TV-80 Audio Console

TECHNICAL MANUAL

Wheatstone Corporation

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TV-80 Live Television Audio Console Technical Manual - 1st Edition

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Attention!

Federal Communications Commission (FCC) Compliance Notice: Radio Frequency Notice

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment, generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This is Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take appropriate measures.

This equipment must be installed and wired properly in order to assure compliance with FCC regulations.

Caution! ***Any modifications not expressly approved in writing by Wheatstone could void the user's authority to operate this equipment.***

ATTENTION!

Signal Path Insert Points

This TV-80 audio console is equipped with insert patch points on the following modules:

Submasters

AUX master signals
SUBMASTER signals

Stereo Masters

STEREO MASTER output signals

These patch points can be bypassed by internal PCB-mounted jumpers. As shipped from the factory, *PCB-mounted insert jumpers have already been installed.* If you intend to use outboard signal loops at these points, you must remove the factory installed jumpers.

See "Submaster Module Insert Bypass" (Chapter 3) and "Master Insert Bypass" (Chapter 4) in the TV-80 Technical Manual for details.

NOTE: While input modules also have insert points, these may simply be front panel bypassed by an "insert" switch at the top of each module.

ATTENTION!

Dual Redundant Power Supplies

If your Wheatstone audio console has been ordered and shipped with a failsafe power supply system, it uses TWO separate rackmount power supplies. Though either is capable of running the console on its own, in failsafe operation both units run in tandem: if one fails, the other takes over, assuring uninterrupted console operation.

Dual failsafe supplies have their output trimmed to entirely different settings than stand-alone single units, and are MEANT to be run in tandem. If they are not, and you attempt to "save" one supply by powering it down and holding it in reserve until you run into an actual failure condition, you could shorten the life expectancy of the working unit.

In order for the failsafe system to perform as designed, always have BOTH rackmount supplies powered up and connected to the console.

ATTENTION!

Wiring Power Supplies into AC Line

To insure proper power sequencing in systems using an Event Computer, we recommend that the PSC-125 Event Computer Power Supply be connected to the same AC power circuit as the TV-80 PSC-1000 Console Power Supply.

Further, if you have failsafe power supply pairs and have connected each PSC-1000 to its own separate AC power circuit, as recommended elsewhere in this manual, *we recommend that you connect one PSC-125 to each of those circuits.*

For additional information, see the special TECH NOTE at the top of page 9-6 in your TV-80 Technical Manual "Power Systems" chapter.

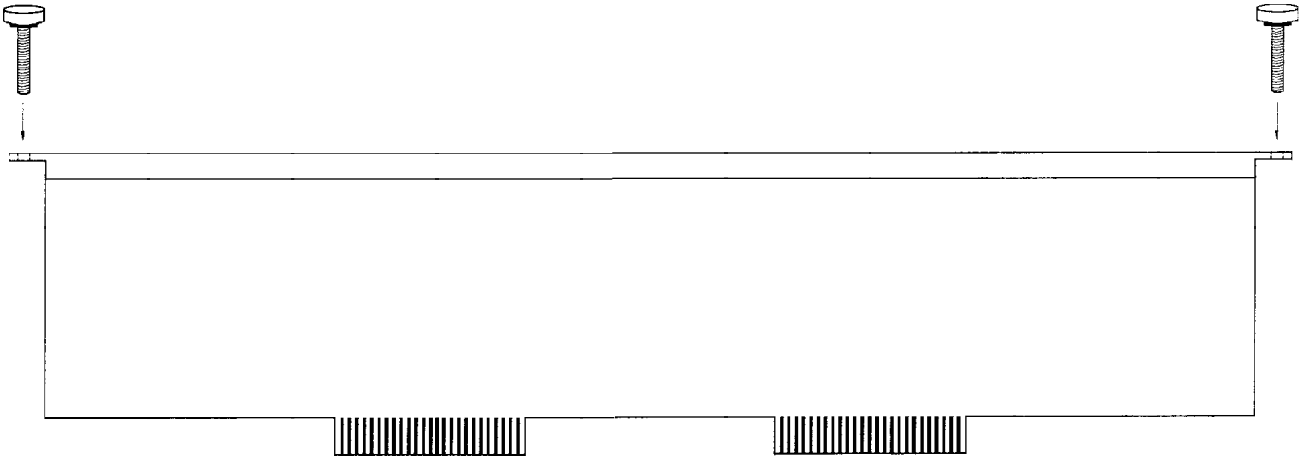
Module Removal Tools

Your Wheatstone TV-80 audio console is equipped with two "module extractor tools" which are mounted underneath the console armrest, to the far right (just in front of the operator's mainframe headphone jack).

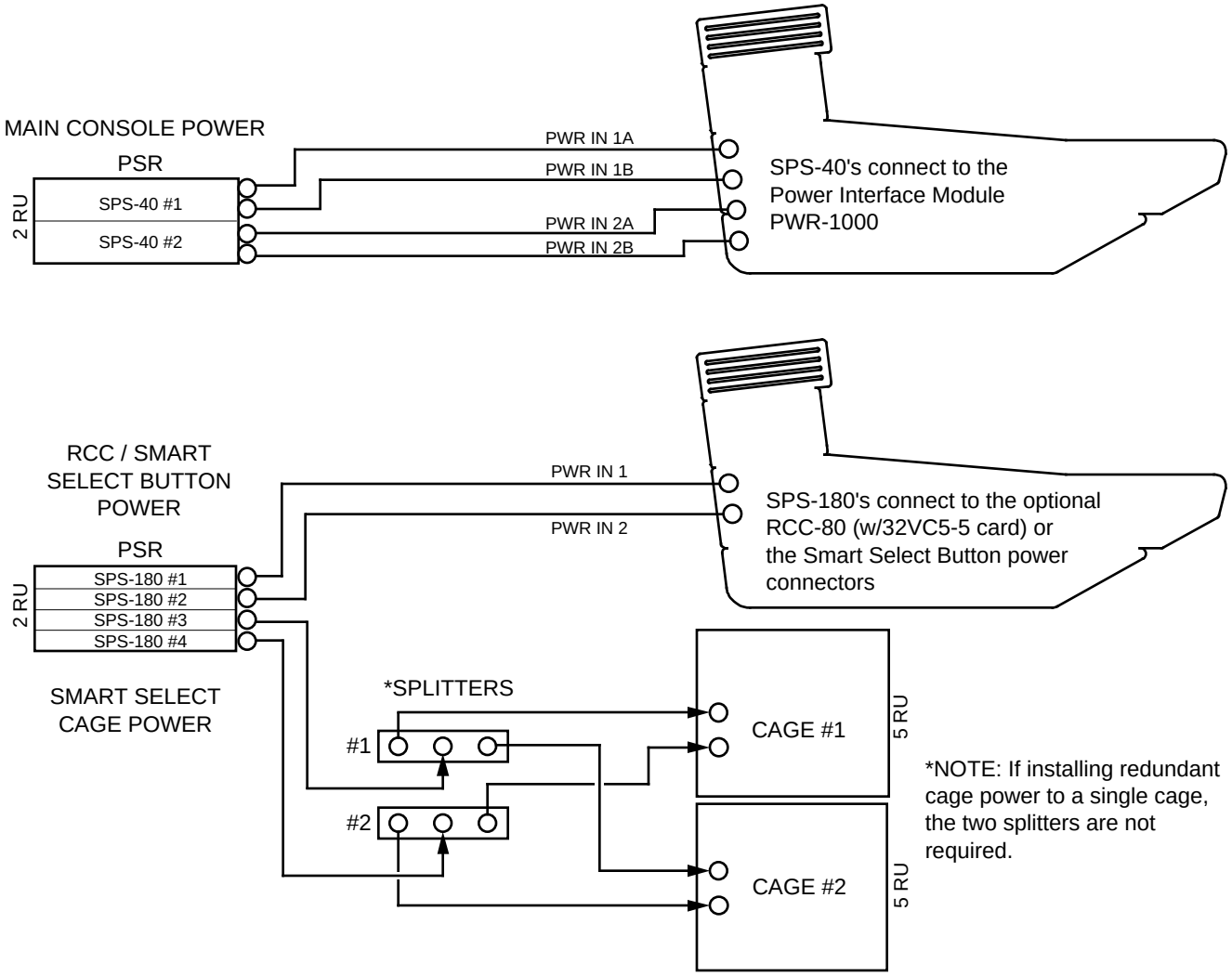
Main module faceplates are held into the console mainframe by three fasteners: a lower rear panel screw (below the module's I/O connectors, located at the rear of the console beneath the meterbridge assembly) and two faceplate mounting screws (top and bottom) located on the control surface of the console. The faceplate mounting screws, when removed, leave specially threaded holes that accept the two extractor tools.

To remove a module faceplate from the mainframe:

Remove the rear panel screw, then the front top and bottom mounting screws. Remove the extractor tools from underneath the armrest, and screw each tool into a module faceplate mounting hole. *Use only four or five turns* (do not over-insert; you may damage the threaded mainframe hole underneath). Using the extractor tools as handles, pull the module straight up out of the mainframe.



POWER SUPPLY AND SMART SELECT INSTALLATION GUIDE



*NOTE: If installing redundant cage power to a single cage, the two splitters are not required.

DEVICE	RACKUNITS	TOTAL POWER REQUIREMENTS
SPS-40 #1 SPS-40 #2	2 (3 1/2")	600W TOTAL
SPS-180 #1 SPS-180 #2	2 (3 1/2")	200W TOTAL
SPS-180 #3 SPS-180 #4		200W TOTAL
SPLITTER #1 SPLITTER #2	1 (1 3/4") 1 (1 3/4")	N / A
CAGE #1 CAGE #2	5 (8 3/4") 5 (8 3/4")	N / A
		SYSTEM TOTAL = 1000W

NOTES: •Power totals assume redundant power supplies are installed.
•Complete system should be run from two 120 VAC/20 AMP circuits.

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Installation

Chapter Contents

Installation

Console Placement

TV-80 consoles are HEAVY. A fully loaded 70 position mainframe can easily weigh 600 lbs. We recommend using at least six people to move and place the console.

Console placement should avoid proximity to any electromagnetic fields, such as large power transformers, motors, and fluorescent lighting fixtures. The console may be mounted either on a custom constructed table surface or the optional factory leg support system. In either case, the console's handrest top surface would generally be located 29-30 inches from the floor.

Do not connect the TV-80 console to its power supply (and do not connect the power supply to the AC power line) until instructed to do so.

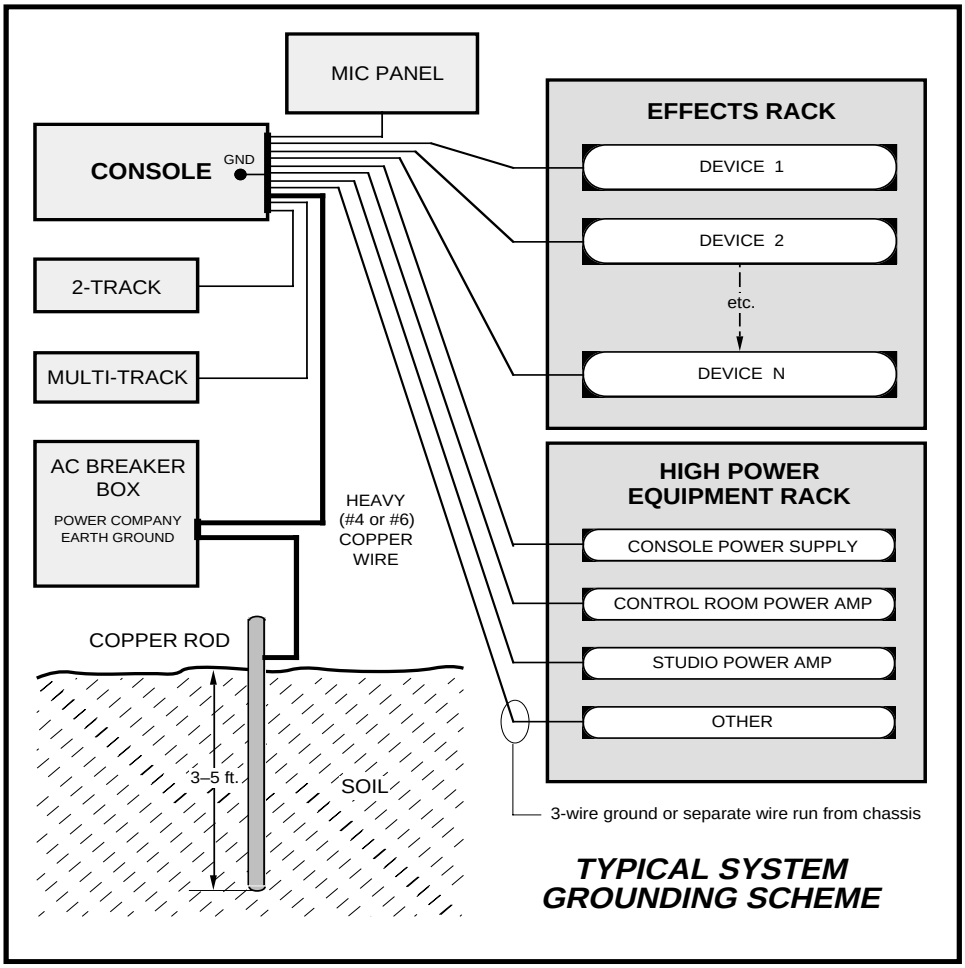
Factory Leg Support System

The optional factory leg system supports the console at sitdown height, and provides a hidden internal wiring chase that may be closed off with a rear concealment panel. The leg support system is pre-assembled at the factory, then broken down for shipment. Field assembly instructions are included in a separate document supplied with the legs. They are also reproduced in Appendix II of this Technical Manual (see page A-8).

System Ground

The first step is to ground the console.

Note that as supplied from the factory, console rackmount power supply common, audio common, and the TV-80 mainframe are connected together at the console, but are NOT connected to electrical ground and the chassis of the power supply. *Safety requirements dictate that a positive connection from the console mainframe to electrical ground be made in the completed installation.* Use one of the grounding lugs on the bottom of the mainframe to establish your system ground. The grounding lug terminal strip may be found at the rear of the console, along the bottom edge of the mainframe pan directly under the rightmost mainframe slots (to the extreme lower left if you are looking at the rear of the console).



Tie the console ground lug terminal strip to the system earth ground. Tie every piece of equipment in the entire audio system to the console ground lug terminal strip.

The system ground serves two important purposes:

(1) It provides a zero signal reference point for the entire audio system;

(2) It assures safety from electrical shock.

There exist two terms that one encounters in a discussion of ground:

(A) EARTH GROUND, which is usually a heavy copper rod driven into the soil adjacent to the building (around 6 feet down) or a connection to the copper water pipes leading into the building. Either is acceptable (unless, of course, the water pipe is made of plastic).

(B) THE POWER COMPANY EARTH CONDUCTOR that enters the building at the power line breaker box; this conductor should be (and is often by code) tied to the above-mentioned earth ground at one point. This point is the SYSTEM EARTH GROUND.

TIE THE CONSOLE GROUND LUG TERMINAL STRIP TO THE SYSTEM EARTH GROUND. TIE EVERY PIECE OF EQUIPMENT IN THE ENTIRE AUDIO SYSTEM TO THE CONSOLE GROUND LUG TERMINAL STRIP. If the system earth ground point is inaccessible, tie the console ground terminal strip to the power company earth conductor at the main breaker box (see drawing "Typical Grounding Scheme" above).

Each piece of equipment should be connected by its own ground wire (usually the round third pin on the AC cord). This means that every AC outlet must have a separate conductor run to the console ground lug terminal strip; the outlets cannot be daisy-chained as is normally encountered in commercial and residential AC systems. Any equipment not supplied with 3-wire AC cables must have individual ground wires (16 gauge or larger) connected to their chassis grounds and then run to the console ground lug terminal strip.

An "isolated AC ground" studio outlet (usually orange in color) can also be used to accomplish the required grounding.

Further Grounding Details

Check all equipment to be absolutely certain that each unit is power transformer isolated from the AC mains to prevent safety hazards.

It is assumed that in each piece of audio equipment the audio ground and the chassis are tied together at some point. Any piece of equipment lacking a grounded chassis is likely to be prone to interference problems.

Locate all unbalanced audio equipment in the same rack if possible, to minimize chassis ground potential differences. It may also be helpful to insulate each piece of unbalanced equipment from its mounting rails in the rack by means of nylon 10-32 screws and insulating washers between rails and faceplates.

Once the system is properly grounded, proceed with the console power supply installation and connection (next section).

Power Supplies

For a complete discussion of TV-80 power supplies, see the "TV-80 Power Systems" chapter of this manual (page 9-1). For the purposes of the current chapter, you should properly rackmount the PSR with SPS-40 units (console) and PSR with SPS-180 units (preselector panels, event computer and rackmount smart select cage) power supplies and connect them to their associated equipment as described in the "Power Systems" chapter. (If failsafe versions have been ordered, you will be installing two units of each type.)

Note the power supplies should be mounted in an equipment rack within fifteen feet of the console (but no closer than 3 feet). Avoid locating any high gain equipment (such as phono preamps, tape recorders, etc.) too near the rackmount supplies, to avoid magnetic interference into that equipment.

Once the supplies are rackmounted, they should be connected to their respective equipment using the supplied cables. Note that each cable's 10-pin female connector has to be rotated until its locating pins match the male connectors on the equipment it powers. *Do not force a connector on; it attaches easily when properly aligned.* Connect the cables first to the rear of the their associated equipment, then to the rear of each rackmount power supply.

Note each power supply is fitted with a 3-wire grounded AC cord that should be plugged into a "clean" AC power source. That is, an AC source that feeds only the control room audio gear. This source should be a separate feed from those powering lighting, air-conditioning, or any other non-audio machinery. The third pin ground wire of the AC source should be tied to the central system ground point. *Note that while the AC power cord ground wire terminates at the power supply chassis, it does NOT connect to the TV-80 console common; the console itself must be grounded separately. (See previous section, "System Ground".)*

The power feed recommended in the text is often installed and referred to in studios as an “isolated AC ground” outlet. It is usually orange in color.

Failsafe Dual Redundant Supply

Wheatstone failsafe power supply systems use two separate rackmount power supplies for each piece of powered equipment. Though either is capable of running a full load on its own, in failsafe operation both units run in tandem: if one fails, the other takes over, assuring uninterrupted operation.

In order for failsafe systems to perform as designed, always have BOTH rackmount supplies powered up and connected to their associated equipment.

The “TV-80 Power Systems” chapter fully covers rackmount installation and connection of failsafe supplies.

Energizing the Supplies

(1) THE CONSOLE – Assuming the TV-80 console mainframe is properly placed and grounded, and its power supply correctly rackmounted and connected to the console’s power interface module rear panel, you may now energize the rackmount power supply by plugging it into the AC mains and turning it on. The console's VU meters will illuminate; individual module switches will assume factory default settings.

(2) THE CONSOLE EVENT COMPUTER ACCESS PANEL – Again, assuming the event computer’s PSR (SPS-180) power supply is correctly rackmounted and connected to the rear panel connectors of the event computer access panel at the console, energize the event computer by pluggin in the power supply to the AC mains. The +5V DC to DC converter, 32VC5-5 PCB, installed in the event computer.

(3) THE SMART SELECT CAGE – With the PSR (SPS-180) power supply correctly rackmounted and connected, energize the rackmount Smart Select Cage by plugging in the power supply to the AC mains. The Smart Cage should energize, with its switcher LEDs lighting to reflect the settings on the console’s associated overbridge preselector panels.

For a more complete discussion of Event Computer and Smart Cage start-up procedures see page 10 of “The Wheatstone Router Control System” technical manual.

(4) THE ROUTER CONTROL SYSTEM PC COMPUTER – With all the preceding equipment energized, boot the Wheatstone Router Control Computer at its separate keyboard. The monitor screen should light up, run through built-in diagnostics, and eventually display the Main Menu described in the Wheatstone Router Control System manual.

It is best to energize the TV-80 console, console event computer, and rackmount smart select cage prior to booting up the PC event computer; this way the computer will be able to immediately find the equipment it is connected to. If the PC is booted first, power-up will take much longer as the system keeps looking for equipment that is not yet activated.

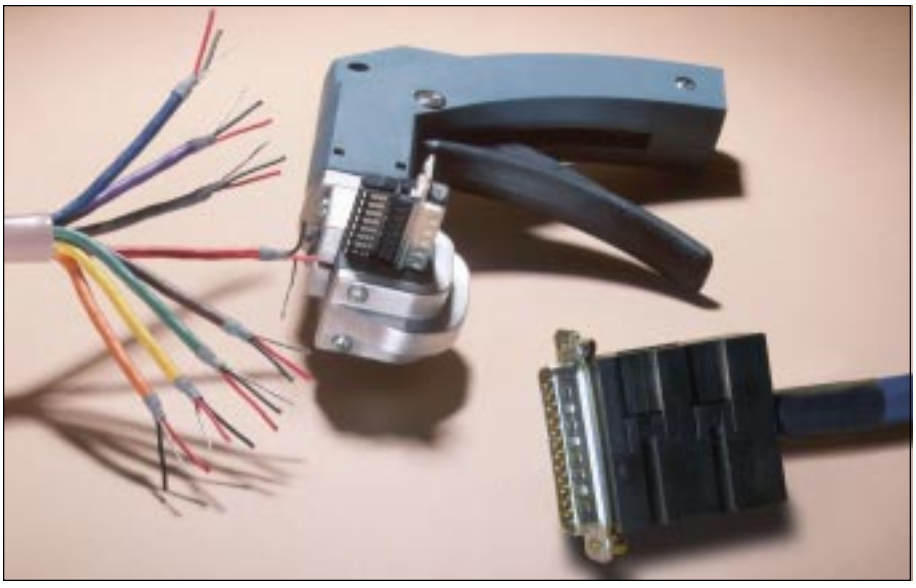
Once you have verified proper power-up, unplug the rackmount power supply's AC cords from the AC mains to de-energize their associated equipment. Power down the PC computer and monitor. You may now proceed to wire up audio and control connections.

Audio and Control Wiring

All audio and control I/O connections to the TV-80 console are made through multipin connectors (DB-25 and DB-9 type) located at the rear of the console.

The Insulation Displacement Connector System

The I/O wiring interface system is based on insulation displacement technology. A special AMP wiring tool is included with each console; it is auto-indexing, and allows individual wire connections to be positively made with a single squeeze of the tool's trigger. The trigger action is ratchet controlled, and will not release until a full connection is made. Once released, the multipin connector held in the tool's jaw automatically indexes to the next connector pin. The technology is such that no stripping, soldering or tinning of wire ends is required; all that



The AMP tool insulation displacement connector system. Note the right angle hood with self-locking tabs. The tool, multipin connectors (with gold plated pins) and latching hoods are supplied with each console.

is needed is for the wires destined for the connector be snub cut and laid out in order (although tubing should be used on bare drain wires). An empty DB-25 or DB-9 connector is inserted into the tool, indexed to the first pin, and the wires are inserted one by one into the jaw and the trigger squeezed. In this way a single multipin connector can be completely wired up in a minute or two.

In the event of a wiring error, connector pins may easily be removed from the shell with the wire still attached, and inserted into the correct position. Observe the side of the connector, with the metal part down. You will see a row of "Vees"—simply press the top of the vee together with a scribe or other sharp instrument; this will unlock the pin from the shell, and it can be removed and inserted into the correct position. Spread the vee apart to lock the pin in the new position. It should never be necessary to discard a connector due to a wiring error.

Note that mating right angle hoods for each connector are also supplied with the console. These have locking tabs that hold the connectors securely to the bottom of the console mainframe.

Connection Procedures

As supplied from the factory, the console requires no logic connections to function. Therefore an orderly installation begins with the audio wiring. Note this manual is organized by module type (inputs, submasters, masters, monitor modules, etc.); each chapter contains detailed wiring instructions for its module type. Proceed through the manual, chapter by chapter, until all modules have been wired to suit your particular installation requirements. Once proper audio operation is verified, go back to each individual chapter and proceed with control wiring.

Insert Points

Certain module signals have built-in insert patch points in their signal chains to allow outboard audio processing. These include SUBMASTERS (with both submaster and auxiliary master insert points) and STEREO MASTERS (stereo master and mono master output signals).

NOTE it is also possible to bridge the insert points at each module's DB-25 I/O connector by connecting "INSERT OUT HI" pins to "INSERT IN HI" pins. See individual module pinout drawings (listed below by page number) for details.

Normally these points are internally bridged at the factory (via PCB-mounted jumpers) prior to shipment. If you intend to use outboard signal loops at these points, you must remove the factory installed jumpers. See pages 3-4 and 3-5 (submasters) and 4-5 (stereo masters) for details.

NOTE: While input modules also have insert points, these may simply be front panel bypassed by the "insert" switch at the top of each module.

Unbalanced Connections

INPUTS — Wire to the console with typical shielded two conductor cable (like Belden 9451), just as if you were connecting a balanced source. At the unbalanced source machine's output, connect the black wire (LOW) to the shield. *If the machine has a -10 dBu output, don't hesitate to turn module input gain as high as is needed.*

See page A-3 of the Appendix for a discussion of balanced versus unbalanced connections.

OUTPUTS — TV-80 consoles use a balanced output circuit which behaves exactly like the secondary of a high-quality transformer, with no center tap—this output is both balanced and floating. Either the HIGH or LOW side of the output should be strapped to ground, with the output taken from the other side. (Normally you'd strap LOW to ground, and take HIGH to feed your unbalanced equipment.)

Quick Reference Pinouts

For fastrack access to individual module wiring information, refer to the pinout information on the following pages:

Input Modules

Mono Mic/Line Input

Printed Circuit Board Load Sheets
(TECHNICAL DRAWINGS booklet)

Schematics
(TECHNICAL DRAWINGS booklet)

Stereo Line Input

Printed Circuit Board Load Sheets
(TECHNICAL DRAWINGS booklet)

Schematics
(TECHNICAL DRAWINGS booklet)

Mono Mic/Line Inputs

General

MI-80 input modules accept and output mono signals. Each module can select one of four mono source signals: two are mic level and two are line level.

Each input channel consists of three separate panels mounted in a single mainframe position:

a) the main module itself (far right),

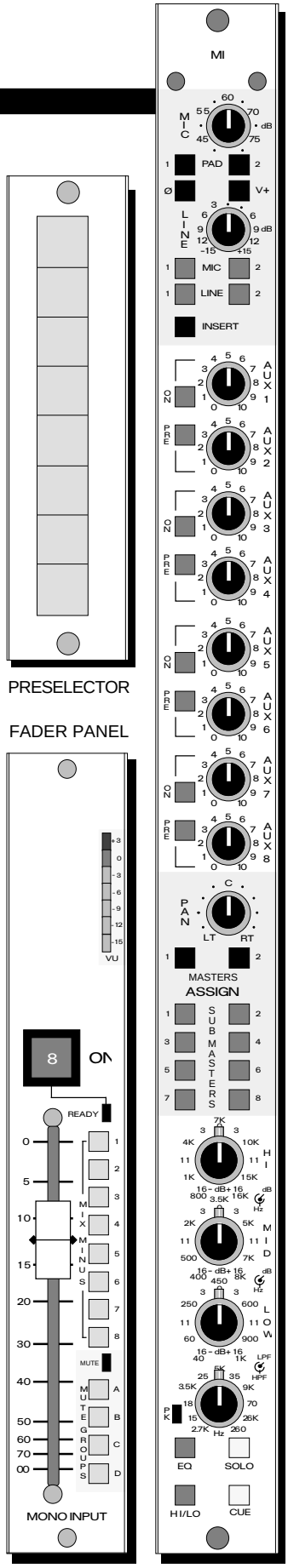
b) a fader panel directly in line with and below the main module (physically separated by the console's alpha-numeric source display strip), and

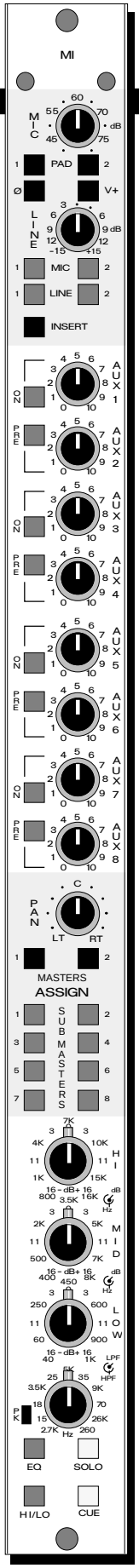
c) an (optional) 8-bank preselector switching panel located directly above each channel in the meterbridge overbank section.

Input channel audio connections are made via a DB-25 multi-pin connector ("A" upper) located on the back rear panel of each main module. Input channel logic and control signals are made through three DB-9 connectors ("MUTE FOLLOW", "MIC LOGIC", and "MACHINE CONTROL") also mounted on the same rear panel.

Note console preselector panel switches do *not* control audio directly. Instead, they send control pulses to separate rackmounted switching cages ("Smart Select®" cages). Actual audio source signals are wired directly to the rackmounted Smart Select® cages (via rear DB-25 connector pairs); the cages then feed selected source signals back to the main input modules.

