

# Film-Tech

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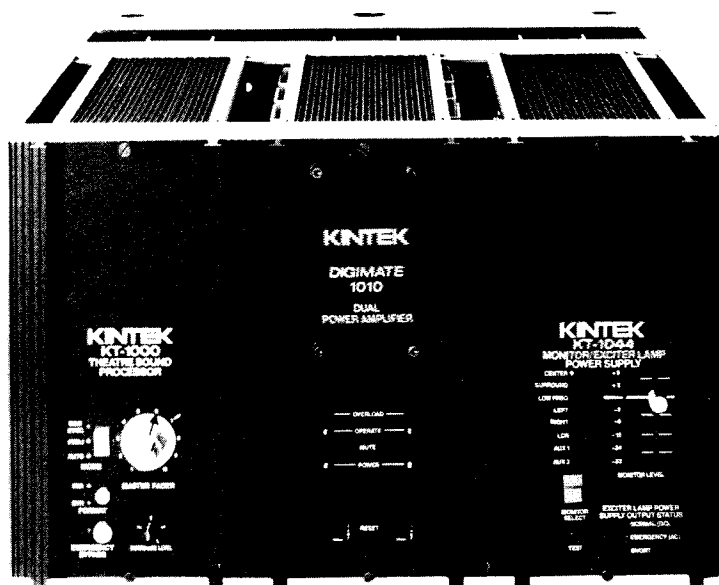
# CENTER/SURROUND THEATRE SOUND SYSTEMS

## KT-2010 AND KT-2012

- **DESIGNED FOR THE SMALL TO MEDIUM-SIZED AUDITORIUM.**
- **TWO-CHANNEL PLAYBACK OF DOLBY STEREO™ FILMS WITH KINTEK'S SVA PROCESSOR AND SYNTHESIZED SURROUND SOUND FOR MONO FILMS.**
- **FULLY AUTOMATED FORMAT DETECTION AND SELECTION.**
- **NOISE REDUCTION AND DYNAMIC RANGE EXPANSION.**
- **LOW FREQUENCY OUTPUT FOR OPTIONAL SUBWOOFER SYSTEM.**
- **NON-SYNC SOURCE SELECTION.**
- **ALL MODULAR COMPONENTS HOUSED IN DEDICATED WALL MOUNT OR RACK-MOUNTABLE FRAME.**

In order to satisfy today's sophisticated consumers at current ticket prices, every auditorium must have high quality stereo sound. Kintek™ Center/Surround Sound Systems were designed to provide superb two-channel stereo sound at a reasonable price for the small to medium-sized auditorium. They are perfect for the multiplex that does not want to sacrifice sound quality in its smaller "less important" auditoriums.

The KT-2010 and KT-2012 systems play Dolby Stereo™ film in 2-channel format and synthesize surround sound for mono films maintaining dialog intelligibility, and the integrity of music and effects. Center/Surround systems are easy to install and operate. The components are modular and all connections are secured to barrier-type terminal strips mounted on the frame. Both systems come with a prewired 10½" high wall mount or rack-mountable frame.



KT-2010

# KINTEK

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## KT-2010

The KT-2010 is designed for the single-projector auditorium. Its sound processor, the KT-1000, contains a stereo preamplifier with backup, 3-band noise reduction and dynamic range expansion, SVA decoder, fully automatic format detector, and a surround synthesizer. Its stereo amplifier, a Digimate, has been field proven as a reliable, continuous output, high power work-horse. Each amplifier has its own power supply. Each amplifier power supply has dual rectifiers and filters. It's complete with a two-channel monitor and an exciter lamp power supply with variable DC output and AC power back-up called the KT-1044. The entire system offers emergency back-up protection at the touch-of-a-button.

## KT-2012

The KT-2012 is designed for the two-projector auditorium. It contains the KT-1000A which provides the same noise reduction, dynamic range expansion, SVA decoder, format detector, and surround synthesizer as found in the KT-1000. Its main power amplifier is a Digimate. The system is complete with the KT-1042 two-channel monitor, dual stereo preamplifier and change-over switch. Regulated DC exciter lamp supply is optional.



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Kintek recognized the need for flexible and reliable theatre sound systems nearly ten years ago. Component sound systems versatile enough to fill any modern theatre's sound needs has been the central design philosophy. Finally, not to forget one of the most important elements, we have assembled engineering and customer service groups dedicated to providing the ultimate performance versus cost.

**WARRANTY AND REPAIR:** Equipment manufactured by Kintek carries a limited warranty against defects in material and workmanship for two years from the date of purchase.

KT-2010 CENTER/SURROUND THEATRE SOUND SYSTEM



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NOTE: KINTEK products are manufactured under one or more of the following US patents: 3,681,618; 3,714,462; 4,101,849; 4,097,767, 4,589,129; 1,153,701(Canadian). Other patents pending.

### WARRANTY AND REPAIR.

Equipment manufactured by KINTEK carries a limited warranty against defects in materials and workmanship for a period of two years from the date of purchase. KINTEK will, at its option, repair or replace defective components provided the unit is shipped prepaid to KINTEK or its authorized distributors with a return authorization number (RA). Defects caused by modifications or misuse or other damage caused by improper packing are not covered by this limited warranty.

### FUSES

KT-1044 Monitor/Exciter Power Supply--2 amp slow blow, 8 amp slow blow, and 10 amp slow blow in the exciter supply section; 1/4 amp slow blow in the monitor section.

KT-1000 Theatre Sound Processor--1 amp slow blow.

The Digimate 1110 has circuit breakers not fuses.

### EMERGENCY OPERATION

KT-1000--Press the EMERGENCY BYPASS switch and adjust the Bypass Level Control (BYP LEVEL). The Bypass Level Control can be found behind the removable plate on front of this module.

KT-1044--The exciter lamp power supply is equipped to shift automatically to AC supply if the regulated DC supply should fail (indicated by the EMERGENCY (AC) LED).

Digimate 1110--If the center channel amplifier should fail the system may be operated in mono by inverting the amplifier module. Loosen the top and bottom thumb screws, slide the module out, turn it up-side-down, slide into place, and tighten the thumbscrews.

## Chapter 1

### KT-1000 FRONT PANEL CONTROLS

#### 1.1 MASTER FADER.

The MASTER FADER is made up of two concentric controls: the Vernier Control, the bottom section of the knob, and the Master Gain Control, the top section of the knob.

The Master Gain is normally set at "7", however, there is another 12dB of reserve gain provided between "7" and "10"; this control can fade to infinity. Ordinarily, the Master Gain can remain at the setting used for the feature presentations. Center, surround and low frequency outputs maintain their correct balance for any setting of the Master Gain.

The Vernier Control is normally set at "5". You can raise or lower the gain 6dB from its normal position while allowing the Master Gain to remain constant.

#### 1.2 SURROUND LEVEL CONTROL.

The SURROUND LEVEL control will permit minor changes in the surround level; its normal position is straight up.

#### 1.3 MODE SWITCH.

The MODE switch, a rocker switch with LED indication, has three positions: NON/SYNC, PROJ, and AUTO.

The upper, NON/SYNC position turns off the SVA format. This enables the NON/SYNC input to fade in and mute the input from the projector preamp.

When the Mode switch is set at PROJ, the NON/SYNC is faded out and the projector preamp is "soft" switched on. The internal stereo detector will not operate when the system is in the PROJ mode.

At the AUTO position, external automation will select NON/SYNC or Projector with the same mute and fade functions as with manual switching, the appropriate LED will be lit. The AUTO position will allow the internal stereo detector to select the SVA when a stereo film is played. Returning to NON/SYNC either manually or by automation will change the format from SVA to SYN automatically.

