Earth) Terminal

CAUTION
Refer to Manual

Double
Insulated

Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

Do Not Service Alone. Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect Power. To avoid electric shock, disconnect the main power by means of the power cord or, if provided, the power switch.

Use Caution When Servicing the CRT. To avoid electric shock or injury, use extreme caution when handling the CRT. Only qualified personnel familiar with CRT servicing procedures and precautions should remove or install the CRT.

CRTs retain hazardous voltages for long periods of time after power is turned off. Before attempting any servicing, discharge the CRT by shorting the anode to chassis ground. When discharging the CRT, connect the discharge path to ground and then the anode. Rough handling may cause the CRT to implode. Do not nick or scratch the glass or subject it to undue pressure when removing or installing it. When handling the CRT, wear safety goggles and heavy gloves for protection.

Use Care When Servicing With Power On. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.

X-Radiation. To avoid x-radiation exposure, do not modify or otherwise alter the high-voltage circuitry or the CRT enclosure. X-ray emissions generated within this product have been sufficiently shielded.

Kit Description

This kit provides instructions for replacing the touch panel in VM700T Measurement Sets with serial numbers below B049999.

This document supports Tektronix modification: ECO 1087 and ECR 31202.

Products

VM700T   B010100 – B049999

Minimum Tool and Equipment List

Required tools and equipment	Size
Flat-blade screwdriver,	3/16 or 1/4 inch blade
Combination wrench or nut driver	3/16 inch
Socket wrench	1/4 inch socket
Pozidriv screwdriver	1X, 2X

Kit Parts List

Circuit/figure number	Quantity	Part number	Description
	1 EA	063-2913-xx	FIRMWARE UPGRADE, SET OF 6 DISKS
	1 EA	065-0716-xx	TOUCH PANEL ASSY; VM700T; 119-6974-xx W/PACKAGING
	1 EA	119-7347-xx	TOUCH SCREEN CONTROLLER; ELO 2701,ELO PART NUMBER 351−0770−00, USED ON VM700T WITH ELO TOUCH PANEL, SAFETY CONTROLLED
	4 EA	129-1602-xx	SPACER, POST
	1 EA	174-5413-xx	CABLE ASSEMBLY, POWER AND I/O, ELO TOUCH PANEL CONTROLLER
	4 EA	211-0503-xx	SCREW, MACHINE; 6−32 X 0.188, PNH, STL CD PL, POZ
	1 EA	407-5001-xx	BRACKET; CONTROLLER BOARD

Circuit/figure number	Quantity	Part number	Description
	1 EA	614-1008-xx	FRONT PANEL BEZEL ASSY
	1 EA	075-0854-01	UPGRADE KIT INSTRUCTIONS; 050-3610-01 and above

Installation Instructions

These instructions are for personnel who are familiar with servicing the product. If you need further details for disassembling or reassembling the product, refer to the appropriate product manual. Contact your nearest Tektronix, Inc., Service Center or Tektronix Factory Service for installation assistance.

⚠️ **CAUTION.** *To prevent static discharge damage, service the product only in a static-free environment. Observe standard handling precautions for static-sensitive devices while installing this kit. Always wear a grounded wrist strap, grounded foot strap, and static resistant apparel while installing this kit.*

Remove

⚠️ **WARNING.** *To avoid a dangerous electrical shock from hazardous voltages inside the product, always shut off instrument power at the rear-panel switch and disconnect the power cord from electrical mains before removing covers or performing disassembly/reassembly procedures. Failure to do so may result in serious injury or death.*

⚠️ **CAUTION.** *To prevent static discharge damage, observe the following precautions:*

- *Minimize handling of static-sensitive components.*

- *Transport and store static-sensitive components or assemblies in their original containers, on a metal rail, or on conductive foam. Label any package that contains static-sensitive components or assemblies.*

- *Discharge the static voltage from your body by wearing a wrist grounding strap while handling these components.*

- *Servicing static-sensitive assemblies or components should be done only at a static-free work station. Avoid handling components in areas that have a floor or work surface covering capable of generating a static charge.*

Remove the Cover Panels   1.   Remove the top and bottom panels, and the left and right side panels as
follows:

    a.   Remove the screws at the rear edge of the cover panel to be removed.

