Film-Tech

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Installation and Service Manual

HF100 Cinema Hi-Fi
HF102 Surround Hi-Fi

5200 Regulated Exciter Module

made in AMERICA

SMART

Theatre Systems

5945 Peachtree Corners East - Norgross, Ga. 30071
(800) 45-SMART or (404) 449-6698

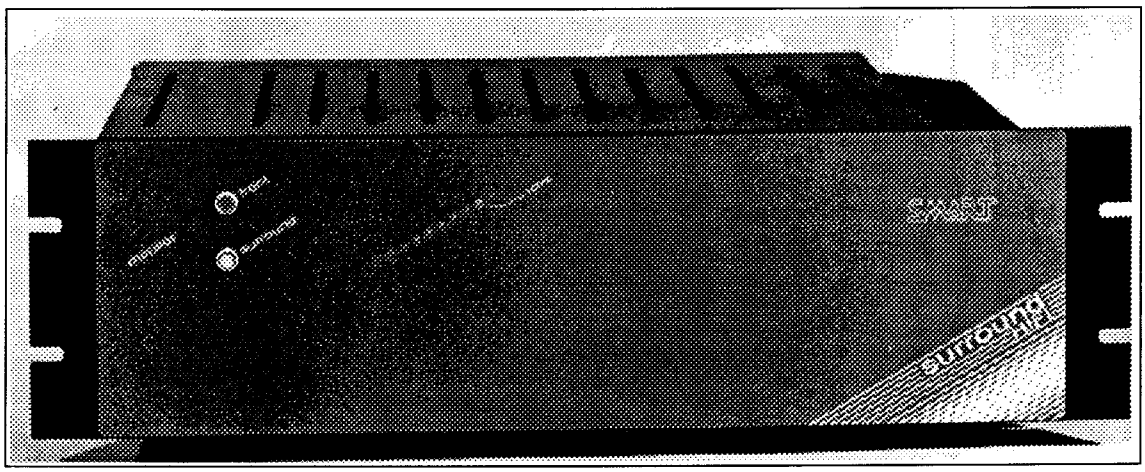
Cinema Hi-Fi Installation and Service Manual

The **HF100 Cinema Hi-Fi** is the first sound system package capable of utilizing the full potential of the SVA stereo optical soundtrack in a monaural playback. Clean audio design, noise reduction, and a large MOSFET power amplifier, along with a one octave room equalizer provides all the elements for a superb mono presentation in the auditorium. The dynamics are restored, the soundtrack is quiet, and the full fidelity is heard because of the ability to equalize the system to the auditorium.

The HF100 is a basic stand alone product that contains all the features of a fine mono sound package, plus much more. This product can be easily expanded to a Front-Surround 2-channel stereo system. Also the product is prewired for a digital pulse-width-modulation regulated exciter supply option which can quickly be added at any time. The product is available in a 117 VAC or 220/240 VAC 50/60 Hz version.

The components in the Cinema Stereo Hi-Fi system are:

HF100 Cinema Hi-Fi monaural sound package. Highlights of this product are as follows: 4 solar cell preamplifiers for 2 projector stereo with electronic changeover. Type "A" noise reduction for SVA stereo prints. SR emulation for soundtracks encoded in the Spectral Recording process. DNR electronic soundtrack cleaner for mono prints and trailers. A DC exciter supply with HI or LO outputs for domestic or imported exciter bulbs. A 120 watt RMS MOSFET power amplifier. One octave boost and cut equalizer. Full emergency backup using the internal 10 watt active monitor amplifier.



HF102 Surround Hi-Fi Companion Unit.

The **HF102 Surround Hi-Fi** companion product will expand the HF100 into a Front-Surround stereo system. The unit has the additional 120 watt power amplifier, the surround channel one octave equalizer, an adjustable time delay, and stereo matrix. The HF100 and HF102 are connected together with a single computer type connector.

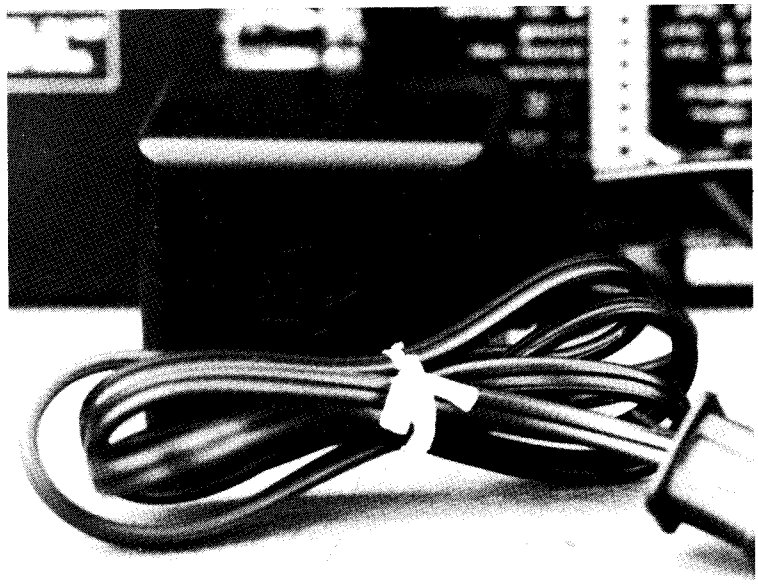
The **5200 Regulated Exciter Supply** is an option that quickly connects to the back of the HF100. This high frequency switching supply provides extremely tight regulation of voltage to the exciter bulb even if the AC line voltage varies from 109 to 130 VAC (domestic version).

UNPACKING THE PRODUCT.

The HF100 package contains the Cinema Hi-Fi product plus this manual. Also look for the support package that contains a tuning wand, and the 5 ft. length of film test loop required for use in calibrating the unit. The test loop has a noise

reduction reference tone on one side and pink noise on the opposite side of the film. The emergency backup power supply will also be found in the foam filled shipping carton.

Check the unit for shipping damage and report any damage to the freight carrier immediately before calling the factory.



Backup Power Supply

PRELIMINARY INSTALLATION

Pick a suitable place to mount the HF100 that is well ventilated and away from large, hum producing transformers used for other booth equipment. The HF100 is offered in a table-top version for shelf or desk mounting, and a rack mount version for installation in a lamphouse console or standard equipment rack.

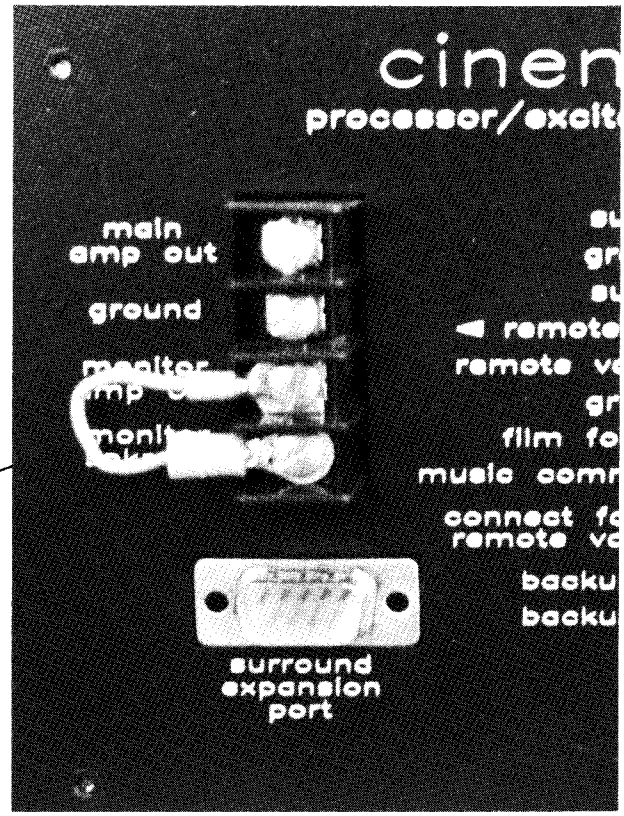
Check the back of the product to see that the factory installed jumper clip is present between the "Monitor Amp Out" terminal and the "Monitor Speaker In" terminal on TERMINAL STRIP 3. This jumper connects the monitor amplifier to the internal speaker. Instructions for connecting a remote monitor speaker to the HF100 is on page XX of this manual.

All installer calibration controls are accessible through the top panel. These controls will be out of reach of the operator and were placed there to minimize tampering. Plan your cable length of all connecting cables so the unit may be slid forward in the rack or console without removing any cables.

The AC power pack included with the HF100 is used to supply power to the monitor amplifier, backup relays, and the backup preamp. The power supply MUST be plugged into a convenient outlet or you will have no booth monitor. The 10 watt RMS monitor amplifier is used as an emergency backup to the 120 watt MOSFET amplifier in the event of a system problem. The emergency power pack is UL listed and has an output of 16-18 VAC.

If the 5200 Regulated Exciter module option was purchased, the module was shipped already installed on the back of the HF100. The add-on module covers the terminals of the standard internal DC supply. The 5200 has its own output terminals that sends a regulated exciter voltage and the DC backup supply to the bulb(s).

If the 5200 option is not used, the internal DC exciter output terminals will be visible on the back of the chassis (adding the module will cover these terminals). The exciter bulb(s) are connected to the terminals that are clearly labeled. The DC(+) and DC(-) terminals are floating. If the bulb(s) are grounded at the projector, the (-) terminal should be used for the ground wire of the bulb(s).

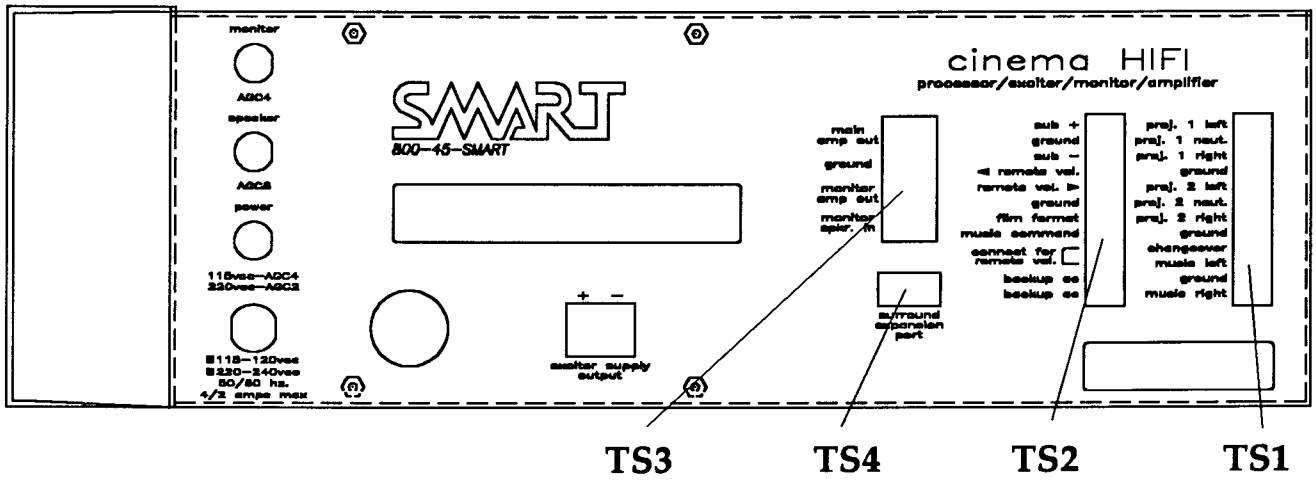


Monitor Amp Jumper

DB9 Connector to add Surround Hi-Fi to system.

A DB9 computer type male connector on the back of the unit is used to easily connect the HF100 to a HF102 Surround Hi-Fi package when a mono system is expanded to a Stereo Hi-Fi combination Front-Surround system. Installation and calibration of the HF102 is covered on pages 10-17 of this manual. The DB9 surround expansion port may also be used to feed a hearing impaired system if the HF102 is not present. Pin 1 is the Left preamp output and pin 2 is the right preamp output signals. Pin 3 is circuit ground for both channels. When the HF102 is used in the system, the preamp signals are available on that product. In both cases, the preamp output signals are not affected by the setting of the Master Fader control.

If a remote Master Fader control is desired, it must be connected to the TS2 quick connector. See page 21 in this manual for hookup instructions.



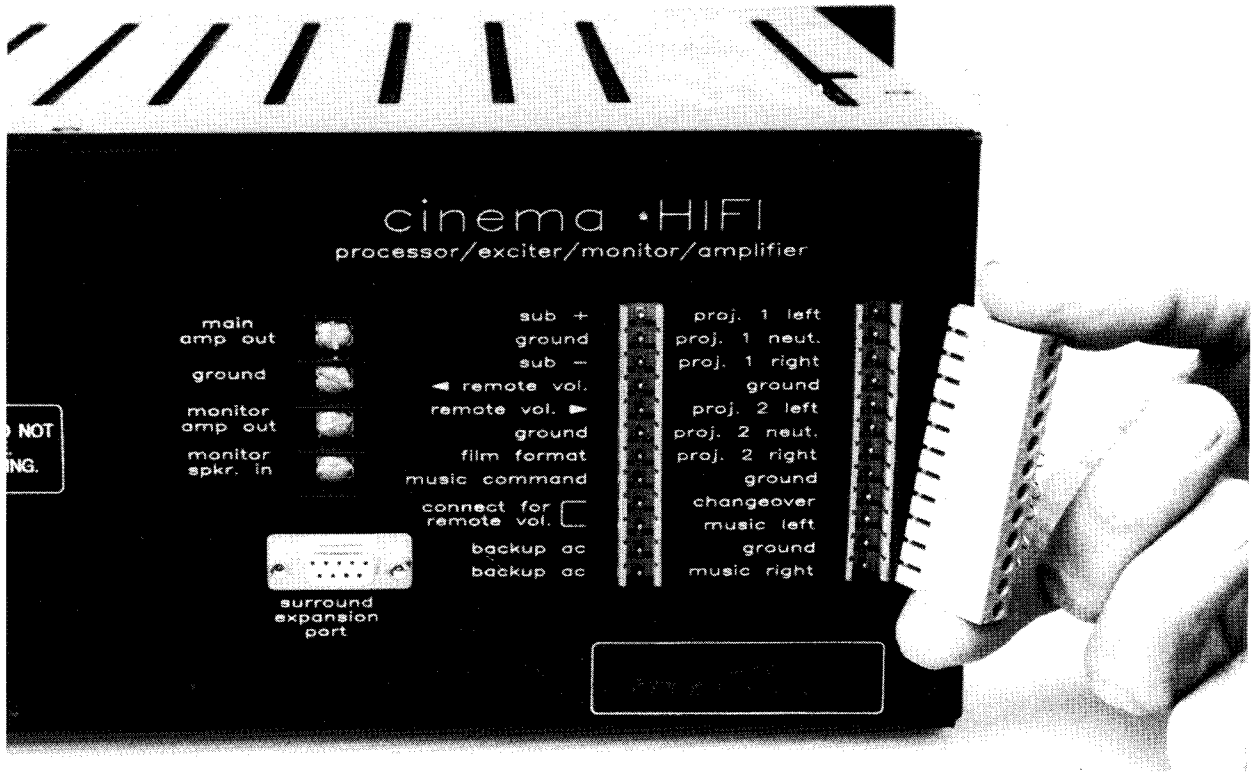
INSTALLATION

SOLAR CELL HOOKUP. The HF100 contains 4 identical wide response preamplifiers for dual projector booths. A monaural or stereo solar cell may be used when you are using only the HF100 in a system. If the sound system has both the HF100 and HF102, then a stereo solar cell must be used.

Connect one lead of a monaural solar cell to the Proj 1 Left terminal of the quick connect connector(pin 12). A shielded, jacketed, twisted pair audio cable should be used for this hookup. Use a small piece of wire to connect pin 12 of the connector to pin 10 (Proj 1 Right) of the connector so that the monaural solar cell is feeding both the left and right solar cell inputs simultaneously. The other lead of the solar cell is connected to the Neutral input of Projector 1 input. The shield

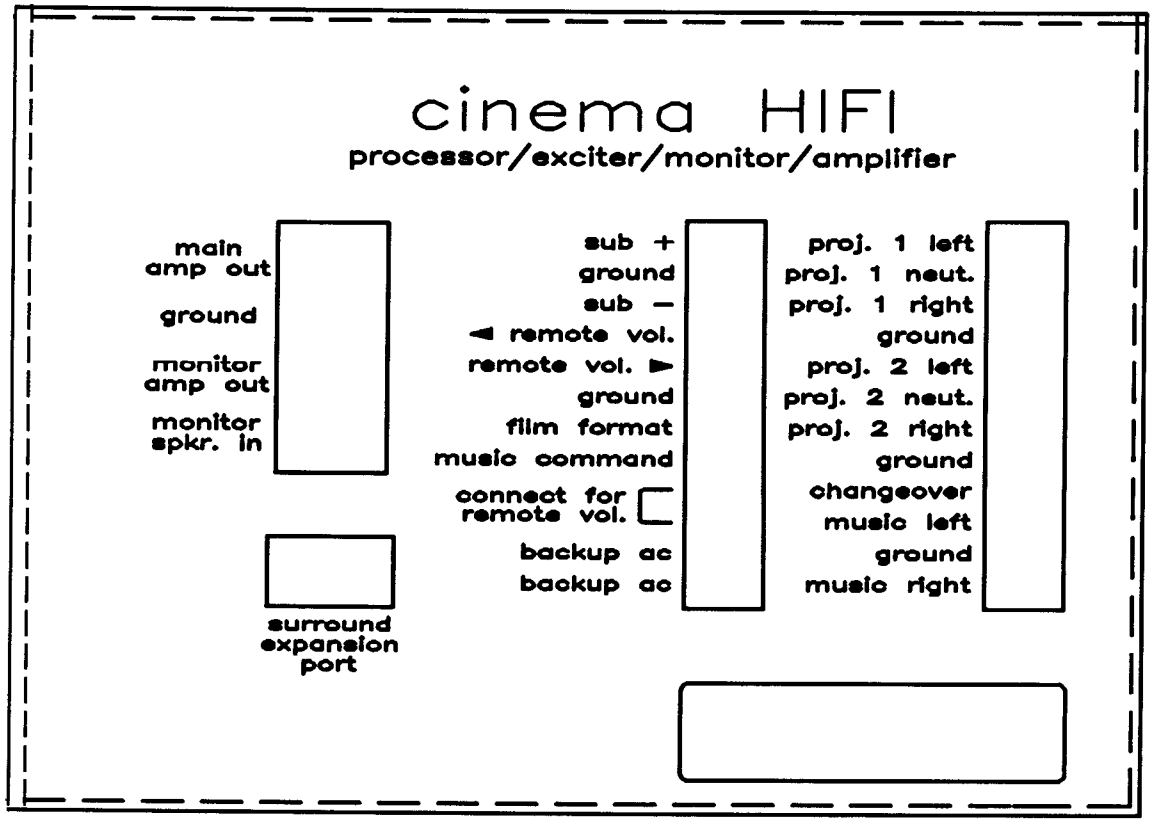
of the audio cable is connected to the GROUND terminal (pin 9) of the connector. The projector end of the shield must be cut off so that it does not touch any part of the projector. Wrapping electrical tape around the cable jacket will insure that no part of the shield will touch ground which will result in a ground loop and possible hum in the system.

