ELECTRO-VOICE

5000 SERIES

MODULAR AUDIO ELECTRONICS

GENERAL DESCRIPTION

The Electro-Voice 5000 series modular audio electronics system is a unique grouping of products which provide great flexibility for integration within audio systems of widely differing requirements.

PRODUCT GROUP

- 5001 mainframe for modules
- 5101 ac power distribution module
- 5202 two-way crossover
- 5301 octave-band equalizer
- 5303 1/3-octave equalizer
- 5306 notch filter
- 5502 four-input automatic mixer with remote-controllable output
- 5503 four-input automatic mixer with remote-controllable inputs and output
- 5505 six-input, one-output mixer
- 5506 six-input, two-output mixer with remote-controllable inputs and outputs
- 5702 compressor/limiter
- 5805A 100-watt low-impedance (8/4 ohm) amplifier
- 5806 100-watt low-impedance "slave" amplifier (must be used with 5805A)
- 5807A 100-watt high-impedance (70.7-V) amplifier
- 5808 100-watt high-impedance "slave" amplifier (must be used with 5807A)
- 5825 dual 50-watt low-impedance (8/4 ohm) amplifier
- 5902 custom module for user-configured circuits
- 5934 four-room combiner

Additionally, many accessories which enhance the usefulness of the 5000-series products are offered: filters and crossovers which plug into the equalizer or crossover modules; blank and security covers; accessory connectors for modules; test modules; extender cards; active and passive combining cards for mixers; input/output transformers and custom room-combining products.

It is evident that virtually every commonly used electronic device needed for a complete audio system installation can be found within the wide range of EV modular audio products.

The system gives a contractor many features which are simply unavailable if traditional (non-modular) audio electronics products are used:

1. Rack-space "real estate" - nine audio modules (in addition to the 5101) can be inserted into a mainframe which occupies only 8.75 inches of vertical rack space.
2. Freedom from the hassles of interconnecting traditional "stand-alone" devices, with the attendant problems of ground loops, etc.
3. All devices from the system are from one manufacturer, so purchasing, inventory and servicing are simplified.
4. An additional service benefit is that modules can be simply replaced (no interconnections or hardware must be removed or changed).
5. No worries about matching impedances/levels.
6. Internal fan cooling, precluding the necessity of external fans.

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 front panel provides protection from unauthorized tampering with the system's controls. The panel may also be locked in place, providing additional security.

FRONT PANEL LED's

All active modules have LED's located on their front panels. The green LED's indicate that the particular module is receiving ac main voltage. Red LED's on the amplifier modules indicate clipping (THD) or that the amplifier is in the standby 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 amplitude of the audio signal on the output of that particular module. This provides a convenient and meaningful troubleshooting aid. In a properly operating system, all yellow LED's should vary in brightness with the program material. Should a module fail, its LED and all other yellow LED's in modules driven by that module would go out. It would then be very 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 ohm resistor. This 600 ohm 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 (50,000 ohms or greater) such as oscilloscopes, real time analyzers, or ac volt meters. The test points on the 5000 modules are designed to accept the either the model IE-30A or PC-40 real-time analyzer (RTA) test probe (or similar oscilloscope-type 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 many operating parameters from the front panel. For example, with pink noise on the input of the first module, an RTA may be used to test the system for balance, frequency response, crossover points, etc.

Levels at these test points may be measured and documented for future reference. This allows replacement modules to be quickly and easily set up for substitution of any module that may fail.

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-head 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. Refer to the owner's manual or price list for the proper model of security cover for the application.

FORCED AIR COOLING

The 5101 module provides forced-air cooling for the 5000 system. Cooling is required for the amplifier modules; most other modules do not require forced-air cooling. The fan draws cool air in through vents from the top, bottom and left side of the 5001 mainframe. The air is exhausted from the right side of the mainframe housing.

The fan has a jumper-selectable idle speed and automatically switches to high-speed operation when internal thermal sensors indicate a high-temperature condition.

115/230 VOLT OPERATION

The system may be operated from either 115 V ac or 230 V ac. Selection of main voltage is by a clearly marked jumper on the 5101 ac power distribution module.

REMOTE ON/OFF

Because the system on/off pushbutton switch controls a triac, the on/off functions can easily be operated from a remote location. The ac power indicator LED may also be remoted.

DESCRIPTION OF SYSTEM ARCHITECTURE

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 servicing.

Nine universal sockets within the mainframe allow an EV module to be placed in any position (except the rightmost slot) within the mainframe The versatile mainframe also allows other components external to the modular system to be coupled into the mainframe at any point along the signal path.

The EV 5000 series is the first system to offer total mainframe flexibility. For example, the mainframe will accept up to nine 6x2 mixer modules, or up to one kilowatt in amplifiers, or a complete sound system consisting of a wide variety of different signal processing modules. The sound system designer is not limited to just amplifiers or preamplifiers as is the case with some modular systems offered by other manufacturers.

SECURITY

Several levels of security are offered in the EV 5000 series modular system. All module controls can be key-locked behind the mainframe front panel. The master or main power switch is also behind the locking front panel. This feature, in combination with an easily obtainable key-activated switch (typically used with alarm systems) can provide remote on/off control with security, for maximum flexibility. The EV system also offers security covers for individual modules which prevent unauthorized people from tampering with the control settings. With the EV 5000 system, total access to the system can be provided to some, limited access to others and no access to unauthorized people. The system does not require installation in secure environment as would conventional individual products.

AMPLIFIERS

EV has designed a most unique series of amplifiers for use within the modular system The range from low-impedance types to high-impedance types, and from low output powers to a kilowatt. The amplifiers can be operated in parallel, bridge, bridge/parallel, triamp or biamp configurations by using simple switch controls.

Another useful feature adding to the system's 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 significantly reduces costs. 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 module in the 5000 system has its own dedicated, fused, dc supply. If a module fails, it will be effectively isolated 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 EV 5000 series 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 dialing the 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.