    b.   Remove the panel by sliding it carefully to the rear of the instrument and
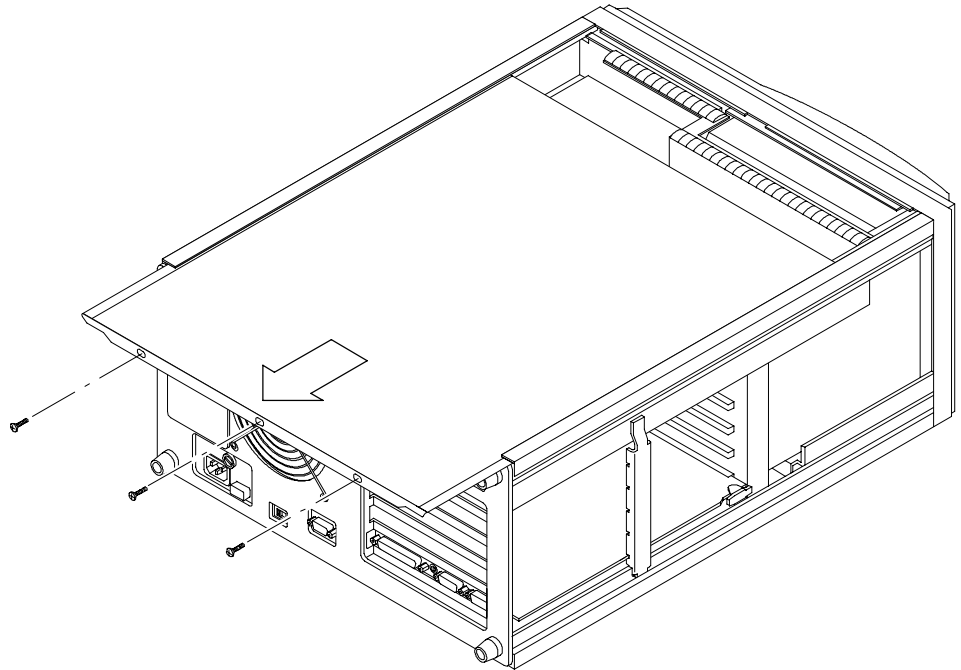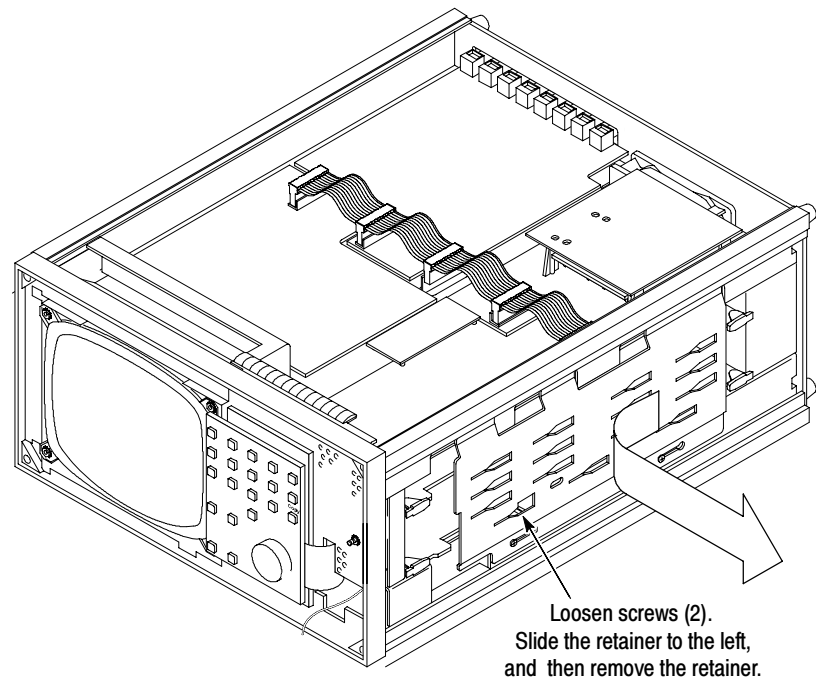out of the grooves in the chassis frame (see Figure 1).

Figure 1: Removing a cover panel

Remove the Card Cage Retainer

2. Remove the Card Cage Retainer from the right side by following these steps:

 a. Remove the two screws that fit the EMI bracket on right front side of the frame to have access to the bezel screw.

 b. Loosen, but do not remove, the two screws on the front of the card cage retainer (see Figure 2).

Loosen screws (2).
Slide the retainer to the left,
and then remove the retainer.

Figure 2: Loosening the screws on the right card cage retainer

 c. Slide the retainer carefully to the left until the screw heads clear the slots, and then remove the retainer to expose the CPU board for removal.

 d. Disconnect the interconnection cable at J9 on the CPU board.

Remove the CRT Bezel

3. Remove CRT bezel as follows:

 a. Remove the four screws holding the bezel to the front frame (see Figure 3). There is one screw on each side and one each in the top and bottom of the bezel.
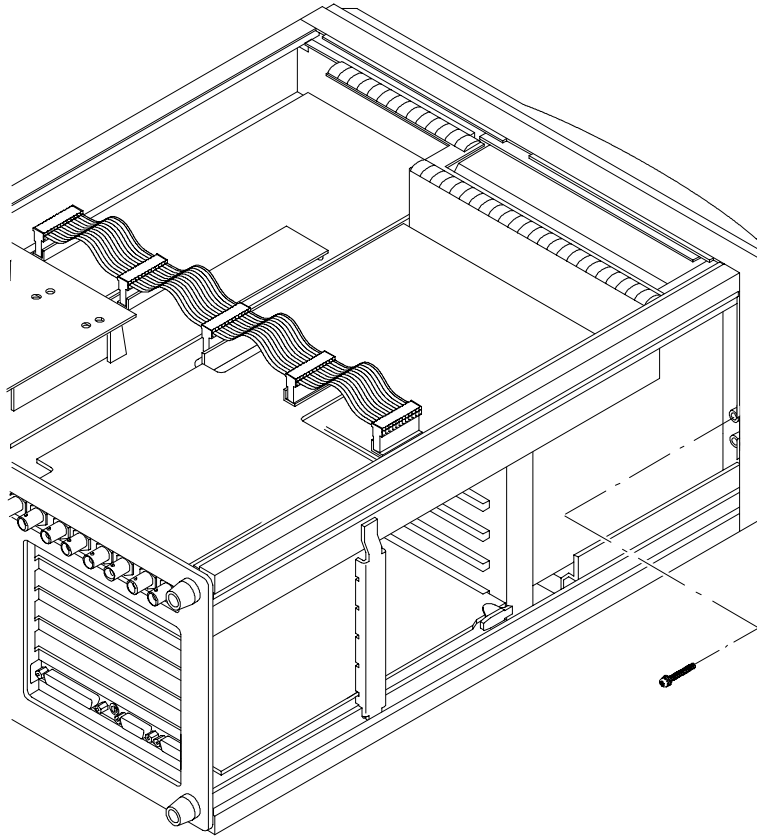
Figure 3: Locating the bezel retaining screws

