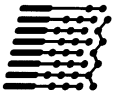
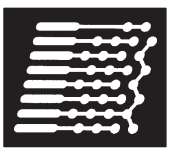
W-12
DIGITAL RADIO CONSOLE



AUDIOARTS ENGINEERING

TECHNICAL MANUAL
September 2007



W-12 Digital Radio Console Technical Manual - 1st Edition

AUDIOARTS ENGINEERING
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New Bern, North Carolina 28562
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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.***

Installing the Clamp-on Ferrite

One ferrite has been included with your W-12 installation kit to help suppress undesired electromagnetic interference. Rather than install it at the factory, this ferrite has been packaged separately so that you can attach it after the cable has been run, thus easing installation.

Place the ferrite on the console end of the cable that connects the W-12 console to the power supply.

To attach the ferrite:

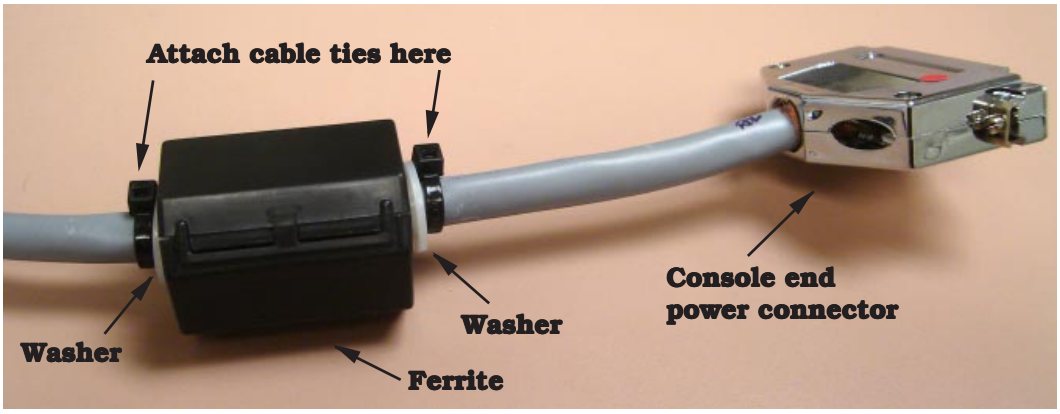
1. Place the ferrite on the cable so that the ferrite's curved inner edge rests firmly on the cable, close to the connector that plugs to the console power connector.

2. Press the two halves of the ferrite closed until they snap together.

3. Place the split washers (2) on the cable on the each side of the ferrite.

4. Attach the cable ties (2) just below the washers so that the ferrite cannot slide down the cable.

Refer to the following figure.



IMPORTANT!

W-12 Audio Levels

General

All professional digital audio broadcast consoles manufactured by Audioarts are hybrid in nature. That is, they allow the user to connect both analog and digital domain sources and provide both analog and digital outputs. While this approach allows for greater flexibility when interconnecting source and destination equipment, the user must be aware of what levels to expect when applying, say, a digital input and measuring at an analog output.

Gain Structure

Broadcast consoles by design have various electronic stages at which the signal level may be amplified or attenuated. The primary stages are the A-D converter input, channel fader, DSP mixing, and the bus output D-A converters. The sum of these gain stages is commonly referred to as the console's "gain structure." Wheatstone consoles are factory calibrated for 0dB or "unity gain" when the input channel fader is set to nominal (-12dB).

The following is a stage by stage breakdown of the W-12 console's gain stages:

Analog Input (A-D Converter)

- The ADC input circuit cards are designed so that a +4dBu input signal will yield a -20dBFS digital output with the channel fader at nominal.
- An input gain adjust switch setting can be changed to increase the gain by 8dB to allow for interfacing unbalanced equipment.
- Mic level preamps have trim pots for matching various microphone source levels to the console's normal +4dBu analog operating level.

DSP Gain

- Set in firmware for unity gain (-20dBFS input yields a -20dBFS output when the input channel fader is set to nominal), digital *attenuation* may be applied on a channel by channel basis via a dipswitch setting.

Analog Bus Output Gain (D-A Converter)

- The analog output DAC circuits are designed so that a -20dBFS digital input signal will yield a +4dBu analog output with the channel fader at nominal.

Audio Reference Levels

All consoles are fully factory calibrated and will comply with the following reference level:

-20dBFS digital = +4dBu analog = 0VU Note: 0dBu = .775v rms

+4dBu = 1.23v rms

These settings will provide a headroom of 20dB over the nominal input signal of +4dBu analog, or -20dBFS digital.

Note that due to the lack of level standards in the digital domain, headroom available for digital sources will be entirely dependant on the source. In fact, CD's are frequently made with less than 1dB of digital headroom, and any boosting of digital CD levels in the console by moving the fader up above the nominal can result in overload distortion for that channel. For this reason, a dipswitch allows for digital *attenuation* on a fader by fader basis; digital sources can be conveniently attenuated this way to guard against digital overload caused by not enough headroom on the digital source. Since the W-12 console meters are true digital reading meters, they will always show the console's digital levels, and whether there are any "overs" in the signal. By pressing a channel's "CUE" button, the switched meters will show the digital level of that channel's source. By using the program and watching these meters, the amount of attenuation can be adjusted to meet your headroom requirements.

Typical Input Levels

Mic Inputs Nominal	= -50dBm, 150ohm	Maximum = -26dBm
Analog Inputs Nominal	= +4dBu	Maximum = +24dBu
Digital Inputs Nominal	= -20dBFS	Maximum = 0dBFS

W-12 Technical Manual

Table of Contents

Chapter 1 – Installation and Power

Chapter 2 - Console Features

Chapter 3 - Controls and Functions

Chapter 4 - Schematic and Load Sheet Drawings

Appendix 1

Installation and Power

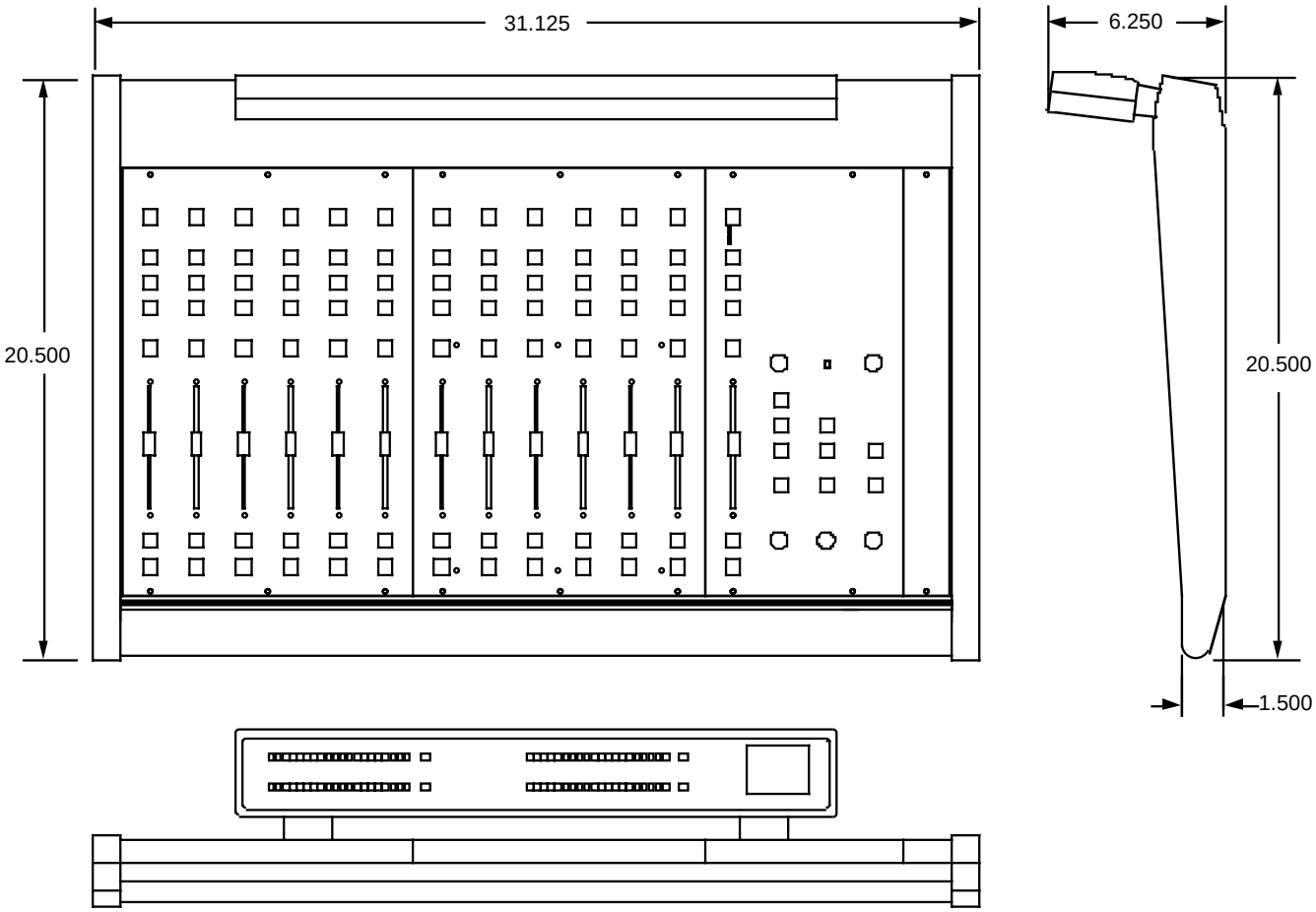
Chapter Contents

Installation and Power

Unpacking and Installing the Console

The W-12 console, with its power supply, connecting cable, and technical manual, 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 W-12 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.



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 W-12 mainframe are connected together at the console, but are NOT connected to electrical ground and the chassis of the power supply. Safety requirements dictate that a positive connection from the console mainframe to electrical ground be made in the completed installation. Use the grounding lug on the rear of the mainframe to establish your system ground. The grounding lug may be found at the rear of the console, on the rear frame panel, to the left if you are looking at the rear of the console.

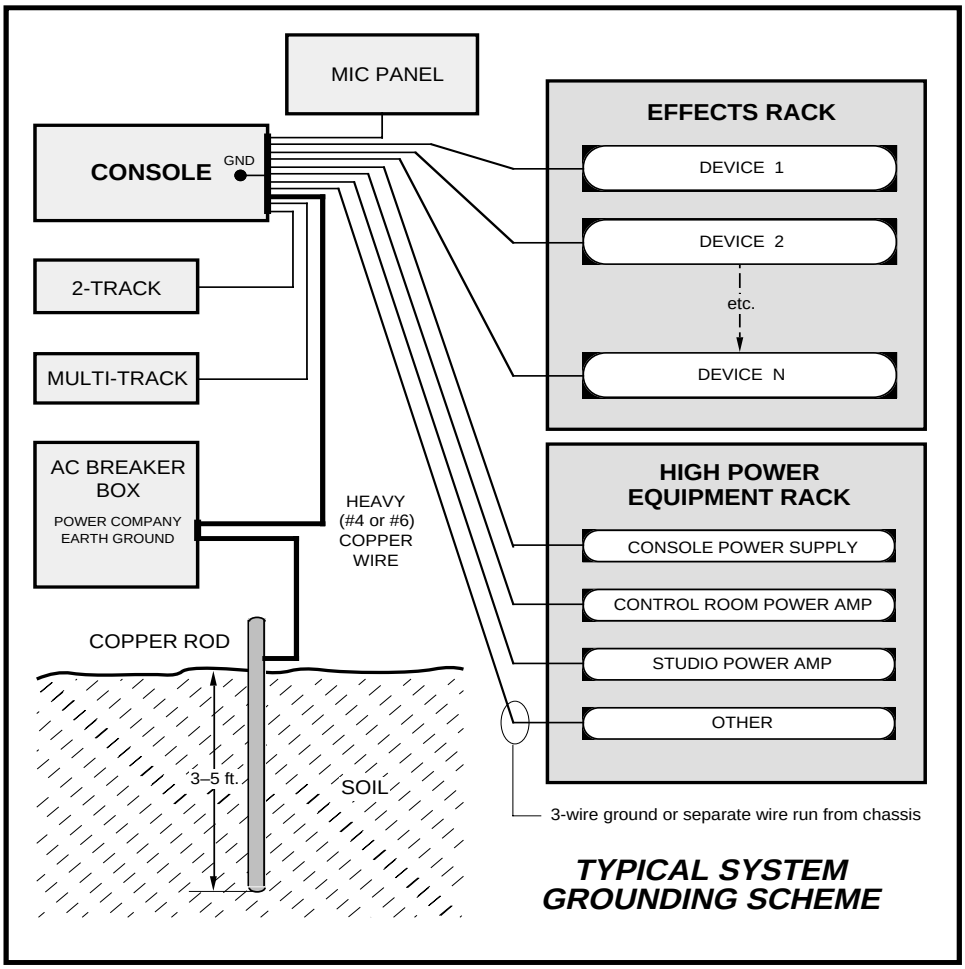
The system ground serves two important purposes:

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

(2) It assures safety from electrical shock.

