# Film-Tech

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# INSTALLATION AND OPERATION MANUAL

# SR 130 OPTICAL STEREO DECODER
# SR 230 DUAL PROJECTOR EXPANDER

SMART
THEATRE SYSTEMS

**SMART THEATRE SYSTEMS**
P.O. BOX 80361, ATLANTA, GEORGIA 30341 404/422-1082

# ADDENDUM TO SR 130/SR 230 MANUAL

1. Solar cell color coding mentioned in this publication is incorrect. The GREEN solar cell wire is the RIGHT channel and the RED lead is the LEFT channel. Please make this notation in your manual.

2. The internal music trim pots are reversed. The LEFT pot is the level set for the RIGHT channel, and the RIGHT pot is the level set for the LEFT channel (see pg. 13, MUSIC INPUTS). This necessitates the opposite pot be adjusted for the desired level set.

3. The SR 230 Expander cannot be installed or adjusted until the SR 130 is fully trimmed and calibrated. Set up the SR 130 with either projector, make all the adjustments mentioned in the installation section of the manual, then install the SR 230 for the two projectors. Levels in the SR 230 can be trimmed ONLY AFTER the SR 130 is operating properly.

4. We highly recommend that a 9 kHz SMPTE tone loop be used for the sound lens focus and azimuth instead of the pink noise film you may have used in the past. We have found that azimuth can be off as much as 30 degrees when using the pink noise film. The very short wavelength of the 9 kHz tone makes a very fine adjustment possible so that the surround channel has the lowest level of crosstalk. While running the loop, feed the left amplified signal to the "X" axis input of an oscilliscope. Feed the right amplified signal to the "Y" axis input of the scope. Adjust the lens azimuth until the circle collapses into a diagonal line running NE to SW (top of scope screw is North). Focus lens for the longest line while maintaining correct azimuth. Disregard the temporary "giggle" as the loop splice passes the solar cell.

5. Our manual emphasizes the easy adjustment of the SR 130 without sophisticated test equipment. However many dealers possess and use the fine test gear necessary to set up other brands of optical decoders. The following procedure may be followed when proper test equipment is available in the booth.

   5.1 While a Dolby tone loop is running, measure the input signal to the individual left and right inputs of the SR 130. Input signal should measure between 7 and 10 millivolts AC on each channel. If you cannot obtain this level from the solar cell, increase exciter lamp voltage (DO NOT exceed bulb rating) or inspect the sound lens for cloudiness. Unless the SR 130 is properly driven with an adequate signal, poor performance will result.

5.2 While tone loop is running, place one lead of your meter or scope on the right output terminal and the other lead on the left output of the SR 130. Turn Dyna-span control fully counterclockwise for this procedure. Adjust the internal balance control until you see the lowest AC audio signal on your meter or scope. Make sure neither meter lead is grounded to the system in order to avoid misleading readings.

5.3 Turn threshold (THS) control fully counterclockwise. Connect scope or meter leads to surround output and ground. Adjust the NULL control for the minimum AC reading on the test equipment. The meter may not be able to read the signal below the film noise floor, but the scope can display a more perfect null. On a very sensitive scope scale, the waveform will look very "fuzzy" due to the noise riding on the signal. Adjust for the lowest signal.

5.4 With the test set up still connected from the last step, adjust the threshold control until the film noise disappears. This is a sensitive adjustment. Do not go beyond the point where the film noise disappears to avoid losing subtle sounds on the surround track.

5.5 Set the Dyna-span control using the procedure described on Page 11 of this manual.

# SR 130 OPTICAL STEREO DECODER


# SMART SR 130

MADE IN U.S.A.

**FULL FOUR CHANNEL OR TWO CHANNEL THEATRE OPTICAL STEREO DECODER WITH EXCLUSIVE "DYNA-SPAN" FOR DRAMATIC STEREO**

## FEATURES:

Full 4-Channel Optical Stereo
Front-Surround for Small Theatres
Exclusive "DYNA-SPAN" Circuitry
Stereo Intermission Music Fade
Rear Channel Music
State of the Art Engineering
All Self Contained Features
Easiest of All Decoders to Install
Quality Engineered
Compatible with Existing Systems
Automation Capability or Manual Operation

The SR 130 is a simple and reliable optical stereo system that can virtually produce stereo rivaling the big, expensive systems. Full 4-channel outputs can serve large auditorium systems, or simple front channel-surround channel stereo can ideally fulfill the requirements of long, narrow theatres.

The economy of front-surround only stereo will allow multiplex or small theatres to utilize the information that is on the optical stereo print without buying a great deal of supporting equipment. The present stage speaker amplifier may be used with only the addition of a surround amplifier and surround speakers.

Because the SR 130 uses a different approach to noise reduction, the constant re-calibration and "fiddling" is not necessary. Good results can be maintained over a long period of time. Our exclusive dyna-span circuits produce dramatic stereo effects while reducing soundtrack noise.

The SR 130 is the easiest of all to install and adjust. Alignment generally takes only five minutes after the solar cell chain has been optimized. The only test instrument required is a meter and earphone.

Operator controls include mono-stereo mode, rear channel on-off, master 4-channel fader, automatic-manual music fade out and power switch. A built in "peak level" indicator signals loud sound passages that may require the operator's attention.

All features of the SR 130 are self contained. The unit is designed for a single projector input. Internal controls allow the installing engineer to balance the stereo solar cell. For dual projector booths, the Model SR 230 dual projector expander is required. This matching unit provides solid state changeover, level trim between projectors, remote changeover lamps and automation compatibility.

SMART
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DIV. J. S. SMART CO.

# SR 130

## PERFORMANCE SPECIFICATIONS

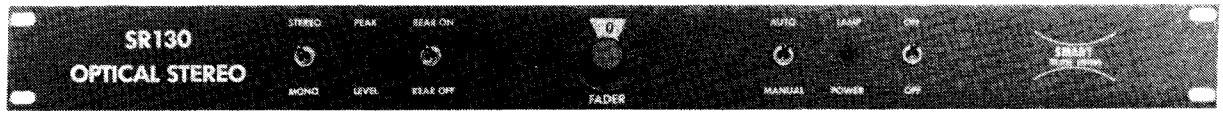
| | |
|---|---|
| **Trim Balance Each Input:** | ±2.5 dB |
| **Solar Cell Preamp Gain:** | 40 dB |
| **Music Input Gain:** | 6 dB or Better |
| **Output Capability:** | 2.5V RMS All Channels |
| **Total Harmonic Distortion:** | .25% |
| **Separation: Center to Rear:** | 30 dB |
| **Crosstalk Left to Right:** | 50 dB |
| **Power Consumption:** | 3 Watts |
| **Weight:** | 4.5 Lbs. |
| **Dimensions:** | 19" x 1¾" x 6" Rack Mount |
| **Color:** | Theatre Black |
| **Options:** | SR 230 Dual Projector Expander |

## TECHNICAL DESCRIPTION

The SR 130 is a full four channel optical decoder with left, center, right and surround outputs. The DYNA-SPAN circuitry is used only on the left and right channels to minimize noise spread across the three front channels. DYNA-SPAN also heightens the full stereo effect while localizing the center channel during dialogue scenes. The SR 130 may also be used for center-to-surround applications in long, narrow theatres. In this mode of operation, the center channel is unaffected by DYNA-SPAN, and contains the sum of information from the left and right channels. A new low noise integrated circuit is used in the dual preamps that improves the signal to noise ratio by better than 10dB over chips that were available in the recent past. Preamp inputs contain a high pass filter that minimizes film thumps and VLF noise, while an RF suppressor minimizes RF pickup. The output capability of the unit is 2.5 volts RMS. The mono-stereo switch silently mutes all channels except the center and drops the gain by 10dB in the mono mode because of the higher average recording level of mono films. A three channel intermission music circuit fades on command from automation equipment or the front panel manual switch. The single panel fader controls all four channels through the use of voltage controller amplifiers. Internal switching between music - film, mono-stereo and rear speakers on-off is all electronic. No relays or hard switching is used to minimize pops in the sound system. The SR 130 contains no power amplifier.

# INDEX

# SR 130 OPTICAL STEREO DECODER




The Smart SR 130 Optical Stereo Decoder is a self-contained optical soundtrack system front end. It handles both monaural and optical stereo tracks and contains special decoding circuits that provide a center channel and surround channel from standard SVA (Stereo Variable Area) recordings. The unit may be used as a full four channel system in the usual way, or as a center-to-surround system for long, narrow auditoriums where stage stereo separation may be poor because of closely spaced speakers. When used in this manner, all front stereo information is mixed into the center channel output and surround information is sent to the speakers placed to the sides and rear of the auditorium. The left and right outputs are not used for center-surround only systems.

Switching between modes is absolutely silent, with no pops or clicks, because of our special electronic switching circuits. Front panel switches control these electronic circuits and no mechanical switching is used. A professional sounding four channel intermission music fader will cross-fade between recorded music and film on command from automation equipment or manual actuation.

