Film-Tech

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SMART products are designed to deliver unsurpassed quality in workmanship and performance. The following information gives detailed instructions on the installation and operation of the SMART MOD VI stereo processor. We strongly encourage new owners of the MOD VI to thoroughly read this entire manual before placing their new SMART products into service. This will ensure that the MOD VI will be operated properly to give the superior performance that it was designed to deliver.

For service or installation assistance, please call our Technical Support Department between the hours of 8 a.m.-5 p.m. E.S.T., Monday - Friday
1-800-45-SMART

LIMITED WARRANTY: SMART products and accessories are warranted against malfunction or failure due to defects in workmanship or materials for a period of one year from the date of shipment. If a problem occurs during the warranty period, the unit will be repaired, or replaced at our option, without charge for materials or labor. If air frieght is requested by the dealer, the difference between air and surface charges will be billed to the dealer. This limited warranty does not cover products that have been abused, altered, modified, or operated in other than specified conditions. Prior factory approval is required on all returns. Returned equipment or defective parts must be shipped freight prepaid to us by the dealer or customer.

Our limited warranty doesn not cover damages resulting from accident, misuse or abuse, lack of responsible care, or failures not attributable to manufacturing defects, except as provided herein. SMART Devices, Inc. makes no warranties, express or implied, including warranties of merchantability or fitness for a particular purpose.

RETURN POLICY: Factory autorization MUST be obtained before returning any product. A 15% restocking charge will be issued on unused equipment (in original box) that is returned for credit. Credit is issued to the dealer's account. The credit may be used against future pruchases and no cash transactions are offered. All returns must be shipped freight prepaid by the dealer. Equipment returned without a factory RA (Return Authorization) will be refused.

SECTION 1
INTRODUCTION

The MOD VI Cinema Stereo Processor is the first and only processor to incorporate the patented Circle Surroundä technology, the latest innovation in optical stereo soundtrack reproduction. Circle Surround produces 6 channels of audio from a standard optical stereo soundtrack by sensing the slight phase bias on the surround channel when digital masters are mixed down to 4-channel optical tracks. This means you can have split surround optical sound presentations in auditoriums that are equipped for split surround operation.

In addition, the MOD VI utilizes the SRS 3-D sound enhancement system, which brings out sounds that may have been previously hidden by other processors. The MOD VI is the first processor to have both optical and digital tracks benefit from the SRS circuitry to produce fuller, wider and more transparent sound and eliminate the auditorium "sweet spot." This ensures that the audience will have a full stereo perspective in every seat in the auditorium.

Digital soundtracks may be processed in six channel mode which includes split surrounds and subwoofer.

To achieve optimum results from your new MOD VI Cinema Stereo Processor, the theatre engineer installing the system should be totally familiar with all features and adjustments. Careful attention to detail and familiarity with the installation instructions will allow you to offer a system that has a sound quality second to none.

Using This Manual

For quick reference, this manual has included several icons to alert the reader to special content.

WARNING! Indicates procedures that may warrant extra attention to avoid component fatality.

DOUBLE CHECK! Indicates tips on avoiding common errors in installation or operation.

SHAMELESS PLUG! Indicates a mention of another quality SMART product.

This Text Style indicates the most important primary setup, calibration and operation instructions.

This Text Style indicates additional notes and information.

SECTION 2
FEATURES

Circle Surround DSP Matrix. The patented Circle Surround produces 6 channels of audio from a standard optical stereo soundtrack. It does this by sensing the slight phase bias on the surround channel when digital masters are mixed down to 4-channel optical tracks. This means you can have split surround optical sound presentations in auditoriums that are equipped for split surround operation. SMART is the first manufacturer to introduce this technology into professional cinema applications. The DSP matrix in the MOD VI produces highly accurate decoding of the optical stereo or SR soundtrack.

SRS 3-D Sound Enhancement. The patented SRS enhancement is a standard feature of the new MOD VI. No longer an expensive option, this process can be turned on or off from a front panel operator switch or by automation. The MOD VI is the first processor to be able to use SRS on optical stereo tracks and digital soundtracks. This process is not active in theaters using Front Surround Mode.

Fader Control/Remote Equalization Settings. The MOD VI has one master FADER that controls the overall playback level for all six channels. This master fader is used as the volume control for all formats. The individual left and right master music level controls are located to the front right of the main circuit board (MR and ML). The octave equalization settings (7 bands plus bass and treble) are set with potentiometers on the front PCB panel, so re-equalizing the MOD VI will not be necessary in the event of a main circuit board replacement.

Format Switching. The formats available on the MOD VI are Mono, Stereo A, Stereo SR, SRS On/Off, Digital and Music. All formats may be manually controlled by the gray pushbuttons on the front panel. Red Light Emitting Diodes mounted in the front pushbuttons indicate the selected format. The indicator LED's are visible from a distance so it is not necessary to be near the processor to verify the status. Format switching is also possible by connecting an automation or remote switch contacts to the AUTOMATION terminals on the back of the MOD VI.

Solar Cell/Reverse Scan Inputs. The MOD VI has stereo solar cell inputs with electronic changeover for two projectors. Each pair of stereo cell inputs is an electronically balanced circuit that helps to reduce any interference pickup on the solar cell leads. Separate "neutral" leads for right and left channels allow for Reverse Scan wiring.

Digital Inputs. The MOD VI is fully compatible with popular digital formats (i.e. DTS, Dolby Digital, etc.). The MOD VI will easily handle the stage, split surround, and subwoofer channels from an external digital decoder.

Music Inputs. The MOD VI is designed to process both stereo and mono music sources from tape, CD or cartridge players. The music is processed through the Circle Surround matrix to produce 6 channels of sound from a stereo music source. In addition, these inputs may be used as an A/V input for use with VCR's or laserdisc players. The music inputs are run through the Circle Surround matrix.

Surround Channel Time Delay. The MOD VI has a digital time delay circuit for the surround channel while playing optical stereo prints. Time delay of the surround channel in optical stereo mode is necessary for two reasons: 1) to mask any front to surround crosstalk and, 2) to synchronize the stage and surround channels to eliminate echo caused by different sound path lengths from the stage and surround speakers.

Main Outputs. The MOD VI has six output channels: LEFT, CENTER, RIGHT, LEFT SURROUND, RIGHT SURROUND and SUB(woofer). The SUB outputs are balanced with SUB+ and SUB- terminals available. This allows a standard dual channel amplifier to be used in mono bridged mode to feed a subwoofer speaker.

Main Power Supply. A fully-regulated switching power supply is furnished with the MOD VI processor. This supply is heavily filtered and supplies ample current for both the positive and negative 15 VDC supplies, as well as the logic level 5 VDC supply. This external power supply minimizes the chances of hum pickup when high gain electronic circuits are placed in the same chassis as a power supply.

Emergency Sound Backup Power Supply. A 120V backup power supply is included with the MOD VI to power the backup preamp built into the MOD VI. This will ensure that you will never lose a show when using the MOD VI processor. The 120V backup supply delivers about 12 VDC at 100mA. For installations where 120V is not available, the user should supply their own power supply. The output should be 12VDC @ 100mA and be relatively ripple free. The bypass capability is a standard feature on the MOD VI and is not an extra cost option as it is on other systems. MONO BYPASS supplies sound to the Center Channel only.