To hookup a stereo solar cell, use a 3-conductor shielded audio cable or a pair of 2-conductor shielded cables between the cells and the HF100 for each projector. Again, the shield(s) the cable(s) should only be connected at the preamp end and not used at the soundhead end. Connect the left channel cell output (red) to the Projector 1 Left input terminal of the quick connector (pin 12). Connect the right cell output (green) to the Projector 1 Right input terminal (pin 10). The neutral lead of the solar cells are wired to the neutral terminal of the preamps (pin 11), and the shield(s) connected to pin 9 (ground terminal).

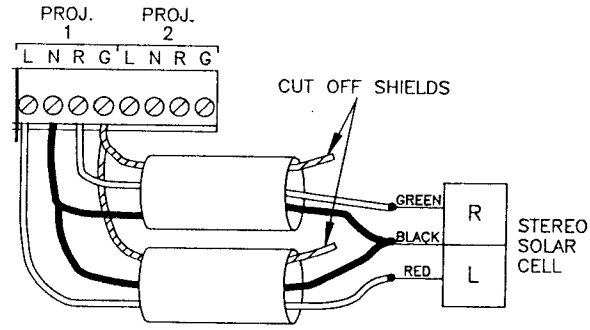


Input and control lines enter HF100 through Quick Connectors

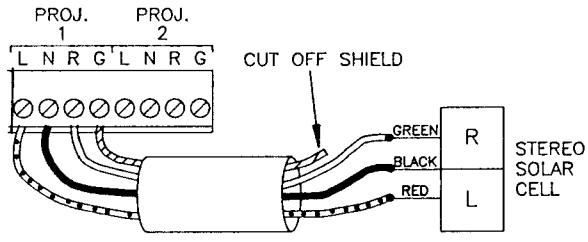
If two projectors are used in the booth, the second soundhead should be connected in a similar manner to the projector 2 inputs. Changeover is electronic. Please see page XX of this manual for wiring instructions and automation interface.



All terminals are clearly labeled on rear of chassis.



Wiring Stereo solar cells with a pair of two conductor shielded audio cables.



Wiring Stereo solar cells with 3-conductor shielded cable.

NON-SYNC MUSIC INPUTS. It is likely that you are using a stereo music player (CD player, cassette player, or music distribution system) for intermission music. Whether the booth sound system is monaural using the HF100 only, or Front-Surround stereo with the HF100 and HF102, the hookup from the stereo player is the same. Connect the left output of the player to the LEFT MUSIC input of the HF100 and the right output of the player to the RIGHT MUSIC input of the HF100 quick connect connector TS1. The shield from the music player should be connected to the MUSIC GROUND terminal of the connector. The music inputs are mixed in the HF100 for a L+R signal to the center stage speaker. In a stereo sound system a L-R signal is sent to the HF102 for music on the surround speakers.

EMERGENCY BACKUP SUPPLY. The external power pack used to power the backup system must be plugged into the same electrical phase AC source as the main power plug on the HF100. The power pack is prewired to pins 1 and 2 of TS2 by the factory. The power pack produces about 15 volts AC to supply the emergency preamp, active booth monitor amplifier, and the emergency relays in the HF100 and HF102. Unless the power pack is plugged into an AC outlet, the monitor will not work, even in the normal mode of operation, since the monitor gets its power from the external power pack.

SUBWOOFER OUTPUT. The HF100 contains a low-pass 12 dB/octave 80 Hz. filter circuit to send deep bass output to an external subwoofer amplifier and auditorium speaker system. The subwoofer output is active in all modes of operation including non-sync music. The balanced subwoofer output may be used to drive a dual channel power amplifier in mono-bridge mode without modification to the amplifier. The balanced output is valuable when running long lines to an active subwoofer system at the stage (like our DS571 and DS572 activated subwoofer systems).

If the external subwoofer amplifier has an unbalanced audio input, you should use the (+) terminal of the subwoofer output of the HF100 plus ground. These terminals are on the quick connector TS1 pins 12, 11, and 10.

STAGE SPEAKER HOOKUP. The stage speaker is connected to the terminal marked "Main Amp Out" and ground on the TS3 terminal strip. Be sure to use at least a 12 gauge speaker cable to avoid losses to the stage speaker. Runs of

more than 100 feet require larger cable. The MOSFET power amplifier in the HF100 and HF102 will deliver a minimum of 120 watts RMS into an 8 ohm speaker load and 180 watts RMS into a 4 ohm speaker load.

AUTOMATION INTERFACE. The HF100 is capable of remote film format change, projector changeover, and remote non-sync fade-in and fade-out from a suitable automation or remote switch panel. Connect the "Format Change" terminal (pin 6) on TS2 to the film format control of the automation system. Any ground terminal on the HF100 can be used for the return circuit. With a momentary ground (pulse), the "Format Change" terminal will cause the film format to change from a mono film to the stereo mode for SVA prints. See page XX of this manual for instructions on the operation of the film format change alternatives.

NON-SYNC MUSIC COMMAND. Connect the "Music Command" terminal (pin 5) to the non-sync control of the automation. Holding this pin to ground will cause a music Fade-in to occur and a film fade-out. Releasing the ground on the "Music Command" terminal will reverse the action and allow film sound to pass through the system.

PROJECTOR CHANGEOVER. Grounding the "Change-over" contact (pin 4) of TS1 will cause the electronic changeover in the HF100 to switch the stereo preamps of Projector 1 to Projector 2 in dual projection booths. Releasing this pin from ground will return the switches to the projector 1 preamps. The automation should also be capable of switching the exciter lamps on another set of contacts.

NOTE: *The "Music Command", "Format Change" and "Change-over" must be remotely controlled by "dry contacts" within the automation or remote switch panel. Be sure there is no voltage on these contacts to avoid damage to the delicate electronic switches in*

the HF100.

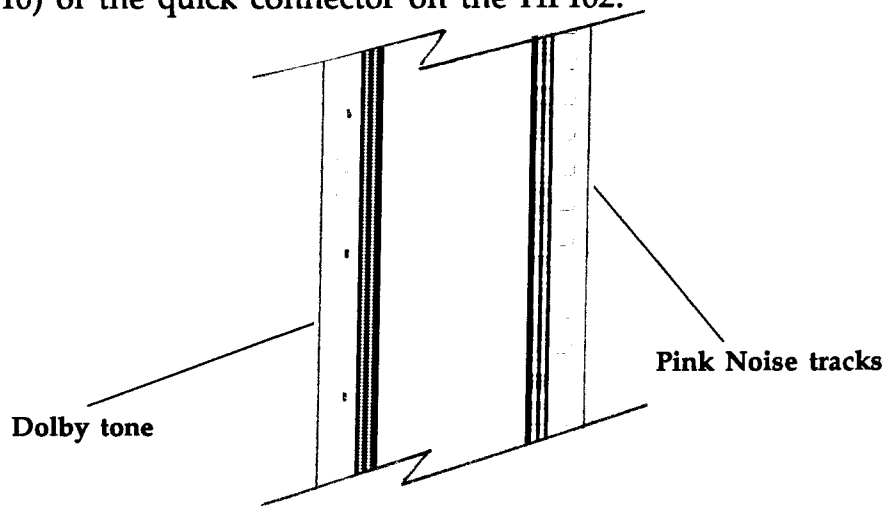
EXCITER BULB HOOKUP. The HF100 contains a DC exciter lamp supply that may be set for either HI output or LO output for domestic or imported bulbs. The exciter bulb is factory set in the HI position (8.2 VDC) during quality control testing. If you need to run the bulb in the LO (5 VDC) position, it will be necessary to remove the top cover of the HF100 and locate the GREEN wire from the toroid transformer. It has a FASTON connector on the free end. Unplug the gray FASTON from the diode block that feeds the DC exciter supply. It is located on the bottom of the chassis next to the toroid transformer. Plug the green wire onto the diode block for low voltage output to the exciter lamp.

SET UP AND CALIBRATION

The HF100 should be adjusted first before the HF102 if you are installing a stereo system. Apply power to the HF100 and verify that the exciter bulb comes on and one of the front panel selector buttons illuminates. Make sure the emergency power pack is plugged in which powers the monitor amplifier and backup circuits.

If you are using a stereo solar cell.....

Thread and run a left-right cell alignment loop to set the position of the solar cells. Use the pink noise side of the test loop furnished with the HF100 and with your dual trace scope and RTA, adjust the soundhead components for the lowest crosstalk, correct azimuth, and best frequency response. Preamp outputs appear on pins 1 & 2 of the DB9 connector on the HF100. Also the same signals appear on the Left preamp output (pin 12) and Right preamp output (pin 10) of the quick connector on the HF102.



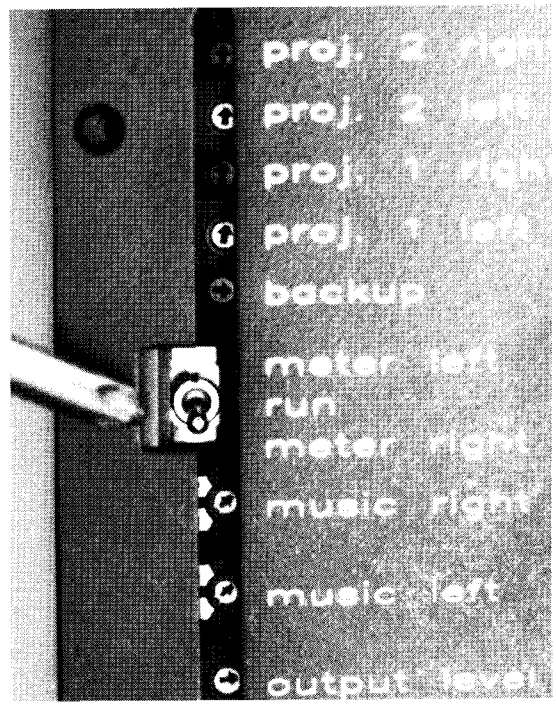
5 feet of test loop is furnished with the HF100

If you are using a mono solar cell.....

Use buzz track and snake track loops to properly set the position of the solar cell. Align the soundhead components for the best frequency response, azimuth and focus using the pink noise loop supplied. Remember that even though you may be installing a monaural system, you likely will be playing many stereo prints and the system reproduction is very dependent on the quality of sound that comes from the soundhead.

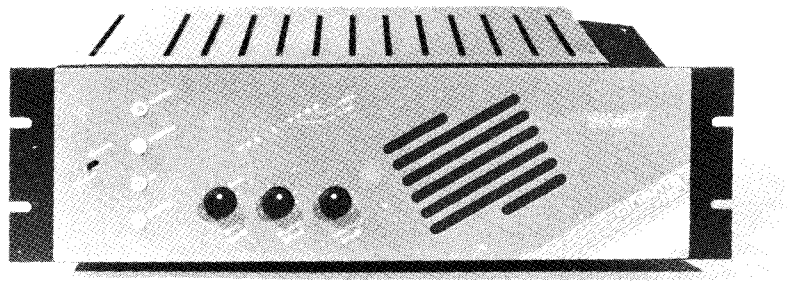
PREAMP LEVEL CALIBRATION

Run the reference tone side of the loop (Dolby tone). Move the LED meter switch (accessible through the top cover) to the Left Preamp position and read the level on the front panel meter. Adjust the left preamp input gain control with the tuning wand until the meter reaches the YELLOW calibrate marking. Increase the preamp slightly until the RED LED above the YELLOW just barely comes on. Decrease the gain until the RED LED winks off and the YELLOW is still fully on. This step calibrates the noise reduction tracking.



Switch to Left or Right Preamp to read level on LED display.

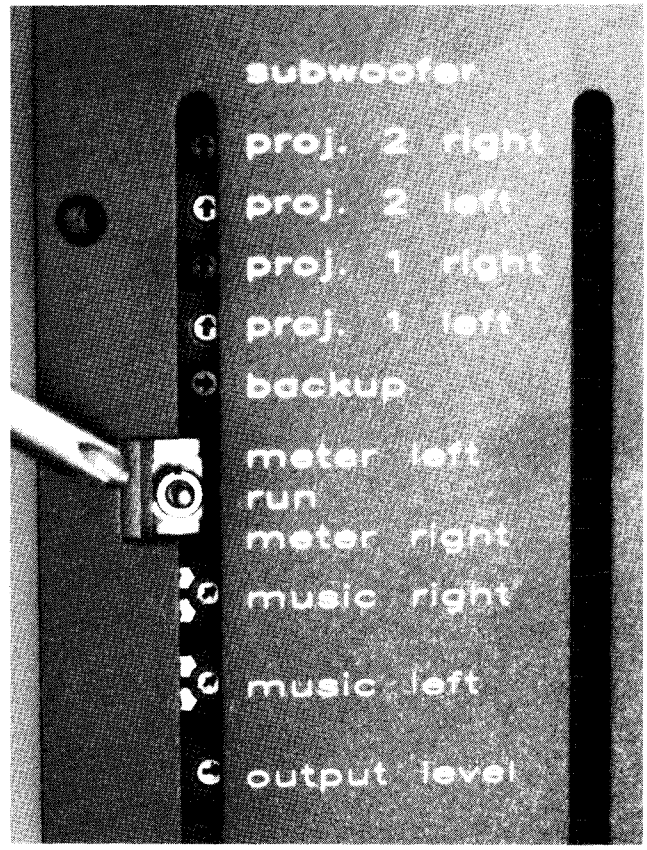
Now, switch the meter to the right preamp and perform the same function for the right input from the cell. Even though you may be using the system for monaural playback, there are 2 tracks on the soundtrack that must be calibrated for proper playback from a stereo print.



LED display on front panel is used to calibrate system.

The procedure is the same for monaural or stereo colar cells because the mono cell is driving both preamps similtaneously whereas the stereo cells are driving each preamp separately.

Move the meter switch to the middle position to monitor the output of the HF100 power amplifier.



Be sure to return LED display switch to RUN.

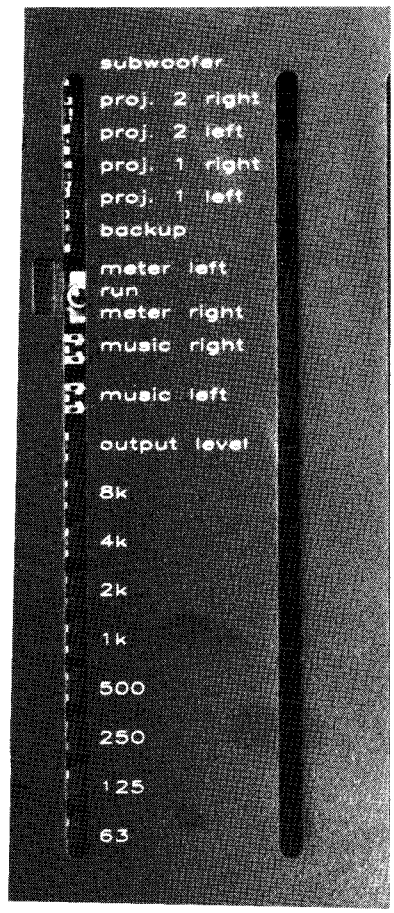
From this point, the set up of the "B" chain for a stereo system is identical to the setup of a mono system.

ROOM EQUALIZATION.

The HF100 and HF102 have full one octave filter sets to equalize the system for the room acoustics of different auditoriums. The filters will boost and cut each band of frequencies by 12 dB. The filters are in the flat response position when shipped from the factory. Each section is adjusted with the tuning wand and the starting position of each filter pot is approximately half way through the full rotation. Turning a filter pot counter-clockwise will cut the frequency band up to 12 dB (from flat), and turning the pot clockwise will boost the band by 12 dB. This gives a total range of 24 dB for the operating range even though using the entire range would result in extreme equalization.

Connect the output of your pink noise generator (output from the RTA test instrument) to the left and right music inputs of the HF100 simultaneously. Select MUSIC on the front panel selector switch and turn the front panel music pot fully open. Pink noise should be heard in the auditorium and on the booth monitor. The pink noise generator source should be set for 1 volt RMS output (using an analog voltmeter).

The equalizers are set by using the tuning wand and rotating each filter pot either clockwise for a boost in the frequency, or counter-clockwise for a cut of the frequency band.