The exclusive Dyna-span circuits are used on the left and right channels to heighten the stereo effect, minimize film noise during center channel dialogue passages, and localize center channel information. This feature makes the theatre stereo presentation very dramatic, with an illusion that the stereo image is larger than it actually is.

The single front panel Fader controls four VCA's (Voltage Controlled Amplifiers) that vary the playback level on all four channels simultaneously. Close tracking is assured because, unlike multi section carbon audio pots, a control voltage locks all electronic attenuators together. A Peak Level Indicator warns the operator that high level information is being sent into the auditorium. This lamp flashes only when the soundtrack information is near 100% modulation. Loud passages may require operator attention to minimize bleed through problems in multi-cinema buildings.

The SR 130 is a single projector input device intended for platter equipped booths. The companion SR 230 Dual Projector Expander allows the main unit to accept two projectors, and contains all the necessary trim adjustments, electronic changeovers and balancing adjustments for use with exciter lamp changeover or electronic changeover in two projector systems.

# OPERATION

MASTER FADER

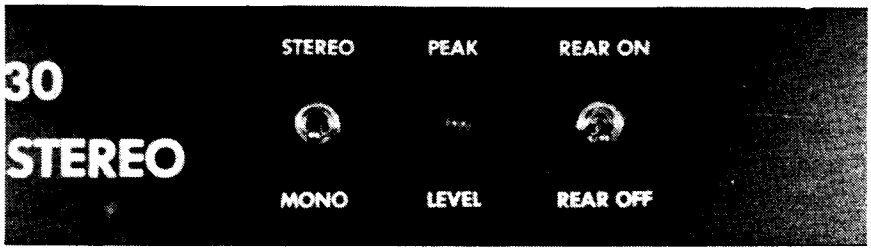
Controls sound level from projectors to the auditorium for both stereo and mono films. For normal operation this control is normally set in its its mid-position. Volume may be adjusted up or down depending on the recorded level of the film being exhibited.

STEREO-MONO SWITCH

Selects mode of operation. In the mono position only the center channel is operative. Audio through the surround and side channels is muted. Also the output level is automatically decreased by 6 dB to compensate for the louder levels on mono films. In the stereo mode, all channel outputs are activated.

PEAK LEVEL INDICATOR

This lamp will blink when the soundtrack information is near its highest sound level (100% modulation). Operator should check sound level in the auditorium to see if it is too loud. This lamp will indicate high levels for both mono or stereo films.




OPERATOR SWITCHES THAT ARE FREQUENTLY USED ARE ON LEFT SIDE OF FRONT PANEL

REAR OFF

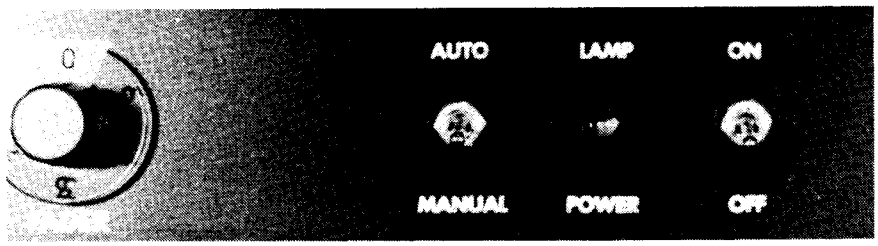
This switch allows the operator to turn off the film surround track when there is no program material on the track. Some features are recorded without surround information. The switch does not affect the intermission music that also may be played through the surround speakers.

POWER ON SWITCH

Turns SR 130 ON and OFF. The power light indicates that AC power is present in the unit and that the power supply is working.

AUTOMATIC-MANUAL SWITCH

Is part of the intermission music and film soundtrack selector. If your theatre is equipped with automation equipment that triggers the music circuits, the switch must be left in the automatic position. This is also true if a remote switch has been installed to actuate the music. If no automation equipment or remote switch is present in the booth, the panel AUTOMATIC-MANUAL switch will actuate the music fade when in the manual position or film will be active in the automatic position. If no music source is used this switch may be used to mute film sound before and after the show. When a tape player is used, it must be rolling BEFORE the music fade circuit is activated to avoid "scoop" as the machine comes up to speed. Adjust volume of tape player to vary volume in the auditorium. Music levels are preset inside the SR 130.
OPERATORS NOTE: NEVER run a mono film in the stereo mode. A non-encoded film will trigger the various circuits that are intended for encoded prints and produce unpleasant results. The unnatural effects created will be annoying to most of the audience.




LOW PRIORITY SWITCHES ARE ON RIGHT SIDE OF PANEL

HOW IT WORKS

The small signals from the left and right sections of the projector solar cells are pre-amplified by independent preamps to raise their levels to a usable signal for processing. The signals contain not only the left and right discreet channel information, but also two other channels matrixed into these physical soundtracks. Center and surround tracks are recorded with a constant phase shift superimposed on the left and right tracks. In order to extract the four channel information accurately, expensive and complex circuitry is required. Simplified circuitry often results in marginal performance and instability. Tracking problems with the noise reduction encoding process and lack of front channel separation are design obstacles in less sophisticated circuits. Dialogue (which represents 80% or more of the program content of a feature film) often appears on all three front channels instead of the center only. The left and right side channel stage speakers contribute nothing but noise when only dialogue is present. The SR 130 takes a different approach to these problems to produce a subjectively pleasing stereo presentation. The Dyna-span circuits expand the sound on the left and right channels when music or effects are present on these channels, and suppress the noise and dialogue information when no program exists on the side channels. This results in a "hard center channel" illusion and exaggerated stereo spread when all channels contain separate information. Tracking noise reduction expanders are not used in the unit so that constant referencing and calibrating is not necessary. Surround program information is routed separately to a compressor and expander to help reduce noise on the rear speakers. An adjustable threshold control allows the installer to set the noise floor level below the compander "knee". The center channel is not band passed or restricted in any way. It is a full fidelity channel.

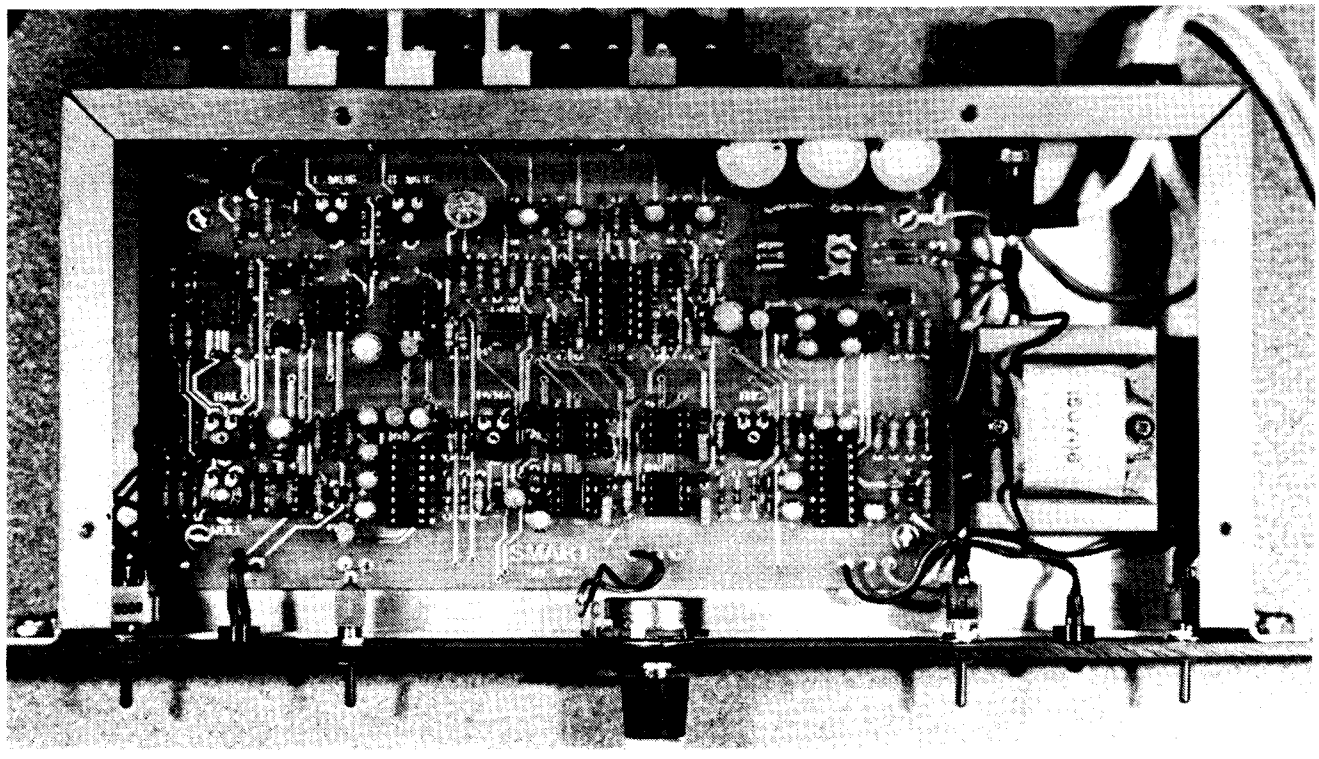
ABOUT THE CIRCUITRY.....

