

Film-Tech

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JS-200 SERIES

INSTRUCTION MANUAL



ULTRA★STEREO®

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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 digital playback formats. 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 on 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.

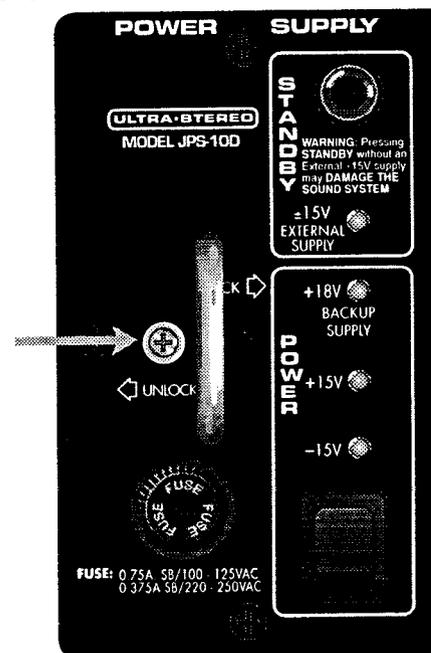
**Please read this entire manual
before commencing your
installation.**

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.

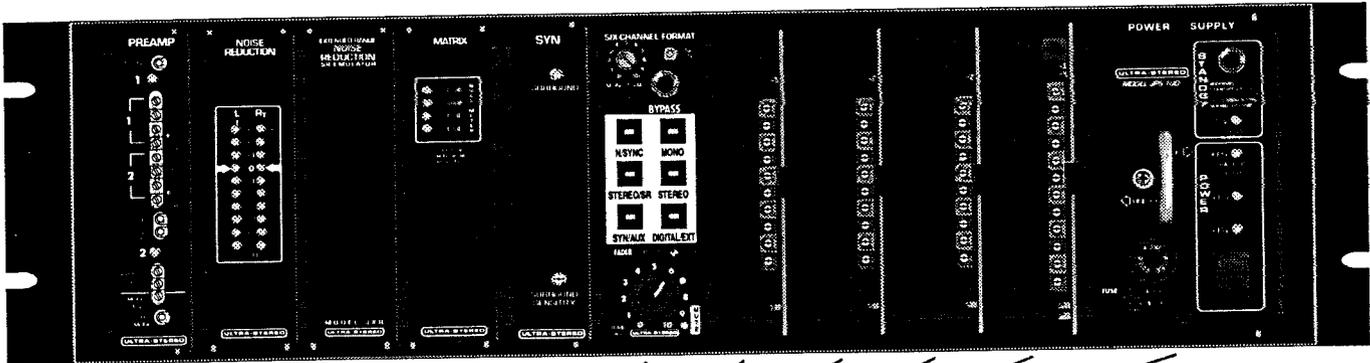
NOTE: The power supply has been secured by a latching bar that locks the unit to the frame, anchored by a #1 phillips head screw on the front panel. To remove the power supply from the frame loosen the screw beneath the handle and slide the latch to the left. The module may now be removed by pulling 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.

Model JPS-10



Note: To remove power supply, loosen screw (see arrow) and slide latch to the left

2. SYSTEM CONFIGURATIONS



	JO-20 Optical Preamp	JNR-10 Noise Reduction	JXR-10 SR Playback	JM-05 Matrix	JFM-20 Six-Channel Format	JEQ-06 Left EQ	JEQ-06 Center EQ	JEQ-06 Right EQ	JSE-20 Surround EQ	JPS-10 Power Supply	
★ JS-200	●	●			●		●			●	Plays mono prints in mono. Includes noise reduction to accurately decode stereo prints.
JS-220	●	●			●		●		●	●	Plays mono prints and decodes stereo prints into center and surround channels.
JS-223	●	●			●		▨		●	●	Same as JS-220, but with 1/3 octave EQ in center channel.
JS-230	●	●		●	●	⊖	●	⊖	●	●	Plays mono prints and decodes stereo prints in three-channel sound with stereo surrounds.
JS-260	●	●		●	●	●	●	●	●	●	Plays mono prints/ decodes stereo prints in four channels/plays digital films in six channels.
JS-263	●	●		●	●	●	▨	●	●	●	Same as JS-260, but with 1/3 octave EQ in center channel.
JS-280	●	●		●	●	▨	▨	▨	●	●	Same as JS-260, but with 1/3 octave EQ in front channels.
JSX-1000A	●	●		⊘	●	▨	▨	▨	●	●	Six channel THX approved processor with deluxe matrix
JSX-1000S	●	●	⊙	⊘	●	▨	▨	▨	●	●	Six-channel deluxe system with SR Playback module.

● =Standard

⊘ =JMX-10 Matrix

⊙ =JXR-10 SR Playback

⊖ =JSS-05 Stereo Surround

▨ =JEQ-10 1/3 Oct EQ

Notes: All units equipped with subwoofer output.

Optional to all units – JSYN-05 Stereo Synthesizer

3. SPECIFICATIONS

FEATURES

- Low noise preamplifier with adjustable high-frequency slit loss compensation circuitry.
- High quality type "A" 4-band noise reduction as well as wide dynamic range SR playback.
- Matrix decoder with 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 digital surround delay with two channels of octave equalization.
- Automation control with remote fader capability.
- Stereo Music fade in and out controllable from the automation.
- Adjustable subwoofer channel output with downward expander to minimize low frequency noise.
- 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 six 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 Ω impedance.

Six digital/external line inputs with a sensitivity of 300mV at 10 k Ω impedance. Four auxiliary inputs with a sensitivity of 775 mV at 30 k Ω input impedance. A Stereo Non-Sync input with a sensitivity of -30 dB at 15 k Ω that feeds all four channels is also provided. It can be faded in or out by automation.

OUTPUTS

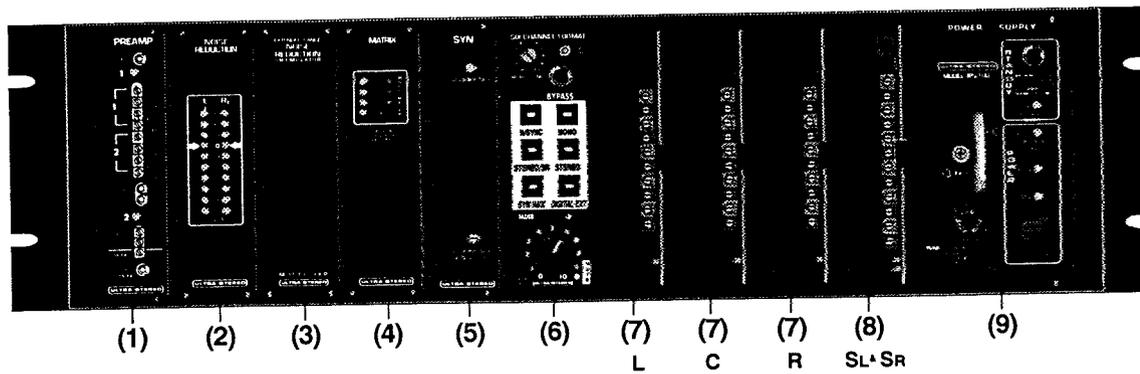
Six outputs corresponding to Left, Center, Right, Surround Left, Surround Right and Subwoofer. Nominal output is 0 dB (0.775 volts). Maximum output is +20 dB. The circuitry will drive 600 ohm loads. The analog subwoofer channel contains a bandpass of 25 Hz - 60 Hz and a downward expander and combines the low frequency information from the three front channels in any analog optical sound track playback mode.

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 0.15% and less than 0.1% with digital/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-260) is 17 pounds (7.7 kg). Shipping weight is approximately 21 pounds (9.5 kg).



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 high frequencies to match the Academy Curve. A backup mono preamp, powered by a separate power supply, is also included.

(2) NOISE REDUCTION

The type "A" noise reduction circuit is a precision four band expander that decodes with ± 1 dB accuracy for the entire audio band. Both Left and Right channels are included in the one module. 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 (775 mV).

(3) SR PLAYBACK MODULE

The SR Playback Module contains the complex circuitry required to track the sophisticated dynamic action of the SR process with a nominal ± 2 dB accuracy between 30 Hz and 15 kHz. Both left and right channels are included in the one module. 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 (775 mV).

(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 and produces a surround channel with music and sound effects.

(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. Adjustment range at each frequency is ± 6 dB. 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 ± 15 volts with a Backup Supply of nominally +18 volts for the emergency bypass mono preamplifier. Switching for an external ± 15 volt 750 mA supply is included on the front panel. The standard Power Supply is switchable for 115/230 VAC, 50/60 Hz supplies (Figure 1). 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.**

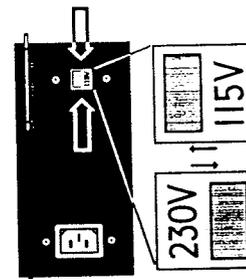


Figure 1. Voltage Selector Switch Settings
(on back of power supply module)

4. DESCRIPTION OF MODULES

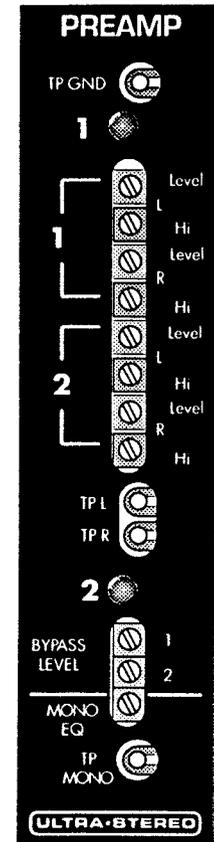
OPTICAL PREAMPLIFIER MODULE Model JO-20

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. The "Hi" adjustment changes the peak frequency of the high frequency boost circuitry. With the newer type 0.47 mil slit lenses it is possible to achieve a flat response ± 1 dB to about 14 kHz. The bottom section is the mono preamp. The "MONO EQ" 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."

Model JO-20



Model JO-10

The JO-10 optical preamplifier uses transformer input circuit. The test points and adjustments are the same as the JO-20. This module is recommended when there

are possible electrical grounding problems in the theatre. The transformers are far less susceptible to click and pop noise caused by faulty electrical wiring.

NOISE REDUCTION MODULE Model JNR-10

The **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 a 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 if the system does

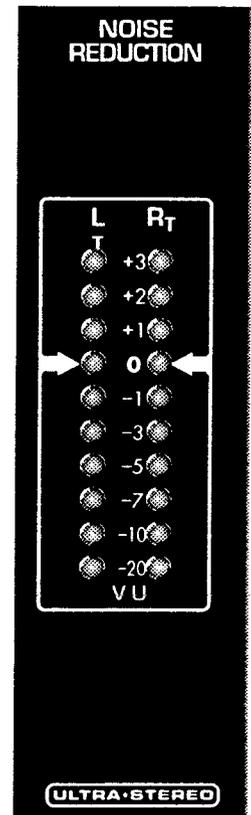
not have a matrix decoder.

The LED 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.

SR PLAYBACK MODULE Model JXR-10

The **ULTRA*STEREO** SR playback module contains a highly complex circuit built on a four-layer pc board. In order to closely track the SR process, the design incorporates low and high frequency sliding filters. A total of eight variable ele-

ments are used to play back SR encoded material with a nominal ± 2 dB accuracy. The single module contains circuitry for both left and right channels, plus sum and difference outputs for center and surround operations.



Model JNR-10

MATRIX DECODER MODULE Model, JM-05/JMX-10/JMX-20

The JM-05 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.