      b. Carefully separate the bezel from the frame.

      c. Disconnect the 5-conductor cable from the STBY/ON switch. See Figure 4.

      d. Remove the nut that holds the STBY/ON switch ground strap ring terminal to the keyboard bracket, and disconnect the ground strap. See Figure 4.

Remove the STBY/ON Switch

4. Remove the STBY/ON switch as follows:

      a. From the circuit side of the STBY/ON switch, remove the two nuts holding the switch assembly to the bezel. See Figure 4.

      b. Separate the switch and its front plate from the bezel.

      c. Discard the bezel; you will replace it with the new one provided in the kit.
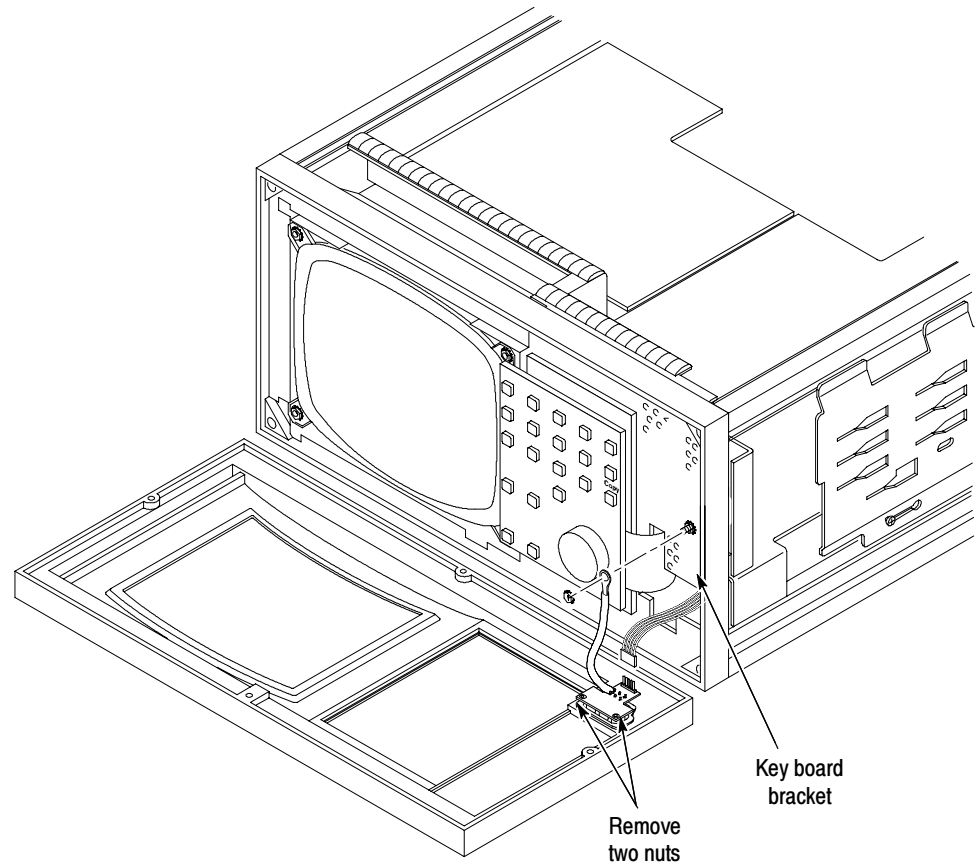
Figure 4: Disconnecting the STBY/ON switch

