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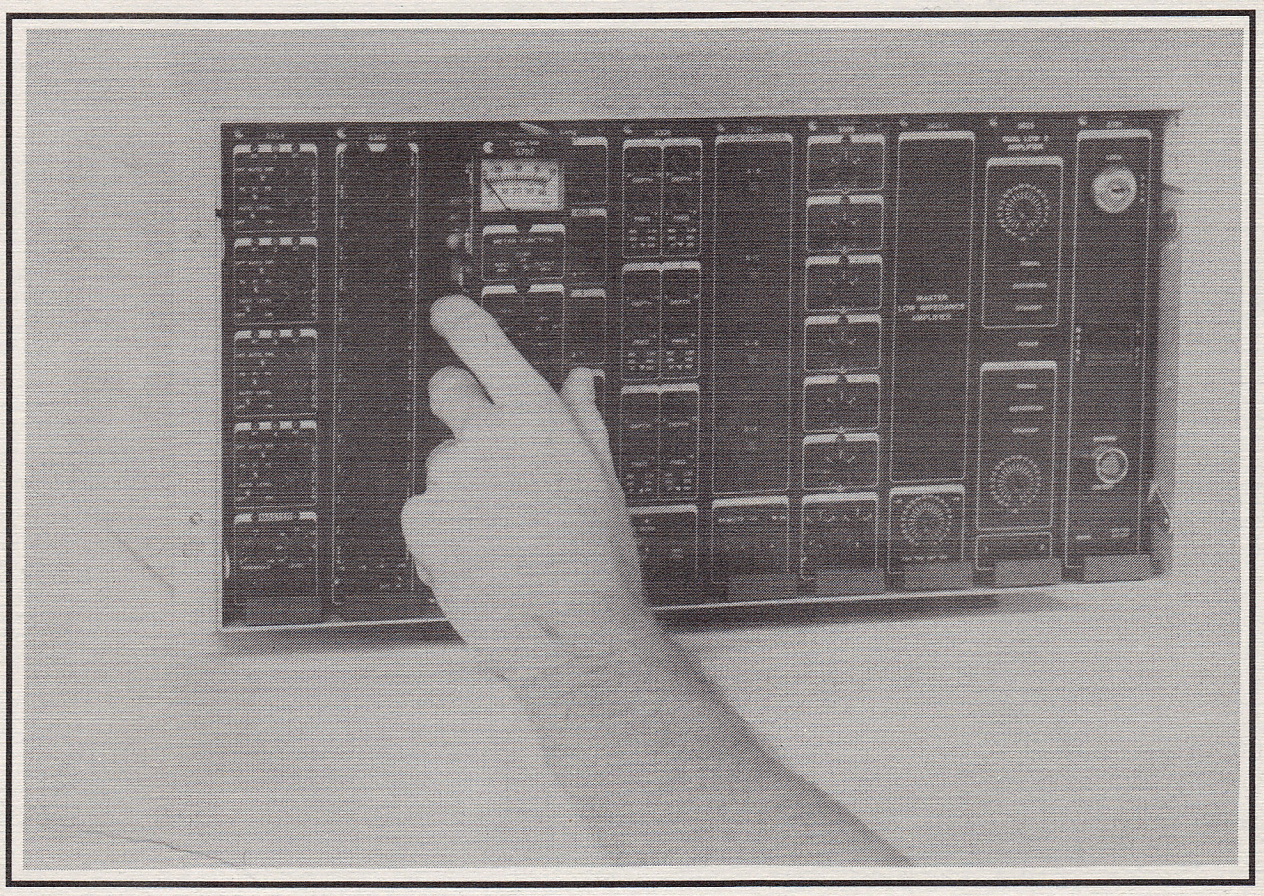
5001 MANUAL



Operation and Owners Manual for the
5001 Mainframe and
5000 Modular Sound System

Printed in U.S.A.

INTRODUCTION

The Ivie Series 5000 Modular System represents a totally new concept in professional sound reproduction. Ivie has focused the design criteria on reliability, quality, versatility and compactness. This manual describes the 5001 Mainframe, and gives an overview and design criteria for the complete 5000 Modular System.

DESCRIPTION OF SYSTEM ARCHITECTURE

The modular system offers a wide variety of powerful signal processing plug-ins from mixers and preamplifiers to equalizers, crossovers, notch filters and numerous amplifier combinations ranging from low impedance to high impedance.

Virtually every electronic component of a complete sound system installation can be plugged into the 19 inch Series 5000 Mainframe, which occupies only 8.75 inches of vertical rack space.

UNIVERSAL MAINFRAME SYSTEM

The rugged, aluminum Mainframe is totally passive, to provide economy and reliability. Once bolted into a standard 19 inch rack, the Mainframe should never require any servicing.

Nine universal sockets within the Mainframe allow any Ivie module to be inserted in any position within the Mainframe. The versatile Mainframe also allows other components external to the modular system to be coupled into the Mainframe at any point(s) along the signal path.

The Ivie 5000 is the first system to offer total Mainframe flexibility. For example, the Mainframe will accept up to nine 6x2 mixer modules, or up to a kilowatt in amplifiers, or a complete sound system consisting of a wide variety of different signal processing modules. The acoustical engineer is no longer limited to modular systems offering just amplifiers or preamplifiers.

Several levels of security are offered on the modular 5000 system. All module controls can be key-locked behind the Mainframe front panel. The Master or Mains Power Switch is also behind the locking front panel. This feature in

combination with a key-activated remote ON/OFF control, provides maximum flexibility. The Ivie system also offers security covers for individual modules that prevent unauthorized tampering with the control settings. WIth the Ivie 5000 system, you can provide total access to the system for some, limited access for others, and still prevent unauthorized access. The system does not require installation in a secure environment, as would a conventional sound system.

AMPLIFIERS

Ivie has designed a unique series of amplifiers for use within the modular system. They range from low impedance types to high impedance types, and from low output powers to a kilowatt. You can parallel, bridge, bridge/parallel, triamp or biamp the amplifiers using simple switch controls.

Another useful feature adding to the systems flexibility and economy is the MASTER/SLAVE amplifier concept. A single high impedance master amplifier module is capable of driving up to eight slave amplifiers. The slave amplifiers contain no expensive drive circuitry of their own, but are instead driven by the master amplifier. This reduces costs significantly. Mainframe output power can be incremented in 100 watt units using economical slave amplifier modules.

Reliability of the amplifiers, and all other modules is enhanced through the use of redundant power supplies. Every modules in the 5000 system has its own dedicated, fused, DC supply. If a module fails, it will remove itself from the mainframe AC source, leaving the other modules fully operational.

SYSTEM COMPATIBILITY

Many conventional sound systems utilize products from several different manufacturers, which may or may not be optimized for matched impedance load, drive level and dynamic range. All too often, modifications are necessary to overcome ground loops and other problems caused during system interface.

The Ivie system is fully optimized for impedance, signal levels and dynamic range. The switch programmable interface bus inside the mainframe eliminates ground loops, and the need to provide external module to module wiring. System wiring is reduced to the setting of bus switches on each 5000 module - a simple, economical effort.

Reliability is assured through the use of plated-through printed circuit boards, gold plated connectors, sealed pots and precision components.

SYSTEM MAINTENANCE

By design, the Ivie 5000 system is one of the most easily maintained and serviceable systems available. Signal presence indicators located on the front panel of every module allow signal paths to be traced visually, regardless of the system complexity.

The signal output port of every module is tied to a test point on the module's front panel. Total system performance can be verified from the front panel, using RTA's, oscilloscopes, or DVMs - without removing wires, and without pulling the modules from the mainframe. Modules can be removed from, and replaced into the mainframe, under full power, without damage.

Output lines on each amplifier provide the capability to remotely monitor the status of large installations. Using simple LED arrays, or a computer monitoring system, each amplifier can indicate: STATUS OK, HI FAN, POWER SUPPLY FAULT, or THERMAL FAULT. All system problems can be quickly isolated and corrected.

Obsolescence is nearly eliminated with the Ivie 5000 Modular System. The Ivie system can be expanded and reconfigured to meet the growth needs of almost any environment. Adding electronics to the 5000 is as simple as setting a few switches, and plugging the new module into a slot in the mainframe.