An LED 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:

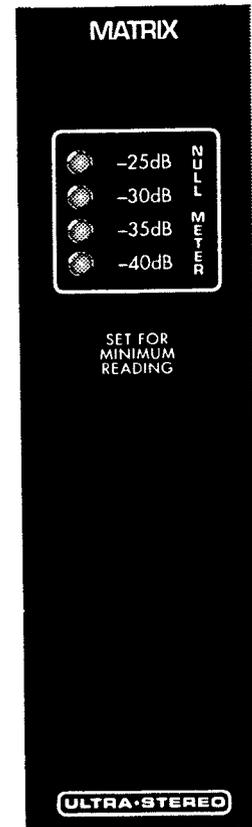
The JMX-10 is an improved version of the JM-05 with a substantial increase in separation between channels. This module is also approved by the Lucas-film THX organization.

The JMX-20 is an improved version of the JMX-10 with an even greater channel separation over a wider dynamic range. The redesigned control circuitry results in smoother operations of the decoding.

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.

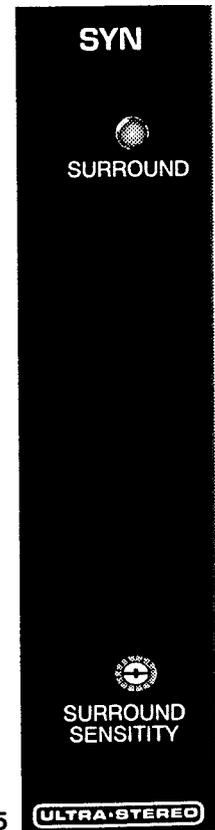


Model JMX-10

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.



Model JSYN-05

SIX CHANNEL FORMAT MODULE Model JFM-20

The Six Channel Format Module controls all the processor switching. The circuitry selects BYPASS, N/SYNC, MONO, STEREO, STEREO/SR, DIGITAL/EXT or SYN/AUX 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 panels.

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

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 N/SYNC trimpot on the front panel controls the intermission music level. Left and Right N/SYNC inputs are routed through the Format and Equalizer modules. 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.

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.

MONO TRIM pot allows additional attenuation to be set for the MONO mode. This makes it convenient for the projectionist to adjust the volume of the trailers.

STEREO mode routes the stereo signal from the Optical Preamp through the Noise Reduction (in the second slot), Matrix, Format, and Equalizer modules.

STEREO/SR mode selects the third slot which is designed for SR playback and feeds the signal to the Matrix, Format, and Equalizer modules.

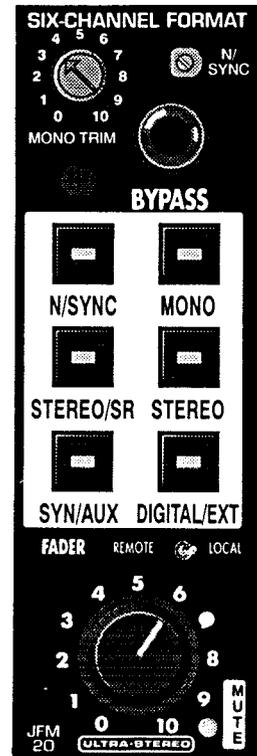
DIGITAL/EXT enables the six discrete inputs (300 mV) and routes them through the Format and Equalizer modules. In this mode, the surround channels bypass the Surround Delay circuit, and are sent directly to the Surround Left and Surround Right equalizers. In any other modes, the signal from the delay circuit feeds both surround channels.

SYN/AUX mode selects the Stereo Synthesizer module (when present). The signal is routed from the Optical/Preamp through the Synthesizer, Format and Equalizer modules. This mode also enables the four AUX INPUTS (775 mV) and routes them through the Format and Equalizer modules. When a Pink Noise module is installed into the synthesizer slot, the SYN/AUX mode will route the pink noise signal to the appropriate channel.

SUBWOOFER VOLUME 10-turn trim pot can be reached by going over the top of the front panel with a trimming tool (Figure 2). It is an additional gain control for the subwoofer channel besides the main fader. In the DIGITAL/EXT mode, the subwoofer channel accepts the external input only. In any other modes, a subwoofer circuit in the Format module sums the left, center and right channels and sends them through a 20 Hz to 60 Hz band pass circuit and a downward expander to reduce the low frequency noise.

MUTE function is activated by grounding the automation input terminal on the back board. When grounded, the MUTE LED indicator lights.

LOWER LEVEL mode automatically reduces the output volume from 3 dB to 6 dB when triggered by automation. Please refer to AUTOMATION SETUP on page 16 for detail.



Model JFM-20

IMPORTANT!
If a remote fader is not installed, setting the fader switch to REMOTE will mute the SOUND SYSTEM.

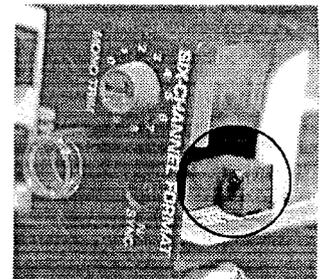


Figure 2.
Subwoofer volume

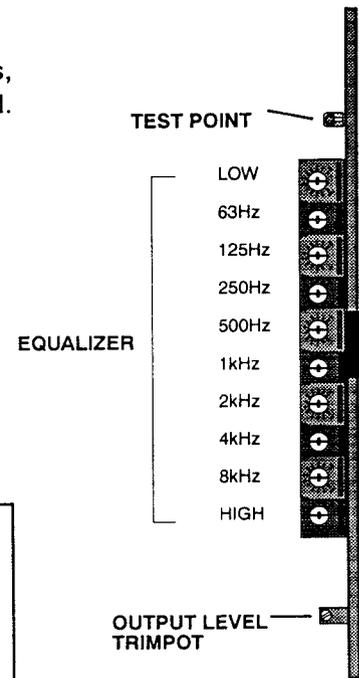
HOUSE EQUALIZER MODULE Model JEQ-06

The Equalizer module is designed to compensate for problems in loudspeakers and room acoustics. The frequencies 63 Hz through 8 kHz have octave bandpass equalizers with an adjustment range of ± 6 dB. There are also LOW and HI shelving type equalizers with an adjustment range of ± 8 dB.

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 reach-

ing power amplifiers and loudspeakers, except if the BYPASS format is selected.

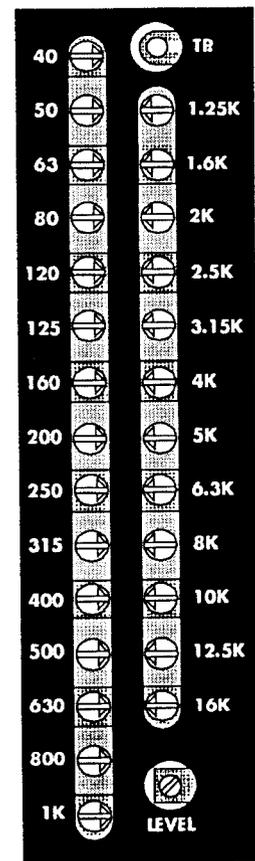
NOTE: The main fader cannot control the output volume if the pink noise signal is fed into the test point. Make sure the **LEVEL** control of the equalizer is set at minimum before feeding any signal into the test point to prevent overloading power amplifiers and speakers.



Model JEQ-06

HOUSE EQUALIZER MODULE Model JEQ-10

The 1/3 Octave Equalizer module has 27 bandpass circuits, 40 Hz through 16 kHz. The 40 Hz band has a ± 8 dB adjustment range. The frequencies 50 Hz through 16 kHz have ± 6 dB adjustment range. 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 maximum level is 2 volts. 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.



Model JEQ-10

SURROUND DELAY/EQUALIZER MODULE Model JSE-20

The JSE-20 Surround Delay/Octave EQ Module uses a low noise 90 dB dynamic range digital time delay followed by a noise reduction circuit which reduces film noise by 6 dB. The delay time can be adjusted from 8 ms to 132 ms (Figure 3). The time table printed on the pc board makes it very convenient to set the delay time accordingly.

The module has two separate equalizers—surround left and surround right—for the digital/external formats. Each equalizer has six ± 6 dB boost/cut controls at 63 Hz, 125 Hz, 250 Hz, 2 kHz, 4 kHz and 8 kHz to more precisely tune the surround channel response. Delayed turn-on and instant turn-off of the output prevents powering-up transients from reaching amplifiers and speakers.

There are two test points labeled Sl and Sr at the top of the module which allow an external "0" dB Pink noise signal to be fed into either Surround Left or Surround Right channels for equalizing and

setting sound pressure levels. The same test point can be used to monitor problems in the signal feeding the surround equalizer circuitry. Each channel has a 15-turn LEVEL pot at the bottom of the board to set the output level precisely. Maximum level is 2 volts.

JSE-20 Delay Settings

Switch Setting	Time Delay
0	8 ms
1	16 ms
2	25 ms
3	33 ms
4	41 ms
5	50 ms
6	58 ms
7	66 ms
8	74 ms
9	83 ms
A	91 ms
B	99 ms
C	107 ms
D	116 ms
E	124 ms
F	132 ms

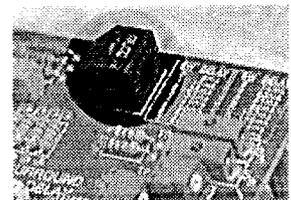
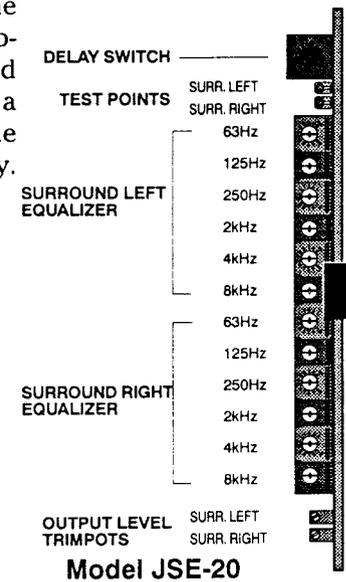


Figure 3. JSE-20 Delay Switch

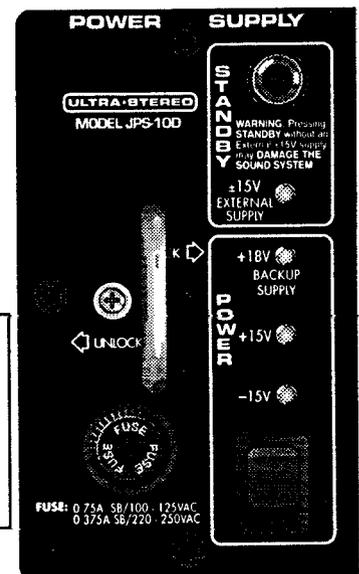
POWER SUPPLY MODULE Model JPS-10

The Power Supply Module provides the main ± 15 V DC supply and an emergency supply for the backup optical preamp from a nominal +18V 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 9V to 24V DC at 30mA with a negative center pin, or 9V to 24VAC at 30mA. These are 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 V DC supply with a capacity of no less than 750mA. When

the Standby Power Supply is connected, the EXT LED will be lit. Activate it by pressing the STANDBY button on the Power Supply Module. **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.



Model JPS-10

5. INSTALLATION AND ALIGNMENT

PRELIMINARY ALIGNMENT

Equipment Needed

- Dual trace oscilloscope
- Pink noise generator such as JPN-10
- Real-time spectrum analyzer, with microphone
- Sound pressure level meter
- Set of test films

(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 4*. 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.