Remove the Keypad Board Assembly

5. Remove the Keypad board assembly (679-3620-XX) from the instrument as follows:

    a. Remove the seven flat-head screws holding the Keypad board assembly bracket to the VM700T front frame. See Figure 5.
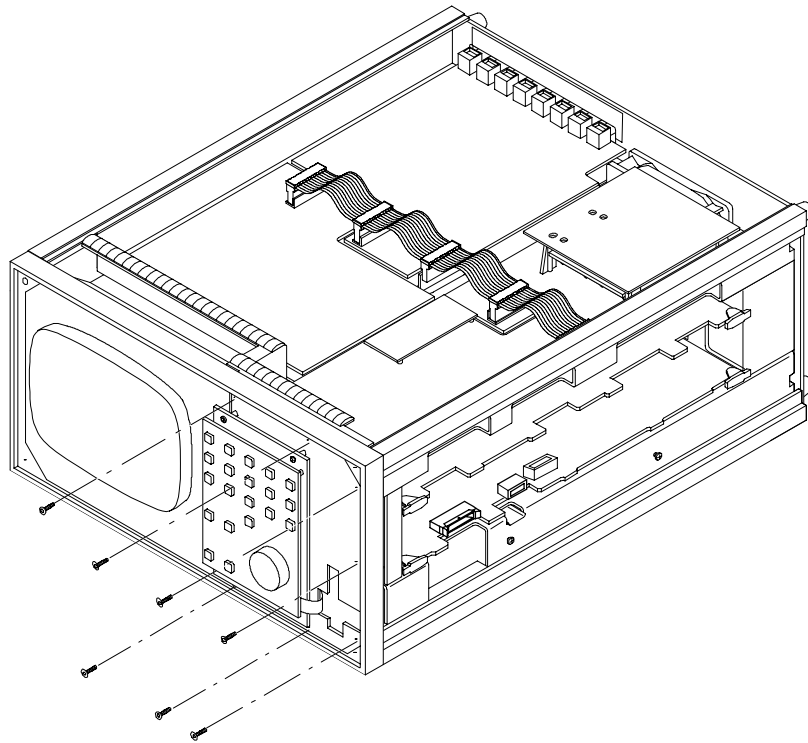
Figure 5: Removing the retaining screws from the Keypad board

    b. Carefully separate the Keypad board assembly from the instrument.

    c. On the back of the Keypad board assembly, remove the touch panel connector at J933 and the ground wire attached to the standoff, to remove the Keypad board assembly from the instrument.
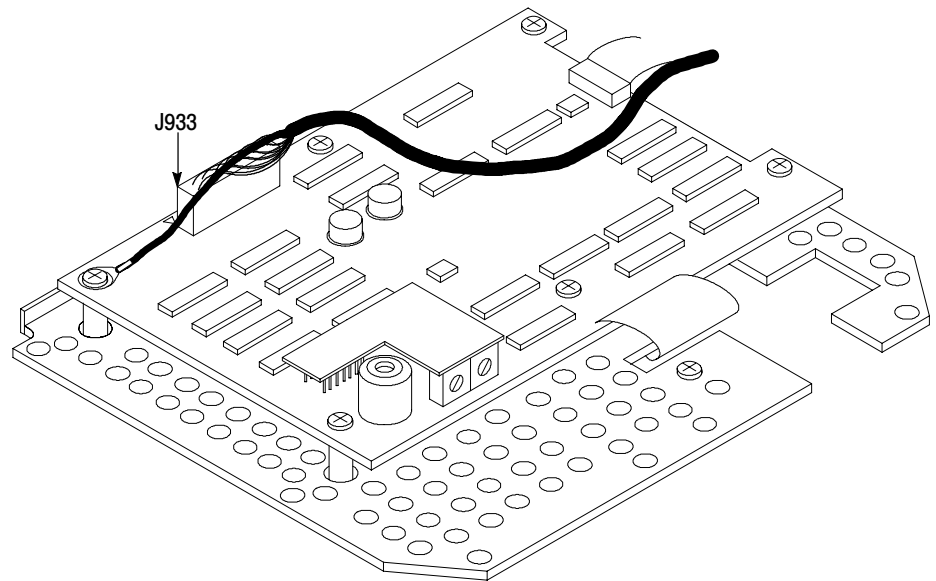
Figure 6: Orienting connector J933 for installation on the Keypad board

Remove the CRT Touch Panel

6. Remove the CRT touch panel as follows:

   a. Remove the four nuts that hold the touch panel in place, and then lift the CRT touch panel away from the CRT.
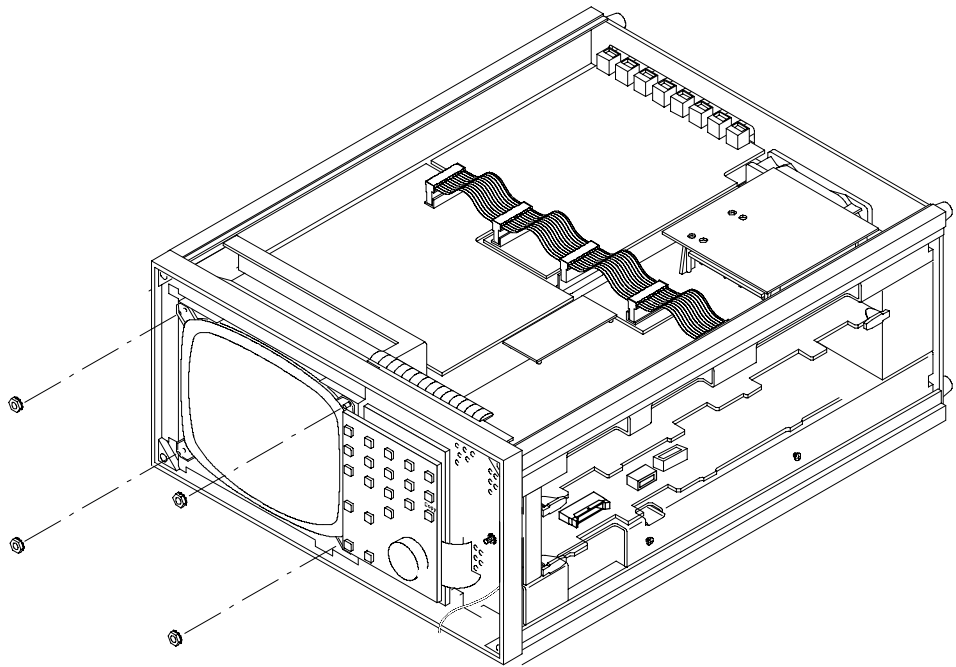

Figure 7: Removing the CRT touch panel nuts

Install

Install the new CRT Touch Panel

1. Install the new CRT touch panel as follows:

   a. Position the CRT touch panel from the kit against the CRT, and secure it in place with the four nuts removed earlier. See Figure 7.

