TECHNICAL MANUAL

A-32/A-20 On-Air Console

Wheatstone® Corporation

600 VIP Parkway, Syracuse, New York · tel 315-455-7740 / fax 315-454-8104

KUTE

A-20/A-32

SN 20344

Radio On-Air Consoles

OWNER'S MANUAL

August 1989

Wheatstone Corporation
6720 V.I.P. Parkway, Syracuse, N.Y. 13211 (315-455-7740)

ZIP 13212

315-452-5000 phone
315-452-0160 FAX

IMPORTANT!

In order to pass audio through your new console, you must wire up insertion points in certain modules.

Note in particular
MM-20 input modules
and the
OM-20 output* module.

See "Connection" section in your manual for details.

*OM-20 output module is supplied from factory with insert points already bridged (via PCB mounted dipswitch).

ATTENTION!

ADDENDA TO A-20 CONSOLE OWNER'S MANUAL:

Please note the following changes/additions to your manual documentation:

A-32 CONSOLE: This manual applies to both A-20 (10 input) and A-32 (16 input) consoles.

SL-20 STEREO LINE INPUT MODULE:
[4/91] The CR MUTE function has been dropped. See D version schematic (SL-20D PCB)

PS-20 POWER SUPPLY (load sheet drawing):
Voltage regulators (Q2 through Q5) are now using #4-40 steel screws, insulating shoulder washers and metal #4-40 locking nuts.

May 1991

TABLE OF CONTENTS

Specifications
System Signal Flow Diagram

GENERAL
- Console Overview
- Mainframe Installation
- Cut-Out Dimension Drawing
- System Ground

CONSOLE I/O CONNECTIONS
- General
- Dipswitch Controlled Functions
- Control Ports
- Master I/O Pinout Drawing
- Individual Module Pinouts
- Console Bus Chart

MODULE SECTION
- Faceplate Drawings
- Control Explanations
- Signal Flow Diagrams
- Interface Charts
- Schematics
- Load Sheets

PERFORMANCE GRAPHS
- Level Diagrams

PARTS LISTS

TECHNICAL NOTES
- Testpoints
- Updates

OPTIONAL ACCESSORIES
- Clock Control Card (CLK-5)
- Timer Control Card (TM-6A)
- Tape Remote Module (SS-6/FF-2)
- Line Select Module (LS-6)
- Multi-Phone Module (MP-32)
- Intercom Module (ICM-32)
- Studio Turret (ST-20)
- Copystand

THE A-20 ON-AIR BROADCAST CONSOLE

LOGIC CONTROLLED AUDIO—Since impeccable electrical specifications were the design objective, VCAs, FETs, and use of line transformers were avoided to reduce the significant noise, distortion and bandwidth limitations that these component choices impose. The audio design concept employs the straight wire approach to maximize audio performance. The A-20 employs sealed high quality relays to control channel ON and CUE as well as monitor, mute and interrupt functions. Additionally the mic channel employs a short turn-on delay to avoid acoustic noise from the channel ON switch.

THE LOGIC SYSTEM—The A-20 provides an isolated contact closure from individual input module ON and OFF switches to provide interface-free machine starts. The module can also accept external ON/OFF commands by simply receiving a contact closure from cart machines, or a logic low command. The module's A/B source selector switch also switches the logic commons for the A and B machine control ports to allow a logic-follow function.The A-20's internal logic is controlled by dipswitches located on the input modules. Available functions include: control room mute and on-air tally relay, studio mute and studio on-air tally relay, and console timer restart. Additionally the control room module can be dipswitch programmed to provide a split cue mode that places program in the left monitor speaker and cue in the right. The control module also has a dipswitch selection to allow cue to interrupt the headphone monitor.

INPUT CIRCUITRY—All line level inputs are electronically balanced and are capable of +26dBm levels. This type of active circuitry optimizes bandwidth and distortion and avoids unnecessary use of line transformers. Additionally the line input modules have front panel accessible multi-turn screwdriver driven gain trim controls to accommodate a wide range of signal sources. Mic modules also have a front panel gain trim control but also utilize a mic transformer, which is better suited to low level signals in high RF environments.

OUTPUT CIRCUITRY—The program, audition, mono, mix-minus, control room and optional studio outputs are all electronically balanced and capable of delivering +28dBm levels. Multi-turn front panel screwdriver adjustable gain trim controls are provided.

HEADPHONE CIRCUITRY—A headphone output jack is provided, located below counter level. Headphone derives its signal from the control room source selector switch and may be programmed by an internal dipswitch to receive input module cue signals. This switching action is automatically activated from the console's internal logic buses. Headphone output level is set by a high quality conductive plastic level control.

CONTROL ROOM FUNCTION—The control room module receives its signal from a six position source selector switchbank. Source choices include program, audition, mono and two external electronically balanced stereo inputs. A long-life conductive plastic level control then drives the control room's electronically balanced outputs. Control room signal is muted when control room mic is ON. The module can be internally dipswitch-selected to operate in a split cue mode, where the cued module is placed in the right monitor speaker and a dimmed mono sum signal is placed in the left. The studio mic module can be dipswitch selected to talk back to the control room's cue circuit to facilitate intercom functions. A control room on-air tally relay is activated whenever the announcer microphone is energized.

CONSOLE TIMER—The A-20 meterbridge comes standard with a digital elapsed time counter and corresponding control panel (mounted in the lower portion of the OM-20 output module). This control panel is provided with start/stop, hold, and reset buttons. Another handy feature is a recessed timer restart switch. When activated it allows dipswitch pre-programmed line modules to reset the timer to zero and begin counting upon a channel ON command.

STUDIO FUNCTION—An optional studio module is provided with a six position source selector switchbank, a conductive plastic level control and electronically balanced outputs, as well as a talkback button which allows the control room talent to communicate to the studio output. Also, an independent external talkback output is provided to feed an independent speaker when so desired. A studio on-air tally relay is activated whenever the studio microphone is energized.

LINE SELECTOR—An optional six source stereo line selector module is available that may be wired to the input port of line input, control room or studio modules to expand their input capacity.

TAPE REMOTE MODULE—An optional tape remote module is available that provides twelve switches to enable full function control of two remote tape machines. The module is also available as six pairs of stop/start buttons to control six cart machines.

STUDIO TURRET—An optional family of studio turret and turret panels is available. These panels include a crystal-controlled (or 60 Hz timebase) clock, elapsed time counter (which may slave from the console's restart bus), a headphone/speaker control panel, a mic control panel (On, Off, Talkback, Cough), and an eight-bank stereo selector panel.

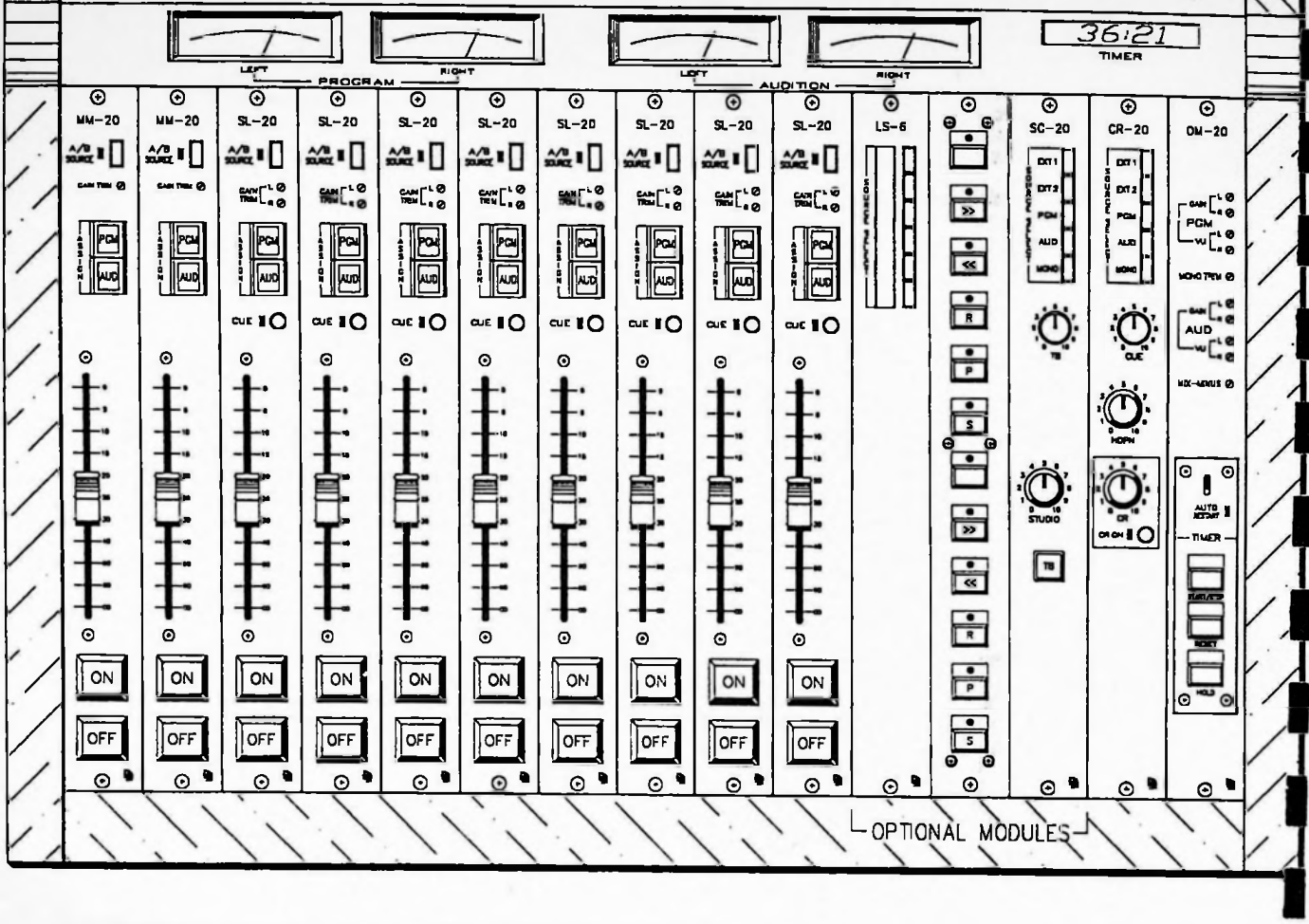
MAINFRAME—The A-20 mainframe is unique, both in terms of structure and interface. It utilizes an innovative approach to its interface system that greatly improves connection reliability and ease of installation, uisng gold contact insulation displacement (ID) connectors and ribbon wire (developed by the computer industry for its superior reliability and maintenance characteristics). This system replaces older motherboard technology and its inherent vulnerability to solder joint failure and loose debris shorting. Console I/O connections are made to 25-pin DB connectors mounted on the bottom plate of the console. Mating gold contact connectors plug into the underside of the console, allowing console placement close to walls and eliminating the need for flip-up procedures (and allowing wiring changes during console operation). The gold contact connectors are far superior to the tin contact Molex type and eliminate the need for bringing external wiring into the console's interior, a major source of RF contamination.

PERFORMANCE—Performance is the most outstanding feature of the A-20 console. A review of the specification page (following) says it all: This console in every way performs equal to its larger format counterparts. There is simply no compromise made in this area.

IN SUMMARY, the A-20 On-Air Broadcast Console is a significant achievement in console design in terms of ease of installation, service, integrity of connections and technical performance. It borrows componentry and methods from both the computer and audio industries. The A-20 is a perfect choice for stations planning an upgrade in signal quality or control room image. It is also a natural choice for newsroom and small production applications.

- 2 mic channels
- 8 stereo line channels
- 4 VU meters
- 1 elapsed time counter (w/auto restart)
- module machine start function
- Program and Audition stereo buses
- Cue bus
- Mix-Minus bus
- automatic cue release
- A/B source select w/LED indicator
- control room module
- headphone function
- split/cue monitor or external cue out
- fully modular construction
- gold contact interface
- fully regulated, short circuit protected rackmount power supply (3½" high)
- mating gold pin DB-25 connectors included
- 3-year limited warranty
- precision multi-turn calibration trims throughout
- pre burned-in, socket-mounted ICs
- gold contact industry standard ON/OFF switches
- channel A/B logic follow
- hinged meterbridge solid oak cabinetry
- lexan laminated module panels
- fully enclosed aluminum chassis
- fully enclosed aluminum meterbridge

A–20 CONSOLE MODULE LAYOUT
(INPUT MODULE TYPES DETERMINED BY CLIENT)



PRELIMINARY SPECIFICATIONS: A-20 ON-AIR BROADCAST CONSOLE

(All faders @ nominal settings (– 10dB); Gain 0dB line, 54dB mic)

FREQUENCY RESPONSE:
- Line input: ±0.2dB (20Hz-20KHz)
- Mic input: ±0.5dB, 30Hz-20KHz

THD + NOISE:
- Line input: <0.003% (20Hz-20KHz @ +20dBm out)
- Mic input: <0.005% (1KHz @ +20dBm out)

SMPTE IMD (Line in): <0.008% (+20dBm out)

NOISE (20Hz-20KHz):
- Line input: better than – 88dBm
- Mic input (150Ω source): EIN-128dB (– 74dBm)

OFF ISOLATION: better than – 100dB @1KHz

SLEW RATE (Line): 12V/microsecond (bal out)

PHASE SHIFT (Line in): less than 12°(20Hz-20KHz)

STEREO SEPARATION (Lt-Rt): – 55dB @1KHz

INPUT GAIN:
- Stereo Line: 28dB max
- Mic: 67dB max

GAIN TRIM RANGE:
- Stereo Line: 20dB
- Mic: 36dB

INPUT:
- Stereo Line: 50KΩ bal, +26dBu max
- Mic: 150Ω nom, 0dB max

OUTPUT (Bus): +30dBu max, +20dBm

MIXING BUSES: 2 Stereo (Program, Audition)
1 Cue

METERS: 4 Lighted Mechanical VU
(2 PGM, 2 AUD, plus timer)

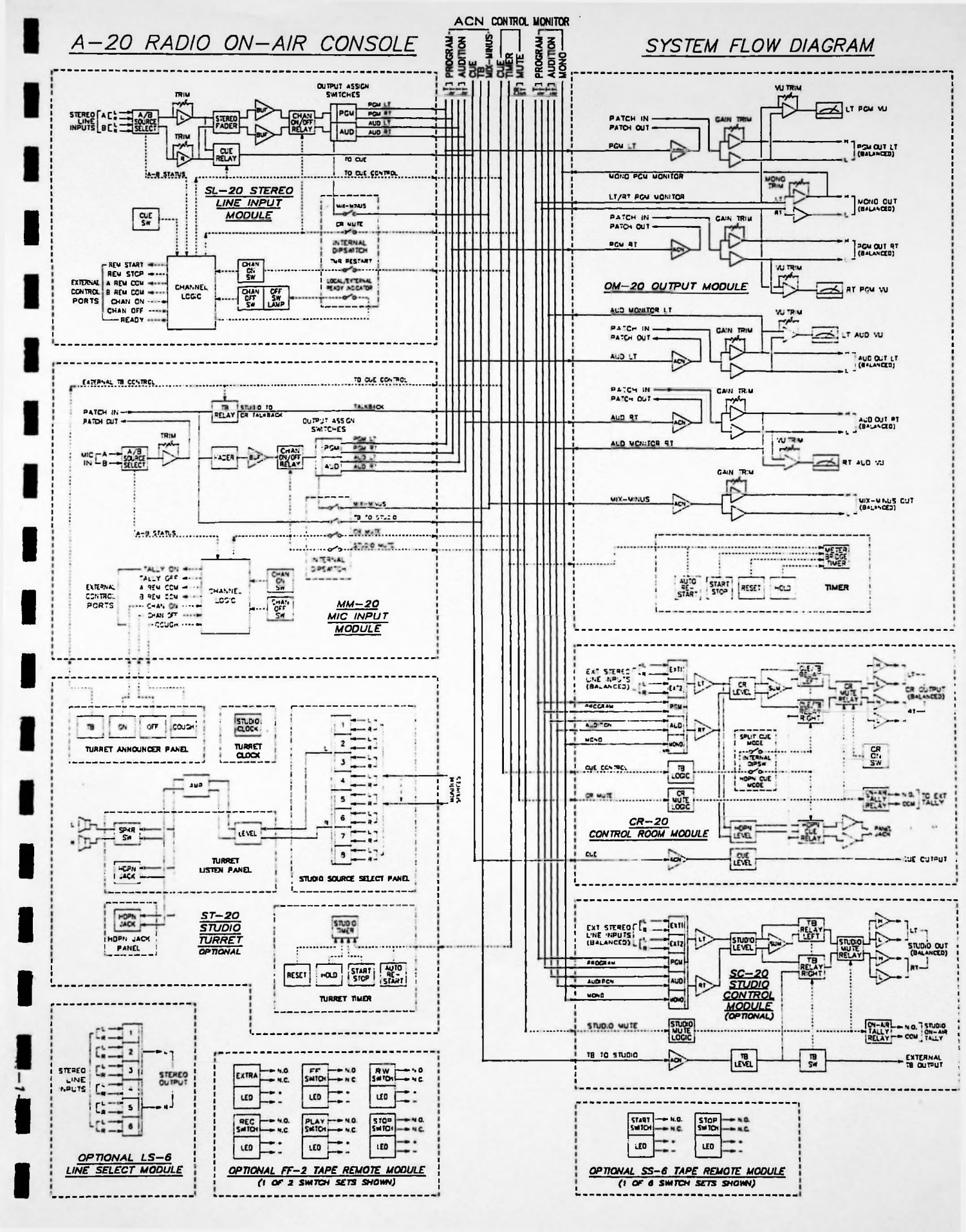
FADERS: 100mm conductive plastic

CROSSTALK: –80dB @1KHz

Specifications and features subject to change without notice.

A-20 RADIO ON-AIR CONSOLE

SYSTEM FLOW DIAGRAM



GENERAL

A-20 CONSOLE OVERVIEW:

For a better understanding of the console, refer to the A-20 module illustrations and signal flow diagrams in conjunction with the following section:

The WHEATSTONE A-20 ON-AIR BROADCAST CONSOLE is a modular, 2-channel console for radio on-air applications. The console comes supplied with individual stereo PROGRAM and AUDITION outputs, plus a MONO SUM (derived from PROGRAM) and a MIX-MINUS output. The mainframe comes supplied with the following standard modules: 10 inputs (2 mono mic [MM-20], 8 stereo line [SL-20]), a control room module (CR-20), an output module (OM-20), and 3 blank positions (for optional modules; see below). The console meterbridge houses 4 VU meters (PGM LT, PGM RT, AUD LT and AUD RT) and a digital timer. A rackmount power supply (failsafe option available) is included.

STANDARD MODULES are as follows:

(1) MM-20 MONO MIC INPUT: A dual source mono microphone input module with A/B select switch (w/LED indicator), front panel multi-turn gain trimpot, output assign (PGM and/or AUD), long-throw conductive plastic fader, and lighted channel ON and OFF switches. Logic functions (selectable via internal dipswitch) are as follows: mix-minus assign, talkback to studio, control room mute, and studio mute. The module also has the following external control ports: tally on, tally off, channel on, channel off, and cough. Note that remote control functions will follow the source select switch A/B setting.

(2) SL-20 STEREO LINE INPUT: A dual source stereo line input module with A/B source switch (w/LED indicator), left and right multi-turn front panel gain trimpots, output assign (PGM and/or AUD), CUE (w/LED indicator), long-throw conductive plastic stereo fader, and lighted channel ON and OFF switches. Logic functions (selectable via internal dipswitch) are as follows: mix-minus assign, control room mute, timer restart, and local/external ready light indicator. The module also has the following external control ports: remote start, remote stop, channel on, channel off, and ready. Note that remote control functions will follow the source select switch A/B setting.

(3) CR-20 CONTROL ROOM MODULE: This module controls monitor source selection (PGM, AUD, and MONO console signals, plus two external stereo line inputs), control room level (w/on switch), headphone level (the module has a built-in headphone amp) and CUE level. CUE can be internally set (via dipswitch) to automatically interrupt CR and/or HDPN. The module also has a built-in on-air tally relay.

(4) OM-20 OUTPUT MODULE: Contains front panel multi-turn trimpots for PGM, AUD, MONO and MIX-MINUS outputs, plus VU trims for the PGM and AUD meters. This module also houses the timer control panel (Start/Stop, Reset, Hold, Auto-Restart).

The following OPTIONAL MODULES are available, but do not need to be installed in the console for it to operate:

(1) SC-20 STUDIO CONTROL MODULE - Similar to the CR-20 module, but without the cue and headphone circuits. The module provides a studio monitor feed controlled by a single stereo level pot, which follows an 5-bank source selector switch which picks up the console's PGM, AUD, and MONO signals plus two external stereo line signals. There is also a TALKBACK function to the studio output.

(2) LS-6 LINE SELECTOR MODULE - This independent module accepts six stereo line input signals, selecting one via switching and sending it to the module's I/O connector, where it may be user-wired to an appropriate input module.

(3) SS6/FF2 TAPE REMOTE MODULES - Used to control remote tape and/or cart machines. There are two versions: one has six pairs of START/STOP buttons; (SS-6); the other (FF-2) two full-function sets of controls (FF, RW, REC, PLAY, STOP, EXTRA).

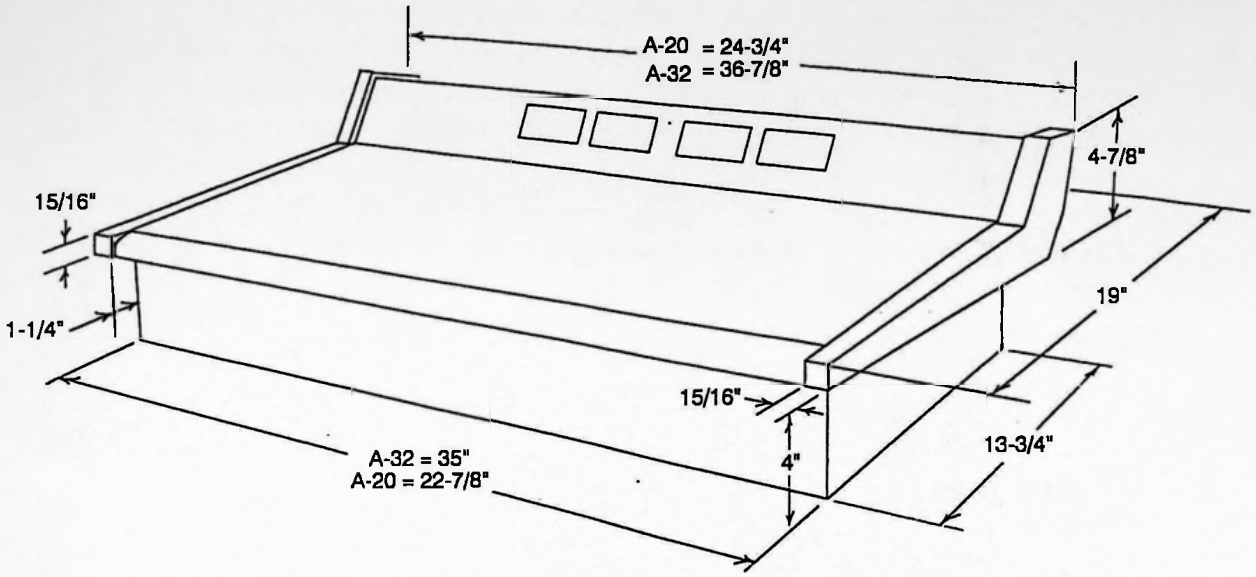
A-20 MAINFRAME INSTALLATION:

Installing the WHEATSTONE A-20 Console is relatively straightforward. The console is normally shipped as two packages: one carton containing the console and documentation, and one carton with power supply, power cable, and AC power cord. Begin the installation by unpacking and locating these items.

Refer to the A-20 dimension drawing ("Counter-Mount Cut-out Dimensions") in the booklet; note that the console is designed to be "drop-in" mounted to a counter/table top or other flat surface. The standard A-20 counter cut-out dimension is 14-1/4 by 28-1/8 inches.

Once the cut-out has been prepared, the console can be lowered into the furniture opening. First remove the bottom connector covering panel as it is easier before the console is installed in the furniture. With the panel removed, note the individual DB-25 type connectors on the mainframe bottom; the console is designed to have all audio and control signals enter and exit the console through these connectors. Also note the power connector and grounding wire strip. (See "View of Mainframe Bottom".)

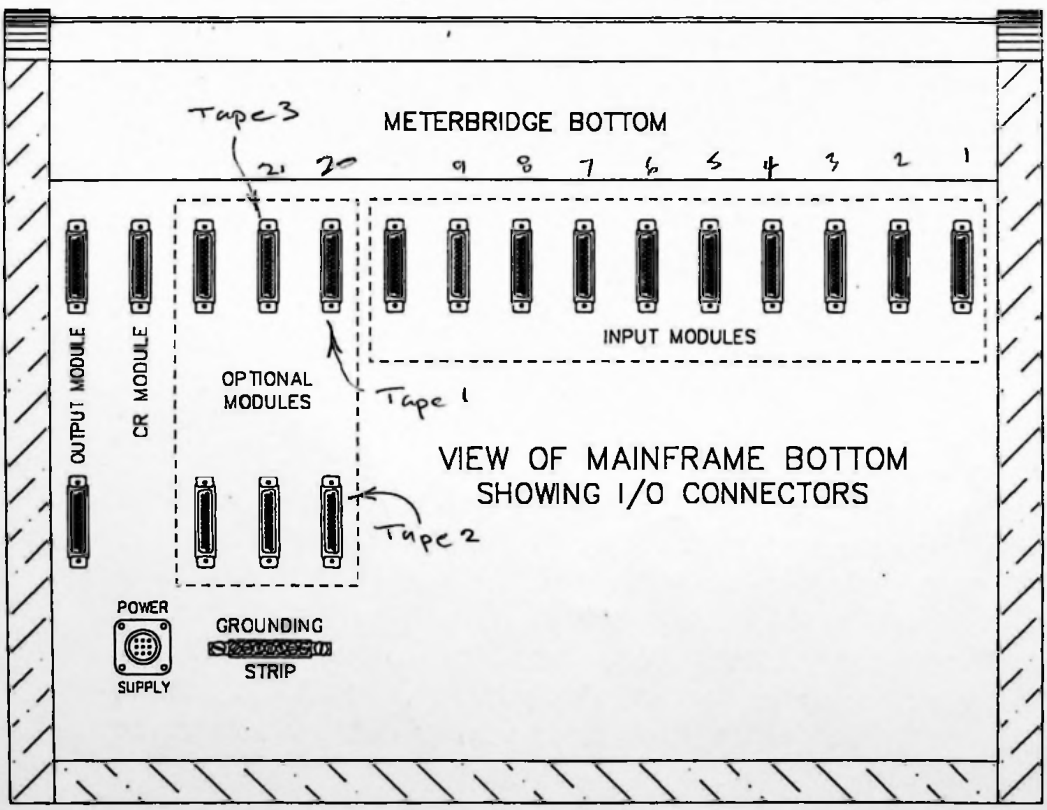
With the mainframe in place in the furniture, check the VU meters for static, power-off alignment. If any adjustment is needed, raise the hinged meter bridge and note the meter adjusters located in the rear center of the meters; also note the meter lamp holders. Once the meters are aligned, close the meter bridge. No further access to it is generally neccessary except for occasional lamp replacement.



A-32/A-20 CONSOLE DIMENSIONS

COUNTER MOUNT CUT-OUT DIMENSIONS

A-32 CONSOLE (16 inputs) = 14-1/4" x 35-1/4"
A-20 CONSOLE (10 inputs) = 14-1/4" x 23-1/8"



SYSTEM GROUND:

Note that the console power supply common, audio common, and the mainframe chassis are connected together at the mainframe, but are not connected to electrical ground and the chassis of the power supply as supplied by the factory. Safety requirements dictate that a positive connection from the 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 system ground serves two important purposes:

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

(2) Assure safety from electrical shock.

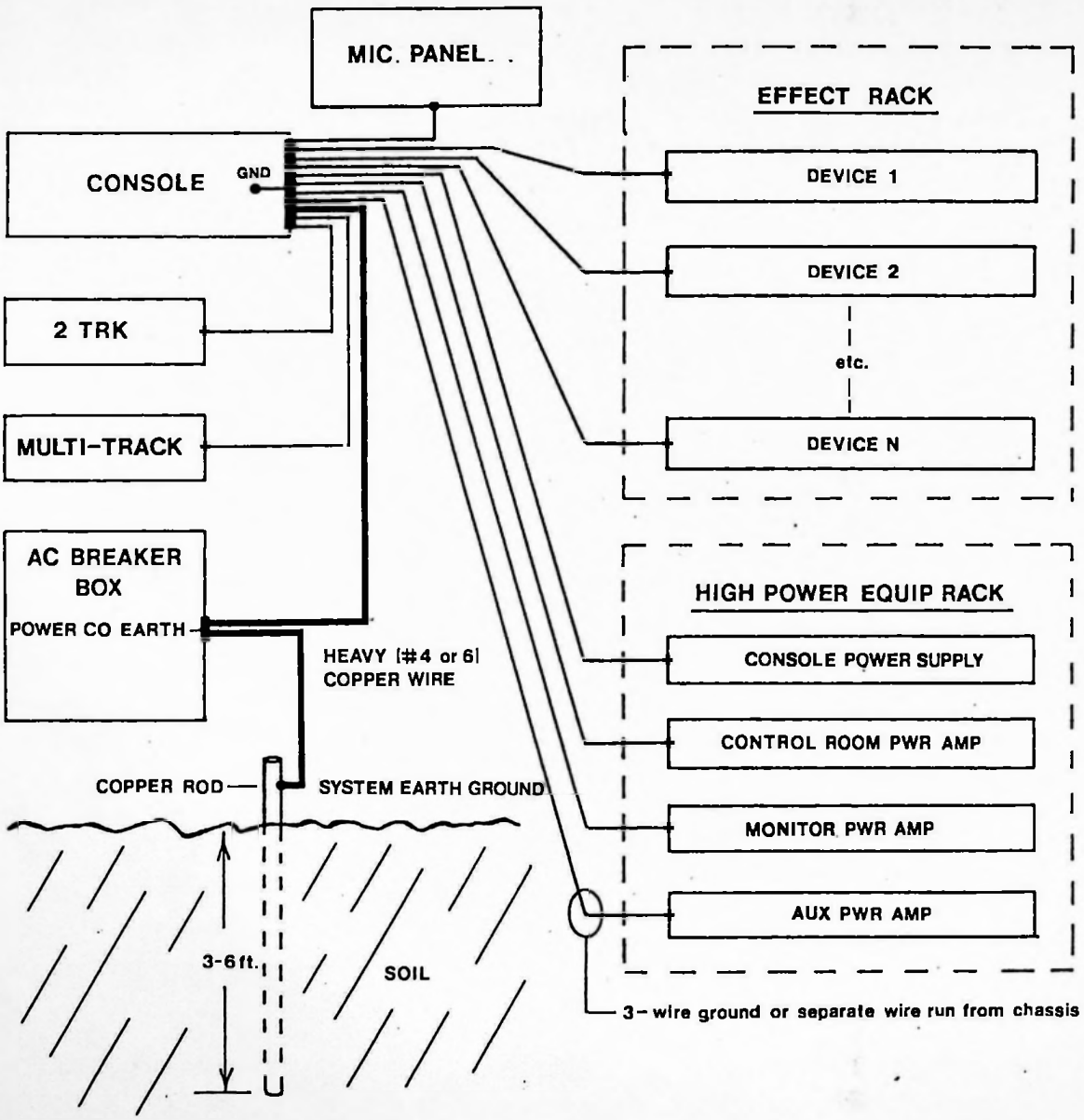
There exist two terms that one encounters in a discussion of ground:

(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.

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").

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.



TYPICAL GROUNDING SCHEME

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 it's 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).

CONSOLE I/O CONNECTIONS

A-20 SIGNAL AND CONTROL CONNECTIONS

GENERAL

All audio and control I/O connections to the A-20 console are made through multipin DB-25 type connectors that have latching hoods or shells, and plug in to the mating connectors in the bottom of the console mainframe. These mating connectors are organized into two rows (called "upper" and "lower"; upper is closer to the meter bridge and lower is closer to the handrest) with the connectors spaced to match the module spacing--approximately 1.5" apart (see drawing, "View of Mainframe Bottom"). Note input modules and the CR-20 module have only one DB-25 connector (upper), while the output module and optional module positions have two. As each connector totals 25 individual contacts and the entire console can have as many as 19 functioning connectors, system wiring can become quite complex.

The console is supplied from the factory for local operation. That is, each module and its associated channel ON and OFF lamps will operate directly with no external connections to the module control ports. Therefore for an orderly installation it is best to begin with the audio wiring, verify proper operation (i.e., no ground loops), and then proceed with control wiring. Refer to the individual module schematic diagrams for exact schematic details of each pin.

The supplied DB-25 connectors are standard DBC type with solderable pins. Note the mounting blocks incorporate individual small type molded pin numbers. Be sure to double-check the correct pin position before inserting pins into mounting blocks as pins are self-locking and difficult to remove. (Note: optional insulation displacement type connectors, complete with self-indexing crimping tool, are available from Wheatstone on special order.)

Note that MM-20 Mic Input modules have audio insert, or patch points. These insert points are brought out to the module's DB-25 connector and are <u>not</u> internally strapped on the modules. Therefore for proper operation these insert points must be either jumpered at the DB-25 connector directly or else terminated at a patch bay or jack field. **Do not attempt to establish an audio path through the console without first wiring the insert points on MM-20 input modules.**

Note that the console's OM-20 output module also has insert points on PGM and AUD; however, these points may be bypassed through an internal dipswitch on the module's printed circuit card ("SW1"). Again, do not attempt to establish an audio path through the console without either wiring or bypassing these insert points.

Consoles are supplied with all mic channels programmed to mute the control room speakers, so you won't hear anything from the control room speakers if one of the mic channels is turned on. (See MM-20 Input Module internal dipswitch logic functions under "Console Overview".)

If LS-6 line select modules are used, their left and right outputs must be connected to an appropriate input module through the modules' I/O DB-25 connectors.

The following pages list the various A-20 modules along with specific wiring information; this information is also available on the individual module schematic drawings.

A-20 CONSOLE LOGIC AND CONTROL OVERVIEW

DIPSWITCH CONTROLLED FUNCTIONS:

CR MUTE - This function is programmable on MM-20 and SL-20 input module PCB-mounted dipswitches. When activated, it will cause the console's control room output to be muted whenever the programmed modules' channel ON buttons are pushed. The most common usage for this function is to prevent control room feedback when the announcer's mic channel is open.

STUDIO MUTE - Available on MM-20 module PCB dipswitches. Mutes the console's studio output whenever programmed modules' channel ON button is activated. Used to prevent feedback when the studio announcer mic channel is open.

TB TO STUDIO - Programmable on MM-20 module PCB dipswitches. Sends the module's pre-fader signal to the studio talkback bus. When used with the announcer mic channel module, permits control room to studio communcation.

TIMER RESTART - Available on SL-20 module PCB dispswitches. When the programmed module's channel ON button is pushed, the console timer is automatically reset to zero and starts counting.

MIX-MINUS - Assigns the module's output signal to the console's mix-minus bus. Available on both MM-20 and SL-20 input module PCB dipswitches.

LOCAL/READY ENABLE - On SL-20 input module PCB dipswitches. Allows the module's channel OFF switch indicator lamp to be controlled by an external device (i.e., to function as a ready light for a remote tape or cart machine; "Ready" setting) or to simply follow the OFF switch itself ("Local" setting).

MIX-MINUS OFF dip switch in SL-20 modules. Enable this sw in SL-20 modules that do not feed the mix-minus bus. Turn sw OFF in SL-20 modules that are intended to feed the MIX-MINUS bus. Prevents loss of stereo seperation in modules NOT feeding mix minus bus.

A-20 CONSOLE LOGIC AND CONTROL OVERVIEW

MODULE CONTROL PORTS:

MM-20 MONO MIC INPUT MODULES:

REMOTE ON/REMOTE OFF - Permit the module's channel ON and OFF buttons to be activated from a remote location. Can be wired to follow the module's A/B source selector switch.

COUGH - A remote momentary OFF function. Can be wired to follow the module's A/B source selector switch.

ON TALLY - Permits a remote 24V indicator lamp to be controlled by the module's channel ON circuit.

OFF TALLY - Permits a remote 24V indicator lamp to be controlled by the module's channel OFF circuit.

TALKBACK - Accepts a control signal from a remote location. When activated, sends the module's pre-fader signal to the console's talkback to control room bus. Typically used with studio announcer mic channel to permit communcation with control room. Can be wired to follow the module's A/B source selector switch.

SL-20 STEREO LINE INPUT MODULE:

START MACHINE/STOP MACHINE - Allows a remote machine to be started and stopped by pushing the module's channel ON and OFF buttons. Can be wired to follow the module's A/B source selector switch.

ON CHANNEL/OFF CHANNEL - Permits the module's channel ON and OFF buttons to be activated from a remote location. Can be wired to follow the module's A/B source selector switch.

READY - Allows a remote machine to control the module's channel OFF switch indicator lamp. (Note: the "local/ready" dipswitch must be in the "ready" position).

CR-20 CONTROL ROOM MODULE:

TALLY OUT - This control port is a relay contact that can be made to close by MM-20 and SL-20 input module channel ON switches (see CR MUTE function above). For control circuits only; do not connect a 115V circuit directly to the tally out pins.

OPTIONAL SC-20 STUDIO CONTROL MODULE:

TALLY 2 OUT - This control port is a relay contact that can be made to close by MM-20 input module channel ON switches (see STUDIO MUTE function above). For control circuits only; do not connect a 115V circuit directly to the tally 2 out pins.

UPPER DB-25 I/O CONNECTOR
OM-20 MODULE

PGM LT INS IN SH	13	N/C
PGM LT INS IN HI	12	PGM LT INS IN LO
PGM RT INS IN LO	11	PGM RT INS IN SH
AUD LT INS IN SH	10	PGM RT INS IN HI
AUD LT INS IN HI	9	AUD LT INS IN LO
AUD RT INS IN LO	8	AUD RT INS IN SH
AUD LT INS OUT SH	7	AUD RT INS IN HI
AUD LT INS OUT HI	6	AUD LT INS OUT LO
AUD RT INS OUT LO	5	AUD RT INS OUT SH
PGM LT INS OUT SH	4	AUD RT INS OUT HI
PGM LT INS OUT HI	3	PGM LT INS OUT LO
PGM RT INS OUT LO	2	PGM RT INS OUT SH
	1	PGM RT INS OUT HI

UPPER DB-25 I/O CONNECTOR
CR-20 MODULE

EXT 1 LT IN SHIELD	13	N/C
EXT 1 LT IN HIGH	12	EXT 1 LT IN LOW
EXT 1 RT IN LOW	11	EXT 1 RT IN SHIELD
EXT 2 LT IN SHIELD	10	EXT 1 RT IN HIGH
EXT 2 LT IN HIGH	9	EXT 2 LT IN LOW
EXT 2 RT IN LOW	8	EXT 2 RT IN SHIELD
CR LT OUT SHIELD	7	EXT 2 RT IN HIGH
CR LT OUT HIGH	6	CR LT OUT LOW
CR RT OUT LOW	5	CR RT OUT SHIELD
CUE OUT SHIELD	4	CR RT OUT HIGH
CUE OUT HIGH	3	CUE OUT LOW
TALLY OUT COMMON	2	TALLY OUT SHIELD
	1	TALLY OUT N.O.

UPPER DB-25 I/O CONNECTOR
SC-20 MODULE

EXT 1 LT IN SHIELD	13	N/C
EXT 1 LT IN HIGH	12	EXT 1 LT IN LOW
EXT 1 RT IN LOW	11	EXT 1 RT IN SHIELD
EXT 2 LT IN SHIELD	10	EXT 1 RT IN HIGH
EXT 2 LT IN HIGH	9	EXT 2 LT IN LOW
EXT 2 RT IN LOW	8	EXT 2 RT IN SHIELD
STUDIO LT OUT SH	7	EXT 2 RT IN HIGH
STUDIO LT OUT HI	6	STUDIO LT OUT LO
STUDIO RT OUT LO	5	STUDIO RT OUT SH
TALKBACK OUT SH	4	STUDIO RT OUT HI
TALKBACK OUT HI	3	TALKBACK OUT LO
TALLY 2 COMMON	2	TALLY 2 SHIELD
	1	TALLY 2 N.O.