The signal flow diagram on page 8 of the Technical Drawings is helpful in clarifying the information presented in this chapter. You are encouraged to refer to it in conjunction with the text that follows.





Main Module

Input section

The upper section of this input module selects between two mono microphone and two mono line inputs. The microphone section provides a variable gain control, switched Mic 1 and Mic 2 pad circuits (-20dB), and switchable +40V phantom power (labeled "V+"). The electronically balanced line input section has a center detent input gain control (with PCB-mounted calibration trimpots for fine adjustment). The phase reverse switch affects both mic and line inputs. A patch point INS switch (for both mic and line) allows insertion of any pre-patched external processing gear (insert points are electronically balanced in and out).

AUX Section

This section taps eight post-EQ auxiliary send signals from the main input channel and routes them to the console's send ACN busses. There is a pre/post selector switch and an ON switch for each pair of aux circuit. While aux pre/post switches normally switch before or after both the channel fader AND channel On switch, special PCB-mounted slide switches (four per module) permit dual AUX pairs to follow main channel ON/OFF even when switched to "pre" (page 2-12).

PAN Control

This center-detent rotary control pans the module's mono signal left and right within assigned stereo submasters and masters signals.

Bus Assign

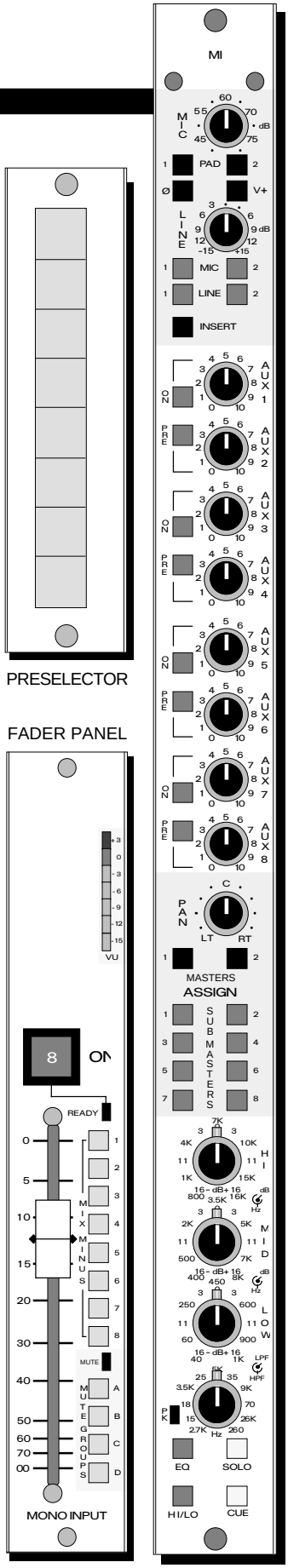
Each input module may have its output assigned to any combination of the console's two stereo MASTERS and/or eight mono SUBMASTERS.

Equalization Section

A four-band EQ/filter section is included, employing 3 sweep frequency peaking sections (each ±16dB with reciprocal curves) plus sweep frequency (-12dB/octave slope) low pass (2.7KHz-26KHz) and high pass (12Hz to 260Hz) filters. Note the three-band EQ and HI/LO pass filter sections may be switched in and out separately.

Peak LED

A peak reading LED indicator lights to indicate overload conditions within the channel circuitry (the indicator monitors both pre and post fader points in the signal chain).



PRESELECTOR

FADER PANEL

Cue and Solo

Both pre-fader CUE and post-fader/post-channel on SOLO switches are provided. These switches tap the module's PFL and AFL signals and route them to the console's stereo SOLO/CUE monitor bus, where they may be used to feed operator headphones, control room monitors, dedicated speakers, etc. (SOLO/CUE is mastered at the console's control room module; see Chapter 5.)

Direct Out

Each input module has an electronically balanced direct output. It is post fader, post channel ON.

Preselector Panel

TV-80 input modules may be supplied with optional overbridge preselector panels. These consist of an eight-bank switch array that determines the source signal being fed to the main module's Line 1 input. As stated before, preselector panels do not control audio directly; they send control pulses to switcher cards mounted in a separate rackmount Smart Select® cage. The cage card then returns the appropriate signal to the module. See pages 8-2 thru 8-5 for smart cage wiring details.

Input Fader Panel

Each input module has an associated fader panel located directly below it. Starting from the bottom, these panels are configured as follows:

Fader

A 3000 Series Penny & Giles long-throw (104mm) fader. Plug-in for easy servicing.

Mute Groups

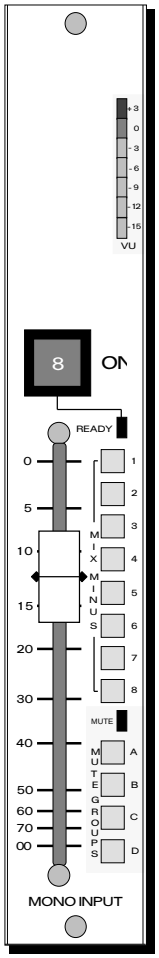
Each input channel may be assigned to any or all of four Mute Control Groups. These groups (A thru D) can then be muted by the press of a single master mute button (in other words, whenever the master switch for a mute group is activated, any module assigned to that group will have its output muted). A "mute" LED indicator lights whenever a module has been muted. (The four mute master switches are located in the fader section of the board, directly underneath the power interface module in the center of the console.)

Mix Minus

Feeds the module's signal to the console's mix-minus system. Any module turned ON automatically feeds a signal to all eight mix-minus busses. Creation of a feed for IFB or remote use is done by simply pressing one or more of the eight mix-minus switches on the chosen input module's fader panel, which *removes* that module's feed from the selected busses. Illuminated mix-minus switches thus show the *deselected* status directly at the input source.

Note the mix-minus signal may be programmed (by an internal PCB-mounted slide switch) to be pre or post fader; a programming jumper permits the mix-minus feed to follow channel ON/OFF. See page 2-10, "Mix Minus" for details.

FADER PANEL



Ready LED

Used for line inputs; this tally LED is powered by an external source machine to indicate when it is cued-up and ready for play.

Channel ON

This momentary action lighted pushbutton switch turns the input channel on and off. It may also be programmed to activate tallies and mutes (4) and timer restart; DB-9 control ports let the switch control (or be controlled by) external devices. See this chapter, "Input Module External Control Ports" and "Input Module Logic Programming" for a complete discussion.

Metering

Each individual input channel has its own 7-segment LED VU ladder built in to that channel's fader panel. This LED VU may be internally programmed to monitor pre or post fader. It is always, however, pre channel ON/OFF, allowing it to function as a signal present indicator. The VU ladder is calibrated via a PCB-mounted trimpot on the fader panel's main printed circuit board ("CR1" – see "FPI-80" load sheet on page 41 of the Technical Drawings, center left). Note a single PEAK LED indicator at the bottom of the main module faceplate also warns of overload transients (it monitors both pre and post fader).

Input channels may also be metered at the console's SOLO VU meter pair in the console overbridge, just above the VU/Oscillator module. The SOLO meters may be driven pre or post fader, depending on whether the module's CUE (PFL) or SOLO (AFL) switches are pressed.

Input Module Control Ports

The MI-80 input module has two control ports: one for microphone sources ("MIC LOGIC"), the other for line sources ("MACHINE CONTROL"). Each has its own DB-9 connector mounted on the module's rear panel.

Control functions are input specific; that is, programming jumpers on the module's switch PCB (SISW-80) activate them for Line 1 and/or Line 2, and programming jumpers on the module's main PCB activate them for Mic 1 and/or Mic 2.

EXAMPLE: A logic enable jumper for L2 has been installed (but not one for L1). When L2 is selected at the top of the module, and the module's Channel ON switch is pressed, then control functions will take place for any source machine hooked up to the Line 1/2 Logic DB-9 connector. However, if L1 is preselected and the channel is turned ON, nothing will take place at the source machine wired to the control connector.

Generally speaking, input port control jumpers (zero ohm resistors) are already installed at the factory as required by client specifications, however, should you wish to install your own, see jumpers J4 thru J7, Technical Drawings "MI-80 Switch Card" load sheet (page 18, lower right) and "SISW-80 Schematic" (page 17, D3):

Mic 1 – J7
Mic 2 – J6
Line 1 – J5
Line 2 – J4

MIC LOGIC DB-9 connector Functions (for Mic Sources):

To Turn the Module ON & OFF from a Remote Location

REMOTE ON – Activates the module's CHANNEL ON switch. Provide a momentary closure between pins 1 and 7. This will latch the module ON. (User-supplied momentary contact switch required.)

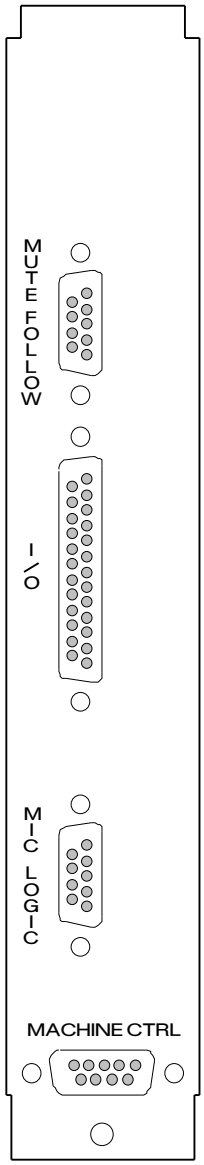
REMOTE OFF – De-activates the module's CHANNEL ON switch. Provide a momentary closure between pins 1 and 9. This will latch the module OFF. (User-supplied momentary contact switch required.)

COUGH (Momentary OFF) – Provide a closure between pin 3 and pin 1. This will turn the module OFF. Note this is a non-latching mode; the module will turn on again as soon as the closure stops. (User-supplied momentary contact switch required.)

Talkback to Control Room (TB to CR)

Lets talent at a remote location talk to the console operator instead of having his mic signal go out "live". In this case a user-supplied momentary action TALKBACK switch is required for the remote microphone, where a closure between pins 1 and 2 does two things: (a) the module's PFL signal is placed on the console's CUE bus (where it may be heard by the console operator) and (b) the module's COUGH function is simultaneously activated, to prevent the TB signal from going out over other assigned busses (i.e., "live"). This non-latching condition continues until the external TB switch is released.

Refer to the pintout diagrams on page 2-12 in conjunction with the text of this section.



The module's MIC LOGIC and MACHINE CTRL DB-9 connectors are located at the bottom of the rear panel

On Tally

Lets the module's channel ON switch control an on-air light or other "microphone on" indicator at a remote location. This opto-isolated control function provides a continuous closure between pin 4 (ON TALLY) and pin 1 (GND) whenever the module's channel ON switch is pressed. This closure can be used to control an externally powered tally light that requires a continuous closure to function. Or an external tally light (i.e., LED) can be powered from the input module by connecting the external LED to pin 6 (+5V) and pin 4 (ON TALLY). In either case, the current is not to exceed 50 milliamps.

MACHINE CTRL DB-9 connector Functions (for Line Sources):

To START & STOP a Remote Source Machine Using the Module's Channel ON Switch:

Machine START – The remote source machine's external on pins are wired to the console input module's DB-9 CONTROL connector pins 2 (START) and 1 (MACHINE COMMON). Whenever the module's channel ON switch is activated, the remote machine will start playing.

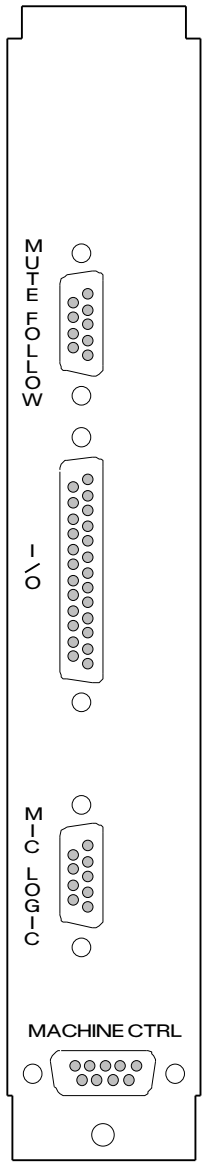
Machine STOP – The remote source machine's external off pins are wired to the console input module's DB-9 CONTROL connector pins 3 (STOP) and 1 (MACHINE COMMON). Whenever the module's channel ON switch is deactivated, the remote machine will stop playing.

EFS On/Off – This control function is designed to run European type source machines (as opposed to the American MACHINE START/ STOP functions called out above). When the module is on, a constant closure occurs between DB-9 pins 4 (EFS ON/OFF) and 1 (MACHINE COMMON).

An External Source Machine Turns the Module ON & OFF

REMOTE ON – Activates the module's CHANNEL ON switch. A momentary closure between pins 6 and 7 will latch the module ON. (Can be activated by external source machine control pulses.)

REMOTE OFF – De-activates the module's CHANNEL ON switch. A momentary closure between pins 6 and 9 will latch the module OFF. (Can be activated by external source machine control pulses.)



The module's MACHINE CTRL DB-9 connector is located at the bottom of the rear panel

Ready LED

The module's fader panel has a green ready LED next to the channel ON switch. This LED can be powered by an external source machine to indicate when that machine is cued up and ready for play. The LED hookup pins are 8 (+) and 5 (–) [5VDC nominal].

Input Module Logic Programming

Mute/Tally

The console has four separate MUTE control lines; each input module may be programmed to activate any of these via its channel ON switch. The MUTE control lines are used to shut off control room and studio monitor speakers whenever the microphone for that particular location is activated. The same MUTE control lines can also activate TALLY ports at the console's control room monitor (CR-80) and studio monitor (SC-80) modules (see pages 5-6 and 6-5).

Input module programming is accomplished by PCB-mounted dipswitches located on the main module PCB. Note each of the channel's inputs [M1/2, L1/2] may be programmed separately. See Technical Drawings "MI-80" load sheet (page 15, lower right) and schematic (page 13, D-3). The input mute programming dipswitches are:

Mic 1 – Dipswitch "SW13"
Mic 2 – Dipswitch "SW14"
Line 1 – Dipswitch "SW15"
Line 2 – Dipswitch "SW16"

NOTE on those input modules with an associated preselector panel, each preselector input can also be programmed to mute separately. The eight associated preselector panel dipswitches are "SW1" through "SW8" on the preselector panel PCB. See Technical Drawings "SB-80" load sheet (page 127, center) and schematic (page 126, B-3).

Timer Restart

Input modules may be programmed to automatically reset the console's digital timer to zero and start it counting up whenever the channel On switch is pressed (this is the default setting). This is accomplished by PCB-mounted slide switch "SW12". See Technical Drawings "MI-80" load sheet (page 15, lower right) and schematic (page 13, C-1).

Mix Minus

The input module's summed mix-minus assign signal may be programmed pre or post fader via a PCB-mounted slide switch ("SW14") on the module's fader panel main PCB. See Technical Drawings "FPI-80" load sheet (page 41, lower left) and schematic (page 38, C-5). The default setting is "post".

The input module's summed mix-minus assign signal may also be programmed to follow the channel ON switch via a programming jumper ("J3") on the module's fader panel main PCB (this is the default setting). If jumper "J4" is installed instead, then mix-minus will follow the console's Mute Group control lines as well. See Technical Drawings "FPI-80" load sheet (page 41, left center) and schematic (page 38, dead center).

LED VU ladder

The input module's mono LED VU meter signal may be programmed pre or post fader via a PCB-mounted slide switch ("SW13") on the module's fader panel main PCB. See Technical Drawings "FPI-80" load sheet (page 41, extreme left) and schematic (page 38, B-7). The default setting is "pre", which allows the meter to act as a "signal present" indicator.

AUX Sends

Aux sends may be programmed to follow the module's channel ON switch regardless of their individual front panel pre/post fader switch settings (this is the default setting). This is accomplished by PCB-mounted slide switch (SW 22) on the module's switchcard PCB. See Technical Drawings "SISW-80 Switch Card Load Sheet" (page 18, center right) and schematic (page 16, A-4).

Mute Follow Connector

The module's MUTE FOLLOW DB-9 connector, located at the top of the rear panel, is used to transmit muting and tally control signals between the module proper and it's optional preselector panel in the console's overbridge. It is wired pin-for-pin to a matching connector mounted behind each preselector, on the rear face of the console meterbridge.

Actual preselector mute/tally programming is done through PCB-mounted dipswitches (eight; one for each source) on each preselector panel switchcard. See Technical Drawings, "SB-1000 Smart Button" schematic (page 126) and load sheet (page 127).

Input Module Audio Wiring

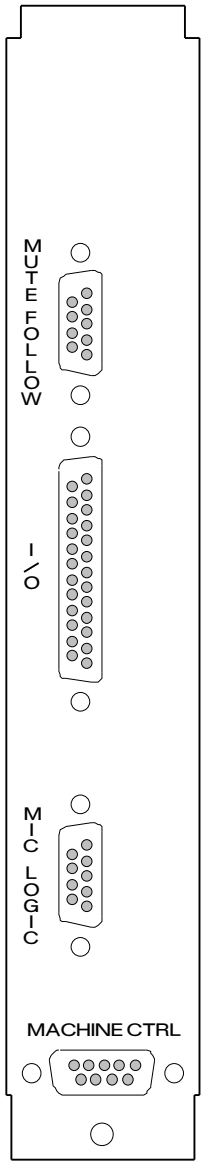
All audio wiring for the mono mic/line input module is via a single DB-25 connector (I/O "A") mounted on the module's rear panel. Audio signals include mic and line inputs, insert point wiring, and direct out. See drawing on next page for detailed pinouts.

Printed Circuit Board Load Sheets

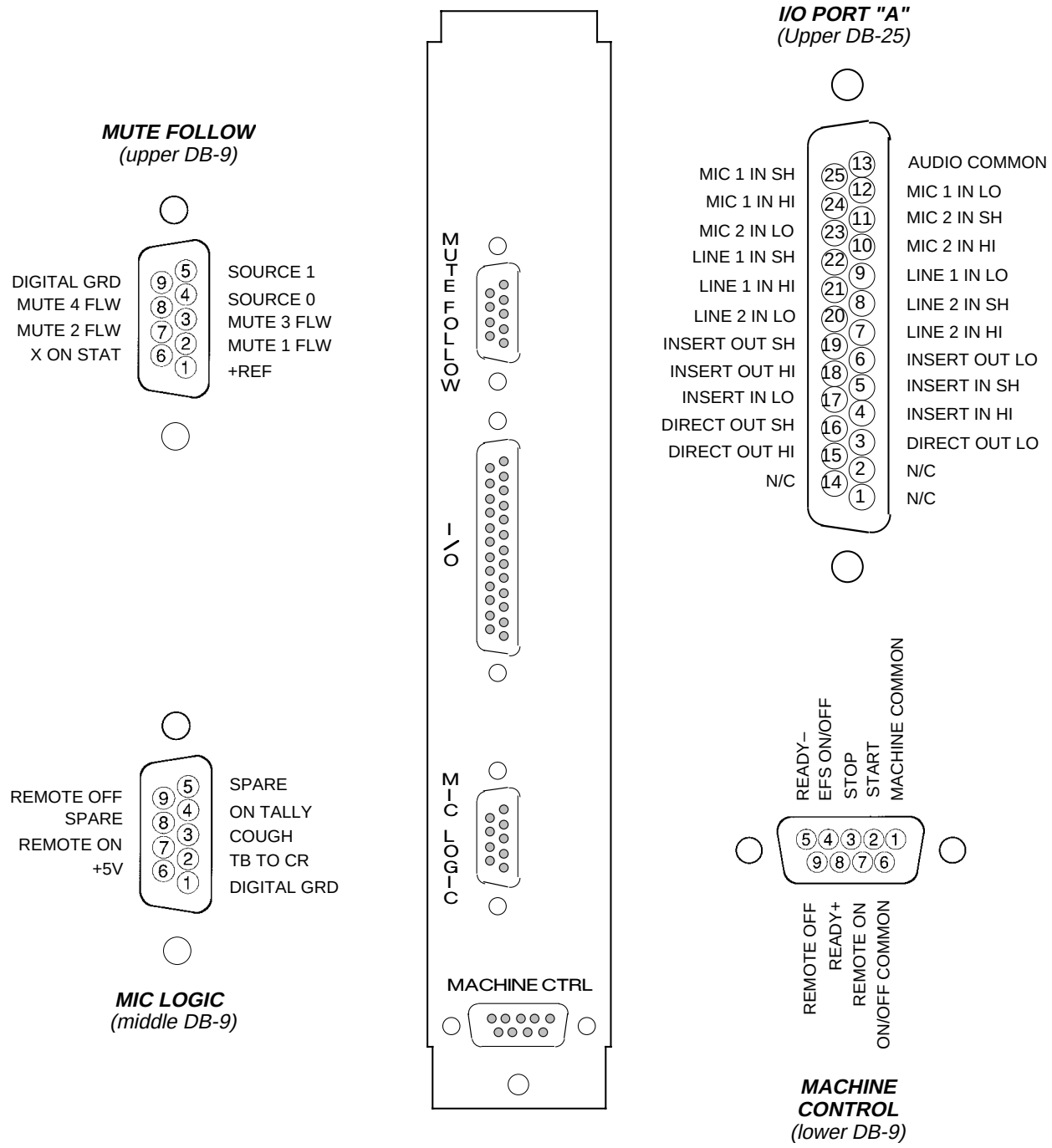
Load sheet drawings, showing all part locations, are in the Technical Drawings booklet (see contents on page 2-2 for specific drawing locations).

Schematics

Schematic drawings are also in the Technical Drawings booklet (see contents on page 2-2 for specific drawing locations).



The module's DB-25 connector (A) handles all audio input/output signals.



Mono Mic/Line Input Module Rear Panel Pinouts

Stereo Line Inputs

General

SI-80 input modules accept and output stereo signals; each module can select one of four stereo line level source signals.

Each input channel consists of three separate panels mounted in a single mainframe position:

a) the main module itself (far right),

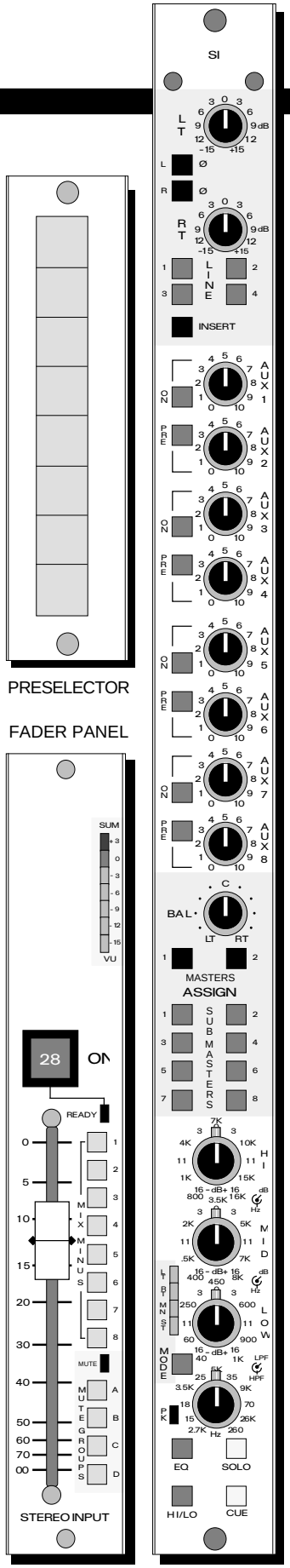
b) a fader panel directly in line with and below the main module (physically separated by the console's alpha-numeric source display strip), and

c) an (optional) 8-bank preselector switching panel located directly above each channel in the meterbridge overbank section.

Input channel audio I/O (input/output) connections are made via two DB-25 multi-pin connectors ("A" upper; "B" lower) located on the back rear panel of each main module. Input channel logic and control signals are made through a DB-9 "Control" connector directly below the two DB-25 audio connectors (see page 2-35). An additional DB-9 connector, "mute follow", is mounted on each rear panel; it is used to allow preselector sources to activate the console's four mute/tally signals.

Note console preselector panel switches do *not* control audio directly. Instead, they send control pulses to separate rackmounted switching cages ("Smart Select®" cages). Actual audio source signals are wired directly to the rackmounted Smart Select® cages (via rear chassis-mounted DB-25 connector pairs); the cages then feed selected source signals back to the main input modules.

For a better understanding of the text that follows, please refer to the signal flow diagram on page 19 of the Technical Drawings.



Main Module

Input Section

The upper section of this input module selects one of four stereo line inputs. The electronically balanced line input section has left and right center detent input gain controls (with PCB-mounted calibration trimpots for fine adjustment), left and right phase reverse switches and a patch point INSERT switch (stereo insert points are electronically balanced in and out).

AUX Section

This section taps eight summed (L+R) post-EQ auxiliary send signals from the main input channel and routes them to the console's send ACN busses. There is a pre/post selector switch and an ON switch for each pair of aux circuits. *NOTE aux circuits may also be programmed to operate as left/right stereo pairs via PCB-mounted programming dipswitches (see page 2-19).* Also, while aux pre/post switches normally switch before or after both the channel fader AND channel On switch, special PCB-mounted slide switches (four per module) permit dual AUX pairs to follow main channel ON/OFF even when switched to "pre" (page 2-19).

BAL Control – MODE Switch

The center-detent BAL rotary control operates in conjunction with the module's MODE switch. Here are the possible settings and functions:

Stereo Mode (ST) – Default setting (MODE switch cap illuminates); the rotary control functions as a regular L/R stereo balance pot.

Mono Mode (MN) – Rotary control functions as a pan pot (a L+R summed signal is panned L/R within the module's stereo field).

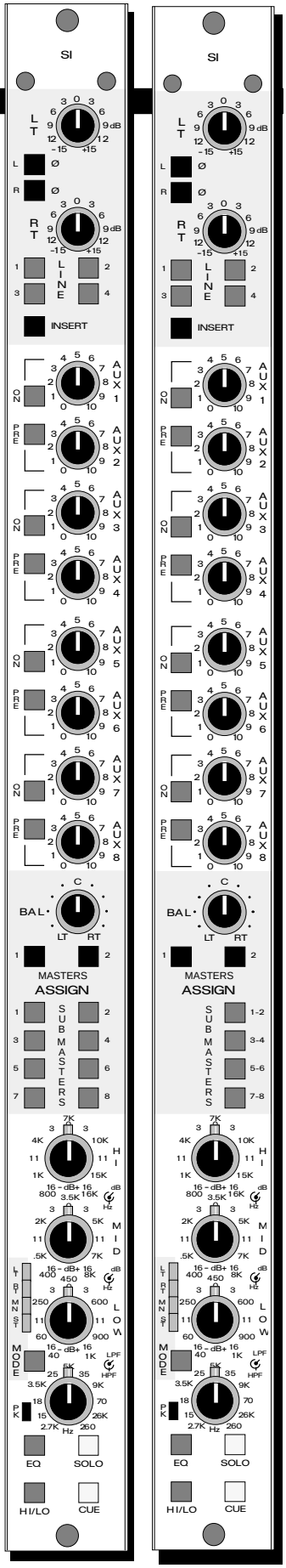
Right Mode (RT) – Rotary control pans the right channel signal L/R within the module's stereo field.

Left Mode (LT) – Rotary control pans the module's left channel signal L/R within the module's stereo field.

Bus Assign

Each input module may have its output assigned to any combination of the console's two stereo MASTERS and/or eight mono SUBMASTERS.

Note the module is available in two versions: one assigns a summed L+R channel signal to the eight mono SUBMASTERS ("SI-88"; left panel); the other assigns the module's stereo signal to L/R pairs of SUBMASTERS (i.e., 1-2, 3-4, 5-6, 7-8; "SI-84"; shown on right panel).



Equalization Section

A four-band stereo EQ/filter section is included, employing 3 sweep frequency peaking sections (each ±16dB with reciprocal curves) plus sweep frequency (-12dB/octave slope) low pass (2.7KHz-26KHz) and high pass (12Hz to 260Hz) filters. Note the three-band EQ and HI/LO pass filter sections may be switched in and out separately.

Peak LED

A peak reading LED indicator lights to indicate overload conditions within the channel circuitry (the indicator monitors both pre and post fader points in the signal chain).

