

# Film-Tech

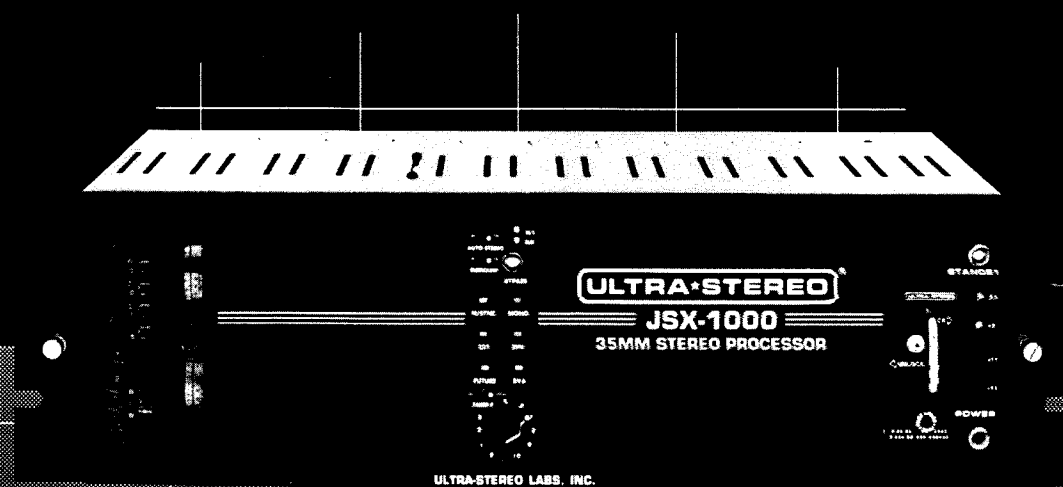
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# JS Series Instruction Manual



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Please record the following information for your records:

Model: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_ Purchased from: \_\_\_\_\_

### One Year Limited Warranty



*Ultra Stereo Labs warrants that each product manufactured by it will be free from defects in material and workmanship under normal usage for a period of one year after its purchase new from an authorized dealer. Our obligation under this warranty is limited to repairing or replacing any product or component which we are satisfied does not conform with the foregoing warranty and which is returned to our factory, freight paid, or serviced by one of our authorized contractors. The Foregoing Warranty is Exclusive And in Lieu of All Other Warranties, Whether Expressed or Implied. Such warranty shall not apply to any product or component (A) repaired or altered by anyone other than Ultra Stereo Labs or an authorized service contractor; (B) tampered with or altered in any way or subjected to misuse, negligence or accident or (C) which has been improperly connected, installed or adjusted otherwise than in accordance with Ultra Stereo Labs instruction.*

# 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 has a window of transparent plastic to permit visual monitoring of 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.

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

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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 by a latching bar that locks the unit to the frame, anchored by a #1 phillips head screw on the front panel. To remove the power supply from the frame loosen the screw beneath the handle and slide the latch 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 screw under the handle to secure the latch.

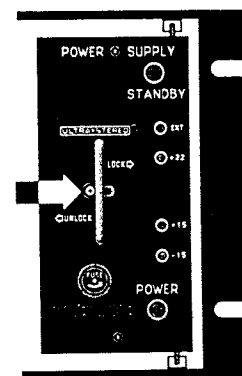
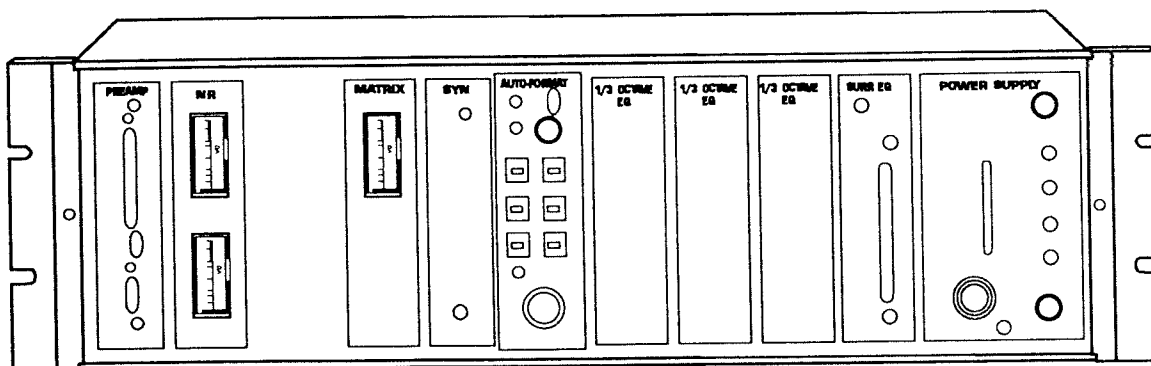


Figure 1. To remove power supply loosen screw and slide latch to the left

## 2. SYSTEM CONFIGURATIONS



	Optical Preamp	Noise Reduction	Future	Matrix	Stereo Synthesizer	Format	Left EQ	Center EQ	Right EQ	Surround EQ	Power Supply	
JS-105	●	●				●		●			●	Plays mono prints in mono, includes noise reduction to accurately decode stereo prints.
JS-115	●	●				●		●		●	●	Plays mono prints in mono and decodes stereo prints into center and surround channels.
JS-125	●	●			●	●		●		●	●	Same as JS-115, plus a stereo synthesizer.
JS-145	●	●		●		●	●	●		●	●	Plays mono prints in mono and decodes stereo prints into left, right and surround channels.
JS-155	●	●		●	●	●	●			●	●	Same as JS-145, plus a stereo synthesizer.
JS-165	●	●		●		●	●	●	●	●	●	Plays mono prints in mono and decodes stereo prints in full four channel sound.
JS-165-3	●	●		●		●	⊘	●	⊘	●	●	Plays mono prints in mono and decodes stereo prints in three channel sound with stereo surrounds.
JS-175	●	●		●	●	●	●	●	●	●	●	Same as the JS-165, plus a stereo synthesizer.
JS-175-3	●	●		●	●	●	⊘	●	⊘	●	●	Same as the JS-165-3, plus a stereo synthesizer.
JS-185	●	●		●		●	⊘	⊘	⊘	●	●	Same as the JS-165, but with 1/3 octave EQ for left, center and right channels.
JS-195	●	●		●	●	●	⊘	⊘	⊘	●	●	Same as the JS-175, but with 1/3 octave EQ for left, center and right channels.
JSX-1000	●	●		⊗		⊙	⊘	⊘	⊘	⊘	●	Deluxe four channel stereo processor approved for use with THX sound systems.

⊗ =JM-10 Matrix

⊙ =JFM-10 Format

⊘ =JSS Stereo Surround

⊘ =JEQ-10 1/3 Oct EQ

⊘ =JSE-10 Surr EQ

## 3. SPECIFICATIONS

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### FEATURES

- The preamplifier has adjustable high-frequency slit loss compensation circuitry.
- High quality wide dynamic range 4-band "A" type noise reduction.
- 40 dB channel separation through the decoder matrix between adjacent channels.
- Stereo synthesizer with surround sound capability.
- Octave or 1/3 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 two projectors. Each cell input is balanced with a sensitivity of -65 dB at 200  $\Omega$  impedance.

Four external 'digital ready' line inputs with a sensitivity of 0 dB at 10 k $\Omega$  impedance. A Stereo Non-Sync input with a sensitivity of -30 dB at 15 k $\Omega$  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 20 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 75 dB below signal in all modes. Under the same conditions, the total harmonic distortion is typically less than 0.1% and less than 0.1% with external line inputs.

#### SIZE AND WEIGHT

The overall size of the unit is 5-1/4" x 19" 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-175) is 17 pounds (7.7 kg). Shipping weight is approximately 21 pounds (9.5 kg).

#### OPTIONS

The following modules – standard on the JSX-1000 – are optional on all JS series processors:

- JFM-10 Auto-format
- JEQ-10 1/3 octave EQ
- JSE-10 Extended range surround EQ
- JMX-10 Matrix

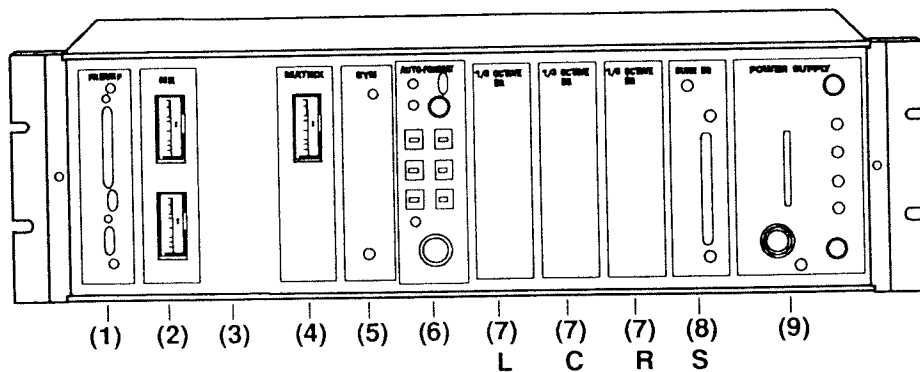


Figure 3. Module Locations (numbers are referenced below)

### (1) OPTICAL PREAMPLIFIER

The projector solar cell inputs have adjustable high frequency boost circuitry to compensate for a variety of scanning slit widths. Projector changeover of the dual projector preamplifier is accomplished by grounding the "X-OVER" terminal on the backboard. The mono preamp output has an adjustment for mid 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  $\pm 1$  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) FUTURE

This slot is for a future "SR" type decode module.

### (4) 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.

### (5) SYNTHESIZER

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

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

Six push-buttons select the format and may be used to 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 or 1/3 octave equalization is available with the JS system. A fixed high frequency boost is incorporated into the octave eq to compensate for screen losses. Output level is adjustable by a 15 turn front panel potentiometer.

