Film-Tech

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INSTALLATION AND OPERATION MANUAL

SR 135 OPTICAL STEREO DECODER

SMART THEATRE SYSTEMS

SMART THEATRE SYSTEMS

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SR135 Stereo Decoder

CRASH COURSE

For those installers who have installed this product before, here is a brief checklist of each step of hookup and adjustment. A detailed description is offered for each phase or option within this manual. If you have not installed this product before, we suggest you become familiar with the unit by reading this manual.

- Install into rack in a well ventilated place. Hook solar cells to input using only three conductor shielded audio cable. Make sure shield is not grounded at projector end.

- Align the stereo solar cell.

- Connect each output to respective input of following piece of equipment (equalizer, amplifier, etc) using shielded audio cable.

- Hook DIR (direct output) to Stereo Generator, if used in the system.

- Connect tape player to MUSIC INPUT terminals using shielded cable.

- Turn power amplifiers off before calibrating decoder.

- Short one solar cell input and measure output of the DIRECT OUTPUT with an accurate meter or scope. Raise opposite preamp trim control until you read .5 volts AC while running Dolby Tone cat. 69 loop.

- Remove short on first solar cell input and short the other input to ground. Adjust opposite preamp level pot until .5 volts AC is measured at the DIRECT OUTPUT terminal.

- Remove the shorting wire and move meter to the SURROUND OUTPUT terminal. Adjust either preamp level pot very slightly until you get the lowest possible reading on the meter on expanded meter scale.

- Turn on power amplifiers and set SR135 master fader at 12 to 2 o'clock setting. Run pink noise side of cat. 69 loop. Adjust Left channel stage speaker output at 79 dB SPL, when RIGHT solar cell input is shorted. Then, short LEFT solar cell input and set the Right stage speaker amplifier for 79 dB SPL. Remove short and set center channel stage speaker for 85 dB SPL. Use Choo-Choo loop to set surround channel level in the auditorium.

- Switch MONO-STEREO panel switch to MONO. Adjust mono level pot for 80 dBA SPL. Calibrate input of SG1130 or SG110 Stereo Generator only after setting MONO level control.

- Adjust the music level control on the front panel for proper playback level in the auditorium.

SR135 INSTALLATION INSTRUCTIONS

The SMART SR135 Stereo Decoder is a compact, full four channel stereo optical film processor that updates the highly successful SR130 decoder. This advanced product offers the following new features:

- Single projector solar cell input with balanced transformerless circuitry. Low hum and RF pickup.

- Deluxe "Dynaspan Matrix" four channel decoding. The same module that is used in the SR300 Deluxe Decoder.

- Quiet surround channel time delay. Double chip design that provides wide bandwidth and low noise.

- All adjustments from the rear of the unit. No adjustments inside.

- Four channel fader allows wide range of auditorium volume settings.

- Direct output terminal to feed a Stereo Generator or monitor that is not affected by master fader settings.

- All steel chassis affords high isolation against hum producing booth equipment.

- Heavy duty premium lever switches on the front panel for manual operation, and remote control of music-film transition.

These features, along with hookup and calibration procedures will be discussed in this manual.

PRELIMINARY INSTALLATION. Select a well ventilated place in the equipment rack to install the SR135. Make sure the unit is not immediately adjacent to hum producing magnetic fields radiated by large power transformers. The preamplifier section of the SR135 has a large amount of available gain that will amplify hum fields if proper attention *is not given to placement.* Make sure the AC power cord is plugged into a grounded receptacle for protection to the theatre staff, and to reduce the chances of a ground loop in the system.

SOLAR CELL WIRING. The film stereo preamplifier uses a transformerless balanced input circuit that affords very high common mode rejection to hum and electrical noise pickup. This balanced input MUST BE maintained by using a *three conductor shielded audio cable from the stereo solar cell* to the inputs of the SR135. If three conductor shielded cable is not available, you may use *a pair* of two conductor cables in order to have enough conductors to carry the signals. Also, the proper cable is available from SMART in any length you require. Refer to Fig. 1 for proper wiring of either type of cable.

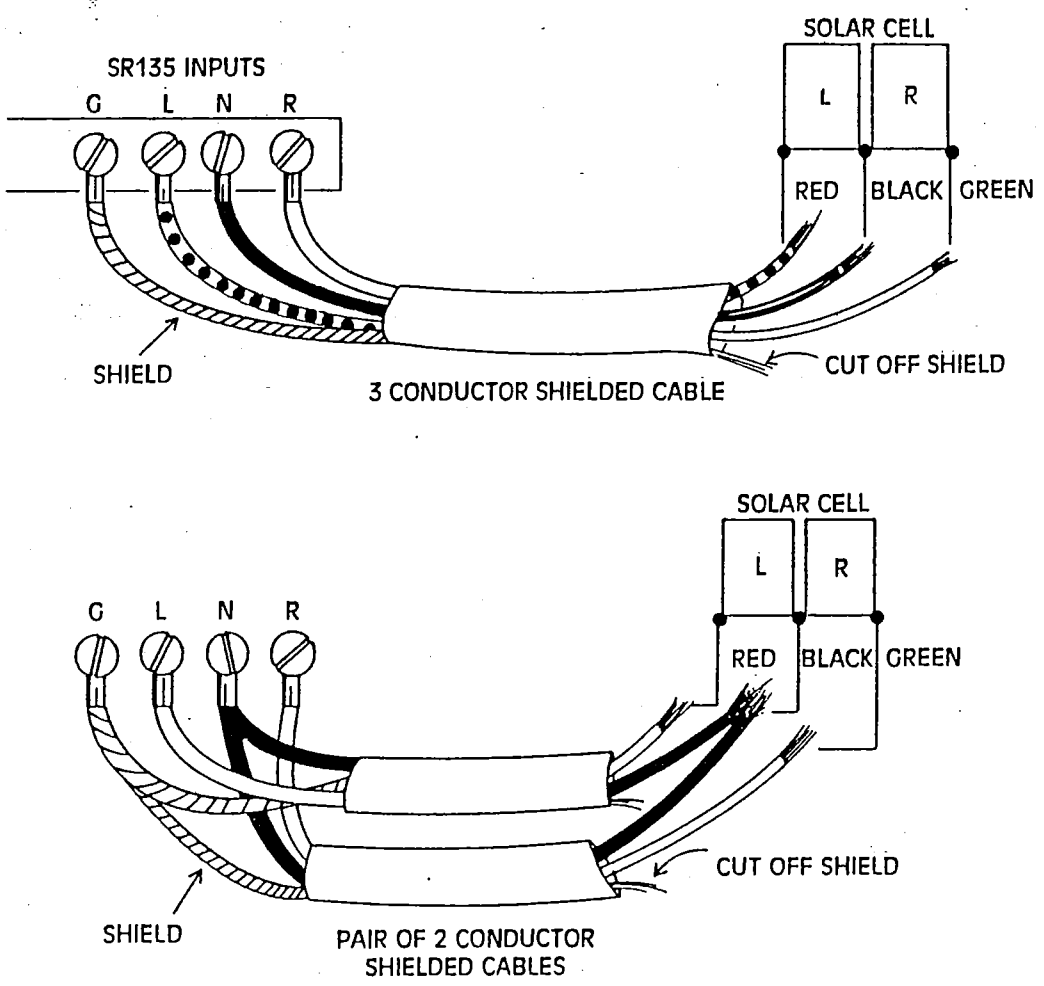


Fig. 1

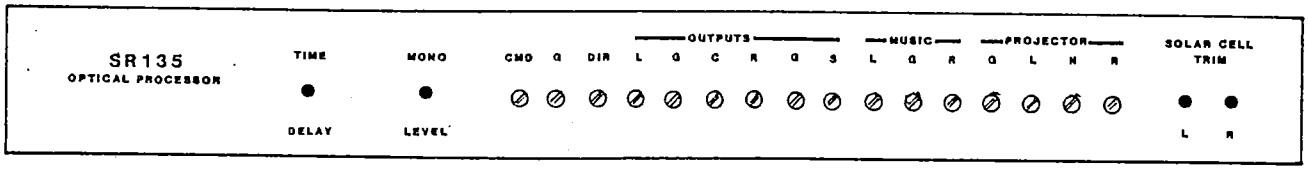
SOLAR CELL HOOKUP. Connect the wire from the left solar cell(red) to the (L)eft input terminal of the SR135. Connect the wire from the right solar cell(green) to the (R)ight input terminal. The neutral solar cell lead (black) should be connected to the (N)eutral input terminal, and the shield of the cable to the (G)round terminal. Be sure to *cut off the shield at the projector end* so that a ground loop is not created. Only the SR135 end of the shielded cable should be connected.

