
AIR 4

RADIO CONSOLE

 *AUDIOARTS ENGINEERING*

TECHNICAL MANUAL
June 2012



AIR 4 Radio Console Technical Manual

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*a division of Wheatstone Corporation

Attention!

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

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



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

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

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



Attention!

IMPORTANT SAFETY INSTRUCTIONS

THIS PRODUCT IS INTENDED FOR INDOOR USE ONLY

When using an electrical appliance, basic safety precautions should always be followed.

DANGER - To reduce risk of electric shock read all instructions before using this power supply. A power supply should never be left unattended when plugged in. Always unplug this power supply from the main socket immediately after using.

WARNING - To reduce risk of burns, fire, electric shock or injury to persons or animals:

1. Use this power supply only for its intended use as described below.
2. Do not use outdoors.
3. Do not allow to be used as a toy. Pay close attention when this power supply is used by, or near to, children.
4. Use only attachments recommended by the manufacturer.
5. Never operate this power supply if it has a damaged cord or plug, if it has been dropped or damaged or if it has fallen into water. In such cases return the power supply to an authorized dealer or service centre for examination or repair.
6. Never drop or insert an object into any openings.
7. Do not operate where aerosol (spray) products are being used or where oxygen is being administered.
8. This power supply should be used near to a convenient and easily accessible mains socket.

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Installation and Power

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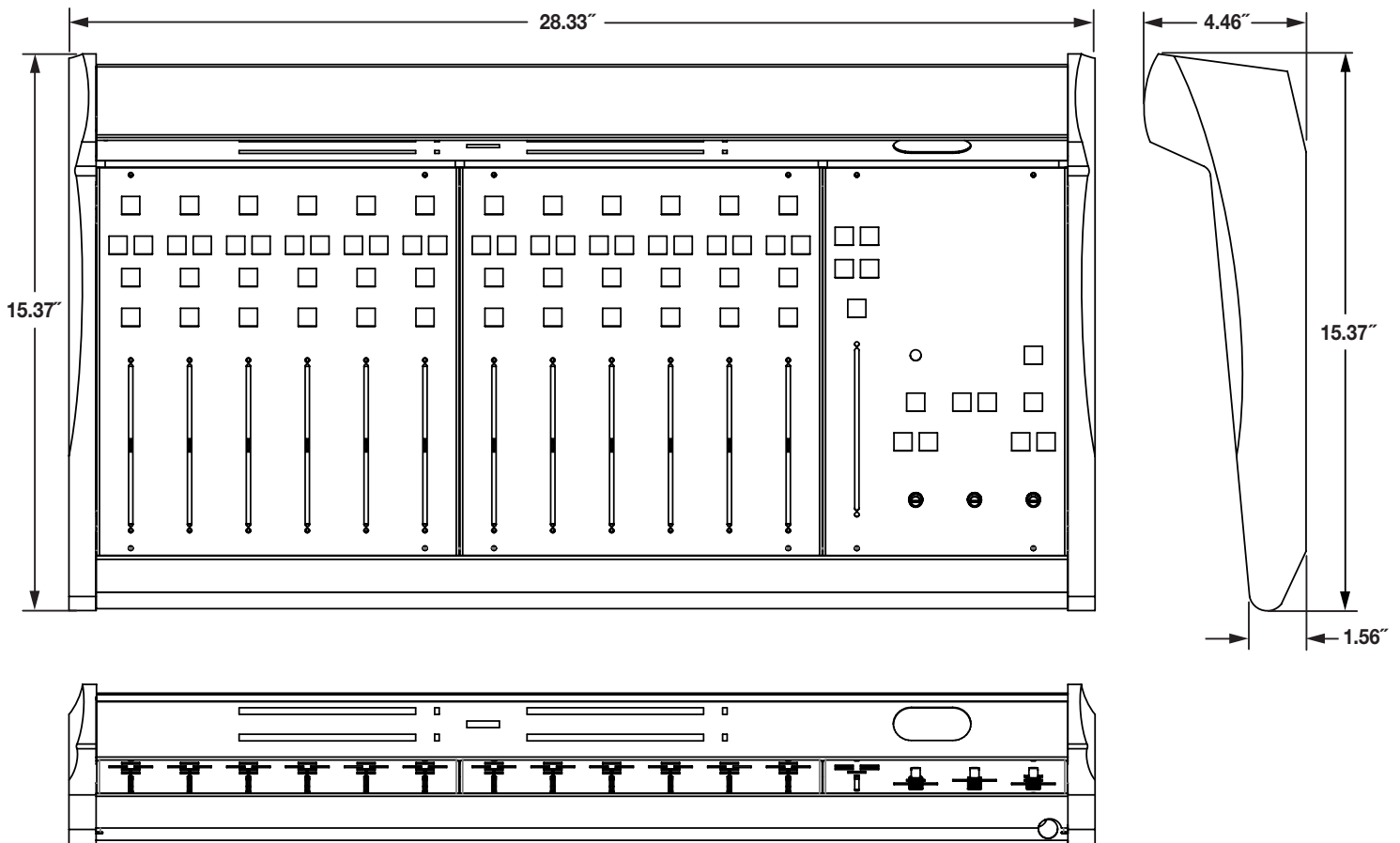
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Installation and Power

Unpacking and Installing the Console

The AIR 4 console with its power supply, connecting cable, and “Installation and Connections Quick Reference” is shipped in one packing box. The console can be unpacked by one person by grasping the console at both sides, and lifting it upward out of the box. Remove packing materials and store them in the box for future use. Carefully place the console on your countertop (the AIR 4 audio console is designed for countertop placement). Avoid proximity to any electromagnetic fields, such as large power transformers, motors, and fluorescent lighting fixtures.

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



Power Supply

The AIR 4 console is powered by a factory supplied power adapter with 100-240V/50-60Hz input, 50W maximum output power, and a 4 foot long output cable.



DC Power Output Pinout

	PIN #	OUTPUT
	1	COM
	2	COM
	3	+5VDC
	4	-15V
	5	+15V

The power supply adapter is supplied 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 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.

Energizing

Assuming the AIR 4 console mainframe is properly placed, and its power supply correctly connected to the console, you may now energize the power supply adapter by plugging it into the AC mains. The console’s individual module switches will assume factory default settings.

Note: To de-energize the console, unplug the power supply adapter’s AC cord from the AC mains. *Never de-energize the console by disconnecting the cable that connects the console and power supply adapter together.*

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

Audio and Control Wiring

All audio I/O connections to the AIR 4 console are made via RJ-45 connectors and 3-pin plug terminals located on the rear panel of the console. For control connections there is also a multipin DB-25 connector. See the console’s rear drawing on page 1-8.

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 (LO) to the shield.

ANALOG OUTPUTS – AIR 4 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 HI or LO side of the output should be strapped to ground, with the output taken from the other side. (Normally you’d strap LO to ground, and take HIGH to feed your unbalanced equipment.)

Hook-Ups

The rear of the console has multiple RJ-45 connectors to plug in 24 stereo line inputs, the external input, caller connections to and from hybrid, as well as providing studio, control room, microphone, PGM, and USB analog output connections. There is also a 12-pin boxed header (CT7, on the CONA4-4 PCB) with the four 3-pin plug terminals plugged into this header provided for microphone inputs.

A DB-25 is provided for control connections and for the Cue output.

There is also a USB port with type B connector available for interfacing with a computer (see page 2-4 for details).

Pinouts drawings on pages 1-9 through 1-11 show all wiring connection at glance.



Audio Connections

Analog Stereo Inputs – RJ-45 (1 through 12)

The signals are analog stereo; level is +4dBu balanced.

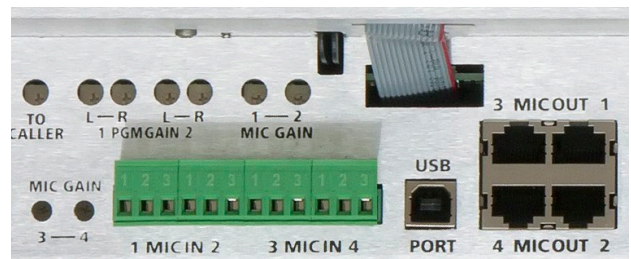
A Pin 1 – HI	}	INPUT A LT
A Pin 2 – LO		
A Pin 3 – HI	}	INPUT A RT
A Pin 6 – LO		
B Pin 1 – HI	}	INPUT B LT
B Pin 2 – LO		
B Pin 3 – HI	}	INPUT B RT
B Pin 6 – LO		

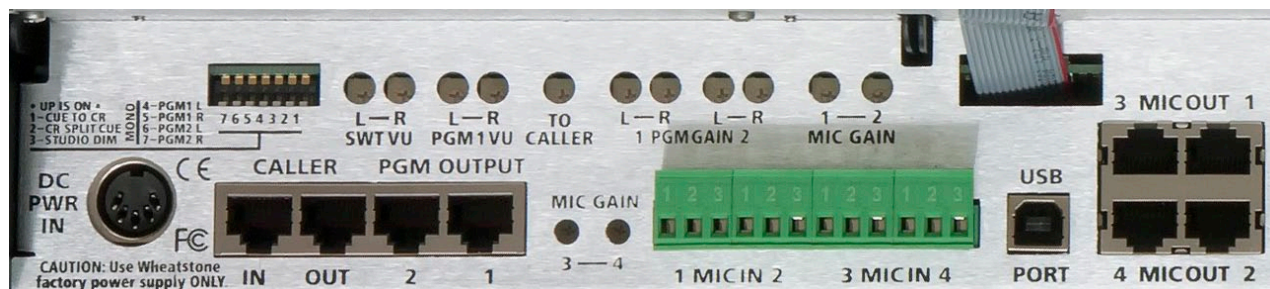
MIC 1 - MIC 4 Inputs – 12-pin Header

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

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

These connections are to the inputs of four internal mic preamplifiers. The outputs of the mic preamplifiers must be connected to the desired line inputs before you will be able to hear the microphones. See page 2-3 for details.





MIC 1 - MIC 4 Outputs – RJ-45

All signals are analog mono, unbalanced.

Pin 1 – HI	] MIC 1 OUT
Pin 2 – SH	
Pin 1 & 3 – HI	] MIC 2 OUT
Pin 2 & 6 – SH	
Pin 1 & 3 – HI	] MIC 3 OUT
Pin 2 & 6 – SH	
Pin 1 & 3 – HI	] MIC 4 OUT
Pin 2 & 6 – SH	

Caller Connections – RJ-45

The signals are analog mono; level is +4dBu balanced.

Pin 1 – HI	] CALLER IN
Pin 2 – LO	
Pin 1 – HI	] CALLER OUT
Pin 2 – LO	

PGM Outputs – RJ-45

The signals are analog stereo; level is +4dBu balanced.

Pin 1 – HI	] PGM 1 LT OUT
Pin 2 – LO	
Pin 3 – HI	] PGM 1 RT OUT
Pin 6 – LO	
Pin 1 – HI	] PGM 2 LT OUT
Pin 2 – LO	
Pin 3 – HI	] PGM 2 RT OUT
Pin 6 – LO	

External Inputs – RJ-45

The signals are analog stereo; level is +4dBu balanced.

Pin 1 – HI	] EXT LT IN
Pin 2 – LO	
Pin 3 – HI	] EXT RT IN
Pin 6 – LO	

Monitor Outputs – RJ-45

The signals are analog stereo; unbalanced.

Pin 1 – HI	] CR LT OUT
Pin 2 – SH	
Pin 3 – HI	] CR RT OUT
Pin 6 – SH	

Pin 1 – HI } STU LT OUT
 Pin 2 – SH }
 Pin 3 – HI } STU RT OUT
 Pin 6 – SH }

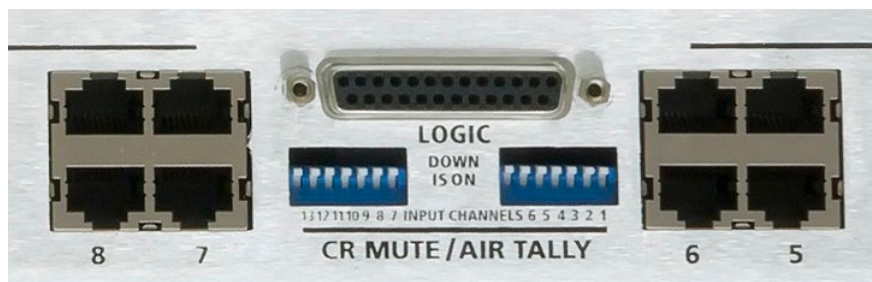
USB Output – RJ-45

The signals are analog stereo; unbalanced.

Pin 1 – HI } USB LT OUT
 Pin 2 – LO }
 Pin 3 – HI } USB RT OUT
 Pin 6 – LO }

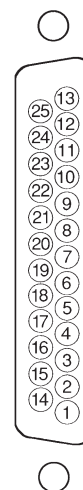
Cue Output and Control Connections – DB-25

All control ports (except On Air Tally and Mic 2 TB to Cue/CR) use opto-isolators. Functions include Mic 2 TB to Cue/CR, On Air Tally, and Start for remote source machines. Several pins can be used for the common side connections to remote starts, as indicated on the pinout below.



DB-25 Connections

- Pin 1 – Start Channel 1
- Pin 2 – Start Channel 2
- Pin 3 – Start Channel 3
- Pin 4 – Start Channel 4
- Pin 5 – Start Channel 5
- Pin 6 – Start Channel 6
- Pin 7 – Cue Out
- Pin 8 – Cue Out Audio Common
- Pin 9 – On Air Tally N.O.
- Pin 10 – On Air Tally Common
- Pin 11 – Mic 2 TB to Cue/CR
- Pin 12 – Mic 2 TB to Cue/CR Common
- Pin 13 – Start Common
- Pin 14 – Start Common
- Pin 15 – Start Common
- Pin 16 – Start Common
- Pin 17 – Start Common
- Pin 18 – Start Common
- Pin 19 – Start Channel 7
- Pin 20 – Start Channel 8
- Pin 21 – Start Channel 9
- Pin 22 – Start Channel 10
- Pin 23 – Start Channel 11
- Pin 24 – Start Channel 12
- Pin 25 – Start Phone Channel



Typical DB-25 connector

Cue Output

The Cue output signal (for feeding an external cue amplifier) is mono unbalanced.

To START Remote Source Machines Using Channel START Switches

EXTERNAL START – Hook up the remote machine’s “start” control pins to the DB-25 connector control pins; for example, for channel 1 wire to Start Channel 1, Pin 1, and Start Common, either one of the Pins 13 - 18.

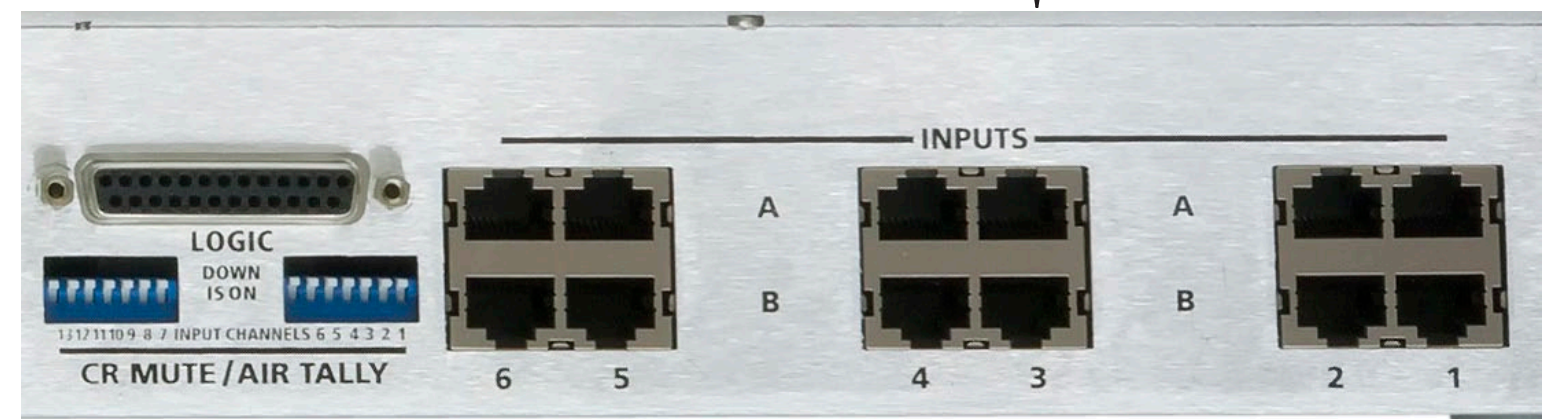
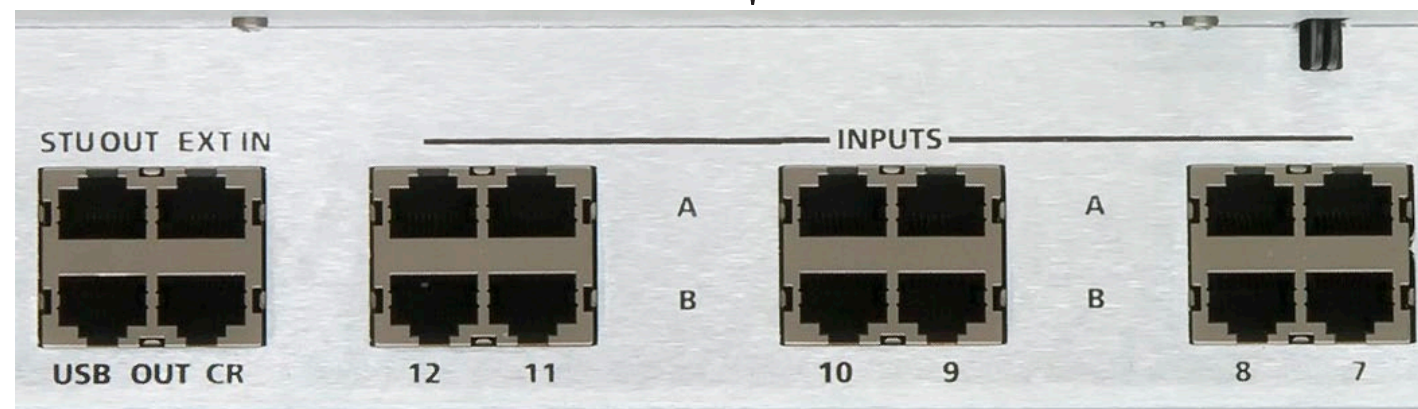
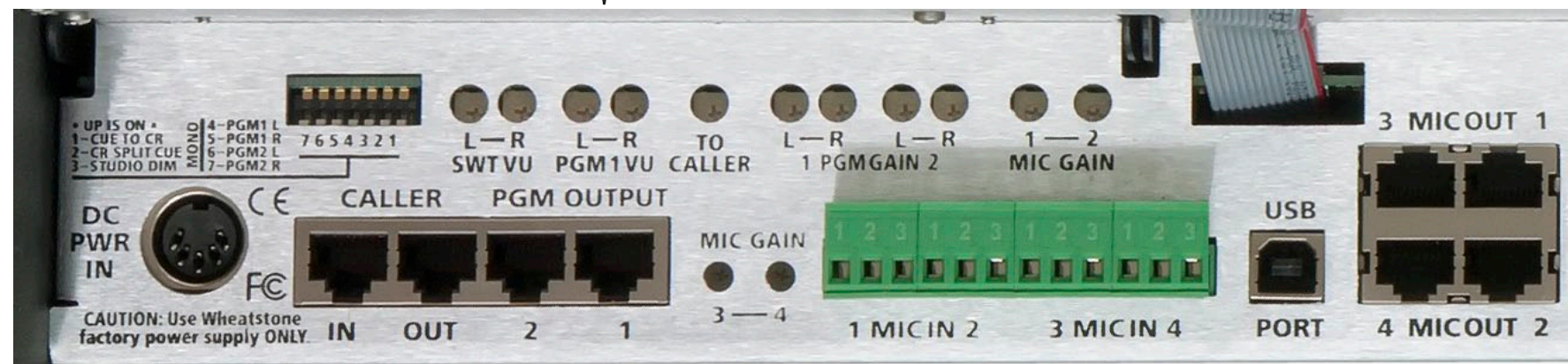
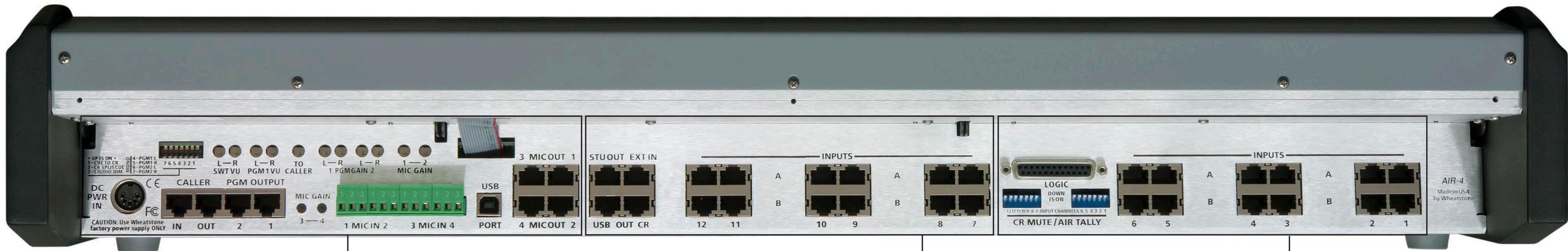
MIC 2 Talkback to Cue/Control Room

The talkback to cue logic input is used to connect an external user-supplied button that enables the person activating it to talk to the operator in the control room, via the console’s cue speaker. Provide a closure between Mic 2 TB to Cue/CR, Pin 11 and Mic 2 TB to Cue/CR Common, Pin 12. This will cause the channel’s pre fader signal to be sent to the console’s Cue bus, where it may be heard by the console operator. This non-latching condition continues until the closure is released. (Requires a user-supplied momentary action TALKBACK switch at the studio microphone location.)

On Air Tally

Lets any programmed channel’s START switch control an on-air light or other “microphone on” indicator at a remote location. This control function provides a contact closure between Pin 9 (On Air Tally N.O.) and Pin 10 (On Air Tally Common) whenever the module is ON.

