

# Instructions



**050-3613-00**

**Front-Panel Display Replacement**

**WFM90, WFM91, WFM90D, and WFM91D**

**075-0856-00**

**Warning**

The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

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# 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.*

While using this product, you may need to access other parts of the system. Read the *General Safety Summary* in other system manuals for warnings and cautions related to operating the system.

**Connect and Disconnect Properly.** Do not connect or disconnect probes or test leads while they are connected to a voltage source.

**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 apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

**Replace Batteries Properly.** Replace batteries only with the proper type and rating specified.

**Recharge Batteries Properly.** Recharge batteries for the recommended charge cycle only.

**Use Proper AC Adapter.** Use only the AC adapter specified for this 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.**

**Symbols and Terms**

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



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

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

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**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 symbol may appear on the product:



# 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, switch off the instrument power, then disconnect the power cord from the mains power.

**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.



# Kit Description

This document supports Tektronix modification: ECR 30035.

## Products

<b>WFM90</b>	All
<b>WFM91</b>	All
<b>WFM90D</b>	B010100 through B019999
<b>WFM91D</b>	B010100 through B019999

## Required Tools

Name	Description
Torx screwdriver handle	Accepts Torx-driver bits
T-10 Torx tip	Torx-driver bit for T-10 size screw heads
1/4 in hexagonal driver	
Flat blade screwdriver	
Tweezers or needle-nosed pliers	

## Kit Parts List

Circuit/figure number	Quantity	Part number	Description
A5	1 EA	065-0721-00	DISPLAY MODULE; LCD,PROMATE;234V X 479H,4 INCH,COLOR,6 OCLOCK,NTSC/PAL,BACKLIGHT,ANALOG RGB IN
	1 EA	174-5067-00	CABLE ASSEMBLY
	1 EA	348-0090-00	PAD, CUSHIONING: 2.03 X 0.69 X 0.312
	4 EA	348-1722-00	LCD FOOT ASSY
	1 EA	075-0856-00	FRONT-PANEL DISPLAY REPLACEMENT KIT INSTRUCTIONS WFM90/91, WFM90D/91D; KIT 050-03613-00





# 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.



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**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.

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## Remove



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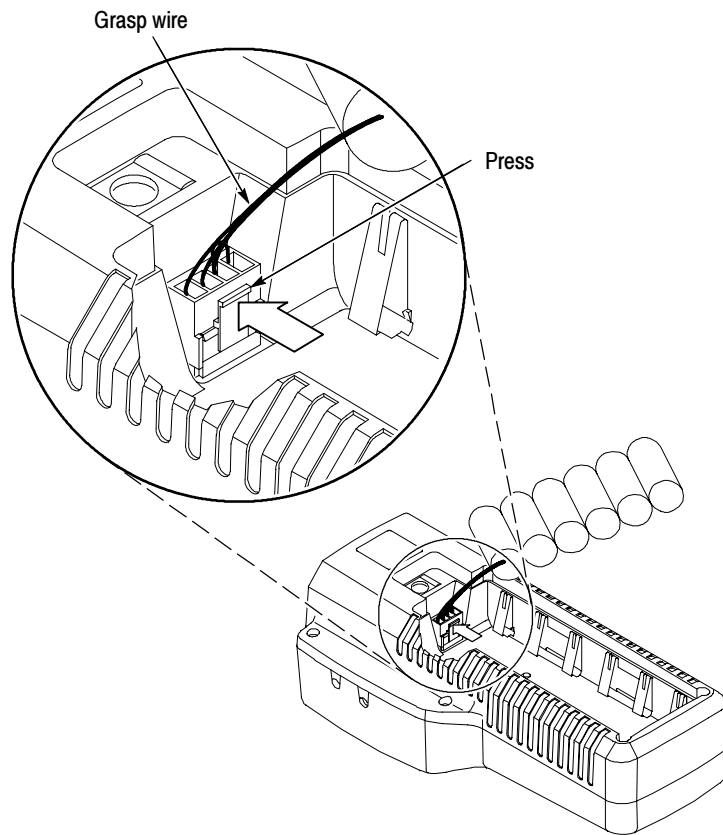
**CAUTION.** To prevent damage to the instrument, disconnect the power adapter and remove installed batteries from the monitor before starting disassembly.