CAUTION

DOUBLE CHECK your work to see that the solar cell leads arrive at the proper terminals. A reversal of two of the three leads will cause very strange results. You may hear the center channel information through the surround speakers, the surround through the stage, and the left channel out of phase with the right. This is a common error, so verify correct wiring before proceeding.

OUTPUT CONNECTIONS. The respective outputs of the four channel decoder are labeled (L)eft, (C)enter, (R)ight, and (S)urround. A shielded wire connected to each of these output terminals are connected to the proper inputs of four power amplifiers. A convenient (G)round terminal between the output terminals may be used for one or more cable shield connections. The output level of these terminals is affected by the setting of the master fader.

DIRECT OUTPUT. The output terminal labeled "DIR"(direct) is used to feed a stereo generator similar to the SMART SG1130. It contains the sum of the signals that appear on the main outputs. This separate output is not affected by the setting of the master fader, and remains constant. You may connect an active monaural booth monitor to this terminal for monitoring the film soundtrack. The monitor must contain it's own amplifier. However, the intermission music *does not appear at this output,* as it does on the main outputs. Connect a shielded wire from the direct output to the input of the stereo generator. Ground the shield.



REAR VIEW OF CHASSIS

COMMAND TERMINAL. The four channel intermission music fade circuit is activated remotely by grounding the command terminal. When grounded, the *film source is muted* and the music will fade-in. When the command terminal is un-grounded, the film sound will appear at the main outputs, and the music will slowly fade-out. Connect a pair of unshielded twisted pair wires to the command terminal and a nearby (G)round terminal. A remote SPST switch may be positioned near the projector(s) to activate the transition. If no remote switch is desired, the front panel MUSIC-FILM switch provides the same action. When remote switching is used, the MUSIC-FILM switch *must always be left in the FILM position.*

MUSIC INPUT PADS. There are two fixed input attenuators that set the gain range of the stereo music inputs. This is necessary because of the wide range of tape players that are available on the market. Some may have a very high output level, while others are medium output. To avoid overdriving the inputs to the SR135 music inputs, the product is shipped with the internal "shunt" tabs in the high level position. This will accommodate most high level players without the risk of overdrive distortion and crosstalk to the film channel. The front panel MUSIC LEVEL control should run between 2 o'clock and 4 o'clock for normal operation. This gives the operator some working range if he wishes to adjust for minor tape recording variations. If the tape player used does not have sufficient output capability to drive the music inputs, remove the top chassis cover and move the two "shunts" to the LOW position. This will add 12 dB of gain to each music input channel. Again, the MUSIC LEVEL panel control should operate in the 2 to 4 o'clock position for minimum crosstalk to the film channel.

MUSIC LEVEL CONTROL. The front panel music level control allows the operator to set the auditorium music loudness at a different setting from the film level. Often pre-show music is lower in volume than the feature film. This control is independent from the master fader, and should operate in the high end of it's range.

ADJUSTMENT AND CALIBRATION PROCEDURES

The setup and adjustment to the SR135 is simple and straight forward. An accurate service meter or scope is all that is needed to calibrate the product. However, before any adjustments can be made, you must make sure the split stereo solar cell is perfectly aligned in order for the decoder to properly process the stereo soundtrack. To align the solar cell:

1. Turn off all power amplifiers that are connected to the outputs of the SR135. Open the master fader to its maximum position.

2. Connect one probe of your dual trace scope to the left output of the SR135. Connect the scope ground clip to the nearest ground terminal.

3. Connect the other probe lead to the right output terminal of the SR135. Ground the lead clip to the nearest ground terminal.

4. Run a LEFT-RIGHT test loop on the projector and adjust the solar cell for minimum crosstalk on each channel.

5. Run a pink noise loop or 9KHz loop to set the azimuth and focus of the sound lens while monitoring with an X-Y setting on the scope. These settings are critical to good high frequency response and crosstalk rejection on the surround channel. Focus affects response and azimuth affects the amount of crosstalk on the surround channel.

NOTE: You may not measure the exact same level from each half of the split solar cell when connected to the outputs of the SR135 due to minor sensitivity differences in the solar cell sections, small gain differences in the SR135, and action of the Matrix decoder on the side channels. Ignore these differences during this phase of installation. Balancing can be accomplished in the later stages of installation.

6. Replace the left-right alignment loop with the Dolby cat.69 reference level loop. Move the probe of your meter or scope to the **DIRECT** output and monitor the level while adjusting the input trim controls for each preamplifier. Here is the procedure:

A. Temporarily short one solar cell input with a short piece of wire from the Left solar cell input to the neutral terminal.

B. Adjust the Left preamplifier trim control (located on the rear of the chassis) until you read .5 volts output on your meter or scope.

C. Move the temporary short from the Left solar cell to the Right solar cell. (between right and neutral).

D. Adjust the Right preamplifier trim control until you read .5 volts on the center channel output.

E. Move your meter probe to the surround output terminal. Remove the shorting wire on the solar cell inputs. Slowly adjust either the left or right preamplifier input trim controls until you observe the lowest possible reading on your meter. This is the null setting which controls the crosstalk between the center stage channel and surround.

F. Lower the master fader setting from its maximum setting to about mid scale (12 o'clock).

This completes the set up of the stereo film system in the SR135. the next step is to balance the auditorium levels, mono level, and time delay setting.

AUDITORIUM LEVEL. With the Master Fader set at mid-position, run the pink noise side of the Cat.69 test loop. *The pink noise track is recorded 12 dB lower in level than the SVA reference tone on the opposite side of the film.* Turn all level controls on the individual power amplifiers to their minimum settings and apply AC power to the amps. Temporarily *short the LEFT solar cell wire* from the solar cell input to the neutral terminal. Raise the level of the RIGHT power amplifier until 79 dBA is present at the rear of the auditorium. If you don't have a sound pressure meter for these measurements, adjust for normal listening level. Now *un-short the LEFT solar cell lead* and *short the RIGHT solar cell lead to neutral* at the input of the SR135. Adjust the LEFT channel power amplifier level for 79 dBC in the room.

Un-short the Right solar cell lead and raise the CENTER channel power amplifier level to a reading of 85 dBC (this is temporary) in the auditorium. **NOTE:** You may have noticed that when you connected the other solar cell lead to the SR135, the side channels went down considerably in level. This is because the matrix circuit senses in-phase material that produces a "hard" center channel. When left or right program material appears on the stereo optical soundtrack the side channels will be at their proper level.

While the center channel is still reproducing the pink noise, raise the Master Fader until the sound pressure meter reads 85 dBC. Keep the loop running for the next phase of the setup procedure.

MONAURAL LEVEL. A small control on the rear of the chassis controls the playback level of the mono soundtrack. Switch the front panel STEREO-MONO switch to the MONO position. While the pink noise loop is running, adjust the sound level in the auditorium to 80 dBC. This completes the mono and stereo stage speaker balance and level adjustments.

SURROUND CHANNEL ADJUSTMENTS. The surround channel speakers must be adjusted for level and time delay. Short *either* solar cell input lead to the neutral terminal. This will force the surround channel to full output. Using any available soundtrack (feature. trailers, short subject, etc.) adjust the time delay for a proper setting when standing ⅔rds of the length of the auditorium from the screen. The time delay control on the rear of the chassis increases the delay with a clockwise rotation of the control. A point will be reached where the sound from the center stage speaker and the sound from the surround speakers will be "syncronized". Adjust the control a little

farther to increase the delay about 10 milliseconds greater. This is the correct setting. The operating range of the built in time delay circuit in the SR135 is from 30 milliseconds to 105 milliseconds.

Replace the film you were using for the time delay test with a Front-surround test loop (choo-choo track). The sound on this track will quickly alternate between the center channel and the surround channel. Adjust the surround channel power amplifier for equal sound pressure from the front stage speaker and the surround speakers.

FINAL CHECKOUT. It's now showtime! Place a reel of feature film stereo optical material on the projector and evaluate your work. Pay particular attention to any crosstalk that appears on the surround channel. The small amount that may appear could be due to projector "skew" caused by lateral play in the soundhead mechanism. Normally the time delay on the surround channel will mask the crosstalk so that the audience is not aware of it.

During soundtrack passages of dialog, the sound should be reproduced through the center stage speaker Side channels (left-stage and right-stage) should be down considerably. When music or effects appear on the track, the sides will be instantaneously opened for the proper balance of material. This "logic control" in the matrix module produces a hard center channel, and also reduces film noise on the side channels when only dialog is present in the photoplay.

BIG TIP. We recommend that the projector soundhead has a .6 mil (or smaller) slit in the optical sound lens for extended high frequency response. No slit correction circuitry is used in the SR135.

