
R-90

Linear Audio Console



TECHNICAL MANUAL
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R-90 Linear Audio Console Technical Manual - 2nd Edition

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R-90 Technical Manual

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Installation and Power

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Installation and Power

Unpacking the Console

The R-90 console is shipped as two packages. One carton contains the console and the second carton contains the power supply, connecting cable, connector kit and documentation.

Countertop Mounting

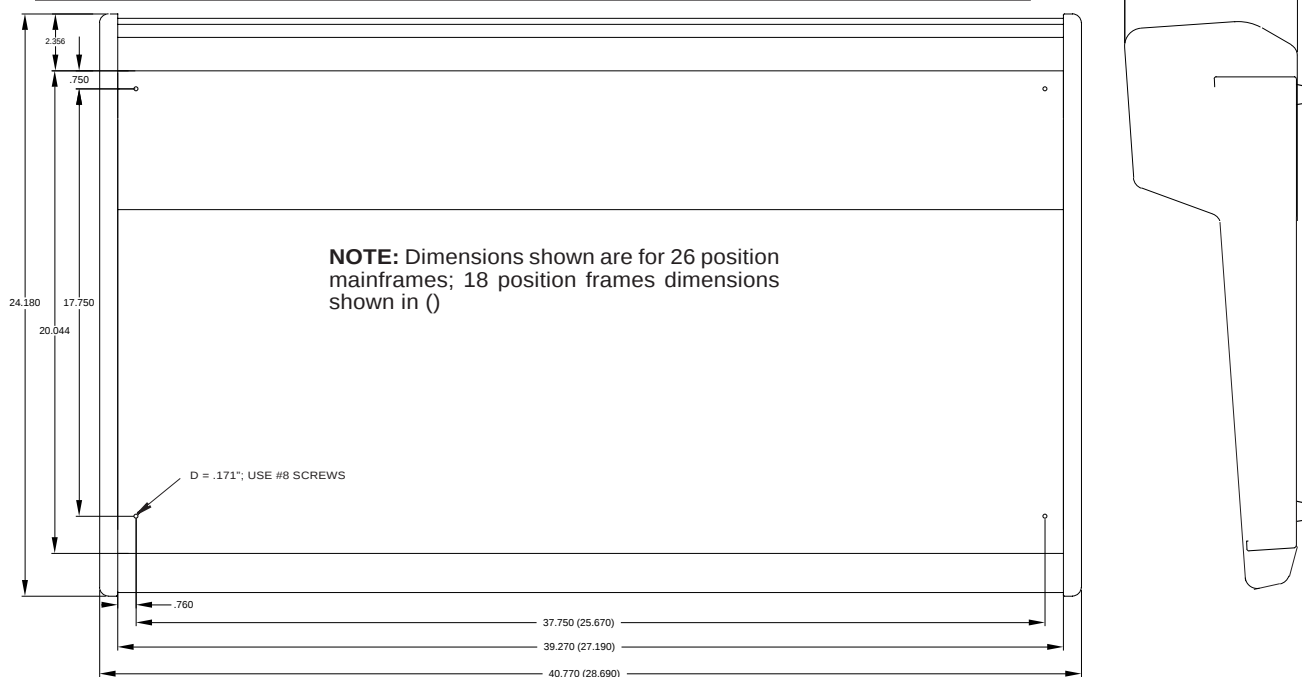
The R-90 audio console is designed for countertop mounting. Console placement should avoid proximity to any electromagnetic fields, such as large power transformers, motors, and fluorescent lighting fixtures. If you will be securing the console to the counter top, you may want to pre-drill the mounting holes (see sketch below).

Set the console in place on the counter, and remove the screws that hold down the first and the last modules in place (two per module). Carefully remove those modules from the frame. Attach the console mainframe to the counter top, using the holes provided in the bottom of the chassis and screws appropriate to the counter material, and reinstall the removed modules.

The console extends approximately 7 5/8" above the countertop at the meterbridge. The hinged meterbridge will require 14" above the countertop surface and 4 3/4" behind the rear meterbridge to open freely.

Do not connect the R-90 console to its power supply (and do not connect the power supply to the AC power line) until instructed to do so.

NOTE: This console contains static-sensitive devices. Normal precautions against static discharge should be observed when handling individual modules.



System Ground

The first step is to ground the console.

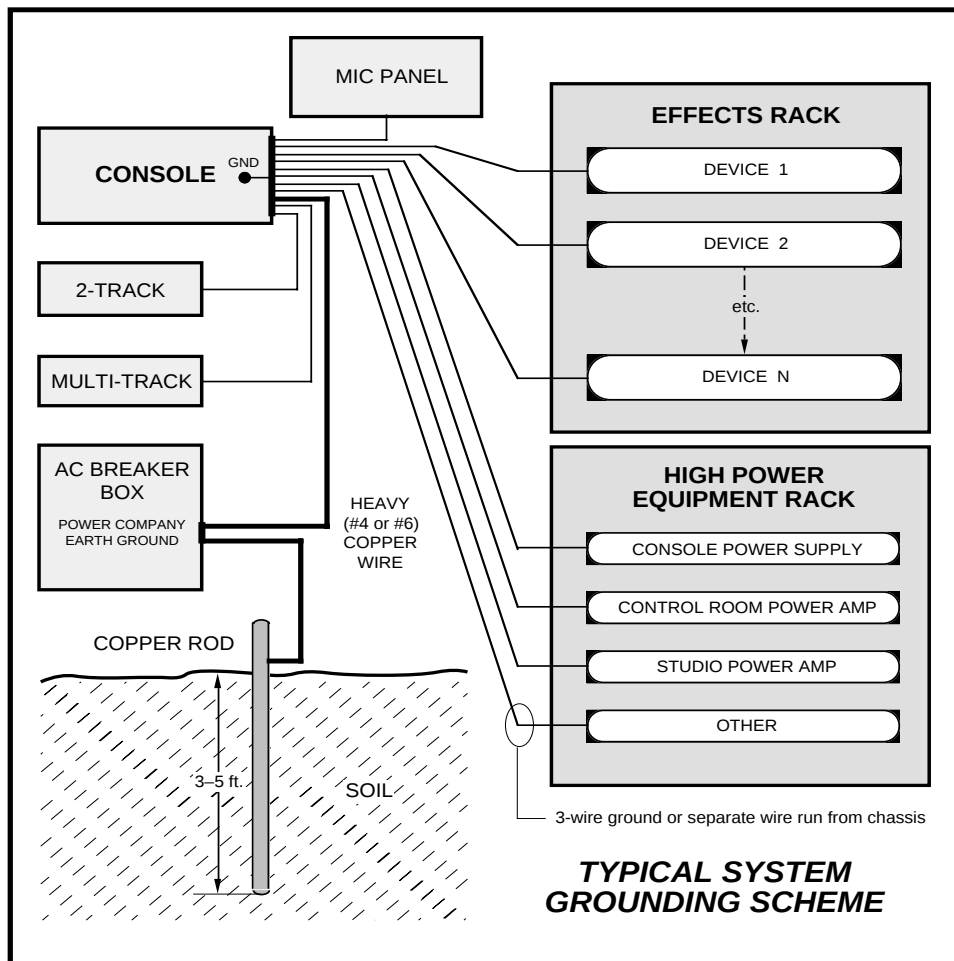
Note that as supplied from the factory, console rackmount power supply common, audio ground, and the R-90 mainframe are connected together at the console, but are NOT connected to electrical ground and the chassis of the power supply. Safety requirements dictate that a positive connection from the console mainframe to electrical ground be made in the completed installation. Use the grounding lug on the rear of the mainframe to establish your system ground. The grounding lug may be found at the rear of the console, on the rear frame panel, to the left if you are looking at the rear of the console.

The system ground serves two important purposes:

- (1) It provides a zero signal reference point for the entire audio system;
- (2) It assures safety from electrical shock.

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

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



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.

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

Each piece of equipment should be connected by its own ground wire (usually the round third pin on the AC cord). This means that every AC outlet must have a separate conductor run to the console ground lug; 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.

Further Grounding Details

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

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

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

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

Power Supply

PS-6040 Power Supply

The R-90 console is powered by a model PS-6040 power supply. Mount the PS-6040 power supply in a standard 19" equipment rack, keeping in mind that adequate ventilation is necessary to prevent heat build-up within the rack.

If failsafe redundant supplies have been ordered, you will be installing two units and an additional rackmount panel.

Once the supply is rackmounted, it should be connected to the console using the factory supplied cable. The cable has two different types of 9-pin connectors on its end: a plastic shell connector that connects to the console's power supply connector, and a multi-pin cable-mount connector that plugs into the PS-6040 power supply. The console's power supply connector is located at the rear of the console, at the right end of the meterbridge bottom pan.



Note that the power supply cable's 9-pin female connector has to be rotated until its locating pins match the male connector on the power supply. Do not force a connector on; it attaches easily when properly aligned. Connect the cable first to the console, then to the rear of the rackmount power supply.

If you are using two supplies (failsafe option), connect the long power supply cable's round power supply connector to the center connector of the rackmount failsafe panel. Then connect one supply with a short cable to either of the two remaining connectors on the failsafe panel and connect the second supply with a short cable to the last connector.

Note each power supply is fitted with a 3-wire grounded AC cord that should be plugged into a "clean" AC power source, that is, an AC source that feeds only the control room audio gear. This source should be a separate feed from those powering lighting, air-conditioning, or any other non-audio machinery. The third pin ground wire of the AC source should be tied to the central system ground point. *Note that while the AC power cord ground wire terminates at the power supply chassis, it does NOT connect to the R-90 console common; the console itself must be grounded separately. (See previous section, "System Ground".)*

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

PS Cable Pinout								
	PIN						PIN	
	ORG 1	← +5V Digital →					7	ORG
	YEL 2	← +5V Digital →					4	YEL
	GRN 3	← Digital Common →					6	GRN
	BLK 4	← Audio Common →					1	BLK
	N/C 5	← N/C →					5	N/C
	BLU 6	← -18V →					3	BLU
	BRN 7	← Audio Common →					8	BRN
	VIO 8	← +40V Phantom →					9	VIO
	RED 9	← +18V →					2	RED

Power Supply End
9-pin Connector
Female

Console End
9-pin Connector
Female

Failsafe Dual Redundant Supply

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

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

Energizing

Assuming the R-90 console mainframe is properly placed and grounded, and its PS-6040 power supply correctly rackmounted and connected to the console, you may now energize the PS-6040 rackmount power supply by plugging it into the AC mains. The four LEDs on the power supply front panel should light up to indicate the presence of their respective voltages. The console's VU meters will illuminate and individual module switches will assume factory default settings.

Once you have verified proper power-up, turn off the rackmount power supply to de-energize the console. You may now proceed to wire up audio and control connections.

Audio and Control Wiring

All audio and control I/O connections to the R-90 console are made through multipin DB-25 connectors located on the top of each module. The output module also has a DB-9 connector. The factory supplied hand crimping tool is used for all I/O wiring connections to and from the console (see instruction on the page 1-8).

Connection Procedures

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

Unbalanced Connections (analog audio)

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

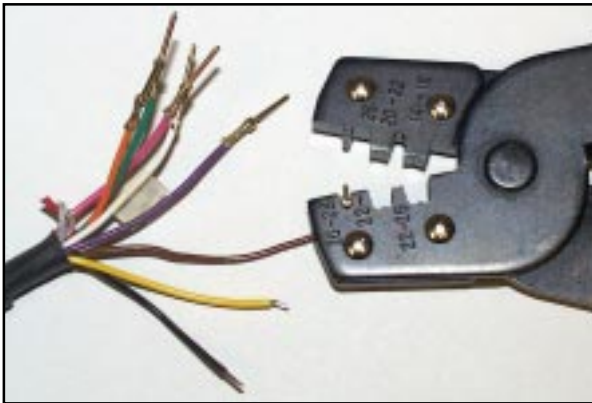
ANALOG OUTPUTS — R-90 consoles use an electronically balanced output circuit. Care must be exercised when connecting them to an unbalanced system. While temporarily shorting the low side of the output signal to ground will not cause any problems, continued operation will result in increased distortion, decreased reliability, and possible oscillation problems. If you must connect the 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.

Modules Layout

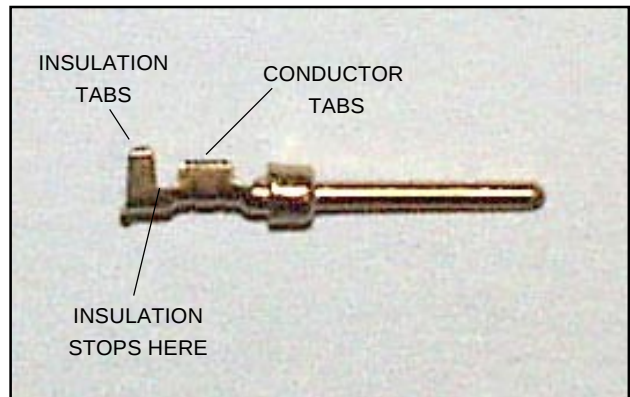
The R-90 console's mainframe comes supplied with 20 (for 26 pos. frame) or 12 (for 18 pos. frame) input modules along with an output module, a control room/studio module, and a line preselect module. Each module type has its assigned slot (see drawings on pages 1-9 and 1-10). Also there can be optional modules: a superphone, an additional line preselect, a tape remote, and a studio two. Optional modules (except studio two) can be placed in any input slot. The optional Studio two module has a dedicated slot (see layout drawings).

HAND CRIMP TOOL WIRING INSTRUCTIONS

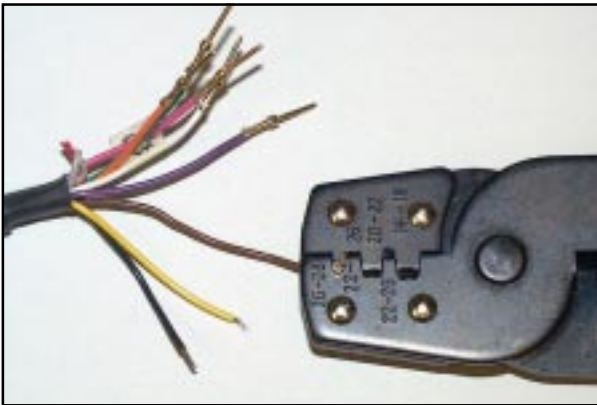
The supplied hand crimping tool (W/S#850068) is used for all I/O wiring connections to and from the console. It is to be used with the supplied pin (figure 1) intended for 22"-28" gauge wire.



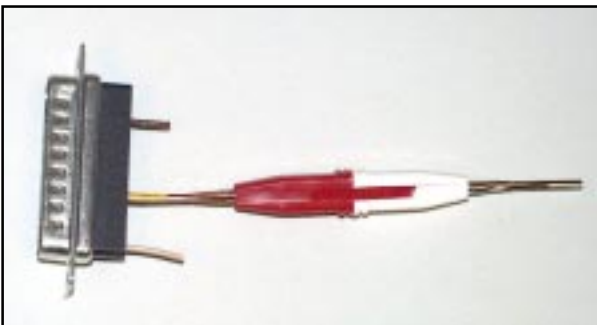
(2) The terminal conductor tabs with stripped wire are placed in anvil 26-28.



(1) Pin crimp terminal



(3) Jaws fully closed; the insulation tabs have been crimped.



(4) Place extractor tip over pin terminal to be removed.

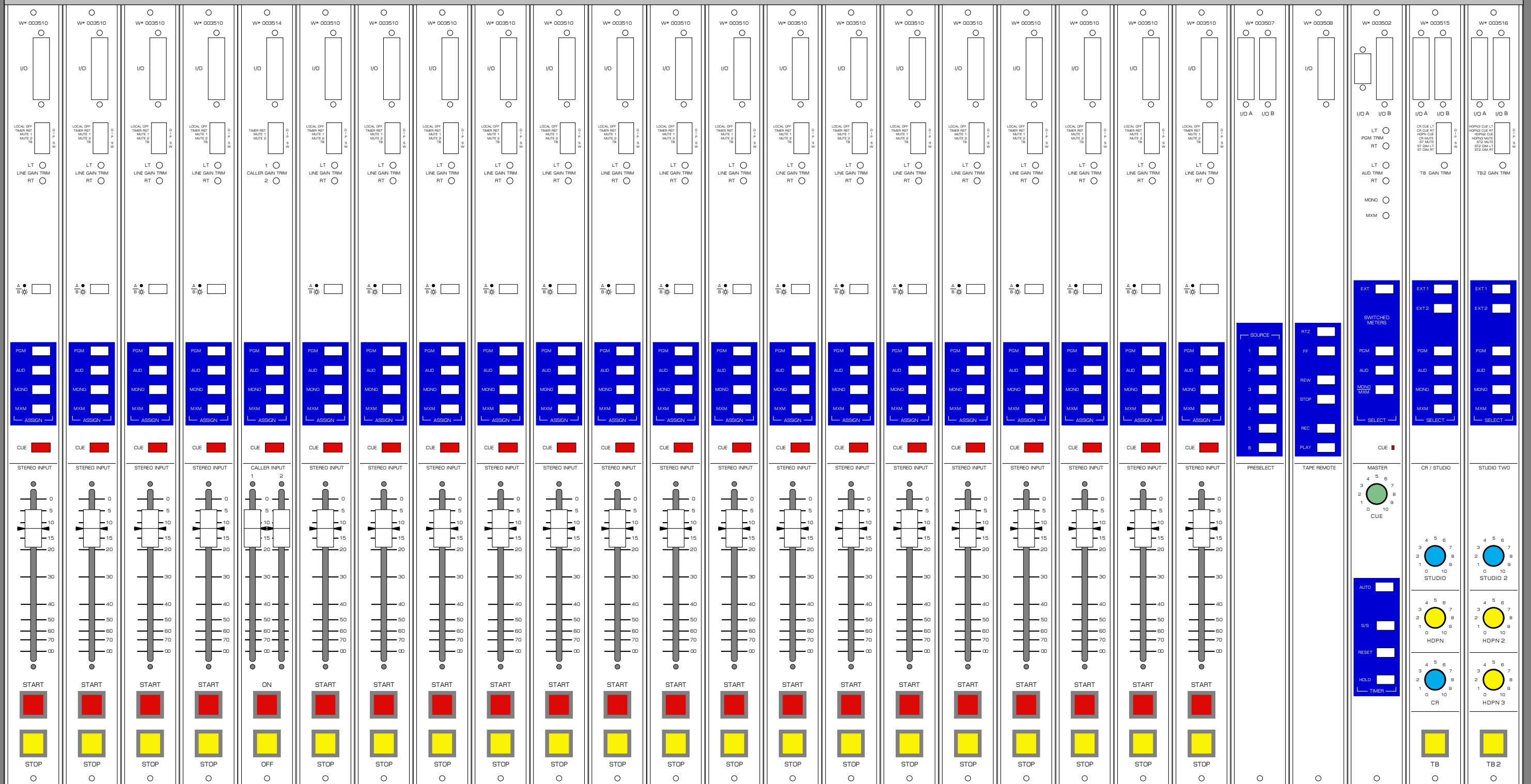
1) Strip wire approximately 3/16" (insert in proper wire stripper, rotate one half turn, and pull insulation off wire).

2) Insert wire into terminal until wire insulation is stopped by conductor tabs, and place the conductor tabs on the anvil marked as 26-28 (figure 2).

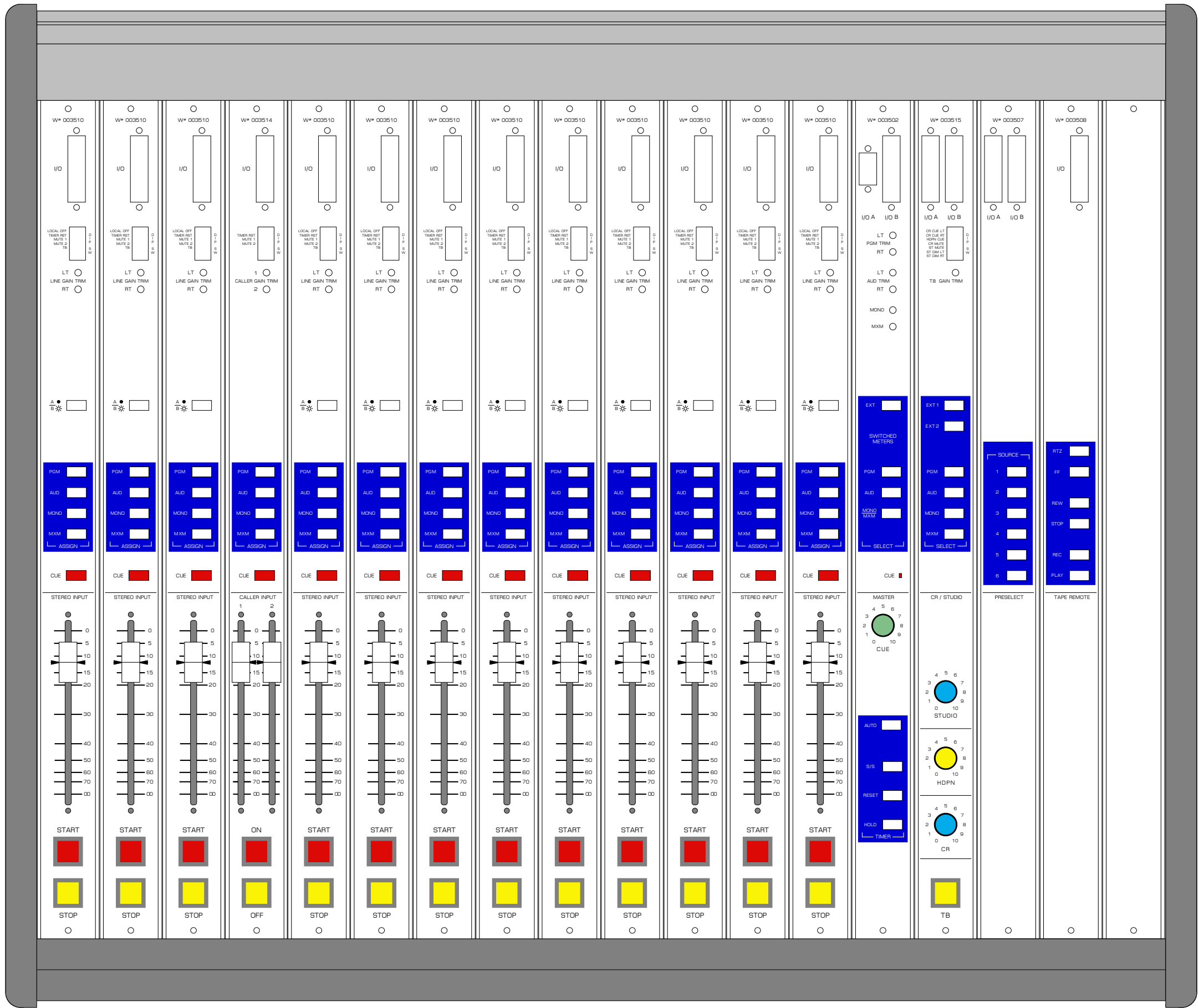
3) CRIMP by squeezing handles until jaws are fully closed to secure wire in the terminal (figure 3).

4) If there is an insertion error or if a circuit change is needed, you'll need to use the supplied pin extractor tool (W/S#850069) to remove terminals, and correct your mistake without having to sacrifice a connector. Place extractor tip (red side) over pin terminal to be removed (figure 4), and press it downwards motion until tip rests upon Housing. Then pull out the pin terminal from Housing. It should never be necessary to discard a connector due to a wiring error.

Note that metallized plastic hoods for each connector are also supplied with the console.



NOTE: 1. CONSOLE CAN ACCOMMODATE UP TO 23 INPUT OR ACCESSORY MODULES.
 2. MASTER OUTPUT, CONTROL ROOM/STUDIO AND OPTIONAL STUDIO TWO MODULES HAVE THEIR DEDICATED SLOTS—LAST THREE SLOTS AT THE RIGHT END OF THE FRAME.
 3. OPTIONAL MODULES—SUPERPHONE, ADDITIONAL LINE SELECT, AND TAPE REMOTE—CAN BE PLACED IN ANY SLOT POS.1-23.



- NOTE: 1. CONSOLE CAN ACCOMMODATE UP TO 13 INPUT MODULES (LINE AND OPTIONAL SUPERPHONE—SLOTS 1-13).
 2. MASTER OUTPUT AND CONTROL ROOM/STUDIO MODULES HAVE THEIR DEDICATED SLOTS (AS SHOWN).
 3. OPTIONAL STUDIO TWO MODULE (NOT SHOWN) SHOULD BE PLACED IN LINE SELECT MODULE SLOT—THIRD SLOT FROM THE RIGHT END OF THE FRAME. IN THIS CASE LINE SELECT MODULE CAN BE PLACED IN ANY SLOT POS.1-13.
 4. LAST TWO SLOTS AT THE RIGHT END OF THE FRAME SHOULD BE USED FOR OPTIONAL TAPE REMOTE OR ANY NON-POWERED OPTIONAL MODULES.
 5. ADDITIONAL OPTIONAL LINE SELECT MODULE CAN BE PLACED IN ANY SLOT POS. 1-13.

Quad Mic Preamp

(QMP-4)

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Quad Mic Preamp (QMP-4)



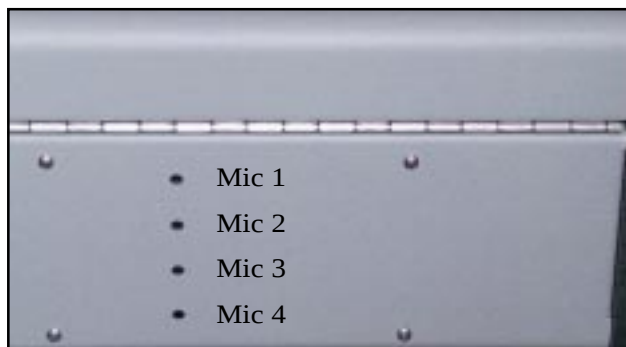
Overview

The QMP-4 is a quad mono microphone preamplifier and is mounted in the left side of the console meterbridge rear. Mic level sources are wired to QMP-4 mic preamp inputs. QMP-4 output signals are then wired to input pins of individual SL-90 input modules. SL-90 module A inputs should be used if you need to have the mic activate control room or studio muting.

Phantom power is available at each input port; it may be selectively activated by a dipswitch SW1 (the factory default is OFF).

Recessed meterbridge rear multi-turn trimpots (range 38dB) adjust the level of each input independently.

Example: with a microphone input of –60dBm @150Ω at the port, gain trim can set levels from -22dBu to +16dBu (note maximum preamp gain is +76dB).



All audio input and output signals are made via two 12-position plug terminals mounted on the QMP-4 PCB.

Internal Programming Options

Internal programming for the quad mic preamp is made via printed circuit board (PCB) mounted seven-position dipswitch SW1. Note that when a dipswitch position is thrown to the right it is ON.

Phantom Power

Dipswitch SW1 turns phantom power on for the four microphone input ports.

SW1 position 7 activates phantom power for microphone 1

SW1 position 5 activates phantom power for microphone 2

SW1 position 3 activates phantom power for microphone 3

SW1 position 1 activates phantom power for microphone 4

Note the factory default setting for phantom power is OFF.

Hook-Ups

As stated before, all user wiring to and from QMP-4 takes place at the 12-position plug terminals mounted on the QMP-4 PCB. A pinout drawing on page 2-6 shows all wiring connections at a glance.

Audio Input Connections (CT3)

All signals are analog mono. The mic input level is normally -50dBu, balanced.

Pin 1 – Mic 1 In SH

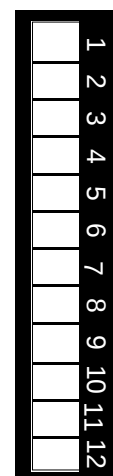
Pin 2 – Mic 1 In LO

Pin 3 – Mic 1 In HI

Pin 4 – Mic 2 In SH

Pin 5 – Mic 2 In LO

Pin 6 – Mic 2 In HI



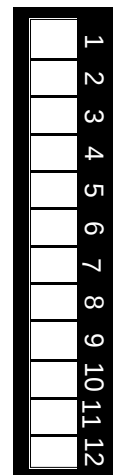
Typical 12-position plug terminal

Pin 7 – Mic 3 In SH
 Pin 8 – Mic 3 In LO
 Pin 9 – Mic 3 In HI
 Pin 10 – Mic 4 In SH
 Pin 11 – Mic 4 In LO
 Pin 12 – Mic 4 In HI

Audio Output Connections (CT4)

All signals are analog mono. The mic output level is normally +4dBu, balanced.

Pin 12 – Mic 1 Out SH
 Pin 11 – Mic 1 Out LO
 Pin 10 – Mic 1 Out HI
 Pin 9 – Mic 2 Out SH
 Pin 8 – Mic 2 Out LO
 Pin 7 – Mic 2 Out HI
 Pin 6 – Mic 3 Out SH
 Pin 5 – Mic 3 Out LO
 Pin 4 – Mic 3 Out HI
 Pin 3 – Mic 4 Out SH
 Pin 2 – Mic 4 Out LO
 Pin 1 – Mic 4 Out HI



Typical 12-position
plug terminal

Note that each output wires in parallel to the left and right input channels of an input stereo module (SL-90).

For example:

Pin 12 – Mic 1 Out SH wires to	Pin 25 - Line A Lt In SH
	Pin 11 - Line A Rt In SH
Pin 11 – Mic 1 Out LO wires to	Pin 12 - Line A Lt In LO
	Pin 23 - Line A Rt In LO
Pin 10 – Mic 1 Out HI wires to	Pin 24 - Line A Lt In HI
	Pin 10 - Line A Rt In HI

Power Connections (CT7)

A ribbon cable connects the 10-pin connector on the QMP-4 (CT7) to the 10-pin connector mounted on the center of the MBR-2000 motherboard (CT8) to provide power to the microphone preamplifier.

- Pin 1 – Analog Ground
- Pin 2 – Analog Ground
- Pin 3 – +Phantom V
- Pin 4 – +Phantom V
- Pin 5 – +V In
- Pin 6 – +V In
- Pin 7 – -V In
- Pin 8 – -V In
- Pin 9 – Analog Ground
- Pin 10 – Analog Ground

QMP-4 Quad Mic Preamp

Plug Terminal Pinouts

INPUT PORTS ANALOG

MIC 1 IN SH	1
MIC 1 IN LO	2
MIC 1 IN HI	3
MIC 2 IN SH	4
MIC 2 IN LO	5
MIC 2 IN HI	6
MIC 3 IN SH	7
MIC 3 IN LO	8
MIC 3 IN HI	9
MIC 4 IN SH	10
MIC 4 IN LO	11
MIC 4 IN HI	12

OUTPUT PORTS ANALOG

MIC 4 OUT HI	1
MIC 4 OUT LO	2
MIC 4 OUT SH	3
MIC 3 OUT HI	4
MIC 3 OUT LO	5
MIC 3 OUT SH	6
MIC 2 OUT HI	7
MIC 2 OUT LO	8
MIC 2 OUT SH	9
MIC 1 OUT HI	10
MIC 1 OUT LO	11
MIC 1 OUT SH	12

Installing the Optional QMP-4 Mic Preamp



The optional QMP-4 comes complete with mounting hardware. The ribbon cable, installed at the factory to provide power to the pre-installed QMP-4 card, also includes a second plug (“Connector” on the picture above) for connecting the optional QMP-4 card. Handle the 10-pin plug on the ribbon cable assembly with care; the pins are sharp and fragile. Perform the following steps to install the QMP-4:

- turn off the power to the console;
- swing the meterbridge up and back until it rests in a fully opened position;
- attach the QMP-4 preamp assembly directly to the right of the factory installed preamp (located at the lefthand end of the meterbridge), using four type 4-40x1/4 pan head screws and four nylon standoffs through the four predrilled holes on the meterbridge rear (“Optional QMP-4 Area” on the picture above); orient it to match the factory installed QMP-4;
- plug in the ribbon cable connector to the 10-pin boxed header on the QMP-4 board (CT7);
- connect the required audio wiring to the 12-pin plug terminals on the QMP-4 card, referring to the “Hook-Ups” chart (see pages 2-3 - 2-5);
- close the meterbridge.

This completes the optional QMP-4 installation procedure.

Stereo Line Input (SL-90)

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Stereo Line Input (SL-90)

Module Overview

SL-90 modules are for stereo line input signals.

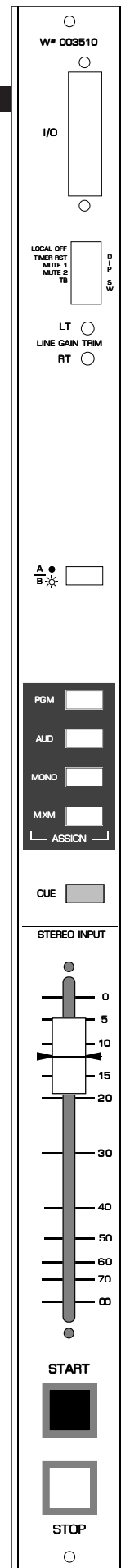
Each module accepts two stereo sources: A and B, switched at the top of the module. Recessed front panel multi-turn trimpots adjust the left and right levels. Output switches assign the selected source signal to any combination of the console's four outputs: two stereo outputs—PGM (program) and AUD (audition); and two mono outputs—MONO and MXM (mix-minus). Note that the assignment to the MXM output is post-fader, pre-on, while the other assignments are post-fader, post-on.

A CUE switch places the module's signal on the console's cue bus, where it may be heard on the meterbridge mounted cue speaker and/or as an interrupt to the console operator's headphones and/or control room monitor speakers. The various cue interrupt modes are programmed at the console's CRS-90 (Control Room/Studio) module via PCB-mounted dipswitch. See page 5-3.

Level is set by a long-throw fader.

Channel ON (START) and OFF (STOP) switches are at the bottom of the module. In addition to being controlled remotely, these can also be programmed (via internal PCB-mounted dipswitch) to perform a variety of functions, including starting and stopping external source machines, activating control room and studio mutes, external tallies, and timer restart. The STOP switch's LED can be controlled by an external source machine to act as a "ready" indicator.

All audio and control input and output signals are made via the multi-pin DB-25 connector mounted on the top of the module and located underneath the hinged meterbridge.



Internal Programming Options

All internal programming is made via PCB mounted dipswitch SW1 located on the top of the module (beneath the DB-25 connector). Note that when a dipswitch position is thrown to the right it is ON.

Mutes

An SL-90 module can be programmed to mute speakers when the channel is ON. The R-90 console has two mute control lines: control room/HDPN 3 and studio/studio two. Each of these is activated by an A input source.

SW1 position 4 mutes the studio/studio two when source A is ON

SW1 position 5 mutes the control room/HDPN 3 when source A is ON

Timer Restart

The console's digital timer can be programmed to automatically reset to zero and begin counting up when the module's ON button is pressed.

SW1 position 6 activates timer restart

Local/Ready

The module's channel OFF switch normally has its LED indicator controlled by the switch itself (Local). This is the factory default setting. However, should you wish to have the LED function as a Ready light for an external source machine, dipswitch SW1 position 7, when thrown to the left, passes control to the Ready input on the module's DB-25 connector. A closure between the Ready input (DB-25 pin 2) and Digital Ground (DB-25 pin 19) will activate the OFF switch LED. As long as the closure is maintained, the LED will be lit.

