5 January 2005 – This contact update page has been added to the Acrobat document you have downloaded. Please disregard any contact information printed within the document.

Our Mailing and Shipping Address:

1514 Ed Bluestein Blvd., Suite 201 (for U.S. Mail)
Austin, TX 78721 U.S.A.
Phone: 512-389-5358
Fax: 512-301-3932
Main Email Address: cvanr@whiteinstruments.com
World Wide Web Site: http://www.whiteinstruments.com/

Note: Repairs and packages should be shipped to Suite 202
JUMP START

For our customers who would like to get their new equalizer into service without reading the entire manual:

1. Check to determine that you received everything you paid for and that nothing appears to be damaged.
2. Check the setting of the AC Line Voltage Switch on the rear panel.
3. Mount the equalizer in the rack.
4. We suggest that the front panel Gain Control and the High-Pass Filter Controls be initially set to full counterclockwise (CCW). We also suggest the filters be set to their flat positions.
5. Refer to the following drawings to become familiar with the equalizer's input and output circuits and their polarity.

6. Purchase or construct the appropriate input and output interface cables. Connect them to the equalizer.
7. Be advised that the equalizer is not equipped with a power switch. It is powered up whenever the appropriate AC is connected to the Power Cable. The equalizer is, however, equipped with a mute relay which prevents it from passing a signal until the power supply is up and stable.
   It is advised that the power amplifiers be turned off or down before connecting the equalizer to AC power or removing/inserting input/output cables.
8. Connect the equalizer to AC power.
WARRANTY POLICY

Your White Instruments Equalizer is Warranted against defects in manufacturing, workmanship and original components for a period of ONE YEAR from the date of purchase. During this period White Instruments will repair or replace the equalizer, at our option, so long as it has not been subjected to abuse. Abuse may be physical and/or electrical in nature. White Instruments will be the sole judge of this criteria.

White Instruments is the only warranty repair facility in the United States. Outside of the United States, White Instruments’ Distributors are authorized to make Warranty Repairs.

HOW TO OBTAIN WARRANTY REPAIRS

The equalizer should be securely packed and shipped, prepaid, to White Instruments or one of its Authorized Offshore Distributors. A return authorization is not required.

Our U.S.A. shipping address may be found in the COMMUNICATIONS section of this manual.

Contact the factory for the name and address of the Offshore Distributor nearest you.

A copy of your sales receipt should be included to establish the warranty date. Without it we will have to rely on the serial number, which indicates when we originally shipped the equalizer to a dealer.

A completed trouble report or letter detailing the equalizer’s malfunction must be included. See appendix for an example you may copy.

Your name, shipping address and telephone number must be included.

Every effort will be made to complete warranty repairs within five working days of receipt of the unit. Your equalizer will be returned to you via best surface freight, prepaid. If you instruct us to return your equalizer via air freight, it will be shipped with freight charges collect.

HOW TO OBTAIN OUT-OF-WARRANTY REPAIRS:

Should the required repairs not be covered by our warranty you will be charged for parts and the labor required to repair the unit. Should you require an estimate of charges prior to repairing the unit you should notify White Instruments of this when returning the unit. Every effort will be made to complete the repair within five working days. The unit will be returned C.O.D. unless other arrangements have been made.

As a service to our customers we do not consider our Repair Department to be a profit center.
COMMUNICATIONS:

TELEPHONE:
(512) 389-3800

FAX:
(512) 389-1515

MAILING ADDRESS:
1514 Ed Bluestein
Austin, Texas 78721

UNPACKING:

Carefully unpack and inspect your new equalizer for shipping damage. Save the packing materials to assure safe transit to us in the event your equalizer should ever need factory service. Immediately report any damage to the carrier. Your equalizer was shipped with full insurance unless we were instructed otherwise. Although White Instruments is not responsible for damage in shipping we will assist you in quickly obtaining parts and/or service.