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### Power

Before disassembling the instrument, disconnect the power adapter and remove the optional NiMH battery pack or the alkaline batteries.

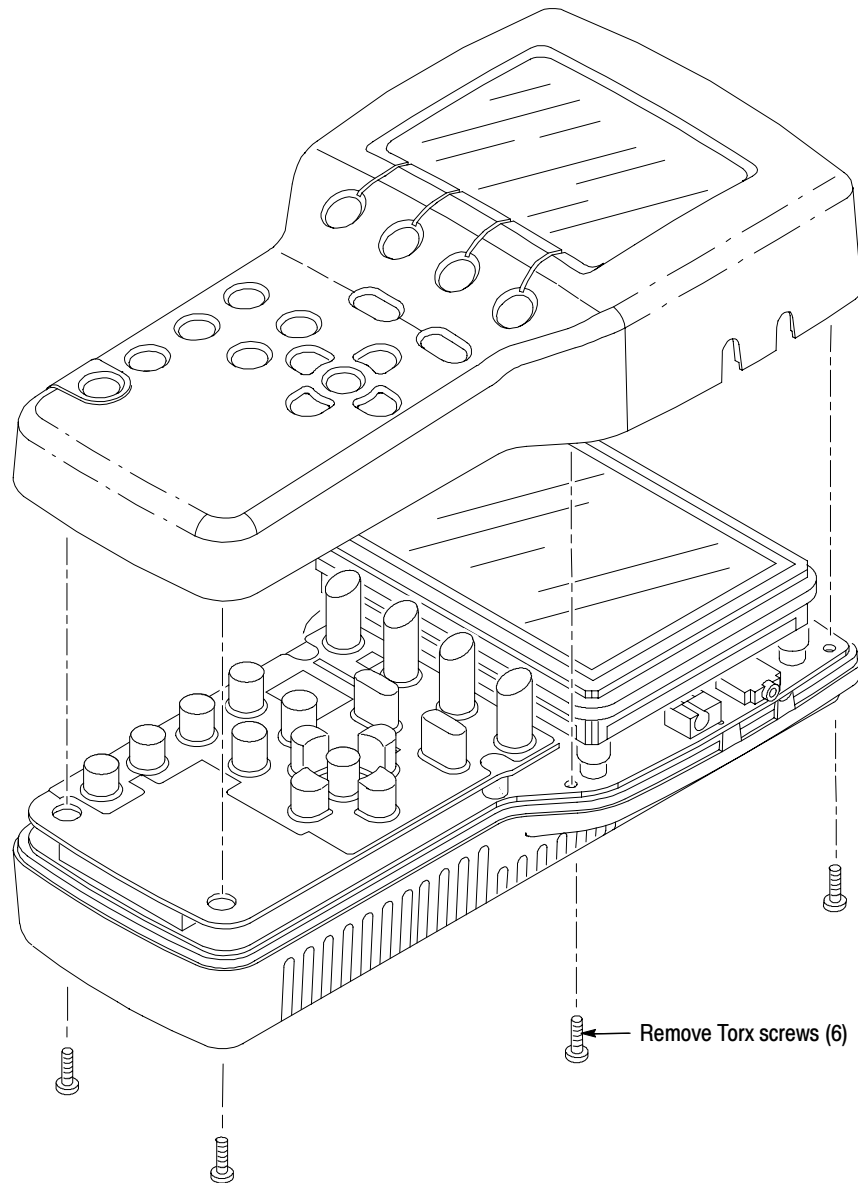
1. Remove the battery cover as follows:
  - a. Turn the turnlock stud 1/4-turn counterclockwise using a screwdriver or coin.
  - b. Pull out on the upper portion of the battery cover.
2. If the NiMH battery pack is installed in your product, remove it as follows:
  - a. Tap the bottom of the battery pack so that the back of the battery pack falls into your hand.
  - b. Grasp the batteries close to the wire leads. Use your thumb to press in on the top portion of the battery connector tab.
  - c. Pull up gently to remove the batteries. See Figure 1 on page 8.
3. If C-size alkaline batteries are installed in your product, remove them by carefully pulling them out of the battery compartment.



