

MODELS SE30 & SE30-2E
GATED COMPRESSOR/MIXER
OPERATING AND SERVICE MANUAL

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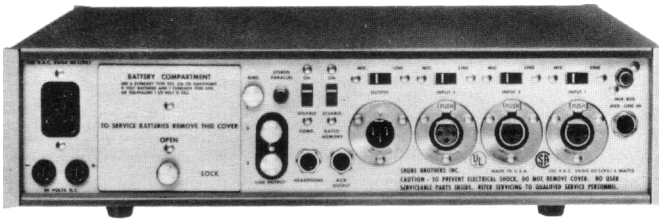
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WARNING

To reduce the risk of fire or electric shock, do not expose this appliance to rain or extreme moisture.

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(Model SE30 shown)

DESCRIPTION

The Shure Model SE30* Gated Compressor/Mixer is a high-quality gated memory compressor combined with a self-contained, portable, three-input mixer and remote amplifier designed specifically for professional applications in AM, FM, and TV broadcasting, film, tape, and disc recording, CATV, and sound reinforcement. An accessory cover is available (A100A) which covers the front controls and provides a handle, as well as a support stand for tilting the front panel upward for easier vision of controls during operation. An accessory rack-mount kit (A100B) is available for permanently installed program compressor applications.

Features include:

- Three transformer coupled inputs, switchable, low impedance microphone or line level.
- Individual feedback-type level controls for each input to provide maximum clipping and minimum noise levels over a wide dynamic range.
- Low-frequency roll-off switch for each input.
- Input 1 switchable on front panel to low-distortion, 1 kHz tone oscillator.
- Mix bus jack for adding additional mixers for additional input capability.
- Feedback-type output control (located after compression attenuator) to provide optimum output noise level regardless of setting.
- Binding posts for balanced 600-ohm line output plus professional three-pin male audio connector switchable from line to microphone level output.
- Two-level headphone monitor jack for 600 to 2,000 ohm headphones.
- Compression range of 40 dB, with a slope or compression ratio of approximately 10 to 1 in the normal operating range.
- Gated Memory with a meter indicator to minimize "pumping."
- True average-responding compression to maximize output level regardless of peak-to-average ratio of program material, either music or speech. (Peak responding circuit to reduce gain rapidly for significant increases in the input signal.)
- Response rate (averaging time constant) adjustment on front panel to compensate for various types of program material.
- Extremely low distortion, noise, and RF susceptibility, with wide, flat frequency response at any level of compression.
- +18 dB output capability.
- Dual-scale illuminated meter for output VU indication or dB compression.
- +4 or +6 dBm range switch for VU meter.
- AC or battery operation with built-in battery supply using readily available 9-volt batteries.
- Automatic, noiseless switch-over to batteries in the event of ac line failure.
- Battery-check switch to check battery condition without interrupting operation of unit.
- Detachable ac line cord.
- Auxiliary meter lamp operates independently from a "D" type dry cell for meter illumination when ac power is not available.
- Auxiliary high level input and output on phone jacks for special applications (approximately --20 dBV).
- Microphone and line inputs and outputs phase indicated.
- Stereo parallel jack for synchronizing the compression circuits of two units.
- Listed by Underwriters' Laboratories and Canadian Standards Association (SE30 only).

*Unless otherwise noted, information applies to both SE30 and SE30-2E models.

GUARANTEE

This Shure product is guaranteed in normal use to be free from electrical and mechanical defects for a period of one year from date of purchase. Please retain proof of purchase date. This guarantee includes all parts and labor. This guarantee is in lieu of any and all other guarantees or warranties, express or implied, and there shall be no recovery for any consequential or incidental damages.

SHIPPING INSTRUCTIONS

Carefully repack the unit and return it prepaid to:

Shure Brothers Incorporated
Attention: Service Department
1501 West Shure Drive
Arlington Heights, Illinois 60004

If outside the United States, return the unit to your dealer or Authorized Shure Service Center for repair. The unit will be returned to you prepaid.

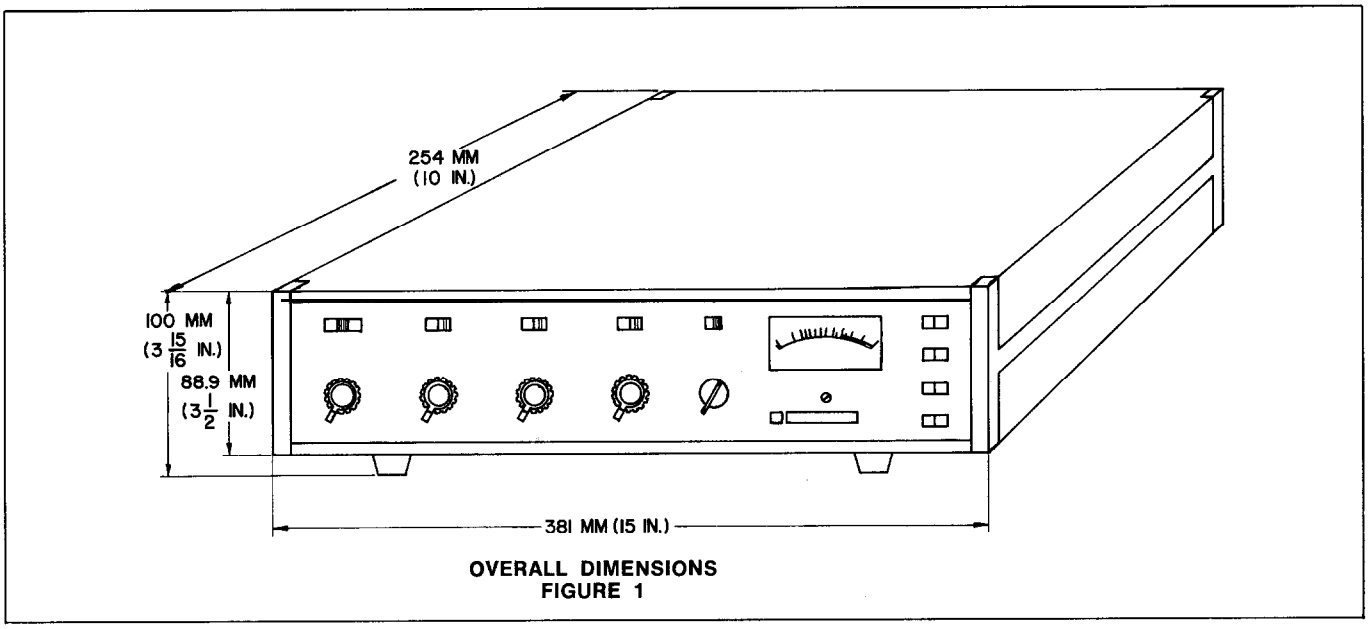
SPECIFICATIONS

- **Frequency Response:**
  Flat ±2 dB, 30 to 20,000 Hz.
- **Gain:**
  (Below compression threshold, output terminated, Line 600 ohms, Microphone 150 ohms, Aux. 47 K ohms.)

INPUT	OUTPUT		
	LINE	MICROPHONE	AUX.
Low Impedance Microphone thru 150 ohms.	105 dB	55 dB	85 dB
Line or Aux. Line thru 600 ohms	57 dB	7 dB	37 dB

- **Noise:**
  Equivalent input noise: -129.5 dBV maximum (Microphone input, 150 ohms, 20 kHz equivalent noise bandwidth with lower cutoff frequency of 300 Hz, at full gain.)
  Equivalent input hum and noise: -126 dBV maximum (same as above, but lower cutoff frequency of 20 Hz.)
  Output: (Input controls minimum):

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OVERALL DIMENSIONS
FIGURE 1

SPECIFICATIONS (Cont'd)

TEST CONDITIONS	NOISE	HUM AND NOISE
Output control at 10	– 45 dBV	– 42 dBV
Output control set for 20 dB less gain	– 62 dBV	– 59 dBV

- **Distortion:**
  Below compression threshold, under 0.5% THD at +15 dBm output, 30-20 kHz.
  At 10 dB compression, under 1% THD at +15 dBm output, Response Rate set to 7, 50-20 kHz. With Response Rate set to 0 (fast), under 2% THD at 50 Hz. At 1 kHz, under 0.8% THD at any level of compression from 0 to 40 dB.
- **Compression Ratio:**
  8:1 minimum from 10 to 20 db compression.
  5:1 minimum from 10 to 30 dB compression.
- **Compression Threshold:**
  Microphone: -96 dBV at maximum input gain.
  Line: -48 dBV at maximum input gain.
- **Recovery Time:**
  Time required for gain to reach 90% of its final value when input is reduced by 10 dB from 20 dB compression is adjustable from approximately 100 milliseconds to 8 seconds by Response Rate control.
- **Attack Time:**
  Same as recovery time for increases up to 12 dB. Maintains peak to average ratio at 12 dB (sine-wave equivalent).
- **Gated Memory:**
  In "hold" condition, less than 20 dB gain recovery after 1 minute.
- **Tone Oscillator:**
  1.0 kHz ± 10%, THD under 1%.
- **Input Control Interaction:**
  Under 0.1 dB with any combination, mix bus jack open. Under 1.5 dB with mix bus terminated in 50 K ohms or less.
- **Lo-cut Filters:**
  -6 dB per octave, 3 dB down at approximately 150 Hz.
- **Input/Output:**

INPUT	IMPEDANCE		INPUT CLIPPING LEVEL
	Designed for Use With	Actual	
Microphone*	25 to 600 ohms	1.1 K ohms	From – 38 dBV to – 10 dBV, depending upon input control setting
Line or Aux. Line	33 K ohms or less	66 K ohms	From + 10 to + 38 dBV, depending upon input control setting

*Common-mode Rejection: 100 dB minimum at 100 Hz, microphone input.

OUTPUT	IMPEDANCE		OUTPUT CLIPPING LEVEL
	Designed for Use With	Actual	
Line	600 ohm line*	120 ohms	+ 18 dBm, 6.2 V
Microphone	25 to 600 ohm microphone inputs	Under 1 ohm	– 34 dBV, 20 mV
Aux.	High-impedance (10 K ohm or greater) unbalanced Aux. inputs	4.3 K ohms	– 4 dBV, 0.63 V

*Other impedances may be used, from 150 ohms up, but VU meter is calibrated for 600-ohm termination.

- **Mix bus:**
  Impedance 3.9 K ohms. Gain (through 3.9 K ohms) from mix bus to line output, is 63 dB. Gain from microphone input to mix bus is 26 dB (terminated in 3.9 K ohms). Overall gain drops by 10 dB with mix bus terminated.
- **Circuit Protection:**
  Shorting the outputs, even for prolonged periods, will not damage the unit.
  Microphone inputs will not be damaged by signals of up to 3 volts.
- **Temperature Range:**
  Operating:
  -18°C (0°F) to 57°C (135°F).
  Storage:
  -29°C (-20°F) to 74°C (165°F).
- **Weight:**
  9 lbs., 13½ oz. (4.5 kg) with batteries and line cord.
- **Operating Voltage:**
  AC Operation:
  108-132 volts, 50/60 Hz (SE30 only).
  108-132 or 216-264 volts, 50/60 Hz (SE30-2E only).
  DC Operation:
  30 volts ± 20%.

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SPECIFICATIONS (Cont'd)

- **Battery Operation:**

  27 volts nominal, 21.5 volts minimum. Current consumption at 27 volts, 10 ma. at no signal; 12 ma. at 20 dB compression and +8 dBm output.

- **Battery Life:**

  Estimated 80 hours at 4 hours use per day.

- **Battery Complement:**

  9 volt, 6 Eveready type 222 or 216 or equivalent.
  One heavy-duty 1.5 volt "D" size cell, Eveready type D99 or equivalent to power Aux. Light approximately 8 hours continuously.

CONTROL AND CONNECTOR DESCRIPTIONS (See Figure 2)

(1) **Input Controls:** Control gain of individual input stages to adjust relative levels between inputs and to adjust amount of compression. Input 1 (1A) also controls Tone Oscillator level when used.

(2) **Lo-cut Filter Switches:** Low frequency response is reduced by 6 dB per octave below approximately 150 Hz with switch set to IN. Input 1 switch (2A) also activates tone oscillator.

(3) **Output Control:** Controls output level when unit is used in compression or acts as a master gain control when compression is disabled. May be used for overall fading. Does not affect amount of compression.

(4) **VU Range Switch:** Selects meter sensitivity so 0 VU indicates results from either +4 dBm or +8 dBm line output level.

(5) **Gated Memory Indicator:** Will be red when Gated Memory is "holding" prior amount of compression during a low input signal. Will be white whenever input signal is above compression threshold, or if either Gated Memory or compression is disabled. Illuminated by ac operated lamps or independent battery operated auxiliary light.

(6) **Response Rate Control:** Adjusts time constant of compression system to compensate for different types of program material. Generally, a faster setting (lower numbers) results in a more constant output level but a more audible compression effect. Setting this control is a subjective matter, but the following guidelines may be used:

Speech 3
Popular Music 5
Symphonic Music 7

(7) **Meter:** Indicates either VU output level (upper VU scale) or compression due to input signal above threshold by the amount indicated (lower DB Compression scale). VU meter isolated from dc on line output. Illuminated by ac operated lamps or independent battery operated auxiliary light.

(8) **Meter Switch:** Selects function of meter for VU output level or DB Compression.

(9) **Battery Check Switch:** Spring-return switch overrides Meter switch, allows checking battery condition without affecting operation of unit. A reading of 0 VU indicates end-of-life.

(10) **Aux. Light Switch:** Spring-return switch allows illumination of meter and Gated Memory indicator from internal battery.

(11) **Power Switch:** Controls ac, external dc and internal battery power applied to the unit, but will not prevent power from being drawn from the internal batteries by a load connected to 30 Volts DC jacks (26) when switched to OFF.

REAR PANEL

(12) **Mix Bus Jack:** Phono pin jack allows adding inputs by interconnecting to a similar jack on another SE30 or M67 Mixer.

(13) **Input Connectors:** Female professional three-pin audio connectors* accept balanced low-impedance microphone or high-level line inputs. Wired with pins 2 and 3 "hot" and pin 1 ground.

(14) **Mic/Line Input Switches:** Select either microphone or line level input sensitivity for each input.

(15) **Aux. Line Input Jack:** Three-conductor (tip, ring, sleeve) phone jack provides a second balanced line input for Input 1. May be used in conjunction with, or instead of, three-pin input connector when input switch (14A) is set to LINE. Inserting a two-conductor phone plug will automatically unbalance the input without otherwise affecting operation. Tip and ring are "hot," sleeve is ground, and tip is in phase with pin 2 of input and output.

(16) **Output Connector:** Male professional three-pin audio connector* provides balanced output at either line level or microphone level (50 dB below line level). Wired with pins 2 and 3 "hot" and pin 1 ground, in phase with input connectors.

(17) **Mic/Line Output Switch:** Selects either microphone or line level output at output connector.

(18) **Aux. Output:** Two-conductor (tip-sleeve) phone jack provides isolated unbalanced aux. level (20 dB below line level) output, for use with tape and cassette recorders and power amplifiers with high level, high impedance inputs. Tip of jack is in phase with tip of Aux. Line Input jack (15).

(19) **Headphone Jack:** Three-conductor (tip, ring, sleeve) phone jack wired to provide two different output levels for 600 to 2,000 ohm headphones. If a two-conductor (tip, sleeve) phone jack is inserted partially (to the first detent), output will be approximately .18 volts into 1,000 ohms at +4 dBm output. If the plug is inserted fully, the voltage will be approximately .38 volts. If stereo headphones are used, signal will appear in both phones. The tip and ring are in phase with pin 3 of the input and output.

(20) **Line Output Terminals:** Thumbscrews for direct wire connections to balanced line, wired in parallel with three-pin Output connector (16) in LINE position of switch only. Phase is indicated by pin number references, and a ground thumbscrew is provided.

(21) **Gated Memory Switch:** Will disable Gated Memory function without affecting other operation.