Digital Smart Port. The Digital Smart Port allows for future upgrades in the MOD VI, including digital 1/3 octave equalization and Afterburner effects, as well as an alternative port for monitor signals.

SECTION 3
INSTALLATION INSTRUCTIONS

SYSTEM CONFIGURATION

To configure the system type, open the MOD VI front panel and remove the PCB stops (The white vertical card guides on either side). Slide out the main PCB and remove it from the cabinet. (All rear plugs must be removed).

Six Channel Circle Surround. Jumper across H2, pins 1 and 2. (factory preset)

Front Surround Mode. Place a jumper on H2, pins 2 and 3. Note: SRS mode is not active in Front Surround mode, since SRS only affects Left and Right channels. H2 is located towards the back of the MOD VI main board,

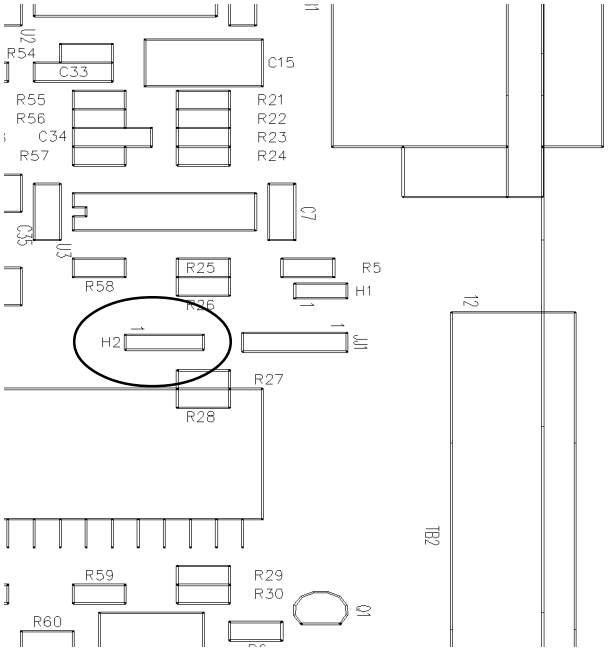

Figure 1. Enlargement of the H2 area of the Main circuit board. (Matrix board not shown).

near the rear left corner of the Circle Surround matrix board. (see Figure 1.)

PROCESSOR PLACEMENT IN THE RACK

Mounting. Before mounting the MOD VI processor in the equipment rack or projector console, be sure to select a well ventilated area that allows cool air to circulate around the individual components. In SMART prewired rack systems, the Power Supply (PS-2) is mounted on the floor of the rack, and the rack-mounted processor is placed at eye level for easy visibility of the system operation status.

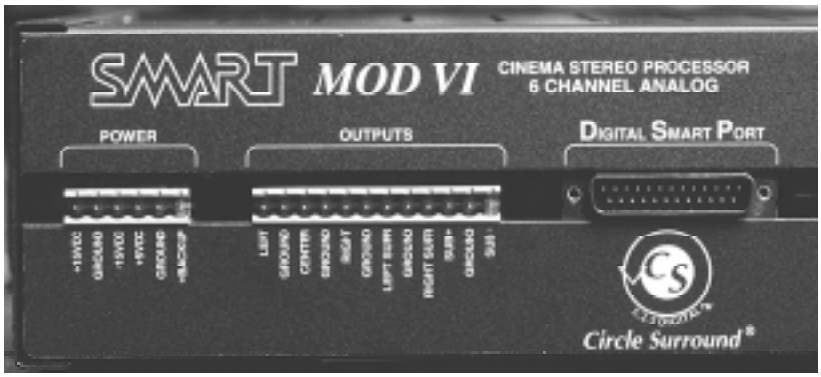

Figure 2. MOD VI rear panel (left).

WIRING HOOKUP INSTRUCTIONS

1. Connect Power Supply (PS-2) to the MOD VI rear panel.

The PS-2 is a cool-running, universal switching power supply that operates on 100-250 VAC (50-60Hz), needing only a change in plug to operate in any country. It delivers clean +15, -15 and +5 DC voltages to the MOD VI and has enough extra power to run companion products. When installing, make sure that the processor is not immediately adjacent to hum producing components. Run the factory supplied power supply wiring harness along the left side of the equipment cabinet (when viewed from the rear) to the MOD VI processor. Dress the wires for appearance and craftsmanship. The wiring harness has a 6 position Phoenix connector that plugs into the leftmost socket on the rear of the MOD VI, labeled POWER (see Figure 2).

WARNING: ***Do NOT plug a "live" power supply into the back of the MOD VI processor!*** Make sure that the power supply is DISCONNECTED from the power mains before connecting to the MOD VI. Failure to heed this warning can cause fatal damage to internal components and void the manufacturer's warranty.

The wire codes for the main Power Supply are as follows (from left to right on the back of the MOD VI):

Red : +15 VDC
Black : GROUND
White : -15 VDC
Brown : +5 VDC

Backup Power Supply. The emergency power supply is a 12 VDC, 100mA supply that is furnished only on 120VAC models. It comes from the factory connected to the 6

position Phoenix connector when shipped to North American customers. Other customers in other countries will need to provide their own 12 VDC, 100mA backup supply.

The wire codes for the Backup Power Supply are as follows (from left to right on the back of the MOD VI):

Black w/ white stripe : +BACKUP
Black : GROUND

Remember to check all connections before applying power to the system. A wire that is reversed could be very destructive to the system.

2. Connect Solar Cell or Reverse Scan soundhead to SOUNDHEAD port.

Solar Cell. Using three-conductor shielded cable, connect the wire from the left solar cell (red) to the corresponding +LEFT1 input terminal of the MOD VI SOUNDHEAD connector. Connect the wire from the right solar cell (green) to the +RIGHT1 input terminal. The common solar cell lead (black) should be connected to both –LEFT1 and –RIGHT1, and the shield of the cables should be connected to a GROUND terminal. Be sure to cut off the shield at the projector end so that a ground loop is not created. Only the shields on the MOD VI end of the cable should be grounded. It is good practice to tape or shrink wrap the end of the shielded cable at the sound head to prevent any stray shield wires from grounding out to the sound head case.

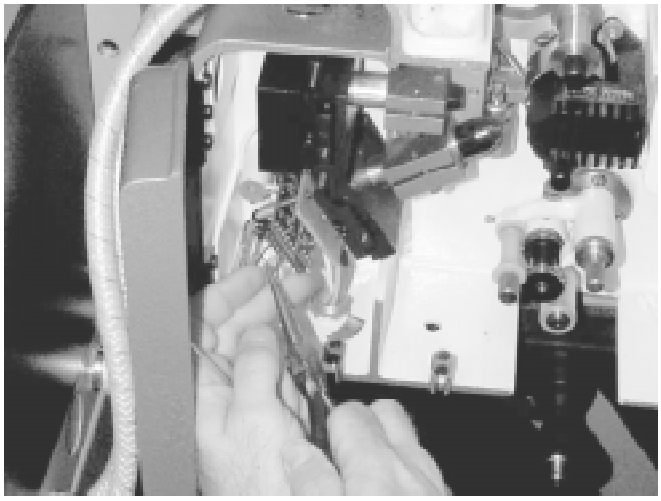

Figure 3. Connecting the MOD VI to a Reverse Scan soundhead.

