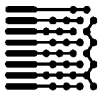
R-17 Radio Console



AUDIOARTS® ENGINEERING

TECHNICAL MANUAL
November 1998

R-17 Radio Console Technical Manual - 2nd Edition

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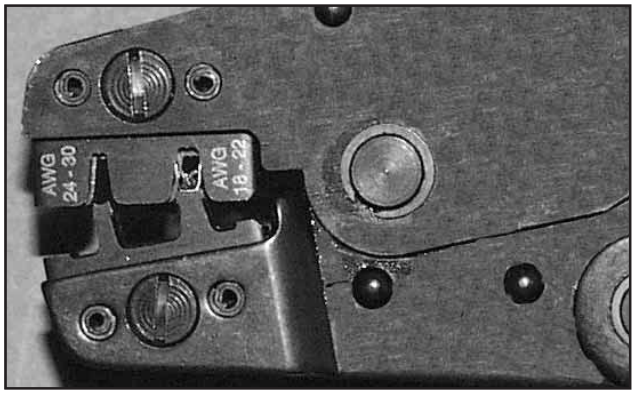
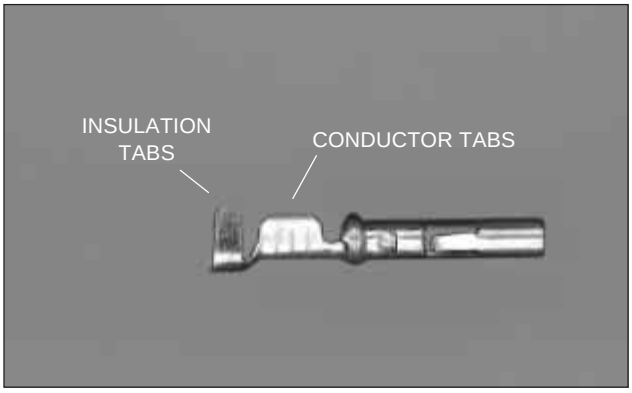
HAND CRIMP TOOL WIRING INSTRUCTIONS

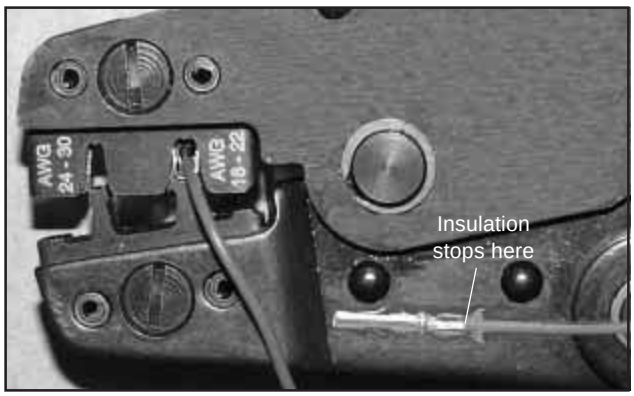
The supplied hand crimping tool (PALADIN model PA1645, W/S#850067) is used for all I/O wiring connections to and from the console. It is to be used with the supplied .062" pin diameter silver crimp terminals (figure 1) intended for 22 gauge wire.



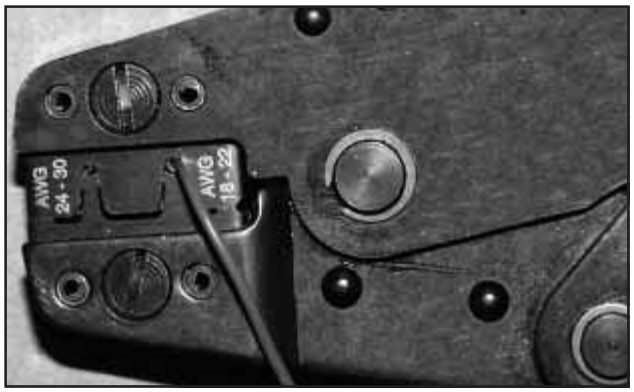
(2) The terminal conductor tabs (pointing UP) are placed in anvil 18-22; the terminal's insulation tabs extend in front towards the camera.



(1) .062" pin diameter silver crimp terminal



(3) The stripped 22 gauge wire is placed into the terminal and crimped. Note the wire's insulation must stop just short of the conductor tabs (detail)



(4) Final step: jaws fully closed; the insulation tabs have been crimped.

1) Strip wire approximately 3/16" (insert in proper wire stripper, rotate one half turn, and pull insulation off wire).

2) Leaving wire aside for the moment, with Paladin tool fully open (engraved side toward you) bring a terminal into position from the unmarked side of the tool. Place the conductor tabs (inner set as shown in figure 1) on the "18-22" or "24-30" (depending on the wire) anvil (slightly curved surface) so that the circular portion of the tabs rests in the curved surface of the anvil and the two tabs face up into the walls of the female jaw. The insulation tabs will be flush with the top of the tool (figure 2).

3) Close tool very slightly, only to the point of holding the terminal in position (figure 2).

4) Insert wire into terminal until wire insulation is stopped by conductor tabs (figure 3). CRIMP by squeezing handles until jaws are fully closed.

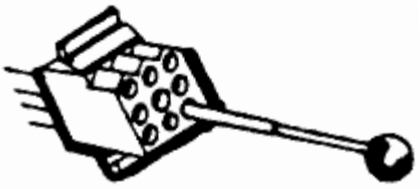
5) If there is an insertion error or if a circuit change is needed, you'll need to use an extractor tool to remove terminals (next section).

EXTRACTOR PIN INSTRUCTIONS

If you should accidentally insert a crimp terminal pin into the wrong socket, the supplied pin extractor tool (Waldom P/N W-HT-2023) will let you correct your mistake without having to sacrifice a connector.

STEP 1.
Push wire attached to pin terminal, to be removed, forward to free pin terminal locking flanges from the Nylon Connector Housing.

STEP 2.
Place extractor tip over pin terminal to be removed. Press handle portion of extractor in downward motion until tip rests upon Nylon Housing.



STEP 3.
Push ball at top of extractor down toward pin terminal; pin terminal will extract from Nylon Housing.

Table of Contents

Console Overview

Chapter Contents:

SYSTEM DESCRIPTION

For a better understanding of the console, refer to the R-17 console module faceplate drawing (page 1-3) and system signal flow diagram (page 1-4) in conjunction with the following section.

The AUDIOARTS R-17 RADIO CONSOLE is designed for radio on-air applications. The console comes equipped with ten inputs and two stereo outputs (PROGRAM and AUDITION). Input modules may be of two types: mono (mic) and stereo (line); these may be plugged in any combination within the ten input positions of the mainframe. Stereo line inputs have an automatic cue circuit that sends the module's signal to the console's cue bus and headphone outputs whenever activated. The console includes two VU meters (switchable between PGM and AUD) and a built-in CUE speaker and HEADPHONE amplifier. An output module also houses a TALKBACK circuit, and the monitor module contains level controls for the console's CUE, CONTROL ROOM and HEADPHONE outputs, as well as a monitor source selector switchbank (PGM, AUD and EXTERNAL line in). All console I/O connections are via 12-pin connectors.

Standard Modules

(1) MM-17 MONO MIC INPUT module: accepts a microphone level signal (input is electronically balanced), assigning it to the console's stereo PROGRAM and/or AUDITION outputs. A PCB mounted trimpot sets input gain. An insert point is provided for external processing. Channel level is set by a long-throw conductive plastic fader, and lighted channel ON and OFF buttons control the signal. These same buttons can also be programmed (via a PCB mounted dipswitch) to mute the console's CONTROL ROOM output to prevent feedback when a microphone channel is used for the console operator's (announcer) microphone. An additional dipswitch allows the module signal to be sent to the console's TALKBACK bus for control room/studio communication.

(2) SL-17 STEREO LINE INPUT module: accepts an electronically balanced stereo line level input (internal trimpots set right and left input gain trim), assigning it to console's PGM/AUD outputs. A CUE circuit is included. When activated, it sends the module's signal to the console's cue speaker and headphone output, allowing the operator to preview material with the channel off and the fader down, before it goes out over the air. A stereo conductive plastic fader sets channel level, and module START and STOP buttons control the external source device (CD player, CART and TAPE machines, etc.) as well as the channel's audio. External connections are also provided to turn the

channel on and off.

(3) O-17 MASTER OUTPUT module: one per console; handles the R-17's two electronically balanced stereo outputs (PROGRAM and AUDITION); also houses a VU meter select switch (PGM/AUD) and a TALKBACK circuit and output. Front panel accessed trimpots allow VU meter calibration; an additional front trimpot controls TB level.

Some special order R-17 consoles may be equipped with internal VU trimpots. If this is the case with your console, it will be necessary to remove the O-17 module from the mainframe in order to access the internal card mounted trimpots.

(4) CR-17 CONTROL ROOM module: selects control room monitor source (EXT, PGM, AUD), and houses master level controls for CUE, CR and HDPN outputs.

Optional Features

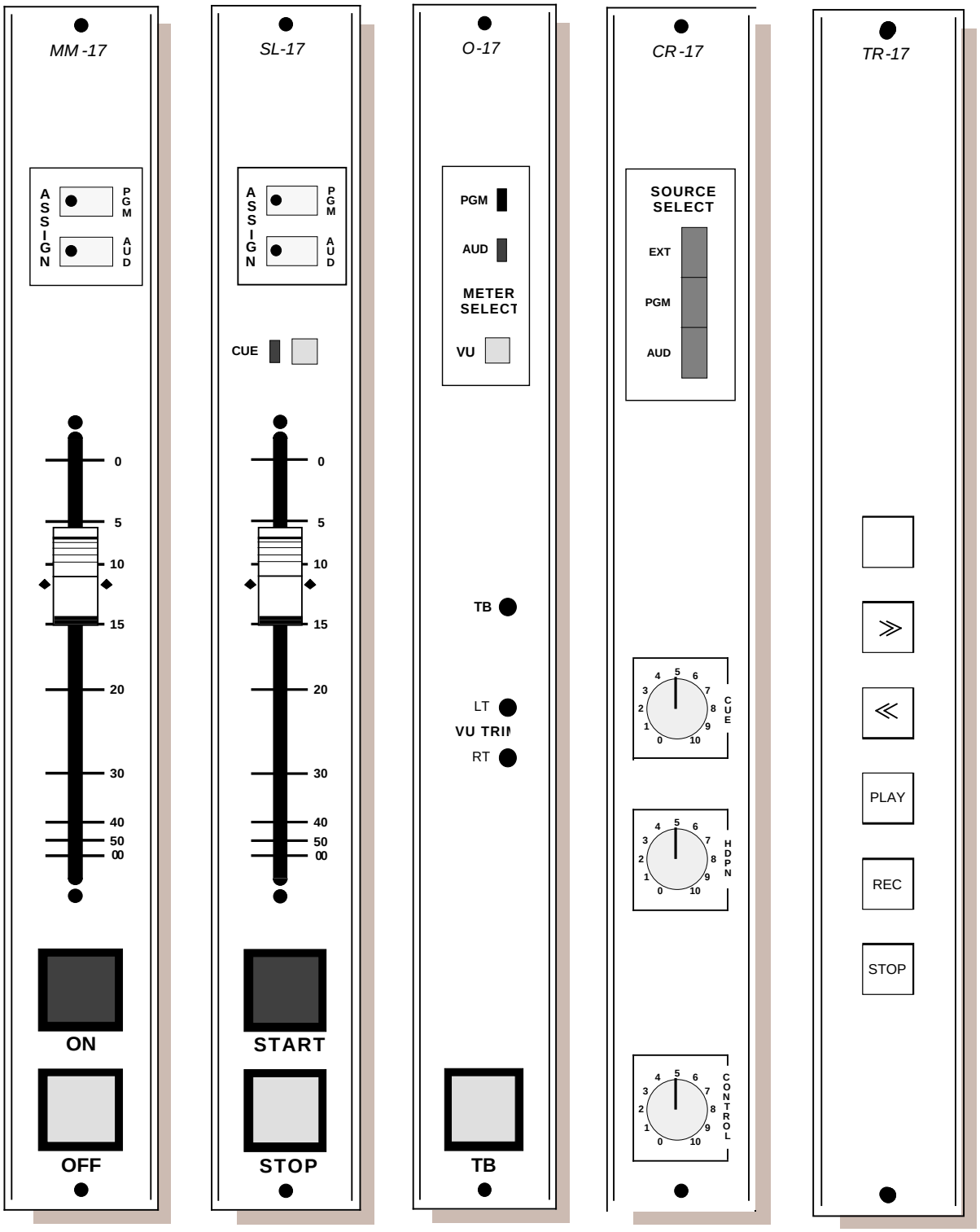
(1) TR-17 TAPE REMOTE module: available in two versions: FF-1, with full function control for one reel-to-reel machine; or SS-3, with three pairs of START/STOP buttons. All switches have tally back LED illumination.

(2) LINE PRESELECTOR: this switchbank selects one of six stereo line inputs; its output can feed any input module or the external line input on the control room monitor source selector. The Line Preselector is located on the center of console's meterbridge, next to the VU meters.

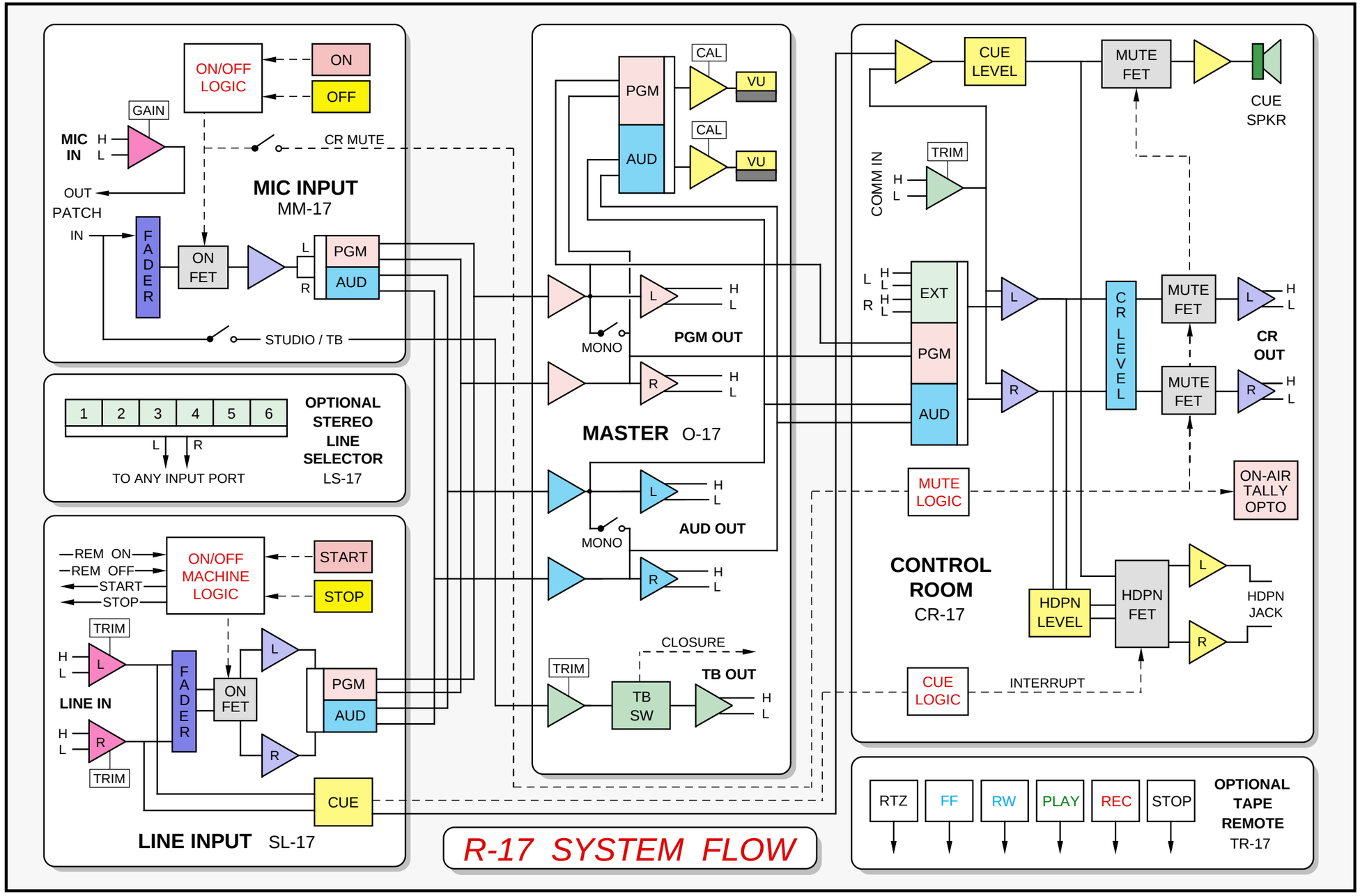
PERFORMANCE SPECIFICATIONS

FREQ RESPONSE	
Line, 20Hz	-0.25dB
Line, 20KHz	-0.10dB
Mic, 20Hz	-0.10dB
Mic, 20KHz	-0.10dB
DYNAMIC RANGE	
Line, unity gain	113dB
Mic, 54dB gain	99dB
S/N RATIO (ref +8dBu)	
Line	93dB
Mic	82dB
NOISE	
Mic EIN	-128dBu
THD + N (20Hz–20KHz)	
Line, +24dBu	.002%
Mic (1KHz) +24dBu	.006%
IMD (SMPTE)	
Line, +4dBu	.004%
Line, +24dBu	.006%
Mic, +24dBu	.006%
DIM	
Line, +16dBu	.002%
Line, +24dBu	.003%
Mic	.005%
MAXIMUM INPUT	
Line	+28dBu
Mic, minimum trim	-4dBu
MAXIMUM OUTPUT	
Line	+28dBu
HEADROOM	
ref +4dBu	24dB
SLEW RATE	15V/µs
BUS CROSSTALK	
1KHz	-100dB
20KHz	-80dB
STEREO SEPARATION	
1KHz	-85dB
OFF ISOLATION (MM-10)	
1KHz	-100dB
20KHz	-80dB
MAXIMUM GAIN	
Line	+33dB
Mic	+74dB
PHASE RESPONSE	
Line, 20Hz–20KHz	±12°
SQ WAVE RESPONSE	
Ringing	0
Overshoot	0
CONNECTORS	12 pin multi
DIMENSIONS	
Width (left-to-right)	18-1/2"
Depth (front-to-back)	16-3/4"
Height (rear)	6-7/8"
Height (front)	2-3/8"

Specifications and features subject to change without notice.



R-17 Console - Module Faceplates Drawing


ON/OFF LOGIC
ON
OFF
GAIN
MIC IN H L
CR MUTE
OUT
PATCH IN
MIC INPUT
MM-17
FADER
ON FET
L
R
PGM
AUD
STUDIO / TB
1 2 3 4 5 6
L R
TO ANY INPUT PORT
OPTIONAL STEREO LINE SELECTOR
LS-17
REM ON
REM OFF
START
STOP
ON/OFF MACHINE LOGIC
START
STOP
TRIM
H L
LINE IN
FADER
ON FET
L
R
PGM
AUD
CUE
LINE INPUT SL-17
CAL
VU
PGM
AUD
MONO
PGM OUT
MASTER O-17
AUD OUT
CLOSURE
TRIM
TB SW
TB OUT
CUE LEVEL
MUTE FET
CUE SPKR
COMM IN
TRIM
EXT
PGM
AUD
MUTE LOGIC
CR LEVEL
MUTE FET
CR OUT
ON-AIR TALLY OPTO
CONTROL ROOM
CR-17
HDPN LEVEL
HDPN FET
HDPN JACK
CUE LOGIC
INTERRUPT
RTZ
FF
RW
PLAY
REC
STOP
OPTIONAL TAPE REMOTE
TR-17
R-17 SYSTEM FLOW

Installation

Chapter Contents

INSTALLING THE CONSOLE

Installation is simple; the console comes shipped in a single carton, held in place with foam blocks. Since the R-17 sits above the counter it is not necessary to prepare the countertop by making a cutout. Simply unpack and place in the desired location. Bear in mind that final console placement should take into consideration avoiding proximity to any electromagnetic fields, such as large power transformers, motors, and flourescent lighting fixtures.