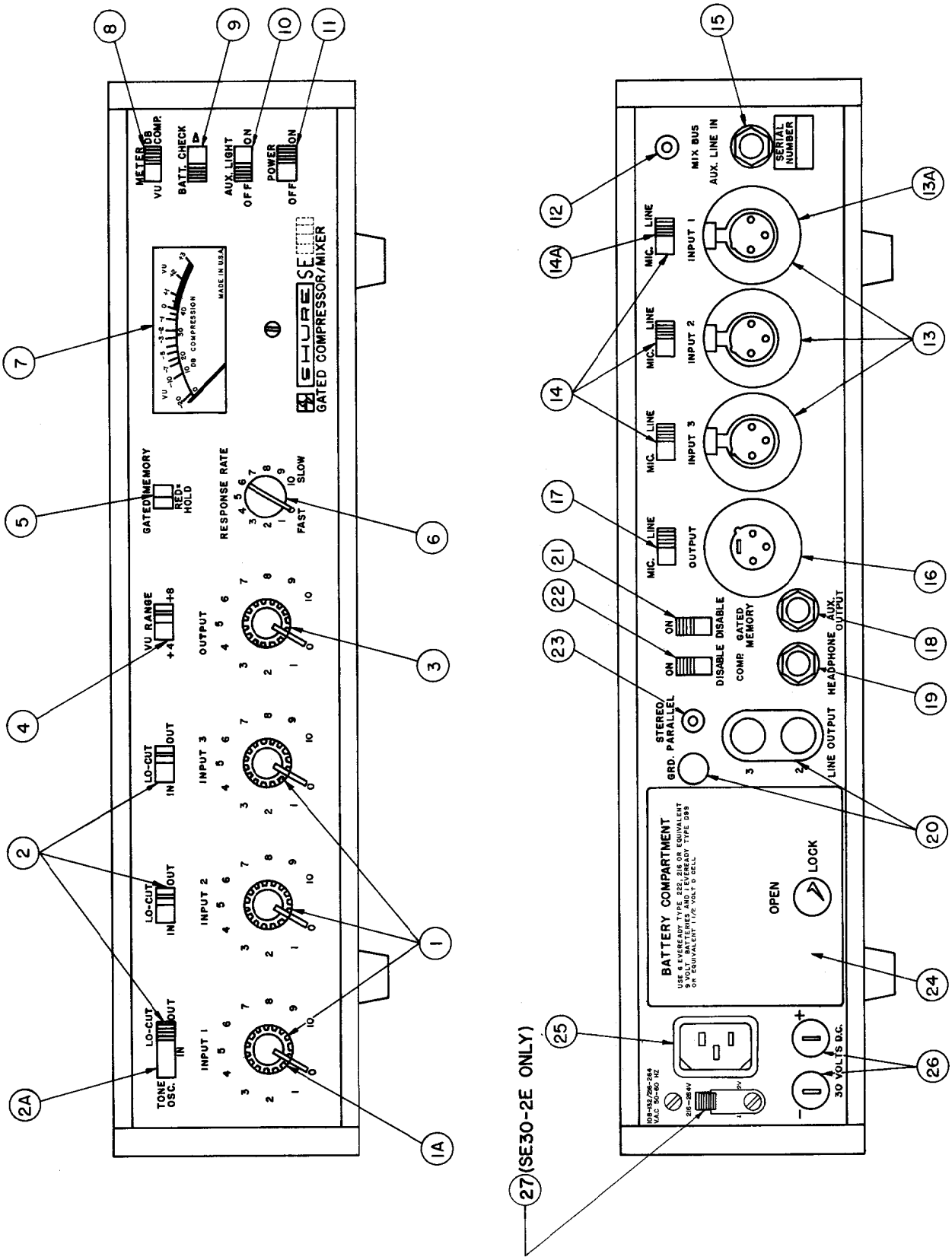
(22) **Compression Switch:** Will disable compression and Gated Memory functions of the SE30, converting it to a high-quality linear mixer and remote amplifier.

(23) **Stereo Parallel Jack:** Phono pin jack allows two units to be synchronized to compress equally the channel sum (L + R) signal. See Service section.

(24) **Battery Compartment:** Requires six readily available O-volt batteries (Eveready type 222 or 216 or equivalent) wired in series-parallel for 27 volts dc and one heavy-duty D cell (Eveready type D99 or equivalent)

*Designed to mate with Cannon XL series, Switchcraft A3 (Q. G.) series. or equivalent connector.

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CONTROLS AND CONNECTORS
FIGURE 2

CONTROL & CONNECTOR DESCRIPTIONS (Cont'd)

for auxiliary light (batteries not included). Removed by turning knob on back of Battery Compartment to OPEN position and pulling compartment rearward out of chassis. Cover may then be opened by unscrewing thumbscrew. Unit will operate in an emergency with three 9-volt batteries for approximately one-fourth the life of a six battery set, by using either the right or left row of battery connectors.

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(25) **AC Power Receptacle:** Special internationally accepted connector for detachable ac line cord, three-wire with safety ground pin.

(26) **30 Volts DC Jacks:** May be used for powering the unit from an external 30 ± 20% dc source, or for powering external equipment (up to 5 ma) from the batteries or ac operated power supply of the SE30. Controlled by front-panel Power switch (11) except that an external load will discharge the batteries with the unit OFF. In this case, remove the Battery Compartment (24) when unit is turned off.

(27) **Voltage Selector Switch:** Selects operating voltage range of 108-132 V or 216-264 V (SE30-2E only).

GENERAL OPERATION

(See Figure 2)

POWER CONNECTIONS:

AC Line Operation: Insert female end of ac line cord into chassis power receptacle (25) and connect male plug to a three-wire grounding ac power receptacle providing 108 to 132 V, 50/60 Hz (SE30 only). Model SE30-2E: Obtain a suitable three-pin male plug and attach it to the line cord. Plug should be installed by qualified service personnel. (Brown lead goes to "hot" or "live" terminal, blue lead to neutral terminal, and green/yellow lead to ground or earth terminal.) Select the proper operating voltage (108-132 V or 216-264 V) using the voltage selector switch (27). Insert female end of line cord into chassis power receptacle (25) and connect male plug to a three-wire grounding ac power receptacle providing the proper operating voltage (108-132 V or 216-264 V, 50/60 Hz).

Battery Operation: Unit will automatically operate on batteries installed in Battery Compartment (24) if unit is not supplied with ac power. Condition of the 9-volt batteries should be checked periodically with the Batt. Check Switch (9) and batteries should be replaced as the meter indication approaches 0 VU with the unit in operation. Standby battery condition may be checked even during ac line operation, but an indication of +½ VU should be considered as the replacement point, since the battery voltage will drop somewhat under load. The auxiliary light D cell may be checked by operating the Aux. Light switch (10). If the light becomes extremely dim, promptly replace or remove the D cell to avoid damage due to leakage. The unit will remain operative, except for the light, regardless of the condition of this cell.

Automatic Switchover: If batteries are installed in Battery Compartment (24). operating power will be supplied by these batteries in the event that the ac line voltage drops too low or is removed. The switchover is automatic and noiseless.

External DC Operation: An external source of dc may be connected to the 30 Volts DC jacks (26) to operate the unit if ac power is not used. The SE30 will draw approximately 12 ma. at 30 volts and must be operated at 30 volts ± 20%.

INPUT CONNECTIONS:

Microphones: Inputs (13) with switches (14) set to MIC. are designed to accept signals from low impedance (25 to 600 ohms) dynamic, ribbon, or condenser microphones, or microphone level signals such as the low impedance microphone level output of a mixer. Inputs are balanced (transformer coupled, mumetal shielded) and connections are pins 2 and 3 "hot," pin 1 ground. For unbalanced sources, connect either pin 2 or pin 3 to ground at the input cable connector.

High Level Signals: With switches (14) set to LINE the inputs (13) will accept balanced 600-ohm line signals. Inputs are bridging (with 66 K ohm impedance) so that higher impedance sources such as Aux. signals (up to 33 K ohms) may also be used. For such unbalanced inputs, the signal may be applied to pin 3, with pins 1 and 2 ground. Input 1 can accept two high-level signals simultaneously through the three-pin Input connector (13a), and through the Aux. Line Input jack (15), which are electrically isolated but identical in gain and impedance.

OUTPUT CONNECTIONS:

Microphone: The microphone level output is available at the Output connector (16) when the switch (17) set to MIC. It is used for feeding a low-impedance microphone line or the low impedance microphone input of an associated piece of equipment. This is a balanced output with pin 1 ground and pins 2 and 3 "hot" and in phase with the corresponding input pins. This output is isolated and may be used simultaneously with all other outputs appearing on other connectors.

Line: The line output is available at the Output connector (16) when the switch (17) is set to LINE, and at all times at the Line Output terminals (20). These two connectors are then wired in parallel and are provided for interconnection convenience for either standard three-pin audio connectors or for wires such as a telephone twisted pair. This is a balanced output, transformer coupled with pin 1 ground and pins 2 and 3 "hot" and in phase with the corresponding input pins. The Line Output terminals (20) are similarly numbered for phase indication. This output may be used to drive impedances above 150 ohms but the VU meter is properly calibrated for use with a 600-ohm terminated line. The line output transformer will operate properly with up to 100 ma. flowing through the line, permitting the use of ordinary "dialed-up" telephone lines with dc across them. Operation at +4 dBm output is recommended for this use to avoid any significant increase in distortion due to overdriving the phone line. This output is isolated and may be used simultaneously with all other outputs except that the Output connector (16) and Line Output terminals (20) are wired in parallel when the switch (17) is set to LINE.

Aux. Output: An unbalanced output 20 dB below line level is available at the Aux. Output jack (18) for a Separate, isolated lower level feed. The impedance is 4.3 K ohms, suitable for driving high impedance (10 K ohms or greater) loads, such as reel to reel or cassette tape recorders or power amplifiers. Tip of jack is in phase with tip of Aux. Line Input jack (15).

Headphones: The headphone output appears on the rear panel and is designated "Headphones." A three-conductor phone jack is used to provide a choice of level for different sensitivity or impedance headphones. Normally, a two-conductor phone plug should be used. If inserted only partially (to the first detent), the available voltage is approximately .18 volts into 1,000 ohms with +4 dBm out of the Line Output. With the same output conditions (+4 dBm), the second position will provide approximately .38 volts. These voltages are selected for normal operation with 600-ohm to 2,000-ohm headphones. Other headphone impedances may be used, but with a variation in the headphone monitor level. The headphone jack is isolated from the line output and with the headphone output shorted the maximum change in line level output is .5 dB. If stereo phones are used, the three-conductor plug may be inserted completely (to second position) and output will appear in both phones.

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GENERAL OPERATION (Cont'd)

The "Tip" connection of the headphone plug will be in phase with Pin 3 of all Input (13) and Output (16) connectors, and with the tip of the Mix Bus jack (12).

TYPICAL SET-UP AND OPERATION

A typical set-up and operation procedure is described for remote amplifier applications, with a single input source (microphone).

1. Connect microphone to Input 1 connector (13a) and set Input switches (14) to MIC. Set Output Switch (17) to LINE and connect phone line either to Output jack (16) or Line Output terminals (20). Insert ac line cord into ac receptacle (25) and plug cord into ac source, unless battery operation is desired. Monitor headphones may be connected to Headphone jack (19).
2. Set Compressor (22) and Gated Memory (21) switches to ON, Meter switch (8) to DB COMP, Lo-Cut switches (2) and VU Range switch (4) as appropriate.
3. Rotate Input Control (1) and Output Control (3) full counterclockwise to 0, and set Response Rate Control (6) to 3, assuming a typical speech input.
4. Turn Power switch (11) ON and wait approximately 1 minute for the circuitry to stabilize. DB Comp. meter (7) should read full scale left (line below zero on lower scale) and Gated Memory indicator (5) should be red.
5. Set Input 1 switch (2a) to TONE OSC. and rotate Input 1 Control (la) clockwise for a DB Compression meter (7) reading of 10 (lower scale). Gated Memory indicator (5) will change to white.
6. Set Meter switch (8) to VU and rotate Output Control (3) for a VU meter (7) reading of 0 VU (upper scale). Tone will be heard in headphones. The signal thus applied to the line may be used for calibration of the equipment receiving the signal.
7. Reduce setting of the Output control (3) for a meter reading of -2 VU, and return Input 1 switch (2a) to IN. Note setting of Output Control (3) for future use. (This reduction in sine-wave output is made to account for the moderate short-term output dynamic range encountered for speech with the suggested Response Rate control setting. A faster setting would eliminate the need for this, but the compression would then become more audible.)
8. Set Meter switch (8) to DB COMP.
9. Now, with the expected average sound level entering the microphone, set the Input 1 control (la) for an average DB Compression meter (7) reading of approximately 10 (lower scale). This is the recommended operating level for the SE30, since the unit will now be able to maintain a substantially constant output level for input reductions of 10 dB and increases of as much as 30 dB.
10. Observe the operation of the Gated Memory indicator (5). It should be white during speech input and change to red during pauses between sentences and words, indicating that the DB compression level is being "remembered" during program lapses.

    If the indicator remains white or "jitters" with no spoken input to the microphone, it is an indication that the acoustic background noise level at the microphone is near or above the Gated Memory threshold. The solution to this is to reduce the setting of the Input 1 Control (1a) until the Gated Memory Indicator (5) is consistently red without speaking into the microphone. The DB Compression level will then be determined by the loudness of the speaker and his proximity to the microphone. This adjustment is very important to insure proper operation in situations having very high background noise levels, such as sporting events or parades.

OPERATING CONSIDERATIONS

LARGE CHANGES IN INPUT LEVEL

If the overall sound and noise levels entering the microphone do not significantly change from those encountered during set-up, as indicated by a DB Compression meter (7) reading of 0 to 20 dB, and if proper operation of the Gated Memory indicator (15) continues, it will not be necessary to adjust any controls further.

If, however, large changes in the signal going into the microphone and/or in background noise do occur, some Input 1 control (1A) readjustment may be advisable, as indicated by the DB Compression meter and Gated Memory indicator. For example, a significant increase in background noise and signal may occur during an exciting portion of a sporting event, such that the Gated Memory no longer "holds" during pauses and the DB Compression reads higher than previously indicated. A gradual reduction of the Input 1 control (1a) setting will not be noticeable to the listener, due to the automatic effect of the compressor, but proper action will be restored.

During a later, more subdued portion of the program, it may become apparent that the DB Compression meter (7) is reading near zero, and the Gated Memory indicator does not always change to white during speaking. A gradual increase of the Input 1 control (la) setting will then allow operation at the proper level. Thus, during operation, after setting the proper output level with the master gain control, it is generally necessary only to monitor compression level on the DB Compression meter (7) and to observe proper action of the Gated Memory indicator (5).

Control setting changes need only be made for long-term, large changes in signal or noise levels. It is not necessary to "ride gain" to maintain a constant line output level as measured by the VU meter, since that is the compressor's function.

RESPONSE RATE ADJUSTMENT

The proper setting of the Response Rate control (6) is determined by subjective factors, according to the type of program material. Generally, a slower setting will result in less audible compression, but a wider short-term output dynamic range, that is, a less consistent output level. Faster settings will result in a more nearly constant output level but will make the effect of compression more audible. The Response Rate control (6) setting may be changed during operation for more satisfactory results if desired. A guideline for an initial setting according to program material is: Speech-3; Popular Music-5; Symphonic Music-7. The output leveling effect may be observed for various settings by observing the VU meter (Meter switch (8) set to VU), while the subjective effect is best ascertained by listening on monitor headphones.

MULTIPLE INPUTS

Up to three microphones or input sources may be used simultaneously with the SE30. In this case, the overall "mixed" signal and background noise levels determine DB Compression and Gated Memory action. For the best results when several inputs are to be used one at a time, only the used Input controls should be turned up. For a

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conference or conversation situation, with several microphones "live" but only one speaker talking at a time, each Input control should be set so that each speaker results in approximately the same amount of compression, observing that the overall level is correct for proper Gated Memory action.

SIMULTANEOUS MIXED INPUTS

With simultaneous (mixed) inputs, the compressor will automatically maintain a constant overall output level, so that the balance among the sources may be adjusted easily by monitoring with headphones. Simply observe that the DB Compression meter (7) is reading in the normal operating range and that Gated Memory action is proper.

AUTOMATIC "DUCKING"

The balance between two sources may be adjusted to produce automatic "ducking," for example, for an announcer's voice over musical programming. In this case, set the Input control for the music source for a low amount of compression, such as 5 dB. Then set the announcer's microphone Input control for 15 dB compression when he is speaking. When the announcer talks during music, the SE30's gain will be reduced by 10 dB, "ducking" the music level below the voice level by that amount. When he stops speaking, the music will return to full output.

ADDITIONAL INPUTS

To accommodate more inputs than three, a Mix Bus jack (12) is provided which may be connected to a similar jack on another SE30 or M67 Mixer. When a Mixer with a mix bus is used in conjunction with the SE30, a compressed output may be obtained from the SE30, and an uncompressed output of the same mixed material will be available from the Mixer.