Reverse Scan. If you are using a Reverse Scan system, use a two-conductor shielded cable to connect the -LEFT1 and +LEFT1 terminals on the MOD VI to the corresponding terminals on the Reverse Scan terminal block. Connect another two-conductor cable likewise from the -RIGHT1 and +RIGHT1 terminals to the corresponding terminals on the Reverse Scan terminal block. The "neutral" wires (-LEFT1 and -RIGHT1) should not be tied together.

If you have a second projector, repeat the above steps except hook your solar cell wires to the -RIGHT2, +RIGHT2, -LEFT2 and +LEFT2 inputs.

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

3. FOR TWO PROJECTOR SYSTEMS: Connect XOVER and ground terminals on MOD VI AUTOMATION port to the automation changeover relay terminals.

Projector changeover is accomplished by using only a single pair of wires and either a manual switch or relay contacts in the automation system. A relay closure in the automation equipment will execute a changeover by grounding the XOVER terminal. Run a two-conductor shielded cable to the "dry" contacts of the automation projector changeover relay. On the other end, connect one wire to the XOVER terminal on the MOD VI. Ground the other wire to the nearest ground terminal on the MOD VI. Connect the shield of the wire, on the MOD VI end, to a ground terminal. Cut off the shield on the automation end. When the automation relay closes, Projector Two of the MOD VI will be "enabled," and the first pair of stereo preamplifiers (Projector One) will be "disabled." Releasing the relay will cause the reverse action to

Figure 4. MOD VI Rear Panel (right).

occur. In other words, Projector One is always ON until the XOVER terminal is grounded. The XOVER terminal must be tied to ground to activate Projector Two. It is not a pulse-toggled input.

FOR TWO PROJECTOR SYSTEMS WITHOUT AN AUTOMATION: Rig a single pole, single throw switch between the XOVER terminal and a GROUND terminal. When the switch is open, Projector 1 will be active, when it is closed, Projector 2 will be active.

NOTE : Changeover between projectors is done electronically in the MOD VI. This necessitates that BOTH exciter lamps be lit at the same time. No exciter light changeover is provided in the unit. An exciter light changeover has at least 3 dB more circuit noise than an electronic changeover and is NOT recommended in high quality systems.

4. Connect the MUSIC LEFT and MUSIC RIGHT inputs on the MOD VI to the stereo music source.

The non-sync music inputs for the MOD VI are run through the Circle Surround DSP matrix to generate 6 channels of auditorium music. Connect your stereo music source (CD player, tape, etc.) to the MUSIC LEFT and MUSIC RIGHT inputs on the back of the MOD VI.

Occasionally, a theater may use a monaural sound player such as a background music cartridge player or satellite music service that does not have stereo capabilities. In this event, connecting a mono signal into both LEFT and RIGHT MUSIC inputs will generate music in the center channel only.

SMART recommends using a stereo distribution amplifier such as the SMART DA226 to feed signals from one music source to multiple sound processors.

5. FOR SYSTEMS USING AN AUTOMATION: Connect the format pins on the AUTOMATION port of the MOD VI to the system's corresponding automation relay terminals.

A momentary ground contact on one of the FORMAT SELECT inputs on the rear of the MOD VI will switch the processor to any desired format, including music. The SRS format select terminal will toggle between SRS ON and SRS OFF when pulsed to ground.

Note: The MOD VI powers up in Intermission Music mode.

MUTING FUNCTION:
A convenient MUTE terminal in the AUTOMATION section of the back panel allows all output channels of the MOD VI to be silenced whenever this terminal is grounded.

6. FOR DIGITAL SYSTEMS: Connect the Digital DB25 connector to the DIGITAL INTERFACE port and the Digital system's interface port.

The MOD VI system has six inputs (Left, Center, Right, Left Surround, Right Surround and Sub) via a DB25 interface connector marked DIGITAL INTERFACE that can be used to process the outputs from an external digital decoder (i.e. DTS, Dolby Digital). The DIGITAL INTERFACE inputs accept any high level multi-channel source. The audio signals are processed through the SRS 3-D Enhancement circuitry (if SRS is turned on), individual equalizers, and Master Voltage Controlled Amplifier circuit before they appear at the main OUTPUTS. These signals do not pass through the Circle Surround matrix.
The computer-type DB25 connector marked DIGITAL INTERFACE on the back of the processor is for an external digital decoder. SMART provides the proper cables for the different digital decoders available on the market.

The DIGITAL INTERFACE DB25 pinouts:

Pin 1	Left
Pin 3	Center
Pin 5	Right
Pin 6	Left Surround
Pin 7	Right Surround
Pin 8	SubWoofer
Pin 9	Mono
Pin 10	Music
Pin 11	Stereo A
Pin 12	Digital
Pin 13	Stereo SR
Pin 14-25	Ground

Another application of the DIGITAL INTERFACE terminals is for external sync sources. Sound-Interlock from a 35-mm reproducer or a single 16-mm projector may be fed into the DIGITAL INTERFACE and selected with the front panel DIGITAL format switch.

DEFAULT OPTICAL SELECTION:
External digital decoders available on the market have a function that instructs the processor to switch to an optical format in the event that the digital decoder fails or loses time code. When this happens, the digital decoder will pulse the appropriate terminal (MONO, STEREO A, STEREO SR, or MUSIC) to ground to alert the processor to switch to the optical format. The information pertaining to which format to default to is encoded in the digital soundtracks on DTS prints. On Dolby Digital, the default is SR.