The Package Should Contain the Following:
One Model 4675 Equalizer
This Manual
Four Rack Mounting Screws
One User Service Card

Also... Either a 4675C Clear Security Cover or a 4675M Metal Security Cover, if ordered, with two rack mounting screws.
SECURITY COVER INSTALLATION

The Model 4675 is normally supplied with its front panel flush with its rack mounting ears. The Accessory Security Covers (p/n 4623C and 4623M) are designed to mount over the rack mounting ears flush with the front of the rack.

HOW TO REPOSITION THE RACK MOUNTING EARS

The rack mounting ears must be moved forward in order to recess the equalizer’s front panel before installing the security cover.

1. Place the equalizer on a FLAT surface.
   
   **CAUTION** Do NOT lift the equalizer off of this surface until BOTH rack mounting ears have been reinstalled.
   
   **also...** REMOVE ONLY ONE RACK MOUNTING EAR AT A TIME!

   The rack mounting ears hold the equalizer together. If both are removed at the same time it is possible for the equalizer to shift out of square. This would make the reassembly difficult.

2. Remove the rack mounting ear by removing the four 6-32, phillips head screws.
3. Align the ear according to the following drawing.

![Diagram showing the correct placement of the rack mounting ears]

4. Reinstall the four 6-32 screws as shown in the drawing. One drop of LOCTITE on each screw is suggested.
5. Tighten the screws before removing the other rack mounting ear.
6. Repeat the procedure for the other rack mounting ear.

HOW TO RACK MOUNT THE EQ & SECURITY COVER:

1. Install the equalizer in the rack using the four screws in the four corners of the rack mounting ears.
2. Install the security cover using two screws in the middle of each rack mounting ear.
SOUND SYSTEM CONNECTIONS

The Model 4675 is connected to the sound system via two XLR connectors for each channel. Interface wiring to the equalizer should be high quality, two conductor, shielded cable terminated with the appropriate connectors.

The equalizer is constructed so that the audio circuit can be floated within the chassis by use of the shield lift switch.

The chassis is bonded to AC ground through the power cable.

AC ground is also available at a screw terminal on the rear panel of the equalizer between the channel A and B connectors.

It is not the purpose of this manual to provide a dissertation on sound system interfacing, shielding, grounding and safety techniques. However, a few comments seem to be in order.

Grounding Lug: NEVER remove the grounding lug from the AC power cable. To do so is dangerous (and unlawful in most jurisdictions)! Further it is unnecessary since the audio processed by this unit can be isolated from AC ground by setting the shield lift switch to the LIFT position.

A good technical ground can and should be achieved through the proper design and installation of the AC system.

Shield: The shield should not be thought of as part of the audio circuit. Rather, it simply helps protect the audio circuit from radiated electrostatic and RFI noise.

It is a generally accepted practice to connect the shield to AC ground at only ONE end of the audio cable. The other end should be left open or connected to AC ground through a .01 mfd capacitor.

Cables: Interface cables, whether purchased or made, should be of the highest possible quality and treated with the same respect as any other fine audio component.

Polarity: When a positive pressure is applied to the diaphragm of a microphone the loudspeaker should move outward.

Although a DIN standard exists for the wiring of XLR connectors, many manufacturers, for one reason or another, still wire their XLR connectors contrary to the standard. For this reason you need to be aware of the polarity of every XLR connector in the sound system.

White Instruments follows the DIN standard by assigning pin # 2 as audio high or + and pin # 3 as audio low or -.
UNBALANCED OPERATION:
The Model 4675 automatically adjusts its inputs and outputs for balanced or unbalanced operation.

In unbalanced mode, according to DIN standards, pin no. 2 is audio + and pin no. 3 is audio common.

Note that if these connections are reversed on either input or output, the Model 4675 will still function, but polarity inversion will result.

![Model 4675 Input Diagram](image)

The cable shield is connected through pin no. 1 to circuit common. If the SHIELD LIFT SWITCH on the rear panel is in the EARTH position, pin #1 is also connected to chassis and earth ground through the AC plug ground pin. If the switch is in the LIFT position, pin #1 and circuit common are left isolated from the chassis and earth ground. Note that this switch affects both channels of the equalizer. Regardless of switch position, the XLR connector hood is always connected to chassis and earth ground.