Cue and Solo

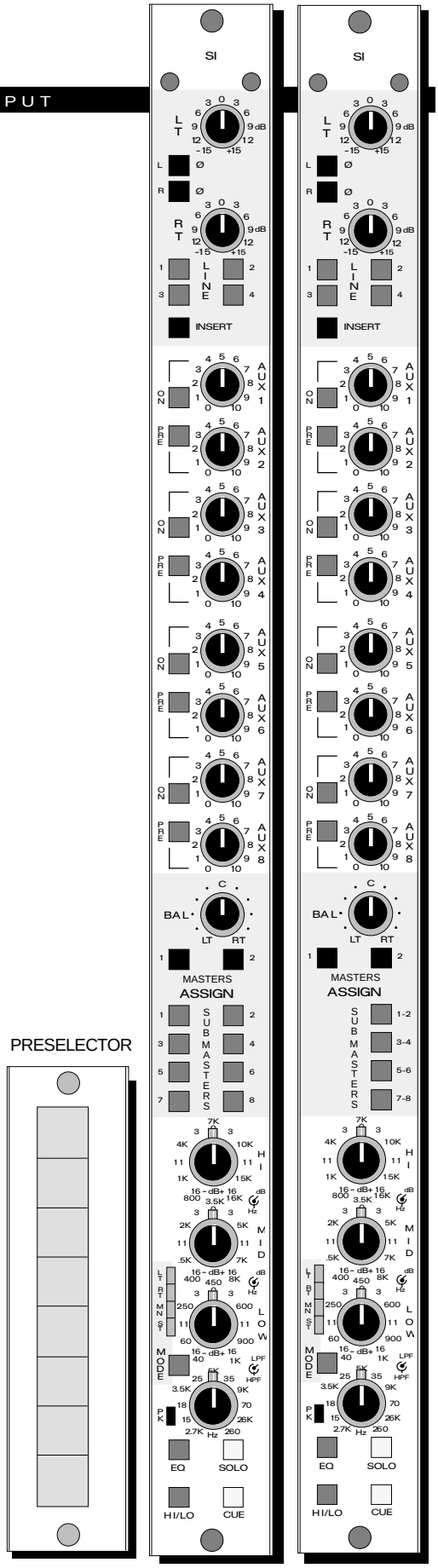
Both pre-fader CUE and post-fader/post-channel on SOLO functions are provided. These switches tap the module's PFL and AFL signals and route them to the console's stereo SOLO/CUE monitor bus, where they may be used to feed operator headphones, control room monitors, dedicated speakers, etc. (SOLO/CUE is mastered at the console's control room monitor module; see Chapter 5.)

Direct Out

Each input module has an electronically balanced direct output. It is post fader, post channel ON.

Preselector Panel

TV-80 input modules may be supplied with optional overbridge preselector panels. These consist of an eight-bank switch array that determines the source signal being fed to the main module's Line 1 input. As stated before, preselector panels do not control audio directly; they send control pulses to switcher cards mounted in a separate rackmount Smart Select® cage. The cage card then returns the appropriate signal to the module. See pages 8-2 thru 8-5 for smart cage wiring details.



Input Fader Panel

Each input module has an associated fader panel located directly below it. Starting from the bottom, these panels are configured as follows:

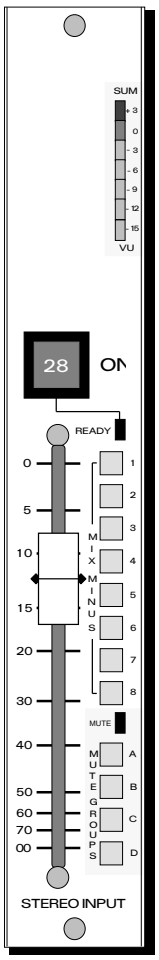
Fader

A 3000 Series Penny & Giles long-throw (104mm) stereo fader. Plug-in for easy servicing.

Mute Groups

Each input channel may be assigned to any or all of four Mute Control Groups. These groups (A thru D) can then be muted by the press of a single master mute button (in other words, whenever the master switch for a mute group is activated, any module assigned to that group will have its output muted). A “mute” LED indicator lights whenever a module has been muted. (The four mute master switches are located in the fader section of the board, directly underneath the power interface module in the center of the console.)

FADER PANEL



Mix Minus

Feeds the module’s signal to the console’s mix-minus system. Any module turned ON automatically feeds a signal to all eight mix-minus busses. Creation of a feed for IFB or remote use is done by simply pressing one or more of the eight mix-minus switches on the chosen input module’s fader panel, which *removes* that module's feed from the selected busses. Illuminated mix-minus switches thus show the *deselected* status directly at the input source.

Note the mix-minus signal may be programmed (by an internal PCB-mounted slide switch) to be pre or post fader; a programming jumper permits the mix-minus feed to follow channel ON/OFF. See page 2-18, “Mix Minus” for details.

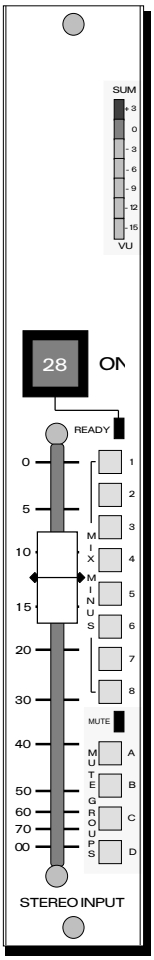
Ready LED

Used for line inputs; this tally LED is powered by an external source machine to indicate when it is cued-up and ready for play.

Channel ON

This momentary action lighted pushbutton switch turns the input channel on and off. It may also be programmed to activate tallies and mutes (4) and timer restart; a DB-9 control port lets the switch control (or be controlled by) external devices. See this chapter, “Input Module External Control Ports” and “Input Module Logic Programming” for a complete discussion.

FADER PANEL



Metering

Each individual input channel has its own 7-segment LED sum VU ladder built in to that channel's fader panel. This LED VU may be internally programmed to monitor pre or post fader. It is always, however, pre channel ON/OFF, allowing it to function as a signal present indicator. The VU ladder is calibrated via a PCB-mounted trimpot on the fader panel's main printed circuit board ("CR1" – see "FPI-80" load sheet on page 41 of the Technical Drawings, center left). Note a single PEAK LED indicator at the bottom of the main module faceplate also warns of overload transients (it monitors both pre and post fader).

Input channels may also be metered at the console's stereo SOLO VU meter pair in the console overbridge, just above the VU/Oscillator module. The SOLO meters may be driven pre or post fader, depending on whether the module's CUE (PFL) or SOLO (AFL) switches are pressed.

Input Module Control Port

The SI-80 input module has one DB-9 CONTROL port mounted at the bottom of the module's rear panel.

Control functions are input specific; that is, programming jumpers on the module's switch PCB (SISW-80) activate them for Lines 1 thru Line 4.

EXAMPLE: A logic enable jumper for L2 has been installed (but not one for L1). When L2 is selected at the top of the module, and the module's Channel ON switch is pressed, then control functions will take place for any source machine hooked up to the Control DB-9 connector. However, if L1 is preselected and the channel is turned ON, nothing will take place at the source machine wired to the control connector.

Generally speaking, input port control jumpers (zero ohm resistors) are already installed at the factory as required by client specifications, However, should you wish to install your own, see jumpers J4 thru J7, Technical Drawings "Stereo Line Switch Card" load sheet (page 18, center right) and schematic (page 17, D3). Input ports are enabled as follows: Line 1: J7, Line 2: J6, Line 3: J5, Line 4: J4.

To START & STOP a Remote Source Machine Using the Module's Channel ON Switch:

Machine START – The remote source machine's external on pins are wired to the console input module's DB-9 CONTROL connector pins 2 (START) and 1 (MACHINE COMMON). Whenever the module's channel ON switch is activated, the remote machine will start playing.

Machine STOP – The remote source machine's external off pins are wired to the console input module's DB-9 CONTROL connector pins 3 (STOP) and 1 (MACHINE COMMON). Whenever the module's channel ON switch is deactivated, the remote machine will stop playing.

EFS ON/OFF – This control function is designed to run European type source machines (as opposed to the American MACHINE START/STOP functions called out above). When the module is on, a constant closure occurs between DB-9 pins 4 (EFS ON/OFF) and 1 (MACHINE COMMON).

An External Source Machine Turns the Module ON & OFF

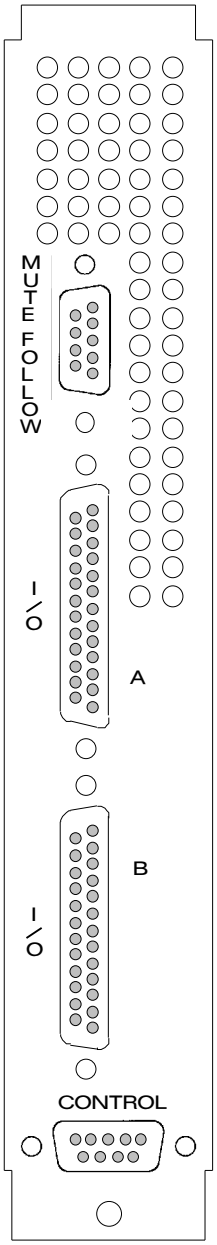
REMOTE ON – Activates the module's CHANNEL ON switch. A momentary closure between pins 6 and 7 will latch the module ON. (Can be activated by external source machine control pulses.)

REMOTE OFF – De-activates the module's CHANNEL ON switch. A momentary closure between pins 6 and 9 will latch the module OFF. (Can be activated by external source machine control pulses.)

Ready LED

The module's fader panel has a green ready LED next to the channel ON switch. This LED can be powered by an external source machine to indicate when that machine is cued up and ready for play. The LED hookup pins are 8 (+) and 5 (–) [5VDC nominal].

Refer to the pinout diagrams on page 2-21 in conjunction with the text of this section.



The DB-9 CONTROL connector is mounted at the bottom of the module's rear panel.

Input Module Logic Programming

Mute/Tally

The console has four separate MUTE control lines; each input module may be programmed to activate any of these via its channel ON switch. The MUTE control lines are used to shut off control room and studio monitor speakers whenever the channel for that particular location is activated. The same MUTE control lines can also activate TALLY ports at the console's control room monitor (CRM-80) and studio monitor (STM-80) modules (see pages 5-6 and 6-5).

Input module programming is accomplished by PCB-mounted dipswitches located on the main module PCB. Note each of the channel's inputs [L1 thru L4] may be programmed separately. See Technical Drawings "SI-80" load sheet (page 44, lower right) and schematic (page 42, C-3). The input mute programming dipswitches are:

Line 1 – Dipswitch "SW19"
Line 2 – Dipswitch "SW20"
Line 3 – Dipswitch "SW21"
Line 4 – Dipswitch "SW22"

NOTE on those input modules with an associated preselector panel, each preselector input can also be programmed to mute separately. The eight associated preselector panel dipswitches are "SW1" through "SW8" on the preselector panel PCB. See Technical Drawings "SB-80" load sheet (page 127, center) and schematic (page 126, B-3).

Timer Restart

Input modules may be programmed to automatically reset the console's digital timer to zero and start it counting up whenever the channel On switch is pressed (this is the default setting). This is accomplished by PCB-mounted slide switch "SW18". See Technical Drawings "SI-84/88" load sheetS (page 27/36, lower right) and schematicS (page 25/34, C-2).

Mix Minus

The input module's summed mix-minus assign signal may be programmed pre or post fader via a PCB-mounted slide switch ("SW14") on the module's fader panel main PCB. See Technical Drawings "FPI-80" load sheet (page 41, lower left) and schematic (page 38, C-5). The default setting is "post".

The input module's summed mix-minus assign signal may also be programmed to follow the channel ON switch via a programming jumper ("J3") on the module's fader panel main PCB (this is the default setting). If jumper "J4" is installed instead, then mix-minus will follow the console's Mute Group control lines as well. See Technical Drawings "FPI-80" load sheet (page 41, left center) and schematic (page 38, dead center).

Sum LED VU ladder

The input module's mono sum LED VU meter signal may be programmed pre or post fader via a PCB-mounted slide switch ("SW13") on the module's fader panel main PCB. See Technical Drawings "FPI-80" load sheet (page 41, extreme left) and schematic (page 38, B-7). The default setting is "pre", which allows the meter to act as a "signal present" indicator.

AUX Sends

The TV-80 console aux SEND busses are normally configured as eight mono ACNs. However, they may be reprogrammed as left/right pairs if desired. This is accomplished by PCB-mounted slide switches on the module's main PCB (SW 10-17). See Technical Drawings "SI-84/88" load sheets (page 27/36, left center) and schematics (page 23/32, A-6 thru D-6). The programming switches are:

Aux send 1 sum/left: SW10
Aux send 2 sum/right: SW 11
Aux send 3 sum/left: SW12
Aux send 4 sum/right: SW 13
Aux send 5 sum/left: SW14
Aux send 6 sum/right: SW 15
Aux send 7 sum/left: SW 16
Aux send 8 sum/right: SW 17

Note the above switches are reached through access cutouts in the module's upper switchcard PCB.

Aux sends may also be programmed to follow the module's channel ON switch regardless of their individual front panel pre/post fader switch settings (this is a the default setting). This is accomplished by PCB-mounted slide switch (SW 22) on the module's switchcard PCB. See Technical Drawings "SISW-80 Switch Card" load sheet (page 18, center right) and schematic (page 16, A-4).

Mute Follow Connector

The module's MUTE FOLLOW DB-9 connector, located at the top of the rear panel, is used to transmit muting and tally control signals between the module proper and it's optional preselector panel in the console's overbridge. It is wired pin-for-pin to a matching connector mounted behind each preselector, on the rear face of the console meterbridge.

Actual preselector mute/tally *programming* is done through PCB-mounted dipswitches (eight; one for each source) on each preselector panel switchcard. See Technical Drawings, "SB-1000 Smart Button" schematic (page 126) and load sheet (page 127).

Input Module Audio Wiring

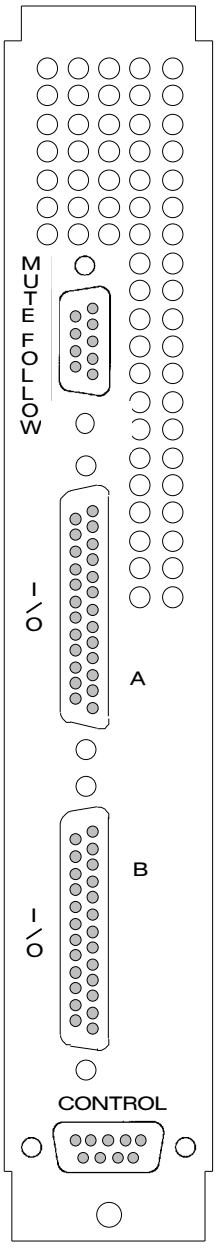
All audio wiring for the stereo mic/line input module is via two DB-25 connectors mounted on the module's rear panel. Audio signals include line inputs (upper connector "A") and insert point wiring and direct out (lower connector "B"). See drawing on next page for detailed pinouts.

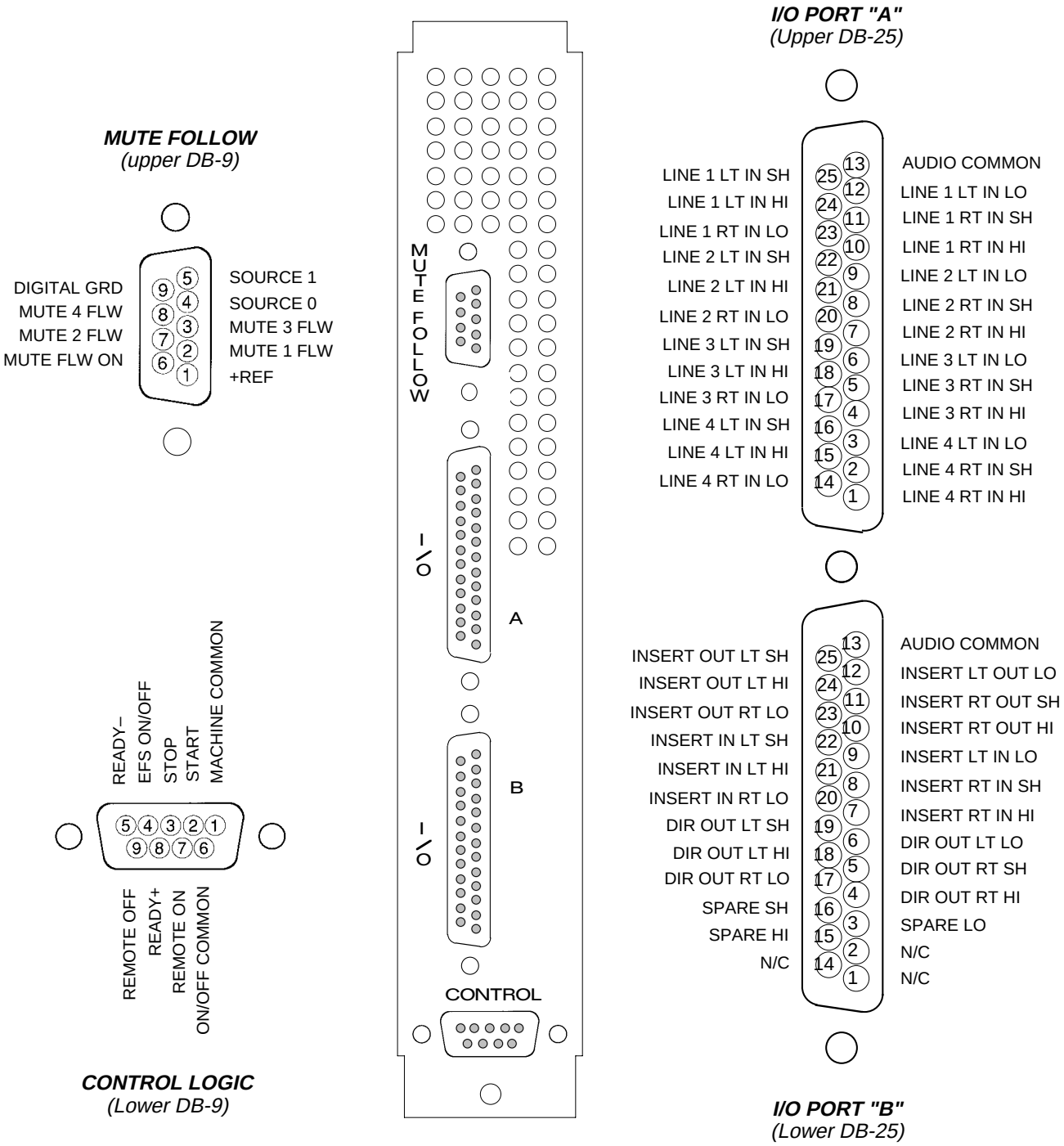
Printed Circuit Board Load Sheets

Load sheet drawings, showing all part locations, are in the Technical Drawings booklet (see contents on page 2-3 for specific drawing locations).

Schematics

Schematic drawings are also in the Technical Drawings booklet (see contents on page 2-3 for specific drawing locations).





Stereo Line Input Module Rear Panel Pinouts

Submaster Modules

Chapter Contents

Submaster Module

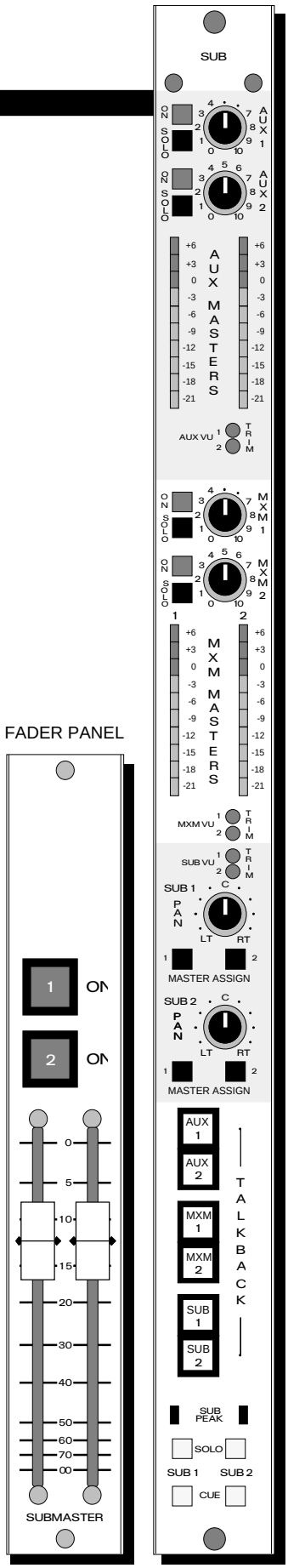
General

TV-80 audio consoles come equipped with four SUBMASTER modules. Each submaster module controls two mono subgroups and houses the master circuitry for two console AUX SEND and two console MIX MINUS outputs. There is an associated dual fader panel directly beneath each main module faceplate.

Submaster audio I/O (input/output) connections are made via two DB-25 multi-pin connectors ("A" upper; "B" lower) located on the back rear panel of the module (see page 3-6).

Please refer to the signal flow diagram on page 46 of the Technical Drawings in conjunction with the text of this chapter.

Main Module Controls



FADER PANEL

Aux Master Section

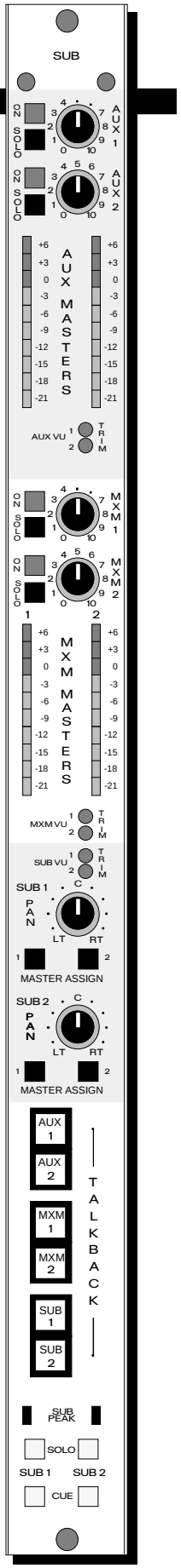
The TV-80 console has eight AUX send outputs; each of the console's four submaster modules contains the master controls for two console AUX sends. Each control set consists of a master level pot, an ON switch, and a SOLO switch, which allows the console operator to spot monitor that particular AUX signal via the console's SOLO interrupt circuit and SOLO/CUE VU meters. Note AUX insert points are provided (they may be PCB-jumper bypassed—the factory default; see page 3-4).

Mix Minus Master Section

The TV-80 console has eight MIX MINUS outputs; each of the console's four submaster modules contains the master controls for two console MIX MINUS outputs. Each control set consists of a master level pot, an ON switch, and a SOLO switch, which allows the console operator to spot monitor that particular MIX MINUS signal via the console's SOLO interrupt circuit and SOLO/CUE VU meters.

Mix Minus Confidence Feed

This is a feature that interrupts regular Mix Minus outputs with a mono line level signal inputted at each submaster module's rear panel upper DB-25 ("A") audio connector. Individual interrupts are controlled by eight MIX MINUS CONFIDENCE FEED switches on a separate module. A ninth MASTER switch will interrupt all eight feeds simultaneously.



LED VU Ladders

These four meters monitor the module's two AUX and two MIX MINUS outputs.

VU Trims

AUX and MIX MINUS (mono) outputs each are metered via two 10-segment LED VU ladders. These meters are calibrated by the AUX and MXM recessed front panel trimpots on the main module faceplate. There are left and right trimpots for the console's meterbridge mounted submaster VU meters.

Pan Pots

Pan submaster mono signals L and R within assigned output master stereo signals.

Master Assign

The module's SUBMASTER signals may be further assigned to the TV-80 console's two stereo master outputs.

Talkback

Six TB switches (AUX1, AUX2, MXM1, MXM2, SUB1 and SUB2) allow of the console operator's talkback microphone signal to be routed to each submaster module's AUX, MIX MINUS and SUBMASTER outputs.

Sub Peak LED

Each Submaster module has two SUB Peak LEDs which monitor the module's submaster signals for overload transients.

Solo and Cue

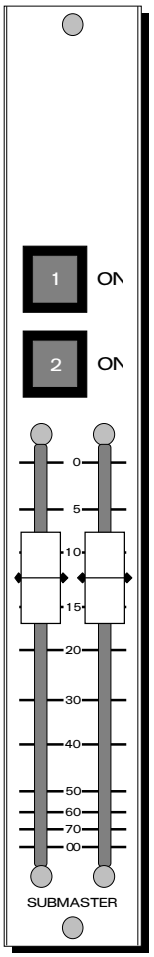
Two submaster pre-fader CUE and post-fader SOLO switches are provided. These switches tap the module's PFL and AFL signals and route them to the console's SOLO/CUE monitor bus, where they may be used to feed operator headphones, control room monitors, dedicated speakers, etc. (SOLO/CUE is mastered at the console's control room monitor module; see Chapter 5.)

Submaster Insert Point (rear panel)

The module's rear panel has an electronically balanced insert point in the submaster signal chain (lower DBD-25 connector "B"). It is normally PCB-jumper bypassed at the factory (see page 3-5).

Fader Panel Controls

FADER PANEL



Each submaster module has an associated dual fader panel located directly below it. Starting from the bottom, these panels are configured as follows:

Faders

3000 Series Penny & Giles long-throw (104mm) faders; one for each submaster channel. Plug-in for easy servicing.

Channel ON

These momentary action lighted pushbutton switches turn the module's submaster signals on and off.

Metering

Submasters

In standard mainframe configurations, each of the console's eight submaster modules has a dedicated VU meter mounted in the console meterbridge. This monitors the submaster signal as it outputs the console. Recessed front panel access VU calibration trimpots in the middle of the module ("SUB 1-2") permit calibration. A SUB PEAK LED is included at the bottom of the main module faceplate. Like all signals on the console, submasters can also be metered (PFL or AFL) at the stereo SOLO meter pair.

Submaster Module Internal Programming

AUX Solo

The module's AUX signals are mono; the console's SOLO circuit is stereo. PCB dipswitch "SW5" allows you to determine whether the mono AUX signal goes onto the left and/or right SOLO busses. See Technical Drawings SG-80 schematic (page 51, B-3), and PCB load sheet (page 53 lower right).

AUX Insert Bypass

The module's mono AUX signal electronically balanced insert points are normally bypassed at the factory via PCB jumpers (see Technical Drawings SG-80 schematic, page 48 D&C-6, and PCB load sheet (page 60 extreme lower left). If you wish to use these patch points it will be necessary to *remove* the factory installed jumpers.

Submaster Insert Bypass

The module's electronically balanced SUBMASTER insert points may be bypassed via PCB jumpers "J4" through "J7". (See Technical Drawings SG-80 PCB load sheet, page 53 lower left, and schematic, page 47 D-5 & B-5).

NOTE insert bypass jumpers are normally pre-installed at the factory. If you intend to use a submaster outboard processing loop, you must remove these jumpers.

Submaster Module Audio Wiring

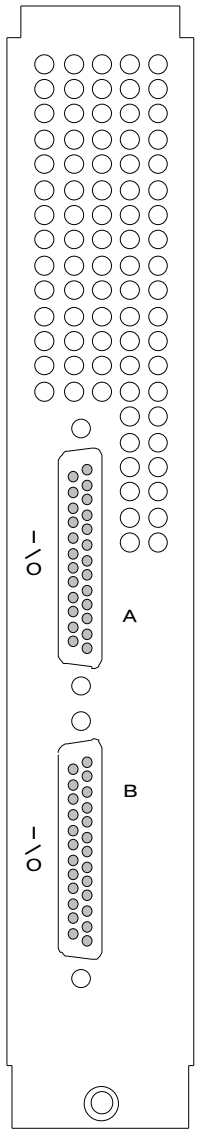
All audio wiring for the submaster module is via two DB-25 connectors mounted on the module's rear panel (see right). Audio signals include submaster outputs, aux and mix minus outputs, confidence feed line in (upper connector "A") and submaster and aux insert points (lower connector "B"). See pinout drawing on next page for wiring details.

Printed Circuit Board Load Sheets

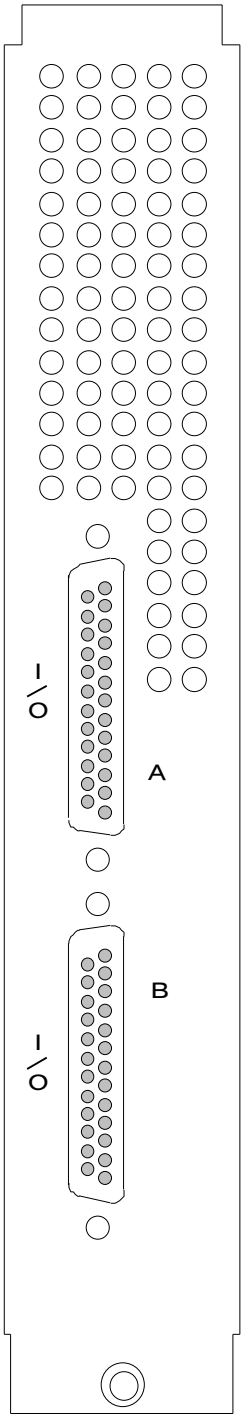
Load sheet drawings, showing all part locations, are in the Technical Drawings booklet (see "Chapter Contents" on page 3-1 for specific drawing locations).

Schematics

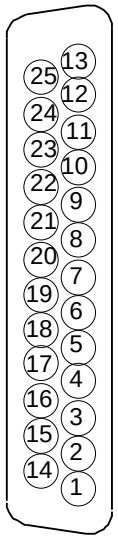
Schematic drawings are in the Technical Drawings booklet (see "Chapter Contents" on page 3-1 for specific drawing locations).



