# Film-Tech

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ULTRA★STEREO®


# JS Instruction Manual

## JS 5 / 95 series

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# Table Of Contents



Please record the following information for your records:

Model: _____ Serial Number: _____

Date of Purchase: _____ Purchased from: _____

# 1. INTRODUCTION

The **ULTRA*STEREO** JS series of sound processors have been designed for low cost, flexibility, reliability and excellent performance. Modular construction allows the user to expand and update the capabilities of the unit. By using the same mainframe, a theatre can purchase the JS series equipment with complete confidence, whether the immediate need is for a simple mono or full stereo system. In addition, connection points have been included on the mainframe to accept future sound formats using, for example, an extended range noise reduction system or a two-track digital player. Each processor contains a backup power supply, a backup mono optical preamplifier and an emergency bypass button to keep the show going.

The alignment of the processor has been considerably simplified. No extender cards or special modules are required to make adjustments. The built-in meters and test jacks give the technician immediate information and access to all inputs and outputs of the individual plug-in modules in the processor on the front panel. The equipment has been carefully aligned at the factory with special test fixtures. *Never alter any internal preset controls.*

All controls necessary for daily operation of the processor are easily accessible on the front panel. In addition, the front cover is made of transparent plastic to permit visual monitoring of all internal meters and indicator LEDs.

The components that make up the complete system are of computer grade for reliability. Many have precision tolerances to insure the long term stability of the processor, thereby alleviating the need for frequent servicing. If you have reason to doubt that a module is performing correctly, please request a replacement from your dealer or the factory. All **ULTRA*STEREO** equipment has been "burned-in" at the factory for an extended period in order to eliminate the possibility of premature failure. All IC's that can be damaged by external equipment are plugged into sockets for easy replacement. No other servicing of the modules is advisable in the field.

## *Please read this entire manual before commencing your installation.*

Unpack the unit carefully. If the container has been damaged, thoroughly inspect the equipment to make certain that there is no hidden damage. File a claim immediately with the carrier if any damage is found. Also advise your dealer or the factory.

***NOTE:*** *The power supply has been secured to the rack frame with two 1/2" 4-40 bolts, one on the top and the other on the bottom. Remove these bolts and the two washers underneath them with a Number 1 Phillips screwdriver. Should it ever be necessary to re-ship the unit, make certain that these bolts and washers are replaced securely, or ship the power supply separately. There is also a latching bar that locks the unit to the frame, secured by a bolt on the front panel. Remove the power supply from the frame by removing the 2 bolts that hold it to the frame. Then loosen the bolt beneath the handle and slide the bolt to the left. The module may now be removed by pulling on the handle.* ***Make certain that the switch on the back is set correctly to 115V or 230V for your supply voltage.*** *The unit works equally well on 50 or 60 Hz supplies. (Units manufactured for use on 100 V supplies are clearly marked on the back panel of the power supply and do not contain a selector switch. Should it ever be necessary to run such a unit on other voltages, it must be connected to an autotransformer, or be replaced with a switchable supply.) Replace the module in the frame and slide the latch all the way to the right, making certain that it is fully engaged in the frame. Tighten the bolt under the handle to secure the latch.*

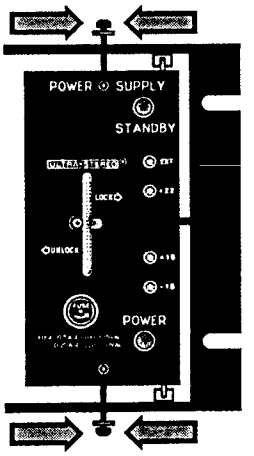



**Figure 1. Remove These 'Shipping Safety' Bolts & Washers Before Use.**

# 2. SYSTEM CONFIGURATIONS

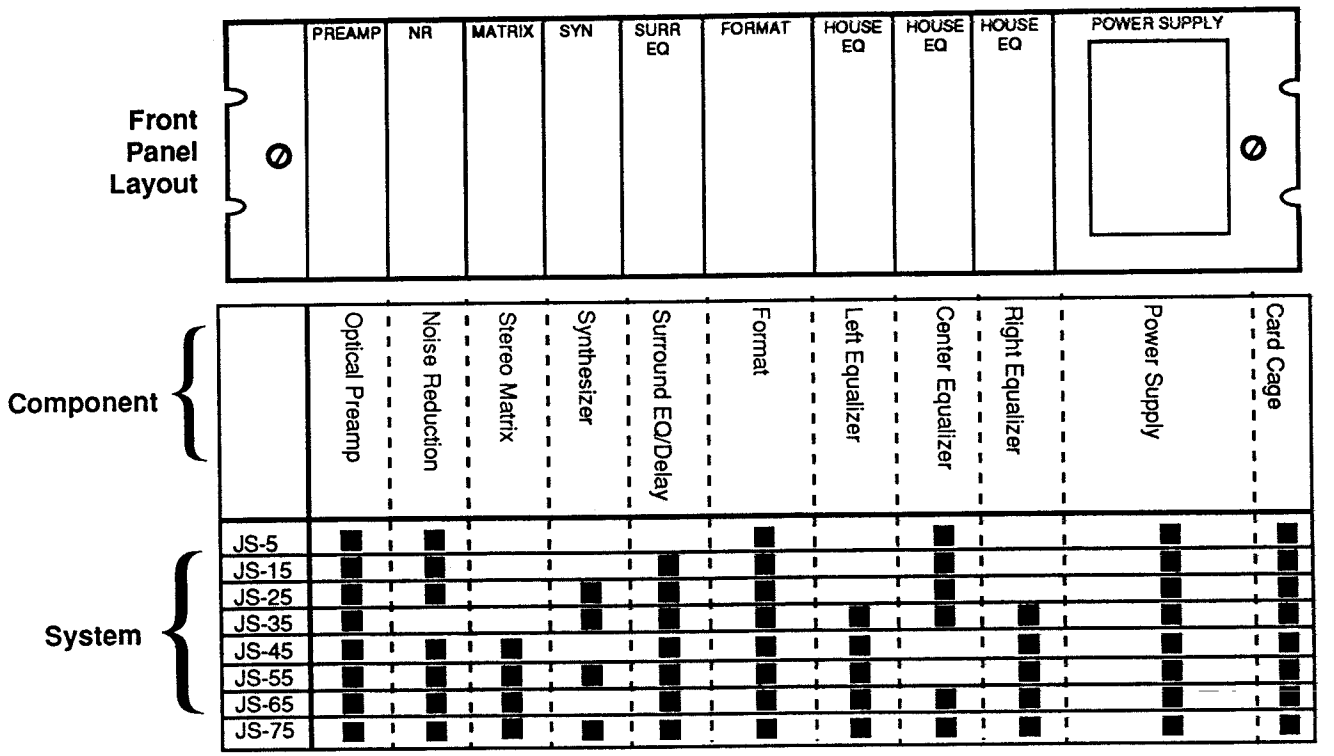



**Figure 2. System Configurations (boxes indicate components included in each system)**

**JS-5 Monaural – with Noise Reduction for Stereo Prints**

Plays mono prints in monaural sound and includes professional noise reduction circuitry to decode stereo prints, which vastly improves their mono presentation.

**JS-15 Monaural – with Noise Reduction and Surround Sound**

Plays mono prints in monaural sound and decodes stereo prints into Center and Surround channels.

**JS-25 Same as above – plus Synthesized Surround Sound**

Plays mono prints in monaural sound; produces a Synthesized Surround channel from mono prints and true Surround from stereo prints.

**JS-35 Monaural and Synthesized Stereo**

Plays mono prints in monaural sound and synthesizes mono and stereo prints into pseudo stereo plus Surround Sound.

**JS-45 Stereo (Left/Right/Surround)**

Plays mono prints in Left and Right channels and plays stereo prints in Left, Right and Surround.

**JS-55 Stereo (Left/Right/Surround) with Synthesizer**

Same as above with a synthesizer to play mono and stereo prints in a pseudo stereo plus Surround.

**JS-65 Stereo (Left/Center/Right/Surround) – Standard System**

Plays mono prints in monaural sound and stereo prints in full four channel sound.

**JS-65-3 (Center/Left Surround/Right Surround)***

Plays mono prints in monaural sound and stereo prints in three channel sound with stereo Surround.

**JS-75 Stereo (Left/Center/Right/Surround) – with Synthesizer**

Has the same features as the JS-65 plus a synthesizer to produce a pseudo stereo and a Surround channel from both mono and stereo prints.

**JS-75-3 Same as JS-65-3 but with Synthesized Surrounds***

Has the same features as the JS-65-3 plus a synthesizer to produce pseudo stereo Surrounds from both mono and stereo prints.

**JPN-01 Pink Noise Generator**

Simple plug-in pink noise generator for quick and easy theatre alignment.

***NOTE:* All JS Series Systems include a Subwoofer channel and stereo non-sync as standard features.**

* The -3 units require JSS-05 for L&R EQ slots; the Surround EQ slot is not used.

# 3. SPECIFICATIONS

## FEATURES

- The preamplifier has transformer inputs for RFI & hum shielding.
* High quality wide dynamic range 4-band noise reduction.
* 40 dB channel separation through the decoder matrix between adjacent channels.
* Stereo synthesizer with surround sound capability.
* Octave house equalizers with output level adjustment.
* Low noise adjustable surround delay with house equalization.
* Automation control with remote fader capability.
* Stereo Music fade in and out controllable from the automation.
* Adjustable subwoofer channel output for thundering bass response.
* Backup mono preamplifier with backup power supply.
* Programmable backboard for operation in chosen mode.

We reserve the right to alter these specifications at any time. **ULTRA*STEREO** equipment is manufactured in the United States of America.

The **ULTRA*STEREO** "JS" series is designed as a low cost, high performance version of our Academy Award winning stereo processor. It is the most versatile processor on the market today. Systems are available to handle one to five channels. The modular construction of the "JS" Series allows it to be serviced rapidly and upgraded by the addition of the required modules. Therefore, if one starts by purchasing a simple mono system, nothing has to be scrapped when it is desired to turn it into full stereo. All systems contain Subwoofer & Stereo Non-Sync channels. The choice of Mono, Stereo and Synthesized Stereo is left to the customer.

## TECHNICAL INFORMATION

### INPUTS

Balanced stereo solar cell inputs for one or two projectors, depending upon the preamplifier chosen. Each cell input is transformer isolated with a sensitivity of -65 dB at 200 Ω impedance.

Four external 'digital ready' line inputs with a sensitivity of 0 dB at 10 kΩ impedance. A Stereo Non-Sync input with a sensitivity of -30 dB at 15 kΩ that feeds all four channels is also provided. It can be faded in or out by automation.

### OUTPUTS

Five outputs corresponding to Left, Center, Right, Surround and Subwoofer. Nominal output is 0 dB (0.775 volts). Maximum output is +20 dB. The circuitry will drive 600 ohm loads. The Subwoofer channel contains a bandpass of 25 Hz - 60 Hz and combines the low frequency information from the three front channels.

### NOISE & DISTORTION

With the output level set at 0 dB, equalizers set to their mid position and typical solar cell input levels at 1 kHz, noise is greater than 70 dB below signal in all modes. Under the same conditions, the total harmonic distortion is typically less than 0.18% and less than 0.1% with external line inputs.

### SIZE AND WEIGHT

The overall size of the unit is 5-1/4" x19" x 9" (13.3 x 48.3 x 22.9 cm). The unit is designed to mount in a standard rack frame or cabinet. The weight of the complete unit (Model JS-75) is 17 pounds (7.7 kg). Shipping weight is approximately 21 pounds (9.5 kg).

### OPTIONS

An automation interface panel is available to simplify connections to automation systems. Cue pulses from the projector are routed through this panel to select the proper format. Level trim controls are also included to adjust the sound volume for different formats.

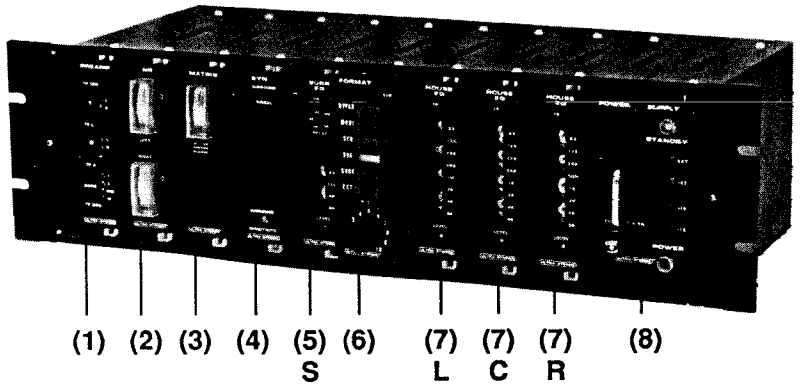



**Figure 3. Module Locations (numbers are referenced below)**

## (1) OPTICAL PREAMPLIFIER

Single and dual projector preamplifiers are available. The projector solar cell inputs have high frequency boost circuitry to compensate for standard 0.001" (25 micron) scanning slits. Compensation for different slit widths can be provided if specified at time of ordering. Projector changeover of the dual projector preamplifier is accomplished by grounding the "X-OVER" terminal on the backboard. The mono preamp output has adjustments for mid and high frequencies to match the Academy Curve. A backup mono preamp is powered by a separate power supply.

## (2) NOISE REDUCTION

The noise reduction circuit is a precision four band expander that decodes with ±1 dB accuracy for the entire audio band. Left and Right channels are included in the one unit. Sum and difference outputs for the mono (center) and surround channels are also derived from this module. The reference level for 50% modulation is 0 dB.

## (3) STEREO DECODING MATRIX

The matrix processes left and right inputs and produces either three or four channel outputs. The card is programmed by the mainframe switches to decode left, right and surround, or left, center, right and surround. The surround channel is switchable on and off with proper corrections to the matrix decoding circuitry. Channel separation is 40 dB between adjacent channels.

## (4) SYNTHESIZER

This module takes a monaural input and synthesizes 4 pseudo stereo channels. It positions the dialog track in the center channel.

## (5) SURROUND EQUALIZER/DELAY

This module serves the dual function of providing 4 equalizer settings and time delay circuitry for matching the system to the theatre.

## (6) FRONT PANEL CONTROLS (Format Module)

Six pushbuttons manually select the format and override external automation controls. A Master Fader sets the level of all channels. Trimmers are provided for adjusting the Subwoofer and Non-Sync levels.

## (7) HOUSE EQUALIZER

Octave equalization is standard with the JS system. A fixed high frequency boost is incorporated to compensate for screen losses. Output level is adjustable by a 10 turn front panel potentiometer.

## (8) POWER SUPPLY

The main Power Supply is ±15 volts with a Backup Supply of nominally +20 volts for the emergency bypass mono preamplifier. Switching for an external ±15 volt 400 mA supply is included on the front panel. The standard Power Supply is switchable for 115/230 VAC, 50/60 Hz supplies. There is an optional 100 VAC Power Supply available on special order. ***Never use the Standby Switch as an ON/OFF switch, to avoid damage to your entire sound system.***

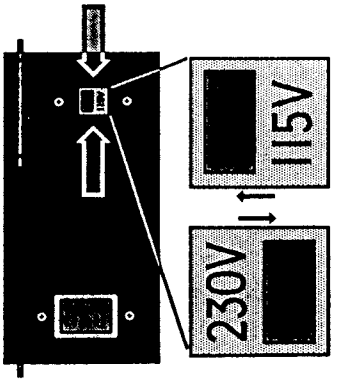
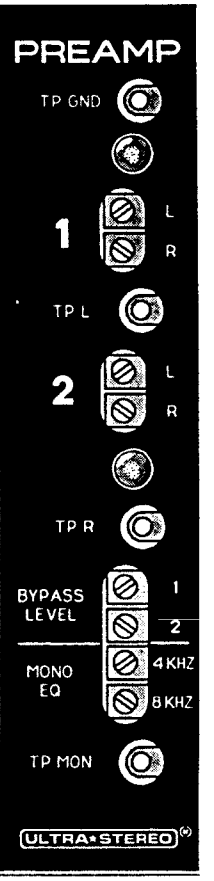



**Figure 4. Voltage Selector Switch Settings (on back of power supply module)**

# 4. DESCRIPTION OF MODULES

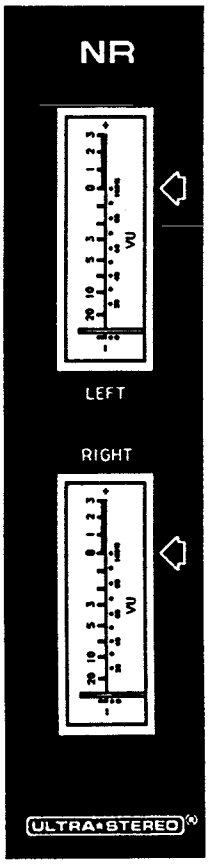
## OPTICAL PREAMPLIFIER MODULE Model JO-05




This module is divided into three sections: a stereo, a mono, and an emergency mono preamp. Input transformers are used to isolate the sensitive input circuitry from xenon lamp ignition voltage spikes, from RF interference and from ground loops. The preamp accepts stereo cell inputs from two projectors and will switch from machine "1" to machine "2" when the changeover (XO) terminal on the rear of the unit is connected to an "E" terminal.

The top section is the stereo preamp. LEDs indicate that either projector "1" or "2" is active. Test points "TP L" and "TP R" refer to left and right channel output points used for aligning the system. Level adjustments are provided for each channel and projector. The dual projector stereo preamps include fixed high frequency boost circuitry to compensate for the scanning slit. The bottom section is the mono preamp. Level controls are included for adjusting the emergency bypass preamp for projectors "1" and "2". The "MID"and "HI" frequency controls adjust the response of the regular mono preamp. The "TP MON" is the output of the regular mono preamp.

## NOISE REDUCTION MODULE Model JNR-10




The new **ULTRA*STEREO** noise reduction module is a special circuit containing proprietary integrated circuits that accurately decode the information on stereo variable area encoded sound-tracks. It is an unique four band expander quite unlike any other competitive system. The accuracy of decoding is ±1 dB from 20 Hz - 16 kHz. The single module contains circuitry for both left and right channels, plus sum and difference outputs for center and surround operation.

The VU meters indicate the decoding levels. The proper alignment point is "0" VU with standard 50% stereo level test films, such as the **ULTRA*STEREO** Type 1 Test Film.The sum and difference outputs are routed to the Matrix module.

## SVA MATRIX MODULE Model JM-10

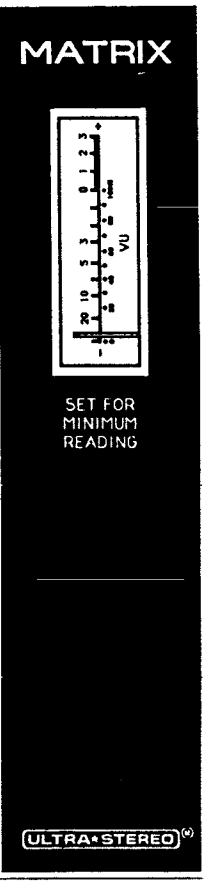
The SVA Matrix module is designed to decode accurately the four channels of information encoded on the two stereo optical soundtracks. The module contains DC control circuitry and audio steering circuitry to get the maximum separation possible in decoding. It also contains logic switching to allow the matrix to operate in Left/Right/Surround or Left/Center/Right/Surround modes. The Surround channel can be turned on and off with the appropriate compensation to the decoding circuitry.

A VU meter is included on the front panel to permit the installer to balance the Left and Right preamp channels accurately, in order to minimize the leakage of dialog into the surround channel. The crosstalk of the matrix is illustrated to the right:

| | Matrix Outputs (dB) | | | |
|---|---|---|---|---|
| Inputs | L | C | R | S |
| Left | 0 | -40 | -40 | -40 |
| Center | -40 | 0 | -40 | -40 |
| Right | -40 | -40 | 0 | -40 |
| Surround | -40 | -40 | -40 | 0 |

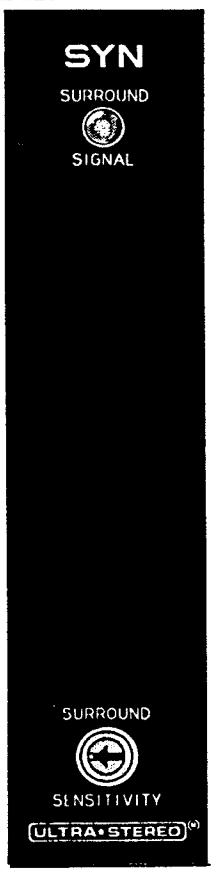
When the JS series systems are used without the Matrix module in a Front/Back configuration, switches on the back board must be appropriately set.

***NOTE:*** *Make sure that the "X-Y" switches are off when a matrix card is inserted. (L,R,S or L,R,C,S operation.) Otherwise the surround channel signal will be low and distorted.*

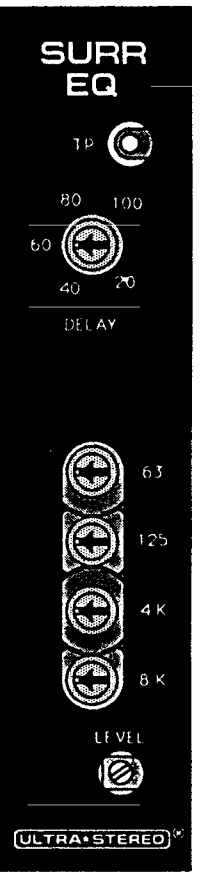



## SYN MODULE (SYNTHESIZED STEREO) Model JSYN-05

The Synthesized Stereo module produces several channels from a monophonic optical film. If a stereo film is played, the synthesizer will combine the left and right stereo film channels and then synthesize the resulting single channel to stereo. The module is fed from the stereo preamp output lines. When the mainframe is programmed for FRONT/BACK operation, the SYN module produces a mono output for the front channel and a Synthesized Surround output for the Back Channel. When the mainframe is programmed for LEFT/RIGHT/SURROUND operation, the SYN module produces a Synthesized Stereo in Left and Right Channels and a Synthesized Surround. When the mainframe is programmed for LEFT/CENTER/RIGHT/SURROUND operation, the SYN module produces four outputs. In this mode, the synthesizer keeps the dialog information primarily in the center channel, while music and effects move to the Left and Right channels. The surround circuit is switched on by loud music and effects, but rarely by dialog. A surround L.E.D. light and sensitivity adjustment is included to set the Surround turn on level.



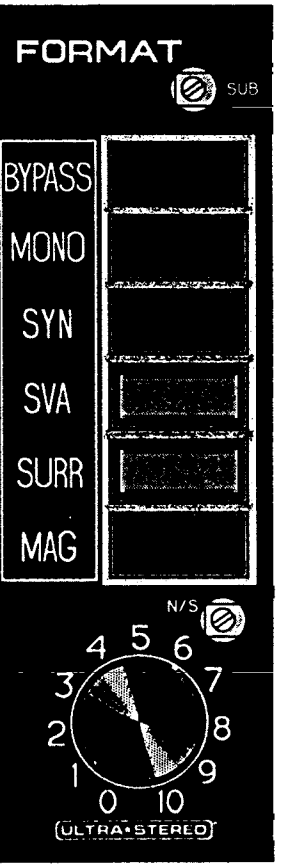
## SURROUND/EQUALIZER MODULE Model JSE-05




The Surround/Equalizer module features a low noise analog delay line that is adjustable from 20 to 100 milliseconds to compensate for different size auditoriums. The circuit has a flat frequency response from 100 Hz to 7 kHz. A compressor/expander circuit is included to minimize noise in the surrounds. In addition, a four band equalizer permits some tuning of the surround speakers. Delayed turn-on and instant turn-off of the output prevents powering-up transients from reaching amplifiers and speakers.

There is a test point at the top of the module which allows an external "0" dB Pink Noise signal to be fed into the surround channel for equalizing the speakers and setting sound pressure levels. The same test point can be used for monitoring problems in the signal feeding the surround equalizer circuitry. The level pot at the bottom of the board is a ten turn control for setting the output level precisely. The maximum level is 2 volts. The EXTERNAL input to the processor is fed directly to the equalizer, bypassing the delay circuitry.

## FORMAT MODULE Model JFM-05




The Format module controls all the switching within the JS processors. The circuitry selects BYPASS, MONO, SYNTHESIZED STEREO, SVA STEREO, SURROUND, or EXTERNAL INPUT modes. The module is designed for automation switching, with all switching done electronically. A ribbon connector is included on the back panel for easy connection to an automation system, or interface accessory unit. In case of an emergency, the BYPASS switch disables the electronic switching and feeds the emergency preamp output to the main volume control and to the Center Channel output terminal.

Automation control triggers opto-isolated lines which in turn activate mode switching. The front panel pushbuttons disable the automation and directly activate the mode switching. If the automation system fails, pressing front panel buttons will switch the processor into the proper mode. The automation lines require 10 milliamperes of current. Therefore it is possible to put L.E.D. lights in series with the control lines to provide remote mode indication. These control lines require a sustained grounded condition to operate. If the Automation Interface Accessory is used the mode switching circuitry can be activated by automation pulses.

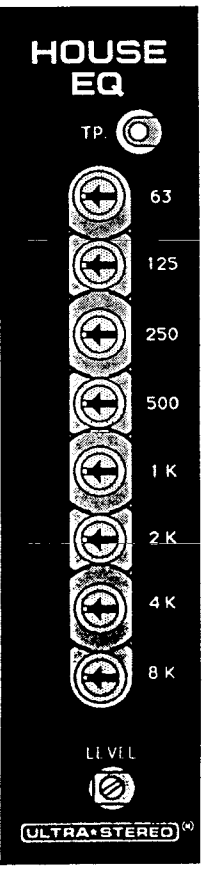
There is also a subwoofer circuit included in the Format module that sums the front three channels and sends them through a 20 Hz to 60 Hz bandpass circuit. The control at the top of the module is used to set the subwoofer level. Additionally, there is an intermission music fade circuit which can be operated manually by a separate switch, or triggered by the automation system, to fade stereo music in and out smoothly. The music can be fed into the 2- Channel Non-Sync terminals and the level can

*(Continued on next page)*

be adjusted by the control on the front panel above the Main Fader knob. The Main Fader has no effect on the Non-Sync level. The sensitivity of the non-sync input is very high, so it may be necessary to add 20 kΩ resistors in series with the inputs when using high output tape or digital disc players. The stereo music lines are mixed together to feed the center and surround channels.

There is also a remote volume line to allow adjustment of the volume from other locations. This facility can also be arranged to be operated by the automation system, so that relative levels can be preset for different formats. When the MONO switch is selected and the mainframe is programmed for LEFT/RIGHT/SURROUND operation, the mono signal is sent to the Left and Right channels at a -3 dB level. The outputs of the Format module are sent to the appropriate Equalizers.

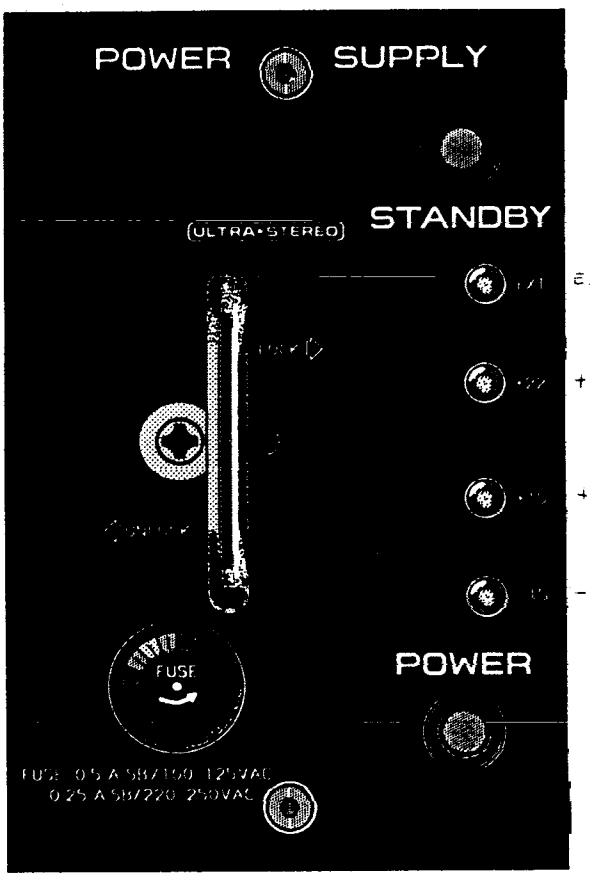
## HOUSE EQUALIZER MODULE Model JEQ-05




The Equalizer module is designed to compensate for problems in loudspeakers and room acoustics. It is an octave band circuit in which the 63 Hz and 8 kHz controls are shelving type equalizers. These controls adjust 40 Hz and 12 kHz ±12 dB. The frequencies 125 Hz through 4 kHz have bandpass equalizers with an adjustment range of ±6 dB. There is also an additional boost from 8 to 12 kHz to compensate for screen losses.