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

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



TYPICAL SYSTEM GROUNDING SCHEME

Tie the console ground lug terminal strip to the system earth ground. Tie every piece of equipment in the entire audio system to the console ground lug terminal strip.

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

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

Each piece of equipment should be connected by its own ground wire (usually the round third pin on the AC cord). This means that every AC outlet must have a separate conductor run to the console ground lug; the outlets cannot be daisy-chained as is normally encountered in commercial and residential AC systems. Any equipment not supplied with 3-wire AC cables must have individual ground wires (16 gauge or larger) connected to their chassis grounds and then run to the console ground lug terminal strip.

Further Grounding Details

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

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

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

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

Power Supply

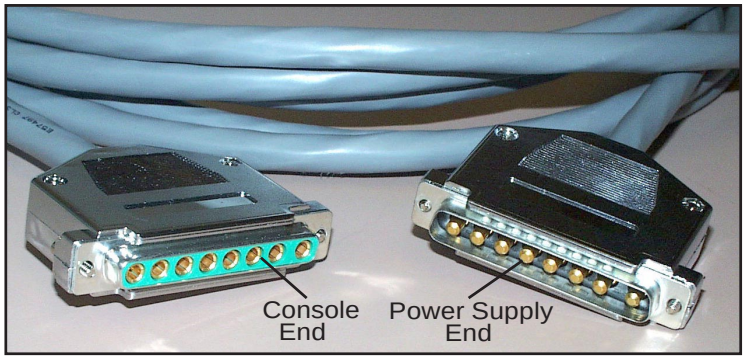
Front view of the SPS-100 rackmount power supply

Rear view of the SPS-100 rackmount power supply

The W-12 console is powered by an Audioarts Model SPS-100 rackmount power supply. This unit occupies two 19” wide rack spaces (total height 3-1/2”). Convection cooled, it requires ample ventilation space above and below it. The SPS-100 generates heat in the course of normal operation — do *not* mount heat sensitive devices in the same rack cabinet.

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 cable has two different types of connectors on it: an 8-pin female connector that connects to the console’s power supply connector, and an 8-pin male connector that plugs into the rear of the rackmount SPS-100 power supply. The console’s power supply connector is located at the rear of the console, toward the left end of the meterbridge bottom pan when viewed from the rear of the console.



PS Cable Pinout

Console End 8-pin Connector *Female*				Power Supply End 8-pin Connector *Male*
PIN			PIN	
VIO	1	Phantom	1	VIO
GRN	2	Digital Common	2	GRN
BRN	3	Digital Common	3	BRN
WHT	4	+ Digital	4	WHT
ORG	5	+ Digital	5	ORG
BLK	6	Audio Common	6	BLK
BLU	7	- V	7	BLU
RED	8	+ V	8	RED

Note that the power supply is fitted with a 3-wire grounded AC cord that should be plugged into a "clean" AC power source, that is, an AC source that feeds only the control room audio gear. This source should be a separate feed from those 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.

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 W-12 console mainframe is properly placed and grounded, and its SPS-100 power supply correctly rackmounted and connected to the console, you may now energize the power supply by plugging it into the AC mains. The green “PWR” LED on the power supply front panel should light up to indicate the presence of the voltage.

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

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

Audio and Control Wiring

Audio I/O and control connections to the W-12 console are made via DB-25, and DB-9 connectors, and 6-pin and 3-pin plug terminals, located on the rear panel of the console. See the console’s rear drawing on page 1-8. The factory supplied hand crimping tool is used for all I/O wiring connections to and from the console (see instructions on page 1-23).

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 110ohm. High quality digital audio cable offers better signal transmission performance versus typical analog audio cable, especially over long cable runs. Check the cable manufacturer’s 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 connectors. These crimp style connectors will accept wire gauge 24 - 28AWG.

SPDIF INPUTS - The SPDIF (Sony/Phillips Digital Interface) or “consumer” digital audio interface is a two wire unbalanced signal typically on a single RCA style connector. We recommend using shielded twisted pair cables for these connections. Wire the SPDIF center conductor (HOT) to the SRC-W12 “HI” input pin using one wire of the pair and

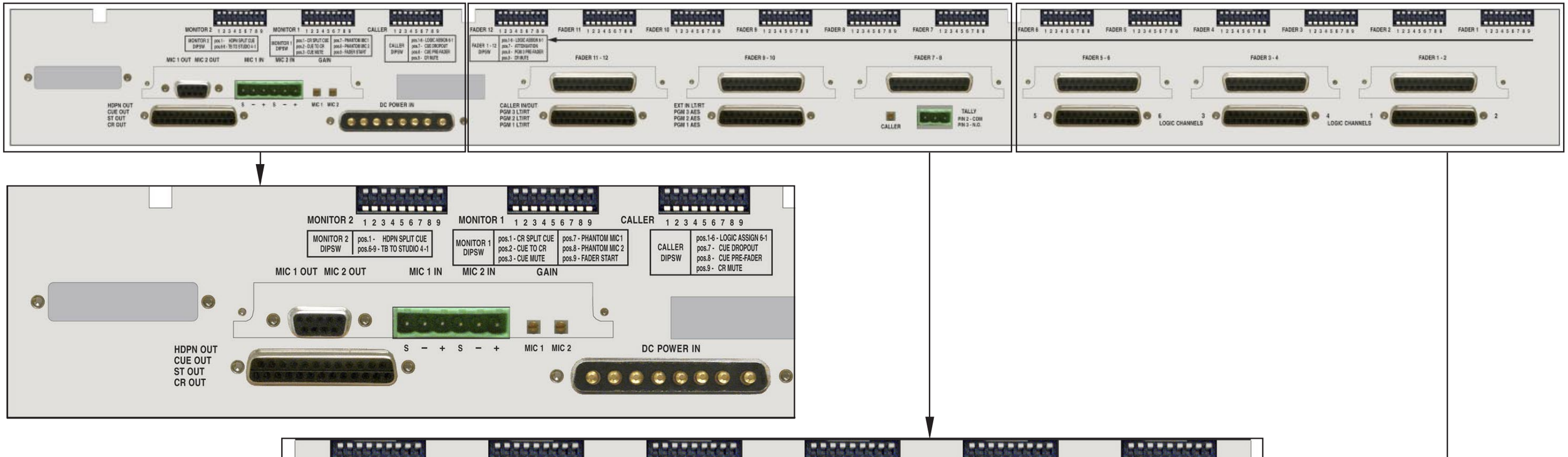
wire the SPDIF shell (ground) to the SRC-W12 “LO” input pin with the other wire of the pair. Connect the cable’s shield to the SRC-W12 “SH” pin, leaving the shield floating (that is, not connected) at the SPDIF end.

The SRC-W12 digital input audio card is provided with 110 ohm / 75 ohm switches on the A and B inputs to allow impedance matching with 75 ohm sources.

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 — All of the W-12 console’s line level analog outputs are electronically balanced, low impedance, outputs, expecting a minimum load of 600 ohms. The outputs are balanced but are not floating. Therefore, **care must be exercised when connecting them to an unbalanced system.** While temporarily shorting the low side of the output signal to ground will not cause any problems, continued operation under these conditions will result in increased distortion, decreased reliability, and possible oscillation problems. **If you must connect one of these outputs to an unbalanced system, be sure to leave the low side unterminated, and connect the unbalanced system to the high side output and shield connections only.**

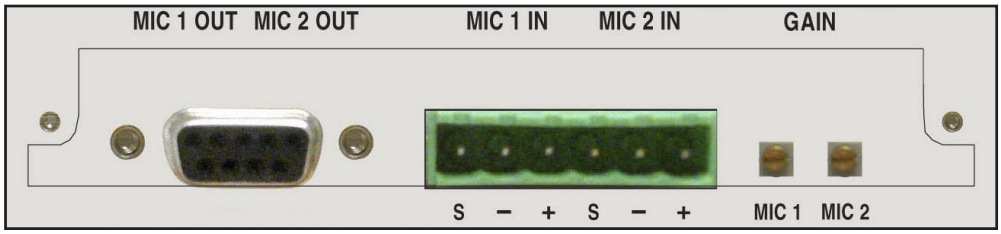


W-12 Console Rear

Hook-Ups

The rear of the console has six slots for plugging in the analog (ADC-W12) or digital (SRC-W12) input daughter cards Each daughter card provides the audio input circuitry for two faders. The rear of the console also has a plug in dual microphone preamp card (MP-W12) with a 6-pin plug terminal provided for microphone MIC1 and MIC2 inputs, and a DB-9 connector for microphone preamp outputs. Additional DB-25 connectors are provided for monitor, analog, and digital program outputs, caller input/output, external input, and logic connections. There also is a 3-pin plug terminal provided for tally connections.

Pinout drawings on pages 1-16 through 1-22 show all wiring connections at glance.



Audio Connections

MPW-12 Mic Preamp Connections

MIC 1 and MIC 2 Inputs—6-pin Plug Terminal

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

Pin 1 – Mic 1 In SH
Pin 2 – Mic 1 In LO
Pin 3 – Mic 1 In HI

Pin 4 – Mic 2 In SH
Pin 5 – Mic 2 In LO
Pin 6 – Mic 2 In HI

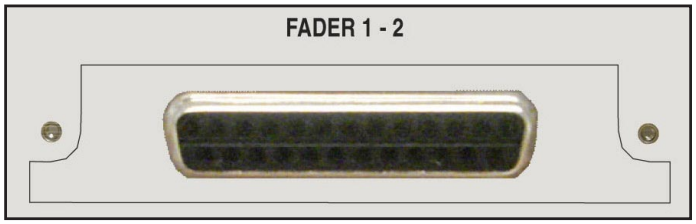
MIC 1 and MIC 2 Outputs—DB-9

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

Pin 5 – Mic 1 Out SH
Pin 4 – Mic 1 Out HI
Pin 9 – Mic 1 Out LO

Pin 8 – Mic 2 Out SH
Pin 7 – Mic 2 Out HI
Pin 3 – Mic 2 Out LO

ADC-W12 Analog Input Connections—DB-25



Pin 25 – LINE 1 A LT IN SH
Pin 24 – LINE 1 A LT IN HI
Pin 12 – LINE 1 A LT IN LO

Pin 11 – LINE 1 A RT IN SH
Pin 10 – LINE 1 A RT IN HI
Pin 23 – LINE 1 A RT IN LO

Pin 22 – LINE 1 B LT IN SH
Pin 21 – LINE 1 B LT IN HI
Pin 9 – LINE 1 B LT IN LO

Pin 8 – LINE 1 B RT IN SH
Pin 7 – LINE 1 B RT IN HI
Pin 20 – LINE 1 B RT IN LO

Pin 19 – LINE 2 A LT IN SH
Pin 18 – LINE 2 A LT IN HI
Pin 6 – LINE 2 A LT IN LO

Pin 5 – LINE 2 A RT IN SH
Pin 4 – LINE 2 A RT IN HI
Pin 17 – LINE 2 A RT IN LO

Pin 16 – LINE 2 B LT IN SH
Pin 15 – LINE 2 B LT IN HI
Pin 3 – LINE 2 B LT IN LO

Pin 2 – LINE 2 B RT IN SH
Pin 1 – LINE 2 B RT IN HI
Pin 14 – LINE 2 B RT IN LO

SRC-W12 Digital Input Connections—DB-25

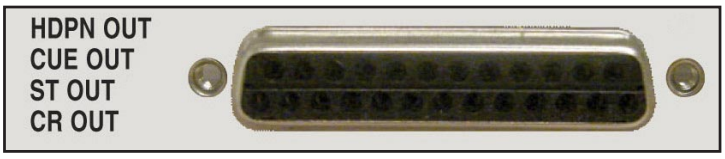
Pin 25 – AES 1 A IN SH
Pin 24 – AES 1 A IN HI
Pin 12 – AES 1 A IN LO