If a sound system designer wishes to integrate external electronics into the audio chain of the modular system, this can be accomplished with the use of the direct inputs or outputs on the accessory terminal strip. Transformer isolation can be easilly accomplished through the use of the TBT600 transformer accessory.

SYSTEM MAINTENANCE

By design, the EV 5000 modular system is one of the most easily maintained and serviceable systems available. Signal presence indicators 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 volt meter's 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.

Digital output lines on each amplifier provide the capability to remotely monitor the status of large installations. Using simple LED arrays or a computer monitor 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 virtually eliminated with the EV 5000 modular system. It can be expanded and reconfigured to meet the growth needs of almost any environment. Adding electronics to the 5000 system 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 5000 series will assure reliability. EV's research team will continue to provide a flow of new modules and new technologies.

MAINFRAME

The mainframe has ten slots to accept modules. The farthest slot to the right of the mainframe is keyed so that it will accept only the 5101 ac power distribution module. No other module will fit in this slot. The other nine slots are universal and will accept any module other than a power module. This allows the use of nine amplifiers or nine mixers or nine equalizers, etc., or any combination of modules which might be required.There are several recommendations when assigning modules to slots in the mainframe:

1. Always fill the mainframe from right to left, beginning with the 5101 and then following with amplifier modules. After the 5101 is in place, insert any amplifier modules immediately to the left of the 5101. The last modules (to the left) to be inserted should be the signal-processing or mixer modules.
2. Do not allow any unused slots between modules. This would allow the forced-air cooling to come in through the front panel, and not maintain proper cooling for the rest of the modules.
3. Place all signal processing modules in the slots to the left of all amplifiers .

NOTE: Blank panels (BP-1) may be used to fill unused slots between modules, to the left of the other modules, as mentioned in item 1, above. Because the amplifiers produce the greatest amount of heat, it is simply common sense to locate the high-heat items "downwind" from the other modules.

Careful attention should be paid to these guidelines in order to provide the most reliable operation of the 5000 system!

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. It is first routed through the ac power distribution module and then back onto the motherboard for distribution to other modules. Three ac voltages are distributed via the motherboard: the main voltage for use by the amplifiers and 30 volts and 5 volts ac for all other modules. All ac voltages are fused, rectified, filtered and regulated within each module as required. This provides additional system reliability. 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 ten (bus 0-9) audio interconnect buses that connect the first nine slots together in parallel. Each audio module with the exception of amplifier slaves contains ten- position audio bus assign switches. These bus switches may be programmed to send or receive on any of the ten audio buses. See Figure 1 below. The microphone inputs to the mixer are made via a terminal block (TB40) 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 crossover is assigned to bus 1. The two crossover outputs are assigned to buses 2 and 3. This bus system also allows multiple inputs to be driven from one output. The second output of the mixer is assigned to an unused bus.

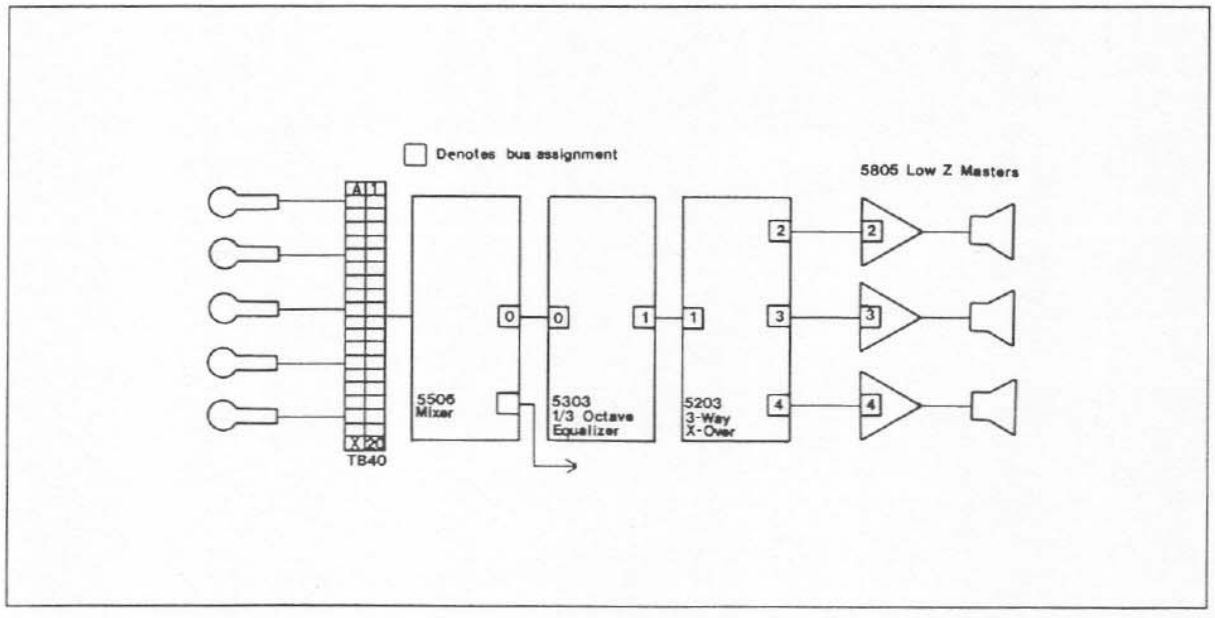


Figure 1 System Diagram with Bus Assignments

Because all audio buses are in parallel, it does not matter into which slot the module is plugged. Of course the TB40 must be attached behind the proper module, in this case the mixer. Also the speakers must be connected to the terminal blocks behind the amplifiers. It is easy to see that a system may be "rewired" simply by changing the audio bus assignments.

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

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. If perceptible audio problems occur with the 5000 system, it is prudent to immediately check the settings of the bus assign switches.