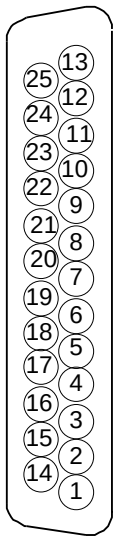
The module's two DB-25 connectors (A & B) handle all input/output signals.



I/O PORT "A
(Upper DB-25)



SUB 1,3,5,7 OUT SH	25	13 AUDIO COMMON
SUB 1,3,5,7, OUT HI	24	12 SUB 1,3,5,7 OUT LO
SUB 2,4,6,8 OUT LO	23	11 SUB 2,4,6,8 OUT SH
AUX 1,3,5,7 OUT SH	22	10 SUB 2,4,6,8 OUT HI
AUX 1,3,5,7 OUT HI	21	9 AUX 1,3,5,7 OUT LO
MXM 1,3,5,7 OUT LO	20	8 MXM 1,3,5,7 OUT SH
CONFIDENCE IN SH	19	7 MXM 1,3,5,7 OUT HI
CONFIDENCE IN HI	18	6 CONFIDENCE IN LO
MXM 1,3,5,7 INTR LOGIC	17	5 DIGITAL COMMON
AUX 2,4,6,8 OUT SH	16	4 MXM 2,4,6,8 INTR LOGIC
AUX 2,4,6,8 OUT HI	15	3 AUX 2,4,6,8 OUT LO
MXM 2,4,6,8 OUT LO	14	2 MXM 2,4,6,8 OUT SH
		1 MXM 2,4,6,8 OUT HI



SUB 1,3,5,7 INSERT OUT SH	25	13 AUDIO COMMON
SUB 1,3,5,7 INSERT OUT HI	24	12 SUB1,3,5,7 INSERT OUT LO
SUB 2,4,6,8 INSERT OUT LO	23	11 SUB 2,4,6,8 INSERT OUT SH
SUB 1,3,5,7 INSERT IN SH	22	10 SUB 2,4,6,8 INSERT OUT HI
SUB 1,3,5,7 INSERT IN HI	21	9 SUB 1,3,5,7 INSERT IN LO
SUB 2,4,6,8 INSERT IN LO	20	8 SUB 2,4,6,8 INSERT IN SH
AUX 1,3,5,7 INSERT OUT SH	19	7 SUB 2,4,6,8 INSERT IN HI
AUX 1,3,5,7 INSERT OUT HI	18	6 AUX 1,3,5,7 INSERT OUT LO
AUX 1,3,5,7 INSERT IN LO	17	5 AUX 1,3,5,7 INSERT IN SH
AUX 2,4,6,8 INSERT OUT SH	16	4 AUX 1,3,5,7 INSERT IN HI
AUX 2,4,6,8 INSERT OUT HI	15	3 AUX 2,4,6,8 INSERT OUT LO
AUX 2,4,6,8 INSERT IN LO	14	2 AUX 2,4,6,8 INSERT IN SH
		1 AUX 2,4,6,8 INSERT IN HI

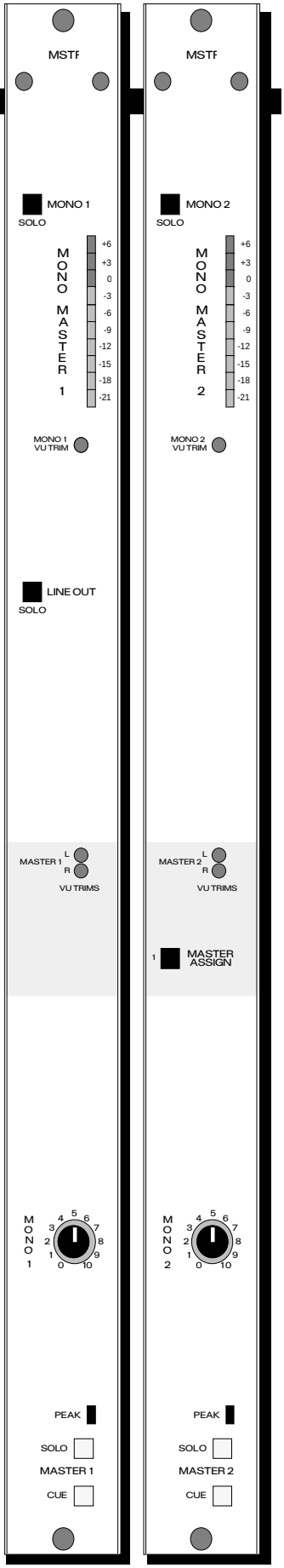
I/O PORT "B
(Lower DB-25)

SUB-80 Dual Mono Submaster Module Pinouts

Stereo Master Modules

Chapter Contents

Stereo Master Module



General

TV-80 audio consoles come equipped with two stereo MASTER modules. Each master module controls one of the console's main stereo outputs. There is an associated stereo fader panel directly beneath each main module faceplate.

Stereo master audio I/O (input/output) connections are made via two DB-25 multi-pin connectors ("A" upper; "B" lower) located on the back rear panel of the module (see pages 4-6 and 4-7).

Please refer to the signal flow diagrams on pages 59 and 60 of the Technical Drawings in conjunction with the text of this chapter. Note stereo MASTER modules utilize the same printed circuit boards as SUBMASTER modules.

Main Module Controls

Mono Master Solo Switch

This switch allows the console operator to spot monitor that particular MONO signal via the console's SOLO interrupt circuit and SOLO VU meters.

Mono Master LED VU Ladder.

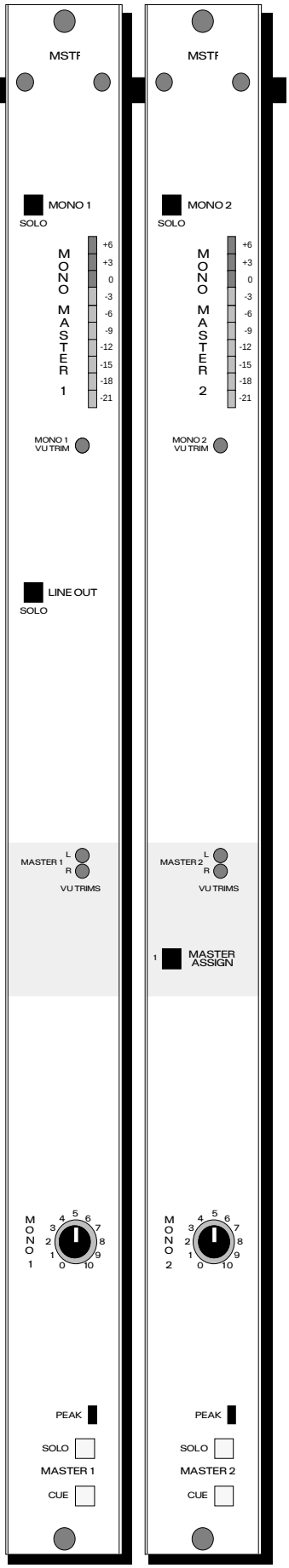
This 10-segment meter monitors the mono master output.

Line Out Solo Switch

Stereo Master Module #1 has two outputs: the regular stereo output, and a special "LINE OUTPUT" which is the same signal but with an interrupt circuit that allows the console operator to substitute an external signal for the regular stereo output. This dedicated SOLO switch will monitor the module's LINE OUTPUT signal.

VU Trims

These recessed front panel trimpots may be used to calibrate the module's main VU meter pair ("Master") and mono master LED VU ladder.



Mono Pot

Controls output level of mono master.

Master 1 Assign (Module 2 only)

Master module 2 may be back-assigned to Master 1 for grand mastering situations.

Outputs

Master modules have two main outputs: stereo master and mono master. Stereo Master module #1 also has an additional LINE OUTPUT tapped off the stereo master out (see "Stereo Master Interrupt" immediately following).

Stereo Master Interrupt (Module 1 only)

This feature interrupts the #1 stereo master module's LINE OUTPUT with a mono line level signal inputted at the module's rear panel upper DB-25 ("A") audio connector. The interrupt is turned on and off by a STEREO MASTER INTERRUPT switch on a separate confidence feed panel. *It may also be turned off (but not on)* by a user-supplied external "Tone Off" switch wired to control pins on that module's rear panel (see page 8-6).

Peak LED

Monitors the module's stereo master signal for overload transient peaks.

Solo and Cue

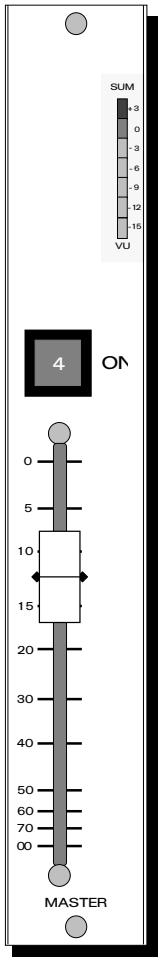
Both pre-fader CUE and post-fader SOLO switches are provided. These switches tap the module's PFL and AFL signals and route them to the console's stereo SOLO/CUE monitor bus, where they may be used to feed operator headphones, control room monitors, dedicated speakers, etc. (SOLO/CUE is mastered at the console's control room monitor module; see Chapter 5.)

Insert Point (rear panel)

The module's rear panel has an electronically balanced stereo insert point in the stereo master signal chain (lower DB-25 connector "B"). It is normally PCB-jumper bypassed at the factory (see page 4-5).

Fader Panel Controls

Each stereo master module has an associated fader panel located directly below it. Starting from the bottom, these panels are configured as follows:



FADER PANEL

Fader

A 3000 Series Penny & Giles long-throw (104mm) stereo fader. Plug-in for easy servicing.

Channel ON

This momentary action lighted pushbutton switch turns the module on and off.

Sum VU

An LED ladder display that meters the module's stereo master summed L+R output. Note the meter may be programmed (by an internal PCB-mounted slide switch, see page 4-5) to monitor pre or post fader. It is always, however, pre channel ON/OFF, allowing it to function as a signal present indicator.

Metering

Stereo Masters

Like inputs and submasters, stereo master fader panels have built-in mono sum LED VU ladders with PCB-mounted calibration trimpots. They may also be metered (PFL or AFL) at the stereo SOLO meter. However, they additionally have dedicated L-R VU meter pairs in the console's meterbridge (these are calibrated by recessed trimpots in the middle of each stereo master module faceplate). A PEAK LED indicator is also mounted at the bottom of the main module faceplate.

Master Module Internal Programming

Master Insert Bypass

The module's electronically balanced STERO MASTER insert points may be bypassed via PCB jumpers "J4" through "J7". (See Technical Drawings SG-80 PCB load sheet, page 53 lower left, and schematic, page 47 D-5 & B-5).

NOTE insert bypass jumpers are normally pre-installed at the factory. If you intend to use an outboard processing loop, you must remove these jumpers.

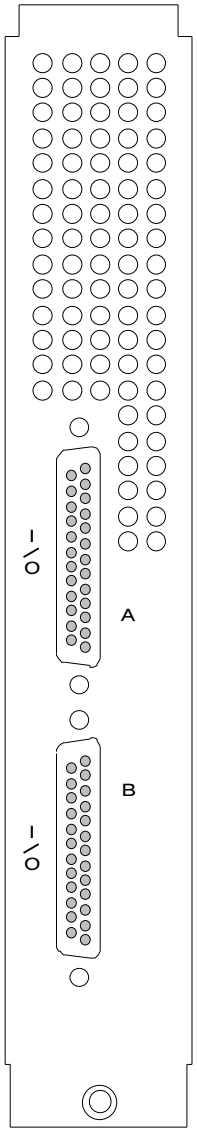
Sum LED VU

The stereo master module's mono sum LED VU meter signal may be programmed pre or post fader via a PCB-mounted slide switch ("SW13") on the module's fader panel main PCB. See Technical Drawings FPO-80 load sheet (page 64, far left) and schematic (page 61, B-7). The default setting is "post".

The Sum LED VU meter may be calibrated by a PCB-mounted trimpot ("CR1") on the fader panel main printed circuit board. See Technical Drawings "FPO-80" load sheet (page 64, left center) and schematic (page 61, B-6).

Master Module Input/Output Wiring

All wiring for the master modules is via two rear panel DB-25 connectors (see right). Signals include stereo and mono sum master outputs, external tone in, external tone control lines (upper connector "A") and master insert points (lower connector "B"). Note external tone pins ("external tone" is the stereo master interrupt signal referred to on page 4-3) are on master module #1 only. See pinout drawings on next two pages for wiring details.



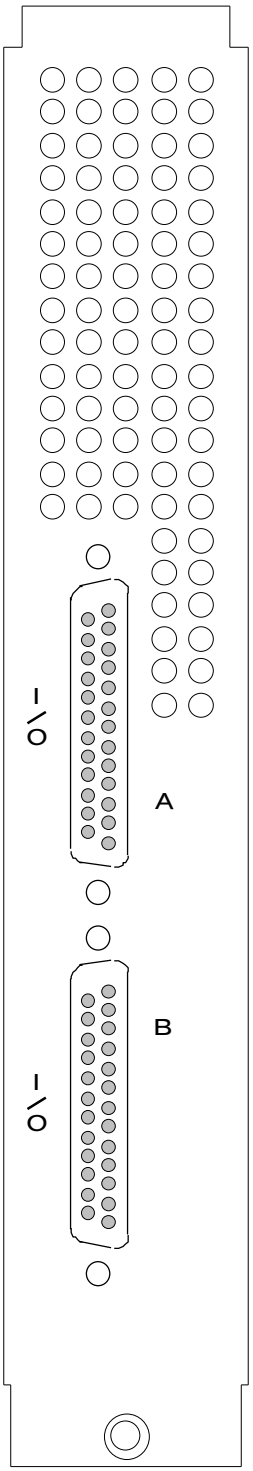
The module's two DB-25 connectors (A & B) handle all input/output signals.

Printed Circuit Board Load Sheets

Load sheet drawings, showing all part locations, are in the Technical Drawings booklet (see "Chapter Contents" page 4-1 for specific drawing locations).

Schematics

Schematic drawings are in the Technical Drawings booklet (see "Chapter Contents" page 4-1 for specific drawing locations).



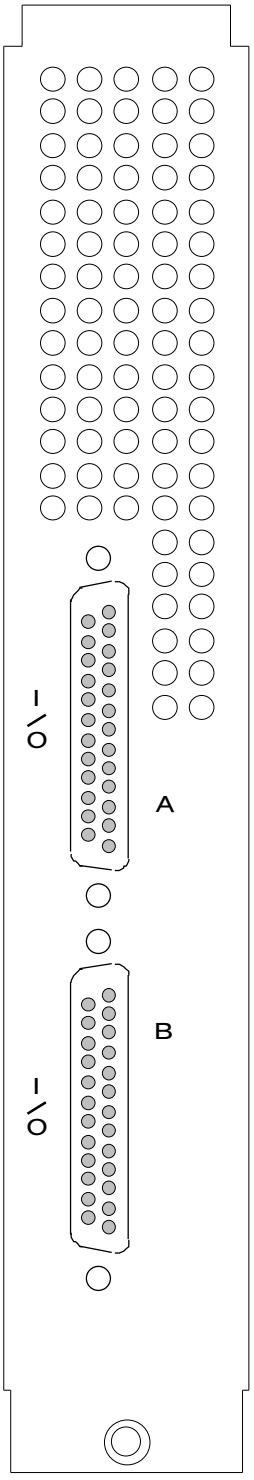
I/O PORT "A
(Upper DB-25)

STEREO 1 LT OUT SH	25	AUDIO COMMON
STEREO 1 LT OUT LT HI	24	STEREO 1 LT OUT LO
STEREO 1 RT OUT LO	23	STEREO 1 RT OUT SH
AUDIO COMMON	22	STEREO 1 RT OUT HI
N/C	21	N/C
LINE OUT LT LO	20	LINE OUT LT SH
TONE IN SH	19	LINE OUT LT HI
TONE IN HI	18	TONE IN LO
STEREO INTR LOGIC	17	DIGITAL COMMON
MONO 1 OUT SH	16	N/C
MONO 1 OUT HI	15	MONO 1 OUT LO
LINEOUT RT LO	14	LINEOUT RT SH
	13	LINEOUT RT HI
	12	
	11	
	10	
	9	
	8	
	7	
	6	
	5	
	4	
	3	
	2	
	1	

ST 1 INSERT OUT LT SH	25	AUDIO COMMON
ST 1 INSERT OUT LT HI	24	ST 1 INSERT OUT LT LO
ST 1 INSERT OUT RT LO	23	ST 1 INSERT OUT RT SH
ST 1 INSERT IN LT SH	22	ST 1 INSERT OUT RT HI
ST 1 INSERT IN LT HI	21	ST 1 INSERT IN LT LO
ST 1 INSERT IN RT LO	20	ST 1 INSERT IN RT SH
AUDIO COMMON	19	ST 1 INSERT IN RT HI
N/C	18	N/C
N/C	17	AUDIO COMMON
MONO 1 INSERT OUT SH	16	N/C
MONO 1 INSERT OUT HI	15	MONO 1 INSERT OUT LO
MONO 1 INSERT IN LO	14	MONO 1 INSERT IN SH
	13	MONO 1 INSERT IN HI
	12	
	11	
	10	
	9	
	8	
	7	
	6	
	5	
	4	
	3	
	2	
	1	

I/O PORT "B
(Lower DB-25)

Stereo Master 1 Module Rear Panel Pinouts



I/O PORT "A
(Upper DB-25)

STEREO 2 LT OUT SH	25	13 AUDIO COMMON
STEREO 2 LT OUT LT HI	24	12 STEREO 2 LT OUT LO
STEREO 2 RT OUT LO	23	11 STEREO 2 RT OUT SH
AUDIO COMMON	22	10 STEREO 2 RT OUT HI
N/C	21	9 N/C
N/C	20	8 AUDIO COMMON
N/C	19	7 N/C
N/C	18	6 N/C
N/C	17	5 DIGITAL COMMON
MONO 2 OUT SH	16	4 N/C
MONO 2 OUT HI	15	3 MONO 2 OUT LO
N/C	14	2 AUDIO COMMON
		1 N/C

ST 2 INSERT OUT LT SH	25	13 AUDIO COMMON
ST 2 INSERT OUT LT HI	24	12 ST 2 INSERT OUT LT LO
ST 2 INSERT OUT RT LO	23	11 ST 2 INSERT OUT RT SH
ST 2 INSERT IN LT SH	22	10 ST 2 INSERT OUT RT HI
ST 2 INSERT IN LT HI	21	9 ST 2 INSERT IN LT LO
ST 2 INSERT IN RT LO	20	8 ST 2 INSERT IN RT SH
AUDIO COMMON	19	7 ST 2 INSERT IN RT HI
N/C	18	6 N/C
N/C	17	5 AUDIO COMMON
MONO 2 INSERT OUT SH	16	4 N/C
MONO 2 INSERT OUT HI	15	3 MONO 2 INSERT OUT LO
MONO 2 INSERT IN LO	14	2 MONO 2 INSERT IN SH
		1 MONO 2 INSERT IN HI

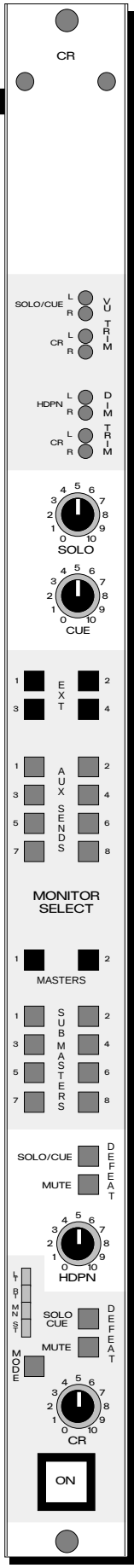
I/O PORT "B
(Lower DB-25)

Stereo Master 2 Module Rear Panel Pinouts

Control Room Module

Chapter Contents

Control Room Module



General

Each TV-80 audio console is equipped with a CR-80 control room monitor module. The control room module allows the console operator to monitor the TV-80 console's inputs and outputs by means of a monitor source select switchbank and the console's SOLO/CUE system. It is also the module that houses the console's on-air tally port.

Input channel audio I/O (input/output) connections are made via two DB-25 multi-pin connectors ("A" upper; "B" lower) located on the back rear panel of the module. Tally logic and control signals are made through a DB-9 "TALLIES" connector directly above the rear panel's two DB-25 audio connectors (see page 5-7).

Please refer to the signal flow diagram on page 68 of the Technical Drawings in conjunction with the text of this chapter.

Controls

VU Trims

Two pairs of recessed, front panel trimpots are used to calibrate the console's SOLO/CUE VU feed and optional CR (control room monitor signal) VU meters.

NOTE while the console's SOLO/CUE master circuitry is located on the CR module, solo meter VU driver circuitry is actually on the console's VO-80 module. The CR module's SOLO/CUE trimpots adjust the signal feed going from the CR module to the VO module's solo/external VU meter drivers (which have their *own* calibration trimpots; see page 7-2).

Solo and Cue Master Level Controls

These rotory level controls set the loudness for the console's SOLO and CUE outputs.

Monitor Select

These source select switches allow the console operator to monitor the console's eight aux sends, eight submasters and two master outputs. Four additional external line inputs (brought in to the module's rear panel) may also be accessed.

Headphone Section

The module's headphone circuit follows the monitor source select switching. There are two headphone outputs: one electronically balanced line level out (programmable as either pre or post HDPN level control), and the other driven by a built-in amplifier (amplifier output may be stereo or L+R summed). Note the headphone outputs are normally subject to the console's muting and solo/cue interrupt circuits; however, these may be defeated by front panel switching if desired.

CR Section

Control room output is determined by the module's monitor source select switching and is subject to the console's muting and solo/cue interrupt circuits (front panel switch defeatable). A CR ON switch turns the console's control room outputs on and off. There are two such outputs; both are electronically balanced line level: one is post level control (variable), the other pre (fixed).

MODE Switch

The mode switch affects both CR and HDPN outputs as follows:

Left Mode (LT) – Left signal to both channels
Right Mode (RT) – Right signal to both channels
Mono Mode (MN) – Left plus right sum signal to both channels
Stereo (ST) — "Normal" mode (MODE switch illuminated).

Tally Ports

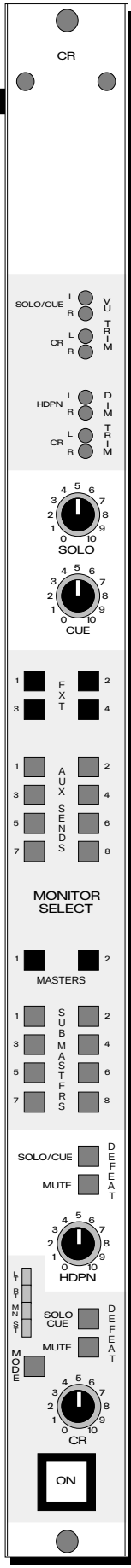
The CR-80 module outputs the console's On-Air tally function. There are two ports: relay closure and opto-isolated. Both are controlled by the console's mute/tally control lines (four; which one activates the CR tally port is determined by a PCB-mounted dipswitch).

Metering

Solo/Cue (mastered at CR-80; metered at VO-80 module)

The console's solo/external left/right meter pair is multi-functional. Under normal use, they will monitor the external line source selected at the VU/Oscillator module's "External Meter Select" switches (see page 7-3; four external sources are available, brought in at the VO module's rear panel upper DB-25 connector). Whenever CUE or SOLO is activated anywhere on the console, however, the meters automatically switch to the activated signal (a "solo/cue activated" LED below the external source switches on the VO-80 module lights when this happens). When solo/cue is de-activated (by pressing the pertinent switch again) the meters return to the selected external signal.

To reiterate: There are two sets of front panel calibration trimpots associated with the solo/ext VU meters. The first set calibrates the meter driver circuitry itself at the VO-80 module ("Solo/Ext"— located at the top of the VO module faceplate). The second set ("Solo/Cue") is located at the top of the control room monitor (CR-80) module; these adjust the level of the solo/cue signal being fed to the VO-80 module circuitry.



Solo/Cue Logic Programming

A number of PCB-mounted programming switches on the CR-80 module allow the console's solo/cue interrupt system to be configured in different ways. The system is designed to allow the console operator to spot monitor any signal or module via PFL (Cue) or AFL (Solo) switching throughout the signal chain. Any time a SOLO or CUE switch is activated on the console, the CR-80 module's control room and headphone outputs are automatically interrupted and the selected signal replaces the monitor signal normally determined by the module's MONITOR SOURCE SELECT switching. Whether or not these interrupts occur, and the manner in which they occur, is determined by the programming switches described in this section.

NOTE the level of SOLO and CUE interrupt signals is determined by the solo/cue master rotary level controls and not by the CR or HDPN level pots; thus, be careful when setting solo/cue master levels or you may be unpleasantly surprised the first time you activate a solo/cue switch.

HDPN/CR Interrupt Select

PCB dipswitch "SW24" (see Technical Drawings CR-80 schematic page 72 C-4, and PCB load sheet page 74 lower right) determines which signals (cue and/or solo) will interrupt the module's CR and/or HDPN outputs.

CR/HDPN Dim Option

Normally a cue or solo signal will replace the CR-80 module's regular monitor output. However, it is also possible to DIM (attenuate) the regular output and overlay it with the full strength cue/solo signal. PCB dipswitch "SW25" (see Technical Drawings CR-80 schematic page 72 B-4, and PCB load sheet page 74 lower right) can activate the DIM function for CR interrupt (dipswitch toggle #1) and/or HDPN interrupt (dipswitch toggle #2). If your console is equipped with optional front panel dim trims the amount of attenuation for the CR and HDPN dim functions may also be adjusted.

CR/HDPN Mute

The console's four mute control lines can automatically turn off the module's CR and/or HDPN outputs whenever a programmed input module channel ON switch is activated. PCB-mounted dipswitch "SW25" (see Technical Drawings CR-80 schematic page 72 B-4, and PCB load sheet page 74 lower right) can activate this muting function for CR (dipswitch toggle #3) and/or HDPN (dipswitch toggle #4).

WHICH of the console's four mute control lines will activate the CR-80 module's muting functions is determined by PCB-mounted dipswitch "SW23" (see Technical Drawings CR-80 schematic page 72 D-5, and PCB load sheet page 74 lower right).

Cue Speaker Output Mode

PCB-mounted slide switch "SW19" (see Technical Drawings CR-80 schematic page 71 D-2, and PCB load sheet page 74 lower center) determines whether the module's cue speaker output is stereo or mono (L+R sum).

Headphone Output Options

Headphone Amp Output Mode

PCB-mounted slide switch "SW20" (see Technical Drawings CR-80 schematic page 71 B-2, and PCB load sheet page 74 lower center) determines whether the module's headphone amplifier output is stereo or mono (L+R sum).

Headphone Line Output Pre/Post Select

PCB-mounted slide switch "SW18" (see Technical Drawings CR-80 schematic page 71 C-4, and PCB load sheet page 74 center) determines whether the module's electronically balanced line level headphone output is pre or post headphone level control.

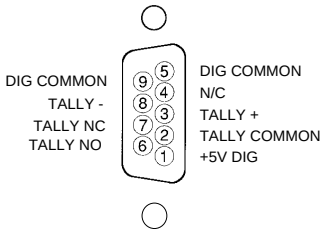
Control Room "On-Air" Tally Port

The CR-80 module tally port is activated by the console's mute control lines (see dipswitch "SW23", preceding). Tally signals are outputted at the module's DB-9 "TALLIES" connector, located at the top of the module's rear panel. There are two types of control signals available:

a) a simple relay closure with N.O., N.C. and tally common pins (maximum current 50 milliamps at 24V), and

b) opto-isolated tally+ and tally– control pins (used to power an external +5V tally light/LED; maximum current 50 milliamps).

If you will be using a high powered lamp/bulb for the external tally, you will need to provide an external power and relay circuit that takes its control pulse from the CR-80 module's tally pins.



CR Module Audio Wiring

All audio wiring for the control room monitor module is via two DB-25 connectors mounted on the module's rear panel (see below). Audio signals include external line inputs (upper connector "A") and CR, HDPN and Solo/Cue outputs (lower connector "B"). See pinout drawing on next page for wiring details.

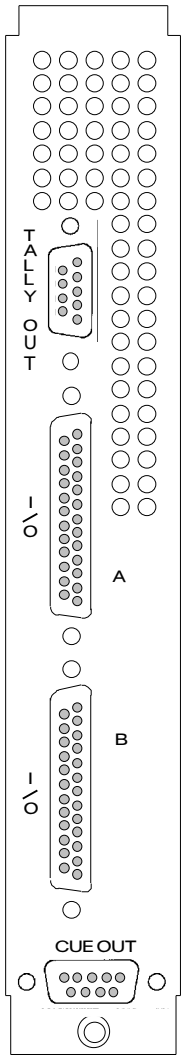
A separate DB-9 connector ("Cue Out") at the bottom of the module's rear panel handles the console's master CUE output.

