Film-Tech

The information contained in this Adobe Acrobat pdf file is provided at your own risk and good judgment.

These manuals are designed to facilitate the exchange of information related to cinema projection and film handling, with no warranties nor obligations from the authors, for qualified field service engineers.

If you are not a qualified technician, please make no adjuatments to anything you may read about in these Adobe manual downloads

www.film-tech.com

INSTALLATION AND OPERATION MANUAL

EX505 EXCITER-MONITOR

American
Made

SMART
THEATRE SYSTEMS

SMART THEATRE SYSTEMS

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

EX505 INSTALLATION CRASH COURSE

Here is a quick explanation of the hook-up instructions for the EX505 Monitor-Exciter Supply. If you have installed this unit before, then this can be your check list. If not, then consider the following as a brief overview of the installation requirements.

- Using shielded audio cables, hook the sound system stereo decoder outputs to the MONITOR INPUT terminals. The INPUT terminals are labeled FRONT-SURROUND.

- Connect the system main power amplifier output to the terminals marked MAIN OUT. Observe which terminal is the Amplifier ground.

- Hook the stage speaker line to the STAGE SPEAKER terminals.

- Connect the exciter lamp wires to the LAMP OUT terminals.

- Select the appropriate voltage range for bulbs with HI-LO strap on barrier strip.

- Calibrate the PROGRAM METER with test film or trailers using the special "tuning wand" through the METER control hole in the rear of the chassis.

- Plug devices that are to be switched by the front POWER SWITCH into the CONVENIENCE OUTLETS on the rear of the EX505.

- Check the fuse rating for the proper value when using either one or two exciter bulbs simultaneously.

† There is an *alternative input hookup method* to allow monitoring from the output of the sound system power amplifier output. See the appropriate section of this manual for precautions and hookup procedure.

The installer should make the owner or operator aware of the proper operation and features of the SMART EX505 to avoid an unnecessary service call. Be sure the theatre is armed with spare fuses for emergency use.

A more complete description of the installation and adjustments of the EX505 Monitor-Exciter Supply is included in this manual.

1

EX505 INSTALLATION AND SERVICE MANUAL
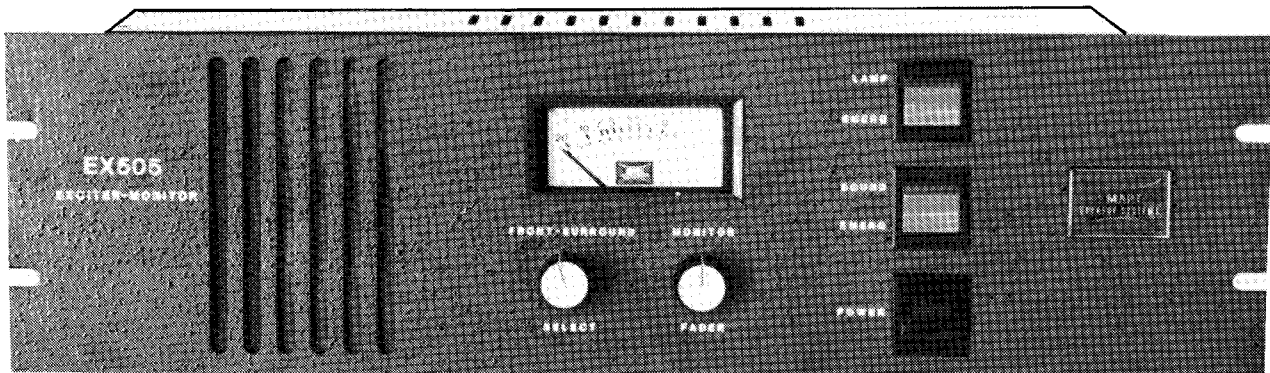
The SMART EX505 is a space saving product that combines a high power DC exciter lamp supply and an active two channel booth monitor system into one rack mounted 5¼ inch package. When installing this product, keep in mind that there are two sections that are *independent* in their functions, but powered by the large toroid transformer. Refer to the schematic diagram for details on the internal wiring.