There is a test point at the top of the Equalizer module for feeding in Pink Noise at "0" dB from an external source for setting auditorium equalization and sound pressure level. The **ULTRA✳STEREO** plug-in Pink Noise Generator is also usable for this operation directly. This test point can also be used to monitor problems in the input lines to the equalizer. There is a control at the bottom of the module to set the level of the output. The maximum level is 2 volts. Delayed turn-on and instant turn-off of the output prevents powering-up transients from reaching power amplifiers and loudspeakers, except for the subwoofer channel, or if the BYPASS format is selected.

## POWER SUPPLY MODULE Model JPS-05




The Power Supply Module generates the main ±15 volt DC supply and an emergency supply for the backup optical preamp from a nominal +20 volt source. LEDs illuminate to indicate that the supplies are operating correctly. In the event that both internal supplies fail, the processor will operate in the BYPASS mode if an AC adaptor is plugged into the EMERGENCY POWER jack on the back of the processor. This adaptor can be anything in the range of 9 to 24 volts DC at 30 milliamperes, with a negative center pin and is available at most electronic stores.

**A STANDBY POWER SUPPLY** which will power the entire processor may be connected to the EXT PWR terminals on the back of the processor. This supply must be a regulated ±15 volt DC supply with a capacity of no less than 300 milliamps. It is activated by pressing the STANDBY button on the Power Supply Module. The operation of this supply is indicated by the LED marked EXT. ***BE AWARE*** that if the STANDBY button is pressed when the EXT LED is not lit, the processor will shut down!

***NOTE!*** *If the STANDBY button is used as an ON/OFF switch, the turn-on transients can damage other equipment. Only use the power button to turn the system on and off.*

# 5. INSTALLATION AND ALIGNMENT

## PRELIMINARY ALIGNMENT

**(A)** Clean the soundhead optics thoroughly. If the film guide rollers are worn, replace them. Excessive side to side weave will cause insurmountable problems for the SVA stereo circuitry and must be corrected prior to installation.

**(B)** If the exciter lamp is old or blackened inside, replace it. Make sure the lamp is operating at a voltage greater than 60% of its rating.

**(C)** With the mono solar cell in the projector, run the SMPTE BUZZ TRACK film and align the guide rollers for minimum output.

**(D)** For stereo installations, remove the mono solar cell and place a white card about an inch away from the sound lens. The image of the exciter lamp filament should look like *Figure 5.* If necessary, raise or lower the lamp and move it in and out until the filament is centered in the spot of light. This will insure that the slit is evenly illuminated, thereby producing the least distortion in playback.

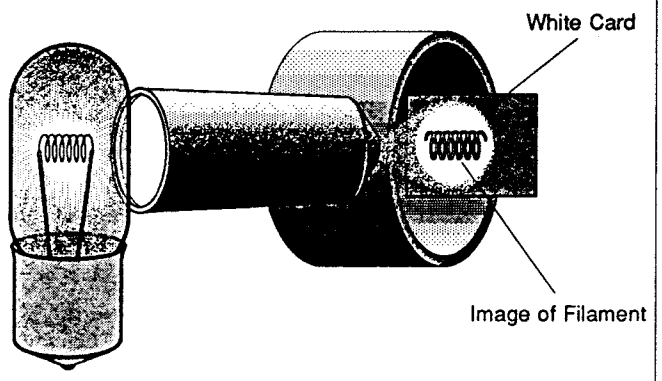



Figure 5. Preliminary Lamp Alignment

## ALIGNMENT OF SOLAR CELL AND PREAMPLIFIER

**(A)** Mount the stereo solar cell on the projector and position the bracket, so that the slit image hits the upper part of the cell. The cell should be approximately 0.040 inch (1 mm) behind the film such that the slit image just fills the cell width, but DOES *NOT* SPILL OVER. See *Figures 6 and 7.*

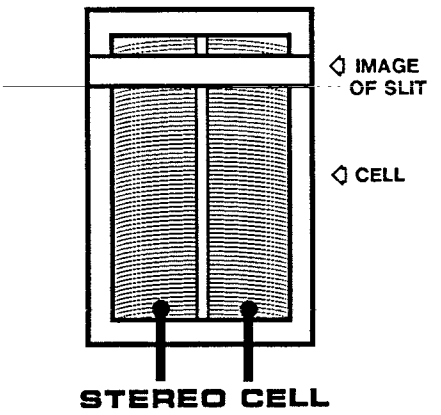



Figure 6. Stereo Solar Cell

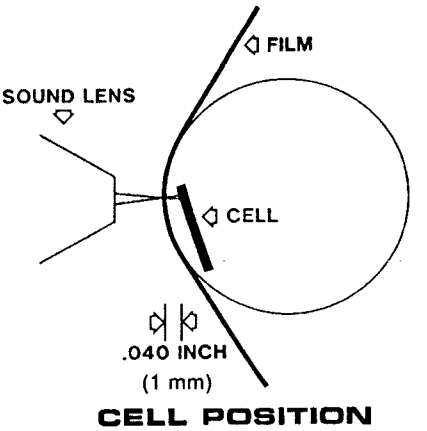



Figure 7. Cell Position

**(B)** Install the audio line from the cell to the OPTICAL PREAMP. Use Belden Nº 8404 or equivalent four conductor twin shielded cable, or a pair of two conductor shielded cables such as Belden Nº 8451. (A single two conductor shielded cable is not recommended.) Connect the lines to the terminal block marked CELL INPUTS at the rear of the processor. Be sure that the RED lead of the cell is connected to the left "L" input terminal marked "+" and the GREEN lead of the cell is connected to the right "R" input terminal marked "+". The BLACK cell leads connect to the low "–" input terminals of BOTH Left and Right channels respectively.

**(C)** If there are two projectors the changeover is accomplished by grounding the "X-OVER" terminal. Connect a latching relay, with the appropriate rating, so that one coil is powered by the dowser circuit of projector "1" and the other coil is powered by the dowser circuit of projector "2". The relay contacts must be connected to the "XO" and "E" terminals so that the contacts are closed when projector "2" is operational.

**(E)** Connect a dual trace oscilloscope to the test points on the preamplifier marked "TP L" (Left channel), "TP R" (Right channel), and "TP GND" (Audio ground). Run a 100% alternating left/right STEREO ALIGNMENT film, such as the Type 2 Test Film from **ULTRA*STEREO**. Move the cell in and out until the crosstalk is at a minimum on both channels as shown in *Figure 8*. It may be necessary to set the gain of the preamp roughly at this time.

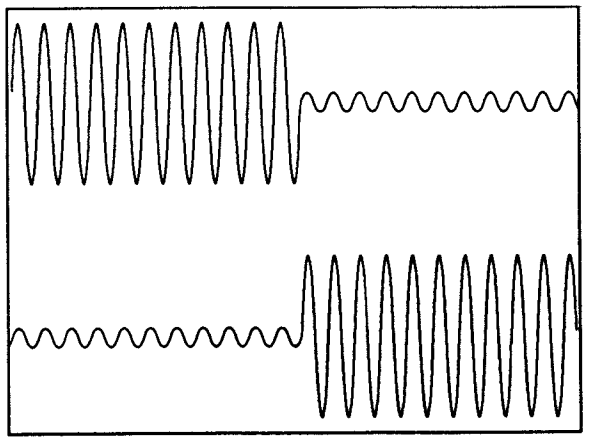


**Figure 8. Minimum Crosstalk Results When This Display Appears On Dual-Trace Scope: Source Is ULTRA*STEREO Type 2 Test Film or Equivalent (Measured at Preamp TP-L, TP-R & GND)**

**(F)** Run a 50% level film such as the **ULTRA*STEREO** Type 1 Test Film or equivalent. Adjust the Left and Right level controls on Projector "1" until the VU meters on the noise reduction 'NR' module read "0" VU. If the unit has a MATRIX module, fine tune the Right channel level until the null meter drops to its lowest reading. Repeat the procedure for Projector "2" if applicable.

***NOTE:** The* **ULTRA*STEREO** *Type 1 Test Film contains 50% tones at 100 Hz, 1 kHz, and 10 kHz. All these tones should read the same on the VU meters, ±2 dB.*

**(G)** Double check the cell alignment by running a 100% STEREO ALIGNMENT film, such as the **ULTRA*STEREO** Type 2 Test Film. The amplitude of the two 100% modulated waveforms should be identical (see *Figure 9*). If one is greater than the other, while the modulated waveforms of the 50% level film are identical, there is a problem with the scanning beam. Either the slit is not uniformly illuminated along its length, or the scanning beam is not in perfect alignment with the film guide roller and solar cell. Since most soundhead optics cannot be moved in or out, it will be necessary to reposition the film guide roller and realign the solar cell, so that both the 50% and 100% modulated tones match from channel to channel. When this fine alignment is not done, loud sounds (above 50% modulation) will be distorted and will leak into the surround loudspeakers.

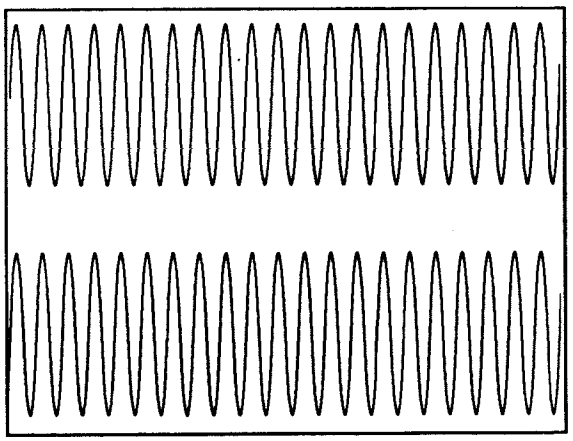


**Figure 9. Double-Check of Alignment Displayed On Dual-Trace Scope: Source Is ULTRA*STEREO Type 2 Test Film (Measured at Preamp TP-L, TP-R & GND)**

**(H)** Connect a REAL TIME ANALYZER to the test jack "TP L" on the PREAMP. Run a FOCUS, "P TONE" or PINK NOISE film and adjust the focus of the soundhead optics for the best high frequency response on the analyzer (*Figure 10*). At the same time, adjust the azimuth for the thinnest display on the oscilloscope (*Figure 11*). The focus and azimuth adjustments interact, so it will be necessary keep

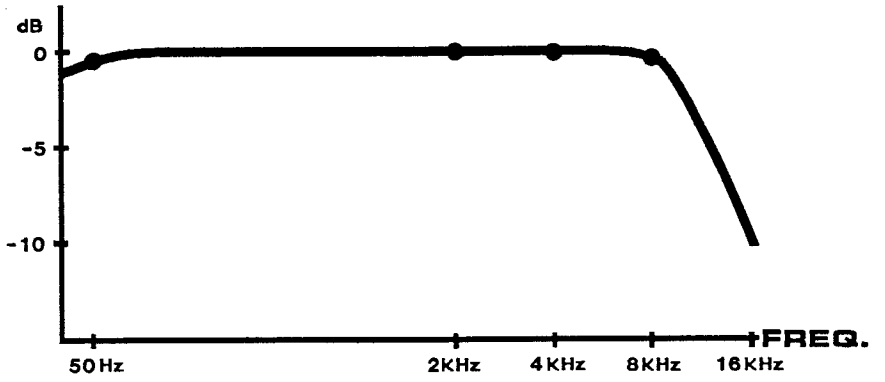



**Figure 10. Checking Optimum High Frequency Response on a Real Time Analyzer With a Focus, "P Tone" or Pink Noise Source: (Measured at Preamp TP-L)**

adjusting both until the best combination is achieved.

**I)** If there is more than a 2 dB difference between channels at 8 kHz on the analyzer, it may be necessary to replace the sound lens.
**(J)** Connect the REAL TIME ANALYZER to the test point "TP MON" and adjust the "MID" and "HI" controls on the PREAMP for the response shown in *Figure 12.*
**(K)** The curve in *Figure 12,* plus the auditorium rolloff, approximately equals the standard Academy Curve.

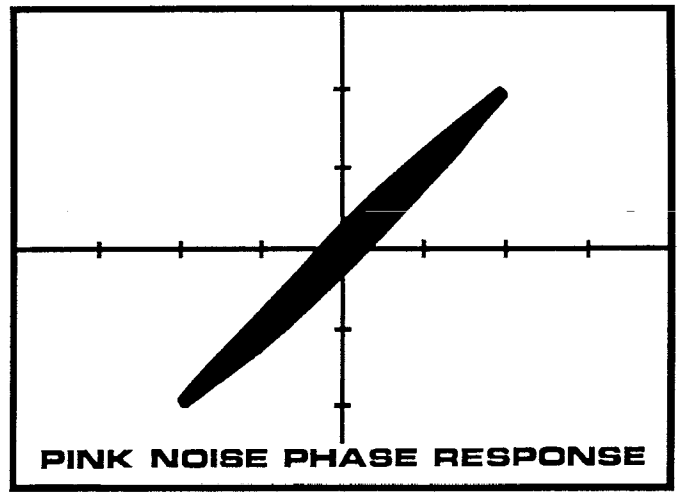



**Figure 11. Azimuth Adjustment Viewed on Oscilloscope While Running HF Test With a Focus, "P Tone" or Pink Noise Source: Adjust for Thinnest Display**

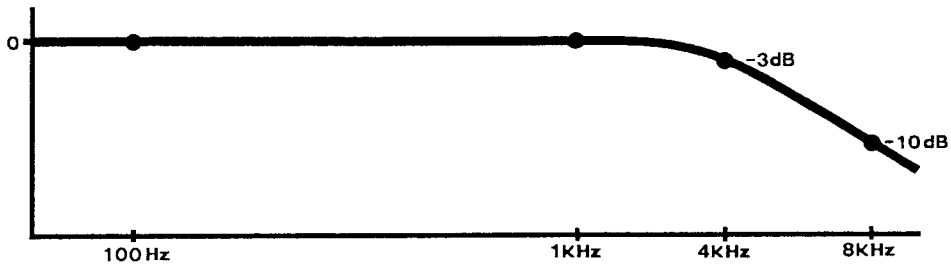



**Figure 12. Adjustment of MID and HIGH Controls Should Produce This Frequency Response Display on a Real Time Analyzer: Using "P Tone" or Pink Noise Source (Measured at Preamp TP-MON)**

# 6. SETUP PROCEDURES

## (A) SETUP OF FRONT/BACK SYSTEMS

In order for a Front/Back system to work properly, the rack must contain the following modules:

PREAMP
NOISE REDUCTION
SURROUND EQUALIZER
FORMAT
EQUALIZER - Center channel only
POWER SUPPLY

This system must not have a matrix card. Instead, all three F/B switches on the back of the system chassis should be switched ON to carry the center and surround information to the FORMAT module and to program the system for Front/Back operation.

### (i) Setup of Front/Back Systems With Stereo Surrounds: JS-65-3, JS-74-3

In order for a stereo surround system to work properly, it must contain the following modules:

PREAMP
NOISE REDUCTION
MATRIX
FORMAT
LEFT/SURROUND EQUALIZER (JSS-05)
CENTER EQUALIZER
RIGHT/SURROUND EQUALIZER (JSS-05)
POWER SUPPLY

The setup procedure is the same as a standard three or four channel system. Pink noise should be fed to the Left/Surround Equalizer, and Right/Surround Equalizer through the test point, or with a Pink Noise Module with the Surround switched on only. The level should be set for 85 dB SPL. Left or Right channel information from the film soundtrack will come out of the Center and appropriate Surround channel.

## (B) SETUP OF LEFT/RIGHT/SURROUND SYSTEMS

In order for a Left/Right/Surround system to work properly, the rack must contain the following modules:

PREAMP
NOISE REDUCTION
MATRIX
SURROUND
FORMAT
EQUALIZERS - Left and Right channels
POWER SUPPLY

The L/R/S switch on the back of the system chassis must be switched ON. This will feed mono information to the Left and Right Channels. It will reprogram the MATRIX card for operation without a center channel, and will reprogram the SYNTHESIZER socket for Left and Right operation.

## (C) SETUP OF LEFT/CENTER/RIGHT/SURROUND SYSTEMS

In order for a Left/Center/Right/Surround system to work properly, the rack must contain the following modules:

PREAMP
NOISE REDUCTION
MATRIX
SURROUND EQUALIZER
FORMAT CARD
EQUALIZERS - Three channels
POWER SUPPLY

***NOTE!*** *The F/B and L/R/S switches on the back of the system chassis should all be in the OFF position, otherwise the surround channel will be low in level and distorted.*

## (D) SPEAKER PHASING AND HORN COVERAGE

The easiest way to perform this test is to use the **ULTRA*STEREO** Pink Noise Generator Module. It should be plugged into the Synthesizer slot. (See Instructions for use in Section 6F.)

(1) In any multi-channel sound system the proper "phasing " (actually, proper *polarity*) of all loudspeakers is crucial. They must all work together to produce a total sound field. If one of the three front speakers is reversed in phase relative to the others, some strange abberations will result. Also the low and high frequency drivers in each speaker system must be in proper phase. It is not uncommon to find a single woofer or horn out of phase with the rest of the system! It is a good practice to feed pink noise simultaneously to all front channel power amplifiers. Set all the amplifier levels about the same and walk around the theatre. A phase error will create a strange tunnel effect at the mid-point between front speakers. Reversing the wires on one speaker should eliminate the problem. With a REAL TIME ANALYZER and with only the center channel speaker connected, one will notice an increase in low and high frequency energy as the left channel

speaker is connected. Similarly, there should be an additional increase in level as the right channel is connected. If any loudspeaker is out of phase, there will not be an increase, there could even be a decrease in level! If a single woofer or horn is out of phase, one may notice an increase in energy in only the low or high frequency range.

(2) The crossover network is another potential problem area. The primary function of the adjustment on this network is to match the low frequency and high frequency horn outputs. Feed PINK NOISE into the power amplifier and use a REAL TIME ANALYZER with a microphone in the room to adjust the crossover control, or tap for flat response in the mid band range, from 250 Hz to 2 kHz.

(3) Check the tilt of the high frequency horn. If necessary adjust it for good coverage throughout the auditorium. See *Figure 9.*

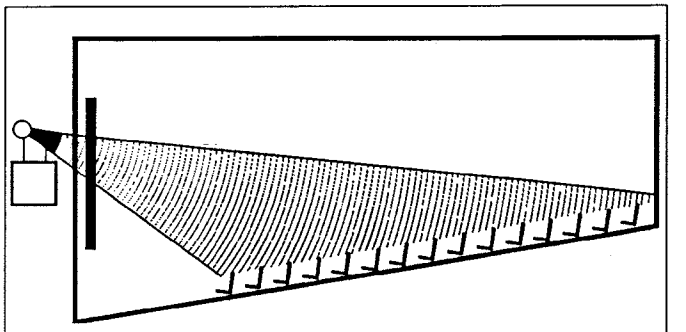


**Figure 13. High Frequency Horn Aiming For Optimum Coverage Throughout Theatre**

## (E) AUDITORIUM EQUALIZATION

(1) Connect the outputs of the processor to the power amplifiers. Make sure the volume controls on the power amplifiers are set at minimum. Switch outputs to HIGH (O dB) or LOW (-10 dB) on the back of the system chassis to suit your application. Reference should be made to the power amplifier manufacturer's documentation, to determine the required input level, to modulate the power amplifier fully.

(2) Feed PINK NOISE at "0" dB into the test point at the top of the center channel EQUALIZER module, or insert an Ultra-Stereo pink noise module into the 'SYN' slot. Switch on the center channel pink noise. (If you have a Left/Right/Surround system, feed pink noise into the left channel).

(3) Set the sound pressure level at 85 dB with the power amplifier volume at maximum by adjusting the LEVEL pot on the EQUALIZER module.

***NOTE!*** *IT IS IMPORTANT THAT ALL BUTTONS ARE OUT ON THE FORMAT MODULE (unless you are using the pink noise card, in which case only the SYN and SURR buttons should be IN.) Set up the REAL TIME ANALYZER with the microphone two thirds of the way back and in the center of the auditorium. MAKE SURE TO SET THE TEN-TURN LEVEL TRIMPOT ON THE EQUALIZER MODULE TO ITS MINIMUM POSITION and set all the equalizer controls to their mid positions. Slowly raise the level of the center channel amplifier to its full on position. Now slowly raise the ten-turn LEVEL trimpot on the equalizer module until you reach approximately 85 dB, SPL. Adjust the equalizer until the response in Figure 14 is obtained.*

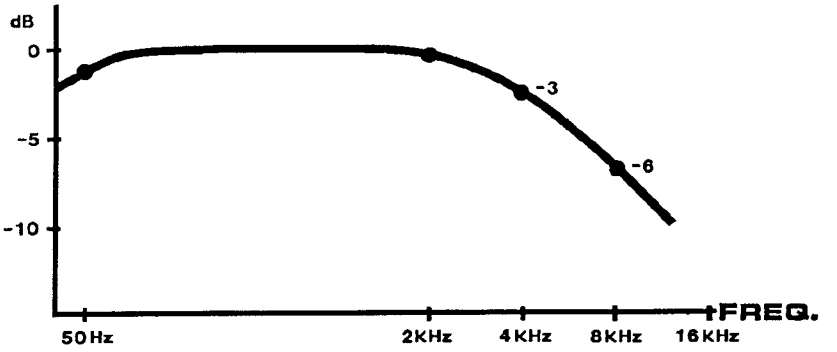



**Figure 14. Real Time Analyzer Display With Test Mic Located In the Middle of the Auditorium and EQ Properly Set**

(4) Repeat the tuning procedure for the left and right channels if applicable.

(5) Feed PINK NOISE into the SURROUND EQ module at "0"dB and adjust the response of the surround channel. Set the sound pressure level to 85 dB. It is necessary to double check the surround channel with a surround TEST LOOP, such as the **ULTRA*STEREO** Type 3 Test Film. Thread the loop and press "SVA" and "SURR" on the FORMAT module . Set the volume on the FORMAT module at "6." Set the DELAY on the SURROUND module fully counterclockwise. Run the loop and listen for the balance of sound from the front and back channels from the center of the auditorium. They should be subjectively the same level. DO NOT raise the surround channel more than 6 dB louder than the front channels. Hollywood sound mixers have become more aggressive in their use of surrounds in the last few years, so that an exaggerated surround level can overpower the dialog at times. Set the DELAY on the SURROUND module according to the following formula for an observer sitting 2/3 towards the back of the auditorium:

**Length of Theatre - (Width of Theatre/2) = Delay** in mS.

***NOTE:*** *1 foot in distance approximates to 1 millisecond in time.*

(6) When the equalization and volume controls are set to 85 dB SPL in the auditorium, run a reel of stereo material and check the sound. A setting of "6" on the master fader will produce normal volume in the auditorium.

## (F) ADJUSTMENT OF SYNTHESIZER CARD

Thread a piece of mono film with wide range music, effects, and dialog. Rotate the SENSITIVITY control on the SYN module fully clockwise. Run the film and when a section of film with DIALOG ONLY appears, carefully rotate the sensitivity control COUNTERCLOCKWISE until the dialog just drops out of the surround channel. DO NOT rotate the SENSITIVITY control too far counterclockwise. There will be a point as the control is rotated counterclockwise where the dialog will suddenly drop in level. This is the correct setting. Moving the SENSITIVITY control too far counterclockwise will eliminate much of the surround information and cause the surrounds to switch on and off erratically. Setting the control too far clockwise will cause dialog to leak continually into the surrounds. Hum can be introduced into the preamplifier due to a grounding problem, or from stray light from a pilot lamp, or other light source falling onto the solar cell. In this case, it may not be possible to switch out the dialogue. Eliminate any hum before proceeding. (Fluorescent lights are particularly troublesome in this regard.)

High level music and effects will switch the surround channel on. Occasionally, when loud music, effects, and dialog occur simultaneously, some dialog information will appear in the surround channel.

# 7. BYPASS MODE, AUTOMATION, REMOTE VOLUME, NON/SYNC & SUBWOOFER SETUP

## (A) BYPASS MODE SETUP

Thread an **ULTRA*STEREO** Test Film, Type 2, 100%-level loop on the Projector. Set the master fader to "6". Using a meter across the center channel output line, or across the power amplifier, or using a sound pressure meter in the auditorium (whichever is easiest), run the loop and press MONO on the FORMAT card. Note the reading. Press BYPASS and adjust the pot on the PREAMP card labelled "1" for the same meter reading obtained in the MONO mode. This will match the bypass level to the mono level. Repeat the procedure for Projector "2" if applicable.

## (B) AUTOMATION SETUP

The JS series can be controlled by automation. By connecting any automation terminal to "E", the system is put in that mode.

***NOTE:*** *All the buttons on the Format module must be OUT! (i.e. off). Pressing any button on the Format module will override the automation control!*

The logic on the JS unit is the sustained type, not momentary. An automation control panel accessory will be available shortly to take momentary pulses and activate the JS system. The JS automation lines will feed 10 milliamps to Earth Ground, so that it is possible to put an LED in series with the automation line as a mode indicator. The surround line is separate from the SVA and SYN line, so to activate SVA and SURR together it will be necessary to use a diode in series with the SURR terminal. Another diode in series with the SURR terminal can be connected to the SYN terminal, to activate SYN and SURR together. See *Figure 15.* A diode type 1N4002 or equivalent is ideal for this purpose.

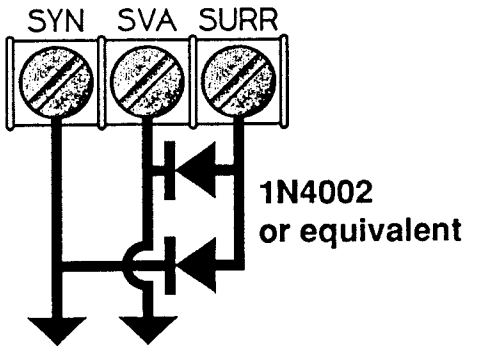



**Figure 15. Circuit For Simultaneous Activation of the SVA, SYN and SURR Logic**

## (C) REMOTE VOLUME

Connect a 10 kΩ audio potentiometer to the "15 V", "CONTROL", and "E" terminals. Additional remote volume controls can be switched in as shown in *Figure 16.* As many pots as required may be cascaded. *Be aware that they all interact.*

***NOTE:*** *The Remote Fader works in series with the Master Fader. If a Remote Fader will always be in the line, it is desirable to set up the output pots for a pressure level, to compensate for the volume loss, with the Remote Fader(s) in the normal position(s).*

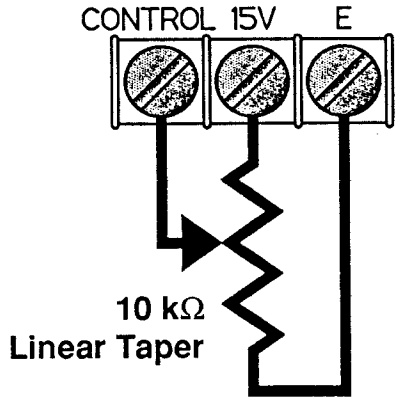



**Figure 16. Circuit For Remote Master Volume Control**

## (D) NON/SYNC CONNECTIONS

The JS series features a stereo music fade in and out circuit. Connect the tape or disc player to the terminals marked N/SYNC INPUTS "L" and "R". An eearth ground is also needed. Use any convenient "E" terminal.

***NOTE:*** *With some tape or compact disc players, the input may be overloaded. In this case, insert 20 kΩ resistors in series with the hot side of the input lines.*

The Non/Sync is not affected by the Master Fader and is adjusted by a pot, just above the master fader knob, on the FORMAT module. In order to activate the fade in circuit, the N/S FADE terminal must be connected to an "E" terminal. Removal of this jumper will result in the fade out of the Non-Sync signal. In some cases, it may be necessary to insert 1:1 input transformers in the line, if the tape player is located in another part of the theater. This will avoid hum being introduced through the audio grounding.