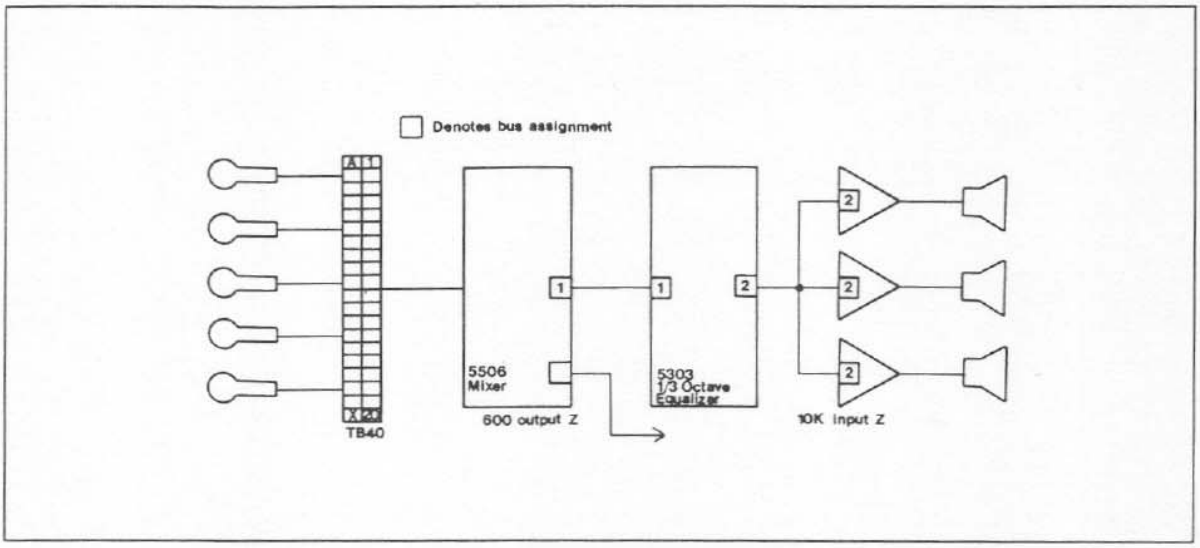


FIGURE 2 Typical Multiple Input Driven From One Output

INITIAL BUS ASSIGNMENTS

Initial bus assignments may be facilitated by drawing the system block diagram as shown in Figures 1 and 2 and labelling the inputs and outputs with the bus assignments. This helps to prevent duplicate 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 masters to masters when used in bridge mode. The 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 jumpering of the master and slave output terminals together (+ to +, - to -). See Figure 3A.

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 the two masters. See Figure 3A.

Bridge/parallel combinations are also accommodated by the bus system. Figure 3A shows several amplifier combinations.

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

EXTERNAL ACCESS TO THE AUDIO BUS SYSTEM AND OTHER I/O PORTS

Every audio module with the exception of an amplifier slave 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 of the microphone inputs, outputs, mix bus, and remote control connections. In all other modules, the top connector permits access to the ten audio buses which are paralleled up from the bottom connector. Direct inputs and outputs to that particular module are also available on this connector. On the master amplifier modules, all of the above I/O connections are available along with the amplifier status I/O 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 TB40).

AMPLIFIER OUTPUTS

There are nine two-position screw terminal blocks located on the rear of the mainframe (see Figure 7). 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 3A, 3B, and 3C show several different amplifier configurations

