Film-Tech

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INSTALLATION AND OPERATION MANUAL

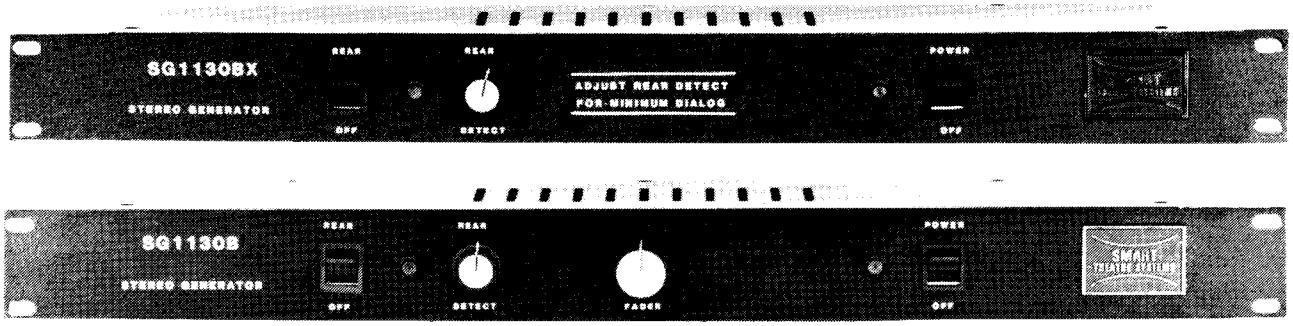
SG1130B & SG1130BX STEREO GENERATOR

SMART THEATRE SYSTEMS

SMART THEATRE SYSTEMS

3856 Green Industrial Way, Atlanta, GA 30341 (404) 452-1820

SG1130B & SG1130BX STEREO GENERATOR



THRILLING 5 CHANNEL STEREO-LIKE SOUND FROM A STANDARD MONAURAL SOUNDTRACK

FEATURES

- Synthesizes STEREO from MONO
- Wide Screen Stage Presentation
- Effective EFFECTS Surround
- Sub woofer Channel
- "Hard" dialog Localization
- Compatible with Old or New Systems
- No Special Solar Cell needed
- Full 1 year Limited Warranty
- Quality Engineered
- All Setup Controls on Chassis
- Solar Cell Input on SG1130B
- No "Extras" to buy
- Built-in Time Delay

WIDE SCREEN STEREO

The SG1130B and SG1130BX are the latest versions of the highly successful SG1130 Stereo Generator. These highly versatile products are valuable for today's modern motion picture theatre. Because a majority of feature film releases are still monaural recordings, the Stereo Generator may be used almost every day. Stereo optical films may be played through the system if a theatre receives a stereo print but does not have the proper equipment to decode the stereo information. A convincing stereo- like effect is created by this unit that will add spaciousness and fullness to a normally dull and lifeless monaural soundtrack.

The univeral design of the SG1130B makes the product easy to install in new or existing booths with almost any brand of supporting equipment. The SG1130B has it's own four channel fader control to allow the operator to match the sound levels of the theatre stereo or mono system. The SG1130B can also be used without a preamplifier, right from the projector solar cell.

The SG1130BX is a variation of the product that mates to the SMART SR300 Stereo Decoder. No Master fader is required because the SR300 controls all level and logic functions in the system.

The Stereo Generator creates a full five channel psuedo-stereo presentation from a single channel soundtrack source. Special circuitry assures that the center channel dialog material stays in the center, and does not drift to the side channels. This is a much more sophisticated scheme than found in competative products. The left and right stage channels are synthesized with a special process that produces 20 bands of material on each channel, creating a gaint spread of music and effects without "stretching" center channel dialog information.

A built-in surround generator directs soundtrack effects and music to the surround speakers so that the audience is enveloped in the action and excitement of the film. An internal time delay section is fully adjustable so that surround sound is in perfect "sync" with the stage sound. A subwoofer output on the SG1130B and SG1130BX provides bass enhancement if an additional subwoofer system is employed in the system.

All setup controls are accessible from the rear of the chassis for easy calibration. The Stereo Generator is undoubtly the most sophisticated and advanced synthesizer on the market.

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SG1130B & SG1130BX
STEREO GENERATOR

CRASH COURSE

In order to make the SG1130B or SG1130BX work well, you must **FOLLOW THE INSTRUCTIONS EXACTLY**. This product is *different than any other theater product* and demands special attention to detail during installation. **IF THE INSTALLER DOES NOT KNOW HOW THE PRODUCT WORKS, HE WILL LIKELY NOT GET IT TO WORK RIGHT.**

- Hook the output of booth preamplifier to the high level input of the SG1130B.
- Set master fader of the preamp (feeding the SG1130B) to a normal operating level.
- Run a Dolby reference tone loop on the projector.
- Set the INPUT control on the rear of the SG1130B until the front panel L.E.D. *"snaps"* on. (Disregard film splice in loop.)
- Set SG1130B MASTER FADER to the mid-position. (There is no Master Fader in the SG1130BX model.)
- Remove the Dolby loop and run a feature film (not trailers or snipes). Do NOT USE the *tone loop* for the next steps. Use a trailer or feature film.
- Move the TEST SWITCH on the rear of the chassis to the TEST position.
- Adjust the TIME DELAY control so that the sound from the surround speakers is in "sync" with the front speakers when standing *near the rear* of the auditorium.
- Set OUTPUT CONTROLS of the SG1130B to match the output level of your stereo decoder so that switching from real stereo to synthesized stereo is the same loudness.
- Adjust the front panel REAR DETECT control until the surround channel comes ON only during effects passages on the soundtrack. Clockwise rotation of this control increases the sensitivity, and counterclockwise reduces triggering of the surround. Fully counterclockwise is OFF.

A more complete description of the operation and adjustments of the SG1130B and SG1130BX is included in this manual.

SG1130B & SG1130BX INSTALLATION

There are now *two new versions* of the popular SMART SG1130 Stereo Generator, the SG1130B and the SG1130BX. These new versions have new circuitry, additional features, and improved performance. All installer adjustable controls are now accessible through holes in the chassis back panel. It is no longer necessary to remove the top cover to calibrate the system levels. The *only time* the top cover need be removed is to change the shunt which controls the center channel high frequency response. This shunt is normally in the *flat* response position as shipped, but it may be placed in the high frequency rolloff position if the center channel is too bright sounding. Most installers prefer the flat position because the preamplifier or processor feeding the unit has already been adjusted for the right response curve.

The SG1130B is a stand alone product that may be driven by a solar cell, or any brand of sound preamplifier or stereo processor. It contains a four channel MASTER FADER to adjust the synthesized output levels in order to match the levels of a stereo decoder. The MASTER FADER is also necessary when the Stereo Generator is fed directly from a solar cell *when a booth preamplifier is not used* in the system. A high level input is available if the unit is used with a Dolby™ processor, or other brand of stereo head-end equipment. Details of interfacing to various brands of equipment are described in other sections of this manual.

The SG1130BX is a variation of the SG1130B that contains no MASTER FADER control, or solar cell input. This version is used in pre-wired SMART racks systems that use the SR300 Stereo Decoder as a master control center. The levels are controlled by the SR300 for all modes of operation.