Labor savings, resulting from the time saved in installation and maintenance are significant. The numerous patented design and operating features of the modular 5000 will assure reliability.

MAINFRAME

The Mainframe has 10 slots to accept modules. The far slot to the right of the Mainframe is keyed so that it will only accept a 5101 Power Distribution Module. No other module will fit in this slot. The other 9 slots are universal and will accept any module other than a 5101. This allows the use of 9 modules other than a power module. This could be 9 amplifiers or 9 mixers or 9 equalizers, or any combination of modules.

MOTHERBOARD

The motherboard runs the entire length of the Mainframe. The motherboard provides all necessary interconnects for the 5000 series modules. There are two major bus systems on the motherboard.

AC BUS SYSTEM

The AC Mains is connected to the motherboard via the 5101. It is first routed through the AC power distribution module, and then back into the mother boards for distribution of other modules. Three AC voltages are distributed via the motherboards. The mains voltage (either 120v. or 240v.) which is used by the amplifiers, and 30 volts and 5 volts AC for all other modules. All AC voltages are fused, rectified, filtered, and regulated by each module according to the needs of that module. The 30 and 5 volt AC voltages are also available on the rear panel at the auxiliary power connector.

PROGRAMMABLE AUDIO BUS SYSTEM

The motherboard contains 10 (bus 0-9) audio interconnect buses that connect the first 9 slots together in parallel. Each audio module, with the exception of amplifier slaves, contains one or more 10 position audio bus assign switches. These bus switches may be programmed to send or receive on any of the 10 audio buses. For example, see Figure 1 on the following page. The microphone inputs to the mixer are made via a terminal block (TB-40) mounted on the rear of the Mainframe. The output of the mixer is programmed, or assigned, to bus 0. The 1/3 octave equalizer input is assigned to receive on bus 0. Since the output of the mixer and the input of the equalizer share the same bus, the signal path is complete. The output of the equalizer is then assigned to bus 1, and the input of the cross-over is assigned to bus 1. The 2 cross-over outputs are assigned to buses 2 and 3, etc. This bus system also allows inputs to be driven from one output. The second output of the mixer is assigned to an unused bus.

Because all audio buses are in parallel, it does not matter into which slot the module is plugged, however, organizing signal flow from left to right is recommended. Of course, the TB-40 must be attached behind the proper module, in this case the mixer. Also, the speaker must be connected to the terminal blocks behind the amplifier. It is easy to see that the system may be "rewired" simply by

changing the audio bus assignments.

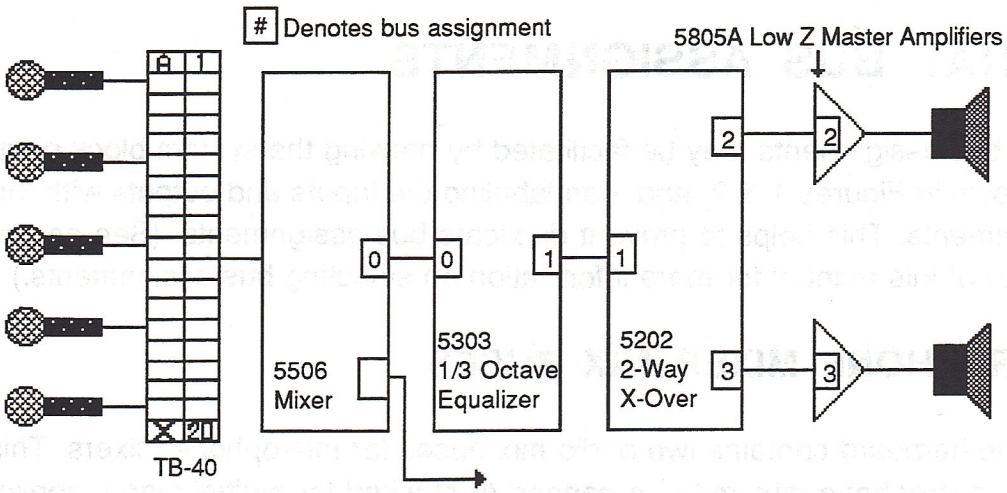


Figure 1

Because the output impedance of all modules will work into a 600 Ω load, and the input impedance of all modules is 10,000 Ω, there is no problem in driving multiple inputs from a single output. FIgure 2 below shows a typical application of multiple inputs driven from one output. A maximum of 16 inputs may be driven from one output.

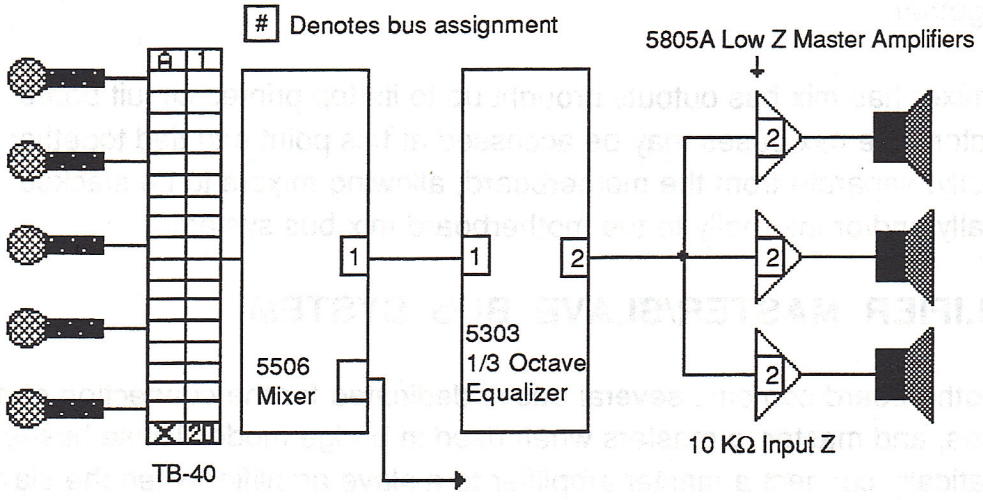


Figure 2

NOTE: If two outputs are assigned to the same audio bus no damage will occur. However, the two outputs will load each other down and try to drive one another causing improper operation. Should you experience a problem with the 5000, it

would be prudent to first check the bus assign switches for proper bus assignment.

INITIAL BUS ASSIGNMENTS

Initial bus assignments may be facilitated by drawing the system block diagram as shown in Figures 1 & 2, and then labeling the inputs and outputs with the bus assignments. This helps to prevent duplicate bus assignments. (See application section of this manual for more information on selecting bus assignments.)

MICROPHONE MIXER MIX BUSES

The motherboard contains two audio mix buses for microphone mixers. This allows microphone mixers to be ganged or stacked for multiple input applications. For example, two 5506 mixers plugged anywhere into the same Mainframe would automatically have their two mix buses (bus A to bus A, bus B to bus B) tied together. This would provide 12 inputs with two program outputs. Each of the two program outputs would have two level controls, one on each mixer. Additional mixers may also be stacked to provide additional inputs and outputs. There are two jumpers located on the microphone mixer printed circuit board. Clipping them prevents the connection of the mixer to the motherboard mix bus system. This allows several mixers to be used in one Mainframe without their mix buses being tied together.

Each mixer has mix bus outputs brought up to its top printed circuit board connector. The mix buses may be accessed at this point and tied together externally, separate from the motherboard, allowing mixers to be stacked externally and/or internally to the motherboard mix bus system.

AMPLIFIER MASTER/SLAVE BUS SYSTEM

The motherboard contains several buses dedicated for the connection of masters to slaves, and master to masters when used in bridge mode. These buses automatically connect a master amplifier to a slave amplifier when the slave is plugged into the slot directly to the right of a master. The only additional wiring required is the jumper of the masters and slave output terminals together (+ to + and - to -) (See Figure 3 on page 8).

Automatic connection to additional slaves will occur as they are plugged into the

slots immediately to the right of the first slave. The bus system will automatically connect two masters for use in bridge operation if the second master's bridge/normal switch is set to the bridge position. The load for two amplifiers in the bridge mode is connected across the two plus (+) output terminals of two masters (See Figure 3 on the following page).

