3M™ Workstation Monitor Model 724

User's Guide

Index

SAFETY INFORMATION

Please read, understand, and follow all safety information contained in these instructions prior to the use of this 3M™ Workstation Monitor Model 724. Retain these instructions for future reference.

Intended Use:

The 3M Workstation Monitor Model 724 is intended to monitor the operation of two wrist strap grounding systems and two work surfaces. This product has been designed and tested for use with 3M™ Dual Conductor Wrist Straps and 3M Work Surfaces Grounding Systems. If the equipment is used in a manner not specified in these instructions, the protection provided by the equipment may be impaired. Use in any other application has not been evaluated by 3M and may lead to an unsafe condition.

Explanation of Symbols	
	CAUTION
	Operator(s) Wrist Strap Assembly Ground
	Work Surface Ground
	Earth; ground
	Power input connector polarity (center negative)

Explanation of Signal Word Consequences		
	**WARNING**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury and/or property damage.
	**CAUTION**	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or property damage.
	NOTICE	Indicates a situation which, if not avoided, could result in property damage.

⚠ WARNING

To reduce the risks associated with fire and explosion:

- Do not use in an explosive environment - monitor is not designed to be intrinsically safe.

To reduce the risks associated with medical device malfunction:

- Persons with heart pacemaker devices should never use this monitor.

To reduce the risks associated with hazardous voltage and fire:

- Use only the power supply provided by 3M and specified for the country of use.
- Do not position the monitor accessories or other equipment where unplugging the power supply is difficult.
- Always locate the power source (socket or outlet) near the equipment. The power supply plug serves as the disconnect device.
- Do not modify or attempt to service the power supply or monitor; there are no user serviceable parts.
- Do not use the power supply if damaged;
- Replace power supply if damaged using only 3M supplied parts.
- Do not use the 3M™ Workstation Monitor Model 724 or its power supply outdoors in wet/humid environments.
- Do not use the Workstation Monitor Model 724 or its power supply outside of the operating conditions listed in this user guide.
- Always follow instructions for installation as stated in these user instructions.

⚠ CAUTION

To reduce the risks associated with environmental contamination:

- Dispose of this monitor in accordance with all applicable local and government regulations.

NOTICE

To reduce the risk of ESD damage to components or assemblies being handled:

- Monitor must be checked periodically to verify each test mode is functioning correctly.
- Ensure proper operation of monitor by performing operational verification test as required.
- Ensure tester is properly grounded.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Environmental Conditions

This equipment has been tested and found to be safe to operate within these environmental conditions.
This is not a warranty of equipment performance within these conditions.

- Indoor use only.
- Ingress Protection: IPX0.
- Altitude: Up to 2,000 m.
- Mains supply voltage fluctuations up to ± 10% of the nominal voltage.
- Transient overvoltages up to the levels of overvoltage category II.
- Temporary overvoltages occurring on mains supply.
- Pollution degree 2.
- Temperature: Maximum 110˚F / 43˚C Minimum 50˚F / 10˚C.
- Humidity: Maximum relative humidity 80% for temperatures up to 31˚C decreasing linearly to 50% relative humidity at 40˚C.

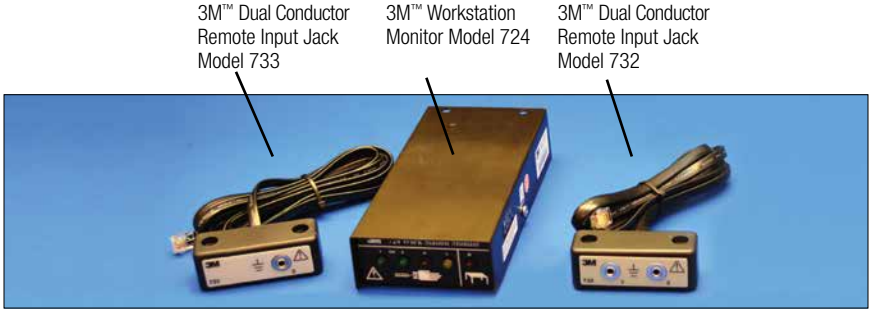


Figure 1 – 3M™ Workstation Monitor Model 724 with remote input jacks.

SECTION 1
Theory of Operation

The 3M™ Workstation Monitor Model 724 (Figure 1) is designed to monitor the operation of the wrist strap grounding systems of two operators. To accomplish this, it uses a DC current source to measure a loop electrical resistance. The system uses a special wrist band and ground cord that contain two independent elements. The Workstation Monitor Model 724 employs two selectable test voltages (9 and 16 volts) and resistance limits (10 Megohms and 35 Megohms). It also monitors the grounding of up to two 3M work surfaces. The Workstation Monitor Model 724 contains a current-limiting resistor, through one side of the wrist band, through the skin of the wearer under the band, through the second side of the wrist band, through the second conductor of the ground cord that contains a current-limiting resistor, and finally back to the monitor.

