

**RAYMER MODELS 1010 AND 1040**

**DESCRIPTION**

The Raymer models 1010 and 1040 are monaural solid state 100 watt and 40 watt RMS paging amplifiers with built-in F.M. tuner, music-on-hold driver, chime source and alarm siren source. Five input channels are provided in addition to the chime and siren inputs. These are identified as four paging channels and one music channel. The four paging channels are as follows: The PHONE channel has a 500/600 ohm balanced transformer input to provide proper termination for the paging access output port of registered telephone equipment such as a PABX or switchboard. Both MIC/LINE channels #1 and #2 have balanced inputs which may be wired to accommodate either low impedance microphones or balanced lines. The AUX channel has an unbalanced input with an input sensitivity of 250mv. for use as the paging source from other audio equipment such as a preamplifier or intercom system. The MUSIC channel may receive its source from either the built-in F.M. tuner or an external signal such as a tape deck. This choice is made by means of a selector switch on the front panel. Paging priority is automatically performed by a voice activated circuit which mutes this music channel when any of the paging inputs are used or the chime or siren tones are activated.

A music-on-hold driver is also included in the Model 1010/1040. The music source for this driver is the same as selected by the MUSIC select switch for background music. Two outputs are available from this driver; 500 ohms adjustable to a maximum level of +4db to drive the input of a M.O.H. card, and 8 ohms adjustable for a maximum level of 1 watt as required to drive the BELL SYSTEM music-on-hold connecting arrangement. A separate control is provided to adjust this M.O.H. level.

The CHIME signal provided is a single strike 800 cycle bell-like tone which may be activated for use as a night call, a pre-announcement alert, or a break bell. A separate control is provided to adjust the chime level.

A SIREN signal is also furnished in the Model 1010/1040. This is a fast whoop sweeping from 600 to 1500Hz which may be activated for alarm or security purposes. A separate control is provided to adjust this siren level.

Separate BASS and TREBLE controls are provided to compensate for frequency response characteristics of the speaker system or the acoustical environment. In addition, a TRUMPET PROTECT switch is provided on the front panel. This reduces the low frequency power delivered to trumpet speakers below their "low frequency cut-off" to protect the speaker diaphragm from damage as well as reduce excessive loading of the amplifier at low frequencies.

Power output terminals are included to drive 4 ohm or 8 ohm speaker lines, or for power distribution lines, both 25 volt and 70 volt outputs are provided. In addition, a BOOSTER AMP output jack is provided so that supplemental amplifiers may be operated simultaneously to deliver more power to the additional speaker systems.

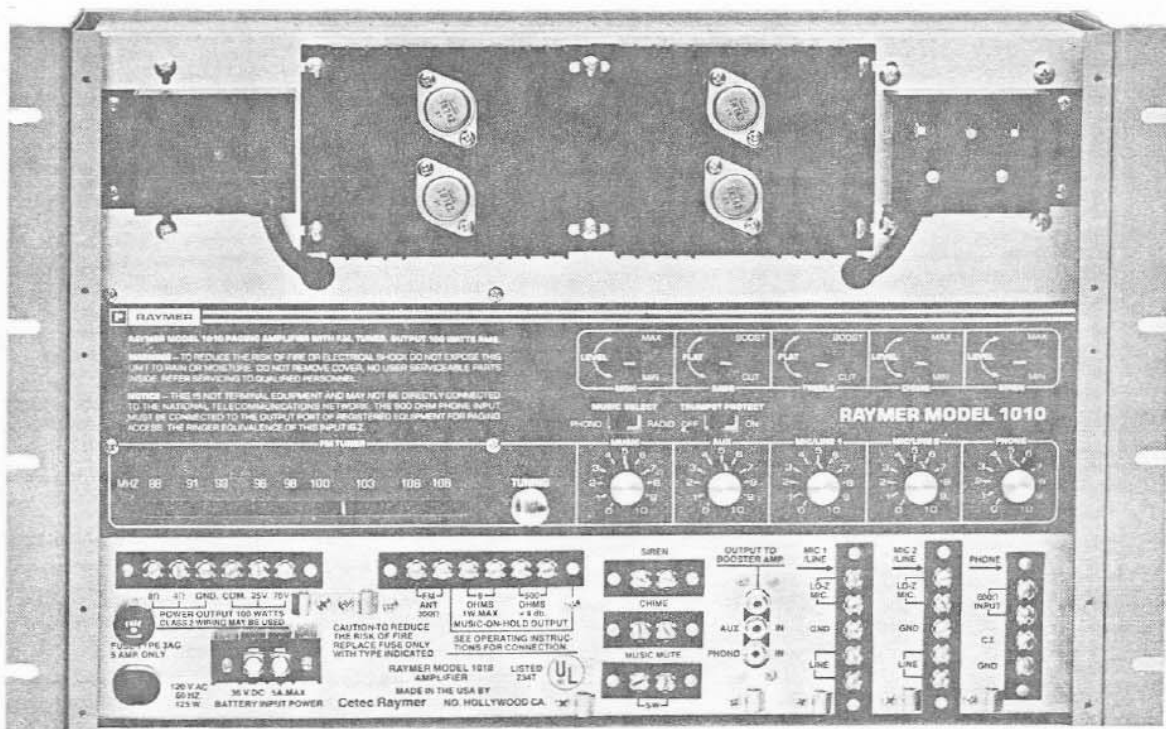
In addition to the power switch located on the control panel, a push-to-reset circuit breaker is included which protects the entire unit from conditions beyond the safe operating limits which might cause component damage.