## (E) SUBWOOFER SETUP

Thread an **ULTRA*STEREO** Type 1 Test Film pink noise loop on the projector and press MONO. Set the volume of the Subwoofer Channel with the ten-turn trimpot at the top of the Format module. With only the Center Channel and Subwoofer Amplifier ON and the Master Fader set at "6", adjust the Subwoofer trimpot, so that the response on the spectrum analyzer in the Subwoofer frequencies equals that of higher frequencies.

Alternately, insert an **ULTRA*STEREO** Pink Noise Generator module into the SYN slot and press SYN on the Format module. Switch on the Center Channel Pink Noise Generator. The Subwoofer ten-turn trimpot should be adjusted so that the response on the spectrum analyzer in the Subwoofer frequencies equals that of higher frequencies.

## (F) USE OF PINK NOISE ALIGNMENT CARD, Model JPN-01

The **ULTRA*STEREO** Pink Noise Generator Module is a handy tool which will not only speed up the equalization process, but will also expose possible loudspeaker phasing problems. This module is able to send in-phase (+) and out-of-phase (-) pink noise to the Left, Center, Right, and Surround channels. Insert the module into the SYN slot and press SYN on the FORMAT module. Set the MASTER FADER at "6" and set the room level for roughly 85 dB. Equalize each channel as described in section 6E on page 14. After the equalization has been accomplished, one should check the phasing of all front channels. As mentioned earlier, should one loudspeaker, or even horn or woofer, be out of phase with another loudspeaker, dialog will be less intelligible, music will sound less dynamic, and the theatre "just won't sound right" when familiar material is played.

## (G) OVERALL SYSTEM CHECK

Place an **ULTRA*STEREO** Type 3(b) Test Film in the Projector. With the Main Fader set at "6", go into the center of the auditorium with a Sound Pressure Level Meter. The Left Channel is identified by a 250 Hz tone, followed by Pink Noise in the Left, Center, Right and Surround Channels, in that order. All Channels should measure 85 dB SPL ±1 dB and should sound the same subjectively.

An additional track (a) is available on the same film for verifying the Front and Back performance. In this case, the Center Front Channel is identified with a 500 Hz tone, followed by Pink Noise in the Center and Surround Channels. These tests should show Pink Noise also at 85 dB SPL, ±1 dB, and sound the same subjectively.

# 8. OPERATION

*NOTE: If you have a MONO or unmarked print, press the MONO button for normal mono operation. If you have a synthesizer fitted, and wish to play the mono print in synthesized stereo, press the SYN and SURR buttons.*

*If you have a STEREO or SVA print which has the* **ULTRA*STEREO** *or Dolby Laboratories name on the print leader, press the SVA and SURR buttons. (SVA stands for Stereo Variable Area, and describes the form that the Photographic or Optical Soundtrack takes on the film.)*

## A more detailed explanation of the use of the system follows:

The bottom button on the power supply should be pressed IN. You should see two red and one green LEDs lit. This confirms that the unit is operating. *The top button on the supply should be OUT unless you are using an external supply.* ***Do NOT under any circumstance*** use the top button for an ON/OFF switch, as you may damage your loudspeakers and other equipment. This switch should only be used *when a separate supply is connected to the system.* The top (green) LED will be lit if an external supply is connected and operating.

If your theater is automated, all of the buttons on the Format module should be OUT. Under this condition, the **ULTRA*STEREO** Sound Processor will be operated by the automation. Refer to the manufacturer's instructions for the required preparation of your films for automated operation.

Adjust the Volume Control in the center of the Processor to achieve the desired level to suit the particular print being played and the conditions in the auditorium. ( A setting of "6" is normal.)

### MONO

This mode is used for normal Academy Mono films with ALL Processors. Press the **MONO** button on the Format module.

### SYNTHESIZED STEREO

This mode is used for Processors fitted with a Synthesizer card when it is required to obtain a synthesized stereophonic sound from a mono print. Press the **SYN** button. If you require the Surround speakers to be operational, press the **SURR** button too.

### SVA

This mode is used for Processors fitted with 2, 3 & 4 channel modules. Press the **SVA** button any time you wish to play a stereo print. If you have surround speakers fitted and wish to use them, also press the **SURR** button.

### EXT

This mode is available on all Processors and permits the use of an external 1 to 4 channel source with the system, such as a CinemaScope magnetic print. Its use will depend on what external device is attached to the Processor. Press the **EXT** button.

### BYPASS

The Bypass button is provided to enable the equipment to keep operating under Emergency conditions. There is a separate power supply which feeds an emergency mono preamplifier and sends its output through the fader direct to the three front power amplifiers. Press the **BYPASS** button and adjust the volume.

*NOTE! Ask for a service call as soon as possible if it is ever necessary to use this mode.*

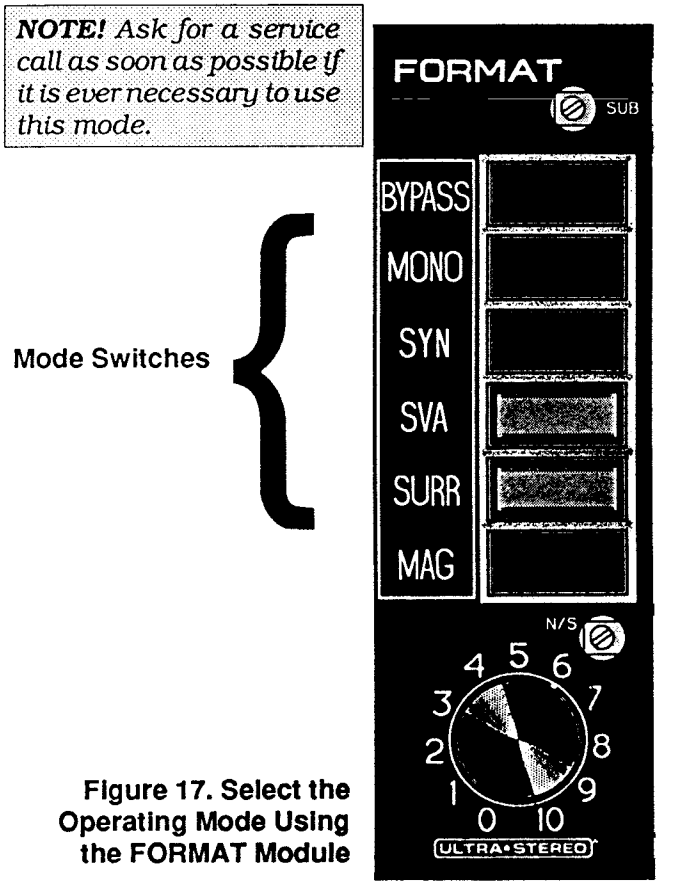



**Figure 17. Select the Operating Mode Using the FORMAT Module**

# 9. TROUBLESHOOTING

*Please do not alter any preset controls on the surface of the printed circuit boards. If a module does not function correctly, it should be returned to the factory for investigation and repair, using the special alignment fixtures.*

| PROBLEM | CHECK | SOLUTION |
|---|---|---|
| SOUND SYSTEM DOES NOT WORK and no LEDs are lit on the Power Supply. | Power source | Reset circuit breaker or replace fuse. |
| | Power cord | Make sure power cord is firmly seated. |
| | Power supply fuse | Replace fuse- 1/2 A Slow Blow for 115 VAC or 1/4 A SB for 230 VAC. |
| SOUND SYSTEM DOES NOT WORK and either the +15 V or -15 V LED on the Power Supply is out. | Seating of House EQ modules | Turn off Power Supply, unplug House EQ modules. Turn on Power Supply. If both LED's light carefully replug House EQ modules making sure the gold fingers line up with the socket. |
| | Failure of a module. | Turn off Power Supply, unplug all modules, turn on Power Supply. If both + and -15 V LED's light then a module has failed. Plug in one module at a time until the defective one is found. |
| | Failure of the Power Supply. | If the + and -15 V LED's will not both light then replace the Power Supply. |
| SOUND SYSTEM DOES NOT WORK and + and -15 V LED's on the Power Supply are lit. Note: the +22 V LED should be lit to indicate operation of the backup supply, but the EXT LED will only light if an external ±15 V supply is connected. | Power amplifiers | Make sure amplifiers are operating and volume controls are up. |
| | Change-over | Switch change-over to operating projector. LED lights on the Preamp indicate which projector is in use. |
| | Exciter lamp | Replace bulb or repair exciter supply. |
| | Stereo solar cell on projector | Make sure the solar cell is illuminated and clean. Use compressed air. DO NOT USE ORGANIC SOLVENTS OR ALCOHOL. |
| | "VU" meters on the NR module | Make sure both meters are moving with program material. If not, there is a problem with the solar cell, the wiring, or the Preamp. If both meters are moving, there is a problem in the JS-5/95 unit, the unit wiring, the power amplifiers, or the loudspeakers. |
| | Press BYPASS mode<br>Note: This mode puts sound in all three front channels. | If sound comes out of the three front speakers, then the problem is in the JS-5/95 unit. If there is no sound, the problem is somewhere else. |
| | Incorrectly set Voltage Selector Switch on 115v line. | Make certain the switch on the back of the power supply is set to 115v for a supply of 105-125v. |

*(Continued...)*

| PROBLEM | CHECK | SOLUTION |
|---|---|---|
| NO SOUND IN ONE OR MORE FRONT CHANNELS | Press BYPASS mode | If the channel or channels are still dead, the problem is an amplifier, speaker, or wiring. If all front channels work, then the problem is in the JS 5/95 unit. |
| | Press other mode switches | If the channel or channels are still dead swap House EQ modules to see if one has failed. If the problem persists in all modes, the Format module may have failed. Check different modes to determine if only one mode has a problem. Refer to later section in TROUBLESHOOTING. |
| NO SOUND IN SURROUND CHANNEL | Power amplifier | Replace speaker fuse or main fuse, replace amplifier. |
| | Speakers or wiring | Speakers are often series connected so if one fails they all will not work. |
| | Press SYN or SVA and SURR then try NON/SYNC MUSIC | If NON/SYNC MUSIC plays but the SYN or SVA and SURR does not, there is a problem in the SURR/EQ module. |
| | Setting of DELAY on SURR/EQ module. | Move the adjustment pot for the DELAY to see if the delay line starts working. |
| SOUND IS DISTORTED | Power amplifier or speaker | Try to determine if distortion is in one or all channels. If distortion is in one channel exchange power amplifiers or speaker lines to locate problem. |
| | Press several mode switches | Try to determine if one or all modes are distorted. If all are distorted swap HOUSE EQ modules. |
| | Try NON/SYNC MUSIC | If MUSIC is not distorted the problem is in the PREAMP, the SOLAR CELL alignment, or FORMAT module. |
| | SVA and SURR mode | If there is distortion only in this mode then there could be a problem in the NR or MATRIX modules. |
| | SYN and SURR mode | If there is distortion only in this mode then there is a problem with the SYN module. |
| | Exciter lamp | Make sure correct lamp is used. There are vertical and horizontal versions of many exciter lamps. |
| HUM IN ALL CHANNELS | Stray light pickup at the solar cell on the projector. | Eliminate source of stray light. |
| | PREAMP module. | Eliminate cause of hum ground loops, bad exciter lamp supply, JS 5/95 unit located too near hum field from power amplifier or another piece of equipment. |
| | Wiring between JS 5/95 unit and power amplifiers | Sometimes amplifiers with balanced inputs can produce hum when they are fed from a unit with a single audio ground. Check amplifier manual for operation with unbalanced inputs. |

| PROBLEM | CHECK | SOLUTION |
|---|---|---|
| BUZZING SOUND IN ALL CHANNELS, MAINLY THE SURROUNDS | Grounding of JS-5/95 unit | It may be necessary to open the link on the JS backboard between E and AC GND. |
| | PREAMP module | The Preamp may have some high frequency oscillation. Check the Solar Cell wiring. Make certain that the lines are not routed too close to the Power Amplifier or Loudspeaker wiring. It may be necessary to re-route the cell lines. If in doubt, remove wires from the backboard and short the input. If this does not solve the problem, replace the PREAMP. |
| | SURR/EQ module | If unplugging this card stops the buzz, there is a problem in the module. |
| SYN MODE-SURROUNDS ARE ON ALL THE TIME | Hum pickup | Eliminate the cause of hum-ground loops, bad exciter lamp supply, stray light. If removing hum does not solve the problem, replace the module. |
| SVA MODE- SOUND FROM LEFT OR RIGHT CHANNEL ONLY. | Solar cell or wiring | Re-align solar cell or check that the cell wiring is not broken or shorted on one channel. |
| | "VU" METERS on NR module | If one meter does not move with program material, check the PREAMP, NR, and MATRIX modules. |
| SVA MODE-DIALOG IS LEAKING INTO THE SURROUNDS | Soundhead azimuth alignment and preamp level settings | Re-adjust soundhead azimuth and reset preamp levels with test film. |
| | Soundhead guide rollers | Make sure the soundhead guide rollers are not loose and do not have any end play. Some rollers are spring loaded on one side. Make sure the fixed side is not loose. |
| | SURR/EQ module | Surround level is set too high. Reset to 85 dB SPL. |
| SVA MODE- SURROUNDS ARE EXTREMELY LOW | Soundhead alignment | The solar cell is too far back. Move it to within .040" (1mm) of the film and readjust. |
| | JS-5/95 Backboard | There are two DIP switches marked "X" and "Y". These must be OFF when a MATRIX module is plugged into the JS-5/95 unit. |
| | SURR/EQ module | If the problem persists replace the module. |

***NOTE:*** *A monitoring system in the projection booth that is able to look at both the processor and power amplifier outputs will greatly facilitate troubleshooting.*

# 10. HINTS AND TIPS FROM THE FIELD

*Please take note of the following:*

- **Make absolutely certain that the solar cell lines run in their own conduit from the cell to the processor inputs, without passing through any electrical or automation boxes. They must not be placed adjacent to loudspeaker lines.** Failure to do so may lead to system noise or oscillations due to the amplification required to reproduce the solar cell signals.
- Make sure to keep all ambient light off the solar cells during alignment or operation (i.e. framing light or room lights and particularly any flourescent lights).
- Note that adjusting SYNTHESIZER surround DOES NOT effect Stereo SVA surround.
- If it is necessary to disconnect system ground from earth ground, simply remove the jumper between the points marked AC GND and E near the solar cell inputs on the rear panel.
- When placing a signal into the test points on the equalizer cards, keep in mind that the volume control does NOT effect the output levels. Adjust your signal generator for a low level output before making a connection so you do not accidentally damage any loudspeakers!
- For critical adjustment of signal levels, (see pages 10 and 11) it is more important to null the meter on the matrix card than to have the meters on the noise reduction card be exactly the same, due to slight variations between meters' sensitivity.
- If after careful alignment, the theatre just doesn't sound like other installations, you may want to check inter loudspeaker phasing and phasing between the high frequency horns and their associated low frequency woofers. A phasing problem is not immediately obvious and often hard to find. The symptoms include decreased intelligibility in the dialog, as well as a general degradation of sound quality and poor localization of the sound sources. The use of our accessory Pink Noise Generator module will be helpful for this purpose. It has two way switches for each of the four channels. When two switches are placed in the In Phase (+) positions, the signals should add. This can be verified with a Sound Pressure Meter. Conversely, with one switch in the In Phase (+) and the other switch in the Out of Phase (-) position, the signals should subtract. You should obtain very similar readings between the three front speaker systems. If you do not do so, there is clearly a problem of phasing, which must be corrected immediately.

## WARNING

***Please Read This Notice Regarding U*S 2-Track Stereophonic Test Films***

*Take note that these test films are supplied on Polyester Support in order to give the user long term usefullness and reliability due to freedom from shrinkage. The user must be aware that this base material is far stronger than Celulose Tri-Acetate that is used for most release prints. Great care must be taken to ensure that it is correctly threaded into the projector or sound reader to avoid any possible damage. Make certain that the loudspeakers are set at a very low level or turned completely off before running any of these films. We take no responsibility for any damages, consequential or otherwise, even though caused by negligence or other fault from the use of these films.*

### Three films are available...

**Type 1 – For routine maintenance:**

a) 100 Hz - 1 kHz - 10 kHz tones at 50% Modulation. Each tone is approximately 2 feet in length. Set the Noise Reduction Meters to read 0 at 1 kHz. The other tones should read 0 ±1 dB.

b) Pink noise at 50% Modulation.The 'A' chain should read flat ±2 dB between 50 Hz & 10 kHz.The 'B' chain should read ±3 dB between 100 Hz &10 kHz in accordance with ANSI PH22.202M & ISO 2969.

**Type 2 – For installation and major realignment:**

a) 1 kHz alternating between tracks 1 & 2 at 100% Modulation. Both tracks should show clean waveforms on an oscilloscope.

b) 'P' tone at 50% Modulation. This is to be used in the same way as pink noise. It will be found to provide a more precise means of initial alignment.

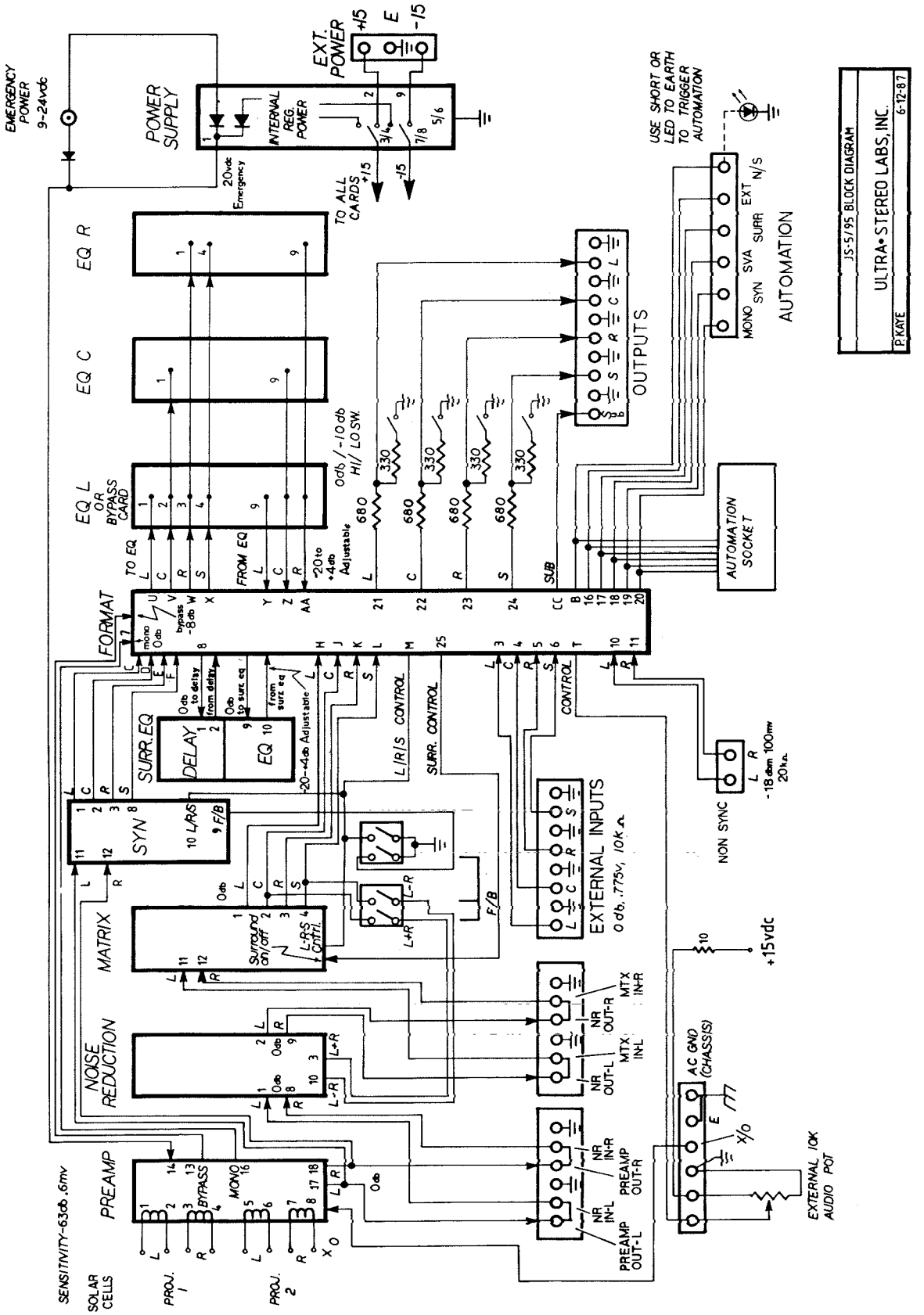
**Type 3 – For overall performance verification:**

a) 500 Hz tone in the Center Channel, followed by pink noise in the Center & Surround Channels.

b) 250 Hz tone in the Left Channel, followed by pink noise in the Left, Center, Right & Surround Channels.

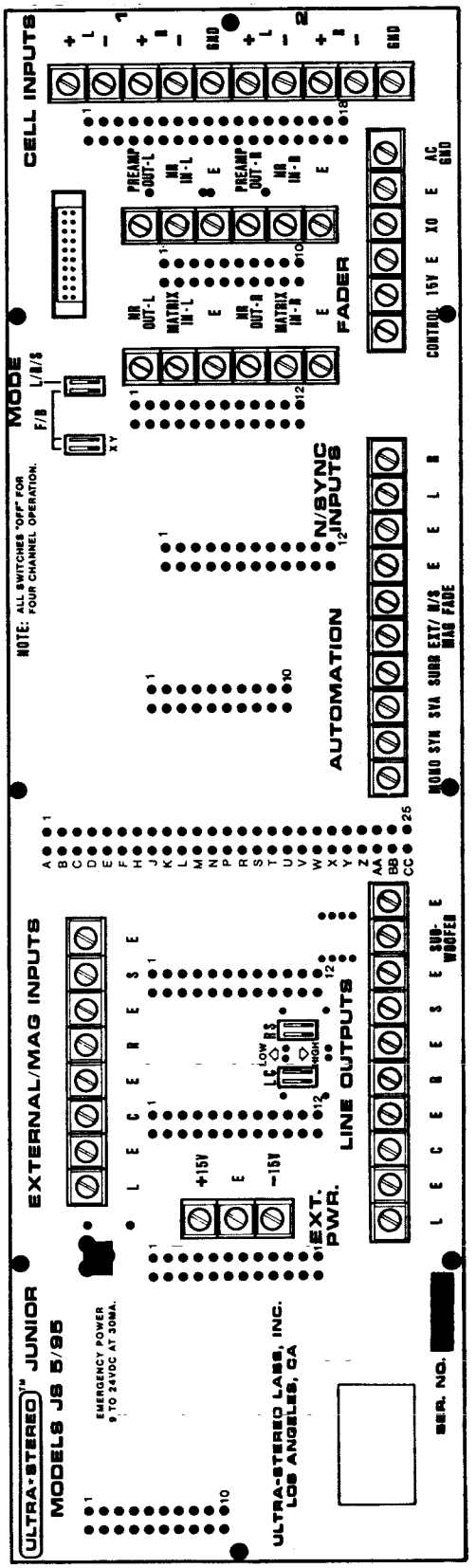
# 11. DRAWINGS & PARTS LISTS

## JS-Series Block Diagram

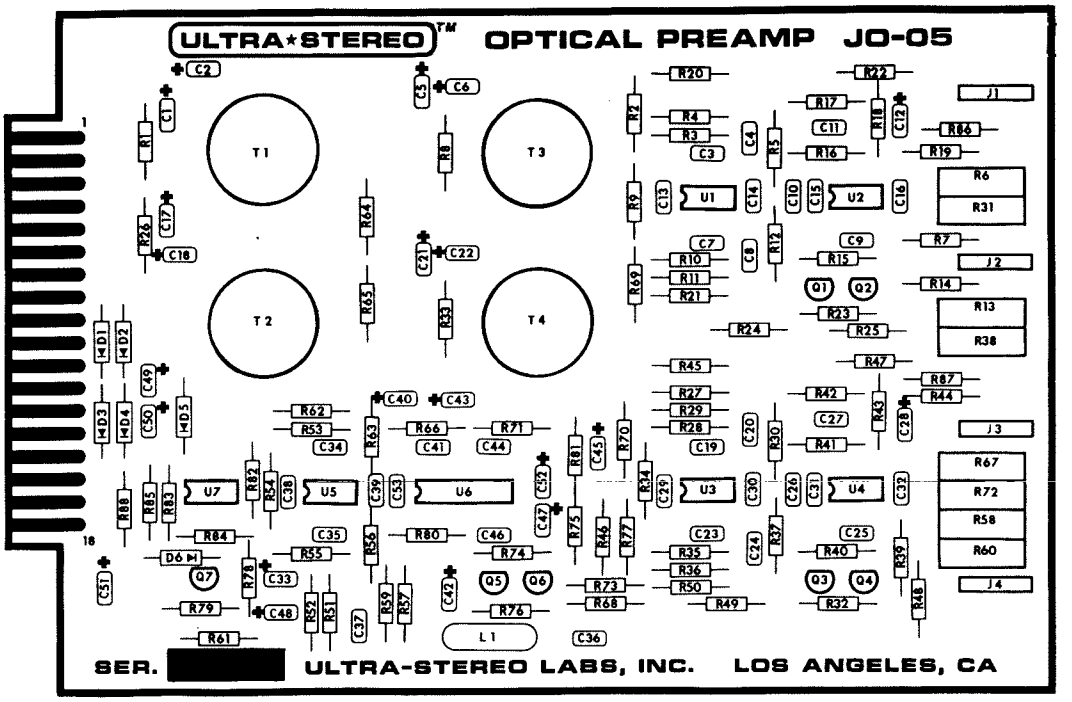


# Model JCH-05 Rear Board: Layout & Parts List

| PART | VALUE | U*S # |
|---|---|---|
| R1 | 680 Ω | 112009.00 |
| R2 | 300 Ω | 112007.00 |
| R3 | 680 Ω | 112009.00 |
| R4 | 300 Ω | 112007.00 |
| R5 | 680 Ω | 112009.00 |
| R6 | 300 Ω | 112007.00 |
| R7 | 680 Ω | 112009.00 |
| R8 | 300 Ω | 112007.00 |
| R9 | 10 Ω | 112001.00 |
| R10 | 10 Ω | 112001.00 |
| D1 | 1N4002 | 141005.00 |
| J1 | Auto Plug | 162006.00 |
| J1A | Auto Socket | 162009.00 |
| J2 | Ext Power | 162007.00 |
| S1/2 | X/Y Switch | 173005.00 |
| S3/4 | FB/LRS Switch | 173005.00 |
| S5/6 | L/C ATT Switch | 173005.00 |
| S7/8 | R/S ATT Switch | 173005.00 |
| TB1 | 10 Way BK | 163005.00 |
| TB2 | 6 Way BK | 163003.00 |
| TB3 | 6 Way BK | 163003.00 |
| TB4 | 8 Way BK | 163004.00 |
| TB5 | 10 Way BK | 163005.00 |
| TB6 | 10 Way BK | 163005.00 |
| TB7 | 6 Way BK | 163003.00 |
| TB8 | 3 Way BK | 163001.00 |
| TS1 | Card Socket | 162004.00 |
| TS2 | Card Socket | 162002.00 |
| TS3 | Card Socket | 162003.00 |
| TS4 | Card Socket | 162003.00 |
| TS5 | Card Socket | 162002.00 |
| TS6 | Card Socket | 162005.00 |
| TS7 | Card Socket | 162003.00 |
| TS8 | Card Socket | 162003.00 |
| TS9 | Card Socket | 162003.00 |
| TS10 | Card Socket | 162002.00 |
| M1 | PCB | 181013.00 |
| M2 | 2 Way Straps | 169005.00 |
| M3 | Rrack Frame | 182014.00 |
| M4 | Card Guides | 169004.00 |
| M5 | 1/4" Screw | 167001.00 |
| M6 | US Power Cord | 172003.00 |
| M6A | Int'l Power Cord | 172004.00 |
| M7 | Carton | 183001.00 |
| M8 | Foam Packing | 183002.00 |
| M9 | Manual | 184001.00 |
| M10 | Front Cover | 199003.00 |
| M11 | Operator Card | 184002.00 |
| | -END OF LIST- | |