Selection of Test Voltage and Resistance Limit

The 3M™ Workstation Monitor Model 724 allows for the selection of test voltages (9V or 16V) and resistance limits (10 Megohms or 35 Megohms). The additional ranges have been added to accommodate global electrical static discharge requirements. Selection of the operating parameters are left up to the user's discretion (See Section 4).

Operator Monitoring: Single and Dual

The wrist strap monitoring function is activated by plugging a wrist strap dual conductor ground cord into either one of the jacks on the 3M™ Dual Conductor Remote Input Jack Models 732 and 733. If the resistance of the wrist strap loop is within the limits of the selected range (1.5 Megohms to 10 Megohms or 1.5 Megohms to 35 Megohms) on the Workstation Monitor Model 724, the cord, the wrist band, and the contact to the arm of the wearer, it is considered to be functioning correctly. At this time, one of the (OK) green lamps (1 or 2) will be illuminated on the front of the monitor.

Figure 3 – 3M™ Workstation Monitor Model 724 Faceplate

The wrist strap of the second operator is measured in the same way. Operators are identified by the two (OK) green lamps (1 & 2). However, the same high wrist strap red lamp (H) and low yellow (L) lamps illuminate when a fault is detected. The green lamp that extinguishes identifies the operator that is experiencing the fault condition.

If the resistance of the wrist strap loop is higher than the selected range (10 Megohms or 35 Megohms) on the Workstation Monitor Model 724, an (OK) wrist strap green lamp (1 or 2) extinguishes, and a high wrist strap red lamp (H) illuminates with an audible alarm. This is an indication of a high resistance in the cord band, or poor contact between arm and band. If the resistance in the loop is under 1.5 Megohms, it is an indication of a low resistance meaning one or both current-limiting resistors are bypassed. The low yellow lamp (L) will flash and an (OK) green lamp (1 or 2) will remain illuminated.

Voltage on Operator When Connected to the 3M™ Workstation Monitor Model 724

There is a concern about the voltage that is applied to an operator while they are connected to a monitor. Some of today's electronic components are extremely sensitive to electrostatic discharge from a person (less than 10 volts). The user should determine if these voltages can damage the device being handled. The following chart for the Workstation Monitor Model 724 illustrates the level of voltage that will appear on the operator under various resistance conditions.

NOTICE

A low resistance condition also can be caused by touching a grounded object or by standing on a conductive surface. This may trigger the low resistance alarm on the 3M™ Workstation Monitor Model 724

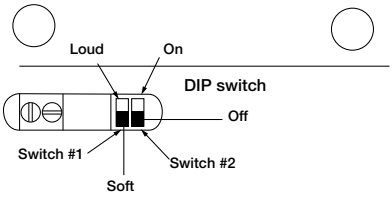
Voltage on Operator when connected to the Workstation Monitor Model 724

Condition	9V-10 Megohms	9V-35 Megohms	16V-10 Megohms	16V-35 Megohms
No Skin Resistance	0.9V	0.9V	1.6V	1.6V
200K Ohm Skin Resistance	1.0V	1.0V	1.8V	1.8V
Likely Case Before Alarm	2.5V	3.6V	4.4V	6.4V
Worst Case Before Alarm	4.5V	7.1V	8.0V	12.6V
Absolute Worst Case	9.0V	9.0V	16.0V	16.0V

Note: For more information about wrist strap monitoring, see Additional Wrist Strap Monitoring Information (Section 15).

Audible Alarm Tones

For wrist strap malfunctions the 3M™ Workstation Monitor Model 724 indicates a different tone for each operator – a continuous tone for #1 operator and a fast chirping beep for #2 operator. The volume of the wrist strap alarm is adjusted by selection of the internal DIP switch #1. For work surface malfunctions, a slow chirping beep is made. This alarm sound is turned on or off by selection of DIP switch #2. Switch #1 and #2 are accessible through a slot located in the bottom of the chassis.