This manual refers to the SG1130B in the installation procedures. If you are aligning or installing an SG1130BX, the procedures are similar. Skip over any reference to the MASTER FADER or Solar Cell input.

For those who are familiar with the installation of the original SG1130, the SG1130B is set up in a very similar manner, with the exception of control locations, which are now located on the rear of the chassis and are accessible through holes in the rear panel. The SG1130B now has two different inputs; one HIGH LEVEL level input, called HI IN, and one low level input called CELL IN (solar cell). If you are using the output from a monaural preamplifier to drive the SG1130B, use the HI IN input. Or you may connect a mono (or stereo) solar cell directly to the SG1130B using the CELL IN input. The input capabilities of this product are discussed in more detail in other sections of this manual.

HOW THE SG1130B WORKS! To produce a convincing five channel stereo-like effect from a single monaural soundtrack involves a great deal of electronic "trickery" in order to generate the wide screen sound illusion necessary to match the modern wide screen picture. Also, a surround sound source must be created to complete the effect. The SG1130B incorporates some complicated circuits to achieve this goal. The SG1130B uses two sealed modules on the main circuit board for the FRONT SYNTHESIZER and SURROUND GENERATOR. These modules contain matched components and are carefully calibrated. The special circuitry contained in each module is proprietary and considered to be non-repairable in the field. If a module fails, it must be replaced as a module.The FRONT SYNTHESIZER creates 20 very narrow bands of material from the monaural source to produce a wide spread of effects and music to the LEFT and RIGHT stage channels. This circuit is called a "Comb Filter" because the bands resemble a comb when viewed on special test equipment. The Combs on one channel are the inverse of the Combs on the other channel. Therefore all the sound program material is represented on one channel or the other. A unique circuit is also contained in the module that generates a "hard center channel" for the dialog on the soundtrack. The Center Channel material leads the side channels by 11 milliseconds of time. The Center Channel MUST be set 6 dB louder than the side channels in order to maintain the desired results. The LEFT and RIGHT side channels also contain some BASS enhancement and are both *Phase Coherent* so that there is no bass cancellation between channels.The SURROUND SOUND MODULE contains the necessary circuitry to derive a separate source for the special effects on the soundtrack. A front panel control, labeled "REAR DETECT", allows the operator to make minor sensitivity adjustments to the module to accommodate the different recording techniques used by various filmakers. The synthesized surround EFFECTS channel should be monitored in the booth during the first showing of a new print to determine if the last setting of the control is correct. A slight trim may be necessary to keep dialog out of the surround channel. A full time delay circuit inside the SG1130B allows the installer to adjust the "sync" of the surround with the front channels.

The SG1130B is level sensitive and *must be calibrated* by the installer for proper operation. A Dolby reference tone loop is necessary to make this adjustment. If the SG1130B is not properly set up, you may encounter distortion, or a poor signal-to-noise ratio, and possible mis-tracking of the surround generator. Follow the procedures in this manual for proper calibration. The unit has a high level input that may be fed from the existing booth preamplifier. The SMART SXL735 Sound Control Center or the SMART SR135 Decoder DIRECT OUTPUT is ideal for this purpose.

SURROUND MODULE not only contains the sensing circuitry that detects special effects on the monaural soundtrack, but also contains a logic system that "votes" between dialog and effects on the soundtrack. The sensitivity of the logic system is controlled by the front panel REAR DETECT knob. A setting must be found that *rejects dialog*, but allows the effects to pass to the surround channel. Remember that the SG1130B utilizes an *EFFECTS type* surround channel that is *only on* during special dramatic effects in the film. This feature is different than an "ambience" surround channel used on other brands of Stereo Synthesizers. Here is a "truth table" that will help you understand the conditions that allow the surround to turn on.

SOUNDTRACK AUDIO	MODE
Voice	OFF
Soft Music	OFF
Effects	ON
Soft Effect and Voice	OFF
Loud Effects and Voice	ON
Loud Music	ON

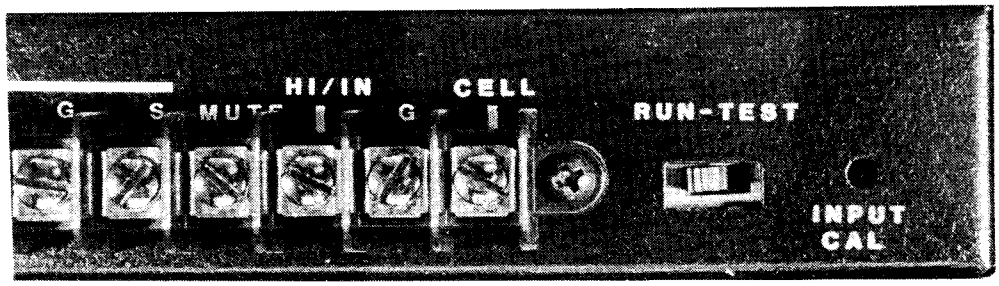
The SURROUND MODULE also contains a VCA (voltage controlled amplifier) circuit that quickly fades the surround material IN and OUT, instead of "chopping" on and off. The Surround Channel time delay aids in masking any "bleed through" from front channel material.

A more detailed description of the operation of the SG1130B is covered in the individual headings of this manual.

HOOKUP INSTRUCTIONS

INPUTS. There are two audio input terminals on the rear barrier strip of the SG1130B Stereo Generator. Input number ONE is normally used when feeding the unit from a monaural preamplifier. This input is labeled HI IN. The SG1130B also has a Solar Cell input labeled CELL IN. Only one input can be used at a time. A shorting link is supplied with the unit to short the un-used input to ground to reduce circuit noise and greatly reduce the risk of RF pickup or other electrical noises generated by booth equipment. **NOTE: YOU MUST GROUND THE UN-USED INPUT ON THE SG1130B.**

The SG1130BX version does not have the Solar Cell input. The terminal marked CELL IN is a duplicate of the HI IN terminal. This is conveneint if you are interfacing the SG1130B to a a Dolby CP55, or similar stereo decoder. Interfacing to other products is discussed further in this manual. It is a good practice to GROUND the number TWO input to the nearest ground terminal if it is not being used.