### (8) SURROUND EQUALIZER/DELAY

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

### (9) POWER SUPPLY

The main Power Supply is  $\pm 15$  volts with a Backup Supply of nominally +20 volts for the emergency bypass mono preamplifier. Switching for an external  $\pm 15$  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. **To avoid damage to your entire sound system, never use the Standby Switch as an ON/OFF switch.**

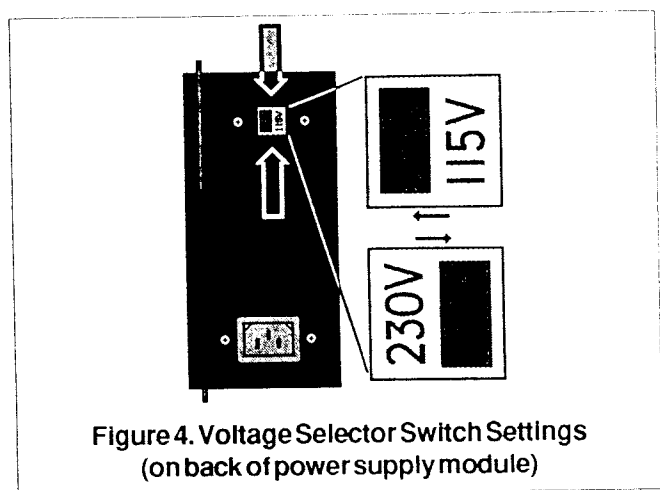


Figure 4. Voltage Selector Switch Settings (on back of power supply module)



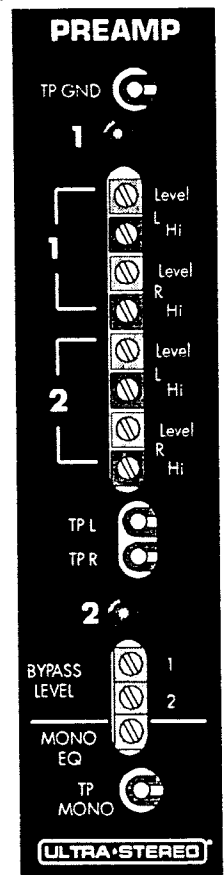
## 4. DESCRIPTION OF MODULES

### OPTICAL PREAMPLIFIER MODULE Model JO-20

This module is divided into three sections: a stereo, a mono, and an emergency mono preamp. Active, transformerless input circuitry is now 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 adjustable high frequency boost circuitry for each input channel to compensate for the scanning slit. With the newer type 0.6 or 0.7 mil slit lenses it is possible to achieve a flat response  $\pm 1$ dB to about 14 kHz. The bottom section is the mono preamp. The 4-8kHz frequency control adjusts the response of the regular mono preamp. The "TP MON" is the output of the regular mono preamp. Level controls are included for adjusting the emergency bypass preamp for projectors "1" and "2".

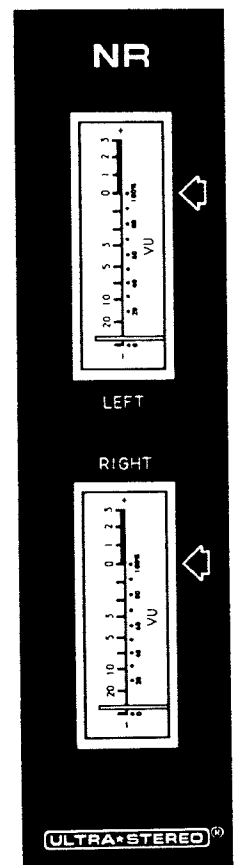


### NOISE REDUCTION MODULE Model JNR-10

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 soundtracks. It is a unique four band expander quite unlike any other competitive system. The accuracy of decoding is  $\pm 1$  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 left and right outputs are

routed to the Matrix module via the rear panel "NR OUT - MATRIX IN" terminal block. The SUM and DIFFERENCE outputs are routed to the Format module via the rear panel "MODE" DIP switches.



## 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.

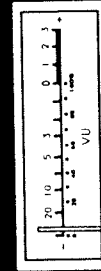
A VU meter is included on the front panel to permit the installer to balance the Left and Right preamp channels accurately, in order to minimize the leakage of dialog into the surround channel. The crosstalk of the matrix is illustrated to the right:

Inputs	Matrix Outputs (dB)			
	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 "MODE" DIP switches are off when a matrix card is inserted. for L,R,S or L,R,C,S operation. otherwise the surround channel signal will be low and distorted.

## MATRIX



SET FOR  
MINIMUM  
READING

ULTRA\*STEREO®

## 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.

## SYN

SURROUND



SIGNAL

SURROUND



SENSITIVITY

ULTRA\*STEREO®

## FORMAT MODULE Model JFM-05

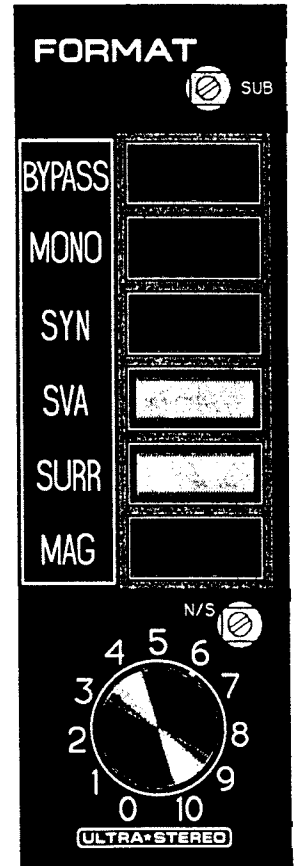
The Format module controls all the switching within the JS processors. The circuitry selects **BYPASS**, **MONO**, **SYNTHESIZED STEREO**, **SVA STEREO**, **SURROUND**, or **EXTERNAL INPUT** modes. The module is designed for sustained automation switching, with all switching done electronically. In case 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 push-buttons 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.

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 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 k $\Omega$  resistors in series with the inputs when using high output tape or digital disc players. Left and right Non-Sync inputs are fed directly to the equalizers, then to the power amplifiers. The left and right inputs 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.



## FORMAT MODULE Model JFM-10

The Auto Format module controls all of the the processor switching. The circuitry selects **BYPASS**, **MONO**, **SYNTHESIZED STEREO**, **SVA STEREO**, **FUTURE**, or **EXTERNAL INPUT** modes. Automation pulses trigger opto-isolated lines which in turn activate mode switching and illuminate the corresponding front panel LED's. If the automation system fails, the front panel momentary push buttons will override automation pulses, switching the processor into the proper mode. A terminal block on the rear of the processor will power external mode indicating LED's for use in remote switching panels.

**NOTE: The push buttons will not override a sustained automation signal.**

A subwoofer circuit in the Auto Format module sums the left, center, and right channels and sends them through a 20 Hz to 60 Hz band pass circuit. The subwoofer level is controlled by the 'SUB' trimpot near the top of the Auto Format module. Delayed turn-on and instant turn-off of the output prevents powering-up transients from reaching the power amplifiers and loudspeakers, except if the **BYPASS** format is selected.

**AUTO-STEREO - ON/OFF** switches stereo sensing circuitry on the JFM-10. When activated, the circuit will switch the processor to **SVA STEREO** mode automatically whenever it senses stereo information lasting at least one second.

**SURROUND - ON/OFF** switches the surround channel on or off. Switching the surround channel off causes the surround channel information to be fed equally to the left and right channel outputs.

**FADER - LOCAL/REMOTE** selects either the front panel main fader or a remote fader.

**BYPASS** mode disables all electronic switching and active circuitry, feeding the emergency bypass preamp output to the main volume control and directly to the

left, center, and right channel output terminals.

**N/SYNC** mode fades stereo intermission music smoothly in when activated. The 2 channel Non-Sync input is routed through the Format and Equalizer modules. The 'N/SYNC' trimpot on the Auto Format module controls the intermission music level. The left and right signals are summed and sent to the center channel, and the left minus right signal is sent to the surround channel.

**EXT** mode enables the four line level (0 dB) inputs and routes them through the Format and Equalizer modules. In this mode, the surround channel bypasses the Surround Delay circuit, and the Surround Indicator LED is not illuminated.

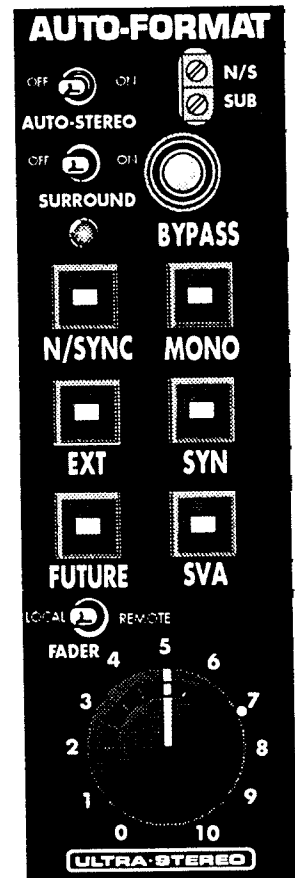
**MONO** mode routes the mono signal from the Optical Preamp through the Format and center channel Equalizer modules. In this mode the surround channel is not activated.

**SYN (PINK\*)** mode selects the Stereo Synthesizer module (when present). The signal is routed from the Optical Preamp through the Synthesizer, Format and Equalizer modules.

\*In the model JSX-1000 there is no provision for a Stereo Synthesizer. When a Pink Noise Module is plugged in to the JSX-1000, pressing the PINK button will route the pink noise signal to the appropriate channel.

**SVA** mode routes the stereo signal from the Optical Preamp through the Noise Reduction, Matrix, Format, and Equalizer modules.

**FUTURE** mode is programmed for "SR" optical stereo. Pressing "FUTURE" will switch in the SR noise reduction and feed the signal to the Matrix, Format, and Equalizer modules.



### **IMPORTANT!**

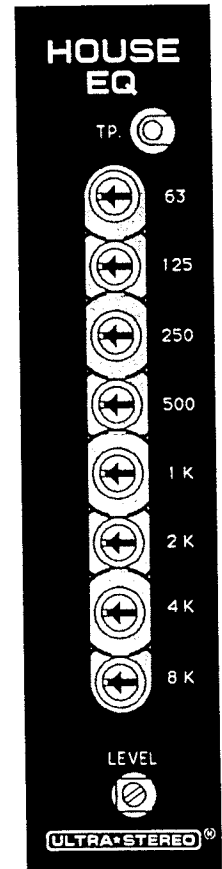
*If a remote fader is not installed, setting the fader switch to REMOTE will MUTE the SOUND SYSTEM.*

## 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  $\pm 12$  dB. The frequencies 125 Hz through 4 kHz have bandpass equalizers with an adjustment range of  $\pm 6$  dB. There is also an additional boost from 8 to 12 kHz to compensate for screen losses.

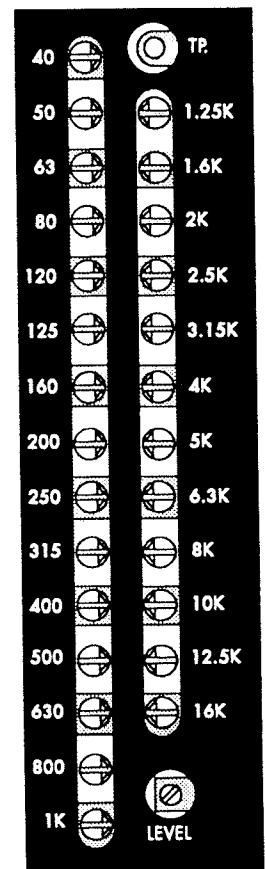
There is a test point at the top of the Equalizer module for feeding in Pink Noise at "0" dB from an external source for setting auditorium equalization and sound pressure level. The ULTRA\*STEREO plug-in Pink Noise Generator is also usable for this operation directly. This test point can also be used 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 if the BYPASS format is selected.



## HOUSE EQ MODULE Model JEQ-10

The 1/3 Octave Equalizer module has 27 EQ bands, 40 Hz through 12.5 kHz. The 40 Hz and 50 Hz bands are  $\pm 9$  dB bandpass equalizers. The frequencies 63 Hz through 16 kHz are  $\pm 6$  dB bandpass equalizers. The test point at the top of module may be used to monitor the input or to feed a signal through the Equalizer module. The trimpot at the bottom of the module controls the output level. The 1/3 Octave Equalizer module is supplied with a removable security cover which prevents access to the EQ and level adjustments. To remove the cover, unplug the module and loosen slightly the two screws nearest the front / center of the module. Delayed turn-on and instant turn-off of the output prevents powering-up transients from reaching the power amplifiers and loudspeakers, except if the BYPASS format is selected.