The first major installation step is to make sure the console is properly grounded.

SYSTEM GROUND

Safety requirements dictate that a positive connection from the console mainframe to electrical ground be made in the completed installation.

The system ground serves two important purposes:

(1) Provides a zero signal reference point for the entire audio system;
(2) Assure safety from electrical shock.

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

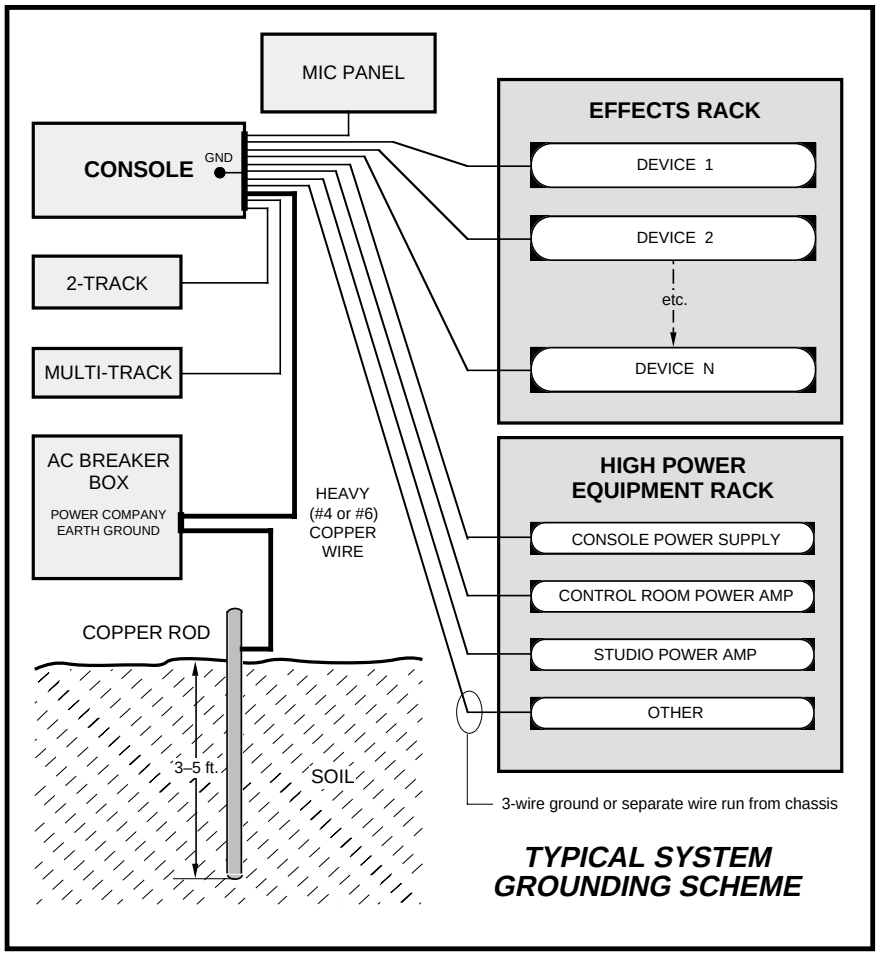
(A) EARTH GROUND, which is usually a heavy copper rod driven into the soil adjacent to the building (around 6 feet down) or a connection to the copper water pipes leading into the building. Either is acceptable, unless, of course, the water pipe is of the newer plastic variety.

(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.

The grounding point on the R-17 console is a thumb lug located at the lower right corner of the rear panel. This is the central grounding point for the console mainframe. TIE THE CONSOLE MAINFRAME TO THE SYSTEM EARTH GROUND. TIE EVERY PIECE OF EQUIPMENT IN THE ENTIRE AUDIO SYSTEM TO THE CONSOLE MAINFRAME GROUND. If the system earth ground point is inaccessible, tie the console ground mainframe ground to the power company earth conductor at the main breaker box (see drawing "Typical Grounding Scheme" on next page).

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; 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 mainframe ground.

Tie the console mainframe ground to the system earth ground. Tie every piece of equipment in the entire audio system to the console mainframe ground.



Further 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, you may proceed with the audio and control input/output connections (next section).

THE CONSOLE POWER SUPPLY

The R-17 console uses a separate rackmount power supply unit. The power supply should be mounted in an adjacent equipment rack within fifteen feet (but no closer than 3 feet) of the console. It should be mounted in a rack space (it requires two rack spaces or 3 1/2") where proper air circulation is possible. Avoid locating any high gain equipment (such as phono preamps, tape recorders, etc.) too near to the power supply, to avoid magnetic interference into that equipment.

Once the supply is mounted, connect the linking power cable at the console end to the connector CT28, passing underneath the last righthand module. Power supply connector (CT28) is a 6-pin plug that mates with a matching socket ("DC IN") mounted on the motherbord (see page 3-13). Connect the other end of the cable to the rear of the rackmounted power supply.

The 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 feeding powering lighting, air-conditioning, or any other non-audio machinery. The third pin ground wire of the AC source should be tied to the system earth ground point (see "System Ground" section).

Assuming the console mainframe is properly installed and grounded, and its power supply correctly rackmounted and connected to the console, you may now continue with the audio and control connections (next chapter).

Console I/O Connections

Chapter Contents

GENERAL

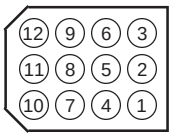
All audio and control I/O connections to the R-17 console are made through 12-pin connectors with locking tabs that connect to mating connectors on the console main printed circuit board. There is one 12-pin connector per module position, located just under the top end of each module, and accessed by removing individual modules. The CR monitor module has one additional I/O connector (CT25) for the on-air tally, talkback and comm in links.

As supplied from the factory, the console requires no logic connections to function. Therefore an orderly installation begins with the audio wiring. Once proper audio operation is verified (i.e., no ground loops), proceed with the control wiring.

The supplied 12 pin connectors use crimp type pins. A crimp tool is supplied with the console. *Always be careful to double check pin numbering on the connector block and the wiring diagram before inserting the pin in the block.* A pin extractor tool is also included; it is handy to remove pins that have been inserted in the wrong connector block hole, or if rewiring or wiring repair is needed in the future.

Consoles are normally supplied with the first mic channel preprogrammed to mute the control room speakers, so you won't hear anything from the control room speakers or CUE if Channel 1 is turned ON. This mute can be reprogrammed (see dipswitch controlled functions, page 3-3).

Key diagram showing back of typical 12-pin I/O connector plug, with pin numbers oriented as they would be seen while wiring. Beveled corners correspond to PCB mounted mating sockets.



See Appendix drawing "Balanced and Unbalanced R-17 Console Connections" on page A-3 for connection details.

The I/O connections can now be made. Note that a gap is provided at the back of the console for cable entry.

Refer to the Module I/O Pinout text to connect the console to your equipment. Recommended setup is to have all microphone inputs connected to the first channels (MM-17 type), with the remaining channels used as line inputs (SL-17). Group input types together. For example, if you have three cart machines, connect them to the inputs of three successive SL-17 modules.

Refer to the Module I/O Connection Section and note that the audio signal connections follow a logical pattern. Pins are grouped in 4 groups (called pairs for this discussion) of 3 pins each (1-3, 4-6, 7-9, and 10-12). The first pin of each group (1, 4, 7, and 10) is audio common, or ground, for connection of shields. The next pin (2, 5, 8, and 11) is the low side for balanced signals, or ground for unbalanced signals. The third pin (3, 6, 9, and 12) is the high side for balanced signals, or the signal connection for unbalanced ones.

In the case of stereo signals, left is always assigned to the first (pins 1-3) or third (pins 7-9) pair of a connector, and right is always assigned to the second (pins 4-6) or fourth (pins 10-12) pair.

The console's microphone inputs are provided with insert points for external processing. If you do not wish to use these patch points, it will be necessary to bridge them at the appropriate connector(s) before signal will pass. See Mic Module Audio Connection text (below) for details.

The console's PROGRAM, AUDITION, TALKBACK and CONTROL ROOM (CR) outputs are electronically balanced, low source impedance; minimum load impedance is 600 ohms.

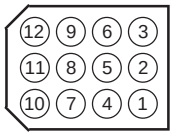
Once the signal wiring is complete, check that each item is correctly wired before continuing.

MONO MIC INPUT MODULE (MM-17)

Mic Module Audio Connections

Module input/output signal connections are made via dedicated 12–pin connectors mounted on the console's main printed circuit board directly underneath the top of each module. Connectors are accessed by removing individual modules. The key drawing to the left shows a typical connector.

Key diagram showing back of typical 12-pin I/O connector plug, with pin numbers oriented as they would be seen while wiring. Beveled corners correspond to PCB mounted mating sockets.

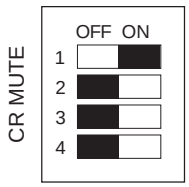


(CT1 thru 10, Main Printed Circuit Board)

Pin 1 - MIC INPUT, SHIELD
Pin 2 - MIC INPUT, LOW
Pin 3 - MIC INPUT, HIGH
Pin 4 - INSERT OUT, SHIELD
Pin 5 - INSERT OUT, LOW
Pin 6 - INSERT OUT, HIGH
Pin 7 - INSERT IN, SHIELD
Pin 8 - INSERT IN, LOW
Pin 9 - INSERT IN, HIGH
If you do not intend to use the insert patch loop, bridge pin 6 to pin 9 to preserve the signal path.
Pin 10 - ON/OFF COMMON
Pin 11 - REMOTE OFF
Pin 12 - REMOTE ON

Mic Module Control Ports

View of MM-17 PCB mounted 4-position dipswitch (SW3).



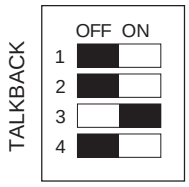
The following logic functions, listed by pin number, are available at 12-pin I/O connector of each MM-17 mono mic input module:

PIN 12: **REMOTE ON SWITCH** - a contact closure from this pin to ON/OFF common pin (see below) will turn the channel ON.

PIN 11: **REMOTE OFF SWITCH** - a contact closure from this pin to ON/OFF common pin (see below) will turn the channel OFF.

PIN 10: **ON/OFF COMMON** - completes the circuit for the module's remote ON and OFF switch connections.

Mic Module Dipswitch Controlled Functions



Note that a position is ON when the righthand side of the rocker switch is pressed DOWN; a position is OFF when the lefthand side is DOWN.

There is a four position dipswitch on the printed circuit board of each MM-17 microphone input module. Positions 1 and 3 may be user-programmed as follows:

Position 1: CR MUTE - **This is normally pre-programmed at the factory on the leftmost MM-17 input module.** When activated, it automatically mutes the console's control room and cue speaker output whenever that input module is turned ON. This is to prevent feedback from the announcer's mic. This same control signal activates the opto-isolated on-air tally line located on the console's main printed circuit board (see "On-Air Tally Circuit" below).

Position 3: TALKBACK TO STUDIO - When activated, sends the module's signal to the console's talkback bus. When the talkback button (on the O-17 output module) is pushed, the signal is routed to the console's talkback output. Note the talkback feed is taken pre-fader, pre-ON/OFF, so it is not necessary for the module to be ON in order to talkback to the studio.

DIPSWITCH positions (2) and (4) are not used.

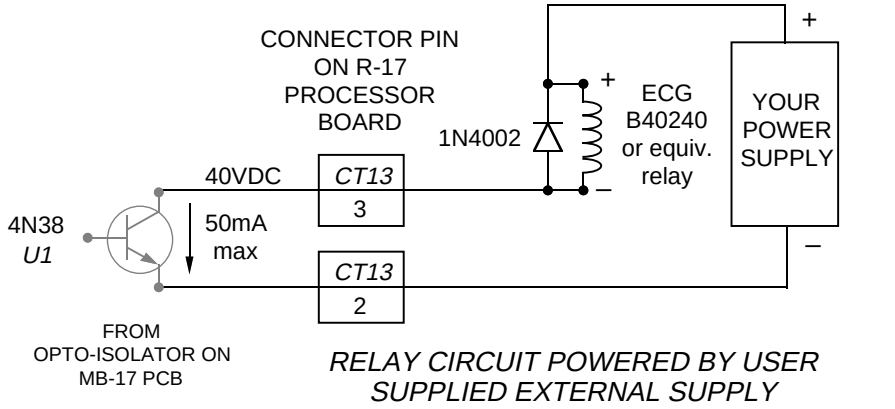
Once the dipswitch settings have been made, check that each MM-17 input module dipswitch is correctly programmed before continuing.

On-Air Tally Circuit

For controlling "on-air" tally functions, an opto isolator is provided. The tally may be activated by any MM-17 input module ON switch programmed

TYPICAL CONTROL ROOM ON-AIR TALLY CIRCUIT

USER-SUPPLIED RELAY TRIGGERED BY CONSOLE CR MUTE CIRCUIT

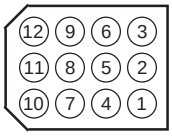


to mute CR. The opto transistor collector and emitter connections are available at a 12 pin connector (CT13) located just below the CR-17 monitor module's regular I/0 connector.

STEREO LINE INPUT MODULE (SL-17)

Line Module Audio Connections

Key diagram showing back of typical 12-pin I/O connector plug, with pin numbers oriented as they would be seen while wiring. Beveled corners correspond to PCB mounted mating sockets.



Module input/output signal connections are made via dedicated 12–pin connectors mounted on the console's main printed circuit board directly underneath the top of each module. Connectors are accessed by removing individual modules.

(CT1 thru 10, Main Printed Circuit Board)

Pin 1 - LINE INPUT LEFT, SHIELD
Pin 2 - LINE INPUT LEFT, LOW
Pin 3 - LINE INPUT LEFT, HIGH
Pin 4 - LINE INPUT RIGHT, SHIELD
Pin 5 - LINE INPUT RIGHT, LOW
Pin 6 - LINE INPUT RIGHT, HIGH
Pin 7 - START SWITCH
Pin 8 - ON/OFF SWITCH COMMON
Pin 9 - STOP SWITCH
Pin 10 - START/STOP SWITCH COMMON
Pin 11 - REMOTE OFF SWITCH
Pin 12 - REMOTE ON SWITCH

Line Module Control Ports

The following logic functions, listed by pin number, are available at the 12-pin I/O connector of each SL-17 stereo line input module:

PIN 7: **START** - Provides a closure to START/STOP common pin (see below) when the module's START button is pressed. Used to start remote source machines (cart and tape machines, CD players, etc.).

PIN 9: **STOP** - Provides a closure to START/STOP common pin (see below) when the module's STOP button is pressed. Used to stop remote source machines.

PIN 10: **START/STOP COMMON**

PIN 12: **REMOTE ON SWITCH -** a contact closure from this pin to ON/OFF common pin (see below) will turn the channel ON.

PIN 11: **REMOTE OFF SWITCH** - a contact closure from this pin to ON/OFF common pin (see below) will turn the channel OFF.

PIN 8: **ON/OFF COMMON** - completes the circuit for the module's remote ON and OFF switch connections.

MASTER OUTPUT MODULE (O-17)

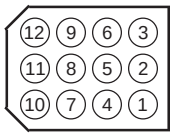
Output Module Audio Connections

Module input/output signal connections are made via a dedicated 12–pin connector mounted on the console's main printed circuit board, directly underneath the top of the module. The connector is accessed by removing the module. PROGRAM and AUDITION outputs are electronically balanced, low source impedance; minimum load impedance is 600Ω.

(CT11 "MSTR", Main Printed Circuit Board)

Pin 1 - AUDITION OUTPUT LEFT, SHIELD
Pin 2 - AUDITION OUTPUT LEFT, LOW
Pin 3 - AUDITION OUTPUT LEFT, HIGH
Pin 4 - AUDITION OUTPUT RIGHT, SHIELD
Pin 5 - AUDITION OUTPUT RIGHT, LOW
Pin 6 - AUDITION OUTPUT RIGHT, HIGH
Pin 7 - PROGRAM OUTPUT LEFT, SHIELD
Pin 8 - PROGRAM OUTPUT LEFT, LOW
Pin 9 - PROGRAM OUTPUT LEFT, HIGH
Pin 10 - PROGRAM OUTPUT RIGHT, SHIELD
Pin 11 - PROGRAM OUTPUT RIGHT, LOW
Pin 12 - PROGRAM OUTPUT RIGHT, HIGH

Key diagram showing back of typical 12-pin I/O connector plug, with pin numbers oriented as they would be seen while wiring. Beveled corners correspond to PCB mounted mating sockets.



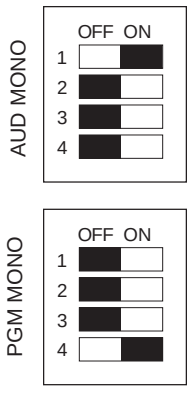
Output Module Dipswitch Controlled Functions

There is a four position dipswitch on the printed circuit board of the O-17 output module. It allows the user to switch the console's PROGRAM and AUDITION buses to mono mode. Positions 1 and 4 may be user-programmed as follows:

Position 1: AUD MONO - When activated, sums the left and right AUDITION channels and sends L+R to both channels.

Position 4: PGM MONO - When activated, sums the left and right PROGRAM channels and sends L+R to both channels.

DIPSWITCH positions (2) and (3) are not used.



View of O-17 PCB mounted 4-position dipswitch (SW3). Note that a position is ON when the righthand side of the rocker switch is pressed DOWN; a position is OFF when the left-hand side is DOWN.

Talkback Control

A control closure (activated by the module's momentary action TB switch) is provided at CT13 (CR-17 module Auxiliary Ports Connector) on the console's main processing board:

(CT13, Main Printed Circuit Board)

Pin 8 - TB SW N.O.
Pin 9 - TB SW COM

CONTROL ROOM MONITOR MODULE (CR-17)

Monitor Module Audio Connections

Connections are made via a dedicated 12–pin connector mounted on the console's main printed circuit board directly underneath the top of the module. The connector is accessed by removing the module.

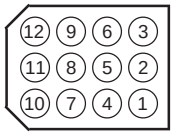
(CT12 "CR", Main Printed Circuit Board)

Pin 1 - CR OUTPUT LEFT, SHIELD
Pin 2 - CR OUTPUT LEFT, LOW
Pin 3 - CR OUTPUT LEFT, HIGH
Pin 4 - CR OUTPUT RIGHT, SHIELD
Pin 5 - CR OUTPUT RIGHT, LOW
Pin 6 - CR OUTPUT RIGHT, HIGH

Control Room Output is electronically balanced, low source impedance; minimum load impedance is 600Ω.

Pin 7 - EXTERNAL LINE IN LEFT, SHIELD
Pin 8 - EXTERNAL LINE IN LEFT, LOW
Pin 9 - EXTERNAL LINE IN LEFT, HIGH
Pin 10 - EXTERNAL LINE IN RIGHT, SHIELD
Pin 11 - EXTERNAL LINE IN RIGHT, LOW
Pin 12 - EXTERNAL LINE IN RIGHT, HIGH

Key diagram showing back of typical 12-pin I/O connector plug, with pin numbers oriented as they would be seen while wiring. Beveled corners correspond to PCB mounted mating sockets.



Monitor Module Auxiliary Ports

The following additional functions, listed by pin number, are available at a second 12-pin connector (CT13) located just beneath the module's primary (CT12) connector.

(CT13, Main Printed Circuit Board)

Pin 1 - SHIELD
Pin 2 - ON-AIR TALLY; emitter
Pin 3 - ON-AIR TALLY; collector

On-Air Tally is an opto-isolated connection activated by mic input module ON switches that have been programmed to Mute CR. See page 3-3.