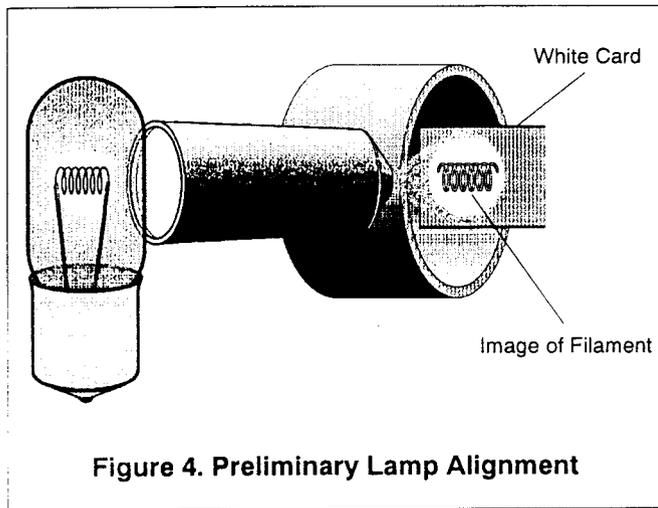


Figure 4. Preliminary Lamp Alignment

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 5 and 6*.

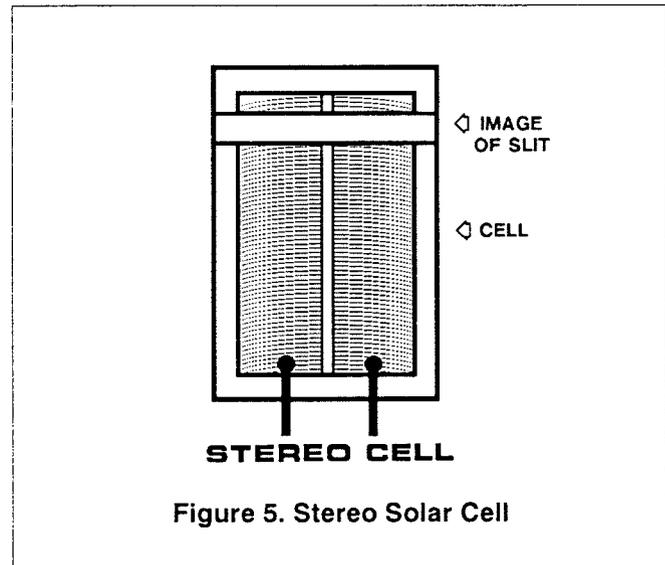


Figure 5. Stereo Solar Cell

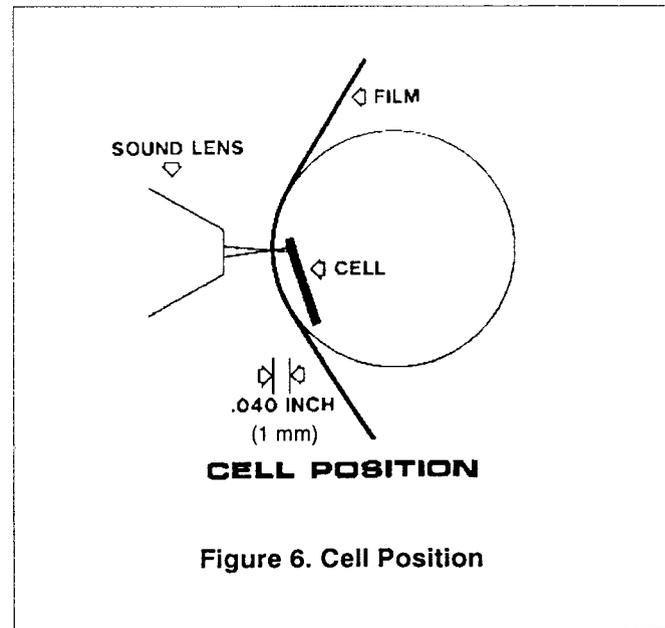
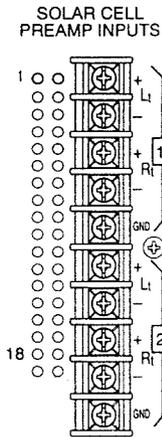


Figure 6. Cell Position

(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 "L" input terminal marked "+" and the GREEN lead of the cell is connected to the "R" input terminal marked "+". The BLACK cell leads connect to the low "-" input terminals of BOTH Left and Right channels respectively. Connect the shielding of the cable to the "GND" terminal. Do not connect the shielding at the projector end.



(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 7. It may be necessary to set the gain of the preamp roughly at this time.

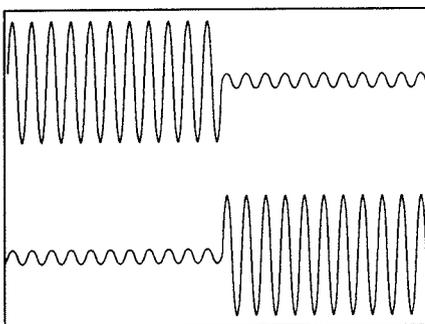


Figure 7. Minimum Crosstalk Results When This Display Appears On Dual-Trace Scope:
Source is ALTERNATING LEFT/RIGHT test film
(Measured at Preamp TP-L, TP-R & GND)

(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 The tone should read the same on the VU meters, ± 1 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 8). 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.

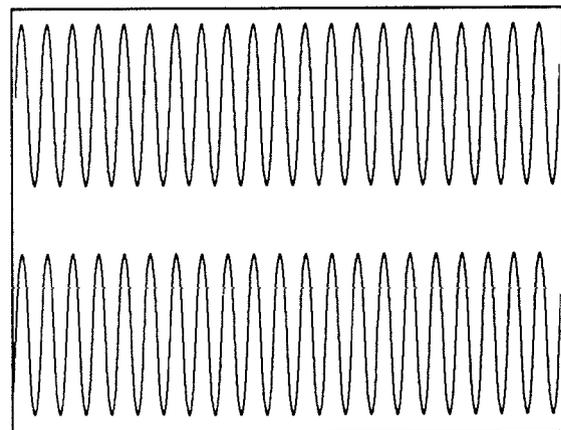


Figure 8. Double-Check of Alignment
Displayed On Dual-Trace Scope:
(Measured at Preamp TP-L, TP-R & GND)

(H) Connect a REAL TIME ANALYZER to the test jack "TP L" on the PREAMP. Run a FOCUS, "PTONE" or PINK NOISE film and adjust the focus of the soundhead optics for the best high frequency response on the analyzer (Figure 9). At the same time, adjust the azimuth for the thinnest display on the oscilloscope (Figure 10). The focus and azimuth adjustments interact, so it will be necessary to keep adjusting both until the best combination is achieved.

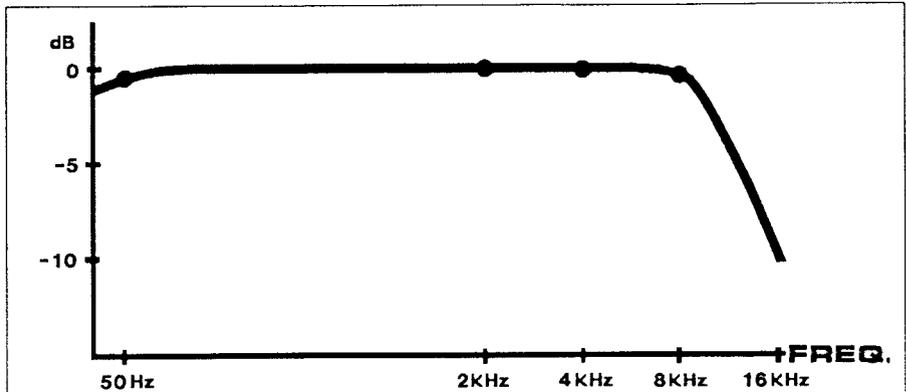


Figure 9. Checking High Frequency Response on a Real Time Analyzer with a Focus, "P Tone," or Pink Noise Source: (Measured at Preamp TP-L)

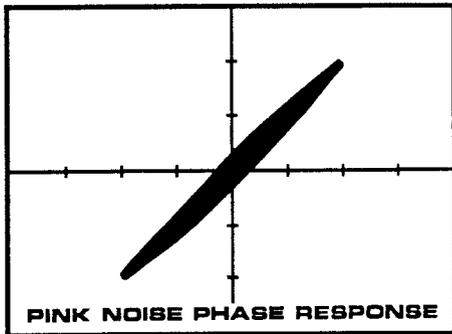


Figure 10. Azimuth Adjustment Viewed on Oscilloscope While Running HF Test with a Focus, Type I test film, or Pink Noise Source: Adjust for Thinnest Display

(J) Once the projector is adjusted, raise the high frequency controls until a flat response ± 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 shift 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 .047 mil slit lenses it is possible to achieve a flat response ± 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.

(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.

(K) Connect the REAL TIME ANALYZER to the test point "TP MON" and adjust the "MONO EQ" control on the PREAMP for the response shown in Figure 11.

(L) The curve in Figure 11, plus the auditorium rolloff, approximately equals the standard Academy Curve.

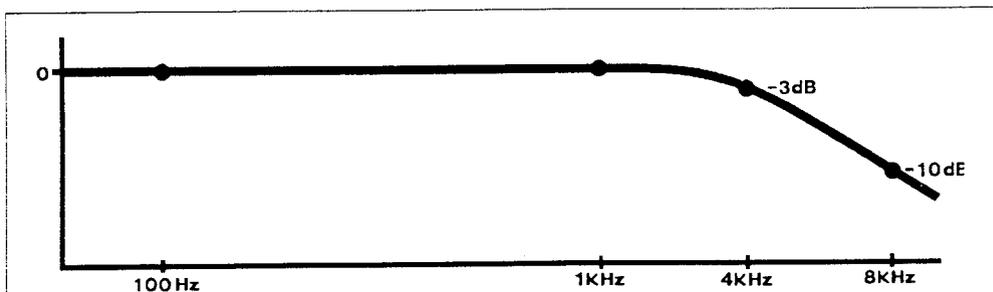
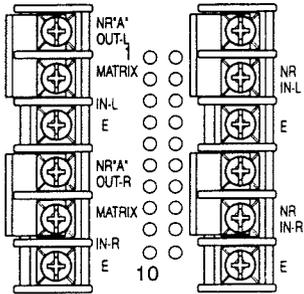


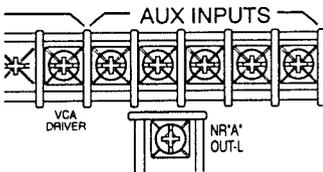
Figure 11. Adjustment of the MONO EQ Control Should Produce This Frequency Response Display on a Real Time Analyzer: Using ULTRA*STEREO Type I test film. (Measured at Preamp TP-MONO)

6. BACKBOARD, AUTOMATION, REMOTE FADER, NON/SYNC SETUP

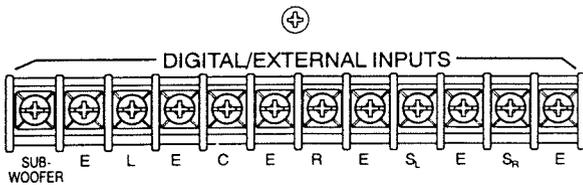
JUMPER LINKS should be in position for normal operations. There are four jumper links between PREAMP OUT and NR IN as well as NR OUT and MATRIX IN. They give flexibility for some special applications. A jumper link between "AC GROUND (CHASSIS)" and "E" (system ground) is normally on. You may need to remove it if there is a ground loop problem.



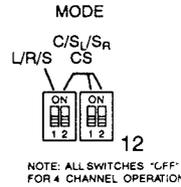
AUX INPUTS accept four auxiliary input lines. The sensitivity is 775 mV. The synthesizer or pink noise module has to be removed from the slot to use the AUX INPUTS.



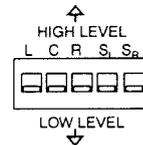
DIGITAL/EXTERNAL INPUTS accept left, center, right, surround left, surround right and sub-woofer line signals from a digital playback system or any other external inputs. The input sensitivity is 300 mV.