3M™ Workstation Monitor Model 724 bottom view

Figure 4 –
Selected desired alarm options

Work Surface Monitoring

The Workstation Monitor Model 724 monitors its connection to ground and the grounding of a 3M ESD work surface. A loop resistance is measured from the monitor, through a 3M™ Monitor/Table Mat Cord 2380D to the work surface (Section 2), across the conductive layer of the work surface, through the grounding wire of the work surface to an electrical ground and finally back to the monitor through the Workstation Monitor Model 724 grounding wire. If the resistance of the loop exceeds 3.7 Megohms the work surface high red lamp (M) will illuminate and all green lamps will be extinguished. If DIP switch #2 is in the ON position (Figure 4) the audible alarm will activate. If no ESD work surface is to be monitored, the Monitor/Table Mat Cord 2380D and the ground wire of the Workstation Monitor Model 724 must be connected to an electrical ground (Section 3). This is done to ensure that the Workstation Monitor Model 724 is providing a ground connection for the operators. Again, if the loop resistance exceeds 3.7 Megohms the work surface high red lamp (M) will illuminate and the alarm will activate if selected.

NOTICE

The grounding wire from the work surface and the ground wire from the 3M™ Workstation Monitor Model 724 must be attached to separate electrical grounds. The work surface monitoring function is active any time that the power supply for the monitor is plugged in.

NOTICE

Disconnect the 3M™ Monitor/Table Mat Cord 2380D to prevent possible damage to the 3M™ Workstation Monitor Model 724 before testing the resistance of the work surface with a high voltage megohmmeter.

SECTION 2
Installation of 3M™ Workstation Monitor Model 724 with Work Surface Ground Monitoring

Wire Attachments and Grounding - See Figure 12 for complete drawing of the 3M Workstation Monitor Model 724 wire connections.
Tools required – Small blade, screwdriver and wire cutter.

a) Connect the work surface to an electrical ground with the appropriate one megohm ground cord you received at time of purchase.

b) Using a small screwdriver move the DIP switch #2 on the Workstation Monitor Model 724 to the ON position to activate the work surface audible alarm (Figure 4).

c) Locate the accessory package that contains a 3M™ Monitor/Table Mat Cord 2380, Workstation Monitor Model 724 ground wire (with ring terminal), and the two-wire connector plug.

d) Attach the 3M Monitor/Table Mat Cord 2380 (tinned wire end) to the work surface terminal of the two-wire connector by inserting it into opening and securing with the screwdriver (Figure 5A or 5B). Attach the plastic cap end to the snap on the work surface.

e) Determine how you want to ground the Workstation Monitor Model 724:
   - If you are grounding through the AC adapter perform step (2f).
   - If you are grounding through the Workstation Monitor Model 724 ground wire perform step (2g).

f) Attach the tinned ground wire of the AC adapter to the ground terminal of the two-wire connector by inserting it into opening and securing with screwdriver (Figure 5B). Continue with step (2h).

g) Attach the tinned Workstation Monitor Model 724 ground wire to the ground terminal of the two-wire connector by inserting the tinned end into opening and securing with screwdriver (Figure 5A). Attach the ring terminal end with a screw (not supplied) to an electrical ground (Figure 7B). Continue with step (2h).

Note: Two snap fasteners or appropriate connectors must be installed at opposite corners of the work surface to use this feature. Recommended surfaces are 3M™ Wrist Straps 8200, 8300, and 8800. Use of a 3M™ Female Snap Fastener 3034 or 3050 (depending on the type of surface) is recommended for connection to the 3M™ Monitor/ Table Mat Cord 2380 that is supplied with the Workstation Monitor Model 724. If you are using the 3M™ Dissipative Hard Laminate Material 8300, attach the Monitor/Table Mat Cord 2380 to suitable hardware used to make an electrical connection to the ground layer of the work surface. This may require you to cut off the plastic cap end of the Monitor/Table Mat Cord 2380.

Note: If for any reason a snap fastener cannot be used on the work surface, the plastic cap on the end of the 3M™ Monitor/Table Mat Cord 2380 can be cut off and replaced with a ring terminal not supplied (Figure 6).

h) Plug the two wire connector into the jack at the rear of the 3M™ Workstation Monitor Model 724 (Figure 8).

i) Insert the plug connector of the 3M™ Dual Conductor Remote Input Jack 732 cable into the 732 jack at the rear of the Workstation Monitor Model 724 (Figure 9).

j) Insert the round connector from the AC adapter into the jack at the rear of the Workstation Monitor Model 724.

Note: Disconnect the 3M™ Monitor/ Table Mat Cord 2380 to check for visual and audible high work surface alarm condition and reconnect. If the high work surface lamp (M) is on before removing the Monitor/Table Mat Cord 2380, check for loose connections or high resistance to ground (>3.7 Megohms). Disconnect the Monitor/ Table Mat Cord 2380 from the work surface and check the resistance to ground by attaching one lead of an ohmmeter to the connector on the work surface and the other lead to ground.