HOUSE EQUALIZATION. The performance of the SR135 can be improved with the addition of the EQ600 three channel Theatre Equalizer. This product follows the SR135 and shapes the room response of the house by removing large "lumps" in the speaker system response. Also, the soundtrack playback can be "sweetened" for a more pleasant overall sound quality. Refer to the EQ600 equipment manual for a complete description of features and capabilities.

DON'T TOUCH! Inside the SR135 chassis there are two upright pots on the main P.C. card that are factory adjusted for maximum common mode rejection of RF and extraneous noise at the inputs of the balanced solar cell preamplifier. Changing these settings will degrade the performance of the circuit. Also, two pots associated with the time delay section are factory adjusted for optimum bias to the MN3005 time delay chips. These pots are set for the individual characteristics of each chip and should not be touched unless a chip has been replaced.

ADDITIONAL COMMENTS

FRONT-SURROUND USE. The SR135 is ideally suited for theatres that intend to equip for two channel stereo using a single center screen stage speaker and surround speakers. The center channel output of the SR135 is not affected by the "Dyna-Span" matrix, and represents a sum of all front channels. Use the same set up and calibration procedure outlined in this manual for four channel operation, except for the auditorium balance settings of the LEFT and RIGHT stage channels.

SPLIT SURROUND. Very long, narrow theatres and large motion picture palaces have a special problem setting the time delay properly because of the extreme distance from the rear seats and the screen. If the time delay of the surround channel is set to accommodate listeners in the rear of the house, the listeners in the center of the auditorium will hear an echo due to the long delay setting. Likewise, if the time delay setting is set for the middle of the seating area, the listeners in the rear will hear crosstalk in the surround speakers because of insufficient delay "masking".

This problem can be corrected by using a second time delay following the built-in time delay in the SR135 . Set the SR135 for proper delay in the center of the auditorium. Feed the input of another time delay product from the output terminals of the SR135. Adjust the second delay to accommodate the rear seats. Check for proper playback level through each system with a "choo-choo" test loop. This method requires another surround channel power amplifier and separate wiring to the second group of speakers. An ideal product for this application is the SMART TTD360 Time Delay.

POWER AMPLIFIERS. Some power amplifiers do not have input level controls and rely on the device that is feeding it to control the drive. The SR135 does not have individual output trim pots. The master fader will vary the stereophonic signals to the amplifier, but cannot adjust individual balance between channels. We suggest you use only amplifiers that have some type of input adjustment controls when interfacing a SR135 to the system.

BOOTH MONITORING. The SR135 has two outputs that can drive an active booth monitor (one that has it's own amplifier). The main outputs feed each channel of the house power amplifiers. The direct output feeds a Stereo Generator accessory, but *does not* include intermission music at this output. However,the direct output produces a constant level that is not affected by the setting of the Master Fader. It also sums the stereophonic channels for use with a monaural booth monitor. The ideal product to use with the SR135 is the SMART EX500 four channel active monitor-exciter lamp supply, or the MN520 four channel active monitor. This allows the operator to listen to each channel that is being sent to the separate power amplifiers.

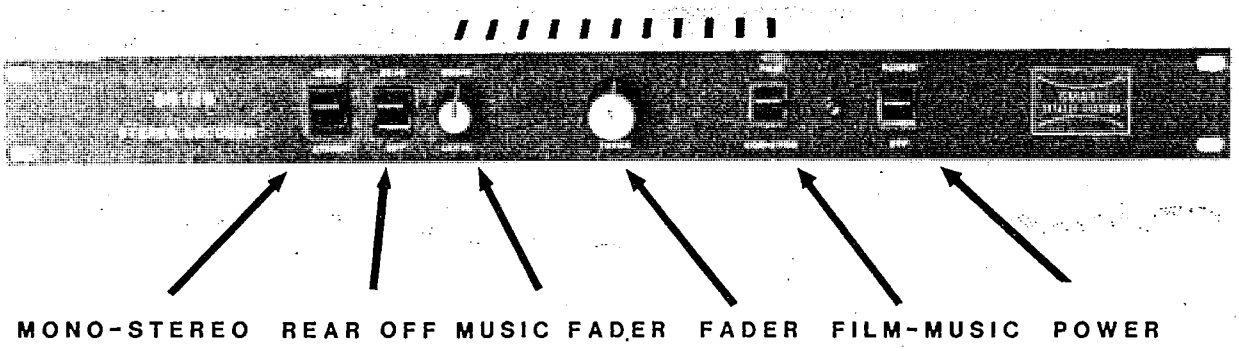
STEREO GENERATOR CONNECTION. If the SR135 is to be used with the SMART SG1130B or SG1130BX 4 channel stereo generator, or the SG1100 Front-Surround Generator, a shielded wire must be connect between the DIR(direct) output terminal and the number one (1) input of the Stereo Generator. The outputs of the Generator and the outputs of the SR135 must be switched into the next piece of equipment (equalizer, amplifier, etc.) through a switch panel. The SMART SW900 4 channel switch panel is ideal for this use. Calibrate the input to the Stereo Generator with the Dolby cat. 69 reference tone until the front panel LED blinks on. This can only be done after you have set the mono level in the SR135.

GROUNDING PRACTICE. Good grounding practice in a theatre sound system assures the lowest possible noise pickup from extraneous spikes and AC line garbage generated by other booth equipment. Do not rely on the ground plug on the AC power line for good earth ground. It may be several ohms above actual earth ground. Find a good electrical ground in the booth (do NOT rely on metal water pipes) and run a braided ground strap or heavy gauge wire to this point from the equipment rack. Sometimes this is difficult in an old building. Water pipes are now being outlawed as electrical ground points in many communities due to the chance of shock to plumbers. A good ground system is well worth the effort and extra expense. Follow all other recommended grounding procedures.

SCREENING ROOM USE. The SR135 has an adjustable time delay range of 30 milliseconds to 105 milliseconds on the surround channel output. This range will accommodate proper settings in most standard or mini-cinema auditoriums. When the SR135 is used in rooms smaller than 30 feet in length, the time delay may be at the "edge" of it's adjustment range. A factory modification of the time delay section of the product will allow a shorter delay adjustment. This special modification is by request when the order is placed with the factory, and a small charge is added to the purchase price for the changes.

WIDE SCREEN
STEREO

The **WIDE SCREEN STEREO** logo shown above may be used by the theatre that installs a SMART stereo product to advertise the playback capability of the theatre. This logo may be incorporated into a newspaper ad, program flyers, or reproduced for special promotional activities. The logo tells the patrons that the theatre is presenting it's feature in Stereo. This pertains to optical stereo, synthesized stereo, or magnetic 35MM/70MM formats.



OPERATION

(1) STEREO-MONO SWITCH. Format switch used to activate the four channel SVA stereo operation or monaural single channel playback. This switch should be left in the MONO position at all times unless you are playing a genuine stereo optical print. DO NOT run mono films in the stereo position.

(2) REAR OFF SWITCH. Allows you to turn off the rear channel when stereo prints do not contain any surround channel information. When the switch is off, any film noise that may be present is not allowed to pass to the surround speakers. The rear channel automatically mutes when the STEREO-MONO switch is in the MONO position.

(3) NON-SYNC LEVEL CONTROL. Adjusts the loudness of the intermission music source independently from the FILM sound. The playback level is usually set below the level of the main feature film presentation.

(4) MASTER FADER CONTROL. This control raises or lowers the level of the four channel film decoder outputs. It also controls the monaural soundtrack playback. It does not control the non-sync source level.

(5) FILM-NON-SYNC SWITCH. The SR135 has remote music fade capability that allows the non-sync source to be controlled by automation or a remote switch. If this feature has been provided in your system, make sure the switch is in the FILM position. If no remote switch has been installed, place the switch in the NON-SYNC position for intermission music, and in the FILM position for film playback.

(6) POWER SWITCH. This is the main power switch to the SR135. This switch is not used if the all of the sound system components are on a single master power switch or circuit breaker.

A more detailed description of the controls and features of the SR135 Stereo Decoder is given in the technical portion of this manual.

SR135 SERVICE

A fanning strip makes connecting input and output leads easier. Leads are permanently soldered to the strip and then mated to the screw terminals. If the unit ever has to be removed for service, the fanning strip can be quickly removed. Fanning strips may be ordered separately from SMART THEATRE SYSTEMS is you cannot procure them locally.

The latest SMART equipment uses "shunts", instead of switches to select the various operation selections. This is generally a one time function, and is set by the sound engineer during installation. To move the "shunt", simply pull the plastic shorting plug straight up, and place on the desired pins. Note that the two small holes face downward when properly installed.