Pin 4 - COMM IN, SHIELD
Pin 5 - COMM IN, LOW
Pin 6 - COMM IN, HIGH

The COMM port is used to feed an incoming communication link to the console. Its signal goes to CUE, CR and HDPN. It is used in conjunction with the console's Talkback output (below), and allows two-way intercom links between the control room and remote locations. Often this means connecting the station telco hybrid to the console's TB and COMM ports.

See drawing on page 3-4, "Typical Control Room On-Air Tally Circuits" for on-air tally relay wiring details.

Pin 7 - TALKBACK SW SHIELD
Pin 8 - TALKBACK SW N.O.
Pin 9 - TALKBACK SW COM
This is a control closure activated by the O-17 output module's TB switch.
Pin 10 - TALKBACK OUTPUT, SHIELD
Pin 11 - TALKBACK OUTPUT, LOW
Pin 12 - TALKBACK OUTPUT, HIGH
When the TB switch is pressed, MM-17 input module signals that have been dipswitch-programmed for TB are sent to this electronically balanced output (low source impedance; minimum load impedance is 600Ω). See page 3-3.

TAPE REMOTE MODULE (optional)

R-17 tape remote switches are simple closures brought out to I/O pins on the two connectors dedicated to this accessory section. The switches are illuminated, with the user providing external power as indicated.

Tape Remote Switches 1-3

(CT2, T-50 Transition PCB)

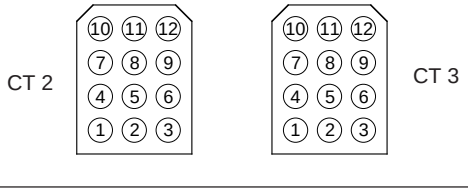
Pin 1 - SWITCH 1, LED ANODE
Pin 2 - SWITCH 2, LED ANODE
Pin 3 - SWITCH 3, LED ANODE
Pin 4 - SWITCH 1, LED CATHODE
Pin 5 - SWITCH 2, LED CATHODE
Pin 6 - SWITCH 3, LED CATHODE
Pin 7 - SWITCH 1, COMMON
Pin 8 - SWITCH 2, COMMON
Pin 9 - SWITCH 3, COMMON
Pin 10 - SWITCH 1, NORMALLY OPEN
Pin 11 - SWITCH 2, NORMALLY OPEN
Pin 12 - SWITCH 3, NORMALLY OPEN

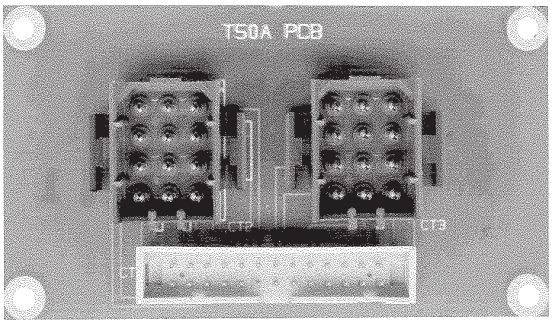
Tape Remote Switches 4-6

(CT3, T-50 Transition PCB)

Pin 1 - SWITCH 4, LED ANODE
Pin 2 - SWITCH 5, LED ANODE
Pin 3 - SWITCH 6, LED ANODE
Pin 4 - SWITCH 4, LED CATHODE
Pin 5 - SWITCH 5, LED CATHODE
Pin 6 - SWITCH 6, LED CATHODE
Pin 7 - SWITCH 4, COMMON
Pin 8 - SWITCH 5, COMMON
Pin 9 - SWITCH 6, COMMON
Pin 10 - SWITCH 4, NORMALLY OPEN
Pin 11 - SWITCH 5, NORMALLY OPEN
Pin 12 - SWITCH 6, NORMALLY OPEN

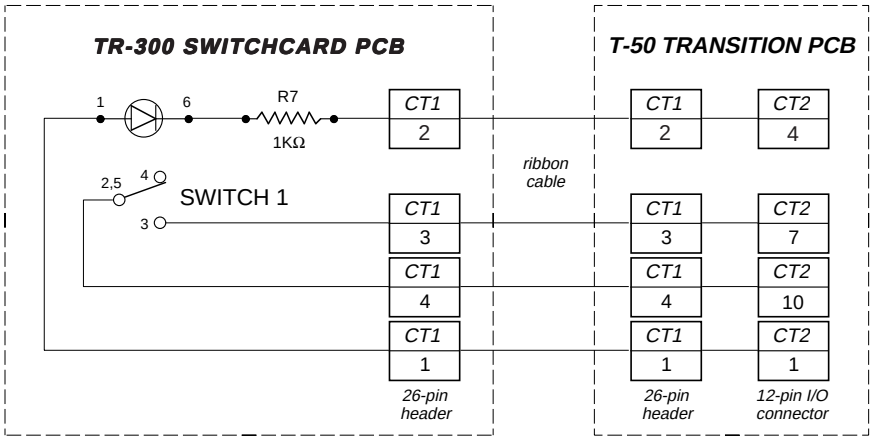
Key diagram showing back of typical 12-pin I/O connector plugs, with pin numbers oriented as they would be seen while wiring. Beveled corners correspond



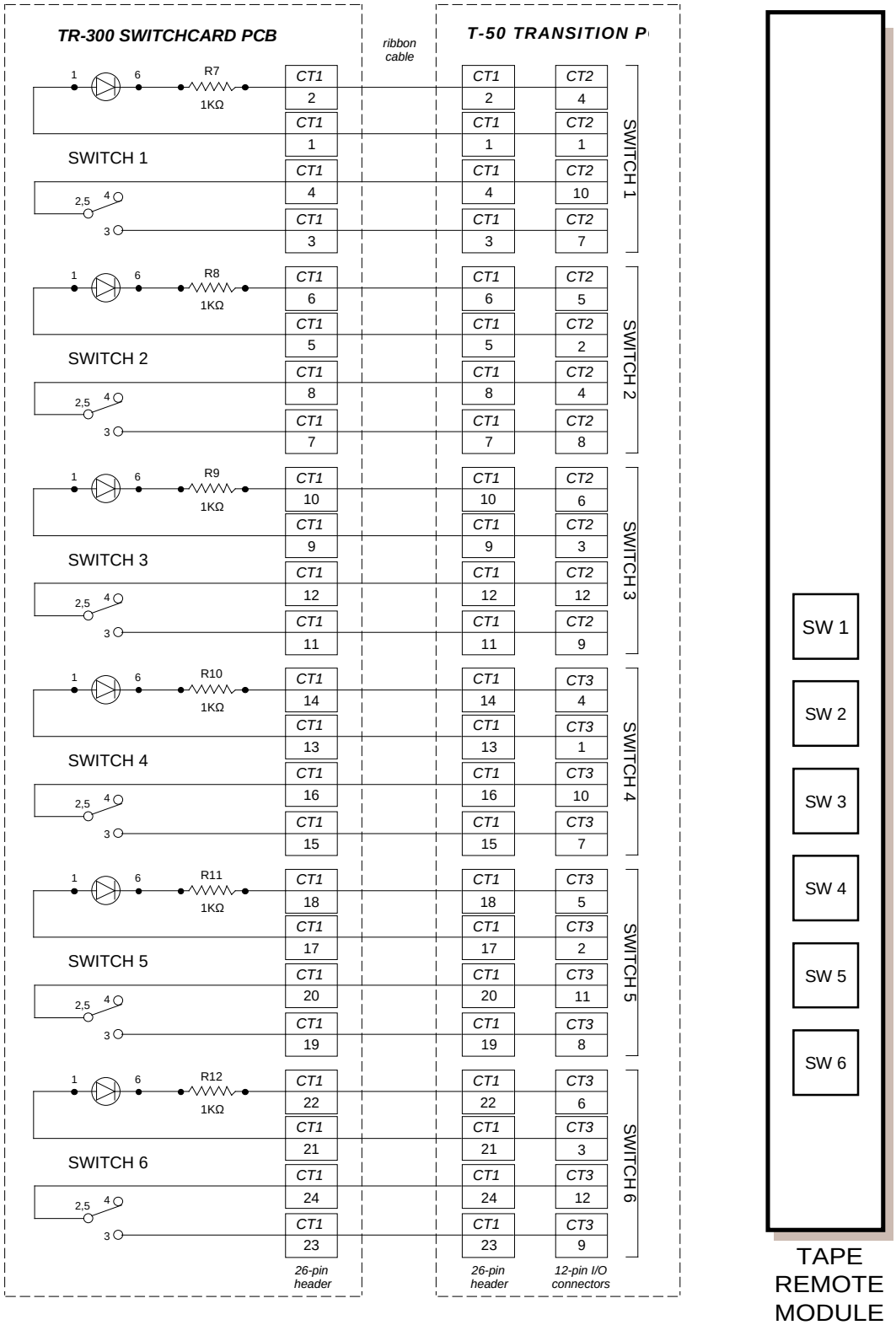


T-50 Transition Printed Circuit Board

26-pin header ("CT1") on T-50A PCB (mounted on bottom of mainframe at righthand end) accepts ribbon cable connector



TYPICAL CIRCUIT – #1 of 6 shown


TR-300 SWITCHCARD PCB
ribbon cable
T-50 TRANSITION P
R7
1KΩ
SWITCH 1
R8
1KΩ
SWITCH 2
R9
1KΩ
SWITCH 3
R10
1KΩ
SWITCH 4
R11
1KΩ
SWITCH 5
R12
1KΩ
SWITCH 6
CT1
CT2
CT3
26-pin header
26-pin header
12-pin I/O connectors
SW 1
SW 2
SW 3
SW 4
SW 5
SW 6
TAPE REMOTE MODULE

LINE PRESELECTOR (optional)

R-17 line preselector picks one of six external stereo line inputs coming into the console (via three dedicated 12-pin connectors) to appear at its output connector, where it may be picked up and wired to another console input to expand its source capability (a stereo line input channel or the external line input port on the console's monitor SOURCE select switchbank are typical destinations).

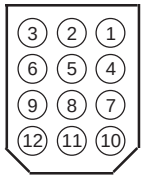
Input and output connectors are located under the console's hinged meterbridge.

Line Preselector Inputs 1 & 2

(CT3, LS-50 load sheet dwg)

Pin 1 - LINE 2 LEFT INPUT, SHIELD
Pin 2 - LINE 2 LEFT INPUT, LOW
Pin 3 - LINE 2 LEFT INPUT, HIGH
Pin 4 - LINE 2 RIGHT INPUT, SHIELD
Pin 5 - LINE 2 RIGHT INPUT, LOW
Pin 6 - LINE 2 RIGHT INPUT, HIGH
Pin 7 - LINE 1 LEFT INPUT, SHIELD
Pin 8 - LINE 1 LEFT INPUT, LOW
Pin 9 - LINE 1 LEFT INPUT, HIGH
Pin 10 - LINE 1 RIGHT INPUT, SHIELD
Pin 11 - LINE 1 RIGHT INPUT, LOW
Pin 12 - LINE 1 RIGHT INPUT, HIGH

Key diagram showing back of typical 12-pin I/O connector plug, with pin numbers oriented as they would be seen while wiring. Beveled corners correspond to PCB mounted mating sockets.



Line Preselector Inputs 3 & 4

(CT2, LS-50 load sheet dwg)

Pin 1 - LINE 4 LEFT INPUT, SHIELD
Pin 2 - LINE 4 LEFT INPUT, LOW
Pin 3 - LINE 4 LEFT INPUT, HIGH
Pin 4 - LINE 4 RIGHT INPUT, SHIELD
Pin 5 - LINE 4 RIGHT INPUT, LOW
Pin 6 - LINE 4 RIGHT INPUT, HIGH
Pin 7 - LINE 3 LEFT INPUT, SHIELD
Pin 8 - LINE 3 LEFT INPUT, LOW
Pin 9 - LINE 3 LEFT INPUT, HIGH
Pin 10 - LINE 3 RIGHT INPUT, SHIELD
Pin 11 - LINE 3 RIGHT INPUT, LOW
Pin 12 - LINE 3 RIGHT INPUT, HIGH

Line Preselector Inputs 5 & 6

(CT1, LS-50 load sheet dwg)

Pin 1 - LINE 6 LEFT INPUT, SHIELD
Pin 2 - LINE 6 LEFT INPUT, LOW
Pin 3 - LINE 6 LEFT INPUT, HIGH
Pin 4 - LINE 6 RIGHT INPUT, SHIELD
Pin 5 - LINE 6 RIGHT INPUT, LOW
Pin 6 - LINE 6 RIGHT INPUT, HIGH
Pin 7 - LINE 5 LEFT INPUT, SHIELD
Pin 8 - LINE 5 LEFT INPUT, LOW
Pin 9 - LINE 5 LEFT INPUT, HIGH
Pin 10 - LINE 5 RIGHT INPUT, SHIELD
Pin 11 - LINE 5 RIGHT INPUT, LOW
Pin 12 - LINE 5 RIGHT INPUT, HIGH

Line Preselector Output

(CT4, LS-50 load sheet dwg)

Pin 1 - LEFT OUTPUT, SHIELD
Pin 2 - LEFT OUTPUT, LOW
Pin 3 - LEFT OUTPUT, HIGH
Pin 4 - RIGHT OUTPUT, SHIELD
Pin 5 - RIGHT OUTPUT, LOW
Pin 6 - RIGHT OUTPUT, HIGH
Pin 7 - AUDIO COMMON
Pin 8 - NO CONNECTION
Pin 9 - NO CONNECTION
Pin 10 - AUDIO COMMON
Pin 11 - NO CONNECTION
Pin 12 - NO CONNECTION

VU METER ALIGNMENT

Unless VU meters are noticeably mis-aligned, this procedure (which can be a lengthy process) is normally NOT required.

With the console in place on the counter top, check the VU meters for static, power-off alignment. If any adjustment is needed, raise the hinged meter bridge (by removing two phillips head screws on the lower flange of the meterbridge, just above the tops of the console modules) and note the meter adjusters located in the rear center of the meters. Alignment is accomplished by using a small flat blade screw driver to turn the adjusting screws until the meter reading is correct. Note that the screw should always be turned clockwise, and that correct adjustment is made when the meter is brought UP to the correct mark from downscale. Also *notice that the static zero position changes as the meter bridge is brought down to its normal position*. Make small incremental adjustments and return the meterbridge to operating position between adjustments; continue this procedure until the meter static zeroes are correct with the meterbridge in position.

Note that the VU meter lamps are replaceable from the back of the meter.

COMPLETING THE INSTALLATION

If you have trouble at this or any other point in the installation test, turn to the section on troubleshooting, at the end of the technical section of the manual.

Before connecting the console's AC power, turn all faders and level controls on the console and any monitor equipment connected to it down to minimum. In preparation for testing your installation, assign one stereo input channel to PGM and select PGM on the CR module.

The AC connector may now be connected; this will turn on the console. At this point the VU meters should be lit, and the LEDs of any assign switches that are down should be lit. Each input channel will have either its ON or OFF lamp lit. Stereo input module CUE LEDs may be lit. Turn all channels off (OFF and STOP buttons) and de-activate all CUE switches that are lit.

Turn the module you will begin testing with On by pressing the START button; the START switch indicator lamp should light. Make sure the channel is assigned to PGM and slowly move the fader up. You should see movement on the PGM meters.

Press the CUE button for that channel and slowly turn up the CUE level control on the CR-17 module; you should hear the source material in the console's CUE speaker. Note that the channel fader and ON/OFF status have no effect on the volume of the CUE signal. When finished, turn down the CUE speaker level control.

Turn the console's CR level control to the 2 o'clock position, and slowly turn up the control room monitor amplifier; your source material should become audible. (If your power amplifier does not have input level controls, use external pads to allow a comfortable listening level with the console monitor pots set at 2 o'clock; this will assure optimal L—R tracking).

Monitor amplifier input gain settings are important; they should be adjusted to allow a comfortable listening level when the monitor module's CR level pot is set around 2 o'clock. If monitor amp input gains are set too high, you may find yourself continually running the CR level pot between 8 and 10 o'clock; this is the worst part of any potentiometer's attenuation range, and should be avoided.

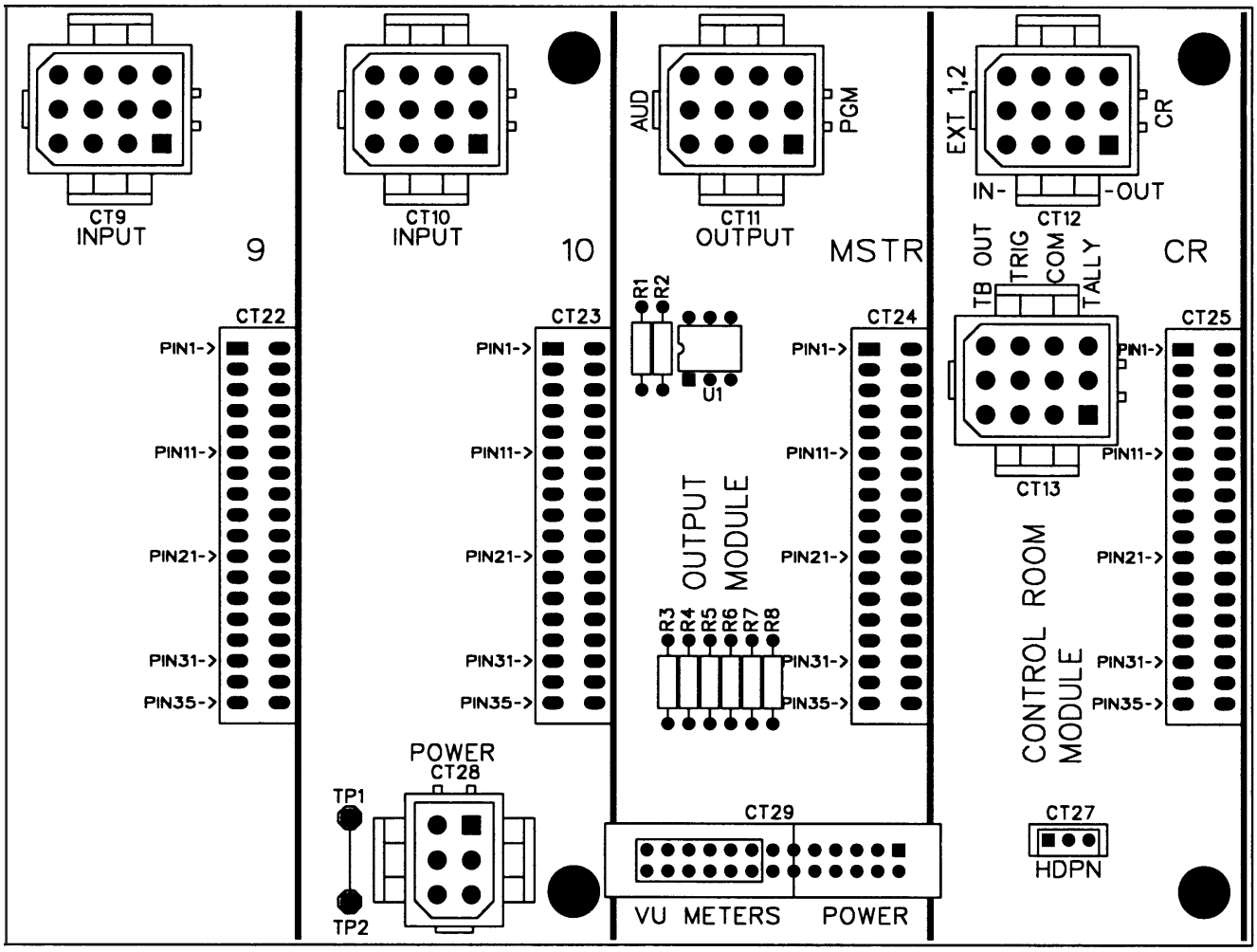
When finished, de-activate the PGM assign on the input module.

