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# **220 Digital Audio Console**

## **TECHNICAL MANUAL**

 **AUDITRONICS**

March 2000

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**220 Digital Audio Console Technical Manual - 1st Edition**

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AUDITRONICS  
600 Industrial Drive  
New Bern, North Carolina 28562  
252-638-7000

\*a division of Wheatstone Corporation

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# Attention!

## **This console contains static sensitive devices:**

Normal precautions against static discharge should be observed when handling individual modules. In particular, modules being packed for shipping for return or repair must be packed in special static protection bags before packaging. Damage caused by static discharge may not be covered under warranty.

## **Replacing Modules in a Powered-up Console:**

While in an emergency situation it is possible to remove and insert modules on a powered-up console, Auditronics does not recommend this procedure. Whenever possible it is best to power down the console first before removing or replacing modules.

However, if you find you must proceed with this operation, then be sure to take the following precaution:



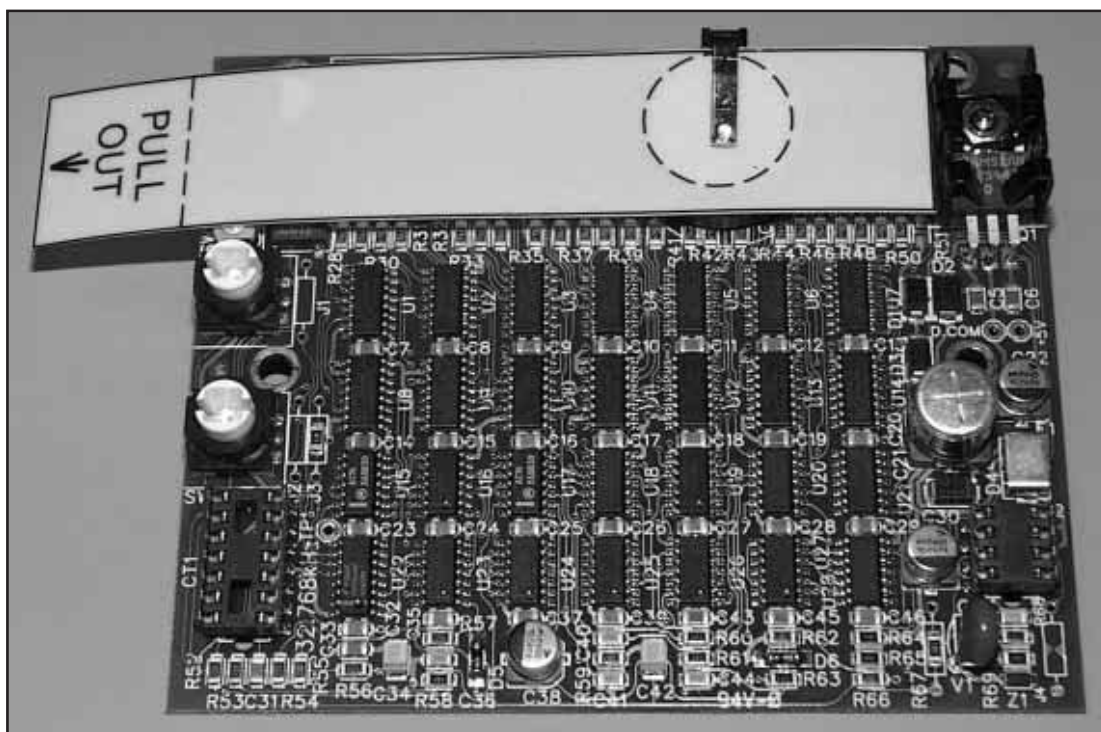
**When re-inserting a module, take care to replugin it squarely into its mainframe connector socket, so all edgecard fingers make contact simultaneously.** In other words, the gold-plated bus connector fingers on the bottom edge of the module's printed circuit board must be inserted squarely (i.e., perpendicular) to the mating socket on the bottom pan of the console mainframe. **The intent is to prevent a situation where one of the module's power pins makes significant contact before the others.** (Naturally, this same precaution must be taken when using extenders.)

If the above instructions are followed the procedure should be routine; if they are not, you could run the risk of damaging the console's logic chips.

Again, to avoid ANY possibility of this damage, whenever possible we strongly recommend powering down the console *before* replacing any modules.

## Console Clock Battery Backup

To activate battery backup of the console's clock simply pull out the yellow strip from the clock display card, that is mounted on the inside of console meterbridge, as shown on the picture below.



Console Clock Display Card

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# Installation and Power

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# Installation and Power

## Countertop Mounting

The 220 digital audio console is designed for countertop drop-in mounting. Console placement should avoid proximity to any electromagnetic fields, such as large power transformers, motors, and fluorescent lighting fixtures. The required cut-out width is 37 1/4" and cut-out front-to-back dimension is 19". The front of the console will extend approximately one inch forward of the cut-out. The console's wooden sidepieces will extend about 7/8" on either side of the cut-out width.

### Clearances

Note the two module extractor tools (black thumbwheel screws) mounted in the front surface of console's lower mainframe pan (just above and to the left of the righthand headphone jack). These must be removed before lowering the console into its cutout!



Once in place the console mainframe pan will extend approximately 5/8 inches below the countertop surface. Note the hinged meterbridge will require 15" above the countertop surface to open freely. When fully open the meterbridge will extend 5 1/2" behind the rear line of the cut-out. When closed, the meterbridge will extend 2 1/4" behind this rear cut-out line and 8 1/8" above the countertop surface.

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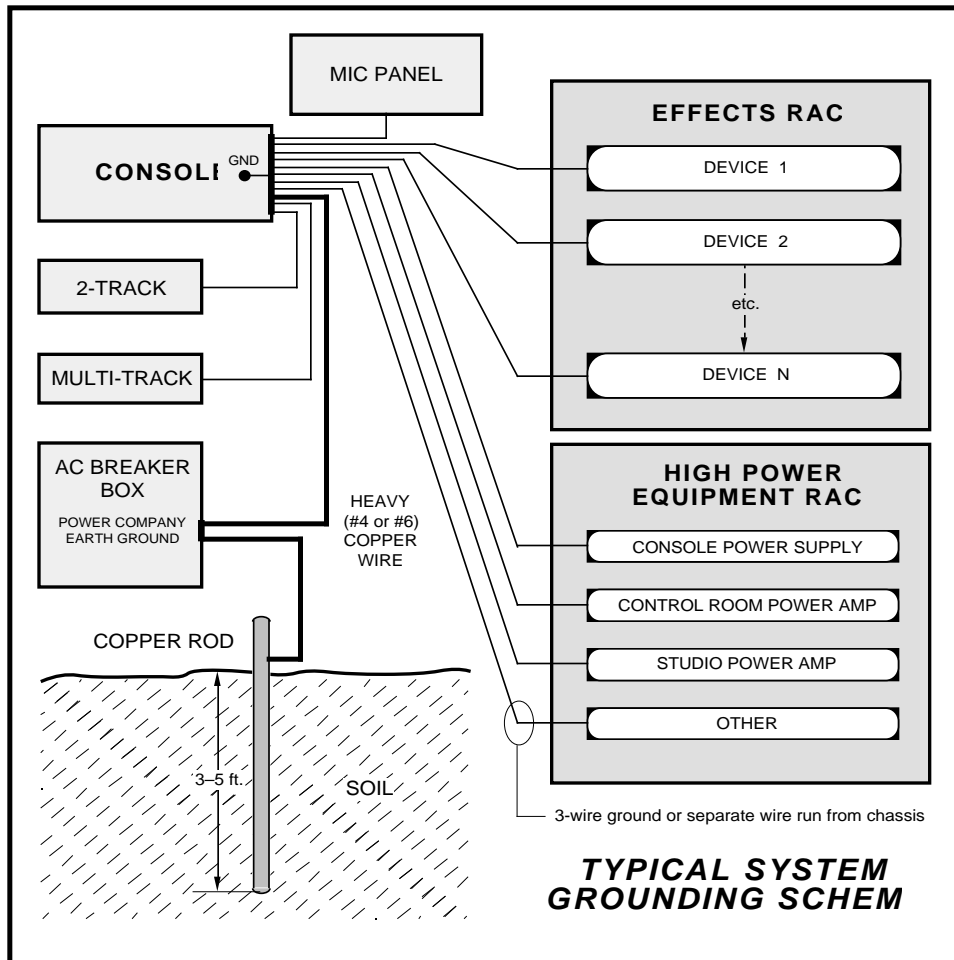
Do not connect the 220 console to its power supply (and do not connect the power supply to the AC power line) until instructed to do so.

---

## 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 220 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



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.

made in the completed installation. Use one of the grounding lugs on the rear of the mainframe to establish your system ground. The grounding lug terminal strip may be found at the rear of the console, along the bottom edge of the mainframe pan directly under the rightmost mainframe slots (to the lower 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).

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

**TIE THE CONSOLE GROUND LUG TERMINAL STRIP TO THE SYSTEM EARTH GROUND. TIE EVERY PIECE OF EQUIPMENT IN THE ENTIRE AUDIO SYSTEM TO THE CONSOLE GROUND LUG TERMINAL STRIP.** If the system earth ground point is inaccessible, tie the console ground terminal strip to the power company earth conductor at the main breaker box (see drawing "Typical Grounding Scheme" 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 terminal strip; the outlets cannot be daisy-chained as is normally encountered in commercial and residential AC systems. Any equipment not supplied with 3-wire AC cables must have individual ground wires (16 gauge or larger) connected to their chassis grounds and then run to the console ground lug terminal strip.

### **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**

The 220 console is powered by a Wheatstone Model PSC-D340 rackmount power supply. This heavy duty unit occupies three 19" wide rack spaces (total height 5-1/4"). Convection cooled, it requires ample ventilation space above and below it. Do not mount heat generating devices in the same rack cabinet.

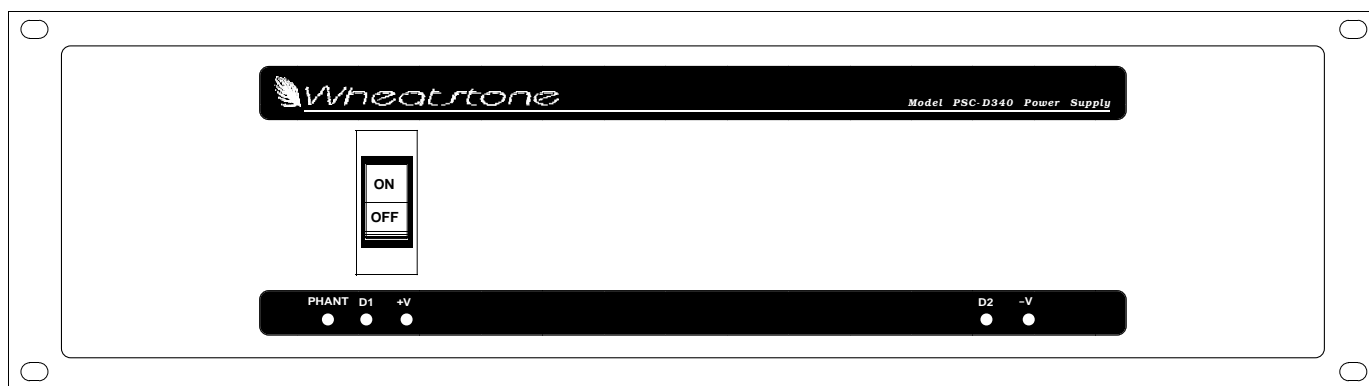
If failsafe redundant supplies have been ordered, you will be installing two units and an additional rackmount panel.

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

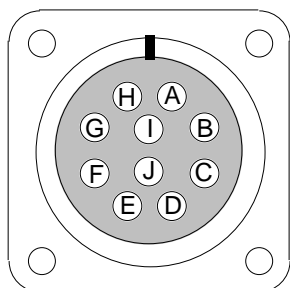
Once the supply is rackmounted, it should be connected to the console using the factory supplied cable. The console's power supply connector is located at the rear of the console, at the right end of the meterbridge bottom pan. If you are using one supply, connect it to the console connector. If you are using two supplies (failsafe option), connect the long power supply cable 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 that the power supply cable's 10-pin female connector has to be rotated until its locating pins match the male connector on the console. 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.

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 220 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.

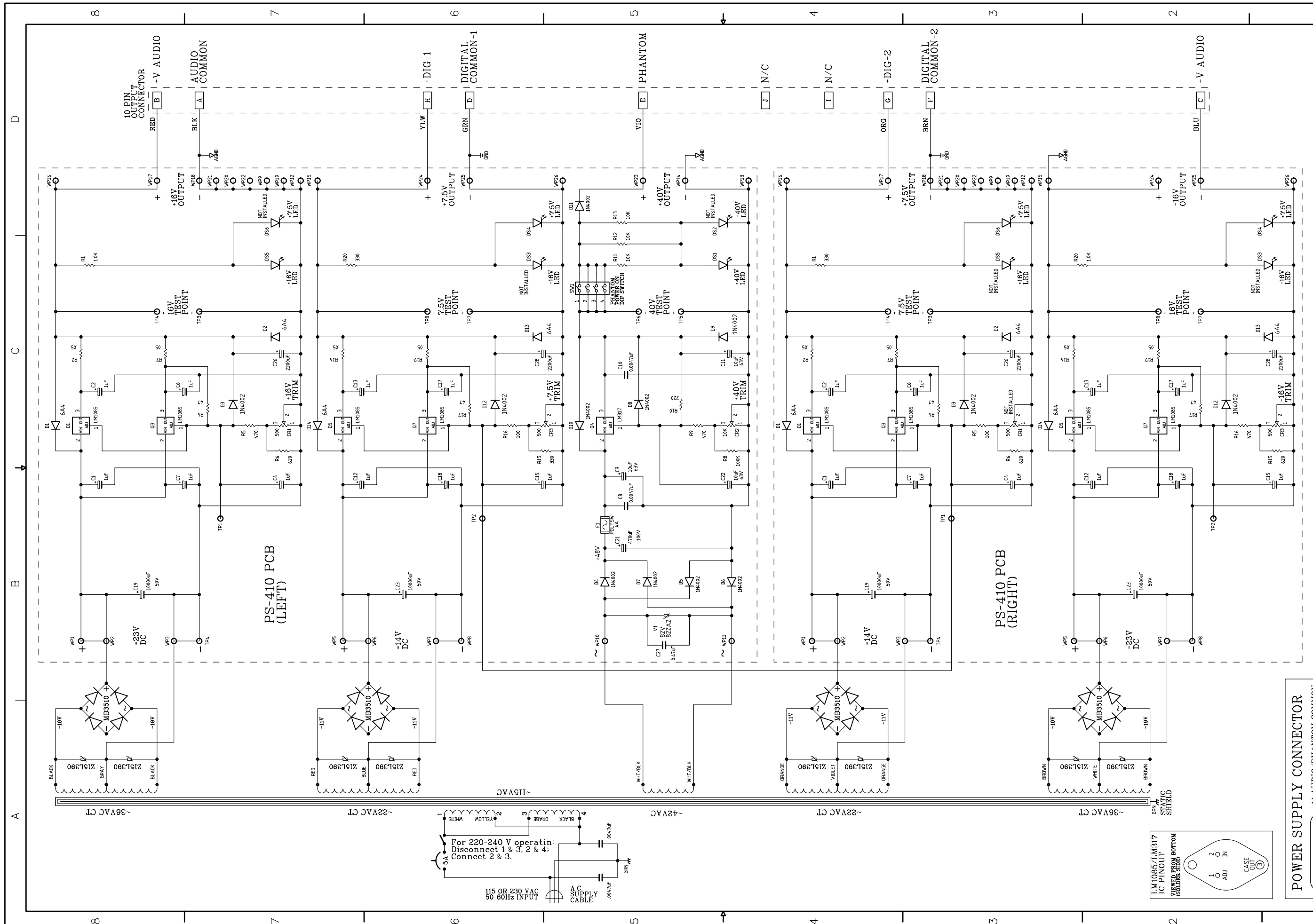


## The PSC-D340 Power Supply

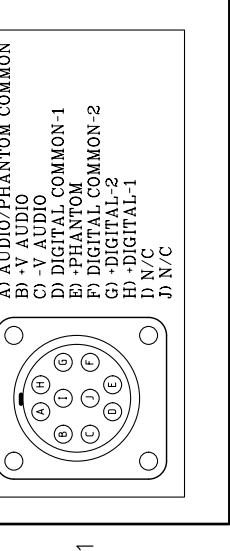


**TYPICAL POWER CONNECTOR**  
(10-pin)

- A : audio/phantom common
- B : +V audio
- C : -V audio
- D : digital common
- E : phantom power
- F : digital common
- G : +digital
- H : +digital
- I : n/c
- J : n/c



CONTRACT NO.		PSC-D340	
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN	SA	SIZE	FSCM NO.
CHECKED		D	00S0023E
ISSUED		SCALE	DWG. NO.
W # 700259			00S0023E
			REV
			7 OF 7



Power Supply Schematic - Sheet 1 of 1

### 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 220 console mainframe is properly placed and grounded, and its PSC-D340 power supply correctly rackmounted and connected to the console, you may now energize the PSC-D340 rackmount power supply by plugging it into the AC mains and turning it on, using its front panel circuit breaker/switch. The five 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 220 console are made through multipin DB-25 (or in the case of the OMD-220 Digital Control Ports, a DB-15) connectors located on the top of the each module.

### 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.

### Digital Audio Connections

**CABLE** - All AES/EBU input and output digital audio connections are balanced and should be made using a high quality digital audio cable. Be sure to select a digital audio cable with an integral drain wire of the same wire gauge (AWG) as the twisted pair. Typical AES/EBU digital audio cable has a very low characteristic capacitance per ft (pF/ft), and a nominal impedance of 110Ω. High quality digital audio cable offers better signal transmission performance versus typical analog audio cable, especially over long cable runs. Check the cable manufactures data sheet to be sure the cable you plan to use will work in your application.

**CONNECTORS** - All AES/EBU connections are made with the supplied DB-25 male mating connectors. These crimp style connectors are the insulation displacement type and will accept wire gauge 24 - 28AWG.

**SPDIF INPUTS** - The SPDIF (Sony/Philips Digital Interface) or “consumer” digital audio interface is a two wire unbalanced signal typically on a single RCA style connector. To connect SPDIF devices to the 220 console simply wire the SPDIF center conductor (HOT) to the IND-220 “HI” input pin and SPDIF shell (ground) to the IND-220 “LO” input. Connect the IND-220 “SHIELD” at the console end only.

### Analog Insert Points

Certain module signals have insert patch points in their signal chains to allow outboard audio processing. These include MONO MIC INPUTS (IND-220).

Normally these points are internally bridged at the factory (via PCB-mounted programming jumpers) prior to shipment. If you intend to use outboard signal loops at these points, you must reprogram these jumpers. See pages 2-3 (mic inputs).



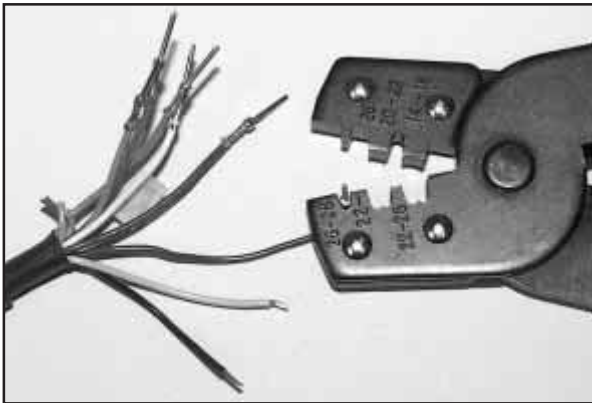
**Unbalanced Connections (analog audio)**

**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.

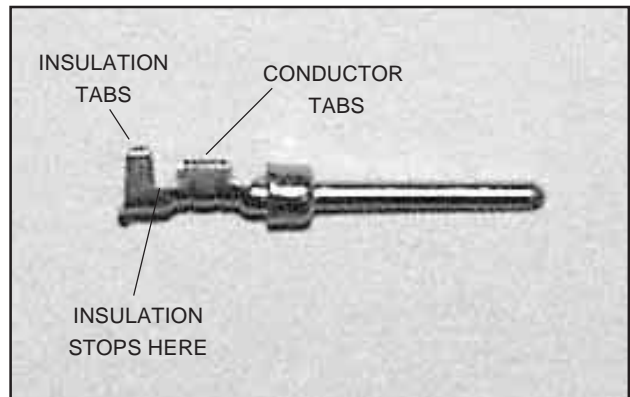
**ANALOG OUTPUTS** — 220 consoles use a balanced output circuit which behaves exactly like the secondary of a high-quality transformer, with no center tap—this output is both balanced and floating. Either the HIGH or LOW side of the output should be strapped to ground, with the output taken from the other side. (Normally you'd strap LOW to ground, and take HIGH to feed your unbalanced equipment.)

## HAND CRIMP TOOL WIRING INSTRUCTIONS

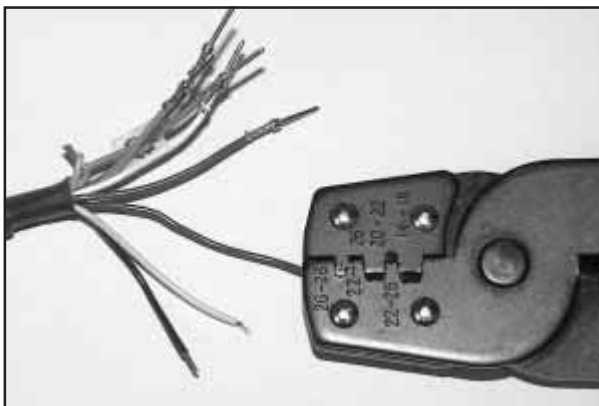
The supplied hand crimping tool (W/S#850068) is used for all I/O wiring connections to and from the console. It is to be used with the supplied pin (figure 1) intended for 24"-28" gauge wire.



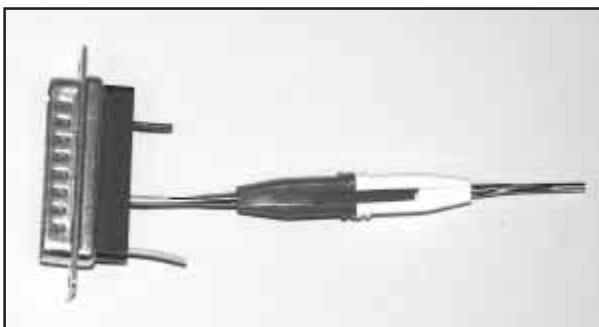
(2) The terminal conductor tabs with stripped wire are placed in anvil 26-28.



(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.

# Input Module (IND-220)

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# Input Module (IND-220)

## Module Overview

The IND-220 is a dual input module with double wide faceplate, and having one main PCB card. Depending on the type of input signals the module will handle, it will also have any combination of two piggyback cards for mono microphone (-50dBu nominal), stereo line analog, or stereo line digital inputs. Each section of the dual module accepts two sources, A and B, switched at the top of the module.

IND-220 modules are for microphone input signals (-50dBu nominal) and for stereo line input signals. Each module accepts two mono/stereo sources: A and B, switched at the top of the module. They are available in three different versions: mono microphone inputs, analog stereo line inputs and digital stereo line inputs.

The mono version uses an MMADC-220 piggyback card at the input stage of the module. Phantom power is available at both input ports; it may be selectively activated by an internal jumper (the factory default is OFF). Recessed front panel multi-turn trimpots (range 38dB) adjust the level of the A and B inputs 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).

An insert point (+4dBu balanced) is provided: it is post-trim and may be internally bypassed, which is the factory default setting.

The ADC (analog-to-digital converter) version uses an SLADC-220 piggyback card at the input stage of the module, and accepts +4dBu balanced analog input signals. Recessed front panel multi-turn trimpots adjust the left and right levels..

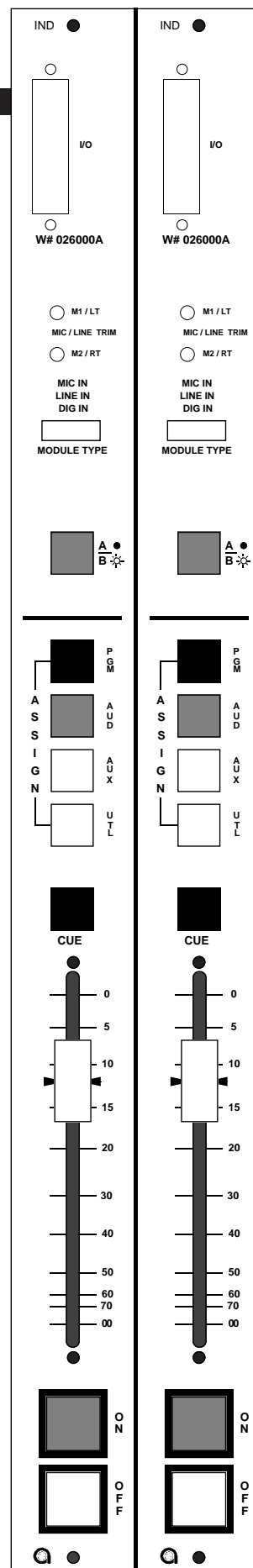
The SRC (sample rate converter) version uses an SRC-220 piggyback card at the input stage of the module, and accepts digital (AES is factory default) input signals.

Output switches assign the selected source signal to any combination of the console's four stereo outputs: PGM (program), AUD (audition), AUX (auxiliary) and/or UTL (utility).

Level is set by a long-throw fader.

The channel ON and OFF switches are at the bottom of the module. In addition to being controlled remotely, these can also be programmed (via VDIP program) to perform a variety of console control functions, including activating control room and studio mutes, talkbacks, external tallies, and timer restart.

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



## Internal Programming Options

Internal programming for the mono mic module is made via printed circuit board (PCB) mounted jumpers on the module's MMADC-220 piggyback card.

For the purposes of this manual, we will assume you are holding the removed module upright, component side towards you, with gold-plated card fingers to the left and the module faceplate to the right. This will enable you to read the control legends silkscreened next to each programming jumper.

### Insert Bypass

Jumper J1 (located at the center of the MMADC piggyback card) will bypass the module's insert point in and out of the audio signal chain. Note again that the factory default is "insert bypassed". In other words, when shipped from the factory J1 is installed.

### Phantom Power

Jumpers J4 and J5 (located on the MMADC piggyback card next to CT2 connector) turns phantom power on and off for the module's two microphone input ports.

J5 activates phantom power for microphone A

J4 activates phantom power for microphone B

Note the factory default setting for phantom power is OFF.

### Talkback

Typically, one of the 220 console's input modules will be used for the control room (CR) console operator's microphone. The jumper J2 (located on the middle of the MMADC piggyback card) allows that microphone to also function as a talkback mic. It places the signal (pre-insert, pre-fader, pre-on/off) onto the console's talkback bus. When the console operator presses a TB switch on the console's SCD-220 Studio Control 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 IND-220 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 A" control pin and Digital Ground (see page 2-9 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-insert, pre-fader, pre-on/off) signal will be placed on the console's Cue bus. Simultaneously, the module's regular output will be muted (i.e., Cough will be activated) so the talkback signal doesn't go out over the air.

## VDT Programming Options

Mutes, timer restart, cue dropout, local/ready, tallies, and utility bus pre-fader programming are made via Virtual Dip Switch Software (see Chapter 6).

## Hook-Ups

As stated before, all user wiring to and from IND-220 modules takes place at DB-25 multi-pin connector mounted on the top of each module. There is one connector per section of the double wide module. A pinout drawing on page 2-9, 2-10 and 2-11 shows all wiring connections at a glance.

## Microphone Inputs

### Audio Connections

These include A and B mic inputs, and insert in and out. The mic input level is nominally -50dBu. Insert points are +4dBu balanced in and out. All signals are analog mono.

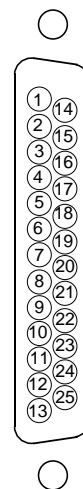
- Pin 25 – Mic A In SH
- Pin 24 – Mic A In HI
- Pin 12 – Mic A In LO
- Pin 11 – Mic B In SH
- Pin 10 – Mic B In HI
- Pin 23 – Mic B In LO
- Pin 22 – Insert Out SH
- Pin 21 – Insert Out HI
- Pin 9 – Insert Out LO
- Pin 8 – Insert In SH
- Pin 7 – Insert In HI
- Pin 20 – Insert In LO

Note the insert points are normally bypassed by PCB-mounted jumper J1 (see page 2-3). The Insert Out pins may be used as a channel direct output if desired.

### Control Connections

These include remote on and off, cough, talkback and tally functions. Note each function is available for A source port, allowing it to follow the module's A mic selector switch.

- Pin 1 – Cough A
- Pin 2 – Off Tally A
- Pin 3 – Remote Off A
- Pin 4 – Digital Ground
- Pin 5 – +5V Digital
- Pin 6 – Tally B



Typical DB-25 connector

Pin 14 – TB to CR A  
 Pin 15 – On Tally A  
 Pin 16 – Remote On A  
 Pin 17 – Digital Ground  
 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 16 (Remote On A) and Digital Ground (Pins 4, 17 or 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 3 (Remote Off A) and Digital Ground (Pins 4, 17 or 19). This will latch the module OFF. (User-supplied momentary contact switch required.)

**COUGH** — Temporarily Mutes the module. Provide a closure between Pin 1 (Cough A) and Digital Ground (Pins 4, 17 or 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.)