UPPER DB-25 I/O CONNECTOR
SL-20 MODULE

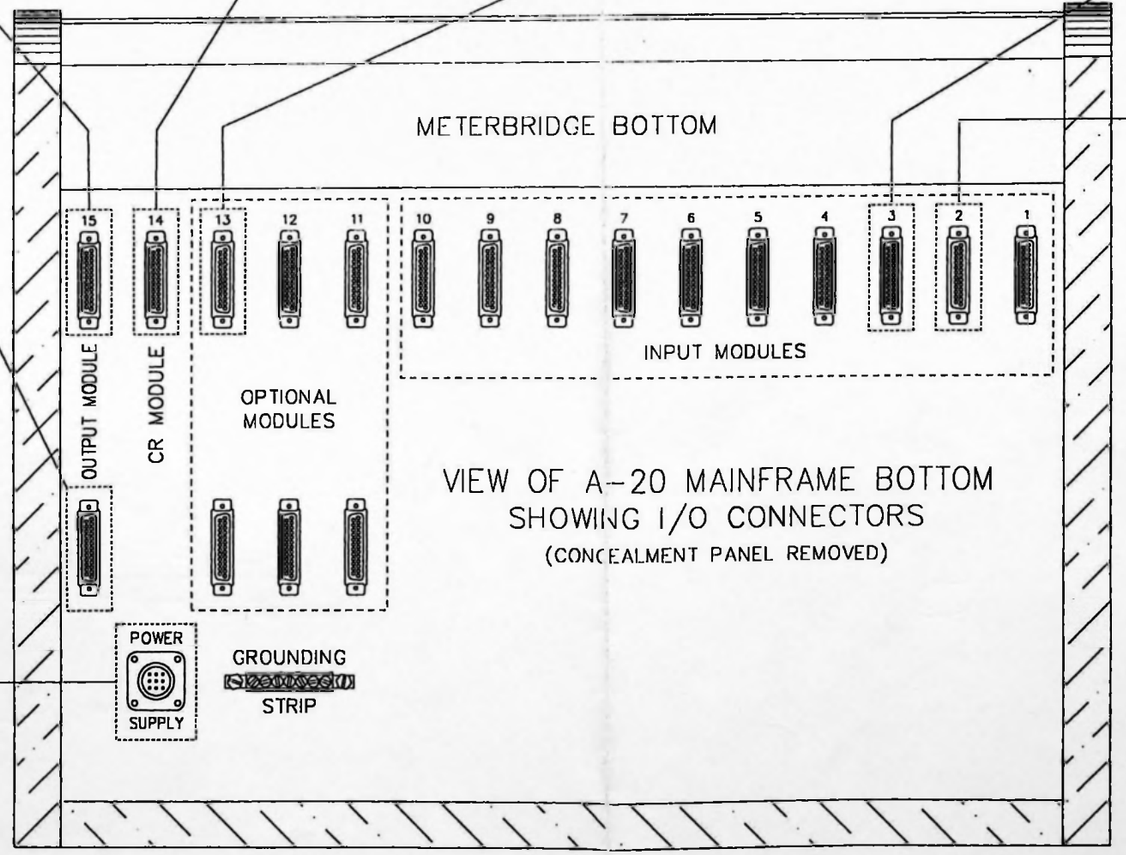
LINE A LT IN SH	13	N/C
LINE A LT IN HI	12	LINE A LT IN LO
LINE A RT IN LO	11	LINE A RT IN SH
LINE B LT IN SH	10	LINE A RT IN HI
LINE B LT IN HI	9	LINE B LT IN LO
LINE B RT IN LO	8	LINE B RT IN SH
N/C	7	LINE B RT IN HI
N/C	6	N/C
A LOGIC FOLLOW	5	N/C
ON	4	B LOGIC FOLLOW
START	3	OFF
READY	2	STOP
	1	DIGITAL COMMON

LOWER DB-25 I/O CONNECTOR
OM-20 MODULE

PGM LT OUT SH	13	N/C
PGM LT OUT HI	12	PGM LT OUT LO
PGM RT OUT LO	11	PGM RT OUT SH
AUD LT OUT SH	10	PGM RT OUT HI
AUD LT OUT HI	9	AUD LT OUT LO
AUD RT OUT LO	8	AUD RT OUT SH
MONO OUT SHIELD	7	AUD RT OUT HI
MONO OUT HIGH	6	MONO OUT LOW
MIX-MINUS OUT LO	5	MIX-MINUS OUT SH
SPARE A SHIELD	4	MIX-MINUS OUT HI
SPARE A HIGH	3	SPARE A LOW
SPARE B LOW	2	SPARE B SHIELD
	1	SPARE B HIGH

POWER SUPPLY CONNECTOR

1) TIMER RESTART
2) +24V
3) DIGITAL COMMON
4) AUDIO COMMON
5) 60Hz SYNC
6) -18V
7) AUDIO COMMON
8) +48V
9) +18V



UPPER DB-25 I/O CONNECTOR
MM-20 MODULE

MIC A IN SHIELD	13	N/C
MIC A IN LOW	12	MIC A IN HIGH
MIC B IN HIGH	11	MIC B IN SHIELD
INSERT OUT SHIELD	10	MIC B IN LOW
INSERT OUT HIGH	9	INSERT OUT LOW
INSERT IN LOW	8	INSERT IN SHIELD
N/C	7	INSERT IN HIGH
DIGITAL COMMON	6	N/C
A LOGIC FOLLOW	5	+24V DIG
ON	4	B LOGIC FOLLOW
ON TALLY	3	OFF
TALKBACK	2	OFF TALLY
	1	COUGH

I/O CONNECTOR PINOUTS	
A-20 RADIO ON-AIR CONSOLE	
6-22-88	Wheatstone Corporation 8720 V.I.P. Parkway Syracuse, NY. 13211
MS	
NO SCALE	CONNECTOR HOOK-UP DWG
	#A20/PIN-1

I/O CONNECTOR PINOUT DRAWING

A-20 SIGNAL AND CONTROL CONNECTIONS

MODULE PINOUTS

1) MM-20 MONO MIC INPUT MODULE (AUDIO)
   a) All module audio connections are on upper DB-25 connector (slot #1 and #2)
   b) Mic input A high is pin #12
   c) Mic input A low is pin #24
   d) Mic input A shield is pin #25
   e) Mic input B high is pin #10
   f) Mic input B low is pin #23
   g) Mic input B shield is pin #11
   h) Patch insert output high is pin #21
   i) Patch insert output low is pin #9
   j) Patch insert output shield is pin #22
   k) Patch insert input high is pin #7
   l) Patch insert input low is pin #20
   m) Patch insert input shield is pin #8
   n) **Jump pin #21 to pin #7 if no insert is required**
2) MM-20 MONO MIC INPUT MODULE (CONTROL)
   a) Control connections are on upper DB-25 (slot #1 and #2)
   b) Remote control of "ON", "OFF", and "COUGH" are available from two locations. A switch closure between the desired function pin and the "A" or "B" logic follow pins will activate the function. Note that the input source switch on the module must be in the corresponding position.
   c) alternately, a contact closure between digital common (pin #18) and one other remote function pin will also activate that function, regardless of the position of the input source switch.
   d) Wheatstone manufactures the ANP-5 Announcer Panel and ST-20 turret for these control applications.
   e) A logic follow is pin #17
   f) B logic follow is pin #4
   g) Remote ON is pin #16
   h) Remote OFF is pin #3
   i) COUGH is pin #1
   j) ON TALLY is pin #15
   k) OFF TALLY is pin #2
   l) remote "tally on" (to activate the "ON" switch lamp at the remote panel) is pin #15. Connecting a 24 or 28 volt lamp between this pin and pin #5 (+24V DIG) will light it whenever the input module is in the "ON" state.
   m) remote "tally off" (to activate the "OFF" switch lamp at the remote panel) is pin #2. Connecting a 24 or 28 volt lamp between this pin and pin #5 (+24V DIG) will light it whenever the input module is in the "OFF" state.

REV 5/91/MS

n) TALKBACK is pin #14. A contact closure between this pin and digital common (pin #18) will activate the module TB relay. This relay will send the module's pre-fader audio signal to the console's "TB to CR" bus for communication from the remote location to the console. It also activates the TB/CUE logic bus for interrupting the control room and/or headphone outputs.

o) Digital Common is pin #18

3) SL-20 STEREO LINE INPUT MODULE (AUDIO)

a) All module audio connections are on upper DB-25 connector (slots #3 thru #10)

b) Input A left high is pin #24

c) Input A left low is pin #12

d) Input A left shield is pin #25

e) Input A right high is pin #10

f) Input A right low is pin #23

g) Inpul A right shield is pin #11

h) Input B left high is pin #21

i) Input B left low is pin #9

j) Input B left shield is pin #22

k) Input B right high is pin #7

l) Input B right low is pin #20

m) Input B right shield is pin #8

4) SL-20 STEREO LINE INPUT MODULE (CONTROL)

a) Control connections are on upper DB-25

b) Remote control of module "ON" and "OFF" are available from two locations. A switch closure between the desired function pin and the "A" or "B" logic follow pins will activate the function. Note that the input source switch on the module must be in the corresponding position

c) A logic follow is pin #17

d) B logic follow is pin #4

e) Remote ON is pin #16

f) Remote OFF is pin #3

g) START is pin #15

h) STOP is pin #2

i) READY is pin #14

j) START and STOP functions of remote machines are accomplished by dedicated closure contacts from the module's channel ON and OFF switches. Machines at two locations may be independently controlled; control is determined by the position of the module's A/B source select switch. Machine connections should be between A or B logic follow and the desired START or STOP function pin.

k) READY allows the module's channel OFF switch lamp to be controlled by a remote machine. Connect digital common (pin #1) to the digital or control common of the remote machine, and ready (pin #14) to the switched port of the remote machine. Note that the module "ready" dipswitch must be in the "remote" position for this function to work.

5) OM-20 OUTPUT MODULE (AUDIO):

a) Audio connections are on both upper and lower DB-25 connectors (slot #15). The **upper connector has the insert points** and the **lower connector has the module outputs**. The insert outputs are unbalanced, 10 ohms impedance capable of driving loads up to 600 ohms. The insert inputs are unbalanced, 10K ohms input impedance. The module outputs are electronically balanced, 10 ohms output impedance; maximum load is 600 ohms. As the module outputs are electronically balanced, care must be exercised when connecting them to an unbalanced system; while temporarily shorting the low side of the output signal to ground will not cause any problems, continued operation will result in increased distortion, decreased reliability, and possible oscillation problems. If you must connect the module output to an unbalanced system, be sure to leave the low side unterminated, and connect the unbalanced system to the high side output and shield connections.

b) **The OM-20 module will not pass signal if its insert points are not provided with a signal path.** An internal dipswitch on the module's printed circuit card allows unused insert points to be bridged by flipping the appropriate switch: PGM LT (#3), PGM RT (#4), AUD LT (#2), AUD RT (#1); otherwise wire the insert points as detailed below:

c) Insert points (upper DB-25 connector) are as follows:

d) PGM left insert out high is pin #15

e) PGM left insert out low is pin #3

f) PGM left insert out shield is pin #16

g) PGM left insert in high is pin #24

h) PGM left insert in low is pin #12

i) PGM left insert in shield is pin #25

j) PGM right insert out high is pin #1

k) PGM right insert out low is pin #14

l) PGM right insert out shield is pin #2

m) PGM right insert in high is pin #10

n) PGM right insert in low is pin #23

o) PGM right insert in shield is pin #11

p) AUD left insert out high is pin #18

q) AUD left insert out low is pin #6

r) AUD left insert out shield is pin #19

s) AUD left insert in high is pin #21

t) AUD left insert in low is pin #9
u) AUD left insert in shield is pin #22
v) AUD right insert out high is pin #4
w) AUD right insert out low is pin #17
x) AUD right insert out shield is pin #5
y) AUD right insert in high is pin #7
z) AUD right insert in low is pin #20
aa) AUD right insert in shield is pin #8

6) OM-20 AUDIO OUTPUTS (lower DB-25 connector; slot #15):
a) PGM left out high is pin #24
b) PGM left out low is pin #12
c) PGM left out shield is pin #25
d) PGM right out high is pin #10
e) PGM right out low is pin #23
f) PGM right out shield is pin #11
g) AUD left out high is pin #21
h) AUD left out low is pin #9
i) AUD left out shield is pin #22
j) AUD right out high is pin #7
k) AUD right out low is pin #20
l) AUD right out shield is pin #8
m) PGM MONO out high is pin #18
n) PGM MONO out low is pin #6
o) PGM MONO out shield is pin #19
p) MIX-MINUS out high is pin #4
q) MIX-MINUS out low is pin #17
r) MIX-MINUS out shield is pin #5

7) CR-20 CONTROL ROOM MODULE (AUDIO):
a) Audio connections are on the upper DB-25 connector, slot #14)
b) EXT 1 left in high is pin #24
c) EXT 1 left in low is pin #12
d) EXT 1 left in shield is pin #25
e) EXT 1 right in high is pin #10
f) EXT 1 right in low is pin #23
g) EXT 1 right in shield is pin #11
h) EXT 2 left in high is pin #21
i) EXT 2 left in low is pin #9
j) EXT 2 left in shield is pin #22
k) EXT 2 right in high is pin #7
l) EXT 2 right in low is pin #20
m) EXT 2 right in shield is pin #8
n) CR left out high is pin #18
o) CR left out low is pin #6
p) CR left out shield is pin #19
q) CR right out high is pin #4

r) CR right out low is pin #17
s) CR right out shield is pin #5
t) CUE out high is pin #15
u) CUE out low is pin #3
v) CUE out shield is pin #16

8) CR-20 CONTROL MODULE (CONTROL):
a) Control connections are on the upper DB-25 connector (slot #14)
b) The control port called TALLY OUT is a relay contact that can be made to close by MM-20 and SL-20 input module channel ON switches. (This is accomplished by activating the input modules' CR MUTE dipswitch function). This relay contact is suitable for control circuits only; **DO NOT** connect a 115 volt circuit directly to the TALLY OUT pins.
c) TALLY OUT common is pin #14
d) TALLY OUT n.o. is pin #1
e) TALLY OUT shield is pin #2

9) OPTIONAL SC-20 STUDIO CONTROL MODULE (AUDIO):
a) Audio connections are on the upper DB-25 connector
b) EXT 1 left in high is pin #24
c) EXT 1 left in low is pin #12
d) EXT 1 left in shield is pin #25
e) EXT 1 right in high is pin #10
f) EXT 1 right in low is pin #23
g) EXT 1 right in shield is pin #11
h) EXT 2 left in high is pin #21
i) EXT 2 left in low is pin #9
j) EXT 2 left in shield is pin #22
k) EXT 2 right in high is pin #7
l) EXT 2 right in low is pin #20
m) EXT 2 right in shield is pin #8
n) STUDIO left out high is pin #18
o) STUDIO left out low is pin #6
p) STUDIO left out shield is pin #19
q) STUDIO right out high is pin #4
r) STUDIO right out low is pin #17
s) STUDIO right out shield is pin #5
t) TB out high is pin #15
u) TB out low is pin #3
v) TB out shield is pin #16

10) OPTIONAL SC-20 STUDIO CONTROL MODULE (CONTROL):

a) Control connections are on the upper DB-25 connector

b) The control port call TALLY 2 OUT is a relay contact that can be make to close by MM-20 input module channel ON switches. (This is accomplished by activating the input modules' STUDIO MUTE dipswitch function). This relay contact is suitable for control circuits only; **DO NOT** connect a 115 volt circuit directly to the TALLY 2 OUT pins.

c) TALLY 2 OUT common is pin #14

d) TALLY 2 OUT n.o. is pin #1

e) TALLY 2 OUT shield is pin #2

11) OPTIONAL MP-32 MULTI-PHONE MODULE (AUDIO):

a) All module audio connections are on upper DB-25 connector (slots #11-13)

b) Mic input high is pin #24

c) Mic input low is pin #12

d) Mic input shield is pin #25

e) Hybrid 1 input high is pin #10

f) Hybrid 1 input low is pin #23

g) Hybrid 1 input shield is pin #11

h) Hybrid 2 input high is pin #21

i) Hybrid 2 input low is pin #9

j) Hybrid 2 shield is pin #22

k) Sum mic output high is pin #4

l) Sum mic output low is pin #17

m) Sum mic output shield is pin #5

n) Sum callers output high is pin #18

o) Sum callers output low is pin #6

p) Sum callers output shield is pin #19

q) Hybrid 1 output high is pin #1

r) Hybrid 1 output low is pin #14

s) Hybrid 1 shield is pin #2

t) Hybrid 2 output high is pin #15

u) Hybrid 2 output low is pin #3

v) Hybrid 2 output shield is pin #16

w) PGM output high is pin #7

x) PGM output low is pin #20

y) PGM output shield is pin #8

12) OPTIONAL ICM-32 INTERCOM MODULE (AUDIO):

a) Module input audio connections are on upper DB-25 connector (slots #11-13)
b) Balanced line in/out high is pin #15
c) Balanced line in/out low is pin #3
d) Balanced line in/out shield is pin #16
e) Optional line input high is pin #1
f) Spare connection is pin #14
g) Optional line input shield is pin #2

13) OPTIONAL ICM-32 INTERCOM MODULE (LOGIC):

a) Module logic connections are on upper DB-25 connector (slots #11-13)
b) External digital + power feed is pin #10
c) External digital common is pin #23
d) Station call line 1 is pin #4
e) Station call line 2 is pin #17
f) Station call line 3 is pin #18
g) Station call line 4 is pin #6
h) Station call line 5 is pin #7
i) Station call line 6 is pin #20
j) External +V feed is pin #24
k) External -V feed is pin #12
l) Additional audio commons at pins #5, 8, 11, 19, 22 & 25

14) OPTIONAL ICM-32 INTERCOM MODULE (AUDIO):

a) Module output audio connections are on lower DB-25 connector (slots #11-13)
b) Balanced line in/out high is pin #15
c) Balanced line in/out low is pin #3
d) Balanced line in/out shield is pin #16
e) Optional speaker ouput high is pin #1
f) Optional speaker output low is pin #14
g) Optional speaker output shield is pin #2

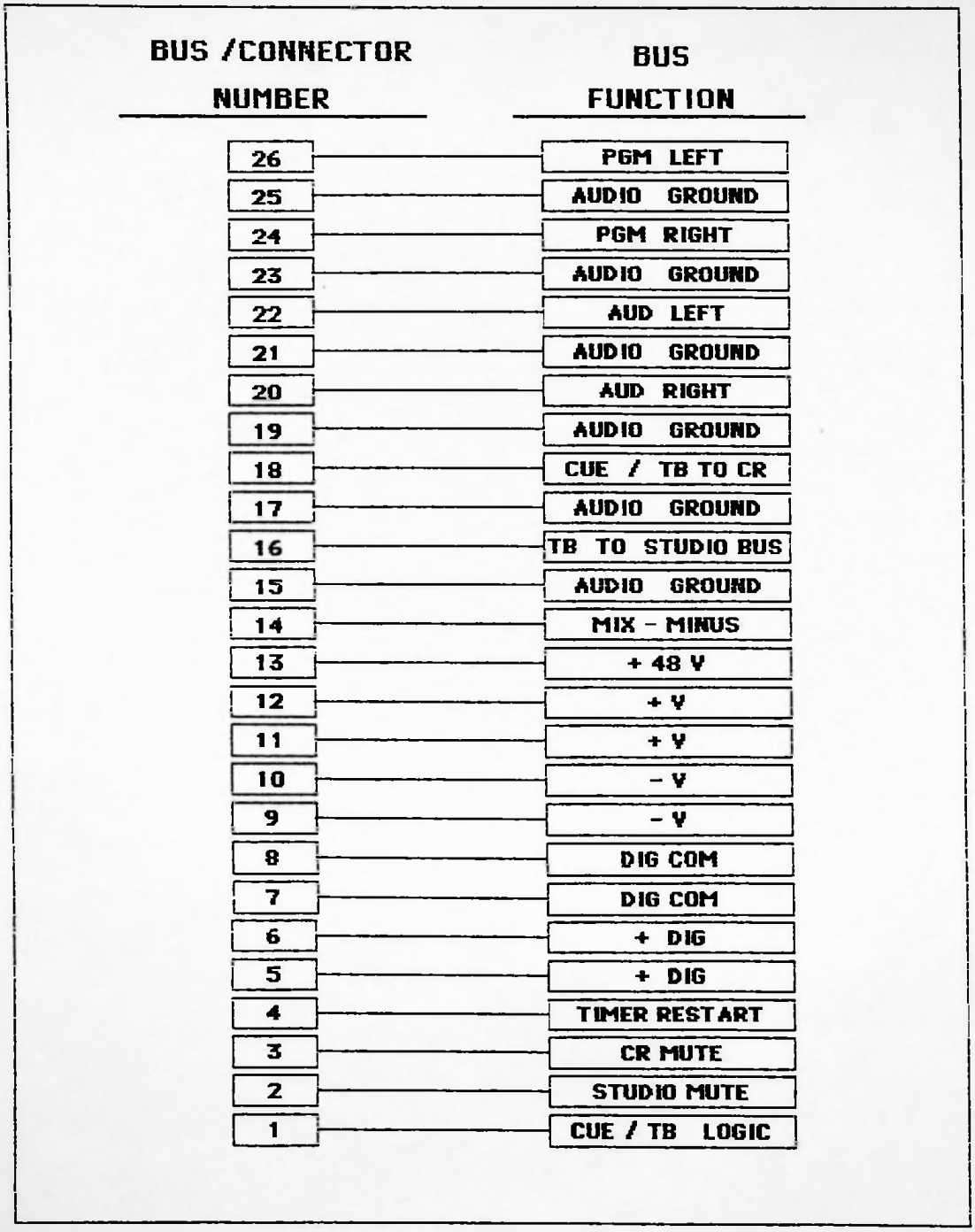
15) OPTIONAL ICM-32 INTERCOM MODULE (LOGIC):

a) Module redundant logic connections are on lower DB-25 connector (slots #11-13)
b) External digital + power feed is pin #10
c) External digital common is pin #23
d) Station call line 1 is pin #4
e) Station call line 2 is pin #17
f) Station call line 3 is pin #18
g) Station call line 4 is pin #6
h) Station call line 5 is pin #7
i) Station call line 6 is pin #20
j) External +V feed is pin #24
k) External -V feed is pin #12
l) Additional audio commons at pins #5, 8, 11, 19, 22 & 25

16) OPTIONAL LS-6 LINE SELECT MODULE

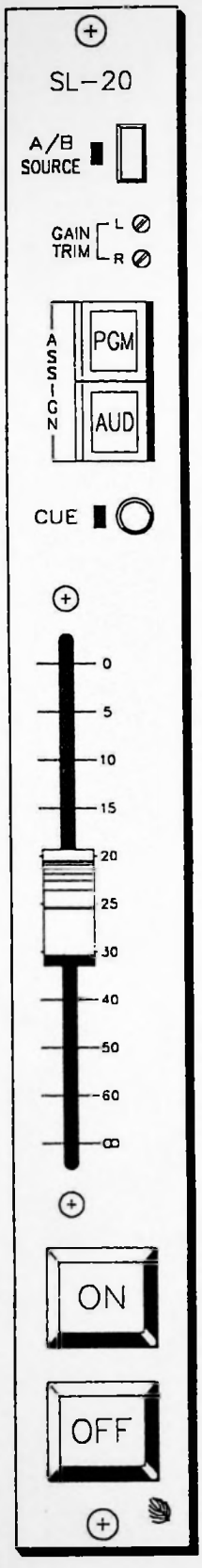
For pinouts, see LS-6 LINE SELECT SCHEMATIC & LOAD SHEET

A-20 BUS CHART



REV 12/88

MODULE SECTION



SL–20

SL-20 STEREO LINE INPUT MODULE

A/B SOURCE—This switch (w/LED indicator) selects between the module's two stereo line inputs (machine control logic will follow the chosen source).

GAIN TRIM—Two recessed multi-turn trimpots that set the module's left and right gain trim levels.

ASSIGN—These two switches (w/barndoor status indicators) assign the module's stereo signal to the console output buses (Program and/or Audition).

CUE—When activated this switch (w/LED indicator) sends the module signal to the console cue bus. This signal is used at the control room module, where it may be programmed to automatically interrupt the control room and headphone monitor feeds and/or feed an external cue output. Cue is automatically released when the channel On button is activated, or when cue is pressed again.

FADER—A 100mm precision conductive plastic stereo fader sets the module output level.

ON/OFF—These two switches (w/indicator lights) turn the module signal on and off. They can also be programmed to perform other functions via the console logic circuitry (see below).

PROGRAMMABLE FUNCTIONS—The module ON/OFF switches can be programmed (via an intenal dipswitch) to automatically *mute control room* monitor speakers when the channel is ON. The same dipswitch can also be programmed to *restart timer* when the ON switch is pressed and can also send the module signal to the console's *mix-minus* bus.

EXTERNAL CONTROL—The SL-20 input module may be turned On and Off via external control ports. Module ON/OFF switches can also Start and Stop external devices (cart machines, etc.) w/logic following the module's A/B source select switch. The module's OFF switch indicator light may be programmed (via dipswitch, see above) to function as a remote ready light activated from an external device, or it may be lighted from the module's internal circuitry.

MM-20 MONO MIC INPUT MODULE

A/B SOURCE—This switch (w/LED indicator) selects between the module's two transformer balanced microphone inputs.

GAIN TRIM—A recessed multi-turn trimpot that sets the input gain level (range: 36dB).

INSERT POINT—A patch insert point (post gain trim, pre-fader) is provided for individual channel processing, such as equalization and compression.

ASSIGN—These two switches (w/barndoor status indicators) assign the module signal to the consule's output buses (Program and/or Audition).

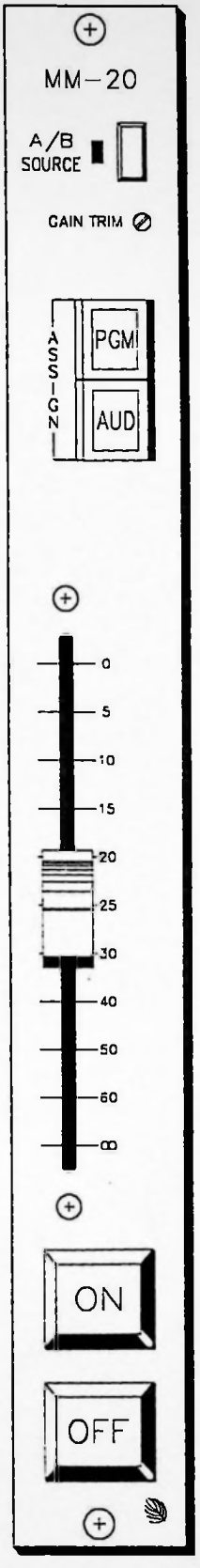
FADER—A 100mm precision conductive plastic fader controls module output level.

ON/OFF—These two switches (w/indicator lights) turn the module signal on and off. They can also be programmed to perform other functions via the console logic circuitry. On/Off status may also be controlled from a remote turret location (see ST-20 STUDIO TURRET).

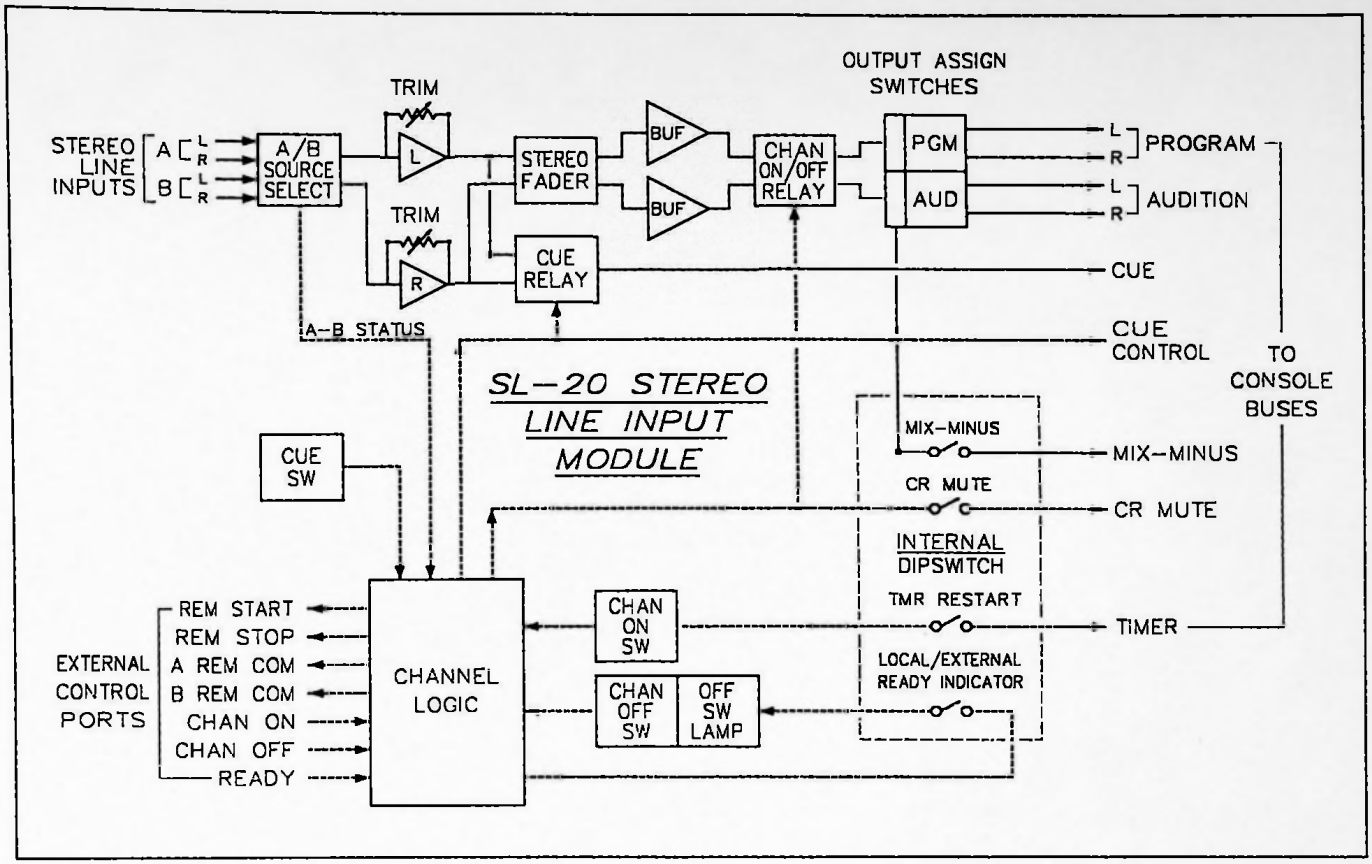
PROGRAMMABLE FUNCTIONS—The module ON/OFF switches can be programmed (via an internal dipswitch) to automatically *mute control room* (and activate on-air tally relay) and *mute studio* when the channel is ON. The same dipswitch can also program the module to feed audio to the console's *mix-minus* bus for telephone or scimmer applications, or to feed *talkback* to studio.

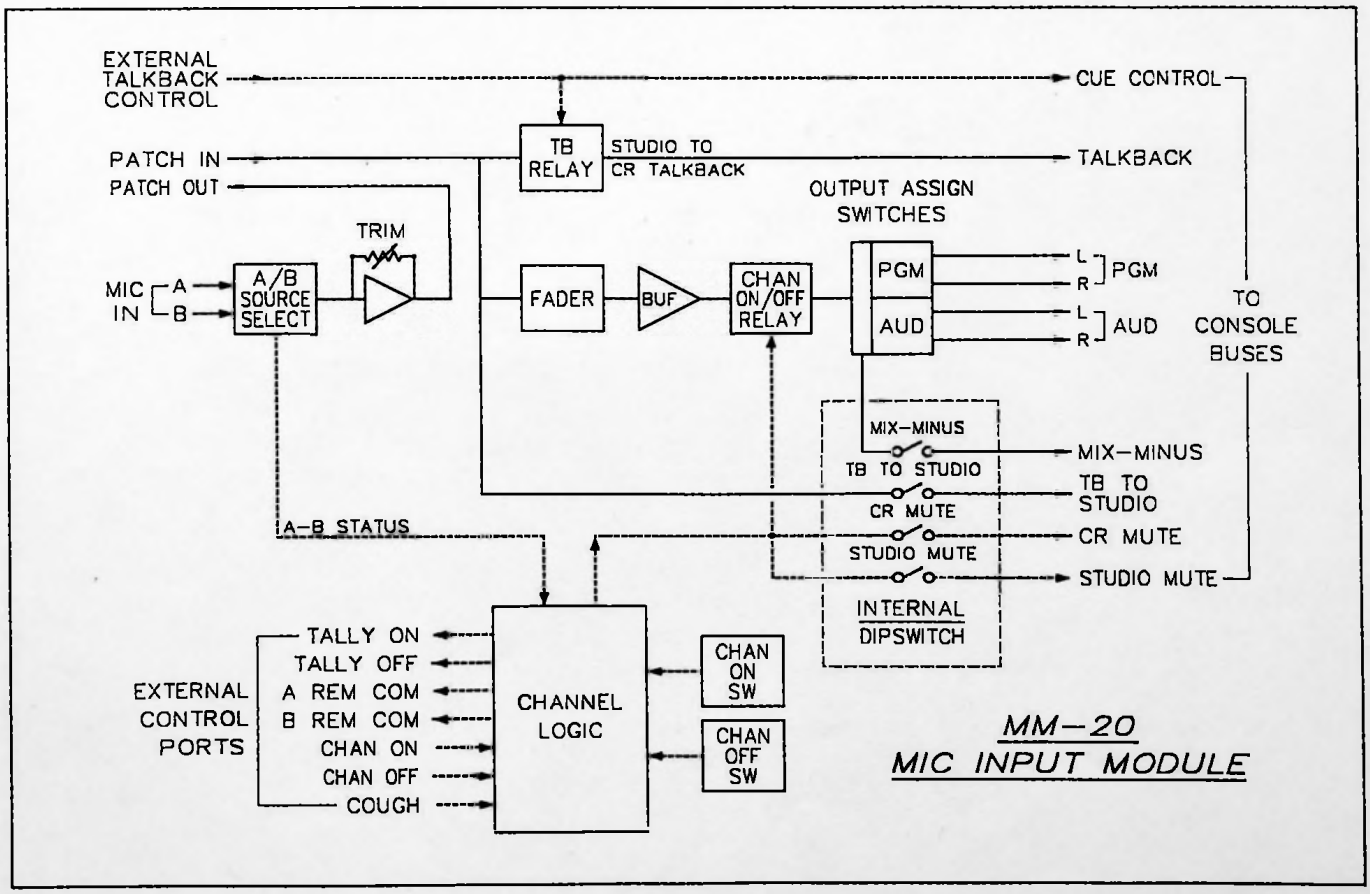
EXTERNAL CONTROL—The MM-20 input module may be externally controlled (On, Off, Cough, Talkback to CR) by an optional Studio Turret Announcer Panel. Module ON/OFF switches can also control remote tally indicators (w/logic following the module's A/B source select switch).

TALLY—Module ON/OFF status tally signals are provided to interface to optional remote studio turret accessories.