SECTION 3
Installation of 3M Workstation Monitor Model 724 without Work Surface Ground Monitoring

Wire Attachments and Grounding – See Figure 12 for complete drawing of Workstation Monitor Model 724 wire connections.
Tools required – Small blade, screwdriver, and wire cutter.

a) Using a screwdriver move DIP switch #2 on the Workstation Monitor Model 724 to the OFF position to deactivate the work surface audible alarm (Figure 4).

b) Locate the accessory package that contains a 3M™ Monitor/Table Mat Cord 2380, Workstation Monitor Model 724 ground wire (with ring terminal), and the two-wire connector plug.

c) Attach the Monitor/Table Mat Cord 2380 (tinned wire end) to the work surface terminal of the two-wire connector plug by inserting into opening and securing with screwdriver (Figure 5A or 5B).

NOTICE

Do not physically connect the 3M™ Monitor/Table Mat Cord 2380 and the 3M™ Workstation Monitor Model 724 ground wire together. The ground wire for the work surface and the ground wire from the 3M™ Workstation Monitor Model 724 must be attached to separate electrical grounds. However, by attaching the wires to the same ground but at a different physical location, the 3M™ Workstation Monitor Model 724 can check for loose or lost connections to ground. This would be indicated by the high red work surface lamp (M) illuminating.

d) Cut off the plastic cap on the end of the 3M™ Monitor/Table Mat Cord 2380 and strip off approximately 1/2 inch of insulation and twist the stranded wire together (Figure 6). Attach this end to an electrical ground using a ring terminal (not supplied) or by wrapping the wire around the head of a screw (Figure 7A).

e) Determine how you want to ground the 3M™ Workstation Monitor Model 724:
- If you are grounding through the AC adapter, perform Step (3f.)
- If you are grounding through the Workstation Monitor Model 724 ground wire, perform Step (3g.)

f) Attach the tinned ground wire of the AC adapter to the ground terminal of the two-wire connector by inserting into opening and securing with screwdriver (Figure 5B). Continue with Step (3h.)

g) Attach the tinned Workstation Monitor Model 724 ground wire to the ground terminal of the two- wire connector by inserting the tinned end into opening and securing with screwdriver (Figure 5A). Attach the ring terminal end with a screw (not supplied) to an electrical ground (Figure 7B). Continue with Step (3h.)

h) Plug the two wire connector into the jack at the rear of the Workstation Monitor Model 724 monitor (Figure 8).

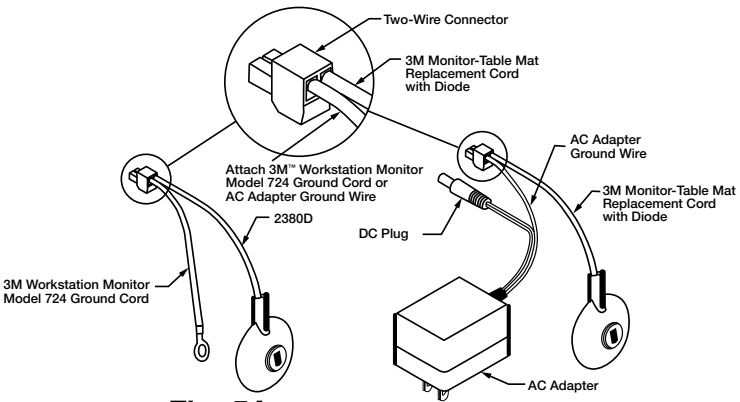


Figure 5A & 5B – Attaching ground wire/cord and work surface cord to two-wire connector.

Figure 6 – Cutting off table mat ground snap.

Figure 7A – Attaching system grounds. Note work, surface and unit are grounded at different locations.

Figure 7B – Grounding 3M™ Workstation Monitor Model 724.

Figure 8 – Inserting two-wire connector into rear of 3M™ Workstation Monitor Model 724.

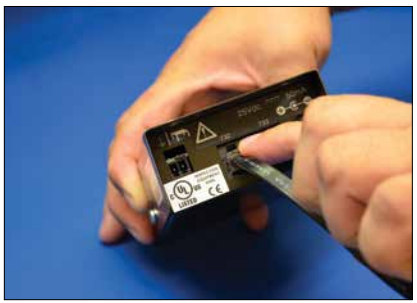


Figure 9 – Inserting 3M™ Dual Conductor Remote Input Jack plug into rear of 3M™ Workstation Monitor Model 724.