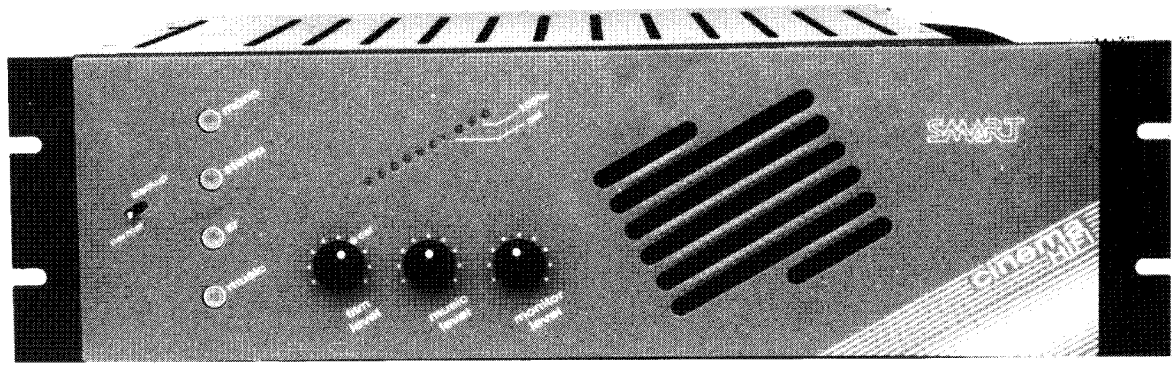
With the test microphone in the auditorium, analyze the room response with the RTA and set the EQ filters for the desired ISO 2969 room curve. If you are using a subwoofer system reduce the subwoofer output control on the HF100 to the minimum setting by turning the control (accessible through the top cover) fully counterclockwise.

Adjust the system OUTPUT LEVEL control (accessible through the top cover) for 79-85 dB SPL in the auditorium. Remember that the MUSIC pot should be wide open for this test and when the MUSIC and MASTER FADER are placed in the proper operating position, the system volume in the auditorium will be right for program material. The OUTPUT LEVEL control adjusts the audio drive to the power amplifier so that the MASTER FADER will produce the correct volume range in the auditorium.

ALTERNATE METHOD FOR EQUALIZATION. You may use the pink noise side of the test loop provided if you observe the following precautions.

The slit-width of the sound lens will affect the maximum frequency response that you can get from a high fidelity stereo print. Do not try to equalize the high frequency response of the HF100 to compensate for a poor lens response. Modes other than SVA stereo, will sound too sharp. Therefore, use good judgment in equalizing from the loop with a "Low-Fi" soundhead.

Select STEREO on the front panel format switches and adjust the FILM LEVEL control for a usable level in the auditorium. Adjust the equalizers for the desired ISO 2969 room curve.



Format switches

Set the operator FILM LEVEL fader to the CAL position while the pink noise loop is still running and monitor the sound pressure level in the auditorium with an SPL meter. Adjust the OUTPUT LEVEL pot through the top cover until you are 6 dB below the desired level. The film loop is recorded at 50% modulation and program material on an actual soundtrack will be at the right level.

SUBWOOFER OUTPUT LEVEL. If you are using a subwoofer speaker and amplifier in the system you should attempt to get a flat bass response down to at least 80 Hz from the stage speakers. The subwoofer will handle the very low frequencies below the range of the stage speakers. Add the subwoofer by turning the subwoofer control on the HF100 clockwise until the deep bass frequencies shown on the RTA are equal to the stage speaker. Some installers like to add an extra 3 dB of level to the subwoofer. However, never add more than 6 dB or the male voice dialog on the soundtrack will begin to sound unnatural. The subwoofer output low pass filter on the HF100 is down 3 dB at 80 Hz with a 18 dB per octave curve.

It's time now to run some film.

Rotate the front panel FILM LEVEL pot to the "CAL" position. Select MONO on the format switches and run a scrap trailer. Check the monitor for sound and then go to the auditorium for a sound check. If the sound level is too low or too loud, you may compensate accordingly by adjusting the OUTPUT LEVEL control through the top cover of the HF100. When the HF100 is switched to the stereo or SR mode, the level will automatically go up 6dB to allow for the general recording level on these formats.

Select the STEREO format on the font panel switches. Switch the front panel NORMAL-BACKUP switch to backup. Adjust the backup level pot through the top cover while monitoring the trailer. When switching back and forth between NORMAL and BACKUP it is possible to match the two levels exactly. This adjustment must be made while monitoring the auditorium loudspeaker.

NOTE: *When the BACKUP mode is selected, the booth monitor will mute to allow all the power from the active monitor amplifier to be diverted to the stage speaker. The backup trim pot adjusts the emergency preamp and monitor amp. The front panel MONITOR pot has no control when the HF100 is in the backup mode of operation. Also, there will be no non-sync music during backup.*

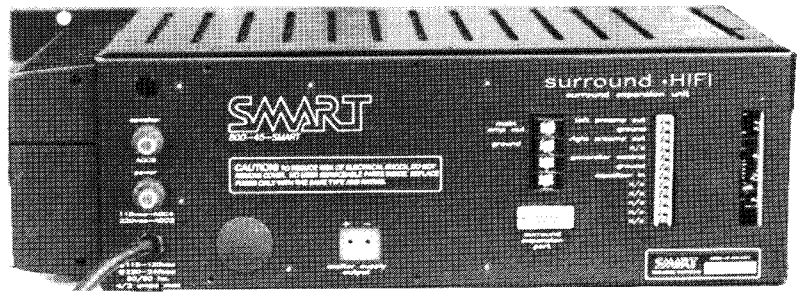
NON-SYNC MUSIC LEVELS. Connect a CD or cassette player to the music inputs and rotate the MUSIC LEVEL control on the front panel to the 2 or 3 o'clock position. Adjust the MUSIC RIGHT and MUSIC LEFT pots through the top cover of the HF100 until you have a good balance of the two channels on the recording. If you are also using the HF102 in the system, monitor the surround channel on the booth monitor and adjust the music trim pots for minimum vocal on the surround channel when playing a vocal recording. The front stage speaker reproduces an L+R signal from the recording and the surround channel reproduces a L-R product. You are attempting to null the "phantom" channel on most commercial recordings on the surround channel with this procedure.

The VCA's used in the music circuits have a fade-out range of ›80 dB. If you drive the music input too hard from the player, you will hear low level music during the film presentation. The correction for this symptom is to lower the music trim pots until the music is no longer heard while the soundtrack is playing. The front panel MUSIC LEVEL control may be adjusted to the desired non-sync level in the auditorium.

When you are satisfied the HF100 has been calibrated properly, slide the unit into the console or equipment rack and secure the product with the 4 rack screws furnished.

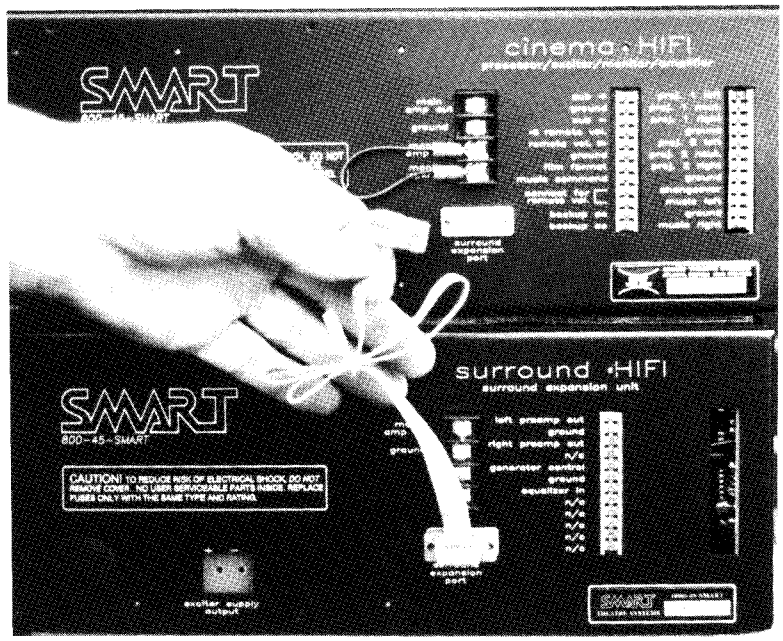
INSTALLING THE HF102 SURROUND HI-FI

The HF102 receives its signals from the HF100. A multi-conductor cable carries the left and right audio, VCA control, monitor select control, and emergency relay control between the two units. Do not attempt to adjust the HF102 until the HF100 is set up properly.



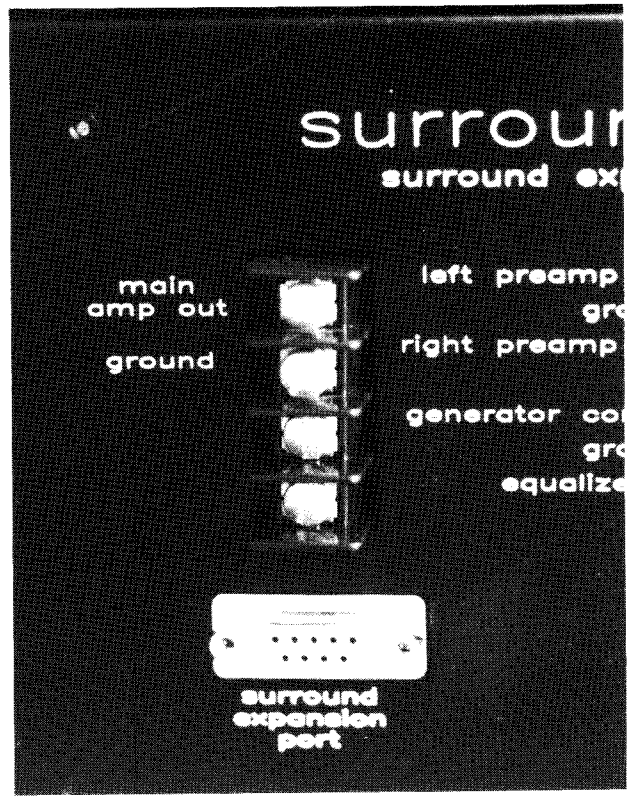
Rear view of HF102 Surround Hi-Fi

Connect the DB9 computer cable (supplied with the HF102) to the HF100 and HF102. Apply AC power to the unit.



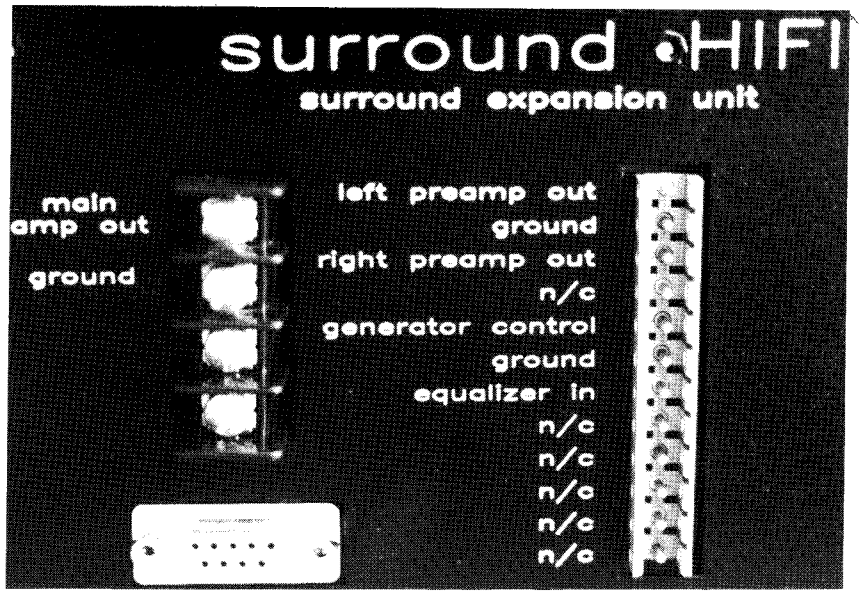
Connect the cable to both the HF100 and HF102.

Connect the surround speakers to the MAIN OUT and GROUND. The MOSFET amplifier in the Surround Hi-Fi has a power rating of 120 watts RMS into 8 ohms, and 180 watts RMS into 4 ohms. If you can wire the surround speakers for 4 ohms, you will obtain the maximum power available from the amplifier to achieve extra headroom capability.



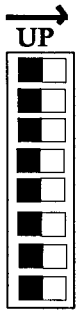
Surround Speaker Output Terminals and DB9 connector.

EQUALIZATION. A quick way to set the one octave equalizer is to inject pink noise directly into the HF102 from the pink noise generator in the RTA test instrument. Special inputs have been provided on the HF102. The quick connector has a jumper between the "Equalizer In" and the adjacent "Ground" terminals. Remove the jumper and inject pink noise into the unit. The level in the auditorium may be adjusted with the OUTPUT LEVEL trim pot accessible through the top cover. With the test microphone set in the proper location in the auditorium, adjust the EQ filters for the ISO 2969 curve.



Equalizer input terminal is on the quick connector.

Injecting pink noise through the quick connector will bypass the time delay circuit in the HF102. Be sure to replace the jumper when you are through tuning the room. The jumper shorts this special input to ground to avoid picking up interference on this unterminated input.

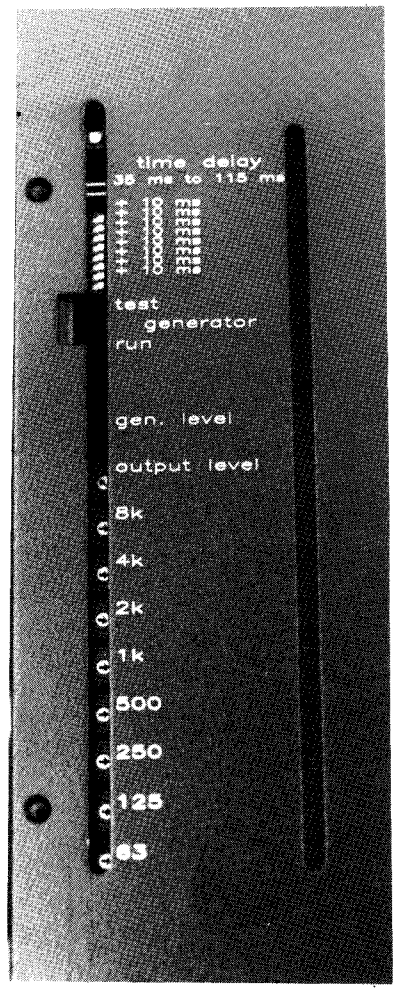


Time Delay DIP Switches

TIME DELAY SETTING. The time delay section uses a premium "double chip" design and is fully adjustable from 35 milliseconds to 115 milliseconds in 10 millisecond increments. An 8 switch DIP package (piano key type) is accessible through the top cover to set the delay. You may use the flat of the tuning wand, a screwdriver, or pen to turn on each switch. Any switch that is UP will add another 10 milliseconds of delay until the desired delay is achieved. You may start at either end of the DIP package.

SETTING SURROUND LEVEL. The HF102 gets its signals from the HF100. Set the FILM LEVEL front panel control on the HF100 to the CAL (calibrate) position while running a Dolby Cat #151 "Choo-Choo" loop on the projector. Make sure the HF102 is in the STEREO mode of operation.

Adjust the OUTPUT LEVEL trim control through the top cover until the front channel and surround channel appear to be matched in the auditorium.

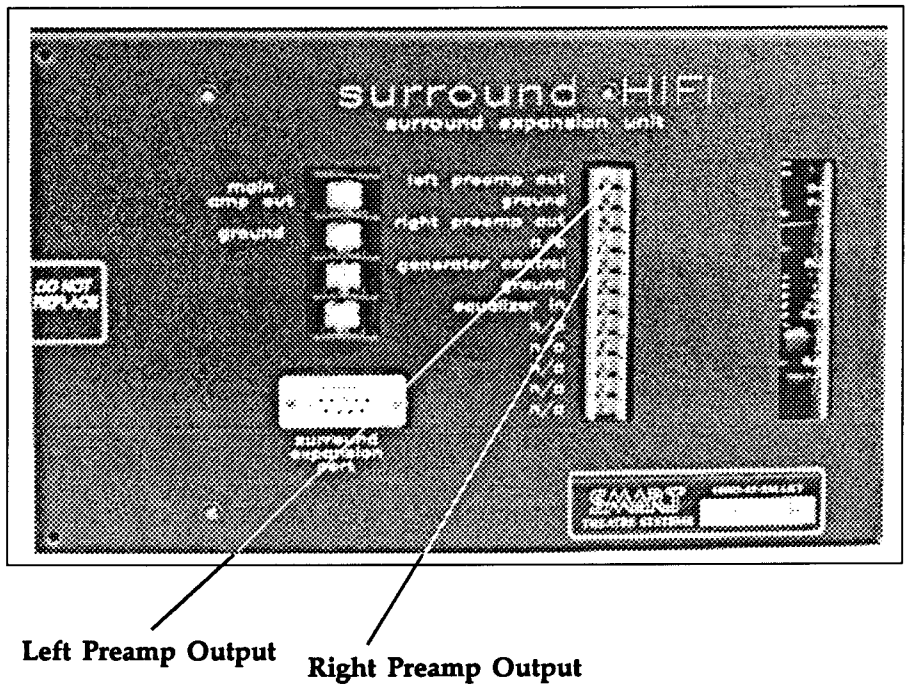


Surround Hi-Fi Top cover.

This completes the adjustments of the HF102.

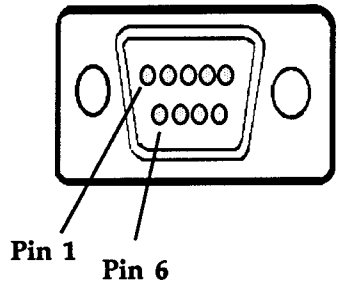
HEARING IMPAIRED SYSTEMS. Most of the systems used in theatres for hearing impaired patrons require a constant audio level input. That is, the MASTER FADER should not affect the level going to the hearing impaired transmitter. A left preamp output and light preamp output is available on the quick connector of the HF102 to drive any kind of external system. Also, the same signals are available on the DB9

connector of the HF100 if the HF102 is not used in the theatre sound system.