Bridge/parallel combinations are also accommodated by the bus system (Figures 3, 4, and 5 on pages 8, 9, and 10 show several amplifier combinations).

For detailed information on amplifier design and installation, consult the proper amplifier manuals.

REAR PANEL CONNECTIONS

EXTERNAL ACCESS TO THE AUDIO BUSES AND OTHER I/0 PORTS

Every signal module with the exception of amplifier slaves has a top and bottom printed circuit edge connector. The bottom connector plugs into the motherboard accessing AC power and audio interconnects. The top edge connector provides access to a number of circuits within the individual modules. On the mixer module, the top connector has all the microphone inputs, outputs, mix bus, and remote control connections. In all other modules, the top connector permits access to the 10 audio buses which are paralleled up from the bottom connector. Direct inputs and outputs to the particular module are also available on this connector. On the master amplifier status, all of the above I/0 connections are available along with the amplifier status I/0 ports for remote monitoring. All of the above connections are made on the rear of the 5001 Mainframe via one of the accessory, plug-on barrier strip connectors (such as the TB-40).

AMPLIFIER OUTPUTS

There are nine, two-position, screw terminal blocks located on the rear of the Mainframe (see Figure 10, page 15). These terminal blocks are the output connections (+, -) for the individual amplifier modules. When the amplifiers are used in bridge, parallel, or bridge/parallel configurations, the individual blocks must be strapped together according to the amplifier configuration used (Figures 3, 4, and 5 on the following pages show several different amplifier configurations):

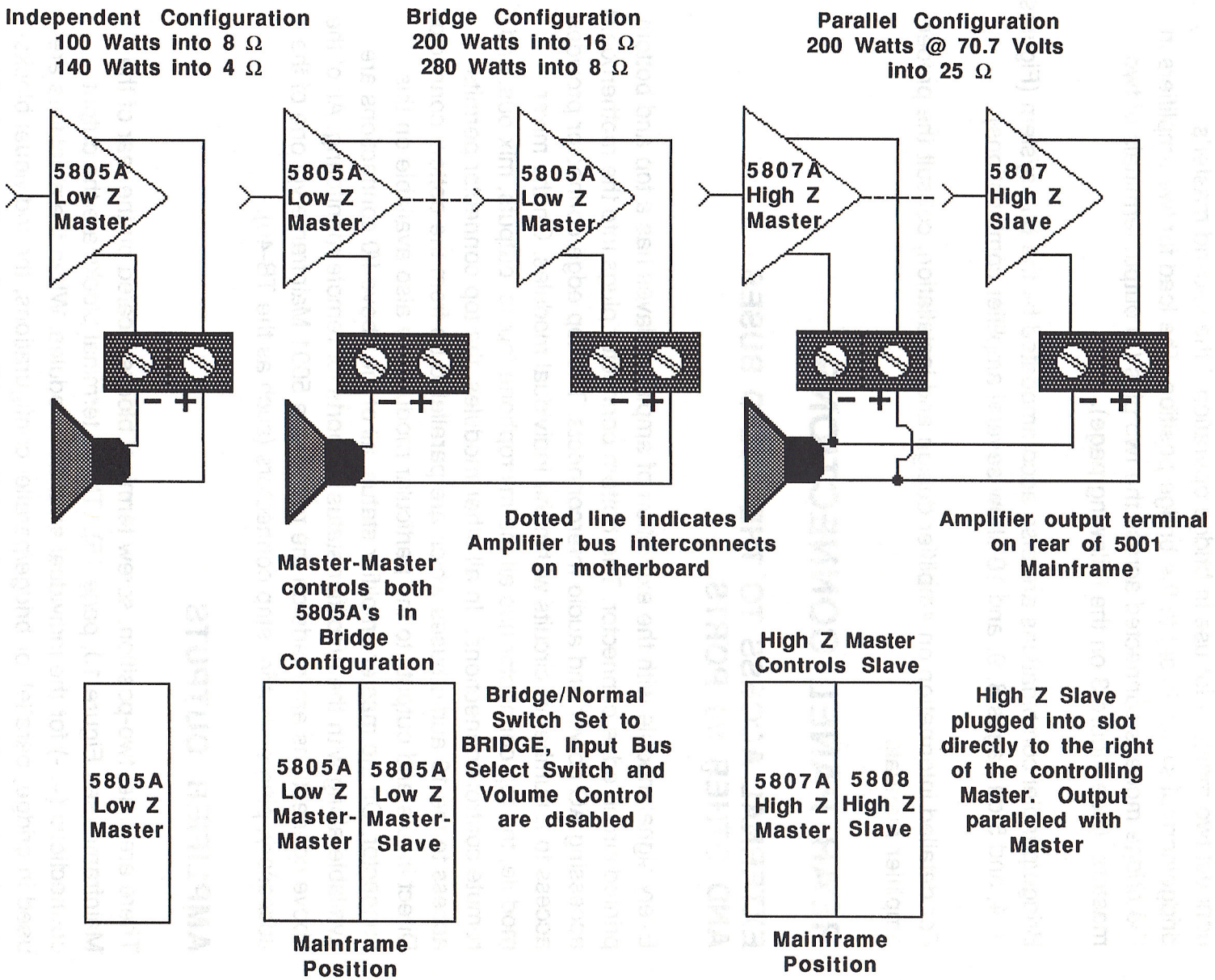

Independent Configuration
100 Watts into 8 Ω
140 Watts into 4 Ω
Bridge Configuration
200 Watts into 16 Ω
280 Watts into 8 Ω
Parallel Configuration
200 Watts @ 70.7 Volts
into 25 Ω
5805A Low Z Master
5805A Low Z Master
5805A Low Z Master
5807A High Z Master
5807 High Z Slave
- +
Dotted line indicates Amplifier bus interconnects on motherboard
Amplifier output terminal on rear of 5001 Mainframe
Master-Master controls both 5805A's in Bridge Configuration
High Z Master Controls Slave
5805A Low Z Master
5805A Low Z Master-Master
5805A Low Z Master-Slave
Bridge/Normal Switch Set to BRIDGE, Input Bus Select Switch and Volume Control are disabled
5807A High Z Master
5808 High Z Slave
High Z Slave plugged into slot directly to the right of the controlling Master. Output paralleled with Master
Mainframe Position
Mainframe Position