Almost every component used in the SR135 is available locally from a radio parts house. The only parts that are not likely to be found are the special sealed modules, and the time delay chip. Refer to the schematic diagram and parts list for information regarding a component description. IC sockets are used to facilitate easy removal and replacement of any Integrated Circuit, should this ever become necessary.

Each unit is burned in for a minimum of 168 hours before Q.C. testing and packaging. A failure of one or more functions of the SR135 will result in a service call from the owner. Always check the obvious causes of the symptoms first.

1. Is the unit receiving A.C. power? (Power L.E.D. ON)

2. Has the fuse blown? (replace with ½ amp 3AG type only)

3. Are all panel switches in their proper position?

4. Is the supporting equipment functioning properly? (amplifiers, equalizers, exciter lamp supply, etc.)

When all symptoms point to an internal problem, your only choice is to substitute a spare (or similar piece of equipment) and fix the unit in the booth or shop.

A quick check of the power supply voltages will indicate the proper operating voltages for the active components. Place your service meter negative lead on a convenient chassis GROUND point. Switch the meter to the +30 D.C. range and measure the voltage input to the POSITIVE regulator (pin 1). It should be 18-24 volts. Now measure the output of the regulator (pin 3). This voltage should be very close to +15 volts. Now, do the same with the NEGATIVE regulator. Use the positive lead of your meter on the chassis GROUND, and the negative lead for voltage measurements. Pin 2 is the input to the regulator, and pin 3 is the output. Again, you should measure nearly -15 volts. If you cannot obtain the voltages mentioned, you could have a bad diode in the rectifier bridge, a shorted filter capacitor, or an open winding on the transformer. **BE CAREFUL NOT TO SHORT THE PINS ON THE REGULATORS WHILE MAKING THESE TESTS. A MOMENTARY SHORT COULD DESTROY THE IC REGULATORS.**

When you are satisfied that the voltages are correct, go the section for the circuitry that appears to be giving trouble. The most practical way to troubleshoot audio circuits is through signal tracing. Put an audio signal into the input and follow the signal with a scope until the signal stops. This method allows you to locate a defective component in the related section.

Since the SR135 uses a bi-polar supply, each audio IC op-amp output should measure nearly 0 volts D.C. with no signal. That is, you should be able to probe each output pin with your service meter and see a minimum offset. If the op-amp is showing a few volts at the output pin, it it likely that a bad capacitor or resistor is causing an input bias that forces the output of the amplifier to shift. A defective IC could also be the culprit. Also check for a hairline short in the PC card foil traces. Here are several tips that will aid in troubleshooting:

1. Make sure the switches are in the proper position before testing the unit.

2. Very hot IC's usually indicate an internal short.

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

4. Shorted input capacitors may bias an IC op-amp OFF.

5. Be sure IC's are firmly in their sockets. They can be vibrated loose during shipment.

Signal tracing procedures may also be employed when servicing the time delay portion of the SURROUND CHANNEL. A signal at the input, through the filter circuit, the delay chip, and the anti-alias filter will reveal where the signal has stopped. Refer to the schematic for pin identification of the signal flow. The HFE4047 clock associated with the delay chip must be operating properly for the audio signal to pass through the delay chip. An oscilloscope will reveal high level square wave pulses on pins 10 and 11 of the 4047 when this device is operating. If either phase of the clock fails, no audio can pass. We suggest you **NOT REMOVE** the delay chip itself unless you are positive it has failed. This component is very expensive, and can be easily destroyed by stray static caused by handling. The BIAS pots near the chips are factory set to each individual chip, and *should not be moved* unless the IC must be replaced by a new device.

The MATRIX MODULE in the SR135 contains many components and IC's that are factory calibrated. The module is not intended to be serviced without special test equipment and test fixtures. A defective module is replaced on an *EXCHANGE ONLY* basis. We suggest the SR135 be returned to the factory for servicing if a module failure is verified. The "plated through" holes on the main PC card are easily damaged when service is attempted without the aid of the proper de-soldering equipment.

An important part of any pre-service call is to make sure that the operator or other theater personnel is fully familiar with the operation of this equipment. Often service calls are made un-necessarily because the operator was not trained with the correct operation procedures.

MANY IC DEVICES CAN BE DESTROYED BY HANDLING. CMOS logic devices and Bi-FET Op Amps are very static sensitive. They are safe when plugged into their sockets, but removal can expose the inputs to conduct static electricity from tools, your hands, or other static generating components. USE PROPER HANDLING PROCEDURES when removing IC's from their sockets.

SMART THEATRE SYSTEMS maintains a factory service department that can provide quick handling of replacement parts, or telephone advice in the event of a problem in installation or service.

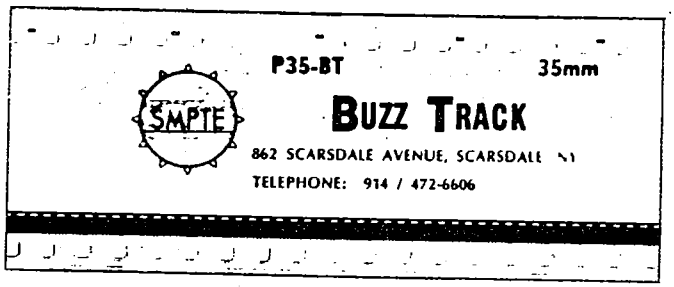
EXPORT MODELS. The SR135 can be supplied with the AC power transformer strapped for 230 volt 50/60 Hz operation. If you wish to change from 115 VAC to 230VAC or vice versa, special wire jumpers on the main PC board must be installed in their proper positions. Two (2) jumpers are required for 115 VAC operation, but only one (1) jumper is used for 230 VAC. The portion of the PC card that contains these parts is very crowded and not easily accessible. An easy method to effect a conversion is to remove the chassis top cover and "snip" the existing jumpers from the top side of the board. Replace the top cover and remove the bottom chassis cover. You now have a clear view of the area in which the new jumpers must be installed. The double sided PC card will easily permit new jumpers to be soldered into position. After the jumpers are installed, remove the AC power plug used on domestic U.S. units and refit with the desired local type plug.

SMART
THEATRE SYSTEMS

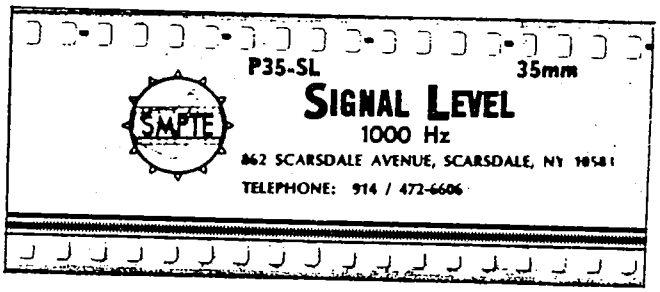
STANDARD 35MM TEST FILMS

Test films are basic to the alignment and calibration of many stereo optical and monaural sound theatre systems. Several of these films are available from SMPTE, while others are produced by Dolby Labs.

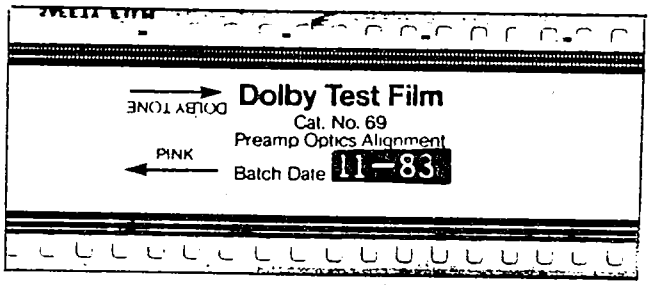
Loops may be made by wrapping and splicing a length of test film so that it forms a circle. Generally 5 feet is more than enough. The test "loop" is threaded only through the optical sound head components. Threading procedures will vary among different brands of sound heads.



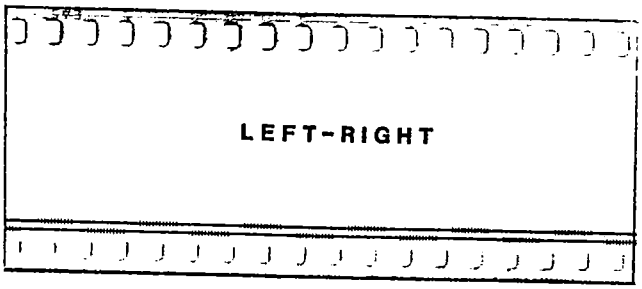
BUZZ TRACK. Is Used to set the lateral position of the "idler" or sound impedance drum. As the adjusting screw is turned a high frequency sound is heard, or a low buzz. Adjust the drum until your are between the two tones, and no sound is heard.