The entire unit is housed in a sturdy steel cabinet 5 inches deep by 12-3/16 inches high by 17 inches wide with two metal flanges which permit rack mounting, or which may be inverted to permit mounting on a wall surface. All operating controls, with the exception of the power switch and circuit breaker, are located behind a hinged access door which may be locked to

prevent tampering.

The Model 1010/1040 is normally powered from a standard A.C. outlet providing 120 volts at 60Hz. In addition, terminals are provided to permit 36 volt D.C. battery backup operation of the amplifier portion of the unit only under emergency conditions. Automatic changeover to battery operation is made possible whenever a battery is connected to these terminals. Current to provide a holding charge on the batteries is provided by the power supply of the unit.

Three status lights on the control panel indicate the operating conditions of the unit: the green light indicates normal operation from the power mains, the amber light indicates emergency operation from the battery source. A red lamp provides visual indication that the amplifier is operating improperly due to conditions such as overdrive, load mismatch or oscillation due to coupling between the output and the amplifier input.



## Specifications

### Amplifier Specifications

Power Output: Model 1010—100 watts RMS  
Model 1040—40 watts RMS

Distortion: Less than 2.5% THD @ 1KHz

Output Regulation: 2db or less

Frequency Response: ± 2db 30Hz to 20KHz

Trumpet Protect "On": - 12db @ 50Hz

Outputs: 4 ohm and 8 ohm unbalanced, 25V and 70V balanced

Tone Control Bass: ± 16db @ 50Hz

Tone Control Treble: ± 17db @ 15KHz

Input Specifications

Input	Impedance	Sensitivity
Aux:	250K ohm unbal.	300mV
Phono:	47K ohm unbal.	275mV
Line:	10K ohm bal.	85mV
Mic:	150 ohm bal.	0.7mV
Phone:	600 ohm bal.	90mV

### MOH Amplifier Specifications

Power Output: 1 watt RMS @ 8 ohms (2.8V)  
3 milliwatt RMS @ 500 ohms (+4dbm)

Distortion @ 1KHz: Less than 0.3% THD

Frequency Response: ± 2db 30Hz to 20KHz

Hum and Noise: Below 1 watt, -65db

### FM Tuner Specifications

Tuning Range: 87.5 to 108.5MHz

Ext. Antenna Input: 300ohm balanced or 75ohm unbalanced

Sensitivity: 3µV for 30db quieting

Frequency Response: ± 1.5db 50Hz to 15KHz

Frequency Response	S/N Ratio
± 2db 30Hz to 20KHz:	67db
+ 6db -2db 50Hz to 15KHz. (includes loudness compensation)	64db
± 2db 50Hz to 15KHz:	60db
± 2db 100Hz to 12KHz:	60db
± 2db 200Hz to 12KHz:	66db

### Tone Generator Specifications

Chime Signal: 800Hz Single Strike

Chime Envelope: Exponential Decay

Siren Signal: 700Hz to 1.2 KHz Sweep

Siren Sweep Rate: 5Hz (200 milliseconds)

### Muting

Attenuation: -30db (music channel)

Activation: Automatic voice activated or manual with SPST switch

### Overload Protection

AC Power: Push to Reset Breaker

Battery Power: 5 Amp Fuse

Internal Circuitry: Dual slope current limit

### Power Requirement

AC Power: 120V AC 60Hz 1A average, 1.6A peak

Battery Power: 36V DC 3A avg., 5A peak

Dimensions

Weight

Height: 12 3/16" Actual: 33 lbs.

Width: 19" Shipping: 38 lbs.

Depth: 5"

## UNPACKING

The unit should be removed carefully from the carton and inspected for any possible damage in transit. If there is any evidence of damage which might have occurred in shipment, immediately notify your supplier or the transportation company which delivered it. Claims for damage sustained in transit must be made upon the carrier. Save all packing material for the claim agent who will supply you with the proper forms and give you the necessary instructions for filling out a claim.

## INSTALLATION

The Model 1010/1040 has ample vents for adequate ventilation; however, the unit must be installed with sufficient clearance around the cabinet to permit free air flow. Do not install the unit in a sealed box or cabinet without adequate ventilation. **DO NOT PLACE ANY OBJECT ON TOP OF THE COVER OR IN ANY WAY BLOCK THE AIR FLOW OF THE VENTS. DO NOT STORE OR OPERATE THE AMPLIFIER IN AREAS WHERE THE AMBIENT TEMPERATURE EXCEEDS 140° DEGREES F.**

This amplifier may be mounted in 12-3/16 inches of vertical rack space. Should other heat generating equipment be installed immediately above or below the unit, then at least 2 inches spacing should be provided between these units for adequate ventilation. By reversing the mounting flanges on the cabinet, the Model 1010/1040 may be mounted on a flat wall surface. It is not necessary to remove the chassis from the cabinet in order to reverse the mounting flanges. Just remove the six screws which secure each mounting flange to the side of the cabinet and invert the mounting flange. Then secure the flange to the side of the cabinet with the original screws. To avoid possible internal damage to the unit, do not use screws longer than 1/2 inch to replace the original screws if they become lost.

In order to make connections to the unit, it is necessary to remove the lower front cover and hinged access door assembly. This is done by removing the six screws which attach this assembly to the front of the cabinet.