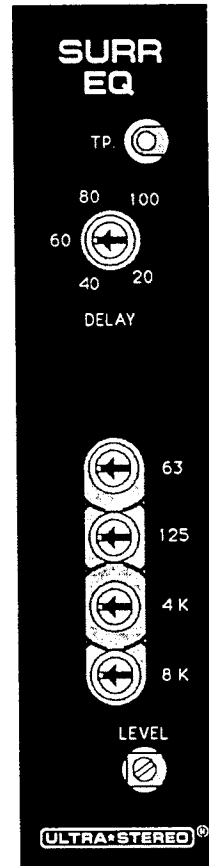


## SURROUND/EQUALIZER MODULE Model JSE-05

The JSE-05 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 15 turn control for setting the output level precisely. The maximum level is 2 volts. The EXTERNAL and NON/SYNC inputs to the processor are fed directly to the equalizer, bypassing the delay circuitry.

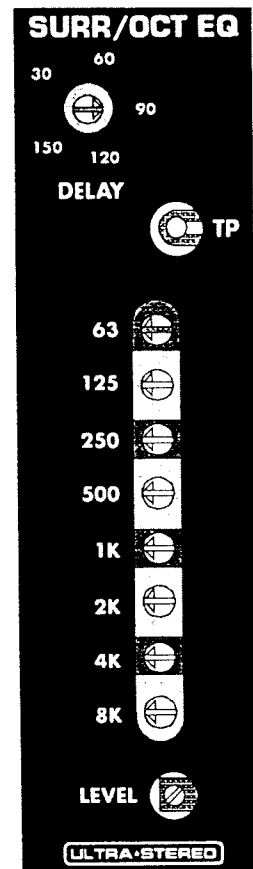


## SURROUND/EQUALIZER MODULE Model JSE-10

The JSE-10 Surround/Octave EQ module has a dual analog delay circuit which has an increased range of 30 to 150 milliseconds. The delay line flat frequency response is also increased to 8kHz. The module has an eight band octave equalizer with boost/cut controls at 63, 125, 250, 1000, 4000 and 8000 Hertz to more precisely tune the surround channel speakers. The 63Hz and 8kHz adjustments are not shelving type controls as in the JSE-05 Surround/Equalizer. The JSE-10 has delayed turn-on and instant turn-off, as in the JSE-05.

The test point near the top of the module 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 15 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.

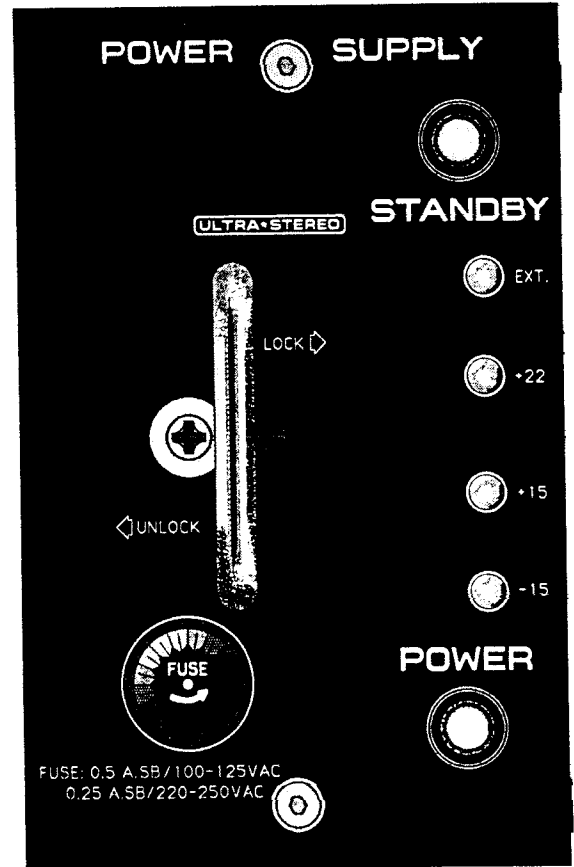


## POWER SUPPLY MODULE Model JPS-05

The Power Supply Module generates the main  $\pm 15$  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  $\pm 15$  volt DC supply with a capacity of no less than 500 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

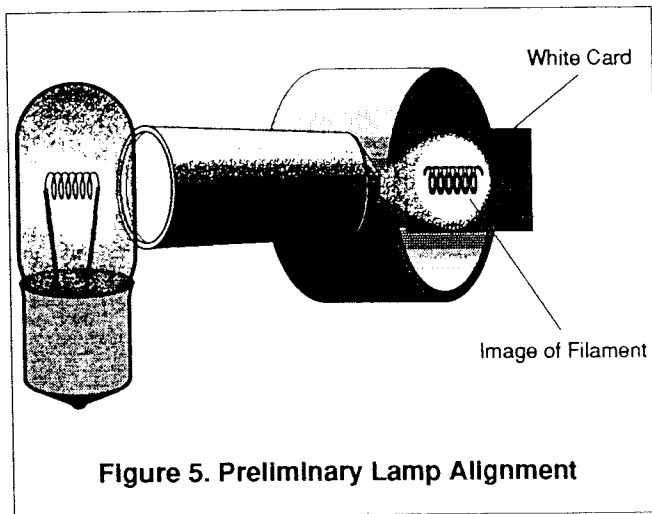
## PRELIMINARY ALIGNMENT

(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.

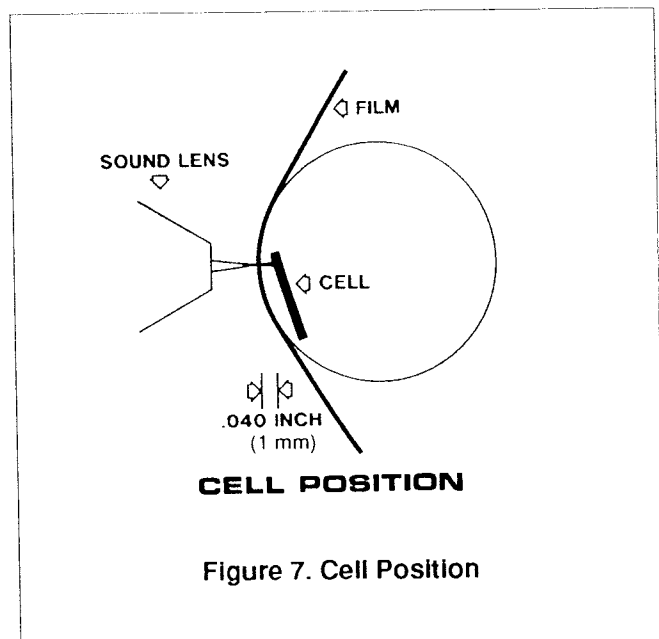
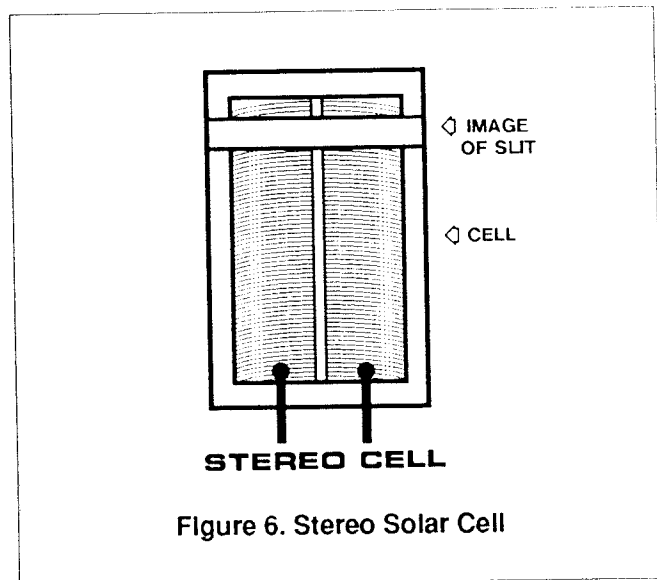
(D) For stereo installations, remove the mono solar cell and place a white card about an inch away from the sound lens. The image of the exciter lamp filament should look like *Figure 5*. If necessary, raise or lower the lamp and move it in and out until the filament is centered in the spot of light.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



is evenly illuminated, thereby producing the least distortion in playback.

## 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*.

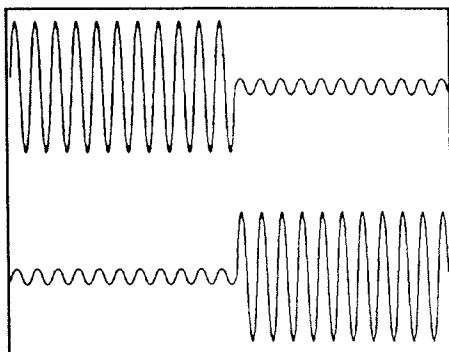




**(B)** Install the audio line from the cell to the OPTICAL PREAMP. Use Belden N° 8404 or equivalent four conductor twin shielded cable, or a pair of two conductor shielded cables such as Belden N° 8451. (A single two conductor shielded cable is not recommended.) Connect the lines to the terminal block 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)** Make sure all of the high frequency 15 turn trimpots are set fully COUNTER-clockwise. 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 and 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.



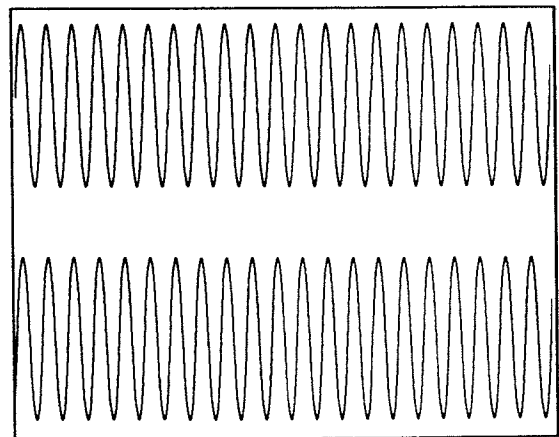
**Figure 8. Minimum Crosstalk Results When This Display Appears On Dual-Trace Scope:**  
Source is ALTERNATING LEFT/RIGHT test film  
(Measured at Preamp TP-L, TP-R & GND)

**(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% tone at 1 kHz and 50% modulated pink noise. These tones should read the same on the VU meters,  $\pm 2$  dB.

**(G)** Double check the cell alignment by running a 100% STEREO ALIGNMENT 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



**Figure 9. Double-Check of Alignment**  
Displayed On Dual-Trace Scope:  
(Measured at Preamp TP-L, TP-R & GND)

into the surround loudspeakers.

**(H)** Connect a REAL TIME ANALYZER to the test jack "TP L" on the PREAMP. Run a FOCUS 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 to keep 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) Once the projector is adjusted, raise the high frequency controls until a flat response  $\pm 1$ dB is observed on a REAL TIME ANALYZER with the pink noise loop. At the

same time look at the phase relationship between LEFT and RIGHT channels. The high frequency controls not only adjust the high frequency levels, but also shifts the phase. Make sure the phase between LEFT and RIGHT channels is as thin a line as possible, even if the high frequency responses are slightly different. Phase differences between left and right channels cause dialog leakage in the surrounds. With the newer type 0.6 or .047 mil slit lenses it is possible to achieve a flat response  $\pm 1$ dB to about 14kHz. MAKE SURE THE LENS AND SOLAR CELL IS CLEAN, since a small amount of oil can substantially reduce high frequency output.