SIGNAL LEVEL. A 1 kHz tone used to set reproducible level in monaural systems. The level is not an absolute reference, but may be used as a reference if special equipment is calibrated to this film.



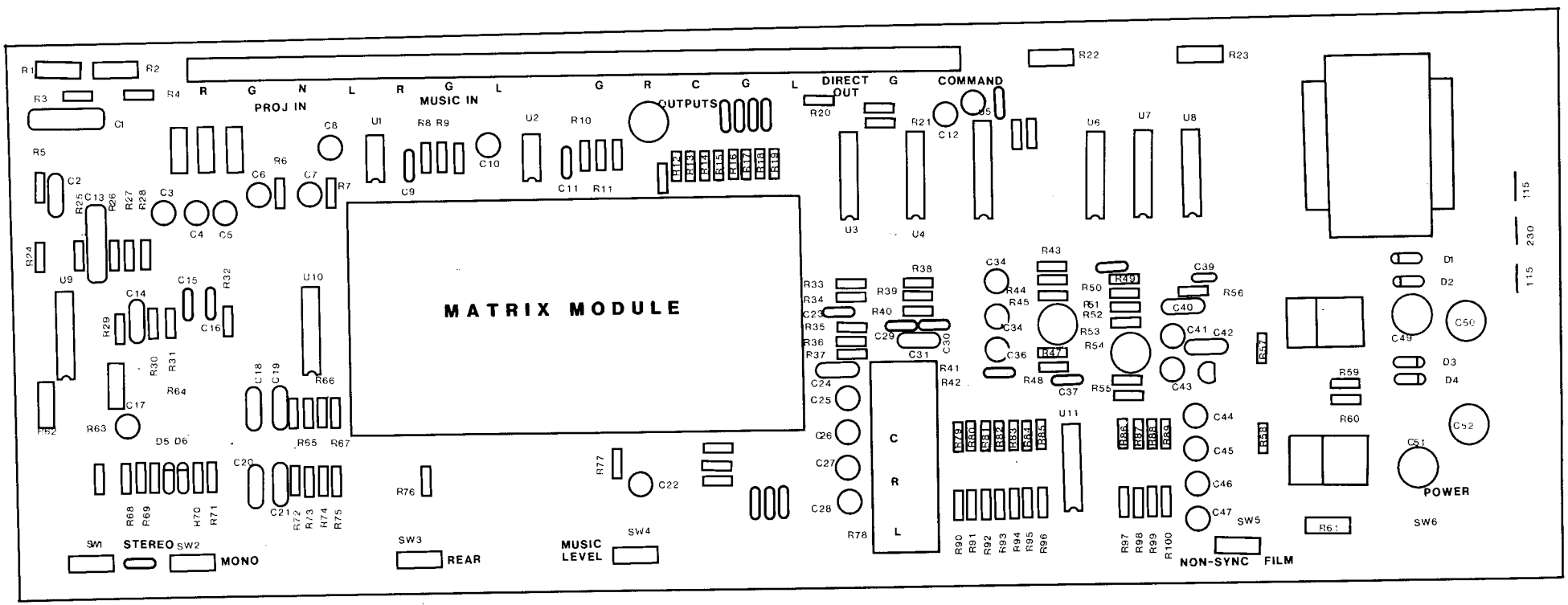
DOLBY TEST FILM. Contains two test tracks. One is the Dolby reference tone for setting noise reduction tracking, and the other is pink noise for EQ applications. Film is turned over to use each side.



LEFT-RIGHT. Alignment film for setting mechanical position of a split stereo solar cell. Must be used with a dual trace oscilloscope with each input monitoring a each channel of the solar cell outputs.

Many other special test films are available for sound system alignment.

