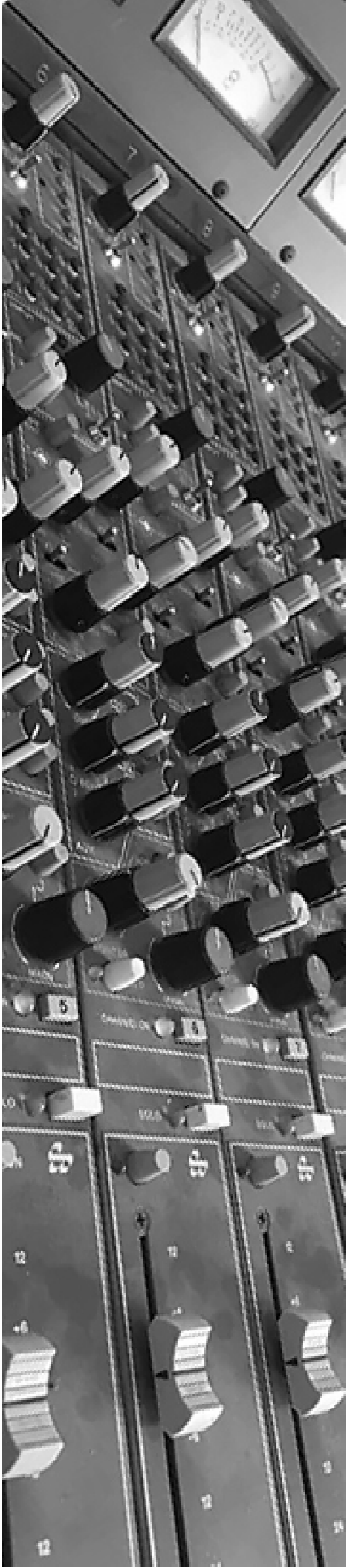
The Sound Workshop Series 34: Recording/ Mixing Console.



sound workshop

Sound Workshop

Series 34 Record/Mix Audio Console

Owners Manual

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Section 1

General Information

1.1 DESCRIPTION

The Series 34 is Sound Workshop's latest generation of professional audio mixing console, incorporating the latest advances in recording studio technology. As a result, the Series 34 console enjoys all the high performance standards, the ease of operation, and the reliability that previous Sound Workshop owners have come to expect.

A partial list of available Series 34 features includes:

>Rigid high-strength multi-input mainframe.
>Optimized high-performance microphone preamplifier.
>Four-band sweep equalizer.
>Six auxiliary send buses (4 mono, 1 stereo).
>High-resolution peak/average meters, featuring ultra-sharp 3-color, 40-segment displays.
>Full input chain metering (in addition to bus/tape metering).
>Balanced transformerless outputs (+27 dBu).
>ARMS Console Computer (Super-Group input grouping system, In-Place-Solo, Tape Automation)

Each Sound Workshop Series 34 console is made up of the following components:

>Rigid high-strength Mainframe, with meter bridge housing.
>Up to 50 Input/Output modules, each with LED meter, 24-track assign matrix, four-band equalization, comprehensive echo and cue sends, input fader and computer controls.
>Echo Master module, with master controls for echo sends and returns 3 and 4.
>Master module, with most of the master control functions, mixdown and cue returns, and ARMS Computer Control master functions.
>Modular Patch Bay System.
>One or two power supply rack mount cabinets.

Sound Workshop's Series 34 uses balanced transformerless output stages, which permit output levels to exceed +27 dBu before clipping. The nominal track output level is +4 dBu, but may be easily adjusted to other levels (-10 dBu to +8 dBu).

The newly-designed microphone preamplifier further extends the performance capabilities of the Series 34. In addition, new thick-film laser-trimmed resistive networks will be found in all critical circuits, to assure ultra-stable operation.

1.2 THE INPUT/OUTPUT CONCEPT

At the core of all modern multi-track consoles is the Input/Output (or "I/O") Module, so-called because it presents all controls and electronics - Input and Output - for one audio channel within a single module. In fact, the I/O concept has proven so popular that it has become the de facto "standard" of the recording industry.

For the studio engineer, the advantages of the I/O module become obvious after a very few sessions in the studio. With all controls relating to a particular channel conveniently located on a single module, the engineer does not have to search three or four separate locations simply to set up input and output controls, track and monitor assignments.

For the console manufacturer, there are related advantages. Since all I/O modules are identical, manufacturing economies are readily achieved. Sophisticated procedures for fabrication, assembly and testing are readily implemented, and will greatly enhance product reliability and system performance.

The in-line design of Sound Workshop's Series 34 console results in a compact versatile system that is simple to operate yet functionally versatile. The uncluttered layout leads to a quick and thorough understanding of each control's location and purpose. Signal flow is straightforward and easy to follow.

For example, during a tracking session the signal path from microphone output to tape input first passes through the mic preamplifier, and then through the input channel signal processing and channel fader (or VCA), after which it is normally assigned to a track-summing bus. Here, an Active Combining Amplifier (ACA) sends the combined signal to the track booster amplifier, and then to the console's track output.

For multi-track tape monitoring while recording, each tape recorder output is routed through its respective console line input amplifier to the monitor level control, and then to the stereo mix panpot. The signals on the stereo mix buses are fed to the Master Module for processing, monitoring and stereo recording.

During the eventual multi-track to stereo mixdown session, each multi-track signal is fed from its line-input amplifier to the respective input channel. Here, the channel equalizer, filter, aux sends and fader provide the same signal processing capabilities that were available to the microphone signals during the original recording session. After processing, each signal is routed through its pan pot to the stereo mix buses for monitoring and stereo recording.

Since the same module is used for recording, mixdown, input and output, the user enjoys system versatility and reliability, free from the clutter and cramped spacing often found in less- flexible multi-function designs. With the addition of comprehensive Echo Master and Master modules, as well as extensive switching and patching capabilities, Sound Workshop's Series 34 may be easily used in any creative application, from multi-track recording and video/film post production, to sound reinforcement and broadcast studio operation.

1.3 LIMITED WARRANTY

To assure Sound Workshop customers of reliable factory support, the following LIMITED WARRANTY is provided. The Sound Workshop LIMITED WARRANTY gives you specific legal rights, and you may have other rights as well, which vary from state to state.

A. Sound Workshop Professional Audio Products, Inc. warrants the Series 34 Mixing Console to be free from defects in material and workmanship. For a period of one year from the date of purchase, any part or subassembly will be repaired or replaced (at Sound Workshop's option), if it is found to be defective under the terms of this warranty.

   If warranty repair/replacement is necessary, please return the defective item to Sound Workshop, with all shipping costs prepaid. The repaired/replaced item will be returned to you at Sound Workshop's expense. Our obligation is limited to the repair or replacement of defective items returned to the factory, and we reserve the right to charge for service and shipping if the defect is not due to a fault of Sound Workshop.

B. Sound Workshop assumes no responsibility or liability for inconvenience, loss of time or usage, or any other commercial or other loss which may arise from interrupted operation. Our liability shall in no event include consequential damages.

C. Sound Workshop reserves the sole right to determine if a defect in material or workmanship is our fault. This warranty does not cover damage caused by unauthorized modifications or attempted repairs by others. Misuse, neglect or accidental damage are also not covered by the warranty.

D. The Sound Workshop LIMITED WARRANTY is valid only for the original purchaser, in the country in which the purchase was made. For the warranty to be valid, the enclosed Warranty Registration Card must be returned to Sound Workshop within 20 days of the date of purchase. A copy of the original sales receipt must accompany any warranty claim.

E. Implied warranties are limited to the duration of this warranty, and this includes all implied warranties of fitness for a specific purpose or merchantability.

1.4 EXPEDITING SERVICE

To assure you of the fastest possible service, in the event that you require assistance in the operation or maintenance of your console, please contact your authorized Sound Workshop dealer. All Sound Workshop dealers are required to maintain a well-equipped service department and are prepared to assist you with your console related needs.

Should it become necessary to return an item to the factory, please call first so that we may be better prepared to offer you fast and efficient service. Sound Workshop may be reached by phone at (516) 582-6210 and by Telex at 530464 (Sound Workshop).

1.5 ELECTRICAL SPECIFICATIONS

0 dBu = 0.775 VAC rms

INPUTS

Microphone

Impedance	>1.2 kilohms, active balanced
Level (without 20dB pad)	-62 dBu to -17 dBu, nominal

Line

Impedance	>40 kilohms, active balanced
Level	-8 dBu to +8 dBu, nominal

Patch

Impedance	>5 kilohms, unbalanced
Level	-2 dBu, nominal

Echo Return

Impedance	>7 kilohms, unbalanced
Level	+4 dBu, nominal

Aux Mix Bus

Input Impedance	>7 kilohms, unbalanced
Input Level	+4 dBu, nominal

Tape 1 & Tape 2 Monitor

Input Impedance	>7 kilohms, unbalanced
Input Level	+4 dBu, nominal (trimable from -8 to +8 dBu)

OUTPUTS

Impedance	<100 ohms

Maximum Level

Track, Mix, Control Room	>+27 dBu, balanced
All others	>+21 dBu, unbalanced

Nominal Level

All except Direct & Patch	+4 dB
Direct & Patch	-2 dBu

MISCELLANEOUS

Frequency Response	20 Hz to 20 kHz, +0/-0.5dB
Slew Rate	>8 volts per microsecond

Microphone Equivalent Input Noise @ 60 dB gain

200 ohm source	< -129.0 dBu
0 ohm source	< -130.5 dBu

Distortion (THD and IM)	
Typical	<.03%
Maximum	<.1%
Signal-to-Noise Ratio	>82 dB
Crosstalk	
1 kHz	<70 dB
20 kHz	<50 dB
System Gain	78 dB (Mic in to Mix Bus out)
Oscillator	
Frequency Response	20 Hz-to-20 kHz sweep (+/-0.2 dB)
Max Output Level	+4 dBu
Integrated Circuits	CD4053, IH5011, HA4605, LF351 LF353, LM339, NE5532, NE5534, TL074 XR2206, RC4558
High Resolution Meters	
Supply Requirements	+/-15.00 to 16.50 VDC
Current Draw	75 mA
Input Impedance	40 kohms, balanced bridging
Nominal Input Level	-2 dBu
Input Range	-8 to +8 dBu (internal select)
Displayed Dynamic Range	40 dB
Modes	Average, Peak, DC
Mode Select	Ground enable
Peak Attack Time	0.1 ms full scale indication of full scale input
Peak Decay Time	3 seconds full scale (approximate)
Intensity Control Bus	3.75 to 0 VDC

1.6 MECHANICAL SPECIFICATIONS

Consoles
See Figure 1A

Power Supplies
19" x 14" x 5.25" - Allow 5" behind power supply for cable bend

Shipping Dimensions/Weights
All weights are approximate

Consoles:	3424	62" x 36" x 45"	300 pounds
	3432	88" x 36" x 45"	350 pounds
	3440	104" x 36" x 45"	400 pounds
	3450	124" x 36" x 45"	450 pounds
Power Supplies:		33" x 24" x 14"	50 pounds

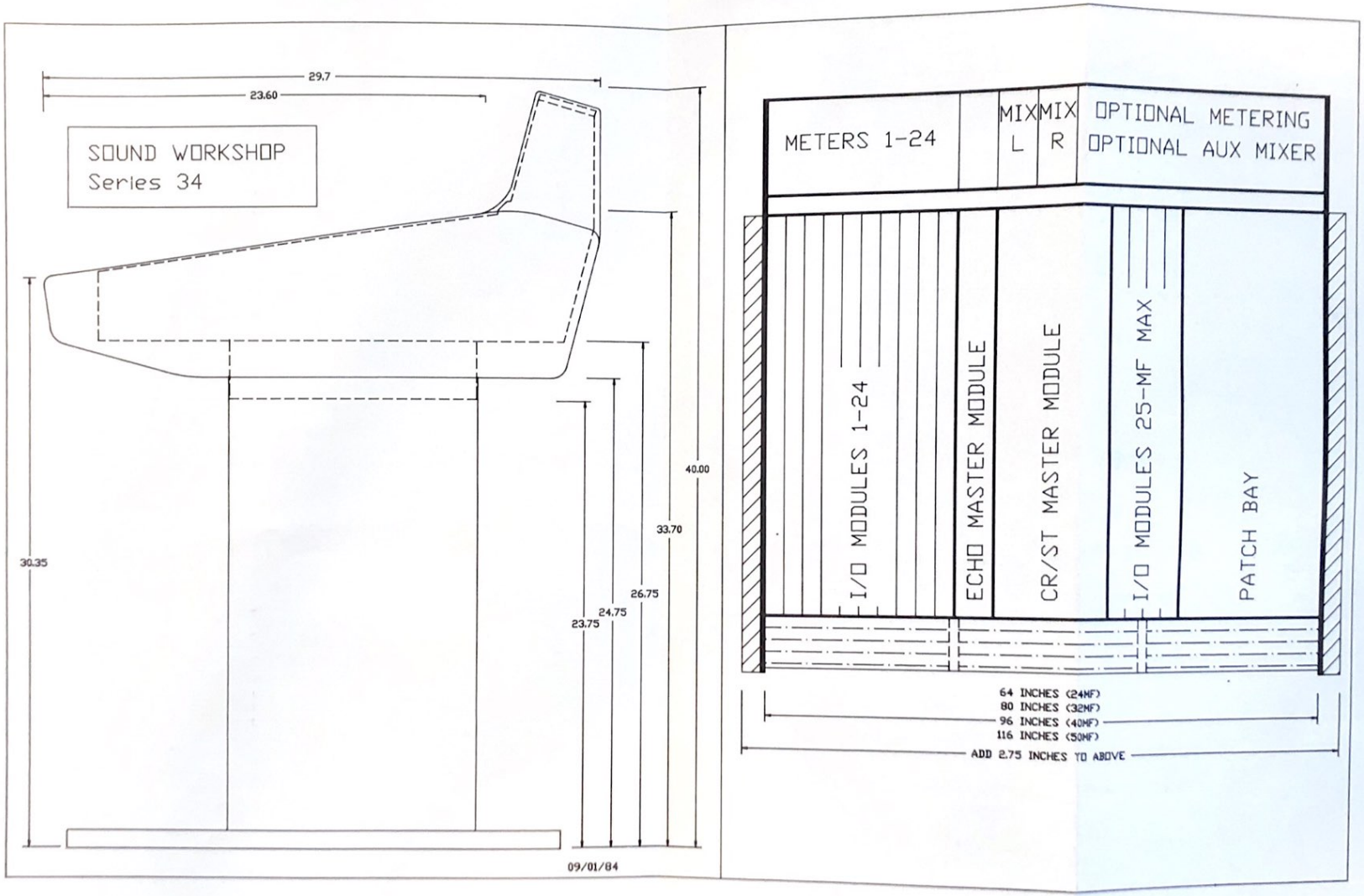


FIG 1A - MECHANICAL SPECIFICATIONS

Section 2

Installation

2.1 INTERFACING NOTES

An extensive connector system is provided for all of the Series 34's input and output lines. All audio cables interface to the console via multi-pin connectors located in the two pedestal legs. The inside covers on both pedestal legs may be removed, for convenient access to the cables.

All audio lines should be 2-conductor cables with a foil shield. For ease of termination, use cables that include a separate shield drain wire. Within the cable, both signal lines and the drain wire should be low-capacitance stranded #22 or #24 AWG conductors.

All I/O audio lines must be crimped into the connector pins supplied with the Series 34 console. After doing so, the pins are snapped into housing assemblies, which are then plugged onto the consoles interface connectors located in the legs. Crimping is one of the easiest, most reliable methods of termination currently available. However, care must be taken that the crimping tool has been properly adjusted, and that the crimping procedure is carefully executed (Figure 2J).

Each Sound Workshop console is supplied with complete instructions, drawings, connector layouts and connector parts which are needed for a simple and reliable installation. It is essential that all terminations are properly crimped. An optional crimping tool is available from Sound Workshop (Part No. HTR-2445A).

2.1.1 Microphone Cables

All microphone-level audio cables enter the console through the left pedestal leg, where they are terminated in 36-pin molded connector housings (Amp Part # 1-350356-9). Crimp-type pins (Amp Part # 641300-1) are supplied and installed into the connector housings as illustrated in the microphone connector drawing (Figure 2A).

2.1.2 Line Level Cables

All line-level audio cables enter and exit through the right console pedestal leg and are terminated using the connector parts as detailed in the previous paragraph. Line-level connector pinouts are illustrated in the line-level interface drawings (Figure 2C-I).

2.2 GROUNDING AND SHIELDING

It is important to remember that the terms "ground" and "shield" are not synonymous. A ground wire is a low-resistance conductor used to minimize differences in potential between circuits. A shield is a protective device against outside electrical interference, such as from stray electrostatic fields.

2.2.1 Grounding Procedures

The object of any grounding system is to minimize the ground potential differences between circuits. In the ideal system installation, there is a single-point electrical ground, which is common to all input, output and power circuits. In designing the complete system, the single-point ground will help to avoid ground loops, which exist whenever there is more than one DC path to ground.

Sound Workshop recommends that the console be at the center of the grounding system. All external equipment should have separate ground wires that are returned to this central point. These wires should be insulated, stranded (not solid), #12 AWG or larger (Belden 9912 or equivalent). For ground return wires longer than 20 feet, proportionately larger-gauge wire should be used.

Rack-mounted equipment requires particular care. It may be most practical to run a single ground return wire to the console from a well-insulated ground bus in the rack. Individual ground wires may be used to connect each piece of rack equipment to the ground bus. It is not suitable to simply ground the rack to the console, and assume that by doing so all equipment installed in the rack is therefore properly grounded. Such a grounding system is inherently unreliable.

Ground wires returned to the console may be soldered directly to the console's ground bus. These wires may be routed to the ground bus via the right pedestal leg, and soldered to the bus where it extends beneath the patchbay panel. For heavy gauge wires, a high-power soldering iron may be required, and great care should be taken to insure that nearby audio cables are not burned by the iron.

A single ground wire should be run from the console's grounding point to a good Earth ground, such as a metal grounding rod driven into the soil. Make sure the rod is driven a few feet into the ground and is actually earthed. Sand, mica or crushed rock do not make satisfactory grounds.

If a reliable grounding rod system is impossible, then a cold water pipe or a steel support within a building may be used. Do not use metal 2x4s within a wall or ceiling for this purpose.

2.2.2 Microphone Shields

The shields on all microphone lines must be connected at both ends of the cable. This assures shielding continuity from the console out to the microphone in the studio. Since the microphone is not otherwise connected to the electrical system, there is no danger of a ground loop occurring.

2.2.3 Line Shields

To make sure that other cable shields do not inadvertently serve as grounds (thereby setting up potential ground loops), each shield should be wired to a cable connector at one end of the cable only. Sound Workshop recommends that shields be connected at the external equipment end only. Leave the shield disconnected at the console end of each cable. It is important to observe this convention throughout the installation, in order to guarantee a quiet properly-operating system.

Recommended equipment interconnections are illustrated in Figures 2B and 2K-L.

2.3 CONSOLE SET-UP AND TURN-ON

Note: The following procedures should be performed under the direct supervision of your authorized Sound Workshop dealer, who is familiar with your console, and prepared to offer expert assistance during this critical phase. Your dealer's presence assures you that your new Series 34 console will be installed to your complete satisfaction.

Carefully unpack the shipping crate, and verify that all the items listed on the attached packing slip are present. The following items should be found:

- ✓ Rack mount power supply (supplies)
- ✓ Multi-conductor cables for power supply (supplies)
- ✓ Installation Kit containing Amp pins/housings
- ✓ Spare Parts Kit
- Extender Ribbon Set
- Amp-Pin Insertion/Removal Tools
- ✓ Owners Manual

2.3.1 Normalizing the Console

It is good operating procedure to completely normalize a console before starting a recording or mixdown session, as well as before performing any system tests. In other words, all controls are placed in their appropriate "neutral" position (off, centered, released, etc., depending on the specific function). This lessens the possibility that a signal will get misrouted by some switch or potentiometer being left in an improper position. This procedure should also be followed before turning the console on for the first time.

When console normalization is to be performed on an operational console, first make sure the monitor system is set for a safe low-level output, so that unexpected high-level signals will not damage the speakers.

To properly normalize the Series 34 console, follow this 7-step procedure:

1. Place all console switches in the Up (released) position.
2. Turn all Level potentiometers fully counter-clockwise.
3. Turn all Pan Pots to their center position (1A, upper sections of 4B-E and 5A, 6E, 23A, 32A-C).
4. Place the MIXDOWN MASTER FADER (42) in its uppermost position.
5. Place all other slide faders in their lowermost position.
6. Remove all patch cords from the patch bay.

ON ARMS EQUIPPED CONSOLES ONLY:

7. Make sure that the SYSTEM ON (43I) and MASTER SOLO (43O) LEDs are off. MASTER WRITE (43N) LED will be on.

2.3.2 Power Supply Setup

NOTE: Do not turn the power supply on yet.

The main power supply for the series 34 console consists of two bipolar (+/-16 VDC) supply modules, plus a Phantom Power module. Supply 'A' powers the left hand side of the console (half of the supplied I/O modules and half of the meter bridge). Supply 'B' powers the rest of the console, and Supply 'C' is the 48 volt phantom-powering module. Consoles with more than two mechanical meters have an additional 48 volt supply for the meter lights.

Inside the power supply, there are five vertically-mounted LEDs on the Power Distribution Board located at the rear of the chassis. These may be viewed through the metal grill on the top of the power supply, and indicate the presence of the following supply voltages (1 is the top LED, 5 is the bottom LED):

1. Red - Positive supply rail on module A
2. Green - Negative supply rail on module A
3. Red - Positive supply rail on module B
4. Green - Negative supply rail on module B
5. Red - Phantom Power supply (module C)

There is a separate fuse for each module, located on the power supply's front panel.

Place the console at, or near, its proper position in the control room, and remove the inside cover from the right leg. This exposes the connector for the power supply. Locate the 16-pin male CPC connector labelled #1. 50 input mainframes will have an additional connector labeled #2. For /C series consoles equipped with Sound Workshop's ARMS computer, there is a second 16-pin connector nearby, labelled A. Consoles with more than 2 mechanical meters will have a separate 4 pin connector labeled B.

Temporarily place the power supply (supplies) near the console, so it may be easily reached during the initial check-out procedure. Do NOT turn it on yet. Attach one end of the 16-conductor supply cable to the #1 connector in the console leg, and the other end to the #1 connector on the power supply. Repeat this procedure for the #2 cable on larger consoles. For /C series consoles, repeat the procedure for cable A. At this time, also connect cable B if console has a mechanical meter bridge. Since the cables and connectors are identical, make sure that the cable runs are between connectors 1-to-1, 2-to-2, and A-to-A.

Make sure all front-panel fuse caps are in place, and that the power switch is off. Plug in the power supply's AC power cord, and make sure that no pilot lights are illuminated.

On the series 34's Master Module, locate the Oscillator section. (Master Module, location 41). Depress the TEST and the 1K switches. Note the two LEDs, located just above the TEST and FREQUENCY switches. These are illuminated by the B module within the power supply housing. The TEST (yellow) LED is powered by the negative rail, and the FREQUENCY (red) LED is powered by the positive rail. Therefore, the illumination of both is an indication that both sides of bipolar power module B are functioning properly.

Turn the power supply ON, and quickly verify that both LEDs are illuminated. Also verify that all 5 LED's on the power distribution board are on. If not, turn the power supply off immediately, and do the following:

If none of the LED's were illuminated: Recheck all connections, and try again. If all LEDs are still not illuminated, turn the power supply off, and contact your authorized Sound Workshop dealer or call the factory for assistance.

If only some LED's were illuminated: This condition may infrequently occur, due to capacitive circuit elements within the console, and does not indicate a console or power supply malfunction. Turn the power supply on-off-on within a one-second interval. If this does not illuminate all LEDs, turn the power supply off again and seek assistance.

Verify that the positive and negative voltages supplied to the console are within specifications, by measuring these voltages at I/O modules 1 and xx (where xx = the number of the last I/O module on your console). Each voltage reading should be taken at the front mother ribbon connector (P2) where it is attached to the module. Make sure the voltage is measured at a point before the diode on the module. The following voltages should be seen:

Pin	Purpose	Voltage	Tolerance
3	Positive Supply Rail	+16 VDC	+/-0.1 volt
4	Negative Supply Rail	-16 VDC	+/-0.1 volt

ARMS power Board - located under the console, below the patchbay, on Series /C consoles only. Refer to Drawing 101-508 for pin locations.

P3-Pins	Purpose	Voltage	Tolerance
1,2	Positive Supply Rail	+16 VDC	+/-0.1 volt
3,4	Negative Supply Rail	-16 VDC	+/-0.1 volt

P4-Pins:	Purpose	Voltage	Tolerance
1,2,8,9	Logic Supply Rail	+5 VDC	+/-0.1 volt
3-7	Ground		

NOTES for Series /C consoles: On the ARMS power board, LEDs 1 and 2 are illuminated by pressing Data switches A and B (43K,L) on the Master Module. LED 3 is not used. LED 4 indicates the presence of +5 VDC.

As an additional check of the microphone-line phantom power supply, measure the voltage at pins 2 and 3 on any microphone input line. Before doing so, make sure the +48 Switch (3C) on the corresponding I/O module is depressed. The following voltages should be seen:

Pin	Purpose	Voltage	Tolerance
2	Phantom power	+48 VDC	+/-0.5 volt
3	Phantom power	+48 VDC	+/-0.5 volt

Measure both pins 2 and 3 with respect to pin 1 (Shield). Also measure the voltage difference between pins 2 and 3 and verify that it is less than 0.5 volt.

If any measured voltage is not within its specified tolerance, perform the Power Supply Alignment Procedure in Section 5 before continuing.

2.4 MONITOR SYSTEM SETUP

For optimum system operation, it is essential that the gain staging between the Series 34 console and the monitor amplifiers is given careful attention. The following procedure will verify that your monitor system is properly interfaced with the console output. Before you begin this procedure, make sure that your monitor speakers are capable of withstanding the power and listening levels that may be delivered to them. Proper speaker protection is the responsibility of the system owner.

The optimum setting for the Series 34 Monitor level controls (38F and 39F) is between 12:00 and 3:00 o'clock. When the control is near the 3:00 o'clock position, the listening level should be very loud - about as loud as you would ever want it to be.

To begin, turn the Series 34 Studio and Control Room Monitor level potentiometers (38F, 39F), and the power amp sensitivity controls, to their minimum (counter-clockwise) position. (If your power amp does not have input level controls, it may be necessary to install an in-line attenuator between the console outputs and the amplifier inputs.)

On the console, set the appropriate Monitor Level potentiometer to the 3:00 o'clock position. Now play back some representative program material, and advance the monitor amp's input level controls (or the in-line attenuator) until the listening level is very loud.

Follow the same procedure for both the control room and the studio monitor systems.

Note: When the console's Monitor Level potentiometer is at the 2:00 o'clock position and the mix-bus meters read zero VU, the level at the Monitor outputs will be +4 dBu.

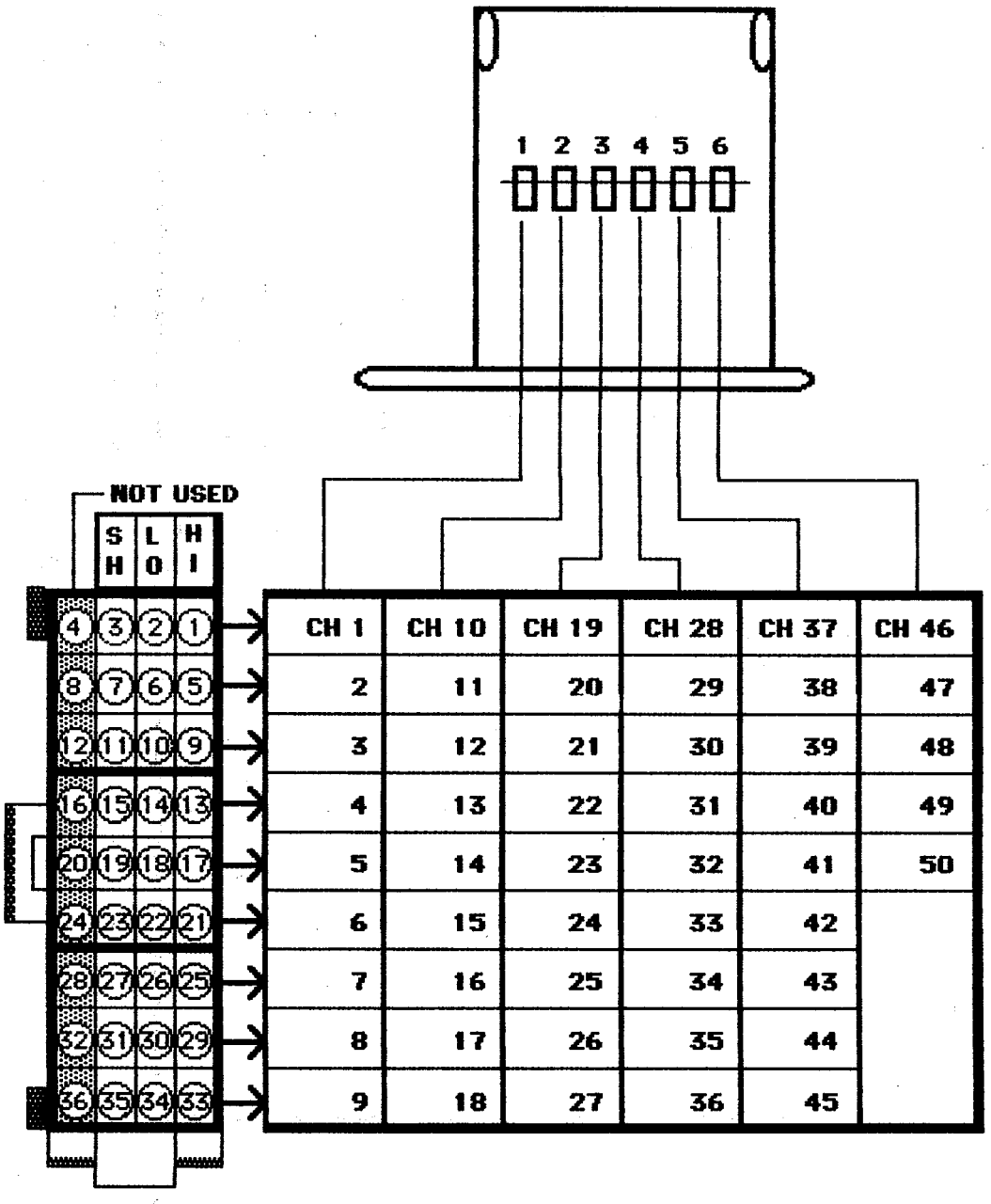


FIG 2A - MICROPHONE INTERFACE

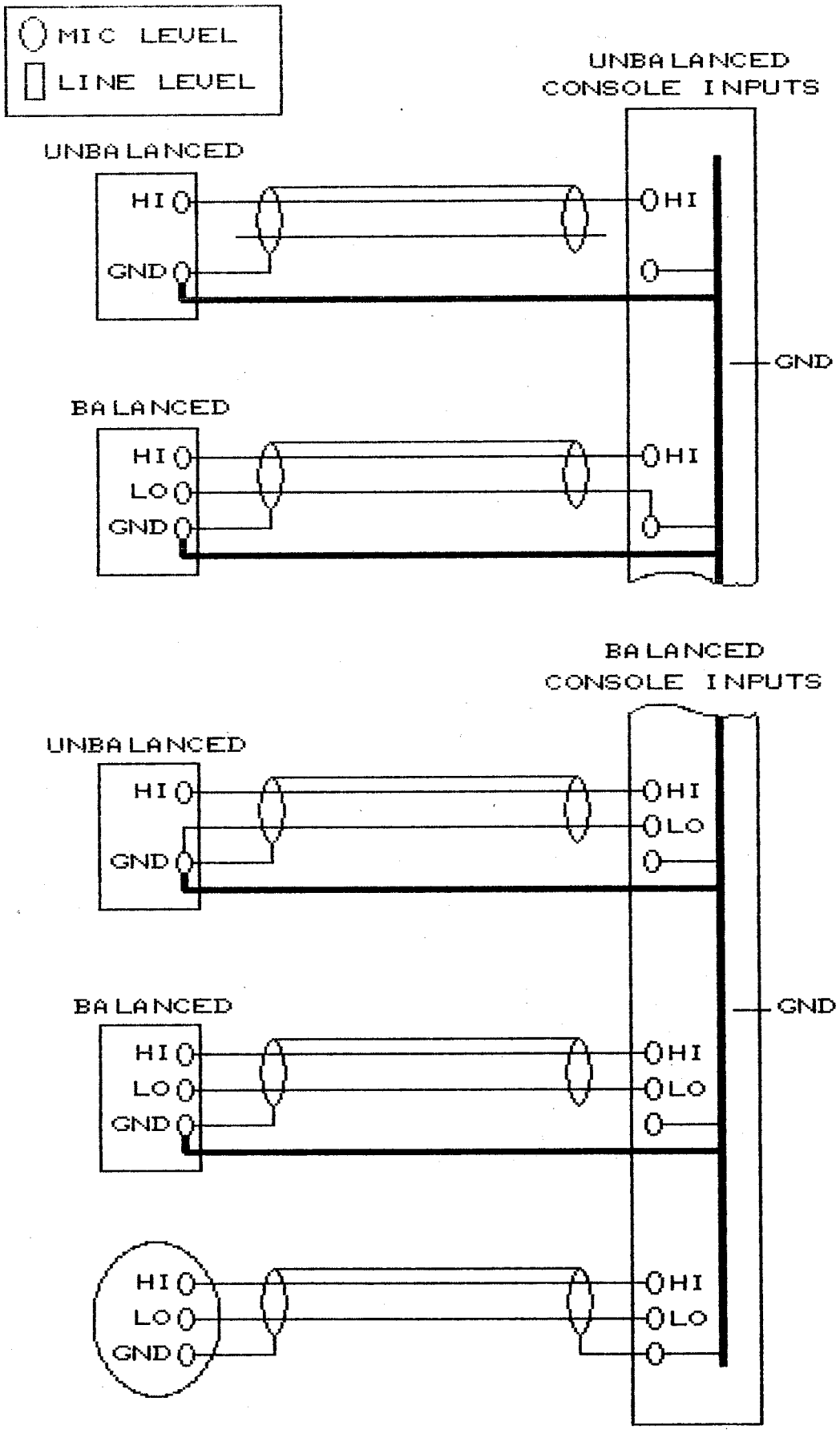
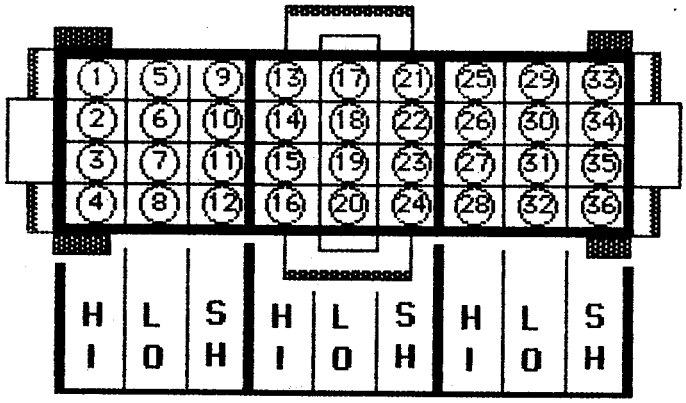


FIG 2B - MIC/LINE WIRING CONVENTION

Connector Pinout



Channel Input/Output

PROC B OUT	LINE IN 4	BUS OUT 4
PROC B IN	LINE IN 3	BUS OUT 3
PROC A OUT	LINE IN 2	BUS OUT 2
PROC A IN	LINE IN 1	BUS OUT 1

Master-1

N/C	N/C	N/C
N/C	N/C	N/C
STUD [R] OUT	CUE [R] OUT	CUE [L] OUT
STUD [L] OUT	C/R [R] OUT	C/R [L] OUT

Master-2

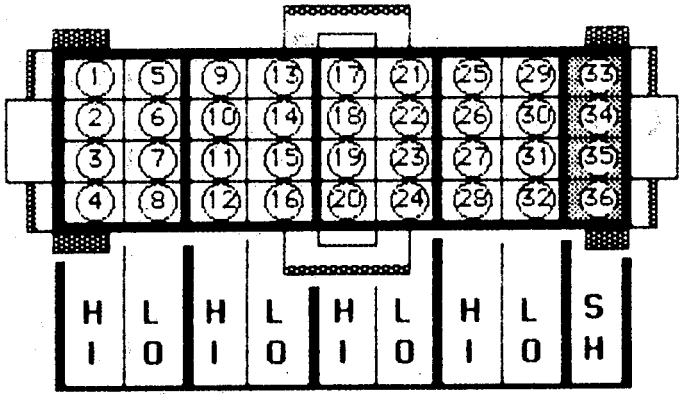
CHMBR 2[R] OUT	ECHO RETURN 2	ECHO SEND 2
CHMBR 2[R] IN	TAPE 1 [R] MON	MIX RIGHT OUT
CHMBR 2[L] OUT	ECHO RETURN 1	ECHO SEND 1
CHMBR 2[L] IN	TAPE 1 [L] MON	MIX LEFT OUT

Master-3

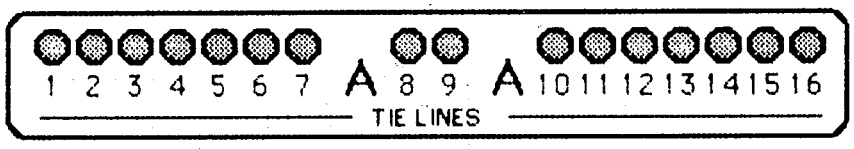
TAPE 3 [R] OUT	ECHO RETURN 4	ECHO SEND 4
TAPE 3 [R] IN	TAPE 2 [R] MON	MIX RIGHT OUT
TAPE 3 [L] OUT	ECHO RETURN 3	ECHO SEND 3
TAPE 3 [L] IN	TAPE 2 [L] MON	MIX LEFT OUT

FIG 2C - USER INTERFACE WIRING - CONSOLE I/O

Connector Pinout



Tie Line Patch Card



Tie Line Interface Card

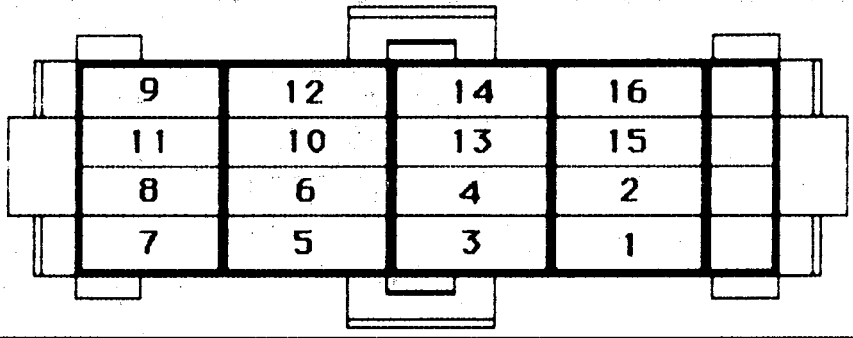


FIG 2E - USER INTERFACE WIRING - TIE LINES

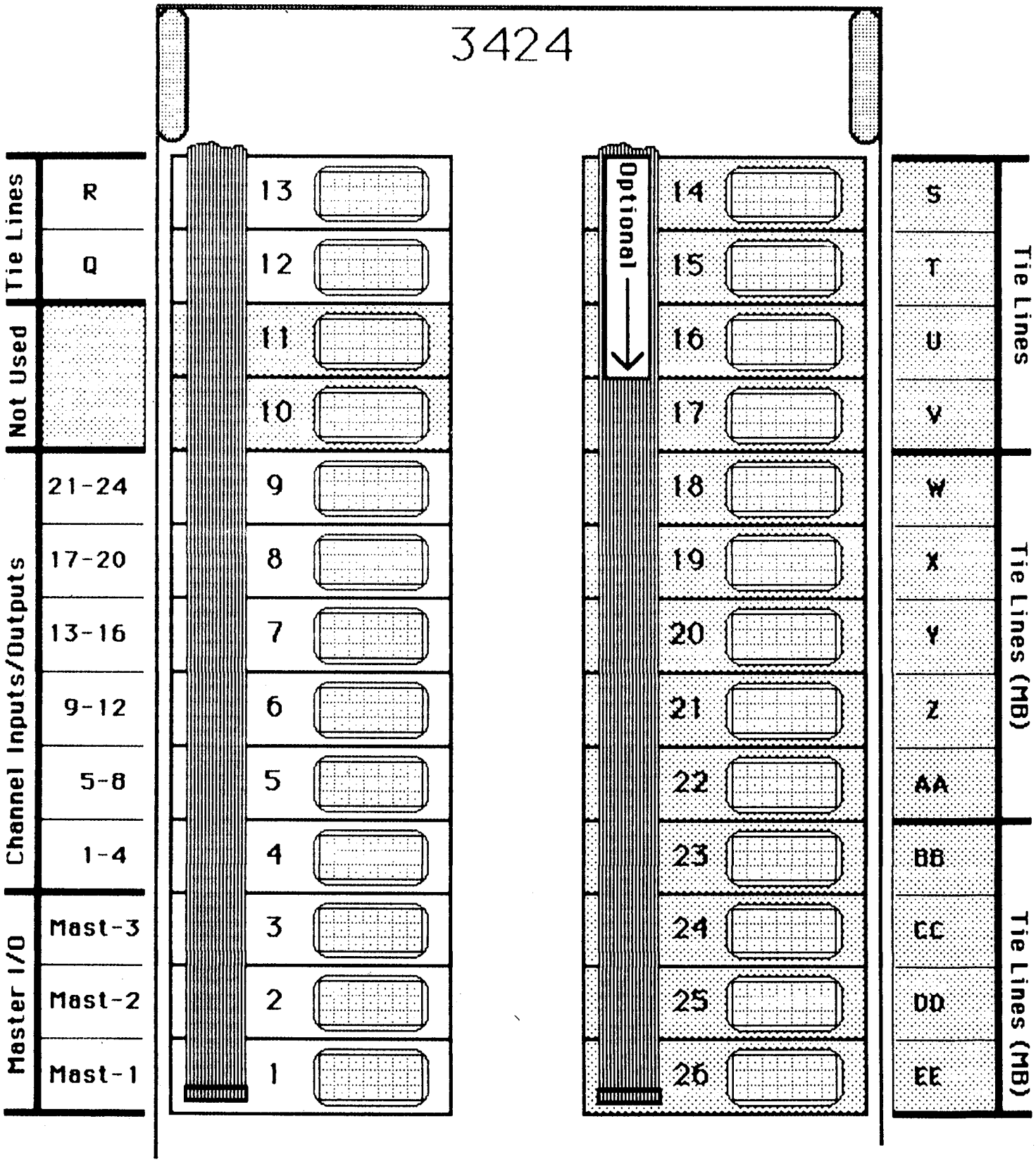


FIG 2F - USER INTERFACE CARD LAYOUT - 24MF

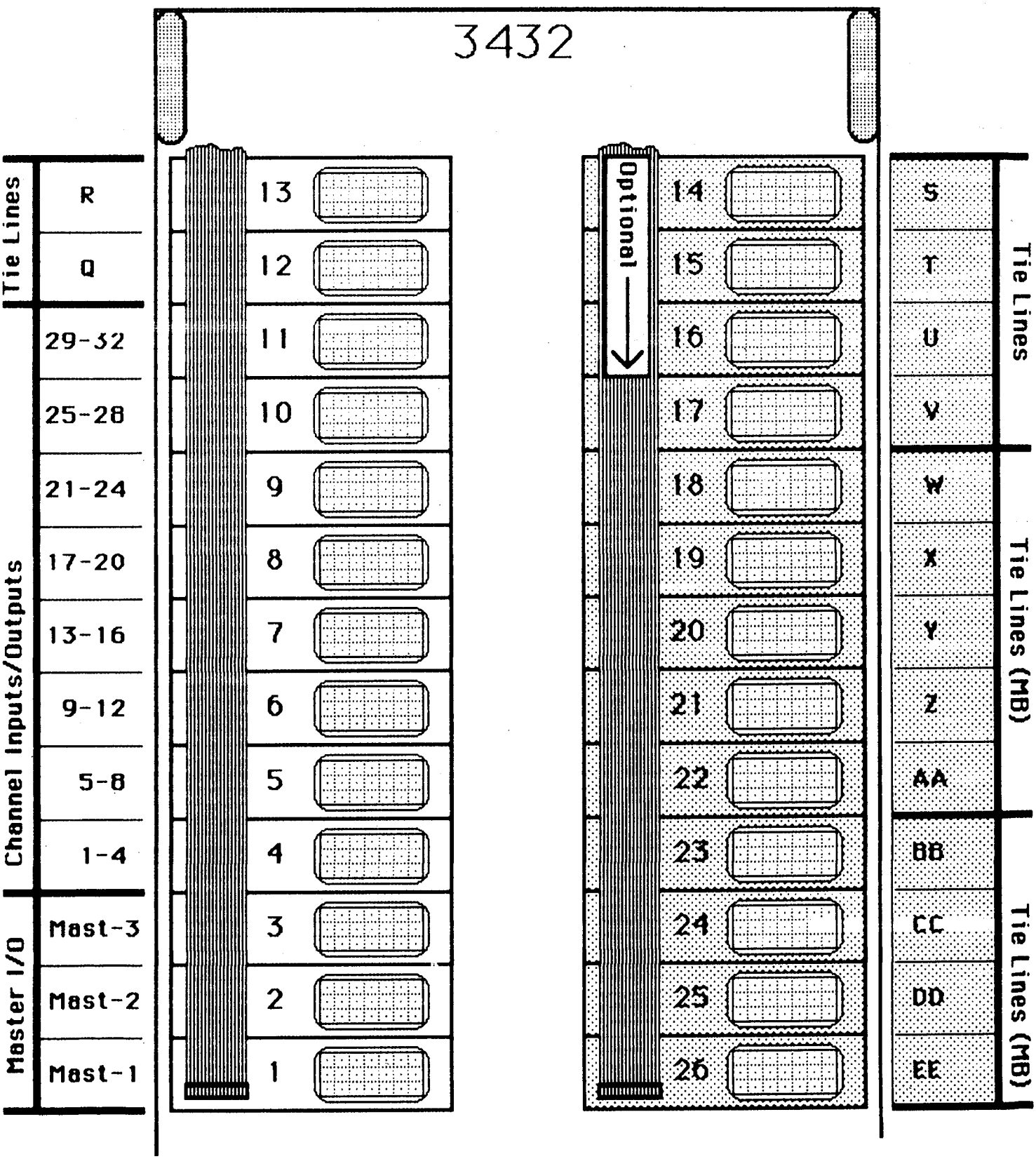


FIG 2G - USER INTERFACE CARD LAYOUT - 32MF

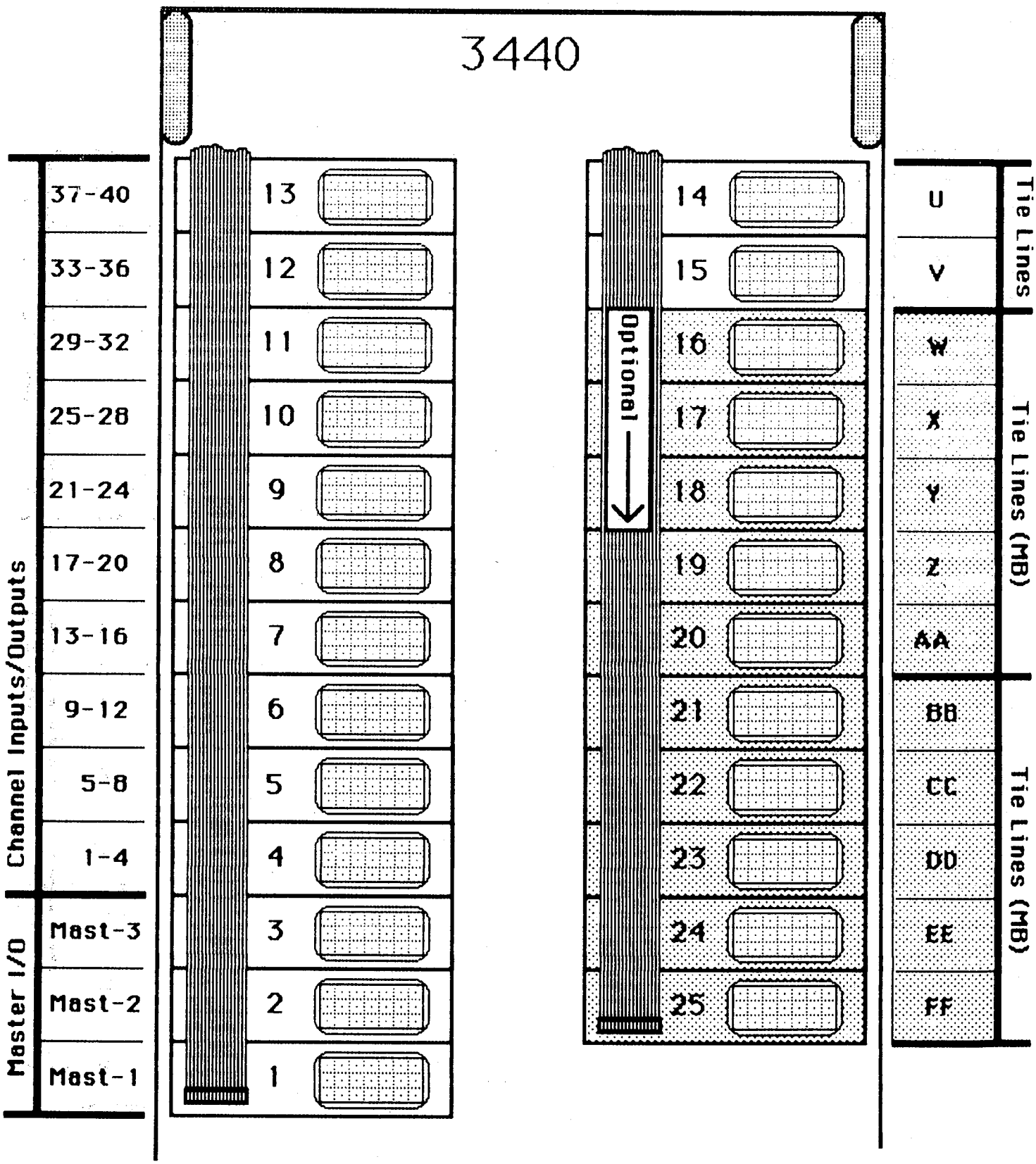


FIG 2H - USER INTERFACE CARD LAYOUT - 40MF

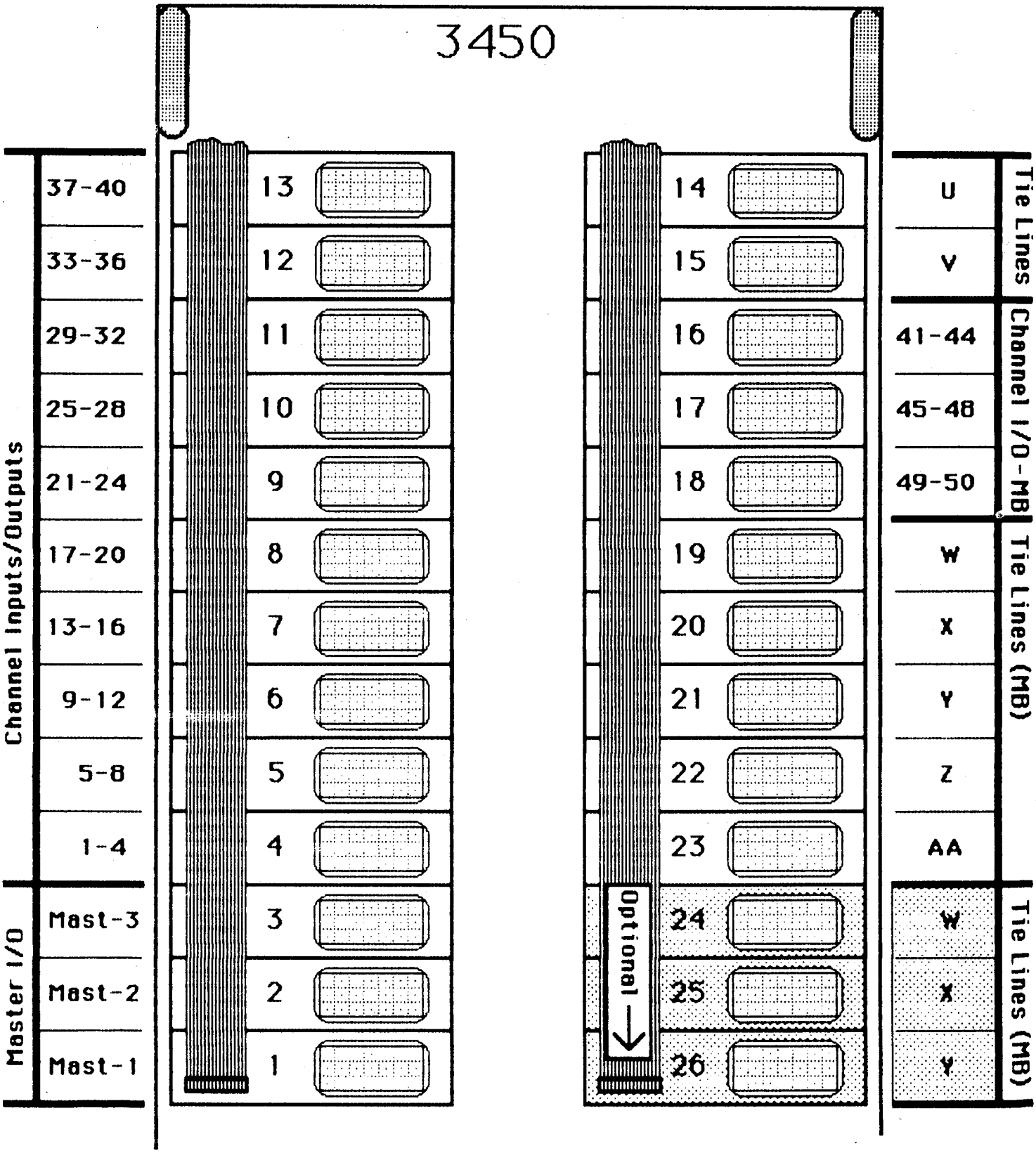


FIG 21 - USER INTERFACE CARD LAYOUT - 50MF

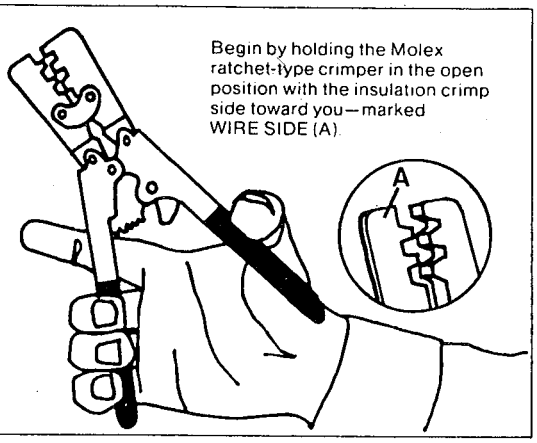
how to hand crimp

NOTE: This hand tool is primarily intended for standard conductor sizes. It may not give a good insulation crimp support for all wire variations.

CAUTION: This tool is **adjustable.** See illustration 6 before use, set jaw eccentric to maximum opening then adjust crimp to wire pull test. Failure to follow this procedure can result in tool breakage.

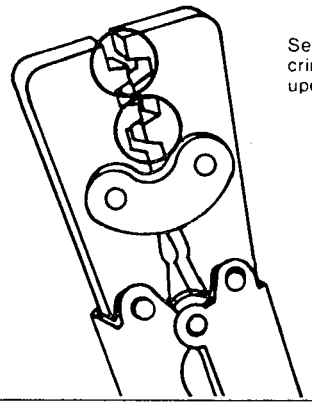
Follow these six simple steps to fast, *positive* terminal crimping.

1.



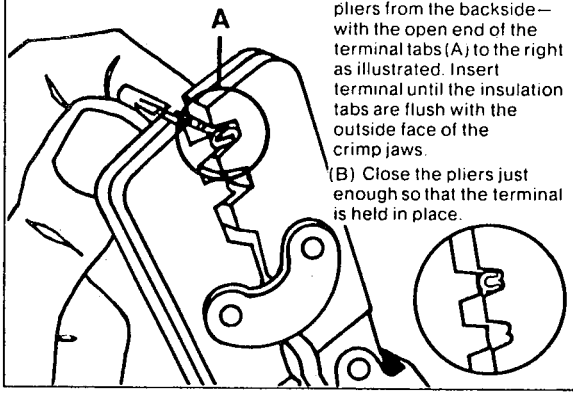
Begin by holding the Molex ratchet-type crimper in the open position with the insulation crimp side toward you—marked WIRE SIDE (A).

2.



Select the proper crimping jaws, depending upon the wire size.

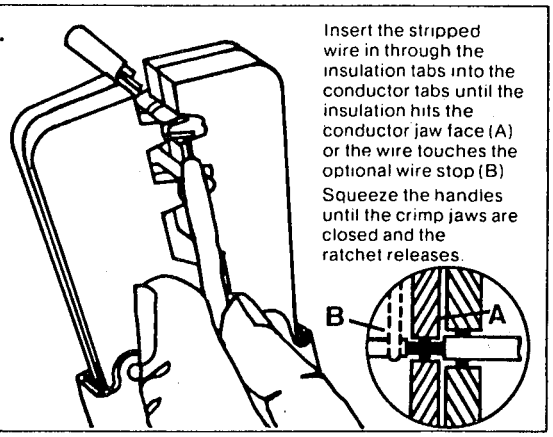
3.



Insert the terminal into the pliers from the backside—with the open end of the terminal tabs (A) to the right as illustrated. Insert terminal until the insulation tabs are flush with the outside face of the crimp jaws.

(B) Close the pliers just enough so that the terminal is held in place.

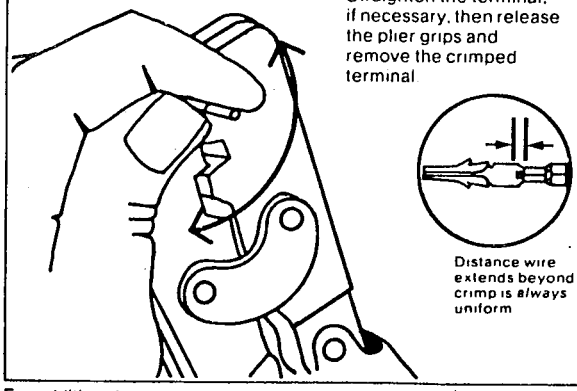
4.



Insert the stripped wire in through the insulation tabs into the conductor tabs until the insulation hits the conductor jaw face (A) or the wire touches the optional wire stop (B)

Squeeze the handles until the crimp jaws are closed and the ratchet releases.

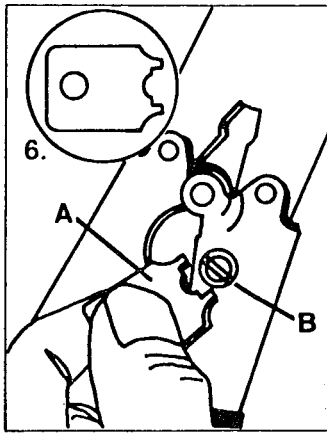
5.



Straighten the terminal, if necessary, then release the plier grips and remove the crimped terminal.

Distance wire extends beyond crimp is *always* uniform

6.



How to adjust crimping pressure.

If too much or too little pressure is needed to release the crimper s ratchet pawl at the end of the crimp stroke, the ratchet can be easily adjusted. A spanner* wrench (A) provided with the tool can be used to rotate the keyed lock and stud nut (B) on the crimper handle. Turning this lock nut clockwise increases pressure; turning it counter-clockwise reduces crimping pressure.

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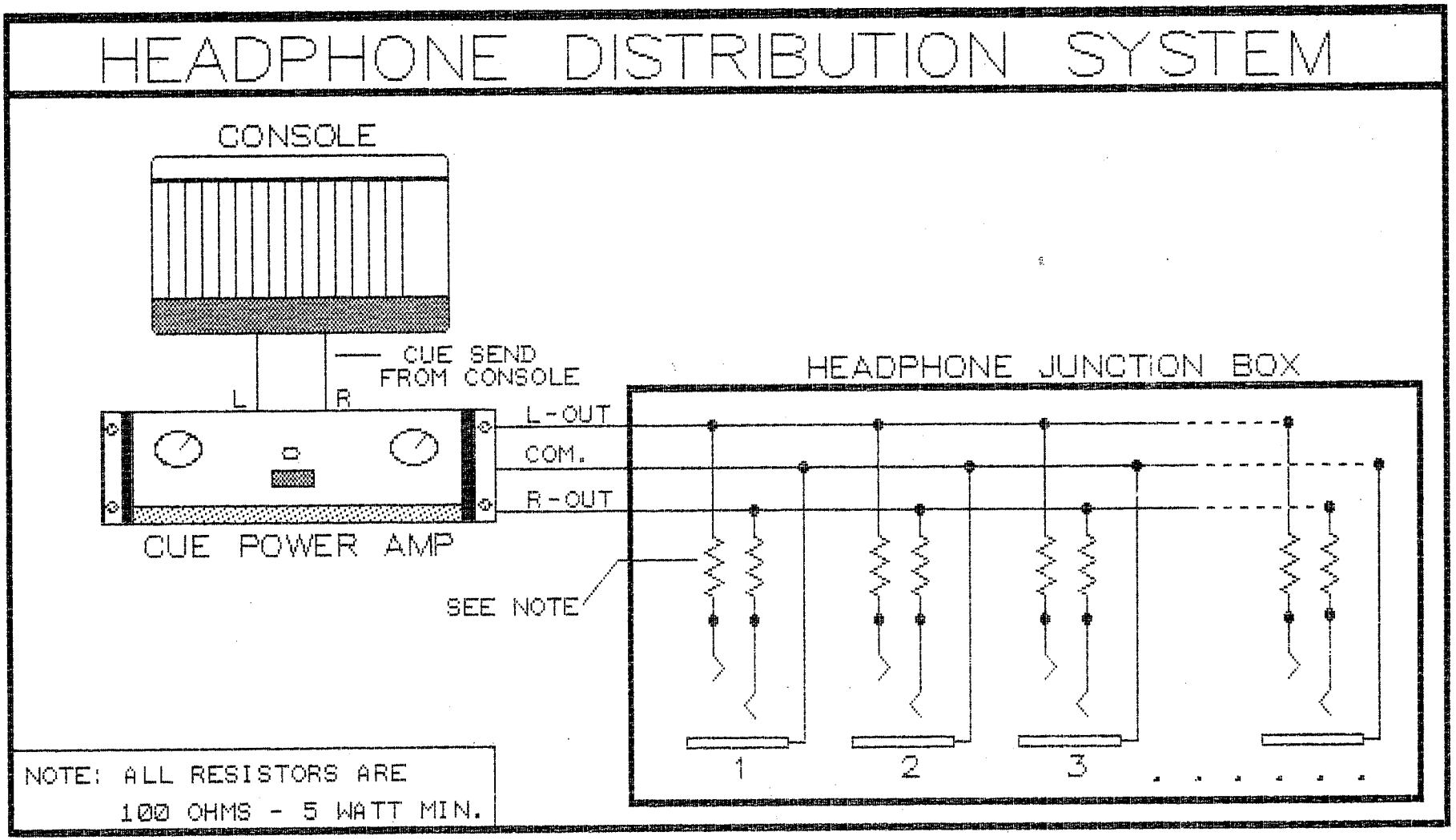
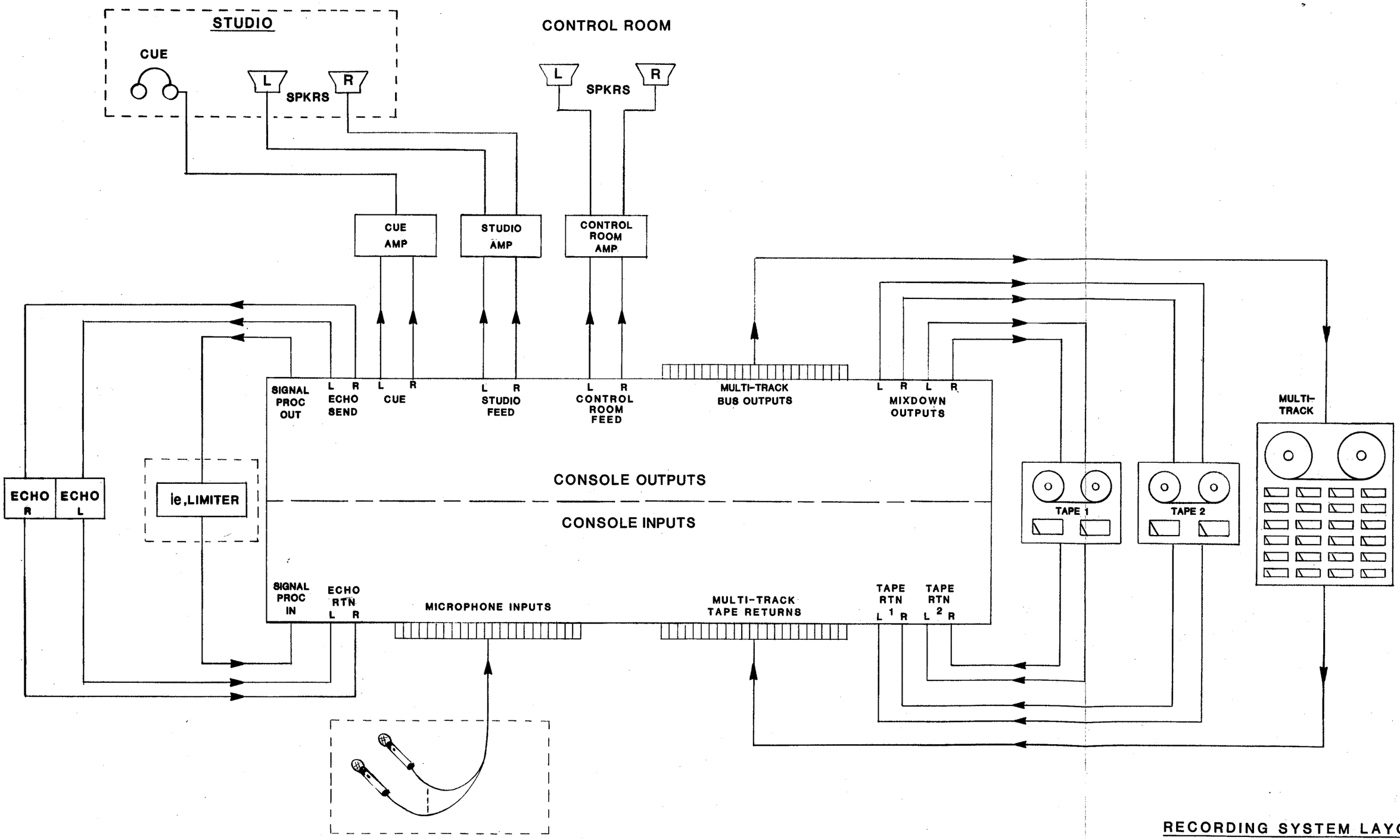
***Newer models should be adjusted with a screw driver.**

FIG 2J - PROPER CRIMPING TECHNIQUE

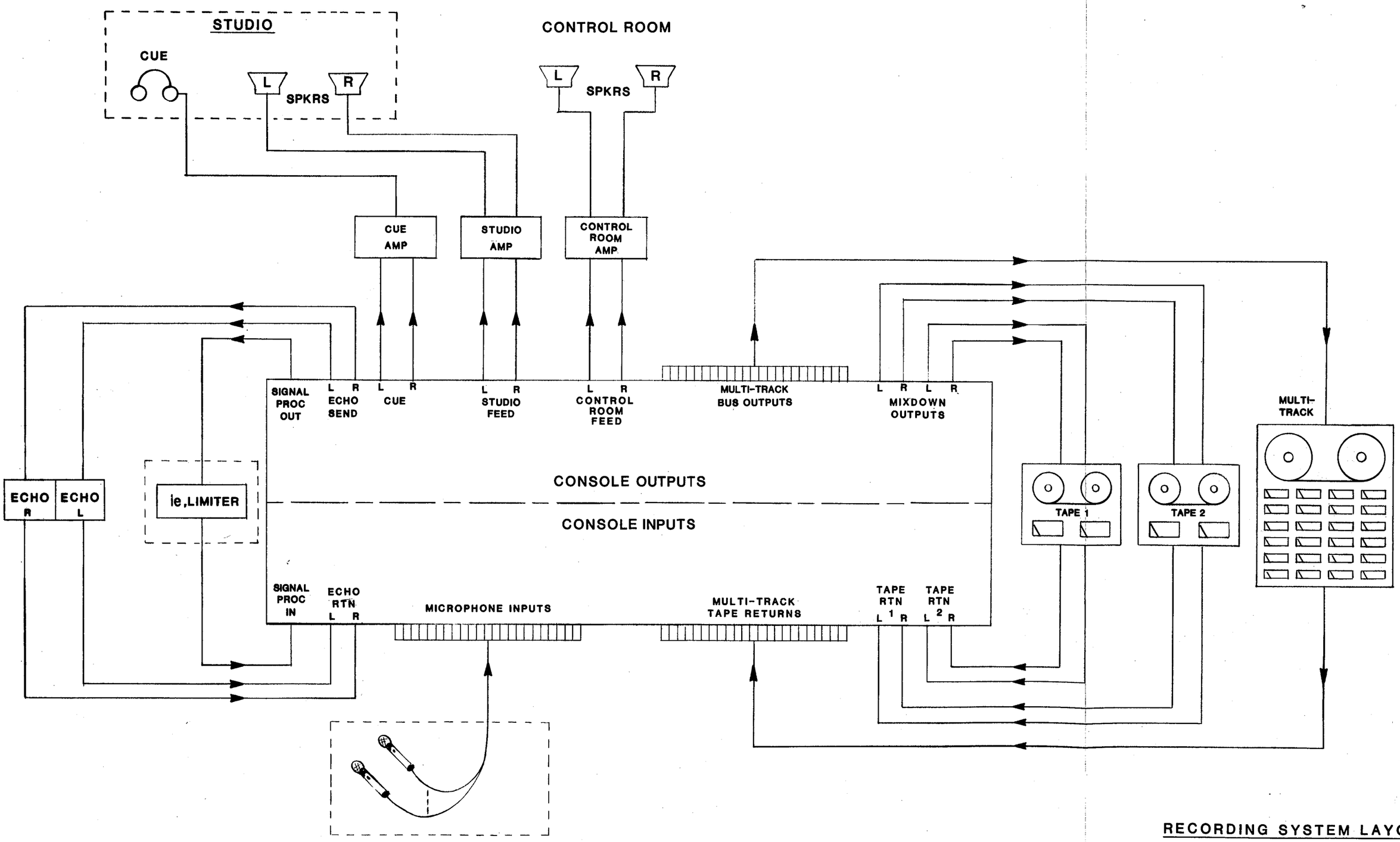
FIG 2K - TYPICAL HEADPHONE DISTRIBUTION SYSTEM





RECORDING SYSTEM LAYOUT

FIG 2L - TYPICAL RECORDING SYSTEM LAYOUT



RECORDING SYSTEM LAYOUT

FIG 2L - TYPICAL RECORDING SYSTEM LAYOUT

Section 3

Operation

3.1 OVERVIEW

In the following pages, each operating control of the Series 34 console is described in detail. First, the Functional Descriptions offer brief overviews of the controls on each of the Series 34 modules. This is followed by a Directory of Console Controls. For easy reference, each description is keyed to one of the three module control layout drawings found at the end of this section.

For purposes of discussion, signal flow within each I/O module may be divided into two sections: the Channel path and the Monitor path. The Channel path routes the signal from the module input to the track-summing buses, while the Monitor path feeds the input signal to the stereo mix buses. Differences between the two paths are dependant on how the I/O module controls and switches are set.

3.2 I/O MODULE

[Block Diagram 202-100, Figure 3A/1]

3.2.1 Track Assignment Matrix [1]

The Series 34 console contains 24 active track-summing buses. At the top of each I/O module, 12 pushbutton switches [1C] allow the user to route any input signal to one or more stereo pairs of buses [1/2, 3/4, ..., 23/24). On each module, the TRACK ASSIGN pan-pot [1A] pans the incoming signal between the odd/even track-summing bus pair(s) selected by the TRACK ASSIGN switches. When the pan-pot is rotated fully left or right, the signal is routed to only one of the two buses that are selected by each TRACK ASSIGN switch (Left = odd bus, Right = even bus).

In addition, each I/O module provides a direct post-fader output which is routed to a DIRECT OUTPUT jack on the patch bay. This output may be used to feed a tape recorder or other auxiliary equipment.

3.2.2 I/O LED Meter Display [2]

Depending on the position of the MIC/LINE switch [3E], the five-segment LED meter on each I/O module displays the level of either the incoming line-level signal or the output of the microphone preamplifier. Consequently, this meter may be used to verify Mic trim or Tape Cal adjustments. If the equalizer is in the channel path, then the effect of the equalization controls [4A-G] will be seen on the meter.

The Series 34 meter circuit is designed to produce a display that resembles the ballistics of a mechanical VU meter. Wide- angle, high-intensity LEDs indicate VU levels of -15, -10, -3 (green), 0 (yellow), and +3 (red), even under high ambient light conditions. The internal trim pot for each I/O meter has been factory calibrated to give a 0 VU indication when the signal level is -2 dBu, the internal operating level of the console. The trim pot may be reached via an access hole adjacent to the -3 LED.

To prevent current surges that might inject noise into the audio circuitry, a constant-current source is used to drive the meter LEDs.

3.2.3 Microphone Preamplifier [3]

The Series 34 Input/Output module uses a low-distortion, high-gain balanced transformerless microphone preamplifier circuit. Using a feedback-type control, the MIC TRIM potentiometer [3D] is used to vary circuit gain over a 45 dB range, to accommodate nominal input signal levels from -62 dBu to -17 dBu. For higher level input signals, the PAD switch [3A] inserts 20 dB of attenuation. A polarity switch [3B] reverses the polarity of the incoming signal, and phantom-powered capacitor microphones may be operated by depressing the +48 switch [3C].

3.2.4 Line Input Amplifier [3]

Depressing the MIC/LINE switch [3E] places the module in the Line Input mode. The amplifier design includes a transformerless differential input for the incoming line level signal. The line input may be fed from either a balanced or an unbalanced source signal, and an internal trim pot allows amplifier gain to be optimized for input signals from -10 dBu to +8 dBu. The trim pot may be reached through the CAL opening located adjacent to the MIC/LINE switch.

The balanced-input, variable-gain amplifier design permits easy interface with any tape recorder or other line-level source, regardless of its nominal output level and structure. The line amplifier's output feeds both the main input channel and the monitor sections of the I/O module.

3.2.5 Equalizer [4]

Every I/O module contains an active four-band sweep equalizer [4]. Four sets of dual-concentric potentiometers provide level and frequency control for low, mid (1 & 2) and high frequencies. A mechanical detent on each level control permits settings to be accurately repeated. However, the potentiometer may also be placed at any position between the detents. Levels are adjustable over a +/-15 dB range, and the four frequency bands are as follows:

High Frequency	750 Hz - 15 kHz [4D]
Mid Frequency 2	400 Hz - 8 kHz [4B]
Mid Frequency 1	150 Hz - 3 kHz [4E]
Low Frequency	35 Hz - 700 Hz [4C]

The wide overlap in frequency ranges provides maximum equalizer flexibility, with no inter-band interaction. The circuit design incorporates four active biFET IC stages, in a unity-gain configuration. The equalizer has an exceptionally low noise characteristic, minimal phase shift, and very low transient distortion.

In addition, the independent low-cut filter switch [4A] inserts a 40 Hz, 18 dB-per-octave low-cut (high-pass) filter in the Equalizer circuit block.

An EQ IN switch [4G] on each module allows the equalizer to be switched out of the circuit, while depressing the MON switch [4F] moves the equalizer out of the channel path and into the monitor section.

3.2.6 Cue and Echo Send Lines [5]

Each module's AUX section provides control over the signal sent to the stereo Cue bus and/or to the four Echo Send buses. These unbalanced lines have a clipping level of +21 dBu. Otherwise, each bus matches the performance specifications of the main console output buses.

The stereo Cue signal is a dual-concentric potentiometer [5A] with separate controls for level and panning. Similar potentiometers [5B,C] provide level control only for Echo Sends 1 and 2, and 3 and 4. In addition, POST/PRE and CHAN/MON (channel/monitor) switching [5D-G] is provided for Echo Send lines 1-3.

Cue and Echo Send signals may be derived from one of four possible sources. For the Cue Send and Echo Sends 1-3, the CHAN/MON switch selects a feed from the channel or from the monitor section, and the POST/PRE switch picks up that signal from a point before or after the channel or monitor level control. Echo Send line 4 is always fed from the post-fader channel output, but can be internally selected to be fed from the same sourcing as Echo Send 3.

The chart given here lists the four signal sources for the Cue Send and Echo Sends 1-3:

-----SWITCHES-----		----------
CHAN/MON	POST/PRE	SIGNAL SOURCES
Up	Up	Channel section, after fader
Up	Down	Channel section, before fader
Down	Up	Monitor section, after level control
Down	Down	Monitor section, before level control

Master level controls and metering for the Cue Send lines and for Echo Sends 1 and 2 are located on the Series 34 Master Module. Echo 3 and 4 controls are found on the Echo Master Module.

3.2.7 Monitor/Mixdown Section [6]

This section of the Series 34 I/O module selects the signal to be monitored and routed to the Stereo Mixdown bus. When the MON/MXDN switch [6D] is released, the signal selected by the BUS/TAPE switch [6C] is monitored. Level and pan are adjusted with the Monitor Level [6A] and Mix Bus Pan [6E] potentiometers. When the BUS/TAPE switch is released, the monitored signal is taken from the channel track- summing bus. When the switch is depressed, the signal comes from the line input amplifier (normally fed by the multi-track tape recorder returns). Monitored signals may be routed to the Solo bus by depressing the Monitor Solo switch [6B].

When the MON/MXDN switch [6D] is depressed, the channel output is selected. The FADER [9] and MIX BUS PAN pot [6E] determine the level and stereo position of the monitored signal. The monitored signal is also sent to the Echo and Cue send controls, and it may be routed to the Solo bus by depressing the CHANNEL SOLO switch [8].

The chart given here summarizes the effects of these switches. The underlined segment indicates the position of each switch:

6D	6C	Monitored Signal
MON/MXDN	BUS/TAPE	TRACK SUMMING BUS
MON/MXDN	BUS/TAPE	LINE INPUT AMPLIFIER
MON/MXDN		CHANNEL OUTPUT

3.2.8 Channel On Switch [7]

Depressing the CHANNEL ON switch [7] turns on all post-fader channel feeds within the I/O module. In the released position, all feeds are muted. For optimum signal-to-noise ratio, the CHANNEL ON switch should remain in the released position (mute) when the I/O module is not in use. Since the switch action is silent, it may be conveniently used for punching in and out, as needed.

3.2.9 Channel Solo Switch [8]

One or more input signals may be routed to the solo bus by depressing the CHANNEL SOLO switch [8] on the appropriate I/O module(s). When multiple CHANNEL SOLO switches have been depressed, the SOLO DEFEAT switch [39I] on the master module may be used as a Group Solo switch. In any case, the solo mode has no effect on the normal recording/signal-routing functions of the I/O module, and so it may be freely used during recording or mixdown work. Since the solo signal is taken from a point before the CHANNEL ON switch [7], muted signals may be soloed for cueing purposes. This feature can be quite helpful in making very tight, fader-up, punch-ins.

3.2.10 Channel Fader Section [9]

Level control for each input channel is provided by a Penny & Giles audio-taper CHANNEL FADER [9B]. The input to the fader is taken from a point immediately after the Patch Out/In jacks, which may be used as insertion points within this signal path. (During multi-track recording, if more than 10 dB of gain reduction at the CHANNEL FADER is consistently required, the MIC TRIM potentiometer [3D] should be used to attenuate the incoming signal, thereby maintaining the correct console gain structure.)

The CHANNEL FADER feeds a booster amplifier which in turn feeds the CHANNEL ON and SOLO switches [7, 8]. With the ARMS Console Computer option installed, the audio-taper fader is replaced with a VCA-law fader, and the input channel level is VCA controlled via a DC reference voltage derived from the fader and its associated circuitry. The in-circuit position of the CHANNEL FADER and the MONITOR LEVEL potentiometer [6A] may be exchanged by depressing the MON switch [9A] located just above the fader.

3.2.11 ARMS Computer Controls [10]

These LEDs and switches are used in conjunction with Sound Workshop's Auto-Recall Mixdown System (ARMS). Please refer to the ARMS owners manual for complete details.

3.3 ECHO MASTER MODULE

[Block Diagram 202-101, Figure 3A/2]

3.3.1 VU Meter and Meter Switches [21, 25]

The LED VU meter found in the Echo Master Module uses the same high-performance circuit design found in the I/O Module meters. Here, it monitors either the Send or Return line chosen by the METER SELECT switches [25].

3.3.2 Echo Send and Return Controls [22, 23, 24]

Just below the VU meter, an ECHO RETURN matrix [22] consisting of twelve pushbuttons may be used to assign Echo Returns 3 and 4 to one or more pairs of odd/even track summing buses. Individual controls for each Echo Return are found immediately below the matrix. Each has its own PAN pot [23A] and LEVEL potentiometer [23B]. By depressing the ECHO RETURN-to- TRACK ASSIGN switch [23C], the Echo return is routed to the ECHO RETURN matrix. The ECHO RETURN-to-MIX BUS switch [23D] routes the signal to the Stereo Mix bus, while an ECHO RETURN SOLO switch [23E] allows either return line to be routed to the solo bus.

There is a separate ECHO SEND MASTER potentiometer [24A] for Send Lines 3 and 4, as well as an ECHO SEND SOLO switch [24B].

3.3.3 Microphone, Function and Display Controls [26, 27, 28]

For talkback and slating, a high-performance electret microphone [26] is built into the Echo Master Module. Just below it, four FUNCTION switches [27] may be used to control user- defined functions. Near the bottom of the module, an INTENSITY potentiometer [28A] and VU/PPM switch [28B] control the intensity and meter ballistics of the Series 34's high-resolution meter modules.

3.4 CR/STUDIO MASTER MODULE

[Block Diagram 202-101, Figure 3A/3]

For operational efficiency, the Series 34 Master Module conveniently groups all the important master control functions within a clearly-defined area.

Each Summing Bus (Cue sends 1 & 2, Echo sends 1-4, Solo and Mix Left and Right) feeds an identical circuit block, consisting of an Active Combining Amplifier (ACA), fader, and an Output Booster (AFB - After-Fader Booster). Note: the Echo send 3 and 4 level controls are located on the Echo Master Module, and use a rotary potentiometer in place of a slide fader.

In addition to summing the normal channel outputs, the Stereo Mix buses are also fed from the following sources: Echo returns 1-4 via the Echo-to-Mix switches [23D and 36],two auxiliary inputs via the BUS IN patch points, and the Slating amplifier.

Each ACA feeds its Summing Bus output to a fader, which provides full-range level control to the Output Booster amplifier. This amplifier delivers a nominal +4 dBu output level into a 600-ohm load.

3.4.1 Echo and Cue Controls [31 - 37]

The upper section of the Series 34 Master Module contains all master controls associated with the Left and Right Cue sends and Echo Sends 1 and 2. The ECHO RETURN-to-MIX PAN and LEVEL potentiometers [32A-D] are used to set the stereo position and level of the echo return lines feeding the stereo mix bus. An ECHO-to-MIX switch [36] in the echo return section may be used to add the echo signal into the mix. In addition, there are ECHO RETURN-to-CUE LEVEL [33] and TALKBACK-into-CUE LEVEL potentiometers [34] located in the upper right hand corner of the module.

Immediately below these controls, four slide faders [35] are used to set the master levels for Echo Sends 1 and 2, and for the Left and Right Cue Sends. The Master Module's five-segment AUX LEVEL meter [31] will monitor any one of these send lines, via the AUX SELECT switches [37]. This signal is also fed to the Studio and Control Room Monitor section. Therefore, when the AUX SELECT switches for Cue 1 and Cue 2 are both depressed, it is possible to stereo monitor the cue system by also depressing the Studio or Control Room AUX switch [38C and/or 39C].

The meter's circuit design provides a signal response that matches the ballistics of a mechanical VU meter. The high- intensity wide angle leds provide a clear multi-color display even under high ambient light conditions. The leds indicate levels of -15, -10, -3, 0 and +3 VU. The meter is factory calibrated to indicate 0 VU for a +4 dBu output level. An internal trim pot is provided for meter calibration. To prevent current surges from injecting noise into the audio circuitry, the leds are driven by a constant-current source.

3.4.2 Monitor Controls [38 & 39A-F]

Monitor select and level controls are grouped in the mid section of the Series 34 Master Module. For the studio monitor system, a set of four STUDIO MONITOR SELECT switches [38A-D] and a STUDIO MONITOR ON switch [38E] route the appropriate signal to the STUDIO LEVEL potentiometer [38F]. A similar set of controls [39A-F] are used for the control room monitor system. When either AUX switch [38C, 39C] is depressed, the signal chosen by the AUX SELECT switch [37A-D] is monitored. Within the Control Room group of switches, the MONITOR ON switch is replaced by a MONO switch [38E] for monitoring in the mono mode. Especially on multi-mic recording and multi-track mixdowns, this function should be frequently used to check for phase cancellation effects and other mono-mode compatibility problems.

3.4.3 Master Solo Controls [39G-I]

Master Solo controls are also found in the Control Room section of the module. A SOLO ENABLE LED [39G] provides a clear visual indication that the Solo Bus is feeding the control room monitor system. The SOLO LEVEL potentiometer [39H] may be used to adjust the listening level of the Solo signal. When the Solo mode has been selected on one or more I/O modules, the Master Module's SOLO DEFEAT switch [39I] may be used as a Master Group Solo control. By simply depressing this one switch, all active solos are lifted, and the normal monitoring mode is restored. Releasing the switch reactivates the solo mode.