Talkback

Typically, one of the R-90 console's input modules will be used for the control room (CRS) console operator's microphone. The third position of the dipswitch SW1 allows that microphone to also function as a talkback mic. It places the signal (pre-fader, pre-on/off) onto the console's talkback bus. When the console operator presses a TB switch on the console's CRS-90 Control Room/Studio module, the talkback bus (which is carrying his microphone signal) will interrupt the regular monitor signal being fed to the studio and talent will hear his voice through the studio monitor speakers.

In order for the studio to reply to the console operator, the SL-90 module controlling the studio's microphone signal must be routed to the console's cue bus, where it can interrupt the regular control room monitor feed and be heard by the operator. This is accomplished by a user-supplied TB switch in the studio. The switch provides a momentary closure between the module's DB-25 connector "TB to CR" control pin and Digital Ground (see page 3-5 for wiring details). As long as this closure is maintained (i.e., as long as talent holds down the studio TB button) the module's (pre-fader, pre-on/off) signal will be placed on the console's Cue bus.

Hook-Ups

As stated before, all user wiring to and from SL-90 modules takes place at the DB-25 multi-pin connector mounted on the top of each module. There is one connector per module. Pinout drawings on page 3-7 show all wiring connections at a glance.

Audio Connections

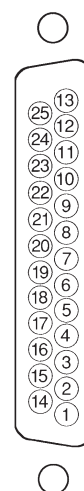
These include A and B source inputs; level is +4dBu balanced.

Pin 25 – Line A In Lt SH
 Pin 24 – Line A In Lt HI
 Pin 12 – Line A In Lt LO
 Pin 11 – Line A In Rt SH
 Pin 10 – Line A In Rt HI
 Pin 23 – Line A In Rt LO
 Pin 22 – Line B In Lt SH
 Pin 21 – Line B In Lt HI
 Pin 9 – Line B In Lt LO
 Pin 8 – Line B In Rt SH
 Pin 7 – Line B In Rt HI
 Pin 20 – Line B In Rt LO

Control Connections

All control ports (except Tally) are opto-isolated. Functions include remote on and off, tally, ready, and start/stop for remote source machines.

Pin 1 – Cough
 Pin 2 – Ready
 Pin 3 – Start
 Pin 4 – Stop
 Pin 5 – Start/Stop Com
 Pin 6 – B Tally
 Pin 14 – Remote On
 Pin 15 – On Tally
 Pin 16 – Remote Off
 Pin 17 – TB to CR
 Pin 18 – +5V Digital
 Pin 19 – Digital Ground



Typical DB-25
connector

To Turn the Module ON & OFF from a Remote Location

In the case of stereo line input modules, “remote location” can also refer to a remote source machine that is feeding its audio to the module in question. A contact closure (which may be sourced by the external machine), will activate the module’s channel ON and OFF switches.

REMOTE ON — Activates the module’s channel ON switch. Momentary connect Pin 14 (Remote On) and Digital Ground (Pin 19) to latch the module ON.

REMOTE OFF — Activates the module’s channel OFF switch. Momentary connect Pin 16 (Remote Off) and Digital Ground (Pin 19) to latch the module OFF.

COUGH — Temporarily Mutes the module. Provide a closure between Pin 1 (Cough) and Digital Ground (Pin 19). This will turn the module OFF. Note this is a non-latching mode; the module will turn ON again as soon as the closure stops. (User-supplied momentary contact switch required.)

To START and STOP Remote Source Machines Using Module ON/OFF Switches

EXTERNAL START — Hook up the remote machine’s “start” control pins to the SL-90 module’s DB-25 connector control pins: for START wire to Pins 3 and 5.

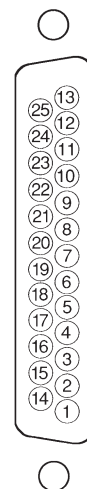
EXTERNAL STOP — Hook up the remote machine’s “stop” control pins to the SLD-90 module’s lower DB-25 connector control pins: for STOP wire to Pins 4 and 5.

To Control the Module’s OFF Switch LED with an External Source Machine

READY — Hook up the remote machine’s Ready output to the SL-90 module’s DB-25 connector pin 2 (Ready) and pin 19 (Digital Ground). The module’s Ready port is looking for a contact closure. As long as the closure is maintained, the module’s OFF LED will be illuminated.

Talkback to Control Room

If an SL-90 module is being used for a studio microphone, this connection allows talkback from that studio to the console operator. Provide a closure between Pin 17 (TB to CR) and Digital Ground (Pin 19). This will cause the module’s pre fader signal to be sent to the console’s Cue bus, where it may be heard by the console operator. This non-latching condition continues until the closure is released. (Requires user-supplied momentary action TALKBACK switch at the studio microphone location.)



Typical DB-25 connector

On Tally

Lets the module's channel ON switch control an on-air light or other "microphone on" indicator at a remote location. This control function provides a continuous +5 volt signal at Pin 15 (On Tally) whenever the module is ON.

This signal can be used to control an externally powered tally light that requires a continuous signal to function. Or an external tally light (i.e., LED) can be powered from the input module by connecting the external LED to Digital Ground (Pin 19) and the On Tally port. In either case, current should not exceed 30 milliamps.

Tally B

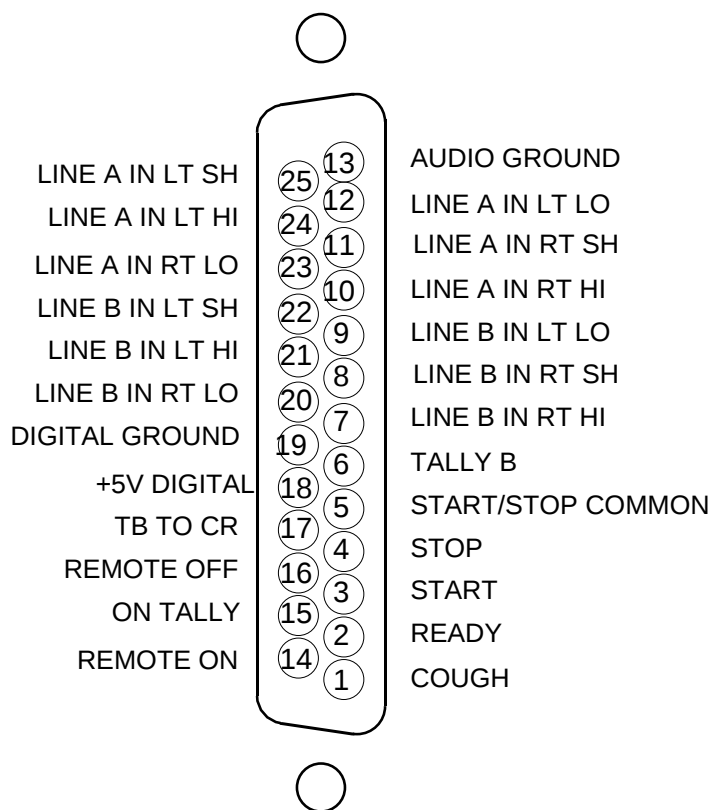
Provides a remote indication that the module's B source has been selected. This control function provides a continuous closure (open collector) between Pin 6 (Tally B) and Digital Ground (Pins 19) whenever the B source is selected.

This closure can be used to control an externally powered tally light that requires a continuous closure to function. An external tally light (i.e., LED) can be powered from the input module by connecting the external LED to +5V Digital (Pin 18) and the B Tally port. Current should not exceed 30 milliamps.

SL-90 Stereo Line Input

DB Connector Pinouts

I/O PORTS ANALOG AND LOGIC



Output Module

(OM-90)

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Output Module

(OM-90)

Module Overview

The master output module handles the console's Program, Audition, and Mono/Mix-Minus outputs. All outputs are calibrated with recessed front panel multi-turn trimpots.

Each R-90 console has two pairs of left-right VU meters: PGM and SWT (switched) located on the console's meterbridge. The switched meter follows the SELECT switching, allowing the console operator to meter PGM, AUD, MONO and MXM, and an external stereo line signal (analog, +4dBu balanced), which may be brought into the module on its DB-25 connector.

The OM-90 module houses the master Cue LED. Whenever Cue is activated anywhere on the console this LED will illuminate and the CUE signal will automatically appear on the switched VU meter pair. When cue is de-activated, the switched meter pair goes back to its previously selected signal.

The CUE master level control sets the level of the console's cue signal.

Whenever CUE is activated elsewhere on the console (stereo line inputs, the superphone module, or for studio talkback) its signal will appear at the console's built-in cue speaker mounted in the meterbridge. Depending on how the CRS-90 module has been programmed, cue can also interrupt the control room monitor speakers. The way Cue interrupts the control room/studio outputs is determined by PCB-mounted dipswitch. See "Cue Interrupt" on page 5-3.

The OM-90 module also generates the console's monitor signals, which feed the Control Room and Studio modules.

At the bottom of module are the timer control buttons (the timer display is mounted in the righthand end of the console meterbridge):

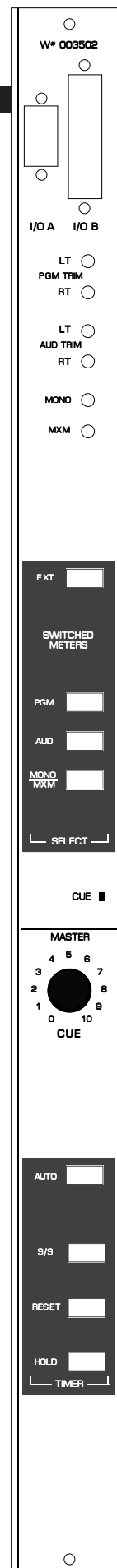
AUTO – enables timer restart functions from programmed input modules' ON buttons.

S/S - START/STOP - halts the timer, holds the last count, and then restarts and accumulates the count when depressed again.

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

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

All user wiring to and from the OM-90 module takes place at DB-25 and DB-9 multi-pin connectors mounted on top of the module and located underneath the hinged meterbridge. All analog audio is +4dBu balanced. Pinout drawing on page 4-5 shows all wiring connections at a glance.



Hook-Ups

As stated before, all user wiring to and from the OM-90 modules takes place at DB-25 and DB-9 multi-pin connectors on the top of module.

DB-25 Connector – Audio

Handles External input and Program, Audition, Mono, and Mix-minus outputs. All signals are +4dBu balanced.

Pin 25 – PGM Lt Out SH
Pin 24 – PGM Lt Out HI
Pin 12 – PGM Lt Out LO

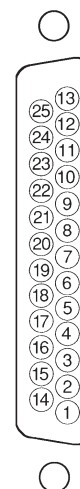
Pin 11 – PGM Rt Out SH
Pin 10 – PGM Rt Out HI
Pin 23 – PGM Rt Out LO
Pin 22 – AUD Lt Out SH
Pin 21 – AUD Lt Out HI
Pin 9 – AUD Lt Out LO

Pin 8 – AUD Rt Out SH
Pin 7 – AUD Rt Out HI
Pin 20 – AUD Rt Out LO
Pin 19 – MONO Out SH
Pin 18 – MONO Out HI
Pin 6 – MONO Out LO

Pin 5 – MXM Out SH
Pin 4 – MXM Out HI
Pin 17 – MXM Out LO

Pin 16 – EXT Lt In SH
Pin 15 – EXT Lt In HI
Pin 3 – EXT Lt In LO

Pin 2 – EXT Rt In SH
Pin 1 – EXT Rt In HI
Pin 14 – EXT Rt In LO

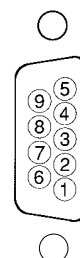


Typical DB-25 connector

DB-9 Connector – Audio

Handles CUE output.

Pin 5 – CUE Out SH
Pin 4 – CUE Out HI
Pin 9 – CUE Out LO



Typical DB-9 connector

DB-9 Connector — Control

Handles Tally 1 and Tally 2 control connections.

Pin 3 – Tally 1 N.O.

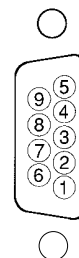
Pin 7 – Tally 1 Com

Pin 6 – Tally 2 Com

Pin 1 – Tally 2 N.O.

Pins 2 and 8 - Audio Common

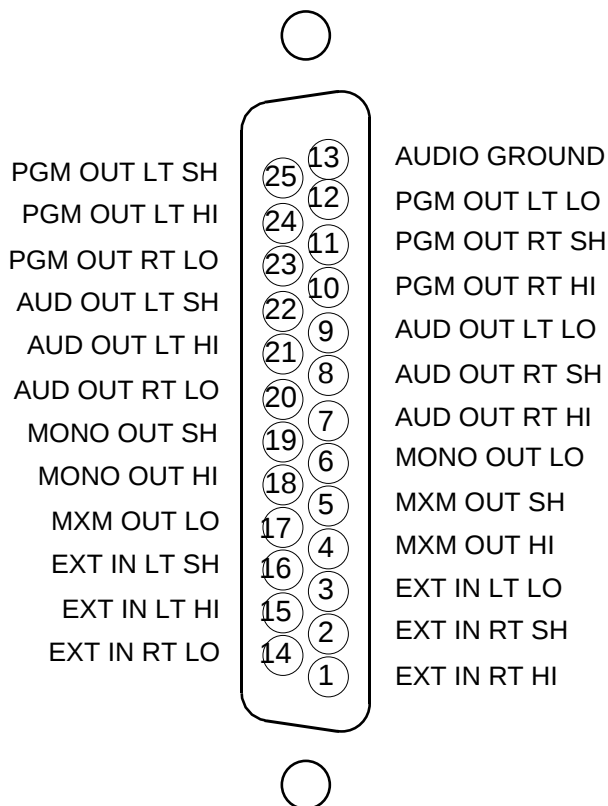
These are simple relay closures that activate whenever programmed input modules are turned ON (see pages 2-3 and 3-3). The Tally 1 closure is activated whenever the CR mute is activated, and the Tally 2 closure is activated whenever the studio mute is activated. The ports can be used to control externally powered tally lights that requires a continuous closure to function.



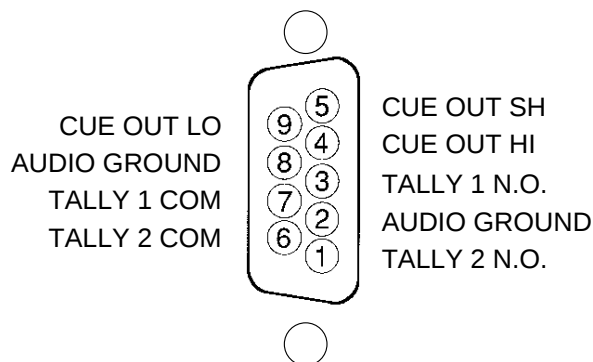
Typical DB-9
connector

OM-90 Output Module *DB Connector Pinouts*

I/O PORTS ANALOG (DB-25)



ANALOG OUTPUT PORTS



Control Room/Studio Module

(CRS-90)

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Control Room/Studio Module

(CRS-90)

Module Overview

The CRS-90 module is the R-90 console operator's monitor module. It allows the operator to listen to the console's two stereo (PGM & AUD) outputs, two mono (MXM & MONO) outputs and two external stereo line level inputs brought directly into the module.

A recessed front panel multi-turn trimpot adjusts talkback level.

The CRS-90 module also houses three console monitor circuits, which follow the source selection switches. They are:

CONTROL ROOM (CR)—a dedicated output designed to drive a separate, user provided power amp/speaker system in the main control room;

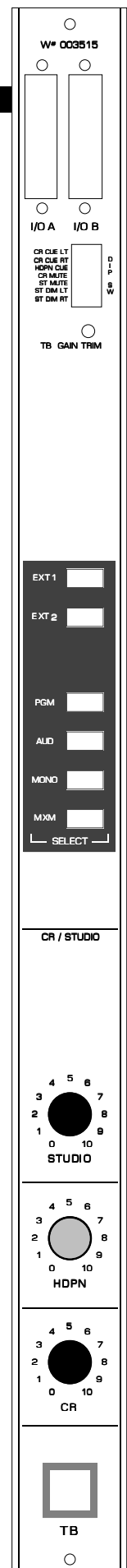
STUDIO—a second stereo output intended for a remote (i.e., non CR) studio power amp/speaker system;

HEADPHONE (HDPN)—an additional output (w/built-in power amp) that drives the console operator's headphones. There are two types of headphone output: the +4dBu balanced output at the module's right DB-25 connector (B), and the headphone jack mounted in the right-hand corner of the console, which is actually the output from a built-in headphone amplifier.

MONITOR OUTPUT—a monitor source select (without CUE or MUTE interrupt) independent output.

The CRS-90 module has a talkback switch. When the talkback switch is pressed (it is momentary action), any microphone assigned to talkback bus (see page 3-3) will interrupt the regular monitor signals being sent to the studio.

All user wiring to and from the CRS-90 module takes place at the DB-25 multi-pin connectors mounted at the top of the module and located underneath the hinged meterbridge. There are two connectors: the left one accepts the external 2 source input and handles audio outputs; the right one accepts the external 1 source input and handles audio outputs. All audio connections are stereo line level analog signals. A pinout drawing on page 5-6 shows all wiring connections at a glance.



Internal Programming Options

Internal programming for the control room/studio module is made via printed circuit board (PCB) mounted dipswitch SW1 located on the top of the module (beneath the DB-25 connectors). Note when a dipswitch position is thrown to the right it is ON.

Cue Interrupt

Dipswitch SW1 pos. 5-7 determines how the console's Cue function will interrupt regular monitor signals:

- SW1 position 7 sends cue to CR left
- SW1 position 6 sends cue to CR right
- SW1 position 5 sends cue to HDPN*

*factory default settings

CR/Cue Mute

The audio from both the control room speakers and the console's built-in meterbridge speaker can easily be picked up by the console operator's microphone. This is a potential source of feedback. For this reason the console provides muting to the control room output and the built-in cue speaker whenever a mic programmed for control room/HDPN3 mute is turned ON with A selected as the input source (see page 3-3).

SW1 position 4 will mute cue and the CR output whenever an input channel set to activate the CR mute is ON

Studio Mute

When SW1 pos 3 is activated, it automatically mutes talkback out and the console's studio output whenever an input module programmed for studio/studio 2 mute is turned ON with A selected as the input source. This is used to prevent feedback from studio mics.

Studio Dim

Input modules controlling studio microphones can be programmed to MUTE a studio whenever the module is turned on (i.e., it's microphone is live). If you wish, you can have a studio DIM (drop -20dB in level) instead of MUTE:

SW1 positions 1 causes Studio right to DIM

SW1 positions 2 causes Studio left to DIM

Note the DIM functions also affect the talkback interrupt. Note also if the studio is muted, talkback cannot be heard. However, if the studio is programmed to DIM instead of MUTE, talkback audio could presumably make it from the studio monitor speakers to the open studio mic.

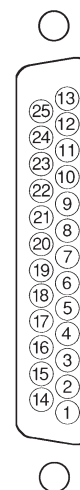
Hook-Ups

As stated before, all user wiring to and from the CRS-90 module takes place at the two DB-25 multi-pin connectors mounted at the top of the module.

Left DB-25 “A” Connector — Audio

Handles module’s External 2 Stereo inputs and studio pre, headphone pre, and monitor pre outputs. All audio signals are analog stereo.

Pin 25 – Ext 2 Lt In SH
 Pin 24 – Ext 2 Lt In HI
 Pin 12 – Ext 2 Lt In LO
 Pin 11 – Ext 2 Rt In SH
 Pin 10 – Ext 2 Rt In HI
 Pin 23 – Ext 2 Rt In LO
 Pin 22 – St Pre Lt Out SH
 Pin 21 – St Pre Lt Out HI
 Pin 9 – St Pre Lt Out LO
 Pin 8 – St Pre Rt Out SH
 Pin 7 – St Pre Rt Out HI
 Pin 20 – St Pre Rt Out LO
 Pin 19 – HDPN Pre Lt Out SH
 Pin 18 – HDPN Pre Lt Out HI
 Pin 6 – HDPN Pre Lt Out LO
 Pin 5 – HDPN Pre Rt Out SH
 Pin 4 – HDPN Pre Rt Out HI
 Pin 17 – HDPN Pre Rt Out LO
 Pin 16 – Mon Pre Lt Out SH
 Pin 15 – Mon Pre Lt Out HI
 Pin 3 – Mon Pre Lt Out LO
 Pin 2 – Mon Pre Rt Out SH
 Pin 1 – Mon Pre Rt Out HI
 Pin 14 – Mon Pre Rt Out LO



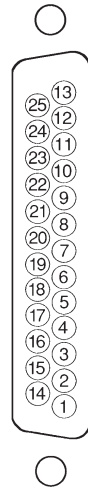
Typical DB-25 connector

Right DB-25 “B” Connector — Audio

Handles module’s External 1 Stereo inputs and studio, headphone, and control room outputs. All audio signals are analog stereo.

Pin 25 – Ext 1 Lt In SH
 Pin 24 – Ext 1 Lt In HI
 Pin 12 – Ext 1 Lt In LO
 Pin 11 – Ext 1 Rt In SH
 Pin 10 – Ext 1 Rt In HI
 Pin 23 – Ext 1 Rt In LO

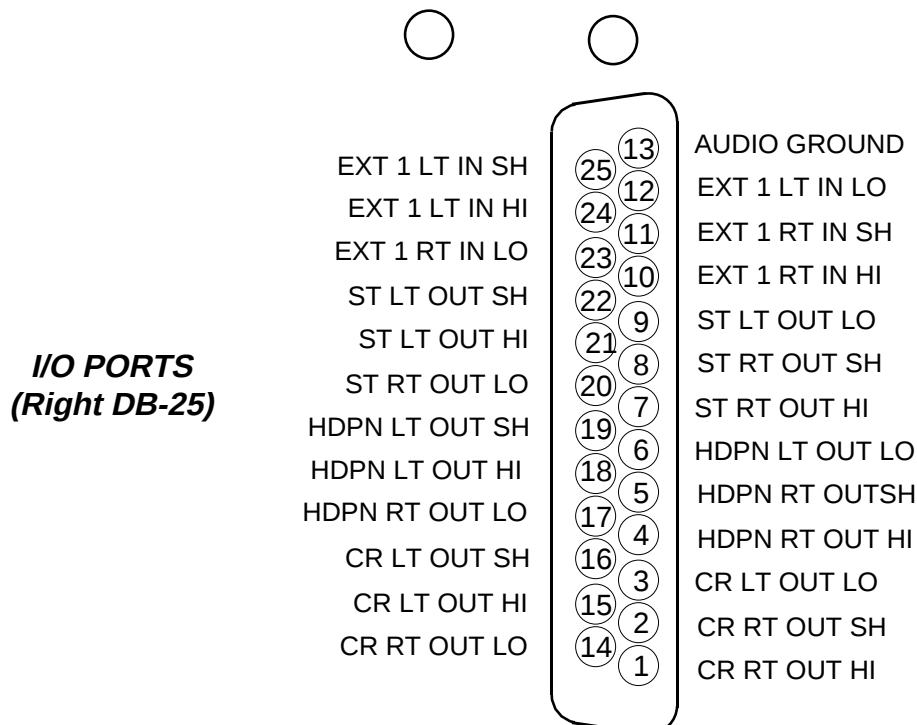
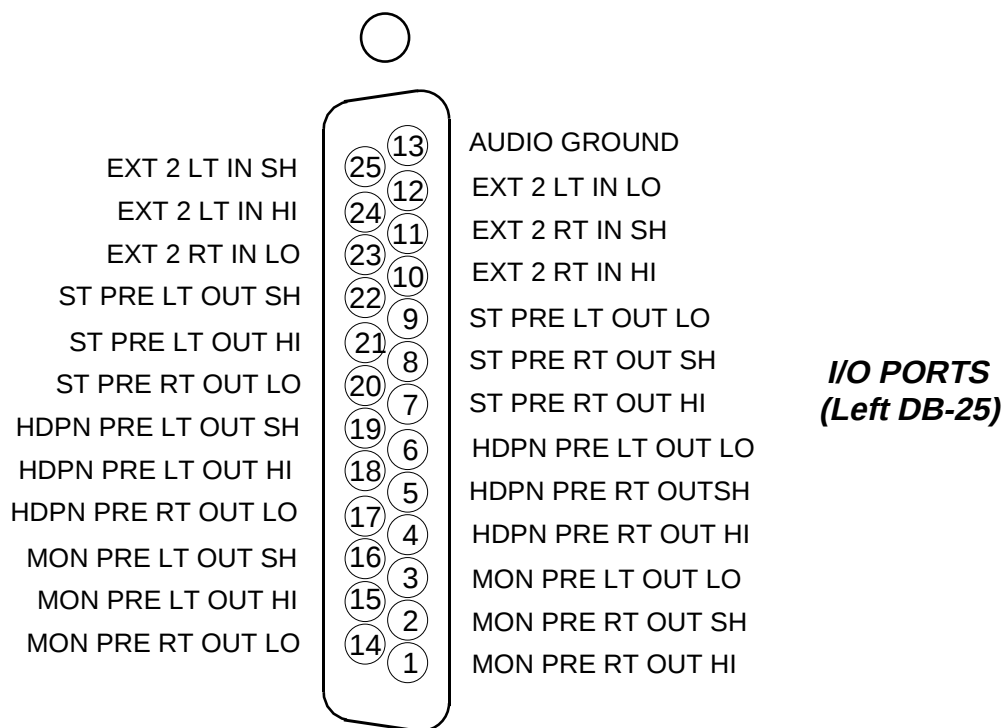
Pin 22 – St Lt Out SH
 Pin 21 – St Lt Out HI
 Pin 9 – St Lt Out LO
 Pin 8 – St Rt Out SH
 Pin 7 – St Rt Out HI
 Pin 20 – St Rt Out LO
 Pin 19 – HDPN Lt Out SH
 Pin 18 – HDPN Lt Out HI
 Pin 6 – HDPN Lt Out LO
 Pin 5 – HDPN Rt Out SH
 Pin 4 – HDPN Rt Out HI
 Pin 17 – HDPN Rt Out LO
 Pin 16 – CR Lt Out SH
 Pin 15 – CR Lt Out HI
 Pin 3 – CR Lt Out LO
 Pin 2 – CR Rt Out SH
 Pin 1 – CR Rt Out HI
 Pin 14 – CR Rt Out LO



Typical DB-25
connector

CRS-90 Control Room/Studio Module

DB Connector Pinouts



Studio Two Module

(SS-90; optional)

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Studio Two Module

(SS-90; optional)

Module Overview

The optional SS-90 module is similar to the CRS-90 module. The monitor signal being sent to this studio follows the source select switching. This switching is identical to the control room/monitor module's and includes the console's two stereo (PGM & AUD) outputs, two mono (MXM & MONO) outputs and two external stereo line level inputs brought directly into the module.

A recessed front panel multi-turn trimpot adjusts talkback level.

The SS-90 module also houses three console monitor circuits, which follow the source selection switches. They are:

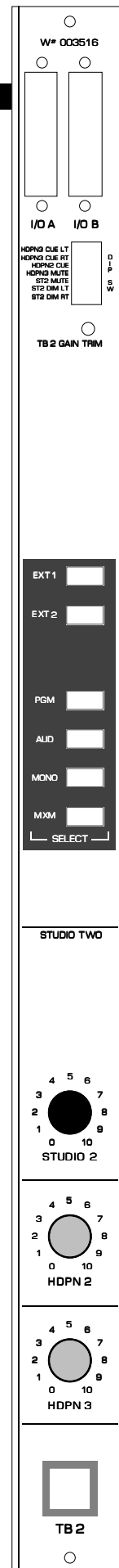
STUDIO—a stereo output intended for a remote studio power amp/speaker system;

HEADPHONES (HDPN2 & HDPN3)—an additional line level balanced outputs to drive power amplifiers for guest or produce headphones. Both pre and post fader outputs are provided.

MONITOR OUTPUT—a monitor source select (without CUE or MUTE interrupt) independent output.

The SS-90 module has a talkback switch. When the talkback switch is pressed (it is momentary action), any microphone assigned to talkback bus (see pages 3-3) will interrupt the regular monitor signals being sent to the second studio output.

All user wiring to and from the SS-90 module takes place at the DB-25 multi-pin connectors mounted at the top of the module and located underneath the hinged meterbridge. There are two connectors: the left one accepts the external 2 source input and handles audio outputs; the right one accepts the external 1 source input and handles audio outputs. All audio connections are stereo line level analog signals. A pinout drawing on page 6-6 shows all wiring connections at a glance.



Internal Programming Options

Internal programming for the control room/studio module is made via printed circuit board (PCB) mounted dipswitch SW1 located on the top of the module (beneath the DB-25 connectors). Note when a dipswitch position is thrown to the right it is ON.

Cue Interrupt

Dipswitch SW1 pos 5-7 determines how the console's Cue function will interrupt regular monitor signals:

- SW1 position 7 sends cue to HDPN 3 left
- SW1 position 6 sends cue to HDPN 3 right
- SW1 position 5 sends cue to HDPN 2*

*factory default settings

HDPN 3 Mute

When SW1 pos 4 is activated, it automatically mutes the console's headphone 3 output whenever an input module programmed for control room/HDPN 3 mute is turned ON with A selected as the input source.

Studio 2 Mute

When SW1 pos 3 is activated, it automatically mutes talkback out and the console's studio 2 output whenever an input module programmed for studio/studio 2 mute is turned ON with A selected as the input source. This is used to prevent feedback from the studio mics.

Studio 2 Dim

Input modules controlling studio microphones can be programmed to MUTE a studio whenever the module is turned on (i.e., it's microphone is live). If you wish, you can have a studio DIM (drop -20dB in level) instead of MUTE:

- SW1 positions 1 causes Studio 2 right to DIM
- SW1 positions 2 causes Studio 2 left to DIM

Note the DIM functions also affect the talkback interrupt. Note also if the studio is muted, talkback cannot be heard. However, if the studio is programmed to DIM instead of MUTE, talkback audio could presumably make it from the studio monitor speakers to the open studio mic.

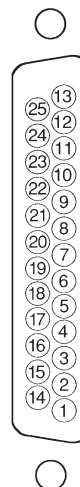
Hook-Ups

As stated before, all user wiring to and from the SS-90 module takes place at the two DB-25 multi-pin connectors mounted at the top of the module.

Left DB-25 “A” Connector — Audio

Handles module’s External 2 Stereo inputs and studio 2 pre, headphone 2 pre, and monitor 2 pre outputs. All audio signals are analog stereo.

Pin 25 – Ext 2 Lt In SH
 Pin 24 – Ext 2 Lt In HI
 Pin 12 – Ext 2 Lt In LO
 Pin 11 – Ext 2 Rt In SH
 Pin 10 – Ext 2 Rt In HI
 Pin 23 – Ext 2 Rt In LO
 Pin 22 – St 2 Pre Lt Out SH
 Pin 21 – St 2 Pre Lt Out HI
 Pin 9 – St Pre 2 Lt Out LO
 Pin 8 – St Pre 2 Rt Out SH
 Pin 7 – St Pre 2 Rt Out HI
 Pin 20 – St Pre 2 Rt Out LO
 Pin 19 – HDPN 2 Pre Lt Out SH
 Pin 18 – HDPN 2 Pre Lt Out HI
 Pin 6 – HDPN 2 Pre Lt Out LO
 Pin 5 – HDPN 2 Pre Rt Out SH
 Pin 4 – HDPN 2 Pre Rt Out HI
 Pin 17 – HDPN 2 Pre Rt Out LO
 Pin 16 – Mon 2 Pre Lt Out SH
 Pin 15 – Mon 2 Pre Lt Out HI
 Pin 3 – Mon 2 Pre Lt Out LO
 Pin 2 – Mon 2 Pre Rt Out SH
 Pin 1 – Mon 2 Pre Rt Out HI
 Pin 14 – Mon 2 Pre Rt Out LO



Typical DB-25 connector

Right DB-25 “B” Connector — Audio

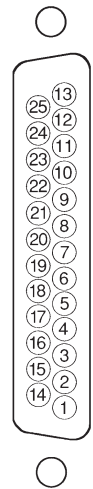
Handles module’s External 1 Stereo inputs and studio 2 and headphones 2 and 3 outputs. All audio signals are analog stereo.

Pin 25 – Ext 1 Lt In SH
 Pin 24 – Ext 1 Lt In HI
 Pin 12 – Ext 1 Lt In LO
 Pin 11 – Ext 1 Rt In SH
 Pin 10 – Ext 1 Rt In HI
 Pin 23 – Ext 1 Rt In LO

Pin 22 – St 2 Lt Out SH
 Pin 21 – St 2 Lt Out HI
 Pin 9 – St 2 Lt Out LO
 Pin 8 – St 2 Rt Out SH
 Pin 7 – St 2 Rt Out HI
 Pin 20 – St 2 Rt Out LO

 Pin 19 – HDPN 2 Lt Out SH
 Pin 18 – HDPN 2 Lt Out HI
 Pin 6 – HDPN 2 Lt Out LO
 Pin 5 – HDPN 2 Rt Out SH
 Pin 4 – HDPN 2 Rt Out HI
 Pin 17 – HDPN 2 Rt Out LO

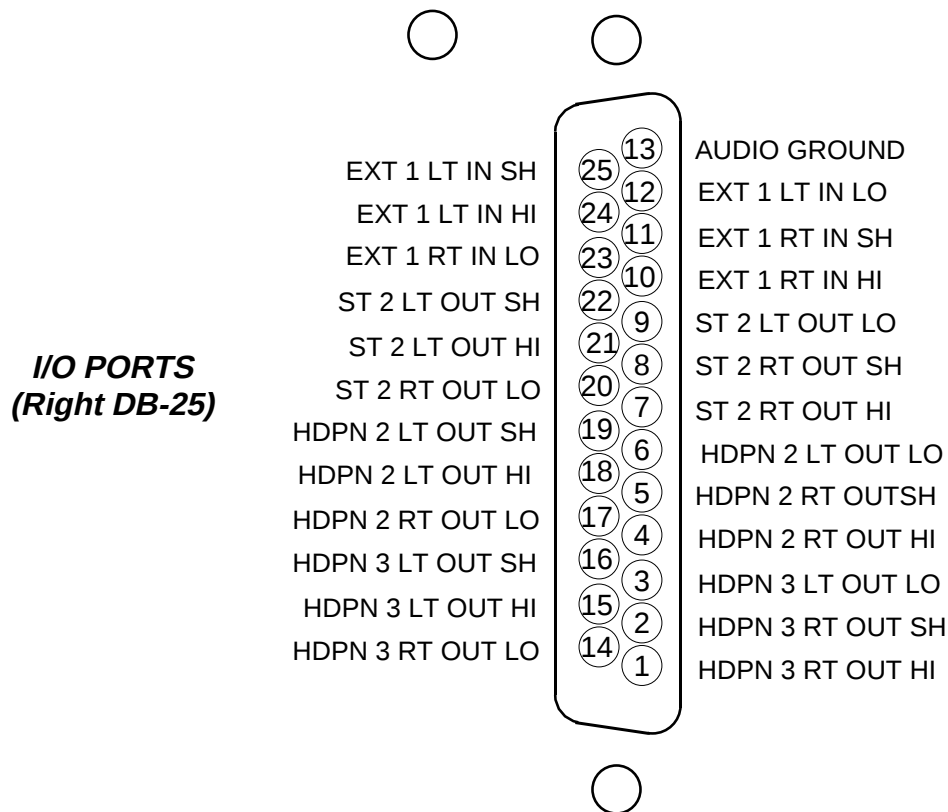
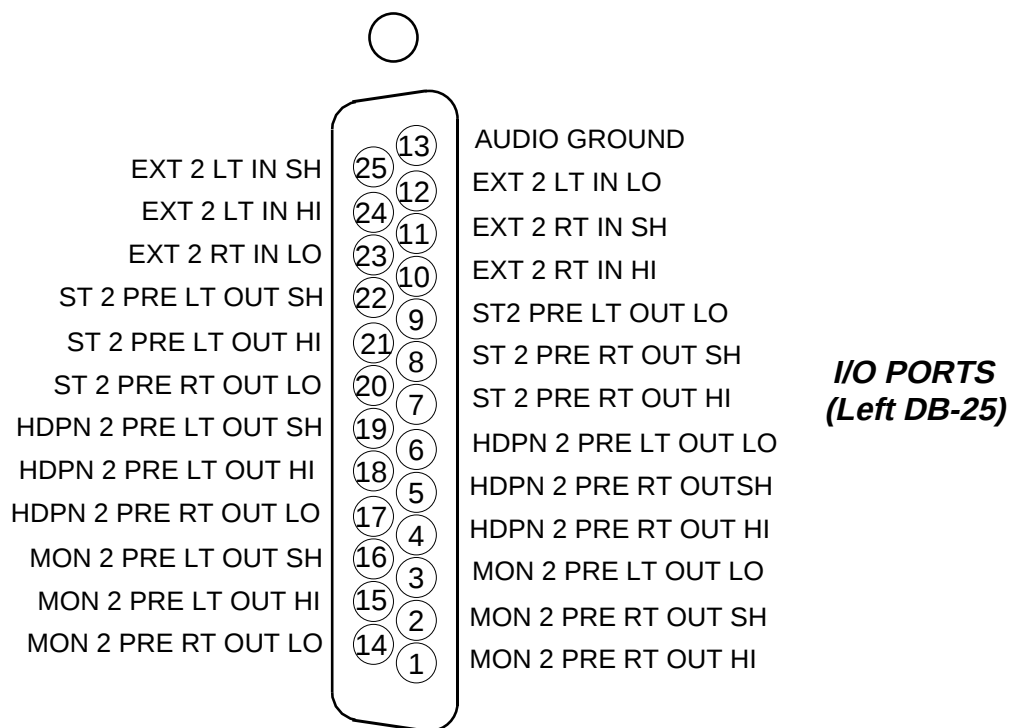
 Pin 16 – HDPN 3 Lt Out SH
 Pin 15 – HDPN 3 Lt Out HI
 Pin 3 – HDPN 3 Lt Out LO
 Pin 2 – HDPN 3 Rt Out SH
 Pin 1 – HDPN 3 Rt Out HI
 Pin 14 – HDPN 3 Rt Out LO



Typical DB-25
connector

SS-90 Studio Two Module

DB Connector Pinouts



Superphone Input

(SPN-90; optional)

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Superphone Input (SPN-90)

Module Overview

The SPN-90 input module is used for telephone call-ins, and can handle two callers. Caller signals enter the module from your station hybrid; each caller has its own long-throw fader that controls the level of the caller's voice.