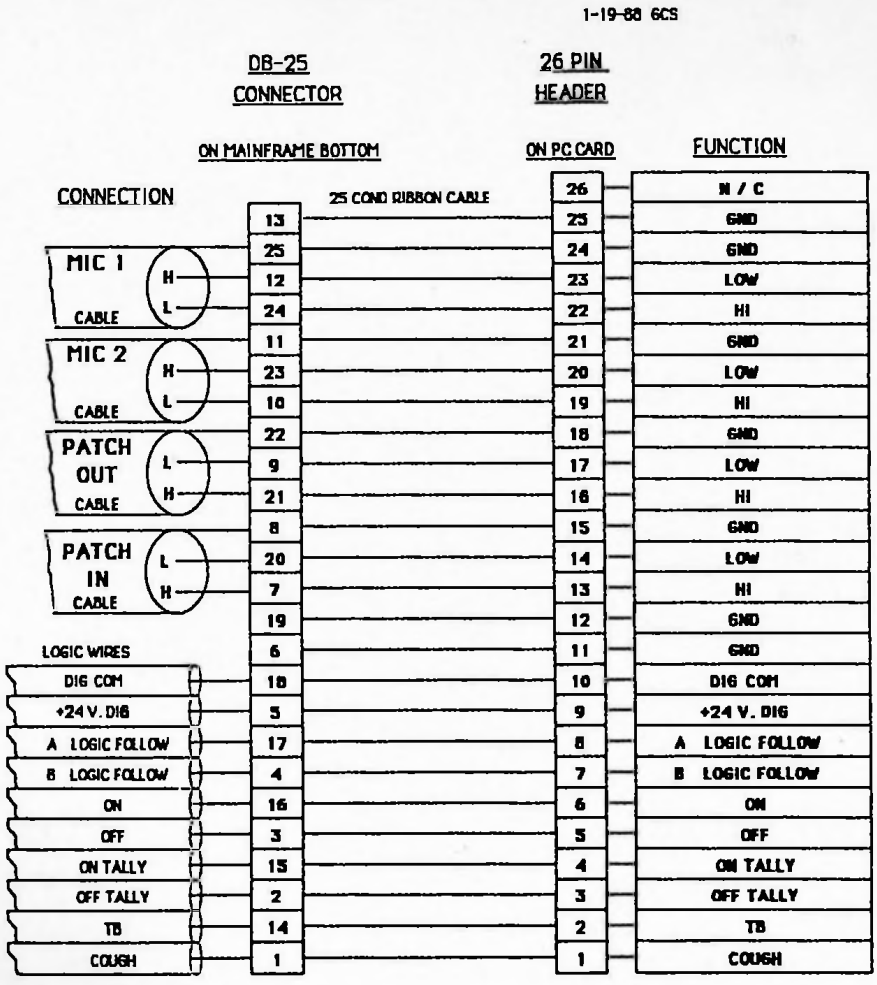
MM–20


OUTPUT ASSIGN SWITCHES
TRIM
STEREO LINE INPUTS
A
B
L
R
A/B SOURCE SELECT
TRIM
L
R
STEREO FADER
BUF
BUF
CHAN ON/OFF RELAY
PGM
AUD
PROGRAM
AUDITION
CUE RELAY
CUE
A-B STATUS
CUE CONTROL
TO CONSOLE BUSES
SL-20 STEREO LINE INPUT MODULE
CUE SW
MIX-MINUS
MIX-MINUS
CR MUTE
CR MUTE
INTERNAL DIPSWITCH
TMR RESTART
TIMER
LOCAL/EXTERNAL READY INDICATOR
EXTERNAL CONTROL PORTS
REM START
REM STOP
A REM COM
B REM COM
CHAN ON
CHAN OFF
READY
CHANNEL LOGIC
CHAN ON SW
CHAN OFF SW
OFF SW LAMP

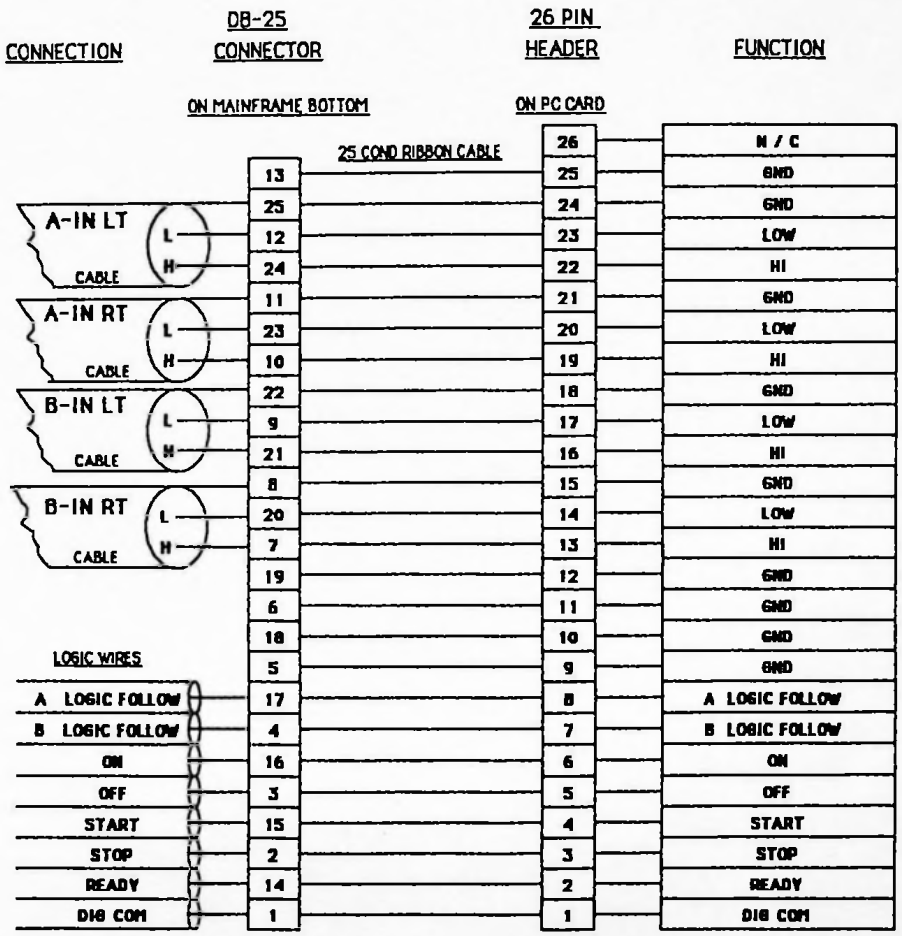

EXTERNAL TALKBACK CONTROL
CUE CONTROL
PATCH IN
PATCH OUT
TB RELAY
STUDIO TO CR TALKBACK
TALKBACK
OUTPUT ASSIGN SWITCHES
TRIM
MIC IN
A
B
A/B SOURCE SELECT
FADER
BUF
CHAN ON/OFF RELAY
PGM
AUD
PGM
AUD
TO CONSOLE BUSES
MIX-MINUS
MIX-MINUS
TB TO STUDIO
TB TO STUDIO
CR MUTE
A-B STATUS
CR MUTE
STUDIO MUTE
STUDIO MUTE
INTERNAL DIPSWITCH
EXTERNAL CONTROL PORTS
TALLY ON
TALLY OFF
A REM COM
B REM COM
CHAN ON
CHAN OFF
COUGH
CHANNEL LOGIC
CHAN ON SW
CHAN OFF SW
MM-20 MIC INPUT MODULE

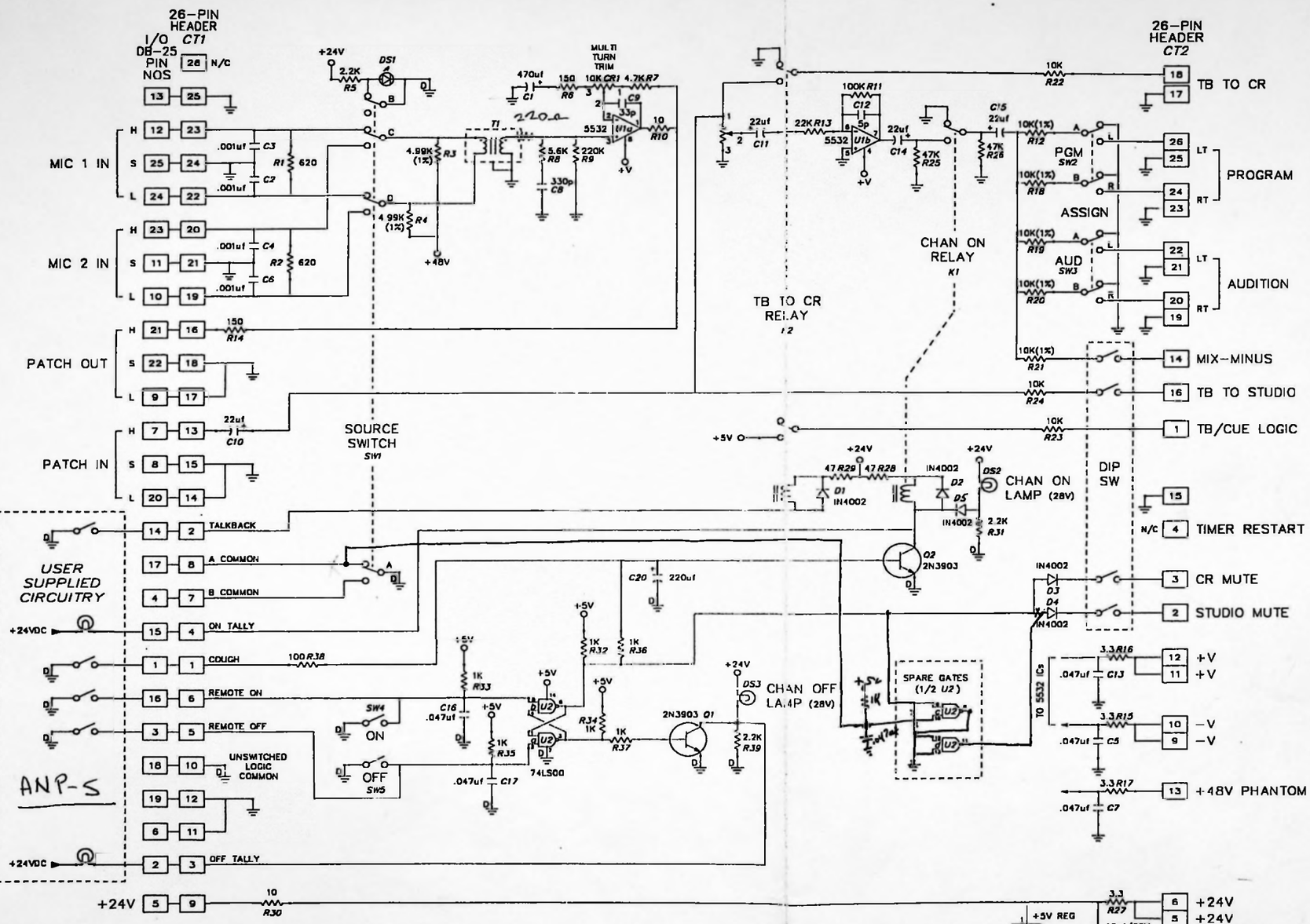
MM-20 INTERFACE CHART

1-19-88 GCS

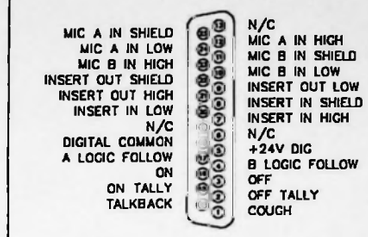


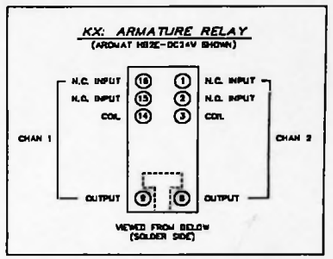
SI-20 INTERFACE CHART

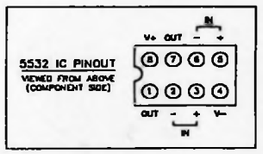


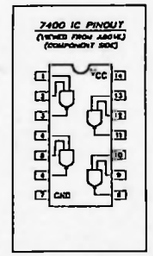


UPPER DB-25 I/O CONNECTOR
MM-20 MODULE





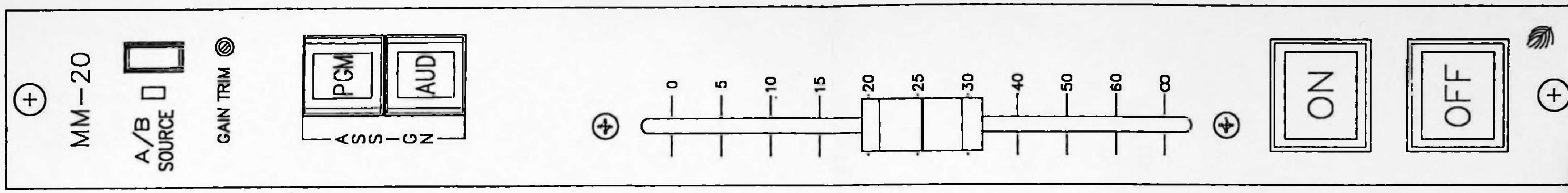


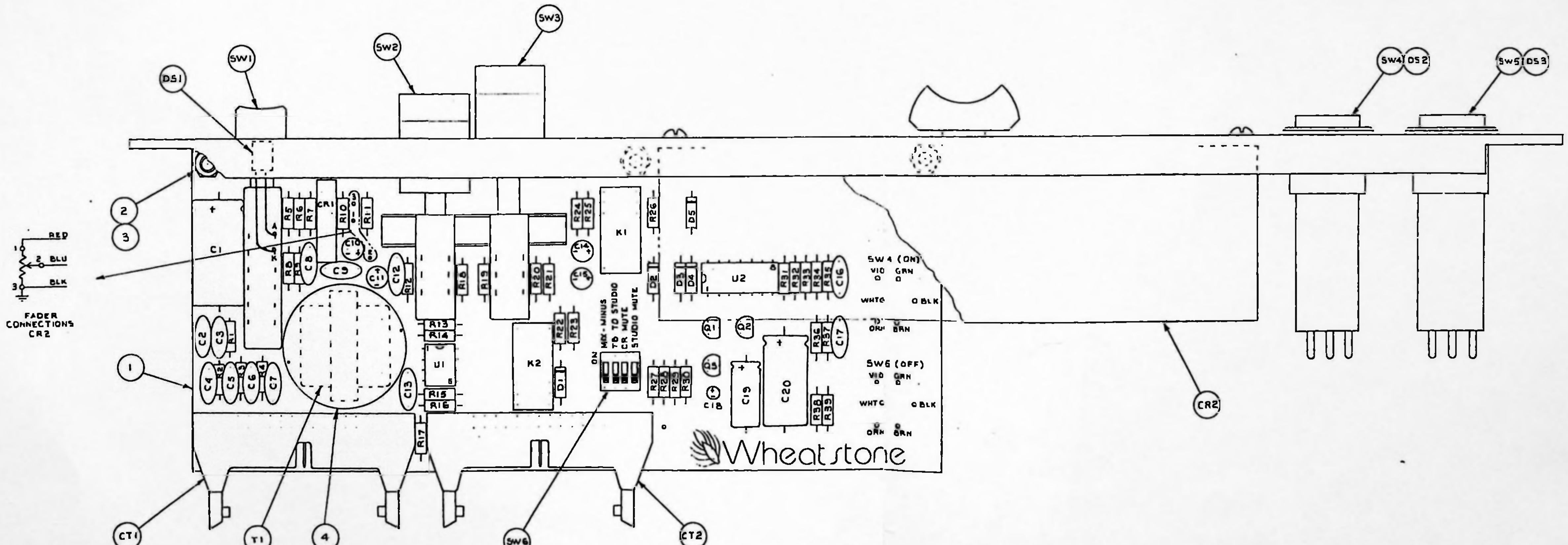


Mod Note: studio only mutes when B Select is active.

MM-20 MONO MIC INPUT		
A-20 RADIO ON-AIR CONSOLE		
6-17-88	Wheatstone Corporation 6720 V.I.P. Parkway Syracuse, NY. 13211	
MS		
NO SCALE	MODULE SCHEMATIC DWG	
	MM-20B PCB	#A20/SCH-1

MM-20 MONO MIC INPUT SCHEMATIC





PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
1	PRINTED CIRCUIT BD., MM-20	1
2	SCREW, FLAT HD, PHILLIPS, #4-40 X 3/8LG	3
3	HEX NUT, #4-40	3
4	TRANSFORMER SHIELD	1
5	DIP SOCKET, 8 PINS	1
6	DIP SOCKET, 14 PINS	1
C1	CAPACITOR, 470µf/25V, ELECTROLYTIC	1
C2,3,4 & 6	CAPACITOR, .001µf, CERAMIC	4
C5,13,16 & 17	CAPACITOR, .047µf, CERAMIC	4
C8	CAPACITOR, 390pf, CERAMIC	1
C9	CAPACITOR, 33pf, CERAMIC	1

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
C10,11,14 &15	CAPACITOR, 22µf/25V, ELECTROLYTIC	4
C12	CAPACITOR, 5pf, CERAMIC	1
C18	CAPACITOR, 1µf/25V, TANTALUM	1
C19	CAPACITOR, 10µf/25V, ELECTROLYTIC	1
C20	CAPACITOR, 220µf/25V ELECTROLYTIC	1
C 7	CAPACITOR, 100µf/100V ELECTROLYTIC	1
SW6	SWITCH, DIP, 4-SPST	1
CT1 & 2	CONNECTOR, 26 PIN RT. ANGLE DIL HEADER	2
CR1	POTENTIOMETER, 10K MULTI-TURN	1
D1-5	DIODE, 1N4002	4
DS1	DISPLAY, RED LED, .10 X .20	2
DS2 & 3	DISPLAY, INCANDESCENT LAMP, 28V	2
CR2	FADER	1

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
K1 & 2	RELAY, DPDT, 24V	2
Q1 & 2	TRANSISTOR, 2N3903, NPN	2
Q3	VOLTAGE REGULATOR, 78L05AWC	1
R28 & 29	RESISTOR, 47±5%, 1/4W	2
R1 & 2	RESISTOR, 620±5%, 1/4W	2
R3 & 4	RESISTOR, 4.99K±1%, 1/4W	2
R5, 30, 31	RESISTOR, 2.2K±5%, 1/4W	3
R6 & 14	RESISTOR, 150±5%, 1/4W	2
R7	RESISTOR, 4.7K±5%, 1/4W	1
R8	RESISTOR, 5.6K±5%, 1/4W	1
R9	RESISTOR, 220K±5%, 1/4W	1
R10 & 30	RESISTOR, 10±5%, 1/4W	2

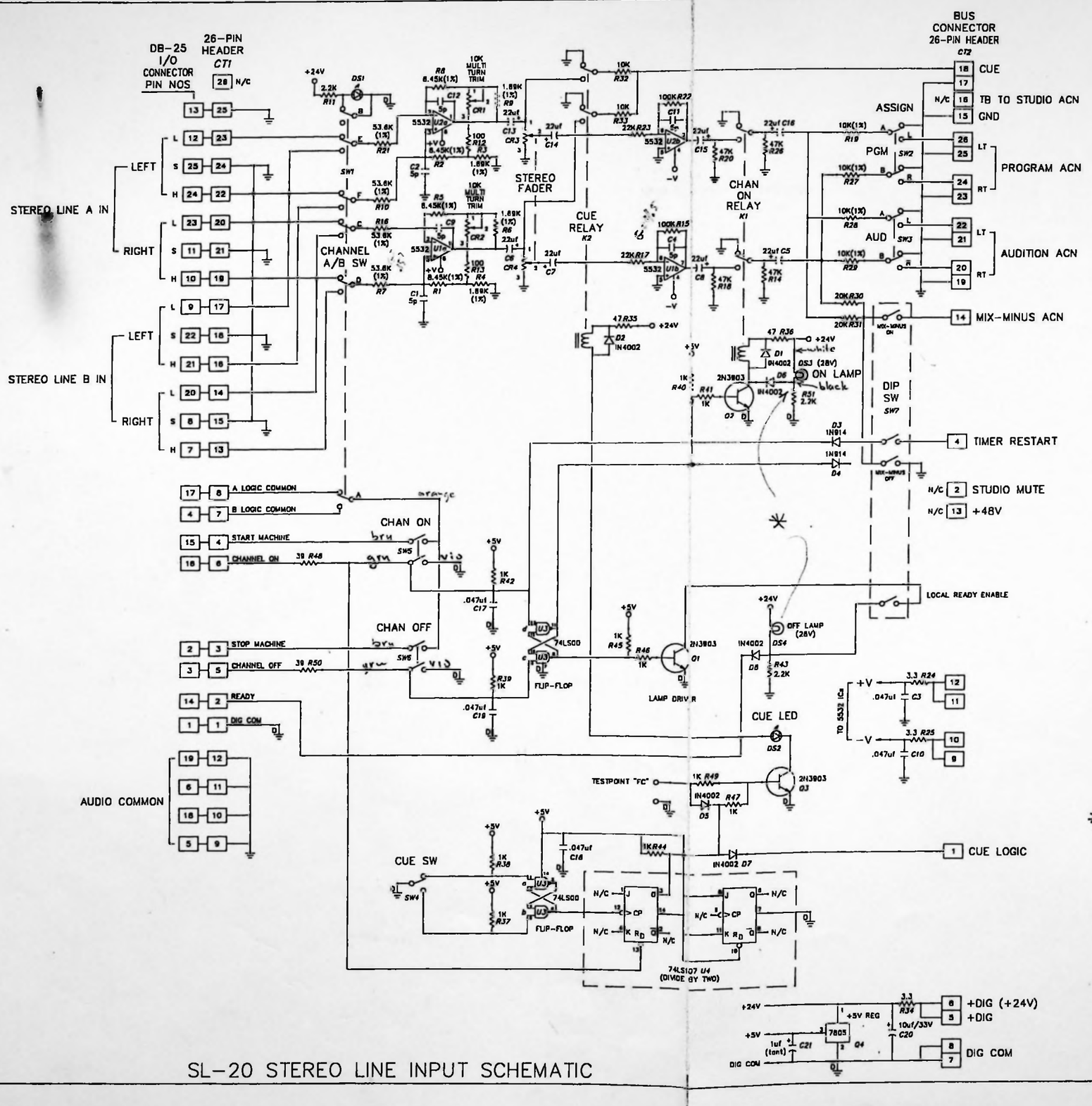
PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
R11	RESISTOR, 100K±5%, 1/4W	1
R12 & 18-21	RESISTOR, 10K±1%, 1/4W	5
R13	RESISTOR, 22K±5%, 1/4W	1
R15,16,17 & 27	RESISTOR, 3.3±5%, 1/4W	4
R22,23 & 24	RESISTOR, 10K±5%, 1/4W	3
R25 & 26	RESISTOR, 47K±5%, 1/4W	2
R32-37	RESISTOR, 1K±5%, 1/4W	6
R38	RESISTOR, 100±5%, 1/4W	1
SW1	SWITCH, 4PDT	1
SW2 & 3	SWITCH ASSEMBLY, 2-DPDT	1
T1	MICROPHONE TRANSFORMER	1
U1	I.C., DUAL OP-AMP, 5532	1
U2	I.C., QUAD NAND GATES, 74LS00	1

"C" VERSION

"B" VERSION

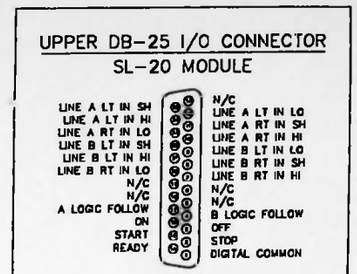
REV 7-12-88

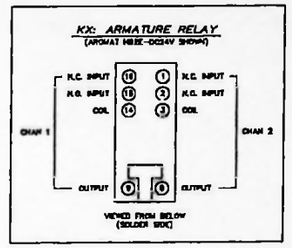
MM-20 MONO MIC INPUT		
A-20 RADIO ON-AIR CONSOLE		
1-26-88	Wheatstone Corporation 6720 V.I.P. Parkway Syracuse, NY. 13211	
RA		
SCALE: 2X	PCB LOAD SHEET	
DO NOT SCALE	MM-20B PCB	#A20/LOAD-2

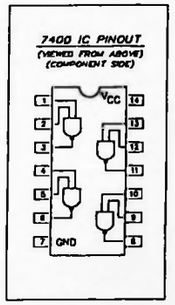


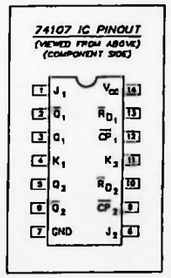
SL-20 STEREO LINE INPUT SCHEMATIC

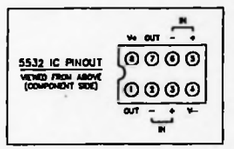
UPPER DB-25 I/O CONNECTOR
SL-20 MODULE





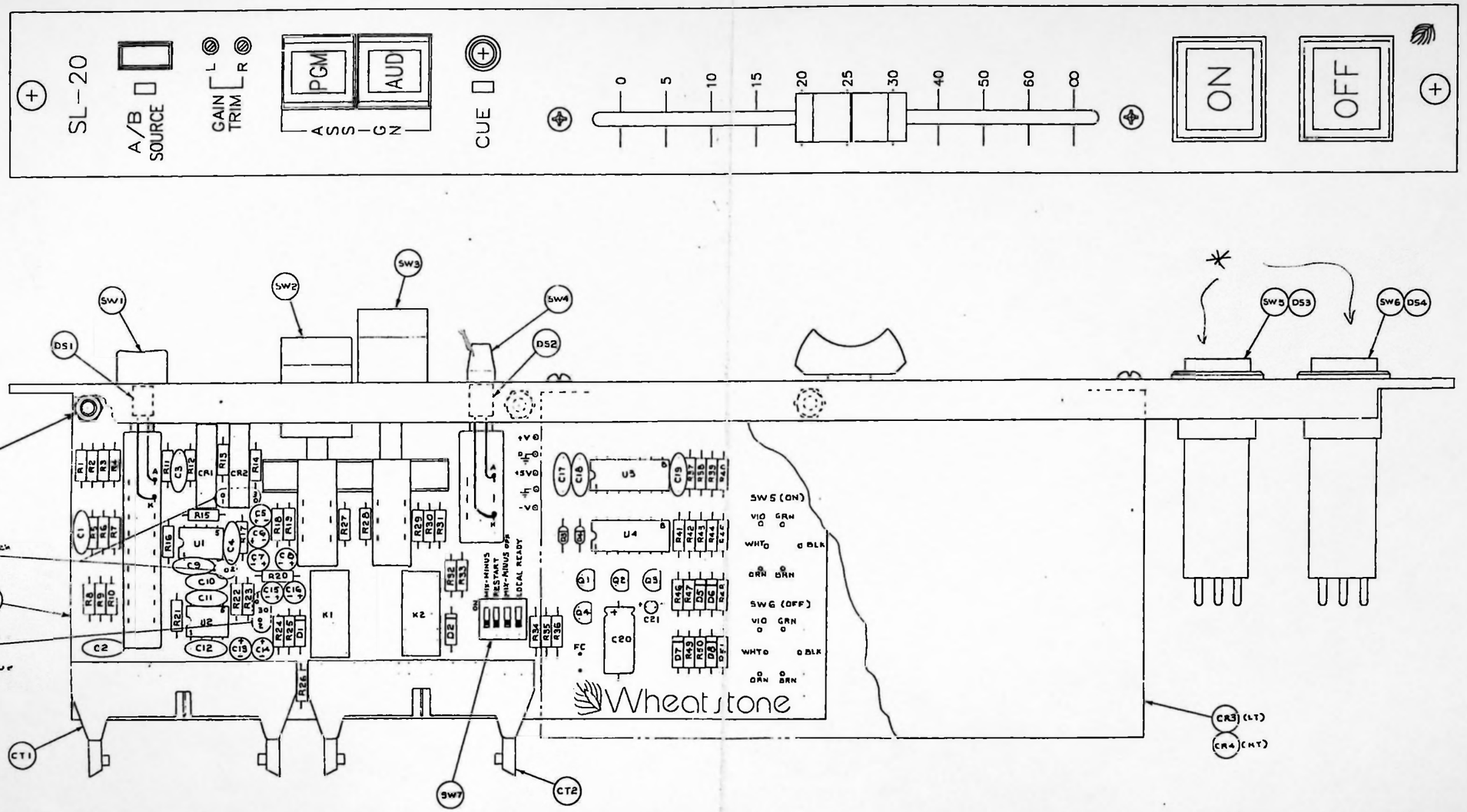






* LED lamps draw 16mA @ 24V
R43, R51 removed

SL-20 STEREO LINE INPUT	
A-20 RADIO ON-AIR CONSOLE	
05-09-91	Wheatstone Corporation 6720 V.I.P. Parkway Syracuse, NY. 13211
JS	
NO SCALE	MODULE SCHEMATIC DWG
	SL-20D PCB #A20/SCH-2



PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
1	P.C.B, SL-20	1
2	SCREW, FLAT HD. PHILLIPS, #4-40 X 3/8 LG	3
3	HEX NUT, #4-40	3
4	DIP SOCKET, 8 PINS	2
5	DIP SOCKET, 14 PINS	2
C1,2,4,9,11 & 12	CAPACITOR, 5pf, CERAMIC	6
C3,10,17,18 & 19	CAPACITOR, .047μf, CERAMIC	5
C20	CAPACITOR, 10μf/35V, ELECTROLYTIC	1
C21	CAPACITOR, 1μf/35V, TANTALUM	1
CR1 & 2	POTENTIOMETER, 10K, MULTI-TURN	2

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY
CR3&4	STEREO FADER	1
CT1 & 2	CONNECTOR, 26 PIN HEADER	2
D1,2,5,6,7&8	DIODE, IN4002	5
D3&4	DIODE, IN 914	2
DS1 & 2	LED, RED, .10" x .20"	2
DS3 & 4	LAMP, INCANDESENT, 28V	2
K1&2	RELAY, DPDT, 24VDC	2
Q1, 2 & 3	TRANSISTOR, 2N3903, NPN (TO-92)	3
Q4	REGULATOR, 78L05AWC, +5V (TO-92)	1
R1,2,5 & 8	RESISTOR, 8.45K ±1%, 1/4 W	4
R3,4,6 & 9	RESISTOR, 1.69K ±1%, 1/4 W	4

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY
R7,10,16 & 21	RESISTOR, 53.6K ±1%, 1/4 W	4
R11,43 & 61	RESISTOR, 2.2K ±5%, 1/4W	4
R14,18,20 & 26	RESISTOR, 47K ±5%, 1/4W	4
R15 & 22	RESISTOR, 100K ±5%, 1/4W	2
R17 & 23	RESISTOR, 22K ±5%, 1/4W	2
R19,27,28 & 29	RESISTOR, 10K ± 1%, 1/4W	4
R24,25 & 34	RESISTOR, 3.3 ±5%, 1/4W	3
R30 & 31	RESISTOR, 20K ±5%, 1/4W	2
R32 & 33	RESISTOR, 10K ± 5%, 1/4W	2
R37-42, 44, 45, 46, 47 & 49	RESISTOR, 1K ±5%, 1/4W	11

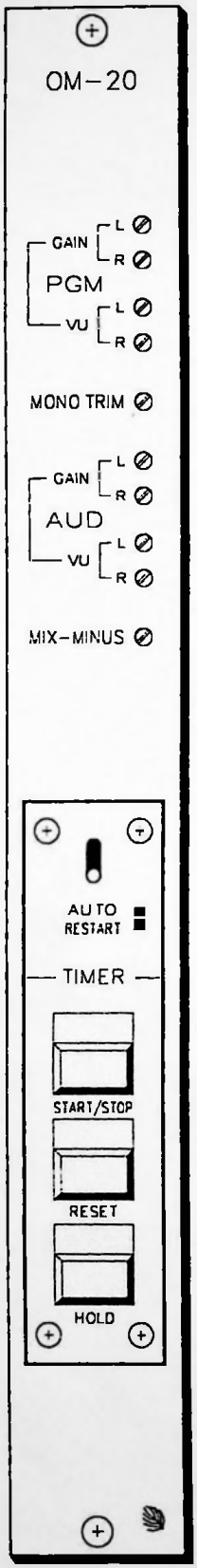
PARTS LIST		
ITEM NO.	DESCRIPTION	QTY
R12 & 13	RESISTOR, 100 ±5%, 1/4W	4
SW1	SWITCH, 6PDT	1
SW2 & 3	SWITCH ASSY, 2-DPDT	1
SW4	SWITCH, DPDT	1
SW5 & 6	SWITCH, DPDT, MOMENTARY	2
SW7	SWITCH, DIP, 4-SPST	1
U1 & 2	I.C., 5532, DUAL OP-AMP	2
U3	I.C., 74L900, QUAD NAND	1
U4	I.C., 74LS107, DUAL J-K F/F	1
R48 & 50	RESISTOR, 39 ±5%, 1/4 W	
R35 & 36	RESISTOR, 47 ±5%, 1/4 W	2

5-16-91: D VERSION (SL) | 5-23-83: ADD D8, 1N4002

SL-20 STEREO LINE INPUT

A-20 RADIO ON-AIR CONSOLE

1-11-88	Wheatstone Corporation, 8720 V.I.P. Parkway, Syracuse, NY. 13211
RA	
SCALE: 2X	PCB LOAD SHEET
DO NOT SCALE	SL-20D PCB | SA20/LOAD-1



OM–20

OM-20 OUTPUT

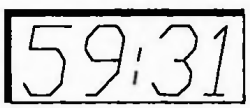
PROGRAM—Program output level is set by two recessed multi-turn trimpots (left and right). Two additional trimpots set Program VU meter levels. Left and right insert points are provided (pre-trim).

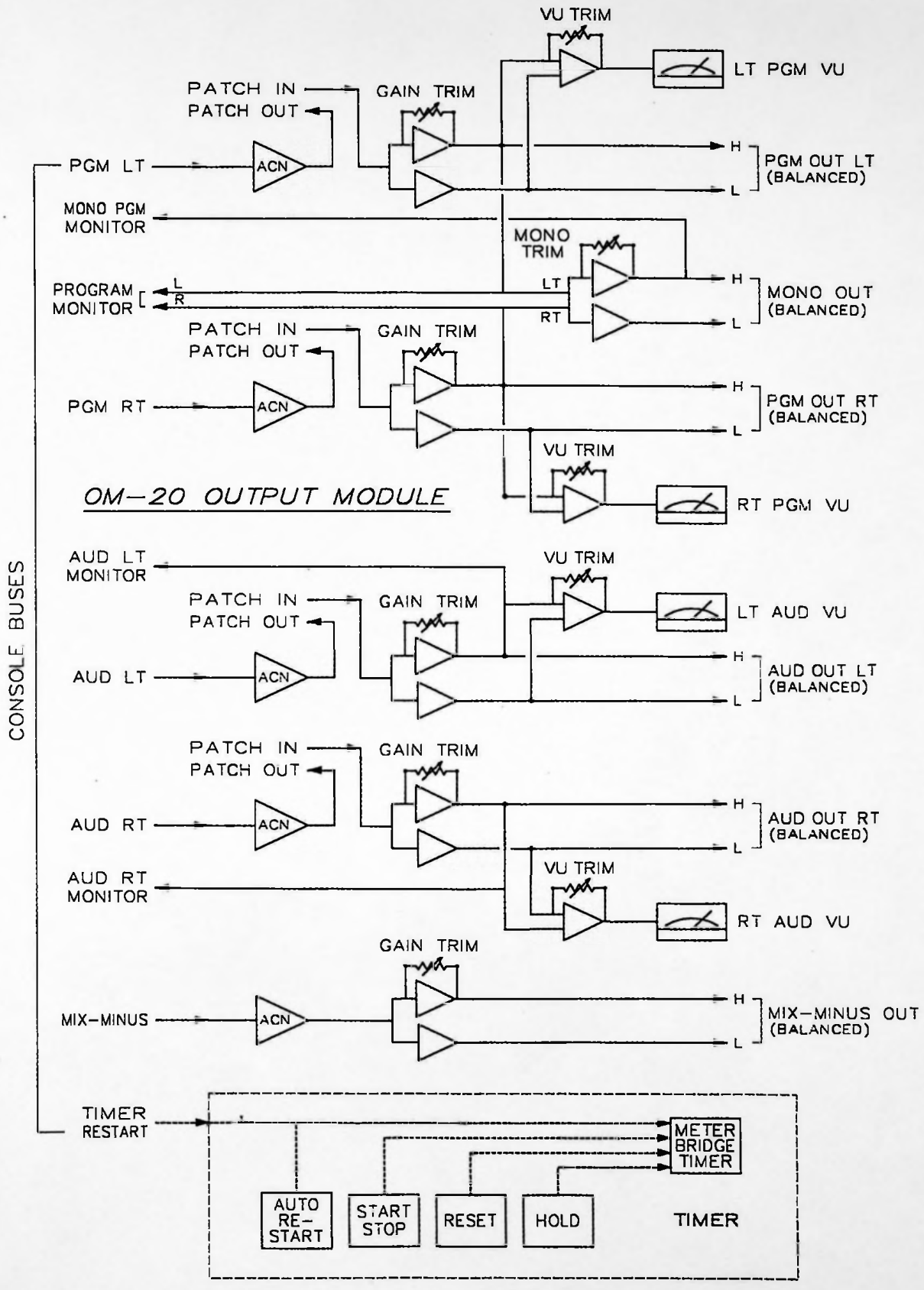
MONO—A single recessed multi-turn trimpot sets the mono sum output level. This signal is the sum of left and right Program outputs.

AUDITION—Audition output level is set by two recessed multi-turn trimpots (left and right). Two additional trimpots set Audition VU meter levels. Left and right insert points are provided (pre-trim).

MIX-MINUS—A single recessed multi-turn trimpot sets the Mix-Minus output level. Individual mic and line input modules may be dipswitch-programmed to feed this bus to facilitate use with telephone hybrids or scimmers.

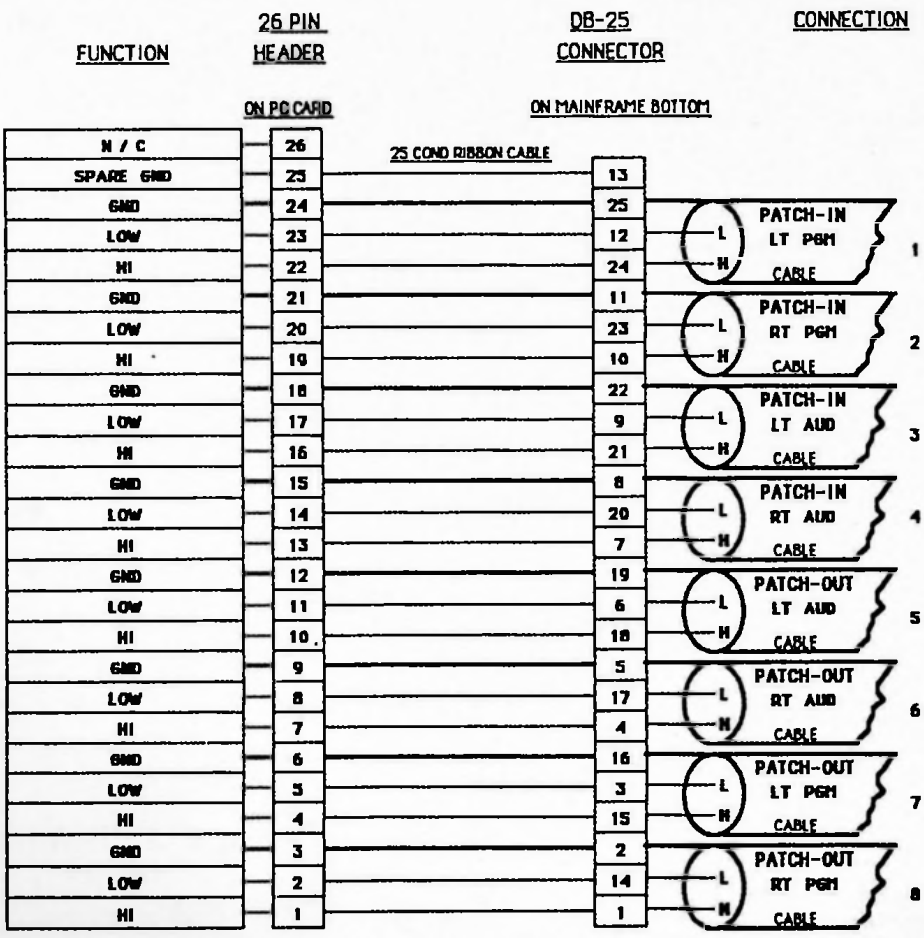
TIMER—The control panel for the console's digital timer (meterbridge display) is located on the output module. There are three pushbutton switches (Start/Stop, Reset, Hold) and one toggle switch (Auto Restart); this enables the timer restart function programmable at individual SL-20 input modules. Auto-restart does not disable manual functions.