(K) Connect the REAL TIME ANALYZER to the test point "TP MON" and adjust the 4-8kHz control on the PREAMP for the response shown in Figure 12.

(L) The curve in Figure 12, plus the auditorium rolloff, approximately equals the standard Academy Curve.

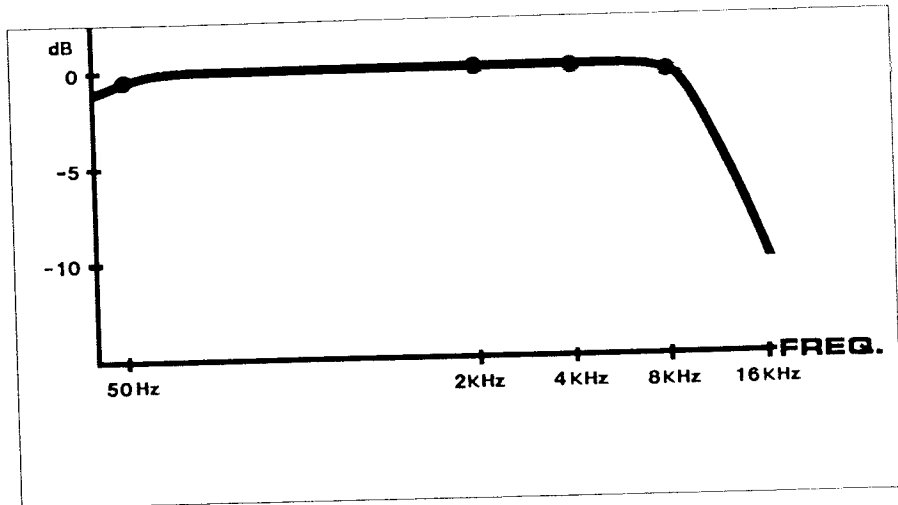


Figure 10. Checking High Frequency Response on a Real Time Analyzer With a Focus, "P Tone" or Pink Noise Source: (Measured at Preamp TP-L)

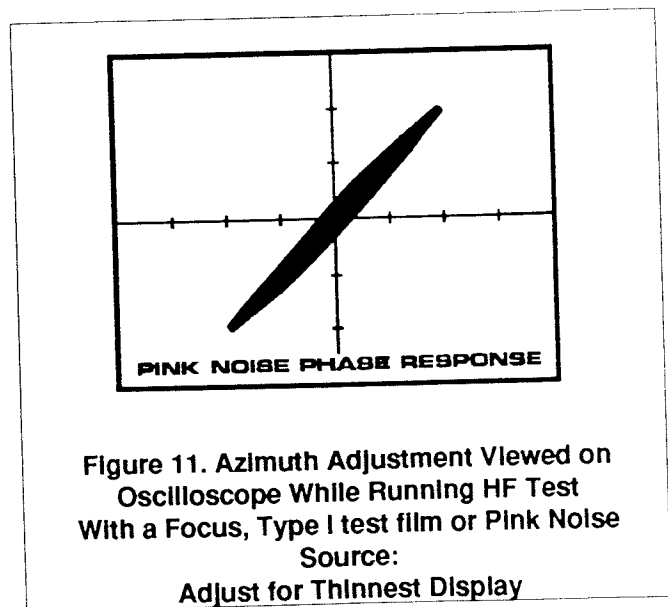


Figure 11. Azimuth Adjustment Viewed on Oscilloscope While Running HF Test With a Focus, Type I test film or Pink Noise Source: Adjust for Thinnest Display

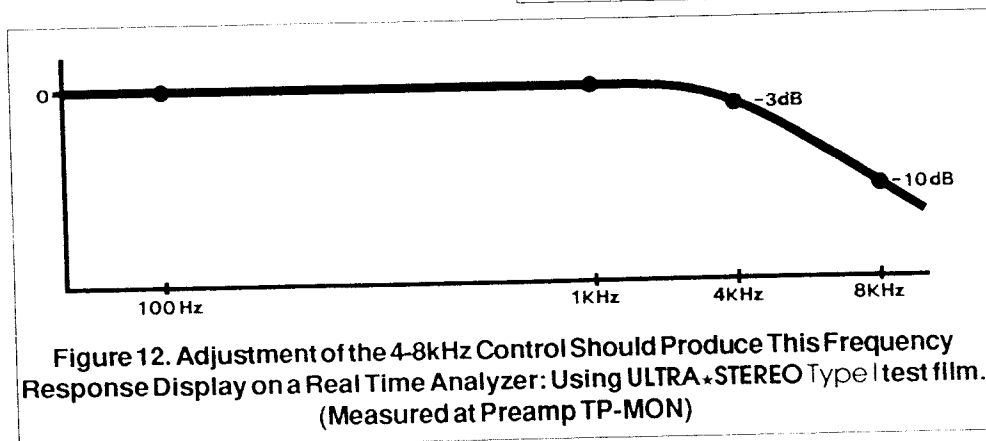


Figure 12. Adjustment of the 4-8kHz Control Should Produce This Frequency Response Display on a Real Time Analyzer: Using ULTRA\*STEREO Type I test film. (Measured at Preamp TP-MON)

## 6. SETUP PROCEDURES

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### (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  
FORMAT  
EQUALIZER – Center channel only  
SURROUND EQUALIZER  
POWER SUPPLY

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.

### (B) SETUP OF FRONT/BACK SYSTEMS WITH STEREO SURROUNDS: JS-165-3, JS-175-3

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)  
SURROUND EQUALIZER  
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 for each Stereo Surround EQ module should be set for 82 dB SPL so that the Surround level will be 85dB SPL when the Left and Right Surround Channels are on together. Left or Right channel information from the film soundtrack will come out of the Center and appropriate Surround channel.

### (C) 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  
FORMAT  
EQUALIZERS – Left and Right channels  
SURROUND EQUALIZER  
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.

### (D) 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  
FORMAT CARD  
EQUALIZERS – Three channels  
SURROUND EQUALIZER  
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.

### (E) 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.

(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 aberrations 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.

#### (F) 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 (0 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

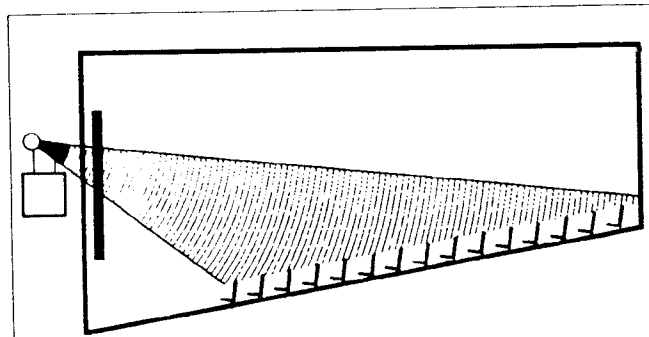
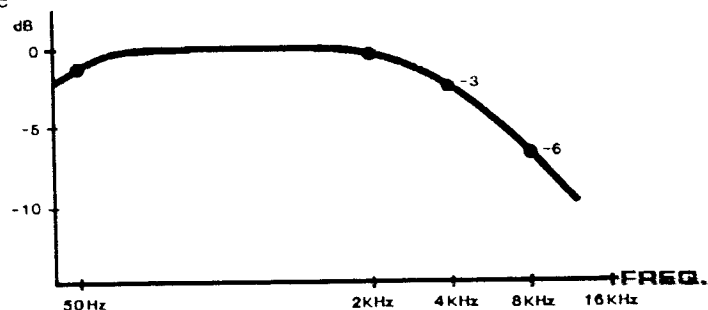


Figure 13. High Frequency Horn Aiming For Optimum Coverage Throughout Theatre

**NOTE!** With the JFM-05 FORMAT MODULE 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 15 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 15 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



LEVEL pot on the EQUALIZER module.

(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. 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.

### (G) 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 1, 50%-level loop on the Projector. Set the master fader to "7". 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 – JFM-05

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 JFM-05 Format module must be OUT! (i.e. off). Pressing any button on the Format module will override the automation control!

The logic in the JFM-05 unit is the sustained type, not momentary. The JS automation lines will feed 10 milliamperes to Earth Ground, so that it is possible to put an LED in series with the automation line as a mode indicator.

### (C) AUTOMATION SETUP – JFM-10

The JFM-10 Auto-Format module is designed for use with pulsed automation systems. By pulsing an automation terminal to "E" (system ground) the processor selects that mode.

**NOTE:** The buttons on the front of the JFM-10 WILL NOT override a sustained grounding of any automation terminal. Make sure the automation system is PULSING into each mode and is not making a sustained contact.

The JFM-10 will drive external mode indicating LED's through the "Automation LED Lines" terminal block.

### (D) REMOTE VOLUME

Connect a 10 k $\Omega$  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:** With the JFM-05 Format module, 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).

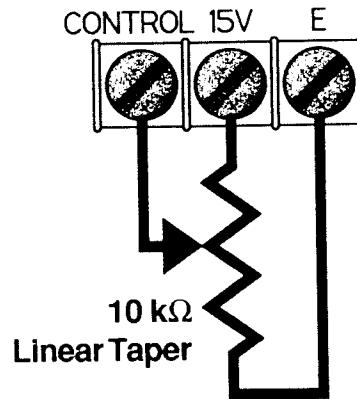


Figure 16. Circuit For Remote Master Volume Control

### (E) 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 earth 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 k $\Omega$  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 the "N/S" trimpot on the FORMAT module. In order to activate the fade in circuit, connect the "N/S" automation terminal to an "E" terminal or select "N/SYNC" on the JFM-10 FORMAT module. Opening the connection (or selecting another mode on the JFM-10 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.

## **(F) 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 "7", 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.

## **(G) USE OF PINK NOISE ALIGNMENT CARD, Model JPN-10**

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 **MASTERFADER** at "7" and set the room level for roughly 85 dB. Equalize each channel as described in section 6E on page 17. 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.

## **(H) OVERALL SYSTEM CHECK**

Place a **Cat. 151(b)** Test Film in the Projector. With the Main Fader set at "7", 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  $\pm$  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,  $\pm$  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 POWER 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 STANDBY button on the supply should be OUT unless you are using an external supply. **Do NOT under any circumstance use the STANDBY 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 "Standby Power" terminal block on the rear of the processor. 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 JFM-05 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 or 7 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 configured for 2, 3 & 4 channel operation. 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 "External Mag Inputs" terminal block on the rear of 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.