Outputs from HF102 Surround Hi-Fi for feeding a separate Hearing Impaired System.

1 - L Preamp
2 - R Preamp
3 - Ground
4 - Surr. Mon Sig.
5 - Monitor Control
6 - Music (L-R)
7 - Surr Relay (cold)



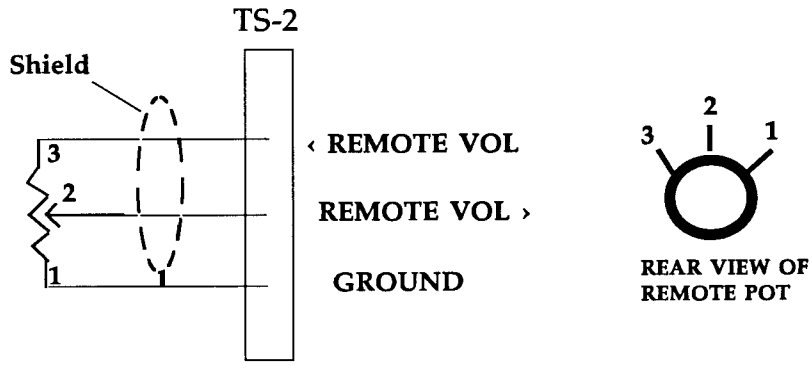
Male DB9 Connector on HF100 will feed Hearing Impaired System

OPTIONAL STEREO GENERATOR. If the theatre plays many monaural films, you may want to add the stereo generator to the HF102. A switch, accessible through the top cover of the HF102 allows you to force the surround generator on while adjusting the generator level. This adjustment should be made while running a mono trailer on the projector.

Cinema Hi-Fi and Surround Hi-Fi in a wall mount equipment cabinet. Also there is 3 1/2" space for a CD or Cassette player.

SIMPLE REMOTE MASTER FADER

To add a remote master fader, simply remove the jumper on the TS-2 connector and add a twisted pair-shielded audio cable to the remote volume control. One of the audio conductors must connect to the FROM remote control and the other to the TO remote control. The shield of the cable is connected to the HF100 ground, with the other end of the shield connected to the low side of the pot. A 10K linear pot should be used for the remote. See the hookup diagram. When the remote pot is used, the internal pot is not active any longer. This simple remote is suggested when the sound system is always controlled from a remote location. A more elaborate remote control of the film level fader is shown in the next section of this manual.



Wiring of simple remote film fader control.

INSTALLATION OF HF103 & HF104 REMOTE FADERS

Cable requirements:

A 24 inch length of 2-conductor thermostat or telephone type wire is used to connect the local panel to the HF100 CinemaHiFi remote terminals. If you purchased the HF104 booth panel, the wires are provided on the panel.

Connect to TS2:
Red lead to HF100 terminal 9
Yellow Lead to HF100 terminal 4

A 2-conductor non-shielded cable must be run between the HF104 booth panel and the HF103 Remote box at the remote location.

Connect from Booth Panel to Remote Box:
Gray pigtail to your wire, then to Gray on Remote
Blue pigtail to your wire, then to Blue on Remote

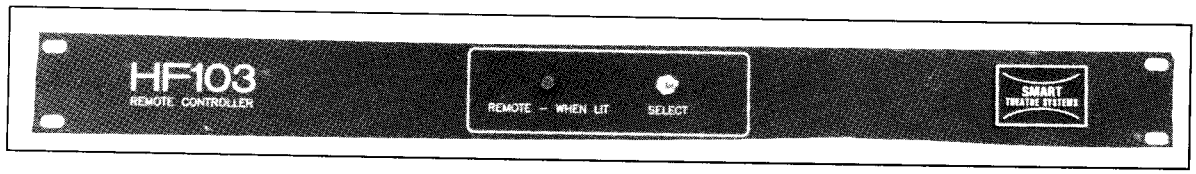
A 2-conductor shielded audio cable and a single non-shielded wire must be run between the HF100 Cinema HiFi and the HF103 Remote box at the remote location.

Connect to TS2:

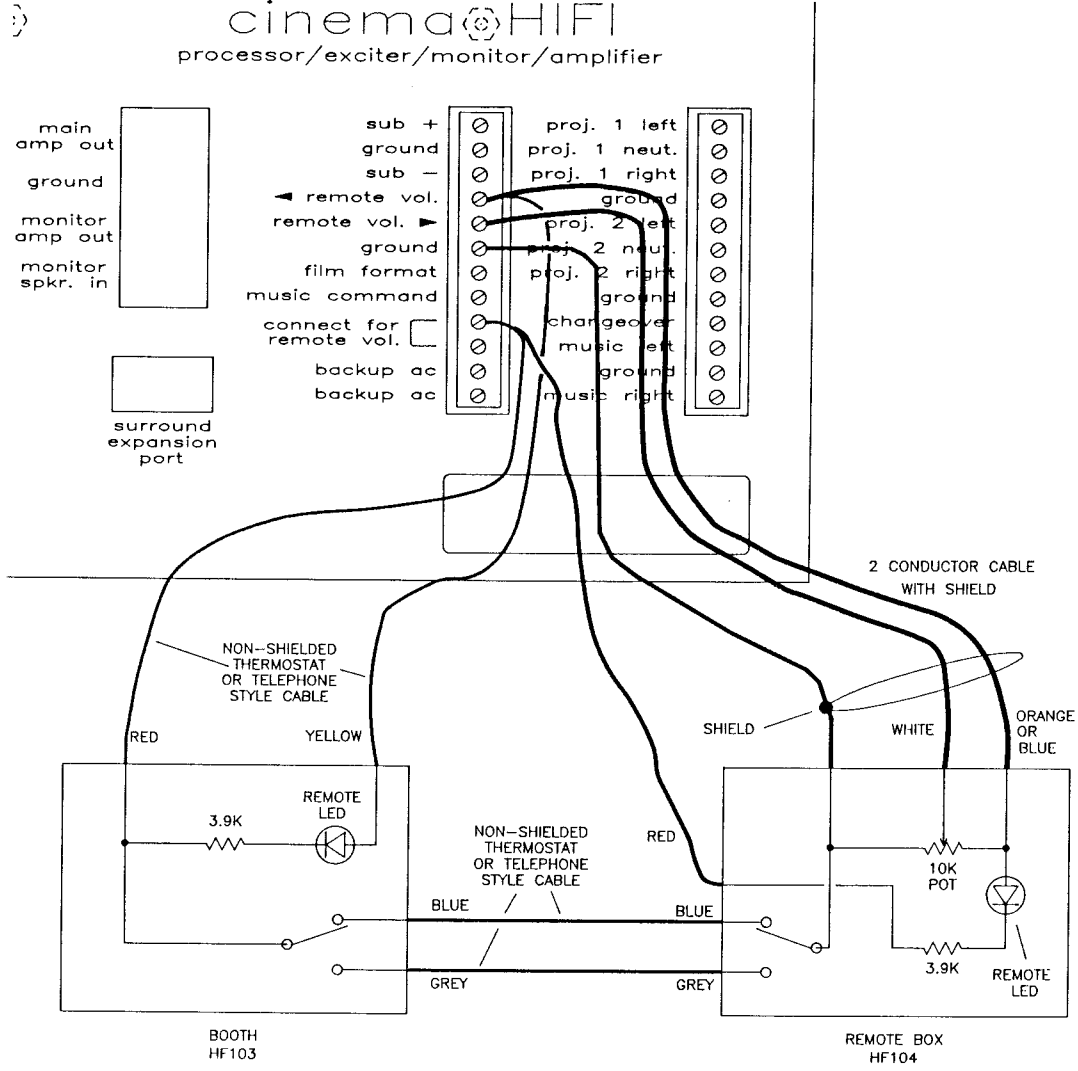
SHIELDED	Shield to terminal 6 of HF100 (Ground)
	Orange to terminal 4 of HF100 (< Rem. Vol)
	White to terminal 5 (> Rem.Vol.)
	Red (non-shielded) to terminal 9 of HF100

Refer to the wiring diagram for hook-up.

When using your own wire be sure to keep the color code consistent from the booth to the remote box to avoid a hook-up error. It is a good idea to write the color coding on the wiring diagram for any possible future servicing.

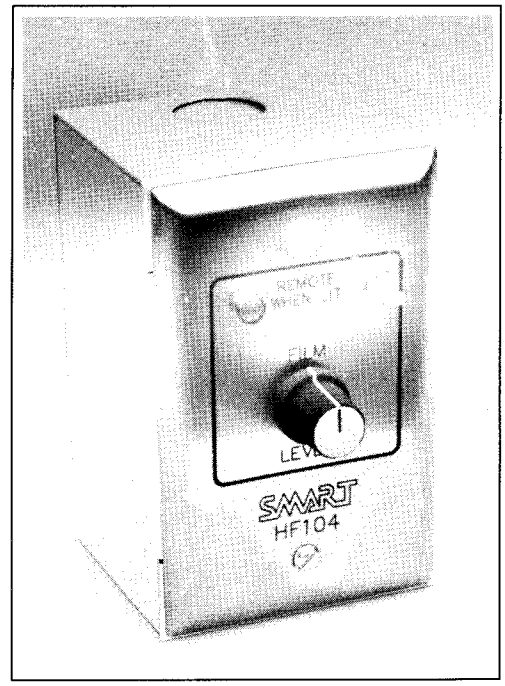


The HF103 rack mount Remote Controller is mounted in the console or sound equipment cabinet near the HF100, or between the HF100 and HF102.



Component wiring for HF103 and HF104 to HF100 Cinema Hi-Fi

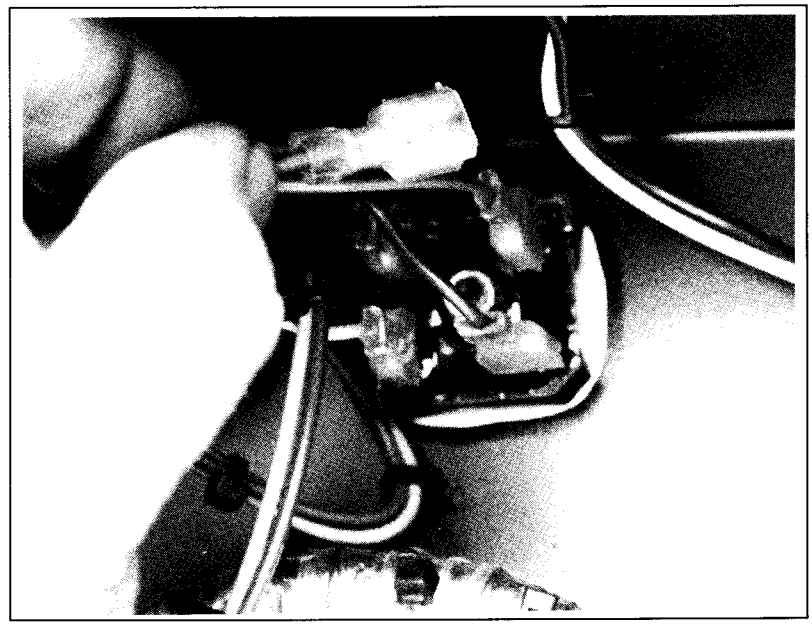
The HF104 Remote box may be installed in the auditorium or managers office for easy adjustment of the film sound level.



EXCITER LAMP SUPPLIES

The internal exciter supply furnished in the basic HF100 Cinema Hi-Fi is an unregulated DC supply with selectable HI and LO outputs for domestic bulbs and European type bulbs. The HF100 is shipped with the exciter output set in the HI position for countries that use 117V AC operation, and the LO position for 220/240 VAC operation.

To change the setting from one to the other, remove the top cover of the chassis. Locate the diode bridge block for the DC exciter supply. This part is on the chassis floor, in the upper right hand side (when viewed from the front panel. If a GREEN wire is connected to one of the terminals of the diode block, the output voltage is set in the LO (5 volts) output. To change the output to HI, pull the FASTON connector from the block and push on the nearby GRAY wire. The output will now be in the HI (7.5 volts) position.

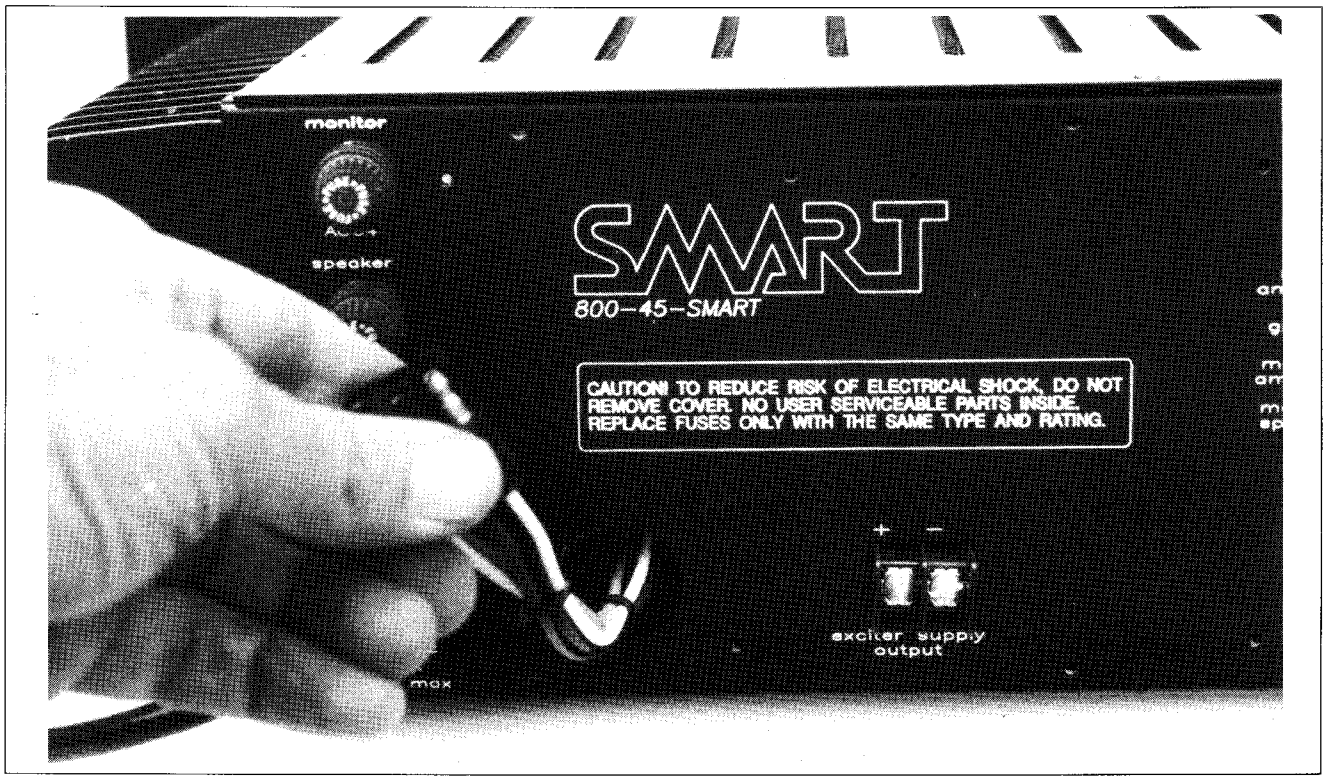


Pull FASTON connector from diode block and replace with other wire to change DC output voltage of ungegulated exciter supply.

The DC exciter supply is extremely reliable due to its simplicity and the use of heavy duty industrial parts.

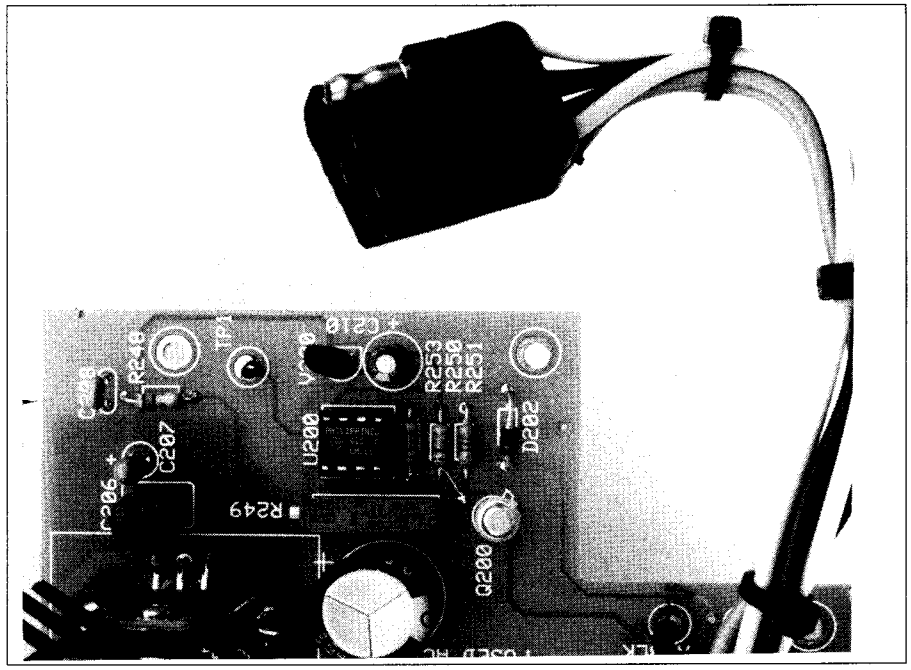
OPTIONAL REGULATED EXCITER SUPPLY

The 5200 module is an option to the HF100 to utilize the benefits of regulated exciter supply when the system is used with the HF102 Stereo Surround system. The regulated exciter module provides a "rock solid" DC output to the exciter bulb no matter what fluctuations occur on the main AC lines within the operating range of 109 to 130 volts AC. Bulb brightness is constant. This is very important in stereo systems because the noise reduction system must be referenced to a known level in order to operate properly. If the bulb brightness changes throughout the show, the stereo performance will suffer and often noise reduction "pumping" is noticed.