This signal can be used to control an externally powered tally light that requires a continuous closure to function. *Current should not exceed 2 amps at 30 volts DC.*



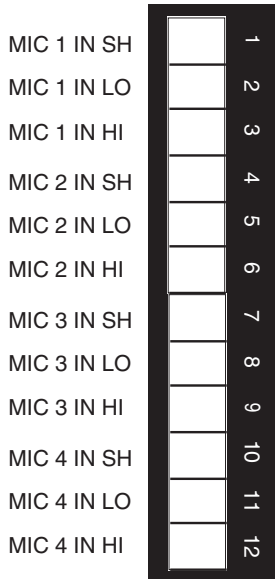
AIR 4 Console Rear

Audio Connections

MICS INPUTS

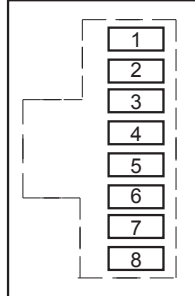
"MIC 1 IN" - "MIC 4"

12-pin BOXED HEADER

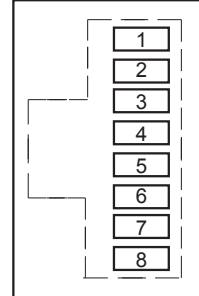


MICS OUTPUTS

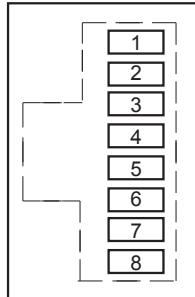
"MIC 1 OUT" RJ-45



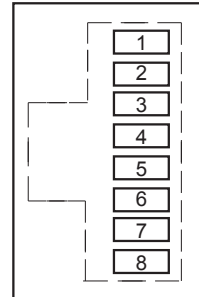
"MIC 3 OUT" RJ-45



"MIC 2 OUT" RJ-45

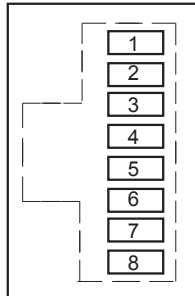


"MIC 4 OUT" RJ-45

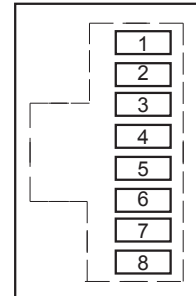


LINE INPUTS #1 through # 12

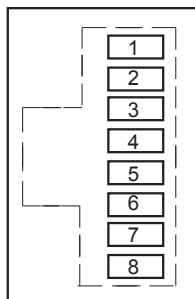
"A" RJ-45



"B" RJ-45

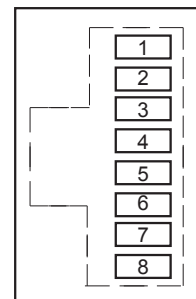


"IN" RJ-45



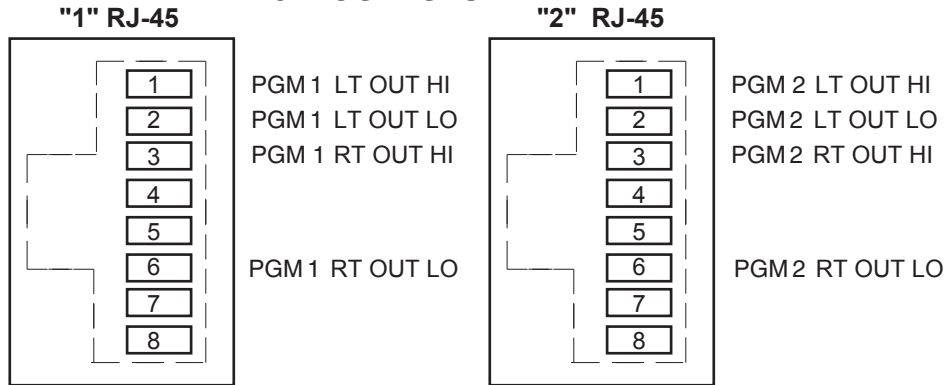
CALLER

"OUT" RJ-45

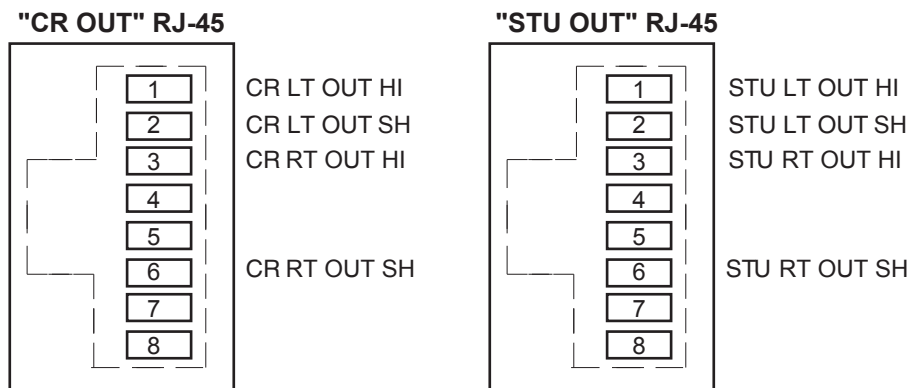


Audio Connections

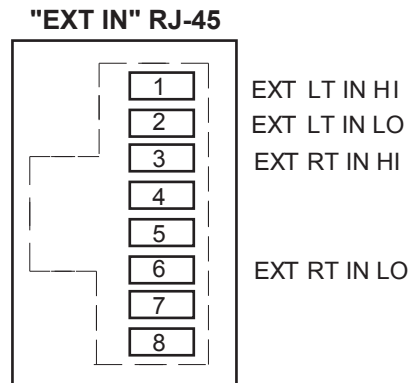
PGM OUTPUTS



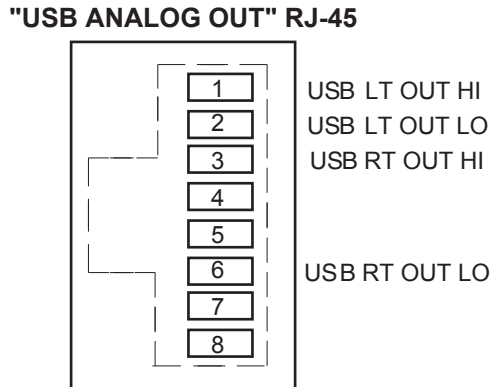
MONITORS OUTPUTS



EXTERNAL INPUT

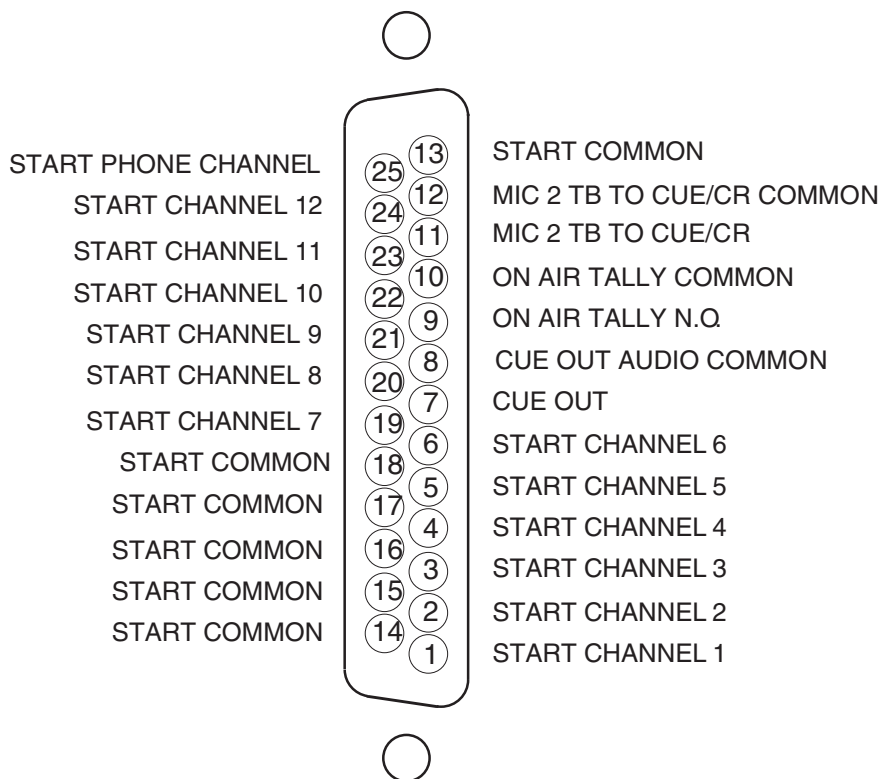


USB OUTPUT



Cue Out and Control Connections

LOGIC - DB-25 Connector



Console Features

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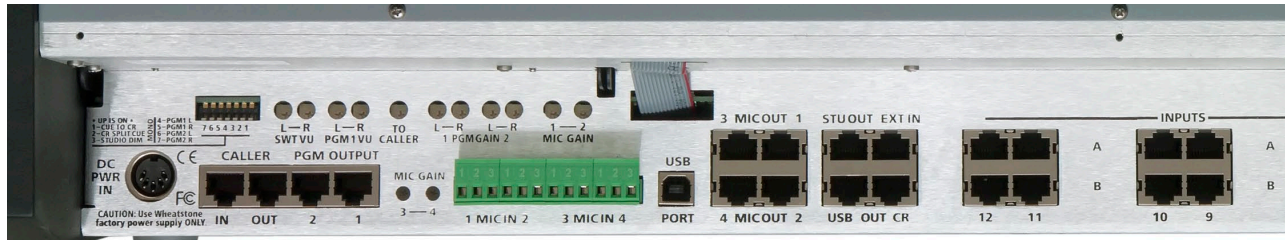


Console Features

Overview

Each AIR 4 console has two Input panels and one Master panel. The Input panel consists of six faders with associated switches. The Master panel has a PHONE section, a CONTROL section, a HEADPHONE section, and a STUDIO section. Each section is described below.

The basic purpose of the console is to take some of the many audio signals that are wired to the console inputs, and generate several outputs that combine these inputs in various groups and at various degrees of loudness, or signal strength. The typical application is in a radio station where it is desired to develop the signals that the station will broadcast (the on air signal), as well as several additional signals for recording and monitoring.



Inputs

The AIR 4 console is designed to handle up to 24 analog stereo pro level (+4dBu balanced) inputs, four mono microphone (-50dBu nominal) inputs, and one external stereo line level (+4dBu balanced) input that goes directly to control room or studio.

The AIR 4 also has one analog (+4dBu balanced) input dedicated to use as a telephone caller input.

Analog Mono Mic Level Inputs

These inputs are used to connect to microphones, which typically put out signals at relatively low signal strength, and therefore require more amplification (increase in signal strength) to be properly audible in the output. Mic level sources are plug into the four 3-position plug terminals located on the rear of the console. On the rear of the console also are four RJ-45 connectors used for MIC outputs, and the MIC 1 - MIC 4 GAIN trimpots for adjusting the level of each microphone input independently.

Example: With a microphone input of -60dBm @150ohm at the port, gain trim can set levels from -22dBu to +16dBu (note maximum preamp gain is +76dB) at the PGM 1 or PGM 2 output.

These microphone connections are to the inputs of four internal microphone preamplifiers. In order to actually hear the microphone audio, the microphone preamplifier outputs must be wired to the desired line inputs that feed the faders you will use to control the microphone levels.

Looking at the rear of the console, there are four RJ-45 connectors towards the left end of the console labeled MIC 1 OUT - MIC 4 OUT. These are the outputs, respectively, of the MIC 1 preamp - MIC 4 preamp.

In a typical installation you will want to feed the mic signal to both left and right sides of the stereo line input. For this reason, we have duplicated the MIC OUT signal as both left and right, so that a simple RJ-45 patch cord will carry the mic signal to both left and right sides of the stereo input of whichever line input you want the mic to feed.

Analog Stereo Line Level Inputs

These inputs are typically used to connect to machines, such as tape decks, cart machines, CD players, etc., that provide analog outputs. As mentioned above, you can also feed these inputs from the outputs of the internal mic preamps.

Outputs

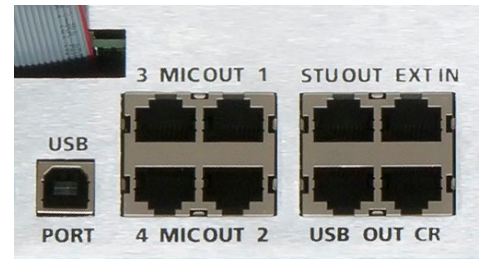
The console main analog outputs include two Program stereo buses (PGM 1 and PGM 2). The Program stereo outputs can be programmed to mono outputs via dipswitch SW 1 (described in the “Console Internal Programming” section).

Monitor outputs include a stereo Control Room output, a stereo Studio output, a mono cue output, and a stereo headphone jack.

The console's mono cue signal feeds the internal speaker in the meterbridge, and also provides the cue signal used to interrupt Control Room and headphones, if such interrupt has been enabled by the installer.

USB Port

The console contains a USB 2.0 interface, available via the USB Type B connector on the rear panel, to enable audio to pass between the console and a USB port on a computer. Internally, dipswitches select either PGM 1 or PGM 2 as the audio from the console to the computer (see "Console Internal Programming"). Audio coming back from the computer via USB shows up as a stereo analog signal on the USB OUT RJ-45 connector. From there, the audio can be patched to any line input, or to the external input.



Using the USB Port . . .

Any computer having a USB port and installed drivers capable of passing and utilizing digital audio data should work with the Air 4 USB port. Use a cable having a USB Type B connector on the Air 4 end and a connector on the other end that will mate with the computer's USB port; this will typically be a USB Type A connector.

. . . With a MAC

In general, this will be a plug-and-play process. The main concern is to choose the USB Audio Codec under *System Preferences > Sound* as desired for audio input and/or output. Then simply start the application.

. . . With a Windows® PC

When you first connect the Air 4 USB port to a PC running Windows you will see the famous "found new hardware" sequence of messages. At some point this sequence should end with a message that the new hardware is installed and ready to use.

Setting up any given application to use the Air 4 USB port will depend on the application itself. Generally, you will need to select the appropriate device from a list of devices in a Preferences dialog.

As an example, let's look at WinAmp, a free software application used by millions to play back audio streams from a network (or the Internet), or to play audio streams into a network.

To play audio from the Air 4 on the computer:

- Install the free LineIn plugin for WinAmp.
- Under *Preferences - Input* select the LineIn plugin from the Input list and click *Configure*, then find the USB Audio Codec in the list of available devices and note its corresponding device number, which you will need below.
- In WinAmp, choose *Play URL...*
- Enter "line://dev=n" where 'n' is the device value that you discovered above.
- Now when you click Play, WinAmp will play the Air 4 audio on the output device

selected in WinAmp. This could be speakers, a sound card, or even an output stream. To play audio from the computer on the Air 4:

- Under *WinAmp Preferences - Output* select an output plugin and click *Configure*, then select the USB Audio Codec as the device.
- Play the desired computer audio with WinAmp and the audio will appear at the USB OUT connector on the back of the Air 4. You must patch this output to the desired fader (using the appropriate connector from the INPUTS bank), or to the EXT IN if desired, to route the audio.

Other Computers

If your computer does not use one of the above operating systems, or otherwise behaves differently than described above, consult the documentation for that computer, operating system, and/or application.

General Considerations

If any problems are encountered, please consider the following points:

- The audio that is output from the Air 4 on the USB port depends on the setting of the internal dipswitches that select between PGM 1 and PGM 2 as the source (see “Console Internal Programming”).
- The audio coming back into the Air 4 on the USB port is available at the USB OUT, which *must* be patched to a line input if you want it to come up on a fader, or to the EXT IN if you want it available only in the monitors, or to some external device if that’s where you want it to show up.
- If you are not able to get the audio into or out of the USB port, check the USB cable, its connections at both ends, and the port selection settings in the application you are using.
- If you have the audio flowing where you want and it suddenly becomes intermittent or disappears, check the USB cable and the connections at both ends.
- Once you have the USB audio under control it is a good idea to make a record of the application being used, including its version number, the audio direction (into or out of the computer), and all the settings that were required to make it work. This information will be invaluable if you later have to troubleshoot the USB audio, or set it up on another computer.

Mute and Tally

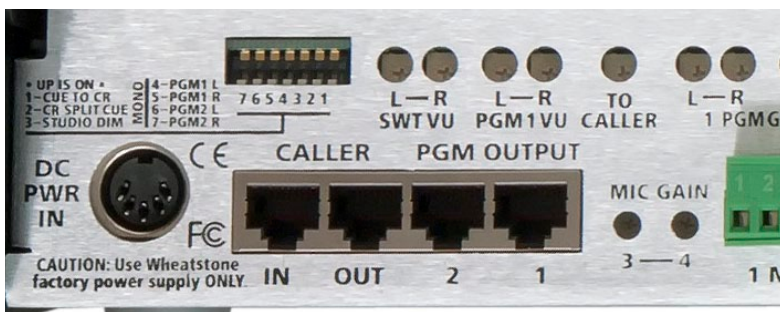
The console has the ability to mute the control room output. The console also has an ON AIR tally output that is used to drive user-provided external circuitry that will in turn operate the control room on air indicator. This tally is automatically activated whenever the control room mute is activated. Thus, turning on any module that activates the control room mute also turns on the ON AIR tally. Whenever this tally is activated the ON AIR indicator in the meterbridge will also illuminate.

See the “Console Programming Options” section for details.

Console Programming Options

All programming (except for the headphone split cue option and selection of audio to feed to an external computer via the USB port) is made via three PCB mounted dipswitches located on the console's rear panel. One dipswitch (PGM/CUE switch) is on the top left side of the rear, and programs the control room cue, the studio dim function, and the mono program outputs. The two other dipswitches (CR MUTE/AIR TALLY) are in between the two groups of INPUTS RJ-45 connectors, and activate CR mute and AIR TALLY.

PGM/CUE Dipswitch



When a PGM/CUE dipswitch position is up it is ON.

Cue Interrupt

The dipswitch pos. 1, when activated, sends cue to the control room.

Split Cue, Control Room

The dipswitch pos. 2, when activated, allows a summed (L+R) version of the regular program to be sent to the right side of the CR monitor stereo output, while CUE is sent to the left side.

Split Cue, Headphone

Consoles are normally programmed at the factory for CUE to appear on the left channel, while L+R sum of the control room output appears on the right. This can be changed with jumper J1 on the back side of the Master Panel. The jumper normally spans pins 2 and 3 of the jumper header. To defeat this split cue option, move the jumper to span pins 1 and 2 instead. Then cue will interrupt both sides of the headphones.

Studio Dim

The dipswitch pos. 3, when activated, allows normal studio audio to DIM (drop -20dB in level) when talkback to studio is engaged. If this dipswitch is not activated, the normal studio audio is completely interrupted by the MIC 1 audio when talkback to studio is engaged.

If the studio is programmed to DIM talkback audio could presumably make it from the studio monitor speakers to the open studio mic.

Program Mono

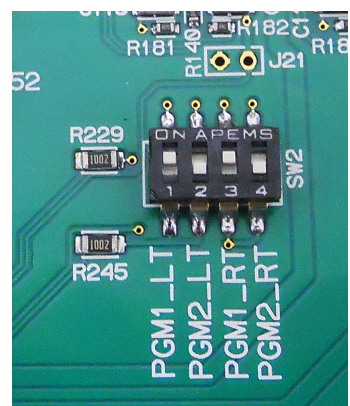
The dipswitch pos. 4 - 7, when activated, sums the left and right PROGRAM channels and sends L+R to the appropriate channel:

- Pos. 4 - sends L+R of the PGM 1 to the PGM 1 LT channel;
- Pos. 5 - sends L+R of the PGM 1 to the PGM 1 RT channel;
- Pos. 6 - sends L+R of the PGM 2 to the PGM 2 LT channel;
- Pos. 7 - sends L+R of the PGM 2 to the PGM 2 RT channel.



USB Source Dipswitches (internal)

Dipswitch SW2 on the CONA4-4 board is used to determine whether PGM 1 or PGM 2 will feed the USB link. Positions 1 and 3 should be on to feed USB with PGM 1, while positions 2 and 4 should be on to feed USB with PGM 2. If PGM 1 is to be used, the PGM 2 positions should be off, and if PGM 2 is to be used, the PGM 1 positions should be off. **DO NOT** activate both PGM 1 and PGM 2 simultaneously!



CR MUTE/AIR TALLY Dipswitches



When a CR MUTE/AIR TALLY dipswitch position is down it is ON.

CR Mutes

An input channel can be programmed to mute the control room speakers when the channel is ON. Positions 1 through 12 and caller (13) of the dipswitches, when activated, automatically mute the console's control room speakers when the corresponding channels 1 through 13 are turned ON. This is done to prevent feedback from the CR announcer's mic. At the same time the ON AIR LED in the center of the meterbridge will light up.

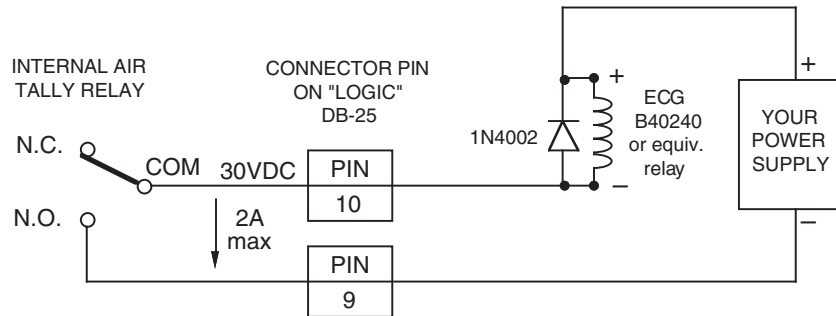
On Air Tally

For controlling the “on-air” tally function, a relay is provided. The tally is activated when any channel set for CR mute is turned on or put into cue.

The relay connections are available at the “LOGIC” DB-25 connector mounted on the rear of the console. Connect the on-air light to the external user-provided relay. Do not bring on-air light AC connections to any pin of any connector on the console.

TYPICAL CONTROL ROOM ON-AIR TALLY CIRCUIT

USER-SUPPLIED RELAY TRIGGERED BY CONSOLE CR MUTE CIRCUIT



RELAY CIRCUIT POWERED BY USER SUPPLIED EXTERNAL SUPPLY

Controls and Functions

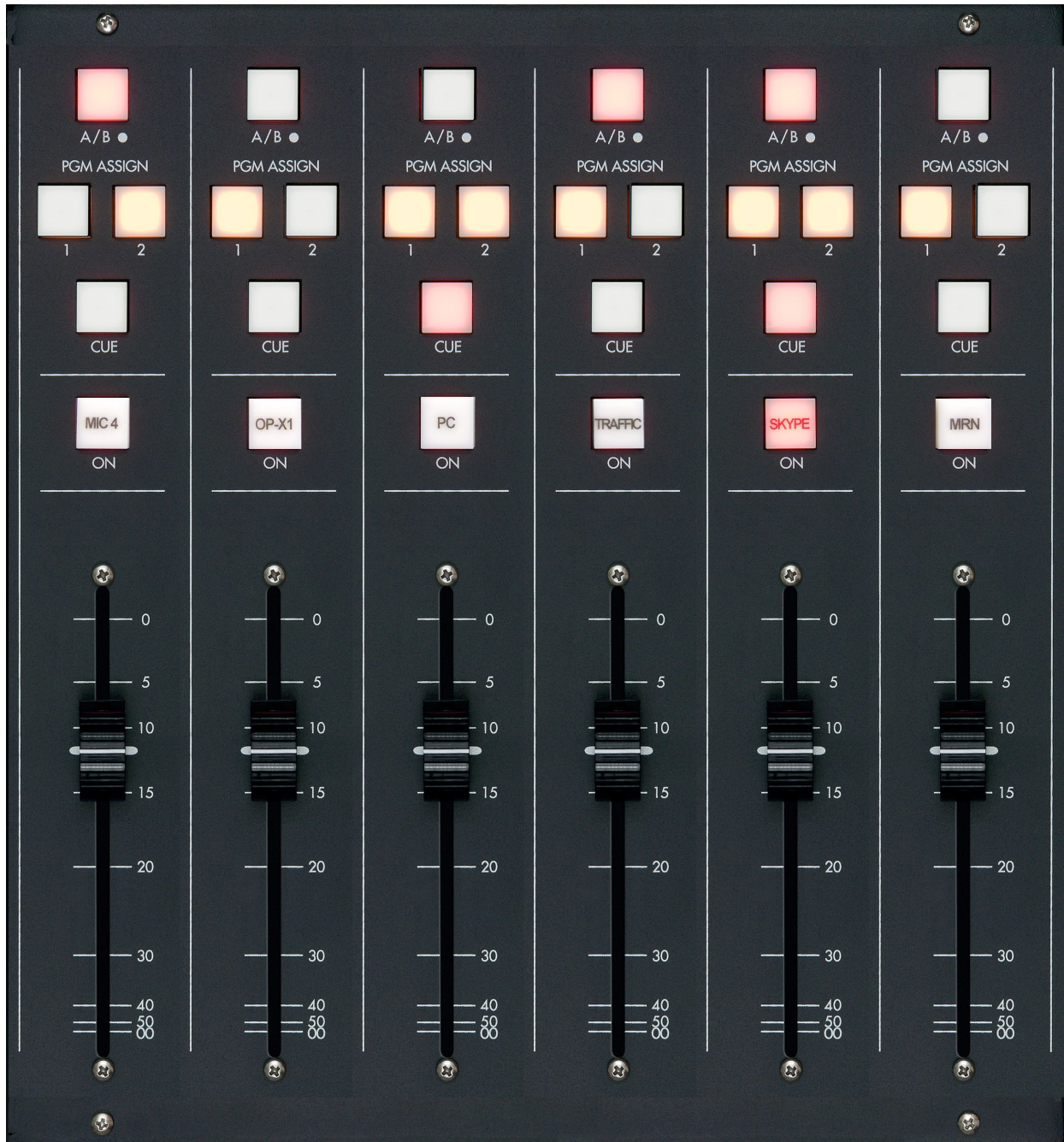
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Controls and Functions

Input Panel (IP-AIR4)

The Input panel of the AIR 4 console has six identical strips representing six input channels.