Figure 3

HIGH Z BRIDGE/PARALLEL CONFIGURATION

400 Watts @ 140 Volts into 50 Ω

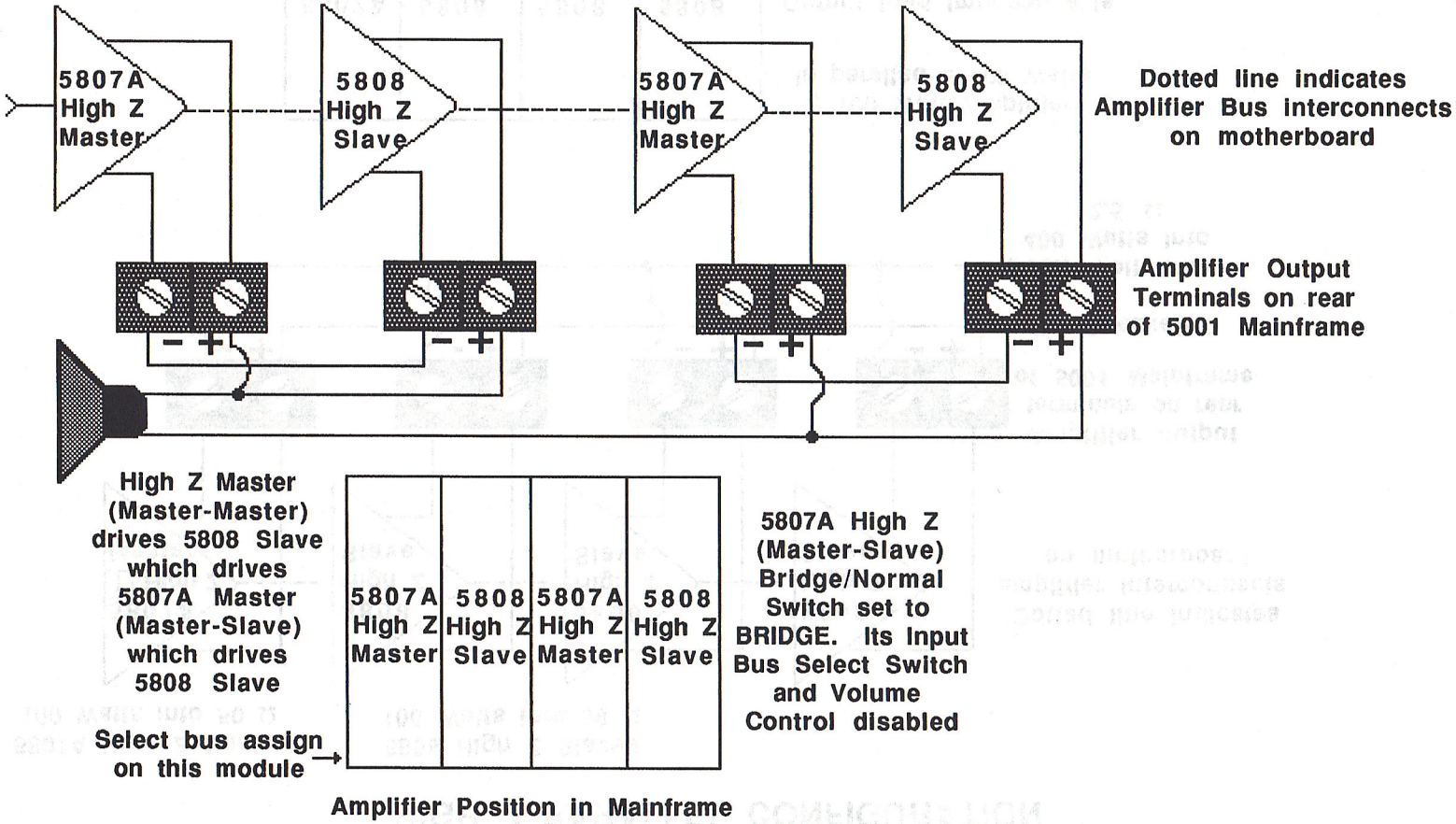


Figure 4

HIGH Z PARALLEL CONFIGURATION

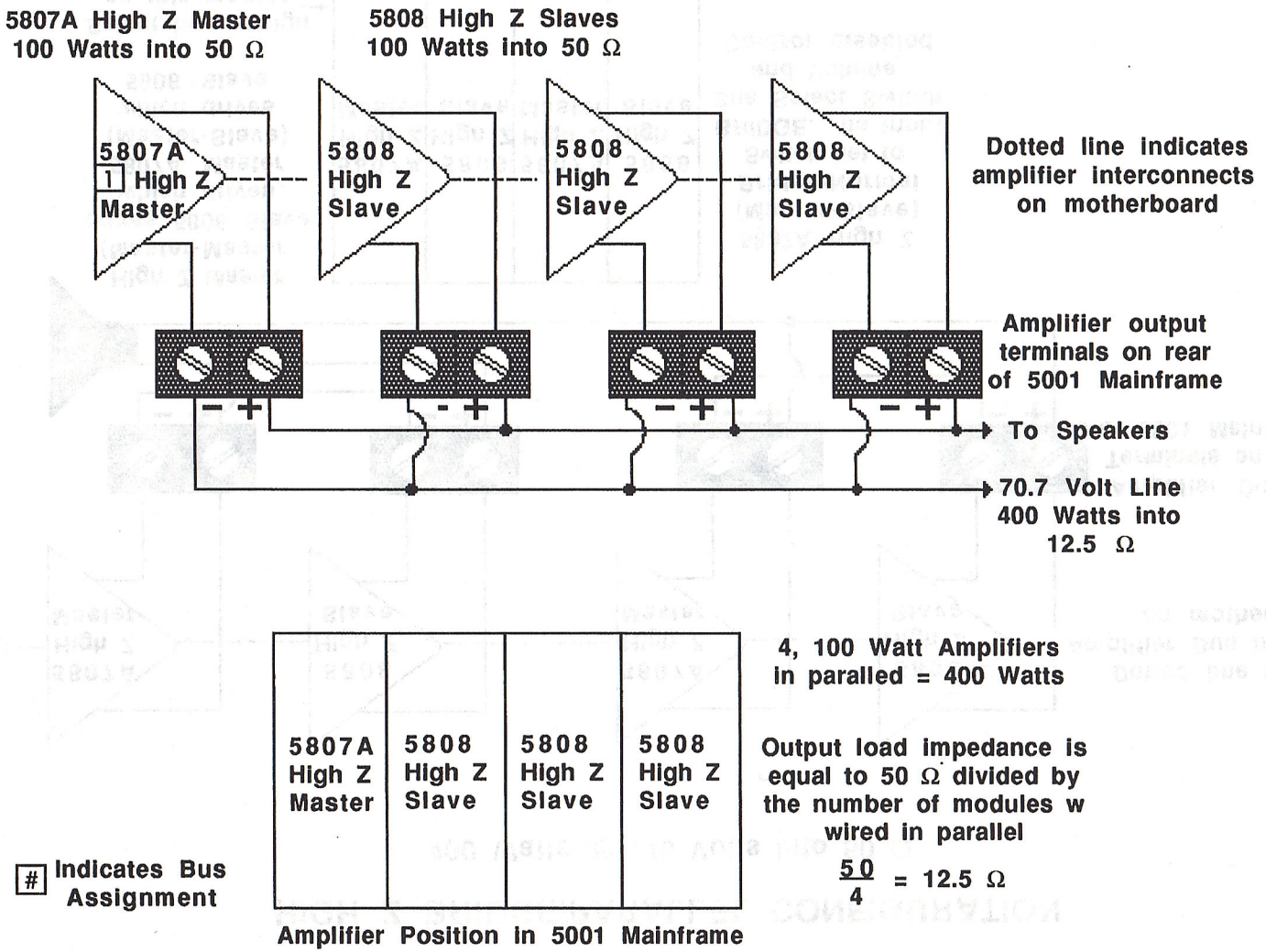
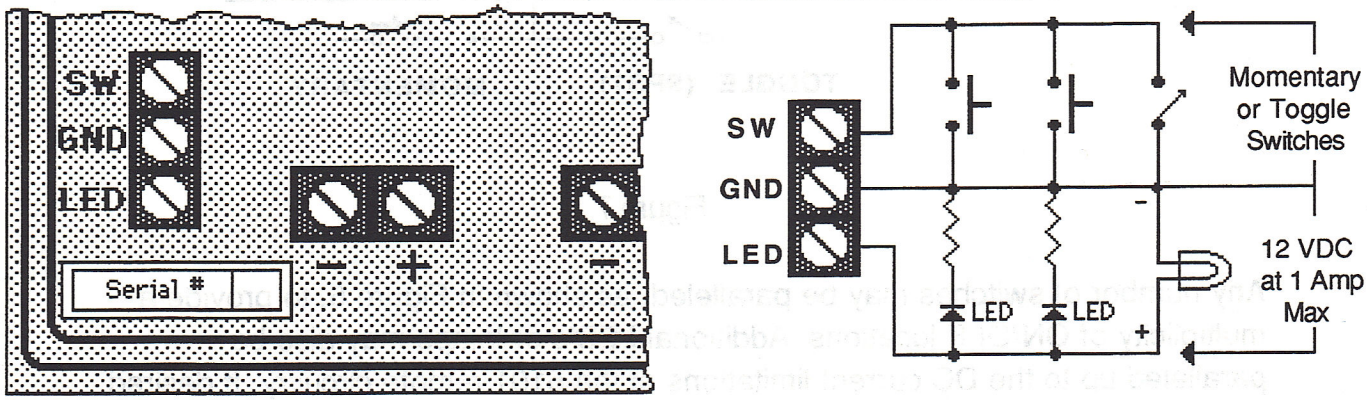


Figure 5

REMOTE ON/OFF

The 5101 provides low level DC, remote ON/OFF switching for the 5000 system. A three position screw terminal block is located on the left side of the 5001 Mainframe rear panel. This terminal block has three connections: switch, ground, (See Figure 6 below) and LED. The front panel system ON/OFF switch and LED indicator may be remoted with either momentary or SPST switches, as Figure 6 below details:

5001 Mainframe Rear Panel



Remote On/Off Circuit: Switches may be either momentary or SPST, *but not both in parallel. Either one type or the other must be selected.* Indicators may be either LED or incandescent lamps. The 5101 will supply a maximum of 1 amp to drive the indicators.