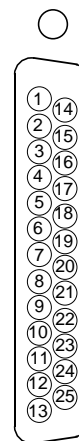
### Talkback to Control Room

If an IND-220 module is being used for a studio microphone, this connection allows talkback from that studio to the console operator. Provide a closure between Pin 14 (TB to CR A) and Digital Ground (Pins 4, 17 or 19). This will cause two things to happen: (1) the module's pre fader signal is sent to the console's Cue bus, where it may be heard by the console operator, and (2) the module's Cough function is activated, muting the module's post fader signal and preventing the TB signal from going out over other assigned busses (i.e., "live"). This non-latching condition continues until the closure is released. (Requires user-supplied momentary action TALKBACK switch at the studio microphone location.)

### 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 closure (open collector) between Pin 15 (On Tally A) and Digital Ground (Pins 4, 17 or 19) whenever the module is ON.

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



Typical DB-25  
connector

We recommend a series resistor between the LED and +5V digital when you are powering the external tally from the console; a value of 220Ω (1/4W 5%) is suggested.



### Off Tally

Identical to “On Tally” (preceding), only this tally is active when the module is OFF. Off Tally A is Pin 2.

### 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 4, 17 or 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 5 or Pin 18) and the B Tally port. In either case, current should not exceed 30 milliamps.

We recommend a series resistor between the LED and +5V digital when you are powering the external tally from the console; a value of 220Ω (1/4W 5%) is suggested.

## Stereo Line Analog Inputs

### Audio Connections

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

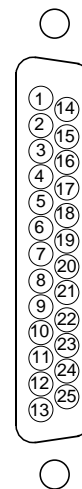
- Pin 25 – Line A In Lt SH
- Pin 24 – Line A In Lt HI
- Pin 12 – Line A In Lt LO
- Pin 11 – Line A In Rt SH
- Pin 10 – Line A In Rt HI
- Pin 23 – Line A In Rt LO
- Pin 22 – Line B In Lt SH
- Pin 21 – Line B In Lt HI
- Pin 9 – Line B In Lt LO
- Pin 8 – Line B In Rt SH
- Pin 7 – Line B In Rt HI
- Pin 20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

## Stereo Line Digital Inputs

### Audio Connections

These include A and B source inputs (AES).

- Pin 25 – Line A AES SH
- Pin 24 – Line A AES HI
- Pin 12 – Line A AES LO
- Pin 11 – Line B AES SH
- Pin 10 – Line B AES HI
- Pin 23 – Line B AES LO



Typical DB-25 connector

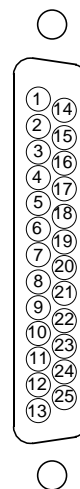


## Control Connections

These are identical for stereo line analog and digital versions of the IND-220 module.

All control ports (except Tally B) are opto-isolated. Functions include remote on and off, on tally, ready, and start/stop for remote source machines. Each function is available for the A source port, allowing it to follow the module's A source selector switch.

- Pin 1 – Ready A-
- Pin 2 – Ready A+
- Pin 3 – Start A+
- Pin 4 – Stop A+
- Pin 5 – Start/Stop Com A
- Pin 6 – Tally B
- Pin 14 – Remote On A-
- Pin 15 – Remote On A+
- Pin 16 – Remote Off A-
- Pin 17 – Remote Off A+
- 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 5VDC signal, as indicated below, will activate the module’s channel ON and OFF switches.

**REMOTE ON** — Activates the module’s channel ON switch. Provide a momentary 5VDC signal between Pins 14 and 15 (Remote On A). This will latch the module ON. Be sure to observe the polarity as indicated above and on the pinout diagram on pages 2-10, 2-11.

**REMOTE OFF** — Activates the module’s channel OFF switch. Provide a momentary 5VDC signal between Pins 16 and 17 (Remote Off A). This will latch the module OFF. Be sure to observe the polarity as indicated above and on the pinout diagram on pages 2-10, 2-11.

### 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 IND-220 module’s lower DB-25 connector control pins: for START A wire to pins 3 and 5.

**EXTERNAL STOP** — Hook up the remote machine’s “stop” control pins to the IND-220 module’s lower DB-25 connector control pins: for STOP A wire to pins 4 and 5.

Note that these are opto isolated outputs. START/STOP COM A (pin 5) connects to the opto emitters, while the remaining connections (START A, pin 3 and STOP A, pin 4) connects to the opto collectors. Correct polarity must be observed in wiring to these connections.

#### **To Control the Module's OFF Switch LED with an External Source Machine**

READY — Hook up the remote machine's "ready" control pins to the IND-220 module's DB-25 connector control pins: for READY A wire to pins 1 and 2. The module's Ready port is looking for a 5VDC signal with pin 2 positive with respect to pin 1 (READY A). As long as the voltage is present in the correct polarity, the OFF switch LED will be illuminated.

#### **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 4, 17 or 19) whenever the B source is selected.

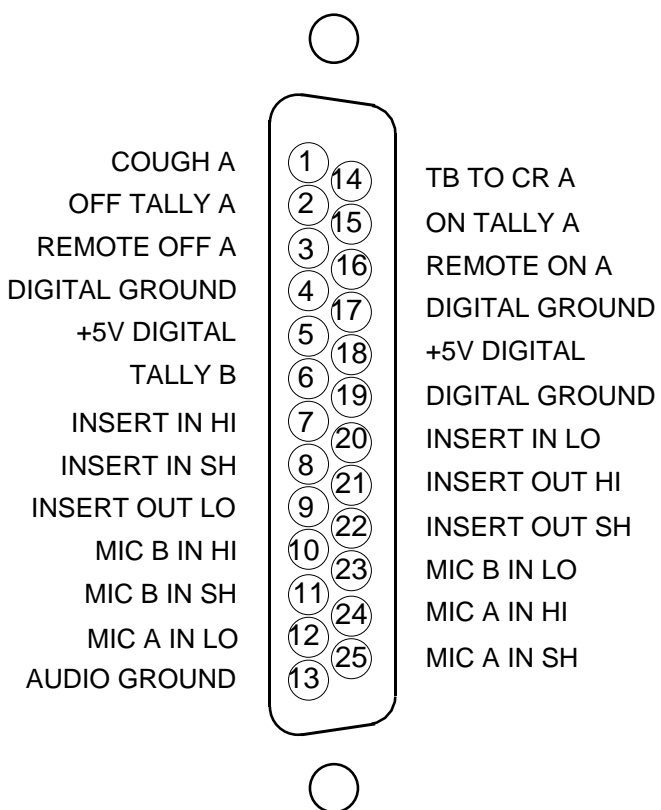
This closure can be used to control an externally powered tally light that requires a continuous closure to function. An external tally light (i.e., LED) can be powered from the input module by connecting the external LED to +5V Digital (Pin 18) and the B Tally port. In either case, current should not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

We recommend a series resistor between the LED and +5V digital when you are powering the external tally from the console; a value of 220 $\Omega$  (1/4W 5%) is suggested.

# IND-220 Mono Mic Input

## DB Connector Pinouts

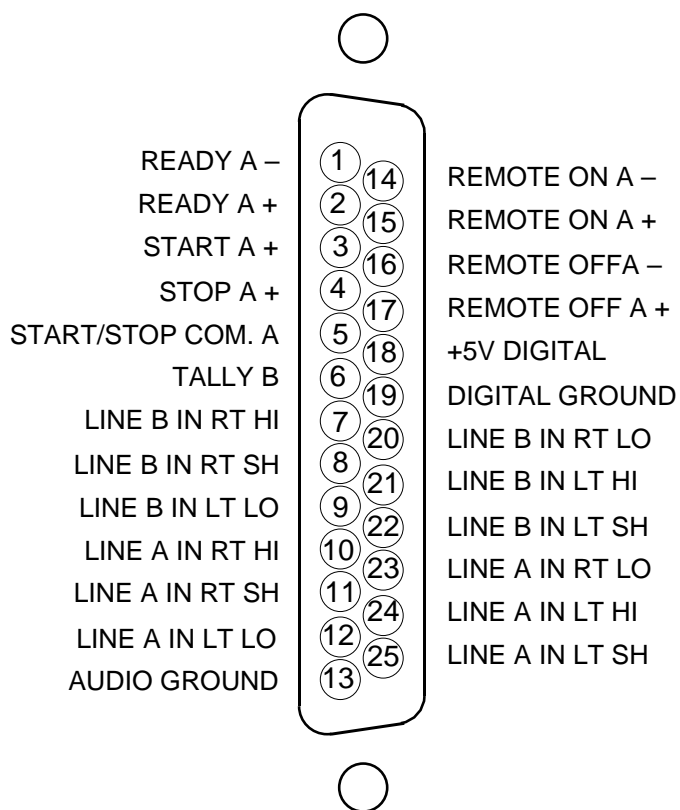
**I/O PORTS  
ANALOG  
AND  
LOGIC**



# **IND-220 Stereo Line Input**

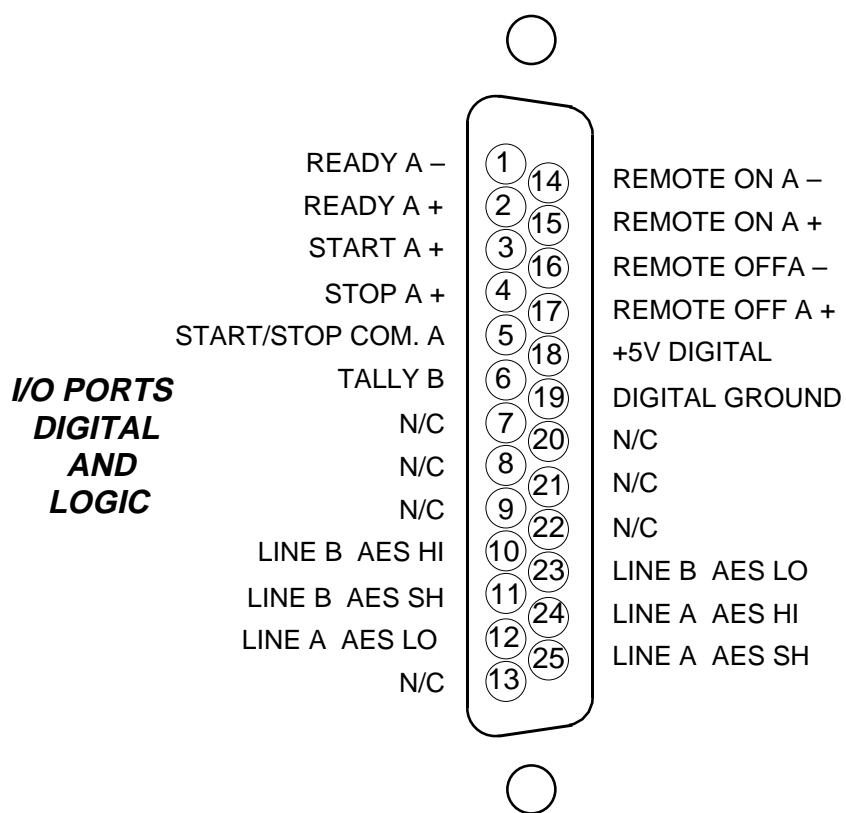
## *Analog Version DB Connector Pinouts*

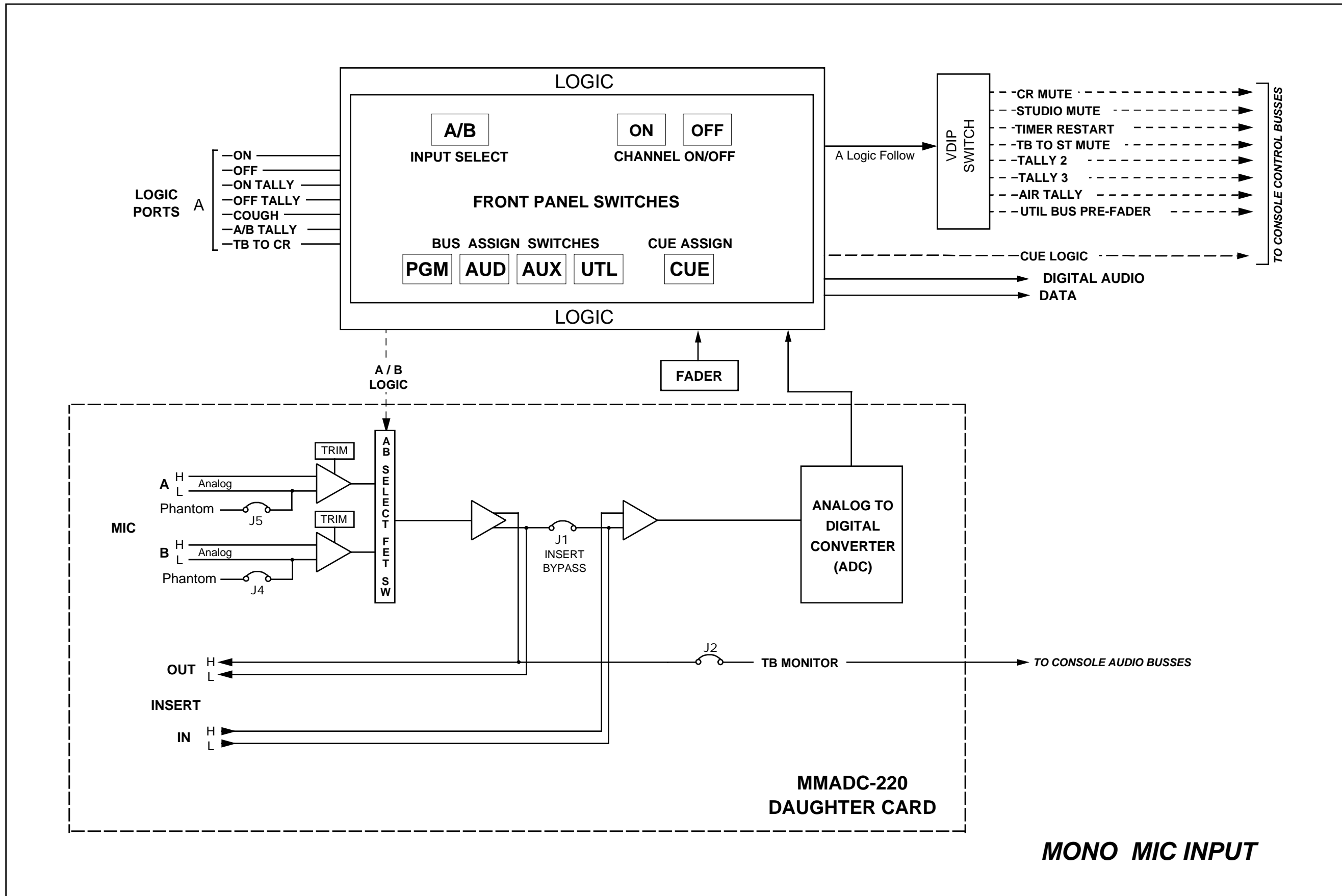
**I/O PORTS  
ANALOG  
AND  
LOGIC**



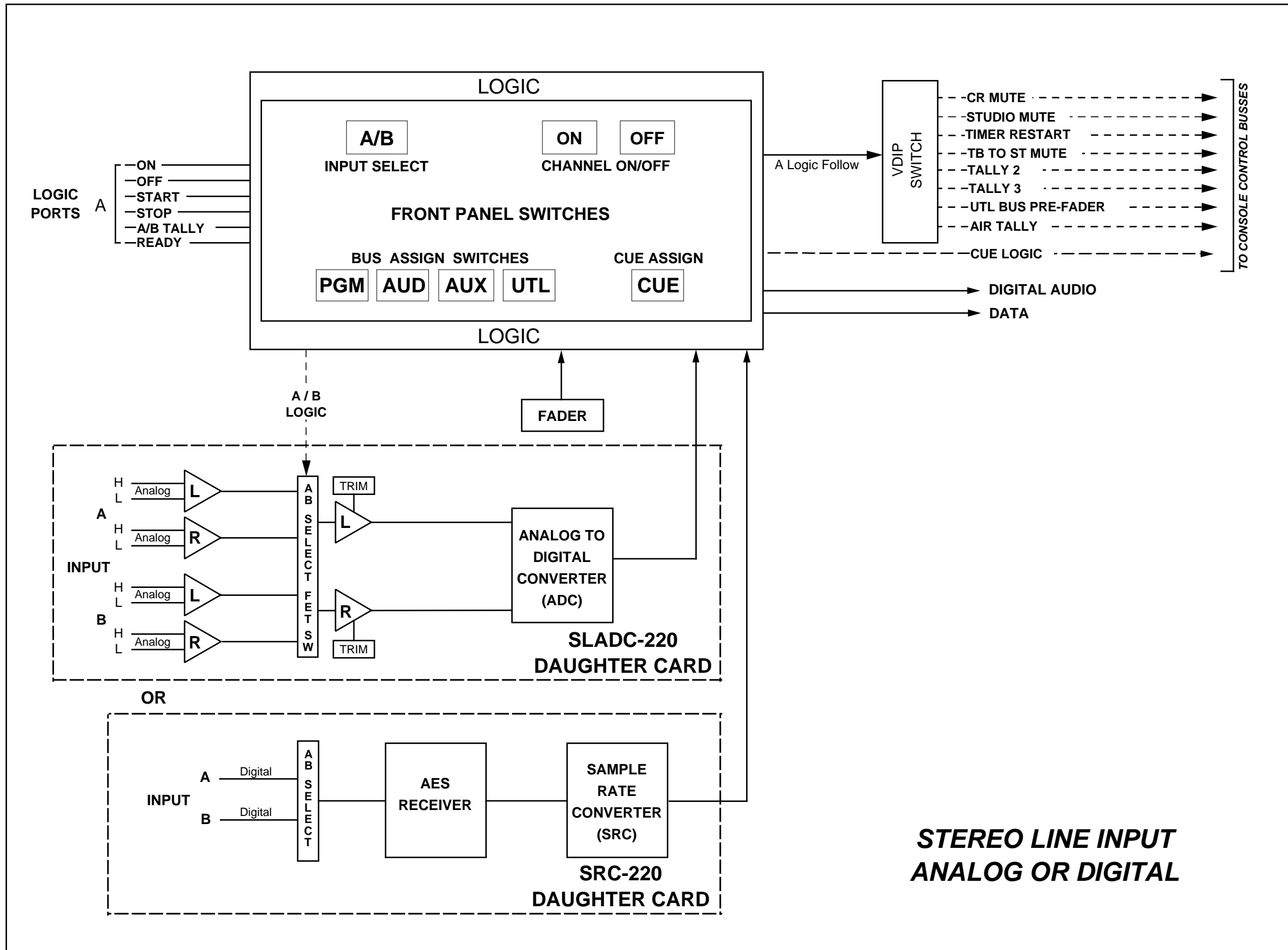
# IND-220 Stereo Line Input

## Digital Version (SRC) DB Connector Pinouts





IND-220 Input Module - Signal Flow Diagram



IND-220 Input Module - Signal Flow Diagram

# Output Module

## (OMD-220)

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# Output Module (OMD-220)

## Module Overview

Master output module handles the console's Program, Auxiliary, Audition and Utility outputs and outputs analog, digital signals and meter output signals.

The OMD-220 module is the console's central controller (CPU) and digital signal processor (DSP).

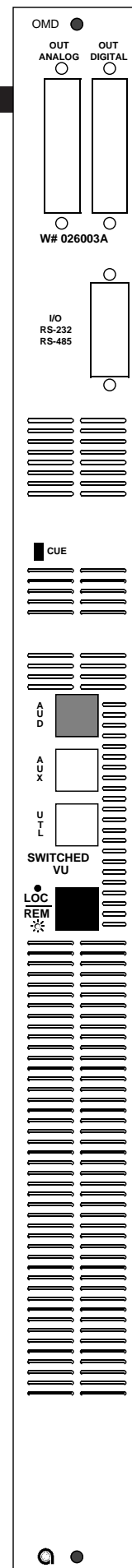
The 220 Digital Audio console is provided with a serial interface port, which is located on the lower DB-15 connector of the OMD-220 module (see connection diagrams for pin-outs and other details). This serial interface is designed to provide a number of functions including external control and set-up, system interface, etc. Through this serial interface, the 220 console's control protocol is available, allowing visibility and control of the console switches and other functions. The "Virtual Dip Switch" application program (supplied with the 220 console) communicates set up information through this serial interface (see Chapter 6).

Each 220 console has two pairs of left-right digital 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 AUD, AUX, and UTL.

The OMD-220 module houses the master CUE LED indicator. 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 it's previously selected signal.

The OMD-220 module also generate the console's monitor signals, which feed the Control Room and Studio modules.

All user wiring to and from the OMD-220 module takes place at DB-25 and DB-15 multi-pin connectors mounted on top of the module and located underneath the hinged meterbridge. There are two DB-25 connectors: the left one handles analog outputs; the right one handles digital outputs (AES format) and one DB-15 connector handles digital control ports. All analog audio is +4dBu balanced. Pinout drawings on pages 3-10 and 3-11 show all wiring connections at a glance.



## CPU

The OMD-220 module is the master control module for the 220 Digital Audio Console. By monitoring the various console modules and serial ports, the OMD-220 controls all of the console audio and logic functions. Because the system architecture is designed to work by communicating function and status changes, the 220 console is very responsive and fault tolerant.

The OMD-220 has several functions and modes that can be configured by the user. These are normally set to default values at the factory, and should not be altered casually.

1. The first function is the console ID address. This function is set using jumpers J12 - J19. This address is used to identify the console serial interface port so that external devices such as automation systems, the VDip software, and external controllers will communicate with the console correctly. Because the 220 serial interface port can be configured as an RS-485 device, and multiple consoles can be connected to the same RS-485 bus, each console needs a unique address to identify it properly on the bus, ensuring that the right commands get passed to the correct console. The specific address set is unimportant except that any external controller must use a matching address to communicate with the console. The address is set with the jumpers in binary format (for example with all jumpers removed the address is “0”, with the first jumper inserted, the address is “1”, with just the second jumper inserted the address is “2”, with the first and second jumpers inserted the address is “3” and so on). Consult the section “Internal Programming Options”, page 3-6, for more details. The 220 console is normally configured with an address of “1”. Do not change the console address unless you are using the console in an RS-485 bus system.

2. The second function is serial interface configuration. Jumpers J1-3 and J24 control the serial interface protocol and RS-485 termination for the serial port on the OMD-220 module. This port can be configured as RS-232 or RS-485, and terminated or unterminated via these jumpers. Again, the default settings are for normal operations and should not be changed unless you are using the console in an RS-485 bus system. Consult the sections “Serial Interface”, page 3-5, and “Internal Programming Options”, page 3-6 to 3-7, for specific configurations. Jumper J11 is also used with the serial interface; by installing it, the normal checksum in the serial protocol is disabled. This can be useful with some external control devices which are not equipped to generate a checksum in their messages.

3. The third function is nominal audio make-up gain. Jumpers J4 - J6 are used to establish the master gain setting for the 220 console. This allows users to configure the nominal fader setting and signal headroom to suit their specific needs or preferences. The digital audio signals entering the 220 console are usually normalized in the recording or transmitting process for

peak signals such that the absolute maximum peak signal is very close to, but does not exceed, the maximum or highest digital word in the AES bit stream. This implies that any decrease in signal caused by placing the console fader at a “normal” setting somewhat less than full up needs to be made up at the output of the console or the signal will be lower than it was at the source. Radio consoles are normally operated with their faders at less than full up to allow for some control over level and mixing ( if a signal is too low or quiet, the fader can be moved up until the signal matches the normal levels as shown in the console meters.). By using the jumpers, the user can configure what the normal fader setting (and hence the output make-up gain) should be. Consult the “Global Gain” table in the “Internal Programming Options” section, page 3-7, for the gain values. The 220 console is normally shipped with a make-up gain setting of +12dB for a nominal fader setting of -12dB from the top. Note that setting the make-up gain too high for the signals and fader settings used can result in a clipped or distorted signal, just as it could with an analog console.

4. The fourth function is serial interface control. The front panel of the OMD-220 module has a pushbutton LOC/REM switch. Activating this switch will enable the remote serial interface to the console, and deactivating the switch will disable the remote serial interface. When the interface is activated, any device connected to the interface can control any of the console functions. Note that the console operator also has control of the console functions even when the remote serial interface is enabled; the console will respond to any command regardless of where it comes from. When the interface is disabled, the console will not respond to any commands sent to the remote serial interface; it will respond only to the console switches and faders.

## DSP

DSP functions solely as a mix engine, combining all of the console audio signals as directed by the console faders and switches to produce the various output mixes for PROGRAM, AUDITION, AUXILIARY, UTILITY, CUE, and TELEPHONE.

The DSP operates at a factory set sample rate, normally 48KHz, which dictates the output sample rate of the 220 console digital outputs. Consult Wheatstone Tech Support if you wish to use a different output sample rate. Since all of the console digital inputs are equipped with sample rate converters, the console inputs will accept any sample rate between the range of 1/2 to twice the output sample rate, and will actually track a variable sample rate as long as it remains within this range. This feature allows you to interface different types of digital sources into the console, each with different sample rates.

## Serial Interface

### Using the Serial Interface

The 220 Serial Interface is designed to support serial communications under the RS-422/485 and -232 protocols. The proper serial interface protocol must be selected (via jumpers on the OMD-220 module) or else serial communications will not function correctly. No serial interface connections are required for normal, stand alone operation of the 220 console; in fact the console will work normally with an improper connection to the serial interface. The function of the serial interface is to enable remote operation of the 220 console functions; local operation of the console switches and faders will always override any remote commands that may have been sent via the serial interface. In addition, the LOC/REM button on the OMD-220 module can be used to disable any serial communications with the 220 console. Toggling the switch “ON” and “OFF” alternately enables and disables the serial interface port on the 220 console. The pushbutton LOC/REM switch lights when the serial interface is active. Remember, the 220 console can always be controlled by its faders and switches regardless of the status of the serial interface. If remote control of the console is desired, the “remote” mode must be selected with the LOC/REM switch.

The most common use for the 220 Serial Interface is to allow configuration changes (mutes, tallys, etc.) by means of the “Virtual Dip Switch” program supplied with the console and described in Chapter 6 of this manual. To do this, the “Virtual Dip Switch” program must first be installed on a suitable PC, and a serial cable connected from the COM port of your PC to the DB-15 connector on the OMD-220 module. Be sure that the RS-232 mode for the console serial interface (the default setting) has been selected via the jumpers on the OMD-220 module. Push the LOC/REM button to enable remote operation and start the program on the PC. Use the program as described in this manual to modify the 220 console configuration. Once the configuration has been set, the PC can be disconnected from the console.

Another use for the 220 Serial Interface is for complete remote operation by an external control system. When used in this way, the 220 console acts as a passive listener to the serial interface awaiting serial protocol commands. Any external system that can deliver serial text strings in the proper serial protocol format will be able to control the console. Consult Auditronics Technical Support for more details on enabling this functionality.

## Internal Programming Options (CPU)

All internal programming is made via printed circuit board mounted jumpers on the module's PR-220 PCB card.

For the purposes of this manual, we will assume you are holding the removed module upright, component side towards you, with gold-plated card fingers to the left and the module faceplate to the right. This will enable you to read the control legends silkscreened next to each programming jumper.

### Global Settings

Jumpers J10 - J25 determines various console operating parameters:

		Bit	Weight
Console ID	J19	0	1
	J18	1	2
	J17	2	4
	J16	3	8
	J15	4	16
	J14	5	32
	J13	6	64
	J12	7	128

Note: Each 220 Console ID# is set by jumpers J16 - J19 and J12 - J15. These jumpers are read as an 8 bit field with Bit 0 mapped to jumper J19 and Bit 7 mapped to jumper J12. This ID# is read by the CPU at boot up and is required by serial communications software.

Example: Desired ID=17, install jumpers J15 and J19

In multi-console, RS-485 connected system, each 220 console **MUST** have a unique Console ID#. Default Console ID is 1 (J19 - installed).

Misc	J11 - ignore serial input checksum byte (default not installed)
	J10 - not used
	J9 - not used
	J8 - not used

Note: Some automation systems may require J11 to be installed.

Global Gain	[	J7 - not used
		J6 - 8dB
		J5 - 4dB
		J4 - 2 dB

Note: These jumpers set the fader scale factor that will be applied to each input module at the DSP stage. Default setting is 12dB (J6 and J5 - installed).

**J24 - RS-485/RS-232 Select**

Jumper J24 selects the hardware interface type (RS-485 or RS-232) for the serial Com port.

	OFF	ON
J24	RS-485	RS-232

**J1 - J3 - RS-485 Termination**

Jumpers J1 - J3 are used for RS-485 termination. Termination must be switched in pairs (i.e., TX and RX BOTH ON or BOTH OFF) for a given Com X port.

	OFF	ON	Serial Port
J1	Not terminated	Terminated	TX
J2, J3	Not terminated	Terminated	RX

## Hook-Ups

As stated before, all user wiring to and from the OMD-220 modules takes place at two DB-25 and one DB-15 multi-pin connectors on the top of module.

### Upper Left DB-25 Connector – Analog Audio Outputs

Includes Program, Audition, Auxiliary and Utility 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

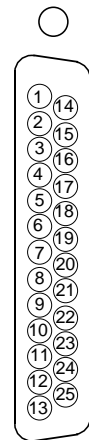
Pin 8 – AUD Rt Out SH  
 Pin 7 – AUD Rt Out HI  
 Pin 20 – AUD Rt Out LO

Pin 19 – AUX Lt Out SH  
 Pin 18 – AUX Lt Out HI  
 Pin 6 – AUX Lt Out LO

Pin 5 – AUX Rt Out SH  
 Pin 4 – AUX Rt Out HI  
 Pin 17 – AUX Rt Out LO

Pin 16 – UTL Lt Out SH  
 Pin 15 – UTL Lt Out HI  
 Pin 3 – UTL Lt Out LO

Pin 2 – UTL Rt Out SH  
 Pin 1 – UTL Rt Out HI  
 Pin 14 – UTL Rt Out LO



Typical DB-25 connector

### Upper Right DB-25 Connector – Digital Outputs

Handles digital Program, Audition, Auxiliary and Utility outputs.