Source Select

Each input channel accepts two analog stereo sources: A and B, switched at the top of the panel. The A/B button will be lit when source B is selected.

Program Assign

Output switches assign the selected source signal to any combination of the console's two stereo Program outputs – PGM 1 and PGM 2. The button will be lit when the source is assigned to its respective bus. To remove a source from the bus, press the button again; the light will go off to indicate that the source is no longer assigned to that bus. NOTE that when the console is powered up all input channels will be off, with source A selected, and assigned to PGM 1.

Recessed rear panel trimpots adjust the left and right levels of PGM 1 and PGM 2 outputs.

Cue Button

A CUE switch places the channel's signal on the console's cue bus, where it may be heard on the meterbridge mounted cue speaker, as an interrupt to the console operator's headphones, and as an interrupt to the control room monitor speakers, if so programmed.

Press the CUE button. The channel's input signal will be included in the console's CUE output at a level that is independent of the FADER setting, and the button will light. The fader does not need to be turned ON. To remove a fader from cue, press the CUE BUTTON again; the light will go off to indicate the channel is no longer assigned to cue.

Fader

Level is set by a long-throw fader. The fader is the sliding mechanism that determines how strong is the presence of the input in some of the various console outputs.

If the fader is all the way down (that is, pulled toward the console operator), the signal will not be present in either of the two program main buses to which it is assigned. As the fader is moved up (that is, pushed away from the console operator) the signal will appear more strongly in each of the main buses to which it is assigned.

ON Button

The ON button turns the channel on and off by means of electronic switching and can simultaneously start external source machines. The channel is ON when the ON button is lit. These can also be programmed (as mentioned in the previous chapter) to activate control room mute and on air tally.



Master Panel (MST-AIR4)

The Master panel includes the Caller Input, Control Room monitor, Studio monitor, and Meters sections.



Caller Input

The caller section is used for the telephone call-in talk segments, and controls the audio for the caller. The caller signal enters the console from your station hybrid.

The caller feed can be either or both of the two Program buses. The caller feed will never contain the caller's own voice.

A recessed rear panel trimpot adjusts the caller output level.

Program Assign

Output switches assign the caller to any combination of the console's two Program outputs (PGM 1 and PGM 2), and permit live talk-ins.

Pressing either of the two program switches causes the caller's audio to be included in the output mix for that bus, at a level dependent on the FADER setting, as long as the caller section is ON. The button will be lit when the caller is assigned to its respective bus. To remove the caller from a bus to which it is currently assigned, press the button again; the light will go off to indicate that the caller is no longer assigned to that bus.

CUE Button

The CUE button allows interviewing the caller prior to airing by including the caller's voice in the console's cue bus, where it may be heard on the meterbridge mounted cue speaker.

TB Button

When the TB switch is pressed (it is momentary action), the microphone (MIC 1) will interrupt the regular caller signal, thus allowing the DJ to talk to the caller prior to airing.

Fader

The long-throw fader sets the caller's signal level.

If a fader is all the way down the caller's voice will not be present in either of the two Program buses (PGM 1 and PGM 2) to which the phone is assigned. As the fader is moved up the signal will appear more strongly in each of the main buses to which the phone is assigned.

The fader position will also affect the strength of the caller in the cue output.

ON Button

The ON button determines if the phone channel is ON or OFF. The channel is ON when the ON button is lit. The button can also be used to provide external start logic for the hybrid.

If the phone channel is OFF, caller signal will not be present in any main bus output, regardless of the status of the PROGRAM ASSIGN buttons or the position of the fader. If the phone channel is OFF its signal will still be present in the cue output if it has been assigned to cue.



Caller Set-Ups

Pre-air segment communication between the console operator (DJ) and callers is aided by the CUE button, which places the caller's voice on the console's cue speaker and headphones, and (if so programmed) CR speakers. Additionally, pressing the caller TB switch sends the MIC 1 signal to the caller output.

A typical call-in segment might proceed as follows:

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

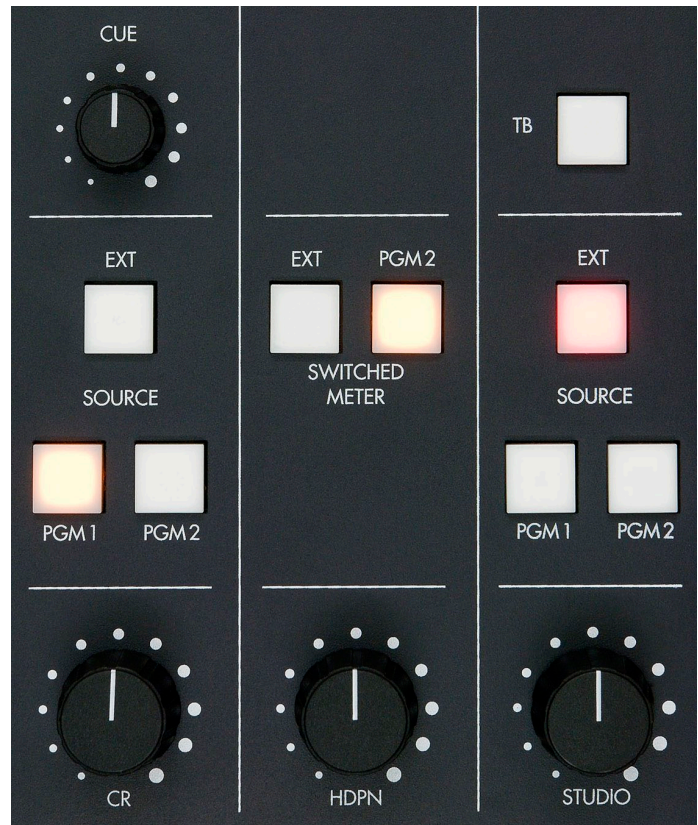
When he is ready to take the call on-air, the DJ makes sure his mic and phone are assigned to PGM 1 or PGM 2 and turns them ON. He then deactivates caller CUE to hear the normal feed.



Control Room Monitor

This is the console operator's monitor that allows the operator to listen to the console's two stereo Program outputs and an external stereo line level input. This section of the console includes the monitor level controls for the control room, headphone, and cue circuits.

In a typical radio application the console is located in the Control Room. Speakers in the Control Room allow the console operator to listen to the console bus outputs to be assured that the console is performing as desired. These speakers are fed by a stereo signal from the console's Control Room output. In addition to the Control Room output, the operator may also desire to listen to specific isolated faders via the cue system and the console's internal cue speaker, or may want to listen via headphones. Thus, the control room monitor consists of the above mentioned level controls, along with two program assign (PGM 1 and PGM 2) buttons, and an external input (EXT) button.



In some instances the console operator may also be performing talent whose voice will be heard over the radio. The operator's microphone may thus provide a part of the signal that is going out over the air. If that signal is the one being monitored with the Control Room speakers, there is the potential for feedback. The amplified signal from the Control Room speakers is picked up by the microphone and amplified to a new, higher, level, which then is once again picked up by the microphone. The signal quickly rises to an ear-splitting screech. To prevent this, the operator's microphone is normally set to MUTE the Control Room output to prevent the occurrence of feedback.

The master CUE circuit drives a meterbridge-mounted speaker through a built-in power amp, and can be programmed to interrupt control room feed, or provide a split feed (program mono sum to right, cue to left) to the control monitor speakers. It also automatically interrupts the headphone feed.

Program Select

Pressing either of the two program (PGM 1 or PGM 2) switches allows the operator to listen to the selected output bus. The button will be lit when the monitor is assigned to its respective bus.

EXT Switch

Pressing the EXT switch allows the operator to pick up the external input (useful for such items as tape recorders or air returns) to listen.

CONTROL ROOM Level Control

The CONTROL ROOM level control determines the overall loudness of the signal being monitored as it appears in the Control Room speakers. As the control is turned clockwise, the loudness increases up to a maximum at the limit of mechanical rotation. To decrease the loudness, turn the control in a counterclockwise direction.

NOTE: If the Control Room is muted and you turn the level control all the way up, then remove the condition that has the Control Room muted, the sound in the Control Room speakers will suddenly be VERY LOUD!

CUE Level Control

The CUE level control determines the overall loudness of the cue signal as it appears in the console's cue speaker (located behind the grill in the METERBRIDGE).

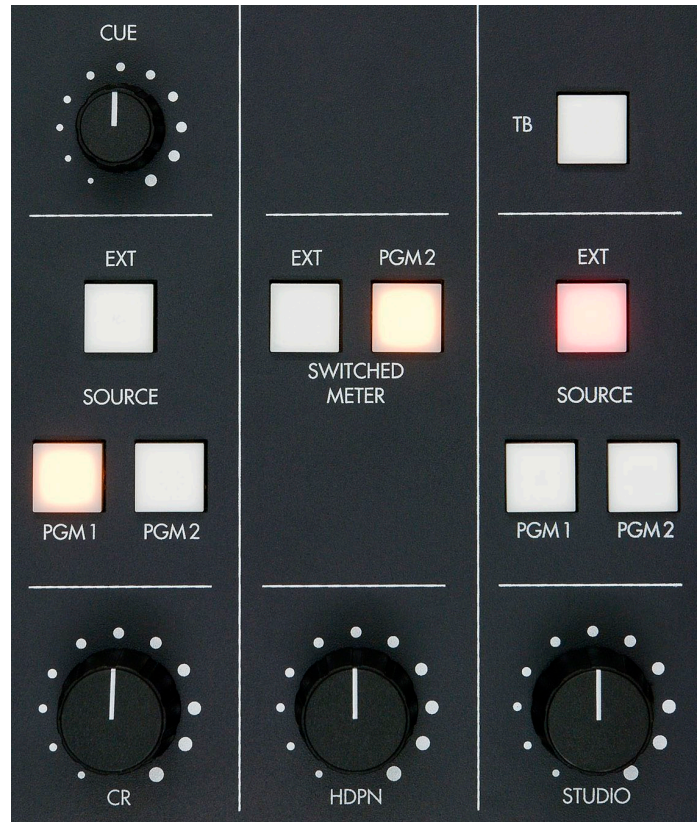
Like the Control Room speakers, the cue speaker also has the potential for feedback. To avoid this situation, operator mics that mute the Control Room will also mute the cue speaker.

NOTE: If cue is muted and you turn the level control all the way up, then remove the condition that has the cue muted, the sound in the cue speaker will suddenly be VERY LOUD!

HEADPHONE Level Control

The HEADPHONE level control determines the overall loudness of the headphone output signal, which monitors the same source (PGM 1, PGM 2, or EXT) as the Control Room speakers.

The headphone output signal appears at the HEADPHONE JACK, located beneath the armrest near the right side of the console. The jack is provided as a place to plug in user-supplied **stereo** headphones having an impedance of **60 Ohms or higher**.

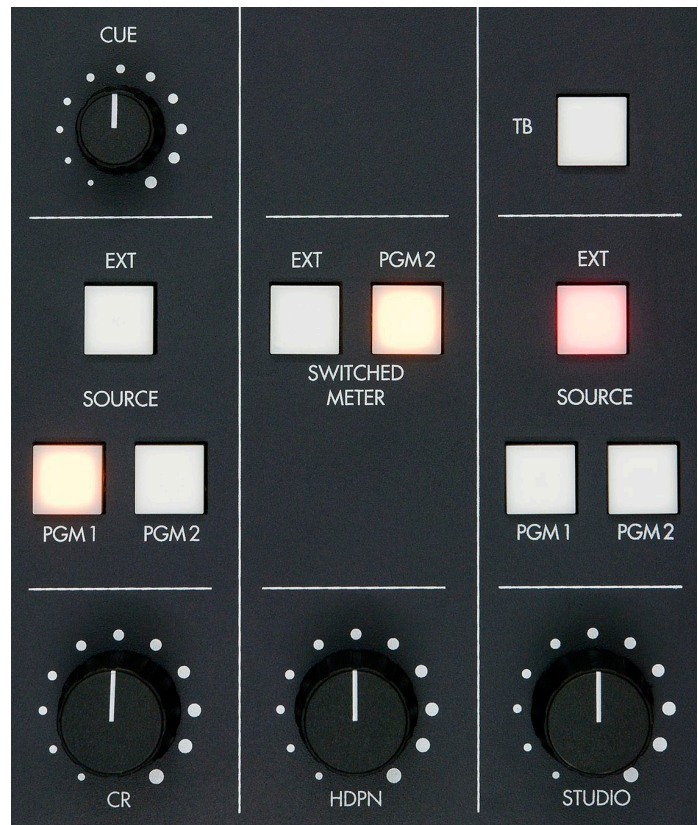


Studio Monitor

In addition to the Control Room, there may be a Studio in which one or more performers will be assembled, usually with microphones so that their voices can become part of the mix. Speakers may be provided in the Studio to allow the talent to listen to the console bus outputs at times that they are not actually on air. These speakers are fed from the console's stereo Studio output.

The studio monitor consists of a STUDIO level control, a TB (talkback) button, two program assign (PGM 1 and PGM 2) buttons, and an external input (EXT) button.

A connection is provided on the console's DB-25 connector to wire up a MIC 2 TB to CUE/CR switch provided by the user. This switch enables a guest using MIC 2 to talk back to the Control Room over the console's cue system.



Program Select

Pressing either of the two program PGM 1 or PGM 2 switches allows the selected output bus to be heard in the studio. The button will be lit when the monitor is assigned to its respective bus.

EXT Switch

Pressing the EXT switch allows the external balanced input (such as tape recorders or air returns) to be heard in the studio.

STUDIO Level Control

The STUDIO level control determines the overall loudness of the signal being monitored as it appears in the Studio speakers.

TB (Talkback) Button

The TB button lets the operator's microphone signal interrupt the normal feed to the studio speakers, allowing the operator to talk to the performers in the Studio. If the Studio Dim dipswitch (described in Chapter 2) is set to the ON position, the normal studio feed is not completely removed, but is dimmed by 20dB.

Meters (VU-AIR4)

The METERS section consists of two VU meter pairs on the console's meterbridge and a METERS select button, located on the Master panel.

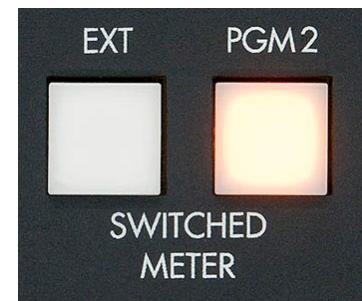


VU Meter Pairs

VU meter pairs (PROGRAM 1 VU and SWITCHED VU) are stereo LED bargraph type meters.

The level of the signal being metered is indicated by the number of display elements that are lighted. The more elements lighted, the stronger is the signal being displayed. The right four LEDs in each bargraph are red to indicate when the signal level is approaching a clipping (distorted) level. The next four LEDs are yellow, indicating a normal level range, and the remaining LEDs are green. The top member of the pair indicates the level of the signal's left channel, while the bottom member of the pair indicates the level of the signal's right channel. Peak (CLIP) indication is also provided.

The left VU meter pair shows the level of the PGM 1 output, while the right VU meter pair (the SWITCHED VU) shows the level of the signal that is selected for it (PGM 2 or EXT).



METERS Select Button

The METERS buttons select the source for the switched meter pair, as indicated above.

On Air LED

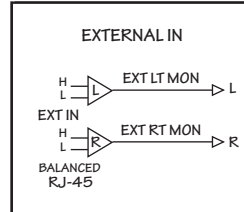
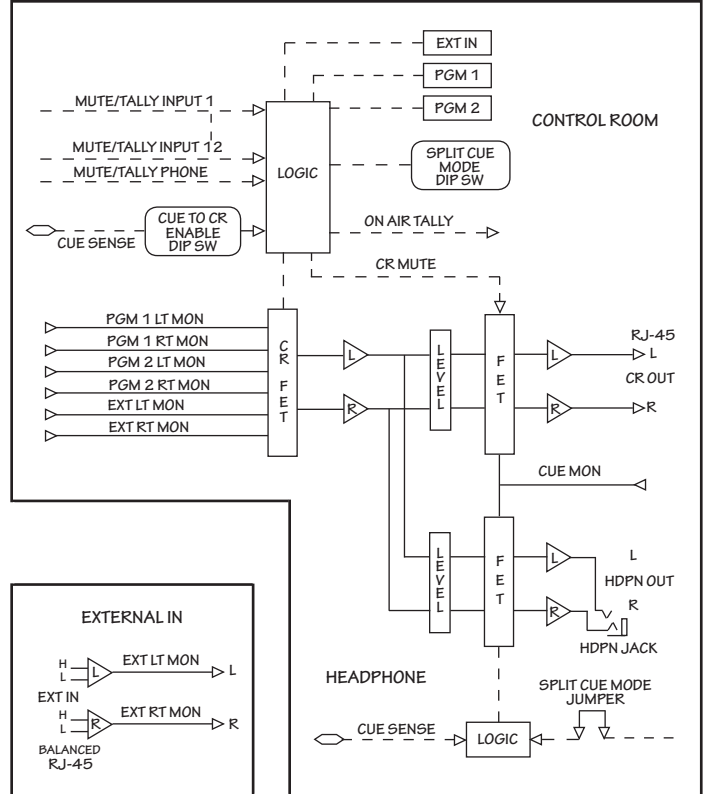
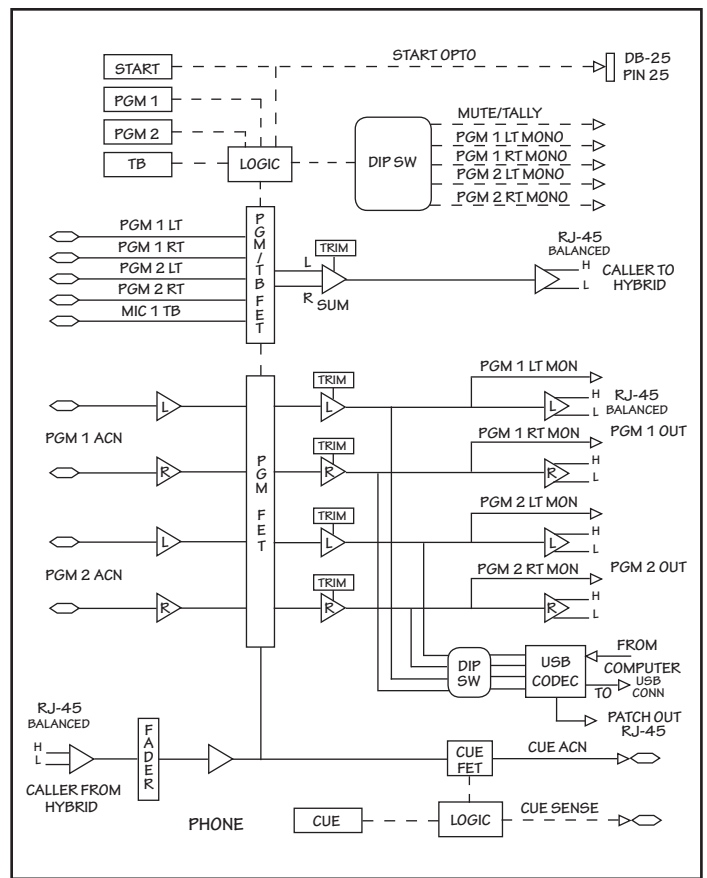
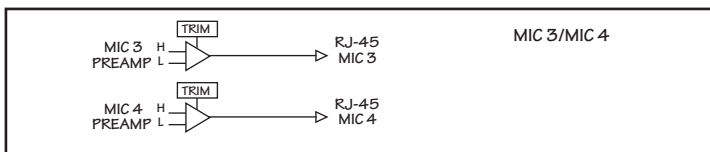
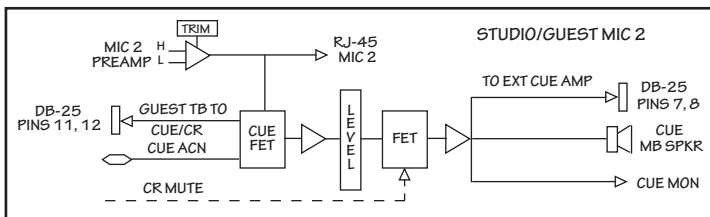
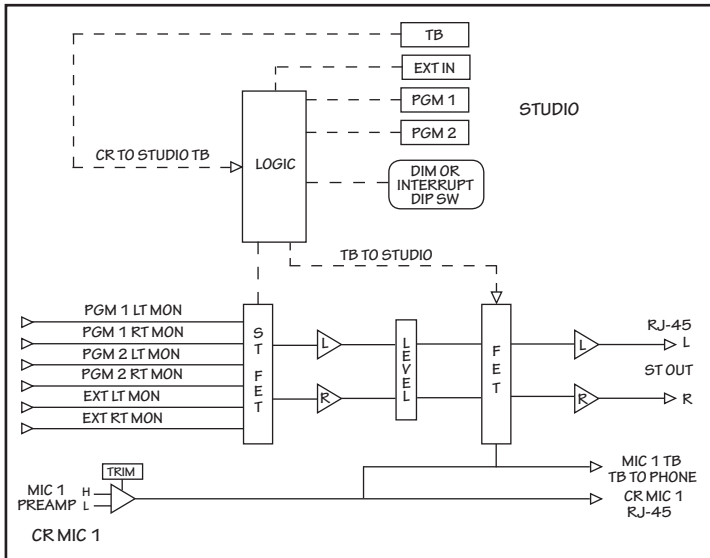
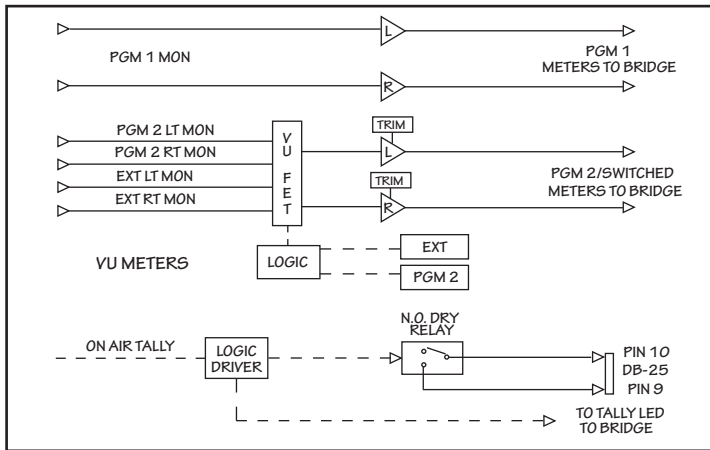
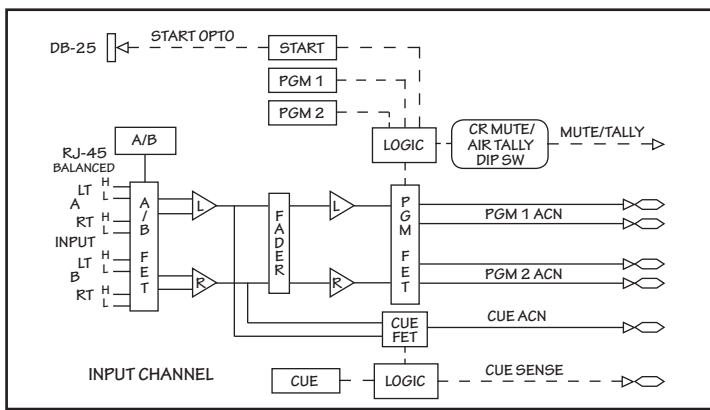
The ON AIR LED, located in the middle of the meter-bridge, lights up when any input channel is programmed by dipswitch to have the CR MUTE/AIR TALLY dipswitch activated, and is also ON.