Printed Circuit Board Load Sheets

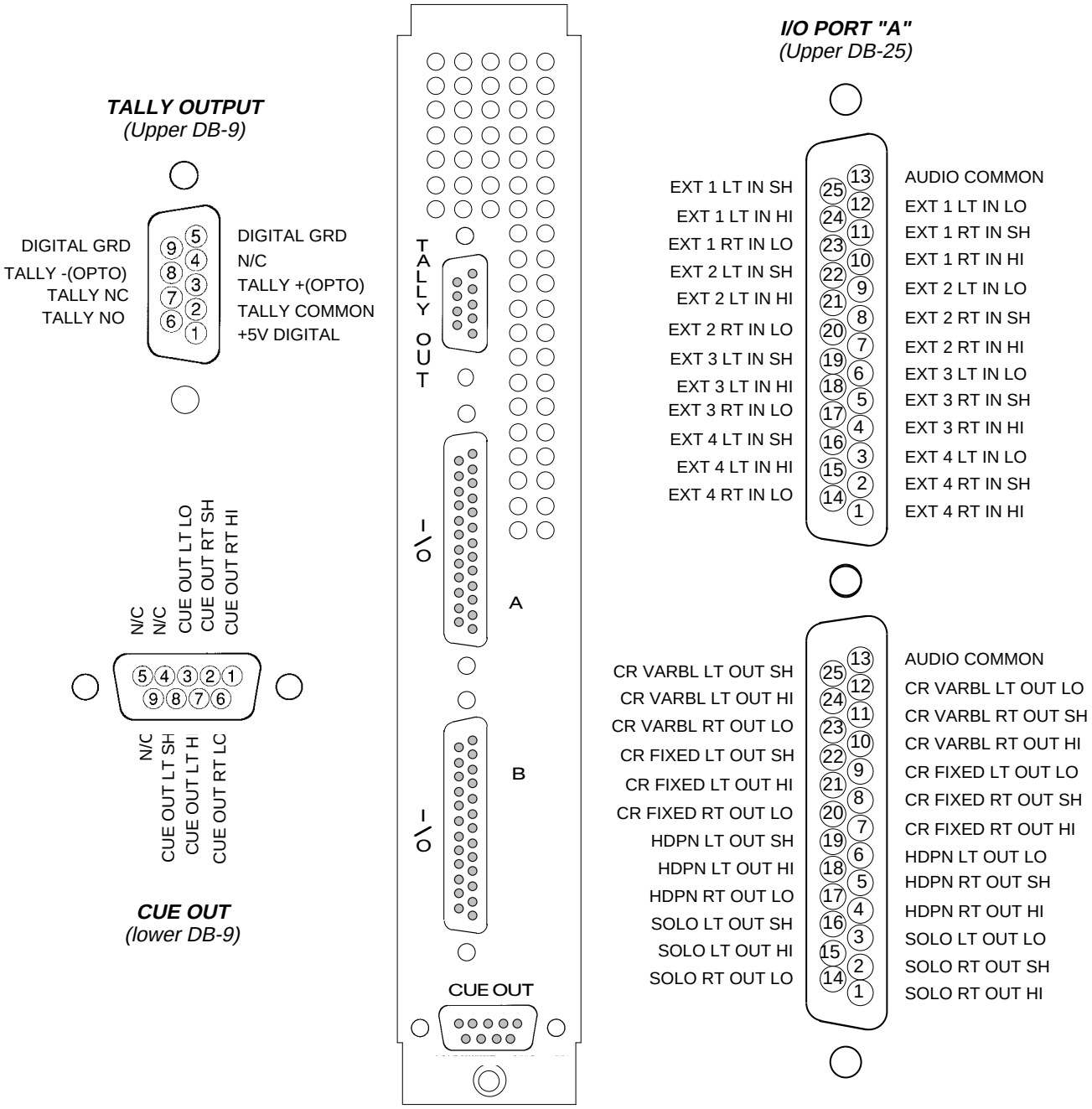
Load sheet drawings, showing all part locations, are in the Technical Drawings booklet (see "Chapter Contents" page 5-1 for specific drawing locations).

Schematics

Schematic drawings are in the Technical Drawings booklet (see "Chapter Contents" page 5-1 for specific drawing locations).



CR-80 Module Rear Panel Connectors



CR-80
CONTROL ROOM MODULE

Control Room Monitor Module Rear Panel Pinouts

Studio Monitor Module

Chapter Contents

Studio Monitor Module

General

TV-80 audio consoles can be equipped with one or more SC-80 studio monitor modules. Each of these modules allows the console operator to send monitor versions of the TV-80 console's outputs to a separate studio. Source selection is determined by a set of monitor source select switches that match those available on the console's control room monitor module. Each studio module has two outputs: a main electronically balanced line level STUDIO output (available as both variable and fixed level), and a HEADPHONE output available as line level or from a built-in headphone jack (located underneath the console armrest, to the extreme right). Each module also features an on-air tally port and a talkback circuit.

Input channel audio I/O (input/output) connections are made via two DB-25 multi-pin connectors ("A" upper; "B" lower) located on the back rear panel of the module. Tally logic and control signals are made through a DB-9 "Tallies" connector directly above the rear panel's two DB-25 audio connectors (see page 6-6).

Please refer to the signal flow diagram on page 69 of the Technical Drawings in conjunction with the text of this chapter. Note the SC-80 studio monitor module utilizes the same printed circuit boards as the CR-80 Control Room module.

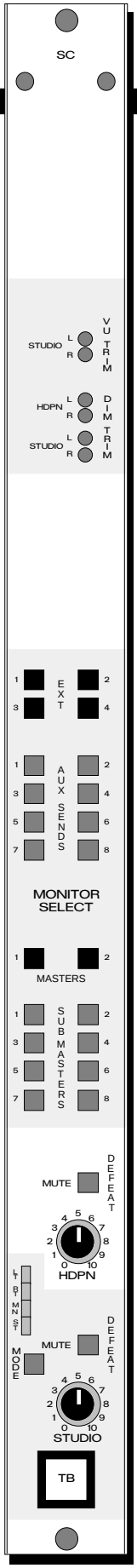
Controls

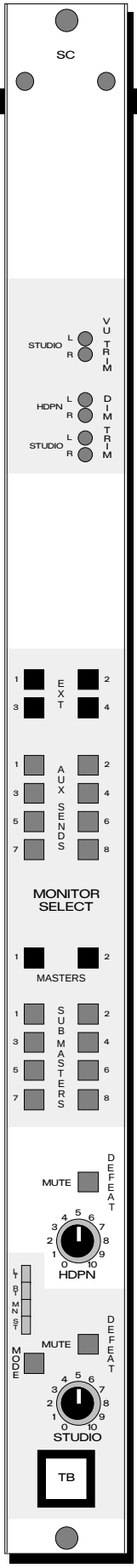
Studio VU Trims

Two pairs of recessed, front panel trimpots used to calibrate optionally available Studio Monitor meters.

Talkback Dim Trims

Two pairs of recessed, front panel trimpots are used to set the dim level of the module's headphone and studio outputs during Talkback interrupts.





Monitor Select

These source select switches allow studio talent to monitor the console's eight aux sends, eight submasters and two master outputs. Four additional external line inputs (brought in to the module's rear panel) may also be accessed.

Headphone Section

The studio module's headphone circuit follows the monitor source select switching. There are two headphone outputs: one electronically balanced line level out (programmable as either pre or post HDPN level control), and the other driven by a built-in amplifier (amplifier output may be stereo or L+R summed). Note the headphone outputs are normally subject to the console's mute control circuits; however, this may be defeated by a front panel switch if desired.

Studio Section

Studio output is determined by the module's monitor source select switching and is subject to the console's muting and talkback interrupt circuits (muting is front panel switch defeatable). A studio talkback switch (TB) routes the console operator's talkback microphone signal (see "Talkback" on page 7-2 of the VO-80 Chapter) to the studio output. There are two studio output ports; both are electronically balanced line level: one is POST level control (variable), the other PRE (fixed).

MODE Switch

The mode switch affects both STUDIO and HDPN outputs as follows:

Left Mode (LT) – Left signal to both channels
Right Mode (RT) – Right signal to both channels
Mono Mode (MN) – Left plus right sum signal to both channels
Stereo (ST) — "Normal" mode (MODE switch illuminated).

Tally Ports

The SC-80 module includes a tally function. There are two ports: relay closure and opto-isolated. Both are controlled by the console's mute/tally control lines (four; which one activates the studio tally port is determined by a PCB-mounted dipswitch).

Studio Module Logic Programming

HDPN Talkback Interrupt

PCB dipswitch "SW26" (dipswitch toggle #4; see Technical Drawings CR/SC-80 schematic page 72 C-4, and PCB load sheet page 74 extreme lower right) determines whether talkback will interrupt the studio HDPN outputs.

STUDIO/HDPN Dim

Normally the operator talkback signal will replace the SC-80 module's regular monitor output. However, it is also possible to DIM (attenuate) the regular output and overlay it with the full strength talkback signal. PCB dipswitch "SW25" (see Technical Drawings CR/SC-80 schematic page 72 B-4, and PCB load sheet page 74 lower right) can activate the DIM function for STUDIO interrupt (dipswitch toggle #1) and/or HDPN interrupt (dipswitch toggle #2). If your console is equipped with optional front panel dim trims the amount of attenuation for the STUDIO and HDPN dim functions may also be adjusted.

STUDIO/HDPN Mute

The console's four mute control lines can automatically turn off the module's STUDIO and/or HDPN outputs whenever a programmed input module channel ON switch is activated. PCB-mounted dipswitch "SW25" (see Technical Drawings CR/SC-80 schematic page 72 B-4, and PCB load sheet page 74 lower right) can activate this muting function for STUDIO (dipswitch toggle #3) and/or HDPN (dipswitch toggle #4).

WHICH of the console's four mute control lines will activate the SC-80 module's muting functions is determined by PCB-mounted dipswitch "SW23" (see Technical Drawings CR/SC-80 schematic page 72 D-5, and PCB load sheet page 74 lower right).

Headphone Amp Output Mode

PCB-mounted slide switch "SW20" (see Technical Drawings CR/SC-80 schematic page 71 B-2, and PCB load sheet page 74 lower center) determines whether the module's headphone amplifier output is stereo or mono (L+R sum).

Headphone Line Output Pre/Post Select

PCB-mounted slide switch "SW18" (see Technical Drawings CR/SC-80 schematic page 71 C-4, and PCB load sheet page 74 center) determines whether the module's electronically balanced line level headphone output is pre or post headphone level control.

Studio "On-Air" Tally Port

The SC-80 module tally port is activated by the console's mute control lines (see dipswitch "SW23", preceding). Tally signals are outputted at the module's DB-9 "Tallies" connector, located at the top of the module's rear panel. There are two types of control signals available:

a) a simple relay closure with N.O., N.C. and tally common pins (maximum current 50 milliamps at 24V), and

b) opto-isolated tally+ and tally– control pins (used to power an external +5V tally lite/LED; maximum current 50 milliamps).

If you will be using a high powered lamp/bulb for the external tally, you will need to provide an external power and relay circuit that takes it control pulse from the SC-80 module's tally pins.

Studio Module Audio Wiring

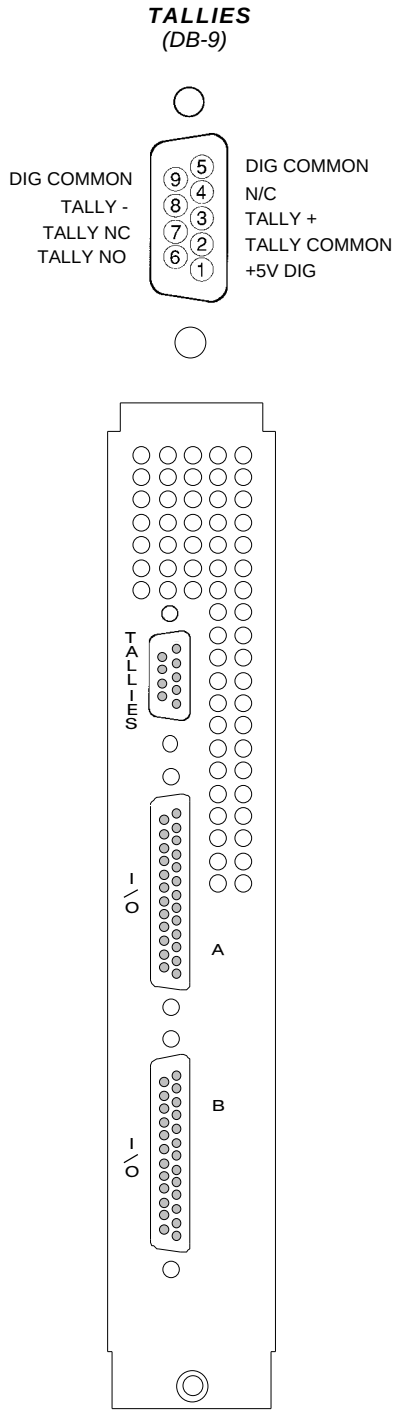
All audio wiring for the studio monitor module is via two DB-25 connectors mounted on the module's rear panel (see right). Audio signals include external line inputs (upper connector "A") and STUDIO and HDPN outputs (lower connector "B"). See pinout drawing on next page for wiring details.

Printed Circuit Board Load Sheets

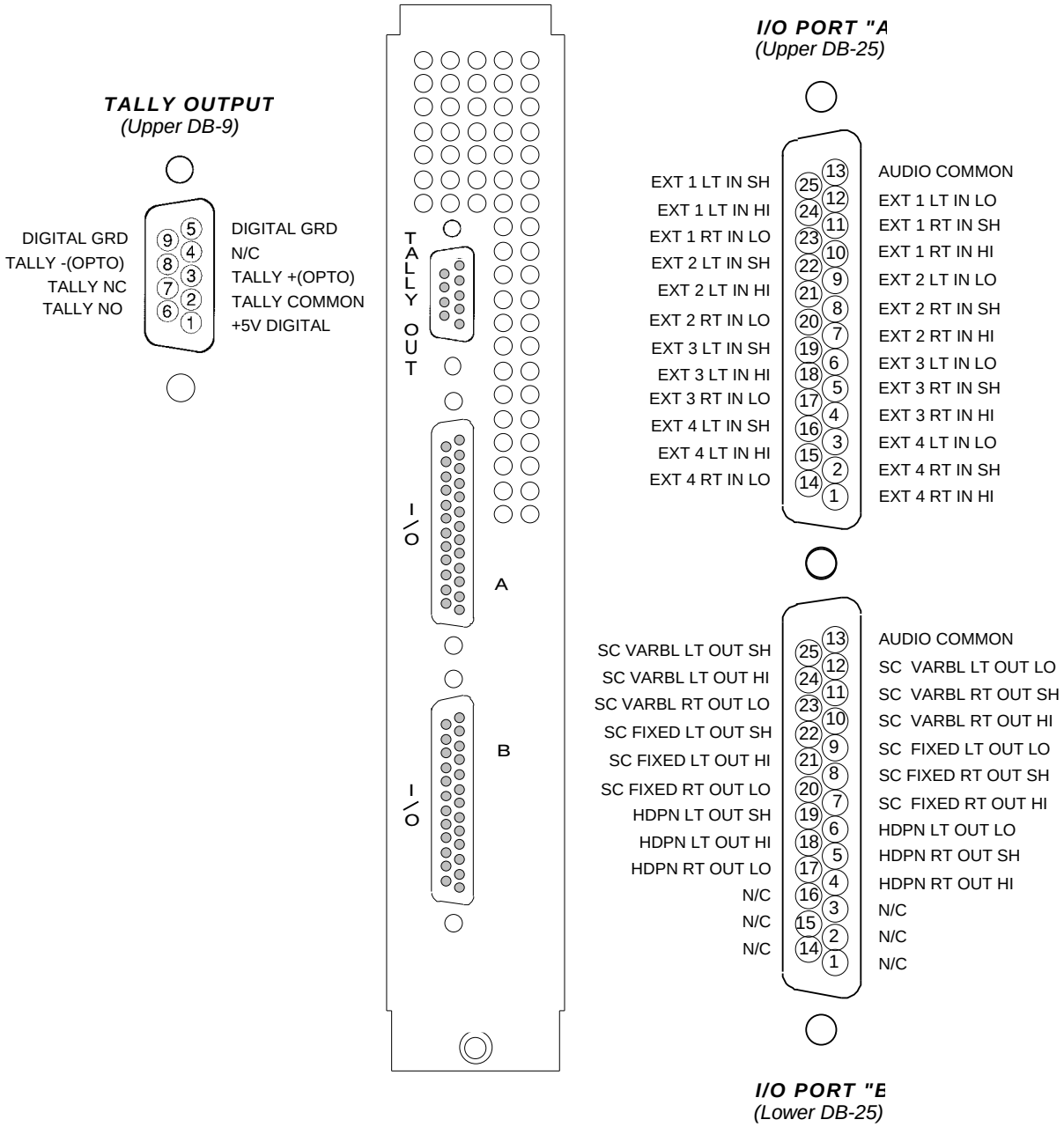
Load sheet drawings, showing all part locations, are in the Technical Drawings booklet (see "Chapter Contents" on page 6-1 for specific drawing locations).

Schematics

Schematic drawings are in the Technical Drawings booklet (see "Chapter Contents" on page 6-1 for specific drawing locations).



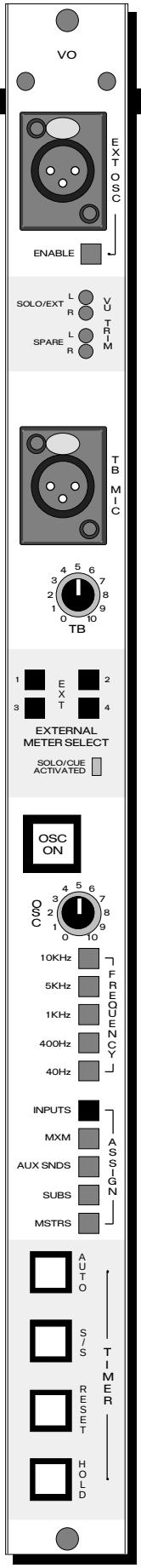
SC-80 Module Rear Panel Connectors



Studio Monitor Module Rear Panel Pinouts

VU / Oscillator Module

Chapter Contents



VU / Oscillator Module

General

The TV-80 audio console VU/Oscillator (VO) module houses the console's talkback, oscillator, external meter and timer control circuits.

Module audio (and timer control) connections are made via two DB-25 multi-pin connectors ("A" upper; "B" lower) located on the back rear panel of the module. An upper DB-9 "TB" connector handles talkback signals, and a lower DB-9 "Spare VU" connector handles signals for the console's spare VU meter driver circuitry (see page 7-5).

Please refer to the signal flow diagram on page 79 of the Technical Drawings in conjunction with the text of this chapter.

Module Controls

External Oscillator Enable

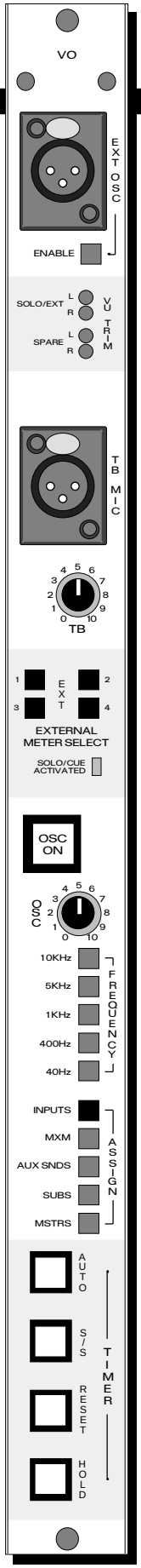
When activated this switch (with associated front panel XLR input jack) substitutes an external oscillator signal for the module's built-in oscillator (via either the XLR jack OR the module's oscillator in pins on the rear panel lower DB-25 connector).

VU Trims

Recessed front panel trimpots for calibrating the console's meterbridge SOLO/EXT VU meters.

Talkback

The master level control for the console operator's talkback microphone. The signal comes from the associated front panel XLR input jack OR the module's external talkback input pins on the rear panel upper DB-9 ("TB/OSC") connector. *Note phantom power is present at both talkback inputs.*



External Meter Select

The console's external/solo meter can select from four external line inputs brought into the console via the VO module's rear panel upper DB-25 connector. NOTE the external signal is automatically interrupted by SOLO/CUE whenever a solo or cue switch is activated anywhere on the console. The "solo/cue activated" LED illuminates whenever this occurs.

NOTE there are *two* sets of VU trimpots associated with the SOLO/EXT meters. The L/R pair at the top of the VO-80 module calibrates the SOLO/EXT meters themselves. The "SOLO/CUE" pair at the top of the CR-80 (control room monitor) module sets the level of the solo/cue VU interrupt feed.

Oscillator Section

A five-frequency built-in test oscillator with ON switch, level control, and separate assignment switches to all inputs, mix-minus busses, aux sends, submasters and master modules. Allows the entire console signal chain to be calibrated from input to output.

Oscillator output may be calibrated by an internal PCB-mounted trimpot ("CR11"; see Technical Drawings MO-1000 schematic page 80 C-3, and PCB load sheet page 84 center).

Timer Control

Four pushbutton controls for the console's digital timer:

AUTO – enables timer restart functions from programmed input modules

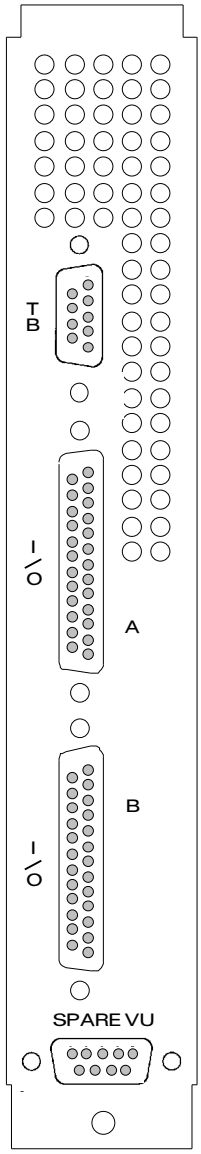
S/S – Start/Stop

RESET - return to zero (if the timer is stopped it will hold at zero; if it is running it will reset to zero and immediately begin counting up).

HOLD – freezes the timer *display* (the counter keeps on going); when released the display catches up to the current count.

VO Module Input/Output Wiring

All wiring for the VO module is via two DB-25 and two DB-9 connectors mounted on the module's rear panel (see right). See pinout drawing on next page for complete wiring details.

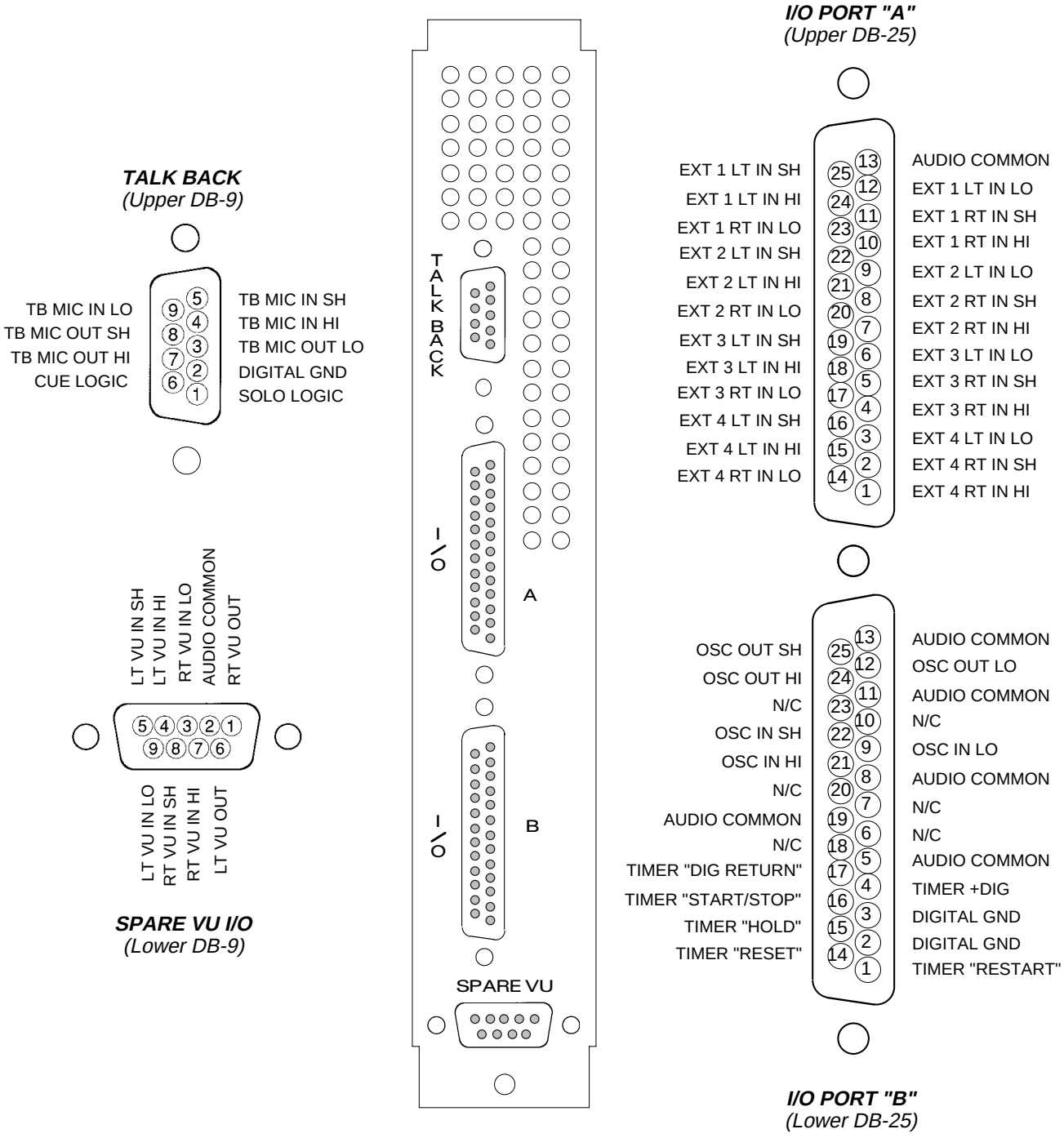


Printed Circuit Board Load Sheets

Load sheet drawings, showing part locations, are in the Technical Drawings booklet. See "Chapter Contents" page 7-1 for specific drawing locations.

Schematics

Schematic drawings are in the Technical Drawings booklet. See "Chapter Contents" page 7-1 for specific drawing locations.



VU/Oscillator Module Rear Panel Pinouts

Options

Chapter Contents

Smart Select® Cage

This console is equipped with rackmounted Smart Select® switcher cages which accept control pulses from certain of the console's input module preselector panels. The preselector panels are mounted in the console overbridge area, directly above their associated input modules. Each panel can select eight different stereo sources, the selected source is then fed to designated input module source ports. (See "Input Modules" chapter, page 2-6).

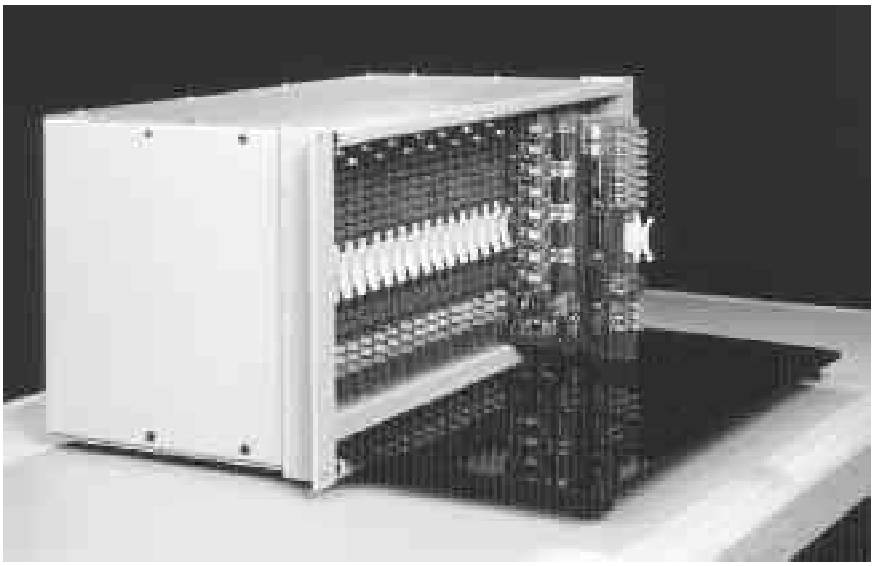
Power for the switcher cage comes from a PS-340 rackmount power supply, which is discussed in the "TV-80 Power Systems" chapter of this manual (page 9-7). Audio wiring pinout diagrams may be found on pages 8-4 and 8-5 of this chapter.