Output switches assign callers to any combination of the console's four outputs: PGM (program), AUD (audition), MONO and MXM (mix-minus).

Two recessed front panel trimpots at the top of the module adjust the console's CALLER levels.

The channel ON (red) and OFF (amber) switches are at the bottom of the module. These can be programmed (via PCB-mounted dipswitch) to activate control room and studio mutes, and timer restart.

All audio and control signals hook-ups are made via a multi-pin DB-25 connector mounted on the top of the module and located underneath the hinged meterbridge.

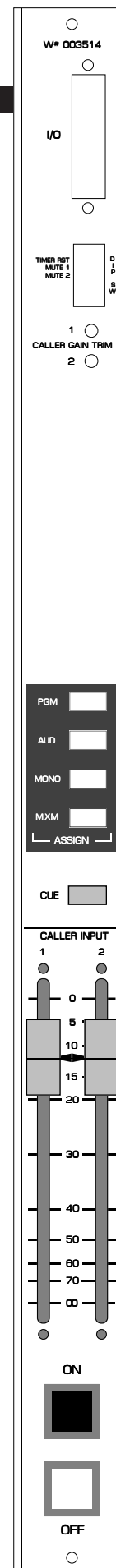
Caller Set-Ups

Pre-air segment communication between the console operator (DJ) and callers is via CUE button which places the callers' voices on the console's cue speaker (or control room speakers/operator's headphone if the CRS-90 module's cue interrupt function has been so programmed).

A typical call-in segment might proceed as follows:

Caller phones in, DJ picks up off-air during a track play to set up the call. He assigns his mic channel and the phone module to MXM, places the caller in CUE, and talks to the caller. Neither the DJ mic nor the phone module need to be ON for two-way communication.

When he is ready to take the call on-air, the DJ makes sure both modules (his mic and phone) are assigned to PGM and turns them ON. He then deactivates caller CUE to hear the normal feed.



Internal Programming Options

Internal programming is accomplished via printed circuit board (PCB) mounted dipswitch SW1, located on the top of the module (beneath the DB-25 connector). Note when a dipswitch position is thrown to the right it is ON. The SPN-90 PCB card contains PCB-mounted trimpots which may be used to set the module's output feed levels.

Mutes

When the SPN-90 phone channel ON switch is pressed, it can activate console mute functions. Dipswitch SW1 determines which of the console's two mute lines will be activated:

- SW1 pos 5 mutes the control room when the phone module is ON*
- SW1 pos 4 mutes studio when the phone module is ON

*factory default settings

Timer Restart

When the module is turned ON, the console's digital timer can be programmed to automatically reset to zero and begin counting up.

- SW1 pos 6 activates timer restart when the phone module's ON/START switch is pressed

Gain Trimpots

There are two PCB-mounted trimpots. They are used as follows:

- CR1 - sets Callers 1 In port input gain
- CR2 - sets Callers 2 In port input gain

Hook-Ups

As stated before, all user wiring to and from SPN-90 modules takes place at a multi-pin DB-25 connector mounted on the top of the module.

Audio Connections

These include callers 1 & 2 inputs and outputs. All are +4dBu balanced analog mono.

- Pin 25 – Call 1 In SH
- Pin 24 – Call 1 In HI
- Pin 12 – Call 1 In LO
- Pin 11 – Call 2 In SH
- Pin 10 – Call 2 In HI
- Pin 23 – Call 2 In LO
- Pin 22 – Call 1 Out SH
- Pin 21 – Call 1 Out HI
- Pin 9 – Call 1 Out LO
- Pin 8 – Call 2 Out SH
- Pin 7 – Call 2 Out HI
- Pin 20 – Call 2 Out LO

Control Connections

These include remote on and off, and on tally functions.

- Pin 3 – Start
- Pin 4 - Stop
- Pin 5 - Start/Stop Common
- Pin 14 – Remote On
- Pin 15 – ON Tally
- Pin 16 - Remote Off
- Pin 18 - +5V Digital
- Pin 19 - Digital Ground

To Turn the Module ON & OFF from a Remote Location

REMOTE ON — Activates the module's channel ON switch. Provide a momentary closure between Pin 14 (Remote On) and Digital Ground (Pin 19). This will latch the module ON. (User-supplied momentary contact switch required.)

REMOTE OFF — Activates the module's channel OFF switch. Provide a momentary closure between Pin 16 (Remote Off) and Digital Ground (Pin 19). This will latch the module OFF. (User-supplied momentary contact switch required.)

To START and STOP Remote Source Machines Using Module ON/OFF Switches

EXTERNAL START — Hook up the remote machine's Start control pins to the SPN-90 module's DB-25 connector control pins: for START wire to pins 3 and 5.

EXTERNAL STOP — Hook up the remote machine's Stop control pins to the SPN-90 module's DB-25 connector control pins: for STOP wire to pins 4 and 5.

When the module's ON/START switch is pressed, a closure takes place between START/STOP COMMON and START; when the module's OFF switch is pressed, a closure takes place between START/STOP COMMON and STOP. These may be used to control a remote tape machine for recording phone segments.

On Tally

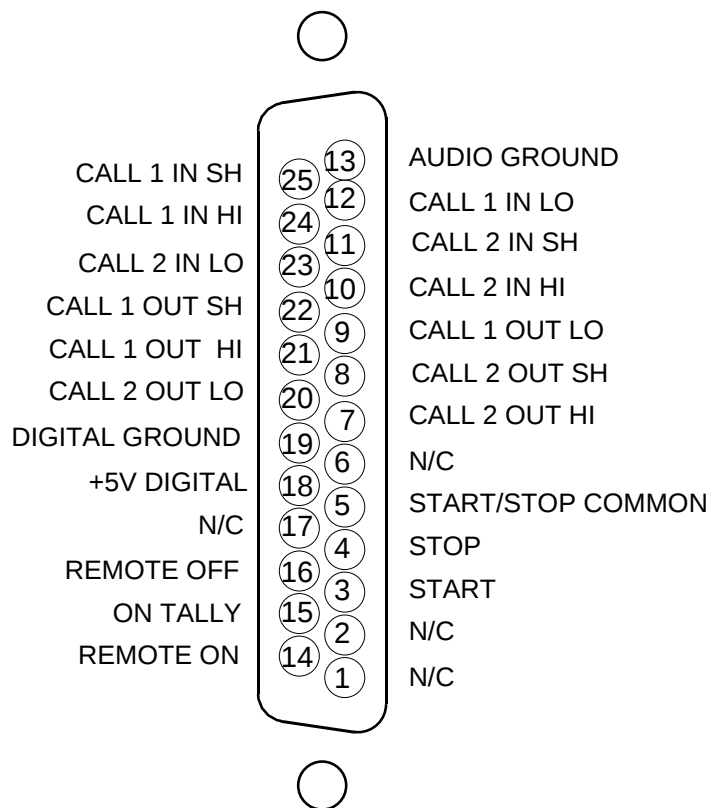
Lets the module's channel ON switch control an on-air light or other "microphone on" indicator at a remote location. This control function provides a continuous +5 volt signal at Pin 15 (On Tally) whenever the module is ON.

This signal can be used to control an externally powered tally light that requires a continuous signal to function. Or an external tally light (i.e., LED) can be powered from the input module by connecting the external LED to Digital Ground (Pin 19) and the On Tally port. In either case, current should not exceed 30 milliamps.

SPN-90 Superphone Module

DB Connector Pinouts

I/O PORTS ANALOG AND LOGIC



Line Preselector Module

(LS-90)

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Left DB-25 "A" Connector—Audio Outputs	8-3
Right DB-25 "B" Connector—Audio Inputs	8-3
DB Connector Pinout Drawing	8-5

Line Preselector Module

(LS-90)

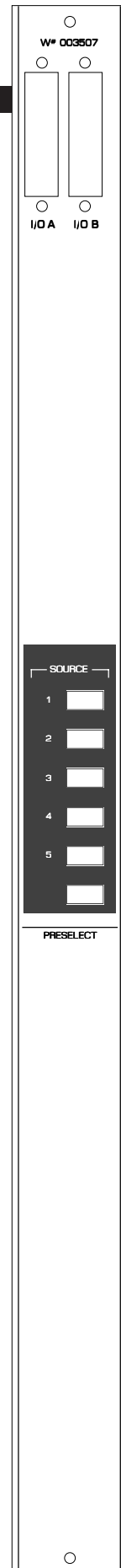
Module Overview

This module electronically selects one of six stereo line sources and routes it to one stereo output, allowing you to expand the source capability of an input channel or monitor module.

All audio input and output signals are made via two DB-25 multi-pin connectors mounted at the top of the module and located underneath the hinged meterbridge.

Internal Programming Options

There are no internal programming options on the LS-90 module.



Hook-Ups

Left DB-25 “A” Connector - Audio Inputs 5, 6

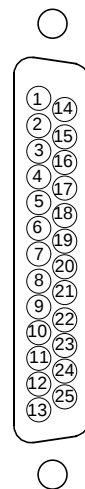
Pin 25 – Line 5 Lt In SH
 Pin 24 – Line 5 Lt In HI
 Pin 12 – Line 5 Lt In LO
 Pin 11 – Line 5 Rt In SH
 Pin 10 – Line 5 Rt In HI
 Pin 23 – Line 5 Rt In LO
 Pin 22 – Line 6 Lt In SH
 Pin 21 – Line 6 Lt In HI
 Pin 9 – Line 6 Lt In LO
 Pin 8 – Line 6 Rt In SH
 Pin 7 – Line 6 Rt In HI
 Pin 20 – Line 6 Rt In LO

Left DB-25 “A” Connector - Audio Outputs

Pin 19 – Line Lt Out SH
 Pin 18 – Line Lt Out HI
 Pin 6 – Line Lt Out LO
 Pin 5 – Line Rt Out SH
 Pin 4 – Line Rt Out HI
 Pin 17 – Line Rt Out LO

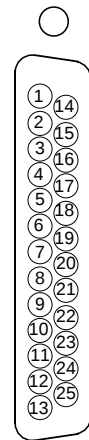
Right DB-25 “B” Connector - Audio Inputs 1-4

Pin 25 – Line 1 Lt In SH
 Pin 24 – Line 1 Lt In HI
 Pin 12 – Line 1 Lt In LO
 Pin 11 – Line 1 Rt In SH
 Pin 10 – Line 1 Rt In HI
 Pin 23 – Line 1 Rt In LO
 Pin 22 – Line 2 Lt In SH
 Pin 21 – Line 2 Lt In HI
 Pin 9 – Line 2 Lt In LO
 Pin 8 – Line 2 Rt In SH
 Pin 7 – Line 2 Rt In HI
 Pin 20 – Line 2 Rt In LO
 Pin 19 – Line 3 Lt In SH
 Pin 18 – Line 3 Lt In HI
 Pin 6 – Line 3 Lt In LO
 Pin 5 – Line 3 Rt In SH
 Pin 4 – Line 3 Rt In HI
 Pin 17 – Line 3 Rt In LO



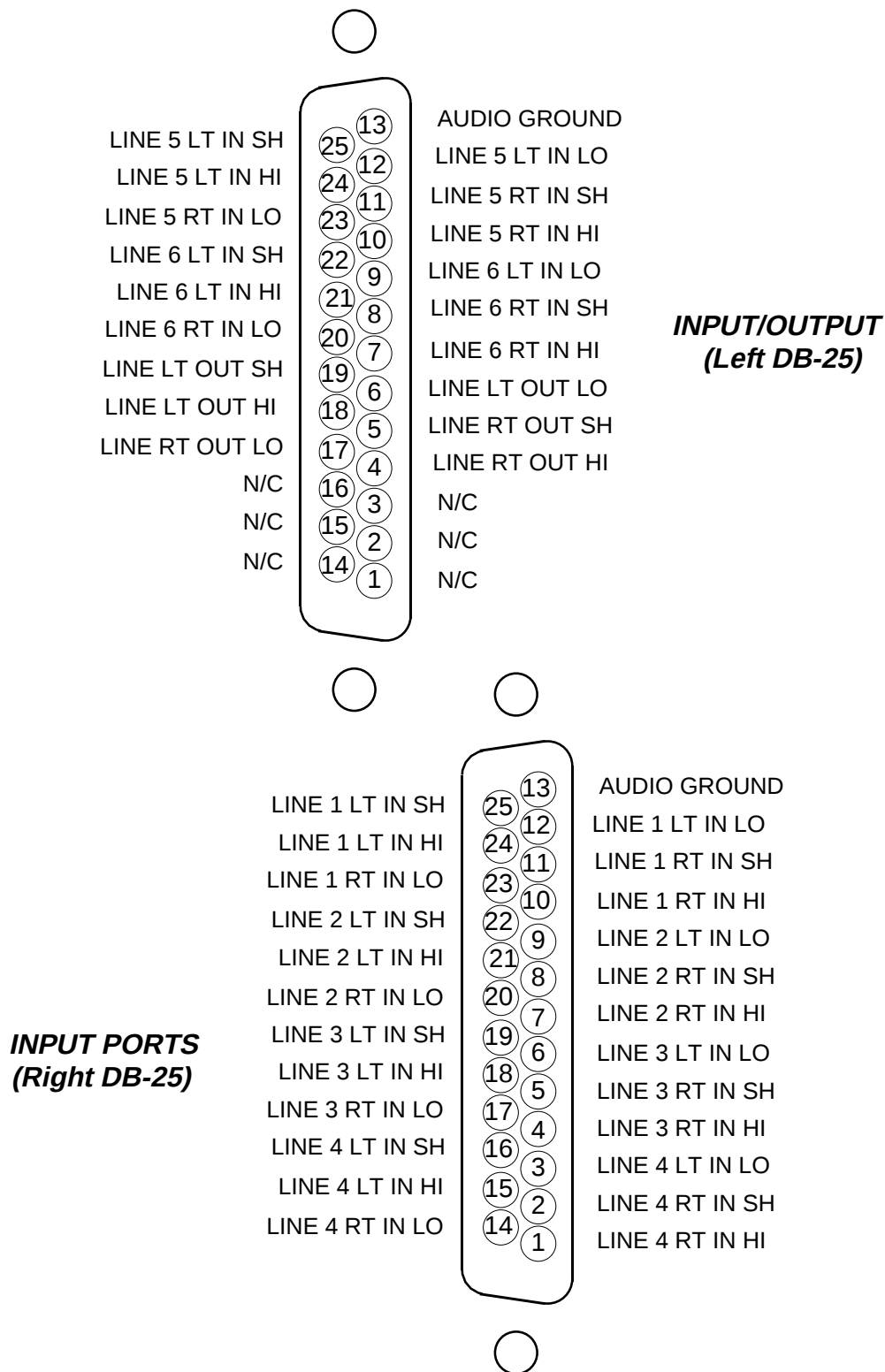
Typical DB-25 connector

Pin 16 – Line 4 Lt In SH
 Pin 15 – Line 4 Lt In HI
 Pin 3 – Line 4 Lt In LO
 Pin 2 – Line 4 Rt In SH
 Pin 1 – Line 4 Rt In HI
 Pin 14 – Line 4 Rt In LO



Typical DB-25
connector

LS-90 Line Selector Module *DB Connector Pinouts*



Tape Remote Module

(TR-90; optional)

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Module Overview 9-2

DB Connector Pinout Drawings

START/STOP Function Control I/O 9-3

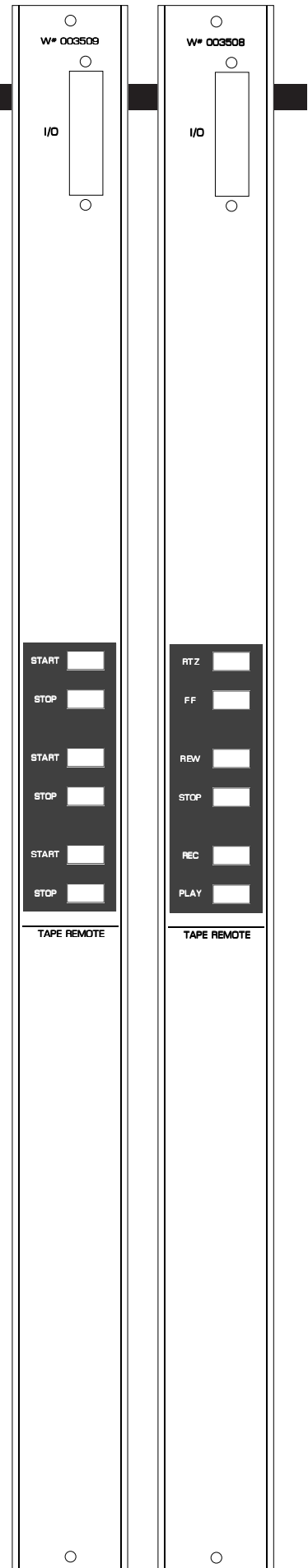
Full-Function Control I/O 9-4

Tape Remote Module

(TR-90; optional)

Module Overview

This optional module is available in two versions. The START/STOP version offers three sets of START and STOP buttons to provide start-stop control of three remote reel-to-reel machines. The full function version provides RTZ, FF, REW, STOP, REC, and PLAY buttons for a single machine. LED indicators in each switch function as tallyback indicators and are powered by the source machine. There are no internal connections between the tape remote panel and the console's power rails.



W* 003509

I/O

TAPE REMOTE MODULE

TR-90/SS Tape Remote Module DB Connector Pinouts

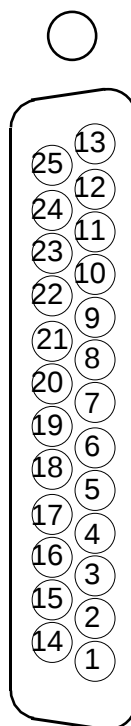
SW1
SW2
SW3
SW4
SW5
SW6



TAPE REMOTE

I/O CONTROL PORTS (DB-25)

SW6 (STOP) COMMON
SW6 (STOP) LED-
SW5 (START) COMMON
SW5 (START) LED-
SW4 (STOP) COMMON
SW4 (STOP) LED-
SW3 (START) COMMON
SW3 (START) LED-
SW2 (STOP) COMMON
SW2 (STOP) LED-
SW1 (START) COMMON
SW1 (START) LED-



N/C
SW6 (STOP) N.O.
SW6 (STOP) LED+
SW5 (START) N.O.
SW5 (START) LED+
SW4 (STOP) N.O.
SW4 (STOP) LED+
SW3 (START) N.O.
SW3 (START) LED+
SW2 (STOP) N.O.
SW2 (STOP) LED+
SW1 (START) N.O.
SW1 (START) LED+

W# 003508

I/O

TAPE REMOTE MODULE

TR-90/FF Tape Remote Module DB Connector Pinouts

SW1

SW2

SW3

SW4

SW5

SW6



TAPE REMOTE

I/O CONTROL PORTS (DB-25)

SW6 (PLAY) COMMON

SW6 (PLAY) LED-

SW5 (REC) COMMON

SW5 (REC) LED-

SW4 (STOP) COMMON

SW4 (STOP) LED-

SW3 (REW) COMMON

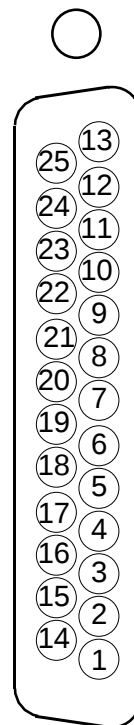
SW3 (REW) LED-

SW2 (FF) COMMON

SW2 (FF) LED-

SW1 (RTZ) COMMON

SW1 (RTZ) LED-



N/C

SW6 (PLAY) N.O.

SW6 (PLAY) LED+

SW5 (REC) N.O.

SW5 (REC) LED+

SW4 (STOP) N.O.

SW4 (STOP) LED+

SW3 (REW) N.O.

SW3 (REW) LED+

SW2 (FF) N.O.

SW2 (FF) LED+

SW1 (RTZ) N.O.

SW1 (RTZ) LED+

Meterbridge

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Setting the Time	10-3
Capacitor Backup	10-3
Operational Modes	10-3

Meterbridge

Overview

The console's meterbridge houses two pairs of left-right VU meters (Program and Switched; see "Output Module" Chapter 4), the digital timer display, the cue speaker, and the console clock.

The meterbridge assembly hinges open for easy access (VU meter lamp replacement, setting the clock). Simply swing the bridge up and back until it rests in a fully opened position.

Digital Timer

The console timer control buttons are located on the OM-90 Output Module (see page 4-2).

The timer is provided with an AUTO-RESTART function so programmed input modules can automatically reset the timer display to zero and start a new count, allowing the announcer to easily track his own pace.

The START/STOP button halts the timer, holds the last count, and then restarts and accumulates the count when depressed again—perfect for compiling tapes of desired duration.

RESET has a dual-mode capability:

- if you depress it while the timer is counting, the display will instantly reset to zero and start a fresh count;
- if the timer is already stopped, depressing this button will reset the timer to zero, where it will hold until start is pressed, or until an auto restart is activated.

HOLD button allows you to hold the display for a longer viewing duration, while still allowing the counter to continue in the background. Releasing the button will then display the current count.

Console Clock

The Wheatstone digital clock is a six-digit time-of-day clock with LED display. The clock is designed with CMOS circuits and an on-board crystal-controlled time base oscillator. There are two basic parts to the clock: a main PCB containing the clock circuits and clock set controls (also may include capacitor backup) and a second PCB containing displays. Clock set controls may be accessed by opening the meterbridge cover.

Controls

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

The trimmer alters 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 4.096 MHz. 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 due to the aging effect of quartz crystals. A minor readjustment of the trimmer will compensate for this effect.

A buffered output of the oscillator is available at TP1 to assist in adjusting the oscillator.

Setting the Time

The setting controls consist of two switches: MODE and SET. To set the clock, open the meterbridge cover:

- 1) The control switches (mounted on the main clock PCB assembly) are labelled "M" and "S". "M" (Mode) is used to scroll from seconds to minutes to hours; "S" is used to Set the time. The procedure is to set the clock slightly ahead of the current time, hold the second count at "00" until the current time catches up, and then release the count.
- 2) Press the MODE button until the hour digits blink. Depress the SET button until the desired hour is displayed.
- 3) Press the MODE button until the minute digits blink. Depress the SET button until the desired minute count is displayed.
- 4) Press the MODE button until the second digits blink. Depress and hold the SET button; the seconds display will hold at "00". When the current time catches up to the display, release the SET button. The clock will start counting. Hit the MODE button three more times to place the clock into working mode.

Capacitor Backup

With the meterbridge open note the super capacitor at C25. This super capacitor is self charging. Note that the super capacitor does NOT light up the clock display; it powers the clock crystal to keep it from losing count (it will do this for about one hour).

Operational Modes

The standard factory default clock configuration is crystal-controlled, 12 hour mode, stand-alone operation. However, the clock will operate either from the internal crystal controlled time base or from an ESE master (TC-76, TC-89, TC-90, autodetect) signal. Because crystal time bases are subject to drift over time, Wheatstone recommends operating the clock in the ESE slave mode for those applications where the exact time is critical.

It can also be programmed to count in either 12 hour or 24 hour modes. Connect an ESE master at connector CT3 (Pin 1 - Signal, Pin 2 - Shield). Switch #4 on SW3 sets 12/24 hour mode (Off - 12 hour, On - 24 hour).

Parts List

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R-90 Spare Parts Kit	11-35

QMP-4 QUAD MIC PREAMP PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
U2, U4, U6, U8	8 PIN .3" DIP SMT SOCKET	4	245001
CT7	10PIN BOXED HEADER, STRAIGHT	1	250077
CT3, CT4	12 POSITION PLUG ON BARRIER STRIP	2	260045
CT3, CT4	12 POSITION BOXED HEADER RIGHT ANGLE	2	260057
U2, U4, U6, U8	2017 MIC PREAMP IC	4	320003
U1, U3, U5, U7	NE5532 DUAL LINEAR OP-AMP SMT	4	325001
Z1-Z16	5.1V SMT ZENER DIODE C5V1	16	355002
C1, C10, C11, C13, C19, C23, C27, C29, C34, C36, C40, C46	CAPACITOR, 10 μ F 50V ELECTROLYTIC SMT	12	405001
C6, C18, C30, C42	CAPACITOR, 22 μ F 25V ELECTROLYTIC SMT	4	405002
C12, C35	CAPACITOR, 100 μ F 25V ELECTROLYTIC SMT	2	405003
L1-L8	FERRITE BEAD SMT 1206 PACKAGE	8	405010
C2, C7, C14, C20, C24, C31, C37, C43	CAPACITOR, 33pF 100V CERAMIC SMT	8	415002
C5, C17, C28, C41	CAPACITOR, 330pF 100V CERAMIC SMT	4	415004
C4, C9, C16, C22, C26, C33, C39, C45	CAPACITOR, .001 μ F 50V CERAMIC SMT	8	415005
C3, C8, C15, C21, C25, C32, C38, C44	CAPACITOR, .1 μ F 50V CERAMIC SMT	8	415007
R2, R9, R12, R16, R23, R26, R32, R38, R41, R47, R52, R55	10 OHM 5% .25W MC1206 RESISTOR	12	435002
R10, R11, R24, R25, R39, R40, R53, R54	47 OHM 5% .25W MC1206 RESISTOR	8	435005
R6, R20, R29, R43	1.30 KOHM 1% .25W MC1206 RESISTOR	4	435016
R1, R3, R4, R7, R14, R15, R17, R18, R21, R28, R30, R31, R33, R34, R36, R44, R45, R46, R48	4.99 KOHM 1% .25W MC1206 RESISTOR	19	435023
R49	4.99 KOHM 1% .25W MC1206 RESISTOR	1	435023
R5, R13, R19, R27, R35, R42, R50, R56	10.0 KOHM 1% .25W MC1206 RESISTOR	8	435028
R8, R22, R37, R51	13.3 KOHM 1% .25W MC1206 RESISTOR	4	435030
CR1-CR4	1K TRIM POT SMT	4	505001
SW1	7 POSITION DIP SWITCH	1	510048
PCB_QMP4	PRINTED CIRCUIT BOARD SMT	1	700768
F1, F2	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	2	835001

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SL-90 STEREO LINE INPUT MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	FACEPLATE	1	003530
CT1	RIGHT ANGLE 25 PIN PC MOUNT CONNECTOR .318	1	220120
	6 PIN .098" PLUG FOR #26 AWG	2	230031
	9 PIN .098" PLUG FOR #26 AWG	1	230032
CT5, CT6	6 PIN .098" HEADER	2	250065
CT3	9 PIN .098" HEADER	1	250066
U5	74ACT00 TTL SMT Quad 2-Input NAND	1	305004
U1-U4	NE5532 DUAL LINEAR OP-AMP SMT	4	325001
Q1, Q2	MMBTA55 PNP SMT TRANSISTOR	2	345002
Z3	6.2V 1W ZENER DIODE	1	350013
D6, D7	1N4002W RECTIFYING 1AMP SMT DIODE	2	355001
Z1, Z2	5.1V SMT ZENER DIODE C5V1	2	355002
D1-D5, D8	1N4148 FAST SWITCHING SMT DIODE	6	355003
U6-U10	74VHC4053 SMT Triple 2-Channel Analog Mux	5	385001
C1, C12, C24-C28, C33, C37, C39, C42	CAPACITOR, 22μF 25V ELECTROLYTIC SMT	11	405002
C2, C3, C11, C32, C40, C41	CAPACITOR, 100μF 25V ELECTROLYTIC SMT	6	405003
C5-C7, C9, C10, C14-C16, C18, C19, C21, C29	CAPACITOR, 10pF 100V CERAMIC SMT	12	415001
C22, C31	CAPACITOR, 33pF 100V CERAMIC SMT	2	415002
C44	CAPACITOR, .01μF 50V CERAMIC SMT	1	415006
C4, C8, C13, C17, C20, C23, C30, C34-C36, C38, C43, C46, C47	CAPACITOR, .1μF 50V CERAMIC SMT	14	415007
C45	CAPACITOR, .22μF 50V CERAMIC SMT	1	415009
R34, R36, R46	10 OHM 5% .25W MC1206 RESISTOR	3	435002
R27, R80, R81	100 OHM 5% .25W MC1206 RESISTOR	3	435007
R41	150 OHM 5% .25W MC1206 RESISTOR	1	435008
R26, R29, R37, R39, R43, R45, R48, R50, R78	220 OHM 5% .25W MC1206 RESISTOR	9	435009
R30, R32, R33, R76, R77, R79	1.00 KOHM 1% .25W MC1206 RESISTOR	6	435015
R70, R71	2.43 KOHM 1% .25W MC1206 RESISTOR	2	435020
R56, R73, R75, R84	3.32 KOHM 1% .25W MC1206 RESISTOR	4	435021
R1, R3, R4, R7, R8, R14, R16, R17, R20, R21, R57-R60	4.99 KOHM 1% .25W MC1206 RESISTOR	14	435023
R2, R5, R6, R9, R15, R18, R19, R22, R28, R31, R38, R40, R42, R44, R47, R53, R61-R69, R72	10.0 KOHM 1% .25W MC1206 RESISTOR	26	435028
R74, R82, R83	10.0 KOHM 1% .25W MC1206 RESISTOR	3	435028
R23, R35, R52	22.1 KOHM 1% .25W MC1206 RESISTOR	3	435036
R54, R55	40.2 KOHM 1% .25W MC1206 RESISTOR	2	435039
R24, R49	88.7 KOHM 1% .25W MC1206 RESISTOR	2	435043
R25, R51	221 KOHM 1% .25W MC1206 RESISTOR	2	435046
CR1, CR2	50K 15 TURN TRIM POT	2	500015

SL-90 STEREO LINE INPUT MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
START/STOP SWITCH	DPDT PUSHBUTTON SWITCH, MOMENTARY ACTION, GRAY HOUSING	2	510063
SW2-SW7	2 POLE PUSHBUTTON SWITCH, ALTERNATE ACTION	6	510097
SW1	7 POSITION RIGHT ANGLE DIP SWITCH	1	510282
FADER KNOB	WHITE FADER KNOB FOR CPA SERIES FADERS	1	520057
START SWITCH CAP	LB STYLE RED BUTTON	1	530057
STOP SWITCH CAP	LB STYLE YELLOW BUTTON	1	530060
A/B/PGM/AUD/MONO/MXM SWITCH BUTTON	CUSTOM WHITE LIGHT PIPE BUTTON	5	530268
CUE SWITCH BUTTON	CUSTOM RED LIGHT PIPE BUTTON	1	530269
FADER	STEREO AUDIO TAPER FADER	1	540051
STOP SWITCH LED	YELLOW LED FOR R5 ON/OFF SWITCH	1	600031
START SWITCH LED	3MM RED LED FOR ON/OFF SWITCH	1	600077
DS1	HIGH INTENSITY AMBER SMT LED RIGHT ANGLE	1	605010
DS2, DS6	ULTRABRIGHT RIGHT ANGLE RED SMT	2	605017
DS3	ULTRABRIGHT RIGHT ANGLE GREEN SMT	1	605018
DS4, DS5	ULTRABRIGHT RIGHT ANGLE YELLOW SMT	2	605019
PCB_SL2000	PRINTED CIRCUIT BOARD SMT	1	700656
	PEM FASTENERS	4	821009
F1-F3	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	3	835001