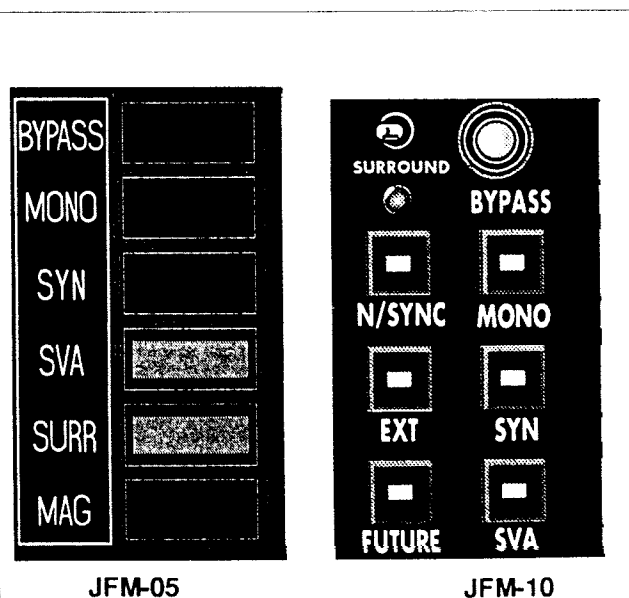


Figure 17. Select the Operating Mode Using the FORMAT Module



## 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  Power cord  Power supply fuse	Reset circuit breaker or replace fuse.  Make sure power cord is firmly seated.  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  Failure of a module.  Failure of the Power Supply.	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.  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.  If the + and -15 V LED's will not both light then replace the Power Supply.
SOUND SYSTEM DOES NOT WORK and + and -15V 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 $\pm 15$ V supply is connected.	Power amplifiers  Change-over  Exciter lamp  Stereo solar cell on projector  "VU" meters on the NR module  Press BYPASS mode Note: This mode puts sound in all three front channels.  Incorrectly set Voltage Selector Switch on 115v line.	Make sure amplifiers are operating and volume controls are up.  Switch change-over to operating projector. LED lights on the Preamp indicate which projector is in use.  Replace bulb or repair exciter supply.  Make sure the solar cell is illuminated and clean. Use compressed air. DO NOT USE ORGANIC SOLVENTS OR ALCOHOL.  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 unit, the unit wiring, the power amplifiers, or the loudspeakers.  If sound comes out of the three front speakers, then the problem is in the JS unit. If there is no sound, the problem is somewhere else.  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	<p>Press BYPASS mode</p> <p>Press other mode switches</p>	<p>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.</p> <p>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 TROUBLE-SHOOTING.</p>
NO SOUND IN SURROUND CHANNEL	<p>Power amplifier</p> <p>Speakers or wiring</p> <p>Press SYN or SVA and SURR then try NON/SYNC MUSIC</p> <p>Setting of DELAY on SURR/EQ module.</p>	<p>Replace speaker fuse or main fuse, replace amplifier.</p> <p>Speakers are often series connected so if one fails they all will not work.</p> <p>If NON/SYNC MUSIC plays but the SYN or SVA and SURR does not, there is a problem in the SURR/EQ module.</p> <p>Move the adjustment pot for the DELAY to see if the delay line starts working.</p>
SOUND IS DISTORTED	<p>Power amplifier or speaker</p> <p>Press several mode switches</p> <p>Try NON/SYNC MUSIC</p> <p>SVA and SURR mode</p> <p>SYN and SURR mode</p> <p>Exciter lamp</p>	<p>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.</p> <p>Try to determine if one or all modes are distorted. If all are distorted swap HOUSE EQ modules.</p> <p>If MUSIC is not distorted the problem is in the PREAMP, the SOLAR CELL alignment, or FORMAT module.</p> <p>If there is distortion only in this mode then there could be a problem in the NR or MATRIX modules.</p> <p>If there is distortion only in this mode then there is a problem with the SYN module.</p> <p>Make sure correct lamp is used. There are vertical and horizontal versions of many exciter lamps.</p>
HUM IN ALL CHANNELS	<p>Stray light pickup at the solar cell on the projector. PREAMP module.</p> <p>Wiring between JS 5/95 unit and power amplifiers.</p>	<p>Eliminate source of stray light.</p> <p>Eliminate cause of hum ground loops, bad exciter lamp supply, JS unit located too near hum field from power amplifier or another piece of equipment.</p> <p>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.</p>

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  SURR/EQ 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.  If unplugging this card stops the buzz, there is a problem in the module.
	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.
SYN MODE-SURROUNDS ARE ON ALL THE TIME	Solar cell or wiring	Re-align solar cell or check that the cell wiring is not broken or shorted on one channel.
SVA MODE-SOUND FROM LEFT OR RIGHT CHANNEL ONLY.	"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/or preamp level and hi frequency boost settings	Re-adjust soundhead azimuth and reset preamp levels and high frequency boost with test film.
	Soundhead guide rollers  SURR/EQ module	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.  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  SURR/EQ module	There are two DIP switches marked "X" and "Y". These must be OFF when a MATRIX module is plugged into the JS unit.  If the problem persists replace the module.

**NOTE: A monitoring system such as the *ULTRA\*STEREO CM-35* 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 fluorescent 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 12 and 13) 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.

Figure 18. If Modules are difficult to remove use a small screwdriver positioned under the RIGHT FRONT edge of the module cover to loosen it from it's card edge connector.

**WARNING: ULTRA\*STEREO Type 1 test film is supplied on Polyester Support in order to give the user long term usefulness and reliability due to freedom from shrinkage. This base material is far stronger than Cellulose 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, from the use of these films.**

### Test Films...

#### Type 1 - For installation and major realignment:

a) 1 kHz tone at 50% Modulation. Set the Noise Reduction Meters to read 0 at 1 kHz. The other tones should read  $0 \pm 1$  dB.

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. The 'A' chain should read flat  $\pm 2$  dB between 50 Hz & 10 kHz. The 'B' chain should read  $\pm 3$  dB between 100 Hz & 10 kHz in accordance with ANSI PH22.202M & ISO 2969.

#### Dolby Cat. No. 97

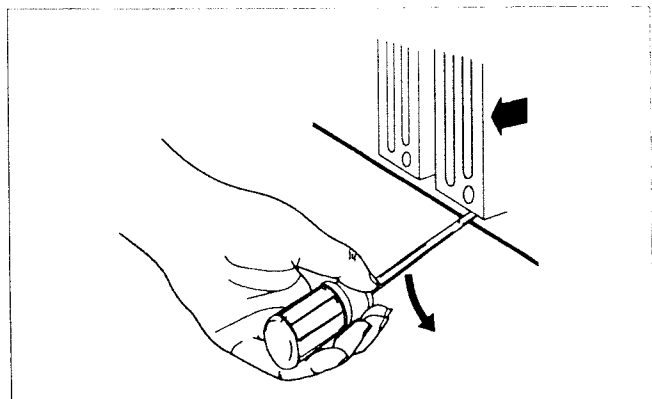
1 kHz alternating between tracks 1 & 2 at 100% Modulation. Both tracks should show clean waveforms on an oscilloscope.

#### SMPTE Buzz Track

For preliminary solar cell alignment.

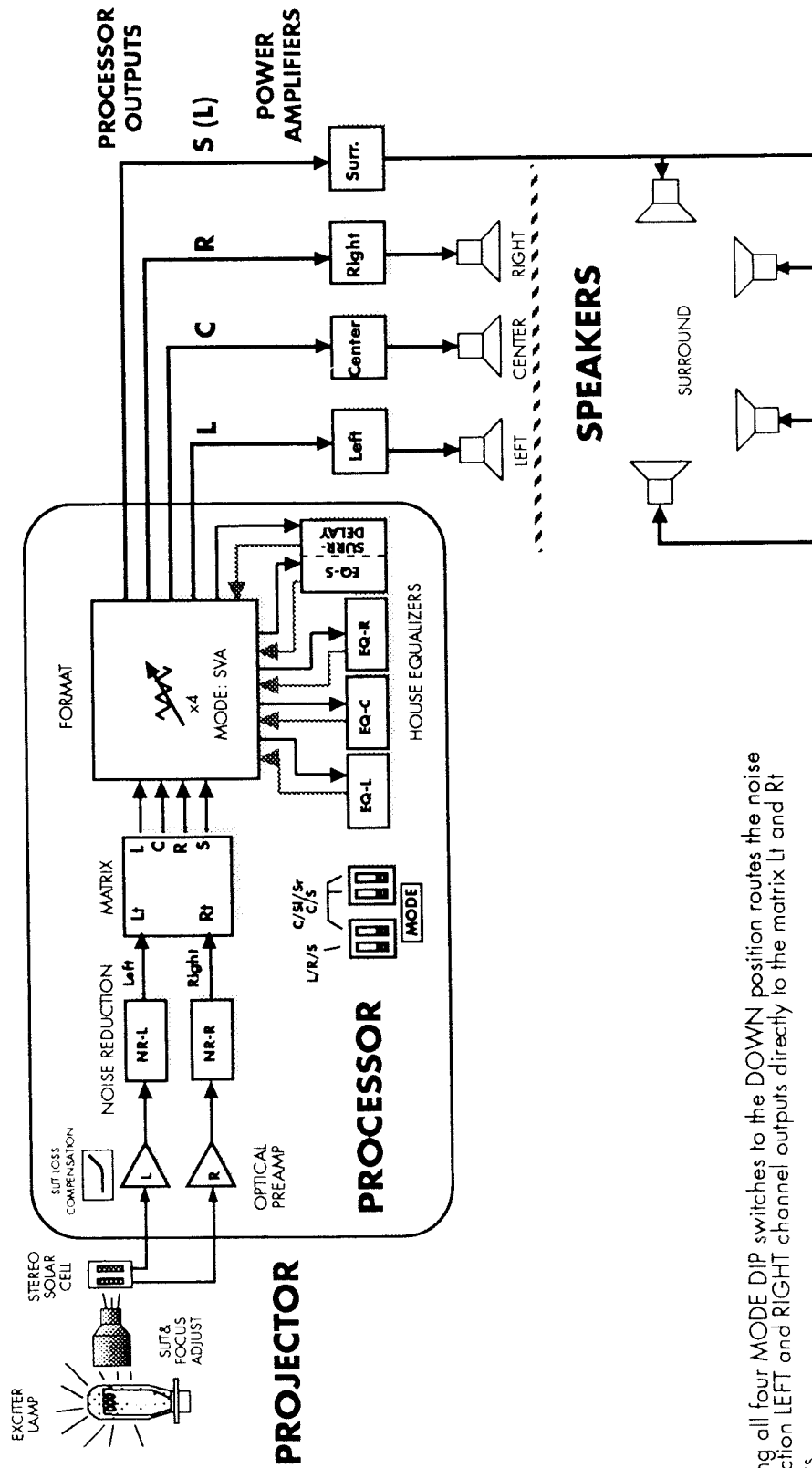
**Dolby Cat. No. 151** - For overall performance verification:

Alternating center and surround pink noise that is band limited.



