

GRAY RESEARCH AND DEVELOPMENT COMPANY DIV.

Post Office Box 296

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GRAY EQUALIZER MODEL #602-C

GENERAL SPECIFICATIONS

PHYSICAL SIZE - Switch can occupies space behind panel 3 1/4" wide, 3" high, 3 5/8" deep. Dial plate 4 1/4" wide, 3 1/4" high. Component can 3 7/8" x 3 7/8", 5 3/8" high, not including mounting straps.

SWITCH CAN MOUNTING - Clearance holes for two switch shafts. Two screw clearance holes to attach dial plate and mount can.

COMPONENT CAN MOUNTING - Four screw holes to hold two mounting bars welded to can bottom.

CIRCUIT - Four terminal network isolated from ground, used with balanced or unbalanced line. One side of each input terminal is connected to "COM". Terminals marked "OUT" are designed to provide a single output for balanced or unbalanced line.

COMPENSATION MEANS - Reactive and resistance elements of close tolerances connected across cartridge. Equalizing networks utilize cartridge impedance as part of compensating networks.

INPUT IMPEDANCE - Function of frequency as well as switch setting due to type of network used. Example: On G. E. Position #1, about 600 ohms at 50 cps, falls to about 160 ohms at 400 cps, rises to about 2,000 ohms at 10 K.C.

OUTPUT IMPEDANCE - Output network holds impedance within plus or minus 20% of nominal value. Normally supplied as 150 ohms. (See page 3 for conversion to other impedances.)

OUTPUT TERMINATION - Designed to work into pre-amplifier intended to be operated from 150 ohms (50 or 250 ohms if this is Equalizer output impedance ordered) mike source. In generally accepted broadcast practice, such pre-amplifier is essentially unloaded on tube side. Working Equalizer into higher than nominal impedance, little effect on frequency response or output level. Somewhat lower impedance reduces general level slightly, several DB more at higher frequencies.

INSERTION LOSS - Defined as function of source, input, output and load impedances. Since first two vary with frequency and input impedance varies with switch setting, a single figure cannot be given. See OUTPUT LEVEL.

OUTPUT LEVEL - With switch on Position #1, measured across 150 ohm Equalizer output terminals, average G. E. RPX-145 cartridge driven at 4.7 cm. per sec., level is approximately 66 dbm. Columbia 10003-M record 1,000 cycle band is approximately this velocity at 78 RPM. Above 1,000 cps, compensation switch setting affects this output level figure.

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602-C INSTRUCTIONS

CARTRIDGE SELECTION - Two input terminations for 2 cartridges to be connected at all times. Two position rotary switch allows choice of cartridge to be used.

FREQUENCY CONTROL - Four position selector switch for choice of 4 different compensations:

- Position #1 - Flat playback to recordings made without high frequency pre-emphasis, such as instantaneous lacquers or pre-war pressings.
- Position #2 - Intermediate curve between Flat & Standard.
- Position #3 - Complements standard RIAA recording curve.
- Position #4 - Roll-Off for standard recordings to reduce abnormal surface noise.

MOUNTING INSTRUCTIONS

SWITCH CAN MOUNTING HOLES - Clearance holes for two 1/4" diameter switch shafts on 1 5/8" centers measured horizontally. Two mounting holes to clear #8-32 screws in line 3/4" immediately above and below right-hand switch. Two screws serve dual purposes of attaching dial plate to front and switch unit to rear of panel.

SWITCH CAN MOUNTING SCREWS - Two screws 3/4" long provided to mount can on panels 1/16" to 7/16" thick. Panels 1/2" to 1" thick: 1 3/8" screws; longer screws will damage the switch mechanism. (Screws should never extend inside the can farther than 3/4".)

SWITCH SHAFT LENGTH - Make trial installation of switch can. Check amount of shaft to be removed. Remove can from panel. Clamp unwanted portion of shaft in vise and remove with hacksaw. Any other method of supporting assembly may damage switches.

COMPONENT CAN MOUNTING HOLES - Two bars 5/8" wide x 5 1/8" long welded to can bottom having 4 clearance holes rectangularly located 2 1/4" x 4 1/2" centers for #6-32 screws.