3.4.4 Communications Section [40]

Communications controls are also located in the mid section of the Master Module. The STUDIO TALKBACK LEVEL potentiometer [40A] adjusts the level of the talkback signal feeding the studio monitors. Talkback level is not affected by the Studio LEVEL control [38F] and On/Off switch [38E]. Immediately below the STUDIO TALKBACK control, the SLATE LEVEL potentiometer [40B] performs the same function for the signal feeding the Track-summing, Stereo Mixdown, and Stereo Cue buses. In either case, the TALKBACK switch [40C] must be depressed to enable the Talkback/Slating functions. The TALKBACK-to-CUE switch [40D] may also be used to route the signal to the Cue buses only, to permit headphone-communication to the studio musicians while recording. When either Talkback switch is depressed, a logic circuit mutes the feeds to the Control Room and Studio monitors.

3.4.5 Test Oscillator [41]

All oscillator controls are located next to the Communications section. A LEVEL potentiometer [41A] adjusts the oscillator's output level, while the frequency is determined by a potentiometer [41B] and two multiplier switches [41D,E]. The adjacent TEST switch [41C] is used to feed the oscillator output to all the Track-summing and Stereo Mixdown buses. The oscillator output is also available at the OSC jack in the Patch Bay. When the oscillator's LEVEL potentiometer is turned fully clockwise, the output level is +4 dBu at the Oscillator jack in the patch bay.

3.4.6 Mixdown Master Control [42]

In the lower left hand corner of the Master Module, the MIXDOWN MASTER FADER [42] regulates the stereo output signal sent to both two-channel tape recorders, and to the Control Room and Studio monitor systems.

3.4.7 ARMS Computer Controls [43]

Just to the right of the Mixdown Master Fader, a group of 16 pushbuttons and LEDs are provided. The first eight of these switches may be assigned to user-defined functions, while the remaining eight are for use with Sound Workshop's Auto-Recall Mixdown System (ARMS). Please refer to the ARMS manual for complete details.

3.5 PATCH BAY

[Figures 3B-D and all Block Diagrams]

A comprehensive patch bay provides convenient insertion points within each I/O module, as well as at all key locations in the Echo Master and Master modules. There are also patch points for tie lines and signal processors. For complete patch bay details, see the appropriate Flow Charts. In addition, Figures 3B-D illustrate the layout of the patch bay. Also refer to Section 5 for important Maintenance notes.

3.6 METER BRIDGE

To monitor the console outputs or tape returns, as determined by the position of the BUS/TAPE switch [6C], two metering designs are offered, both of which mount in the Series 34 console's meter bridge. The High-Resolution Meters provide forty-segment, three-color LED displays that feature both peak and average modes. Both modes are displayed using the same meter scale, allowing accurate analysis of peak signal content by switching between modes. At 0 VU, resolution is 0.25 dB, which allows precise system calibration. The intensity of the LEDs may be adjusted over a wide range to eliminate the eye fatigue that is so common with many LED displays.

For more traditional metering requirements, Sound Workshop provides conventional mechanical meter modules. Conventional and High-Resolution meter modules may be intermixed within the limits of the available space.

3.7 DIRECTORY OF CONSOLE CONTROLS

The numbers and letters given below correspond to those seen on the appropriate Module Call-Out drawings found at the end of this section.

3.7.1 INPUT/OUTPUT MODULE

[Block Diagram 202-100, Figure 3A/1]

[1A] **TRACK ASSIGN** pan-pot. Pans the incoming signal between the odd/even track-summing bus pair(s) selected by the TRACK ASSIGN switches [1C].

[1B] **KLUDGE** hole. Drilled and capped to accommodate future options.

[1C] **TRACK ASSIGN** switches. Assign the incoming signal to one or more of the odd/even track-summing bus pairs, in conjunction with the TRACK ASSIGN pan-pot [1A].

[2] **VU METER.** Five LEDs provide a visual indication of the Microphone or Line Input level, as selected by the MIC/LINE switch [3E].

[3A] **PAD** switch. Inserts a 20 dB attenuation network before the microphone preamplifier.

[3B] **POLARITY** switch. Reverses the polarity of the microphone line (for 180-degree sinewave phase shift).

[3C] **+48** switch. Supplies 48 VDC to the microphone line, for phantom-powered capacitor microphones.

[3D] **MIC TRIM** potentiometer. Controls the gain of the microphone preamplifier over a range of 45 dB.

[3E] **MIC/LINE** switch. Selects either the microphone or the line as the I/O module's input signal.

[4] **EQUALIZER** section.

[4A] **LOW-CUT FILTER** switch. Inserts an 18 dB-per-octave low-cut (high-pass) filter in the input signal path. Note that this switch operates independently of the EQ IN [4G] switch.

[4B-E] **LEVEL and FREQUENCY** potentiometers. Adjust the level and frequency for each of four bands of equalization, as seen here:

Control	Level (upper knob)	Frequency Range (lower knob)	Band
4D	+/-15 dB	750 Hz - 15 kHz	High
4B	+/-15 dB	400 Hz - 8 kHz	Mid 2
4E	+/-15 dB	150 Hz - 3 kHz	Mid 1
4C	+/-15 dB	35 Hz - 700 Hz	Low

[4F] **EQ MONITOR INSERT** switch. Removes the equalizer from the channel path and inserts it in the monitor path. (Note that the equalizer is active only when the EQ IN switch [4G] is depressed.

[4G] **EQualizer IN** switch. Routes the channel or monitor input signal selected by the MONITOR INSERT switch [4F] through the equalizer.

[5A] **CUE LEVEL and PAN** potentiometers. Adjust the level (lower knob) and pan position (upper knob) of the input signal fed to the stereo cue bus.

[5B] **ECHO LEVEL 1 & 2** potentiometers. Adjusts the levels of the input signal fed to echo buses 1 (lower) and 2 (upper).

[5C] **ECHO LEVEL 3 & 4** potentiometers. Adjusts the levels of the input signal fed to echo buses 3 (lower) and 4 (upper).

[5D] **POST/PRE** switch. Routes the appropriate input signal to the CUE LEVEL and PAN potentiometers [5A] from a point after (POST) or before (PRE) the source selected by the CHANnel/MONitor switch [5E].

[5E] **CHANnel/MON** switch. Routes either the channel or the monitor signal to the POST/PRE switch [5D].

[5F] **POST/PRE** switch. Routes the appropriate input signal to the ECHO LEVEL potentiometers [5B and 5C] from a point after (POST) or before (PRE) the source selected by the CHANnel/MONitor switch [5G]. NOTE: the switch effects only the bus-3 side of the 5C potentiometers. The bus-4 side is permanently assigned to the post-fader channel output.

[5G] **CHANnel/MON** switch. Routes either the channel or the monitor signal to the POST/PRE switch [5F].

[6A] **Monitor LEVEL** potentiometer. Adjusts the level of the monitor signal when the MON/MXDN switch [6D] is released. NOTE: When the MON switch [9A] is depressed, this potentiometer is exchanged with the CHANNEL FADER [9B].

[6B] **MONITOR SOLO** switch. Routes the monitored signal to the solo bus, which is inserted in the control room monitor system in place of the regular monitor signal. NOTE: muted signals and multiple channels may be soloed.

[6C] **BUS/TAPE** switch. Routes the signal from the track-summing bus or the tape return to the monitor LEVEL potentiometer [6A] and to the meter module.

[6D] **MON/MXDN** switch. Routes the signal from the BUS/TAPE switch [6C] or from the INPUT FADER [9] to the MIX BUS PAN potentiometer [6E]. (MON = BUS/TAPE, MXDN = INPUT FADER.)

[6E] **MIX BUS PAN** potentiometer. Pans the signal selected by the MON/MXDN switch [6D] between the left and right mix buses.

[7] **CHANNEL ON** switch. Turns the channel signal path on or off (mute).

[8] **SOLO** switch. Routes the channel output signal to the solo bus, which is inserted in the control room monitor system in place of the regular monitor signal. NOTE: muted signals and multiple channels may be soloed.

[9A] **MON** switch. When depressed, exchanges the CHANNEL FADER [9B] with the monitor LEVEL potentiometer [6A].

[9B] **CHANNEL FADER.** Controls the level of the channel (or monitor) input signal.

[10A-E] **ARMS Computer Controls.** These LEDs and switches are used in conjunction with Sound Workshop's Auto-Recall Mixdown System (ARMS). Please refer to the ARMS instruction manual for complete details.

3.7.2 ECHO MASTER MODULE

[Block Diagram 202-101, Figure 3A/2]

NOTE: Echo controls on this module are for Echo Lines 3 and 4 only. Echo lines 1 and 2 are controlled from the Master Module.

[21] **ECHO VU** meter. Provides a visual indication of the Echo send or return level (on line 3 or 4), as selected by the METER SELECT switches [25A-D].

[22] **ECHO RETURN ASSIGN** matrix. Assigns the incoming echo return signal to one or more of the odd/even track-summing buses when an ECHO RETURN-to-TRACK SUMMING BUS switch [23C] is depressed.

NOTE: There are two sets of controls [23A-E] and [24A-B], to accommodate echo send and return lines 3 and 4.

[23A] **ECHO RETURN PAN** potentiometer. Pans the incoming signal between the selected odd and even track-summing bus pair and/or between the left and right mix buses, according to the status of the ECHO RETURN-to-TRACK SUMMING BUS switch [23C] and the ECHO RETURN-to-MIX BUS switch [23D].

[23B] **ECHO RETURN LEVEL** potentiometer. Controls the level of the incoming echo return line.

[23C] **ECHO RETURN-to-TRACK** Summing Bus switch. Routes the incoming echo return line to the ECHO RETURN ASSIGN matrix [22].

[23D] **ECHO RETURN-to-MIX** Bus switch. Routes the incoming echo return line to the stereo mix bus.

[23E] **ECHO RETURN SOLO** switch. Routes the incoming echo return line to the solo bus.

[24A] **ECHO SEND MASTER** potentiometer. Controls the level of the outgoing echo send line.

[24B] **ECHO SEND SOLO** switch. Routes the outgoing echo send line to the solo bus.

[25A-D] **METER SELECT** switches. Route the signal from either of the send or return lines to the ECHO VU meter [21].

[26] **TALKBACK/SLATING microphone.** A high-sensitivity electret microphone for talkback and slating.

[27] **FUNCTION SELECT** switches. Provide convenient switching facilities for any user-defined functions.

[28A] **METER INTENSITY** potentiometer. Adjusts the brightness of the related high-resolution meter modules.

[28B] **VU/PPM SELECT** switch. Selects Average (VU) or Peak (PPM) ballistics mode for the related high-resolution meter modules.

3.7.3 MASTER MODULE

[Block Diagram 202-101, Figure 3A/3]

[31] **AUX BUS LEVEL** meter. Displays the level of Echo Send line 1 or 2, or of the left or right Cue Send line, according to the status of the AUX BUS SELECT switches [37].

[32A,C] **ECHO RETURN-to-MIX PAN** potentiometer. Pans the incoming left [32A] and right [32C] echo return lines to the Stereo Mix Bus, when the ECHO-to-MIX switch [36] is depressed.

[32B,D] **ECHO RETURN-to-MIX LEVEL** potentiometer. Adjusts the level of the incoming left [32B] and right [32D] echo return line feeds to the Stereo Mix Bus.

[33A-B] **ECHO RETURN-to-CUE LEVEL** potentiometer. Adjusts the level of the incoming left [33A] and right [33B] echo return line feeds to the Stereo Cue Bus.

[34A-B] **TALKBACK-into-CUE LEVEL** potentiometer. Adjusts the level of the Talkback [40C] or Cue [40D] line feeds to the Stereo Cue Bus.

[35A-B] **ECHO SEND MASTER LEVEL** potentiometer. Adjusts the level of Echo Send lines 1 [35A] and 2 [35B].

[35C-D] **CUE SEND MASTER LEVEL** potentiometer. Adjusts the level of Cue Send lines Left [35C] and Right [35D].

[36] **ECHO-to-MIX** switch. Routes Stereo Echo Return lines 1 and 2 to the Stereo Mix Bus, in conjunction with the ECHO RETURN-to-MIX potentiometers [32B,D].

[37A-D] **AUX SELECT** switches. Select the signal to be routed to the AUX BUS meter [31]. The metered signal may be Cue Send line 1 [37A], Cue Send line 2 [37B], Echo Send line 1 [37C] or Echo Send line 2 [37D]. The switches also select the line going to the AUX position in the STUDIO MONITOR SELECT [38C] and CONTROL ROOM MONITOR SELECT [39C] switches.

[38A-D] **STUDIO MONITOR SELECT** switches. Select the signal to be monitored in the studio. The monitored signal may be from Tape 2 [38A], Tape 1 [38B], Aux Bus [38C] or Mixdown Bus [38D].

[38E] **STUDIO MONITOR ON/OFF** switch. Routes the selected signal to the studio monitor system.

[38F] **STUDIO LEVEL** potentiometer. Adjusts the playback level of the studio monitor system.

[39A-D] **CONTROL ROOM MONITOR SELECT** switches. Select the signal to be monitored in the control room. The monitored signal may be from Tape 2 [39A], Tape 1 [39B], Aux Bus [39C] or Mixdown Bus [39D].

[39E] **CONTROL ROOM MONO** switch. When depressed, places the control room monitor system in the mono mode.

[39F] **CONTROL ROOM LEVEL** potentiometer. Adjusts the playback level of the control room monitor system.

[39G] **SOLO ON** LED. Indicates when one or more input channels are in the Solo mode.

[39H] **SOLO LEVEL** potentiometer. Adjusts the level of the solo bus. Used in conjunction with the CONTROL ROOM LEVEL potentiometer [39F].

[39I] **SOLO DEFEAT** switch. Disables the Solo mode, regardless of the status of all I/O module Solo switches [8]. May be used as a Group Solo control.

[40A] **STUDIO TALKBACK** potentiometer. Adjusts the level of the Talkback signal fed to the studio monitor system. Talkback level is not affected by the STUDIO LEVEL or ON/OFF controls [38E,F].

[40B] **SLATE LEVEL** potentiometer. Adjusts the level of the Talkback signal fed to the Track, Stereo Mix and Stereo Cue buses.

[40C] **TALKBACK** switch. Routes the Talkback signal to the Track, Stereo Mix and Stereo Cue buses, as well as to the Studio monitor system.

[40D] **TALKBACK-to-CUE** switch. Routes the Talkback signal to the Stereo Cue Bus only.

[41] **OSCILLATOR** Controls.

[41A] **LEVEL** potentiometer. Adjusts the output level of the built-in test oscillator.

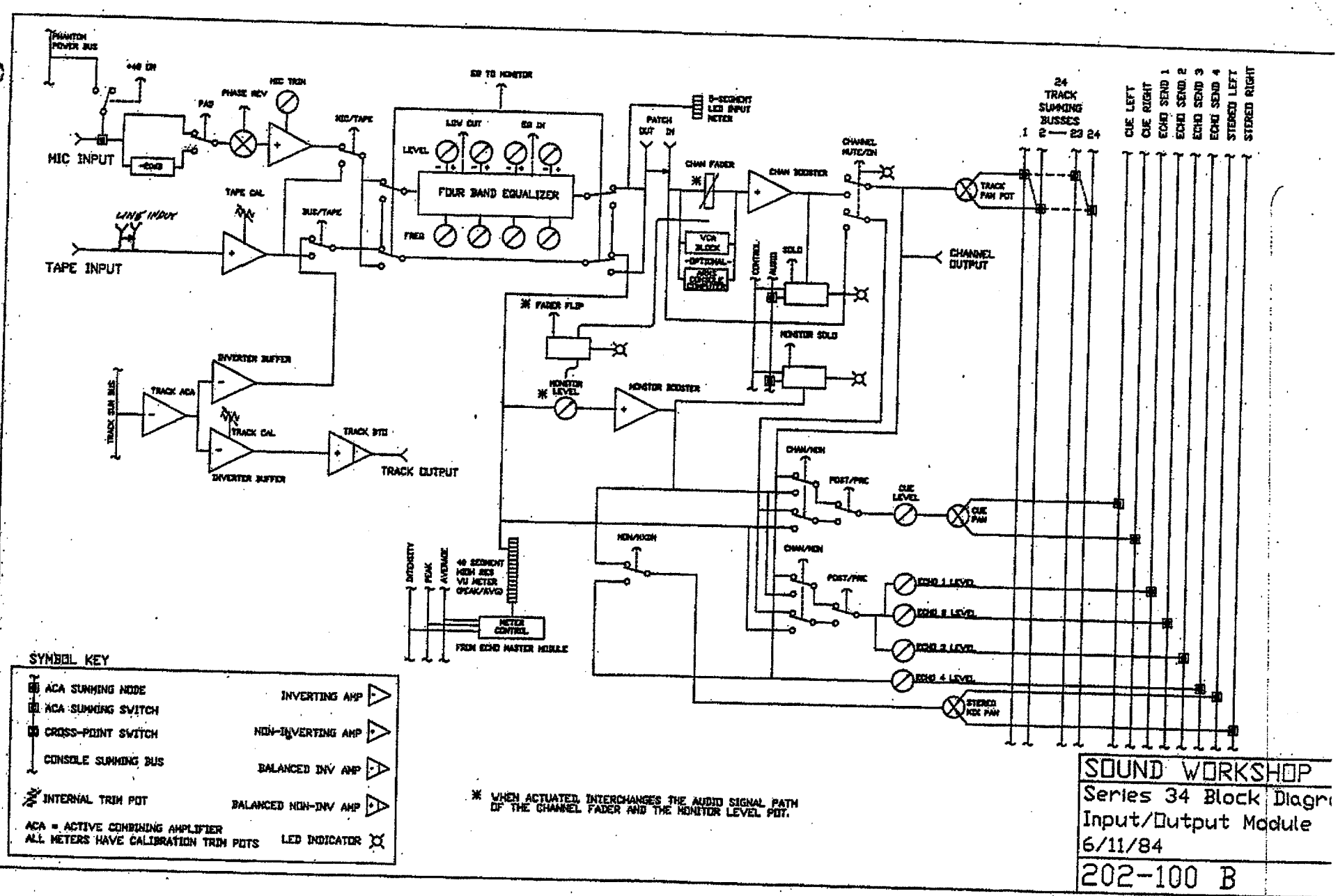
[41B] **FREQUENCY** potentiometer. Tunes the output frequency of the test oscillator. Used in conjunction with the FREQUENCY MULTIPLIER switches [41D-E].

[41C] **TEST** switch. Routes the oscillator output signal to the Track and Stereo Mix buses.

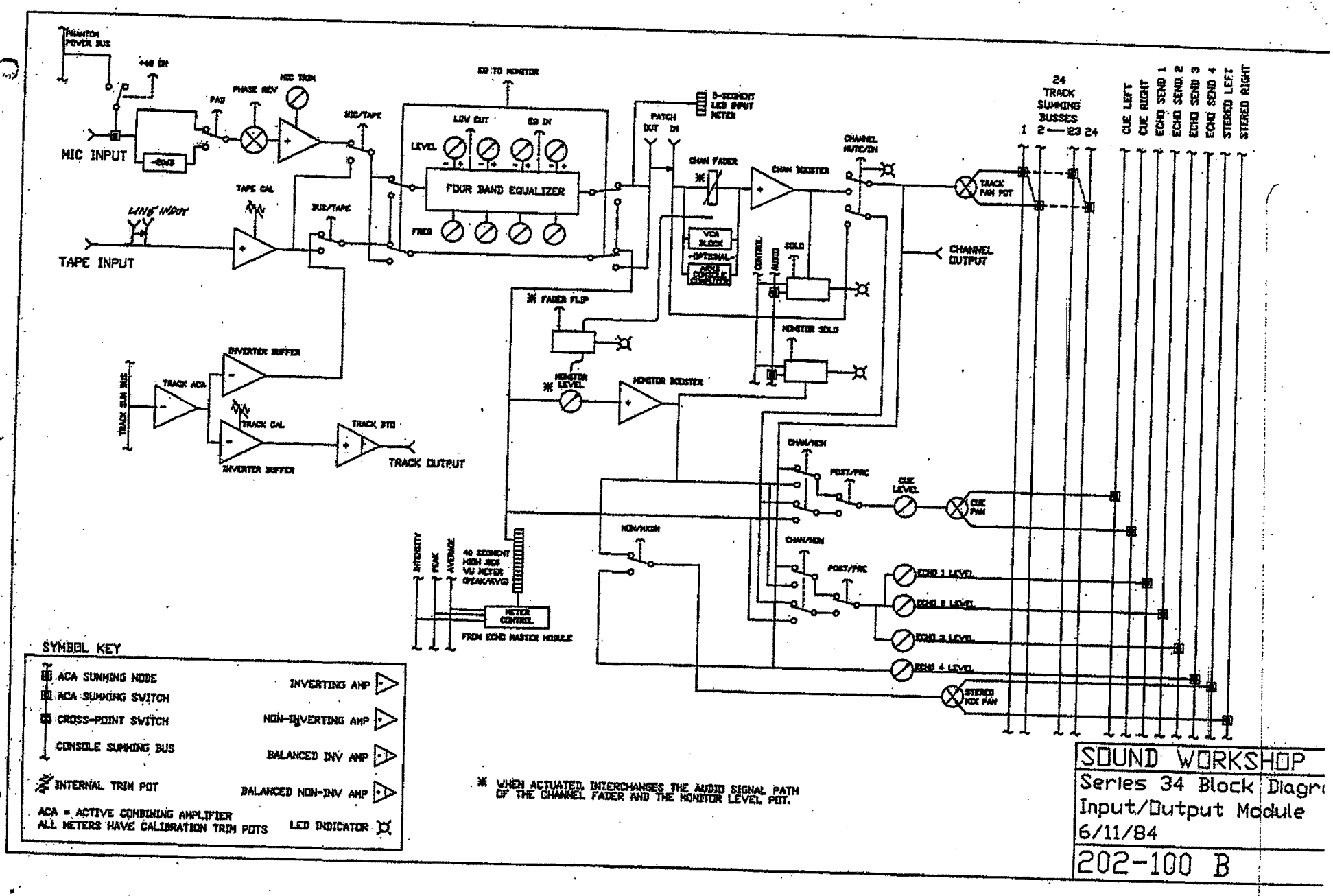
[41D-E] **MULTIPLIER** switches. Select the range (x1, x10, x100) in which the FREQUENCY potentiometer [41B] operates. When both switches are released, the oscillator output is disabled.

[42] **MIXDOWN MASTER** fader. Adjusts the level of the Stereo Mix Bus signal fed to the two-channel tape recorders, and to the control room and studio monitor systems.

[43] **ARMS COMPUTER CONTROLs.** These LEDs and switches are used in conjunction with Sound Workshop's Auto-Recall Mixdown System (ARMS). Please refer to the ARMS instruction manual for complete details.



SOUND WORKSHOP
Series 34 Block Diagr
Input/Output Module
6/11/84
202-100 B



SYMBOL KEY

- ACA SUMMING NODE
- ACA SUMMING SWITCH
- CROSS-POINT SWITCH
- CONSOLE SUMMING BUS
- INTERNAL TRIM POT
- ACA = ACTIVE COMBINING AMPLIFIER
- ALL METERS HAVE CALIBRATION TRIM POTS
- INVERTING AMP
- NON-INVERTING AMP
- BALANCED INV AMP
- BALANCED NON-INV AMP
- LED INDICATOR

* WHEN ACTUATED, INTERCHANGES THE AUDIO SIGNAL PATH OF THE CHANNEL FADER AND THE MONITOR LEVEL POT.

SOUND WORKSHOP

Series 34 Block Diagr

Input/Output Module

6/11/84

202-100 B

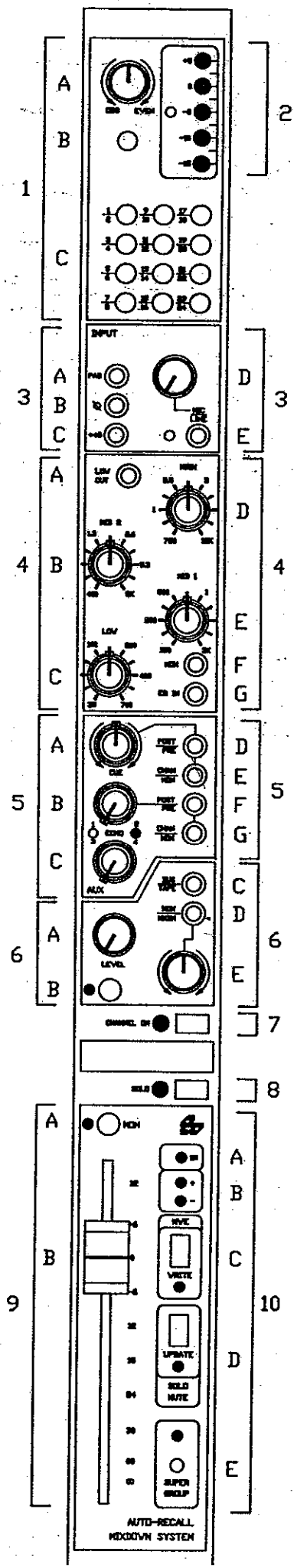
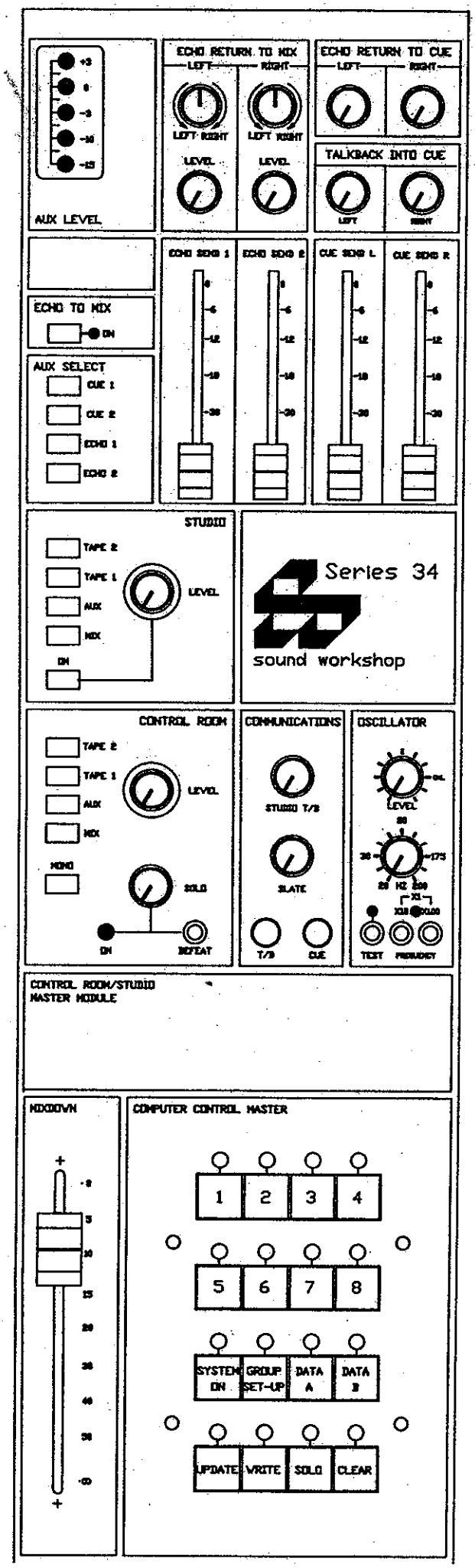


FIG 3A/1 - CALLOUTS - INPUT MODULE



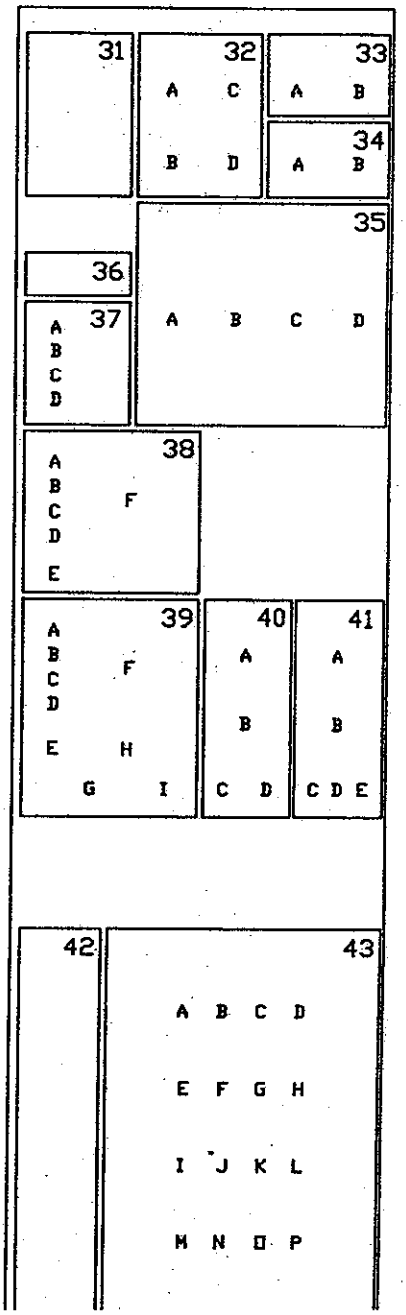
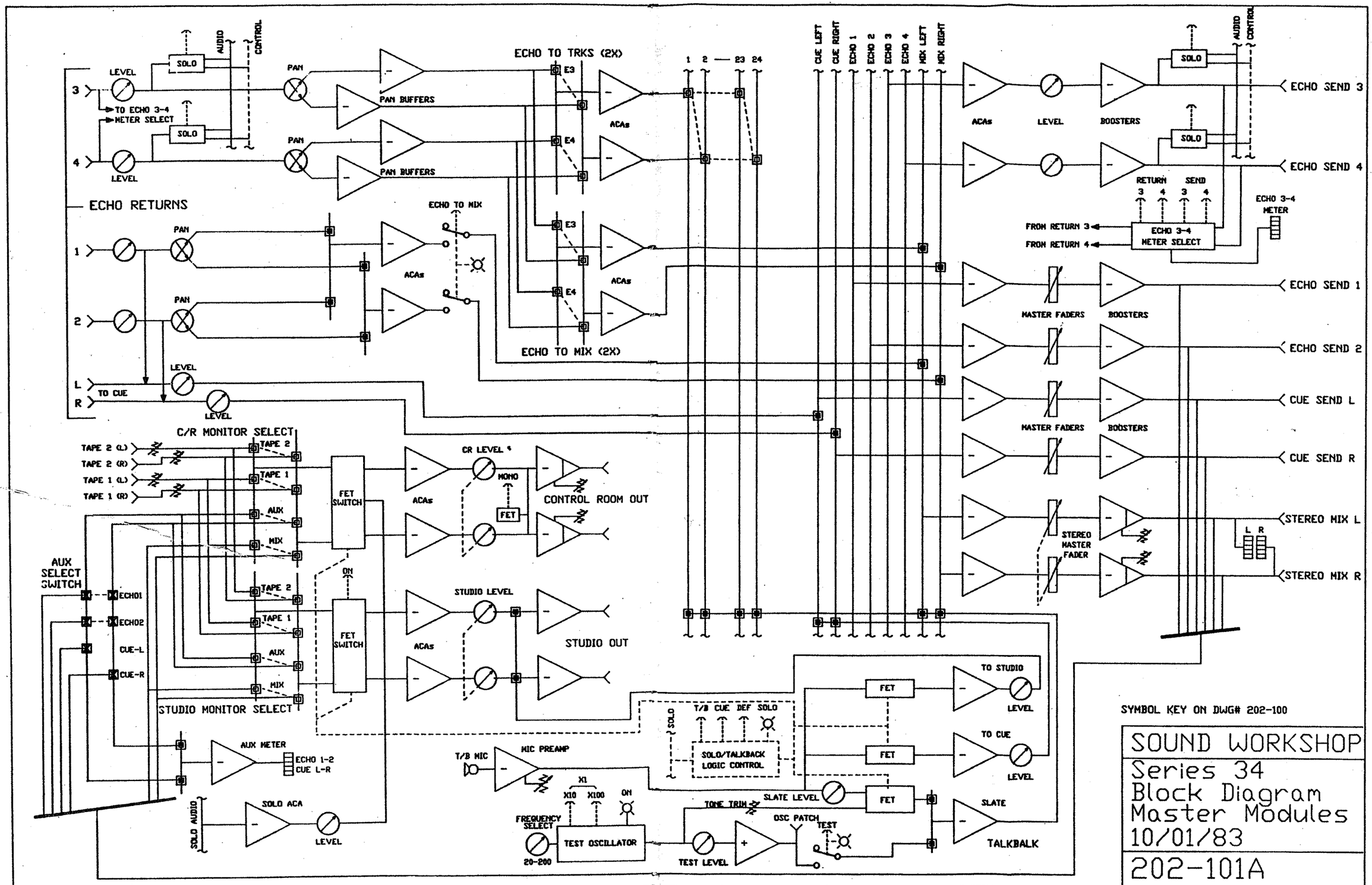


FIG 3A/3 - CALLOUTS - CR/STUDIO MASTER MODULES

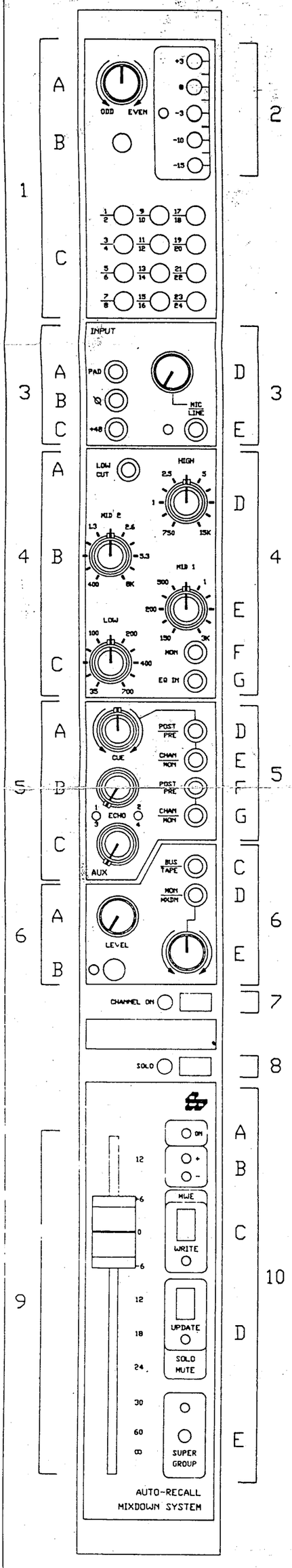


SYMBOL KEY ON DWG# 202-100

SOUND WORKSHOP

Series 34
Block Diagram
Master Modules
10/01/83

202-101A



SOUND WORKSHOP
Series 34
Input/Output Module

1 - TRACK ASSIGN MATRIX AND PAN-POT

2 - INPUT CHANNEL VU METER

3 - MIC/LINE INPUT SECTION

4 - FOUR-BAND SWEEPABLE EQUALIZER

5 - AUX SEND SECTION

6 - MONITOR/MIXDOWN SECTION

7 - CHANNEL ON/MUTE SWITCH

8 - CHANNEL SOLO SWITCH

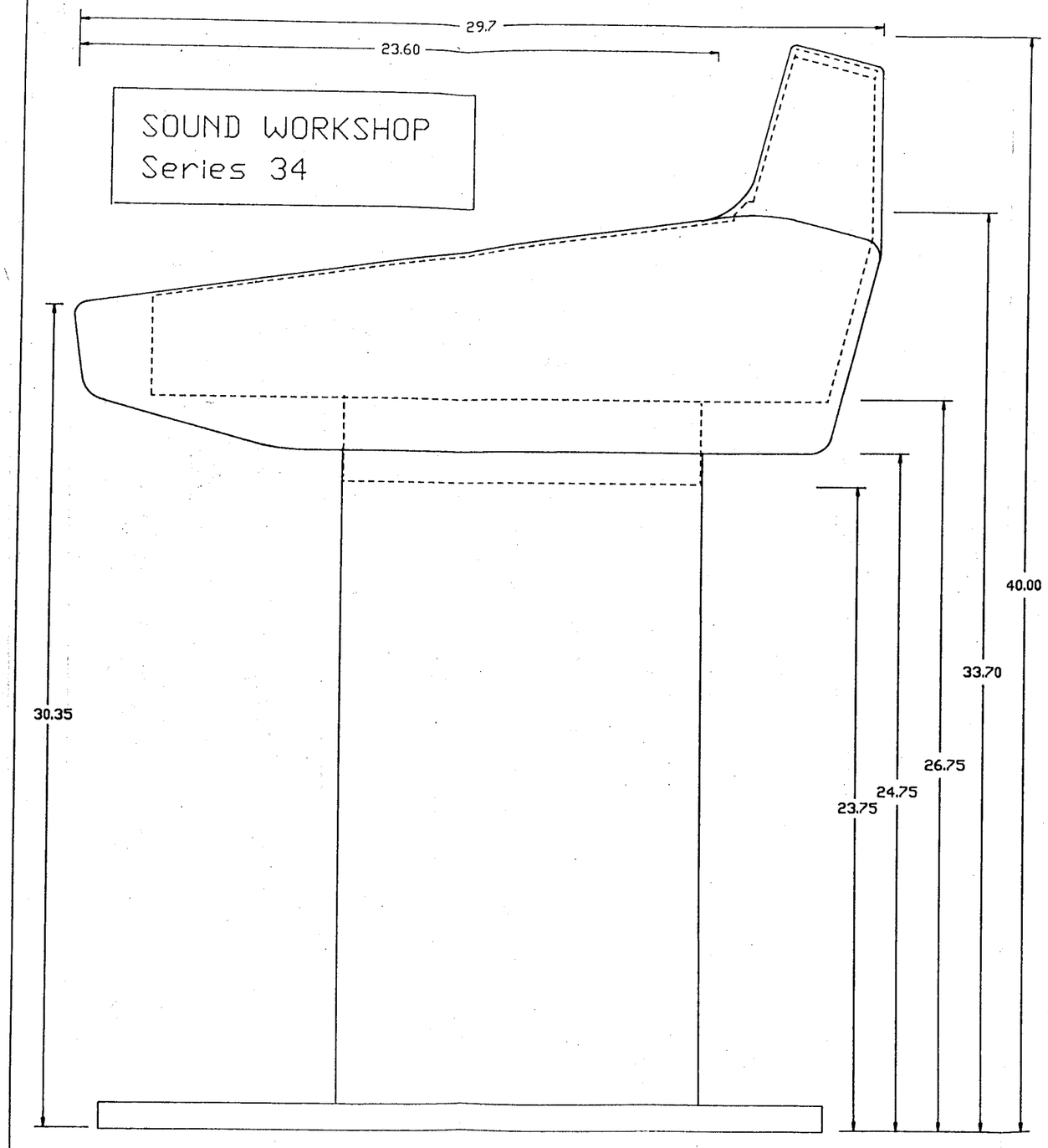
9 - INPUT CHANNEL P&G FADER

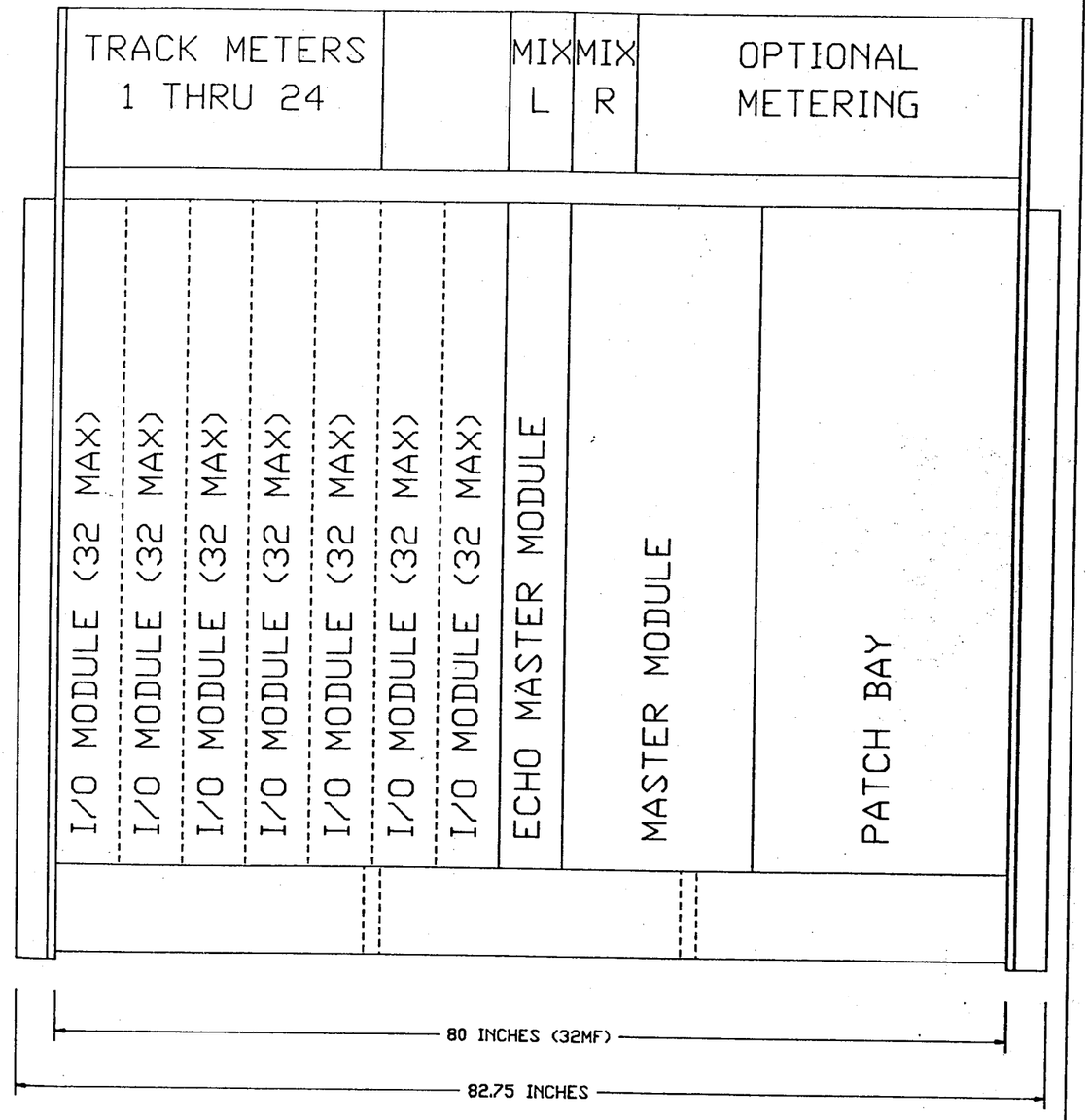
10 - SWITCHES & LEDS FOR DIGITAL CONTROL/VCA FUNCTIONS

10/01/83

202-325A

SOUND WORKSHOP
Series 34





10/01/83
202-301A

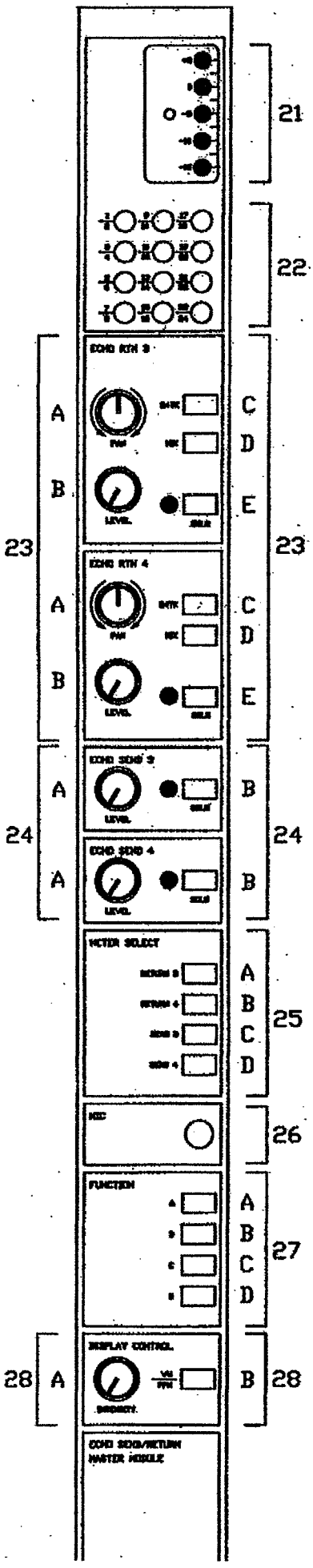
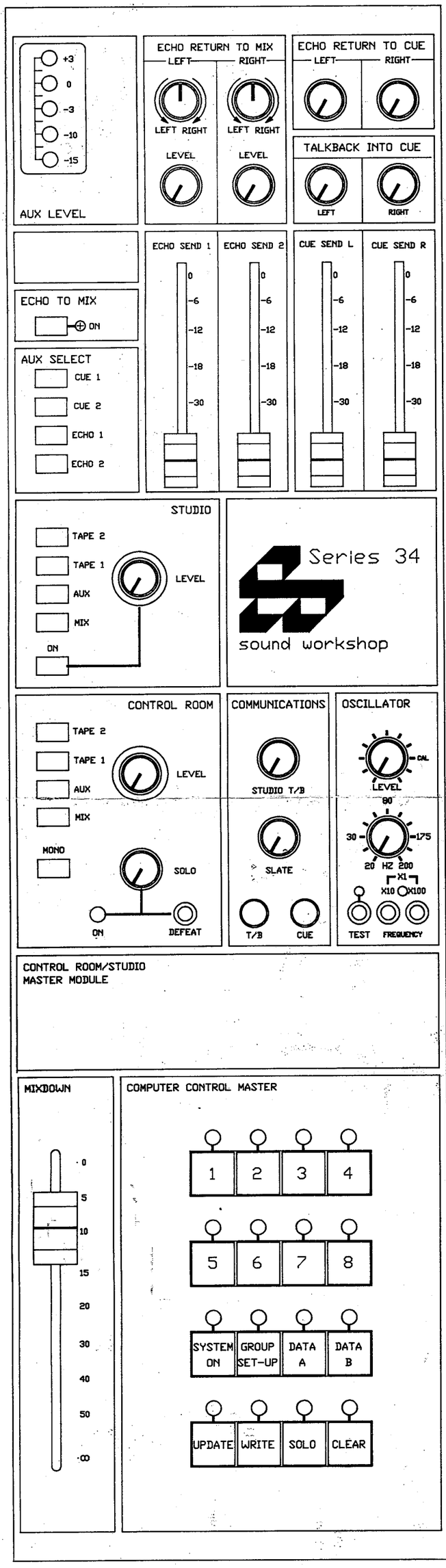
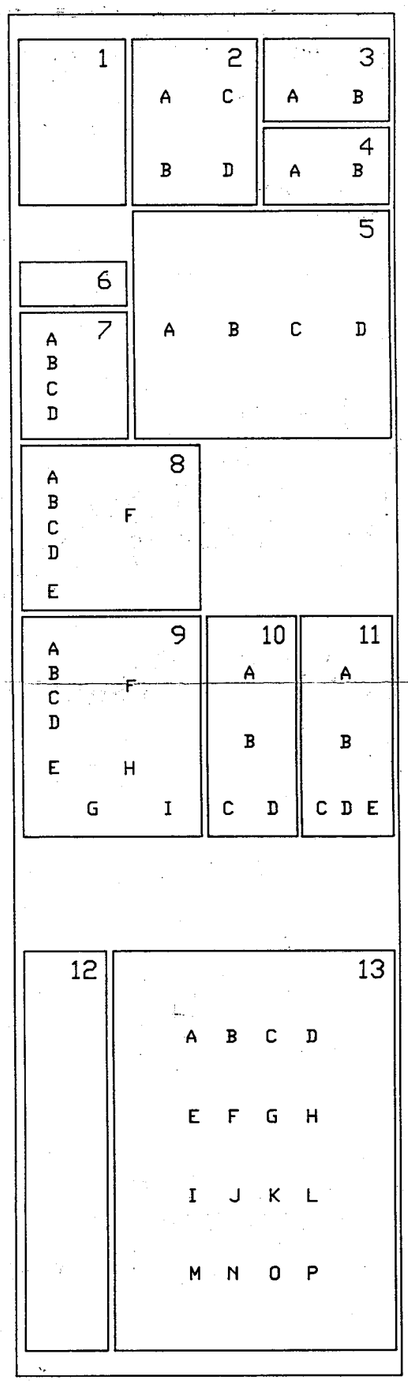
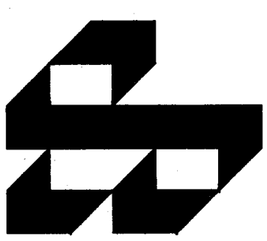


FIG 3A/2 - CALLOUTS - ECHO MASTER MODULE

SOUND WORKSHOP
Series 34
Master Module







10/01/83

202-301A

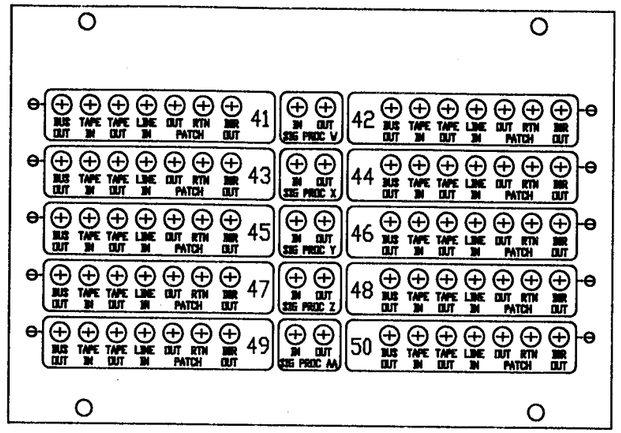


FIG 3B/1 - MB PATCH PANEL - 50MF (CHAN 41-50)

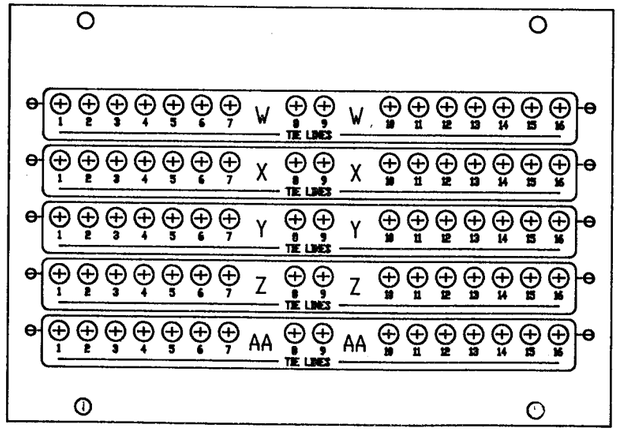


FIG 3B/2 - MB PATCH PANEL - TIE LINES (W-AA)

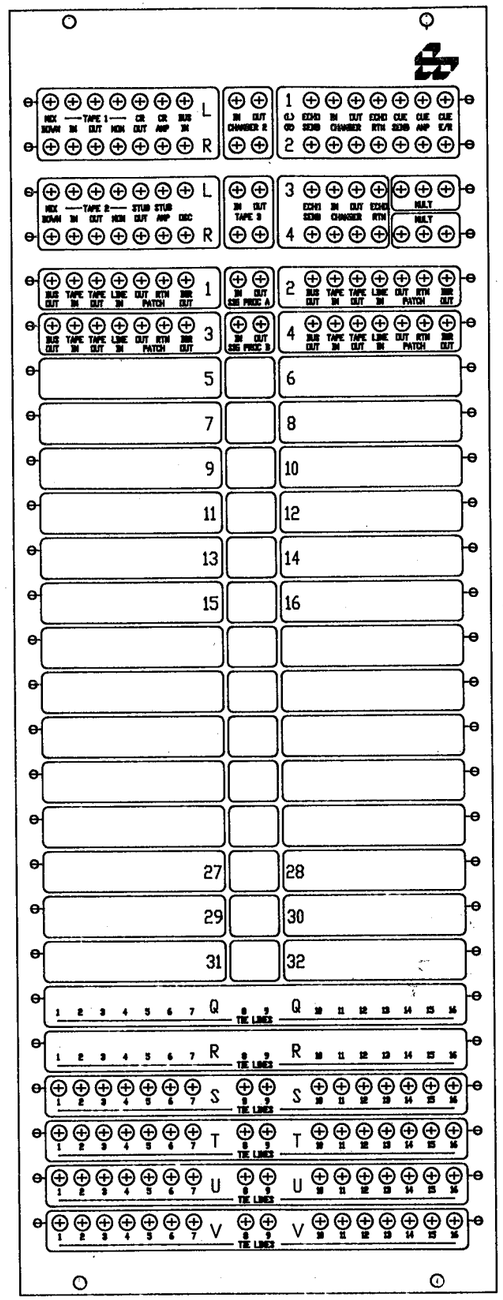


FIG 3C - PATCH PANEL LAYOUT - 24MF/32MF

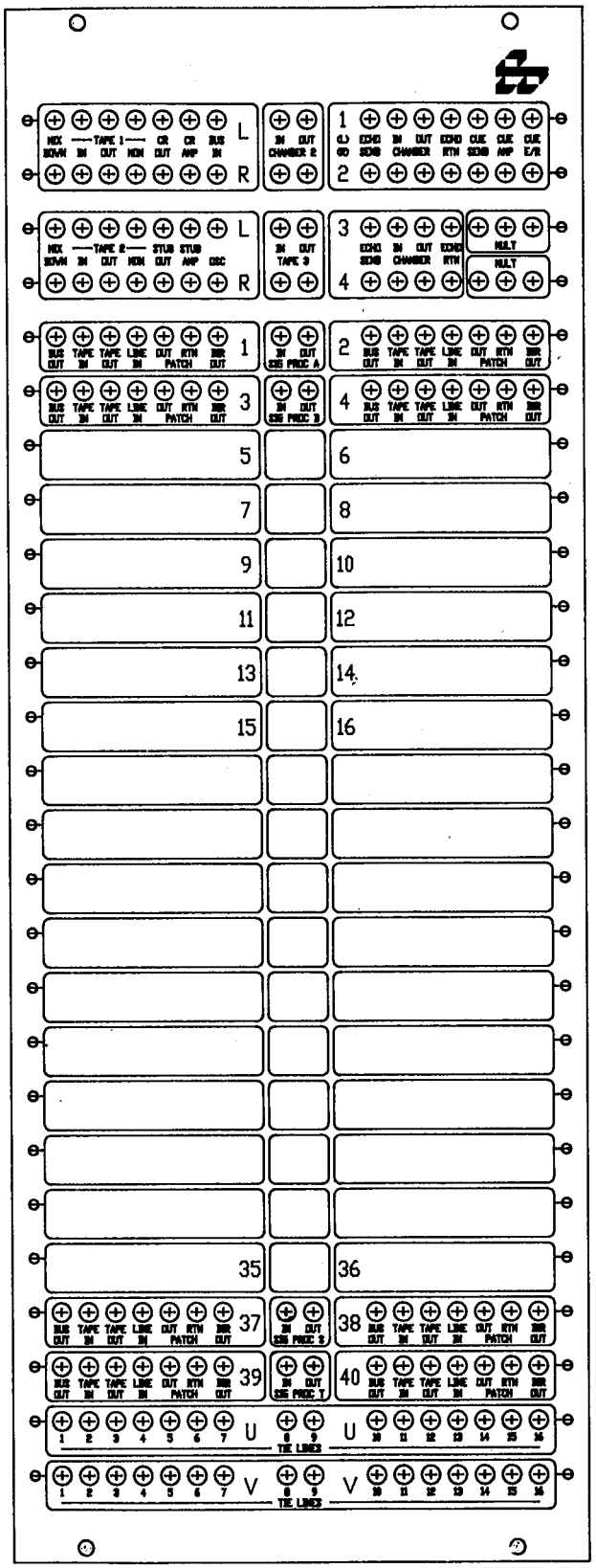
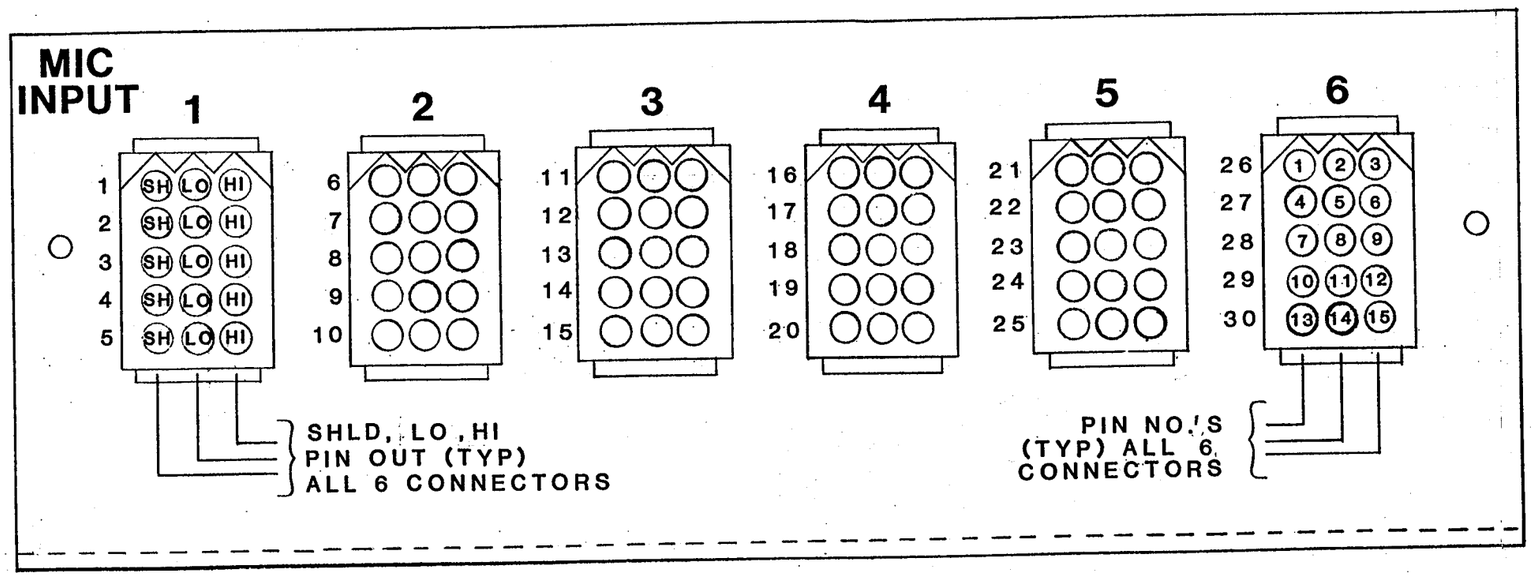


FIG 3D - PATCH PANEL LAYOUT - 50MF/40MF



MICROPHONE INTERCONNECT

FIGURE 3D

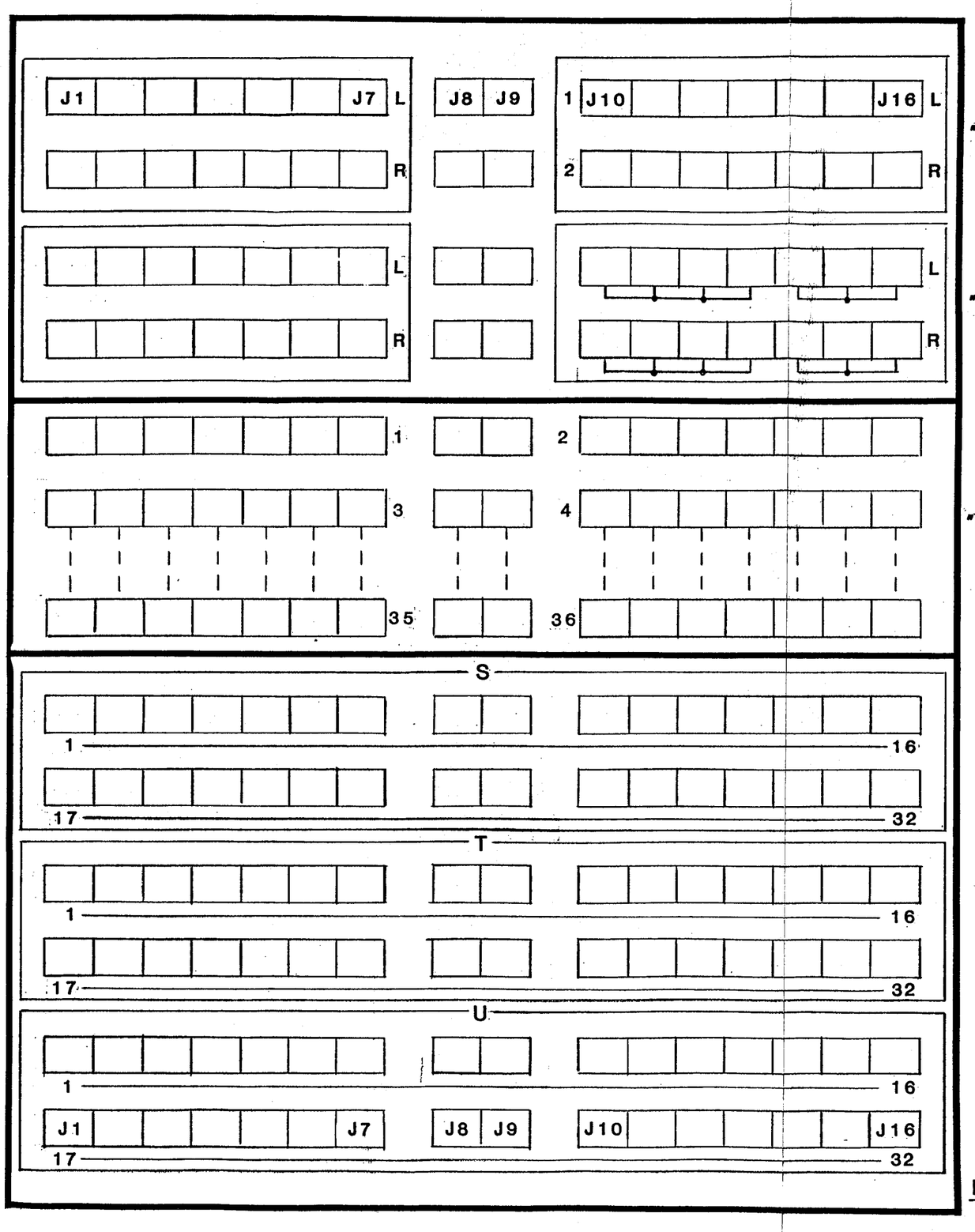
INTERFACE FOR MASTER FUNCTIONS

SHIELDED CABLE HARNESS TO MASTER MODULE

INTERFACE FOR MULTI-TRACK

RIBBON HARNESS TO I/O MODULE

TIE LINE'S



L
"C/R" PATCH CARDS
R

L
"STUDIO" PATCH CARDS
R

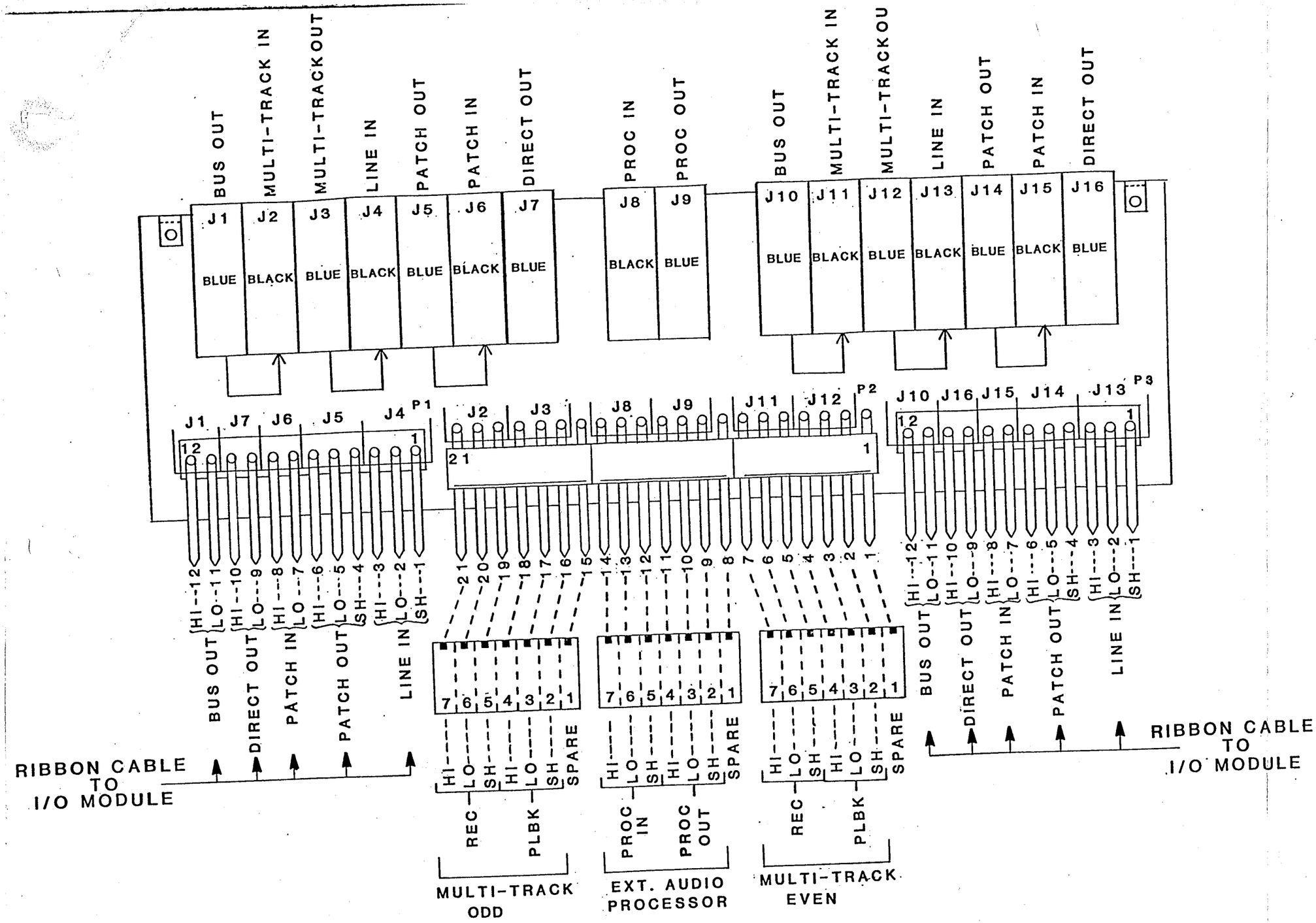
"I/O" PATCH CARDS

NOTES:

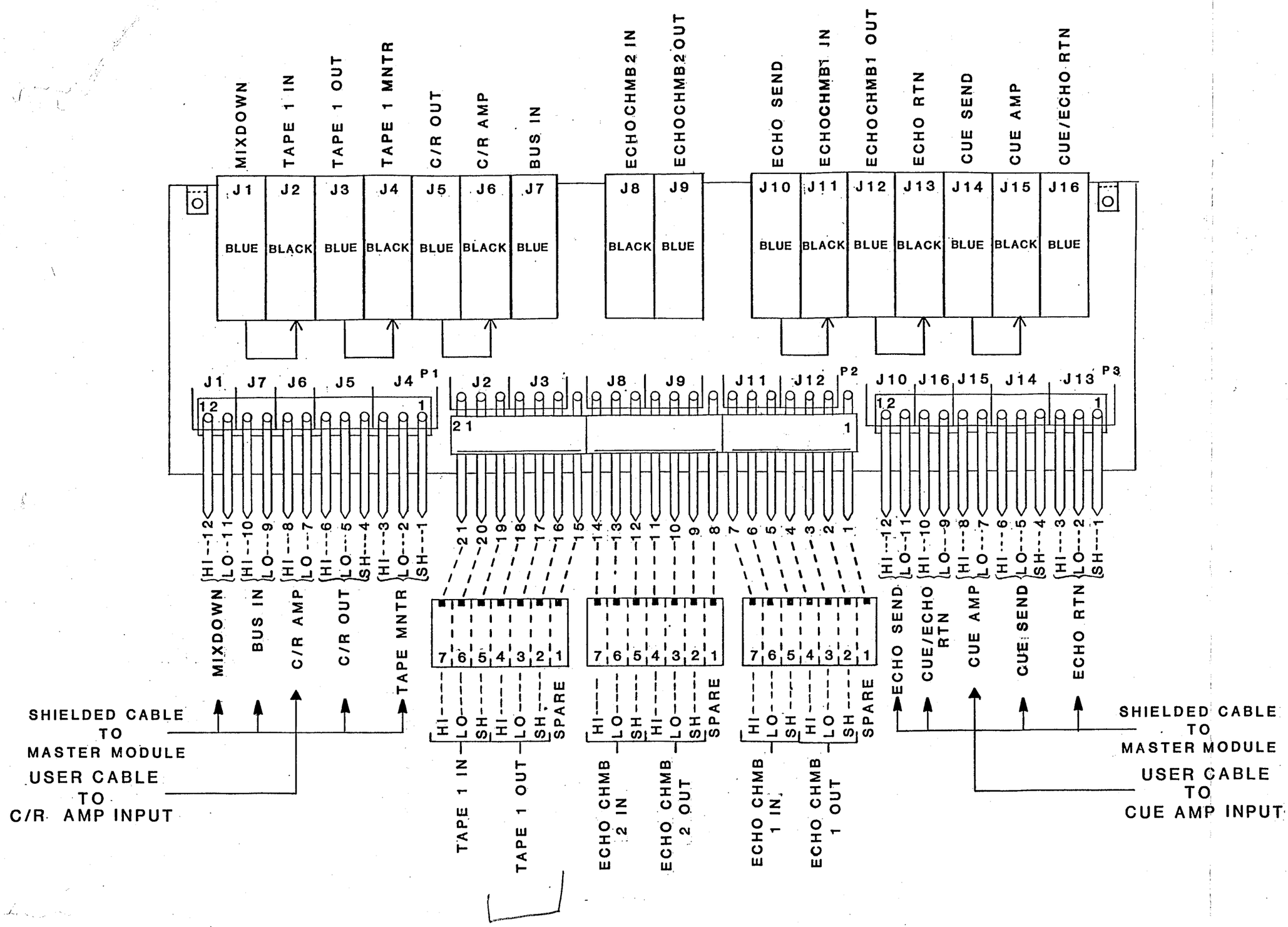
1. # OF I/O IS DETERMINED BY MAINFRAME SIZE.
2. J8 + J9 AVAILABLE FOR USER INTERFACE. NOT TIED TO ANY CONSOLE CIRCUTRY.

PATCHBAY LAYOUT

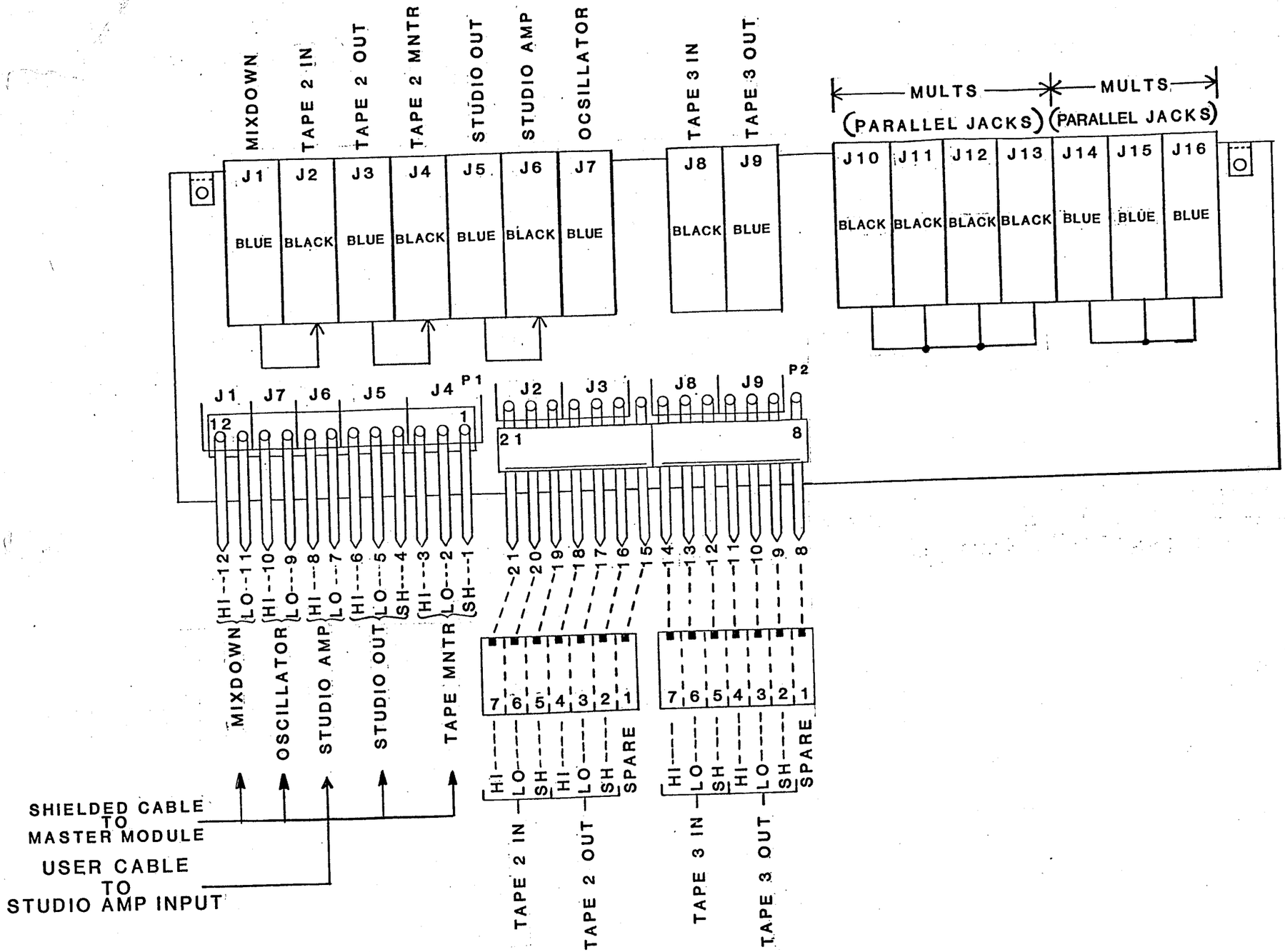
FIGURE 3H



I/O PATCH CARD
– BALANCED
FIGURE 3J



CONTROL ROOM PATCH CARD
-BALANCED
FIGURE 3K



STUDIO PATCH CARD
-BALANCED
FIGURE 3L

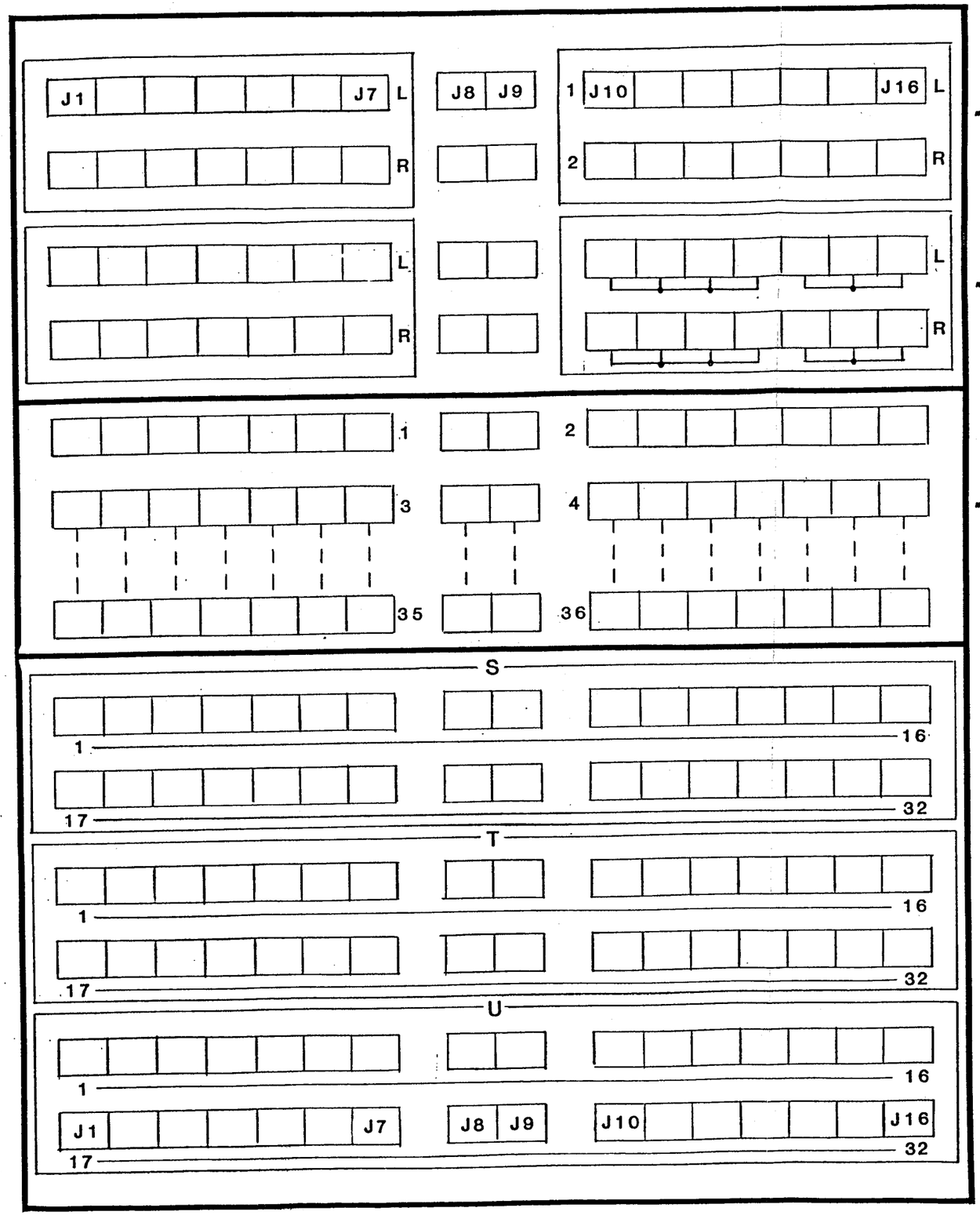
INTERFACE FOR MASTER FUNCTIONS

SHIELDED CABLE HARNESS TO MASTER MODULE

INTERFACE FOR MULTI-TRACK

RIBBON HARNESS TO I/O MODULE

TIE LINE'S



NOTES:

1. # OF I/O IS DETERMINED BY MAINFRAME SIZE.
2. J8 + J9 AVAILABLE FOR USER INTERFACE. NOT TIED TO ANY CONSOLE CIRCUTRY.

PATCHBAY LAYOU

FIGURE 3

Section 4

Circuit Analysis

4.1 INPUT/OUTPUT MODULE

The Series 34 I/O Module consists of several interconnected circuit blocks. Each module is made up of six printed-circuit boards and a front panel. (The VCA option adds two more PC boards.)

Printed Circuit Boards:	Schematic	Assembly Drawing
1. Microphone Preamplifier	202-122	202-522
2. Four-Band Equalizer	202-132	202-532
3. Aux. Send	202-120s4	202-523
4. Track Bus Assign	202-120s6	202-524
5. Monitor Solo and Flip	202-120s7	202-528
6. Main I/O Module Assembly	202-120s1-3,5	202-521
7. Voltage Control Card	103-122	103-522
8. Volt-Controlled Amplifier	203-122	203-583

Each of these circuit blocks is described in detail below. Note that component reference numbers on each board should not be confused with similar numbers on the main I/O assembly. For a functional description of each Series 34 module, see Section 3 of this manual. Top panel controls and indicators, ie: switches, rotary or slide potentiometers, and LED's, are indicated in parentheses. Component designations are given in brackets and use the following letters :

Component	Letter
Capacitor	C
Diode	D
Inductor	I
Opamp	U
Resistor	R
Resistor Network	RN
Switch	S
Transistor	Q
Wire Jumper	W

4.1.1 Microphone Preamplifier

202-122 Schematic
202-522 Assembly Drawing

The microphone preamplifier boosts the incoming low-level signal to the console's -2 dB operating level. The Series 34 console uses a high-gain, low-distortion, balanced transformerless microphone preamplifier with variable feedback - controlled circuit gain.

Common-Mode Parameters

Low-frequency common-mode rejection may be optimized by adjusting the CMR trimpot [R5] in the R5,6,7 network. The common - mode input range of the NE5534 Opamp [U1] is protected against excessive inputs by diodes D5 and D6.

Resistor Network

Precision-trimmed resistors for the 20 dB attenuation pad and the phantom powering network are contained within the HN-PAD network [HN1]. In the normal configuration, a jumper wire [W1] shorts the center-tap resistor in the phantom powering network, thus providing correct powering for most microphones.

Circuit Components

C1,C2	DC Blocking Capacitors, to keep +48 VDC phantom power out of the rest of the preamplifier circuit.
C3,C4	Bypass Capacitors, to provide RF bypass and compensate for long microphone-line inductance.
C5-8,C10	Frequency Compensation Capacitors.
C9	Blocking Capacitor, to prevent DC offset as MIC TRIM pot [R1] is adjusted.
C11	DC Output Blocking Capacitor.
C12,C13	Bypass Capacitors, to provide audio and RF bypass on incoming power rails.
D1-4	Zener Diodes [1N5235], to provide protection against excessive input voltages to mic pre-amp (7.5 V clipping point).
D5,D6	Common-Mode Protection Diodes [1N4148].
HN-1	Resistor Network, contains 20 dB attenuation pad and phantom-power resistor network.
HN-2	Resistor Network, contains base bias and emitter load resistors for Q1 and Q2, feedback/gain and oscillation-prevention resistors (see Drawing 203-501).
L1,L2	Ferrite Beads, part of the RF suppression network.
R1	MIC TRIM (3D) potentiometer.
R2	Provides a DC return path to ground for C11.
R3	not used.
R4	Part of frequency compensation network for U2.
R5-7	Low-frequency common-mode rejection network.
R8	Part of input terminating network.
R9,10	not used.
R11,12	Collector load resistors for Q1 and Q2.
S1	POLARITY Switch (3B), reverses polarity of the microphone line.
S2	+48 Switch (3C), supplies phantom powering to mic line.
S3	PAD Switch (3A), inserts 20 dB attenuation pad in mic line.
U1	Microphone preamplifier [NE5534].
Q1,Q2	Front-End Transistors [T51A], to provide low-noise performance and good gain bandwidth for the Opamp [U1].

4.1.2 Four-Band Equalizer

202-132 Schematic
202-532 Assembly Drawing

The Series 34 equalizer provides four stages of frequency control. Each stage operates over a 20:1 frequency range, and supplies up to 15 dB of cut or boost at the selected frequency. Frequency control is achieved by adjusting the resistance of a modified Wein bridge network in a null pot circuit. The low-cut filter is a three-pole design providing an 18 dB-per-octave cut below 40 Hz.

The basic design consists of a variable bandpass filter for each of the High, High-Mid, Low-Mid, and Low frequency ranges, and controls to change the frequency and the amount of boost or cut. The boost/cut control is a "null" pot at the input of the filter. The signal fed to the filter may be in phase or out of phase as determined by the null pot. If the null pot is centered, signal cancellation will take place and no filter effect will occur.

The output of the filter is then mixed back in with the primary signal at the mix amplifier. If the output of the filter and the primary signal are in phase, the two signals add together and an increase (boost) in the total output of the mix amp occurs. If the signals are out of phase, cancellation takes place and a decrease (cut) in the signal occurs. The amount of cut/boost is determined by the 'off-center' position of the null pot.

Circuit Description

To aid in understanding and to allow a more convenient circuit description, the low frequency range portion of the EQ is shown in Figure 4A The two amplifiers are all part of one quad operational amplifier IC, but they have been given individual reference numbers in this drawing.

Signal is applied to the low frequency section and feeds signal to the null pot R10C and to the "-" input of U1 through input resistor RN2. U1 is a unity gain amplifier that inverts the signal and feeds it to the other side of R10C and to the next EQ stage (this would be low- mid frequency section).

Null pot R10C now has in phase signal on one side (signal input) and out of phase signal on the other side (U1 out). Signal is now sent from the arm of R10C, through U2, and into the filter network. Remember, if the arm is centered, zero signal will result at the arm due to phase cancellation.

The filter circuit used in the EQ is a standard Wein-bridge design. A detailed description of Wein-bridge filter circuits may be found in any good electronic circuits textbook. The output of the filter feeds the "+" input of U1.

If the arm of the null pot is moved towards the output of U1, out of phase signal will be sent through U2 and the filter circuit. The output of the filter circuit sends the out of phase signal to U1. The out of phase signal on the "+" input of U1 internally sums with the in phase signal on the "-" input and provides a net result of decreased or cut signal output. (The internal summing effect here is similar to a balanced line feeding a differential input.)

If the arm of the null pot is moved towards the applied signal, in phase signal will be sent to U2, through the filter, and on to U1. The in phase signal at the "+" input and the in phase signal at the "-" input will internally sum with the net result of a increased or boosted signal output.

The gain of U2 determines the maximum amount (15dB in this design) of the boost or cut at the center frequency. R10A and R10B determine the center frequency and provide a range adjustment of 20:1.

Circuit Components

C1-3	Low-cut filter's cutoff frequency network.
C5	DC Blocking Capacitor.
C7	DC Output Blocking Capacitor.
C10-13	Roll-off Stabilizers for main signal amplifiers.
C15,16	Low-band frequency determining capacitors.
C19,21	Lower-midband frequency determining capacitors.
C23-26	Upper-midband frequency determining capacitors.
C28,29	Upper-band frequency determining capacitors.
R1-3	Low-cut filter's cutoff frequency network.
R5	DC return to ground, to prevent clicks.
R7	DC Output return resistor.
R10A&B-R13A&B	Frequency control potentiometers (lower section of 4B-E)
R10C-R13C	Boost/Cut potentiometers (upper section of 4B-E)
R15-22	Frequency control end-stop resistors.
RN1	Unity-gain network for low-cut filter.
RN2,3	Unity-gain network for the main signal chain amps.
RN4	Side-chain feedback resistors.
RN5,6	Side-chain input reference resistors.
S1	Low-cut filter switch (4A).
U1	[I351] Active element for the low-cut filter.
U2A&B U3C&D	[I074] Main signal amplifiers.
U2C&D U3A&B	[I074] Side-chain buffer amplifiers.