To connect the 5200 module, remove the plastic plug and pull the 6 pin connector through the hole. The polarized connector mates to the plug on the 5200. Fasten the module to the back of the HF100 chassis with 4 screws.

If you are adding the 5200 regulated exciter module to an HF100 already in service, you will also need to add an integrated circuit chip to the "Auto-Sense" portion of the HF100. An IC socket is provided on the rear PC board. This IC controls the comparator section of the automatic backup capability of the HF100. If the chip were included with ALL HF100 units from the factory, the illuminated front panel



IC chip U200 must be added if the 5200 module is installed in the field. Be sure to observe pin coding on the chip.

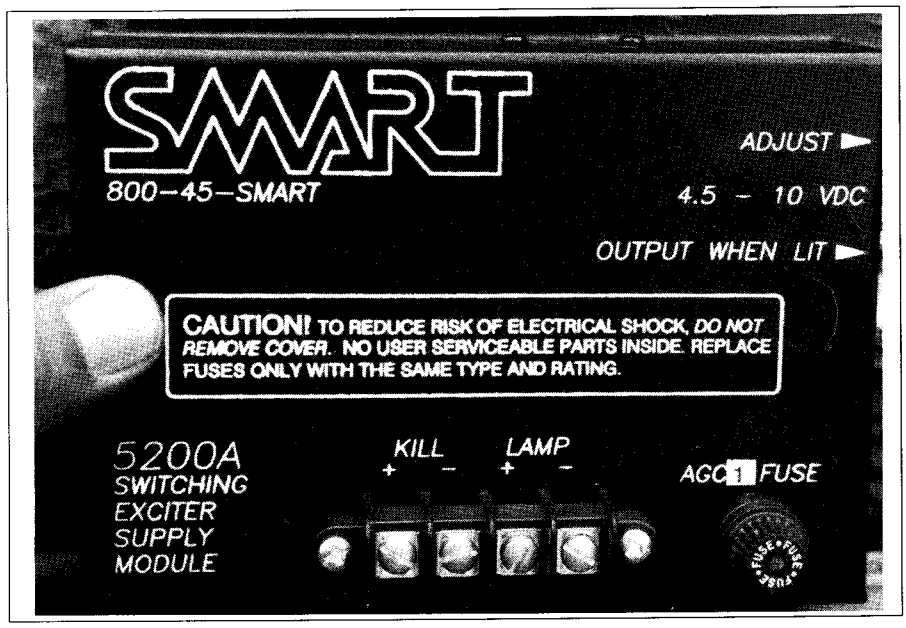
buttons would blink constantly to warn the operator that there is a problem with the regulated exciter supply. Therefore, we only install the chip in HF100 systems that are shipped with the 5200 module already installed.

The 5200 module is AC line driven and has its own separate AC fuse. This makes the exciter completely independent of the main HF100. The high frequency switching supply runs at about 200 kHz which puts hum and noise far above audibility. The stability of this supply is an amazing 1/10 of 1%. This means that the AC input may vary from 109 to 130 VAC, yet the output of the 5200 will remain virtually constant.

CAUTION: Dangerous high voltage and current are contained in the 5200 switching supply. Do not try to service this unit with power applied.

The output adjustment of the 5200 is accomplished by using a tuning wand or very small screwdriver. The 15 turn pot (accessible through the hole in the chassis) will vary the output voltage from 4.5 VDC to 10 VDC. Connect your voltmeter to the bulb contacts in the soundhead before adjusting the desired voltage. The reading you get at the bulb will be accurate because there will be wire resistance losses from the supply to the bulb.

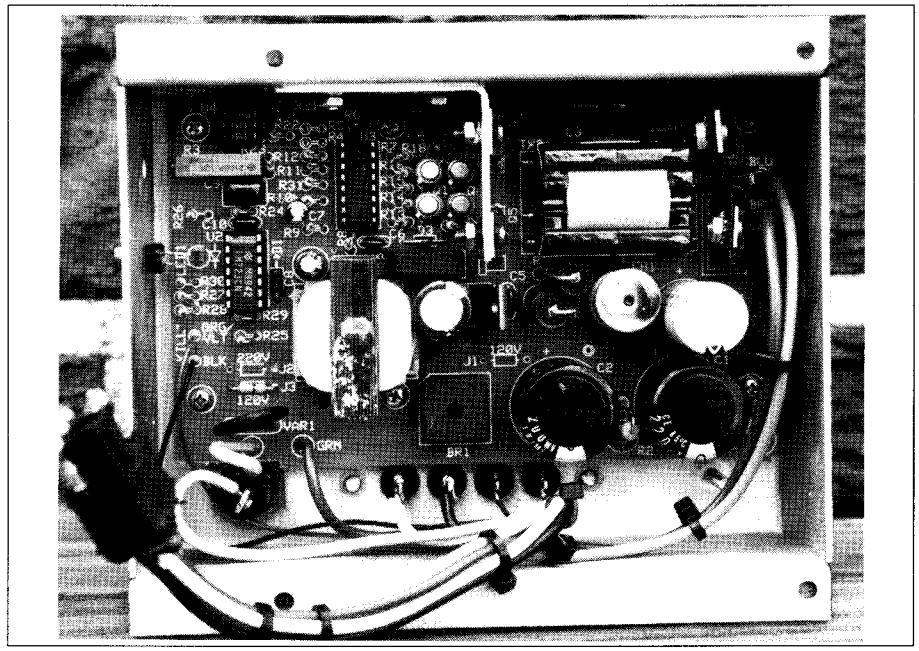
Use tuning wand or screwdriver to adjust regulated output voltage.



Spade lugs or a fanning strip should be used when connecting to the lamp output terminals or kill circuit.

A unique feature of the SMART regulated exciter supply series is the "Kill" circuit that reduces the bulb voltage during intermission. When the KILL terminals are shorted, the bulb will drop from the pre-set brightness to a glow status to extend bulb life. The normal brightness will be restored when the KILL terminals are unshorted. This valuable feature prevents thermal shock to the bulb filament that normally occurs when current rushes into a cold filament.

The KILL terminals can be connected to an automation system or a remote control switch. Be sure that the contacts of the relay or switch are "dry" with no voltage on them. A voltage applied to the KILL terminals will damage the input to the transistor that controls the circuit.



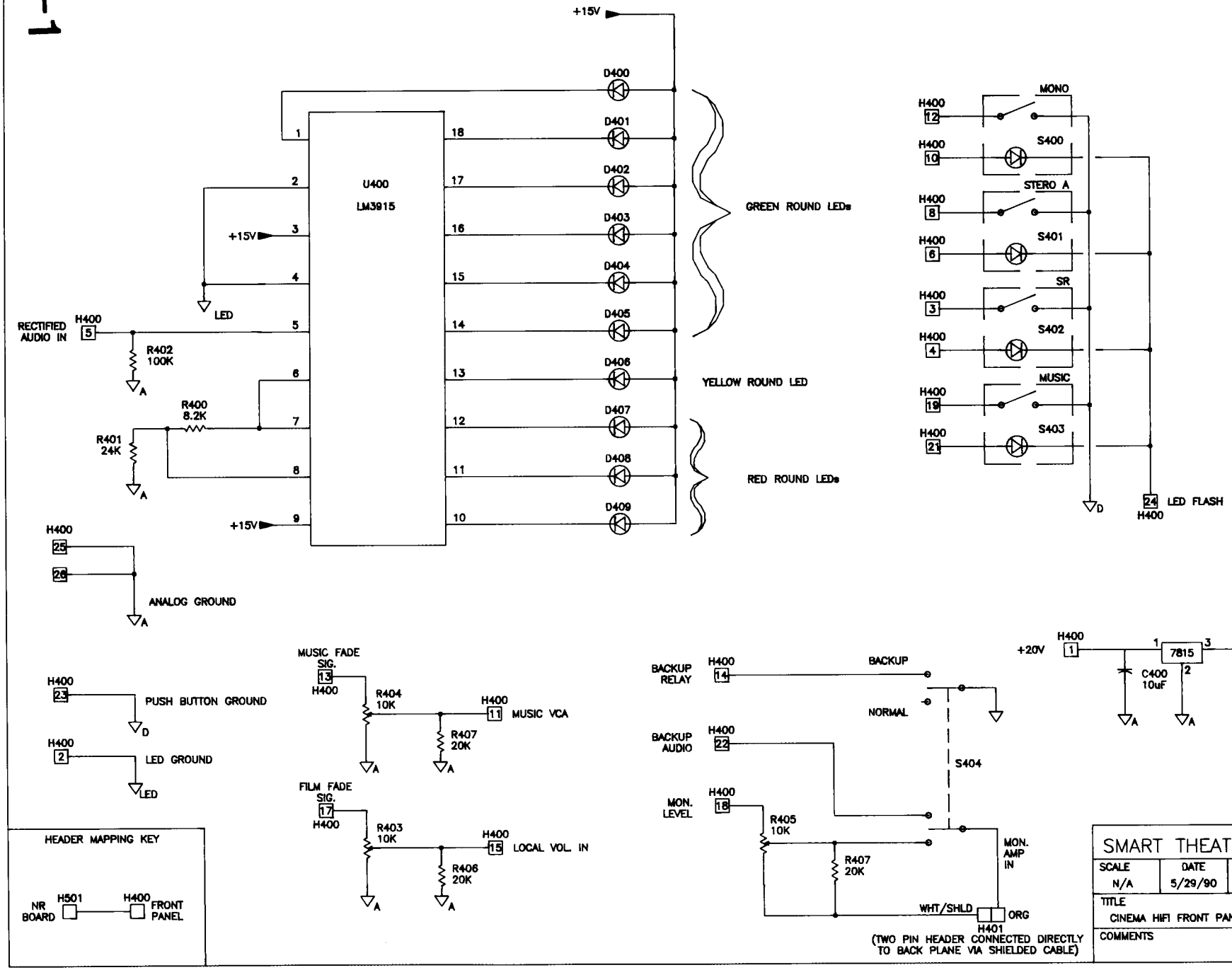
View of the interior of the 5200 regulated switching supply module. This high current unit is very compact.

SMART Theatre Systems maintains a factory service department that offers quick handling of replacement parts or advice on field servicing of any of our products. The service department can be reached at 1-(800) 45-SMART or (404) 451-1820.

Schematic Diagrams

SMART

S-1



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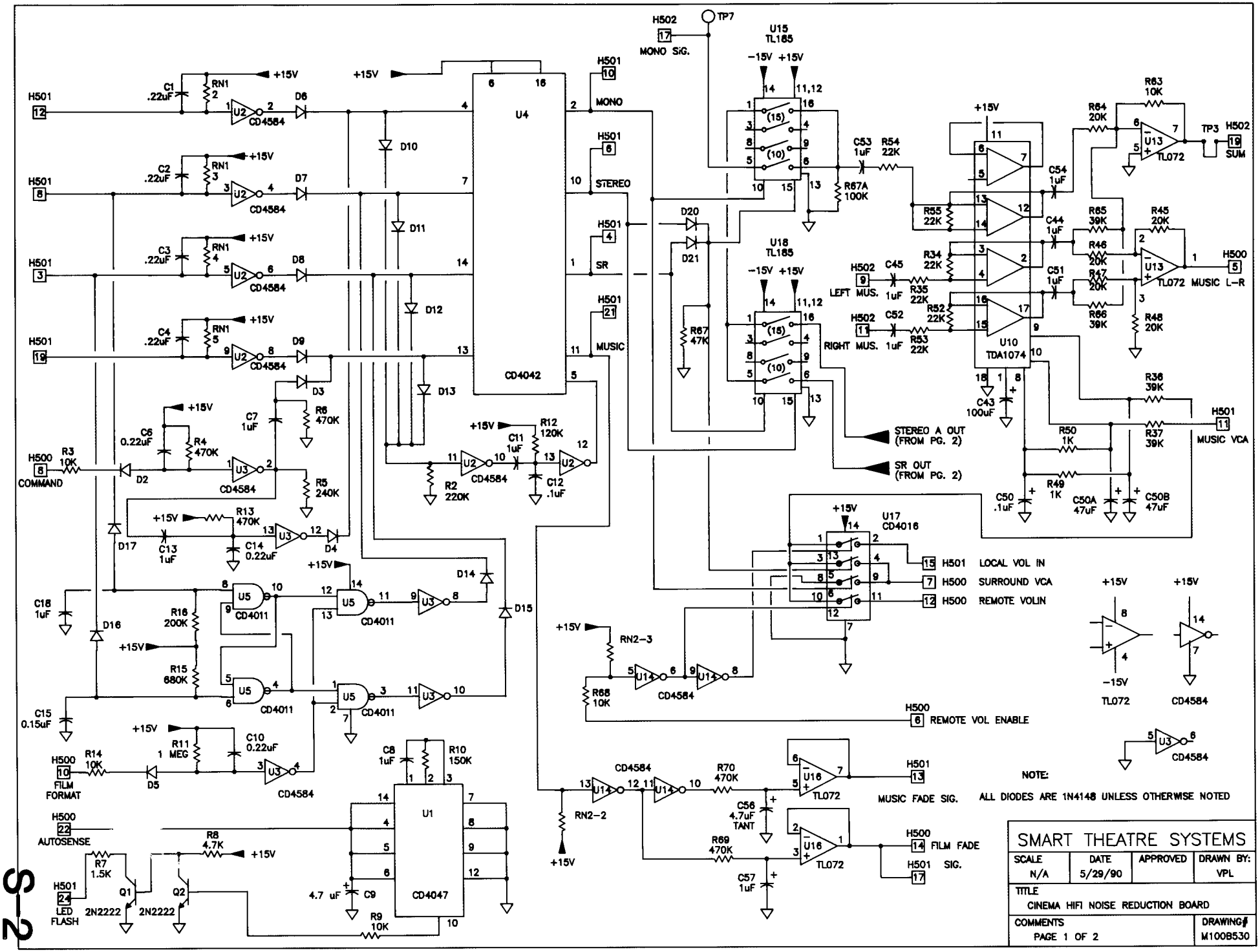
CINEMA HIFI FRONT PANEL			
COMMENTS			DRAWING#
			M100A500