**Figure 1: Removing the NiMH battery pack**

**Top Cover Assembly**

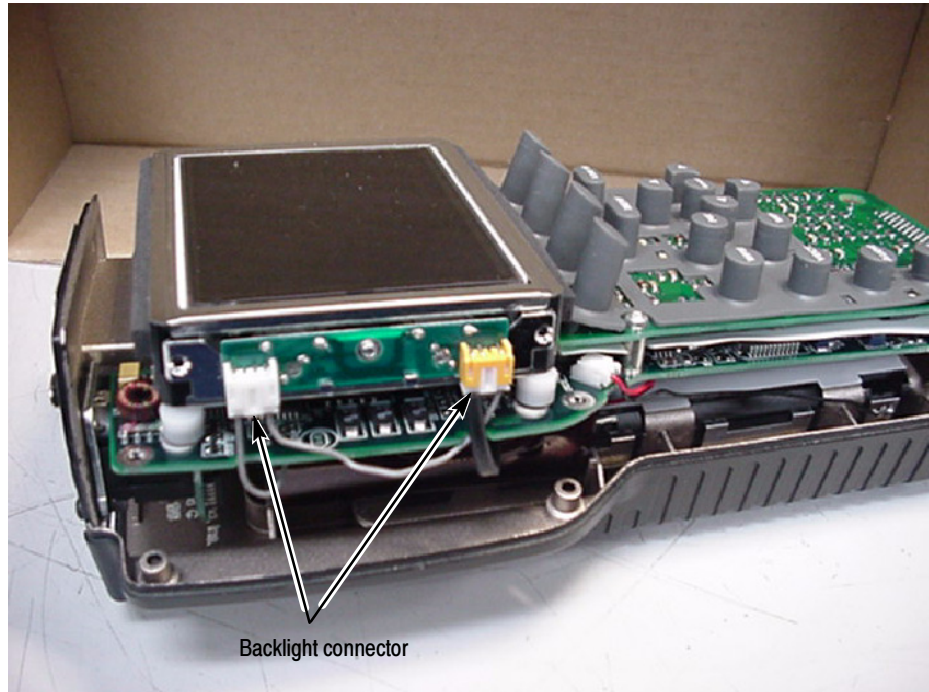
1. Remove the six retaining screws using the T-10 Torx-tip screwdriver. See Figure 2.

**Figure 2: Removing the top cover**

2. Turn the instrument over and gently lift the top cover off of the bottom cover.
3. Set the top cover face up on your work surface or cover it with a lint-free cloth to prevent dust from accumulating on the inside surface of the cover.

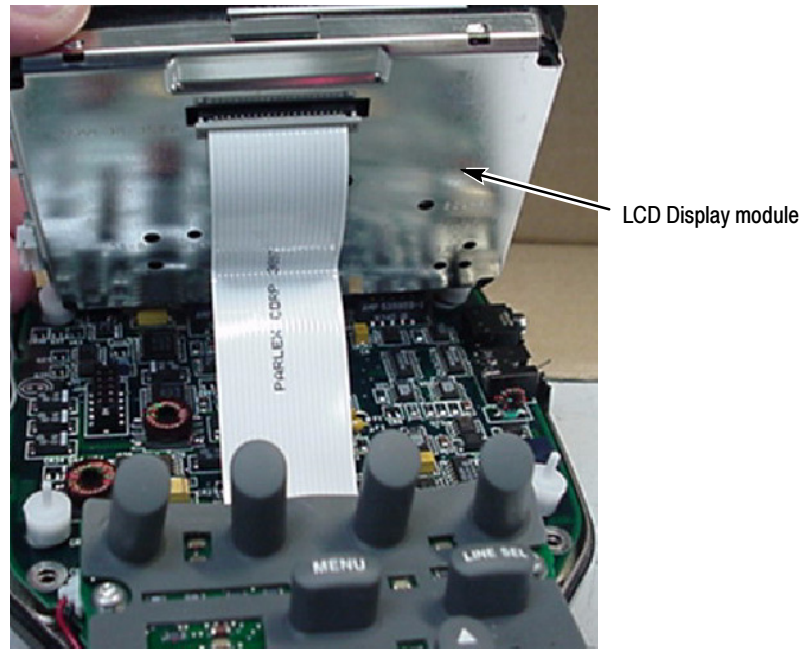
**LCD Display Module**

1. Disconnect the two backlight connectors from the LCD Display module. These connectors are shown in Figure 3.



**Figure 3: Disconnect the backlight connectors**

2. Grasp the sides of the LCD Display module and lift the module as shown in Figure 4 so that you can access the 20-pin cable underneath the module.