Pin 11 – AES 1 B IN SH
Pin 10 – AES 1 B IN HI
Pin 23 – AES 1 B IN LO

Pin 22 – AES 2 A IN SH
Pin 21 – AES 2 A IN HI
Pin 9 – AES 2 A IN LO

Pin 8 – AES 2 B IN SH
Pin 7 – AES 2 B IN HI
Pin 20 – AES 2 B IN LO

Monitor Output Connections—DB-25



Pin 25 – CR LT OUT SH
Pin 24 – CR LT OUT HI
Pin 12 – CR LT OUT LO

Pin 11 – CR RT OUT SH
Pin 10 – CR RT OUT HI
Pin 23 – CR RT OUT LO

Pin 22 – ST LT OUT SH
Pin 21 – ST LT OUT HI
Pin 9 – ST LT OUT LO

Pin 8 – ST RT OUT SH
Pin 7 – ST RT OUT HI
Pin 20 – ST RT OUT LO

Pin 19 – CUE LT OUT SH
Pin 18 – CUE LT OUT HI
Pin 6 – CUE LT OUT LO

Pin 5 – CUE RT OUT SH
Pin 4 – CUE RT OUT HI
Pin 17 – CUE RT OUT LO

Pin 16 – HDPN LT OUT SH
Pin 15 – HDPN LT OUT HI
Pin 3 – HDPN LT OUT LO

Pin 2 – HDPN RT OUT SH
Pin 1 – HDPN RT OUT HI
Pin 14 – HDPN RT OUT LO

Program Analog Output & Caller Connections—DB-25

Pin 25 – PGM 1 LT OUT SH
Pin 24 – PGM 1 LT OUT HI
Pin 12 – PGM 1 LT OUT LO

Pin 11 – PGM 1 RT OUT SH
Pin 10 – PGM 1 RT OUT HI
Pin 23 – PGM 1 RT OUT LO

Pin 22 – PGM 2 LT OUT SH
Pin 21 – PGM 2 LT OUT HI
Pin 9 – PGM 2 LT OUT LO

Pin 8 – PGM 2 RT OUT SH
Pin 7 – PGM 2 RT OUT HI
Pin 20 – PGM 2 RT OUT LO

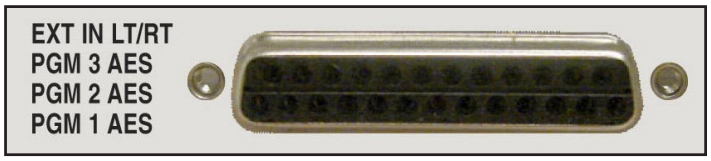
Pin 19 – PGM 3 LT OUT SH
Pin 18 – PGM 3 LT OUT HI
Pin 6 – PGM 3 LT OUT LO

Pin 5 – PGM 3 RT OUT SH
Pin 4 – PGM 3 RT OUT HI
Pin 17 – PGM 3 RT OUT LO

Pin 16 – CALLER IN SH
Pin 15 – CALLER IN HI
Pin 3 – CALLER IN LO

Pin 2 – CALLER OUT SH
Pin 1 – CALLER OUT HI
Pin 14 – CALLER OUT LO

Program Digital Output & External Input Connections—DB-25



Pin 25 – PGM 1 AES OUT SH
Pin 24 – PGM 1 AES OUT HI
Pin 12 – PGM 1 AES OUT LO

Pin 22 – PGM 2 AES OUT SH
Pin 21 – PGM 2 AES OUT HI
Pin 9 – PGM 2 AES OUT LO

Pin 19 – PGM 3 AES OUT SH
Pin 18 – PGM 3 AES OUT HI
Pin 6 – PGM 3 AES OUT LO

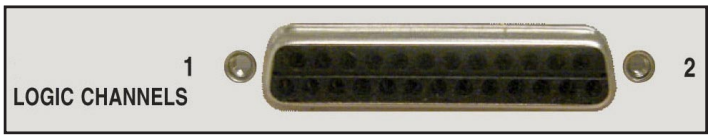
Pin 16 – EXT LT IN SH
Pin 15 – EXT LT IN HI
Pin 3 – EXT LT IN LO

Pin 2 – EXT RT IN SH
Pin 1 – EXT RT IN HI
Pin 14 – EXT RT IN LO

Logic Connections

Logic Port Connections—DB-25

All control ports are opto-isolated except for the On Air Tally, which uses relay contacts. The rear of the console has three DB-25 connectors to handle 1-2, 3-4, and 5-6 logic ports. The list below shows the DB-25 connections for logic ports 1-2.

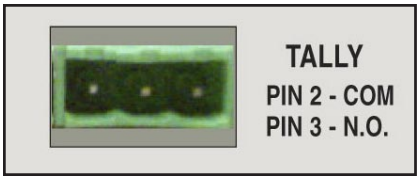


Pin 1 – Port 1 Cough
Pin 2 – Port 1 Ready
Pin 3 – Port 1 Start
Pin 4 – Port 1 Stop
Pin 5 – Port 1 Start/Stop Common
Pin 6 – Port1 Tally B
Pin 7 – Port 2 Cough
Pin 8 – Port 2 Ready
Pin 9 – Port 2 Start
Pin 10 – Port 2 Stop
Pin 11 – Port 2 Start/Stop Common
Pin 12 – Port 2 Tally B
Pin 13 – Audio Ground
Pin 14 – Port 1 Remote On
Pin 15 – Port 1 On Tally
Pin 16 – Port 1 Remote Off
Pin 17 – Port 1 TB to CR
Pin 18 – Port 1 +5V Digital
Pin 19 – Digital Ground
Pin 20 – Port 2 Remote On
Pin 21 – Port 2 On Tally
Pin 22 – Port 2 Remote Off
Pin 23 – Port 2 TB to CR
Pin 24 – Port 2 +5V Digital
Pin 25 – Digital Ground

The connections for logic ports 3-4 and 5-6 follow the same pattern.

Tally—3-pin Plug Terminal

Pin 2 – Tally Common
Pin 3 – Tally N.O.



Logic Port Mapping

The W-12 console has six logic "ports" for interconnection to remote machines or control panels. These logic ports are assignable to the input fader channels 1-12 and the phone channel via dipswitch assignments (covered in greater detail on page 2-7). For now, suffice it to say that logic port numbers in the following discussion refer to the logic port that the fader channel is mapped to.

To Turn the Channel ON & OFF from a Remote Location

"Remote location" can also refer to a remote source machine that is feeding its audio to the channel in question. A contact closure (which may be sourced by the external machine) will activate the channel's ON and OFF switches.

REMOTE ON — Activates the channel's ON switch. Momentarily connect Remote On (Pin 14 for logic ports 1, 3 & 5; Pin 20 for logic ports 2, 4 & 6) and Digital Ground (Pin19 or Pin 25) to latch the channel ON. (User-supplied momentary contact switch required.)

REMOTE OFF — Activates the channel's OFF switch. Momentarily connect Remote Off (Pin 16 for logic ports 1, 3 & 5; Pin 22 for logic ports 2, 4 & 6) and Digital Ground (Pin19 or Pin 25) to latch the channel OFF. (User-supplied momentary contact switch required.)

COUGH — Temporarily Mutes the channel. Provide a closure between Cough (Pin 1 for logic ports 1, 3 & 5; Pin 7 for logic ports 2, 4 & 6) and Digital Ground (Pin19 or Pin 25). This will turn the channel OFF. Note this is a non-latching mode; the channel will turn ON again as soon as the closure stops. (User-supplied momentary contact switch required.)

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

EXTERNAL START — Hook up the remote machine's "start" control pins to the channel's DB-25 connector control pins: for START wire to Pins 3 and 5 for logic ports 1, 3 & 5; to Pins 9 and 11 for logic ports 2, 4 & 6.

EXTERNAL STOP — Hook up the remote machine's "stop" control pins to the channel's DB-25 connector control pins: for STOP wire to Pins 4 and 5 for logic ports 1, 3 & 5; to Pins 10 and 11 for logic ports 2, 4 & 6.

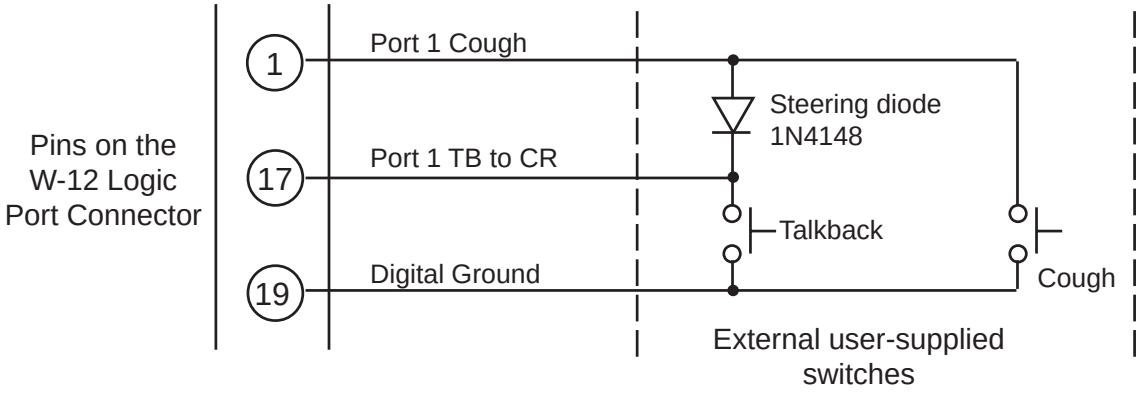
To Control the Channel's OFF Switch LED with an External Source Machine

READY — Hook up the remote machine's Ready output to the logic port DB-25 connector Ready (Pin 2 for logic ports 1, 3 & 5; Pin 8 for logic ports 2, 4 & 6) and Digital Ground (Pin19 or Pin 25). The channel's Ready port is looking for a contact closure. As long as the closure is maintained, the channel's OFF LED illumination will be opposite what it normally is. That is, if the OFF LED is expected to be lit (channel off) the external closure will turn that LED off, whereas if the OFF LED is expected to be off (channel on) the external closure will turn the LED on. The net effect is to make channel's OFF LED flash when an external ready pulse is applied.

Talkback to Control Room

In order for talent in the studio to talk to the console operator, the input channel controlling the studio's microphone signal must be routed to the console's cue bus, where it can be heard by the operator. This is accomplished by a user-supplied TB switch wired to provide a momentary closure between the logic port DB-25 connector "TB to CR" (Pin 17 for logic ports 1, 3 & 5; Pin 23 for logic ports 2, 4 & 6) and Digital Ground (Pin19 or Pin 25). As long as this closure is maintained (i.e., as long as talent holds down the TB button) the channels's pre-fader, pre-on/off signal will be placed on the console's Cue bus.

Normally such conversations occur during off time. In this case the fact that the studio mic channel may continue to feed buses it is assigned to is not a problem. However, if you think the Talkback to Control Room feature may be used at times when you want to be sure the mic is not feeding a bus, you can have the user-supplied talkback switch activate both the Talkback to Control Room and Cough features. To prevent a Cough switch from activating both features at once you would use a diode steering circuit, wired like this:



On Tally

Lets the channel's ON switch control an on-air light or other "microphone on" indicator at a remote location. This control function provides a continuous closure between On Tally (Pin 15 for logic ports 1, 3 & 5; Pin 21 for logic ports 2, 4 & 6) and Digital Ground (Pin19 or Pin 25) whenever the channel 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 logic ports by connecting the external LED to +5V Digital (Pin 18 for logic ports 1, 3 & 5; Pin 21 for logic ports 2, 4 & 6) and the On Tally connection. In either case the current should not exceed 30 milliamps.

NOTE: In most cases, if you are wiring up an ON AIR tally light, you would use the tally output discussed on page 2-5 instead of an On Tally output from one of the logic ports.

Tally B

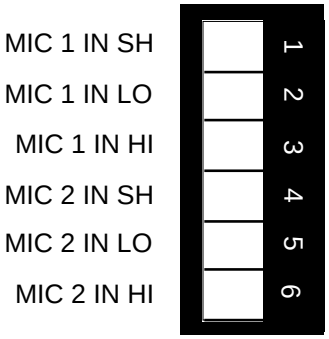
Provides a remote indication that the channel's B source has been selected. This control function provides a continuous closure between Tally B (Pin 6 for logic ports 1, 3 & 5; Pin 12 for logic ports 2, 4 & 6) and Digital Ground (Pin19 or Pin 25) whenever the B source is selected.

This closure can be used to control an externally powered tally light that requires a continuous closure to function. Or an external tally light (i.e., LED) can be powered from the logic port by connecting the external LED to +5V Digital (Pin 18 for logic ports 1, 3 & 5; Pin 21 for logic ports 2, 4 & 6) and the B Tally connection. The current should not exceed 30 milliamps.

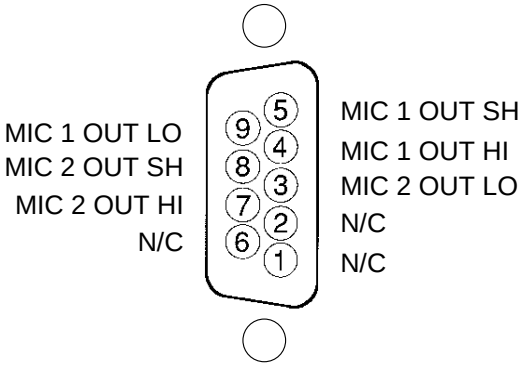
Tally B is very useful if you are using the B input and also using the logic port to interface with a machine. The Tally B signal can be used to activate an external, user-provided relay to "steer" the logic interface between an A and a B machine, or to simply block logic interfacing when B (or A) input is selected.