VENTILATION. The lamp supply is capable of supplying 8 amperes of current to drive *two bulbs simultaneously.* The 25 amp diode bridge is mounted on the chassis at the rear to help cool it during heavy current draw. To assure long life and cool operation, it is necessary to assure that there is adequate air flow across the rear of the unit. Do not rack mount the EX505 directly above heat generating equipment (power amps, other supplies, etc.) without a spacer or vent panel to separate the distance.

PROTECTION. There are three fuses accessible from the rear of the product to protect the circuits. The main AC line fuse is a 3 amp 250 volt 3AG type. The monitor power amplifier fuse is a 2 amp 3AG type. However, the DC lamp fuse should be 12 Amp if *two bulbs* are used simultaneously, and 8 Amp if a *single bulb* is used. Make sure the proper fuse is installed to avoid a possible hazard or service call. Extra fuses are included with the EX505. Please alert the theater owner or operator as to where they are stored.

RACK MOUNTING. The EX505 should be mounted in a position in the rack where it is easily accessible to the operator. The monitor FADER control should be conveniently available, and the PROGRAM METER easily visible. We suggest that the unit be mounted in the upper half of the rack space, near the main preamp fader. Use a vent panel above and below the unit for proper air circulation. Four rack mounting screws are furnished with the product.

EXCITER BULB RANGE. Before wiring the exciter lamps in the projector(s), determine what voltage range you wish to use. A three terminal barrier strip on the rear of the chassis allows selection. A movable metal jumper must be placed between the HI-COMMON or COMMON-LO terminals to provide a permanent and positive lamp voltage output. American bulbs should run in the HI POSITION. Many foreign projectors have low voltage bulbs and should run in the LOW POSITION selection. You can readily determine which setting is proper by examining the label on the bulb. Bulbs that range from 4.5 volts to 6 volts should be run in the LO range, and bulbs that like 7.5 volts to 10 volts should run on the HI range. **DO NOT HOOK THE EXCITER LAMP(S) TO THE RANGE SELECTION TERMINALS.** Also, a metal jumper *must be installed* in either the HI or LO position, or there will be *no output* at the output terminals.

DC LAMP SUPPLY. Because the DC supply is unregulated, the actual voltage output may vary according to the instantaneous AC line voltage in the building. You may measure slight variations on the lamp output terminals at different installations. Also, because of wire resistance between the rack mounted supply and the projector, a further drop of voltage will occur. Make your voltage measurements at the *bulb end of the wire.* A suitable wire gauge must be used to minimize voltage losses. For a short distance run, a number 12 AWG or 14 AWG is recommended. Number 10 AWG or larger should be used for very long runs to minimize voltage drop due to wire resistances. Smaller gauge wire may be dangerous and not meet the electrical code in your area.

LAMP OUTPUT. Two terminals are located on the same rear barrier strip as the RANGE SELECT terminals. These are the lamp output terminals. If two bulbs are used in the booth system, *two runs of wire* are recommended (one pair to each bulb) so that each bulb receives equal voltage. If you run a single pair of wires to the first bulb, and then extend wires to the second, a further voltage drop will appear on the second bulb, thereby reducing its brightness. This practice is satisfactory if you are wiring an exciter light changeover where only one bulb is on at a time and is controlled by a changeover switch near each projector. The single pair of wires can be run to the switch system and a "branch" extended to each bulb.