The SR 130 uses the most advanced components available. The preamplifiers use a new dual section integrated circuit that is fully 10 dB quieter than types that were recently available. This super low noise front end contains a high pass filter that allows signals from each solar cell to be amplified above 50 Hz. Frequencies below 50 Hz are rolled off to reduce splice thumps, low frequency rumble and mechanical pickup noise. The 3 dB point of each input filter is 55 Hz with a 12 dB per octave roll off. The left and right preamps have a 20 dB gain and a projector balance control allows the gain to be increased or decreased 2.5 dB. Therefore, a total of 5 dB swing is available to balance the two inputs to make up for sensitivity differences or slight misalignment of stereo solar cells. The left and right signals are each passed on to two independent Dyna-span expander circuits while the center channel is summed by a network into the center channel attenuator-amplifier. Left and right signals are subtracted for the 180° out of phase surround information. This difference signal is routed through a compressor-expander for noise control of rear program and on to its own attenuator. Each channel appears at its own line amplifier-buffer amplifier section and to each respective output. All four channels arrive at the output in phase with each other.

The intermission music inputs accept a left and right signal from an external tape player. Each cross-fade amplifier has a gain of 6 dB and is adjustable through two internal gain controls. A signal as low as .25 volts RMS will drive the SR 130 to full output while in the intermission music mode. A command terminal on the rear barrier strip actuates the music fade-to-film transition.

The power supply of the SR 130 is fully regulated. Varying AC line voltages will not affect the circuits. A triple capacitor Pl network filter section produces an overall signal-to-noise ratio of better than 70 dB. Considering that a good mono print has a signal-to-noise ratio of approximately 45 dB to 50 dB, the SR 130 is better than one hundred times quieter than the film. All output terminals are color coded for quick identification and easy installation.

Switching to all program modes is done electrically for a silent and quiet transition. Front panel mechanical switches perform the command instructions to the electrical switches.



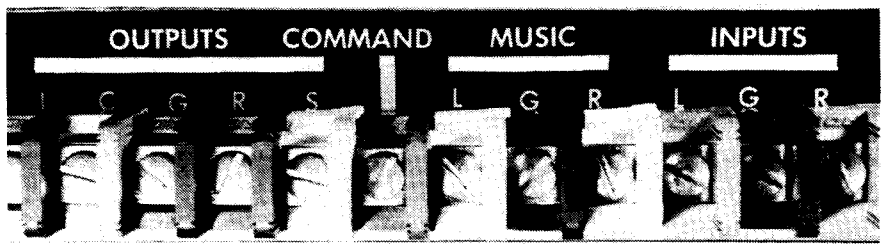
# INSTALLATION

NOTE: Leave enough slack lead on wires connected to the SR 130 so that chassis may be pulled partially out of the rack while still connected.

## STEREO SOLAR CELL INPUTS

Extend a three conductor audio cable from the projector solar cell to the SR 130. A pair of two conductor audio cables will also serve well. Do not ground the shield at the projector. It must be left ungrounded to avoid ground loops in the system that may result in hum and RF (electrostatic pickup). Cable with a full foil shield and drain wire is superior to braided shield because the foil is 100% effective, whereas the tiny holes in braided shield is only 93% useful. The stereo solar cell has a red wire, a black wire and a green wire leaving its base. RED is RIGHT channel, GREEN is LEFT channel output and BLACK is COMMON. Do not ground the black lead or connect it to the cable shield. It will be ground later.

The two solar cell inputs on the SR 130 are color coded RED and GREEN. All black terminals are ground points. Connect the audio cable to the respective left and right projector inputs at the decoder unit. Join the common solar cell lead and the shield together and connect it to the black terminal between the red and green terminals. Each solar cell is terminated in 680 Ohms.




REAR VIEW OF BARRIER STRIP

## MUSIC MACHINE INPUTS

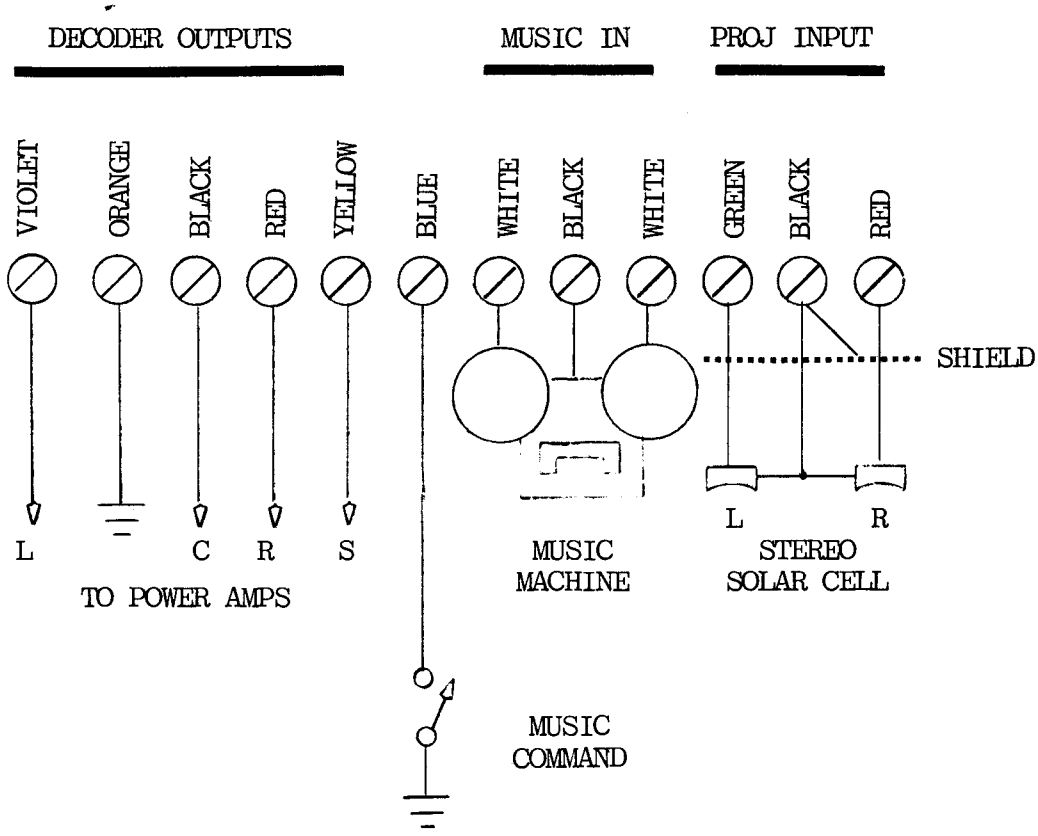
The stereo music inputs will work with most music sources. This high level input has a 100 k input impedance and will bridge the source without loading. The music inputs need a minimum of .25 volts from the tape player in order to drive the system to an adequate level. Connect the music player to the respective left and right music input terminals with the shield to the black GROUND terminal. The music inputs are color coded WHITE.

## DECODER OUTPUTS

The high level outputs are labeled for each channel and color coded. The VIOLET terminal is LEFT output, ORANGE is CENTER, BLACK - GROUND, GREEN is RIGHT output and YELLOW the SURROUND channel.

MUSIC COMMAND

When the BLUE command terminal is grounded, the SR 130 will slowly fade-in the intermission music while quickly fading out the film soundtrack on all four output channels. The reverse action takes place when the blue terminal is ungrounded. If the theatre is equipped with an automation system that has intermission music capability, run a pair of wires from the automation music relay to the BLUE command terminal. The other lead is connected to the nearby BLACK ground terminal. Make a test with your service meter to see that the relay is DRY with no voltage present before connecting the SR 130. If the theatre has no automation, manual music command is accomplished by installing a SPST switch in a box near the projector. The operator can manually switch music and film from this remote location.




EXCITER LAMP

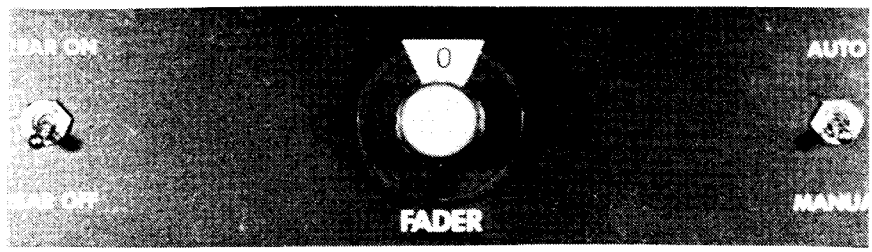
Should be run at full brightness for stereo films. It is common practice in many booths to run exciter lamps at reduced voltage in order to extend bulb life. This procedure will degrade the stereo separation because the center of the bulb filament is hotter than the edges. More light is sent to the center of the film soundtrack with a sharp drop off on the sides. It is mandatory that the light level across the slit be uniform for good stereo reproduction. A DC exciter lamp supply is a must to avoid hum. The SR 130 can reproduce sounds faithfully down to 50 Hz.