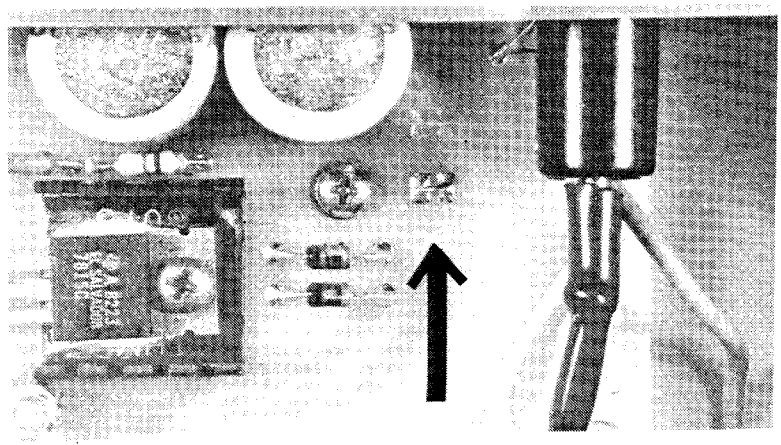


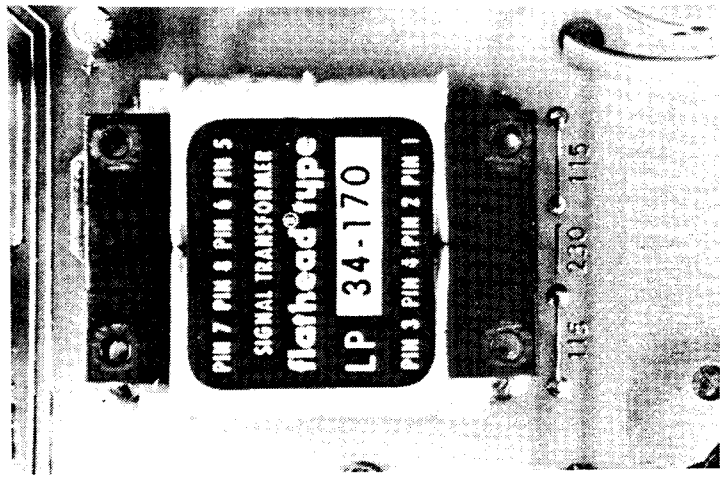
MUTE. The terminal marked MUTE is used to "kill" all five outputs of the SG1130B when grounded. A pair of wires connected to the MUTE terminal and GROUND to automation equipment or a SPST switch near the projectors will remotely turn the SG1130B Stereo Generator's audio outputs ON and OFF. This terminal is also used for interfacing to other SMART products (SR300 Deluxe Stereo Decoder).

OUTPUTS. There are FIVE high level outputs on the SG1130B Stereo Generator rear terminal strip. (L) LEFT, (C) CENTER, (R) RIGHT, and (S) SURROUND outputs are connected to their respective power amplifier inputs through shielded audio cable. Convenient ground terminals are provided for the shield of each cable. The fifth output (labeled SUB) is the SUB-WOOFER output. This output is used ONLY when a separate power amplifier and sub-woofer system is employed in the auditorium sound system. Each of the outputs of the SG1130B is controlled by the MASTER FADER control on the front panel. The SUB-WOOFER output on the SG1130BX version is a fixed level output since the BX *does not have* a MASTER FADER control. The amplifier that drives a sub-woofer speaker system in the auditorium can be set to a pre-set level and left at that setting because once the desired sound levels are determined, they generally stay that way.

OUTPUT MONITORING. When the Solar Cell INPUT of the SG1130B is used, the soundtrack signal from the solar cell is amplified by a built-in preamplifier stage. Input termination impedance for the solar cell is about 4000 ohms. In order for the operator to monitor sound in the booth, an active monitor must be used (SMART EX500, EX510, or other brand). The SUB terminal on the barrier strip is a composite signal of the LEFT and RIGHT comb filters. This signal can be used to feed the active booth monitor, or a sub-woofer monitor (or both). The signal at this output has a gentle high frequency roll-off above 3 kHz, but is suitable for monitoring purposes.

GROUNDING. The printed circuit card in the SG1130B is grounded to the chassis. Also, the third wire of the AC cable is connected to the printed circuit board, chassis, equipment rack, and the booth electrical system. If for some reason, the ground for the AC cable or printed circuit board must be broken from the system, two jumpers have been provided on the PC card that can be cut. These wire loops may be "snipped" individually to change the grounding scheme. It is very important to observe good grounding procedures for a quiet, humfree system, particularly if a sub-woofer is used. Most city electrical codes demand that the chassis of electronic equipment is properly grounded to avoid possible electrical shock to theatre personnel in the event of a problem in the unit. Check the codes in your area. If in doubt, play it safe, and locate an absolute ground point for the sound system equipment rack.





AC POWER. The SG1130B will operate on 115 volt AC or 230 volt AC sources. The transformer is designed to accept either 50Hz or 60Hz. Each unit is shipped with the jumpers in the 1125 volt position. If 230 volt operation is desired, the *two* 115 jumpers must be removed, and *one* wire jumper installed in the 230 volt position. The power Bi-polar supplies of the SG1130B Stereo Generator are fully regulated.

EQUALIZATION. If separate house equalizers are used in the system, *they should follow* the SG1130B. *DO NOT equalize the program signal that feeds the unit.* Also, we do not recommend shaping of the surround channel. This channel has a band pass filter included in the time delay circuit that will resist the amount of shaping that can be performed.

SUB-WOOFER INSTALLATION. A separate sub-woofer system may be connected directly to the rear terminal labeled SUB. This output contains the in-phase sum of the left and right channels, and is controlled by the front panel Master Fader. You may connect the sub-woofer output directly to the input of a sub-woofer amplifier, or the output may be used to drive a sub harmonic synthesizer like the DBX model 500 or 505. The choice of the power amplifier is dependent upon the sensitivity of the woofer you are using. Some woofers are very efficient, while others require a great deal of power. Whatever you choose, the sub-woofer amplifier MUST HAVE a 20Hz or 30Hz high pass filter built-in to protect the speaker from over-excursion during high power sound passages. If you are feeding the DBX "Boom Box" with the SG1130B, the high pass filter is not necessary. Some Sub-woofer power amplifiers on the market contain their own active low pass (100Hz) and high pass (30 Hz) filters and do not require additional external processing. Remember to use the proper gauge wire between the power amplifier and speaker to avoid high power losses.

FRONT-SURROUND USE. Using the SG1130B for Front-Surround installations is *not* recommended. The SG1130B Stereo Generator is a full *five channel* synthesizer. If your application requires only a surround channel added to an existing center stage speaker system, the the SMART SG1100 is a better choice. It is a lower cost product because the entire front synthesizer circuitry is omitted. The SG1100 allows you to derive a surround channel ONLY from an existing mono or stereo system.

SET UP AND ADJUSTMENT

The SG1130B Stereo Generator is designed to be a UNITY GAIN device. That is, if you feed 1 volt of audio to it's input terminal, you will get 1 volt of audio at the outputs. However, there are several gain controls in the unit that will allow you to alter the gain in order to adapt to various preamplifiers and amplifiers in the system that may have different drive requirements. Keep in mind that the levels must be set so that you can achieve the necessary reference level the SG1130B must have, in order to properly synthesize. An input that is too low will result in noisy front channels. Signals that are too high at the input will cause distortion on the front channels, and a surround channel that turns on during the wrong program material. For these reasons, the SG1130B MUST be adjusted with a known reference level. We have designed the system to calibrate when the Dolby Cat. 69 tone loop is used. This test film is readily available to dealers that install stereo systems, and is quite accurate.

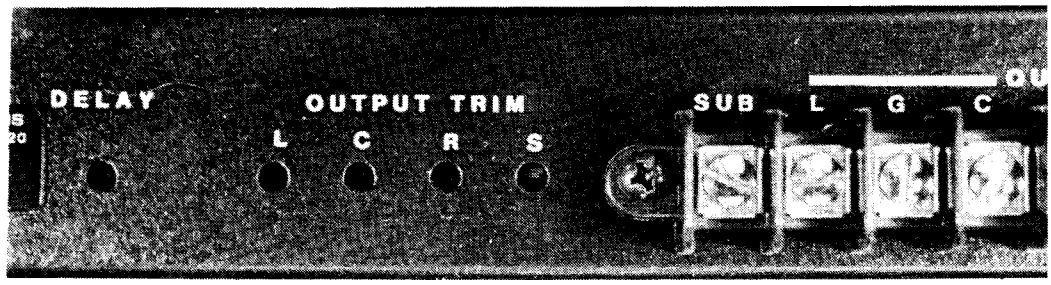
TOOLS NEEDED

(1) Dolby™ Cat. 69 Reference 50% modulation Test Tone Loop.
(1) SMPTE 1 kHz tone loop.
(1) Small flat blade plastic tuning wand.
(1) Small Phillips screwdriver.