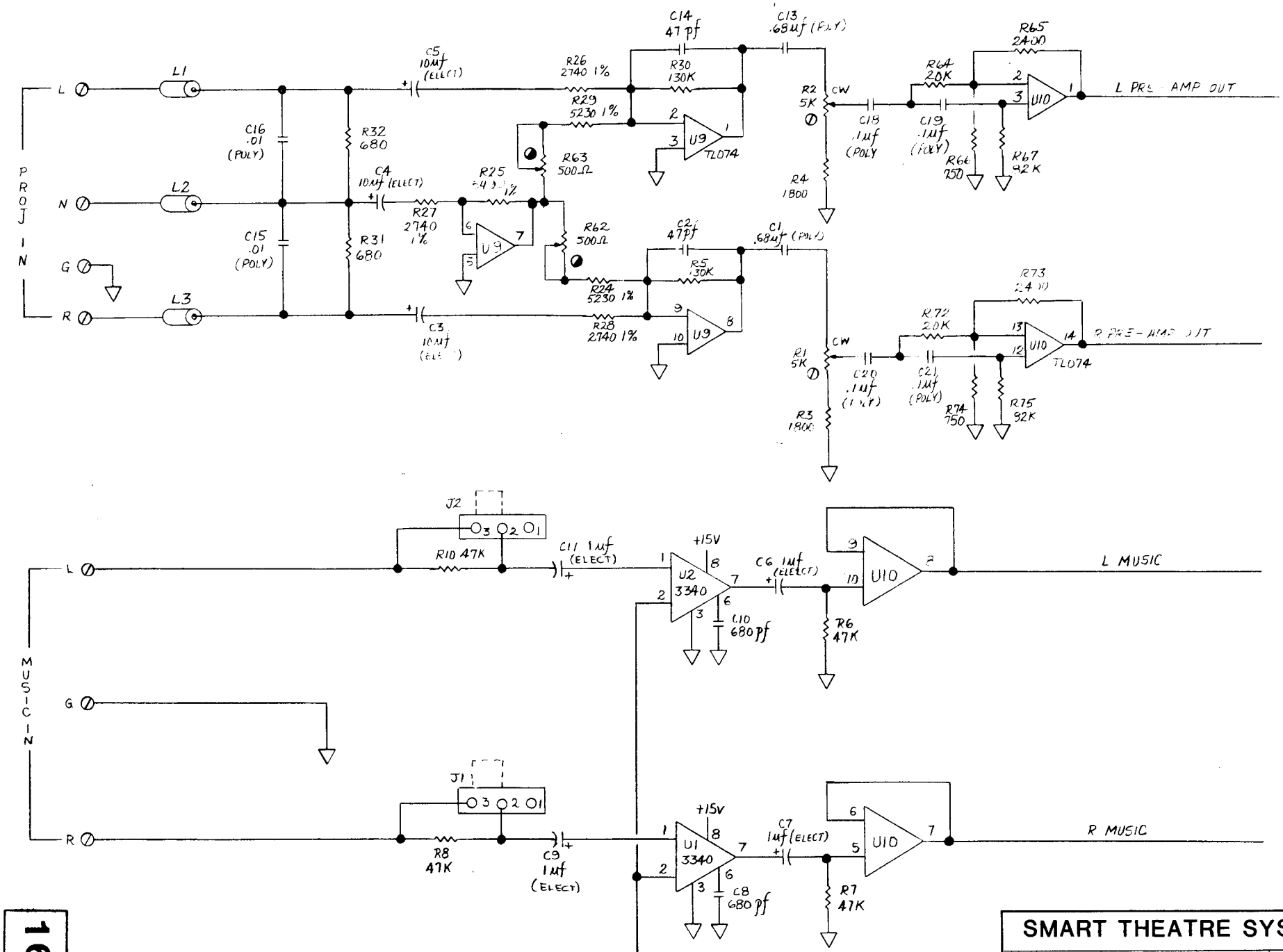
SR135 Stereo Decoder



SR135 PARTS PLACEMENT DIAGRAM

SR135 PARTS LIST

DESIG NATON	PART	VALUE	RATING
C001	CAPACITOR	.68 UF	POLY, 50VDC
C002	CAPACITOR	47 PF	CERAMIC, 50VDC
C003	CAPACITOR	10 UF	ELECTRO, 25VDC
C004	CAPACITOR	10 UF	ELECTRO, 25VDC
C005	CAPACITOR	10 UF	ELECTRO, 25VDC
C006	CAPACITOR	1 UF	ELECTRO, 50VDC
C007	CAPACITOR	1 UF	ELECTRO, 50VDC
C009	CAPACITOR	1 UF	ELECTRO, 50VDC
C010	CAPACITOR	680 PF	CERAMIC, 50VDC
C011	CAPACITOR	1 UF	ELECTRO, 50VDC
C012	CAPACITOR	22 UF	ELECTRO, 16 VDC
C013	CAPACITOR	.68 UF	POLY, 50VDC
C014	CAPACITOR	47 PF	CERAMIC, 50VDC
C015	CAPACITOR	.01 UF	POLY, 100VDC
C016	CAPACITOR	.01 UF	POLY, 100VDC
C017	CAPACITOR	4.7UF	ELECTRO, 16VDC
C018	CAPACITOR	.1 UF	POLY, 50VDC
C019	CAPACITOR	.1 UF	POLY, 50VDC
C020	CAPACITOR	.1 UF	POLY, 50VDC
C021	CAPACITOR	.1 UF	POLY, 50VDC
C022	CAPACITOR	10 UF	ELECTRO, 25VDC
C023	CAPACITOR	470 PF	CERAMIC, 50VDC
C024	CAPACITOR	330 PF	CERAMIC, 50VDC
C025	CAPACITOR	10 UF	ELECTRO, 25VDC
C026	CAPACITOR	10 UF	ELECTRO, 25VDC
C027	CAPACITOR	10 UF	ELECTRO, 25VDC
C028	CAPACITOR	10 UF	ELECTRO, 25VDC
C029	CAPACITOR	.022UF	POLY, 100VDC
C030	CAPACITOR	680 PF	CERAMIC, 50VDC
C031	CAPACITOR	.0068	POLY, 50VDC
C034	CAPACITOR	1 UF	ELECTRO, 50 VDC
C035	CAPACITOR	1 UF	ELECTRO, 50VDC
C036	CAPACITOR	4.7 UF	TANTALUM, 16VDC
C037	CAPACITOR	680 PF	CERAMIC
C038	CAPACITOR	.1 UF	CERAMIC, 50VDC
C039	CAPACITOR	330 PF	CERAMIC, 50VDC
C040	CAPACITOR	.1 UF	CERAMIC, 50VDC
C041	CAPACITOR	10 UF	ELECTRO, 25VDC
C042	CAPACITOR	.1 UF	CERAMIC
C043	CAPACITOR	1 UF	ELECTRO, 50VDC
C044	CAPACITOR	22 UF	ELECTRO, 16VDC
C045	CAPACITOR	22 UF	ELECTRO, 16VDC
C046	CAPACITOR	22 UF	ELECTRO, 16VDC
C047	APACITOR	22 UF	ELECTRO, 16VDC
C048	CAPACITOR	1000UF	ELECTRO, 10VDC
C049	CAPACITOR	100 UF	ELECTRO, 16VDC
C050	CAPACITOR	2200	ELECTRO, 35VDC
C051	CAPACITOR	100 UF	ELECTRO, 16VDC
C052	CAPACITOR	2200	ELECTRO, 35VDC
C053	CAPACITOR	.018UF	POLY, 50VDC
C054	CAPACITOR	.15 UF	CERAMIC, 50VDC
C055	CAPACITOR	.15 UF	CERAMIC, 50VDC
C056	CAPACITOR	.15 UF	CERAMIC, 50VDC
C057	CAPACITOR	.01 UF	POLY, 100VDC
C058	CAPACITOR	.01 UF	POLY, 100VDC
C059	CAPACITOR	.01 UF	POLY, 100VDC
C060	CAPACITOR	.01 UF	POLY, 100VDC
C062	CAPACITOR	.27 UF	POLY, 50VDC
C063	CAPACITOR	.1 UF	CERAMIC, 50VDC
C064	CAPACITOR	2.2 UF	ELECTRO, 16VDC
R001	POT, TRIM	5K	P.C. MOUNT
R002	POT, TRIM	5K	P.C. MOUNT
R003	RESISTOR	1800	5% 1/4 WATT
R004	RESISTOR	1800	5% 1/4 WATT
R005	RESISTOR	130K	5% 1/4 WATT
R006	RESISTOR	47K	5% 1/4 WATT
R007	RESISTOR	47K	5% 1/4 WATT
R008	RESISTOR	47K	5% 1/4 WATT
R010	RESISTOR	47K	5% 1/4 WATT
R012	RESISTOR	100K	5% 1/4 WATT
R013	RESISTOR	100K	5% 1/4 WATT
R014	RESISTOR	100K	5% 1/4 WATT
R015	RESISTOR	100K	5% 1/4 WATT
R016	RESISTOR	100K	5% 1/4 WATT
R017	RESISTOR	100K	5% 1/4 WATT
R018	RESISTOR	100K	5% 1/4 WATT
R019	RESISTOR	100K	5% 1/4 WATT
R021	RESISTOR	100	5% 1/4 WATT
R022	POT, TRIM	25K	P.C. MOUNT
R023	POT, TRIM	10K	P.C. MOUNT
R024	RESISTOR	5230	1% 1/4 WATT
R025	RESISTOR	5490	1% 1/4 WATT
R026	RESISTOR	2740	1% 1/4 WATT
R027	RESISTOR	2740	1% 1/4 WATT
R028	RESISTOR	2740	1% 1/4 WATT
R029	RESISTOR	5230	1% 1/4 WATT
R030	RESISTOR	130K	5% 1/4 WATT
R031	RESISTOR	680	5% 1/4 WATT
R032	RESISTOR	680	5% 1/4 WATT
R033	RESISTOR	2200	5% 1/4 WATT
R034	RESISTOR	2200	5% 1/4 WATT
R035	RESISTOR	39K	5% 1/4 WATT
R036	RESISTOR	39K	5% 1/4 WATT
R037	RESISTOR	47K	5% 1/4 WATT
R038	RESISTOR	750	5% 1/4 WATT
R039	RESISTOR	7500	5% 1/4 WATT
R040	RESISTOR	7500	5% 1/4 WATT
R041	RESISTOR	12K	5% 1/4 WATT
R042	RESISTOR	7500	5% 1/4 WATT
R043	RESISTOR	10K	5% 1/4 WATT
R044	RESISTOR	15K	5% 1/4 WATT
R045	RESISTOR	1200	5% 1/4 WATT
R047	RESISTOR	33K	5% 1/4 WATT
R048	RESISTOR	3300	5% 1/4 WATT
R049	RESISTOR	100K	5% 1/4 WATT
R050	RESISTOR	2200	5% 1/4 WATT
R051	RESISTOR	2200	5% 1/4 WATT
R052	RESISTOR	100K	5% 1/4 WATT
R053	POT, TRIM	2K	P.C. MOUNT
R054	POT, TRIM	10K	P.C. MOUNT
R055	RESISTOR	100K	5% 1/4 WATT
R056	RESISTOR	3900	5% 1/4 WATT
R057	RESISTOR	470	5% 1/4 WATT
R058	RESISTOR	470	5% 1/4 WATT
R059	RESISTOR	10K	5% 1/4 WATT
R060	RESISTOR	10K	5% 1/4 WATT
R061	RESISTOR	2400	5% 1/2 WATT
R062	POT,TRIM	500	P.C. MOUNT
R063	POT, TRIM	500	P.C. MOUNT
R064	RESISTOR	20K	5% 1/4 WATT
R065	RESISTOR	2400	5% 1/4 WATT
R066	RESISTOR	750	5% 1/4 WATT
R067	RESISTOR	82K	5% 1/4 WATT
R068	RESISTOR	47K	5% 1/4 WATT
R069	RESISTOR	470K	5% 1/4 WATT
R070	RESISTOR	3300	5% 1/4 WATT
R071	RESISTOR	470K	5% 1/4 WATT
R072	RESISTOR	20K	5% 1/4 WATT
R073	RESISTOR	2400	5% 1/4 WATT
R074	RESISTOR	750	5% 1/4 WATT
R075	RESISTOR	82K	5% 1/4 WATT
R076	RESISTOR	470K	5% 1/4 WATT
R077	RESISTOR	1800	5% 1/4 WATT
R078	POT, PANEL	10K	4 GANG MASTER
R079	RESISTOR	10K	5% 1/4 WATT
R080	RESISTOR	22K	5% 1/4 WATT
R081	RESISTOR	22K	5% 1/4 WATT
R082	RESISTOR	10K	5% 1/4 WATT
R083	RESISTOR	47K	5% 1/4 WATT
R084	RESISTOR	47K	5% 1/4 WATT
R085	RESISTOR	22K	5% 1/4 WATT
R086	RESISTOR	100K	5% 1/4 WATT
R087	RESISTOR	100	5% 1/4 WATT
R088	RESISTOR	100K	5% 1/4 WATT
R089	RESISTOR	100	5% 1/4 WATT
R090	RESISTOR	10K	5% 1/4 WATT
R091	RESISTOR	100K	5% 1/4 WATT
R092	RESISTOR	100K	5% 1/4 WATT
R093	RESISTOR	47K	5% 1/4 WATT
R094	RESISTOR	22K	5% 1/4 WATT
R095	RESISTOR	10K	5% 1/4 WATT
R096	RESISTOR	22K	5% 1/4 WATT
R097	RESISTOR	100K	5% 1/4 WATT
R098	RESISTOR	100	5% 1/4 WATT
R099	RESISTOR	100K	5% 1/4 WATT
R100	RESISTOR	100	5% 1/4 WATT
R101	RESISTOR	47K	5% 1/4 WATT
R102	RESISTOR	1800	5% 1/4 WATT
R103	RESISTOR	2.2 M	5% 1/4 WATT
R104	RESISTOR	2.2 M	5% 1/4 WATT
R105	RESISTOR	2.2 M	5% 1/4 WATT
R106	RESISTOR	10K	5% 1/4 WATT
R107	RESISTOR	10K	5% 1/4 WATT
R108	RESISTOR	100K	5% 1/4 WATT
L1	INDUCTOR		FERRITE BEAD
L2	INDUCTOR		FERRITE BEAD
L3	INDUCTOR		FERRITE BEAD
D1	DIODE	1 AMP	SILICON 50V
D2	DIODE	1 AMP	SILICON 50V
D3	DIODE	1 AMP	SILICON 50V
D5	DIODE	1N4148	SIGNAL SILICON
D6	DIODE	1N4148	SIGNAL SILICON
VR1	REGUALTOR	7815	15 VOLT, 1 AMP
VR2	REGUALTOR	7915	15 VOLT, 1 AMP
VR3	REGULATOR	78L15	15 VOLT 300MA
U1	IC	MC3340	VCA
U2	IC	MC3340	VCA
U3	IC	CD4066	QUAD SWITCH
U4	IC	TL074	QUAD OP AMP
U5	IC	NE470	COMPANDER
U6	IC	MN3005	TIME DELAY
U7	IC	MN3005	TIME DELAY
U8	IC	CD4047	CLOCK
U9	IC	TL074	QUAD OP AMP
U10	IC	TL074	QUAD OP AMP
U11	IC	TL074	QUAD OP AMP
T1	TRANSFORMR	34-170	POWER TRANSFORM