VU TRIM
LT PGM VU
PATCH IN
PATCH OUT
GAIN TRIM
PGM LT
ACN
H
L
PGM OUT LT
(BALANCED)
MONO PGM
MONITOR
MONO
TRIM
PROGRAM
MONITOR
L
R
LT
RT
MONO OUT
(BALANCED)
PATCH IN
PATCH OUT
GAIN TRIM
PGM RT
PGM OUT RT
(BALANCED)
VU TRIM
RT PGM VU
OM-20 OUTPUT MODULE
CONSOLE BUSES
AUD LT
MONITOR
VU TRIM
PATCH IN
PATCH OUT
GAIN TRIM
LT AUD VU
AUD LT
AUD OUT LT
(BALANCED)
PATCH IN
PATCH OUT
GAIN TRIM
AUD RT
AUD OUT RT
(BALANCED)
AUD RT
MONITOR
VU TRIM
RT AUD VU
GAIN TRIM
MIX-MINUS
MIX-MINUS OUT
(BALANCED)
TIMER
RESTART
METER
BRIDGE
TIMER
AUTO
RE-
START
START
STOP
RESET
HOLD
TIMER

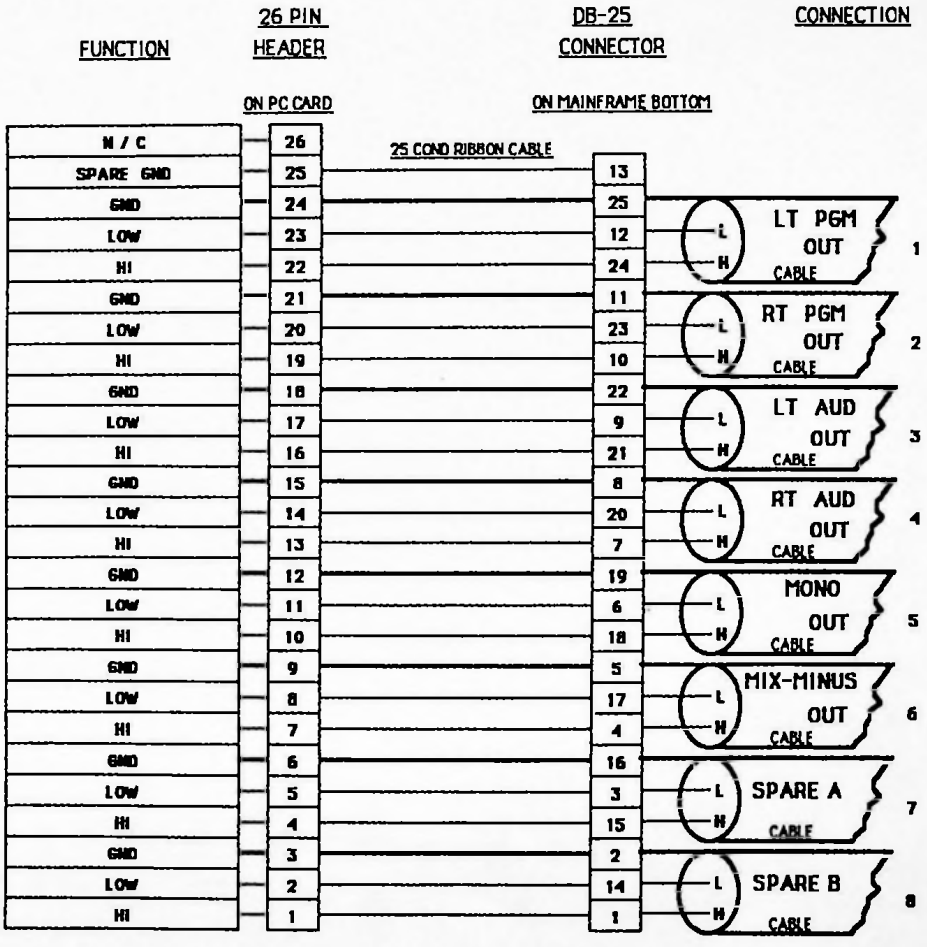
OM-20 UPPER INTERFACE CHART

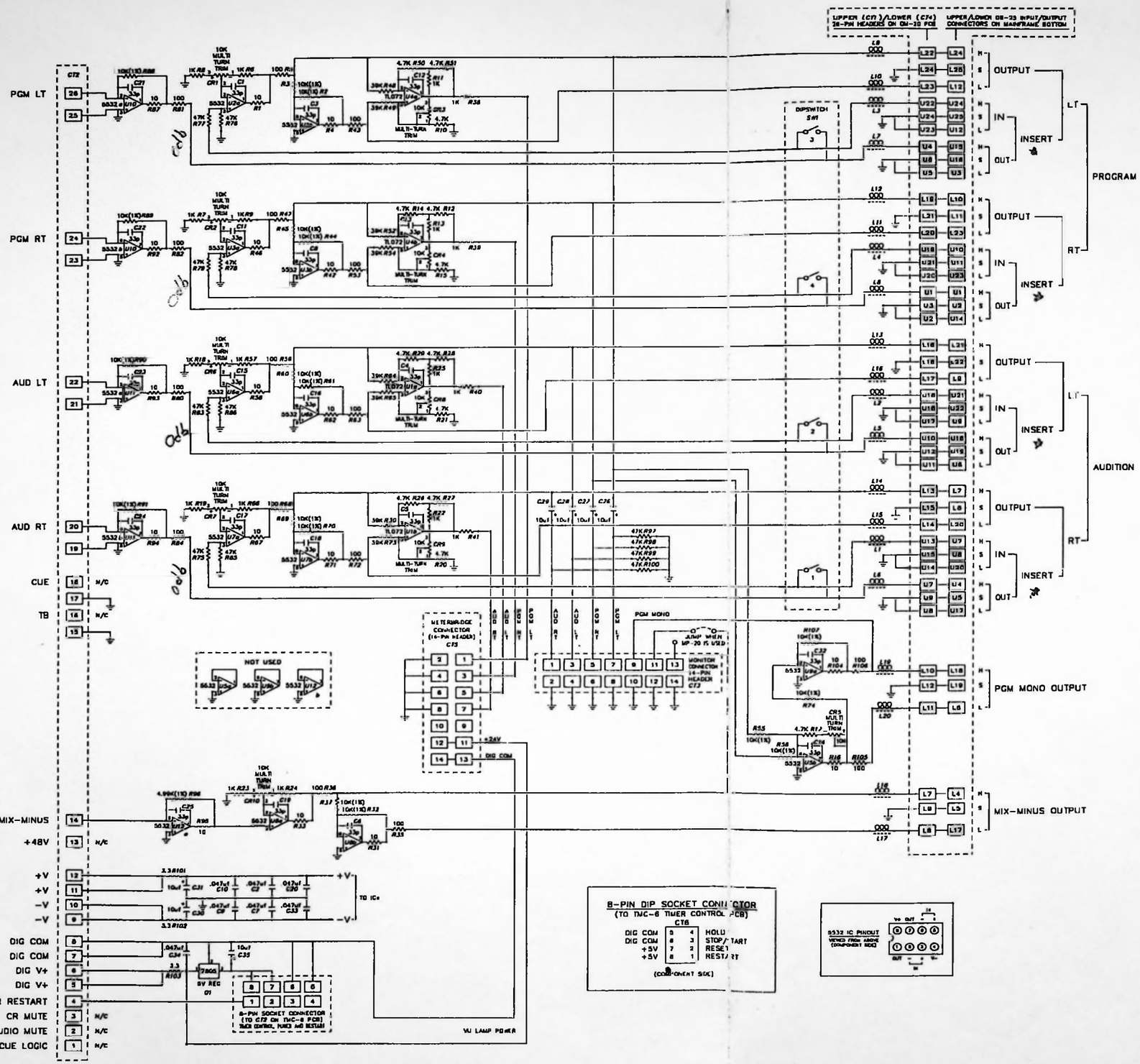
2-11-88 GCS



OM-20 LOWER INTERFACE CHART

1-25-88 GCS





UPPER DB-25 I/O CONNECTOR
OM-20 MODULE

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

LOWER DB-25 I/O CONNECTOR
OM-20 MODULE

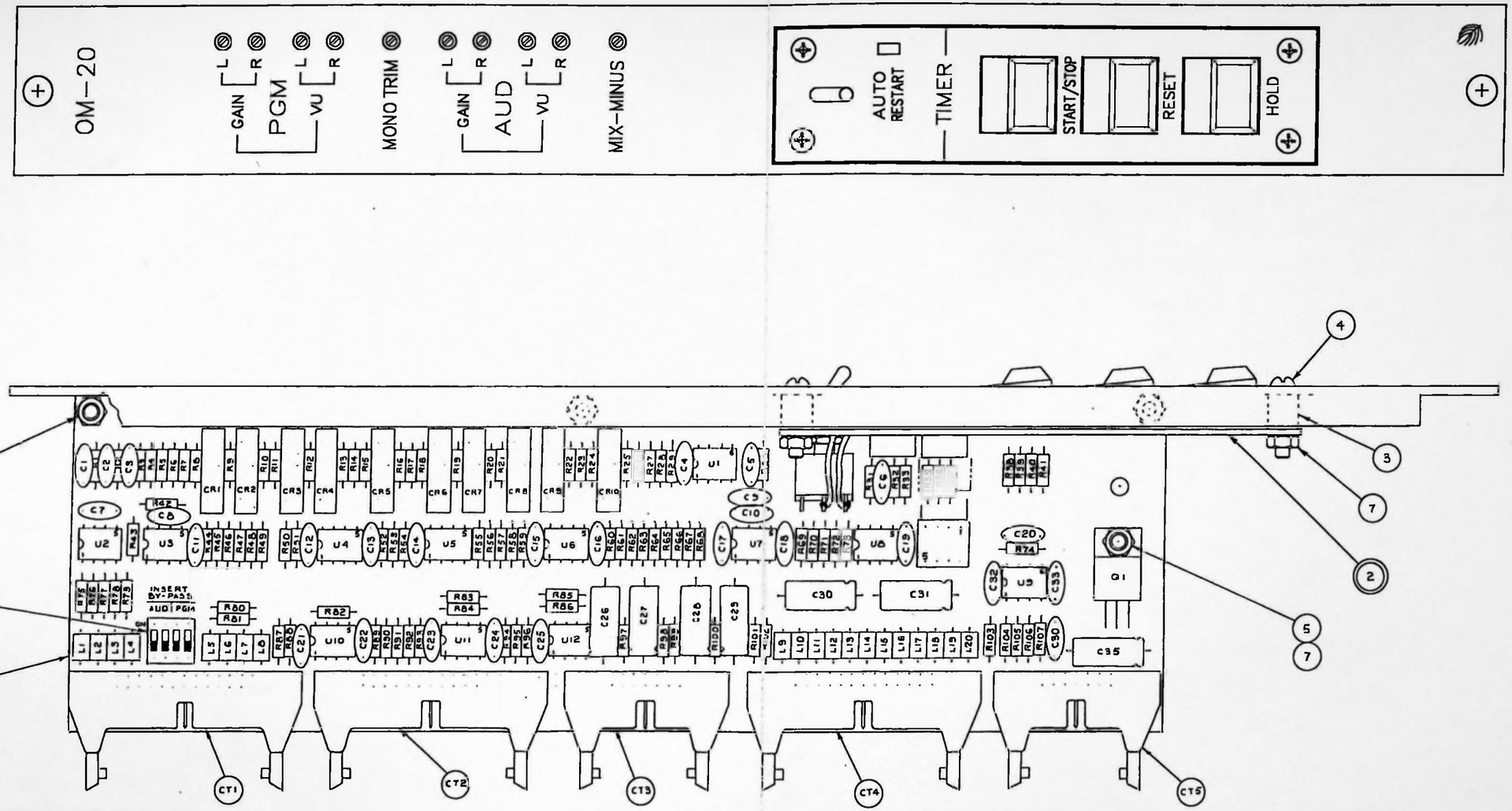
PGM LT OUT SH	13 25	N/C
PGM LT OUT HI	12 24	PGM LT OUT LO
PGM RT OUT LO	11 23	PGM RT OUT SH
AUD LT OUT SH	10 22	PGM RT OUT HI
AUD LT OUT HI	9 21	AUD LT OUT LO
AUD RT OUT LO	8 20	AUD RT OUT SH
MONO OUT SHIELD	7 19	AUD RT OUT HI
MONO OUT HIGH	6 18	MONO OUT LOW
MIX-MINUS OUT LO	5 17	MIX-MINUS OUT SH
SPARE A SHIELD	4 16	MIX-MINUS OUT HI
SPARE A HIGH	3 15	SPARE A LOW
SPARE B LOW	2 14	SPARE B SHIELD
	1	SPARE B HIGH

NOTE: FOR TIMER CONTROL CARD SEE TMC-6 SCH DWG (TM6/SCH-1)

note: Factory cal Is:
Ø db at mixer sum to output Amp Insertion point
IE: INSert on connector. #
0db = .7745966 V RMS
0db = 2.19089 V P-P

OM-20 OUTPUT MODULE		
A-20/32 RADIO ON-AIR CONSOLE		
12-18-89	Wheatstone Corporation 6720 V.I.P. Parkway Syracuse, NY. 13211	
CAZ		
	SCHEMATIC DRAWING	
REVISED	OM-20A PCB	#A20/SCH-3

OM-20 OUTPUT SCHEMATIC



PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
1	PRINTED CIRCUIT BD., OM-20	1
2	TIMER CONTROL ASSEMBLY, TMC-6	1
3	SPACER, 1/4 O.D. X 3/16 LG FOR #4 SCREW	4
4	SCREW, ROUND HD, PHILLIPS, #4-40 X 5/8 LG	4
5	SCREW, PAN HD, SLOTTED, #4-40 X 5/8 LG	1
6	SCREW, FLAT HD, PHILLIPS, #4-40 X 3/8 LG	3
7	HEX NUT, #4-40	8
8	DIP SOCKET, 8 PINS	13
C1,3-6,8,11-19,21-25,32	CAPACITOR, .33pf, CERAMIC	21
C2,7,9,10,20,33&34	CAPACITOR, .047µF, CERAMIC	7
C26-31 & 35	CAPACITOR, 10µf/25V, ELECTROLYTIC	7

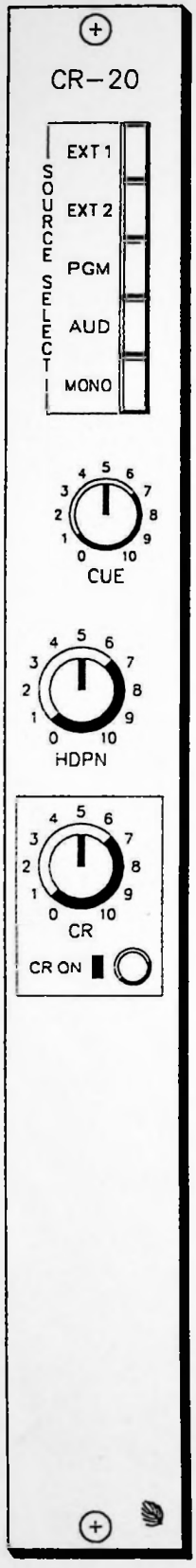
PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
CR1-10	POTENTIOMETER, 10K, MULTI-TURN	10
CT1,2 &4	CONNECTOR, 26 PIN RT. ANGLE DIL HEADER	3
CT3 & 5	CONNECTOR, 14 PIN RT. ANGLE DIL HEADER	2
LI-20	RF CHOKE, FERRITE BEAD	20
Q1	VOLTAGE REGULATOR, +5V, 7805-T	1
R1,4,16,31,33,42,46, 58,62,67,71,87,92-95 & 104	RESISTOR, 10 ±5%, 1/4 W	17
R2,3,32,37,44,45,55, 56,60,61,63,70,74,88-91 & 107	RESISTOR, 10K ±1%, 1/4W	18
R5,35,36,43,47,53,59, 64,68,76,80,81,86,84, 105 & 106	RESISTOR, 100 ±5%, 1/4W	16

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
R6-9,11,18,19,22-25, 27 & 66	RESISTOR, 1K ±5%, 1/4W	14
R10,12,14,15,17,20,21,26, 27,28,29,50 & 51	RESISTOR, 4.7K ±5%, 1/4W	13
R30,48,49,52,54,61,63	RESISTOR, 99K ±5%, 1/4W	8
R38-41	RESISTOR, 3.9K ±5%, 1/4W	4
R75-79,83,85,86, 97-100	RESISTOR, 47K ±5%, 1/4W	12
R96	RESISTOR, 4.99K ±1%, 1/4W	1
R101, 102 & 103	RESISTOR, 3.3 ±5%, 1/4W	3

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
SW1	SWITCH, 4 SECTION DIP (4-SPST)	1
U1 & 4	I.C., DUAL OP-AMP, TL072	2
U2,3 & 5-12	I.C., DUAL OP-AMP, 5532	10

OM-20 OUTPUT MODULE	
A-20 RADIO ON-AIR CONSOLE	
2-09-88	Wheatstone Corporation 8720 V.I.P. Parkway Syracuse, NY. 13211
RA	
SCALE: 2X	PCB LOAD SHEET
DO NOT SCALE	OM-20A PCB | #A20/LOAD-3

OM-20 OUTPUT LOAD SHEET



CR–20

CR-20 CONTROL ROOM

SOURCE SELECT—This switchbank determines what (stereo) signal will be fed to the control room monitor speaker and the console operator's headphone. In addition to the console Program, Audition and Mono (sum) buses, two external stereo line inputs may be selected.

CUE—The master level control for the Cue circuit. It feeds an external output port as well as optional control room and headphone interrupts.

HDPN—The headphone level control (stereo). This control is high quality conductive plastic to assure reliable operation. The headphone signal is fed to a ¼" headphone jack located in the console frame below counter level.

CR—The level control for the control room monitor signal (stereo). This control is high quality conductive plastic to assure reliable operation.

CR ON—Turns the control room monitor signal on and off (w/LED indicator).

PROGRAMMABLE FUNCTIONS—Cue may be programmed to *interrupt* the *headphone* circuit *and/or control room* monitor circuits via an internal dipswitch. When the headphones are programmed, the regular source select signal is replaced in both channels by the Cue signal. With the control room circuits, a split cue mode is available. When activated (again via the internal dipswitch) the regular stereo source signal is summed and sent to the left channel, while Cue goes to the right channel. A control room mute function will activate when those input modules so programmed are turned on (see MM-20 and SL-20 module pages). An *on-air tally relay* will also close in response to same to control a remote tally light.

SC-20 STUDIO CONTROL (OPTIONAL)

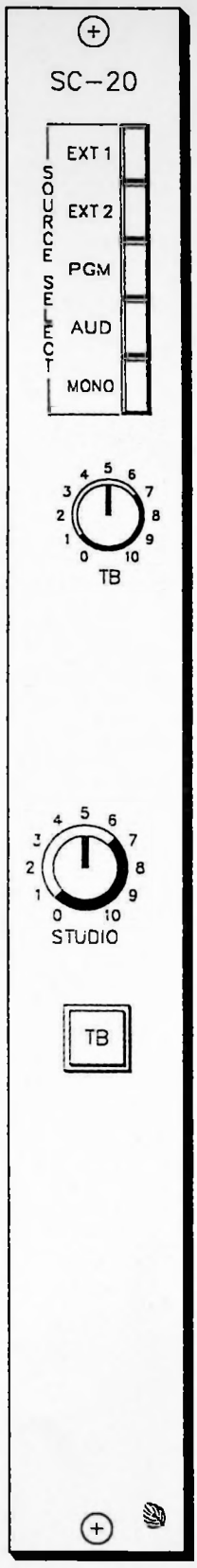
SOURCE SELECT—This switchbank determines what (stereo) signal will be fed to the studio monitor speaker system. In addition to the console Program, Audition and Mono (sum) buses, two external stereo line inputs may be selected.

TALKBACK—Controls talkback level coming into studio. (Announcer mic module would be dipswitch programmed to feed the bus to this talkback function.)

STUDIO—Controls signal level going to studio speaker system. This control is high quality conductive plastic to assure reliable operation.

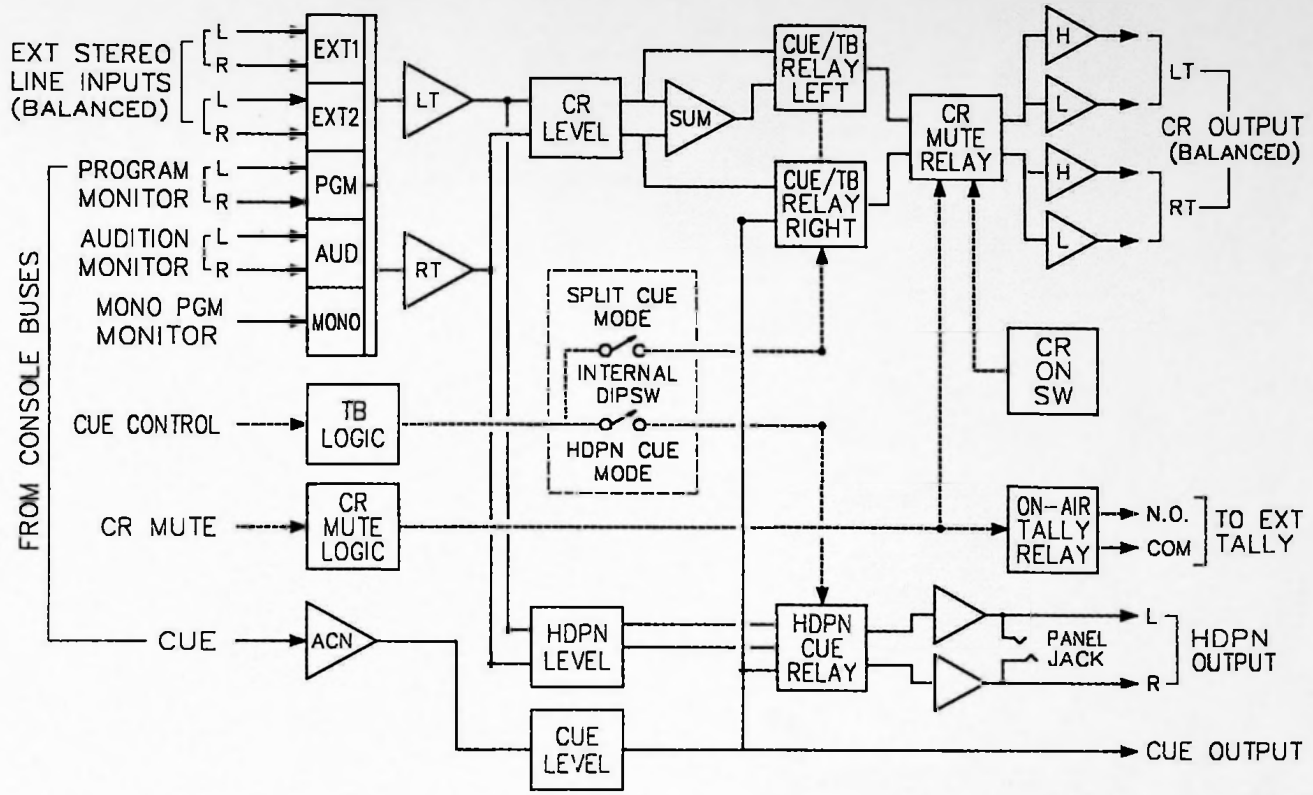
TALKBACK BUTTON—Momentary button feeds announcer mic to studio output.

STUDIO MUTE—Studio mic module is dipswitch selected to mute studio when studio mic is On.

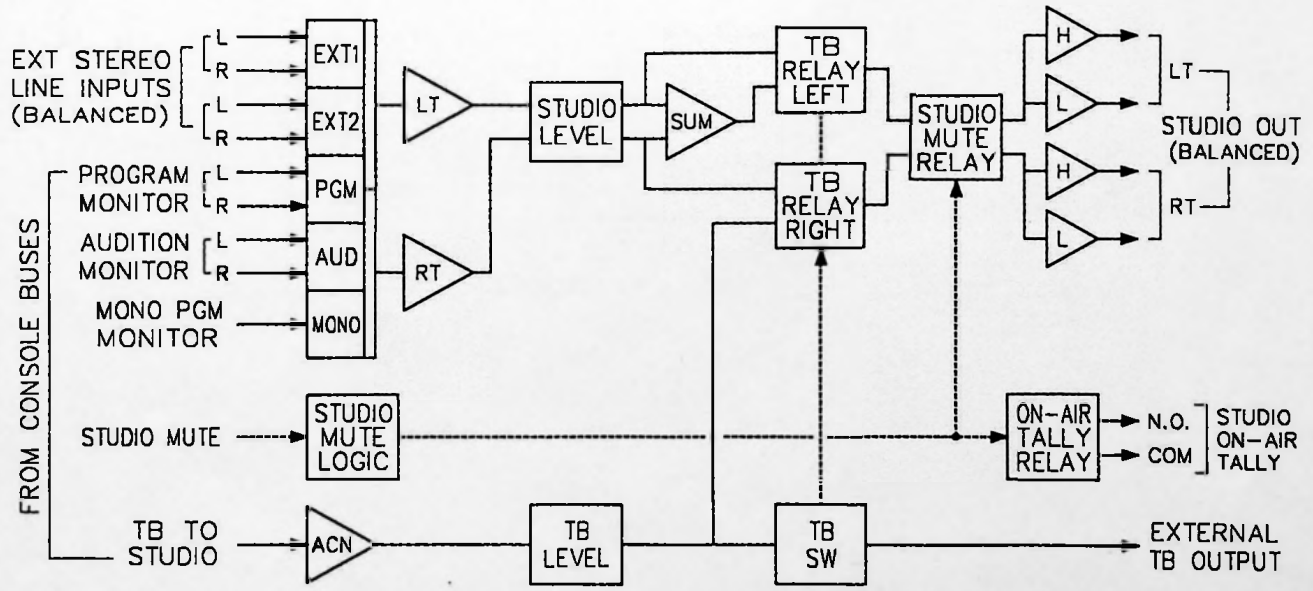


SC–20
(OPTIONAL)

CR–20 CONTROL ROOM MODULE

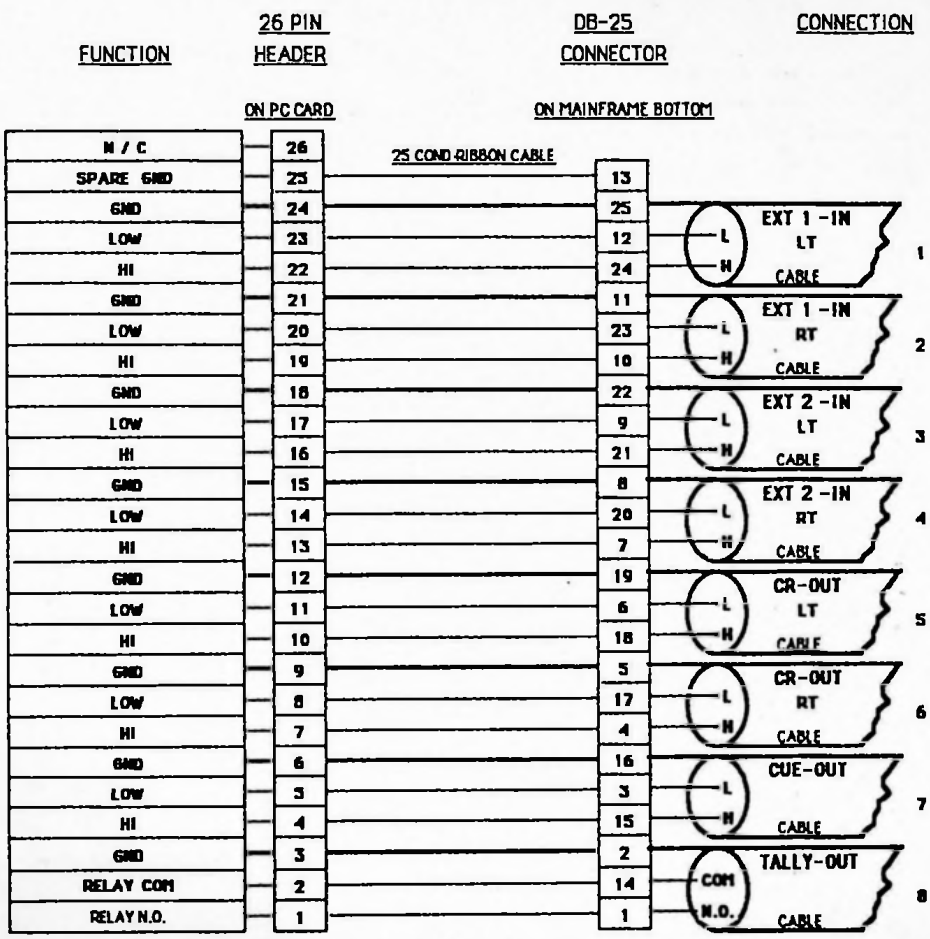


OPTIONAL SC–20 STUDIO CONTROL MODULE

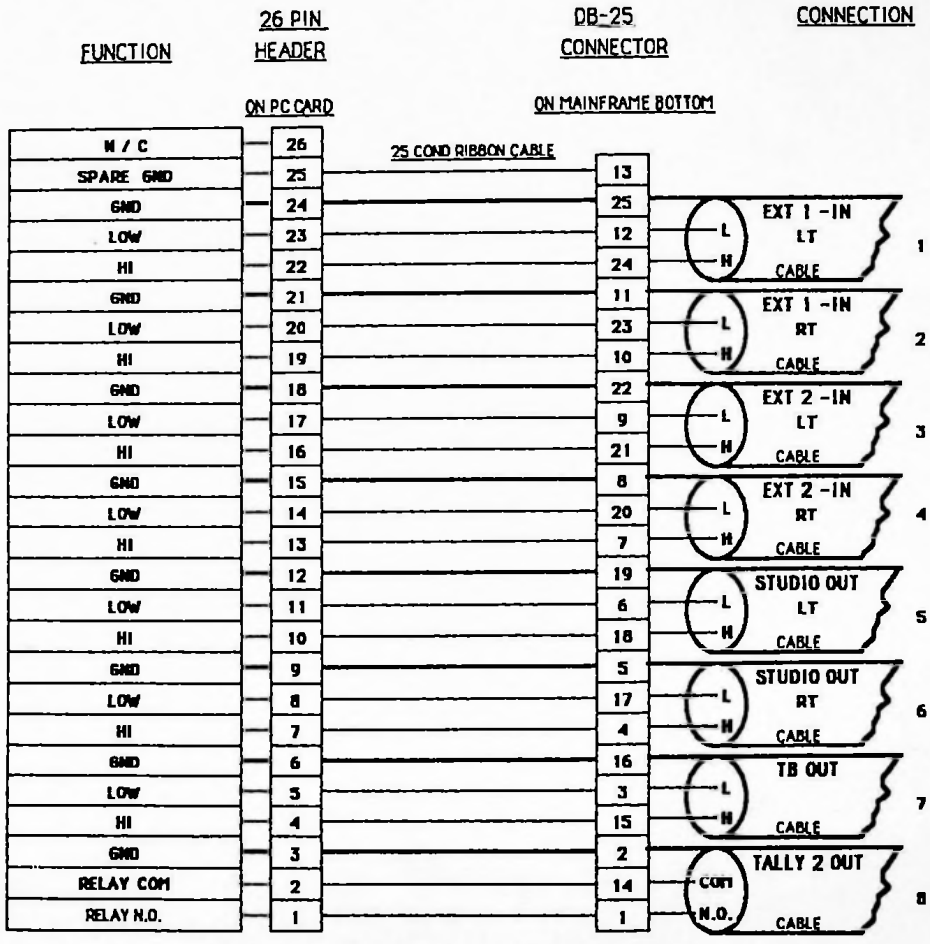


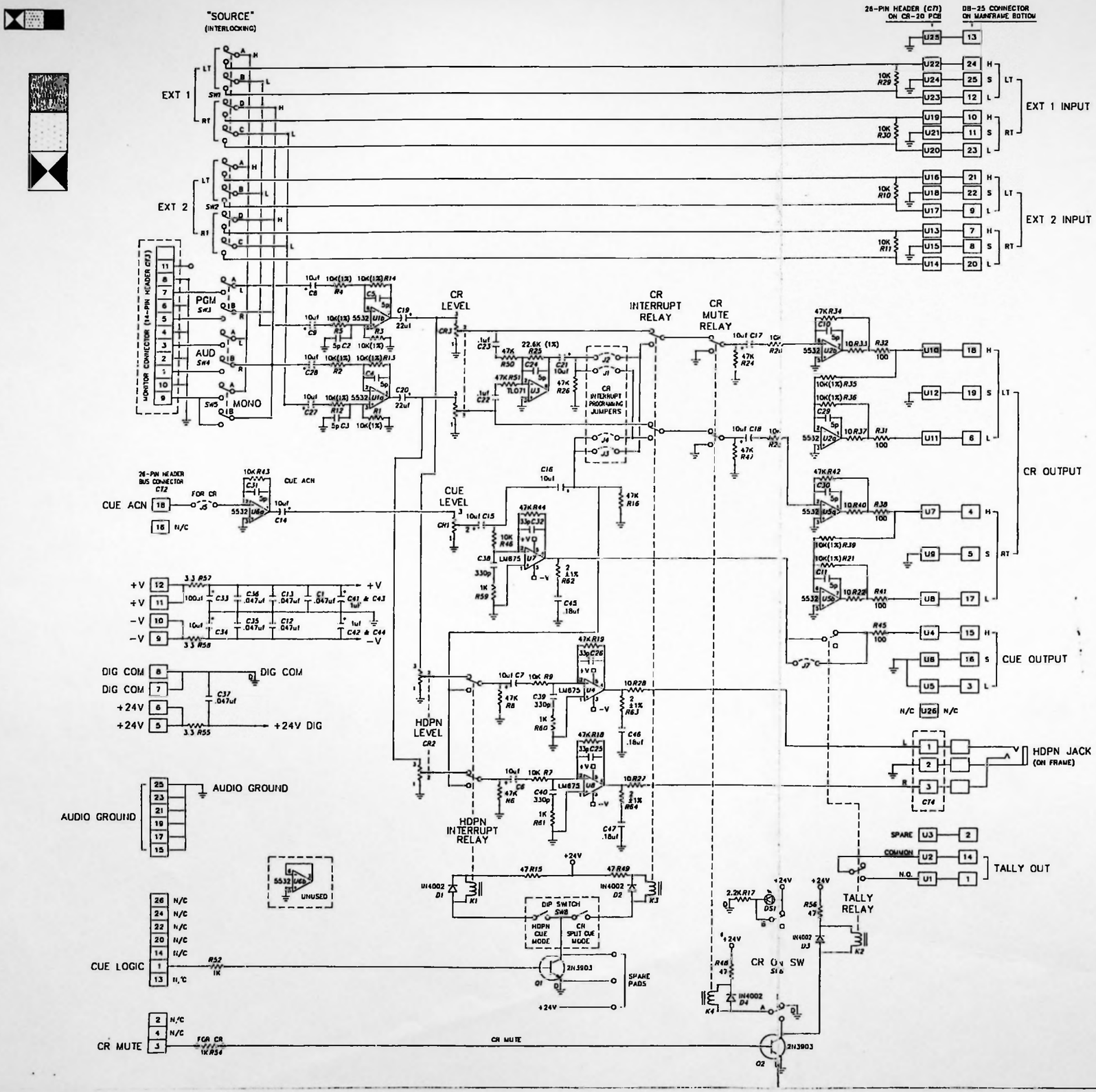
CR-20 UPPER INTERFACE CHART

2-11-88 GCS



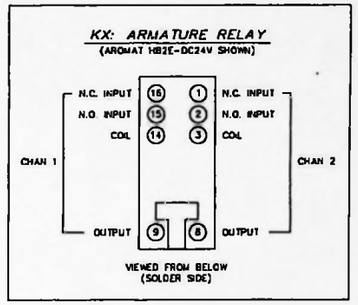
SC-20 UPPER INTERFACE CHART

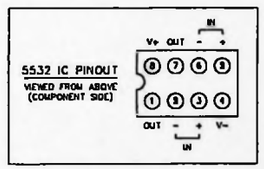


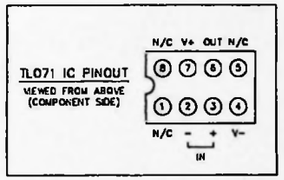


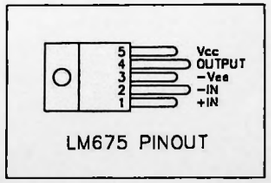
UPPER DB-25 I/O CONNECTOR
CR-20 MODULE

EXT 1 LT IN SHIELD	13	N/C
EXT 1 LT IN HIGH	25	EXT 1 LT IN LOW
EXT 1 RT IN LOW	24	EXT 1 RT IN SHIELD
EXT 2 LT IN SHIELD	12	EXT 1 RT IN HIGH
EXT 2 LT IN HIGH	23	EXT 2 LT IN LOW
EXT 2 RT IN LOW	11	EXT 2 RT IN SHIELD
CR LT OUT SHIELD	10	EXT 2 RT IN HIGH
CR LT OUT HIGH	22	CR LT OUT LOW
CR RT OUT LOW	9	CR RT OUT SHIELD
CUE OUT SHIELD	21	CR RT OUT HIGH
CUE OUT HIGH	8	CUE OUT LOW
TALLY OUT COMMON	20	TALLY OUT SHIELD
	7	TALLY OUT N.O.

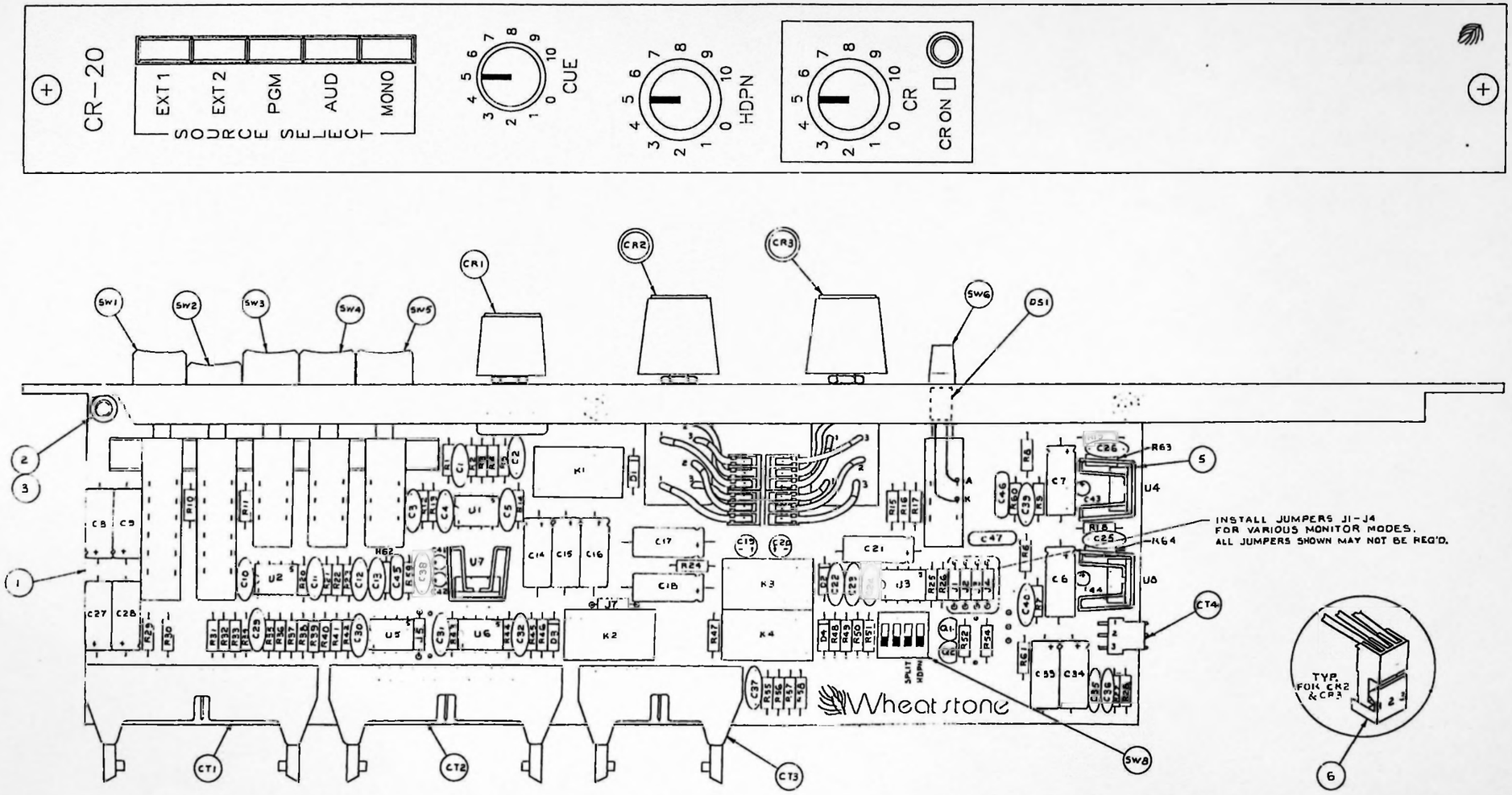








CR-20 CONTROL ROOM		
A20/A32 RADIO ON-AIR CONSOLE		
05-15-91	Wheatstone Corporation 6720 V.I.P. Parkway Syracuse, N.Y. 13211	
JS		
NO SCALE	MODULE SCHEMATIC DWG	
	CR-200 PCB	#A20/SCH-4



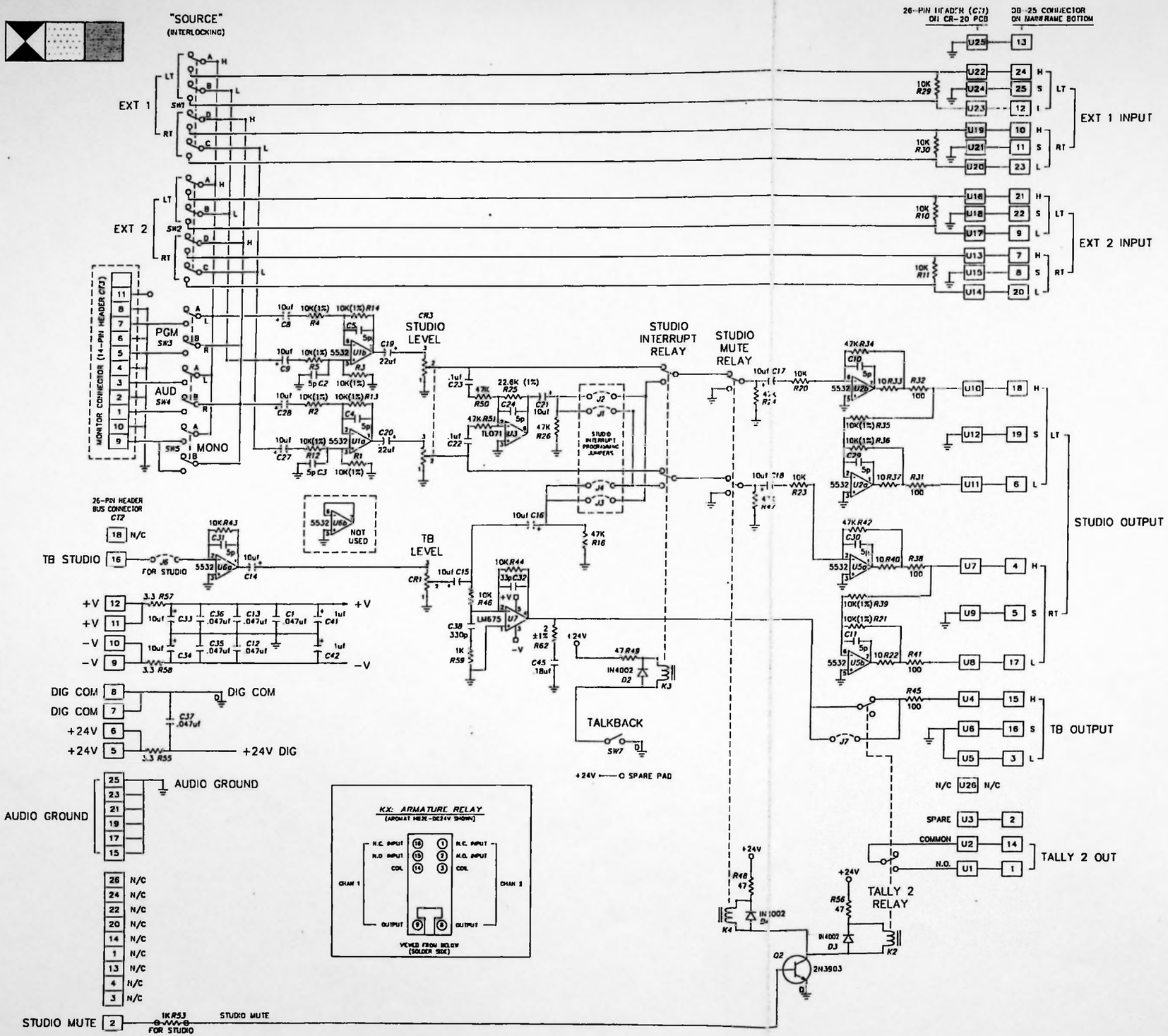
PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
1	PRINTED CIRCUIT BD, CR-20	1
2	SCREW, FIL HD, PHILLIPS, #4-40 x 3/8 LG	3
3	CLIP-CLINCH NUT #4-40	3
4	DIP SOCKET, 8 PINS	5
5	HEAT SINK (10-220)	3
6	CONNECTOR, 3 PIN LOCKING ST. HEADER	4
C25,26,32	CAPACITOR, 33pF, CERAMIC	3
C1,12,13,35,36&37	CAPACITOR, .047µf, CERAMIC	6
C2-5,10,11,24,29 30, & 31	CAPACITOR, 5pf, CERAMIC	10
C6-9,14-18,21,27,28,	CAPACITOR, 10µf/25V, ELECTROLYTIC	12
C33& 34	" 100+7/35V "	2
C19 & 20	CAPACITOR, 22µf/25V, ELECTROLYTIC	2
C22 & 23	CAPACITOR, .1µf, CERAMIC	2