**NOTE:** If the system has been wired so that the External Automation has control of format, then the front panel push button and stereo detector are disconnected. The SVA or SYN LEDs will indicate which format has been selected.

#### 1.4 FORMAT PUSH BUTTON.

The FORMAT push button, with LED indication, selects either SVA(stereo) or SYN(synthesizer).

#### 1.5 EMERGENCY BYPASS SWITCH.

When the EMERGENCY BYPASS Switch is pressed, a reserve mono preamp. is connected to the solar cell, and center power amplifier. The level is controlled by the Bypass Level Trim Control. This control, labeled BYP LEVEL, can be found behind the removable plate on the front on this unit(refer to section 3.2). When the KT-2010 is installed, the bypass level should be set to a comfortable listening level. The power for the bypass system comes directly from the 24 volt power supply.



## Chapter 2

### INTERNAL CONTROLS AND AUTOMATION

#### 2.1 LOCATION AND DEFINITION.

2.1.1 PREAMP CARD--left-hand card when looking down inside the KT-1000 module from the front. There are two switches on the card, both will be preset at the factory.

Slide switch at top edge of board--determines whether SVA format can be turned ON by Remote Control(forward position) or by Internal Detector(back position). The Internal Detector setting allows the front panel controls to activate the SVA format. The Remote Control setting is used if you are going to operate the SVA from automation; this setting will override the other mode controls. The unit is set at the factory in the Internal Detector or back position. NOTE: When terminal 9 on TBl is grounded to terminal 8, system will be in synthesizer format (mono). If terminal 9 is allowed to float, the system will shift to SVA(refer to figure 1, KT-2010 System Frame Wiring).

Slide Switch in center of board--determines if the solar cell is set for mono(back position) or split solar cell (forward position). When connecting a mono solar cell, connect the cell to the right cell input and let the left input terminals float. The unit is factory set in the split solar cell position.

MODE Switch--described in section 1.3, Front Panel Controls. If the AUTO position is selected, TBl terminal 11 is grounded, NON/SYNC will be selected. Projection is selected by letting terminal 11 float(refer to figure 1).

SURROUND DELAY(ms)--trim Potentiometer located on the right-side of the module. (The module must be slid out of the frame to view this location.)

<u>Setting</u>	<u>Delay</u>
Fully counter-clockwise	--25 milliseconds
10 o'clock	--45 milliseconds
12 o'clock	--60 milliseconds
2 o'clock	--75 milliseconds
Fully clockwise	--90 milliseconds

The KT-1000 comes factory set with a 60 millisecond delay. The amount of delay is determined by the distance from the screen to the last row of seats minus the distance from the last surround speaker plus 20 milliseconds. The procedure for checking the delay is found in Chapter 3, System Connection and Calibration, section 3.3.13 Step 13.