Assign the input channel, the CR module, and the VU meter select switch on the master output module to AUD; the source material should appear.

BE CAREFUL: LOUD SOUNDS IN THE HEADPHONES CAN DAMAGE YOUR HEARING!

Test the other channels, the headphone jack (if there is no audible source material at the headphone output, check to make sure input module CUE switches aren't activated; they will automatically interrupt headphone source monitoring), the TB output, and the COMM input, if one is used in your installation. Check any external logic and machine control functions.

This completes the R-17 console installation.



R-17 CONSOLE MAIN PRINTED CIRCUIT BOARD

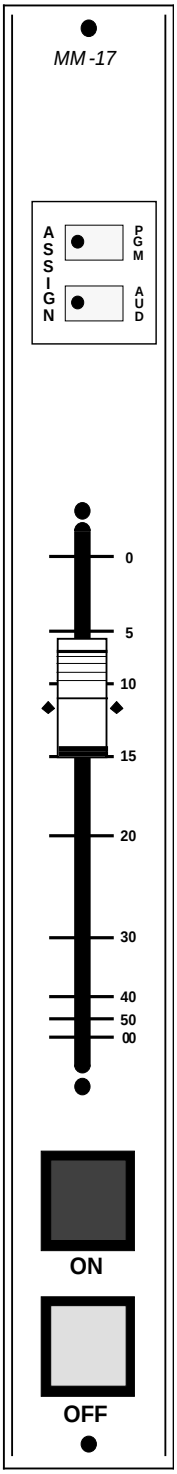
RH end showing typical 12-pin connectors

Connectors 9 and 10 are for the last 2 input modules of the console. Connector 11 ("MSTR") is for the O-17 Master Output Module, and Connectors 12 and 13 are for the CR-17 Control Room Monitor Module. "U1" is the console's on-air tally opto-isolator circuit. Note connectors 1 thru 8 (not shown) are identical to CT-9 and CT-10.

I/O CONNECTOR PIN NUMBER	MODULE				
	MM-17	SL-17	O-17	CR-17	
	CT1 THRU 10		CT11	CT12	CT13
1	MIC IN SH	LT IN SH	AUD OUT LT SH	CR OUT LT SH	SHIELD
2	MIC IN LO	LT IN LO	AUD OUT LT LO	CR OUT LT LO	ON-AIR TALLY EMITTER
3	MIC IN HI	LT IN HI	AUD OUT LT HI	CR OUT LT HI	ON-AIR TALLY COLLECTOR
4	INS OUT SH	RT IN SH	AUD OUT RT SH	CR OUT RT SH	COMM IN SH
5	INS OUT LO	RT IN LO	AUD OUT RT LO	CR OUT RT LO	COMM IN LO
6	INS OUT HI	RT IN HI	AUD OUT RT HI	CR OUT RT HI	COMM IN HI
7	INS IN SH	START SW	PGM OUT LT SH	EXT IN LT SH	TB SW SHIELD
8	INS IN LO	ON/OFF SWITCH COMMON	PGM OUT LT LO	EXT IN LT LO	TB SW N.O.
9	INS IN HI	STOP SW	PGM OUT LT HI	EXT IN LT HI	TB SW COM
10	ON/OFF COMMON	START/STOP COMMON	PGM OUT RT SH	EXT IN RT SH	TB OUT SH
11	REMOTE OFF SW	REMOTE OFF SW	PGM OUT RT LO	EXT IN RT LO	TB OUT LO
12	REMOTE ON SW	REMOTE ON SW	PGM OUT RT HI	EXT IN RT HI	TB OUT HI

R-17 CONSOLE I/O PINOUT SUMMARY TABLE

Module Controls



Chapter Contents

MONO MIC INPUT MODULE (MM-17)

ASSIGN - These switches (w/LED indicators) route the channel signal to the console's stereo Program and/or Audition output busses.

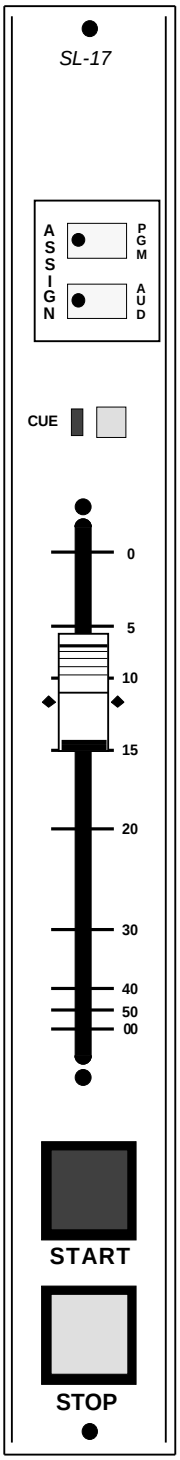
FADER - A long-throw 104mm precision conductive plastic fader.

ON/OFF SWITCHES - These lighted switches turn the channel signal ON and OFF.

PROGRAMMABLE FUNCTIONS - These are activated by the module's channel ON button and may be preset (via a PCB-mounted dipswitch; see page 3-3) to mute the control room (and activate an on-air tally circuit), and assign the module's signal (pre-fader, pre-channel on/off) to the console's talkback bus.

GAIN TRIM - An internal gain trim potentiometer provides 34dB of control range, allowing source signals to be matched to the module's input circuitry.

INSERT (PATCH) POINT - Allows external processing of the channel signal.



STEREO LINE INPUT MODULE (SL-17)

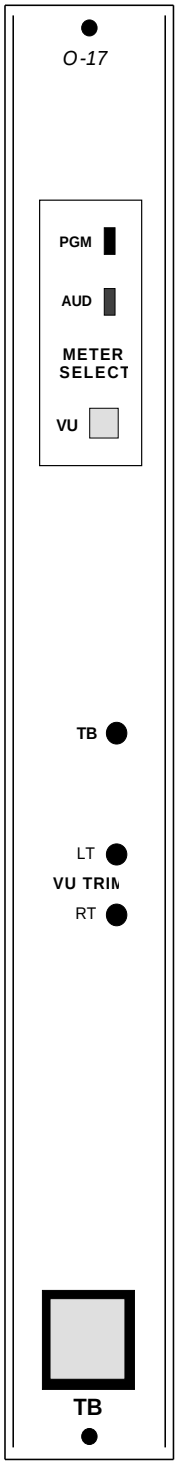
ASSIGN - These switches (w/LED indicators) route channel signal to console's stereo Program and/or Audition output busses.

CUE SWITCH - (w/LED indicator) sends the module's pre-fader signal to the CR module, where it appears on the CUE speaker level control and the HEADPHONES. Depressing the cue switch activates this function. Cue mode is de-activated when the cue button is pressed again.

FADER - A long-throw 104mm stereo precision conductive plastic fader.

START/STOP SWITCHES - The START switch, when depressed, turns the channel signal ON, and may be made to start a source machine (cart, tape or CD player) by using the appropriate connections on the module's 12-pin connector. The STOP switch turns the channel signal OFF and may be made to stop the external machine.

GAIN TRIM - An internal gain trim potentiometer provides a 27dB control range (–6 to +21dB), assuring compatibility with professional (+4dBu) machines such as carts, or consumer (-10dBu) machines such as cassette players.



MASTER OUTPUT MODULE (O-17)

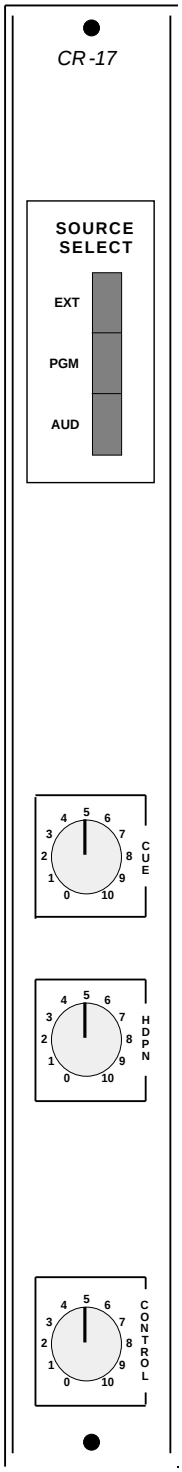
PROGRAM, AUDITION, and TALKBACK outputs are electronically balanced.

METER SELECT - Assigns PGM or AUD to the console's two VU meters. LED status indicators clearly show selected bus.

TALKBACK - This front panel recessed trimpot sets the level of the console's talkback output.

VU TRIM - Front panel recessed trimpots permit easy VU calibration.

TB - Momentary action pushbutton activates the console's talkback output. The talkback signal picks up all MM-17 input modules that have been dipswitch-assigned to the talkback bus. A dry contact closure is also provided for interfacing external equipment.



CONTROL ROOM MONITOR MODULE (CR-17)

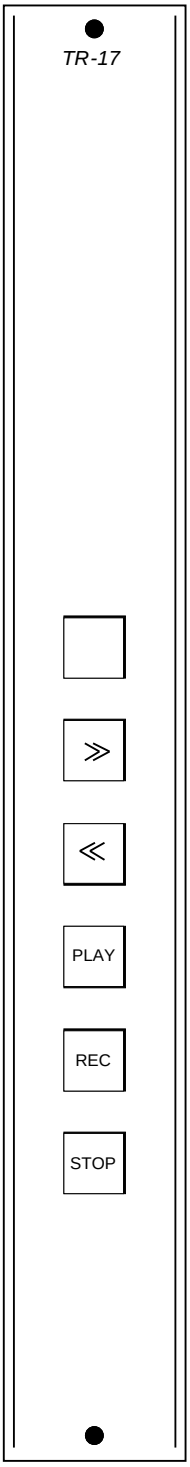
SOURCE SELECT - Determines what signal (PGM, AUD or EXT line in) will be fed to the CR and HEADPHONE outputs.

CUE - Sets the cue speaker level.

HDPN - Sets the level of the built-in headphone amplifier. Headphone normally listens to Source Select, but automatically switches to CUE when any input module cue switch is engaged. The headphone level control is conductive plastic for long life, and connectorized for easy servicing.

CONTROL - Determines control room monitor level. Follows Source Select (above). The control is conductive plastic for long life, and connectorized for easy servicing. The console CR output is electronically balanced to allow interference-free feed to the control room power amp.

CONTROL ROOM MUTE - The operator's mic module can be dipswitch selected to mute control room when activated. This mute function prevents control room feedback.



TAPE REMOTE MODULE (TR-17) - optional

TAPE REMOTE - A full function switchbank (return-to-zero, fast forward, rewind, play, record, stop) for controlling one external recording machine. Switches have built-in LED indicator that can be powered by the external machine.

Console Operation

ChapterContents

The following notes are provided as an aid to understanding the console's operation. It is impossible, without writing a fair-sized text book, to cover all possible aspects of console use. The basics are as follows:

FADER AND LEVEL CONTROLS

Normally, the faders will be run at the "in-hand" setting indicated by the darts on the fader scale, corresponding to about 12 dB below maximum fader setting. If you find yourself continually running a channel with the fader all the way to the top, the signal source is probably at too low a level. If the source has its own level control, that control may need to be turned up. Check with someone in charge if you're not sure about changing levels on other equipment.

Except for the headphone level, the console's output level controls will generally be run at a 2 o'clock setting. If this results in the control room speaker amplifier having to be run close to minimum, then turn the console's CR level control down some, or use external pads to attenuate the input signal to the power amplifier.

If there is no headphone output, check to make sure no input module CUE switches are activated, as they will automatically interrupt the regular headphone program.

Run the headphone level at a setting that is comfortable for you, but remember, LOUD SOUNDS CAN DAMAGE YOUR HEARING. Remember that a signal source may be at a higher level than you think it is. Be careful when switching channels ON or into CUE, if they will be heard in the headphones. The CUE level control also affects headphone volume for channels that are in CUE.

INPUT ASSIGN & MONITOR SELECT SWITCHES

The console is provided with two stereo output busses. The busses are utilized by assigning input channels to them. For example: An input module is assigned to AUD if the AUD button for that channel is down, and the associated AUD LED is on. Further, the AUD bus is selected by the control room monitor speakers when the AUD button on the CR-17 module is down,

and the associated LED is on. Because of these two actions, the input channel signal is heard in the control room speakers.

The PGM, (or Program) bus is generally used for the on-air signal. For example, if the commercial spot recorded on the cart machine connected to channel 7 is supposed to be heard on the air, then channel 7 should be assigned to PGM. On the other hand, if you have two studio mics that should both be on-air, those two channels should be assigned to PGM.

Even though, at a particular time, only one or two inputs may be assigned to the PGM bus, the other inputs may still be used. For example, while a channel 2 studio mic is on-air, with a CD being played on channel 6 as background to the studio mic, the operator can assign the tape recorder on channel 9 to the AUD (or Audition) bus, with AUD then being selected at the CR (Control Room), so the operator can locate a certain song on the tape without interfering with the on-air signal.

The on-air signal from a modulation monitor or a high-quality tuner can be connected to the EXT (External) input of the CR module, to allow the operator to monitor off-air by using the EXT selector for that module.

CUEING

In addition to the assignment features described above, the console has an additional mono CUE bus that can be used by the operator when he or she needs to be sure that, for example, the cart machine on channel 7 is set to play the right jingle. Channel 7 CUE button is pushed, and the associated LED lights. The material on that channel appears at the console CUE speaker, and also on the headphones. Meanwhile, the on-air signal is uninterrupted. Once the cart selection is verified, the CUE button is pressed again to take the channel out of CUE. At the proper time, the channel START button is pushed. If the external logic to the cart is connected to the module logic port, pushing the START button will also activate the cart machine.

TALKBACK

The console's Talkback bus allows the operator's microphone to act as an intercom signal to a remote location. By programming the input module controlling this microphone to feed the TB bus (see page 3-3), whenever the console TB button is pressed that microphone's signal will be sent to the console's Talkback output. This output can then be used to feed a remote amp/speaker (or headphone, telephone hybrid, or order wire).

COMM IN

The COMM IN port allows a return intercom signal from the remote location to be fed to the console's cue speaker and headphones. Used in conjunction with TB, it allows two-way communication between the operator and a remote location.

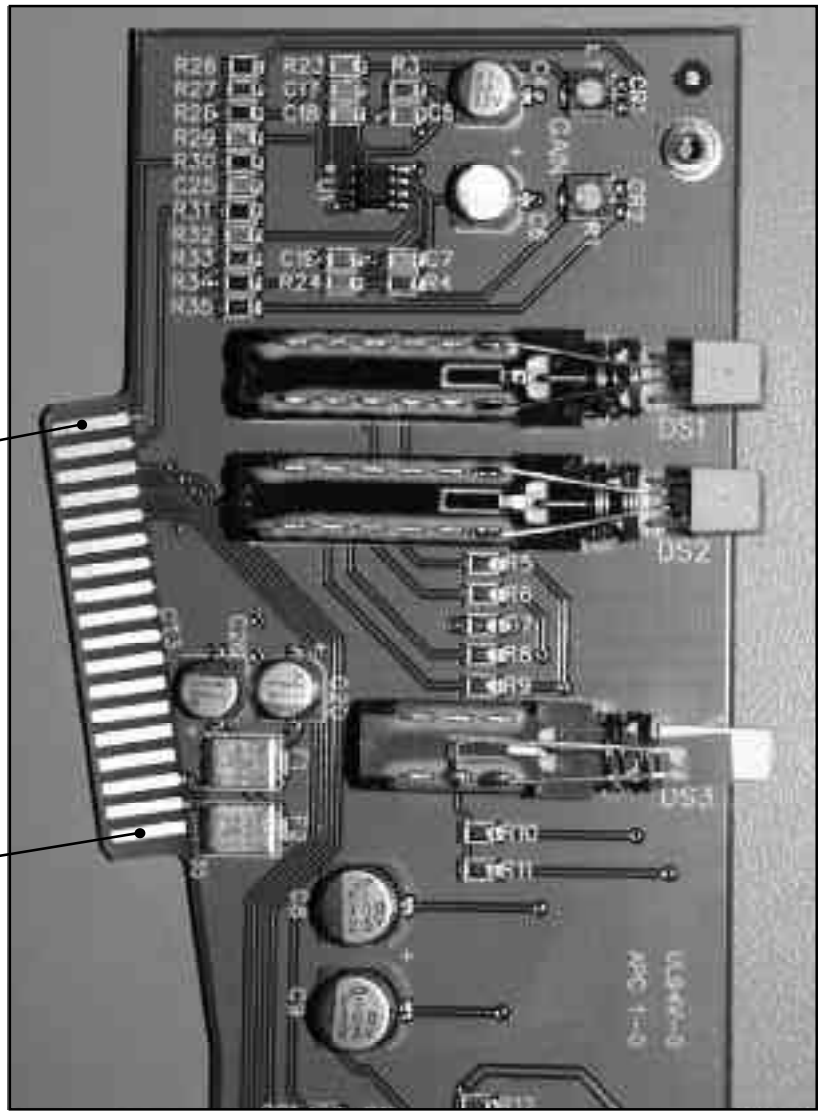
Schematic Drawings

Chapter Contents

Component Side Pin 1
(Solder Side Pin 2)

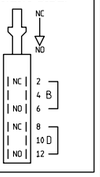
PCBEDGECARDFINGERNUMBERS
Component Side: Pins 1–35 (Odd)
Solder Side: Pins 2–36 (Even)

Component Side Pin 35
(Solder Side Pin 36)

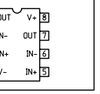


Detail view of typical printed circuit board (top half of component side; in this case an SL-17 stereo line input module PCB) showing edgecard bus connector fingers. For a complete listing of R-17 bus assignments, see chart on page 6-7.