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
CR1	POTENTIOMETER, 10K	1
CR2 & 3	POTENTIOMETER, DUAL 10K W/CABLE	2
CT1 & 2	CONNECTOR, 26 PIN RT. ANGLE DIL HEADER	2
CT3	CONNECTOR, 14 PIN RT. ANGLE DIL HEADER	1
CT4	CONNECTOR, 3 PIN RT. ANGLE SIL HEADER	1
C38,39,40	CAPACITOR, 330pf, CERAMIC	3
DI-4	DIODE, IN4002	4
DS1	DISPLAY, RED LED, .10 X .20	1
J1-5 & 7	JUMPER	6
K1-4	RELAY, DPDT, 24V	4
Q1&2	TRANSISTOR, 2N3903, NPN	2
C41-44	CAPACITOR, 1µf/25V, TANT	4
C45,46 & 47	CAPACITOR, .18µf, FILM	3

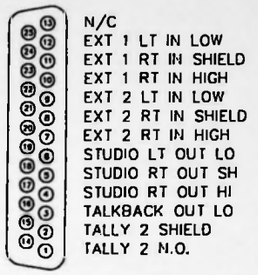
PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
R1-5,12,13,14,21,35,36,39	RESISTOR, 10K±1%, 1/4W	12
R7,9,10,11,20,23,29,30 & 46	RESISTOR, 10K±5%, 1/4W	9
R6,8,16,18,19,24,26, 34,42,44,47,50&51	RESISTOR, 47K±5%, 1/4W	13
R22,27,28,33,37&40	RESISTOR, 10±5%, 1/4W	6
R17	RESISTOR, 2.2K±5%, 1/4W	1
R31,32,38,41,43	RESISTOR, 100±5%, 1/4W	5
R5557&58	RESISTOR, 3.3±5%, 1/4W	3
R15,48,49&56	RESISTOR, 47±5%, 1/4W	4
R62,63&64	RESISTOR, 2.2K, 1/4W	3
R52,54,59,60,61	RESISTOR, 1K±5%, 1/4W	5
SW1-5	SWITCH ASSY, 2-4PDT & 3-DPDT, INTERLOCKED	1
SW6	SWITCH, DPDT	1

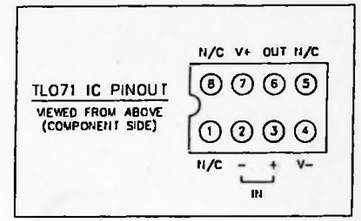
PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
SW8	SWITCH, DIP, 4-SPST	1
U1,2,5&6	I.C., DUAL OP-AMP, 5532	4
U3	I.C., SINGLE OP-AMP, TL071	1
U4,7&8	I.C., POWER AMP, LM675	3
R25	RESISTOR, 22.6K ±1%, ¼w	1

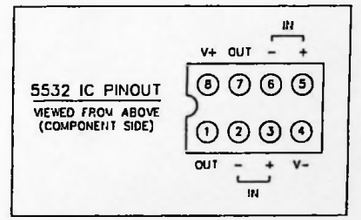
CR-20 CONTROL ROOM	
A-20 RADIO ON-AIR CONSOLE	
MAY 18, '81	Wheatstone Corporation 8720 V.I.P. Parkway Syracuse, NY. 13211
RA	
SCALE: 2X	PCB LOAD SHEET
DO NOT SCALE	CR-20D PCB / A20/LOAD-3

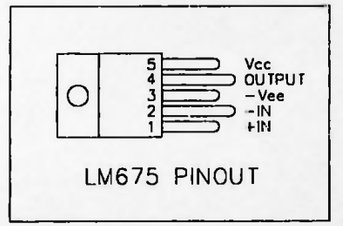


UPPER DB-25 I/O CONNECTOR
SC-20 MODULE



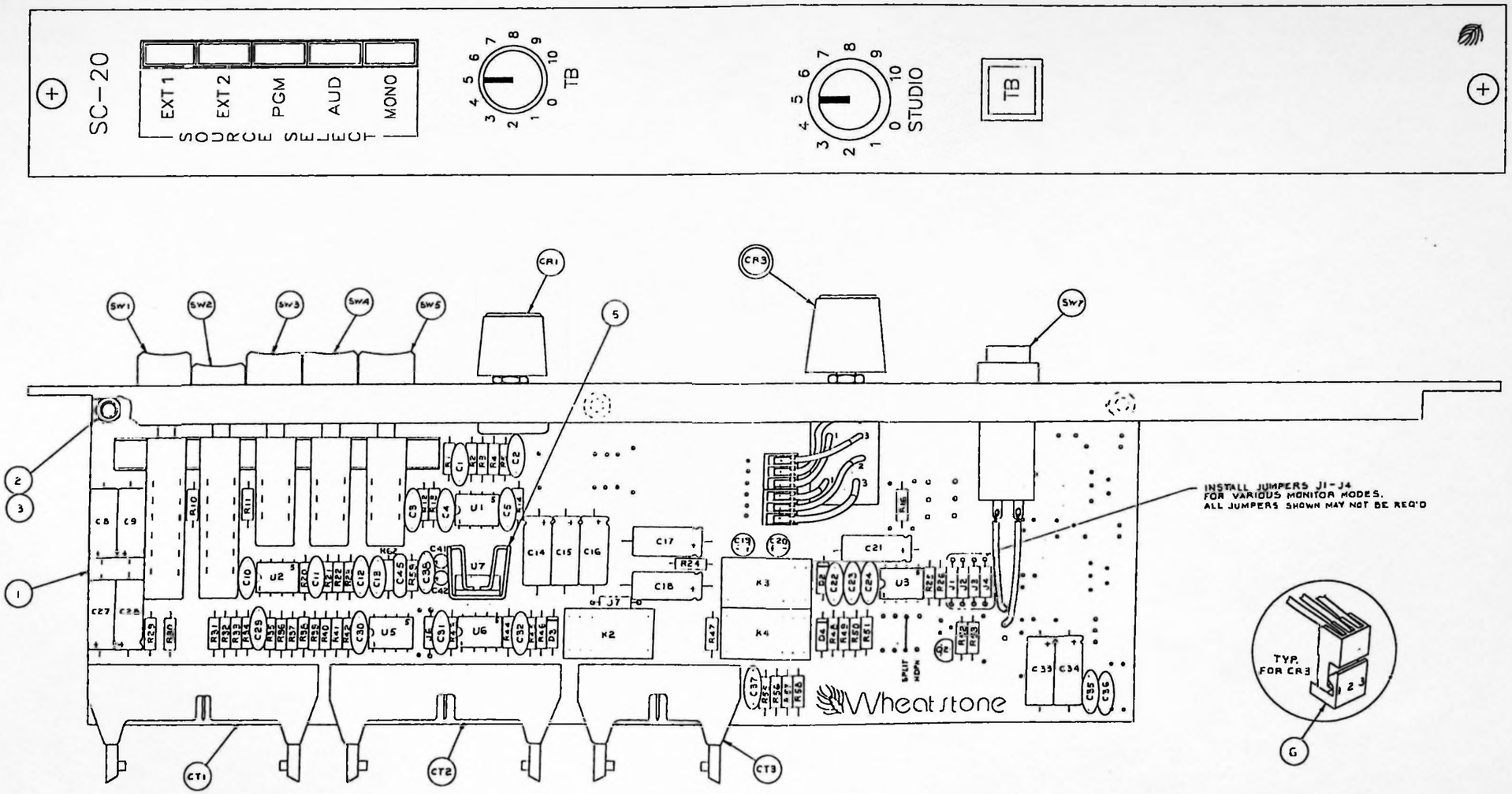






SC-20 STUDIO CONTROL SCHEMATIC

SC-20 STUDIO CONTROL	
A20/A32 RADIO ON-AIR CONSOLE	
05-14-91	Wheatstone Corporation 6720 V.I.P. Parkway Syracuse, N.Y. 13211
JS	
NO SCALE	SCHEMATIC DWG
REV 5-14-91	CR-20D PCB / A20_SCH-5



PARTS LIST		
ITEM NO.	DESCRIPTION	QTY
1	PRINTED CIRCUIT BD, CR-20	1
2	SCREW, FLAT HD, PHILLIPS, #4-40 x 3/8	3
3	SELF CLINCHING NUT, #4-40	3
4	DIP SOCKET, 8 PINS	4
5	HEAT SINK	1
6	CONNECTOR, 3 PIN LOCKING ST. HEADER	2
C1,12,13,35,36 & 37	CAPACITOR, .047 µf, CERAMIC	6
C2-5,10,11,24,29,30,31,32	CAPACITOR, 5 pf, CERAMIC	11
C6,9,14-16,21,27,28,33,34	CAPACITOR, 10 µf/25V, ELECTROLYTIC	12
C19 & 20	CAPACITOR, 22 µf/25V, ELECTROLYTIC	2
C22 & 23	CAPACITOR, .1 µf, CERAMIC	2
C38	CAPACITOR, 330pf, CERAMIC	1
C45	CAPACITOR, .18 µf, FILM	1

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
CR1	POTENTIOMETER, 10K	1
CR3	POTENTIOMETER, DUAL 10K W/CABLE	1
CT1 & 2	CONNECTOR, 26 PIN RT. ANGLE DIL HEADER	2
CT3	CONNECTOR, 14 PIN RT. ANGLE DIL HEADER	1
D2,3 & 4	DIODE, IN4002	3
J1-4,6 & 7	JUMPER	6
K2,3 & 4	RELAY, DPDT, 24V	3
Q2	TRANSISTOR, 2N5903, NPN	1
C41 & 42	CAPACITOR, 1 µF/25V, TANT	2

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
R1-6,12,13,14,21,35,36,39	RESISTOR, 10K ±1%, 1/4W	12
R10,11,20,23,29,30,43,46	RESISTOR, 10K ±5%, 1/4W	8
R16,24, 26,44,47,60 & 51,54,62	RESISTOR, 47K ±5%, 1/4W	17
R22,33,37 & 40	RESISTOR, 10 ±5%, 1/4W	4
R31,32,38,41,45,62	RESISTOR, 100 ±5%, 1/4W	6
R55,57 & 58	RESISTOR, 3.3 ±5%, 1/4W	3
R48,49 & 56	RESISTOR, 47 ±5%, 1/4W	3
R34 & 42	RESISTOR, 100K ±5%, 1/4W	2
R53, R59	RESISTOR, 1K ±5%, 1/4W	2
RC2	RESISTOR, 2 ±1%, 1/4W	1
SW1-6	SWITCH ASSY, 2-4PDT & 3-DPDT, INTERLOCKED	1
SW7	SWITCH, MOMENTARY (N/O)	1

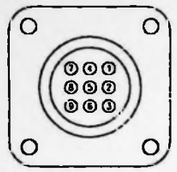
PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
U1,2,5 & 6	I.C., DUAL OP-AMP, 5532	4
U3	I.C., SINGLE OP-AMP, TL071	1
U7	I.C., POWER AMP LM675	1
R25	RESISTOR, 22.6K ±1%, 1/4W	1

SC-20 STUDIO CONTROL

A-20 RADIO ON-AIR CONSOLE

May 18 '91	Wheatstone Corporation 8720 V.I.P. Parkway Syracuse, NY. 13211
RA	
SCALE: 2X	PCB LOAD SHEET
DO NOT SCALE	CR-20D PCB | A20/LOAD-4

POWER SUPPLY CONNECTOR



1) TIMER RESTART
2) +24V
3) DIGITAL COMMON
4) AUDIO COMMON
5) 60Hz SYNC
6) -18V
7) AUDIO COMMON
8) +48V
9) +18V

LM338K
LM317HVK
(BOTTOM)

PIN 1 (ADJUST)
PIN 2 (INPUT)
CASE (OUTPUT)

78XXT PINOUT

GND IN OUT

79I8T PINOUT

GND IN OUT

OPTIONAL TURRET INTERFACE PACKAGE

26-PIN HEADER | RIBBON CABLE | DH-25 CONNECTOR

+24V
+12V
+12V
DIG COM
DIG COM
60Hz
TIMER RESTART

AC IN
FAN
CHASSIS
PROGRAMMING JUMPERS FOR 115V/230V OPERATION
115V 115V 230V

PSI-20A POWER INTERFACE PCB
(MOUNTED IN CONSOLE MAINFRAME)

RED — TIMER RESTART
BLK — +24V
BLU — DIGITAL COMMON
GRY — 60Hz
BRN — +48V
VIO — +18V
GRN — -18V
ORG — AUDIO COMMON
WHT — AUDIO COMMON

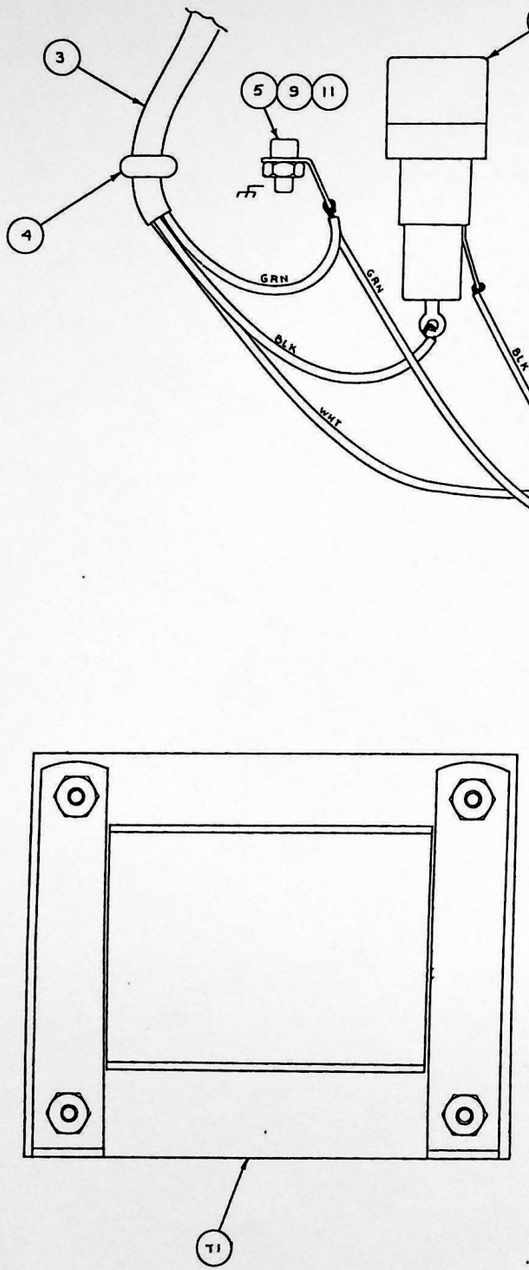
9-PIN CONNECTOR (TO CONSOLE) ◄— PS CABLE —► 9-PIN CONNECTOR (FROM PS)

TIMER RESTART
+24V
DIGITAL COMMON
+48V
+18V
-18V
AUDIO COMMON

26-PIN HEADER CONNECTOR
(TO CONSOLE BUS LINES)

PS/PSI-20 POWER SUPPLY	
A-20/A-32 RADIO ON-AIR CONSOLE	
4-23-90	Wheatstone Corporation, 6720 V.I.P. Parkway, Syracuse, NY. 13211
CAZ	
	SCHEMATIC DRAWING
PS-20D & PSI-20D PCBs	

4-24-91 - 48V-D; ADDED DIODE D16, DIS, D17, J7



PARTS LIST

ITEM NO.	DESCRIPTION	QTY.
1	PRINTED CIRCUIT BD, PS-20	1
2	HEAT SINK / REAR BRACKET	1
3	A.C. POWER CORD	1
4	GROMMET	1
5	GROUND LUG (CHASSIS)	1
6	FUSE HOLDER	1
7	SCREW, PLASTIC, #4-40 X 3/8 LG	4
8	SCREW, PAN HD, SLOTTED, #6-32 X 3/8 LG	6
9	SCREW, SOCKET HD, CAP. #6-32 X 3/8 LG	1
10	HEX NUT, #4-40	4
11	HEX NUT, #6-32	7
C1-4	CAPACITOR, .005μf/1KV, CERAMIC	4
C5	CAPACITOR, 470μf/63V, ELECTROLYTIC	1
C6	CAPACITOR, 1μf/50V, ELECTROLYTIC	1
C7,8,10,11,15 &14	CAPACITOR, 1μf/35V, TANTALUM	6
C9,12.	CAPACITOR, 4700μf/35V, ELECTROLYTIC	2
C16 &17	CAPACITOR, 10μf/35V, ELECTROLYTIC	2
C15	CAPACITOR, 10,000μf/35V, ELECTROLYTIC	1
D1-6 &9-17	DIODE, IN4002	15
DS1	DISPLAY, LED, YEL (.20" SQ)	1
DS2	DISPLAY, LED, GRN (.20" SQ)	1
DS3 & 4	DISPLAY, LED, RED (.20" SQ)	2
D7 & 8	DIODE, GA4	2
CT1	CONNECTOR, 9 PIN FLANGE MT. BULK HD	1
CT2	CONNECTOR & CABLE ASSY, DB25S TO 25PIN DIL	1
CT3	CONNECTOR, 26 PIN DIL RT. ANGLE HEADER	1
CR1	TRIM-POT, 10K	1
Q1	REGULATOR, +48V, LM317HVK (TO-3)	1
Q2	REGULATOR, -18V, 7918T (TO-220)	1
Q3	REGULATOR, +18V, 7818T (TO-220)	1
Q4	REGULATOR, ADJUSTABLE, LM338K (TO-3)	1
Q5	REGULATOR, +12V, 7812T (TO-220)	1
R1	RESISTOR, 220 ±5%, 1/4 W	1
R2	RESISTOR, 8.45K ±1%, 1/4W	1
R3	RESISTOR, 3.3 ±5%, 1/4W	1
R4	RESISTOR, 9.1K ±5%, 1/4W	1
R5&6	RESISTOR, 1K ±5%, 1/4W	2
R7&8	RESISTOR, 2.2K ±5%, 1/4W	2
R9	RESISTOR, 220 ±5%, 1/4W	1
T1	TRANSFORMER	1
VR1 &2	VARISTOR, V82ZA2	2
VR3-6	VARISTOR, V33ZA1	4
VR7&8	VARISTOR, V47ZA1	2
F1	FUSE, 1 AMP SLO-BLO	1
J6,7	JUMPER	2
12	INSULATOR, MICA, TO-220	3
13	INSULATOR, MICA, TO-3	1

4-24-91 - REV-D, ADDED DH; DII; DIC; DI7; J7. OUTPUT DIODE PROTECTION

REV'C'- MODIFIED FOR HIGH CURRENT PWR SUPPLY RA - 3/21/90

5-25-89 ADDED R9&10 & Q4 WAS 7824T

8-23-88 CHANGE F1 TO 1 AMP SLO-BLO DWG.

POWER SUPPLY

A-20/A-32 RADIO ON-AIR CONSOLE

3-21-90

RA

SIZE: 2X

DO NOT SCALE

Wheatstone Corporation
8720 V.I.P. Parkway
Syracuse, NY. 13211

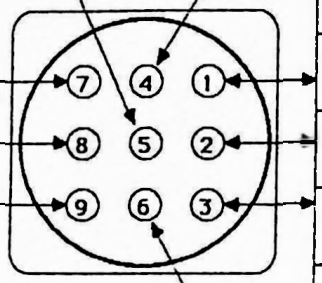
PCB LOAD SHEET

PCB PS-20D

A20/LOAD-5

A-20 MS POWER PINOUT AT PWR SUPPLY

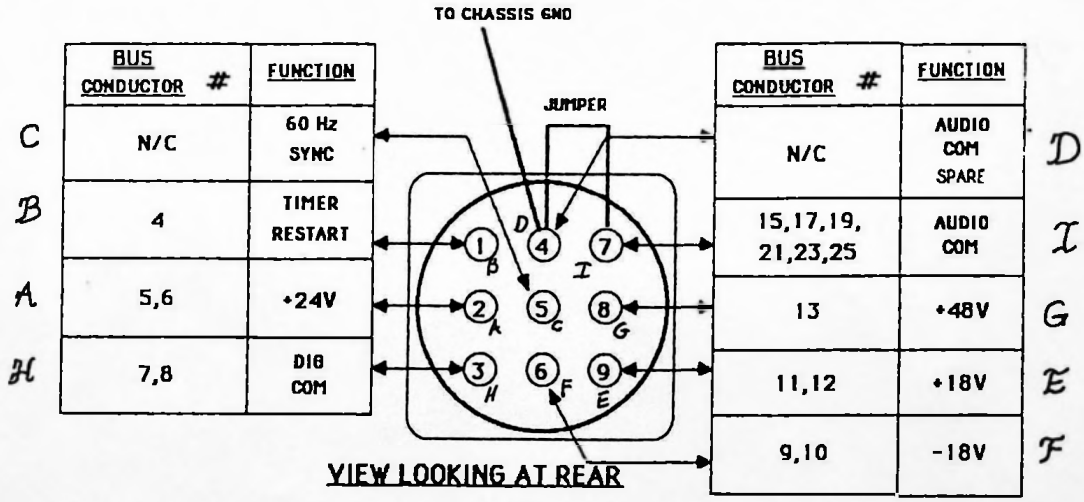
WIRE COLOR	FUNCTION
GREY	60 Hz SYNC SPARE
ORANGE	AUDIO COM
BROWN	+48V
VIO	+18V



WIRE COLOR	FUNCTION
WHT	AUDIO COM
RED	TIMER RESTART
BLACK	+24V
BLUE	DIG COM
GREEN	-18V

VIEW LOOKING AT PINS

A-20 MS POWER PINOUT AT CONSOLE

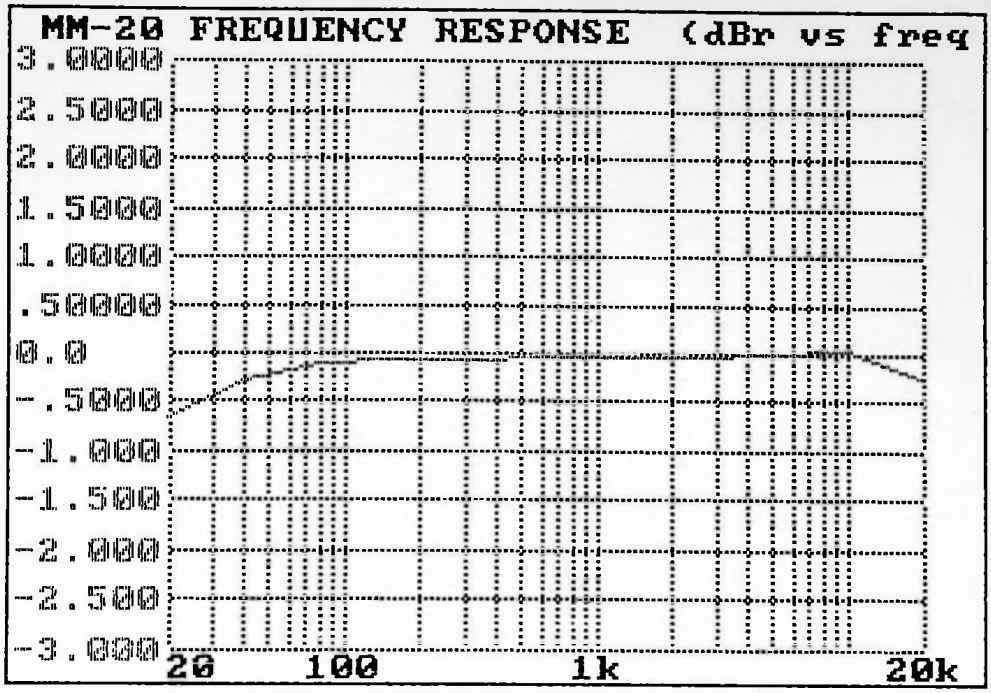


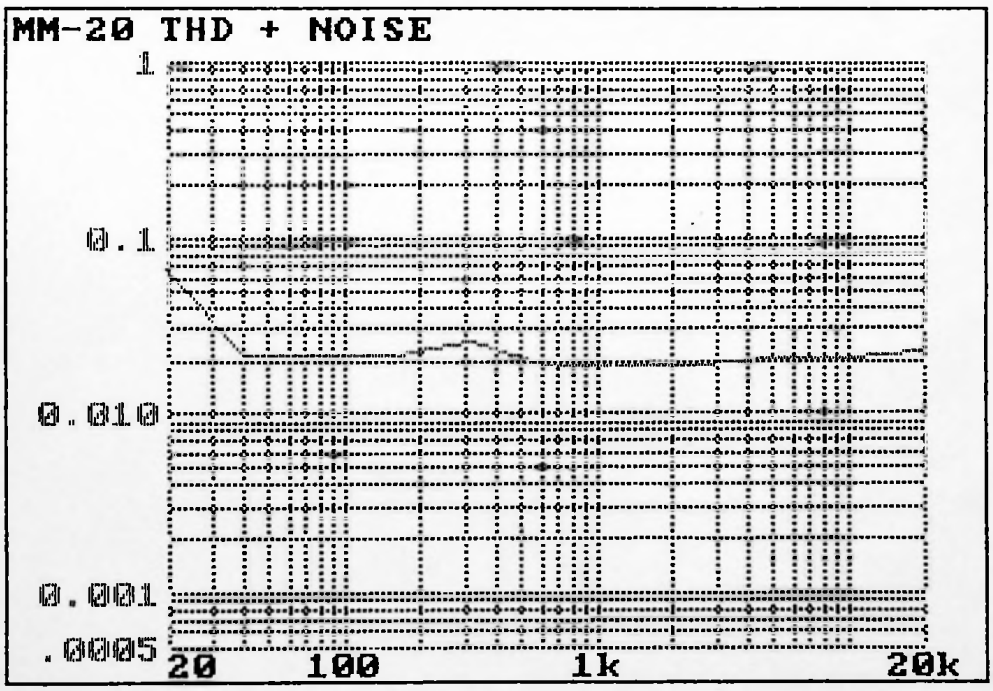
BUS CONDUCTOR #	FUNCTION
N/C	60 Hz SYNC
4	TIMER RESTART
5,6	+24V
7,8	DIG COM

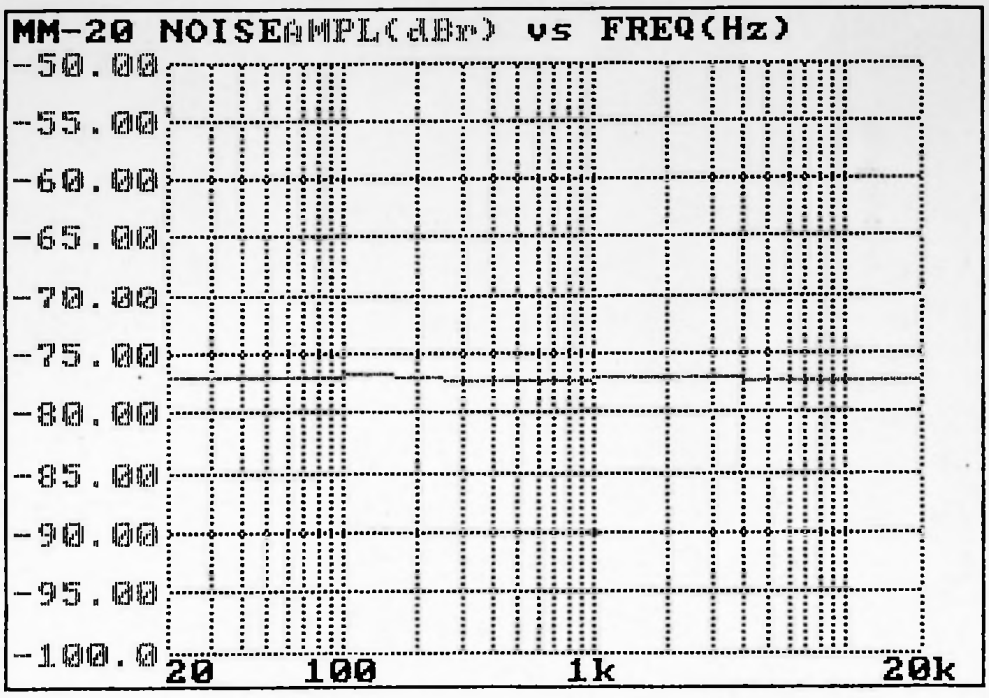
BUS CONDUCTOR #	FUNCTION
N/C	AUDIO COM SPARE
15,17,19, 21,23,25	AUDIO COM
13	+48V
11,12	+18V
9,10	-18V

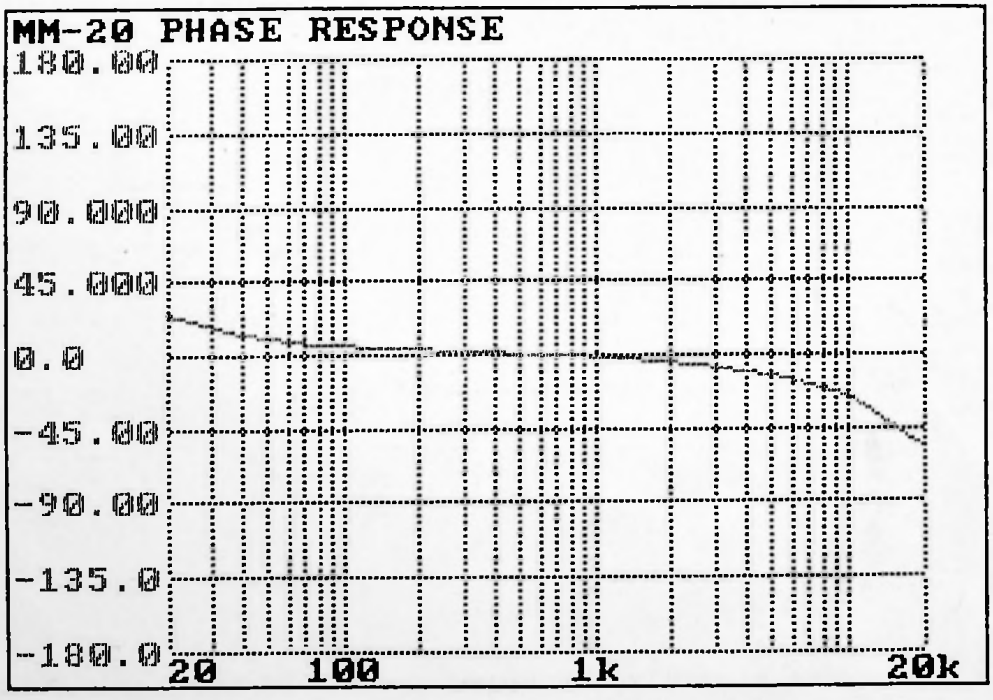
VIEW LOOKING AT REAR

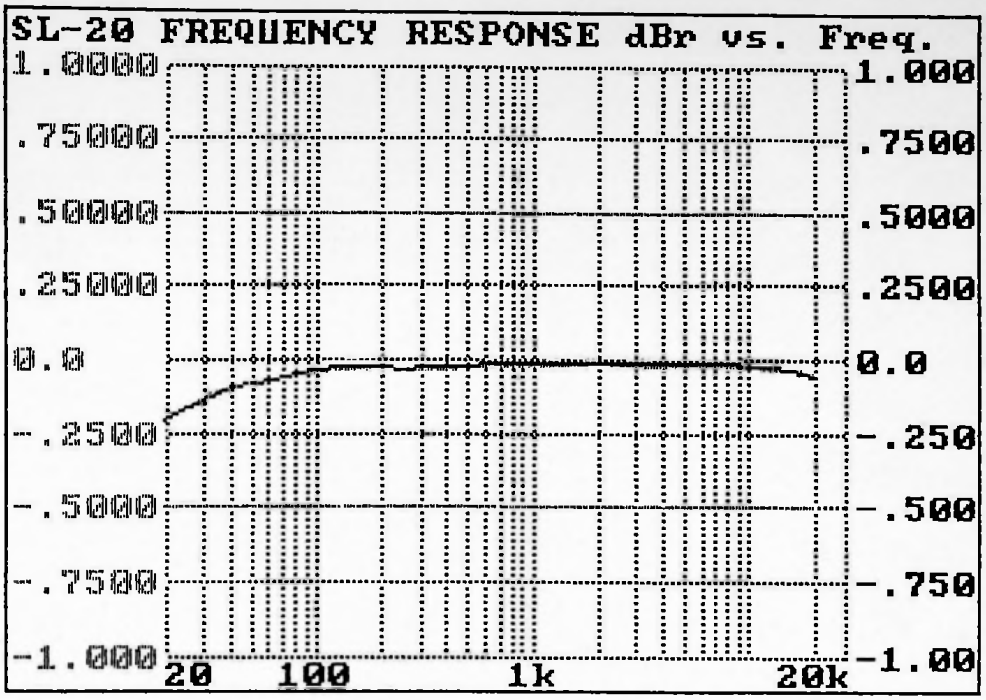
PERFORMANCE GRAPHS

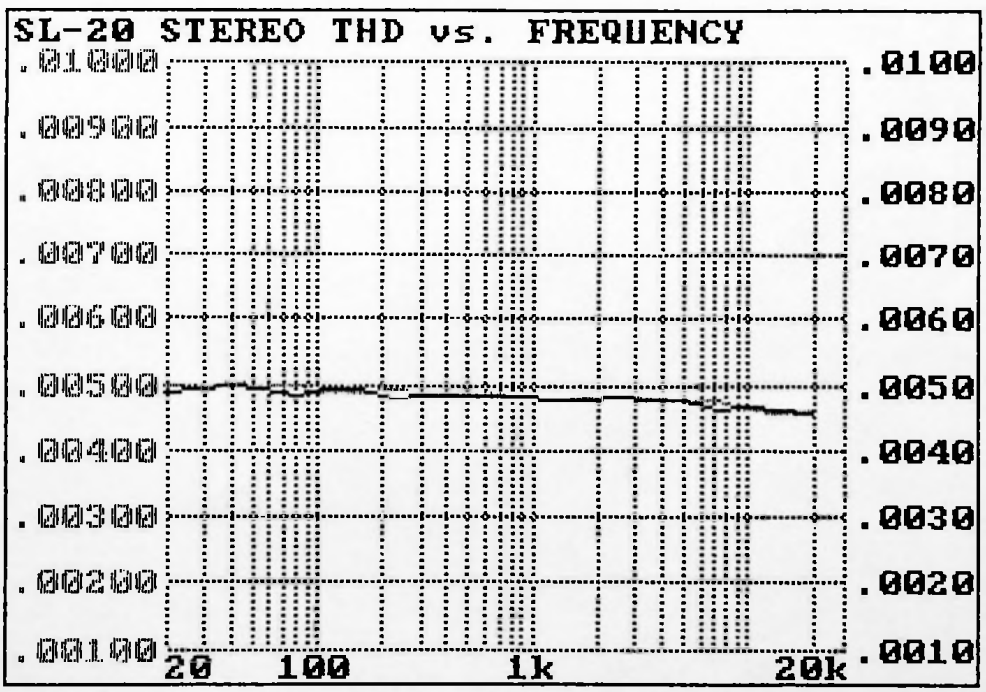

MM-20 FREQUENCY RESPONSE (dBr vs freq
3.0000
2.5000
2.0000
1.5000
1.0000
.50000
0.0
-.5000
-1.000
-1.500
-2.000
-2.500
-3.000
20
100
1k
20k

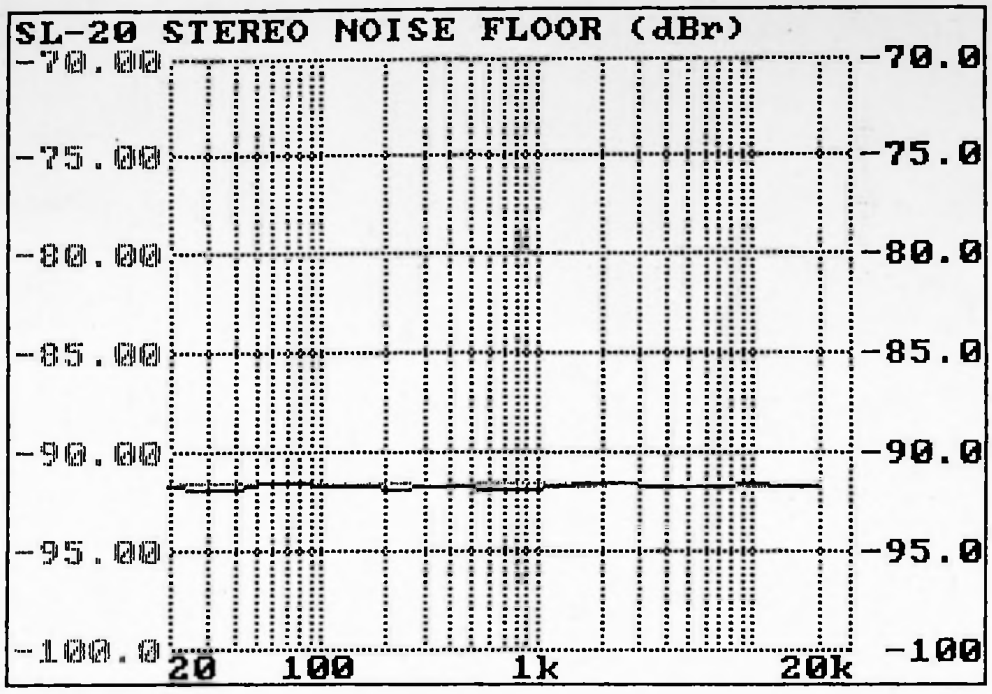

MM-20 THD + NOISE
1
0.1
0.010
0.001
.0005
20
100
1k
20k

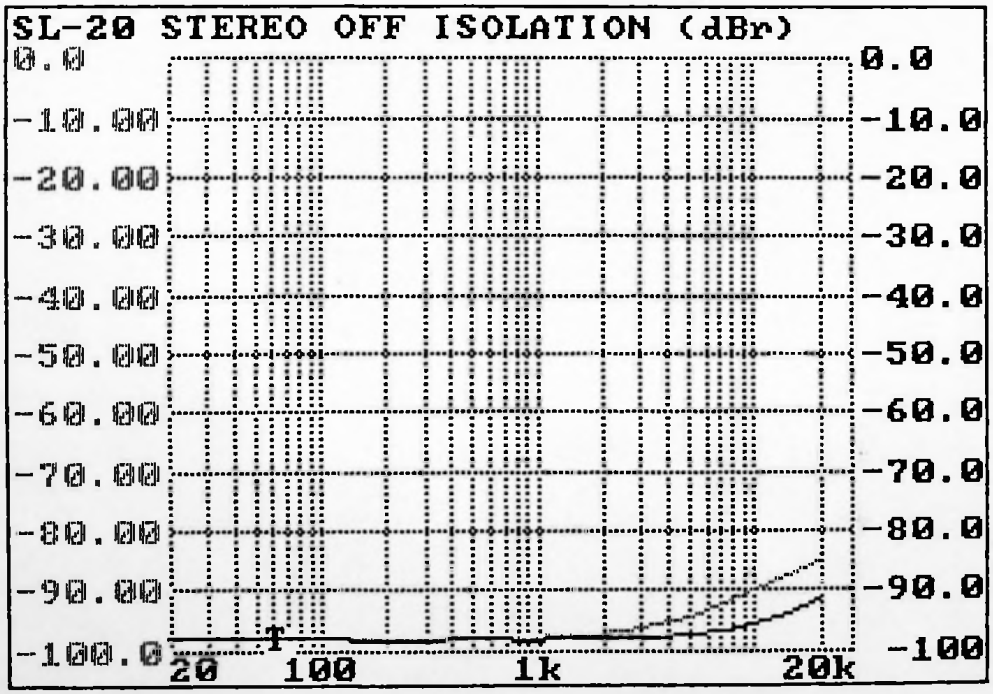

MM-20 NOISEAMPL(dBr) vs FREQ(Hz)
-50.00
-55.00
-60.00
-65.00
-70.00
-75.00
-80.00
-85.00
-90.00
-95.00
-100.0
20
100
1k
20k