# 11. BLOCK DIAGRAMS

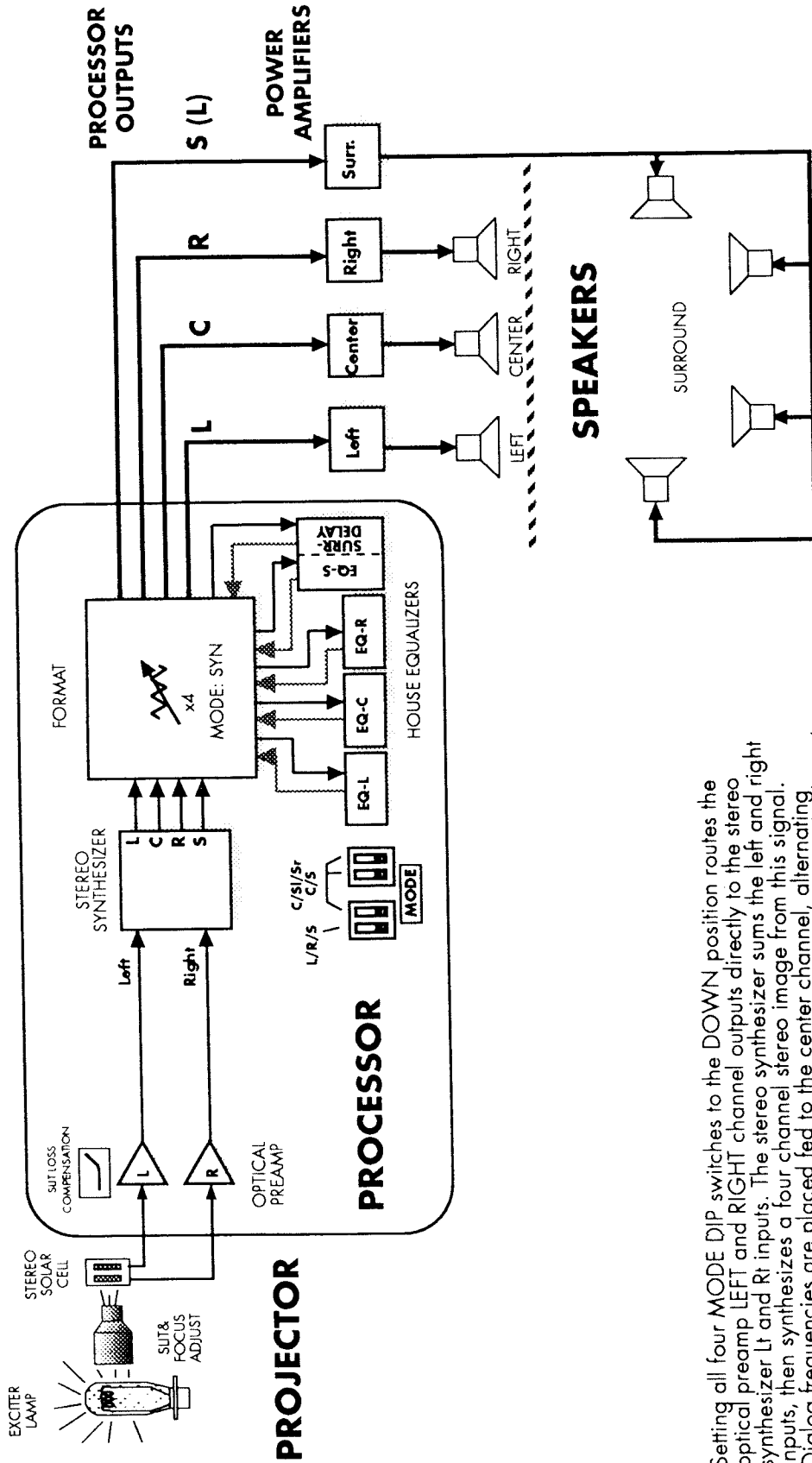
## Four Channel SVA Mode Block Diagram



Setting all four MODE DIP switches to the DOWN position routes the noise reduction LEFT and RIGHT channel outputs directly to the matrix Lt and Rt inputs.

**SVA MODE**  
 four channel 35mm optical stereo decoding  
 MODELS: JS-165, JS-175, JS-185, JS-195, JSX-1000

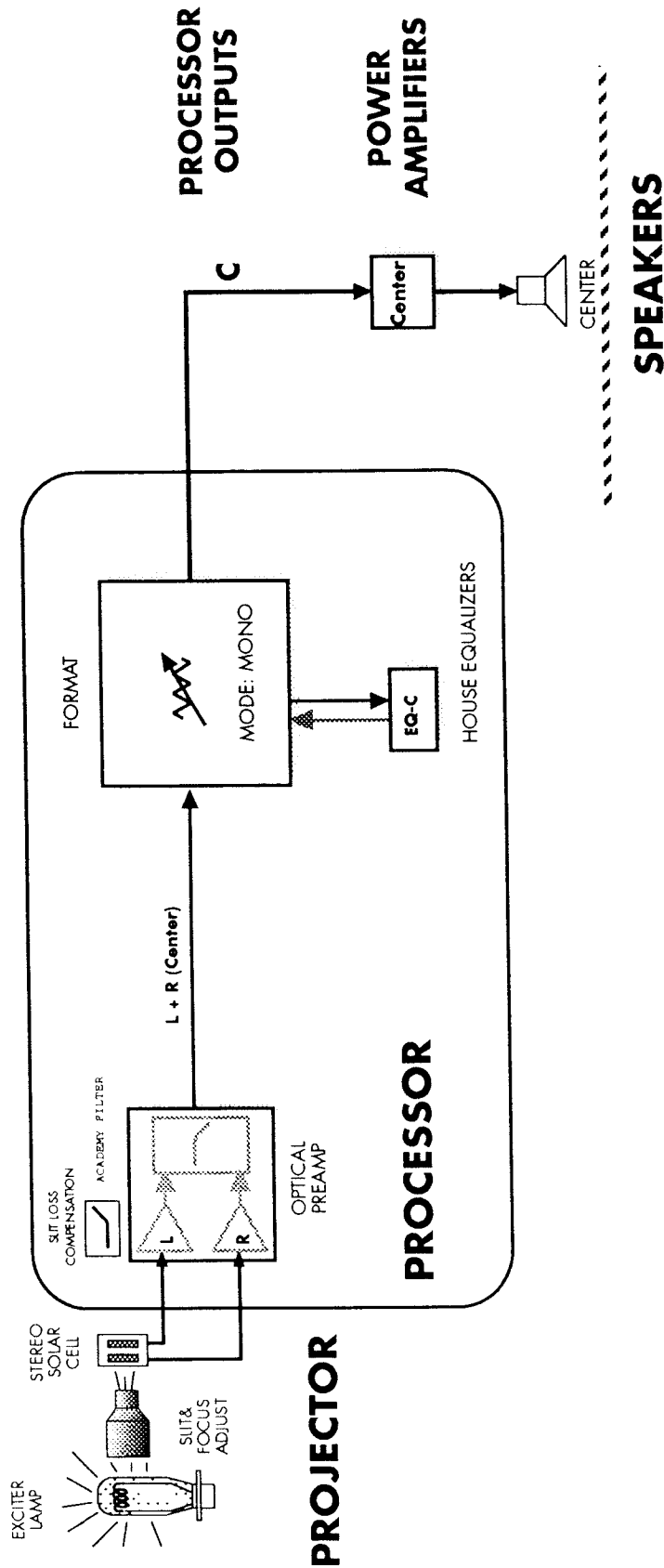
# Four Channel SYN (Synthesize) Mode Block Diagram



Setting all four MODE DIP switches to the DOWN position routes the optical preamp LEFT and RIGHT channel outputs directly to the stereo synthesizer Lt and Rt inputs. The stereo synthesizer sums the left and right inputs, then synthesizes a four channel stereo image from this signal. Dialog frequencies are placed fed to the center channel, alternating frequency bands are fed to the left and right channels, and very high and very low frequencies are fed to the surround channel. The stereo synthesizer sensitivity adjustment is used to keep dialog out of the surround channel and should be set just below the point where dialog is heard in the surround channel.

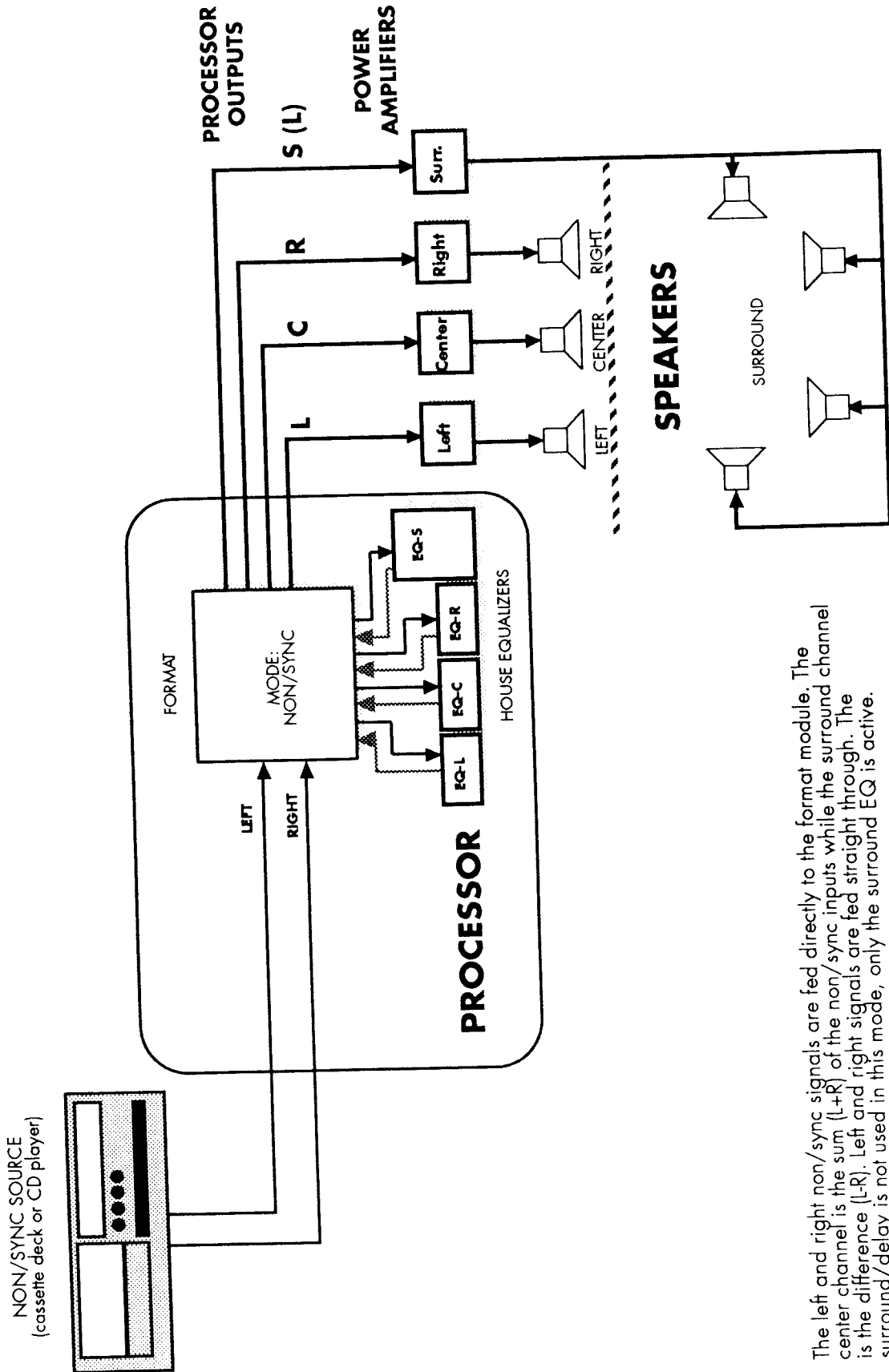
**SYN MODE**  
 Four channel 35mm optical playback  
 MODELS: JS-175, JS-195