# Model J0-05 Optical Preamp: Layout & Parts List




| PART | VALUE | U*S # |
|---|---|---|
| R1 | 300 Ω | 112007.00 |
| R2 | 2 kΩ | 112014.00 |
| R3 | 62 kΩ | 112033.00 |
| R4 | 1.5 kΩ | 112013.00 |
| R5 | 3.01 kΩ | 111007.00 |
| R6 | 10 kΩ | 117005.00 |
| R7 | 10 kΩ | 111013.00 |
| R8 | 300 Ω | 112007.00 |
| R9 | 2 kΩ | 112014.00 |
| R10 | 62 kΩ | 112033.00 |
| R11 | 1.5 kΩ | 112013.00 |
| R12 | 3.01 kΩ | 111007.00 |
| R13 | 10 kΩ | 117005.00 |
| R14 | 10 kΩ | 111013.00 |
| R15 | 100 kΩ | 112034.00 |
| R16 | 75 kΩ | 111039.00 |
| R17 | 100 kΩ | 111042.00 |
| R18 | 2 kΩ | 112014.00 |
| R19 | 47 Ω | 112002.00 |
| R20 | 10 Ω | 112001.00 |
| R21 | 10 Ω | 112001.00 |
| R22 | 10 Ω | 112001.00 |
| R23 | 10 Ω | 112001.00 |
| R24 | 100 kΩ | 112034.00 |
| R25 | 100 kΩ | 112034.00 |
| R26 | 300 Ω | 112007.00 |
| R27 | 2 kΩ | 112014.00 |
| R28 | 62 kΩ | 112033.00 |
| R29 | 1.5 kΩ | 112013.00 |
| R30 | 3.01 kΩ | 111007.00 |
| R31 | 10 kΩ | 117005.00 |
| R32 | 10 kΩ | 111013.00 |
| R33 | 300 Ω | 112007.00 |
| R34 | 2 kΩ | 112014.00 |
| R35 | 62 kΩ | 112033.00 |
| R36 | 1.5 kΩ | 112013.00 |
| R37 | 3.01 kΩ | 111007.00 |
| R38 | 10 kΩ | 117005.00 |
| R39 | 10 kΩ | 111013.00 |
| R40 | 100 kΩ | 112034.00 |
| R41 | 75 kΩ | 111039.00 |
| R42 | 100 kΩ | 111042.00 |
| R43 | 2 kΩ | 112014.00 |
| R44 | 47 Ω | 112002.00 |
| R45 | 10 Ω | 112001.00 |
| R46 | 10 Ω | 112001.00 |
| R47 | 10 Ω | 112001.00 |

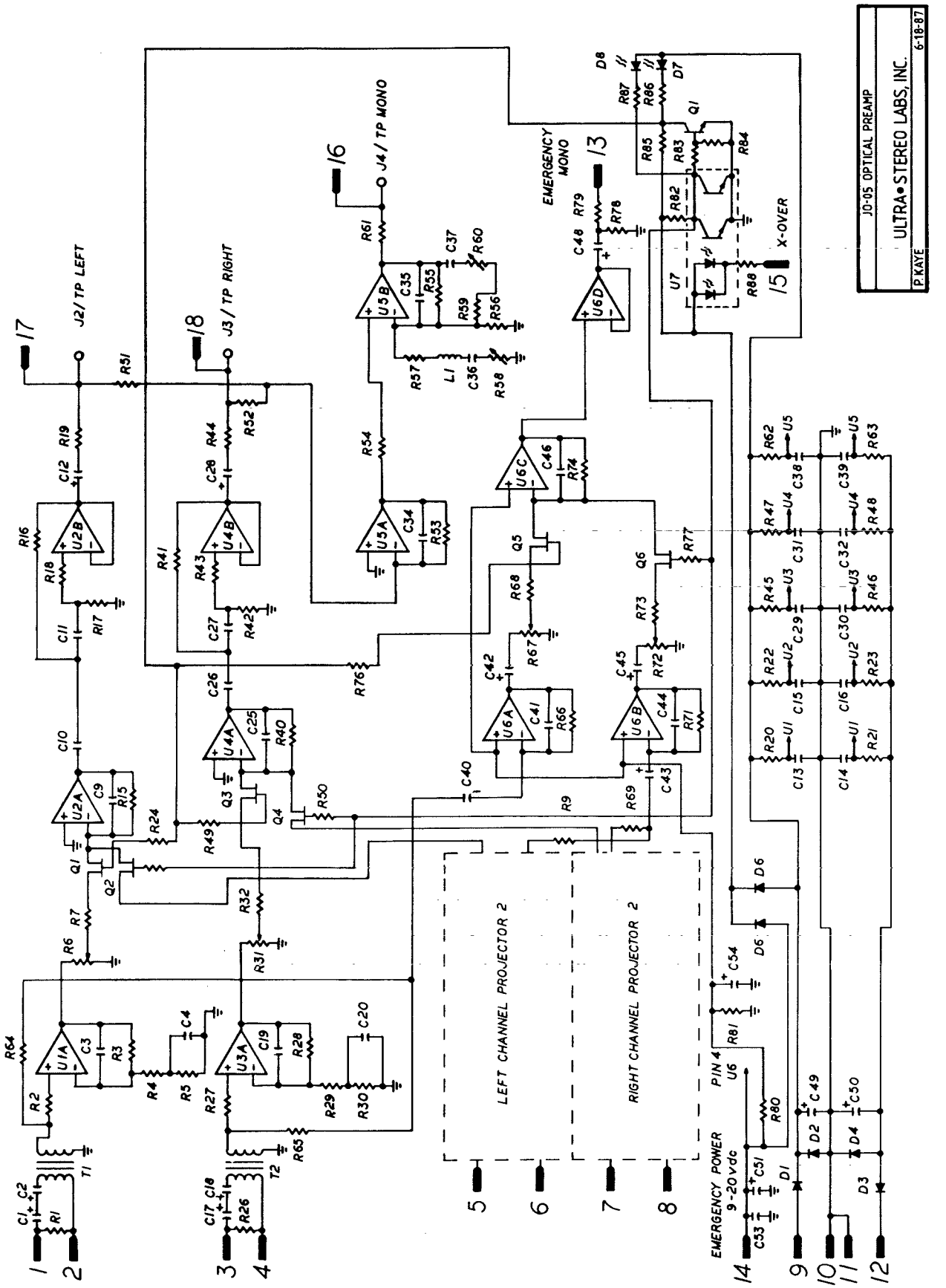
| PART | VALUE | U*S # |
|---|---|---|
| R48 | 10 Ω | 112001.00 |
| R49 | 100 kΩ | 112034.00 |
| R50 | 100 kΩ | 112034.00 |
| R51 | 100 kΩ | 111042.00 |
| R52 | 100 kΩ | 111042.00 |
| R53 | 4.99 kΩ | 111011.00 |
| R54 | 2 kΩ | 112014.00 |
| R55 | 6.8 kΩ | 112020.00 |
| R56 | 680 Ω | 112009.00 |
| R57 | 100 Ω | 112003.00 |
| R58 | 10 kΩ | 117005.00 |
| R59 | 1 kΩ | 112011.00 |
| R60 | 10 kΩ | 117005.00 |
| R61 | 47 Ω | 112002.00 |
| R62 | 10 Ω | 112001.00 |
| R63 | 10 Ω | 112001.00 |
| R64 | 249 kΩ | 111050.00 |
| R65 | 249 kΩ | 111050.00 |
| R66 | 1 MΩ | 111055.00 |
| R67 | 10 kΩ | 117005.00 |
| R68 | 10 kΩ | 111013.00 |
| R69 | 249 kΩ | 111050.00 |
| R70 | 249 kΩ | 111050.00 |
| R71 | 1 MΩ | 111055.00 |
| R72 | 10 kΩ | 117005.00 |
| R73 | 10 kΩ | 111013.00 |
| R74 | 249 kΩ | 111050.00 |
| R75 | 100 kΩ | 112034.00 |
| R76 | 100 kΩ | 112034.00 |
| R77 | 100 kΩ | 112034.00 |
| R78 | 100 kΩ | 112034.00 |
| R79 | 47 Ω | 112002.00 |
| R80 | 100 kΩ | 112034.00 |
| R81 | 100 kΩ | 112034.00 |
| R82 | 10 kΩ | 112022.00 |
| R83 | 100 kΩ | 112034.00 |
| R84 | 10 kΩ | 112022.00 |
| R85 | 10 kΩ | 112022.00 |
| R86 | 6.8 kΩ | 112020.00 |
| R87 | 6.8 kΩ | 112020.00 |
| R88 | 1 kΩ | 112011.00 |
| C1 | 47 µF | 128006.00 |
| C2 | 47 µF | 128006.00 |
| C3 | 47 pF | 121003.00 |
| C4 | 8200 pF | 122013.00 |
| C5 | 47 µF | 128006.00 |
| C6 | 47 µF | 128006.00 |

| PART | VALUE | U*S # |
|---|---|---|
| C7 | 47 pF | 121003.00 |
| C8 | 8200 pF | 122013.00 |
| C9 | 10 pF | 121001.00 |
| C10 | 100 nF | 125008.00 |
| C11 | 100 nF | 125008.00 |
| C12 | 10 µF | 128003.00 |
| C13 | 100 nF | 121006.00 |
| C14 | 100 nF | 121006.00 |
| C15 | 100 nF | 121006.00 |
| C16 | 100 nF | 121006.00 |
| C17 | 47 µF | 128006.00 |
| C18 | 47 µF | 128006.00 |
| C19 | 47 pF | 121003.00 |
| C20 | 8200 pF | 122013.00 |
| C21 | 47 µF | 128006.00 |
| C22 | 47 µF | 128006.00 |
| C23 | 47 pF | 121003.00 |
| C24 | 8200 pF | 122013.00 |
| C25 | 10 pF | 121001.00 |
| C26 | 100 nF | 125008.00 |
| C27 | 100 nF | 125008.00 |
| C28 | 10 µF | 128003.00 |
| C29 | 100 nF | 121006.00 |
| C30 | 100 nF | 121006.00 |
| C31 | 100 nF | 121006.00 |
| C32 | 100 nF | 121006.00 |
| C33 | 10 µF | 128003.00 |
| C34 | 6800 pF | 122012.00 |
| C35 | 47 pF | 121003.00 |
| C36 | 47 nF | 125006.00 |
| C37 | 6800 pF | 122012.00 |
| C38 | 100 nF | 121006.00 |
| C39 | 100 nF | 121006.00 |
| C40 | 10 µF | 128003.00 |
| C41 | 47 pF | 121003.00 |
| C42 | 10 µF | 128003.00 |
| C43 | 10 µF | 128003.00 |
| C44 | 47 pF | 121003.00 |
| C45 | 10 µF | 128003.00 |
| C46 | 47 pF | 121003.00 |
| C47 | 10 µF | 128003.00 |
| C48 | 10 µF | 128003.00 |
| C49 | 10 µF | 128003.00 |
| C50 | 10 µF | 128003.00 |
| C51 | 470 µF | 128009.00 |
| C52 | 10 µF | 128003.00 |
| C53 | 100 nF | 121006.00 |

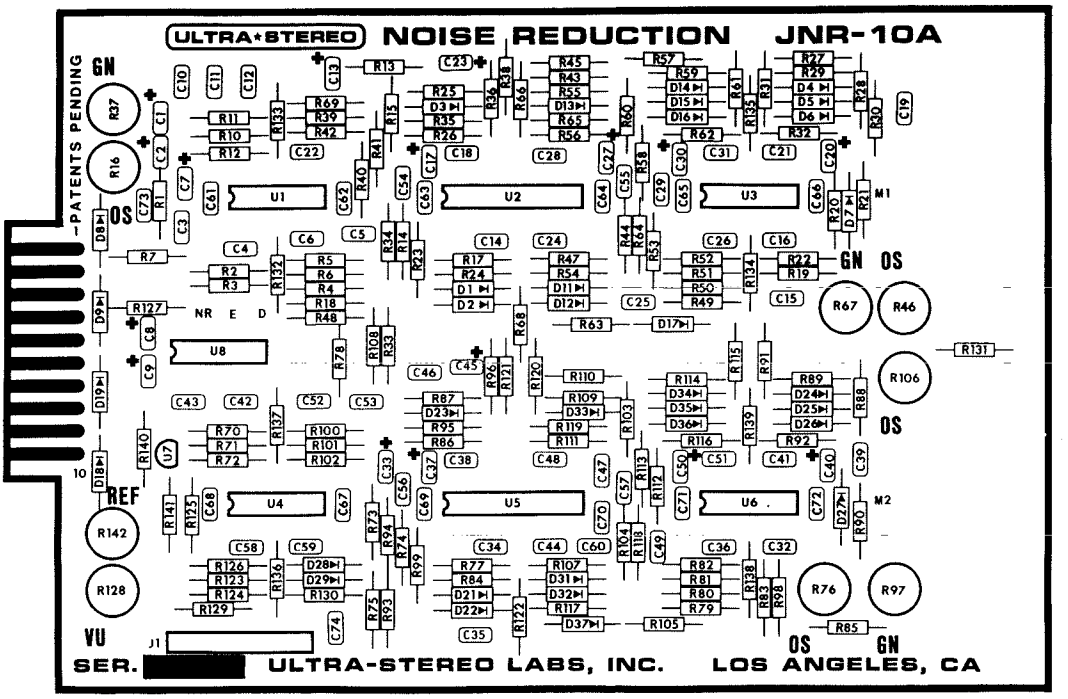
| PART | VALUE | U*S # |
|---|---|---|
| L1 | 27 mH | 131001.00 |
| D1 | 1N4004 | 141005.00 |
| D2 | 1N4004 | 141005.00 |
| D3 | 1N4004 | 141005.00 |
| D4 | 1N4004 | 141005.00 |
| D5 | 1N4004 | 141005.00 |
| D6 | 1N4004 | 141005.00 |
| P1 | Red LED | 146001.00 |
| P1A | LED Holder | 169003.00 |
| P2 | Green LED | 146003.00 |
| P2A | LED Holder | 169003.00 |
| J1 | Black TP | 164001.00 |
| J2 | Red TP | 164002.00 |
| J3 | GreenTP | 164004.00 |
| J4 | Purple TP | 164003.00 |
| Q1 | J-174 | 145001.00 |
| Q2 | J-174 | 145001.00 |
| Q3 | J-174 | 145001.00 |
| Q4 | J-174 | 145001.00 |
| Q5 | J-174 | 145001.00 |
| Q6 | J-174 | 145001.00 |
| Q7 | 2N3904 | 142001.00 |
| T1 | Transformer | 152001.00 |
| T2 | Transformer | 152001.00 |
| T3 | Transformer | 152001.00 |
| T4 | Transformer | 152001.00 |
| U1 | 8 Pin Socket | 161001.00 |
| U1A | NE-5532 | 143009.00 |
| U2 | 8 Pin Socket 1 | 61001.00 |
| U2A | NE-5532 | 143009.00 |
| U3 | 8 Pin Socket | 161001.00 |
| U3A | NE-5532 | 143009.00 |
| U4 | 8 Pin Socket | 161001.00 |
| U4A | NE-5532 | 143009.00 |
| U5 | 8 Pin Socket | 161001.00 |
| U5A | NE-5532 | 143009.00 |
| U6 | 14 Pin Socket | 161002.00 |
| U6A | XR-4212 | 143022.00 |
| U7 | ILD-1 | 144001.00 |
| M1 | PCB | 181001.00 |
| M2 | Cover | 182003.00 |
| M3 | 1/4" Screw | 167001.00 |

-END OF LIST-

# Model J0-05 Optical Preamp Schematic Diagram

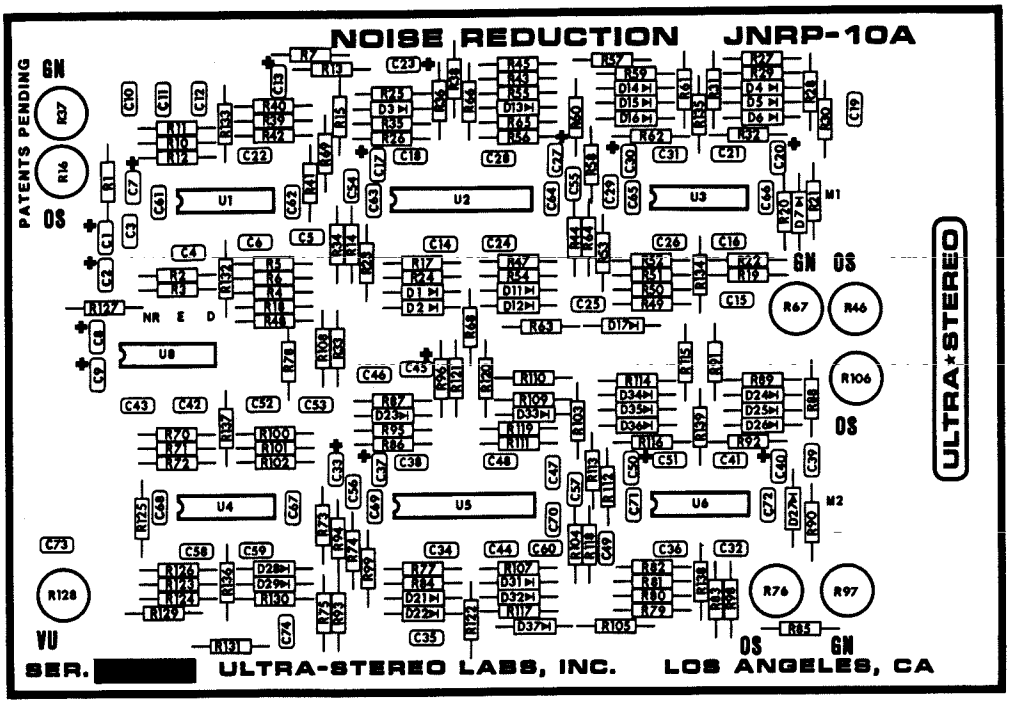


# Models JNR-10 & JNRP-10 Noise Reduction Units: Layout & Parts List




| PART | VALUE | U*S # | PART | VALUE | U*S # | PART | VALUE | U*S # | PART | VALUE | U*S # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R1 | 20 kΩ | 111019.00 | R48 | 100 kΩ | 111042.00 | R95 | 200 Ω | 112004.00 | R142 | 500 Ω | 117001.00 |
| R2 | 10 kΩ | 111013.00 | R49 | 100 kΩ | 111042.00 | R96 | 56.2 kΩ | 111037.00 | C1 | 10 µF | 128003.00 |
| R3 | 20 kΩ | 111019.00 | R50 | 150 kΩ | 111046.00 | R97 | 25 kΩ | 117007.00 | C2 | 10 µF | 128003.00 |
| R4 | 100 kΩ | 111042.00 | R51 | 100 kΩ | 111042.00 | R98 | 40.2 kΩ | 111030.05 | C3 | 680 pF | 122003.00 |
| R5 | 49.9 kΩ | 111034.00 | R52 | 150 kΩ | 111046.00 | R99 | 40.2 kΩ | 111030.05 | C4 | 150 pF | 122001.00 |
| R6 | 49.9 kΩ | 111034.00 | R53 | 6.49 kΩ | 111012.00 | R100 | 26.7 kΩ | 111024.00 | C5 | 470 nF | 125010.00 |
| R7 | 47 Ω | 112002.00 | R54 | 56.2 kΩ | 111037.00 | R101 | 53.6 kΩ | 111036.00 | C6 | 10 pF | 121001.00 |
| R8 | Omitted | | R55 | 26.7 kΩ | 111024.00 | R102 | 1 kΩ | 112011.00 | C7 | 470 nF | 125010.00 |
| R9 | Omitted | | R56 | 44.2 kΩ | 111032.00 | R103 | 4.99 kΩ | 111011.00 | C8 | 22 µF | 128004.00 |
| R10 | 280 kΩ | 111050.05 | R57 | 1 kΩ | 112011.00 | R104 | 301 Ω | 111001.00 | C9 | 22 µF | 128004.00 |
| R11 | 280 kΩ | 111050.05 | R58 | 51 kΩ | 112032.00 | R105 | 1 MΩ | 112040.00 | C10 | 4700 pF | 122011.00 |
| R12 | 1 kΩ | 112011.00 | R59 | 51 kΩ | 112032.00 | R106 | 100 kΩ | 117009.00 | C11 | 4700 pF | 122011.00 |
| R13 | 14 kΩ | 111016.00 | R60 | 4.99 kΩ | 111011.00 | R107 | 26.7 kΩ | 111024.00 | C12 | 4700 pF | 122011.00 |
| R14 | 301 Ω | 111001.00 | R61 | 40.2 kΩ | 111030.05 | R108 | 100 kΩ | 111042.00 | C13 | 10 µF | 128003.00 |
| R15 | 470 kΩ | 112039.00 | R62 | 40.2 kΩ | 111030.05 | R109 | 10 kΩ | 111013.00 | C14 | 1800 pF | 122008.00 |
| R16 | 100 kΩ | 117009.00 | R63 | 78.7 kΩ | 111040.00 | R110 | 44.2 kΩ | 111032.00 | C15 | 470 nF | 125010.00 |
| R17 | 56.2 kΩ | 111037.00 | R64 | 301 Ω | 111001.00 | R111 | 105 kΩ | 111044.00 | C16 | 10 pF | 121001.00 |
| R18 | 100 kΩ | 111042.00 | R65 | 200 Ω | 112004.00 | R112 | 1 kΩ | 112011.00 | C17 | 10 µF | 128003.00 |
| R19 | 100 kΩ | 111042.00 | R66 | 56.2 kΩ | 111037.00 | R113 | 51 kΩ | 112032.00 | C18 | 10 pF | 121001.00 |
| R20 | 150 kΩ | 111046.00 | R67 | 25 kΩ | 117007.00 | R114 | 51 kΩ | 112032.00 | C19 | 100 nF | 125008.00 |
| R21 | 100 kΩ | 111042.00 | R68 | 10 Ω | 112001.00 | R115 | 301 kΩ | 111051.00 | C20 | 2.2 µF | 127003.00 |
| R22 | 150 kΩ | 111046.00 | R69 | 100 kΩ | 111042.00 | R116 | 10 kΩ | 111013.00 | C21 | 10 pF | 121001.00 |
| R23 | 6.49 kΩ | 111012.00 | R70 | 78.7 kΩ | 111040.00 | R117 | 4.99 kΩ | 111011.00 | C22 | 10 pF | 121001.00 |
| R24 | 56.2 kΩ | 111037.00 | R71 | 158 kΩ | 111047.00 | R118 | 1 kΩ | 111004.00 | C23 | 10 µF | 128003.00 |
| R25 | 26.7 kΩ | 111024.00 | R72 | 1 kΩ | 112011.00 | R119 | 200 Ω | 112004.00 | C24 | 47 pF | 121003.00 |
| R26 | 44.2 kΩ | 111032.00 | R73 | 14 kΩ | 111016.00 | R120 | 40.2 kΩ | 111030.05 | C25 | 470 nF | 125010.00 |
| R27 | 1 kΩ | 112011.00 | R74 | 301 Ω | 111001.00 | R121 | 10 Ω | 112001.00 | C26 | 10 pF | 121001.00 |
| R28 | 51 kΩ | 112032.00 | R75 | 470 kΩ | 112039.00 | R122 | 10 Ω | 112001.00 | C27 | 10 µF | 128003.00 |
| R29 | 51 kΩ | 112032.00 | R76 | 100 kΩ | 111042.00 | R123 | 100 kΩ | 111042.00 | C28 | 10 pF | 121001.00 |
| R30 | 4.99 kΩ | 111011.00 | R77 | 56.2 kΩ | 111037.00 | R124 | 100 kΩ | 111042.00 | C29 | 100 nF | 125008.00 |
| R31 | 40.2 kΩ | 111030.05 | R78 | 100 kΩ | 111042.00 | R125 | 100 kΩ | 111042.00 | C30 | 2.2 µF | 127003.00 |
| R32 | 40.2 kΩ | 111030.05 | R79 | 78.7 kΩ | 111040.00 | R126 | 40.2 kΩ | 111030.05 | C31 | 10 pF | 121001.00 |
| R33 | 78.7 kΩ | 111040.00 | R80 | 100 kΩ | 111042.00 | R127 | 47 Ω | 112002.00 | C32 | 150 pF | 122001.00 |
| R34 | 301 Ω | 111001.00 | R81 | 78.7 kΩ | 111040.00 | R128 | 25 kΩ | 117007.00 | C33 | 10 µF | 128003.00 |
| R35 | 200 Ω | 112004.00 | R82 | 100 kΩ | 111042.00 | R129 | 10 kΩ | 111013.00 | C34 | 47 pF | 121003.00 |
| R36 | 56.2 kΩ | 111037.00 | R83 | 7.5 kΩ | 111012.05 | R130 | 14 kΩ | 111016.00 | C35 | 100 nF | 125008.00 |
| R37 | 25 kΩ | 117007.00 | R84 | 56.2 kΩ | 111037.00 | R131 | 1 kΩ | 112011.00 | C36 | 10 pF | 121001.00 |
| R38 | 10 Ω | 112001.00 | R85 | 26.7 kΩ | 111024.00 | R132 | 10 Ω | 112001.00 | C37 | 10 µF | 128003.00 |
| R39 | 100 kΩ | 111042.00 | R86 | 44.2 kΩ | 111032.00 | R133 | 10 Ω | 112001.00 | C38 | 10 pF | 121001.00 |
| R40 | 100 kΩ | 111042.00 | R87 | 1 kΩ | 112011.00 | R134 | 10 Ω | 112001.00 | C39 | 100 nF | 125008.00 |
| R41 | 49.9 kΩ | 111034.00 | R88 | 51 kΩ | 112032.00 | R135 | 10 Ω | 112001.00 | C40 | 1 µF | 127002.00 |
| R42 | 100 kΩ | 111042.00 | R89 | 51 kΩ | 112032.00 | R136 | 10 Ω | 112001.00 | C41 | 10 pF | 121001.00 |
| R43 | 14 kΩ | 111016.00 | R90 | 4.99 kΩ | 111011.00 | R137 | 10 Ω | 112001.00 | C42 | 470 pF | 122004.00 |
| R44 | 301 Ω | 111001.00 | R91 | 40.2 kΩ | 111030.05 | R138 | 10 Ω | 112001.00 | C43 | 470 pF | 122004.00 |
| R45 | 470 kΩ | 112039.00 | R92 | 40.2 kΩ | 111030.05 | R139 | 10 Ω | 112001.00 | C44 | 47 pF | 121003.00 |
| R46 | 100 kΩ | 117009.00 | R93 | 69.8 kΩ | 111038.00 | R140 | 200 Ω | 112004.00 | C45 | 10 µF | 128003.00 |
| R47 | 56.2 kΩ | 111037.00 | R94 | 301 Ω | 111001.00 | R141 | 1 kΩ | 112011.00 | C46 | 4700 pF | 122011.00 |