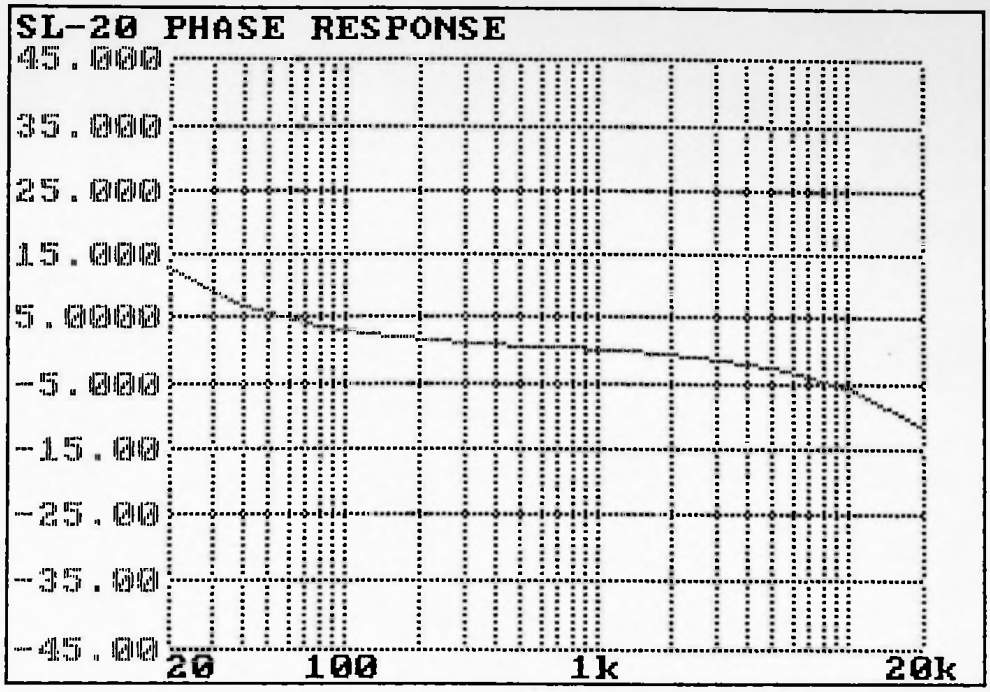

MM-20 PHASE RESPONSE
180.00
135.00
90.000
45.000
0.0
-45.00
-90.00
-135.0
-180.0
20
100
1k
20k


SL-20 FREQUENCY RESPONSE dBr vs. Freq.
1.0000
.75000
.50000
.25000
0.0
-.2500
-.5000
-.7500
-1.000
1.000
.7500
.5000
.2500
0.0
-.250
-.500
-.750
-1.00
20
100
1k
20k

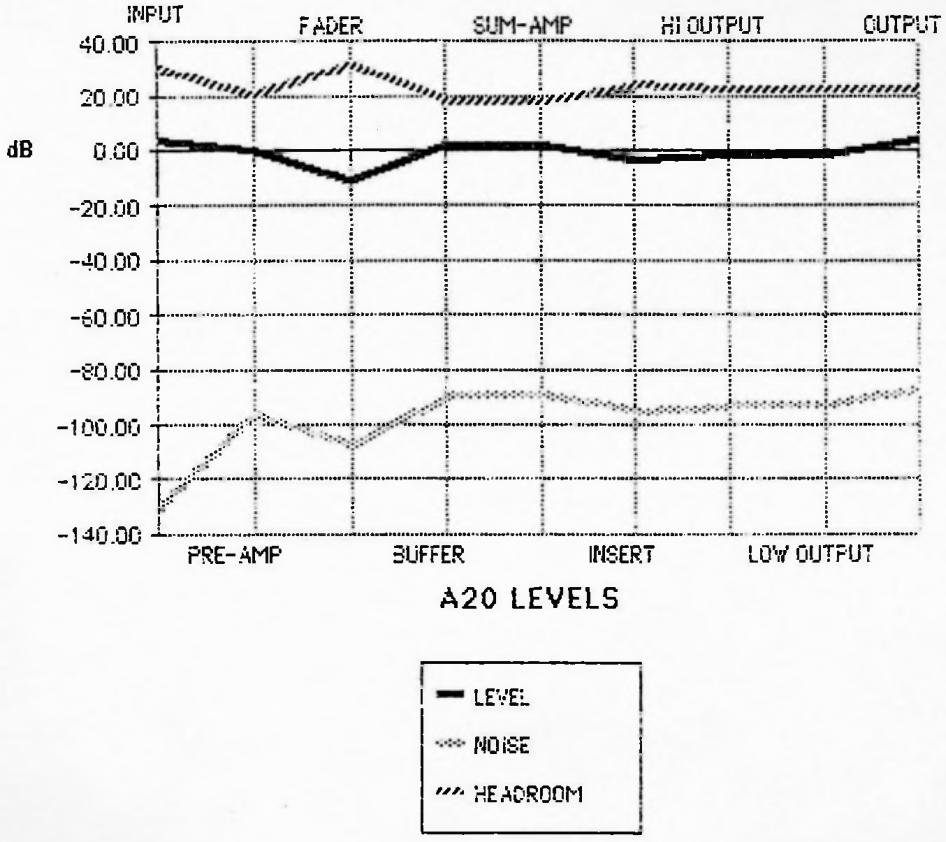

SL-20 STEREO THD vs. FREQUENCY
.01000
.00900
.00800
.00700
.00600
.00500
.00400
.00300
.00200
.00100
.0100
.0090
.0080
.0070
.0060
.0050
.0040
.0030
.0020
.0010
20
100
1k
20k


SL-20 STEREO NOISE FLOOR (dBr)
-70.00
-75.00
-80.00
-85.00
-90.00
-95.00
-100.0
-70.0
-75.0
-80.0
-85.0
-90.0
-95.0
-100
20
100
1k
20k


SL-20 STEREO OFF ISOLATION (dBr)
0.0
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
-80.00
-90.00
-100.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-100
20
100
1k
20k


SL-20 PHASE RESPONSE
45.000
35.000
25.000
15.000
5.0000
-5.000
-15.00
-25.00
-35.00
-45.00
20
100
1k
20k

A-20 LEVEL GRAPH



PARTS LISTS

A-20 FRAME

A20 FRAME PARTS LIST			
UPDATED 6/13/88			
PART NAME /#	QTY USED	WHERE USED	NOTES
CABLE ASSEMBLIES			
MAIN BUS	1	---	MAIN INTERCONNECT BUS
MONITOR BUS	1	---	CONNECTS OM,CR, & SC MODULES
VU CABLE ASSEMBLY	1	---	
DB-I/O CABLE	VARIES	---	CONSOLE I/O CABLE
TIMER CABLE ASSEMBLY	1	---	
CONNECTORS			
26 PIN CONNECTOR	16	FRAME	MAIN BUS CONNECTOR
DB-25 BLANK	VARIES	FRAME	COVER FOR UNUSED DB-25
DB-25 CONNECTOR	VARIES	---	CONSOLE I/O CONNECTOR
DB-25 PINS	25 PER DB-25	---	PINS FOR DB-25
RT ANGLE HOOD	1 PER DB-25	---	HOOD FOR DB-25
CLASPS	2 PER DB-25	FRAME	LATCH BLOCKS FOR DB-25
8-PIN RIBBON CONN.	2	---	TIMER CONNECTOR
14 PIN PLUG	4	---	MONITOR & METER BUS CONNECTOR
MIL_CHASSIS (PC)	1	---	MULTIPIN POWER CONNECTOR
112 JACK	1	FRAME	RTS HEADPHONE JACK
FRAME PARTS			
A20 VU METER	4	METER BRIDGE	
PSI-20 CARD	1	---	POWER INTERFACE CARD
TM-6 TIMER	1	METER BRIDGE	#TM-6 TIMER
A20 METER CLIPS	5	METER BRIDGE	
METER LAMP HOLDERS	4	METER BRIDGE	
METER LAMPS	4	VU METERS	12 VOLT CARTRIDGE TYPE
A20 FRAME	1	---	METAL FRAME ASSEMBLY
A20 FRAME SIDEPLATES	2	---	OAK SIDEPLATES
A20 CONNECTOR COVER	1	---	BOTTOM COVER
A20 PLEXI	1	METER BRIDGE	PLEXIGLASS PANEL
GROUND KIT	1	FRAME	GROUND BUS CONNECTOR

MIC. INPUT

MM20 PARTS LIST UPDATED 6/10/88	MM-20 EACH USED	WHERE USED	NOTES
PART NAME / #			
CONTROLS			
F2UEE_LT	2	SW2,SW3	ASSIGNMENT SWITCHES
F4UEE_LT	1	SW1	A/B SOURCE SWITCH
T1STURN_TRIM	1	CR1	GAIN TRIMMER, 10KΩ
M104_MONO_FADER	1	CR2	SLIDE FADER
KNOBS			
FU_GRAY	1	SW1	A/B SWITCH BUTTON
SLIDE	1	---	SLIDE FADER KNOB
CONNECTORS			
J14_PIN	1	U2	14 PIN DIP I.C. SOCKET
J8_PIN	1	U1	8 PIN DIP I.C. SOCKET
SEMICONDUCTORS			
Q1N4002	4	D1-D4	1 AMP 100 PIV
Q7805REG (L05AWC)	1	Q3	5 VOLT REGULATOR
NE5532	1	U1	DUAL OP-AMP
Q74LS00	1	U2	TTL-LS GATES
Q2N3903	2	Q1,Q2	2N3903 (NPN) TRANSISTOR
LED			
8X_RED	1	DS1	SQUARE RED LED
CAPACITORS			
CP5P	1	C12	5pFd CERAMIC DISC
CP33P	1	C9	33 pFd CERAMIC DISC
CP330P	1	C8	330 pFd CERAMIC DISC
CP.001_DISC	4	C2,C3,C4,C6	001µFd CERAMIC DISC
CP.047_DISC	5	C5,C7,C13,C16,C17	0.047uFd CERAMIC DISC
CP10UF_25V	1	C19	10µFd 35V ELECTROLYTIC
CP220UF_25V	1	C20	220µFd 35V ELECTROLYTIC
CP470UF_25V	1	C1	470uFd 35V ELECTROLYTIC
CP1UF_TANT	1	C18	1µFd 35V TANTALUM
CP22UF_UP	4	C10,C11,C14,C15	22uFd 25V ELECTROLYTIC
HARDWARE			
MIC_XFORMER	1	T1	MIC INPUT TRANSFORMER
AROMAT_RELAY	1	K1,K2	DPDT 24V RELAY
MISC			
B2_BANK_RAIL	1	---	ASSIGN SWITCH MOUNTING RAIL
LG_ORG_BARN_DOOR	1	SW2	PROGRAM SWITCH BUTTON
LG_BLUE_BARN_DOOR	1	SW3	AUDITION SWITCH BUTTON
DIALITE_SWITCH (311)	2	SW4,SW5	ON, OFF SWITCHES
DIALITE_AMB_BUTTON	1	SW5	OFF SWITCH BUTTON
DIALITE_RED_BUTTON	1	SW4	ON SWITCH BUTTON
DIALITE_LAMP 28V	2	SW4,SW5	T 1-3/4 28V LAMP
MANUFACTURED PARTS			
MM-20 FACEPLATE	1	---	MM-20 FRONT PANEL
MM-20 PCB	1	MAIN CARD	MM-20 PCB
DIP_SWITCH_4	1	SW6	4 POSITION DIP SWITCH
26PIN_RT_HEADER	2	CT1,CT2	26 PIN RIGHT ANGLE HEADER

S40009 $47.38

LINE INPUT

Part Number — Price $

SL-20 PARTS LIST			
UPDATED 6/10/88			
	SL-20 EACH USED	WHERE USED	NOTES
PART NAME / #			
CONTROLS			
F2UEE_LT	3	SW2,SW3,SW4	ASSIGN SWITCHES,CUE SWITCH
F6UEE	1	SW1	A/B SOURCE SWITCH
T1STURN_TRIM	2	CR1,CR2	INPUT GAIN TRIMMERS, 10KΩ
M104_STEREO_FADER	1	CR3-4	STEREO FADER — S40011 — 71.64
KNOBS			
FM_GRAY	1	---	CUE SWITCH BUTTON
FU_GRAY	1	---	A/B SWITCH BUTTON
SLIDE	1	---	KNOB FOR FADER
CONNECTORS			
J14_PIN	2	U3,U4	14 PIN I.C. SOCKET
J8_PIN	2	U1,U2	8 PIN I.C. SOCKET
SEMICONDUCTORS			
Q1N4002	5	D1,D2,D5,D6,D7	1 AMP 100 PIV
Q7805REG (L05AWC)	1	Q4	5 VOLT REGULATOR
NE5532	2	U1,U2	DUAL I.C. OP-AMP
Q74LS107	1	U4	TTL-LS DUAL J-K FLIP FLOP
Q74LS00	1	U3	TTL-LS GATES
Q2N3903	3	Q1,Q2,Q3	2N3903 (NPN) TRANSISTOR
LED			
8X_GREEN	1	DS2	SQUARE, GREEN LED (CUE)
8X_RED	1	DS1	SQUARE, RED LED (A/B)
CAPACITORS			
CP5P	6	C1,C2,C4,C9,C11,C12	5 pFd CERAMIC DISC CAPACITOR
CP_047_DISC	5	C3,C10,C17,C18,C19	.047 µFd CERAMIC DISC CAPACITOR
CP10UF_25V	1	C20	10µFd 35V ELECTROLYTIC
CP1UF_TANT	1	C21	1µFd 35V TANTALUM
CP22UF_UP	8	C5-C8,C13-C16	22µFd 25V ELECTROLYTIC
HARDWARE			
AROMAT_RELAY	2	K1,K2	DPDT 24V RELAY
MISC			
B2_BANK_RAIL	1	---	ASSIGN SWITCH MOUNTING RAIL
LG_ORG_BARN_DOOR	1	SW2	PROGRAM SWITCH BUTTON
LG_BLUE_BARN_DOOR	1	SW3	AUDITION SWITCH BUTTON
DIALITE_SWITCH (311)	2	SW5,SW6	ON/OFF SWITCHES — S10043 — 14.94
DIALITE_AMB_BUTTON	1	SW6	OFF BUTTON
DIALITE_RED_BUTTON	1	SW5	ON BUTTON
DIALITE_LAMP 28V	2	SW5,SW6	T1-3/4, 28V LAMP
MANUFACTURED PARTS			
FACEPLATE	1	---	SL-20 FRONT PANEL
SL-20 PCB	1	MAIN CARD	SL-20
DIP_SWITCH_4	1	SW7	4 POS. DIP SWITCH
26PIN_RT_HEADER	2	CT1,CT2	26 PIN RIGHT ANGLE HEADER

Negative center post →

OUTPUT

OM20 PARTS LIST			
UPDATED 6/10/88			
	OM-20 EACH USED	WHERE USED	NOTES
PART NAME / #			
CONTROLS			
T15TURN_TRIM	10	CR1-CR10	GAIN AND YU TRIMMERS, 10KΩ
CONNECTORS			
J8_PIN	12	U1-U12	8 PIN DIP I.C. SOCKET
SEMICONDUCTORS			
Q7805-T	1	Q1	5 VOLT REGULATOR
NE5532	10	U2,U3,U5-U12	DUAL OP-AMP, HIGH OUTPUT
LF353	2	U1,U4	DUAL OP-AMP
FERRITE BEAD	20	L1-L20	---
CAPACITORS			
CP33P	21	C1,C3-C6,C8,C11-C19 C21-C25,C32	33 pFd CERAMIC DISC
CP.047_DISC	7	C2,C7,C9,C10,C20,C33-C34	.047 µFd CERAMIC DISC
CP10UF_25V	7	C26-C31,C35	10 uFd 25V ELECTROLYTIC
MANUFACTURED PARTS			
OM20 FACEPLATE	1	---	OM-20 FRONT PANEL
OM-20 PCB	1	MAIN CARD	OM-20 PCB
SE_RED	1	RESET SWITCH	ON TIMER CONTROL CARD
SE_BLUE	1	HOLD SWITCH	ON TIMER CONTROL CARD
SE_WHITE	1	START/STOP SWITCH	ON TIMER CONTROL CARD
DUAL_TOGGLE	1	AUTO RESTART SWITCH	ON TIMER CONTROL CARD
DIP_SWITCH_4	1	SW1	4 POSITION DIP SWITCH
26PIN_RT_HEADER	3	CT1,CT2,CT4	26 PIN RIGHT ANGLE HEADER
CT14PIN_RT_HEADER	2	CT3,CT5	14 PIN RIGHT ANGLE HEADER
LOADED TMC	1	---	TIMER CONTROL CARD

Part price

CONTROL ROOM

CR-20 PARTS LIST UPDATED 6/10/88			
	CR-20 EACH USED	WHERE USED	NOTES
PART NAME / #			
CONTROLS			
A10K_DUAL (BOURNS)	2	CR2,CR3	HEADPHONE,CONTROL ROOM POTS
DQ_16	1	CR1	CUE POT
F2UEE_LT	4	SW3-SW6	SOURCE SELECT,CR "ON" SWITCHES
F4UEE_LT	2	SW1,SW2	SOURCE SELECT SWITCHES
KNOBS			
FM_GRAY	1	SW6	CR "ON" SWITCH BUTTON
FU_GRAY	5	SW1-SW5	SOURCE SELECT SWITCH BUTTONS
SIFAM_RED	1	CR1	CUE POT KNOB
SIFAM_COLLET	2	CR2,CR3	HEADPHONE, CR POT KNOB
CONNECTORS			
J8_PIN	6	U1-U6	8 PIN DIP I.C. SOCKET
SEMICONDUCTORS			
Q1N4002	4	D1-D4	1 AMP 100 PIV
NE5532	5	U1,U2,U4-U6	DUAL OP-AMP HIGH POWER
TL071	1	U3	SINGLE OP-AMP
Q2N3903	2	Q1,Q2	2N3903 (NPN) TRANSISTOR
LED			
L1200_GREEN	1	DS1	CR "ON" SWITCH LED
CAPACITORS			
CP33P	13	C2-C5,C10,C11,C24-C26	33 pFd CERAMIC DISC
		C29-C32	33 pFd CERAMIC DISC
CP_047_DISC	6	C1,C12,C13,C35-C37	.047 µFd
CP_1_FILM	2	C22,C23	1 µFd FILM
CP10UF_25Y	14	C6,C7,C14-C18,C21,C33,C34	10 uFd 35V ELECTROLYTIC
CP22UF_UP	2	C19,C20	22 uFd 25V ELECTROLYTIC
HARDWARE			
AROMAT_RELAY	4	K1-K4	DPDT 24V RELAY
AMP_3PIN_HEADER	1	CT4	HEADPHONE JACK CONNECTOR
AMP_3PIN_PLUG	1	CT4	HEADPHONE JACK PLUG
FLEX_STRIP_SNAP	2	CR2,CR3	POT CONNECTORS
FLEX_10STRIP	2	CR2,CR3	POT PLUGS
MANUFACTURED PARTS			
CR-20 FACEPLATE	1	---	CR-20 FRONT PANEL
CR-20 PCB	1	MAIN CARD	CR-20A PCB
DIP_SWITCH_4	1	SW8	4 POSITION DIP SWITCH
26PIN_RT_HEADER	2	CT1,CT2	26 PIN RIGHT ANGLE HEADER
CT14PIN_RT_HEADER	1	CT3	14 PIN RIGHT ANGLE HEADER

26 Aug 16 –

S00029 16.08
S00028 0.63

STUDIO CONTROL, OPTIONAL

SC-20 PARTS LIST			
UPDATED 6/10/88			
	CR-20	WHERE	NOTES
	EACH USED	USED	
PART NAME / #			
CONTROLS			
A10K_DUAL (BOURNS)	1	CR3	STUDIO LEVEL CONTROL
DQ_16	1	CR1	TB LEVEL CONTROL
F2UEE_LT	3	SW3-SW5	SOURCE SELECT SWITCHES
F4UEE_LT	2	SW1,SW2	SOURCE SELECT SWITCHES
KB-25	1	SW7	TB SWITCH
KNOBS			
KB-YELLOW	1	SW7	TB SWITCH BUTTON
FU_GRAY	5	SW1-SW5	SOURCE SELECT SWITCH BUTTONS
SIFAM_RED	1	CP1	TB POT KNOB
SIFAM_COLLET	1	CR2,CR3	STUDIO LEVEL POT KNOB
CONNECTORS			
J8_PIN	5	U1-U6	8 PIN DIP I.C. SOCKET
SEMICONDUCTORS			
Q1N4002	3	D2-D4	1 AMP 100 PIV
NE5532	4	U1,U2,U5,U6	DUAL OP-AMP HIGH POWER
TL071	1	U3	SINGLE OP-AMP
Q2N3903	1	Q2	2N3903 (NPN) TRANSISTOR
CAPACITORS			
CP33P	13	C2-C5,C10,C11,C24,C29-C32	33 pFd CERAMIC DISC
CP.047_DISC	6	C1,C12,C13,C35-C37	.047 µFd
CP.1_FILM	2	C22,C23	1 µFd FILM
CP10UF_25V	12	C8,C9,C14-C18,C21,C33,C34	10 µFd 35V ELECTROLYTIC
CP22UF_UP	2	C19,C20	22 µFd 25V ELECTROLYTIC
HARDWARE			
AROMAT_RELAY	3	K2-K4	DPDT 24V RELAY
FLEX_STRIP_SNAP	1	CR3	POT CONNECTORS
FLEX_10STRIP	1	CR3	POT PLUGS
MANUFACTURED PARTS			
SC-20 FACEPLATE	1	---	CR-20 FRONT PANEL
SC-20 PCB	1	MAIN CARD	CR-20A PCB
DIP_SWITCH_4	1	SW8	4 POSITION DIP SWITCH
26PIN_RT_HEADER	2	CT1,CT2	26 PIN RIGHT ANGLE HEADER
CT14PIN_RT_HEADER	1	CT3	14 PIN RIGHT ANGLE HEADER

POWER SUPPLY

PS-20 PARTS LIST			
UPDATED 6/13/88			
PART NAME / #	PS-20 EACH USED	WHERE USED	NOTES
CONNECTORS			
MIL_CHASSIS	1	CT1	MULTIPIN POWER CONNECTOR
SEMICONDUCTORS			
Q1N4002	13	D1-D13	1 AMP 100 PIV
Q7818REG	1	Q3	+18 VOLT REGULATOR
Q7918REG	1	Q2	-18 VOLT REGULATOR
Q7812REG	1	Q5	+12 VOLT REGULATOR
Q7824REG	1	Q4	+24 VOLT REGULATOR
VARISTOR 39Z1	4	VR3-VR6	VARISTOR
VARISTOR 47Z1	2	VR7,VR8	VARISTOR
VARISTOR 56Z2	2	VR1,VR2	VARISTOR
LM317RED	1	Q1	+48 VOLT REGULATOR
LED			
8X_RED	2	DS3,DS4	SQUARE RED LED
8X_GREEN	1	DS2	SQUARE GREEN LED
8X_YELLOW	1	DS1	SQUARE YELLOW LED
CAPACITORS			
CP.005_1KV	4	C1-C4	.005 µFd 1KV CERAMIC
CP1UF_50V	1	C6	1 µFd 50V ELECTROLYTIC
CP10UF_25V	1	C16	10 µFd 25V ELECTROLYTIC
CP470UF_63V	1	C5	470 µFd 63V ELECTROLYTIC
CP2200UF	3	C9,C12,C15	2200 µFd 35V ELECTROLYTIC
CP1UF_TANT	6	C7,C8,C10,C11,C13,C14	1 µFd 35V TANTALUM
HARDWARE			
GROUND_LUG	1	---	CHASSIS GROUND CONNECTION
LINE_CORD	1	---	
FUSE_HOLDER	1	---	
F2_FUSE	1	---	2 AMP FUSE, TYPE 313
PS-20 POWER_XFORMER	1	T1	POWER TRANSFORMER
MANUFACTURED PARTS			
PS-20 PCB	1	MAIN CARD	PS-20A
PS-20 FACEPLATE	1	---	FRONT PANEL
PS-20 HEATSINK	1	---	REAR HEATSINK/BRACKET
PS-20 BRACKET	1	---	FRONT CARD BRACKET
PS-20 CHASSIS	1	---	CHASSIS
PS-20 COVERS	2	---	COVERS
J25PIN_DB_CABLE	1	CT2	TURRET INTERFACE CONNECTOR
TO-220 MICA_INSULATOI	4	---	USE THERMAL COMPOUND
CT26PIN_RT_PLUG	1	CT3	26 PIN RIBBON PLUG
CT26PIN_RT_HEADER	1	CT3	26 PIN RIGHT ANGLE HEADER

TECHNICAL NOTES

A-20 TECHNICAL NOTES:

The following test point signal/level information was measured with a standard Wheatstone A-20 console under normalized settings. The levels will therefore be different with modified consoles or settings, and represent the average of several different measurements. They are intended for troubleshooting where gross deviations from the published levels can help locate a problem; minor deviations are not very significant.

The normalized settings are as follows: input signal is a sine of 1KHz frequency and a voltage equivalent to +4dBm level for line inputs and -50dBm level for mic inputs. The signal is applied to one channel only; all other channels are turned off and their assignment switch buttons are up (this is significant when looking at noise levels). The input fader is adjusted for a -12dB in hand setting, and the console output level is +4dBm. The noise levels are measured RMS with a low pass filter of 30KHz. They are provided to help isolate a noisy I.C. stage. The noise figures listed for the output modules are all for line level signals.

The testpoints labeled "control" are specified for when the control function is "ON" or active. The control circuits use LSTTL for logic, with transistors for +24V relay drivers. Note that the actual logic control bus levels may change slightly as more relays are activated by one control signal. (This is common with mic channels when both mutes and tallys are desired from one "mic on" signal.) The control buses are LSTTL active HI except for timer restart, which is active LOW. The relay drive transistors will have about 1 volt at the collector when the relay is "on" (or energized), and 24 volts at the collector when the relay is "off".

NOTE: **Wheatstone does not recommend removing or inserting modules while the console is powered up.** The danger is possible shorting of module traces against an exposed metal surface; this could blow out the power resistors on the module (see paragraph (3) below). If care is taken to prevent this, it is possible to remove or reinsert a module during a power-up condition with no damage to the console; however, this maneuver should be reserved for emergency situations only.

The audio circuits of the console consist almost entirely of plug-in I.C. op-amps. The types called out in the schematic drawings 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) Do not attempt to put any significance to the fact that you measure very low signal levels on the inverting or "minus" input of an op-amp stage. This is normal due to the large amount of negative feedback ("virtual ground") and you can waste a lot of time looking for where the signal went.

(2) When one of these I.C.'s fail, they commonly swing their output to one of the power supply rails. This should be a first check when a bad I.C. is suspected. Measure the output pin of the I.C. directly (to avoid measuring after a decoupling capacitor) under a no signal condition and look for a large DC voltage 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.

(3) All of the console modules pick up their power supply voltage from the main distribution buses by means of small value (typically 3.3Ω) resistors. These resistors 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. These resistors will generally become open circuits when an I.C. fails, often with no visual indication. Whenever a fault is suspected check the voltage on the module side of these resistors. If one needs replacement be sure to stand it up off of the circuit card as they can become hot enough to burn the card under fault conditions. 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 these fusing resistors being open. Do not defeat the protection offered by these resistors by replacing them with wires. In a pinch any low value 1/4 watt resistor can be used.

(4) Because of the feedback loop in the op-amp circuit, sometimes a signal can be measured or heard even when the I.C. 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 I.C. must be working properly.

(5) This console has electronically balanced output circuits on its main output channels. Care should be taken when installing or testing these circuits to avoid connecting the "low" side of these outputs to ground or to an input circuit that has a low impedance to ground. While such a connection will not cause immediate damge to the console, levels will be incorrect and distortion figures will rise. If an unbalanced connection must be made to these outputs, let the "low" side float unconnected or else build it out with a 620Ω or higher resistor.

The technical information for each individual module is contained on the schematic drawings. Installation and hook up information are also summarized in the text of this manual, and test point data are provided on the pages following this section.

In general, the A-20 console is rugged and user friendly. I/O connections can be unplugged or plugged in while powered up with no damage. Occasionally this will cause a transient in the logic system that may be sufficient to turn a channel "on" or "off" but this is rare. 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. The Lexan panel overlays are durable and can be easily cleaned with "Windex". If they become burned or torn through carelessness they can be replaced; consult Wheatstone for details. Care should be taken with the plexiglas covering the VU meters as it is easily scratched, and 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 recommends using the optional EXT-20 extender ribbon set when working on a module active in the console. This allows the module to be removed and relocated to a more convenient location while still electrically connected to the console circuits. Please be sure not to invert the connectors when using the EXT-20 extender ribbons (this is detailed in the extender instructions) or to lean a module connected via the extenders against any metalic tools or surfaces as the exposed circuit board could be shorted out (blowing the fusing resistors mentioned in (3) above). These extender ribbons are included in the optional enhanced installation kit, or may be ordered from the factory.

Wheatstone maintains an active program of user support and technical assistance. You are encouraged to call the factory with any questions, problems, ideas, or suggestions regarding your A-20 console.

MONO MIC INPUT

		TEST POINT	DATA		
MODULE					
MM-20	TEST POINT	TYPE	LEVEL	NOISE	NOTES
	U1/P3	AUDIO	-34dBu	---	input transformer sec.
	U1/P1	AUDIO	0dBu	-83dBu	pre-amp/insert out
	U1/P7	AUDIO	0.8dBu	-81dBu	fader buffer
	U2/P6	CONTROL	LOGIC HI	---	"ON" relay driver
	U1/P8	DC	+18V	---	+audio supply
	U1/P4	DC	-18V	---	-audio supply
	CT2/P15	DC	0V (GND)	---	audio ground
	Q3/P3	DC	+5V	---	+5V regulator
	Q3/P1	DC	+24V	---	+lamp supply
	CT2/P8	DC	0V (GND)	---	digital common

STEREO LINE INPUT

		TEST POINT	DATA		
MODULE	TEST POINT	TYPE	LEVEL	NOISE	NOTES
SL-20					
	U1/P1	AUDIO	0dBu	-96dBu	rt. pre-amp
	U2/P1	AUDIO	0dBu	-96dBu	lt. pre-amp
	U1/P7	AUDIO	0dBu	-91dBu	rt. fader buffer
	U2/P7	AUDIO	0dBu	-91dBu	lt. fader buffer
	U3/P11	CONTROL	LOGIC HI	---	"ON" relay driver
	U4/P3	CONTROL	LOGIC HI	---	"CUE" relay driver
	U2/P8	DC	+18V	---	+audio supply
	U2/P4	DC	-18V	---	-audio supply
	CT2/P15	DC	0 V (GND)	---	audio ground
	Q4/P1	DC	+24V	---	+lamp supply
	Q4/P3	DC	+5V	---	+5V regulator
	CT2/P8	DC	0 V (GND)	---	digital common

OUTPUT MODULE

		TEST POINT	DATA		
MODULE					
OM-20	TEST POINT	TYPE	LEVEL	NOISE	NOTES
	U11/P7	AUDIO	0dBu	-91dBu	rt. AUD insert out buffer
	U10/P7	AUDIO	0dBu	-91dBu	rt. PGM insert out buffer
	U6/P1	AUDIO	-2dBu	-94dBu	lt. AUD high output amp
	U6/P7	AUDIO	-2dBu	-93dBu	lt. AUD low output amp
	U7/P1	AUDIO	-2dBu	-94dBu	rt. AUD high output amp
	U7/P7	AUDIO	-2dBu	-93dBu	rt. AUD low output amp
	U11/P1	AUDIO	0dBu	-91dBu	lt. AUD insert out buffer
	U10/P1	AUDIO	0dBu	-91dBu	lt. PGM insert out buffer
	U2/P1	AUDIO	-2dBu	-94dBu	lt. PGM high output amp
	U2/P7	AUDIO	-2dBu	-93dBu	lt. PGM low output amp
	U3/P1	AUDIO	-2dBu	-94dBu	rt. PGM high output amp
	U3/P7	AUDIO	-2dBu	-93dBu	rt. PGM low output amp
	CT3/P7	AUDIO	-2dBu	-94dBu	lt PGM monitor
	CT3/P5	AUDIO	-2dBu	-94dBu	rt PGM monitor
	CT3/P3	AUDIO	-2dBu	-94dBu	lt AUD monitor
	CT3/P1	AUDIO	-2dBu	-94dBu	rt AUD monitor
	U9/P1	AUDIO	-2dBu	-88dBu	PGM MONO high output amp
	U5/P7	AUDIO	-2dBu	-88dBu	PGM MONO low output amp
	U8/P1	AUDIO	-2dBu	-91dBu	MIX-MINUS high output amp
	U8/P7	AUDIO	-2dBu	-91dBu	MIX-MINUS low output amp
	CT2/P4	CONTROL	LOGIC LOW	---	timer restart
	U2/P8	DC	+18V	---	+audio supply
	U2/P4	DC	-18V	---	-audio supply
	CT2/P15	DC	0V (GND)	---	audio ground
	Q1/P3	DC	+5V	---	timer power
	Q1/P1	DC	+24V	---	+lamp supply
	Q1/P2	DC	0V (gnd)	---	digital common

CONTROL ROOM

		TEST POINT	DATA		
MODULE					
CR-20	TEST POINT	TYPE	LEVEL	NOISE	NOTES
	U1/P7	AUDIO	-2dBu	-94dBu	lt. diff. amp
	U1/P1	AUDIO	-2dBu	-94dBu	rt. diff. amp
	U6/P1	AUDIO	+6dBu	-92dBu	CUE sum amp
	U3/P6	AUDIO	-16dBu	-94dBu	CR sum amp
	U6/P7	AUDIO	+4dBu	-92dBu	CUE output amp
	U2/P7	AUDIO	-2dBu	-88dBu	lt. CR output amp
	U5/P1	AUDIO	-2dBu	-88dBu	rt. CR output amp
	U4/P7	AUDIO	+4dBu	-84dBu	lt. HDPN output amp
	U4/P1	AUDIO	+4dBu	-84dBu	rt. HDPN output amp
	R54	CONTROL	LOGIC HI	---	CR mute relay control
	R52	CONTROL	LOGIC HI	---	HDPN interrupt relay control
	U1/P8	DC	+18V	---	+audio supply
	U1/P4	DC	-18V	---	-audio supply
	CT2/P15	DC	0V (GND)	---	audio ground
	SW6/LUG "A"	DC	+24V	---	+lamp supply

STUDIO CONTROL

		TEST POINT	DATA		
MODULE					
SC-20	TEST POINT	TYPE	LEVEL	NOISE	NOTES
	U1/P7	AUDIO	-2dBu	-94dBu	lt. diff. amp
	U1/P1	AUDIO	-2dBu	-94dBu	rt. diff. amp
	U6/P1	AUDIO	0dBu	-90dBu	TB sum amp
	U3/P6	AUDIO	-9dBu	-94dBu	STUDIO sum amp
	U6/P7	AUDIO	+4dBu	-93dBu	TB output amp
	U2/P7	AUDIO	-2dBu	-91dBu	lt. STUDIO output amp
	U5/P1	AUDIO	-2dBu	-91dBu	rt. STUDIO output amp
	R54	CONTROL	LOGIC HI	---	STUDIO mute relay control
	U1/P8	DC	+18V	---	+audio supply
	CT2/P15	DC	0V (GND)	---	audio ground
	U1/P4	DC	-18V	---	-audio supply

OPTIONS

CONSOLE CLOCK

GENERAL DESCRIPTION

The Wheatstone model CLK-5 clock is a six-digit time-of-day clock with LED display intended for mounting in a Wheatstone audio console or control turret. The clock is designed with CMOS LSI circuits and an on board crystal-controlled time base oscillator. Numerous jumpers are provided on the clock circuit board to allow for various operational modes, including 12-hour, 24-hour, remote slave, and 60Hz power line or 1Hz referenced timebase. There are two basic parts to the clock: a main PCB containing the clock displays and circuits, and a remote switch card containing the controls for setting the clock.

CONTROLS

The clock is controlled by a trimmer and various switches; the trimmer is mounted on the main clock PCB assembly and the switches are mounted on the control card.

The trimmer serves to slightly alter the frequency of the quartz-controlled oscillator, which in turn causes the clock to run slightly slower or faster. In order to keep accurate time, the oscillator must run at 4.194304 MHz, which is divided down internally to yield 1.000000 Hz at the input (pin 8) of the LSI counter. The oscillator is set to this frequency at the factory. However, due to the nature of quartz/crystal-controlled oscillators, there may be a slight change in the frequency of the oscillator during the first few months of operation as the crystal "ages". A minor readjustment of the trimmer will compensate for this effect.

The various switches serve to allow the clock to be reset, preset, stopped and speeded up to set to the correct time-of-day. The switches operate in the following manner:

1) RESET is used to clear the LSI counters upon power up. **The internal counters and registers may assume any arbitrary value when power is first applied, and reset clears the registers to allow proper clock operation.** It can also be used when 2 or more clocks are slaved together to sync each counter to the same starting value.

2) LOAD is used to load the internal registers with the correct end of count value (i.e., "13" for 12-hour clocks and "24" for 24-hour clocks). Use this function after power-up & reset but before setting the correct time-of-day.

3) SET is used to transfer the preset information into the internal registers. NOTE: If your clock continues counting after the rollover time (12:59 or 23:59), it indicates that clock power was interrupted, and the full SET and LOAD procedure was not carried out. **It is essential that staff members who may reset the clock be familiar with the full setting procedure. Without loading the correct end of count value, the clock will count to 99:59 before rolling over.**

4) FAST is used to rapidly advance the count as an aid in setting the correct time-of-day.

5) HOLD is used to prohibit counting as an aid in setting the correct time-of-day.

CONSOLE CLOCK

SETTING PROCEDURE

Two procedures are given to set the correct time-of-day into the Wheatstone clock. The first is a complete procedure to use after the clock has been powered down, and the second is a simplified procedure to use to adjust the clock after it has been correctly initialized (I.e. Daylight Savings Time).

The complete power-up procedure is as follows:

1) Turn on the power and allow a couple of seconds for the power supply to stabilize. The clock display will begin advancing.

2) Press and release the RESET switch. The display will reset to 00:00:00 and begin advancing.

3) Press and hold the LOAD switch.

4) Press and release the SET switch.

5) Release the LOAD switch.

6) Press and hold the FAST switch. The display will rapidly advance. Release the FAST switch when the display indicates just past the correct time-of-day.

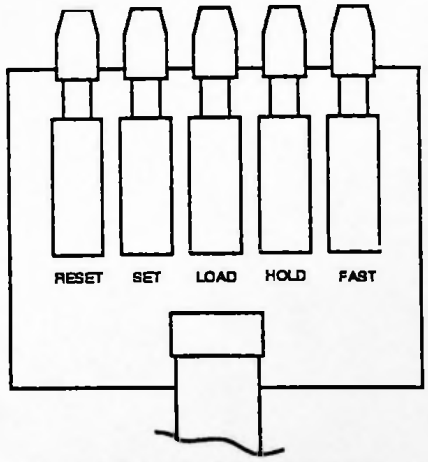
7) Press the HOLD switch (for convenience in setting, this switch will latch until pressed again). The display will freeze at its current count. Release the switch when the time-of-day catches up to the frozen count in the clock display. The clock is now set and will advance in sync with the correct time. Note that in this set-up that you must wait for the time-of-day to catch up to the indicated time in the display, so it is to your advantage when advancing the display with the FAST switch not to overshoot the time by very much to avoid a long wait. In fact, if you do overshoot by more than a couple of minutes,it is usually quicker to advance the clock through another cycle and try again. The Fast switch speeds up the counting by a factor of 2048, so it doesn't take very long (about 21 seconds) to cycle through 12 hours. This procedure is needed only once after the power is first applied to the clock, and should not be repeated unless the power to the clock has been interrupted.

The simplified procedure to set the clock is basically the last two steps of the above initialization procedure. If the clock is running and counting correctly, then:

1) Press and hold the FAST switch. The display will rapidly advance. Release the FAST switch when the display indicates just past the correct time-of-day.

2) Press the HOLD switch. The display will freeze at its current count. Release the switch when the time-of-day catches up to the frozen count in the clock display. The clock is now set and will advance in sync with the correct time.

Note the internal crystal oscillator has been set to the correct frequency (4.194304 MHz) for accurate timekeeping; however, some slight re-adjusting of the internal trimmer capacitor may become necessary during the first few months of operation due to the aging effect of quartz crystals. A buffered output of the oscillator is available at pin#2 of IC #U6 to assist in adjusting the oscillator.



CLOCK CONTROL CARD WITH
HINGED METERBRIDGE UP

CONSOLE CLOCK

OPTIONS

As previously described, the clock will operate either from the internal crystal controlled time base or from a 60Hz power line signal. It can also be programmed to count in either 12 hour or 24 hour modes, and the internal counters can be slaved from another clock or other source of 1 Hz timing signals (TTL levels). Implementing these various options consists of installing and/or removing various jumpers and diodes; these are detailed on the clock schematic diagram. The standard clock configuration is crystal controlled, 12 hour mode, stand-alone operation.