SECTION 4
Selection of Test Voltage and Resistance Limit

Tools required – Small blade, screwdriver.

The 3M™ Workstation Monitor Model 724 allows for the selection of test voltages (9V or 16V) and resistance limits (10 Megohms or 35 Megohms). The additional ranges have been added to accommodate global ESD requirements. Selection of the operating parameters are left up to the user's discretion.

a) Select the desired resistance and voltage limit by moving the appropriate slide switch (with screwdriver) on the side of the Workstation Monitor Model 724 to the desired position (Figure 2).

SECTION 5
Mounting the 3M Workstation Monitor Model 724 and 3M™ Dual Conductor Remote Input Jack Model 732

a) Mount or position the Workstation Monitor Model 724 so that the lamps are easily viewed by the operator (Figs. 10 and 11). Mount the Workstation Monitor Model 724 to the underside of a work bench top or shelf through the two holes located at the top rear of the case using the two screws supplied. If using the screws is not possible, apply an appropriate amount of durable, double-sided adhesive foam tape to the case.

b) Locate the Dual Conductor Remote Input Jack Model 732 so that it is convenient for the operators to attach their wrist strap ground cord. Mount the remote with the screws provided.

Figure 10 – 3M™ Workstation Monitor Model 724 mounted on bench top.

Figure 11 – 3M™ Workstation Monitor Model 724 mounted under shelf or bench.

c) Plug the AC adapter into a 3-prong grounded outlet (North American System). Outside North America use appropriate AC adapter (see specifications Section 11). The 3M™ Workstation Monitor Model 724 is ready for use.

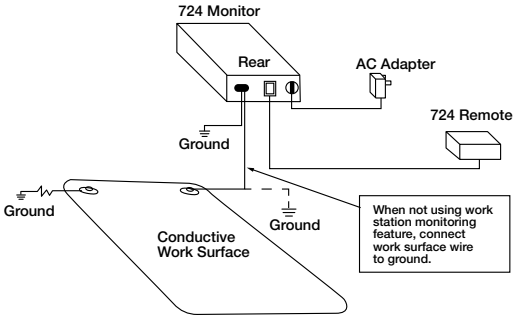


Figure 12 – 3M™ Workstation Monitor Model 724 wire connection diagram for single work station.

SECTION 6
Wrist Strap Connection

a) Attach a 3M™ Dual Conductor Ground Cord to a 3M™ Dual Conductor Wrist Band. Plug the cord into either of the two jacks on the 3M™ Dual Conductor Remote Input Jack Model 732 (Figure 13). Plugging into a jack activates the monitor for that input.

b) The high wrist strap red lamp (H) should illuminate and the corresponding audible alarm for the input (1 or 2) should sound indicating proper functioning of the monitor.

c) Slip the wrist band on your wrist. The alarm should quiet and the wrist strap high red lamp (H) should slowly extinguish. The corresponding OK wrist strap green lamp (1 or 2) should illuminate.

Figure 13 – Connecting wrist snap ground cord to 3M™ Dual Conductor Remote Input Jack Model 732.

SECTION 7
Fault Conditions

(Refer to Figure 3)

Red Wrist Strap Lamp (H) Accompanied by an Audible Alarm

This indicates that a high resistance condition (greater than 10 Megohms or 35 Megohms) exists for an operator or wrist strap assembly. If two operators are connected to the monitor the high condition is with the operator whose green lamp has extinguished. Check the operator for good contact between the wrist and band. Check the ground cord and connections for continuity. Some operators have difficulty in providing sufficient continuity to the wrist band due to dry skin or arm hair. They may need to use an approved skin moisturizer or reposition the wrist band on the arm.

Note: The operators may complain that the alarm is sounding too often until they learn to adjust the wrist band to fit securely or apply an approved skin moisturizer on a frequent basis. Please remember that the monitor is informing you that the operator is exceeding the established static control requirement for resistance to ground when wearing a static protective wrist strap assembly. These alarms alert the operator when sensitive electronics are possibly being exposed to static electricity. Prior to incorporating the work station monitor into your static control process, the operator was unaware of these events.

Yellow Wrist Strap Lamp (L) with no Audible Alarm

NOTICE

This indicates that a low resistance condition (less than 1.5 Megohms) exists between the operator and ground. One or both of the one megohm current-limiting resistors are being bypassed. A low resistance condition can be caused by touching a grounded object or by standing on a conductive surface.

Red Work Surface Lamp (M)

This indicates that a high resistance condition (greater than 3.7 Megohms) exists across the conductive layer of the work surface and/or the ground connections. Check the work surface, ground cords, and the connections for continuity. Note the audible alarm may also sound if selected.