A JUMPER MUST BE INSTALLED BETWEEN "C" AND "HI", OR "C" AND "LO" FOR A LAMP OUTPUT
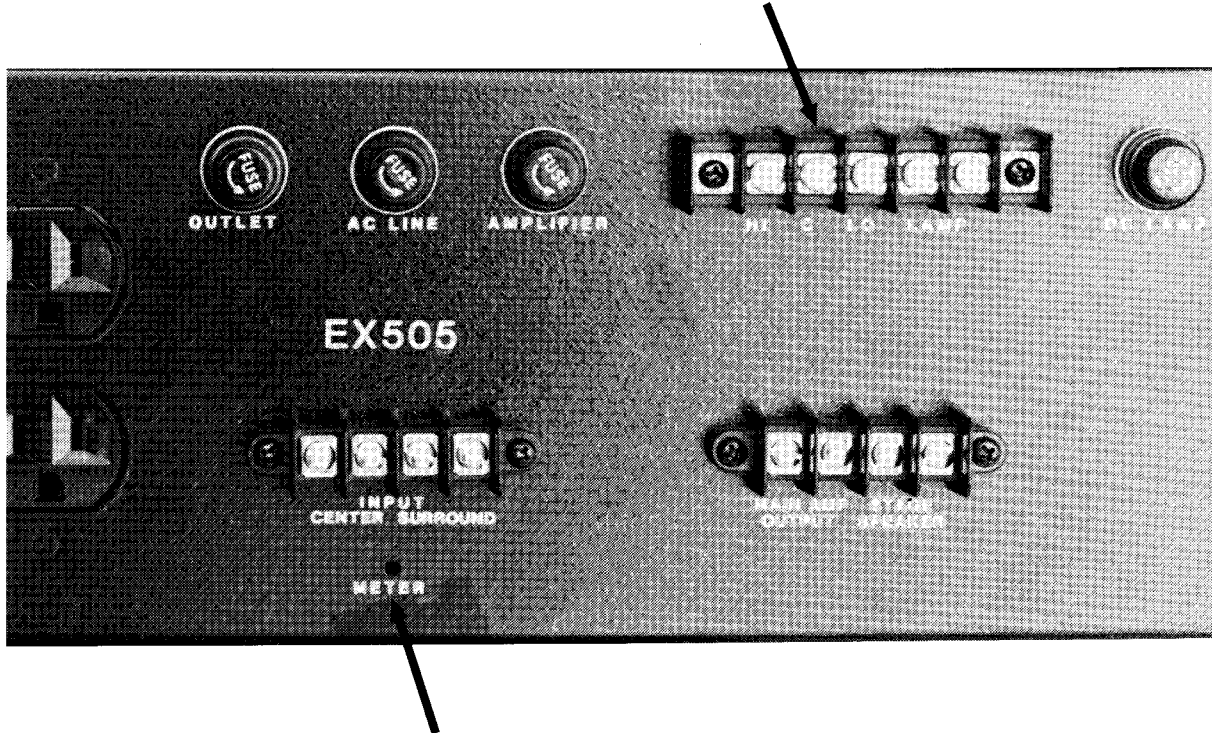
HOLE IN CHASSIS FOR CALIBRATING METER AND MONITOR

BOOTH MONITOR AND PROGRAM METER

MONITOR WIRING. Connect two separate shielded audio cables from the outputs of the device being monitored, to the two sets of amplifier input terminals on the rear of the EX505. The input terminals are on barrier strips on the rear of the chassis. The shield of the audio cable *plus* the low side of the audio cable from the preceding piece of equipment should be tied to circuit ground. Do not ground the shield of the audio cable at BOTH ends. Keep this audio cable away from AC lines or speaker lines when routing from the sending device to the monitor input. The front panel Program Selector Switch is labeled FRONT-SURROUND.Be sure the front channel of a stereo decoder feeds the input terminals marked CENTER.