The amplifier has an AC power cord with a 3 prong plug. This cord should be plugged into a 2 wire circuit grounded 120 volt 60Hz outlet. **DO NOT REMOVE THE GROUNDING PIN FROM THIS PLUG** as it is the safety ground for the metal cabinet.

A screw terminal block is also provided as a means of connection to a 36 volt battery supply for emergency operation of the amplifier. This power input requires an average current of 3 amperes (5 amperes max.). Battery selection should be made by referring to the battery manufacturer's performance curves which show the amp-hour rating of the battery at this current. Battery connection and installation should be made in compliance with local electrical codes.

## CONNECTIONS

All connections are made on the lower portion of the chassis face. Connection to the PHONO input, AUX input and BOOSTER AMP output require the use of a standard phono plug. All other connections are made by means of screw terminals.

The PHONE input to the amplifier is designed to provide a balanced 600 ohm termination for the paging

access output port of registered equipment such as a PABX or switchboard. Such equipment contains the protective circuitry required by the FCC and has the appropriate registration number. When connected in this manner, no registration number is required for the Model 1010 or 1040.

**PHONE INPUT:** THIS UNIT IS NOT TERMINAL EQUIPMENT AND MAY NOT BE DIRECTLY CONNECTED TO THE NATIONAL TELECOMMUNICATIONS NETWORK. THE RINGER EQUIVALENT OF THE 500 OHM INPUT IS "Z". THIS MEANS THAT RINGING VOLTAGE SHOULD NOT BE APPLIED TO THIS INPUT.

Input connections are made by means of four screw terminals on the face of the unit. The input from this paging access port should be connected to the two terminals marked INPUT. The centertap of this input transformer is identified as C.T. When this input is connected to a balanced circuit, such as a phone line, it may be necessary to ground this centertap in order to eliminate noise induced by longitudinal imbalance of that line. The terminal marked GND is the same ground as the amplifier and may be used to ground the centertap. If the amplifier is not properly grounded or if there is noise on the power outlet to which the unit is connected, this technique will not eliminate all of the noise. In such a case it may be necessary to connect the C.T. terminal to a "waterpipe" ground for minimum noise.

**MIC/LINE:** The inputs for both MIC/LINE 1 and MIC/LINE 2 are balanced. Input connections are made by means of five screw terminals for each channel on the face of the unit. Either a 150 to 250 ohm low impedance microphone or a balanced line may be used as the input to each of these channels. Low impedance microphone wiring requires the use of a shielded cable with two center conductors. These two conductors should be connected to the terminals marked LO-Z MIC and the shield connected to the terminal marked GND. No other wiring should be included inside of this cable and any unused wires in the cable should be connected to ground to prevent any R.F. pickup.

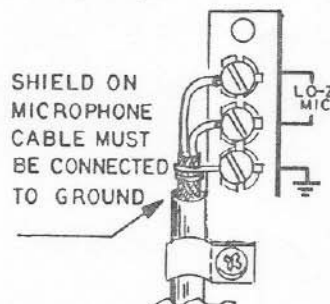


FIGURE 1.  
LOW IMPEDANCE  
MICROPHONE  
INPUT WIRING.

Line inputs should be connected to the two terminals marked LINE. This input has an impedance of 10,000 ohms and may be used as the bridging input from 500/600 ohm lines.

**AUX INPUT:** The AUX input is unbalanced high impedance with a maximum sensitivity of 250mv. This input may be used as the paging source from other preamplified signals such as a mixer or intercom. Input connection to this circuit requires the use of a shielded audio cable with a standard phono plug. This input is located on the face of the unit and is identified as AUX.

## OUTPUT CONNECTIONS

100 or 40 watts RMS power output is provided for 4 or 8 ohm speaker lines or for distribution on 25 volt or 70 volt lines. Output connections are made by means of screw terminals on the face of the unit.

Long speaker lines have an appreciable resistance with resulting power loss. To avoid this power loss, the use of matching transformers on either 25 volt or 70 volt lines is recommended. This arrangement also allows the connection of multiple speakers which have different power requirements. In all cases it is advisable to run as heavy a wire as possible consistent with requirements. To avoid inducing hum into the speaker lines do not run speaker cables parallel to power line cables.

In some areas 70 volt distribution lines must be run in conduit. Check your local city electrical codes before installing a 70 volt speaker system to determine the local code requirements.

The 4 OHM and 8 OHM outputs are used when connecting directly to speaker voice coils. When a speaker or a series-parallel array of speakers with an impedance of 8 ohms is connected to the amplifier output, use the terminals marked 8 OHMS and GND. Use the terminals marked 4 OHMS and GND for a speaker circuit with a 4 ohm impedance. Do not simultaneously load both outputs at their rated impedance as this will appear as a demand for twice the rated output from the amplifier and represent an overload to the unit. In a similar manner, do not load both the speaker output and the 25 or 70 volt output simultaneously at full power demand. A combination of speaker loads is permissible using the various outputs from the amplifier; however, the sum of these demands should not exceed the rated power output of the amplifier.