Figure 6

Making the selection between momentary or SPST switches is done on the 5101 Power Module. A selection switch is provided as shown in Figure 7 on the following page. The switch is somewhat out of sight under the fan bracket, as the cut away view shows, but it is not difficult to locate, once you know where to find it.

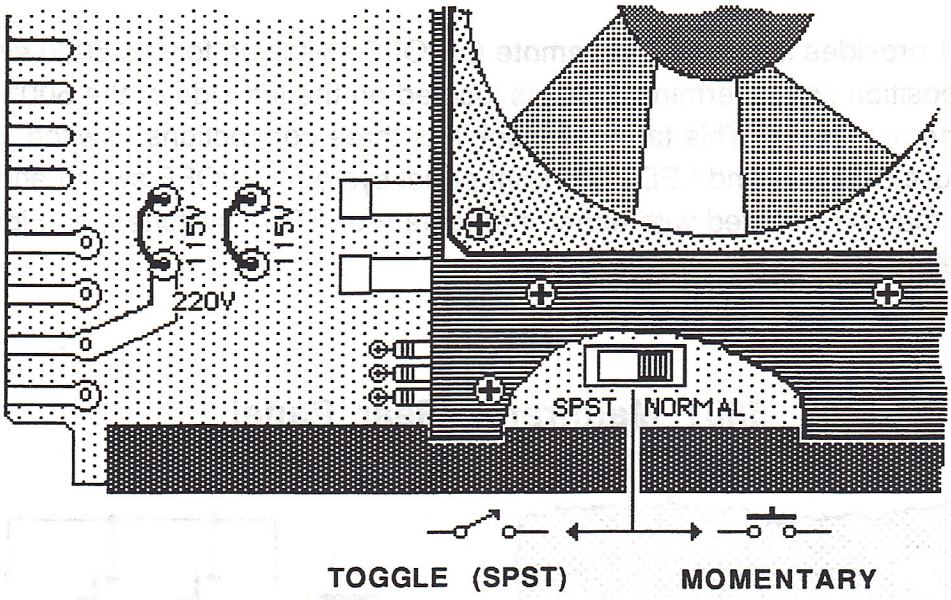


Figure 7

Any number of switches may be paralleled, as shown in Figure 6, to provide a multiplicity of ON/OFF locations. Additional LED's or lamps may also be paralleled up to the DC current limitations of the 5101 remote circuitry. If desired, an incandescent lamp may be substituted for the LED. The 5101 is capable of providing 12 volts at up to 1 amp of current for the indicator circuitry.

120 VOLT OR 220 VOLT OPERATION

The 5000 system will operate at either 120 VAC or 240 VAC. The voltage selection is made on the 5101 Power Module. Figure 7 above shows the 5101 configured for 120 VAC operation. To modify for 240 VAC operation, remove the jumpers on the 5101, as shown in Figure 7 above, and then install a jumper as shown in Figure 8 on the following page.

No other changes are necessary for 220 VAC operation. The amplifiers in the 5000 Series Modular products will operate from either a 120 VAC line, or a 220 VAC line:

JUMPER INSTALLED FOR 220 VAC OPERATION

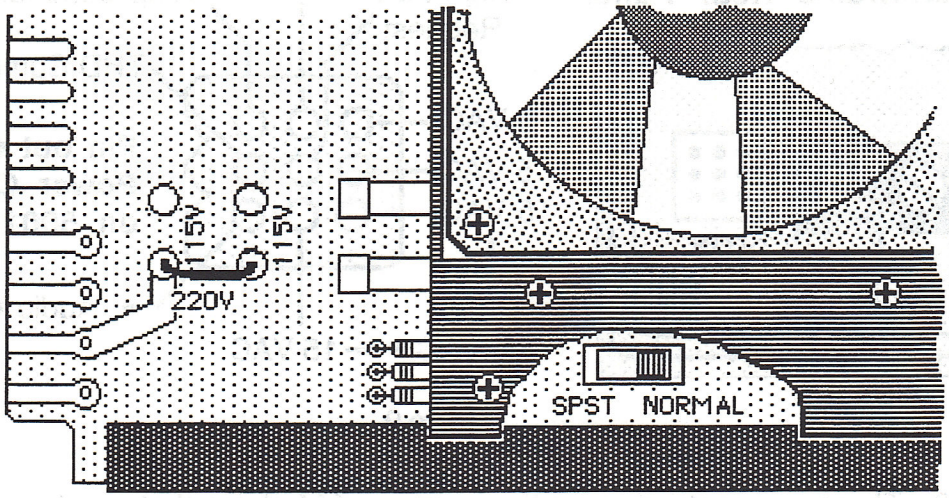


Figure 8

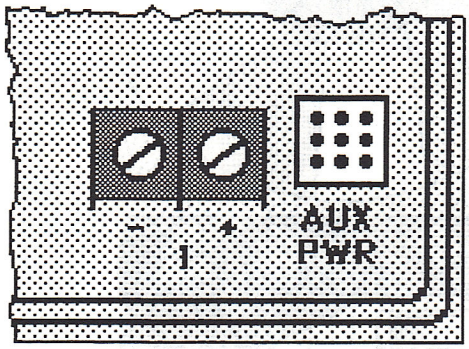
AUXILIARY POWER CONNECTOR

The nine-pin, female molex connector located on the right side of the 5001 Mainframe rear panel is the auxiliary power connector (See Figure 9 on the following page). This connector has both 30 and 5 volt AC lines connected to it from the motherboard inside the 5001 Mainframe. The power ground reference is also available at this connector. FIgure 9 shows its pin call out.. The purpose of the auxiliary power connector is to provide AC to power via an umbilical cable to another Mainframe. This may eliminate the need for a second power module, but there are some restrictions, and those are covered in the notes below. To power a second Mainframe from a 5101, the AUX power connectors on the rear of the two Mainframes must be connected together. The 15 VAC, and the 5 VAC lines should be brought from one Mainframe to another. The CT Ground must also be connected.

The mating molex connector is Molex number 03-06-2092. The pins that insert into the 03-06-2092 are Molex number 02-09-6106 for wires 14 to 20 gauge and Molex number 02-09-61233 for wires 18 to 22 gauge.

NOTE #1: *Amplifiers, which require fan cooling, may not be used on the second Mainframe because no forced-air-cooling is available.*

5001 Mainframe Rear Panel



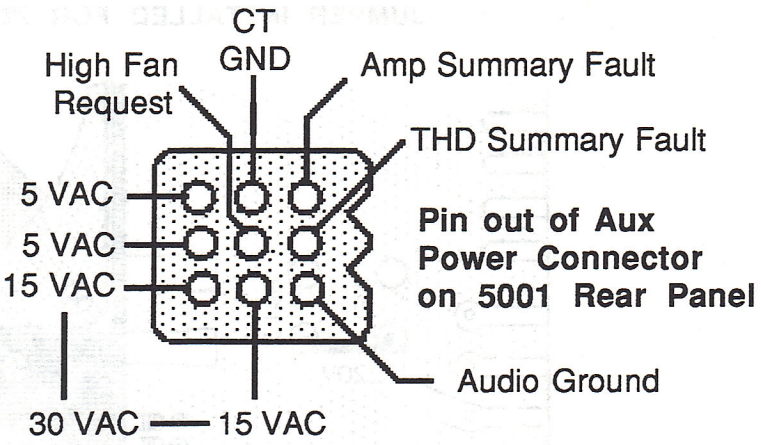


Figure 9

Note #2: *There is a restriction on the number of Modules that can be powered from a single 5101. Following is a table that will help in planning Mainframe and module layout.*

PLANNING SIGNAL PROCESSOR POWER CONSUMPTION

The 5101 Power Module transformer will provide 100 watts of low voltage AC power. Care must be exercised so as not to overload the 5101. The table below shows the power consumption per module. Calculate the power required by the number of modules to be used in the Mainframe(s) and then check to make certain that it does not exceed a total of 100 watts. The 5101 is capable of providing a maximum of 100 watts for the use of signal processing modules. Normally, this power consumption calculation would be made only if a 5101 was used to power two or more Mainframes.