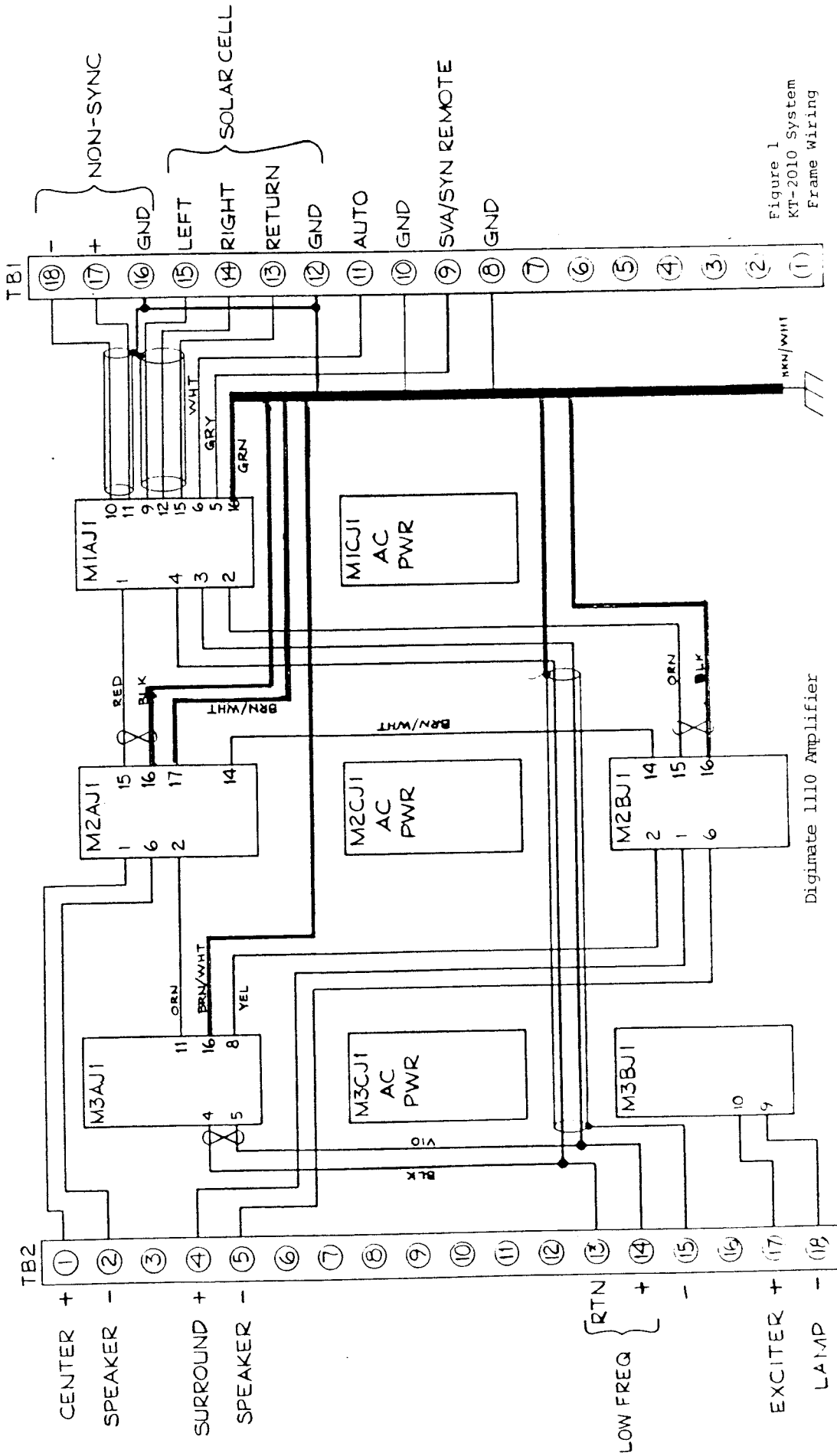


Figure 1  
KT-2010 System  
Frame Wiring

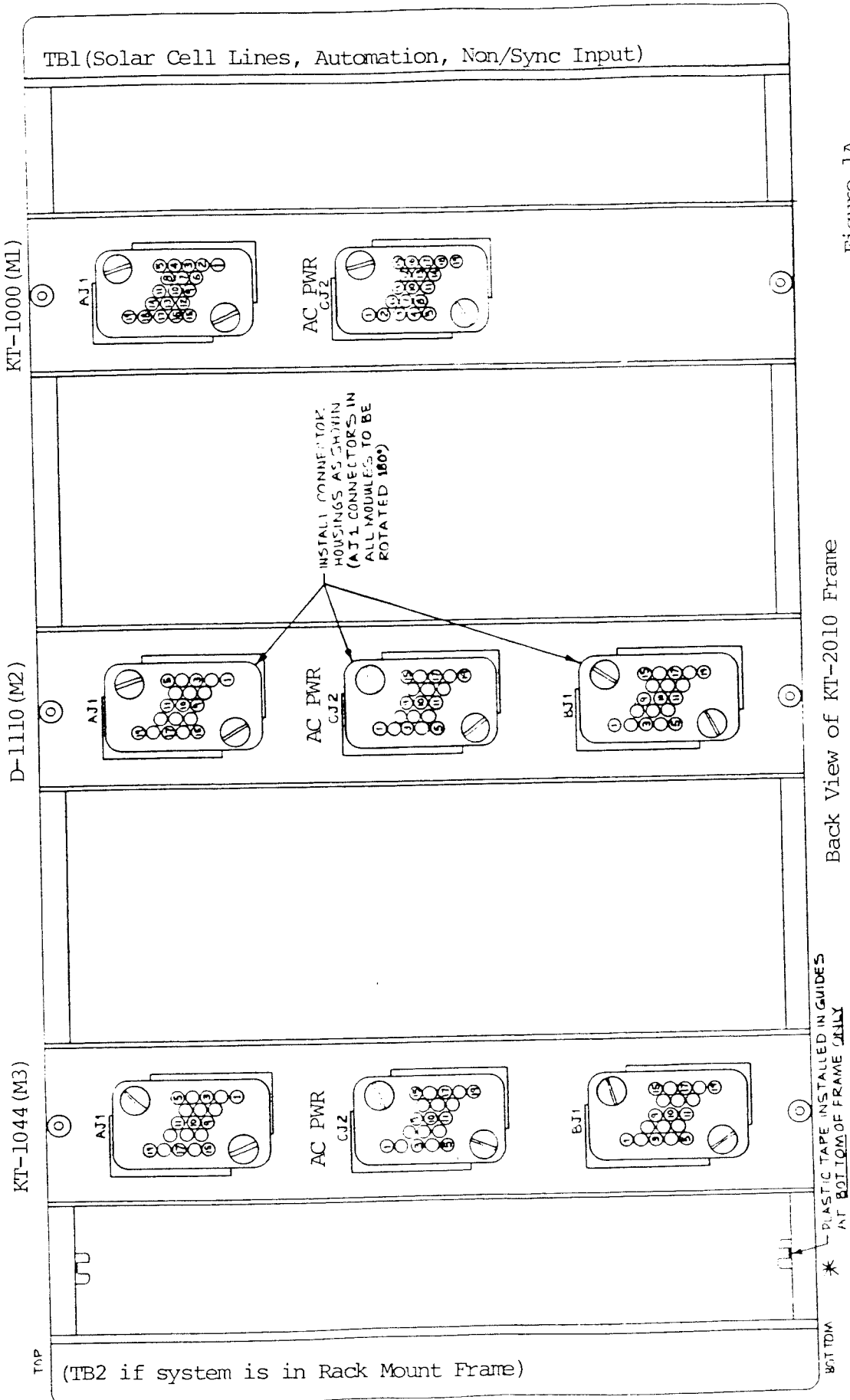


Figure 1A

Back View of KT-2010 Frame

\* PLASTIC TAPE INSTALLED IN GUIDES AT BOTTOM OF FRAME ONLY

## Chapter 3

### SYSTEM CONNECTIONS AND CALIBRATION

#### 3.1 CONNECTIONS--refer to figure 1.

##### 3.1.1--TB1--on the right side, when looking from the back.

--Solar Cell--connect solar cell lines to TB1, on the right side, terminals 12-15, according to the diagram.

--Automation(optional)--connect to TB1 terminals 8-11. For an explanation of Automation requirements, refer to chapter 2, Internal Controls and Automation.

--Non/Sync Input--connect to TB1 terminals 16-18. This is a balanced or differential input, refer to appendix for sample hookups.

##### 3.1.2--TB2-- On a rack mount unit these terminals are found on the back of the frame on the left side(when you are looking from the rear. On a wall mount unit, the connections are made in the lower terminal block located in the pan.

--Center Loud Speaker--connect to TB2 terminals 1(plus) and 2(minus).

--Surround Speakers--connect to TB2 terminals 4(plus) and 5(minus). The group of surround speakers should be interconnected so that the load impedance to the amplifier is not less than 4 ohms.

--Exciter Lamp--connect to TB2 terminals 17 & 18.

--Low Frequency Lines, KT-90--(will be connected during calibration process) connect to TB2 terminals 13-15. For a differential input, such as the KT-90, connect 14(high), 13(low) and 15(shield). Single ended inputs should be connected to 14(high) and 15(ground).

##### 3.1.3 AC Supply Lines--connect the three AC supply lines into 117 Volt source. The Processor Module requires 1 amp., the Power Amplifier Module requires 10 amps., and the Monitor requires 1 1/2 amps.

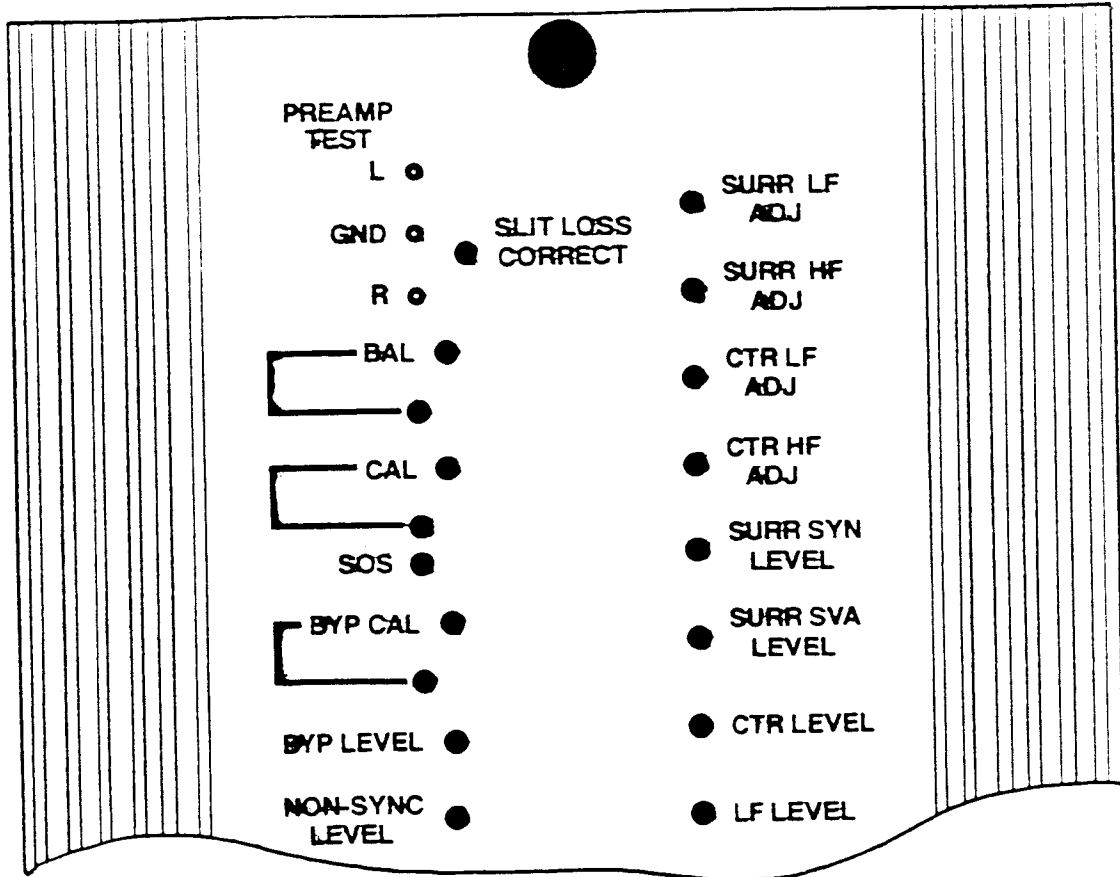


Figure 2  
KT-1000 Trim Controls and Indicators

### 3.2 CALIBRATION.

Each KT-1000 is carefully adjusted at the factory to the levels that occur in the majority of today's movie theatres. The system should require only preamp adjustment to operate satisfactorily.