The 25 VOLT and 70 VOLT outputs are used with speaker distribution systems in which each speaker has a line matching transformer which is connected for the specific wattage requirement of that speaker. This permits the use of a large number of speakers with various sound level requirements to operate from a common source. By rating these transformers in the wattage which they demand across a 25 volt or 70 volt line, there is no necessity in calculating total impedance. The total wattage demand of such a speaker line may be determined by adding up the sum of all the speaker demands in the system. This total should not exceed the wattage rating of the amplifier used to drive the system. Connection to the 25 volt or 70 volt outputs is made by means of screw terminals on the face of the unit, use the terminals marked COMM and 25V (or 70V) according to the line desired.

Optimum performance of any amplifier depends upon proper impedance match between the output and the load. Connecting a load of mismatched impedance to an amplifier will deteriorate the overall performance of the system. To accurately measure the impedance of a speaker line, the Raymer model LWT should be used. This test instrument permits direct reading of the wattage demand or impedance of a speaker line and is a valuable aid in determining opens, shorts or mismatch conditions.

## BOOSTER AMPLIFIER OUTPUT

The audio signal at this jack is the same signal which is applied to the amplifier portion of the Model 1010/1040. By connecting a supplemental power amplifier (such as the Raymer Model 1011) to this jack, power may be delivered simultaneously to additional speaker systems. A shielded audio cable with phono plugs at each end is required to make this connection.

## MUSIC-ON-HOLD OUTPUT

Two separate outputs are provided to drive different music-on-hold arrangements. They are identified as 8 ohm and 500 ohm outputs. Connection to these outputs are made by means of screw terminals on the face of the unit. The output signal level at these terminals is adjusted by the M.O.H. LEVEL control. This M.O.H. source is selected by the MUSIC SELECT switch.

The 500 ohm output is isolated from ground and may be used to drive a balanced line at a +4db level (1.23V). This output may be used to drive the music-on-hold line card in privately owned key systems. Refer to the technical specifications supplied by the manufacturer for proper connections and input voltage requirements.

The 8 ohm output has a maximum power of 1 watt (2.83V.) which may be used to drive a monitor speaker or the Bell Telephone System music-on-hold arrangement identified by their USOC (Universal Service Order Code) as LVH for rotary dial systems or FTP for touchtone systems. This connecting arrangement must be ordered from your local telephone company marketing department.

## COMMAND CIRCUITS

Three different functions occur upon command by a switch closure, these are CHIME tone, SIREN tone and MUSIC MUTE. Connections to activate these functions are made by means of screw terminals located on the face of the unit.

**CHIME TONE:** A single 800 cycle chime note is sounded each time that a switch circuit is closed across the terminals marked CHIME. This tone may be used as a night call if the switch closure is from a PABX, a pre-announcement alert if the switch is part of a Push-To-Talk microphone, or break announcement bell if the switch is on a time clock. A separate level control on the front panel adjusts this chime level.

**SIREN:** A whooping siren signal is sounded as long as there is a switch closure across the terminals marked SIREN. This signal may be used for security or alarm purposes by using the speakers in the sound system instead of additional alarm sounding devices. Switch activation of this function may be from an intrusion detector, heat sensor or manual switch. A separate level control on the front panel adjusts this siren level.

**MUSIC MUTE:** The music channel is muted as long as there is a switch closure across the terminals marked MUTE. The Model 1010 includes an automatic voice activated circuit which mutes the music channel when any of the paging inputs are used or the chime or siren tones are activated. The mute function provided by these terminals may be used in addition to this automatic feature to mute the music channel.

## F.M. TUNER OPERATION

The F.M. tuner portion of the Model 1010/1040 uses the AC power cord as the FM antenna, which should be sufficient in strong reception areas. In remote or poor reception areas, an external antenna will increase the number of stations received. Antenna connections should be made in accordance with the instructions supplied by the antenna manufacturer. Connections to the antenna input are made by means of screw terminals on the face of the unit. Twinlead wire from a 300 ohm antenna should be connected across the terminals marked FM ANT. When a 72 ohm antenna is used, the coax shield should be connected to ground and the center conductor connected to one of the FM ANT terminals.

A small flat blade screwdriver is required to set the FM frequency. To tune the unit to the desired station:

1. Connect a monitor speaker or telephone test handset across the 8 ohm terminals of the M.O.H. output.

2. Move the MUSIC select switch to the RADIO position and adjust the MOH level control until sound is heard in the monitor device.

3. Remove the plug from the hole marked TUNING by gently prying with the screwdriver blade. This exposes the screwdriver slot adjustment for tuning.

4. With the screwdriver, turn this adjustment until the dial indicator is at the frequency of the desired station (clockwise rotation increases frequency).

5. When the desired station is received, turn the tuning adjust both clockwise and counterclockwise until the dial pointer is in the center of the position where best reception is observed.

6. Replace the plug over the tuning adjustment.

7. While in the Music-On-Hold condition, adjust the MOH level control for a comfortable listening volume at the telephone handset.

## TONE CONTROLS

Both BASS and TREBLE controls are provided to compensate for frequency response requirements which may result from the characteristics of the speaker system or acoustical conditions. These controls have a turnover frequency of 1000Hz. The BASS

control allows a maximum boost or cut of 15db at 50Hz and the TREBLE control allows a maximum boost or cut of 15db at 15KHz. These controls are located on the face of the unit. For a "flat" frequency response the white markers on these controls should be placed in a horizontal position as indicated on the face plate. Clockwise rotation of these controls is used for boost; counterclockwise for cut.

## TRUMPET PROTECT

The Model 1010/1040 is equipped with a slide switch on the front panel which reduces the low frequency response of the unit to protect the diaphragms of trumpet speakers below their "Cut-off" frequency. In the ON position, the response is flat. This switch may also be used to increase speech intelligibility.