MONITORING A PREAMPLIFIER OR STEREO PROCESSOR. The EX505 has been designed for universal use with almost every brand or type of Stereo processor or preamplifier on the market. The "bridging" impedance of the input circuitry can safely be connected to the output of the sending device without serious loading of the device. SMART products have an extra output on most processors or preamplifiers labeled "DIRECT OUT". This extra output is not affected by the master fader setting and therefore will provide a continuous sound level to the input of the EX505 monitor amplifier. Connecting the processor/preamplifier output to the input of the EX505 is the preferred method of installation because the EX505 internal monitor amplifier has provision to act as an emergency backup amplifier if the main power amplifier fails. However, the booth monitor must have a *continuous audio input in order to function as a backup system.* If your installation is using a mono preamp, you may use the second channel to monitor the output of the main power amplifier. This is easy to do since the terminals that carry the power amplifier outputs to the stage speaker is very nearby. Install a 180KΩ ¼ watt resistor from the HOT amplifier output terminal to the SURROUND INPUT terminal. Extending the ground to the input terminals is unnecessary because the terminal strips are grounded inside the chassis.**EMERGENCY BACKUP MONITOR OUTPUT.** In order to act as a backup to the main power amplifier, the EX-505 switching circuits must receive the output of the main system amplifier. This power signal is passed through the front panel SOUND-EMERG (Emergency) switch, then sends the signal to the stage speaker. Wire the output of the sound system main amplifier to the terminals on the rear of the chassis labeled "MAIN OUTPUT". Then, wire the stage speaker line to the terminals labeled "STAGE SPEAKER". When the front panel switch is in the SOUND position, *the main amplifier will feed the stage speaker directly* and *the booth monitor amplifier will feed the internal monitor speaker.* If the operator moves the switch to the EMERG position, the *main amplifier is cut off from the stage speaker* and *the booth monitor amplifier feeds the stage.* The front panel FADER will then control the volume level in the auditorium. The internal *monitor speaker is disconnected* when the EMERG switch is activated to minimize the load on the monitor amplifier. This scheme assumes that you have not fed the input of the EX505 with the output of the main power amplifier as a signal source.

PROGRAM METER. A large illuminated modulation meter on the front panel of the EX505 shows the operator the volume level coming from the film. Trailers and short subjects may register a high level, whereas feature films may have a moderate output. The PROGRAM METER is valuable in determining the relative loudness in the auditorium. The soft meter illumination is ideal for a normally lit projection booth.

CALIBRATION. There is a small hole in the chassis below the monitor amplifier INPUT TERMINALS. This is the meter calibration pot that may be reached with the "tuning wand" supplied with the EX505. Using the flat blade end of the wand, find the slot in the center of the internal control. With a Dolby™ reference level test loop running on one projector, rotate the control *clockwise* for an increase in meter level. Adjust until the meter reads 50% on the lower scale of the meter. This corresponds to -6 dB on the upper meter scale. This setting would indicate the true recording level on the soundtrack. Trailers and short subjects are usually recorded louder and may register 100% at times. Calibration should be made only when the preamplifier feeding the EX505 is at its normal setting for a normal size audience. The calibration control also affects the audio drive to the monitor amplifier. As you increase the control, more audio signal is fed to the monitor. If no test loop is available, run trailers and adjust the meter for 100% modulation. Calibrate with the front panel FRONT-SURROUND switch in the FRONT position only.