The fine tune procedure will require:

Test Film  
Real Time Analyzer  
Sound Pressure Level Meter  
Dual Trace Oscilloscope

3.2.1 Step 1: Loosen the thumbscrew on the top of the KT-1000 and slide the half-panel up to view the trim controls and their indicators (refer to figure 2)

3.2.2 Step 2: Set the MASTER FADER. The Master Gain should be set at "7" and the Vernier should be set at "10". (Master Fader described in section 1.1, Front Panel Controls)

3.2.3 Step 3: Set the exciter lamp supply voltage to match the requirements of the exciter lamp. This adjustment is at the back of the KT-1044 Monitor/Exciter Lamp module behind the barrier strip. The voltage can be reduced by as much as 25% to extend the lamps life. (For additional information reference Chapter 5, KT-1044 Monitor/Exciter Supply).

### 3.3 CALIBRATE AND BALANCE SOLAR CELL.

3.3.1 Step 1: Turn ON projector exciter lamp. Select PROJ Mode on the KT-1000 and make sure there is no film in the projector sound head.

3.3.2 Step 2: On the Preamp card adjust the calibration (CAL), a screwdriver adjustment in the left row, until the CAL LED lights. Then adjust the balance (BAL), just above the CAL adjustment, until the BAL LED lights. If while making these adjustments the SOS (Service Optical Sound) LED lights, you must adjust the projector optics using the SMPTE Buzz Tracks for lateral guide alignment, and Pink Noise (Dolby CAT 69) for focus and azimuth to obtain maximum high frequency output. Make sure you set the balance potentiometer in the physical center of its travel (3 o'clock) before adjusting the projector optics.

To set an unbalanced solar cell: Gently clean the optics and solar cell with a Q-tip. Turn ON the exciter lamp, with no film in the projector, adjust the CAL potentiometer until the CAL LED lights. Loosen the solar cell adjustment screw; it is located on the cell bracket in the projector soundhead. Move the cell into position so that the light from the slit hits the cell within the upper 1/4 area at the top of the cell, and the BAL LED lights on the KT-1000. This adjustment assures that the stereo solar cell is in perfect alignment with the slit lens and exciter lamp.

Connect a dual trace oscilloscope to the preamp test points on the KT-1000. Run SMPTE Buzz Track and adjust the lateral guide roller until no modulation is detected from either trace.

3.3.3 Step 3: While there is no film in the projector, adjust the bypass calibration by pushing the red Emergency Bypass button and adjust the trim until the Bypass Calibration LED lights. (for additional instruction regarding bypass procedure refer to section 3.3.10)

3.3.4 Step 4: Connect the positive lead of a Real Time Analyzer to the left or right preamplifier test points, and the negative lead to ground. Run a Pink Noise Loop in the projector with emulsion facing away from the screen. Adjust the Slit Loss Correction potentiometer to obtain the flattest line possible out to 10kHz; one adjustment sets the response for both the left and right preamps. If you have problems adjusting the slit loss correction, connect a dual trace oscilloscope to the test points, set in X/Y mode, and reset the slit lens to achieve the narrowest 45 degree line (and the maximum high frequency response on the Real Time Analyzer). To verify the proper operation of the preamp., measure the output of the preamp. at the test points with an analogue voltmeter (should measure about .25 Volts or -12dBv).

NOTE: Loudspeaker efficiency, auditorium size and acoustics will have a significant effect on SPL readings. The SPL readings to follow are meant to be used as a guide, but may vary as much as +/-6 dB. The ultimate level settings should be checked with film program. In the SVA(stereo) format, there should be a noticeable separation between the center and surround channels; the surround channel should not dominate the center channel. In the SYN(synthesize) format, dialog crosstalk should not be audible in the surrounds; loud sustained sound should project clearly from the surrounds.



3.3.5 Step 5: Put the KT-1000 in SVA format and turn ON the center power amplifier, located on the left hand side of the Digimate 1110, by sliding the mute switch up. Adjust the center trim control(CTR LEVEL) so that the Sound Pressure Level(SPL) is 80dBc(slow) in the middle of the room. The efficiency of the center channel screen speaker, and the size and acoustics of a particular auditorium will affect the SPL readings. If you cannot adjust the CTR LEVEL to get a reading of 80dBc, lower the Vernier control of the Master Fader until the center level trim can be adjusted to give you a reading of 80dBc. Turn OFF the center power amp.

3.3.6 Step 6: Remove one of the solar cell feed lines, not the ground, so that only one preamp is being fed, this allow Pink Noise to be fed through the surround channel. Do not recalibrate or rebalance the solar cell. Turn ON the surround power amplifier, located right side of the 1110, and adjust the the SVA surround trim(SURR SVA LEVEL) so that there is 80dBc in the middle of the room.

3.3.7 Step 7: Change the KT-1000 to SYN format and turn ON the center power amplifier. Make note of the SPL level in the middle of the room. You will be setting the SYN surround level(SURR SYN LEVEL) approximatley 6 dB lower than that reading. (Verify the settings with program material as suggested on the previous page after set-up is complete). Turn OFF the center power amplifier.

3.3.8 Step 8: Turn ON the surround amplifier and adjust the SURR SYN LEVEL until the surround reads 6 dBc lower than the SYN center reading taken in Step 7. Turn OFF the surround power amp.

3.3.9 Step 9: Connect the low frequency lines(KT-90) to the low frequency power amp. The Above Threshold Limiter on the low-frequency channel has been set in the factory to allow only 1 volt RMS to power the amplifier, so the gain of the power amplifier should be adjusted so 1 volt RMS would drive the speaker to a safe high limit. Having set the low frequency power amplifier gain, set the SPL in the middle of the room to 75dBc by adjusting the low frequency trim.

**NOTE:** For the remaining steps leave the Pink Noise Loop running and lower the Vernier control to "5".

3.3.5 Step 5: Put the KT-1000 in SVA format and turn ON the center power amplifier, located on the left hand side of the Digimate 1110, by sliding the mute switch up. Adjust the center trim control(CTR LEVEL) so that the Sound Pressure Level(SPL) is 80dBc(slow) in the middle of the room. The efficiency of the center channel screen speaker, and the size and acoustics of a particular auditorium will affect the SPL readings. If you cannot adjust the CTR LEVEL to get a reading of 80dBc, lower the Vernier control of the Master Fader until the center level trim can be adjusted to give you a reading of 80dBc. Turn OFF the center power amp.

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**NOTE:** For the remaining steps leave the Pink Noise Loop running and lower the Vernier control to "5".

3.3.10 Step 10: Be sure that the Center power amplifier is ON, the Surround power amplifier is OFF, and the KT-90 Subwoofer is OFF. Set the format to "SYN" and adjust the Bypass Level trim(BYP LEVEL) so the level of Pink Noise matches the level in the auditorium when the Emergency Bypass button is pushed, a comfortable listening level.

3.3.11 Step 11: You will be adjusting the Monitor Level Indicators on the KT-1044. Turn ON the Center, Surround and the Subwoofer Amplifiers, and set the KT-1000 format to SYN. The Monitor Level trim controls are found at the rear of the Monitor: the CENTER is at the top of the string of trim potentiometers and follows the same pattern as the LED's on the front of the 1044.