COMPONENT CAN LOCATION - Precautions against hum pick-up have been included in design of Equalizer. Hum sensitive components are located in component can. For best results, orientation of component can is desirable. If wide variation of hum level is obtained for different positions of can in some general location, stray fields are obviously very high. A more favorable location with respect to excessive stray magnetic fields should be chosen.

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602-C INSTRUCTIONS

CONNECTIONS - For balanced line output, connect as shown on diagram 75131. For lowest possible hum, attention must be paid to proper grounding practices.

For unbalanced line output, connect as Note 2 on diagram 75131. This connects one side of the inputs to one side of the output. No connection should be made at the Equalizer between common and shield since this results in an unwanted ground loop. Attention must be paid to proper grounding practices.

CARTRIDGE CHARACTERISTICS - Equalizer design based on G. E. cartridge inductance of 250 MH and DC resistance 220 ohms. Variation of plus or minus 20% of inductance and/or resistance from these values has negligible effect. Increase in cartridge inductance of the order of 100% will reduce output above about four hundred cycles by several DB. Increase in cartridge resistance of the order of 100% reduces output in region of 100 to 400 cycles several DB with negligible effect above 1500 cycles.

MAINTENANCE - #602-C Equalizer is soundly engineered and constructed to give long trouble-free service. Servicing by user is not recommended. Calibration and performance depend on relative positions of components and certain components are adjusted at factory for optimum performance.

If trouble develops, Equalizer should be returned to factory for adjustment or repair. It should be packed and shipped prepaid to the address above with complete data on difficulty. Unit will be given special attention and returned without delay.

IMPEDANCE CONVERSION

The manufacture of the 602-C Equalizer has been standardized with an output of 150 ohms. The design, however, allows for easy field modification to either 50 ohm or 250 ohm impedance.

The following are the steps for this conversion:

- A. Open the top of the large can by carefully inserting two screwdrivers in two adjacent sides and prying the lid off.
- B. To convert to 50 ohms:
 1. Replace the two 27 ohm, 1/2 watt resistors (color coded red, violet, black) with two 4.7 ohm, 1/2 watt resistors (color coded yellow, violet, gold).
 2. Disconnect the yellow transformer lead from the terminal strip holding the 4.7 ohm resistor and solder the green wire to this terminal.

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602-C INSTRUCTIONS

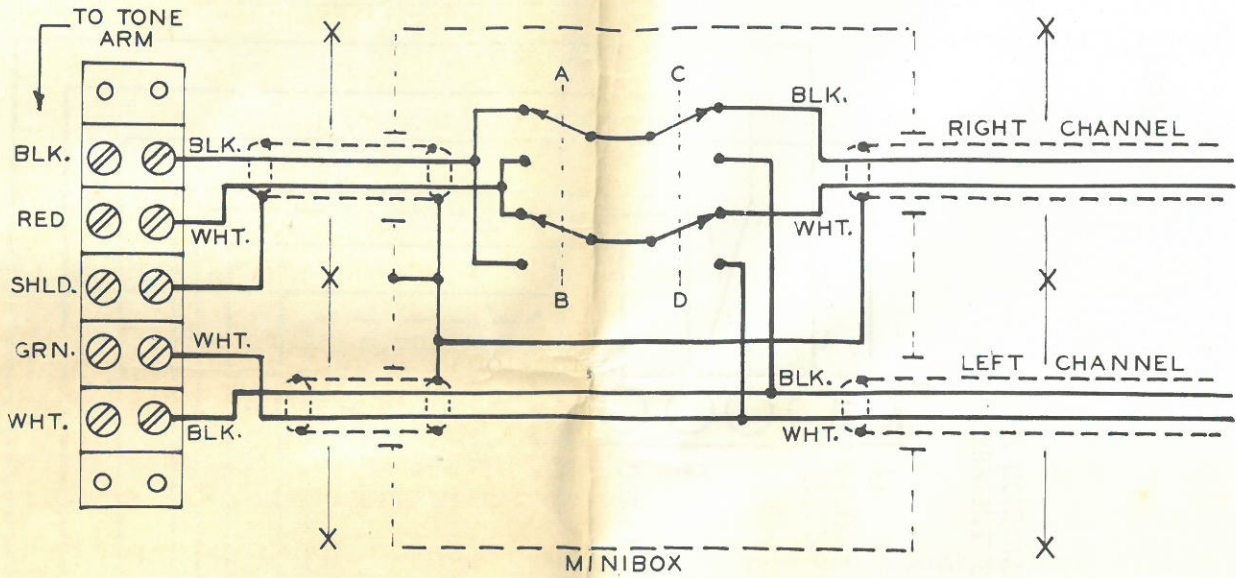
3. Insulate yellow wire.