PRELIMINARY SET UP. Turn all internal controls to their fully counterclockwise positions. Set the master fader front panel control to about it's 12 o'clock position. Set the front panel Rear Detect control to it's fully counterclockwise position.

INPUT ADJUSTMENT. Set the output level of the preamplifier feeding the SG1130B at it's normal operating level. With the Dolby™ tone loop running on the selected projector, set the input control of the SG1130B until the front panel LED "snaps on". The LED has a sharp turn on characteristic. Disregard any flickering of the LED caused by the splices in the film loop.

OUTPUT LEVEL CONTROLS. Each channel has it's own output level control on the main PC card inside the SG1130B. This enables the sound engineer to match the levels of an SVA decoder that may also be part of the theater sound system. When the operator switches between SVA and Synthesize, the levels should be the same. Clockwise rotation of each pot increases the level. **Remember, THE CENTER CHANNEL LEVEL MUST BE 6 DB HIGHER THAN THE LEFT AND RIGHT CHANNELS.**



TIME DELAY ADJUST. There is a small hole in the rear of the chassis that will access the DELAY adjustment pot on the P.C. card. The tuning wand tool supplied with the SG1130B is ideal for making adjustments. Clockwise rotation of the control INCREASES the time delay for the surround channel from a minimum of 30 milliseconds to a maximum of 105 milliseconds. The placement of surround speakers and length of the auditorium will dictate the amount of delay required. Move the TEST-RUN switch on the rear of the chassis to the TEST position. This will force the rear channel ON all the time. Run a reel of feature film. Have your assistant stand in the auditorium while you adjust the DELAY control, and signal when the sound from the front speakers and surround speakers are in perfect "sync". This observation should be made at a point that is two-thirds to the rear of the room from the front stage speakers. When this adjustment has been made, move the TEST-RUN switch to the RUN position for normal operation.

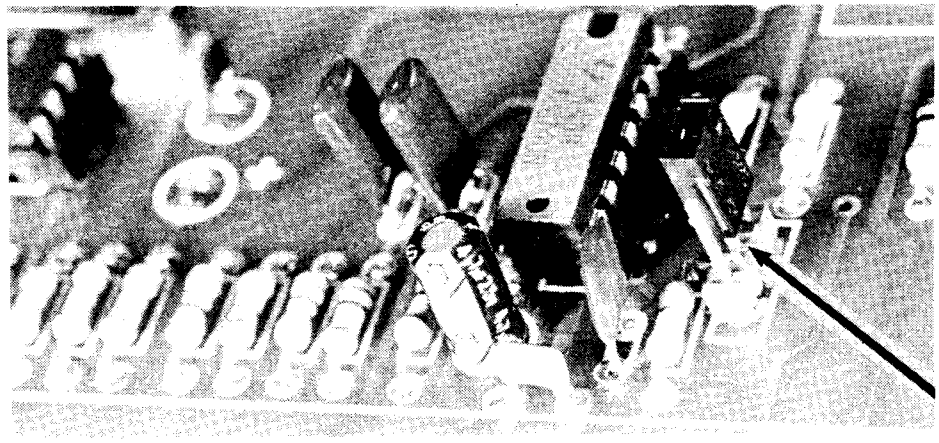
SUB-WOOFER LEVEL. The sub-woofer output on the rear terminal strip (labeled SUB) represents the addition of the left and right in-phase signals from the main channels. The output level varies as the MASTER FADER is changed. Turn the Dolby™ Cat. 69 film loop over so that the *pink noise track* is playing. Adjust the sub-woofer amplifier until the proper bass fullness is achieved in the auditorium.

FINAL ADJUSTMENTS. Play a feature film on the system while switching between the SVA system and the SG1130B Stereo Generator. *DO NOT USE TRAILERS OR SNIPES FOR THIS TEST.* This type of material should *NEVER* be synthesized. It is generally recorded at maximum modulation with a great deal of distortion and recorder overload. Mark the setting of the preamplifier that is driving the SG1130B. Now that a reference has been established, the preamplifier setting CANNOT be changed. It may be wise to remove the knob. All auditorium volume changes should be made using the MASTER FADER control on the SG1130B.

DON'T TOUCH

There are two internal controls that are factory set for each SG1130B. The small vertical pot in the upper left corner of the PC card calibrates the reference "trigger" level. The BIAS pot associated with the time delay circuit adjusts the MN3005 for optimum performance. *DO NOT ADJUST THESE CONTROLS.*

HF ROLLOFF SWITCH. The SG1130B has a provision to gently roll off the high frequency portion of the audio spectrum. This feature is valuable when the unit is fed from a preamplifier that has a high end that is too bright. A "header" labeled HF (located near the SYNTHESIZER module) will tailor the frequency response when the "shunt" is connected to the two lower prongs. A 6 dB per octave roll will start at 3.5 kHz. If a connection is made to the two top prongs, the response is unaltered, and all audio shaping should occur in the preamp that is feeding the SG1130B.



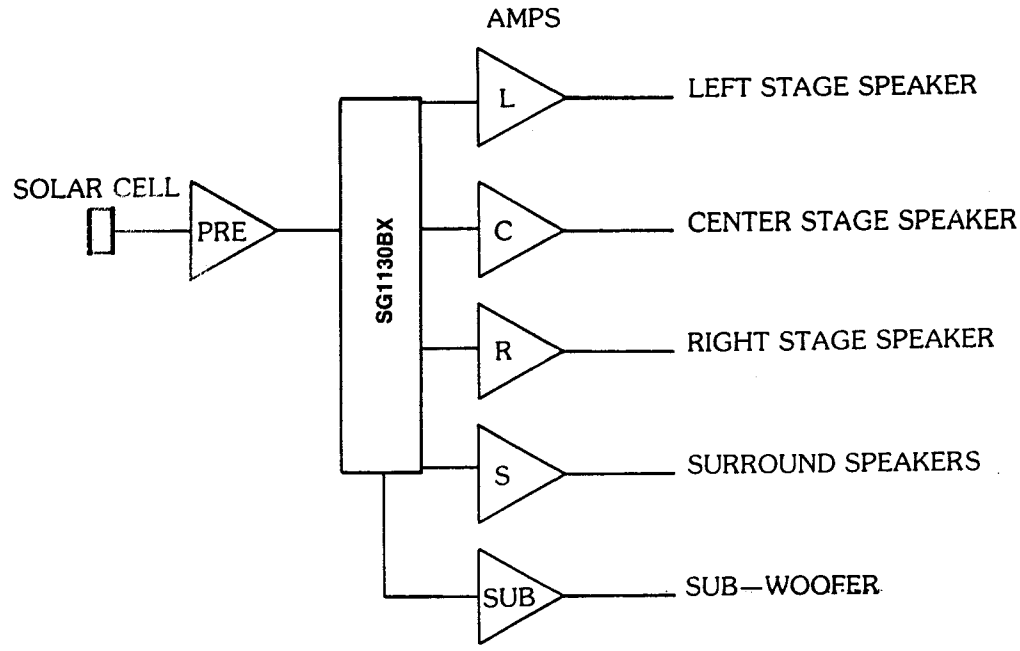
SHUNT USED TO SELECT THE HF ROLLOFF IN FREQUENCY RESPONSE.