## HIGH FREQUENCY RESPONSE

High Frequency Response has been extended on the new SVA films. Unlike standard monaural prints that follow the SMPTE recording curve, the stereo optical films contain frequencies up to 15 kHz. In order to "retrieve" this wide band material during playback, a narrow slit sound lens must be used. If you are installing the SR 130 in an older theatre the lens should be replaced with one that has a maximum slit height of 1 mil. Narrower slits will decrease light transmission to the solar cell, but increase high frequency response. The new lens will also improve the sound of mono prints. It is a good long term investment for all optical films.

## MASTER FADER

Four VCA (Voltage Controlled Amplifiers) control the audio level throughout the unit. The VCA's are locked together and controlled by one front panel fader potentiometer. It is recommended that set up of the auditorium amplifier levels be made with the master in mid-position. This will give the operator approximately 15 dB of operating range in either direction from center. THIS POT DOES NOT TURN THE SOUND FULLY OFF. It has a restricted 33 dB maximum range. This feature prohibits the operator from accidently turning sound down to a point where he may think he has a system failure.

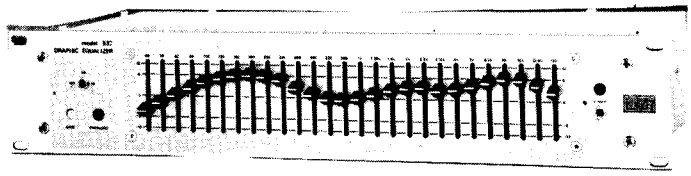



## PRELIMINARY PREPARATION

If projector does not already have a stereo solar cell, one must be installed. Split solar cells are available from Kelmar Systems, Inc., 284 Broadway, Huntington Station, New York, 11746, and are manufactured to precisely fit each each brand of soundhead. The procedure for aligning the solar cell is identical to the other optical stereo systems on the market. After you have mechanically mounted the new split solar cell and verified that light from the sound lens is striking the face of the cells, the SR 130 must be wired so that its preamplifiers can provide a usable signal to monitor while the cell is being adjusted.

## HOUSE EQUALIZATION

The SR 130 is a basic sound control center that decodes optical stereo tracks, mono prints and stereo intermission music. The unit contains no equalization controls. This unit may be installed as a front-surround system only, or as a left-right system for FM multiplex at drive-in theatres, or a full four channel stereophonic system. To add these circuits would not be cost effective if only a portion of the filter sets were used in the various system configurations the unit is capable of. If equalization is desired or necessary in some difficult acoustic environments, reliable and inexpensive filter sets are available from a number of manufacturers that may be inserted in the system between the SR 130 and the power amplifiers. Special test equipment is required to properly "tune" a room.



## AMPLIFIER POWER REQUIREMENTS

There is a valid reason why higher power amplifiers are used in stereo systems than conventional mono systems. Typically, mono prints are recorded differently with a great deal of limiting and compression on the optical release print. This shortens the dynamic range allowing the program envelope to ride close to the maximum modulation limit. Often, the high recording level exceeds 100% in certain portions of the audio spectrum which produces noticeable distortion. Also, it is common practice to high pass the mono track at 80 Hz and add a bass "bump" to compensate for the lack of deep base. SVA prints, on the other hand, are recorded at a lower average level, with only the loudest passages reaching 100% modulation. This increased dynamic range demands more power from the amplifier to pass the material without amplifier "squaring" or clipping. Also, the tracks extend down to 50 Hz where a great deal of bass power must be delivered by the amplifier. We feel that a minimum of 100 watts is necessary for each channel to accomodate these new demands. Standard theatre stage speakers are generally high efficiency transducers. If lower efficiency devices are used, more power is required. Surround speakers are not driven to the same level as stage speakers because all units work together to create the proper sound pressure level, with each supplying only a portion of the pressure. The energy is distributed by many sources for the surround track rather than one transducer for each of the stage tracks.

## VENTILATION

The SR 130 should be installed in a 19 inch rack that has sufficient air circulation. The unit should be installed away from heat generating equipment with the top cover in the clear so that internal components can convectively cool. Do not block vents on the top of the chassis.

## MECHANICAL INSTALLATION

Like other stereo systems on the market, a standard method is used to mechanically align the split solar cell. Good stereo separation is possible only when each half of the cell sees only its own portion of the dual, bi-lateral track, and not the other. This is a sensitive adjustment and requires patience and a steady hand. Good high frequency response is dependent on accurate lens focus. Good surround can only be achieved with precise lens azimuth. Some older lenses have a centering pin to "guarantee" perfect azimuth alignment. Don't believe it! They have been known to be "perfectly" out of azimuth alignment. Refer to the soundhead manufacturing instructions. Most adjustments are made by moving the lateral guide in older projectors, while some new soundheads move the scanning beam. Be aware of which method is required. Also, it is good practice to put a fresh exciter lamp in the socket for stereo system operation. Before starting the projector, turn sound drum by hand to see that it is not scraping against the solar cell.

1. Run standard SMPTE buzz track loop on projector.

2. Loosen lateral guide screws and turn the adjusting screw until a buzz is heard. Slowly adjust in reverse direction till buzz disappears. While monitoring with a headphone or amplifier-speaker across the center channel output of the SR 130 you will hear a 300 Hz tone as the lateral guide is moved in one direction and a 1000 Hz tone in the other direction. The objective is to center the film soundtrack so that you are between the two signals and no tone is heard. Two tones are not used on all buzz loops.

3. Replace buzz track loop with SMPTE 7 kHz test loop and adjust exciter lamp bracket for highest sound output using meter or oscilliscope connected across center channel output of the SR 130. Also observe that the filament of the exciter lamp is in center of the back of the lens. Maximum light output should appear on the face of the solar cells.

4. While the 7 kHz loop is still running, adjust the azimuth and focus for maximum amplitude on the meter, or maximum height of signal and most symmetrical sine wave on scope. Azimuth will be "fine tuned" later in the installation and alignment procedure.

5. Place a left-right test loop on projector. Loosen solar cell adjusting screw and connect one input of a dual trace oscilliscope across the left output of the SR 130 and the other input of the scope across the right output. Run test loop and observe wave forms on the scope. As the split cell is moved slightly in and out past the sound light beam, one wave form will increase in ampliture and the other will decrease. Adjust until both wave forms appear to be equal with a minimum of crosstalk (signal from the other track). Tighten locking screw.

This completes the mechanical solar cell alignment.

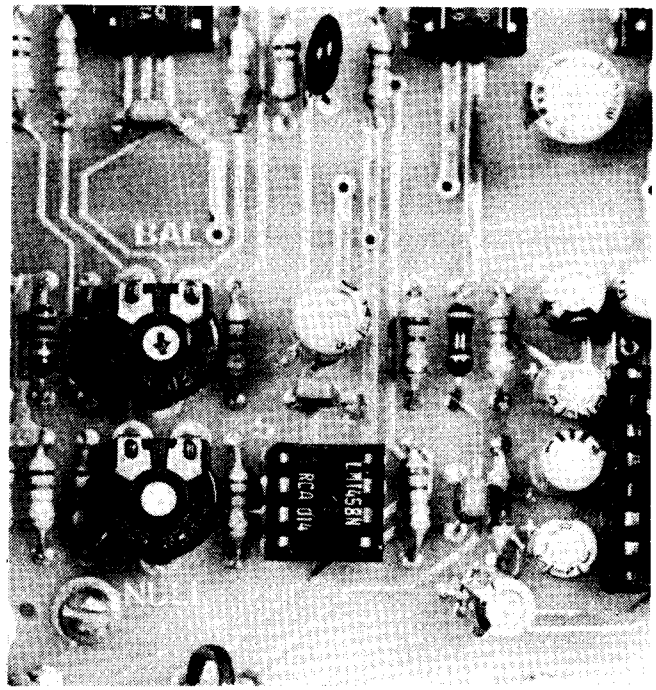
## SETUP ADJUSTMENTS

Pull the SR 130 forward from the rack so the top cover can be removed to make internal adjustments. Controls are labeled on printed circuit board. Open the Master Fader fully while power amplifiers are still turned off. All set up procedures are made with the stereo-mono switch in the stereo position.

### SOLAR CELL BALANCE (BAL)

Thread the projector with a test loop. The SMPTE P35-SL 1 kHz or Dolby CAT. 69 reference tone are satisfactory for this procedure. Connect a headphone (600 Ohms or higher) across the left output channel (violet terminal) and right output terminal (red) and adjust the balance control for MINIMUM sound. As you adjust through the null, the sound level will rise on either side of the null. Approach the null slowly until a minimum output is heard in the headset.