C. To convert to 250 ohms:

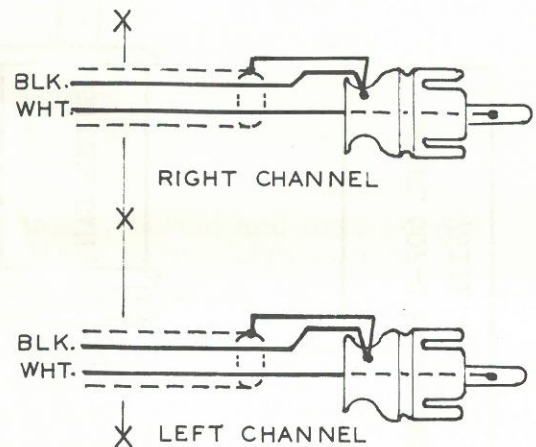
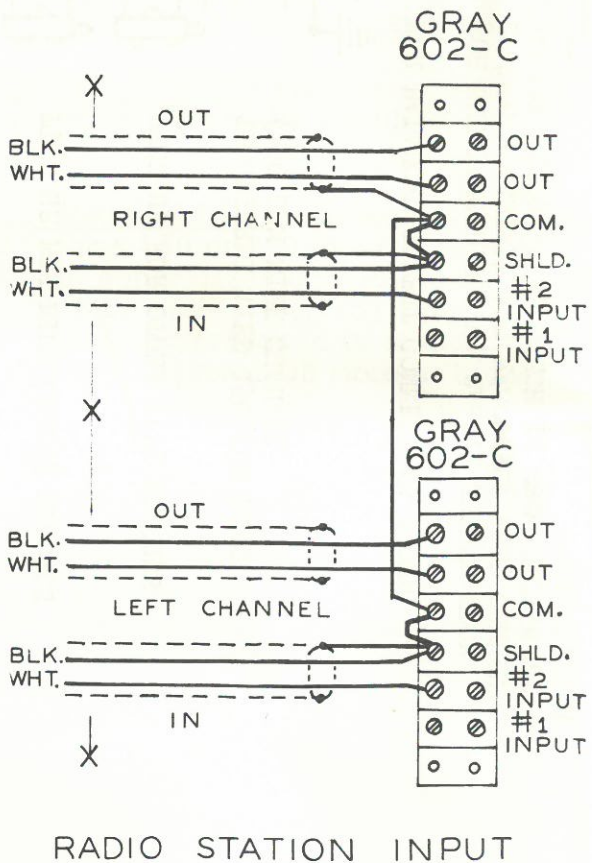
1. Replace the two 27 ohm, 1/2 watt resistors (color coded red, violet, black) with two 47 ohm, 1/2 watt resistors (color coded yellow, violet, black).
2. Disconnect the yellow transformer lead from the terminal strip holding the 47 ohm resistor and solder brown (or in some cases, white) to this terminal.
3. Insulate yellow wire.

D. Tuck loose wires beside transformer and replace top cover of can.

CARTRIDGE MATRIXING CIRCUIT



SWITCH POSITION		FUNCTION
A	C	STEREO CARTRIDGE — STEREO SOUND
A	D	MONO CARTRIDGE — LEFT CHANNEL
B	C	STEREO CARTRIDGE — STEREO SOUND RIGHT CHANNEL 180° OUT OF PHASE
B	D	STEREO CARTRIDGE — MONO SOUND VERTICAL CUT RECORDS



HI-FI SYSTEM INPUT

NOTE: USE BELDEN 8522 OR EQUIVALENT IN ALL CIRCUITS.