Adjustment of the CENTER trim: Push the MONITOR SELECT switch, located on the front of the unit, until the CENTER LED lights up. The monitor select button is such that one push changes the setting one increment, therefore, you may have to push the button a couple of times to select the setting you desire. Adjust the CENTER trim until the "-24" LED Level Indicator lit. Repeat the procedure for the SURROUND and LOW FREQ trims.

NOTE: When unattended the Monitor will automatically return to CENTER.

3.3.12 Step 12: You will be adjusting the NON/SYNC level. With all amplifiers still ON, play Non/Sync (ie., intermission music) into the auditorium; Set the Non/Sync level to the desired level in the auditorium.

--Run a stereo film and listen to the system in the SVA Mode to verify level settings.

--Run a mono film and verify the settings in the synthesize mode.

3.3.13 Step 13: Setting the delay to perfectly match the auditorium size and speaker placement (refer to 2.1.1). Remove the positive lead of the solar cell from TB1; this allows dialog to be reproduced in the surrounds. Lower the Surround Level Control to its minimum position. Run a passage of film containing dialog; listen for clear dialog to arrive through the center channel first, without a noticeable echo in the surrounds. Walk around the room to determine that the SURROUND DELAY (mS) setting is the best average for the entire seating area. Reconnect the solar cell lead and return the Surround Level Control to the 12 o'clock position.

# DIGIMATE 1110 AMPLIFIER

- **MODULAR DESIGN FOR EASY INSTALLATION.**
- **FAILURE RESISTANT SYSTEM.**
- **OCCUPIES A MINIMUM AMOUNT OF SPACE.**
- **CONVECTION COOLED.**
- **CLEAN, QUIET OPERATION.**
- **SIGNALGARD CIRCUIT PROTECTION.**
- **ANTI-THUMP SPEAKER PROTECTION.**
- **QUALIFIED FOR MAJOR MOTION PICTURE USE.**

Digimate 1110 amplifiers have been field proven as reliable, continuous-output, high power workhorses. They are two-channel amplifiers designed to fit into a standard 19 inch rack-mount frame. Each dedicated frame can hold up to three amplifiers for a total frame capacity of six channels.

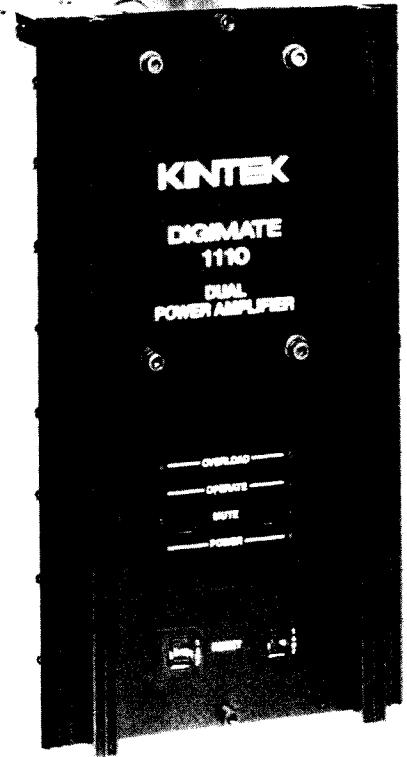
The Digimate 1110 system is mechanically compact; the frame is 10½ inches high and 15½ inches deep. The system is modular in design for easy accessibility. Each amplifier is fitted with a male connector on the rear panel, which mates with a matching frame connector. All connections to input equipment and loudspeakers are secured to barrier-type terminal strips mounted on the frame. Interchangeability and rapid replacement have been design criteria in the Digimate system.

The Digimate 1110 is convection cooled. There are no fans which contribute to noise pollution or clog a forced-air-dependent cool-

ing system. Many amplifier designs use filtered forced air; without constant maintenance these amplifiers shut-down or worse still are vulnerable to catastrophic amplifier failure. The Digimate 1110's convection cooling system is maintenance free and fully reliable.

Its power transformer is unique; it has been designed to operate at high temperatures and transfers heat to large thermal sinks.

The Digimate 1110 is a fixed gain amplifier; its high impedance DC coupled input circuit, balanced to ground, can be driven balanced or unbalanced with low hum induction.



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The output circuit is unique. It's possible to overload the amplifier without causing damage to the power stage. The amplifier will operate without destroying itself due to the *Signalgard* circuit. This internal monitor assures safe amplifier operation without shutting down the output signal. *Signalgard* monitors those amplifier operating parameters that determine the amplifier's Safe Operating Area (SOA). *Signalgard* maintains the output signal continuously as opposed to systems using thermal relays or "crow bars." The result is an amplifier that can be overdriven or overloaded without losing the output signal. The Digimate 1110 will always remain on and within the SOA.

The Digimate 1110 will pass Direct Current. If fed a DC offset up to 500 millivolts, it will "servo" the DC out of the output so that the speakers will not be harmed and the amplifier will operate normally.

The Digimate 1110 has dual power supply rectifiers, regulators, and filters. This means that if a rectifier, regulator, or filter fails, the second channel's supply will continue uninterrupted. The power supply is in the SOA loop and cannot be exceeded if the amplifier is properly installed.

There are circuit breakers on the power transformer windings—to replace the fuses found on most amplifiers. Transient thumps and spikes during start-up and shut-down are eliminated by protective circuits; no special start-up precautions need be taken.

The Digimate 1110 is a completely tried and proven system. We know of no better commercial amplifier value. It will deliver sine wave at full power continuously.

Try that on a bargain consumer-designed amplifier.

## DIGIMATE 1110 SPECIFICATIONS

**Frequency response:** +0–.3dB at 10 Hz.  
+.1dB at 20 kHz.

**Noise:** –67dBv.

**Distortion:** .025%

**IM Distortion:** .03%

**Input Volts for full output-8 Ohms:** 1.98

**Gain:** 26dB ± .3dB

**Rise and Fall Time:** 4

**Slew Rate:** 20 V/

**Channel Separation:** –86 dB

**Power Output into 8 Ohms:** 200 Watts\*

**4 Ohms:** 260 Watts\*

\*power output with all channels loaded, per channel at 120 Volt line.



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**WARRANTY AND REPAIR:** Equipment manufactured by Kintek carries a limited warranty against defects in material and workmanship for a period of two years from the date of purchase.

## Chapter 4

### DIGIMATE 1110 POWER AMPLIFIER

#### 4.0 Introduction.

The Digimate 1110 Amplifier is a two-channel modular amplifier. Each amplifier has its own power supply. Each amplifier power supply has dual rectifiers and filters. The amplifier is fitted with male connector on the rear panel which mate with matching frame connector. All connectors to input equipment and loudspeakers are made through barrier-type terminal strips mounted on the frame, so the amplifier can be removed or installed in the rack in a matter of a few seconds. Interchangeability and rapid replacement have been design criteria in this system design.

The 1110 amplifier has been field proven as a reliable, continuous output, high power workhorse. Its installation requirements should be carefully noted and observed. Ambient temperature and free availability of air supply should be considered in the proper placement of this unit. Normal good housekeeping standards should be observed especially in regards to dust and airborne dirt.

The Digimate 1110 amplifier has been designed for convection cooling. Many amplifier designs have used forced air blowers to carry off the generated heat. With forced air, the failure of the blower fans results in the amplifier shut down or catastrophic amplifier failure in those units not having thermal protection systems. If the 1110 amplifier is installed following the instruction in section 3 of this manual, the amplifier should operate trouble free at full power for many years.