# MONO Mode Block Diagram



**MONO MODE**  
 35mm optical stereo playback  
 MODELS: JS-105, JS-115, JS-125, JS-165, JS-165-3, JS-175,  
 JS-175-3, JS-185, JS-195, JSX-1000 and JB-2

# Four Channel Non/Sync Mode Block Diagram

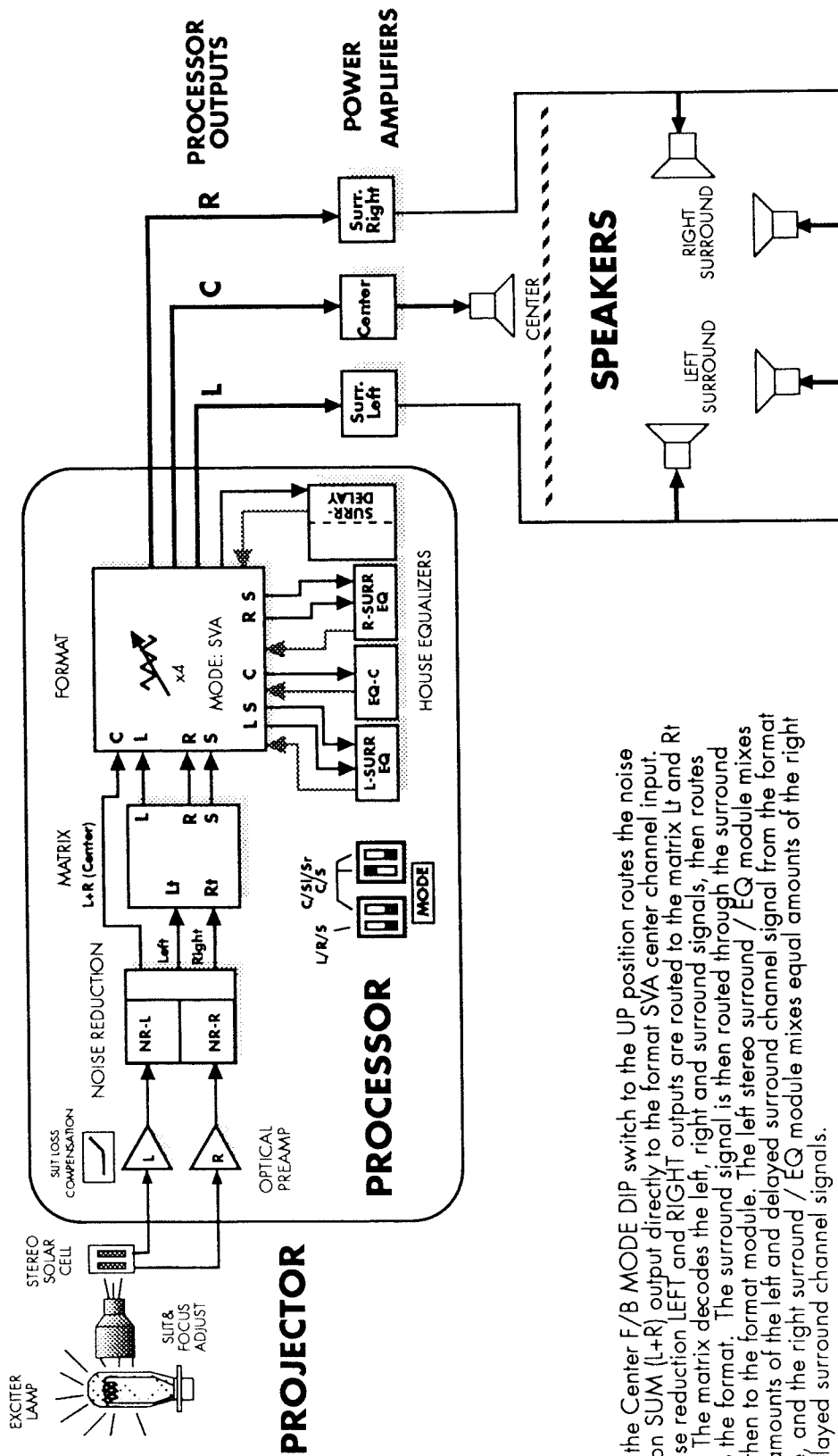


The left and right non/sync signals are fed directly to the format module. The center channel is the sum (L+R) of the non/sync inputs while the surround channel is the difference (L-R). Left and right signals are fed straight through. The surround/delay is not used in this mode, only the surround EQ is active.

**NON/SYNC MODE**  
 four channel playback  
 MODELS: JS-165, JS-175, JS-185, JS-195, JSX-1000



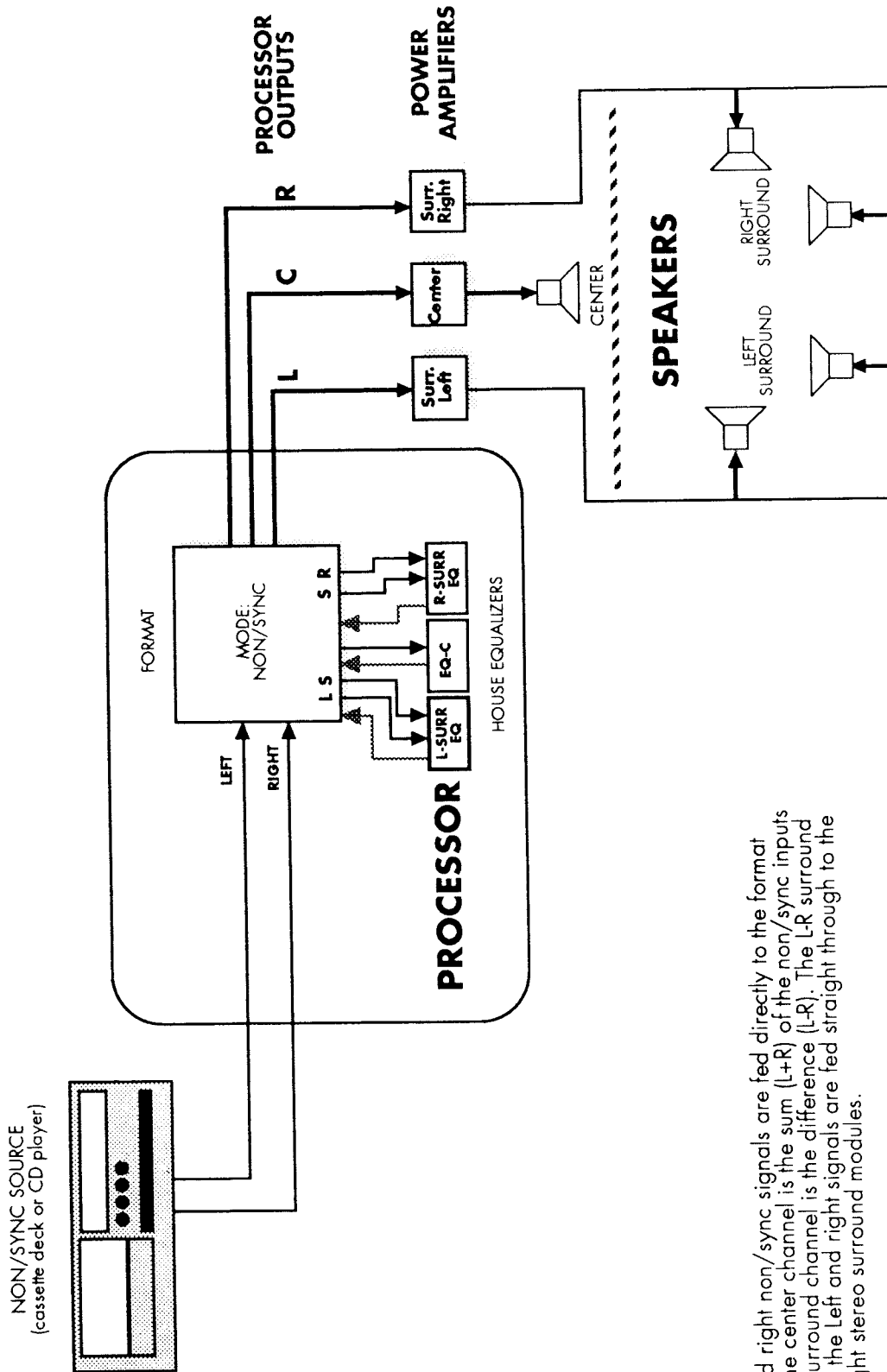
# Three Channel SVA Mode Block Diagram



Setting the Center F/B MODE DIP switch to the UP position routes the noise reduction SUM (L+R) output directly to the format SVA center channel input. The noise reduction LEFT and RIGHT outputs are routed to the matrix Lt and Rt inputs. The matrix decodes the left, right and surround signals, then routes them to the format. The surround signal is then routed through the surround delay, then to the format module. The left stereo surround / EQ module mixes equal amounts of the left and delayed surround channel signal from the format module, and the right surround / EQ module mixes equal amounts of the right and delayed surround channel signals.

**SVA MODE**  
 three channel split surround  
 35mm optical stereo decoding  
 MODELS: JS-165-3 and JS-175-3

# Three Channel Non/Sync Mode Block Diagram



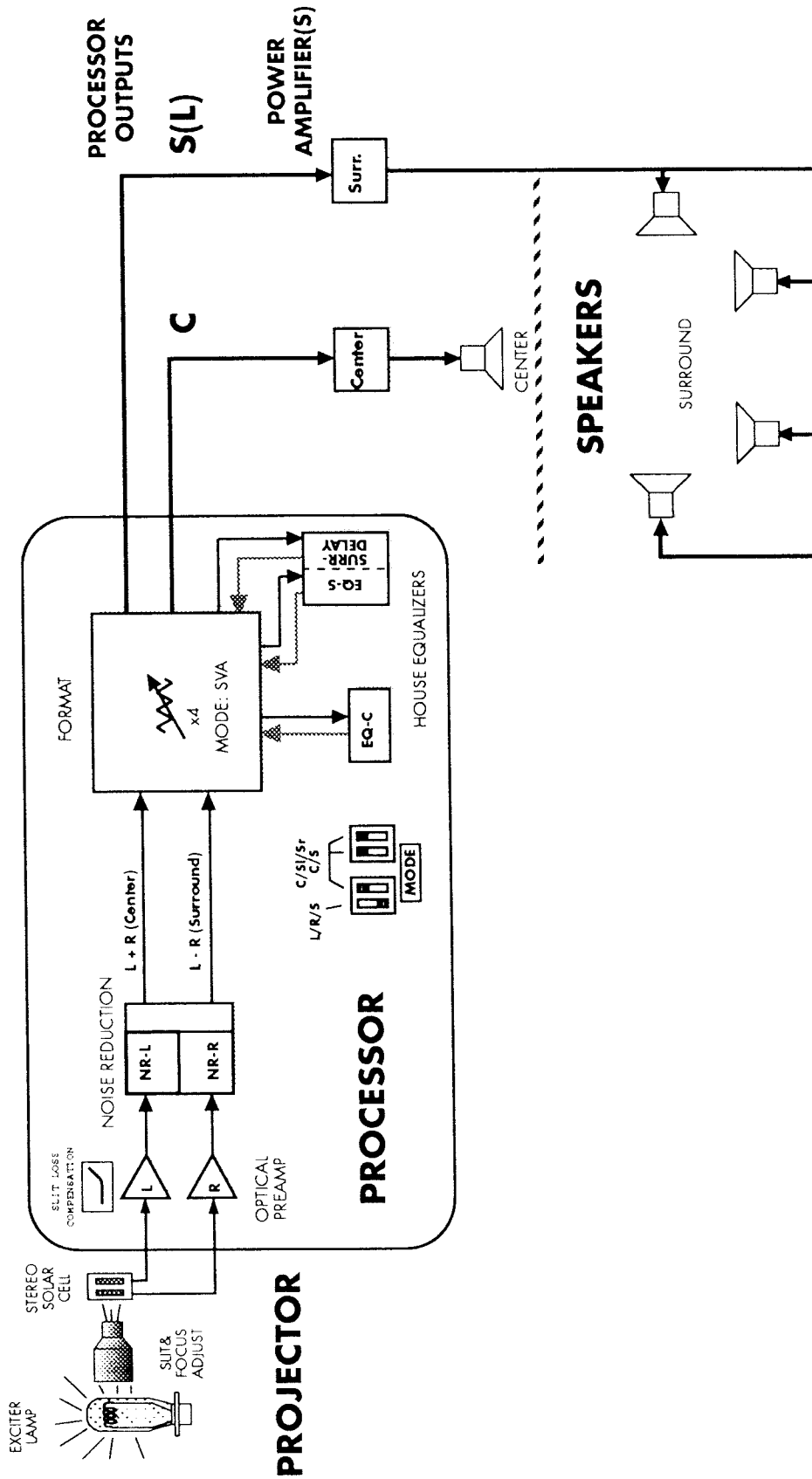
The left and right non/sync signals are fed directly to the format module. The center channel is the sum (L+R) of the non/sync inputs while the surround channel is the difference (L-R). The L-R surround signal and the Left and right signals are fed straight through to the left and right stereo surround modules.