SECTION 8
3M™ Standby Jack Model 3057

Since the activating switches are located in the 3M™ Dual Conductor Remote Input Jack Models 732 and 733, the normal operating procedure is for the operators to disconnect their cords from the remotes when leaving the work station. However, an optional 3M Standby Jack Model 3057 that allows the wrist strap ground cord to remain plugged into the remotes is available. Simply attach it to any convenient location then disconnect the cord from the wrist band and attach it to the standby jack. The OK green lamp (1 or 2) on the 3M™ Workstation Monitor Model 724 will illuminate upon connection. The low yellow lamp (L) will slowly flash if the standby jack is grounded. It can be grounded by attaching a ground wire to the screws or back plate. It can also be grounded if the plate is attached to a grounded metal surface. The operator should reconnect the wrist strap ground cord to their wrist band upon returning to the work station.

SECTION 9
3M Dual Conductor Remote Input Jack Model 733

The 3M Dual Conductor Remote Input Jack Model 733 is used to separate the two wrist strap jacks on the Dual Conductor Remote Input Jack Model 732 that connect to a Workstation Monitor Model 724. This provides a separation up to approximately 10 feet apart. This is done using a second remote input module Dual Conductor Remote Input Jack Model 733 in conjunction with the Dual Conductor Remote Input Jack Model 732 originally supplied with the Workstation Monitor Model 724. Two separate work stations can also be created using the Dual Conductor Remote Input Jack Model 733 and the 3M™ Monitor/Table Mat Interconnect Cord Model 2389 (10 ft.). Instructions for creating two separate work stations are included with the purchase of the 3M Monitor/Table Mat Interconnect Cord Model 2389 (Figure 15).

SECTION 10
Installation of 3M™ Dual Conductor Remote Input Jack Model 733

a) Insert the plug connector of the Dual Conductor Remote Input Jack Model 733 cable into the Model 733 jack at the rear of the 3M™ Workstation Monitor Model 724 (Figure 14).

b) Fully insert the small plastic plug that comes with the kit into the #2 wrist strap input on the Dual Conductor Remote Input Jack Model 732. This disables the #2 input and prevents a situation where two users would simultaneously attempt to use the input lines to the Workstation Monitor Model 724.

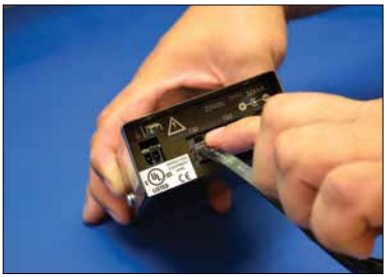


Figure 14 – Inserting 3M™ Dual Conductor Remote Input Jack Model 733 plug into rear of 3M™ Workstation Monitor Model 724

c) Position and mount both remote input jacks in convenient locations.

SECTION 11
Verification Procedure for the Workstation Monitor Model 724

The Workstation Monitor Model 724 cannot be recalibrated after the initial factory calibration. However, the following steps can be used to determine if the Workstation Monitor Model 724 is operating within its specifications.

Equipment Needed:

- Small blade screwdriver.
- Resistance Substitution Box (RSB), 1 Ohm to 45 Megohms ±1%.
- One two-conductor cable with standard 3.5 mm (miniature) phone plug attached on one end and appropriate connectors on the other end to connect to RSB.

  Note: Two-conductor cable must have an isolation resistance of >1 Gigohm between conductors. Two separated wires may also be used to obtain higherisolation resistance.
- Two wires with alligator clips.
- Ohmmeter capable of measuring to 45 Megohms ±0.5%, to verify the RSB.

Procedure
Work Surface

a) Access the DIP switches SW1 and SW2 through a slot located at the bottom of the chassis. Adjust SW1 to the LOUD position and SW2 to the ON position with a small screwdriver (Figure 4).

b) Plug in the AC adapter. Note that the red high work surface lamp (M) is illuminated with an audible alarm (slow chirping beep).

c) Adjust DIP switch SW1 to the SOFT position. Note that the loudness of the alarm decreases.

d) Adjust DIP switch SW2 to the OFF position. Note that the audible alarm is silenced.

e) Attach the 3M™ Monitor/Table Mat Cord Model 2380 and the 3M™ Workstation Monitor Model 724 ground wire to the RSB using the two wires with alligator clips. Set the resistance as follows and observe Workstation Monitor Model 724 output:
   3.1 Megohms – Red work surface lamp (M) OFF.
   4.3 Megohms – Red work surface lamp (M) ON.

f) Disconnect the cords from the RSB.

g) Connect the ring terminal end of the Workstation Monitor Model 724 ground wire to the metal snap of the Monitor/Table Mat Cord 2380. The red work surface lamp (M) should now be OFF.