## OPERATION

Three status indicator lamps on the upper face panel of the unit indicate the operating condition of the Model 1010/1040. The green lamp indicates normal operation from the power mains, the amber lamp indicates emergency operation from a battery supply (if used) and the red lamp indicates an amplifier overload condition.

The green power indicator should light when the power switch is turned on. If it does not, check that the power cord is firmly inserted in the power outlet and that the circuit breaker is not "tripped" by pushing the red button above the power switch. The circuit breaker will trip under overload conditions as indicated by the red overload light. Under normal operating conditions, the red light may blink occasionally to indicate that the unit has reached its peak power output. Constant blinking of the light indicates that the level control is adjusted too high or that the output load is either shorted or mismatched. A steady red light indicates that the system is oscillating. This is caused by some form of feedback from the speaker lines back into an input circuit. Typical conditions which cause this problem may be a short of the output line to ground or an open ground on an input circuit.

In the event that the circuit breaker constantly "trips" although the overload light does not light, do not attempt to override the function of the breaker, but return the unit to the factory for repair.

---

## WARRANTY

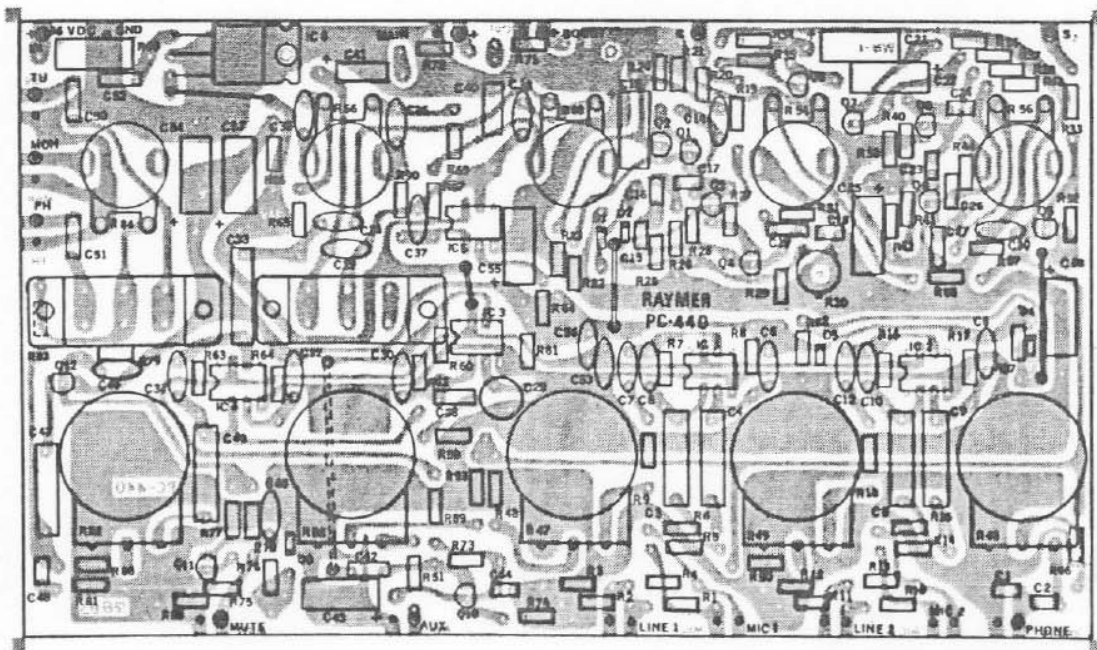
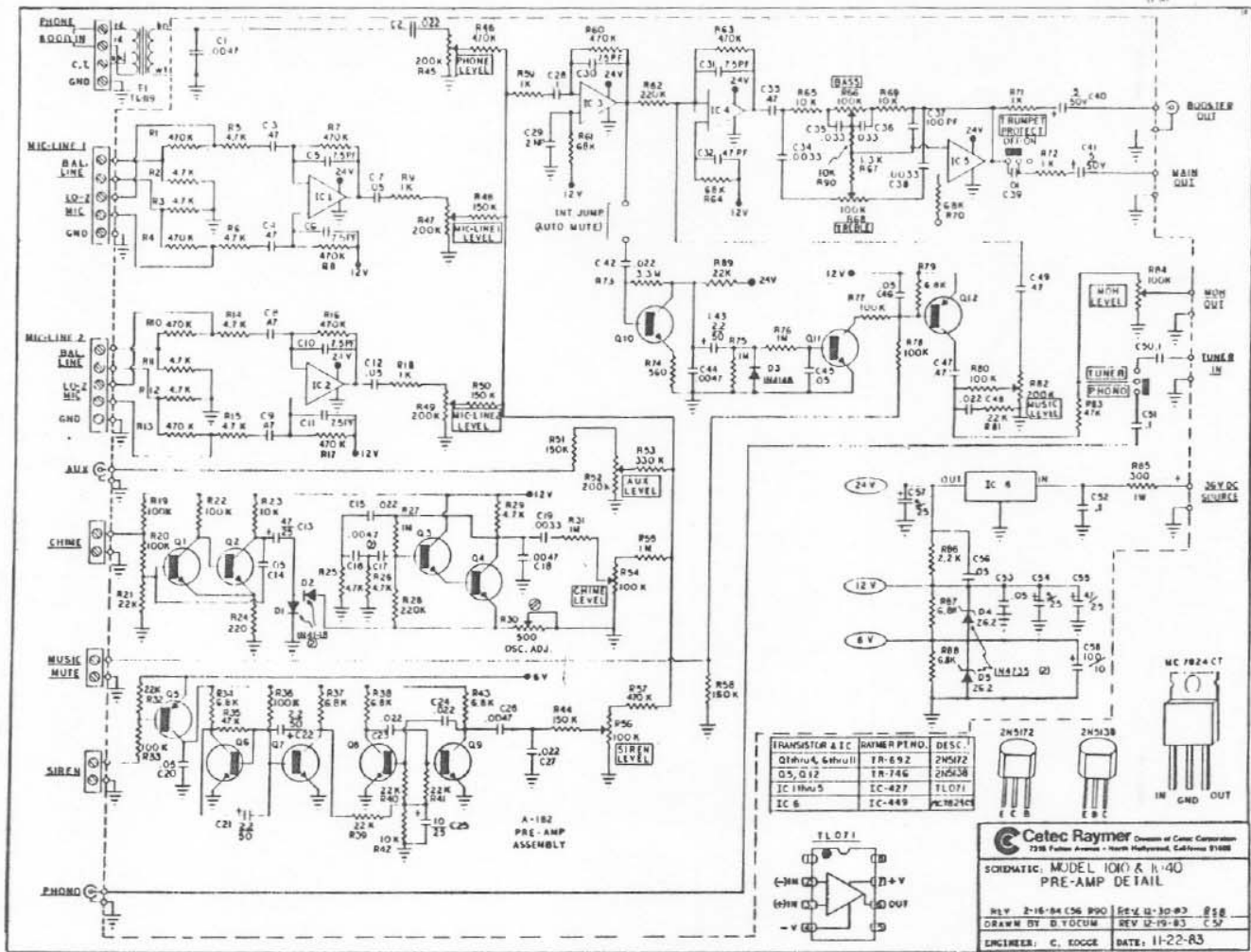
THIS UNIT HAS BEEN VERY CAREFULLY INSPECTED AND IS WARRANTED TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE AND SERVICE FOR A PERIOD OF ONE YEAR FROM DATE OF SALE TO THE ORIGINAL PURCHASER. THIS WARRANTY DOES NOT EXTEND TO ANY UNIT WHICH BEEN SUBJECT TO ABUSE, MISUSE, NEGLIGENCE, ACCIDENT, IMPROPER INSTALLATION, OR ALTERATIONS. THE OBLIGATION OF CETEC RAYMER UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OF ANY DEFECT IN MATERIAL OR WORKMANSHIP AND/OR THE REPLACEMENT OF ANY DEFECTIVE PART, PROVIDED THE UNIT IS RETURNED TO CETEC RAYMER TRANSPORTATION PREPAID.