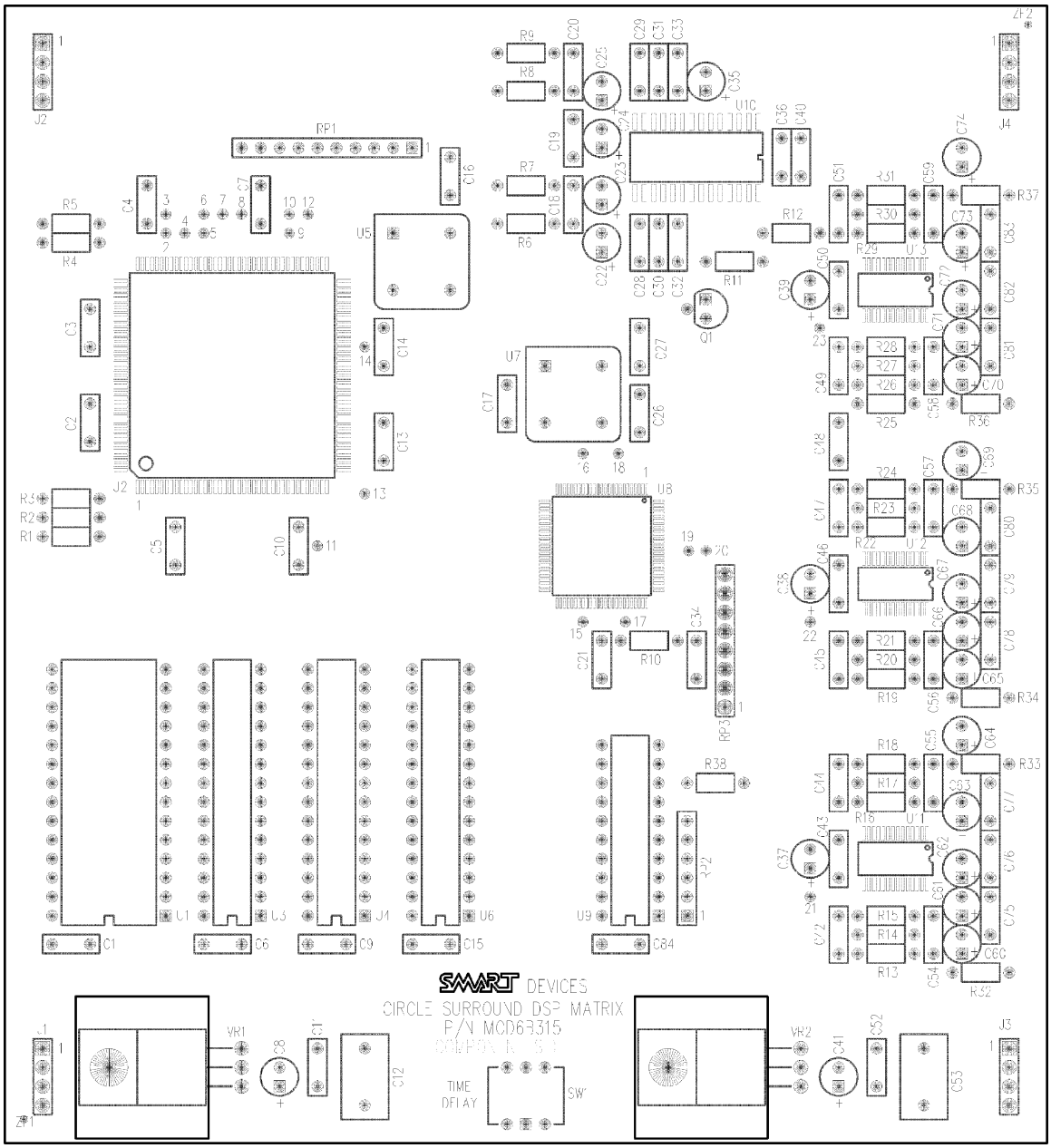

Figure 5a. MOD VI DSP Matrix circuit board diagram (left).

7. Connect the OUTPUT terminals of the MOD VI to the inputs of the system amplifiers.

The main OUTPUTS are labeled LEFT, CENTER, RIGHT, LEFT SURROUND, RIGHT SURROUND, SUB+ and SUB-. Shielded cable should be run between these terminals and the next piece of equipment in the sound system (equalizer, amplifer, etc.). Convenient GROUND terminals are provided near the outputs. A balanced subwoofer output is available on the MOD VI to provide an easy means to mono bridge the sub amplifier. The subwoofer output may also be operated in an unbalanced configuration by connecting to the SUB+ terminal and GROUND.

DIGITAL SMART PORT:
The Digital Smart Port has been added to allow for an optional 1/3 octave equalizer replacement for the built-in octave equalization,in addition to other features. Six internal jumpers (H14, H17, H18, H19, H20, and H21) must be changed to bypass the octave equalizer and activate the Digital Smart Port. The Digital Smart Port pinouts are listed on the following page:

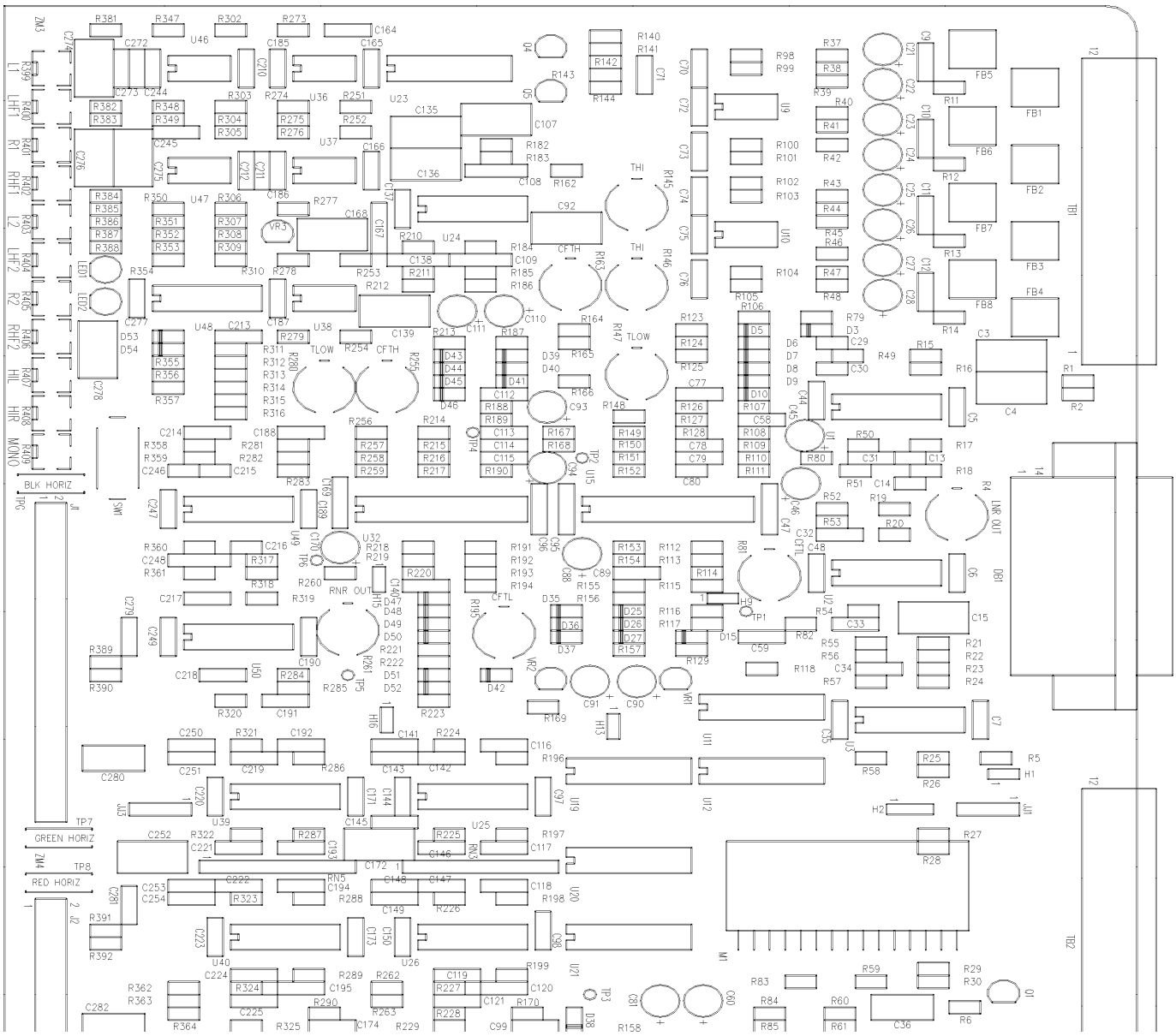

Figure 5b. MOD VI main circuit board diagram (left).