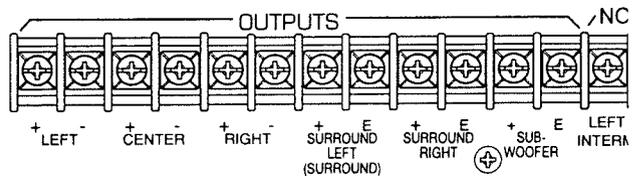
MODE SWITCH is used to accomplish different system configurations. Please refer to the block diagrams for usage.



LEVEL SWITCH changes the output level. **HIGH LEVEL** corresponds to 0 dB output level. Setting to **LOW LEVEL** will get 10 dB attenuation. Reference should be made to the power amplifier manufacturer's documentation to determine the required input level and to modulate the power amplifier fully.



OUTPUTS is to connect the inputs of power amplifiers to the corresponding channel terminals. Use a two conductor shielding cable for each channel. Shielding should be connected to the power amplifier end. If the theatre does not have two surround channels, use the surround left (S_L) output only.



NON/SYNC CONNECTIONS

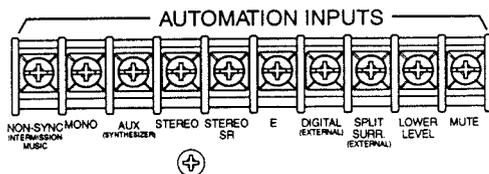
The JS series features a stereo music fade in and out circuit. Connect the tape or disc player (or a Music Distribution System such as MDS-1400) to the terminals marked N/SYNC INPUTS "L" and "R". An earth ground is also needed. Use any convenient "E" terminal.

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

The Non/sync mode output volume is controlled by the master fader and "N/SYNC" trimpot on the Format card. 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-20 FORMAT module. Opening the connection (or selecting another mode on the JFM-20 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 theatre. This will avoid hum being introduced through the audio grounding.

AUTOMATION SETUP – JFM-20

The JFM-20 Auto-Format module is designed for use with pulsed automation systems. By pulsing an AUTOMATION INPUTS terminal to "E" (system ground) the processor selects that mode.



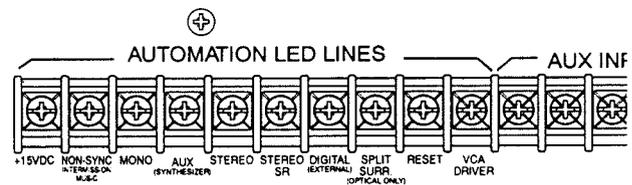
LOWER LEVEL Pulsed grounding this terminal along with a sound mode will lower the processor output 3 dB to 6 dB which can be preset on the Format card. To adjust this attenuation level, pull out the Format card and set the pot on the top PC board with a small screw driver. By triggering any other automation input terminal the system will select the appropriate mode at the normal output level. This allows the theatre to run stereo trailers at a lower volume and restore normal volume for the feature film or adjust levels automatically between programs. In order to use single sound mode at both normal and lower levels, you must use external steering diodes.

MUTE function needs a sustained grounding signal. Grounding the MUTE terminal will mute the processor outputs and light the LED indicator in the front of the Format card.

"SPLIT SURR." is reserved for future use. No triggering to this terminal is needed for digital stereo surround playback.

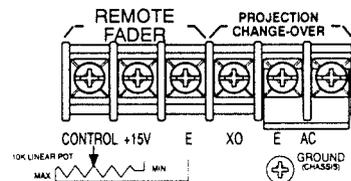
NOTE: The buttons on the front of the JFM-20 WILL NOT override a sustained grounding of any automation terminal. Make sure the automation system is PULSING into each mode and is not making a sustained contact.

The JFM-20 will drive external mode indicating LED's through the "AUTOMATION LED LINES" terminal block.



REMOTE FADER

Connect a 10 kΩ linear potentiometer to the "15 V", "CONTROL", and "E" terminals. Additional remote volume controls can be connected.



Be aware that a Switch must be installed to select the "CONTROL" line from the appropriate remote volume control.

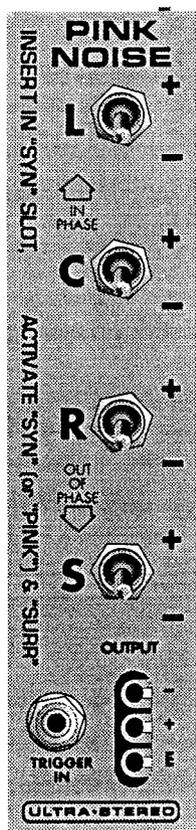
7. SETUP PROCEDURES

Note: Before feeding any signal into the system, make sure the volume controls on the power amplifiers are set at minimum, 15-turn level trimpots on the equalizer modules are set at minimum, and all the equalizer controls to their mid position. Set the Sub-woofer level control on the Format card at minimum.

(A) 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 MASTER FADER at "7" and set the room level for roughly 85 dB. Equalize each channel. After the equalization has been accomplished, one should check the phasing of all front channels. 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.

In-phase (+) and out-of-phase (-) 0 dB pink noise signals are also available from two test points at the bottom of the card. By inserting a switch into the phone jack (with a 2.46 mm microphone plug), the pink noise generator's output can be turned on and off remotely.



Model JPN-10

(B) AUDITORIUM EQUALIZATION

Set up the **REAL TIME ANALYZER** with the microphone two-thirds of the way back and in the center of the auditorium. Feed pink noise at "0" dB into the test point at the top of the center channel equalizer module, or insert a JPN-10 pink noise module into the synthesizer slot and switch on the center channel pink noise. Set the main fader to "7." Slowly raise the level of the center channel power 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 12 is obtained.

Repeat the tuning procedure for the left and right channels if applicable. If the theatre has only one surround channel, use the surround left channel SI output terminal. Feed pink noise at "0" dB into the SI test point or insert a JPN-10 pink noise module into the synthesizer slot and switch on the surround channel pink noise. Slowly raise the level of the surround channel power amplifier to its full on position. Then raise the 15-turn level trimpot on the surround equalizer until 85 dB, SPL is reached. Equalize the response of the surround channel.

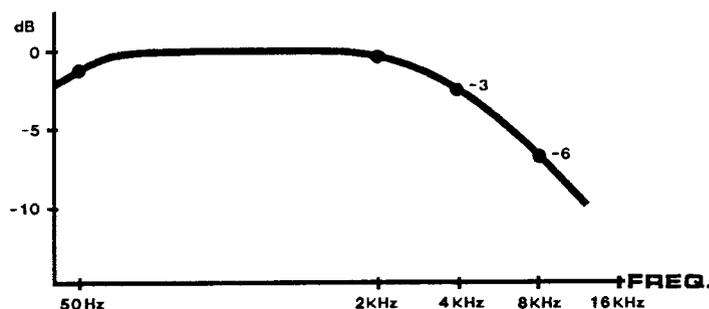


Figure 12. Real Time Analyzer

Display With Test Mic Located in the Middle of the Auditorium and EQ Properly Set

If the theatre has two surround channels, switch off one channel by turning down the volume control of the power amplifier or turning off the power amplifier if applicable. Feed the pink noise into the other surround channel. Set the sound pressure level to 82 dB and equalize the response. Do the same to the other surround channel. When feeding pink noise to both surround channels, the sound pressure level will be 85 dB.

It is necessary to double check the surround channel with a surround pink noise TEST LOOP. Thread the loop and press "STEREO" on the FORMAT module. Set the volume on the FORMAT module at "7." Set the DELAY on the SURROUND module to minimum. 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.

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 "7" on the master fader will produce normal volume in the auditorium.

(C) SUBWOOFER SETUP

(1) Analog Signals – With the pink noise generator in the SYN slot, turn on Left, Center, and Right switches. *Make sure that only the subwoofer power amplifier is on!* Adjust the volume at the subwoofer channel with the multi-turn pot at the top of the Format card to 85 dB. Newer Format cards have the subwoofer pot recessed so it is more difficult for unauthorized persons to adjust. An alternative way to set subwoofer level requires either a pink noise test loop or a pink noise generator with the center channel switched on. With the Format card set in "MONO," both center and subwoofer power amplifiers on, and the main volume at "7," adjust the subwoofer trimpot so that the display on a spectrum analyzer is about equal between 20 Hz and 200 Hz.

(2) Digital/External Signals – Feed a signal from the digital/external source. If the analog subwoofer has already been set, use the trimpot on the external device to set the subwoofer to the recommended level.

(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.

(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 13*.

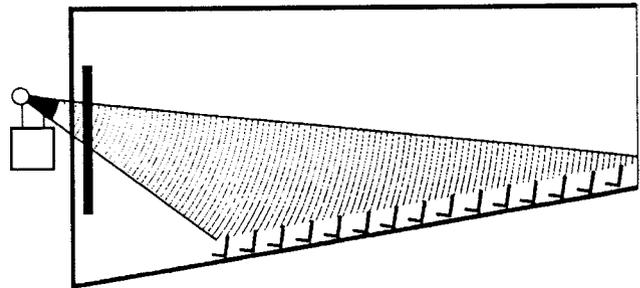


Figure 13. High Frequency Horn Aiming For Optimum Coverage Throughout Theatre

(E) 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** card. Feed pink noise to the center channel equalizer and set the level for 85 dB SPL. Repeat the procedure for the surround channel. Left and right signals will come through both the center channel at 82 dB and the surround channel at 82 dB which produces a total of 85 dB. With the pink noise generator in the "SYN" slot, turn on the center channel switch and set the center channel equalizer level to 85 dB with the main fader set on "7." Repeat the procedure with the surround channel.

(F) SETUP OF FRONT/BACK SYSTEMS WITH STEREO SURROUNDS JS-230

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/JSS-20)
- CENTER EQUALIZER
- RIGHT/SURROUND EQUALIZER (JSS-05/JSS-20)
- SURROUND EQUALIZER
- POWER SUPPLY

Pink noise should be fed to the center channel either directly into the test point on the center equalizer or by using the pink noise module. Adjust the output level for 85 dB SPL. To set the left/surround channel, insert pink noise directly into the JSS equalizer occupying the left channel slot and set for 82 dB SPL. Alternately, use the pink noise module. Turn on the surround switch and set level for 82 dB SPL with the right surround amplifier off. Repeat the procedure for the right surround channel. When both surround channels are operating, the total level should be 85 dB SPL. Left or Right channel information from the film soundtrack will come out of the Center and appropriate Surround channel.

(G) 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 (JM-05)
- FORMAT (JFM-10)
- 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. Feed pink noise into the left equalizer and set the level to 85 dB. Repeat the procedure for the right and surround channel and set to 85 dB.

(H) SETUP OF LEFT/CENTER/RIGHT/SURROUND SYSTEMS

(See setup on page 17) 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.

(I) 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.

(J) 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 BYPASS LEVEL pot on the PREAMP card (see page 7) 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.

With an emergency backup power supply plugged in, the BYPASS mode can be operated even when the main power supply JPS-10 is turned off.

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** button.

If you have a **STEREO** or **SVA** print which has the **ULTRA*STEREO** or Dolby Laboratories name on the print leader, press the **STEREO** button. (*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 theatre is automated, 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.

STEREO

This mode is used for Processors configured for 2, 3 & 4 channel operation. Press the **STEREO** button any

time you wish to play a stereo print.

STEREO/SR

This mode is used for processors configured for two, three and four-channel operation. Press the **STEREO/SR** button any time you wish to play the new stereo prints encoded with the "SR" noise reduction process.