Smart Select® Audio Wiring

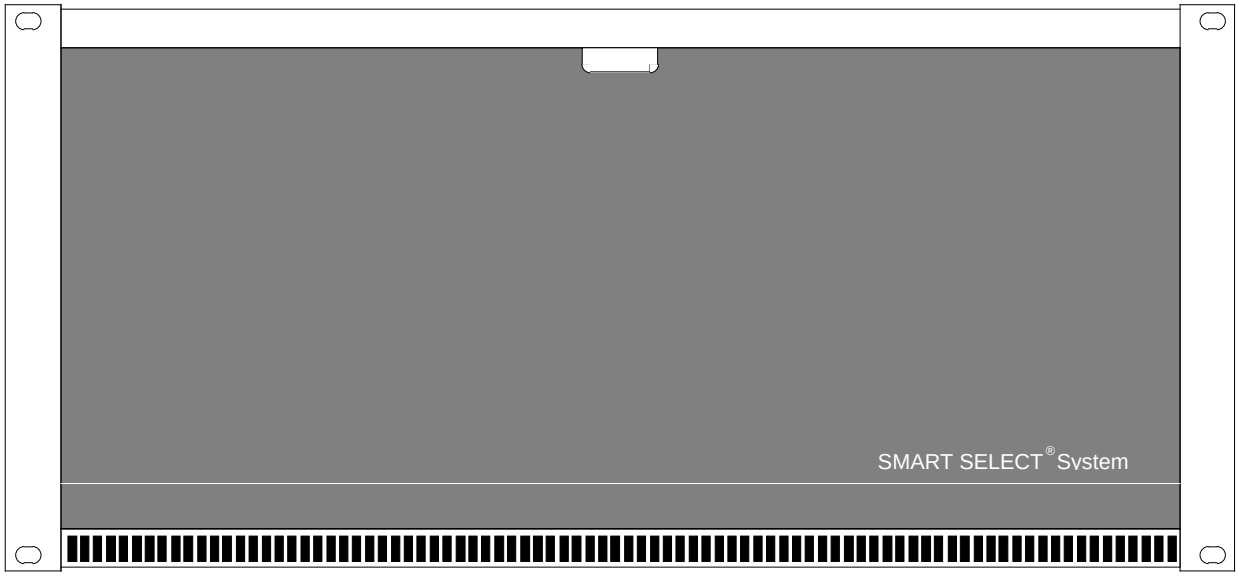
The Smart Select® cage (see photo below) consists of a rackmount chassis populated by switcher cards (two kinds: stereo line and mono mic/line); each card (there are a maximum of eighteen cards per unit) controls eight sources, corresponding to console overbridge mounted preselector panel switchbanks. Inputs and output for each card are via two DB-25 (inputs) and one DB-9 (output) multipin connectors mounted in the back of the chassis (see bottom photo next page;). Pinouts for these connectors are called out on pages 8-4 and 8-5 (note mono cards only use one upper DB-25 input connector). Outputs from the Smart Select cage DB-9 ports connect to matching DB-25 connectors (Line 1 input) on the back of the associated TV-80 input module, located in line with the preselector panels they feed.

Technical Drawings

Schematics and printed circuit card load sheets are included in the separately bound "Technical Drawings" section of this manual. See Contents on page 8-1 for specific drawing locations.



The Wheatstone Smart Select cage. This rackmount unit performs the actual audio switching for the TV-80 console's input module preselector panels. Each pull-out card accepts control pulses from a single preselector panel, returning one of eight possible audio sources back to the console. There are two types of cards: mono and stereo. Each rackmount cage can accommodate up to eighteen switcher cards.



The Wheatstone Smart Select Cage – It is 8 3/4" high and occupies five rackmount spaces

Rear view of the chassis showing audio connectors for eighteen preselector panels

Upper DB-25	Function
13	n/c
25	Channel 1 LT shield
12	Channel 1 LT low
24	Channel 1 LT high
11	Channel 1 RT shield
23	Channel 1 RT low
10	Channel 1 RT high
22	Channel 2 LT shield
9	Channel 2 LT low
21	Channel 2 LT high
8	Channel 2 RT shield
20	Channel 2 RT low
7	Channel 2 RT high
19	Channel 3 LT shield
6	Channel 3 LT low
18	Channel 3 LT high
5	Channel 3 RT shield
17	Channel 3 RT low
4	Channel 3 RT high
16	Channel 4 LT shield
3	Channel 4 LT low
15	Channel 4 LT high
2	Channel 4 RT shield
14	Channel 4 RT low
1	Channel 4 RT high

Stereo Line Switcher Card Upper DB-25 Female Connector

Lower DB-25	Function
13	n/c
25	Channel 5 LT shield
12	Channel 5 LT low
24	Channel 5 LT high
11	Channel 5 RT shield
23	Channel 5 RT low
10	Channel 5 RT high
22	Channel 6 LT shield
9	Channel 6 LT low
21	Channel 6 LT high
8	Channel 6 RT shield
20	Channel 6 RT low
7	Channel 6 RT high
19	Channel 7 LT shield
6	Channel 7 LT low
18	Channel 7 LT high
5	Channel 7 RT shield
17	Channel 7 RT low
4	Channel 7 RT high
16	Channel 8 LT shield
3	Channel 8 LT low
15	Channel 8 LT high
2	Channel 8 RT shield
14	Channel 8 RT low
1	Channel 8 RT high

Stereo Line Switcher Card Lower DB-25 Female Connector

DB-9	Function
5	n/c
9	n/c
4	n/c
8	output, LT shield
3	output, LT low
7	output, LT high
2	output, RT shield
6	output, RT low
1	output, RT high

Stereo Line Switcher Card Female DB-9 Connector

Rackmount Smart Select Cage Audio Pinouts

(Stereo Line Switcher Cards)

Upper DB-25	Function
13	n/c
25	Channel 1 shield
12	Channel 1 low
24	Channel 1 high
11	Channel 2 shield
23	Channel 2 low
10	Channel 2 high
22	Channel 3 shield
9	Channel 3 low
21	Channel 3 high
8	Channel 4 shield
20	Channel 4 low
7	Channel 4 high
19	Channel 5 shield
6	Channel 5 low
18	Channel 5 high
5	Channel 6 shield
17	Channel 6 low
4	Channel 6 high
16	Channel 7 shield
3	Channel 7 low
15	Channel 7 high
2	Channel 8 shield
14	Channel 8 low
1	Channel 8 high

Mono Mic/Line Module
Upper DB-25 Female
Connector

DB-9	Function
5	n/c
9	n/c
4	n/c
8	output, LT shield
3	output, LT low
7	output, LT high
2	output, RT shield
6	output, RT low
1	output, RT high

Mono Mic/Line Module
Female DB-9 Connector

Rackmount Smart Select Cage Audio Pinouts

(Mono Mic/Line Switcher Cards)

Confidence Module

The CONF-80 Confidence module is designed to interrupt regular console signals with a substitute signal as desired. It affects MIX-MINUS and STEREO MASTER #1 LINE OUT signals.

Mix-Minus Interrupt (Confidence Feed)

By their nature, mix-minus outputs are normally only active for those short periods of time when they are in actual use; this often leaves long periods of time when talent or listeners at the other end have no way of knowing whether the circuit is active and working properly. The purpose of this feature is to provide a "confidence" signal that feeds the console's MXM outputs during off periods to assure the individuals involved that the system is indeed functional and ready for instant "on-air" use.

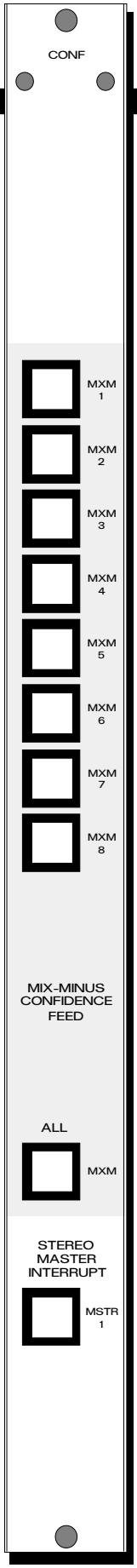
Pressing the Confidence module's MXM interrupt switches causes the console's regular Mix-Minus outputs (there are eight of them; each one mastered at an individual submaster module) to be replaced with a mono line level signal ("Confidence Feed IN") inputted at each submaster module's rear panel upper DB-25 audio connector. The interrupt signal(s) can be different for each module or paralleled across so each MXM output gets the same confidence feed. Note pressing the MXM ALL switch interrupts all eight MXM outputs simultaneously. When the MXM ALL switch is turned off, individual switches will revert to their original states (but see "Internal Programming" on next page).

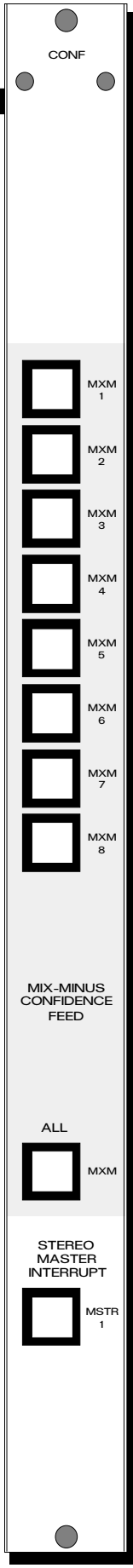
See the Submaster Module signal flow diagram on page 46 of the technical drawings to understand how the circuit works.

Stereo Master 1 Interrupt (Tone Interrupt)

Similar to the confidence feed feature, Stereo Master 1 Interrupt is used at the console's Stereo Master Module #1, where a mono line level signal ("Ext Tone IN") inputted at the module's rear panel upper DB-25 audio connector interrupts the "on-air" output (i.e., the Stereo Master 1 main LINE OUTPUT output signal). The purpose is to allow the console to be used for rehearsal and set-up prior to going on-air, but without having the rehearsal signal fed further up the broadcast chain. Instead, a substitute signal (usually a simple tone; hence "tone interrupt") is outputted from the console whenever the Stereo Master Interrupt switch is activated.

Note Stereo Master Interrupt may also be turned OFF (but not ON) by a user-supplied external "Tone Off" switch wired to lower DB-25 control pins on the confidence module's rear panel ("Remote Tone Dropout Logic"; see diagram on page 8-9).





See the Stereo Master Module #1 signal flow diagram on page 59 of the technical drawings to understand how the circuit works. For applicable wiring and connections see the diagram on page 8-9.

Confidence Module External Control

The Stereo Master 1 Interrupt function can be de-activated from a remote location via a user-supplied switch. Simply provide a momentary closure between Lower DB-25 connector Pin 17 (Remote Tone Dropout Logic) and Pin 5 (digital ground). This will latch the tone interrupt function OFF.

Confidence Module Internal Programming

A 4-position PCB-mounted dipswitch on the Confidence module's main printed circuit board provides three user-programmable options for the CONF-80 module (see load sheet drawing on page 67 of the technical drawings – "SW1" lower right):

FLASH ENABLE (Dipswitch position 1) — When activated, causes all Confidence module switch indicator LEDs to flash whenever a switch is activated (as opposed to steady illumination, which is the factory default).

MSTR DROP (Position 2) — Whenever the MXM ALL switch is pressed all eight individual MXM switches are automatically activated. As shipped from the factory, when the MXM ALL switch is subsequently turned OFF, individual switches will revert to their original states. However, if dipswitch position 2 is activated, whenever the MXM ALL switch is turned OFF, all individual MXM switches are turned off as well, regardless of their original states.

MUTE DROP (Position 4) — The TV-80 console has four monitor mute control lines; in typical use the console will be programmed to activate Mute Line 1 whenever the main studio mic input module is turned ON (this is tantamount to going "live on-air"). By throwing dipswitch position 4, whenever the console's mute control line #1 is activated, ALL confidence panel interrupt functions (mix-minus confidence feeds as well as stereo master 1 line out tone interrupt) will be automatically de-activated. Note when the mute control line is de-activated, all switches remain off—they do not revert to their original states)

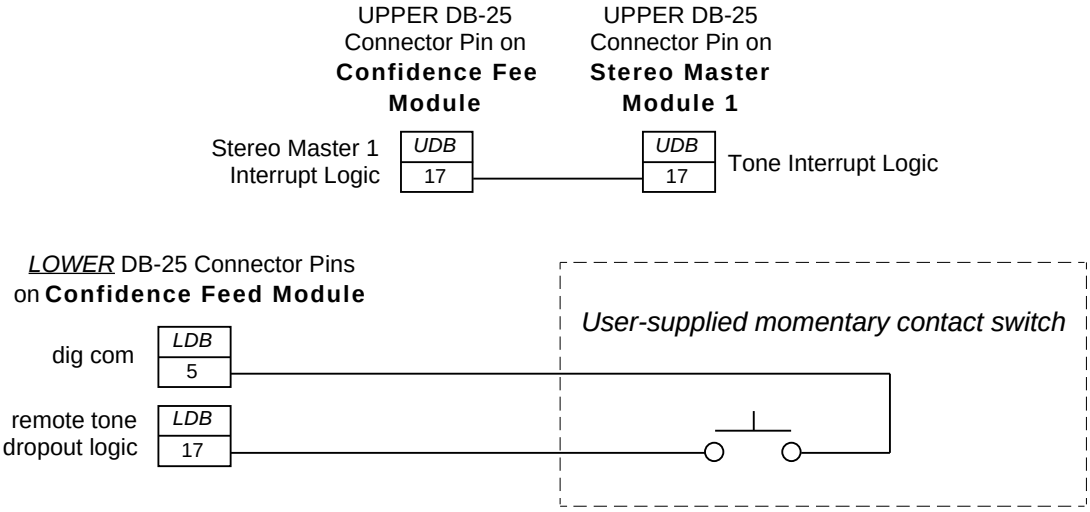
Technical Documentation

The Technical Drawings booklet contains schematics (page 65) and a Load Sheet drawing (page 67).

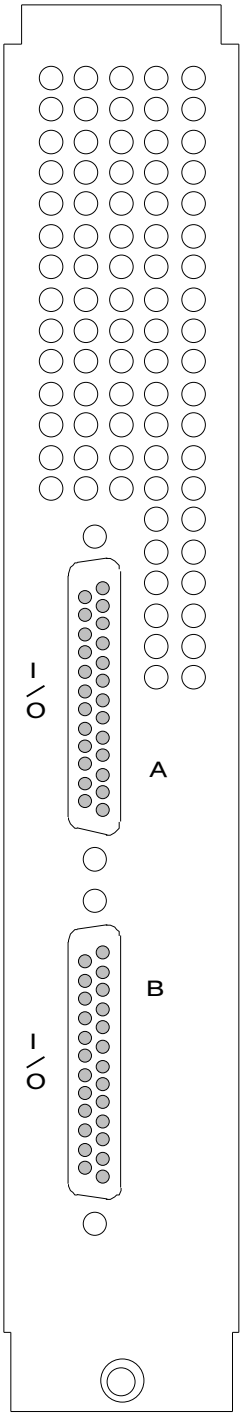
Confidence Module Control Wiring to Submasters & Stereo Master #1

STEREO MASTER #1 INTERRUPT CONTROL WIRING *("Tone Ir*

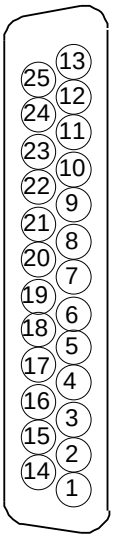
Connect Confidence Feed module upper DB-25 control pin 17 (Stereo Master 1 interrupt logic) to upper DB-25 pin 17 of Stereo Master Module #1 (Tone Interrupt Logic)



Remote control (dropout, or OFF only) of the STEREO MASTER #1 interrupt feature may be performed with an external user-supplied momentary contact closure (one pulse latches interrupt feature OFF)

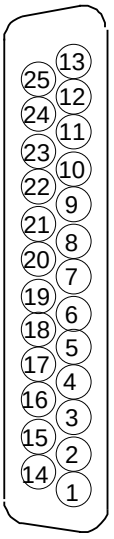


I/O PORT "A
(Upper DB-25)



DIGITAL GND	25	AUDIO COMMON
MXM 2 INTERRUPT LOGIC	24	MXM 1 INTERRUPT LOGIC
MXM 3 INTERRUPT LOGIC	23	DIGITAL GND
DIGITAL GND	22	MXM 4 INTERRUPT LOGIC
MXM 6 INTERRUPT LOGIC	21	MXM 5 INTERRUPT LOGIC
MXM 7 INTERRUPT LOGIC	20	DIGITAL GND
DIGITAL GND	19	MXM 8 INTERRUPT LOGIC
N/C	18	N/C
STEREO MSTR 1 INTERRUPT LOGIC	17	DIGITAL GND
AUDIO COMMON	16	MXM ALL INTERRUPT LOGIC*
N/C	15	N/C
N/C	14	AUDIO COMMON
	13	N/C
	12	
	11	
	10	
	9	
	8	
	7	
	6	
	5	
	4	
	3	
	2	
	1	

*available but not used



DIGITAL GND	25	AUDIO COMMON
N/C	24	N/C
N/C	23	DIGITAL GND
DIGITAL GND	22	N/C
N/C	21	N/C
N/C	20	DIGITAL GND
DIGITAL GND	19	N/C
N/C	18	N/C
REMOTE TONE DROPOUT LOGIC	17	DIGITAL GND
AUDIO COMMON	16	N/C
N/C	15	N/C
N/C	14	AUDIO COMMON
	13	N/C
	12	
	11	
	10	
	9	
	8	
	7	
	6	
	5	
	4	
	3	
	2	
	1	

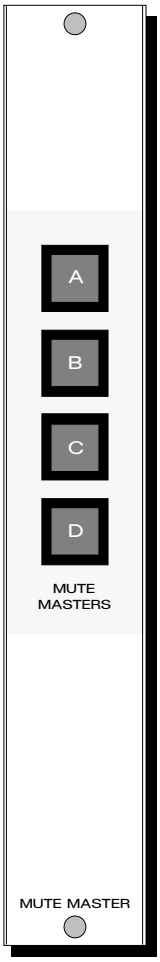
I/O PORT "B
(Lower DB-25)

CONFIDENCE FEED PANEL

Confidence Panel Wiring Pinouts

Mute Master Panel

The MUTE MASTER panel houses the console's four mute group (A thru D) master switches. It is usually located in the fader panel position directly below the console's power interface module (plugged in the center of the mainframe).



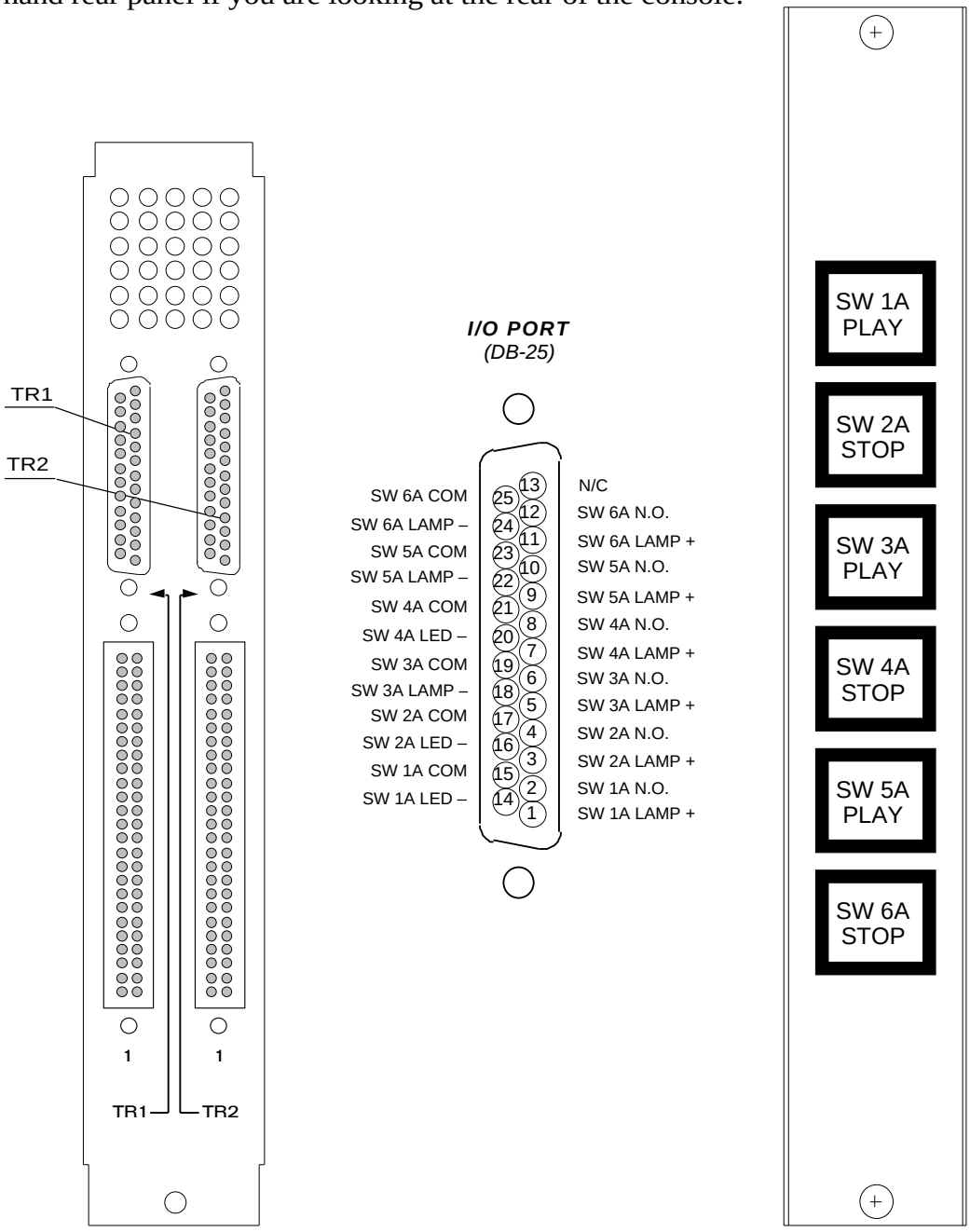
Mute Masters A thru D

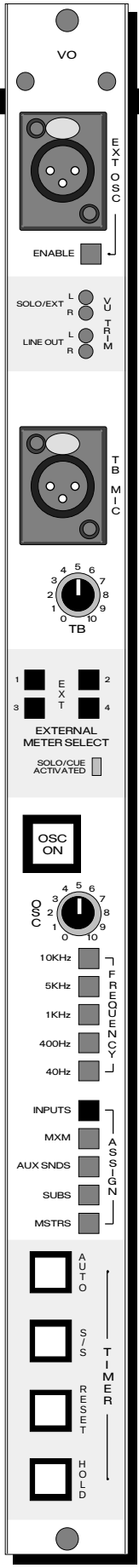
All of the console's input modules may be individually assigned to any or all of four mute control busses (A thru D) by means of front panel switches on each channel's fader panel. This feature allows groups of input modules to be turned ON and OFF by means of the four master MUTE switches mounted on this panel.

Tape Remote Panel

This optional panel is used to control three external source machines using three pairs of START/STOP buttons. LED indicators in each switch function as tallyback indicators and are powered by the source machines; there are no internal connections between the tape remote panel and the console's power rails. Switch pinouts are shown below. Note the switch cap legends can also be ordered to read RTZ, FF, RW, PLAY, REC, and STOP for full-function control of one remote tape machine.

All user wiring takes place at DB-25 multi-pin connector mounted on the top of the extreme left-hand rear panel if you are looking at the rear of the console.





Timer

The timer display is mounted in the console's overbridge, just below the SOLO/EXT meter pair. It is controlled by four pushbutton switches at the bottom of the VU/Oscillator module. Control functions are as follows:

AUTO – enables timer restart functions from programmed input modules (see Input chapter, "Timer Restart")

S/S – Start/Stop

RESET - return to zero (if the timer is stopped when this button is pressed it will hold at zero; if it was running it will reset to zero and immediately begin counting up).

HOLD – freezes the timer *display* (the counter keeps on going); when released the display catches up to the current count.

Timer restart, Stop/Start, Reset and Hold control pulses are also paralleled out at the module's lower DB-25 connector, allowing a second (slave) timer to be controlled by the console (see VO-80 module pinout drawing on page 7-5).

A printed circuit board load sheet and schematic for the timer may be found in the technical drawings on pages 149 and 148 respectively.

TV-80 Power Systems

Chapter Contents

TV-80 Power Systems

General

TV-80 audio consoles utilize three separate power supply systems; in each case a separate rackmounted unit supplies power via special cables. When dual failsafe systems have been ordered there are two supplies of each type:

SPS-40 – powers the audio console (via a PWR-80 Power Interface module located in the center of the TV-80 mainframe)

SPS-180 – powers

- the console's RCC event computer access panel (+5V DC to DC converter, 32VC5-5 PCB, installed in the event computer);
- the console's preselector panels;

a second SPS-180 – powers

- the separate rackmount Smart Select® cage (which performs audio switching for input modules configured with optional preselector panels).

SPS-40 Console Power Supply

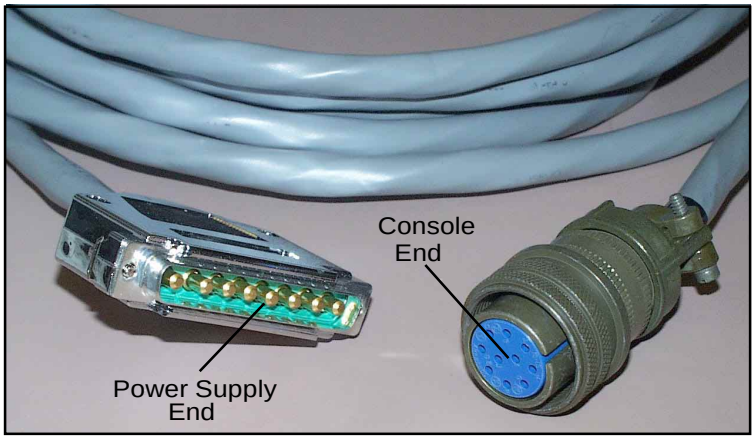
The SPS-40 power supply is installed in a Wheatstone Model PSR rackmount unit. Each PSR houses up to two SPS-40 power supply units. Mount the power supply in a standard 19" equipment rack, keeping in mind that adequate ventilation is necessary to prevent heat build-up within the rack.

Note the power supply (supplies) should be mounted in an equipment rack within fifteen feet of the console (but no closer than 3 feet).

This power supply contains high voltage circuits that are hazardous and potentially harmful. ***Under no circumstances should the metal cover be removed!*** If you have a problem with the power supply, the SPS-40 unit must be returned to Wheatstone Corporation for repair.

Front view of the PSR rackmount power supply

Rear view of the PSR (SPS-40) rackmount power supply



PS Cable Pinout

Power Supply End 8-pin Connector *Male*						Console End 10-pin Connector *Female*
	PIN			PIN		
VIO	1	◄ Phantom ►		E	VIO	
GRN	2	◄ Digital Ground ►		D	GRN	
BRN	3	◄ Digital Ground ►		F	BRN	
YEL	4	◄ Digital+ ►		H	YEL	
ORG	5	◄ Digital+ ►		G	ORG	
BLK	6	◄ Analog Ground ►		A	BLK	
BLU	7	◄ -V in ►		C	BLU	
RED	8	◄ +V in ►		B	RED	

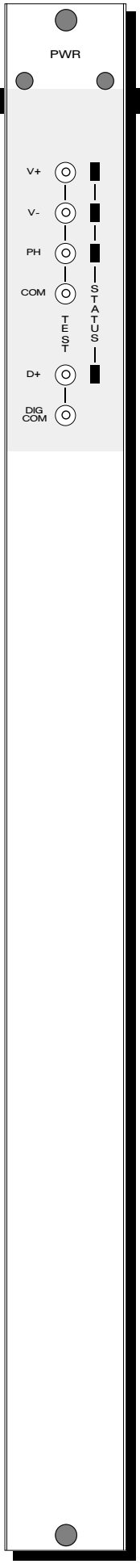
Once the supply is rackmounted, it should be connected to the control surface using the factory supplied cable. The cable has two different types of connectors on its end: a 10-pin female connector that connects to the power interface module (for information on the TV-80's power interface module, refer to page 9-4 of this chapter), and an 8-pin male connector that plugs into the PSR power supply. Note that the power supply cable's 10-pin female connector has to be rotated until its locating pins match the male mating connector on the power interface module. Do not force a connector on; it attaches easily when properly aligned. Connect the cable(s) first to the power interface module, then to the rear of the rackmount power supply.

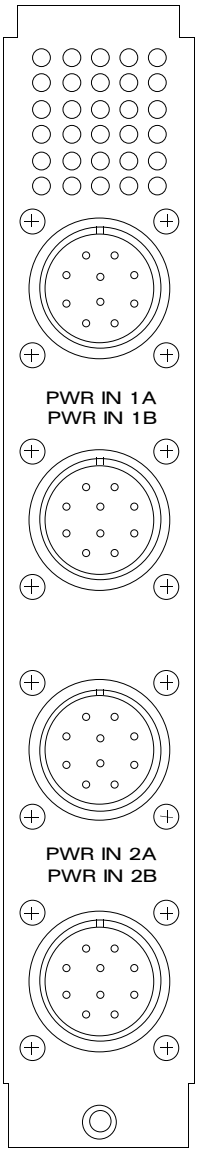
Note that each power supply is fitted with a 3-wire grounded AC cord that should be plugged into a "clean" AC power source, that is, an AC source that feeds only the control room audio gear. This source should be a separate feed from those powering lighting, air-conditioning, or any other non-audio machinery. The third pin ground wire of the AC source should be tied to the central system ground point.