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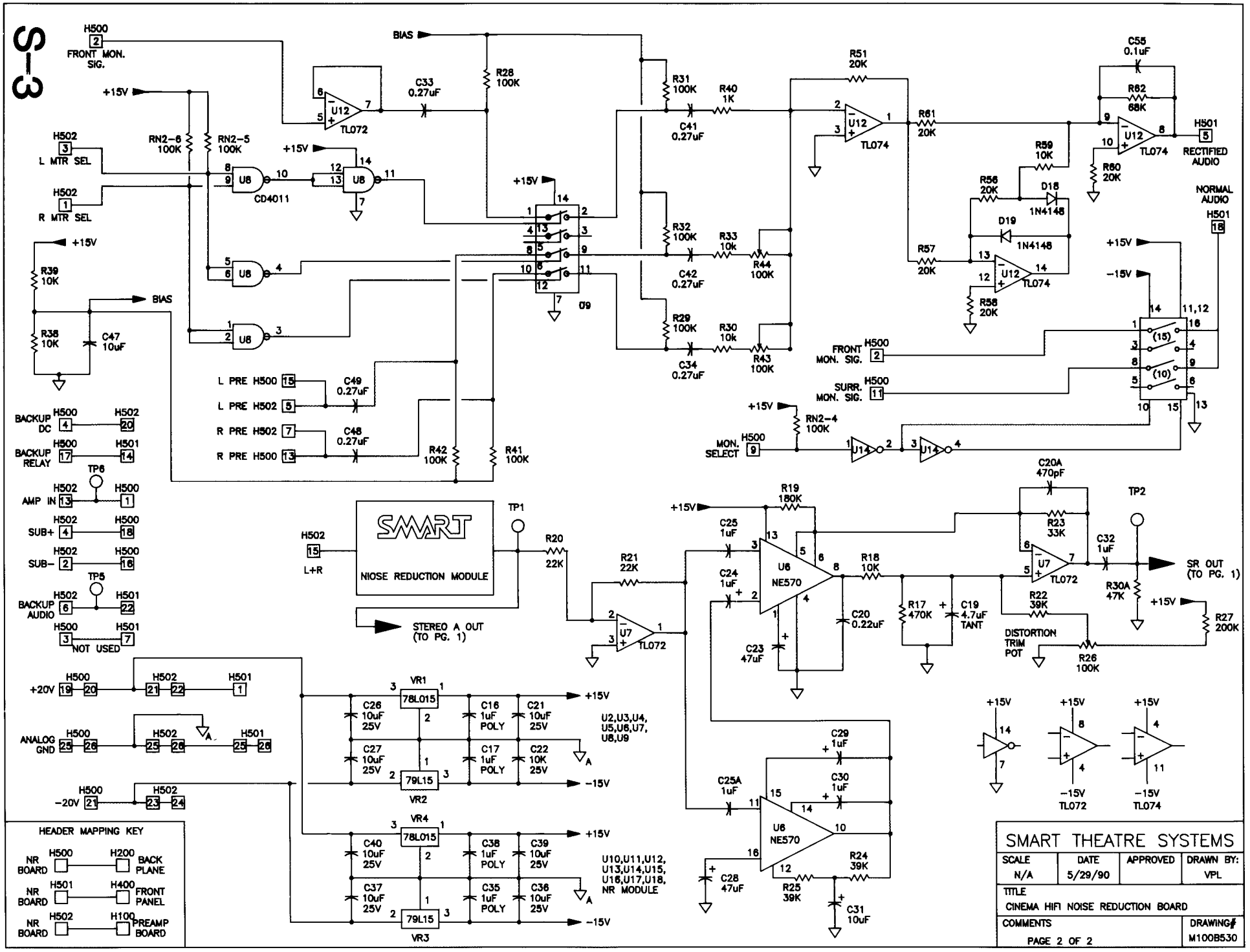
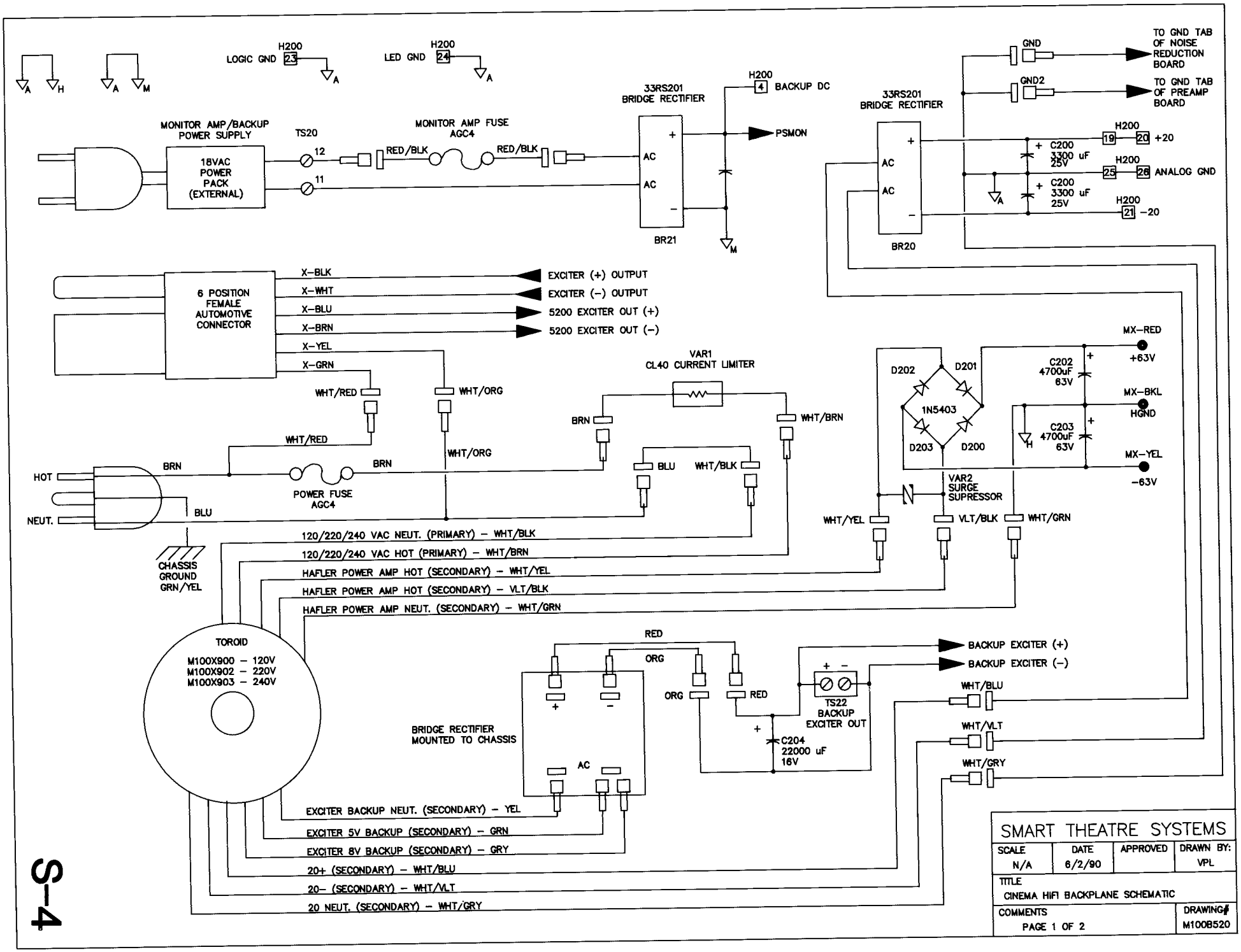
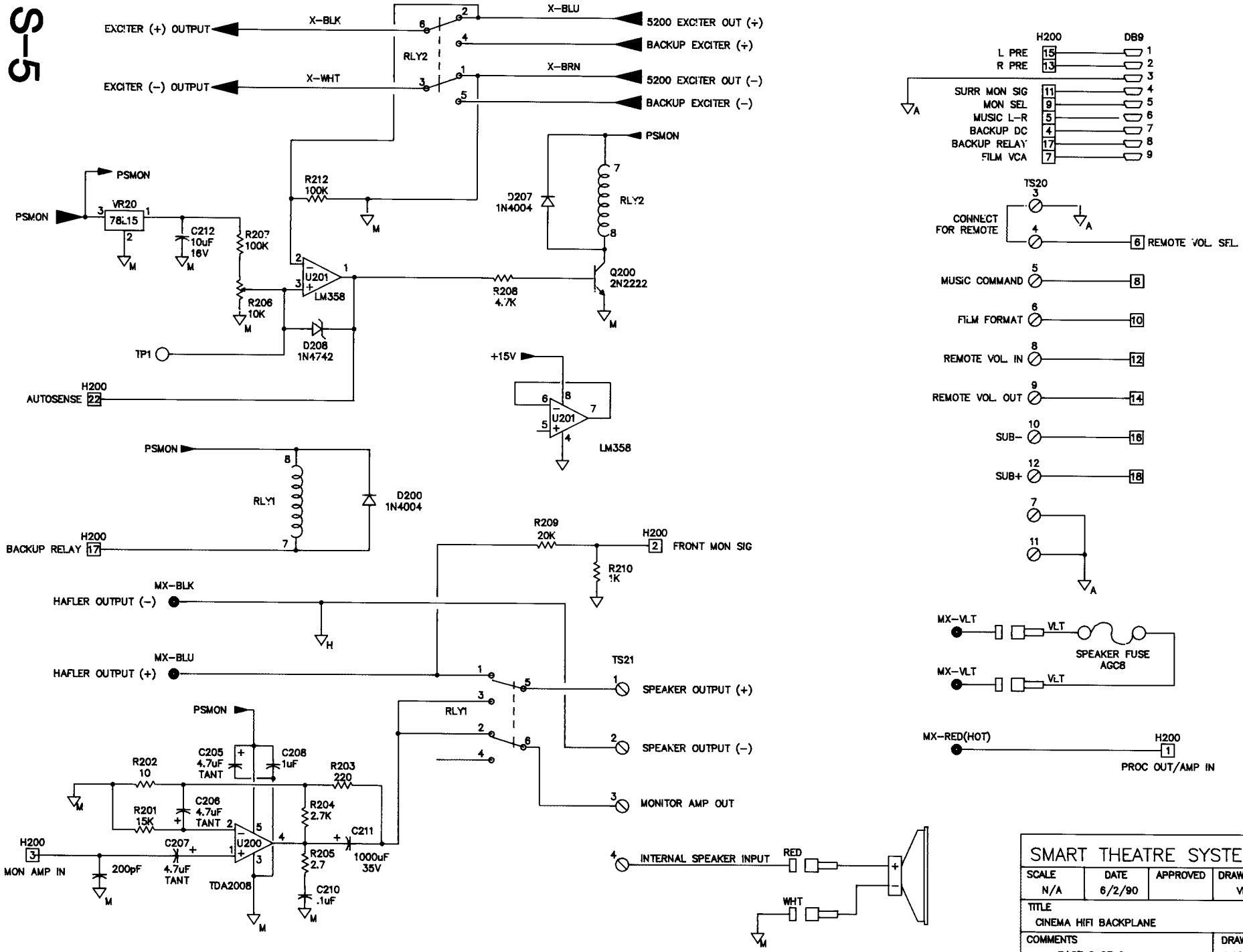
COMMENTS: PAGE 1 OF 2			DRAWING# M1008530

S-2


S-3
H500 2 FRONT MON. SIG.
+15V
BIAS
RN2-6 100K
RN2-5 100K
H502 3 L MTR SEL
H502 1 R MTR SEL
U12 TL072
C33 0.27uF
R28 100K
U8 CD4011
R31 100K
R40 1K
C41 0.27uF
R51 20K
U12 TL074
R61 20K
C55 0.1uF
R62 68K
R60 20K
H501 5 RECTIFIED AUDIO
R59 10K
R56 20K
D18 1N4148
D19 1N4148
R57 20K
R58 20K
NORMAL AUDIO H501 18
R39 10K
R38 10K
C47 10uF
R32 100K
R33 10k
R44 100K
C42 0.27uF
R29 100K
R30 10k
R43 100K
C34 0.27uF
L PRE H500 15
L PRE H502 5
R PRE H502 7
R PRE H500 13
C49 0.27uF
C48 0.27uF
R42 100K
R41 100K
FRONT MON. SIG. H500 2
SURR. MON. SIG. H500 11
MON. SELECT H500 9
RN2-4 100K
BACKUP DC H500 4 H502 20
BACKUP RELAY H500 17 H501 14
AMP IN H502 13 H500 1 TP6
SUB+ H502 4 H500 18
SUB- H502 2 H500 16
BACKUP AUDIO H502 6 H501 22 TP5
NOT USED H500 3 H501 7
SMART NIOSE REDUCTION MODULE
H502 15 L+R
TP1
R20 22K
R21 22K
STEREO A OUT (TO PG. 1)
R19 180K
C20A 470pF
R23 33K
C25 1uF
C24 1uF
U6 NE570
R18 10K
C20 0.22uF
C23 47uF
R17 470K
C19 4.7uF TANT
C32 1uF
TP2
SR OUT (TO PG. 1)
R30A 47K
R22 39K
DISTORTION TRIM POT
R26 100K
R27 200K
+20V H500 19 20 H502 21 22 H501 1
ANALOG GND H500 25 26 H502 25 26 H501 25 26
-20V H500 21 H502 23 24
VR1 78L015
VR2 79L15
VR4 78L015
VR3 79L15
C26 10uF 25V
C27 10uF 25V
C16 1uF POLY
C17 1uF POLY
C21 10uF 25V
C22 10K 25V
U2,U3,U4, U5,U6,U7, U8,U9
C40 10uF 25V
C37 10uF 25V
C38 1uF POLY
C35 1uF POLY
C39 10uF 25V
C36 10uF 25V
U10,U11,U12, U13,U14,U15, U16,U17,U18, NR MODULE
C25A 1uF
C29 1uF
C30 1uF
C28 47uF
R24 39K
R25 39K
C31 10uF
+15V
-15V
TL072
TL074
HEADER MAPPING KEY
NR BOARD H500 H200 BACK PLANE
NR BOARD H501 H400 FRONT PANEL
NR BOARD H502 H100 PREAMP BOARD
SMART THEATRE SYSTEMS
SCALE N/A
DATE 5/29/90
APPROVED
DRAWN BY: VPL
TITLE CINEMA HIFI NOISE REDUCTION BOARD
COMMENTS PAGE 2 OF 2
DRAWING# M100B530


H200
LOGIC GND 23
H200
LED GND 24
MONITOR AMP/BACKUP POWER SUPPLY
18VAC POWER PACK (EXTERNAL)
TS20
12
11
MONITOR AMP FUSE AGC4
RED/BLK
RED/BLK
33RS201 BRIDGE RECTIFIER
AC
AC
+
-
BR21
H200
4 BACKUP DC
PSMON
33RS201 BRIDGE RECTIFIER
BR20
GND
GND2
TO GND TAB OF NOISE REDUCTION BOARD
TO GND TAB OF PREAMP BOARD
C200 3300 uF 25V
C200 3300 uF 25V
H200
19 20 +20
H200
25 26 ANALOG GND
H200
21 -20
6 POSITION FEMALE AUTOMOTIVE CONNECTOR
X-BLK
X-WHT
X-BLU
X-BRN
X-YEL
X-GRN
EXCITER (+) OUTPUT
EXCITER (-) OUTPUT
5200 EXCITER OUT (+)
5200 EXCITER OUT (-)
VAR1
CL40 CURRENT LIMITER
WHT/RED
WHT/ORG
WHT/RED
WHT/ORG
BRN
WHT/BRN
HOT
NEUT.
BRN
BRN
BLU
WHT/BLK
POWER FUSE AGC4
BLU
CHASSIS GROUND GRN/YEL
D202
D201
1N5403
D203
D200
C202 4700uF 63V
C203 4700uF 63V
MX-RED
+63V
MX-BKL
HGND
MX-YEL
-63V
VAR2
SURGE SUPRESSOR
WHT/YEL
VLT/BLK
WHT/GRN
120/220/240 VAC NEUT. (PRIMARY) - WHT/BLK
120/220/240 VAC HOT (PRIMARY) - WHT/BRN
HAFLER POWER AMP HOT (SECONDARY) - WHT/YEL
HAFLER POWER AMP HOT (SECONDARY) - VLT/BLK
HAFLER POWER AMP NEUT. (SECONDARY) - WHT/GRN
TOROID
M100X900 - 120V
M100X902 - 220V
M100X903 - 240V
RED
ORG
ORG
RED
BRIDGE RECTIFIER MOUNTED TO CHASSIS
AC
TS22 BACKUP EXCITER OUT
C204 22000 uF 16V
BACKUP EXCITER (+)
BACKUP EXCITER (-)
WHT/BLU
WHT/VLT
WHT/GRY
EXCITER BACKUP NEUT. (SECONDARY) - YEL
EXCITER 5V BACKUP (SECONDARY) - GRN
EXCITER 8V BACKUP (SECONDARY) - GRY
20+ (SECONDARY) - WHT/BLU
20- (SECONDARY) - WHT/VLT
20 NEUT. (SECONDARY) - WHT/GRY
SMART THEATRE SYSTEMS
SCALE N/A
DATE 6/2/90
APPROVED
DRAWN BY: VPL
TITLE
CINEMA HIFI BACKPLANE SCHEMATIC
COMMENTS
PAGE 1 OF 2
DRAWING#
M100B520
S-4

S-5



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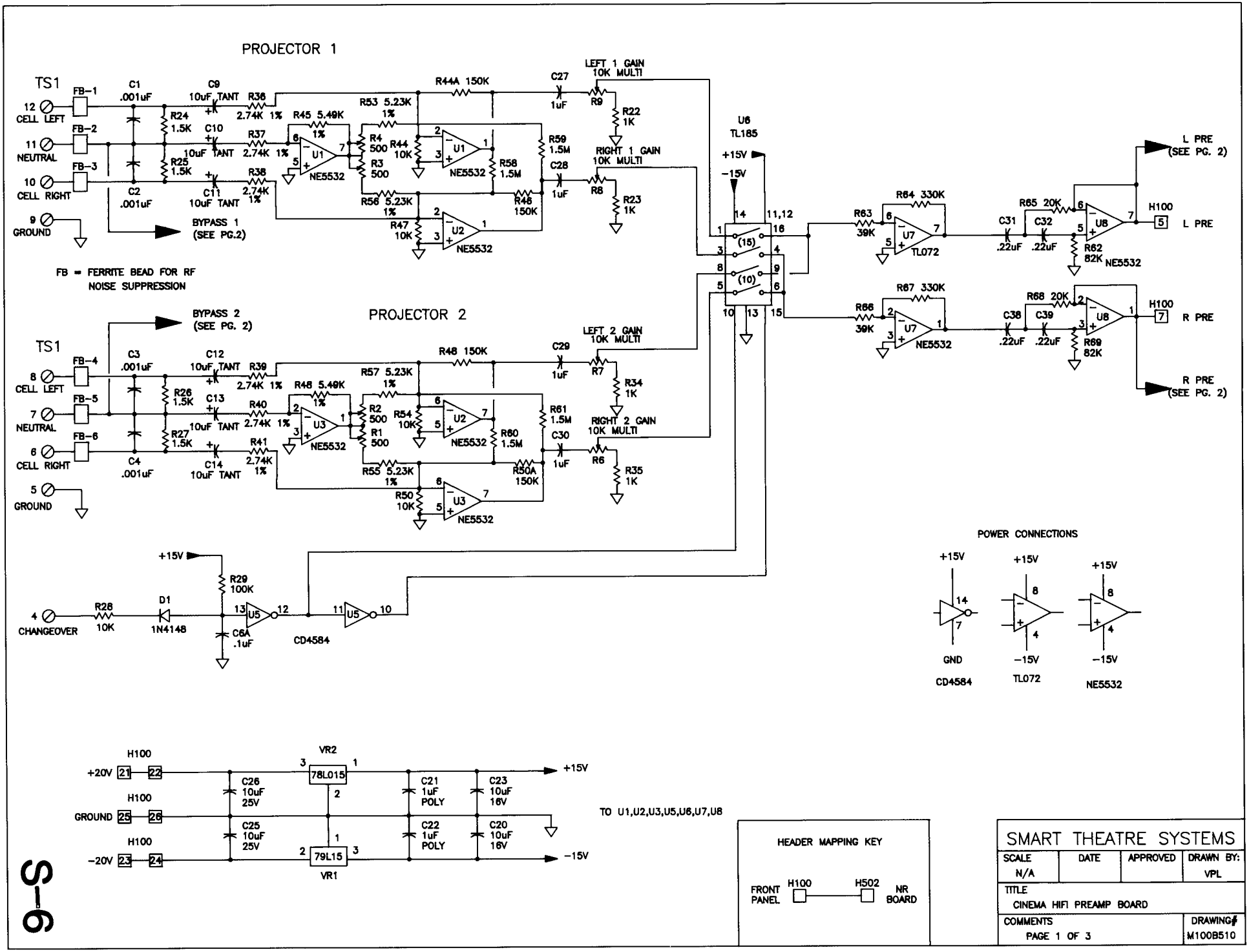
COMMENTS PAGE 2 OF 2			DRAWING# M100B520