Assemble Keypad and Keypad Controller

2. Install the new Power and I/O cable assembly (Tektronix part number 174-5413-xx) onto the back of the Keypad board (Tektronix part number 679-3620-xx) as follows:

   a. Remove the solder from the hole near fuse F890 that is marked +5V and solder the red wire from the new Power and I/O cable assembly into this hole. See Figure 8.
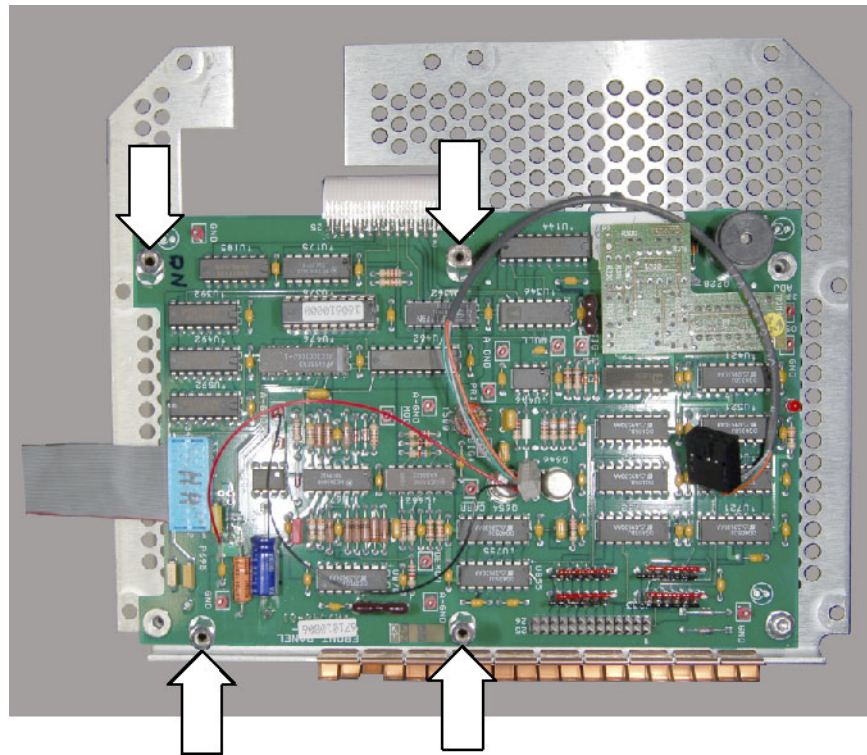
Figure 8: Solder Power cable to Keypad board

    b. Wrap and solder the black wire from the new Power and I/O cable assembly to TP580 (ground terminal).

3. Install the new Touch Panel Controller board assembly (Tektronix part number 119-6934-xx) to the Keypad board assembly as follows:

    a. Remove four screws from the Keypad board (see Figure 9) and install the four spacer posts (Tektronix part number 129-1602-xx) into the holes. Torque the standoffs to 8 in–lbs, using a 1/4 inch socket.

Figure 9: Spacer post locations

    b. Secure the Touch Panel Controller board to the bracket (Tektronix part number 407-5001-xx), using the four screws (Tektronix part number 211-0503-xx). See Figure 10.
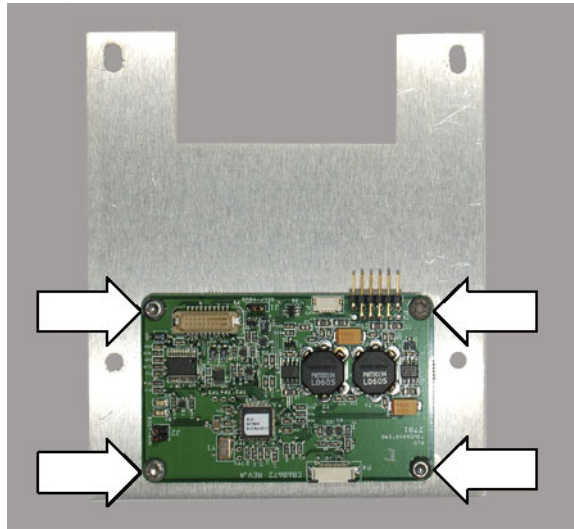
Figure 10: Installing the Touch Panel Controller board to the bracket