MP-W12
Mic Preamp Connections

MIC 1 & MIC 2 INPUTS (6-pin Plug Terminal)

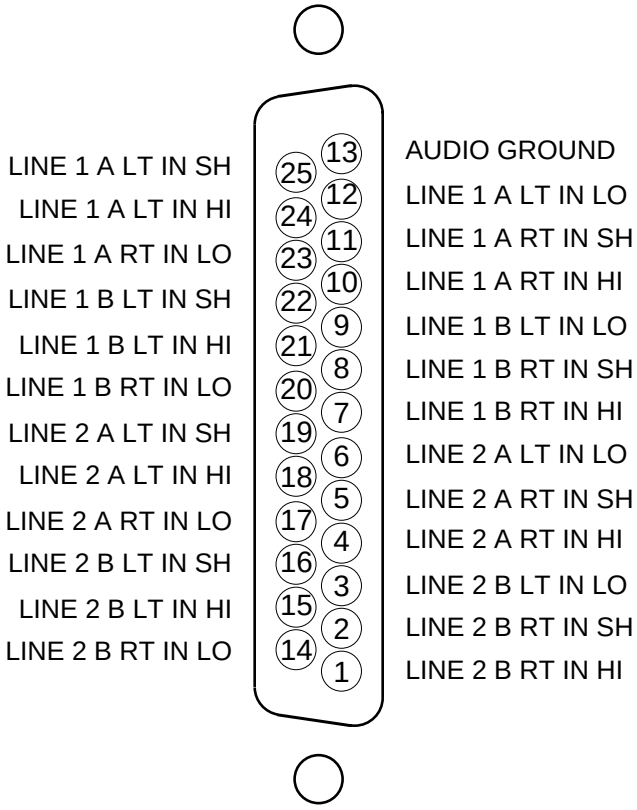


MIC 1 & MIC 2 OUTPUTS DB-9



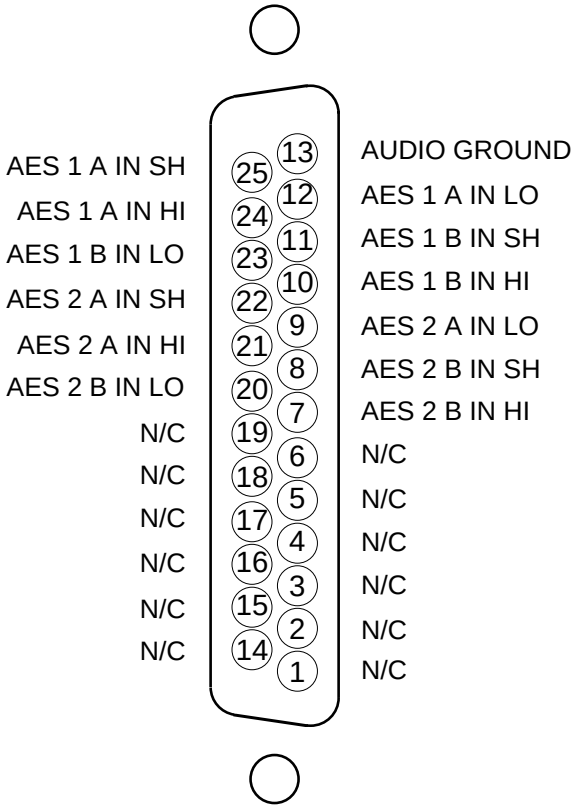
ADC-W12
Analog Input Connections

DB-25



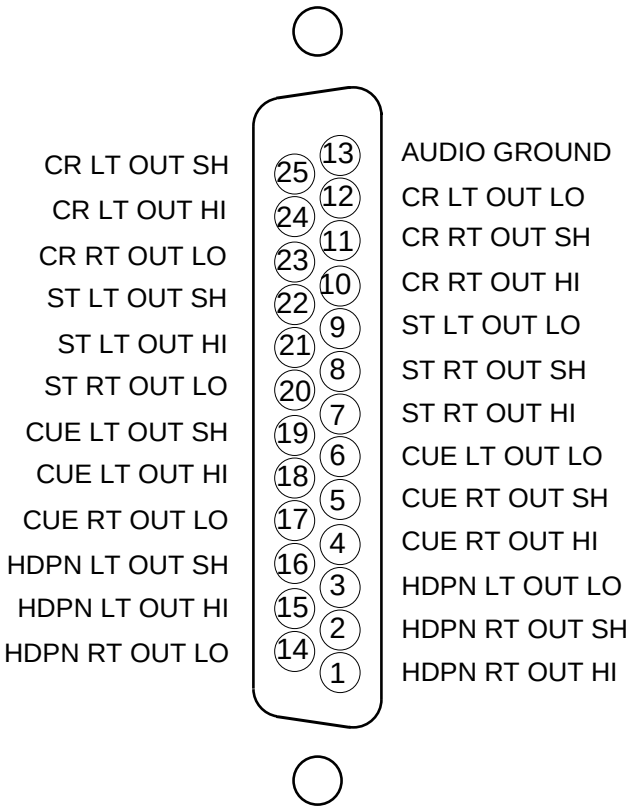
SRC-W12
Digital Input Connections

DB-25



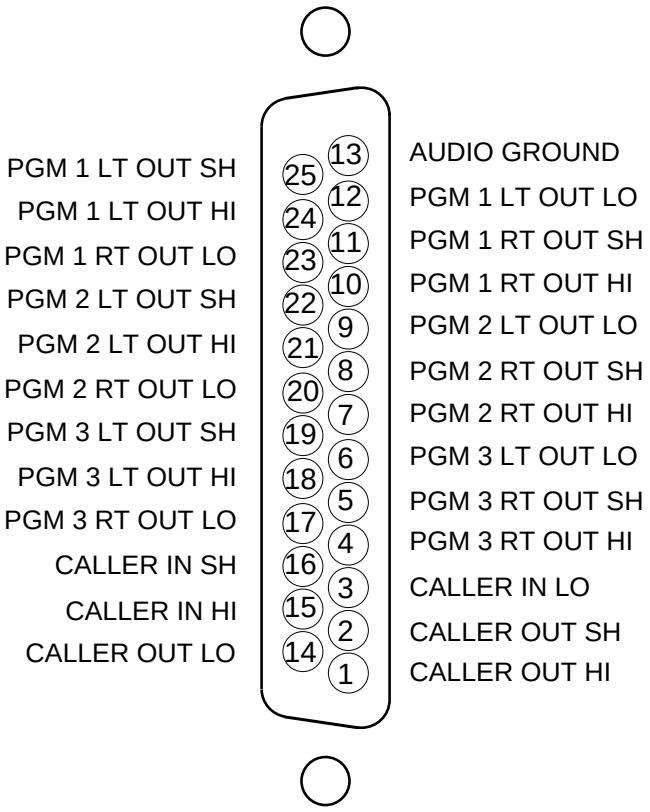
MN-W12 Monitor Connections

DB-25



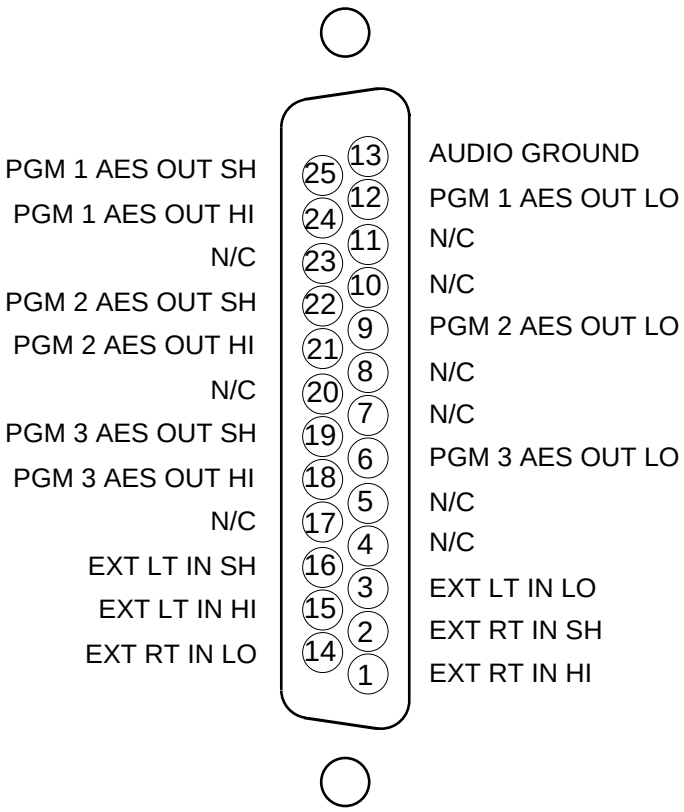
PGM Analog Output & Caller Connections

DB-25



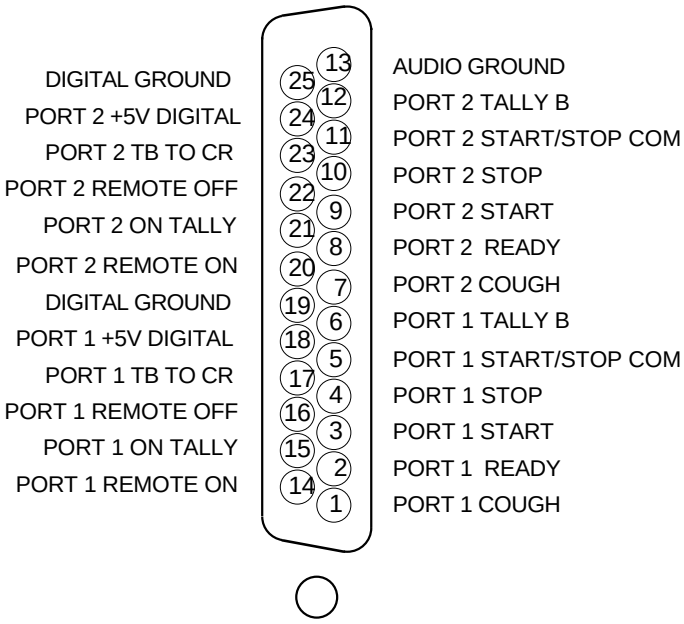
PGM Digital Output & External Input Connections

DB-25

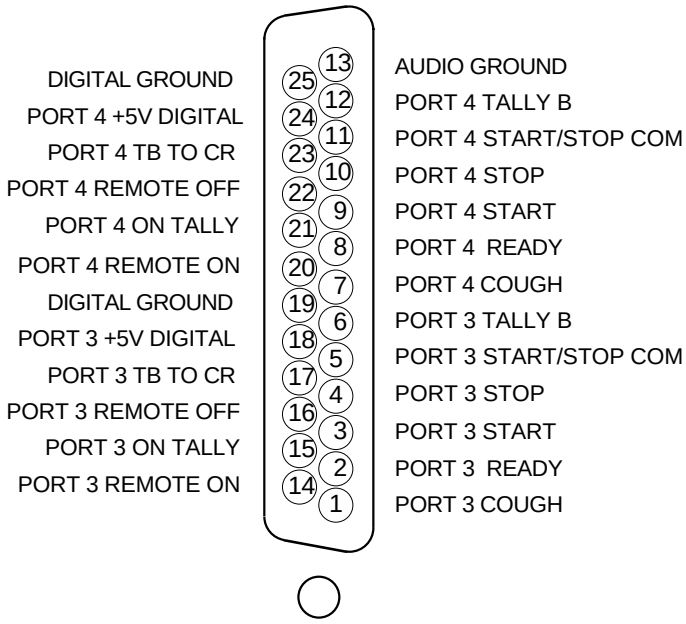


Logic Connections

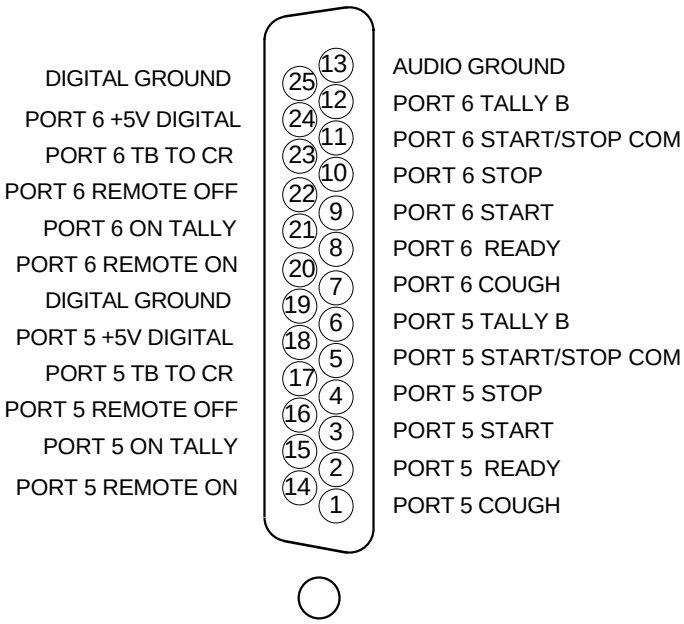
LOGIC PORTS 1-2
DB-25



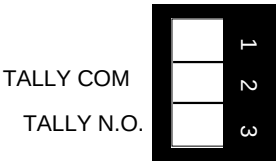
LOGIC PORTS 3-4
DB-25



LOGIC PORTS 5-6
DB-25



TALLY
(3-pin Plug Terminal)



Input Daughter Card Installation

To configure the console inputs, two types of daughter cards are available (Figure 1):

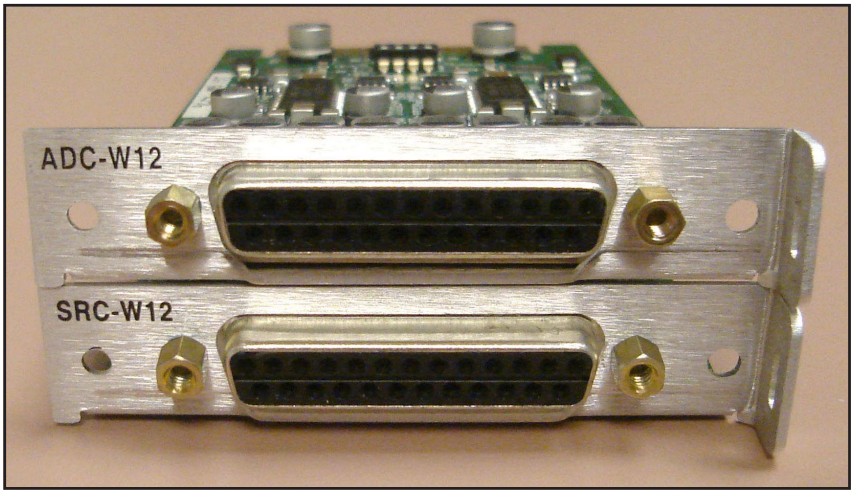


Figure 1. Input Daughter Cards

- Analog ADC-W12 (W#009716) daughter card;
- Digital SRC-W12 (W#009717) daughter card.