Inputs may also be added by connecting the line level or microphone level output of another mixer to one of the SE30 inputs.

EXCESSIVE AMBIENT NOISE

Under certain conditions, such as high noise levels, it may be impossible to adjust the Input control (1) so that the Gated Memory can consistently discriminate between background and program. In such a case, the Gated Memory switch (21) should be set to Disable and the amount of compression should be reduced to minimize the audible effects of "pumping."

In extremely severe cases, compression should not be used at all, since the increase in background noise during pauses will be quite unpleasant. The SE30 may then be used as a high-quality linear mixer by setting the Comp. switch (22) to DISABLE and setting the Meter switch (8) to VU to monitor output level. As with any mixer it will then be desirable to set the Input control (1) as high as possible without clipping, and set the output VU level with the Output control (7), to provide best signal-to-noise ratio.

FADING TECHNIQUE WITH COMPRESSION

Fading of inputs with a compressor must be accomplished somewhat differently than with a linear mixer. Since a slow reduction of input level within the compression region will be compensated for by an increase in gain, no audible fading will occur. Consequently, fading an input down should be done rapidly, at least to the point at which the Gated Memory changes to the "hold" state.

For overall program fades, it is desirable to use the Output control (3), since it does not affect the amount of compression but only the output level.

SPECIAL APPLICATION CONSIDERATIONS

SOUND REINFORCEMENT

The SE30 may be used in sound reinforcement installations, but some care must be exercised in such applications. Since this compressor can only reduce its gain when a signal exceeds its compression threshold, maximum gain occurs with low signal levels, and the sound-reinforcement system's gain must be adjusted to be stable (no ringing or howling) with no compressor gain reduction. This may be accomplished by adjusting system gain with the SE30's Comp. switch (22) set to DISABLE. With proper system adjustment, the SE30 may be used to level the sound of a "wavering" speaker, or to prevent power amplifier overdrive with extremely strong signals.

STEREO OPERATION

Two SE30's may be synchronized to operate together for stereo applications by interconnecting their Stereo Parallel jacks (23) and performing the adjustment procedure outlined in the Service Section of the manual.

One unit will compress the left channel signal and the other will compress the right channel signal, but both will respond equally to the sum (left and right) signal to minimize apparent stereo image shift.

Because of the necessity of providing the two units with a properly balanced stereo signal, it is recommended that stereo applications be restricted to single inputs for each channel, with mixing and balancing being accomplished in another mixer prior to the SE30's.

SINGLE INPUT PROGRAM COMPRESSOR

When the SE30 is used as a single line input, permanently installed program compressor, it is possible to improve the signal-to-noise ratio by disabling two of the inputs and thus reducing the electrical noise of the mixing system. This modification is outlined in the Service Section.

RESPONSE RATE KNOB REMOVAL

To prevent inadvertent misadjustment of the Response Rate control (6) the knob may be removed and the hole filled with the plastic plug included with the SE30. This procedure is described in the Service Section.

THEORY OF OPERATION

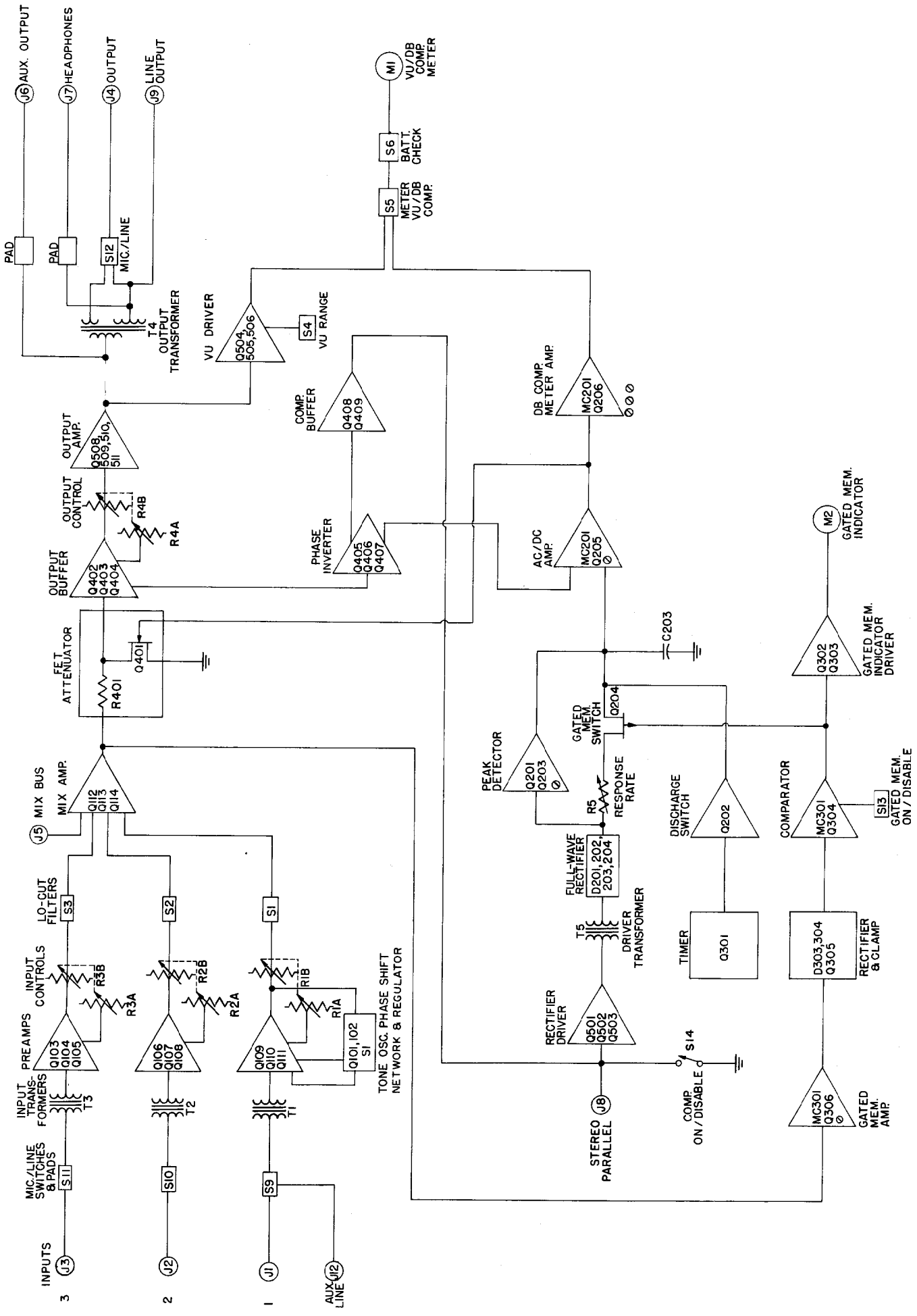
(See Figure 3)

Operation of the SE30 Gated Compressor/Mixer may be explained by referring to the Functional Block Diagram, Figure 3. The active devices in each stage, as well as other important components, are identified by their reference numbers, for ease of location on the Schematic Diagram (Figure 4) and the Chassis Parts and Printed Circuit Board Parts Placement diagrams (Figures 5 and 6). The first digit of three-digit references indicates the printed circuit board upon which the part is located.

INPUT-OUTPUT SIGNAL PATH

Balanced input signals entering through J1, J2, and J3 are amplified by the three transformer-coupled, variable-gain input preamplifiers. Low-level signals are applied directly to the transformer primaries, and high-level (line) signals are attenuated by balanced -48 dB resistive pads. The Input controls are ganged, dual-section potentiometers arranged such that a reduced control setting increases the negative feedback around the stage, thus reducing gain and increasing the input clipping level. Since the preamplifier stage gain cannot be reduced below 6 dB from its

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FUNCTIONAL BLOCK DIAGRAM - FIGURE 3

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maximum of 30 dB, the second potentiometer section acts as a conventional voltage divider output attenuator for low control settings. The input transformers increase the signal voltage by 21 dB.

Input 1 has a second line input, phone jack J12, which operates only in the LINE position of S9. Additionally, this stage (Q109, 110, 111) may be converted to a level-stabilized, low distortion, 1 kHz Wien bridge tone oscillator.

A feedback-type, virtual-ground, low gain (3 dB) mixing amplifier (Q112, 113, 114) assures nearly zero interaction among input level control settings. Each input to the mixing stage has a resistance-capacitance low frequency rolloff filter providing a 6 dB per octave slope, 3 dB down at about 150 Hz. The mix bus jack (J5) contains a switch so that when a phono plug is inserted, the mix bus impedance is increased from near zero to 3.9 K ohms, for compatibility with conventional mixing systems.

Automatic gain reduction is accomplished by the voltage variable FET attenuator, R401 and Q401. With signal levels below compression threshold, or when compression is disabled, the FET gate-to-source voltage is sufficiently negative to prevent FET conduction. Increased signal levels, however, are sensed and the dc control voltage is increased until the FET drain-to-source resistance is reduced enough to maintain a nearly constant signal voltage across Q401.

This compressed signal is applied to the Output Buffer stage (Q402, 403, 404), which has variable feedback similar to the input preamplifiers, via the dual-section Output potentiometer. This assures optimum output-stage clipping and noise characteristics, either with a constant, compressed signal to the Output Buffer stage, or with compression disabled. The output amplifier (Q508, 509, 510, 511) is a class -AB, fixed gain line driver stage transformer-coupled to the output load. A tertiary winding on T4 provides a microphone level balanced output, and headphone and unbalanced auxiliary outputs are also derived from the output amplifier stage through appropriate pads.

A three-transistor circuit (Q504, 505, 506) provides full-wave rectification and power amplification to drive the meter (Ml) with proper damping characteristics for the VU output level function. The gain of the VU driver circuit is changed by S4 for the two VU ranges.

D.C. CONTROL GENERATION

The signal voltage appearing across the attenuator FET (Q401) travels through a portion of the Output Buffer (Q402, 403, 404) and a unity-gain Phase Inverter (Q405, 406, 407) to the Compression Buffer (Q408, 409), a 30-dB gain stage. The output of this stage may be shorted to ground by switch S14 to disable compression, or it may be connected in parallel with a similar stage in a second SE30 via its Stereo Parallel jack (J8) so that stereo difference signals will be canceled out and thus not compressed, and the stereo sum will be the controlling signal.

The signal at this point enters a small class-B power amplifier, the Rectifier Driver (Q501, 502, 503). A full-wave diode bridge rectifier (D201, 202, 203, 204) is driven from this amplifier through Driver Transformer T5, thus generating full-wave rectified, unfiltered pulses whose amplitude is proportional to the absolute value of the signal across the attenuator FET (Q401).

The Response Rate control (R5) and capacitor C203 form a resistance-capacitance integration or averaging network with an adjustable time constant so that a smooth dc voltage is generated, equal to the average value of the full-wave rectified pulses. This dc voltage is amplified (X2) by the AC/DC Amplifier (MC201, Q105) and applied to the gate of the attenuator FET (Q401). The AC/DC Amplifier has low input bias current to minimize its discharging effect upon the integrating capacitor (C203). An adjustment associated with this amplifier applies an offset voltage to the FET, setting the compression threshold.

The integrating R-C network assures an equal charge and discharge time constant to provide a true average-responding compression system. However, such a system will exhibit a large overshoot in output when the input level is suddenly increased. A Peak Detector (Q201, 203) is therefore provided which monitors the instantaneous amplitude of the rectified pulses. If a pulse exceeds the average value by a preset amount, this detector will very rapidly charge C203 enough to maintain the peak signal amplitude within a reasonable upper limit. The Peak Detector threshold is set such that normal program material at a constant level will not activate the circuit, but it will reduce compressor gain rapidly for significant increases in input level.

The AC/DC *Amplifier also has an input terminal for signal voltage, fed via the Output Buffer and Phase Inverter. This serves to apply one-half of the signal voltage across FET Q401 to its gate, along with the dc control voltage, thus reducing distortion due to the FET's nonlinear resistance characteristic.

The dc control voltage applied to the gate of Q401 is used to drive meter Ml through the dB Compression Meter Amplifier (MC201, Q206). This amplifier has gain, offset, and gain reduction adjustments to allow calibration of the meter reading to correspond at three points to actual levels of compression, despite the nonlinear relationship between compression and dc control voltage.

GATED MEMORY

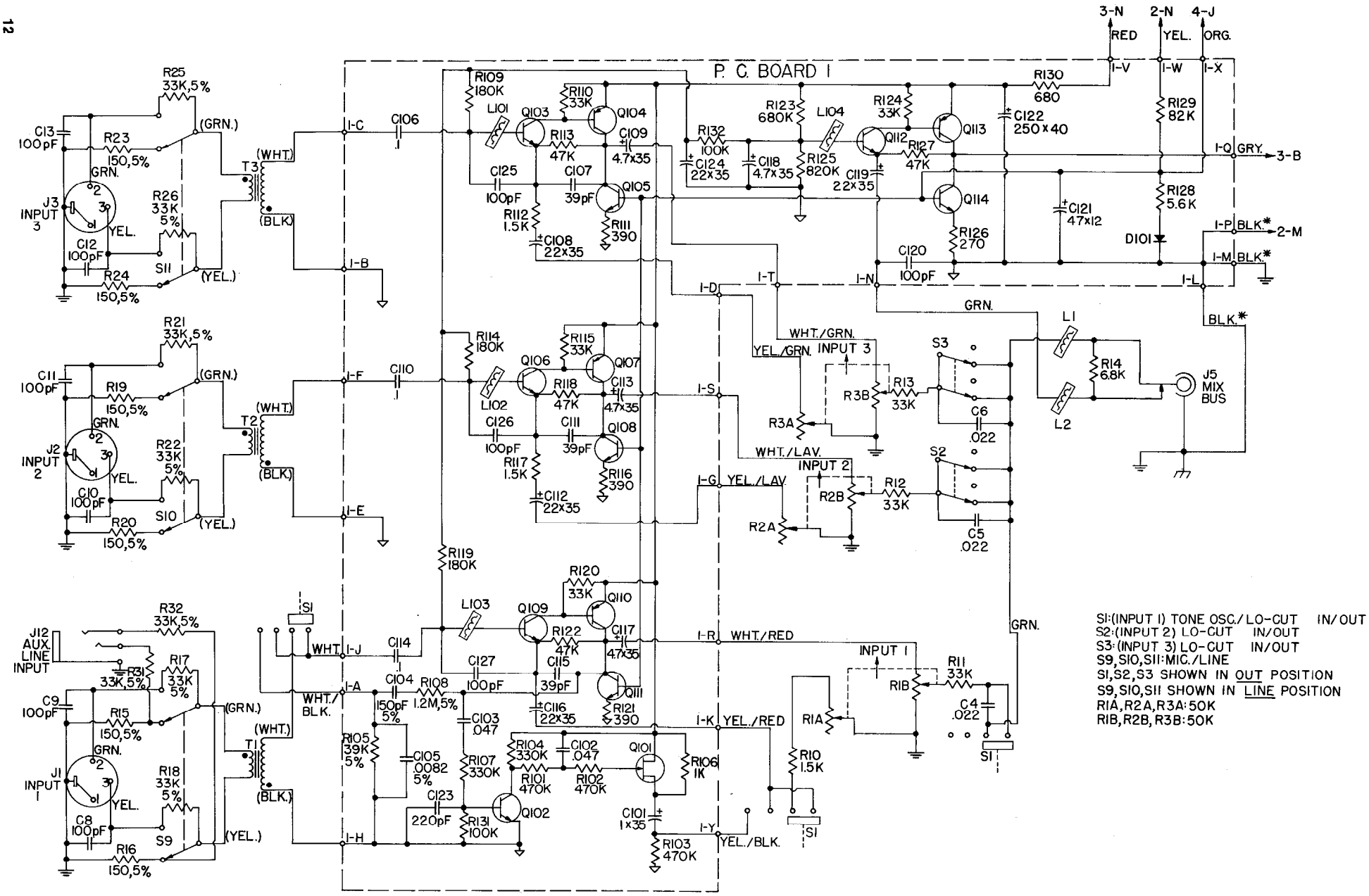
The Gated Memory Switch FET Q204 allows the integrating capacitor (C203) to be charged and discharged as described under normal signal conditions. However, when the input signal drops below compression threshold, Q204 becomes an open circuit, preventing discharge of C203 and maintaining the amount of gain reduction just prior to the opening of the FET switch.