⚠ **CAUTION.** *Install the cables as instructed. If cables are installed incorrectly, the instrument may be damaged.*

    c. Install the non-keyed end of the new Power and I/O cable assembly (Tektronix part number 174-5413-xx) to the P1 connector on the Touch Panel Controller board. See Figure 11.
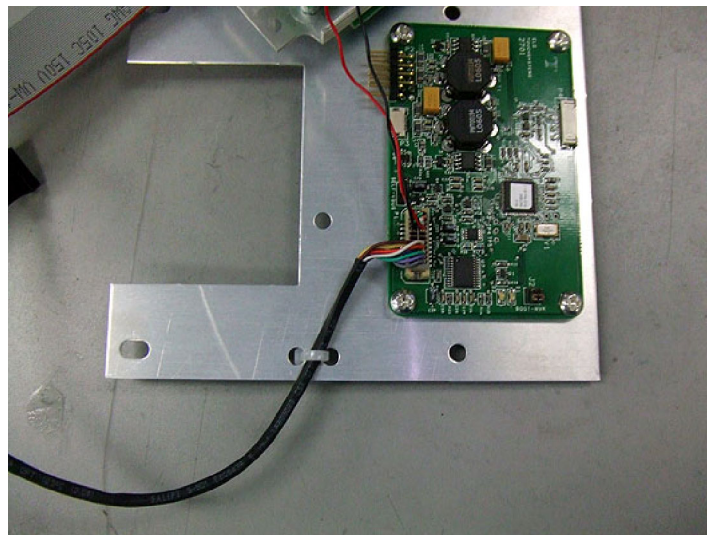

Figure 11: Connecting the RS232 cable to the Touch Panel Controller board

d. Fasten the cable to the bracket using cable ties as shown in Figure 11. Cut off the end of the cable tie.

e. Position the Touch Panel Controller board and bracket assembly on the standoffs on the Keypad board. See Figure 12.

f. Secure the bracket to the standoffs using the four screws (Tektronix part number 211-0510-xx). Torque to 8 in-lbs.

g. Replace the keypad board assembly by performing step C on page 8 in reverse order.
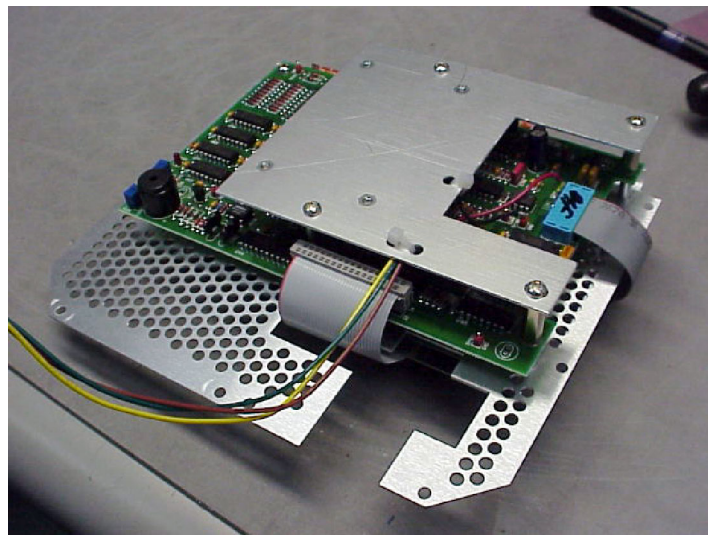

Figure 12: Attaching the Touch Panel Controller assembly to the Keypad board

Replace the Boot ROM (A5U14)

4. Install the supplied Boot ROM (A5U14) on the CPU (A5) circuit board as follows:

⚠ *CAUTION. To prevent damage, use an extraction tool to remove the Boot ROM (U14) from the socket. When replacing the supplied Boot ROM (U14), orient the pins using the indexed corner on the Boot BOM to the printed outline on the board.*

a. Use the board ejector tabs to release the CPU (A5) circuit board.

b. Slide the CPU (A5) circuit board out until you can reach the Boot ROM (A5U14). You may need to lift the CPU (A5) circuit board over a board post located below the board. See Figure 13.