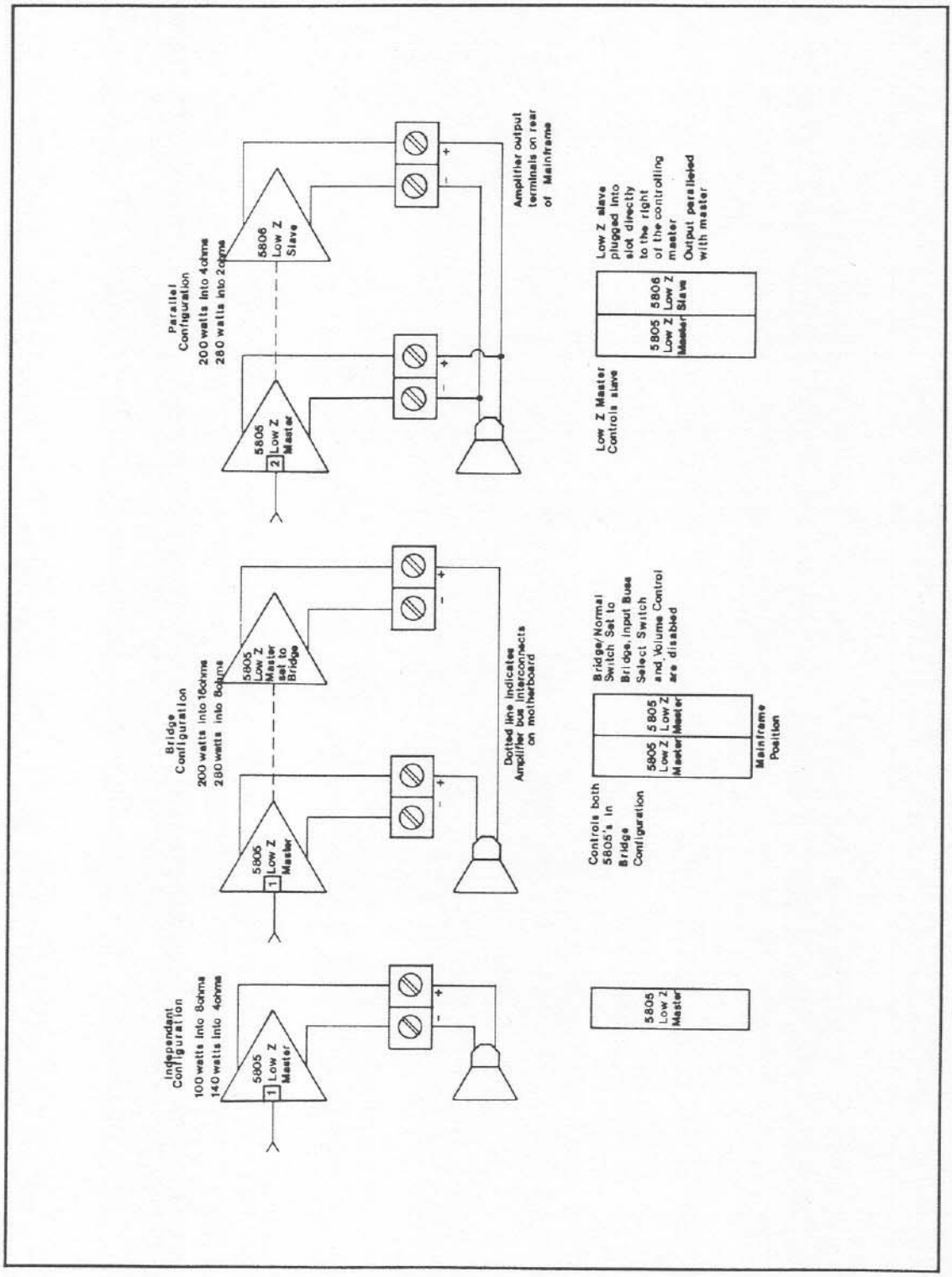


FIGURE 3A Independant, Bridge and Parallel Configurations

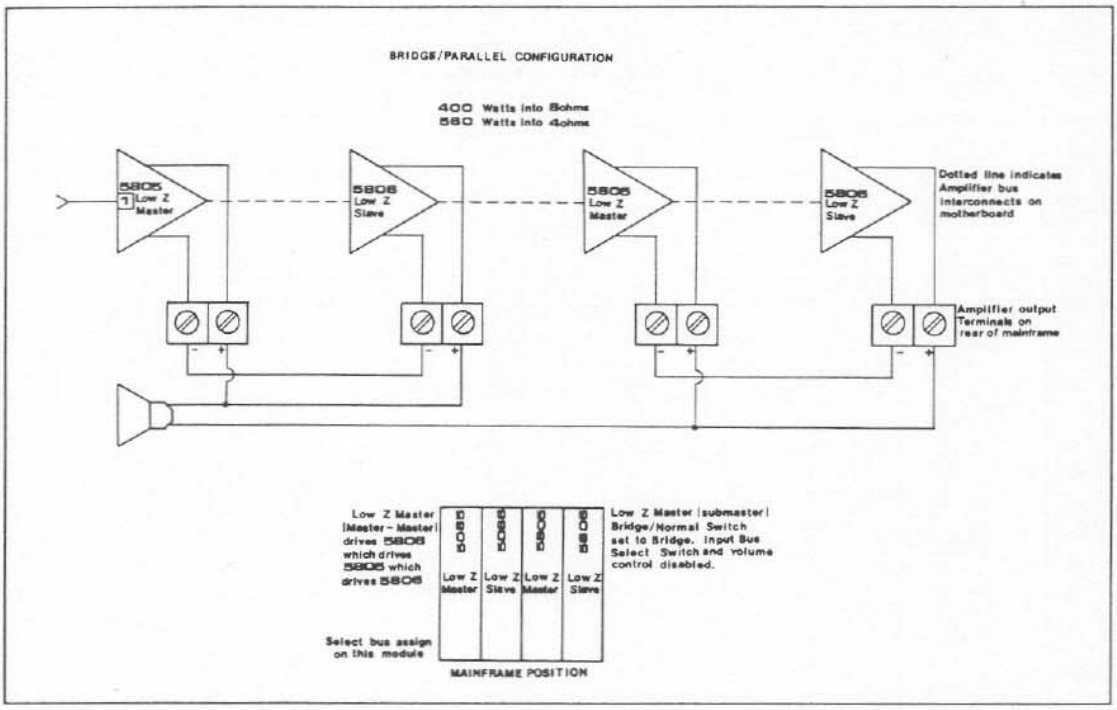


FIGURE 3B Bridge/Parallel Configuration

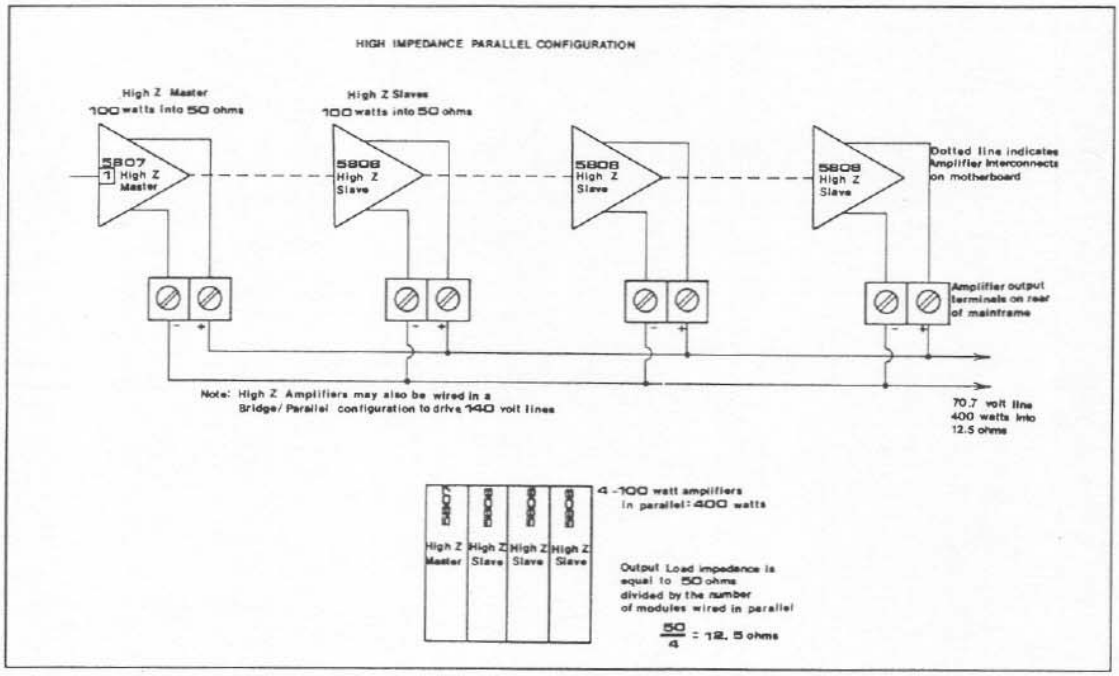


FIGURE 3C High Impedance Parallel Configuration

REMOTE ON/OFF

The 5101 provides low level dc remote on/off switching for the 5000 modular system. A three position screw terminal block is located on the left side of the rear panel. This terminal block has three connections: switch, ground, (Figure 4A) and LED. The front panel system on/off switch and LED indicator may be remoted. The on/off switch may be either a momentary normally open push type or a toggle type (an internal switch in the 5101 allows for use of both types).

Any number of switches may be paralleled, 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. Figure 4B shows typical remote on/off connections for the 5101.

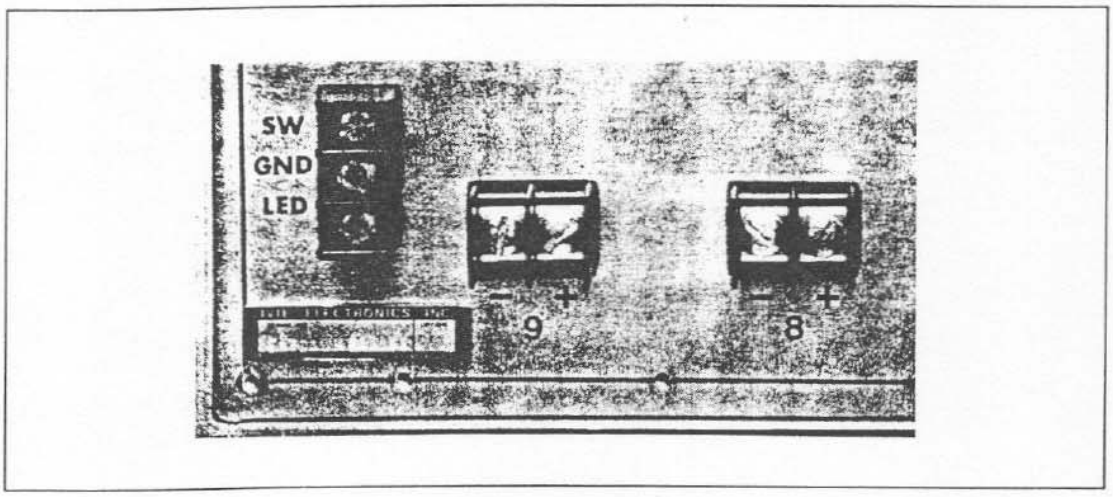


FIGURE 4A 5101 Rear Panel

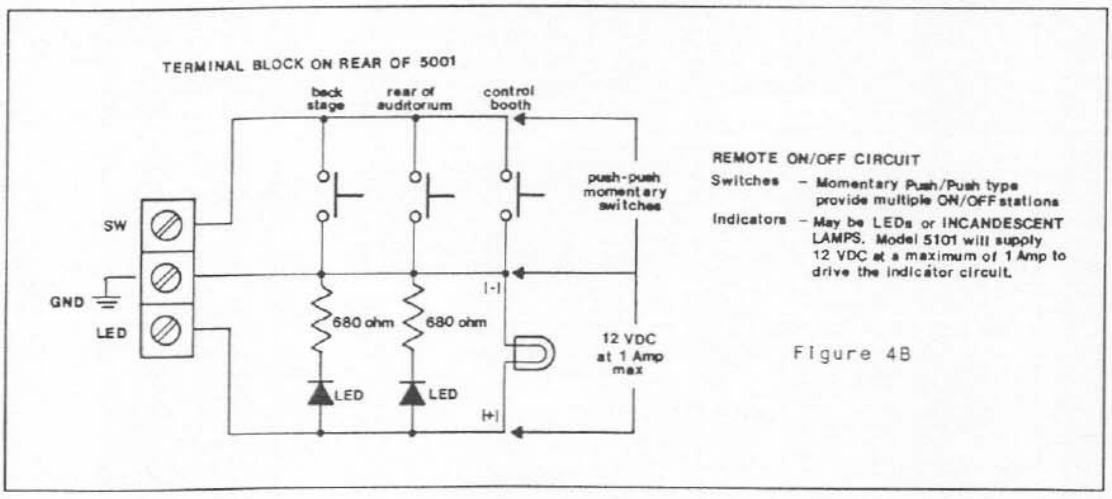


FIGURE 4B 5101 Rear Panel

AUXILIARY POWER CONNECTOR

The nine-pin female molex connector located on the right side of the rear panel is the auxiliary power connector (Figure 5A). This connector has both 30- and 5-volt ac lines connected to it from the motherboard. The power ground reference is also available at this connector. Figure 5B shows the pin call out for this connector. This connector provides ac to power accessories or may be used to power another mainframe. This may eliminate the need for a second power module. To power a second mainframe from a 5101 the AUX PWR (auxilary power) connectors on the rear of the two mainframes must be connected together. The two 15- and 5-volt ac lines should be connected from one mainframe to another. The CT GND (circuit 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: There is a restriction on the number and type of modules that may be used in the second mainframe when using auxilary power. For example, amplifiers may not be used in the second mainframe because no forced-air- cooling is available.