Each daughter card determines the input signal type, analog or digital, for two adjacent audio channels. One card configures channels 1 and 2, the next card configures channels 3 and 4, etc.

The daughter cards specific to your order are shipped in a separate package.

- The ADC-W12 analog daughter card is configured at the factory to work with +4dBu balanced sources, but can be configured for 8dB of additional gain for situations where lower level line sources are used with the 4 position dipswitch SW1. When a dipswitch position is on the associated audio channel is set for normal gain; to achieve higher gain turn the appropriate dipswitch off.

  SW1 position 1 controls the left side gain of the second (even) channel
  SW1 position 2 controls the right side gain of the second (even) channel
  SW1 position 3 controls the left side gain of the first (odd) channel
  SW1 position 4 controls the right side gain of the first (odd) channel

Please note that the gain switches affect both A and B inputs (see page 3-3) of the channel, so it is best not to have a +4dBu source on an A input and a lower level source on the same channel's B input.

To install the console's daughter cards you must follow this procedure:

- ***Make sure the console is powered down.***
- Slide the daughter card in the appropriate opening in the rear of the console to plug in its edgecard fingers to the motherboard edge connector. (Figures 2 & 3).

Figure 2. Motherboard Without Card

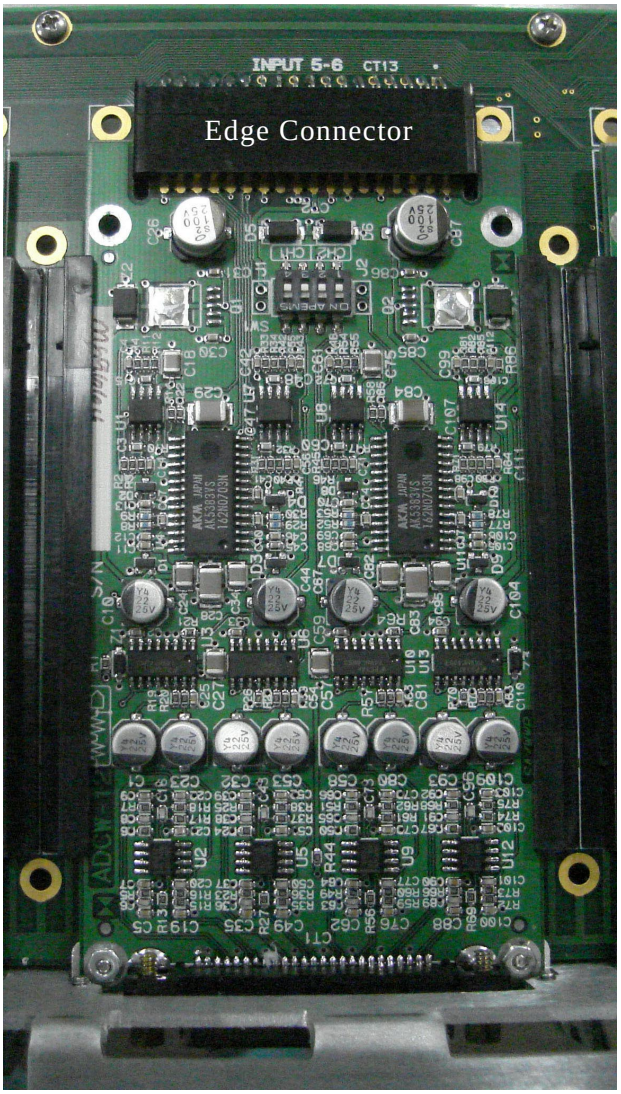


Figure 3. Motherboard With Plugged In Card

- Tighten the daughter card down (Figure 4) with the supplied two Phillips panhead screws (included in the console's connector kit).

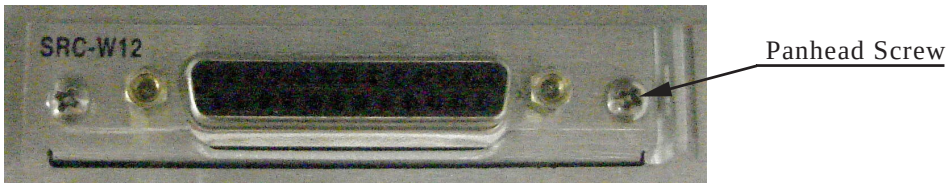
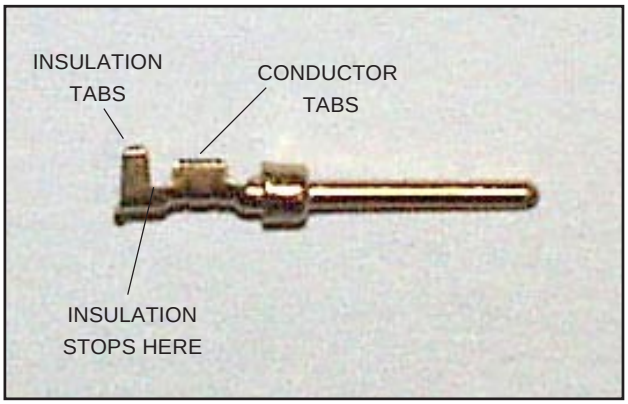


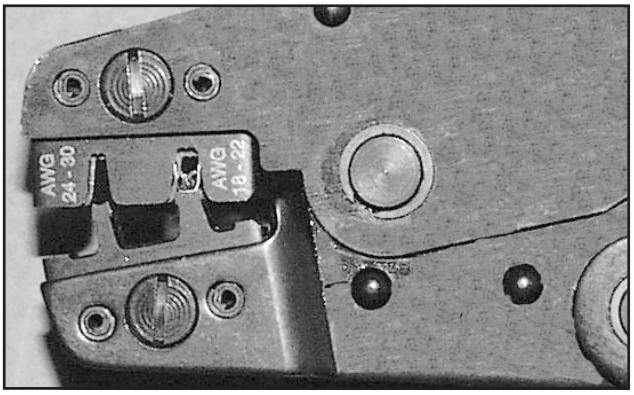
Figure 4. Assembled Card

HAND CRIMP TOOL WIRING INSTRUCTIONS

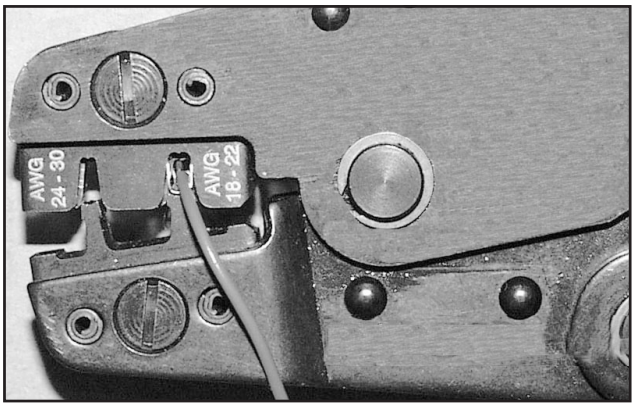
The supplied hand crimping tool (W/S#850067) is used for all I/O wiring connections to and from the console. It is to be used with the supplied pin (figure 1) intended for 22"-28" gauge wire.



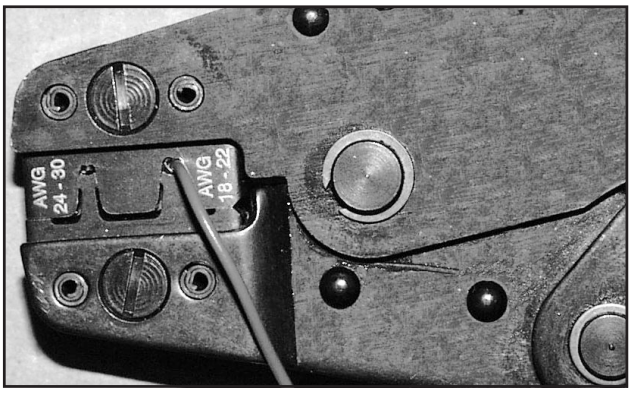
(1) Pin crimp terminal



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



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



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

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

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

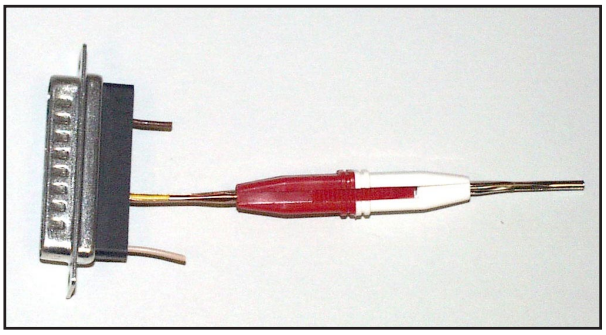
3) Close tool very slightly, only to the point of holding the terminal in position (figure 2).

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

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

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

PIN EXTRACTOR INSTRUCTIONS



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

If you accidentally insert a crimp terminal pin into the wrong socket, you'll need to use the supplied pin extractor tool (W/S#850069) to remove terminal pin, and correct your mistake without having to sacrifice a connector. Place extractor tip (red side) over terminal pin to be removed (figure 5), and press it downwards motion until tip rests upon Housing. Then pull out the terminal pin from Housing. It should never be necessary to discard a connector due to a wiring error.