LISTENING TEST. The use of the test loops is necessary in the set-up procedures of the SG1130B. However, when a feature film is played for final system balance, you MUST listen to all channels *IN CONTEXT.* Monitoring a single channel (perhaps, through a selectable 4 channel booth monitor panel) will be very misleading. The SG1130B "tears apart" the monaural sound track, processes the material, and re-assembles the audio in the auditorium in separate channels. Normal booth monitoring should be from the center channel.

CENTER CHANNEL LEVEL SETTING. The center channel MUST BE 6 dB louder than the left and right stage speakers in order to "mask" the comb filters that produce the wide stereo spread. How much is 6 dB? A 3 dB higher setting is just barely noticeable to the human ear, and a 6 dB increase is definitely higher to the ear, but only slightly. Output levels can be measured with a scope, or meter that has a dB scale. The Dolby reference tone loop *CANNOT be used to set the center level*, because of a built-in high pass filter on the center channel. An SMPTE 1 kHz tone is ideal. You MAY NOT get an output reading on one of the side channels (the LEFT or the RIGHT) when the 1kHz tone is running because the comb filters will cancel that frequency on one channel, but allow it to pass to the other channel. If you kill the projector motor while the sound is still running, the descending tone will pass from one channel to the other as each new band of frequencies appears. This is a quick way to check the operation of the front channel.

SURROUND DETECT SENSITIVITY. The front panel control labeled REAR DETECT allows the operator to adjust for minor differences in print soundtrack recordings. Fully counterclockwise rotation of the control turns the surround systems OFF. As the pot is rotated clockwise, more and more material is allowed to appear on the surround system. The sensitivity of the detection circuitry should be set so that special effects "trigger" the surround system. If dialog appears, decrease the sensitivity slightly until the dialog disappears. Refer to the logic "truth table" at the front of this manual for clarification of what material may appear on the surround channel. We have found that a control setting of around 12 o'clock seems normal for most soundtracks. We suggest that the operator monitor the surround channel during the first showing of a new feature to assure a proper setting. Heavy limiting and distortion on trailers or snipes may cause erratic action of the surround. The operator is advised to *turn the surround off* by rotating the REAR DETECT control to the fully counter-clockwise position.

PEAK INDICATOR LED. The LED near the NORMAL-BYPASS switch monitors the incoming audio of the SG1130B. Its' primary use is to calibrate the synthesizer to the 50% modulation level so that the individual circuits are running at their proper performance levels. The LED is always connected to the audio input and will blink when the soundtrack level is at 50% modulation or more. This gives the operator a handy indication of the sound volume in the auditorium. It is a good idea to instruct the operator about this feature so that he is aware of the function.



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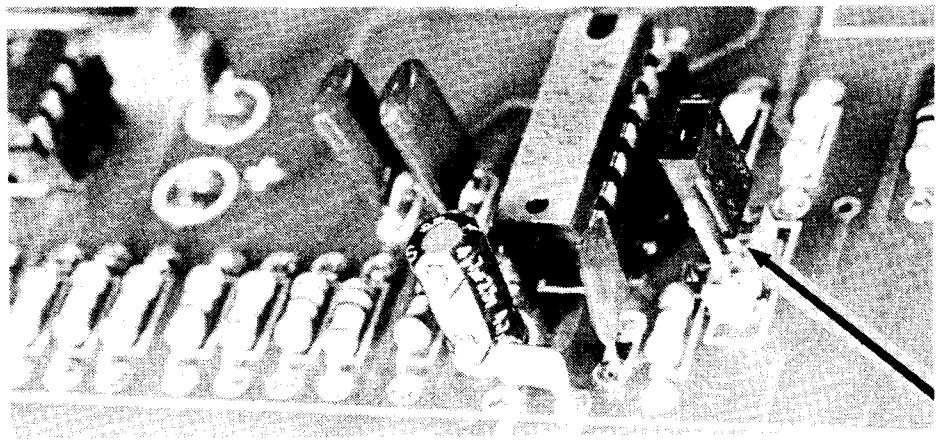

SHUNT USED TO SELECT THE HF ROLLOFF IN FREQUENCY RESPONSE.

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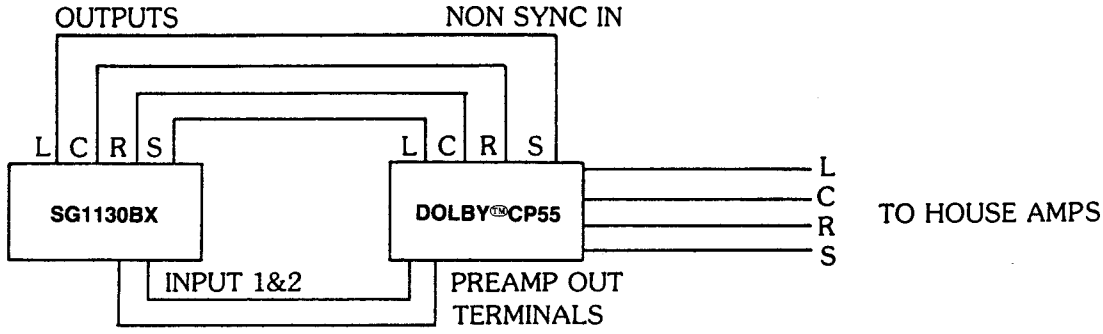
INTERFACING TO THE BOOTH SYSTEM. The SG1130B Stereo Generator is universal in design, and will mate to most new or existing sound equipment. Its high impedance input allows you to "bridge" the current preamplifier without heavy loading. Its' low impedance output will drive any vacuum tube or solid state amplifier. The following diagrams suggest several possible hookup schemes in the various booths. The factory engineering staff will be pleased to assist if you have an unusual application.

TYPICAL BOOTH HOOKUP. Existing booth preamp or SMART SXL735 feed the SG1130B. This arrangement is for theaters that do not have SVA stereo. The sub-woofer option may be used, or not.

SG1130B WITH THE SMART SXL 735 BACKUP provides an emergency system. The SXL735 is "strapped" for exciter light changeover. This allows the left and right solar cell to be mixed through Proj. 1 and Proj. 2 inputs of SXL735. A 4 pole double throw switch must be provided in the system to select between the SVA chain and the Synthesizer chain.



HOOKUP TO A DOLBY CP55. Inputs to the SG1130B are fed from the CP55 PREAMP OUT terminals on the rear barrier strip. Outputs of the SG1130B feed the non-sync inputs of the CP55. Another way is to use the Dolby Cat. 223 option card that will allow several 4 channel inputs to feed the CP55. Two 10K resistors can be used to isolate the outputs of the two preamp channels of the CP55 so that signals are summed into the HI IN terminal of the SG1130B.