USING THE EX505 WITH SMART EQUIPMENT. The latest generation of Stereo Decoders (SR300 and SR135) and preamps (SXL735) produced by SMART THEATRE SYSTEMS have a DIRECT OUTPUT terminal to drive other system components with a constant level. The FADER on these products affects the MAIN OUTPUT terminal only, and not the DIRECT OUTPUT. Use the *direct output* to feed the EX505 monitor amplifier, and the *main output* to feed the house power amplifier. The operator can therefore adjust his preamp FADER to suit the house volume level without changing the calibration of the PROGRAM METER or changing the input signal level to the EX505.
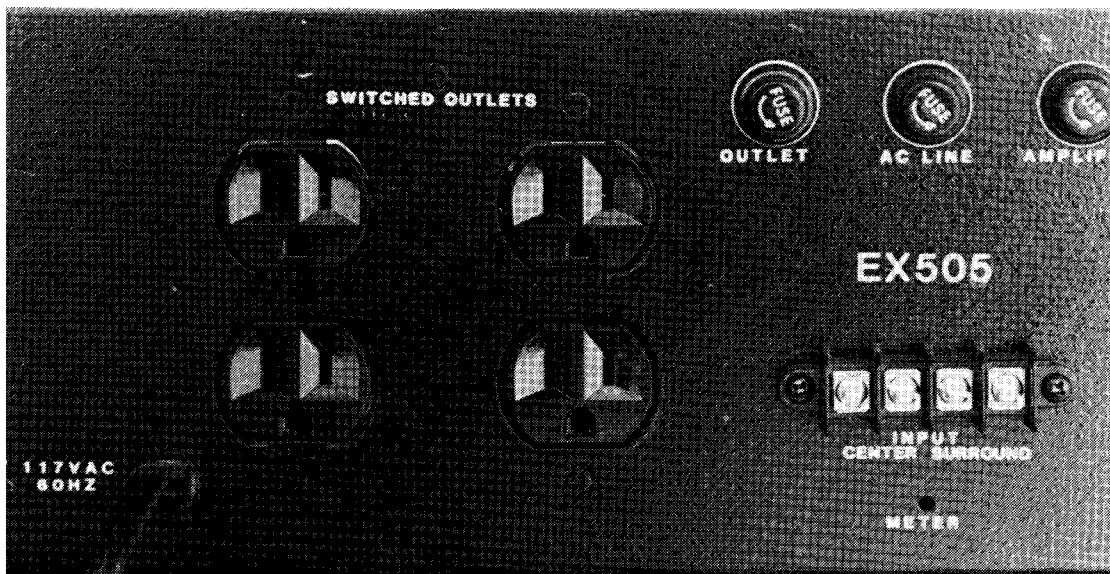

AC CONVENIENCE OUTLETS. There are four duplex outlets on the rear of the EX505 that are switched by the front panel power switch. This array of outlets IS NOT FUSED by the EX505. Each piece of equipment plugged into the convenience outlets must be individually fused for protection. The front panel power switch can be used to turn the whole sound system on and off. Be sure that the total current draw through the outlets does not exceed 12 amps *or the current rating of the switch and line cord will be exceeded.*. Another advantage of the convenience outlets is that it provides a common ground point in the sound system for the green third wire of each piece of equipment.

EXCITER CHANGEOVER
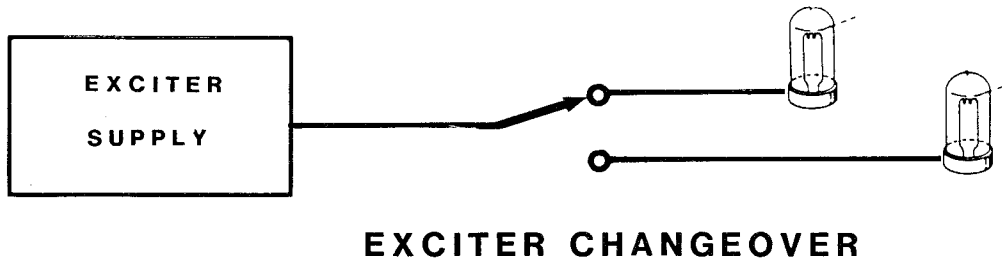
INSTALLATION OF AN EXCITER CHANGEOVER. MAKE SURE THE SWITCH (OR AUTOMATION) CAN SAFELY HANDLE 5 AMPERES.