Power Interface Module

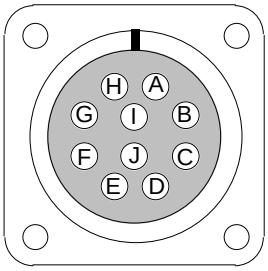
The PWR-80 power interface module accepts power from the console's (dual failsafe) rackmounted SPS-40 power supplies and feeds it to the TV-80 console. In the unlikely event of a power supply failure, the panel automatically switches over to the second redundant supply so the console continues uninterrupted operation.

The front panel of this module has test points and status LED indicators for the console's V+, V–, phantom power and digital V+ power rails. The test points allow these rails to be checked under load. Pinout details for the module's rear panel connectors are shown below.





TYPICAL POWER CONNECTOR
(10-pin)

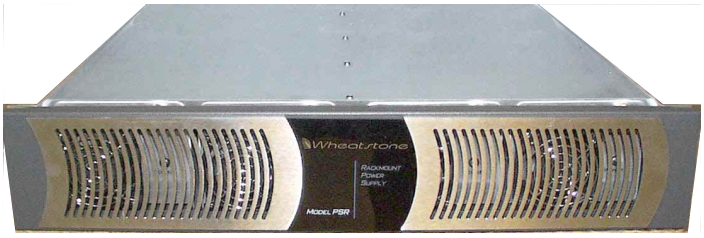


A : audio/phantom common
B : 18V+
C : 18V–
D : digital common 2
E : +40V phantom power
F : digital common 1
G : digital+ 1
H : digital+ 2
I : n/c
J : optional 60Hz sync

Power Interface Module Rear Panel Pinouts

SPS-180 Power Supply

The SPS-180 power supply unit installed in a Wheatstone Model PSR rackmount unit. The PSR unit occupies two 19" wide rack spaces (total height 3-1/2") and houses up to four SPS-180 power supply units.



Front view of the PSR rackmount power

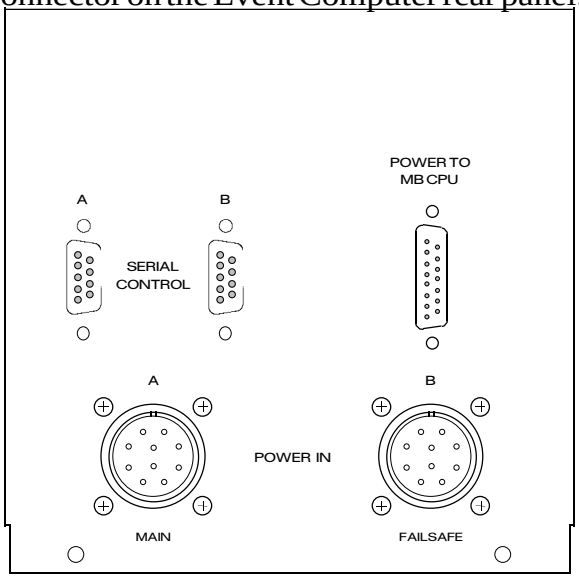
Rear view of the SPS-180 unit

This power supply contains high voltage circuits that are hazardous and potentially harmful. ***Under no circumstances should the metal cover be removed!*** If you have a problem with the power supply, the SPS-180 unit must be returned to Wheatstone Corporation for repair.

The SPS-180 power supply (or failsafe pair) powers the console's RCC event computer access panel **(see TECH NOTE on page 9-6 of this chapter)** and the console's preselector panels. A second SPS-180 (or failsafe pair) powers the separate rackmount Smart Select® cage (which performs audio switching for input modules configured with optional preselector panels).

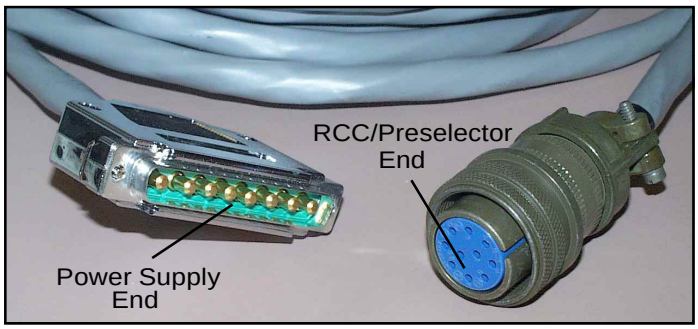
Event Computer and Preselector Panels

To power the TV-80's Event Computer a supplied cable runs from the power supply chassis rear 8-pin connector to a 10-pin connector on the Event Computer rear panel. If you have ordered a failsafe configuration, there will be two supplies; each feeds one connector on the Event Computer rear panel.



Rear (detail) view of the optional console-mounted TV-80 Event Computer access panel. The two 10-pin connectors at the bottom accept cables from rackmounted SPS-180 power supplies. If a failsafe configuration has not been ordered, only the "Main" connector will be used. (Note the only voltage used is +8 VDC.)

SPECIAL NOTE: If your console has been ordered with preselector panels but NO Event Computer, the SPS-180 power interface to the console will be by a special blank module whose rear panel will have the required connectors.



PS Cable Pinout

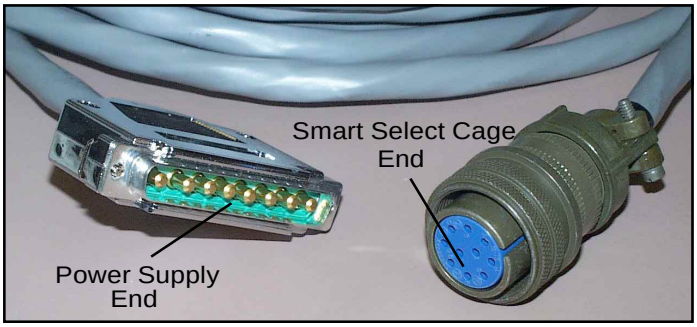
Power Supply End 8-pin Connector *Male*					Event Computer or Preselector Panel End 10-pin Connector *Female*
	PIN		PIN		
VIO	1	Phantom	E	VIO	
GRN	2	Digital Ground	D	GRN	
BRN	3	Digital Ground	F	BRN	
YEL	4	Digital+	H	YEL	
ORG	5	Digital+	G	ORG	
BLK	6	Analog Ground	A	BLK	
BLU	7	-V in	C	BLU	
RED	8	+V in	B	RED	

TECH NOTE: To insure proper power sequencing in systems using an Event Computer, we recommend that the SPS-180 Event Computer Power Supply be connected to the same AC power circuit as the SPS-40 Console Power Supply. Further, if you have failsafe power supply pairs and have connected each SPS-40 to its own separate AC power circuit, as recommended elsewhere in this manual, we recommend that you connect one SPS-180 to each of those circuits. *If this is not done and the power to the SPS-180(s) is temporarily interrupted, the console's Smart Select displays could display inaccurate information about the channel sources after the SPS-180(s) restart,* requiring the operator to toggle the source on each of the affected channels to correct the display error. No other ill effects will be produced.

Smart Select Cage

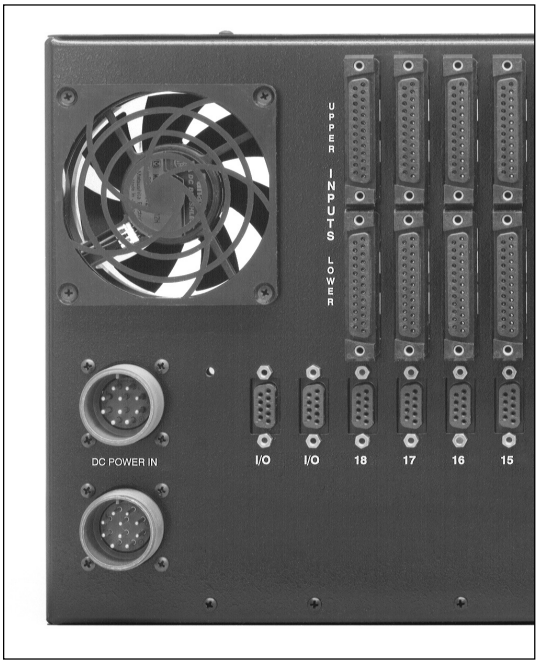
To power the TV-80's separate rackmounted Smart Select® Cage, which performs the actual audio switching for the console's optional input module preselector panels, a supplied cable runs from the power supply chassis rear 8-pin connector to a 10-pin connector on the back of the Smart Select® Cage chassis. If you have ordered a failsafe configuration, there will be two supplies; each feeds one connector on the back of the cage.

If the system employs two Smart Select® cages, an FSI-B unit is used to split the supply voltage signals to feed both cages. A cable connects the center connector of the FSI-B to the power supply. A second shorter cable connects the cage (either connector) to one of the remaining connectors on the FSI-B. A third (short) cable connects the other cage to the FSI-B. A failsafe configuration with two cages employs two FSI-B units. The first one is wired as described, while the second one is used to connect the remaining connectors on the cages to the second supply.



PS Cable Pinout

Power Supply End 8-pin Connector *Male*		PIN		PIN		Smart Select Cage End 10-pin Connector *Female*
	VIO	1	Phantom →	E	VIO	
	GRN	2	Digital Ground →	D	GRN	
	BRN	3	Digital Ground →	F	BRN	
	YEL	4	Digital+ →	H	YEL	
	ORG	5	Digital+ →	G	ORG	
	BLK	6	Analog Ground →	A	BLK	
	BLU	7	-V in →	C	BLU	
	RED	8	+V in →	B	RED	



Left rear view of rackmount Smart Select Cage showing dual 10-pin power connectors. If dual failsafe SPS-180 power supplies have not been ordered, only one connector will be used.

Appendices

Appendix I

Appendix II

Appendix III

Appendix I

TV-80 Console Internal Wiring Paths

As previously stated, most mainframe positions on a TV-80 console have three active sections: the main module itself, an (optional) overbridge preselector panel, and an associated fader panel directly in line with and below the main module (the two being separated by the console's alpha-numeric source display strip).

Main Module PCBs to Fader Panel PCBs

Main input modules plug (via upper and lower 120-pin edge connectors) into motherboards (MBM-1000 PCBs) mounted in the bottom of the console mainframe. Two 20-pin ribbon cable connectors at each slot location on the motherboard pick-up those signals that must connect to each position's fader panel.

EXAMPLE: see page 111 of the Technical Drawings, main motherboard load sheet (lower left) and schematic, page 118, where CT49 and CT41 (20-pin ribbon cable connector sockets) pick up fader signals from CT32 (lower 120-pin edgecard connector socket). The two ribbon cables then thread through openings under the console's alphanumeric display strip, where they plug into mating sockets (in this case C17 and C15) on the fader panel's motherboard (MBF-1000 PCB; see LOAD SHEET, upper right, page 122 and SCHEMATIC, left half, page 123). The mating sockets then parallel the signals to the fader panel's 120-pin edge card connector socket.

Main Module PCBs to Meterbridge VUs

Individual module VU signals route (via main PCB edgecard fingers) to mainframe motherboard PCBs, where they are carried via ribbon cables to their respective meters. See Technical Drawings, page 132 "Mainframe Meter Wiring" for more information.

Balanced vs. Unbalanced Connections

By now everyone knows (or should know) that balanced inputs and outputs are highly desirable - they have an intrinsic ability to reject hum, noise, crosstalk, and RF, even if the shielding and grounding leave something to be desired. Telephone companies routinely pack hundreds of balanced lines into one cable, with no shielding, next to AC power lines and street lights, and if good balance is maintained, the individual circuits are completely free of noise and crosstalk.

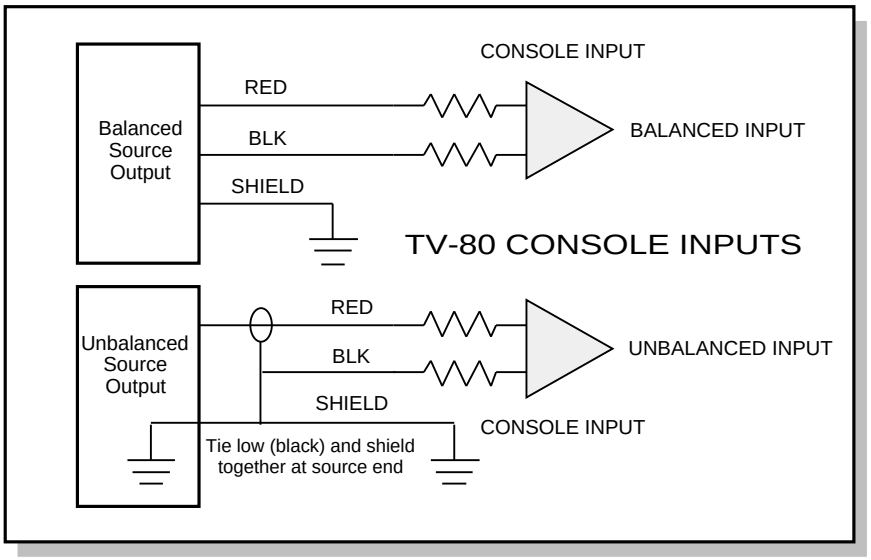
Not all equipment used in stations is balanced, however, and the most cost-effective devices often don't have +4 dBu output levels, either. Because of these realities, all Wheatstone consoles are designed to accept balanced or unbalanced sources with levels as low as -10 dBu.

Connecting unbalanced inputs is simple—wire to the console with typical shielded two conductor cable (like Belden 9451), just as if you were connecting a balanced source. At the unbalanced machine's output, connect the black wire (LOW) to the shield. This "pseudo-balanced" connection has proven to be the simplest and most trouble-free way to go. Another plus is that the wiring need not be changed out if a balanced output machine is subsequently installed in that position. *If the machine has a -10 dBu output, don't hesitate to turn your input trimmers as high as is needed.*

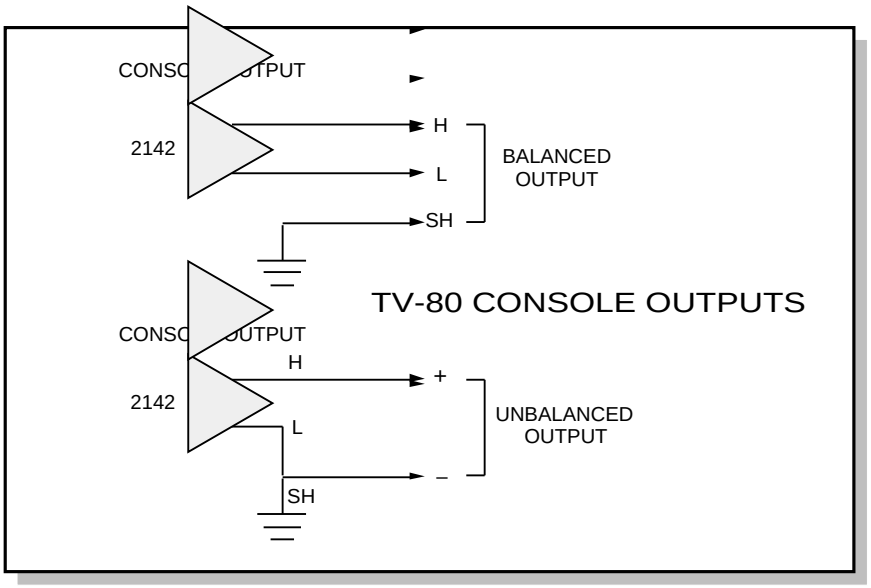
TV-80 consoles use a balanced output circuit which behaves exactly like the secondary of a high-quality transformer, with no center tap—this output is both balanced and floating. Either the HIGH or LOW side of the output should be strapped to ground, with the output taken from the other side. (Normally you'd strap LOW to ground, and take HIGH to feed your unbalanced equipment.)

The ability to use output HIGH or LOW permits an easy phase reversal of the console's output signals, should this be desired.

This type of self-compensating active-balanced output has been tried before, but it required costly hand-matching of resistors to maintain stability and low distortion. The 2142 balanced line driver IC uses laser-trimming of the on-chip resistors, under computer control, to achieve the desired results. A major advantage over the discrete component designs is the ability to replace the IC without the need for hand-picking resistors to restore the performance of the circuit.



Typical unbalanced input and output connections to the TV-80 console.



Notes on Level Measurement

Audio levels today are commonly referred to as voltage equivalents of power levels in 600 ohm circuits. One milliwatt (0 dBm) in 600 ohms is a voltage of .775 V. The corresponding unit for use in circuits where the exact impedance is unknown or irrelevant is the dBu (the "u" stands for "unloaded"). Thus, 0 dBu is .775 V regardless of the impedance of the circuit where it is measured. (Note the dBu should not be confused with the dBV; 0 dBV = 1 volt.)

For your convenience, here are some commonly encountered level measurement values:

0 dBm in 600 ohms = .775 V = 0 dBu in any impedance

+4 dBu = 1.23 V

+8 dBu = 1.95 V

-10 dBu = .245 V

-20 dBu = 77.4 mV

-50 dBu = 2.45 mV

When checking out a system, remember to measure the input voltage at the connector, as variations in input impedance and generator source impedance can invalidate your results.

Extender Ribbons

TV-80 consoles are shipped with EXTENDER RIBBONS. These 3-foot cables allow individual modules to be removed from the console mainframe and still remain powered-up and connected to the bus system, for active troubleshooting. There are three types of extender ribbons: one for main modules, one for fader panels, and one for overbridge preselector panels.

Troubleshooting

Basic Procedures

If you have encountered difficulty in testing your installation, check the items listed below before opening the console. *Note that some items may seem very obvious;* **it is often the most obvious things that we overlook.**

1) Are the console power supply systems properly installed and operating correctly?

2) Are the sources you are using to test the console installation producing normal, line level signals? For example, if a cart machine is the source, is the cart playing? Is the output of it connected to the console?

3) When checking for sound from the control room speakers, is the external monitor amplifier on? Is the amplifier volume turned up to a normal level? Are the speakers connected to the amplifier outputs? Are the console's SOLO and CUE functions deactivated? (Under normal programming they will interrupt the regular monitor signal.)

4) If you have checked external devices and connections, and feel that the problem is within the console, double check all wiring before attempting to troubleshoot the console itself.

Testing a "Live" (Powered-Up) Console – Precautions

(1) If a module must be removed, but remain connected while troubleshooting (using the extender ribbons that come with the console), place a piece of cardboard or other non-conducting material across the console where the module will be placed. This will prevent shorting, and also avoid scratching or marring the faceplates.

(2) Be extremely careful when using meter or oscilloscope test probes, to avoid shorting a test point to an adjacent connection. This is especially important when probing a pin 7 op-amp output, since the adjacent pin 8 is at 18 volts.

(3) **NEVER** remove or insert an integrated circuit while the console is powered up.

Integrated Circuits

The audio circuits of the console consist almost entirely of plug-in IC op-amps. The types called out in the schematic drawings and parts lists are chosen for optimum performance; in an emergency situation other types of known matching pin-out and capability can be temporarily substituted. Some useful troubleshooting hints for these circuits follow.

(1) Resistors and capacitors, including electrolytic capacitors, have a vanishingly small failure rate in this equipment.

(2) Do not attempt to put any significance to the fact that you can measure very low signal levels on the inverting or "minus" input of an op-amp stage. Due to the large open-loop gain of the typical op-amp, the inverting input of an amplifier, configured as an inverter with its non-inverting input grounded, acts as a “virtual ground,” and signal levels at this point can be expected to be extremely low. However, a circuit fault could result in a large signal level at the inverting input, so it may be worth checking.

(3) When one of these ICs fails, it commonly swings its output to one of the power supply rails. This should be a first check when a bad IC is suspected. Measure the output pin of the IC directly (as opposed to measuring after a coupling capacitor) under a no-signal condition and look for a large DC offset at the output. Note that this test is not valid for those op-amps used in non-audio circuits such as integrators and relay drivers.

(4) All of the console modules pick up their power supply voltage from the main distribution busses through polyswitches. These devices are provided to limit the current drawn by the module under fault conditions and prevent a module level fault from becoming a console level fault. *Polyswitches will generally activate when an IC fails (see item 3, previous).* Whenever a fault if suspected check the voltage on the module side of the polyswitches. When all of the circuits in a module indicate the same fault (all outputs have no audio and a large DC value, or all meters are pegged under no signal conditions, etc.) it is generally due to one of the polyswitches becoming active. Do not defeat the protection offered by these devices by replacing them with wires. Instead, determine the fault that caused them to activate in the first place and correct it.

A polyswitch is an electronic fuse that switches to a very high impedance state when it's current theshold is reached. The device resets to a very low impedance state when the fault condition is cleared and they have cooled off to normal temperature.

(5) The capacitive loading effect of a test probe may occasionally cause oscillations in a high gain amplifier circuit. For this reason it is advisable, when using meter probes to measure DC voltage in an amplifier circuit, to isolate the "hot" lead from the circuit under test with a 10K resistor. This introduces a slight measurement error, depending on the meter input impedance, but this error is slight compared to the error that occurs if the amplifier is oscillating. If signal tracing with an oscilloscope, use a low capacity probe.

(6) Because of the feedback loop in the op-amp circuit, sometimes a signal can be measured or heard even when the IC is defective or even removed. Generally this signal will become more and more distorted as the level increases; also the gain of the affected path will be incorrect. Don't assume that because you can observe an output signal the IC must be working properly.

Other Details

(1) In general, TV-80 consoles are rugged and user friendly. I/O connections can be unplugged or plugged in while powered up with no damage. Occasionally, this may cause a transient in the logic system that may be sufficient to affect a channel's ON/OFF or CUE status, but this is rare.

(2) If the power cable is being unplugged from the mainframe or the power supply, be sure to first turn the power off to avoid arcing the connector pins.

(3) The module faceplate Lexan panel overlays are very durable, and can be easily cleaned with Windex. If they should become damaged or torn through carelessness they can be replaced—consult Wheatstone for details.

(4) Care should be taken with the plexiglas covering the VU meters, as it is easily scratched.

(5) Fader knobs should be removed or installed only when the fader is at the end of its travel, to avoid "bowing" the internal fader structure.

Wheatstone maintains an active program of user support and technical assistance. You are encouraged to call (252-638-7000) or fax (252-637-1285) the factory with any questions, problems, ideas, or suggestions regarding your TV-80 console.

APPENDIX II

Factory Leg Set Assembly

Furniture Leg Set Assembly Instructions

The TV-80 furniture leg set is shipped in four sections:

a) two wooden endpieces
b) a front vanity panel, pre-attached to an interior access panel
c) a rear vanity panel

Note the leg set has already been pre-assembled with the TV-80 console at the factory, so all holes have been predrilled. The set is subsequently broken down for shipping purposes. All that remains at the client end is re-assembly.

a) Note the wooden end pieces: the curved edges face towards the front; metal brackets have been pre-mounted on their inside surfaces; the bottom edge of each piece is longer than the top edge. When set upright in the correct orientation, the distance between them will equal the width of your TV-80 audio console, and the front and rear vanity panels will span that distance.

Refer to the drawing on the next page

b) The double vanity panel (the one already attached to the unfinished wooden ACCESS PANEL) is the *front* spanning piece. Its formica surface faces front; the cherry strip is its bottom edge and rests on the floor. Note the metal angle piece running the entire length of the access panel's top edge—this attaches to the bottom of the TV-80 console.

c) The single vanity panel is the *rear* spanning piece. Its formica surface faces to the rear. The cherry strip is its bottom edge; when in place it leaves a 3/4" gap between it and the floor. This is for wiring cable access.

FIELD ASSEMBLY CONSISTS OF FIVE BASIC STEPS:

1) Position the two side pieces and mount the ACCESS PANEL (with its attached front vanity panel) to them, by screwing through the side piece front metal brackets directly into the predrilled holes on the access panel's (inside) surface, using the wood screws provided.

2) Mount the REAR VANITY PANEL to the rear metal brackets of the side pieces. Note this panel is attached using finished cupwasher screws that go into pre-tapped holes on the side pieces' rear metal brackets. Remember there will be a 3/4" gap between the rear panel's cherry trim strip and the floor.

3) With all screws tightened and the leg set safely assembled as a rigid structure, it is time to place the TV-80 console onto the leg set. REMEMBER THE CONSOLE IS **HEAVY**! *Depending on mainframe size, it can easily weigh 600+ pounds.* **We recommend six people to lift it in place.**

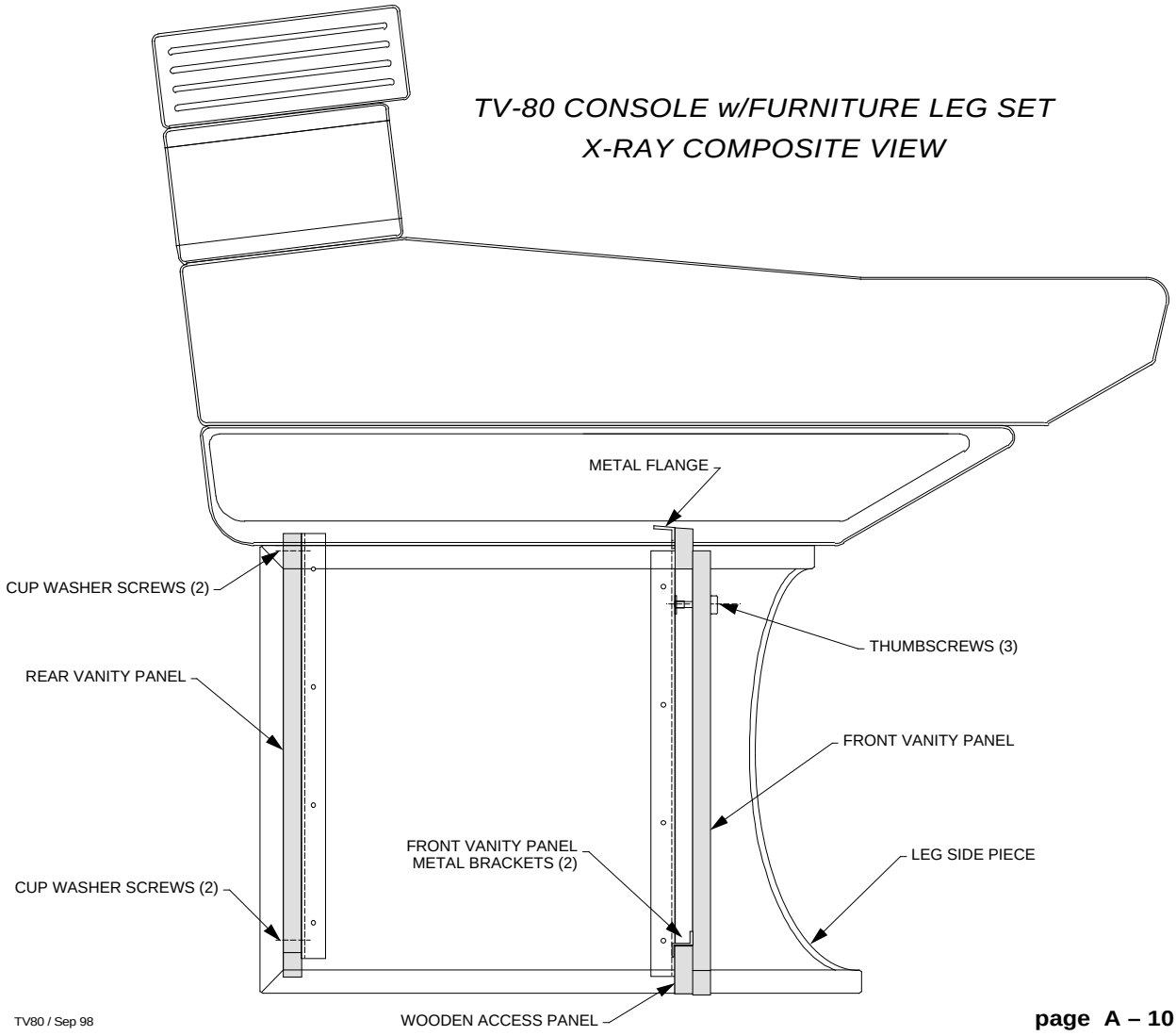
When properly in position (see drawing next page) the console's wooden endpieces will rest on the leg stand's side pieces, and will span the premounted REAR metal brackets. Front to rear position is determined by the predrilled holes in the bottom of the console's mainframe, which correspond to the holes in the metal flange running the full length of the ACCESS PANEL's top edge. NOTE also the rear metal plates on the inside top of the leg stand side pieces. Once the console is screwed down, these swing up and are screwed to the inside of the console wooden side pieces to further secure the completed structure.