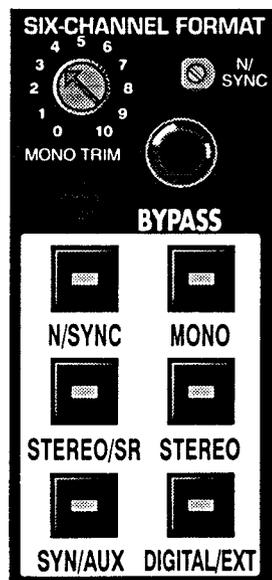
DIGITAL/EXT

This mode is available on all Processors and permits the use of an external 1 to 6 channel source with the system, such as a CinemaScope magnetic print or digital playback. Its use will depend on what external device is attached to the "Digital/Ext Inputs" terminal block on the rear of the Processor. Press the **DIGITAL/EXT** button.

BYPASS – Optical Sound Only

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.



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- 3/4 A Slow Blow for 115 VAC or 3/8 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 +18 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 Change-over Exciter lamp Stereo solar cell on projector LED 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 or JSX Series 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 STEREO 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 STEREO does not, there is a problem in the SURR/EQ module.</p> <p>Move the adjustment pot for the DELAY JSE-05/JSE-10 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>STEREO mode</p> <p>SYN 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 the processor 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 and JSX Series	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. With the JSE-05 and JSE-10, a low line voltage can cause a hum in the surrounds. Raise power line voltage or replace power supply module.
	Hum pickup	Eliminate the cause of hum-ground loops, bad exciter lamp supply, stray light.
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.
STEREO MODE-SOUND FROM LEFT OR RIGHT CHANNEL ONLY.	LED METERS on NR module	If one meter does not move with program material, check the PREAMP, NR, and MATRIX modules.
STEREO 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	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.
STEREO 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 and JSX Series	There are four DIP switches marked MODE . These must be OFF when a MATRIX module is plugged into the JS unit.
	SURR/EQ module	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 Mode 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 page 8*), it is more important to null the LED 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.

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...

ULTRA*STEREO Type 1 – Pre-amp adjustment and optical alignment

- a) 1 kHz tone at 50% Modulation. Adjust the pre-amp level controls so that the noise reduction meters read "0".
- b) Pink noise at 50% Modulation. Align the focus and azimuth of the exciter lamp optics for maximum high frequencies and phase match between channels. Then adjust the pre-amp high frequency control for flat response ± 2 dB between 50 Hz & 10 kHz (50 Hz - 12 kHz with .6 mil or smaller slit lenses). 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.

Dolby Cat. No. 97 – Solar cell alignment film

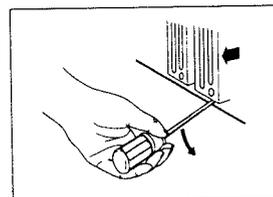
1kHz tone at 100% modulation alternating between left and right channels. This film is used to set the lateral (in/out) position of the solar cell. Use a dual track oscilloscope to view and maximize the channel separation.

SMPTE Buzz Track – Guide roller alignment film

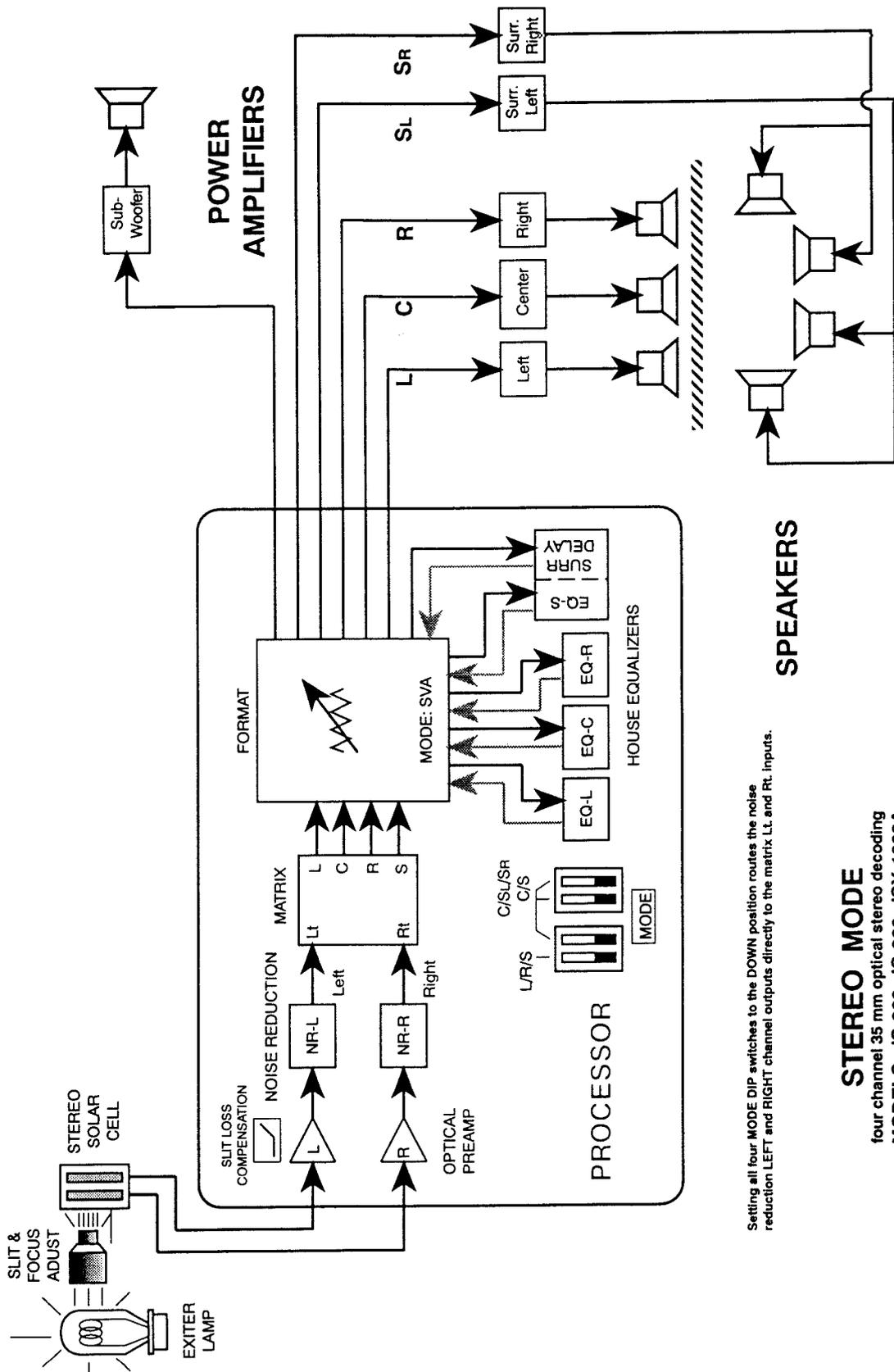
This film contains tones just outside the soundtrack area. A low frequency tone is used on one edge and a high frequency tone is used on the other edge. Align the guide rollers for either equal or minimum tone levels.

Dolby Cat. No.151 – Surround channel level adjustment

Band limited pink noise alternating between center and surround channels. Set delay at minimum. Listen for equal volume in center and surround channels.