4.1.3 Monitor and Aux Send

202-120 s4	Schematic
202-521	Input Module Assembly
202-523	Aux send Assembly

The Monitor booster amplifier circuit consists of an NE5534 integrated circuit Opamp [U2] and its associated components. The circuit restores the 12 dB insertion loss of the monitor level control.

Each panning network consists of a two-section rotary potentiometer, two loading resistors and two (or more) output voltage-to-current conversion resistors. The pan pot is connected so that when it is is rotated fully counter-clockwise, the output of the Left section will be maximum, while the Right section is cut off. Full clockwise rotation produces the opposite effect. When the pan pot is placed in its center position, the loading resistors attenuate each section by 3 dB, instead of the 6 dB which would otherwise occur. This provides a true constant-energy panning characteristic. (This panning-network description also applies to the Track Assign panning network seen in drawing 202-120s6.)

Circuit Components

C6	DC Input Blocking Capacitor.
C7	DC Output Blocking Capacitor.
C18,19	Power input decoupling capacitors.
D1,2	Power input decoupling diodes.
R2F	Cue Send level pot (5A lower).
R2R	Cue send pan pot (5A upper)
R4F	Echo send 1 level pot (5B lower)
R4R	Echo send 2 level pot (5B upper)
R5F	Echo send 3 level pot (5C lower)
R5R	Echo send 4 level pot (5C upper)
R16	DC return path to ground for the Opamp [U2] non-inverting (+) input.
R17,18	Part of the feedback/gain network.
R19,20	Pan pot loading resistors.
R21	Mix Bus pan pot (6E).
R23,23	Voltage-to-current resistors.
R24-27	Echo send (1-4) voltage-to-current summing resistors.
R80	DC return path to ground for C7.
R84,85	Voltage-to-current resistors.
S4	Cue send source select (5E)
S5	Cue send pre/post source select (5D)
S6	Echo send source select (5G)
S7	Echo send pre/post source select (5F)
S10	Mix pan pot source select (6D)
U2	[NE5534] Opamp.

4.1.4 Track-Summing Bus Assign

202-120 s6 Schematic
202-521 Assembly

This network assigns the output of the module to one or more odd/even pairs of console track summing buses. Provision is made for panning the output between the selected odd/even pair(s). The circuit functions are similar to the other panning network in the I/O module. (see description of monitor section panning circuit above)

Circuit Components

R34	Track Assign pan pot (1A).
R35,36	Loading resistors.
R101-124	Voltage-to-current resistors.
S20-31	Track Assign switches (1C).

4.1.5 Monitor Solo and Flip

202-120 s7 Schematic
202-528 Assembly

This assembly contains switching facilities for two functions:

1. Monitor SOLO [6B]. Depressing this switch routes the monitor signal to the solo audio bus. At the same time, the Solo DC logic circuit mutes the currently monitored signal in the control room and the solo'd channel(s) is (are) inserted in its place. The LED adjacent to the SOLO switch is illuminated to indicate the module is in the Solo mode.

2. MONitor Flip [9A]. This switch interchanges the functions of the channel fader [9B], and the monitor level potentiometer [6A]. The LED adjacent to the MON Flip switch is illuminated when the switch is depressed.

Circuit Components

LED1	SOLO indicator.
LED2	FLIP indicator.
R1-R3	Constant current source network.
R4	Monitor LEVEL potentiometer (6A).
S1	Monitor SOLO switch (8).
S2	MONitor Flip switch (9A).
Q1	Constant current source network.

4.1.6 Main Printed Circuit Board

202-120 s1	Schematic:	Line Input Amplifier
202-120 s2		VU Meter
202-120 s3		Fader Booster/Interface
202-120 s4		Monitor Booster/Interface
202-120 s5		Track ACA and Output
202-521	Assembly Drawing	

The following components are mounted directly on the Main Printed Circuit Board. The function of the diodes, capacitors and resistors listed here is repeated in the description of the circuit block in which each may be found. For further details, refer to the appropriate schematic diagram given in parentheses.

C18,19	(202-120s4)	Power input decoupling capacitors.
C21,22		High frequency power bypasses
D1,2	(202-120s4)	Power input decoupling diodes.
Q4	(202-120s3)	Current generator
R4	(202-120s2)	VU Meter calibration potentiometer.
R14	(202-120s1)	DC return for C5
R19-23	(202-120s4)	Mix Bus pan network.
R24-27	(202-120s4)	Voltage-to-current resistors for Echo sends 1-4.
R33	(202-120s5)	Track out HI DC return
R35,36	(202-120s6)	Track panning network resistors.
R37	(202-120s3)	Solo logic bus isolation resistor.
R38	(202-120s3)	Voltage-to-current resistor for Solo audio bus.
R42	(202-120s3)	DC return for C17
R43	(202-120s1)	Patch out isolation resistor
R51-55	(202-120s2)	Part of VU meter reference divider string
R64	(202-120s3)	Current generator sensing
R65	(202-120s3)	Current generator reference
R66	(202-120s3)	Current generator reference
R83	(202-120s5)	Unbalanced feed isolation resistor
R84	(202-120s4)	Voltage-to-current resistor for Cue send Left
R85	(202-120s4)	Voltage-to-current resistor for Cue send Right
R87	(202-120s5)	Track out LOW DC return
	(Refer to I/O Module front panel drawing)	
S1	(3E)	MIC/LINE switch.
S2	(4G)	EQualizer IN switch.
S3	(8)	Channel SOLO switch.
S4	(5E)	Cue CHAN/MON switch.
S5	(5D)	Cue POST/PRE switch.
S6	(5G)	Echo CHAN/MON switch.
S7	(5F)	Echo POST/PRE switch.
S8	(6C)	BUS/TAPE switch.
S9	(not used)	
S10	(6D)	MON/MXDN switch.
S11	(7)	CHANNEL ON switch.
S12	(4F)	Equalizer to MONitor switch.
S20-31	(1C)	Track Assign switches.

4.1.7 Line Input Amplifier

202-120 s1 Schematic
202-521 Assembly

The LF351 Opamp [U1] and its associated components provide a balanced transformerless input for line-level signals with a nominal level ranging from -10 dBu to +8 dBu. The circuits bridging input has an impedance greater than 40 kohms. Amplifier gain can be adjusted by a trim pot [R2] which is accessed through a hole in the I/O module's faceplate directly to the left of the MIC/LINE switch (3E).

Circuit Components

C1,C2	RF Bypass Capacitors.
C3,C4	DC Blocking Capacitors.
C5	DC Output Blocking Capacitor.
R1	not used.
R2	Logarithmic taper gain trim pot.
R3,4	not used.
R5-13	Gain network resistors.
R14	DC return path to ground for C5.
U1	[LF351] op-amp

4.1.8 VU Meter and Driver

202-120 s2 Schematic
202-521 Assembly

The RC4558 Integrated Circuit [U6] and its associated components form a precision rectifier that changes the incoming signal to a DC voltage which is sent to the LM339 Voltage Comparator [U7]. Here, it is compared with a series of fixed voltages from the Resistor Network [R51-55]. Normally, these fixed voltages hold their respective comparator stages on, thereby shunting the source current formed by the T51A transistor [Q1] and the [R61-63] network.

As the audio-derived DC voltage exceeds the lowest of the fixed voltages, the first comparator turns off, allowing the source current to flow through the -15 VU LED and illuminate it. As the voltage increases, the next three LED's (-10, -3, 0 VU) are illuminated in the same manner. A separate comparator consisting of two T51A transistors [Q2,3] is used for the +3 VU LED.

To illuminate the LED's, the T51A transistor [Q1] and [R61-63] network provides a constant 8 ma current source, and prevents current surges that might otherwise inject noise into the audio circuitry.

The circuit design provides LED response matching the ballistics of a mechanical VU meter. An internal trim pot [R4] is used for meter level calibration. It may be accessed through a hole adjacent to the -3 VU LED.

In the normal configuration, a jumper wire in the third position to the right of diode [D3] routes the output of the MIC/LINE switch (3E) to the meter circuit.

Circuit Components

C20	Sets the response time to match the ballistics of a mechanical VU meter.
D3,D4	Rectifier diodes for U6.
R4	Meter calibration trim pot.
R44-50	Gain networks for U6.
R51-55	Part of VU reference divider string
R56-60	Bias and load resistors for Q2 and Q3.
R61	Emitter resistor for Q1, sets 8 ma constant current level.
R62-63	Bias resistors for Q1.
Q1	T51A provides 8 ma constant current drive for VU meter LEDs.
Q2,Q3	T51A comparator for +3 VU led.
U6	RC4558 Dual Opamp.
U7	LM339 Quad Comparator.

4.1.9 Fader Booster/Interface

202-120 s3 Schematic
202-512 Assembly

The Fader booster amplifier circuit consists of an NE5534 integrated circuit Opamp [U3] and its associated components. The circuit restores the 12 dB insertion loss of the input channel fader.

Circuit Components

C15	DC Input Blocking capacitor.
C17	DC Output Blocking capacitor.
C24	Part of the feedback network, to provide circuit stability.
C25	Opamp compensation capacitor.
R37	Solo logic bus isolation resistor.
R38	Channel Solo summing resistor.
R42	DC return path to ground for C17.
R67	DC return path to ground for the Opamp (U3) non-inverting (+) input.
R68,69	Part of the feedback/gain network.
R70	Prevents capacitive loading oscillation at the circuit output.
U3	NE5534 Opamp.

4.1.10 Track Bus ACA

202-120 s5 Schematic
202-521 Assembly

The Active Combining Amplifier (ACA) circuit for the Track Buses consists of an NE5534 integrated circuit Opamp [U4] and its associated components. Sound Workshop has selected the NE5534 because of its extreme low-noise characteristic, which makes it an excellent choice for sensitive summing applications. The ACA circuit sums all the signals routed to its associated bus, and raises the nominal output level to -2 dB. Note that the signal polarity is inverted by the ACA. Provision is made for a separate Summing Ground, or common circuit, as protection against crosstalk and ground loops.

Circuit Components

C13	DC Output Blocking Capacitor.
C14	Part of the feedback network, used to maintain circuit stability.
R39	Prevents capacitive loading oscillation at the circuit output.
R40	Part of the feedback/gain network.
R41	Stabilizer/Isolation resistor.
R81	Return path to ground for Summing Ground line.
U4	NE5534 Opamp, used as an Active Combining (Track Summing) Amplifier.

4.1.11 Track Output Inverter, Bus Monitor Inverter/Buffer

202-120 s5 Schematic
202-521 Assembly

The Track Output Inverter and Bus Monitor Inverter/Buffer circuit consists of an NE5532 integrated circuit Opamp [U5] and its associated components. The nominal output level of the Track Output Inverter [U5A] can be adjusted from -16 dBu to +2 dBu, using the Track Output Calibration trim pot [R3]. The adjustment may be made through the access hole to the left of the MIC/LINE switch (3E). The Bus Monitor Inverter/Buffer [U5B] feeds the monitor section of the I/O module.

Circuit Components

C8	DC Output Blocking Capacitor.
C9,10	Part of the feedback network, used to maintain circuit stability.
C11	DC Input Blocking Capacitor.
R3	Trim pot, to adjust gain for a nominal output from -10 dBu to +8 dBu.
R16	DC return path to ground for the Opamp [U5] non-inverting (+) input.
R28-31	Part of the feedback/gain network.
R79	DC return path to ground for C8.
R83	Prevents capacitive loading oscillation at the circuit output.
U5	NE5532 Dual Opamp.

4.1.12 Balanced Output

202-120 s5 Schematic
202-521 Assembly

The Balanced Track Output circuit consists of an LF351 [U8], and an NE5532 [U9] integrated circuit Opamp, along with their associated components. A hybrid network [HN]) contains laser- trimmed precision resistors which, together with the ICs, comprise an unbalanced driver and an electronically balanced output stage. The circuit provides 6 dB of gain, for an output level of -10 dBu to +8 dBu, depending on the position of trim pot R3 (described above). The track output circuit may be operated in either a balanced or unbalanced output configuration.

Circuit Components

C12,28	DC Output blocking capacitors.
C26,27	Output stage stabilizing capacitors.
HN1	Balanced Output Hybrid network.
U8	I351 Driver stage.
U9A&B	I5532 Output stages.

4.1.13 High Resolution Meter Module

202-160	Schematic
202-562, 202-562	Assemblies

The input section of the meter consists of U1 P12-14 configured as an adjustable gain balanced input stage. Resistor R1 sets the gain of the stage with the value of 20K yielding unity gain. U1 P8-10 and U1 P1-3 comprise a precision rectifier, extracting an exact full wave rectified version of the audio input signal. This rectified signal is fed into 2 separate weighting networks, one for each mode of the meter.

U1 P5-7 and U2 P8-10 form a sample and hold circuit to implement the "PEAK" function of the meter. Capacitors C5 & C6 together with Resistors R 7-9 determine the holding and recovery characteristics of the sample and hold function. The circuit is discharged to +V to create a linear decay characteristic. R12 calibrates the output of the peak detector. R14 is provided to correct for any DC offset in the peak detector and in the following stages when in the peak mode.

U2 P12-14 forms an average weighting inverter to implement the "VU" mode of the meter. R20 and C7 set the time constant of the averaging network to be equivalent to a mechanical meter in the -20 to +3 range of the meter scale. R23 is provided to trim the DC offset of the averaging stage and all other stages in the "VU" mode. R21 sets the calibration of the average stages output.

A third "DC INPUT" mode is selectable to provide for special applications of the meter bar graph. No internal calibration is provided and calibration and scaling is left to the optional electronics.

U3 is a 3 channel CMOS FET switch used to select the operating mode of the meter. RN3 provides pull-up to +V so that ground enable logic can be implemented. U2 P5-7 convert the current output of U3 to a voltage so that grounding P2 Pins 1,2, or 3 selects PEAK, VU, or EXTERNAL DC modes for the meter.

The LED display comprises an array of 40 individual LED's each configured to come on at a particular level. U4 thru U13 contain the 40 individual voltage comparators required to control these LED's. Hybrid networks RN5, 6, & 7 contain precision networks setting the turn on voltages for each of the 40 comparators. Each group of (10) LED's is connected as a separate series string across the supply rails. Transistors Q2 - Q4 provide constant current drive for each of the strings. Emitter resistors R41- R44 set the relative currents to provide appropriate visual balance between the (3) colors of the display. The base voltage applied to these transistors determines the current thru the LED strings and thus the intensity of the display. U2 P1-3 and Q1 form the interface and DC level shift network that enables the console INTENSITY bus to control the display intensity of the meters by controlling the DC base voltage to the current drivers. The display functions by having the comparators "un-short" successive LED's in the string as the applied control voltage (derived from the input audio) varies. Thus, with no audio applied, all the LED's are "shorted" and the display is "off". As voltage is developed at Pin 7 of U2, successive comparator stages are turned "off" and the associated LED's are turned "on".

Circuit components

C1,2	Input amp stabilization caps
C3	Precision rectifier compensation and anti-chatter
C4	Feed forward frequency pole
C5,6	Peak value Capture
C7	Averaging time constant
C10	Input amp DC blocking
D3	+ input clamp
D4	- input detector
D5	Clamp
D6	Peak detector
D7	Current to voltage clamp
D8	Level shifter offset regulator
P1	Audio and DC control Input
Q1	Control voltage level shifter
Q2-Q5	Display string constant current drivers
R1	Input gain set
R2,3	Input feedback
R4	Feed forward compensation
R5	Sample & hold input scaling
R6	Feedback from peak capture
R7-9	Discharge path
R10	Parasitic suppressor
R12	Peak cal trim
R13	Peak output scaling voltage to current converter
R14	Peak offset trim
R16-17	Offset trim cal network
R19-20	Averaging inverter gain set
R21	Averaging stage output cal
R22	Averaging stage output voltage to current converter
R23	Average DC offset trim
R24-25	Average offset trim cal network
R29	Current to voltage scaling resistors
R35	Input offset setting resistor
R37-R40	Control voltage level shifters
R41-R44	Display current setting resistors
RN1	Balanced input network
RN2	Precision rectifier ground ref and feedback resistors
RN3	DC input voltage to current converter (pins 7 & 8) Logic pull up for mode switch (pins 1-6)
RN4	Control input interface network
RN5-RN7	Display LED set point network
U1	Audio input, precision rect, and peak detector
U3	Mode selector
U2	Sample and hold buffer (pins 8,9,10) Intensity control input level shifter (pins 1-3) Mode selector current to voltage converter (pins 5-7)
U4-U13	Display control comparators
U14-U17	Display LED's

4.1.14 Single VU Meter Driver/Buffer Board

240-160 Schematic
240-560 Assembly

The meter driver consists of a balanced transformerless gain stage with trimable gain. The output impedance of this stage is set to provide "VU" damping for the following meter.

Circuit components

C1,C2	Power bypass
C3,C4	Amplifier high frequency roll-off
M1	Meter
R1	Gain control endstop
R2	Gain trimmer
R3	Amplifier feedback
R4	Amplifier non-inverting return
R5,R6	Meter calibration and damping
RN1	Balanced input network

4.2 ECHO RETURN MODULE

202-151 Schematic
202-551 Assembly

4.2.1 Return Pan Amplifiers

Each Pan amplifier consists of a "loss" type panner followed by 6db gain inverting buffers on the left and right outputs. Output DC decoupling is included.

Circuit Components

C3-6	Pan amplifier output DC blocking
C7-10	High frequency roll off
R1,2	Return level pot
R3,4,6,8	Panner input resistors
R5,7	Pan pot
R9-12	Pan amplifier feedback
RN1 P1-2	Pan amplifier DC return
P7-8	Pan amplifier DC return
RN1 P3-6	Pan buffer input resistors
RN2 P1-2	Pan amplifier DC return
P7-8	Pan amplifier DC return
RN2 P3-6	Pan buffer input resistors
S1-4	Return select - 1,2 TO 24 Track. 3,4 TO Mix
U1,3	Pan amplifiers

4.2.2 Return Buffer to 24 Track Assign

This is a unity gain summing, inverting amplifier combining and buffering the signal to the echo return assign matrix.

Circuit Components

C12-13	High frequency roll off
C16-17	DC blocking
RN3 P1-8	Input resistors
RN4 P1-2,7-8	DC return
RN4 P3-6	Feedback resistors
U2	Buffer amplifier

4.2.3 Return Buffer to Mix Assign

This is a unity gain summing, inverting amplifier combining and buffering the signal to the echo return to the MIX bus

Circuit Components

C14,15	High frequency roll off
C18,19	DC blocking
RN5 P1-8	Input resistors
RN6 P3-6	Feedback resistors
RN6 P1-2	Bus summing resistor
RN6 P7-8	Bus summing resistor
U4	Buffer amplifier

4.2.4 24 Track Assign Matrix

This circuit is identical to the one used on each Input Module. Please see the complete description in the Input Module circuit analysis.

Circuit Components

R50	Gain equalization loss
RN10-15	Summing resistors to track buses

4.2.5 Solo

The SOLO system has a local current generator to provide clickless illumination of the desired LED's. Control and audio buses are handled as in the I/O module.

Circuit Components

LED1-4	Solo ON LED's
Q1	Current generator
R17	Current sensor
R18-19	Part of reference divider
RN6	Solo audio summing
R16	Solo DC isolation
S5-8	Solo switches

4.2.6 Talkback

Circuitry is provided to power and decouple an electret condenser microphone mounted in the module. Low frequency filtering is provided to restrict the response to voice frequencies and reduce the occurrence of acoustic feedback.

Circuit Components

C21	DC blocking and low frequency roll off
C22	Power de-coupling and filter
MIC	Electret microphone
R31-32	Power divider

4.2.7 High Resolution Meter Control

U10 derives a regulated +5 source for the intensity control pot R52. S10 selects the VU or PPM mode.

Circuit Components

R51	Isolation
R52	Intensity control
S10	VU/PPM Mode select
U10	Regulator

4.2.8 Echo Send ACA (Active Combining Amplifier)

These stages are the combining amplifiers for the ECHO 3 & 4 buses.

Circuit Components

C27-28	DC blocking
C29-30	High frequency roll off
R29-30	Isolation
R27-28	Feedback
U6	Combining amplifier

4.2.9 Echo Send Booster

These are inverting amplifiers with 6dB of gain. They serve to correct the phase of the echo send signal and provide +4 dBu nominal output level for the send buses.

Circuit Components

C23-24	DC blocking
C25-26	High frequency roll off
R23-24	Echo send level control
R25-26	Input resistor
RN7 P3-6	Feedback
RN7 P1-2	DC return
RN7 P7-8	DC return
U5	Buffer amplifier

4.2.10 Meter Summing

This stage allows multiple summing inputs to the LED VU meter.

Circuit Components

C33	High frequency roll off
R33-34	Part of precision DC rectifier
RN8	Input resistors
RN9 P1-2	Feedback
S9	Meter select
U7	Buffer amplifier

4.2.11 Meter Rectifier, Driver, and Display

This circuit is identical to the one used on each Input Module. Please see the complete description in the Input Module circuit analysis.

4.2.12 Other Components

C1,C2	RFI filtering
C34,C35	Power decoupling
D1,D2	Power protection and decoupling
R20,R21	Send 3 & 4 isolation
S11-14	User defined function switches

4.3 VOLTAGE CONTROL CARD

4.3.1 VCA Sub Assembly

203-183 Schematic
203-583 Assembly

The VCA Sub Assembly plugs into the main Voltage Control Card (VCC). On this PCB is all of the circuitry associated with the actual audio portion of the "VCA". The heart of the VCA sub-card is the TA-101 Gain Cell manufactured by Valley People (Nashville, TN). The Gain Cell is a voltage-controlled current-in/current-out device and utilizing this circuit for VCA applications requires the addition of voltage to current and current to voltage converters at the inputs and outputs respectively (Figure 4B).

U1 [LF351] and its associated components convert the audio input voltage to input current supplied to the Gain Cell. U3 [LF351] is a current to voltage converter providing audio output voltage from the current output of the Gain Cell. One half of U2 [4558] is a DC control ACA which provides the control bias voltage to the Gain Cell from the external DC control sources. The other half is a bias voltage regulator and bias inverter.

FET transistors Q1 and Q2 provide a "soft switch" for on/off control of the audio signal. Logic transistors Q3 and Q4 drive Q1 and Q2 through 22 msec timing networks to create the "soft switching". A +5 voltage at pin 9 (J1 of the PC assembly) will mute the audio signal.

Trim pots in the circuitry provide the following adjustments:

R19	Adjusts for minimum DC control voltage at the output of the Gain Cell
R12	Adjusts for minimum IM distortion at unity gain
R4	Adjusts for minimum IM distortion at +12dB and -12dB of gain

These trim pot adjustments are set at the factory. A precise sequence must be followed due to interaction between the adjustments. No attempt should be made to change these settings!

Circuit Components

C1	Feedback capacitor - provides circuit stability
C2	Feedback capacitor - noise filter
C3	Feedback capacitor - provides short circuit stability
C4-5	Response time caps
Q1-2	Soft switching transistors
Q3-4	Provide logic drive to Q1 and Q2
R2-6	Input bias resistors for TA-101(U4)
R4	Trim pot - sets min IMD at + or - 12dB gain
R13	Feedback/gain resistor for U2
R7-9,RN1	Control bias resistors
RN2 P5,7	Base bias resistors for Q3
RN2 P3	Collector load resistor for Q4
RN2 P2	Collector load resistor for Q3
R24-25	Base bias resistors for Q4
R1	Input resistor for U1
R21	Feedback/gain resistor for U3
R22	Base bias resistor for Q1
R23	Base bias resistor for Q2
R12	Trim pot - sets minimum IM distortion at unity gain
R19	Trim pot - adjusts for minimum control DC at output of TA-101 (U4)
U1	Input bias compensator for TA-101
U2	[4558] opamp used as control voltage ACA and bias inverter
U3	[LF351] opamp used as current to voltage converter for output of TA-101
U4	TA-101 Electronic Gain Cell

4.3.2 Voltage Control Card

103-122	Schematic
103-522	Assembly

The voltage control card has three separate functions. It provides logic control and status indication for the computer system, it provides DC control voltage from the fader to the VCA assembly, and it allows interface between the VCA and the analog portion of the computer system.

The VCA operates in conjunction with a special VCA law fader which when combined, simulate the audio taper of a standard fader.

U1 P12-14 and U1 P1-3 provide DC bias and control voltages to the VCA. Trim pot R31 sets the output bias voltage for the fader "0" position. At U1 P1 the following voltages appear for these fader settings:

Fader full up	-.75v
Fader at "0"	+.75v
Fader down	+12.00v

These voltages are fed into the interface section which provides interface of the fader output control voltage with the VCA assembly and the computer system. This section switches VCA control between fader and computer. FET transistors Q3 and Q4 provide this switching. When Q4 is on, fader control voltage is fed to the VCA. When Q3 is on, computer control voltage is fed to the VCA. Q1 and Q2 provide logic control of Q3 and Q4 from the computer system. If the computer system is not being used or not installed, Q4 is always on. This allows for local fader control of the VCA.

U1 P8-10 is used as a unity gain, non-inverting buffer between the fader DC control voltage and the computer system. U1 P5-7 is a filter/buffer amp between the computer system control voltage and the VCA. Trim pot R17 (part of the input resistor network to U1 P5-7) sets the voltage control parameter from the computer system to the VCA at exactly 8dB/volt.

Switches S1, 2, and 3-2 along with LED's 1-5 and 6-2 are used for computer control and status indication. This circuitry is totally independent, including power and ground, from the rest of the circuitry on the PC board. Circuit description for this section is covered in the Auto-Recall Mixdown System (ARMS) text.

Circuit Components

C1	Feedback capacitor and noise filter
C2	Noise filter capacitor
C3	Filter capacitor
C4	Feedback/filter capacitor
C5-7	Power bypass capacitors
D1	Part of fader bias network
D2	Zener diode - part of fader bias network
Q1-2	Provide logic drive to Q3 and Q4
Q3-4	Provide control switching to VCA
R1	Isolation resistor
R2	Feedback/gain resistor for U1 P1-3
R3-4	Input resistors for U1 P1-3
R5	Feedback/gain resistor for U1 P12-14
R6-7	Bias network for U1 P12-14
R8-9	Input resistors for U1 P12-14 (fader control) - also part of noise filter with C2
R10-11	Part of fader bias network
R12	not used
R13	Part of fader bias network
R14	Input resistor for U1 P12-14 (group control)
R15	Trim pot - sets the 0db DC output of the fader to match the "0" position of fader scale (see text)
R16	Input resistor for U1 P5-7
R17	Trimpot - (see text)
R18	Bias resistor for "+" input of U1 P5-7
R19	Gain resistor for U1 P5-7
R20	Feedback/gain resistor for U1 P5-7
R21	Input resistor (through Q3) for the control ACA (U2) on the VCA card (ARMS control)
R22	Collector load resistor for Q2
R23	Input resistor (through Q4) for the control ACA (U2) on the VCA card (local group fader control)
R24-25	Base bias resistors for Q2
R26	Collector load resistor for Q1
R27-28	Base bias resistors for Q1
R29	Part of fader loading network
R30	Part of Computer System (See ARMS Section)
R31	Trimpot - sets max DC control voltage with fader full up to -.75v
R32-40	Part of Computer System (See ARMS Section)
R41	Part of fader loading network
S1-S3	Part of Computer System (See ARMS Section)
U1	[LM324] quad opamp

4.4 MASTER MODULE

The Series 34 Master Module consists of several individual circuit blocks that are interconnected by wires, connectors, or PC lands to form the total Master Module assembly. Seven PC boards and a front panel make up the module. Each circuit block will be described and a component/function list will be included.

MAIN/MASTER PC ASSEMBLY
912-151 Schematic
912-551 Assembly

COMMUNICATIONS PC ASSEMBLY
202-153 Schematic
202-553 Assembly

SWITCH MODULE PC ASSEMBLY
202-154 Schematic
202-554 Assembly

BALANCED OUTPUT DRIVER PC ASSEMBLY (FOUR BOARDS)
007-141 Schematic
007-541 Assembly

FRONT PANEL ASSEMBLY:
202-520 Assembly - Series 34 Master Module
912-152-1 Schematic - Series 34 Pot board with pan
912-552 Assembly - Series 34 Pot board with pan

4.4.1 Main/Master PC Assembly:

912-151 Schematic
912-551 Assembly

The Master PC board consists of the summing amplifier for solo, the summing and output booster amplifiers for 2-trk Mix, Echo 1 & 2, and Cue L & R, the output booster amplifiers for Control Room and Studio, the input amplifiers for Echo Return, and the Control Room Mono circuit.

4.4.2 Bus Summing Amplifiers:

The identical circuit is used for the Solo, Echo, Cue, and 2-Track Mix summing amplifiers. A minor exception to this statement occurs when additional inputs to the circuits such as Echo Return to Cue require additional summing resistors into the amplifier. Since seven separate summing amp circuits are required, and since all seven have separate component numbers, a typical circuit design will be discussed here.

The ACA incorporates an ultra low noise wide band op-amp in a 0 gain, inverting/combining circuit. A 100 ohm resistor isolates the stage from the bus capacity and enhances circuit stability. The signal level after the ACA is - 2dBu nominal and out of phase. This low signal insures that bus headroom is preserved. A following booster corrects the phase and brings the level up to +4 dBu nominal for interface to the outside world. Roll off caps are 10 pf, the minimum to insure stability and RFI free summing. No HF pole cap is required.

Circuit Components

The following table relates the component numbers of the seven circuits to the typical circuit (Figure 4C).

Cf	Feedback capacitor - provides circuit stability
Co	Output DC blocking capacitor
Ri	Input bus isolation resistor
Rf	Feedback/gain resistor
Rext	Additional summing resistor
Ro	Output isolation resistor
U	NE5534 opamp

SUMMING AMP	Ri	Rf	Cf	Co	U	Ro
Solo	R37	R38	C15	C23	U5	R86
Echo 1	R41	R42	C17	C25	U7	R83
Echo 2	R39	R40	C16	C24	U6	R82
Cue Left	R45	R46	C19	C27	U9	R85
Cue Right	R43	R44	C18	C26	U8	R84
2 Track Left	R33	R34	C13	C20	U3	R80
2 Track Right	R35	R36	C14	C21	U4	R81

Additional components unique to individual circuits

R28	Aux input to 2-trk Mix left
R32	Aux input to 2-trk Mix right
R48	Echo Rtn 1 to Cue left
R50	T/B to Cue left
R47	Echo Rtn 2 to Cue right
R49	T/B to Cue right
R27	Echo Rtn 1 to 2-trk Mix left
R31	Echo Rtn 2 to 2-trk Mix right
R29	Slate audio to 2-trk Mix left
R30	Slate audio to 2-trk Mix right

4.4.3 Output Booster Amplifiers

Auxiliary Sends

This stage inverts the phase of the bus ACA to normal, adds 6 dB of gain, and allows the CR to drive 600 ohm loads with a +4 dBu nominal signal.

Circuit Components - Cue Send Booster

R61.62	Input resistors
R65,66	Feedback resistors
U12	Booster amplifier
C29,30	High frequency roll off
C33,34	DC Blocking
R69,70	Load isolation
R73,74	DC Return

Circuit Components - Echo Send Booster

R59,60	Input resistors
R63,64	Feedback resistors
U11	Booster amplifier
C27,28	High frequency roll off
C31,32	DC Blocking
R67,68	Load isolation
R71,72	DC Return return

2 Track Mix Booster

These stages incorporate our 007-541 BTO circuits and provide trimable overall gain. See separate description of BTO stage later in this section.

Circuit Components

A3,4	Balanced Track Output amplifier assembly
R51,52	Input resistors
R97,98	Feedback gain trim
R53,54	Feedback end stop

4.4.4 Control Room Booster Amplifier & Mono/Stereo Switching

These stages incorporate our 007-541 BTO circuits and provide trimable overall gain and MONO/STEREO switching. Q1 is a logical inverter as required by the FET switches and R6/C1 along with R5/C2 provide ramped control voltage for silent switching, even in the presence of signal. All switching is done at ground potential to eliminate any residual distortion. Extra switches are incorporated to maintain this potential on the "off" inputs.

Circuit Components - CR Booster Amp

A1,2	Balanced Track Output amplifier assembly
R1	CR Master level control
R7,10	Input resistors
R91,92	Feedback gain trim
R11,12	Feedback end stop

Circuit Components - Mono/Stereo Switching

C1	Timing
C2	Timing
R1	Base pull up
R2	Collector pull up
R3	Base divider
R4	Base divider
R5	Ramp current feed
R6	Ramp current feed
R8	Mono input
R9	Mono input
Q1	Logic inverter
Q2	Audio switch
Q3	Audio switch
Q4	Audio switch
Q5	Audio switch

4.4.5 Studio Booster

This stage provides 6 db of gain with summing for the Studio Select and Talk Back to Studio signals.

Circuit Components

C3,4	High frequency roll off
C5,6	DC Blocking
R2	Studio master level control
R3	T/B to Studio level control
R13-16	Input summing resistors
R17-18	Feedback
R75-76	Isolation
R77-78	DC Return
U1	Studio booster amplifier

4.4.6 Two-Track Tape Returns

These four trim pots allow the user to adjust the 2 Track tape return level for Tape 1 and Tape 2 monitor positions. They can be adjusted over a range of -8 dBu to +8 dBu.

Circuit Components

C9-12	RFI Bypass
R93	Tape 2 Left trim
R94	Tape 2 Right trim
R95	Tape 1 Left trim
R96	Tape 1 Right trim

4.4.7 VU Meter Level Scalers

This is a unity gain buffer isolating the external VU meter from the MIX bus signal.

Circuit Components

R55,58	Input resistors
R56,57	Feedback resistors
U10	Buffer amplifier

4.4.8 Echo Return Active Combining Amplifier

This stage is a unity gain combining amp which sums the signals from the echo return pan pots.

Circuit Components

C7,8	DC Blocking
R19,20	DC Return
R21,22	Feedback
R23-26	Input
U2	Combining amplifier

4.4.9 Communications PC Assembly

202-153	Schematic
202-553	Assembly

The Communications PC board consists of the Talkback (T/B) microphone preamplifier, T/B inverter/follower amplifiers, T/B switching logic, solo logic, and the console oscillator circuitry.

4.4.10 T/B Mic Pre-Amp

The T/B mic preamp is actually two separate circuit stages. The first stage is a single ended, switched gain amplifier with a maximum gain of 45 dB. When the T/B buttons are not depressed, a FET is used to reduce the circuit gain. This is done to minimize the amount of microphone bleed through. The second stage amplifier allows additional adjustable gain from 0dB to 46dB to bring the T/B mic signal up to the nominal circuit operating level. An internal trim pot (R6) varies the gain of the second stage within the 46dB range. Both amplifier stages are part of the quad opamp integrated circuit U1 [HA4605]. The output of the second stage feeds the Slate level control (R8) and the solid state analog switch integrated circuit U5 [IH5011]. U5 is controlled by the T/B switching logic and provides switching of the T/B signals to the T/B inverter/follower amplifiers.

Circuit Components

C1,C2	Provide circuit stability
C3	Output DC blocking capacitor
C21	Output DC blocking capacitor
R1-4	Feedback/gain resistors (first stage)
R5	Input resistor (second stage)
R6	Trim pot - provides gain adjustment (second stage)
R7	Feedback/gain resistor (second stage)
R8	Slate audio level pot
U1	[HA4605] quad opamp

4.4.11 T/B Inverter/Follower Amplifiers

The other two sections of U1 are used for the T/B to Cue and T/B to Studio inverter/follower amplifiers. Integrated circuit U3 [LF356] is used as the Slate audio amplifier and has a fixed gain of 6dB to allow setting loss in the Slate level control. Slate tone and Test tone from the oscillator are also summed into U3.

Circuit Components

C14-16	Output DC blocking capacitors
R31	Input resistor to U3 - Slate audio input
R32	Input resistor to U3 - Slate tone input
R33	Feedback/gain resistor - U3
R34,R35	Feedback/gain resistors - U1
R36,R37	Input resistors - U1
R38	not used
R42	Input resistor to U3 - Test Tone input
R63	Prevents oscillation due to capacitive load on output of Slate amplifier
R64	Same as R63 - T/B to Cue amplifier
R65	Same as R63 - T/B to Studio amplifier
U1	[HA4605] quad opamp
U3	[LF353] dual opamp
U5	[IH5011] 4PST solid state analog switch

4.4.12 Oscillator Section

U2 [XR2206] is a function generator integrated circuit capable of supplying a sine wave output over a frequency range of 1Hz to 200kHz with less than .5% distortion. The circuit design as used in the Master Module operates well within the limits of the IC to provide a precision, very stable sine wave oscillator with level stability of +/- .2dB at all frequencies.

The output of the oscillator IC is fed through a full range level control (R20) to the output booster amplifier U4 [LF351]. Complementary transistors Q4 and Q5 at the output of U4 provide increased current drive capability for the circuit. The booster amplifier has fixed gain of 6dB, but variable oscillator output is achieved with the Oscillator Level control.

Circuit Components

C4,5	Frequency range capacitors: X10 range
C6	Frequency range capacitor: X1 range
C7	Frequency range capacitor (normally not used)
C8	Frequency range capacitor: X100 range
C11	Output DC blocking capacitor
C12	Transient filter capacitor
C13	Decoupling capacitor
LED 1	TEST "on" indicator
LED 2	OSC "on" indicator
R9	Frequency adjustment pot - top panel control
R10	Multi-turn trim pot: provides adjustment for minimum distortion and defines the Sine wave mode of the IC by tying pins 13 and 14 together
R11-12	These resistors refine the resolution of trim pot R13
R13	Trim pot - provides adjustment for waveform symmetry
R14-15	Bias resistors for trim pot R16
R16	Trim pot - sets nominal output at Pin 2 of the IC
R17	Current limit resistor for LED 2
R18	Trim pot - slate tone level trim
R19	Current limit resistor for LED 1
R61	Timing resistor in series with trim pot R9
S4	TEST switch - routes signal to slate amplifier
S5	Frequency range switch: 1kHz
S6	Frequency range switch: 10kHz
U2	[XR2206] IC function generator

(U4 is the output booster for the oscillator section which is considered a separate circuit block, so a separate component list is given below.)

C20	Output DC blocking capacitor
Q4	Current boost transistor
Q5	Current boost transistor
R8	Slate tone level pot
R20	Oscillator level pot
R21	Feedback/gain resistor
R22	Gain resistor
R23-26	Base bias resistors for Q4 and Q5
R27-28	Emitter load resistors for Q4 and Q5
R29	prevents oscillation due to capacitive loading on the output of the circuit
R66	Provides a DC return for C20
U4	[LF351] opamp

4.4.13 Talkback and Solo Logic

With the exception of R30, the Solo level pot, the rest of the communications circuit description deals with the T/B logic and audio switching, solo logic switching, and the solo defeat logic.

4.4.14 Solo Logic

The base of Q6 is tied to the Solo logic bus through R50. When the Solo logic bus is pulled low by a Solo switch in the I/O module, the base of Q6 is pulled low turning Q6 off. Q6 is normally biased on by R48. When Q6 is turned off, the collector is pulled high by constant current source Q1, and the Solo LED (LED 3) is turned on. The base of Q2 is pulled high through R52 turning on the transistor. The collector of Q2 is pulled low and releases the positive logic signal being sent through diode D3. The cathode of D3 is pulled low by bias resistors in the Control Room switching circuitry, and the solo audio is switched into the Control Room inverter/follower amplifiers by a solid state analog switch. The collector of Q2 also pulls the base of Q3 low and Q3 turns off. The collector of Q3 goes high sending positive logic through D1 and D2 to the Studio and Control Room circuitry respectively. This logic disables the switching functions to provide Studio and Control Room mute during Solo. (Note: in standard systems, D1 is omitted from the PC assembly so that Studio does not mute during Solo.)

4.4.15 Solo Defeat

The Solo Defeat logic deactivates the solo interrupt logic signal to the Control Room input switching circuit thereby preventing the I/O module solo switches from initiating Control Room solo. Normally Q6 is biased on by base resistor R48. When any of the I/O module solo switches is depressed, the base of Q6 is pulled low through the series resistor R50. Q6 turns off and the collector goes high activating further logic and eventually providing solo switching to the Control Room amplifiers. If the Solo Defeat switch (S1) is depressed, an additional resistor (R49) is placed in series with the existing R50. The large value of R49 prevents the base of Q1 from being pulled low by the I/O module solo switches and blocks any activation of solo logic.

4.4.16 Talkback Logic and Audio Switching

The T/B switch enables all three T/B functions (Slate, Cue, and Studio) together by activating the logic for all the sections of the solid state analog switch U5 [IH5011]. U5 switches signal from the output of the T/B mic preamp to the T/B to Cue and T/B to Studio inverter/follower amplifiers. U5 also switches signal from the Slate level control and the Slate tone control into the Slate amplifier. The Cue T/B switch also activates U5, but only the T/B to Cue switch section of U5 is enabled.

When the T/B switch (S2) is depressed, the base of Q7 is pulled high turning the transistor on and forcing the collector low. The collector low is fed to U5 and turns on the switch sections for Slate audio, Slate tone, and T/B to Studio. The base of Q8 is also pulled high through the normally closed contacts of the T/B to Cue switch (S3). This forces the collector of Q8 low. This low is fed to U5 turning on the T/B to Cue switch section. S2 also sends positive logic out through diodes D4 through D6 to ensure Control Room mute, Studio mute, and Solo mute functions during T/B.

When the T/B to Cue switched is depressed, the base of Q8 is pulled high forcing the collector low and turning on the T/B to Cue section of U5. This is the only section of U5 that is activated during Cue T/B. S3 also sends logic out through D7 through D9 to ensure Control Room, Studio, and Solo mute functions.

Circuit Components

C9	Internal DC bypass
C10,17-18	Transient filter capacitors
C21	not used
D1-9	Logic isolation diodes
D10-11	Switching protection diodes
Q1	Constant current source transistor for LED 3 (Solo)
Q2-3	Provide solo logic switching
Q6	Solo logic bus input transistor
Q7	Logic driver to U5 for "T/B"
Q8	Logic driver to U5 for "Cue"
Q10	Mic turn on FET
R30	Solo Level
R39	Base input resistor for Q7
R40	Logic resistor
R41	Base bias resistor for Q7
R43	Base input resistor for Q8
R44	Collector load resistor for Q7
R45	Collector load resistor for Q8
R46-47	Base bias resistor for Q1
R48	Base bias resistor for Q6
R49-50	Base input resistor for Q6
R51	Current limit resistor for LED 3 (solo)
R52-53	Base input/bias resistor for Q2
R54	Collector load resistor for Q2
R55-56	Base input/bias resistor for Q3
R57	Collector load resistor for Q3
R58-59	Isolation resistors for mute logic control lines
R60	Emitter resistor for Q1
R62	Base bias resistor for Q8
R70	"Off" Gain setting
S1	Solo Defeat switch
S2	T/B switch
S3	Cue switch

4.4.17 Switch Module PC Assembly

202-154	Schematic
202-554	Assembly

The Switch Module consists of the switching circuits for Echo Return Assign to Mix, Aux Select, Studio Input Select, and Control Room Input Select. In addition, the Control Room and Studio input amplifiers and the Aux VU level indicator circuits are located on this PC assembly.

4.4.18 Echo Return Assign

Switch S5 routes the Echo Return signal from the output of the pan mix amps (see Main PC description) to the 2-trk Mix buses through the bus summing resistors and also provides LED indication of Echo Return to Mix.

Circuit Components

LED 6	Echo return to mix indicator
R17	Current limit resistor for S5 indicator LED (LED 6)
S5	Echo Return to 2 Track Mix Switch

4.4.19 Aux Select

The Aux Select switch assembly S6A-D selects which of the four send signals (Echo 1, Echo 2, Cue L, Cue R) will be sent to the Aux Level indicator and to the Control Room and Studio input select switches.

4.4.20 Studio Input Amplifiers and Input Switching

Integrated circuit U5 [HA4605] is a quad opamp. Two of the four opamps in this IC are used for the Studio Input Amplifiers, while the remaining two sections are used for the Control Room Input Amplifiers. Integrated circuit U1 [IH5011] is a solid state analog switch and is used for Studio On and T/B to Studio switching. U2 [IH5001] is used for Control Room mute and Solo interrupt switching.

Circuit Components

C3	Transient filter capacitor
C8,9	Input DC blocking capacitor
C12,13	Output DC blocking capacitor
C16,17	High frequency roll off
D1	Logic diode - part of On/Mute circuit
R18-18	Part of "On" bias network
R20,21	DC reference
R22,23	Feedback/gain resistor
R44-51	Input resistors
S7A-D	Input select switch assembly
S8	Studio On switch
U1	[IH5011] 4PST solid state analog switch
U5	[HA4605] quad opamp

4.4.21 Control Room Input Amplifiers and Input Switching

Two sections of U5 [HA4605] are used as the Control Room Input Amplifiers. U2 [IH5011] is a 4PST analog switch and provides switching for Control Room mute and solo interrupt.

Circuit Components

C4-5	Transient filter capacitors
C10,11	Input DC blocking capacitor
C14,15	Output DC blocking capacitor
C18,19	High frequency roll off
D2	Logic diode - part of CR mute network
R52-59	Input resistors
R60,61	Solo audio input resistor
R62,63	Feedback/gain resistor
R64-65	Bias network for CR mute logic signal
R66-67	Bias network for solo interrupt logic signal
S9A-D	Input select switch assembly
S10	MONO switch
U2	[IH5011] 4PST solid state analog switch
U5	[HA4605] quad opamp

4.4.22 Aux Level Indicator

Integrated circuit U3 [RC4558] and its associated components form a precision rectifier. The incoming audio signal is changed to a DC voltage which is sent to a voltage comparator IC, U4 [LM339]. U4 compares the DC voltage derived from the audio signal with a series of fixed voltages formed by the resistor network R32 and R37-40. The fixed voltages from this network normally hold the comparator stages on, thereby shunting the LED source current. As the audio DC voltage exceeds the fixed DC voltages, the comparator stages begin to sequentially turn off, allowing the source current to flow through the respective LED in the 5-segment LED VU display. An additional comparator stage to activate the fifth LED (+3) is formed by the transistor network of Q2 and Q3. The design of the circuitry provides LED response matching the ballistics of a mechanical VU meter along with an internal trim pot for level calibration. Q1 and R28 and R42-43 form a constant current source (8ma) to drive the LED's. This is used to prevent current surges that might inject noise into the audio circuitry.

Circuit Components

C6	Sets response time of U3 P1-3 to match ballistics of a mechanical VU meter
D3,4	Rectifier diodes for U3
Q1	Provides constant current (8ma) drive for VU LED's
Q2,3	Comparator/drive transistors for LED 1 (+3)
R71	Trim pot - level calibration
R24,25, R31,69	Gain network for U3 P1-3
R26,30,70	Gain network for U3 P5-7
R27,29, R33,34,41	Bias/load resistors for Q2 and Q3
R28,R43	Bias resistors for Q1
R32	Part of level reference divider
R35	DC offset compensation
R36	DC offset compensation
R37	Part of level reference divider
R38	Part of level reference divider
R39	Part of level reference divider
R40	Part of level reference divider
R42	Emitter resistor for Q1 - sets constant current level to 8mA
U3	[RC4558] dual opamp
U4	[LM3391 quad comparator

4.4.23 Balanced Output Driver PC Assembly

007-141	Schematic
007-541	Assembly

This circuit develops a fully balanced high level output capable of driving 600 ohm loads up to +27 dBu. It includes a input ACA/BUFFER, an inverter, and a pair of op-amps connected in a cross balanced feedback arrangement to develop the floating output. Half of the feedback is derived from the output voltage of each stage and half from the output current. The output isolation resistors also function as current sensors. R8 & R9 provide just enough error in the cross balancing feedback to prevent the instability which results from infinite output Z.

Circuit Components

C1,2	Power bypass
C3,5,6	High frequency roll off
C4,7,8	DC Blocking
RN3A	Input ACA feedback
RN3B	Inverter feedback
RN3C	Input
RN3D	Input
RN4A	Feedback
RN4B	Feedback
RN4C	Feedback
RN4D	Feedback
R2	Unbalanced output isolation
R5,6	Feedback divider
R7,10	Output isolation and sensing
R8, 9	Feedback gain unbalanced
R11,12	DC Return

4.4.24 Front Panel Assembly

202-570	Assembly - Series 34 Master Module
912-152-1	Assembly - Series 34 Pot board with pan

Circuit Components

R1	Control Room level control
R2	Studio level control
R3	Talkback to Studio level control

(Note: The following Send/Return Master controls are mounted on a series of four PC boards which then mount to the front panel assembly. The Echo Send/Return boards consist of one linear fader, one level pot, and one pan pot each. The Cue Send/Return boards consist of one linear fader, and two level pots each. Please examine the proper schematic and assembly drawings for further details.)

R5	Echo send 1 level control
R5	Echo send 2 level control
R4	Echo return 1 level control
R4	Echo return 2 level control
R3	Echo return 1 pan pot
R3	Echo return 2 pan pot
R5	Cue send 1 level control
R5	Cue send 2 level control
R3	Echo return 1 to Cue level control
R3	Echo return 2 to Cue level control
R4	Talkback to Cue 1 level control
R4	Talkback to Cue 2 level control

4.4.25 Misc Components

C39,40	Power decoupling
C41	Power decoupling
C42-48	RFI Bypass
C35-38	RFI Bypass
D1,2	Power decoupling and isolation

SERIES 34 EQUALIZER

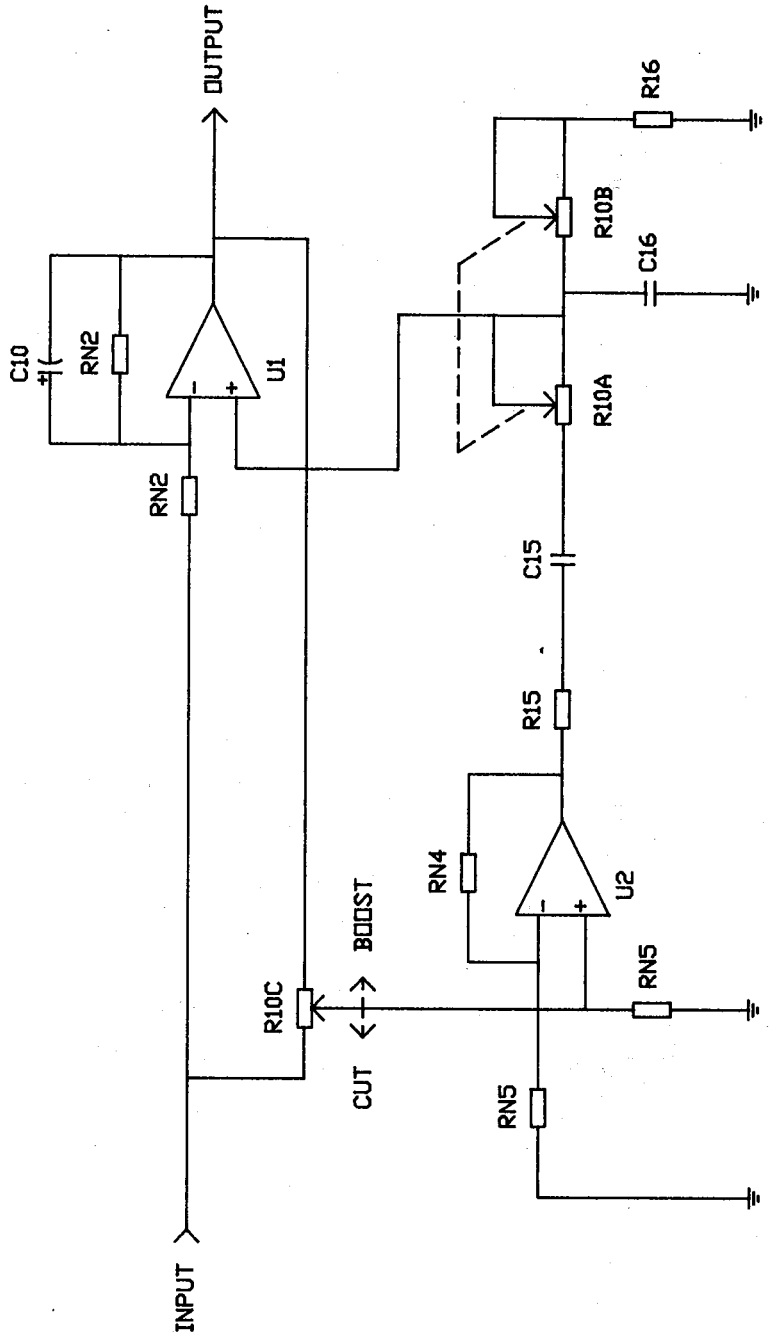


FIG 4A - EQUALIZER SIMPLIFED CIRCUIT

VCA BLOCK DIAGRAM

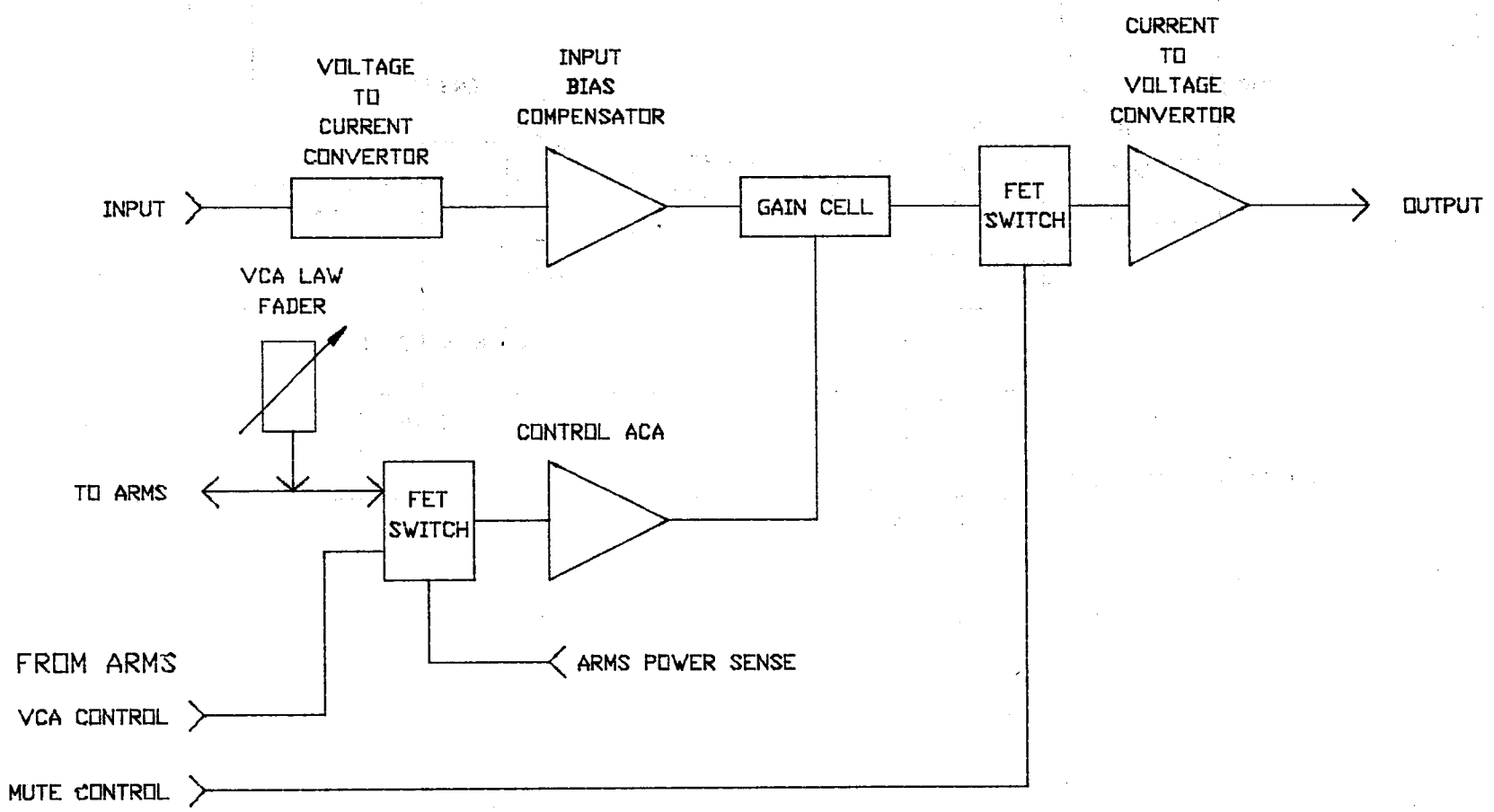
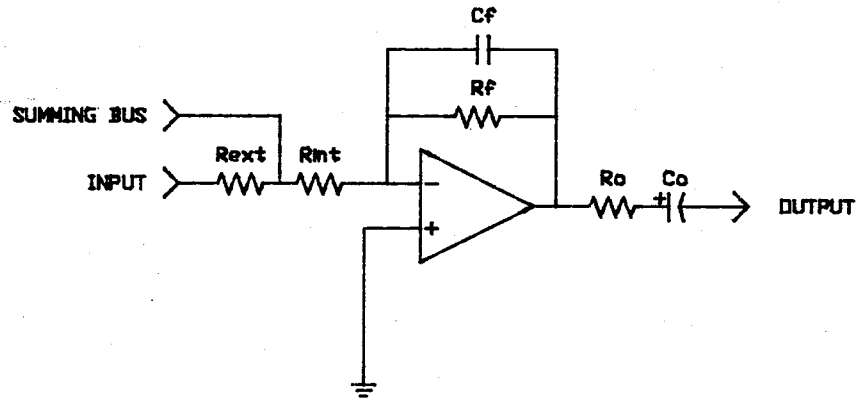


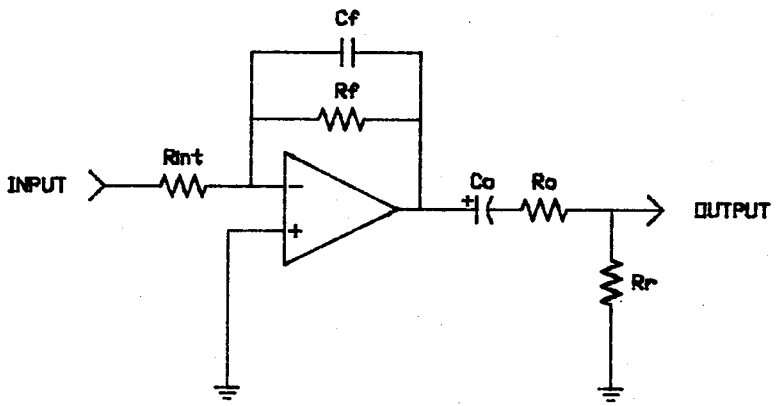
FIG 4B - VCA CIRCUIT BLOCK DIAGRAM

FIG 4C - CIRCUIT DIAG - SUMMING & OUTPUT

MIX/AUX SUMMING ACA'S



AUX/STUDIO OUTPUT BOOSTER



Section 5

SYSTEM MAINTENANCE

5.1 ELECTRICAL ALIGNMENT PROCEDURES

Note: 0 dBu = 0.775 VAC rms

Warning: Do not adjust any internal potentiometers other than the ones specified in the following procedures. No sealed potentiometer should be adjusted without first consulting your authorized Sound Workshop dealer or the factory.

5.1.1 Power Supply - Console Audio (+/- 16V)

53615 Schematic
53611 Assembly Drawing

If the voltages measured at the console are not within tolerance, adjust the appropriate trim pot on the power supply:

Trim Pot label	Purpose	Voltage	Tolerance
+V	Positive Supply Rail	+16 VDC	+/-0.1 volt
-V	Negative Supply Rail	-16 VDC	+/-0.1 volt

Note: Current-limiting potentiometers (I limit) are factory sealed and must not be adjusted under any circumstances.

5.1.2 POWER SUPPLY - Phantom (+48V)

51336 Schematic
51330 Assembly Drawing

Trim Pot label	Purpose	Voltage	Tolerance
+V	Phantom power	+48 VDC	+/-0.5 volts

5.1.3 POWER SUPPLY - ARMS (+5V; +/-16V)

52982 Schematic
53126 Assembly Drawing

Trim Pot label	Purpose	Voltage	Tolerance
+V	Positive Supply Rail	+16 VDC	+/-0.1 volt
-V	Negative Supply Rail	-16 VDC	+/-0.1 volt
+5	Logic	+5 VDC	+/-0.1 volt

5.1.4 Master Module

202-153 Communications Module Schematic
202-503 Assembly Drawing

912-151 Master PC Board Schematic
912-551 Assembly Drawing

NOTE: THIS ALIGNMENT PROCEDURE SHOULD BE COMPLETED IN THE FOLLOWING ORDER

1. Turn the Series 34's TEST OSCILLATOR on and set frequency at 1 kHz. Turn LEVEL potentiometer (41A) fully clockwise, and let oscillator stabilize for ten minutes before proceeding. Patch an external meter into the OSCILLATOR OUT jack on the patch bay. On the Communications Module, adjust R16 for a meter reading of +4 dBu.

2. Depress OSCILLATOR TEST switch (41C) to feed oscillator signal to all Multi-Track and Mixdown Buses. Put MIXDOWN FADER (42) in its full on position. On the Master PC Board, measure the voltage on P13, pins 1 and ~~2 3.~~ Adjust OSCILLATOR LEVEL potentiometer (41A) for a meter reading of -2 dBu on each pin. The potentiometer knob should be pointing to the CAL legend. If it is not, rotate the knob cap until it is properly aligned. Make sure these controls are not disturbed during the remaining procedures.

Note: Trim pots R91-R98 are found on the Master PC Board, and may be reached by tilting the Control Room Module up. Use drawing 912-551 as a guide.

3. Patch an external meter into MIX BUS LEFT OUTPUT on the Patch Bay. Adjust R98 for a meter reading of +4 dBu. Move the meter to the MIX BUS RIGHT OUTPUT and repeat while adjusting R97.

4. Patch external meter into CONTROL ROOM LEFT OUT on the Patch Bay. Depress MIX switch (38D) and adjust the CONTROL ROOM MONITOR LEVEL potentiometer (38F) for a meter reading of +4 dBu. Patch the meter into CONTROL ROOM RIGHT OUT on the Patch Bay and verify that the meter reading remains at +4 dBu. If necessary, adjust R91 (left output) or R92 (right output) so that the levels are equal.

5. Patch an external meter into CONTROL ROOM LEFT OUT, as in step 4. Patch both MIX BUS OUT jacks into the TAPE 1 MONITOR RETURNs, and Depress TAPE 1 switch (38B). Adjust R95 so that the meter reading in the TAPE 1 mode remains at +4 dBu. Move the meter to CONTROL ROOM RIGHT OUT, and repeat the procedure while adjusting R96.

6. Repeat Step 5, this time patching into the TAPE 2 MONITOR RETURNS,and depress TAPE 2 switch (38A). Adjust R93 and R94 for meter readings of +4 dBu. Verify that all setting are correct by switching between MIX, TAPE 1 and TAPE 2 (38D, B, A). The meter reading should remain at +4 dBu. If not, repeat steps 4-6.

5.1.5 Input/Output Module

202-120s5 I/O Module ACA and Track Output Schematic
202-521 I/O Module Assembly Drawing

Note: All adjustments below refer to trim pots on each I/O Module main PC board.

1. If necessary, re-adjust TEST OSCILLATOR as in Steps 1 and 2 above. Make sure oscillator TEST (41C) switch is still depressed.

2. Patch an external meter into MULTI-TRACK BUS 1 OUTPUT on the Patch Bay. Adjust R3 for a meter reading of +4 dBu. This adjustment may be made through the access hole to the left of the MIC/LINE switch (3E). The R3 trim pot is near the bottom of the I/O module card, and about one inch forward (towards bolster) of the access hole. Therefore, a long thin screwdriver will be required to make adjustments. (The trim pot directly aligned with the access hole is R2, which is used in the Line Input Calibration procedure below).

3. Repeat Step 2 for all other I/O modules.

5.1.6 High Resolution Meters

202-160 Meter Driver Board Schematic
202-561 Assembly Drawing

Note: Adjustments are made on the Meter Driver Board.

1. If necessary, adjust the TEST OSCILLATOR as in Steps 1 and 2 of the Master Module Procedure.

2. On the Echo Master Module, depress the VU/PPM switch (28B).

3. On I/O Module 1, release the BUS/TAPE switch (6C). Adjust R12 for a meter reading (High-Resolution Meter) of 0 VU (i.e., 0 dB).

4. On the Echo Master Module, release the VU/PPM switch (28B).

5. Adjust R21 for a meter reading of 0 VU (i.e., 0 dB).

6. Repeat Steps 2-5 for all other I/O modules.

5.1.7 Mechanical Meters

240-160 Meter Driver Board Schematic
240-560 Assembly Drawing

Note: Adjustments are made on the Meter Driver Board.

1. If necessary, adjust the TEST OSCILLATOR as in Steps 1 and 2 of the Master Module Procedure.

2. Release the TEST switch (41C) to lift the Oscillator test signal. Verify that the Meter 1 needle comes to rest at the mark below -20 VU on the meter face. If it does not, adjust the meter's Rest Point Calibration Screw, which may be accessed through the hole in the METER DRIVER BOARD on the back of the meter.

3. Depress the TEST switch (41C) on the oscillator and adjust R2 for a meter reading of 0 VU.

4. Repeat Steps 2 and 3 for all other meters.

5.1.8 Line Input Calibration

NOTE: Meter Calibration Procedure must precede this calibration

202-120s1 I/O Module Input and Equalizer Schematic
202-521 I/O Module Assembly Drawing

103-122 Voltage Control Card Schematic
103-522 Voltage Control Card Assembly Drawing

Note: Most adjustments are made on the I/O Module Main PC Board. However, the Step 6 adjustment is made on the Voltage Control Card (VCA-equipped consoles only).

1. Release the console oscillator TEST switch (41C). Depress the BUS/TAPE switch (6C).

2. Using either an external signal generator or the consoles own oscillator, patch a 1kHz, +4dBu signal into the LINE 1 INPUT jack on the Patch Bay. Adjust R2 for a Console (High-Resolution or Mechanical) meter reading of 0 VU. Access to R2 is through the access hole to the left of the MIC/LINE switch (3E). If there is no meter associated with the module, set R2 for a -2 dBu reading at the PATCH OUT jack.

3. While watching the five-segment LED meter (2) on the I/O module, adjust R4 so that the yellow 0 VU LED is just illuminated. This adjustment can be made through the access hole next to the meter's -3 LED. (Turn the potentiometer down, and then up slowly until the 0 VU LED just comes on.)

4. With an external meter, verify that the level at the CHANNEL PATCH OUT jack is -2 dBu, +/-0.25 dBu.

5. Repeat Steps 1-4 for all other I/O modules.

6. FOR VCA EQUIPPED CONSOLES ONLY. R31 is located on the Voltage Control Card. Turn the ARMS Computer off before proceeding. Patch an external meter into the CHANNEL 1 DIRECT OUT jack, and apply a 1 kHz, 0 dBu signal to the CHANNEL 1 PATCH IN jack. Turn the channel "ON", Set the CHANNEL FADER (9) to the 0 mark, and adjust R31 for a meter reading of 0 dBu.

7. Repeat Step 6 for all other I/O modules.

5.2 INPUT MODULE REMOVAL & INSTALLATION

NOTE: ALL CONSOLE POWER SUPPLIES MUST BE TURNED OFF BEFORE REMOVING OR INSTALLING ANY MODULES.

5.2.1 Module Removal

See Figure 5B

1. Remove upper and lower module screws.

2. Pivot the fader end of the module up approximately 6 inches.

3. Disconnect the Computer Channel Ribbon (If console has ARMS)

4. Disconnect the Ground Jumper and Front Mother Ribbon.

5. Pivot module up an additional 6 to 8 inches.

6. Disconnect the Rear Mother Ribbon.

7. Remove the upper end of the module from the mainframe approximately 4 inches.

8. Disconnect the Patch Bay Harness, Microphone Harness, and Meter Feed Harness (If applicable).

5.2.2 Module Installation

To install an I/O Module, reverse the above procedure.

5.3 PATCHBAY CLEANING

All electrical interconnect systems require periodic cleaning to ensure integrity of their signal paths. This is especially true of studio patch bays and patch cords. Under normal usage and environmental conditions, we recommend cleaning patch cords at a minimum of once a month. Under heavy usage and/or extreme environmental conditions (ie: cigarette smoke and dust) this should be done more often.

A good quality brass cleaner such as Noxon should be used. Once the patch cords are cleaned, they will act to burnish the contacts in the patch bay and therefore no special cleaning of the bay itself should be required. If the patch bay is heavily contaminated, we recommend using a high quality, freon based, non-residue spray cleaner, such as Miller-Stephenson's Contact Re-Nu as follows: First, the jacks should be sprayed with the cleaner. Immediately following this, a clean patch cord should be inserted into and removed from the jack several times to exercise the contacts and ensure that the jack is cleaned.

5.4 FADER CLEANING

Should it become necessary to clean the faders, do not use any solvents or sprays, as these will attack and possibly damage the conductive plastic elements. After disassembly, the faders should be rinsed under only warm tap water. If needed, a soft brush may be used to remove heavy deposits from the elements or contact fingers. Be careful not to bend the contacts at any time during the cleaning. After the faders are cleaned, they should be allowed to air dry or a low wattage blow dryer may be used.

5.5 CONNECTOR PINOUTS

The following is a list of all interface connectors located on the Input, Meter, Echo Return, and Master modules. These connectors and their associated wiring harnesses perform all of the electrical interconnection within the console system itself. Exact information as to location and orientation of these connectors can be found in their respective assembly drawings. Note: No intra-module (ie: EQ Assembly to Input Module main PC Assembly) connections are listed. Refer to the appropriate schematic and/or assembly drawings for this information.

5.5.1 I/O Module Connectors

202-120 Schematic
202-521 Assembly

P1 - Rear Mother Ribbon

Pin#	Function
1	Phantom power bus (+50 Volts)
2	Chassis ground bus
3	Track summing bus 23
4	Track summing bus 15
5	Track summing bus 24
6	Track summing bus 7
7	Track summing bus 21
8	Track summing bus 16
9	Track summing bus 13
10	Track summing bus 8
11	Track summing bus 22
12	Track summing bus 5
13	Track summing bus 14
14	Track summing bus 19
15	Track summing bus 6
16	Track summing bus 20
17	Track summing bus 3
18	Track summing bus 11
19	Track summing bus 12
20	Track summing bus 17
21	Track summing bus 4
22	Track summing bus 18
23	Track summing bus 1
24	Track summing bus 9
25	Track summing bus 10
26	Track summing bus 2

P2 - Patch Bay Ribbon Harness

Pin#	Function
1	Common
2	Line Input Lo (-)
3	Line Input Hi (+)
4	Common
5	Common
6	Patch Output
7	Common
8	Patch Return
9	Common
10	Direct Output
11	Track Output Lo (-)
12	Track Output Hi (+)

P3 - Front Mother Ribbon

Pin#	Function
1	Common
2	Common
3	+16 Volts DC (Supply Rail)
4	-16 Volts DC (Supply Rail)
5	2-Track Summing Bus - Left
6	2-Track Summing Bus - Right
7	Solo Audio Summing Bus
8	Solo DC Logic Bus
9	Echo 4 Summing Bus
10	Echo 3 Summing Bus
11	Echo 2 Summing Bus
12	Echo 1 Summing Bus
13	Cue Left Summing Bus
14	Cue Right Summing Bus

P6 - Meter Feed Harness

Pin#	Function
1	Common
2	Track Jumper(ACA Output)
3	Meter Bridge Feed
4	Unbalanced Output (Track Inverter Out)

5.5.2 Microphone Pre-Amplifier Connector

202-122 Schematic
202-522 Assembly

P1 - Microphone Harness

Pin#	Function
1	Common
2	Microphone Input Lo (-)
3	Microphone Input Hi (+)
4	N/C

5.5.3 Voltage Control Card

103-122 Schematic
103-522 Assembly

P1 - Computer Channel Ribbon

Pin#	Function
1	Logic Common
2	Logic Common
3	Write
4	N/C
5	Update
6	Group Switch
7	Sense
8	Spare Switch
9	Solo/Update LED
10	Group LED
11	Mute/Write LED
12	VCA Mute
13	+ Null LED
14	- Null LED
15	+5 Volts Return
16	Channel ON LED
17	N/C
18	+5 Volts
19	VCA Control Output
20	VCA Control Return

5.5.4 Master Module / Main PC Assembly Connectors

912-151 Schematic
912-551 Assembly

P1/P2 - Control Room/Patch Bay Harness

Note: P1 and P2 are identical, with P1 carrying Left Channel Audio and P2 carrying Right Channel Audio

Pin#	Function
1	Common
2	Common
3	Tape 1 Playback (from Patch Bay)
4	Common
5	Control Room Output Lo (-) (to C/R Amp)
6	Control Room Output Hi (+) (to C/R Amp)
7	Common
8	N/C
9	Common
10	2-Track Mix Bus Aux Input (from PB)
11	2-Track Mix Bus Output Lo (-) (to 2-Track)
12	2-Track Mix Bus Output Hi (+) (to 2-Track)

P3/P4 - Control Room/Patch Bay Harness

Note: P3 and P4 are identical, with P3 carrying Left Channel Audio and P4 carrying Right Channel Audio

Pin#	Function
1	Common
2	Common
3	Tape 2 Playback (from PB)
4	Common
5	Common
6	Studio Room Output (to Studio Amp)
7	Common
8	N/C
9	Common
10	Oscillator Output - P4 Only (P3 - N/C)
11	2-Track Mix Bus Output Lo (-) (to 2-Track)
12	2-Track Mix Bus Output Hi (+) (to 2-Track)

P5/P6 - Control Room/Patch Bay Harness

Note: P5 and P6 are identical, with P5 carrying Left Channel Audio (& Echo 1) and P6 carrying Right Channel Audio (& Echo 2)

Pin#	Function
1	Common
2	Common
3	Echo Return (from PB)
4	Common
5	Common
6	Cue Send (to Cue Amp)
7	Common
8	N/C
9	Common
10	Echo Return to Cue (from PB)
11	Common
12	Echo Send (to Chamber)

P12 - Front Mother Ribbon

Pin#	Function
1	Common
2	Common
3	+16 Volts DC (Supply Rail)
4	-16 Volts DC (Supply Rail)
5	2-Track Summing Bus - Left
6	2-Track Summing Bus - Right
7	Solo Audio Summing Bus
8	Solo DC Logic Bus
9	Echo 2 Summing Bus
10	Echo 1 Summing Bus
11	Cue Right Summing Bus
12	Cue Left Summing Bus

P19/20 - Stereo Meter Harness

Note: P19 and P20 are identical, with P19 feeding the Left VU Assembly and P20 feeding the Right VU Assembly

Pin#	Function
1	N/C
2	Common
3	+V
4	-V
5	Audio Feed to Meter Circuit

5.5.5 Master Module / Switch PC Assembly Connectors

292-154 Schematic
202-554 Assembly

P1 - Slate/Talkback Harness

Pin#	Function
1	Chassis ground bus
2	Spare
3	Phantom power bus (+50 Volts) to Echo Return Module
4	Slate Audio to Echo Return Module
5	Common
6	Common
7	Talkback Mic from Echo Return Module

5.5.6 Echo Return Module ConnectorsJ!

202-151 Schematic
202-551 Assembly

P1 - Echo to Patch Bay Harness

Pin#	Function
1	N/C
2	N/C
3	N/C
4	N/C
5	Echo Return 3 (from PB)
6	Common
7	Echo Return 4 (from PB)
8	Common
9	Echo Send 3
10	Common
11	Echo Send 4
12	Common

P2 - Rear Mother Ribbon

Refer to Input Module P1 call-out for this information.

P3/6 - Front Mother Ribbon

Pin#	Function
1	Common
2	Common
3	+16 Volts DC (Supply Rail)
4	-16 Volts DC (Supply Rail)
5	2-Track Summing Bus - Left
6	2-Track Summing Bus - Right
7	Solo Audio Summing Bus
8	Solo DC Logic Bus
9	Echo 4 Summing Bus
10	Echo 3 Summing Bus
11	N/C
12	N/C

P5 - Slate/Talkback Harness

Pin#	Function
1	+50 Volts Phantom Power
2	Slate Audio
3	Talkback Mic Lo
4	Talkback Mic Hi

P7 - High Resolution Meter Control

Pin#	Function
1	PEAK Mode select logic
2	AVG Mode select logic
3	DC Mode select logic
4	Intensity control bus
5	N/C
6	N/C
7	N/C

5.5.7 High Resolution Meter Module

202-160 Schematic
202-560 Assembly

P1 - Audio Input

Pin#	Function
1	Audio In Hi (+)
2	Audio In Lo (-)
3	Common
4	DC Input

P2 - High Resolution Meter Ribbon

Pin#	Function
1	Peak Mode Select Logic
2	AVG Mode Select Logic
3	DC Mode Select Logic
4	Intensity Control Bus
5	Common
6	+16 Volts
7	-16 Volts

5.5.8 Single VU Meter Module

240-160 Schematic
240-560 Assembly

P1 - Audio Input

Pin#	Function
1	Audio In Hi (+)
2	Audio In LO (-)
3	Common
4	N/c

P2 - Mechanical Meter Ribbon

Pin#	Function
1	Common
2	+16 Volts
3	-16 Volts
4	+48 Volts
5	-48 Volts
6	Lamp Power
7	Lamp Power

5.6 CONSOLE POWER SYSTEM

5.6.1 Overview

Power for the Series 34 console is supplied from rack mount chassis which contain various sub-assemblies. These chassis come in five models :

MODEL #	USE
PSR-55PT	All power requirements (EXCEPT arms) in consoles with mechanical meters.
PSR-55P	Same as above but used in consoles with Hi-Resolution meters.
PSR-D	ARMS Computer power (40 input mainframes and smaller).
PSR-5D	ARMS power and additional Bi-polar power for 50 input mainframes with ARMS computer.
PSR-5	Additional Bi-polar power for 50 input mainframes without ARMS computer.

Refer to Figure 5F for a description of the sub-assembles within each power supply rack.

Refer to figures 5G and 5H to see how the various rack styles relate to console size, and how the Power Supply Harnesses (PSH) interface to the console.

Power for the Series 34 console exits the power supply chassis thru multi-pin connectors in one of two ways; either by utilizing the POWER DISTRIBUTION BOARD (PDB) or by going directly to the multi-pin connector. The PDB is used to route the outputs of the sub-assemblies to the proper pins in the Power Supply Harness (PSH). It is also used to distribute AC power (110/220) within each rack chassis. A PDB is used in all of the above models with the exception of PSR-D which houses the PS-5/16/16 (ARMS supply). This sub-assembly along with PS-T36 always exits the rack without going through the PDB. The AC feed to the PS-T36, however, does originate from the PDB.

5.6.2 Power Distribution

The PSR-55PT is used as the primary power source for the SERIES 34. Each of the two PS-16/16/-5 sub-assemblies are fed to half of the console. The "split" is accomplished by interrupting the power buses on the front mother ribbon at the "electrical center point" of the console. This creates two independent loads that are referred to as the "LEFT" and "RIGHT" loads (Left and Right is referenced to the mixing position).

The following chart represents the sub-assemblies which make up the Left and Right loads for each console size.

SIZE	LEFT LOAD (SUPPLY A)	RIGHT LOAD (SUPPLY B)
24	INPUT MODULES AND METERS 1 THRU 14	INPUT MODULES AND METERS 15 THRU 24, ERM, CRM MIX METERS.
32	INPUT MODULES AND METERS 1 THRU 16	INPUT MODULES 17 THRU 32 METERS 17 THRU 24, MIX METERS, ERM, CRM.
40	INPUT MODULES AND METERS 1 THRU 19	INPUT MODULES 20 THRU 40 METERS 21 THRU 24, MIX METERS, ERM, CRM.

When a console is configured with all mechanical meters, the meter power (+/- 16v, not bulb power) is not split into a Left and Right load. All power for these meters are from the "A" sub-assembly and connect to the "Tail" of the Mechanical Meter Ribbon (MMR).

On a 50 input mainframe, the console is divided into three equal loads, LEFT, CENTER, and RIGHT.

LOAD	POWERED MODULES	SPLICE
LEFT (PSR-55PT, supply A)	INPUT MODULES 1 THRU 22	11-12
CENTER (PSR-55PT, supply B)	INPUT MODULES 23 THRU 42 ERM, AND CRM.	34-35
RIGHT (PSR-5 OR 5D)	INPUT MODULES 43 THRU 50 METERS 1 THRU 24, MIX	43
	METERS	13-14

5.6.3 Mechanical Meter Bulb Power

Power for the mechanical meter bulbs is derived from the PS-T36 sub-assembly. This is a step down transformer with an output voltage of 36VAC. The AC input to this comes from the Power Distribution Board (PDB) P5-7,9. The PDB is modified when the console is configured with all mechanical meters. This modification consists of jumping pins 6 and 7, 8 and 9 of P5. With this modification, sub-assemblies PS-T36 AND PS-50 now share the "C" fuse in the power supply rack. Bulb power enters the console using the "B" Power Supply Harness (PSH). The internal wiring of the console then connects this to the Mechanical Meter Ribbon (MMR) pins 6 and 7.

5.6.4 Phantom Power

Phantom power (+48VDC) originates in the PS-50 sub-assembly. From the "1" PSH (pin #14), the internal wiring of the console brings this bus to the Echo Return Module (P5-1). It then goes to the track assign board in the ERM which ties this to the Rear Mother Ribbon (RMR) pin #1.

5.6.5 Power Cable Pinouts

Within each Power Supply Harness are buses that terminate in various locations in the mainframe. See Figure 5I and 5J for a description of what each pin in the harness represents, along with the point of origin and destination of each bus.

5.6.6 Fuse Values

FUSE VALUE (AMPS) FOR
POWER SUPPLY SUB-ASSEMBLIES

POWER SUPPLY	110v	220v
PS-16/16-5	3.0	1.5
PS-50	0.5	.25
PS-5/16/16	2.0	1.0

FUSE VALUES FOR POWER SUPPLY
CHASSIS ASSEMBLIES - (SPARE)

RACK MODEL#	A	B	C
PSR-55P(T)	3	3	.5
PSR-D	2	2*	2*
PSR-5D	3	2	3*

*For use as spare
A, B, and C refer to the sub-assemblies in FIGURE 1.

5.7 GROUND STRUCTURE

Within the Series 34, a #8 solid copper bar is installed that extends the width of the mainframe. It is secured to the mainframe via solder lugs that are bolted to the main support rail. This bar is referred to as the "Ground Bus" and is the central ground point of the console.

There are two types of grounds within the power structure of the console. These are AUDIO (analog) and COMPUTER (digital) ground. Computer ground is distributed in the mainframe by the ARMS POWER BOARD (APB). This ground originates from the PS-5/16/16 sub-assembly, and is used only for the components of the ARMS computer system (Processor and Digitizer boards). Audio ground is the chassis or Ground Bus ground and originates in the PS-16/16-5 sub-assemblies. The ground bus is also where the commons of each of the PS-16/16-5 sub-assemblies tie together. Audio and Computer ground tie to each other at only one point, by connecting pins 14 and 16 of PSH "A" to the Ground Bus.

5.7.1 Microphone Interface Harness

The microphone harness consists of a group of 2-conductor shielded wires that are used to interface between the studio and the console. Each of the wires have their shields tied together and soldered to a terminal strip at the connector bracket in the left console leg. A wire is connected between the ground bus and the terminal strip, thereby grounding all of the incoming microphone wires. The shields on the input module side of the harness are lifted.

5.7.2 Input and Master Modules.

All of the above sub-assemblies tie to the ground bus independently. This is accomplished by jumpers that are soldered directly to the ground bus and plug into the appropriate connector on the various modules. See the module callout drawings for the connector "P#".

5.7.3 Patchbay

Grounding of the patchbay is accomplished by a jumper wire that connects between the ground bus and the upper patch bay card mounting screw. The bottom side of the patchbay panel is conductive, thereby grounding all of the patch bay modules that are attached to it.

5.7.4 Meters

The mechanical meters are tied to ground by a wire that is soldered to the ground bus. This wire connects to the Mechanical Meter Ribbon (MMR) on pin #1 via an inline connector on the tail of the ribbon harness. This connector is also used to supply power to the ribbon.

Hi-resolution meters are tied to ground via a wire that is directly soldered to the Hi-Res Ribbon (HRR) pin #5. The location of this splice is specified in the power distribution chart. There are two wires for this ground, one each for the for the left load and right loads.