c. Remove the existing Boot ROM (A5U14) using an extraction tool, and replace it with the supplied Boot ROM (A5U14) on the CPU (A5) circuit board as shown in Figure 13. Note the index on the corner of the Boot ROM (A5U14).
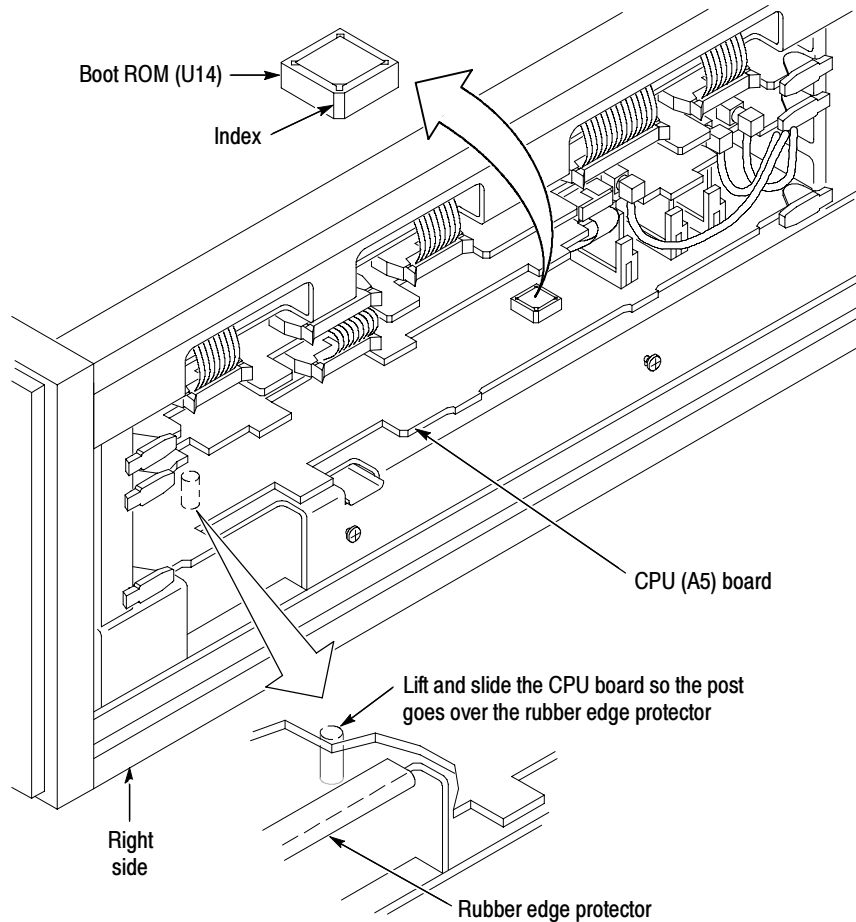

Figure 13: Replacing the Boot ROM

d. Slide the CPU (A5) circuit board into the card cage, and press firmly to seat the interboard connector.

Replace the Keypad Board Assembly

5. Replace the Keypad board assembly as follows:

a. Attach the touch panel cable to P2 on the Touch panel controller board. The key on the plug should be towards the shield. Make sure to route the cable outside of the standoffs. See Figure 14 on page 17.

b. Route the new RS232 cable alongside the flat ribbon cable that connects the Keyboard assembly to J9 on the CPU board. Connect the keyed end of the RS232 cable to J5 on the CPU board.
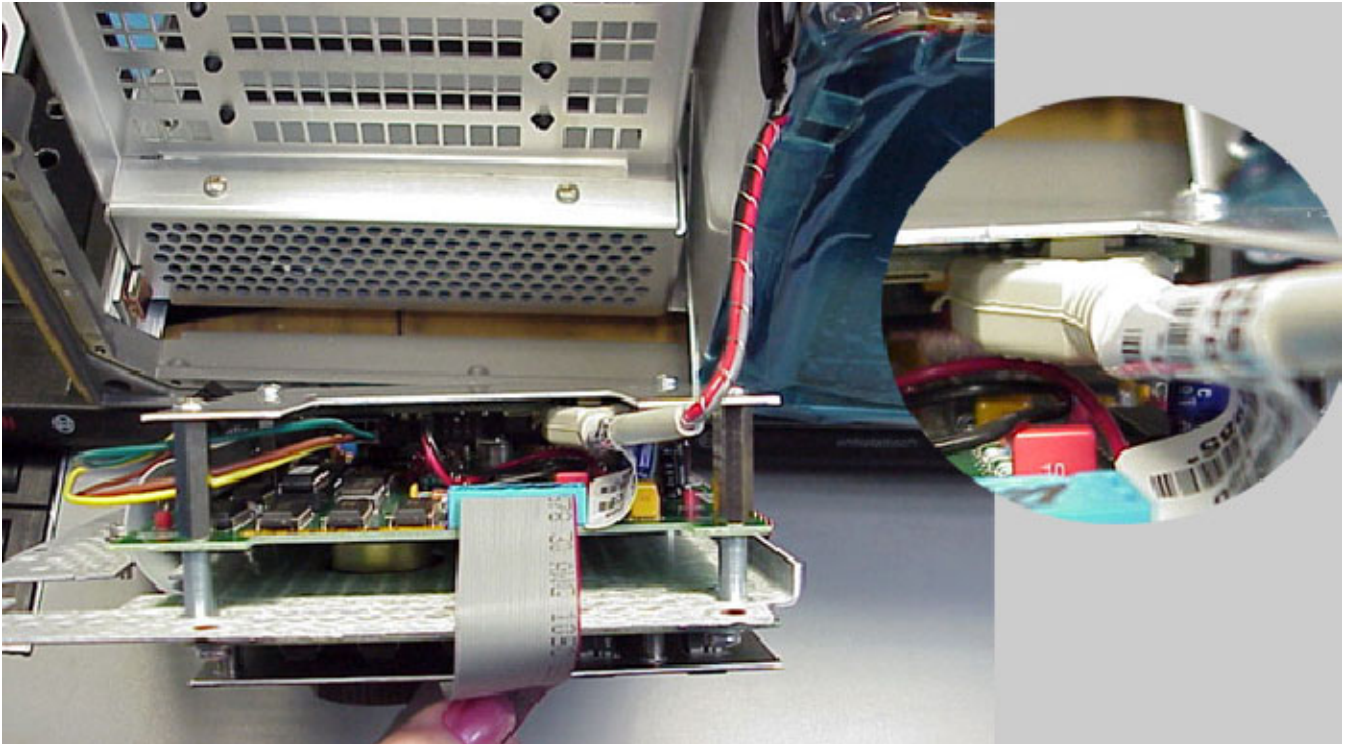

Figure 14: Installing the Keypad board assembly (bottom)

c. Install the Keypad board assembly on the instrument. Make sure that the Touch Screen cable is free from interference with the chassis.

d. Install and tighten the flat-head screws that hold the Keypad board assembly bracket to the instrument front frame. See Figure 5 on page 8.

e. Replace the right-side card cage retainer. See Figure 2 on page 5.