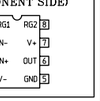
TYPICAL 4 POLE SWITCH PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



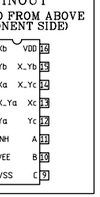
NE5532 IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



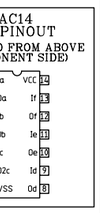
SSM2017 IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



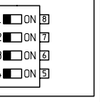
MC14053BCP IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



74AC14 IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



4 POSITION DIPSWITCH PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



NOTE: PHASE SYMBOLS DENOTE SIGNAL POLARITY
IN PHASE
OUT OF PHASE

MB-17 PCB

MB-17 CT1-CT10

CT14-CT23

36 PIN EDGE CONNECTOR

MIC IN LO HI SH

INS OUT LO HI SH

INS IN LO HI SH

POWER INT -V -V +V +V

-50dBu BAL

CHOKE L1

C19 10uF
C20 10uF
C21 0.001uF
C22 0.001uF
C14 330pF
Z3 C5V1
Z4 C5V1
Z5 C5V1
Z6 C5V1
R23 10.0K
R24 10.0K
SSM2017 U1
R2 10
CR1 5K
MIC GAIN TRIM

0dBu
R3 100
22uF C5

FADER
WP1
WP2
WP3
WP4
CT1 10K
-15dBu
C18 22uF
R1 221K

U2 4053
R13 75.0K
C9 10pF
TL072 U4
-2dBu
100uF C6

DS1 RED
DS2 RED
SW1
SW2
R4 1.30K
R5 10.0K
R6 10.0K
R8 10.0K
R7 10.0K
PGM
AUD

36 PIN EDGE CONNECTOR CT14-CT23
LT PGM ACN
RT
LT AUD ACN
RT
N/C
MB-17 PCB

SW3
R9 10.0K
CR MUTE
TB ACN

MB-17 CT28

CT2
1 LAMP ON
2 START SW
3 ST/SP COM
4 SW COM
5 ON
6 LAMP COM
"ON" SW

CT3
1 LAMP OFF
2 STOP SW
3 ST/SP COM
4 SW COM
5 OFF
6 LAMP COM
"OFF" SW

ON
OFF
ON/OFF COMMON

REMOTE_ON
REMOTE_OFF
R22 100
R19 100
D3 4148
D1 4148
R20 4.99K
C12 0.1uF
C13 0.1uF
R21 4.99K

CH_ON
CH_OFF
R15 2.43K
R16 2.43K
R17 100
R18 100
R10 4.99K
74AC14 U3
Q2 MMBTA05
R11 47
D2 4148

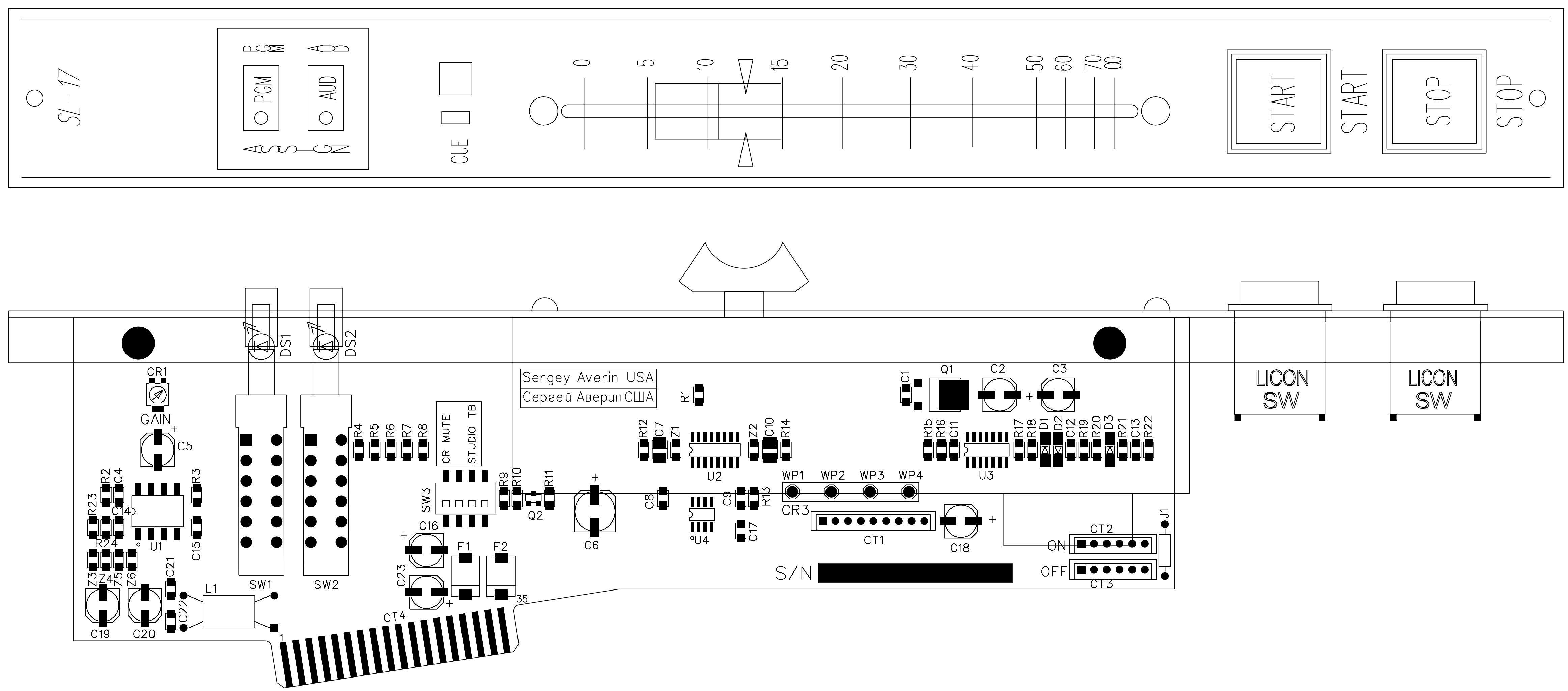
-Vin +Vin
F1 POLYSW .3A
F2 POLYSW .3A
C16 22uF
C23 22uF
C15 0.1uF
C4 0.1uF
C17 0.1uF
C8 0.1uF
C10 1uF
C7 1uF
R14 2.43K
R12 2.43K
C5V1 Z2
C5V1 Z1
Vee
Vdd

Q1 PQ05
C1 0.1uF
C2 22uF
C11 0.1uF
C3 22uF

AGND
VCC
V+
V-

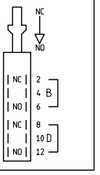
CONTRACT NO.		MM-17	
APPROVALS	DATE	AUDIOARTS ENGINEERING	
DRAWN SA	9-29-99	600 Industrial Drive New Bern, NC 28562	
CHECKED		SIZE C / FSCM NO. / DWG. NO. 26S0004 / REV -	
ISSUED		W* 700361	SCALE MM-17 PCB / SHEET 1 OF 1

MM-17 Mono Mic Input Module Schematic - Sheet 1 of 1

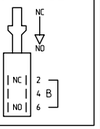


SL - 17
PGM
AUD
CUE
0
5
10
15
20
30
40
50
60
70
START
STOP
LICON SW
LICON SW
Sergey Averin USA
Сергей Аверин США
CR1
GAIN
DS1
DS2
SW1
SW2
SW3
CR MUTE
STUDIO TB
U1
U2
U3
U4
Q1
Q2
L1
F1
F2
CT1
CT2
CT3
CT4
CR3
WP1
WP2
WP3
WP4
J1
ON
OFF
S/N

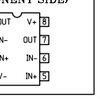
TYPICAL 4 POLE SWITCH PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



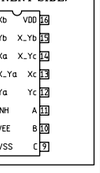
TYPICAL 2 POLE SWITCH PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



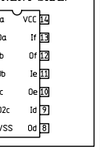
NE5532 IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)

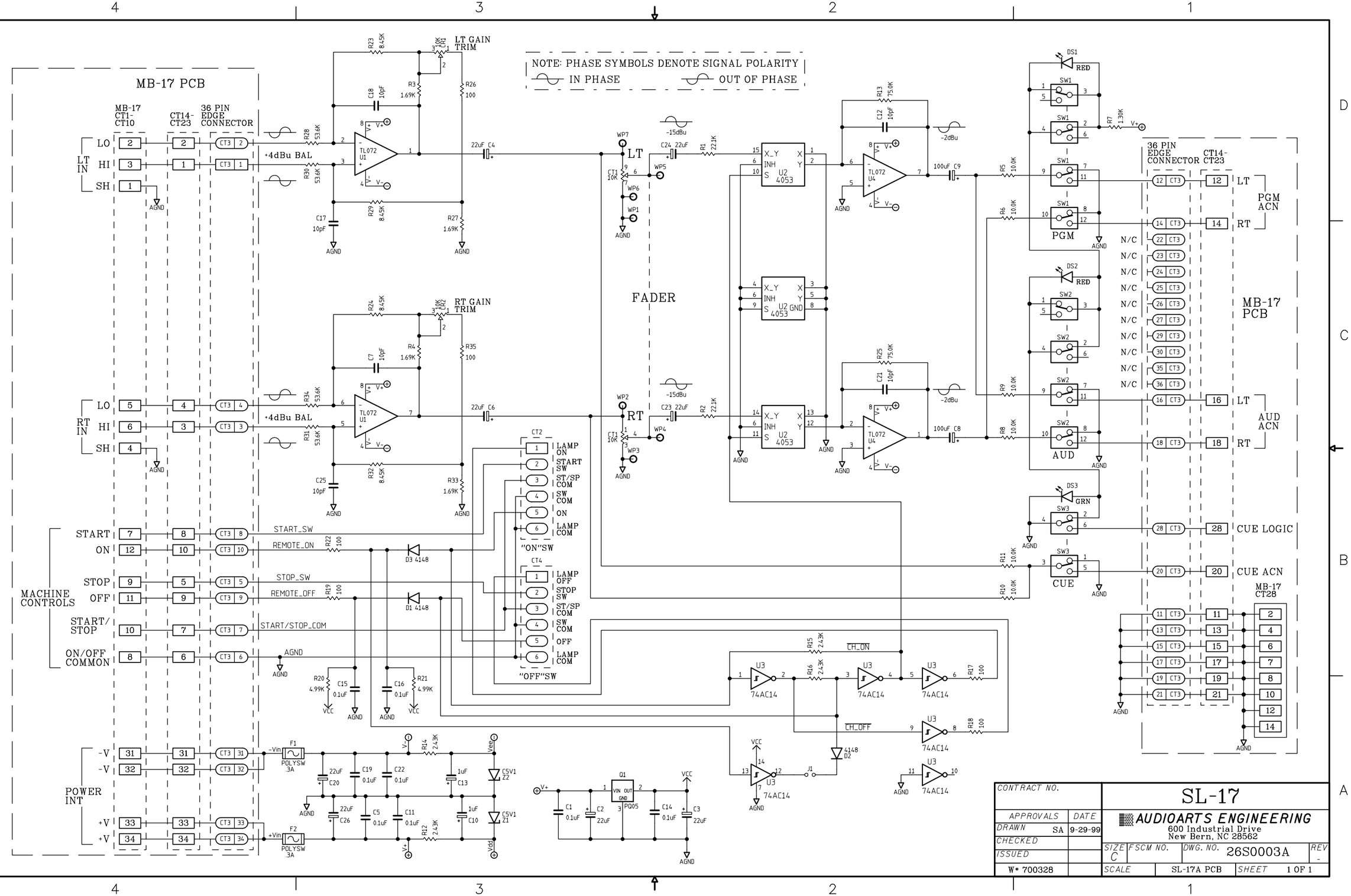


MC14053BCP IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



74AC14 IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)





CONTRACT NO.		SL-17	
APPROVALS	DATE	AUDIOARTS ENGINEERING 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	9-29-99		
CHECKED			
ISSUED			
W# 700328		SIZE C / FSCM NO. / DWG. NO. 26S0003A / REV -	
		SCALE / SL-17A PCB / SHEET 1 OF 1	

SL-17 Stereo Line Input Module Schematic - Sheet 1 of 1

SL - 17

ASSIGN

PGM

AUD

PGM

A

B

CUE

0 5 10 15 20 30 40 50 60 70 80

START

START

STOP

STOP

DS1 DS2 DS3

CR1 CR2

LT RT

GAIN

SW1 SW2 SW3

Sergey Averin USA

Сергей Аверин США

LICON SW

LICON SW

Q1

U1 U2 U3 U4

WP1 WP2 WP3 WP4 WP5 WP6 WP7

CR3 CR4

CT1 CT2 CT3 CT4

J1

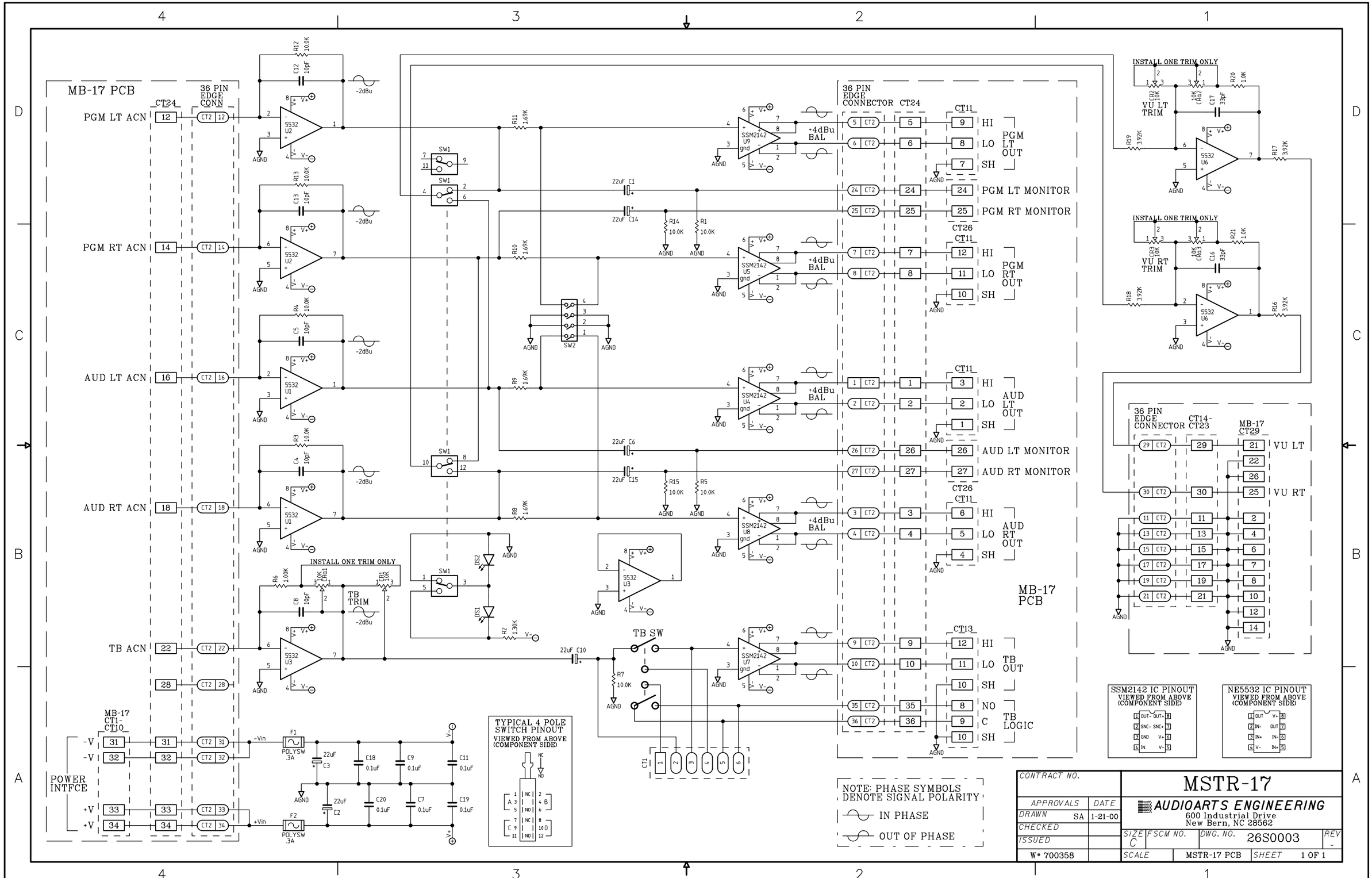
ON

OFF

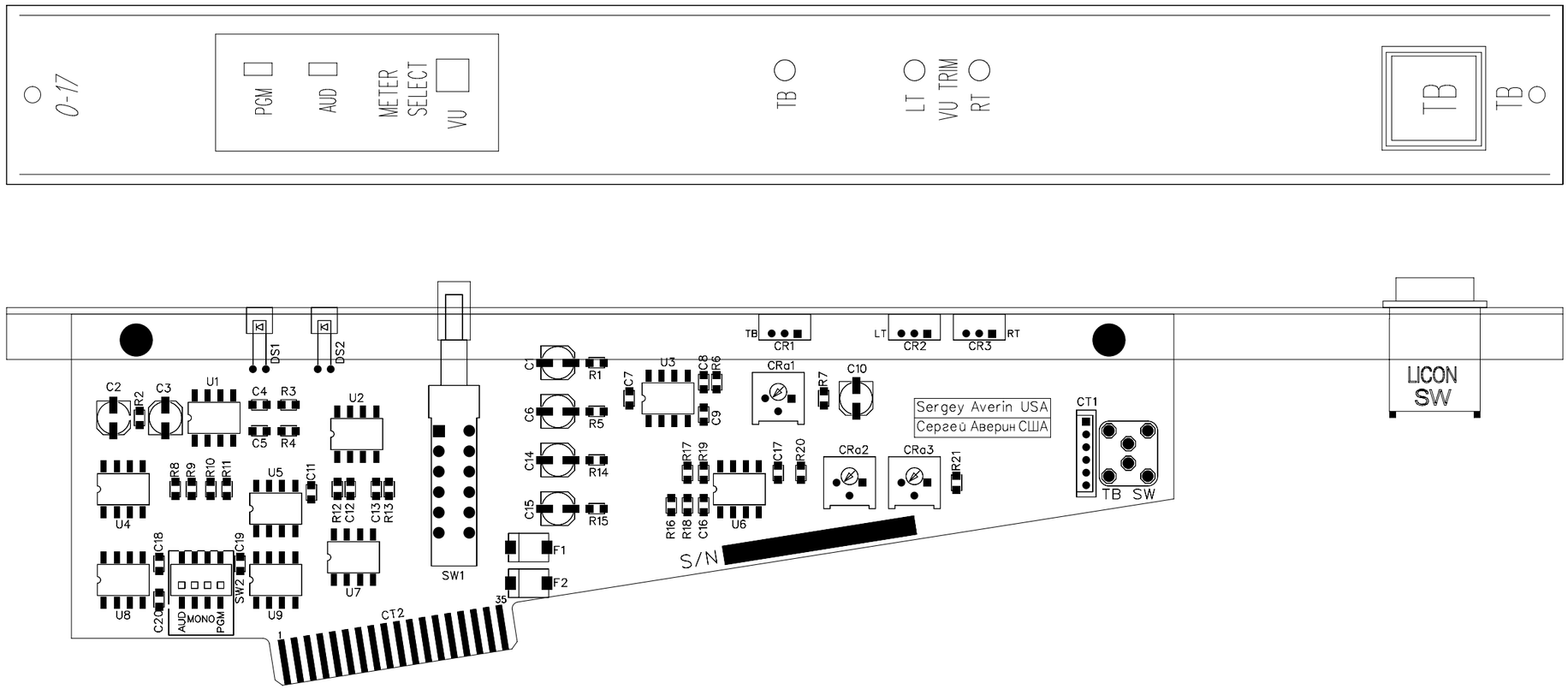
S/N

1

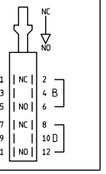
35



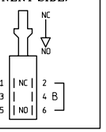
O-17 Master Output Module Schematic - Sheet 1 of 1


0-17
PGM
AUD
METER SELECT
VU
TB
LT
VU TRIM
RT
TB
TB
DS1
DS2
SW1
C1
R1
C6
R5
C14
R14
C15
R15
F1
F2
U3
C8
R6
C7
C9
CRa1
R7
C10
CRa2
CRa3
R17
R19
C17
R20
R21
R16
R18
C16
U6
S/N
Sergey Averin USA
Сергей Аверин США
CT1
TB SW
LICON SW
TB
CR1
LT
CR2
CR3
RT
C2
R2
C3
U1
C4
R3
C5
R4
U2
U4
R8
R9
R10
R11
U5
C11
R12
C12
C13
R13
U7
U8
C18
C19
C20
SW2
AUD
MONO
PGM
U9
CT2
1
35

TYPICAL 4 POLE SWITCH PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



TYPICAL 4 POLE SWITCH PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)

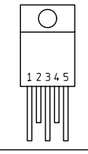


NE5532 IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)

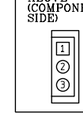
SSM2142 IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)