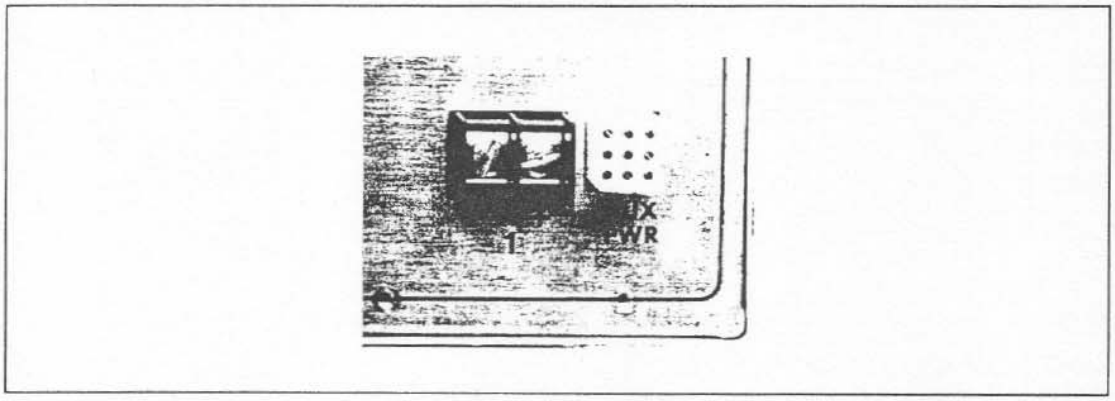


FIGURE 5A 5001 Auxillary Power Connector

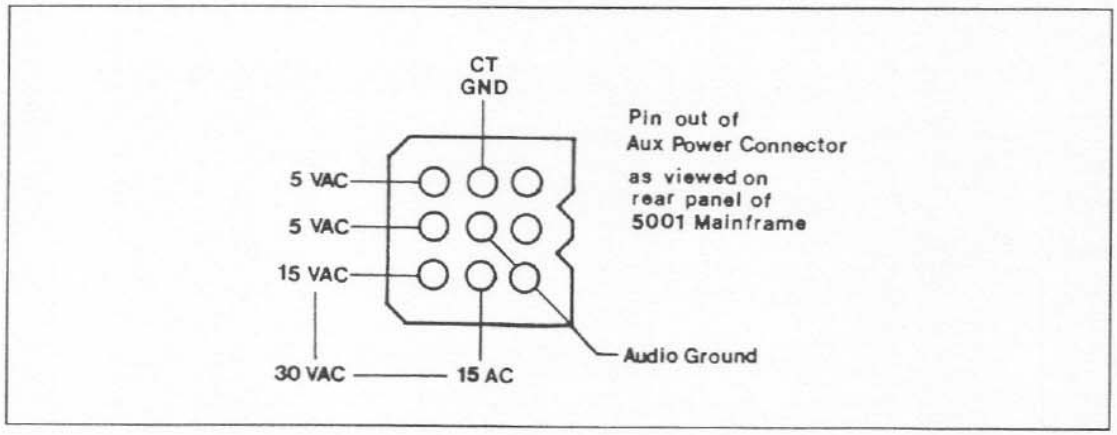


FIGURE 5B Auxillary Power Connector Pin Call Out

PLANNING SIGNAL PROCESSOR POWER CONSUMPTION

The 5101 power module transformer will provide 100 watts of low voltage ac power. Care must be exercised to not overload the 5101. Figure 6 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 you would make the below calculations only if the 5101 was used to power two or more mainframes.

NOTE: The amplifiers must be placed in the mainframe with the 5101 (due to the requirement for fan cooling). The signal-processing modules would be placed in a second mainframe, which would be interconnected with the first mainframe via the auxiliary power connector.

Low Voltage Power Consumption Per Module

Module	5101	5202	5203	5301	5303	5306	5505	5506	5805	5806	5807	5808
Watts	0	1.8	2.7	3.8	7.7	3.4	4.5	9.9	0	0	0	0

EXAMPLE:

100.0 watts available
-67.9 watts required
32.1 watts left for accessories and other modules

4 - 5506 MIXERS	@ 9.9	WATTS EA	=39.6	WATTS
3 - 5303 EQUALIZERS	@ 7.7	WATTS EA	=23.1	WATTS
1 - 5202 CROSSOVER	@ 1.8	WATTS EA	= 1.8	WATTS
1 - 5306 NOTCH FILTER	@ 3.4	WATTS EA	= 3.4	WATTS
6 - 5805 AMPLIFIERS	@ 0	WATTS EA	= 0	WATTS
3 - 5807 AMPLIFIERS	@ 0	WATTS EA	= 0	WATTS
2 - 5001 MAINFRAMES	@ 0	WATTS EA	= 0	WATTS
		TOTAL	=67.9	WATTS

FIGURE 6 Module Power Consumption

INPUT AND OUTPUT CONNECTORS

The rear of the mainframe has nine adhesive-backed metal cover plates attached to it. These cover plates cover the slots intended for the audio connectors. The cover plates allow the proper flow of air to be drawn through the system by the fan. As shipped from the factory, the 5001 mainframe does not have any plug-on audio connectors attached to it, although one TB40 is supplied with each 5001 mainframe.

In order to attach any audio terminal block to the rear panel, the desired cover plate must be removed by peeling it off the back of the mainframe. An audio terminal block (TB40, etc.) may then be installed on the rear panel and held in place by three machine screws. One TB40 (40-pin screw terminal block) is supplied with each 5001 mainframe. This terminal block may be placed over any one of the nine slots on the rear panel. If required, additional terminal blocks may be purchased.