In unbalanced operation, the input impedance of the Model 4675 is 20 kilohms and the output impedance is 51 Ohms.
BALANCED OPERATION:

What is a balanced audio transmission line?

A balanced audio transmission line is a system which, like the shield provides protection from radiated, electrostatic disturbances or RFI noise.

Two assumptions are made...

One  The two audio conductors (wires) are in close proximity to each other. This is often accomplished by tightly twisting them together.

Therefore, it is assumed that the air radiated electrostatic disturbance is imposed on both conductors.

Two  Both audio legs (audio high or +  and audio low or -) are referenced to a common point in the audio circuit.

Then  If the disturbance, in fact, is equally imposed on both audio legs and both audio legs are equally referenced to the common point (balanced), then the disturbance component of the signal does not generate an output signal. To some degree (common mode rejection) the disturbance is canceled.

The fact that the input and/or output of an audio component is balanced is a function of its circuit design, not the audio interface (cable and connectors).

The audio interface can be configured to UNbalance a balanced circuit, but an UNbalanced circuit can not be balanced with the audio interface, alone.

An UNbalanced circuit driving or terminating a balanced circuit will UNbalance the balanced circuit.

MODEL 4675 SPECIFIC:

For balanced operation, simply connect a balanced line to the input and output connectors. According to DIN standards, pin # 2 is audio +  and pin # 3 is audio -. If an appropriate two conductor cable is used and a balanced load is presented to the other end, balanced operation will result.

Pin # 1 connects the cable shield to circuit common. If the SHIELD LIFT SWITCH on the rear panel is in the EARTH position, pin # 1 is also connected to chassis and earth ground through the AC plug ground pin. If the switch is in the LIFT position, pin # 1 and circuit common are left isolated from the chassis and earth ground. Note that this switch affects both channels of the equalizer. Regardless of switch position, the XLR connector hood is always connected to chassis and earth ground.

In balanced operation, the input impedance is 60 kilohms and the output impedance is 102 Ohms.
AC POWER and POWER SUPPLY:

MAINS VOLTAGE:
The Model 4675's power transformer has dual windings which are selected by a switch located on its rear panel. The switch has two positions marked 115 and 230.

In the 115 position the operating range is 100 - 130 vac, 50/60 Hz.
In the 230 position the operating range is 200 - 260 vac, 50/60 Hz.

POWER SUPPLY:
The power supply produces regulated ± 18 vdc rails.

FUSE:
CAUTION Use ONLY the specified fuse. The fuse is a 0.5 AMP fast-acting for either voltage range. The size is 1.25" (313 or 3AG).

POWER CORD:
The equalizer is equipped with a captive 6 ft. power cord with a NEMA 5-15P plug molded on the end. This plug may be changed for operation outside of the United States.

MUTE RELAY:
An audio mute relay closes to pass the audio signal when the power supply has had time to stabilize on power up. It opens to interrupt the audio signal on power down before the power supply has had time to decay.
FRONT PANEL CONTROLS:

FILTER CONTROLS:
The dual banks of 14 two-thirds octave filters are adjusted via 60mm linear potentiometers located on the front panel.

Each filter control has a specified range of 24dB (± 12dB).
The zero position of each linear control is marked with a detent.
The white filled line on the filter control knob indicates channel A.
The red filled line on the filter control knob indicates channel B.

CLIP INDICATION:
Input and/or Output signal clipping is indicated by lighting of the red front panel CLIP indicator.

INPUT:
LED lights at a peak input voltage of: 21.4 volts ± 2.5 volts or 25.8 dBu ± 1.0 dBu

OUTPUT: BALANCED
LED light lights at peak output voltage of: 21.4 volts ± 2.5 volts or 25.8 dBu ± 1.0 dBu

OUTPUT: UNBALANCED
LED lights at peak output voltage of: 10.7 volts ± 1.2 volts or 19.8 dBu ± 1.0 dBu

* dBu = 20 log V/.775 = dBm with 600 ohm load.