# Models JNR-10 & JNRP-10 Noise Reduction Units: Parts List (Cont'd)




| PART | VALUE | U*S # |
|---|---|---|
| C47 | 100 nF | 125008.00 |
| C48 | 10 pF | 121001.00 |
| C49 | 100 nF | 125008.00 |
| C50 | 1 µF | 127002.00 |
| C51 | 10 pF | 121001.00 |
| C52 | 470 pF | 122004.00 |
| C53 | 470 pF | 122004.00 |
| C54 | 22 nF | 125004.00 |
| C55 | 22 nF | 125004.00 |
| C56 | 22 nF | 125004.00 |
| C57 | 470 pF | 122004.00 |
| C58 | 10 pF | 121001.00 |
| C59 | 10 pF | 121001.00 |
| C60 | Omitted | |
| C61 | 100 nF | 121006.00 |
| C62 | 100 nF | 121006.00 |
| C63 | 100 nF | 121006.00 |
| C64 | 100 nF | 121006.00 |
| C65 | 100 nF | 121006.00 |
| C66 | 100 nF | 121006.00 |
| C67 | 100 nF | 121006.00 |
| C68 | 100 nF | 121006.00 |
| C69 | 100 nF | 121006.00 |
| C70 | 100 nF | 121006.00 |
| C71 | 100 nF | 121006.00 |
| C72 | 100 nF | 121006.00 |
| C73 | 100 nF | 121006.00 |
| D1 | 1N914B | 141004.00 |
| D2 | 1N914B | 141004.00 |
| D3 | 1N914B | 141004.00 |
| D4 | 1N914B | 141004.00 |
| D5 | 1N914B | 141004.00 |
| D6 | 1N34A | 141001.00 |
| D7 | 1N914B | 141004.00 |
| D8 | 1N4004 | 141005.00 |
| D9 | 1N4004 | 141005.00 |
| D10 | Omitted | |
| D11 | 1N914B | 141004.00 |
| D12 | 1N914B | 141004.00 |
| D13 | 1N914B | 141004.00 |
| D14 | 1N914B | 141004.00 |
| D15 | 1N914B | 141004.00 |
| D16 | 1N34A | 141001.00 |
| D17 | 1N914B | 141004.00 |
| D18 | 1N4004 | 141005.00 |
| D19 | 1N4004 | 141005.00 |
| D20 | Omitted | |

| PART | VALUE | U*S # |
|---|---|---|
| D21 | 1N914B | 141004.00 |
| D22 | 1N914B | 141004.00 |
| D23 | 1N914B | 141004.00 |
| D24 | 1N914B | 141004.00 |
| D25 | 1N914B | 141004.00 |
| D26 | 1N34A | 141001.00 |
| D27 | 1N914B | 141004.00 |
| D28 | 1N914B | 141004.00 |
| D29 | 1N914B | 141004.00 |
| D30 | Omitted | |
| D31 | 1N914B | 141004.00 |
| D32 | 1N914B | 141004.00 |
| D33 | 1N914B | 141004.00 |
| D34 | 1N914B | 141004.00 |
| D35 | 1N914B | 141004.00 |
| D36 | 1N34A | 141001.00 |
| D37 | 1N914B | 141004.00 |
| U1 | TL074CN | 143017.00 |
| U2 | U*S-6012 | 143023.00 |
| U2A | DIP Socket | 161004.00 |
| U3 | XR-4212 CP | 143022.00 |
| U4 | TLO74CN | 143017.00 |
| U5 | U*S-6012 | 143023.00 |
| U5A | DIP Socket | 161004.00 |
| U6 | XR-4212 CP | 143022.00 |
| U7 | LM317LZ | 143012.00 |
| U8 | DIP Socket | 161002.00 |
| J1 | Flex Connector | 171003.00 |
| M1 | VU Meter | 172001.00 |
| M2 | VU Meter | 172001.00 |
| M3 | PCB | 181002.00 |
| M4 | Metal Cover | 182004.00 |
| M5 | Spacers | 169001.00 |
| M6 | 1-1/8" Screw | 167002.00 |

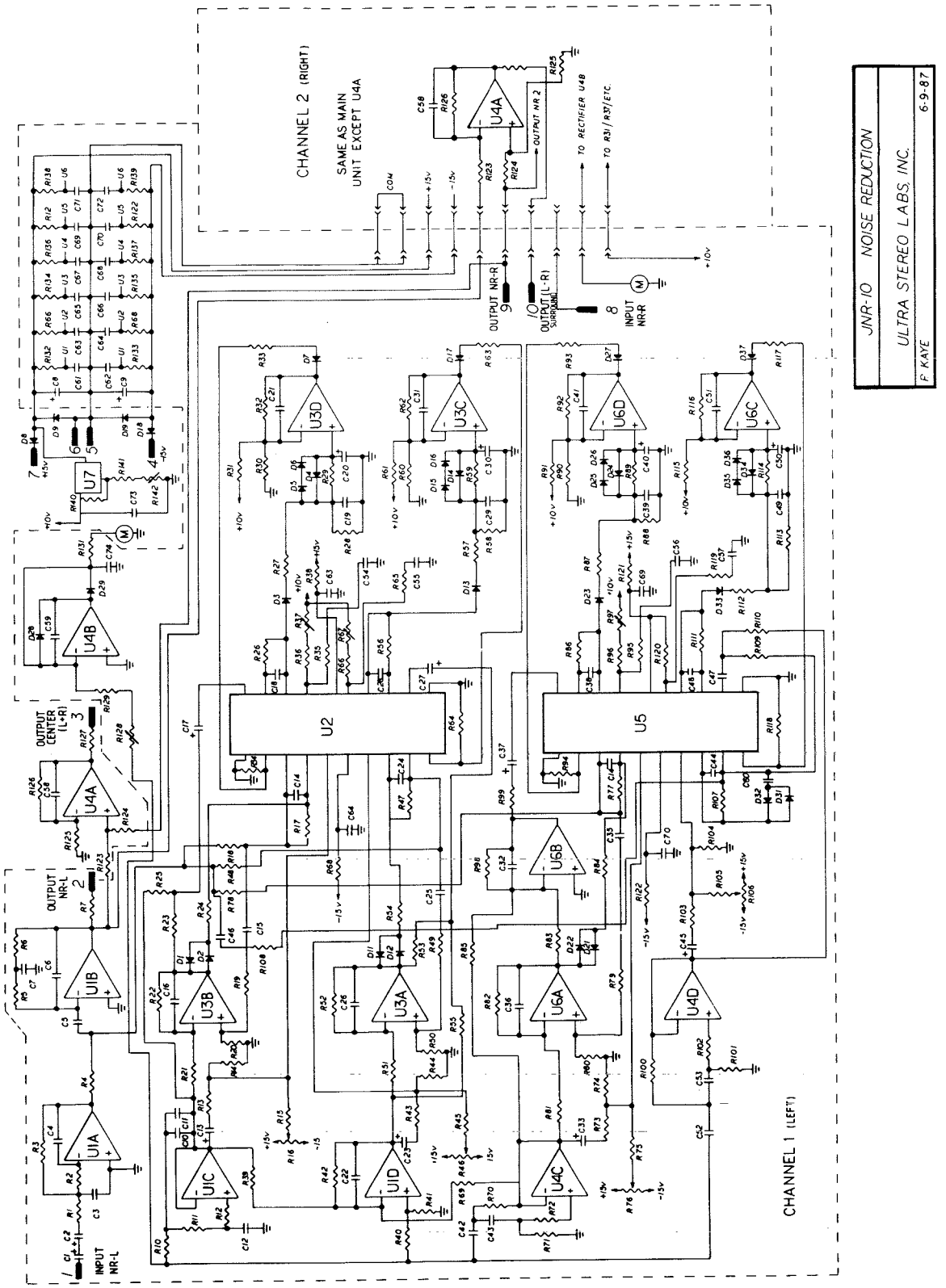
-END OF LIST-

***NOTE:*** *The JNRP-10 has the same components as the JNR-10 with the exceptions shown below.*

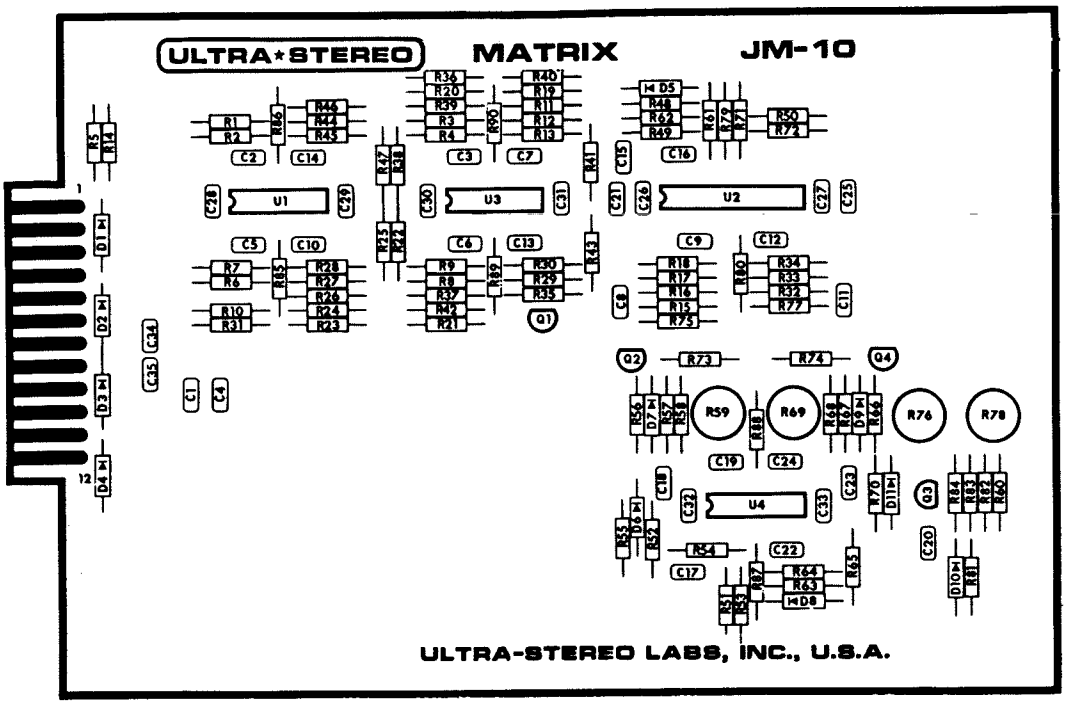
| PART | VALUE | U*S # |
|---|---|---|
| R125 | 69.8 kΩ | 111038.00 |
| R126 | 69.8 kΩ | 111038.00 |
| R140 | Omitted | |
| R141 | Omitted | |
| R142 | Omitted | |
| D8 | Omitted | |
| D9 | Omitted | |
| D18 | Omitted | |
| D19 | Omitted | |
| U7 | Omitted | |

# Model JNR-10/JNRP-10 Noise Reduction Unit: Schematic Diagram

***NOTE:** All adjustments are made at the factory with specialized equipment. Do not attempt adjusting this card.*



# Model JM-10 Decoder Matrix: Layout & Parts List




| PART | VALUE | U*S # |
|---|---|---|
| R1 | 30.1 kΩ | 111026.00 |
| R2 | 30.1 kΩ | 111026.00 |
| R3 | 69.8 kΩ | 111038.00 |
| R4 | 49.9 kΩ | 111034.00 |
| R5 | 47 Ω | 112002.00 |
| R6 | 30.1 kΩ | 111026.00 |
| R7 | 30.1 kΩ | 111026.00 |
| R8 | 69.8 kΩ | 111038.00 |
| R9 | 49.9 kΩ | 111034.00 |
| R10 | 47 Ω | 112002.00 |
| R11 | 100 kΩ | 111042.00 |
| R12 | 100 kΩ | 111042.00 |
| R13 | 49.9 kΩ | 111034.00 |
| R14 | 47 Ω | 112002.00 |
| R15 | 30.1 kΩ | 111026.00 |
| R16 | 30.1 kΩ | 111026.00 |
| R17 | 301 Ω | 111003.00 |
| R18 | 30.1 kΩ | 111026.00 |
| R19 | 174 kΩ | 111047.00 |
| R20 | 100 kΩ | 111042.00 |
| R21 | 100 kΩ | 111042.00 |
| R22 | 69.8 kΩ | 111038.00 |
| R23 | 100 kΩ | 111042.00 |
| R24 | 100 kΩ | 111042.00 |
| R25 | 49.9 kΩ | 111034.00 |
| R26 | 100 kΩ | 111042.00 |
| R27 | 100 kΩ | 111042.00 |
| R28 | 49.9 kΩ | 111034.00 |
| R29 | 20 kΩ | 111019.00 |
| R30 | 20 kΩ | 111019.00 |
| R31 | 47 Ω | 112002.00 |
| R32 | 15 kΩ | 111017.00 |
| R33 | 301 Ω | 111003.00 |
| R34 | 30.1 kΩ | 111026.00 |
| R35 | 49.9 kΩ | 111034.00 |
| R36 | 100 kΩ | 111042.00 |
| R37 | 34.8 kΩ | 111027.00 |
| R38 | 62 kΩ | 111037.05 |
| R39 | 174 kΩ | 111047.00 |
| R40 | 100 kΩ | 111042.00 |
| R41 | 40.1 kΩ | 111030.00 |
| R42 | 174 kΩ | 111047.00 |
| R43 | 100 kΩ | 111042.00 |
| R44 | 100 kΩ | 111042.00 |
| R45 | 100 kΩ | 111042.00 |
| R46 | 100 kΩ | 111042.00 |
| R47 | 100 kΩ | 111042.00 |

| PART | VALUE | U*S # |
|---|---|---|
| R48 | 4.99 kΩ | 111011.00 |
| R49 | 49.9 kΩ | 111034.00 |
| R50 | 7.5 kΩ | 111012.00 |
| R51 | 100 kΩ | 111042.00 |
| R52 | 100 kΩ | 111042.00 |
| R53 | 100 kΩ | 111042.00 |
| R54 | 100 kΩ | 111042.00 |
| R55 | 10 kΩ | 112022.00 |
| R56 | 1 MΩ | 112040.00 |
| R57 | 10 kΩ | 112022.00 |
| R58 | 30.1 kΩ | 111026.00 |
| R59 | 30.1 kΩ | 111026.00 |
| R60 | 10 kΩ | 112022.00 |
| R61 | 20 kΩ | 111019.00 |
| R62 | 200 Ω | 112005.00 |
| R63 | 30.1 kΩ | 111026.00 |
| R64 | 30.1 kΩ | 111026.00 |
| R65 | 10 kΩ | 112022.00 |
| R66 | 1 MΩ | 112040.00 |
| R67 | 10 kΩ | 112022.00 |
| R68 | 30.1 kΩ | 111026.00 |
| R69 | 25 kΩ | 117007.00 |
| R70 | 10 kΩ | 112022.00 |
| R71 | 20 kΩ | 111019.00 |
| R72 | 200 Ω | 112005.00 |
| R73 | 100 kΩ | 112034.00 |
| R74 | 100 kΩ | 112034.00 |
| R75 | 1 MΩ | 112040.00 |
| R76 | 100 kΩ | 117009.00 |
| R77 | 1 MΩ | 112040.00 |
| R78 | 100 kΩ | 117009.00 |
| R79 | 10 Ω | 112001.00 |
| R80 | 10 Ω | 112001.00 |
| R81 | 10 kΩ | 112022.00 |
| R82 | 100 kΩ | 112034.00 |
| R83 | 100 kΩ | 112034.00 |
| R84 | 10 kΩ | 112022.00 |
| R85 | 10 Ω | 112001.00 |
| R86 | 10 Ω | 112001.00 |
| R87 | 10 Ω | 112001.00 |
| R88 | 10 Ω | 112001.00 |
| R89 | 10 Ω | 112001.00 |
| R90 | 10 Ω | 112001.00 |
| C1 | 10 µF | 128004.00 |
| C2 | 10 pF | 121001.00 |
| C3 | 10 pF | 121001.00 |
| C4 | 10 µF | 128004.00 |

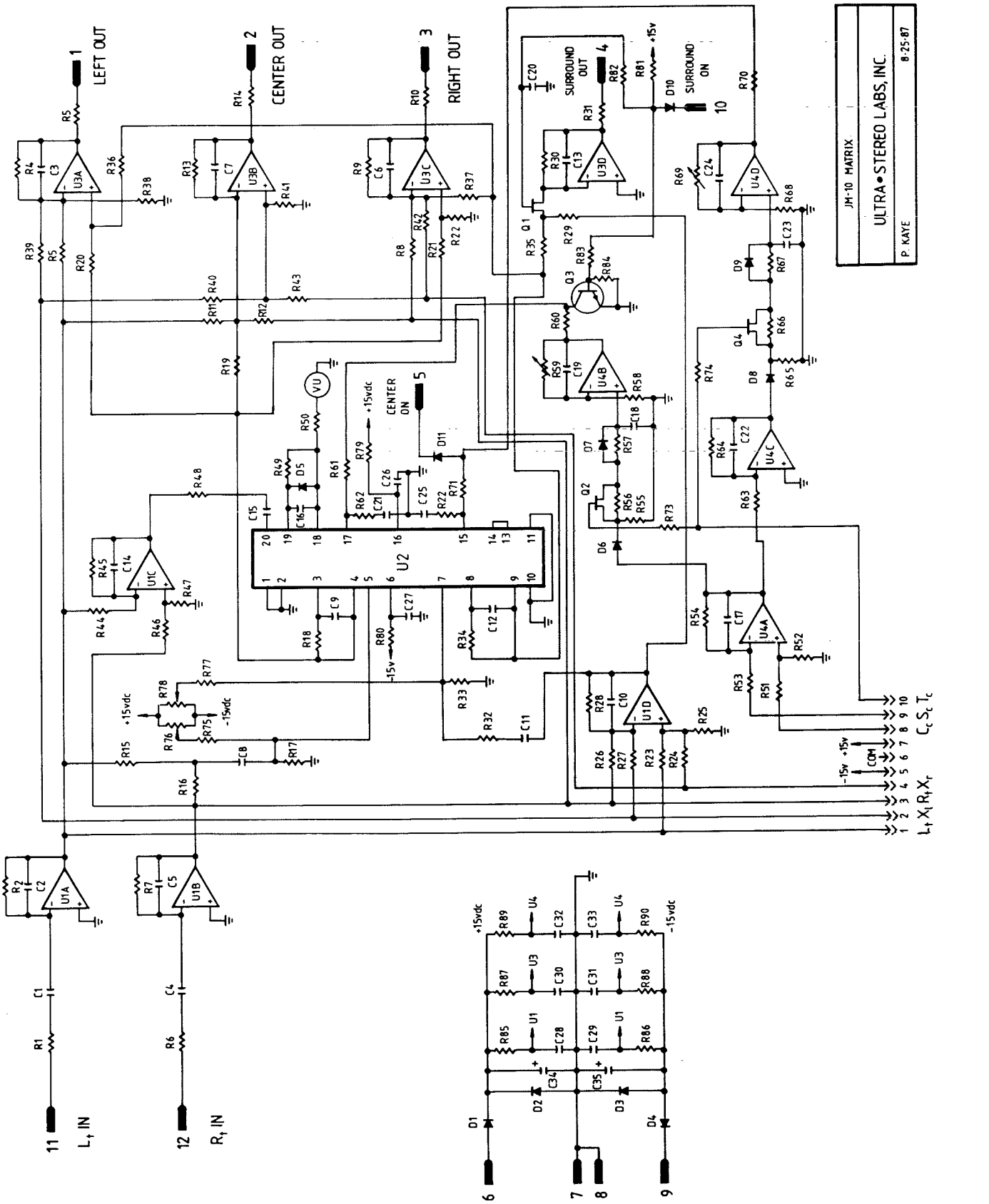
| PART | VALUE | U*S # |
|---|---|---|
| C5 | 10 pF | 121001.00 |
| C6 | 10 pF | 121001.00 |
| C7 | 10 pF | 121001.00 |
| C8 | 10 µF | 128004.00 |
| C9 | 47 pF | 121003.00 |
| C10 | 10 pF | 121001.00 |
| C11 | 10 µF | 128004.00 |
| C12 | 47 pF | 121003.00 |
| C13 | 10 pF | 121001.00 |
| C14 | 10 pF | 121001.00 |
| C15 | 10 µF | 128004.00 |
| C16 | 47 pF | 121003.00 |
| C17 | 10 pF | 121001.00 |
| C18 | 1 µF | 128001.00 |
| C19 | 10 pF | 121001.00 |
| C20 | 100 nF | 121006.00 |
| C21 | 22 nF | 125004.00 |
| C22 | 10 pF | 121001.00 |
| C23 | 1 µF | 128001.00 |
| C24 | 10 pF | 121001.00 |
| C25 | 22 nF | 125004.00 |
| C26 | 100 nF | 121006.00 |
| C27 | 100 nF | 121006.00 |
| C28 | 100 nF | 121006.00 |
| C29 | 100 nF | 121006.00 |
| C30 | 100 nF | 121006.00 |
| C31 | 100 nF | 121006.00 |
| C32 | 100 nF | 121006.00 |
| C33 | 100 nF | 121006.00 |
| C34 | 22 µF | 128005.00 |
| C35 | 22 µF | 128005.00 |
| D1 | 1N-4004 | 141005.00 |
| D2 | 1N-4004 | 141005.00 |
| D3 | 1N-4004 | 141005.00 |
| D4 | 1N-4004 | 141005.00 |
| D5 | 1N914B | 141004.00 |
| D6 | 1N914B | 141004.00 |
| D7 | 1N914B | 141004.00 |
| D8 | 1N914B | 141004.00 |
| D9 | 1N914B | 141004.00 |
| D10 | 1N-4004 | 141005.00 |
| D11 | 1N-4004 | 141005.00 |
| M1 | VU Meter | 172001.00 |
| M2 | 1 1/8"Screw | 167002.00 |
| M3 | 7/8 Spacer | 169001.00 |
| M4 | Flex strip | 171003.00 |
| M5 | PC Board | 181016.00 |

| PART | VALUE | U*S # |
|---|---|---|
| M6 | Metal Cover | 182005.00 |
| Q1 | J-174 | 145001.00 |
| Q2 | J-174 | 145001.00 |
| Q3 | 2N-3904 | 142001.00 |
| Q4 | J-174 | 145001.00 |
| U1 | TL-074CN | 143017.00 |
| U2 | DIP Socket | 161004.00 |
| U2A | U*S-6012 | 143023.00 |
| U3 | TL-074CN | 143017.00 |
| U4 | XR-4212CP | 143022.00 |