OM-90 OUTPUT MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	FACEPLATE	1	003522
CT2	THREADED 9 PIN DB CONNECTOR-IDD9	1	200031
CT1	RIGHT ANGLE 25 PIN PC MOUNT CONNECTOR .318	1	220120
	10 PIN RIBBON PLUG	1	230020
	3 PIN .098" PLUG FOR #26 AWG	1	230028
CT4	3 PIN .098" HEADER	1	250062
CT2	10 PIN PC MOUNT STRAIGHT UP SMT HEADER	1	255005
U7	74ACT00 TTL SMT Quad 2-Input NAND	1	305004
U6, U21	74ACT74 TTL SMT Dual D-Type Pos-Edge-Triggered Flip-Flop	2	305021
U1-U5, U8-U16	OP-275 DUAL LINEAR OP-AMP SMT	14	325002
Q1, Q2	MMBTA55 PNP SMT TRANSISTOR	2	345002
Z3	6.2V 1W ZENER DIODE	1	350013
D3-D6	1N4002W RECTIFYING 1AMP SMT DIODE	4	355001
Z1, Z2	5.1V SMT ZENER DIODE C5V1	2	355002
D2	1N4148 FAST SWITCHING SMT DIODE	1	355003
D1	SS14 SCHOTTKY SMT DIODE	1	355004
U17-U20	74VHC4053 SMT Triple 2-Channel Analog Mux	4	385001
C22, C25-C27, C60-C62	CAPACITOR, 22μF 25V ELECTROLYTIC SMT	7	405002
C20, C63, C64	CAPACITOR, 100μF 25V ELECTROLYTIC SMT	3	405003
C5, C6, C12, C13	CAPACITOR, 10pF 100V CERAMIC SMT	4	415001
C1-C3, C7, C14-C16, C18, C29, C30, C32, C33, C35, C36, C38-C40, C42, C43, C48, C50-C53	CAPACITOR, 33pF 100V CERAMIC SMT	24	415002
C56, C58	CAPACITOR, 33pF 100V CERAMIC SMT	2	415002
C4, C8, C9-C11, C17, C19, C21, C23, C24, C28, C31, C34, C37, C41, C44-C47, C49, C54, C55	CAPACITOR, .1μF 50V CERAMIC SMT	22	415007
C57, C59	CAPACITOR, .1μF 50V CERAMIC SMT	2	415007
R1, R2, R4, R5, R7, R8, R36, R37, R71, R73, R75, R76, R79, R83, R95, R99, R103, R107, R109	10 OHM 5% .25W MC1206 RESISTOR	19	435002
R111, R113, R114	10 OHM 5% .25W MC1206 RESISTOR	3	435002
R14-R25, R126, R127	100 OHM 5% .25W MC1206 RESISTOR	14	435007
R46	150 OHM 5% .25W MC1206 RESISTOR	1	435008
R41, R44, R48, R65-R69	220 OHM 5% .25W MC1206 RESISTOR	8	435009
R53	475 OHM 1% .25W MC1206 RESISTOR	1	435011
R3, R6, R9, R29-R31, R93, R121	1.30 KOHM 1% .25W MC1206 RESISTOR	8	435016
R88, R91, R118, R120	2.43 KOHM 1% .25W MC1206 RESISTOR	6	435020
R122-R125	3.32 KOHM 1% .25W MC1206 RESISTOR	4	435021
R90, R92, R116, R119	3.92 KOHM 1% .25W MC1206 RESISTOR	4	435022
R11, R12, R26-R28, R33, R34, R38, R52, R54-R64, R70, R72, R74, R77, R80-R82, R84-R87	4.99 KOHM 1% .25W MC1206 RESISTOR	31	435023
R89, R94, R96-R98, R100-R102, R104-R106, R110, R112, R115, R117	4.99 KOHM 1% .25W MC1206 RESISTOR	15	435023

OM-90 OUTPUT MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
R10, R13, R32, R35, R78	10.0 KOHM 1% .25W MC1206 RESISTOR	5	435028
R39, R40, R42, R43, R45, R47, R49, R50, R108	40.2 KOHM 1% .25W MC1206 RESISTOR	9	435039
R51	88.7 KOHM 1% .25W MC1206 RESISTOR	1	435043
CR1-CR6	10K 15 TURN TRIM POT	6	500014
CUE POT	10KWSINGLE AUDIO CONDUCTIVE PLASTIC, BOURNS	1	500058
CR7-CR10	10K TRIM POT SMT	4	505002
SW1	2 POLE PUSHBUTTON SWITCH, ALTERNATE ACTION	1	510097
SW2-SW8	2 POLE PUSHBUTTON SWITCH, MOMENTARY	7	510113
CUE KNOB	1/8" COLLET KNOB, NO POINTER, NO LINE	1	520053
CUE CAP	PASTEL GREEN CAP W.BLACK LINE FOR 15MM KNOB	1	530079
EXT/ PGM/AUD/MONO/AUTO SWITCH BUTTON	CUSTOM WHITE LIGHT PIPE BUTTON	5	530268
RESET SWITCH BUTTON	CUSTOM RED LIGHT PIPE BUTTON	1	530269
HOLD SWITCH BUTTON	CUSTOM YELLOW LIGHT PIPE BUTTON	1	530270
START/STOP SWITCH BUTTON	CUSTOM GREEN LIGHT PIPE BUTTON	1	530271
K1, K2	DPDT RELAY,5V	2	550006
DS1, DS6	HIGH INTENSITY AMBER SMT LED RIGHT ANGLE	2	605010
DS4, DS8	ULTRABRIGHT RIGHT ANGLE RED SMT	3	605017
DS3, DS7	ULTRABRIGHT RIGHT ANGLE GREEN SMT	2	605018
DS5, DS9	ULTRABRIGHT RIGHT ANGLE YELLOW SMT	2	605019
PCB_BPSA1000	PRINTED CIRCUIT BOARD	1	700299
PCB_OM2000A	PRINTED CIRCUIT BOARD	1	700655
	D SUB STANDOFFJACK HARDWARE 3/16" LONG	2	820047
	PEM FASTENERS	5	821009
F1-F3	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	3	835001

CRS-90 CONTROL ROOM/STUDIO MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	FACEPLATE	1	003535
CT2	25 PIN DB CONNECTOR	1	200018
CT1	RIGHT ANGLE 25 PIN PC MOUNT CONNECTOR .318	1	220120
	3 PIN .098" PLUG FOR #26 AWG	1	230028
	6 PIN .098" PLUG FOR #26 AWG	3	230031
	26 PIN RIBBON PLUG	1	250043
CT3	3 PIN .098" HEADER	1	250062
CT5-CT7	6 PIN .098" HEADER	3	250065
CT2	26 PIN PC MOUNT STRAIGHT UP SMT HEADER	1	255003
U8, U25, U26	74ACT74 TTL SMT Dual D-Type Pos-Edge-Triggered Flip-Flop	3	305021
U20-U22	LM675 POWER OP AMP	3	320007
U1-U7, U9-U12, U23, U24	OP-275 DUAL LINEAR OP-AMP SMT	13	325002
Q1	MMBTA55 PNP SMT TRANSISTOR	1	345002
Z3	6.2V 1W ZENER DIODE	1	350013
D1, D2	1N4002W RECTIFYING 1AMP SMT DIODE	2	355001
Z1, Z2	5.1V SMT ZENER DIODE C5V1	2	355002
D4	1N4148 FAST SWITCHING SMT DIODE	1	355003
D3	SS14 SCHOTTKY SMT DIODE	1	355004
U13-U19	74VHC4053 SMT Triple 2-Channel Analog Mux	7	385001
C1-C3, C19-C28, C31-C33, C47, C48, C50, C65-C68, C97-C99, C102, C105, C109-C112	CAPACITOR, 22μF 25V ELECTROLYTIC SMT	32	405002
C29, C30, C95, C96, C101	CAPACITOR, 100μF 25V ELECTROLYTIC SMT	5	405003
C49, C53	CAPACITOR, 330μF 25V ELECTROLYTIC SMT	2	405004
C69, C71, C73, C83, C86, C89	CAPACITOR, 1μF 35V ELECTROLYTIC SMT TANTALUM	6	405005
C4, C6, C7, C9, C11, C13, C14, C16, C34, C36, C39, C41, C43-C45, C51, C56, C58, C59, C61	CAPACITOR, 10pF 100V CERAMIC SMT	20	415001
C63, C75, C77, C78, C80, C82, C93, C94, C106, C108	CAPACITOR, 10pF 100V CERAMIC SMT	10	415001
C70, C72, C74	CAPACITOR, 33pF 100V CERAMIC SMT	3	415002
C85, C88, C91	CAPACITOR, 330pF 100V CERAMIC SMT	3	415004
C5, C8, C10, C12, C15, C17, C18, C35, C37, C38, C40, C42, C46, C52, C54, C55, C57, C60	CAPACITOR, .1μF 50V CERAMIC SMT	18	415007
C62, C64, C76, C79, C81, C92, C100, C103, C104, C107	CAPACITOR, .1μF 50V CERAMIC SMT	10	415007
C84, C87, C90	CAPACITOR, .22μF 50V CERAMIC SMT	3	415009
R147-R152	3.3 OHM 5% .25W MC1206 RESISTOR	6	435001
R6, R9, R10, R15, R20, R27, R42, R44, R55, R60, R68, R70, R106, R115, R118, R119, R131, R140	10 OHM 5% .25W MC1206 RESISTOR	18	435002
R156, R157, R160, R161	10 OHM 5% .25W MC1206 RESISTOR	4	435002
F1, F5, F6	47 OHM 5% .25W MC1206 RESISTOR	3	435005
R3, R4, R7, R12, R13, R16-R18, R21, R46, R48, R49, R52, R53, R57, R62, R103, R104, R107	100 OHM 5% .25W MC1206 RESISTOR	19	435007
R112, R113, R116, R133, R142	100 OHM 5% .25W MC1206 RESISTOR	5	435007

CRS-90 CONTROL ROOM/STUDIO MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
R37	150 OHM 5% .25W MC1206 RESISTOR	1	435008
R28, R30, R36, R38, R39	220 OHM 5% .25W MC1206 RESISTOR	5	435009
R123, R126, R128	1.00 KOHM 1% .25W MC1206 RESISTOR	3	435015
R32, R87, R98, R174, R194	1.69 KOHM 1% .25W MC1206 RESISTOR	5	435017
R40, R72, R188, R189	2.00 KOHM 1% .25W MC1206 RESISTOR	4	435018
R74, R120	2.43 KOHM 1% .25W MC1206 RESISTOR	2	435020
R90, R92, R94, R162, R164, R166, R168, R170	3.32 KOHM 1% .25W MC1206 RESISTOR	8	435021
R23, R24, R31, R33, R65, R66, R88, R89, R99, R102, R109, R110, R136, R137, R175	4.99 KOHM 1% .25W MC1206 RESISTOR	15	435023
R96, R100	6.19 KOHM 1% .25W MC1206 RESISTOR	2	435025
R5, R8, R11, R14, R19, R22, R25, R26, R43, R45, R47, R50, R51, R54, R56, R58, R59, R61, R63	10.0 KOHM 1% .25W MC1206 RESISTOR	19	435028
R64, R67, R69, R75-R86, R91, R93, R95, R105, R108, R111, R114, R122, R125, R130, R132	10.0 KOHM 1% .25W MC1206 RESISTOR	26	435028
R134, R135, R138, R139, R141, R143-R145, R153, R154, R163, R165, R167, R169, R171	10.0 KOHM 1% .25W MC1206 RESISTOR	15	435028
R185, R186, R191, R192	10.0 KOHM 1% .25W MC1206 RESISTOR	4	435028
R158, R173, R187	15.0 KOHM 1% .25W MC1206 RESISTOR	3	435032
R97, R101	20.0 KOHM 1% .25W MC1206 RESISTOR	2	435034
R1, R2, R29, R34, R35, R41, R71, R73, R117, R121, R124, R127, R129, R146, R155, R159	40.2 KOHM 1% .25W MC1206 RESISTOR	16	435039
R172, R177-R184, R190, R193	40.2 KOHM 1% .25W MC1206 RESISTOR	11	435039
R176	88.7 KOHM 1% .25W MC1206 RESISTOR	1	435043
CR1	10K TRIM POT	1	500021
STUDIO/HDPN/CR POT	10K POT, DUAL AUDIO	3	500029
TB SWITCH	DPDT PUSHBUTTON SWITCH, MOMENTARY ACTION, GRAY HOUSING	1	510063
SW2-SW7	2 POLE PUSHBUTTON SWITCH, MOMENTARY	6	510113
SW1	7 POSITION RIGHT ANGLE DIP SWITCH	1	510282
STUDIO/HDPN/CR KNOB	15mm GREY COLLET KNOB FOR 1/4" SHAFT	3	520038
STUDIO/CR POT CAP	11mm BLUE CAP W/WHITE LINE FOR 15mm KNOB	2	530045
TB SWITCH CAP	LB STYLE YELLOW BUTTON	1	530060
HDPN POT CAP	CREAM CAP W. BLACK LINE FOR 15MM KNOB	1	530080
EXT1/EXT2/PGM/AUD/MONO/MXM SWITCH BUTTON	CUSTOM WHITE LIGHT PIPE BUTTON	6	530268
DS1, DS2	HIGH INTENSITY AMBER SMT LED RIGHT ANGLE	2	605010
DS3	ULTRABRIGHT RIGHT ANGLE RED SMT LED	1	605017
DS4	ULTRABRIGHT RIGHT ANGLE GREEN SMT LED	1	605018
DS5, DS6	ULTRABRIGHT RIGHT ANGLE YELLOW SMT LED	2	605019
PCB_CR2000A	PRINTED CIRCUIT BOARD SMT	1	700649
	D SUB STANDOFFJACK HARDWARE 3/16" LONG	4	820047
	PEM FASTENERS	4	821009
U20-U22	HEATSINK FOR T-220 WITH MOUNTING PIN	3	825010

CRS-90 CONTROL ROOM/STUDIO MODULE PARTS LIST			
ITEM#	DESCRIPTION	QTY	W#
F1, F5, F6	FUSE/ POLYSWITCH .17 AMP RESETABLE	3	<i>830043</i>
F4	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	1	<i>835001</i>
F2, F3	FUSE/ POLYSWITCH 1.0AMP SMT RESETABLE	2	<i>835002</i>

SS-90 STUDIO TWO MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	FACEPLATE	1	003536
CT2	25 PIN DB CONNECTOR	1	200018
CT1	RIGHT ANGLE 25 PIN PC MOUNT CONNECTOR .318	1	220120
	3 PIN .098" PLUG FOR #26 AWG	1	230028
	6 PIN .098" PLUG FOR #26 AWG	3	230031
	26 PIN RIBBON PLUG	1	250043
CT3	3 PIN .098" HEADER	1	250062
CT5-CT7	6 PIN .098" HEADER	3	250065
CT2	26 PIN PC MOUNT STRAIGHT UP SMT HEADER	1	255003
U8, U25, U26	74ACT74 TTL SMT Dual D-Type Pos-Edge-Triggered Flip-Flop	3	305021
U20, U21	LM675 POWER OP AMP	2	320007
U1-U7, U9-U12, U23, U24	OP-275 DUAL LINEAR OP-AMP SMT	13	325002
Q1	MMBTA55 PNP SMT TRANSISTOR	1	345002
Z3	6.2V 1W ZENER DIODE	1	350013
D1, D2	1N4002W RECTIFYING 1AMP SMT DIODE	2	355001
Z1, Z2	5.1V SMT ZENER DIODE C5V1	2	355002
D4	1N4148 FAST SWITCHING SMT DIODE	1	355003
D3	SS14 SCHOTTKY SMT DIODE	1	355004
U13-U19	74VHC4053 SMT Triple 2-Channel Analog Mux	7	385001
C1-C3, C19-C28, C31-C33, C47, C48, C50, C65-C68, C97-C99, C102, C105, C109-C112	CAPACITOR, 22μF 25V ELECTROLYTIC SMT	32	405002
C29, C30, C95, C96, C101	CAPACITOR, 100μF 25V ELECTROLYTIC SMT	5	405003
C49, C53	CAPACITOR, 330μF 25V ELECTROLYTIC SMT	2	405004
C69, C71, C73, C83, C86, C89	CAPACITOR, 1μF 35V ELECTROLYTIC SMT TANTALUM	6	405005
C4, C6, C7, C9, C11, C13, C14, C16, C34, C36, C39, C41, C43-C45, C51, C56, C58, C59, C61	CAPACITOR, 10pF 100V CERAMIC SMT	20	415001
C63, C75, C77, C78, C80, C82, C93, C94, C106, C108	CAPACITOR, 10pF 100V CERAMIC SMT	10	415001
C70, C72, C74	CAPACITOR, 33pF 100V CERAMIC SMT	3	415002
C85, C88, C91	CAPACITOR, 330pF 100V CERAMIC SMT	3	415004
C5, C8, C10, C12, C15, C17, C18, C35, C37, C38, C40, C42, C46, C52, C54, C55, C57, C60	CAPACITOR, .1μF 50V CERAMIC SMT	18	415007
C62, C64, C76, C79, C81, C92, C100, C103, C104, C107	CAPACITOR, .1μF 50V CERAMIC SMT	10	415007
C84, C87, C90	CAPACITOR, .22μF 50V CERAMIC SMT	3	415009
R147-R152	3.3 OHM 5% .25W MC1206 RESISTOR	6	435001
R6, R9, R10, R15, R20, R27, R42, R44, R55, R60, R68, R70, R106, R115, R118, R119, R131, R140	10 OHM 5% .25W MC1206 RESISTOR	18	435002
R156, R157, R160, R161	10 OHM 5% .25W MC1206 RESISTOR	4	435002
F1, F5, F6	47 OHM 5% .25W MC1206 RESISTOR	3	435005
R3, R4, R7, R12, R13, R16-R18, R21, R46, R48, R49, R52, R53, R57, R62, R103, R104, R107	100 OHM 5% .25W MC1206 RESISTOR	19	435007
R112, R113, R116, R133, R142	100 OHM 5% .25W MC1206 RESISTOR	5	435007

SS-90 STUDIO TWO MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
R37	150 OHM 5% .25W MC1206 RESISTOR	1	435008
R28, R30, R36, R38, R39	220 OHM 5% .25W MC1206 RESISTOR	5	435009
R123, R126, R128	1.00 KOHM 1% .25W MC1206 RESISTOR	3	435015
R32, R87, R98, R174, R194	1.69 KOHM 1% .25W MC1206 RESISTOR	5	435017
R188, R189	2.00 KOHM 1% .25W MC1206 RESISTOR	2	435018
R74, R120	2.43 KOHM 1% .25W MC1206 RESISTOR	2	435020
R90, R92, R94, R162, R164, R166, R168, R170	3.32 KOHM 1% .25W MC1206 RESISTOR	8	435021
R23, R24, R31, R33, R65, R66, R88, R89, R99, R102, R109, R110, R136, R137, R175	4.99 KOHM 1% .25W MC1206 RESISTOR	15	435023
R96, R100	6.19 KOHM 1% .25W MC1206 RESISTOR	2	435025
R5, R8, R11, R14, R19, R22, R25, R26, R43, R45, R47, R50, R51, R54, R56, R58, R59, R61, R63	10.0 KOHM 1% .25W MC1206 RESISTOR	19	435028
R64, R67, R69, R75-R86, R91, R93, R95, R105, R108, R111, R114, R122, R125, R130, R132	10.0 KOHM 1% .25W MC1206 RESISTOR	26	435028
R134, R135, R138, R139, R141, R143-R145, R153, R154, R163, R165, R167, R169, R171	10.0 KOHM 1% .25W MC1206 RESISTOR	15	435028
R185, R186, R191, R192	10.0 KOHM 1% .25W MC1206 RESISTOR	4	435028
R158, R173, R187	15.0 KOHM 1% .25W MC1206 RESISTOR	3	435032
R40, R72, R97, R101	20.0 KOHM 1% .25W MC1206 RESISTOR	4	435034
R1, R2, R29, R34, R35, R41, R71, R73, R117, R121, R124, R127, R129, R146, R155, R159	40.2 KOHM 1% .25W MC1206 RESISTOR	16	435039
R172, R177-R184, R190, R193	40.2 KOHM 1% .25W MC1206 RESISTOR	11	435039
R176	88.7 KOHM 1% .25W MC1206 RESISTOR	1	435043
CR1	10K TRIM POT	1	500021
STUDIO/HDPN/CR POT	10K POT, DUAL AUDIO	3	500029
TB2 SWITCH	DPDT PUSHBUTTON SWITCH, MOMENTARY ACTION, GRAY HOUSING	1	510063
SW2-SW7	2 POLE PUSHBUTTON SWITCH, MOMENTARY	6	510113
SW1	7 POSITION RIGHT ANGLE DIP SWITCH	1	510282
STUDIO/HDPN/CR KNOB	15mm GREY COLLET KNOB FOR 1/4" SHAFT	3	520038
STUDIO2 POT CAP	11mm BLUE CAP W/WHITE LINE FOR 15mm KNOB	1	530045
TB2 SWITCH CAP	LB STYLE YELLOW BUTTON	1	530060
HDPN2/HDPN3 POT CAP	CREAM CAP W. BLACK LINE FOR 15MM KNOB	2	530080
EXT1/EXT2/PGM/AUD/MONO/MXM SWITCH BUTTON	CUSTOM WHITE LIGHT PIPE BUTTON	6	530268
TB SWITCH LAMP	T 1 3/4 MIDGET GROOVED BASE SINGLE CHIP YELLOW LED LAMP REPLACEMENT	1	600030
DS1, DS2	HIGH INTENSITY AMBER SMT LED RIGHT ANGLE	2	605010
DS3	ULTRABRIGHT RIGHT ANGLE RED SMT LED	1	605017
DS4	ULTRABRIGHT RIGHT ANGLE GREEN SMT LED	1	605018
DS5, DS6	ULTRABRIGHT RIGHT ANGLE YELLOW SMT LED	2	605019
PCB_CR2000A	PRINTED CIRCUIT BOARD SMT	1	700649
	D SUB STANDOFFJACK HARDWARE 3/16" LONG	4	820047
	PEM FASTENERS	4	821009

SS-90 STUDIO TWO MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
U20, U21	HEATSINK FOR T-220 WITH MOUNTING PIN	2	<i>825010</i>
F1, F5, F6	FUSE/ POLYSWITCH .17 AMP RESETABLE	3	<i>830043</i>
F4	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	1	<i>835001</i>
F2, F3	FUSE/ POLYSWITCH 1.0AMP SMT RESETABLE	2	<i>835002</i>

SPN-90 SUPERPHONE MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	FACEPLATE	1	003534
CT1	RIGHT ANGLE 25 PIN PC MOUNT CONNECTOR .318	1	220120
	6 PIN .098" PLUG FOR #26 AWG	2	230031
	9 PIN .098" PLUG FOR #26 AWG	2	230032
CT6, CT7	6 PIN .098" HEADER	2	250065
CT2, CT4	9 PIN .098" HEADER	2	250066
U6	74ACT00 TTL SMT Quad 2-Input NAND	1	305004
U1-U5	NE5532 DUAL LINEAR OP-AMP SMT	5	325001
Q1, Q2	MMBTA55 PNP SMT TRANSISTOR	2	345002
Z3	6.2V 1W ZENER DIODE	1	350013
D5, D6	1N4002W RECTIFYING 1AMP SMT DIODE	2	355001
Z1, Z2	5.1V SMT ZENER DIODE C5V1	2	355002
D1-D4	1N4148 FAST SWITCHING SMT DIODE	4	355003
U7-U11	74VHC4053 SMT Triple 2-Channel Analog Mux	5	385001
C1-C3, C9, C23, C27, C29-C31, C35, C37-C39, C44	CAPACITOR, 22μF 25V ELECTROLYTIC SMT	14	405002
C10, C22, C28	CAPACITOR, 100μF 25V ELECTROLYTIC SMT	3	405003
C5, C6, C8, C11, C13-C15, C17, C19, C20, C24, C26	CAPACITOR, 10pF 100V CERAMIC SMT	12	415001
C41	CAPACITOR, .01μF 50V CERAMIC SMT	1	415006
C4, C7, C12, C16, C18, C21, C25, C32-C34, C36, C40, C43, C45	CAPACITOR, .1μF 50V CERAMIC SMT	14	415007
C42	CAPACITOR, .22μF 50V CERAMIC SMT	1	415009
R2, R5, R6, R20, R39, R41	10 OHM 5% .25W MC1206 RESISTOR	6	435002
R3, R4, R7, R8, R10, R13, R81, R82	100 OHM 5% .25W MC1206 RESISTOR	8	435007
R46	150 OHM 5% .25W MC1206 RESISTOR	1	435008
R42, R44, R48, R50, R52, R79	220 OHM 5% .25W MC1206 RESISTOR	6	435009
R80	1.00 KOHM 1% .25W MC1206 RESISTOR	1	435015
R12, R26, R29, R30	1.69 KOHM 1% .25W MC1206 RESISTOR	4	435017
R37, R38, R75-R78	2.43 KOHM 1% .25W MC1206 RESISTOR	6	435020
R55, R62-R68, R73, R74	4.99 KOHM 1% .25W MC1206 RESISTOR	10	435023
R11, R14, R28, R31	8.45 KOHM 1% .25W MC1206 RESISTOR	4	435026
R1, R21-R25, R36, R43, R45, R47, R49, R51, R56-R61, R69-R72, R83	10.0 KOHM 1% .25W MC1206 RESISTOR	23	435028
R33, R40, R54	22.1 KOHM 1% .25W MC1206 RESISTOR	3	435036
R35	40.2 KOHM 1% .25W MC1206 RESISTOR	1	435039
R9, R15, R27, R32	53.6 KOHM 1% .25W MC1206 RESISTOR	4	435041
R34, R53	88.7 KOHM 1% .25W MC1206 RESISTOR	2	435043
CR1, CR2	10K 15 TURN TRIM POT	2	500014
SW2-SW6	2 POLE PUSHBUTTON SWITCH, ALTERNATE ACTION	5	510097

SPN-90 SUPERPHONE MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
SW2-SW6	2 POLE PUSHBUTTON SWITCH, ALTERNATE ACTION	5	510097
SW1	7 POSITION RIGHT ANGLE DIP SWITCH	1	510282
FADER KNOB	BLUE FADER KNOB FOR CPA SERIES FADERS	2	520032
ON SWITCH CAP	LB STYLE RED BUTTON	1	530057
OFF SWITCH CAP	LB STYLE YELLOW BUTTON	1	530060
PGM/AUD/MONO/MXM SWITCH BUTTON	CUSTOM WHITE LIGHT PIPE BUTTON	4	530268
CUE SWITCH BUTTON	CUSTOM RED LIGHT PIPE BUTTON	1	530269
FADER	MONO AUDIO TAPER FADER	2	540050
OFF SWITCH LED	YELLOW LED FOR R5 ON/OFF SWITCH	1	600031
ON SWITCH LED	RED LED FOR R5 ON/OFF SWITCH	1	600077
DS1, DS5	ULTRABRIGHT RIGHT ANGLE RED SMT LED	2	605017
DS2	ULTRABRIGHT RIGHT ANGLE GREEN SMT LED	1	605018
DS3, DS4	ULTRABRIGHT RIGHT ANGLE YELLOW SMT LED	2	605019
PCB_SPN2000	PRINTED CIRCUIT BOARD SMT	1	700657
	D SUB STANDOFFJACK HARDWARE 3/16" LONG	2	820047
	PEM FASTENERS	3	821009
F1-F3	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	3	835001

LS-90 LINE SELECT MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	FACEPLATE	1	003527
CT2	25 PIN DB CONNECTOR	1	200018
CT1	RIGHT ANGLE 25 PIN PC MOUNT CONNECTOR .318	1	220120
	26 PIN PLUG	1	250043
CT2	26 PIN PC MOUNT STRAIGHT UP SMT HEADER	1	255003
U13-U15	74ACT74 TTL SMT Dual D-Type Pos-Edge-Triggered Flip-Flop	3	305021
U1-U6, U11, U12	OP-275 DUAL LINEAR OP-AMP SMT	8	325002
Z3	6.2V 1W ZENER DIODE	1	350013
D1, D2	1N4002W RECTIFYING 1AMP SMT DIODE	2	355001
Z1, Z2	5.1V SMT ZENER DIODE C5V1	2	355002
D4	1N4148 FAST SWITCHING SMT DIODE	1	355003
D3	SS14 SCHOTTKY SMT DIODE	1	355004
U7-U10	74VHC4053 SMT Triple 2-Channel Analog Mux	4	385001
C1-C4, C37-C40, C47-C49, C52, C54, C55, C65	CAPACITOR, 22μF 25V ELECTROLYTIC SMT	15	405002
C50, C51, C61, C62, C64	CAPACITOR, 100μF 25V ELECTROLYTIC SMT	5	405003
C5, C6, C8, C9, C11, C12, C14, C15, C17, C19, C22, C23, C25, C26, C28, C29, C31, C32, C34	CAPACITOR, 10pF 100V CERAMIC SMT	19	415001
C35, C41, C42, C44, C45, C56, C57, C59, C60	CAPACITOR, 10pF 100V CERAMIC SMT	9	415001
C7, C10, C13, C16, C18, C20, C21, C24, C27, C30, C33, C36, C43, C46, C53, C58, C63	CAPACITOR, .1μF 50V CERAMIC SMT	17	415007
C66-C68	CAPACITOR, .1μF 50V CERAMIC SMT	3	415007
R19, R23, R59, R62	10 OHM 5% .25W MC1206 RESISTOR	4	435002
R17, R20, R61, R65	100 OHM 5% .25W MC1206 RESISTOR	4	435007
R37-R42	619 OHM 1% .25W MC1206 RESISTOR	6	435013
R24, R66	2.43 KOHM 1% .25W MC1206 RESISTOR	2	435020
R2, R3, R6, R7, R10, R11, R14, R15, R18, R25-R36, R44, R45, R48, R49, R52, R53, R56	4.99 KOHM 1% .25W MC1206 RESISTOR	28	435023
R57, R60, R68, R69, R72, R73, R78, R79, R82, R83	4.99 KOHM 1% .25W MC1206 RESISTOR	10	435023
R1, R4, R5, R8, R9, R12, R13, R16, R21, R22, R43, R46, R47, R50, R51, R54, R55, R58, R63	10.0 KOHM 1% .25W MC1206 RESISTOR	19	435028
R64, R67, R70, R71, R74, R77, R80, R81, R84	10.0 KOHM 1% .25W MC1206 RESISTOR	9	435028
R75, R76, R86-R97	40.2 KOHM 1% .25W MC1206 RESISTOR	14	435039
R85	88.7 KOHM 1% .25W MC1206 RESISTOR	1	435043
SW1-SW6	2 POLE PUSHBUTTON SWITCH, MOMENTARY	6	510113
1-6 SWITCH BUTTON	CUSTOM WHITE LIGHT PIPE BUTTON	6	530268
DS1-DS6	ULTRABRIGHT RIGHT ANGLE RED SMT LED	6	605017
PCB_LS2000	PRINTED CIRCUIT BOARD SMT	1	700650
	PEM FASTENERS	3	821009
F1-F3	FUSE/ POLYSWITCH .3AMP SMT RESETABLE	3	835001

TR/FF-90 TAPE REMOTE MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	FACEPLATE	1	003528
CT1	RIGHT ANGLE 25 PIN PC MOUNT CONNECTOR .318	1	220120
R1-R6	1.00 KOHM 1% .25W MC1206 RESISTOR	6	435015
SW1-SW6	2 POLE PUSHBUTTON SWITCH, MOMENTARY	6	510113
RTZ/FF/REW BUTTON	CUSTOM WHITE LIGHT PIPE BUTTON	3	530268
STOP BUTTON	CUSTOM RED LIGHT PIPE BUTTON	1	530269
REC BUTTON	CUSTOM YELLOW LIGHT PIPE BUTTON	1	530270
PLAY BUTTON	CUSTOM GREEN LIGHT PIPE BUTTON	1	530271
DS1, DS3, DS5	ULTRABRIGHT RIGHT ANGLE RED SMT LED	3	605017
DS2, DS4, DS6	ULTRABRIGHT RIGHT ANGLE GREEN SMT LED	3	605018
PCB_TR2000	PRINTED CIRCUIT BOARD SMT	1	700658
	PEM FASTENERS	4	821009

TR/SS-90 TAPE REMOTE MODULE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	FACEPLATE	1	003529
CT1	RIGHT ANGLE 25 PIN PC MOUNT CONNECTOR .318	1	220120
R1-R6	1.00 KOHM 1% .25W MC1206 RESISTOR	6	435015
SW1-SW6	2 POLE PUSHBUTTON SWITCH, MOMENTARY	6	510113
START /STOP BUTTON	CUSTOM WHITE LIGHT PIPE BUTTON	6	530268
DS1, DS3, DS5	ULTRABRIGHT RIGHT ANGLE RED SMT LED	3	605017
DS2, DS4, DS6	ULTRABRIGHT RIGHT ANGLE GREEN SMT LED	3	605018
PCB_TR2000	PRINTED CIRCUIT BOARD SMT	1	700658
	PEM FASTENERS	4	821009

MBR-2000 MOTHER BOARD (RIGHT) PARTS LIST			
ITEM#	DESCRIPTION	QTY	W#
CT2-CT5	62 PIN PC MOUNT CARDEDGE CONNECTOR	4	<i>220027</i>
CT1	60 PIN BOARD-TO-BOARD FEMALE CONNECTOR	1	<i>220075</i>
CT6, CT7, CT9, CT10	3 PIN .098" HEADER	4	<i>250062</i>
CT11	16PIN BOXED HEADER, STRAIGHT	1	<i>250075</i>
CT8	10PIN BOXED HEADER, STRAIGHT	1	<i>250077</i>
PCB_MBR2000	PRINTED CIRCUIT BOARD	1	<i>700653</i>

MBE-2000 MOTHER BOARD (EXTENDER) PARTS LIST			
ITEM#	DESCRIPTION	QTY	W#
CT2-CT12	62 PIN PC MOUNT CARDEDGE CONNECTOR	11	<i>220027</i>
CT13	60 PIN BOARD-TO-BOARD MALE CONNECTOR	1	<i>220074</i>
CT1	60 PIN BOARD-TO-BOARD FEMALE CONNECTOR	1	<i>220075</i>
PCB_MBE2011	PRINTED CIRCUIT BOARD	1	<i>700652</i>

MBE-2600 MOTHER BOARD PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
CT2-CT12	62 PIN PC MOUNT CARDEDGE CONNECTOR	11	<i>220027</i>
CT13	60 PIN BOARD-TO-BOARD MALE CONNECTOR	1	<i>220074</i>
PCB_MBE2011	PRINTED CIRCUIT BOARD	1	<i>700652</i>

MBE-2606 MOTHER BOARD PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
CT2-CT7	62 PIN PC MOUNT CARDEDGE CONNECTOR	6	<i>220027</i>
CT8	60 PIN BOARD-TO-BOARD MALE CONNECTOR	1	<i>220074</i>
CT1	60 PIN BOARD-TO-BOARD FEMALE CONNECTOR	1	<i>220075</i>
PCB_MBE2006	PRINTED CIRCUIT BOARD	1	<i>700651</i>

CLK-70 CLOCK PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
U1, U4	8 PIN .3" DIP SMT SOCKET	2	245001
U6	14 PIN .3" DIP SMT SOCKET	1	245002
U1	20 PIN .3" DIP SMT SOCKET	1	245004
CT4, CT5	20 PIN DIL SOCKET	2	250057
CT1	10PIN BOXED HEADER, STRAIGHT	1	250077
U4	74AC14 TTL SMT TAPE & REEL ONLY Hex Schmitt Trigger	1	305027
U2	74LS74 TTL SMT Dual D-Type Pos-Edge-Triggered Flip-Flop	1	305029
U3	DS90C031 LVD DIFF LINE DRIVER SMT	1	305051
U6	LTC491 RS485/ RS422 INTERFACE	1	310041
U1	IC PIC16LC66-04/SP MICRO	1	310064A
U5	IC ADM690 POWER SUPERVISORY	1	310065A
Q2	LM2940 5V LOW DROP OUT VOLTAGE REGULATOR 2940	1	330017
Q1	MMBTA05 NPN SMT TRANSISTOR	1	345001
D7, D9, D10	1N4002W RECTIFYING 1AMP SMT DIODE	3	355001
D2-D6	1N4148 FAST SWITCHING SMT DIODE	5	355003
D1	SS14 SCHOTTKY SMT DIODE	1	355004
Y1	CRYSTAL 4.096 MHZ	1	370022A
E1	CAP 2.2F SUPERCAP 5.5V	1	400069A
C5, C9, C10, C16	CAPACITOR, 22μF 25V ELECTROLYTIC SMT	4	405002
C13, C14	CAPACITOR, 330μF 25V ELECTROLYTIC SMT	2	405004
C11, C17, C19	CAPACITOR, 1μF 35V ELECTROLYTIC SMT TANTALUM	3	405005
C3	TRIMMER CAPACITOR	1	410001
C4	CAPACITOR, 10pF 100V CERAMIC SMT	1	415001
C2	CAPACITOR, 33pF 100V CERAMIC SMT	1	415002
C1	CAPACITOR, 68pF 100V CERAMIC SMT	1	415003
C21-C26	CAPACITOR, .01μF 50V CERAMIC SMT	6	415006
C6-C8, C15, C18, C20	CAPACITOR, .1μF 50V CERAMIC SMT	6	415007
R21	100 OHM 5% .25W MC1206 RESISTOR	1	435007
R22, R23	619 OHM 1% .25W MC1206 RESISTOR	2	435013
R1	49.9 KOHM 1% .25W MC1206 RESISTOR	1	435040
R24	100 KOHM 1% .25W MC1206 RESISTOR	1	435044
R15, R20	10 MOHM 5% .25W MC1206 RESISTOR	2	435050
R13, R14, R19, R25, R27, R28, R31, R34, R35	20.0 KOHM 1% .25W MC1206 RESISTOR	9	435058
R2-R8, R10, R26, R29, R30, R32, R33, R36	53.6 KOHM 1% .25W MC1206 RESISTOR	14	435060
R9, R12	100 KOHM 1% .25W MC1206 RESISTOR	2	435061
R11, R16, R17	10 MOHM 5% .25W MC1206 RESISTOR	3	435062