POWER:
Power is indicated by the GREEN Power-On Indicator.
OUTPUT GAIN CONTROL:
Up To 10dB of GAIN can be added to the output signal (in addition to the gain realized from boost equalization).

In the 0 position the equalizer is set for UNITY GAIN. That is, with all of the two-thirds octave filters set to their detents, the output signal will approximately equal the input signal in level.

Again with all of the two-thirds octave filters set on their detents and the Output Gain Control set on 10, the output signal will be approximately 10dB greater than the input signal.

During the equalization process (using the two-thirds octave filters) gain is added or lost through the spectrum covered by the filters used.

Care should be taken when using additional output gain. It is quite easy to use too much and clip the equalizer. This is even more likely when a great deal of boost EQ is used.

EQ IN/OUT SWITCH:
In the OUT position the EQ In/Out Switch connects the Input Buffer to the Output Buffer through High and Low-Pass Filters and the variable gain stage, thus by-passing the Two-Thirds Octave Filters.

Since the EQ is by-passed, a level change might be noticed when using this control. This depends entirely upon the settings of the Two-Thirds Octave Filters.
REAR PANEL CONTROLS:

AC LINE VOLTAGE SWITCH:

**CAUTION:** Always make certain of the AC line voltage you are connecting to. If the switch is set on 115 vac and the equalizer is connected to 230 vac, the unit will be damaged.

SHIELD GROUND LIFT SWITCH:

This switch is provided to disconnect the shields (pins no. 1 of the XLR connectors) and circuit common of both the input and output interfaces from AC Ground.

When this switch is in the **LIFT** position, pins no. 1 of the XLR connectors and circuit common will be isolated from AC Ground.

When this switch is in the **EARTH** position, audio common will be connected to AC Ground (green wire) and the chassis of the equalizer.

Please refer to the following manual sections: *Unbalanced Operation, Balanced Operation* and the *Circuit Block Diagram*.

You have three options for draining the shield conductor.

Shields are usually connected at inputs and left open or connected through a .01 mfd capacitor at outputs.

**First:** You may leave it unconnected at the connectors and connect it directly to the Ground Terminal.

**Second:** You may drain only through audio common by leaving the Shield Ground Lift Switch OPEN and connecting the shield conductor to the connectors (pin no. 1).

**Third:** You may drain through both audio common and AC ground by CLOSING the Shield Ground Lift Switch and connecting the shield conductor to the connectors.
GROUND TERMINAL:
The Ground Terminal (screw terminal located between the channel A and B connectors) is bonded directly to the chassis and the ground wire of the AC cord (green wire). It is not connected through the Shield Ground Lift Switch. This terminal provides a handy facility for bonding the chassis of the equalizer to those of other components in the sound system. When doing this, however, care should be taken to avoid ground loops between chassis bonding to AC ground and internal bonding to AC ground.
FILTERS:

HIGH AND LOW-PASS FILTERS:
The Model 4675 is bandlimited by a fixed low-pass and a variable high-pass filter. These filters attenuate unwanted ultrasonic and subsonic signals which would otherwise be amplified.

![Model 4675 Passband](image)

The response of each filter is 12dB/octave. The -3dB point of the high-pass filter is variable from approximately 16Hz to 180Hz and the -3dB point of the low-pass filter is set at approximately 49kHz.

TWO-THIRDS OCTAVE FILTERS:
The equalizer features two independent banks of 14 filters on two-thirds octave centers from 40Hz to 16kHz. The range of each filter is 24dB (± 12dB).

Although the filters are centered on two-thirds octave frequencies, their actual bandwidth is somewhat greater than two-thirds of an octave. If this were not the case adjacent filters would not sum together gracefully. This would make ripple-free shelving responses, for example, impossible to achieve.
The bandwidth of the filters was selected so that...