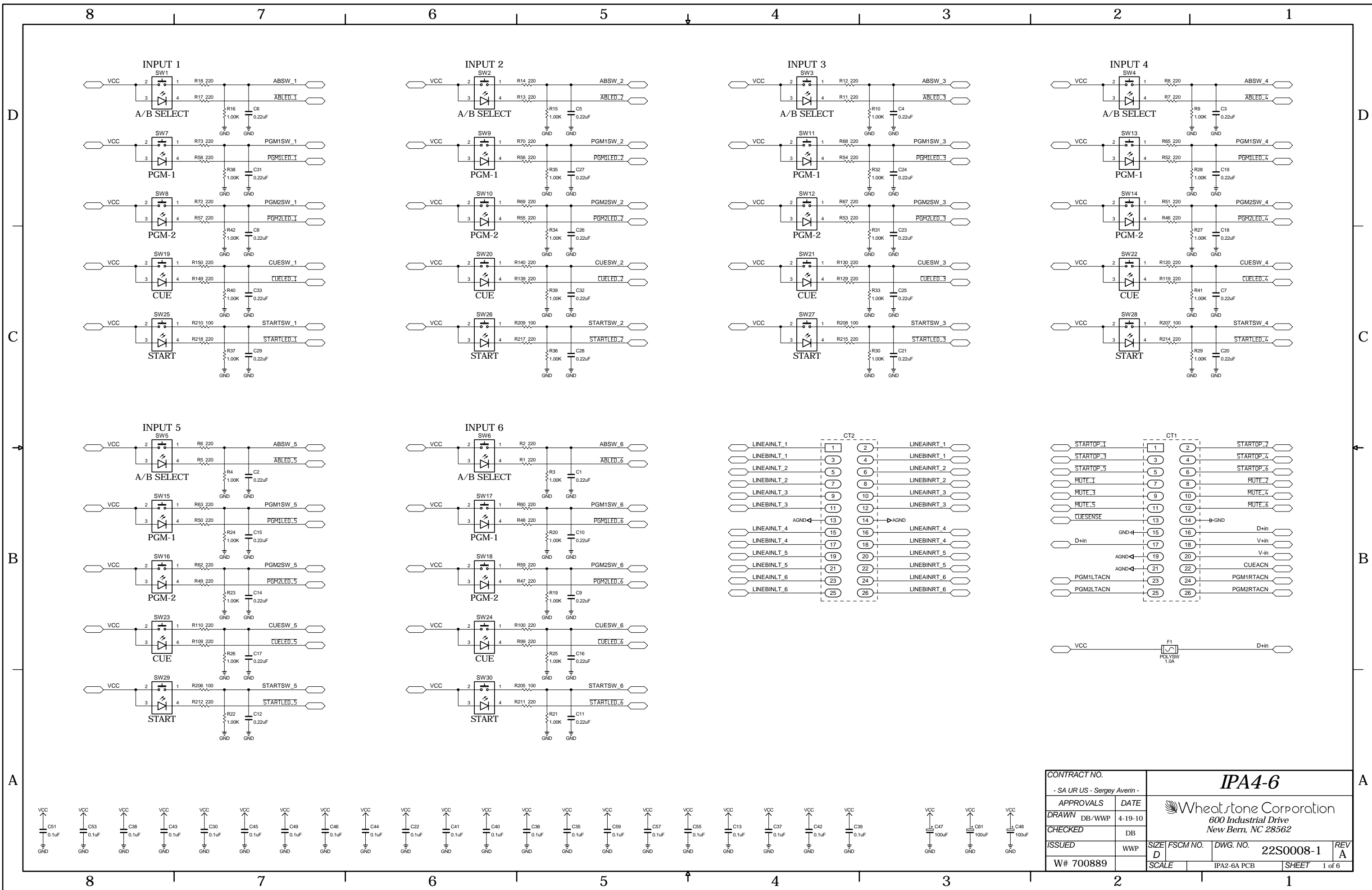
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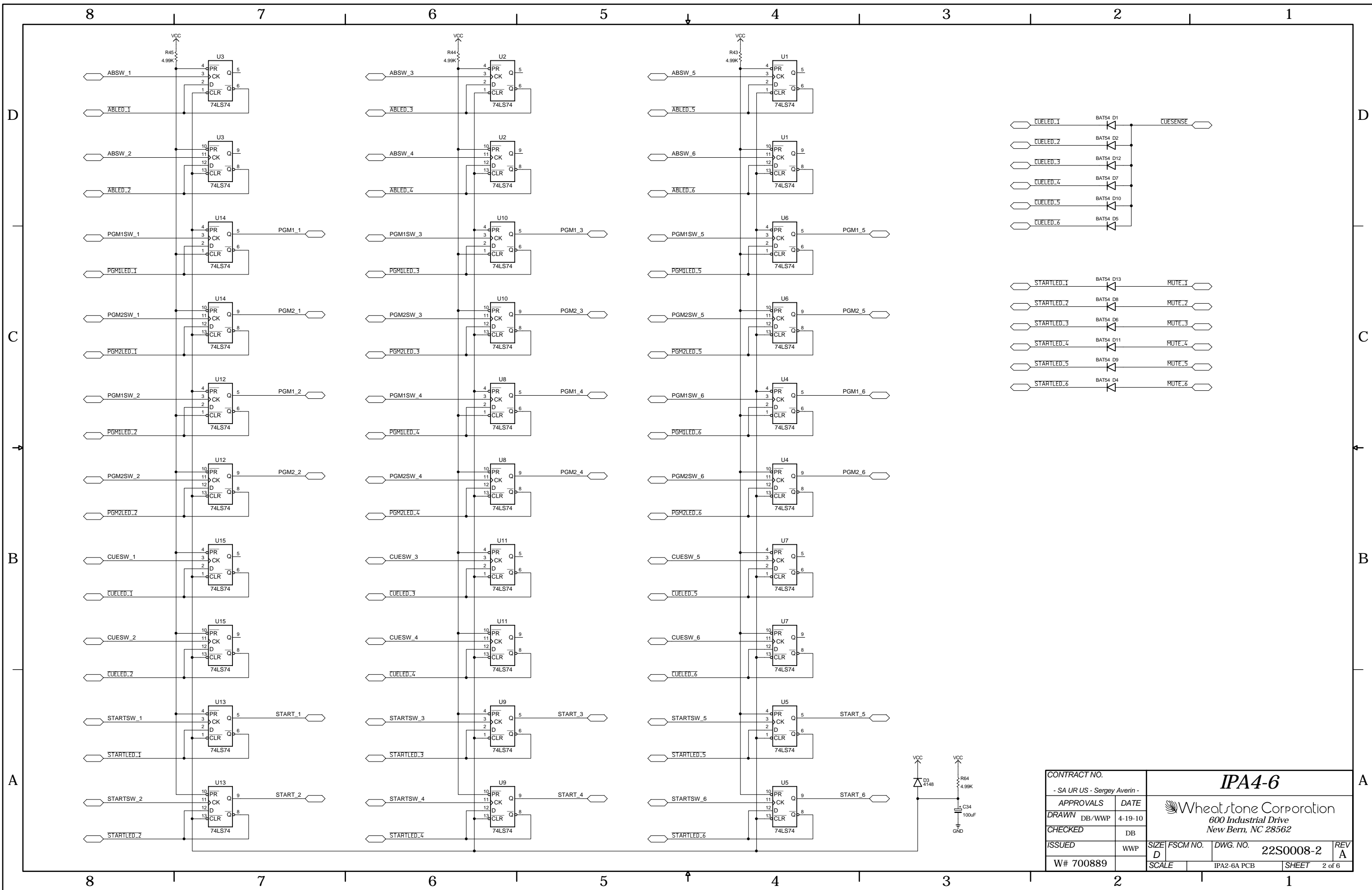


AIR 4 System Flow Diagram



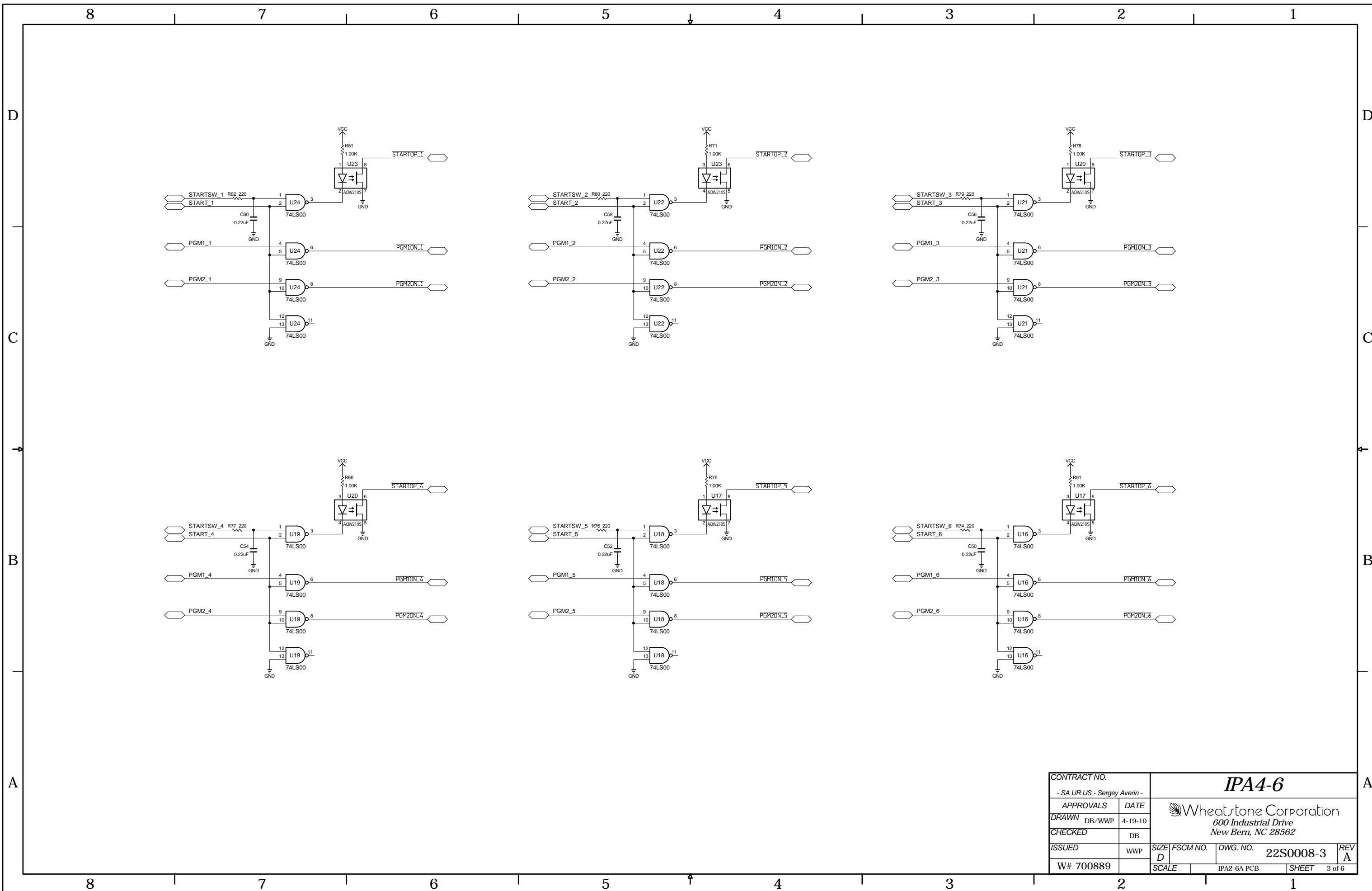
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DRAWN DB/WWP	4-19-10				
CHECKED	DB	SIZE D	FSCM NO.	DWG. NO. 22S0008-1	REV A
ISSUED	WWP	SCALE	IP2A-6A PCB	SHEET 1 of 6	
W# 700889					

IP-AIR4 6 Inputs Panel Schematic - Sheet 1 of 6



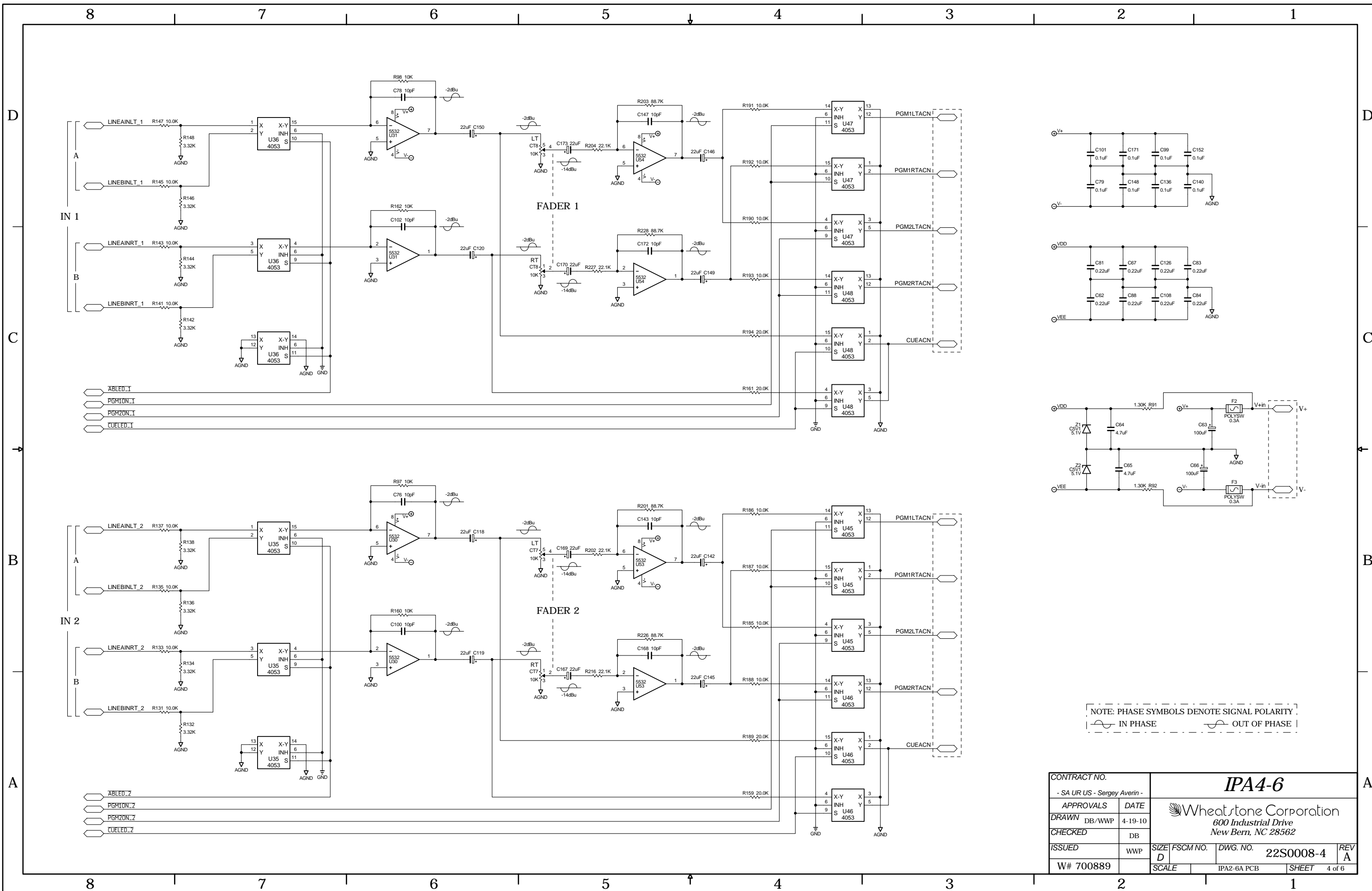
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W# 700889		SCALE	IP2-6A PCB
		SHEET	2 of 6

IP-AIR4 6 Inputs Panel Schematic - Sheet 2 of 6



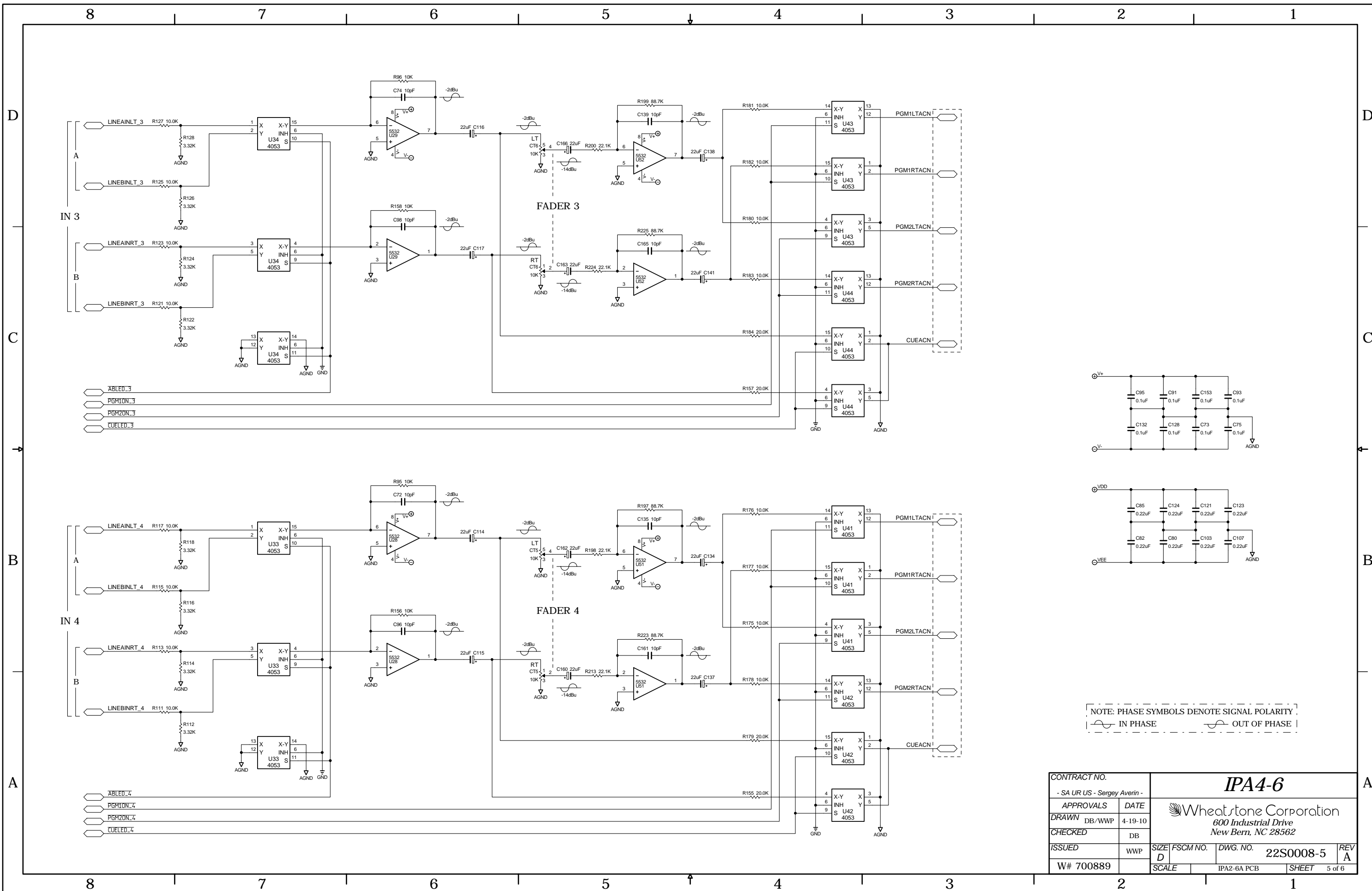
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IP-AIR4 6 Inputs Panel Schematic - Sheet 3 of 6



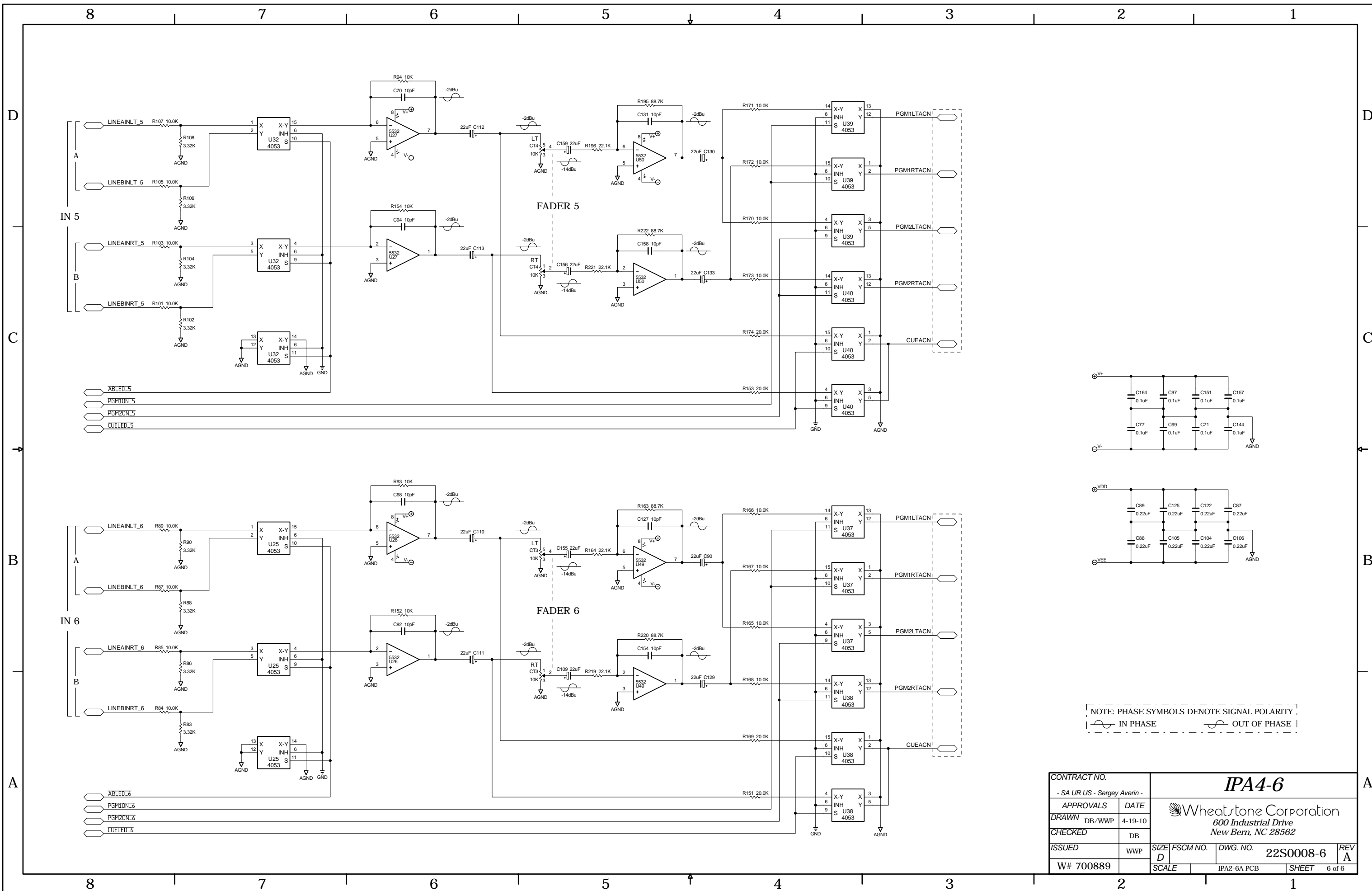
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		SCALE	IP2-6A PCB	SHEET	4 of 6