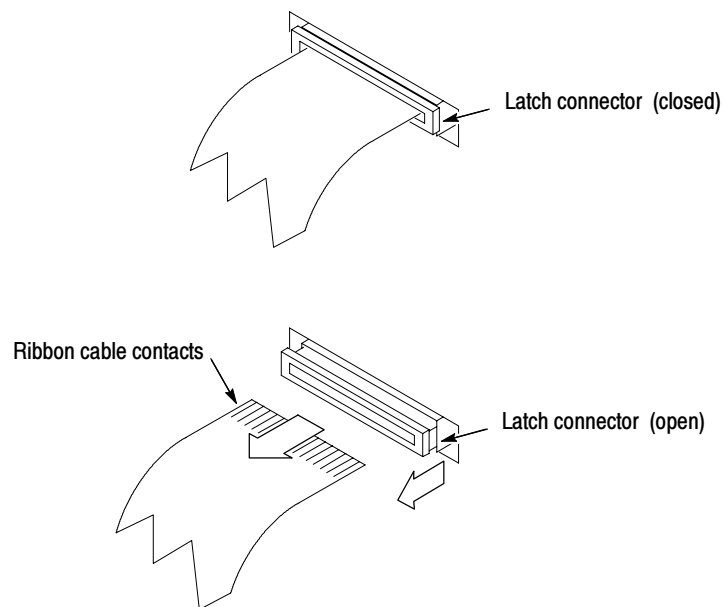
**Figure 4: The 20-pin ribbon cable**

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**NOTE.** The 20-pin ribbon cable connecting the LCD Display module to the Bottom board is a zero insertion-force ribbon cable.

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3. Disconnect the 20-pin ribbon cable as follows:
  - a. Locate the connector latch on the back side of the LCD Display module and pull the latch out as shown in Figure 5.
  - b. Pull the ribbon cable out of the connector.
4. Remove the LCD Display module from the instrument.