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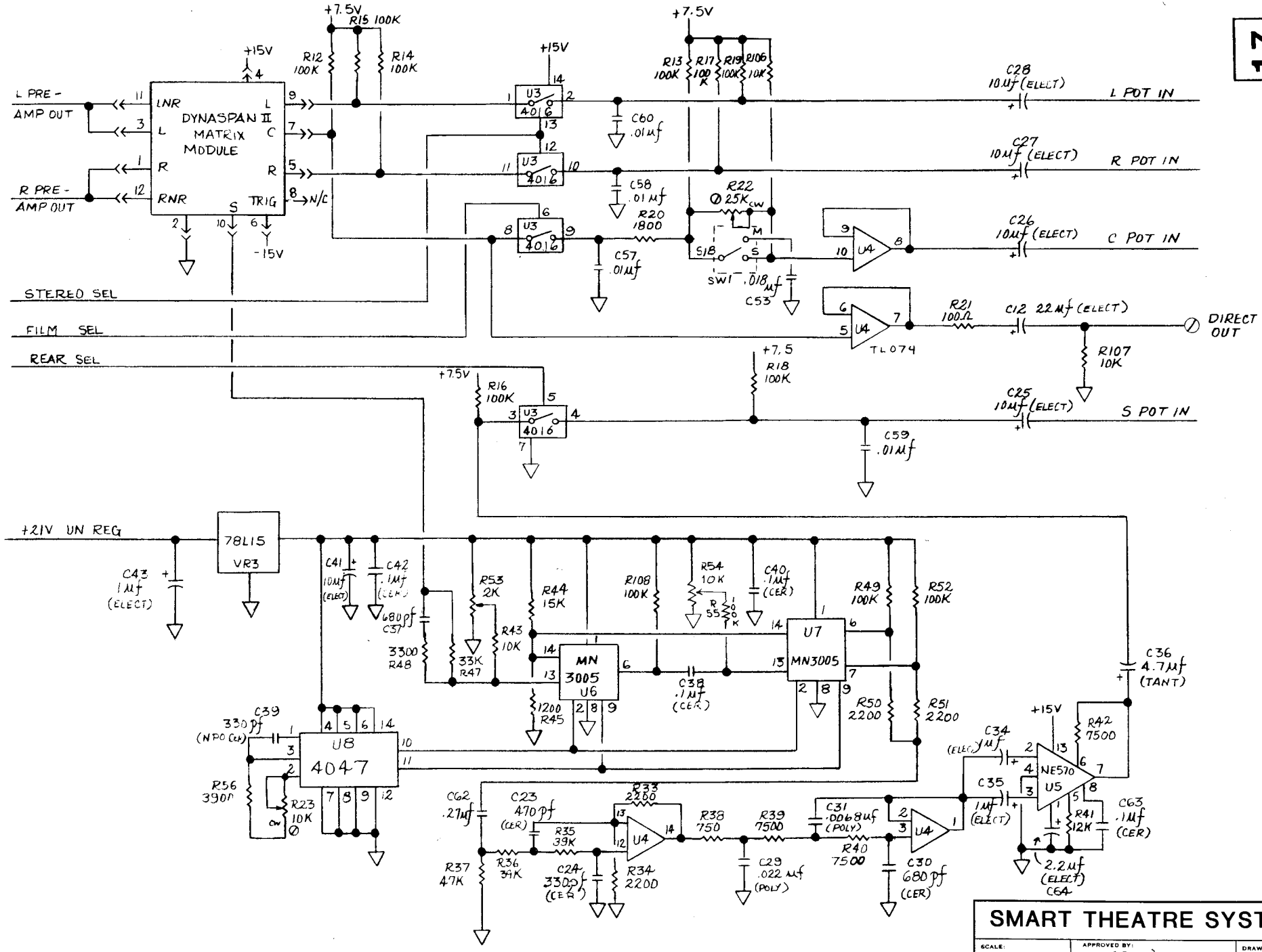
SMART THEATRE SYSTEMS