IP-AIR4 6 Inputs Panel Schematic - Sheet 4 of 6



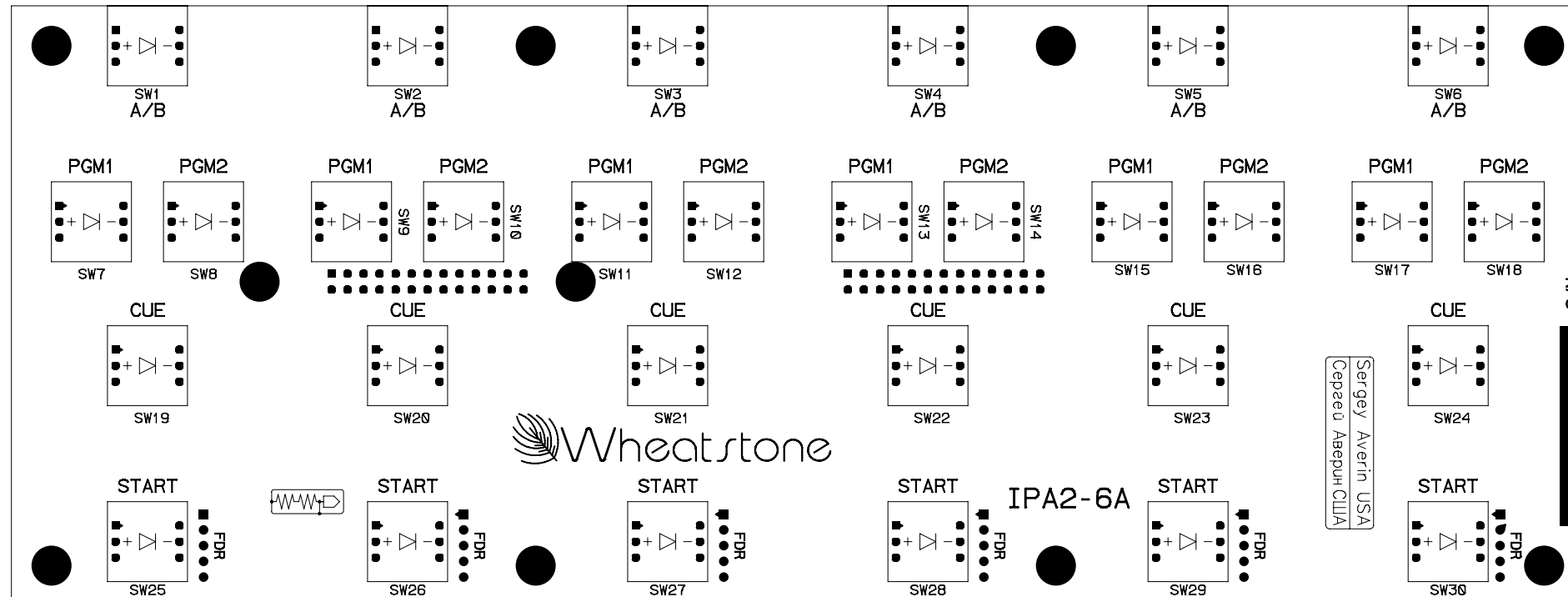
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IP-AIR4 6 Inputs Panel Schematic - Sheet 5 of 6

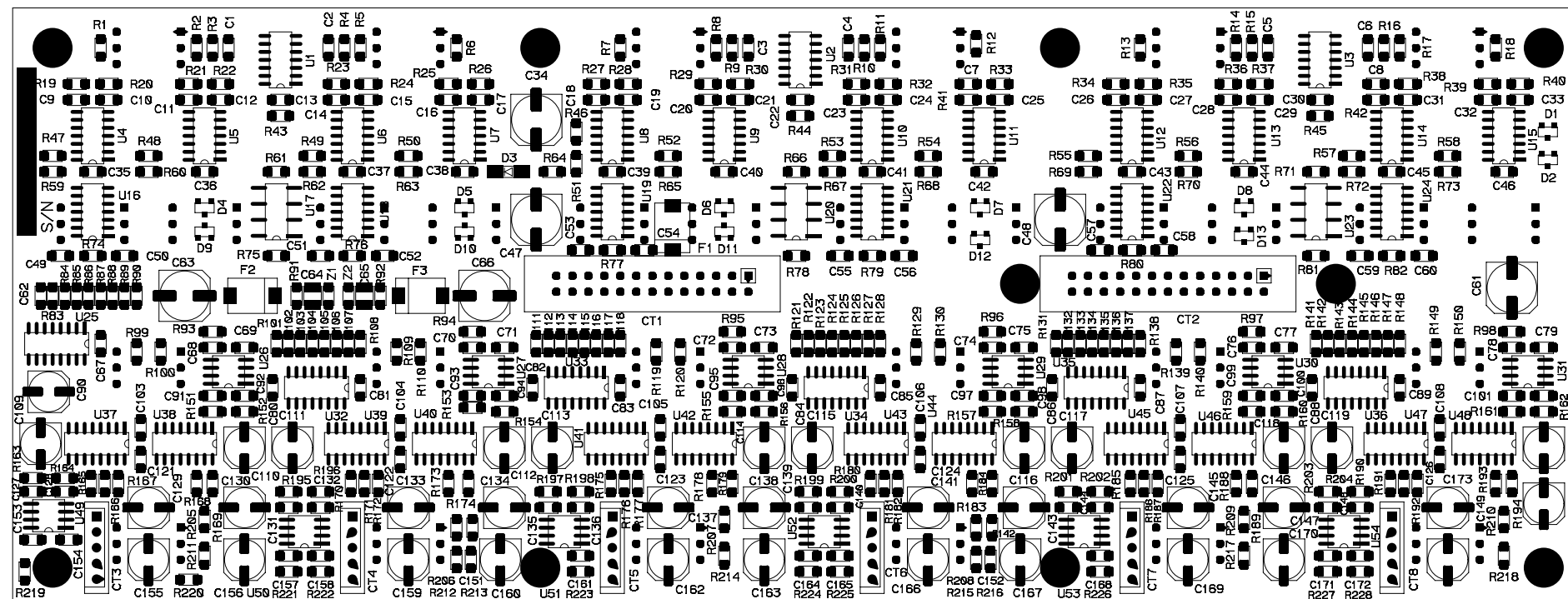


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CHECKED		DB			
ISSUED	WWP	SIZE	FSCM NO.	DWG. NO.	REV
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		SCALE	IP2-6A PCB	SHEET	6 of 6

IP-AIR4 6 Inputs Panel Schematic - Sheet 6 of 6



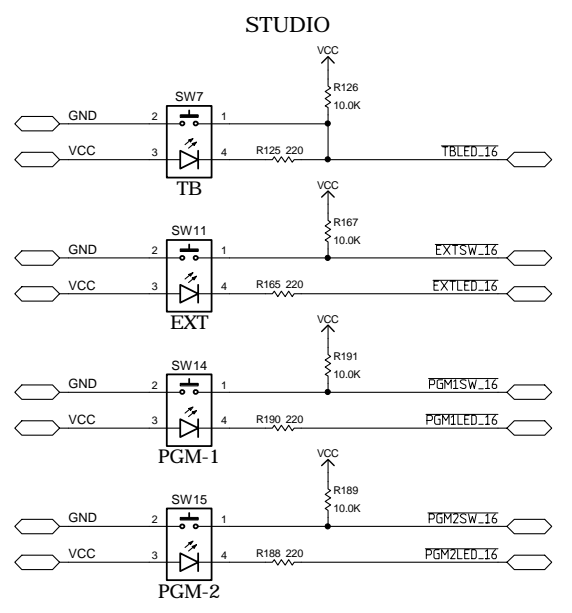
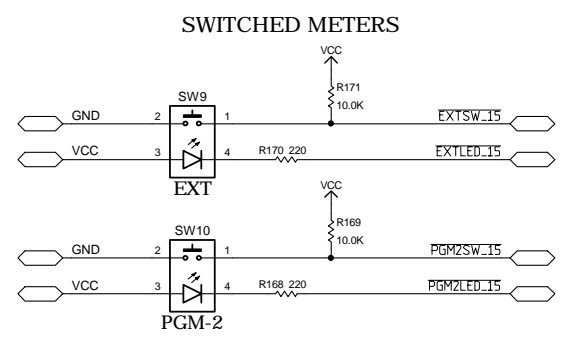
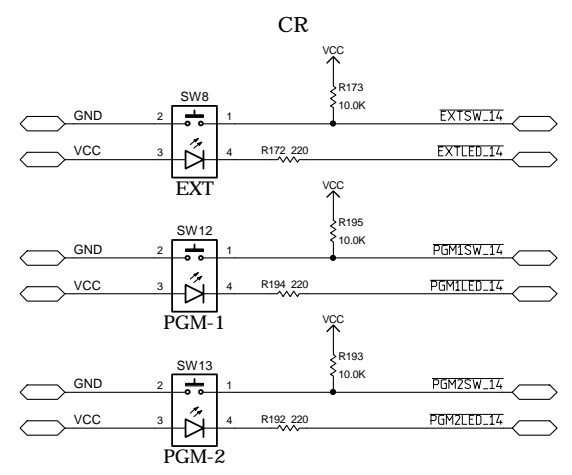
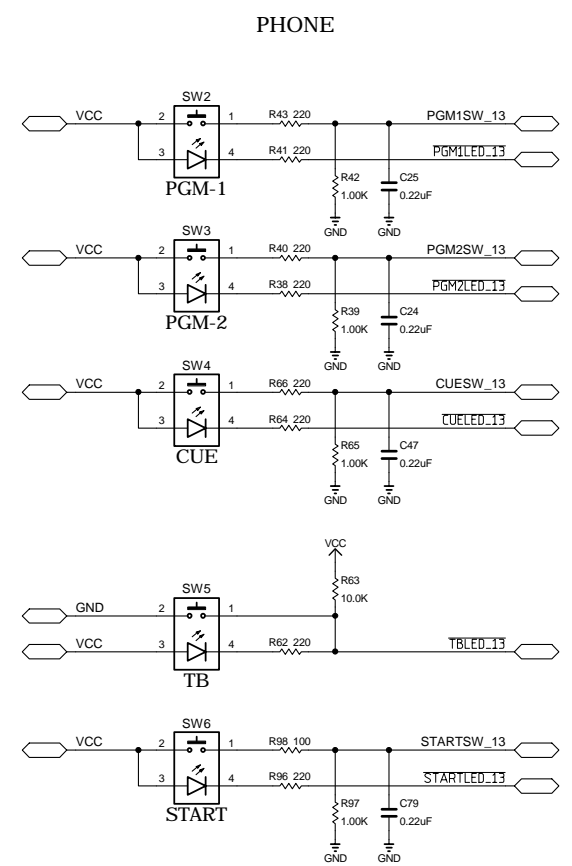
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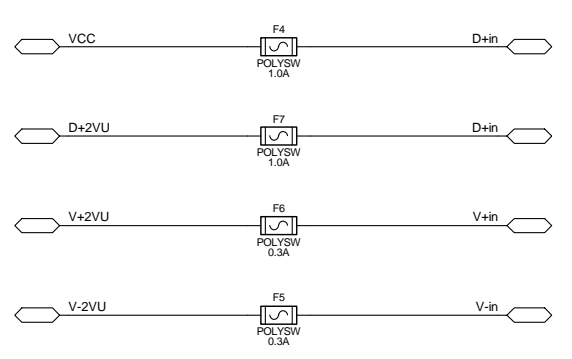
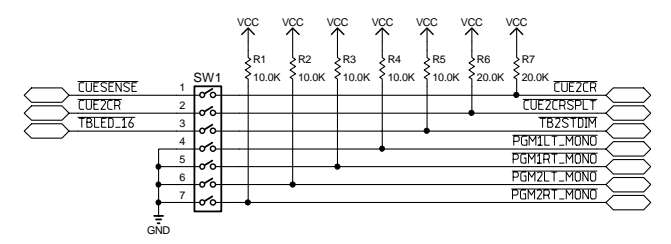
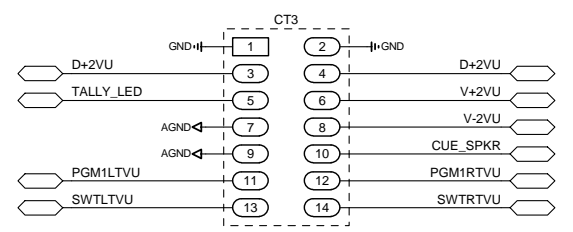
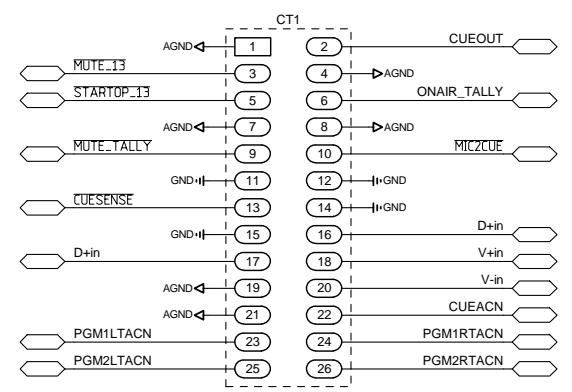
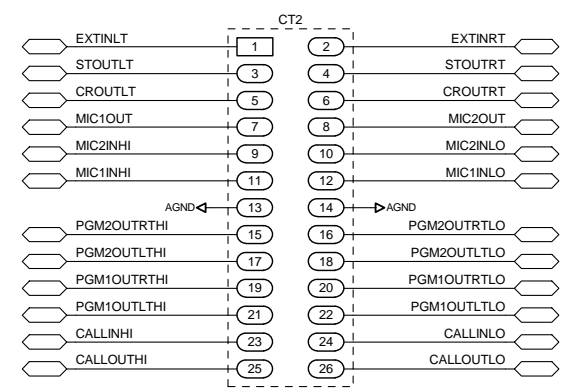
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8 7 6 5 4 3 2 1

D



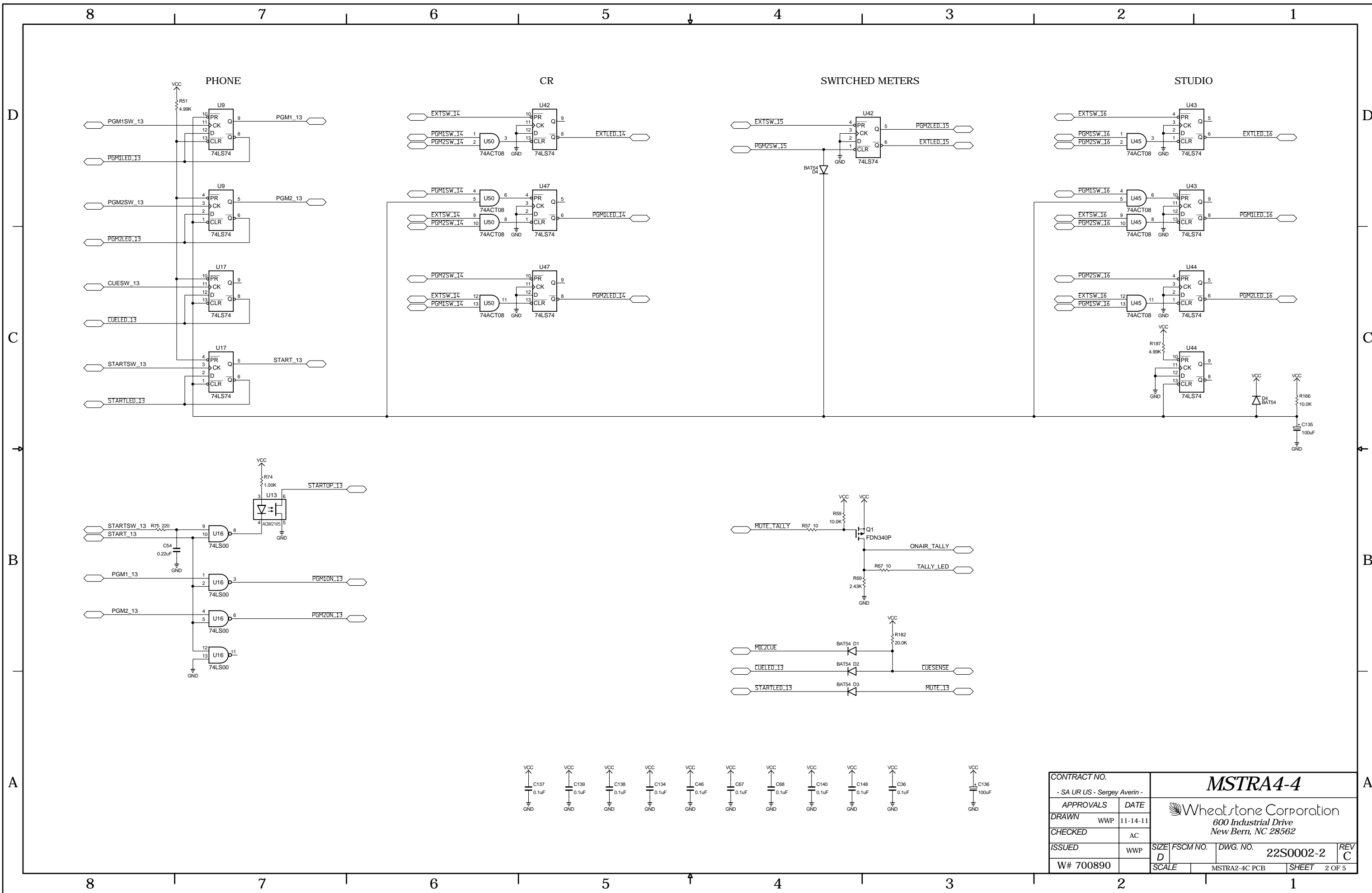
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A

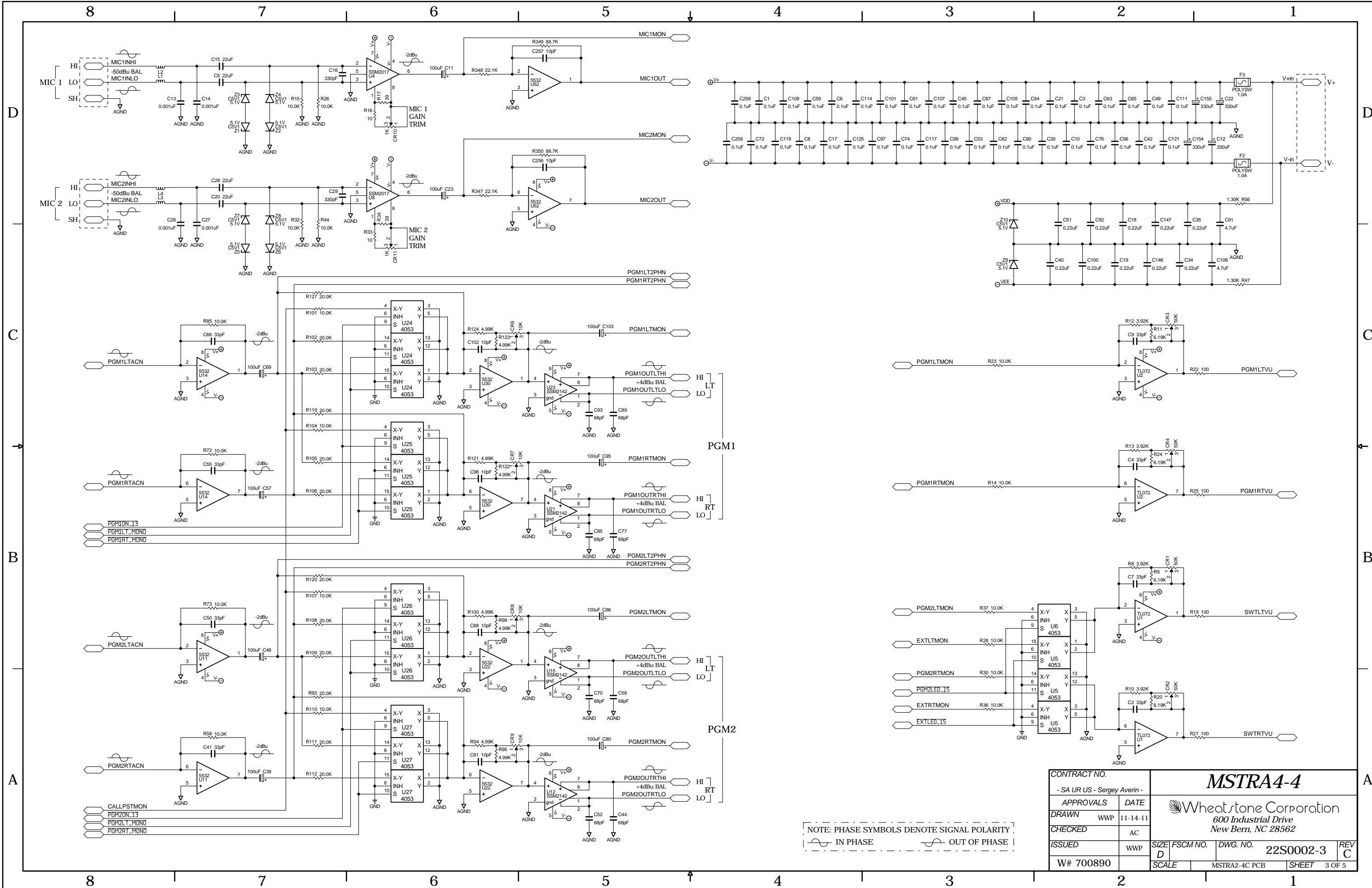
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- SA UR US - Sergey Averin -		Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
APPROVALS	DATE		
DRAWN WWP	11-14-11		
CHECKED	AC		
ISSUED	WWP	SIZE D	FSCM NO. DWG. NO. 22S0002-1 REV C
W# 700890	SCALE	MSTRA2-4C PCB	SHEET 1 OF 5