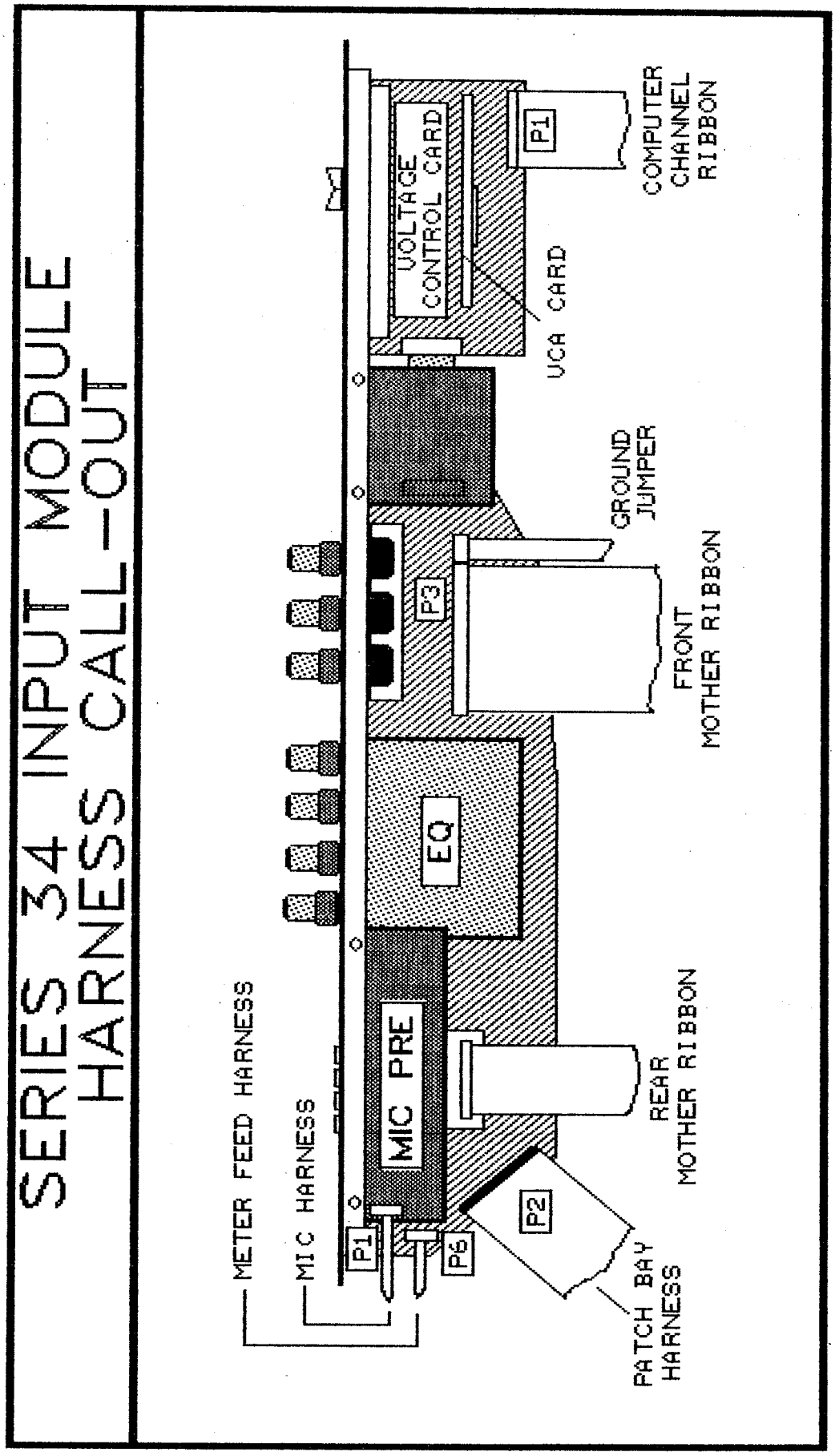


FIG 5B - INPUT MODULE HARNESS CALLOUT

FIG 5C - CR/STUD MASTER MODULE HARNESS CALLOUT

SERIES 34 MASTER MODULE HARNESS CALL-OUT

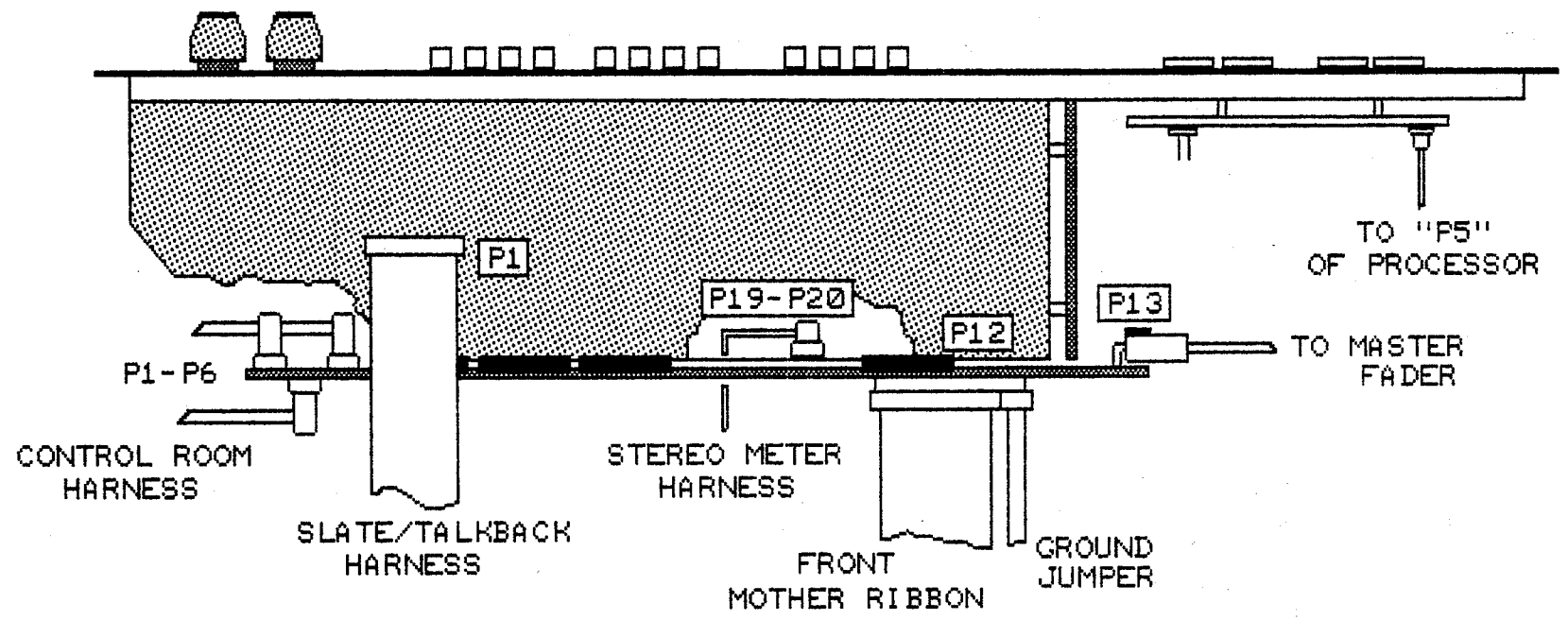


FIG 5D - ECHO MASTER MODULE HARNESS CALLOUT

SERIES 34 ECHO RETURN MODULE HARNESS CALL-OUT

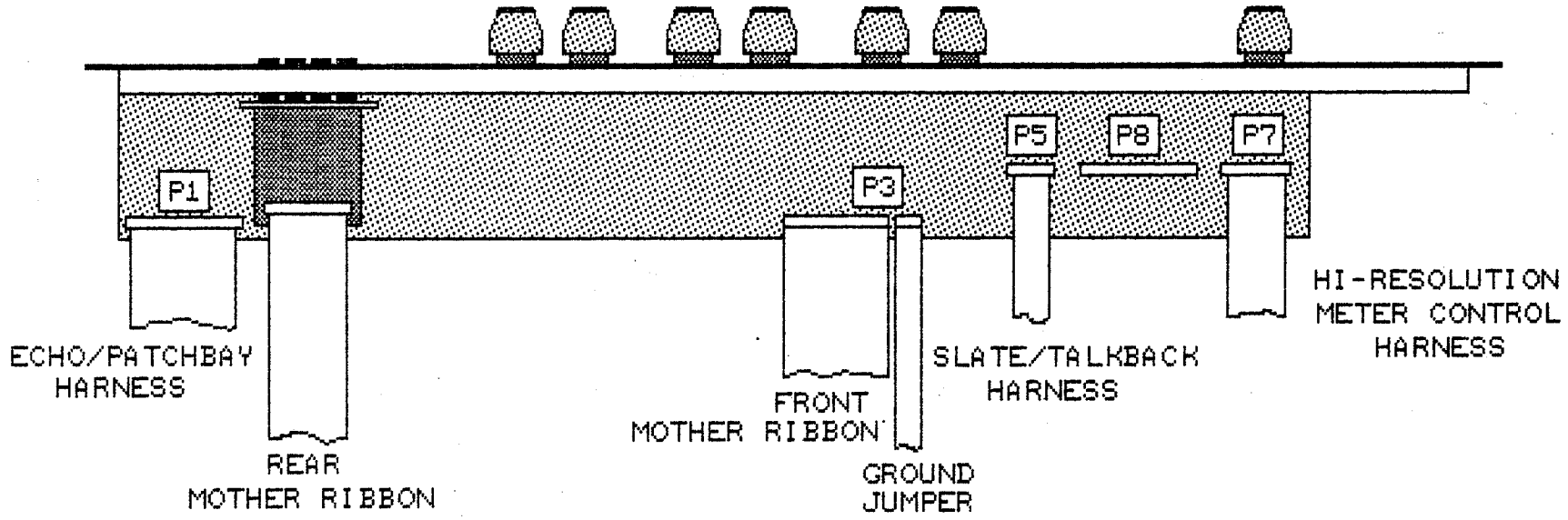
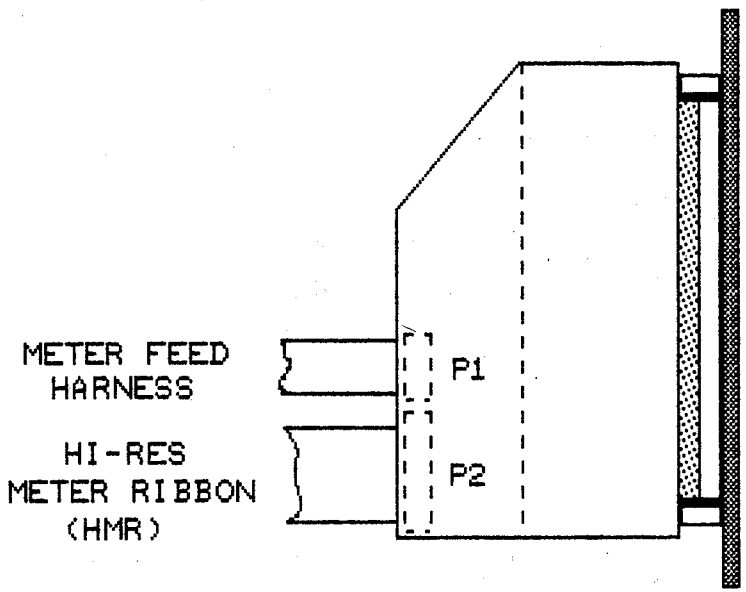


FIG 5E - METER MODULES HARNESS CALLOUT

SERIES 34 METER MODULE HARNESS CALL-OUT

HI-RESOLUTION



MECHANICAL

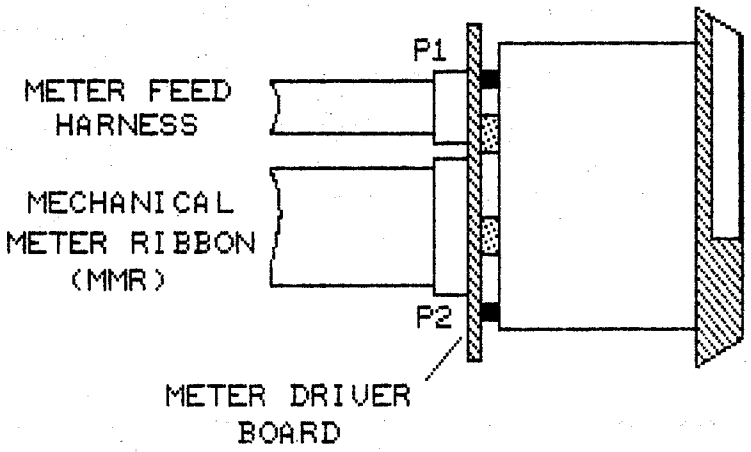
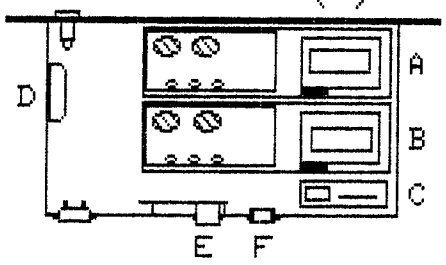


FIG 5F - POWER SUPPLY CHASSIS LAYOUTS

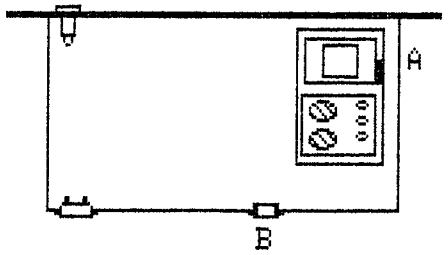
PSR-55P(T)



	REFERENCE #	DESCRIPTION
A	PS-16/16-5	16 VOLT BIPOLAR @ 5AMPS
B	PS-16/16-5	16 VOLT BIPOLAR @ 5AMPS
C	PS-50	50 VOLTS @ .5AMPS (PHANTOM)
D*	PS-T36	36 VAC @ 1AMP (USED FOR METER LAMP POWERING)
E	PDB	POWER DISTRUBUTION BOARD
F	CPC4-CR	4-COND. CHASSIS RECEPTICAL

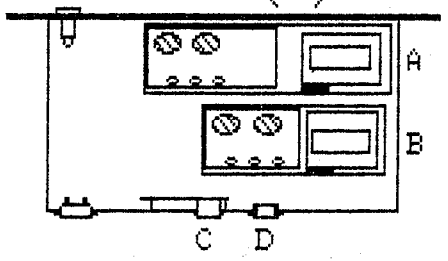
* - PSR-55PT ONLY

PSR-D



	REFERENCE #	DESCRIPTION
A	PS-5/16/16	5 VOLTS @ 6AMPS - 16 VOLT BIPOLAR @ 1AMP
B	CPC16-CR	16-COND. CHASSIS RECEPTICAL

PSR-5(D)



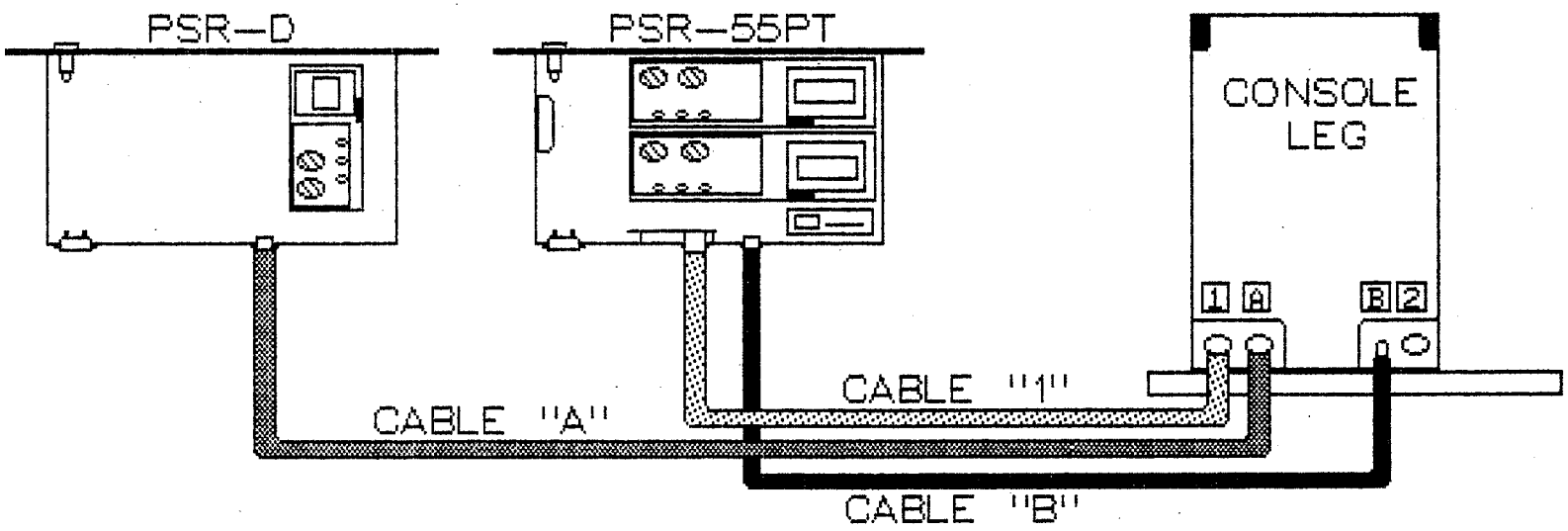
	REFERENCE #	DESCRIPTION
A	PS-16/16-5	SAME AS ABOVE
B*	PS-5/16/16	SAME AS ABOVE
C	PDB	SAME AS ABOVE
D	CPC16-CR	SAME AS ABOVE

* - PSR-5D ONLY

FIG 5G - CONSOLE/POWER INTERFACE (24-40MF)

POWER / CONSOLE INTERFACE

24, 32, 40 INPUT VERSION

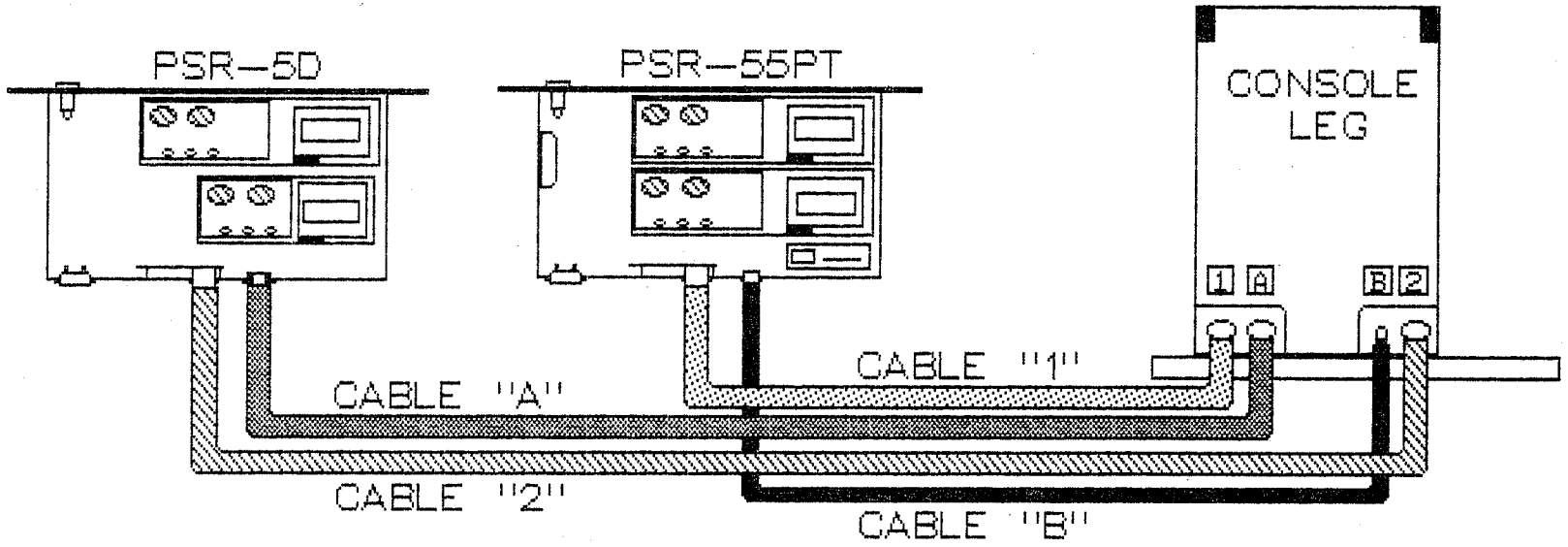


CABLE	FUNCTION
"1"	CONSOLE POWER ± 16v PHANTOM POWER +48v
"A"	COMPUTER POWER ± 16v / +5v
"B"	METER BULB POWER 36vac

FIG 5H - CONSOLE/POWER INTERFACE - 50MF

POWER / CONSOLE INTERFACE

50 INPUT VERSION



CABLE	FUNCTION
"1"	CONSOLE POWER ±16v PHANTOM POWER +48v
"2"	CONSOLE POWER ±16v
"A"	COMPUTER POWER ±16v / +5v
"B"	METER BULB POWER 36vac

POWER SUPPLY HARNESS CALLOUT

40 INPUT MAINFRAMES AND SMALLER

FIG 51 - POWER SUPPLY HARNESS PINNOUT (24-40MF)

CABLE 1

PIN #	ORIGIN	FUNCTION	DESTINATION
1	SUPPLY A	+16v	FMR-1 (L)
2	SUPPLY A	+16v	MMR-2 [HRR-6(L)]
3	SUPPLY A	-16v	FMR-2 (L)
4	SUPPLY A	-16v	MMR-3 [HRR-7(L)]
5	SUPPLY A	COM	BUS BAR
6	SUPPLY A	COM	BUS BAR
7	SUPPLY B	+16v	FMR-1 (R)
8		N/C [+16v]	[HRR-6(R)]
9	SUPPLY A	COM	BUS BAR
10		N/C	
11	SUPPLY B	-16v	FMR-2 (R)
12		N/C [-16v]	[HRR-7(R)]
13	SUPPLY B	COM	BUS BAR
14	SUPPLY C	+50v	ERM P5-1
15	SUPPLY B	COM	BUS BAR
16	SUPPLY B	COM	BUS BAR

CABLE A

PIN #	ORIGIN	FUNCTION	DESTINATION
1	SUPPLY A	COM	P4-3
2	SUPPLY A	+16v	P3-1
3	SUPPLY A	COM	P4-4
4	SUPPLY A	+16v	P3-2
5	SUPPLY A	5v	P4-1
6	SUPPLY A	5v	P4-2
7	SUPPLY A	COM	P4-5
8	SUPPLY A	-16v	P3-3
9	SUPPLY A	+5v	P4-8
10		N/C	
11	SUPPLY A	COM	P4-6
12	SUPPLY A	-16v	P3-4
13	SUPPLY A	+5v	P4-9
14	SUPPLY A	COM	BUS BAR
15	SUPPLY A	COM	P4-7
16	SUPPLY A	COM	BUS BAR

CABLE B

PIN #	ORIGIN	FUNCTION	DESTINATION
1	SUPPLY D	36VAC	MMR-6
2	SUPPLY D	36VAC	MMR-7
3		N/C	
4		N/C	

NOTES

1) CABLE "A" AND "B" CALLOUT REMAINS THE SAME IN ALL VERSIONS.

2) (L) AND (R) INDICATE LEFT AND RIGHT LOADS.

3) WHEN A CONOLE IS CONFIGURED WITH HI-RES METERS USE DATA IN BRACKETS.

LEGEND
FMR - FRONT MOTHER RIBBON
MMR - MECHANICAL METER RIBBON
HMR - HI-RESOLUTION METERS

POWER SUPPLY HARNESS CALLOUT

50 INPUT MAINFRAME

FIG 5J - POWER SUPPLY HARNESS PINNOUT (50MF)

CABLE 1

PIN #	ORIGIN	FUNCTION	DESTINATION
1	SUPPLY A	+16v	FMR-1 (L) SLOTS 1-11
2	SUPPLY A	+16v	FMR-1 (C) SLOTS 12-22
3	SUPPLY A	-16v	FMR-2 (L) SLOTS 1-11
4	SUPPLY A	-16v	FMR-2 (C) SLOTS 12-22
5	SUPPLY A	COM	BUS BAR
6	SUPPLY A	COM	BUS BAR
7	SUPPLY B	+16v	FMR-1 (C) SLOTS 23-34
8	SUPPLY B	+16v	FMR-1 (C) SLOTS 35-42
9	SUPPLY A	COM	BUS BAR
10		SPARE	
11	SUPPLY B	-16v	FMR-2 (C) SLOTS 23-34
12	SUPPLY B	-16v	FMR-2 (C) SLOTS 35-42
13	SUPPLY B	COM	BUS BAR
14	SUPPLY C	+50v	ERM P5-1
15	SUPPLY B	COM	BUS BAR
16	SUPPLY B	COM	BUS BAR

CABLE A

PIN #	ORIGIN	FUNCTION	DESTINATION
1	SUPPLY A	+16v	MMR-2 (L) [HMR-6]
2	SUPPLY A	+16v	MMR-2 (R) [HMR-6]
3	SUPPLY A	-16v	MMR-3 (L) [HMR-7]
4	SUPPLY A	-16v	MMR-3 (R) [HMR-7]
5	SUPPLY A	COM	BUS BAR
6	SUPPLY A	COM	BUS BAR
7	SUPPLY B	+16v	FMR-1 (R)
8		N/C	
9	SUPPLY A	COM	BUS BAR
10		SPARE	
11	SUPPLY B	-16v	FMR-2 (R)
12		N/C	
13	SUPPLY B	COM	BUS BAR
14		N/C	
15	SUPPLY B	COM	BUS BAR
16	SUPPLY B	COM	BUS BAR

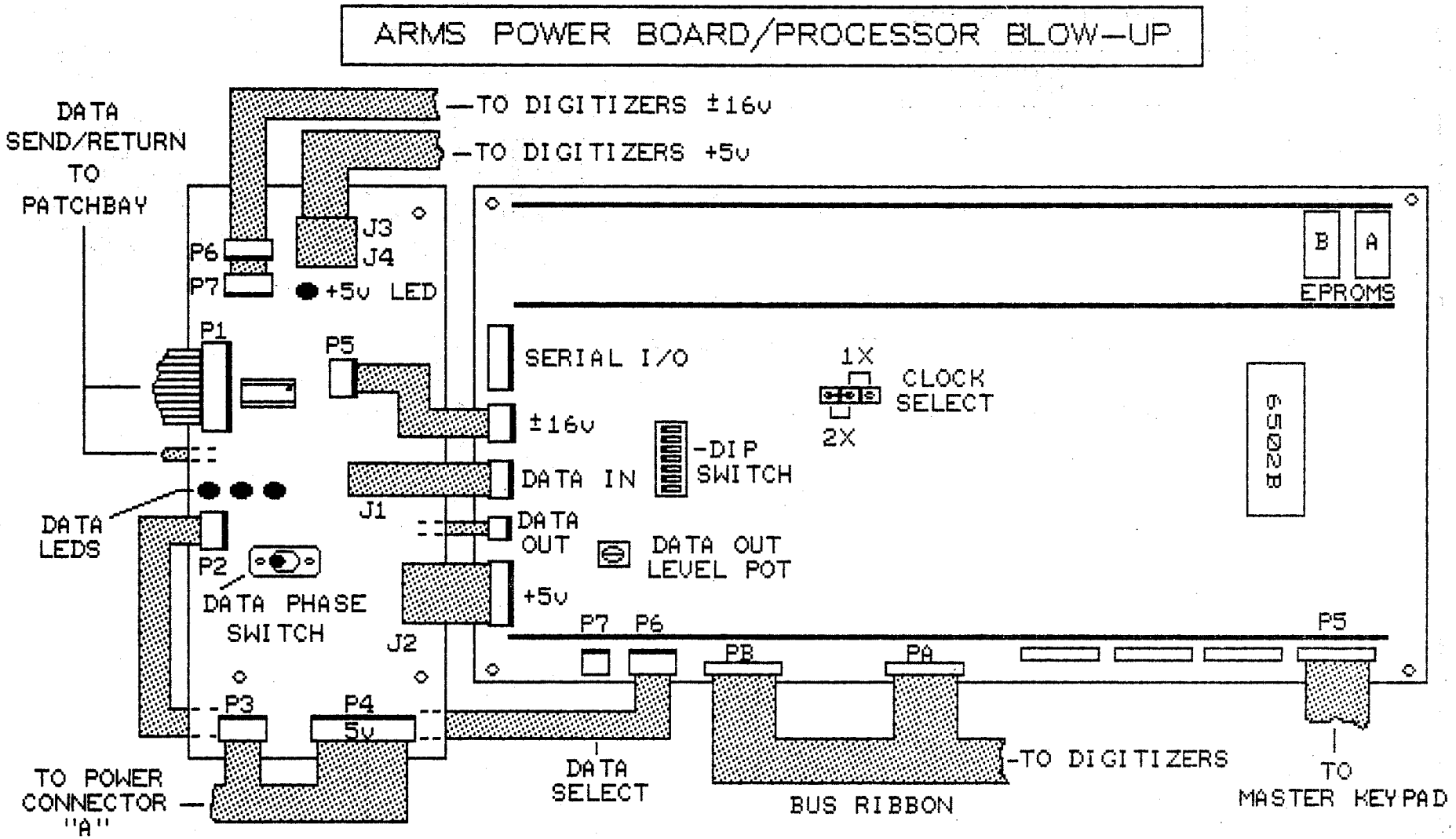
NOTES

1) (L), (R), AND (C) INDICATE LEFT, RIGHT, AND CENTER LOADS.

2) WHEN A CONSOLE IS CONFIGURED WITH HI-RES METERS USE DATA IN BRACKETS.

LEGEND
FMR - FRONT MOTHER RIBBON
MMR - MECHANICAL METER RIBBON
HMR - HI-RESOLUTION METERS

FIG 5K - ARMS POWER/DATA INTERFACE (APB)



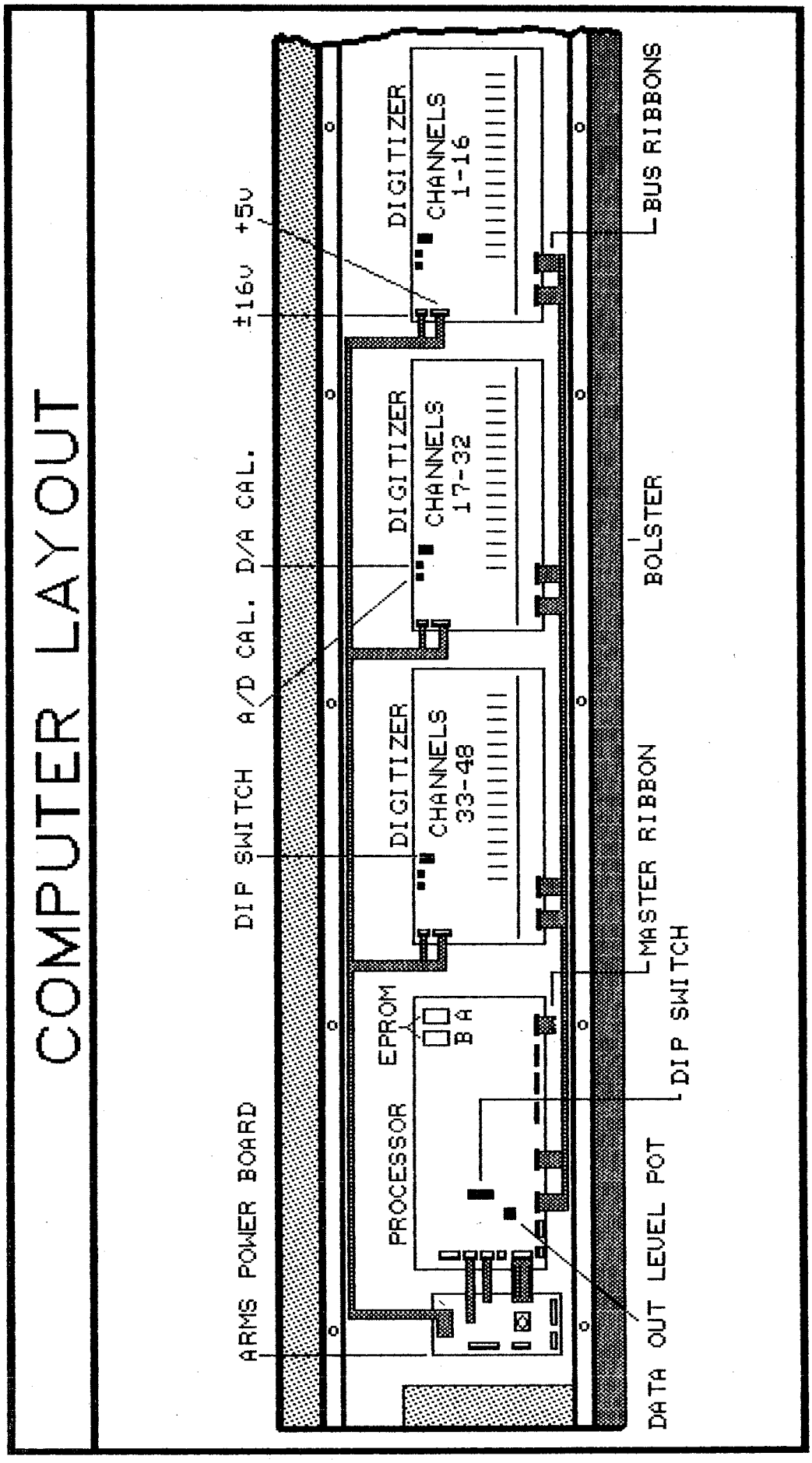
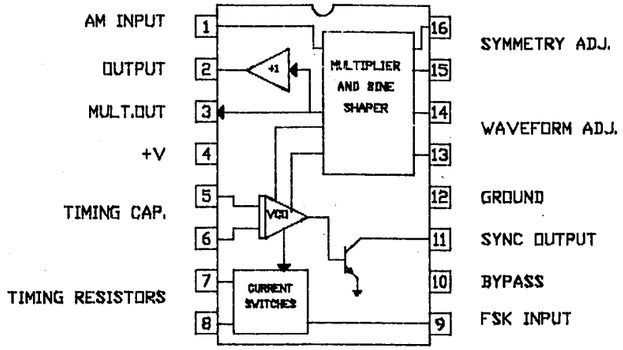


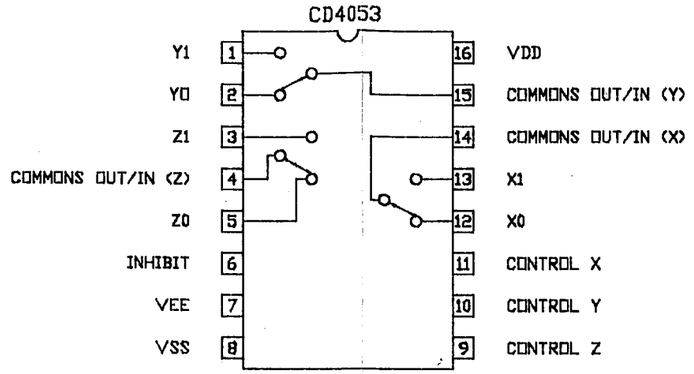
FIG 5L - ARMS SYSTEM LAYOUT

IC CALL-OUTS

XR2206

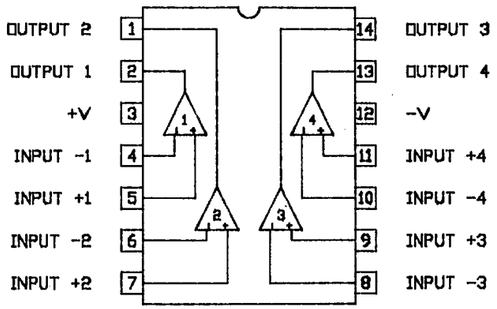


CD4053

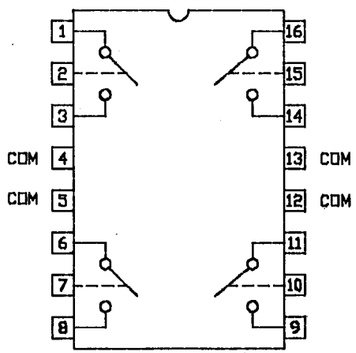


6,9,10,11 CONTROLS
1,2,3,5,12,13 SWITCHES IN/OUT

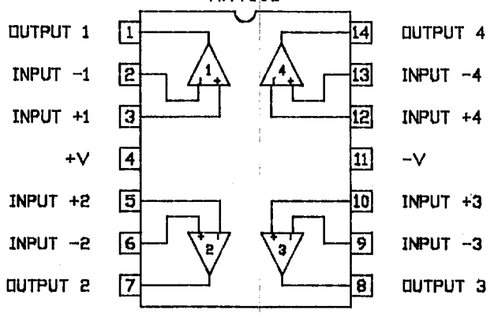
LM339



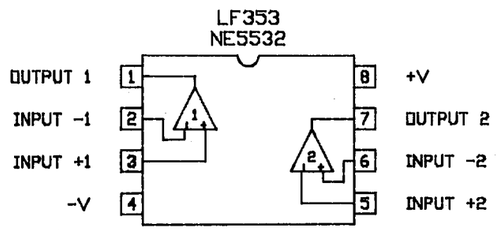
5011



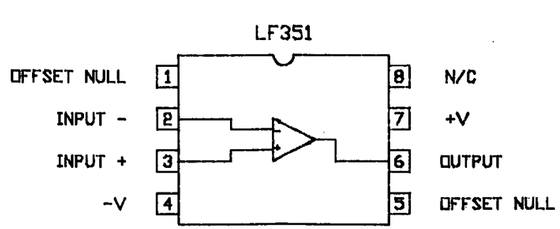
TL074
HA4605



LF353
NE5532



LF351



NE5534

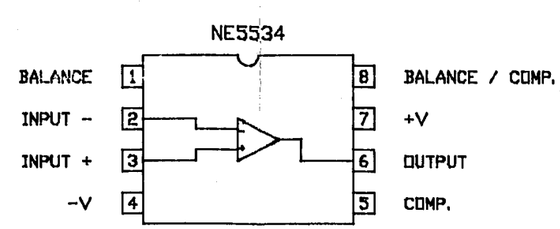


FIG 5M - IC PINNOUT/FUNCTION DETAIL

Section 6

Drawings

6.1 DRAWING CROSS REFERENCE BY DRAWING NUMBER

Note: Drawings are filed here in this sequence. Module Block Diagrams (**) are inserted in Section 3.

6.1.1 Sound Workshop Drawings

Number	Description
007-141	Output Card, Balanced
007-541	Output Card, Balanced
101-108	ARMS Power Board
101-508	ARMS Power Board
103-122	Voltage Control Card
103-522	Voltage Control Card
104-120	Power Dist. Board
104-521	Power Dist. Board, Supply Side
202-100 **	Input/Output Module
202-101 **	Echo Master and Master Modules
202-120 s1	I/O Input and Equalizer
202-120 s2	I/O VU Meter
202-120 s3	I/O Fader Interface
202-120 s4	I/O Monitor & Aux. Send
202-120 s5	I/O ACA & Track Output
202-120 s6	I/O Track Assign
202-120 s7	I/O Monitor Solo & Flip
202-122	Microphone Preamplifier
202-132	Four-Band Equalizer
202-151	Echo Return Module
202-153	Communications Module PCB
202-154	Switch Module
202-160	Meter, 40-Segment Hi-res. VU
202-521	I/O Module
202-522	Microphone Preamplifier
202-523	I/O Aux. Send
202-524	Track-Summing Bus Assign
202-528	Monitor Solo/Flip
202-532	Equalizer, Four-Band
202-551	Echo Master Module
202-553	Communications Module
202-554	Switch Module
202-561	Meter, High-Res. Control PCB
202-562	Meter, High-Res. Display Driver Brd.

202-570	Master Module
203-183	Voltage-Controlled Amplifier
203-501	Microphone Network
203-583	Voltage-Controlled Amplifier
240-160	Meter Driver, VU
240-560	Meter Driver, Mechanical VU
402-196	Patch Bay Card - Tie Line
402-197	Patch Bay Card - Channel
402-581	Patch Bay Interface Card - Channel
402-582	Patch Bay Interface Card - Tie Line
412-101	ARMS Processor (2 sheets)
412-501	ARMS Processor Board
540-160	VU Driver with Peak LED
540-560	VU Driver with Peak LED
612-102	ARMS I/O System
612-115	ARMS Master Keyboard
612-502	ARMS I/O Board
612-515	ARMS Master Keyboard
912-151	Master Module Main PC Assembly
912-152	Potentiometer Board
912-551	Master Module Main PC Assembly
912-552-1	Potentiometer Board with Pan Pot
912-552-2	Potentiometer Board with out Pan Pot

612-501-1 ARMS PC Board
ASSY Processor Board (1977)

6.1.2 Power One Drawings

Number	Description	Module	SW Ref No.
12785	Over-voltage Protector Assembly	OVP-12	PS-OVP
11152	Over-voltage Protector Schematic	OVP-12	PS-OVP
51330	Phantom Power Supply Assembly	HB48-0.5	PS-50
51336	Phantom Power Supply Schematic	HB48-0.5	PS-50
53126	Triple output Supply (ARMS)	HCAA-60W	PS-5/16/16
52982	Triple Output Supply (ARMS)	HCAA-60W	PS-5/16/16
53611	Bi-polar Power Supply Assembly	HDD15-5.0	PS-16/16-5
53615	Bi-polar Power Supply Schematic	HDD15-5.0	PS-16/16-5

6.2 DRAWING CROSS REFERENCE BY DRAWING NAME

6.2.1 Sound Workshop Drawings

Description	Schematic	Assembly Dwg
ARMS I/O System	612-102	612-502
ARMS Master Keyboard	612-115	612-515
ARMS Power Board	101-108	101-508
ARMS Power Supply (Pwr One)	52982	53126
ARMS Processor	412-101	412-501
Communications Module PCB	202-153	202-553
Echo Master Module	202-151	202-551
Equalizer, Four-Band	202-132	202-532
Input/Output Module		202-521
I/O ACA & Track Output	202-120 s5	
I/O Aux. Send Pot Assembly		202-523
I/O Fader Interface	202-120 s3	
I/O Input and Equalizer	202-120 s1	
I/O Monitor & Aux. Send	202-120 s4	
I/O Monitor Solo & Flip	202-120 s7	202-528
I/O Track Assign	202-120 s6	202-524
I/O VU Meter	202-120 s2	
Master Module		202-570
Master Module	912-151	912-551
Meter Driver, Mechanical VU	240-160	240-560
Meter Driver, With Peak LED	540-160	540-560
Meter, High-Res. 40-Segment	202-160	
Meter, High-Res. Control PCB		202-561
Meter, High-Res. Display Driver Board		202-562
Microphone Network		203-501
Microphone Preamplifier	202-122	202-522
Output Card, Balanced	007-141	007-541
Over-voltage Protector (Pwr One)	11152	12785
Patch Bay Card - Tie Line	402-196	
Patch Bay Card - Channel	402-197	
Patch Bay Interface Card - Channel		402-581
Patch Bay Interface Card - Tie Line		402-582
Potentiometer Board with Pan Pot	912-152	912-552-1
Potentiometer Board w/out Pan Pot	912-152	912-552-2
Power Dist. Board	104-120	104-521
Power supply, Bi-polar (Pwr One)	53615	53611
Power Supply, Phantom (Pwr One)	51336	51330
Switch Module	202-154	202-554
Track-Summing Bus Assign Matrix		202-524
Voltage Control Card	103-122	103-522
Voltage-Controlled Amplifier	203-183	203-583

6.3 DRAWING CROSS REFERENCE BY CATEGORY

6.3.1 Block Diagrams

202-100	Input/Output Module
202-101	Master Module

6.3.2 Schematics

007-141	Balanced Output Card
101-108	ARMS Power Board
103-122	Voltage Control Card
104-120	Power Distribution Board
202-120 s1	I/O Input and Equalizer
s2	I/O VU Meter
s3	I/O Fader Interface
s4	I/O Monitor & Aux. Send
s5	I/O ACA & Track Output
s6	I/O Track Assign
s7	I/O Monitor Solo & Flip
202-122	Microphone Preamplifier
202-132	Four-Band Equalizer
202-151	Echo Return Module
202-153	Communications Module PCB
202-154	Switch Module
202-160	40-Segment Hi-res. VU Meter
203-183	Voltage-Controlled Amplifier
240-160	VU Meter Driver
402-196	Patch Bay Card - Tie Line
402-197	Patch Bay Card - Channel
412-101	ARMS Processor
540-160	VU Driver with Peak LED
612-102	ARMS I/O System
612-115	ARMS Master Keyboard
912-151	Master Module Main PCB
912-152	Pot Board

6.3.3 Power Supply Schematics (Power One)

11152	Over-voltage Protector
51336	Power Supply, Phantom
52982	Power Supply, Triple Output (ARMS)
53615	Power Supply, Bi-polar

6.3.4 Assembly Drawings

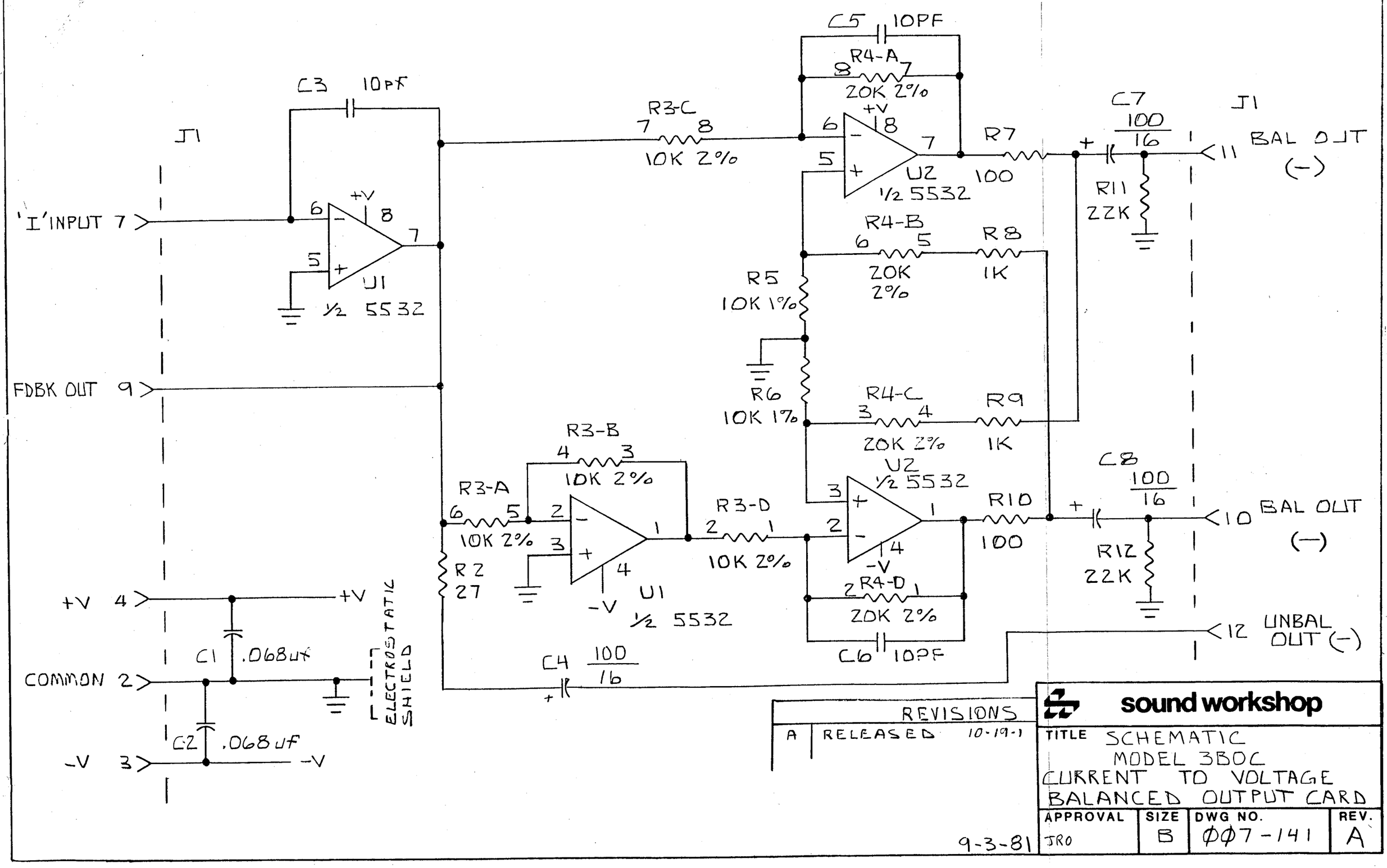
007-541	PC Balanced Output Card
101-508	ARMS Power Board
103-522	PC Voltage Control Card
104-521	Power Distribution Board, PS Side
202-521	I/O Module
202-522	Mic Preamplifier
202-523	I/O Aux. Send
202-524	24-track Assign
202-532	Four-Band Equalizer
202-551	Echo Master Module
202-553	Communications Module
202-554	Switch Module
202-561	High-Resolution Control PCB
202-562	High-Resolution Display Driver
202-570	Master Module
203-501	Microphone Network
203-583	Voltage-Controlled Amplifier
240-560	Mechanical VU Meter Driver
402-581	Patch Bay Interface Card - Channel
402-582	Patch Bay Interface Card - Tie Line
412-501	ARMS Processor Board
540-560	VU Driver with Peak LED
612-502	ARMS AIO Board
612-515	ARMS Master Keyboard
912-551	Master Module
912-552-1	Potentiometer Board with Pan Pot
912-552-2	Potentiometer Board with out Pan Pot

6.3.5 Power Supply Assembly Drawings (Power-One)

12785	Over-voltage Protector
51330	Power Supply, Phantom
53126	Power Supply, Triple Output (ARMS)
53611	Power Supply, Bi-polar

6.3.6 Sound Workshop/Power One Cross-Reference Guide

! - - - - - Power One - - - - - !			Sound Workshop
Assembly	Module	Schematic	
12785	OVP-12	11152	PS-OVP
51330	HB48-0.5	51336	PS-50
53126	HCAA-60W	52982	PS-5/16/16
53611	HDD15-5.0	53615	PS-16/16-5



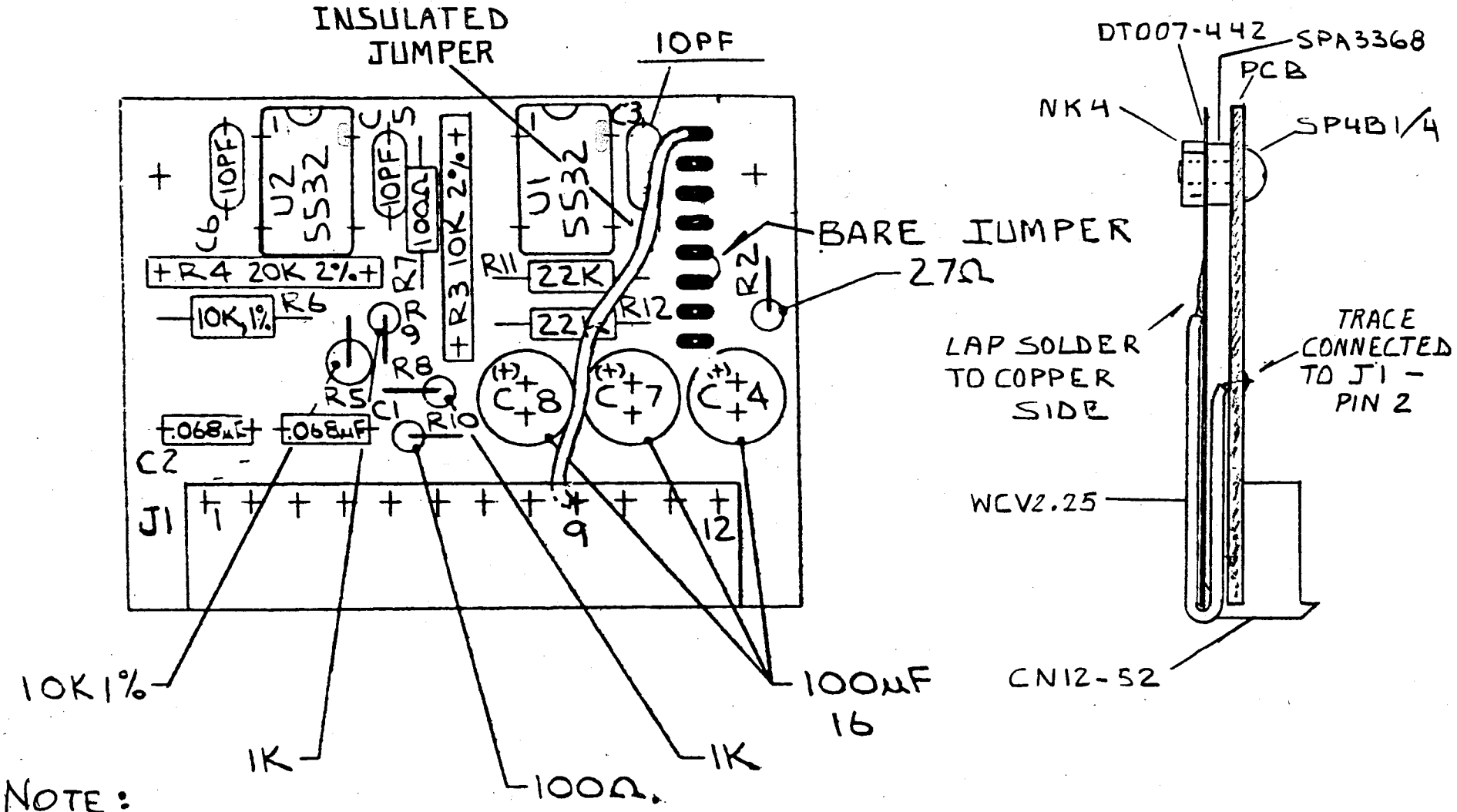
REVISIONS		
A	RELEASED	10-19-1

9-3-81

sound workshop

TITLE SCHEMATIC
MODEL 3B0C
CURRENT TO VOLTAGE
BALANCED OUTPUT CARD

APPROVAL	SIZE	DWG NO.	REV.
JRO	B	ØØ7-141	A



NOTE:

CUT PINS OF J1 FLUSH WITH P.C.

REVISIONS		
A	RELEASED	J.R.O 10/19/1
B	ADDED NOTE JIM 1/81	

J.R.O.
9-3-81

sound workshop

TITLE
ASSEMBLY, P.C.
MODEL 380C
SEE: 912-551 A1 thru A4

APPROVAL	SIZE	DWG NO.	REV.
Jim 9/3/81	A	007-541	B

PROCESSOR

+5VDC DIGITIZERS

+5 POWER SUPPLY

P4 1 2 3 4 5 6 7 8 9

J2 1 2 3 4 5 6 7

J3 1 2 3 4 5 6 7

J4 1 2 3 4 5 6 7

C1 - C10 .47UF

(+5)

(COM)

BIPOLAR PROCESSOR

P5
1 +V
2 COM
3 -V
4 COM

P6 DIGITIZERS
1
2
3
4

P7
1
2
3
4

P3
+16 1 2
-16 3 4

D4 4001

D5 4001

C11 100 16

C12 100 16

-V +V

R1 680

LED4 +5

FROM TAPE DATA

P1
(H) 1
A (L) 2
(c) 3

RS1 20K

RS2 20K

RS3 20K

RS4 20K

U1 4605

-V

Q1 T75
Q2 T75
Q3 T75

D1 4148
D2 4148
D3 4148

R2 470K
R3 470K
R4 470K

DATA A
DATA B
DATA C

LED1
LED2
LED3

RS 2.2K

R6 20K

C13

+V

R8 100
R9 100

PHASE
S1
SW022

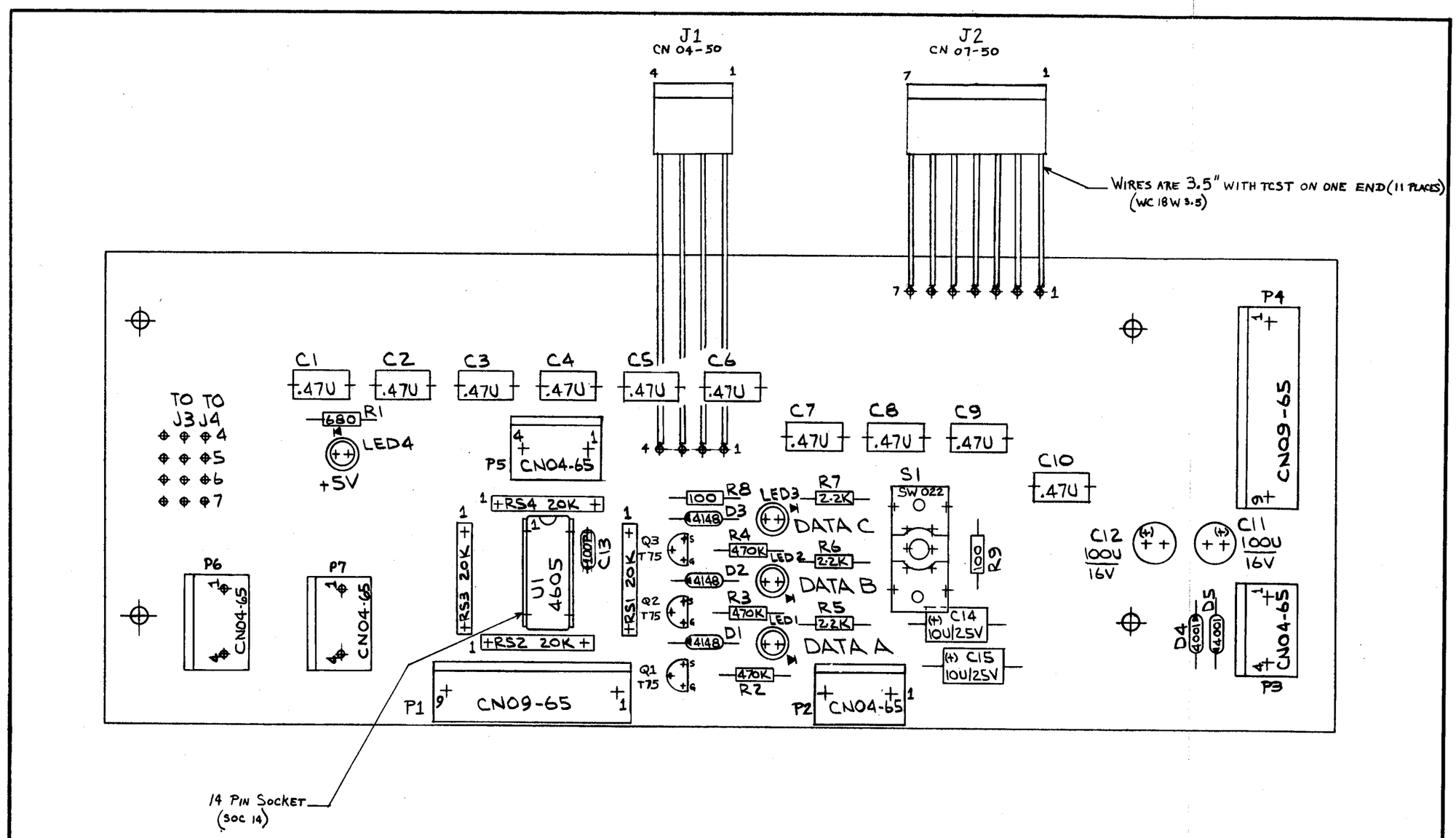
C14 10/25R
C15 10/25R

PROC DATA IN
J1
1
2
3
4

P2
4 3 2 1
C B A COM

DATA SEL.

SOUND WORKSHOP			
SCHEMATIC, ARMS POWER BD. (4APB)			
PJ	C	101-108	



A			
B	REVERSED LOCKING POLARITY OF P6 & P7 PER ECN 55	JG·DA 6·11·82	

SOUND WORKSHOP INC

SCALE: 2/1 | APPROVED BY: | DRAWN BY: KENNEY | DATE: | REVISED

ASSEMBLY, ARMS POWER BD (4 APB)

C | DRAWING NUMBER 101-508 | B

P1

VCA CONTROL OUT 19
VCA CONTROL IN 20
N/C 17
"ON" STATUS 16
WRITE 3
UPDATE 5
+5 18
+5 RETURN 15
+NULL 13
-NULL 14
MUTE-1 WRITE-2 11 STATUS
SOLO-1 UPDATE-2 9 STATUS
SENSE 7
SPARE SWITCH 8
GROUP SWITCH 6
GROUP STATUS 10
LOGIC COM 1
LOGIC COM 2
VCA MUTE 12
N/C 4

R1 1.2K
P/O U1 CONTROL OUT BUFFER
47K R16
R30 680 LED1
MUTE-1
WRITE/MUTE-2
R17 50K PT5 8dB/V SET
SOLO-1
UPDATE/SOLO-2
S1 S2
R32 10K
R33 10K
C7 10-25
R34 680 LED2
R35 680 LED3
R41-1, 1.5K
R36 680 LED4
D3-1 IN 4148
D4-1 IN 4148
R37 680 LED5
R42-1, 1.5K
R38 10K
GROUP
R39 10K
R40 680 LED6-2
S3-2
R46 3.3K
W2-1 +V
W3-1
C4 .47U
R20 47K
R17 PT5 50K
C3 .47U
R18 47K
R19 47K
P/O U1 CONTROL IN FILTER/BFR
R21 8.2K
Q4 T7S
Q3 T7S
R22 47K
R23 8.2K
R26 47K
R27 100K
R24 100K
R25 33K
Q1 T5IA
Q2 T5IA
D6 IN4148
R28-2 22K
R43 47K
R44 47K
D5 IN4148
Q5 T0IA
R45 47K
W1-1
RSCI
RS1
+V
680K RS0
-V
C1 .047U
R2 47K
R4 1M
R31 PT5 50K 'O'db SET
R3 47K
R5 47K
P/O U1 324 DC CONTROL AMPLIFIERS
R6 51K
R7 2.7K
R11 1.5K
D1 4148
R8 27K
R9 20K
C2 .068
R14 47K
R13 330
D2 5Z4Z
P4
FADER, P&G 2.7K VCA LAW

P2
VCA
SEE SCH: 103-183
+V
-V
AUDIO IN
AUDIO OUT
N/C
'I' CONTROL IN
MUTE

S4
DC GROUP SELECT (OPTIONAL)
C B A

P6 P7 P3 P5

1	COM.
2	CONTROL 2
3	CONTROL 1
4	N/C
5	AUDIO IN 2
6	SOLO MUTE BUS
7	COM
8	+V
9	-V
10	AUDIO OUT
11	A
12	B
13	C

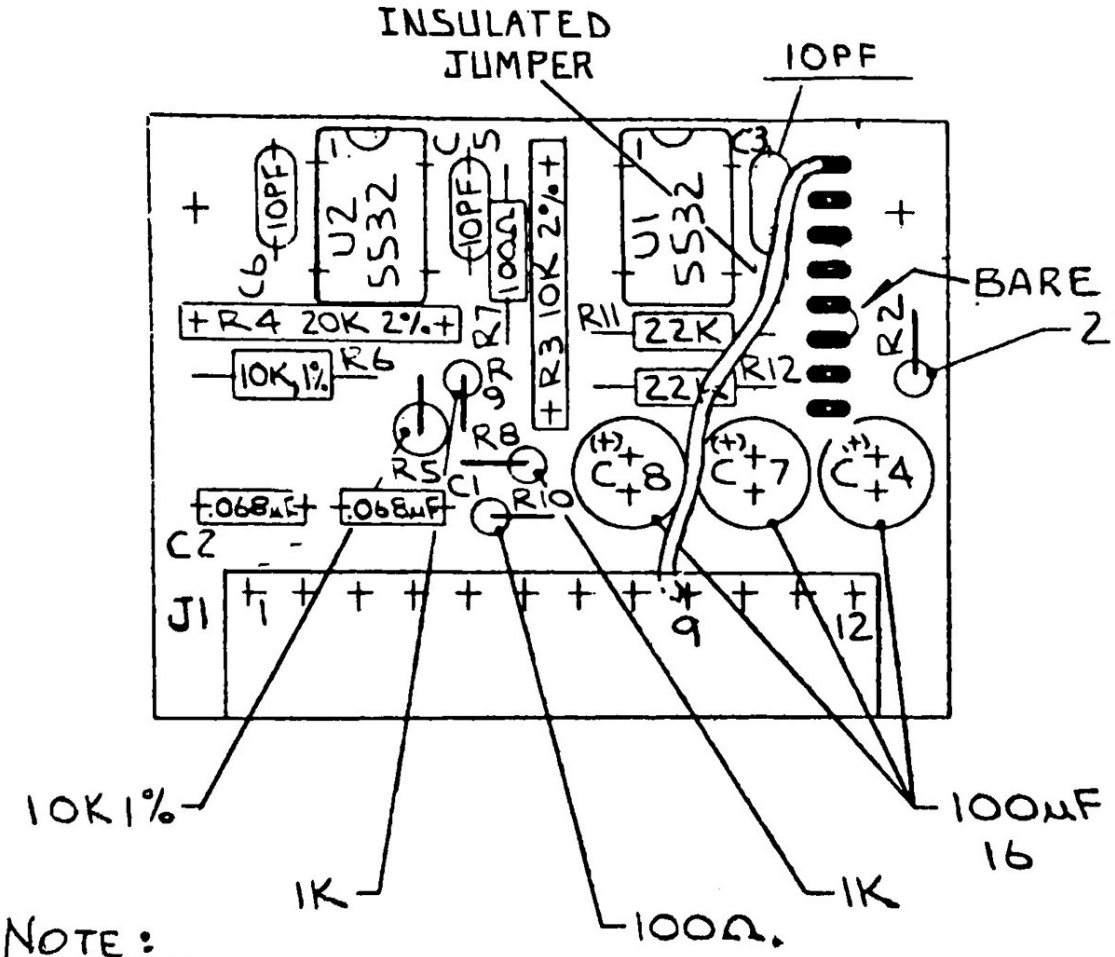
C7 .068
C6 .068
C5 .068

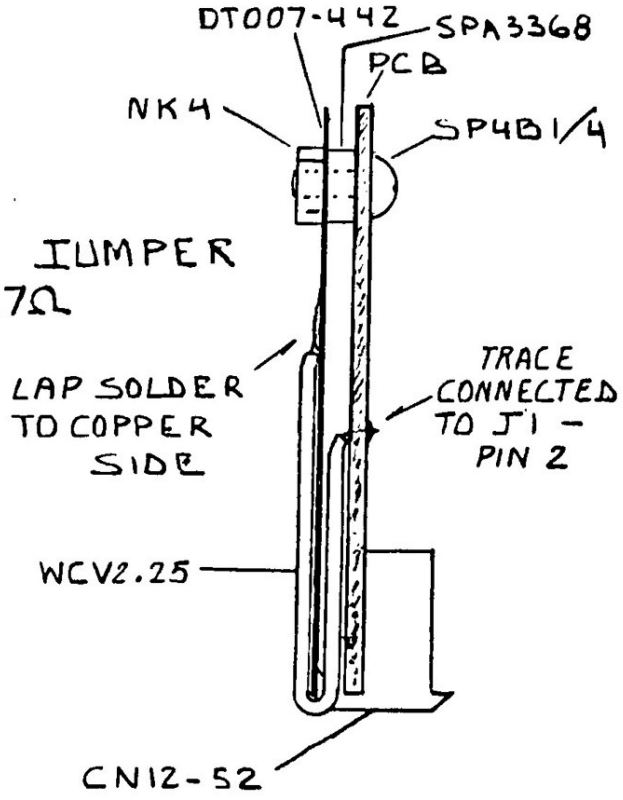
REVISIONS		
A	RELEASED	JIM 12/18/81
B	REPLACED OBSOLETE VCA ECN #54	6/9/82
C	CHANGED TO VCA LAW TAPER SEE ECN # 89	JIM 10/14/82
D	R16 WAS 22K. R4 WAS 220K ADDED R51,52,D6 MOVED C3	2/24/83

SOUND WORKSHOP

SCHEMATIC, VOLTAGE CONTROL CARD 4 VCC

JRD 10/21/81 | D | 103-122 | D





NOTE:

CUT PINS OF J1 FLUSH WITH P.C.

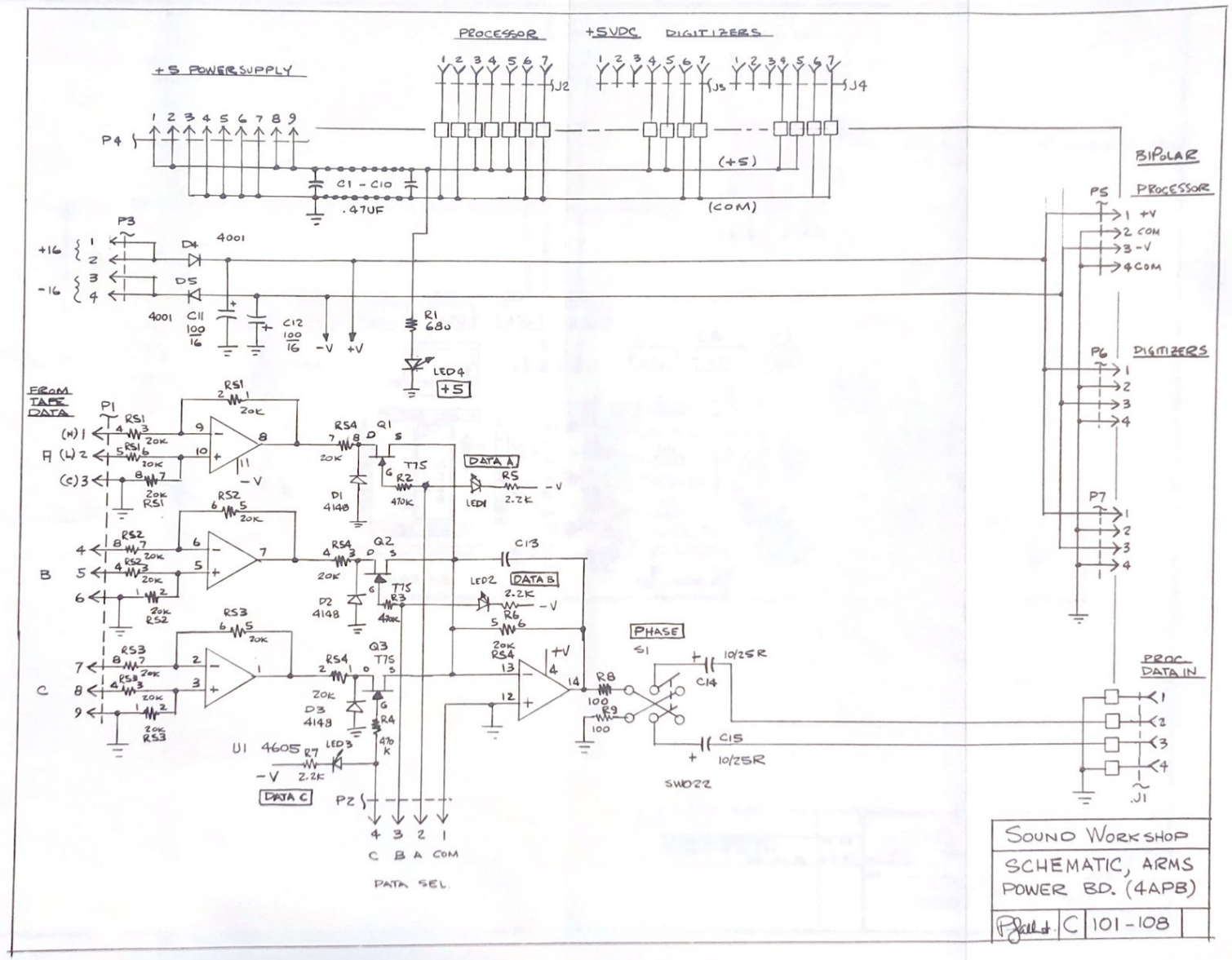
REVISIONS		
A	RELEASED	J.R.O 9/4/81
B	ADDED NOTE JIM 1/81	

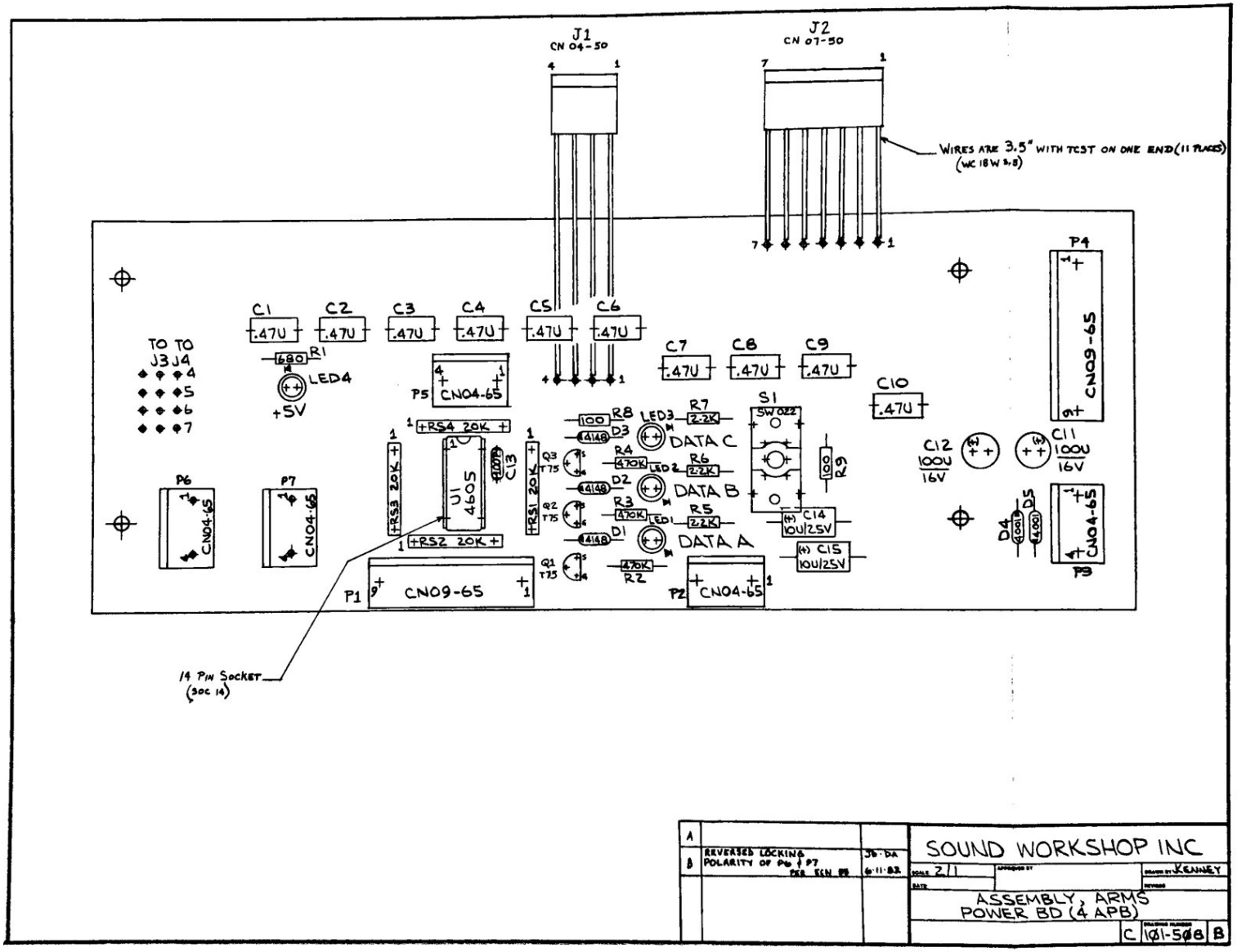
J.R.O.
9-3-81

sound workshop

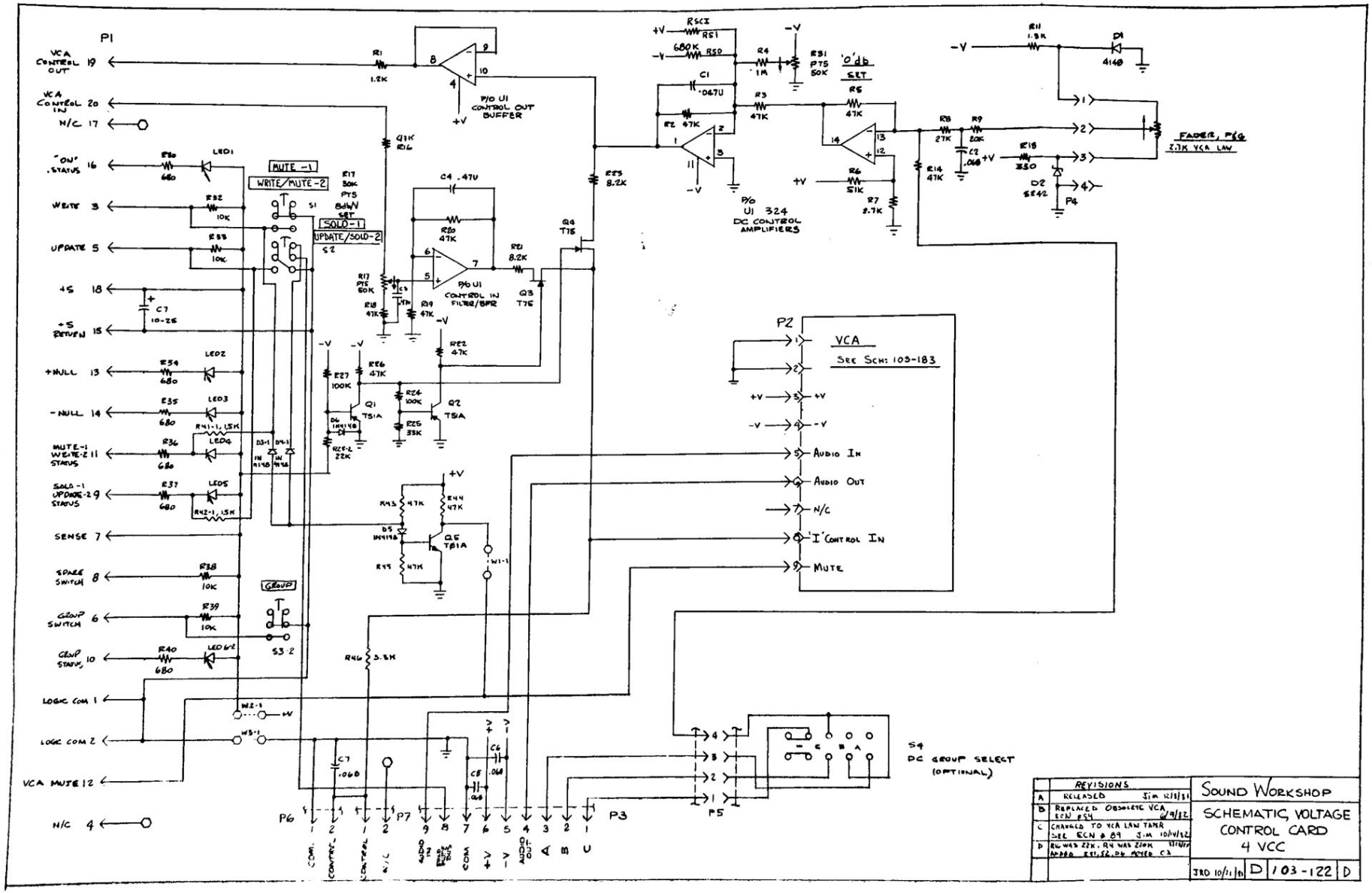
TITLE
ASSEMBLY, P.C.
MODEL 3B0C
SEE 912-551 A1 thru A4

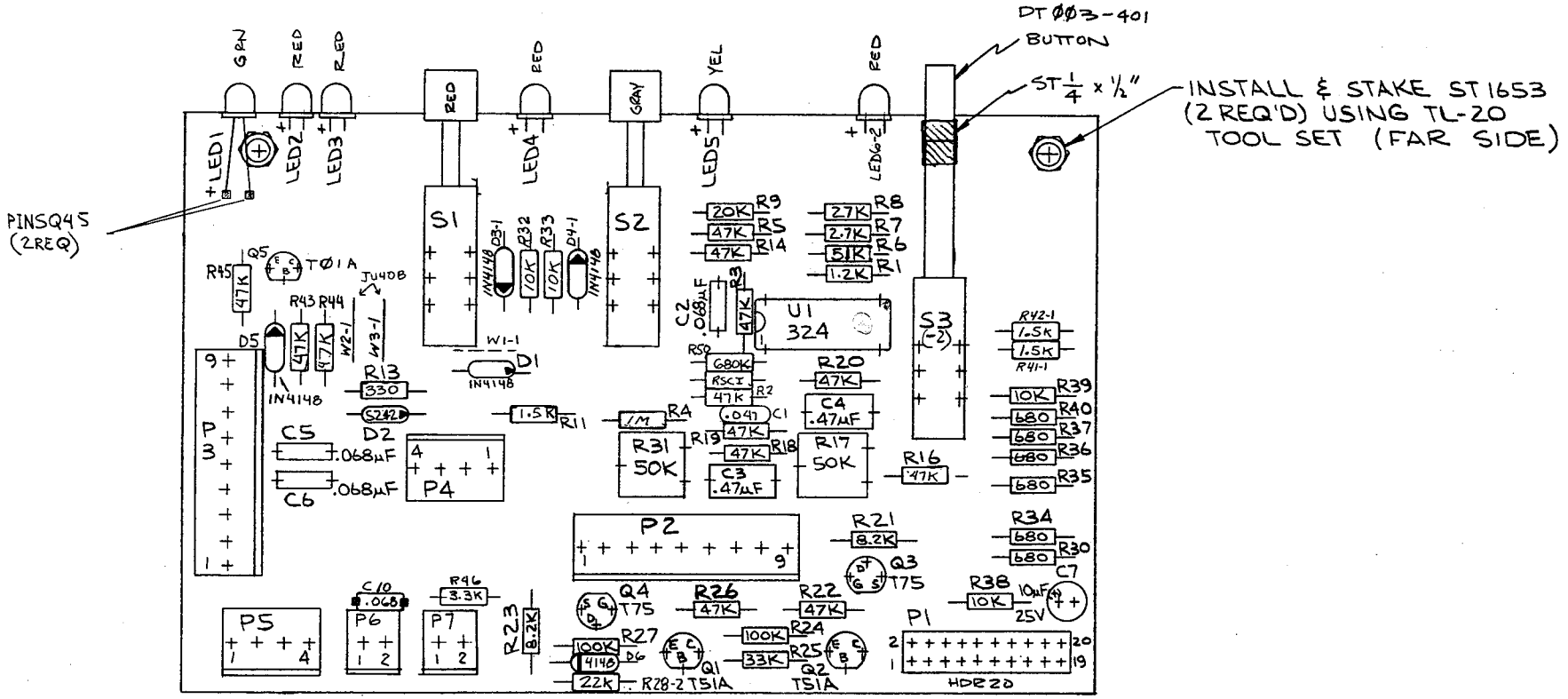
APPROVAL	SIZE	DWG NO.	REV.
Jim 9/3/81	A	007-541	B


PROCESSOR
+5VDC
DIGITIZERS
+5 POWER SUPPLY
P4
J2
J3
J4
C1 - C10
.47UF
(+5)
(COM)
BIPOLAR
PROCESSOR
P5
+V
COM
-V
COM
P6
DIGITIZERS
P7
P3
D4
4001
D5
4001
C11
100
16
C12
100
16
-V
+V
R1
680
LED4
+5
+16
-16
FROM TAPE DATA
P1
RS1
RS2
RS3
RS4
20K
Q1
Q2
Q3
T75
D1
4148
D2
4148
D3
4148
R2
470K
R3
470K
R4
470K
DATA A
DATA B
DATA C
LED1
LED2
LED3
R5
2.2K
R6
2.2K
R7
2.2K
C13
U1
4605
PHASE
S1
S1022
R8
100
R9
100
C14
10/25V
C15
10/25V
PROC DATA IN
J1
PZ
C B A COM
DATA SEL.
SOUND WORKSHOP
SCHEMATIC, ARMS
POWER BD. (4APB)
C
101-108



A			SOUND WORKSHOP INC
B	REVERSED LOCKING POLARITY OF P6 & P7 PER ECN #9	JB-DA 6-11-82	SCALE 2/1 APPROVED BY DRAWN BY KEANEY DATE REVISED
			ASSEMBLY, ARMS POWER BD (4 APB)
			C 101-5006 B


P1
VCA CONTROL OUT 19
VCA CONTROL IN 20
N/C 17
"ON" STATUS 16
WRITE 3
UPDATE 5
+S 18
+S RETURN 15
+NULL 13
-NULL 14
MUTE-1 WRITE-2 STATUS 11
SOLO-1 UPDATE-2 STATUS 9
SENSE 7
SPARE SWITCH 8
GROUP SWITCH 6
GROUP STATUS 10
LOGIC COM 1
LOGIC COM 2
VCA MUTE 12
N/C 4
MUTE -1
WRITE/MUTE-2
SOLO-1
UPDATE/SOLO-2
GROUP
P/O U1 CONTROL OUT BUFFER
P/O U1 CONTROL IN FILTER/BPR
P/O U1 324 DC CONTROL AMPLIFIERS
'0'db SET
FADER, P&G 2.7K VCA LAW
P2
VCA
SEE SCH: 103-183
AUDIO IN
AUDIO OUT
N/C
I CONTROL IN
MUTE
S4
DC GROUP SELECT (OPTIONAL)
P6
P7
P3
P5
REVISIONS
A RELEASED JIM 12/15/81
B REPLACED OBSOLETE VCA ECN #54 6/9/82
C CHANGED TO VCA LAW TAPER SEE ECN # 89 JIM 10/4/82
D R6 WAS 22K, R4 WAS 210K ADDED R11,12,D1 MOVED C3
SOUND WORKSHOP
SCHEMATIC, VOLTAGE CONTROL CARD 4 VCC
JRD 10/1/81 D 103-122 D