Digital Smart Port Pinouts

Pin 1	Subwoofer In	Pin 15	Subwoofer Out
Pin 3	Right Surround In	Pin 17	Right Surround Out
Pin 5	Left Surround In	Pin 19	Left Surround Out
Pin 7	Right In	Pin 21	Right Out
Pin 9	Center In	Pin 23	Center Out
Pin 11	Left In	Pin 25	Left Out
Pin 12	+15 VDC	Pins 2, 4, 6, 8, 10, 16, 18, 20, 22, & 24	Ground
Pin 13	-15 VDC		
Pin 14	+5 VDC		

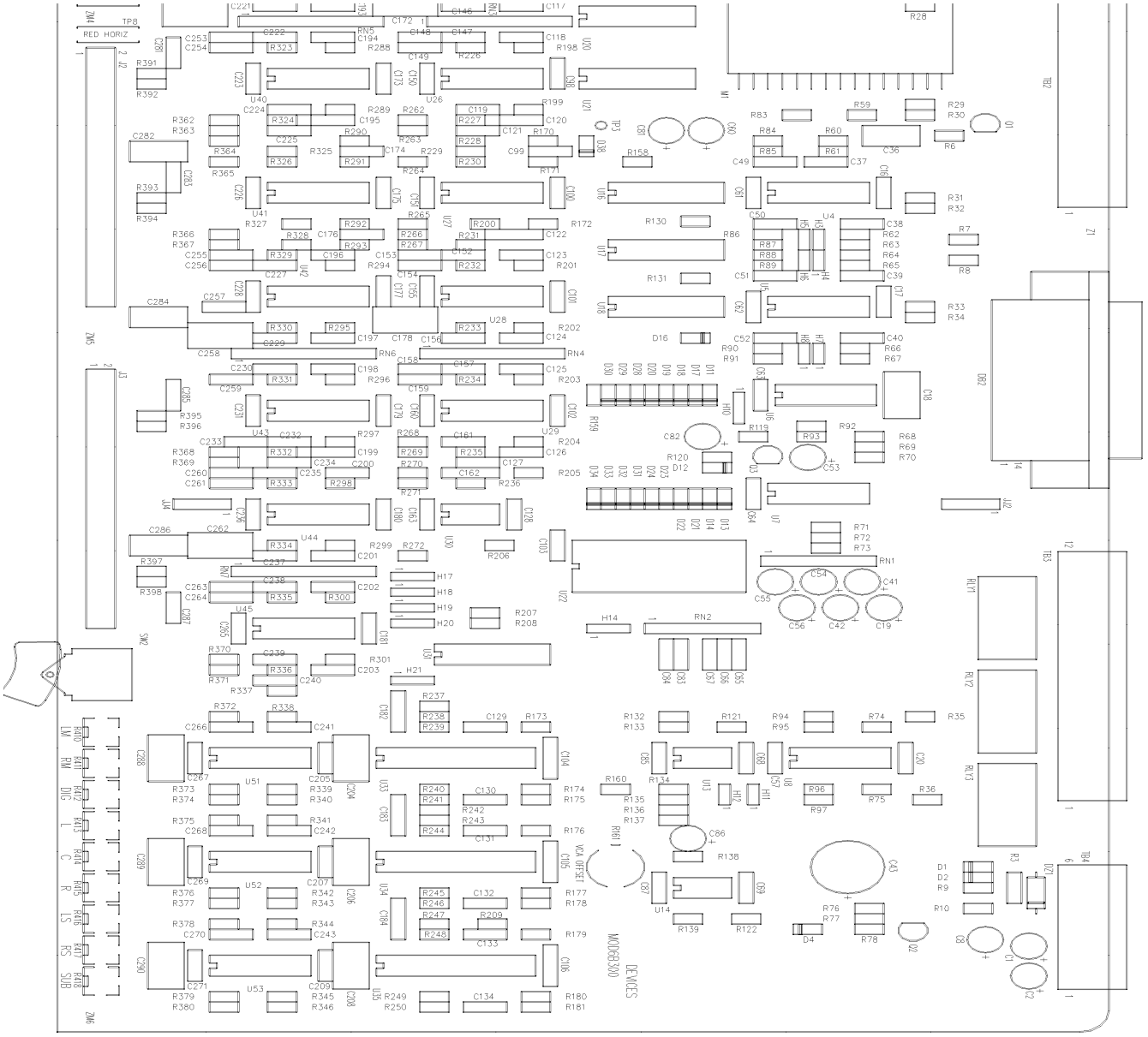

Figure 5c. MOD VI main circuit board diagram (right).

SECTION 4
CALIBRATION

Required Equipment

- sound pressure level meter
- real time analyzer (RTA) with a calibrated microphone
- dual trace oscilloscope
- multimeter
- a tuning wand
- S.M.P.T.E. Buzz Track Loop
- C.A.T. #97 Stereo Cell Alignment Film
- C.A.T. #69 Test Film

Before Calibrating

1. Turn on sound systems for 1 hour.
2. Turn off the SRS feature.
3. Close all doors.
4. If the MOD VI is mounted in a rack, make sure exhaust fan is running.

For more detailed information about setting up SMART processors, see the Theatre Sound for SMART Systems guide.

A CHAIN CALIBRATION

The A chain is usually considered to be the signal path originating from the solar cell and continuing to the processor's master fader. This signal path includes the preamp, noise reduction and matrix stages.

PRELIMINARY

1. **Clean soundhead optics, exciter lamp, optical lens and solar cell before attempting a soundhead alignment.**
2. **Set exciter lamp voltage for at least 80% of rated voltage.**

   BMX 9 volt 4 amp – 7.2 volts
   BXN 10 volt 5 amp – 8 volts
   Most foreign 6.3 volt 4 amp – 5 volts

3. **Make sure film/cell spacing is approximately 1 mm with the slit image striking the top one-third of the solar cell.**
4. **Open the MOD VI front panel and connect Oscilloscope and real time analyzer to the TP7 (left preamp) and TP8 (right preamp) test points.**

TP7 and TP8 are located on the bottom side of the front center of the MOD VI main board between the J1 and J2 connectors. TPG (GROUND) is located to the left of J1, also on the bottom side.

5. **Turn Gain controls fully clockwise.**
6. **Turn Slit Loss controls fully counterclockwise.**

The Preamp Gain controls are R1 and L1 for projector 1, and R2 and L2 for projector 2. The Slit Loss controls are LHF1 and RHF1 for projector 1, and LHF2 and RHF2 for projector 2. Both sets of trimpots are located on the left hand side of the front of the main circuit board.