CLK-70 CLOCK PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
SW1	PUSHBUTTON SWITCH GREEN LED/ NO CAP	1	<i>510094</i>
SW2	PUSHBUTTON SWITCH RED LED/ NO CAP	1	<i>510095</i>
SW3, SW4	4 POSITION SMT DIP SWITCH, TAPE SEALED	2	<i>515001</i>
	GREEN SWITCH CAP	1	<i>530001</i>
	CLEAR BUTTON WITH WHITE FRAME	1	<i>530266</i>
PCB_CLK220E	PRINTED CIRCUIT BOARD SMT	1	<i>700575</i>
Q2	HEATSINK FOR T-220 WITHOUT MOUNTING PIN	1	<i>825004</i>
F1	FUSE/ POLYSWITCH 1.0AMP SMT RESETABLE	1	<i>835002</i>

CLD-70 CLOCK DISPLAY PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
DS1-DS5	20 POSITION SNAP APART SOCKET, .1" SIL	5	250014
	40 PIN BREAKAWAY HEADER STRIPS, STRAIGHT .1" SIL	1	250016
U2	DS90C032 LVD DIFF LINE RECEIVER SMT	1	305052
U1, U3	IC ADSP2115 DSP PROCESSOR	2	315044
C1, C4	CAPACITOR, 100µF 25V ELECTROLYTIC SMT	2	405003
C2, C3, C5-C8	CAPACITOR, .1µF 50V CERAMIC SMT	6	415007
R6, R7	10 OHM 5% .25W MC1206 RESISTOR	2	435002
R2, R3, R5, R8	100 OHM 5% .25W MC1206 RESISTOR	4	435007
R9-R12	220 OHM 5% .25W MC1206 RESISTOR	4	435009
R1, R4	22.1 KOHM 1% .25W MC1206 RESISTOR	2	435036
DS1-DS6	SINGLE DIGIT LED DISPLAY	6	610004
DS7-DS10	SINGLE SEGMENT GREEN LED DISPLAY	4	610018
PCB_CLD220D	PRINTED CIRCUIT BOARD	1	700590

PS-6040 POWER SUPPLY PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	PS-60 POWER SUPPLY FACEPLATE	1	007074
	CHASSIS	1	007075
	COVER	1	007076
	HEATSINK	1	007077
	CARD BRACKET	.1	007078
	HEATSINK FIN	1	007084
	2600-18 POWER SUPPLY CABLE	1	027095A
	GRAY POWER CORD	1	150016
	GROUND LUG	1	230003
	CHASSIS MOUNT MULTI-PIN CONNECTOR	1	230011
	MULTIMATE PIN CONTACT (LOOSE PACK)	9	230015
	PATCH CLIPS	1	280000
Q4	LM317 POSITIVE ADJUSTABLE REGULATOR	1	330012
Q1-Q3	LM338 POSITIVE ADJUSTABLE REGULATOR	3	330014
D1-D10, D14	1N4002 DIODE	11	350003
D11-D13, D15-D17	CR6A4 POWER DIODE	6	350009
VR7, VR8	18ZA1 VARISTOR	2	360000
VR3-VR6	39ZA1 VARISTOR	4	360002
VR1, VR2	82ZA2 VARISTOR	2	360005
C18	CAPACITOR, 10000 μ F 35V ELECTROLYTIC	1	400006
C13, C15	CAPACITOR, 10 μ F 63V ELECTROLYTIC	2	400012
C4, C5, C7-C10	CAPACITOR, 1 μ F 35V TANTALUM ORANGE	6	400014
C1-C3	CAPACITOR, 22 μ F 25V ELECTROLYTIC	3	400017
C16, C19	CAPACITOR, 4700 μ F 35V ELECTROLYTIC	2	400019
C12	470UF 100V AXIAL LEAD UL APPROVED ELECTROLYTIC CAPACITOR	1	400031
C6, C11, C14, C17	CAPACITOR, .0047 μ UF 1KV CERAMIC, UL RATED	4	410015
R5, R8, R13, R18, R19	1.00 KOHM 1% .25W METAL FILM RESISTOR	5	430107
R12	5.49 KOHM 1% .25W METAL FILM RESISTOR	1	430140
R1, R4, R7, R15-R17	10.0 KOHM 1% .25W METAL FILM RESISTOR	6	430153
R2, R3, R6, R9	100 OHM 5% .25W CARBON FILM RESISTOR	4	430212
R14	220 OHM 5% .25W CARBON FILM RESISTOR	1	430214
R10, R11	330 OHM 5% .25W CARBON FILM RESISTOR	2	430215
CR1-CR3	500WTRIM POT	3	500019
DS1-DS4	RED LED	4	600017
	PRINTED CIRCUIT BOARD, PS6040	1	700205
T1	POWER TRANSFORMER	1	800005

PS-6040 POWER SUPPLY PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	SOCKET HEAD CAP SCREW	4	820007
	PHILLIPS PANHEAD MACHINE SCREW S/S	2	820016
	PHILLIPS PAN HEAD MACHINE SCREW SS	18	820021
	HEX SOCKETHEAD S/S SCREW BLK	6	820034
	PHILLIP PANHEAD STAINLESS STEEL SCREW	7	820035
	1/4" HEX KEPNUTS S/Z	18	821005
	SMALL PATTERN KEPNUT	10	821006
	ZINC KEPNUT	4	821008
	PEM FASTENERS	2	821009
	PEM FASTENERS	1	821013
	ID=.125_OD=.187_H=.12 NYLON SPACER	6	823049
	RUBBER GROMMET	4	824005
	STRAIN RELIEF	1	824009
	INSULATOR	3	825008
	FUSE HOLDER	1	830010
F1	1.25 AMP SLOW BLOW FUSE	1	830053

R-90-26 FRAME PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	CLK-70 LOADED CLK/TMR CARD	1	002780
	CLD-70 LOADED CLK/TMR CARD	1	002781
	MBR-2000 LOADED CARD	1	003549
	MBE-2000 LOADED CARD	1	003550
	R-90 FRAME PAN	1	003563
	R-90 MB REAR	1	003565
	R-90 PAN BRACE	1	003567
	R-90 METAL ARMREST	1	003569
	R-90 MB COVER	1	003576
	R-90 MB POWER CONNECTOR BRACKET	1	003579
	R90 MB FACE	1	003585
	R90 CONNECTOR KIT	1	003593
	QUAD MIC PREAMP Loaded Card Assy	1	005549
	LED-3 LOADED CARD	4	007104
	CLK-220 LENS	1	026057A
	MBE-2600 LOADED CARD	1	027086A
	SIDEPLATE R-90 LEFT	1	100090
	SIDEPLATE R-90 RIGHT	1	100091
	ALUMINUM CONTINUOUS HINGE, 72"X1.06" X .040"	3.5	110024
	FELT STRIP	3.5	130248
	26 COND FLAT RIBBON CABLE	10	150083
	10 PIN PLUG	4	230020
	3 PIN .098" PLUG FOR #26 AWG	2	230028
	MULTIMATE PLUG CONTACT (LOOSE PACK)	8	230068
	PLASTIC SHELL CHASSIS CONNECTOR	1	230070
	16 PIN RIBBON PLUG	2	250039
	RTS JACK	1	260005
	PATCH CLIPS	8	280000
	PATCH CLIPS	8	280004
	PATCH CLIPS	7	280007
	VU METER	4	630004
	LIGHT BOX FOR AL29 METER WITHOUT LAMP OR LAMPHOLDER	4	630008
	FLAT WASHER	1	822007
	SHOULDER WASHER	1	822008
	4-40 X .250 HEX ZINC	34	823016
	#6 THUMB SCREW	1	823029

R-90-26 FRAME PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	4-40 X .50 ROUND NYLON SPACER	4	823038
	4-40 X .375 THREADED HEX NYLON STANDOFF	4	823045
	RECESSED BUMPER FOR #8 SCREW	4	824032
	METER TERMINAL	8	826001
	SPEAKER	1	960000

R-90-18 FRAME PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	CLK-70 LOADED CLK/TMR CARD	1	002780
	CLD-70 LOADED CLK/TMR CARD	1	002781
	MBR-2000 LOADED CARD	1	003549
	R90-12 FRAME PAN	1	003562
	R90-12 MB REAR	1	003564
	R90-12 PAN BRACE	1	003566
	R90-12 METAL ARMREST	1	003568
	R90-12 MB COVER	1	003575
	A2000 MB POWER CONNECTOR BRACKET	1	003579
	R90-12 MB FACE	1	003584
	CONNECTOR KIT FOR R90-12	1	003594
	QUAD MIC PREAMP Loaded Card Assy	1	005549
	LED-3 LOADED CARD	4	007104
	CLK-220 LENSE	1	026057A
	MBE-2606 LOADED CARD	2	027087A
	SIDEPLATE R-90 LEFT	1	100090
	SIDEPLATE R-90 RIGHT	1	100091
	ALUMINUM CONTINUOUS HINGE, 72"X1.06" X .040"	0.45	110024
	FELT STRIP	.022	130248
	26 COND FLAT RIBBON CABLE	10	150083
	10 PIN PLUG	4	230020
	3 PIN .098" PLUG FOR #26 AWG	2	230028
	MULTIMATE PLUG CONTACT (LOOSE PACK)	8	230068
	PLASTIC SHELL CHASSIS CONNECTOR	1	230070
	16 PIN RIBBON PLUG	2	250039
	RTS JACK	1	260005
	PATCH CLIPS	8	280000
	PATCH CLIPS	8	280004
	PATCH CLIPS	7	280007
	VU METER	4	630004
	LIGHT BOX FOR AL29 METER WITHOUT LAMP OR LAMPHOLDER	4	630008
	FLAT WASHER	1	822007
	SHOULDER WASHER	1	822008
	4-40 X .250 HEX ZINC	24	823016
	#6 THUMB SCREW	1	823029
	4-40 X .50 ROUND NYLON SPACER	4	823038

R-90-18 FRAME PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	4-40 X .375 THREADED HEX NYLON STANDOFF	4	823045
	RECESSED BUMPER FOR #8 SCREW	4	824032
	METER TERMINAL	8	826001
	SPEAKER	1	960000

R-90-20 CONNECTOR KIT PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	R-90 MANUAL	1	003599
	DB25 INDIVIDUAL CRIMP PIN PLUG FOR 220 CONNECTOR KIT	25	200100
	MALE PIN FOR DB25 PLUG, W/S 200100	634	200101
	METALIZED PLASTIC STRAIGHT HOOD FOR DB25 PLUG, W/S 200100	20	200102
	9 POSITION PLASTIC HOOD, 4-40 JACK SCREWS AND STRAIGHT CABLE EXIT	1	200107
	25 POSITION PLASTIC HOOD, 4-40 JACK SCREWS AND STRAIGHT CABLE EXIT	5	200108
	DB9 INDIVIDUAL CRIMP PIN PLUG FOR 2600 CONNECTOR KIT	1	200109
	CRIMP TOOL FOR 220 DB PLUG	1	850068
	PIN EXTRACTOR TOOL FOR 220 DB PINS	1	850069

R-90-12 CONNECTOR KIT PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	R-90 MANUAL	1	003599
	DB25 INDIVIDUAL CRIMP PIN PLUG FOR 220 CONNECTOR KIT	17	200100
	MALE PIN FOR DB25 PLUG, W/S 200100	434	200101
	METALIZED PLASTIC STRAIGHT HOOD FOR DB25 PLUG, W/S 200100	12	200102
	9 POSITION PLASTIC HOOD, 4-40 JACK SCREWS AND STRAIGHT CABLE EXIT	1	200107
	25 POSITION PLASTIC HOOD, 4-40 JACK SCREWS AND STRAIGHT CABLE EXIT	5	200108
	DB9 INDIVIDUAL CRIMP PIN PLUG FOR 2600 CONNECTOR KIT	1	200109
	CRIMP TOOL FOR 220 DB PLUG	1	850068
	PIN EXTRACTOR TOOL FOR 220 DB PINS	1	850069

R-90 CONSOLE PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	CLK-70 LOADED CLK/TMR CARD		002749
	SL-90 STEREO LINE MODULE		003510
	OM-90 OUTPUT MODULE		003502
	SPN-90 SUPERPHONE MODULE		003514
	CRS-90 CONTROL ROOM/STUDIO MODULE		003515
	SS-90 STUDIO TWO MODULE		003516
	LS-90 LINE SELECT MODULE		003507
	TR-90FF TAPE REMOTE MODULE		003508
	TR-90SS TAPE REMOTE MODULE		003509
	BK-90 BLANK MODULE		003539
	R-90-26 MAINFRAME - WIRED		003580
	R-90-18 MAINFRAME - WIRED		003581
	R60 POWER SUPPLY		007010
	OPTIONAL SPARE PARTS FOR R-90		053580

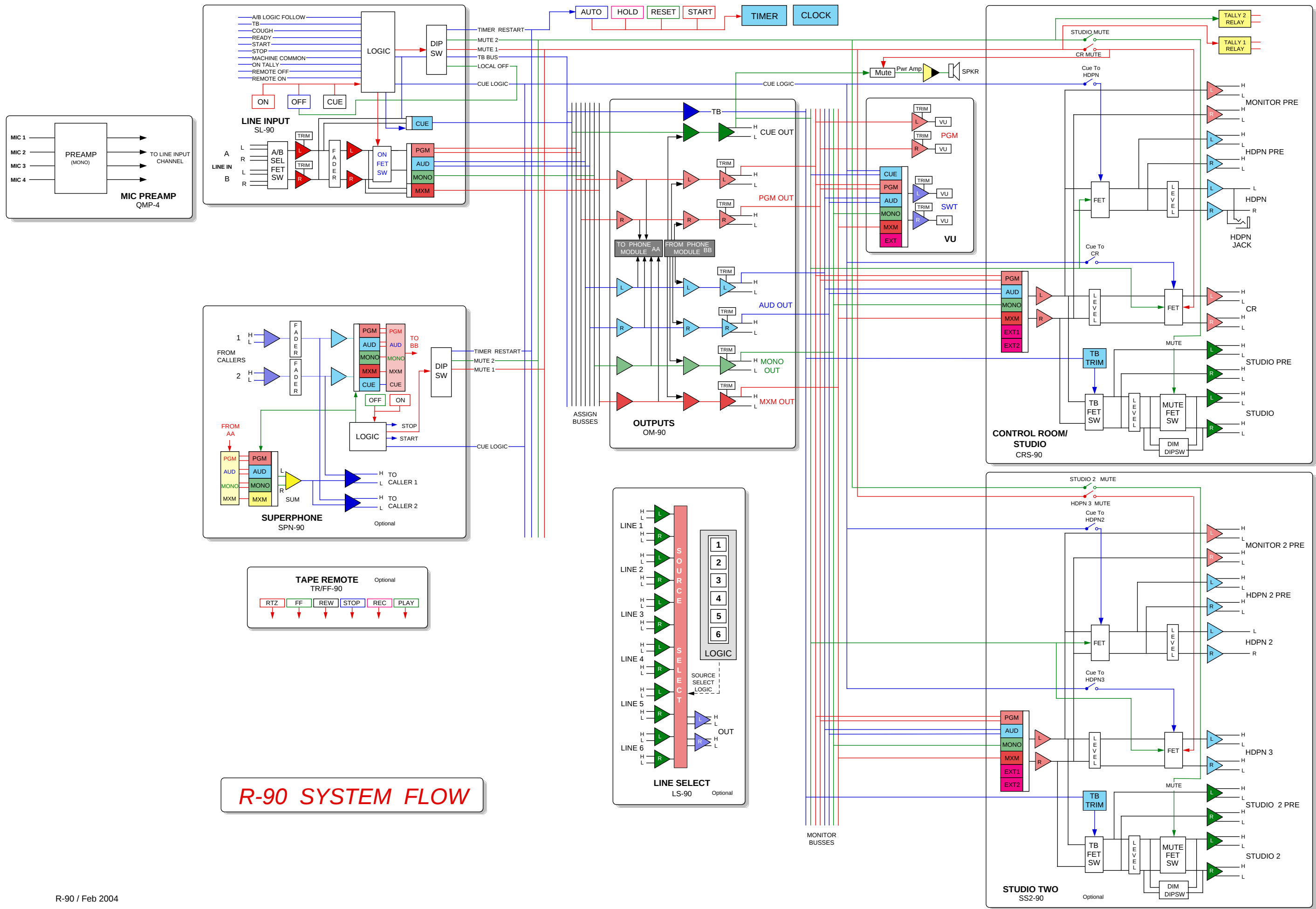
R-90 SPARE PARTS KIT PARTS LIST

ITEM#	DESCRIPTION	QTY	W#
	UTILITY BOXES	1	160021
	MALE PIN FOR DB25 PLUG, W/S 200100	10	200101
	2017 MIC PREAMP IC	1	320003
	10K POT, DUAL AUDIO	1	500029
	DPDT PUSHBUTTON SWITCH, MOMENTARY ACTION, GRAY HOUSING	2	510063
	2 POLE PUSHBUTTON SWITCH, ALTERNATE ACTION	1	510097
	2 POLE PUSHBUTTON SWITCH, MOMENTARY	1	510113
	MONO AUDIO TAPER FADER	1	540050
	MONO AUDIO TAPER FADER	1	540051
	DPDT RELAY,5V	1	550006
	3MM RED LED FOR ON/OFF SWITCH	1	600077
	YELLOW LED FOR R5 ON/OFF SWITCH	1	600031
	PHILLIPS SERRATED PANHEAD S/S SCREW	10	820106

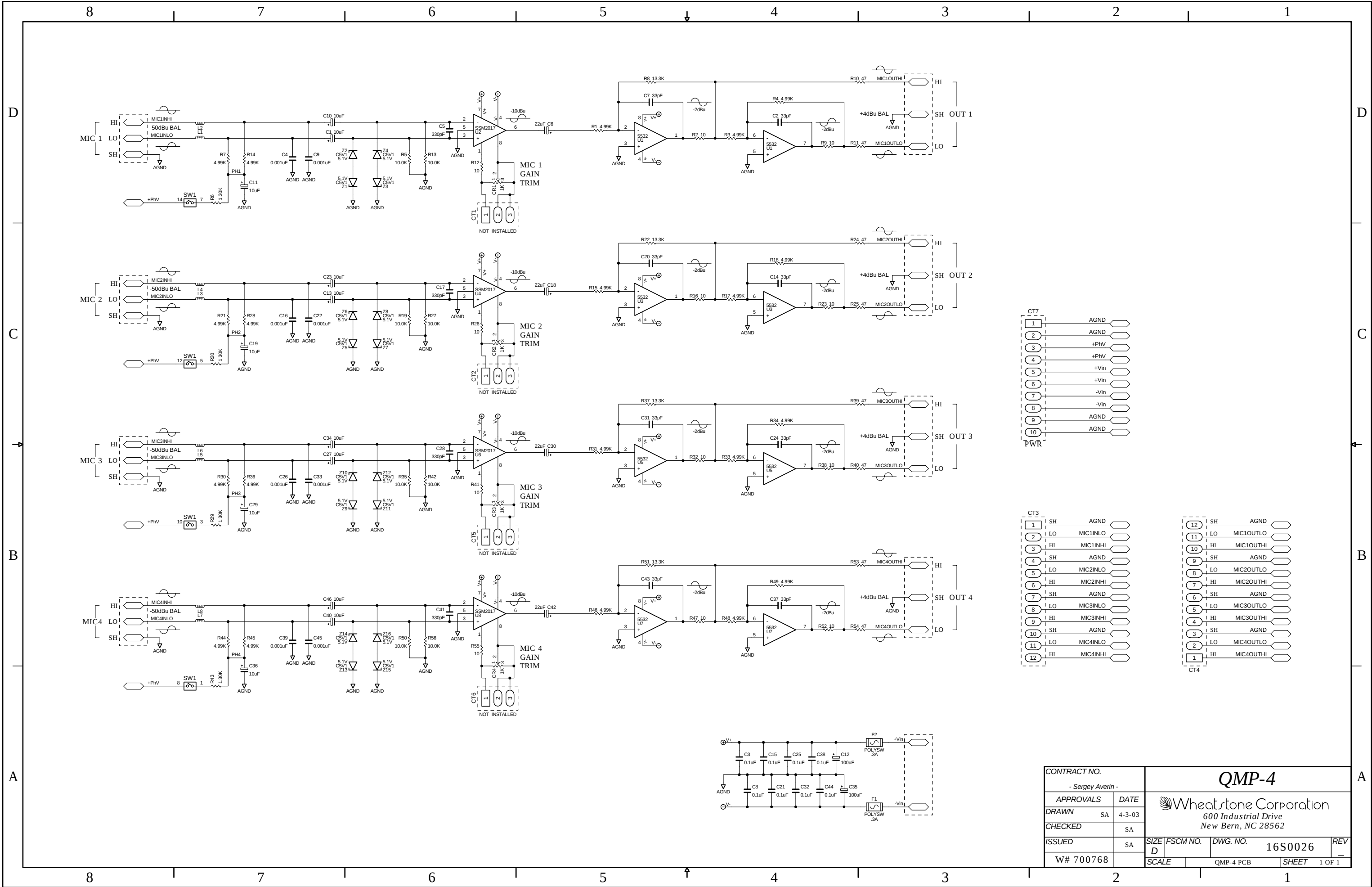
Schematic Drawings

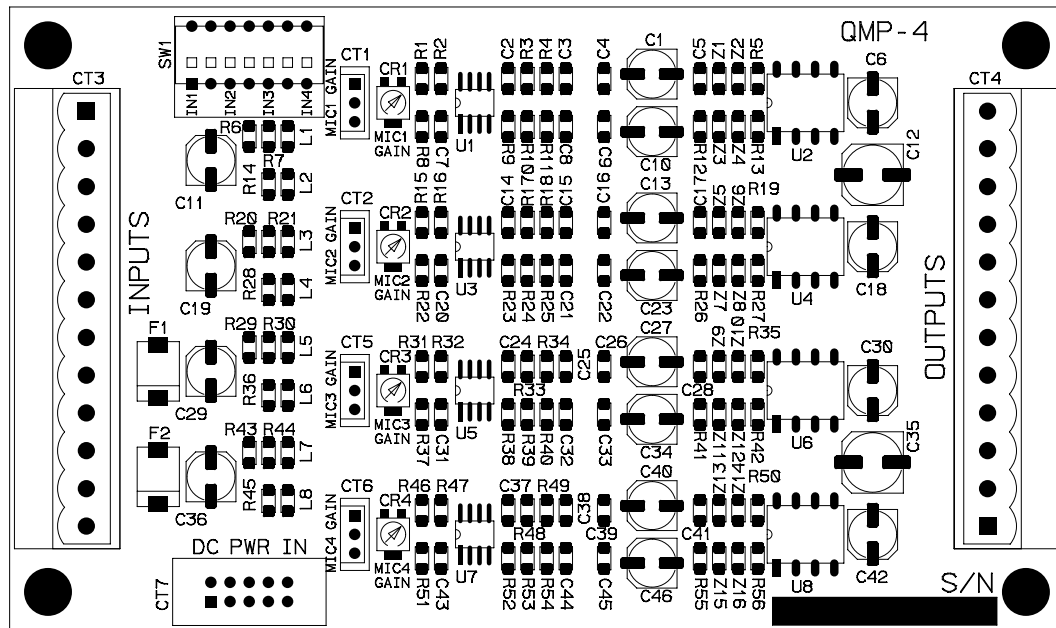
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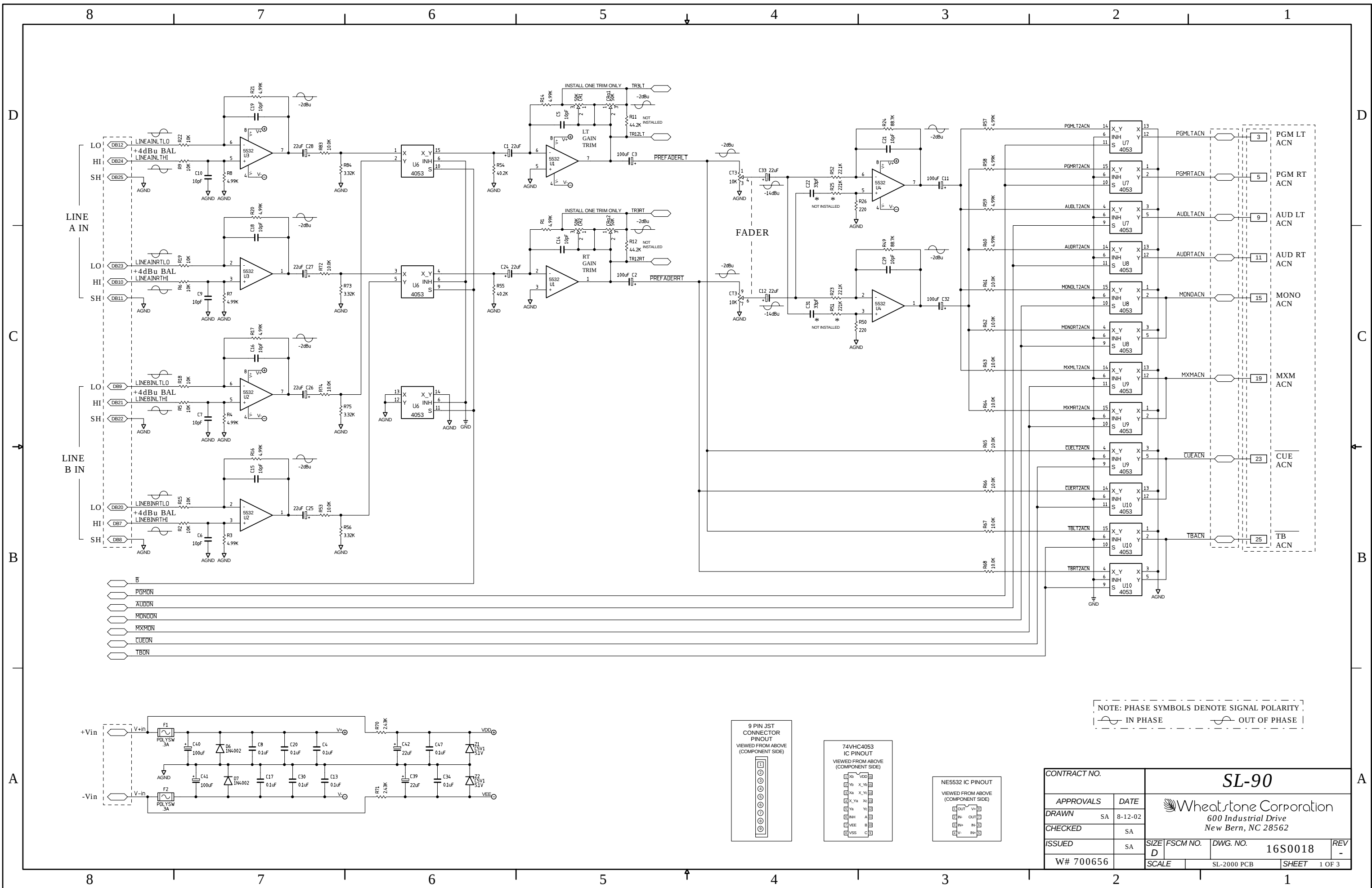
R-90 SYSTEM FLOW



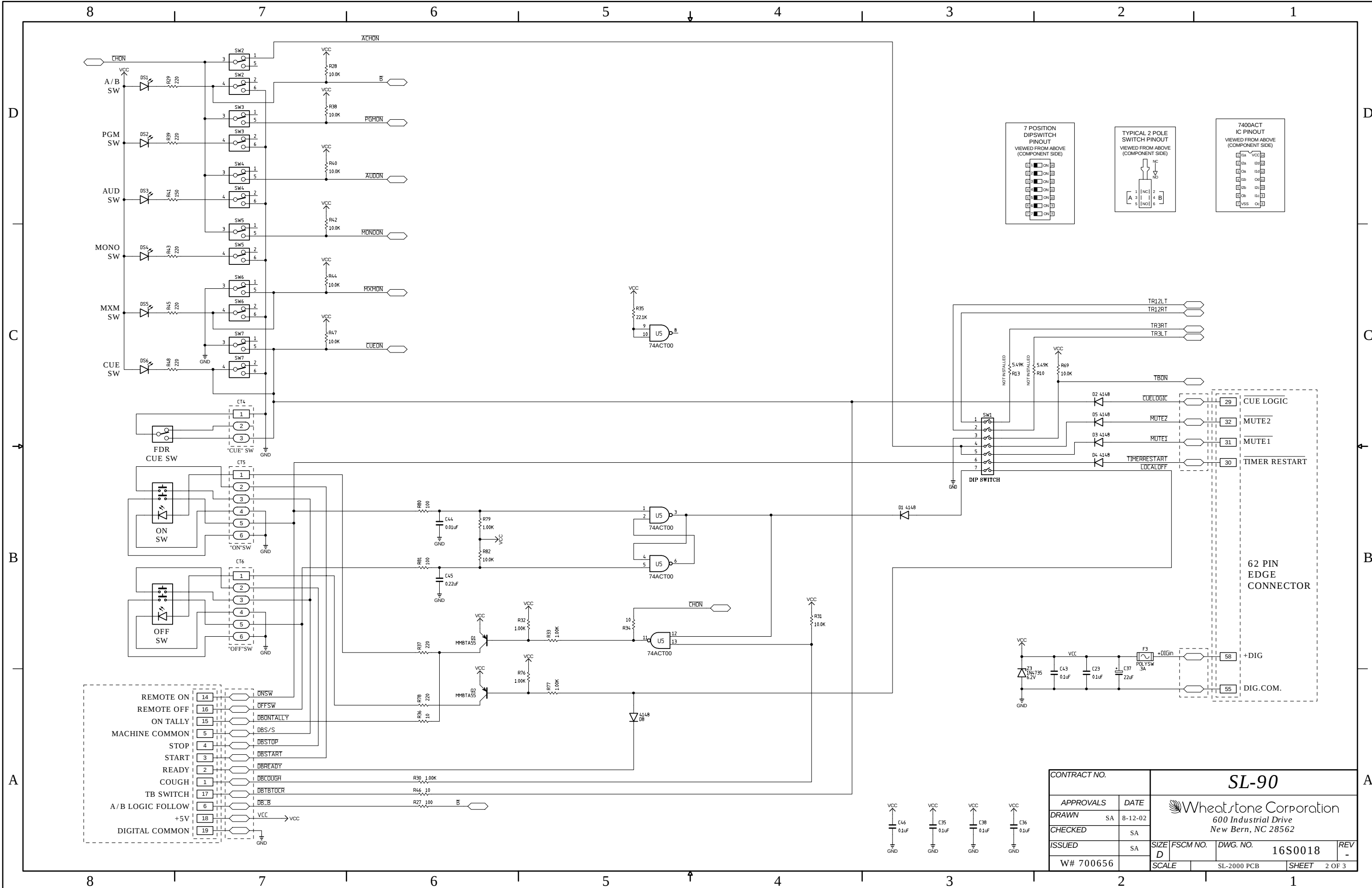


QMP-4 Quad Mic Preamp - Load Sheet

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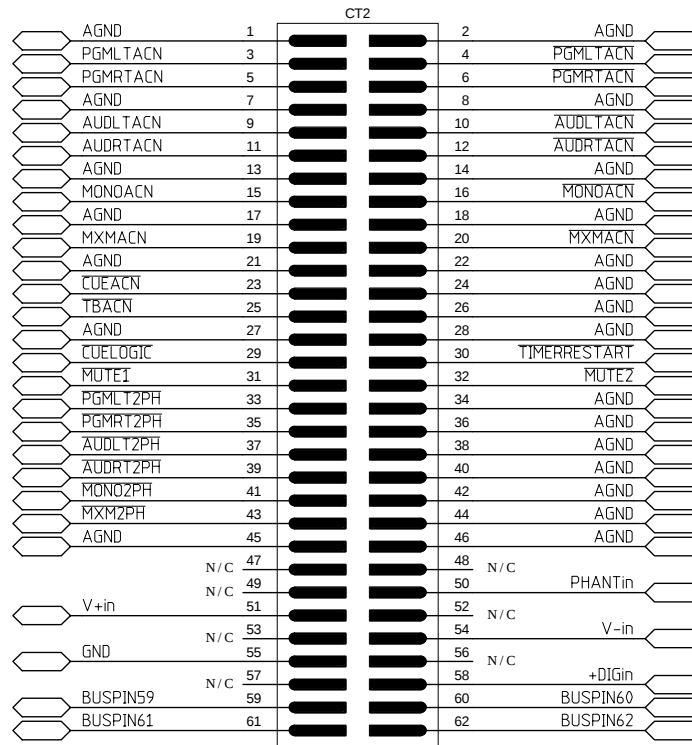