When two adjacent filters are adjusted to create a response centered between them at an amplitude of 12db, there will be less than 0.25dB of ripple.
TROUBLESHOOTING GUIDE:

Every effort has been made to make the Model 4675 easily serviced in the field by a qualified technician.
The equalizer contains three PC boards, control, filter and I/O. The control board is attached to the front panel. Both detach from the component side of the filter board as a unit. This allows access to every socketed semiconductor in the equalizer.
It is possible to field repair 99% of the equalizer’s predicted failure modes WITHOUT disturbing the equalization settings. The majority of these repairs can be made WITHOUT removing the equalizer from the rack.

INTEGRATED CIRCUITS:

All integrated circuits are socketed with the exception of the power supply regulators which are mounted on the rear heat sink.

<table>
<thead>
<tr>
<th>COMPONENT DESIGNATOR</th>
<th>MANUFACTURER</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1</td>
<td>NEC</td>
<td>μPC 4574</td>
</tr>
<tr>
<td>U2</td>
<td>NEC</td>
<td>μPC 4574</td>
</tr>
<tr>
<td>U3</td>
<td>SIGNETICS</td>
<td>NE-5532</td>
</tr>
<tr>
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<td>SIGNETICS</td>
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</tr>
<tr>
<td>U9</td>
<td>SIGNETICS</td>
<td>NE-5532</td>
</tr>
</tbody>
</table>

TROUBLESHOOTING:

Before attempting repairs it is suggested that the technician carefully read the following Guide and that he thoroughly check every function of the equalizer.

Refer to the Component Layout Drawing and Filter Board Photograph for IC locations.

It is suggested that the steps listed below be followed sequentially in that each step verifies circuitry which is necessary for the following section to perform properly.

NOTE: In the following sections there is an assumed op-amp designator suffix for Channel A or Channel B.

  e.g. for Channel A, U2-A
  for Channel B, U2-B
I  No POWER LED indication
   A.  Check AC Mains.
   B.  Replace FUSE (See Rear Panel).

II NO SIGNAL BOTH CHANNELS
    Muting Relay Circuitry. No User Replaceable Parts.
    Refer to Qualified Service Technician.

III NO SIGNAL ONE CHANNEL ONLY
   A.  EQ OUT
        Replace U2 and/or U5 and/or U7 and/or U8 and/or U9.
   B.  EQ IN
        Replace U3 and/or U8.

IV FILTER GROUP DEFECTIVE
   A.  FILTER GROUP A 40 Hz, 160 Hz, 630 Hz, 2500 Hz, 10 kHz
        Replace U4.
   B.  FILTER GROUP B 63 Hz, 250 Hz, 1000 Hz, 4000 Hz, 16 kHz
        Replace U3 and/or U4.
   C.  FILTER GROUP C 100 Hz, 400 Hz, 1600 Hz, 6300 Hz
        Replace U3.

V INDIVIDUAL FILTERS DEFECTIVE
   40 Hz     Replace U7.
   63 Hz     Replace U7.
   100 Hz    Replace U7.
   160 Hz    Replace U6.
   250 Hz    Replace U6.
   400 Hz    Replace U6.
   630 Hz    Replace U6.
   1000 Hz   Replace U2.
   1600 Hz   Replace U2.
   2500 Hz   Replace U2.
   4000 Hz   Replace U1.
   6300 Hz   Replace U1.
   10,000 Hz Replace U1.
   16,000 Hz Replace U1.
FILTER BOARD ACCESS:

DISASSEMBLY:
1. Disconnect the equalizer from AC power.

2. Remove the four slotted, 4-40, panhead screws from the front panel.
   Do NOT remove the phillips head screws!
   At this point the front panel/control board assembly is being held to the
   equalizer by four multi-pin connectors.

3. Use a small flat blade screw driver or a knife to gently pry along the left and
   right edge of the front panel. Pry the front panel forward... Just enough to get
   a finger hold.
   Be careful not to scratch the paint!
   Be careful not to disturb the EQ settings!

4. Pull the front panel straight forward until it separates from the equalizer.

REASSEMBLY:
The multi-pin connectors are keyed so that the front panel/control board assembly can
not be installed upside down.

CAUTION: These connectors are delicate and will not tolerate much abuse!