Replace the CRT Bezel **6.** Install the new CRT bezel (included in the kit) as follows:

a. Install the STBY/ON switch (that you removed from the old bezel) into the new bezel.

b. Position the new CRT bezel near the instrument front panel.

c. Connect the 5-connector cable from the instrument to the STBY/ON switch in the new CRT bezel.

    d. Connect the ground strap ring from the STBY/ON switch to the keyboard bracket. See Figure 4 on page 7. Reinstall and tighten the nut that holds the ground strap ring in place.

    e. Place the bezel on the front frame.

NOTE. Use care in tightening the bezel retaining screws. The threaded bezel inserts can be stripped from the bezel if the screws are over-tightened.

    f. Reinstall and tighten the four screws that hold the bezel to the front frame. See Figure 3 on page 6.

Replace the Card Cage Retainer

7. Replace the card cage retainer by following these steps:

    a. Replace the EMI bracket and tighten the two screws.

    b. Connect the interconnection cable at J9 on the CPU board.

    c. Place the card cage retainer onto the two screws, and slide it to the right. See Figure 2 on page 5.

    d. Tighten the two screws on the front of the card cage retainer.

Replace the Cover Panels

8. Replace the top and bottom panels, and the left and right side panels by guiding them into the chassis grooves, sliding them all the way to the front of the instrument, and installing the screws.

Upgrade Firmware

NOTE. If your instrument firmware image number is 030930 or later version, you need not upgrade the firmware.

The firmware upgrade is performed using the floppy disks supplied with this kit. The installation program on the floppy disks copies the firmware–upgrade software to your PC. You will upgrade your measurement set using the installed software on your PC hard drive. Complete instructions for performing the firmware upgrade are included in the installation program.

The minimum PC hardware and operating system requirements for performing the firmware upgrade are listed below:

Hardware requirements	Operating system requirements[1]
12 MB of free disk space on hard drive	MS/DOS (5.0 or later), Windows 3.1, or Windows 95/98
386 microprocessor or better	
3.5 in. floppy disk drive	
LapLink parallel cable (Tektronix part number 174-3800-xx)	

[1]   **The installation program will not run under Windows NT.**

Load the Firmware Upgrade Software

To load the firmware-upgrade software on your PC, perform the following procedure:

1. Insert the provided Program Disk into a floppy disk drive on your PC.

NOTE. The installation program defaults to an installation source of drive A: and a destination of drive C:. You will be prompted by the installation program to verify or change the source and destination drives as required by your system.

2. Install the upgrade software using one of the following command lines:

- From Windows 3.1 or MS/DOS:
  run INSTALL.BAT

- From Windows 95/98:
  run INSTALL.95

NOTE. The installation program will not run under Windows NT or Windows XP.

3. Follow the screen prompts to complete the loading of the software for the firmware upgrade.

Upgrade Your Measurement Set

Once you have installed the firmware-upgrade software on your PC, you can upgrade multiple VM700T or Turbo VM700A measurement sets without having to reload the floppy disks. To upgrade the firmware of a VM700T or Turbo VM700A measurement set from your PC, perform the following procedure:

⚠

CAUTION. *To avoid loading incorrect firmware into your measurement set, be sure to use the correct firmware–image archive number for the instrument firmware you want to install. If you have installed multiple firmware images, you will have more than one firmware–image directory. If you load the wrong firmware, repeat the firmware upgrade using the correct firmware version.*

The firmware–upgrade installation program creates a directory under the VM_UPGRD directory using the current firmware–image archive number loaded on the floppy disk set. The firmware–image number is based on a date using a format of year, month, and day. In most situations, you will want to load the latest version of the firmware into your measurement set.

1. Change the working directory on your PC to the following firmware–image directory:

   <destination drive>\VM_UPGRD\F_<archive number>

   For example, if you load the firmware–upgrade software to a destination drive of C:\ and your firmware archive number is 000815, then your command–line directory should look like the following:

   C:\VM_UPGRD\F_000815

2. Connect the LapLink cable between the PC and the measurement set.

3. Windows 3.1 or MS/DOS only. To perform the firmware upgrade, run BURN.BAT and follow the prompts.

4. Windows 95/98 only. To perform the firmware upgrade, run BURN.BAT from Windows Explorer and follow the prompts.

Verify Operation

1. After installing a new touch panel, perform the following procedures, which are provided in the *VM700T Video Measurement Set Service Manual:*

   ■ Adjustment procedure steps pertaining to the touch panel

   ■ Performance Verification procedure

NOTE. *Panel calibration values vary greatly depending on the version of touch panel that is installed in your instrument. Sample values shown in the service manual are typical of older touch panels; your results can vary significantly.*

▓ **End of document** ▓