SL-90 Stereo Line Input Module Schematic - Sheet 1 of 3

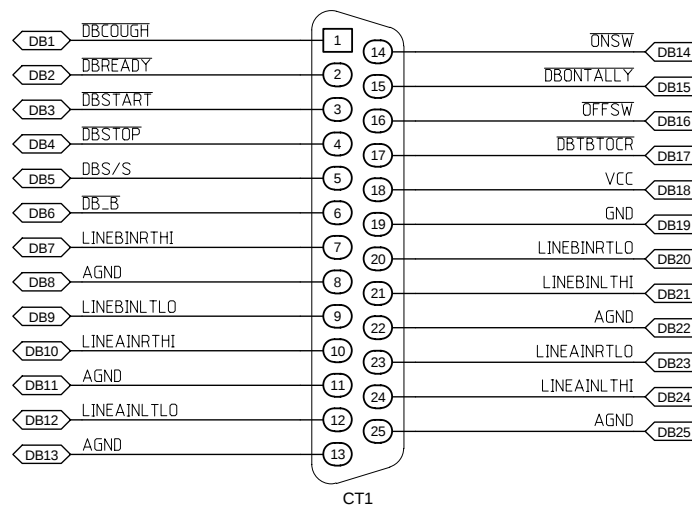


SL-90 Stereo Line Input Module Schematic - Sheet 2 of 3

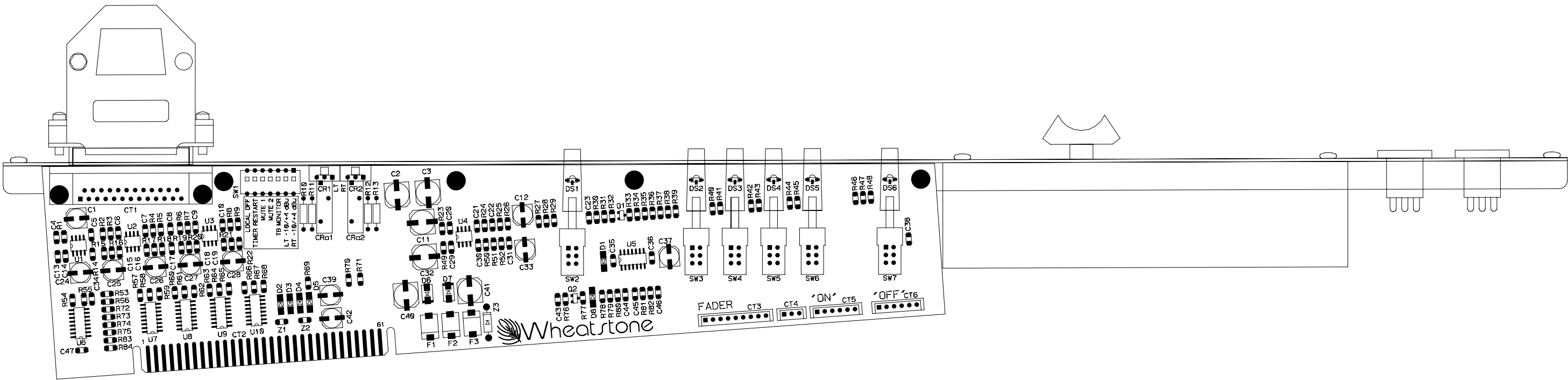
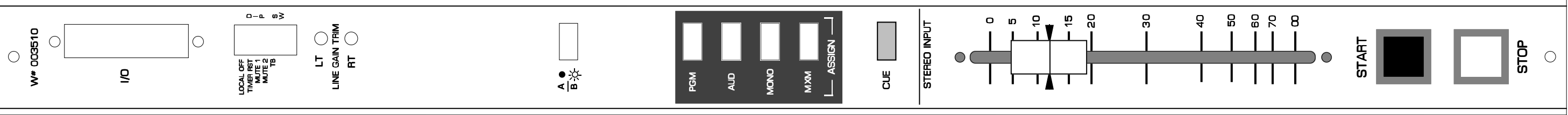
EDGE CONNECTOR BUSS CHART

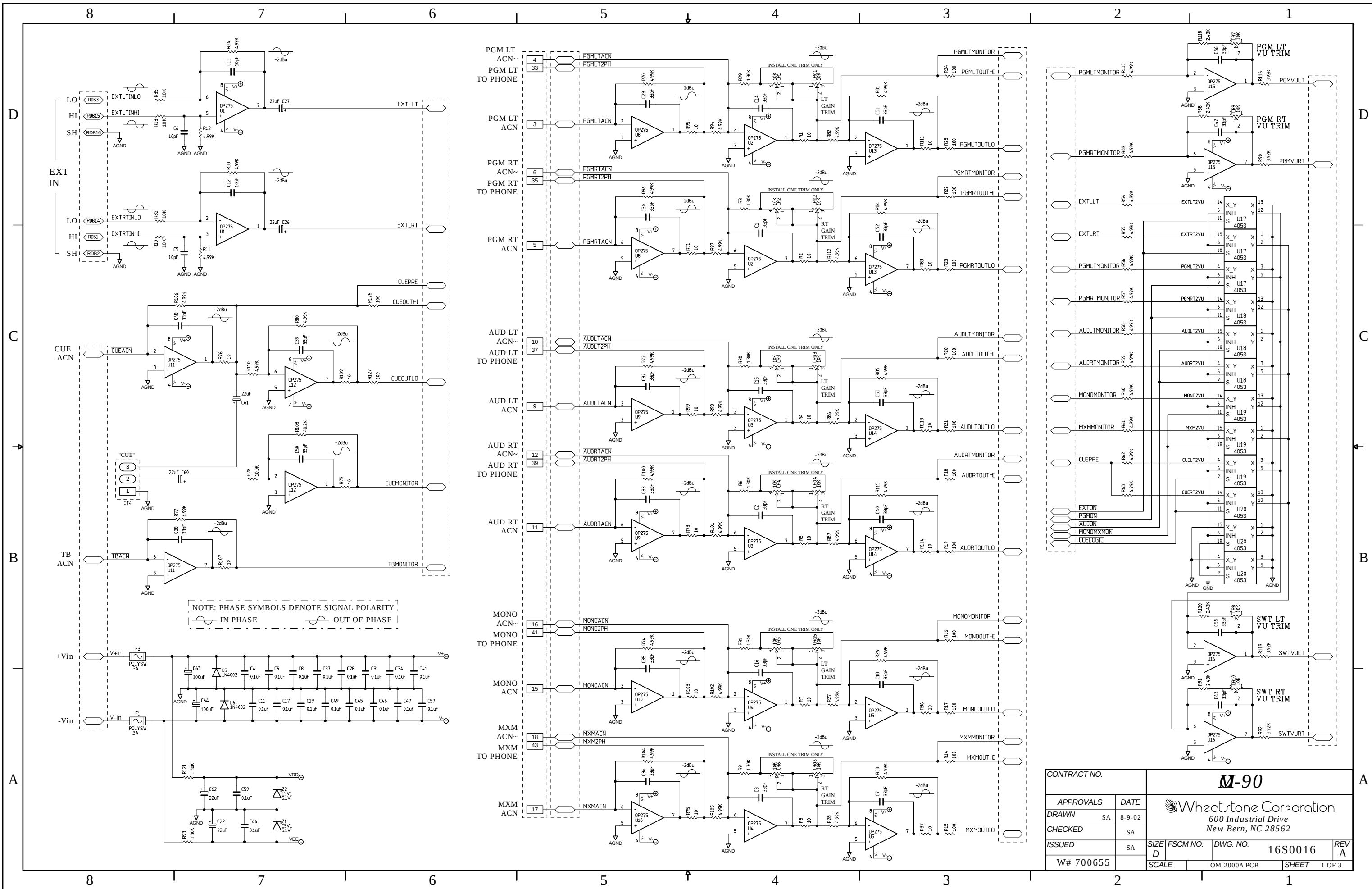


DB-25 CONNECTOR



CONTRACT NO.		SL-90			
APPROVALS		DATE		Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN	SA	8-12-02			
CHECKED	SA				
ISSUED	SA				
W# 700656		SIZE	FSCM NO.	DWG. NO.	REV
		B		16S0019	-
		SCALE	SL-2000 PCB		SHEET 3 OF 3





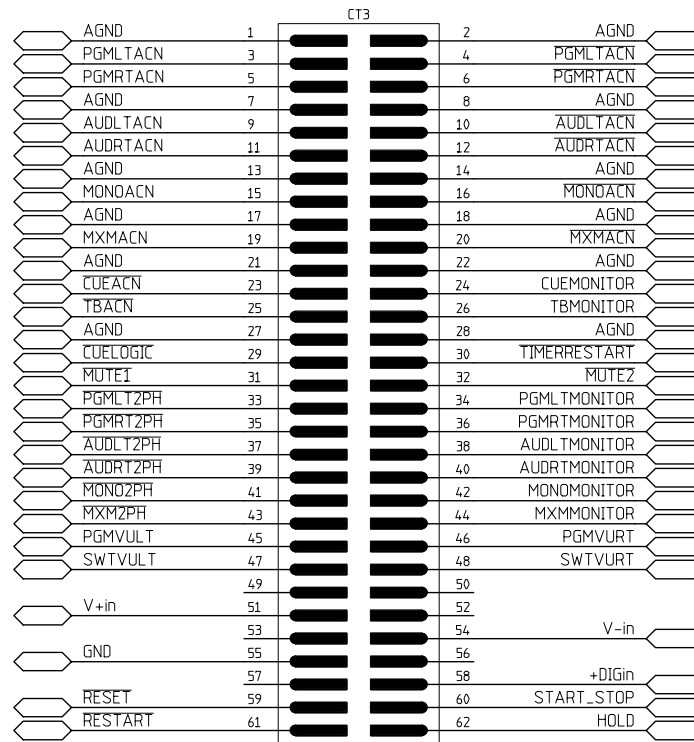
OM-90 Output Module Schematic - Sheet 1 of 3

2

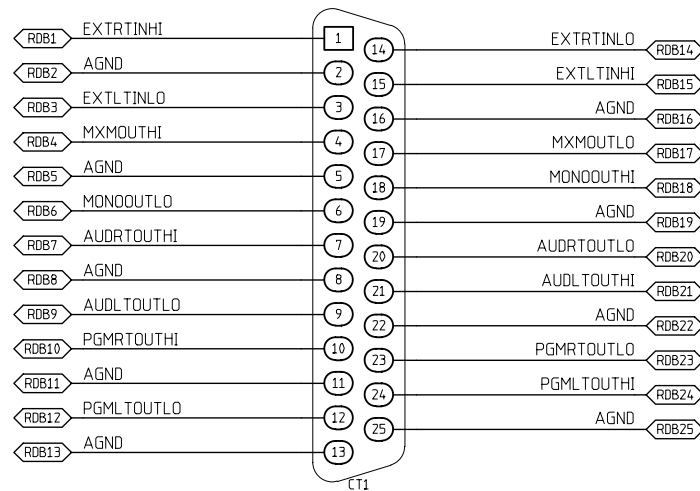


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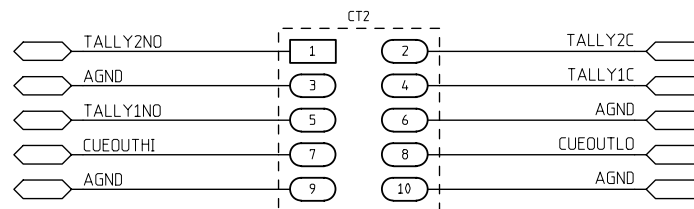
EDGE CONNECTOR BUSS CHART



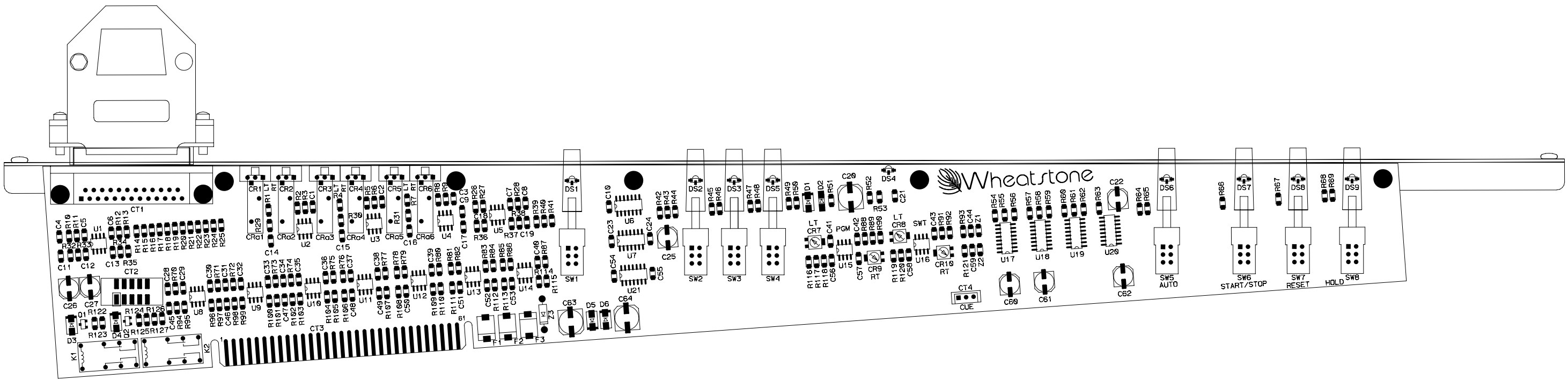
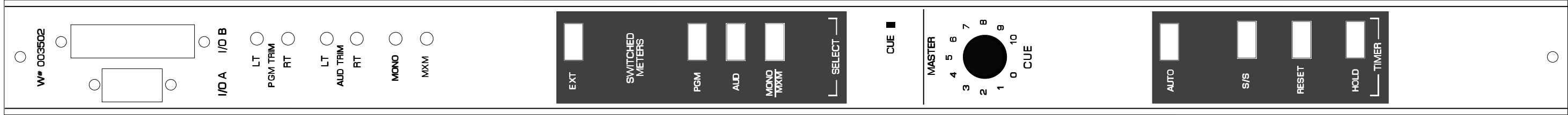
RIGHT DB-25 CONNECTOR

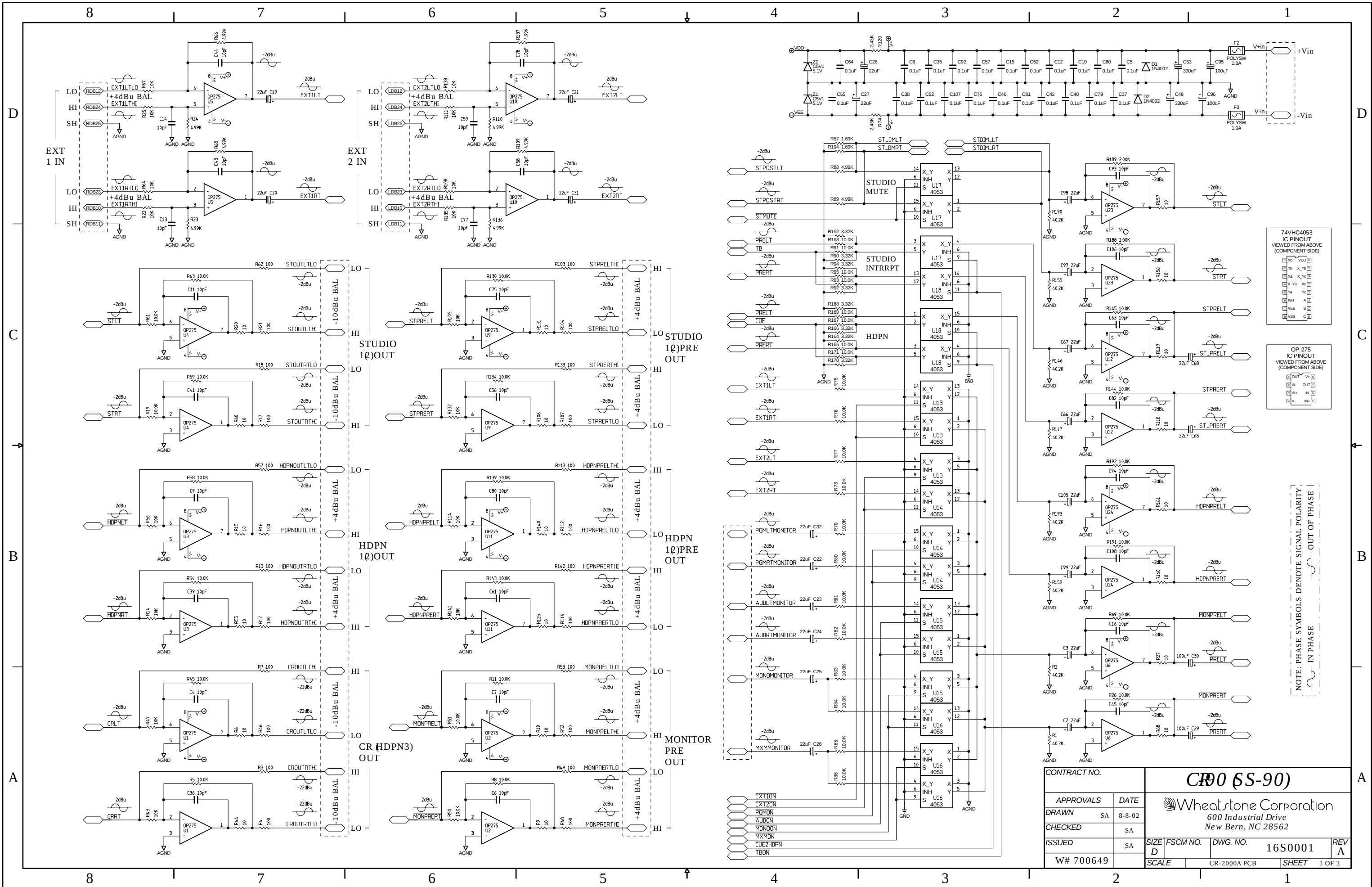


TO LEFT DB-9 CONNECTOR

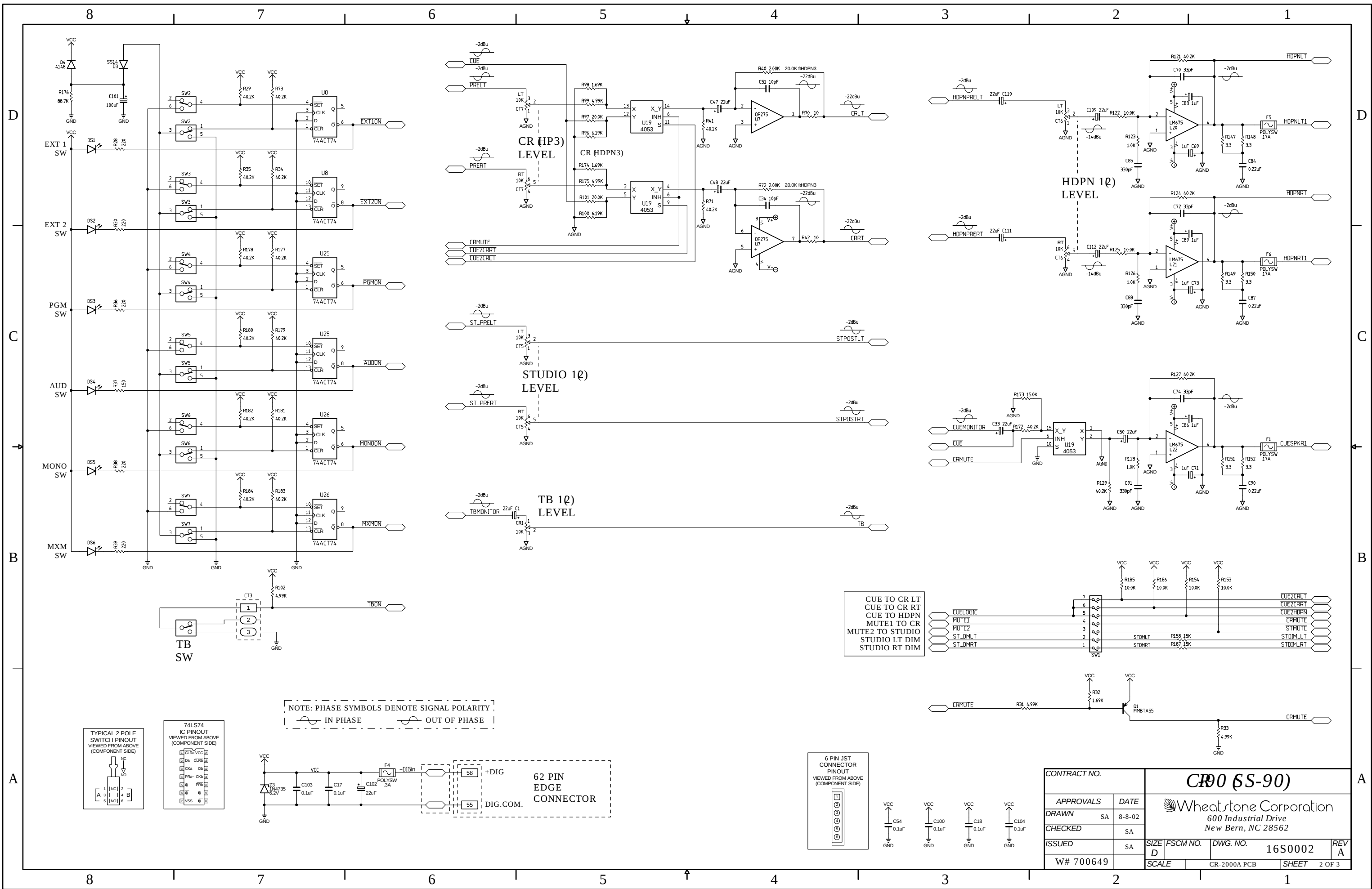


CONTRACT NO.		M-90			
APPROVALS		DATE		Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA		8-9-02			
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ISSUED		SA			
W# 700655		SIZE B	FSCM NO.	DWG. NO. 16S0008	REV A
		SCALE	OM-2000A PCB	SHEET	3 OF 3



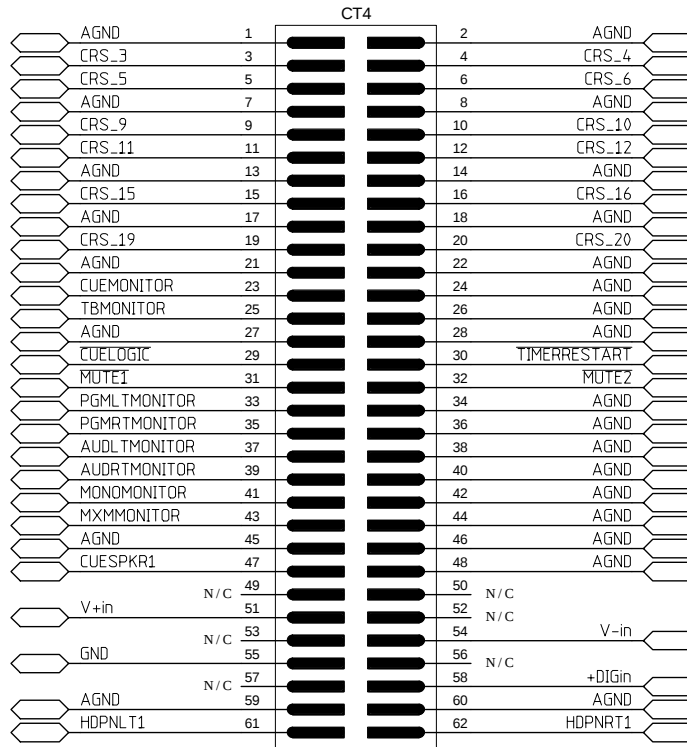


CR-90 (S-90) Control Room (Second Studio) Module Schematic - Sheet 1 of 3

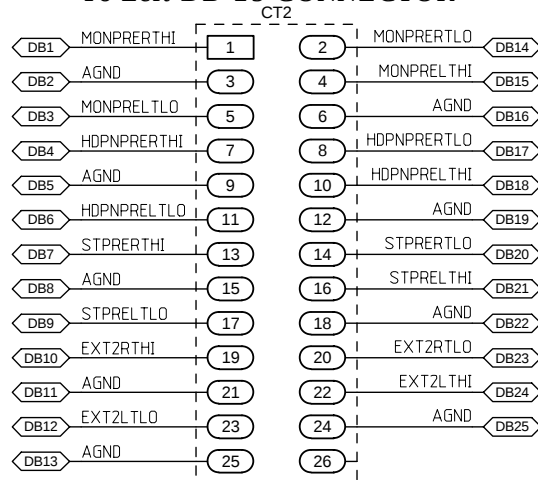


CR-90 (S-90)Control Room (Second Studio)Module Schematic - Sheet 2 of 3

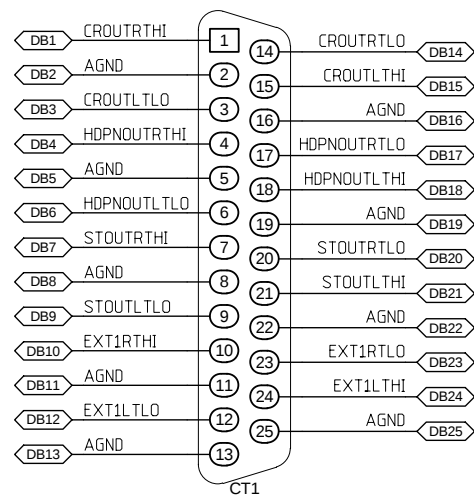
EDGE CONNECTOR BUSS CHART



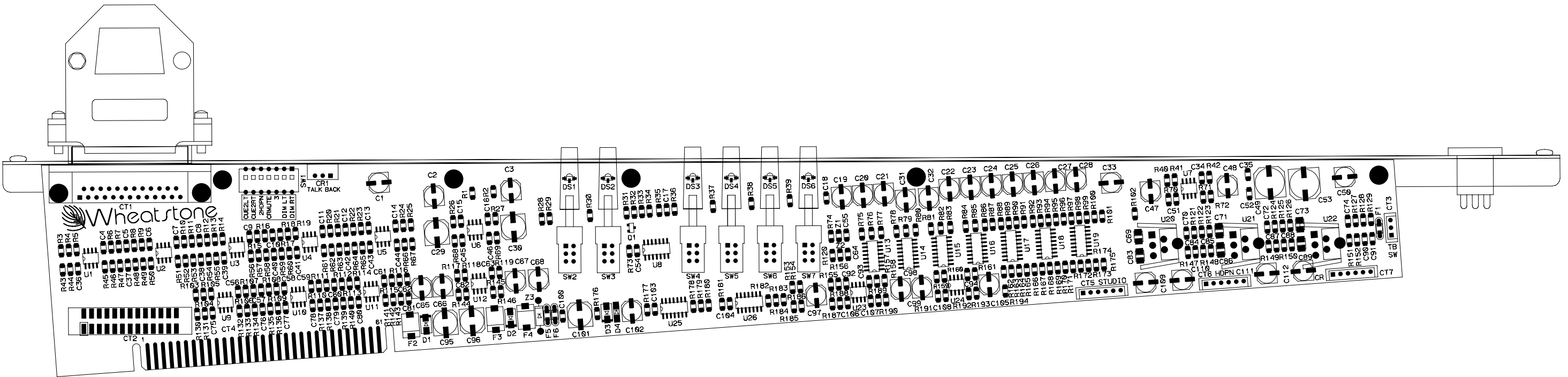
To Left DB-25 CONNECTOR



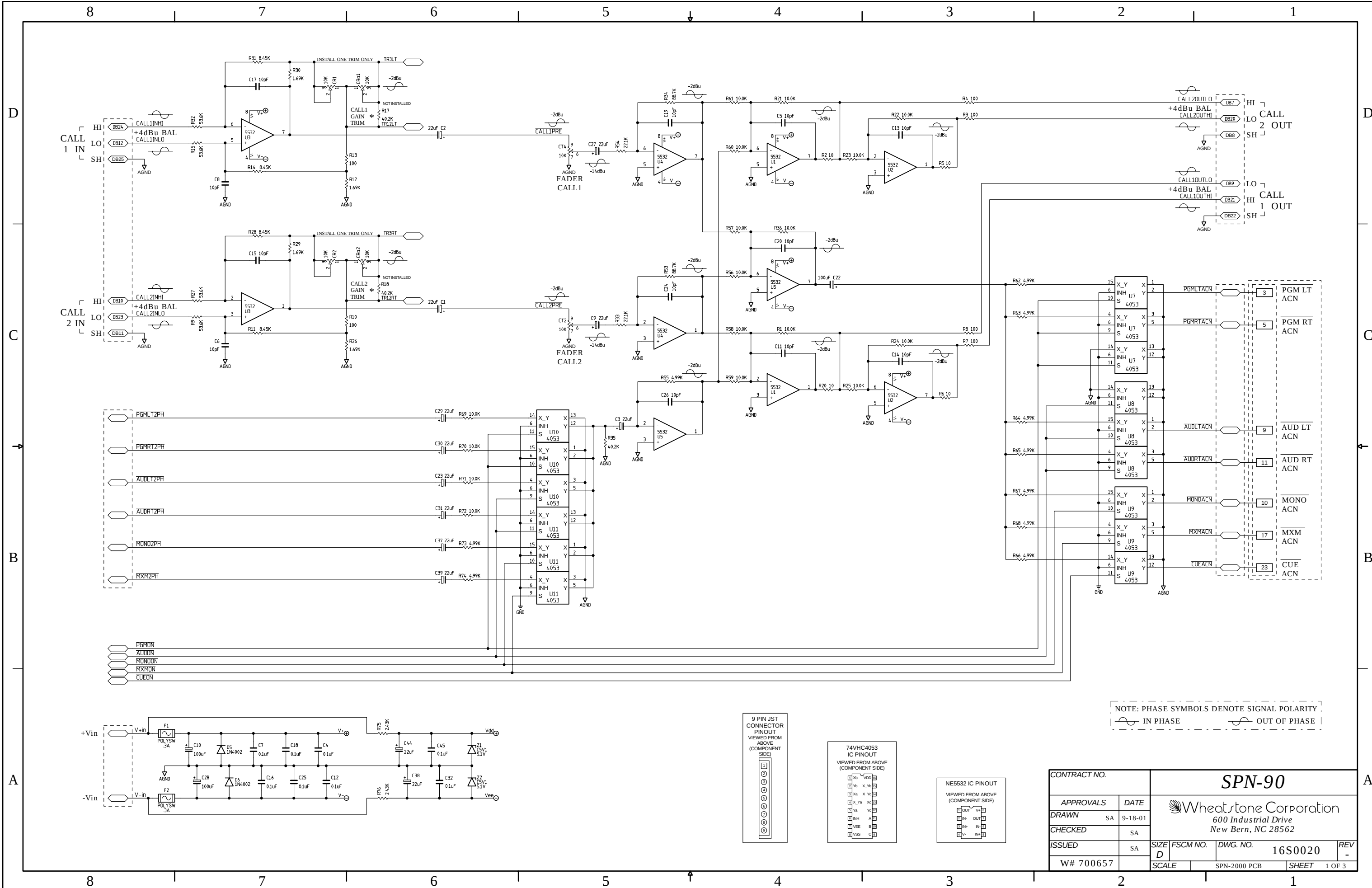
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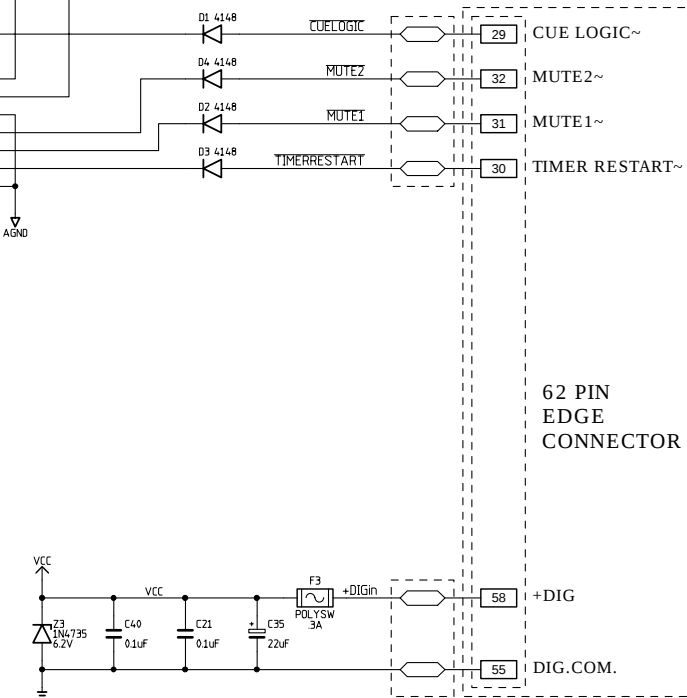
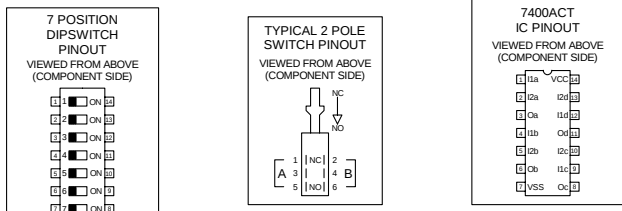
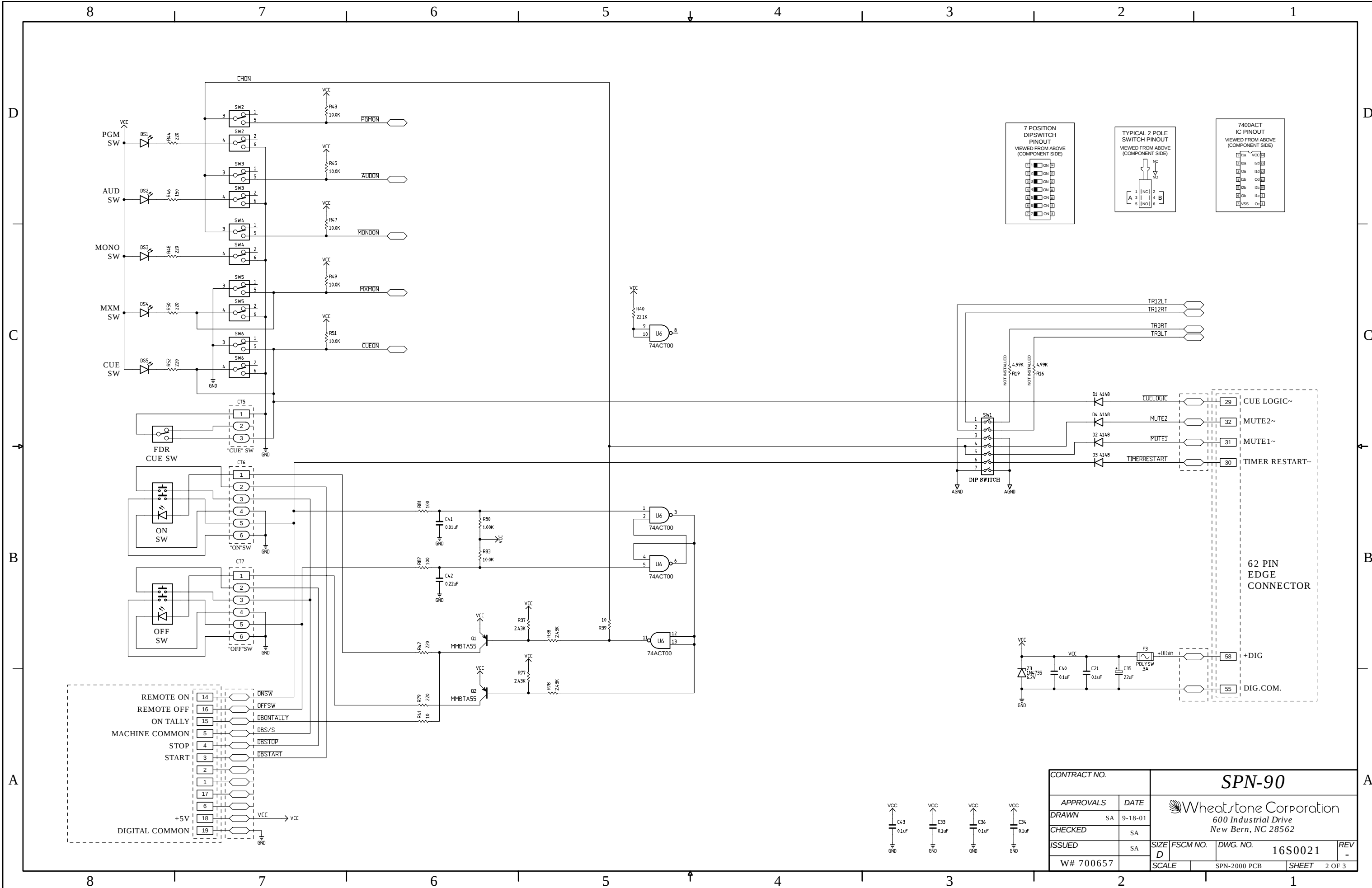
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APPROVALS		DATE		 Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN	SA	8-8-02			
CHECKED	SA				
ISSUED	SA	SIZE	FSCM NO.	DWG. NO.	REV
W# 700649		B		16S0013	-
SCALE		CR-2000A PCB		SHEET 3 OF 3	