The Gated Memory Amplifier (MC301, Q306) receives the uncompressed signal, proportional to input level, from the Mixing Amplifier. A fast-acting voltage doubler rectifier (D303, 304) converts this signal to a dc level which is applied to the Comparator (MC301, Q304) after being clamped by Q305 to assure fast recovery. The Comparator output is a two-level dc signal applied to the gate of FET Q204, and to the Gated Memory Indicator Driver (Q302, 303) to indicate the state of the Gated Memory circuit. The gain of the Gated Memory Amplifier is adjustable to allow setting the comparison threshold, and the switching FET may be prevented from opening by switches S13 or S14.

When power is first applied to the SE30, approximately 30 seconds is required for the dc power supply voltages to become properly established. During this interval, Timer Q301 and Discharge Switch Q202 partially discharge integrating capacitor C203, preventing a possible "latch-up" condition due to a turn-on transient combined with Gated Memory Switch Q204 being open.

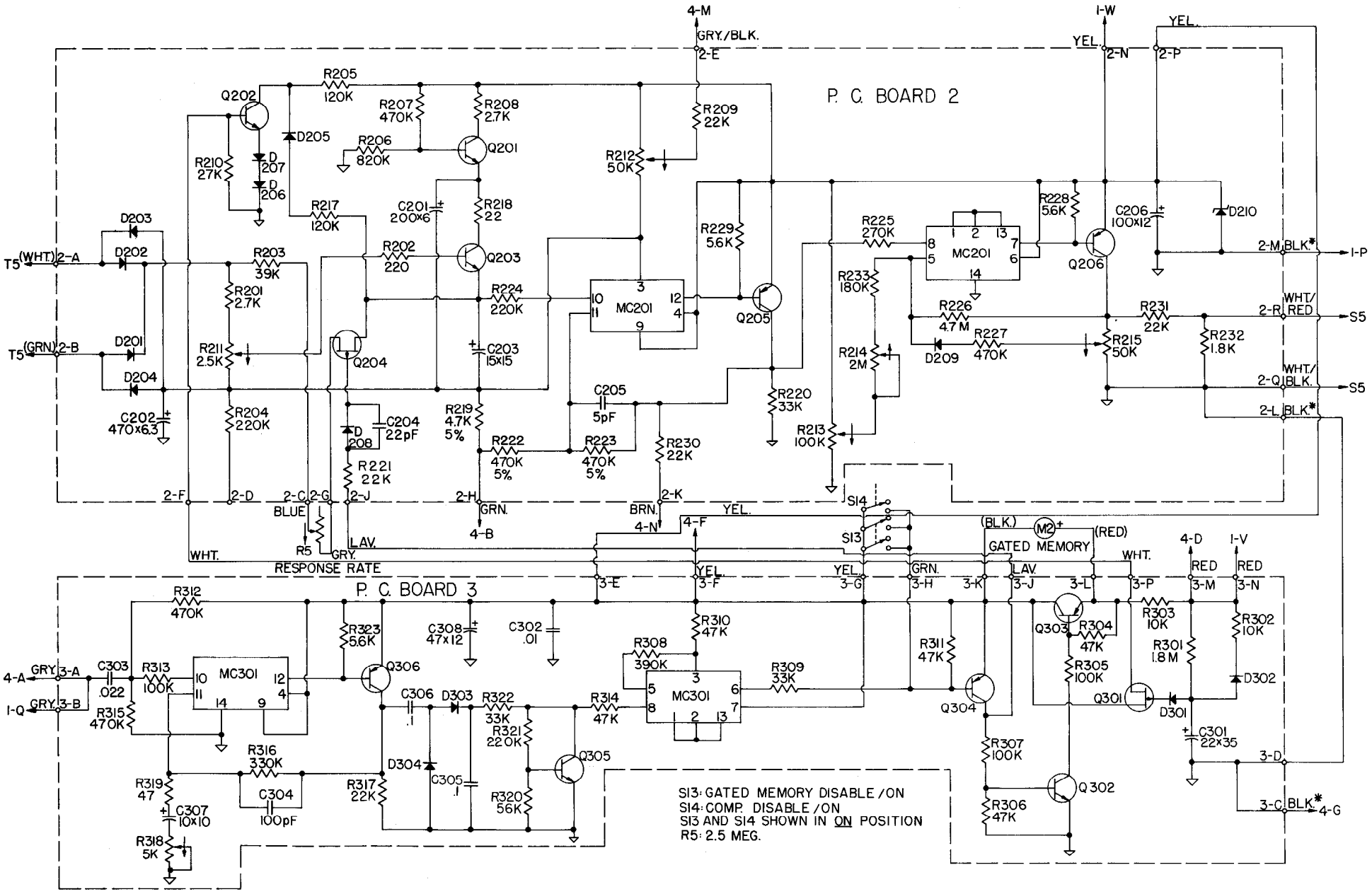
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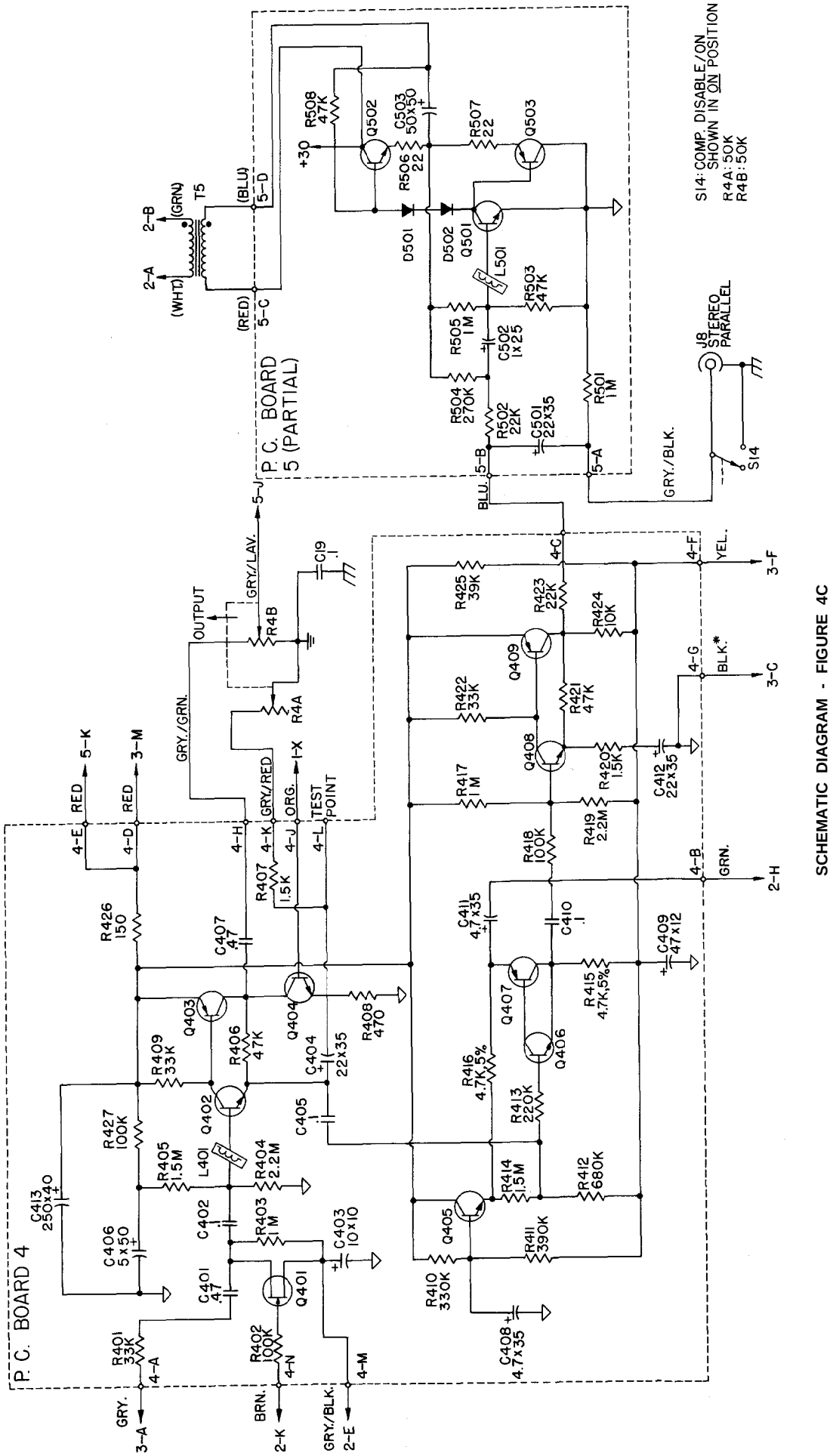


SCHEMATIC DIAGRAM - FIGURE 4A

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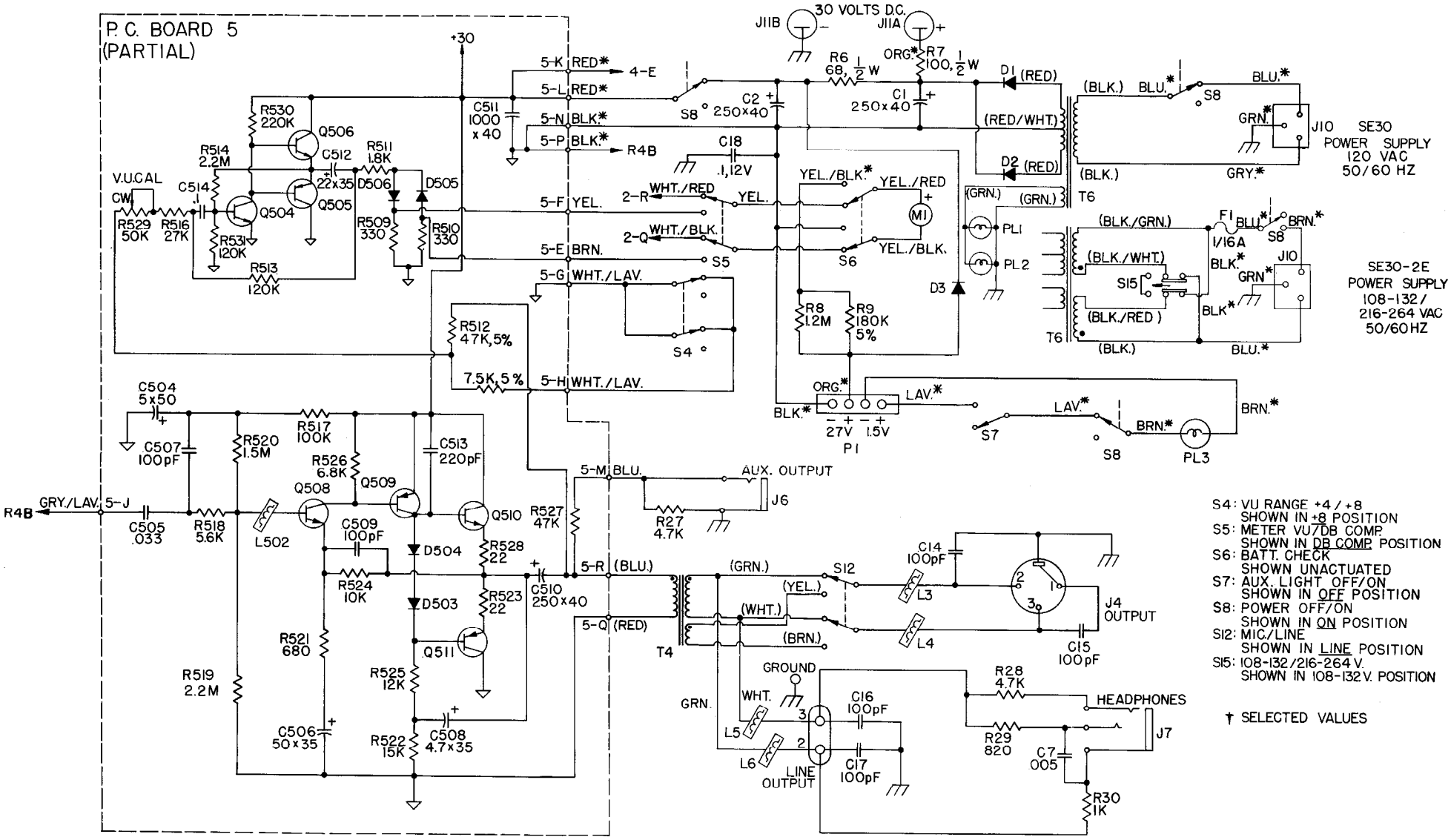
SCHEMATIC DIAGRAM - FIGURE 4B



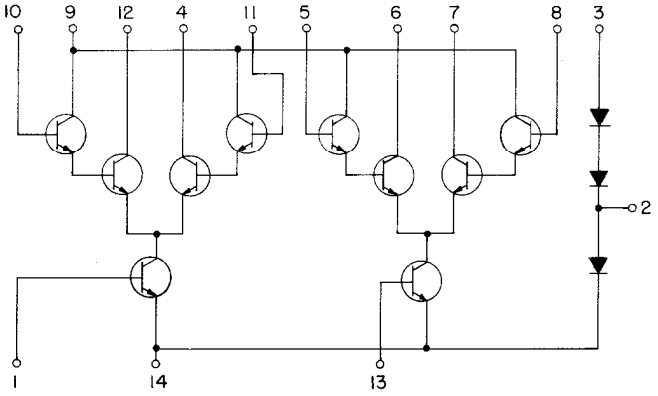
SCHEMATIC DIAGRAM - FIGURE 4C

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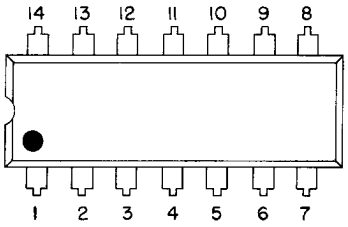
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SCHEMATIC DIAGRAM - FIGURE 4D



SCHEMATIC DIAGRAM



PIN CONNECTIONS-
TOP VIEW

INTEGRATED CIRCUIT MC201 AND MC301
FIGURE 4E

REPLACEMENT PARTS FOR SE30-TABLE 1

REPLACEMENT PARTS FOR SE30 AND SE30-2E

ITEM	SHURE PART NO.	SHURE KIT NO.**	QTY. IN KIT	DESCRIPTION	COMMERCIAL ALTERNATE
—	90A1980	—	—	BATTERY ASS'Y (LESS BATTERIES)	NONE
K5	90A1785	—	—	KNOB (RESPONSE RATE)	NONE
K1,2,3	90A1786	—	—	KNOB (BLACK INSERT)	NONE
K4	90B1786	—	—	KNOB (RED INSERT)	NONE
—	65A1035B,C	—	—	P.C. BOARD SUPPORTS	NONE
—	31A1132A	—	—	THUMB SCREW	NONE
—	56A196	—	—	FEMALE WIRE TERMINALS	NONE
—	95A631	—	—	LINE CORD ASS'Y (SE30 ONLY)	BELDEN 17250, SWITCHCRAFT P2392
—	90A1888	—	—	LINE CORD ASS'Y (SE30-2E ONLY)	NONE
—	95A622	—	—	BUMPER (FOOT)	NONE
—	95A570	—	—	LAMPHOLDER, BAYONET, INSULATED	NONE
—	95A569	—	—	LAMPHOLDER, BAYONET, GROUNDED	NONE
—	95A572	—	—	LAMPHOLDER, MINIATURE SCREW	NONE
—	53A1182	—	—	TOP COVER	NONE
—	53A1185	—	—	BOTTOM COVER	NONE
—	90A1799	—	—	END PLATE	NONE

NOTE: THE COMMECIAL ALTERNATES SHOWN ABOVE ARE NOT NECESSARILY EQUIVALENTS, BUT MAY BE USED IN THE EVENT THAT DIRECT FACTORY REPLACEMENTS ARE NOT IMMEDIATELY AVAILABLE. TO MAINTAIN SPECIFICATIONS AND RELIABILITY, SHURE FACTORY REPLACEMENT PARTS SHOULD BE USED.

* FOR REPLACEMENT, PURCHASE Q502-Q503 AND Q510-Q511 AS MATCHED PAIRS TIS92M-TIS93M.

** ORDER REPLACEMENT PARTS UNDER THIS NUMBER WHEN APPLICABLE. IF NO NUMBER IS SHOWN IN THIS COLUMN, ORDER UNDER SHURE PART NUMBER.