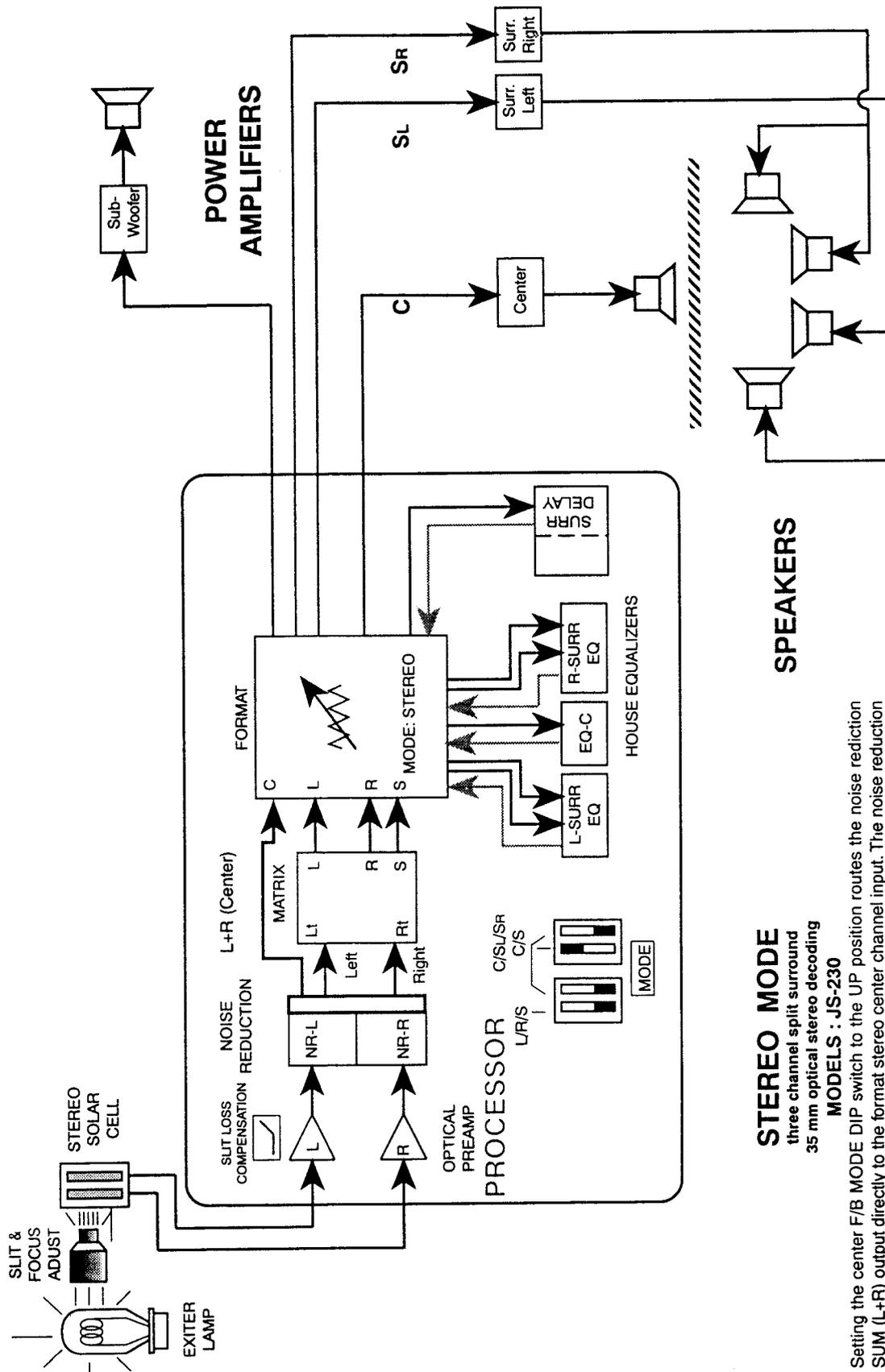


11. BLOCK DIAGRAMS



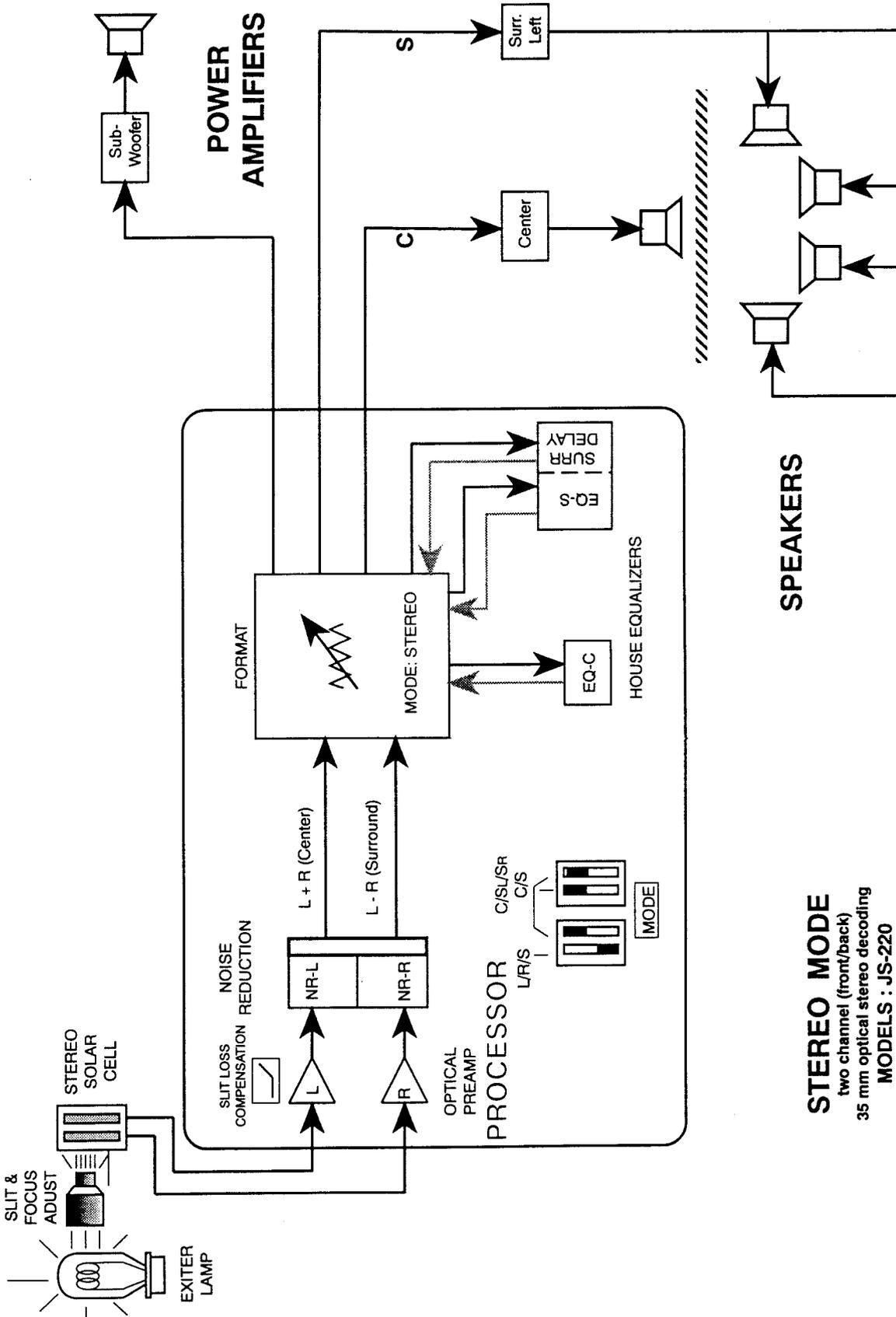
Setting all four MODE DIP switches to the DOWN position routes the noise reduction LEFT and RIGHT channel outputs directly to the matrix Lt and Rt inputs.

STEREO MODE
 four channel 35 mm optical stereo decoding
MODELS :JS-260, JS-280, JSX-1000A



STEREO MODE
 three channel split surround
 35 mm optical stereo decoding
MODELS : JS-230

Setting the center F/B MODE DIP switch to the UP position routes the noise reduction SUM (L+R) output directly to the format stereo 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.

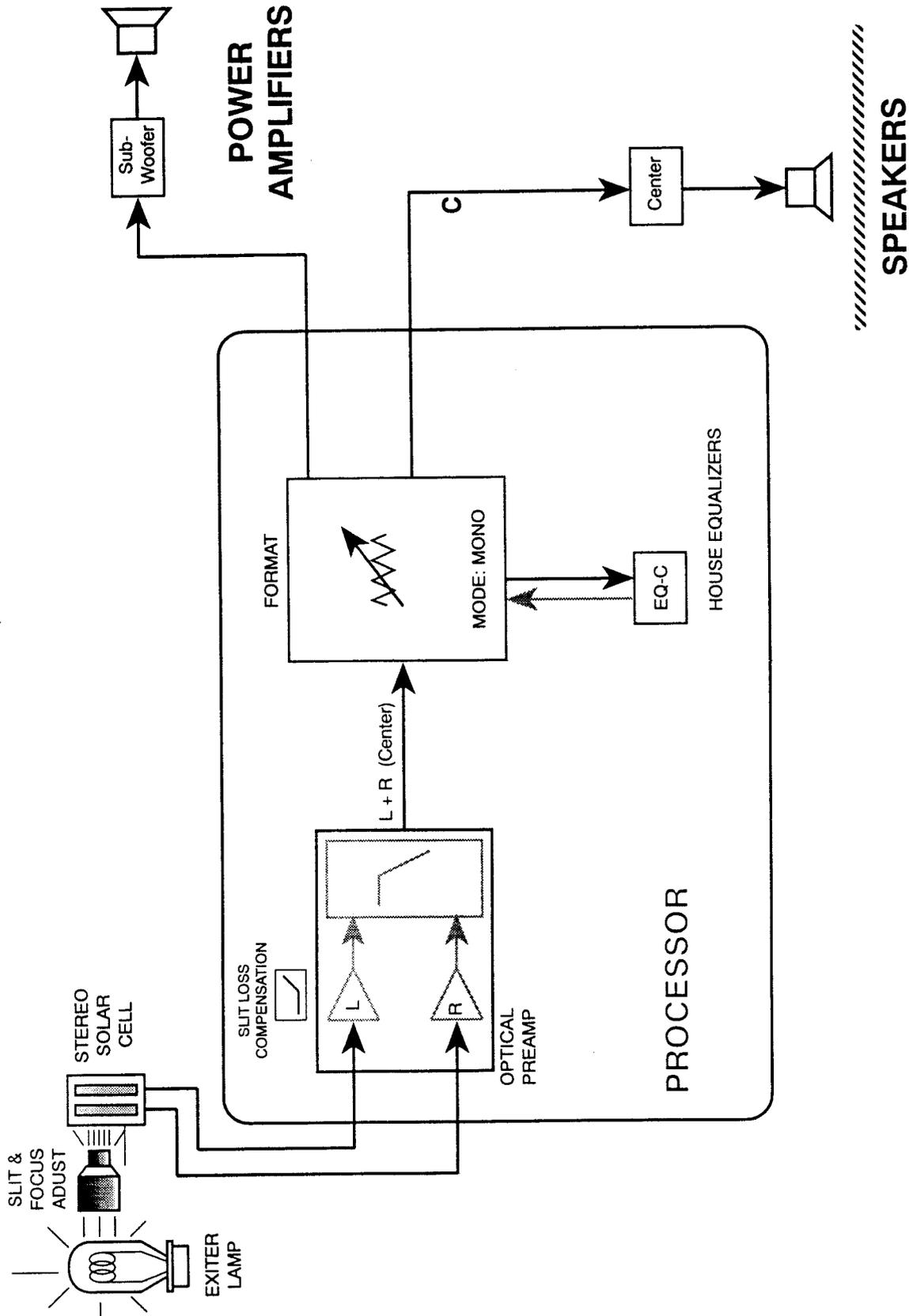


STEREO MODE

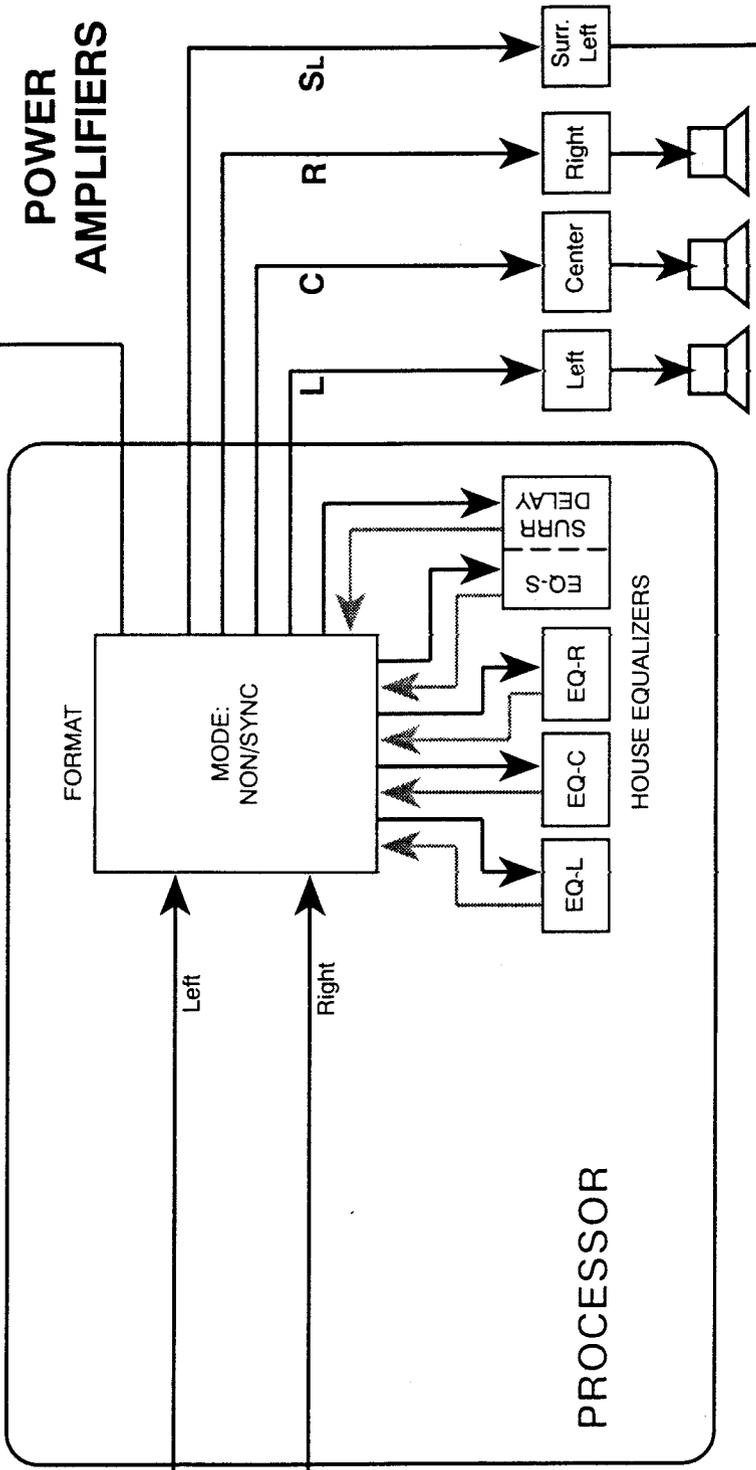
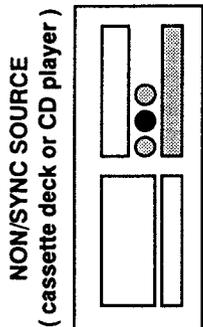
two channel (front/back)
35 mm optical stereo decoding