WRONG

RIGHT
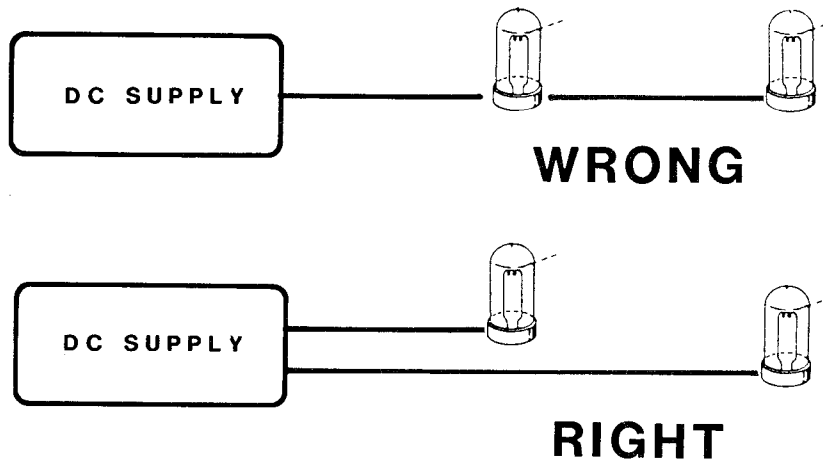
CORRECT WIRING OF TWO BULBS IN A SYSTEM

SMART THEATRE SYSTEMS

OPERATING INSTRUCTIONS

POWER SWITCH. Turns the sound system ON and OFF. The other components of the system are plugged into the convenience outlets on the rear of the EX505 and will be controlled by the master power switch.

LAMP-EMERG SWITCH. The RED panel switch is used to switch the DC exciter lamp supply from DC to AC backup in the event of failure of the main supply. The exciter lamp(s) should maintain about the same brightness on the backup system as on the main DC supply.

SOUND-EMERG SWITCH. The main power amplifier output passes through the SOUND-EMERG switch to the stage loudspeaker system. If the main amplifier fails during a show, this switch substitutes the built-in monitor amplifier as a backup. The monitor FADER must be set for sufficient loudness in the auditorium. When the emergency switch is activated, the booth monitor will be disconnected.

MONITOR CONTROL. The front panel control sets the level of the booth monitor when the SOUND-EMERG switch is its normal SOUND position. When the switch is in the EMERG position, no sound will be heard from the booth monitor speaker. The MONITOR CONTROL now sets the loudness of the stage speaker.

PROGRAM METER. Indicates the level at which the soundtrack was recorded. Most trailers and short subjects are recorded louder than most feature films. The meter can be useful in determining how loud the sound is in the auditorium.

FRONT-SURROUND SWITCH. Used to select the channel you wish to listen to. Normally this switch is left in the FRONT position because most of the program material will appear on the Front channel of a two channel system. The SURROUND may be monitored to check for quality occasionally. If the EX505 is used in a MONO system, the monitor may be wired to check the preamplifier on one input channel, and the output of the main power amplifier on the other channel.

PROTECTION. There are three fuses on the rear of the chassis that protect the internal circuits. *Each should be replaced with the proper size.* The main fuse is a 3 AMP 3AG type. The DC Lamp is a 12 amp fuse if two bulbs are on simultaneously, and 8 amp if only one bulb is used. The monitor amplifier fuse is a 2 amp 3AG type.

The installer should make the owner or operator aware of the proper operation and features of the SMART EX505 to avoid an unnecessary service call. Be sure the theatre is armed with spare fuses for emergency use.

For an expanded explanation of each of the circuits and features, see the appropriate section of this manual.

EX505 SERVICE

LAMP SECTION. The EX505 uses a very efficient toroid transformer as its main power source. The secondary winding voltages are calculated so that the voltage and current on the winding used for the AC lamp supply is about the same as the rectified and filtered DC lamp supply. LO and HI voltage select terminals are used to select the desired operating range for a particular bulb. The following chart indicates the voltages you should measure on each winding with 117 volts AC applied to the primary of the toroid.