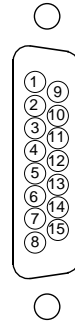
Pin 25 – PGM AES/SPDIF Out SH  
 Pin 24 – PGM AES/SPDIF Out HI  
 Pin 12 – PGM AES/SPDIF Out LO  
 Pin 22 – AUD AES/SPDIF Out SH  
 Pin 21 – AUD AES/SPDIF Out HI  
 Pin 9 – AUD AES/SPDIF Out LO  
 Pin 19 – AUX AES/SPDIF Out SH

- Pin 18 – AUX AES/SPDIF Out HI
- Pin 6 – AUX AES/SPDIF Out LO
- Pin 16 – UTL AES/SPDIF Out SH
- Pin 15 – UTL AES/SPDIF Out HI
- Pin 3 – UTL AES/SPDIF Out LO

Lower Right DB-15 Connector – Digital Control Ports

Handles Com 1 serial connections.

- |  |   |        |
|--|---|--------|
| Pin 1 – RX +                             | } | RS-485 |
| Pin 9 – RX -                             |   |        |
| Pin 10 – TX +                            |   |        |
| Pin 3 – TX -                             |   |        |
| Pin 4 – DTR                              | } | RS-232 |
| Pin 6 – RTS                              |   |        |
| Pin 7 – RX                               |   |        |
| Pin 12 – DSR                             |   |        |
| Pin 13 – CTS                             |   |        |
| Pin 15 – TX                              |   |        |
| Pins 2, 5, 8, 11 and 14 - Digital Ground |   |        |



Typical DB-15 connector



# OMD-220 Outputs

## DB Connector Pinouts

**ANALOG  
OUTPUTS  
(Upper Left  
DB-25)**

UTL RT OUT HI	1	14	UTL RT OUT LO
UTL RT OUT SH	2	15	UTL LT OUT HI
UTL LT OUT LO	3	16	UTL LT OUT SH
AUX RT OUT HI	4	17	AUX RT OUT LO
AUX RT OUT SH	5	18	AUX LT OUT HI
AUX LT OUT LO	6	19	AUX LT OUT SH
AUD RT OUT HI	7	20	AUD RT OUT LO
AUD RT OUT SH	8	21	AUD LT OUT HI
AUD LT OUT LO	9	22	AUD LT OUT SH
PGM RT OUT HI	10	23	PGM RT OUT LO
PGM RT OUT SH	11	24	PGM LT OUT HI
PGM LT OUT LO	12	25	PGM LT OUT SH
AUDIO GROUND	13		

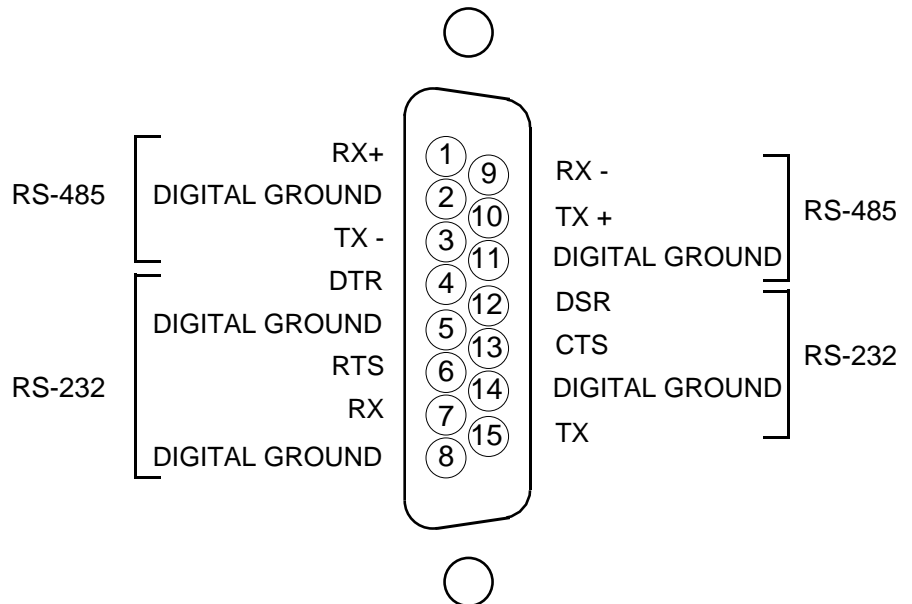
N/C	1	14	N/C
N/C	2	15	UTL AES/SPDIF OUT HI
UTL AES/SPDIF OUT LO	3	16	UTL AES/SPDIF OUT SH
N/C	4	17	N/C
N/C	5	18	AUX AES/SPDIF OUT HI
AUX AES/SPDIF OUT LO	6	19	AUX AES/SPDIF OUT SH
N/C	7	20	N/C
N/C	8	21	AUD AES/SPDIF OUT HI
AUD AES/SPDIF OUT LO	9	22	AUD AES/SPDIF OUT SH
N/C	10	23	N/C
N/C	11	24	PGM AES/SPDIF OUT HI
PGM AES/SPDIF OUT LO	12	25	PGM AES/SPDIF OUT SH
AUDIO GROUND	13		

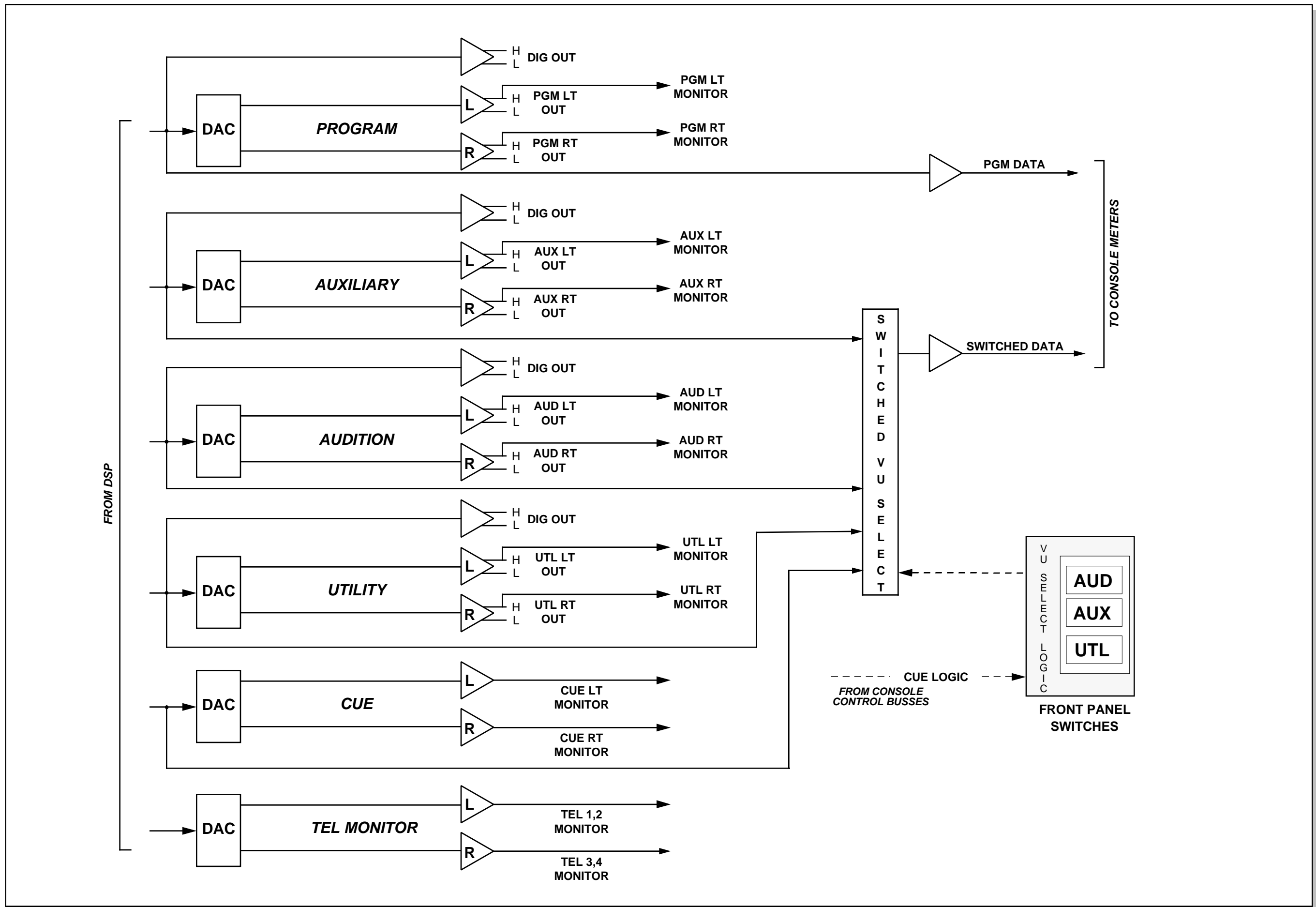
**DIGITAL  
OUTPUTS  
(Upper Right  
DB-25)**

# OMD-220 Digital Control Ports

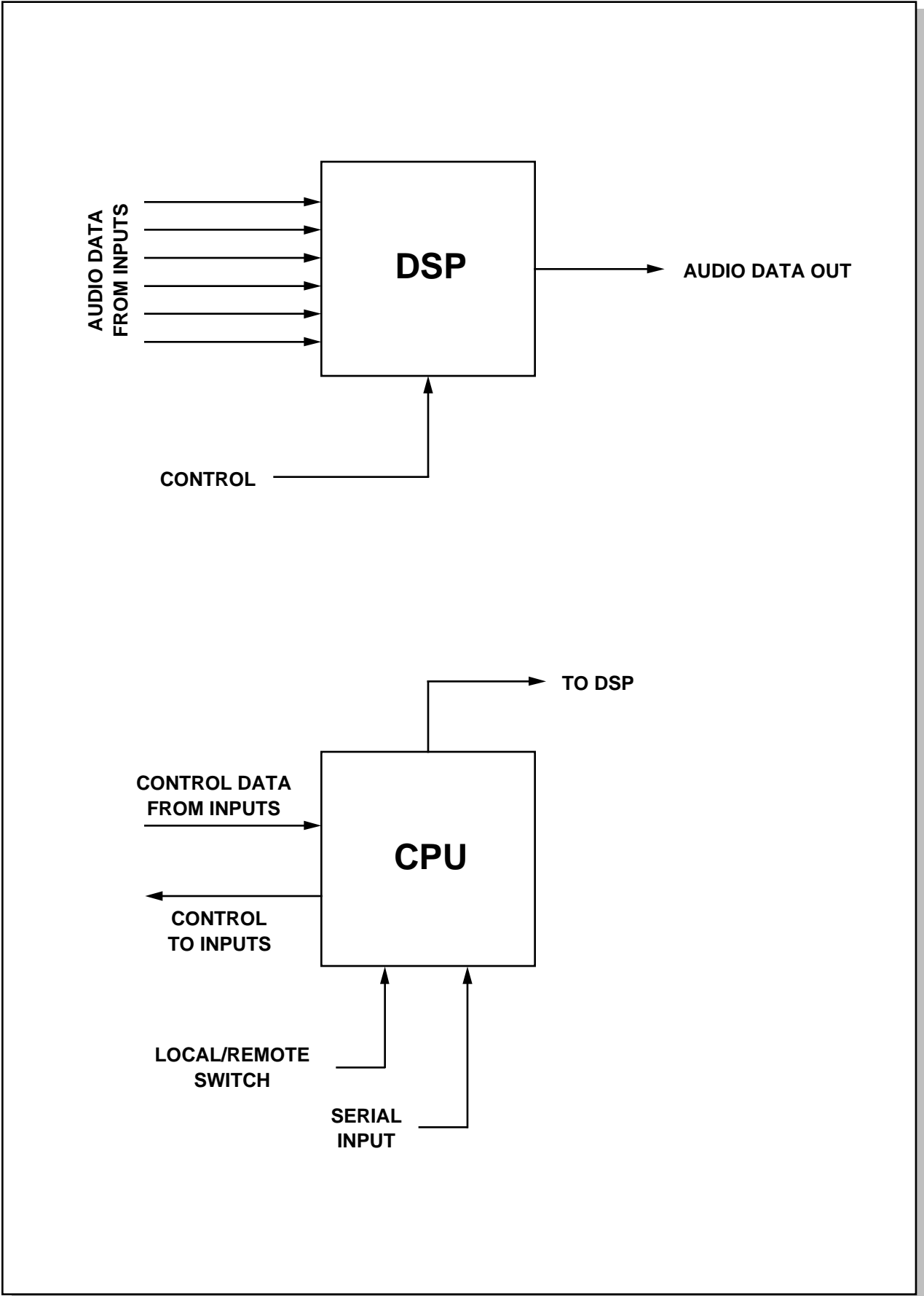
## DB Connector Pinouts

**COM**  
**SERIAL I/O PORTS**  
 (Lower Right  
 DB-15)





Master Outputs - Signal Flow Diagram



CPU/DSP - Signal Flow Diagram

# Control Room Module

## (CRD-220)

### Chapter Contents

<b>Module Overview .....</b>	<b>4-2</b>
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# Control Room Module

## (CRD-220)

### Module Overview

The CRD-220 module is the 220 console operator's monitor module. It allows him to listen to the console's four stereo outputs (PGM, AUD, AUX & UTL) as well as two external stereo line level inputs brought directly into the module.

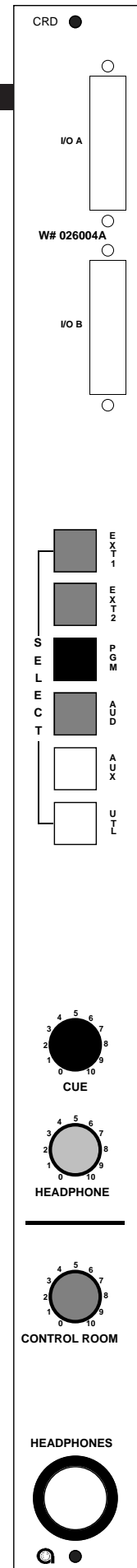
The CRD-220 also houses console HEADPHONE and CONTROL ROOM circuits, which follow the source selection switches.

There are two types of headphone output: the +4dBu balanced output at the module's upper DB-25 connector (pre-level control), and the headphone jack mounted on the bottom of the module, which is actually the output from a built-in headphone amplifier. It is this built-in amp that is controlled by the module's front panel HEADPHONE level control.

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 CRD-220 module has been programmed, cue can also interrupt the control room monitor speakers and/or the console operator's headphone. The way Cue interrupts the module's headphone and CR outputs is determined by internal PCB-mounted jumpers. See "Cue Interrupt" on next page.

All user wiring to and from the CRD-220 module takes place at DB-25 multi-pin connectors mounted at the top of the module and located underneath the hinged meterbridge. There are two connectors: the upper one handles audio outputs and the console on-air tally control signals; the lower accepts the two external source inputs. All audio connections are stereo line level analog signals (+4dBu balanced). A pinout drawing on page 4-5 shows all wiring connections at a glance.



## Internal Programming Options

There are five user-programmable jumpers on the CRD-220 located on the center of the module's PCB card to set various cue interrupt modes and cue mute (see below).

For the purposes of this manual, we will assume you are holding the removed module upright, component side towards you, with gold-plated card fingers to the left and the module faceplate to the right. This will enable you to read the control legends silkscreened next to each programming jumper.

### Cue Interrupt

Jumpers J2, J3, J4 and J5 determines how the console's Cue function will interrupt regular monitor signals:

J5 sends cue to CR left

J4 sends cue to CR right

J3 sends cue to HDPN left\*

J2 sends cue to HDPN right\*

\*factory default settings

### Cue Mute

As Cue is also fed to the console's built-in meterbridge speakers, where it can easily be picked up by the console operator's microphone, there is provision to mute Cue whenever that mic is live (i.e., whenever the control room mute function is activated).

Jumper J1 will mute cue whenever CR is muted (this is the factory default setting)

## Hook-Ups

As stated before, all user wiring to and from the CRD-220 module takes place at two DB-25 multi-pin connectors mounted at the top of the module.

### Upper DB-25 "A" Connector — Audio

Includes cue, headphone and control room outputs. All audio signals are +4dBu balanced, analog stereo.

Pin 25 – Lt Cue Out SH

Pin 24 – Lt Cue Out HI

Pin 12 – Lt Cue Out LO

Pin 11 – Rt Cue Out SH

Pin 10 – Rt Cue Out HI

Pin 23 – Rt Cue Out LO

Pin 22 – Lt Hdpn Out SH

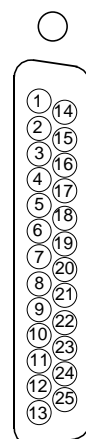
Pin 21 – Lt Hdpn Out HI

Pin 9 – Lt Hdpn Out LO

Pin 8 – Rt Hdpn Out SH

Pin 7 – Rt Hdpn Out HI

See pinout drawing on page 4-5 for all wiring connections at a glance.



Typical DB-25 connector

Pin 20 – Rt Hdpn Out LO

Pin 19 – Lt CR Out SH

Pin 18 – Lt CR Out HI

Pin 6 – Lt CR Out LO

Pin 5 – Rt CR Out SH

Pin 4 – Rt CR Out HI

Pin 17 – Rt CR Out LO

### Upper DB-25 “A” Connector — Control

The console’s on-air tally port is on the CRD-220 upper DB-25 A connector. This is a simple relay closure that activates whenever programmed input modules are turned ON (see page 2-4). The port can be used to control an externally powered tally light that requires a continuous closure to function.

Pin 14 – On-Air Tally Relay COM

Pin 1 – On-Air Tally Relay N.O.



Maximum current through the on-air tally relay closure is 2 amps @30VDC.

### Lower DB-25 “B” Connector — Audio

This connector handles the module’s source select External Stereo inputs. The port wants to see +4dBu balanced analog stereo signals.

Pin 19 – Lt Ext 1 In SH

Pin 18 – Lt Ext 1 In HI

Pin 6 – Lt Ext 1 In LO

Pin 5 – Rt Ext 1 In SH

Pin 4 – Rt Ext 1 In HI

Pin 17 – Rt Ext 1 In LO

Pin 16 – Lt Ext 2 In SH

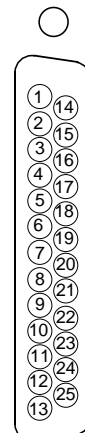
Pin 15 – Lt Ext 2 In HI

Pin 3 – Lt Ext 2 In LO

Pin 2 – Rt Ext 2 In SH

Pin 1 – Rt Ext 2 In HI

Pin 14 – Rt Ext 2 In LO

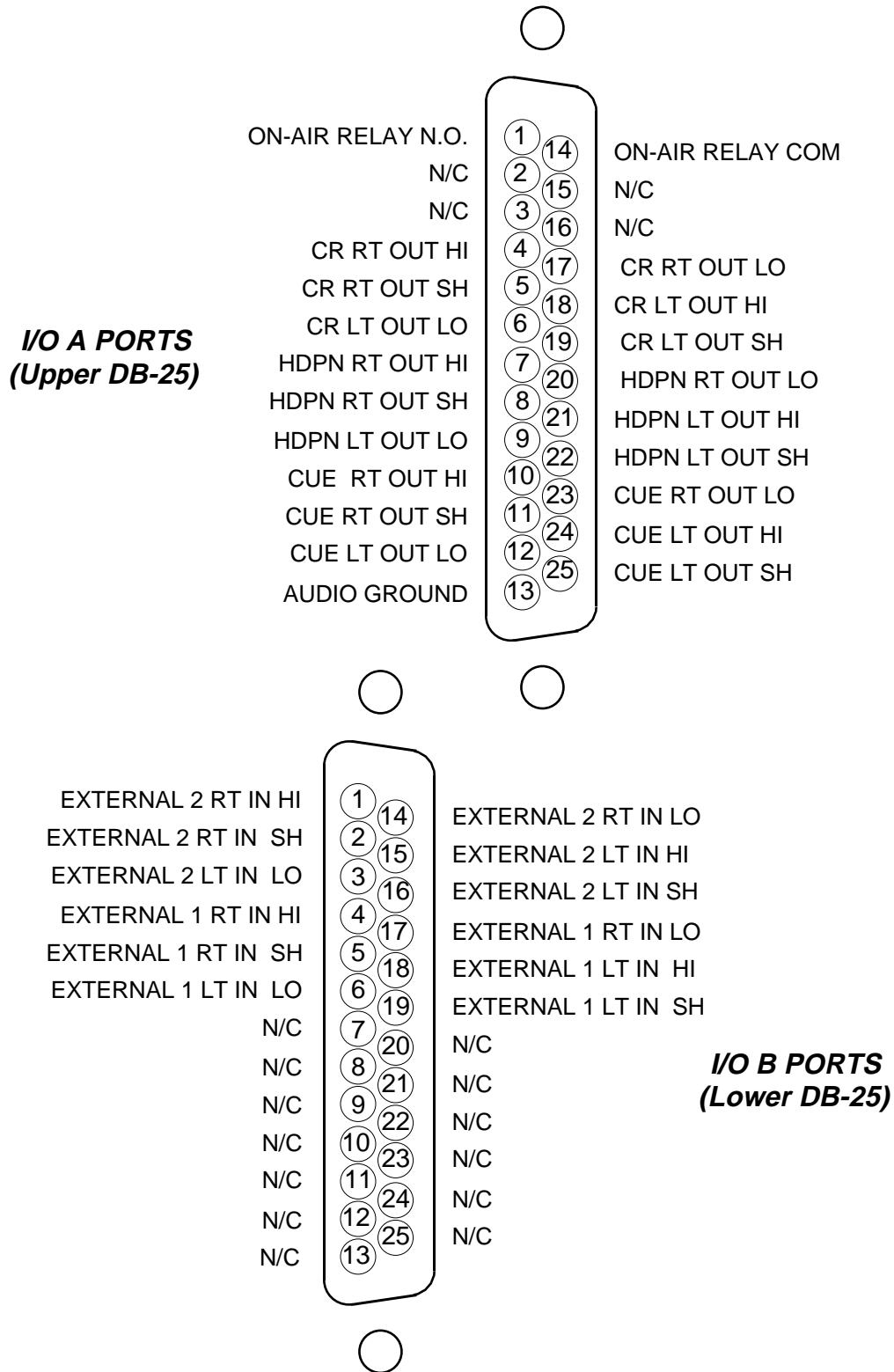


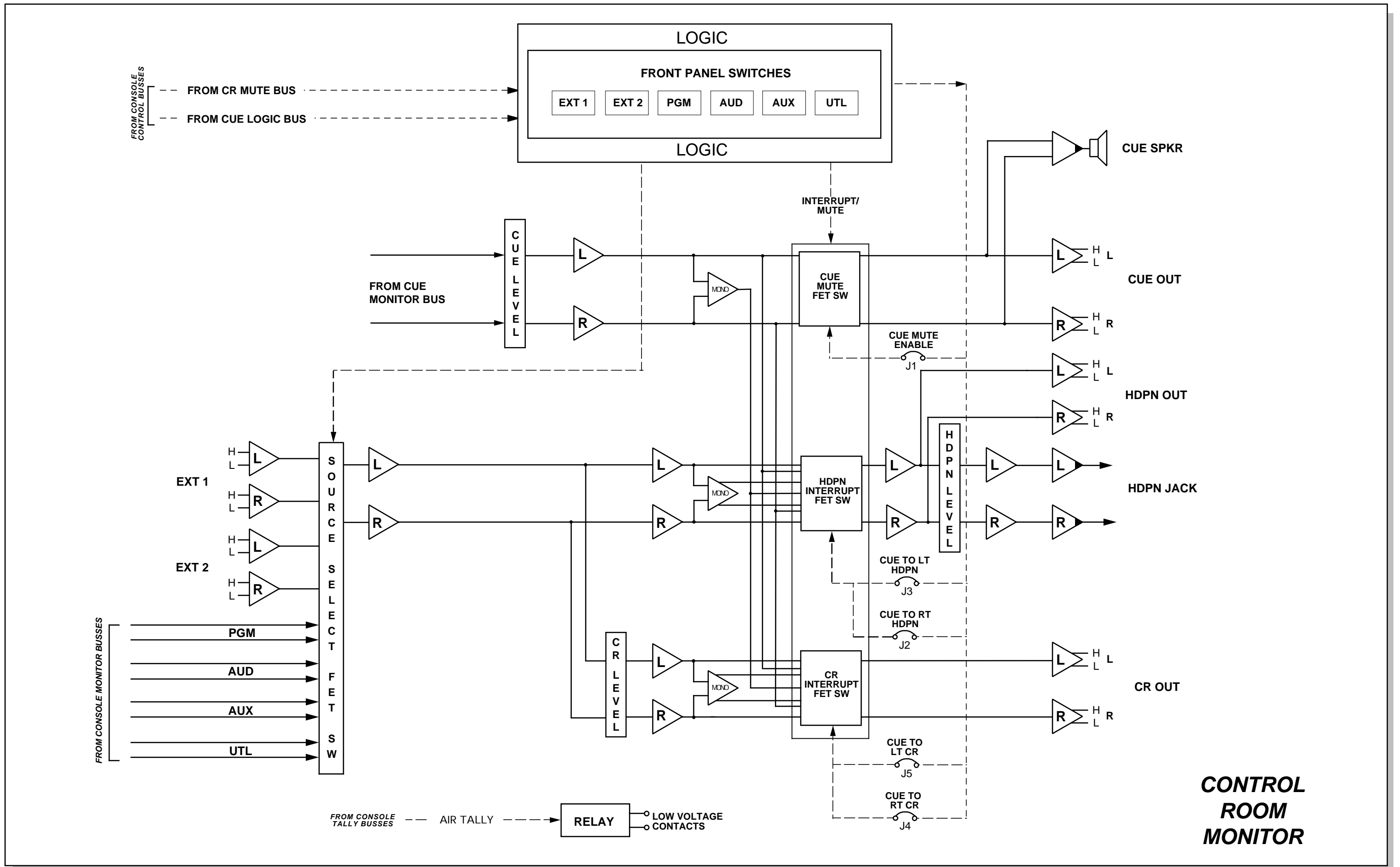
Typical DB-25 connector



# CRD-220 Control Room

## DB Connector Pinouts





**CONTROL ROOM MONITOR**

CRD-220 Control Room Monitor - Signal Flow Diagram

# Studio Control Module

## (SCD-220)

### Chapter Contents

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# Studio Control Module

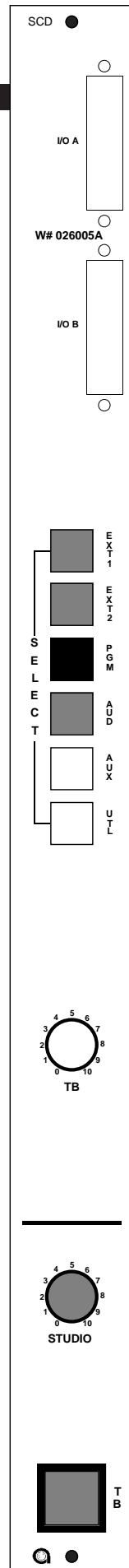
## (SCD-220)

### Module Overview

The SCD-220 module is similar to the CRD-220 control room module, only it controls monitor audio and talkback to an additional (“non-control room”) studio. The monitor signal being sent to this studio follows the source select switching. This switching is identical to the control room module’s and includes the console’s four stereo outputs (PGM, AUD, AUX & UTL) as well as two external stereo line level inputs brought directly into the module.

The studio has a level control and talkback switch. When the talkback switch is pressed (it is momentary action) the console operator’s microphone signal will interrupt the regular monitor signals being sent to the studio in question. The TALKBACK master level control sets the level of this talkback interrupt signal.

All user wiring to and from the SCD-220 module takes place at DB-25 multi-pin connectors mounted at the top of the module and located underneath the hinged meterbridge. There are two connectors: the upper one handles external talkback out and regular studio monitor outputs, plus the console’s Tally 2 and Tally 3 control signals; the lower connector accepts the module’s two external source inputs. It also outputs additional pre-level control studio outputs. All audio connections are (+4dBu balanced) analog signals. A pinout drawing on page 5-5 shows all wiring connections at a glance.



## Internal Programming Options

There are three user-programmable jumpers (J2, J3, J4) on the SCD-220 that are located at the center of the module's PCB.

For the purposes of this manual, we will assume you are holding the removed module upright, component side towards you, with gold-plated card fingers to the left and the module faceplate to the right. This will enable you to read the control legends silkscreened next to the programming jumpers.

### External Talkback Mute/Dim

There is an independent talkback output from the SCD-220 module (see upper DB-25 connector page 5-5). By installing jumper J2, you can make this external talkback output MUTE whenever a studio is muted. You also have the option of making the output DIM (drop -20dB in level) instead of MUTE by installing jumper J3.