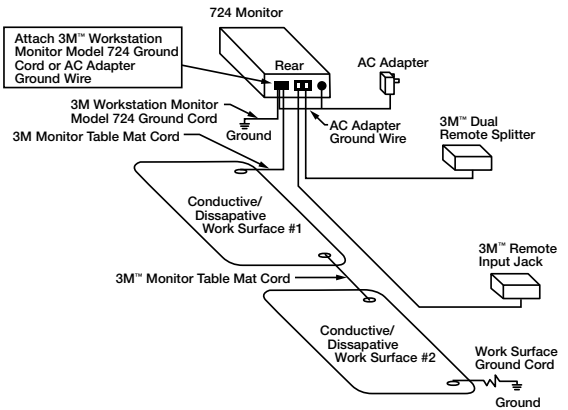


Figure 15 – 3M™ Workstation Monitor Model 724 wire connection diagram for two work stations.

Wrist Strap

Set Resistance Limit 10 Megohms and Test Voltage 9V (Figure 2).

h) Connect the two-wire cable with 3.5 mm phone plug into the #1 input of the 3M™ Dual Conductor Remote Input Jack Model 732 and attach the other end to the RSB. Set the resistance as follows and observe the 3M™ Workstation Monitor Model 724 output:
   - 1.3 Megohms – Yellow low lamp (L) flashing, green (OK) lamp (1) ON, and audible alarm OFF.
   - 1.7 Megohms - Yellow low lamp (L) OFF, green (OK) lamp (1) ON, and audible alarm OFF.
   - 8.5 Megohms – High red wrist strap lamp (H) OFF, green (OK) lamp (1) ON, and audible alarm OFF.
   - 11.5 Megohms – High red wrist strap lamp (H) ON, audible alarm ON (continuous tone), and green (OK) lamp (1) OFF.

i) Repeat step (6h) for input #2 of the Dual Conductor Remote Input Jack Model 732. Audible alarm will be a fast chirping beep.

Set Resistance Limit 35 Megohms and Test Voltage 9V (Figure 2).

j) Test as in step (6h) above. However, set the resistance as follows and observe the Workstation Monitor Model 724 output:
   - 1.3 Megohms – Yellow low lamp (L) flashing, green (OK) lamp (1) ON, and audible alarm OFF.
   - 1.7 Megohms – Yellow low lamp (L) OFF, green (OK) lamp (1) ON, and audible alarm OFF.
   - 29.8 Megohms – High red wrist strap lamp (H) OFF, green (OK) lamp (1) ON, and audible alarm OFF.
   - 40.2 Megohms – High red wrist strap lamp (H) ON, audible alarm ON (continuous tone), and green (OK) lamp (1) OFF.

k) Repeat step (6j) for input #2 of the Dual Conductor Remote Input Jack Model 732. Audible alarm will be fast chirping beep.

Set Resistance Limit 10 Megohms and Test Voltage 16V (Figure 2).

l) Connect the two-wire cable with 3.5 mm phone plug into the #1 input of the 3M™ Dual Conductor Remote Input Jack Model 732 and attach the other end to the RSB. Set the resistance as follows and observe the 3M™ Workstation Monitor Model 724 output:

1.3 Megohms – Yellow low lamp (L) flashing, green (OK) lamp (1) ON, and audible alarm OFF.
1.7 Megohms – Yellow low lamp (L) OFF, green (OK) lamp (1) ON, and audible alarm OFF.
8.5 Megohms – High red wrist strap lamp (H) OFF, green (OK) lamp (1) ON, and audible alarm OFF.
11.5 Megohms – High red wrist strap lamp (H) ON, audible alarm ON (continuous tone), and green (OK) lamp (1) OFF.

m) Repeat step (6l) for input #2 of the Dual Conductor Remote Input Jack Model 732. Audible alarm will be fast chirping beep.

Set Resistance Limit 35 Megohms and Test Voltage 16V (Figure 2).

n) Test as in step (6l) above. However, set the resistance as follows and observe the Workstation Monitor Model 724 output:

1.3 Megohms - Yellow low lamp (L) flashing, green (OK) lamp (1) ON, and audible alarm OFF.
1.7 Megohms - Yellow low lamp (L) OFF, green (OK) lamp (1) ON, and audible alarm OFF.
29.8 Megohms - High red wrist strap lamp (H) OFF, green (OK) lamp (1) ON, and audible alarm OFF.
40.2 Megohms - High red wrist strap lamp (H) ON, audible alarm ON (continuous tone), and green (OK) lamp (1) OFF.

o) Repeat step (6n) for input #2 of the Dual Conductor Remote Input Jack Model 732. Audible alarm will be fast chirping beep.