NOTES:

1) SEE INSTRUCTIONS FOR INFORMATION ON CLOCK SETTING.
2) IC U6 MUST BE "MOTOROLA" OR "TEXAS INSTRUMENTS".
3) CLOCK IS SUPPLIED AS STANDARD IN 12 HOUR, CRYSTAL TIME-BASE MODE.
4) OTHER MODES ARE POSSIBLE AS FOLLOWS:
   A. 24 HOUR: REMOVE J6 AND INSTALL J3
      REMOVE D5, D6, D9 AND INSTALL D4 & D8
   B. 60 Hz POWERLINE TIME BASE: (SOURCE MUST BE ISOLATED, 24 VAC OR LESS, CALL "WHEATSTONE" FOR DETAILS).
      CONNECT 60 Hz INPUT TO PINS 1 AND 6 OF CT2.
      REMOVE J2 AND INSTALL J1.
   C. SLAVE OPERATION: REMOVE U3, J2 AND INSTALL J5.
      CONNECT EXTERNAL SOURCE OF 1 Hz, TTL LEVEL TO PIN 2 OF CT2.
      (MAY BE PIN 3 FROM ANOTHER CLOCK).
      CONNECT EXTERNAL RESET TO PIN 4 OF CT2.
      CONNECT +5V TO PIN 7 OF CT2.
      CONNECT 5 VOLT COMMON (DIGITAL GND) TO PIN 5 OF CT2.

CKC-5
ALL SWITCHES ARE MOMENTARY

LOAD
SET
HOLD
FAST
RESET

HOURS DS3
MINUTES DS1
SECONDS DS2

MODE CONTROL DIODES (SEE NOTES)
1N914

ICM7217C
U2
U1

U3 ICM7213
4.194304 MHz

CHECK FREQUENCY OF OSCILLATOR AT THIS POINT TO MINIMIZE LOADING AND FREQUENCY SHIFT

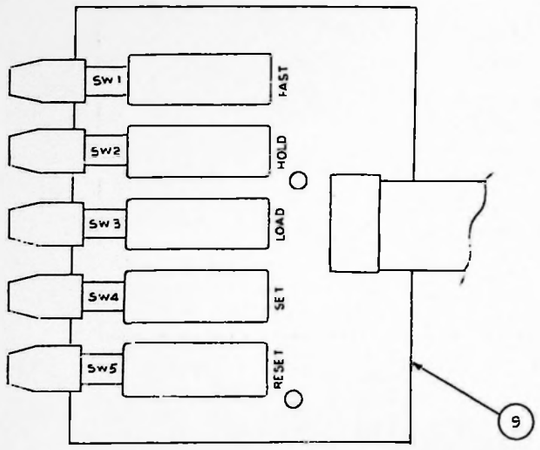
EXT RESET INPUT
EXT 1Hz INPUT
EXT 60Hz INPUT
EXT 1Hz OUTPUT

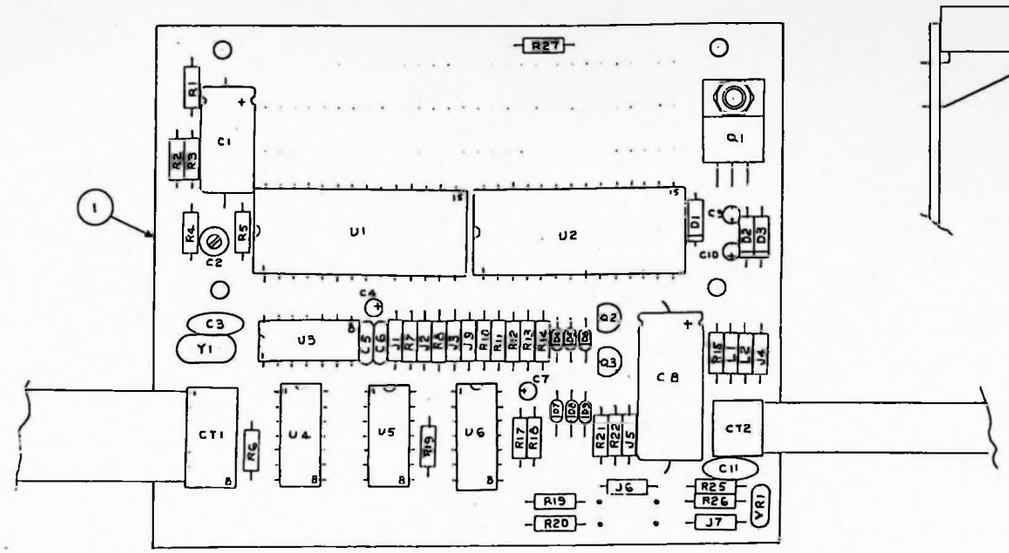
OPTIONAL +5V SUPPLY

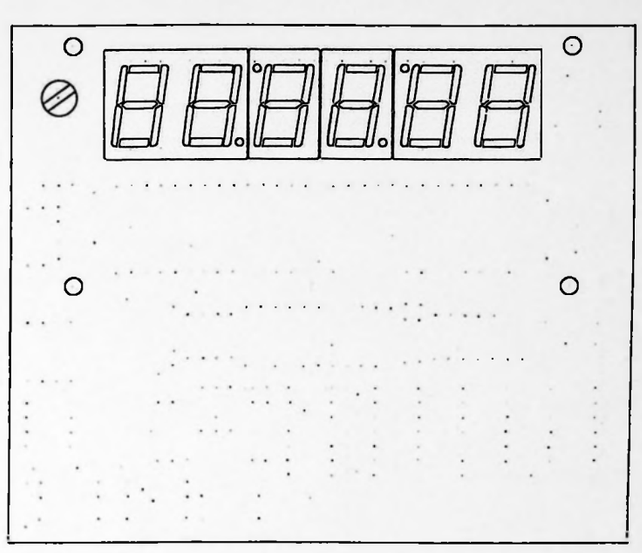
74LS90
U5
U4

CLK-5 CLOCK CONTROL SCHEMATIC

CLK-5 CLOCK CARD	
CKC-5 CLOCK CONTROL	
WHEATSTONE AUDIO CONSOLES	
7-27-89	Wheatstone Corporation 8720 V.I.P. Parkway Syracuse, NY. 13211
CAZ	
	SCHEMATIC DRAWING
CKC-5B PCB	CLK-5B PCB #CLK/SCH-1







PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
1	PCB, CLK-5	1
2	DIP SOCKET, 8 PIN	1
3	DIP SOCKET, 14 PIN	5
4	DIP SOCKET, 28 PIN	2
5	DIP SOCKET, 18 PIN, RT. ANGLE	2
6	DIP SOCKET, 20 PIN, RT. ANGLE	1
7	SIP SOCKET, 9 PIN	4
8	SIP SOCKET, 10 PIN	2
9	PCB, CKC-5B	1
C1	CAPACITOR, 220µf/25V, ELECT.	1
C2	CAPACITOR, VARIABLE, 2.5-12.5pf	1
C3	CAPACITOR, 15pf, CERAMIC	1
C4,7,9 & 10	CAPACITOR, 1µf/25V, TANT	4
C5,6 & 11	CAPACITOR, .047µf CERAMIC	3
C8	CAPACITOR, 470µf/25V ELECT.	1
D1,2 & 3	DIODE, IN4002	3
D4-9	DIODE, IN914	6
R10	RESISTOR, 33K ±5%, 1/4W	1
R14,5,6,8,+12	RESISTOR, 100K ±5%, 1/4W	6
R2 & 27	RESISTOR, 100 ±5%, 1/4W	2
R3	RESISTOR, 1.2K ±5%, 1/4W	1
R7	RESISTOR, 2.4K ±5%, 1/4W	1
R11 & 17	RESISTOR, 470 ±5%, 1/4W	2
R13,14 & 21	RESISTOR, 1K ±5%, 1/4W	3
R15	RESISTOR, 2.7 ±5%, 1/4W	1
R16 & 19	RESISTOR, 10 ±5%, 1/4W	2
R18	RESISTOR, 6.8K ±5%, 1/4W	1
R22	RESISTOR, 4.3K ±5%, 1/4W	1
J1-7 & 9	JUMPER	8
L1 & 2	FERRITE BEAD	2

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY
Q1	REGULATOR, LM7805-T, +5V	1
SW1-5	SWITCH, DPDT, PUSH BUTTON	5
U1 & 2	I.C., COUNTER, ICM7217C	2
U3	I.C., CLOCK REF., ICM7213	1
U4 & 5	I.C., 4-BIT COUNTER, 7490	2
U6	I.C., HEX OR-GATES, 74LS04	1
Q2	TRANSISTOR, 2N3903 (NPN)	1
Q3	TRANSISTOR, 2N3906 (PNP)	1
VR1	VARISTOR, 33Z1	1
Y1	CRYSTAL, 4.194304 MHz	1

CLK/CKC-5B CLOCK CARDS	
WHEATSTONE AUDIO CONSOLES	
10-11-88	Wheatstone Corporation 8720 V.I.P. Parkway Syracuse, NY. 13211
RA	
REV 6-1-91	PCB LOAD SHEET
CLK/DISPLAY-CKC/CONTROL	#CLK/LOAD-1

THE CONSOLE TIMER

DESCRIPTION

The Wheatstone TM-6A timer is a DC-powered, crystal controlled, 4-digit timer with integral LED display, designed specifically for operation in Wheatstone broadcast consoles. It consists of a main timer card assembly with LSI CMOS ICs and TTL control electronics, and a remotely located control panel. All of the timing, counting, and LED display decoder/driver tasks are managed by the LSI chips; the other ICs handle the control logic. The control panel is connected by means of a ribbon cable that plugs into the mating 8 pin socket provided on the timer card.

OPERATION

All timer functions are controlled from the switches mounted on the control panel.

The top pushbutton (S/S) controls the timer START/STOP mode. Activating this switch will start the timer if it was previously inactive, or stop it if it was previously timing. The display shows the current timing count in minutes and seconds.

The middle pushbutton (RESET) controls timer reset. Activating this switch will reset the timing count to 00:00. Upon initial power up, the timer counters will generally initialize at an arbitrary setting; RESET will clear the counters and prepare the timer circuit for operation. (Note that RESET does **not** clear the stop/start status of the timer. If RESET is pressed while the timer is running, the display will immediately change to 00:00, and the timer will continue to count up.)

The bottom pushbutton (HOLD) controls the timer hold mode. Pressing this switch while the timer is counting will freeze the display without stopping the count. Releasing the switch allows the display to once again be updated by the counter.

The toggle switch (RESTART) alternately activates and disables the console timer restart circuit. This allows input modules that have been appropriately programmed to RESET and then START the timer when their channel "ON" switches are pressed. The LED beside the toggle switch lights when restart is active and is dark when restart is disabled. Note that modules that have not been programmed to do so will not activate the timer even though the RESTART switch is on. Also, repeated activation of a module "ON" switch will repeatedly restart the timer, and activation of the module "OFF" switch will not affect the timer. The restart mode is commonly used to monitor program length automatically with repeated manual operation of the timer controls. In this mode the input module is turned on, the current playback machine is started, and the timer is reset and started from a single activation of the input module "ON" switch.

USING SL-20 STEREO LINE INPUT MODULES TO ACTIVATE THE CONSOLE TIMER

FUNCTION: To activate timer modes by input module ON/OFF buttons. For example, to reset and start timer counting whenever a line input channel is turned on.

DESCRIPTION: Timer modes are activated by a logic low signal on the appropriate control line. Normally this is done by the timer control switches mounted on the timer control panel (see

drawing #TM6/SCH-1). However, as the input module logic is controlled similarly with a logic low signal from the module's channel ON switch, that switch can be jumpered to the timer controls with a PCB mounted dipswitch (SW7 on SL-20 module schematic and load sheet) to perform both functions at the same time.

PROCEDURE:

1) Remove SL-20 module from console; program "Timer Restart" function on PCB mounted dipswitch #7.

2) Replace SL-20 module.

3) Make sure timer restart switch is on (OM-20 module timer control panel)

4) When the chosen input module's channel ON button is pressed the console timer will automatically reset and resume counting. **Note** that the timer must be counting before the ON button is pressed, as this reset command does not over-ride the timer start/stop status.

PHOTO-OPTIC ISOLATOR

"GE" 74A1

VIEWED FROM ABOVE (COMPONENT SIDE)

N/C C E

A K N/C

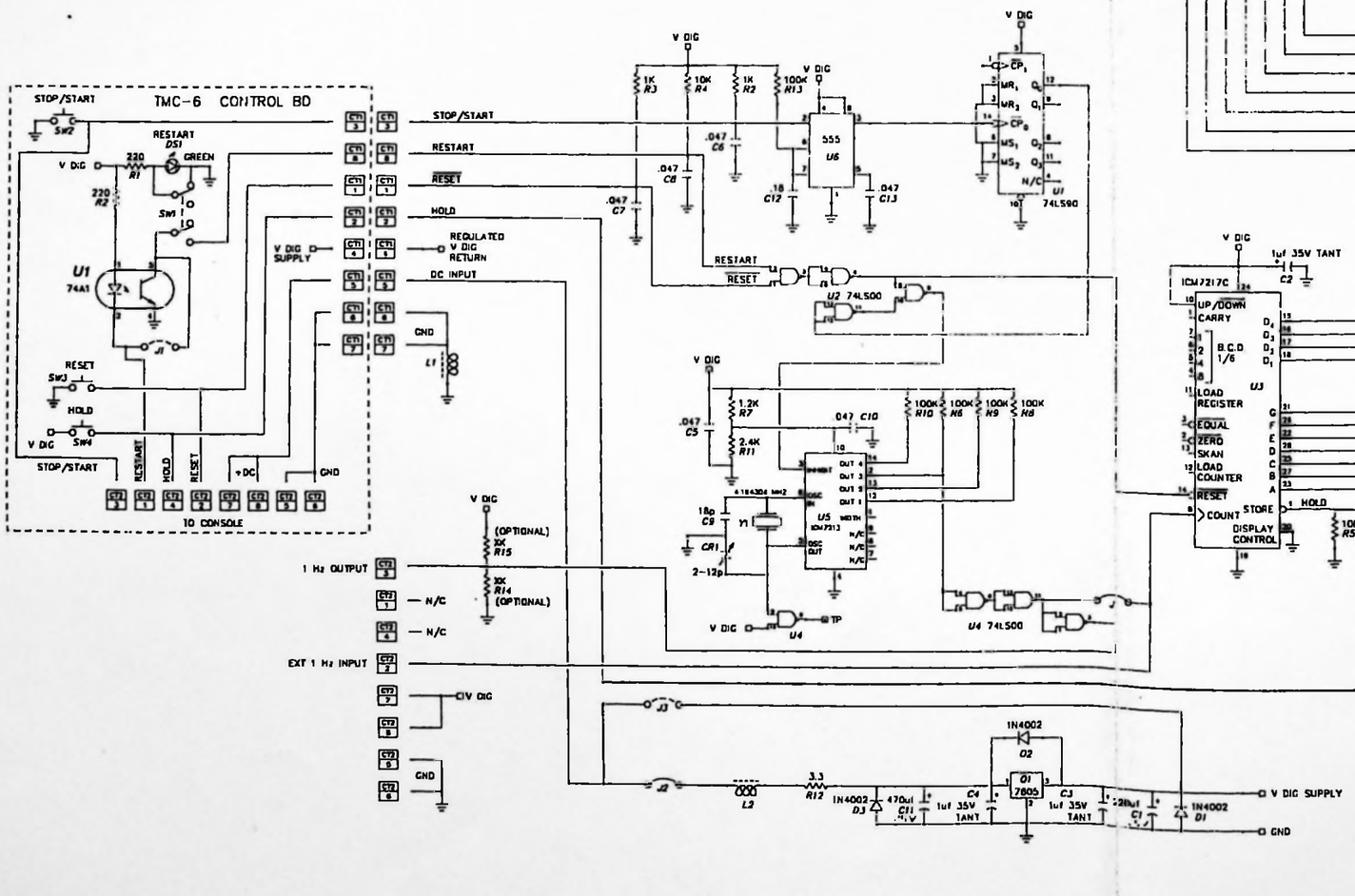
8-PIN DIP SOCKET CONNECTOR
(TO TMC-6 TIMER CONTROL PCB)

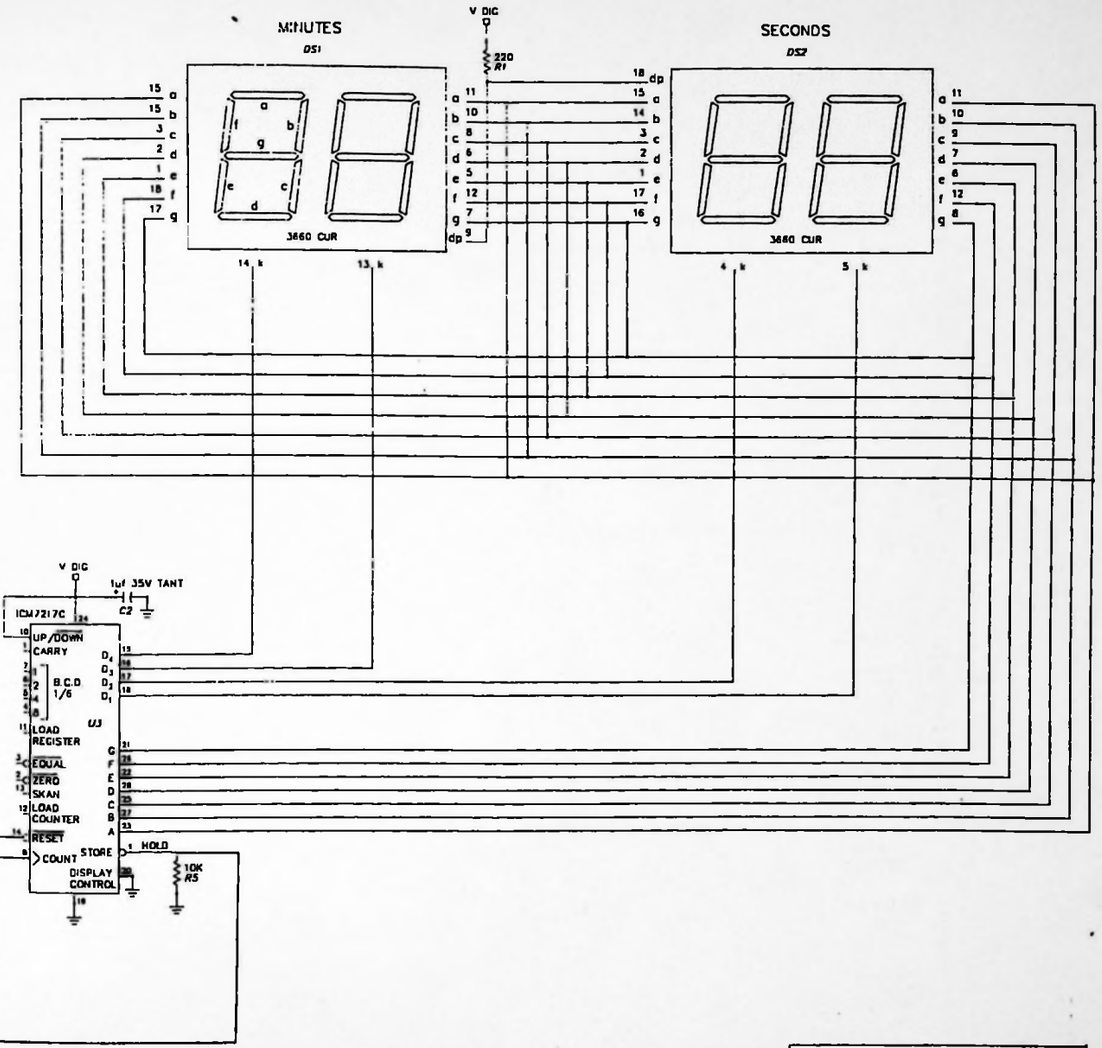
DIG COM	5	4	HOLD
DIG COM	6	3	STOP/START
+5V	7	2	RESET
+5V	8	1	RESTART

(COMPONENT SIDE)
CT2

7805 PINOUT

7400 IC PINOUT
(VIEWED FROM ABOVE)
(COMPONENT SIDE)

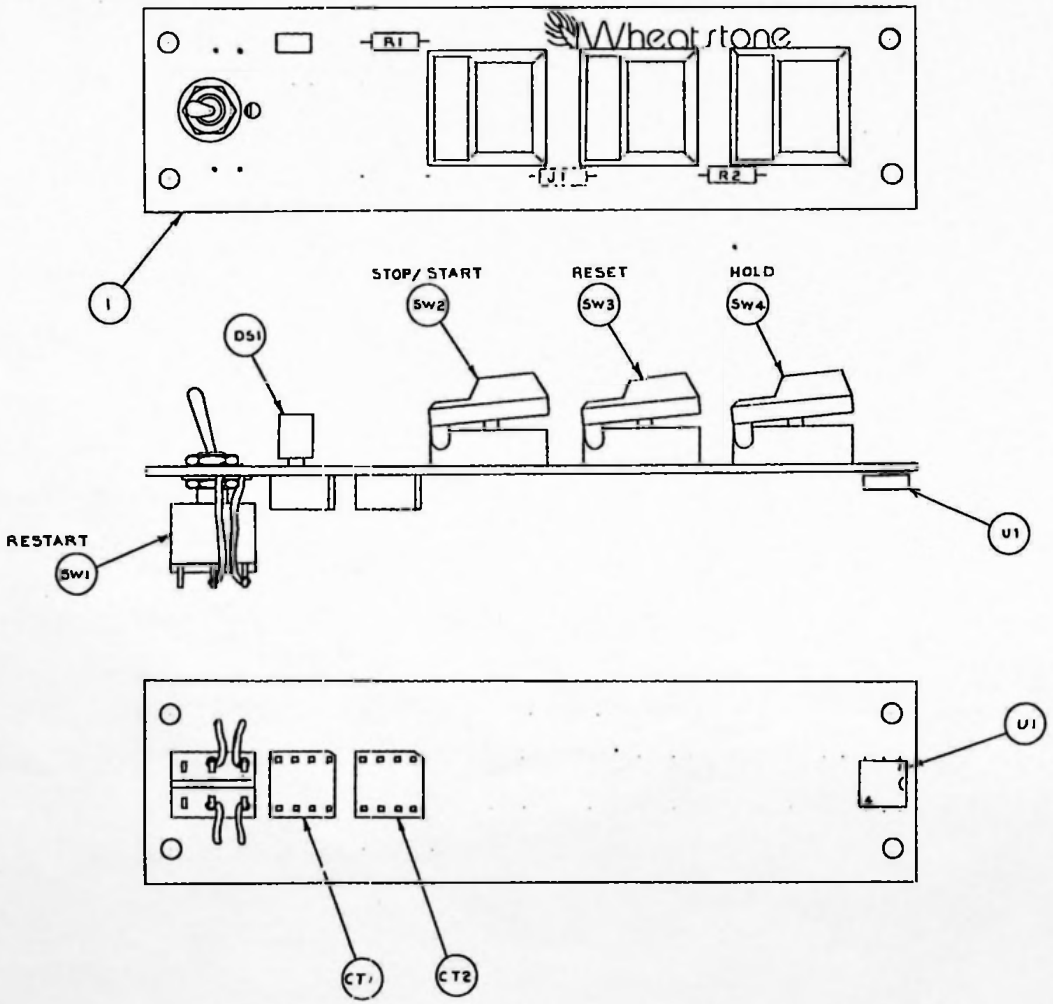




TM-6 TIMER/CONTROL		
WHEATSTONE AUDIO CONSOLES		
6-1-1-80	Wheatstone Corporation 6720 V.I.P. Parkway Syracuse, NY. 13211	
CAZ		
	SCHEMATIC DRAWING	
TM-6B PCB	TMC-6B PCB	#TM6/SCH-1

Drawing applies to both "B" and "C" versions of PCB

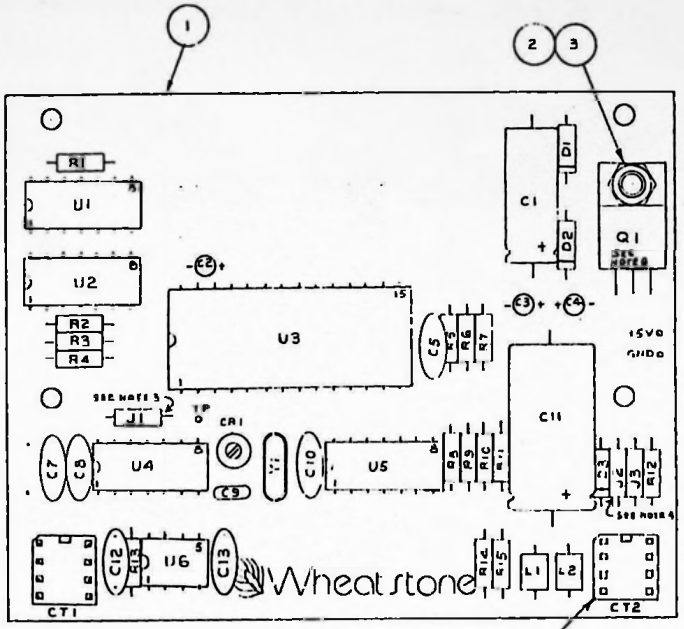
TM-6 TIMER CONTROL SCHEMATIC

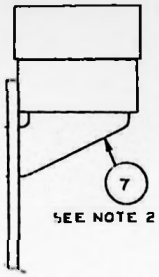


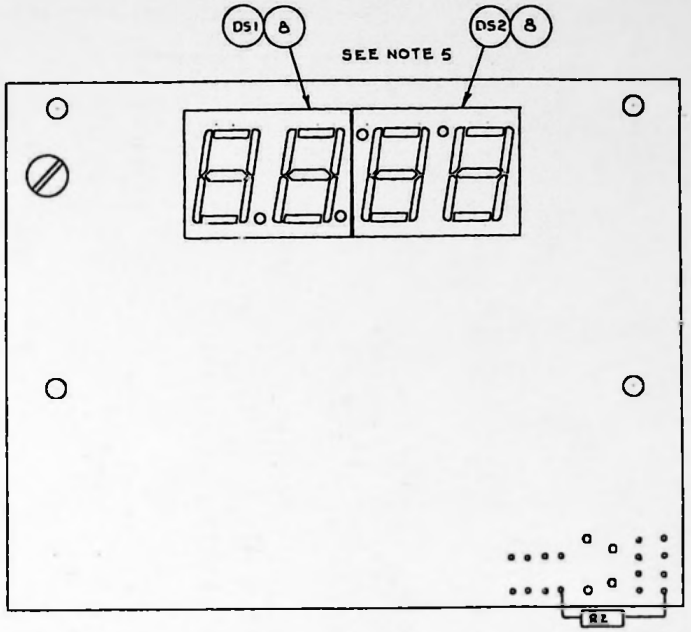
PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
1	PRINTED CIRCUIT BD., TMC-6	1
CT1 & 2	CONNECTOR, 8 PIN DIP	2
DS1	DISPLAY, LED, GRN (.10" x .20")	1
J1	JUMPER (OPTIONAL)	1
R1 & 2	RESISTOR, 220 ±5%, 1/4 W	2
SW1	SWITCH, TOGGLE, DPDT	1
SW2	SWITCH, PUSHBUTTON, SPST, N/O (WHT)	1
SW3	SWITCH, PUSHBUTTON, SPST, N/O (RED)	1
SW4	SWITCH, PUSHBUTTON, SPST, N/O (BLU)	1
U1	I.C., OPTO-ISOLATOR, GE#H74A1	1

TMC-6 TIMER CONTROL	
WHEATSTONE AUDIO CONSOLES	
3-14-88	Wheatstone Corporation 8720 V.I.P. Parkway Syracuse, NY. 13211
RA	
	PCB LOAD SHEET
	SCALE: 2X | #TMC\LOAD-1

- Drawing applies to both "B" and "C" versions of PCB -







PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
1	PCB, TM-6	1
2	SCREW, PAN HD. SLOTTED, #4-40 X 3/8	1
3	HEX NUT, #4-40	1
4	DIP SOCKET, 8-PINS	3
5	DIP SOCKET, 14-PINS	4
6	DIP SOCKET, 28-PINS	1
SEE NOTE 2 — 7	DIP SOCKET, 18-PINS, RT. ANGLE	2
SEE NOTE 2 — 8	SIP SOCKET, 9-PINS	4
C12	CAPACITOR, 0.18μf/100V, MYLAR	1
C1	CAPACITOR, 220μf/25V, ELECTROLYTIC	1
C2,3 & 4	CAPACITOR, 1μf/25V, TANTALUM	3
C5,7,8,10,13	CAPACITOR, .047μf, CERAMIC	5
C9	CAPACITOR, 18pf, CERAMIC	1
C11	CAPACITOR, 470μf/25V, ELECTROLYTIC	1
CR1	CAPACITOR, VARIABLE, 2-12pf	1
D1,2 & 3	DIODE, IN4002	3
DS1 & 2	DISPLAY, 2-DIGIT 7-SEGMENT, LED	2
SEE NOTES 3 & 4 — J1,2 & 3	JUMPER, 0Ω	3
L1 & 2	RF CHOKE, FERRITE BEAD	2
Q1	REGULATOR, +5V, 7806	1
R1	RESISTOR, 220 ± 5%, 1/4W	1
R2+3	RESISTOR, 1K ± 5%, 1/4W	2
R4+5	RESISTOR, 10K ± 5%, 1/4W	2
R6,8,9,10,13	RESISTOR, 100K ± 5%, 1/4W	5

PARTS LIST		
ITEM NO.	DESCRIPTION	QTY.
R7	RESISTOR, 1.2K ± 5%, 1/4W	1
R11	RESISTOR, 2.4K ± 5%, 1/4W	1
R12	RESISTOR, 3.3Ω ± 5%, 1/4W	1
U1	I.C., 7490, 4-BIT DECADE COUNTER	1
U2 & 4	I.C., 74LS00, QUAD NAND GATES	2
U3	I.C., ICM7217C,	1
U5	I.C., ICM7219	1
U6	I.C., 555, TIMER	1

NOTES:

1. ALL ITEMS SHOWN MAY NOT BE NECESSARY FOR THIS PRODUCT, SEE NOTES 2, 3 & 4.
2. ITEM NO. 7 IS REQ'D ONLY FOR RIGHT ANGLE MOUNTING OF THE DISPLAYS, OTHERWISE ITEM NO. 8 SHOULD BE USED.
3. JUMPER J1 IS NOT REQ'D IF THIS TIMER WILL BE TREATED AS A SLAVE UNIT.
4. BOTH JUMPERS, J2 & J3, SHOULD NOT BE INSTALLED AT THE SAME TIME. INSTALL JUMPER J2 IF +12V WILL POWER THIS BD. OR, J3 IF POWERED BY +5V.
5. MOUNT DISPLAYS DS1&2 WITH DECIMAL POINTS POSITIONED AS SHOWN
6. Q1 CIRCUIT IS USED WHEN EXTERNAL POWER SOURCE IS GREATER THAN 5 VOLTS.

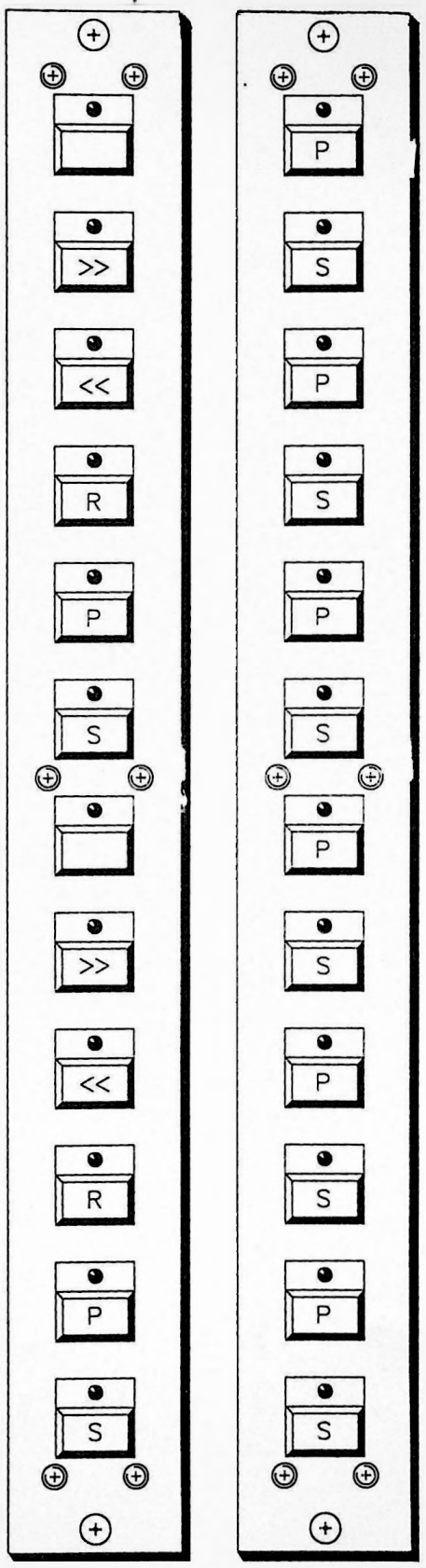
TM-6 TIMER CARD

WHEATSTONE AUDIO CONSOLES

3-14-88	Wheatstone Corporation, 8720 V.I.P. Parkway, Syracuse, NY. 13211
RA	PCB LOAD SHEET
	SCALE: 2X — \TM6\LOAD-1

Drawing applies to both "B" and "C" versions of PCB

See notes re: pin outs from FF-2 module



FF–2
(OPTIONAL)

SS–6
(OPTIONAL)

FF-2 FULL FUNCTION TAPE REMOTE (OPTIONAL)

Two full-function sets of pushbutton controls (w/LED indicators) to control remote reel-to-reel, cart recorder or cassette tape machines (FAST FORWARD, REWIND, RECORD, PLAY, STOP, SPARE).

SS-6 START/STOP TAPE REMOTE (OPTIONAL)

Six pairs of START/STOP pushbutton controls (w/LED indicators) to control remote devices (such as cart machines, etc.).

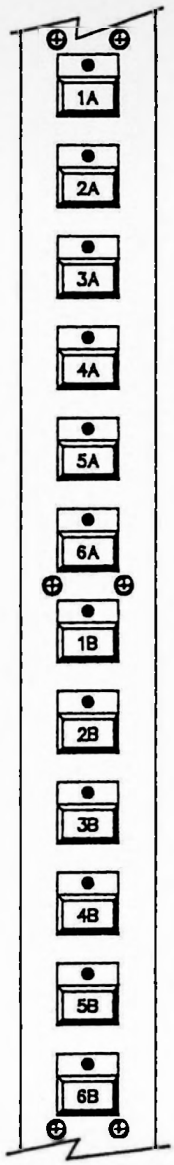
LS-6 LINE SELECT (OPTIONAL)

SOURCE SELECT—A source select switchbank with 6 stereo inputs and one stereo output. The output may be fed (via the modules' standard DB-25 I/O connectors) to any SL-20 input module, control room or studio module to increase its input source capacity.

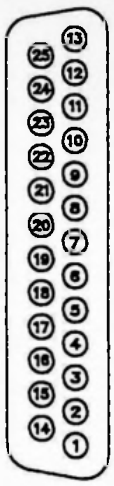
LS–6
(OPTIONAL)

A2–1–88

TR-12 REMOTE CONTROL PCB



MODULE CONTROLS



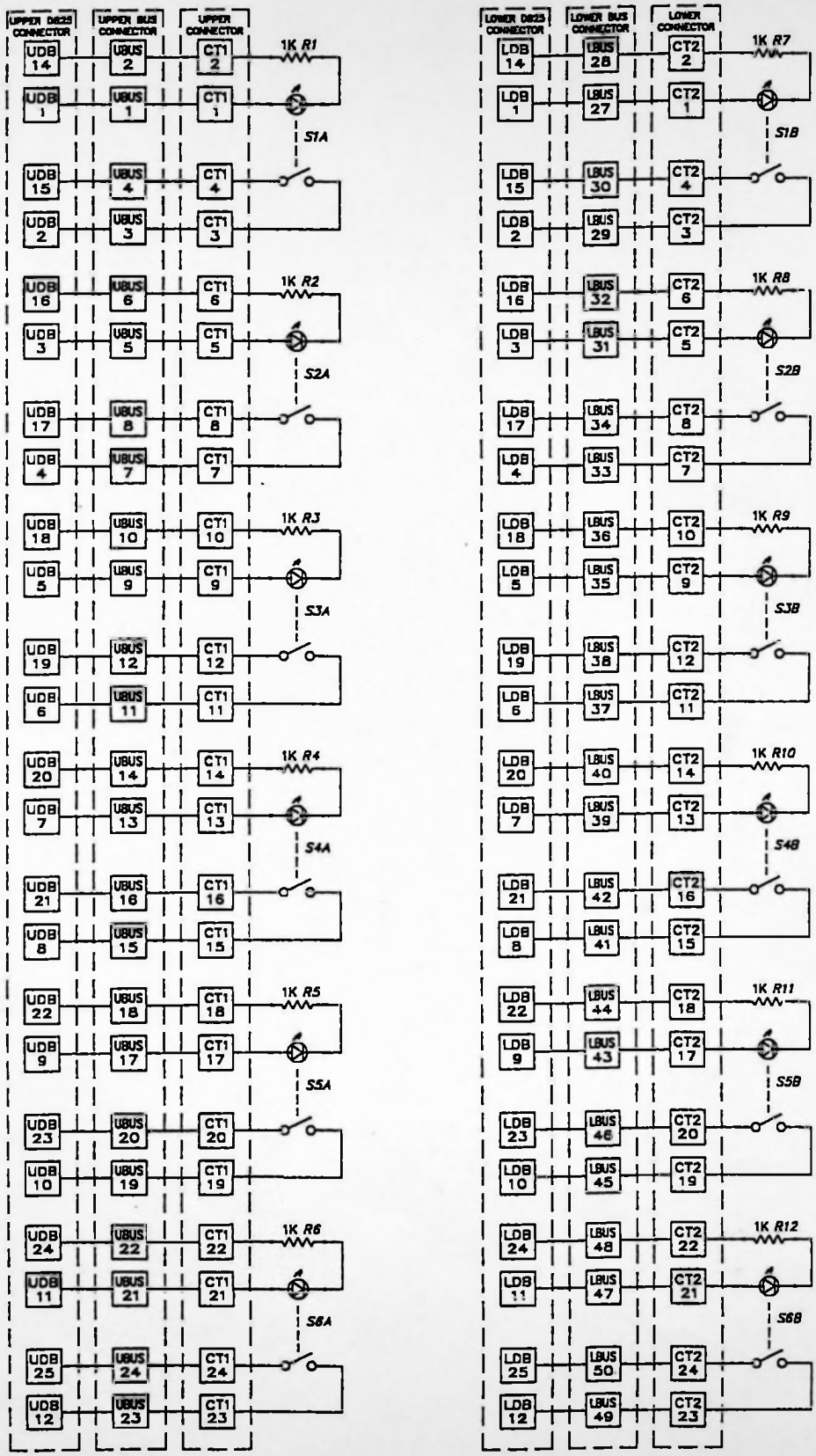
SW 6A COM	25 / 13	N/C
SW 6A LED –	24 / 12	SW 6A N.O.
SW 5A COM	23 / 11	SW 6A LED +
SW 5A LED –	22 / 10	SW 5A N.O.
SW 4A COM	21 / 9	SW 5A LED +
SW 4A LED –	20 / 8	SW 4A N.O.
SW 3A COM	19 / 7	SW 4A LED +
SW 3A LED –	18 / 6	SW 3A N.O.
SW 2A COM	17 / 5	SW 3A LED +
SW 2A LED –	16 / 4	SW 2A N.O.
SW 1A COM	15 / 3	SW 2A LED +
SW 1A LED –	14 / 2	SW 1A N.O.
	1	SW 1A LED +

UPPER DB-25 CONNECTOR
(SWITCHES 1A THRU 6A)

SW 6B COM	25 / 13	N/C
SW 6B LED –	24 / 12	SW 6B N.O.
SW 5B COM	23 / 11	SW 6B LED +
SW 5B LED –	22 / 10	SW 5B N.O.
SW 4B COM	21 / 9	SW 5B LED +
SW 4B LED –	20 / 8	SW 4B N.O.
SW 3B COM	19 / 7	SW 4B LED +
SW 3B LED –	18 / 6	SW 3B N.O.
SW 2B COM	17 / 5	SW 3B LED +
SW 2B LED –	16 / 4	SW 2B N.O.
SW 1B COM	15 / 3	SW 2B LED +
SW 1B LED –	14 / 2	SW 1B N.O.
	1	SW 1B LED +

LOWER DB-25 CONNECTOR
(SWITCHES 1B THRU 6B)

TR-12 TAPE REMOTE MODULE		
AUDIO CONSOLES		
6-25-90	Wheatstone Corporation 6720 V.I.P. Parkway Syracuse, NY. 13211	
CAZ		
	MODULE CONNECTIONS	
TR-12C	T5-SS6 OR T5-FF2	#TR12/DB-1