BALANCE AND NULL POTS ARE LOCATED ON THE LOWER LEFT PORTION OF THE P.C. CARD. IF STEREO SOLAR CELL IS CORRECTLY ALIGNED, THE SETTINGS OF THESE POTS WILL BE APPROXIMATELY IN THE CENTER OF THEIR RANGE. ADJUST SURROUND NULL CONTROL WITH COMPANDER OUT OF THE CIRCUIT. FULL CCW ROTATION OF (THS) CONTROL DISABLES CIRCUIT.




### SURROUND BALANCE (NULL)

Connect headphone to the surround output terminal (yellow) and ground (black). Set the THS (threshold) control to the fully COUNTER CLOCKWISE position. With test loop running, adjust the null control for MINIMUM sound in the headphone. A near perfect null can be achieved if the azimuth adjustment of the sound lens slit has been properly oriented. You should hear only film scratches through the headphone. If the tone cannot be nulled, reinspect and correct the sound lens azimuth. Remove test loop and place a monaural film on the projector. Any film with dialogue will suffice (a preview, short subject, feature, etc.). You should hear a small amount of cross talk dialogue on the surround channel. Refer to Page 12 for a description of threshold adjustment.

## DYNA-SPAN (DYNA)

This control manages the side channels only, and does not affect the center or surround outputs. It is a unique noise reduction and stereo image enhancer. CAUTION: Misadjustment of this control can cause damage to stage speakers with low power capability. Here is the set up procedure for Dyna-Span:

1. Set Master Fader at mid-position.

2. Turn on left and right channel amplifiers only. (Turn controls down on other amplifiers).

3. Turn Dyna control fully clockwise.

4. Run mono film through projector. You may use the same film as in the previous adjustment.

5. While an assistant is in the auditorium, slowly raise the level of the left and right power amplifier controls until a normal level is achieved in the auditorium. Balance left and right channel levels with amplifier level control till the two channels appear equal when standing at a position midway between the stage speakers. The sound will appear very unnatural at this stage of your adjustments, because you are working with an un-encoded mono print.

6. Turn on center channel amplifier and slowly raise its volume until it is 6 dB louder than the sides. The center should appear to dominate.

7. Replace mono print with an SVA encoded print. Adjust Dyna control until side channels dominate slightly with music or effects present on the channels.

NOTE: Academy auditorium standard level is 85 dB SPL. If you do not have a sound pressure level meter, set volume for a comfortable level at the rear seats of the theatre.

With the stage amplifiers and speakers adjusted during the previous phase of installation, only the surround level need be set. With a front-surround test loop adjust the surround amplifier level for proper balance. If no loop is available, use a familiar print with known surround material.

## MUSIC THROUGH SURROUND SPEAKERS

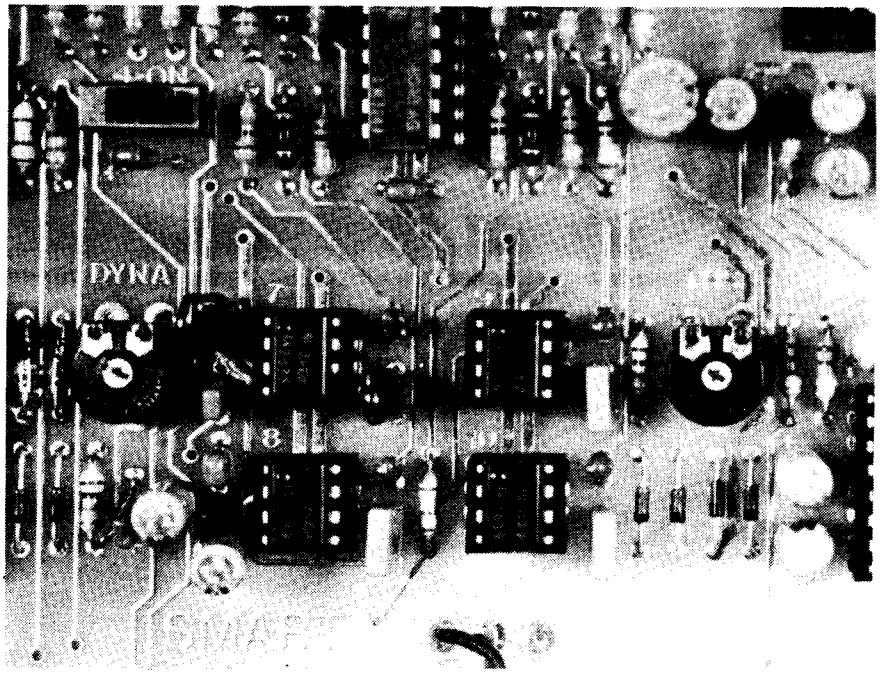
An internal switch (labeled ON) enables the sound engineer to place intermission music through the wall speakers in addition to the stage speakers. The level of the rear speaker feed is 10 dB below the signal level sent to the front speakers and amplifiers. This is necessary because the audience is often closer to the rear speakers. With the switch off, all music is sent to only the stage speakers.

SURROUND THRESHOLD (THS)

While mono film is running, slowly turn threshold control until dialogue is on the verge of a level drop. The headphone will aid in determining this point by isolating the sound from normal booth noises. This adjustment sets the "knee" for the compander circuit that will minimize film noise on the surround channel when no information is present on the track.

NOTE: A crystal earpiece (the type of earphone that comes with inexpensive transistor pocket radios) is usable in making your setup adjustments, but has some unusual properties. Some types may partially rectify the output signal as you listen to the earphone and the sound being fed to the power amp may be partially "clipped" producing temporary distortion. As soon as your task is complete, remove the earphone from the circuit and the distortion will disappear. We suggest you use magnetic or dynamic phones with an impedance of 600 Ohm or greater.

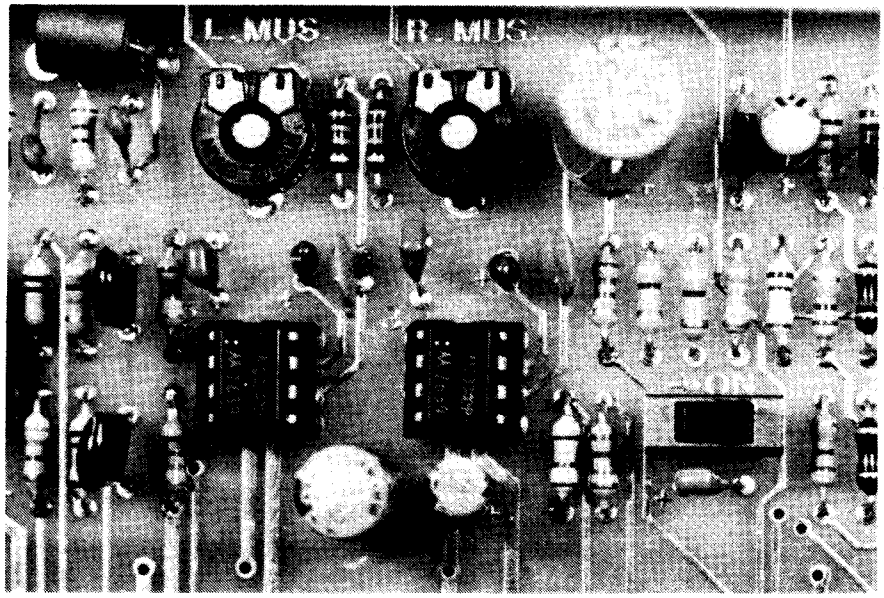
An alternate method of adjusting the internal balance controls is with a service meter instead of an earphone. However, the meter cannot discriminate between a signal and film noise. As you null the signals, the level will drop below the film scratches and noise. A meter will register the noise floor and not see the signal below that point. Your ear, conversely, can differentiate between the sounds and allow you to adjust for a "perfect" null below the noise level.




A SINGLE POT CONTROLS THE TRACKING DYNA-SPAN CIRCUITS. IT IS LOCATED ON THE LOWER CENTER OF THE P.C. CARD NEAR THE ATTENUATOR CHIPS. THE SURROUND THRESHOLD CONTROL IS TO THE RIGHT OF THE CHIPS.

MUSIC INPUTS

Left and right stereo intermission (non-sync) enter through the white terminals of the rear barrier strip and feed the left and right music level pots. These two channels are summed electrically and enter the center channel circuits. Because the stage side speakers are usually as far apart as possible, the center channel music fills in the "hole-in-the-middle". Center channel music is approximately 6 dB higher than the sides.




HELPFUL TIPS

1. Since all final adjustments were made with the Master Fader in the mid-position, the operator can accomodate any print from this initial setting.