SCALE:	APPROVED BY:	DRAWN BY: RO'Thom
DATE: 2-23-84		REVISED

SR135 STEREO DECODER

SCHEMATIC SHEET 1 OF 5 | DRAWING NUMBER 0135B300

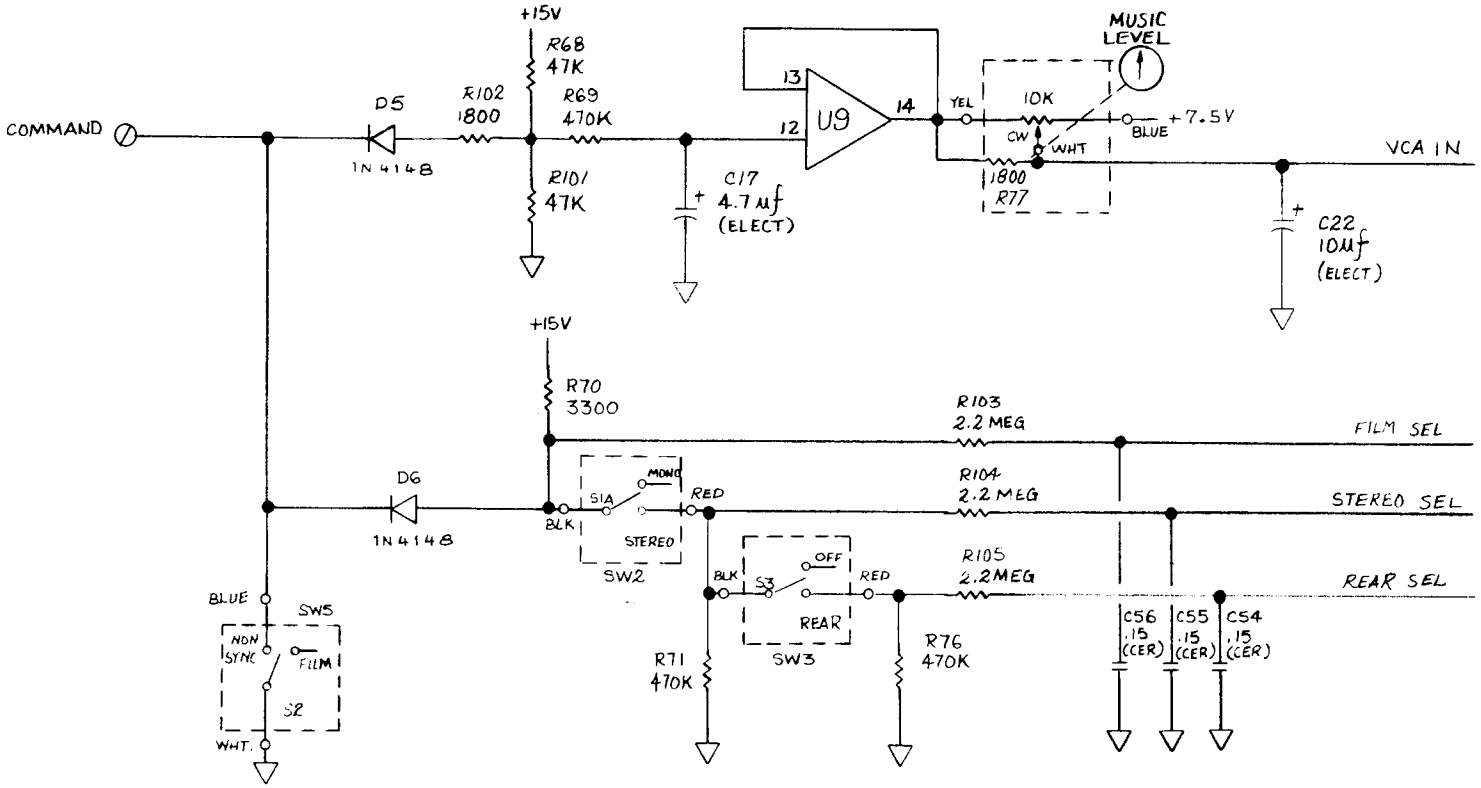


SMART THEATRE SYSTEMS

SCALE:	APPROVED BY:	DRAWN BY:
DATE: 2-23-84		REVISED

SR135 STEREO DECODER

SCHEMATIC SHEET 2 OF 5 — DRAWING NUMBER 0135B300



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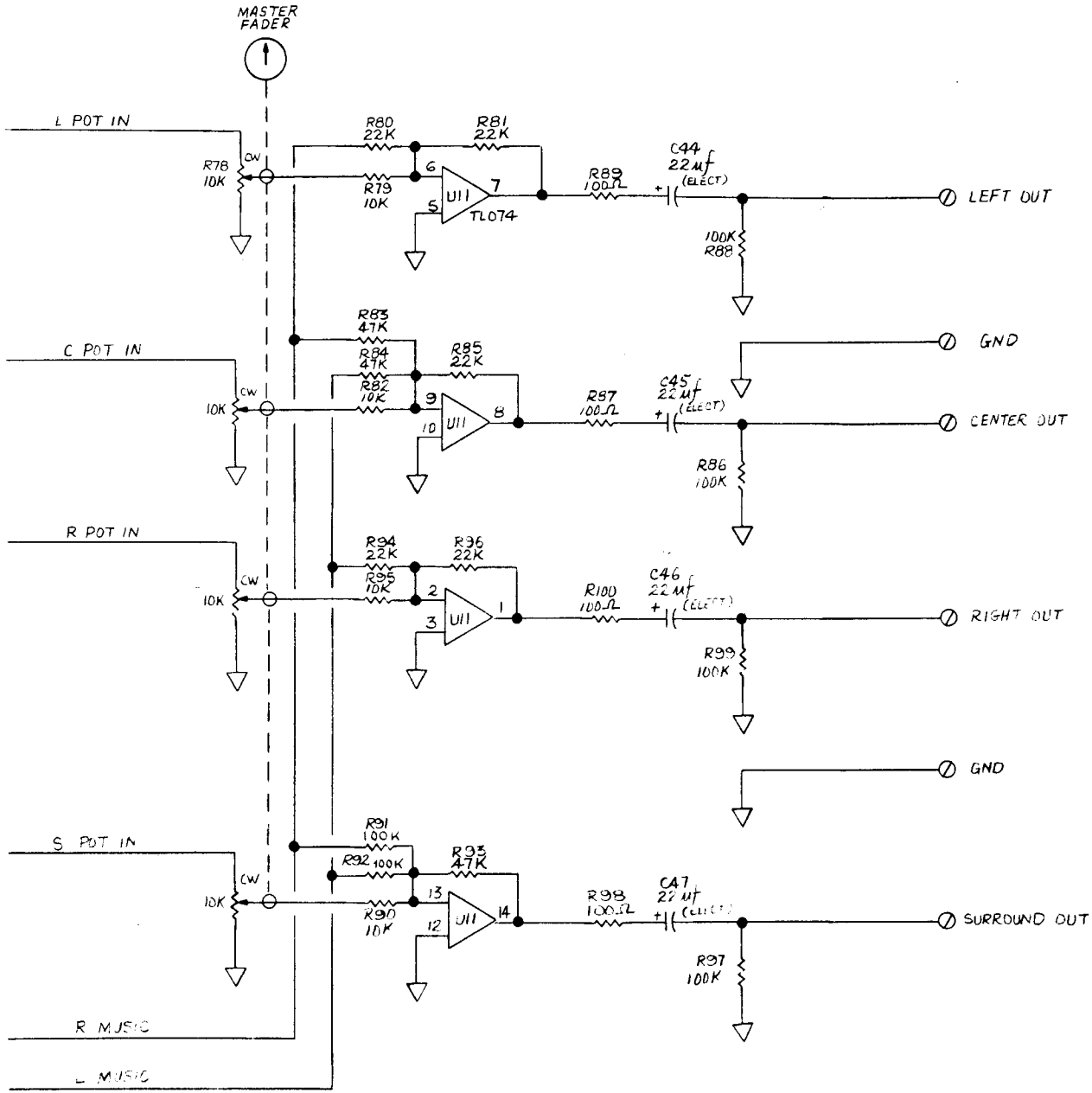
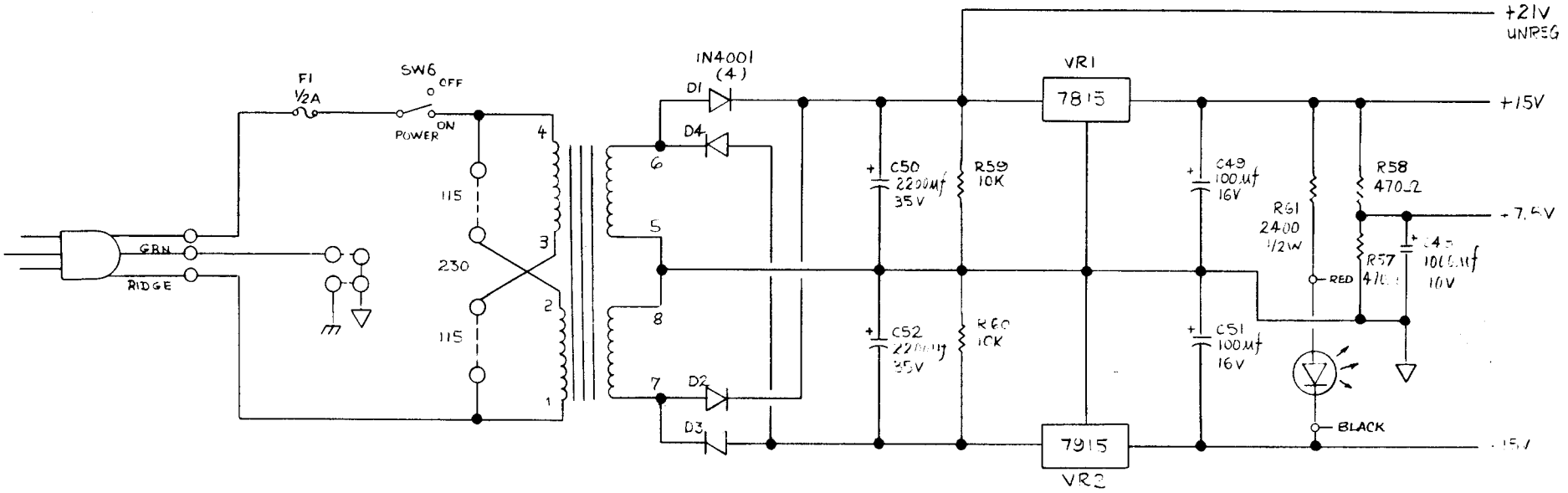
SMART THEATRE SYSTEMS		
SCALE:	APPROVED BY:	DRAWN BY:
DATE: 2-23-84		REVISED
SR135 STERE DECODER		
SCHEMATIC SHEET 3 OF 5		DRAWING NUMBER 0135B300



19

SMART THEATRE SYSTEMS		
SCALE:	APPROVED BY:	DRAWN
DATE: 2-23-84		REVISED
SR135 STEREO DECODER		
SCHEMATIC SHEET 4 OF		DRAWING NUMBER 0135B30



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SMART THEATRE SYSTEMS			
SCALE:	APPROVED BY:	DRAWN BY:	
DATE: 2-23-84		REVISED	
SR135 STER	DECODER		
SCHEMATIC		DRAWING NUMBER	