PROJECTOR 1
TS1
12 CELL LEFT
11 NEUTRAL
10 CELL RIGHT
9 GROUND
FB-1
FB-2
FB-3
C1 .001uF
C2 .001uF
C9 10uF TANT
C10 10uF TANT
C11 10uF TANT
R24 1.5K
R25 1.5K
R36 2.74K 1%
R37 2.74K 1%
R38 2.74K 1%
R45 5.49K 1%
R53 5.23K 1%
R44A 150K
R4 500
R3 500
R44 10K
R56 5.23K 1%
R47 10K
U1 NE5532
U2 NE5532
R58 1.5M
R59 1.5M
R46 150K
C27 1uF
C28 1uF
LEFT 1 GAIN 10K MULTI
RIGHT 1 GAIN 10K MULTI
R9
R8
R22 1K
R23 1K
BYPASS 1 (SEE PG.2)
FB = FERRITE BEAD FOR RF NOISE SUPPRESSION
BYPASS 2 (SEE PG. 2)
PROJECTOR 2
TS1
8 CELL LEFT
7 NEUTRAL
6 CELL RIGHT
5 GROUND
FB-4
FB-5
FB-6
C3 .001uF
C4 .001uF
C12 10uF TANT
C13 10uF TANT
C14 10uF TANT
R26 1.5K
R27 1.5K
R39 2.74K 1%
R40 2.74K 1%
R41 2.74K 1%
R48 5.49K 1%
R57 5.23K 1%
R48 150K
R2 500
R1 500
R54 10K
R55 5.23K 1%
R50 10K
U3 NE5532
U2 NE5532
R60 1.5M
R61 1.5M
R50A 150K
C29 1uF
C30 1uF
LEFT 2 GAIN 10K MULTI
RIGHT 2 GAIN 10K MULTI
R7
R6
R34 1K
R35 1K
U6 TL185
+15V
-15V
(15)
(10)
R63 39K
R64 330K
U7 TL072
R65 20K
R62 82K
U8 NE5532
C31 .22uF
C32 .22uF
H100
5 L PRE
L PRE (SEE PG. 2)
R66 39K
R67 330K
R68 20K
R69 82K
C38 .22uF
C39 .22uF
7 R PRE
R PRE (SEE PG. 2)
4 CHANGEOVER
R28 10K
D1 1N4148
R29 100K
C6A .1uF
U5 CD4584
POWER CONNECTIONS
GND
CD4584
TL072
NE5532
H100
+20V 21 22
GROUND 25 26
-20V 23 24
VR2 78L015
VR1 79L15
C26 10uF 25V
C25 10uF 25V
C21 1uF POLY
C22 1uF POLY
C23 10uF 16V
C20 10uF 16V
TO U1,U2,U3,U5,U6,U7,U8
HEADER MAPPING KEY
FRONT PANEL
H100
H502
NR BOARD
SMART THEATRE SYSTEMS
SCALE N/A
DATE
APPROVED
DRAWN BY: VPL
TITLE CINEMA HIFI PREAMP BOARD
COMMENTS PAGE 1 OF 3
DRAWING# M100B510
S16

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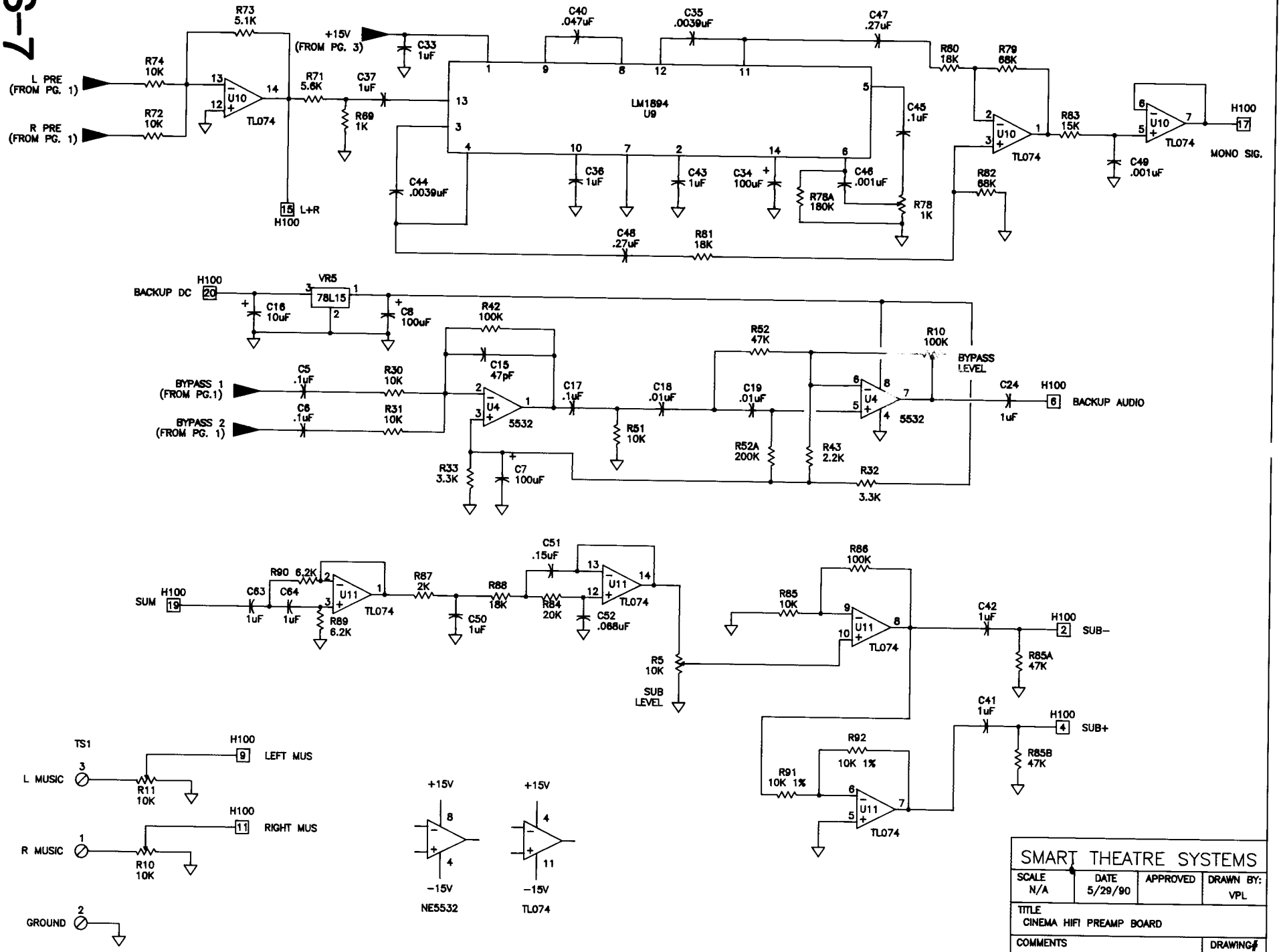
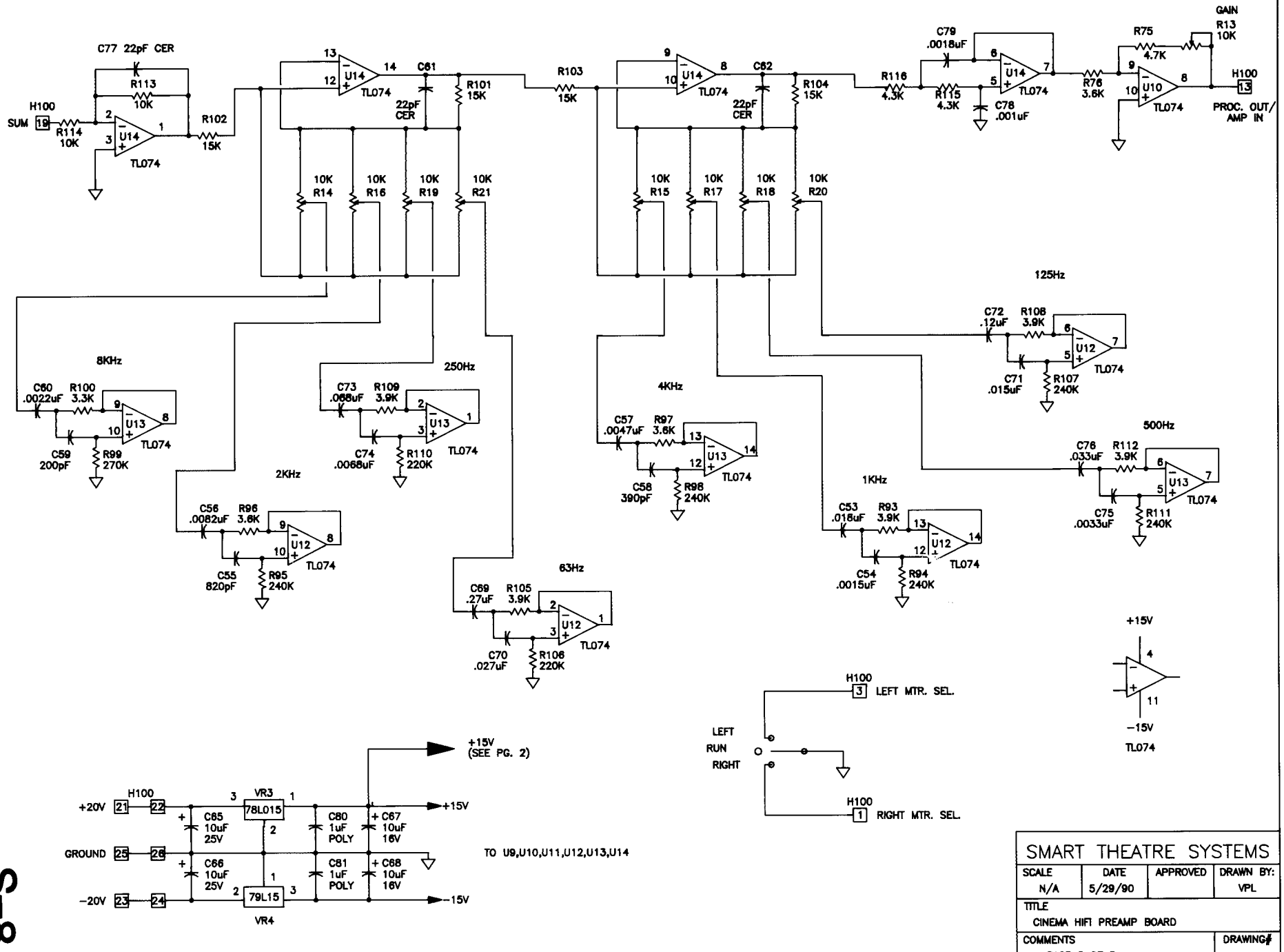
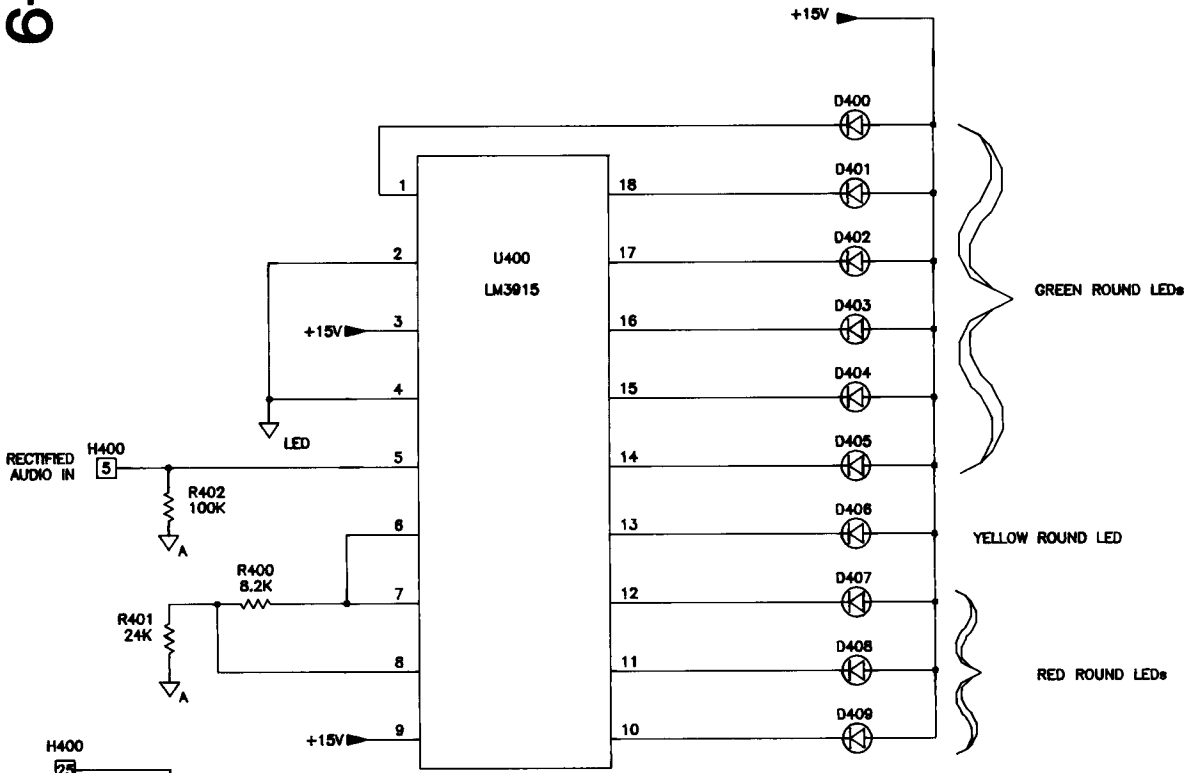
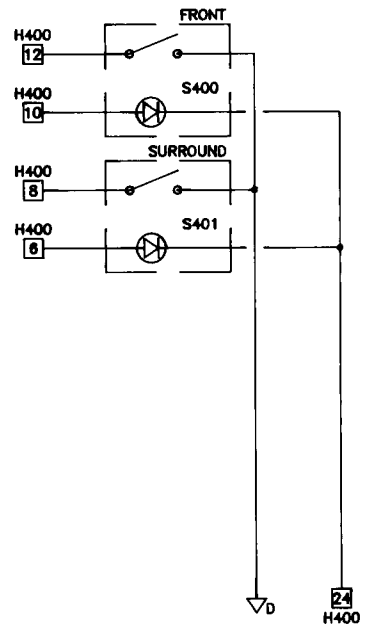
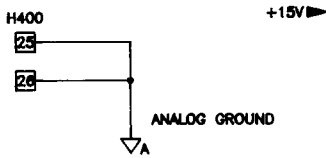


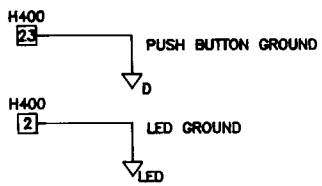
SMART THEATRE SYSTEMS			
SCALE N/A	DATE 5/29/90	APPROVED	DRAWN BY: VPL
TITLE CINEMA HIFI PREAMP BOARD			
COMMENTS PAGE 2 OF 3			DRAWING# M100B510

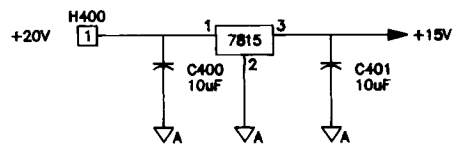

C77 22pF CER
R113 10K
H100 SUM 19
R114 10K
U14 TL074
R102 15K
C61 22pF CER
R101 15K
R103 15K
C62 22pF CER
R104 15K
R116 4.3K
C79 .0018uF
R115 4.3K
C78 .001uF
R75 4.7K
GAIN R13 10K
R76 3.6K
U10 TL074
H100 13 PROC. OUT/ AMP IN
10K R14
10K R16
10K R19
10K R21
10K R15
10K R17
10K R18
10K R20
125Hz
C72 .12uF
R108 3.9K
U12 TL074
C71 .015uF
R107 240K
8KHz
C60 .0022uF
R100 3.3K
U13 TL074
C59 200pF
R99 270K
250Hz
C73 .068uF
R109 3.9K
C74 .0068uF
R110 220K
4KHz
C57 .0047uF
R97 3.6K
C58 390pF
R98 240K
500Hz
C76 .033uF
R112 3.9K
C75 .0033uF
R111 240K
2KHz
C56 .0082uF
R96 3.6K
C55 820pF
R95 240K
1KHz
C53 .018uF
R93 3.9K
C54 .0015uF
R94 240K
63Hz
C69 .27uF
R105 3.9K
C70 .027uF
R106 220K
+15V
4
11
−15V
TL074
H100 3 LEFT MTR. SEL.
LEFT
RUN
RIGHT
H100 1 RIGHT MTR. SEL.
+15V (SEE PG. 2)
H100
+20V 21 22
GROUND 25 26
−20V 23 24
VR3 78L015
VR4 79L15
C65 10uF 25V
C66 10uF 25V
C80 1uF POLY
C81 1uF POLY
C67 10uF 16V
C68 10uF 16V
+15V
−15V
TO U9,U10,U11,U12,U13,U14
S-8
SMART THEATRE SYSTEMS
SCALE N/A
DATE 5/29/90
APPROVED
DRAWN BY: VPL
TITLE CINEMA HIFI PREAMP BOARD
COMMENTS PAGE 3 OF 3
DRAWING# M100B510