2. NEVER run a mono print in stereo. A non-encoded film sounds terrible through a decoder adjusted for SVA.

3. Advise the operator that REAR OFF switch should be turned off if stereo print has no surround track recorded on the film. This will prohibit splices and dirty prints from being reproduced through the rear speakers.

4. Peak Level Indicator only operates when a film approaches 100% modulation. This is true for mono or stereo films.

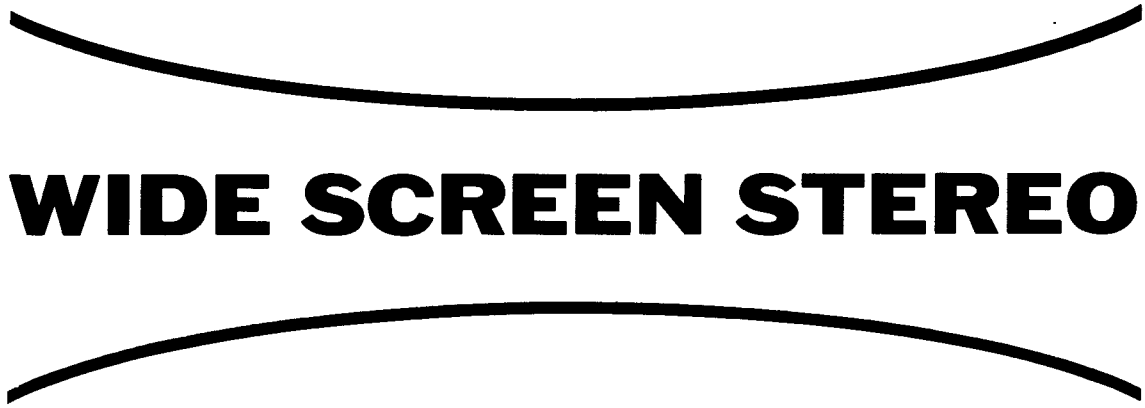
5. Instruct operator to keep solar cells and lenses clean at all times. Exciter lamps should be inspected periodically for cloudiness and low light output.

6. When mono-stereo switch is in the mono mode, the system level automatically drops 6 dB in level to accomodate the louder levels normally used on mono films. Intermission music is still in stereo even though the film is in mono through the center channel only. For this reason all power amplifiers should be left on during each show.

It is important to keep the soundhead parts clean at all times for good sound. Inspect sound lens and solar cell periodically for contamination from oil and grit thrown from dirty prints. Clean the face of the lens and solar cells with isopropyl alcohol or lens cleaner regularly for continued good performance.

## TRADEMARK ADVERTISING

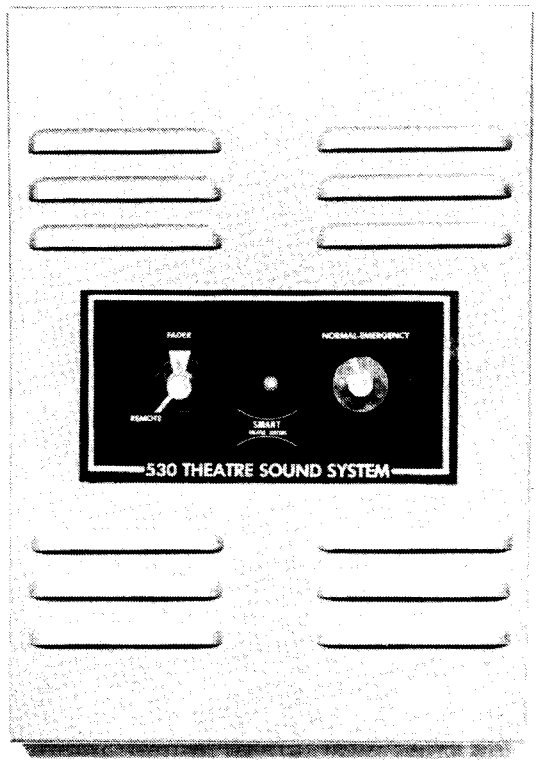
Most advertising press books of optical stereo pictures available to theatres contain a selection of cuts for newspaper ads with and without a Dolby stereo logo. This logo is a trademark of Dolby Laboratories of San Francisco who is very protective of the use of their name and logo. Copyright laws allow them to restrict use of trademarks to theatres who playback SVA prints only on equipment they alone manufacture. Theatres equipped with SMART Stereo Systems need to advertise their stereo playback capability as a boxoffice attraction. Special stereo logos are available to theatres on a no charge basis to paste over the Dolby logo before being sent to the newspaper. They may also be inserted into ads that do not contain a logo. Various sizes are offered on each logo sheet to fit the ad size.



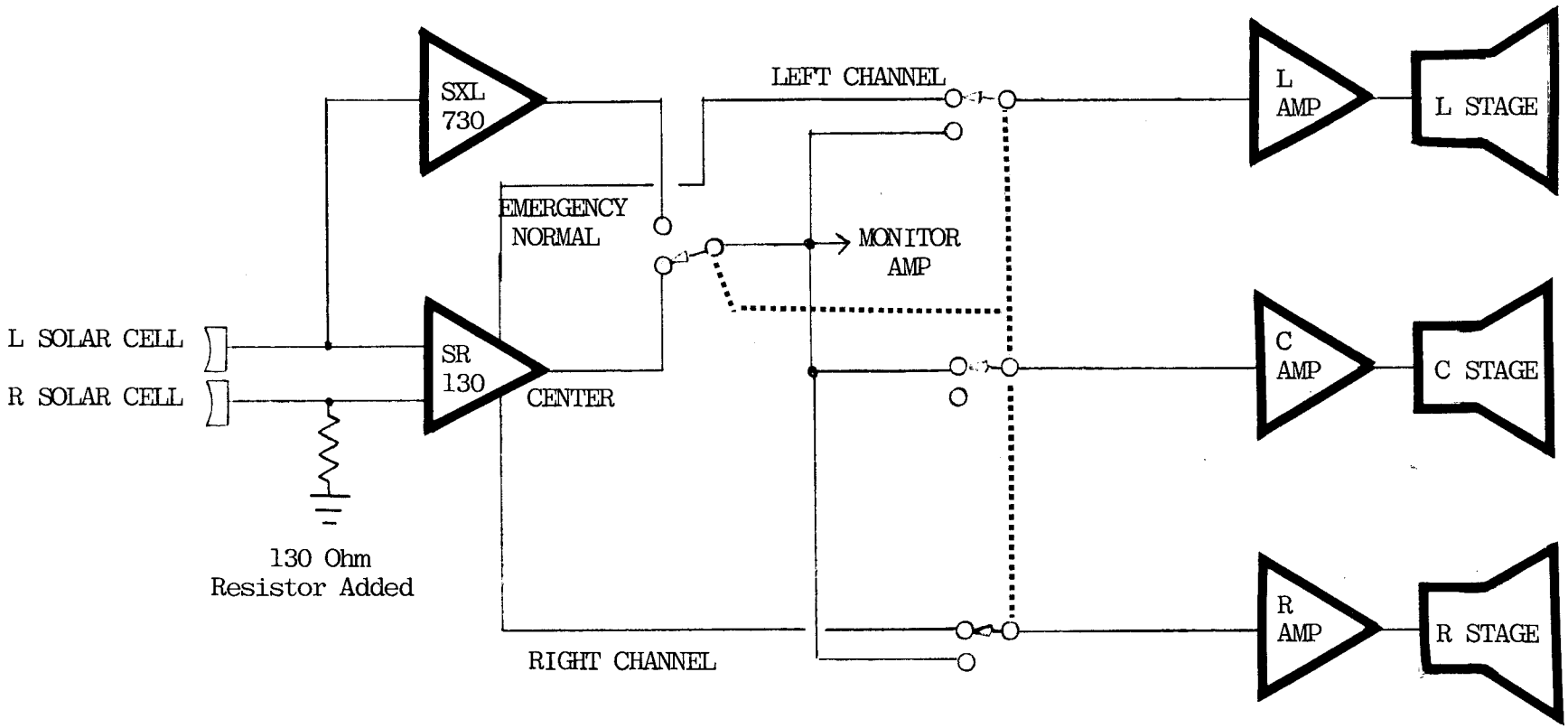
EMERGENCY BACKUP

Good theatre sound system design demands an alternative system for emergency use. The SR 130 uses industrial components with a long life design for reliability. However, no product on the market is absolutely fail prove in all environments. An excellent low cost backup system is the Smart SXL 730 Sound Control Center. This mono device can provide the necessary preamp functions for single or dual projector operation, and all inputs can be bridged with the SR 130 so that a minimum of switching is necessary for an emergency transition. Only the center channel output will need to be switched with the output of the SXL 730 for emergency operation. Please notice that only one section of the split solar cell can be hooked to the SXL 730 input to avoid heavy loading of the SR 130 and SXL 730 combination. Amplifiers should also be considered for possible failures. It is wise to also provide center channel input and output switching to one of the side amplifiers for emergency use.