NOTES:
1. ALL RESISTORS ARE 1/4 W, 10%.
2. ALL IC'S IN SOCKETS SOCØ8

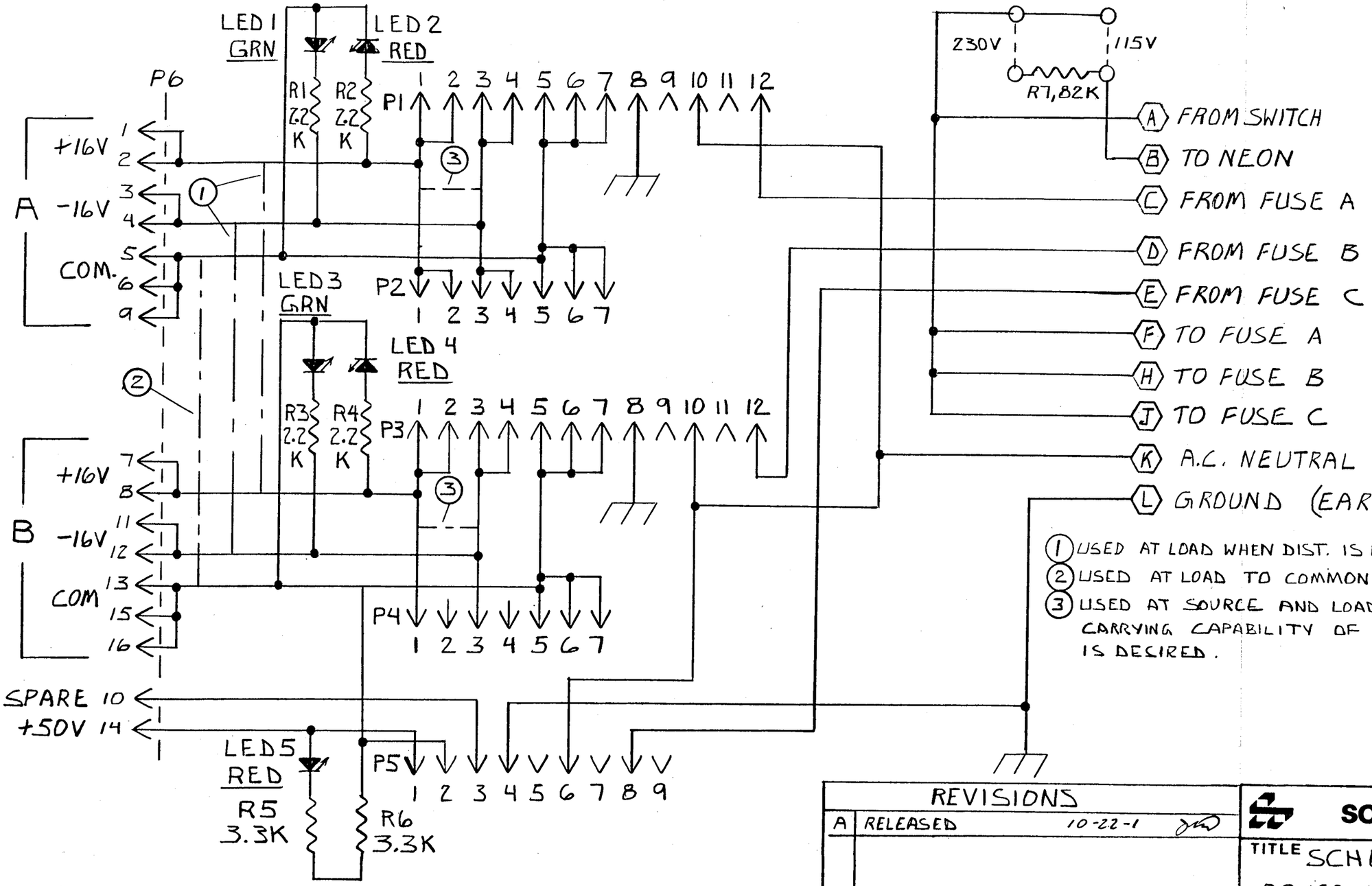
REVISIONS		
A	RELEASED	JIM 12/8/81
B	CHANGE TO VCA LAN TAPER SEE ECN # 90	JIM 10/14/82
C	MOVED R41,42. R4 WAS 220K. R16 WAS 22K. ADDED R50	2-24-85

SOUND WORKSHOP INC

SCALE: 2/1 | APPROVED BY: | DRAWN BY: KENNEY | DATE: | REVISED

ASSEMBLY, VOLTAGE CONTROL CARD

REV. C | C | DRAWING NUMBER 103-522

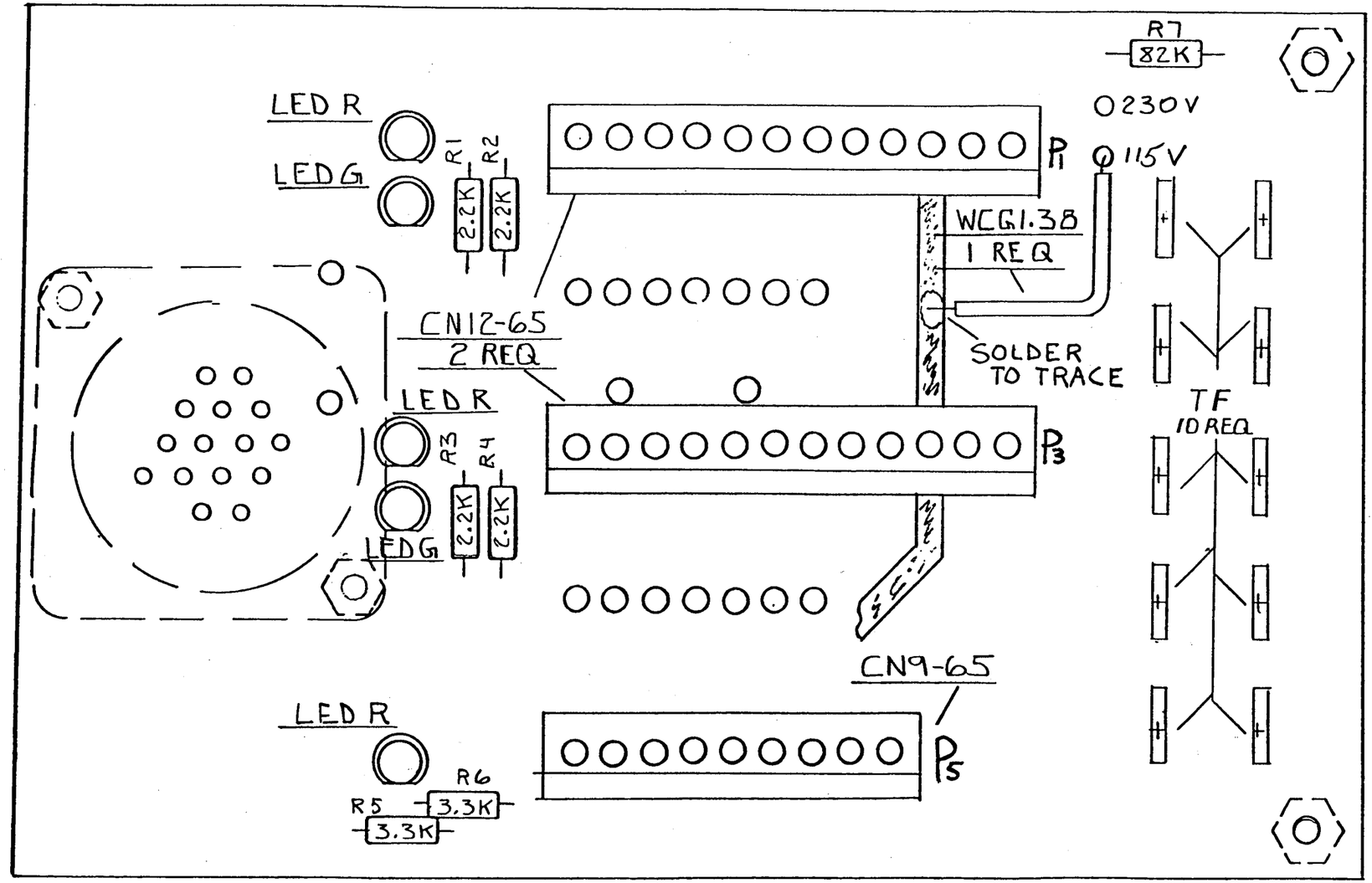


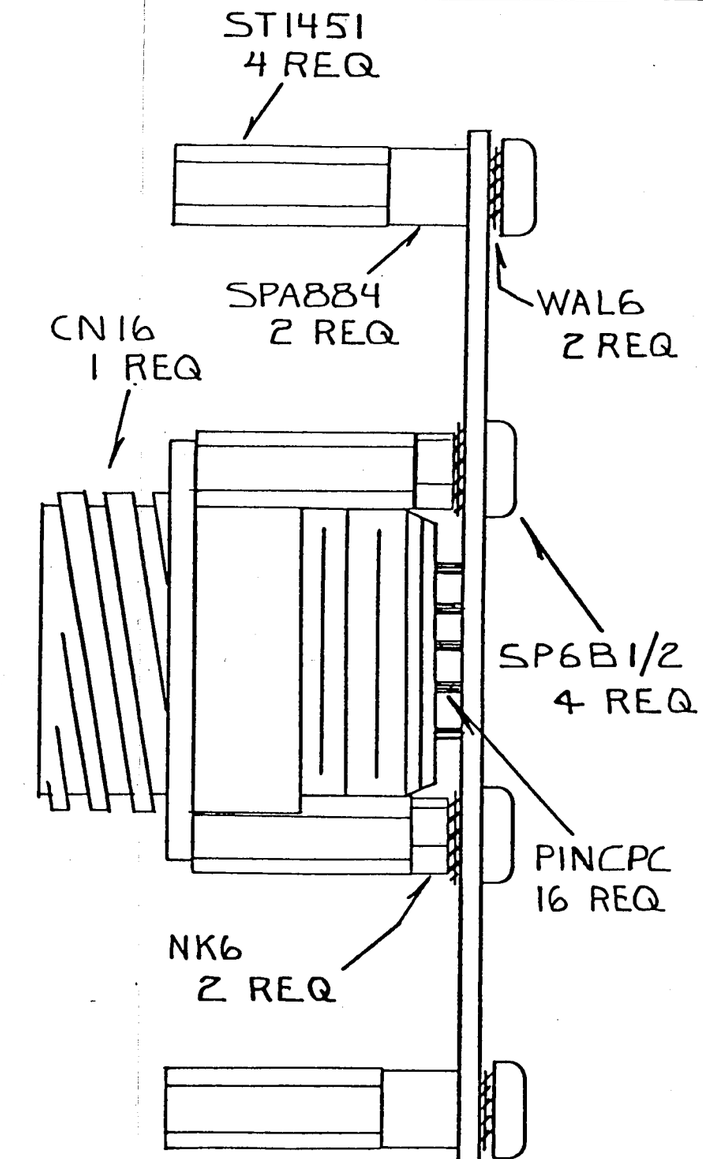
REVISIONS		
A	RELEASED	10-22-1

sound workshop

TITLE SCHEMATIC, POWER DIST. BOARD

APPROVAL	SIZE	DWG NO.	REV.
JRD 9-17-81	B	104-120	A





DETAIL
LEFT SIDE UP

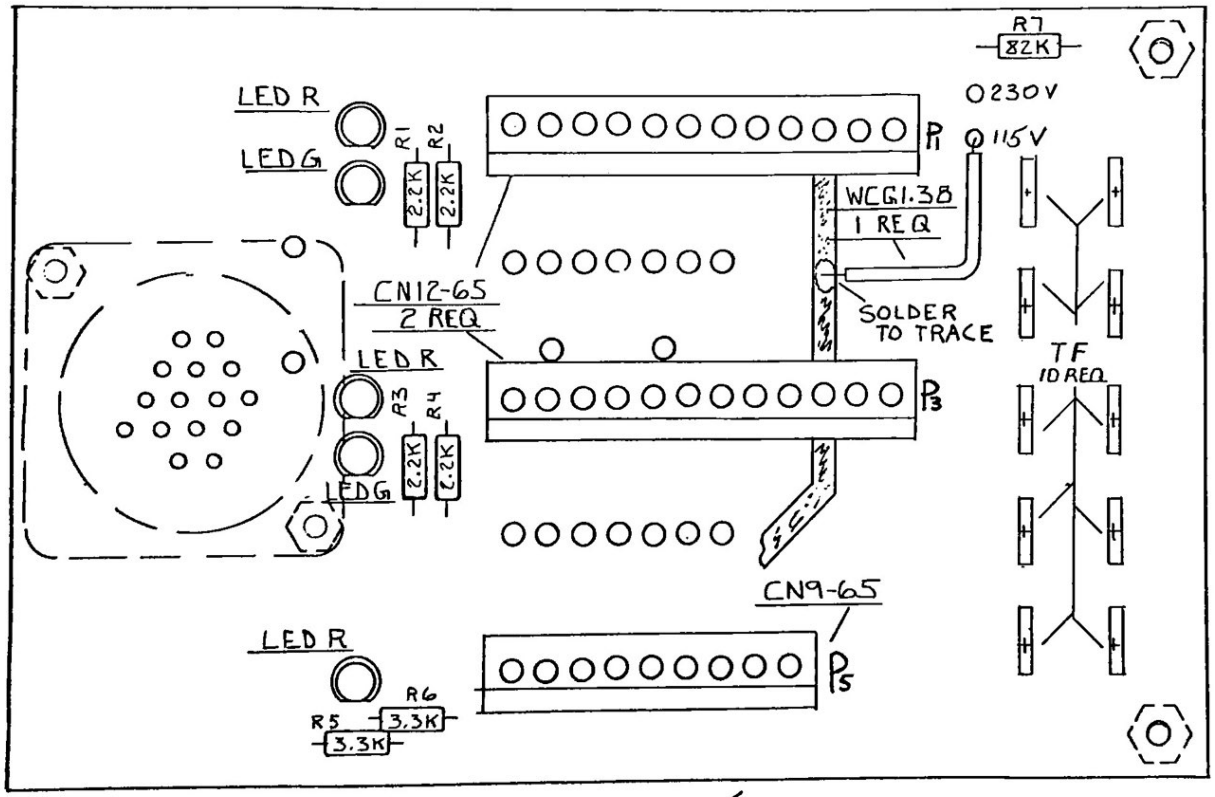
P.C. 104-420

REVISIONS		
A	RELEASED	10-22-1 JRO

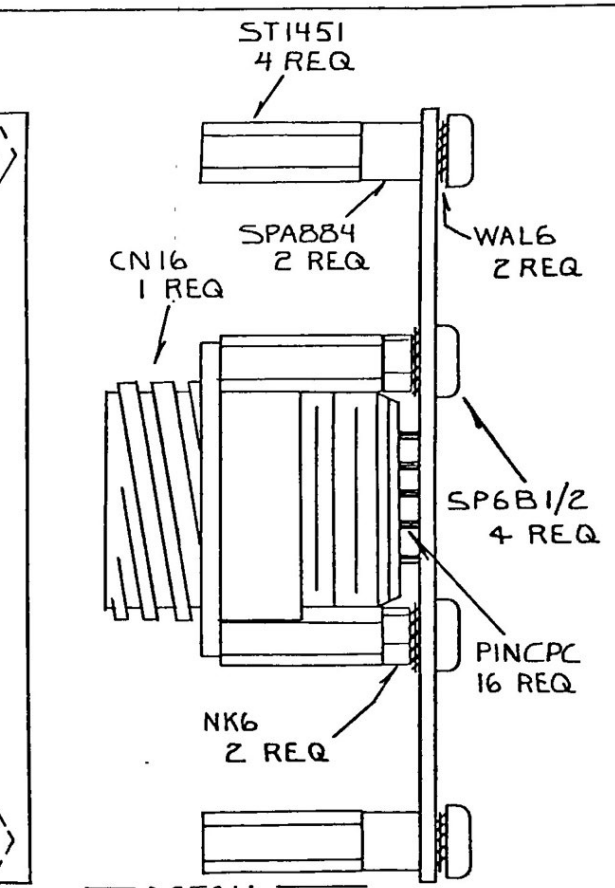
sound workshop

TITLE ASSY, P.C. POWER DIST. (PDB) PWR. SUPPLY SIDE
—STANDARD—

APPROVAL	SIZE	DWG NO.	REV.
JRO 9-30-91	B	104-521	A



P.C. 104-420



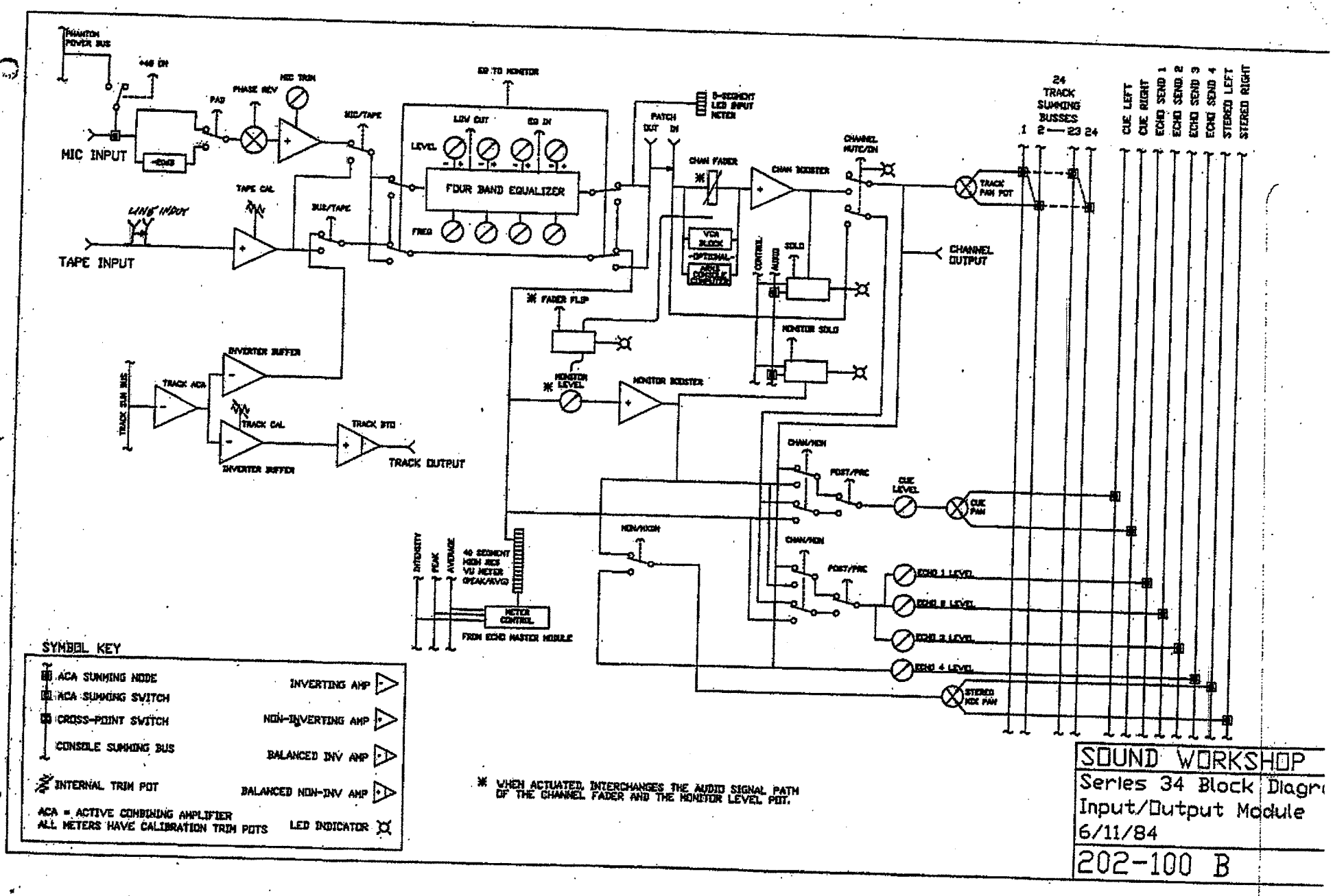
DETAIL
LEFT SIDE UP

REVISIONS		
A	RELEASED	10-22-1

sound workshop

TITLE ASSY, P.C. POWER DIST. (PDB) PWR. SUPPLY SIDE
—STANDARD—

APPROVAL	SIZE	DWG NO.	REV.
JRO 9-30-81	B	104-521	A



SYMBOL KEY

- ACA SUMMING NODE
- ACA SUMMING SWITCH
- CROSS-POINT SWITCH
- CONSOLE SUMMING BUS
- INTERNAL TRIM POT
- ACA = ACTIVE COMBINING AMPLIFIER
- ALL METERS HAVE CALIBRATION TRIM POTS
- INVERTING AMP
- NON-INVERTING AMP
- BALANCED INV AMP
- BALANCED NON-INV AMP
- LED INDICATOR

* WHEN ACTUATED, INTERCHANGES THE AUDIO SIGNAL PATH OF THE CHANNEL FADER AND THE MONITOR LEVEL POT.

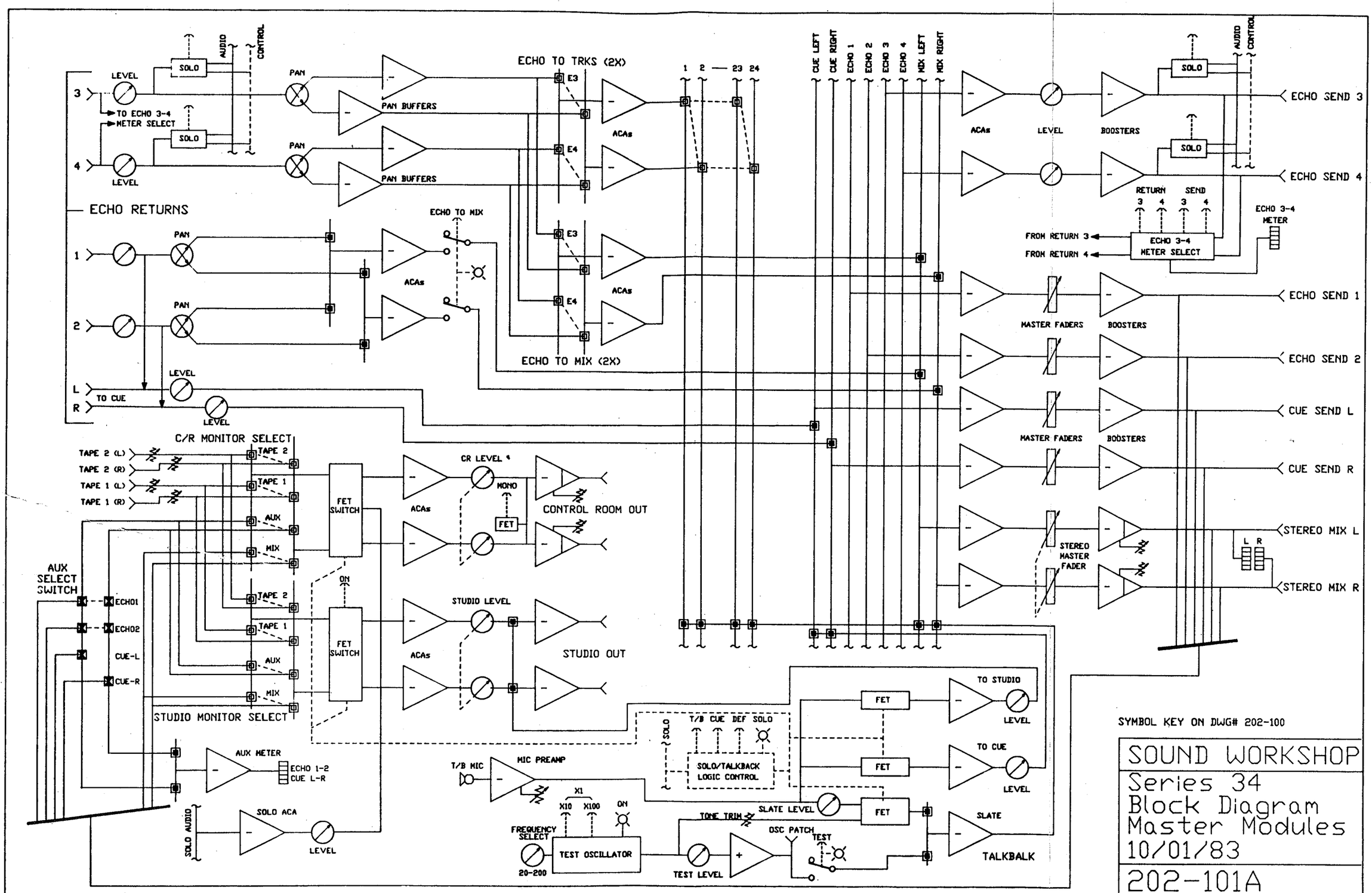
SOUND WORKSHOP

Series 34 Block Diagr

Input/Output Module

6/11/84

202-100 B

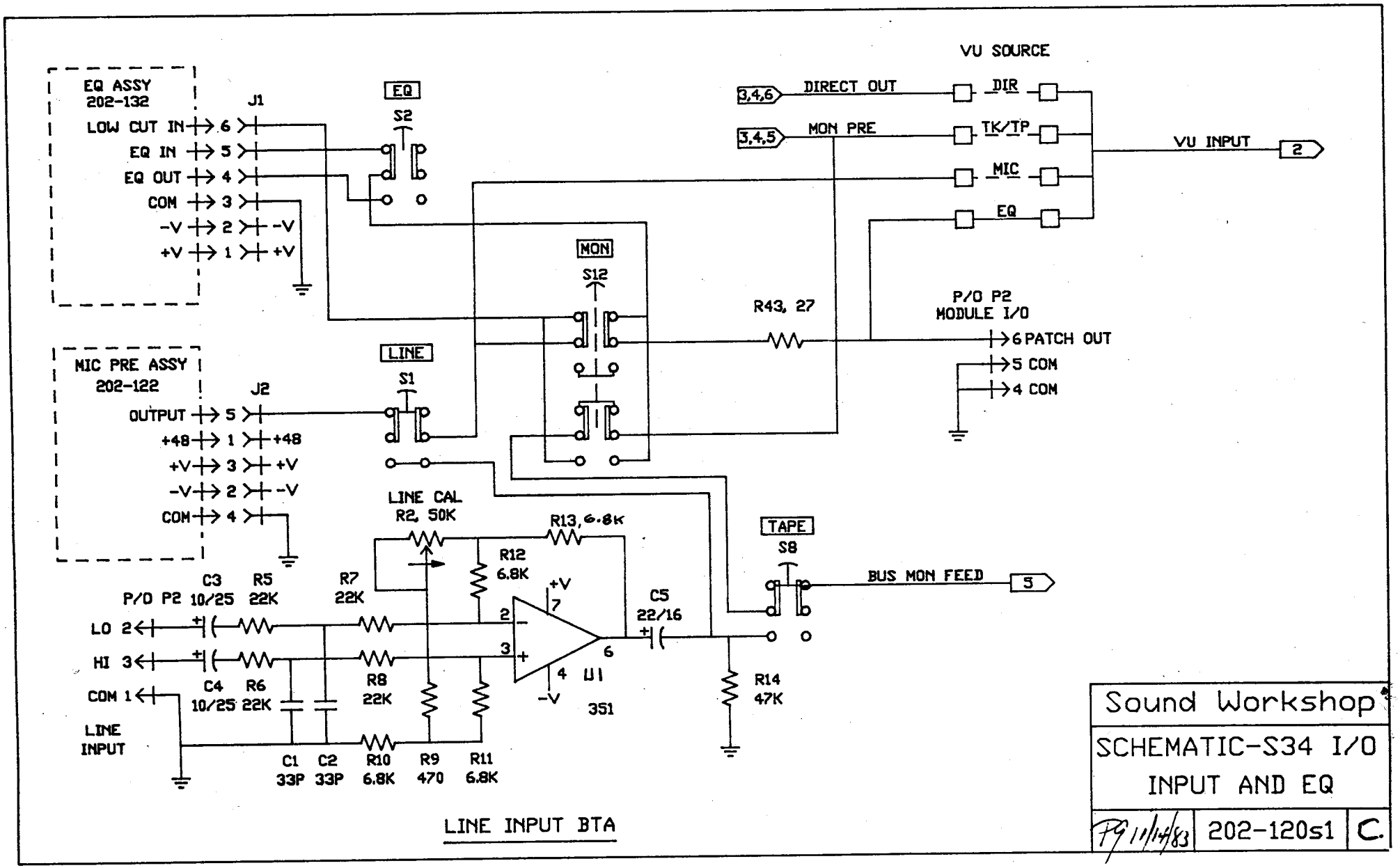


SYMBOL KEY ON DWG# 202-100

SOUND WORKSHOP

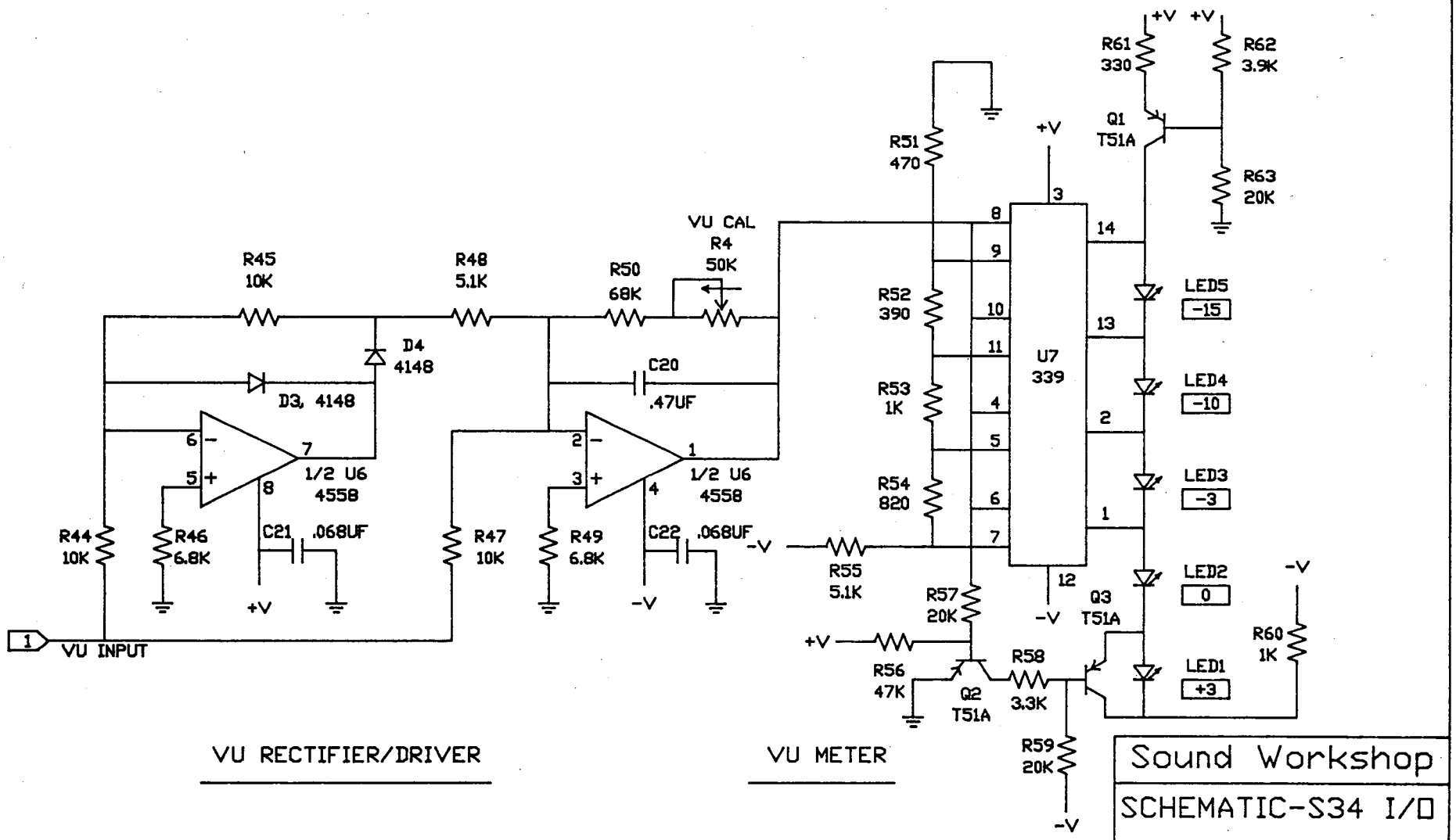
Series 34
Block Diagram
Master Modules
10/01/83

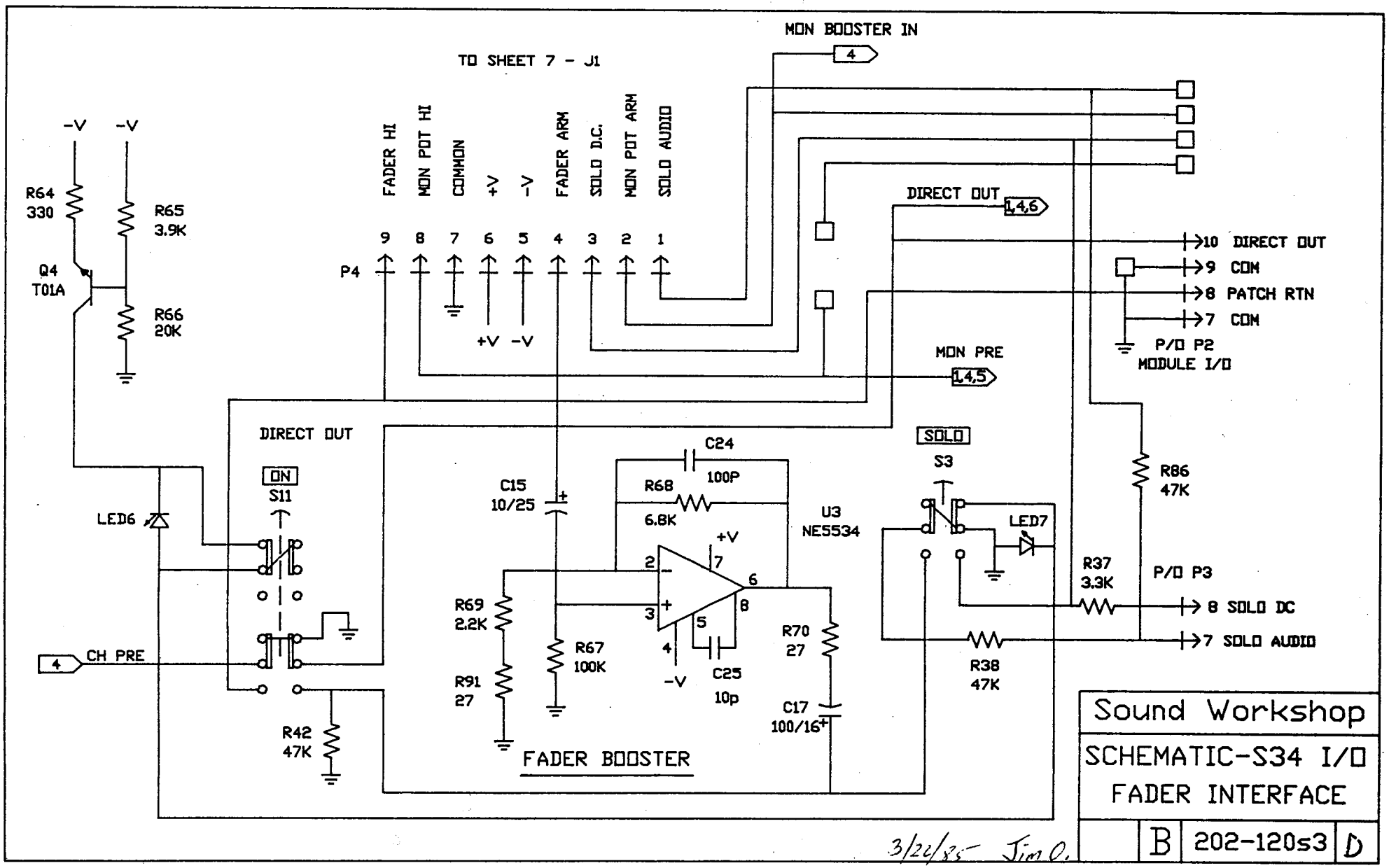
202-101A

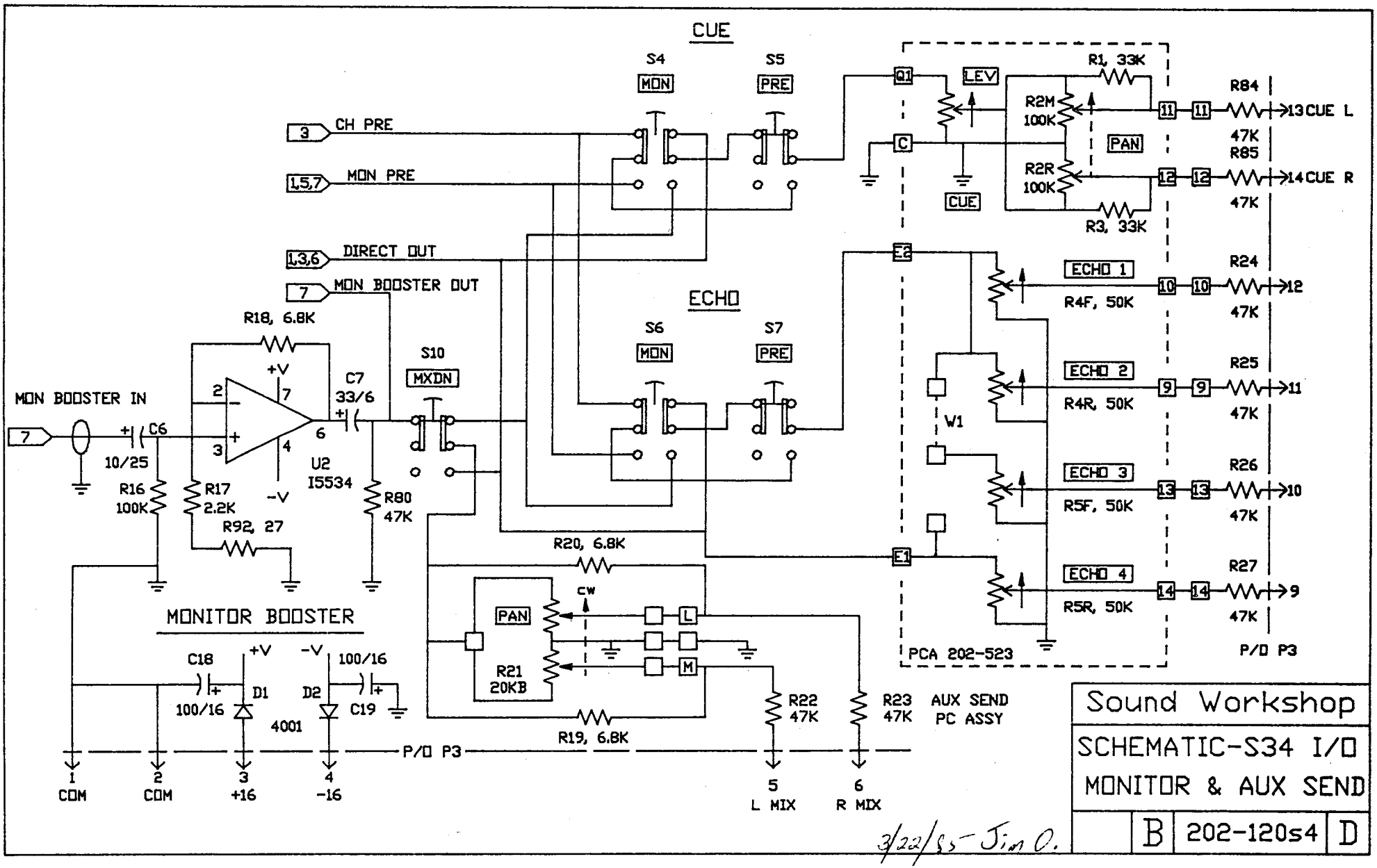


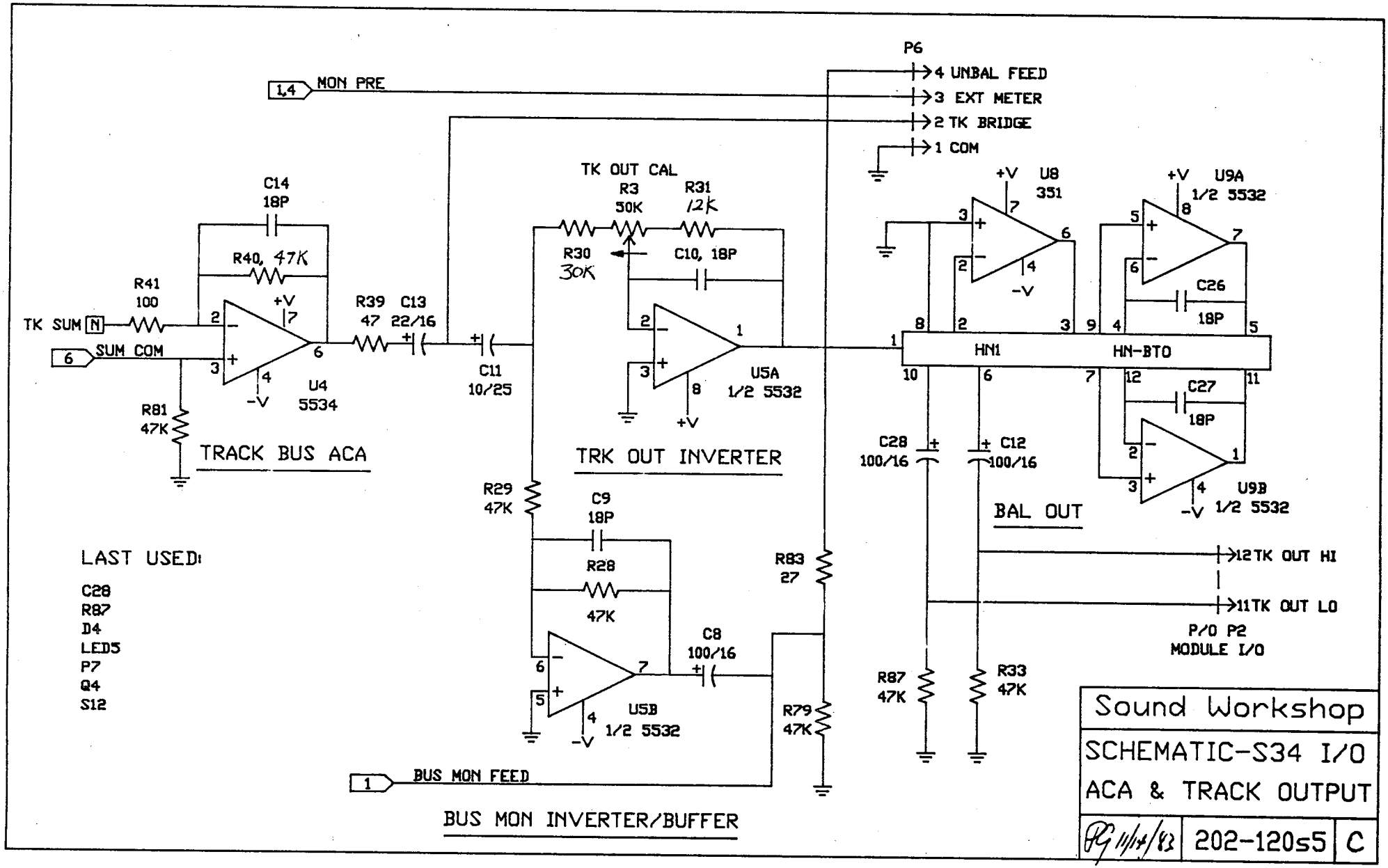
LINE INPUT BTA

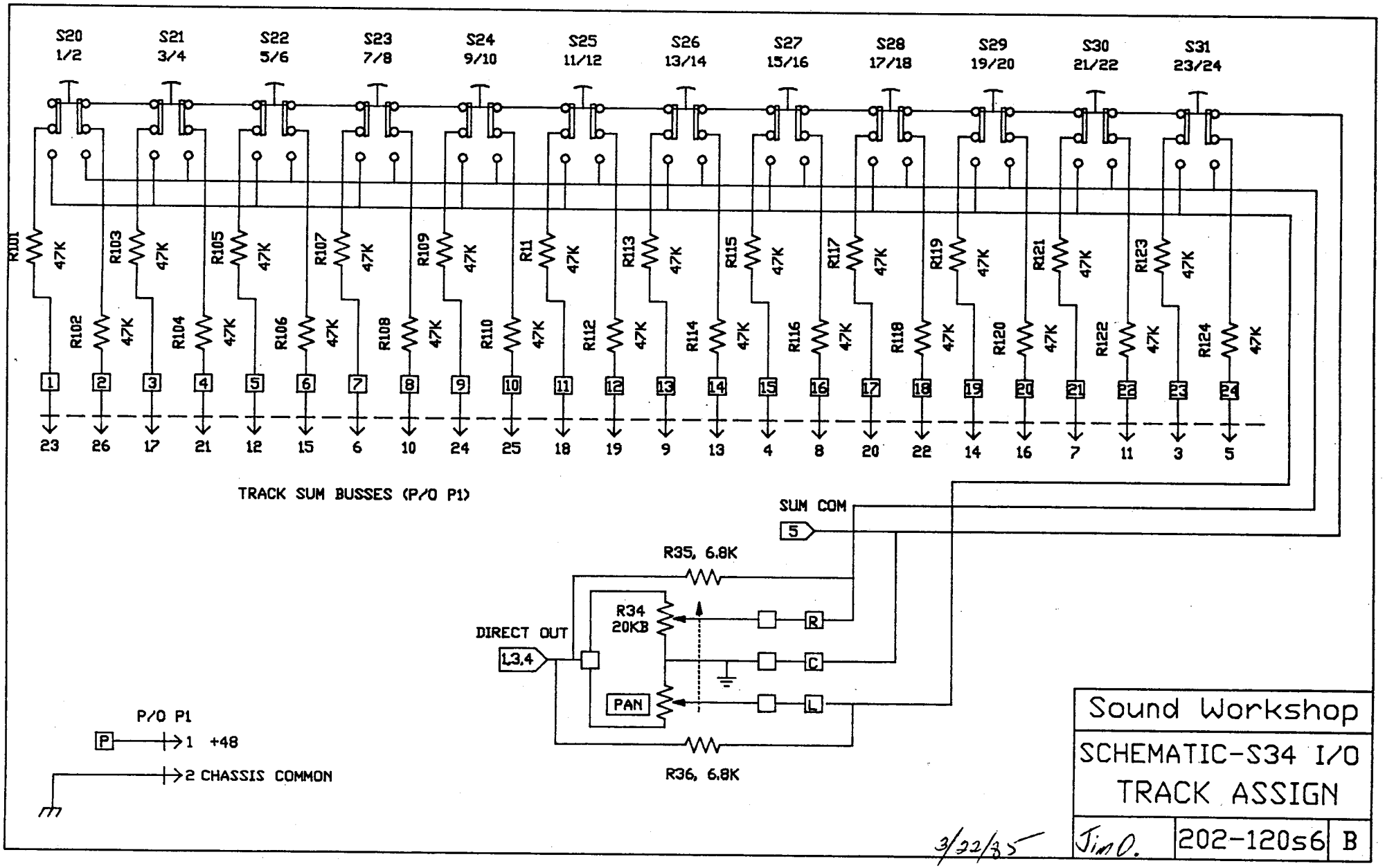
Sound Workshop		
SCHEMATIC-S34 I/O INPUT AND EQ		
PG 11/14/83	202-120s1	C.


R45
10K
R48
5.1K
R50
68K
VU CAL
R4
50K
D4
4148
D3, 4148
C20
.47UF
1/2 U6
4558
1/2 U6
4558
R44
10K
R46
6.8K
C21
.068UF
R47
10K
R49
6.8K
C22
.068UF
1
VU INPUT
+V
-V
R51
470
R52
390
R53
1K
R54
820
R55
5.1K
R57
20K
R56
47K
Q2
T51A
R58
3.3K
R59
20K
U7
339
R61
330
R62
3.9K
Q1
T51A
R63
20K
LED5
-15
LED4
-10
LED3
-3
LED2
0
LED1
+3
Q3
T51A
R60
1K
VU RECTIFIER/DRIVER
VU METER
Sound Workshop
SCHEMATIC-S34 I/O
VU METER
B
202-120s2
B
3/22/35 Jim O.


MON BOOSTER IN
4
TO SHEET 7 - J1
FADER HI
MON POT HI
COMMON
+V
-V
FADER ARM
SOLO D.C.
MON POT ARM
SOLO AUDIO
9 8 7 6 5 4 3 2 1
P4
-V -V
R64 330
R65 3.9K
Q4 T01A
R66 20K
+V -V
DIRECT OUT
1,4,6
10 DIRECT OUT
9 COM
8 PATCH RTN
7 COM
P/O P2
MODULE I/O
MON PRE
1,4,5
DIRECT OUT
ON
S11
LED6
CH PRE
4
C15 10/25
C24 100P
R68 6.8K
U3 NE5534
+V
-V
R69 2.2K
R91 27
R67 100K
R70 27
C17 100/16
C25 10p
FADER BOOSTER
R42 47K
SOLO
S3
LED7
R86 47K
R37 3.3K
P/O P3
8 SOLO DC
7 SOLO AUDIO
R38 47K
Sound Workshop
SCHEMATIC-S34 I/O
FADER INTERFACE
B
202-120s3
D
3/24/85 Jim O.

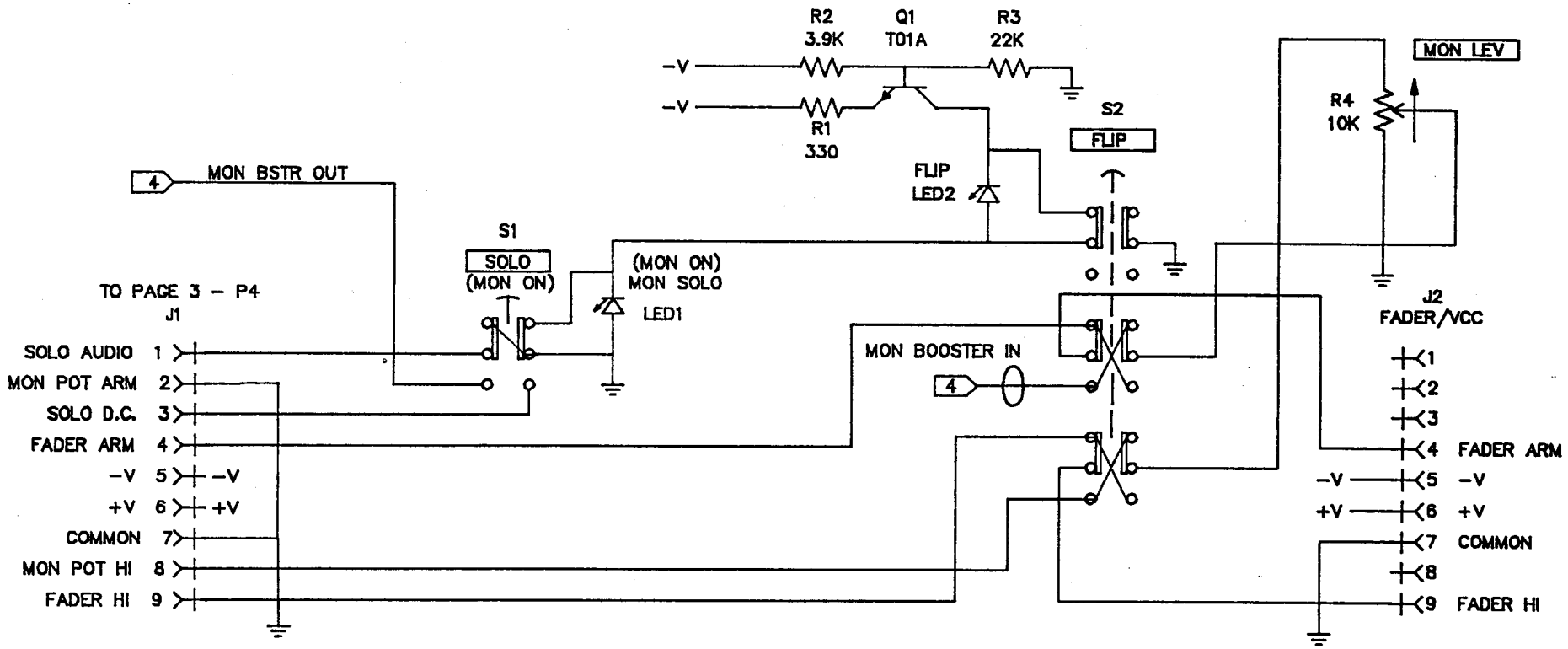

CUE
S4
MON
S5
PRE
3
CH PRE
1,5,7
MON PRE
1,3,6
DIRECT OUT
7
MON BOOSTER OUT
Q1
LEV
R1, 33K
R2M
100K
R2R
100K
R3, 33K
PAN
C
CUE
R84
47K
R85
47K
13 CUE L
14 CUE R
ECHO
S6
MON
S7
PRE
E2
ECHO 1
R4F, 50K
R24
47K
12
ECHO 2
R4R, 50K
R25
47K
11
W1
ECHO 3
R5F, 50K
R26
47K
10
E1
ECHO 4
R5R, 50K
R27
47K
9
P/O P3
PCA 202-523
R18, 6.8K
S10
MXDN
MON BOOSTER IN
7
C6
10/25
C7
33/6
+V
-V
U2
I5534
R16
100K
R17
2.2K
R92, 27
R80
47K
R20, 6.8K
MONITOR BOOSTER
C18
100/16
D1
4001
D2
C19
100/16
PAN
CW
R21
20KB
L
M
R19, 6.8K
R22
47K
R23
47K
AUX SEND
PC ASSY
P/O P3
1
COM
2
COM
3
+16
4
-16
5
L MIX
6
R MIX
Sound Workshop
SCHEMATIC-S34 I/O
MONITOR & AUX SEND
B
202-120s4
D
3/22/88 - Jim O.


P6
4 UNBAL FEED
3 EXT METER
2 TK BRIDGE
1 COM
14 MON PRE
C14
18P
R40, 47K
R41
100
TK SUM N
6 SUM COM
R81
47K
U4
5534
TRACK BUS ACA
R39 47
C13 22/16
C11
10/25
TK OUT CAL
R3
50K
R31
12K
R30
30K
C10, 18P
U5A
1/2 5532
TRK OUT INVERTER
+V U8
351
-V
+V U9A
1/2 5532
C26
18P
HN1
HN-BTO
C27
18P
U9B
1/2 5532
C28
100/16
C12
100/16
BAL OUT
12 TK OUT HI
11 TK OUT LO
P/O P2
MODULE I/O
R87
47K
R33
47K
R29
47K
C9
18P
R28
47K
C8
100/16
U5B
1/2 5532
R83
27
R79
47K
1 BUS MON FEED
BUS MON INVERTER/BUFFER
LAST USED:
C28
R87
D4
LED5
P7
Q4
S12
Sound Workshop
SCHEMATIC-S34 I/O
ACA & TRACK OUTPUT
PG 11/4/83
202-120s5
C



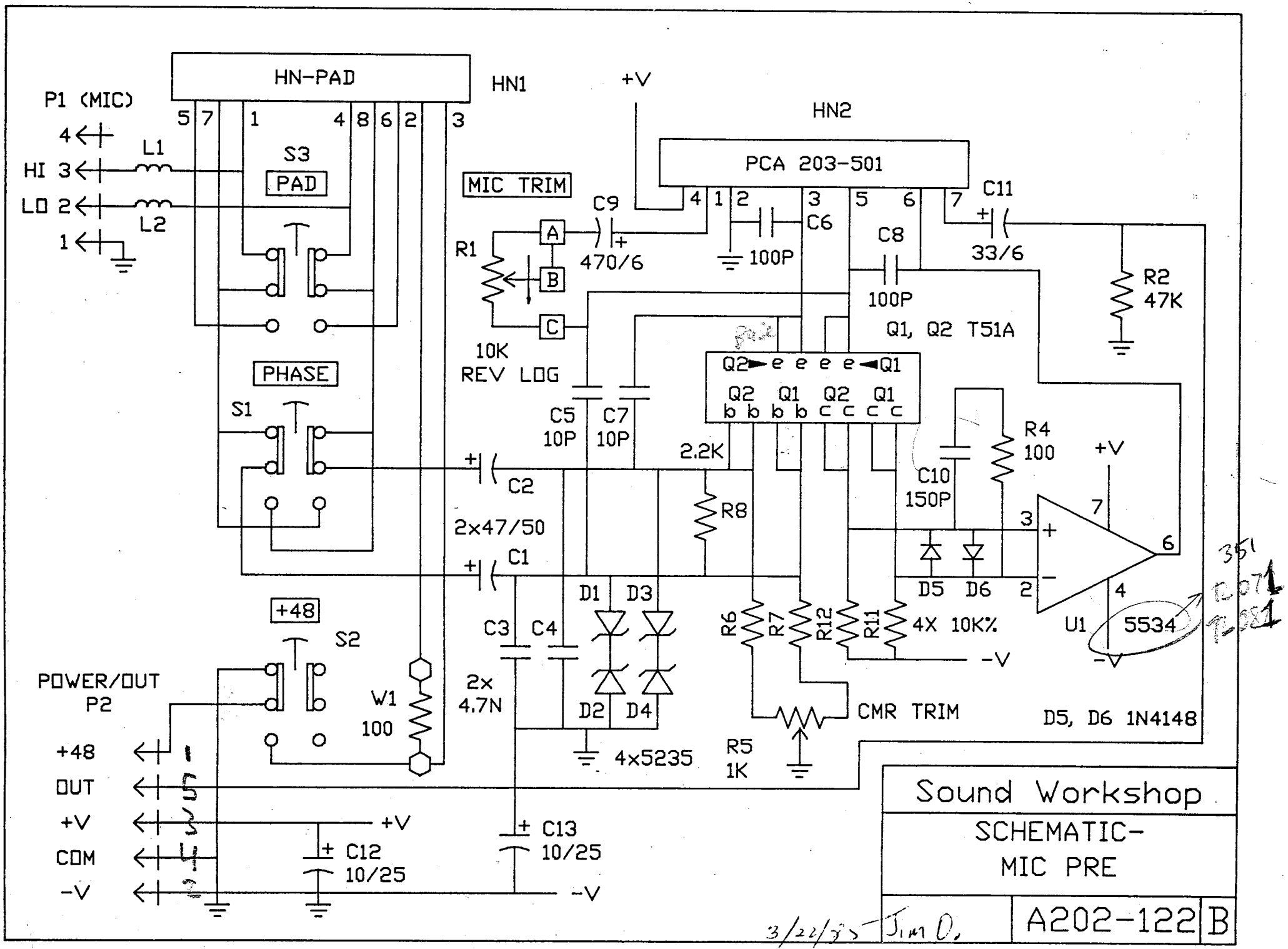
Sound Workshop		
SCHEMATIC-S34 I/O TRACK ASSIGN		
Jim O.	202-120s6	B

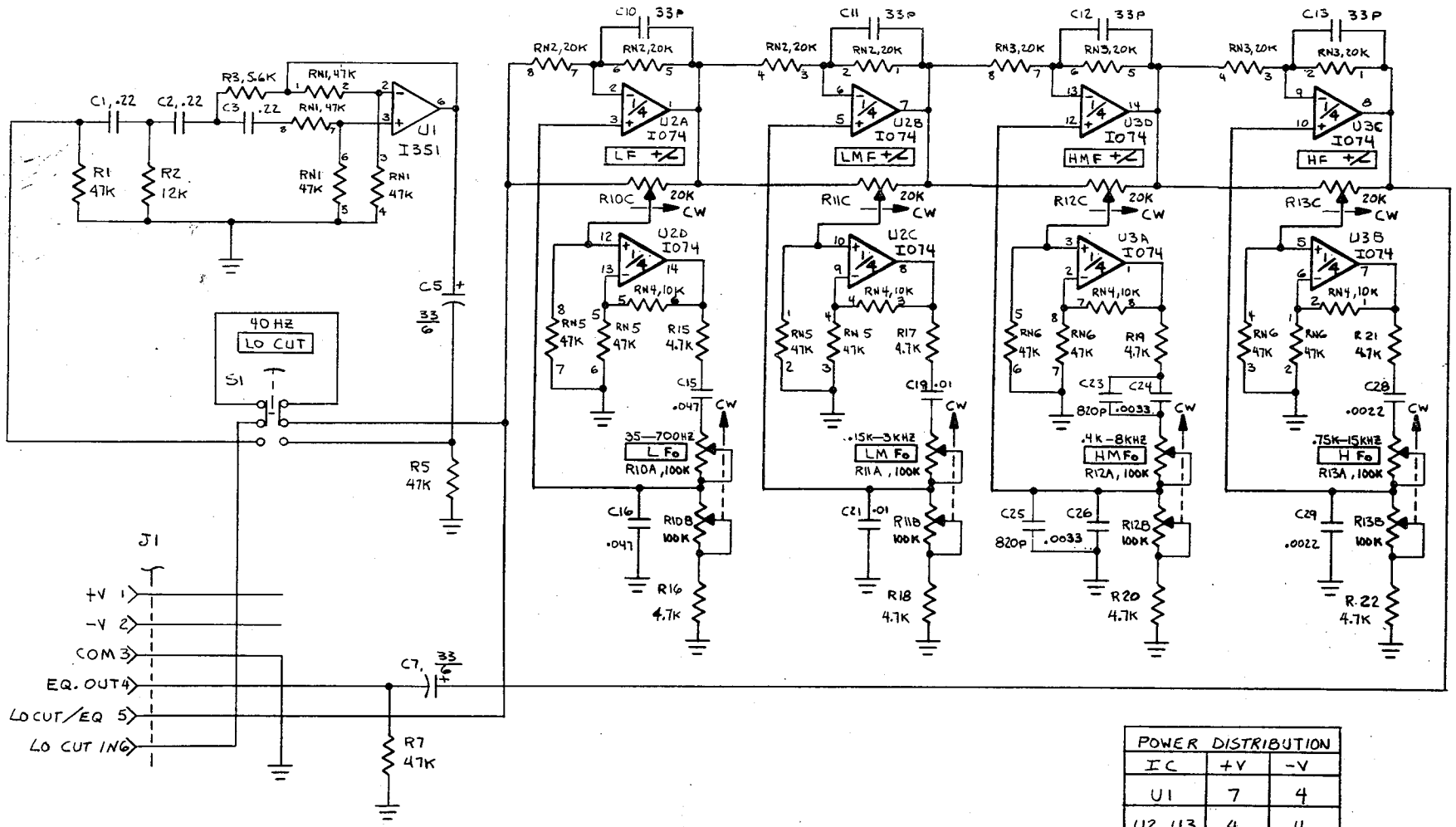
3/22/85



(MON ON) INDICATES MONITOR "ON" OPTION.

Sound Workshop		
SCHEMATIC–S34 I/O MON SOLO / FLIP		
	202120s7	A


HN-PAD
HN1
+V
HN2
P1 (MIC)
4
HI 3
LO 2
1
L1
L2
5 7 1 4 8 6 2 3
S3
PAD
PCA 203-501
4 1 2 3 5 6 7
MIC TRIM
A
B
C
R1
10K
REV LOG
C9
470/6
C6
100P
C8
100P
C11
33/6
R2
47K
Q1, Q2 T51A
Q2 e e e e Q1
Q2 Q1 Q2 Q1
b b b b c c c c
PHASE
S1
C5
10P
C7
10P
2.2K
R8
C2
2x47/50
C1
R4
100
C10
150P
+V
7
3
6
2
4
D5 D6
U1
5534
-V
D1 D3
D2 D4
C3 C4
2x
4.7N
4x5235
R6 R7 R12 R11
4X 10K%
-V
CMR TRIM
R5
1K
D5, D6 1N4148
+48
S2
W1
100
POWER/OUT
P2
+48
OUT
+V
COM
-V
+V
C12
10/25
C13
10/25
-V
Sound Workshop
SCHEMATIC-
MIC PRE
A202-122
B
3/22/93 Jim O.



POWER DISTRIBUTION		
IC	+V	-V
U1	7	4
U2, U3	4	11

REVISIONS			
A	RELEASED	3/17/83	JIM O.

sound workshop

TITLE: SCHEMATIC, 4 BAND EQ

SERIES: 34

APPROVAL	SIZE	DWG NO.	REV.
JIM O. 1/21/83	C	202-132	A

RETURN LEVEL

RTN 3

RTN 4

SEND 3

SEND 4

PAN 3

PAN 4

PAN AMP

SOLO SWITCHES

LED1 LED2 LED3 LED4

24 TK BUS RIBBON

24 TRACK ASSIGN MATRIX
ASSY : 202 - 524
SCH : 202 - 124

3/24TK

4/24T

3/MIX

4/MIX

SEND ACA'S

SEND BOOSTERS

METER SOURCE (INTLKD)

RTN3 RTN4 SEN3 SND4

METER SUM

SPARE

RECTIFIER

INTENSITY

POWER CHART			
IC	TYPE	+V	-V
U1-7	5532	8	4
U8	4558		
U9	339	3	12

LAST USED

C	35
D	5
J	2
P	7
Q	3
R	52
RN	15
U	10
S	12

sound workshop

TITLE
SCHEMATIC-
834 ECHO RTN MODULE

APPROVAL	SIZE	DWG NO.	REV.
JIM O. 4/13/83	D	202-151	B

+60db

C2 470P

R5 470

R6 50K MIC GAIN TRIM

R7 47K

C61 10/25

R4 39K

+V

R1 220

R2 220

P2-3

C20 33/6

C1 470P

R3 39K.

P/O U1 4741

T/B

Q10 T71

R70 100K.

C3 22/16

-V

OSC ON

U2 2206

X1

S5 X10

S6 X100

C4 .033U

C5 .01U

C6 .47U

C7

C8 .0047

R61 10K

R9 PB39F 200KC FREQ.

50K R10 DIST TRIM

R11 22K

R13 50K SYM TRIM

R12 22K

AMPL. TRIM 50K R16.

R14 4.7K

R15 4.7K

C11 100/16

C9 1/50

C12 100/16

C13 100/16

2.2K R17 LED 2

LED 1

R19 2.2K

S4 TEST

S1 SOLO DEFEAT

R46 10K

R47 39K

R48 100K

R50 47n

47K R49

Q1 T51A

R60 330

Q6 T01A

R51 470

C10 1/50

"SOLO" LED3

R52 47K

R53 47K

R54 22K

Q2 T01A

R55 100K

R56 100K

Q3 T01A

R57 15K.

D1

D2

D3

T/B S2

D4 D5 D6 D7 D8 D9

R58 10K

R59 10K

CUE

R39 100K

R41 22K

Q7 T01A

R45 22K

R43 100K

Q8 T01A

R62 22K

D10

R38 100K

D11

R40 100K

T/B

R8 10K LOG SLATE LEVEL PB14F

R31 10K

R42 22K

R32 22K

R33 22K

C18 .047

R44 22K

R36 100K

C19 .047

R37 100K

U5 5011

R34 100K

R35 100K

U3 356

P/O U1

R63 C14 47 100/16

R64 C15 47 22/16

R65 C16 47 22/16

R18 50K LOG.

SLATE TONE LEVEL TRIM

R20 10K LOG

PB14F

LEVEL

R21 22K

R22 22K

U4 351

R25 5.1K

R23 220

R24 220

R26 5.1K

Q4 T01A

R27

R28 Q5 T51A

R29 100

C20 470/16

R66 22K

P3

5 SP

4 SP

9 TEST OSC OUT

7 +V

8 -V

6 COM

3 SLATE AUDIO

R30 SOLO LEVEL 10K

2 SOLO POT HI

1 SOLO POT ARM

P2

2 T/B CUE AUDIO

R2 3 MIC

4 SP

5 SP

9 C/R MUTE

1 T/B STUDIO AUDIO

8 STUDIO MUTE

7 SOLO MUTE

6 SOLO DC

C/R MUTE

STUDIO MUTE

SOLO MUTE

C17 10/25

LAST

C = 21

D = 11

R = 66

S = 6

U = 5

Q = 8

NOTES

1. OMIT D1 FOR STD LOGIC
2. ■ ARE LED SUPPORT PINS.

REVISIONS		
B	ADDED Q10, R70, C20 MIC PRE MOD	11/15/84
A	RELEASED	JIM O. 6/10/83

SOUND WORKSHOP INC.

SCHEMATIC - COMMUNICATIONS MODULE PCB (SERIES 34)

JIM O. 6/10/83 | D | 202-153 | B

A	RELEASED FOR PRODUCTION	8/10/83

P1

MIC 7
COM 6
COM 5
SLATE 4
+48 3
INT. 2 (Q1-B)
CHASSIS 1

LAST REF #
C - 15
D - 4
U - 5
R - 71
LED - 6
Q -
S -
P -

R69 39K
R25 39K
R26 39K
R70 39K
R30 10K
R31 5.1K
D3 4148
D4 4148
C6 .47
R37 470Ω
R24 68K
R71 VU CAL. 50K
R35 10K
R36 10K
U3 4558
+V
-V
R33 47K
R34 3.3K
TSIA Q2
R27 20K
R29 20K
R38 390Ω
R39 1K
R40 820Ω
R32 5.1K
U4 339
R42 330
Q1 TSIA
R43 3.9K
P1-2
R28 20K
-15 LED5
-10 LED4
-3 LED3
0 LED2
+3 LED1
Q3 TSIA
R41 1K

R17 2.2K
LED6
S5 MIX

S6A CUE1
S6B CUE2
S6C ECHO1
S6D ECHO2

STUDIO
R44 10K
S7A TP2
R45 10K
R46 10K
S7B TP1
R47 10K
R48 39K
S7C AUX
R49 39K
R50 20K
S7D MIX
R51 20K

CONTROL ROOM
R52 10K
S9A TP2
R53 10K
R54 10K
S9B TP1
R55 10K
R56 39K
S9C AUX
R57 39K
R58 20K
S9D MIX
R59 20K

U1, 5011
C8 2x 47K
C9 10/25
47K, R20
R21 47K
C3 .047
D1 4148
R18 100K
S8 ON
R19 100K

U2 5011
R60 10K
R61 10K
C4 .047
C5 .047
R66 100K
R64 100K
D2 4148
R65 100K
R67 100K

C16, 10P
R22 39K
C17 22/16
C17, 10P
R23 39K
C13 22/16

P2
2 L
1 R
STUDIO OUT HIGH
3 L
4 R
CR OUT HIGH
CN04-65

U5 4605
C18, 10P
R62 39K
C10 10/25
C14 22/16
C19, 10P
R63 39K
C11 10/25
C15 22/16
-V

MONO S10

LAST USED:
C19

+48 3
SLATE 3
MIC 13
STEREO ECHO L 4
STEREO ECHO R 5
MIX R 18
ECHO L 17
CUE1 6
CUE2 7
ECHO1 8
ECHO2 9
INT 2
+V 10
COM 11
-V 12
TP2 L 5
TP2 R 6
TP1 L 7
TP1 R 8
STEREO L 9
STEREO R 10
STUDIO MUTE 4
SOLO AUDIO 1
CR MUTE 2
SOLO MUTE 3

SOUND WORKSHOP INC.
SCHEMATIC - SWITCH MODULE (SERIES 34 MASTER MODULE)
JIM O. 9/22/83 | D. 202-154 | A

SAMPLE AND HOLD

INPUT BTA

P1
AUDIO INPUT HI 1
COMMON 3
AUDIO INPUT LOW 2
DC INPUT 4
RN1 20K ×4
R1 * 20K
R2 27K
R3 27K
C1 18P
C2 18P
¼ U1

PREC. RECT.

C3 47P
D3
RN2 10K ×4
C10 33/6
D4

PK CAL

R4 82K
C4 150P
R5 20K
R6 20K
D5
D6
C5 .47U
C6 .47U
R7 2.2M
R8 2.2M
R9 2.2M
R10 2.2K
¼ U2
R12 50K
R13 12K
R14 50K
R15 100K
R16 5.6K
R17 1M
PK OFFSET
+V
-V

AVG CAL

R19 47K
R20 150K
R21 50K
R22 20K
C7 .22U
R23 100K
R24 100K
R25 12K
R26 1M
AVG OFFSET

⅓ U3
RN3 47K ×4
R45 150K

D7
R29 47K
¼ U2

P2
+16V 6 — D1 IN4002 — +V
-16V 7 — D2 IN4002 — -V
COMMON 5
4
SELECT LOGIC
Pk 1 — A
Avg 2 — B
DC 3 — C
C8 100/16
C9 100/16

RN4 47K ×4
R35 ** 150K
¼ U

+V -V N/C — P/O P3
J3

* R1 = 20K FOR NOM. INPUT OF +4 dBu.
OMIT FOR -2 dBu.

** R35 SETS DISPLAY CURRENT TO 10ma. OMIT R35 WHEN INTENSITY BUS IS USED.

P/O P3 — 1, 3 — J3

+V R36 5.6K

RN5 HN40-1
RN6 HN40-2
RN7 HN40-3

U4 339
U5
U6
U7
U8
U9
U10
U11
U12
U13
U14, LEDG-10
U15, LEDG-10
U16, LEDY-10
U17, LEDR-10

R37 5.6K
R38 2.2K
Q1 T01A
R39 2.2K
D8
R40 47K
Q2 T51A
R41 270
Q3 T51A
R42 270
Q4 T51A
R43 270
Q5 T51A
R44 470

ALL DIODES 1N4148 UNLESS SPECIFIED

LAST USED
C - 10
D - 8
J
P - 2
Q - 5
R - 45
RN - 7
U - 17

POWER CON.

U #	IC	+V	-V	GND
U1, U2	074	4	11	N/A
U3	4053	16	N/A	6, 7, 8
U4 - U13	339	3	12	N/A

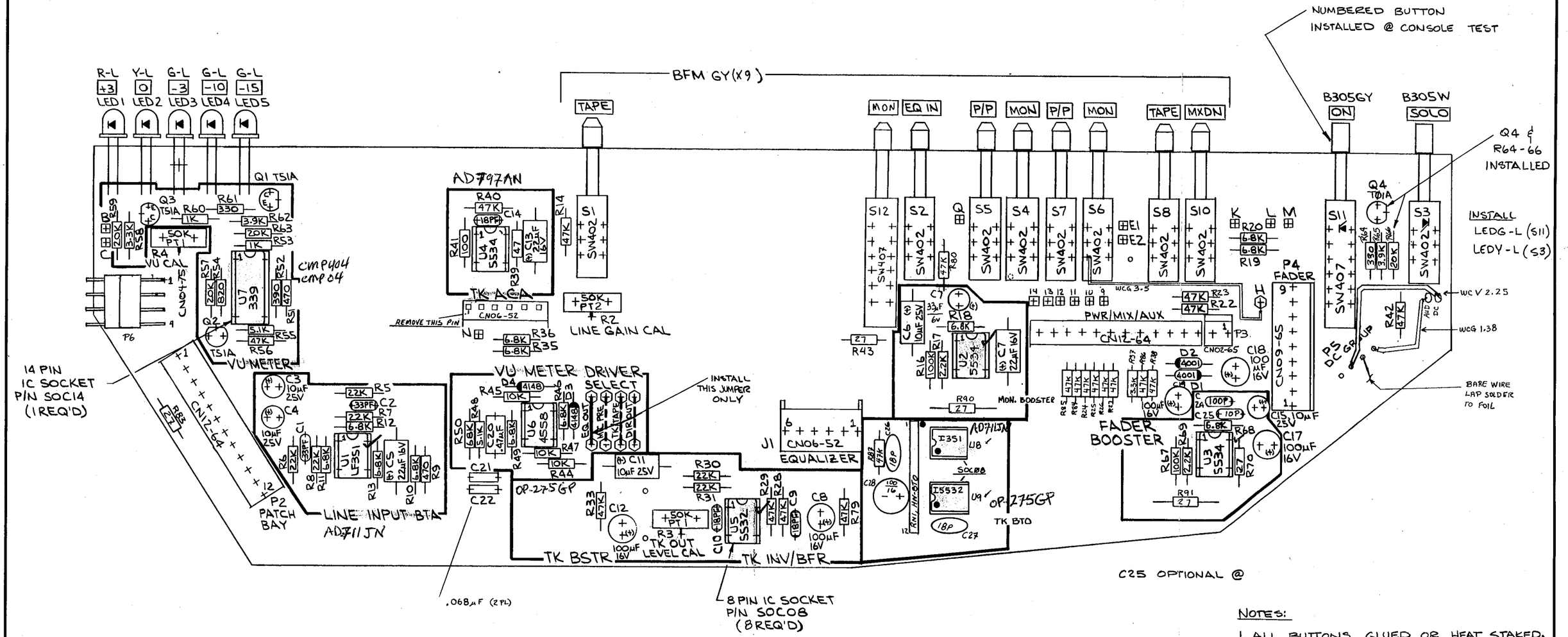
REVISIONS

A	RELEASED	J.M.O. 6/3/83
B	ECN #404	J.M.O. 8/27/83

sound workshop

TITLE
SCHEMATIC- 834
40 SEGMENT HI RES VU

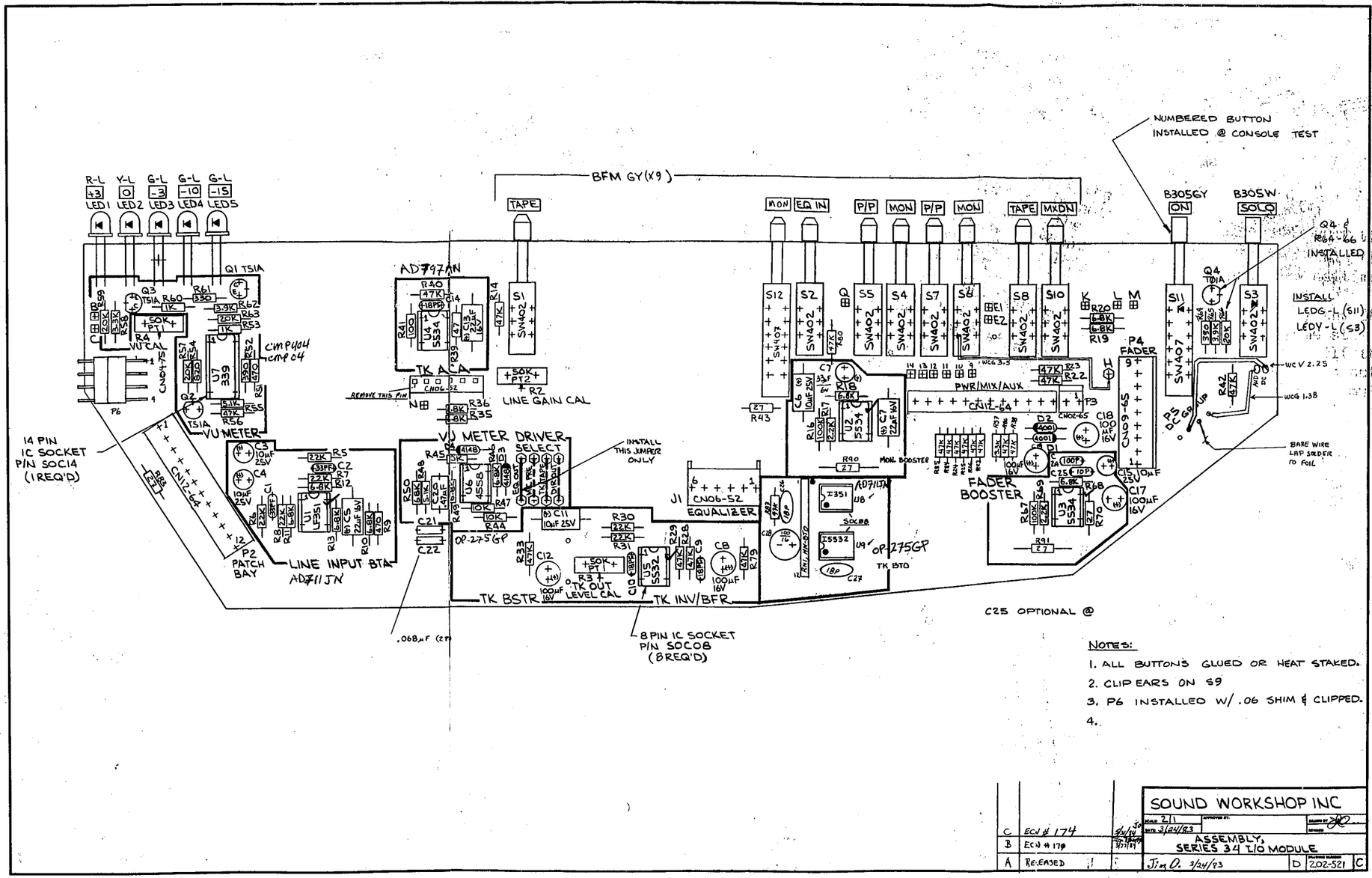
APPROVAL	SIZE	DWG NO.	REV.
DQ 3/29/83	D	202-160	B

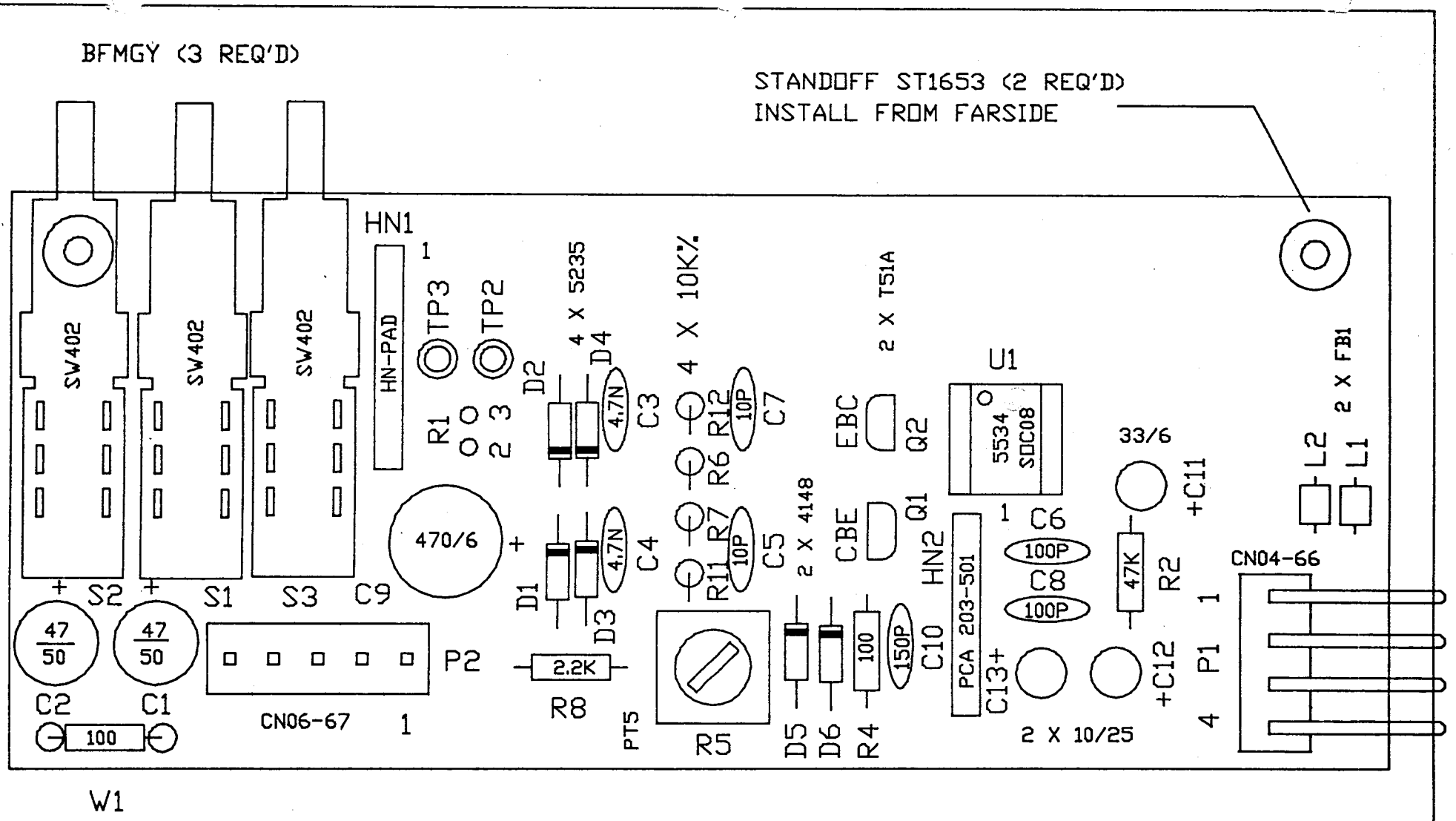


NOTES:

1. ALL BUTTONS GLUED OR HEAT STAKED.
2. CLIP EARS ON S9
3. P6 INSTALLED W/ .06 SHIM & CLIPPED.
4.

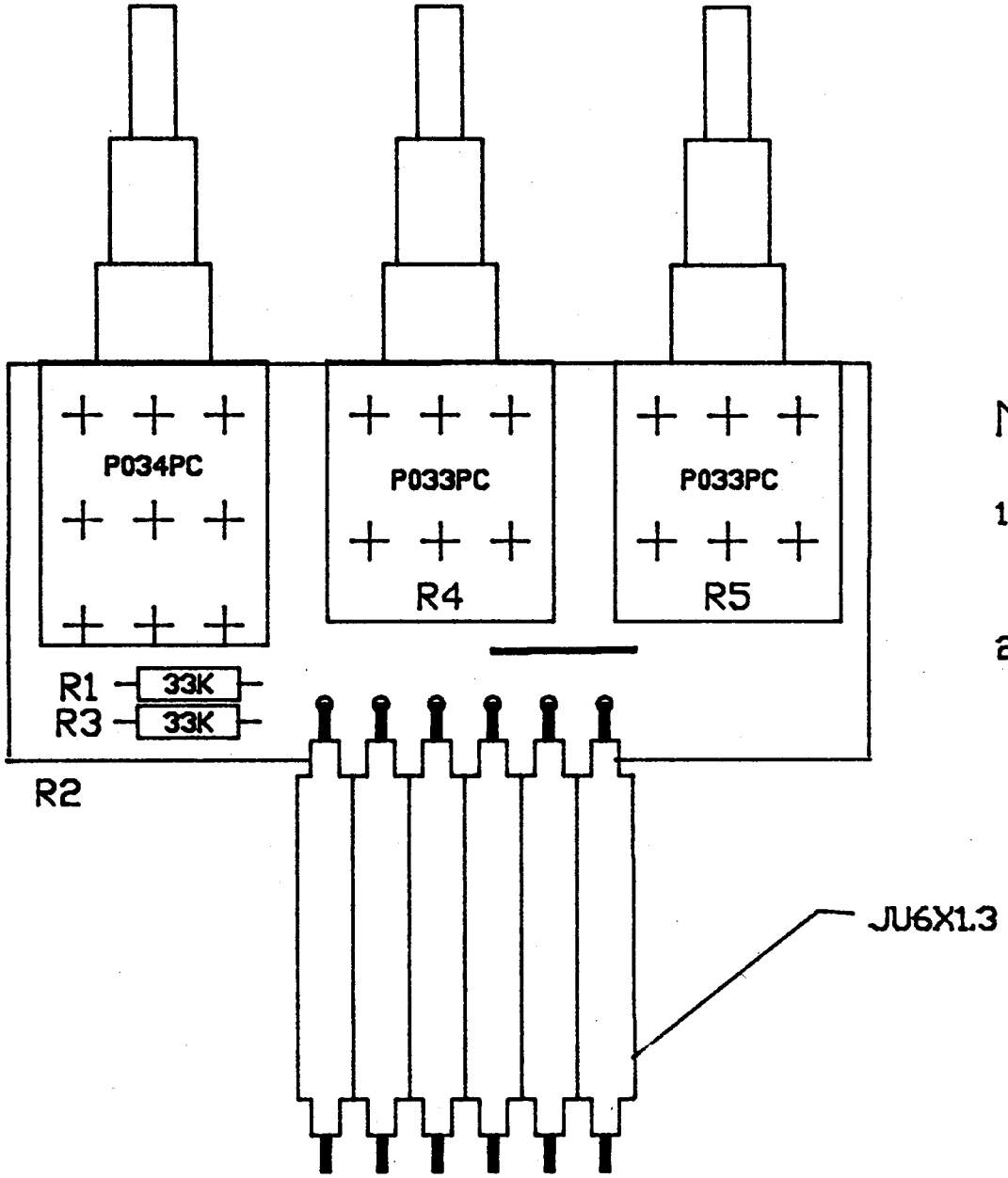
C	ECN # 174	5/4/84 JO	SOUND WORKSHOP INC
B	ECN # 170	3/27/84	SCALE 2/1 · APPROVED BY: · DRAWN BY JO · DATE 3/24/83 · REVISED
A	RELEASED		ASSEMBLY, SERIES 34 I/O MODULE
			Jim O. 3/24/83 · D · 202-521 · C


NUMBERED BUTTON INSTALLED @ CONSOLE TEST
BFM GY(X9)
R-L +3 LED1
Y-L 0 LED2
G-L -3 LED3
G-L -10 LED4
G-L -15 LED5
TAPE
MON
EQ IN
P/P
MON
P/P
MON
TAPE
MXDN
B305GY ON
B305W SOLO
Q4 & R64-66 INSTALLED
INSTALL LEDG-L (S11) LEDY-L (S3)
Q1 TSIA
Q3 TSIA
Q4 TDIA
AD797AN
TK A
VU METER
VU METER DRIVER SELECT
INSTALL THIS JUMPER ONLY
14 PIN IC SOCKET P/N SOC14 (1REQ'D)
P2 PATCH BAY
LINE INPUT BTA
AD711JN
TK BSTR
TK INV/BFR
8 PIN IC SOCKET P/N SOC08 (8REQ'D)
EQUALIZER
PWR/MIX/AUX
FADER BOOSTER
P4 FADER
OP-275GP
TK BTO
TK OUT LEVEL CAL
LINE GAIN CAL
VU CAL
C25 OPTIONAL @
.068μF (27
WCV 2.25
WCG 1.38
BARE WIRE LAP SOLDER TO FOIL
NOTES:
1. ALL BUTTONS GLUED OR HEAT STAKED.
2. CLIP EARS ON S9
3. P6 INSTALLED W/ .06 SHIM & CLIPPED.
4.
SOUND WORKSHOP INC
SCALE 2/1
DATE 3/24/93
ASSEMBLY, SERIES 34 T/O MODULE
Jim O. 3/24/93
D 202-521 C
C ECN # 174
B ECN # 170
A RELEASED



SCREEN: 202-222 SH3 OF 3

Sound Workshop		
ASSY,PC-SERIES 34 MIC PRE-AMP		
3/22/83 Jim D.	A202-522	B



NOTES

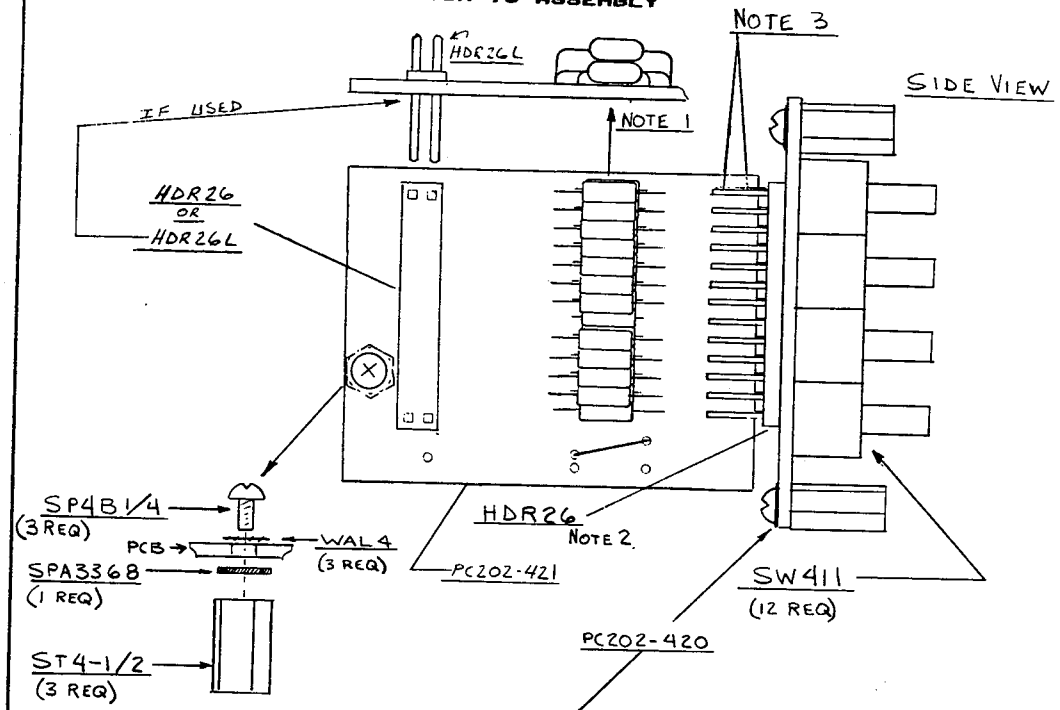
1. INSTALL WCG2.25 IN PCB HOLES "Q" AND "E1" (2 REQ'D)

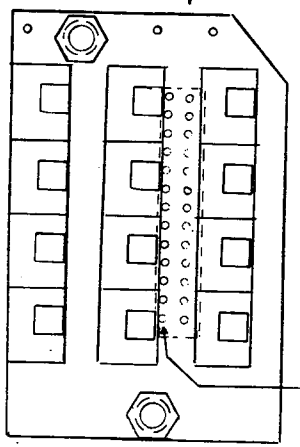
2. INSTALL WCV2.25 IN PCB HOLE "E2" (1 REQ'D)

Sound Workshop		
ASSY,PC-S34 I/O AUX SEND		
7/1/83	A202-523	A

REVISIONS

SEE GENERAL NOTES PRIOR TO ASSEMBLY





FRONT VIEW

CUT THIS ROW FLUSH ON SWITCH SIDE OF PC
SEE NOTE 2

GENERAL NOTES:

1) All resistors are R47K. Install lower resistors first. 12 on .4" centers and 1 on .6" centers. Stack remaining resistors as shown. 11 on .6" centers.