INTERFACING TO THE DOLBY CP200. The SG130BX Stereo Generator can easily be connected to a system that uses a Dolby CP200 by using the SMART SW900 SWITCH PANEL. Only two connections are made to the CP200 system that will not affect its operation or cause any interaction problems. Only four (4) of the six (6) output channels need to be switched between regular operation and synthesized mono operation.

The output signals from the CP200 Stereo optical preamplifiers drive the input of the SG1130B. The four output channels of the SG1130B and the four main outputs of the CP200 (Left, Center, Right, and Surround) are switched by the SW900 4-channel switch panel into the house power amplifiers. The Left-Extra and Right-Extra channels are not switched.

HOOKUP. Find a suitable spot in the equipment rack to place the SG1130B and SW900. You should try to locate these units relatively close to the CP200 unit.

Locate the BS1 terminal strip on the rear of the CP200 and connect a piece of shielded audio cable to the (L)eft Preamp output. Ground the shield to the nearest ground (earth) terminal. Connect the other end of this cable to the 10K ¼ watt resistor. Connect a second audio cable to the (R)ight preamp output of the CP200 and connect the other end to another 10K ¼ resistor. Connect the two loose ends of the resistors to the HI IN terminal of the sg1130B. Connect the shields of the audio cables to the Ground terminal of the SG1130.

The outputs of the SG1130B should be connected to the SW900 panel via shielded audio cable. Also, the four main outputs of the CP200 are connected to the SW900 panel. The panel will feed each of the primary house power amplifiers through shielded audio cable.

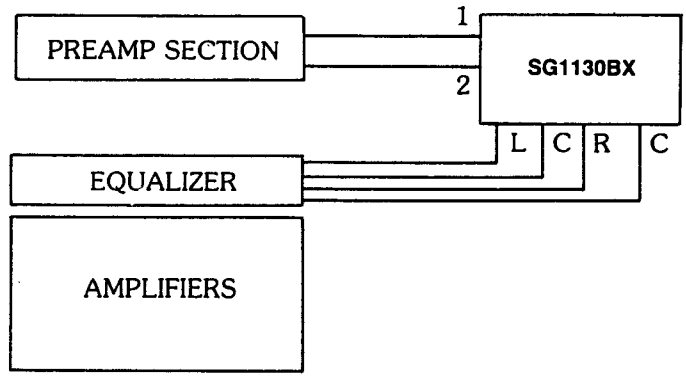
The preamp outputs of the CP200 contain a corrected response curve due to the internal slit loss corrector circuits. These If adjusted for a flat response on SVA prints, the filters will cause the signals to be too bright when reproduced through the SG1130B when a mono film is played, due to the fact that there is no Academy rolloff filter at this point in the CP200 design. The filter is on another card. It is strongly suggested that the internal HF rolloff "shunt" be moved inside the SG1130B for high frequency tailoring.

CP200 OPERATION. When MONO, STEREO SVA, 4-CHANNEL MAG OR 6-CHANNEL MAG is played, use the CP200 as usual with the SW900 switch in the STEREO position. When the SG1130 Stereo Generator is required, place the CP200 in the MONO mode of operation, and the SW900 in the SYNTHESIZER position.

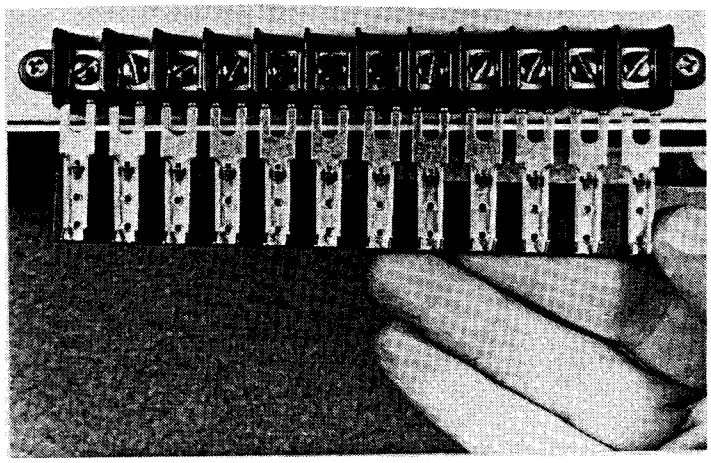
EPRAD STARSCOPE OR OTHER PACKAGE STEREOS. Output of the preamplifier section must be interrupted before the equalizer section to feed the SG1130B. Outputs of SG1130B feed equalizer and power amplifiers.

CONNECTING TO THE SMART SR135 STEREO DECODER. The SG1130B can be fed from the DIRECT output of the SR135 (the terminal labeled DIR on the rear barrier strip). Output switching between the SR135, the SG1130B, and the power amplifiers or equalizers should be done with a 4 pole external panel switch. (The SMART SW900 Panel is a good choice.)

NOTE: All suggested hook-ups mentioned in this manual will permit the sub-woofer output to continue to work when SVA or Synthesized prints as long as the SG1130B is being fed a signal, and the sub-woofer output is not being switched.



FANNING STRIPS are a convenient way to make connection to all barrier terminals of the SG1130B. 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.



The latest SMART equipment uses "shunts" on the P.C. board, instead of switches to select the various operation selections. This is generally a one time selection, 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.**FUSING.** The SG1130 uses one main fuse for the power supply. Replace with a ½ Amp 3AG type *only*.

USING THE SR300 WITH THE SG1130BX STEREO GENERATOR

Hooking the SG1130BX or SG1130B Stereo Generator into the sound system through the SR300 is easy. The Master Fader on the SR300 becomes the *new master for all functions*, and the programming logic of the SR300 controls the switching operation between the Generator and Stereo channels.

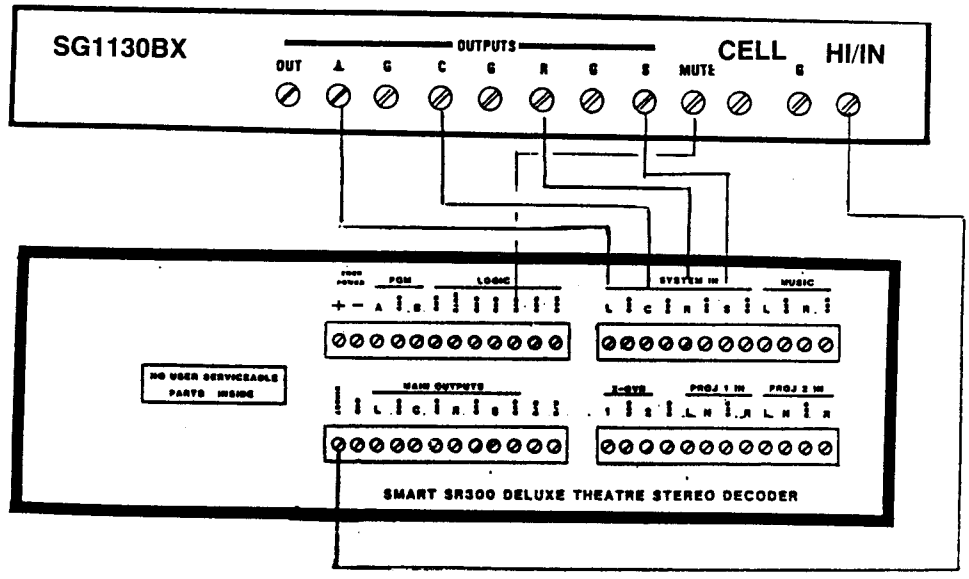
1. Run a single conductor wire from the SYN terminal on the back of the SR300 to the mute terminal of the SG1130BX.