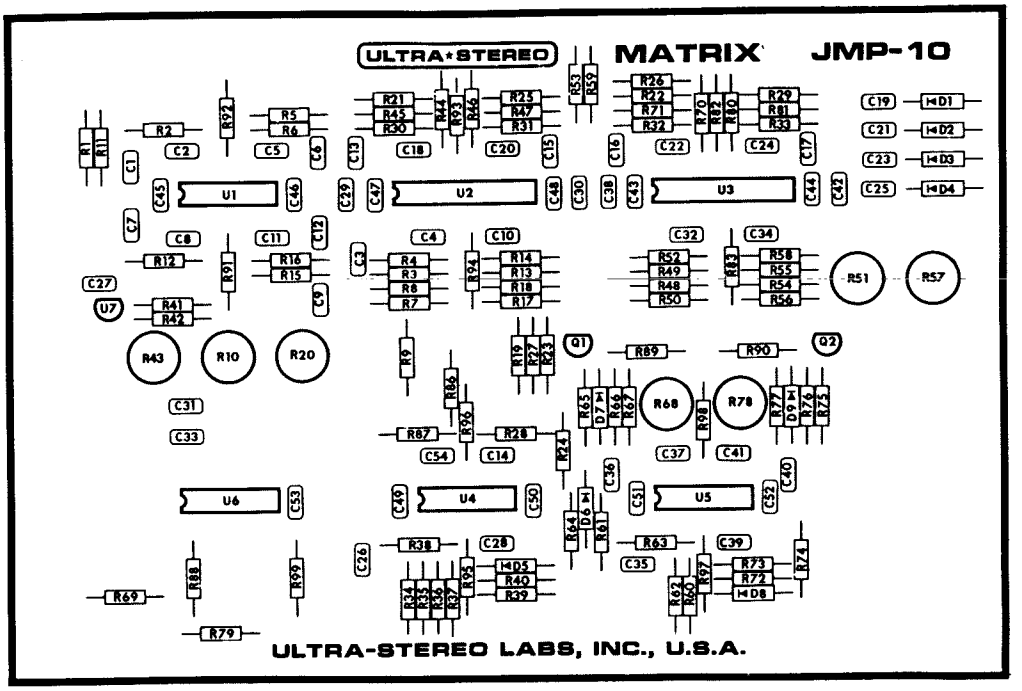
-END OF LIST-

# Model JM-10 Decoder Matrix: Schematic Diagram

***NOTE:** All adjustments are made at the factory with specialized equipment. Do not attempt adjusting this card.*



# Model JMP-10 Decoder Matrix: Layout & Parts List

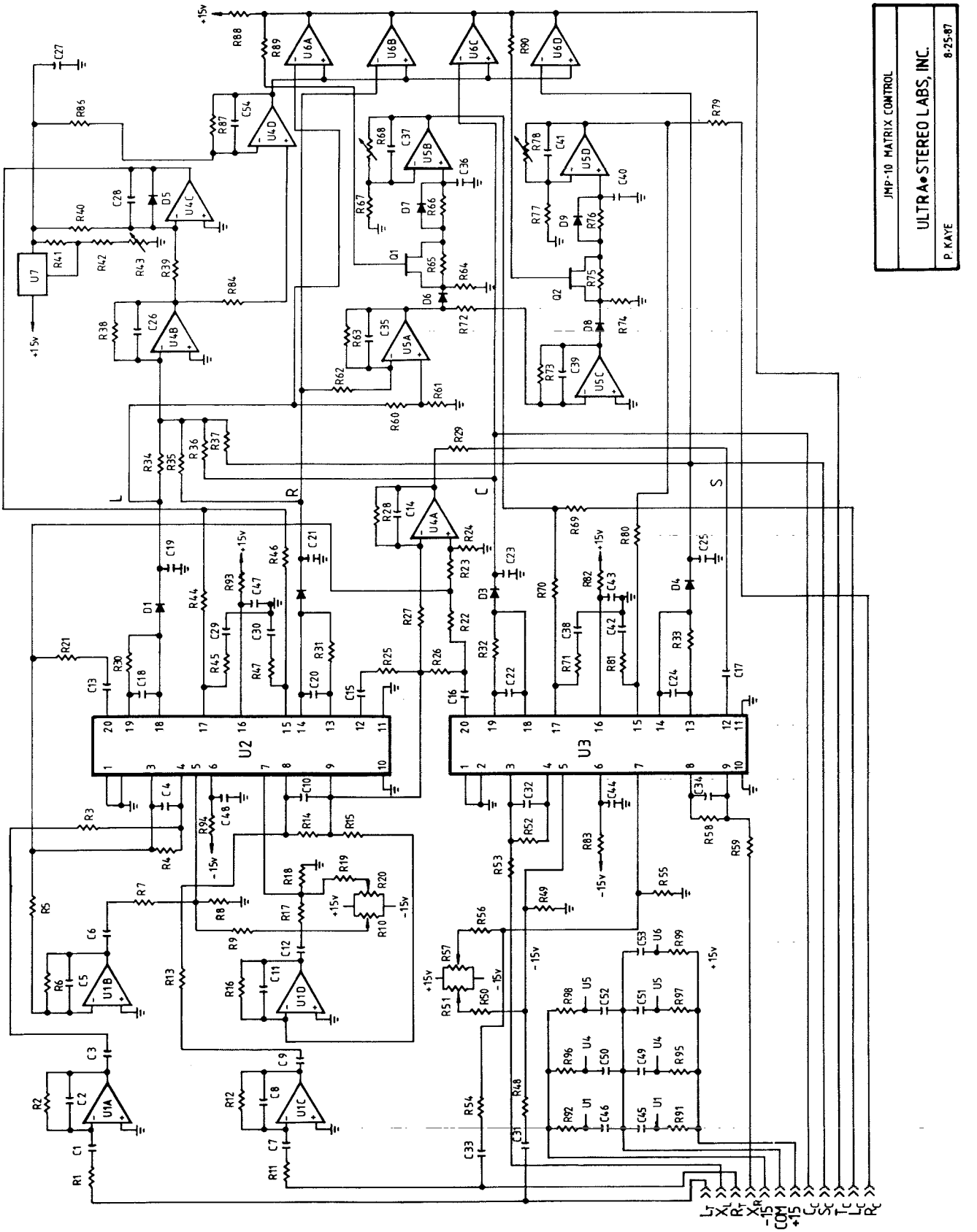



| PART | VALUE | U*S # |
|---|---|---|
| R1 | 49.9 kΩ | 111034.00 |
| R2 | 49.9 kΩ | 111034.00 |
| R3 | 10 kΩ | 111013.00 |
| R4 | 10 MΩ | 111056.00 |
| R5 | 100 kΩ | 111042.00 |
| R6 | 100 kΩ | 111042.00 |
| R7 | 15 kΩ | 111017.00 |
| R8 | 301 Ω | 111003.00 |
| R9 | 1 MΩ | 112040.00 |
| R10 | 100 kΩ | 117009.00 |
| R11 | 49.9 kΩ | 111034.00 |
| R12 | 49.9 kΩ | 111034.00 |
| R13 | 10 kΩ | 111013.00 |
| RI4 | 10 MΩ | 111056.00 |
| R15 | 100 kΩ | 111042.00 |
| R16 | 100 kΩ | 111042.00 |
| R17 | 15 kΩ | 111017.00 |
| R18 | 301 Ω | 111003.00 |
| R19 | 1 MΩ | 112040.00 |
| R20 | 100 kΩ | 117009.00 |
| R21 | 28 kΩ | 111025.00 |
| R22 | 40.1 kΩ | 111030.00 |
| R23 | 49.9 kΩ | 111034.00 |
| R24 | 49.9 kΩ | 111034.00 |
| R25 | 28 kΩ | 111025.00 |
| R26 | 40.1 kΩ | 111030.00 |
| R27 | 100 kΩ | 111042.00 |
| R28 | 100 kΩ | 111042.00 |
| R29 | 40.1 kΩ | 111030.00 |
| R30 | 56.2 kΩ | 111037.00 |
| R31 | 56.2 kΩ | 111037.00 |
| R32 | 56.2 kΩ | 111037.00 |
| R33 | 56.2 kΩ | 111037.00 |
| R34 | 100 kΩ | 111042.00 |
| R35 | 100 kΩ | 111042.00 |
| R36 | 100 kΩ | 111042.00 |
| R37 | 100 kΩ | 111042.00 |
| R38 | 49.9 kΩ | 111034.00 |
| R39 | 20 kΩ | 111019.00 |
| R40 | 49.9 kΩ | 111034.00 |
| R41 | 301 Ω | 111003.00 |
| R42 | 1 kΩ | 112011.00 |
| R43 | 500 Ω | 117001.00 |
| R44 | 30.1 kΩ | 111026.00 |
| R45 | 200 Ω | 112005.00 |
| R46 | 30.1 kΩ | 111026.00 |
| R47 | 200 Ω | 112005.00 |
| R48 | 15 kΩ | 111017.00 |
| R49 | 301 Ω | 111003.00 |
| R50 | 1 MΩ | 112040.00 |
| R51 | 100 kΩ | 117009.00 |
| R52 | 30.1 kΩ | 111026.00 |
| R53 | 30.1 kΩ | 111026.00 |
| R54 | 15 kΩ | 111017.00 |
| R55 | 301 Ω | 111003.00 |
| R56 | 1 MΩ | 112040.00 |
| R57 | 100 kΩ | 117009.00 |
| R58 | 30.1 kΩ | 111026.00 |
| R59 | 47 Ω | 112002.00 |
| R60 | 49.9 kΩ | 111034.00 |
| R61 | 49.9 kΩ | 111034.00 |
| R62 | 100 kΩ | 111042.00 |
| R63 | 100 kΩ | 111042.00 |
| R64 | 10 kΩ | 112022.00 |
| R65 | 1 MΩ | 112040.00 |
| R66 | 10 kΩ | 112022.00 |
| R67 | 30.1 kΩ | 111026.00 |
| R68 | 25 kΩ | 117007.00 |
| R69 | 30.1 kΩ | 111026.00 |
| R70 | 30.1 kΩ | 111026.00 |
| R71 | 200 Ω | 112005.00 |
| R72 | 100 kΩ | 111042.00 |
| R73 | 100 kΩ | 111042.00 |
| R74 | 10 kΩ | 112022.00 |
| R75 | 1 MΩ | 112040.00 |
| R80 | 30.1 kΩ | 111026.00 |
| R81 | 200 Ω | 112005.00 |
| R82 | 10 Ω | 112001.00 |
| R83 | 10 Ω | 112001.00 |
| R84 | 10 kΩ | 111013.00 |
| R85 | 20 kΩ | 111019.00 |
| R86 | 10 kΩ | 111013.00 |
| R87 | 20 kΩ | 111019.00 |
| R88 | 20 kΩ | 111019.00 |
| R89 | 100 kΩ | 112034.00 |
| R90 | 100 kΩ | 112034.00 |
| R91 | 10 Ω | 112001.00 |
| R92 | 10 Ω | 112001.00 |
| R93 | 10 Ω | 112001.00 |
| R94 | 10 Ω | 112001.00 |
| R95 | 10 Ω | 112001.00 |
| R96 | 10 Ω | 112001.00 |
| R97 | 10 Ω | 112001.00 |
| C1 | 4700 pF | 122011.00 |
| C2 | 330 pF | 122002.00 |
| C3 | 10 µF | 128004.00 |
| C4 | 3.3 pF | 121000.00 |
| C5 | 10 pF | 121001.00 |
| C6 | 10 µF | 128004.00 |
| C7 | 4700 pF | 122011.00 |
| C8 | 330 pF | 122002.00 |
| C9 | 10 µF | 128004.00 |
| C10 | 3.3 pF | 121000.00 |
| C11 | 10 pF | 121001.00 |
| C12 | 10 µF | 128004.00 |
| C13 | 10 µF | 128004.00 |
| C14 | 10 pF | 121001.00 |
| C15 | 10 µF | 128004.00 |
| C16 | 10 µF | 128004.00 |
| C17 | 10 µF | 128004.00 |
| C18 | 10 pF | 121001.00 |
| C19 | 220 nF | 125009.00 |
| C20 | 10 pF | 121001.00 |
| C21 | 220 nF | 125009.00 |
| C22 | 10 pF | 121001.00 |
| C23 | 220 nF | 125009.00 |
| C24 | 10 pF | 121001.00 |
| C25 | 220 nF | 125009.00 |
| C26 | 10 pF | 121001.00 |
| C27 | 100 nF | 121006.00 |
| C28 | 220 nF | 125009.00 |
| C29 | 22 nF | 125004.00 |
| C30 | 22 nF | 125004.00 |
| C31 | 10 µF | 128004.00 |
| C32 | 10 pF | 121001.00 |
| C33 | 10 µF | 128004.00 |
| C34 | 10 pF | 121001.00 |
| C35 | 10 pF | 121001.00 |
| C36 | 1 µF | 128001.00 |
| C37 | 10 pF | 121001.00 |
| C38 | 22 nF | 125004.00 |
| C39 | 10 pF | 121001.00 |
| C40 | 1 µF | 128001.00 |
| C41 | 22 nF | 125004.00 |
| C42 | 100 nF | 121006.00 |
| C43 | 100 nF | 121006.00 |
| C44 | 10 pF | 121001.00 |
| C45 | 100 nF | 121006.00 |
| C46 | 100 nF | 121006.00 |
| C47 | 100 nF | 121006.00 |
| C48 | 100 nF | 121006.00 |
| C49 | 100 nF | 121006.00 |
| C50 | 100 nF | 121006.00 |
| C51 | 100 nF | 121006.00 |
| C52 | 100 nF | 121006.00 |
| C53 | 100 nF | 121006.00 |
| D1 | 1N914B | 141004.00 |
| D2 | 1N914B | 141004.00 |
| D3 | 1N914B | 141004.00 |
| D4 | 1N914B | 141004.00 |
| D5 | 1N914B | 141004.00 |
| D6 | 11N914B | 141004.00 |
| D7 | 1N914B | 141004.00 |
| D8 | 1N914B | 141004.00 |
| D9 | 1N914B | 141004.00 |
| Q1 | J-174 | 145001.00 |
| Q2 | J-174 | 145001.00 |
| U1 | XR-4212CP | 143022.00 |
| U2 | DIP Socket | 161004.00 |
| U2A | U*S-6012 | 143023.00 |
| U3 | DIP Socket | 161004.00 |
| U3A | U*S-6012 | 143023.00 |
| U4 | XR-4212CP | 143022.00 |
| U5 | XR-4212CP | 143022.00 |
| U6 | LM-339N | 143015.00 |
| U7 | LM-317LZ | 143011.00 |
| M1 | PC Board | 181015.00 |

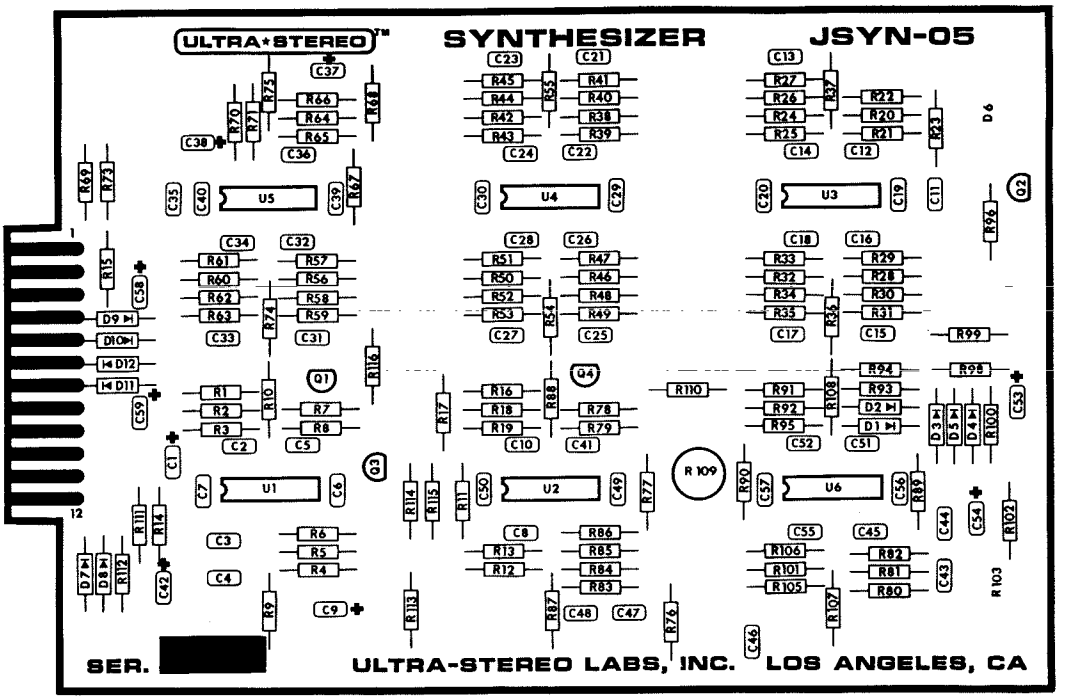
-END OF LIST-

# Model JMP-10 Decoder Matrix: Schematic Diagram

***NOTE:*** *All adjustments are made at the factory with specialized equipment. Do not attempt adjusting this card.*

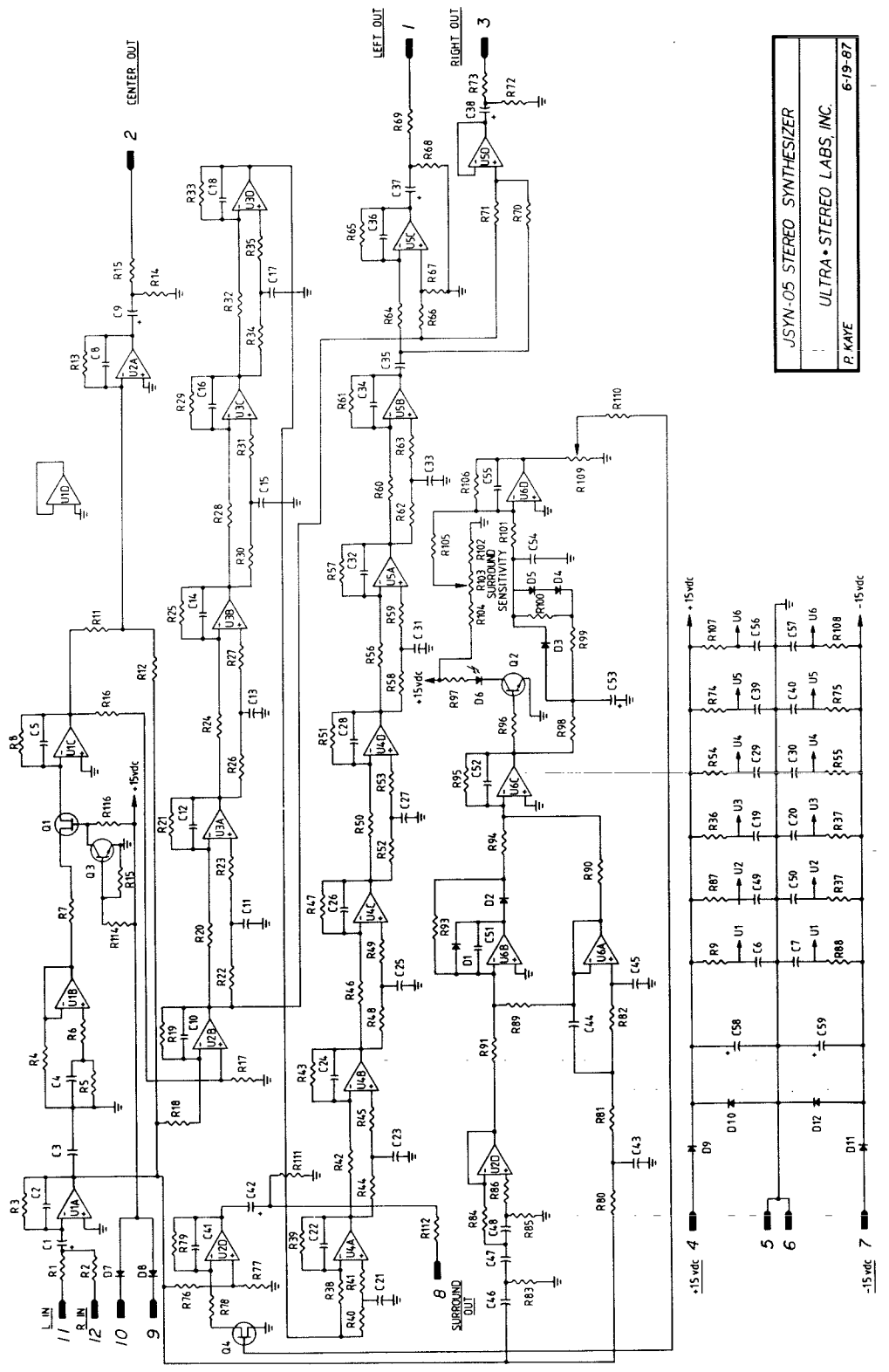


# Model JSYN-05 Synthesizer: Layout & Parts List



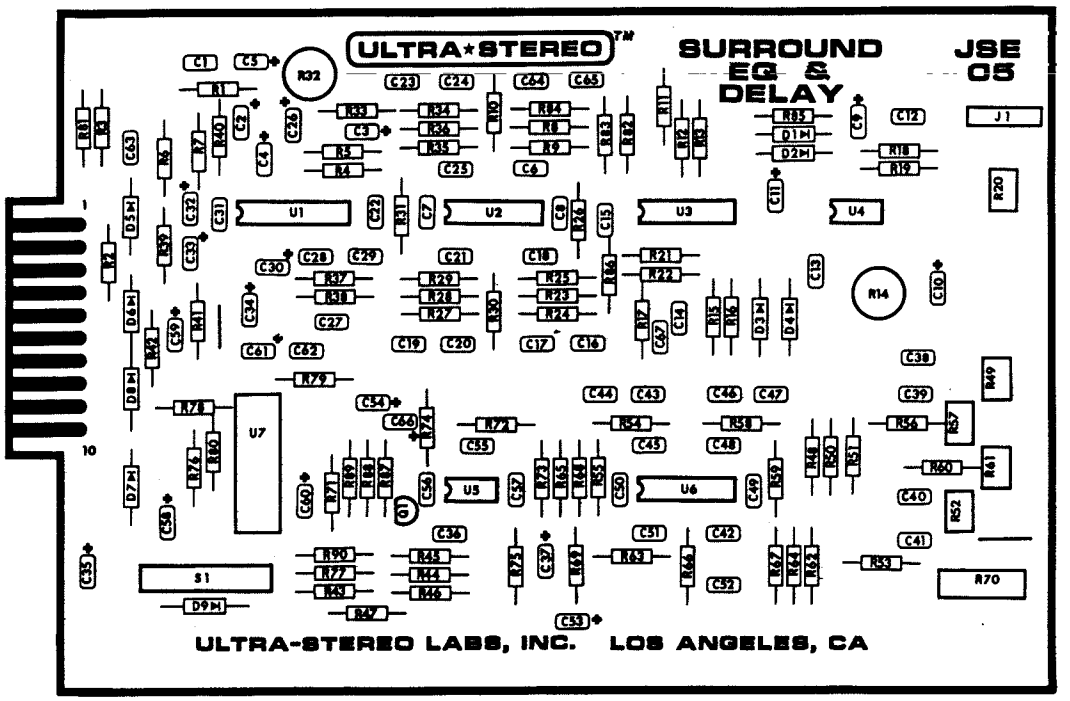

| PART | VALUE | U*S # |
|---|---|---|
| R1 | 20 kΩ | 111019.00 |
| R2 | 20 kΩ | 111019.00 |
| R3 | 4.99 kΩ | 111011.00 |
| R4 | 15 kΩ | 112024.00 |
| R5 | 30 kΩ | 112029.00 |
| R6 | 1 kΩ | 112011.00 |
| R7 | 20 kΩ | 111019.00 |
| R8 | 20 kΩ | 111019.00 |
| R9 | 10 Ω | 112001.00 |
| R10 | 10 Ω | 112001.00 |
| R11 | 20 kΩ | 111019.00 |
| R12 | 10.0 kΩ | 111013.00 |
| R13 | 20 kΩ | 111019.00 |
| R14 | 100 kΩ | 112034.00 |
| R15 | 47 Ω | 112002.00 |
| R16 | 20 kΩ | 111019.00 |
| R17 | 20 kΩ | 111019.00 |
| R18 | 20 kΩ | 111019.00 |
| R19 | 20 kΩ | 111019.00 |
| R20 | 20 kΩ | 111019.00 |
| R21 | 20 kΩ | 111019.00 |
| R22 | 6.8 kΩ | 112020.00 |
| R23 | 1 kΩ | 112011.00 |
| R24 | 20 kΩ | 111019.00 |
| R25 | 20 kΩ | 111019.00 |
| R26 | 10.0 kΩ | 111013.00 |
| R27 | 1 kΩ | 112011.00 |
| R28 | 20 kΩ | 111019.00 |
| R29 | 20 kΩ | 111019.00 |
| R30 | 16 kΩ | 112025.00 |
| R31 | 1 kΩ | 112011.00 |
| R32 | 20 kΩ | 111019.00 |
| R33 | 20 kΩ | 111019.00 |
| R34 | 24 kΩ | 112027.00 |
| R35 | 1 kΩ | 112011.00 |
| R36 | 10 Ω | 112001.00 |
| R37 | 10 Ω | 112001.00 |
| R38 | 20 kΩ | 111019.00 |
| R39 | 20 kΩ | 111019.00 |
| R40 | 36 kΩ | 112030.00 |
| R41 | 1 kΩ | 112011.00 |
| R42 | 20 kΩ | 111019.00 |
| R43 | 20 kΩ | 111019.00 |
| R44 | 12 kΩ | 112023.00 |
| R45 | 1 kΩ | 112011.00 |
| R46 | 20 kΩ | 111019.00 |
| R47 | 20 kΩ | 111019.00 |
| R48 | 16 kΩ | 112025.00 |
| R49 | 1 kΩ | 112011.00 |
| R50 | 20 kΩ | 111019.00 |
| R51 | 20 kΩ | 111019.00 |
| R52 | 26.7 kΩ | 111024.00 |
| R53 | 1 kΩ | 112011.00 |
| R54 | 10 Ω | 112001.00 |
| R55 | 10 Ω | 112001.00 |
| R56 | 20 kΩ | 111019.00 |
| R57 | 20 kΩ | 111019.00 |
| R58 | 39 kΩ | 112031.00 |
| R59 | 1 kΩ | 112011.00 |
| R60 | 20 kΩ | 111019.00 |
| R61 | 20 kΩ | 111019.00 |
| R62 | 62 kΩ | 112033.00 |
| R63 | 1 kΩ | 112011.00 |
| R64 | 20 kΩ | 111019.00 |
| R65 | 10.0 kΩ | 111013.00 |
| R66 | 20 kΩ | 111019.00 |
| R67 | 10.0 kΩ | 111013.00 |
| R68 | 100 kΩ | 112034.00 |
| R69 | 47 Ω | 112002.00 |
| R70 | 20 kΩ | 111019.00 |
| R71 | 20 kΩ | 111019.00 |
| R72 | 100 kΩ | 112034.00 |
| R73 | 47 Ω | 112002.00 |
| R74 | 10 Ω | 112001.00 |
| R75 | 10 Ω | 112001.00 |
| R76 | 100 kΩ | 112034.00 |
| R77 | 1 kΩ | 112011.00 |
| R78 | 200 Ω | 112005.00 |
| R79 | 30 kΩ | 112029.00 |
| R80 | 100 kΩ | 112034.00 |
| R81 | 100 kΩ | 112034.00 |
| R82 | 100 kΩ | 112034.00 |
| R83 | 69.8 kΩ | 111038.00 |
| R84 | 26.7 kΩ | 111024.00 |
| R85 | 470 kΩ | 112039.00 |
| R86 | 1 kΩ | 112011.00 |
| R87 | 10 Ω | 112001.00 |
| R88 | 10 Ω | 112001.00 |
| R89 | 20 kΩ | 111019.00 |
| R90 | 20 kΩ | 111019.00 |
| R91 | 10.0 kΩ | 111013.00 |
| R92 | 10.0 kΩ | 111013.00 |
| R93 | 20 kΩ | 111019.00 |
| R94 | 10.0 kΩ | 111013.00 |
| R95 | 100 kΩ | 112034.00 |
| R96 | 100 kΩ | 112034.00 |
| R97 | 3 kΩ | 112017.00 |
| R98 | 4.99 kΩ | 111011.00 |
| R99 | 10.0 kΩ | 111013.00 |
| R100 | 100 kΩ | 112034.00 |
| R101 | 1 MΩ | 112040.00 |
| R102 | 2.4 kΩ | 112015.00 |
| R103 | 10 kΩ | 118002.00 |
| R104 | 100 kΩ | 112034.00 |
| R105 | 1 MΩ | 112040.00 |
| R106 | 4.7 MΩ | 112043.00 |
| R107 | 10 Ω | 112001.00 |
| R108 | 10 Ω | 112001.00 |
| R109 | 100 kΩ | 118005.00 |
| R110 | 100 kΩ | 112034.00 |
| R111 | 100 kΩ | 112034.00 |
| R112 | 47 Ω | 112002.00 |
| R113 | 100 kΩ | 112034.00 |
| R114 | 100 kΩ | 112034.00 |
| R115 | 10.0 kΩ | 111013.00 |
| R116 | 100 kΩ | 112034.00 |
| C1 | 10 µF | 128003.00 |
| C2 | 6800 pF | 122012.00 |
| C3 | 1800 pF | 122008.00 |
| C4 | 1800 pF | 122008.00 |
| C5 | 10 pF | 121001.00 |
| C6 | 100 nF | 121006.00 |
| C7 | 100 nF | 121006.00 |
| C8 | 10 pF | 121001.00 |
| C9 | 10 µF | 128003.00 |
| C10 | 10 pF | 121001.00 |
| C11 | 1800 pF | 122008.00 |
| C12 | 10 pF | 121001.00 |
| C13 | 1800 pF | 122008.00 |
| C14 | 10 pF | 121001.00 |
| C15 | 1800 pF | 122008.00 |
| C16 | 10 pF | 121001.00 |
| C17 | 1800 pF | 122008.00 |
| C18 | 10 pF | 121001.00 |
| C19 | 100 nF | 121006.00 |
| C20 | 100 nF | 121006.00 |
| C21 | 1800 pF | 122008.00 |
| C22 | 10 pF | 121001.00 |
| C23 | 8200 pF | 122013.00 |
| C24 | 10 pF | 121001.00 |
| C25 | 8200 pF | 122013.00 |
| C26 | 10 pF | 121001.00 |
| C27 | 8200 pF | 122013.00 |
| C28 | 47 pF | 121003.00 |
| C29 | 100 nF | 121006.00 |
| C30 | 100 nF | 121006.00 |
| C31 | 8200 pF | 122013.00 |
| C32 | 47 pF | 121003.00 |
| C33 | 8200 pF | 122013.00 |
| C34 | 47 pF | 121003.00 |
| C35 | 470 nF | 125010.00 |
| C36 | 47 pF | 121003.00 |
| C37 | 10 µF | 128003.00 |
| C38 | 10 µF | 128003.00 |
| C39 | 100 nF | 121006.00 |
| C40 | 100 nF | 121006.00 |
| C41 | 10 pF | 121001.00 |
| C42 | 10 µF | 128003.00 |
| C43 | 22 nF | 125004.00 |
| C44 | 47 nF | 125006.00 |
| C45 | 2700 pF | 122010.00 |
| C46 | 330 pF | 122002.00 |
| C47 | 330 pF | 122002.00 |
| C48 | 330 pF | 122002.00 |
| C49 | 100 nF | 121006.00 |
| C50 | 100 nF | 121006.00 |
| C51 | 10 pF | 121001.00 |
| C52 | 10 pF | 121001.00 |
| C53 | 3.3 µF | 128002.00 |
| C54 | 10 µF | 128003.00 |
| C55 | 10 pF | 121001.00 |
| C56 | 100 nF | 121006.00 |
| C57 | 100 nF | 121006.00 |
| C58 | 10 µF | 128003.00 |
| C59 | 10 µF | 128003.00 |
| D1 | 1N914B | 141004.00 |
| D2 | 1N914B | 141004.00 |
| D3 | 1N914B | 141004.00 |
| D4 | 1N914B | 141004.00 |
| D5 | 1N914B | 141004.00 |
| D6 | Red LED | 146001.00 |
| D6A | LED Holder | 169003.00 |
| D7 | 1N4004 | 141005.00 |
| D8 | 1N4004 | 141005.00 |
| D9 | 1N4004 | 141005.00 |
| D10 | 1N4004 | 141005.00 |
| D11 | 1N4004 | 141005.00 |
| D12 | 1N4004 | 141005.00 |

# Model JSYN-05 Synthesizer: Schematic Diagram




| PART | VALUE | U*S # | PART | VALUE | U*S # | PART | VALUE | U*S # | PART | VALUE | U*S # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Q1 | J-174 | 145001.00 | U1 | TL074CP | 143017.00 | U5 | TL074CP | 143017.00 | M3 | 1/4" Screws | 167001.00 |
| Q2 | 2N3906 | 142002.00 | U2 | TL074CP | 143017.00 | U6 | 4212CP | 143022.00 | | -END OF LIST- | |
| Q3 | 2N3906 | 142002.00 | U3 | TL074CP | 143017.00 | M1 | PC Board | 181005.00 | | | |
| Q4 | PN4392 | 145002.00 | U4 | TL074CP | 143017.00 | M2 | Cover | 182006.00 | | | |

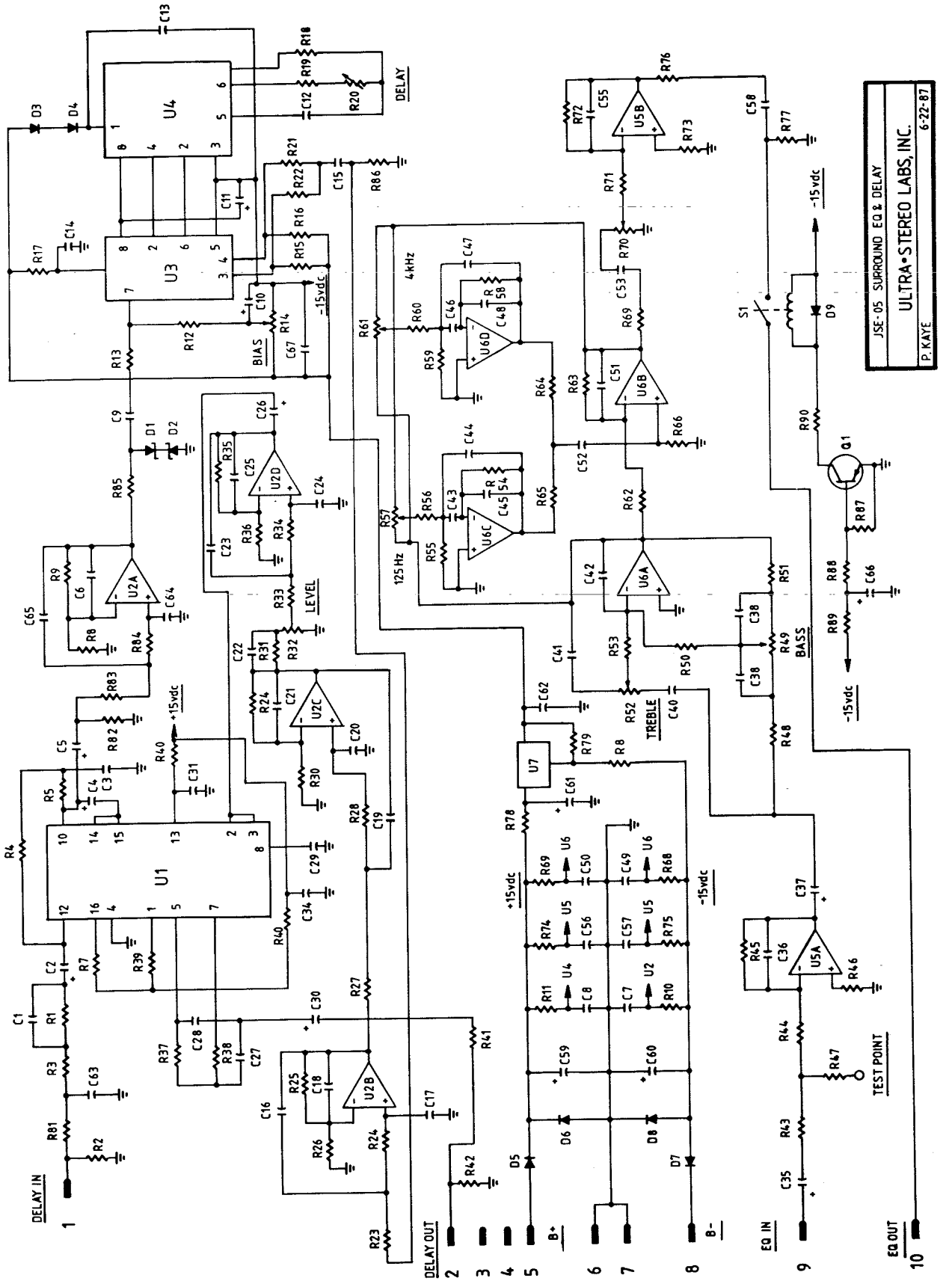
# Model JSE-05 Surround EQ/Delay Line: Layout & Parts List