Low Voltage Power Consumption Per Module

Module	5101	5202	5301	5303	5306	5503	5505	5506	Amps
Watts	0	1.8	3.8	7.7	3.4	11	4.5	9.9	0

This table does not represent all of the modules that are available from Ivie, but it does present a sufficient number to provide a format for calculations. Simply total the wattage requirements of all modules intended to be driven by a single 5101 Power Module, and make sure the total wattage requirement does not exceed 100 watts. Any modules not found in this table have their power consumption

requirements printed in the specifications section of their manuals. Just remember that amplifiers may **not** be placed in a Mainframe without a 5101 Power Module because they need the fan cooling provided by the 5101.

INPUT AND OUTPUT CONNECTORS

The rear of the Mainframe has 9 adhesive-backed, metal cover plates attached to it. These plates cover the slots intended for the audio connectors. The cover plates allow efficiency of the Mainframe cooling system. As shipped from the factory, the 5001 Mainframe does not have any plug-on audio connectors attached to it, although one TB-40 is supplied with each Mainframe.

In order to attach an audio terminal block to the rear panel, a cover plate must be removed by peeling it off the back of the Mainframe. An audio terminal block (TB-40, etc.) may then be installed on the rear panel and held in place by machine screws. One TB-40 (40 pin screw terminal block) is supplied with each 5001 Mainframe. This terminal block may be placed over any of the nine slots on the rear panel. Mixers and the 5825 Amplifier require their own TB-40 terminal blocks. If required, additional terminal blocks for other modules may be purchased.

REAR PANEL INPUT AND OUTPUT CONNECTIONS

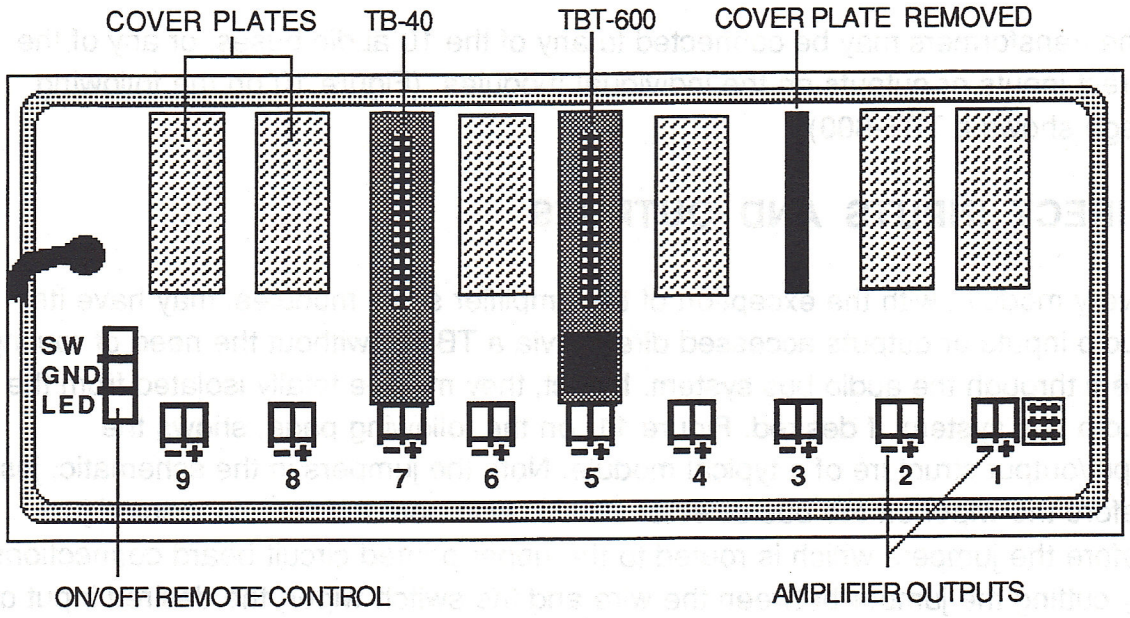


Figure 10

UNBALANCED INPUT/OUTPUT CONNECTIONS

Unbalanced input or output connections to all modules, or to the audio bus system, may be made using a TB-40, 40 pin, screw terminal block. The TB-40 provides access to the different inputs and outputs on all modules. The 5506 mixer module varies from the rest of the modules in that connecting the TB-40 to the 5506 provides access to the 6 microphone inputs, direct outputs, tape outputs, and remote control lines. The 5825, Dual Channel Amplifier requires its own TB-40 to access its second output, and the Ivie automixers require their own terminal blocks (TB-52's). On most other modules, the TB-40 provides access to the 10 audio buses on the motherboard, and the direct inputs and outputs for that particular module.

BALANCED INPUT/OUTPUT CONNECTIONS

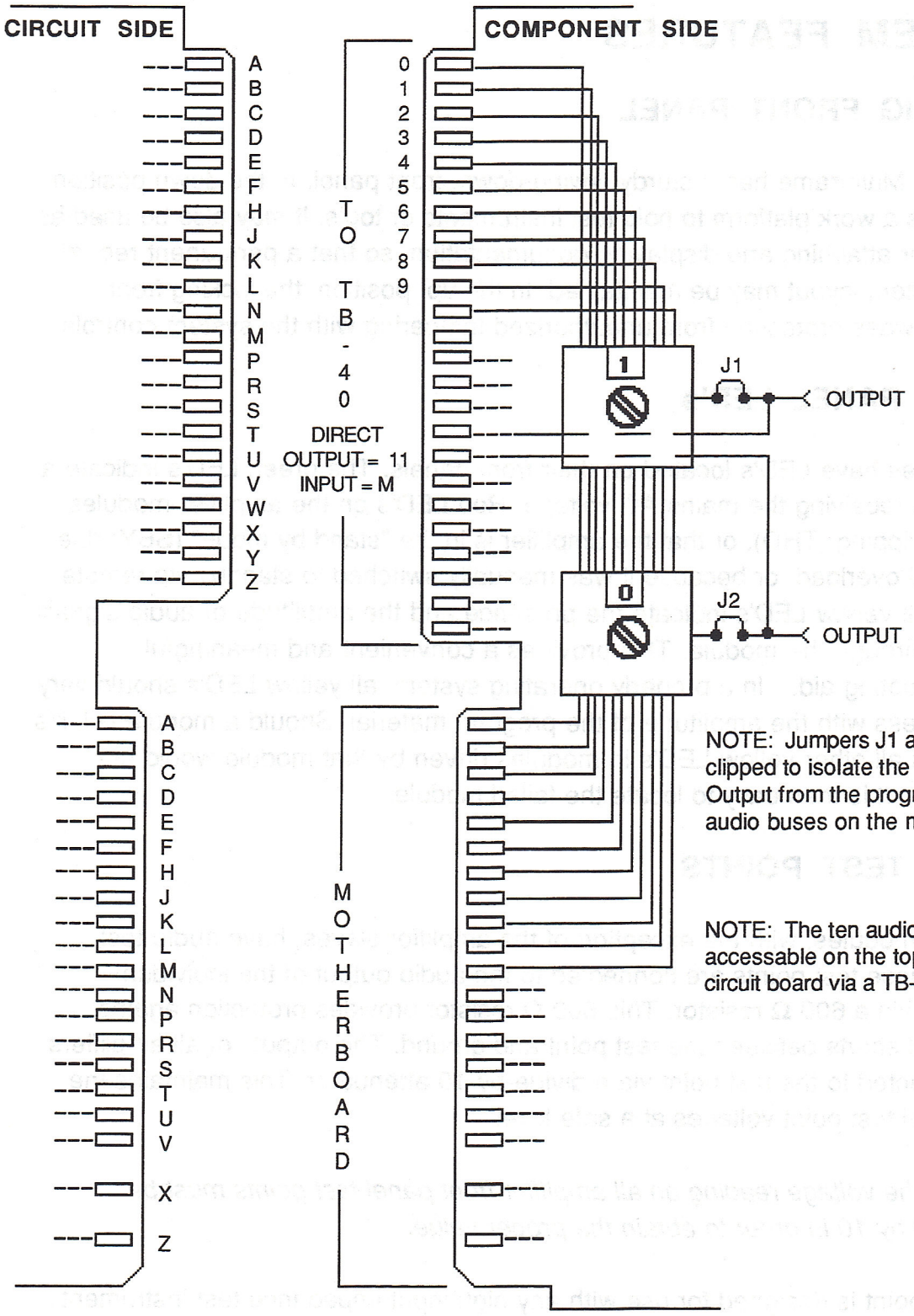
A balanced, transformer isolated access to the audio bus, direct input or direct output may be accomplished with the use of a TBT-600 terminal block. The TBT-600 is a terminal block similar to the TB-40, but with the addition of a 600 Ω, 1 to 1 turns ration transformer mounted on it. This terminal block is designed to provide balanced input or output capability.