4) With the console lifted into place and properly positioned, remove the FRONT VANITY PANEL by unscrewing the black thumbwheels (3) along the outside top edge of same. With these thumbscrews removed, the front vanity panel swings forward at the top and its bottom metal brackets can be lifted clear of the access panel cutouts' bottom edges. This will allow you to get inside the leg stand and screw up through the top edge metal flange into the bottom of the console mainframe. DO NOT REMOVE THE REAR VANITY PANEL TO GAIN ACCESS, AS THE LEG FURNITURE STRUCTURE WILL LOSE ITS RIGIDITY AS A RESULT. Come in from the front!

5) Final step: swing the metal plates at the top rear of each leg side piece up so they are inside the console's wooden end piece and attach them to the console with the wood screws provided. Replace the front vanity panel.

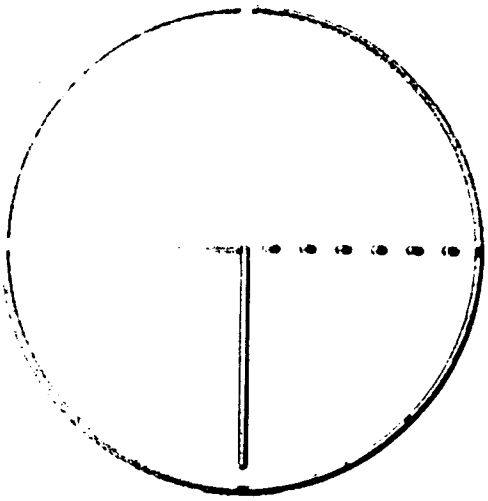
With the console now firmly attached to the leg stand, it is safe to remove the rear vanity panel for wiring access.

TV-80 CONSOLE w/FURNITURE LEG SET
X-RAY COMPOSITE VIEW



APPENDIX III

Torpey Clock Display



TORPEY TIME

CONSOLE-MOUNTING REMOTE TIME DISPLAY

TECHNICAL INSTRUCTION MANUAL

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CONTENTS

This Technical manual contains:

INTRODUCTION

The CPU-7/DSP-17 DIGITAL TIME DISPLAY is a versatile display that is designed to be mounted in a control console. It is a 'slave' display of time data as delivered from a central Master Clock system.

On-board jumpers allow selection of different serial time data sources.

It consists of a compact electronic board which mounts an LED display board on one edge.

The digits are 0.56 in. high.

Power is derived from an outboard 'AC adapter' style power module. Both power and serial code input arrive on a 5-pin locking connector.

SPECIFICATIONS

Input Signals:	SMPTE	as used by Leitch and others
	ESE codes	TC76, TC 89 or TC 90.
	DQS	from Torpey and Dynaquip
	NPR	used by National Public Radio (U.S.)
	NMEA	from a variety of GPS and marine equipment

Input Level ..... RS422 balanced, data line.

Display Type ..... LED (light emitting diode) seven segments.

Display Size ..... 0.56 in. (14.2 mm.)

AM and PM Indicators .....The AM indicator is at the top left corner of the display.
The PM indicator is at the bottom right corner.
(These will light only when jumper J7 is in place. See Section 4.)

Power requirement ..... 9 volts DC from an outboard power pack.

INSTALLATION

PHYSICAL INSTALLATION

Referring to the enclosed mechanical drawing, mounting holes are provided to allow easy installation in your console.

A red acrylic bezel is recommended for the viewing window.

CODE SELECTION

Since the CPU-7 is designed to operate from several input codes, it is necessary to tell the processor which one to expect.

Jumpers J9, J10, J11, and J12 are used. The following table defines these jumper positions.

CODE	J9	J10	J11	J12	USE
ESE TC76	OUT	IN	IN	OUT	For ESE master clocks
ESE TC89	IN	OUT	OUT	OUT	For ESE master clocks
ESE TC90	IN	OUT	OUT	IN	For ESE master clocks
DQS	OUT	OUT	IN	OUT	Torpey CLK-50 or Dynaquip master clocks
SMPTE	OUT	IN	OUT	OUT	For Leitch master clocks
NPR	IN	IN	OUT	OUT	For the National Public Radio SOSS, or Torpey GPS-1 Master Clock System
NMEA	OUT	OUT	OUT	IN	For use with other GPS receivers

Your unit will normally come with the code selector jumpers set for the code as specified on the label attached to the packing material.

CODE CONNECTION

For use with SMPTE or DQS code, the display will automatically adjust to the incoming polarity of the signal. Therefore, the polarity of the DQS or SMPTE signals is not a concern.

In the case of ESE codes, the code polarity must be respected because this code is normally distributed on unbalanced coaxial cable. If the ESE code is connected backwards, the display will show 'HELP 4' on its LEDs, as an indication that the polarity should be reversed.

The NPR control bus is connected via telephone-style modular plugs, and will normally be supplied with the proper connection polarity for this system. See the addendum to this manual for set-up of your SOSS system to deliver time packets.

INITIAL OPERATION

When first powered, if the serial code is not connected, the LED display will begin counting from 00:00:00 with its colons flashing. Once the serial code is correctly connected, the clock will display the decoded time, and the colons will stop flashing.

If after running, the code is then interrupted for any reason, the colons will flash again, and the clock will continue to run on its own crystal.

The flashing colons are a warning to the operator that the code has been interrupted.

CIRCUIT DESCRIPTION

The CPU-7/DSP-17 is made up of two circuit boards : a CPU-7 controller board and a DSP-17 display board. Each type of board is described separately in the following pages.

CPU-7 CONTROLLER

Please refer to drawing CPU-7/2-2 Schematic for the following discussion.

CENTRAL PROCESSING UNIT

The Central Processing unit is the heart of the CPU-7. The MCU (Micro Controller Unit, U1) executes a program stored as a series of instructions in its internal ROM. This program controls all aspects of the CPU-7's function.

OSCILLATOR

C9, C10, and X1 are used in the oscillator circuit of the MCU (U1). The oscillator controls all the timing of the MCU.

POWER ON RESET AND WATCHDOG.

When power is first applied to the CPU-7, U3 resets the MCU (U1), by putting a momentary HI on U1-9.

It also acts as a 'watchdog' circuit. Pin U3-7 needs to be continuously triggered by the processor from U1-39 (DS1), or else its output U3-5 will go HI and reset the processor at U1-9.

CODE RECEIVER

The code receiver takes a balanced signal and converts it to a level suitable for the MCU (U1). The received input code is then available to the processor at U1-10 and at U1-12.

R9, R10, C5, and U4 form a code receiver.

DIGIT SELECTS

The MCU (U1) activates P0.0 (pin 39) through P0.5 (pin 34) when a digit is to be activated. U2 inverts and buffers this signal to the display board connector. R11 is a pull-up resistor network for these signals.

DISPLAY SEGMENT DRIVERS

Parallel segment data is presented by the MCU on port 2, pins 21 to 28. This parallel data is delivered through R1 to R8, to Q1 to Q8 respectively, which invert this signal and drive the segments of the LED's via the display board connector.

CODE SELECTION

Since the CPU-7 is designed to operate from several input codes, it is necessary to tell the processor which one to expect.

Jumpers J9, J10 are wired to the MCU port P0.6 (pin 33) and P0.7 (pin 32) while J11 and J12 go to P3.6 (pin 16) and P3.7 (pin 17). They are used to tell the processor which area of ROM memory to address, and thus which input code is expected.

See the paragraphs titled 'INSTALLATION' for the code selection options.

DISPLAY MODES

The mode of operation is what decides what time value will appear on the display. You have a choice of time zone offsets, including 30 minutes. 12-hour or 24-hour formats are also available.

The mode of operation is controlled by selectively installing jumpers (or closing a switch contact) on the jumper blocks J1 to J8. These jumpers are normally set at the factory (on certain products switches or external connections are provided so the customer may change the display).

The Display Mode jumpers are numbered 1 through 8.

When all jumpers are absent, the product will operate in the 24-hour mode, i.e. no offset from incoming code.

Jumper #8 acts as a leading zero blanking enable. When these pins are connected, hours values from 00 to 09 will appear as 0 to 9.

Jumper #7 converts the incoming code to 12-hour base, with AM and PM indicators lighting.

#6 adds 16 hours to the incoming code
#5 " 8 " " "
#4 " 4 " " "
#3 " 2 " " "
#2 " 1 " " "
#1 " 30 minutes " "

MODES by FUNCTION

JUMPER 7654321	DISPLAY #1	COMMENTS
0000000	TIME 24 HR	NO CONVERSION
1000000	TIME 12 HR	
X000001	ADD 30 MINUTES	
X000010	ADD 1 HOUR	
X000100	ADD 2 HOURS	
X001000	ADD 4 HOURS	
X010000	ADD 8 HOURS	
X100000	ADD 16 HOURS	

For example:

The desired time display is in the 24-hour mode with zero blanking, but with a time offset (addition) of 5 hours:

Install: jumper #8 for leading zero blanking.
jumper #4 for an offset of 4 hours.
jumper #2 for an offset of 1 hour.

RESULT: 4 hours + 1 hour = 5 hours.

If a negative time offset is required, imagine that you are advancing the time display to the next day, so that, for example, if an offset of -3 hours is required, then advance the display by 21 hours (24-3). This case would call for J6 (16 hours), J4 (4 hours), and J1 (1 hour).

Result: 16+4+1=21.

DSP-17 DISPLAY BOARD

1.0 INTRODUCTION

The DSP-17 is a remote timer display board intended for use with the CPU-7 controller board. The display features 0.56 ins. LED's for hours, minutes and seconds display.

Please refer to the schematic labeled DSP-17 for connection of the displays to the CPU-7 board.

TECHNICAL SUPPORT

If you require technical advice concerning the installation, setup, or repair of this unit, we may be reached during normal business hours (Eastern Time) at 1-800-387-6141,or anytime by email at *support@torpeytime.com.*

NOTES:

ADDENDUM

SET-UP OF SOSS SYSTEM FOR NPR CODE

In order for any Torpey Clock to operate on the National Public Radio system, it must receive Time Packets from the SOSS system, which is communicating with NPR headquarters, and receiving this data (among others).

It is necessary to ensure that the Time Packets are sent on the Control Bus, by running the SETUP program of your SOSS system.

To do this:

1. Double-click on the SOSS icon of your OS2 computer's screen. (The picture of the satellite dish)
2. Double-click on SETUP as a choice on the screen.
3. Log on using your security code (if applicable).
4. Click on 'Edit' in the Setup menu. (or use ALT-E).
5. Select 'General Parameters' from this menu.
6. The resulting screen offers a list of options. The second line of this screen is:

   ☐🕐 Send Time Sync Packet Out Control Bus.

   Click on this box to select this option.

   Click on OK to save this, and return to the Setup Editor.
7. Double-click on the top left corner box of this screen to exit.

As a result of this action, your system is operating exactly as it was before, but with Time Packets sent approx. every ten seconds, interspersed with the control data.

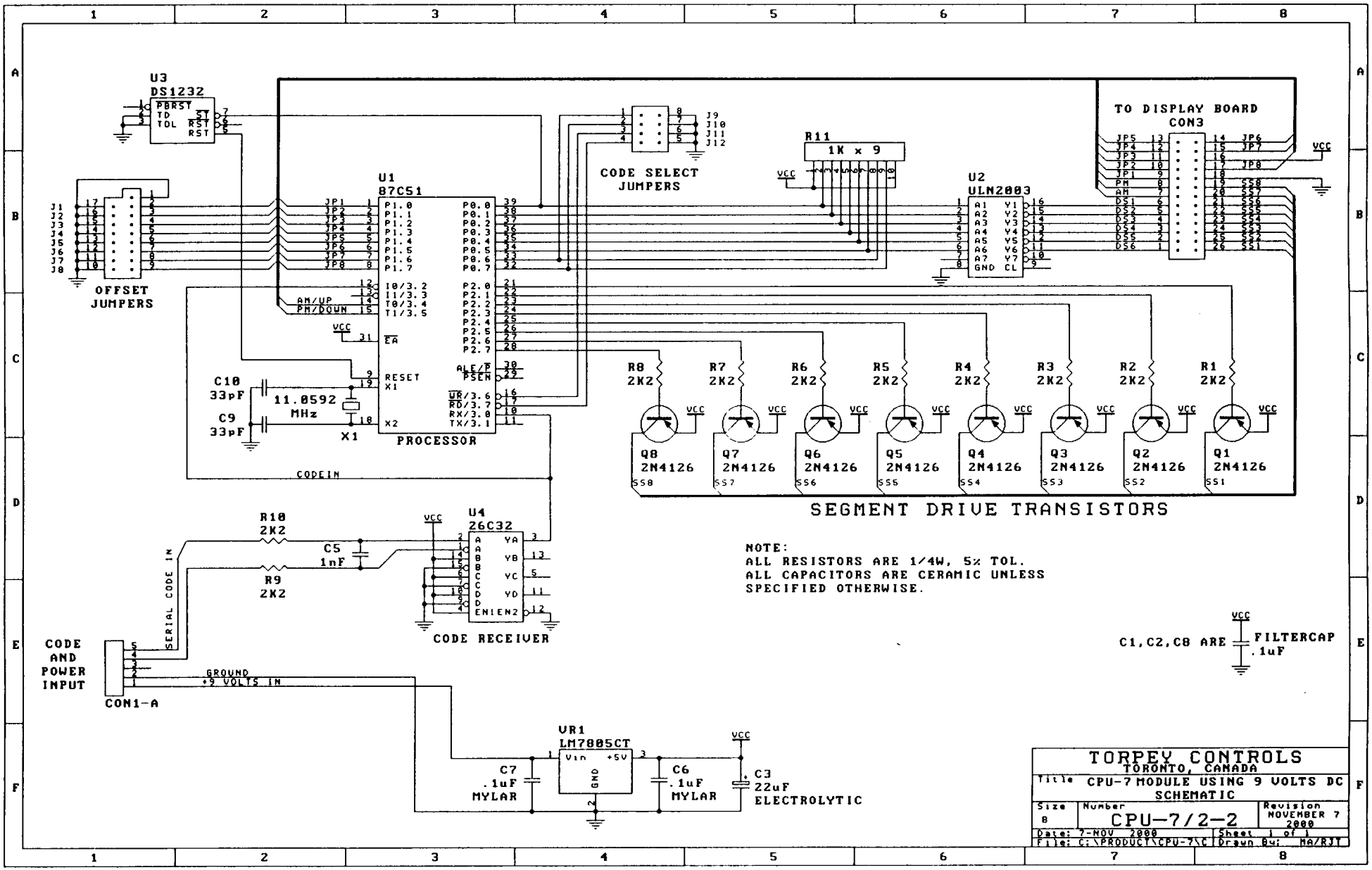
You are now ready to install your Torpey NPR Clock. Choose a convenient location, plug in the power adapter, and connect the telephone-style modular plug to your NPR Control Bus.

When the unit is first powered up, it will begin counting from 00:00:00, with its colons flashing. After a few seconds, it will receive its Time Packet, and set itself to that time. The colons will stop flashing.

NOTE: If the time shown is not in your time zone, or if you desire conversion from 24-hour to 12-hour standard, then consult Section 4 of this manual for Time Offsets.

The unit is delivered to operate in the 24-hour mode of operation. That is, whatever is sent from the SOSS is displayed.

NOTE: IF THE COLONS OF THE DISPLAY BEGIN TO FLASH AFTER THE UNIT IS SYNCHRONIZED, THIS IS AN INDICATION THAT THE UNIT HAS NOT RECEIVED A TIME PACKET FOR OVER A MINUTE, AND IS RUNNING FROM ITS CRYSTAL FREQUENCY AS A REFERENCE. CHECK THAT YOUR MODULAR PLUG IS STILL CONNECTED TO THE CONTROL BUS, AND THAT NOTHING HAS DISTURBED THE SOSS SETUP.


U3
DS1232
U1
87C51
U2
ULN2003
R11
1K x 9
TO DISPLAY BOARD
CON3
CODE SELECT
JUMPERS
OFFSET
JUMPERS
PROCESSOR
C10
33pF
C9
33pF
11.0592
MHz
X1
CODEIN
R8 2K2
R7 2K2
R6 2K2
R5 2K2
R4 2K2
R3 2K2
R2 2K2
R1 2K2
Q8 2N4126
Q7 2N4126
Q6 2N4126
Q5 2N4126
Q4 2N4126
Q3 2N4126
Q2 2N4126
Q1 2N4126
SEGMENT DRIVE TRANSISTORS
R10
2K2
R9
2K2
C5
1nF
U4
26C32
CODE RECEIVER
SERIAL CODE IN
CODE
AND
POWER
INPUT
CON1-A
GROUND
+9 VOLTS IN
VR1
LM7805CT
C7
.1uF
MYLAR
C6
.1uF
MYLAR
C3
22uF
ELECTROLYTIC
NOTE:
ALL RESISTORS ARE 1/4W, 5% TOL.
ALL CAPACITORS ARE CERAMIC UNLESS
SPECIFIED OTHERWISE.
C1,C2,C8 ARE
FILTERCAP
.1uF
TORPEY CONTROLS
TORONTO, CANADA
Title
CPU-7 MODULE USING 9 VOLTS DC
SCHEMATIC
Size
B
Number
CPU-7/2-2
Revision
NOVEMBER 7
2000
Date: 7-NOV 2000
Sheet 1 of 1
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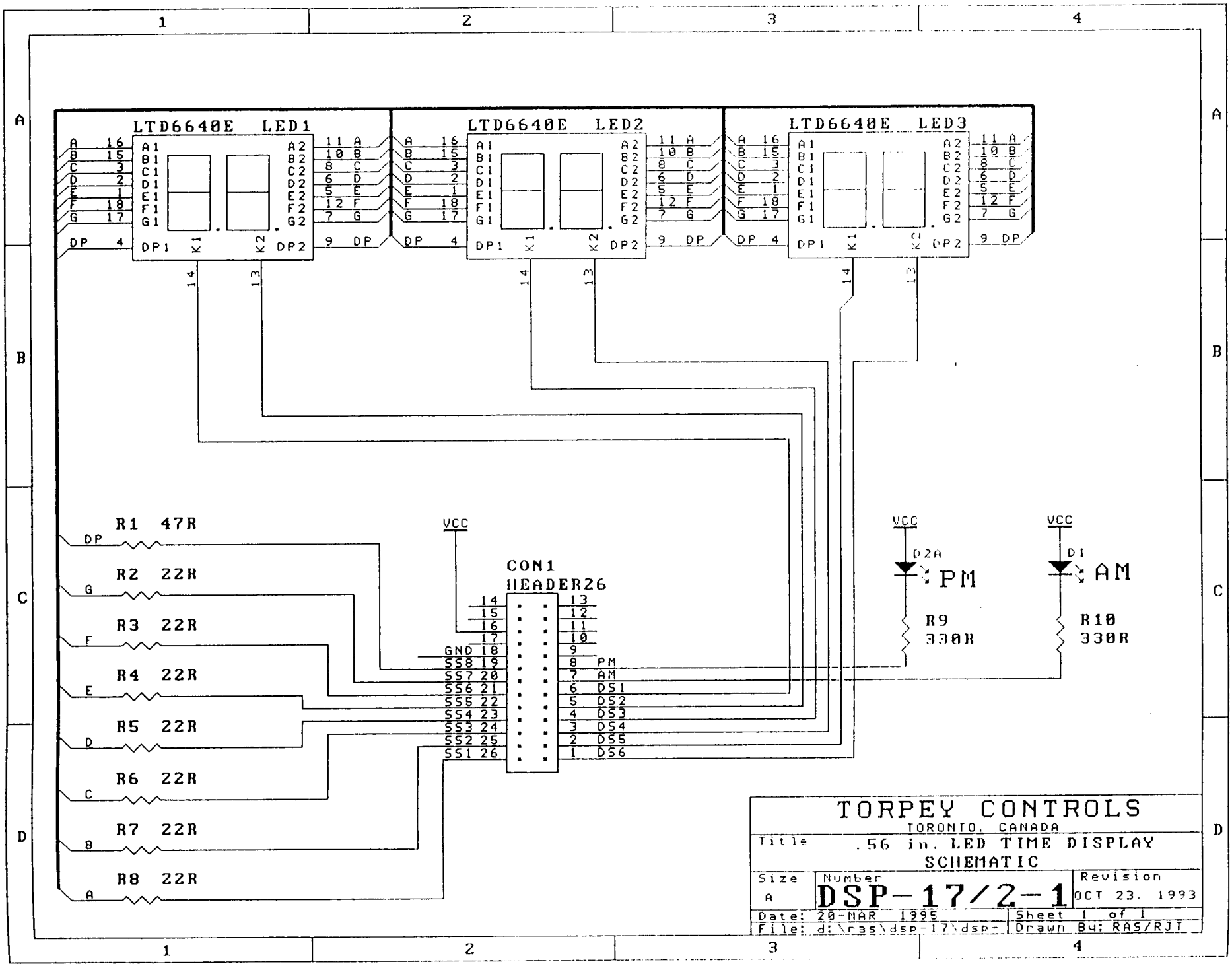
Drawn By: MA/RJT


LTD6640E LED1
LTD6640E LED2
LTD6640E LED3
R1 47R
R2 22R
R3 22R
R4 22R
R5 22R
R6 22R
R7 22R
R8 22R
VCC
CON1
HEADER26
GND
SS8
SS7
SS6
SS5
SS4
SS3
SS2
SS1
PM
AM
DS1
DS2
DS3
DS4
DS5
DS6
D2A
D1
R9
330R
R10
330R
TORPEY CONTROLS
TORONTO, CANADA
Title .56 in. LED TIME DISPLAY
SCHEMATIC
Size A
Number DSP-17/2-1
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Date: 20-MAR 1995
Sheet 1 of 1
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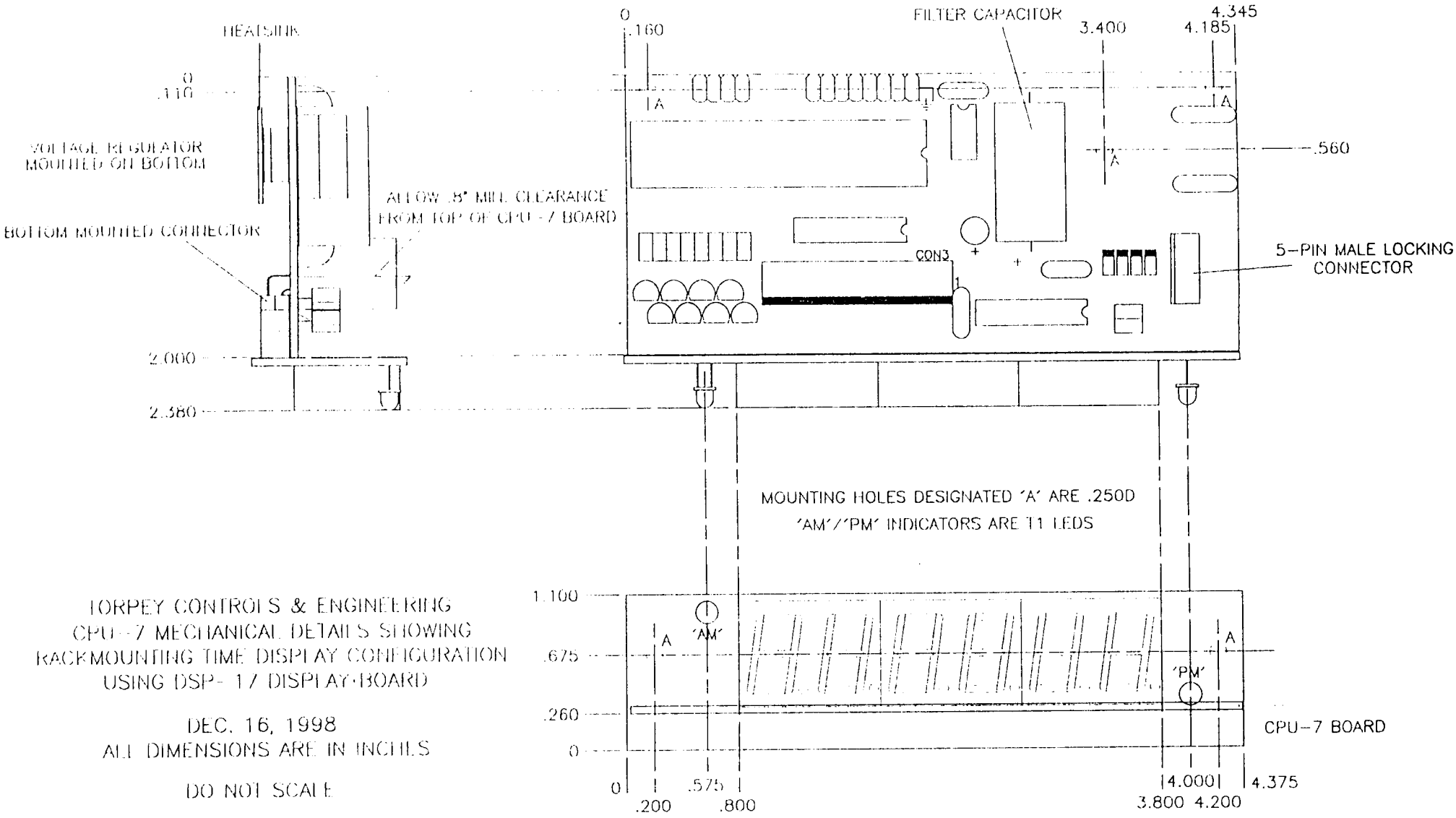

TORPEY CONTROLS & ENGINEERING
CPU-7 MECHANICAL DETAILS SHOWING
RACKMOUNTING TIME DISPLAY CONFIGURATION
USING DSP-17 DISPLAY BOARD

DEC. 16, 1998
ALL DIMENSIONS ARE IN INCHES

DO NOT SCALE

DRAWING: CPU7_17A.MEC

TORPEY CONTROLS & ENGINEERING LIMITED

PRODUCT WARRANTY

Torpey Controls warrants all of its products to be free from defects in materials and workmanship under normal and proper use and service for one year from the date of shipment.

Torpey Controls agrees to repair or replace without charge (except as noted in special provisions) all defective parts of said products which are returned, transportation prepaid, for inspection at its service centre within the period of the warranty, provided that such inspection discloses to the satisfaction of Torpey Controls what the defects are as specified above and provided also that the following conditions of this warranty have been met.

The conditions of this warranty are that the equipment has not:

1. Been altered (other than by approved procedures of Torpey Controls),
2. Been subjected to misuse, improper maintenance, negligence or accident,
3. Been damaged by excessive voltage or otherwise incorrect installation & connections,
4. Had its serial number, or any part altered, defaced or removed,
5. Been used with components not supplied by Torpey Controls (except standard solid-state devices, fuses, batteries, LED's or lamps).

Torpey Controls reserves the right, at our option, to supply replacement subassemblies or modules, which are expected to be installed by the owner's technical staff. Cost of this installation shall be borne by the purchaser or owner. Disposition of defective subassemblies or modules shall be at our instructions.

Fuses, batteries, lamps and LED indicators are excluded from the provisions of this warranty and as to these items no warranty, express or implied, is made by Torpey Controls.

The seller shall have the right of final determination as to the applicability of this warranty.

Equipment shall not be returned to the service centre for inspection, replacement or repair without authorization from Torpey Controls.

This warranty is in lieu of all other warranties expressed, implied or statutory, and all other obligations or liabilities on the part of Torpey Controls. No person, including any distributor, dealer, agent or representative of Torpey Controls is authorized to assume for Torpey Controls any liability on its behalf or in its name, except to refer to this warranty herein contained.

In no event shall Torpey Controls be liable for claims, demands, or damages of any nature, however denominated. The sole warranty liability shall be to repair defective items at the service centre or to supply replacement parts in accordance with the terms of this warranty.

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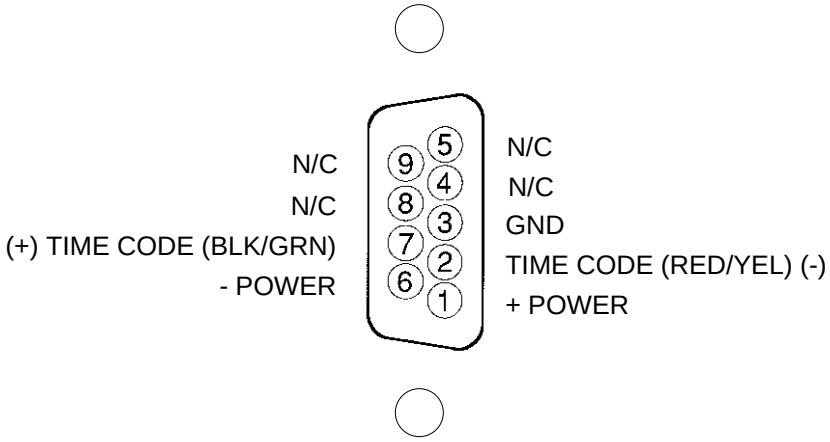
TORPEY CLOCK

DB Connector Pinout



FROM POWER PACK

DB-9 Connector is located on the rear of console meterbridge

Wheatstone Corporation

600 Industrial Drive, New Bern, NC. (252-638-7000 / fax 252-638-1285)