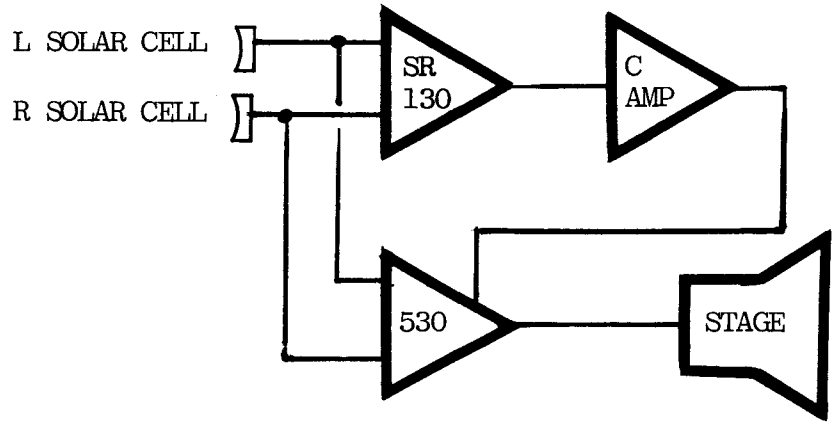
A good alternative choice for backup is the Smart 530 package sound system. This mono unit contains Dual projector preamps, changeover logic, music fade, and a 60 Watt power amplifier. When the 530 mode switch is not in the emergency position the unit acts as a booth monitor amplifier.



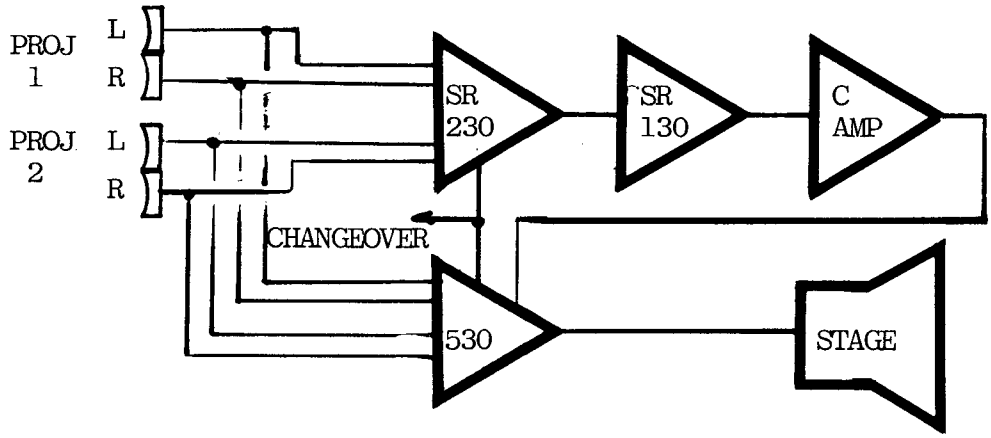

SMART 530 EMERGENCY SOUND SYSTEM




EMERGENCY SOUND WILL EMINATE FROM BOTH THE LEFT AND RIGHT STAGE SPEAKERS
UNLESS CENTER STAGE SPEAKER SWITCHING IS PROVIDED

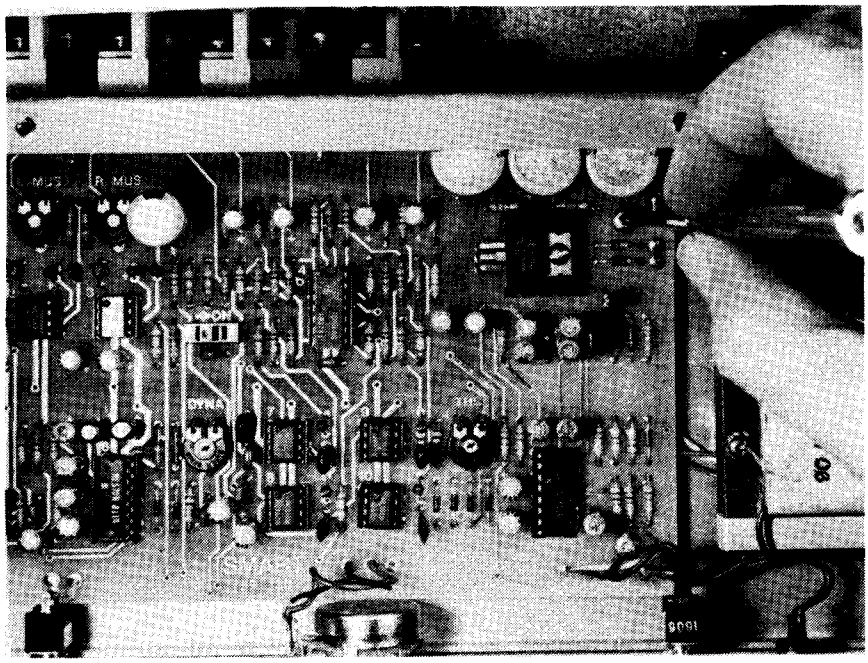



EMERGENCY BACKUP USING SMART 530

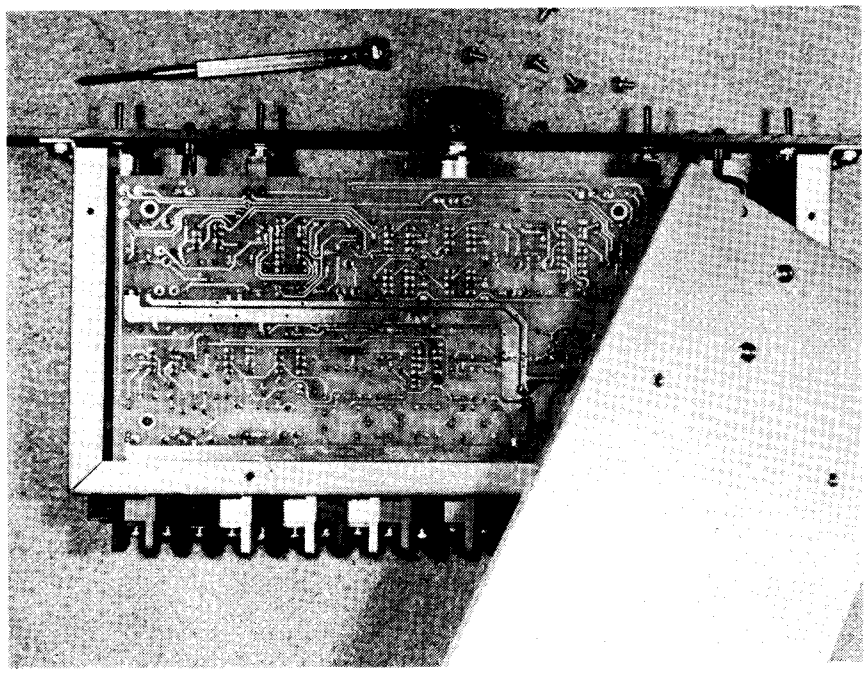



DUAL PROJECTOR EMERGENCY

All attenuator chips are matched in sets of four. They may be interchanged, but if replacement is necessary for any one, all four must be replaced. They are relatively inexpensive, and credit will be issued by the factory for a returned set against the purchase of another matched set. The fade out I. C.'s used in the music-film fade sections are not matched, and should not be interchanged with the attenuator chips.



To gain access to bottom of printed circuit card, remove four phillips screws that hold the card to standoffs of bottom chassis cover.



Remove chassis cover phillips screws and swing cover clear. It is not necessary to disconnect any leads or switches. Transformer is captive to bottom cover.

Every component of the SR 130 is field replaceable with commonly available parts, including the various integrated circuits. The unit has been carefully designed to work with ±10% tolerance capacitors and resistors, even though we manufacture the unit with closer tolerance components. IC sockets are used to facilitate easy removal and replacement on any integrated circuit, should this ever become necessary.

Each unit is "burned in" for 48 hours at the factory before quality control testing and packaging. A failure of one or more functions of the Optical Stereo Decoder will lead to a service call from the owner. Always check the obvious causes of the symptoms first.

1. Is the unit receiving AC power? (Power L.E.D. On)

2. Is a fuse blown? (The SR 130 has only one fuse; replace with 1/2 amp 3 AG type only)

3. Are all external switches (manual or automation) in their proper position?

4. Is the equipment preceding or following the unit operating properly?

5. Are internal switches in proper position? Switches halfway between positions will cause strange symptoms.

When all symptoms point to an internal problem your only choice is to substitute the unit and find the problem in the shop or fix it in the booth.