*** REPLACEMENT OF THESE PARTS NECESSITATES RECALIBRATION OF UNIT. SEE SERVICE SECTION.

(TABLE 1 cont'd on next page)

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TABLE 1 (Cont'd)

REPLACEMENT PARTS FOR SE30 AND SE30-2E					
ITEM	SHURE PART NO.	SHURE KIT NO.**	QTY. IN KIT	DESCRIPTION	COMMERCIAL ALTERNATE
C101	86E636	—	—	CAPACITOR, TANTALUM WET SLUG, 15 X 15	NONE
D1, 2, 3	86A404	RKC21	4	DIODE, SILICON, 500 mA, 200 PIV	1N4002
D101,205,208,209,301,302	86A415	—	—	DIODE, SILICON, LOW LEAKAGE	1N4148
D201,202,203,204,303,304	86A405	RKC19	4	DIODE, GERMANIUM	1N48 OR 1N60
D206,207,501,502,503,504,505,506	86A403	RKC79	1	DIODE, SILICON, 500mA, 100 PIV	1N4001
D210	86A414	—	—	DIODE, ZENER, 10V ± 10%, 400mW	1N5240A
F1	60A297	—		FUSE, SLOW BLOW, 1/16A, 250V, PIGTAIL (SE30-2E ONLY)	LITTELFUSE NO. 315.062
J1, 2, 3	95A482	RKC83	2	CONNECTOR, INPUT	SWITCHCRAFT NO. C3F
J4	95A198	RK122P	1	CONNECTOR, OUTPUT	SWITCHCRAFT NO. C3M
J5	95A634	—	—	PHONO JACK WITH SWITCH (MIX BUS)	SWITCHCRAFT NO. 3512
J6	95B432	—	—	PHONE JACK, SINGLE CKT, (AUX. OUT)	SWITCHCRAFT NO. N111
J7	95E432	—	—	PHONE JACK, 2 CKT, WITH SWITCH (HEADPHONES)	SWITCHCRAFT NO. N113B
J8	95A677	—	—	PHONO JACK (STEREO PARALLEL)	SWITCHCRAFT NO. 3501FP
J9	90A1775	—	—	DUAL BINDING POST (LINE OUTPUT)	NONE
J10	95A568	—	—	A.C. RECEPTACLE	SWITCHCRAFT NO. EAC-301
J11A,J11B	95A226,95B226	—	—	D.C. RECEPTACLE, BLACK AND RED	NONE
J12	95D432	—	—	PHONE JACK, 2 CKT (AUX. LINE IN)	SWITCHCRAFT NO. N112B
L1,2,3,4,5,6, 101,102,103,104, 401,501,502	80A250	—	—	FERRITE BEAD	STACKPOLE NO. 57-0181
M1	95A559	—	—	METER, 200 μA, 1800 OHMS	NONE
M2	95A564	—	—	INDICATOR, 1 mA, 800 OHMS	NONE
MC201***,301	86A801	—	—	INTEGRATED CIRCUIT	RCA CA3050 OR CA3051
P1	95A566	—	—	BATTERY CONNECTOR	NONE
PL1, 2	95A466	RKC7	4	LAMP, 6.3 VOLT	NO. 47
PL3	80A254	—	—	LAMP, 2.25 VOLT	NO. 223
Q101***	86A329	—	—	FET, JUNCTION, N-CHANNEL	2N5458
Q102,105,108,111,114,201,202, 302, 305,404,405 406,408,504,506	86A349	RKC9	4	TRANSISTOR, SILICON, NPN SELECTED HIGH GAIN, LOW NOISE	MOTOROLA MPS6521 OR TEXAS INSTRUMENTS 2N3711
Q103,106,109,112,402	86A350	RKC89	4	TRANSISTOR, SILICON, NPN, SELECTED HIGH GAIN, LOW NOISE	2N5210
Q104,107,110,113,205,206,304, 306,403,407,409,509,505	86A348	—	—	TRANSISTOR, SILICON, PNP, SELECTED HIGH GAIN, LOW NOISE	2N5087
Q203,502,510	86A334	RKC65	1	TRANSISTOR, SILICON, NPN	TEXAS INSTRUMENTS TIS 92*
Q204	86B351	—	—	FET, JUNCTION, P-CHANNEL	2N5460 SELECTED
Q301	86A351	—	—	FET, JUNCTION, P-CHANNEL	2N5460
Q303,503,511	86A335	RKC66	1	TRANSISTOR, SILICON, PNP	TEXAS INSTRUMENTS TIS 93*
Q401***	86B329	—	—	FET, JUNCTION, N-CHANNEL	2N5459 SELECTED
Q501,508	86A336	RKC12	1	TRANSISTOR, SILICON, NPN	TEXAS INSTRUMENTS TIS 97
R1,2,3,4	46A031	—	—	DUAL POTENTIOMETER, 50K/50K	NONE
R5	46A032	—	—	POTENTIOMETER, 2.5 MEG.	NONE
R211***	46A033	—	—	TRIMMER POT., 2.5K	CTS TYPE X-201
R213***	46D033	—	—	TRIMMER POT., 100K	CTS TYPE X-201
R214***	46E033	—	—	TRIMMER POT., 2 MEG.	CTS TYPE X-201
R212,215***	46C033	—	—	TRIMMER POT., 50K	CTS TYPE X-201
R318***	46B033	—	—	TRIMMER POT., 5K	CTS TYPE X-201
S1	55A101	—	—	SLIDE SWITCH, TPTT, SHORTING	SWITCHCRAFT NO. 49329LS
S2,3,4	55B54	—	—	SLIDE SWITCH, DPDT, SLOTTED	SWITCHCRAFT NO. 46206LR
S5	55B119	—	—	SLIDE SWITCH, DPDT	SWITCHCRAFT NO. 46206LR
S6	55A89	—	—	SLIDE SWITCH, DPDT, SPRING RETURN	SWITCHCRAFT NO. 46206MR
S7	55A100	—	—	SLIDE SWITCH, SPST N.O.	SWITCHCRAFT NO. 46201MR
S8	55A90	—	—	SLIDE SWITCH, TPDT, 3 AMP.	STACKPOLE NO. SS-34
S9,10,11,12,13,14	55C119			SLIDE SWITCH DPDT	SWITCHCRAFT NO. 46206LR
S15	55A66	—	—	SLIDE SWITCH,DPDT (SE30-2E ONLY)	NONE
T1,2,3	90F2150	—	—	TRANSFORMER AND SHIELD ASSEMBLY	NONE
T4	51A235	—	—	TRANSFORMER, OUTPUT	NONE
T5	51B229	—	—	TRANSFORMER, DRIVER	NONE
T6	51A253	RKC15	1	TRANSFORMER, POWER (SE30 ONLY)	NONE
	51A259	—		TRANSFORMER, POWER (SE30-2E ONLY)	NONE
PCB1	90A1779	—	—	P.C. BOARD ASS'Y NO. 1	NONE
PCB2***	90A1999	—	—	P.C. BOARD ASS'Y NO. 2	NONE
PCB3***	90A1781	—	—	P.C. BOARD ASS'Y NO. 3	NONE
PCB4***	90A1782	—	—	P.C. BOARD ASS'Y NO. 4	NONE
PCB5***	90A1783	—	—	P.C. BOARD ASS'Y NO. 5	NONE

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*** REPLACEMENT OF THESE PARTS NECESSITATES RECALIBRATION OF UNIT. SEE SERVICE SECTION.

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TEST VOLTAGES, P. C. BOARD TERMINALS
TABLE 2A

TERMINAL	D.C. VOLTAGE	SIGNAL VOLTAGE	
	V.D.C.	DBV	MV A.C.
BOARD 1			
1A	0	-67	0.45
1B	G	G	G
1C	0	---	0
1D	0	---	0
1E	G	G	G
1F	0	---	0
1G	0	---	0
1H	G	G	G
1J	0	-43	7.1
1K	0	-43	7.1
1L	G	G	G
1M	G	G	G
		UNDER	UNDER
1N	0	-70	0.3
1P	G	G	G
1Q	12.3	-30	32
1R	0	-26	50
1S	0	---	0
1T	0	---	0
1V	29.5	---	0
1W	10	---	0
1X	1.0	---	0
1Y	0	---	0
BOARD 2			
2A	2.4	-4	630
2B	2.4	-4	630
2C	2.7	-9	350
2D	2.0	0	0
2E	5.0	---	0
2F	0	---	0
2G	2.7	---	0
2H	2.05	-46	5
2J	0	---	0
2K	3.25	-46	5
2L	G	G	G
2M	G	G	G
2N	10	---	0
2P	10	---	0
2Q	G	G	G
2R	.12	-50	3.2
BOARD 3			
3A	12.3	-30	32
3B	12.3	-30	32
3C	G	G	G

TERMINAL	D.C. VOLTAGE	SIGNAL VOLTAGE	
	V.D.C.	DBV	MV A.C.
BOARD 3 (CONTINUED)			
3D	G	G	G
3E	10	---	0
3F	10	---	0
3G	10	---	0
3H	9.9	---	0
3J	0	---	0
3K	10	---	0
3L	11.4	---	0
3M	29.5	---	0
3N	29.5	---	0
3P	0	---	0
BOARD 4			
4A	12.3	-30	32
4B	2.05	-46	5
4C	19.5	-18	125
4D	29.5	---	0
4E	29.5	---	0
4F	10	---	0
4G	G	G	G
4H	0	-19.5	106
4J	1.0	---	0
4K	0	-43.5	7.5
4L	0	-40	10
4M	5.0	---	0
4N	3.25	-46	5
BOARD 5			
5A	0	-18	125
5B	19.5	-18	125
5C	29.5	---	0
5D	29.5	+ 1.3	1.16V
5E	14.2	- 3	710
5F	14.4	- 3	710
5G	14.6	+ 2.8	1.38V
5H	14.6	---	0
5J	0	-21	88
5K	29.5	---	0
5L	29.5	---	0
5M	0	-18	125
5N	G	G	G
5P	G	G	G
5Q	G	G	G
5R	0	+ 3.3	1.47V

G = GROUND

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TEST VOLTAGES, TRANSISTORS - TABLE 2B

DEVICE	EMITTER OR SOURCE			BASE OR GATE			COLLECTOR OR DRAIN		
	D.C. VOLTAGE	SIGNAL VOLTAGE		D.C. VOLTAGE	SIGNAL VOLTAGE		D.C. VOLTAGE	SIGNAL VOLTAGE	
	V.D.C.	DBV	MV	V.D.C.	DBV	MV	V.D.C.	DBV	MV
BOARD 1									
Q101	26	---	0	26	---	0	26	---	0
Q102	0	---	0	0	-40	10	26	---	0
Q103	13	---	0	13.3	---	0	25.3	---	0
Q104	26	---	0	25.3	---	0	12	---	0
Q105	0.4	---	0	1.0	---	0	12	---	0
Q106	13	---	0	13.3	---	0	25.3	---	0
Q107	26	---	0	25.3	---	0	12	---	0
Q108	0.4	---	0	1.0	---	0	12	---	0
Q109	13	-43	7.1	13.3	-43	7.1	25.3	UNDER -80	UNDER 0.1
Q110	26	---	0	25.3	-80	0.1	12	-26	50
Q111	0.4	---	0	1.0	---	0	12	-26	50
Q112	13	UNDER -70	UNDER 0.3	13.3	---	0	25.3	UNDER -80	UNDER 0.1
Q113	26	---	0	25.3	UNDER -80	UNDER 0.1	12	-30	32
Q114	0.4	---	0	1.0	---	0	12	-30	32
BOARD 2									
Q201	6.0	---	0	6.2	---	0	10	---	0
Q202	0 TO 1	---	0	0	---	0	10	---	0
Q203	2.7	---	0	2.1	-22	79	6.0	---	0
Q204	2.7	---	0	*	*	*	2.7	---	0
Q205	10	---	0	9.4	---	0	3.25	-46	5
Q206	10	---	0	9.4	---	0	1.7	-27	44
BOARD 3									
Q301	0	---	0	26	---	0	10	---	0
Q302	0	---	0	0	---	0	11.4	---	0
Q303	11.4	---	0	11.4	---	0	10	---	0
Q304	10	---	0	10	---	0	0	---	0
Q305	0	---	0	0.55	---	0	2.7	---	0
Q306	10	---	0	9.5	-20	100	4.5	+ 7	2.5V
BOARD 4									
Q401	5.0	---	0	3.25	-46	5	5.0	-40	10
Q402	15	-40	10	*	-40	10	28.4	UNDER -70	UNDER 0.3
Q403	29	---	0	28.4	UNDER -70	UNDER 0.3	14	-19.5	106
Q404	0.4	---	0	1.0	---	0	14	-19.5	106
Q405	19.3	---	0	19.6	---	0	29	---	0
Q406	11.9	-40	10	12.5	-40	10	*	*	*
Q407	16.8	-46	5	*	*	*	11.9	-40	10
Q408	21	-41.5	8.4	*	-41.5	8.4	28.4	UNDER -50	UNDER 3
Q409	29	---	0	28.4	UNDER -50	UNDER 3	20	-12	250
BOARD 5									
Q501	0	---	0	0.6	UNDER -60	UNDER 1	13.2	+ 1.9	1.25V
Q502	13.7	+ 1.3	1.16V	14.2	+ 1.9	1.25V	29.5	---	0
Q503	13.7	+ 1.3	1.16V	13.2	+ 1.9	1.25V	0	---	0
Q504	0	UNDER -90	0	0.56	-43.5	6.7	11.34	+11.0	3.5V
Q505	11.4	+ 9.1	2.85V	11.35	+10.8	3.5V	0	UNDER -90	0
Q506	11.4	+ 9.1	2.85V	11.35	+11.0	3.5V	28.1	UNDER -60	UNDER 1.0
Q508	15.6	-21	88	*	*	*	28.9	-20	100
Q509	29.5	---	0	28.9	-20	100	15.1	+ 4.2	1.62V
Q510	14.6	+ 3.3	1.47V	15.1	+ 4.2	1.62V	29.5	---	0
Q511	14.6	+ 3.3	1.47V	14.1	+ 4.2	1.62V	0	---	0

* DO NOT MEASURE.

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PIN No.	MC201			MC301		
	D.C. VOLTAGE V.D.C.	SIGNAL VOLTAGE DBV	MV	D.C. VOLTAGE V.D.C.	SIGNAL VOLTAGE DBV	MV
1	0.67	---	0	0.67	---	0
2	0.67	---	0	0.67	---	0
3	2.0	---	0	2.0	---	0
4	10	---	0	10	---	0
5	3.25	-46	0	1.95	---	0
6	10	---	0	9.9	---	0
7	9.4	---	0	10	---	0
8	3.25	-46	5	2.65	---	0
9	10	---	0	10	---	0
10	2.7	---	0	4.35	-30	32
11	*	*	*	4.35	-30	32
12	9.4	---	0	9.5	-20	100
13	0.67	---	0	0.67	---	0
14	0	---	0	0	---	0

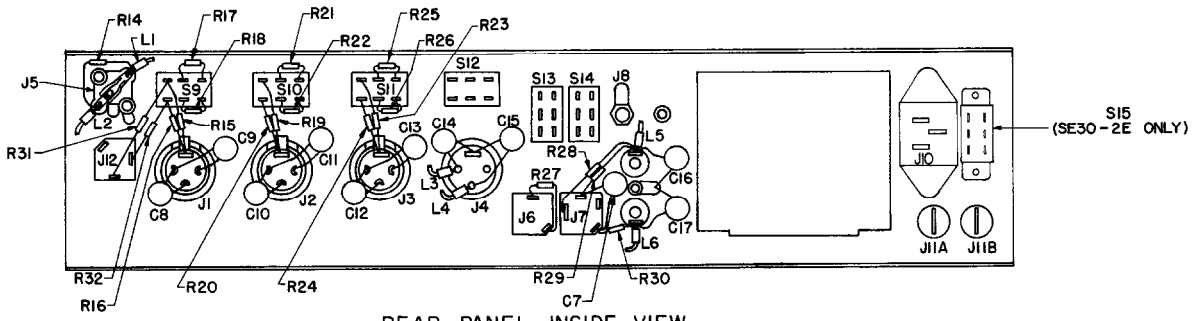
* DO NOT MEASURE.