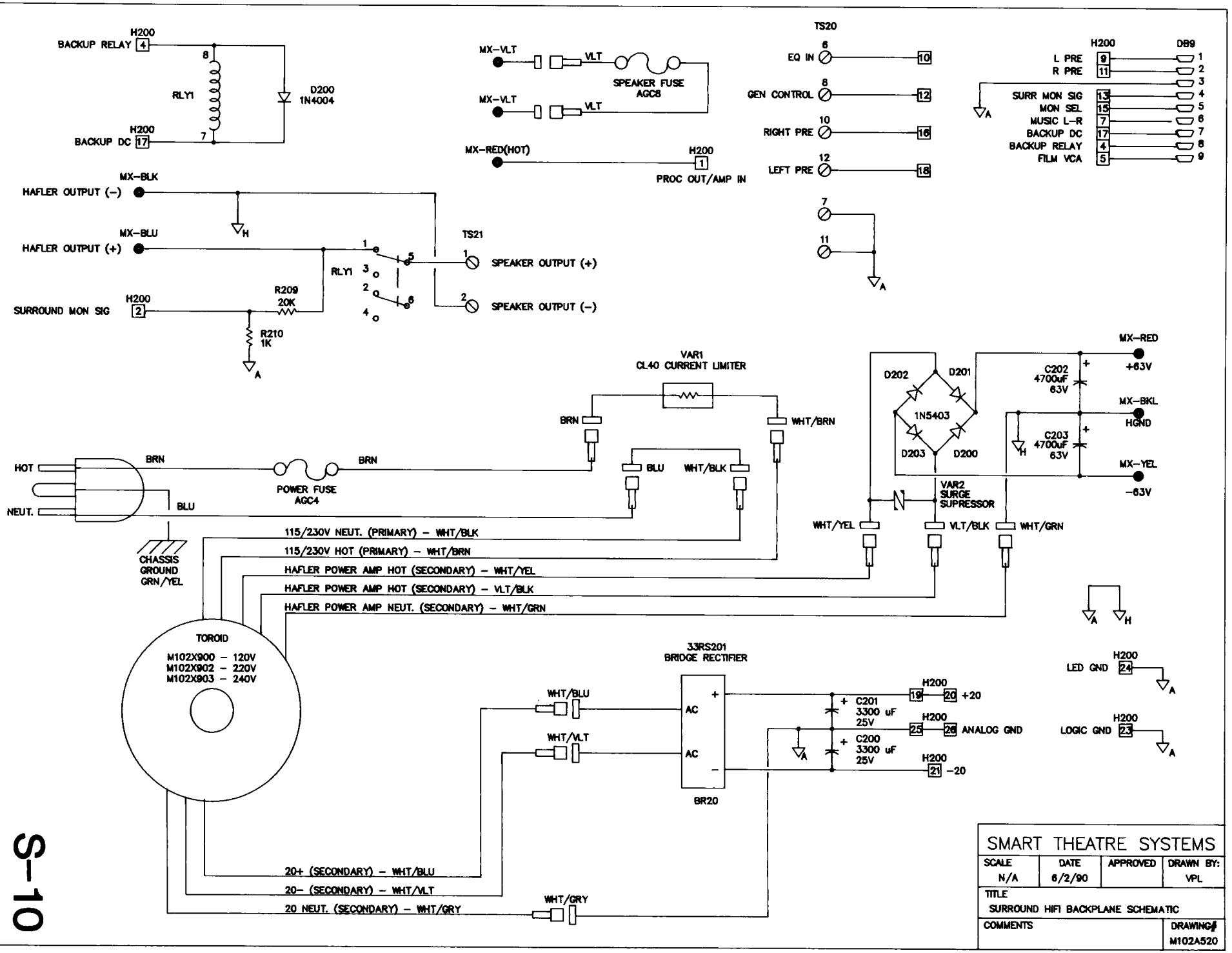




HEADER MAPPING KEY

MATRIX BOARD H501 — H400 FRONT PANEL

SMART THEATRE SYSTEMS			
SCALE N/A	DATE 5/29/90	APPROVED	DRAWN BY: VPL
TITLE: SURROUND HIFI FRONT PANEL			
COMMENTS			DRAWING# M102A500



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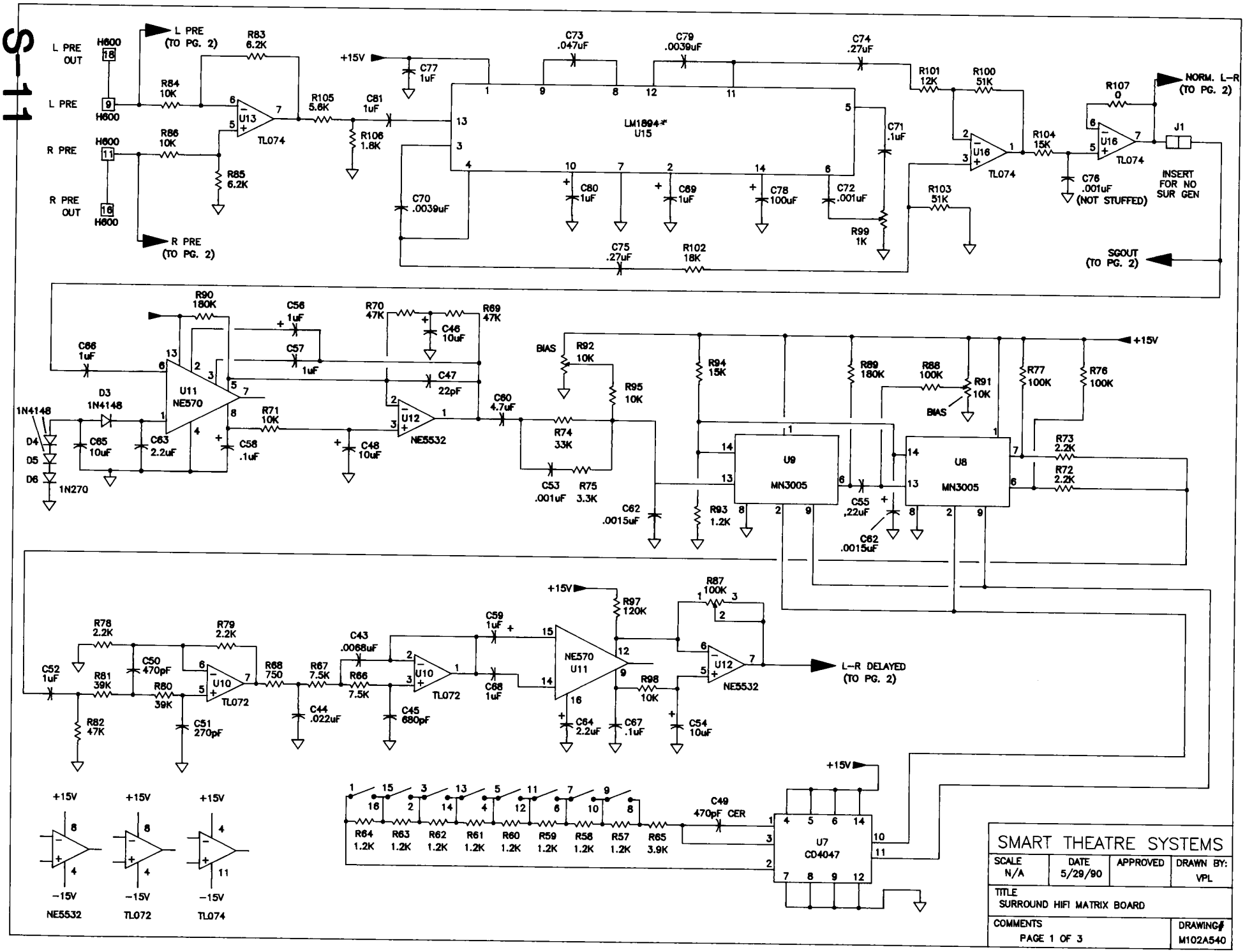
SMART THEATRE SYSTEMS

SCALE	DATE	APPROVED	DRAWN BY:
N/A	6/2/90		VPL

TITLE
SURROUND HIFI BACKPLANE SCHEMATIC

COMMENTS

DRAWING#
M102A520



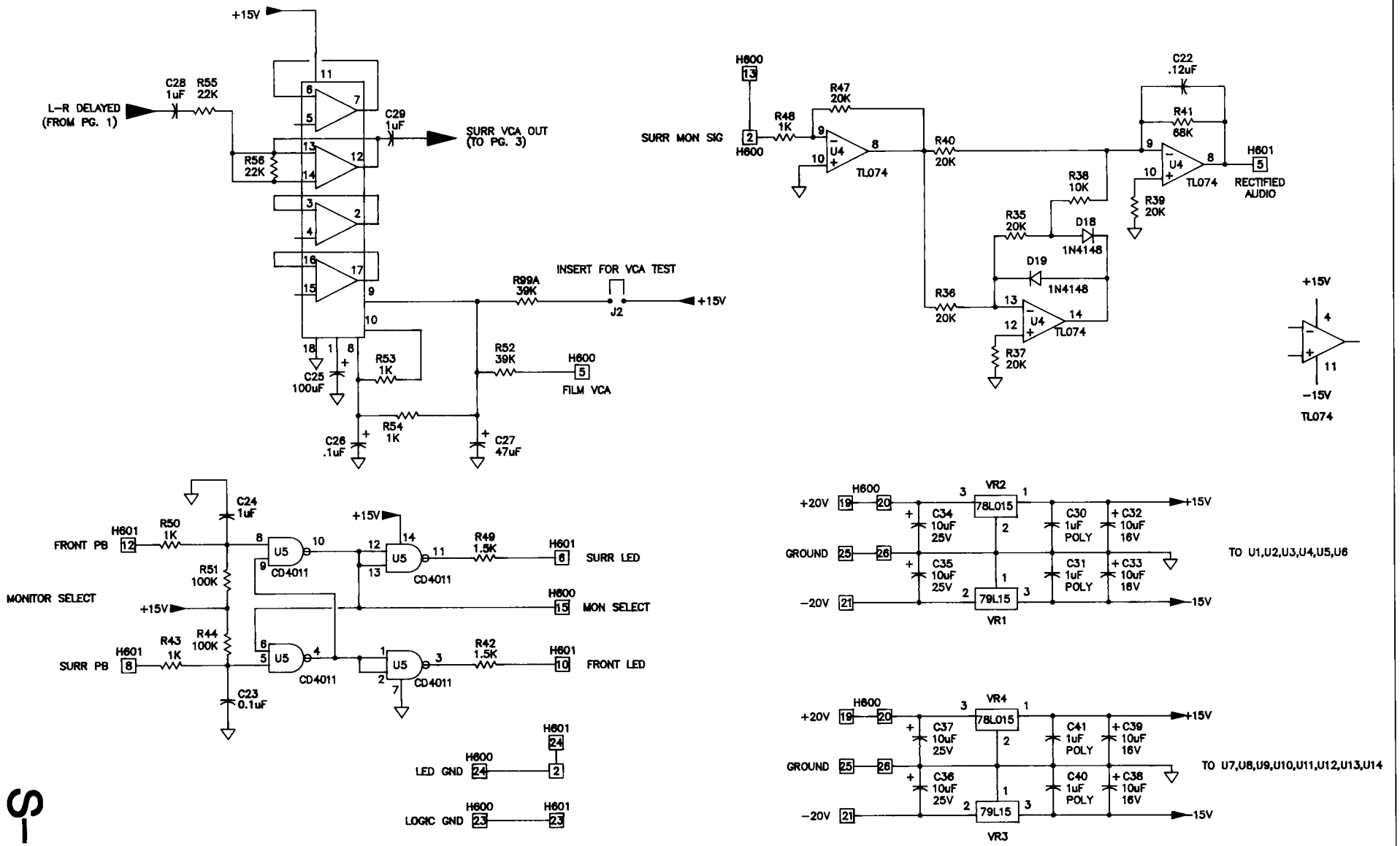
SMART THEATRE SYSTEMS

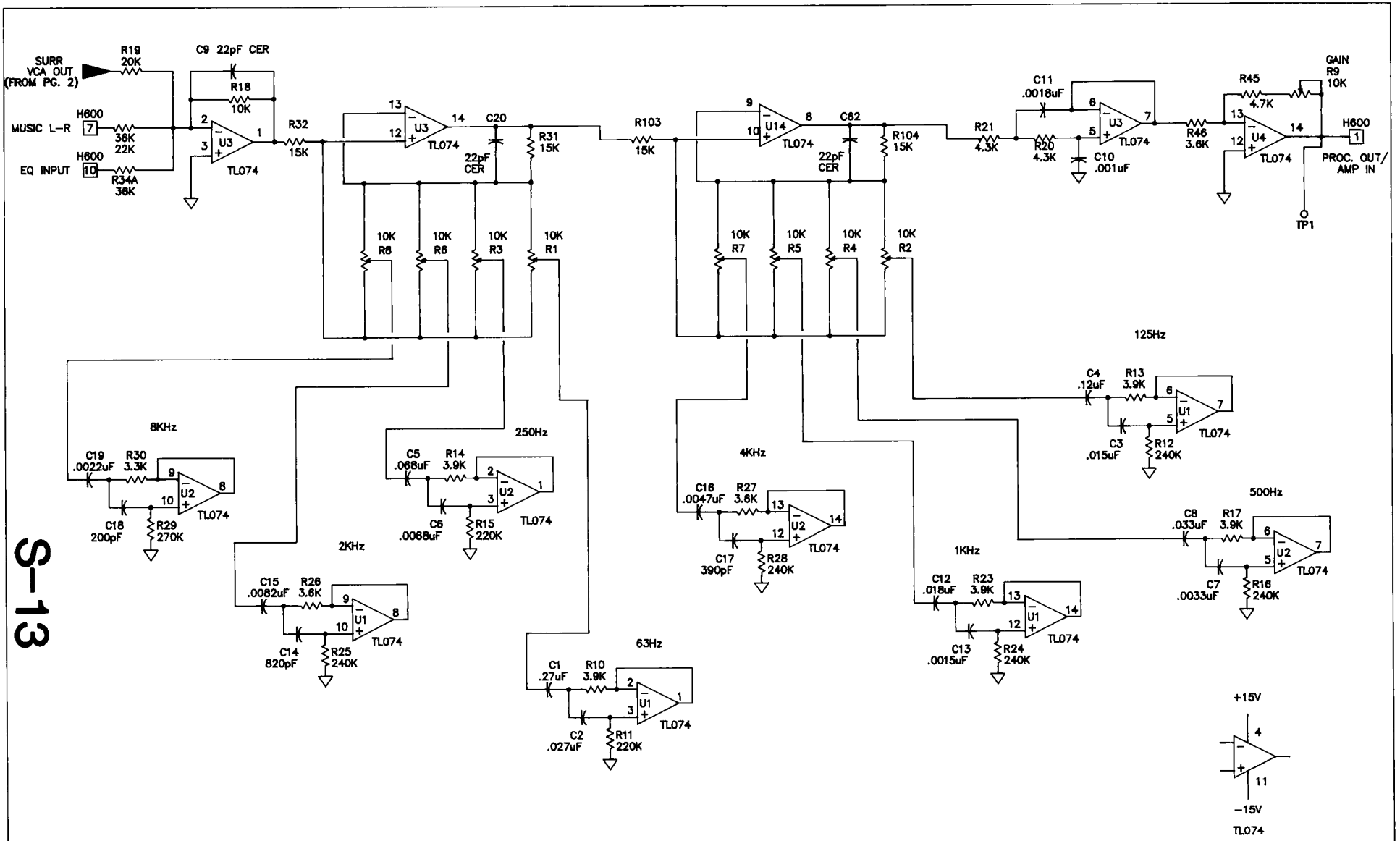
SCALE	DATE	APPROVED	DRAWN BY:
N/A	5/29/90		VPL

TITLE: SURROUND HIFI MATRIX BOARD

COMMENTS: PAGE 1 OF 3

DRAWING# M102A540


+15V
L-R DELAYED (FROM PG. 1)
C28 1uF
R55 22K
R56 22K
C29 1uF
SURR VCA OUT (TO PG. 3)
INSERT FOR VCA TEST
R99A 39K
J2
+15V
R53 1K
C25 100uF
R52 39K
H600 5
FILM VCA
R54 1K
C26 .1uF
C27 47uF
H600 13
SURR MON SIG
H600 2
R48 1K
R47 20K
U4 TL074
R40 20K
C22 .12uF
R41 68K
H601 5
RECTIFIED AUDIO
R39 20K
R38 10K
R35 20K
D18 1N4148
D19 1N4148
R36 20K
R37 20K
+15V
4
11
-15V
TL074
C24 1uF
H601 12
FRONT PB
R50 1K
U5 CD4011
R51 100K
MONITOR SELECT
R49 1.5K
H601 6
SURR LED
H600 15
MON SELECT
H601 8
SURR PB
R43 1K
R44 100K
R42 1.5K
H601 10
FRONT LED
C23 0.1uF
H601 24
H600 24
LED GND
H600 23
H601 23
LOGIC GND
H600
+20V 19 20
GROUND 25 26
-20V 21
VR2 78L015
VR1 79L15
C34 10uF 25V
C35 10uF 25V
C30 1uF POLY
C31 1uF POLY
C32 10uF 16V
C33 10uF 16V
TO U1,U2,U3,U4,U5,U6
VR4 78L015
VR3 79L15
C37 10uF 25V
C36 10uF 25V
C41 1uF POLY
C40 1uF POLY
C39 10uF 16V
C38 10uF 16V
TO U7,U8,U9,U10,U11,U12,U13,U14
S-12
HEADER MAPPING KEY
MATRIX BOARD H600 H200 BACK PLANE
MATRIX BOARD H601 H400 FRONT PANEL
COMPONENTS IN THIS SECTION ARE FOR FUTURE USE AND ARE NOT STUFFED.
R9A SUR. GEN. LEVEL
SGWIPE
SGPOT
SW1
RUN
TEST
SGTEST
H600 12
SGENABLE
U14
16 PIN SOCKET
SGPOT 1 16 GND
SGWIPE 2 15 -15V
SGOUT 3 14 GND
LPRE 4 13 +15V
RPRE 5 12 GND
SGENABLE 6 11 SGTEST
GND 7 10 GND
GND 8 9 NORM. L-R
(SEE PG. 1 FOR CONNECTIONS)
SMART THEATRE SYSTEMS
SCALE N/A
DATE 5/29/90
APPROVED
DRAWN BY: VPL
TITLE SURROUND HIFI MATRIX BOARD
COMMENTS PAGE 2 OF 3
DRAWING# M102A540



SMART THEATRE SYSTEMS			
SCALE N/A	DATE 5/29/90	APPROVED	DRAWN BY: VPL
TITLE SURROUND HIFI MATRIX BOARD			
COMMENTS PAGE 3 OF 3			DRAWING# M102A540