#### 4.1 Circuit Description.

The 1110 amplifier is straightforward. It is a fixed gain amplifier. It has a high impedance DC coupled input circuit, balanced to ground. Its common mode rejection with balanced mode input will aid in maintaining hum free circuits, especially if there is a long run from the driving amplifier.

The output circuit is unique; it is possible to overload the output without damage to the power stages. The amplifier is designed to operate without destroying itself, because of its Signalgard circuit. The Signalgard circuit

monitors those amplifiers operating parameters that determine the Safe Operating Area for the amplifier. The Signalgard circuit responds instantaneously to prevent excess currents from destroying the output stage. It inhibits the output current during those signal periods that would exceed the SOA(Safe Operating Area). This circuit, while more costly than thermal relays or "crow bars" does not cut off the output signal as in those systems which protect by signal cutoff. The result is an amplifier that can be overdriven or overloaded without losing the output signal. The amplifier will always remain on and within the SOA.

#### 4.1.1 The Power Supply.

The 1110 has dual power supply rectifiers, regulators, and filters. This means that if a rectifier, regulator or filter fails, the second channel's supply will continue uninterrupted. The power supply has been designed into the SOA loop and will not be exceeded if the amplifier is installed properly.

The power transformer is unique; it has been designed to operate at high temperatures, and to transfer the internally generated heat to the heat sinks. It is highly efficient; a small transformer that is able to produce large amounts of power. Heat conducting epoxy has been used for potting this transformer. The bobbins for the coils will withstand high temperatures up to 200 degrees C.

The AC line voltage for the power transformer is 110 Volts or 220 Volts. The unit is normally set up for 110 Volt operation at the factory.

#### 4.1.2 Circuit Breaker.

There are circuit breakers on the power transformer primary windings--to replace the fuses found on most amplifiers. To reset in the event a circuit has opened, push the button up to reset; the amplifier should then operate normally.

#### 4.1.3 Mute Switch.

A mute switch is on the front panel. It permits muting the channel on the side of the amplifier on which it is located; left breaker for the left channel and right breaker for the right channel. When the red LED, situated beside the mute switch, is lit, that channel is muted, otherwise the green LED, labeled "OPERATE" will be lit.

#### 4.1.4 Loud Speaker Protection--DC Offset Correction.

The input circuit is DC coupled, any DC on the input will tend to drive the power amplifier off its center quiescent point. Internal to the 1110 is a servo loop to remove this DC offset from the output of the power amplifier. If the DC offset on the output exceeds 6 Volts, the amplifier will mute. This is done to protect the loudspeaker loading the amplifier.

#### 4.1.5 Anti-Thump Circuit.

To prevent a sharp start up or burn off pulse transient from potentially damaging the loudspeaker, the loudspeaker load connection through a relay is delayed by a timer circuit. The anti-thump, DC offset correction and the mute circuit are all interrelated to this speaker protection system.

#### 4.1.6 Overload Indicator.

On the front of the amplifier is an LED marked "OVERLOAD". If the output stage of the 1110 is driven into circuit limiting this LED will light up. If this occurs, the reason for the overload should be determined and eliminated.

### 4.2 Installation.

#### 4.2.0 Mechanical Installation.

The Digimate 1110 amplifier is to be installed in the center slot of the KT-2010 frame. This frame has a large perforated bottom and cover plate. This is for the convection cooling, primarily for the heat generated in the output stage. It is important that the frame in which this amplifier is installed has adequate venting below the amplifiers to allow a sufficient supply of cool fresh air. The top of the frame should have an open area for venting the hot air through the top surface. The area for relieving the heat above the amplifier should be screened with a mesh and should have an effective open area of at least 175 square inches. The input area below the amplifier should have a similar input area available for a cool air supply. The inlet areas can be in the side walls or in the front panel to allow fresh, cool air into the amplifier cooling fins. In a small enclosed room adequate venting of the room is also important to prevent excessive heat build up.



#### 4.2.1 Power Connections.

The AC power connections for amplifier is connected to the back of the frame. At peak output the amplifier can draw as much as 6 1/2 amps; the AC feed should be capable of delivering approximately 7 amps for each amplifiers. Each amplifier has its own circuit breaker so that the AC input to the amplifier needs only a single fuse for the entire system.

#### 4.3.0 Output Connections.

The output connections available on the terminal block are shown in TB 2, Fig 1. The amplifier is capable of high power output and since the load may be located some distance from the amplifier the wire size should be at least #14 for 8 ohm loudspeakers. If the loudspeakers load is 4 Ohms #10 wire size should be used to reduce the losses in the leads.

NOTE: A good way to satisfy these size requirements is to use "ROMEX" 3-conductor with ground for each stage speaker. Use this cable as 2-conductor cable by parelleling four conductors into two. There are two benefits for doing this:

1. It drops the effective wire size by three numbers. Thus ROMEX 14 - 3 wg is the same as running #11 wire OR ROMEX 12 - 3 wg is the same as running #9 wire.

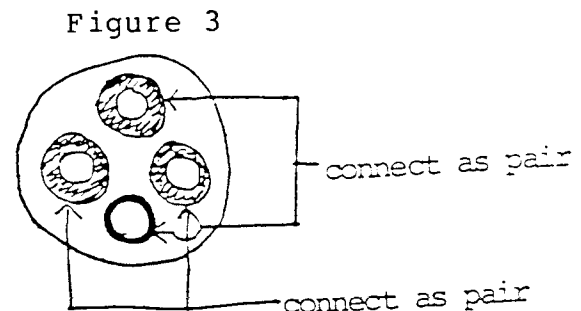
2. Because of the method of connection, the external field around the cable is significantly lowered. This is especially important when all cables are run in steel conduit which will cause increase losses at high frequencies.

The effect of losses: the decoupling of the speaker from amplifier damping, increased frequency response errors and distortion, especially at high frequency.

To make these parallel connections, connect opposite lines together as 1 conductor. Be sure to check, with a circuit tester, that the pairing is the same at both end of the cable.

#### 4.3 Operation.

The Digimate 1110 amplifier has protective circuits to eliminate transient thumps and spikes during start up and shut down. No special start-up precautions need to be taken.



The gain of the amplifier is fixed. It will reach full output with 1.98V RMS of sine wave on the input. If more than one amplifier is driven, it is important to keep all the inputs and connections to speakers properly phased; reversed phasing will reduce the acoustical output although the electrical output is operating at capacity.

Internal electronic circuit monitors assure that the amplifiers always operate in the Safe Operating Area(SOA). If the amplifier currents reach a level which approaches the limit of the SOA, the internal Signalgard monitors will limit the current of the system to prevent exceeding the SOA. This is one of the internal safeguards to assure safe amplifier operation without shutting down the output signal. Thermal rises that approach exceeding the SOA will likewise reduce the operating current and keep the system from entering a failure phase. NOTE: Speaker loads of less than 4 Ohms will cause the temperature to rise and the Signalgard monitor will be activated at normal input levels.

The indicating LED's are self explanatory. The power LED's indicate the power on; they will not light if the primary power has been interrupted. The MUTE LED's will come on when the mute switch has been engaged. "SIGNAL ON" LED indicates the circuits are set to pass amplified signals. "OVERLOAD" indicates that the control circuits have reduced the amplifier's current because of the system's exceeding the SOA.