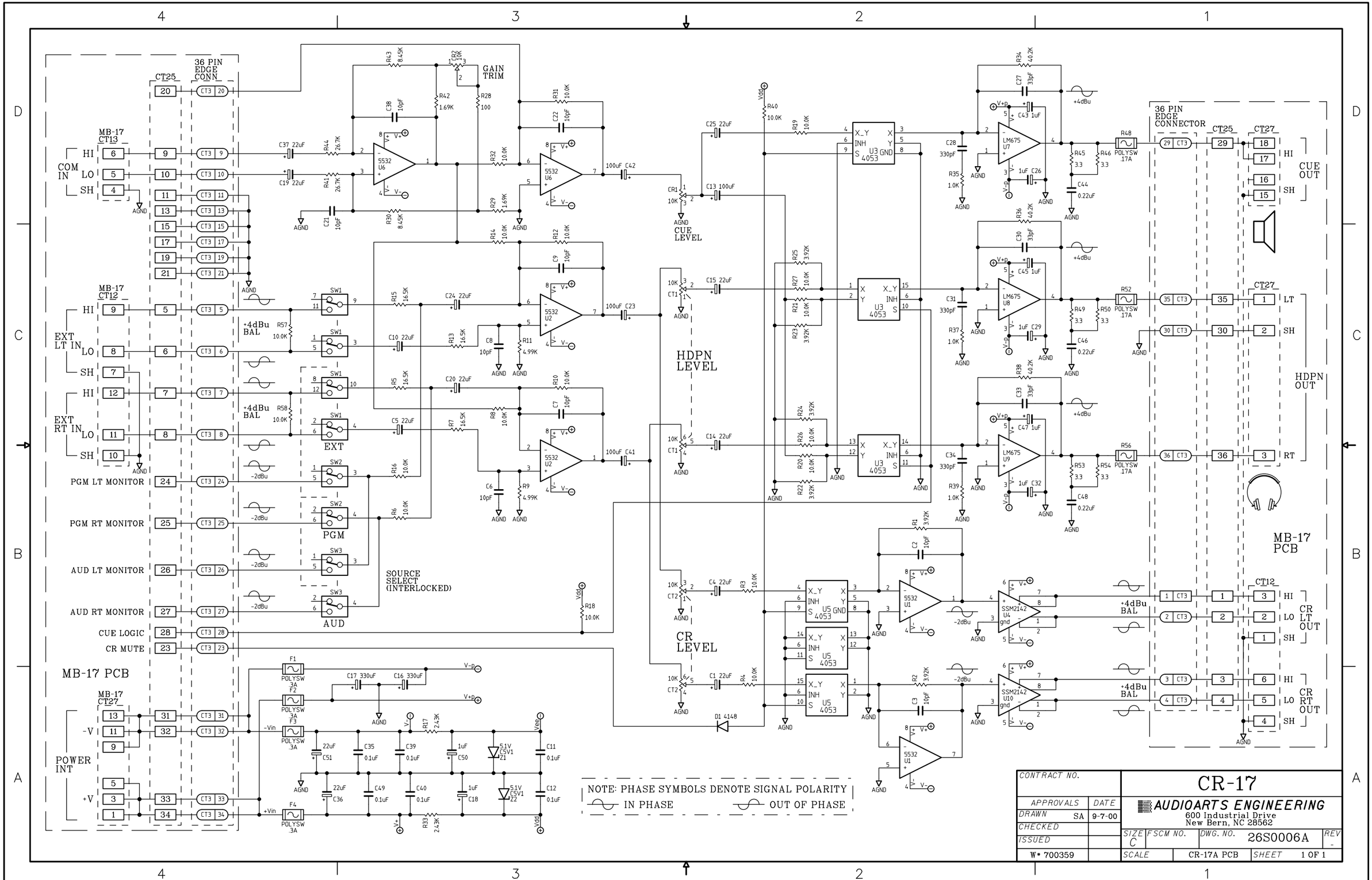
MC14053 IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)

LM675 IC PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)



3 PIN JST CONNECTOR PINOUT
VIEWED FROM ABOVE (COMPONENT SIDE)





CR-17 Control Room Module Schematic - Sheet 1 of 1

CR-10

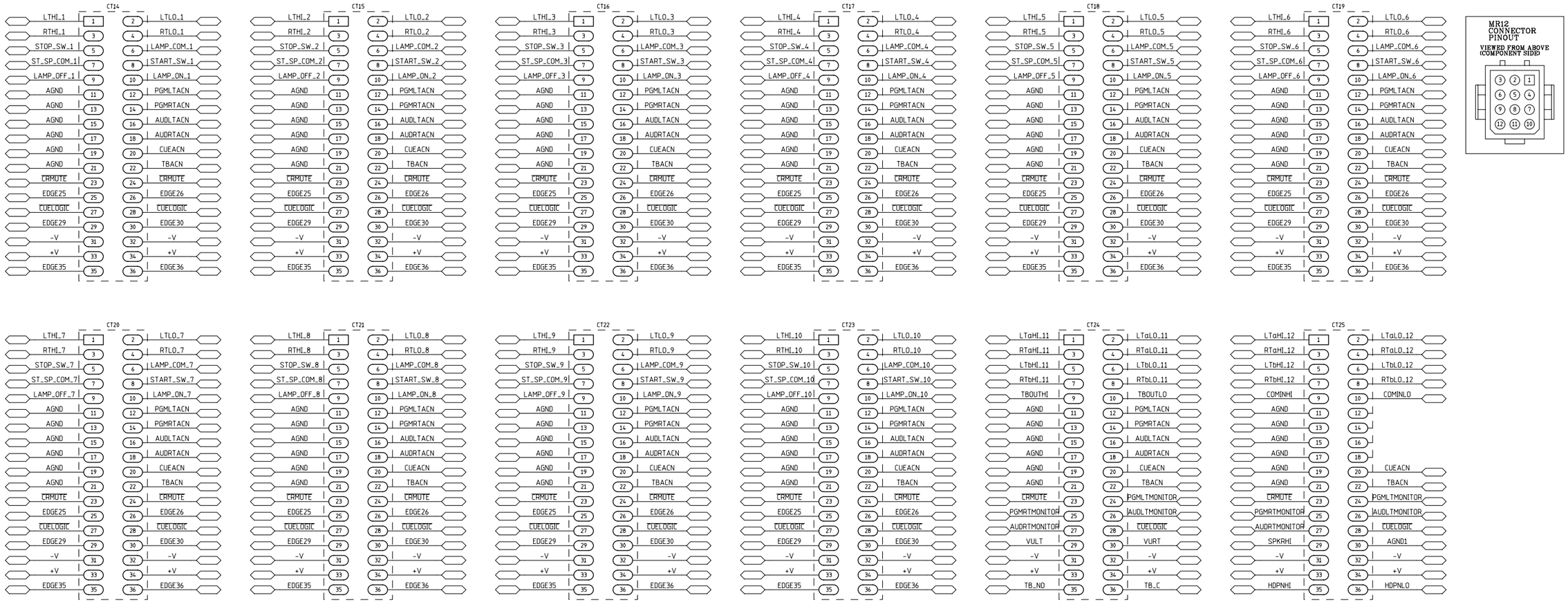
SOURCE SELECT

EXT PGM AUD

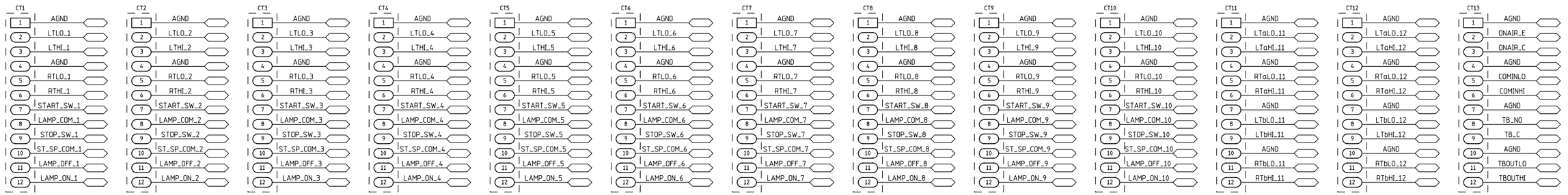
Sergey Averin USA
Сергей Аверин США

S/N

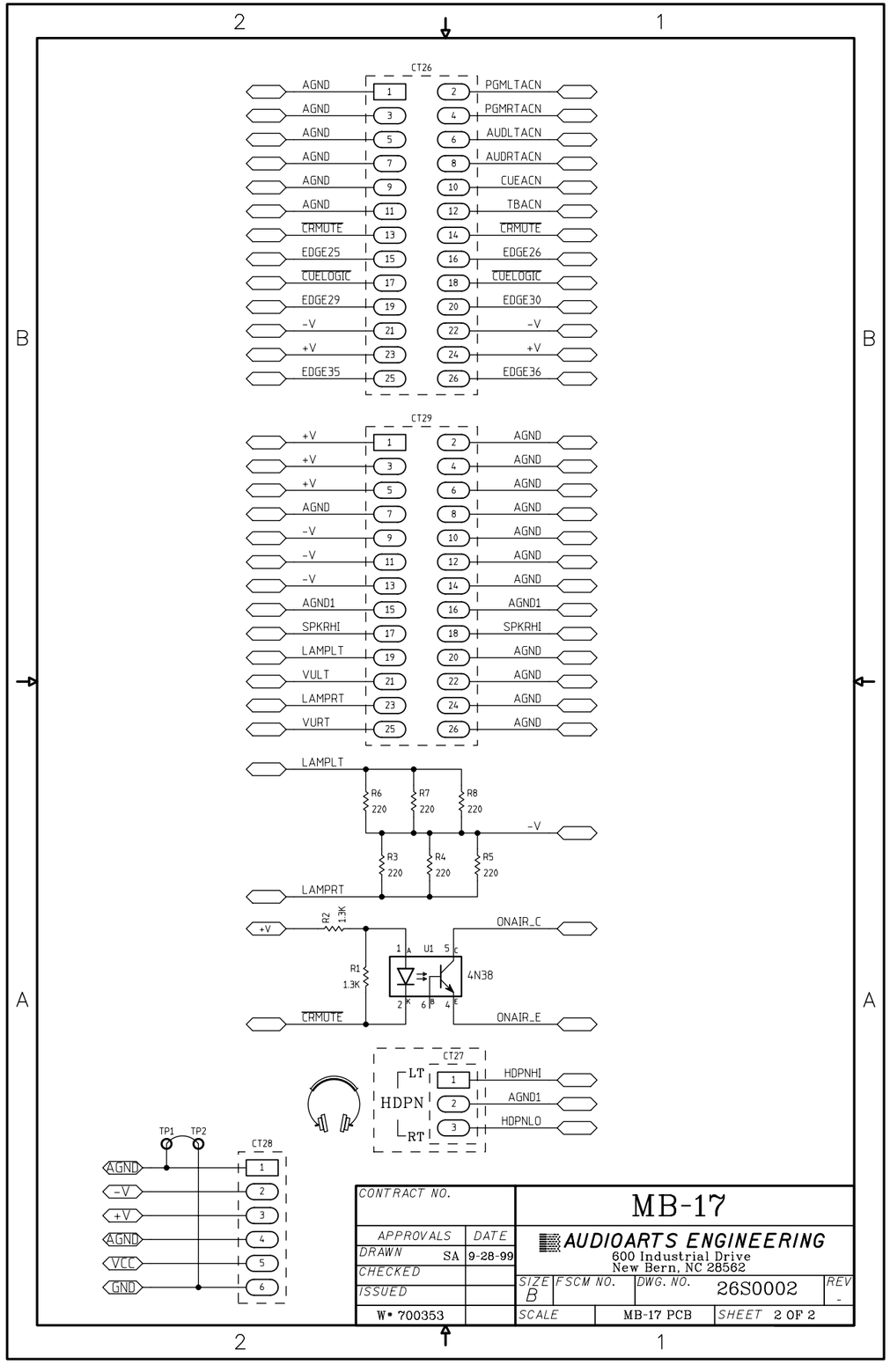
EDGE CONNECTORS BUSS CHART



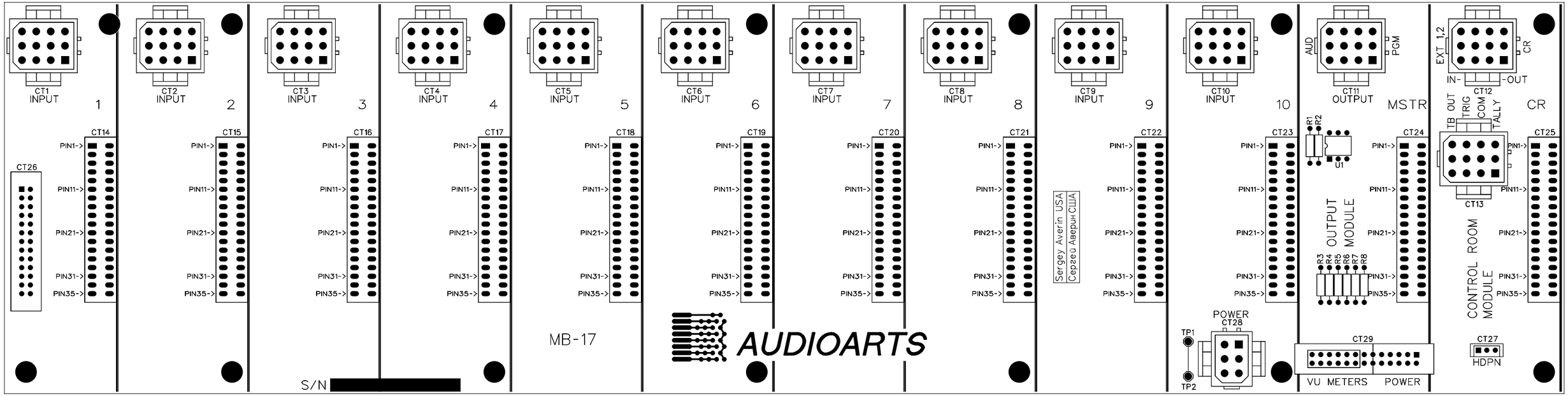
I/O CONNECTORS CHART

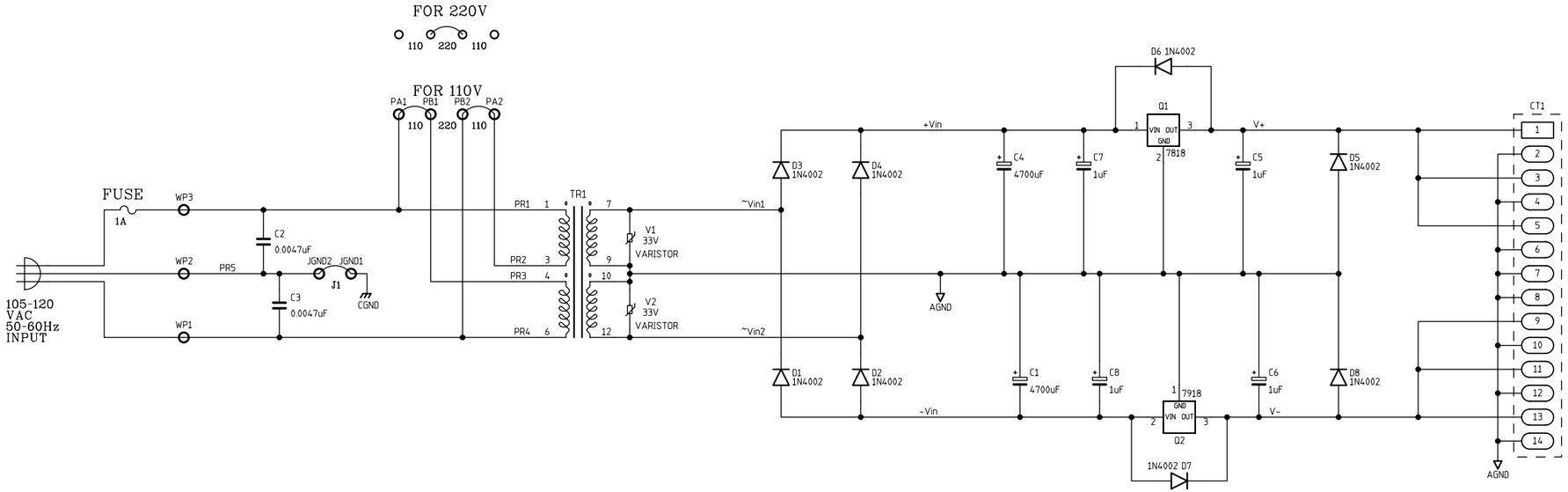


CONTRACT NO.	MB-17
APPROVALS / DATE	AUDIOARTS ENGINEERING 600 Industrial Drive New Bern, NC 28562
DRAWN SA 9-28-99	
CHECKED	
ISSUED	SIZE D · FSCM NO. · DWG. NO. 26S0001 · REV
W# 700353	SCALE · MB-17 PCB · SHEET 1 OF 2



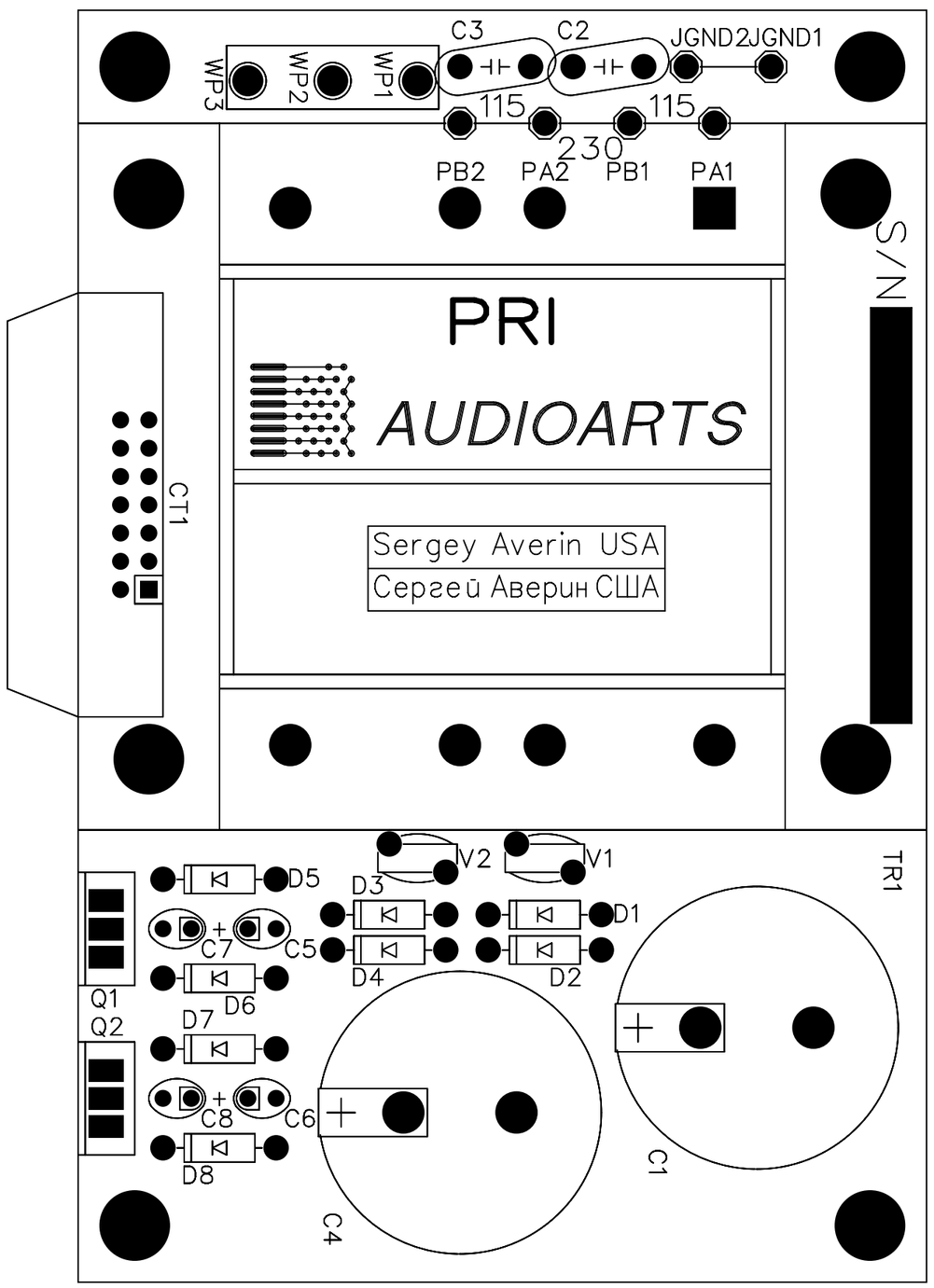
MB-17 Mother Board Schematic - Sheet 2 of 2