SECTION 12
Specifications for North America Power Supply

3M™ Workstation Monitor Model 724 Size	6.5 x 3.125 x 1.375 in. (16.5 x 7.9 x 3.5cm)	
3M™ Dual Conductor Remote Input Jack Models 732 and 733 size	2.75 x 1.0 x 1.0 in. (7.0 x 2.5 x 2.5cm)	
Power Supply Requirements (North America version, included; EU/EK version, optional)	Input: 100-200 Vac +/-10%	Output: 25 Vdc @ 50 mA rated load
Output Plug Polarization	Center Negative	
Output Plug Dimensions	5.5 mm O.D. x 2.1 mm I.D. x 9.5 mm Length	
Test Voltage	9 VDC / 16 VDC Open circuit	
Test Current	Less than 3 microamps	
Environmental Operating Conditions	Indoor use only	
Temperature	Maximum: 110°F / 43°C	Minimum: 50°F / 10°C
Humidity	Maximum relative humidity 80% for temperatures up to 31°C to 50% relative humidity at 40°C.	

SECTION 13
Parts Included

1 ea. 3M Workstation Monitor Model 724
1 ea. 3M Dual Conductor Remote Input Jack Model 732
1 ea. AC Adapter (North America Power Supply). For EU/EK Power Supply, place separate order, 80-0014-0111-8.
1 ea. 3M™ Ground Cord Model 724
1 ea. 3M™ Monitor/Table Mat Cord Model 2380D
1 ea. Two-Wire Connector
4 ea. Mounting Screws
2 ea. Wire Management Clips
1 ea. User's Guide

SECTION 14
Required Accessories and Optional Available Parts

Model No.	Description	Size
4720	3M™ Dual Conductor Wrist Band, Blue (ground cord not included)	adjustable
2368	3M™ Dual Conductor Fabric Wrist Band	adjustable
2381	3M™ Dual Conductor Metal Wrist Strap*	small
2382	3M™ Dual Conductor Metal Wrist Strap*	medium
2383	3M™ Dual Conductor Metal Wrist Strap*	large
2384	3M™ Dual Conductor Metal Wrist Band	small
2385	3M™ Dual Conductor Metal Wrist Band	medium
2386	3M™ Dual Conductor Metal Wrist Band	large
2360	3M™ Dual Conductor Coil Cord	5 ft. (1.5m)
2370	3M™ Dual Conductor Coil Cord	10 ft. (3.0m)
2371	3M™ Dual Conductor Coil Cord	20 ft. (6.0m)
2380D	3M™ Monitor-Table Mat Replacement Cord with Diode	6 ft. (1.8m)
2389	3M™ Monitor-Table Mat Replacement Cord (No resistor)	10 ft. (3.0m)
3057	3M™ Stand-By Jack	1.9 x 1.3 x 1.1 in. (4.8 x 3.3 x 2.8cm)
732	3M™ Replacement Remote Input Jack	6.5 x 3.1 x 1.4 in. (16.5 x 7.9 x 3.5cm)
733	3M™ Dual Remote Splitter Kit	6.5 x 3.1 x 1.4 in. (16.5 x 7.9 x 3.5cm)

Only accessories, optional parts and replacement parts supplied or specified by 3M Company shall be used with this product.

Use only a clean dry cloth to clean the 3M™ Workstation Monitor Model 724.

For Repair & Service Center:
11705 Research Boulevard, Building 1, Austin, TX 78759
Phone: (800) 426-8688 press #2

SECTION 15
Additional Wrist Strap Monitoring Information

Suggested reading on wrist strap requirements and wrist strap monitoring:

- EIA 625 - Requirements for Handling Electrostatic-Discharge-Sensitive (ESDS) Devices.
- EN100015/1 - Protection of Electrostatic Sensitive Devices.
- 3M Tech. Response #123 - Pulsed

Current vs. Constant Current in Work Station Monitors.

- 3M Static Digest Issue No.1, 1998 - Disc Drive Industry - Static Control Considerations.

Note: The 3M references are available by calling 3M Electronic Solutions Division Customer Service Department at 1-866-722-3736. Industry standards (EIA & EN) are available through Global Engineering Documents at 1-800-854-7179.

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