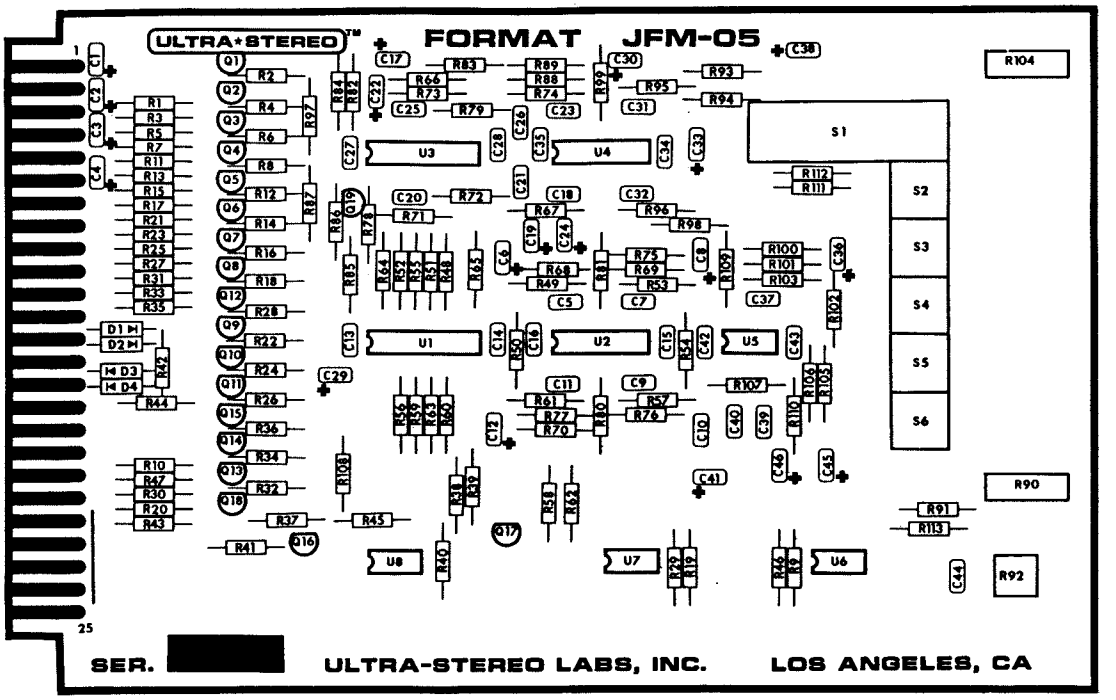

| PART | VALUE | U*S # |
|---|---|---|
| R1 | 39 kΩ | 112031.00 |
| R2 | 100 kΩ | 112034.00 |
| R3 | 20 kΩ | 111019.00 |
| R4 | 47.5 kΩ | 111033.00 |
| R5 | 47.5 kΩ | 111033.00 |
| R6 | 10 kΩ | 112022.00 |
| R7 | 1 MΩ | 112040.00 |
| R8 | 20 kΩ | 111019.00 |
| R9 | 20 kΩ | 111019.00 |
| R10 | 10 Ω | 112001.00 |
| R11 | 10 Ω | 112001.00 |
| R12 | 47.5 kΩ | 111033.00 |
| R13 | 1 kΩ | 112011.00 |
| R14 | 10 kΩ | 117004.00 |
| R15 | 100 kΩ | 112034.00 |
| R16 | 100 kΩ | 112034.00 |
| R17 | 10 Ω | 112001.00 |
| R18 | 20 kΩ | 111019.00 |
| R19 | 3.3 kΩ | 112018.00 |
| R20 | 10 kΩ | 118003.00 |
| R21 | 5.6 kΩ | 112019.00 |
| R22 | 5.6 kΩ | 112019.00 |
| R23 | 30.1 kΩ | 111026.00 |
| R24 | 30.1 kΩ | 111026.00 |
| R25 | 2 kΩ | 111006.00 |
| R26 | 30.1 kΩ | 111026.00 |
| R27 | 30.1 kΩ | 111026.00 |
| R28 | 30.1 kΩ | 111026.00 |
| R29 | 30.1 kΩ | 111026.00 |
| R30 | 51.1 kΩ | 111035.00 |
| R31 | 10 kΩ | 112022.00 |
| R32 | 10 kΩ | 117004.00 |
| R33 | 30.1 kΩ | 111026.00 |
| R34 | 30.1 kΩ | 111026.00 |
| R35 | 41.2 kΩ | 111031.00 |
| R36 | 30.1 kΩ | 111026.00 |
| R37 | 30.1 kΩ | 111026.00 |
| R38 | 62 kΩ | 112033.00 |
| R39 | 2.2 MΩ | 112041.00 |
| R40 | 10 Ω | 112001.00 |
| R41 | 47 Ω | 112002.00 |
| R42 | 100 kΩ | 112034.00 |
| R43 | 1 kΩ | 112011.00 |
| R44 | 100 kΩ | 112034.00 |
| R45 | 100 kΩ | 112034.00 |
| R46 | 2 kΩ | 111006.00 |
| R47 | 1.5 kΩ | 112013.00 |
| R48 | 26.7 kΩ | 111024.00 |
| R49 | 100 kΩ | 118005.00 |
| R50 | 10 kΩ | 112022.00 |
| R51 | 26.7 kΩ | 111024.00 |
| R52 | 100 kΩ | 118005.00 |
| R53 | 10 kΩ | 112022.00 |
| R54 | 402 kΩ | 111052.00 |
| R55 | 49.9 kΩ | 111034.00 |
| R56 | 200 kΩ | 111049.00 |
| R57 | 25 kΩ | 118004.00 |
| R58 | 402 kΩ | 111052.00 |
| R59 | 47.5 kΩ | 111033.00 |
| R60 | 200 kΩ | 111049.00 |
| R61 | 25 kΩ | 118004.00 |
| R62 | 30.1 kΩ | 111026.00 |
| R63 | 30.1 kΩ | 111026.00 |
| R64 | 30.1 kΩ | 111026.00 |
| R65 | 30.1 kΩ | 111026.00 |
| R66 | 1 MΩ | 112040.00 |
| R67 | 10 Ω | 112001.00 |
| R68 | 10 Ω | 112001.00 |
| R69 | 10 Ω | 112001.00 |
| R70 | 10 kΩ | 117005.00 |
| R71 | 26.7 kΩ | 111024.00 |
| R72 | 100 kΩ | 112034.00 |
| R73 | 2 kΩ | 111006.00 |
| R74 | 10 Ω | 112001.00 |
| R75 | 10 Ω | 112001.00 |
| R76 | 47 Ω | 112002.00 |
| R77 | 100 kΩ | 112034.00 |
| R78 | OMITTED | |
| R79 | 300 Ω | 112007.00 |
| R80 | 3.3 kΩ | 112018.00 |
| R81 | 2 kΩ | 111006.00 |
| R82 | 100 kΩ | 112034.00 |
| R83 | 30.1 kΩ | 111026.00 |
| R84 | 30.1 kΩ | 111026.00 |
| R85 | 2 kΩ | 111006.00 |
| R86 | 100 kΩ | 112034.00 |
| R87 | 49.9 kΩ | 111034.00 |
| R88 | 26.7 kΩ | 111024.00 |
| R89 | 62 kΩ | 112033.00 |
| R90 | 1k kΩ | 112011.00 |
| C1 | 2200 pF | 122009.00 |
| C2 | 10 µF | 128003.00 |
| C3 | 10 µF | 128003.00 |
| C4 | 10 µF | 128003.00 |
| C5 | 10 µF | 128003.00 |
| C6 | 330 µF | 122002.00 |
| C7 | 100 µF | 121006.00 |
| C8 | 100 µF | 121006.00 |
| C9 | 10 µF | 128003.00 |
| C10 | 10 µF | 128003.00 |
| C11 | 10 µF | 128003.00 |
| C12 | 680 µF | 122003.00 |
| C13 | 100 µF | 121006.00 |
| C14 | 100 µF | 121006.00 |
| C15 | 100 µF | 121006.00 |
| C16 | 680 pF | 122003.00 |
| C17 | 680 pF | 122003.00 |
| C18 | 10 pF | 121001.00 |
| C19 | 680 pF | 122003.00 |
| C20 | 680 pF | 122003.00 |
| C21 | 10 pF | 121001.00 |
| C22 | 2200 pF | 122009.00 |
| C23 | 680 pF | 122003.00 |
| C24 | 680 pF | 122003.00 |
| C25 | 10 pF | 121001.00 |
| C26 | 10 µF | 128003.00 |
| C27 | 1500 pF | 122007.00 |
| C28 | 10 pF | 121001.00 |
| C29 | 1500 pF | 122007.00 |
| C30 | 10 µF | 128003.00 |
| C31 | 100 nF | 121006.00 |
| C32 | 1 µF | 128001.00 |
| C33 | 1 µF | 128001.00 |
| C34 | 10 µF | 128003.00 |
| C35 | 10 µF | 128003.00 |
| C36 | 10 pF | 121001.00 |
| C37 | 10 µF | 128003.00 |
| C38 | 47 nF | 125006.00 |
| C39 | 47 nF | 125006.00 |
| C40 | 1500 pF | 122007.00 |
| C41 | 1500 pF | 122007.00 |
| C42 | 10 pF | 121001.00 |
| C43 | 10 nF | 125001.00 |
| C44 | 10 nF | 125001.00 |
| C45 | 10 pF | 121001.00 |
| C46 | 330 pF | 122002.00 |
| C47 | 330 pF | 122002.00 |
| C48 | 10 pF | 121001.00 |
| C49 | 100 nF | 121006.00 |
| C50 | 100 nF | 121006.00 |
| C51 | 10 pF | 121001.00 |
| C52 | 100 nF | 121006.00 |
| C53 | 10 µF | 128003.00 |
| C54 | 10 µF | 128003.00 |
| C55 | 10 pF | 121001.00 |
| C56 | 100 nF | 121006.00 |
| C57 | 100 nF | 121006.00 |
| C58 | 10 µF | 128003.00 |
| C59 | 10 µF | 128003.00 |
| C60 | 10 µF | 128003.00 |
| C61 | 10 µF | 128003.00 |
| C62 | 10 µF | 128003.00 |
| C63 | 2200 pF | 122009.00 |
| C64 | 680 pF | 122003.00 |
| C65 | 680 pF | 122003.00 |
| C66 | 22 µF | 128004.00 |
| C67 | 100 nF | 121006.00 |
| D1 | 1N747 | 141003.00 |
| D2 | 1N747 | 141003.00 |
| D3 | 1N914B | 141004.00 |
| D4 | 1N914B | 141004.00 |
| D5 | 1N4002/3 | 141005.00 |
| D6 | 1N4002/3 | 141005.00 |
| D7 | 1N4002/3 | 141005.00 |
| D8 | 1N4002/3 | 141005.00 |
| D9 | 1N4002/3 | 141005.00 |
| J1 | Purple Test Point | 164003.00 |
| U1 | DIP Socket | 161003.00 |
| U1A | NE570 | 143016.00 |
| U2 | TL074CP | 143017.00 |
| U3 | DIP Socket | 161002.00 |
| U3A | MN3005 | 143019.00 |
| U4 | DIP Socket | 161001.00 |
| U4A | MN3101 | 143020.00 |
| U5 | DIP Socket | 161001.00 |
| U5A | NE-5532 | 143009.00 |
| U6 | TL074CP | 143017.00 |
| U7 | LM317T | 143011.00 |
| Q1 | 2N3906 | 142001.00 |
| S1 | Relay | 136001.00 |
| M1 | Printed Circuit Board | 181006.00 |
| M2 | 1/4" Screws | 167002.00 |
| M6 | Hex Nut | 167004.00 |
| M5 | Lock Washer | 167005.00 |
| M4 | 1/2" Screw | 167008.00 |
| M3 | Metal Cover | 182007.00 |

-END OF LIST-

# Model JSE-05 Surround EQ/Delay Line: Schematic Diagram

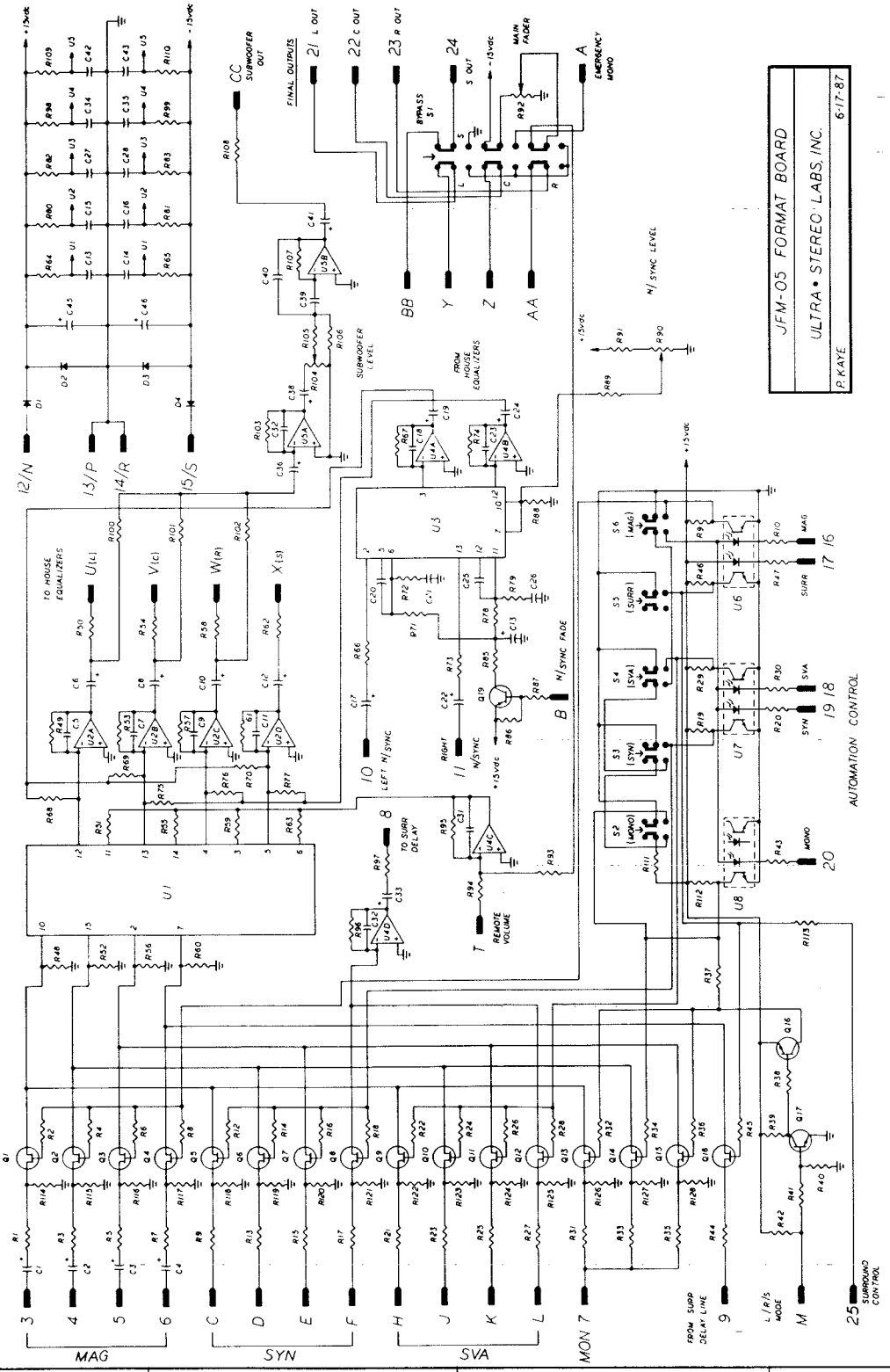


# Model JFM-05 Format Card: Layout & Parts List




| PART | VALUE | U*S # | PART | VALUE | U*S # | PART | VALUE | U*S # | PART | VALUE | U*S # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R1 | 10.0 kΩ | 111013.00 | R48 | 100 Ω | 112003.00 | R95 | 100 kΩ | 112034.00 | C14 | 100 nF | 121006.00 |
| R2 | 100 kΩ | 112034.00 | R49 | 30.1 kΩ | 111026.00 | R96 | 10.0 kΩ | 111013.00 | C15 | 100 nF | 121006.00 |
| R3 | 10.0 kΩ | 111013.00 | R50 | 47 Ω | 112002.00 | R97 | 47 Ω | 112002.00 | C16 | 100 nF | 121006.00 |
| R4 | 100 kΩ | 112034.00 | R51 | 30.1 kΩ | 111026.00 | R98 | 10 Ω | 112001.00 | C17 | 10 µF | 128003.00 |
| R5 | 10.0 kΩ | 111013.00 | R52 | 100 Ω | 112003.00 | R99 | 10 Ω | 112001.00 | C18 | 100 pF | 121004.00 |
| R6 | 100 kΩ | 112034.00 | R53 | 30.1 kΩ | 111026.00 | R100 | 10.0 kΩ | 111013.00 | C19 | 10 µF | 128003.00 |
| R7 | 10.0 kΩ | 111013.00 | R54 | 47 Ω | 112002.00 | R101 | 10.0 kΩ | 111013.00 | C20 | 100 pF | 121004.00 |
| R8 | 100 kΩ | 112034.00 | R55 | 30.1 kΩ | 111026.00 | R102 | 10.0 kΩ | 111013.00 | C21 | 4700 pF | 122011.00 |
| R9 | 10 kΩ | 112022.00 | R56 | 100 Ω | 112003.00 | R103 | 20.0 kΩ | 111019.00 | C22 | 10 µF | 128003.00 |
| R10 | 1 kΩ | 112011.00 | R57 | 30.1 kΩ | 111026.00 | R104 | 10 kΩ | 117005.00 | C23 | 100 pF | 121004.00 |
| R11 | 10.0 kΩ | 111013.00 | R58 | 47 Ω | 112002.00 | R105 | 39 kΩ | 112031.00 | C24 | 10 µF | 128003.00 |
| R12 | 100 kΩ | 112034.00 | R59 | 30.1 kΩ | 111026.00 | R106 | 15 kΩ | 112024.00 | C25 | 100 pF | 121004.00 |
| R13 | 10.0 kΩ | 111013.00 | R60 | 100 Ω | 112003.00 | R107 | 150 kΩ | 111046.00 | C26 | 4700 pF | 122011.00 |
| R14 | 100 kΩ | 112034.00 | R61 | 30.1 kΩ | 111026.00 | R108 | 47 Ω | 112002.00 | C27 | 100 nF | 121006.00 |
| R15 | 10.0 kΩ | 111013.00 | R62 | 47 Ω | 112002.00 | R109 | 10 Ω | 112001.00 | C28 | 100 nF | 121006.00 |
| R16 | 100 kΩ | 112034.00 | R63 | 30.1 kΩ | 111026.00 | R110 | 10 Ω | 112001.00 | C29 | 47 µF | 128005.00 |
| R17 | 10.0 kΩ | 111013.00 | R64 | 10 Ω | 112001.00 | R111 | 10 Ω | 112001.00 | C30 | 10 µF | 128003.00 |
| R18 | 100 kΩ | 112034.00 | R65 | 10 Ω | 112001.00 | R112 | 10 kΩ | 112022.00 | C31 | 100 nF | 121006.00 |
| R19 | 10 kΩ | 112022.00 | R66 | 20.0 kΩ | 111019.00 | R113 | 47 Ω | 112002.00 | C32 | 10 pF | 121001.00 |
| R20 | 1 kΩ | 112011.00 | R67 | 30.1 kΩ | 111026.00 | R114 | 10.0 kΩ | 111013.00 | C33 | 10 µF | 128003.00 |
| R21 | 10.0 kΩ | 111013.00 | R68 | 20.0 kΩ | 111019.00 | R115 | 10.0 kΩ | 111013.00 | C34 | 100 nF | 121006.00 |
| R22 | 100 kΩ | 112034.00 | R69 | 30.1 kΩ | 111026.00 | R116 | 10.0 kΩ | 111013.00 | C35 | 100 nF | 121006.00 |
| R23 | 10.0 kΩ | 111013.00 | R70 | 30.1 kΩ | 111026.00 | R117 | 10.0 kΩ | 111013.00 | C36 | 3.3 µF | 128002.00 |
| R24 | 100 kΩ | 112034.00 | R71 | 24 kΩ | 112027.00 | R118 | 10.0 kΩ | 111013.00 | C37 | 47 nF | 125006.00 |
| R25 | 10.0 kΩ | 111013.00 | R72 | 100 Ω | 112003.00 | R119 | 10.0 kΩ | 111013.00 | C38 | 10 µF | 128003.00 |
| R26 | 100 kΩ | 112034.00 | R73 | 20.0 kΩ | 111019.00 | R120 | 10.0 kΩ | 111013.00 | C39 | 100 nF | 125008.00 |
| R27 | 10.0 kΩ | 111013.00 | R74 | 30.1 kΩ | 111026.00 | R121 | 10.0 kΩ | 111013.00 | C40 | 100 nF | 125008.00 |
| R28 | 100 kΩ | 112034.00 | R75 | 30.1 kΩ | 111026.00 | R122 | 10.0 kΩ | 111013.00 | C41 | 10 µF | 128003.00 |
| R29 | 10 kΩ | 112022.00 | R76 | 20.0 kΩ | 111019.00 | R123 | 10.0 kΩ | 111013.00 | C42 | 100 nF | 121006.00 |
| R30 | 1 kΩ | 112011.00 | R77 | 30.1 kΩ | 111026.00 | R124 | 10.0 kΩ | 111013.00 | C43 | 100 nF | 121006.00 |
| R31 | 14.0 kΩ | 111016.00 | R78 | 24 kΩ | 112027.00 | R125 | 10.0 kΩ | 111013.00 | C44 | 100 nF | 121006.00 |
| R32 | 100 kΩ | 112034.00 | R79 | 100 Ω | 112003.00 | R126 | 10.0 kΩ | 111013.00 | C45 | 10 µF | 128003.00 |
| R33 | 10.0 kΩ | 111013.00 | R80 | 10 Ω | 112001.00 | R127 | 10.0 kΩ | 111013.00 | C46 | 10 µF | 128003.00 |
| R34 | 100 kΩ | 112034.00 | R81 | 10 Ω | 112001.00 | R128 | 10.0 kΩ | 111013.00 | D1 | 1N4004 | 141005.00 |
| R35 | 14.0 kΩ | 111016.00 | R82 | 10 Ω | 112001.00 | C1 | 10 µF | 128003.00 | D2 | 1N4004 | 141005.00 |
| R36 | 100 kΩ | 112034.00 | R83 | 10 Ω | 112001.00 | C2 | 10 µF | 128003.00 | D3 | 1N4004 | 141005.00 |
| R37 | 10 kΩ | 112022.00 | R84 | 36 kΩ | 112030.00 | C3 | 10 µF | 128003.00 | D4 | 1N4004 | 141005.00 |
| R38 | 10 kΩ | 112022.00 | R85 | 30.1 kΩ | 111026.00 | C4 | 10 µF | 128003.00 | Q1 | J-174 | 145001.00 |
| R39 | 1 kΩ | 112011.00 | R86 | 1 kΩ | 112011.00 | C5 | 10 pF | 121001.00 | Q2 | J-174 | 145001.00 |
| R40 | 10 kΩ | 112022.00 | R87 | 10 kΩ | 112022.00 | C6 | 10 µF | 128003.00 | Q3 | J-174 | 145001.00 |
| R41 | 100 kΩ | 112034.00 | R88 | 1 kΩ | 112011.00 | C7 | 10 pF | 121001.00 | Q4 | J-174 | 145001.00 |
| R42 | 10 kΩ | 112022.00 | R89 | 100 kΩ | 112034.00 | C8 | 10 µF | 128003.00 | Q5 | J-174 | 145001.00 |
| R43 | 1 kΩ | 112011.00 | R90 | 10 kΩ | 117005.00 | C9 | 10 pF | 121001.00 | Q6 | J-174 | 145001.00 |
| R44 | 10.0 kΩ | 111013.00 | R91 | 4.99 kΩ | 111011.00 | C10 | 10 µF | 128003.00 | Q7 | J-174 | 145001.00 |
| R45 | 100 kΩ | 112034.00 | R92 | 10 kΩ | 119001.00 | C11 | 10 pF | 121001.00 | Q8 | J-174 | 145001.00 |
| R46 | 10 kΩ | 112022.00 | R93 | 100 kΩ | 112034.00 | C12 | 10 µF | 128003.00 | Q9 | J-174 | 145001.00 |
| R47 | 1 kΩ | 112011.00 | R94 | 100 kΩ | 112034.00 | C13 | 100 nF | 121006.00 | Q10 | J-174 | 145001.00 |

# Model JFM-05 Format Card: Schematic Diagram




| PART | VALUE | U*S # |
|---|---|---|
| Q11 | J-174 | 145001.00 |
| Q12 | J-174 | 145001.00 |
| Q13 | J-174 | 145001.00 |
| Q14 | J-174 | 145001.00 |
| Q15 | J-174 | 145001.00 |
| Q16 | 2N-3906 | 142002.00 |
| Q17 | 2N-3904 | 142001.00 |