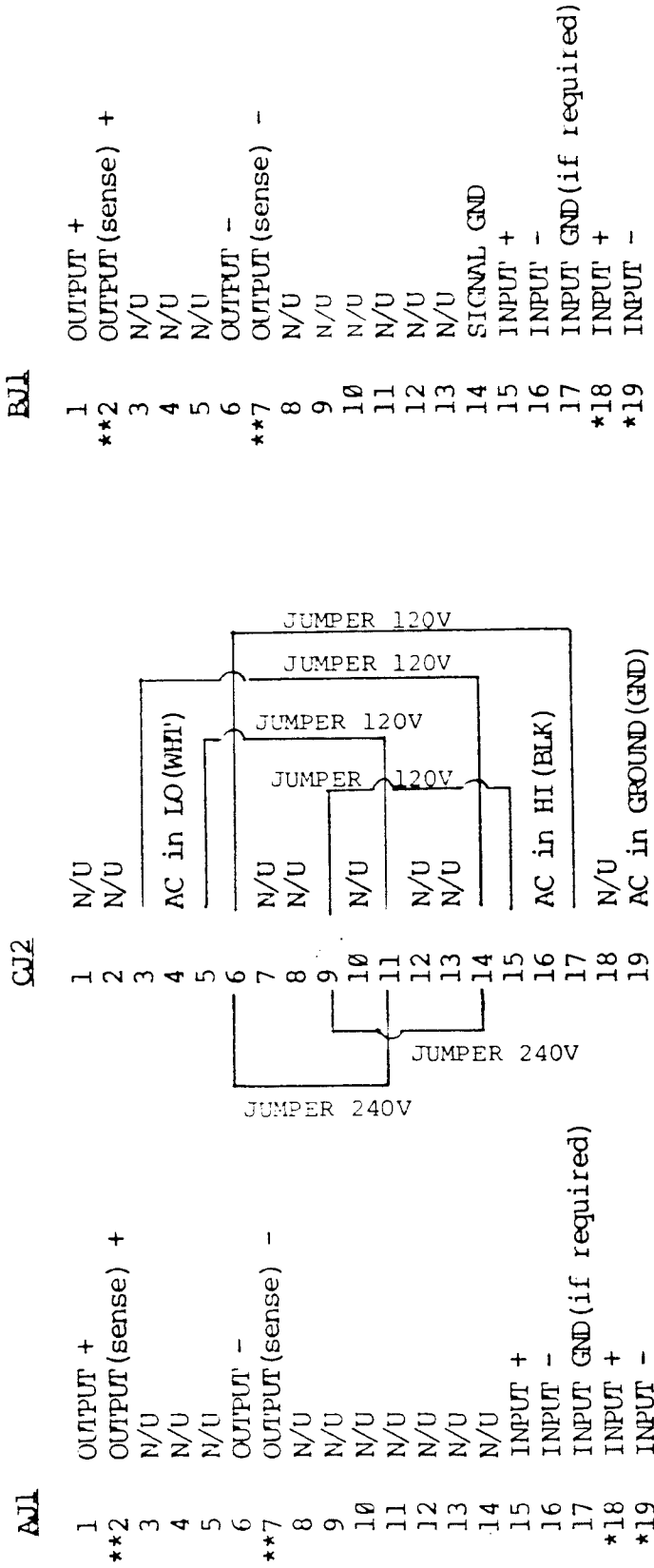
When operating the Digimate 1110, it is desirable to have the load appear as resistive as possible to the output stage. The amplifier will operate into reactive loads, however, it is most efficient in transferring electrical energy into acoustical energy when the loudspeaker system appears resistive.

Each amplifier has a separate "MUTE" switch. It will turn off or on the amplifiers signal path without introducing a thump or transient into the signal path.  
fier installations.

#### 4.4 EMERGENCY BYPASS.

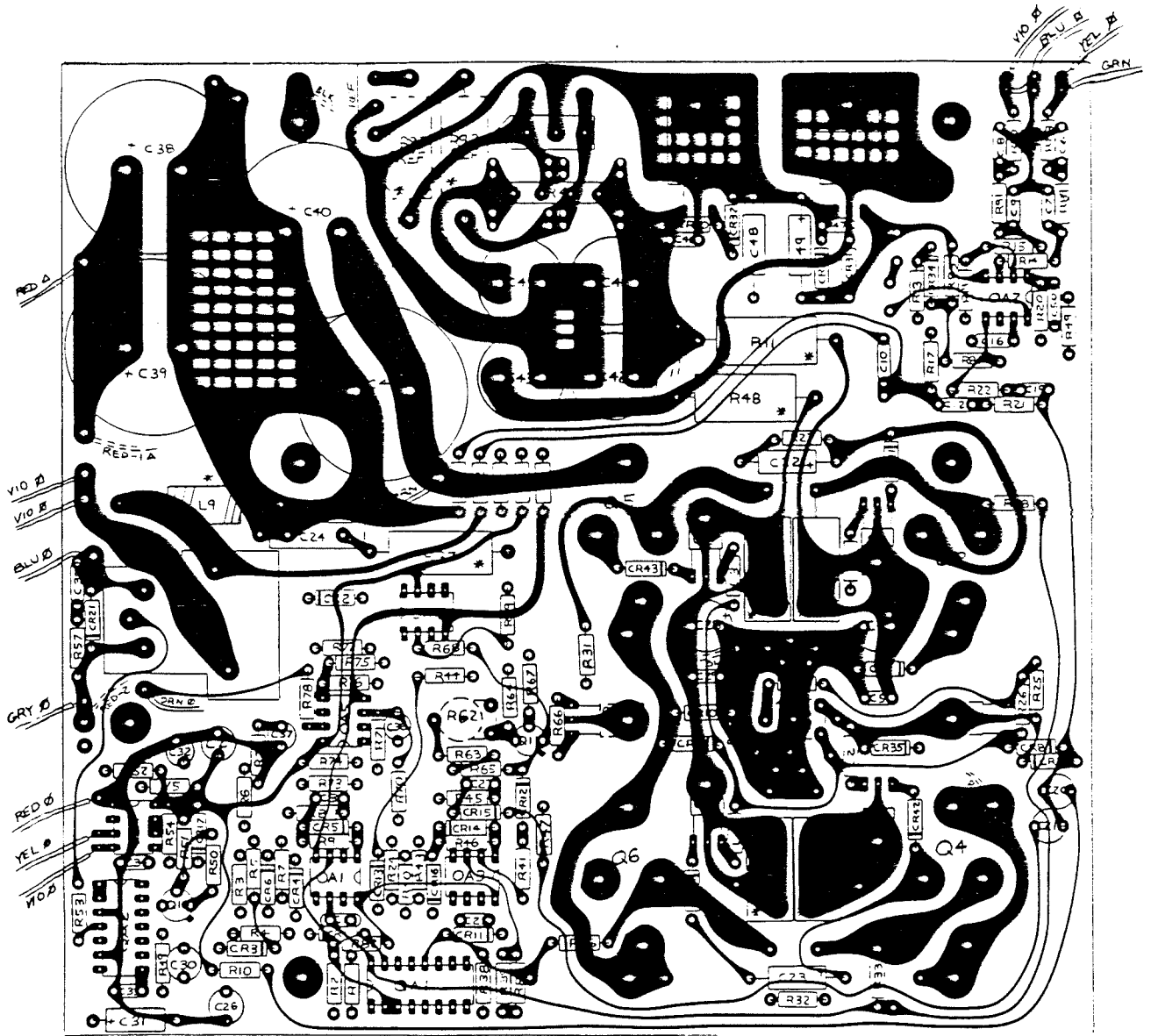
If the center channel amplifier should fail, the left OVERLOAD LED will light(you will note the loss of dialog). The system may be operated in mono by inverting the 1110 module, thus using the surround amplifier to power the center channel. To invert the module, loosen the top and bottom thumb screws, slide the module out of the frame, turn it up-side-down, slide it back in place and tighten the thumb screws. In case of amplifier failure, call your equipment dealer.