CT1 INPUT 1
CT2 INPUT 2
CT3 INPUT 3
CT4 INPUT 4
CT5 INPUT 5
CT6 INPUT 6
CT7 INPUT 7
CT8 INPUT 8
CT9 INPUT 9
CT10 INPUT 10
CT11 OUTPUT MSTR
AUD
PGM
EXT 1,2
CR
IN-
-OUT
TB OUT
TRIG
COM
TALLY
CT12
CT13
CT14
CT15
CT16
CT17
CT18
CT19
CT20
CT21
CT22
CT23
CT24
CT25
CT26
PIN1->
PIN11->
PIN21->
PIN31->
PIN35->
R1
R2
U1
R3
R4
R5
R6
R7
R8
OUTPUT MODULE
CONTROL ROOM MODULE
POWER
CT28
TP1
TP2
CT29
VU METERS
POWER
CT27
HDPN
Sergey Averin USA
Сергей Аверин США
MB-17
AUDIOARTS
S/N



CONTRACT NO.		PS-10	
APPROVALS	DATE	AUDIOARTS ENGINEERING 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	9-20-99		
CHECKED			
ISSUED			
W• 700087		SIZE C / FSCM NO. / DWG. NO. 21S0006B / REV -	
		SCALE / PS-10B PCB / SHEET 1 OF 1	

PS-10 Power Supply Schematic - Sheet 1 of 1


C3
C2
JGND2
JGND1
WP3
WP2
WP1
115
115
230
PB2
PA2
PB1
PA1
S/N
PRI
AUDIOARTS
Sergey Averin USA
Сергей Аверин США
CT1
V2
V1
TR1
D5
D3
D1
C7
C5
D4
D2
Q1
D6
Q2
D7
C8
C6
D8
C1
C4

BUS	FUNCTION	MIC	LINE	OUT	CR
1	I /O	+ IN	+ IN LT	+ AUD LT	+ CR OUT LT
2	I /O	- IN	- IN LT	- AUD LT	- CR OUT LT
3	I /O	+ OUT INS	+ IN RT	+ AUD RT	+ CR OUT RT
4	I /O	- OUT INS (GND)	- IN RT	- AUD RT	- CR OUT RT
5	I /O	+ IN INS	STOP	+ PGM LT	+ EXT IN LT
6	I /O	- IN INS (GND)	ON/OFF COM	- PGM LT	- EXT IN LT
7	I /O	N / C	ST/SP COM	+ PGM RT	+ EXT IN RT
8	I /O	GND	START	- PGM RT	- EXT IN RT
9	I /O	REMOTE OFF	REMOTE OFF	+ TB OUT	+ COMM IN
10	I /O	REMOTE ON	REMOTE ON	- TB OUT	- COMM IN
11	GND	GND	GND	GND	GND
12	PGM ACN LT	PGM ACN LT	PGM ACN LT	PGM ACN LT	N / C
13	GND	GND	GND	GND	GND
14	PGM ACN RT	PGM ACN RT	PGM ACN RT	PGM ACN RT	N / C
15	GND	GND	GND	GND	GND
16	AUD ACN LT	AUD ACN LT	AUD ACN LT	AUD ACN LT	N / C
17	GND	GND	GND	GND	GND
18	AUD ACN RT	AUD ACN RT	AUD ACN RT	AUD ACN RT	N / C
19	GND	GND	GND	GND	GND
20	CUE ACN	N / C	CUE	N / C	CUE ACN
21	GND	GND	GND	GND	GND
22	TB ACN	TB ACN	N / C	TB ACN	N / C
23	MUTE LOGIC	MUTE LOGIC	N / C	N / C	MUTE LOGIC
24	PGM LT MON	N / C	N / C	PGM LT MON	PGM LT MON
25	PGM RT MON	N / C	N / C	PGM RT MON	PGM RT MON
26	AUD LT MON	N / C	N / C	AUD LT MON	AUD LT MON
27	AUD RT MON	N / C	N / C	AUD RT MON	AUD RT MON
28	CUE LOGIC	N / C	CUE LOGIC	N / C	CUE LOGIC
29	VU LT / CUE	N / C	N / C	VU LT	CUE OUT
30	VU RT / GND	N / C	N / C	VU RT	HDPN / CUE GND
31	-V	-V	-V	-V	-V
32	-V	-V	-V	-V	-V
33	+V	+V	+V	+V	+V
34	+V	+V	+V	+V	+V
35	HDPN LT / TB	N / C	N / C	TB SW	HDPN LT
36	HDPN RT / TB	N / C	N / C	TB SW	HDPN RT

3/22/99

R-17 Console Bus Chart

Parts Lists

Chapter Contents

MM-17 MONO MIC MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
MM-17 FACEPLATE	FACEPLATE	1	***002131***
CT4	36 PIN PC MOUNT CARDEDGE CONNECTOR	1	***220007***
	6 PIN .098" PLUG FOR #26 AWG	2	***230031***
	8 PIN .3" DIP SMT SOCKET	1	***245001***
CT2, CT3	6 PIN .098" HEADER	2	***250065***
U3	74AC14 TTL SMT TAPE & REEL ONLY	1	***305027***
U1	2017 MIC PREAMP IC	1	***320003***
U4	TL072 DUAL LINEAR OP-AMP SMT	1	***325003***
Q1	PQ05SZ1 5V 1A REGULATOR SMT T/R	1	***335001***
Q2	MMBTA05 NPN SMT TRANSISTOR	1	***345001***
Z1-Z6	5.1V SMT ZENER DIODE C5V1	6	***355002***
D1-D3	1N4148 FAST SWITCHING SMT DIODE	3	***355003***
U2	74VHC4053 SMT	1	***385001***
L1	FERRITE CHOKE	1	***400025***
C19, C20	CAPACITOR, 10µF 50V ELECTROLYTIC SMT	2	***405001***
C2, C3, C5, C16, C18, C23	CAPACITOR, 22µF 25V ELECTROLYTIC SMT	6	***405002***
C6	CAPACITOR, 100µF 25V ELECTROLYTIC SMT	1	***405003***
C7, C10	CAPACITOR, 1µF 35V ELECTROLYTIC SMT TANTALUM	2	***405005***
C9	CAPACITOR, 10pF 100V CERAMIC SMT	1	***415001***
C14	CAPACITOR, 330pF 100V CERAMIC SMT	1	***415004***
C21, C22	CAPACITOR, .001µF 50V CERAMIC SMT	2	***415005***
C1, C4, C8, C11-C13, C15, C17	CAPACITOR, .1µF 50V CERAMIC SMT	8	***415007***
R2	10 OHM 5% .25W MC1206 RESISTOR	1	***435002***
R11	47 OHM 5% .25W MC1206 RESISTOR	1	***435005***
R2, R17-R19, R22	100 OHM 5% .25W MC1206 RESISTOR	5	***435007***
R4	1.30 KOHM 1% .25W MC1206 RESISTOR	1	***435016***
R12, R14-R16	2.43 KOHM 1% .25W MC1206 RESISTOR	4	***435020***
R10, R20, R21	4.99 KOHM 1% .25W MC1206 RESISTOR	3	***435023***
R5-R9, R23, R24	10.0 KOHM 1% .25W MC1206 RESISTOR	7	***435028***
R1	22.1 KOHM 1% .25W MC1206 RESISTOR	1	***435036***
R13	75.0 KOHM 1% .25W MC1206 RESISTOR	1	***435042***
CR1	1K TRIM POT SMT	1	***505001***
SW1, SW2	4PDT PUSHBUTTON SWITCH	2	***510054***
“ON”/”OFF” SWITCH	PUSHBUTTON SWITCH, 2 POLE MOMENTARY (LUGS)	2	***510080***
SW3	4 POSITION SMT DIP SWITCH, TAPE SEALED	1	***515001***
FADER KNOB	BLUE FADER KNOB WITH WHITE LINE	1	***520052***

MM-17 MONO MIC MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
“PGM”/”AUD” BUTTONS	GREY BUTTON WITH LED LIGHT PIPE	2	***530027***
“OFF” BUTTON	A50 STYLE AMBER BUTTON, PRINTED "OFF"	1	***530048***
“ON” BUTTON	A50 STYLE RED BUTTON, PRINTED "ON"	1	***530049***
CT1	10K SINGLE AUDIO TAPER SELMARK CARBON FADER 100mm	1	***540027***
DS1, DS2	RED LED	2	***600017***
“ON” LAMP	5V LED REPLACEMENT FOR T 1 3/4 LAMP RED SLEEVE REQUIRED	1	***600025***
“OFF” LAMP	T 1 3/4 MIDGET FLANGED BASE SINGLE CHIP YELLOW LED LAMP REPLACEMENT	1	***600029***
PCB_MM17	PRINTED CIRCUIT BOARD SMT	1	***700361***
	PHILLIPS FLAT HEAD STAINLESS STEEL SCREW	2	***820015***
	PHILLIPS PANHEAD ST/ST BLACK	2	***820018***
	PEM FASTENERS	2	***821009***
	4-0 X .187 RND NYLON	2	***823014***
F1, F2	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	2	***835001***

SL-17 STEREO LINE MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
SL-17 FACEPLATE	FACEPLATE	1	***002130***
	8 PIN 3" CABLE ASSEMBLY	1	***150010***
CT3	36 PIN PC MOUNT CARDEDGE CONNECTOR	1	***220007***
CT2, CT4	6 PIN .098" PLUG FOR #26 AWG	2	***230031***
CT2, CT4	6 PIN .098" HEADER	2	***250065***
U3	74AC14 TTL SMT TAPE & REEL ONLY	1	***305027***
U1, U4	TL072 DUAL LINEAR OP-AMP SMT	2	***325003***
Q1	PQ05SZ1 5V 1A REGULATOR SMT T/R	1	***335001***
Z1, Z2	5.1V SMT ZENER DIODE C5V1	2	***355002***
D1-D3	1N4148 FAST SWITCHING SMT DIODE	3	***355003***
U2	74VHC4053 SMT Triple 2-Channel Analog Mux	1	***385001***
C2-C4, C6, C20, C23, C24, C26	CAPACITOR, 22µF 25V ELECTROLYTIC SMT	8	***405002***
C8, C9	CAPACITOR, 100µF 25V ELECTROLYTIC SMT	2	***405003***
C10, C13	CAPACITOR, 1µF 35V ELECTROLYTIC SMT TANTALUM	2	***405005***
C7, C17, C18, C21, C25	CAPACITOR, 10pF 100V CERAMIC SMT	6	***415001***
C1, C5, C11, C14-C16, C19, C22	CAPACITOR, .1µF 50V CERAMIC SMT	8	***415007***
R17-R19, R22, R26, R35	100 OHM 5% .25W MC1206 RESISTOR	6	***435007***
R7	1.30 KOHM 1% .25W MC1206 RESISTOR	1	***435016***
R3, R4, R27, R33	1.69 KOHM 1% .25W MC1206 RESISTOR	4	***435017***
R12, R14-R16	2.43 KOHM 1% .25W MC1206 RESISTOR	4	***435020***
R20, R21	4.99 KOHM 1% .25W MC1206 RESISTOR	2	***435023***
R23, R24, R29, R32	8.45 KOHM 1% .25W MC1206 RESISTOR	4	***435026***
R5, R6, R8-R11	10.0 KOHM 1% .25W MC1206 RESISTOR	6	***435028***
R1, R2	22.1 KOHM 1% .25W MC1206 RESISTOR	2	***435036***
R28, R30, R31, R34	53.6 KOHM 1% .25W MC1206 RESISTOR	4	***435041***
R13, R25	75.0 KOHM 1% .25W MC1206 RESISTOR	2	***435042***
CR1, CR2	10K TRIM POT SMT	2	***505002***
“ON”/”OFF” SWITCH	PUSHBUTTON SWITCH, 2 POLE MOMENTARY PCB MOUNTED	2	***510030***
SW3	DPDT PUSHBUTTON SWITCH	1	***510052***
SW1, SW2	4PDT PUSHBUTTON SWITCH	2	***510054***
FADER KNOB	WHITE FADER KNOB WITH BLACK LINE	1	***520051***
“PGM”, “AUD” BUTTONS	GREY BUTTON WITH LED LIGHT PIPE	2	***530027***
“CUE” BUTTON	WHITE BUTTON, SQUARE	1	***530032***
“OFF” BUTTON	A50 STYLE AMBER BUTTON, PRINTED "OFF"	1	***530048***
“ON” BUTTON	A50 STYLE RED BUTTON, PRINTED "ON"	1	***530049***
FADER	10K DUAL AUDIO TAPER SELMARK CARBON FADER 100mm	1	***540028***

SL-17 STEREO LINE MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
DS3	RECTANGULAR GREEN DIFFUSED LED, TRANSPARENT SIDES	1	***600000***
DS1, DS2	RED LED	2	***600017***
“ON” LAMP	5V LED REPLACEMENT FOR T 1 3/4 LAMP RED SLEEVE REQUIRED	1	***600025***
“OFF” LAMP	T 1 3/4 MIDGET FLANGED BASE SINGLE CHIP YELLOW LED LAMP REPLACEMENT	1	***600029***
PCB_SW2B	PRINTED CIRCUIT BOARD	1	***700118***
PCB_SL17	PRINTED CIRCUIT BOARD SMT	1	***700328***
	PHILLIPS FLATHEAD STAINLESS STEEL SCREW UNDERCUT	2	***820020***
	METRIC M3 SCREW	2	***820061***
	PEM FASTENERS	2	***821009***
	4-0 X .187 RND NYLON	2	***823014***
F1, F2	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	2	***835001***

O-17 MASTER OUTPUT MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
O-17 FACEPLATE	FACEPLATE	1	***002132***
CT2	36 PIN PC MOUNT CARDEDGE CONNECTOR	1	***220007***
CT1	6 PIN .098" PLUG FOR #26 AWG	1	***230031***
U1-U9	8 PIN .3" DIP SMT SOCKET	9	***245001***
CT1	6 PIN .098" HEADER	1	***250065***
U4, U5, U7-U9	2142 BALANCED LINE DRIVER IC	5	***320004***
U1-U3, U6	NE5532 DUAL OP-AMP	4	***320008***
C1-C3, C6, C10, C14, C15	CAPACITOR, 22µF 25V ELECTROLYTIC SMT	7	***405002***
C4, C5, C8, C12, C13	CAPACITOR, 10pF 100V CERAMIC SMT	5	***415001***
C16, C17	CAPACITOR, 33pF 100V CERAMIC SMT	2	***415002***
C7, C9, C11, C18-C20	CAPACITOR, .1µF 50V CERAMIC SMT	6	***415007***
R6, R20, R21	1.00 KOHM 1% .25W MC1206 RESISTOR	3	***435015***
R2	1.30 KOHM 1% .25W MC1206 RESISTOR	1	***435016***
R8, R9, R10, R11	1.69 KOHM 1% .25W MC1206 RESISTOR	4	***435017***
R16-R19	3.92 KOHM 1% .25W MC1206 RESISTOR	4	***435022***
R1, R3-R5, R7, R12-R15	10.0 KOHM 1% .25W MC1206 RESISTOR	9	***435028***
CR1-CR3	10K TRIM POT	3	***500021***
SW1	4PDT PUSHBUTTON SWITCH	1	***510054***
TB SW	PUSHBUTTON SWITCH, 2 POLE MOMENTARY (LUGS)	1	***510080***
SW2	4 POSITION SMT DIP SWITCH, TAPE SEALED	1	***515001***
METER SELECT BUTTON	WHITE BUTTON, SQUARE	1	***530032***
“OFF” BUTTON	A50 STYLE AMBER BUTTON, PRINTED "OFF"	1	***530048***
DS1	RECTANGULAR RED DIFFUSED LED, TRANSPARENT SIDES	1	***600001***
DS2	RECTANGULAR YELLOW DIFFUSED LED, TRANSPARENT SIDES	1	***600002***
PCB_MSTR17	PRINTED CIRCUIT BOARD SMT	1	***700358***
	PHILLIPS FLAT HEAD STAINLESS STEEL SCREW	2	***820015***
	PEM FASTENERS	2	***821009***
	4-0 X .187 RND NYLON	2	***823014***
F1, F2	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	2	***835001***

CR-17 MONITOR MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
CR-17 FACEPLATE	FACEPLATE	1	***002133***
CT3	36 PIN PC MOUNT CARDEDGE CONNECTOR	1	***220007***
CT1, CT2	6 PIN .098" PLUG FOR #26 AWG	2	***230031***
U1, U2, U4, U6, U10	8 PIN .3" DIP SMT SOCKET	5	***245001***
U3, U5	16 PIN .3" DIP SMT SOCKET	2	***245003***
CT1, CT2	6 PIN .098" HEADER	2	***250065***
U4, U10	2142 BALANCED LINE DRIVER IC	2	***320004***
U7-U9	LM675 POWER OP AMP	3	***320007***
U1, U2, U6	NE5532 DUAL OP-AMP	3	***320008***
Z1, Z2	5.1V SMT ZENER DIODE C5V1	2	***355002***
D1	1N4148 FAST SWITCHING SMT DIODE	1	***355003***
U3, U5	14053BCP	2	***380003***
C1, C4, C5, C10, C14, C15, C19, C20, C24, C25, C36, C37, C51	CAPACITOR, 22µF 25V ELECTROLYTIC SMT	13	***405002***
C13, C23, C41, C42	CAPACITOR, 100µF 25V ELECTROLYTIC SMT	4	***405003***
C16, C17	CAPACITOR, 330µF 25V ELECTROLYTIC SMT	2	***405004***
C18, C26, C29, C32, C43, C45, C47, C50	CAPACITOR, 1µF 35V ELECTROLYTIC SMT TANTALUM	8	***405005***
C2, C3, C6-C9, C21, C22, C38	CAPACITOR, 10pF 100V CERAMIC SMT	9	***415001***
C27, C30, C33	CAPACITOR, 33pF 100V CERAMIC SMT	3	***415002***
C28, C31, C34	CAPACITOR, 330pF 100V CERAMIC SMT	3	***415004***
C11, C12, C35, C39, C40, C49	CAPACITOR, .1µF 50V CERAMIC SMT	6	***415007***
C44, C46, C48	CAPACITOR, .22µF 50V CERAMIC SMT	3	***415009***
R45, R46, R49, R50, R53, R54	3.3 OHM 5% .25W MC1206 RESISTOR	6	***435001***
R28	100 OHM 5% .25W MC1206 RESISTOR	1	***435007***
R35, R37, R39	1.00 KOHM 1% .25W MC1206 RESISTOR	3	***435015***
R29, R42	1.69 KOHM 1% .25W MC1206 RESISTOR	2	***435017***
R17, R33	2.43 KOHM 1% .25W MC1206 RESISTOR	2	***435020***
R22-R25	3.92 KOHM 1% .25W MC1206 RESISTOR	4	***435022***
R9, R11	4.99 KOHM 1% .25W MC1206 RESISTOR	2	***435023***
R30, R43	8.45 KOHM 1% .25W MC1206 RESISTOR	2	***435026***
R3, R4, R6, R8, R10, R12, R14, R16, R18-R21, R26, R27, R31, R32, R40, R57, R58	10.0 KOHM 1% .25W MC1206 RESISTOR	19	***435028***
R5, R7, R13, R15	16.5 KOHM 1% .25W MC1206 RESISTOR	4	***435033***
R41, R44	26.7 KOHM 1% .25W MC1206 RESISTOR	2	***435037***
R1, R2, R34, R36, R38	40.2 KOHM 1% .25W MC1206 RESISTOR	5	***435039***
CR1	10K POT, SINGLE AUDIO, 16 mm	1	***500008***
CT1, CT2	10K POT, DUAL AUDIO	2	***500029***
CR2	10K TRIM POT SMT	1	***505002***