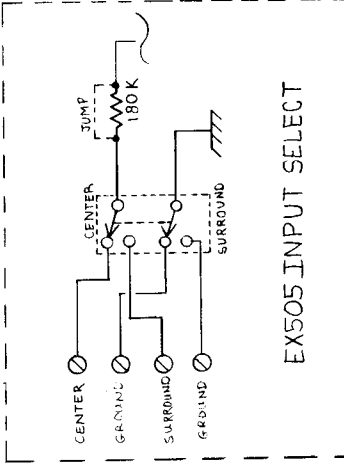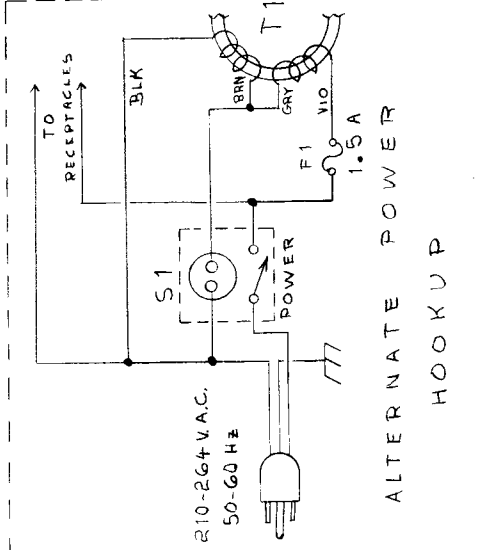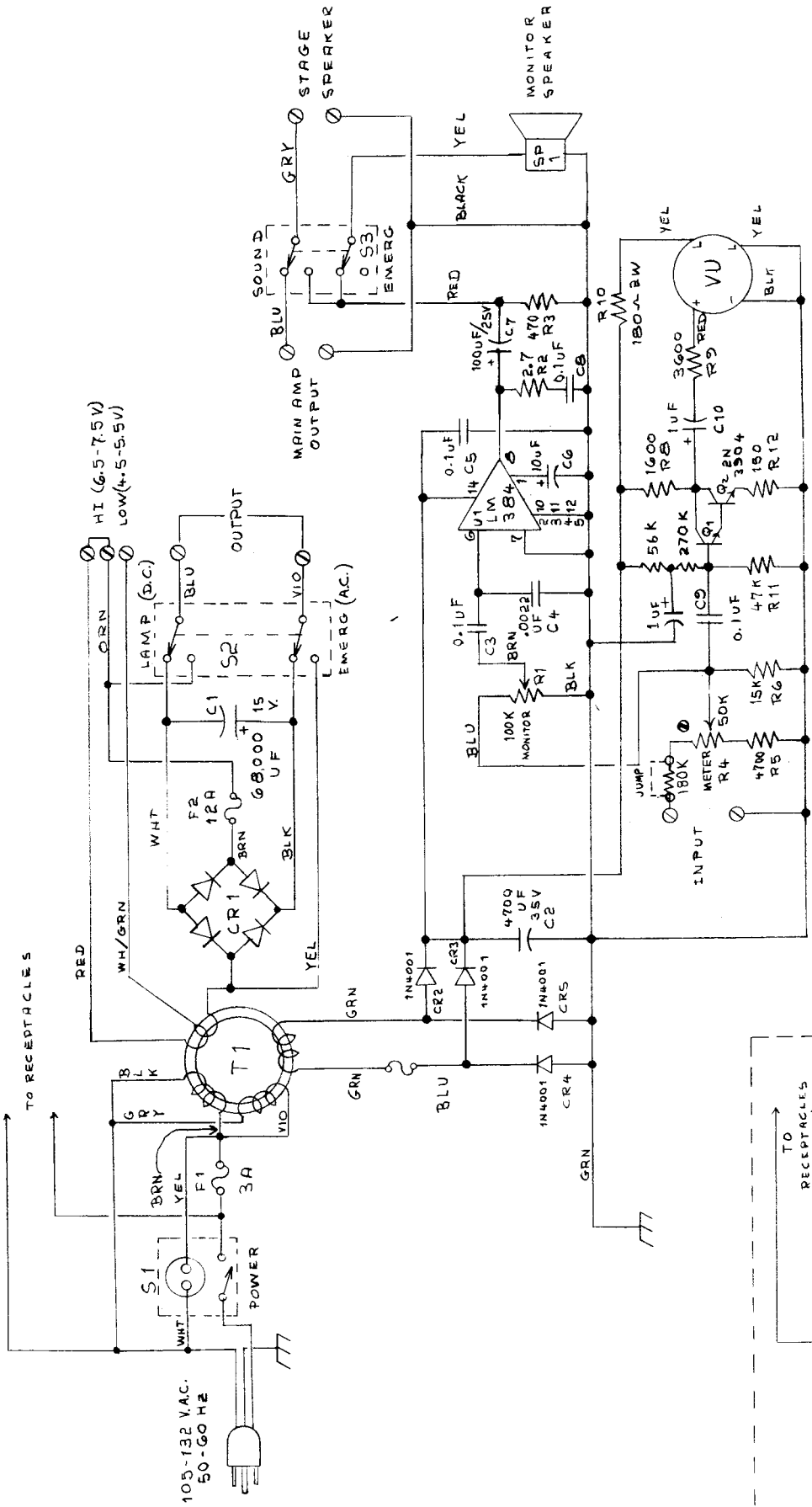| WINDING	AC OUTPUT	DC OUTPUT
LOW SECONDARY	5.6 VOLTS	5.2 VOLTS
HIGH SECONDARY	7.5 VOLTS	7.5 VOLTS
AMPLIFIER TERTIARY	16.5 VOLTS AC	21 VOLTS