Console Features

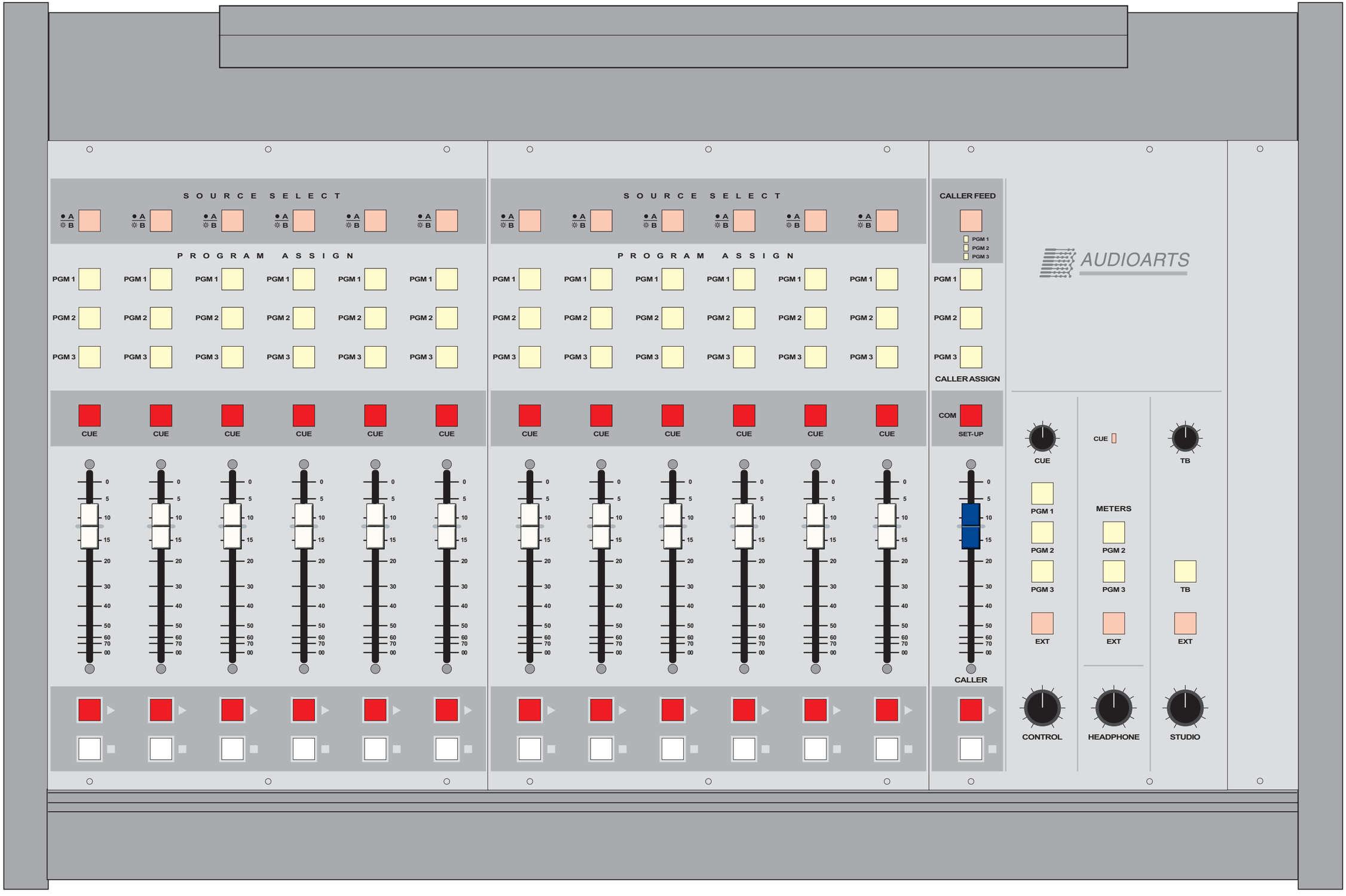
Chapter Contents

Console Features

Overview

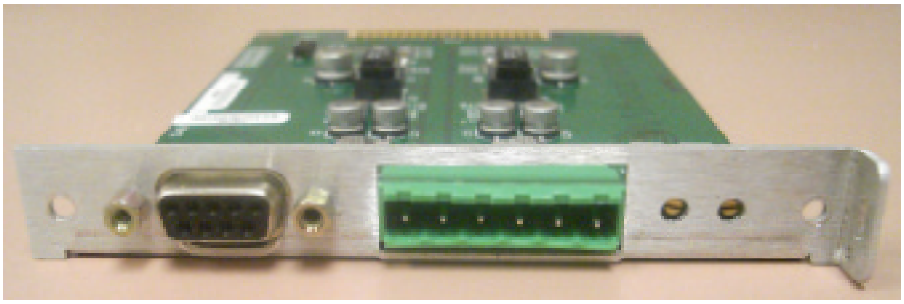
Each W-12 console has two Input panels and one Master panel. The Input panel consists of six faders with associated switches. The Master panel has a CALLER, MONITOR and METERS sections. Each section is described below.

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.



W-12 Console Layout

Mic Preamp



The W-12 console is provided with one dual channel microphone (mic) preamp card, designed to bring balanced microphone level signals (nominally -50dBu) up to a +4dBu balanced line level for routing into any fader channel provided with an analog daughter card. For the uninitiated, mic preamps are required because microphones typically put out signals at relatively low signal strength, and therefore require more amplification (increase in signal strength) than normal line level sources, like CD players and tape players, to be properly audible at the console's outputs.

It is important to note that the end user or installer must **deliberately wire the mic preamp outputs to the desired analog input fader channels**, as there is **no internal path provided to make this connection**.

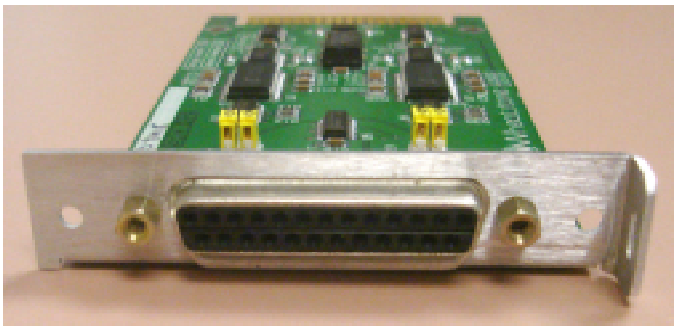
Mic level sources are wired to the 6-position plug terminal that is plugged into the mating 6-position MIC 1 IN / MIC 2 IN connector on the mic preamp at the rear of the console. The line level mic preamp outputs are available at the DB-9 MIC 1 OUT / MIC 2 OUT connector on the mic preamp, which must then be wired to the appropriate analog inputs via the analog input DB-25 connector.

MIC 1 and MIC 2 GAIN trimpots, also on the mic preamp at the rear of the console, are used to adjust the gain of each microphone input independently. These are normally "set and forget" adjustments, and are set at the factory for a gain of 54dB, thus bringing a -50dBu microphone input level up to +4dBu at the output.

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) at the PGM 1, PGM 2, or PGM 3 output.

If you have more than two microphones in use, you will need to provide external mic preamps for all but two of them.

Line Level Inputs



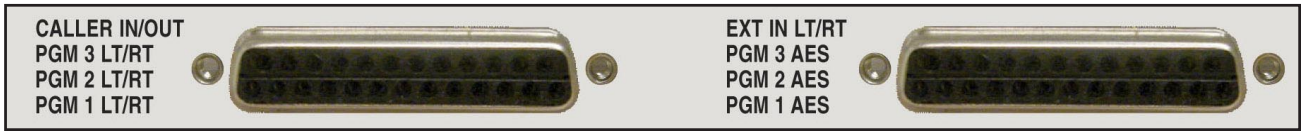
The W-12 console has provision on the rear panel for mounting six dual channel audio daughter cards to provide the console's twelve fader channel line level inputs. Each daughter card, which may be either an analog input card or a digital input card, handles the line level input signals for two fader channels. Looking at the rear of the console, from right to left the daughter cards feed faders 1 and 2, faders 3 and 4, faders 5 and 6, faders 7 and 8, faders 9 and 10, and faders 11 and 12, respectively. Daughter cards are either analog or digital for both

fader channels. Thus, if fader 1 is analog, fader 2 must be analog as well, or if fader 1 is digital, then fader 2 must be digital also. The same rule applies to each mentioned pair of faders.

Each fader channel is capable of A/B operation. This means that each daughter card provides inputs for four stereo signals: first fader A input, first fader B input, second fader A input, and second fader B input. To overstate the obvious, each analog card then has four analog stereo inputs, and each digital card then has four digital inputs; there is no mixing of analog and digital inputs on a single daughter card.

The W-12 also has one external stereo line level (+4dBu balanced) input that is available for control room, studio, or switched meter monitoring, and one analog (+4dBu balanced) input dedicated to use as a telephone caller input.

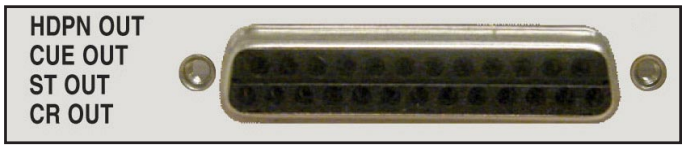
Outputs



The outputs for all three of the W-12's main stereo buses, PGM 1, PGM 2, and PGM 3, are available as both analog and digital outputs. Both analog and digital outputs from a bus may be used at the same time.

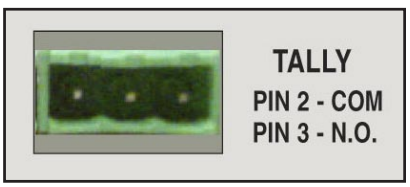
The analog bus outputs all appear on the DB-25 connector mounted below the FADER 11-12 connector on the rear panel. Also on this connector are the dedicated caller output (+4dBu analog balanced) and the previously mentioned dedicated caller input.

The digital bus outputs all appear on the DB-25 connector mounted below the FADER 9-10 connector on the rear panel. Also on this connector is the previously mentioned external monitoring input, which accept a +4dBu line level stereo analog input.



An additional DB-25 connector mounted below the MIC 1 OUT / MIC 2 OUT DB-9, provides stereo analog line level (+4dBu) balanced outputs for Control Room, Studio, Cue, and Headphones. In addition to appearing at this connector, a mono sum of Cue feeds the internal cue speaker, and the Headphones signal also feeds the console's headphone jack.

Mute and Tally

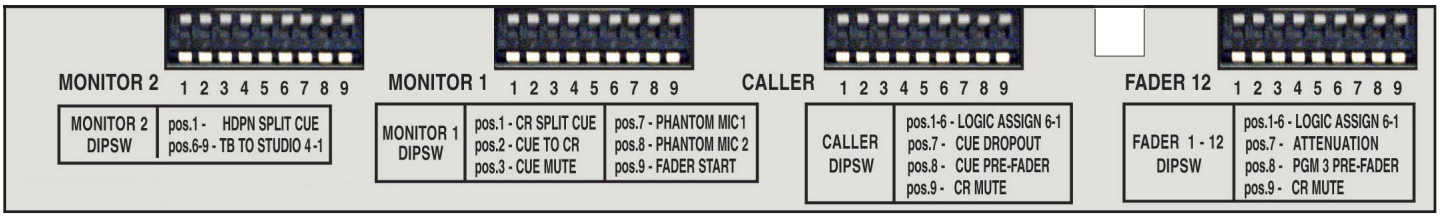


The console has the ability to mute the control room output. The console also has an on air tally output that is used to drive user-provided external circuitry. This tally is automatically activated whenever the control room mute is activated. Thus, turning on any channel that activates the control room mute also turns on the on air tally.

See the "Console Programming Options" section for details.

Console Programming Options

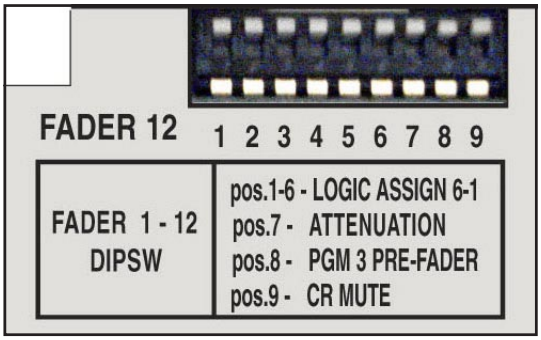
All programming is made via PCB mounted dipswitches located at the top of the console's rear panel. There are twelve fader dipswitches (FADER 1 - FADER 12), one caller dipswitch (CALLER), and two monitor dipswitches (MONITOR 1 and MONITOR 2). Note that when a dipswitch position is in the down position it is ON.



FADER 1-12 Dipswitches

Each input channel has a dedicated dipswitch to program the channel's audio and logic functions.

Attenuation



As mentioned in the **Read Me!** pages at the front of the manual, there is a tendency today for CD's to be made with less than 1dB of headroom. Any boosting of level resulting from moving the fader up from the nominal, unity gain, position results in overload distortion. For this reason, dipswitch position 7 is provided to attenuate a channel's signal by 12dB, thus allowing channels being fed by such hot CD's to have their faders moved above nominal without causing distortion. The 12dB attenuation is applied to the four main stereo buses, cue, and talkback — in other words, anywhere in the console that the channel's audio may be routed.

FADER 1-12 dipswitch position 7 applies 12dB of attenuation to the channel for all bus feeds

PGM 3 Bus Pre-Fader

Position 8 of the FADER 1-12 dipswitches, when activated, will cause the channel signal assigned to the console's PGM 3 output to be tapped before the fader. One possible use for this feature is to allow the board operator's mic to be heard by the caller, using PGM 3 as the caller feed, without the board operator's mic fader needing to be moved up.

CR Mute

An input channel can be programmed to mute the control room speakers when the channel is ON. Position 9 of the FADER 1-12 dipswitches, when activated, automatically mutes the console's control room speakers when the corresponding channel is turned ON. This is done to prevent feedback from any live mics in the Control Room.

Logic Assign

The W-12 console has six logic ports. Positions 1 through 6 of the FADER 1-12 dipswitches, when activated, assign the corresponding logic port to the input channel:

Dipswitch pos.1 assigns the logic port 6
Dipswitch pos.2 assigns the logic port 5
Dipswitch pos.3 assigns the logic port 4
Dipswitch pos.4 assigns the logic port 3
Dipswitch pos.5 assigns the logic port 2
Dipswitch pos.6 assigns the logic port 1

A Note On Logic Port Assignments

Because of the way logic ports are assigned to input channels, it is entirely possible to assign a logic port to more than one input, or to assign multiple logic ports to a single input, or even to combine these two cases, to the extreme end of having all six logic ports simultaneously assigned to every fader. However, **don't do it!** The results will be unpredictable at best.