W# 003515 I/O A I/O B CR QUE LT CR QUE RT HDPN3 QUE HDPN3 MUTE ST2 DIM LT ST2 DIM RT TB GAIN TRIM	EXT1 EXT 2 PGM AUD MONO MXM SELECT	CR / STUDIO	1 2 3 4 5 6 7 8 9 10 0 STUDIO	1 2 3 4 5 6 7 8 9 10 0 HDPN	1 2 3 4 5 6 7 8 9 10 0 CR	TB
W# 003516 I/O A I/O B HDPN3 QUE LT HDPN3 QUE RT HDPN3 QUE HDPN3 MUTE ST2 DIM LT ST2 DIM RT TB2 GAIN TRIM	EXT1 EXT2 PGM AUD MONO MXM SELECT	STUDIO TWO	1 2 3 4 5 6 7 8 9 10 0 STUDIO 2	1 2 3 4 5 6 7 8 9 10 0 HDPN 2	1 2 3 4 5 6 7 8 9 10 0 HDPN 3	TB2

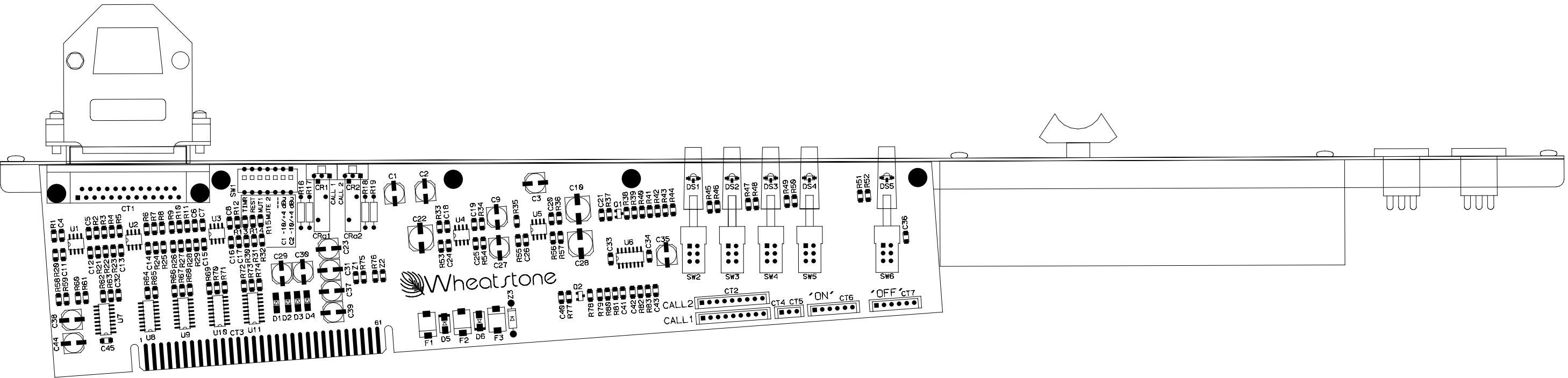
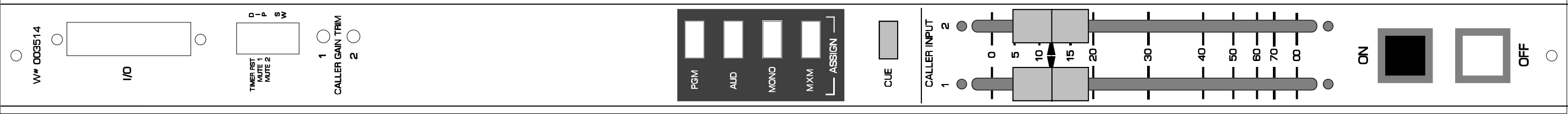


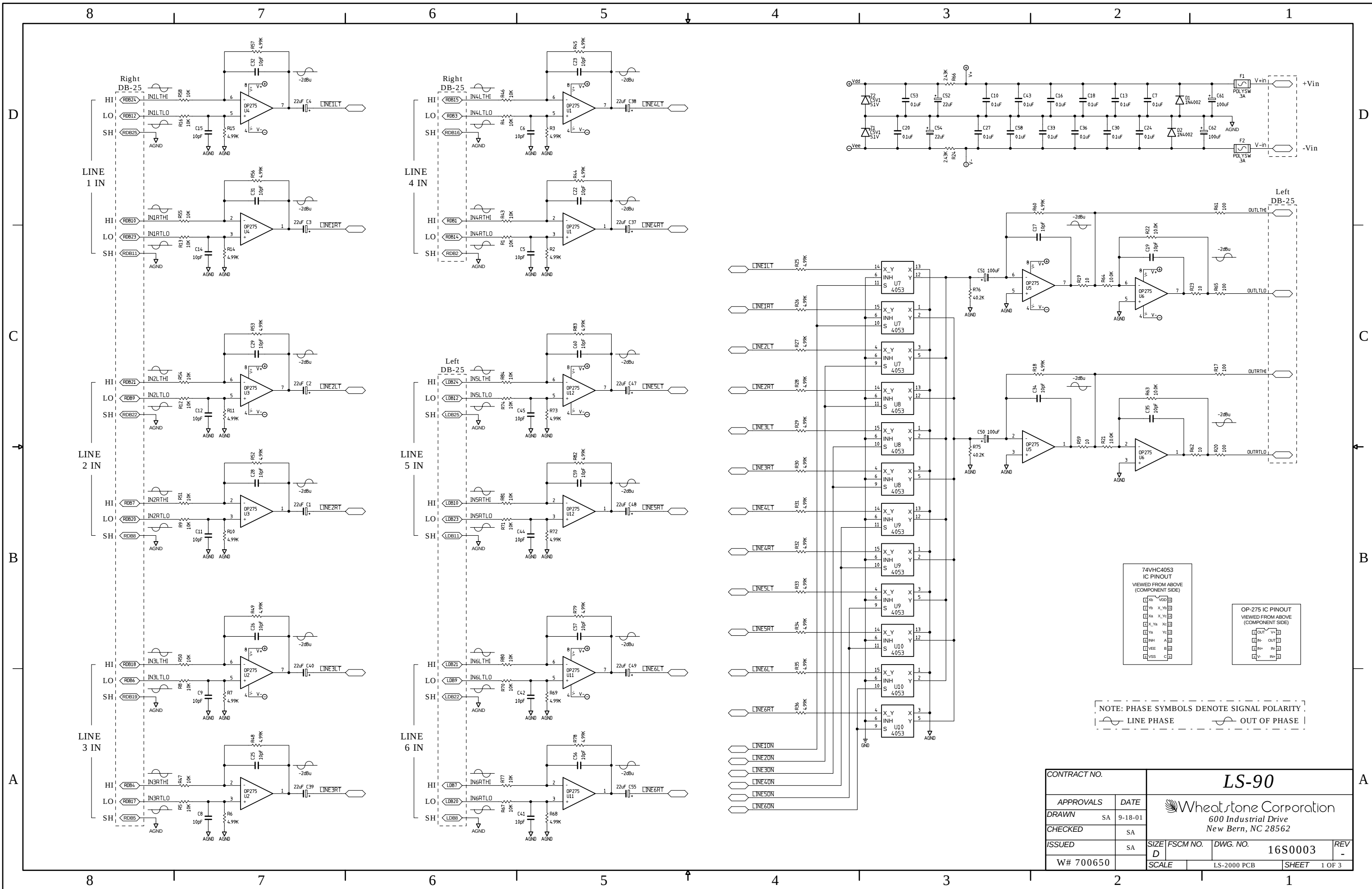
SPN-90 Super Phone Module Schematic - Sheet 1 of 3



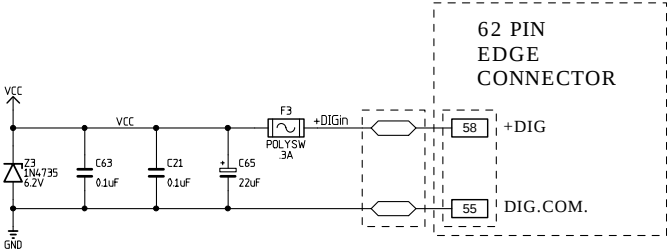
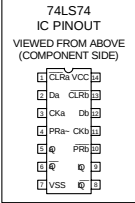
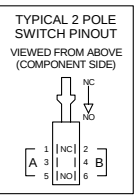
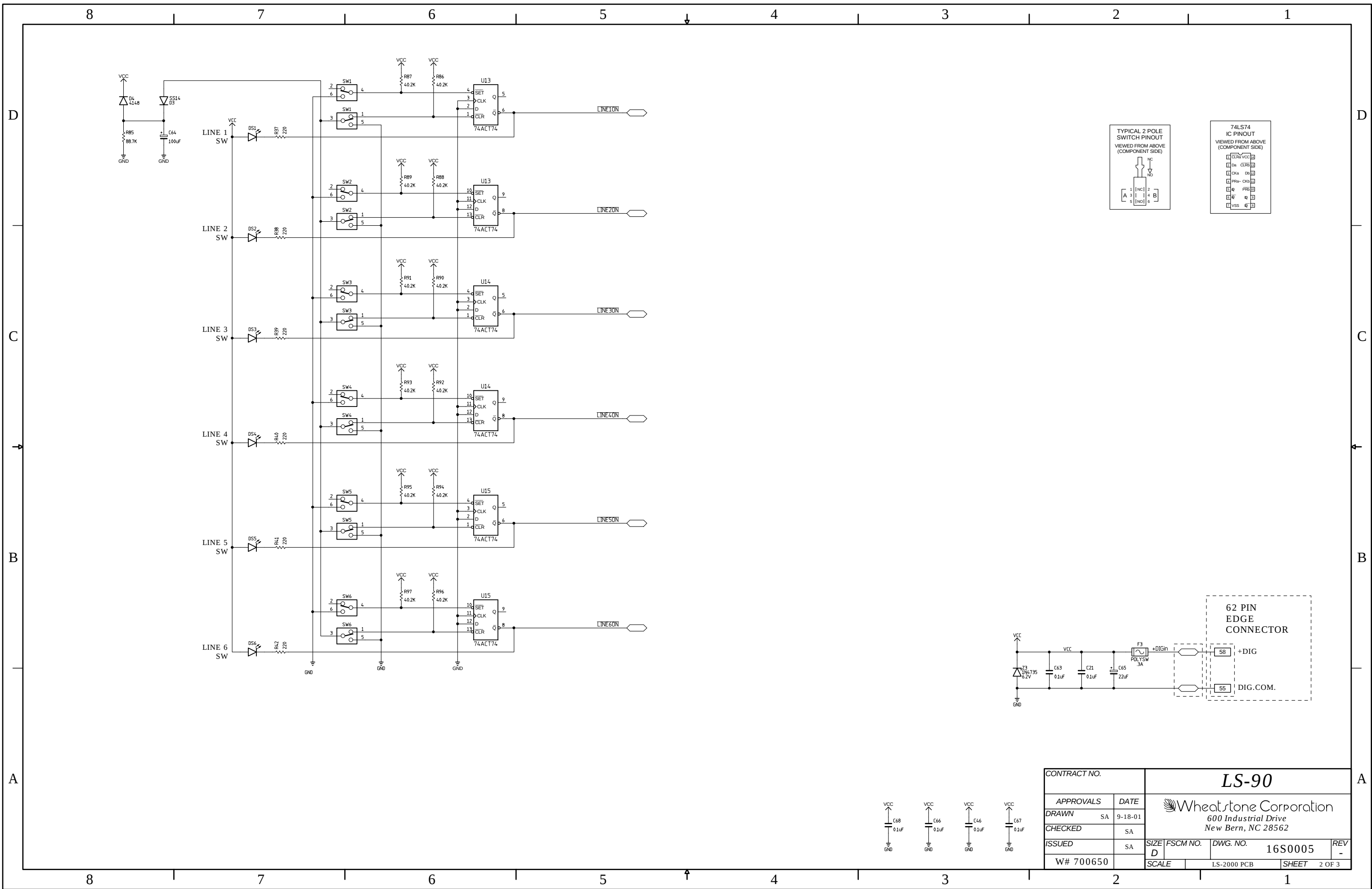
CONTRACT NO.		SPN-90			
APPROVALS	DATE	 Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562			
DRAWN	SA 9-18-01				
CHECKED	SA	SIZE	FSCM NO.	DWG. NO.	REV
ISSUED	SA	D		16S0021	-
W# 700657		SCALE	SPN-2000 PCB	SHEET	2 OF 3

SPN-90 Super Phone Module Schematic - Sheet 2 of 3





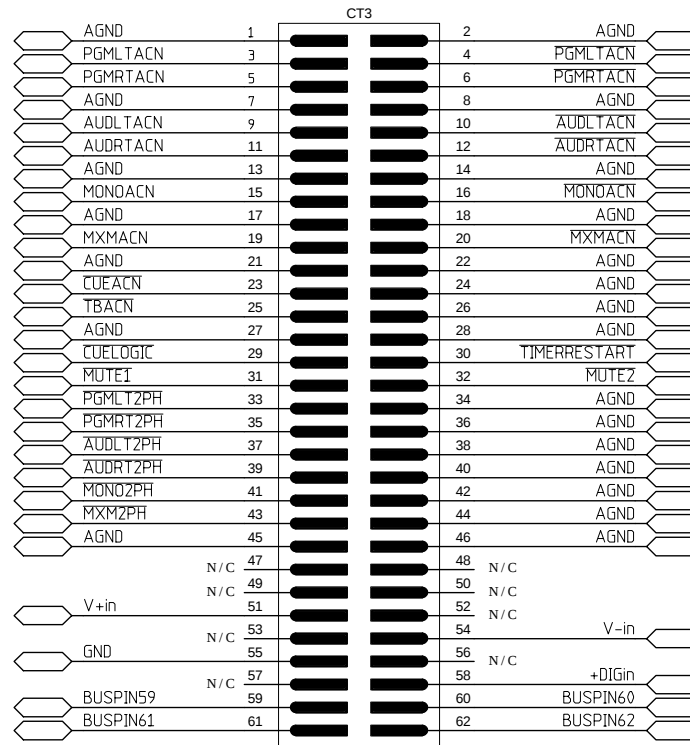
LS-90 Line Select Module Schematic - Sheet 1 of 3



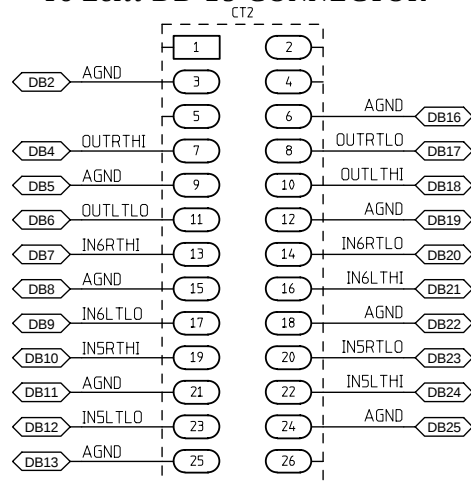
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APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	9-18-01		
CHECKED	SA		
ISSUED	SA	SIZE D	FSCM NO.
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SCALE		LS-2000 PCB	SHEET 2 OF 3

LS-90 Line Select Module Schematic - Sheet 2 of 3

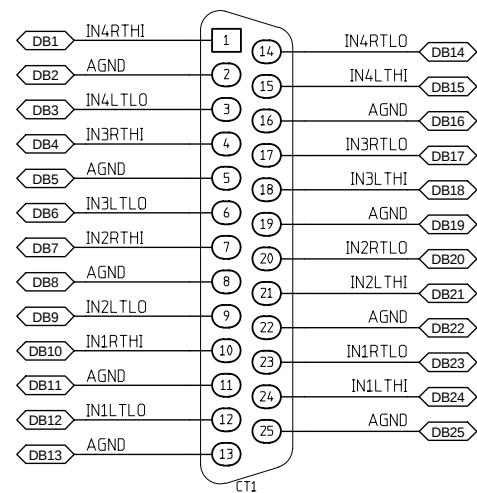
EDGE CONNECTOR BUSS CHART



To Leftt DB-25 CONNECTOR



Right DB-25 CONNECTOR



CONTRACT NO.		LS-90			
APPROVALS		DATE		 600 Industrial Drive New Bern, NC 28562	
DRAWN	SA	9-18-01			
CHECKED	SA				
ISSUED	SA				
W# 700650		SIZE	FSCM NO.	DWG. NO.	REV
		B		16S0011	-
SCALE		LS-2000 PCB		SHEET 3 OF 3	

W# 003507

I/O A

I/O B

SOURCE

1

2

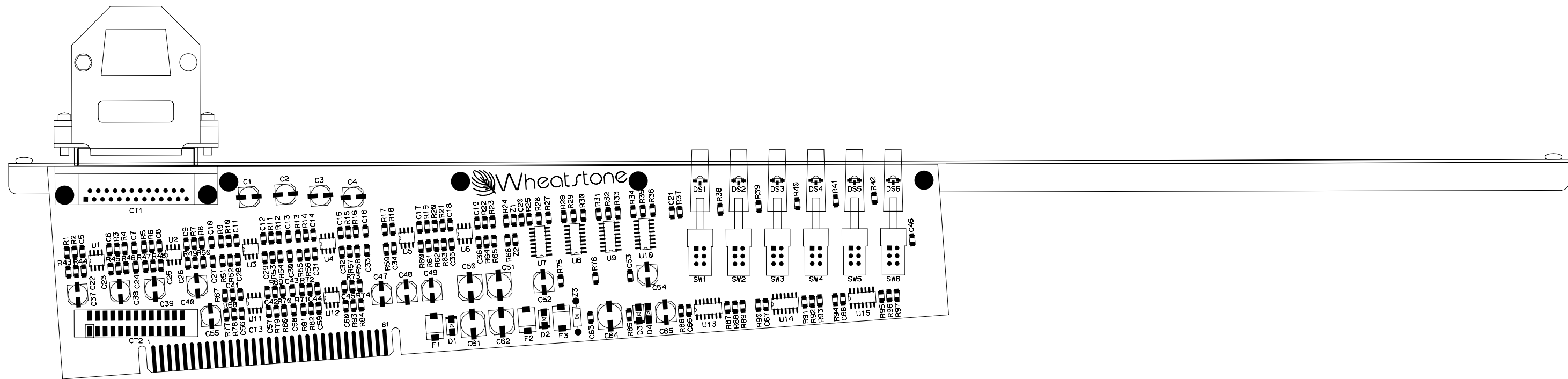
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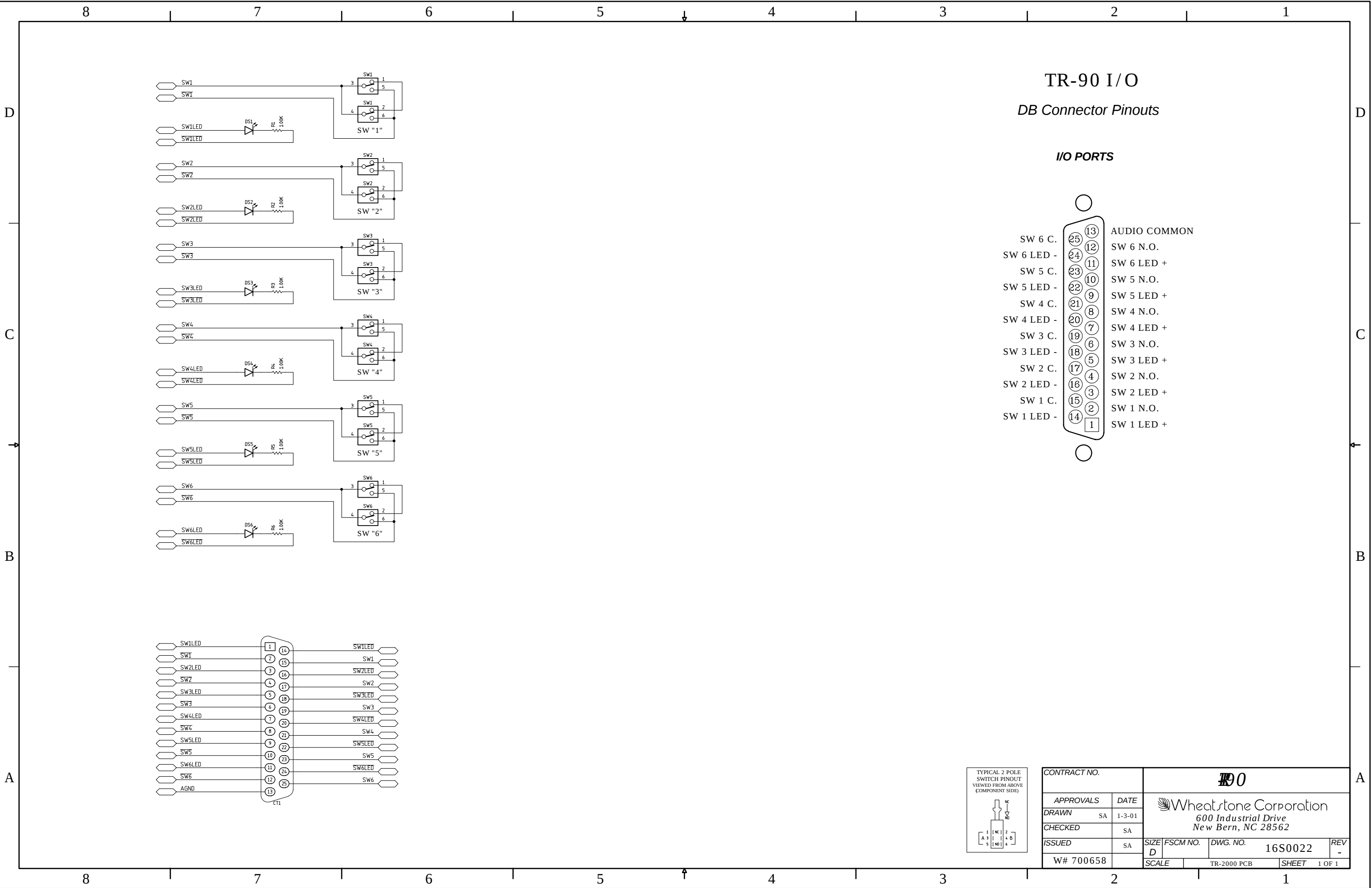
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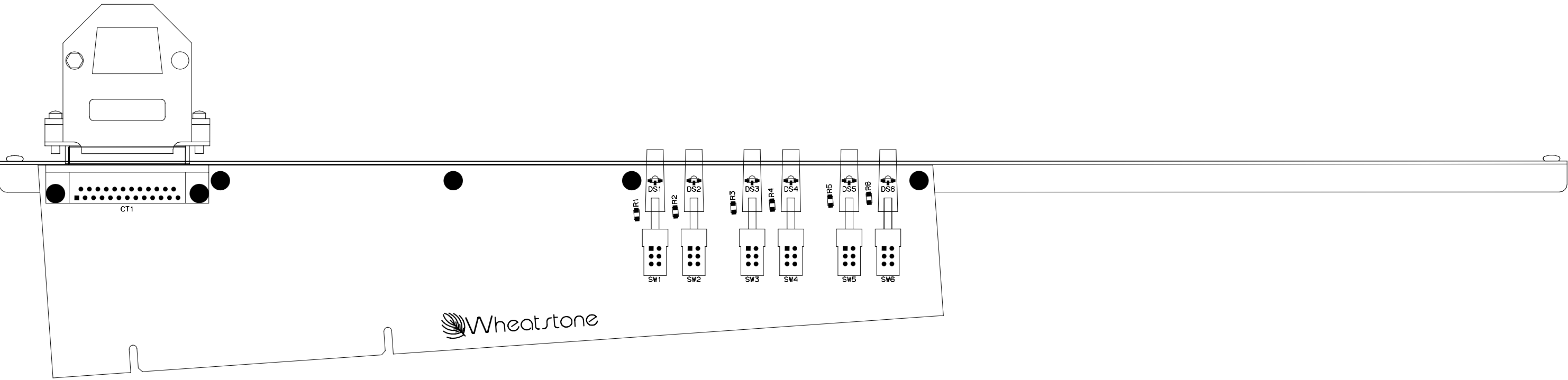
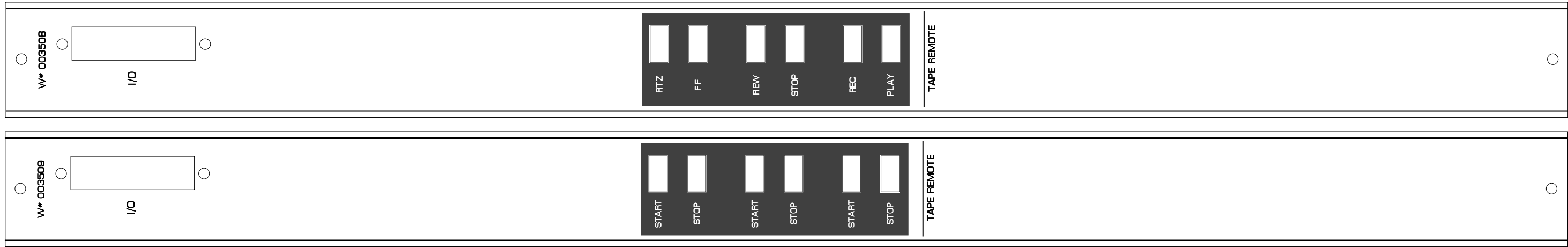
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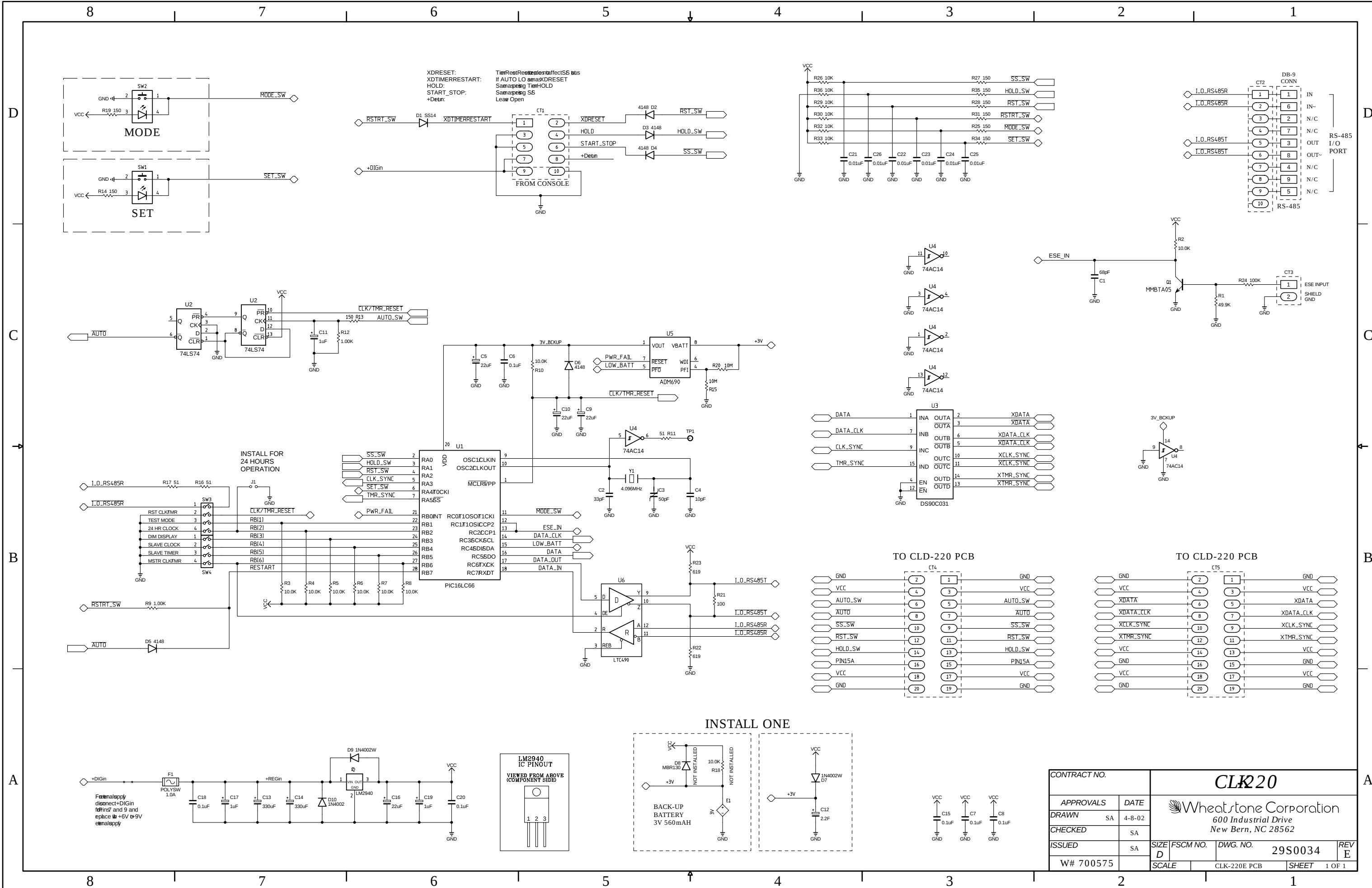
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PRESELECT

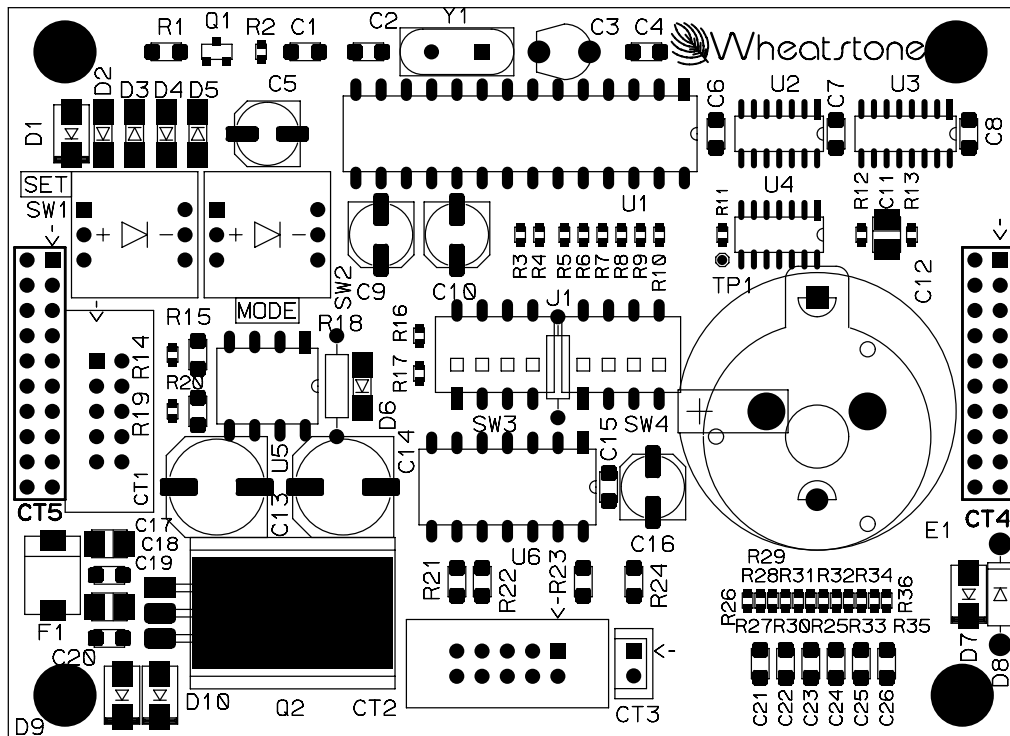




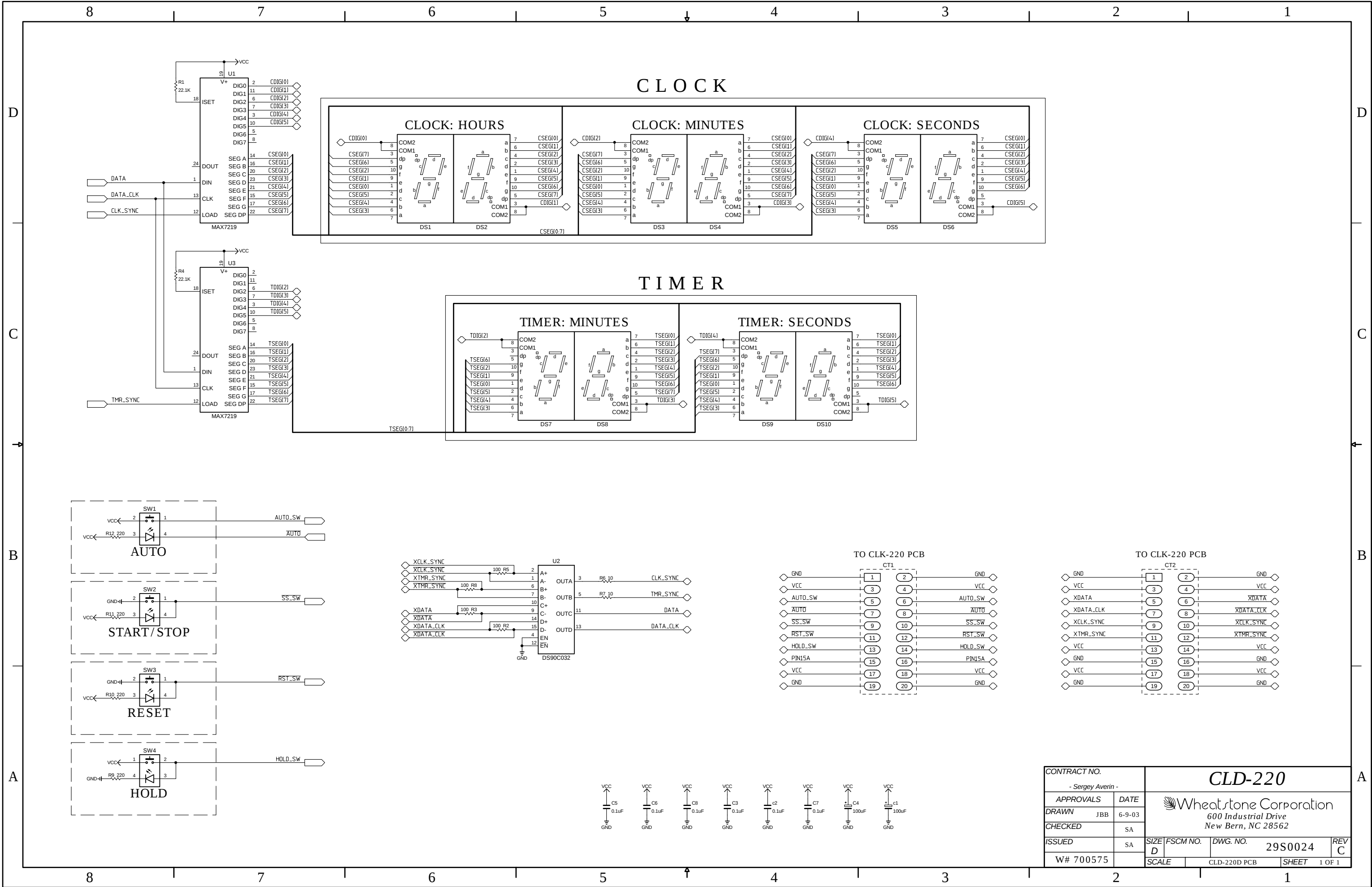




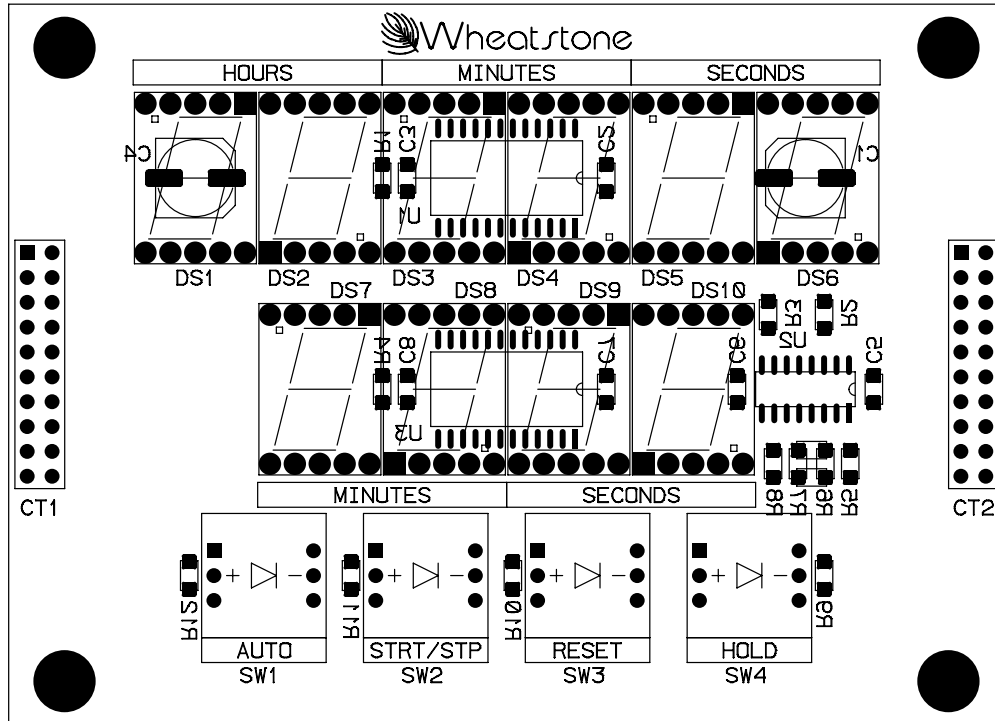
CLK-70 Clock/Timer Schematic - Sheet 1 of 1