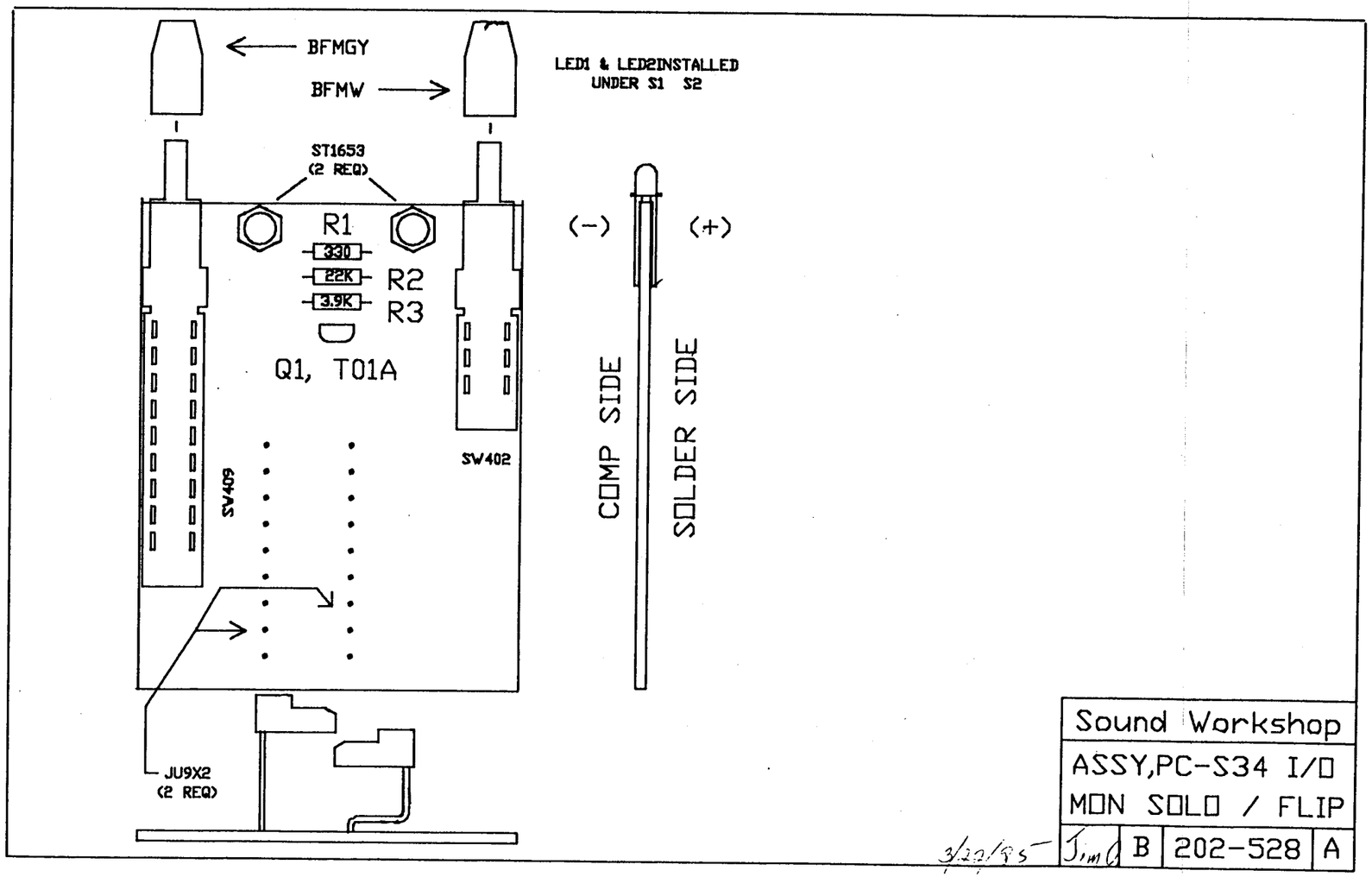
2) On PC 202-420, HDR26 MUST be installed prior to switches. Solder SPARINGLY as one row of pins (shown) must be cut FLUSH to the circuit board to avoid interferesce with the switches.

3) Boards must be mated together using an appropriate alignment fixture or in an actual Series 34 I/O module assembly (or SERIES 34 ER module if applicable). Once the boards have been properly jigged, lap solder the HDR26 on PC202-420 to the foil fingers of PC202-421 in 26 locations as shown.

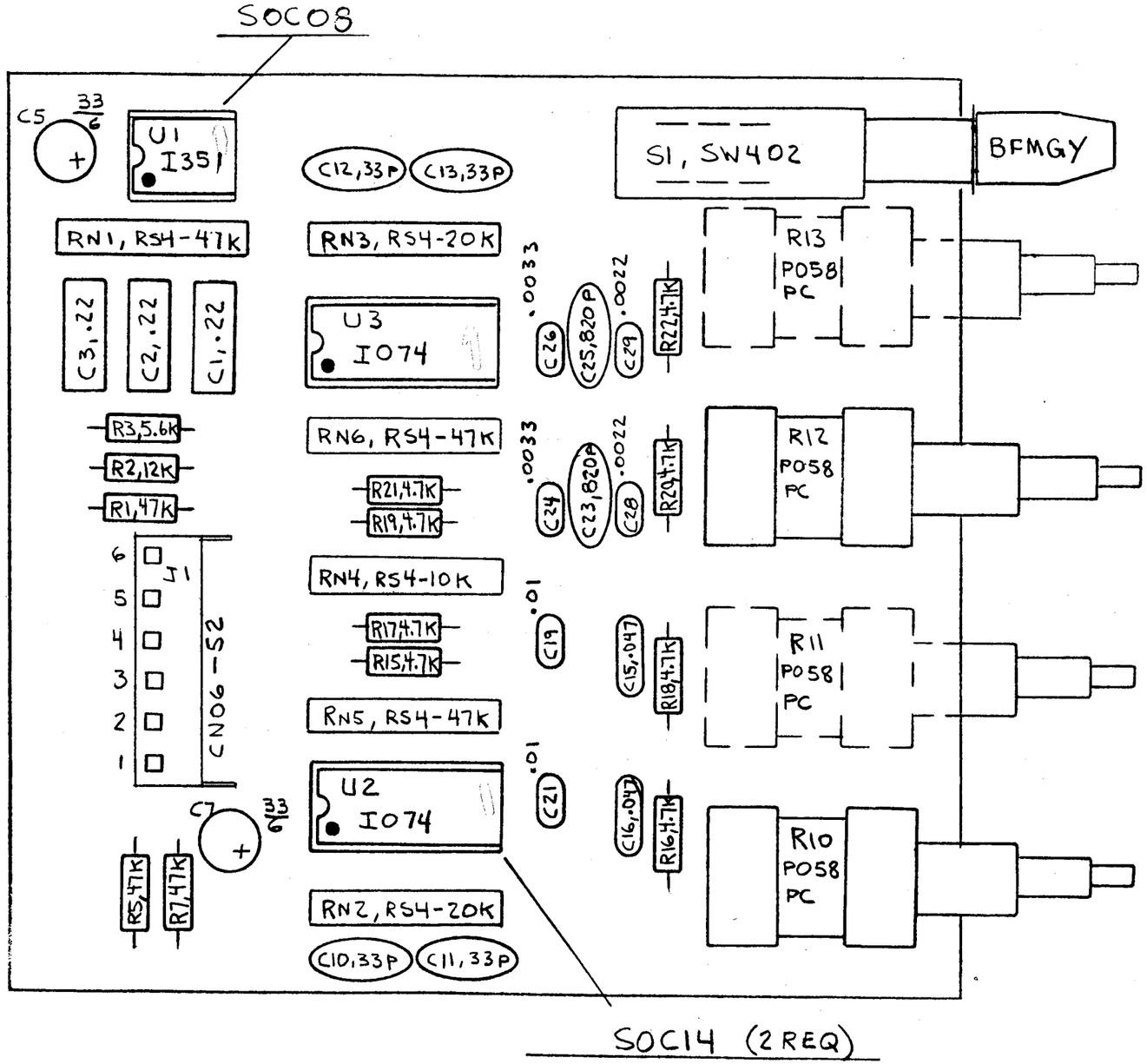
SCALE = 2:1

sound workshop

TITLE			
ASSY,PC-SERIES 34 24 TRACK ASSIGN			
APPROVAL Jim O. 3/25/83	SIZE C	DWG NO. 202-524	REV. A



Sound Workshop			
ASSY,PC-S34 I/O			
MON SOLO / FLIP			
3/22/95 Jim C	B	202-528	A



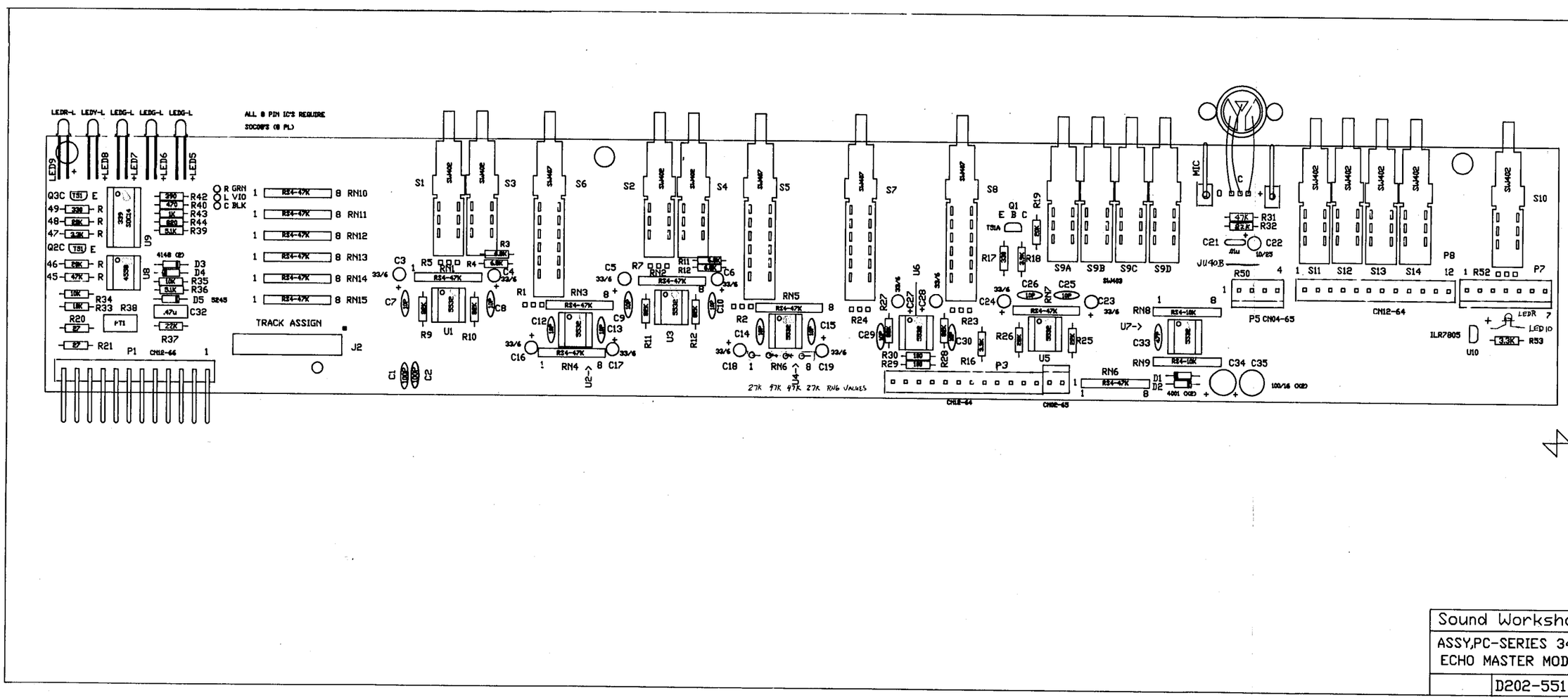
A	RELEASED 3/17/83 JIM O.
REVISIONS	

sound workshop

TITLE

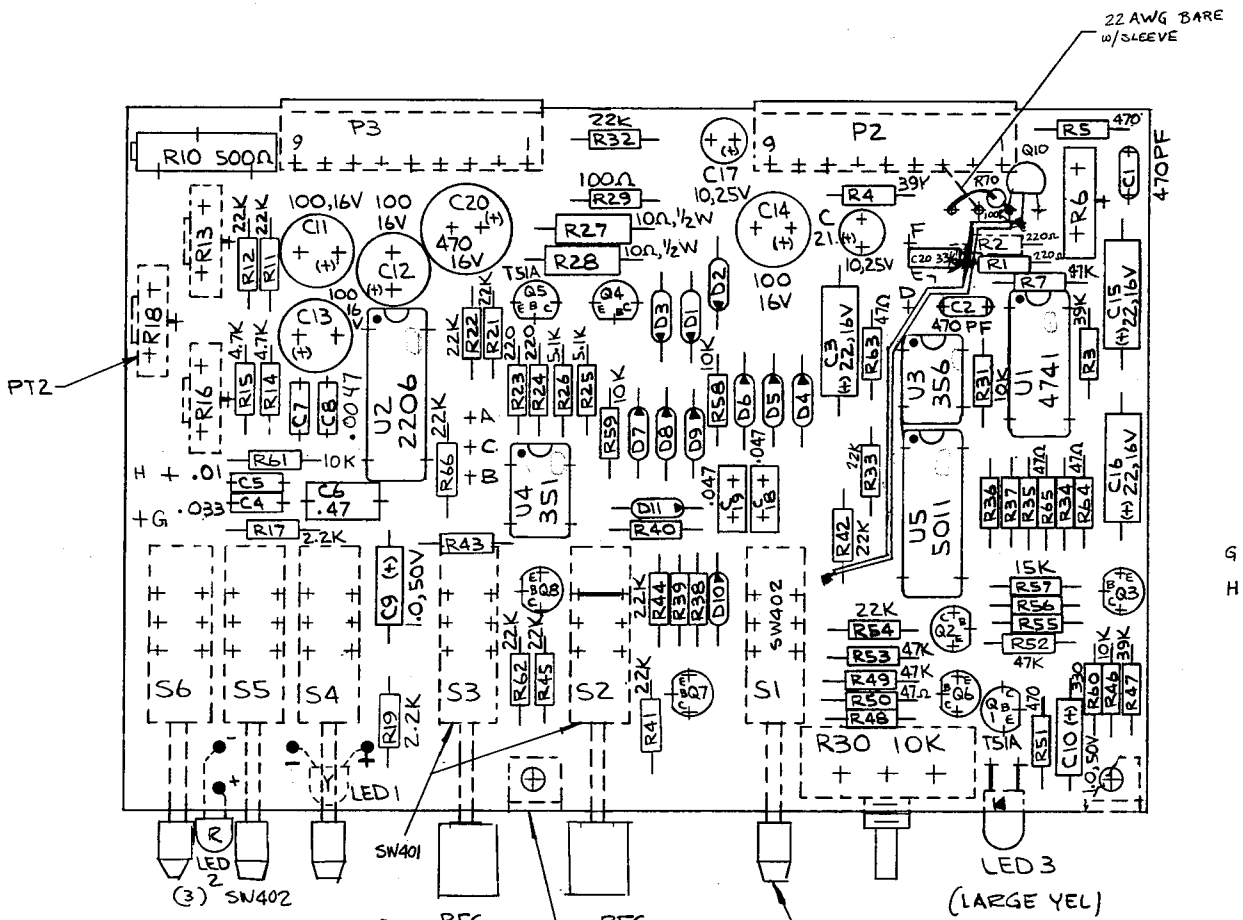
ASSY, PC-4 BAND EQ.
SERIES 30

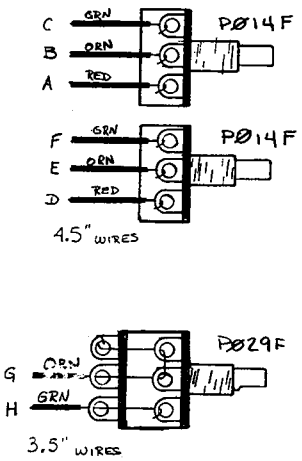
APPROVAL	SIZE	DWG NO.	REV.
JIM O. 1/31/83	B	202-532	A



Sound Workshop	
ASSY,PC-SERIES 34 ECHO MASTER MOD.	
	D202-551 B

A	RELEASED 5/23/83	JH
B	ADDED T/B MIC PRE GAIN REDUCING PARTS 11/8/83	DH

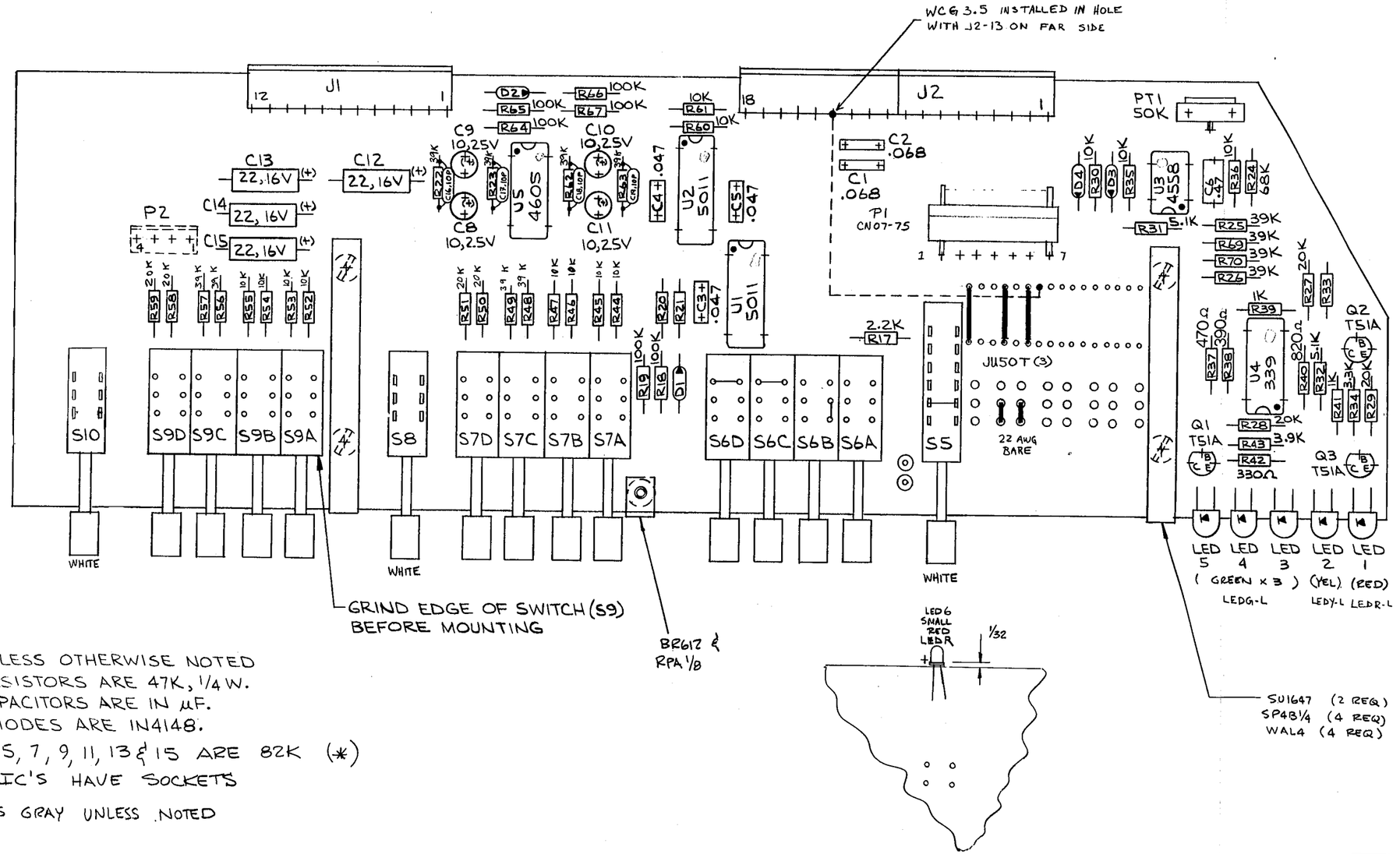




NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE 100K, 1/4 W.
2. ALL CAPACITORS ARE IN µF.
3. ALL TRANSISTORS ARE TO1A.
4. ALL POTS ARE 50K, PT1.
5. ALL DIODES ARE IN4148
6. ALL IC IN SOCKETS
7. OMIT D1

SOUND WORKSHOP INC		
SCALE: 2/1	APPROVED BY:	DRAWN BY: JIM O.
DATE: 6/9/83		REVISED
ASSEMBLY, COMMUNICATIONS MODULE (SERIES 34)		
REV B	C	DRAWING NUMBER 202-553

A	RELEASED FOR PRODUCTION	6/9/83 Jim O.
B	P1 WAS CN07-65	10/23/84



NOTES: UNLESS OTHERWISE NOTED

1. ALL RESISTORS ARE 47K, 1/4 W.
2. ALL CAPACITORS ARE IN µF.
3. ALL DIODES ARE IN4148.
4. R1, 3, 5, 7, 9, 11, 13 & 15 ARE 82K (*)
5. ALL IC'S HAVE SOCKETS
6. BUTTONS GRAY UNLESS NOTED

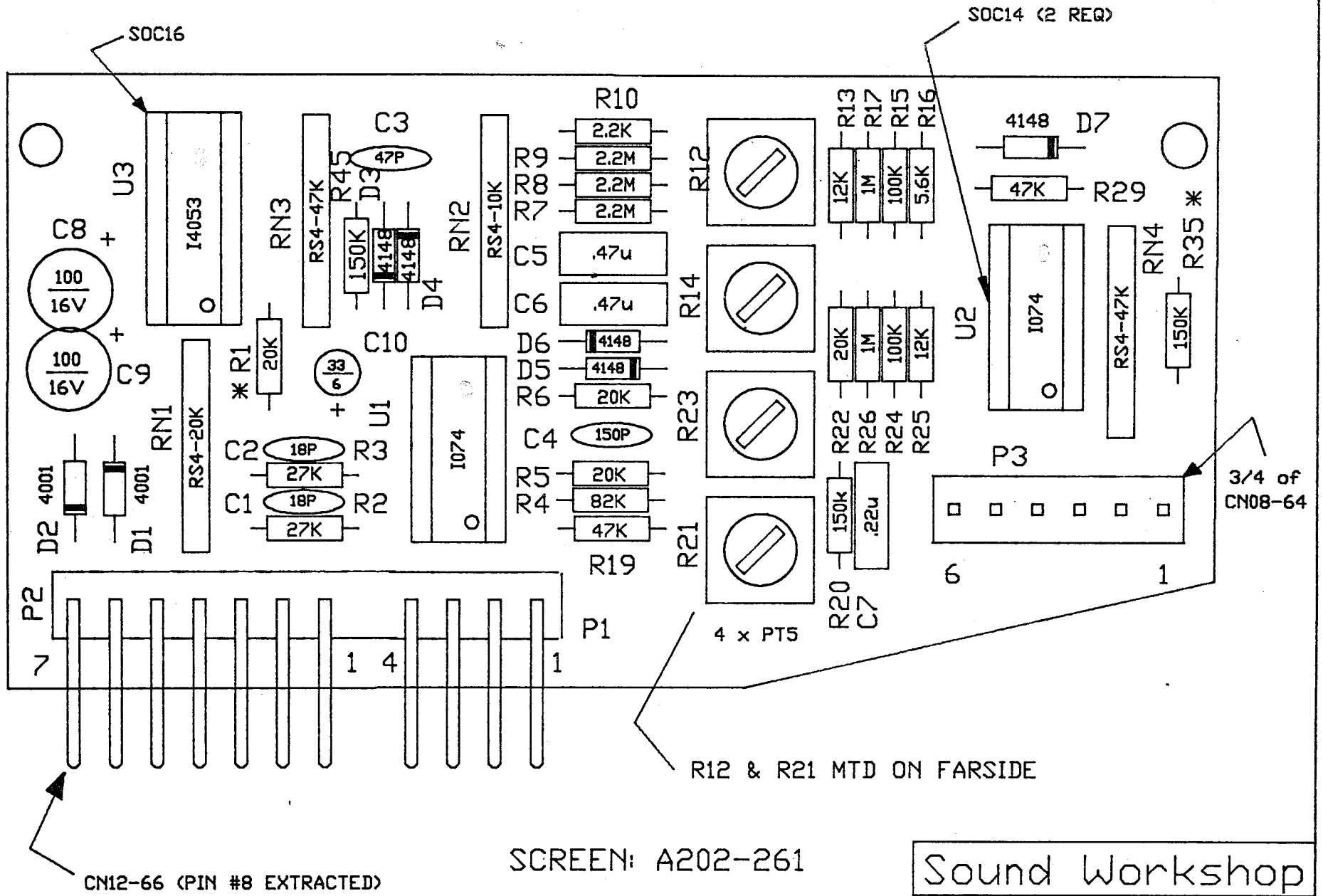
SOUND WORKSHOP INC.

SCALE: 2/1	APPROVED BY:	DRAWN BY: JIM O.
DATE: 6/9/83		REVISED

ASSEMBLY, SWITCH MODULE (SERIES 34 MASTER MODULE)

REV B

DRAWING NUMBER D202-554

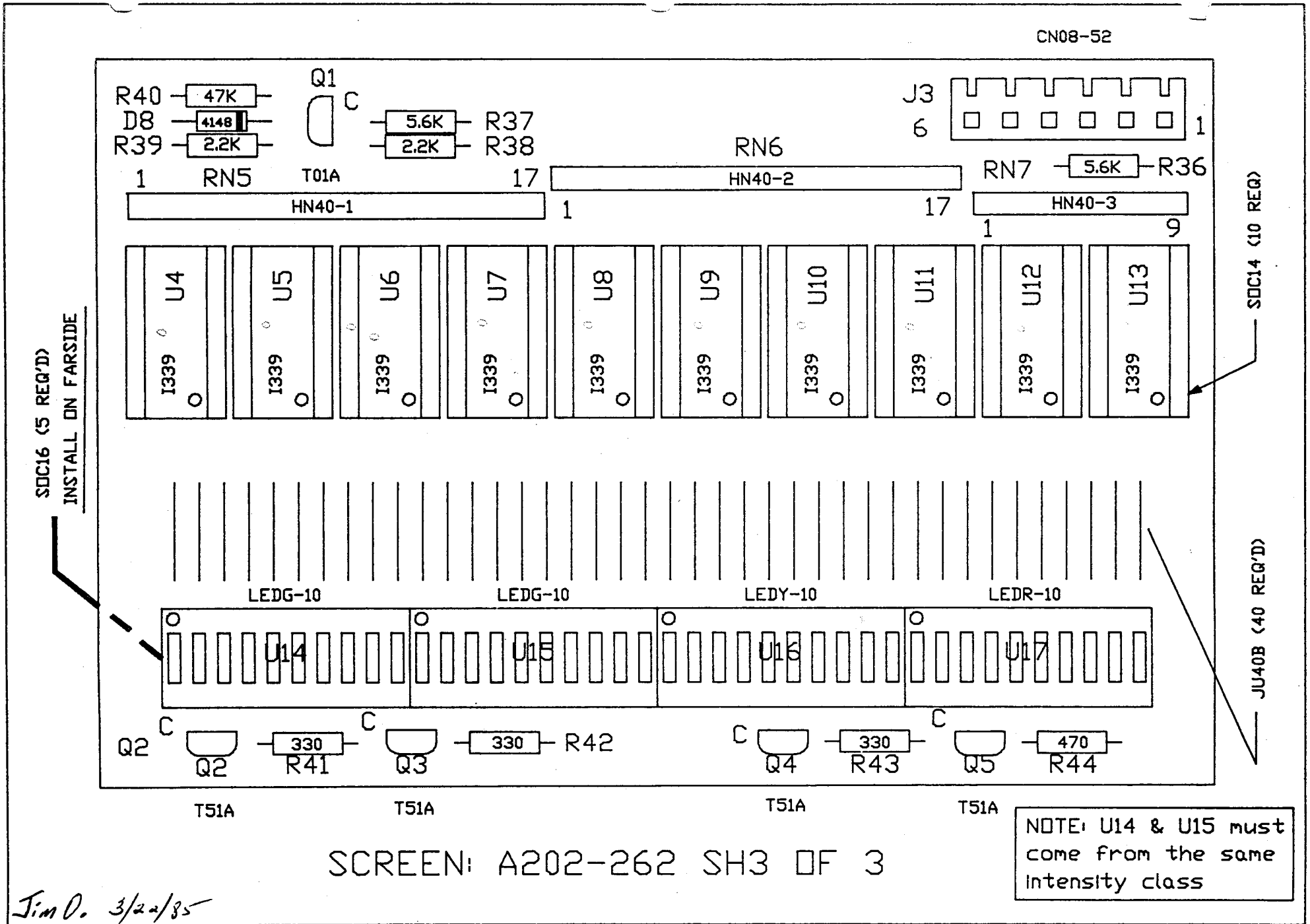


SCREEN: A202-261

SHEET 3 OF 3

* R1 AND R35 OMITTED IN STANDARD VERSION

Sound Workshop		
ASSY - PC BOARD HIGH RES CONTROL		
7/28/83	A202-561	B

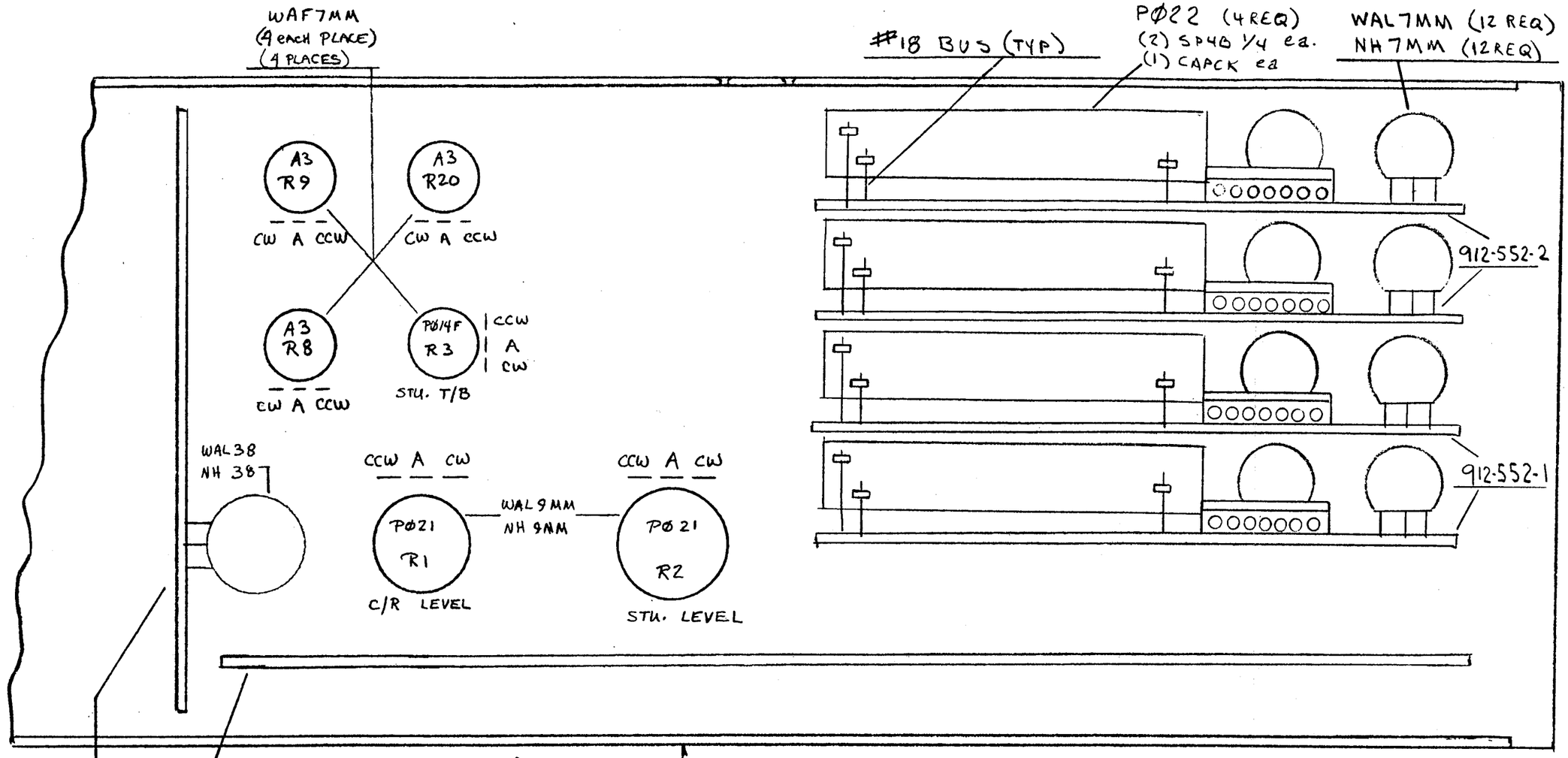


NOTE: U14 & U15 must come from the same intensity class

SCREEN: A202-262 SH3 OF 3

Jim O. 3/22/85

Sound Workshop	PCA - HI RES DISPLAY	A202-562	E

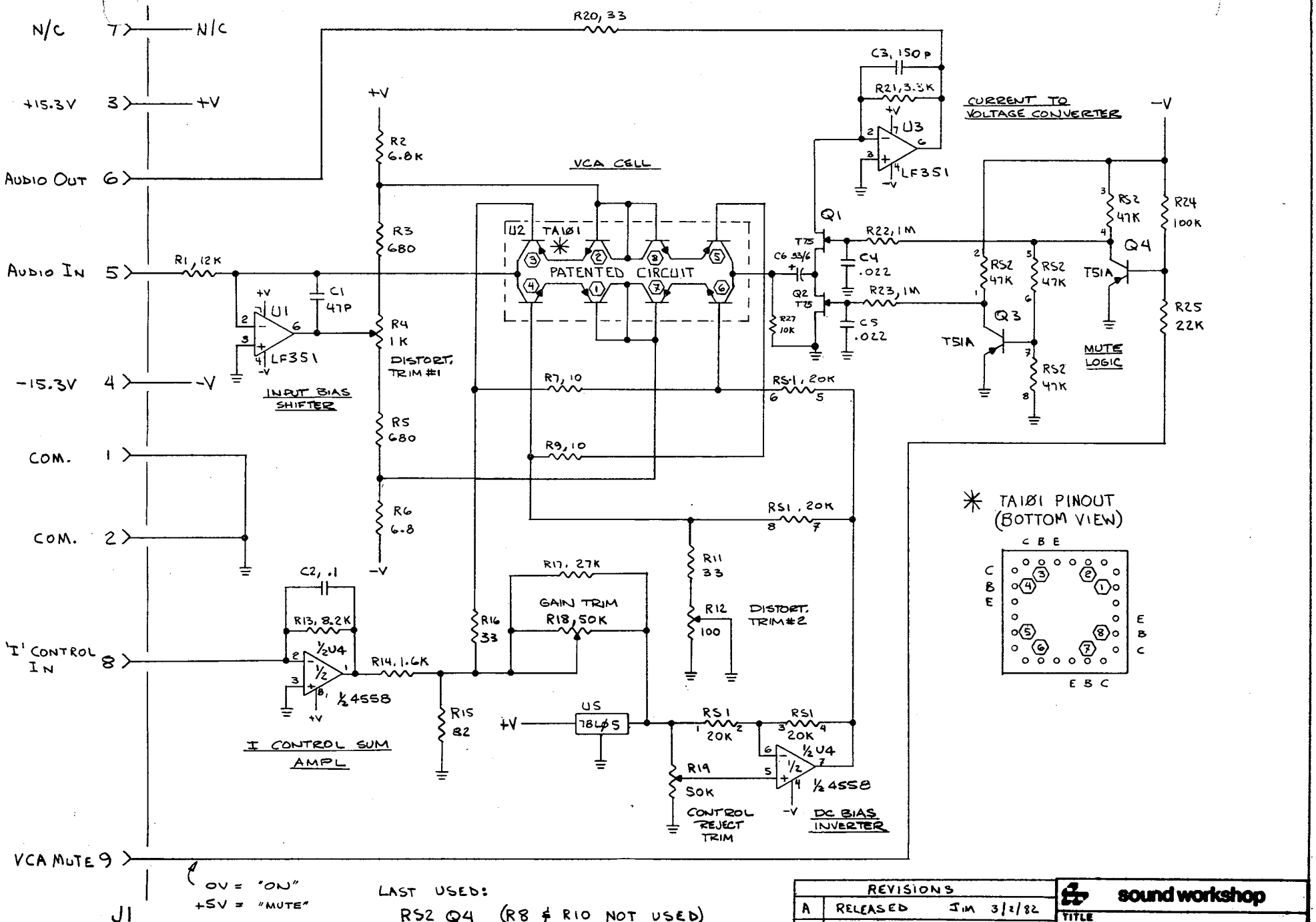


REVISIONS		
A	RELEASED FOR PROD.	8/11/83

sound workshop

TITLE
ASSY SERIES 34
MASTER MODULE

APPROVAL	SIZE	DWG NO.	REV.
DA 8/11/83	B	202-570	A



LAST USED:

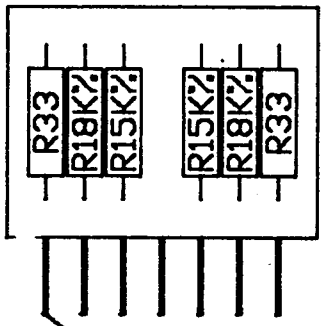
RS2 Q4 (R8 & R10 NOT USED)
R27
C6
U5

REVISIONS		
A	RELEASED	JIM 3/2/82
B	C6 WAS 10/25V	ECN #71 JIM 8/17/82
C	ADDED R27 10K	JR 9/26/83

sound workshop

TITLE: SCHEMATIC, VCA ASSY TA101

APPROVAL	SIZE	DWG NO.	REV.
J.R.O. 1/25/82	C	203-183	C

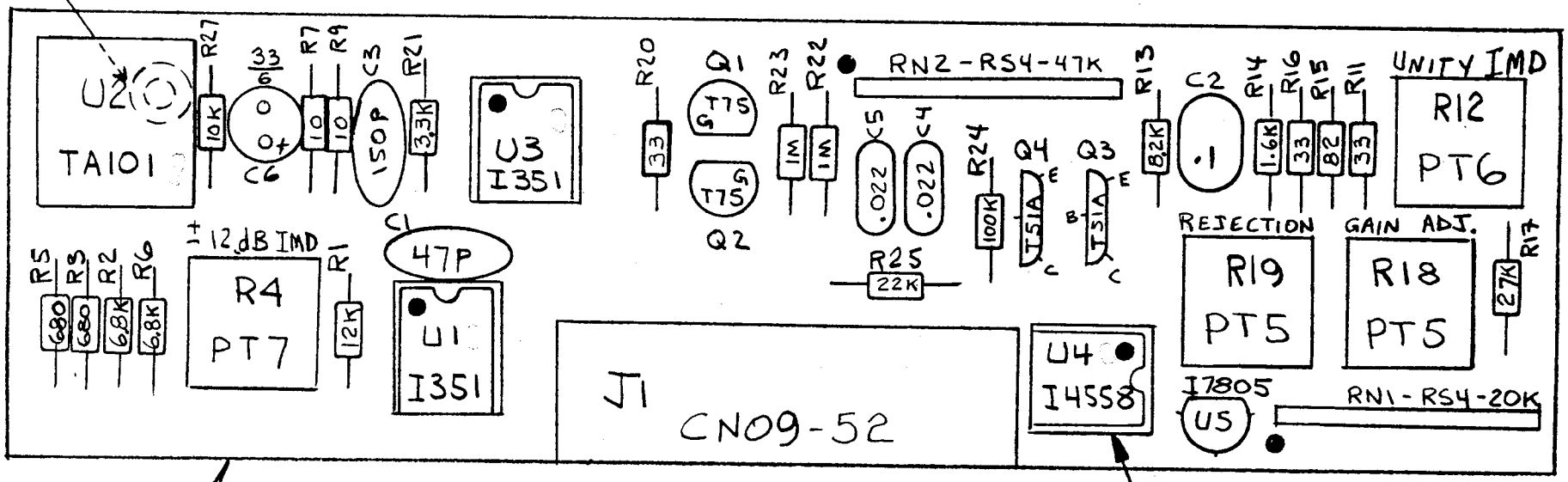


EXTENDED ENDS OF COMP LEADS

ASSY-PC BOARD, MIC NETWORK

A203-501

SPA3-68 FIBRE WASHER UNDER ARRAY



SOCØ8
(3 REQ.)

PC 203-483

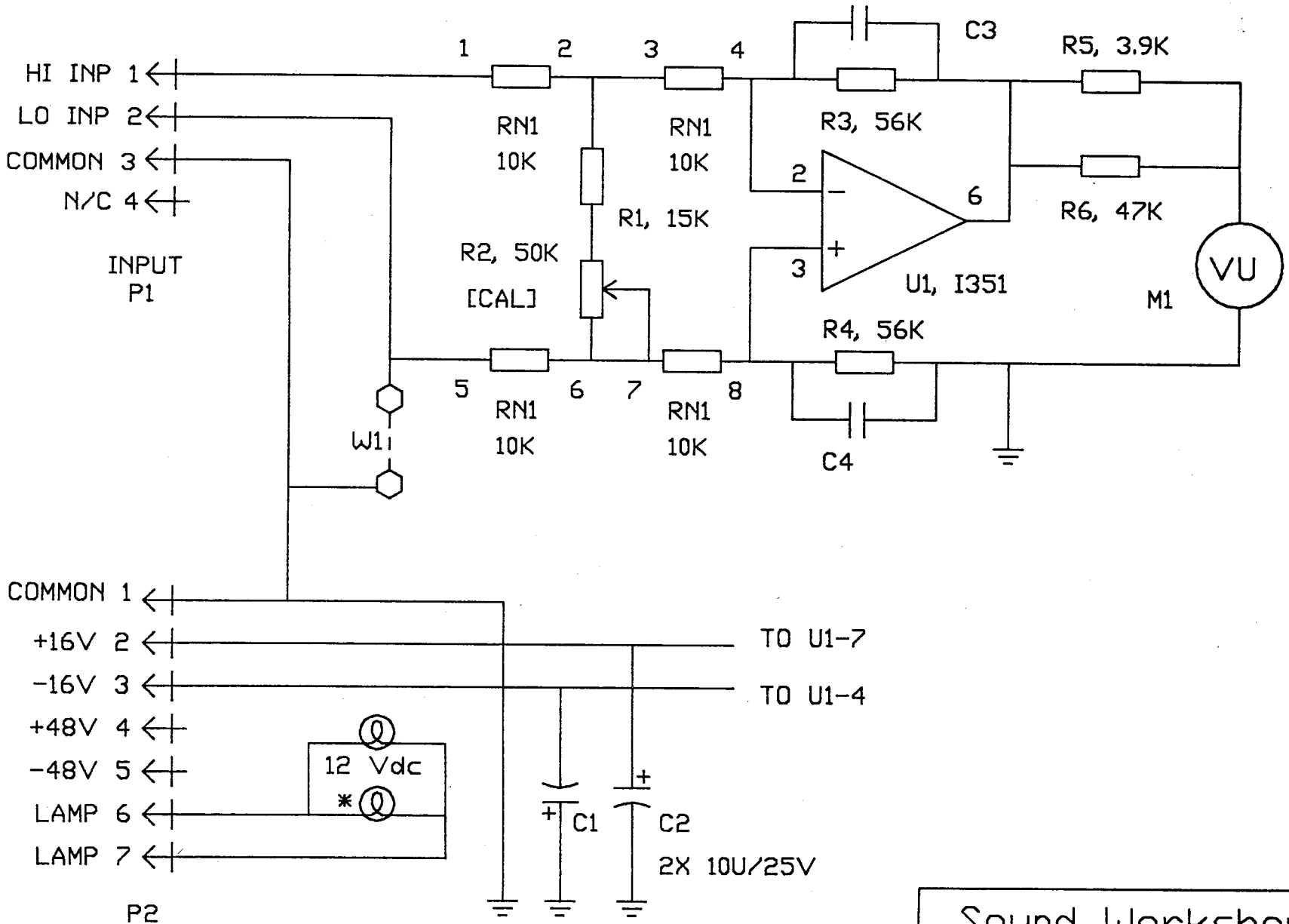
NOTE: RESISTORS ARE ON .4" CENTERS

REVISIONS	
A	RELEASED Jim 0. 3/2/82
B	C6 WAS $\frac{10}{25}$ Jim 8/17/82
C	ADDED R27, 10K Jim 9/26/83
D	ADDED R27 TO ARTWORK. Jim 0. 11/28

sound workshop

TITLE
ASSY, PC-VCA
TA-101

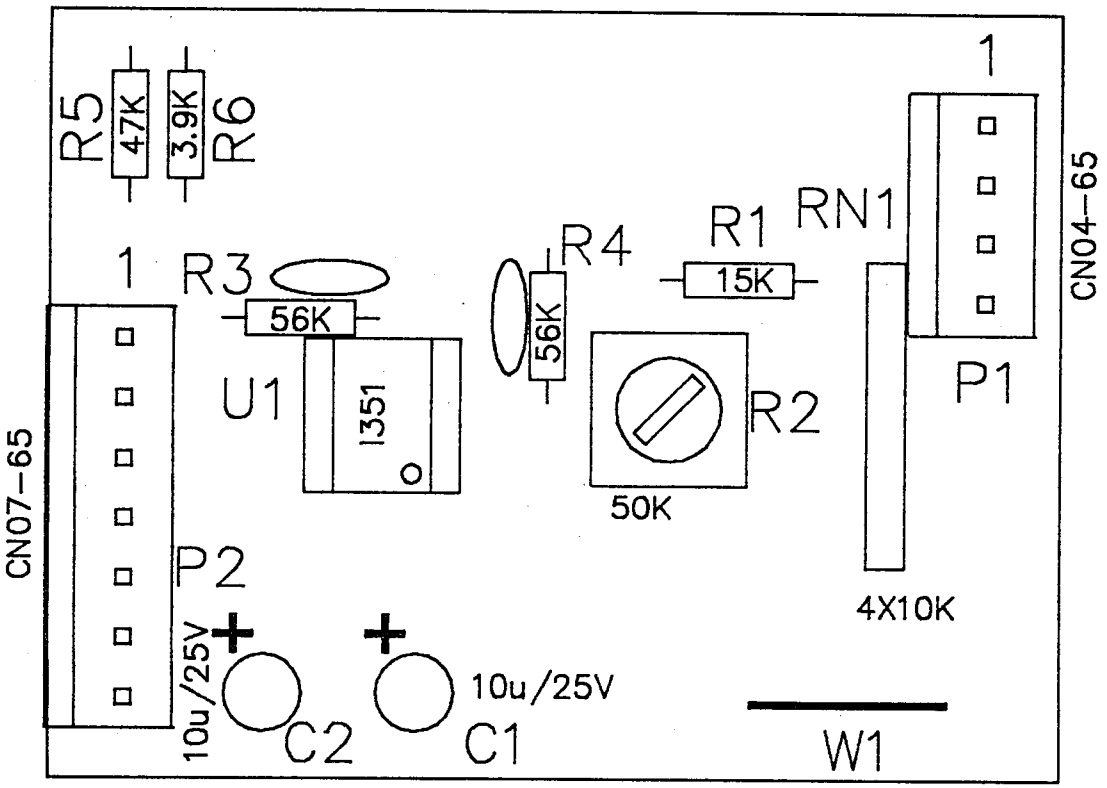
APPROVAL	SIZE	DWG NO.	REV.
JRO 1/29/81	A	203-583	D



* LAMPS LOCATED INSIDE OF METER ASSEMBLY

Sound Workshop		
SCHEMATIC - SINGLE VU METER DRIVER		
Jim O.	A240-160	A

3/22/85

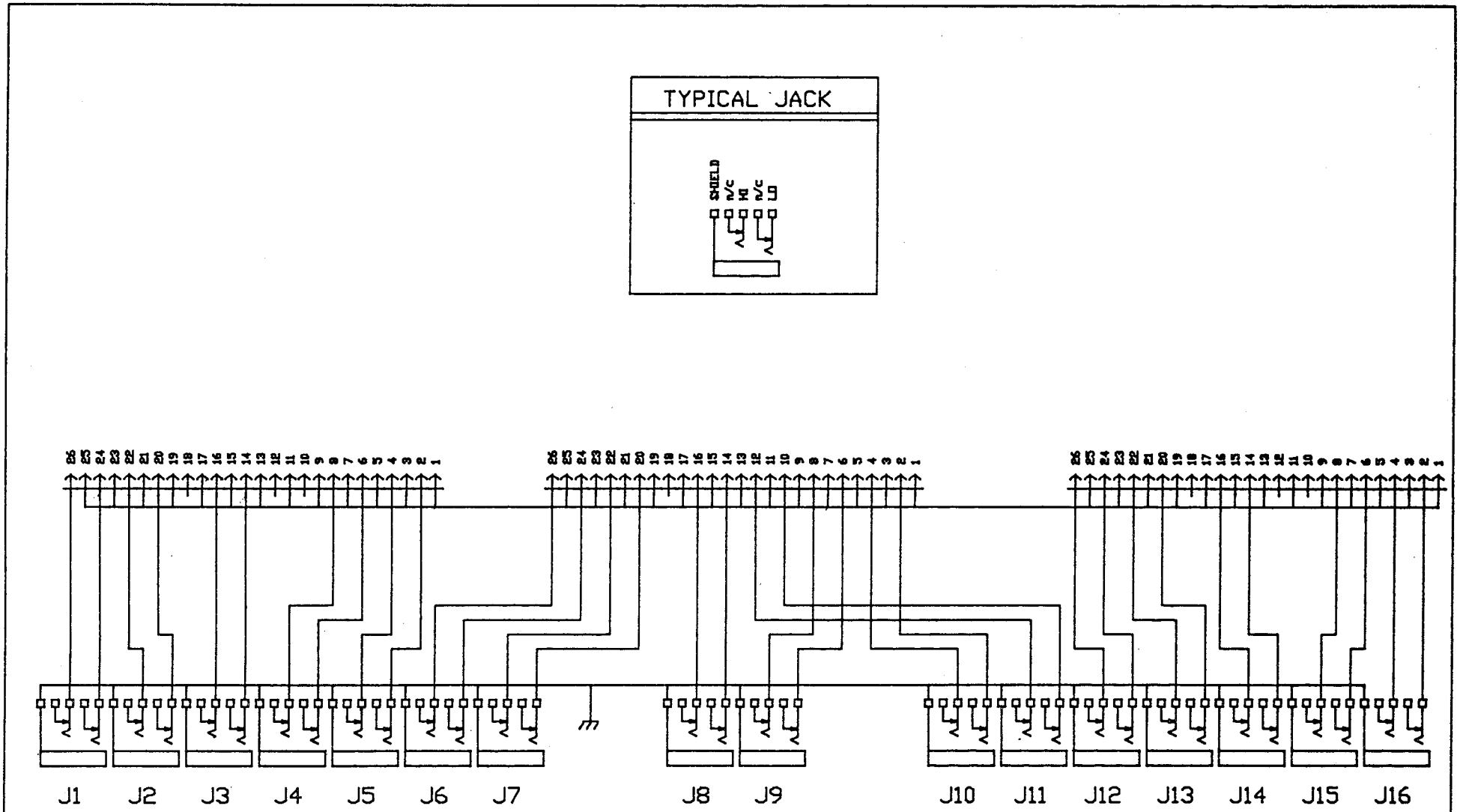


REDUCE TO 2.600" +/-.005"

Sound Workshop		
ASSY,PC-MECH VU DRIVER		
	240-560	A

SCREEN IS 240-260 SHEET 3 OF 3

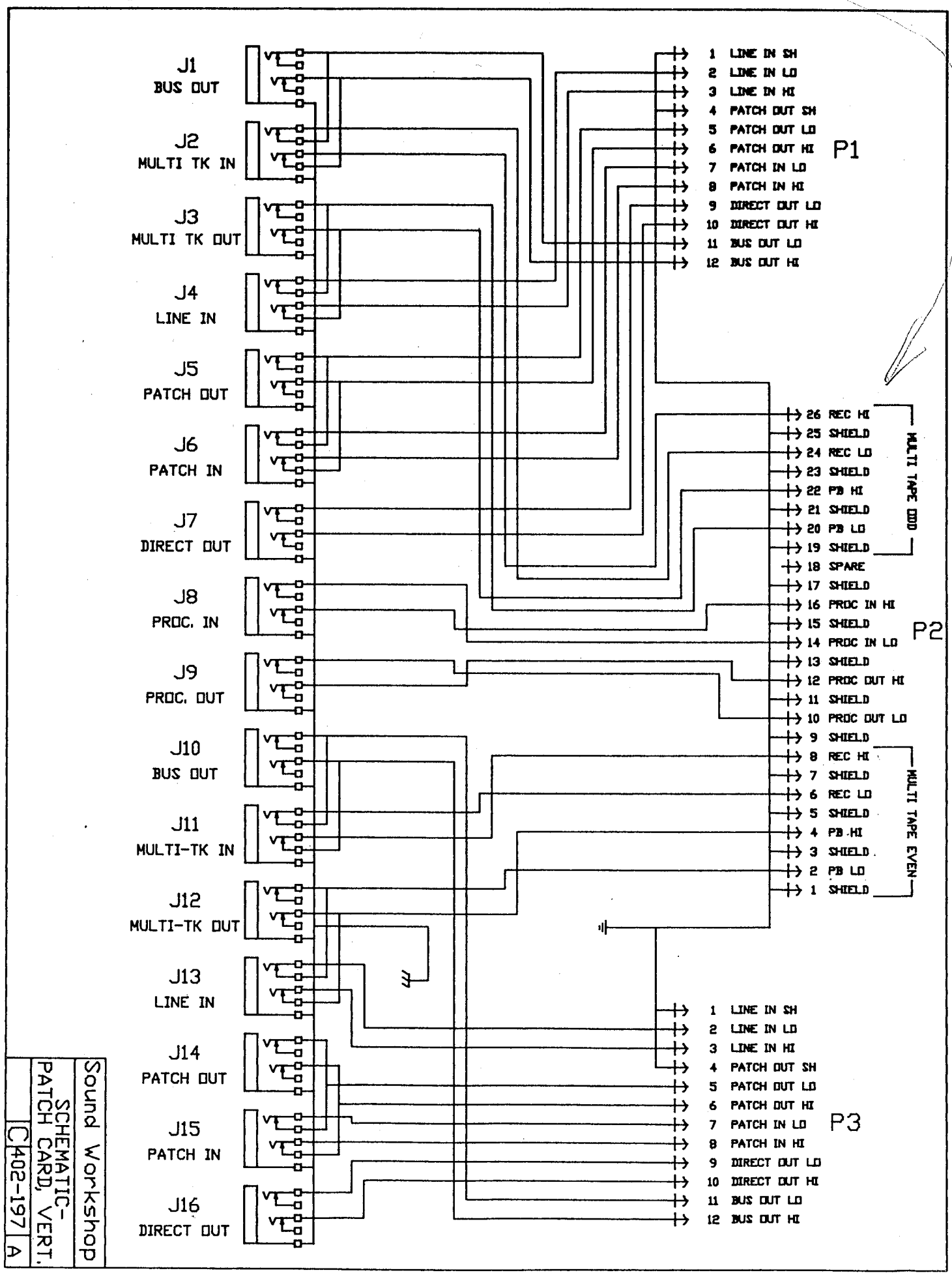
3/20/85

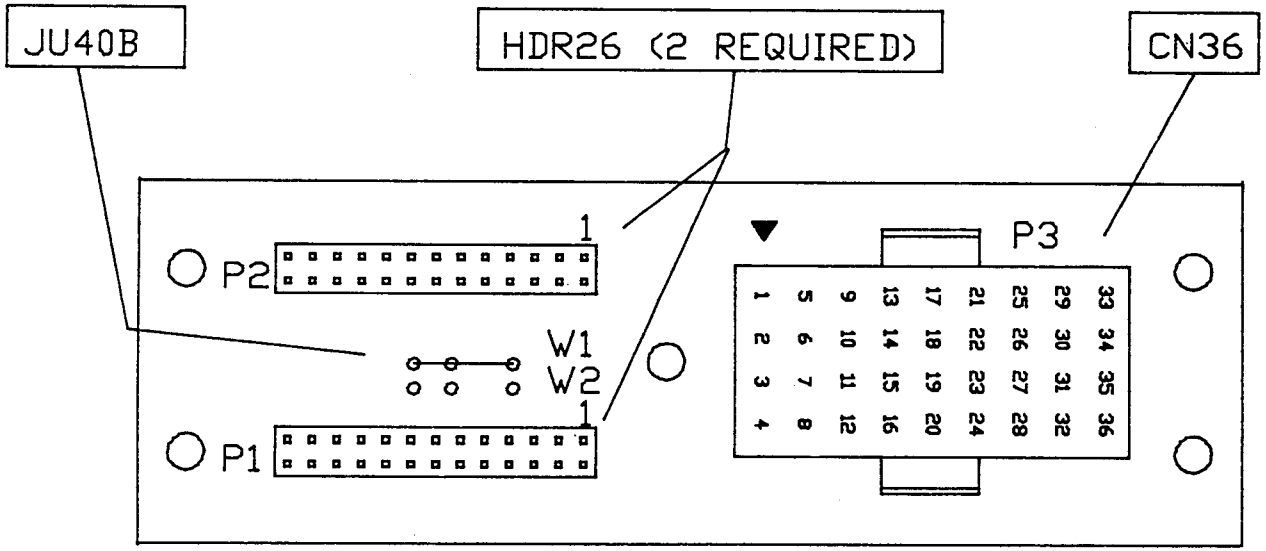


Sound Workshop			
SCHEMATIC- TIE LINE CARD			
	C	402-196	A

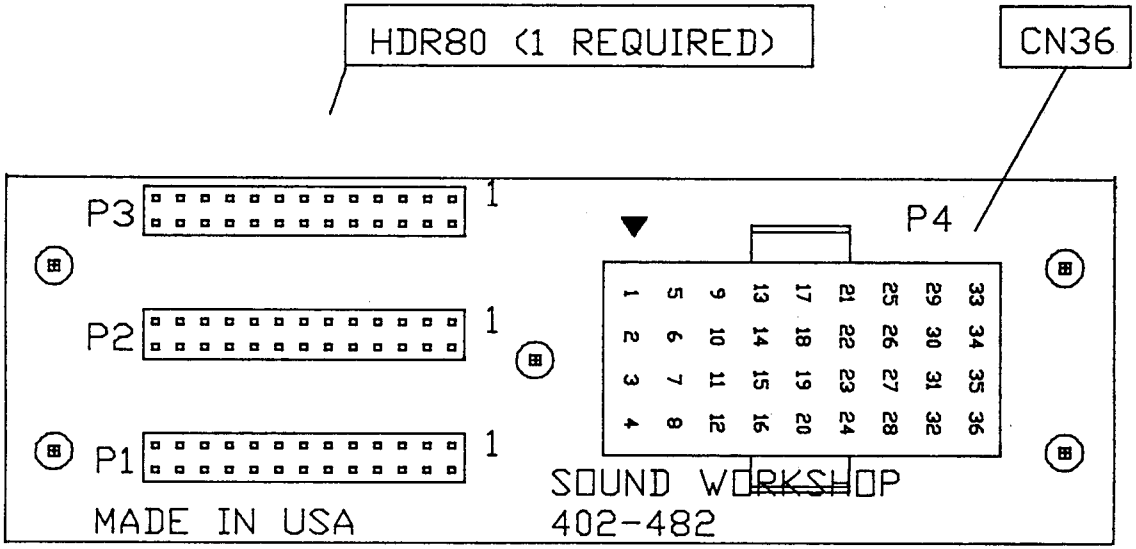
NO GOOD

INCORRECT





Sound Workshop				
ASSY,PC- PATCH I'FACE				
3/22/85	Jim O.	B	402-581	



REDUCE TO 4.000" +/- .005"

A/W 402-282 SHEET 3 OF 3
SCREEN

Sound Workshop		
ASSY,PC- PATCH I'FACE		
	B	402582

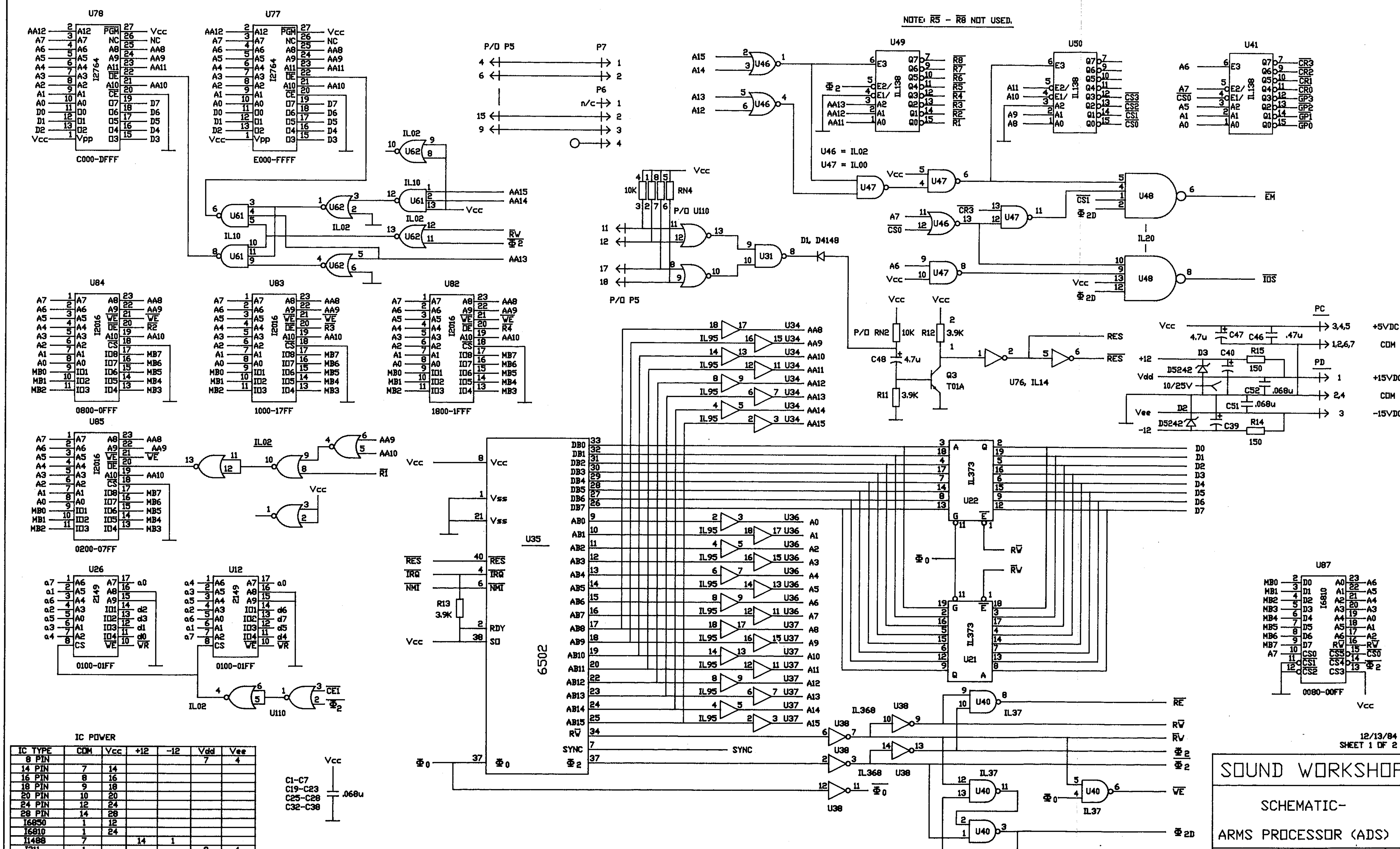
B U42 WAS LS624. CRYSTALS DELETED 5/5/15 JIM O.
REVISIONS

sound workshop

TITLE
SCHEMATIC SHEET 2 OF 2
ARMS PROCESSOR (ADS)

APPROVAL	SIZE	DWG NO.	REV.
Jo Fitzgerald 11/11/89	D	412-101	B

RN1,2,3&4 = R34-10K



IC POWER

IC TYPE	COM	Vcc	+12	−12	Vdd	Vee
8 PIN					7	4
14 PIN	7	14				
16 PIN	8	16				
18 PIN	9	18				
20 PIN	10	20				
24 PIN	12	24				
28 PIN	14	28				
I6850	1	12				
I6810	1	24				
I1488	7		14	1		
I311	1				8	4

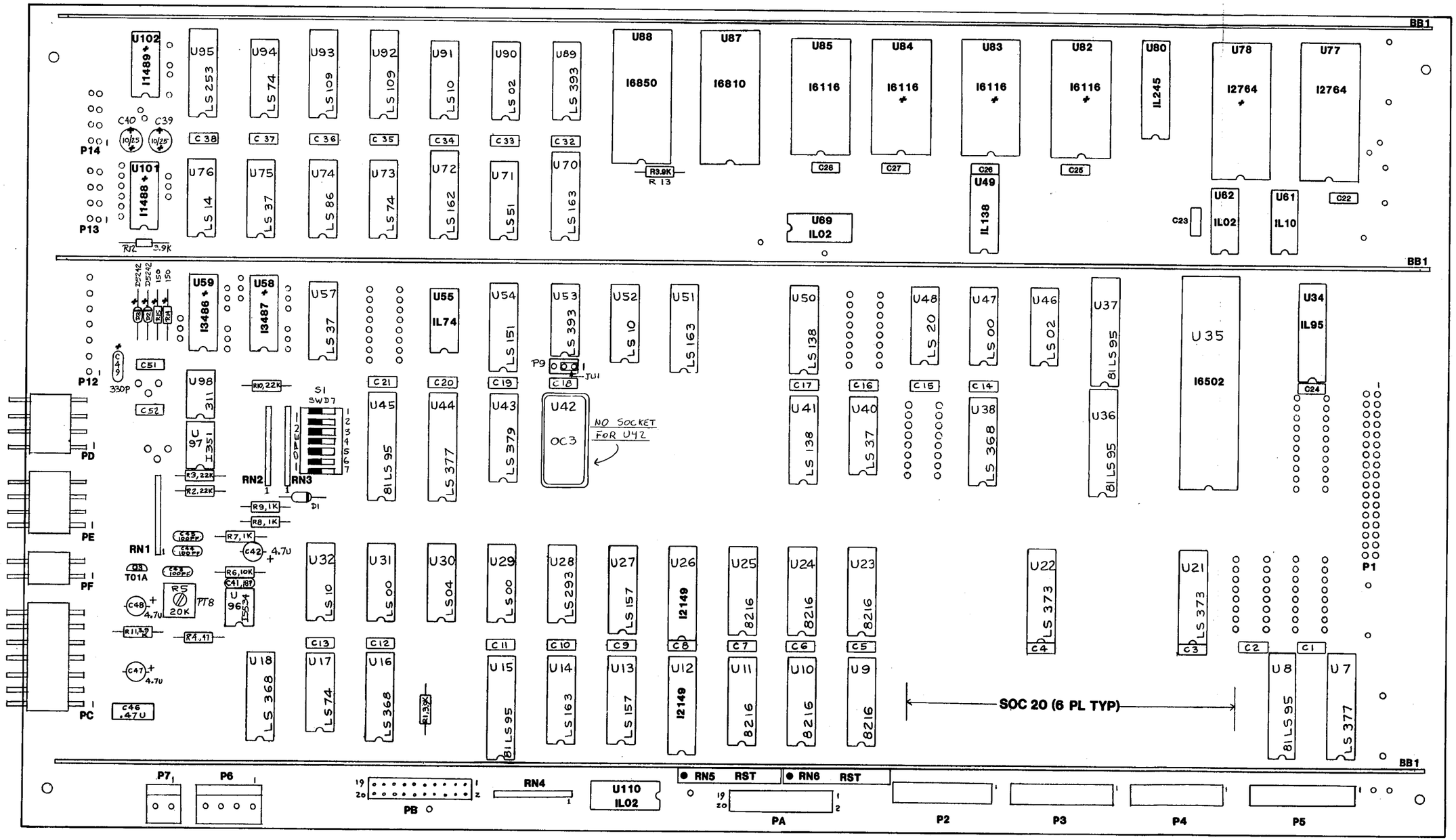
12/13/84
SHEET 1 OF 2

SOUND WORKSHOP

SCHEMATIC-

ARMS PROCESSOR (ADS)

412-101s1 | A



NOTES:

UNLESS NOTED

ALL ICS ARE SOCKETED
* DO NOT INSTALL PART

ALL CAPS. ARE C.068U

PA, PB & P2-P5 ARE EACH 1/3 HDR 60

PC IS CN07-75
PD & PE ARE CN04-75
PF IS CN02-75
PC-PF ARE SET .062" ABOVE P.C.