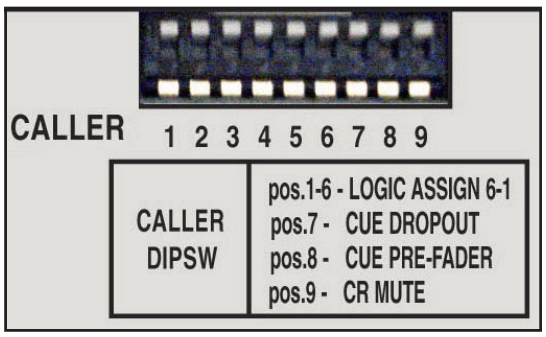
The main reason we mention this is because it can happen, and, if you are experiencing erratic or unpredictable logic interfacing between the console and remote equipment, the very first thing you should do is to **verify** that you **do not have multiple logic ports assigned to the same fader**, and that you **do not have any logic ports assigned to multiple faders simultaneously**. Such configuration is unsupported.

CALLER Dipswitch

Cue Dropout

CUE (i.e., caller COM button) can be made to turn off when the channel's ON switch is pressed. This is the factory default setting.

CALLER Dipswitch position 7 activates cue dropout



Cue Pre/Post

The channel's CUE signal (caller COM button) can tap pre or post fader.

CALLER Dipswitch position 8 activates post-fader cue (default is pre)

CR Mutes

A caller channel can be programmed to mute the control room speakers when the channel is ON. Position 9 of the CALLER dipswitch, when activated, automatically mutes the console's control room speakers when the caller channel is turned ON. This is done to prevent feedback from the CR announcer's mic, through the external phone path.

Logic Assign

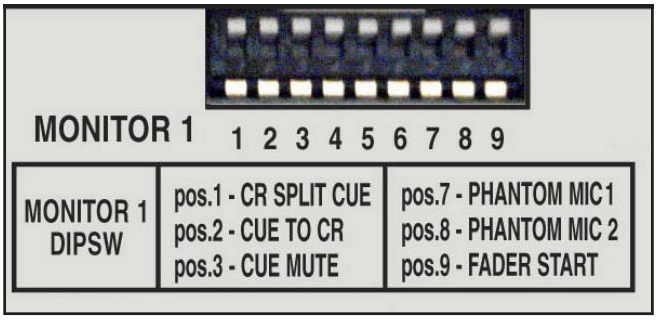
Positions 1 through 6 of the CALLER dipswitch, when activated, assign the logic to the caller channel:

Dipswitch pos.1 assigns the logic channel 6
Dipswitch pos.2 assigns the logic channel 5
Dipswitch pos.3 assigns the logic channel 4
Dipswitch pos.4 assigns the logic channel 3
Dipswitch pos.5 assigns the logic channel 2
Dipswitch pos.6 assigns the logic channel 1

Gain Trimpot

There is a PCB-mounted CALLER trimpot, located on the middle of the console's rear, that sets caller input gain.

MONITOR 1 Dipswitch



Split Cue, Control Room

The MONITOR 1 dipswitch pos. 1, 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 a summed version of CUE is sent to the left side. The CUE TO CR dipswitch (MONITOR 1 position 2) must be activated to achieve Split Cue (see below).

Cue Interrupt

The MONITOR 1 dipswitch pos. 2, when activated, sends cue to the control room.

Cue Mute

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

MONITOR 1 dipswitch pos. 3 will mute cue whenever the CR output is muted by an input channel set to activate the CR mute

Phantom Power

MONITOR 1 dipswitch pos. 7 and 8 turn phantom power on for the two microphone input ports.

Dipswitch pos. 7 activates phantom power for microphone 1
Dipswitch pos. 8 activates phantom power for microphone 2

EFS - European Fader Start

In some situations it is desirable to have the channel's on/off status controlled by the position of the fader. In such a scenario, if the fader is all the way down and the channel is off, moving the fader up slightly from the full down position will turn the channel on without the need to press the channel ON button. In a similar manner, if the fader is up from the full down position by at least a small amount and the channel is on, moving the fader to the full down position will turn the channel off without the need to press the channel OFF button. This feature is enabled by moving the dipswitch position 9 down (on).

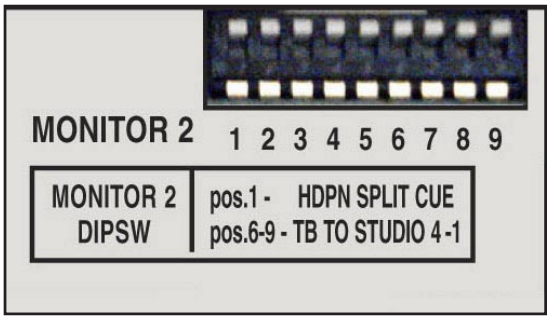
The MONITOR 1 dipswitch pos. 9 enables the EFS feature

Please note that this is a global setting. EFS is either enabled for all 12 input faders or disabled for all 12 input faders. You cannot enable or disable the feature separately on individual faders.

MONITOR 2 Dipswitch

Split Cue, Headphone

Consoles are normally programmed at the factory for the L+R sum of CUE to appear on the left channel, while the L+R sum of the control room output appears on the right. To defeat this split cue option, move up (off) pos.1 of the MONITOR 2 dipswitch. Then cue will interrupt both sides of the headphones.



Talkback to Studio

The W-12 console has an internal talkback (TB) bus that allows audio from any of the faders 1-4 to be used by the console operator to talk to talent in the studio. Typically, one of these faders would be used, but, to accommodate those situations where more than one microphone is used for the talkback function, any of the first four input channels may be assigned to feed the talkback bus. Positions 6-9 of the MONITOR 2 dipswitch are used for this purpose. Turning the switch on routes that channel's pre-fader, pre-on/off signal to the talkback bus. When the console operator presses the TB switch on the MASTER panel, the talkback bus audio interrupts the feed to the studio speakers, allowing the console operator to talk to studio talent.

Dipswitch pos. 6 allows input channel 4's audio to feed the talkback bus

Dipswitch pos. 7 allows input channel 3's audio to feed the talkback bus

Dipswitch pos. 8 allows input channel 2's audio to feed the talkback bus

Dipswitch pos. 9 allows input channel 1's audio to feed the talkback bus

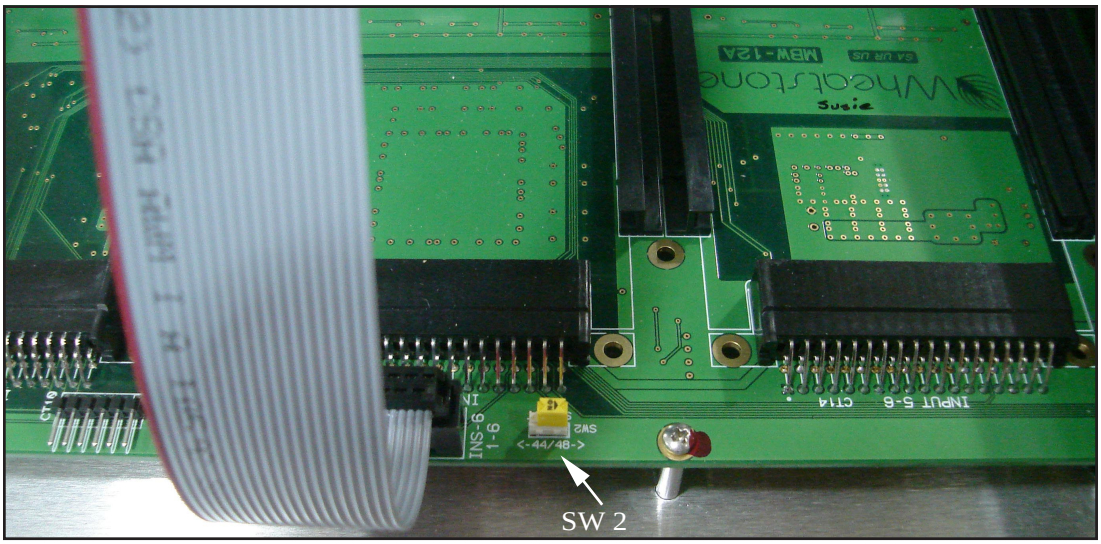
Console Sample Rate

The W-12 console is set at the factory to operate at a sample rate of 44.1 KHz. Slide SW 2 on the motherboard is provided to change the sample rate to 48 KHz if desired.

Power down the console and remove the screws that hold in the first IP-W12 Input Panel. Carefully raise the front end of the panel, nearest the armrest, taking care not to strain or disconnect the ribbon cable that connects the panel to the motherboard.

Standing at the console operator position and looking under the panel at the motherboard, you will find switch SW 2 just to the right of the connector that the panel's ribbon cable plugs into. Slide this switch to the right for a sample rate of 48 KHz, or to the left for 44.1 KHz.

With the switch set at the desired position, carefully lower the panel back down and replace the screws that hold down the panel. You can now power the console back up.



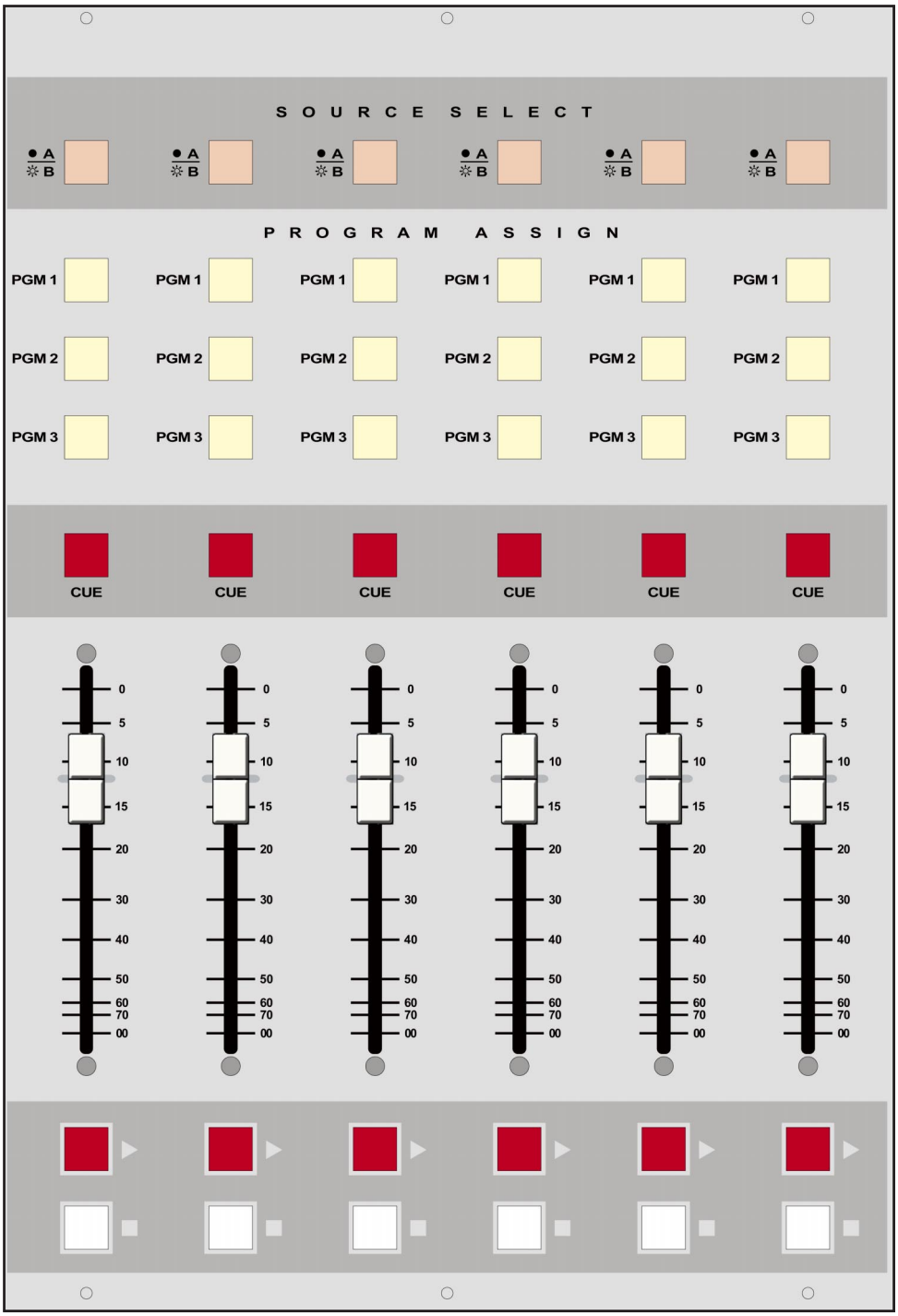
Controls and Functions

Chapter Contents

Controls and Functions

Input Panel (IP-W12)

The Input panel of the W-12 console has six identical strips representing six input channels.



Source Select

Each input channel accepts two analog or digital 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 three stereo Program outputs—PGM 1, PGM 2, and PGM 3. The button will be lit when the source is assign 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.

Cue Button

The 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, as an interrupt to the control room monitor speakers, if so programmed, and at the console's CUE output on the rear panel.