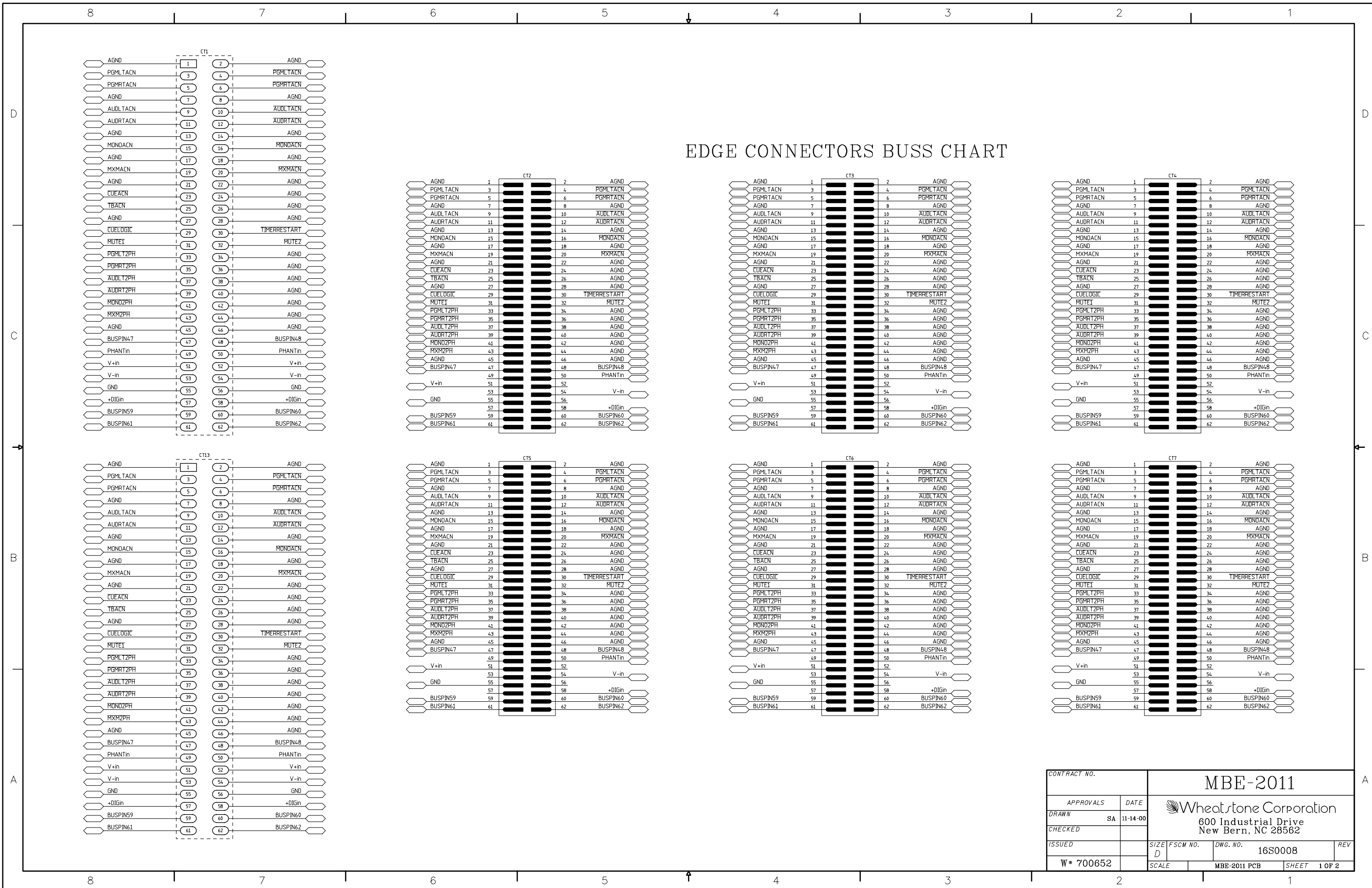
CLK-70 Clock/Timer - Load Sheet



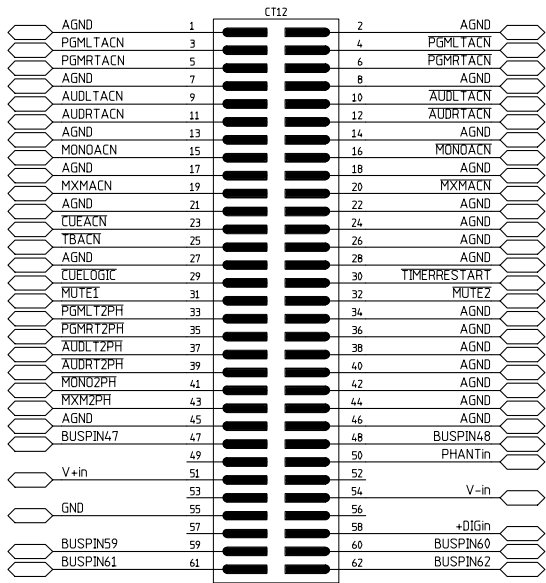
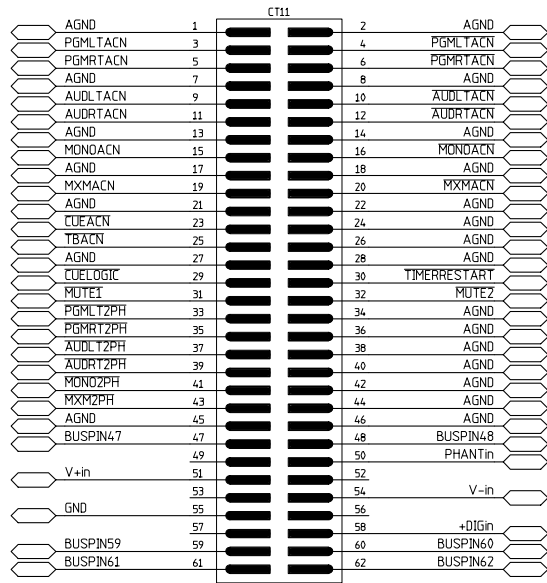
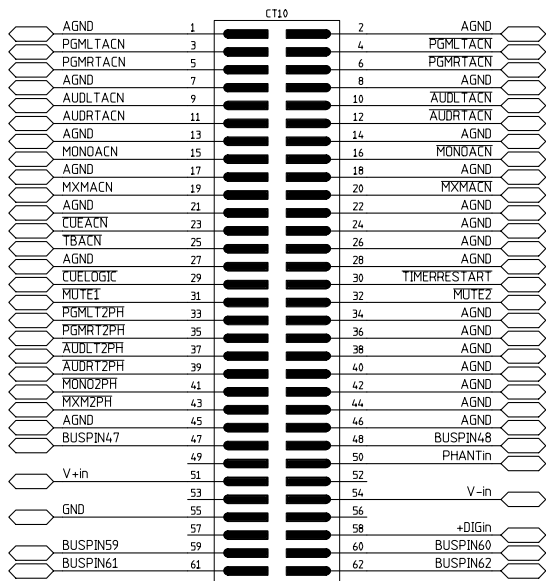
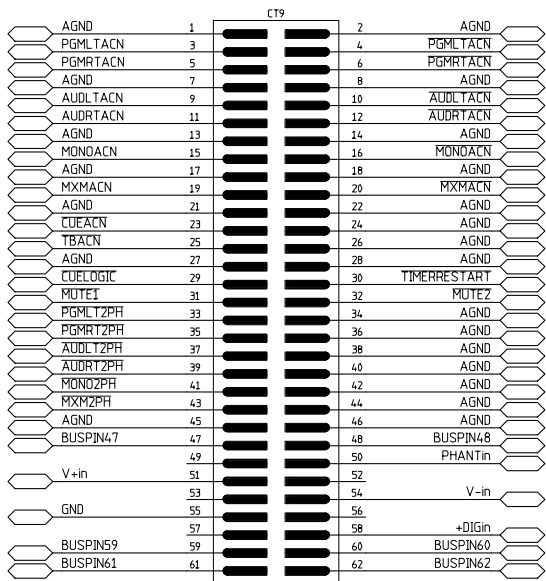
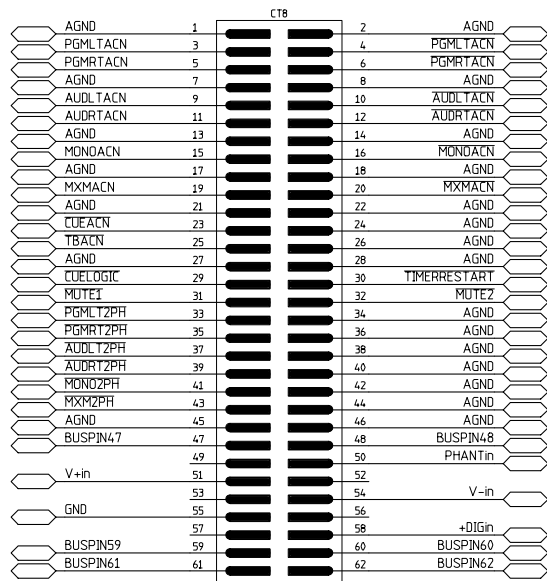
Clock / Timer Display Schematic Sheet 1 of 1



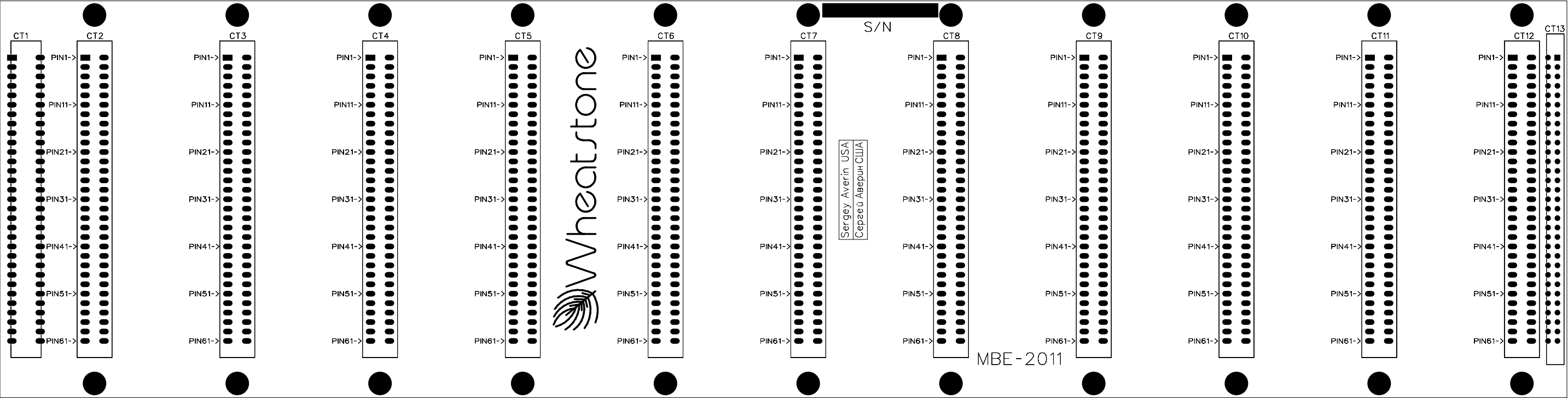
CLD-70 Clock/Timer Display - Load Sheet



EDGE CONNECTORS BUSS CHART



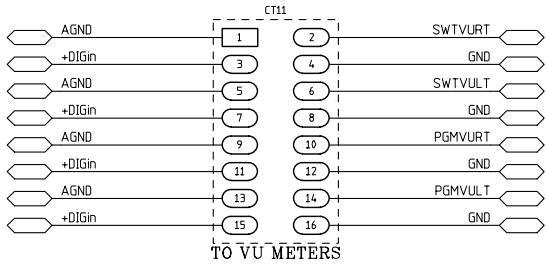
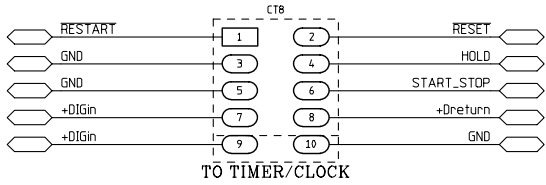
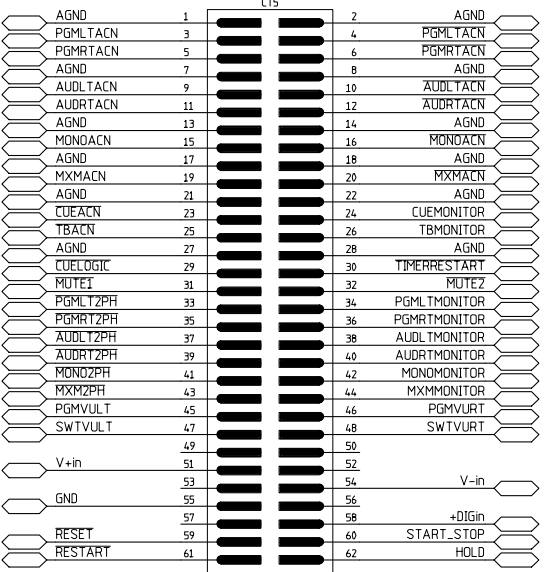
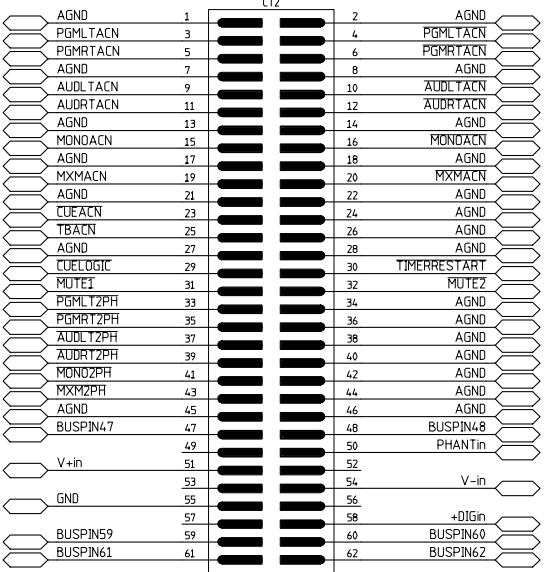
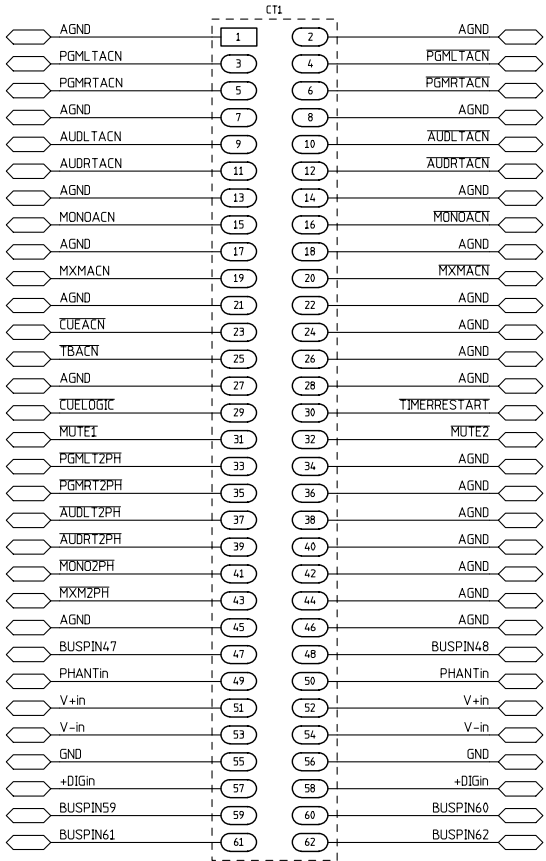
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APPROVALS		DATE	 Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562		
DRAWN	SA	11-14-00			
CHECKED					
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W# 700652			SCALE	MBE-2011 PCB	SHEET 2 OF 2



EDGE CONNECTORS BUSS CHART

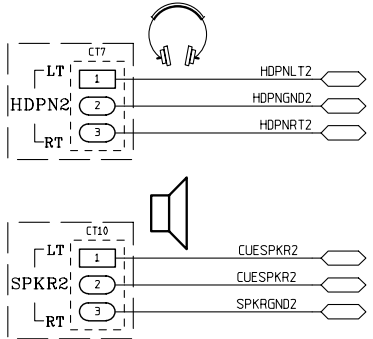
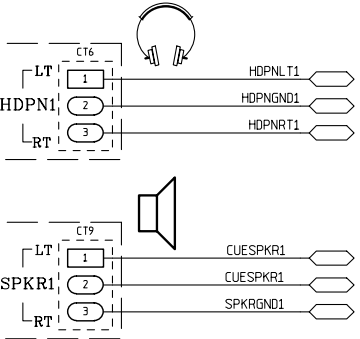
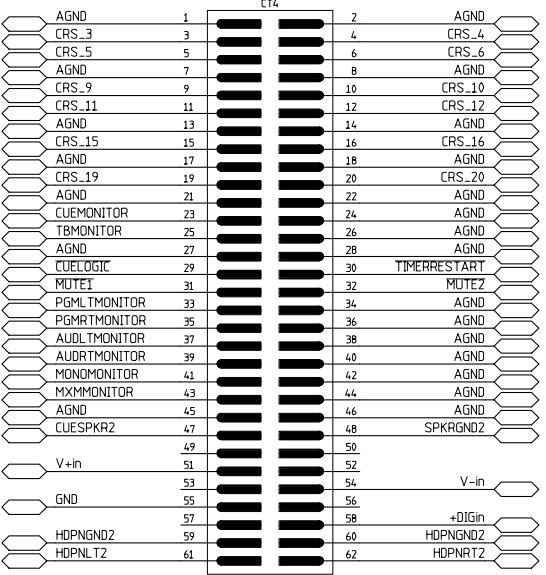
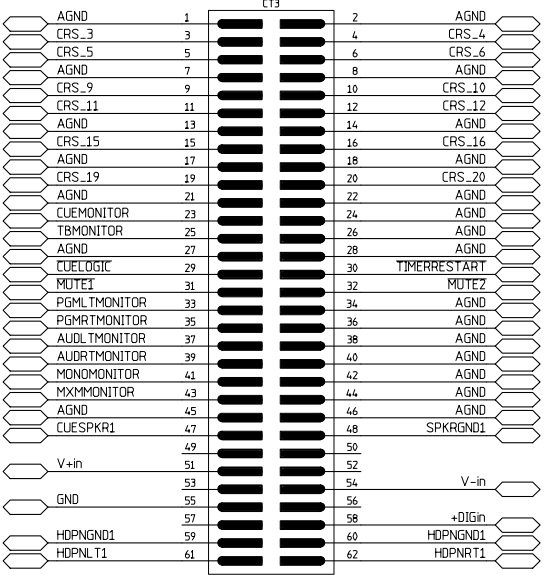
INPUT/SPN MODULE

OUTPUT MODULE

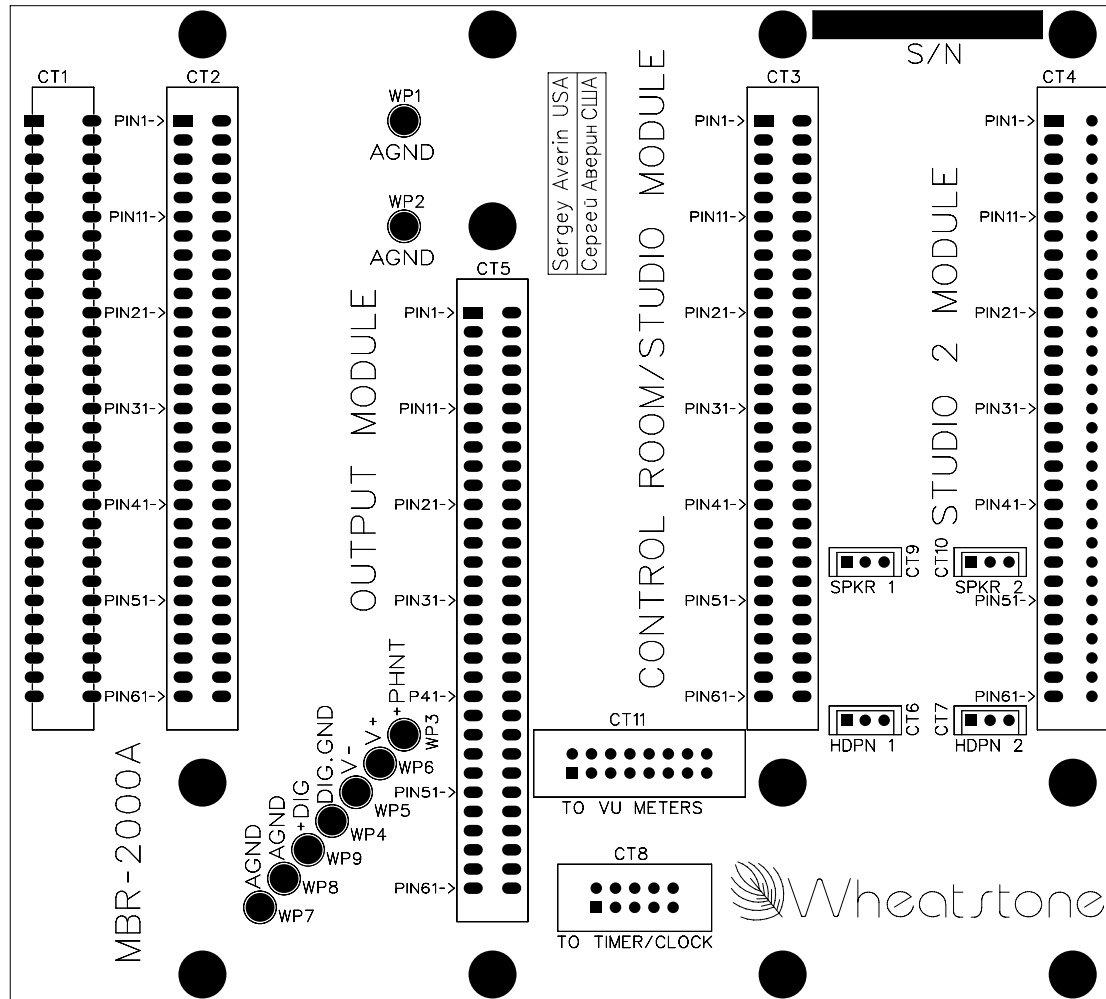


CR MODULE

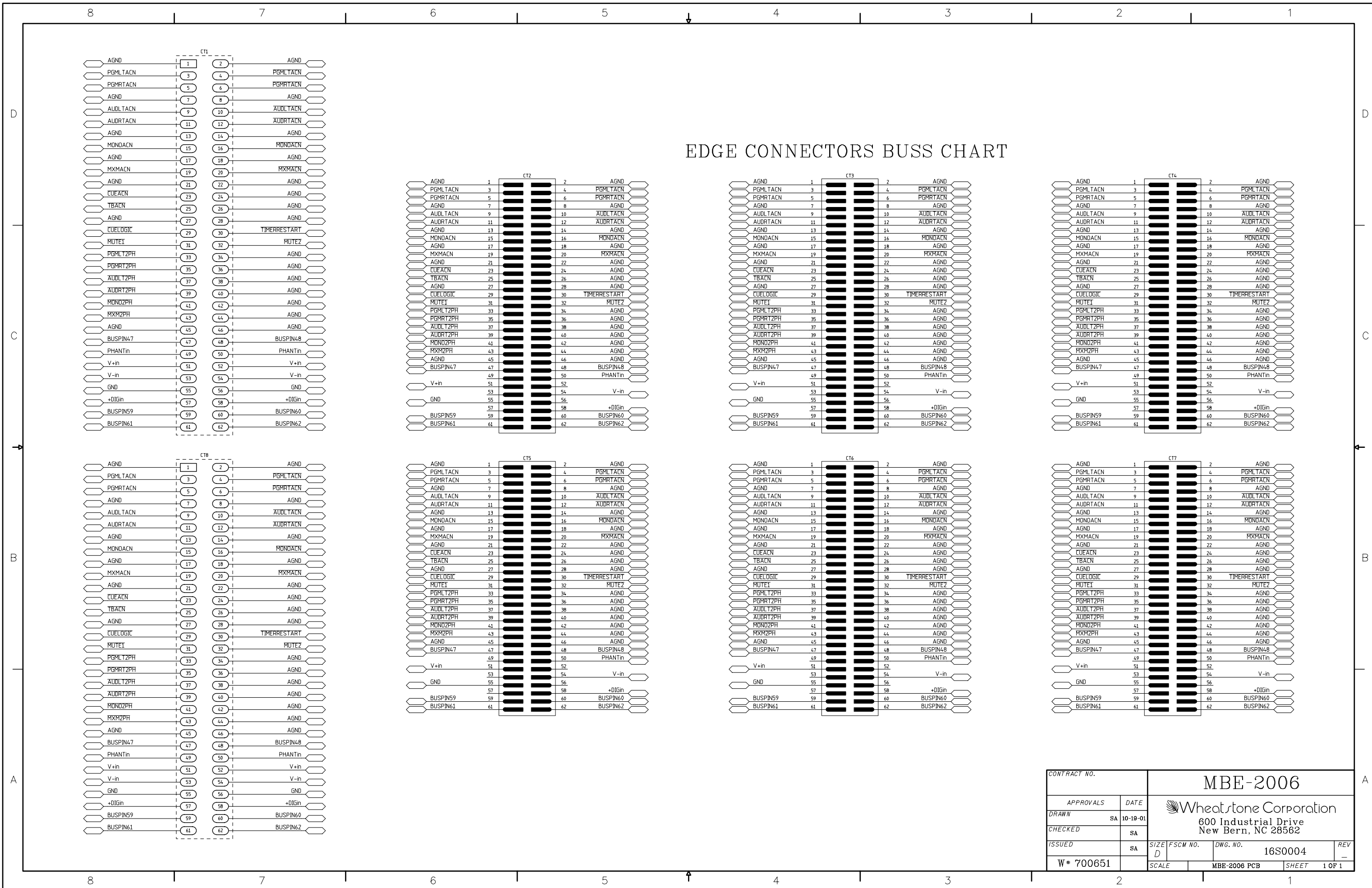
SC2 MODULE

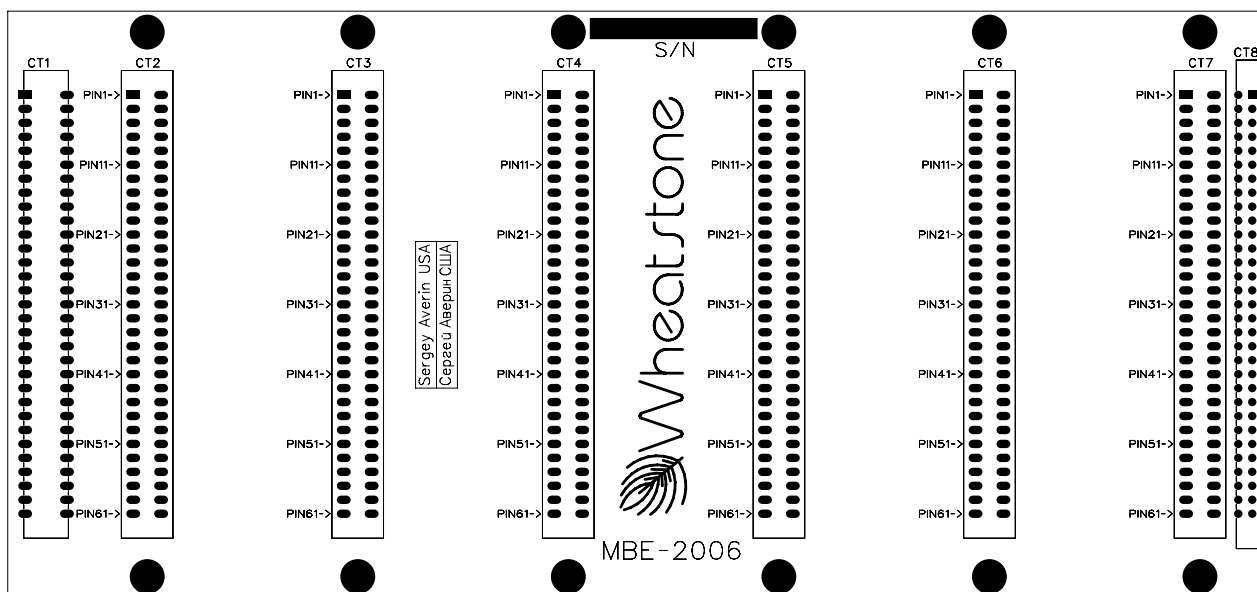


CONTRACT NO.		MBR-2000			
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CHECKED	SA				
ISSUED	SA	SIZE D	FSCM NO.	DWG. NO. 16S0010	REV A
W# 700653		SCALE	MBR-2000A PCB	SHEET	1 OF 1

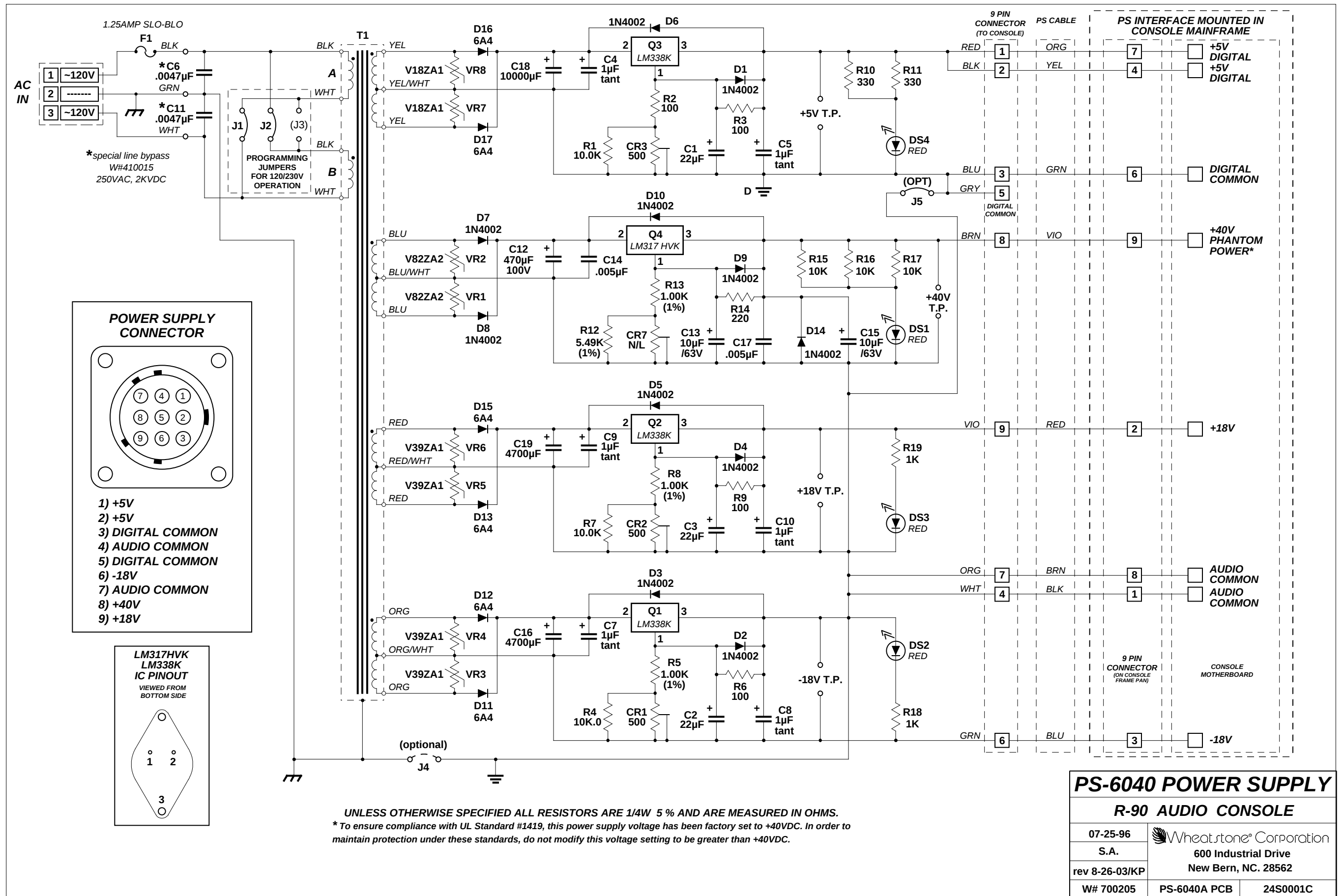


MBR-2000 4 Position Mother Board (Right) - Load Sheet





MBE-2006 6 Position Mother Board (Extender) - Load Sheet



PS-6040 Power Supply Schematic Drawing