7. **Turn the master FADER all the way down to avoid excessive noises in the auditorium for the next steps.**

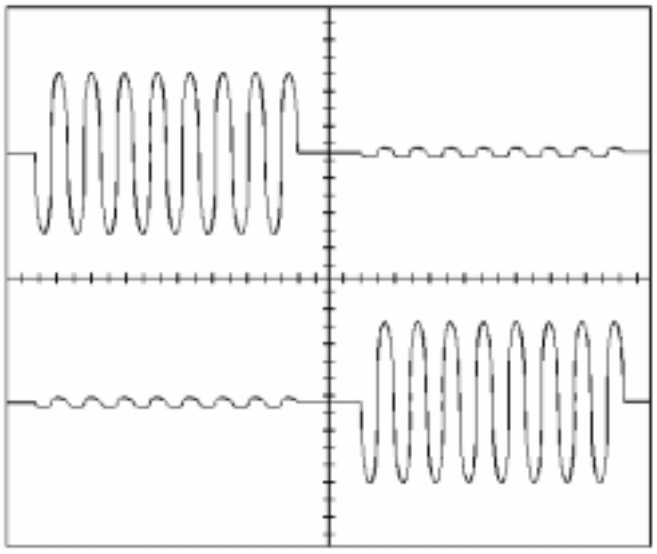

Figure 6. Low crosstalk between channels

SOUNDHEAD ALIGNMENT

1. **Play a S.M.P.T.E. Buzz Track loop.**
2. **Adjust the lateral film guide assembly, laser lens assembly or exciter lamp assembly while monitoring the preamp signals with the oscilloscope.**
3. **Adjust for minimum signal on the left and right channels.**

Refer to specific instructions in the projector soundhead manual. Minor variations in alignment procedure depend on the individual mechanical design of the soundhead.

4. **Play C.A.T. # 97 Stereo Cell Alignment Film.**
5. **Move laser lens or solar cell laterally and vertically until you have achieved minimum crosstalk between channels (see figure 6).**
6. **Repeat steps 1-5 until no further improvement can be obtained.**

7. **Play Pink Noise side of C.A.T. #69 Test Film.**
8. **Switch oscilloscope to X/Y Mode.**
9. **Adjust sound head optical lens azimuth for narrowest diagonal trace (see figure 7).**
10. **Observe the real time analyzer and focus the lens for maximum high frequency output while maintaining the best azimuth.**

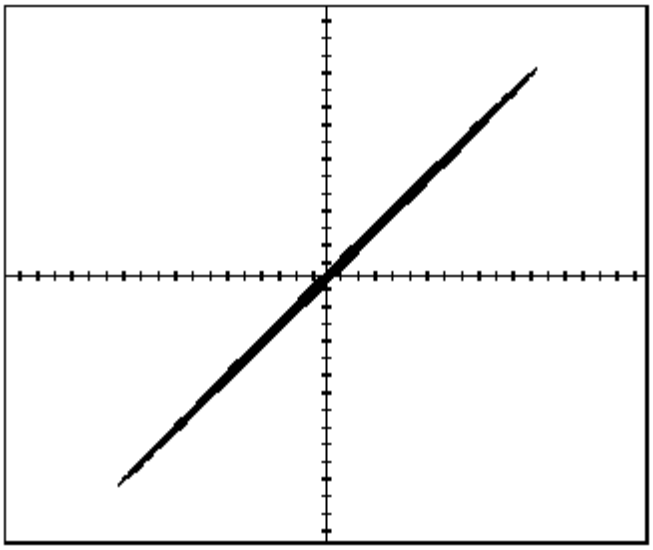

Figure 7. Pink noise in X/Y mode on the oscilloscope.

This is not easy, but it is one of the most critical adjustments affecting the overall system performance and is often not done as well as it should be.

5. **Adjust the vertical and lateral alignment of the EXCITER LAMP for maximum output on both channels. This is especially critical with a narrow slit optical lens because there is a much smaller "window" for the light to pass through.**
6. **Check the high frequency output on both channels and make sure the response is the same on both channels.**

With a narrow slit optical lens, the response should be flat within ± 3 dB to about 12 kHz with NO slit loss correction. If not, this MUST be corrected before proceeding with the next steps. It is not permissible to use slit loss correction to correct poor high frequency response caused by misalignment of the optical soundhead. An EXCITER LAMP out of alignment, the barrel of the optical lens crooked, or oil in the optical lens will all affect output and balance.

SLIT LOSS CORRECTION

1. **Run the Pink Noise side of C.A.T. #69 Test Film.**
2. **Observe the frequency response on your RTA which should be still connected to the preamp testpoints.**
2. **Adjust the left and right slit loss correction trimpots on the PREAMP for optimum flat high frequency response.**

Do not over adjust the slit loss correction in an effort to obtain extended response. This will result in an undesirable frequency response peak. While adjusting the slit loss correction, aim for as flat a high frequency response as possible. If one of the preamp channels is slightly worse that the other , then adjust the better responding preamp to match the lesser. This will ensure that the matrix steering in the MOD VI will be as accurate as possible.

OPTICAL PREAMP CALIBRATION

1. **Run a Dolby C.A.T. #69 Test Film, Dolby tone side.**
2. **Locate the preamp calibration switch (SW1) and LEDs (LED1 and LED2) on the left hand side of the front of the main circuit board.**
3. **Push SW1 to the left. This causes the LEDs to indicate the status of the Left**

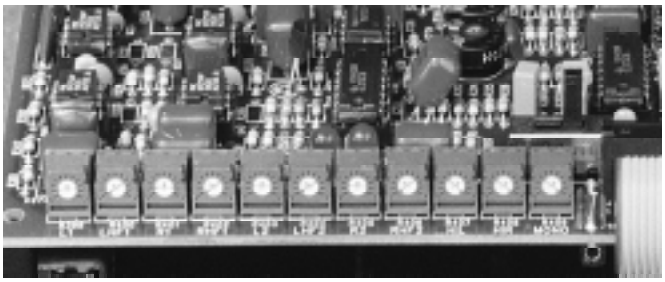

Figure 8. Left side potentiometers (Preamp, slit loss, hearing impaired, and mono levels) and preamp selection switch (SW1).

channel preamp level.

Make sure you are changed over to the correct projector by observing the XOVER pin on the back of the MOD VI. If the pin is open, the system is in projector 1 mode, if it is grounded, the system is in projector 2 mode.

3. Adjust Projector 1 left channel gain control (L1) until both LEDs are lit.

This is a very critical adjustment. You may not be able to get both LED's on simultaneously. Try to get as close as possible.

4. Repeat steps 1-3 for the right channel gain control (R1), and for projector 2 left and right channel gain control (L2 and R2).

You can verify that the LED meters are indicating correctly by connecting an AC voltmeter to the LEFT PRE (TP7) and RIGHT PRE (TP8) test points located on the bottom side of the front of the main circuit board between connectors J1 and J2. Ground (TPG1) is located to the left of J1. You should read between 300 to 325mVAC at these test points.