Jumper 2 mutes external TB whenever Studio is muted\*  
 Jumper 3 makes external TB DIM instead of MUTE

\*factory default settings

### 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:

Jumper 4 causes Studio to DIM instead of MUTE

Note the DIM functions do not affect talkback interrupts, which always completely replace the studio's regular monitor feed with the console operator's TB signal. Note also if a studio is muted, talkback cannot be heard. However, if a studio is programmed to DIM instead of MUTE, talkback audio could presumably make it from the studio monitor speakers to the open studio mic.

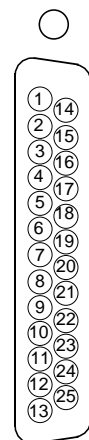
## Hook-Ups

As stated before, all user wiring to and from the SCD-220 module takes place at two DB-25 multi-pin connectors mounted at the top of the module.

### Upper DB-25 "A" Connector — Audio

Includes studio, studio pre-level, and (mono) talkback outputs. All audio signals are analog, +4dBu balanced.

Pin 25 – TB Out SH  
 Pin 24 – TB Out HI  
 Pin 12 – TB Out LO  
  
 Pin 22 – Lt Studio Pre Out SH  
 Pin 21 – Lt Studio Pre Out HI  
 Pin 9 – Lt Studio Pre Out LO  
 Pin 8 – Rt Studio Pre Out SH  
 Pin 7 – Rt Studio Pre Out HI  
 Pin 20 – Rt Studio Pre Out LO



Typical DB-25 connector

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

### Upper DB-25 “A” Connector — Control

The console’s Tally 2 and Tally 3 control ports are on the SCD-220 upper DB-25 connector. These are simple relay closures that activate whenever programmed input modules are turned ON (see page 2-4). The ports can be used to control externally powered tally lights that requires a continuous closure to function.

Pin 14 – Tally 2 Relay COM  
 Pin 1 – Tally 2 Relay N.O.  
 Pin 3 – Tally 3 Relay COM  
 Pin 15 – Tally 3 Relay N.O.

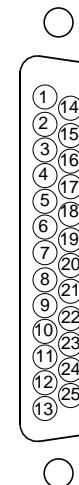


Maximum current through the tally relay closures is 2 amps @30VDC.

### Lower DB-25 “B” Connector — Audio

This connector handles the module’s source select External Stereo inputs. All signals are +4dBu balanced analog stereo.

Pin 19 – Lt Ext 1 In SH  
 Pin 18 – Lt Ext 1 In HI  
 Pin 6 – Lt Ext 1 In LO  
 Pin 5 – Rt Ext 1 In SH  
 Pin 4 – Rt Ext 1 In HI  
 Pin 17 – Rt Ext 1 In LO  
 Pin 16 – Lt Ext 2 In SH  
 Pin 15 – Lt Ext 2 In HI  
 Pin 3 – Lt Ext 2 In LO  
 Pin 2 – Rt Ext 2 In SH  
 Pin 1 – Rt Ext 2 In HI  
 Pin 14 – Rt Ext 2 In LO

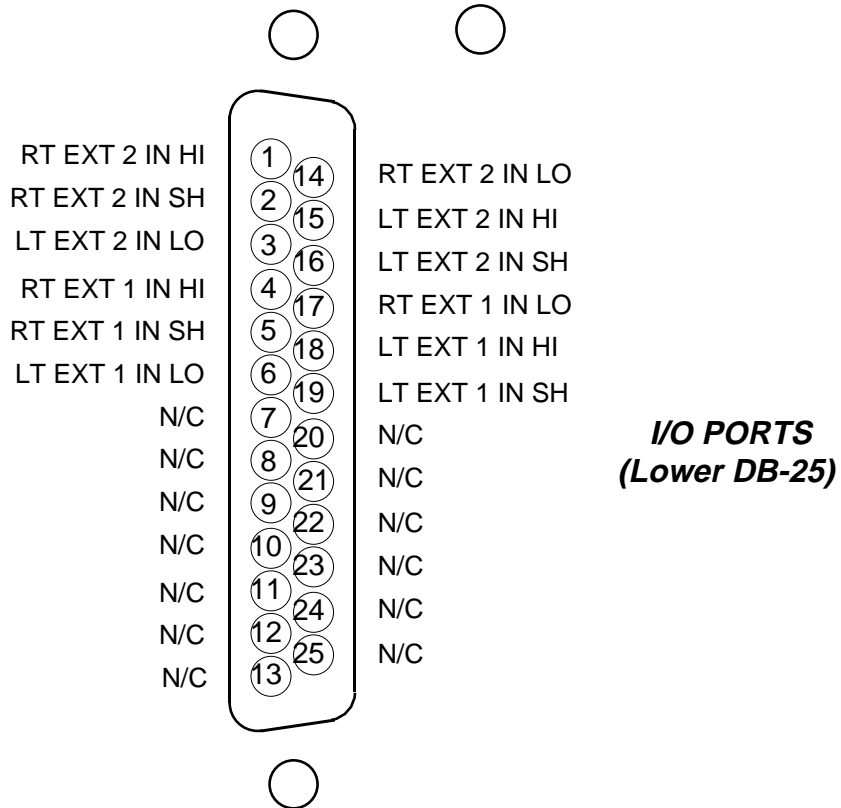
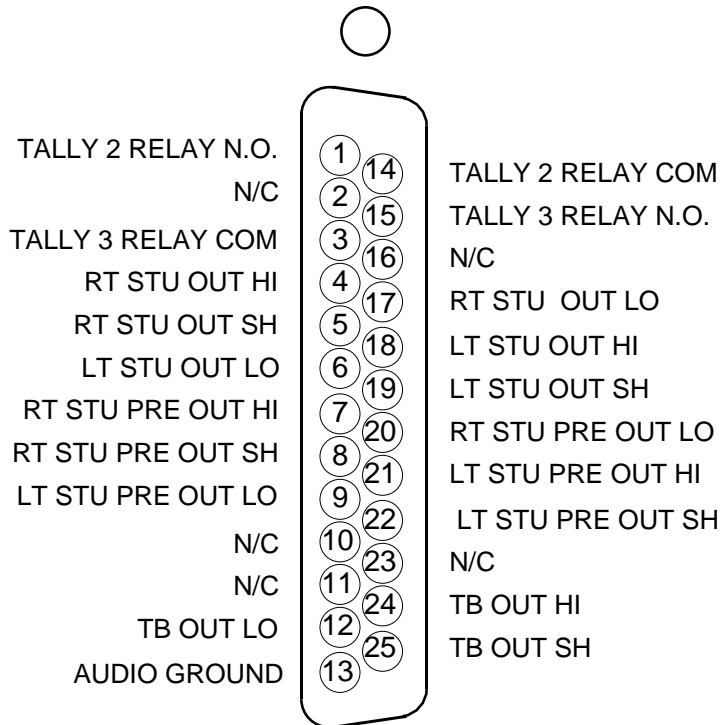


Typical DB-25 connector

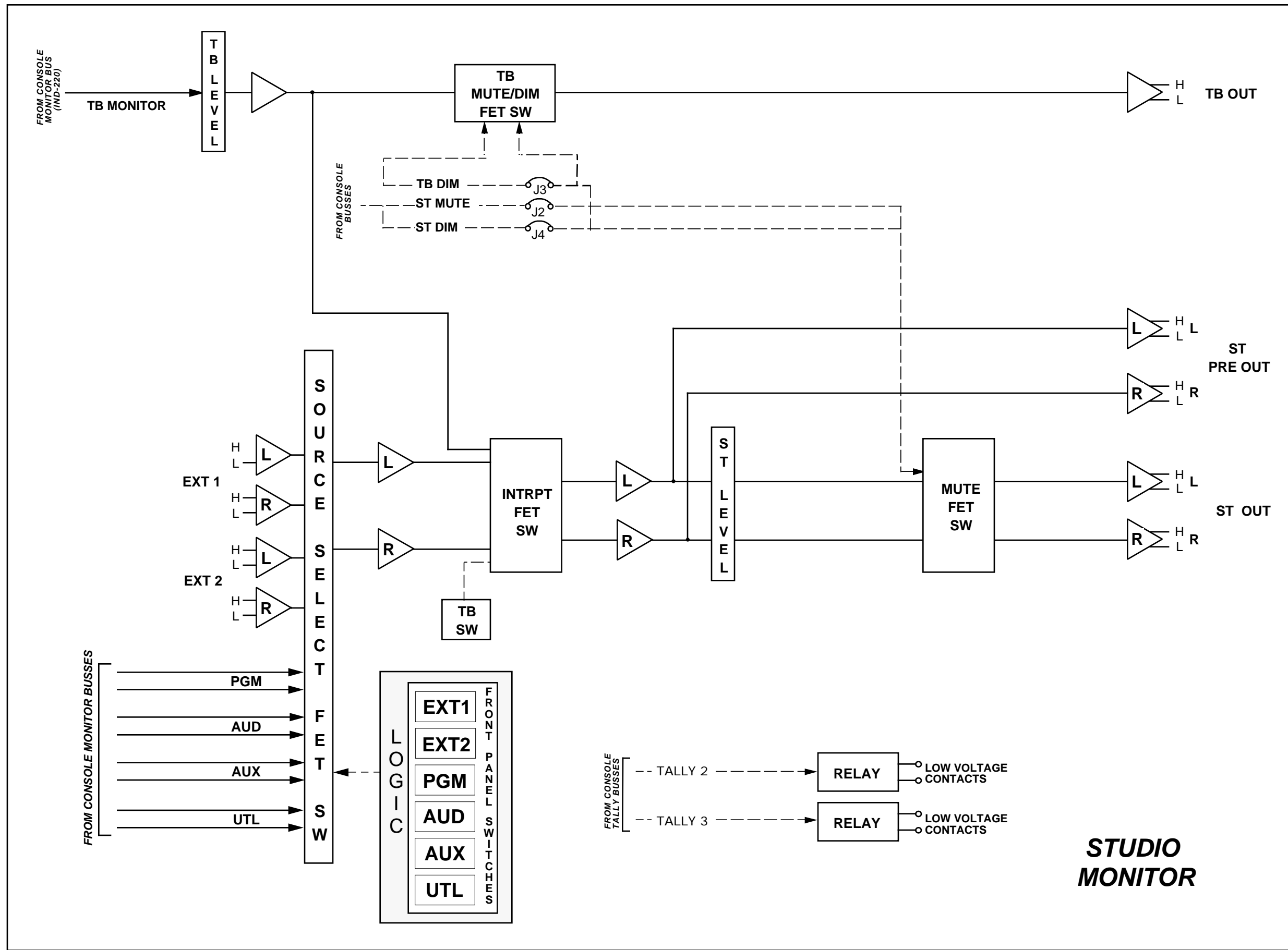
# SCD-220 Outputs

## DB Connector Pinouts

### I/O PORTS (Upper DB-25)



### I/O PORTS (Lower DB-25)



SCD-220 Studio Monitor - Signal Flow Diagram



# Virtual Dip Switch

## Chapter Contents

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Using the program .....	6-5
Input attenuation .....	6-8
Advanced operation.....	6-10
Ending the program .....	6-12
<b>Serial Interface Cable DB Connectors Pinout Drawing .....</b>	<b>6-13</b>

# Virtual Dip Switch

## Virtual Dip Switch Application Program

The application “VDip” is included with the Auditronics 220 Digital Audio console. It is designed to run on any Windows 95/98 compatible PC. When the correct serial port of the external PC that contains the VDip program is connected to the console’s serial interface port, the program can be used to alter certain configuration details (mutes, tallies, etc.) in the 220 console. These details can be saved to a file and called up at a later date, thus making it easy to change console set-ups by running the VDip program and restoring a previously saved file.

### Installation

To install VDip, first be sure that the PC you wish to use is Windows 95/98 compliant, has a CD ROM drive, has at least 50 Mb of hard disk storage available, and has an available serial port mapped to COM 1, COM 2, COM 3, or COM 4. Install the software on the PC by loading the VDip CD that came with the 220 console into the drive tray and then running the install wizard on the CD by double-clicking on “Setup.exe”. Note, if your CD ROM drive is configured for Auto Play, the install program will automatically start when you insert the VDip CD in the drive. Follow the instructions on the screen to complete the installation. When finished, store the CD in a safe place in case you need to install the software on another machine in the future.

### Hooking up the computer

Refer to the diagram on page 6-11 of this chapter showing the proper connections for the serial cable connecting the external PC with the 220 console serial interface port which is located on the lower DB-15 connector of the OMD module. Wire and test the cable. Note that there are certain jumper settings on the OMD module which must match the serial port on your external PC. The console is shipped with the 220 console serial interface set up for a normal RS-232 connection. If your external PC has an available RS-232 connection (which most do) you do not need to modify any of the settings on the OMD module. If you are planning on using an RS-485 connection to the 220 serial interface (to allow multiple consoles and/or multiple controllers to be connected on a common bus), your PC must have an available RS-485 port (most do not) and you must make changes to the settings on the OMD module to set up the proper format, addresses, and terminations for an RS-485 system. If

you are planning to use RS-485, consult the “Serial Interface” part of this manual (page 3-5) for the details on configuring for RS-485. If you are not certain which interface to use or have questions on these details, consult our Auditronics Technical Service engineers. Establishing serial communications between two different pieces of equipment can sometimes be frustrating; we can provide answers to your questions, and even pre-made cables to make the process easier.

### Running the program

Be sure that the serial interface cable is plugged into the OMD lower DB-15 connector on one end, and the proper COM port on your PC at the other. Also be sure that the LOC/REM button on the front of the OMD module has been switched to “Remote”. The VDip program will not communicate with the console unless the console has been set to “Remote”. Start the program as you would any Windows program by double-clicking on its shortcut, or choosing the program from the START/PROGRAMS menu. Once the program opens, you should see a screen similar to figure 1. This is the start-up screen for the program, and is used

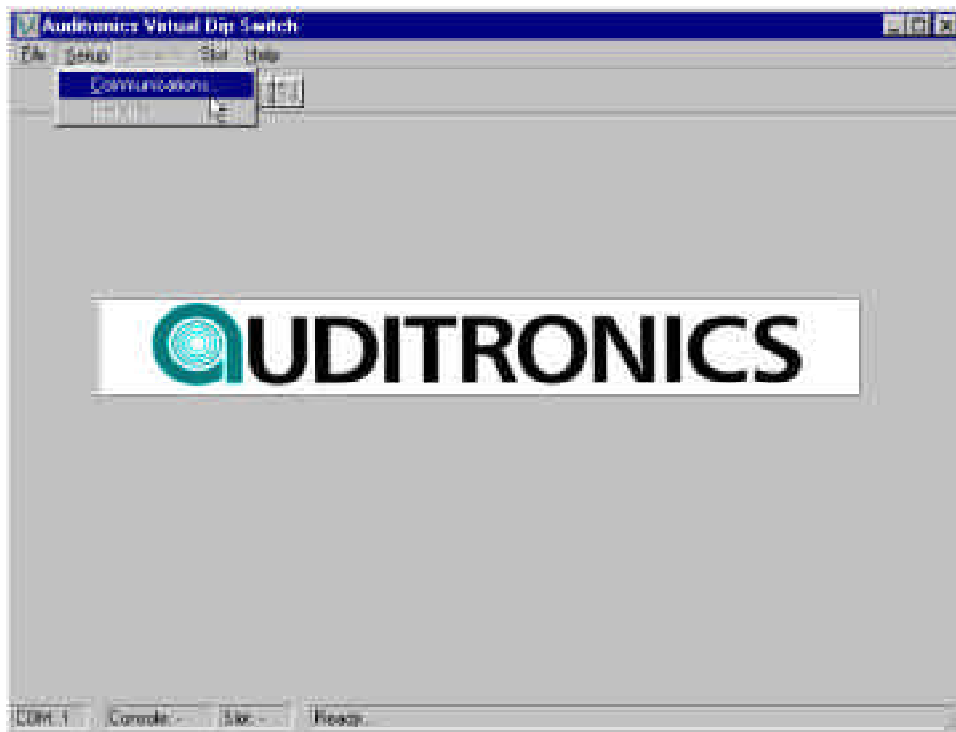


Figure 1

any time you wish to alter the connection status for the program. Select “Communications...” from the “Setup” menu with your mouse and then select the correct “COM” port to match your computer (figure 2). Also verify that the “Virtual Dip Switch Program ID” is set to “1”. This is the

standard setting (for networked operations this DIP switch setting must be altered; consult Auditronics technical support). Leave the settings for Baud Rate and Handshaking as shown in figure 2. Once the correct

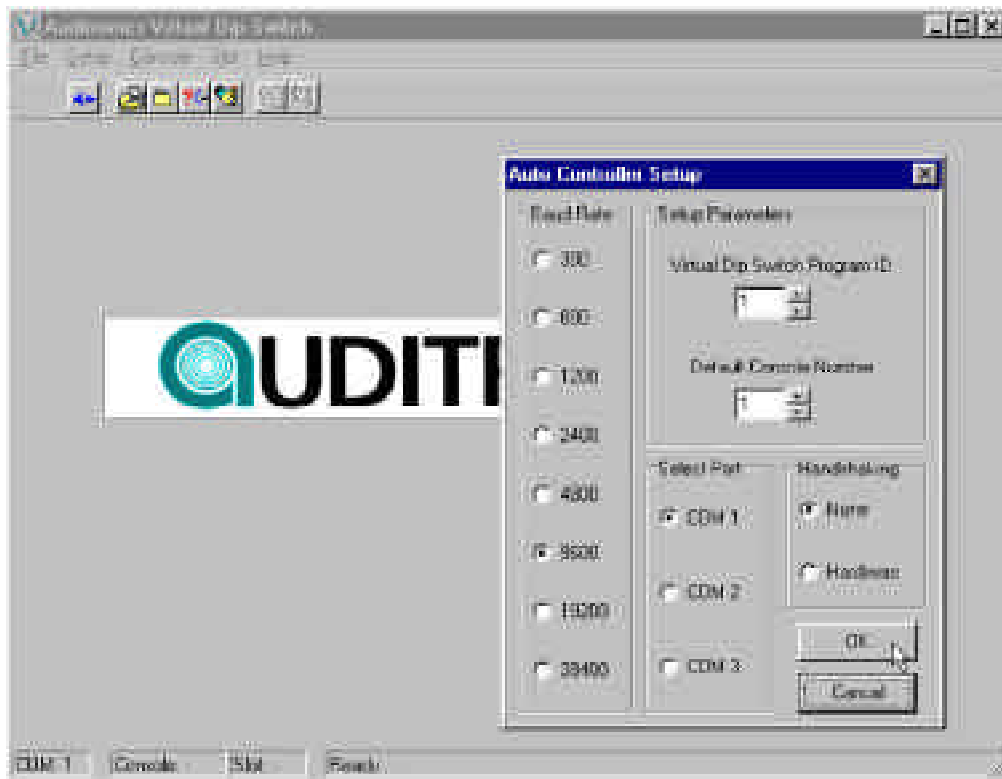


Figure 2

“COM” port is selected, click on “OK” to accept these settings. Click on “Connect” under the “file” menu to establish communications with the 220 console (figure 3). Verify that the Console ID is set to “1” (standard setting).



Figure 3

### Using the program

Once you have established communications with the console, the various screens and menus can be used to control the console functions. The program will inquire about the current settings in the console (see Figures 4, 5). This screen shows the status of all of the input module functions, one module at a time. Functions can be changed by clicking on the function with your mouse; a selected function shows a check box, a de-selected function shows a blank box.

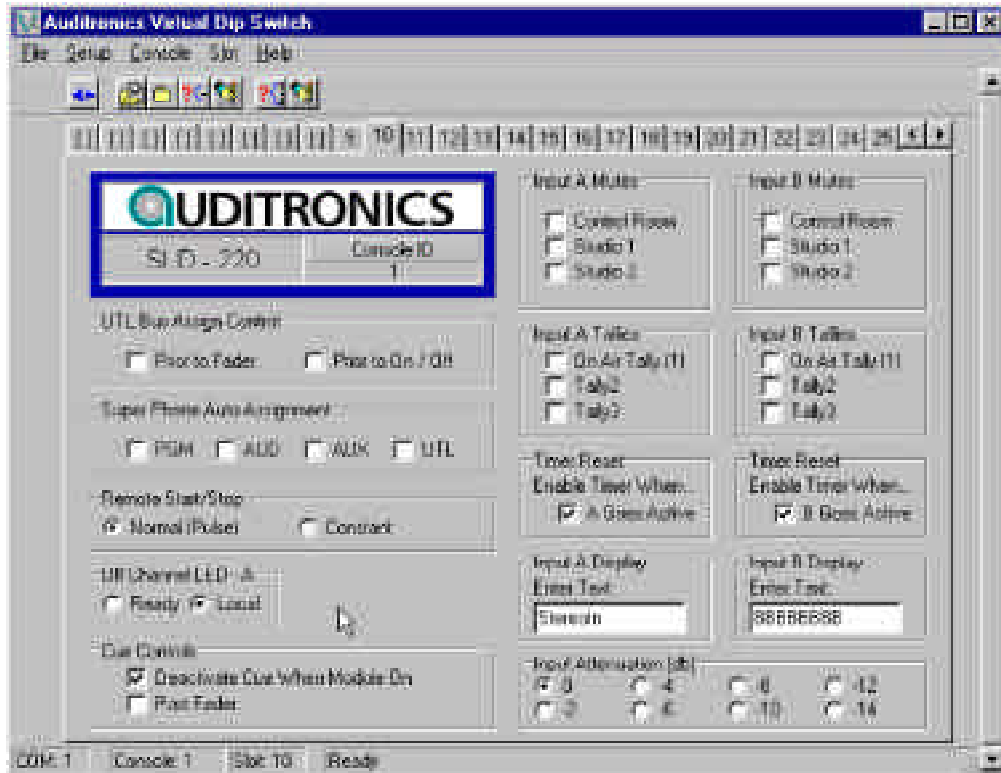


Figure 4



Figure 5

In a similar fashion, your mouse can be used to alter the console mutes and other settings by clicking on the function to enable it on source “A”, “B”, both, or neither. Once you have finished setting the configuration that you wish for an input channel, you send the information to the console by selecting “Write Current” under the “Slot” menu (figure 6).

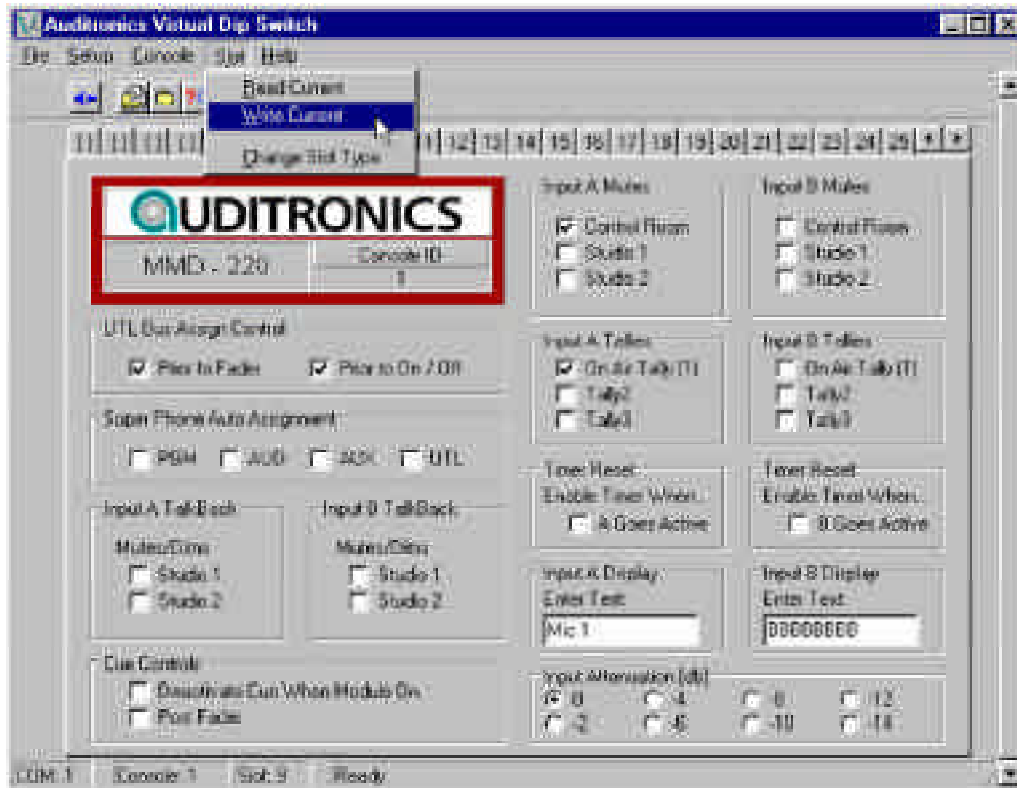


Figure 6

The information is then sent to the console. To select another input channel to modify, choose its corresponding slot number from the selection bar near the top of the status display screen. The status screen will change to show the type and settings of the module in the slot you have selected.

If you choose a slot number that has no module installed, the status screen will show “NO CARD” (figure 7). By selecting each slot and changing

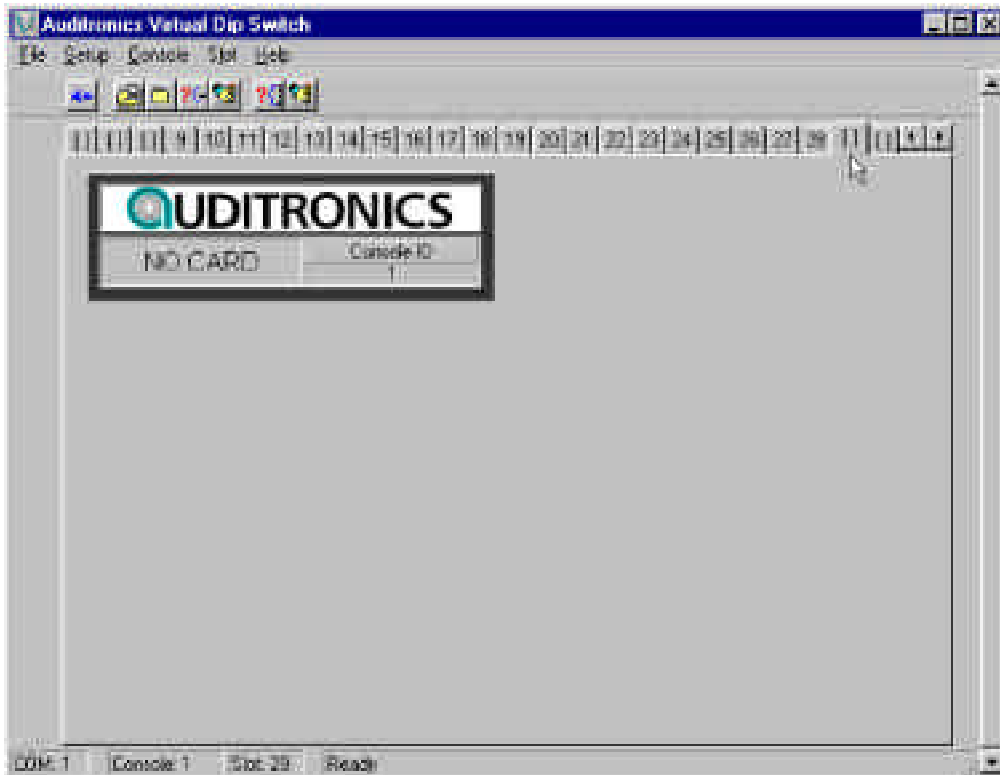


Figure 7

settings, the entire 220 console can be configured to suit your application. Remember, you must select a channel to be modified before you can make changes, and you must “Write Current” after making the changes to pass them on to the console.

### Input attenuation

This exclusive Wheatstone digital console feature allows the user to digitally “trim” the gain back on any input module. While this feature is most useful for reigning in “hot” digital domain sources on SRC input modules, digital attenuation may also be applied to any analog microphone or line level source. Note that the digital attenuation occurs after the analog pre-amp stages, therefore, clipping in those stages can not be corrected with this feature (use analog trim pots located on the input module).



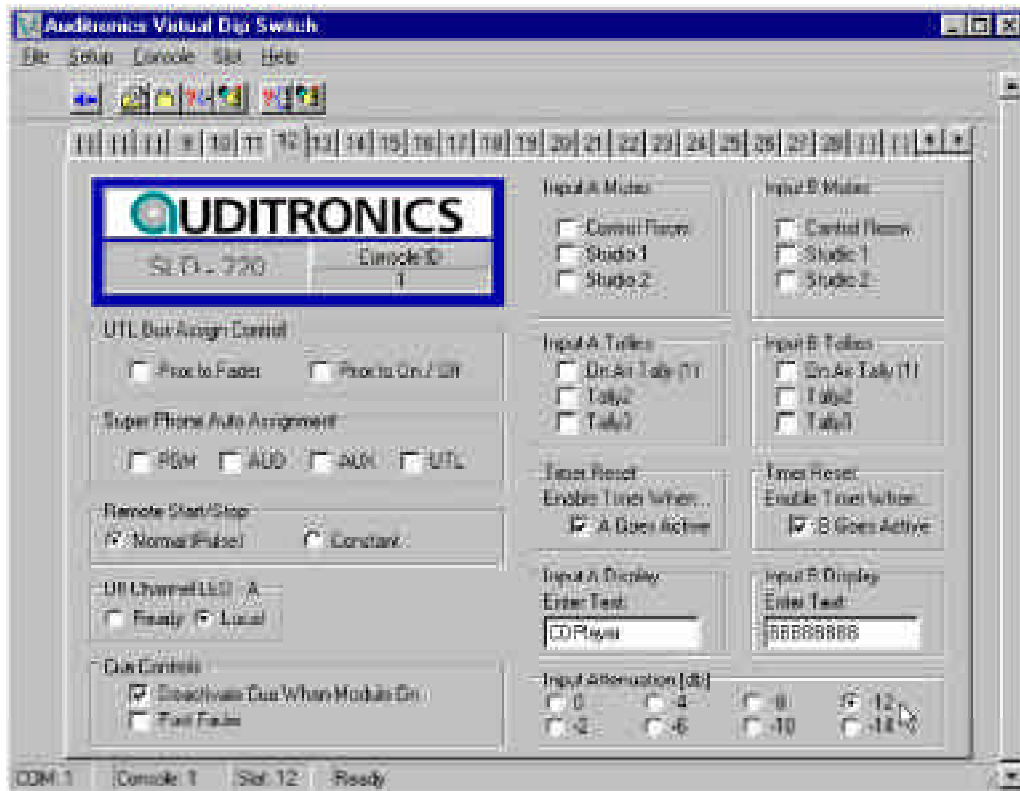


Figure 8

In the lower right corner of the VDip screen (figure 8) there are eight mutually exclusive radio buttons for selecting the desired input attenuation. The attenuation choices are 0db to -14dB in 2 dB steps. Simply click on the appropriate radio button to select the attenuation value and then “WRITE” the selected change to the module. You can use the “Write Slot” toolbar icon or the “Slot” menu item to write the current attenuation setting along with any other module settings. The attenuation setting is immediately written to the corresponding channel.