TEST VOLTAGES, INTEGRATED CIRCUITS
TABLE 1C

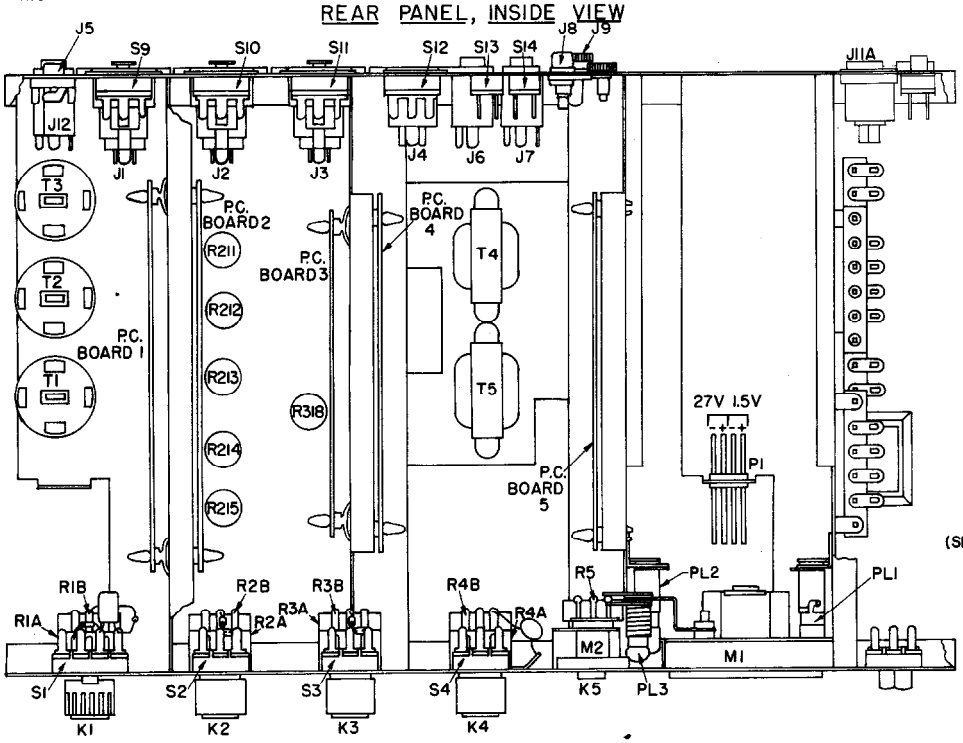
NOTES TO SCHEMATIC DIAGRAM AND TEST VOLTAGES (Figure 4, Table 2)

1. All capacitors shown in microfarads and 50 volts or more unless otherwise indicated. Electrolytic capacitors shown in mF X volts. pF = picofarad.
2. All fixed resistors ±10%, ¼ watt unless otherwise shown. K = 1,000 M = 1,OOO,OOO
3. Components and wiring enclosed within dashed lines are parts of printed circuit board assemblies.
4. The following symbols denote:
   - Direct chassis ground
   - Wired circuit ground
   - Printed circuit board ground
5. Arrows on potentiometers denote clockwise rotation.
6. Wire color designations with asterisks refer to stranded No. 20 AWG wiring, and those in parentheses refer to integral component leads. All other wires are stranded No. 24 AWG.
7. P. C. board terminals and wire destinations are shown as board number-pin letter.
8. First digit of three-digit component references (for example, R101) denotes number of printed circuit board upon which part is mounted. One and two-digit component references denote chassis-mounted parts.
9. AC and DC voltages given in Tables 2A, 2B and 2C are measured with a 2.2 megohm or greater AC voltmeter and a 10 megohm or greater DC voltmeter. All switches set as shown in schematic diagram. AC line = 120 V, 60 Hz. Input 3 control set to 5, Input 1 and 2 controls set to zero, and Response Rate control set to 3. Input signal 1 kHz applied to Input 3, level adjusted for 10 dB compression (signal at Pin A, board 3 equal to -30 dBV or 32 mV). Output control adjusted for + 4 dBm (+ 1.8 dBV or 1.23 V) line output into a 600-ohm load.

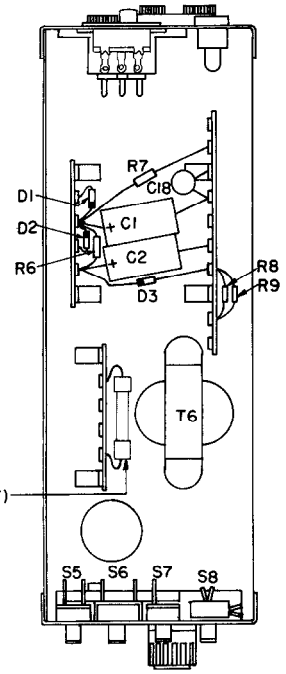
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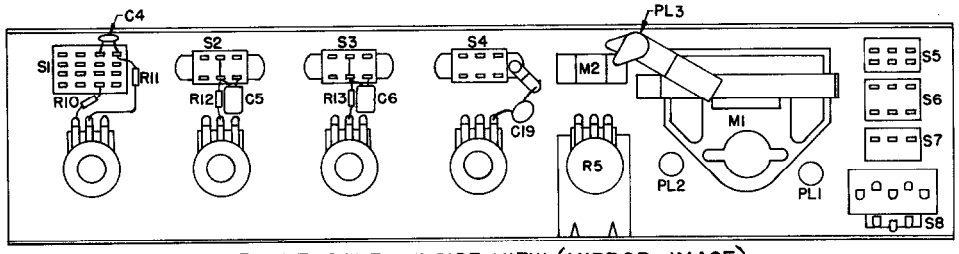
REAR PANEL, INSIDE VIEW



TOP VIEW



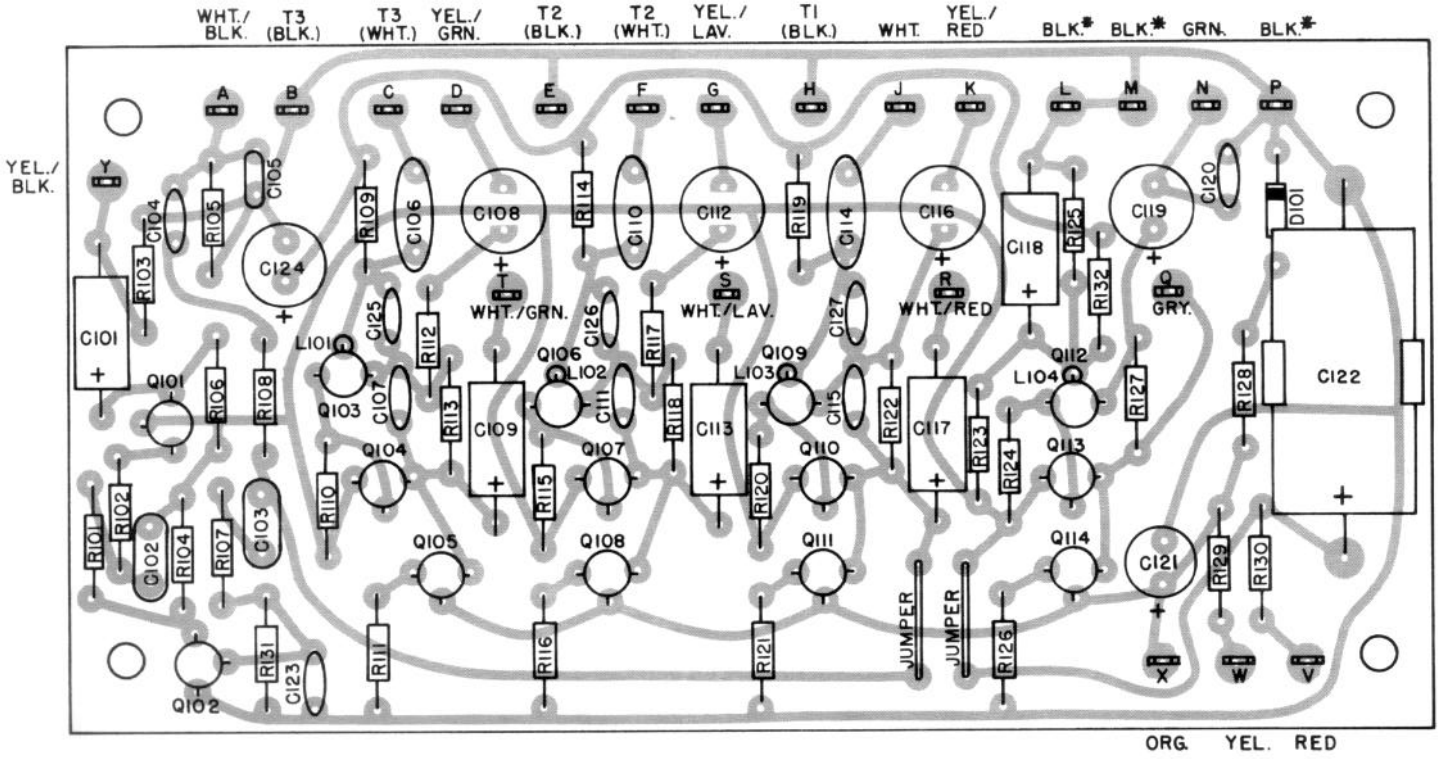
SIDE VIEW



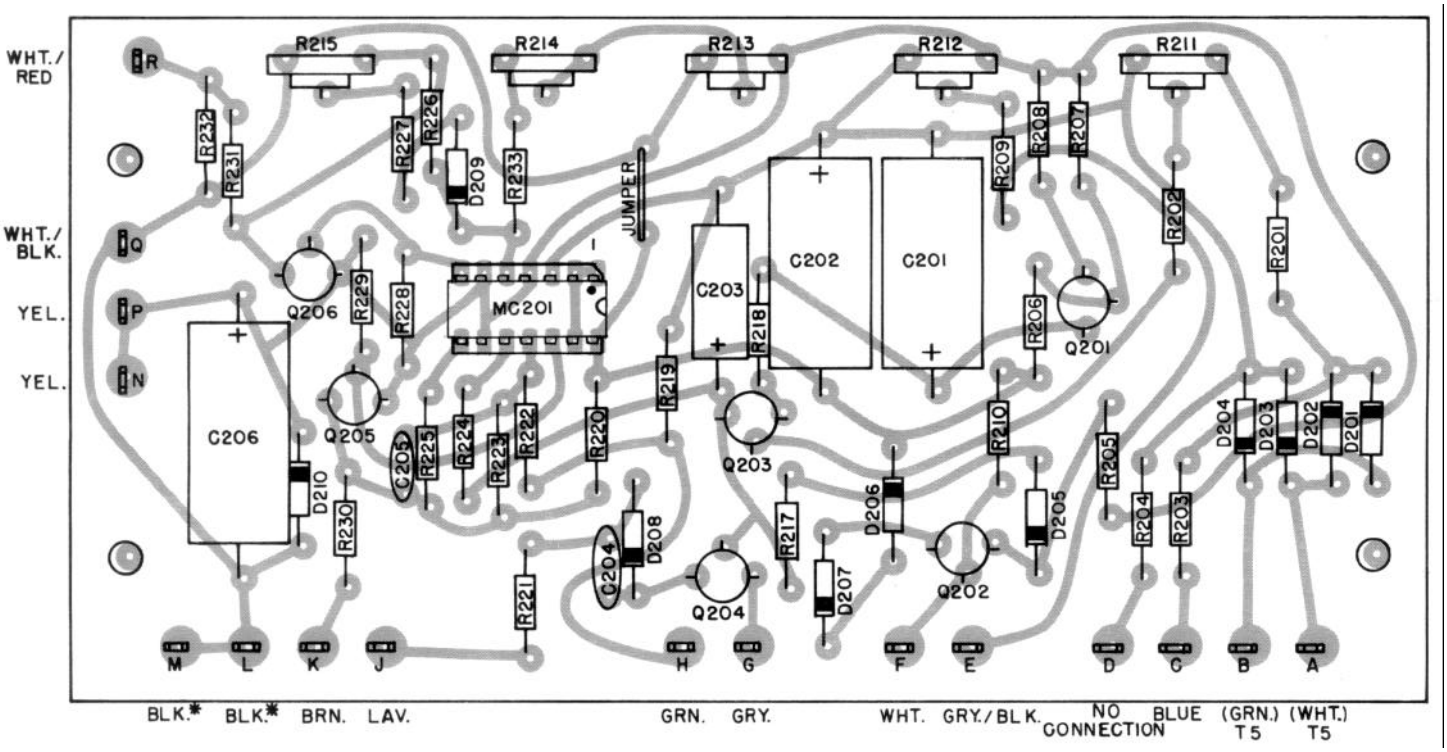
FRONT PANEL, INSIDE VIEW (MIRROR IMAGE)

CHASSIS PARTS PLACEMENT
FIGURE 5

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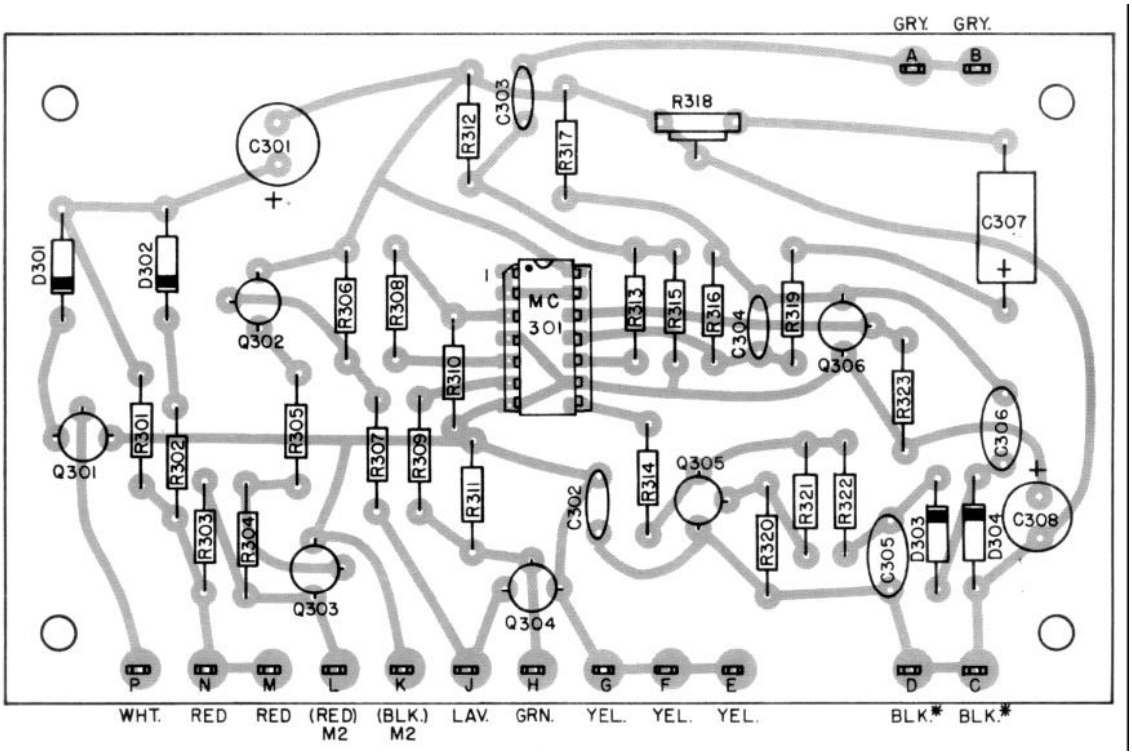
PRINTED CIRCUIT BOARD 1