CR-17 MONITOR MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
RELEASE BAR (SW1-SW3)	3 STATION RELEASE BAR, 12.5MM SPACING	1	***510005***
SWITCH RAIL (SW1-SW3)	3 STATION SWITCH CHASSIS, 12.5MM SPACING	1	***510007***
SPRING CLIP	RELEASE BAR END CLIP 12.5 & 17.5MM	1	***510021***
SW2, SW3	DPDT PUSHBUTTON SWITCH	2	***510052***
SW1	4PDT PUSHBUTTON SWITCH	1	***510054***
“CUE” KNOB	15mm GRAY PUSH-ON KNOB FOR 6mm SHAFT	1	***520017***
“CR”, “HDPN” KNOB	15mm GREY COLLET KNOB FOR 1/4" SHAFT	2	***520038***
SELECT BUTTON	GRAY BUTTON, RECTANGULAR	3	***530026***
“CUE” CAP	11mm BURGANDY CAP W/WHITE LINE FOR 15mm KNOB	1	***530039***
“HDPN” CAP	11mm GRAY/99 CAP W/ WHITE LINE FOR 15MM KNOB	1	***530040***
“CONTROL” CAP	11mm BLUE CAP W/WHITE LINE FOR 15mm KNOB	1	***530045***
PCB_CR17	PRINTED CIRCUIT BOARD SMT	1	***700359***
	PHILLIPS FLAT HEAD STAINLESS STEEL SCREW	2	***820015***
	PEM FASTENERS	2	***821009***
	4-0 X .187 RND NYLON	2	***823014***
	HEATSINK FOR T-220 WITH MOUNTING PIN	3	***825010***
R48, R52, R56	FUSE_.17 AMP_POLYSWITCH	3	***830043***
F1-F4	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	4	***835001***

TR-17/FF TAPE REMOTE MODULE PARTS LIST (optional)

ITEM#	DESCRIPTION	QTY	W#
	50 COND FLAT RIBBON CABLE	1	***150007***
	12 PIN PC MOUNT CONNECTOR	2	***220014***
	12 PIN PLUG	2	***230016***
	FEMALE PINS FOR 12 PIN PLUG	24	***230017***
	26 PIN PLUG	2	***250043***
	26 PIN PC MOUNT STRAIGHT HEADER	2	***250044***
“RTZ”/”REW”/”REC” SWITCH	PUSHBUTTON SWITCH GREEN LED/ NO CAP	3	***510094***
“FF”/”PLAY”/”STOP” SWITCH	PUSHBUTTON SWITCH RED LED/ NO CAP	3	***510095***
“PLAY” SWITCH CAP	GREEN SWITCH CAP	1	***530001***
“REC” SWITCH CAP	RED SWITCH CAP	1	***530003***
“RTZ”/ “FF”/ “REW” SWITCH CAP	WHITE SWITCH CAP	3	***530004***
“STOP” SWITCH CAP	YELLOW SWITCH CAP	1	***530005***
PCB_T50	PRINTED CIRCUIT BOARD - PALETIZED	1	***700121***
PCB_TR300	PRINTED CIRCUIT BOARD	1	***700156***
	PEM FASTENERS	6	***821009***

TR-17/SS TAPE REMOTE MODULE PARTS LIST (optional)

ITEM#	DESCRIPTION	QTY	W#
	50 COND FLAT RIBBON CABLE	1	***150007***
	12 PIN PC MOUNT CONNECTOR	2	***220014***
	12 PIN PLUG	2	***230016***
	FEMALE PINS FOR 12 PIN PLUG	24	***230017***
	26 PIN PLUG	2	***250043***
	26 PIN PC MOUNT STRAIGHT HEADER	2	***250044***
“START” SWITCH	PUSHBUTTON SWITCH GREEN LED/ NO CAP	3	***510094***
“STOP” SWITCH	PUSHBUTTON SWITCH RED LED/ NO CAP	3	***510095***
“START” SWITCH CAP	GREEN SWITCH CAP	3	***530001***
“STOP” SWITCH CAP	YELLOW SWITCH CAP	3	***530005***
PCB_T50B	PRINTED CIRCUIT BOARD - PALETIZED	1	***700121***
PCB_TR 300	PRINTED CIRCUIT BOARD	1	***700156***
	PEM FASTENERS	6	***821009***

LS-17 LINE PRESELECTOR PARTS LIST (optional)

ITEM#	DESCRIPTION	QTY	W#
	12 PIN PC MOUNT CONNECTOR	4	***220014***
	12 PIN PLUG	4	***230016***
	FEMALE PINS FOR 12 PIN PLUG	48	***230017***
	6 STATION 4 POLE INTERLOCKED SWITCH, 12.5MM SPACING	1	***510040***
PCB_LS60	PRINTED CIRCUIT BOARD	1	***700053***

PS-17 POWER SUPPLY PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
PS-17 FACEPLATE	POWER SUPPLY FACEPLATE	1	***002150***
PS-17 COVER	POWER SUPPLY COVER	2	***002151***
PS-17 CHASSIS	POWER SUPPLY CHASSIS	1	***002152***
PS-17 BRACKET	POWER SUPPLY BRACKET	1	***002153***
	UNSHIELDED WIRE	16	***150000***
	GRAY POWER CORD	1	***150016***
	CABLE MOUNT MULTI-PIN CONNECTOR	1	***230010***
	CHASSIS MOUNT MULTI-PIN CONNECTOR	1	***230011***
	MULTI-PIN CONNECTOR STRAIN RELIEF	1	***230012***
	MULTIMATE SOCKET CONTACT (LOOSE PACK)	5	***230014***
	MULTIMATE PIN CONTACT (LOOSE PACK)	9	***230015***
	FEMALE PINS FOR 12 PIN PLUG	5	***230017***
CT-28	6 PIN CABLE MOUNT MR PLUG	1	***230026***
Q1	7818 POSITIVE 18V REGULATOR	1	***330004***
Q2	7918 NEGATIVE 18V REGULATOR	1	***330009***
D1-D8	1N4002 DIODE	8	***350003***
V1, V2	39ZA1 VARISTOR	2	***360002***
C5-C8	CAPACITOR, 1µF 35V TANTALUM ORANGE	4	***400014***
C1, C4	CAPACITOR, 4700µF 35V ELECTROLYTIC	2	***400019***
C2, C3	CAPACITOR, .001µF 50V CERAMIC	2	***410002***
PCB_PS10	PRINTED CIRCUIT BOARD	1	***700087***
	TRANSFORMER	1	***800013***
	PHILLIPS PANHEAD STAINLESS STEEL	4	***820013***
	PHILLIPS PAN HEAD MACHINE SCREW SS	2	***820021***
	1/4" HEX KEPNUTS S/Z	6	***821005***
	SHOULDER WASHER	2	***822012***
	4-0 X .187 RND NYLON	6	***823014***
	STRAIN RELIEF	1	***824009***
	MICA INSULATOR	2	***825009***
	1 AMP FUSE	1	***830004***
	FUSE HOLDER	1	***830010***

R-17 FRAME PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
R-17 BRACKET	BRACKET	2	***002080***
R-17 MB REAR	METER BRIDGE REAR PANEL	1	***002181***
R-17 MB FACE	METER BRIDGE FACEPLATE	1	***002182***
R-17 FRAME RAIL	UPPER FRAME RAIL	1	***002185***
R-17 FRAME PAN	FRAME PAN	1	***002186***
R-17 FRONT LEXAN	FRONT LEXAN COVER	1	***002187***
	OWNER'S MANUAL FOR R17	1	***002192***
LS-60 BLOCK OUT	BRACKET	1	***002483***
	RIGHT 3/4" OAK SIDEPLATE	2	***100017***
	3/4" RADIUS OAK 27/32" X 1 3/16" THICK X 22"LONG	1	***100023***
	ALUMINUM CONTINUOUS HINGE, 72"X1.06" X .040"	.25	***110024***
	26 COND FLAT RIBBON CABLE	6	***150083***
CT-14 - CT-25	36 PIN PC MOUNT CARDEDGE CONNECTOR	12	***220007***
CT-1 - CT-13	12 PIN PC MOUNT CONNECTOR	13	***220014***
CT-1 - CT-13	12 PIN PLUG	13	***230016***
CT-1 - CT-13	FEMALE PINS FOR 12 PIN PLUG	162	***230017***
CT-28	6 PIN PC MOUNT MR CONNECTOR	1	***230025***
CT-28	6 PIN CABLE MOUNT MR PLUG	1	***230026***
CT-27	3 PIN .098" PLUG FOR #26 AWG	1	***230028***
U1	6 PIN IC SOCKET	1	***240008***
CT-29	14 PIN DIP RIBBON PLUG	1	***250034***
CT-27	3 PIN .098" HEADER	1	***250062***
CT-29	14 PIN BOXED HEADER, STRAIGHT	1	***250073***
	RTS JACK	1	***260005***
	PATCH CLIPS	2	***280004***
	PATCH CLIPS	10	***280007***
	4N32 OPTO COUPLER DRLNGTN	1	***340000***
R3-R8	220 OHM 5% .25W CARBON FILM RESISTOR	6	***430214***
R1, R2	1.3 KOHM 5% .25W CARBON FILM RESISTOR	2	***430224***
	12V AL29 METER LAMP	2	***620007***
	VU METER	2	***630004***
	12V LIGHT BOX FOR AL29 METER	2	***630013***
PCB_MB17	PRINTED CIRCUIT BOARD	1	***700353***
	PHILLIPS FLATHEAD STAINLESS STEEL SCREW UNDERCUT	4	***820020***
	PHILLIPS PAN HEAD MACHINE SCREW SS	42	***820021***
	PHILLIPS PANHEAD STAINLESS STEEL SCREW	4	***820026***

R-17 FRAME PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	SHEET METAL SCREWS	20	***820039***
	#8 X 1" EXTRACTOR SCREWS	0	***820046***
	SMALL PATTERN KEPNUT	4	***821006***
	INTERNAL TOOTH LOCK WASHER	18	***822004***
	FLAT WASHER	1	***822007***
	SHOULDER WASHER	1	***822008***
	4-40 X .375 RND ALUM. PEM	22	***823024***
	#6 THUMB SCREW	1	***823029***
	METER TERMINAL	4	***826001***
	HAND CRIMPER	1	***850030***
	EXTRACTOR TOOL	1	***850032***
	SPEAKER	1	***960000***

R-17 SUB ASSEMBLY PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
SPARE PARTS KIT	OPTIONAL SPARE PARTS FOR R16/R10/R17		***052175***
STEREO FADER	WIRED FADER FOR SL-10, SL-17		***052100***
MONO FADER	WIRED FADER FOR MM-10		***052101***
STEREO POT	WIRED STEREO POT FOR CONTROL ROOM & HEADPHONE		***052102***
ON/OFF SWITCH KIT	KIT FOR REPLACING ON-OFF SWITCHES		***052103***
ASSEMBLED MB 17	ASSEMBLED MB-17 MOTHERBOARD FOR R17		***052121***

Troubleshooting

ChapterContents

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. Check that the AC power source for the console is live, and that the console power cable is connected to the AC source.

2. Make sure that the sources you are using to test the console installation are 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 amplifier on? Is the amplifier volume turned up to a normal level? Are the speakers connected to the amplifier outputs? Are mic channels programmed to MUTE CR OFF?

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.

NOTE: THE FOLLOWING PRECAUTIONS SHOULD BE TAKEN WHILE TROUBLESHOOTING OR TESTING A "LIVE" (I.E., POWERED-UP) CONSOLE.

(1) If a module is to be connected to the console via the (optional) extender ribbon while troubleshooting, 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) Use extreme care 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 a logic IC (CMOS analog switch) while the console is powered. The same applies to the audio op-amps.

INTEGRATED CIRCUITS

The audio circuits of the console consist almost entirely of 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) 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.

(2) When one of these ICs fail, 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.

(3) 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.

(4) 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.

(5) This console has electronically balanced floating output circuits on its main output channels. These circuits will work if either side of the output is shorted to ground. However, an unbalanced load connected between "HIGH" and "SHIELD" of the output circuit will float, and experience level changes relating to the impedance to ground at each output leg. For this reason, connect unbalanced loads the same as balanced; i.e., between "HIGH" and "LOW".

See Appendix drawing "Balanced and Unbalanced R-17 Console Connections" on page A-3 for connection details.

(6) In addition to the +/- 18 volts for the op-amps, the CMOS analog ICs require a +/- 5 volt supply, derived from +/- 18 volts via Q1 and Q2 on the CR-17 module PCB. If this supply is not functional, the CMOS outputs experience abnormal loading, which causes some rather weird logic problems. If there appears to be a logic malfunction in the CR-17, check these voltages. Similarly, the MM-17 and SL-17 modules have resistor/zener diode networks to generate the +/-5 volts for the CMOS analog IC's. If you have a logic malfunction, check these voltages.

Technical information for the console is contained on the schematic

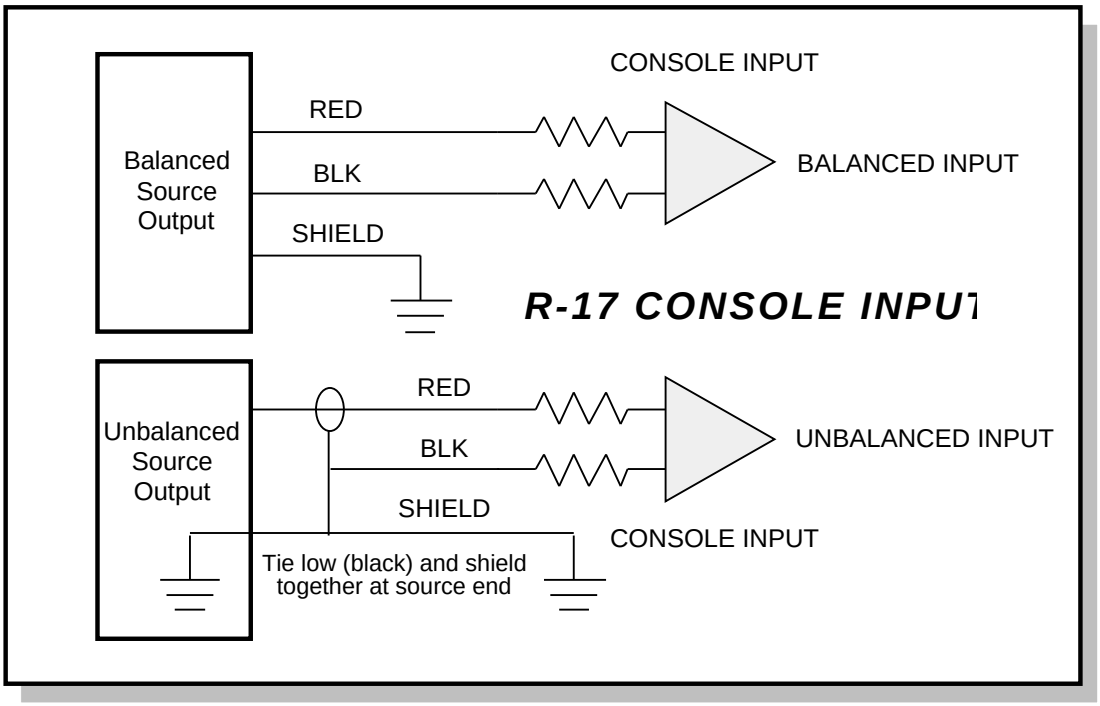
drawings. Installation and hook up information is also summarized in the text of this manual.

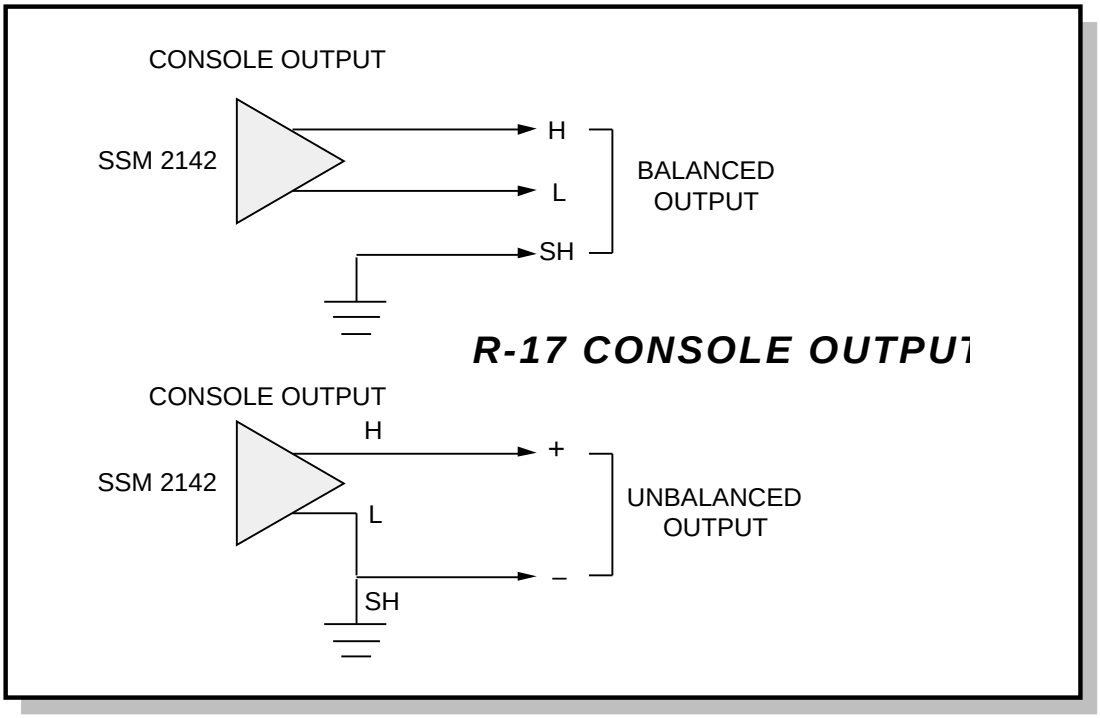
In general, the R-17 console is rugged and user friendly. I/O connections can be unplugged or plugged in while powered up with no damage, provided the precautions described above concerning removal and replacement of modules are carefully followed. Occasionally, this will cause a transient in the logic system that may be sufficient to affect a channel's ON/OFF status, but this is rare. (Note that mic module ON/OFF status powers up randomly when the console is energized; this is normal, and does not indicate anything wrong with the logic system.)

As a final note, 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.

Appendix

Appendix Contents





BALANCED & UNBALANCED R-17 CONSOLE CONNECTIONS

LS-17 Line Preselector Installation Instructions

The LS-17 Line Preselector assembly is shipped attached to its mounting bracket. The bracket attaches to the console mainframe with 4 type 6-32 screws, included in the kit. Perform the following steps to install the LS-17:

(1) turn off the power to the console;
(2) remove the first four modules from the right end of the mainframe (blank or optional TR, CR, OM, and SL);
(3) remove the three screws that hold down the meterbridge, and open the meterbridge;
(4) using a flat-bladed screwdriver, carefully pry off the line selector cutout cover;
(5) hold the LS-17 in position so the four mounting holes in the bracket line up with the pre-drilled mounting holes in the console frame;
(6) install the mounting screws, but don't tighten them;
(7) close the meterbridge slowly, checking to see that the meterbridge clears the LS-17;
(8) if necessary, open the meterbridge and adjust the LS-17 position for best clearance and centering of the switches within the line selector cutout;
(9) when the correct position has been achieved, tighten the screws securely;
(10) make the signal connections to the 12 pin connectors on the LS-17, referring to the connector pinout chart (see Chapter 3, pages 3-11 and 3-12);
(11) reinstall each module removed in step 2 in the same slot it was removed from;
(12) close and secure the meterbridge.

This completes the LS-17 installation procedure.