Why use digital attenuation?

Many of today’s digital audio sources (especially modern rock, rap, etc.) are produced to take full advantage of the available maximum digital output level (0dBFS). Playback of these tracks from a CD player’s digital output result in *average* digital domain levels -6 to -3dBFS or higher! That translates to average analog levels of +18 to +21 dBu; very close to the console’s clipping point of +24dBu. Connecting the digital output from a CD player to a console input with gain on the fader can put the operator in a position of potentially clipping the CD playback. In this case, adding -12dB of attenuation will re-calibrate the input module so that digital clipping of CD source material will be impossible even if the operator pushes the fader all the way to the top.

### Advanced operation

After using the VDip program for a while, its operation becomes routine. There are some advanced features to make it easier to do repetitious tasks. Underneath the top menu bar of the status screen is a row

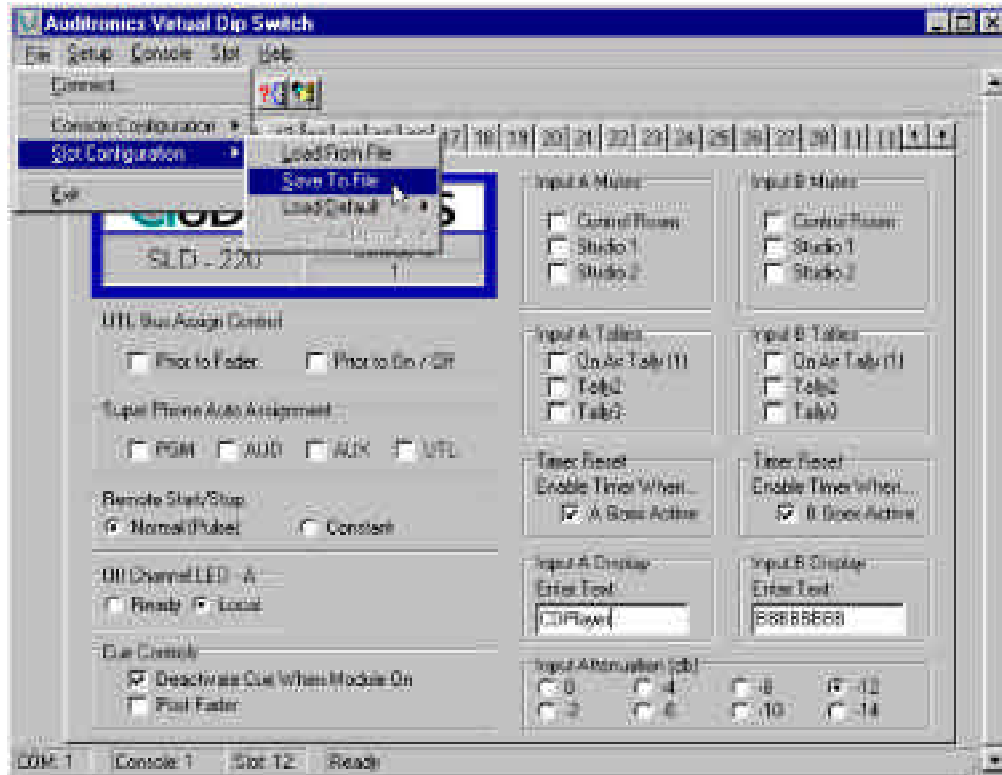


Figure 9

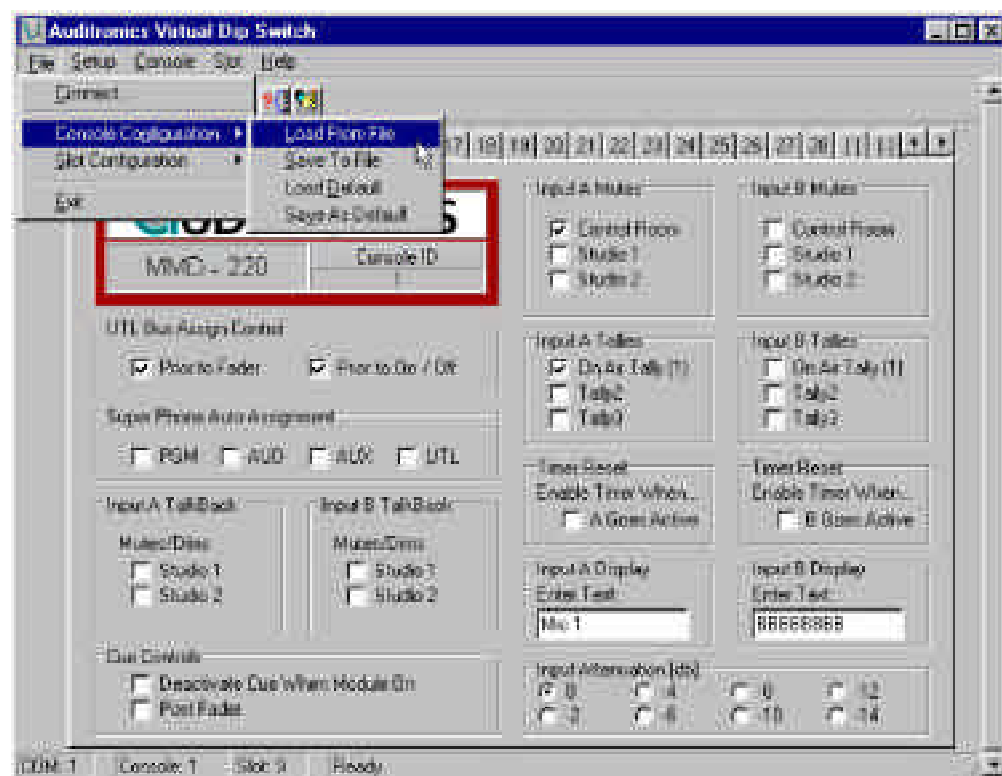


Figure 10

of “buttons” designed to perform routine tasks like “Write Current” and “Read Current”. Moving your mouse pointer over a button and leaving it there for a moment will bring up a short “hint” message on screen that explains the button’s function. Also, under the “Console Configuration” and “Slot Configuration” menus (under “File”) are functions called “Save To File” (figure 9) and “Load From File” (figures 10). Choosing “Save To File” allows you to save all of the console settings under a filename which you can retrieve later using the “Load From File” function. This makes it easy to recall complex but repeatable text and settings information into the console, especially if you name the file something obvious like “7am”, etc. (figure 11).



Figure 11

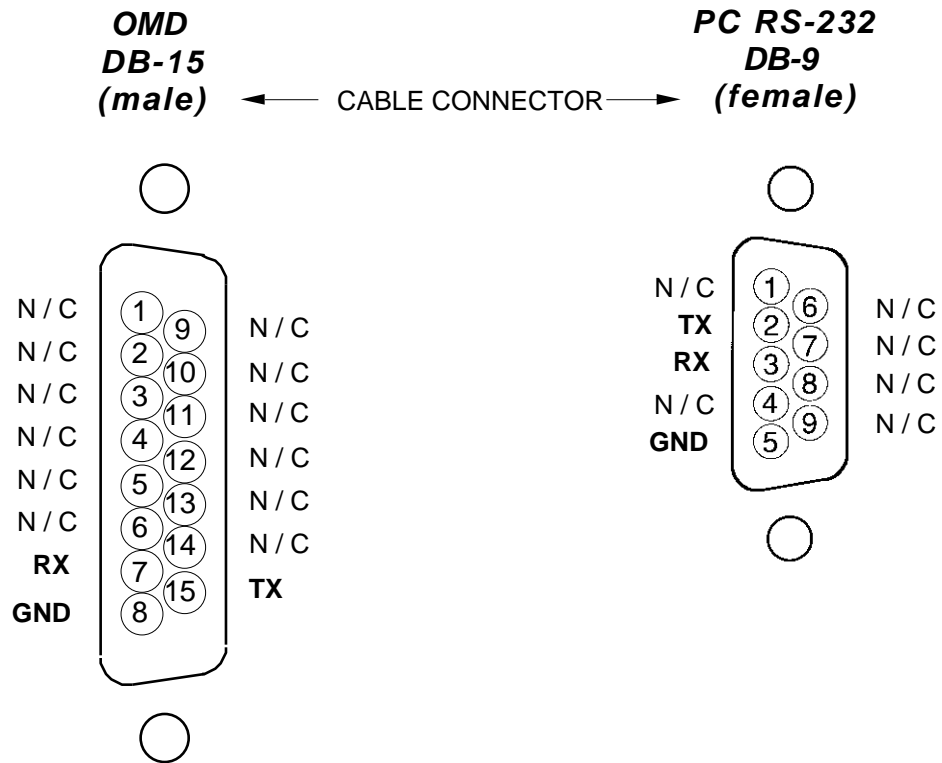
You can have a large number of files saved, limited only by your ability to give them suitable names.

**Ending the program**

Once the console text and settings are to your liking, and have been written to the console, and saved to a file if desired, the VDip program can be ended by selecting “Exit” from the “File” menu. The console settings will remain as you have set them until the next time the VDip program is run. You can remove the computer connection or leave it hooked up, as you desire. Note that if you leave the connection to the computer in place, you should set the LOC/REM switch on the OMD module to “local” in case some other program on the computer tries to write to the COM port. It is unlikely that a stray message sent out the COM port will cause any changes because it will be ignored unless it is sent in the precise 220 serial protocol, but simply switching the console to “local” provides extra insurance.

# Serial Interface Cable

(for use with Virtual Dipswitch)  
DB Connector Pinouts



# Superphone Input

## (SPD-220; optional)

### Chapter Contents

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# Superphone Input (SPD-220)

## Module Overview

SPD-220 input modules are used for telephone call-ins. Each module can handle two callers. Caller signals enter the module from your station hybrid; each caller has its own fader.

Output switches assign callers to any combination of the console's four stereo outputs: PGM (program), AUD (audition), AUX (auxiliary) and/or UTL (utility).

## Caller Set-Ups

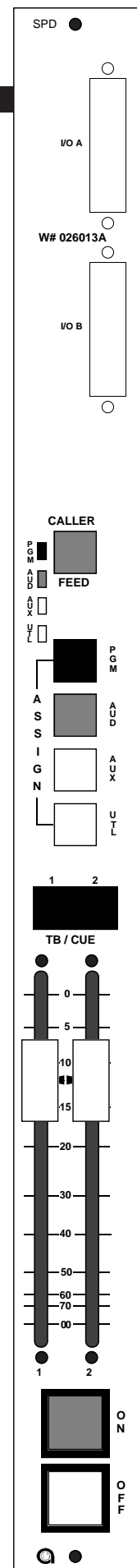
Pre-air segment communication between the console operator (DJ) and callers is via TB/CUE buttons (2) which place the caller's voice on the console's cue speakers (or control room speakers/operator's headphone if the CRD-220 module's cue interrupt function has been so programmed). These cue signals can be internally programmed pre or post fader.

The caller hears the DJ in one of two ways:

1) The DJ can assign his microphone input module to an unused output bus—say UTL—and the DJ then selects the UTL input with the CALLER FEED switch. This sends a dedicated (digitally generated) version of the UTL bus signal to the SPD-220 module's hybrid output, where it is ultimately heard by the caller through his telephone. This mix minus source select method can also be used to preplay a musical segment (or any other program content) for the caller off-air. Take the IND-220 input module handling the desired music cut and assign it to an unused output bus; select the same bus as the caller's mix minus source input and he will hear it off-air.

Microphone input modules can be internally programmed to have their Utility bus feed tapped pre-fader, pre-ON/OFF, making this a logical set-up for the DJ's mic input if you do a lot of call-in work, since the DJ's voice will always be present on the console's Utility output bus regardless of fader or ON/OFF settings on his mic module (which must still be assigned to UTL, however).

2) The DJ's voice signal can be inputted through a special EXT IN port at the SPD-220 module's DB-25 connector. This second method eliminates the need to select a mix minus input everytime you want to talk off-air to the caller. An easy source choice here would be DJ mic module's INSERT OUT port.



**Automatic Features**

Faders can be optionally equipped with end-of-travel CUE switches, which will allow you to talk off-air with a caller with a simple fader overpress. One of the faders can also have an optional EFS type switch to automatically turn the module on when it is run up.

The channel ON (red) and OFF (amber) switches are at the bottom of the module. These can be programmed (via internal PCB-mounted dipswitches) to activate control room and studio mutes, tallies, timer restart and automatic cue drop-out. The ON switch can also automatically trigger an external tape machine for recording purposes (see page 7-6).

Cue Dropout can also be programmed internally (page 7-5), making it unnecessary to de-activate caller setup buttons before going live; simply pressing the module’s ON switch will automatically do this for you.

**Inputs and Outputs**

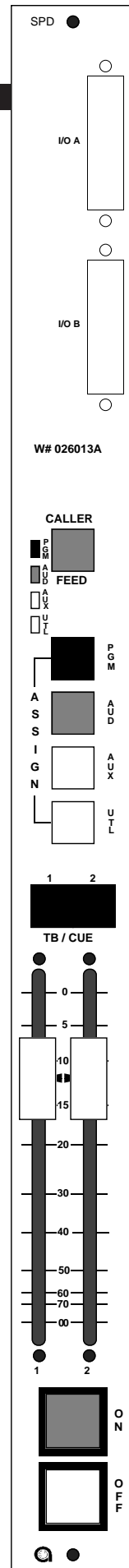
All audio and control signals hook-ups are made via two multi-pin DB-25 connectors mounted at the top of the module and located underneath the hinged meterbridge. The upper connector handles hybrid input signals (i.e., caller input) and the external input mentioned on page 7-2. The lower connector handles outputs, including the module 1 and 2 feeds to your station hybrid (the phone signals going to your callers).

The module also has three addition output feeds on the lower DB-25 connector. These are generally used for recording purposes:

Composite Out – This includes everything: DJ, callers, music beds, etc. Generally used to to record phone segments in advance of actual airplay.

Composite Minus Callers – This includes everything but the callers.

Callers Only – No talent, no DJs, no music; just caller voices.





## Internal Programming Options

Internal programming is accomplished via two 4-position printed circuit board (PCB) mounted dipswitches (SW2, SW3), and two PCB-mounted slide switches (SW1, SW4). This card also contains PCB-mounted trimpots which may be used to set the module's various output feed levels.

For PCB programming, we will assume you are holding the removed module upright, component side towards you, with gold-plated card fingers to the left and the module faceplate to the right. This will enable you to read the control legends silkscreened next to each switch. Note when a dipswitch position is thrown to the right (towards the module's faceplate) it is ON.

### External In

In addition to feeding the DJ's voice signal to the callers via the module's mix minus source select switching, it may also be brought directly in through an EXT IN port on the module's upper DB-25 connector. PCB-mounted slide switch SW1, mounted on the top of the card, activates this external port when thrown to the left (this is the factory default setting).

### Cue Pre/Post

The module's CUE signals (caller setup buttons 1 & 2) can tap pre or post fader. When slide switch SW4 (upper center) is UP they are PRE, when DOWN they are POST. (Factory default setting is PRE.)

### Mutes

When the SPD-220 phone channel ON switch is pressed, it can activate console mute functions. The first three positions of dipswitch SW2, mounted slightly above of the module's CALLER FEED button, determines which of the console's two mute lines will be activated:

- SW2 position 1 mutes the control room when the phone module is ON\*   \*factory default setting
- SW2 position 2 mutes studio when the phone module is ON

### 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.

- SW2 position 4 activates timer restart when the phone module's ON/START switch is pressed\*   \*factory default setting

### Tallies

Turning the module ON can activate a remote tally indicator. There are three tally control lines: on-air, tally 2 and tally 3. The first three positions of dipswitch SW3 (just below dipswitch SW2) program these functions:

- SW3 position 1 activates the on-air tally control line
- SW3 position 2 activates tally 2
- SW3 position 3 activates tally 3

Remote tallies are hooked-up to the console at the Control Room module (CRD-220)

## Cue Dropout

Dipswitch SW3 position 4, when activated, will cause CUE (i.e., caller set-up buttons 1 & 2) to turn off when the module's ON/START switch is pressed. This is the factory default setting.

## Gain Trimpots

There are eight PCB-mounted trimpots (to the left of DB-25 connectors). They are used as follows:

- CR1 - sets Callers 2 In port input gain
- CR2 - sets Callers 1 In port input gain
- CR3 – sets the module's output level to Hybrid 2
- CR4 – sets the module's output level to Hybrid 1
- CR5 – sets the module's "callers only" output level
- CR6 – sets the module's "composite minus callers" ("talent") output level
- CR7 – sets the module's "composite" output level
- CR8 – sets the External In port input gain

Factory default settings for these trimpots is UNITY GAIN.

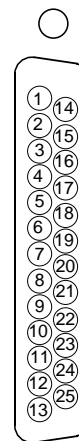
## Hook-Ups

As stated before, all user wiring to and from SPD-220 modules takes place at DB-25 multi-pin connectors mounted at the top of the module and located underneath the hinged meterbridge. There are two connectors per module: the upper one handles audio input signals; the lower audio outputs and control signals. A pinout drawing on page 7-7 shows all wiring connections at a glance.

### Audio Connections (upper DB-25 "A" Connector)

These include External In and station Hybrid 1 & 2 inputs. All are +4dBu balanced analog mono.

- Pin 25 – Ext In SH
- Pin 24 – Ext In HI
- Pin 12 – Ext In LO
- Pin 22 – Hybrid 1 In SH
- Pin 21 – Hybrid 1 In HI
- Pin 9 – Hybrid 1 In LO
- Pin 8 – Hybrid 2 In SH
- Pin 7 – Hybrid 2 In HI
- Pin 20 – Hybrid 2 In LO
- Pins 2,5,11,13,16 and 19 – Audio Ground



Typical DB-25 connector

## Audio and Control Connections (lower DB-25 “B” Connector)

These include outputs to the station hybrid, module output composite feeds (for recording) and remote tape machine START/STOP ports.

- Pin 25 – Composite Out SH
- Pin 24 – Composite Out HI
- Pin 12 – Composite Out LO
- Pin 11 – Composite Minus Callers Out SH
- Pin 10 – Composite Minus Callers Out HI
- Pin 23 – Composite Minus Callers Out LO
- Pin 22 – Callers Only Out SH
- Pin 21 – Callers Only Out HI
- Pin 9 – Callers Only Out LO
- Pin 8 – To Hybrid 1 Out SH
- Pin 7 – To Hybrid 1 Out HI
- Pin 20 – To Hybrid 1 Out LO
- Pin 19 – To Hybrid 2 Out SH
- Pin 18 – To Hybrid 2 Out HI
- Pin 6 – To Hybrid 2 Out LO
- Pin 17 – Start/Stop Common
- Pin 16 – Stop
- Pin 15 – Start
- Pin 4 – Start/Stop Common
- Pin 3 – Stop
- Pin 2 – Start

The last six callouts are simply two parallel-connected sets of pins for the same control port. 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. These are opto isolated outputs. The Start/Stop Common connects to the opto emitters, while Stop and Start connect to the opto collectors. Observe correct polarity when using these outputs.

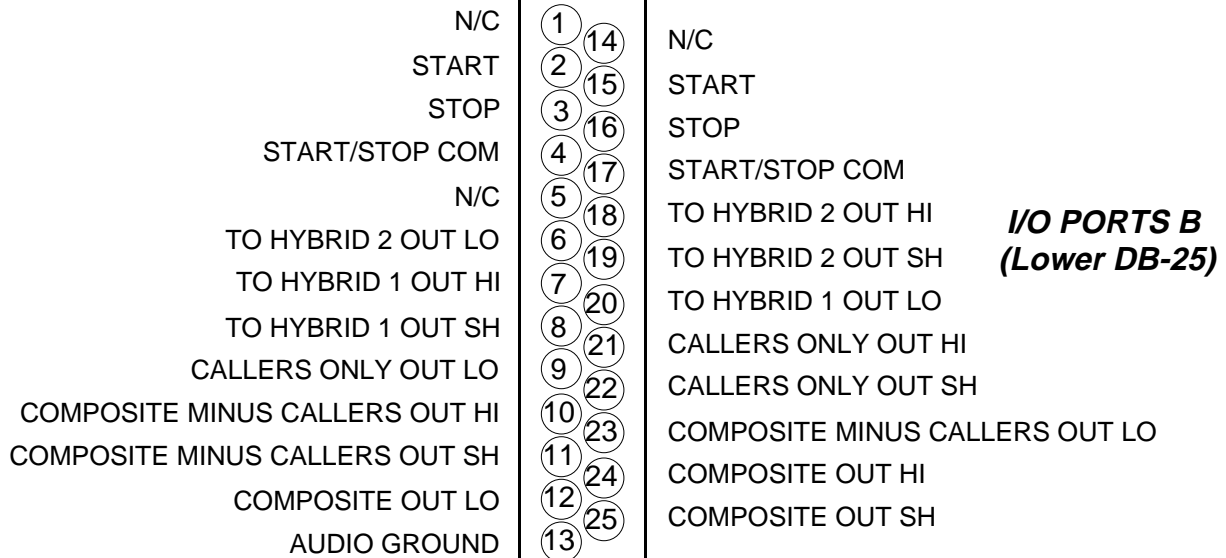
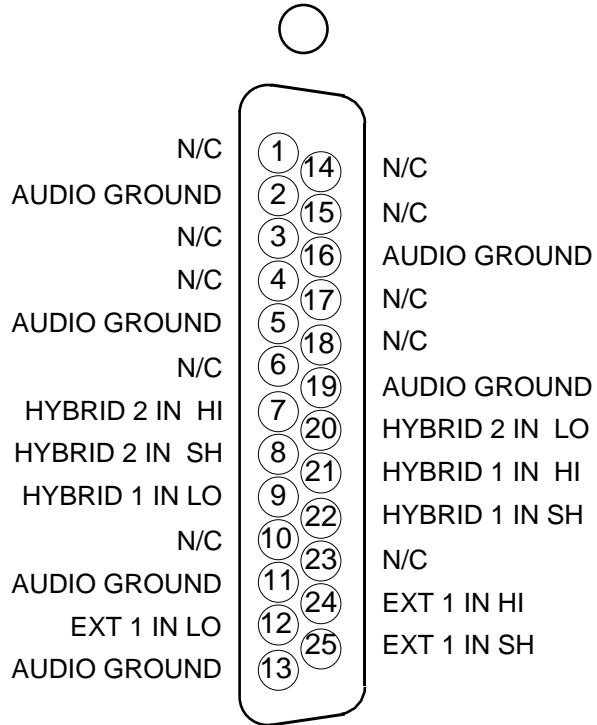


Typical DB-25 connector

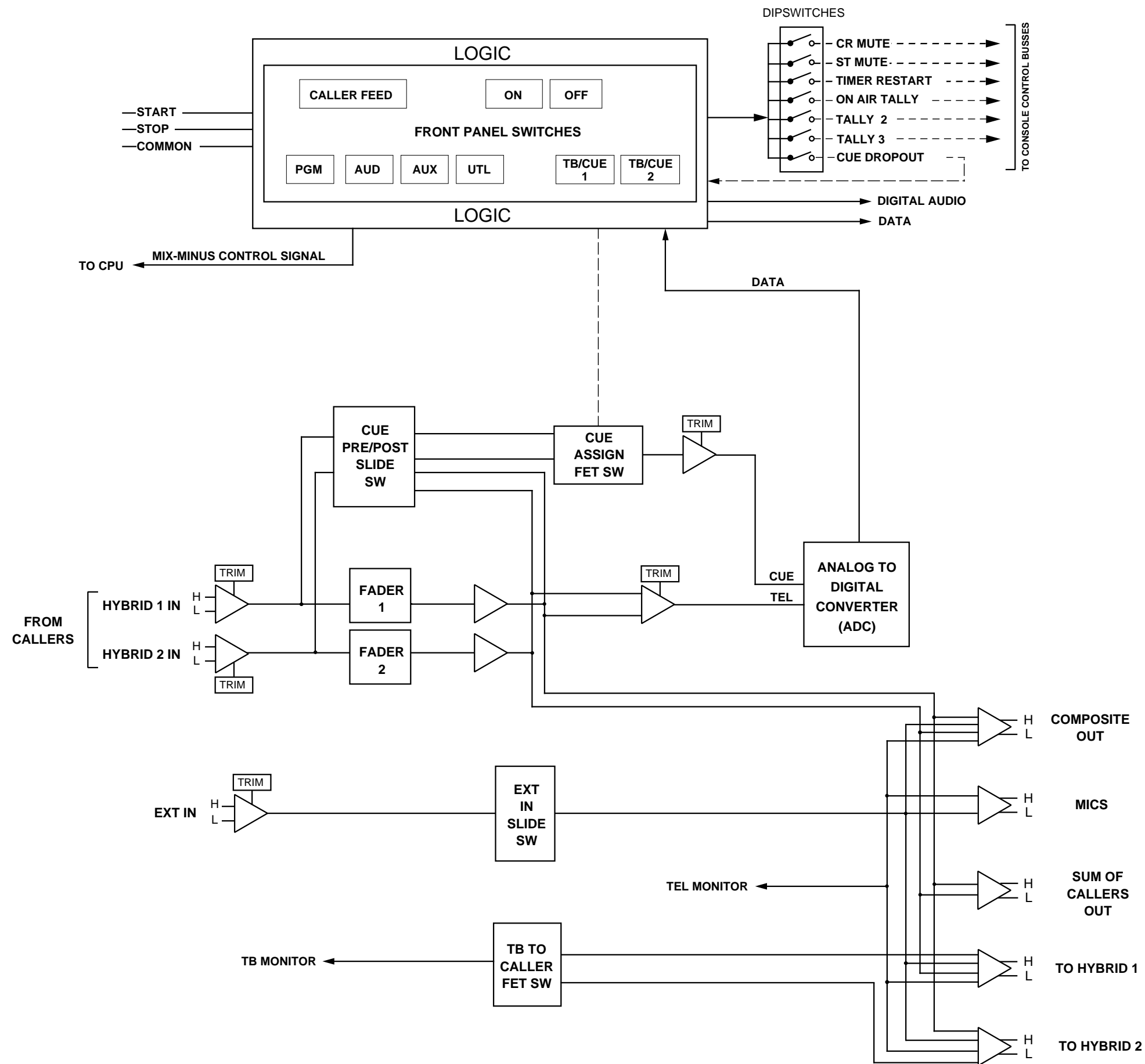
# SPD-220 Superphone

## DB Connector Pinouts

### I/O PORTS A (Upper DB-25)



### I/O PORTS B (Lower DB-25)



**SUPERPHONE INPUT**

SPD-220 Superphone Module - Signal Flow Diagram

# Line Preselector Module- Analog

(LS-220; optional)

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# Line Preselector Module- Analog

(LS-220; optional)

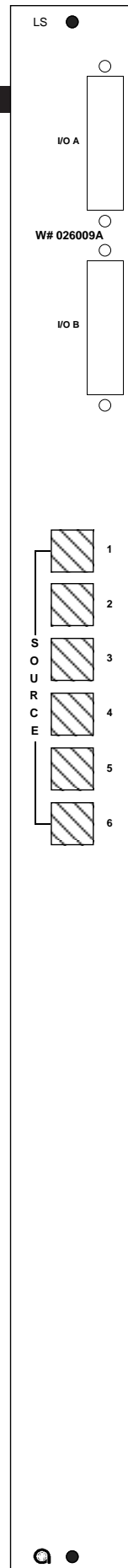
## Overview

This optional 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-220 module.