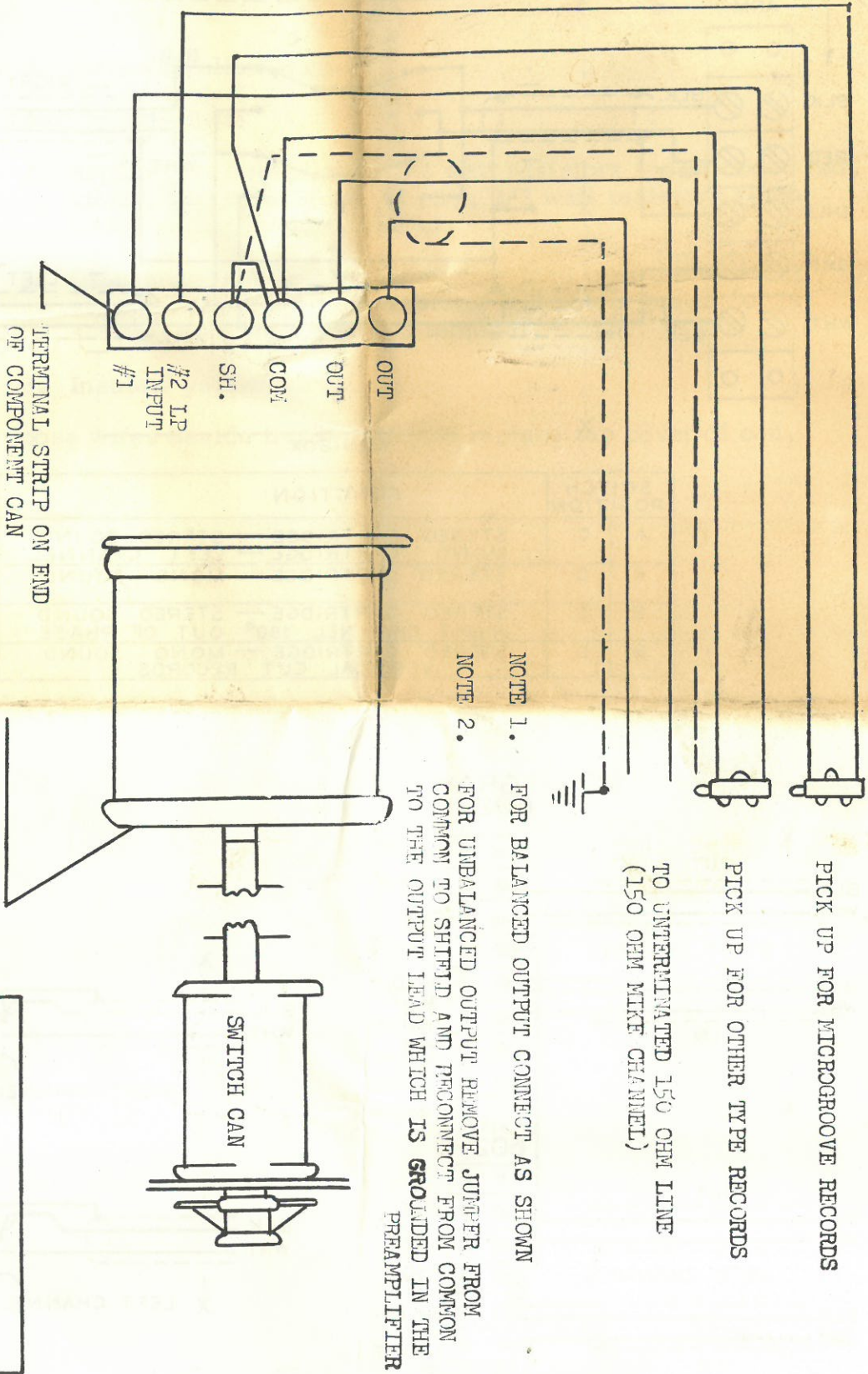


FIGURE 2

MODEL 602-C EQUALIZER
75131 - B