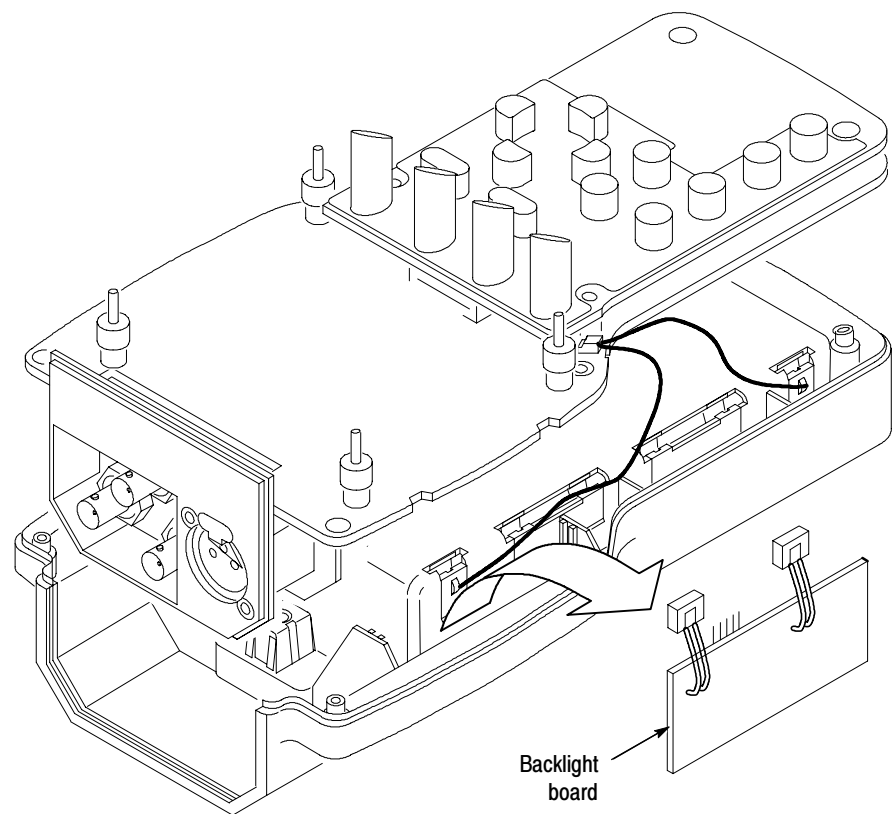


**Figure 5: Open the slide latch connector**

**Backlight Board**

Remove the Backlight board as follows:

1. Lift on the Bottom board while pressing on the battery connector in the battery compartment (the battery cover was removed earlier in this procedure). WFM90D and WFM91D monitors have an SDI board installed; be careful not to disconnect the cables from the SDI board.
2. Gently pull the Backlight board out of the instrument. See Figure 6.
3. Dispose of the Backlight board with its attached covering; this board is integrated into the new display.

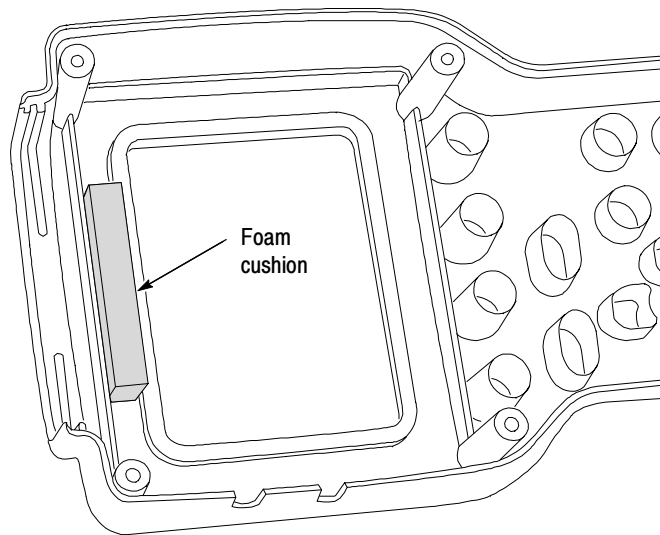


**Figure 6: Remove the Backlight board**

## Replace

### LCD Display module

1. Install the foam cushion supplied with this kit as follows:
  - a. Expose the adhesive strip on the foam cushion.
  - b. Stick the foam cushion to the inside of the instrument cover as shown in Figure 7.