2. Connect a single conductor shielded audio cable from the **(DIR)**ECT OUTPUT of the SR300 and connect the shield to ground. Connect the other end of this cable to the HI/IN (HI level INPUT) terminal (and ground the shield) of the SG1130B. The Input 1 terminal is not used when the SG1130B is mated to an SR300.

3. Run shielded audio cable from each output of the SG1130BX to the SYSTEMS INPUT terminals of the SR300. Left channel goes to Left channel, Center to Center, etc. All four channels must agree with their respective outputs and inputs.

This completes the inter-wiring of the two units. Refer to the SG1130BX manual for calibration instructions. The unit *must be calibrated* in order for the logic circuits to respond properly.

When the SG1130BX is properly calibrated with a Dolby Cat 69 reference tone, set the time delay to the desired delay. If you are using the SG1130B version of the Stereo Generator, set the MASTER FADER ON THE SG1130B **TO ITS HIGHEST SETTING**. This should be about right for operation through the SR300 system circuits. If you are using the SG1130BX version, there is no master fader to adjust. Advise the operator to use only the FADER on the SR300. A slight adjustment of the SG1130B fader may be necessary in order for levels to match between the Stereo program and Synthesized program. The Solar Cell input of the SG1130B version *is not used* when interfacing the Stereo Generator to the SR300 Stereo Decoder.



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. A special Marquee Sign is available from Bevelite-Adler that the theatre owner can use to tell the public that his theatre is presenting the feature film in "Wide Screen Stereo". A selection of **WIDE SCREEN STEREO** marquee signs are available from Bevelite-Adler to help inform your patrons of your stereo playback capability.

SG1130B AND SG1130BX SERVICE

Almost every component used in the SG1130 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 160 hours before Q.C. testing and packaging. A failure of one or more functions of the SG1130 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 PLUS 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 PLUS 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 SG1130 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 EFFECTS (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 pot near the chip is factory set to each individual chip, and *should not be moved* unless the IC must be replaced by a new device.

The FRONT SYNTHESIZER and SURROUND modules in the SG1130 are hermetically sealed in epoxy and cannot be serviced in the field. These sub-circuits are very densely packaged and contain components that are hand selected for accuracy. In the event of a failure of either module, the pins must be de-soldered with suction and the module removed. Replacement modules are available on an *EXCHANGE ONLY* basis. We suggest the SG1130 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.

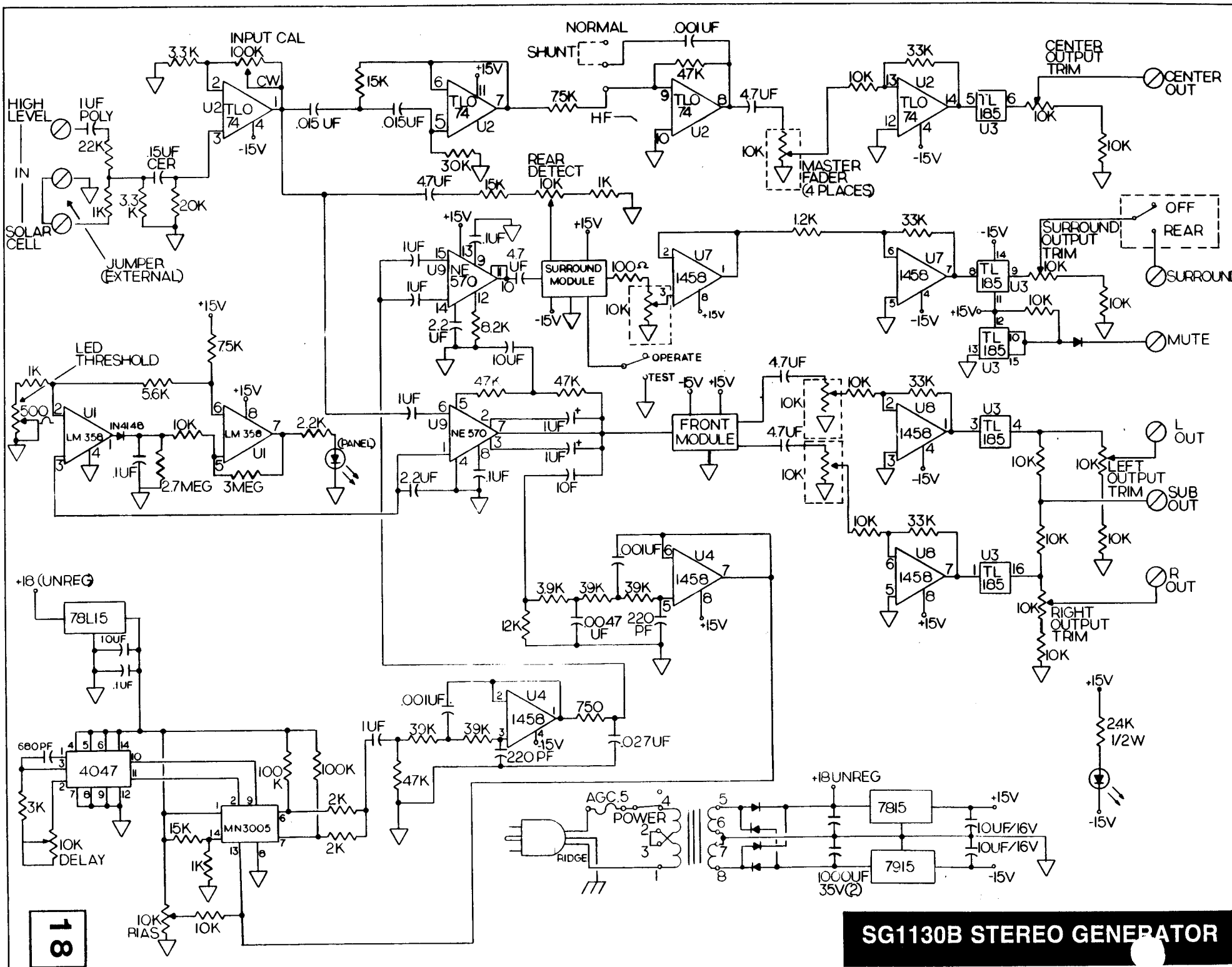
An important part of any pre-service call is to make sure that the operator or other theater personnel is fully familiar with the operation of this equipment. Often service calls are made un-necessarily because the operator was not trained with the correct operation procedures.