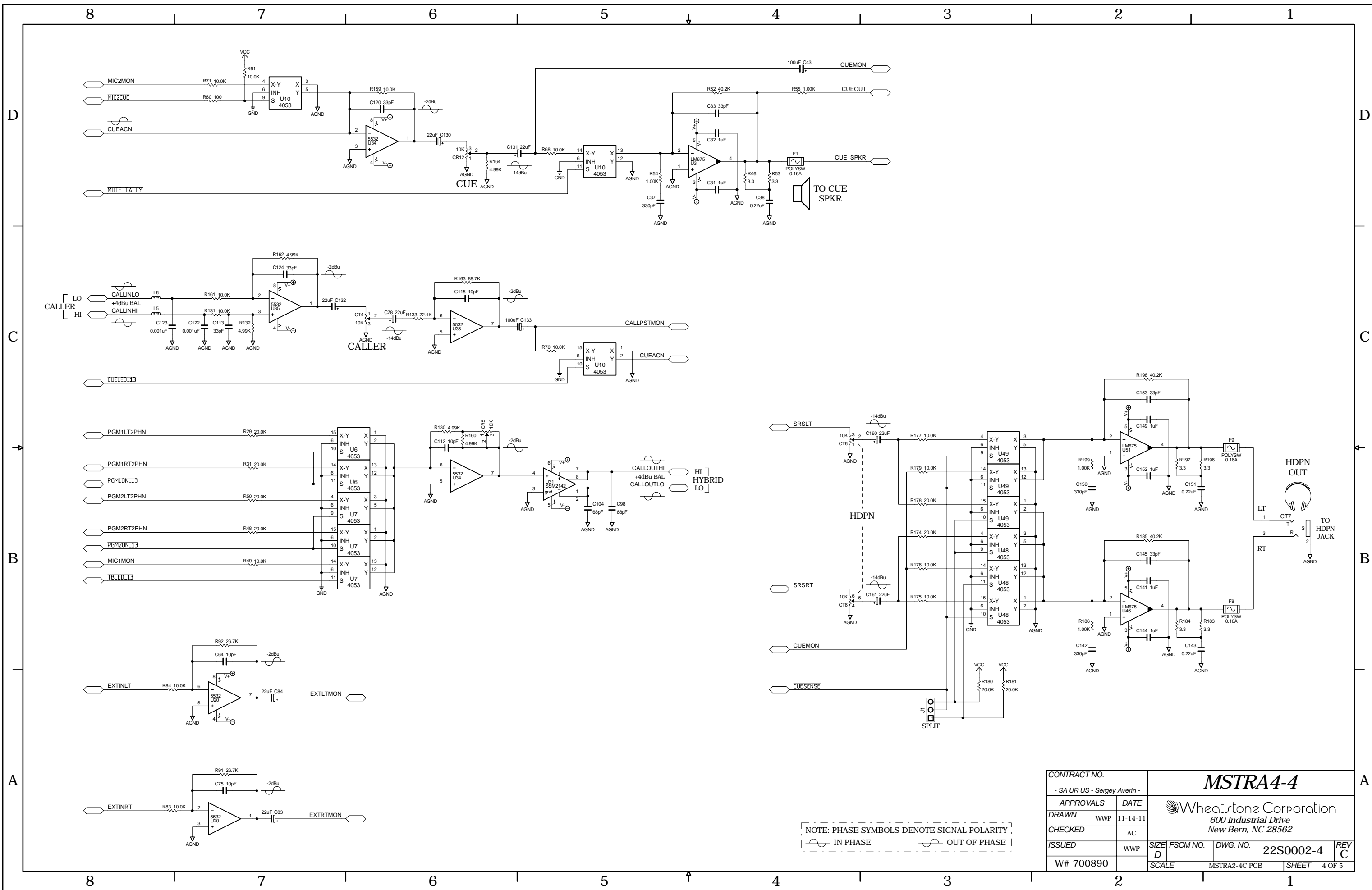
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W# 700890		SCALE	MSTRA2-4C PCB	SHEET 2 OF 5

MST-AIR4 Master Panel Schematic - Sheet 2 of 5



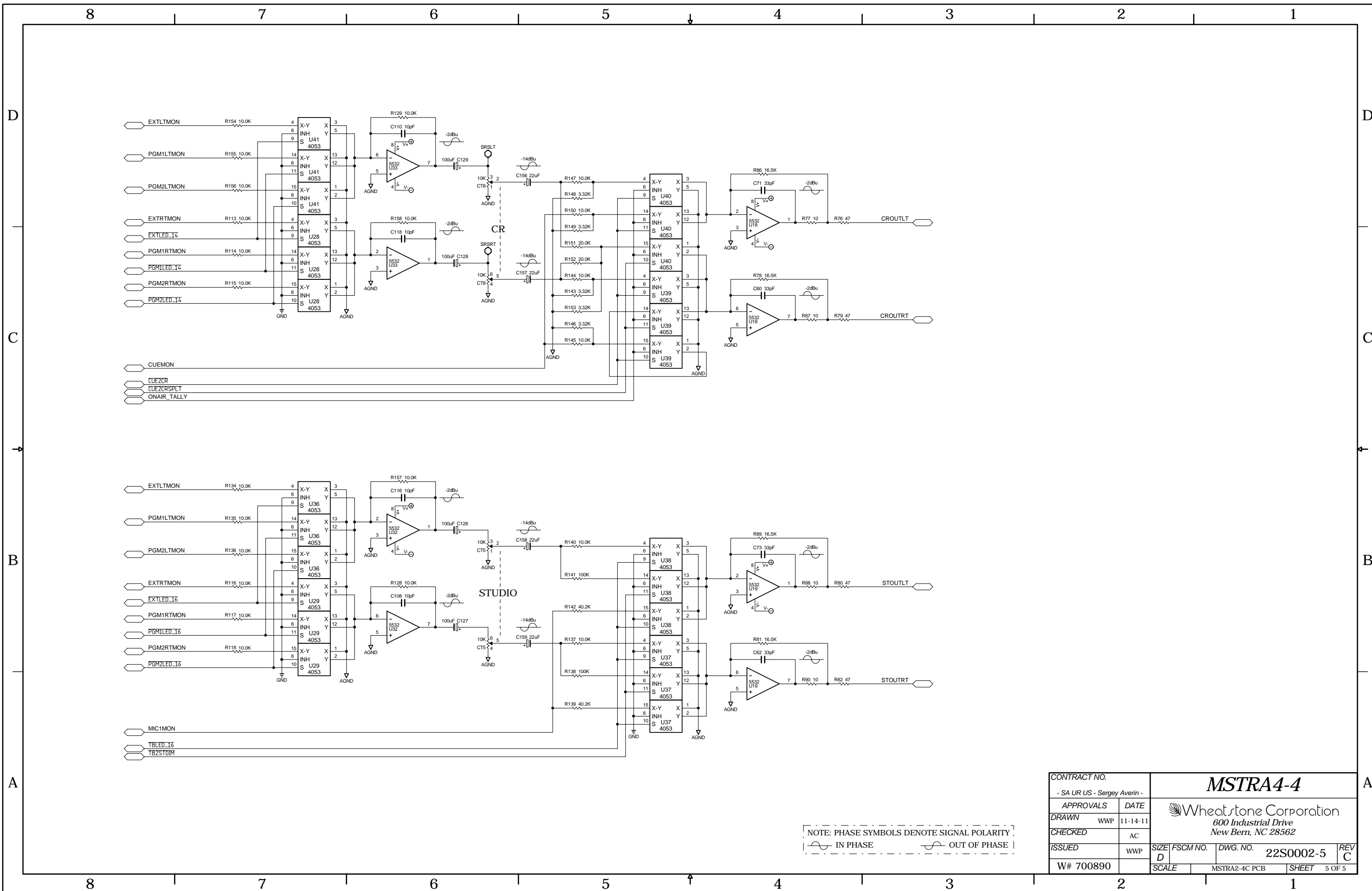
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CHECKED	AC				
ISSUED	WWP	SIZE	FSCM NO.	DWG. NO.	22S0002-3
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MST-AIR4 Master Panel Schematic - Sheet 3 of 5



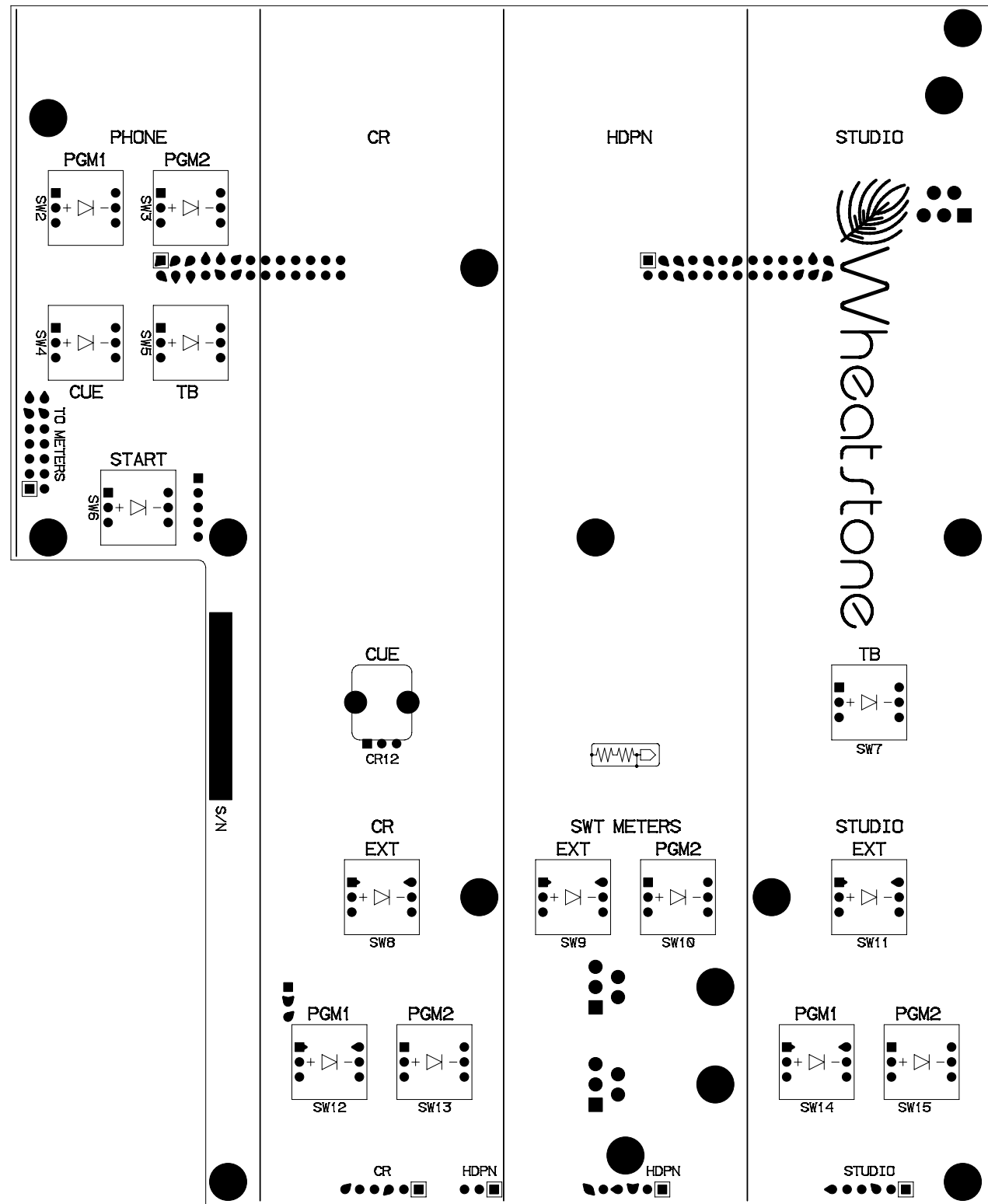
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ISSUED	WVP			REV	C
W# 700890		SCALE	MSTRA2-4C PCB	SHEET	4 OF 5

MST-AIR4 Master Panel Schematic - Sheet 4 of 5

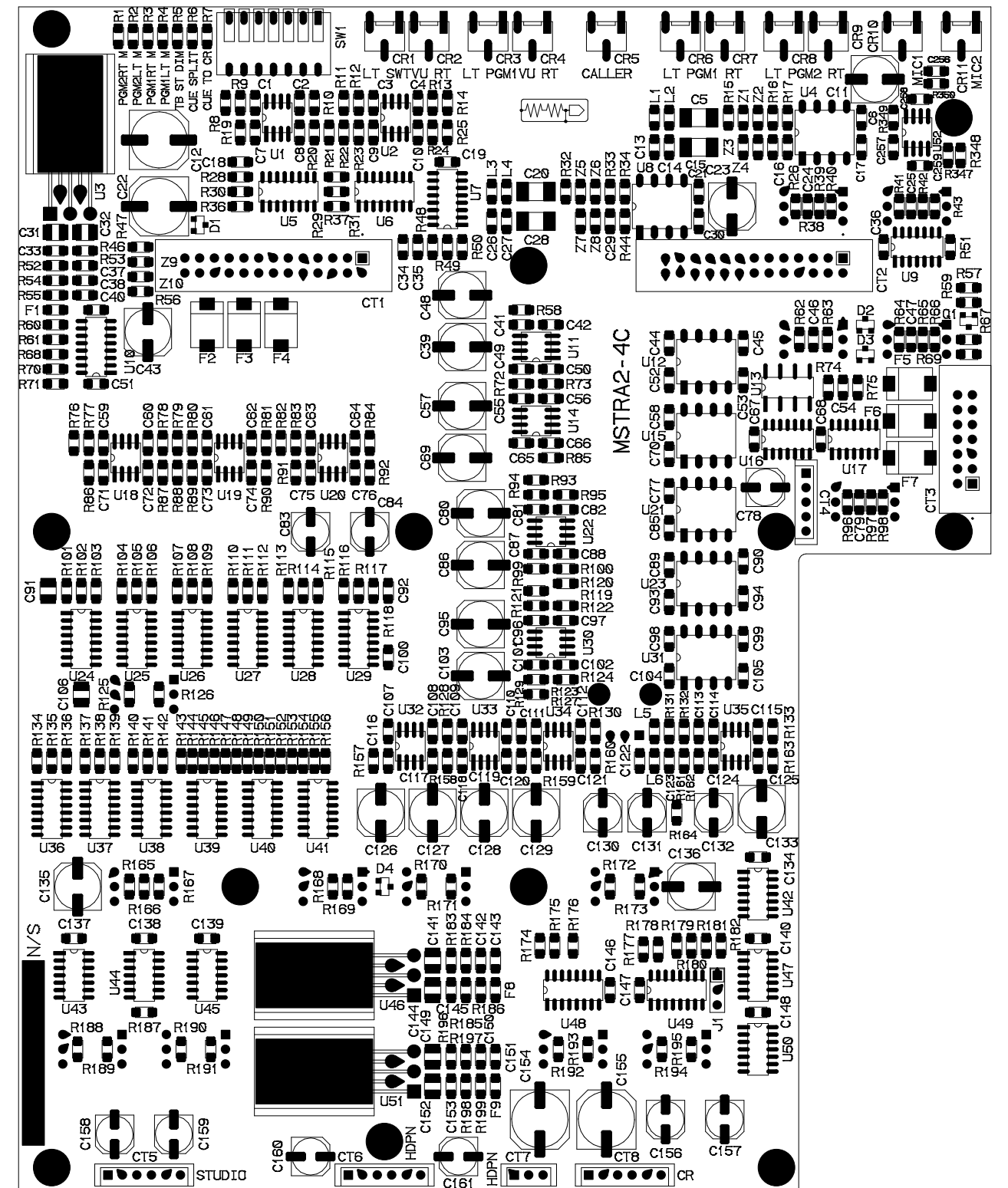


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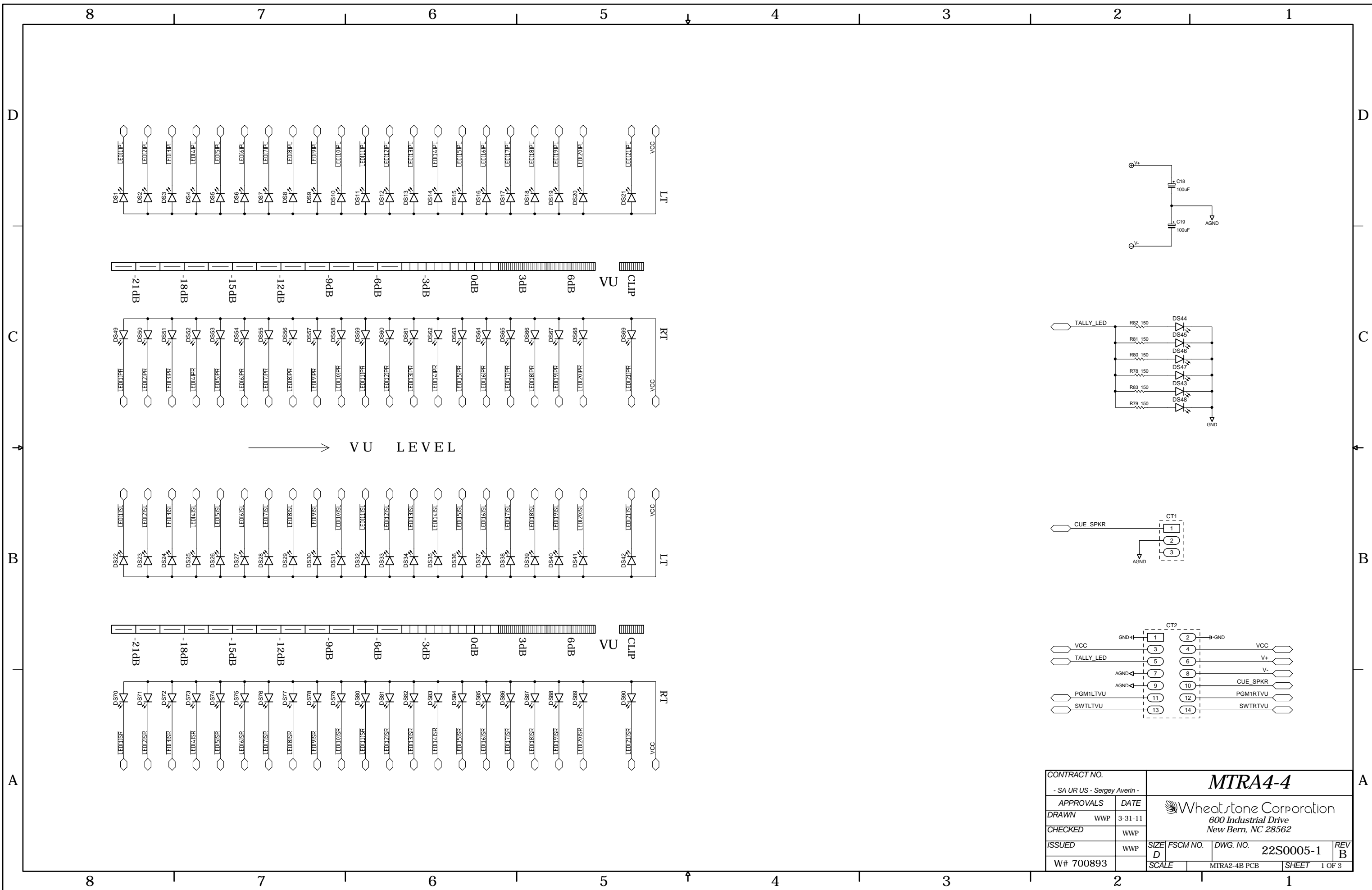
MST-AIR4 Master Panel Schematic - Sheet 5 of 5



Top

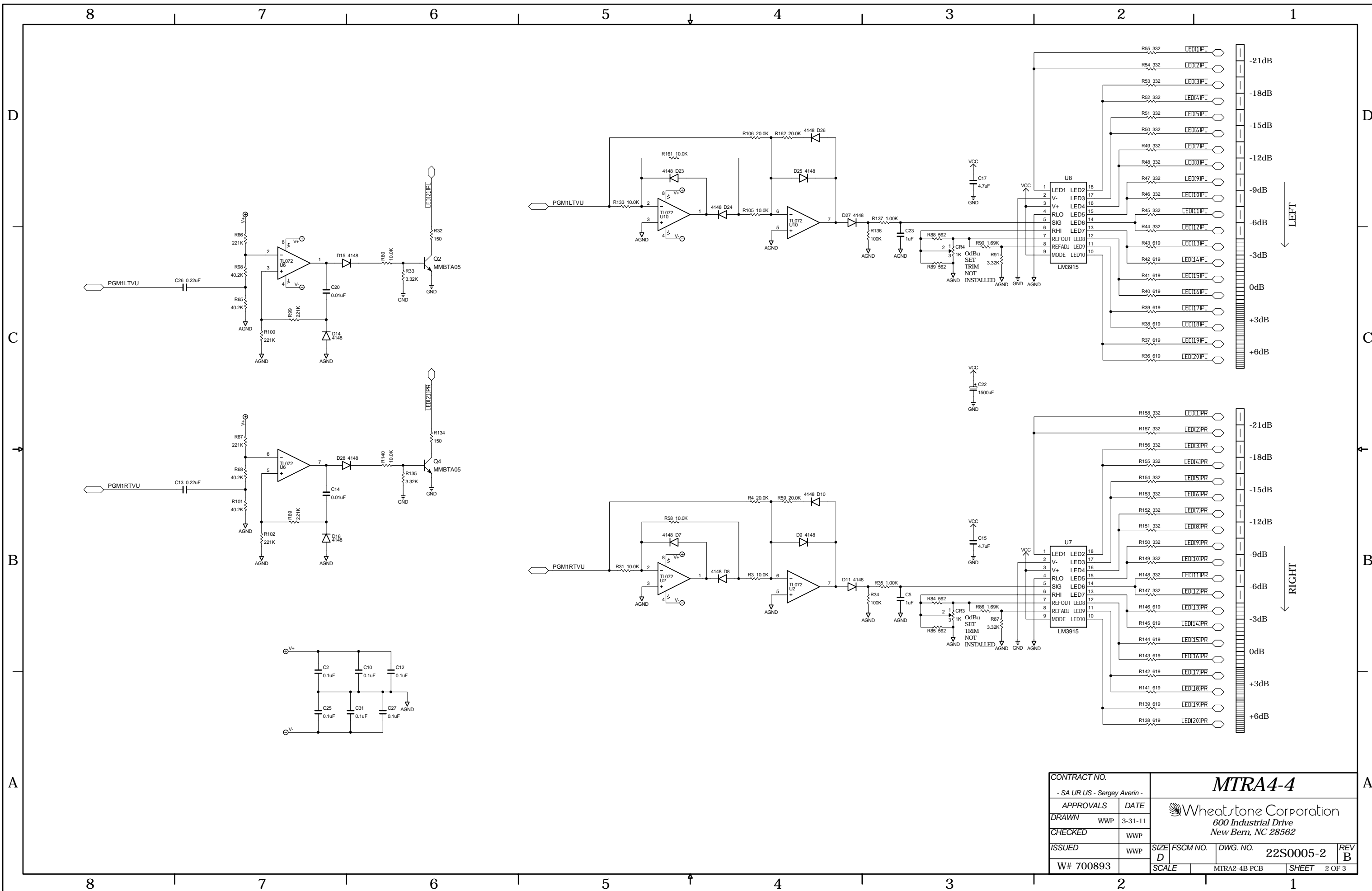


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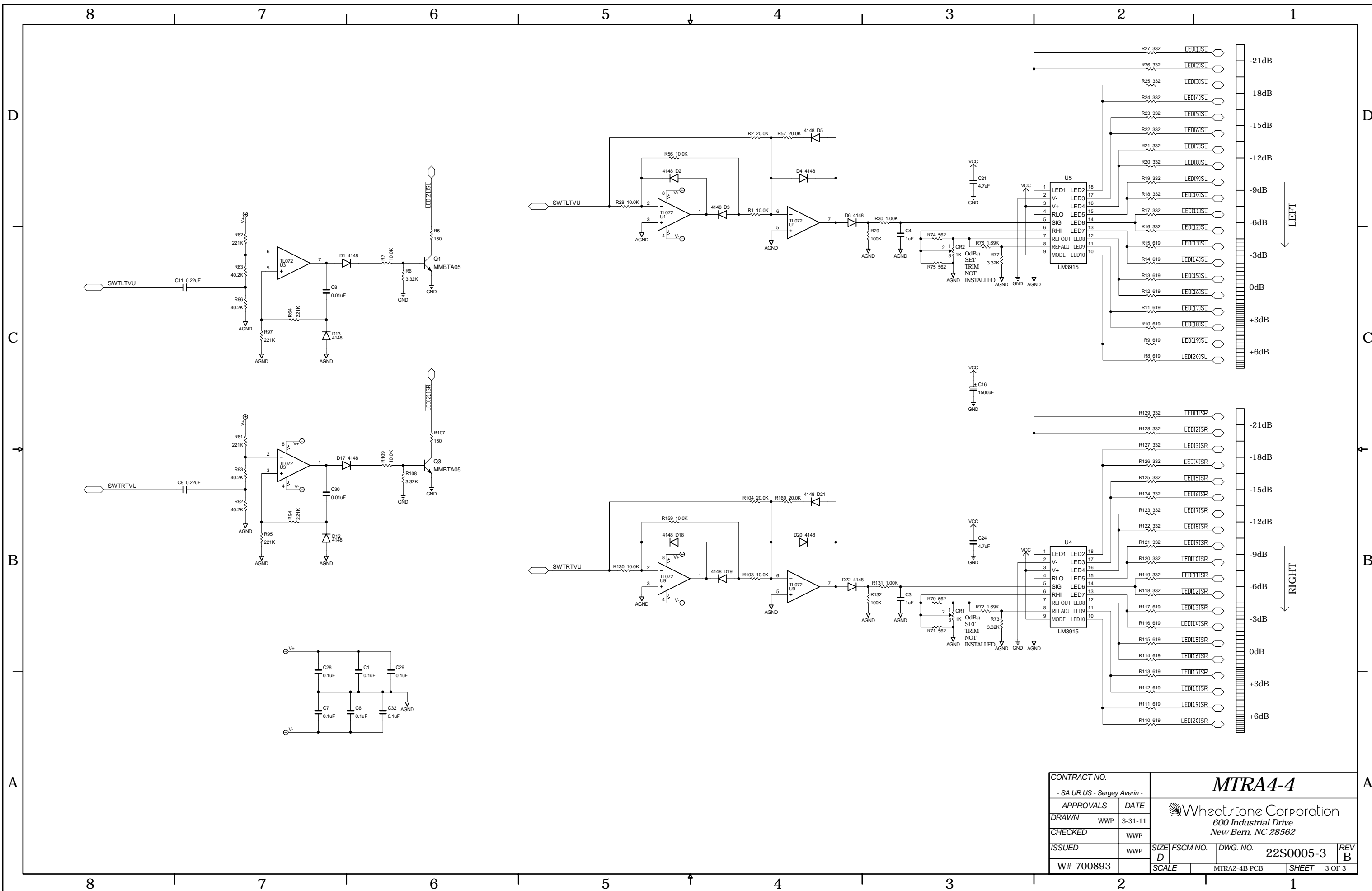
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W# 700893					