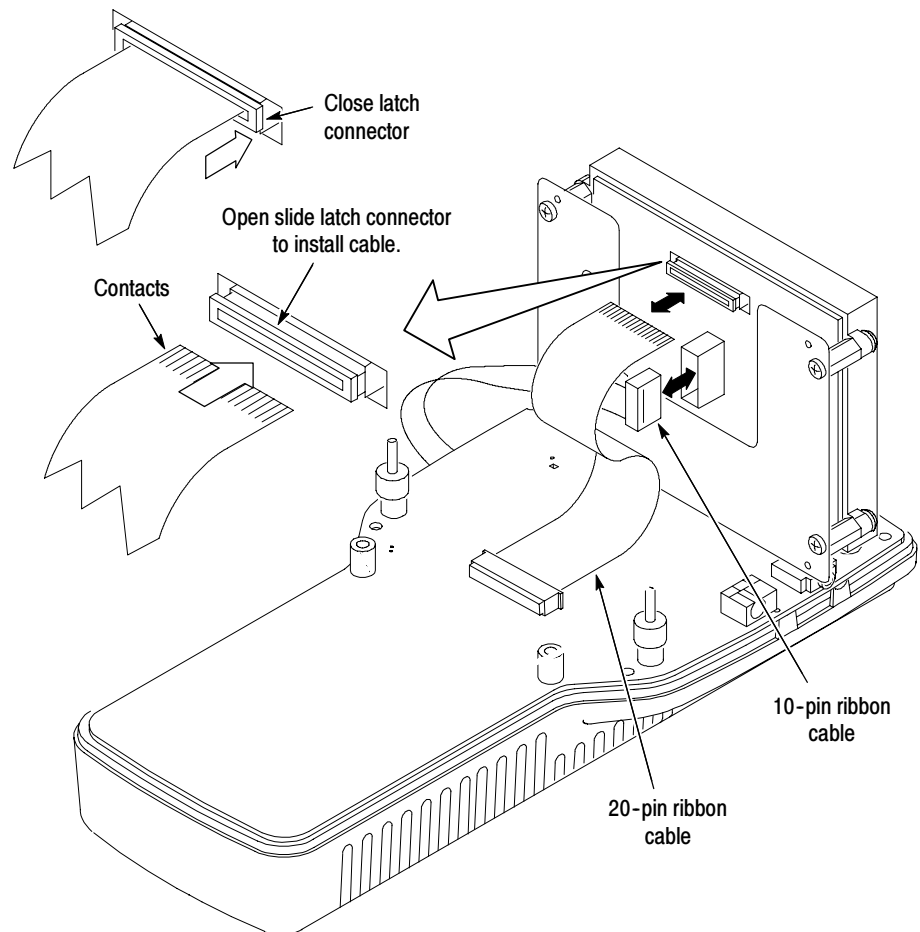


**Figure 7: Installing the foam cushion**

2. Some older WFM90 and WFM91 monitors have rigid feet that support the LCD Display module. Remove and replace those feet as follows:
  - a. From the back of the Bottom board, remove the four nuts that attach the feet.
  - b. Remove the four feet from the front side of the Bottom board and replace them with the stick-on feet supplied in this kit. These feet are shown in Figure 9.
3. The new LCD Display module requires a new 10-pin ribbon cable. Install this cable (supplied in the kit) on the Bottom board as follows. See Figure 8 and Figure 9 for the connector locations.
  - a. Locate J20 on the back side of the Bottom board by finding the corresponding label on the front of the board. (J20 is the connector that was attached to the Backlight board.)



- b. From the back side of the Bottom board, insert the pins of the 10-pin cable into the holes in the board.
4. Put the Bottom board back into the instrument, allowing the plug end of the 10-pin cable to extend out of the instrument.
5. Position the new LCD Display module as shown in Figure 8.
6. Attach the plug end of the 10-pin cable to the 10-pin connector on the back of the LCD Display module as shown in Figure 8.



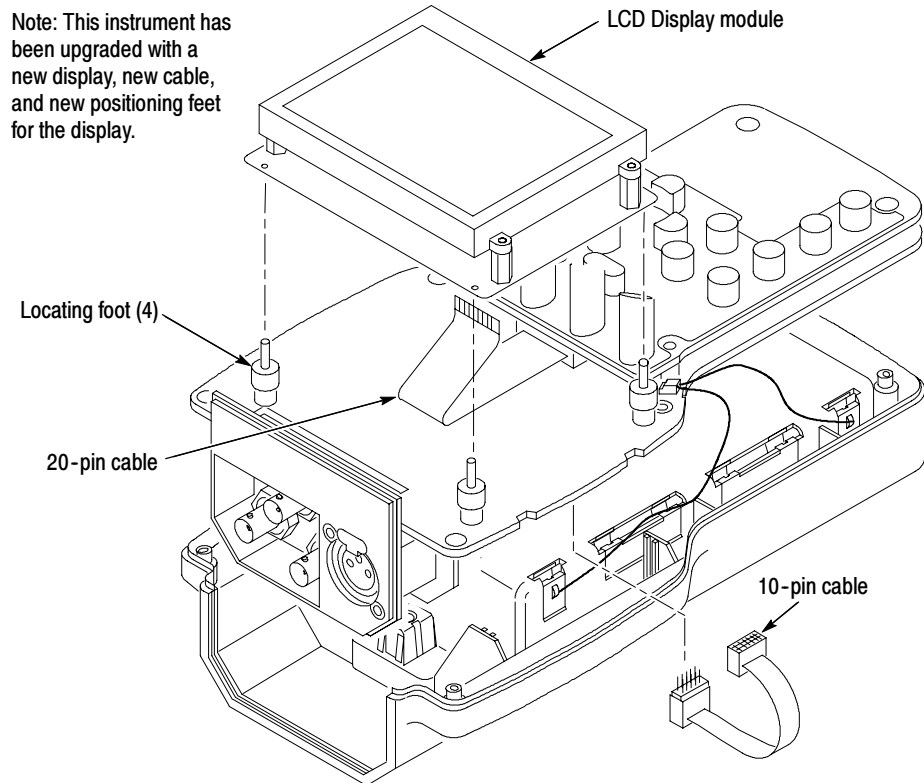
**Figure 8: Installing the cables on the LCD Display module**