MODELS : JS-220

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



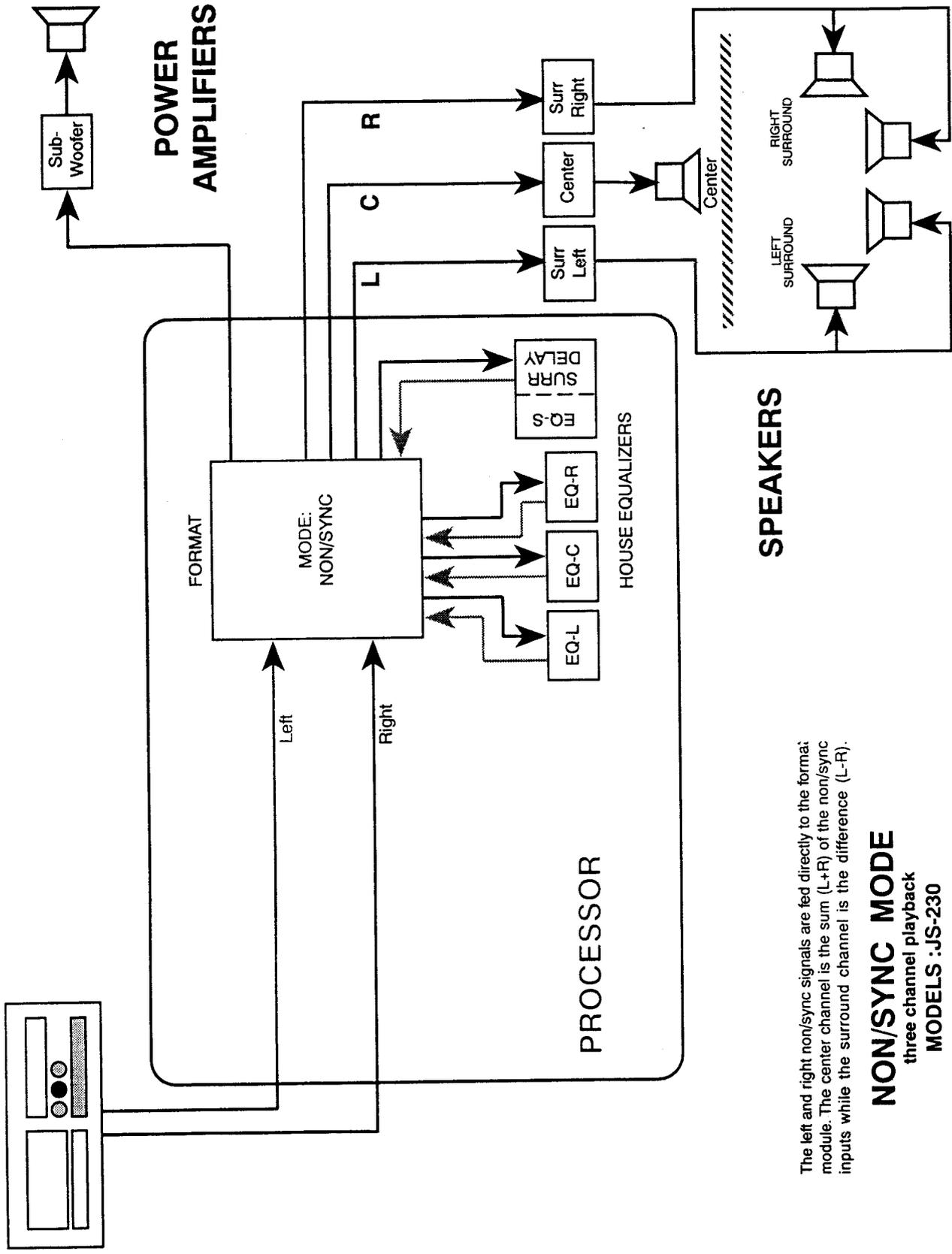
MONO MODE
 35 mm optical play back
 MODELS : ALL



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).

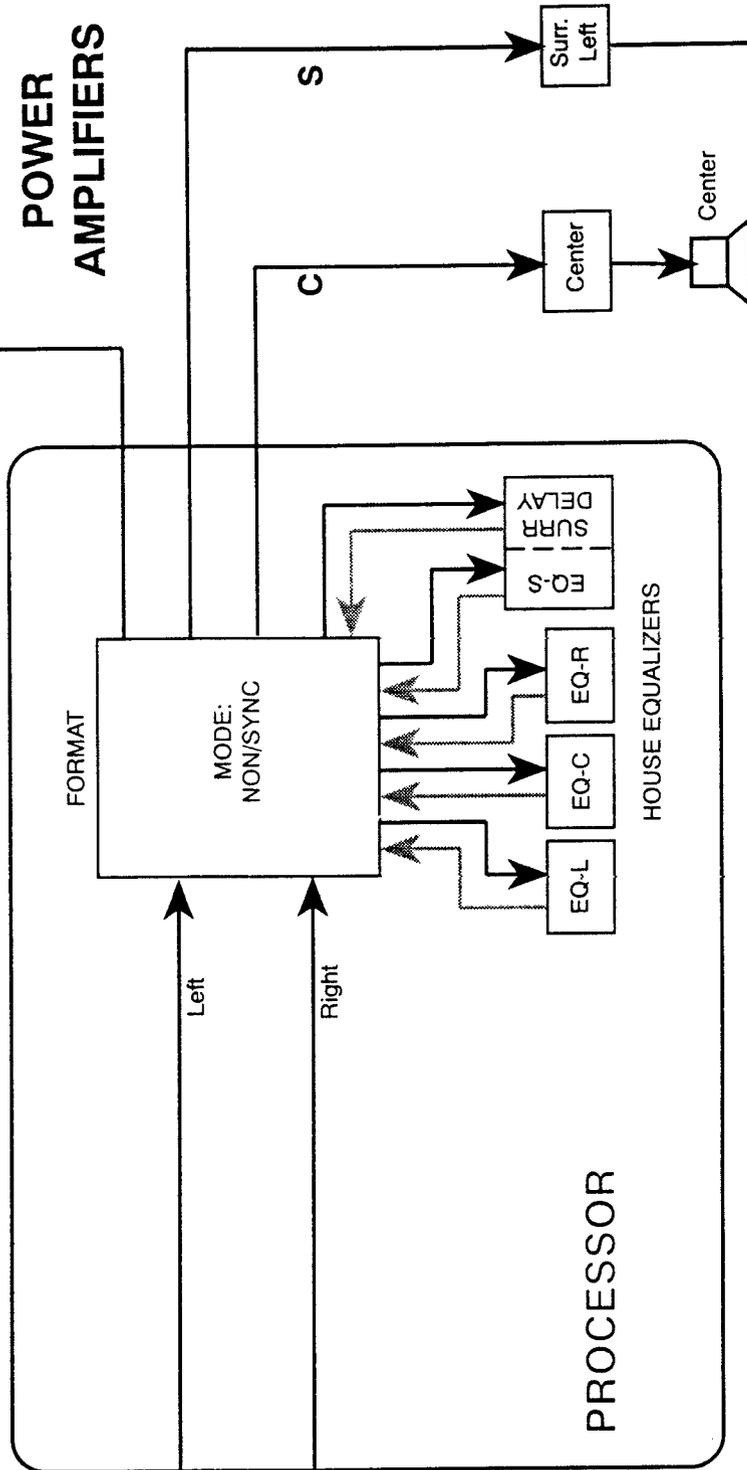
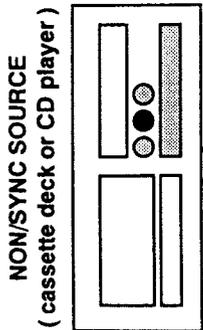
NON/SYNC MODE
four channel playback
MODELS : JS-260, JS-280, JSX1000A

NON/SYNC SOURCE
(cassette deck or CD player)



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).

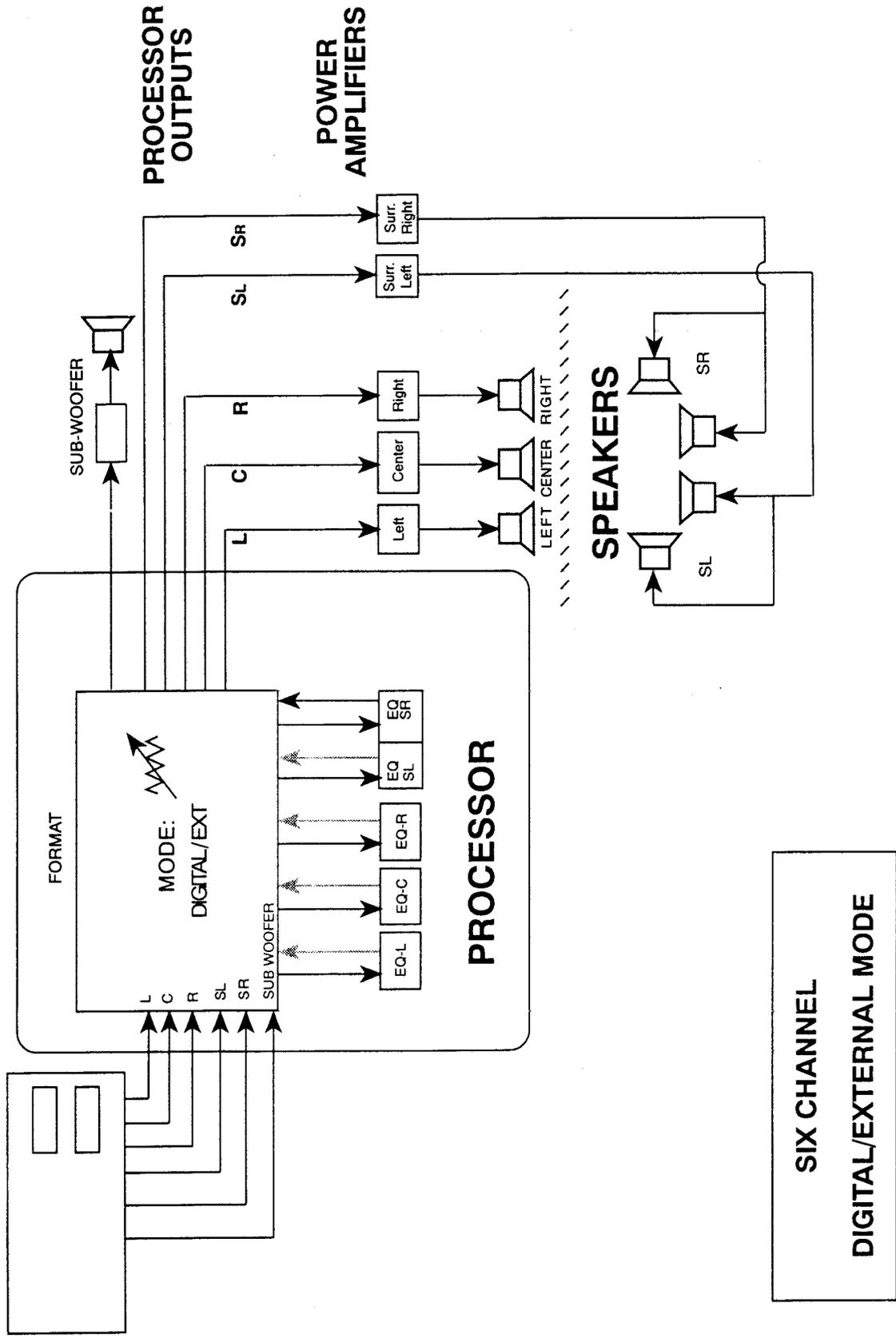
NON/SYNC MODE
three channel playback
MODELS :JS-230