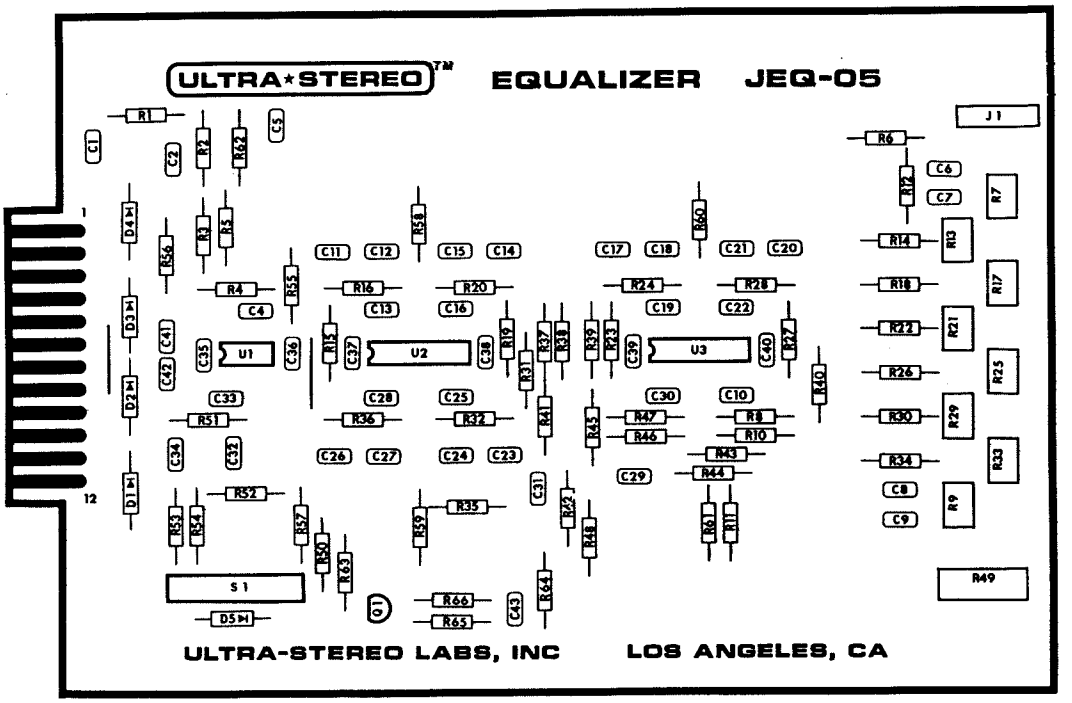
| PART | VALUE | U*S # |
|---|---|---|
| Q18 | J-174 | 145001.00 |
| Q19 | 2N-3906 | 142002.00 |
| S1 | PB Switch | 173006.00 |
| U1 | DIP Socket | 161003.00 |
| U1A | 2024 | 143003.00 |
| U2 | TL-074CP | 143017.00 |
| U3 | DIP Socket | 161003.00 |

| PART | VALUE | U*S # |
|---|---|---|
| U3A | 2022 | 143002.00 |
| U4 | TL-074CP | 143017.00 |
| U5 | DIP Socket | 161001.00 |
| U5A | NE-5532 | 143009.00 |
| U6 | ILD-1 | 144001.00 |
| U7 | ILD-1 | 144001.00 |
| U8 | ILD-1 | 144001.00 |

| PART | VALUE | U*S # |
|---|---|---|
| M1 | PCB | 181008.00 |
| M2 | Cover | 182008.00 |
| M3 | 1/4" Screw | 167001.00 |
| M4 | 3/8" Nut | 167011.00 |
| M5 | 3/8" Washer | 167012.00 |
| M6 | Control Knob | 168001.00 |

-END OF LIST-

# Model JEQ-05 Octave House Equalizer: Layout & Parts List



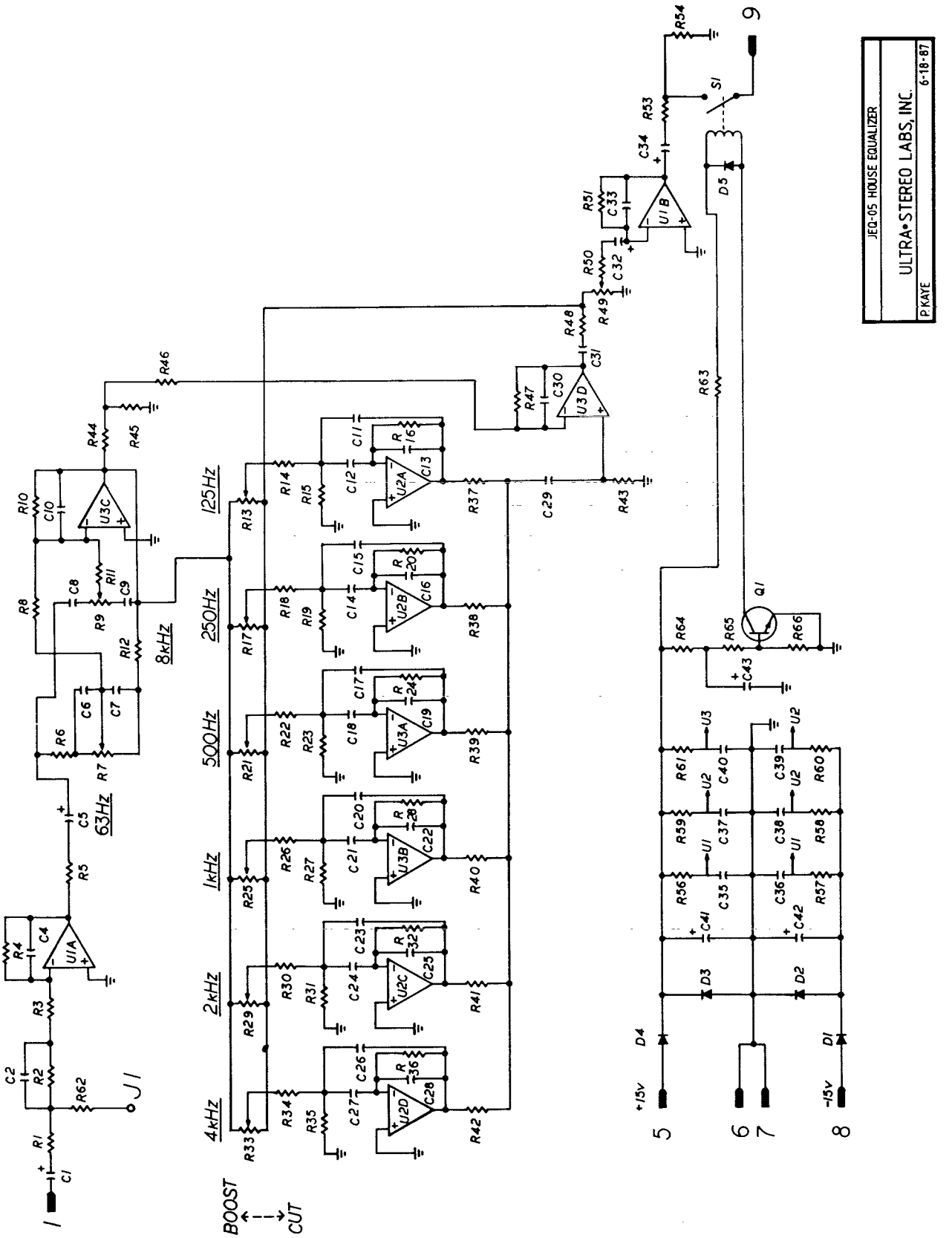

| PART | VALUE | U*S # |
|---|---|---|
| R1 | 1 kΩ | 112011.00 |
| R2 | 69.8 kΩ | 111038.00 |
| R3 | 26.7 kΩ | 111024.00 |
| R4 | 100 kΩ | 112034.00 |
| R5 | 10 Ω | 112001.00 |
| R6 | 26.7 kΩ | 111024.00 |
| R7 | 100 kΩ | 118005.00 |
| R8 | 10 kΩ | 112022.00 |
| R9 | 100 kΩ | 118005.00 |
| R10 | 1 MΩ | 112040.00 |
| R11 | 10 kΩ | 112022.00 |
| R12 | 26.7 kΩ | 111024.00 |
| R13 | 25 kΩ | 118004.00 |
| R14 | 200 kΩ | 111049.00 |
| R15 | 49.9 kΩ | 111034.00 |
| R16 | 402 kΩ | 111052.00 |
| R17 | 25 kΩ | 118004.00 |
| R18 | 200 kΩ | 111049.00 |
| R19 | 56.2 kΩ | 111037.00 |
| R20 | 402 kΩ | 111052.00 |
| R21 | 25 kΩ | 118004.00 |
| R22 | 200 kΩ | 111049.00 |
| R23 | 44.2 kΩ | 111032.00 |
| R24 | 402 kΩ | 111052.00 |
| R25 | 25 kΩ | 118004.00 |
| R26 | 200 kΩ | 111049.00 |
| R27 | 49.9 kΩ | 111034.00 |
| R28 | 402 kΩ | 111052.00 |
| R29 | 25 kΩ | 118004.00 |
| R30 | 200 kΩ | 111049.00 |
| R31 | 44.2 kΩ | 111032.00 |
| R32 | 402 kΩ | 111052.00 |
| R33 | 25 kΩ | 118004.00 |
| R34 | 200 kΩ | 111049.00 |
| R35 | 47.5 kΩ | 111033.00 |
| R36 | 402 kΩ | 111052.00 |
| R37 | 200 kΩ | 111049.00 |
| R38 | 200 kΩ | 111049.00 |
| R39 | 200 kΩ | 111049.00 |
| R40 | 200 kΩ | 111049.00 |
| R41 | 200 kΩ | 111049.00 |
| R42 | 200 kΩ | 111049.00 |
| R43 | 1 MΩ | 112040.00 |
| R44 | 5.6 kΩ | 112019.00 |
| R45 | 680 Ω | 112009.00 |
| R46 | 49.9 kΩ | 111034.00 |
| R47 | 249 kΩ | 111050.00 |

| PART | VALUE | U*S # |
|---|---|---|
| R48 | 10 Ω | 112001.00 |
| R49 | 10 kΩ | 117005.00 |
| R50 | 26.7 kΩ | 111024.00 |
| R51 | 100k Ω | 112034.00 |
| R52 | 2 kΩ | 112014.00 |
| R53 | 47 Ω | 112002.00 |
| R54 | 100 kΩ | 112034.00 |
| R55 | 2 kΩ | 112014.00 |
| R56 | 10 Ω | 112001.00 |
| R57 | 10 Ω | 112001.00 |
| R58 | 10 Ω | 112001.00 |
| R59 | 10 Ω | 112001.00 |
| R60 | 10 Ω | 112001.00 |
| R61 | 10 Ω | 112001.00 |
| R62 | 1.5 kΩ | 112013.00 |
| R63 | 1 kΩ | 112011.00 |
| R64 | 62 kΩ | 112033.00 |
| R65 | 26.7 kΩ | 111024.00 |
| R66 | 10 kΩ | 112022.00 |
| C1 | 10 µF | 128003.00 |
| C2 | 330 pF | 122002.00 |
| C3 | Omitted | |
| C4 | 10 pF | 121001.00 |
| C5 | 10 µF | 128003.00 |
| C6 | 47 nF | 125006.00 |
| C7 | 47 nF | 125006.00 |
| C8 | 1500 pF | 122007.00 |
| C9 | 1500 pF | 122007.00 |
| C10 | 10 pF | 121001.00 |
| C11 | 10 nF | 125001.00 |
| C12 | 10 nF | 125001.00 |
| C13 | 10 pF | 121001.00 |
| C14 | 4700 pF | 122011.00 |
| C15 | 4700 pF | 122011.00 |
| C16 | 10 pF | 121001.00 |
| C17 | 2700 pF | 122010.00 |
| C18 | 2700 pF | 122010.00 |
| C19 | 10 pF | 121001.00 |
| C20 | 1200 pF | 122006.00 |
| C21 | 1200 pF | 122006.00 |
| C22 | 10 pF | 121001.00 |
| C23 | 680 pF | 122003.00 |
| C24 | 680 pF | 122003.00 |
| C25 | 10 pF | 121001.00 |
| C26 | 330 pF | 122002.00 |
| C27 | 330 pF | 122002.00 |
| C28 | 10 pF | 121001.00 |

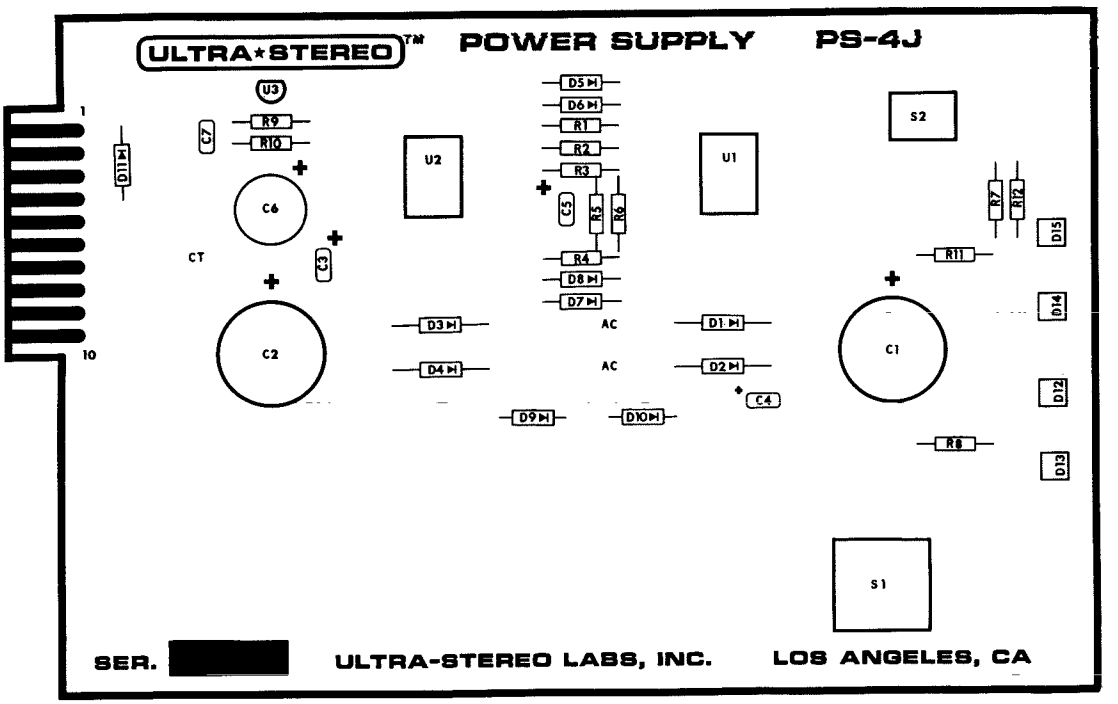
| PART | VALUE | U*S # |
|---|---|---|
| C29 | 47 nF | 125006.00 |
| C30 | 10 pF | 121001.00 |
| C31 | 10 µF | 128003.00 |
| C32 | 10 µF | 128003.00 |
| C33 | 10 pF | 121001.00 |
| C34 | 10 µF | 128003.00 |
| C35 | 100 nF | 121006.00 |
| C36 | 100 nF | 121006.00 |
| C37 | 100 nF | 121006.00 |
| C38 | 100 nF | 121006.00 |
| C39 | 100 nF | 121006.00 |
| C40 | 100 nF | 121006.00 |
| C41 | 10 µF | 128003.00 |
| C42 | 10 µF | 128003.00 |
| C43 | 22 µF | 128004.00 |
| D1 | 1N4004 | 141005.00 |
| D2 | 1N4004 | 141005.00 |
| D3 | 1N4004 | 141005.00 |
| D4 | 1N4004 | 141005.00 |
| D5 | 1N4004 | 141005.00 |
| J1 | Purple TP | 164003.00 |
| U1 | DIP Socket | 161001.00 |
| U1A | NE-5532 | 143009.00 |
| U2 | TL-074CP | 143017.00 |
| U3 | TL-074CP | 143017.00 |
| Q1 | 2N3904 | 142001.00 |
| S1 | Relay | 136001.00 |
| M1 | PCB | 181009.00 |
| M2 | Cover | 182009.00 |
| M3 | 1/4" Screws | 167001.00 |

-END OF LIST-

# Model JEQ-05 Octave House Equalizer: Schematic Diagram



# Model JPS-05 Power Supply: Layout & Parts List

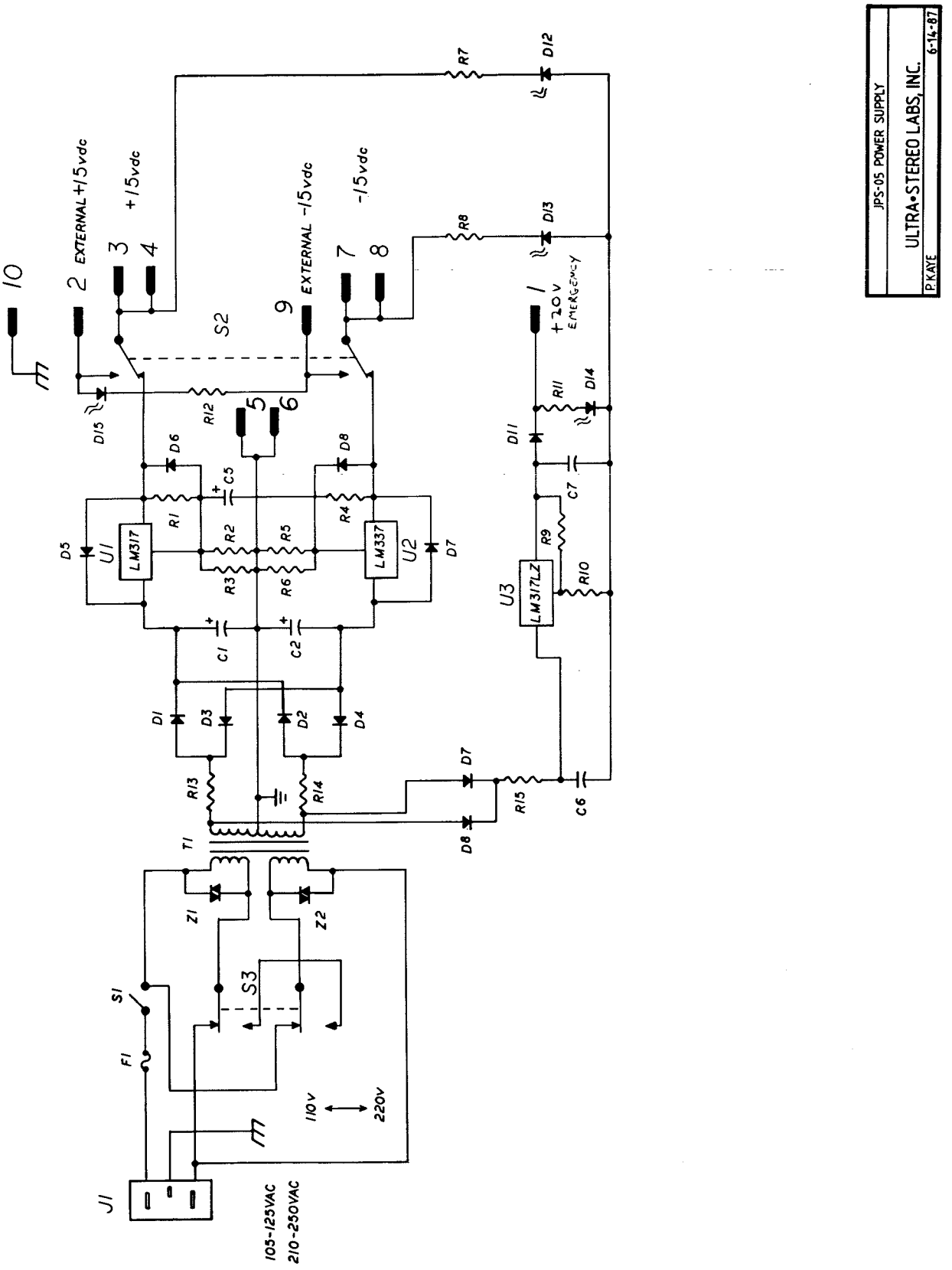



| PART | VALUE | U*S # |
|---|---|---|
| R1 | 300 Ω | 112007.00 |
| R2 | 3.3 kΩ | 112018.00 |
| R3 | Omitted | |
| R4 | 300 Ω | 112007.00 |
| R5 | Omitted | |
| R6 | 3.3 kΩ | 112018.00 |
| R7 | 3.3 kΩ | 112018.00 |
| R8 | 3.3 kΩ | 112018.00 |
| R9 | 300 Ω | 112007.00 |
| R10 | 3.3 kΩ | 112018.00 |
| R11 | 3.3 kΩ | 112018.00 |
| R12 | 3.3 kΩ | 112018.00 |
| C1 | 3300 µF | 128012.00 |
| C2 | 3300 µF | 128012.00 |
| C3 | 10 µF | 128003.00 |
| C4 | 10 µF | 128003.00 |
| C5 | 47 µF | 128007.00 |
| C6 | 470 µF | 128009.00 |
| C7 | 100 nF | 121006.00 |
| V1 | Varistor | 135001.00 |
| V2 | Varistor | 135001.00 |
| D1 | 1N5402 | 141009.00 |
| D2 | 1N5402 | 141009.00 |
| D3 | 1N5402 | 141009.00 |
| D4 | 1N5402 | 141009.00 |
| D5 | 1N4004 | 141005.00 |
| D6 | 1N4004 | 141005.00 |
| D7 | 1N4004 | 141005.00 |
| D8 | 1N4004 | 141005.00 |
| D9 | 1N4004 | 141005.00 |
| D10 | 1N4004 | 141005.00 |
| D11 | 1N4004 | 141005.00 |
| D12 | Red LED | 146001.00 |
| D12A | LED Holder | 169003.00 |
| D13 | Red LED | 146001.00 |
| D13A | LED Holder | 169003.00 |
| D14 | Green LED | 146003.00 |
| D14A | LED Holder | 169003.00 |
| D15 | Green LED | 146003.00 |
| D15A | LED Holder | 169003.00 |
| M1 | Heat Sink | 166001.00 |
| M2 | Heat Sink | 166001.00 |
| M3 | PCB | 181010.00 |
| M4 | Rack Frame | 182010.00 |
| M4A | Rear Flange | 182012.00 |
| M4B | Locking Bolt | 182013.00 |
| M5 | Housing | 182011.00 |

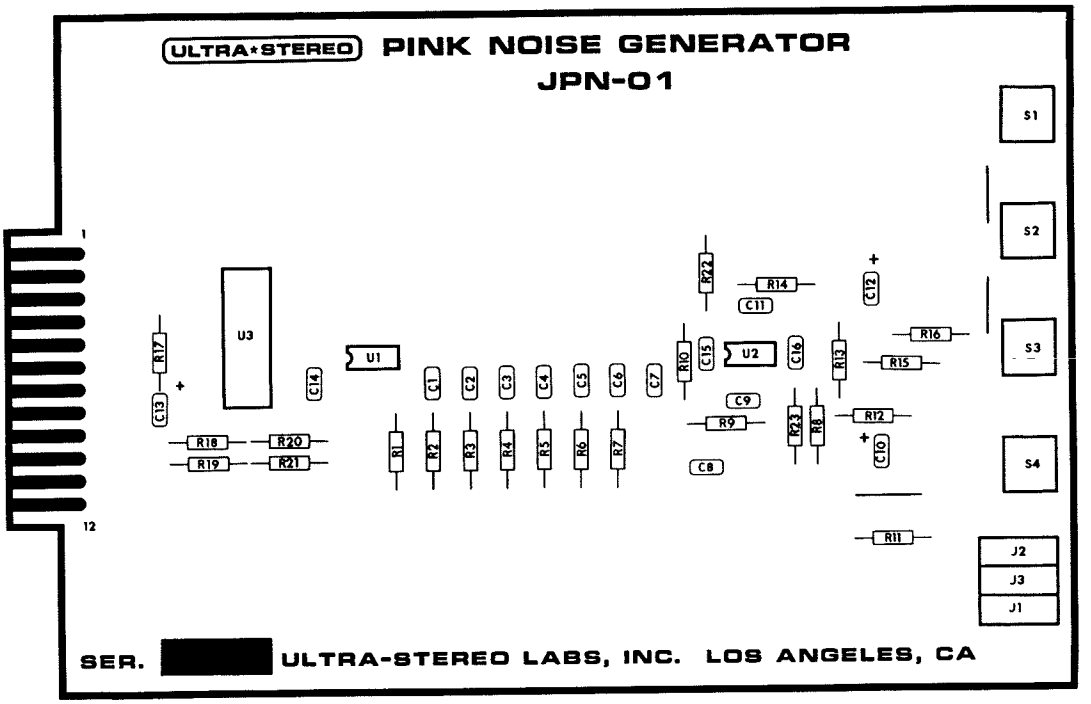
| PART | VALUE | U*S # |
|---|---|---|
| M6 | Fuse Holder | 165001.00 |
| M7 | 1/2 A Slo-Blo Fuse | 165002.00 |
| M8 | Front Handle | 169002.00 |
| M9 | AC Socket | 162008.00 |
| M10 | Lug | 167003.00 |
| M11 | 1/2" Screw | 167008.00 |
| M11A | 1/2" Screw | 167008.00 |
| M12 | Heat Sink Washers | 167006.00 |
| M13 | Lock Washers | 167005.00 |
| M13A | Lock Washers | 167005.00 |
| M14 | Nuts | 167004.00 |
| M14A | Nuts | 167004.00 |
| M15 | 3/8" Screw | 167015.00 |
| M16 | Lock Washers | 167005.00 |
| M18 | 1/4" Screw | 167001.00 |
| M19 | 1/4" Washer | 167009.00 |
| M20 | Fender Washer | 167010.00 |
| M21 | 1/4" Allen Screw | 167007.00 |
| M22 | 1/2" Screw | 167008.00 |
| M23 | Lock Washsers | 167005.00 |
| M24 | Nuts | 167004.00 |
| M25 | 1/2" Screw | 167008.00 |
| M26 | 1/4" Washer | 167009.00 |
| M27 | 1/4" Screw | 167001.00 |
| S1 | Power Switch | 173001.00 |
| S1A | Red Button | 174001.00 |
| S2 | Standby Switch | 173002.00 |
| S2A | Green Button | 174002.00 |
| S3 | 115/230 Switch | 173007.00 |
| T1 | Transformer | 151001.00 |
| U1 | LM317T | 143011.00 |
| U2 | LM337T | 143014.00 |
| U3 | LM317LZ | 143012.00 |

-END OF LIST -

# Model JPS-05 Power Supply: Schematic Diagram



# Model JPN-01 Pink Noise Generator: Layout & Parts List




| PART | VALUE | U*S # |
|---|---|---|
| R1 | 10 kΩ | 112022.00 |
| R2 | 6.8 kΩ | 112020.00 |
| R3 | 3.3 kΩ | 112018.00 |
| R4 | 1.5 kΩ | 112013.00 |
| R5 | 680 Ω | 112009.00 |
| R6 | 220 Ω | 112005.01 |
| R7 | 100 Ω | 112003.00 |
| R8 | 300 kΩ | 112038.00 |
| R9 | 100 kΩ | 111042.00 |
| R10 | 4.99 kΩ | 111011.00 |
| R11 | 100 k Ω | 111042.00 |
| R12 | 47 Ω | 112002.00 |
| R13 | 100 kΩ | 111042.00 |
| R14 | 100 kΩ | 111042.00 |
| R15 | 100 kΩ | 111042.00 |
| R16 | 47 Ω | 112002.00 |
| R17 | 10 Ω | 112001.00 |
| R18 | 1.2 k Ω | 112012.00 |
| R19 | Selected | |
| R20 | 300 Ω | 112007.00 |
| R21 | Selected | |
| R22 | 10 Ω | 112001.00 |
| R23 | 10 Ω | 112001.00 |
| C1 | 1 µF | 125011.00 |
| C2 | 470 nF | 125010.00 |
| C3 | 220 nF | 125009.00 |
| C4 | 100 nF | 125008.00 |
| C5 | 47 nF | 125006.00 |
| C6 | 22 nF | 125004.00 |
| C7 | 22 nF | 125004.00 |
| C8 | 1 µF | 125011.00 |
| C9 | 10 pF | 121001.00 |
| C10 | 22 µF | 128004.00 |
| C11 | 10 pF | 121001.00 |
| C12 | 22 µF | 128004.00 |
| C13 | 22 µF | 128004.00 |
| C14 | 100 nF | 121006.00 |
| C15 | 100 nF | 121006.00 |
| C16 | 100 nF | 121006.00 |
| J1 | Black Test Point | 164001.00 |
| J2 | Red Test Point | 164002.00 |
| J3 | Green Test Point | 164004.00 |
| S1 | Switch | 173008.00 |
| S2 | Switch | 173008.00 |
| S3 | Switch | 173008.00 |
| S4 | Switch | 173008.00 |
| U1 | 8 Pin Socket | 161001.00 |

| PART | VALUE | U*S # |
|---|---|---|
| U1A | MM-5437 | 143023.00 |
| U2 | 8 Pin Socket | 161001.00 |
| U2A | NE-5532 | 143009.00 |
| U3 | LM-317T | 143011.00 |
| M1 | PC Board | 181015.00 |
| M2 | Standoffs | 169006.00 |
| M3 | Bracket | 182016.00 |
| M4 | Cover | 182017.00 |
| M5 | 1/4" Srew | 167002.00 |
| M6 | 1/2" Screw | 167008.00 |
| M7 | Flat Washer | 167009.00 |
| M8 | Lock Washer | 167005.00 |
| M9 | Hex Nut | 167004.00 |
| | -END OF LIST- | |

# Model JPN-01 Pink Noise Generator: Schematic Diagram