MONO BYPASS

MONO Bypass mode utilizes an auxiliary power supply to power the Preamp circuitry, generating mono sound in the Center channel.

1. Run a film soundtrack.
2. Listen to the CENTER channel on the booth monitor.
3. Switch from Normal to Backup.

The red Backup Switch (SW2) is mounted on the front right of the main board, behind the front panel. Pushing the switch to the right is MONO BYPASS mode, to the left is NORMAL mode.

4. Adjust the MONO bypass level pot (left front on the main board) to achieve equal levels while switching from Normal mode to Bypass mode.

Need a low cost Booth Monitor designed with the MOD VI in mind? Try the SMART Devices Cinema STEREOCHECK!

B CHAIN CALIBRATION

The B Chain Calibration is generally considered to be the signal path from the processor's master fader to the speakers.

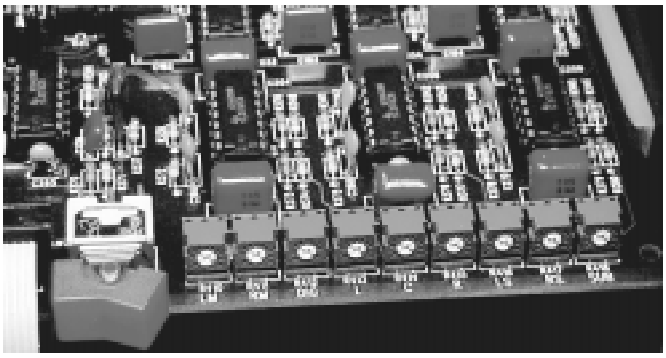

Figure 9. Right side potentiometers (Music, Digital, and main output levels) and Emergency Bypass switch (SW2).

This signal path includes the equalizers and output stage. Before continuing with the B Chain Calibration, check the wiring of all auditorium speakers to make sure the phase is correct.

The "SMART EZ Phase Checker" is a perfect unit for verifying proper phase of speakers!

PRELIMINARY

Special Note: If you will be installing an external digital decoder, do so AFTER setting house levels. See the DIGITAL LEVEL SETTINGS at the end of the B CHAIN CALIBRATION section for more information.

1. Select STEREO A by pushing the appropriate button on the front panel.
2. Set the FADER to the one o' clock position.

EQUALIZATION AND HOUSE LEVELS

The equalizers are normally shipped with the individual trimpots set for a flat frequency response. The octave equalizers used for the stage channels are capable of cutting and boosting each frequency ±10 dB. The individual trimpots are single turn types, with the mid position of each pot being flat (unity gain).

The MOD VI has a built in Pink Noise Generator on the Circle Surround DSP Matrix Board. The TIME DELAY rotary switch located on the front of this board has six Pink Noise settings for generating Pink Noise in any one of the six audio channels:

Pink Noise Settings on TIME DELAY rotary switch

A	LEFT
B	RIGHT
C	CENTER
D	LEFT SURROUND
E	RIGHT SURROUND
F	SUBWOOFER

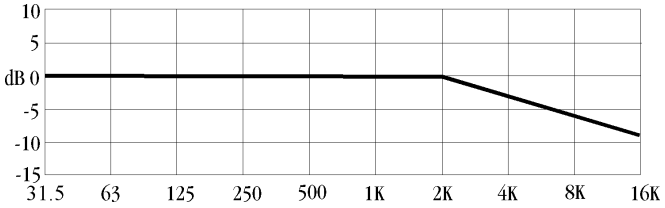

Figure 10. ISO Cinema Playback Standard states that octave bands should be tuned for flat response to 2 kHz, with a 3 dB/octave rolloff above 2

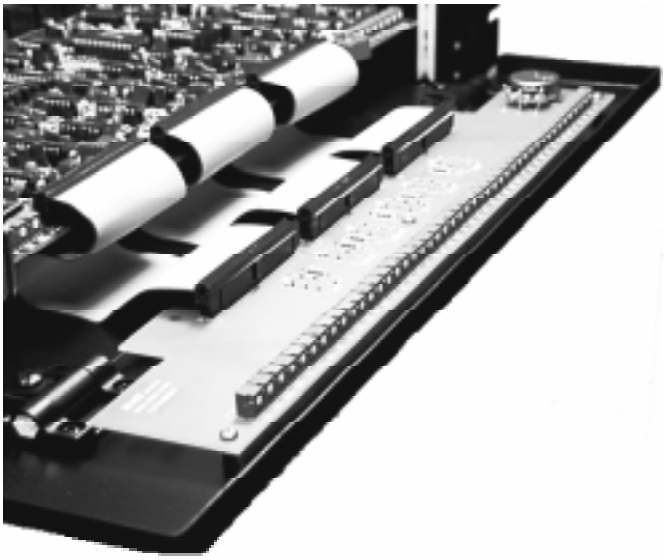

Figure 11. MOD VI front panel with equalizer potentiometers along the front.

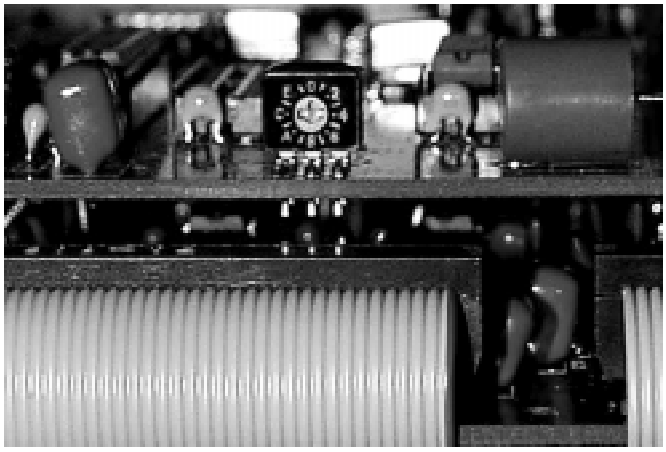

Figure 12. TIME DELAY rotary switch on the Matrix board.

1. Set the TIME DELAY switch (SW1) on the Circle Surround DSP Matrix Card to the correct setting for channel you wish to equalize.
2. Perform the channel equalization (see Figure 10) using the trimpots located inside the front panel (figure 11).

Bass control affects frequencies below 100Hz, and treble affects frequencies above 10kHz.

3. Adjust the output trimpot on the right front of the main circuit board (labeled L, C, R, LS, and RS) so that 79 dBC spl is measured in the auditorium.
4. Repeat steps 1-3 for the five main channels (Left, Center, Right, Left Surround and Right Surround).

Notes On Gain And Equalization: Sound contractors learned, a long time ago, that boosting frequency bands adjacent to bands that are cut introduce a phase shift that the ear is very sensitive to. Although the test instruments show a nice curve, the sound has a coloration that is not natural. For this reason, we encourage you to apply the minimum amount of boost and cut whenever needed. Never over-equalize the system. All frequencies may be cut and boosted by as much as 7 dB in each of the octave bands without creating the above problems. Before attempting to equalize, be sure the stage speaker connections are properly polarized, the polarity of the components in each speaker system is correct, and the speaker devices are mechanically aligned according to the manufacturer's recommendations. Remember that equalizers are used to tune the room, NOT to correct poor speaker installation and alignment.