UNBALANCED INPUT/OUTPUT CONNECTIONS

Unbalanced input or output connections to all modules or the audio bus system may be made with the use of a TB40 40-terminal screw terminal block. The TB40 provides access to different inputs and outputs on all modules. The 5506 mixer module varies from the rest of the modules in that connecting the TB40 to the 5506 provides access to the six microphone inputs, direct outputs, tape outputs, and remote control lines. On most other modules the TB40 provides access to the ten audio buses on the motherboard, and 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 TBT600 transformer accessory. The TBT600 is a terminal block similar to the TB40 but with the addition of a 600 ohm 1:1 turns-ratio transformer mounted on it. This accessory is designed to provide a balanced input or output capability for a module. The transformer may be connected to any of the ten audio buses or any of the direct inputs or outputs on the individual modules.

DIRECT INPUTS AND OUTPUTS

Every module with the exception of the amplifier slave modules may have its audio inputs or outputs accessed directly without the need of connecting them to the audio bus system. In fact, they may be isolated from the audio bus system if desired. Figure 7 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 connected to the upper printed circuit board edge connector. These wires are the direct input and output 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.

MIXING OUTPUTS OF MODULES

Outputs of modules can easily be combined by replacing jumper J1 on the appropriate modules with a 600-ohm resistor and assigning the outputs to the same bus.

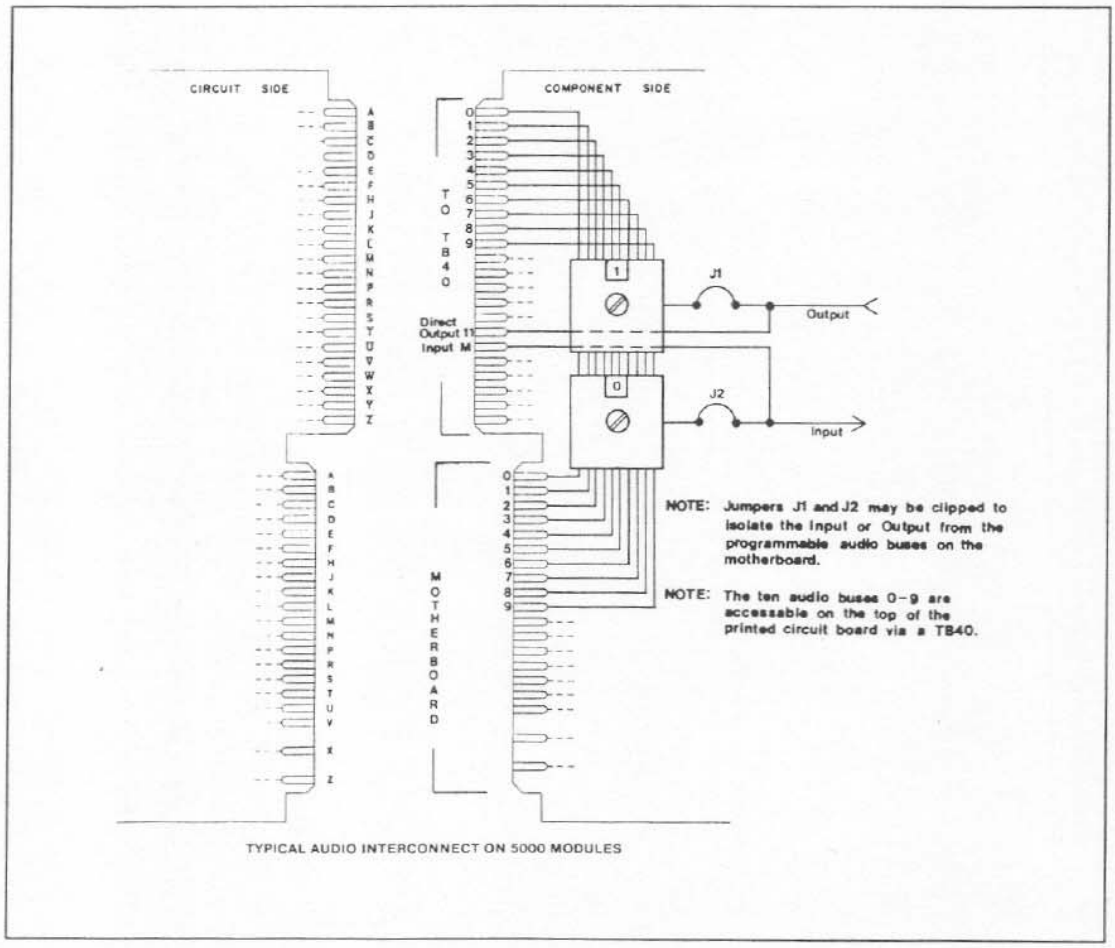


FIGURE 7 Typical 5000 Module Input/Output Configuration

SAMPLE APPLICATIONS

The applications shown in this section demonstrate basic procedures for design and installation of systems using the EV 5000-series modular audio products.

APPLICATION NO. 1

The customer has a small auditorium which needs a new sound system. Requirements are quite simple:

1. lectern microphone.
2. four additional microphone outlets, spaced across the platform area.
3. line level input (could be used for tape playback, or projector audio).
4. line level output for tape recording.
5. moderate SPL, with good fidelity (suitable for both speech and music).

The solution is straightforward (see figure 8). The entire electronics portion of the system can be assembled using off-the-shelf 5000 series products. Assembly time is minimal - install the 5101 ac distribution module into the mainframe, mount the mainframe in the rack (if a rack is needed), set the bus-assign switches on the other modules as shown in the diagram and slide them into the mainframe.

The block diagram shows suggested settings of the bus switches and the mainframe drawing indicates modules and blank panels in appropriate slots for proper cooling.

Additional details on configuring the 5506 mixer for use with phantom-powered microphones and insertion of pads are contained in the owner's manual.

The line level input and output can be transformer isolated by use of the TBT-600 accessory, if required.

APPLICATION NO. 2

This system is of moderate complexity. The sound system requires remote-control of the input channels, coverage for a balcony (and the underbalcony area) and the addition of an external digital signal-delay for the underbalcony speaker system.