## **NON/SYNC MODE**

three channel split surround playback

MODELS: JS-165-3 and JS-175-3

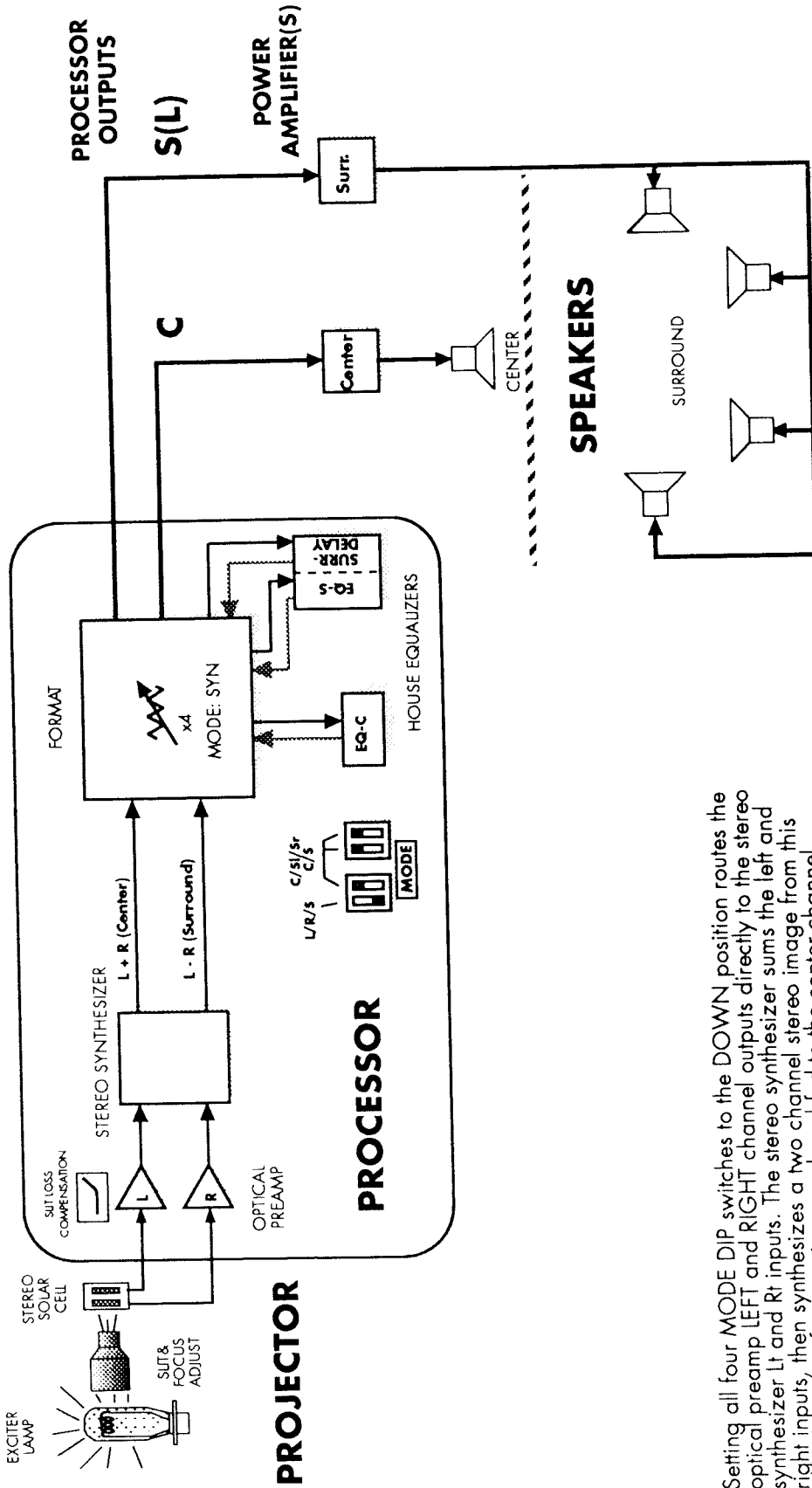
# Two Channel SVA Mode Block Diagram



Setting all three F/B DIP switches to the UP position routes the noise reduction SUM and DIFFERENCE outputs directly to the format SVA center and SVA surround inputs.

**SVA MODE**  
 two channel (front/back) 35mm  
 optical stereo decoding  
 MODELS: JS-115, JS-125

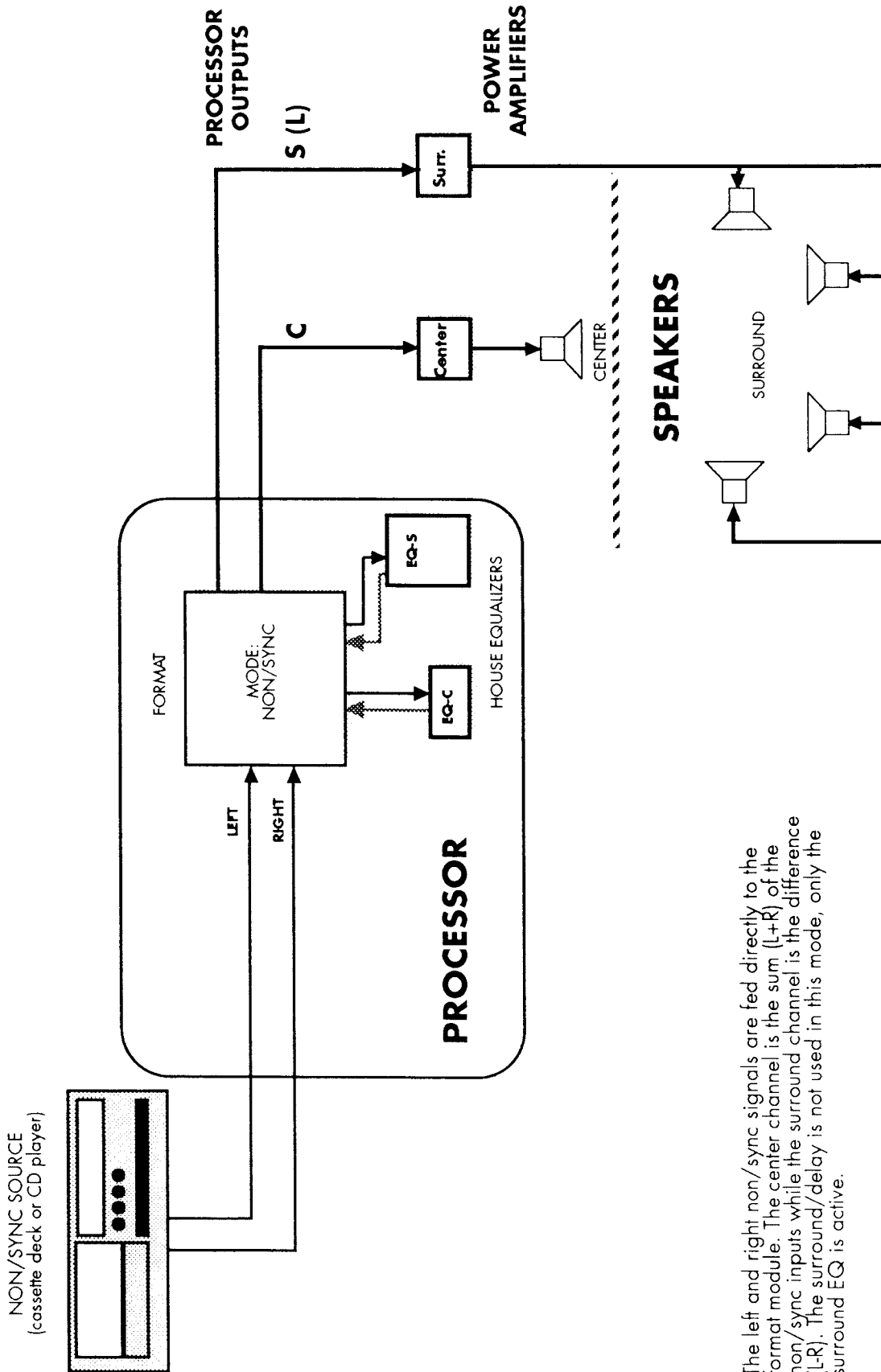
# Two Channel SYN Mode Block Diagram



Setting all four MODE DIP switches to the DOWN position routes the optical preamp LEFT and RIGHT channel outputs directly to the stereo synthesizer Lt and Rt inputs. The stereo synthesizer sums the left and right inputs, then synthesizes a two channel stereo image from this signal. Dialog frequencies are placed fed to the center channel, alternating frequency bands are fed to the center and surround channels, and very high and very low frequencies are fed to the surround channel. The stereo synthesizer sensitivity adjustment is used to keep dialog out of the surround channel and should be set just below the point where dialog is heard in the surround channel.

**SYN MODE - JS-125**  
 two channel (front/back) 35mm optical playback  
 MODEL: JS-125

## Two Channel Non/Sync Mode Block Diagram



The left and right non/sync signals are fed directly to the format module. The center channel is the sum (L+R) of the non/sync inputs while the surround channel is the difference (L-R). The surround/delay is not used in this mode, only the surround EQ is active.

**NON/SYNC MODE**  
two channel playback  
MODELS: JS-115, JS-125 and JB-2