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**NOTE.** The 20-pin cable connecting the LCD Display module to the Bottom board is a zero insertion-force ribbon cable.

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7. Install the 20-pin connector as follows (see Figure 8 on page 15):
  - a. Pull out the latch on the back of the LCD Display module.
  - b. Push the 20-pin cable from the Bottom board into the connector housing.
  - c. When the cable rests against the back of the connector, press in the connector latch to lock the cable in place.
  - d. Set the LCD Display module just above its position on the locating feet. Use your finger to crease the ribbon cable so that when you set the LCD Display module down on the locating feet, the ribbon cable does not raise the module off the feet.
8. Set the LCD display module onto the four locating feet. The locating feet fit into small holes in each of the four corners on the back of the LCD display. See Figure 9 for the feet locations.



**Figure 9: Exploded view of the instrument**



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**CAUTION.** *To avoid damaging the LCD display, do not touch the face of the display because it is difficult to clean and can be scratched.*

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9. Carefully remove the protective plastic film cover from the face of the LCD display by peeling up the corner of the cover and pulling it off the display.
10. If it is necessary to clean the front of the LCD display, wipe gently across the surface using a soft, lint-free cloth dampened in a solution of 75% isopropyl alcohol and 25% water.

## Replace the Covers and Batteries

- Top Cover**
1. Make sure that no wires will be pinched between the top and bottom covers.
  2. Align the top cover over the bottom cover so that the keypad buttons will slide through the top cover keypad holes.
  3. Gently lower the top cover onto the bottom cover. Shake the top cover slightly if necessary to slide the keypad buttons through the top cover holes.
  4. Install the six retaining screws using the Torx-tip screwdriver.

**Optional NiMH Battery Pack**

If this battery pack was installed in your instrument, replace it now as follows:

1. Press the battery connector onto the jumper in the battery compartment.
2. Be sure the battery connector tab snaps onto the jumper housing to prevent a loss of battery power.

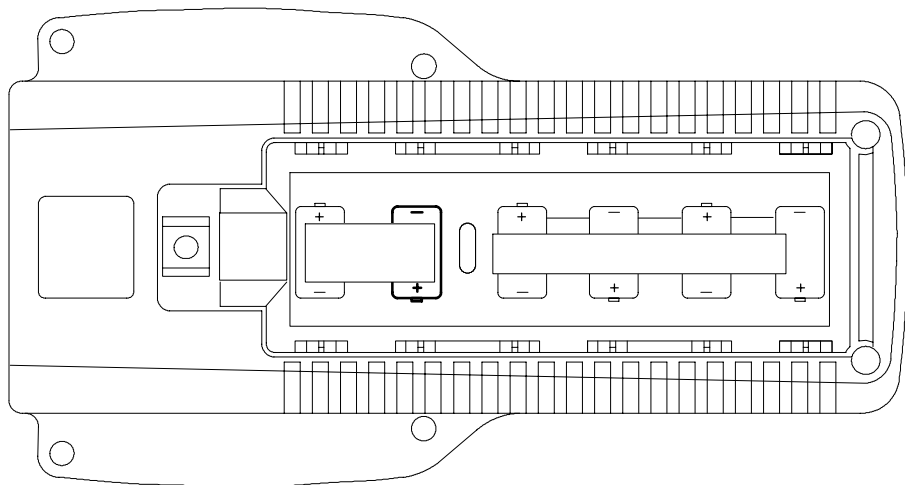
**Alkaline Batteries**

1. Press the C-size alkaline batteries into place according to the polarity label on the bottom of the battery compartment. See Figure 10.