ALL DIODES D4148
ALL RNS ARE RS4-10K

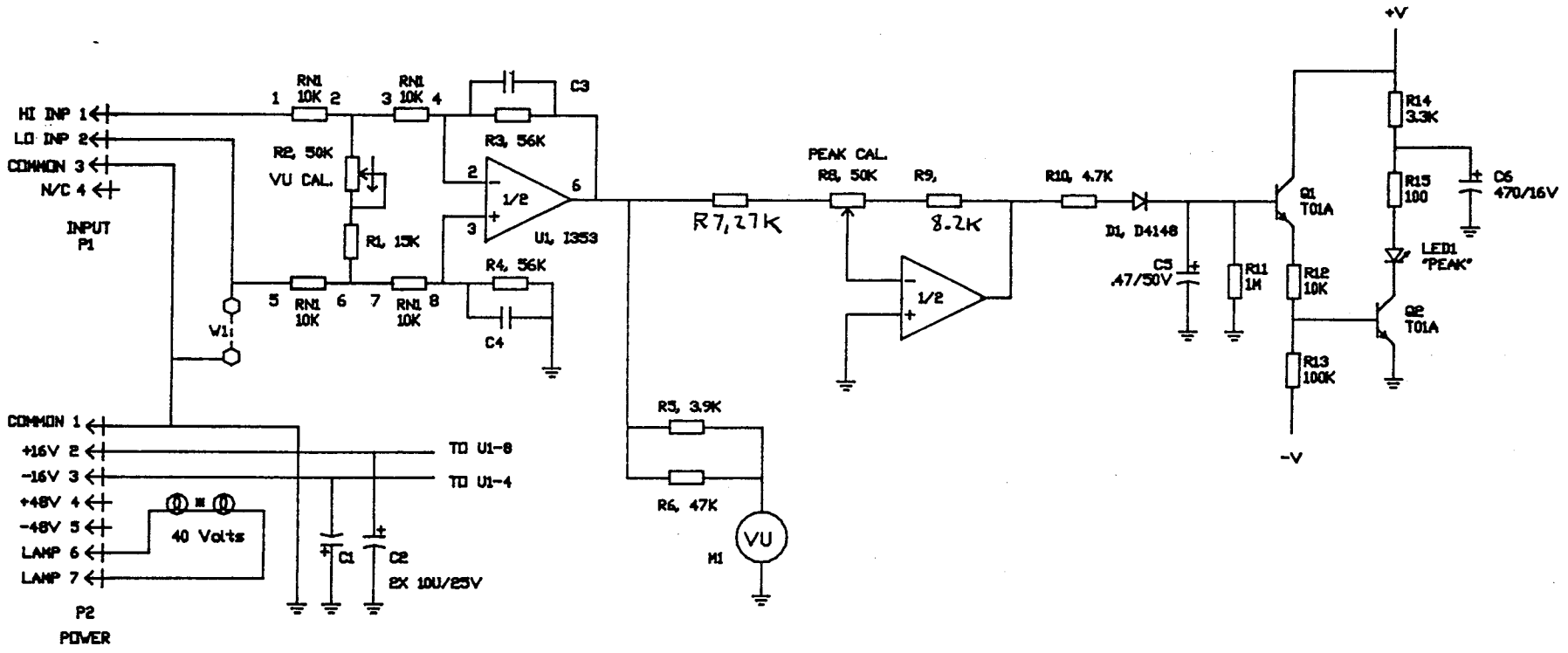
REV.	DESCRIPTION	DATE
D		
C		
B	U42 WAS LS374 CRYSTALS RELEASED S/N 0.	5/6/85
A	RELEASED S/N 0.	12/17/84

SOUND WORKSHOP INC

ASSY. P.C. BOARD
PROCESSOR
ARMS DOUBLE SPEED

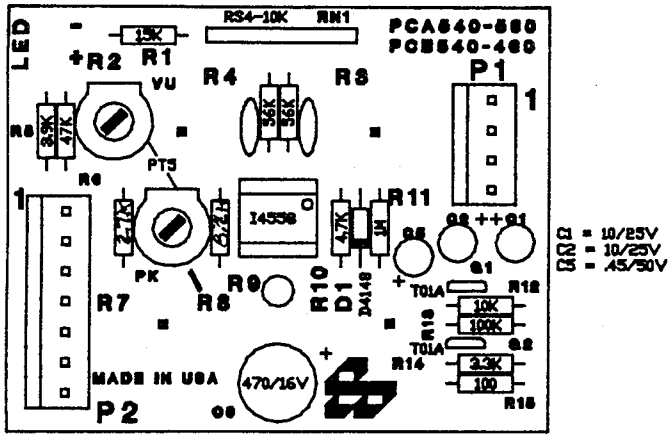
D | 412-501 | B

16 NOVEMBER 1984 | 1 OF 1



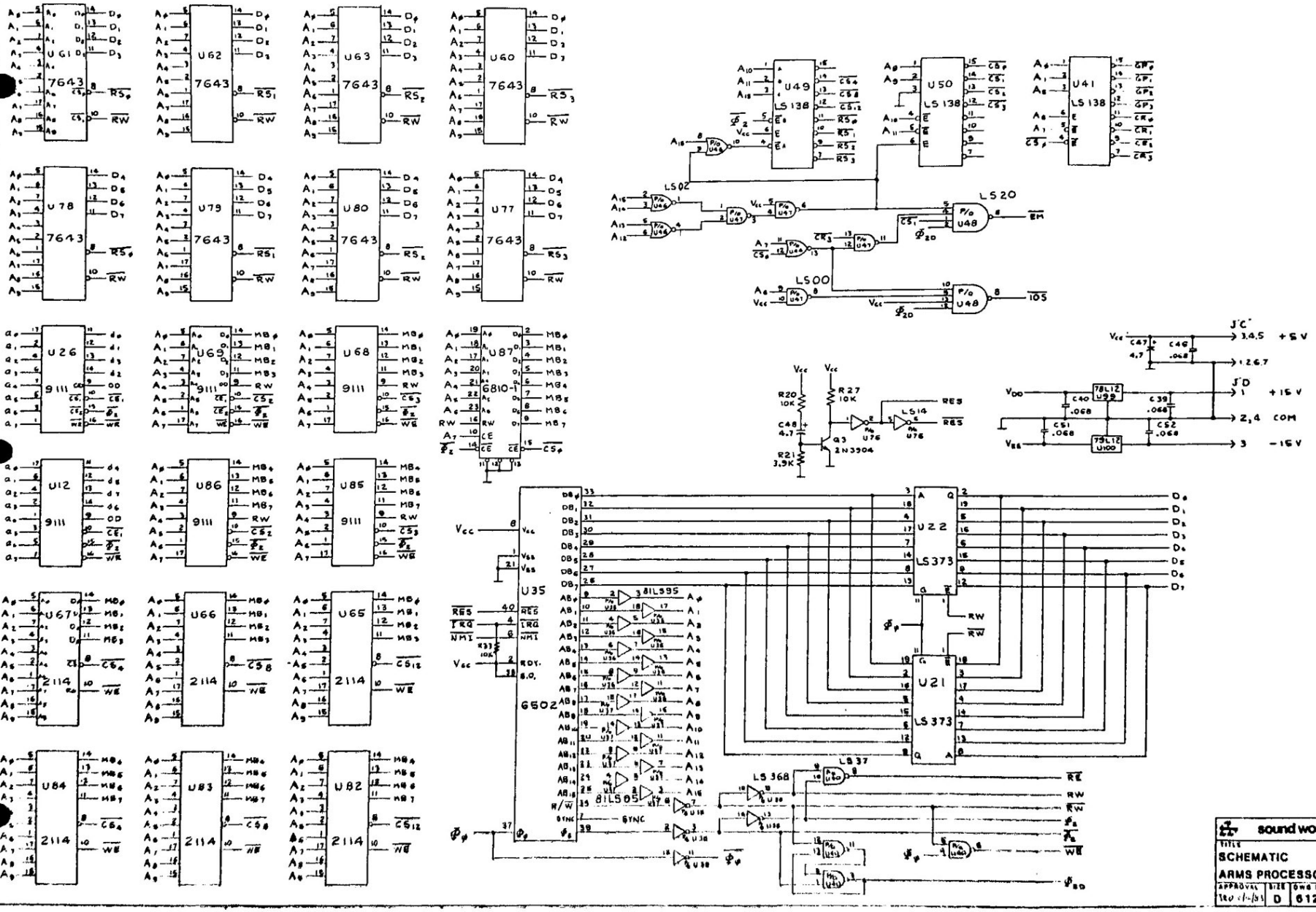
■ LAMPS LOCATED INSIDE OF METER ASSEMBLY

Sound Workshop	
SCHEMATIC-VU DRVR W/PEAK LED	
	540-160



REDUCE TO 4.000" +/-.005"

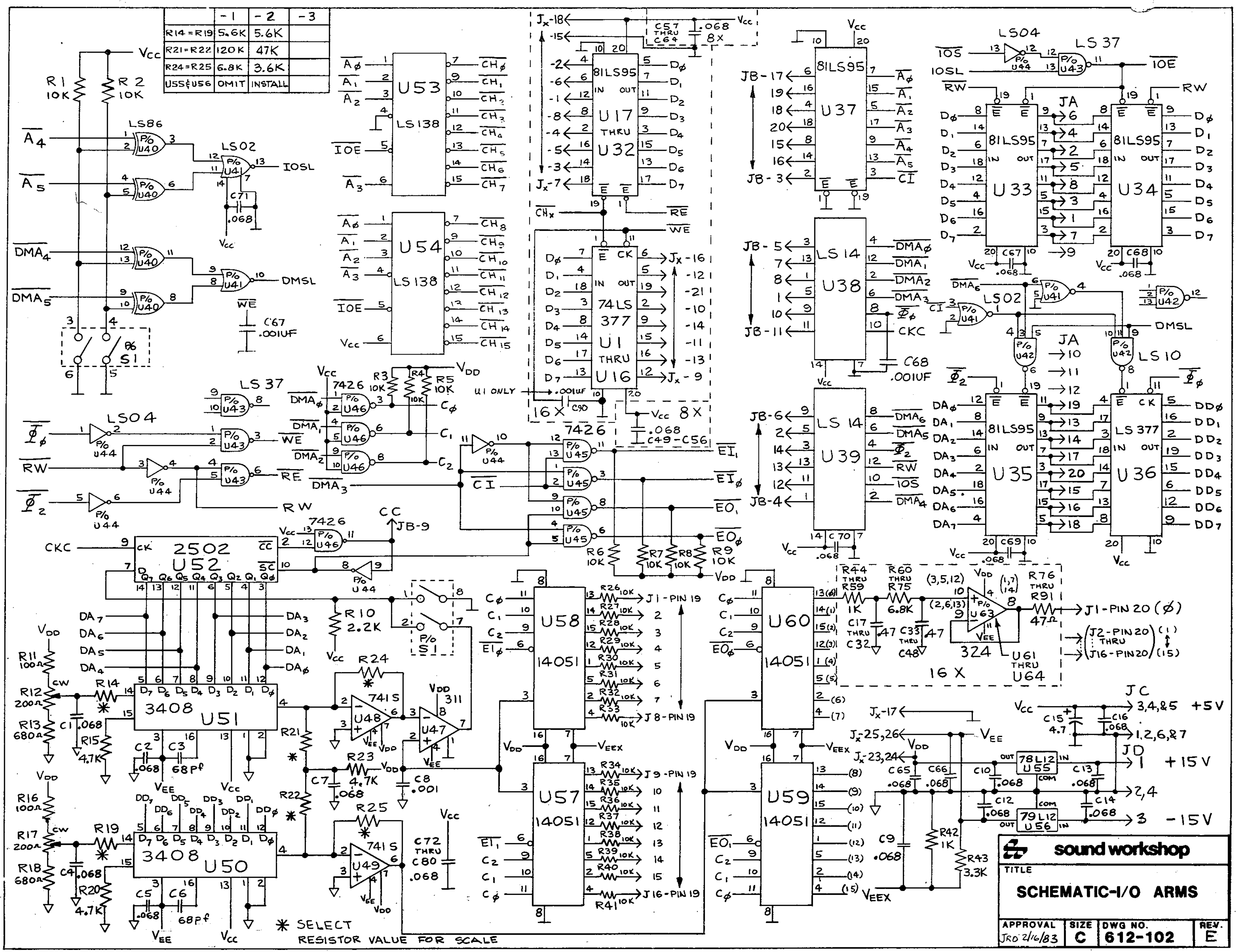
Sound Workshop	
ASSY,PC-VU DRVR W/PEAK LED	
	540-560



sound workshop				
TITLE: SCHEMATIC ARMS PROCESSOR			SHEET 1 OF 2	
APPROVAL	SIZE	DWG NO	REV	
	D	612-101	A	

TITLE	SCHEMATIC ARMS PROCESSOR	SHEET 2 OF 2	
APPROVAL	SIZE	DWG NO.	REV.
JRO 2/14/83	D	612-101	A

sound workshop

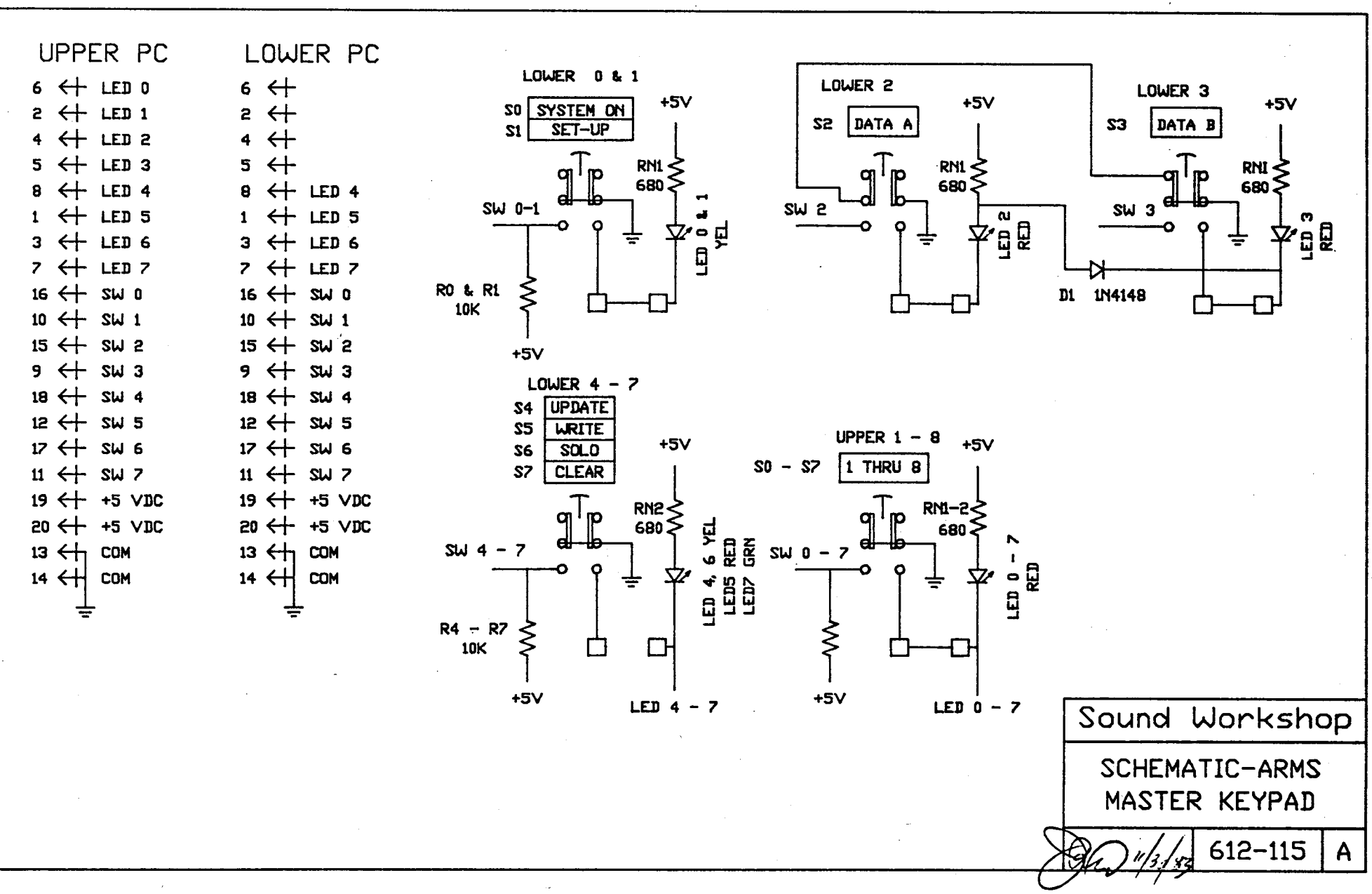


	-1	-2	-3
R14=R19	5.6K	5.6K	
R21=R22	120K	47K	
R24=R25	6.8K	3.6K	
U55&U56	OMIT	INSTALL	

sound workshop

TITLE: SCHEMATIC-I/O ARMS

APPROVAL	SIZE	DWG NO.	REV.
JRO 2/16/83	C	612-102	E


UPPER PC
6 LED 0
2 LED 1
4 LED 2
5 LED 3
8 LED 4
1 LED 5
3 LED 6
7 LED 7
16 SW 0
10 SW 1
15 SW 2
9 SW 3
18 SW 4
12 SW 5
17 SW 6
11 SW 7
19 +5 VDC
20 +5 VDC
13 COM
14 COM
LOWER PC
6
2
4
5
8 LED 4
1 LED 5
3 LED 6
7 LED 7
16 SW 0
10 SW 1
15 SW 2
9 SW 3
18 SW 4
12 SW 5
17 SW 6
11 SW 7
19 +5 VDC
20 +5 VDC
13 COM
14 COM
LOWER 0 & 1
S0 SYSTEM ON
S1 SET-UP
+5V
RN1
680
SW 0-1
R0 & R1
10K
+5V
LED 0 & 1
YEL
LOWER 2
S2 DATA A
+5V
RN1
680
SW 2
LED 2
RED
LOWER 3
S3 DATA B
+5V
RN1
680
SW 3
LED 3
RED
D1 1N4148
LOWER 4 - 7
S4 UPDATE
S5 WRITE
S6 SOLO
S7 CLEAR
+5V
RN2
680
SW 4 - 7
R4 - R7
10K
+5V
LED 4, 6 YEL
LED5 RED
LED7 GRN
LED 4 - 7
UPPER 1 - 8
S0 - S7 1 THRU 8
+5V
RN1-2
680
SW 0 - 7
+5V
LED 0 - 7
RED
LED 0 - 7
Sound Workshop
SCHEMATIC-ARMS
MASTER KEYPAD
11/3/93
612-115
A

(-) RCVR

24 PIN SOCKETS (2 REQ)

18 PIN SOCKET (8 PLACES)

.525"

.068 UF ±5%, 100 V (42 PLACES)

40 PIN SOCKET

8.125"

7.25"

.35"

.225"

.136 D. HOLE (4 PLACES)

J1 (NOT INSTALLED)

U35 6502

U88 6850

U87 6810

XTAL

J14: AUX. IN., SHUNT, (+)RCVR

J13: (-) XMTR, (+) XMTR, Ø 20mA, -12V

J12

J"D": -15, COM, +15

J"E": GND, LO, #1 — DATA IN

J"F": GND, HI — DATA OUT

J"C": GND, GND, +5, +5, +5, GND, GND — LOGIC 5V @ 2A

J "B"

J "A"

J2 J3 J4 J5

GENERAL PURPOSE PORTS

OUTPUT DATA LEVEL

16 PIN SOCKET (2 PLACES)

8 PIN SOCKET (3 PLACES)

20 PIN HEADER (6 PLACES)

SIP #43 10 R-101-332 (2 PLACES)

S1 OPEN 1 2 3 4 5 6 7

RATE	9600	4800	2400	1200
S1-1	CLOSE	OPEN	CLOSE	OPEN
S1-2	CLOSE	CLOSE	OPEN	OPEN

SCAN	16CH	32CH	48CH	64CH
S1-5	CLOSE	OPEN	CLOSE	OPEN
S1-6	CLOSE	CLOSE	OPEN	OPEN

13.75"

14.2"

SOUND WORKSHOP INC

P.C. BOARD ASS'Y PROCESSOR BOARD ARMS

D | 612-501-1 | C

1-27-77

1 OF 1

B	CHANGED S1-3 TO S1-4 AND S1-4 TO S1-3 ON TABLE	APPR'V.	DATE 2/14/77
C	2/14/83 JMO.		
D	ADDED C90 & C91	11/8/83	

20 PIN HEADER (2 PLACES)

FUSE

FUSE

.350"

MOLEX CONNECTOR #09-65-1041

BUSS BAR (3 PLACES)

26 PIN HEADER (16 PLACES)

7.25"

8.125"

U1 LS377 C90 C49 — U2 LS377 — U3 LS377 C50 — U4 LS377 — U5 LS377 C51 — U6 LS377 — U7 LS377 C52 — U8 LS377 — U9 LS377 C53 — U10 LS377 — U11 LS377 C54 — U12 LS377 — U13 LS377 C55 — U14 LS377 — U15 LS377 C56 — U16 LS377

PIN 2 PIN 1 J"A" PIN 2 PIN 1 J"B" PIN 20

U33 81LS95 — U37 81LS95

PIN 1 N/C, 2 N/C, 3 +15, 4 -15

J1 PIN 26 PIN 2 PIN 1 — J2 J3 J4 J5 J6 J7 J8 J9 J10 J11 J12 J13 J14 J15 J16

C57 C58 C59 C60 C61 C62 C63 C64 C71 C70 C67 C68 C69

U34 81LS95 — U35 81LS95 — U36 LS377

U17 81LS95 — U18 81LS95 — U19 81LS95 — U20 81LS95 — U21 81LS95 — U22 81LS95 — U23 81LS95 — U24 81LS95 — U25 81LS95 — U26 81LS95 — U27 81LS95 — U28 81LS95 — U29 81LS95 — U30 81LS95 — U31 81LS95 — U32 81LS95

R76 R77 4.7K — R78 — R79 — R80 — R81 — R82 — R83 — R84 — R85 — R86 — R87 — R88 — R89 — R90 — R91

U4 LS02 — U42 LS10 — U40 LS86 — U43 LS37 — U39 LS14 — U44 LS04 — U38 LS14 C91 .001

C66 C65 C72 C73 C74 C75 C76 C77 C78 C79 C6 68pf C81 C3 68pf C80

U64 324 — U63 324 8x 6.8K — R66 R64 R67 R65 R63 R60 R61 R62 — 8x 1K R50 R48 R51 R49 R47 R44 R45 R46 — U62 324 — U61 324 8x 6.8K — R74 R72 R75 R73 R71 R68 R69 R70 — 8x 1K R58 R56 R59 R57 R55 R52 R53 R54

C37 .47 C38 .47 C21 .47 C19 .47 — C36 .47 C33 .47 C23 .47 C18 .47 — C39 .47 C40 .47 C24 .47 C17 .47 — C35 .47 C34 .47 C22 .47 C20 .47

U60 4051 C9 — U59 4051 — C42 .47 C48 .47 C29 .47 C27 .47 — C45 .47 C44 .47 C31 .47 C26 .47 — C47 .47 C46 .47 C32 .47 C25 .47 — C43 .47 C41 .47 C30 .47 C28 .47

16 x 10K R38 R40 R36 R35 R41 R34 R39 R37 — R30 R32 R28 R27 R33 R26 R31 R29

U57 4051 — U58 4051 — R6 10K R7 10K R9 10K R8 10K — R4 3.3K R2 1K R3 10K R4 10K R5 10K

U45 7426 — U46 7426 — U48 1356 — C8 .001 — U47 311 — R24 R23 4.7K — R100 100Ω

U49 1356 — R22 R21 R25 — C7 — S1 1 2 3 4 — R16 2.2K R15 100 R2 10K R1 10K

C5 — U50 3408 — C4 — R16 680 — R17 200Ω

C2 — U51 3408 — C1 — R11 680 — R12 200Ω

U52 2502 — U53 LS138 — U54 LS138

J"C" PIN 1 COM, 2 COM, 3 +5V @ 1 AMP LOGIC, 4 5 6 COM, 7 COM — C15 4.7uf (TANT.) — C16 C12 C14 — U56 (FUSE)

MOLEX CONNECTOR #09-65-1071

J"D" PIN 1 +15, 2 COM, 3 -15, 4 COM — C10 C13 — U55 (FUSE)

MOLEX CONNECTOR #09-65-1041

.136 DIA. HOLE (4 PLACES)

.525"

.225

13.750"

14.200"

NOMEX INSULATOR .350" x 1.400" (7 PLACES)

.068 uf ±5%, 100V (44 PLACES)

16 PIN SOCKET (6 PLACES)

8 PIN SOCKET (3 PLACES)

NOMEX INSULATOR, .26" x .26" (8 PLACES)

D TO A CALIBRATION

A TO D CALIBRATION

14 PIN SOCKET (4 PLACES)

	A TO D TEST		
	NORM	TEST HI	TEST LO
S1-1	OPEN	OPEN	CLOSED
S1-2	CLOSED	OPEN	OPEN

	1-16	17-32	33-48	49-64
S1-4	OPEN	OPEN	CLOSED	CLOSED
S1-3	OPEN	CLOSED	OPEN	CLOSED

* THESE RESISTOR VALUES ARE SELECTED FOR SCALE.

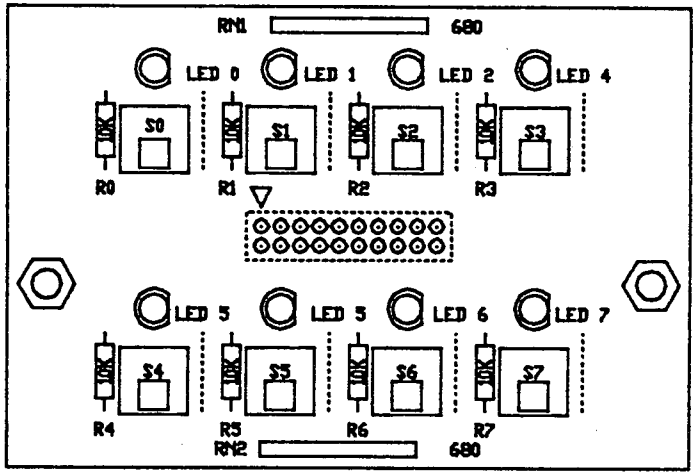
SOUND WORKSHOP INC.

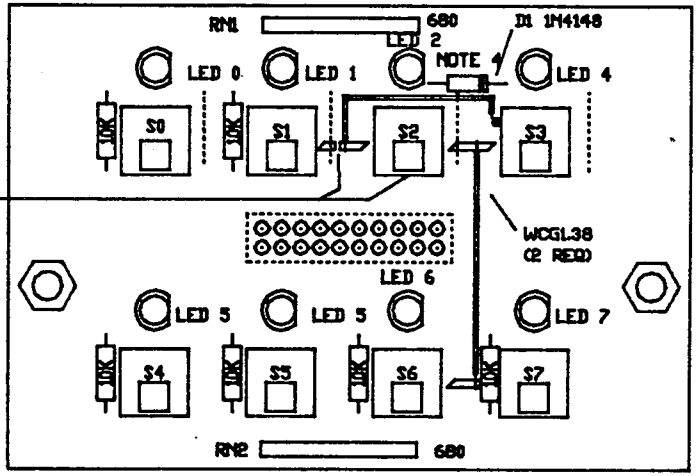
P.C.BD. ASSY., I.O. BRD. ARMS

D | 612-502 | D

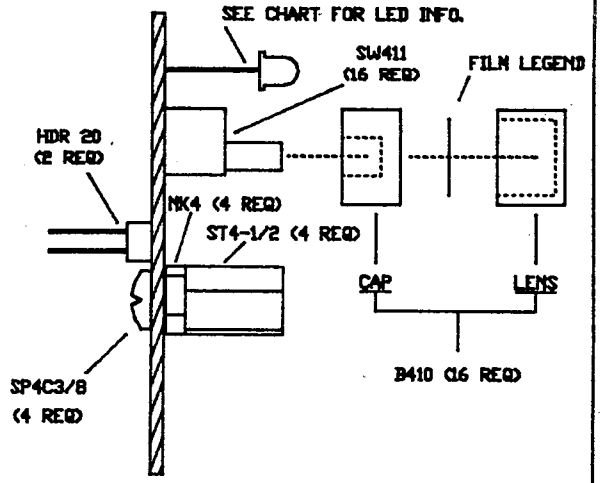
Ray Lapinski | 1-24-77 | 1 of 1

NOTES:
1) ALL RESISTORS 10K
2) ALL JUMPERS JU40B SOLDERED ON REAR OF BOARD
3) LEDS TO PROTRUDE 3/8" BEYOND PANEL FACE.
4) S4 THRU 7 ARE MOMENTARY ON LOWER PC BOARD
5) DIODE CONNECTED BETWEEN LED 2 ANODE AND LED 3 CATHODE





CUT TRACE AS SHOWN AND BETWEEN CENTER CONTACTS (ARMS) OF S2



LEGEND CHART				
SW#	UPPER	LED	LOWER	LED
S0	1	RED	SYSTEN ON	YEL
S1	2	RED	SET-UP	YEL
S2	3	RED	DATA A	RED
S3	4	RED	DATA B	RED
S4	5	RED	UPDATE	YEL
S5	6	RED	WRITE	RED
S6	7	RED	SOLO	YEL
S7	8	RED	CLEAR	GRN

Sound Workshop

ASSY,PC-ARMS
MASTER KEYBOARD

612-515

MATES WITH: 902-154 J1 (202-154)

MATES WITH 902-154 J2 (202-154)

P7 P8

-SOLO AUD. / C/R MUTE / SOLO MUTE / STUDIO MUTE / TAPE 2 L / TAPE 2 R / TAPE 1 L / TAPE 1 R / MIX OUT L* / MIX OUT R* / COM. / MONO SW. / +48V PHAN. / SPARE / SLATE AUD. / RTN ACA OUT L / RTN ACA OUT R / CUE 1 OUT / CUE 2 OUT / ECHO 1 OUT / ECHO 2 OUT / +V / COM. / -V / MIC / SPARE / SPARE / SPARE / MIX ECHO L / MIX ECHO R

SOLO LEVEL P10

SLATE AUD. 3 (B-3) (C22)

COM. 6 / +V 7 / -V 8 — C39, 100/16 — C40, 100/16

TEST OSC. OUT 9 (4-10)

+V -V

P9

STUDIO T/B AUD. 1

CUE T/B AUD. 2 (14AB-4)

MIC 3 (8-13)

SOLO LOGIC 6 (12-8)

SOLO MUTE 7

STUDIO MUTE 8

C/R MUTE 9

FROM SWITCH MODULE D902-154 (P2) (202-154) J2

C/R MASTER R1 10K "R" — R2 10K "F" — R3 10K STUDIO T/B

STUDIO MASTER R1 10K "R" — R2 10K "F" — R3 10K STUDIO T/B

P11

C/R BOOSTERS

R91, 50K R11, 35K — BTO A1 B007-141 — N/C — (1-6) (1-5) LEFT

R7, 82K — R8, 82K — R6, 470K — R5, 470K — R9, 82K — R10, 82K

-15.3V — R1 5.1K — R2 10K — R3 270K — R4 470K — Q1 TS1A — C1 .047 — C2 .047

Q2, T75 Q3, T75 Q4, T75 Q5, T75 RIGHT

(7-12)

BTO A2 B007-141 — N/C — (2-6) (2-5)

R92, 50K R12, 35K

STUDIO BOOSTERS

R13, 47K R14, 47K R15, 47K R16, 47K — C3 10P R17, 100K — C4 10P R18, 100K — 5532 ½ U11 — C5 33/6 R75, 27 — (3-6) LEFT — R77 47K

C6 33/6 R76, 27 — (4-6) RIGHT — R78 47K

TPZL R95, 10K (CW) — TPZR R94, 10K (CW) — TPIL R95, 10K (CW) — TPIR R96, 10K (CW)

C9 100P — C10 100P — C11 100P — C12, 100P

(3-3) (4-3) (1-3) (2-3)

TO POWER SUP. P18 P21 — COM 1 2 / +16V 3 4 / -16V 5 6 / +48V 7

IN4001 D1 — IN4001 D2 — 100/16 C41

P12

COM. 1 / COM. 2 / +16V / -16V / MIX L / MIX R / SOLO AUD. / SOLO LOGIC (9-6) / ECHO 2 / ECHO 1 / CUE 2 / CUE 1

MIXDOWN FADER J5 P13 — R / L — C42 470P — C43 470P — C21 33/6 — C20

R27, 47K (8-17) — R28, 47K (1-10) — R29, 47K — R30, 47K — R31, 47K (8-18) — R32, 47K (2-10)

C13 10P — R34, 47K — R33, 100 — U3 5534 — R80 47 — MIX LEFT

C14 10P — R36, 47K — R35, 100 — U4 5534 — R81 47 — MIX RIGHT

C15 10P — R38, 82K — R37, 100 — U5 5534 — R86 47 — SOLO — C23 33/6 (10-2) — C48 470

C16 10P — R40, 82K — R39, 100 — U6 5534 — R82 47 — ECHO — C24 33/6 (17-6)

C17 10P — R42, 82K — R41, 100 — U7 5534 — R83 47 — ECHO 1 — C25 33/6 (16-6)

C18 10P — R44, 82K — R43, 100 — U8 5534 — R84 47 — CUE 2 — C26 33/6 (15-6)

R47 47K — R49 82K

C19 10P — R46, 82K — R45, 100 — U9 5534 — R85 47 — CUE 1 — C27 33/6 (14-6)

R48 47K — R50 82K

MIX BOOSTERS

RIGHT — R51, 51K — R97, 50K (CW) — R53, 33K — A3 B007-141 — BTO — R55, 51K — R56, 51K — R — ½ U10 4558 — (7-10)

LEFT — R52, 51K — R98, 50K (CW) — R54, 33K — A4 B007-141 — BTO — R57, 51K — R58, 51K — ½ U10 4558 — (7-9)

V.U. LEVEL SCALERS

RIGHT V.U. C902-155 — P17 — 2 3 4 5 — +V -V

LEFT V.U. C902-155 — P16 — 2 3 4 5 — +V -V

I/O

P4 RIGHT P2

1 / 2 / (R94) 3 TP2 IN / 4 / 5 / (R76) 6 STUDIO / 7 / 8 / 9 / (10-9) 10 TEST OSC / 11 MIX OUT LO / 12 MIX OUT HI

(R96) 3 TP1 IN / (A2-10) 5 C/R LO / (A2-11) 6 C/R HI / 7 / 8 / 9 / (R32) 10 AUX MIX IN / 11 MIX OUT LO / 12 MIX OUT HI

P3 LEFT P1

1 / 2 / (R93) 3 TP2 IN / 4 / 5 / (R75) 6 STUDIO / 7 / 8 / 9 / 10 / 11 MIX OUT LO / 12 MIX OUT HI

(R95) 3 TP1 IN / (A1-10) 5 C/R LO / (A1-11) 6 C/R HI / 7 / 8 / 9 / (R28) 10 AUX MIX IN / 11 MIX OUT LO / 12 MIX OUT HI

P6 RIGHT

1 / 2 / 3 RTN IN 2 / 4 / 5 / 6 CUE 2 OUT / 7 / 8 / 9 / 10 CUE ECHO RTN IN 2 / 11 / 12 ECHO 2 OUT

P5 LEFT

1 / 2 / 3 RTN IN 1 / 4 / 5 / 6 CUE 1 OUT / 7 / 8 / 9 / 10 CUE ECHO RTN IN 1 / 11 / 12 ECHO 1 OUT

(17-4) C35 100P — (15-3) C36 100P — (16-4) C37 100P — (14-3) C38 100P

ECHO RETURN ACAs

RIGHT (8-5) — C7 33/6 — R21, 47K — R23, 51K — R24, 51K — ½ U12 5532 — R19 47K

LEFT (8-4) — C8 33/6 — R22, 47K — R25, 51K — R26, 51K — ½ U12 5532 — R20 47K

P16 P17 P14 P15

B912-152-1 — RTN 1 PAN — 51K CW — 20K — 51K — 20K — RTN LEV. — 10K 10K — SND 1 LEV. — C45 470

B912-152-1 — RTN 2 PAN — 51K CW — 20K — 51K — 20K — RTN 2 LEV. — 10K 10K — SND 2 LEV. — C44, 470

B912-152-2 — CUE 1 T/B — 10K — CUE ECHO RTN 1 — 10K — CUE 1 SND. LEV. — C47 470

B912-152-2 — CUE 2 T/B — 10K — CUE ECHO RTN 2 — 10K — CUE 2 SND LEV. — C46 470P

KEY:

(15 - 3) — CONNECTOR P15 — PIN # 3

POWER DISTRIBUTION			
I.C.	+V	-V	⏚
U3-9	7	4	NC
U1,2,10-12	8	4	NC
A1-4	4	3	2

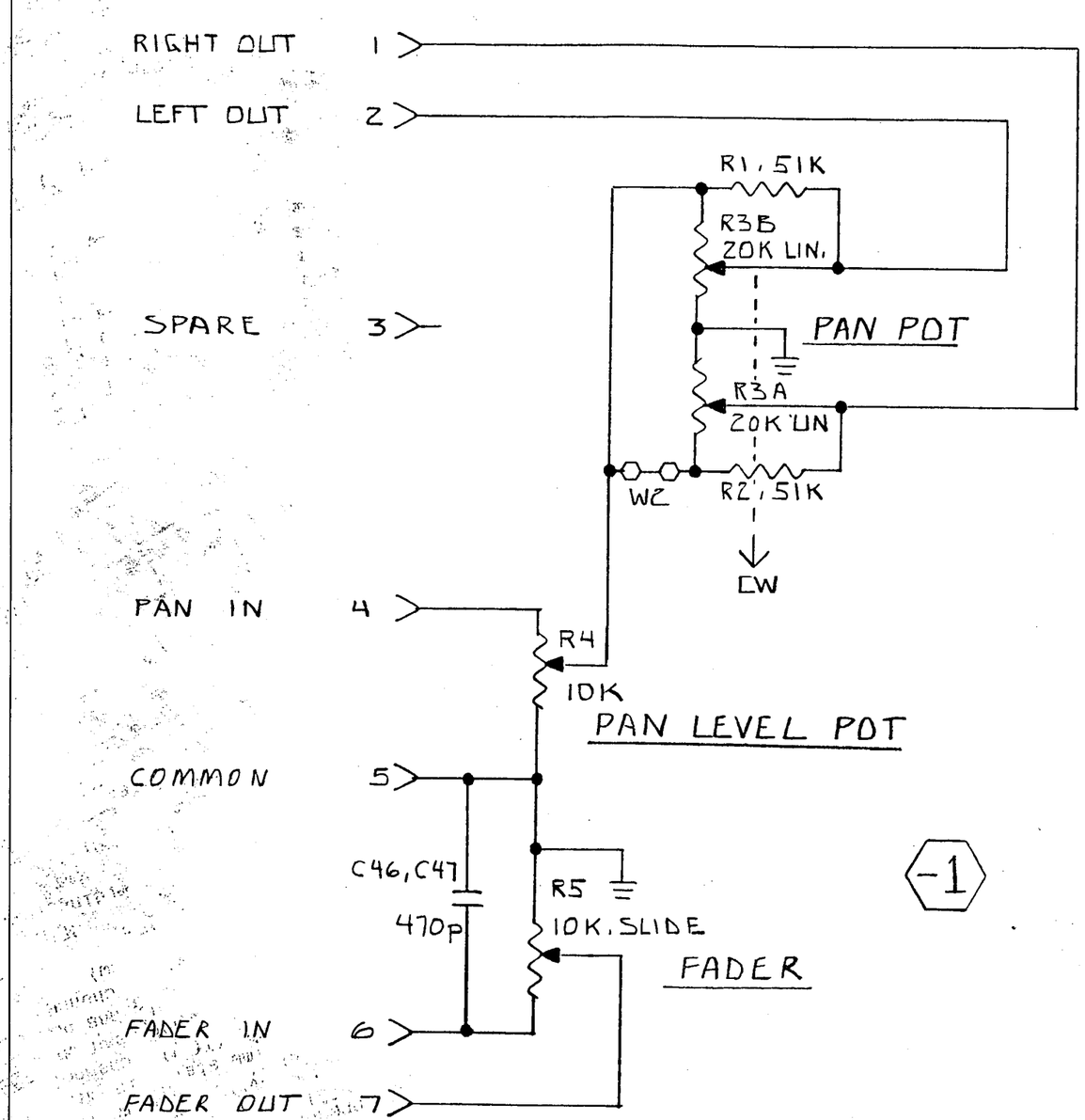
REVISIONS

A	RELEASED JRO	10-19-81
B	ADDED C41	2-16-82
C	R1 WAS 10K, R3 WAS 470K ADDED R8 & R81 DA	ECN #88 6/10/82
D	ECN #143	9/29/83 Jim O.
E	ECN #160	2/6/84 Jim R.
F	R93-96 WERE 50K, R29&30 WERE 82K R56&57 WERE 100K, R34&36 WERE 82K P8-13 & P33 WERE 3 PARTS	11/15/84

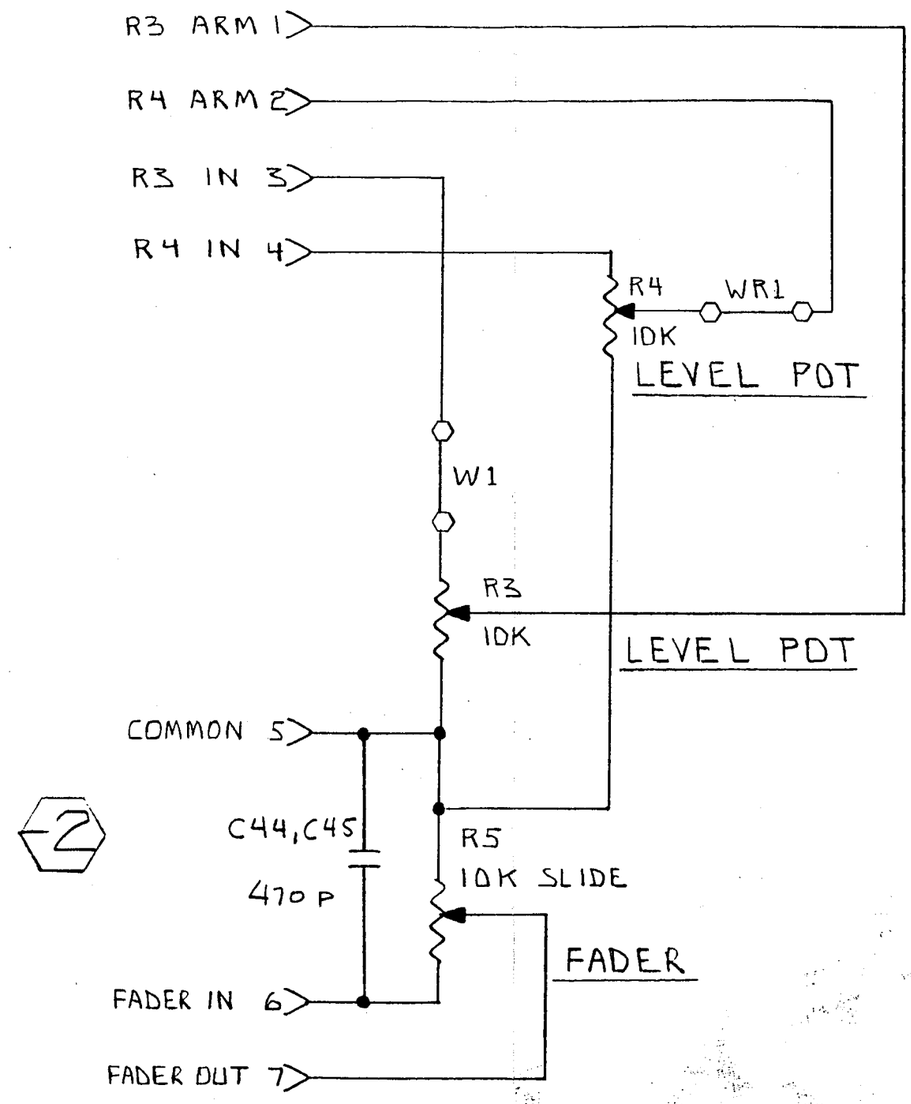
sound workshop

TITLE: SCHEMATIC, MASTER P.C. ASSY SERIES 34

APPROVAL	SIZE	DWG NO.	REV.
JRO 7-25-81	D	912-151	F



-1



-2

REVISIONS		
A	RELEASED	10-19-1
B	ECN 161	

8-10-81 JRO

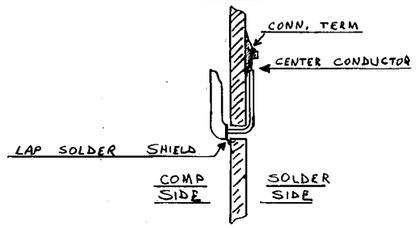
sound workshop

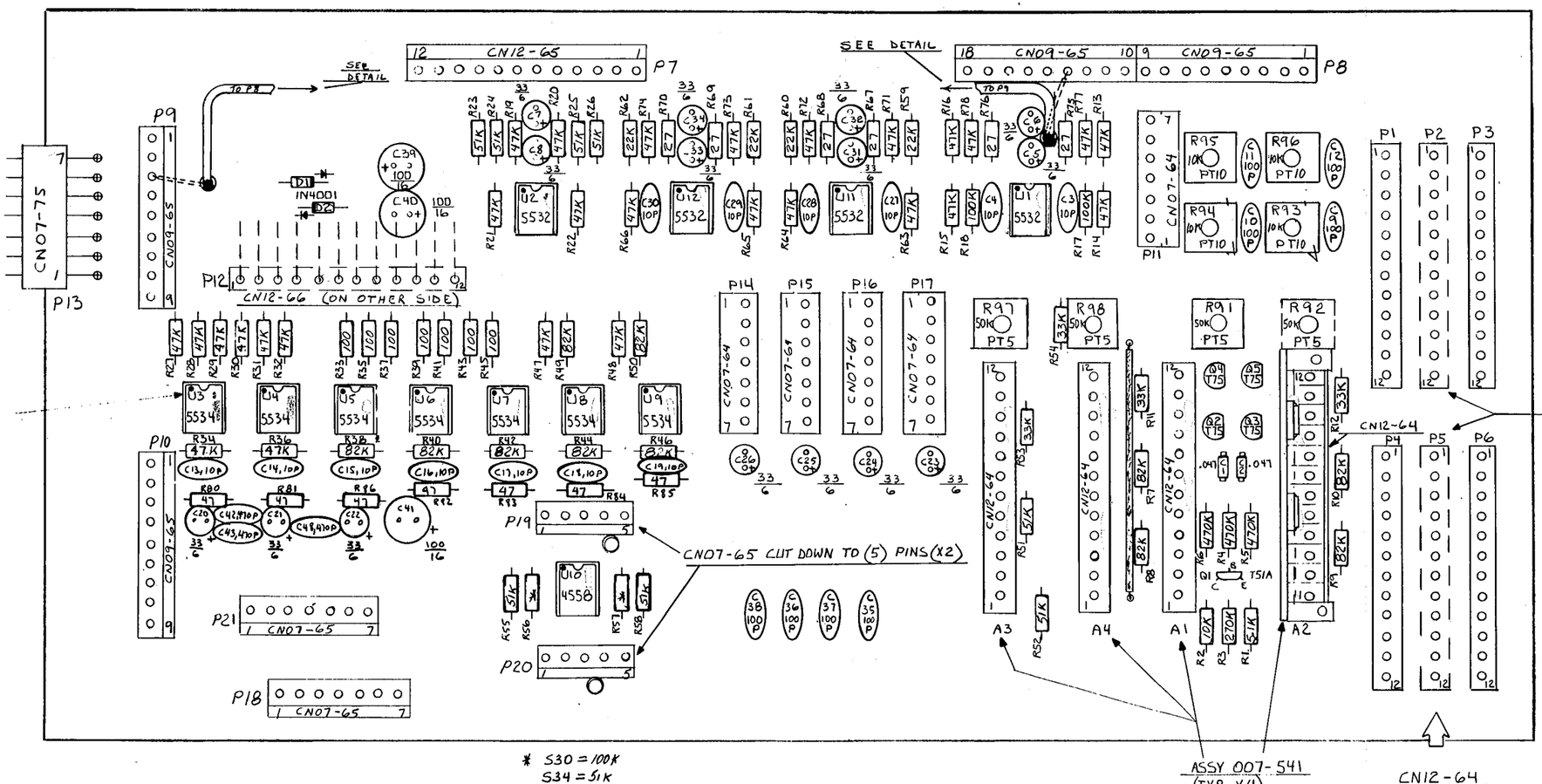
TITLE
SCHEMATIC,
POT BOARD, SERIES 30/34

APPROVAL	SIZE	DWG NO.	REV.
	B	912-152 -½	B

	REVISIONS	
A	RELEASED	10/19/81 Jim
B	ADDED C41	2/10/82 JIM
C	ADDED R80 & R81	6/10/82 DA ECN 58
D	CHANGED LOC. & VALUE R95-96	11/2/83 Jim
E	SEE ECN # 161	2/2/84 Jim
F	R29,30,34 & 36 WERE 82K	11/15/84

DETAIL





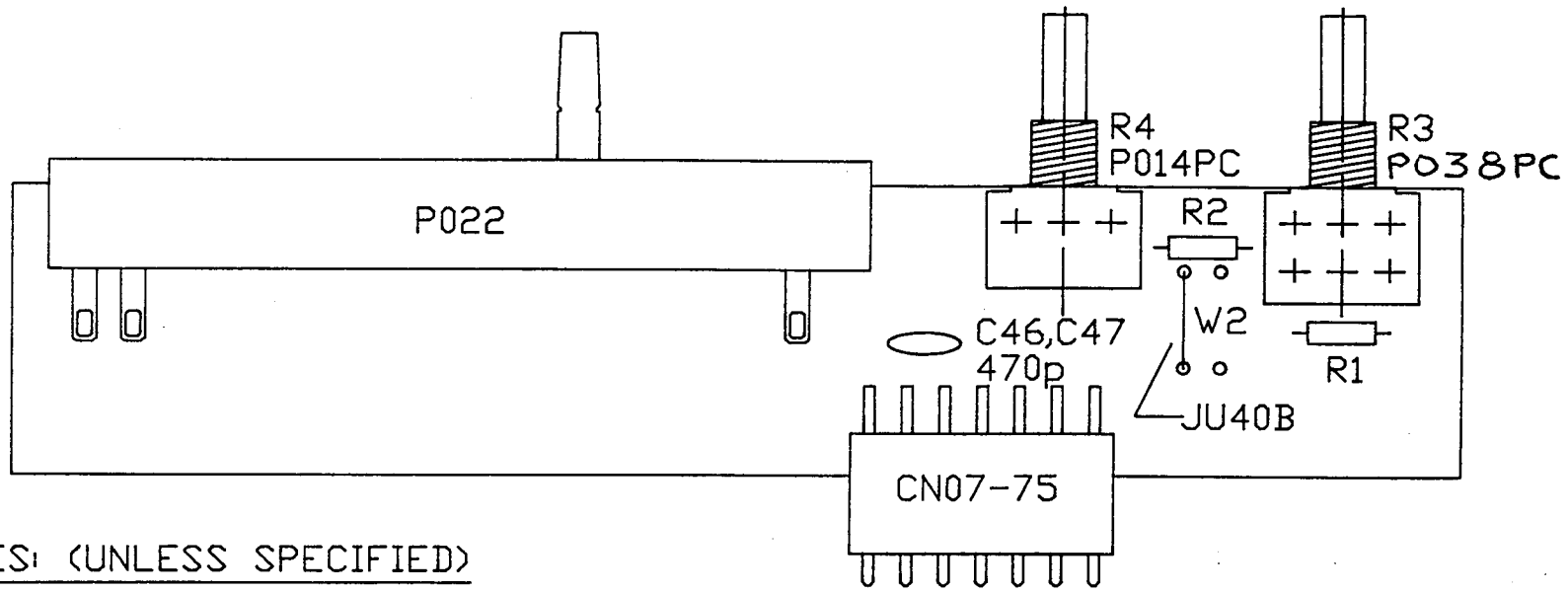
* S30 = 100K
S34 = 51K

sound workshop

TITLE ASSEMBLY MASTER P.C. SER. 34

APPROVAL	SIZE	DWG NO.	REV.
	D	912-551	F

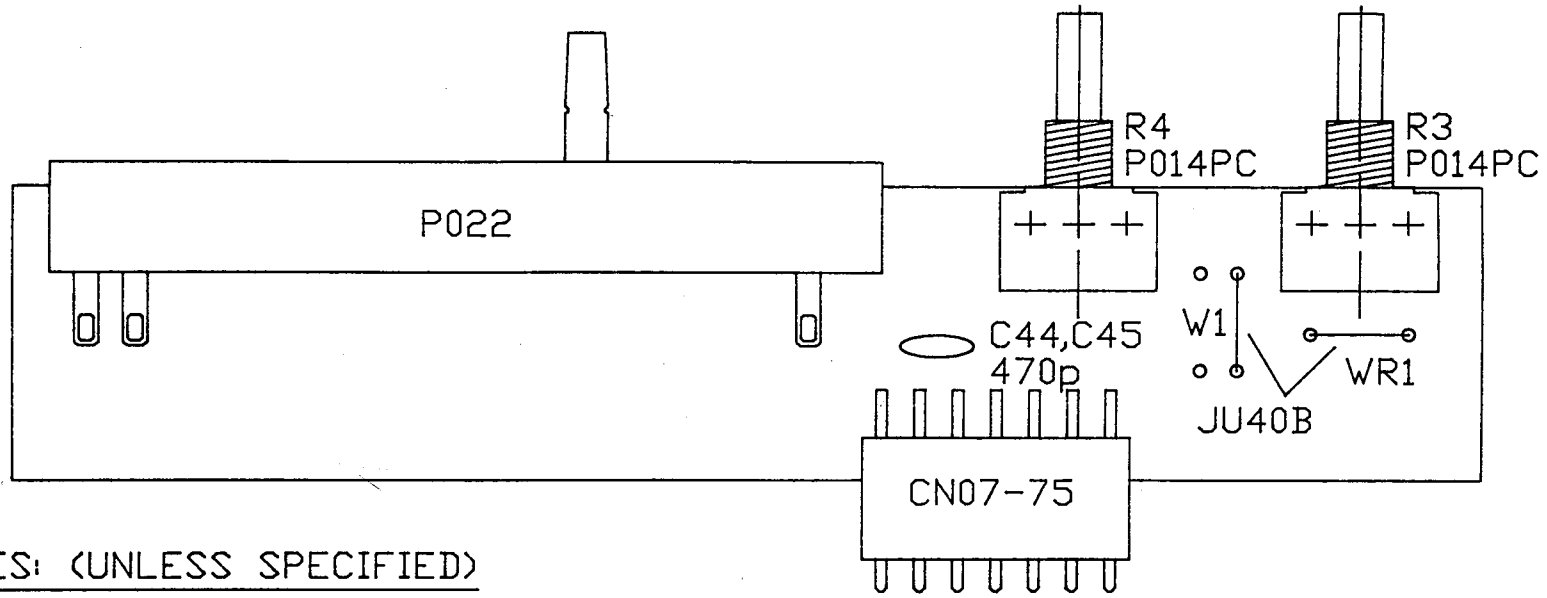
8-10-81 JKJ



NOTES: (UNLESS SPECIFIED)

1) ONE SET CONSISTS OF:
   2 EA -1 ASSYS
   2 EA -2 ASSYS
2) ALL RESISTORS = 51K
3) P022 INSTALLED AT MAIN ASSEMBLY

* * REVISIONS * *		Sound Workshop
D	REDRAWN JRO-7/22/85	ASSY,PC-POT BOARD S30/34 W/PAN
		912-552-1 D



NOTES: (UNLESS SPECIFIED)

1) ONE SET CONSISTS OF:
   2 EA -1 ASSYS
   2 EA -2 ASSYS
2) ALL RESISTORS = 51K
3) P022 INSTALLED AT MAIN ASSEMBLY

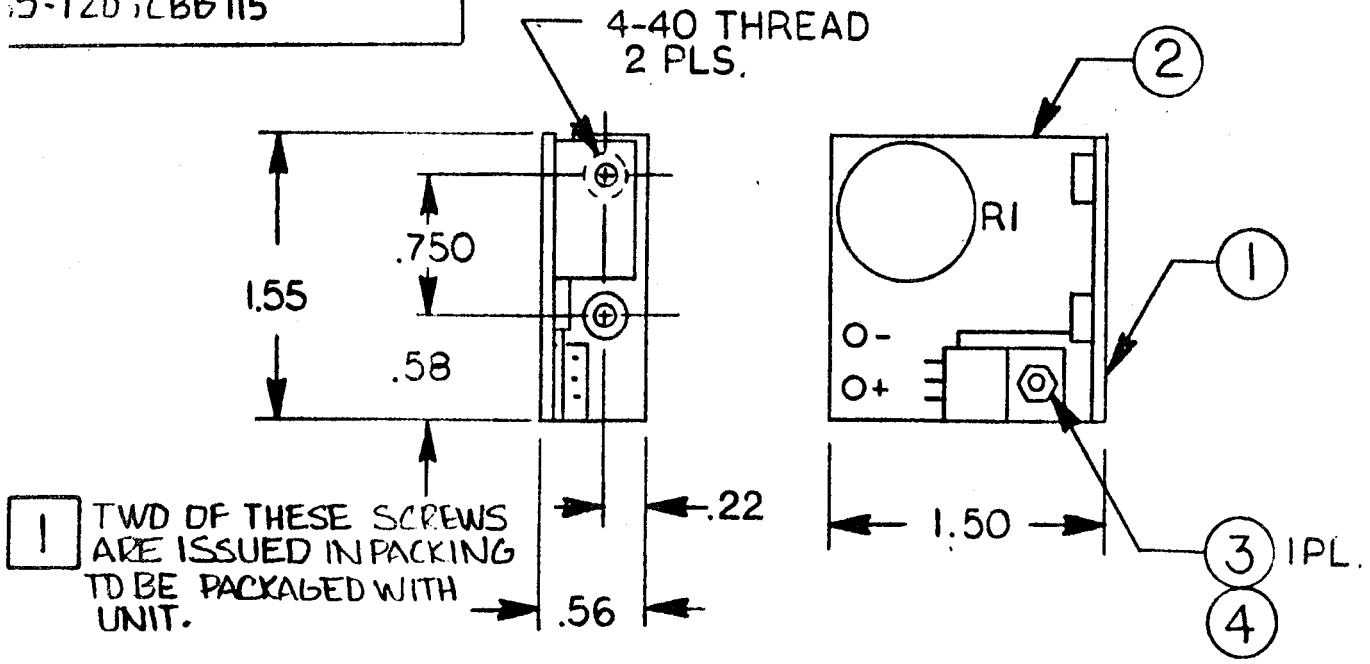
* * REVISIONS * *		Sound Workshop
D	REDRAWN JRO-7/22/85	ASSY,PC-POT BOARD S30/34 W/O PAN
		912-552-2 D

APPLICATION	
	USED ON
24S120,S124 5S120,S123 24 S113,S114,D24 S106, N12,AA15S114,S119,CC15 112,S114,S117,CBB-S112, BB-S112,HB24-104,HC12- 73,106,HC15-102,HC24- 08,HD12-101,HD24-108, CC15-105,HDCC-101,102, VP-12 S111,S112,CP102,105 17,183,DVP-12,PBB S111,)BB S113,CP 106,C15-114, 5-120,CBB 115	B5S112,S113 B15S119,C15S112

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
D	REDRAW & UPDATE ASSEMBLY DWG, ECD 6110	1-18-82	JAMC

ORIGINAL

NOV 03 1983



1 TWO OF THESE SCREWS ARE ISSUED IN PACKING TO BE PACKAGED WITH UNIT.

	ITEM	QTY	DESCRIPTION	STD / P/N
	4	1	KEP NUT, 4-40 X 1/4"	340-10600
1	3	3	SCREW, 4-40 X 3/8"	352-10792
	2	1	BRACKET	412-11151
	1	1	PRINTED CIRCUIT BOARD	081-1115D

TOLERANCE .XX = .030
.XXX = .010

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN P. DEL ROSARIO	1-18-82
CHECKED KL	1-20-82
ENG. APP. JAMC	1-20-82
APPROVED	

POWER-ONE INC. DC POWER SUPPLIES
CAMARILLO, CALIF. 93010
(805)484-2806

TITLE

ASSEMBLY

SIZE	CODE IDENT NO.	DRAWING NO.	
A	54407	12785	D

SCALE | SHEET OF

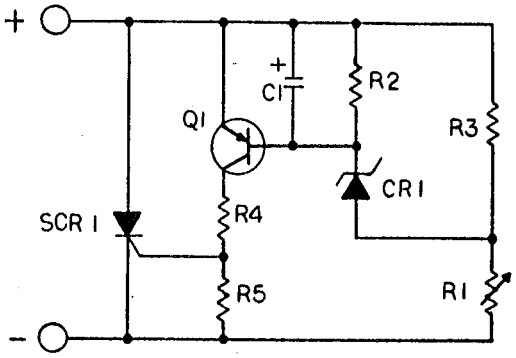
12785 D

ORIGINAL

JUL 13 1983

REVISIONS				
ECO	LTR	DESCRIPTION	DATE	APPROVED
	F	REDRAWN	12-7-77	
1443	G	ADD BRACKET # 412-11151 TO DWG	6-4-79	
2634	H	ADDED HARDWARE LIST	2-27-80	

REF DES	OVP 12	STD P/N	DESCRIPTION
BRACKET	11151	412-11151	BRACKET
C1	1/50V	101-10111	CAPACITOR ALUM. ELECT.
CR1	IN752A	112-10006	DIODE, ZENER
R5	330Ω	151-10353	RESISTOR ½W 5% CF
R4	47Ω	151-10333	
R2	1K	151-10365	
R3	270Ω	151-10351	RESISTOR ½W 5% CF
R1	1.5K	155-10085	POTENTIOMETER 2W, WW
SCR1	S0508LS3	160-10013	SCR
Q1	2N2907A	172-10248	TRANSISTOR
PCB	11150	505-11150	PRINTED CIRCUIT BOARD



OVP-12

TROUBLESHOOTING GUIDE	
SYMPTOM	POSSIBLE PROBLEM
UNIT STAYS ON (SHORTED) AFTER AN OVERVOLTAGE CONDITION IS CORRECTED	SCR 1 SHORTED Q1 SHORTED CR1 SHORTED
RESISTANCE CHECK INDICATES UNIT SHORTED	SCR 1 SHORTED
ERRATIC TRIGGERING OR NOISE SPIKES OR TRANSIENTS	C1 OPEN
UNIT WILL NOT TRIGGER	SCR 1 OPEN Q1 OPEN CR1 OPEN C1 OPEN R4 OPEN

QTY	STD P/N	DESCRIPTION	USED ON
1	352-10792	SCREW	
1	540-10600	KEPNUT	
HARDWARE LIST			

PARTS LIST — NOMENCLATURE OR DESCRIPTION | PART OR IDENTIFYING NO. | CODE IDENT | QTY REQD

POWER-ONE, INC.
CAMARILLO, CALIF. 93010 (805)484-2806

TITLE: SCHEMATIC OVP-12

CONTRACT NO.

APPROVALS — DRAWN | DATE 12/7/77 | CHECKED | 12-8-77 | ENG. APP. | 8-22-79 | APPROVED

TOLERANCE .XX ± .030 .XXX ± .010

MATERIAL | FINISH | DO NOT SCALE DRAWING

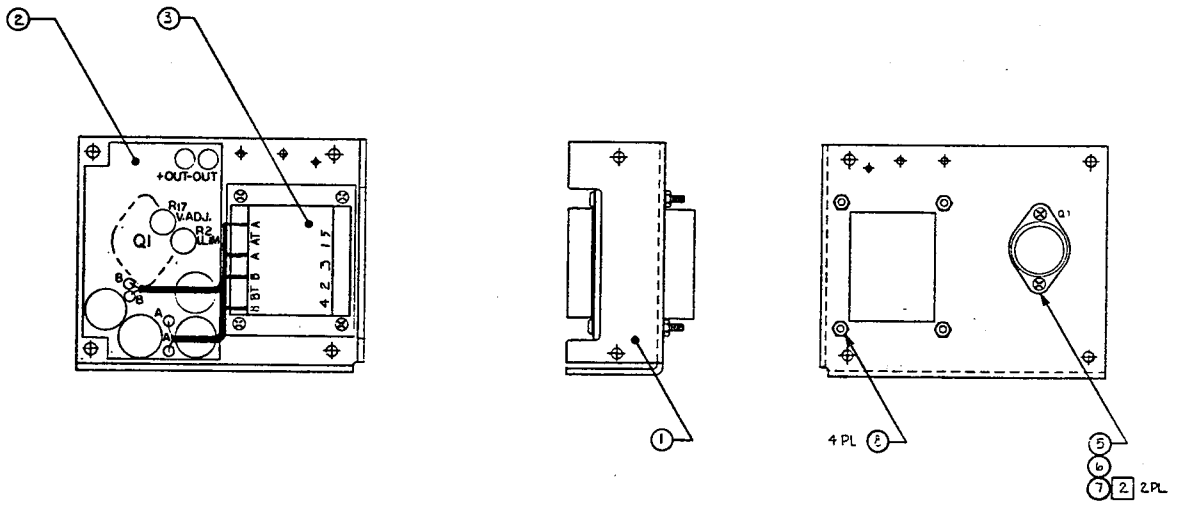
SIZE C | CODE IDENT NO. 54407 | DRAWING NO. 11152 | REV H | SCALE | SHEET OF

NEXT ASSY | USED ON | APPLICATION

DBB-5112
4B24-104
4C12-103,106
4C15-102
4C24-108
4CC15-105
4D12-101
4D24-108
4DCC-101,102

REVISIONS				
ECO	LTR	DESCRIPTION	DATE	APPROVED
9579	V	RELEASE FOR ENGR RUN	9/25/81	
	W	TR ECO	9/30/81	
9596	A	RELEASE FOR PRODUCTION		
10422	B	INC ECO		

ORIGINAL
OCT 25 1983



FOR PARTS LIST SEE P/L 51330 - [1]

3. REFERENCE DESIGNATIONS ARE FOR REFERENCE ONLY AND MAY NOT APPEAR ON PART.

[2] TORQUE TO 6-9 IN-LBS.

[1] FOR PARTS LIST DASH NUMBER SEE APPROPRIATE MODEL MDL.

NOTES: UNLESS OTHERWISE SPECIFIED

QTY REQD	ITEM	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	POWER-ONE STD P/N
PARTS LIST				

TOLERANCE .XX = .030 .XXX = .010

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO

APPROVALS	DATE
DRAWN	9/25/81
ENG APVD	
APPROVED	
MFG APVD	

POWER-ONE INC. CAMARILLO, CALIF. 93010 (805) 484-2806

TITLE: ASSEMBLY, POWER SUPPLY

SIZE	CODE IDENT NO	DRAWING NO.	REV
D	54407	51330	B

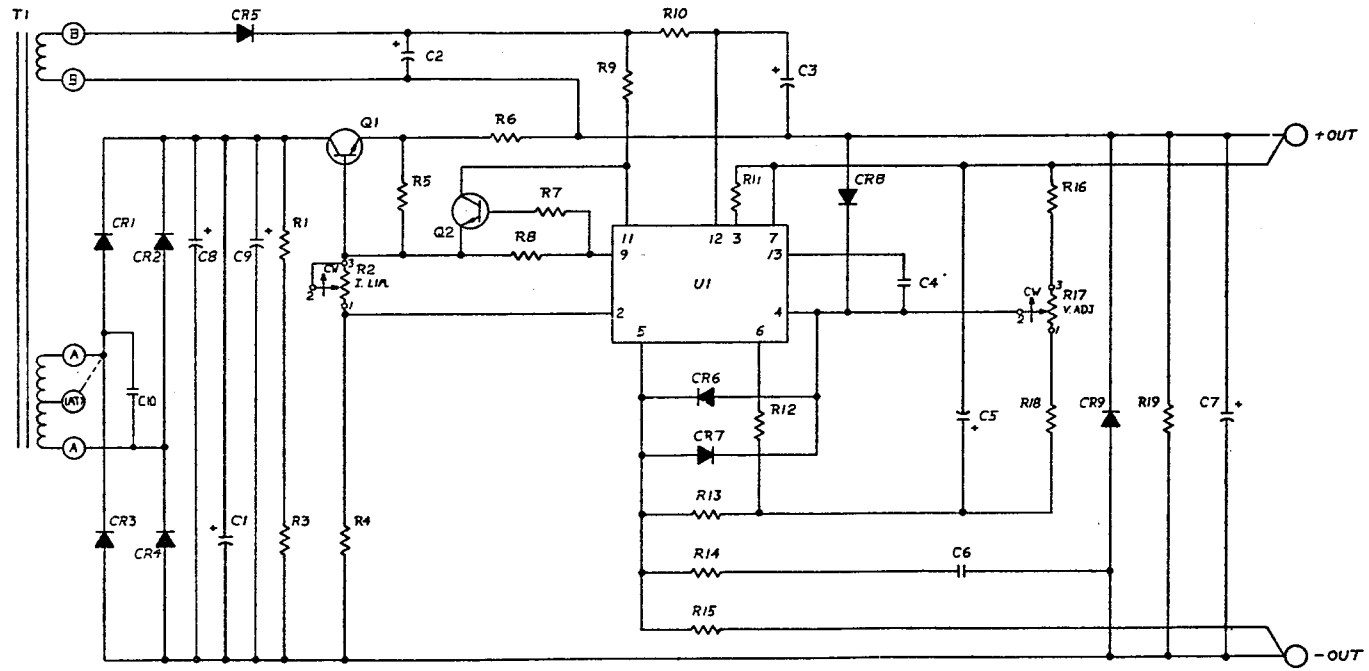
SCALE 1/1 SHEET 1 OF 1

NEXT ASSY	USED ON
APPLICATION	

REVISIONS				
ECO	LTR	DESCRIPTION	DATE	APPROVED
	V3	RELEASE FOR PILOT RUN	9-10-82	EJC
8156	A+	ADDED C10	3-7-83	RC
9596	A	RELEASE FOR PRODUCTION	5-17-83	RC
10097	B	MISC. ECO	11-14-85	[illegible]

ORIGINAL

NOV 18 1983



FOR PARTS LIST SEE PL51336-1

QTY REQD	ITEM	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	POWER-ONE STD P/N
PARTS LIST				

LAST REFERENCE DESIGNATION USED			
C7	C19	Q2	R19
SCR	T1	U1	E --
NOT USED			

NEXT ASSY	USED ON
APPLICATION	

HR120-0.2-A
HB4A-0.5-A
HR250-0.12-A
HR250-0.1-A

TOLERANCE .XX = .030 .XXX = .010

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO

APPROVALS	DATE
DRAWN	9-10-82
CHECKED	9-10-82
ENG APPD	9-10-82
APPROVED	9-10-82
MFG APPD	

POWER-ONE INC. DC POWER SUPPLIES
CAMARILLO, CALIF. 93010 (805) 484-2806

TITLE: SCHEMATIC

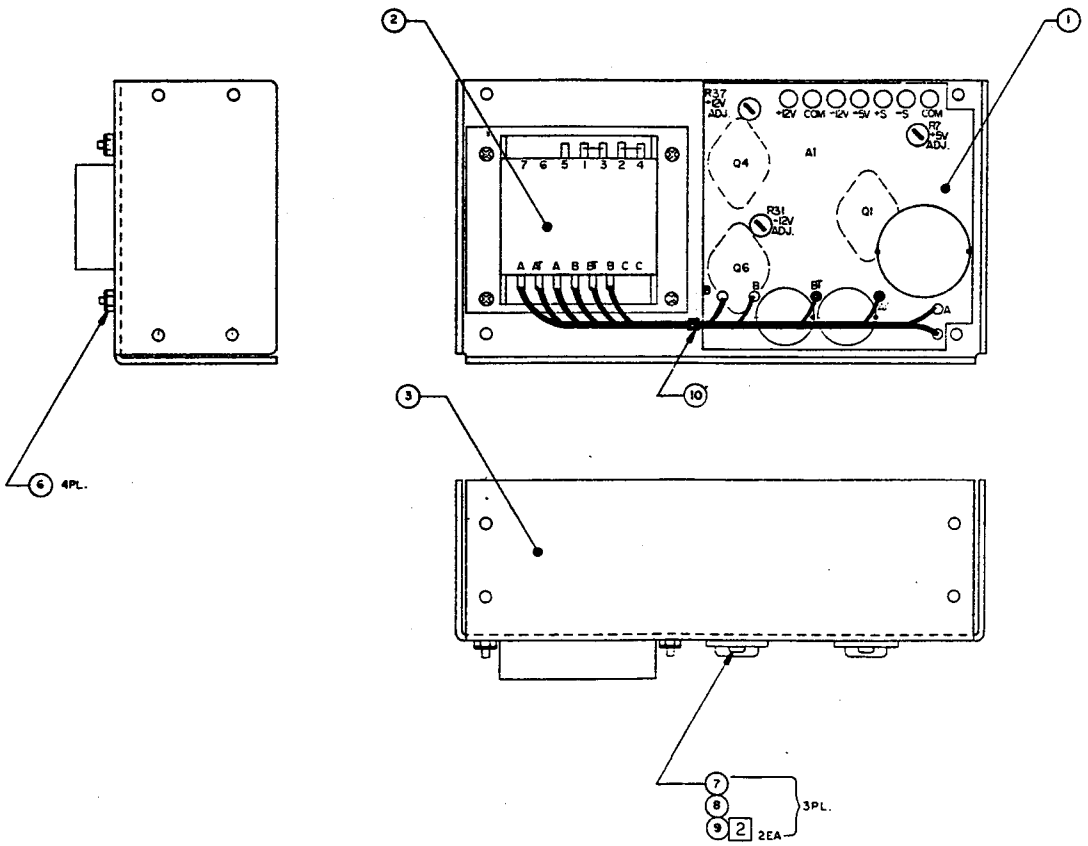
SIZE	CODE IDENT NO.	DRAWING NO.	
D	54407	51336	B

SCALE | SHEET 1 OF 1

[1] FOR PARTS LIST DASH NO. SEE APPROPRIATE MODEL MDL.

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
ECO	LTR	DESCRIPTION	DATE	APPROVED
8697	A	RELEASE TO PRODUCTION	2-23-94	MC



AUG 04 1993

FOR PARTS LIST SEE P/L 53126-1

QTY REQD	ITEM	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	POWER-ONE STD P/N
			PARTS LIST	

TOLERANCE .XX = .030 .XXX = .010

CONTRACT NO.

Power-One INC. CAMARILLO, CALIF. 93010 (805)484-2806

APPROVALS	DATE
DRAWN	
CHECKED	
ENG. APPD.	
APPROVED	
MFG. APPD.	

MATERIAL

FINISH

NEXT ASSY USED ON

APPLICATION

DO NOT SCALE DRAWING

TITLE: ASSEMBLY POWER SUPPLY

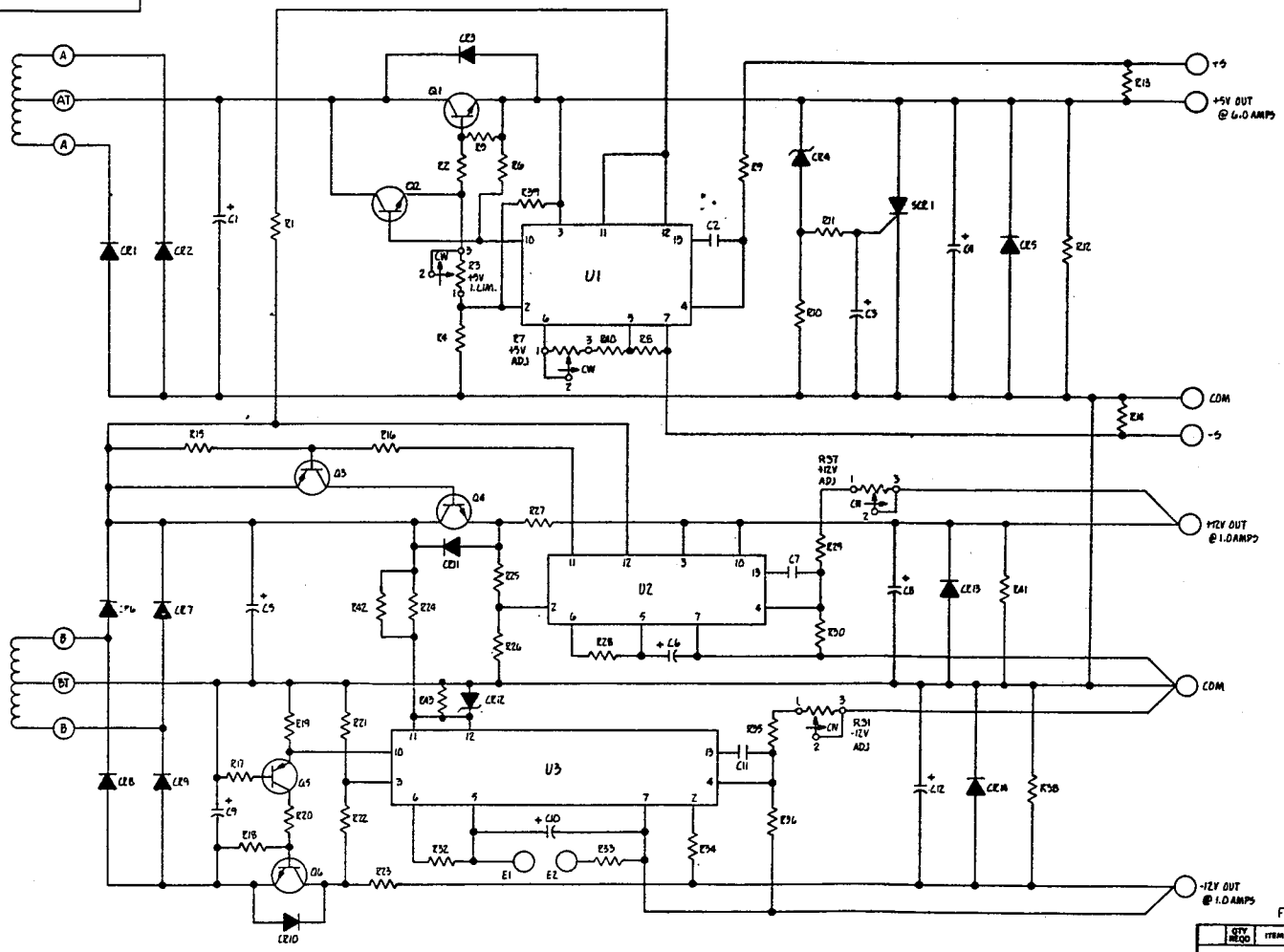
SIZE	CODE IDENT NO.	DRAWING NO.	REV
D	54407	53126	A

SCALE NONE SHEET 1 OF

2 TORQUE TO 6-9 IN-LBS

1 FOR PARTS LIST DASH NO. SEE APPROPRIATE MODEL MDL.

NOTES: UNLESS OTHERWISE SPECIFIED



FOR PARTS LIST SEE P/L 52982-1

[1] FOR PARTS LIST DASH NO SEE APPROPRIATE MODEL MDL.

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
ECO	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASE TO PRODUCTION	4-15-93	

AUG 6 1993

LAST REFERENCE DESIGNATION USED			
C12	CR14	Q6	R43
SCR1	T1	U3	E2
NOT USED			

HCAA-60W-A

NEXT ASSY | USED ON

APPLICATION

DO NOT SCALE DRAWING

QTY REQD	ITEM	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	POWER-ONE STD. P/N

PARTS LIST

TOLERANCE .XX = .030 .XXX = .010

CONTRACT NO.

APPROVALS	DATE
DRAWN DJJ	4-15-93
CHECKED	5-25-93
ENG. APPD	5-25-93
APPROVED	
MFG. APPD	

MATERIAL

FINISH

POWER-ONE INC. CAMARILLO, CALIF. 93010 (805)484-2806

TITLE: SCHEMATIC

SIZE	CODE IDENT NO.	DRAWING NO.	REV
D	54407	52982	A

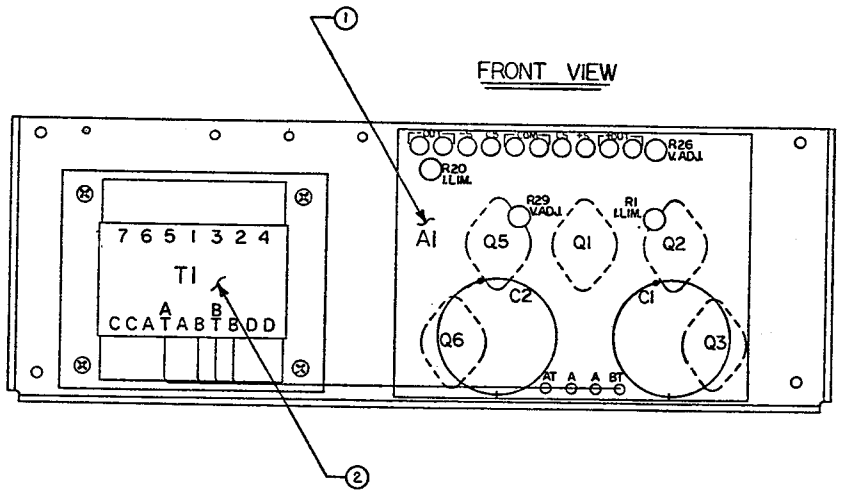
SCALE | SHEET OF

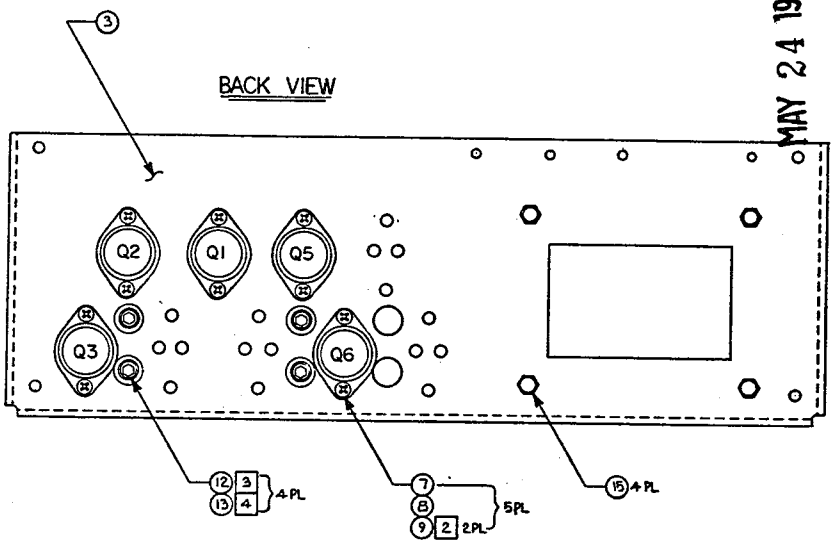
REVISIONS				
ECO	LTR	DESCRIPTION	DATE	APPROVED
10360	A	RELEASED FOR PRODUCTION	12-14-83	

ORIGINAL

DEC 19 1983

MAY 24 1984





FOR PARTS LIST SEE P/L 53611-1

QTY REQD	ITEM	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	POWER-ONE STD. P/N
			PARTS LIST	

4 INSTALL INTERNAL STAR WASHER ON CIRCUIT SIDE OF P.W.B.

3 TORQUE TO 12-14 IN LBS.

2 TORQUE TO 6-9 IN. LBS.

1 FOR PARTS LIST DASH NO. SEE APPROPRIATE MODEL MDL.

NOTES: UNLESS OTHERWISE SPECIFIED

NEXT ASSY	HD015-5-A
USED ON	
APPLICATION	

TOLERANCE .XX = .030, .XXX = .010

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

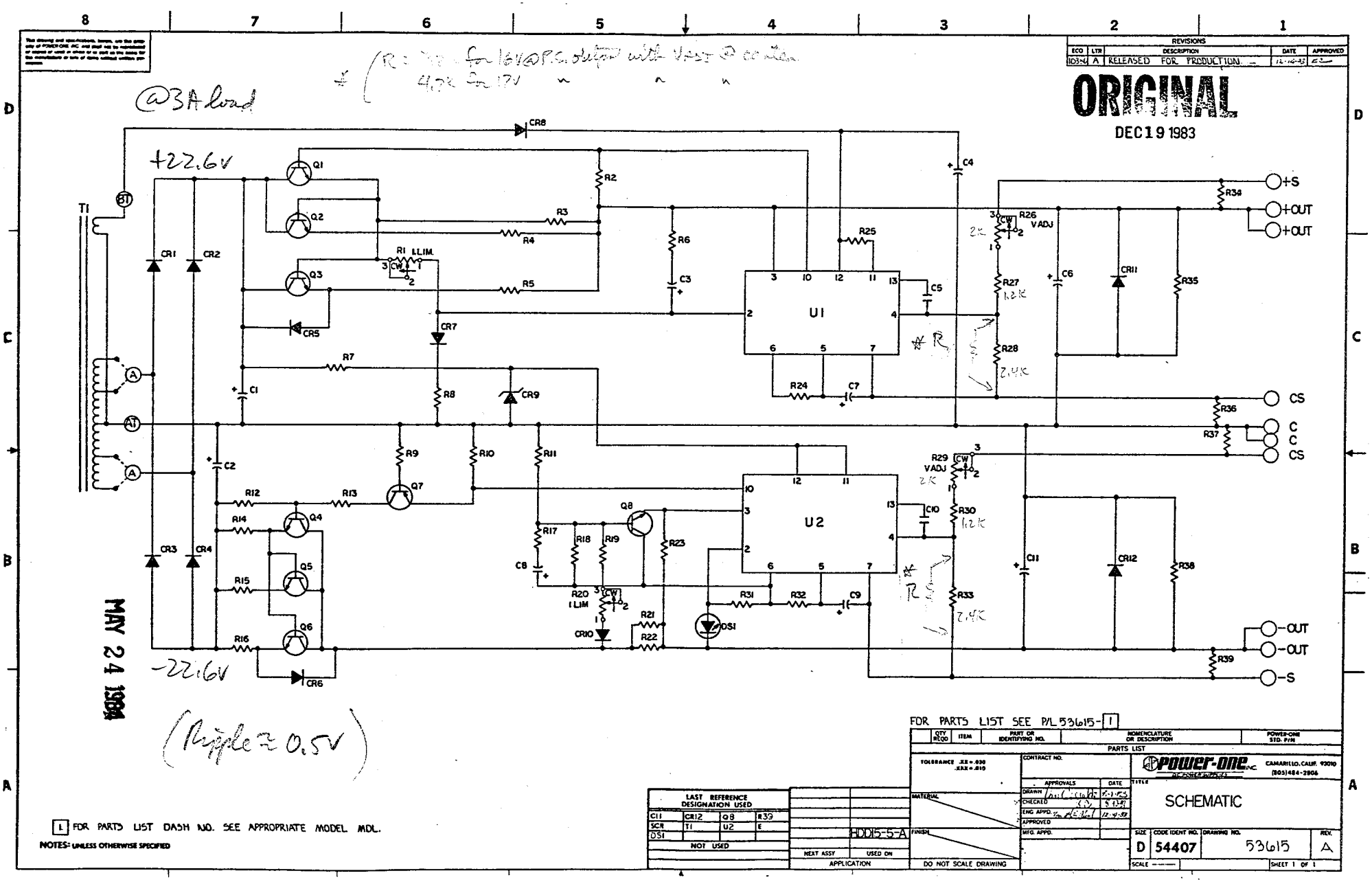
APPROVALS	DATE
DRAWN	12/14/83
CHECKED	12-14-83
ENG. APPD.	12-14-83
APPROVED	
MFG. APPD.	