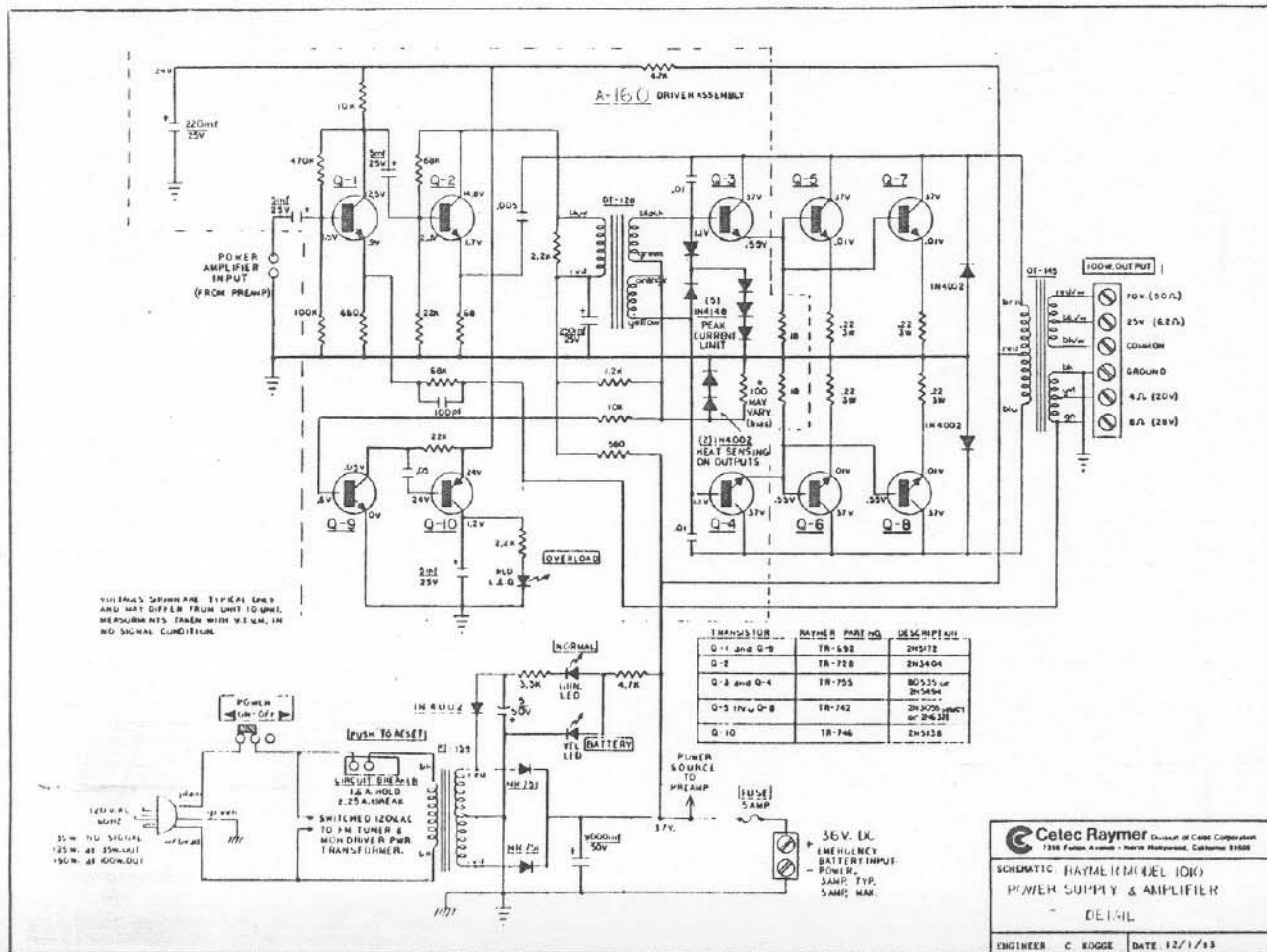
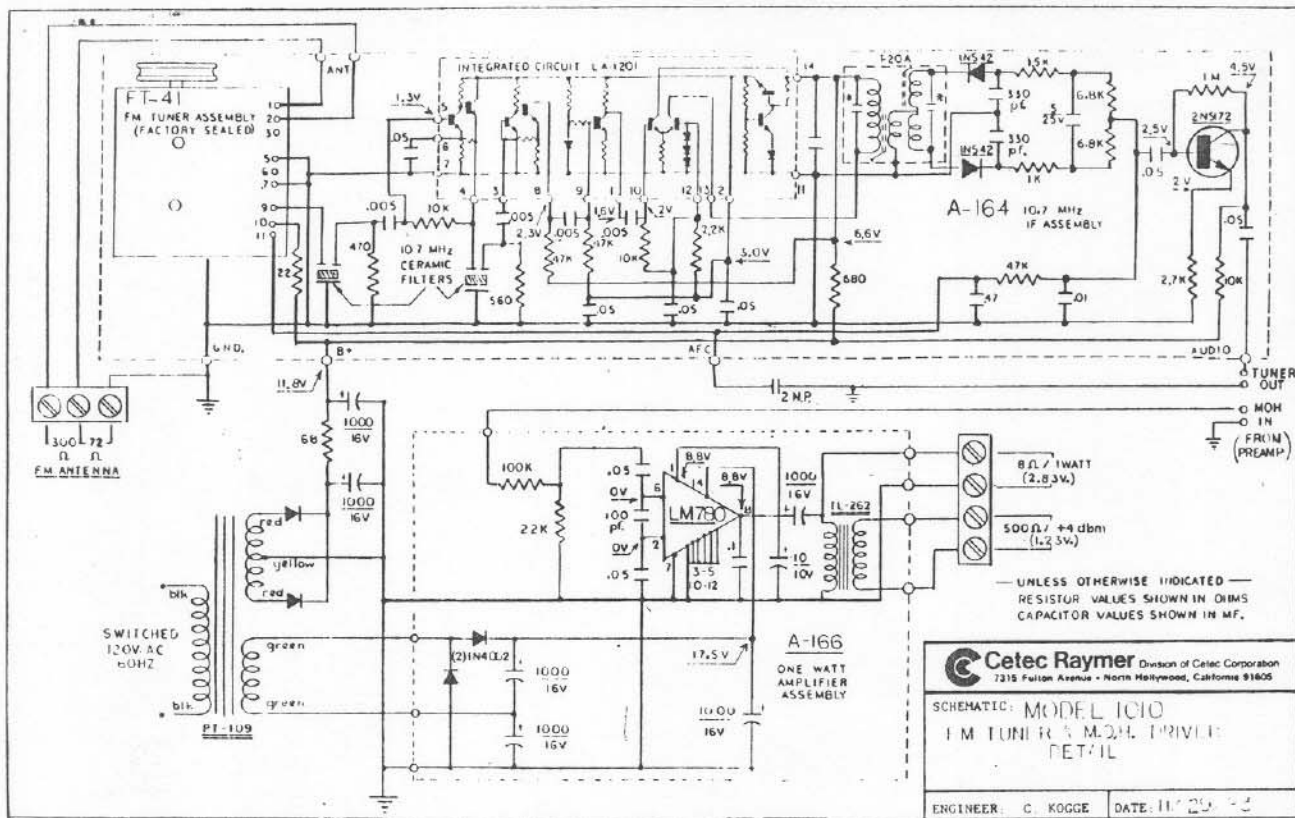
IT IS RECOMMENDED THAT ANY UNIT ON WHICH SERVICE IS REQUIRED BE PROCESSED THROUGH YOUR DISTRIBUTOR OR INSTALLATION COMPANY WHEREVER POSSIBLE.