## Hook-Ups

### LS-220 Audio Inputs 5, 6 (Upper DB-25 “A” Connector)

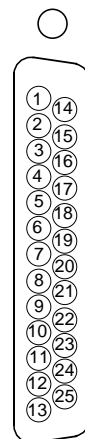
- Pin 25 – Line 5 Lt In SH
- Pin 24 – Line 5 Lt In HI
- Pin 12 – Line 5 Lt In LO
- Pin 11 – Line 5 Rt In SH
- Pin 10 – Line 5 Rt In HI
- Pin 23 – Line 5 Rt In LO
- Pin 22 – Line 6 Lt In SH
- Pin 21 – Line 6 Lt In HI
- Pin 9 – Line 6 Lt In LO
- Pin 8 – Line 6 Rt In SH
- Pin 7 – Line 6 Rt In HI
- Pin 20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

### LS-220 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

### LS-220 Audio Inputs 1-4 (Lower DB-25 “B” Connector)

- 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
- 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

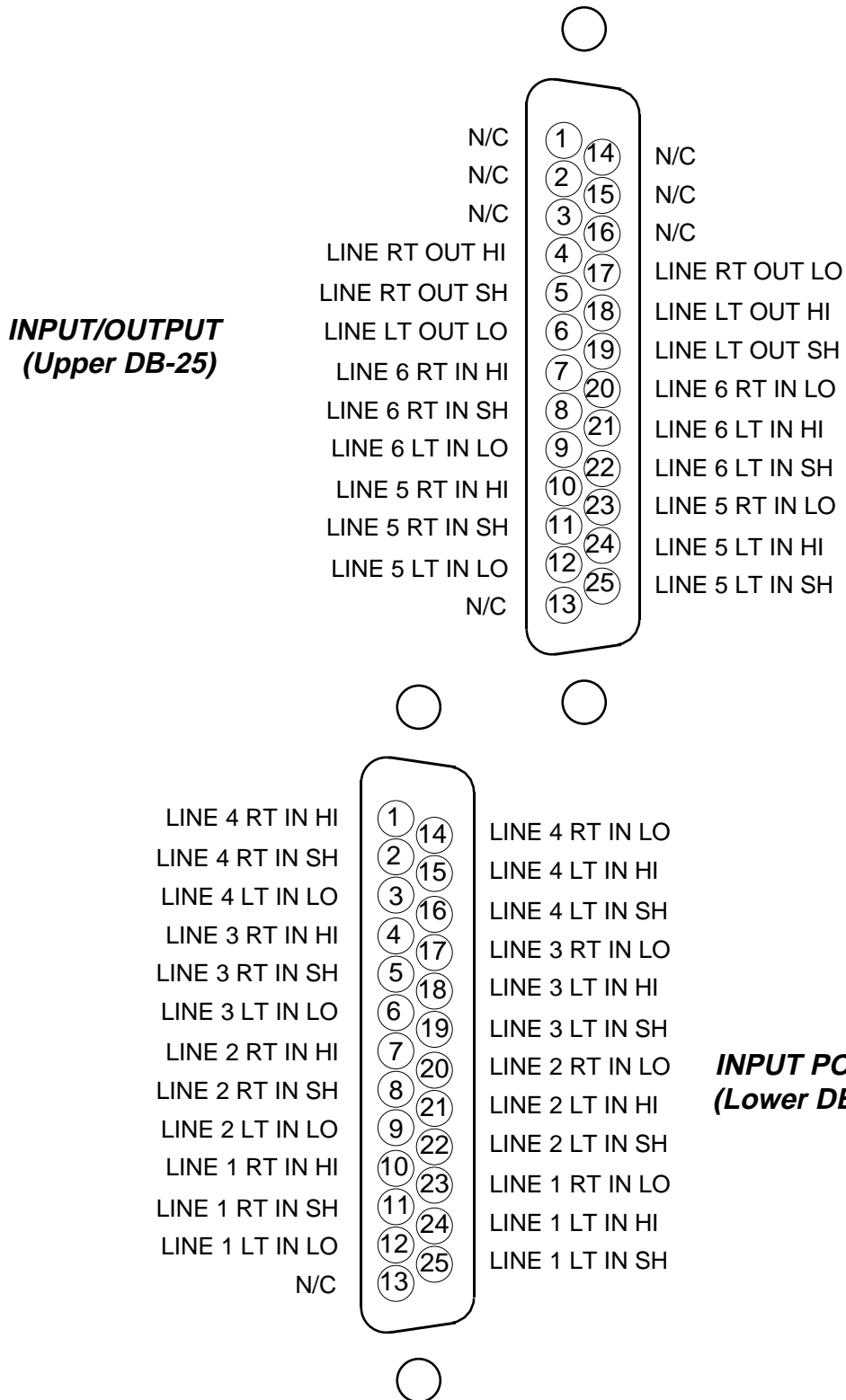


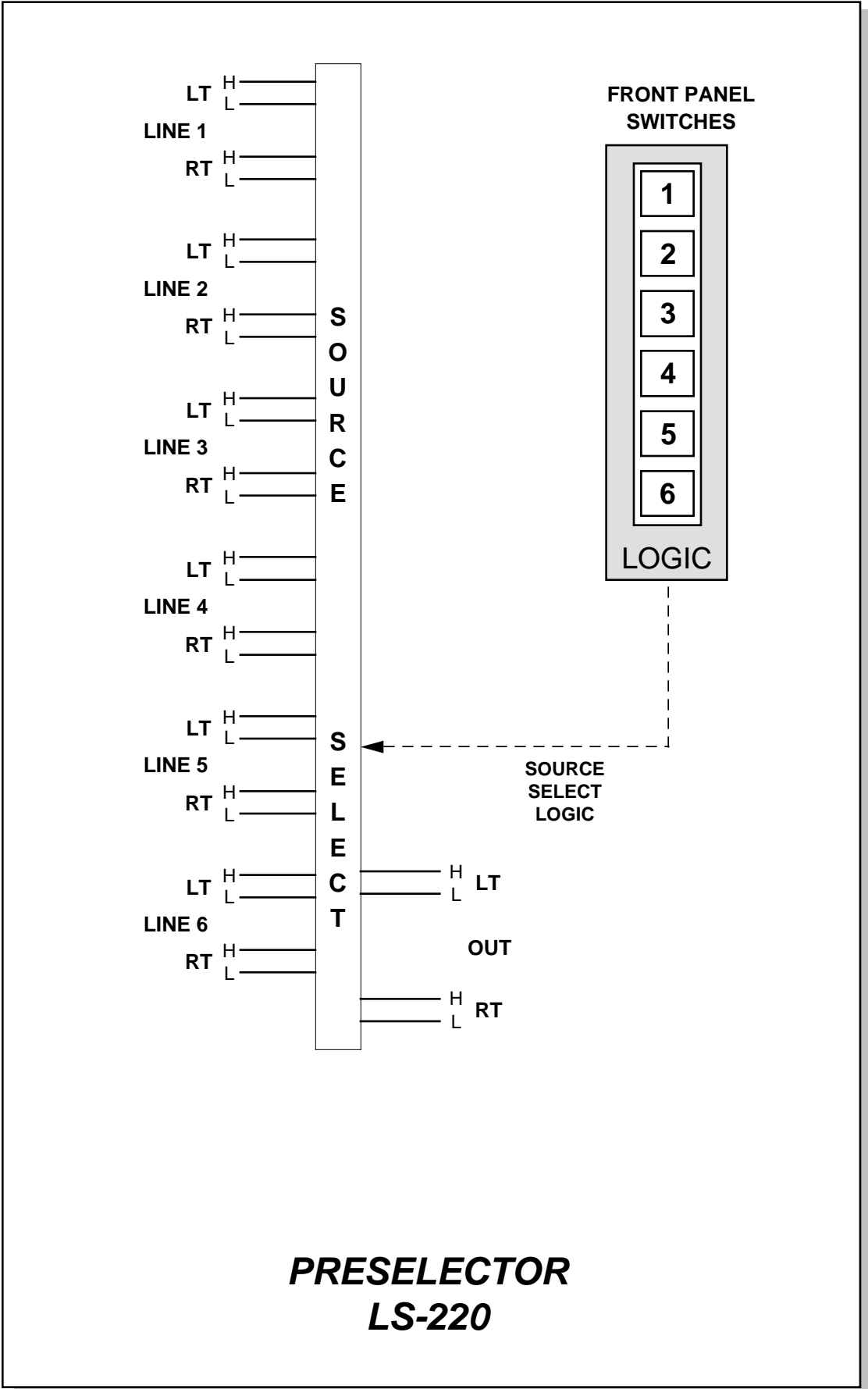
Typical DB-25 connector



# LS-220 Line Selector Module

## DB Connector Pinouts





**PRESELECTOR  
LS-220**

LS-220 Line Preselector - Signal Flow Diagram

# Tape Remote Module

## (TR-220; optional)

### Chapter Contents

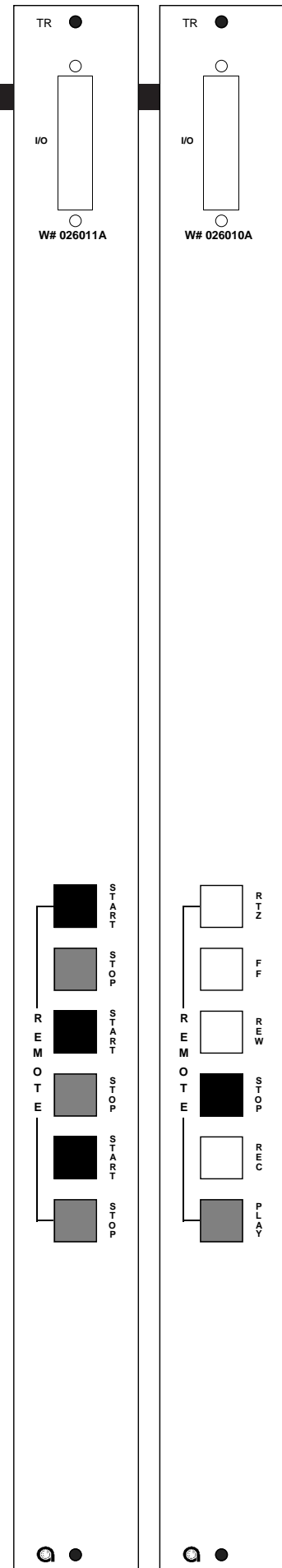
<b>Module Overview .....</b>	<b>9-2</b>
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Full-Function Control I/O .....	9-4

# Tape Remote Module

## (TR-220; optional)

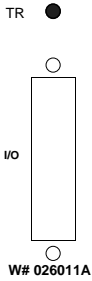
### Module Overview

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, << (for REW), >> (for FF), 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.

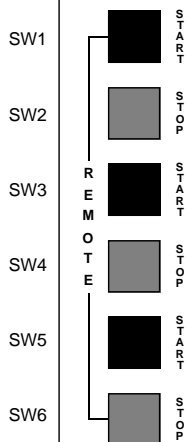


# TR-220/SS Tape Remote Module

## DB Connector Pinouts



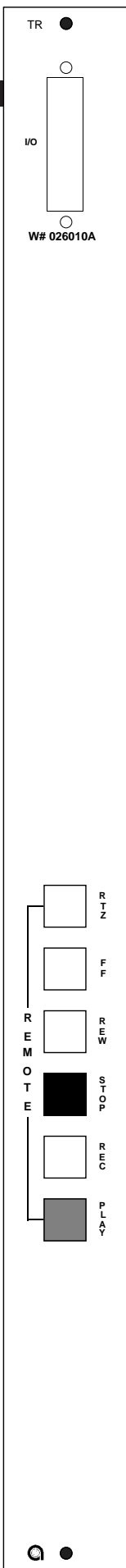
### I/O CONTROL PORTS (DB-25)



SW1 (START) LED+	1	14	SW1 (START) LED-
SW1 (START) N.O.	2	15	SW1 (START)COMMON
SW2 (STOP) LED+	3	16	SW2 (STOP) LED-
SW2 (STOP) N.O.	4	17	SW2 (STOP) COMMON
SW3 (START) LED+	5	18	SW3 (START)LED-
SW3 (START) N.O.	6	19	SW3 (START) COMMON
SW4 (STOP) LED+	7	20	SW4 (STOP) LED-
SW4 (STOP) N.O.	8	21	SW4 (STOP) COMMON
SW5 (START) LED+	9	22	SW5 (START) LED-
SW5 (START) N.O.	10	23	SW5 (START) COMMON
SW6 (STOP) LED+	11	24	SW6 (STOP) LED-
SW6 (STOP) N.O.	12	25	SW6 (STOP) COMMON
N/C	13		

# TR-220/FF Tape Remote Module

## DB Connector Pinouts



### I/O CONTROL PORTS (DB-25)

SW1 (RTZ) LED+	1	14	SW1 (RTZ) LED-
SW1 (RTZ) N.O.	2	15	SW1 (RTZ) COMMON
SW2 (FF) LED+	3	16	SW2 (FF) LED-
SW2 (FF) N.O.	4	17	SW2 (FF) COMMON
SW3 (REW) LED+	5	18	SW3 (REW) LED-
SW3 (REW) N.O.	6	19	SW3 (REW) COMMON
SW4 (STOP) LED+	7	20	SW4 (STOP) LED-
SW4 (STOP) N.O.	8	21	SW4 (STOP) COMMON
SW5 (REC) LED+	9	22	SW5 (REC) LED-
SW5 (REC) N.O.	10	23	SW5 (REC) COMMON
SW6 (PLAY) LED+	11	24	SW6 (PLAY) LED-
SW6 (PLAY) N.O.	12	25	SW6 (PLAY) COMMON
N/C	13		

# Meterbridge

## Chapter Contents

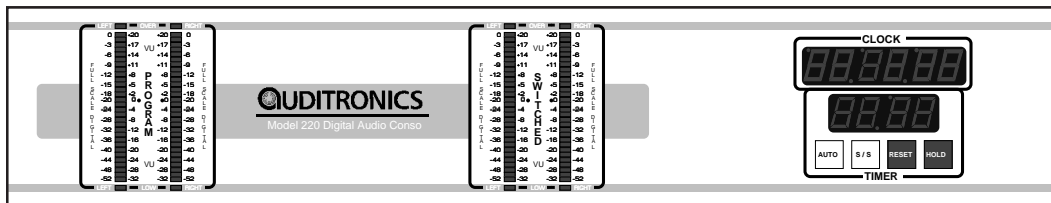
<b>Overview .....</b>	<b>10-2</b>
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# Meterbridge

## Overview

The console's meterbridge houses two pairs of left-right LED meters (Program and Switched; see "Output Module" Chapter 3), the digital timer, the console clock, and cue speaker (controlled by the CRD-220 Control Room Module; see page 4-2). Each LED meter column displays VU average bar, PEAK dot, OVER, and LOW signal.

The meterbridge assembly hinges open for easy access to DB connectors and setting the clock. Simply swing the bridge up and back until it rests in a fully opened position.



## Replacement Parts

Clock/timer and LED meter cards and replacement cue speaker are available. See Appendix for specific ordering information.



## Digital Timer

The console timer control buttons are located below the timer display.

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.

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 battery or capacitor backup) and second PCB containing displays. Clock set controls may be accessed by opening the hinged meterbridge.

### 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 divided by 4 (1.024 MHz) buffered output of the oscillator is available at pin #7 of IC #U1 to assist in adjusting the oscillator.

## Setting the Time

The setting controls consists of two switches: MODE and SET. To set the clock, open the meterbridge and stand beside the console:

- 1) The control switches (mounted inside the meterbridge bottom) 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.

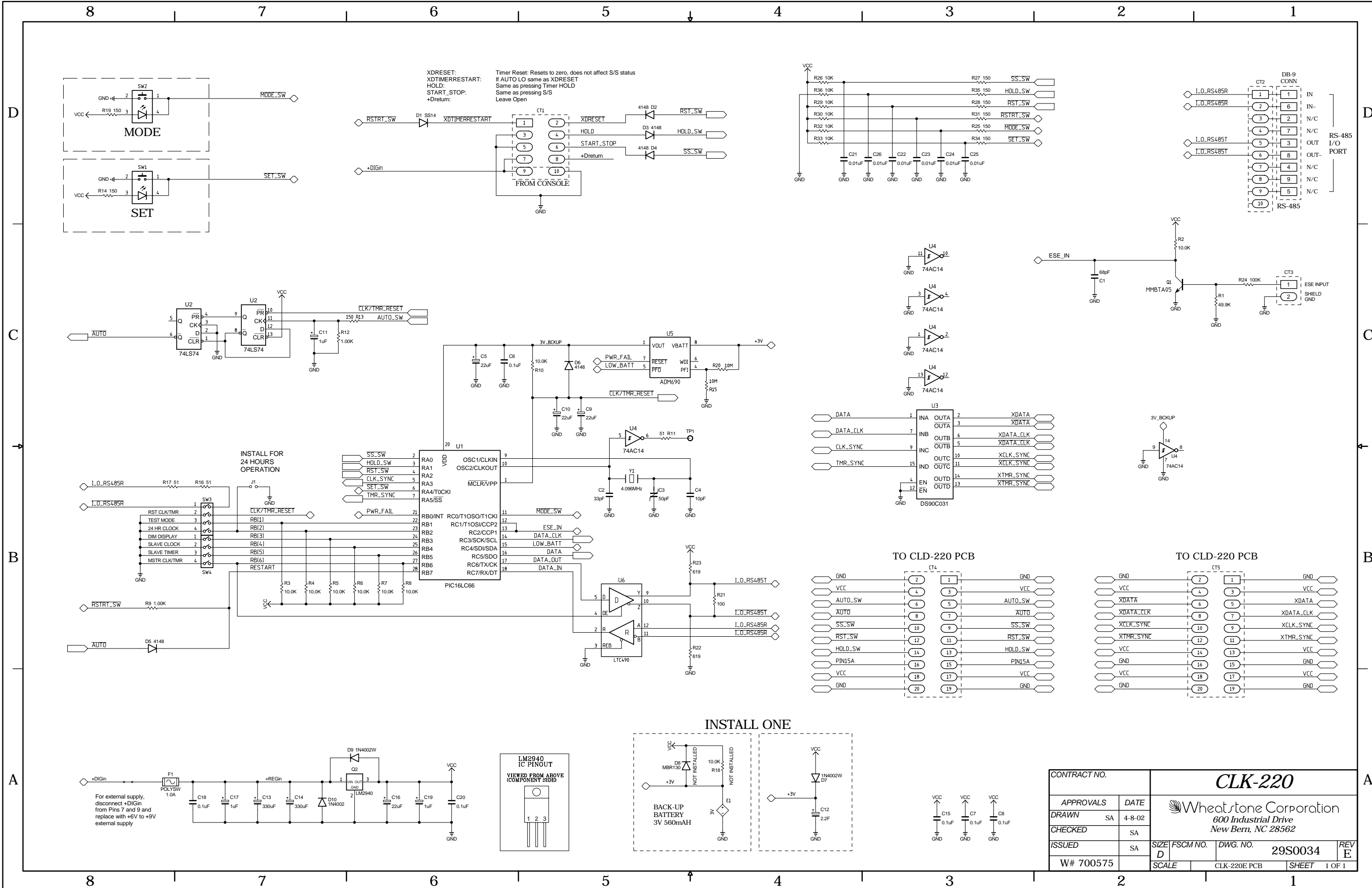
## Battery Backup

With the meterbridge open, note the nickel-sized round Duracell DL2032/3V long-life lithium battery (it goes into the socket negative side in) at the bottom of the clock display card. Note the battery does NOT light up the clock display; it powers the clock crystal to keep it from losing count (it will do this for 3 to 4 weeks).

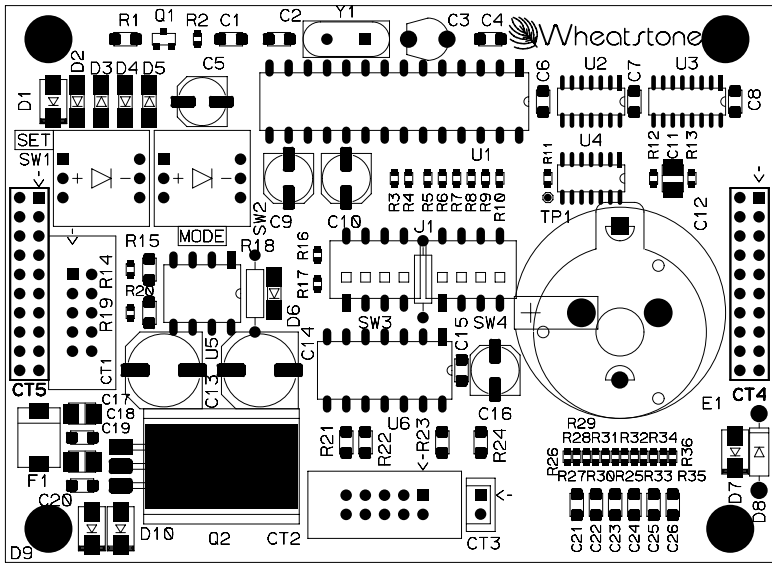
## Operational Modes

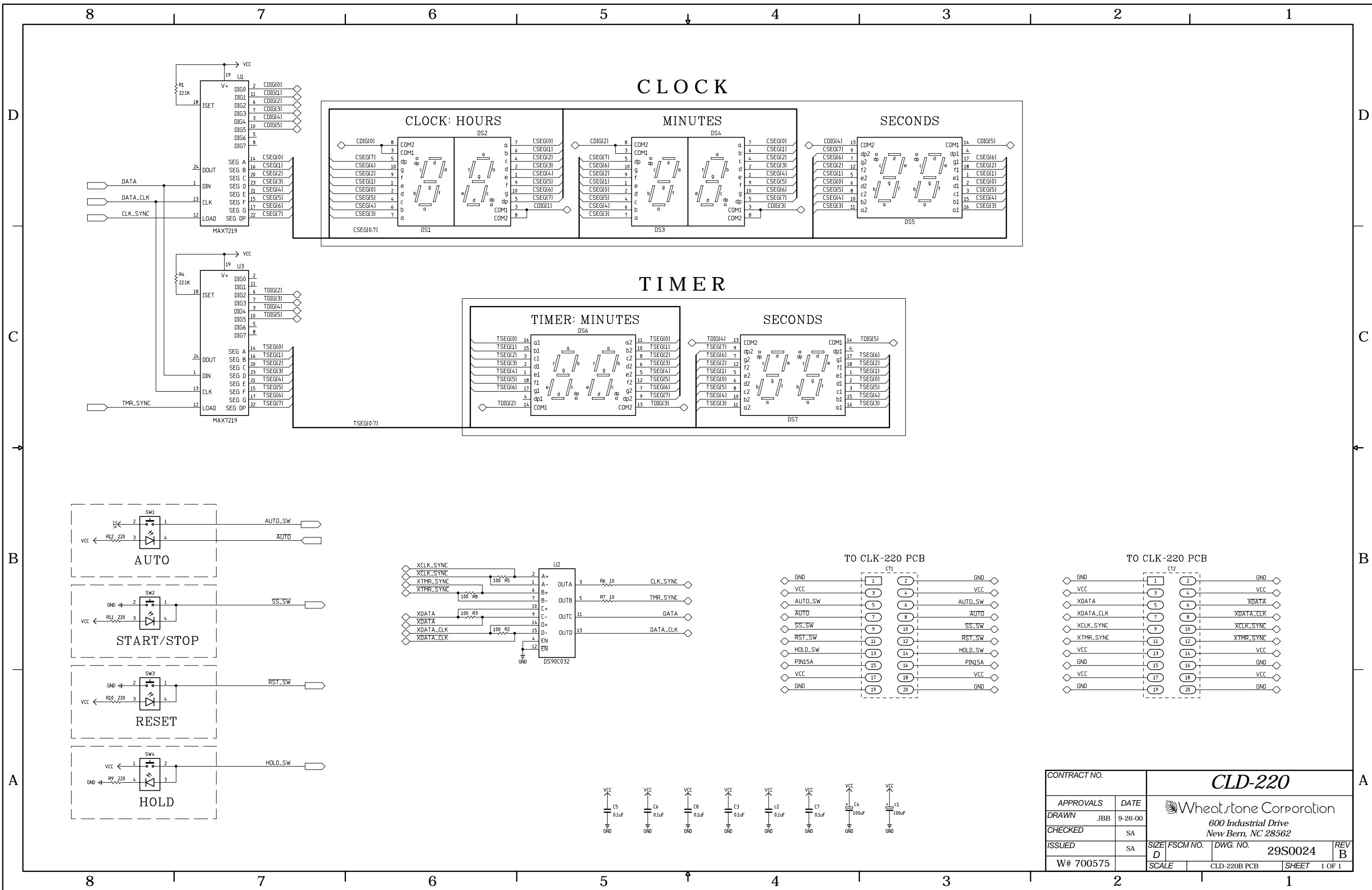
The standard factory default clock configuration is crystal-controlled, 12 hour mode, stand-alone operation. However, the clock will operate either from the internal crystal controlled time base or from an ESE master (TC-76, TC-89, TC-90, autodetect) signal. Because crystal time bases are subject to 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).



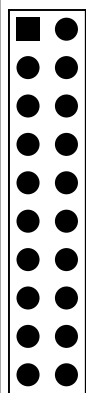
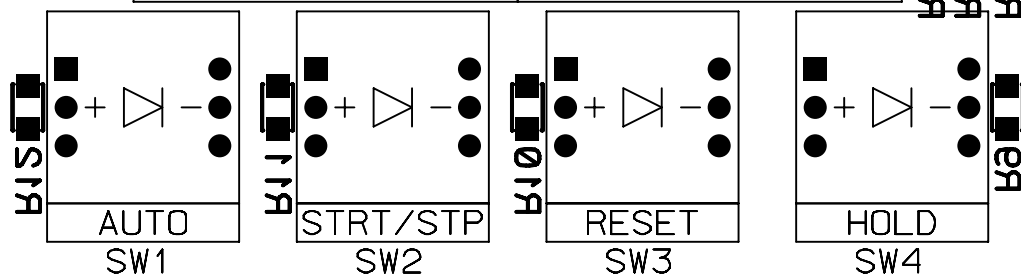
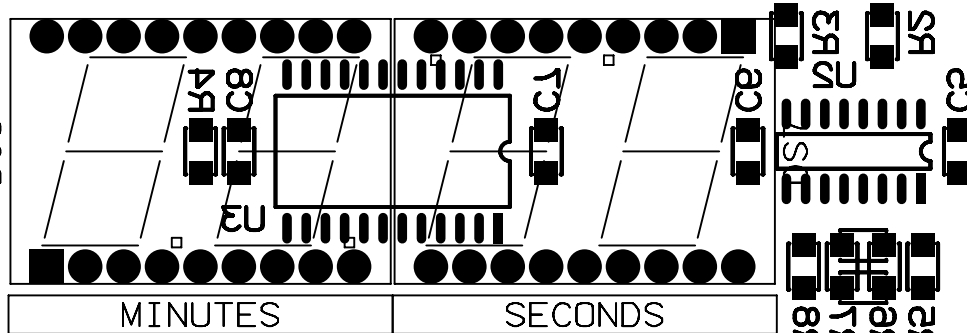
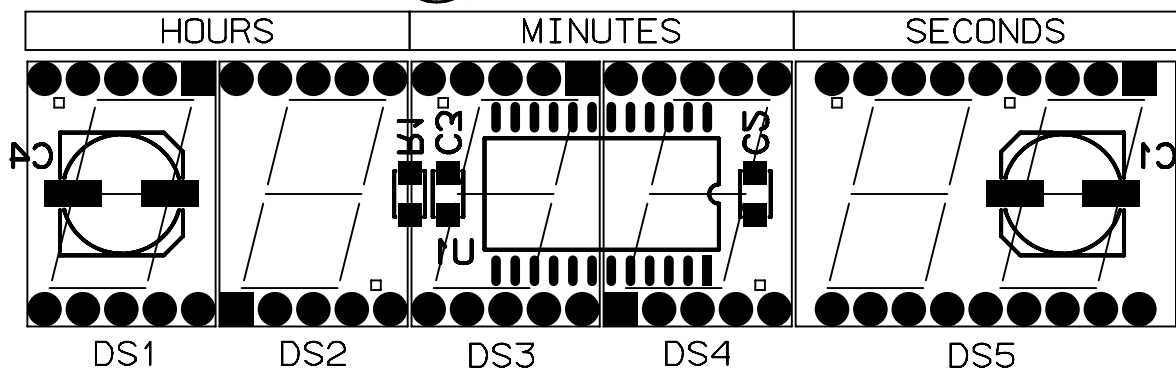
CLK-220 Clock/Timer Schematic Sheet 1 of 1



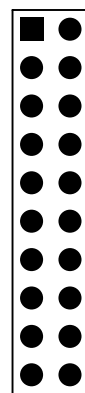


CLD-220 Clock/Timer Display Schematic Sheet 1 of 1

CONTRACT NO.		<b>CLD-220</b>			
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562			
DRAWN	JBB 9-26-00	SIZE	FSCM NO.	DWG. NO.	REV
CHECKED	SA	D		29S0024	B
ISSUED	SA	SCALE	CLD-220B PCB	SHEET	1 OF 1
W# 700575					