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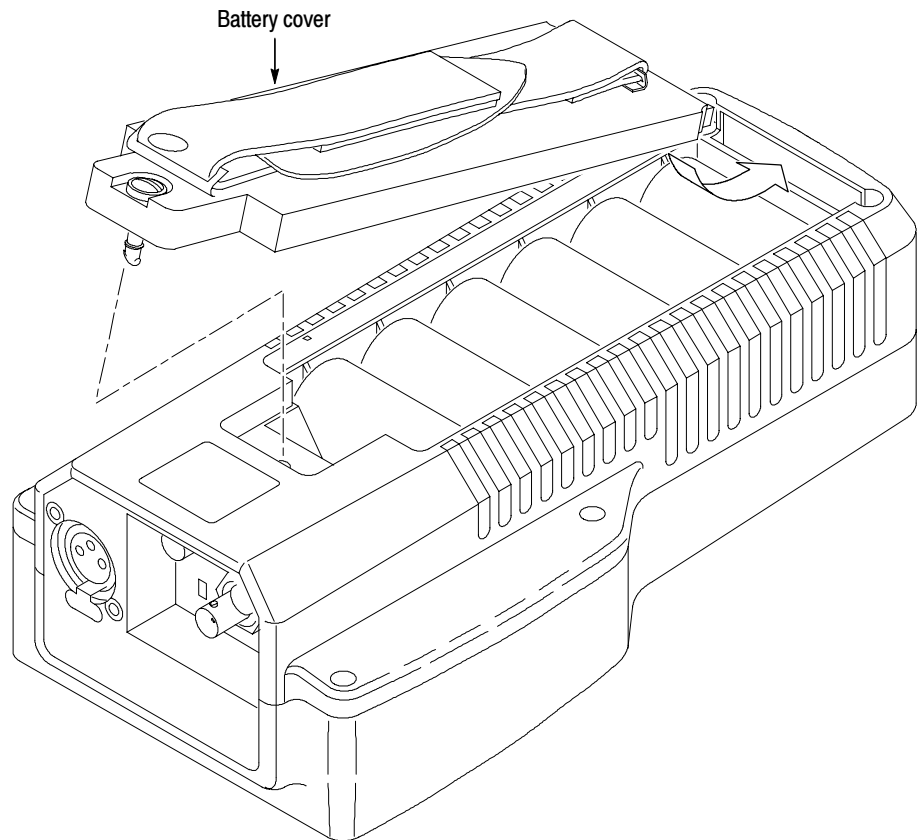
**NOTE.** The polarity of the alkaline batteries must be correct for the instrument to operate. Always replace all of the alkaline batteries at the same time when replacing discharged batteries.

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**Figure 10: Installed polarity of alkaline batteries**

- Battery Cover**
1. Place the lower lip of the battery cover into the instrument housing and press the top portion of the cover into the instrument. See Figure 11.
  2. Secure the battery cover by turning the turnlock stud 1/4-turn clockwise.



**Figure 11: Installing the battery cover**

## Verify Operation

After installing a new LCD Display module, perform the following actions:

### **Adjust the Display (Required)**

The new LCD Display module has different default values than the old module. You will need to adjust the display before you can perform the instrument adjustment procedure.

1. Power on the instrument.
2. Select Display in the Config menu.
3. Select View.
4. Adjust for best viewing.

### **Adjust the Instrument (Required)**

Perform the *Adjustment Procedures* in the *WFM90D & WFM91D Handheld Waveform, Vector, Picture, & Audio Monitor Service Manual*. This is necessary to ensure that the instrument will perform correctly. Do not select the defaults as instructed near the beginning of the procedure.

### **Verify Instrument Performance (Optional)**

If you want to verify instrument performance to specifications, complete the *Performance Verification* procedures in the *WFM90D & WFM91D Handheld Waveform, Vector, Picture, & Audio Monitor Service Manual*.

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