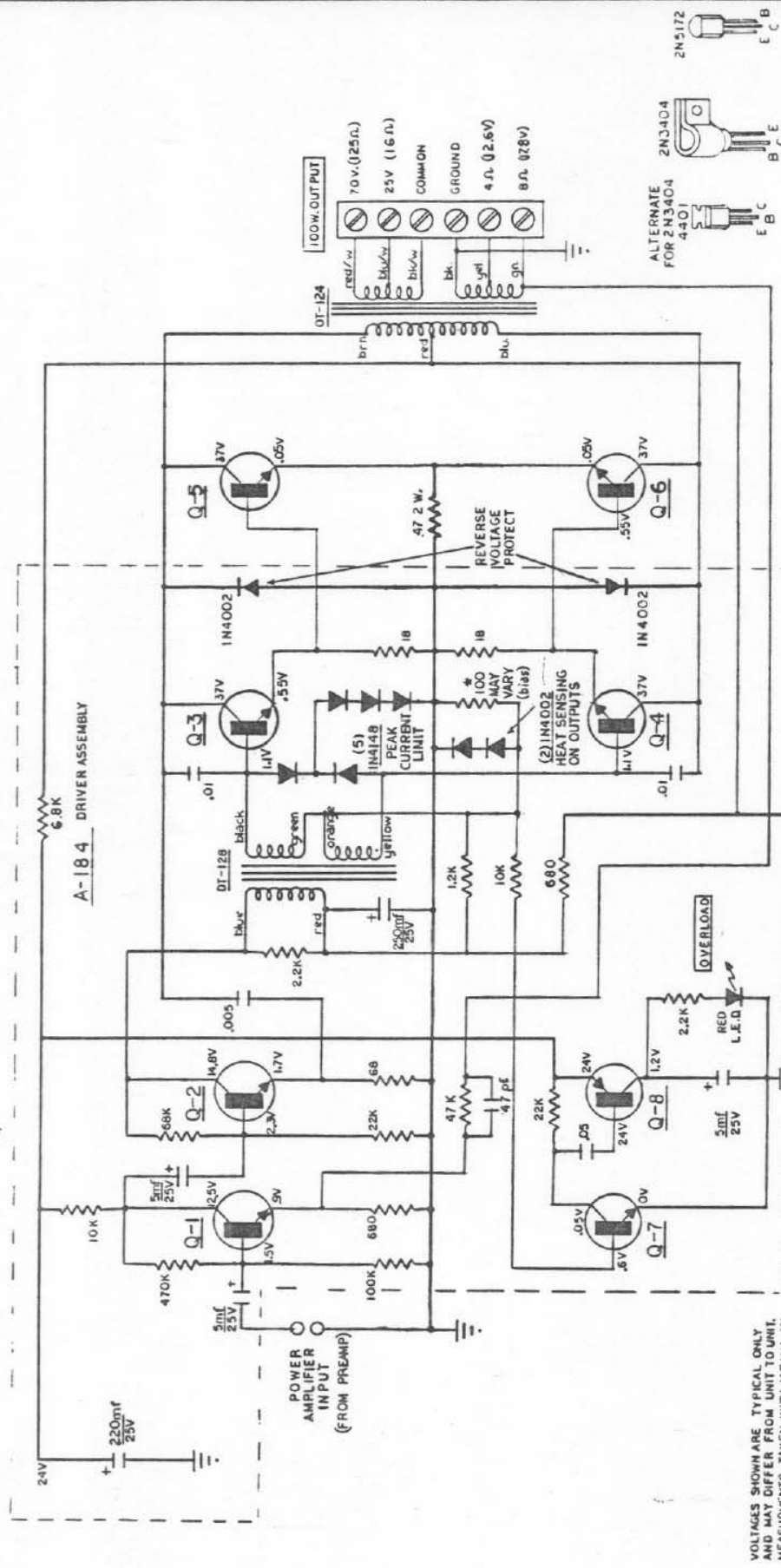
THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON OUR PART. WE NEITHER ASSUME NOR AUTHORIZE ANY OTHER PERSON TO ASSUME FOR US ANY OTHER LIABILITY IN CONNECTION WITH THE PRODUCTS MANUFACTURED BY CETEC RAYMER.