TR-12 TAPE REMOTE MODULE

A-500a RADIO ON-AIR CONSOLE

6-22-90

CAZ

REVISED

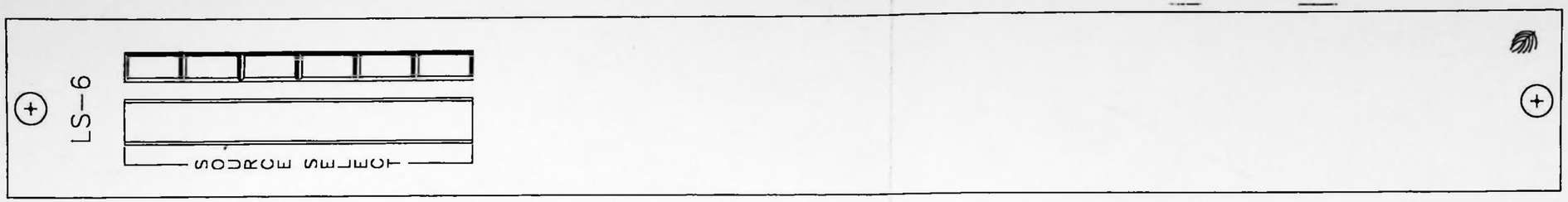
DO NOT SCALE

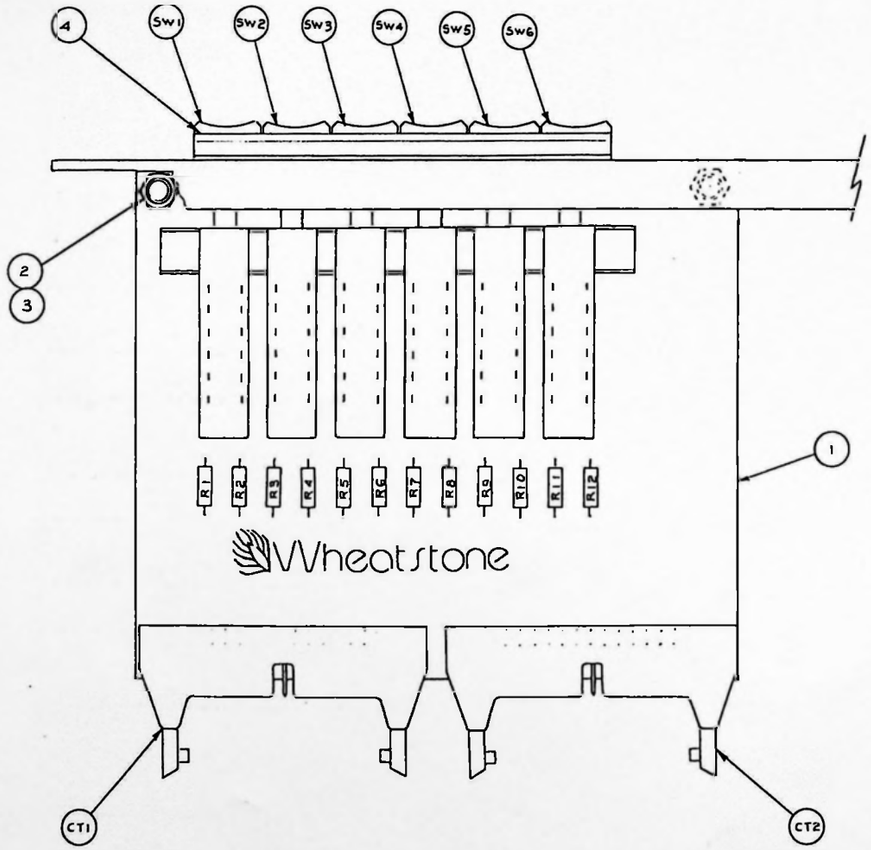
SCHEMATIC DRAWING

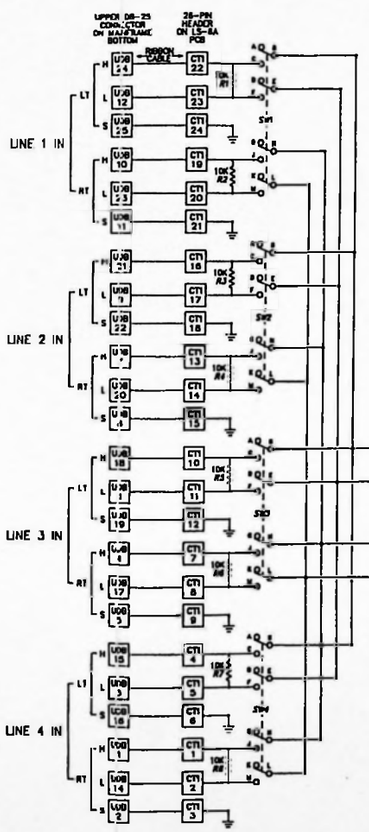
TR-12C PCB

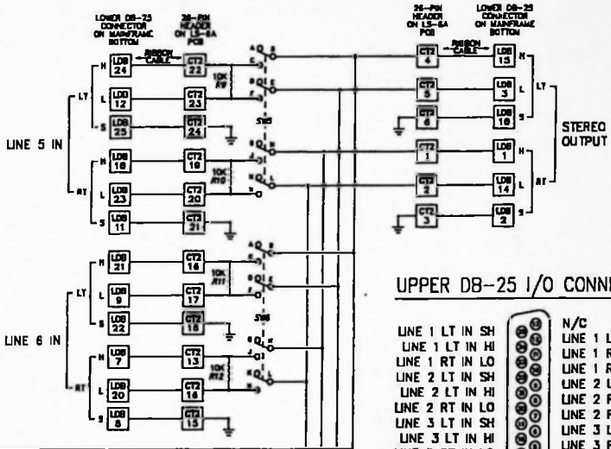
#TR12/SCH-1

Wheatstone Corporation
6720 V.I.P. Parkway
Syracuse, N.Y. 13211









PARTS LIST		
ITEM NO.	DESCRIPTION	QTY
1	PRINTED CIRCUIT BOARD, LS-6A	1
2	SCREW, FLAT HD, PHILLIPS, #4-40 X 3/8 LG	2
3	HEX NUT, #4-40	2
4	WRITE-IN STRIP	1
SW1 THRU SW6	SWITCH, 4POT	6
R1 THRU R12	RESISTOR, 10K 5%	12
CT1, CT2	CONNECTOR, 26-PIN RT. ANGLE DIL HEADER	2

UPPER DB-25 I/O CONNECTOR

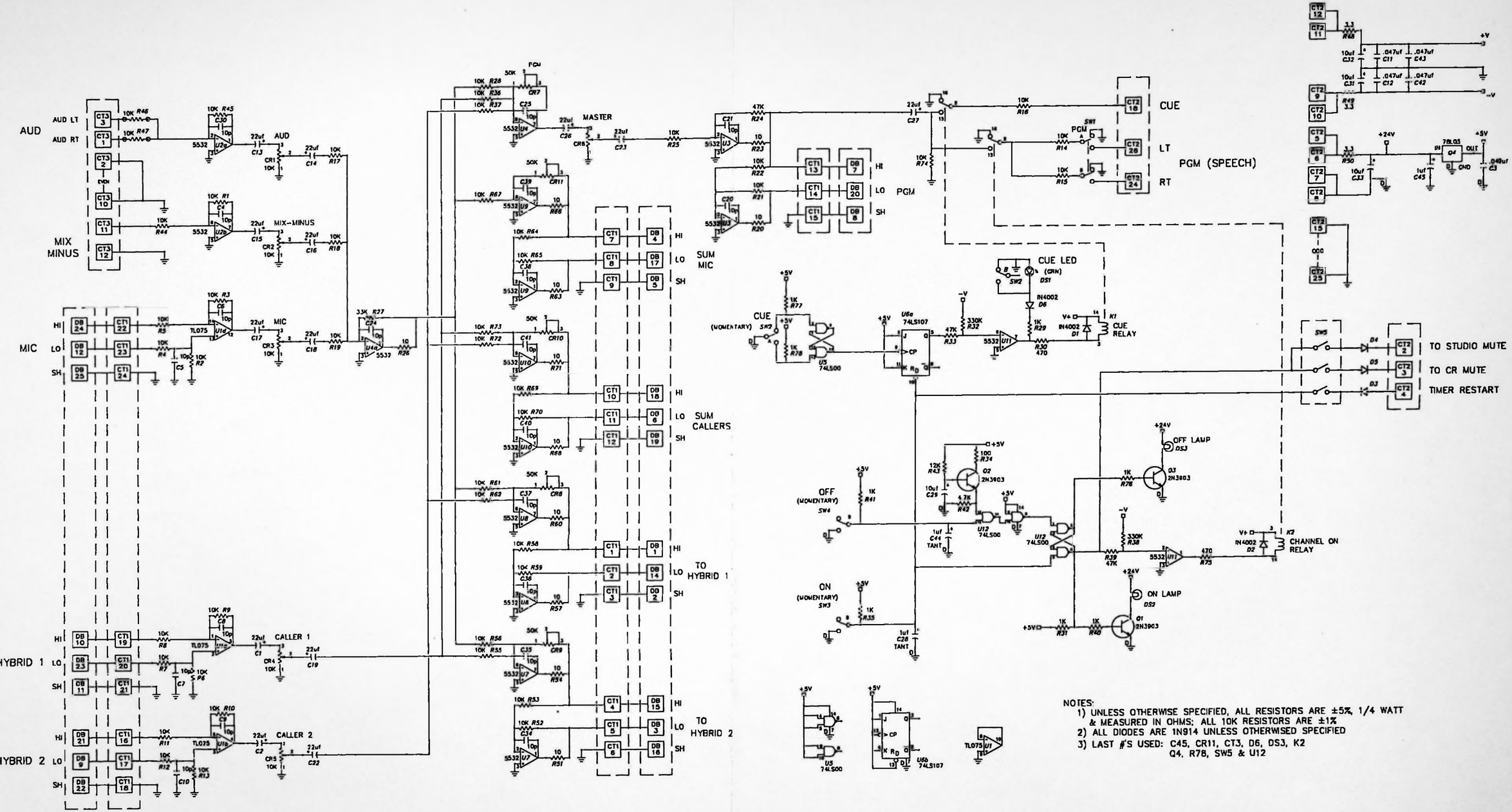
LINE 1 LT IN SH	25	N/C
LINE 1 LT IN HI	24	LINE 1 LT IN LO
LINE 1 RT IN LO	23	LINE 1 RT IN SH
LINE 2 LT IN SH	22	LINE 1 RT IN HI
LINE 2 LT IN HI	21	LINE 2 LT IN LO
LINE 2 RT IN LO	20	LINE 2 RT IN SH
LINE 3 LT IN SH	19	LINE 2 RT IN HI
LINE 3 LT IN HI	18	LINE 3 LT IN LO
LINE 3 RT IN LO	17	LINE 3 RT IN SH
LINE 4 LT IN SH	16	LINE 3 RT IN HI
LINE 4 LT IN HI	15	LINE 4 LT IN LO
LINE 4 RT IN LO	14	LINE 4 RT IN SH
	13	LINE 4 RT IN HI

LOWER DB-25 I/O CONNECTOR

LINE 5 LT IN SH	25	N/C
LINE 5 LT IN HI	24	LINE 5 LT IN LO
LINE 5 RT IN LO	23	LINE 5 RT IN SH
LINE 6 LT IN SH	22	LINE 5 RT IN HI
LINE 6 LT IN HI	21	LINE 6 LT IN LO
LINE 6 RT IN LO	20	LINE 6 RT IN SH
N/C	19	LINE 6 RT IN HI
N/C	18	N/C
N/C	17	N/C
	16	N/C
LEFT OUTPUT SH	15	N/C
LEFT OUTPUT HI	14	LEFT OUTPUT LO
RIGHT OUTPUT LO	13	RIGHT OUTPUT SH
		RIGHT OUTPUT HI

LS-6 LINE SELECT MODULE		
A-20 RADIO ON-AIR CONSOLE		
10-25-88	Wheatstone Corporation 6720 V.I.P. Parkway Syracuse, NY. 13211	
MS		
SCALE: 2X	MODULE DATA SHEET	
	LS-6A PCB	#A20/SCH-7

LS-6 LINE SELECT SCHEMATIC & LOAD SHEET

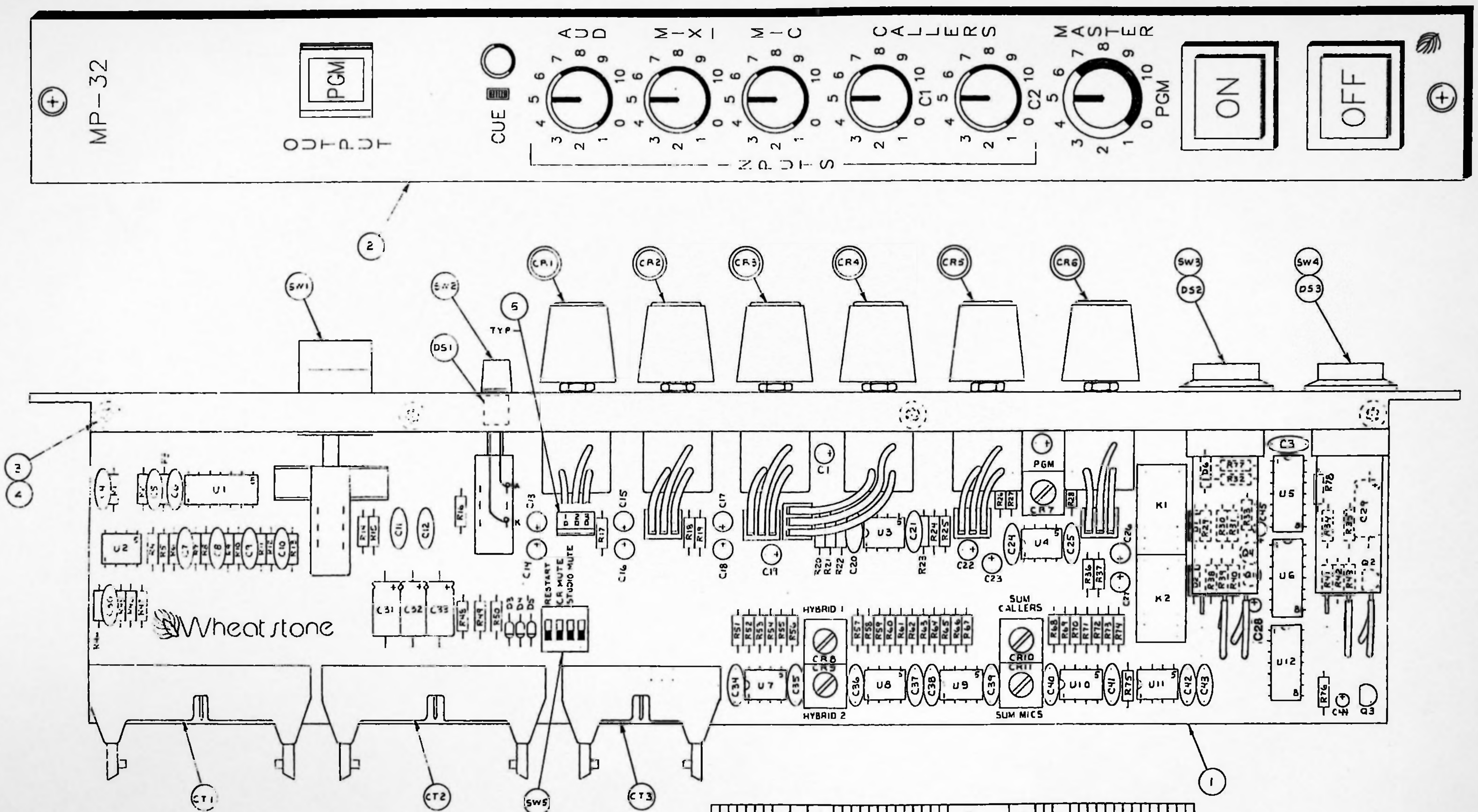


NOTES:
1) UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE ±5%, 1/4 WATT & MEASURED IN OHMS; ALL 10K RESISTORS ARE ±1%
2) ALL DIODES ARE 1N914 UNLESS OTHERWISED SPECIFIED
3) LAST #'S USED: C45, CR11, CT3, D6, DS3, K2 Q4, R78, SW5 & U12

MP-32 MULTI-PHONE MODULE	
A-32 RADIO ON-AIR CONSOLE	
5-30-90	Wheatstone Corporation 8720 V.I.P. Parkway Syracuse, NY. 13211
CAZ	
REVISED	SCHEMATIC DRAWING
	MP-32B PCB / A32/SCH-3

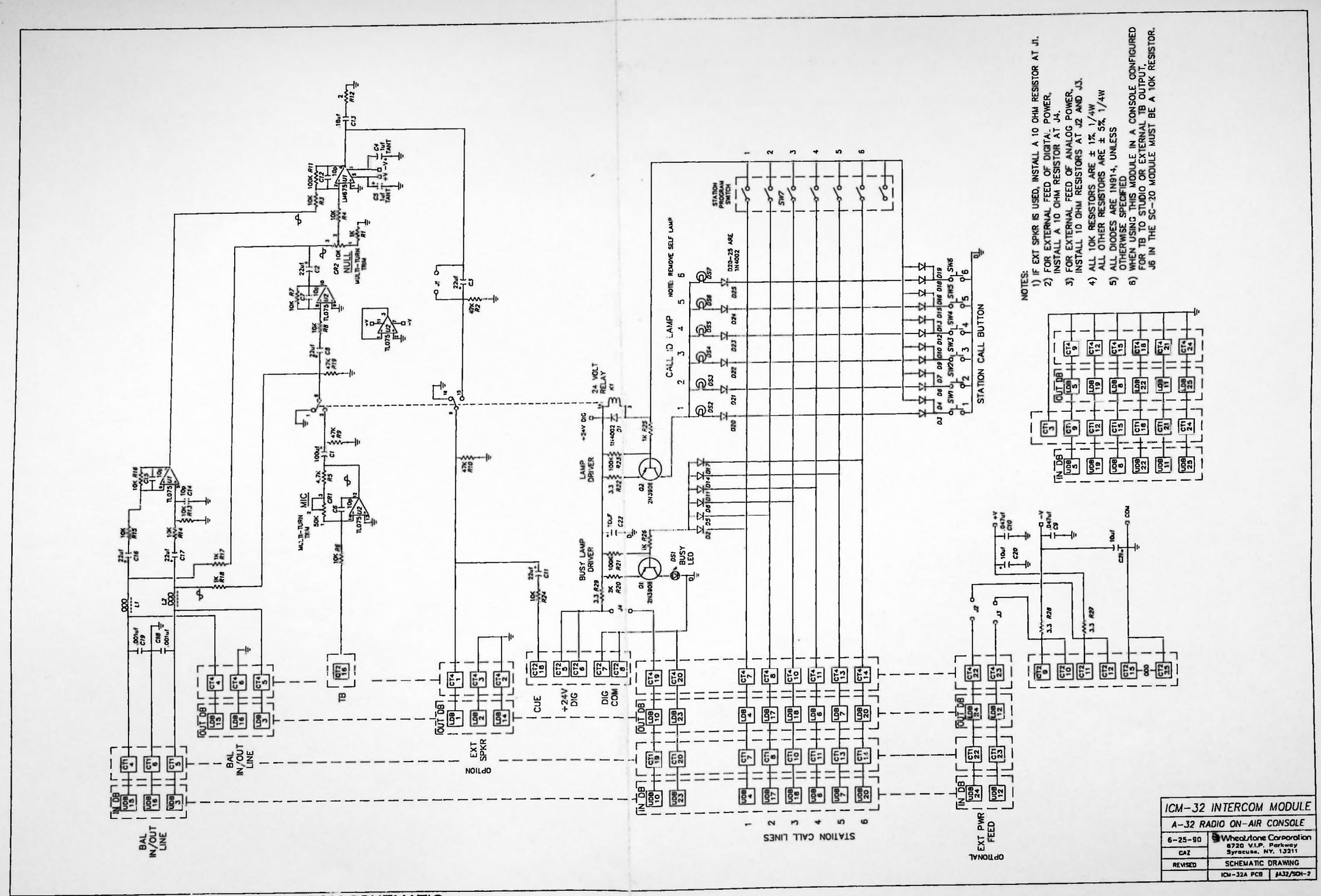
MP-32 MULTI-PHONE SCHEMATIC

Drawing applies to both "A" and "B" versions of PCB

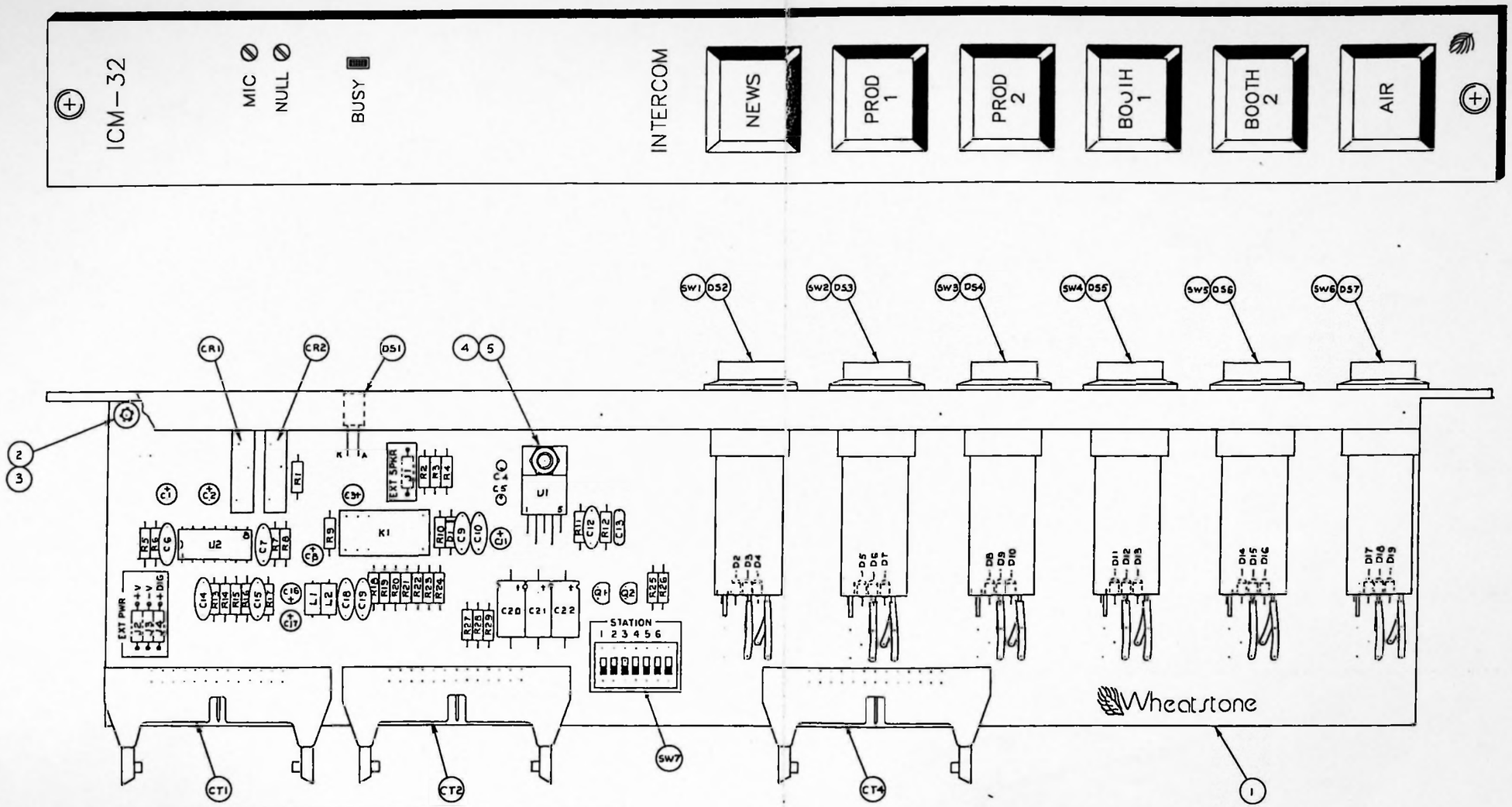


PARTS LIST		
ITEM NO.	DESCRIPTION	QTY
1	PCB MP-32	1
2	FACE PLATE, MP-32	1
3	SELF-CLINCHING NUT #4-40	4
4	SCREW, FLAT HD, PHILLIPS #4-40 X 1/4" LONG	4
5	CONNECTOR 3-PIN LOCKING HEADER	6
C1,2,13-19 22,23,26,27	CAPACITOR, 22uf/25V, ELECTROLYTIC	13
C3,11,12 42,43	CAPACITOR, .047uf, CERAMIC	5
[illegible] 24,25,30 34-41	CAPACITOR, 10pf, CERAMIC	20
C28,44,45	CAPACITOR, 1uf/25V, TANTALUM	3
C29,31-33	CAPACITOR, 10uf/25V, ELECTROLYTIC	4
CR1-6	POTENTIOMETER & CABLE ASSY, 10K	6
CR7-11	TRIM POT, 50K	5
CT1 & 2	CONNECTOR, 20 PIN, RT ANGLE, DIL HEADER	2
CT3	CONNECTOR, 14 PIN, RT ANGLE, DIL HEADER	1
D1, 2 & 6	DIODE, 1N4002	3
D3-5	DIODE, 1N914	3
DS1	DISPLAY, LED [illegible] RECTANGULAR	1
DS2 & 3	24V LAMP, SWITCH MOUNTED	2
K1 & 2	RELAY, DPDT 24VDC	2
Q1-3	TRANSISTOR, 2N3903 NPN	3
Q4	REGULATOR 78L05	1
R1-19,21,22 25,26,36,37 44-47,52,53 55,56,58,59 61,62,64,65 67,69,70 72-74	RESISTOR, 10K ±1%, 1/4 WATT	45
R20,23,26,51 54,57,60,63 66,68,71	RESISTOR, 10 OHMS ±5%, 1/4 WATT	11
R24,32,39	RESISTOR, 47K ±5%, 1/4 WATT	3
R27	RESISTOR, 33K ±5%, 1/4 WATT	1
R29,31,35,40 41,76-78	RESISTOR, 1K ±5%, 1/4 WATT	8
R30,75	RESISTOR, 470 OHM ±5%, 1/4 WATT	2
R33 & 38	RESISTOR, 220K ±5%, 1/4 WATT	2
R34	RESISTOR, 100 OHMS ±5%, 1/4 WATT	1
R42	RESISTOR, 4.7K ±5%, 1/4 WATT	1
R43	RESISTOR, 12K ±5%, 1/4 WATT	1
R48-50	RESISTOR, 3.3 OHMS ±5%, 1/4 WATT	3
SW1	SWITCH, PUSHBUTTON, DPDT	1
SW2	SWITCH, PUSHBUTTON, DPDT, MOMENTARY	1
SW3 & 4	SWITCH, PUSHBUTTON, DPDT, MOMENTARY, ILLUMINATED	2
SW5	SWITCH, SLIDE, 4-SPST, DIP PKG	1
U1	IC, TL075, QUAD OP-AMP	1
U2-4,7-11	IC, 5532, DUAL OP-AMP	8
U5 & 12	IC, 74LS00, QUAD NAND GATE	2
U6	IC, 74LS107, DUAL J-K FLIP/FLOP	1

MP-32 MULTI-PHONE		
A-32 RADIO ON-AIR CONSOLE		
6-4-90	Wheatstone Corporation 6720 V.I.P. Parkway Syracuse, NY. 13211	
RA/CAZ		
SCALE: 2/1	PCB LOAD SHEET	
DO NOT SCALE	MP-32B PCB	#A32/LOD-3



ICM-32 INTERCOM SCHEMATIC

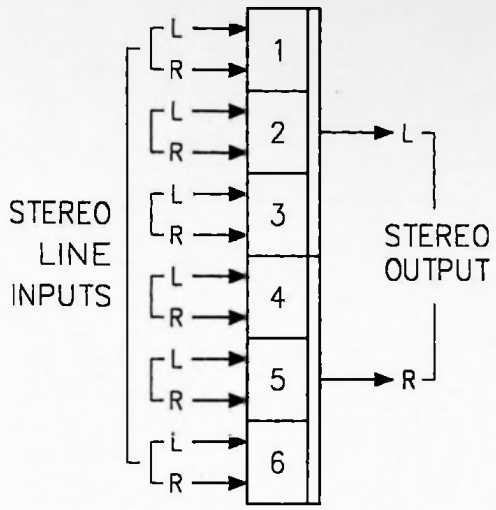


ITEM NO.	DESCRIPTION	QTY
1	PRINTED CIRCUIT BD, ICM-32	1
2	SCREW, PHILLIPS, 4-40	4
3	SCREW, FLAT HD, PHILLIPS, #4-40 X 1/4 LG	4
4	SCREW, NYLON PAN HD SLOTTED, #4-40 X 5/8 LG	1
5	HEX NUT, #4-40, NYLON	1
C1,2,3 & 11,16 & 17	CAPACITOR, 22µf/35V, ELECTROLYTIC	7
C4 & 5	CAPACITOR, 1µf/35V, TANTALUM	2
C6,7,12,14 & 15	CAPACITOR, 5pf, CERAMIC	5
C9 & 10	CAPACITOR, .047µf, CERAMIC	2
C13	CAPACITOR, .1µf, MYLAR	1
C18 & 19	CAPACITOR, .001µf, CERAMIC	2
C20,21 & 22	CAPACITOR, 10µf/35V, ELECTROLYTIC	3
CR1	TRIM POT, MULTI-TURN, 50K	1
CR2	TRIM POT, MULTI-TURN, 10K	1
CT1,2 & 4	CONNECTOR, 26 PIN RT. ANGLE HEADER	3
D1,20-25	DIODE, IN4002	7
D2-19	DIODE, IN914	18
DS1	DISPLAY, LED (GRN) RECTANGULAR	1
DS2-7	DISPLAY, LED (RED) SWITCH MOUNTED	6

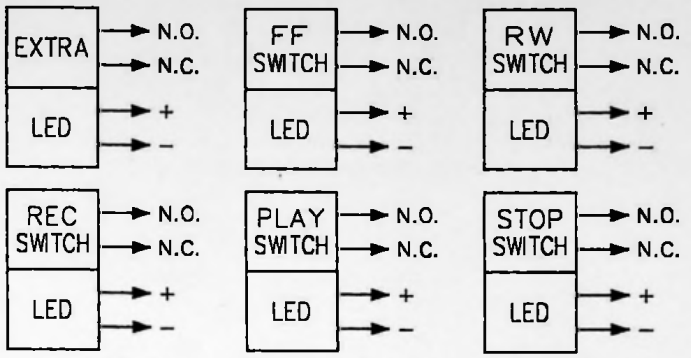
ITEM NO.	DESCRIPTION	QTY
J1-4	JUMPER	4
K1	RELAY, DPDT, 12VDC	1
L1 & 2	FERRITE BEAD, RF CHOKE	2
Q1 & 2	TRANSISTOR, 2N3906, NPN	2
R1,17,18,25 & 26	RESISTOR, 1K ± 5%, 1/4W	5
R2,9,10,19,20 & 22	RESISTOR, 47K ± 5%, 1/4W	6
R3,4,6,7,8,13,14 15 & 24,30	RESISTOR, 10K ± 1%, 1/4W	10
R5	RESISTOR, 4.7K ± 5%, 1/4W	1
R11,21 & 23	RESISTOR, 100K ± 5%, 1/4W	3
R12	RESISTOR, 1Ω ± 1%, 1/4W	1
R27,28 & 29	RESISTOR, 3.3 Ω ± 1/4W	3
SW1-6	SWITCH, DPDT MOM. ILLUMINATED	6
SW7	SWITCH, 7-SPST DIP PKG	1
U1	I.C. LM675 PWR AMP	1
U2	I.C. TL075 QUAD OP-AMP	

ICM-32 INTERCOM MODULE	
A-32 RADIO ON-AIR CONSOLE	
6-11-90	Wheatstone Corporation, 6720 V.I.P. Parkway, Syracuse, NY. 13211
RA	
SCALE: 2X	PCB LOAD SHEET
	ICM-32A PCB / A32/A00-1

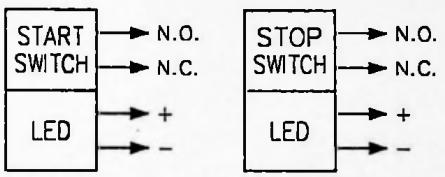
ICM-32 INTERCOM LOAD SHEET



OPTIONAL LS-6
LINE SELECT MODULE

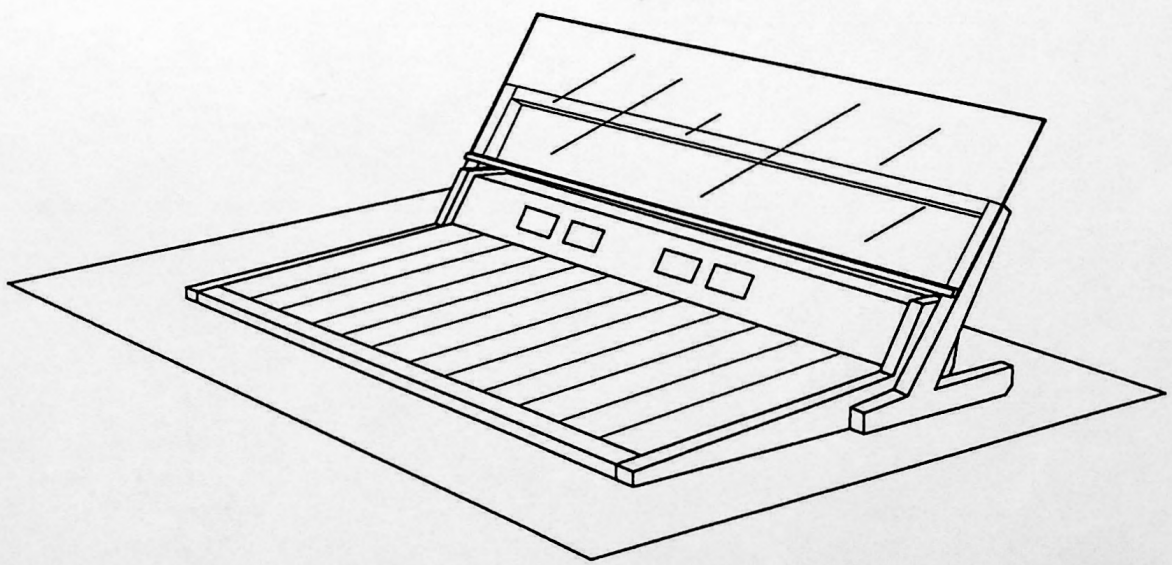


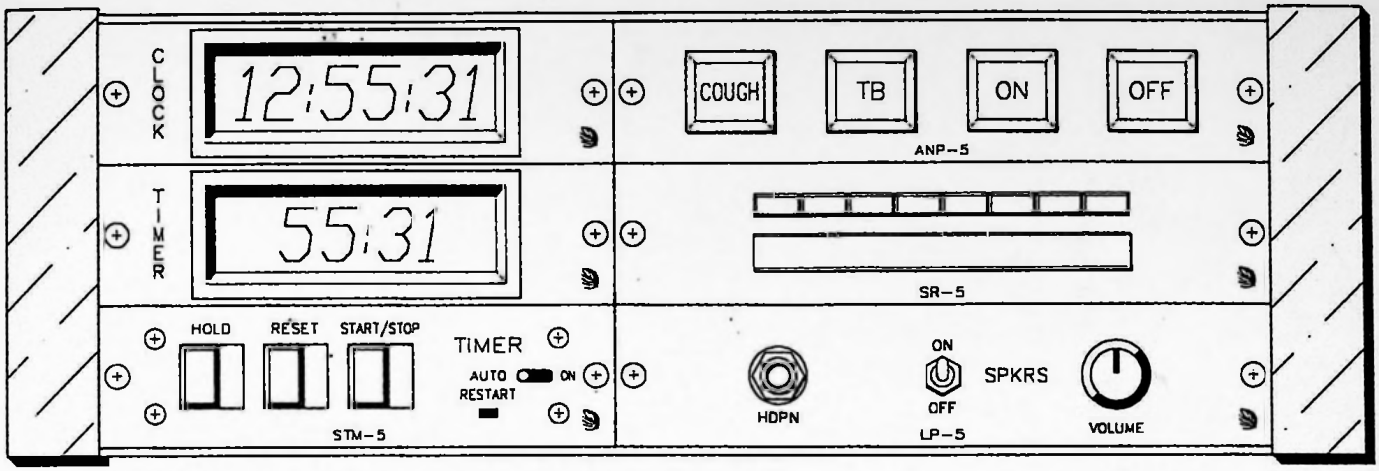
OPTIONAL FF-2 TAPE REMOTE MODULE
(1 OF 2 SWITCH SETS SHOWN)



OPTIONAL SS-6 TAPE REMOTE MODULE
(1 OF 6 SWITCH SETS SHOWN)

A-20 CONSOLE w/OPTIONAL COPYSTAND





ST-20 STUDIO TURRET (OPTIONAL)

The optional studio turret can be equipped with up to six accessory panels:

TURRET CLOCK—A six-digit time-of-day clock with LED display.

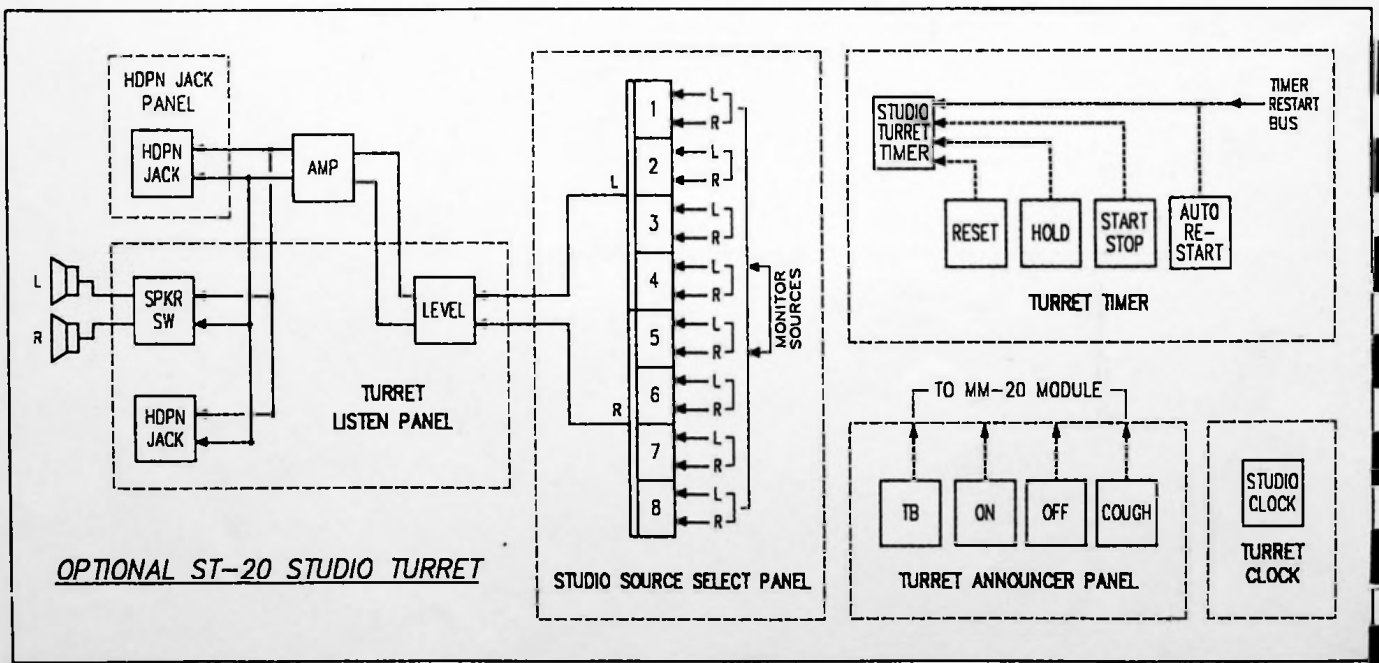
TURRET TIMER—A Four-digit timer with LED display. Timer restart may slave from console if desired.

STM-5 TIMER CONTROL—The control panel for the studio turret timer. It has three pushbutton switches (Start/Stop, Reset, Hold) and one toggle switch (Auto Restart) which enables the timer restart function (initiated from console SL-20 input modules that have been so programmed).

ANP-5 ANNOUNCER PANEL—Used to remotely control an MM-20 microphone input module at the A-20 console. Talk-back, On, Off and Cough (momentary off) functions are provided. (See "External Control", MM-20 module page.) Console tally back signals are provided to illuminate ON/OFF switch.

SR-5 STUDIO REMOTE PANEL—A source select switchbank with 8 stereo inputs and one stereo output. It is used to select monitor signals going to the studio amplifier system.

LP-5 LISTEN PANEL—A stereo level control (used to feed an external studio speaker amplifier), a speaker On/Off switch and a headphone output jack.



OPTIONAL ST-20 STUDIO TURRET