Power-one INC. CAMARILLO, CALIF. 93010 (805)484-2806

TITLE: ASSEMBLY, POWER SUPPLY

SIZE	CODE IDENT NO.	DRAWING NO.	REV.
D	54407	53611	A

SCALE — SHEET 1 OF 1


ORIGINAL
DEC 19 1983
MAY 24 1984
@3A load
+22.6V
-22.6V
(Ripple ≈ 0.5V)
T1
U1
U2
+S
+OUT
+OUT
CS
C
C
CS
-OUT
-OUT
-S
VADJ
VADJ
1.2K
1.2K
2.4K
2.4K
2K
2K
I LIM.
I LIM.
CR8
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR9
CR10
CR11
CR12
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
DS1
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R31
R32
R33
R34
R35
R36
R37
R38
R39
REVISIONS
ECO 103544 | LTR A | DESCRIPTION RELEASED FOR PRODUCTION | DATE 12-16-83 | APPROVED
FOR PARTS LIST SEE P/L 53615-1
PARTS LIST
POWER-ONE INC
CAMARILLO, CALIF. 93010
(805) 484-2806
SCHEMATIC
SIZE D | CODE IDENT NO. 54407 | DRAWING NO. 53615 | REV. A
SCALE —— | SHEET 1 OF 1
LAST REFERENCE DESIGNATION USED
C11 CR12 Q8 R39
SCR T1 U2 E
DS1
NOT USED
EDD15-5-A
NEXT ASSY | USED ON
APPLICATION
DO NOT SCALE DRAWING
1 FOR PARTS LIST DASH NO. SEE APPROPRIATE MODEL MDL.
NOTES: UNLESS OTHERWISE SPECIFIED

SOUND WORKSHOP SERIES 34 PARTS LIST

34CRM - PCA-BAL OUTPUT CARD
[PL#: 007-541]

Qty	Reference #	Description	Part Number
1	PC007-440	PC BD-SERIES 40 BTO	B007-440A
1	DT007-442	DETAIL - SHIELD 3BOC	DT007-442 rev A
3	C10P	CAP-CER DISC 10PF	50V N750 10%
2	C.068U	CAP-MYLAR RAD .068UF	B32510.068/5/100
3	C100-16	CAP-ELECT RAD 100UF/16V	KSMM 100-16
1	CN12-52	CONN-12 PIN (F) RT ANGLE	09-52-3121
2	I5532	DUAL LOW NOISE OP AMP	NE5532AP
1	R27	RESISTOR-1/4 5% 27	CF25
2	R100	RESISTOR-1/4 5% 100	CF25
2	R1K	RESISTOR-1/4 5% 1K	CF25
2	R10K%	RES-MTL FLM 1/8 1% 10K	GP55D
2	R22K	RESISTOR-1/4 5% 22K	CF25
1	RS4-10K	RESISTOR-SIP 4X10K 2%	
1	RS4-20K	RESISTOR-SIP 4X20K 2%	
2	SOC08	SOCKET-IC 8 PIN	WLLS 802-0081642
2	NK4	NUT-KEP 4-40	
2	SP4B1/4	SCREW-PNHD BLK 4-40x1/4	STL-CROSS RECESS
2	SPA3368	WASHER,FIBRE .062 THK	3368
2	WCV2.25	WIRE-CUT VIOLET 2.25"	#22 TOP COAT PVC
SCH	B007-141		
ASY	A007-541		

SOUND WORKSHOP SERIES 34 PARTS LIST

4VCC - PCA-VCA CONTROL CARD
[PL#: 103-522]

Qty	Reference #	Description	Part Number
1	PL203-583	4VCC VCA	PCA-VCA (TA101)
00	PL003-527	SGSA SGSA	SUPER GROUP SW
1	PC103-422	PC BD-16 VCC	C103-422 rev B
1	B305R	BUTTON-RED B305	J5230506500
1	B305GY	BUTTON-GRAY B305	J5230503501
1	C.047U	CAP-MYLAR RAD .047UF	CP100K0470
4	C.068U	CAP-MYLAR RAD .068UF	B32510.068/5/100
2	C.47U	CAP-MYLAR RAD .47UF	B32511.47/5/100
1	C10-25R	CAP-ELECT RAD 10UF/25V	CEM25-0010
1.25	CN65	CONN-ST LOCK 24 PIN .156	MLSR156-24
5	D4148	DIODE-1N4148	1N4148
1	D5242	DIODE-ZENER 1N5242B	1N5242B
.334	HDR60	HEADER-60 PIN	SAE CHD6960W1S
1	I324	IC-324	LM324N
3	JU40B	JUMPER WIRE-BARE #24 .40	J0.40X.25 B 24
1	LEDG	LED T1-GREEN	QEC309A
3	LEDR	LED T1-RED	QEC209A
1	LEDY	LED T1-YELLOW	QEC409A
2	PT5	POT-TRIM 10MM 50K 20%	PTC-10V 50K
2	PINSQ45	PIN-SQUARE .045X.50	CD-1221-25
1	R1.2K	RESISTOR-1/4 5% 1.2K	CF25
6	R680	RESISTOR-1/4 5% 680	CF25
1	R330	RESISTOR-1/4 5% 330	CF25
3	R1.5K	RESISTOR-1/4 5% 1.5K	CF25
1	R2.7K	RESISTOR-1/4 5% 2.7K	CF25
1	R3.3K	RESISTOR-1/4 5% 3.3K	CF25
2	R8.2K	RESISTOR-1/4 5% 8.2K	CF25
4	R10K	RESISTOR-1/4 5% 10K	CF25
1	R20K	RESISTOR-1/4 5% 20K	CF25
1	R22K	RESISTOR-1/4 5% 22K	CF25
1	R27K	RESISTOR-1/4 5% 27K	CF25
1	R33K	RESISTOR-1/4 5% 33K	CF25
13	R47K	RESISTOR-1/4 5% 47K	CF25
1	R51K	RESISTOR-1/4 5% 51K	CF25
2	R100K	RESISTOR-1/4 5% 100K	CF25
1	R680K	RESISTOR-1/4 5% 680K	CF25
1	R1M	RESISTOR-1/4 5% 1M	CF25
1	SOC14	SOCKET-IC 14 PIN	WLLS 802-14-1642
2	SW401	SWITCH-2P/1STA MOM	F2U0A-51213
2	ST1653	STANDOFF-SWAGE 4-40X1/8	1653-2
1	T01A	TRANSISTOR-NPN 1 AMP	ZTX450
2	T75	TRANSISTOR-N CHAN FET	TIS-75
2	T51A	TRANSISTOR-PNP 1 AMP	ZTX550
PCA	C103-522		
SCH	D003-122		
ART	ART013-222		

SOUND WORKSHOP SERIES 34 PARTS LIST

34IM - MAIN ASSEMBLY
[PL#: 202-520]

Qty	Reference #	Description		Part Number
1	PL202-520T	S34 IM TEST	TEST	
1	PL202-521	34IM	IPC	PCA-I/O SER 34
1	PL202-522	34IM	MP	PCA-MIC PRE
1	PL202-522T	S30/34 MIC PRE TEST	MP-T	
1	PL202-523	34IM	IAUX	AUX SEND PCA
1	PL202-524	34IM	TKAS	PCA-24 TK ASSIGN
1	PL202-532	3EQ-4B	EQ	PCA 4 BAND EQ
4	CK111	COVER-KNOB 11MM GRAY		C111 GRAY
2	CKBU	CAP-KNOB 15MM BLU W/LINE		C151-BLUE
1	CKGY	CAP-KNOB 15MM GRY W/LINE		C151-GRAY
1	CKR	CAP-KNOB 15MM RED W/LINE		C151-RED
3	CKSBK	COVER-KNOB 11MM BLACK		C111 BLACK
1	CN06-67	CONN-6 PIN (M) LONG SQ.		3100-1-106-36
1	DT202-425	DETAIL-S34 24TK PANEL		D202-425 rev C
7	K5C-6	KNOB-MEDIUM CONC. BLACK		K5C-6
2	KPBK	KNOB-15MM X 6MM PUSH ON		DC150-006 BLACK
7	KS111	KNOB-11MM GRAY (SELCO)		S111-125
4	NH7MM	NUT-HEX S/W ALPS POTS		7MM
3	NH8MM	NUT-HEX S/W ALPS POTS		8MM
4	NH9MM	NUT-HEX S/W ALPS POTS		9MM
3	NK4	NUT-KEP 4-40		
1	P014F	POT-16MM 10KA W/FLAT SH		Revised 07/02/81
2	P038PC	POT-20KBX2 DETENT		rev of 12/07/81
1	P030F	POT-16MM 10KRD W/FLAT SH		Revised 07/02/81
1	PL1/4	PLUG-HOLE 1/4"		2603
7	SF4B1/4	SCREW-FLHD BLK 4-40x1/4		100D-STL-CR RECS
3	SP4B1/4	SCREW-PNHD BLK 4-40x1/4		STL-CROSS RECESS
16	WAF7MM			
2	WAL4	WASHER-LK INT TH #4		
4	WAL7MM	WASHER-LOCK S/W ALPS POT		7MM
3	WAL8MM	WASHER-LOCK S/W ALPS POT		8MM
4	WAL9MM	WASHER-LOCK S/W ALPS POT		9MM
3	WCG1.38	WIRE-CUT GREEN 1.38"		#22 TOP COAT PVC
1	WCBK2.25	WIRE-CUT BLACK 2.25"		#22 TOP COAT PVC
2	KS151-6	KNOB-15MM BLACK (6MM SH)		S150-006
.2	PC202-429	PCB-S34 POT BOARD		A202-429
1	WCBU3.5	WIRE-CUT BLUE 3.50"		#22 TOP COAT PVC
1	WCO3.5	WIRE-CUT ORANGE 3.50"		#22 TOP COAT PVC
SCH	D902-520			
1	PL203-501	34MP	MPMN	MIC NETWORK
1	PL202-528	34IM	FFPC	FLIP BOARD
1	WCY1.38	WIRE-CUT YELLOW 1.38"		#22 TOP COAT PVC
1	WCG4.5	WIRE-CUT GREEN 4.50"		#22 TOP COAT PVC

SOUND WORKSHOP SERIES 34 PARTS LIST

34IM - PCA-MAIN I/O BOARD
[PL#: 202-521]

Qty	Reference #	Description	Part Number
1	PC902-421	PC BOARD-I/O MODULE	B902-421 REV H
1	B305GY	BUTTON-GRAY B305	J5230503501
1	B305W	BUTTON-WHITE B305	J5230502502
9	BFMGY	BUTTON-FM GRAY	FM-GRAY/TAM-GRAY
2	C.068U	CAP-MYLAR RAD .068UF	B32510.068/5/100
1	C.47U	CAP-MYLAR RAD .47UF	B32511.47/5/100
2	C10-25A	CAP-ELECT AX 10UF/25V	CET25-0010
3	C10-25R	CAP-ELECT RAD 10UF/25V	CEM25-0010
6	C100-16	CAP-ELECT RAD 100UF/16V	KSMM 100-16
1	C100P	CAP-CER DISC 100PF	50V SL 10%
1	C10P	CAP-CER DISC 10PF	50V N750 10%
5	C18P	CAP-CER DISC 18PF	50V N750 10%
2	C22-16	CAP-ELECT AX 22UF/16V	CET16-0022
1	C33-6	CAP-ELECT RAD 33UF-6V	CEM06-0033
2	C33P	CAP-CER DISC 33PF	50V N750 10%
.5	CN65	CONN-ST LOCK 24 PIN .156	MLSR156-24
.166	CN75	CONN-AN LOCK 24 PIN .156	MLAS156-24
2	CN06-52	CONN-6 PIN (F) VERT/TOP	3000-006-2101
1	CN64	CONN-STR RND 24 PIN .156	MFSR156-24
2	D4001	DIODE-1N4002	1N4002
2	D4148	DIODE-1N4148	1N4148
1	HN-BTO	SPEC-HYBRID NETWORK, BTO	Rev A
1	I339	IC-QUAD COMPARATOR	LM339N
2	I351	IC-OP AMP, BI FET, SINGL	LF351N (NAT.)
1	I4558	IC-4558	RC4558NB
2	I5532	DUAL LOW NOISE OP AMP	NE5532AP
3	I5534	IC-5534	NE5534N
1	JU50B	JUMPER WIRE-BARE #22 .50	J0.50X.25 B 22
1	JU50T	JUMPER WIRE-TEFL #22 .50	J0.50X.25 T 22
4	LEDG-L	LED T1-3/4 GREEN	SA543G
1	LEDR-L	LED T1-3/4 RED	SA543R
2	LEDY-L	LED T1-3/4 YELLOW	SA543Y
2	PT1	POT-TRIM 50K LINEAR	X201-R503-B
1	PT2	POT-TRIM 50K LOG	CY4844
1	R100	RESISTOR-1/4 5% 100	CF25
2	R100K	RESISTOR-1/4 5% 100K	CF25
3	R10K	RESISTOR-1/4 5% 10K	CF25
1	R12K	RESISTOR-1/4 5% 12K	CF25
4	R1K	RESISTOR-1/4 5% 1K	CF25
2	R2.2K	RESISTOR-1/4 5% 2.2K	CF25
4	R20K	RESISTOR-1/4 5% 20K	CF25
6	R22K	RESISTOR-1/4 5% 22K	CF25
5	R27	RESISTOR-1/4 5% 27	CF25
2	R3.3K	RESISTOR-1/4 5% 3.3K	CF25
2	R3.9K	RESISTOR-1/4 5% 3.9K	CF25
1	R30K	RESISTOR-1/4 5% 30K	CF25
2	R330	RESISTOR-1/4 5% 330	CF25

SOUND WORKSHOP SERIES 34 PARTS LIST

34IM - PCA-MAIN I/O BOARD
[PL#: 202-521]

Qty	Reference #	Description	Part Number
1	R390	RESISTOR-1/4 5% 390	CF25
1	R47	RESISTOR-1/4 5% 47	CF25
2	R470	RESISTOR-1/4 5% 470	CF25
20	R47K	RESISTOR-1/4 5% 47K	CF25
2	R5.1K	RESISTOR-1/4 5% 5.1K	
12	R6.8K	RESISTOR-1/4 5% 6.8K	CF25
1	R68K	RESISTOR-1/4 5% 68K	CF25
1	R820	RESISTOR-1/4 5% 820	CF25
8	SOC08	SOCKET-IC 8 PIN	WLLS 802-0081642
1	SOC14	SOCKET-IC 14 PIN	WLLS 802-14-1642
9	SW402	SWITCH-2P/1STA ALT ACT	MPB21S-A (F2UEE)
2	SW407	SWITCH-4P ALT ACTION	MPB41S-A (F4UEE)
1	T01A	TRANSISTOR-NPN 1 AMP	ZTX450
3	T51A	TRANSISTOR-PNP 1 AMP	ZTX550
1	WCG1.38	WIRE-CUT GREEN 1.38"	#22 TOP COAT PVC
1	WCV2.25	WIRE-CUT VIOLET 2.25"	#22 TOP COAT PVC
1	WCG3.5	WIRE-CUT GREEN 3.50"	#22 TOP COAT PVC
PCA	D202-521		

SOUND WORKSHOP SERIES 34 PARTS LIST

34IM - PCA-MIC PRE
[PL#: 202-522]

Qty	Reference #	Description	Part Number
.1666	PC202-422	PC BD-SERIES 34 MIC PRE	A202-422 Rev A
3	BFMGY	BUTTON-FM GRAY	FM-GRAY/TAM-GRAY
2	C.0047U	CAP-MYLAR RAD .0047UF	CP100K0047
2	C10-25R	CAP-ELECT RAD 10UF/25V	CEM25-0010
2	C100P	CAP-CER DISC 100PF	50V SL 10%
2	C10P	CAP-CER DISC 10PF	50V N750 10%
1	C150P	CAP-CER DISC 150PF	50V SL 10%
1	C33-6	CAP-ELECT RAD 33UF-6V	CEM06-0033
2	C47-50	CAP-ELECT RAD 47UF/50V	KSMM 47-50
1	C470-6	CAP ELECT RAD 470UF/6.3V	CEM06-0470
1	CN06-67	CONN-6 PIN (M) LONG SQ.	3100-1-106-36
.333	CN12-66	CONN-12 PIN (M) RT ANGLE	3100-3-112-17
2	D4148	DIODE-1N4148	1N4148
4	D5235	DIODE-ZENER 6.8V/5%/.4W	1N5235B
2	FB1	FERRITE BEAD	2643000101
1	HN-PAD	SPEC-HYBRID NET, 20DB PD	
1	I5534	IC-5534	NE5534N
1	PT5	POT-TRIM 10MM 50K 20%	PTC-10V 50K
2	R100	RESISTOR-1/4 5% 100	CF25
1	R2.2K	RESISTOR-1/4 5% 2.2K	CF25
1	R47K	RESISTOR-1/4 5% 47K	CF25
1	SOC08	SOCKET-IC 8 PIN	WLLS 802-0081642
2	ST1653	STANDOFF-SWAGE 4-40X1/8	1653-2
3	SW402	SWITCH-2P/1STA ALT ACT	MPB21S-A (F2UEE)
2	T51A	TRANSISTOR-PNP 1 AMP	ZTX550
SCH	A202-122		
PCA	A202-522		
4	R10K%	RES-MTL FLM 1/8 1% 10K	GP55D

SOUND WORKSHOP SERIES 34 PARTS LIST

34IM - PCA-AUX SEND BOARD
[PL#: 202-523]

Qty	Reference #	Description	Part Number
1	PC202-423	PC BD S34 I/O AUX SEND	A202-423 Rev B
1	JU40B	JUMPER WIRE-BARE #24 .40	J0.40X.25 B 24
1	JU6X1.75	JUMPER-S34 AUX I/O	JU6X1.75
2	P033PC	POT-DUAL CONC 100K AUD	DM10R100KAX2
1	P034PC	POT-3 SECT 50KA/2X100KB	FM60R50KA100KBX2
2	R33K	RESISTOR-1/4 5% 33K	CF25
1	WCBK2.25	WIRE-CUT BLACK 2.25"	#22 TOP COAT PVC
3	WCG2.25	WIRE-CUT GREEN 2.25"	#22 TOP COAT PVC
2	WCV2.25	WIRE-CUT VIOLET 2.25"	#22 TOP COAT PVC
PCA	A202-523		

SOUND WORKSHOP SERIES 34 PARTS LIST

34IM - PCA-FADER FLIP BOARD
[PL#: 202-528]

Qty	Reference #	Description	Part Number
1	BFMGY	BUTTON-FM GRAY	FM-GRAY/TAM-GRAY
1	BFMW	BUTTON-FM WHITE	FM-WHITE/TAM-WHT
2	JU9X2	JUMPER-9 COND SR30 SVCA	JU9X2
1	LEDR	LED T1-RED	QEC209A
1	LEDY	LED T1-YELLOW	QEC409A
1	PC202-428	PCB-S34 FLIP BOARD	A202-428 REV C
1	R22K	RESISTOR-1/4 5% 22K	CF25
1	R3.9K	RESISTOR-1/4 5% 3.9K	CF25
1	R330	RESISTOR-1/4 5% 330	CF25
1	SW402	SWITCH-2P/1STA ALT ACT	MPB21S-A (F2UEE)
1	SW409	SWITCH-6PDT ALT ACT	MPB61S-A (F6UEE)
1	T01A	TRANSISTOR-NPN 1 AMP	ZTX450
1	TWS	TIE WRAP-4" LONG	T18R (08-432)
.7	WS-1	WIRE-SHLD 1 COND FOIL	1X22-7/30
1	WCBU3.5	WIRE-CUT BLUE 3.50"	#22 TOP COAT PVC
1	WCBK4.5	WIRE-CUT BLACK 4.50"	MW22 SOLID TC
1	WCO5	WIRE-CUT ORANGE 5.00"	#22 TOP COAT PVC
1	WCY5	WIRE-CUT YELLOW 5"	#22 TOP COAT PVC
2	ST1653	STANDOFF-SWAGE 4-40X1/8	1653-2

SOUND WORKSHOP SERIES 34 PARTS LIST

34IM - PCA-4 BAND EQ
[PL#: 202-532]

Qty	Reference #	Description	Part Number
1	BFMGY	BUTTON-FM GRAY	FM-GRAY/TAM-GRAY
2	C.0022U	CAP-MYLAR RAD .0022UF	CP100K0022
2	C.0033U	CAP-MYLAR RAD .0033UF	.0033UF/10%/100
2	C.01U	CAP-MYLAR RAD .01UF	.01UF/10%/100V
2	C.047U	CAP-MYLAR RAD .047UF	CP100K0470
3	C.22U	CAP-MYLAR RAD .22UF	B32511.22/5/100
2	C33-6	CAP-ELECT RAD 33UF-6V	CEM06-0033
4	C33P	CAP-CER DISC 33PF	50V N750 10%
2	C820P	CAP-CER DISC 820PF	50V Y5F 10%
1	CN06-52	CONN-6 PIN (F) VERT/TOP	3000-006-2101
2	I074	OP AMP-QUAD BI-FET	TL074CN
1	I351	IC-OP AMP, BI FET, SINGL	LF351N (NAT.)
4	P058PC	POT-CONC, 2x100KC & 20KB	Rev B 02/14/83
1	PC202-432	PC BD-S30 4BAND EQ	B202-432 Rev B
1	R12K	RESISTOR-1/4 5% 12K	CF25
8	R4.7K	RESISTOR-1/4 5% 4.7K	CF25
3	R47K	RESISTOR-1/4 5% 47K	CF25
1	R5.6K	RESISTOR-1/4 5% 5.6K	CF25
1	RS4-10K	RESISTOR-SIP 4X10K 2%	
2	RS4-20K	RESISTOR-SIP 4X20K 2%	
3	RS4-47K	RESISTOR-SIP 4X47K 2%	
1	SOC08	SOCKET-IC 8 PIN	WLLS 802-0081642
2	SOC14	SOCKET-IC 14 PIN	WLLS 802-14-1642
1	SW402	SWITCH-2P/1STA ALT ACT	MPB21S-A (F2UEE)
SCH	C202-132		
PCA	C202-532		

SOUND WORKSHOP SERIES 34 PARTS LIST

34ERM - MAIN ASSEMBLY
[PL#: 202-550]

Qty	Reference #	Description	Part Number
1	PL202-551	34ERM ERPC	PCA-S34 ECHO RET
1	PL202-552	34ERM ERTK	PCA-24 TK ASSIGN
1	DT202-450	DETAIL-ECHO PANEL, S34	D202-450 rev B
2	CKBU	CAP-KNOB 15MM BLU W/LINE	C151-BLUE
4	CKGY	CAP-KNOB 15MM GRY W/LINE	C151-GRAY
7	JS03	JUMPER, STRIP 3 POSITION	
6	KPBK	KNOB-15MM X 6MM PUSH ON	DC150-006 BLACK
1	K5A-6	KNOB-MEDIUM (BLACK) 6MM	K5A-6
1	MICGRILL		
7	NH7MM	NUT-HEX S/W ALPS POTS	7MM
4	NK4	NUT-KEP 4-40	
4	P014F	POT-16MM 10KA W/FLAT SH	Revised 07/02/81
2	P016F	POT-16MM 10KB W/FLT DNT	Revised 07/02/81
4	SF4B1/4	SCREW-FLHD BLK 4-40x1/4	100D-STL-CR RECS
18	WAF7MM		
7	WAL7MM	WASHER-LOCK S/W ALPS POT	7MM
1	WCBK2.25	WIRE-CUT BLACK 2.25"	#22 TOP COAT PVC
1	WCG2.25	WIRE-CUT GREEN 2.25"	#22 TOP COAT PVC
1	WCV2.25	WIRE-CUT VIOLET 2.25"	#22 TOP COAT PVC
1	P016(OLD)		

SOUND WORKSHOP SERIES 34 PARTS LIST

34ERM - PCA-ECHO RETURN
[PL#: 202-551]

Qty	Reference #	Description	Part Number
1	PC202-451	PC-S30 AUX MODULE	D202-451 Rev B
13	B305GY	BUTTON-GRAY B305	J5230503501
4	B305W	BUTTON-WHITE B305	J5230502502
1	C.01U	CAP-MYLAR RAD .01UF	.01UF/10%/100V
1	C.47U	CAP-MYLAR RAD .47UF	B32511.47/5/100
1	C10-25R	CAP-ELECT RAD 10UF/25V	CEM25-0010
2	C100-16	CAP-ELECT RAD 100UF/16V	KSMM 100-16
2	C100P	CAP-CER DISC 100PF	50V SL 10%
12	C10P	CAP-CER DISC 10PF	50V N750 10%
12	C33-6	CAP-ELECT RAD 33UF-6V	CEM06-0033
1	C47P	CAP-CER DISC 47PF	50V N750 10%
1	CN02-65	CONN-2 PIN (M) LOCKING	3100-8-202-01
1	CN04-65	CONN-4 PIN (M) LOCKING	HLSR156-4
1	CN07-65	CONN-7 PIN (M) LOCKING	HLSR156-7
2	CN12-64	CONN-12 PIN (M) STRAIGHT	3100-1-212-01
1.166	CN12-66	CONN-12 PIN (M) RT ANGLE	3100-3-112-17
1	CN26-25	CONN-26 PIN (F) PC	SAE CR2505-26BST
2	D4001	DIODE-1N4002	1N4002
2	D4148	DIODE-1N4148	1N4148
1	D5245	DIODE-ZENER 1N5245B	1N5245B
1	I339	IC-QUAD COMPARATOR	LM339N
1	I4558	IC-4558	RC4558NB
7	I5532	DUAL LOW NOISE OP AMP	NE5532AP
1	ILR7805	IC-5V REG. %5 TOLERANCE	uA78L05ACLP
1	JU40B	JUMPER WIRE-BARE #24 .40	J0.40X.25 B 24
3	LEDG-L	LED T1-3/4 GREEN	SA543G
1	LEDR	LED T1-RED	QEC209A
1	LEDR-L	LED T1-3/4 RED	SA543R
5	LEDY-L	LED T1-3/4 YELLOW	SA543Y
1	MIC	MICROPHONE-NIPPON	EM-10LB
1	PT1	POT-TRIM 50K LINEAR	X201-R503-B
2	R100	RESISTOR-1/4 5% 100	CF25
3	R10K	RESISTOR-1/4 5% 10K	CF25
1	R1K	RESISTOR-1/4 5% 1K	CF25
3	R20K	RESISTOR-1/4 5% 20K	CF25
3	R22K	RESISTOR-1/4 5% 22K	CF25
2	R27	RESISTOR-1/4 5% 27	CF25
2	R27K	RESISTOR-1/4 5% 27K	CF25
3	R3.3K	RESISTOR-1/4 5% 3.3K	CF25
1	R3.9K	RESISTOR-1/4 5% 3.9K	CF25
2	R330	RESISTOR-1/4 5% 330	CF25
1	R390	RESISTOR-1/4 5% 390	CF25
1	R470	RESISTOR-1/4 5% 470	CF25
4	R47K	RESISTOR-1/4 5% 47K	CF25
2	R5.1K	RESISTOR-1/4 5% 5.1K	
4	R6.8K	RESISTOR-1/4 5% 6.8K	CF25
1	R820	RESISTOR-1/4 5% 820	CF25

SOUND WORKSHOP SERIES 34 PARTS LIST

34ERM - PCA-ECHO RETURN
[PL#: 202-551]

Qty	Reference #	Description	Part Number
7	R82K	RESISTOR-1/4 5% 82K	CF25
2	RS4-10K	RESISTOR-SIP 4X10K 2%	
13	RS4-47K	RESISTOR-SIP 4X47K 2%	
8	SOC08	SOCKET-IC 8 PIN	WLLS 802-0081642
1	SOC14	SOCKET-IC 14 PIN	WLLS 802-14-1642
9	SW402	SWITCH-2P/1STA ALT ACT	MPB21S-A (F2UEE)
1	SW403	SWITCH-2P/4STA INTLKD	2KBC0400001037
4	SW407	SWITCH-4P ALT ACTION	MPB41S-A (F4UEE)
3	T51A	TRANSISTOR-PNP 1 AMP	ZTX550
SCH	D202-151		
PCA	D202-551		

SOUND WORKSHOP SERIES 34 PARTS LIST

34ERM - PCA-24 TRK ASSIGN
[PL#: 202-552]

Qty	Reference #	Description	Part Number
1	PC202-420	PCB-SW BD, 24 TK ASSN	A202-420 Rev D
1	PC202-421	PCB-RES BD, 24 TK ASSN	A202-421 Rev B
12	B34	BUTTON-S34	B34
1	HDR26L	HEADER-26 PIN LONG TAIL	SAE CHD6926-W3S
.5	HDR60	HEADER-60 PIN	SAE CHD6960W1S
1	JU40B	JUMPER WIRE-BARE #24 .40	J0.40X.25 B 24
24	R47K	RESISTOR-1/4 5% 47K	CF25
3	SP4B1/4	SCREW-PNHD BLK 4-40x1/4	STL-CROSS RECESS
1	SPA3368	WASHER,FIBRE .062 THK	3368
3	ST4-1/2	STANDOOF-1/4HX 4-40X1/2	1450C
12	SW411	SWITCH-2 POLE LATCHING	SPH121A
3	WAL4	WASHER-LK INT TH #4	
SCH	A202-124		
PCA	A202-524		

SOUND WORKSHOP SERIES 34 PARTS LIST

34CRM - PCA-COMMUNICATIONS BOARD
[PL#: 202-553]

Qty	Reference #	Description	Part Number
1	PC902-453	PC BD-COMM MOD SERIES 30	C902-453A
2	BFGGY	BUTTON-GRAY FG	FG-GRAY/TAG-GRAY
4	BFMGY	BUTTON-FM GRAY	FM-GRAY/TAM-GRAY
2	BR612	BRACKET-KEYSTONE # 612	612
1	C.0047U	CAP-MYLAR RAD .0047UF	CP100K0047
1	C.01U	CAP-MYLAR RAD .01UF	.01UF/10%/100V
1	C.033U	CAP-MYLAR RAD .033UF	.033UF/10%/100V
2	C.047U	CAP-MYLAR RAD .047UF	CP100K0470
1	C.47U	CAP-MYLAR RAD .47UF	B32511.47/5/100
2	C1-50	CAP-ELECT AX 1UF/50V	1UF/50V/AX
2	C10-25R	CAP-ELECT RAD 10UF/25V	CEM25-0010
4	C100-16	CAP-ELECT RAD 100UF/16V	KSMM 100-16
3	C22-16	CAP-ELECT AX 22UF/16V	CET16-0022
1	C33-6	CAP-ELECT RAD 33UF-6V	CEM06-0033
1	C470-6	CAP ELECT RAD 470UF/6.3V	CEM06-0470
2	C470P	CAP-CER DISC 470PF	50V SL 10%
2	CN09-52	CONN-9 PIN (F) RT ANGLE	09-52-3091
10	D4148	DIODE-1N4148	1N4148
1	I2206	IC-2206	XR2206
1	I351	IC-OP AMP, BI FET, SINGL	LF351N (NAT.)
1	I356	IC-356	LF356N
1	I4741	IC-4741	HA3-4741-5
1	I5011	IC-5011	IH5011CPE
1	LEDR	LED T1-RED	QEC209A
1	LEDY	LED T1-YELLOW	QEC409A
1	LEDY-L	LED T1-3/4 YELLOW	SA543Y
2	P014F	POT-16MM 10KA W/FLAT SH	Revised 07/02/81
1	P014LPC	POT-10K AUDIO LPC	P014LPC
1	P029F	POT-16MM 2x200KC W/FL SH	Revised 07/02/81
3	PT1	POT-TRIM 50K LINEAR	X201-R503-B
1	PT2	POT-TRIM 50K LOG	CY4844
1	PT3	POT-TRIM 15T 500	3006-W-1-501
2	R10	RESISTOR-1/2 5% 10	CF50
1	R100	RESISTOR-1/4 5% 100	CF25
12	R100K	RESISTOR-1/4 5% 100K	CF25
5	R10K	RESISTOR-1/4 5% 10K	CF25
1	R15K	RESISTOR-1/4 5% 15K	CF25
2	R2.2K	RESISTOR-1/4 5% 2.2K	CF25
4	R220	RESISTOR-1/4 5% 220	CF25
12	R22K	RESISTOR-1/4 5% 22K	CF25
1	R330	RESISTOR-1/4 5% 330	CF25
3	R39K	RESISTOR-1/4 5% 39K	CF25
2	R4.7K	RESISTOR-1/4 5% 4.7K	CF25
4	R47	RESISTOR-1/4 5% 47	CF25
2	R470	RESISTOR-1/4 5% 470	CF25
4	R47K	RESISTOR-1/4 5% 47K	CF25
2	R5.1K	RESISTOR-1/4 5% 5.1K	

SOUND WORKSHOP SERIES 34 PARTS LIST

34CRM - PCA-COMMUNICATIONS BOARD
[PL#: 202-553]

Qty	Reference #	Description	Part Number
2	RPA1/8	RIVET-POP 1/8X1/8 ALUM	EA42
2	SOC08	SOCKET-IC 8 PIN	WLLS 802-0081642
1	SOC14	SOCKET-IC 14 PIN	WLLS 802-14-1642
2	SOC16	SOCKET-IC 16 PIN	WLLS 802-0161642
2	SW401	SWITCH-2P/1STA MOM	F2U0A-51213
4	SW402	SWITCH-2P/1STA ALT ACT	MPB21S-A (F2UEE)
6	T01A	TRANSISTOR-NPN 1 AMP	ZTX450
1	T271	TRANSISTOR-P CHAN FET	SILICONIX J271
2	T51A	TRANSISTOR-PNP 1 AMP	ZTX550
1	WCG2.25	WIRE-CUT GREEN 2.25"	#22 TOP COAT PVC
1	WCG3.5	WIRE-CUT GREEN 3.50"	#22 TOP COAT PVC
1	WCO3.5	WIRE-CUT ORANGE 3.50"	#22 TOP COAT PVC
2	WCG4.5	WIRE-CUT GREEN 4.50"	#22 TOP COAT PVC
2	WCO4.5	WIRE-CUT ORANGE 4.50"	#22 TOP COAT PVC
2	WCR4.5	WIRE-CUT RED 4.50"	#22 TOP COAT PVC
ASY	C902-553		
SCH	D902-153		

SOUND WORKSHOP SERIES 34 PARTS LIST

34CRM - PCA-SWITCH BOARD
[PL#: 202-554]

Qty	Reference #	Description	Part Number
1	PC902-454	PC BD-SWITCH MOD SER 30	D902-454A
12	B305GY	BUTTON-GRAY B305	J5230503501
3	B305W	BUTTON-WHITE B305	J5230502502
1	BR612	BRACKET-KEYSTONE # 612	612
3	C.047U	CAP-MYLAR RAD .047UF	CP100K0470
2	C.068U	CAP-MYLAR RAD .068UF	B32510.068/5/100
1	C.47U	CAP-MYLAR RAD .47UF	B32511.47/5/100
4	C10-25R	CAP-ELECT RAD 10UF/25V	CEM25-0010
4	C10P	CAP-CER DISC 10PF	50V N750 10%
4	C22-16	CAP-ELECT AX 22UF/16V	CET16-0022
1	CN04-65	CONN-4 PIN (M) LOCKING	HLSR156-4
1	CN07-75	CONN-7 PIN (M) ANG. LOCK	HLAS156-7
2	CN09-52	CONN-9 PIN (F) RT ANGLE	09-52-3091
1	CN12-52	CONN-12 PIN (F) RT ANGLE	09-52-3121
4	D4148	DIODE-1N4148	1N4148
1	I339	IC-QUAD COMPARATOR	LM339N
1	I4558	IC-4558	RC4558NB
1	I4605	IC-QUAD OP AMP	HA1-4605-5
2	I5011	IC-5011	IH5011CPE
3	JU50T	JUMPER WIRE-TEFL #22 .50	J0.50X.25 T 22
3	LEDG-L	LED T1-3/4 GREEN	SA543G
1	LEDR	LED T1-RED	QEC209A
1	LEDR-L	LED T1-3/4 RED	SA543R
1	LEDY-L	LED T1-3/4 YELLOW	SA543Y
1	PT1	POT-TRIM 50K LINEAR	X201-R503-B
6	R100K	RESISTOR-1/4 5% 100K	CF25
13	R10K	RESISTOR-1/4 5% 10K	CF25
4	R1K	RESISTOR-1/4 5% 1K	CF25
1	R2.2K	RESISTOR-1/4 5% 2.2K	CF25
7	R20K	RESISTOR-1/4 5% 20K	CF25
1	R3.3K	RESISTOR-1/4 5% 3.3K	CF25
1	R3.9K	RESISTOR-1/4 5% 3.9K	CF25
1	R330	RESISTOR-1/4 5% 330	CF25
1	R390	RESISTOR-1/4 5% 390	CF25
12	R39K	RESISTOR-1/4 5% 39K	CF25
1	R470	RESISTOR-1/4 5% 470	CF25
3	R47K	RESISTOR-1/4 5% 47K	CF25
2	R5.1K	RESISTOR-1/4 5% 5.1K	
1	R68K	RESISTOR-1/4 5% 68K	CF25
1	R820	RESISTOR-1/4 5% 820	CF25
1	RPA1/8	RIVET-POP 1/8X1/8 ALUM	EA42
1	SOC08	SOCKET-IC 8 PIN	WLLS 802-0081642
2	SOC14	SOCKET-IC 14 PIN	WLLS 802-14-1642
2	SOC16	SOCKET-IC 16 PIN	WLLS 802-0161642
4	SP4B3/8	SCREW-PNHD BLK 4-40x3/8	STL-CROSS RECESS
2	SU1647	SUPPORT-BOARD 1647	1647
2	SW402	SWITCH-2P/1STA ALT ACT	MPB21S-A (F2UEE)

SOUND WORKSHOP SERIES 34 PARTS LIST

34CRM - PCA-SWITCH BOARD
[PL#: 202-554]

Qty	Reference #	Description	Part Number
3	SW403	SWITCH-2P/4STA INTLKD	2KBC0400001037
1	SW407	SWITCH-4P ALT ACTION	MPB41S-A (F4UEE)
3	T51A	TRANSISTOR-PNP 1 AMP	ZTX550
4	WAL4	WASHER-LK INT TH #4	
1	WCG3.5	WIRE-CUT GREEN 3.50"	#22 TOP COAT PVC
SCH	D202-154		
PCA	D202-554		

SOUND WORKSHOP SERIES 34 PARTS LIST

34CRM - WIRING LIST
[PL#: 202-556]

Qty	Reference #	Description	Part Number
1	CN04-50	CONN-4 PIN (F) SHELL	09-50-3041
1	CN07-50	CONN-7 PIN (F) SHELL	09-50-3071
11	TCST	TERMINAL-CRIMP STR	08-50-0106
4	TWS	TIE WRAP-4" LONG	T18R (08-432)
2	WCBK3.5	WIRE-CUT BLACK 3.50"	#22 TOP COAT PVC
1	WCO5	WIRE-CUT ORANGE 5.00"	#22 TOP COAT PVC
1	WCY5	WIRE-CUT YELLOW 5"	#22 TOP COAT PVC
1	WCBR7	WIRE-CUT BROWN 7.00"	MW22 SOLID TC
1	WCR7	WIRE-CUT RED 7.00"	#22 TOP COAT PVC
1	WCBR11	WIRE-CUT BROWN 11.00"	MW22 SOLID TC
1	WCBU11	WIRE-CUT BLUE 11.00"	MW22 SOLID TC
1	WCG11	WIRE-CUT GREEN 11.00"	MW22 SOLID TC
1	WCO11	WIRE-CUT ORANGE 11.00"	MW22 SOLID TC
1	WCR11	WIRE-CUT RED 11.00"	MW22 SOLID TC
1	WCV11	WIRE-CUT VIOLET 11.00"	MW22 SOLID TC
1	WCY11	WIRE-CUT YELLOW 11.00"	MW22 SOLID TC

SOUND WORKSHOP SERIES 34 PARTS LIST

34HIRES - PCA-CONTROL BOARD
[PL#: 202-561]

Qty	Reference #	Description	Part Number
1	PL202-562	34HR HRD	DISPLAY ASSEMBLY
1	PC202-461	PC BOARD, S30 HI RES VU	C202-461 Rev A
1	C.22U	CAP-MYLAR RAD .22UF	B32511.22/5/100
2	C.47U	CAP-MYLAR RAD .47UF	B32511.47/5/100
2	C100-16	CAP-ELECT RAD 100UF/16V	KSMM 100-16
2	C150P	CAP-CER DISC 150PF	50V SL 10%
2	C18P	CAP-CER DISC 18PF	50V N750 10%
1	C33-6	CAP-ELECT RAD 33UF-6V	CEM06-0033
1	C47P	CAP-CER DISC 47PF	50V N750 10%
1	CN08-64	CONN-8 PIN (M) LONG RND	3100-1-208-07
1	CN12-66	CONN-12 PIN (M) RT ANGLE	3100-3-112-17
2	D4001	DIODE-1N4002	1N4002
5	D4148	DIODE-1N4148	1N4148
2	I074	OP AMP-QUAD BI-FET	TL074CN
1	I4053	IC-3XSPDT ANA SW CMOS	MC14053BCP
2	PT5	POT-TRIM 10MM 50K 20%	PTC-10V 50K
2	R100K	RESISTOR-1/4 5% 100K	CF25
2	R12K	RESISTOR-1/4 5% 12K	CF25
2	R150K	RESISTOR-1/4 5% 150K	
2	R1M	RESISTOR-1/4 5% 1M	CF25
1	R2.2K	RESISTOR-1/4 5% 2.2K	CF25
3	R2.2M	RESISTOR-1/4 5% 2.2M	CF25
3	R20K	RESISTOR-1/4 5% 20K	CF25
2	R27K	RESISTOR-1/4 5% 27K	CF25
2	R47K	RESISTOR-1/4 5% 47K	CF25
1	R5.6K	RESISTOR-1/4 5% 5.6K	CF25
1	R82K	RESISTOR-1/4 5% 82K	CF25
1	RS4-10K	RESISTOR-SIP 4X10K 2%	
1	RS4-20K	RESISTOR-SIP 4X20K 2%	
2	RS4-47K	RESISTOR-SIP 4X47K 2%	
2	SOC14	SOCKET-IC 14 PIN	WLLS 802-14-1642
1	SOC16	SOCKET-IC 16 PIN	WLLS 802-0161642
PCA	A202-561		
2	PT5H	POT-TRIM 10MM 47K 20%	PTC-10H(2.5) 47K

SOUND WORKSHOP SERIES 34 PARTS LIST

34HIRES - DISPLAY ASSEMBLY
[PL#: 202-562]

Qty	Reference #	Description	Part Number
1	PC202-462	PC BOARD S30 DRVR/DSPLY	C202-462 Rev A
1	DT202-469	DETAIL-PANEL, 34HRVU	A202-469 rev B
4	BR612	BRACKET-KEYSTONE # 612	612
1	CN06-52	CONN-6 PIN (F) VERT/TOP	3000-006-2101
1	D4148	DIODE-1N4148	1N4148
1	HN40	SPEC-40 SEG VU NETWORK	-1, -2 & -3 revB
10	I339	IC-QUAD COMPARATOR	LM339N
1	JS03	JUMPER, STRIP 3 POSITION	
40	JU40B	JUMPER WIRE-BARE #24 .40	J0.40X.25 B 24
2	LEDG-10	LED-10 SEGMENT GREEN	H/P HDSP-4850
1	LEDR-10	LED-RED 10 SEGMENT	H/P HDSP-4830
1	LEDY-10	LED-YELLOW 10 SEGMENT	H/P HDSP-4840
2	R2.2K	RESISTOR-1/4 5% 2.2K	CF25
3	R270	RESISTOR-1/4 5% 270	CF25
1	R470	RESISTOR-1/4 5% 470	CF25
1	R47K	RESISTOR-1/4 5% 47K	CF25
2	R5.6K	RESISTOR-1/4 5% 5.6K	CF25
10	SOC14	SOCKET-IC 14 PIN	WLLS 802-14-1642
5	SOC16	SOCKET-IC 16 PIN	WLLS 802-0161642
4	SP4B1/4	SCREW-PNHD BLK 4-40x1/4	STL-CROSS RECESS
4	SP4B3/16	SCREW-PNHD BK 4-40X3/16	STL-CROSS RECESS
1	T01A	TRANSISTOR-NPN 1 AMP	ZTX450
4	T51A	TRANSISTOR-PNP 1 AMP	ZTX550
PCA	A202-562		

SOUND WORKSHOP SERIES 34 PARTS LIST

34CRM - MAIN ASSEMBLY
[PL#: 202-570]

Qty	Reference #	Description	Part Number
4	PL007-541	3CRM/34CRM 3BOC	PCA-BAL OUT CARD
1	PL202-553	34CRM CM	COMM. MOD PCA
1	PL202-554	34CRM SM	SWITCH MOD PCA
1	PL202-556	SERIES 34 CRW	WIRING LIST-34CR
1	PL612-515	ARMS MKPC	ARMS MSTR KEY BD
1	PL912-551	3CRM CRPC	PCA-MASTER
1	PL912-552	3CRM ECPC	ECHO/CUE POT ASY
1	CK151	CAP-KNOB 15MM BLK W/LINE	C151-BLACK
3	CKBU	CAP-KNOB 15MM BLU W/LINE	C151-BLUE
2	CKGY	CAP-KNOB 15MM GRY W/LINE	C151-GRAY
2	CKN151	COVER-NUT 15MM BLACK	N151
1	DT202-477	DETAIL-PC BRACKET	A202-477 rev A
1	DT202-479	DETAIL-PANEL S34 C/R	D202-479
4	JU7X10	DETAIL-JUMPER S30 CRM	
1	K5A	KNOB-MEDIUM (BLACK)	3092B1-21 KNOB
8	K5A-6	KNOB-MEDIUM (BLACK) 6MM	K5A-6
4	KA	KNOB-SLIDER	01 LA 132 04
2	KPBK	KNOB-15MM X 6MM PUSH ON	DC150-006 BLACK
2	KPGY	KNOB-15MM X 6MM PUSH ON	DC150-006-GRAY
2	KS151	KNOB-15MM BLACK (SELCO)	S151-250
1	NH38	NUT-HEX BLK 3/8-32	1/2" ACROSS FLTS
12	NH7MM	NUT-HEX S/W ALPS POTS	7MM
2	NH9MM	NUT-HEX S/W ALPS POTS	9MM
1	P014F	POT-16MM 10KA W/FLAT SH	Revised 07/02/81
2	P021	POT-DUAL 10K AUDIO	Revised 11/13/81
4	P022	POT-SLIDE 60MM 10K LOG	LDE4A00410KA
2	SF4B1/4	SCREW-FLHD BLK 4-40x1/4	100D-STL-CR RECS
7	SP4B1/4	SCREW-PNHD BLK 4-40x1/4	STL-CROSS RECESS
10	SP4B3/8	SCREW-PNHD BLK 4-40x3/8	STL-CROSS RECESS
2	SP6B1/4	SCREW-PNHD BLK 6-32X1/4	STL-CROSS RECESS
12	SPA875	SPACER-#4X1/8" NYLON	875
16	WAF7MM		
1	WAL38	WASHER-LK INT TH 3/8ID	
2	WAL4	WASHER-LK INT TH #4	
12	WAL7MM	WASHER-LOCK S/W ALPS POT	7MM
2	WAL9MM	WASHER-LOCK S/W ALPS POT	9MM
ASY	B202-570		

SOUND WORKSHOP SERIES 34 PARTS LIST

4VCC - PCA-VCA AUDIO CARD
[PL#: 203-583]

Qty	Reference #	Description	Part Number
1	PC203-483	PC BD-VCA ASSY (TA101)	A203-483 rev B
2	C.022U	CAP-MYLAR RAD .022UF	.022UF/10%/100V
1	C.1U	CAP-MYLAR RAD .1UF	CP100K1000
1	C150P	CAP-CER DISC 150PF	50V SL 10%
1	C33-6	CAP-ELECT RAD 33UF-6V	CEM06-0033
1	C47P	CAP-CER DISC 47PF	50V N750 10%
1	CN09-52	CONN-9 PIN (F) RT ANGLE	09-52-3091
2	I351	IC-OP AMP, BI FET, SINGL	LF351N (NAT.)
1	I4558	IC-4558	RC4558NB
1	ILR7805	IC-5V REG. %5 TOLERANCE	uA78L05ACLP
2	PT5	POT-TRIM 10MM 50K 20%	PTC-10V 50K
1	PT6	POT-TRIM 3/8 SQ 100 OHMS	3386P-1-101
1	PT7	POT-TRIM 3/8 SQ 1K OHMS	3386P-1-102
1	R1.6K	RESISTOR-1/4 5% 1.6K	CF25
2	R10-1/4	RESISTOR-1/4 5% 10	
1	R100K	RESISTOR-1/4 5% 100K	CF25
3	R10K	RESISTOR-1/4 5% 10K	CF25
1	R12K	RESISTOR-1/4 5% 12K	CF25
2	R1M	RESISTOR-1/4 5% 1M	CF25
1	R22K	RESISTOR-1/4 5% 22K	CF25
1	R27K	RESISTOR-1/4 5% 27K	CF25
1	R3.3K	RESISTOR-1/4 5% 3.3K	CF25
3	R33	RESISTOR-1/4 5% 33	CF25
2	R6.8K	RESISTOR-1/4 5% 6.8K	CF25
2	R680	RESISTOR-1/4 5% 680	CF25
1	R8.2K	RESISTOR-1/4 5% 8.2K	CF25
1	R82	RESISTOR-1/4 5% 82	CF25
1	RS4-20K	RESISTOR-SIP 4X20K 2%	
1	RS4-47K	RESISTOR-SIP 4X47K 2%	
3	SOC08	SOCKET-IC 8 PIN	WLLS 802-0081642
1	SPA3368	WASHER,FIBRE .062 THK	3368
2	T51A	TRANSISTOR-PNP 1 AMP	ZTX550
2	T75	TRANSISTOR-N CHAN FET	TIS-75
1	TA101	TRANSISTOR ARRAY, VCA	TA 101
ASSY	B203-583		

SOUND WORKSHOP SERIES 34 PARTS LIST

34CRM - ARMS MASTER KEYPAD
[PL#: 612-515]

Qty	Reference #	Description	Part Number
1	PC612-415	PC-ARMS MASTER KEYBOAD	A612-415 Rev B
16	B410	BUTTON, RELEGENDABLE	B410WT
1	D414B	DIODE-1N4148	1N4148
.66	HDR60	HEADER-60 PIN	SAE CHD6960W1S
12	JU40B	JUMPER WIRE-BARE #24 .40	J0.40X.25 B 24
1	LEDG-L	LED T1-3/4 GREEN	SA543G
11	LEDR-L	LED T1-3/4 RED	SA543R
4	LEDY-L	LED T1-3/4 YELLOW	SA543Y
4	NK4	NUT-KEP 4-40	
14	R10K	RESISTOR-1/4 5% 10K	CF25
4	RS4-680	RESISTOR-SIP 4 x 680 2%	
4	SP4C3/8	SCREW-PNHD BLK 4-40X3/8	
4	ST4-1/2	STANDOOF-1/4HX 4-40X1/2	1450C
16	SW411	SWITCH-2 POLE LATCHING	SPH121A
2	WCG1.38	WIRE-CUT GREEN 1.38"	#22 TOP COAT PVC
SCH	A612-115		
PCA	A612-515		

SOUND WORKSHOP SERIES 34 PARTS LIST

34CRM - PCA-MASTER
[PL#: 912-551]

Qty	Reference #	Description	Part Number
1	PC912-451	PC BD-S30 CRM	D912-451 Rev C
13	C10P	CAP-CER DISC 10PF	50V N750 10%
8	C100P	CAP-CER DISC 100PF	50V SL 10%
3	C470P	CAP-CER DISC 470PF	50V SL 10%
2	C.047U	CAP-MYLAR RAD .047UF	CP100K0470
15	C33-6	CAP-ELECT RAD 33UF-6V	CEM06-0033
3	C100-16	CAP-ELECT RAD 100UF/16V	KSMM 100-16
1.66	CN64	CONN-STR RND 24 PIN .156	MFSR156-24
3.33	CN65	CONN-ST LOCK 24 PIN .156	MLSR156-24
1	CN07-75	CONN-7 PIN (M) ANG. LOCK	HLAS156-7
10	CN12-64	CONN-12 PIN (M) STRAIGHT	3100-1-212-01
1	CN12-65	CONN-12 PIN (M) LOCKING	HLSR156-12
1	CN12-66	CONN-12 PIN (M) RT ANGLE	3100-3-112-17
2	D4001	DIODE-1N4002	1N4002
1	I4558	IC-4558	RC4558NB
4	I5532	DUAL LOW NOISE OP AMP	NE5532AP
7	I5534	IC-5534	NE5534N
4	PT5	POT-TRIM 10MM 50K 20%	PTC-10V 50K
4	PT10	POT-TRIM 10MM 10K 20%	PTC-10V 10K
6	R27	RESISTOR-1/4 5% 27	CF25
7	R47	RESISTOR-1/4 5% 47	CF25
7	R100	RESISTOR-1/4 5% 100	CF25
1	R5.1K	RESISTOR-1/4 5% 5.1K	
1	R10K	RESISTOR-1/4 5% 10K	CF25
4	R22K	RESISTOR-1/4 5% 22K	CF25
4	R33K	RESISTOR-1/4 5% 33K	CF25
24	R47K	RESISTOR-1/4 5% 47K	CF25
8	R51K	RESISTOR-1/4 5% 51K	CF25
15	R82K	RESISTOR-1/4 5% 82K	CF25
4	R100K	RESISTOR-1/4 5% 100K	CF25
1	R270K	RESISTOR-1/4 5% 270K	CF25
3	R470K	RESISTOR-1/4 5% 470K	CF25
12	SOC08	SOCKET-IC 8 PIN	WLLS 802-0081642
1	T51A	TRANSISTOR-PNP 1 AMP	ZTX550
4	T75	TRANSISTOR-N CHAN FET	TIS-75
1	WCBK2.25	WIRE-CUT BLACK 2.25"	#22 TOP COAT PVC
SCH ASSY	D912-151 D912-551		

SOUND WORKSHOP SERIES 34 PARTS LIST

34CRM - ECHO/CUE POT ASSEMBLY
[PL#: 912-552]

Qty	Reference #	Description	Part Number
4	CN07-75	CONN-7 PIN (M) ANG. LOCK	HLAS156-7
4	C470P	CAP-CER DISC 470PF	50V SL 10%
6	JU40B	JUMPER WIRE-BARE #24 .40	J0.40X.25 B 24
6	P014PC	POT-10K AUDIO PC	Revised 11/13/81
2	P038PC	POT-20KBX2 DETENT	rev of 12/07/81
4	PC912-452	PC BD-S30 CR AUX CONTROL	B912-452 rev B
4	R51K	RESISTOR-1/4 5% 51K	CF25
SCH	B912-152		
ASY	B912-552-1 2 REQ		
ASY	B912-552-2 2 REQ		

PARTS LIST

POWER-ONE D.C. POWER SUPPLIES

DWG. NO. PL.53126-101

SHEET 2 OF 2

REV. SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
1	1	1	081-52982-101	P.W.B ASSEMBLY	BD# 52980	A1
2		1	082-50213	TRANSFORMER		T1
3		1	412-50212	CHASSIS W / SILKSCREEN	50140	
4		2	171-10261	TRANSISTOR	2N6569	Q4,6
5		1	171-10262	TRANSISTOR	2N3055	Q1
6		4	340-10603	KEP-NUTS # 8-32		
7		3	320-10288	INSULATOR MICA		
8		3	320-10290	INSULATOR MC NABB		
9		6	350-10206	SCREWS B.H #6-32 7/16		
10		1	316-20664	TYWRAP		
11						
12						
13						
14						
15						
16						
17						
18						

ORIGINAL

AUG 15 1983

PARTS LIST

POWER-ONE D.C. POWER SUPPLIES

DWG. NO. PL.52982 - 101

SHEET 2 OF 4

REV. SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
1		1	505-52981	PRINTED WIRING BOARD	BD. 52980	A1
2		REF	50213	TRANSFORMER		T1
3						
4		3	154-20020	POTENTIOMETER 2K		R7, 31, 37
5		1	154-20937	POTENTIOMETER 500Ω		R3
6						
7		2	158-10082	RESISTOR .56Ω 2W, 10% BWH		R23, 27
8		1	150-20372	3.6K 1/4W 5% CF		R8
9		1	150-20293	1Ω		R2
10		2	150-20315	15Ω		R5, 25
11		3	150-20307	6.8Ω		R11, 13, 14
12		2	150-20327	47Ω		R10, 22
13		5	150-20343	220Ω		R1, 12, 19, 20, 28
14		2	150-20347	330Ω		R16, 34
15		3	150-20356	750Ω		R24, 40, 42
16		10	150-20361	1.2K		R6, 9, 17, 18, 26, 29, 35, 38, 41, 43
17		3	150-20363	1.5K		R4, 15, 33
18		3	150-20368	RESISTOR 2.4K 1/4W 5% CF		R30, 32, 36

PARTS LIST

POWER-ONE D.C. POWER SUPPLIES

DWG. NO. PL. 52982-101 | SHEET 3 OF 4 | REV. SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
19		1	150-20369	RESISTOR 2.7K 1/4W 5% CF		R21
20		1	150-20383	RESISTOR 10K 1/4W 5% CF		R39
21		3	130-10287	IC VOLTAGE REGULATOR	μA 723	U1,2,3
22						
23		1	172-20771	TRANSISTOR NPN	TIP-29A	Q2
24		REF	171-10262	NPN	2N3055	Q1
25		REF	171-10261	NPN	2N6569	Q4,6
26		2	172-10248	TRANSISTOR PNP	2N2907	Q3,5
27						
28		1	160-10013	SCR 8A 50V	S0508LS3	SCR1
29		4	111-20590	DIODE 1.5A 100V	IN5392	CR6,7,8,9
30		6	111-10251	DIODE 1A 200V	IN4003	CR3,5,10,11,13,14
31		2	111-10256	6A 50V	MR 750	CR1,2
32		1	112-10006	ZENER 5.6V	IN752A	CR4
33		1	112-10009	DIODE ZENER 15V	IN965B	CR12
34						
35		1	101-20950	CAPACITOR ELECT. 22,000uf / 16V		C1
36		2	101-20934	CAPACITOR ELECT. 2200uf / 35V		C5,9

PARTS LIST

POWER-ONE D.C. POWER SUPPLIES

DWG. NO. PL. 52982-101 | SHEET 4 OF 4 | REV. SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
37		1	101-10107	CAPACITOR ELECT. 220uf / 16V		C4
38		2	101-10110	100uf / 35V		C8, 12
39		1	101-10114	10uf / 25V		C6
40		2	101-10111	ELECT. 1uf / 50V		C3, 10
41		1	104-10093	MYLAR .001uf / 100V		C2
42		2	104-10092	CAPACITOR MYLAR .0033uf / 100V		C7, 11
43						
44		3	321-10679	IC SOCKET 14 PIN		FOR: U1, 2, 3
45						
46		2	916-21170	WIRE, 16AWG. BLK, 10" 1/4 x 3/8 T		A, A
47		1	916-21169	WIRE, 16AWG. WHT, 10" 1/4 x 3/8 T		AT
48		2	914-21065	WIRE, 20AWG. BLK, 5 1/2" 1/4 x 1/4 T		B, B
49		1	914-21021	WIRE, 20AWG. WHT, 6 1/2" 1/4 x 1/4 T		BT
50						
51						
52						
53						
54						

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PARTS LIST

Power-one D.C. POWER SUPPLIES

DWG. NO. PL. 51330-101

SHEET 2 OF 2

REV. SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
1		1	412-51332	CHASSIS, S.S.	52613	
2		1	081-51336-101	PRINTED WIRING BOARD	51334	A1
3		1	082-51333	TRANSFORMER		T1
4		1	171-10244	TRANSISTOR	2N3773	Q1
5		1	320-20626	INSULATOR NYLON (TO-3)		
6		1	320-10288	INSULATOR, MICA		
7		2	350-10206	SCREW PHIL B.H. 6-32 X 7/16		
8		4	340-10602	NUT, KEPS 6-32		
9		REF.	51336	SCHEMATIC		

PARTS LIST

Power-One D.C. Power Supplies

DWG. NO. PL. 51336-101 | SHEET 2 OF 3 | REV. SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
1		1	505-51335	PRINTED WIRING BOARD	BD#51334	PWB
2						
3						
4						
5		2	154-20020	POTENTIOMETER 2K		R2,17
6						
7		3	151-10389	RESISTOR, 1/2W 5% C.F. 10K		R1,3,19
8		2	151-10406	1/2W 5% C.F. 51K		R4,15
9		1	151-10302	1/2W 5% CF 1.5Ω		R6
10		1	150-20361	1/4W 5% CF 1.2K		R5
11		3	-20347	330Ω		R7,9,10
12		3	-20375	4.7K		R8,13,18
13		1	-20343	220Ω		R11
14		1	-20327	47Ω		R12
15		1	-20367	2.2K		R14
16		1	150-20368	RESISTOR, 1/4W 5% C.F. 2.4K		R16
17						
18		1	130-10287	IC VOLTAGE REGULATOR	μA723	U1

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PARTS LIST

Power-one D.C. Power Supplies

DWG. NO. PL. 51336-101

SHEET 3 OF 3

REV. SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
19		1	172 - 10247	TRANSISTOR	ZN2219	Q2
20		REF.	171 - 10244	TRANSISTOR	ZN3773	Q1
21						
22		6	111 - 10001	DIODE, 1000V, 1A	IN4007	CR1,2,3,4,5,9
23		2	111 - 10251	DIODE, 200V, 1A	IN4003	CR 6,7
29		1	111 - 20058	DIODE, 100V, 0.2A	IN4448	CR8
25		2	105 - 10090	CAPACITOR CERAMIC .01uF/1KV		C6,10
26		2	101 - 21198	CAPACITOR, ALUM.ELECT 220uF/100V		C1,8
27		1	-10109	330uF/35V		C2
28		1	-10110	100uF/35V		C3
29		1	-10107	220uF/16V		C5
30		1	101 -10116	ALUM.ELECT. 22uF/63V		C7
31	2	—	———	ALUM.ELECT.		C9
32		1	105 - 10088	CAPACITOR CERAMIC 200PF/1KV		C4
33						
34		1	321 - 10679	IC SOCKET, 14 PIN		FOR:U1
35		2	914 - 21020	WIRE 20AWG BLK 4" 1/4 X 1/4T		A,A
36		2	914 - 21496	WIRE 20AWG WHT 4" 1/4 X 1/4T		B,B

PARTS LIST

Power-One D.C. Power Supplies

DWG. NO. PL.53611-101

SHEET 2 OF 2

RE SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
1		1	081-53615-101	PRINTED WIRING BOARD	BD.53613	A1
2		1	082-53612	TRANSFORMER		T1
3		1	412-53908	CHASSIS W/SILKSCREEN	50300	
4						
5		1	171-10261	TRANSISTOR, NPN	2N6569	Q1
6		4	171-10262	TRANSISTOR, NPN	2N3055	Q2,3,5,6
7		5	320-10288	INSULATOR, MICA		
8		5	320-10290	INSULATOR, MCNABB		
9		10	350-10206	SCREW, 6-32 X 7/16" B.H.		
10						
11		2	103-21258	CAPACITOR ELECT. 23000uf/35V.		C1,2
12		4	358-21318	SCREW, ALLEN 10-32 X 3/8		
13		4	392-10829	WASHER, INTERNAL STAR, #10		
14						
15		4	340-10603	KEP, NUTS 8-32		
16						
17						
18						

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PARTS LIST

Power-one D.C. Power Supplies

DWG. NO. PL. 53615-101 | SHEET 2 OF 3 | REV. SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
1		1	505-53614	PRINTED WIRING BOARD	BD# 53613	A1
2						
3		2	154-20937	POTENTIOMETER HORIZ. 500Ω		R1, 20
4		2	154-20020	POTENTIOMETER HORIZ. 2K		R26, 29
5						
6		2	158-10077	RESISTOR .12 2W 10% BWH		R21, 22
7		4	158-10078	.18 2W 10% BWH		R4, 5, 15, 16
8		8	151-10374	2.4K ½W 5% CF		R2, 9, 10, 13, 28, 33, 35, 38
9		5	-10349	220Ω		R3, 14, 24, 25, 32
10		1	-10345	150Ω		R6
11		3	-10365	1K		R7, 12, 17
12		1	-10381	4.7K		R8
13		1	-10411	82K		R11
14		1	-10392	13K		R18
15		1	-10372	2K		R19
16		1	-10373	2.2K		R23
17		2	-10367	1.2K		R27, 30
18		1	151-10389	RESISTOR 10K ½W 5% CF		R31

PARTS LIST

Power-One D.C. Power Supplies

DWG. NO. PL.53615-101

SHEET 3 OF 4

REV. SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
19		4	151-10313	RESISTOR 6.8Ω 1/2W 5% CF		R34,36,37,39
20						
		2	130-10287	I.C. VOLTAGE REGULATOR	μA723	U1,2
22						
23		REF	171-10261	TRANSISTOR, NPN	2N6569	Q1
24		REF	171-10262	" "	2N3055	Q2,3,5,6
25		1	172-20771	" "	TIP29A	Q4
26		1	172-10247	" NPN	2N2219	Q8
27		1	172-10248	TRANSISTOR, PNP	2N2907	Q7
28						
29		4	111-10256	DIODE, 50V. 6A.	MR750	CR1,2,3,4
30		3	" -10251	" 200V. 1A.	1N4003	CR5,6,8
31		2	" -20058	" 100V. 0.2A.	1N4448	CR7,10
32		2	111-10252	" 100V. 3A.	1N5401	CR11,12
33		1	112-10009	" 15.0V. ZENER	1N965B	CR9
34		1	113-10751	DIODE, L.E.D. RED	L.E.D.	DS1
35						
36						

PARTS LIST

Power-one D.C. POWER SUPPLIES

DWG. NO. PL. 53615-101

SHEET 4 OF 4

RE SEE SHT. 1

ITEM NO.	NOTE	QTY REQD	POWER ONE STD PART NO.	DESCRIPTION.	VENDOR NO.	REF. DES.
37		REF	103-21258	CAPACITOR, ELECT. 23000uf/35V.		C1, 2
38		3	101-10114	10uf/25V.		C3, 7, 9
39		1	101-20063	220uf/50V.		C4
40		1	101-10111	1uf/50V.		C8
41		2	101-10109	ELECT. 330uF/35V		C6, 11
41		1	104-10093	FILM .001uF/100V		C5
42		1	104-10092	CAPACITOR, FILM .0033uF/1KV		C10
43		2	321-10679	I.C. SOCKET, 14 PIN		FOR: U1, 2
44		1	352-10218	SCREW, 6-32 X 5/16"		FOR: Q4
45						
46		2	916-21170	WIRE 16AWG. BLK. 10" 1/4 X 3/8 T		A, A
47		1	916-21169	WIRE 16AWG. WHT. 10" 1/4 X 3/8 T		AT
48		1	914-21101	WIRE 20AWG. WHT. 10" 1/4 X 3/8 T		BT
49						
50						
51						
52						
53						

ORIGINAL

DEC 19 1983

SOUND WORKSHOP

FIELD ENGINEERING BULLETIN #36

PRODUCT : SERIES 34 RECORD/MIX CONSOLES
SERIAL #: ALL
DATE : SEPTEMBER 2, 1985
CONTACT : LEE POMERANTZ
DRAWINGS:

TO ALL SERIES 34 OWNERS:

ENCLOSED PLEASE FIND A COPY OF THE SERIES 34 OWNERS MANUAL. WE WOULD LIKE TO THANK YOU FOR YOUR PATIENCE AND UNDERSTANDING OF THE DELAYS ASSOCIATED WITH THIS DOCUMENTATION. ADDITIONAL COPIES ARE AVAILABLE FROM YOUR SOUND WORKSHOP DEALER AT A PRICE OF $75.00 EACH.

NOTE THAT THIS MANUAL REPRESENTS CURRENT PRODUCTION SERIES 34B CONSOLES. WHILE THERE HAVE BEEN PERIODIC UPDATES AND REVISIONS, THESE CHANGES (WITH THE EXCEPTION OF THE PATCH BAY/STUDIO INTERFACE AND THE ARMS PROCESSOR) HAVE BEEN MINOR AND THE ENCLOSED MANUAL IS ACCURATE EVEN FOR VERY EARLY CONSOLES. THOSE OWNERS WHO HAVE SERIES 34A CONSOLES SHOULD INSERT THE DOCUMENTATION THEY RECEIVED WITH THEIR CONSOLE INTO THE FOLLOWING SECTIONS:

1. ALL CONSOLE TO STUDIO INTERFACE INFORMATION - PATCH BAY CARD ASSEMBLY AND SCHEMATIC DRAWINGS (SECTION 6), PATCH BAY WIRING CALL OUTS, AND MICROPHONE WIRING CALL OUTS (SECTION 2).

2. SCHEMATIC AND ASSEMBLY DRAWINGS FOR THE ARMS CONSOLE COMPUTER PROCESSOR (SECTION 6).

A NOTE TO ALL SERIES 34 OWNERS WHO HAVE THE ARMS CONSOLE COMPUTER: A REVISED AND UPDATED ARMS CONSOLE COMPUTER OPERATING GUIDE IS IN THE WORKS AND WILL BE SENT TO YOU UPON ITS COMPLETION.

PLEASE CONTACT ME AT THE FACTORY IF YOU HAVE ANY QUESTIONS.

To summarize the above chart:

When the WRITE led is ON, the channel is in MUTE WRITE. Being in MUTE WRITE means that the ON/OFF Status for this channel will be written into Data according to its present realtime status.

The Realtime status of a channel is shown by the UPDATE or MUTE led. If the led is ON the channel's realtime status is ON. If the led is OFF then the channel is OFF or muted. (If the channel is not in MUTE WRITE than the UPDATE led being on does not mean that the channel is not muted. It means that a realtime mute has not been "installed". The previous Data could be muting this channel. This would be indicated by the ON led being OFF - see below)

If the WRITE led is OFF then the channel is not in the MUTE WRITE mode and the channel will be written into Data according to (or DEPENDANT on) its Status in previous Data. The realtime status of the channel will not affect the data being written.

The Data Status of the channel is <u>always</u> indicated by the green ON led. If the led is ON then the channel is written into Data with an "on" Status. If the ON led is OFF, than the channel is being written as a Mute or OFF.

<u>INSTALLING OR INITIATING MUTES</u>

Channels are muted with the console in the MUTE mode (indicated by the MASTER SOLO and UPDATE leds being lit). Pressing an UPDATE button will Mute that channel. Pressing it again will unmute it or turn it on. (If the channel is in MUTE WRITE than the mute will be written into Data.) If one or more channels are muted the MASTER UPDATE led will flash (and the channel update leds on the muted channels will be off). All muted channels may be unmuted or turned on by pressing MASTER UPDATE. (Now the MASTER UPDATE led is off and the console is in the SOLO mode).

The SOLO mode is the same as the MUTE mode except that the UPDATE buttons now mute all <u>alternate</u> channels. If a channel Update button is pressed, every <u>other</u> channel is muted, effectively putting this channel in an "in-place" Solo mode. Pressing any more Update buttons will turn those chanels on-joining the first channel in its Solo status. To return the console to a full ON status any Update buttons that were pressed must be pressed again or the MASTER UPDATE button may be pressed. If one or more channels is in Solo Status than the MASTER SOLO led will flash.

Leaving the SOLO or MUTE modes to NORMAL console mode (by pressing MASTER SOLO), does not change any mute or solo status of any channels. In fact switching between NORMAL (Level) and SOLO or MUTE has no effect on the status or mode of anything in the console. It merely changes what the leds mean and what the buttons do.

MODE DESCRIPTIONS

READ* The processor ignors the fader position and sets channel level from Data, and writes that level as new Data

WRITE — The processor ignors previous Data and sets level according to fader position, and writes that level as new Data

UPDATE — The processor recognizes the fader position when the UPDATE button is pushed as the UPDATE NULL POINT. The new audio level is set by reading previous data and adding or subtracting any fader movement (referenced to the UPDATE NULL). This composite is written as new Data.

SOLO — When the console is in the SOLO mode (indicated by MASTER SOLO being on) the WRITE and UPDATE buttons and leds revert to alternate function. The SOLO mode also includes the MUTE mode (indicated by both the MASTER SOLO and UPDATE leds being on. While in SOLO, all alternate channels are muted when a 'Solo' button is pressed. These mutes will be written into Data if those channels are in MUTE WRITE.

MUTE WRITE — When in the SOLO (or MUTE) modes the WRITE buttons function as MUTE WRITE buttons, both on the channels and the MASTER mode selector. When in MUTE WRITE, the processor examines the realtime MUTE status of the channel (whether the channel is on or off) and writes it as MUTE Data. This MUTE information is written independently for each channel. If a MUTE (channel off) is written, the audio signal will not be present upon playback, however the LEVEL Data remains and may be recovered by simply writing a "channel on" while in the MUTE WRITE mode. Until a MUTE is written into Data all channels exist in the "on" status.

SWITCHING IN AND OUT OF "SOLO/MUTE MODE" DOES NOT CLEAR MUTES AND DOES NOT CHANGE ANY CHANNEL'S STATUS!!

*READ/CLEAR BUTTON — Pushing the READ or CLEAR button exits all channels from modes that effect Data. That is all channels will revert to READ and MUTE READ. It will not cancel any realtime mute that have been installed by either the solo or mute function. These can be cleared by pressing READ twice within 500ms. In addition, this will clear all current level and mute data stored in memory (RAM) and establish initial Data (all channels 'on'; levels appx. -12).

DATA PATCHING

Automation Data is accessed from and returned to the processor through the Automation Data Patch Card. From top to bottom this card has 3 Blue Jacks, 3 Black Jacks, and another Blue Jack (which is a spare). Data Output from the processor appears on the top 3 jacks. The next 3 jacks are the Data Returns to the processor. Only 1 jack feeds the processor at a time and this is seleted by the FUNCTION switch at the top of the Control Room/Studio Module of the Console. FUNCTION "1" is the top Black Jack, "2" the next, etc. Position "4" of the FUNCTION switch assures that no Data is being fed into the processor. This position should be seleted during the Initial Write Pass. (On the Series 30, switch 'B' is equivalent to Function 1, and 'C' to 3. Pressing neither B or C is equivalent to Function 4).

Normally during Automated Mixdown, 2 tracks are chosen as Data Tracks. These will be used to store the Level and Status (on/off) information for all of the input channels. Data is written on one track at a time. During all "mix passes" the previous Data is fed into the processor from the last Data Track recorded on. The procesor generates new data based on the previous data (or mix) and the current (but ever changing) status of the console. If the entire console is in the READ mode and no channels are in MUTE WRITE than the new Data will be identical to the previous Data, and the mix will not have changed. If channel 14 (for example) is in Write, then new mix will be identical to the old mix except that channel 14's level will be dependant on it's fader position throughout the mix.

Any combination of modes (READ, WRITE, UPDATE, MUTE WRITE) may be used on the various channels of the console at any time, with only one exception:

Initial Write is the mode that the console must be in when writing the first Automation Data Track. Initial Write means that all input channels are in the WRITE mode (their MUTE WRITE status is unimportant). Since all modes other than WRITE require previous Data to establish their new Data levels, they will not work during the first pass (since there is no previous Data).

The only time that the procesor generates Data without previous Data being fed into it is when it is in Initial Write. This also means, however, that if it any time during the mixing process a Data Track is recorded with all channels in WRITE, the processor generates New Data ignoring the previous Data and effectively erasing all previous mixing efforts. Of course the old mix still exists on the previous Data Track, and will exist until the next Automation Pass is made erasing the Data of the old mix.

SAMPLE MIX SESSION PROCEEDURE

A. SET UP

1. Patch Data Inputs and Outputs to proper Tape Machine Inputs and Outputs
2. Set first Data Track (A) to 'Record'
3. Set console for mixdown
4. Set ARMS for Initial Write pass (MASTER WRITE)
5. Set Tape Machine to record Data at -7VU

B. FIRST PASS

1. Rehearse mix

2. Perform mix while recording Data onto Track A
3. Either 'keep' mix and proceed or repeat 'First Pass'

C. PLAYBACK

1. Rewind Tape Machine; set Track A to Sync Mode; set Track B to Record Mode (by always switching the Tape Machine modes immediately after each pass that will be kept, the chances of erasing a wanted Data Track are almost eliminated)
2. Put ARMS into READ by pressing MASTER CLEAR (or READ)
3. Play Tape
4. Note that VALID Data LED is lit
5. Rewind Tape

D. UPDATE PASSES

1. Set desired channels to WRITE or UPDATE (other channels remain in READ). In addition, each channel may or may not be put into MUTE WRITE. (Not being in MUTE WRITE is the equivalent a being in 'Mute Read', and all mute info is totally independant from the level modes)
2. Do not put ALL channels into (level) WRITE as this will cause the processor to perform an Initial Write, which ignors all previous Data.
3. Rehearse mix, feeding latest mix Data into Processor,
4. Perform mix, recording new mix Data onto other Data Track

E. NOTES

1. The Console must be in MASTER WRITE (Initial Write) during the first pass being recorded onto a Data Track.
2. Data must always be played back in the SYNC mode.
3. The VALID Data LED should always be lit when playing tape with Data, indicating that the processor is able to read the recorded data.

   a. If the LED flashes or is intermitant, try recording the data at a higher level. If this problem still persists, check the physical condition of the tape and the alignment of that track.
   b. DO NOT EMPLOY NOISE REDUCTION WHEN RECORDING DATA!
   c. If the LED does not come on at all then reverse the switch position on the phase reversal switch located on the ARMS power Distribution board adjacent to the other ARMS boards. The Data is phase dependant and will not respond to out of phase data. Once this switch is set it will not have to be reversed, except possible when playing back data tracks recorded on a different console/tape machine combination. If reversing phase does not cure the problem check that the processor is 'seeing' the Data by reading voltage at the processor Data Input.

Mode Descriptions

I. OPERATION

A. CONTROLS AND LEDs

1. SUPER-GROUP SET-UP BUTTON (SET-UP BUTTON)-Located just above the other ARMS Master Controls on the Control Room/Studio Master Module. This is a latching-type push-button and puts ARMS into the Super-Group Set-up Mode when in the 'pushed' position (LED Lit). When in the 'up' position, ARMS is in the Operate Mode.

NOTE: On the Series 30 Console the Super-Group Set-Up Button is located below the Master ARMS Controls and is labeled 'A'.

2. SUPER-GROUP CHANNEL BUTTON (VIEW BUTTON)-A momentary push button located on every input channel to the right of the fader at the bottom of its travel. This push button enacts all of the channel related functions of Super-Group, including viewing groups and adding or deleting channels from groups during Set-up Mode operations.

3. SUPER-GROUP LED (LED)-Located just above the VIEW BUTTON. The LED indicates different things at different times and has four (4) modes of indication:

OFF
ON
SLOW FLASH
FAST FLASH

B. OPERATE MODE-When the SET-UP BUTTON is not depressed, Super-Group is in its "normal" or OPERATE MODE (as opposed to the SET-UP MODE, discussed later).

1. While in the OPERATE MODE, with no VIEW BUTTONS pressed the LED on any given channel indicates the following:

OFF	Channel is not a Master
ON	Channel is a Master
SLOW	Channel is a Master under Local Control
FAST	Channel is a Master in Transition

2. While a VIEW BUTTON is pressed (and held), Super-Group is in the VIEW MODE (which is concurrent with the OPERATE MODE, and can be concurrent with certain phases of the SET-UP MODE). The VIEW MODE allows the operator to instantly assertain the Group status of that channel and how it relates the rest of its group if it is a group member. If the channel (with the held VIEW BUTTON) is not a member of a group, then nothing will occur. If it is a Group Member, then the Super-Group LEDs on all channels will change to indicate the following in relation to the group to which that channel belongs.

OFF	Channel is not a member of this group
ON	Channel is a member of this group
FAST	Channel is the Master of this group
SLOW	Channel is the Master of this group, but is now either under Local Control or in Transition

(While any VIEW BUTTON is being held, all other VIEW BUTTONs are ignored).

C. SET-UP MODE - When the SET-UP BUTTON is depressed, ARMS is in the Group Set-up Mode which is used to establish groups, to cancel groups or to modify their membership. When in this mode the VIEW LEDs mean the following:

OFF	Channel is not a member of any group
ON	Channel is a member of a group
FAST	Channel is a Master of a group
SLOW	Channel is a Master of a group, but is now either under Local Control or in Transition

When a VIEW BUTTON is held during Set-Up, the LEDs function as they do while in the OPERATE MODE. The MASTER ARMS Buttons are dedicated to Group functions while in the Set-Up Mode, and have no effect on normal ARMS Modes or Functons

1. TO SET UP A NEW GROUP - Hit the VIEW Button twice (2 times) within 250ms. This stores the current (Local) fader level in memory, and establishes the fader as a group master. To assign or delete members simply touch the view buttons of any desired channels. Each touch will add or delete the channel to the group depending on present status (the touch reverses the membership status). If you press a channel that is a member of another group, the console will 'VIEW' that channels entire group. When that channel is released, you are returned to 'working' on the previous group. When the group membership is satisfactory, press MASTER CLEAR. This enters the new group into memory.

2. TO MODIFY A GROUP - Hit any group member twice within 250ms. This allows you to 'work' on that specific group. Only the LEDs of that group will light (in accordance with the SET-UP Mode LED parameters). Once you are 'working' on a specific group, the functions are the same as setting up a group.

3. TO DELETE AN ENTIRE GROUP - While in SET-UP Mode Press the MASTER UPDATE and press the MASTER VIEW Button of the group you wish to delete within 1 second (1,000ms for you time freaks).

4. TO ESTABLISH A GRAND MASTER - First create a group with a Master only (no members). Make sure that it is entered into memory by pressing MASTER CLEAR. Press MASTER WRITE, followed by the Master destined to be Grand (within 1 second). The GRAND MASTER fader value is added to ALL channel fader values, thereby controlling the level of the entire console.

5. TO ESTABLISH A SOLO DIM MASTER - First set up a group with only a Master (no members). Make sure that it is entered into memory by pressing MASTER CLEAR. Press MASTER SOLO, followed by that Master (within 1 second). The SOLO DIM fader value is added to ALL channel fader values that are not in Solo when the console is in the SOLO DIM Modes(a concurrent mode).

   a. STANDARD SOLO- When channels are solo'd, all other channels are fully attenuated (muted)

   b. SOLO DIM WRITE- When Channels are solo'd the value of the SOLO DIM Master is added to all fader values, on channels that are not in 'solo'. Since fader values are written into data on those channels which are in WRITE or UPDATE, executing Solo Dim Write type solos will effect the data of any channels in those modes.

   c. SOLO DIM- When Channels are solo'd the value of the SOLO DIM Master is added to all VCAs, except those in 'Solo'. Since VCA values are not sent 'to' the processor, executing Solo Dim solos will only effect what is being heard (it will never have an effect on Data).

6. SETTING SOLO MODES- Solo modes are established by pressing combinations of MASTER buttons, while in the SET-UP mode.

   a. STANDARD SOLO is the default solo mode when the processor is turned on. To establish standard solo from another solo mode press MASTER UPDATE and MASTER WRITE.
   b. SOLO DIM WRITE is set by pressing MASTER SOLO and MASTER WRITE.
   c. SOLO DIM is set by pressing MASTER SOLO and MASTER UPDATE.

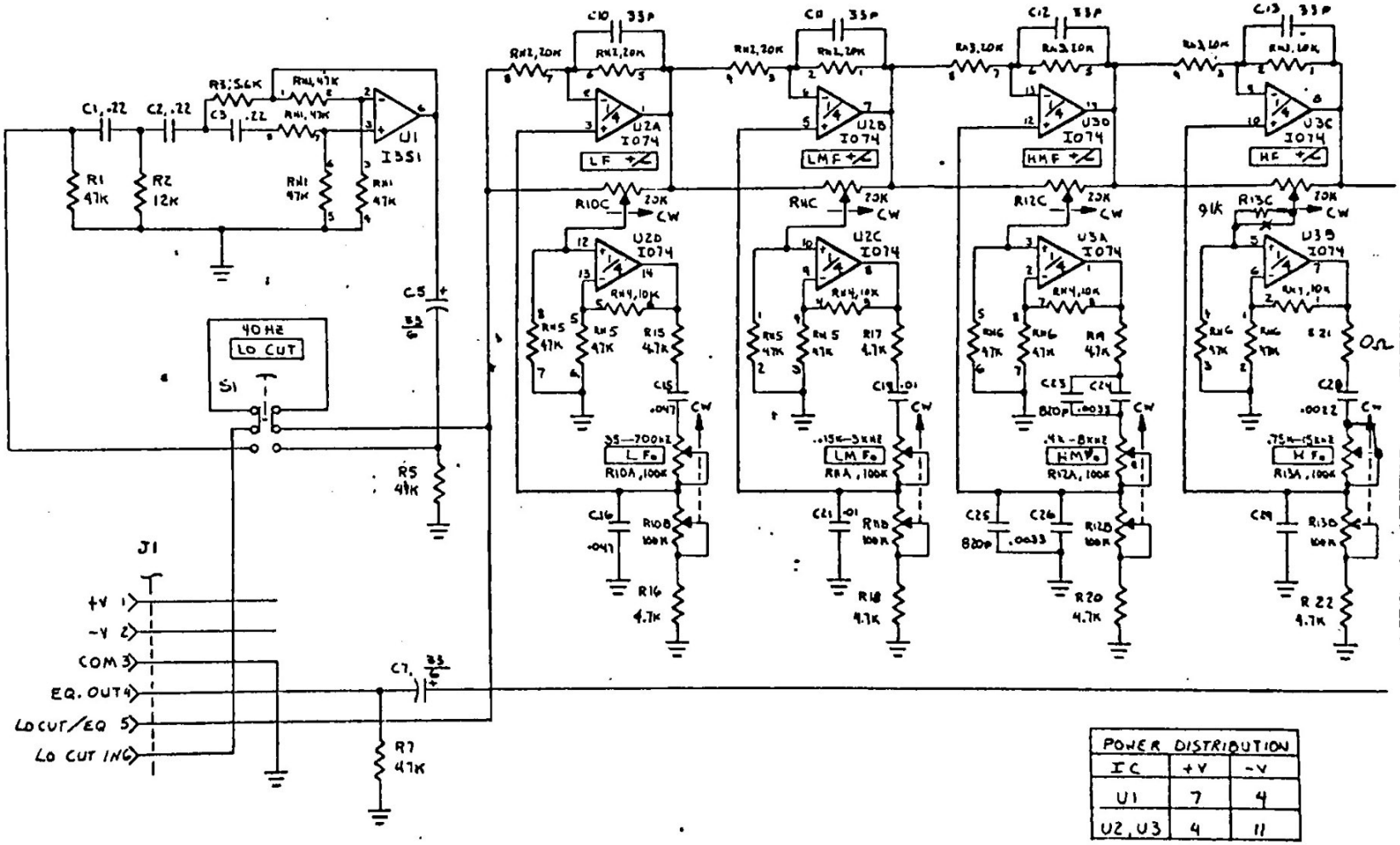
D. GROUPING GENERAL NOTES

1. ALL ARMS Mode Functions follow group structure: Pressing WRITE on a channel that is a group master puts that entire group into WRITE. Likewise with the other functions including UPDATE, SOLO, and MUTE.

2. Group Masters reference to '0' on the fader scale.

3. When setting a new group, the master of that group is intransition mode, and must pass through the '0' point before it takes over group control. This allows groups to be set up in real time, while the console is 'live', without any unwanted level changes.

4. Any individual channel is limited to 12dB of gain above '0'. If additional gain is attempted by a group master addition or by an out of range UPDATE, that channel will simply stay at +12. That situation can be corrected by lowering the console level through an UPDATE PASS, modifying the Grand Master, or both.



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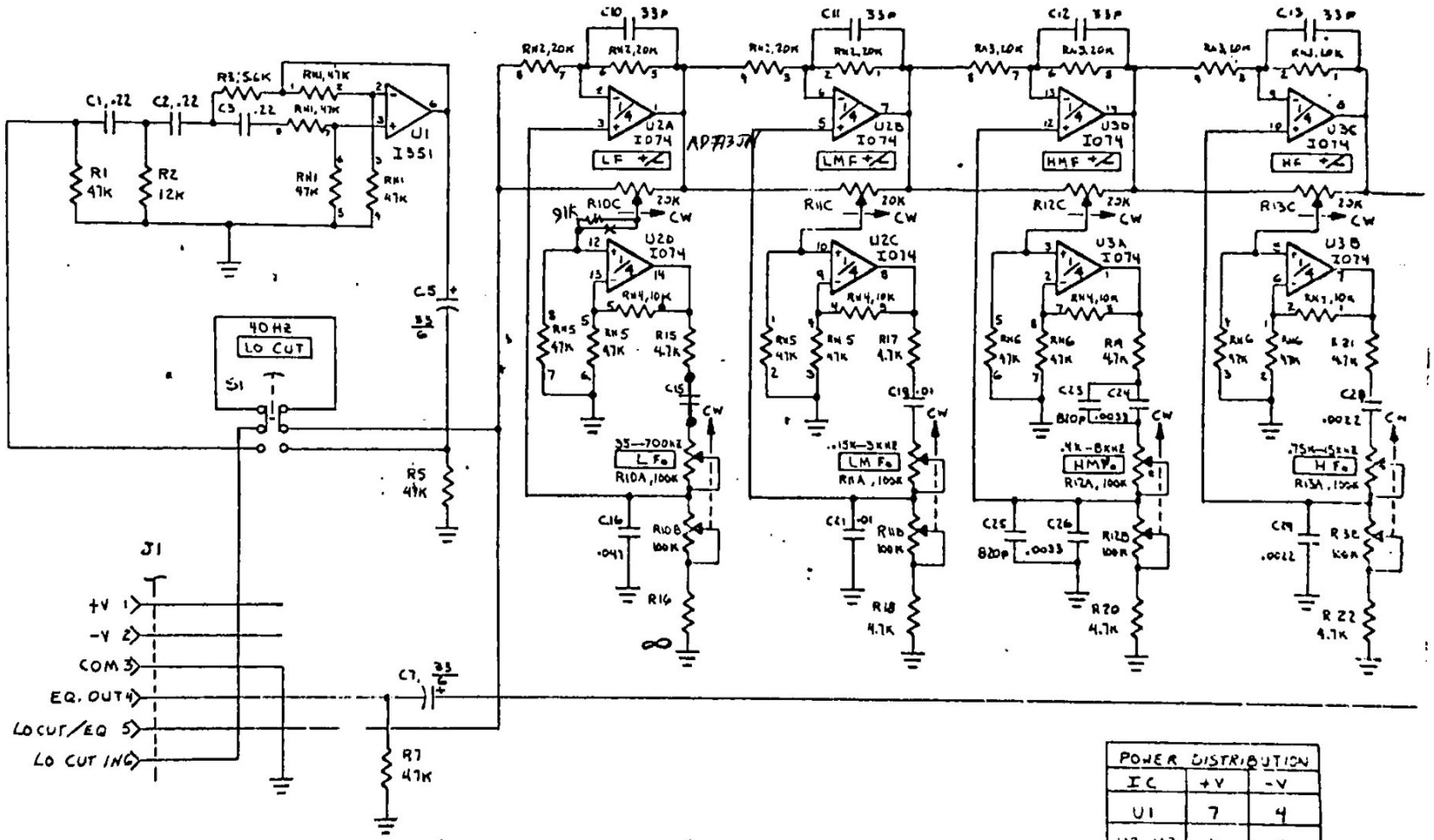

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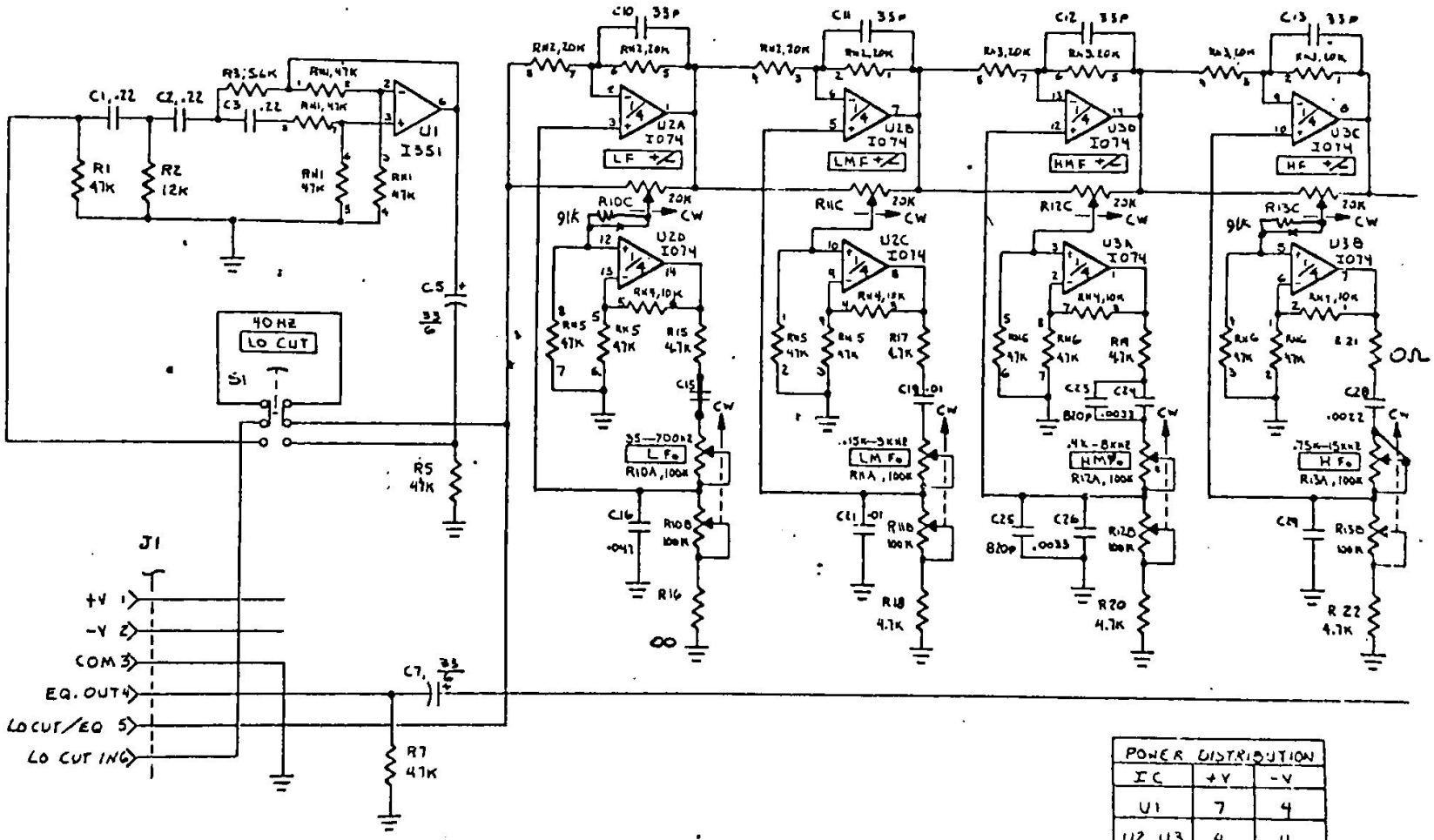

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