MANUFACTURED IN THE USA BY

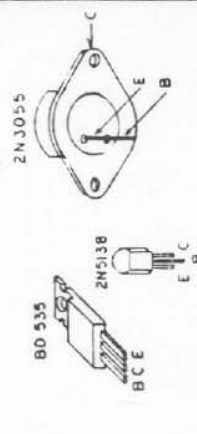
Cetec Raymer Commercial Sound Products







TRANSISTOR	RAYMER PART NO.	DESCRIPTION
Q-1 and Q-7	TR-692	2N5172
Q-2	TR-728	2N3404
Q-3 and Q-4	TR-755	BD535 or 2N5494
Q-5 and Q-6	TR-733	2N3055
Q-8	TR-746	2N5138



TRANSISTOR LEAD IDENTIFICATION

**Cetec Raymer** Division of Cetec Corporation  
 7318 Fulton Avenue - North Hollywood, California 91605  
**SCHEMATIC: RAYMER MODEL 1040**  
**POWER SUPPLY & AMPLIFIER**

DETAIL

ENGINEER: C. KOGGE DATE: 1/25/84

VOLTAGES SHOWN ARE TYPICAL ONLY AND MAY DIFFER FROM UNIT TO UNIT. MEASUREMENTS TAKEN WITH V.I.M.M. IN NO SIGNAL CONDITION.