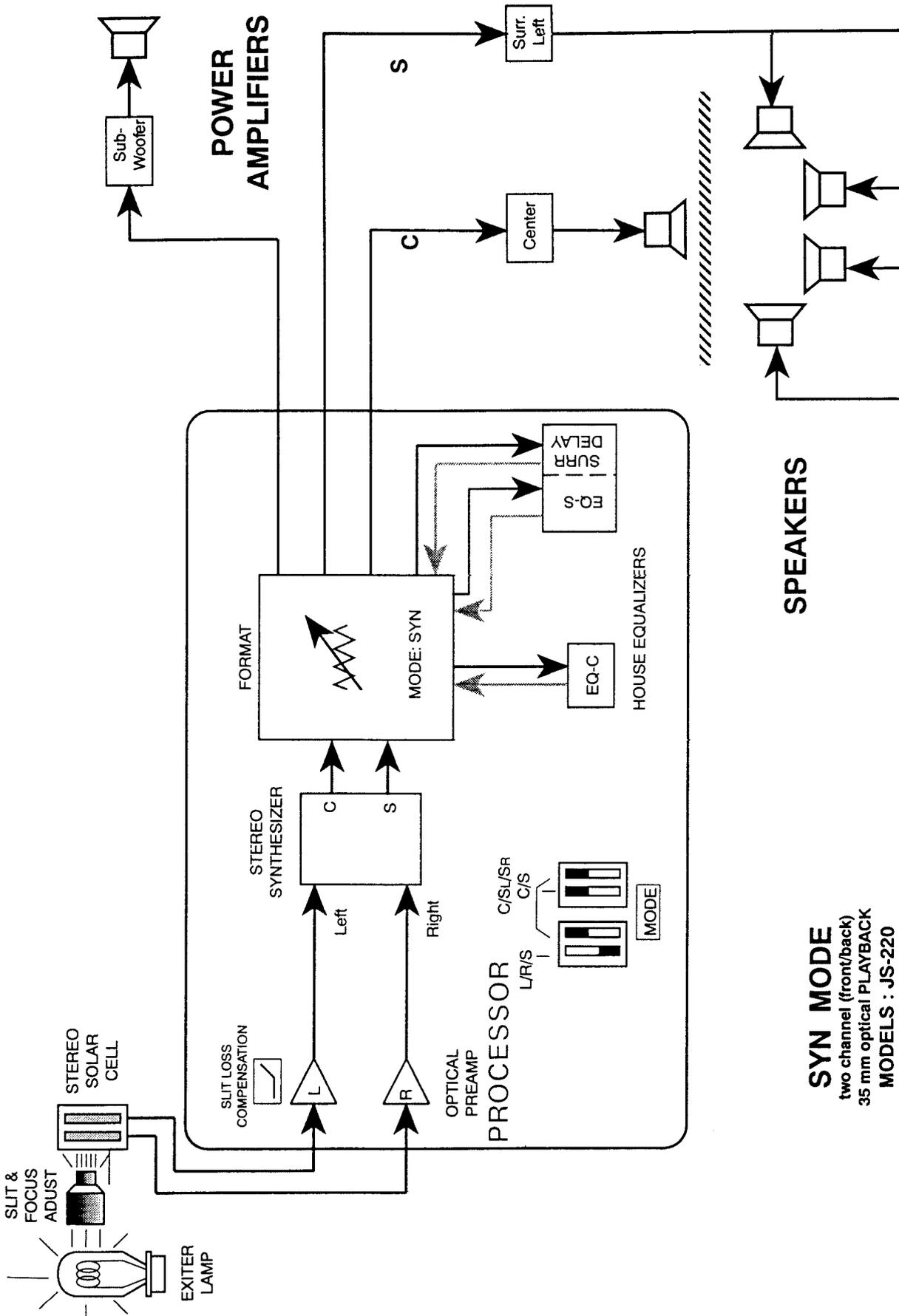


The left and right non/sync signals are fed directly to the format module. The center channel is the sum (L+R) of the non/sync inputs while the surround channel is the difference (L-R).

NON/SYNC MODE
two channel playback
MODELS :JS-220

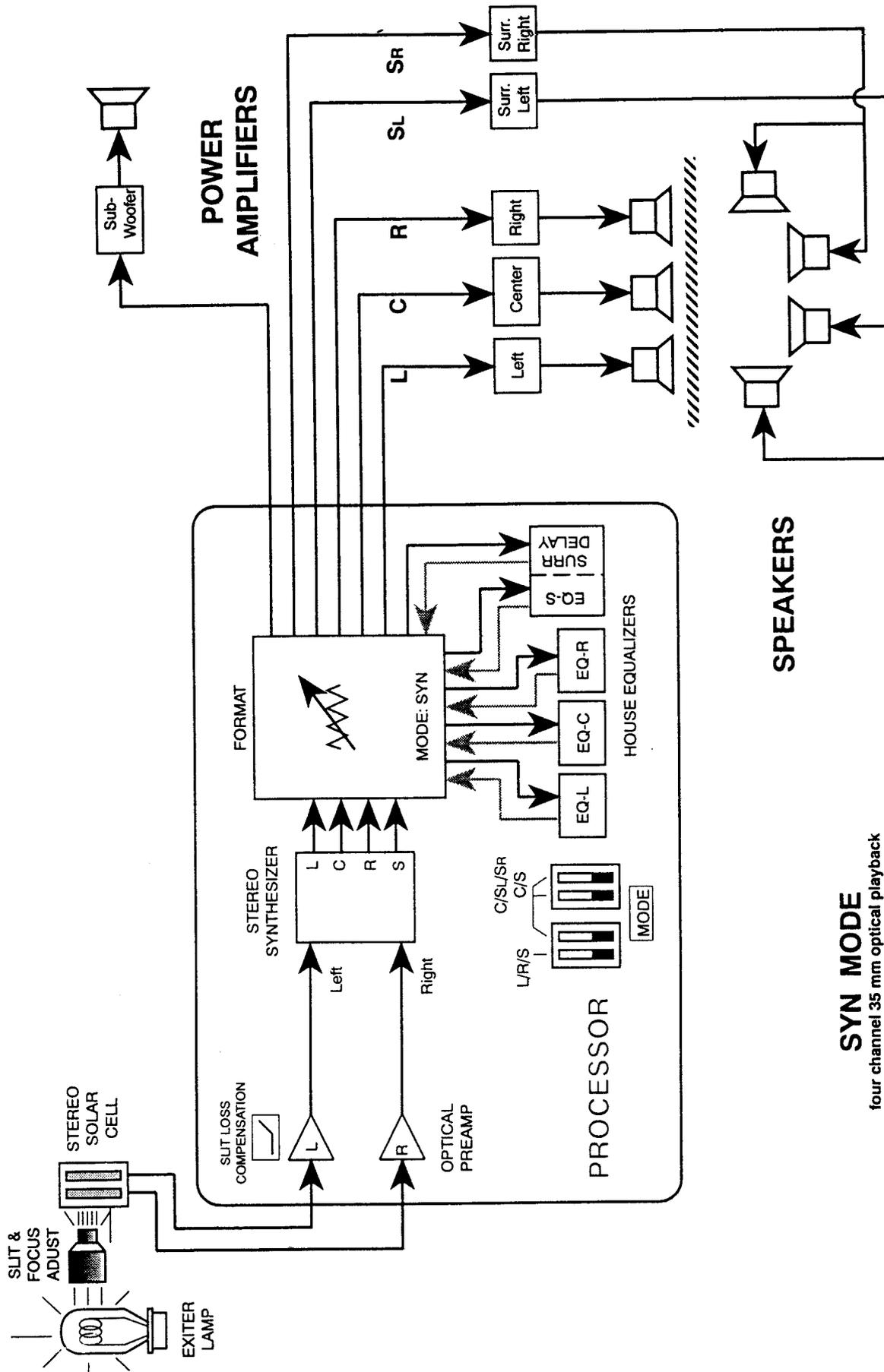
DIGITAL PLAYBACK





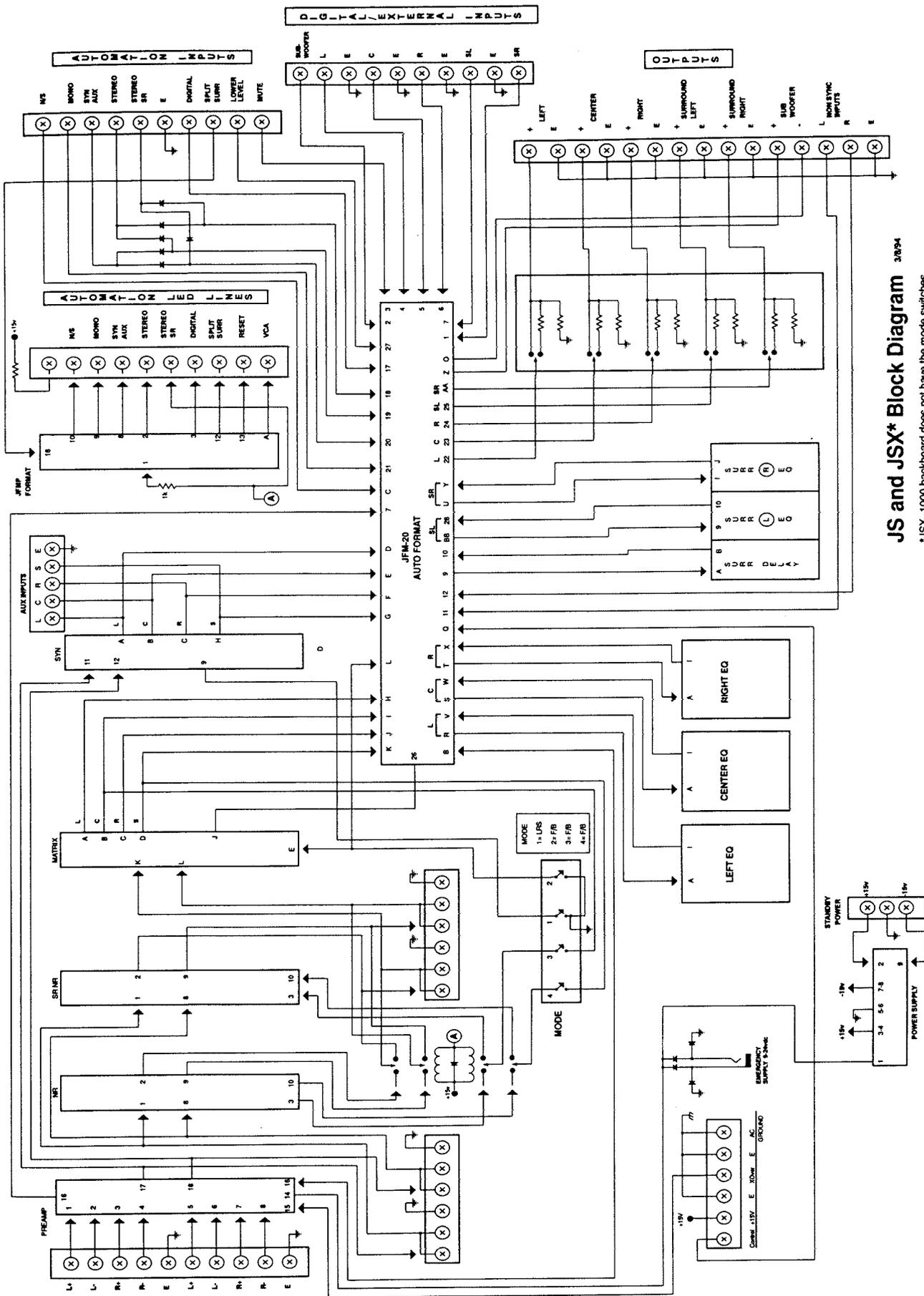
SYN MODE
 two channel (front/back)
 35 mm optical PLAYBACK
MODELS : JS-220

Setting all three F/B DIP switches to the UP position routes the optical preamp Lt and Rt outputs to the stereo synthesizer, and the synthesizer outputs to the format SYN mode center and surround inputs.



SYN MODE
 four channel 35 mm optical playback
MODELS :JS-SERIES

Setting all four MODE DIP switches to the DOWN position routes the audio signal through the optical preamp LEFT and RIGHT channel outputs to the stereo synthesizer, then to the format SYN left, center, right and surround inputs.



JS and JSX* Block Diagram 31094

*JSX-1000 backboard does not have the mode switches.

DTS DIGITAL CIRCUIT BOARDS NEEDED:

DTS # D571 LOGIC

DTS # D575 AUDIO

ULTRA★STEREO®

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