The Low and High secondary feed to exciter lamp output terminals directly when the front panel LAMP-EMERG switch is in the EMERG position. The SELECT TERMINALS must have a shorting link connected from the COMMON terminal to one of the SECONDARY WINDINGS. This AC voltage can be measured at the lamp output terminals.

The DC LAMP output voltage can be measured at the lamp output terminals when the front panel LAMP-EMERG switch is in the LAMP position. The selected secondary winding is rectified by a 25 amp full wave diode bridge and filtered by a 68,000 μf 15 volt electolytic. The resultant DC voltage has an extremely low ripple. Because of the high current capability of the toroid and bridge, there is about a 2 volt drop across the bridge which is converted to heat. If the bridge ever has to be replaced, be sure to use heat sink compound on the replacement diode bridge to assure a good thermal bond to the chassis.

MONITOR AMPLIFIER SECTION. The printed circuit card for the monitor amplifier contains the bridge diodes for full wave rectification and filter capacitor to power the LM384 5 watt integrated circuit power amplifier, along with two transistors in a darlington configuration for the meter driver. A single pot feeds audio to the meter circuits and the monitor amplifier circuits. The amplifier chip *must be soldered to the board in order to properly heat sink the chip*. A second heat sink is cemented to the top of the device. Operating voltage for the amplifier is approximately 21 volts DC. This allows a safety margin for high AC line voltage that could damage the chip if a higher operating voltage were used.

The entire card can be removed for replacement by disconnecting the input leads, the power transformer leads, and the output leads. The front panel level control can be removed without unsoldering. The easiest way to remove to remove a bad IC chip is to cut each lead from the top of the card, and unsolder each pin from the bottom of the card. Refer to the schematic diagram and parts list for circuit details.

SMART THEATRE SYSTEMS maintains a service department for repair of products in or out of warranty. Also, telephone help is available during normal business hours (EST).

SMART THEATRE SYSTEMS

SCALE:	DATE: 11-6-84	APPROVED BY:
		DRAWN BY: WC
		REVISED OLN 11/25/85

EX505 & EX510 EXCITER-MONITOR

SCHEMATIC

DRAWING NUMBER
0510B500

EX505 INPUT SELECT

ALTERNATE POWER HOOKUP