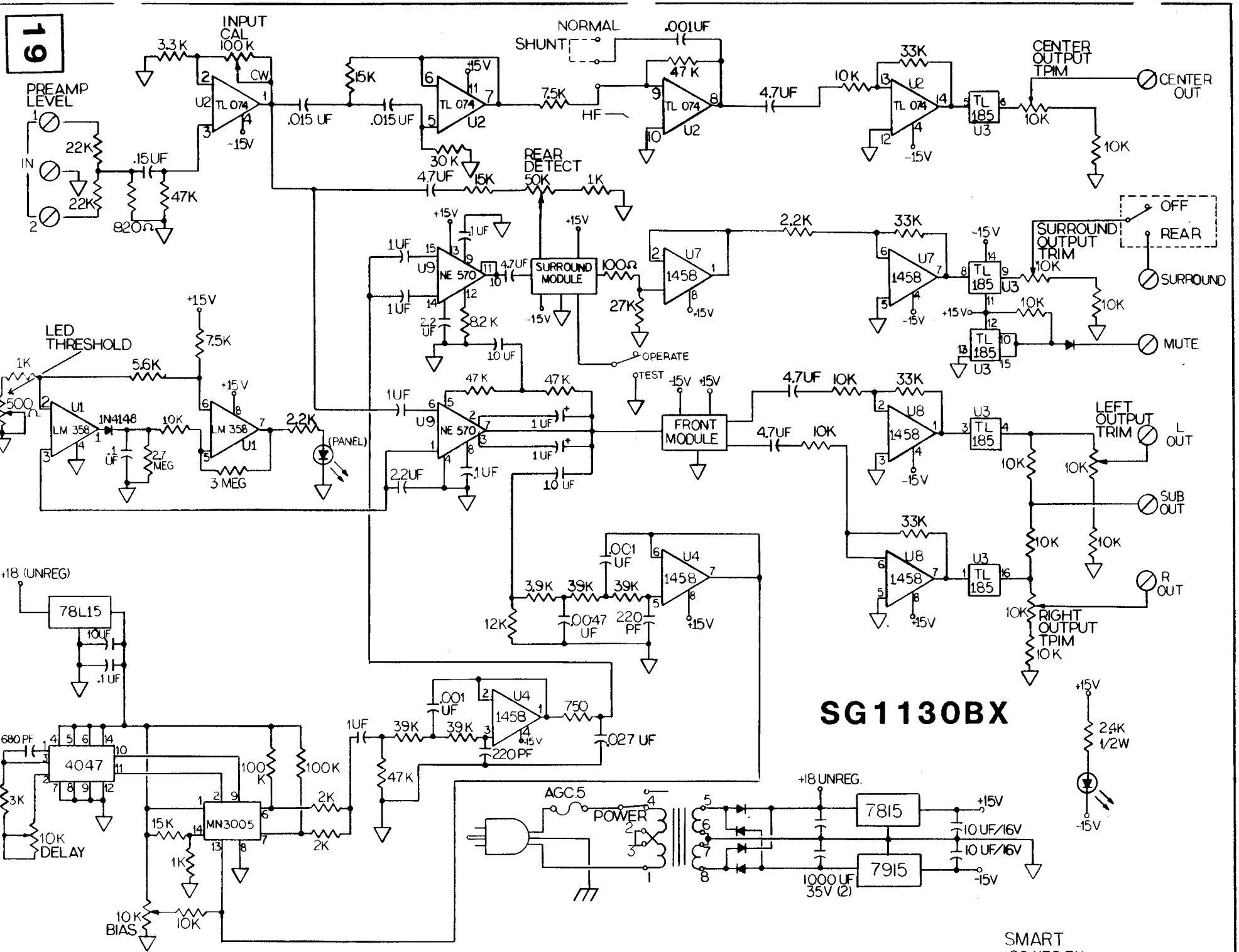
MANY IC DEVICES CAN BE DESTROYED BY HANDLING. CMOS logic devices and Bi-FET Op Amps are very static sensitive. They are safe when plugged into their sockets, but removal can expose the inputs to conduct static electricity from tools, your hands, or other static generating components. USE PROPER HANDLING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

We reserve the right to upgrade or improve this product without prior notice. If you find de-screpencies between the schematic or parts list and the unit you are testing, please contact the factory for latest service information or advice.

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.

SMART
THEATRE SYSTEMS


INPUT CAL
100K
3.3K
CW
HIGH LEVEL
IN
SOLAR CELL
1UF POLY
22K
.15UF CER
3.3K
1K
20K
JUMPER (EXTERNAL)
U2 TLO 74
-15V
.015 UF
15K
.015UF
30K
+15V
NORMAL
SHUNT
.001UF
47K
7.5K
HF
4.7UF
REAR DETECT
10K
1K
4.7UF
15K
10K
IMASTER FADER (4 PLACES)
33K
CENTER OUTPUT TRIM
CENTER OUT
TL 185 U3
SURROUND OUTPUT TRIM
OFF
REAR
SURROUND
MUTE
1.2K
U7 1458
U9 NE 570
4.7 UF
SURROUND MODULE
100Ω
OPERATE
2.2 UF
8.2K
10UF
LED THRESHOLD
7.5K
1K
5.6K
500Ω
U1 LM 358
IN4148
10K
2.2K
(PANEL)
.1UF
2.7MEG
3MEG
TEST
FRONT MODULE
47K
1UF
10F
U8 1458
L OUT
LEFT OUTPUT TRIM
SUB OUT
R OUT
RIGHT OUTPUT TRIM
+18 (UNREG)
78L15
10UF
.1UF
U4 1458
.001UF
3.9K
39K
12K
.0047 UF
220 PF
680PF
4047
100K
2K
3K
10K DELAY
MN3005
15K
1K
10K BIAS
30K
750
.027UF
220 PF
2.4K 1/2W
AGC.5
POWER
RIDGE
+18UNREG
7815
7915
10UF/16V
1000UF 35V(2)


INPUT CAL 100K
CW
3.3K
PREAMP LEVEL
IN
22K
22K
.15UF
47K
820Ω
U2 TL 074
-15V
.015 UF
.015 UF
15K
30K
NORMAL
SHUNT
.001UF
47 K
7.5K
HF
4.7UF
10K
33K
CENTER OUTPUT TPIM
CENTER OUT
10K
10K
REAR DETECT
50K
1K
4.7UF
15K
+15V
1UF
1UF
U9 NE 570
4.7UF
SURROUND MODULE
100Ω
27K
OPERATE
-15V
2.2K
8.2 K
2.2 UF
10 UF
U7 1458
2.2K
33K
SURROUND OUTPUT TRIM
10K
OFF
REAR
SURROUND
TL 185 U3
10K
10K
MUTE
LED THRESHOLD
1K
5.6K
7.5K
500Ω
U1 LM 358
1N4148
10K
2.2K
(PANEL)
.1 UF
2.7 MEG
3 MEG
47 K
47K
1UF
1 UF
1 UF
1 UF
10 UF
2.2UF
TEST
FRONT MODULE
4.7UF
10K
33K
U8 1458
4.7UF
10K
LEFT OUTPUT TRIM
L OUT
10K
10K
SUB OUT
10K
10K
R OUT
10K
RIGHT OUTPUT TPIM 10K
+18 (UNREG)
78L15
10UF
.1 UF
.001 UF
U4 1458
3.9K
39K
39K
12K
.0047 UF
220 PF
680 PF
4047
3K
10K DELAY
100 K
100K
MN3005
15K
1K
2K
2K
10K BIAS
10K
1UF
39K
39K
.001 UF
U4 1458
750
.027 UF
220 PF
47K
AGC.5
POWER
+18 UNREG.
7815
7915
1000 UF 35V (2)
10 UF/16V
10 UF/16V
+15V
-15V
2.4K 1/2W
SG1130BX
SMART
SG 1130 BX