1. Align the front panel/control board assembly on the four threaded, hex stand-
offs from which the retaining screws were removed.

2. Gently push the assembly into the connectors.
   Do not use force!

3. If you need to use force during this step you are not aligned accurately. TRY
   AGAIN.

4. Reinstall the four retaining screws.

5. Reconnect the AC power.
SPECIFICATIONS

Frequency Response: \(20\) Hz \((-2\) dB\) through \(20\) kHz \((-0.5\) dB\).

Recommended Average Operating Level: \(0\) dBu \((0.775\) volts rms\).

Noise: \(-80\) dBu \((\text{re.} 0.775\) volts rms\), \(20\) kHz bandwidth, referenced to the input.

Distortion: Less than \(0.05\%\) THD, \(20\) dBu output, \(20\) kHz bandwidth, into load of \(600\) Ohms or greater.

Input Type: Active servo-balanced differential. Can be operated unbalanced with no change in gain or dynamic range.

Input Impedance: 60 kilohms, balanced. 20 kilohms unbalanced.

Input Common-Mode Rejection Ratio: Greater than \(85\) dB at or below \(1\) kHz. Greater than \(65\) dB at \(10\) kHz.

Input Maximum Operating Level: \(+27\) dBu balanced or unbalanced.

Output Type: Active servo-balanced. Can be operated unbalanced with no gain change.

Output Impedance: \(102\) Ohms balanced, \(51\) Ohms unbalanced.

Output Maximum Drive Capability:

<table>
<thead>
<tr>
<th>Load (Ohms)</th>
<th>Load (picofarads)</th>
<th>Minimum dBu Out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Balanced</td>
</tr>
<tr>
<td>600</td>
<td>2000</td>
<td>22.6</td>
</tr>
<tr>
<td>600</td>
<td>10000</td>
<td>20.8</td>
</tr>
<tr>
<td>1000</td>
<td>2000</td>
<td>26.9</td>
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<tr>
<td>1000</td>
<td>10000</td>
<td>23.0</td>
</tr>
<tr>
<td>10k</td>
<td>2000</td>
<td>27.7</td>
</tr>
<tr>
<td>10k</td>
<td>10000</td>
<td>25.2</td>
</tr>
</tbody>
</table>

Filter Type: Active, single-tuned R-C.

Control Centers: 14 two-thirds octave filters per channel on I.S.O. centers from \(40\) Hz to \(16\) kHz.

Frequency Center Tolerance: \(\pm 5\%\) of center frequency.

Control Range: \(\pm 12\) dB at center frequency. Detent at \(0\) dB \((\pm 0.5\) dB\).

Filter Controls: 60mm potentiometers with center detents and integral dust shields.
| **Crosstalk:** | Less than -85 dB at 1kHz. |
| **High-Pass Filter:** | 12 dB/octave response. -3 dB point adjustable 16 to 180 Hz. |
| **Low-Pass Filter:** | 12 dB/octave response. -3 dB fixed at approximately 49 kHz. |
| **Gain:** | -0.2 (± 0.2 dB) full counterclockwise to + 11.7 dB (± 1.3 dB) full clockwise. |
| **Clip Indicator:** | LED lights at peak input voltage of 21.4 volts ± 2.5 (25.8 dBu ± 1.0) Balanced or Unbalanced and/or 21.4 output volts Balanced, or 10.7 output volts ± 1.2 (19.8 dBu ± 1.0) Unbalanced. |
| **EQ In/Out Switch:** | Front panel mounted miniature toggle switch bypasses two-thirds octave filters only. |
| **Connectors:** | Latching XLR with chassis-grounded shells. |
| **Shield Lift Switch:** | Rear panel slide switch lifts input and output shields of both channels and circuit common from AC ground. |
| **Power Requirements:** | 100-130/200-260 volts, 50/60 Hz. User selectable on rear panel. |

**NOTES**

Please take a moment to record the following information here for future reference.

**Serial Number:**

**Place and Date of Purchase:**

**Attach a copy of your sales receipt:**