CT1

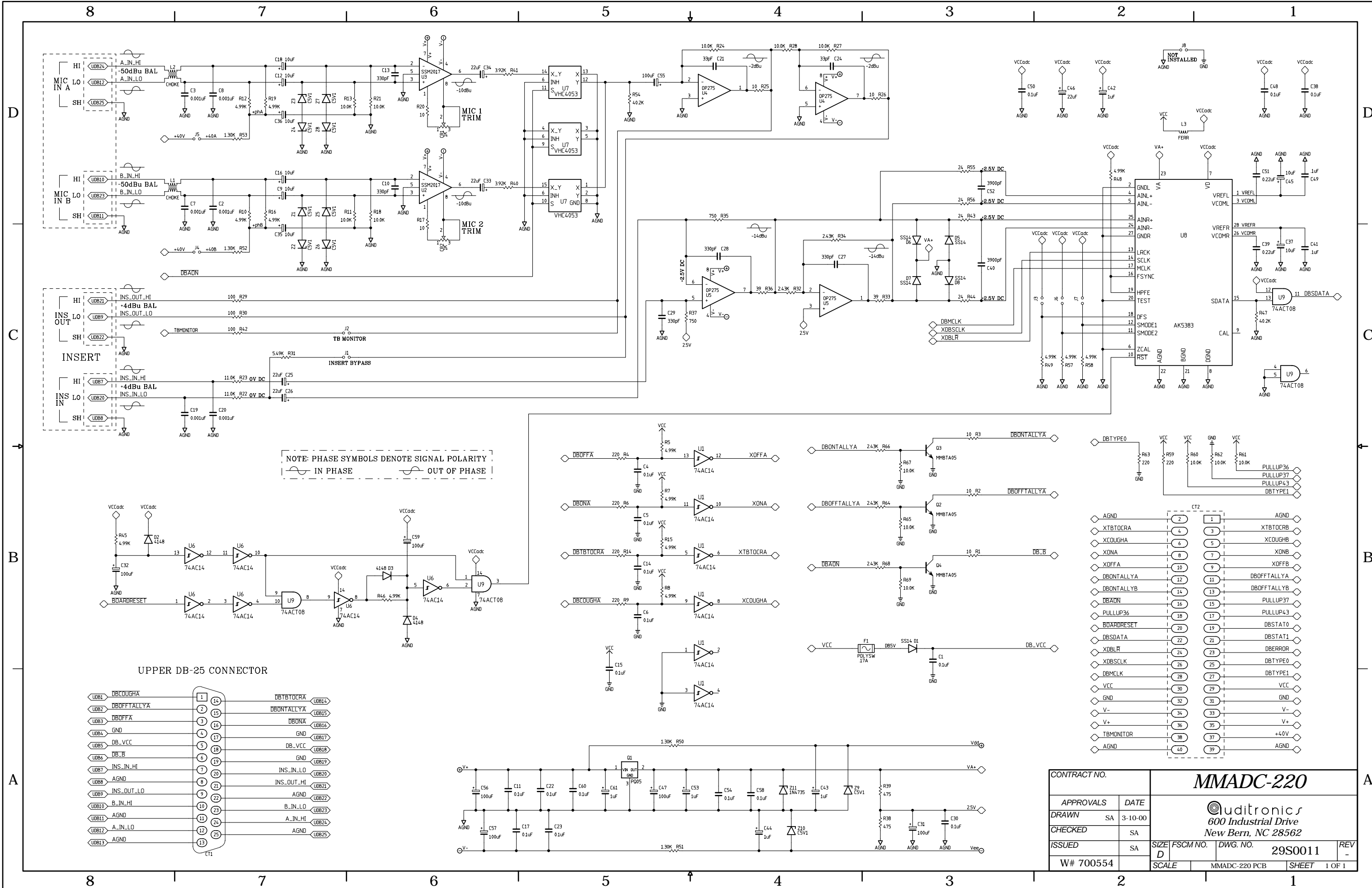
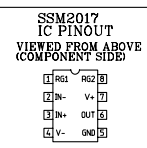
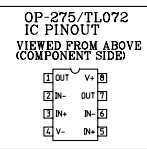
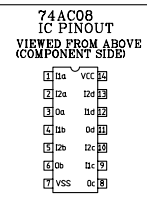
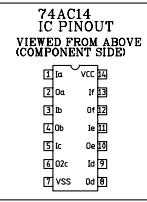
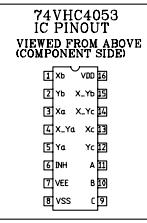
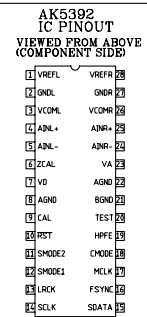


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# I/O Schematic Drawings

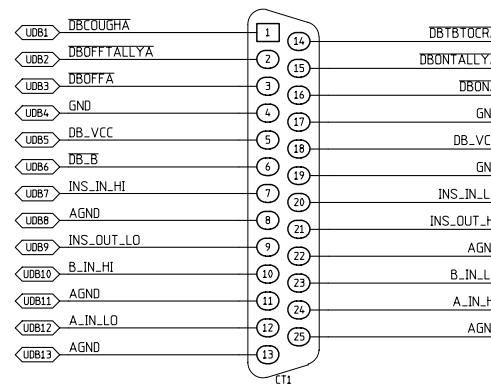
## Chapter Contents

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

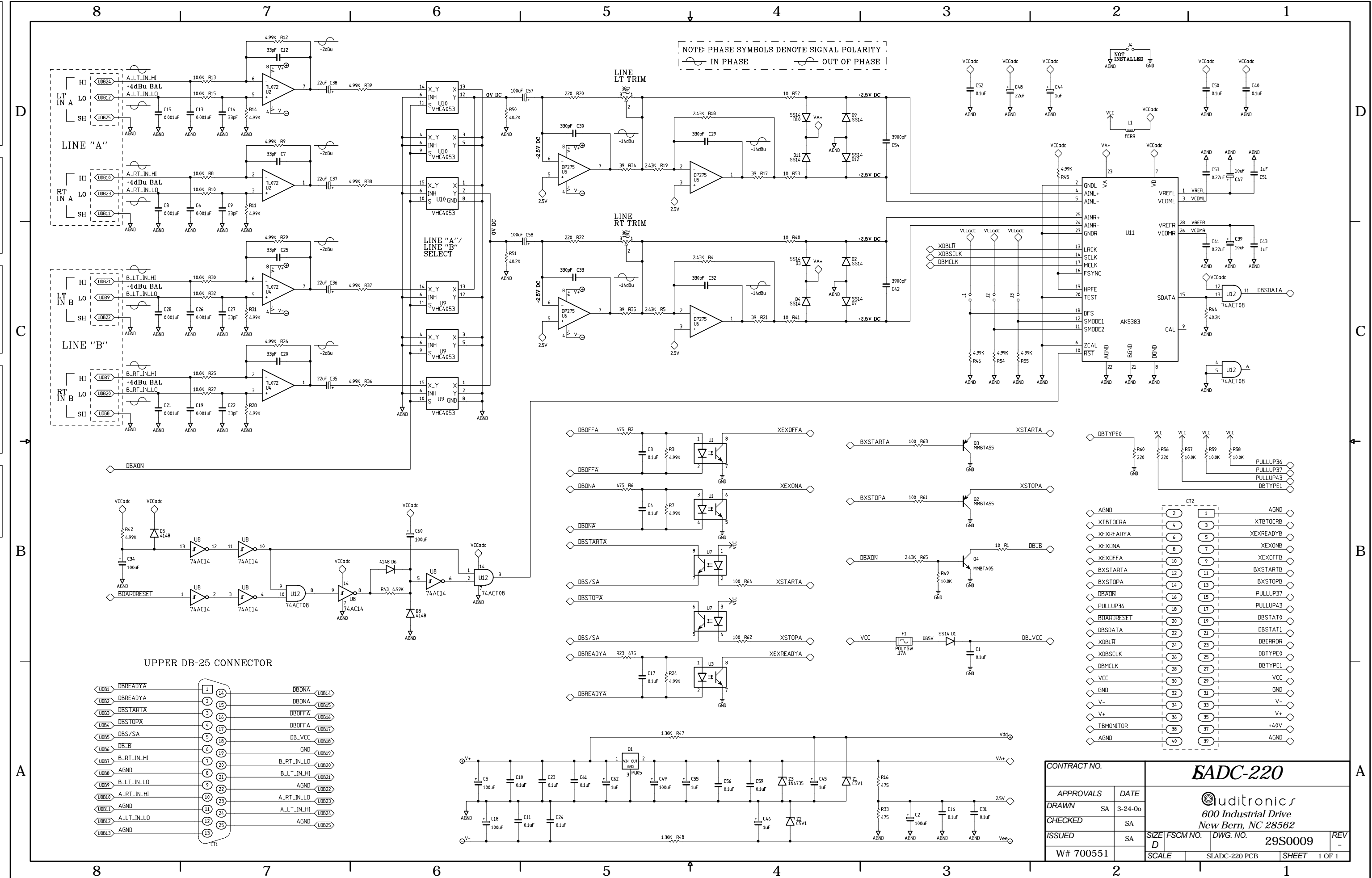
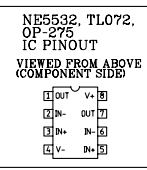
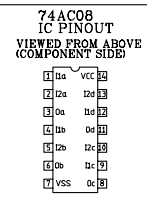
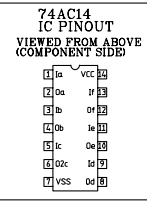
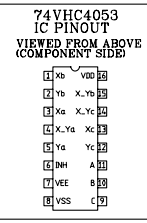
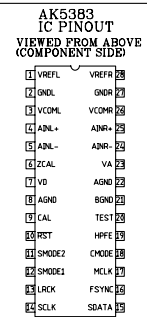
**UPPER DB-25 CONNECTOR**



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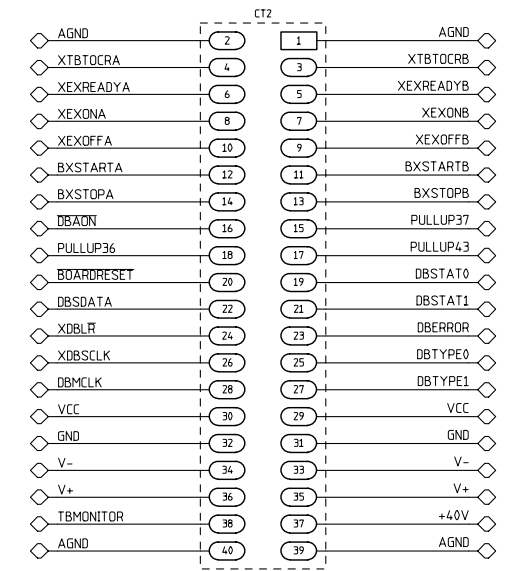
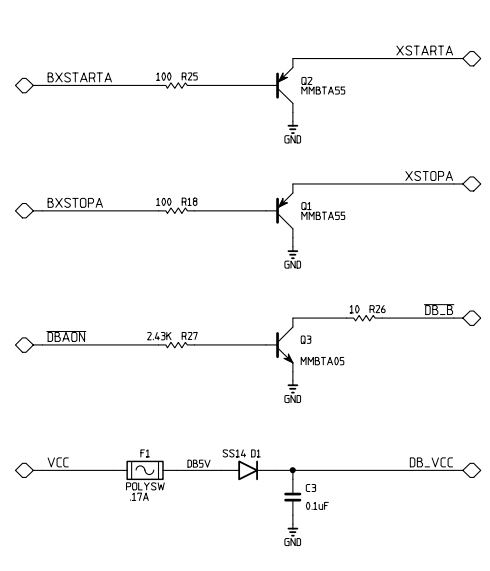
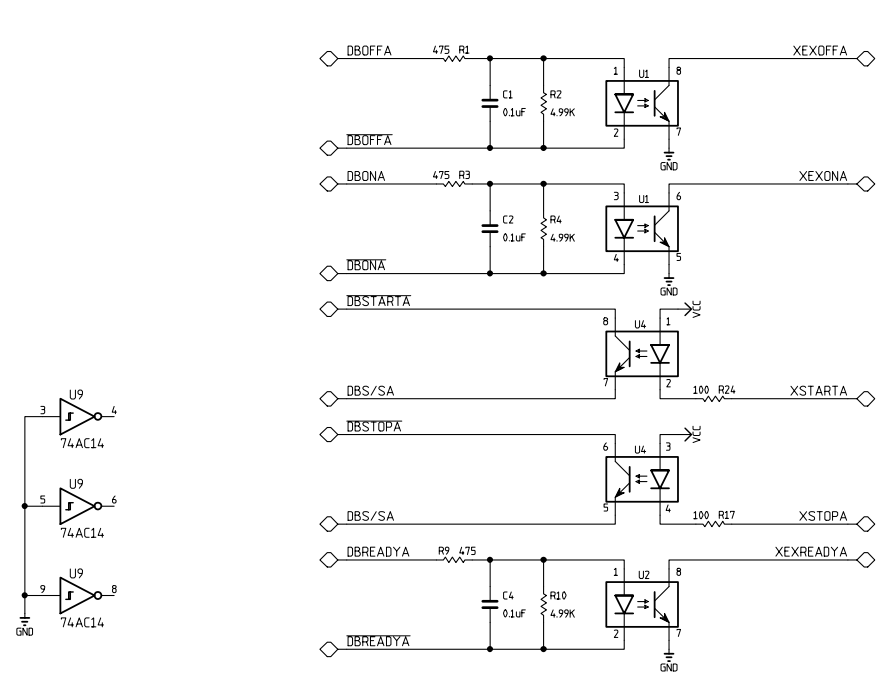
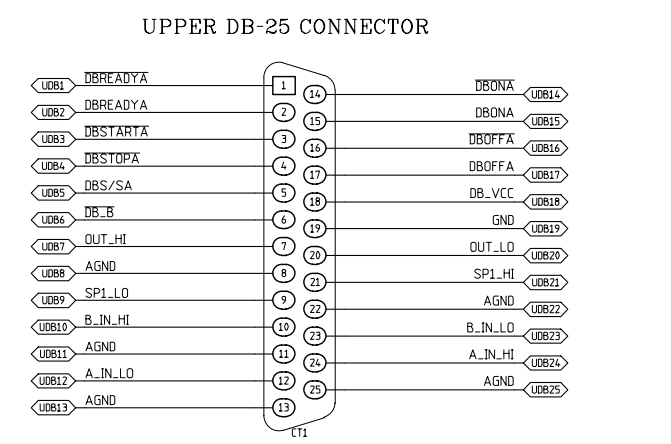
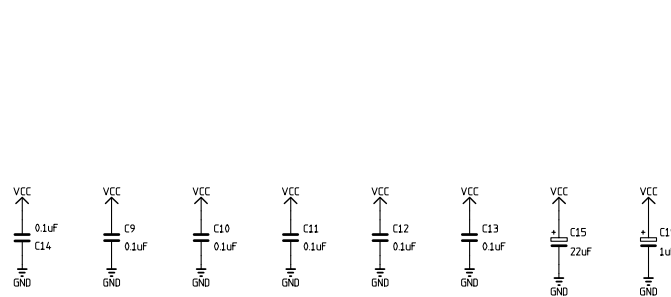
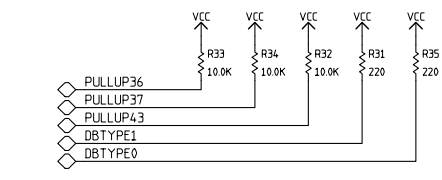
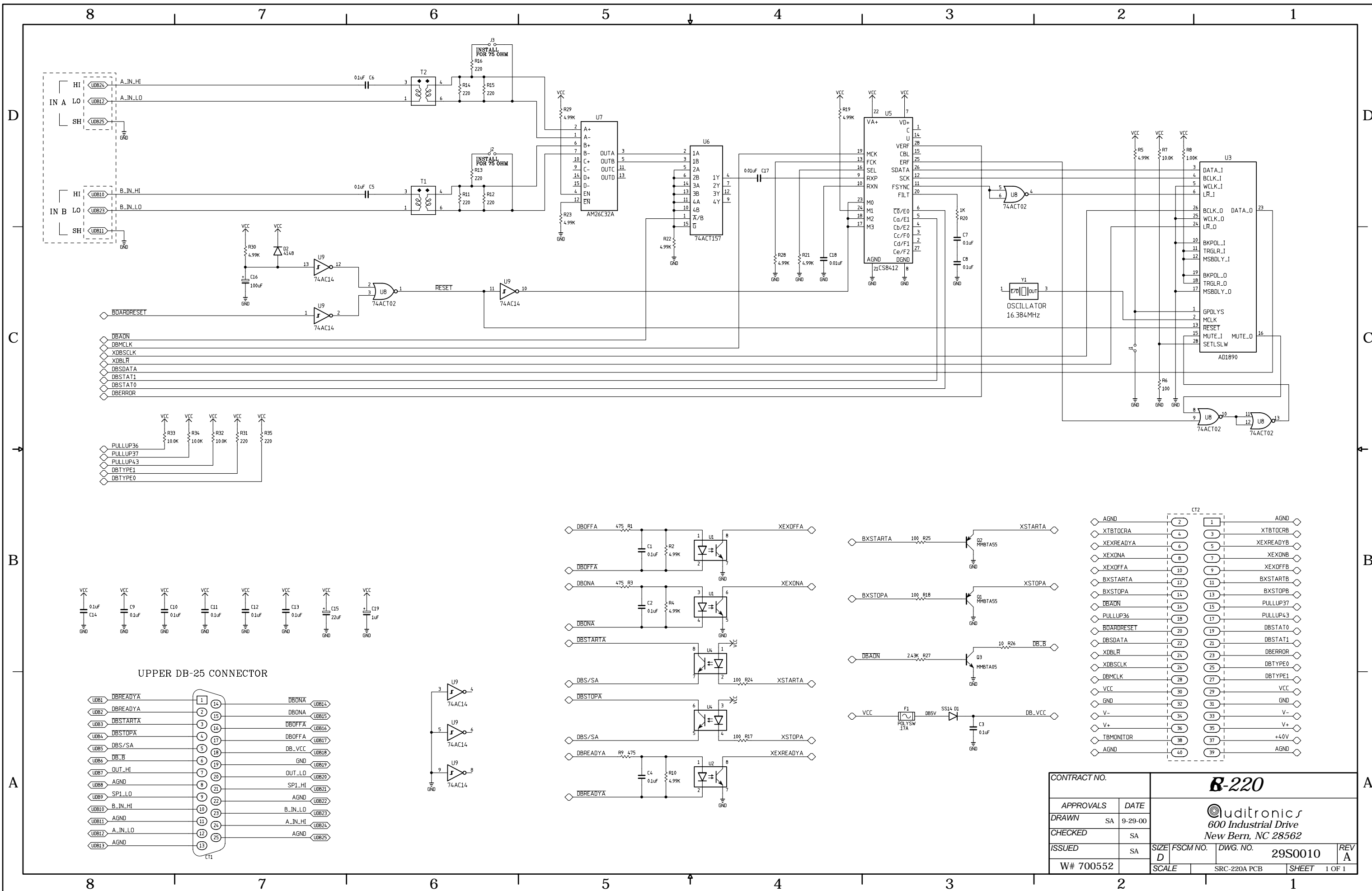
MMADC-220 Mono Mic Input Module ADC Schematic -Sheet 1 of 1





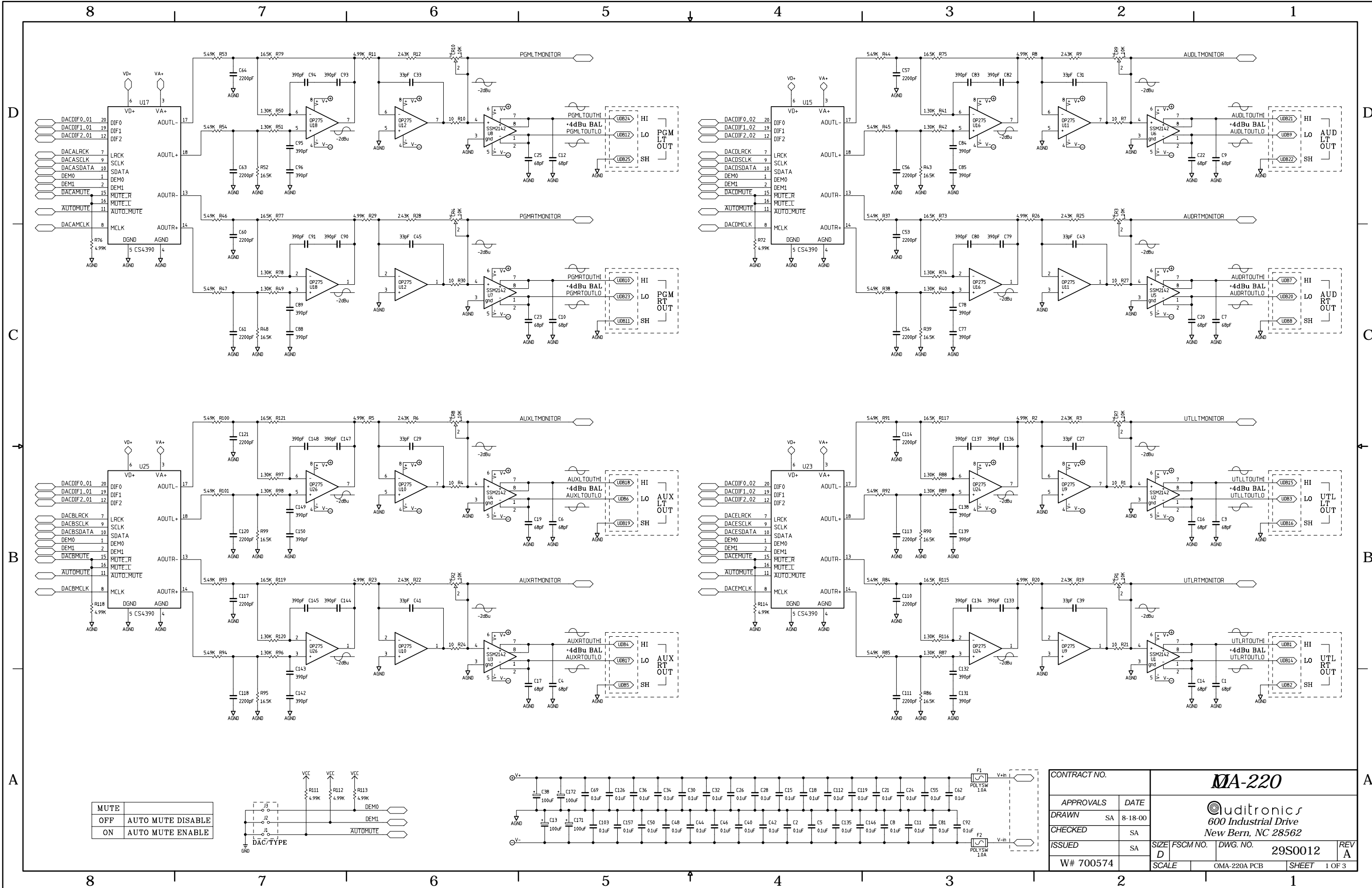
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SLADC-220 Analog Stereo Line Input Module ADC Schematic -Sheet 1 of 1

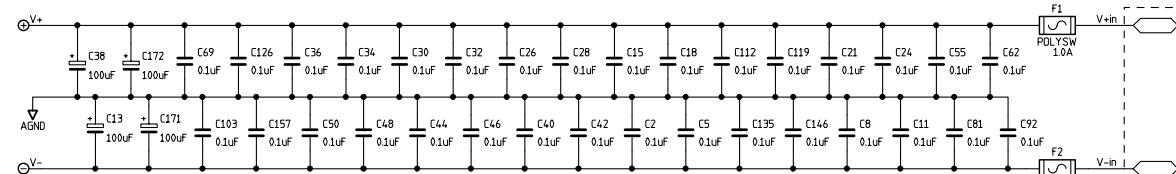
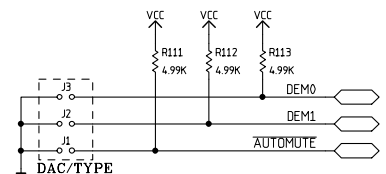


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SRC-220 Digital Stereo Line Input Module SRC Schematic -Sheet 1 of 1

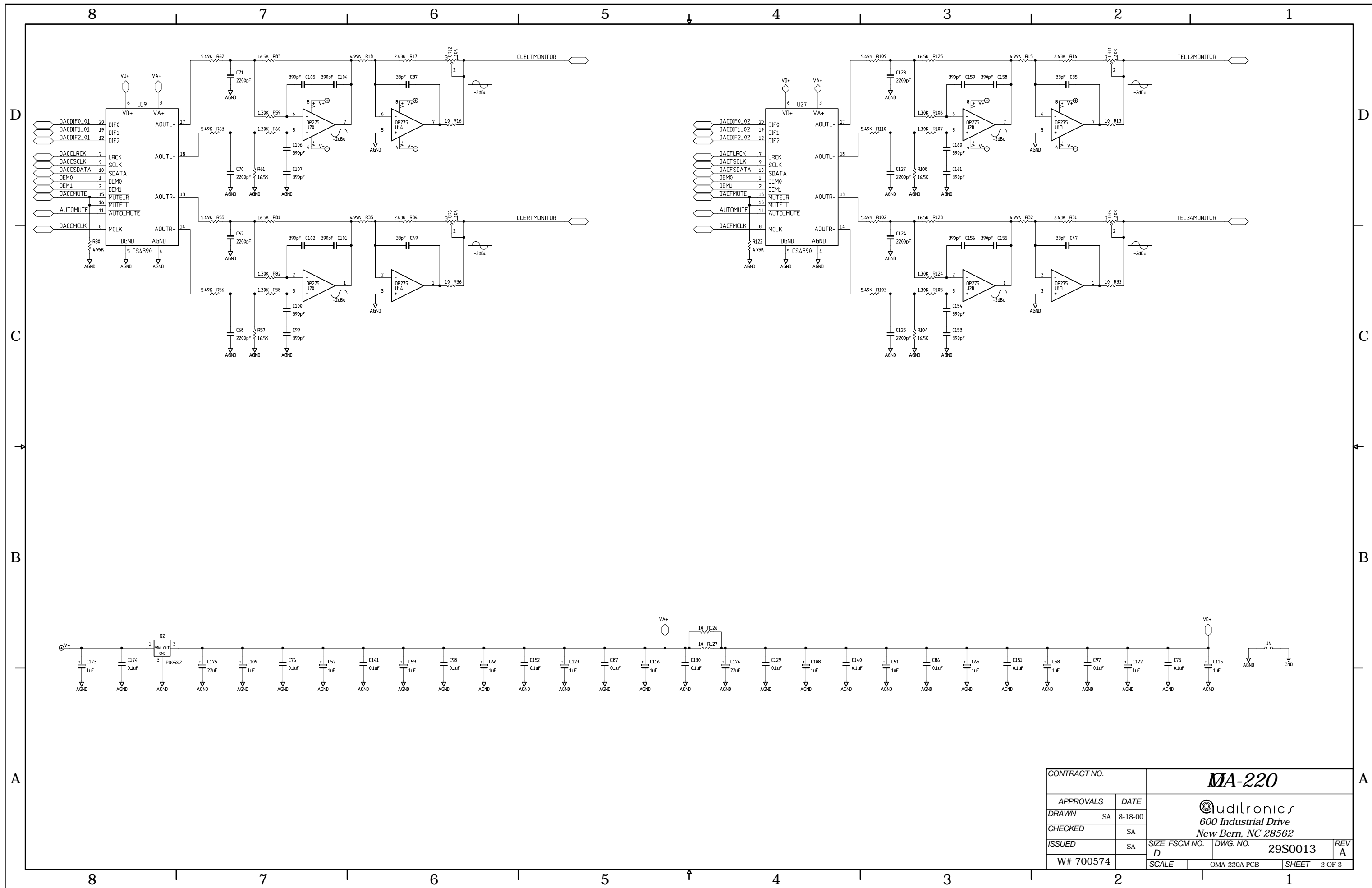


MUTE	
OFF	AUTO MUTE DISABLE
ON	AUTO MUTE ENABLE



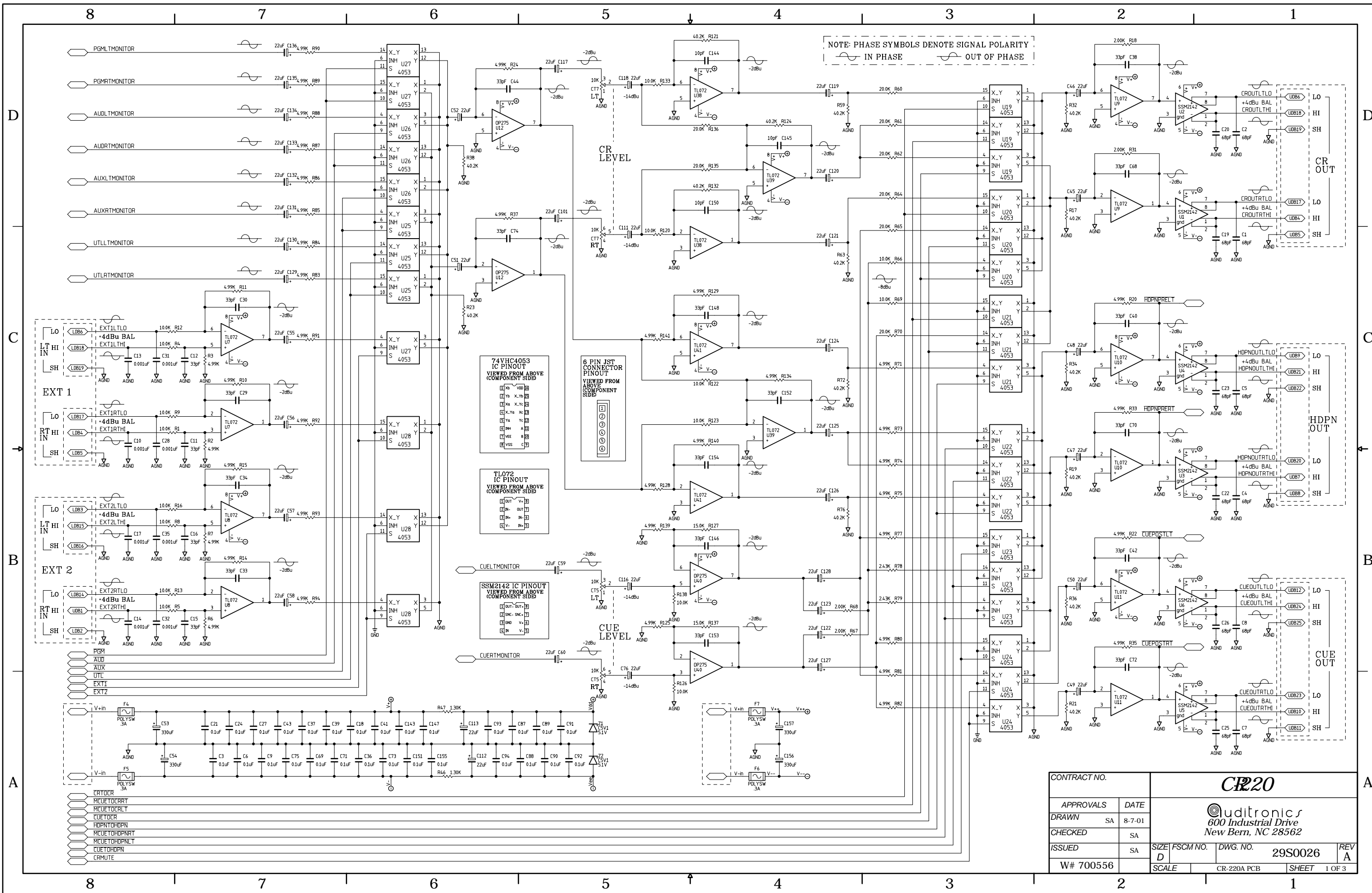
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OMA-220 Output Module Schematic -Sheet 1 of 3