MTR-AIR4 Meters Card Schematic - Sheet 1 of 3



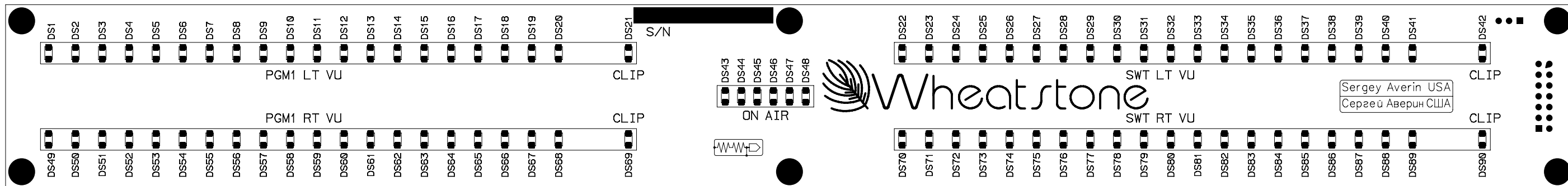
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CHECKED	WWP		
ISSUED	WWP	SIZE D	FSCM NO. DWG. NO. 22S0005-2 REV B
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MTR-AIR4 Meters Card Schematic - Sheet 2 of 3

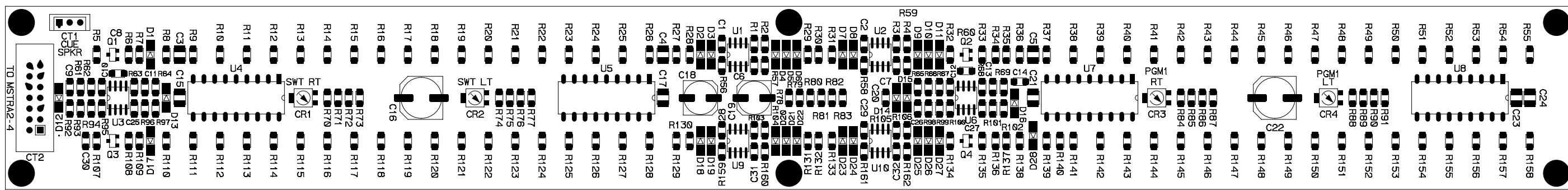


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DRAWN WWP	3-31-11	New Bern, NC 28562	
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ISSUED	WWP	DWG. NO.	22S0005-3
W# 700893	SCALE	MTRA2-4B PCB	SHEET 3 OF 3

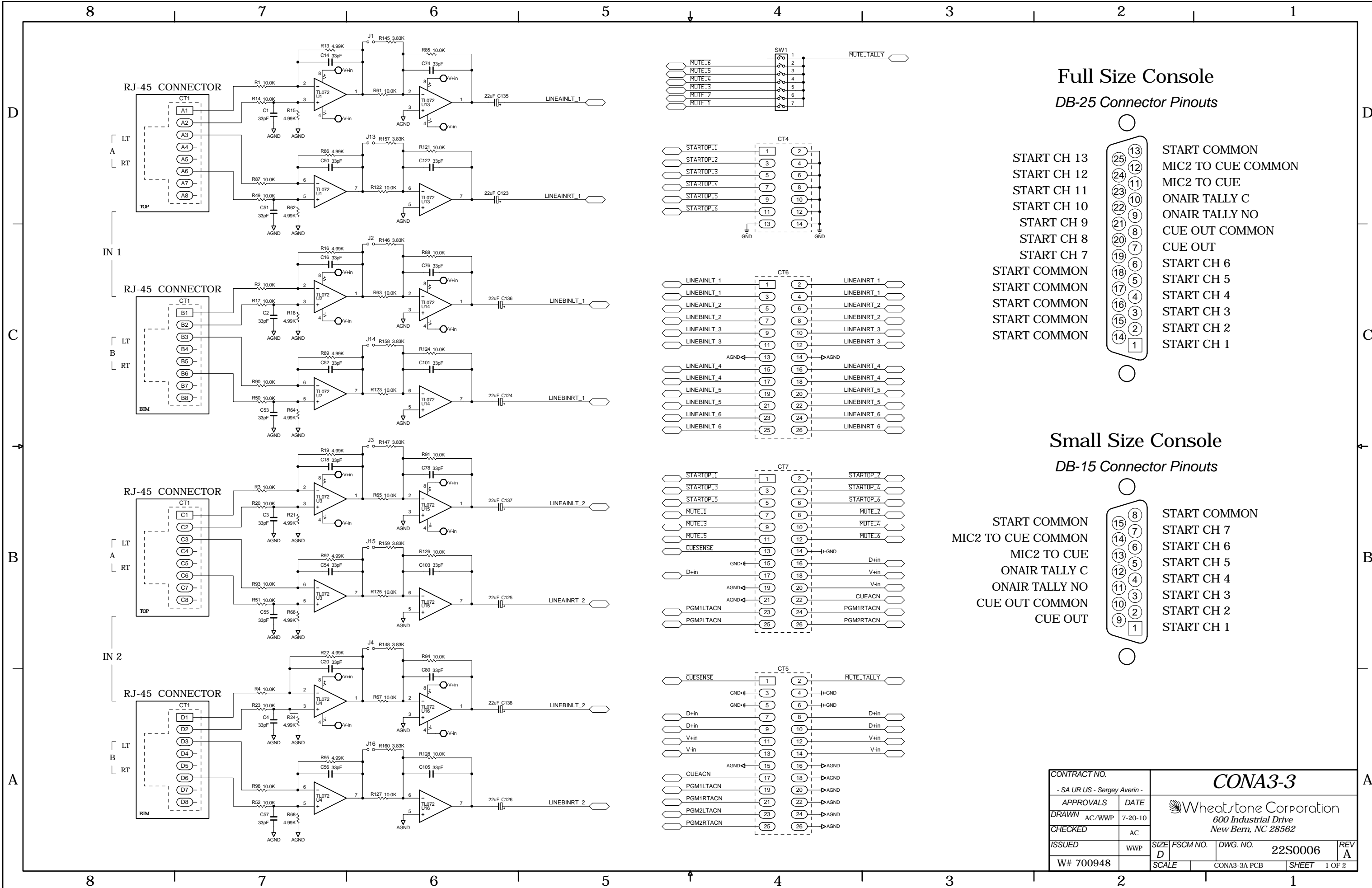
MTR-AIR4 Meters Card Schematic - Sheet 3 of 3



Top



Bottom



Full Size Console DB-25 Connector Pinouts

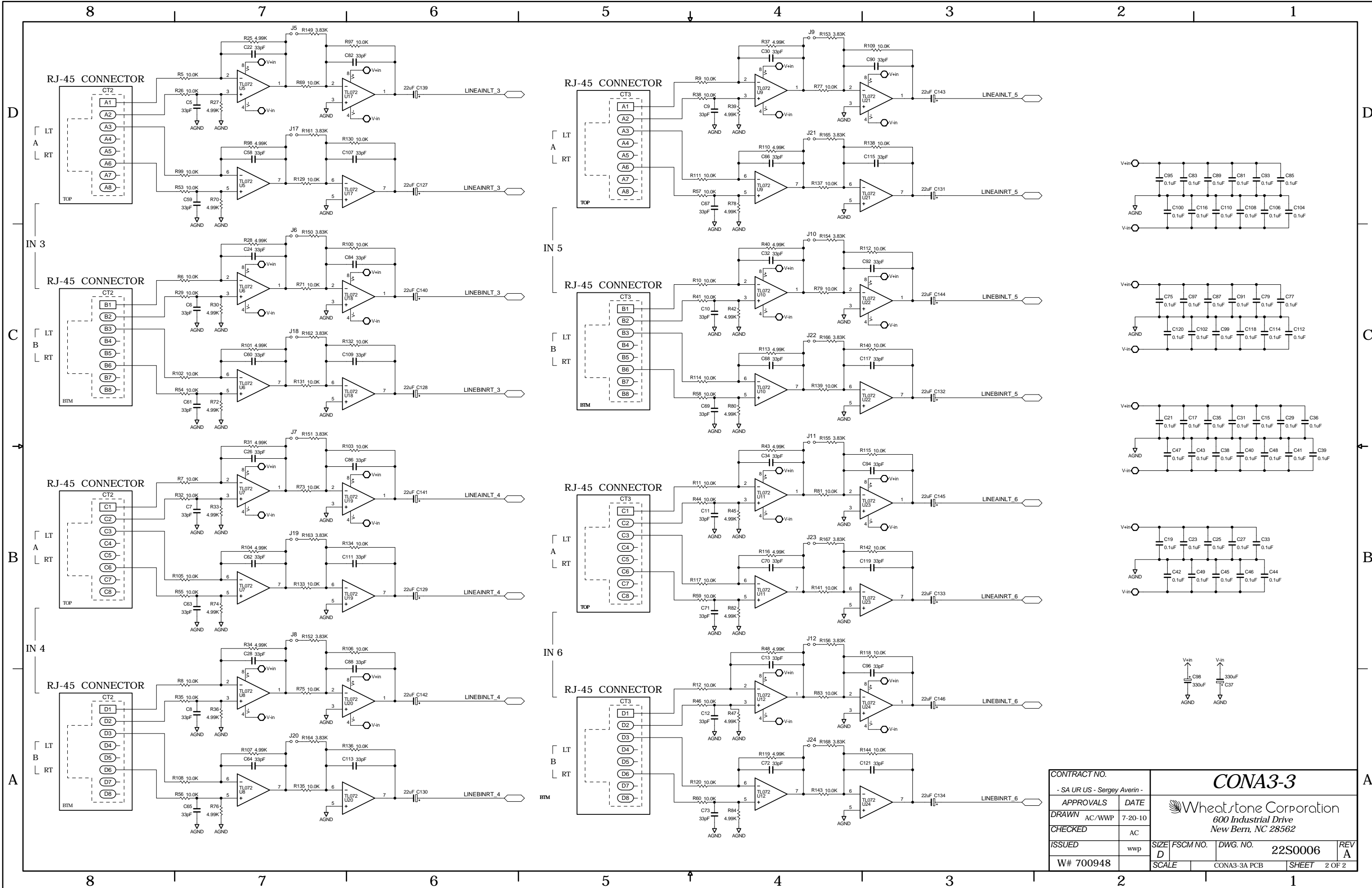
- | | | |
|--------------|----|--------------------|
| START CH 13 | 13 | START COMMON |
| START CH 12 | 12 | MIC2 TO CUE COMMON |
| START CH 11 | 11 | MIC2 TO CUE |
| START CH 10 | 10 | ONAIR TALLY C |
| START CH 9 | 9 | ONAIR TALLY NO |
| START CH 8 | 8 | CUE OUT COMMON |
| START CH 7 | 7 | CUE OUT |
| START COMMON | 6 | START CH 6 |
| START COMMON | 5 | START CH 5 |
| START COMMON | 4 | START CH 4 |
| START COMMON | 3 | START CH 3 |
| START COMMON | 2 | START CH 2 |
| START COMMON | 1 | START CH 1 |

Small Size Console DB-15 Connector Pinouts

- | | | |
|--------------------|---|--------------|
| START COMMON | 8 | START COMMON |
| MIC2 TO CUE COMMON | 7 | START CH 7 |
| MIC2 TO CUE | 6 | START CH 6 |
| ONAIR TALLY C | 5 | START CH 5 |
| ONAIR TALLY NO | 4 | START CH 4 |
| CUE OUT COMMON | 3 | START CH 3 |
| CUE OUT | 2 | START CH 2 |
| | 1 | START CH 1 |

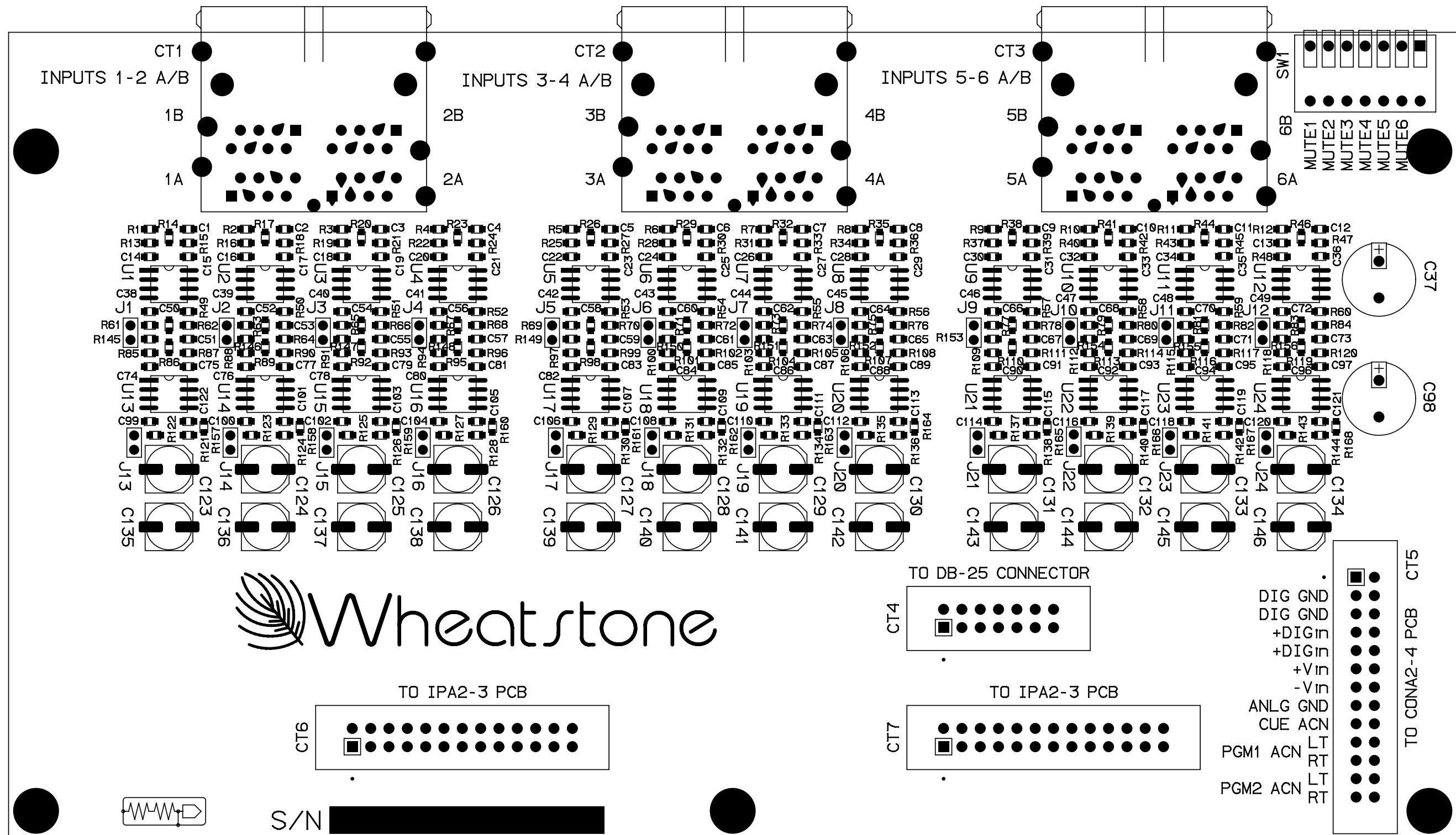
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APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562			
DRAWN AC/WWP	7-20-10				
CHECKED	AC	ISSUED	WWP		
W# 700948	SCALE	SIZE D	FSCM NO.	DWG. NO. 22S0006	REV A
		CONA3-3A PCB		SHEET 1 OF 2	

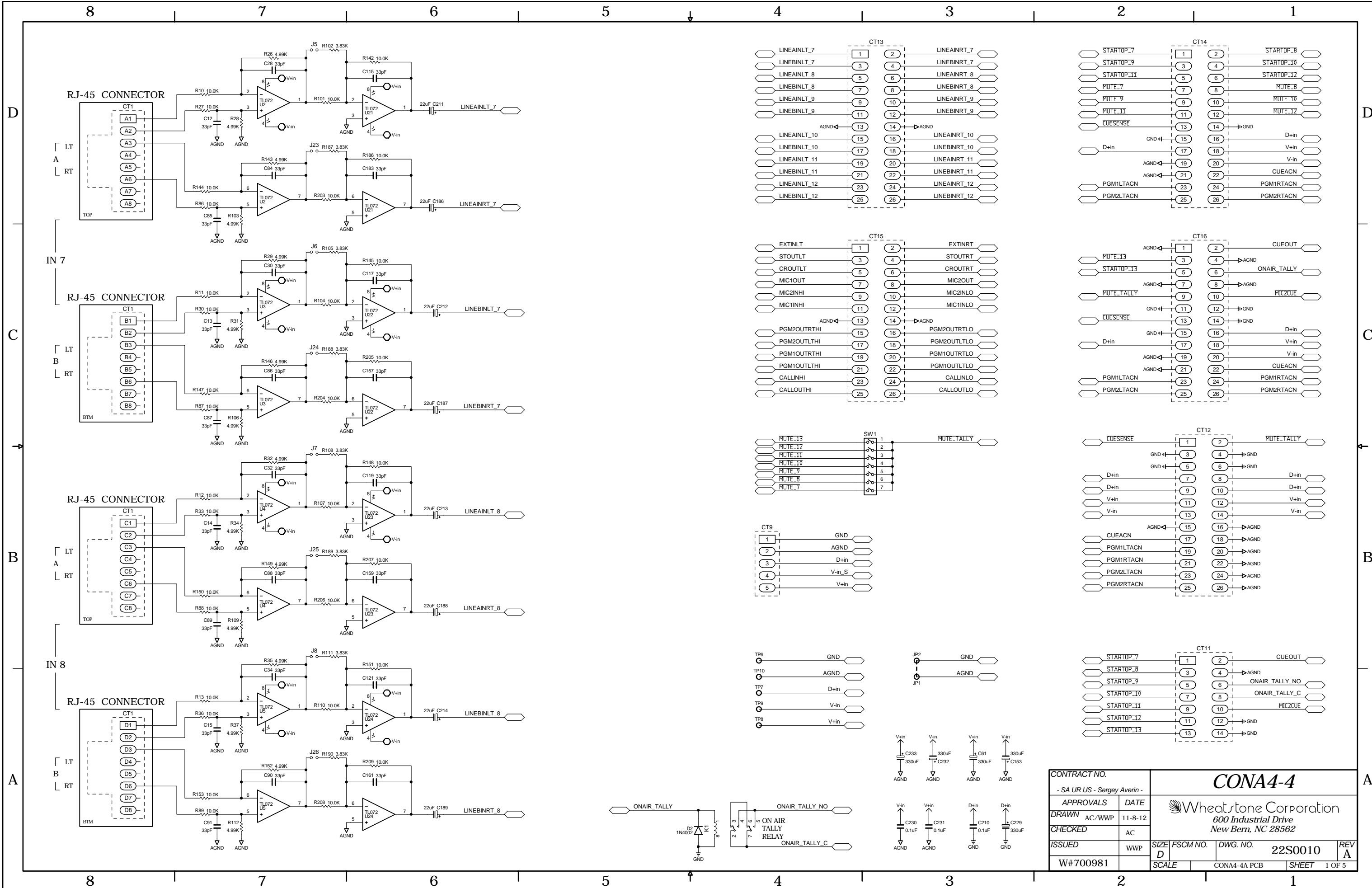
CONA3-3 3 Connector Blocks Schematic - Sheet 1 of 2



CONTRACT NO.		- SA UR US - Sergey Averin -		CONA3-3 Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
APPROVALS	DATE	AC/WWP	7-20-10		
DRAWN	CHECKED	WWP	AC	SIZE	D
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				REV	A
				SHEET	2 OF 2