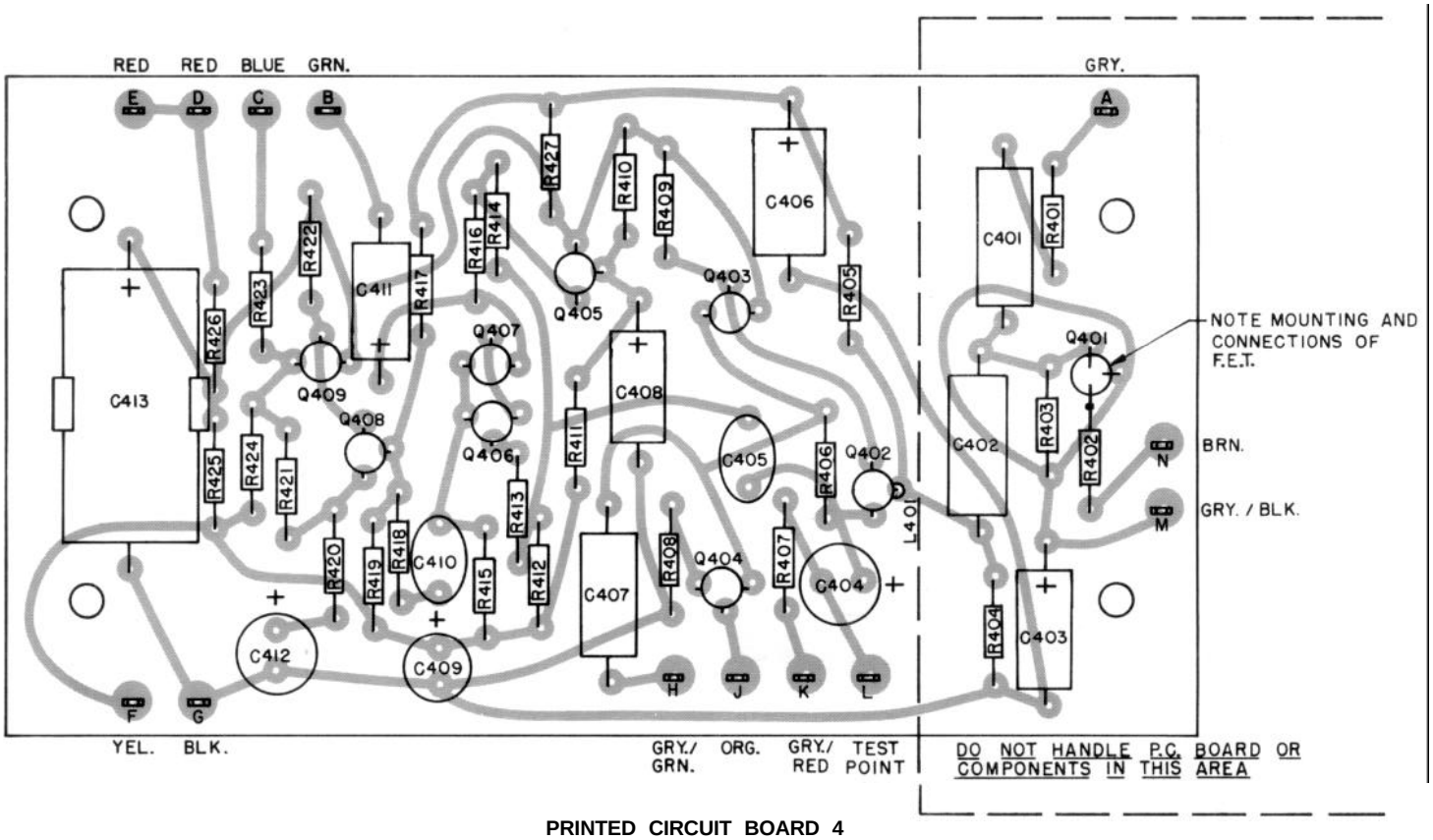
PRINTED CIRCUIT BOARD 2

PARTS PLACEMENT
FIGURE 6A

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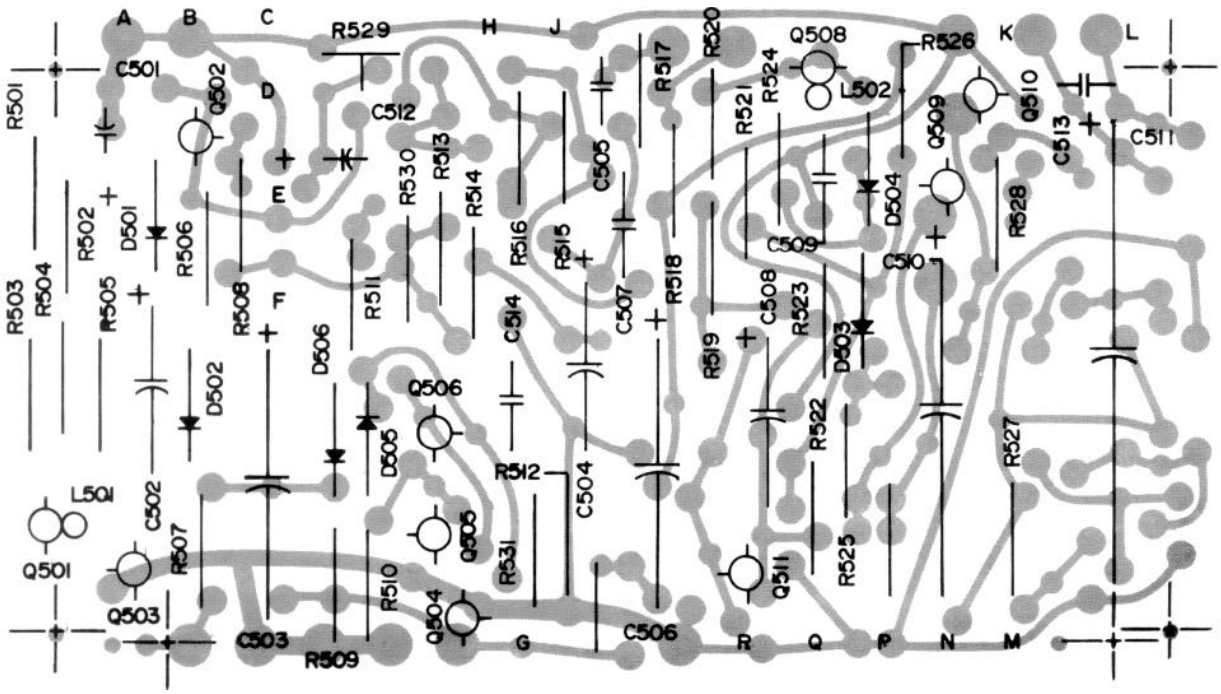
PRINTED CIRCUIT BOARD 3



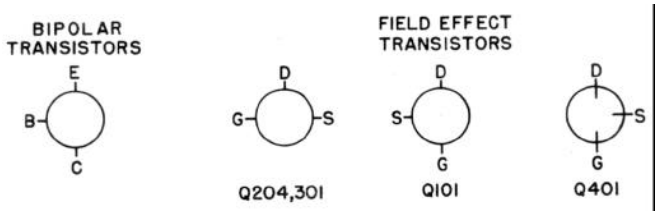
PRINTED CIRCUIT BOARD 4

PARTS PLACEMENT
FIGURE 6B

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PRINTED CIRCUIT BOARD 5



PARTS PLACEMENT
FIGURE 6C

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SERVICE INSTRUCTIONS

The SE30 Gated Compressor/Mixer uses components of the highest quality, operating well within their ratings to assure long life and excellent stability. No routine maintenance is necessary with the exception of battery replacement.

CAUTION: There are no user serviceable parts within the case of the SE30. Refer servicing to qualified service personnel.

BATTERY REPLACEMENT:

No special tools are required.

1. Turn knob on back of Battery Compartment (24) ¼ turn counterclockwise to OPEN position.
2. Slide compartment rearward out of chassis.
3. Release cover by unscrewing thumbscrew on top of cover.
4. Tilt cover upwards, pivoting at connector end of compartment, thus exposing batteries.
5. Unsnap the six 9-volt batteries and replace. Remove the 1.5-volt D cell and replace.
   Note: The SE30 may be operated in an emergency with only three 9-volt batteries, installed in either the right or left row of battery connectors. The 1.5-volt D cell operates only the auxiliary light, and may be omitted if this feature is not required.
6. Pivot cover down, align thumbscrew with speednut, and tighten fully. Batteries are now held firmly by pads in cover.
7. Align metal bottom plate of compartment with plastic guides in SE30 chassis and gently slide compartment fully into chassis.
8. Rotate knob clockwise to LOCK position.

COVER REMOVAL AND REPLACEMENT

Most servicing and calibration can be performed with only the top cover removed. The only tool required is **a** No. 1 or No. 2 Phillips screwdriver.

1. Turn Power switch (11) OFF and remove ac line cord from AC Power Receptacle (25).
2. Remove the upper of the two Phillips screws on each side of the SE30.
3. Remove the top cover by grasping the upper half of each side and pulling straight up. This exposes the components shown in the top view of Figure 5.
4. End plates may be removed for easier access to side-mounted components by removing the remaining Phillips screws on each side of the SE30. The end plates may then be removed by pulling straight up.
5. The bottom cover may be removed either with or without removing the end plates as above. Invert the SE30 and unscrew the four bumpers (feet). The bottom cover may then be pulled straight up from the central chassis. The SE30 will operate properly, except for possible increased hum pickup, with both the top and bottom covers removed.
6. Replace the bottom cover by placing the chassis upside-down and sliding the cover over the chassis, securing it in place with the four bumpers and screws. If the end plates are attached to the cover, position it so that the large holes in the end plates are near the front of the chassis.
7. Replace each end plate, if necessary, by sliding it between the end of the chassis and the inside of the bottom cover, securing it with a Phillips screw. Position the large hole near the front of the chassis. The right and left end plates are interchangeable.
8. Replace the top cover by sliding the ends downward, guided by the recesses in the end plates. Secure with the two remaining Phillips screws.

CHASSIS PARTS

Figure 5 illustrates the location of each chassis-mounted component by reference number, corresponding with those in the Schematic Diagrams (Figure 4) and Replacement Parts List (Table 1). Note that all one and two-digit reference numbers denote 'chassis-mounted components.

The five printed circuit boards are numbered 1 through 5 from left to right, and are easily removable as outlined below. Trimmer potentiometers used during calibration are located on P.C. Boards 2 and 3 and are shown in Figure 5. Complete replacement P.C. Board Assemblies are available. See Replacement Parts List (Table 1), and note that the replacement of certain components and P.C. Boards will necessitate recalibration of the unit.

The color-coded chassis wiring is indicated both in the Schematic Diagrams (Figure 4) and in the P.C. Board Parts Placement Diagrams (Figure 6). Connections associated with each printed circuit board are shown in the Schematic Diagram as follows:
PC. Board 1, Figure 4A; P.C. Board 2 and P.C. Board 3, Figure 4B; P.C. Board 4, Figure 4C; and P.C. Board 5, Figures 4C and 4D. Power supply wiring is shown in Figure 4D.

LAMP REPLACEMENT

The tools required are a No. 1 or No. 2 Phillips screwdriver, and ¼" and 5/16" open-end wrenches.

1. Remove the topcover as described above.
2. To replace the ac operated pilot lamps (PL1 and PL2), remove the hexagonal-head screws mounting the lampholders to their vertical brackets, using the ¼" open-end wrench.
3. The sockets may now be pulled rearward and rotated up so that the #47 bulbs may be replaced. It is advisable to replace both of these lamps when one burns out.
4. Replace the sockets in position and secure with the hexagonal head screws. Note that there are two holes in each bracket, the rear hole for the socket tab and the front hole for the screw.
5. To replace the battery operated Aux. Light (PL3), note the position of the socket between the Gated Memory indicator (M2) and the meter (M1). Remove the hex nut and lockwasher holding the socket to the left meter stud, using the 5/16" open-end wrench.
6. Unscrew the bulb and replace with a #223 lamp, tightening it firmly in the socket.
7. Position the socket bracket over the meter stud, followed by the lockwasher and the nut, and tighten while holding the socket in proper position.
8. Replace the top cover.

PRINTED CIRCUIT BOARD REMOVAL AND SERVICE

A standard blade screwdriver or similar prying tool and long-nose pliers are the only tools needed, unless soldered components are to be replaced. To avoid component and printed circuit board damage, a soldering iron of 40 watts or less is recommended

1. Remove AC line cord and remove top cover as described above.
2. Each printed circuit board is mounted by four plastic

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push-on retainers so that it may be raised above the chassis for service without complete removal. With all power turned off, depress retainer locking tab, if any, and pry each corner of the board from its retainers. Lift the board straight up assuring that all wires clear any obstructions, and position the two lower board mounting holes over the two upper plastic retainers. Snap the board over the retainers, thus exposing the component side and most of the conductor side of the board. After positioning one or more boards in this manner, the SE30 may be operated and measurements made.

3. All connections to printed circuit boards are made by push-on terminals crimped to color-coded wires. To remove a printed circuit board, first turn off all power and remove ac line cord, then grasp each brass terminal with long-nose pliers and pull away from board. The board may then be pried from its retainers and lifted out of the chassis.
4. Figure 6 illustrates the location and position of each printed circuit board component. Note that all such components have three-digit reference numbers, the first digit of which denotes the printed circuit board number. The colors of wires connected to each terminal are also shown to aid in reconnecting boards. Color abbreviations with asterisks refer to stranded No. 20 AWG wiring, and those in parenthesis refer to integral component leads. All other wires are smaller, stranded No. 24 AWG.
5. Printed Circuit Board 4 requires special handling, as noted in Figure 6B. To avoid possible erratic operation under high humidity conditions, the area of the board which includes Q401, R401-404, and C401-403 must be kept free of contamination from perspiration, skin oils, and the like on both sides. This area should not be touched with the fingers, and if any of these components must be replaced, soldering flux must be removed by brushing with a solvent such as clean wood alcohol (methanol) or denatured alcohol. (Do not use rubbing alcohol.) After flux removal, rinse with distilled water to remove electrolyte contaminants. CAUTION: Alcohol is flammable. Do not use near fire.

   Note that FET Q401 is mounted inverted to the board with a direct soldered connection between R402 and the gate lead.
6. Integrated circuits MC201 and MC301 are mounted in 14-pin sockets to facilitate removal and replacement. The notch on one end and a dot or mark identify pin 1, which must be positioned as shown in Figures 6A and 6B and as indicated on the printed circuit board.
7. Typical voltage measurements are given for Various points in the circuitry in Tables 2A, 2B, and 2C. The notes to Schematic Diagram and Test Voltages Outline the test conditions for these measurements. Voltages at all printed circuit board terminals are given in Table 2A, and board-mounted transistor and integrated circuit terminals voltages are given in Tables 2B and 2C. All voltages are measured with respect to chassis ground.
8. Replacement of Printed Circuit Boards 2, 4, or 5, or of MC201 will necessitate recalibration of the compression system as outlined below. In addition, Printed Circuit Board 3 replacement requires Gated Memory recalibration, and Printed Circuit Board 5, or meter MI replacement require VU Meter calibration. Compression system calibration should also be checked if meter M1 is replaced.

CALIBRATION

Each SE30 Gated Compressor/Mixer is individually calibrated at the factory with six internal trimming potentiometers and a selected fixed resistor, to compensate for individual component variations and to assure uniform and accurate performance. The complete calibration procedure is given here for qualified service personnel with access to laboratory quality instruments, in the event that component replacement or changes in internal control settings necessitate recalibration.

For those without adequate facilities, the complete unit may be returned to the factory for calibration. Carefully repack the unit and return it to the factory Service Department. The unit will be returned to you prepaid.

EQUIPMENT NEEDED:

A high-impedance (2 megohm or greater), high-sensitivity (10 mV full scale or better) ac voltmeter, such as a Hewlett-Packard 400 GL or Ballantine 861, is necessary for accurate results. The meter should be equipped with a clip-on shielded test cable.

In addition, a sine-wave audio generator, capable of producing 1 volt at 1 kHz with less than 1% total harmonic distortion, is desirable. A generator with an accurate 10 dB stepped output attenuator, such as the Hewlett-Packard 204D, will greatly simplify changes in input level necessary during the procedure. A shielded cable to connect the output of the generator to the professional three-pin female Input 1 receptacle will be needed. Unbalance the generator output (low side connected to chassis), if generator output is balanced, and wire the cable so that input connector pins 1 and 3 are to the low side of the generator and pin 2 is to the high side.

There are three different portions of circuitry which require calibration: the Gated Memory, the compression system, and the VU meter. A standard blade screwdriver may be used to adjust the trimmer potentiometers during the Gated Memory and compression system calibration. VU meter calibration requires the selection of a fixed resistor and soldering it in place on P.C. Board 5.

During the Gated Memory and compression system Calibration, the internal signal level at terminal A of P.C. Board 3 is monitored and adjusted. The signal voltage at this point will be referred to as E3A. The test signal is provided by an external sine-wave generator, or the internal Tone Oscillator may be used. If an external generator is used, connect its mating cable to the Input 1 connector (13A) with the Input switch (14A) set to LINE, and the Input 1 Filter switch (2A) set to IN. Adjust the generator for 1 volt output at 1 kHz. If the Tone Oscillator is used, set the front-panel Input 1 Filter switch (2A) to TONE OSC.

If the Tone Oscillator or an external generator without a stepped attenuator is used, the voltage at terminal A of P.C. Board 3 (E3A) should be adjusted to the required values by the Input 1 control (1A). If the external generator does have a stepped attenuator, the Input 1 control (1A) should be adjusted so that a l-volt generator output results in 1 volt at terminal A of P.C. Board 3. Lower levels are then obtained by using the generator's attenuator.