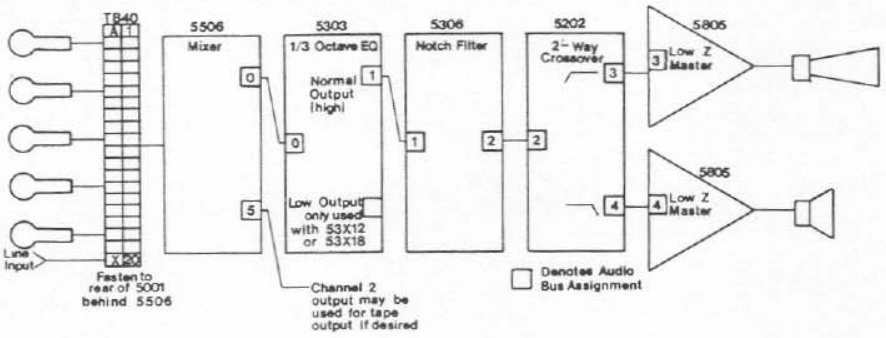
Even though the requirements for this system are considerably greater than those of Application 1, a single mainframe still comfortably contains all the modules required, leaving room for future expansion of the system! (see figure 9)

Possible enhancements to this system would be a 5702 compressor/limiter, a 5306 notch filter and/or another mixer (to provide additional input capability).

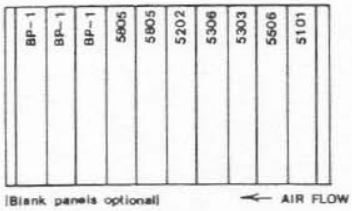
APPLICATION #1

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 TB40 (see Mixer manual).
b) Connect speaker to appropriate amplifier Terminal Blocks on rear of 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 in mainframe.

STEP 5: a) Plug mainframe into mains
b) Set levels and equalization per standard procedures.

Figure 8 Typical System for a Small Auditorium

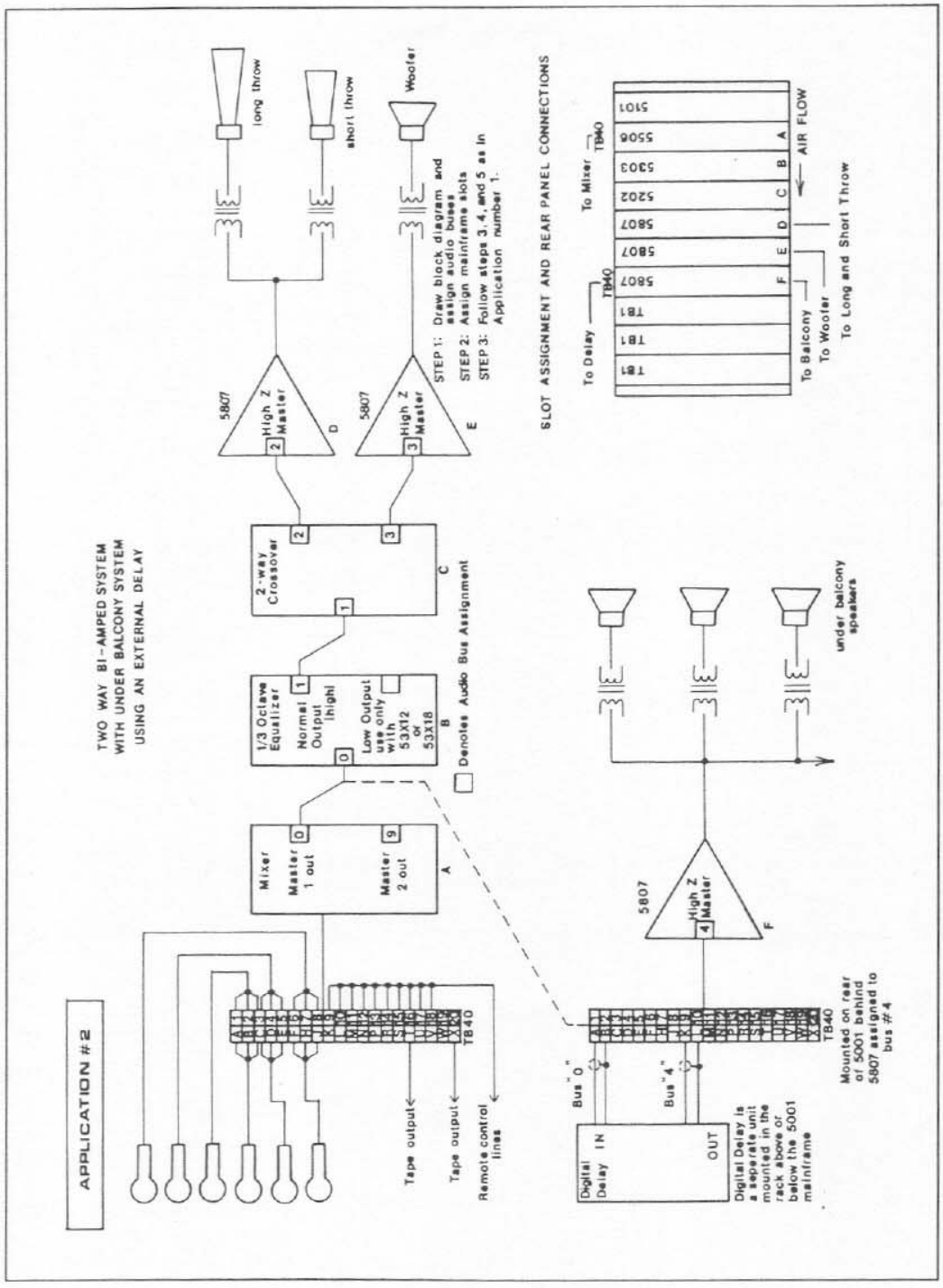


Figure 9 Typical System of Moderate Complexity