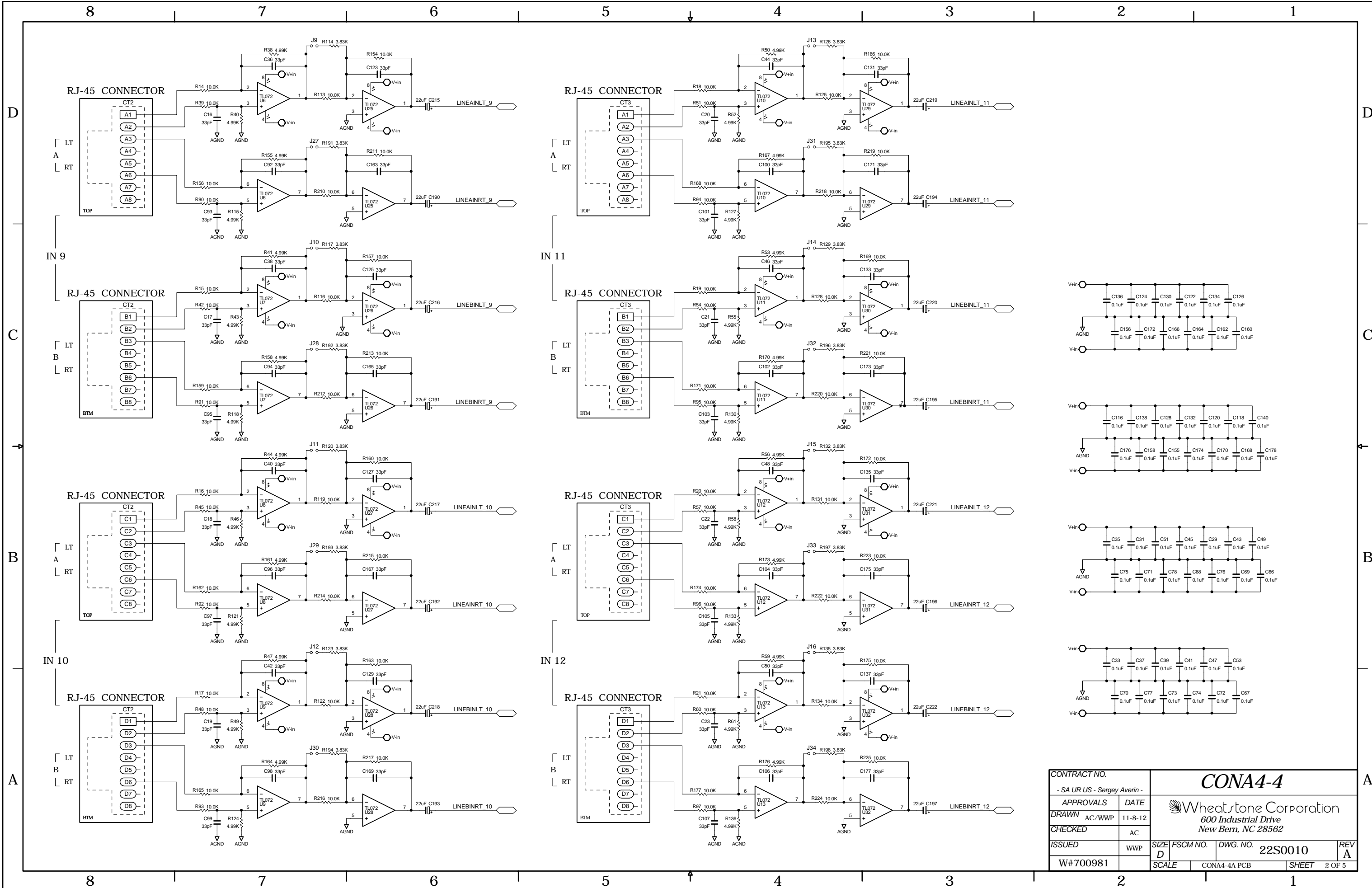
CONA3-3 3 Connector Blocks Schematic - Sheet 2 of 2





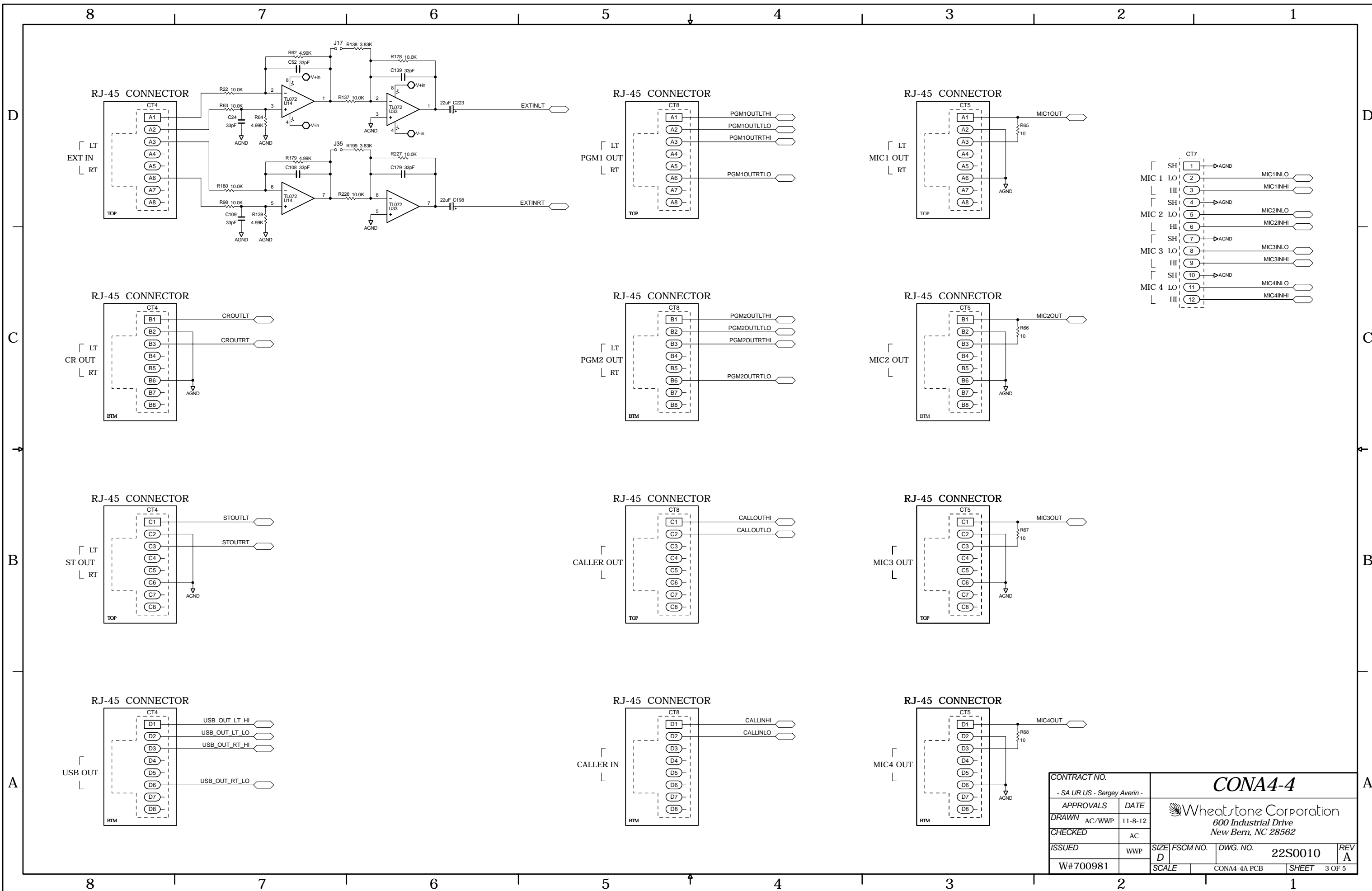
CONA4-4 4 Connector Blocks Schematic - Sheet 1 of 5

CONTRACT NO.		- SA UR US - Sergey Averin -		CONA4-4	
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DRAWN	AC/WWP	11-8-12		Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
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W#700981		SCALE	CONA4-4A PCB	SHEET	1 OF 5



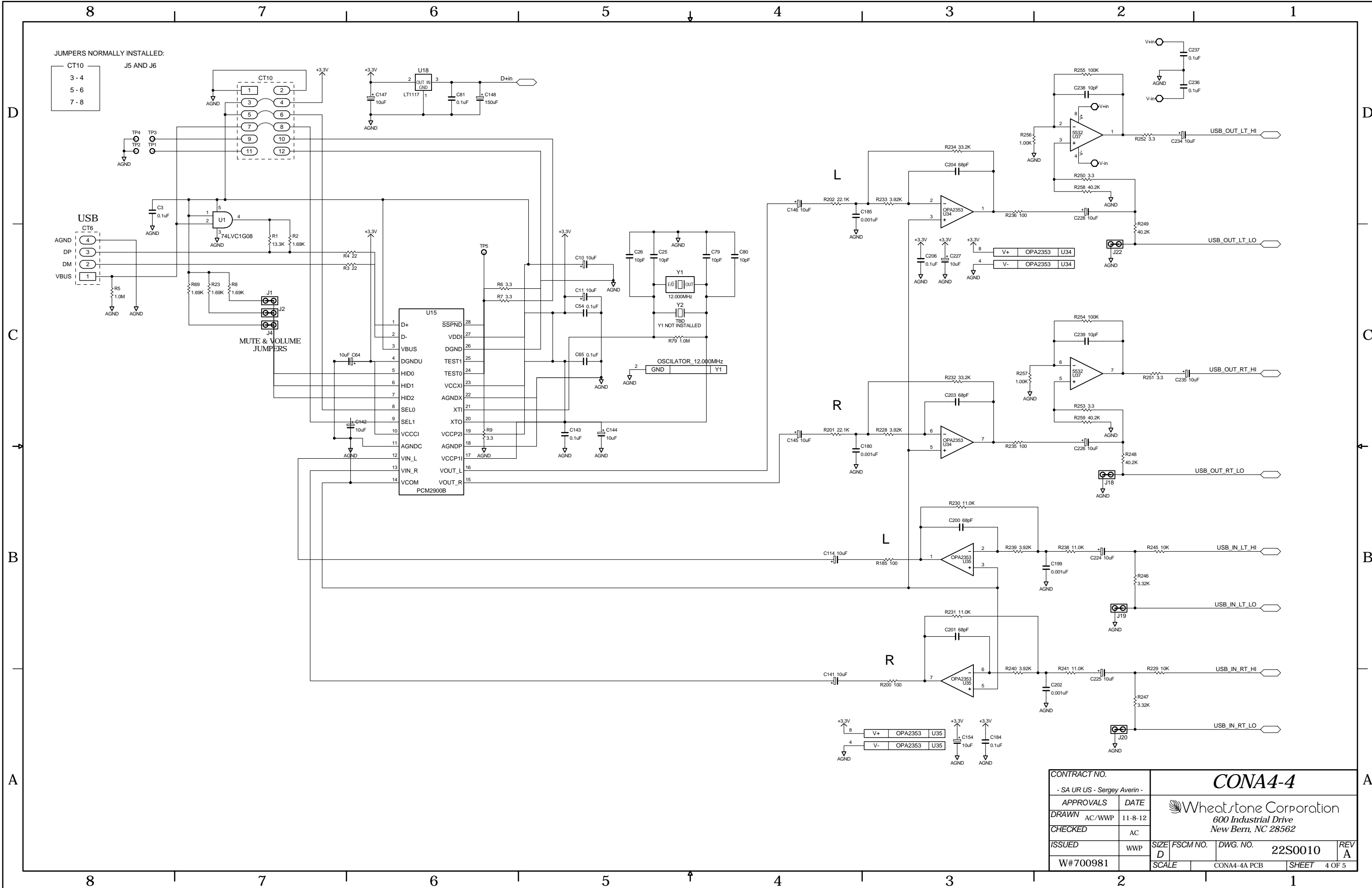
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CHECKED	AC				
ISSUED	WWP	SIZE	FSCM NO.	DWG. NO.	22S0010
W#700981		SCALE	CONA4-4A PCB	SHEET	2 OF 5

CONA4-4 4 Connector Blocks Schematic - Sheet 2 of 5



CONA4-4 4 Connector Blocks Schematic - Sheet 3 of 5

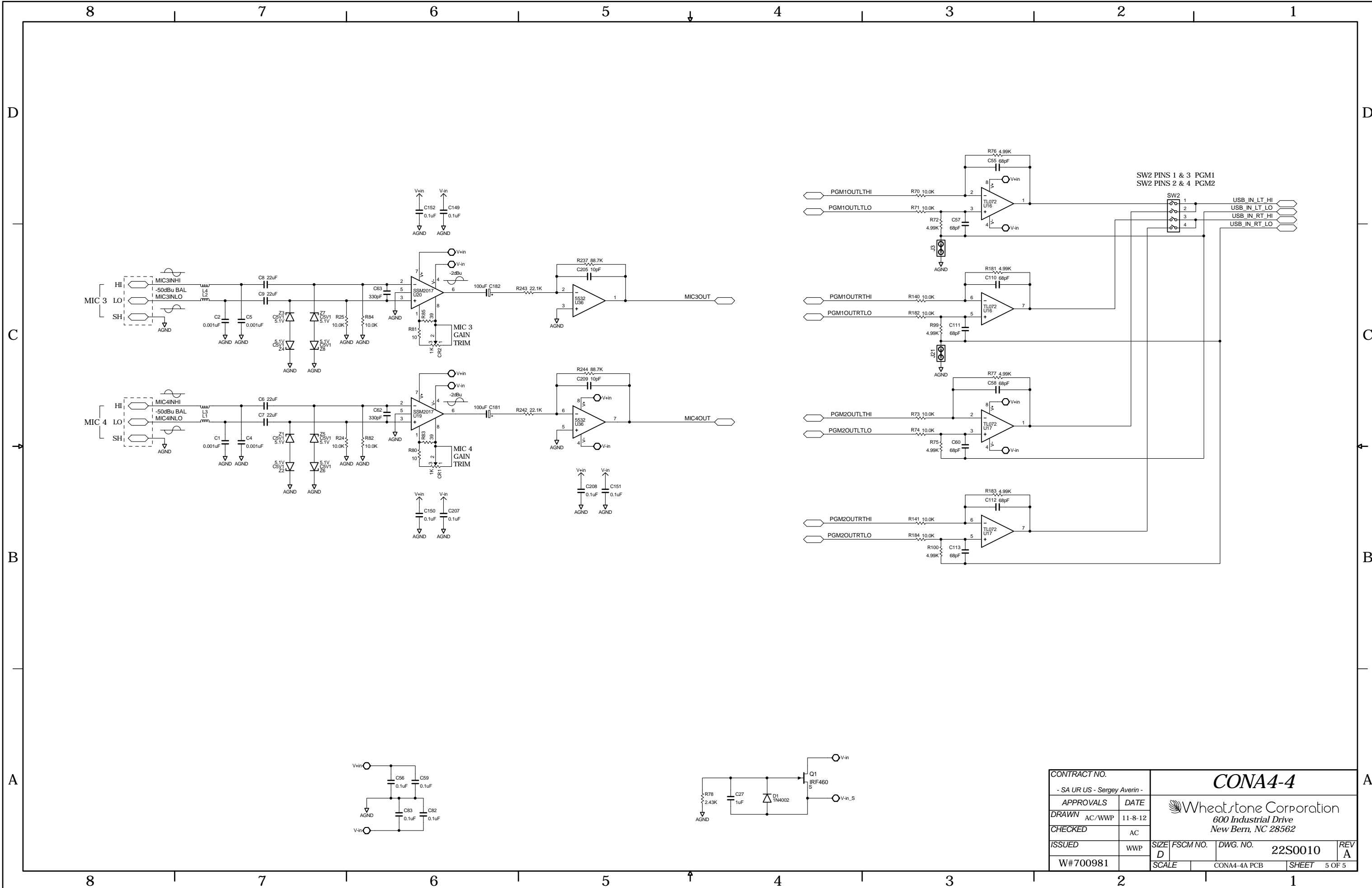
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CHECKED	AC				
ISSUED	WWP	SIZE D	FSCM NO.	DWG. NO. 22S0010	REV A
W#700981		SCALE	CONA4-4A PCB	SHEET	3 OF 5



JUMPERS NORMALLY INSTALLED:
 CT10
 3 - 4
 5 - 6
 7 - 8

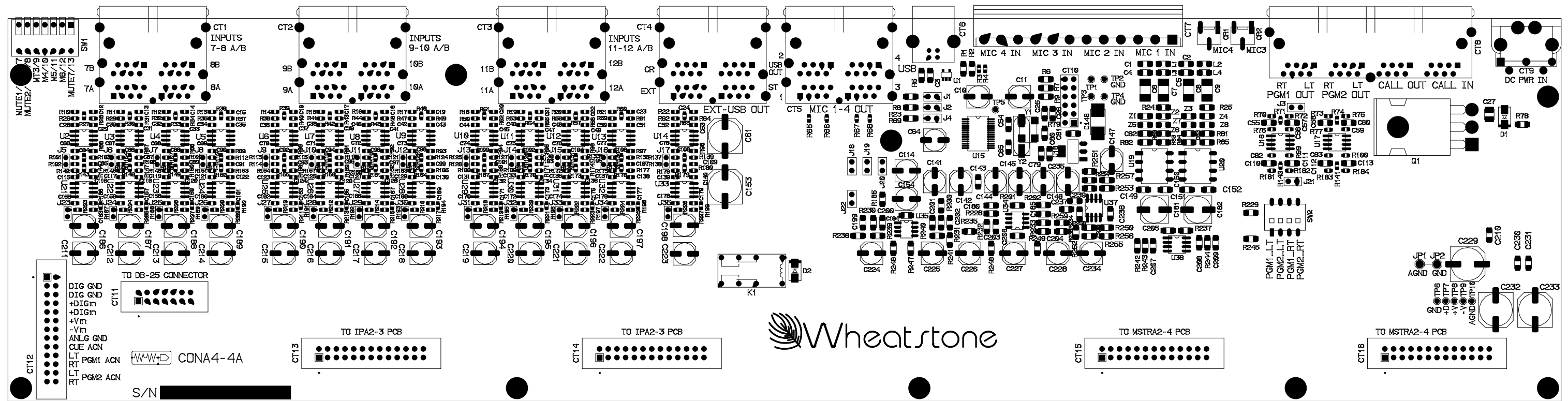
MUTE & VOLUME JUMPERS

CONTRACT NO.		- SA UR US - Sergey Averin -		CONA4-4	
APPROVALS	DATE	DRAWN AC/WWP 11-8-12			
CHECKED	AC	ISSUED WWP		Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
W#700981	SCALE	SIZE D	FSCM NO.	DWG. NO. 22S0010	REV A
		CONA4-4A PCB		SHEET	4 OF 5



CONTRACT NO. - SA UR US - Sergey Averin -		CONA4-4		
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562		
DRAWN AC/WWP	11-8-12			
CHECKED	AC	SIZE D	FSCM NO.	DWG. NO. 22S0010
ISSUED	WWP	SCALE	CONA4-4A PCB	SHEET 5 OF 5
W#700981				REV A

CONA4-4 4 Connector Blocks Schematic - Sheet 5 of 5



Appendices

Appendix 1

AIR 4 Console Performance Specifications.....A-3

Appendix 2

Replacement Parts List.....A-5

Appendix 1

Contents

AIR 4 Performance Specifications	A-3
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AIR 4 Performance Specifications

FREQUENCY RESPONSE

Line (20Hz-20kHz)	+/-0.1dB
Mic (20Hz-20kHz)	+/-0.1dB

DYNAMIC RANGE

Line, unity gain	113dB
Mic, 54dB gain	100dB

NOISE

Line	-89dBu
------	--------

THD+N (20Hz-20kHz)

Line, -4dBu	<0.003%
Mic, -50dBu	<0.02%

MAXIMUM INPUT

Mic	-6dBu
-----	-------

HEADROOM

above -4dB	24dB
------------	------

BUS CROSSTALK

20Hz	-100dB
20kHz	-60dB

STEREO SEPARATION

1kHz	-60dB
------	-------

OFF ISOLATION

1kHz	-115dB
20kHz	-95dB

DIMENSIONS

Width	28.33"
Depth	15.37"
Height (rear)	4.46"
Height (front)	1.56"

Specifications and features subject to change without notice.

Appendix 2

Contents

Replacement Parts List.....	A-5
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For the most part there are no user-replaceable parts in the AIR 4 console. Exceptions are those controls and components that in the course of normal use may need maintenance (i.e., faders, pots, ON switches, etc.). A complete list of available components is shown on the next page. Contact Audioarts Engineering technical support for further information.

Audioarts Engineering (600 Industrial Drive, New Bern, North Carolina, USA 28562) may be reached by phone at 252-638-7000, fax 252-637-1285, electronic mail “techsupport@wheatstone.com”.

REPLACEMENT PARTS – AIR 4 CONSOLE

COMPONENT	DESCRIPTION	WS P/N
IP-AIR4 MODULE	COMPLETE INPUT MODULE	"009003"
MST-AIR4 MODULE	COMPLETE MASTER MODULE	"009004"
IP-AIR4 LOADED CARD ASSY	INPUT PANEL LOADED CARD ASSEMBLY	"002821"
MST-AIR4 LOADED CARD ASSY	MASTER PANEL LOADED CARD ASSEMBLY	"002823"
VU-AIR2 LOADED CARD ASSY	VU METERS LOADED CARD ASSEMBLY	"009728"
CONA3-3 LOADED CARD ASSY	THREE CONNECTOR BLOCKS CARD ASSEMBLY	"009723"
CONA4-4 LOADED CARD ASSY	FOUR CONNECTOR BLOCKS CARD ASSEMBLY	"002847"
FADER	100MM LOW PROFILE MASTER TYPE N FADER ROHS COMPLIANT	"540061"
FADER KNOB	BLACK FADER KNOB, 11MM FOR 3000 SERIES FADER	"520001"
POT	"CR"/"HDPN"/"STUDIO" 10K DUAL AUDIO 1/4" SHAFT POT	"500029"
POT KNOB	21MM BLACK KNOB FOR "CR"/"HDPN"/"STUDIO" POT	"520124"
POT KNOB	15MM BLACK PUSH-ON KNOB FOR "CUE" POT	"520125"
POT CAP	11MM BLACK CAP W/WHITE LINE FOR "CUE" POT	"530037"
POT CAP	21MM BLACK CAP W/WHITE LINE FOR "CR"/"HDPN"/"STUDIO" POT	"530319"
NKK SWITCH	JB15 SWITCH W/BRIGHTER RED LED AND SILICON GASKET	"510290"
NKK SWITCH	JB15 SWITCH W/BRIGHTER YELLOW LED AND SILICON GASKET	"510291"
SWITCH CAP	WHITE SWITCH CAP	"530004"
RJ-45 CONNECTOR	RJ-45 CONNECTOR 4 PORT GANGED, R/A, SHIELDED, EMI FINGERS	"220145"
RJ-45 CONNECTOR	2x2 PORT STACKED MODULAR JACK RJ-45	"260089"
USB CONNECTOR	CONNECTOR USB-B RT ANGLE SHIELDED	"260090"
DB-25 CONNECTOR	LOGIC I/O CONNECTOR	"200018"
RTS JACK	HEADPHONE JACK	"260005"
POWER CONNECTOR	RIGHT ANGLE DIN RECEPTACLE ROHS COMPLIANT	"260071"

REPLACEMENT PARTS – AIR 4 CONSOLE

COMPONENT	DESCRIPTION	WS P/N
HEADER	3 PIN HEADER	"250062"
HEADER	14 PIN RIGHT ANGLE HEADER	"250044"
HEADER	40 PIN BREAKAWAY HEADER STRIPS, STRT .1x.165"	"250071"
HEADER	14 PIN BOXED STRAIGHT HEADER	"250073"
HEADER	12 POSITION R/A BOXED HEADER EURO 5MM CLOSED ENDS ROHS COMPLIANT	"260057"
PLUG TERMINAL	3 POSITION TERMINAL BLOCK EURO 5MM MARKED ROHS COMPLIANT FOR ANALOG I/O CONNECTIONS	"260078"
PLUG	3 PIN PLUG FOR #26 AWG	"230028"
PLUG	14 PIN DIP RIBBON PLUG	"250034"
PLUG	26 PIN RIBBON PLUG	"250043"
POWER SUPPLY	TRIPLE OUTPUT EXTERNAL POWER SUPPLY	"980043"
POWER SUPPLY CORD	7 1/2' BLACK POWER CORD ROHS COMPLIANT	"150017"
SPEAKER	CONSOLE METERBRIDGE SPEAKER	"960016"
MANUAL	TECHNICAL MANUAL FOR AIR 4 CONSOLE	"009093"