SUBWOOFER LEVELS

1. With the SubWoofer Pink Noise channel on, adjust the sub level trimpot (SUB) to the right on the front of the main circuit board for 79 dBC spl from the subwoofer.

The installer may wish to adjust for another level, depending on the amount of subwoofer desired.

MUSIC (NON-SYNC) INPUTS

1. Select Music mode and turn on the music source that is feeding the MOD VI.
2. Turn the left and right music level trimpots (LM and RM) on the right front of the main board to obtain a normal house level.

These trimpots are factory set and may not need adjustment. Adjust the trimpots so that right and left music are set to the same level. A way to accomplish this is to play a stereo music selection with a good vocal track and adjust either the left or right music trimpots for minimum vocals in the surround channel.

The music is played through the DSP matrix the same as a

soundtrack and provides 6 channel decoding from a conventional 2-channel stereo source. This exclusive feature in the MOD VI presents a high impact playback in the auditorium for pre-show entertainment. Although all 2 channel commercial stereo recordings contain hidden "extra channel" information due to multiple microphone recording or multitrack mixdown, you will really appreciate the effect if you purchase CD's that have been encoded in "Circle Surround" with 6-channel source. There are many new recordings available with the "Circle Surround" logo on the CD case.

TIME DELAY

The encoder switch for the Pink Noise is also the control for the overall time delay. The time delay settings for the TIME DELAY encoder switch (located on the Circle Surround DSP Matrix board) are as follows:

Switch pos.	Delay	Switch Pos.	Delay
0	35 ms	5	60ms
1	40 ms	6	65ms
2	45 ms	7	70ms
3	50 ms	8	75ms
4	55 ms	9	80ms

1. Measure the distance in feet from the ideal seat (which is usually 2/3 of the way back from the stage speakers, centered side to side) to the stage speakers.
2. Measure the distance from the ideal seat to the nearest surround speaker.
3. Subtract the two measurements.
4. Add 20 to this number to get the delay (in milliseconds) required in the auditorium.
5. Set the rotary switch on the Circle Surround Matrix Card (SW1) to the nearest setting in milliseconds.

DIGITAL LEVEL SETTINGS

The MOD VI offers a digital level modifier trimpot (DIG) that provides cut from the main FADER level when in digital mode. In addition to externally trimming the DIGITAL INPUT signals, the installer may use this trimpot to fine tune the DIGITAL to Stereo-Optical sound level matching.

Make sure that all other B-chain calibration adjustments have been made prior to adjusting the digital levels (see special note in the PRELIMINARY section of the B CHAIN CALIBRATION).

1. Make adjustments at the output of the external digital decoder or interlock audio tape machine (see manufacturer's manual).

2. Use the DIG trimpot (located on the front right side of the main circuit board) to fine-tune the digital level relative to the Stereo-Optical level.

CINEMA STEREOCHECK BOOTH MONITOR. Our companion MN600 monitor cosmetically matches the MOD VI and has a quick connect DB25 connector to carry signals and power from the MODVI to the monitor inputs. This economy monitor uses the same power supply as teh MOD VI and is easy to connect. Please see the installation manual for the MN600 for more details.

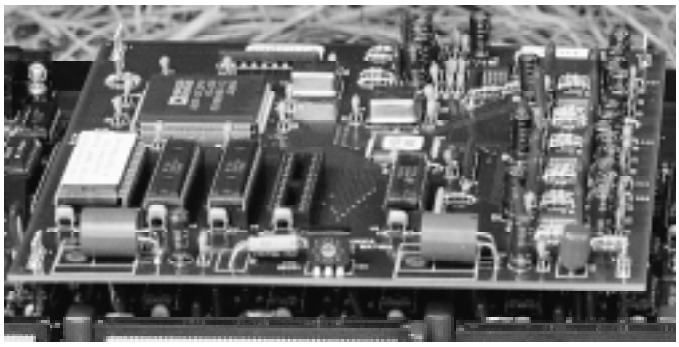

Figure 13. DSP Circle Surround Matrix board.

Figure 14. Model PS-2 switching power supply.

SECTION 5
OPERATING INSTRUCTIONS

The MOD VI system is one of the easiest systems to operate. The Managaer/Operator of the sound booth should review the operation instructions to assure that emergency functions are also understood in the unlikely event of an equipment failure.

TURNING ON THE SYSTEM:
The sound engineer who installed the sound system has provided a way to apply power to the system through a master power switch or circuit breaker. Also, several of the individal components in the equipment rack have their own power switches. Become familiar with all switches or breakers that control power to the sound equipment.

The MOD VI is equipped with a power up muting circuit that allows time for the low level circuits to stabilize before enabling the processor outputs. This circuit prevents a "turn-on thump" from being passed to the auditorium speakers. However, since most amplifiers are not equipped with a comparable muting circut for the power down sequence, it is recommended that the amplifiers be turned off before the processor to avoid a "turn-off thump" in the auditorium.

MUSIC SELECTION:
It is likely that the sound system will be turned on before the arrival of the first audience of the day. The MOD VI powers up in Music mode. If the music player (CD player or tape machine) is running, music will be heard in the auditorium and on the booth monitor. Music may also be selected by pressing the front panel MUSIC button.

PROGRAM SELECTION:
The automation should be set to select the proper formats when needed. However, any format may be overriden by simply pushing one of the Format buttons located on the front of the MOD VI.

LEVEL:
This control is used to set the system level for any format. The system was calibrated with the FADER at the one o'clock position, which is where most prints will play at a normal level.

MUSIC LEVEL CONTROL:
The music level should have been preset by the installer of the sound system. However, if any change in music level is desired then the LM (Left) and RM (Right) music level controls can be turned to change the overall volume level. These trimpots are located behind the front panel on the right front of the main circuit board. The front panel is mounted on hinges and latched by magnets, so a light tug on the top of the panel should open it for access.

MONO BYPASS SWITCH:
The MOD VI contains an emergency bypass system that will keep the sound on the screen in the event of a failure of the processor. This special circuitry is activated by the MONO BYPASS switch, which is located behind the front panel on the front right of the main circuit board. The switch is bright red, and switching it to the right puts the system in MONO BYPASS, to the left is NORMAL mode. During MONO BYPASS, sound is produced only through the Center channel.

MONO BYPASS uses the same preamp circuitry as normal operation. The power is supplied simultaneously by the main supply and a small backup power pack. In the unlikely event of preamp circuitry failure, the backup system may not function. If this happens, please contact your service technician or call the SMART factory.

SRS 3-D SOUND ENHANCEMENT:
The SRS function (activated by the button on the front panel) applies special processing to the Left and Right sound channels to provide fuller and wider sound. This process is therefore not available in the Front Surround Mode, as the Left, Center and Right signals are mixed in this mode.