The transformers may be connected to any of the 10 audio buses, or any of the direct inputs or outputs on the individual modules (Figure 10 on the following page shows a TBT-600).

DIRECT INPUTS AND OUTPUTS

Every module, with the exception of the amplifier slave modules, may have its audio inputs or outputs accessed directly via a TB-40, without the need of routing them through the audio bus system. In fact, they may be totally isolated from the audio bus system, if desired. Figure 11, on the following page, shows the input/output structure of a typical module. Note the jumpers in the schematic, just before the wiper on the bus selector switch. Also note the wire connected just before the jumpers which is routed to the upper printed circuit board connections. By cutting the jumper between the wire and the switch wiper, the desired input or output may be isolated from the audio bus system. This allows a module to be accessed directly without utilizing any of the 10 audio buses.

TYPICAL AUDIO INTERCONNECT ON 5000 MODULES



NOTE: Jumpers J1 and J2 may be clipped to isolate the Input or Output from the programmable audio buses on the motherboard.

NOTE: The ten audio buses 0 - 9 are accessable on the top of the printed circuit board via a TB-40.

Figure 11

SYSTEM FEATURES

LOCKING FRONT PANEL

The 5001 Mainframe has a sturdy, swing-down, front panel. In the down position it provides a work platform to hold test instruments or tools. It may also be used as a place for attaching and displaying documentation, so that a permanent record of the system layout may be maintained. In the up position, the locking front panel provides protection from unauthorized tampering with the system controls.

FRONT PANEL LED's

All modules have LED's located on their front panels. The green LED's indicate a module is receiving the mains AC voltage. Red LED's on the amplifier modules indicate clipping (THD), or that the amplifier is in the "stand by mode" (SBY) due to thermal overload, or because it was manually switched to standby via remote control. All yellow LED's indicate the presence and the amplitude of audio signals passing through the module. This provides a convenient and meaningful troubleshooting aid. In a properly operating system, all yellow LED's should vary in brightness with the amplitude of the program material. Should a module fail, it's LED, plus all other yellow LED's in modules driven by that module would not illuminate. It is then easy to locate the failed module.

AUDIO TEST POINTS

All audio modules, with the exception of the amplifier slaves, have audio test points. These test points are connected to the audio output of the individual modules, via a 600 Ω resistor. This 600 Ω resistor provides protection against accidental shorts between the test point and ground. The outputs of all amplifiers are connected to the test point via a divide-by-10 attenuator. This maintains the front panel test point voltages at a safe level.

NOTE: The voltage reading on all amplifier front panel test points must be multiplied by 10 in order to obtain the proper value.

The test point is designed for use with any high input impedance test instrument (50 kΩ or greater) such as oscilloscopes, real time analyzers, or AC volt meters.

The test points on the 5000 modules are designed to accept the Ivie IE-30A, or PC-40 test probe. The spring-loaded, hook-tip of the probe should be unscrewed, exposing the pointed probe-tip.

The test point also allows for documentation of certain operating parameters from the front panel. For example, with pink noise feeding the input of the first module, an RTA may be used to test the system for balance, frequency response, crossover points, power output levels, etc.

Levels and spectra at these test points may be measured and documented for future reference. This would allow replacement modules to be quickly and easily set up for substitution, in the event of any module fault.

BLANK FRONT PANELS

Blank cover panels are available for the 5000 System. The panels snap into slots that are not filled in the Mainframe, and provide a finished appearance for the system. The model number for the blank panel is BP-1.

SECURITY COVERS

Security covers are available for the individual modules. These covers are held in place by two, 2-56 Allen screws. They provide limited access to modules such as 1/3 octave equalizers, amplifiers, crossovers, notch filters, etc. These covers provide one more level of security.

FORCED AIR COOLING

The 5101 Power Module provides forced air cooling to the 5000 system. It is a "negative pressure" system. The fan in the 5101 draws air through the Mainframe from the open air port on the left of the Mainframe, and through slots in the top and bottom of the Mainframe, exhausting it to the right of the Mainframe. This provides efficient cooling of all parts of the modules inside the Mainframe.

Since the 5101 draws air to the right, amplifier modules should be placed to the right in the Mainframe so heat from them is not drawn through other modules. Open slots, those not filled with a module or a BP-1, should be to the far left in the Mainframe for best cooling. It is also visually easier to establish signal flow from left to right, with the amplifiers being the final component in the audio chain.

APPLICATION SECTION

INTRODUCTION

The two applications in this section endeavor to demonstrate the basic procedure for designing and installing sound systems, using the new 5000 Modular Sound System.

APPLICATION #1

Application #1 is a simple two-way, bi-amped system with 5 microphones and 1 line input. The block diagram shows signal flow and audio bus assignments. Mainframe slots are assigned according to the information in the Forced Air Cooling Section on the previous page of this manual.

Actual connections to the TB-40 are not shown in this application, as they are straightforward. Connection diagrams are shown in related manuals for individual modules. Note that the second output of the mixer is assigned to an unused channel. This output may be used to feed a tape recorder or other devices, as desired.

APPLICATION #2

Application #2 is more complex and goes into greater detail than Application #1.

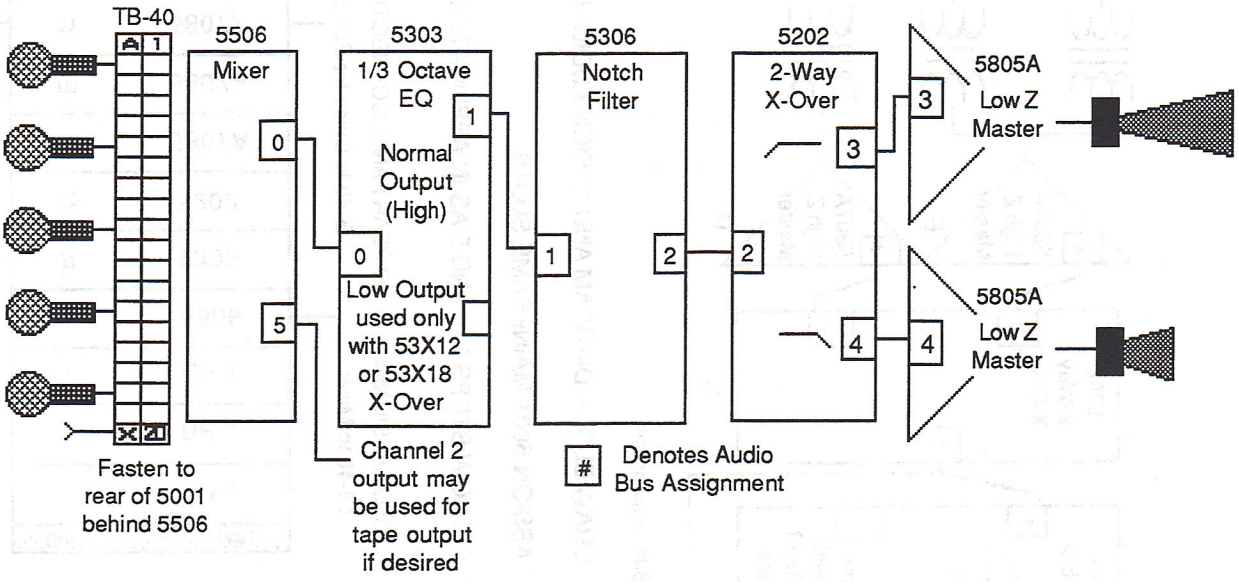
Application #2 shows how to interface the 5000 System with other audio products external to the 5000. Greater detail is shown regarding connections to the TB-40. The second TB-40 is mounted behind the 5807A feeding the balcony. Access to the 10 audio buses is provided via this 5807A with the TB-40 connected to it. The TB-40 was connected to this 5807A so that audio to the rest of the system would not be interrupted should the "Balcony" 5807A be removed from the Mainframe.