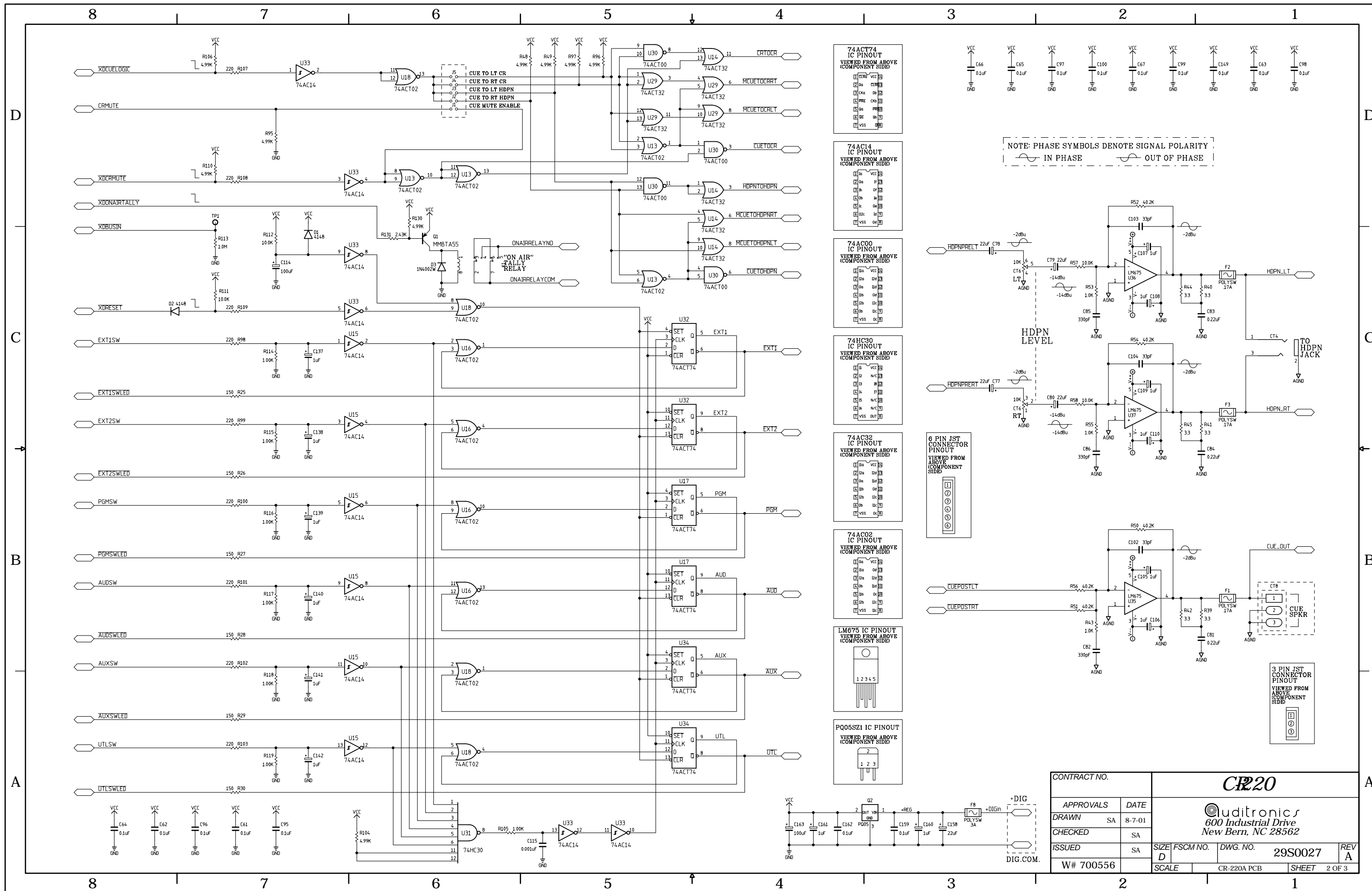
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SCALE		OMA-220A PCB		SHEET 2 OF 3	

OMA-220 Output Module Schematic -Sheet 2 of 3

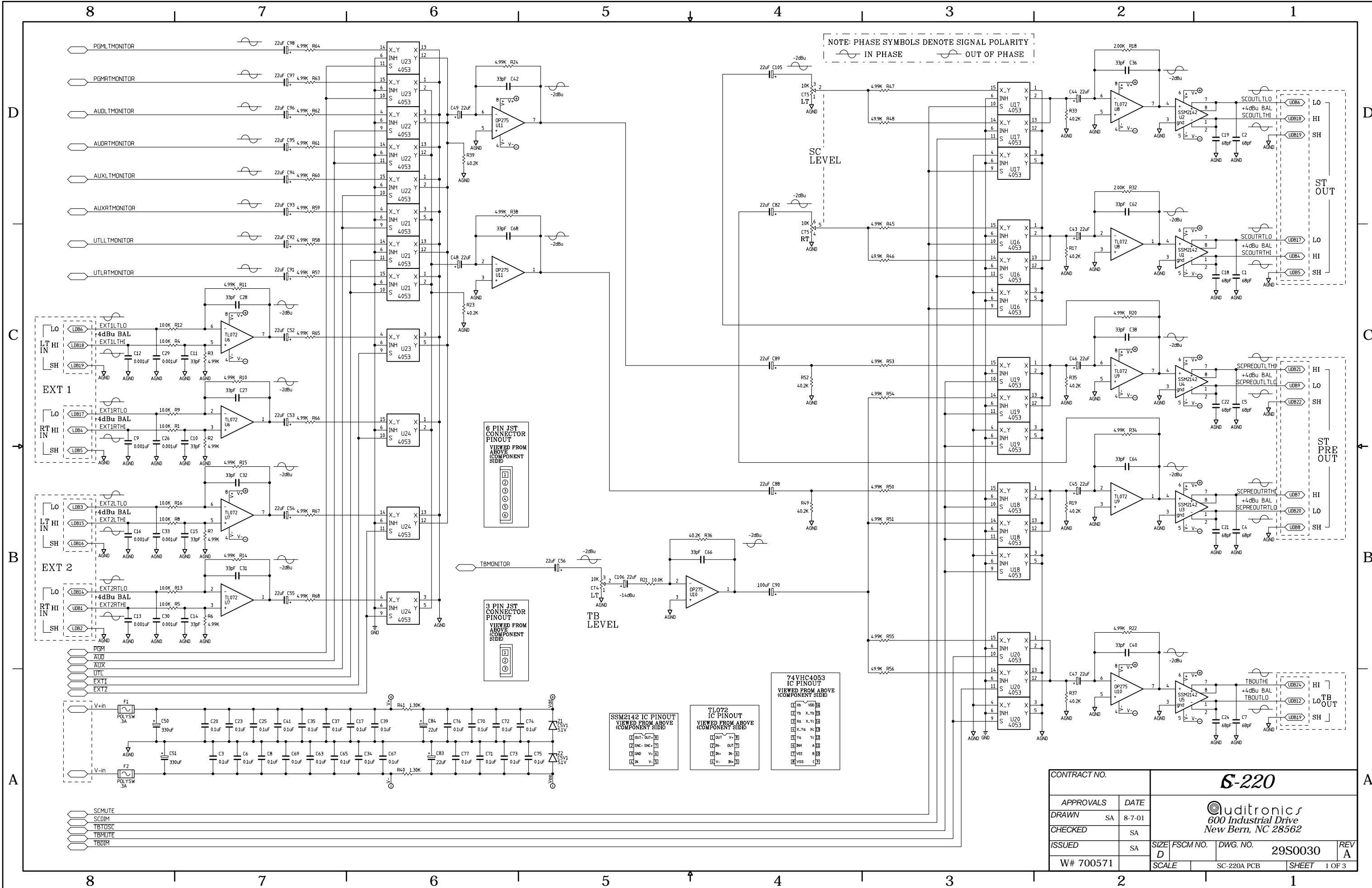


CR-220 Control Room Module Schematic -Sheet 1 of 3

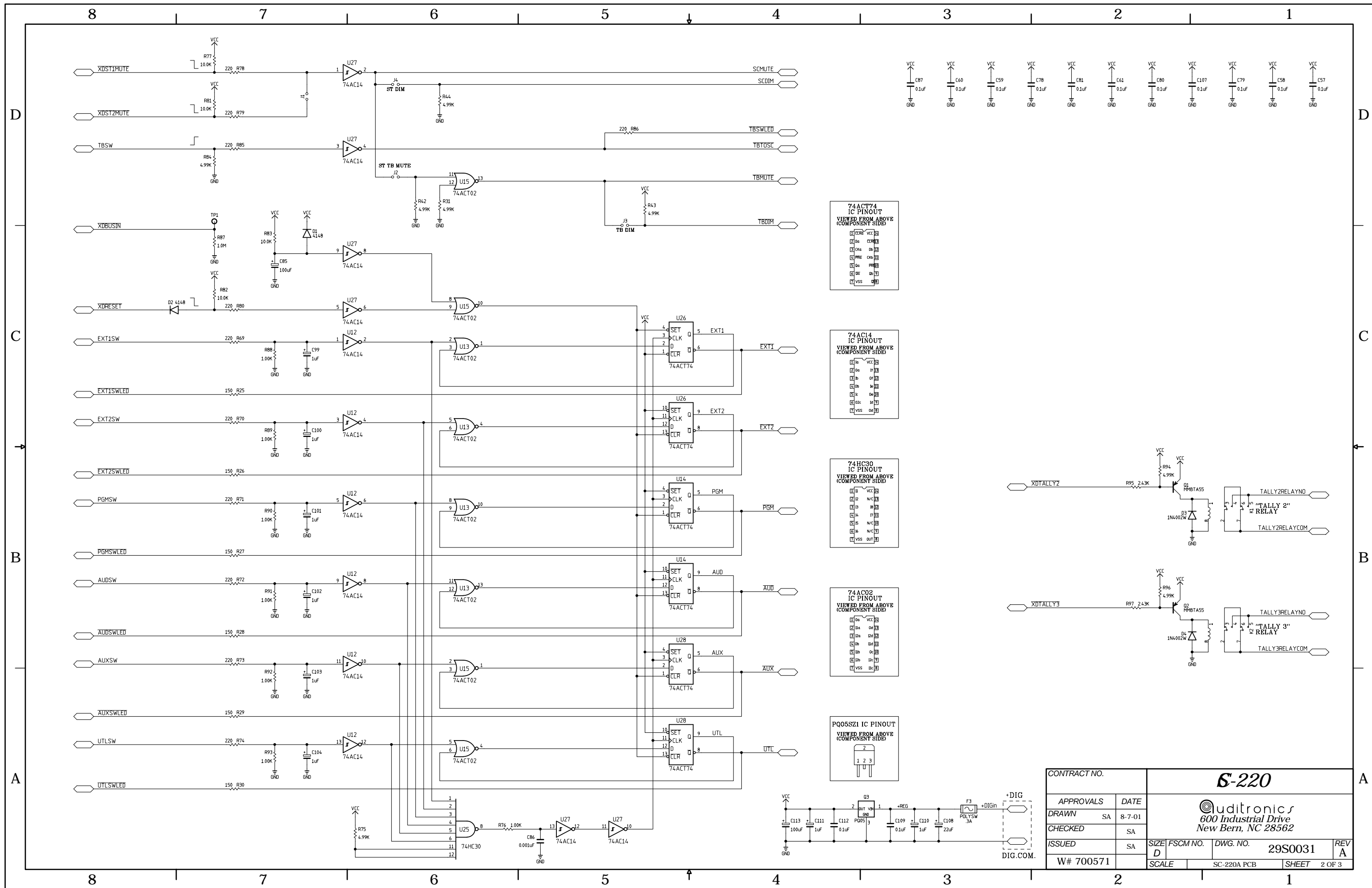
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CR-220 Control Room Module Schematic -Sheet 2 of 3



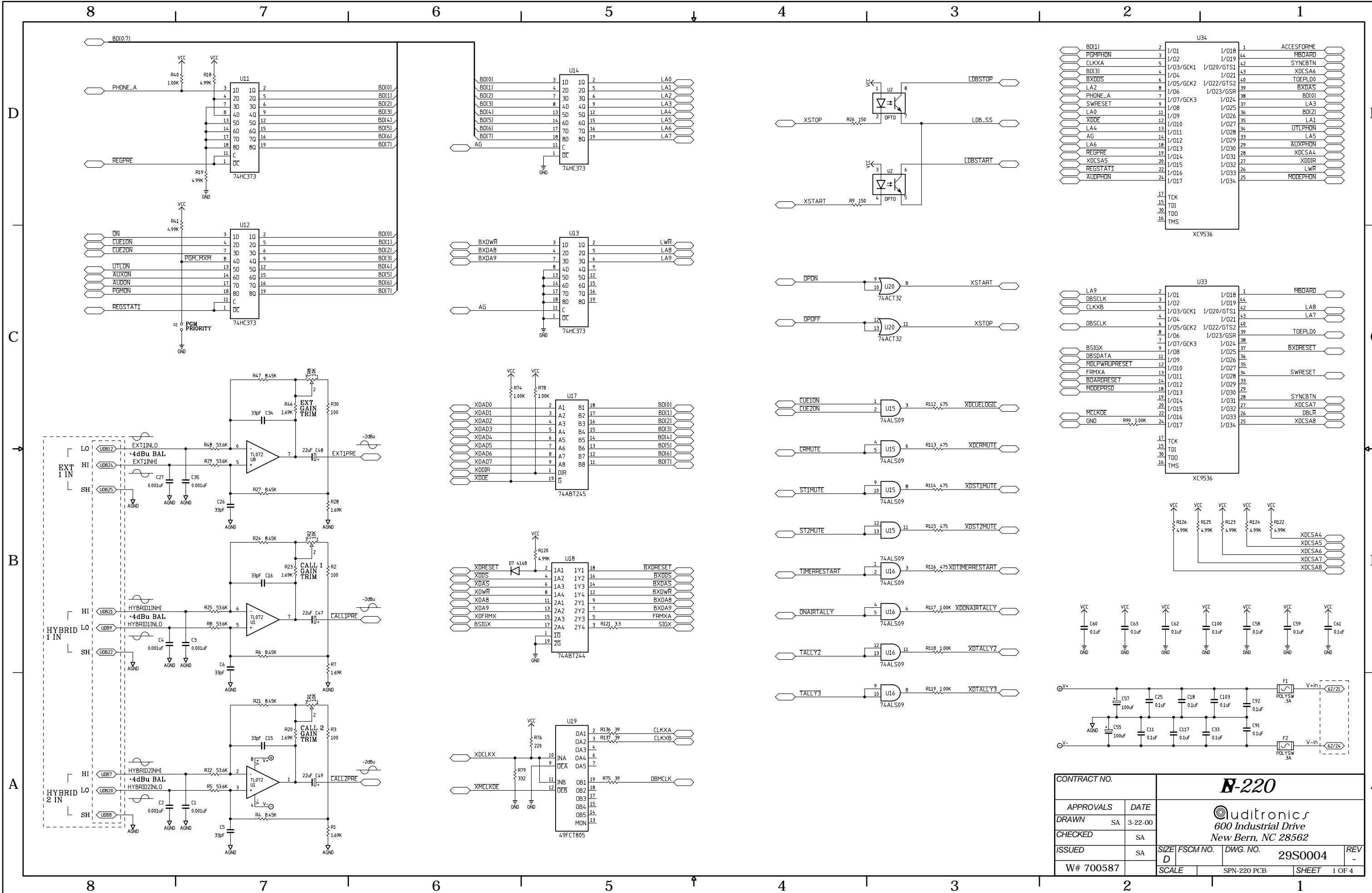
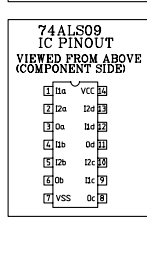
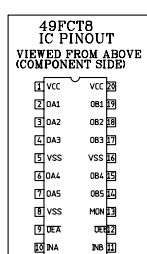
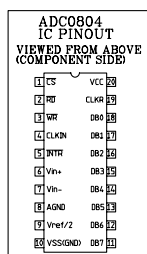
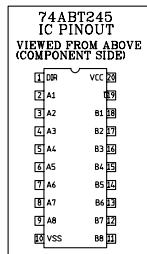
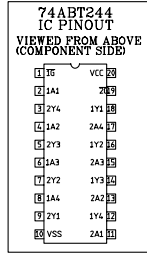
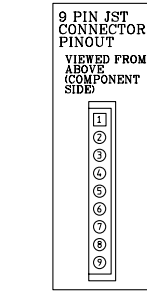
SC-220 Studio Control Module Schematic -Sheet 1 of 3



SC-220 Studio Control Module Schematic -Sheet 2 of 3

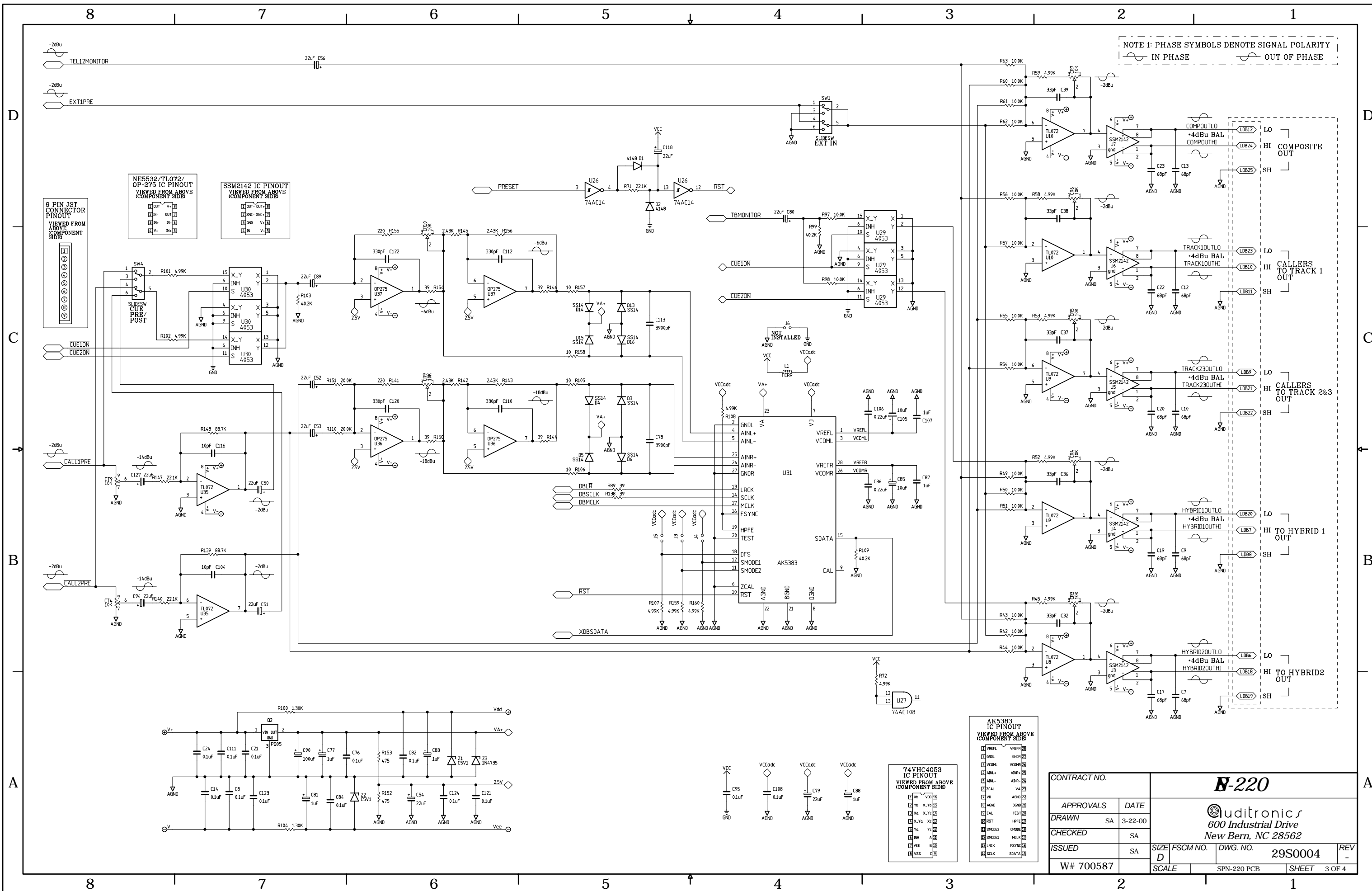
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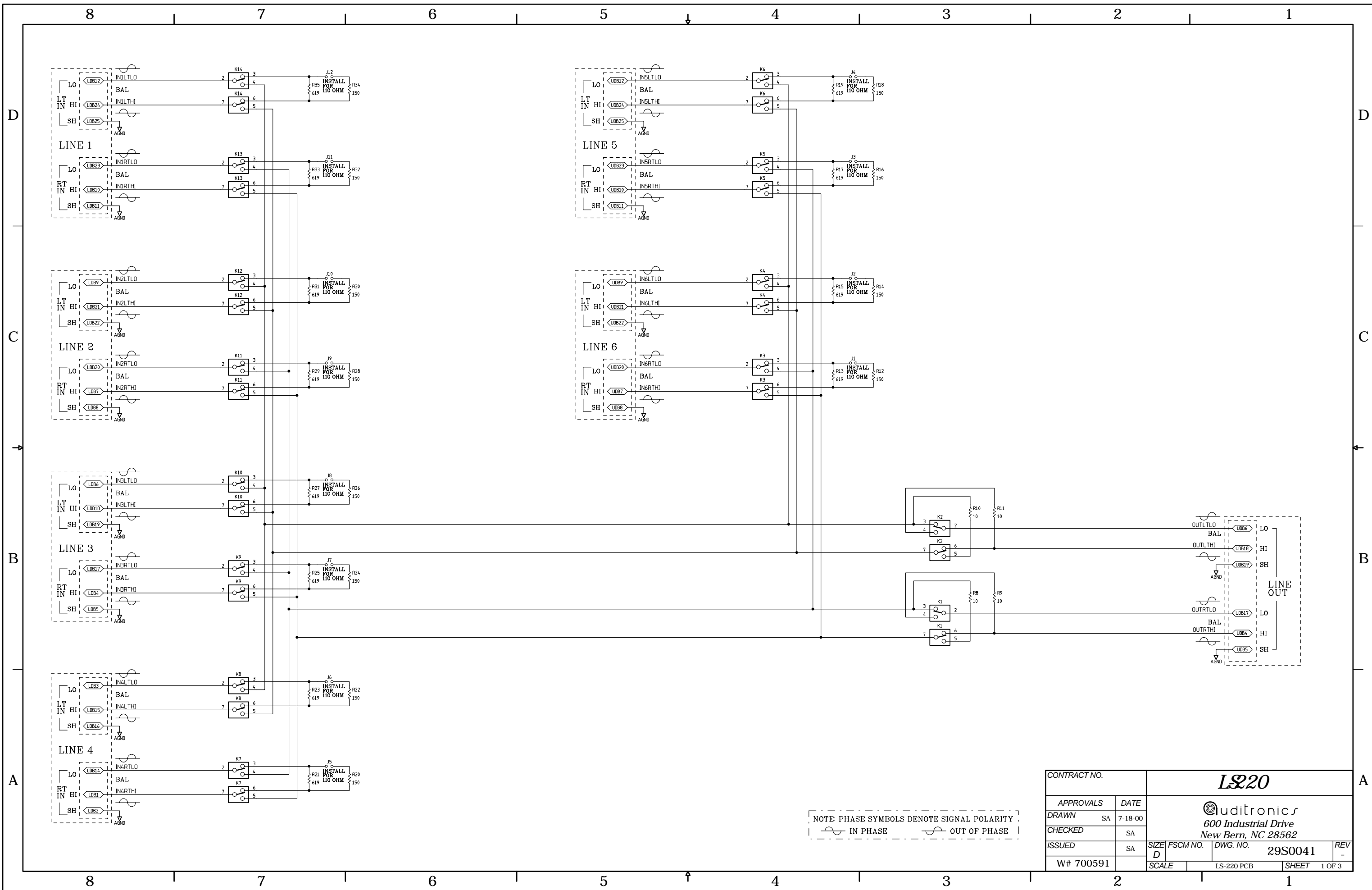
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SPN-220 Super Phone Module Schematic -Sheet 1 of 4



SPN-220 Super Phone Module Schematic -Sheet 3 of 4

CONTRACT NO.		<b>B-220</b>			
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CONTRACT NO.		<b>LS220</b>			
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SCALE		LS-220 PCB		SHEET 1 OF 3	

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

LS-220 Line Selector Module Schematic -Sheet 1 of 3

# Appendix

## Contents

Replacement Parts List .....	A-2
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For the most part there are no user-replaceable parts in the 220 console. Exceptions are those controls and components that in the course of normal use may need maintenance (i.e., faders, pots, ON/OFF switches, indicator lamps, etc.). A complete list of available components is shown on the next page. Contact Wheatstone technical support for further information.

Wheatstone Corporation (600 Industrial Drive, New Bern, North Carolina, USA 28562) may be reached by phone at 252-638-7000, fax 252-637-1285, electronic mail "email@wheatstone.com".

## REPLACEMENT PARTS — 220 AUDIO CONSOLE

COMPONENT	DESCRIPTION	WS P/N
IND-220 MODULE	COMPLETE INPUT MODULE	"026000A"
OMD-220 MODULE	COMPLETE OUTPUT MODULE	"026003A"
CRD-220 MODULE	COMPLETE CONTROL ROOM MONITOR MODULE	"026004A"
SCD-220 MODULE	COMPLETE STUDIO MONITOR MODULE	"026005A"
LS-220 MODULE	COMPLETE LINE SELECT MODULE	"026009A"
SPD-220 MODULE	COMPLETE PHONE MODULE	"026013A"
TR-220/FF MODULE	COMPLETE FULL-FUNCTION TAPE REMOTE CONTROL MODULE	"026010A"
TR-220/SS MODULE	COMPLETE START/STOP TAPE REMOTE CONTROL MODULE	"026011A"
SLADC-220 CARD	A-TO-D CONVERTER DAUGHTER BOARD FOR ANALOG STEREO LINE INPUTS	"026042A"
SRC-220 CARD	SAMPLE RATE CONVERTER CARD FOR DIGITAL INPUTS	"026043A"
MMADC-220 CARD	A-TO-D CONVERTER DAUGHTER BOARD FOR ANALOG MIC INPUTS	"026044A"
VUD-220 CARD	METERBRIDGE VU CARD	"026045A"
CLK/TMR-220 CARD	CLOCK AND EVENT TIMER CARD	"026046A"
MANUAL	OWNER'S MANUAL	"026099A"
PSC-D340 POWER SUPPLY	CONSOLE POWER SUPPLY	"007220"
PS-220 CABLE	CONSOLE POWER SUPPLY CABLE	"026053A"
WIRED REPLACEMENT FADER	WIRED FADER FOR IND-220 MODULES	"052210A"
WIRED REPLACEMENT FADER	WIRED FADER FOR SPD-220 MODULES	"052211A"
WIRED REPLACEMENT SWITCH	WIRED "ON/OFF" SWITCH	"052201A"
WIRED REPLACEMENT POT	WIRED POT FOR CONTROL ROOM AND HEADPHONE MONITOR	"052202A"
I/O CONNECTOR	DB-25 CONNECTOR FOR MODULE I/O CONNECTIONS	"200101"
HOOD	HOOD FOR MODULE I/O DB-25 CONNECTORS	"200102"
REPLACEMENT SWITCH	"ON/OFF" SWITCH	"510109"
REPLACEMENT RED CAP	MODULE "ON" SWITCH CAP	"530097"
REPLACEMENT ORANGE CAP	MODULE "OFF" SWITCH CAP	"530098"
RED LED LAMP REPLACEMENT	MODULE "ON/OFF" SWITCH LED LAMP	"600027"
REPLACEMENT CUE SPEAKER	REPLACEMENT CUE SPEAKER	"960000"