Calibration must be performed with the top cover removed to permit access to the trimmer potentiometers and test points, and during compression system calibration, removal of the bottom cover is also suggested. For complete safety from hazardous powerline voltages, the SE30 should be battery-operated during calibration, using fresh batteries which indicate +1½ VU or better on the meter, with the Batt. Check switch (9) actuated and the Power switch (11) ON.

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PROCEDURE:

First, the meter (7) must be mechanically set to zero. Turn the Power switch (11) OFF and wait one minute. The meter pointer should rest over the mark at the left-hand end of the scale, left of the -20 VU and 0 dB Compression line. Using a small blade screwdriver, rotate the black plastic screw below the meter face to set the pointer, if necessary. The electrical calibrations may now be performed as outlined below.

Unless otherwise specified, set all Lo-cut Filter switches (2) to IN, the Meter switch (8) to DB COMP., the Power (11), Gated Memory (21), and Comp. (22) switches to ON, the Input (14) and Output (17) switches to LINE, and the VU Range switch (4) to +4. Set Output (3) and Input (1) controls to 0, except for Input 1 (1A), adjusted as above. Set Response Rate control (6) to 3. Measure all voltages with respect to chassis ground.

GATED MEMORY CALIBRATION:

The Gated Memory calibration should be checked and adjusted before proceeding to the compression system calibration.

1. Connect meter probe to P.C. Board 3, terminal A, leaving existing gray wire connected, to measure E3A.
2. Adjust input such that E3A is -43.5 dBV (6.6 mV). Red portion of Gated Memory indicator (5) should be exposed.
3. Adjust input such that E3A is -41.5 dBV (8.4 mV). Red portion of Gated Memory indicator (5) should be covered by white vane.
4. If steps 2 and 3 are not correct, adjust input such that E3A is -42.5 dBV (7.5 mV) and rotate R318 fully counterclockwise. Gated Memory indicator (5) will be white. Slowly rotate R318 clockwise just until red portion of Gated Memory indicator is exposed. Recheck steps 2 and 3.

COMPRESSION SYSTEM CALIBRATION:

Because of the interdependence of trimmer settings, the following procedure must be followed in the order listed. The Gated Memory must first be properly calibrated as outlined above.

The voltage at terminal L, P.C. Board 4, referred to as E4L, must also be measured. This terminal is a test point with no wire connected to it, and access may most easily be obtained by setting the chassis on its right or left end and inserting the meter probe from the chassis bottom through the rectangular hole near transformers T4 and T5. The temporary wiring change in step 2 may also most easily be done from the bottom of the unit.

1. Average Level Adjustment (R212).
   Set input such that E3A is -30 dBV (31.6 mV). Voltage E4L must be -40 ± 0.2 dBV (10± 0.2 mV). If necessary, adjust R212 for the proper E4L reading, but allow 15 seconds of settling time after moving R212 setting to read E4L. If this setting is changed, all subsequent calibration steps must be checked.
2. Peak Level Adjustment (R211).
   Move blue wire from terminal C of P.C. Board 2 to terminal D. Set input such that E3A is -20 dBV (100 mV). Voltage E4L must be -27.5 ± 0.3 dbV (44 ± 3 mV). If necessary, adjust R211 for proper E4L reading. Return blue wire from terminal D of P.C. Board 2 to terminal C.
3. DB Compression Meter Calibration Check.
   A. Set input such that E3A is -40 dBV (10 mV). Meter pointer should lie over 0 on the DB Compression scale.
   B. Set input such that E3A is -20 dBV (100 mV). Meter pointer should lie in region occupied by 20 on the DB Compression scale. If either of these checks is not correct, proceed to step 4.
   C. Set input such that E3A is 0 dBV (1.0 V). Meter pointer should lie in region occupied by 40 on the DB Compression scale. If checks A and B are correct, but if this check is not, proceed to step 5.
4. DB Compression Meter Calibration, 0 and 20 Points (R213, R214).
   The settings of R213 and R214 interact to calibrate the meter to read 0 when E3A is -40 dBV (10 mV) and to read 20 when E3A is -20 dBV (100 mV).
   A. Rotate R215 fully clockwise.
   B. Set input such that E3A is -40 dBV (10 mV). Rotate R213 for a meter reading of 0.
   C. Set input such that E3A is -20 dBV (100 mV). If meter reading is less than 20, rotate R214 slightly clockwise. If meter reading is more than 20, rotate R214 slightly counterclockwise. The effect upon the meter reading at this point is unimportant.
   D. Set input such that E3A is -40 dBV (10 mV) and again rotate R213 for a meter reading of 0.
   E. Again set input such that E3A is -20 dBV (100 mV) and observe meter for a reading of 20.
   F. Repeat steps B through E until meter reads 0 when E3A is -40 dBV (10 mV) and 20 when E3A is -20 dBV (100 mV).
   G. Proceed to step 5.
5. DB Compression Meter Calibration, 40 Point (R215). Set input such that E3A is 0 dBV (1.0 V). Rotate R215 until meter reads 40 on the DB Compression scale.

VU METER CALIBRATION:

Proper VU meter calibration is determined by a VU CAL trimmer potentiometer (R529) on P.C. Board 5. The check outlined in step 1 may be performed if P.C. Board 5 has not been replaced, but the procedure of step 2 must be followed if it has been changed.

First, connect a 600-ohm ± 5%, ½ watt resistor (two 1200-ohm, 5%, ¼ watt resistors in parallel may be used) between terminals 3 and 2 of the Line Output connector (20).

1. Calibration check.
   A. Set input so that meter reads approximately 20 on the DB Compression scale, with the Meter switch (8) set to DB COMP.
   B. Set the Meter switch (8) to VU and rotate the Output control (3) until the meter reads 0 on the VU scale.
   C. The voltage measured across the 600 ohm resistor should be 1.8 ± 0.3 dBV (1.23 ± 0.04 V). This is 4.0 ± 0.3 dBm.
2. Calibration procedure.
   If meter Ml has been replaced, first check calibration in step 1. If check fails, follow procedure below.
   A. Set input such that meter reads approximately 20 on the DB Compression scale, with the Meter switch (8) set to DB COMP.
   B. Set the Output control (3) such that the voltage measured across the 600-ohm resistor connected to the Output terminals (20) is 1.8 dBV (1.23 V or 4.0 dBm).

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C. Set the Meter switch (8) to VU and the VU Range switch (4) to +4. Adjust VU CAL trimmer potentiometer (R529) for a 0 VU meter reading. Calibration is complete.

STEREO SYNCHRONIZATION

Two SE30's may be synchronized to operate together for two-channel stereo applications. With the Stereo Parallel jacks (23) connected together and the adjustment below performed, the two units will respond equally to the sum (left and right) signal to minimize apparent stereo image shift. After synchronization, the two units will track together over at least a 20 dB compression range. It is intended that the two units be supplied with a properly balanced and mixed stereo signal from a separate mixer or other source.

The synchronizing adjustment procedure may be performed upon two properly calibrated SE30's as outlined below. The same equipment needed for calibration is used for this procedure, except that an external audio generator is a necessity. A second cable for connecting the generator to the input connector also is required.

ADJUSTMENT:

1. Connect the Input 1 connectors (13A) of both units simultaneously to the audio generator, observing proper phasing. Cables should be wired such that input connector pins 1 and 3 are to the low side of the generator and pin 2 is to the high side. Set the Mic/Line input Switches (14A) appropriately.
2. Set the output of the audio generator for the expected signal level to be applied to the units. This will be adjusted as follows to correspond with 10 dB of compression.
3. Set Output (3) and Input (1) controls to zero, and Response Rate controls (6) to the same setting on both units, preferably between 2 and 5. Set VU Range switches (4) and Input 1 Lo-Cut Filter switches (1A) the same on both units, as required. Set Comp. switches (22) to ON and Gated Memory switches (21) to DISABLE. Set Meter switches (8) to VU.
4. Remove the top covers of both units and apply power.
5. Measure the signal voltage at terminal A of P.C. Board 3 (referred to as E3A) of one unit. Rotate the Input 1 control (1A) of this unit until E3A is -30 dBv (31.6 mv). Measure E3A of the second unit and set its input 1 control (1A) for the same reading. Do not readjust either input 1 control after this step.
6. Set the Output control (3) of the first unit for a meter reading of 0 VU. Repeat for the second unit.
7. Connect the Stereo Parallel jacks (23) of the two units together, using a phono pin plug shielded jumper cable.
8. After 30 seconds, observe the VU meter readings of the two units and note which unit's meter reading has increased above 0 VU. Slowly rotate R212 of this unit clockwise until its VU meter reads 0 VU. Allow 30 seconds for meter reading to stabilize.
9. Reduce generator output until E3A of this unit is -40 dBv (10mv) and set Meter switch (8) to DB COMP. Adjust R213 for a reading of 0 on the dB Compression scale of the meter. Do not disturb any adjustments on the other unit.
10. Increase generator output until E3A of this unit is -20 dBv (100 mv). Set both Meter switches (8) to DB COMP. and observe readings of both meters.
11. Short circuit the output of the audio generator and note the time required for the meter readings of each unit to fall to 0 DB Compression. Remove the generator short circuit and allow the meter readings to rise and stabilize.
12. Adjust the Response Rate control (6) of one of the units in the appropriate direction to make the two meter fall times equal and repeat Step 11 to check the results.
13. Repeat Steps 11 and 12 until meter fall times are equal. The settings of the two Response Rate controls may be somewhat different because of individual component variations between units.
14. Replace the top covers of both units.

OPERATION:

After performing the above adjustments, do not disturb any of the Input, Output, or Response Rate control settings thus established. If the Gated Memory feature is desired, set the Gated Memory switches (21) on both units to ON.

The units may now be fed from a balanced, mixed, stereo source whose level will determine the amount of compression as indicated on the DB Compression meters of the SE30's. Because of individual component variations between units, the two meters may indicate somewhat differently, but both units will operate similarly if adjusted as outlined above.

Since stereo operation is recommended for only a single pair of inputs, it may be desirable to improve the operating signal-to-noise ratio by disabling the two unused input channels on each unit. This procedure is described in the Modifications section below.

If it is necessary to change the Response Rate control settings to compensate for different types of program material, the timing of the two units should be adjusted to be equal. This may be done without removing the covers by applying a signal from an external audio generator to the inputs of both units simultaneously. Set the Gated Memory switches (21) of both units to DISABLE and adjust the generator output for a DB Compression reading of approximately 20 on either unit's meter. Set the Response Rate control (6) of one unit to the number desired, then adjust the Response Rate control of the other unit as described in Steps 11, 12, and 13 above.

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MODIFICATIONS

Noise Improvement for Single Inputs:

The overall signal-to-noise ratio of the SE30 may be improved for single-input applications by disabling the two unused input channels. This automatically reduces the noise level of the mixing circuitry without changing the gain or other characteristics of the remaining input. It is recommended that Input 1 be used and Inputs 2 and 3 disabled to retain the Tone Oscillator and Aux. Line Input features associated with Input 1. To disable Inputs 2 and 3, follow the procedure below.

1. Remove AC line cord and turn off all power. Remove the top cover.
2. Locate resistors R12 and R13 (33K ohms), between Input 2 and 3 controls and their associated Lo-cut Filter switches. Disconnect resistors R12 and R13 from switches S2 and S3. Bend removed lead of resistor away from all terminals, wires, and chassis.
3. Replace top cover. During operation, set Input 2 and Input 3 controls to zero.

Response Rate Knob Removal:

To prevent inadvertent misadjustment of the Response Rate Control for applications in which a fixed setting may be established, the knob may be removed.

1. Experimentally determine the proper Response Rate Control setting for the intended application and rotate the knob to this position.
2. Remove AC line cord and turn off all power. Remove the top cover.
3. Note that the plastic Response Rate knob (K5) extends through the front panel, over the shaft of potentiometer R5. Insert the blade of a standard screwdriver between the rear of the knob and the shaft bushing of R5, and twist the screwdriver ¼ turn. This will slide the knob forward on the shaft partially out of the front panel.
4. Grasp the knob and pull it completely out of the front panel.
5. Push the black plastic plug supplied with the SE30 into the hole thus exposed.
6. To permit subsequent control adjustment or replacement of the knob, the plug may be released by removing the top cover and using long-nose pliers to pinch together the locking devices on either side of the plug body.

Telephone Line Surge Protection:

When using the SE30 to feed a telephone line subject to lightning induced voltage surges, the following part (commercially available) can be installed across the Line Output terminals to provide additional protection for output circuit components:

Metal Oxide Varistor
General Electric Co.
Type No. V22ZA1

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DATA SHEET

ACCESSORIES FOR SHURE MODEL SE30 GATED COMPRESSOR/MIXER

MODEL A100A CARRYING HANDLE ASSEMBLY

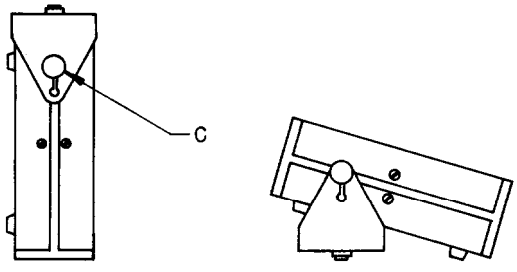
The Shure Model A100A Carrying Handle Assembly provides a means for conveniently carrying the Shure Model SE30 Gated Compressor/Mixer. The Model A100A serves as a handle for carrying the SE30, as a cover for the front panel, and as a tilt stand for positioning the SE30 at an angle for easy reading of the controls and meters. The A100A is easily switched from carrying handle use to tilt stand use simply by re-adjusting two knurled bolts which secure the Model A100A to the SE30. When in the tilt stand position, the SE30 rests on rubber feet mounted on the Model A100A. When in a carrying position, the SE30 may be rested on any flat surface and is then protected by the die cast corners on the rear of the case.

to mount the Model A100A on the Model SE30, proceed as follows:

1. Place the back (bottom) of the SE30 on a flat surface with the front controls facing up.
2. Position the Model A100A over the front of the SE30. The top of the screw slots on the sides of the Model A100A should align with the two tapped holes (C) on the sides of the SE30. See Figure 1, Carrying Position.
3. Screw the two knurled bolts supplied with the Model A100A fully clockwise into the two tapped holes (C) on each side of the SE30.

To position the Model A100A in tilt stand position, proceed as follows:

1. Loosen the knurled bolts at sides of Model A100A by turning them partially counterclockwise.
2. Lift the Model A100A away from the SE30 so that the knurled bolts pass through the bottom of screw slots.
3. Swing the Model A100A handle beneath the SE30 and tighten the knurled nuts (screw clockwise). See Figure 1 Position in Use.



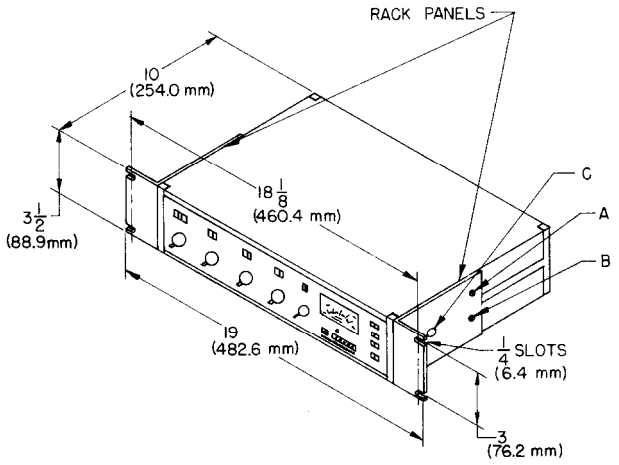
CARRYING POSITION TILT STAND POSITION

CARRYING HANDLE ASSEMBLY
FIGURE 1

MODEL A100B RACK PANEL

The Model A100B Rack Panel provides the Model SE30 with supports for rack mounting. To mount the Model A100B to the Model SE30, proceed as follows:

1. Unscrew the four rubber feet from the bottom of the SE30 to eliminate the obstruction of the rubber feet when sliding the SE30 into a rack panel.
2. Remove screws A and B (turn counterclockwise) from each side of the SE30. See Figure 2, Rack Panel.
3. Position the Model A100B brackets on the sides of the SE30; the three holes of the rack panels are to be aligned with the three tapped holes A, B and C on sides of SE30.
4. Replace screws A and B (turn fully clockwise) to fasten brackets to SE30.
5. Screw the ¼ inch bolts supplied with the Model A100B fully clockwise into the tapped holes at C.



OVERALL DIMENSIONS

RACK PANEL
FIGURE 2

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