The dotted line on the application note shows the access to bus "1." The solid line from the TB-40's to the 5506 and 5807A indicate signal flow only.

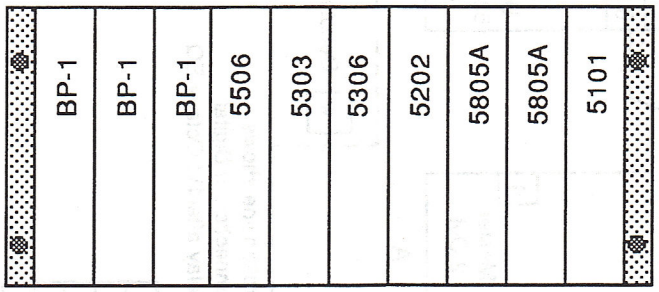
APPLICATION #1

TWO WAY, BI-AMPED SYSTEM WITH FIVE MICROPHONE INPUTS AND ONE LINE LEVEL INPUT

STEP 1: DRAW BLOCK DIAGRAM AND LABEL BUS ASSIGNMENTS



STEP 2: ASSIGN MAINFRAME SLOTS

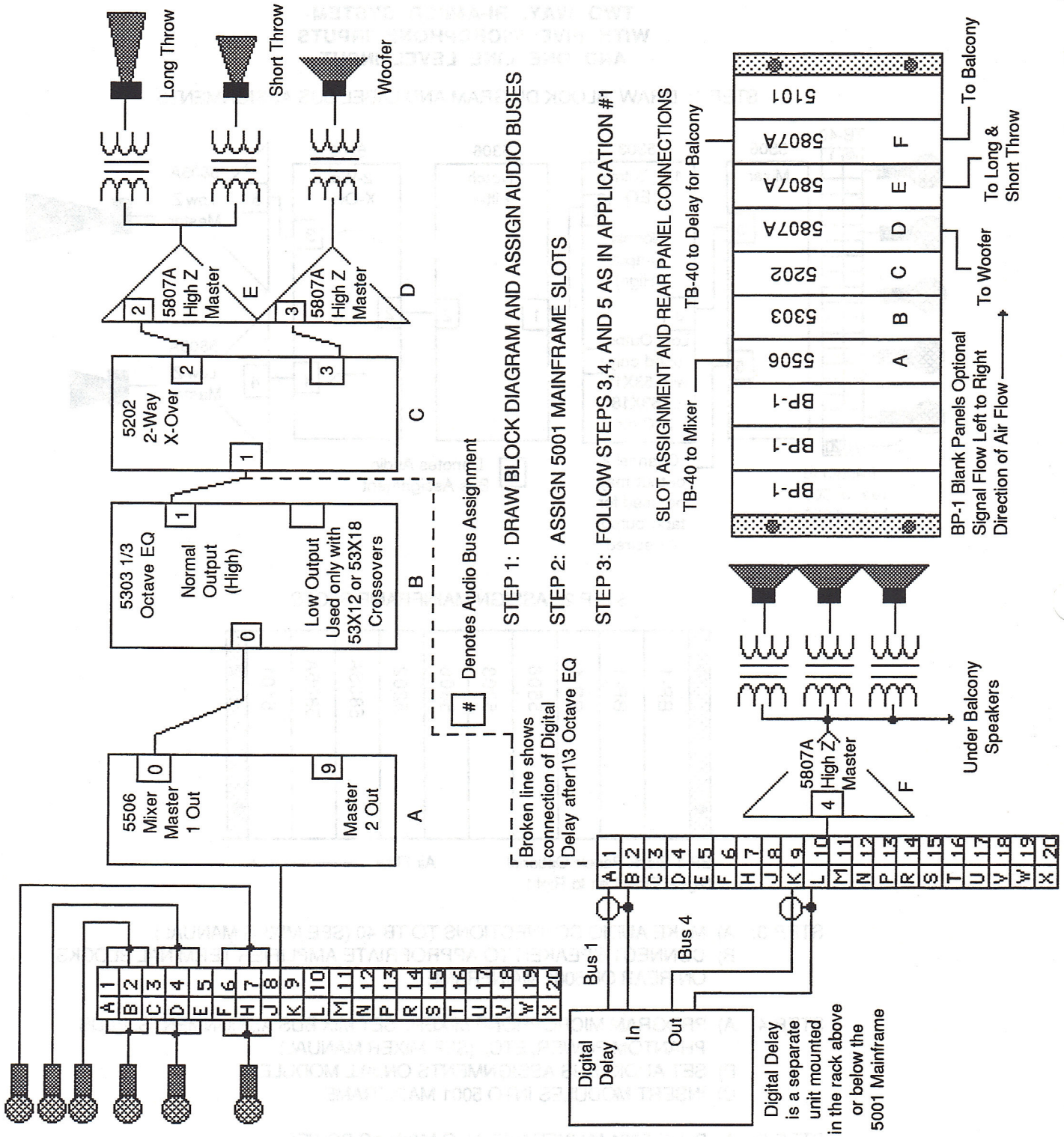


STEP 3: A) MAKE AUDIO CONNECTIONS TO TB-40 (SEE MIXER MANUAL)
B) CONNECT SPEAKER TO APPROPRIATE AMPLIFIER TERMINAL BLOCKS ON REAR OF 5001 MAINFRAME

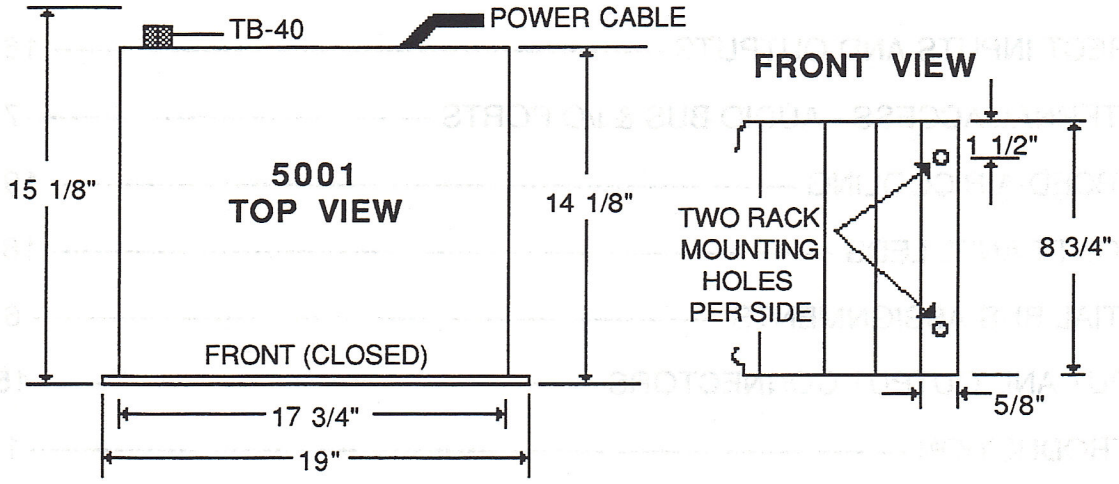
STEP 4: A) PROGRAM MICROPHONE MIXER. SET MIX BUS ASSIGNMENTS, PADS PHANTOM POWER, ETC. (SEE MIXER MANUAL)
B) SET AUDIO BUS ASSIGNMENTS ON ALL MODULES
C) INSERT MODULES INTO 5001 MAINFRAME

STEP 5: A) PLUG 5001 MAINFRAME INTO MAIN AC POWER
B) SET LEVELS AND EQUALIZATION PER STANDARD PROCEDURES

APPLICATION #2



5001 MAINFRAME MECHANICAL



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