A quick check at Pin 3 of the voltage regulator will indicate the proper operating voltages to the active components. Place your meter negative lead on the chassis at any convenient point, and switch your meter to the plus 30 volt DC range. Carefully place the positive probe of the meter on Pin 1 (far left pin) and observe the voltage coming into the regulator. It should read between 18 and 22 volts from the full wave diode rectifiers. If not, you have a diode failure or shorted capacitor. Also, the resistors in the P1 network may have opened. Now move the positive probe of your meter to the output Pin 3 (far right) of the 12 volt regulator. You should read exactly 12 volts D.C. If you cannot obtain this reading, feel the I.C.'s with your hand and see if any chip is getting unusually hot and drawing heavy current. Be careful not to short pins on the regulator when making tests. A momentary short will destroy the pins.

A voltage divider supplies bias to many of the circuits. The divider feeds 6 volts to most of the opamp inputs and must measure near this value for proper operation. Study the schematic diagram to locate these points.

When you are satisfied that voltages are correct, go to the section of the circuitry that appears to be giving trouble. The most practical way to trouble shoot audio circuits is through signal tracing. Put an audio signal into the input and follow it until the signal is no longer present. This method will allow you to locate a defective component.

We have gone to the extra expense of using integrated circuit sockets so that a defective chip can be quickly replaced without unsoldering and re-soldering. Because the integrated circuits contain thousands of active components sealed within their casing, they cannot be fixed. The whole package must be replaced with a suitable replacement. Here are some tips on trouble shooting audio cirucits.

1. Make sure command circuit is activated into the mode you are testing.

2. Very hot I.C.'s are generally shorted internally.

3. An open resistor may lead you to believe that an I.C. is defective. Use a substitute device to see if fault is in the I.C., or elsewhere.

4. Shorted input capacitors will bias the I.C. to an OFF mode.

5. I.C.'s can be vibrated out of sockets during shipment. Be sure they are firmly seated in their sockets.

If you must remove a capacitor or resistor, be sure to clean the solder joint with a flux remover or other solvent so that corrosion does not cause future failures.

In the installation section of this manual shielded audio cable is called for in wiring the SR 130. We recommend foil type shielded cable, rather than braided types. Foil shield provides 100% shielding, whereas the best braided shield can only provide 93% shield ability because of the tiny holes between overlapping conductors. Cheaper braided cable is even less than 93% shielding because of loose weave, but even the cheapest foil shield is still 100% effective.

It is very rare to have to replace an entire P.C. card. Suspect active components first, then capacitors, and finally resistors, in that order. Provide the operator with a 1/2 amp 3 AG fuse in the event a fuse blows. This could avoid a service call.

Smart Theatre Systems maintains a factory service department and can provide quick handling of replacement parts, or telephone advice in the event of a problem.

Refer to the schematic diagram at the end of this manual for component values and circuit wiring.

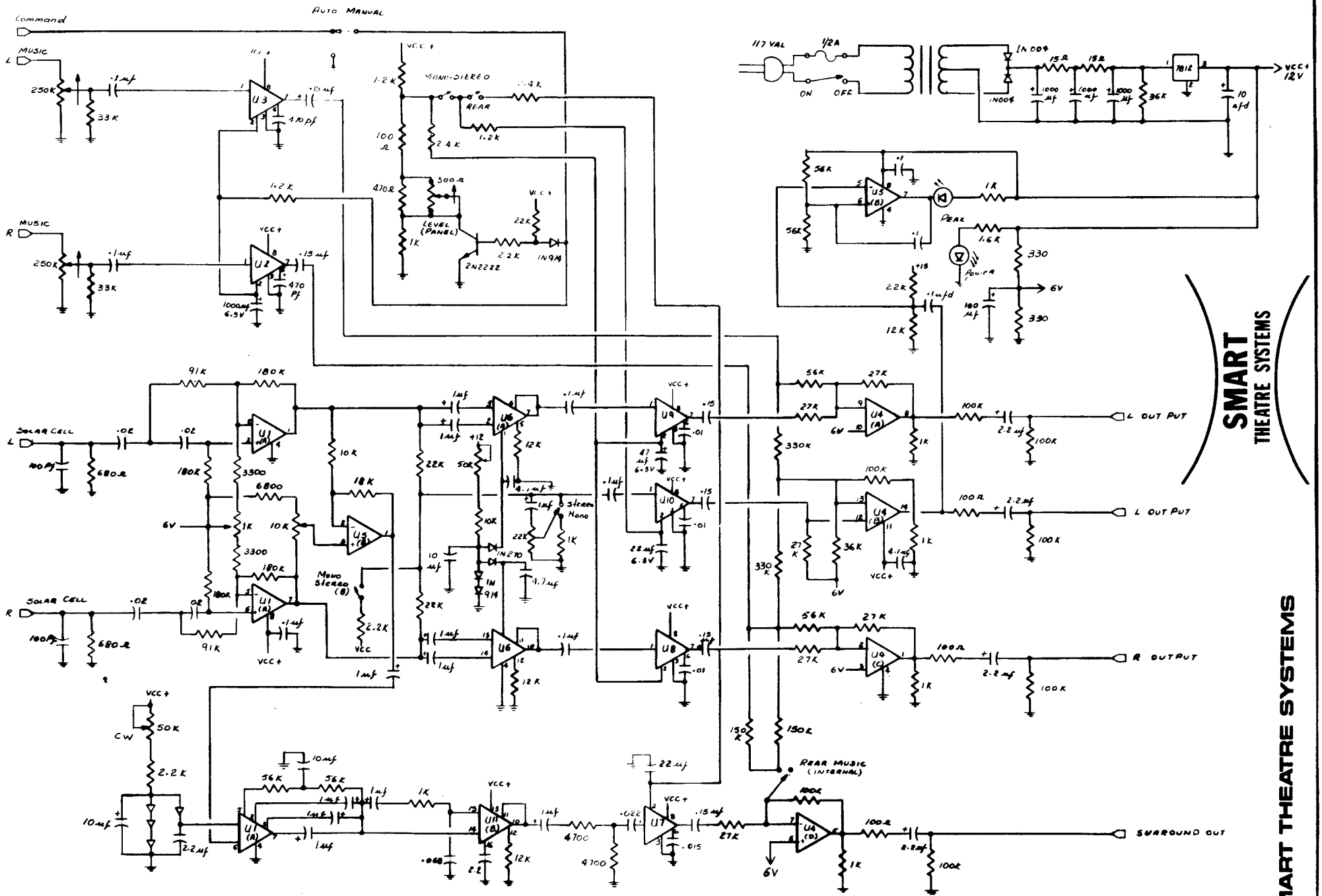
## TWO CHANNEL COMPOSITE FRONT-SURROUND STEREO

Often theatres that have been twinned, or long, narrow theatres cannot realize the full potential of a 4 channel stereo system. Stage speakers are close together and many of the people in the audience are too far from the screen to hear the "spread" of the stage sound. Another problem occurs in normally dimensioned theatres where the side stage speakers are effective when a "scope" print is shown, but blocked by the traveling screen masking when a "flat" picture is exhibited.

One solution to these problems is also very economical. Hang a Smart SS-2 surround speaker on each wall near the screen ahead of the masking and curtains. Instead of aiming them downward (the SS-2 has a fixed 60° angle) turn them on their side so they aim toward the center of the seating area. Although these speakers do not have the projection capability of the stage speakers, they will add a wide dimension to the stereo system with directional sound from the screen extremes.

Another scheme used in narrow theatres is to use the existing mono amplifier and stage speaker with the SR 130 center channel output feeding the front-surround and an additional amplifier and wall speakers for surround sound. The center channel is a composite of the stage left and right sounds minus the surround (out of phase) information. The surround output of the SR 130 is a composite of the left and right minus the center (common mode) information. This type of system is quite effective and adds a great deal to any feature presentation. When the SR 130 is used in this manner the left output and right output are not wired.

The following section of this manual deals with the SR 230 companion unit to the SR 130. The SR 230 is used for two projector booths or for mono installations that have projectors with stereo solar cells for future expansion.


Command
AUTO MANUAL
MUSIC L
MUSIC R
250K
33K
.1 mf
.15 mf
470 pf
100 pf
MONO-STEREO
REAR
LEVEL (PANEL)
2N2222
IN914
1.2K
2.4K
100 Ω
470Ω
300Ω
22K
1K
117 VAC
1/2A
ON
OFF
IN004
15Ω
180Ω
7812
VCC+ 12V
1000 mf
36K
10 mfd
56K
1K
REAR
1.6K
330
POWER
6V
180 mf
.1 mfd
12K
SMART
THEATRE SYSTEMS
91K
180K
SOLAR CELL L
SOLAR CELL R
.02
100 pf
680Ω
3300
6800
10K
18K
6V
Mono Stereo (B)
2.2K
VCC
1 mf
22K
50K
10 mf
IN270
IN 914
4.7 mf
.1 mf
47 mf 6.3V
22 mf 6.8V
27K
330K
100K
2.2 mf
L OUT PUT
R OUTPUT
36K
330 K
150K
REAR MUSIC (INTERNAL)
SURROUND OUT
CW
50K
2.2K
10 mf
2.2 mf
.068
4700
.022
.015
SR130
SMART THEATRE SYSTEMS