DIGIMATE 1010 POWER AMPLIFIER MODULE  
CONNECTOR DESIGNATIONS



\*ALTERNATE INPUTS  
\*\*ALTERNATE OUTPUTS

RECOMMENDED WIRE SIZES--OUTPUTS: 14 TO 16 gauge stranded, INPUTS: 20 to 22 gauge stranded



Board Layout Digimate 1110

## Chapter 5

### KT-1044 MONITOR/EXCITER LAMP SUPPLY

The KT-1044 is the combination of two components: the KT-1043 Exciter Supply and the KT-1034 Monitor.

#### 5.1 DC REGULATED EXCITER LAMP SUPPLY(KT-1043).

--reference Chapter 3, 3.2.3 Step 3.

The exciter lamp power supply can deliver up to six amps of regulated direct current with voltage adjustable from 3.5 to 9.5 volts. It is supplied 110 volts AC through CJ2 pin 4(low), pin 16(high). The output to the exciter lamp is supplied through BJ1 pin 9(ground), pin 10(positive). (refer to schematic, appendix).

On the front panel 3 LED's indicate the output status of the KT-1044: green indicates normal DC output, yellow indicates that the unit has switched itself into emergency status, and red indicates low or no voltage on the output. When the unit has switched to emergency status, the exciter lamp is being powered by 5 volts AC; this would be a result of the loss of the direct current supply. If the current limit of 6 amps is exceeded, the red LED labeled "short" will light.

The current limit has been preset at the factory. The voltage can be adjusted through the rear of the KT-2010 frame with the KT-1044 plugged in, using the potentiometer mounted on the rear of the KT-1044.

#### 5.2 MONITOR(KT-1034)--adjusting the level indicators.

--reference Chapter 3, 3.3.10 Step 10.

Turn ON the Center, Surround and Subwoofer amplifiers, and set the KT-1000 the format to SYN. The Monitor Level Trim Controls are located on the rear panel on the module; the CENTER is at the top of the string of trim potentiometers and follows the same pattern as the LED's on the front panel.

Adjustment of the CENTER trim: Push the MONITOR SELECT switch until the CENTER LED lights up. The Monitor Select switch is such that on push changes the setting one increment. Adjust the CENTER trim until the "-24" LED Level Indicator is lit.

Repeat the procedure for the SURROUND and LOW FREQ trims.

### 5.3 LOCATION OF FUSES.

#### 5.3.1 EXCITER SUPPLY.

There are two fuses mounted in clips at the top edge of the circuit board inside the module.

2 AMP, 250 volt slowblow--located to the rear of the unit in the primary coil of the input transformer.

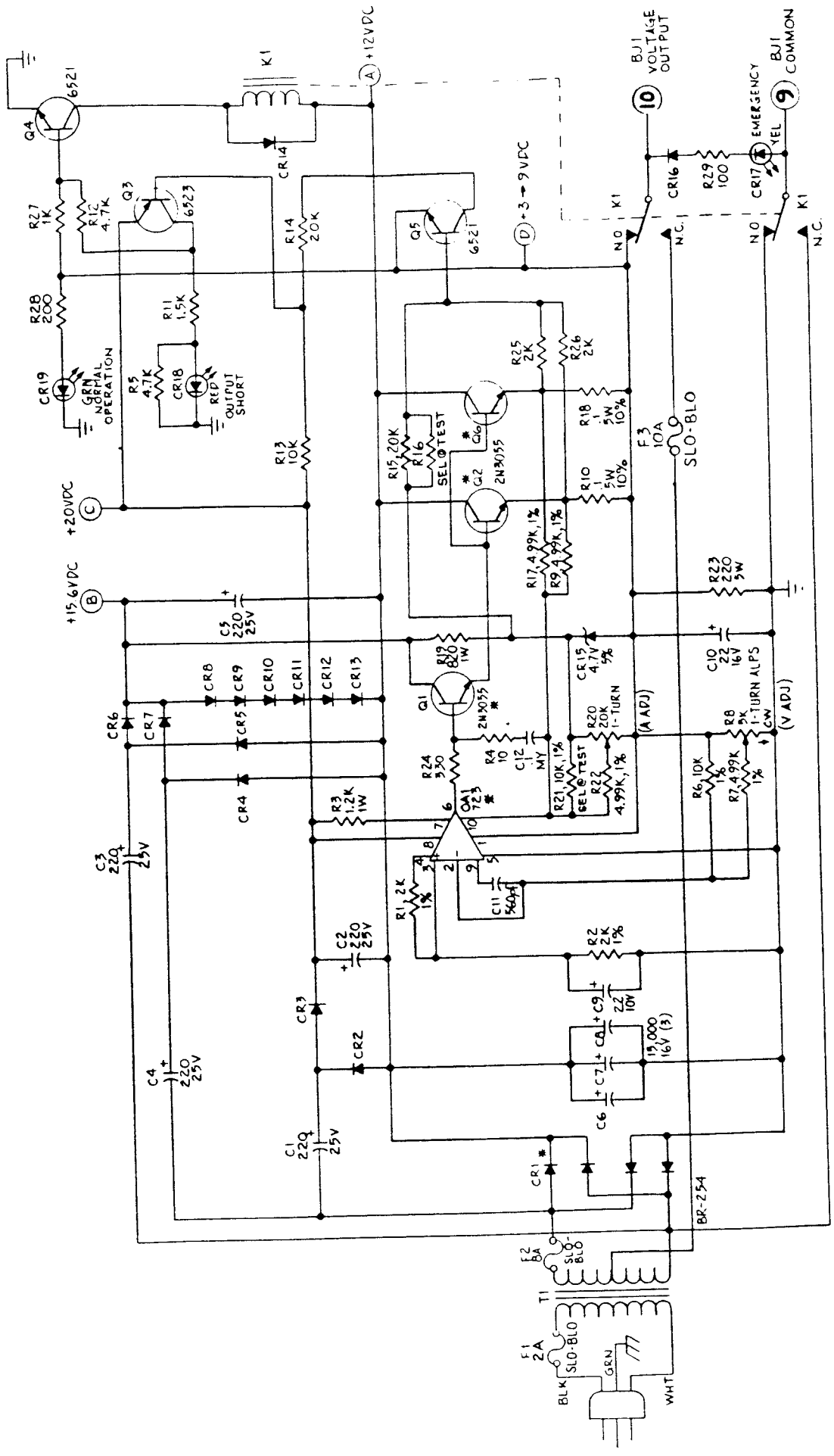
8 AMP, 32 volt slowblow--located closer to the panel between the transformer secondary and the DC rectifier. (Removal of this fuse will result in the unit switching itself to AC operation)

There is a third fuse:

10 AMP, slowblow--located just forward of the PC card in the emergency AC feed.

#### 5.3.2 MONITOR.

1/4 AMP, slow blow--located against the rear panel of module next to the dip switch.



EXCITER LAMP POWER SUPPLY, MODEL 1043

- NOTES:
1. UNLESS OTHERWISE SPECIFIED:
    - A. ALL RESISTORS ARE EXPRESSED IN OHMS AND ARE 1/4W 1%.
    - B. ALL CAPACITORS ARE EXPRESSED IN MICROFARADS.
    - C. ALL DIODES ARE IN4007.
    - D. \* INDICATES HEATSINK ON DEVICE.
  2. \* INDICATES HEATSINK ON DEVICE.
  3. K1 RELAY SHOWN DE-ENERGIZED.

SCHEMATIC