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

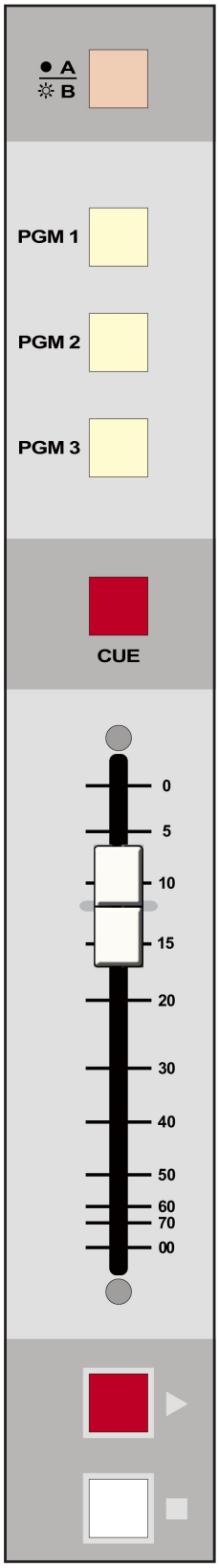
Level is set by a long-throw fader. The fader is the sliding mechanism that determines how strong is the presence of the input in some of the various console outputs.

If the fader is all the way down (that is, pulled toward the console operator), the signal will not be present in any of the three 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.

The channel's fader setting will not affect the level of the signal in CUE. It will also not affect the level of the signal in PGM 3 if the fader has programmed for PGM 3 pre assignment.

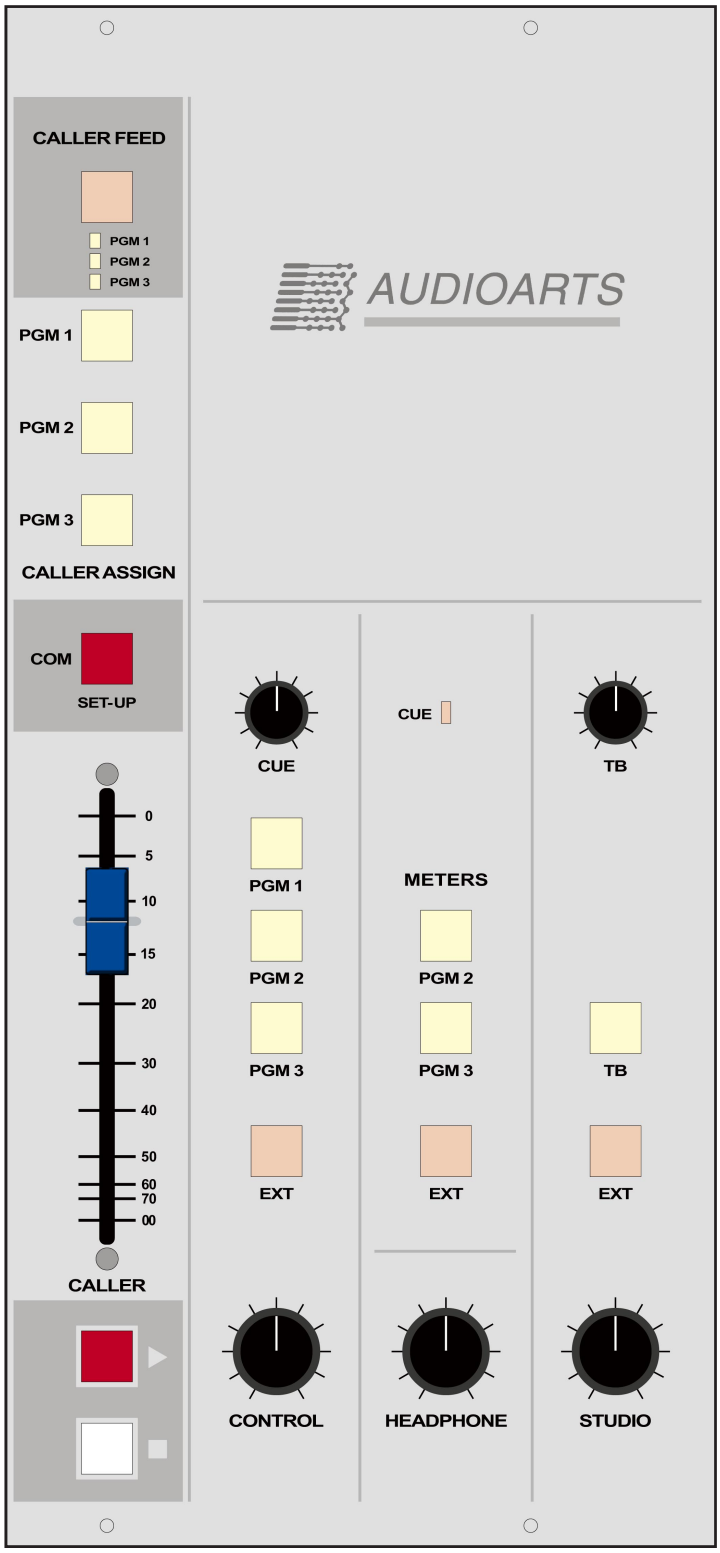
ON/OFF Switches

The ON (red) and OFF (white) buttons on the bottom of the panel turn the channel on and off by means of electronic switching, and can simultaneously start and stop external source machines. These can also be programmed (as mentioned in the previous chapter) to activate control room mute and cue dropout. The OFF switch's LED can be controlled by an external source machine to act as a "ready" indicator. External machine interfacing is only available on faders that have been assigned to a logic port.

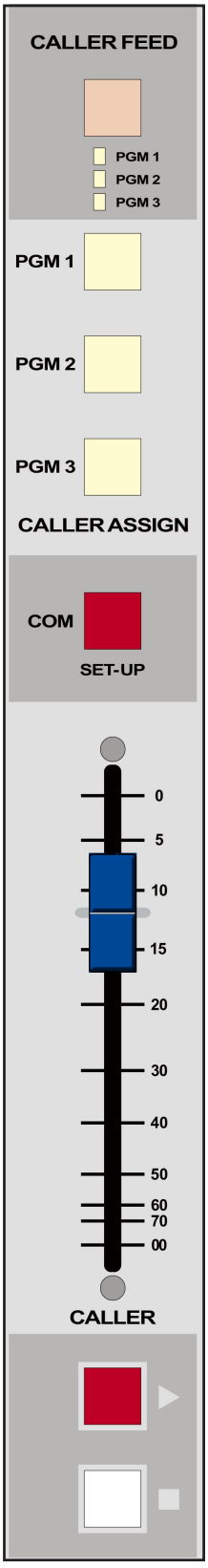


Master Panel (MST-W12)

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



Caller Input



The caller section is used for 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 any of the three Program buses. The caller feed setting is displayed by the three program LEDs under the CALLER FEED button. The caller feed will never contain the caller's own voice.

Program Assign

Output switches assign the caller to any combination of the console's three Program outputs (PGM 1, PGM 2, and PGM 3), and permit live talk-ins.

Pressing any of the three 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.

COM Button

The COM (SET UP, or Cue) button allows interviewing the caller prior to airing by including the caller in the console's cue bus, where it may be heard on the meterbridge mounted cue speaker. At the same time, the console's talkback bus is routed to the output back to the caller, allowing the operator's mic (if so programmed) to be used to talk to the caller off line.

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 any of the three Program buses (PGM 1, PGM 2, and PGM 3) 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, if the caller is set up via the CALLER dipswitch for post fader cue (see page 2-7).

ON/OFF Switches

The ON (red) and OFF (white) buttons on the bottom of the panel determine if the phone channel is ON or OFF. The buttons can also be used to provide external start/stop logic for the hybrid if the caller fader has been assigned to a logic port.

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.

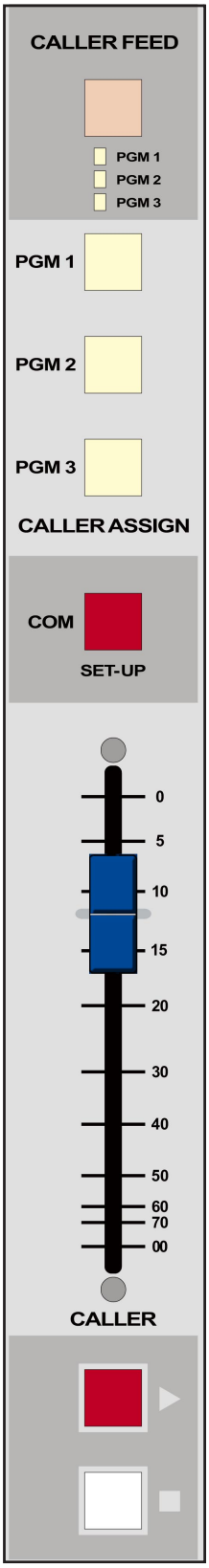
Caller Set-Ups

Pre-air segment communication between the console operator (DJ) and caller is aided by the COM button, which places the caller's voice on the console's cue speaker and headphones, and (if so programmed) CR speakers. This cue signal can be programmed pre or post fader.

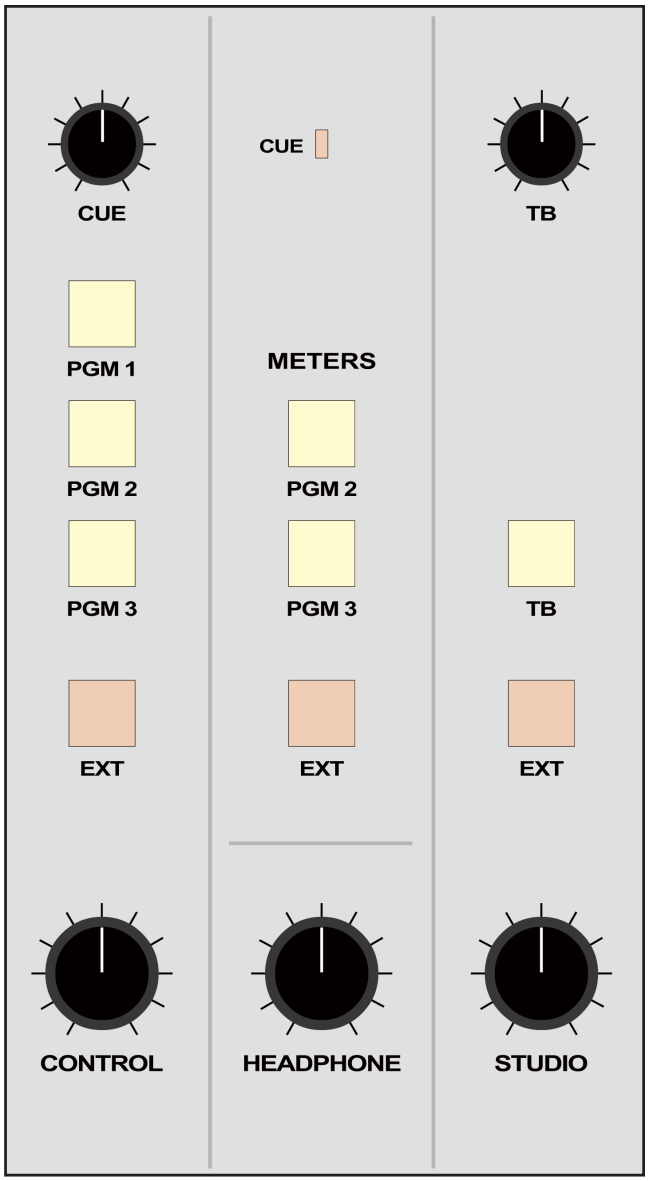
The DJ can assign his microphone input channel to an unused output bus—say PGM 3—and the DJ then selects the PGM 3 bus with the CALLER FEED switch. This sends a dedicated (digitally generated) version of the PGM 3 bus signal to the caller's hybrid output, where it is ultimately heard by the caller through 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 input channel handling the desired music cut and assign it to the same bus as the caller's mix minus source and the caller will hear it off-air.

For convenient handling of call-ins, the console is capable of driving the PGM 3 bus with a pre-fade signal from any input channel 1-12 so programmed (see page 2-6). That way, when you use PGM 3 as the caller FEED source, the DJ mic, and any other inputs you want the caller to hear, do not need to be faded up for the caller to hear them, as long as those inputs are assigned to PGM 3 and programmed for PGM 3 pre. Regardless of any input PGM 3 pre setting, the **caller** audio to the PGM 3 bus is **always** post-fade, post-on.

The DJ microphone input channel can also be assigned via dipswitch to the console's talkback (TB) bus. Any audio on the TB bus is heard by a caller when the caller COM button is pressed.



Monitor Section



The Control Room is the monitor that allows the operator to listen to the console's three 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, the TB level, and the Studio level.

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 three program assign (PGM 1, PGM 2, and PGM 3) 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 preamplified 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 mono sum to left) to the control monitor speakers. It also automatically interrupts the headphone feed.

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.

Control Room Program Select

Pressing any of the three program (PGM 1, PGM 2, or PGM 3) switches in the Control Room section allows the operator to listen to the selected output bus. The selected output bus will normally also be heard in the studio. The button will be lit when the monitor is assigned to its respective bus.

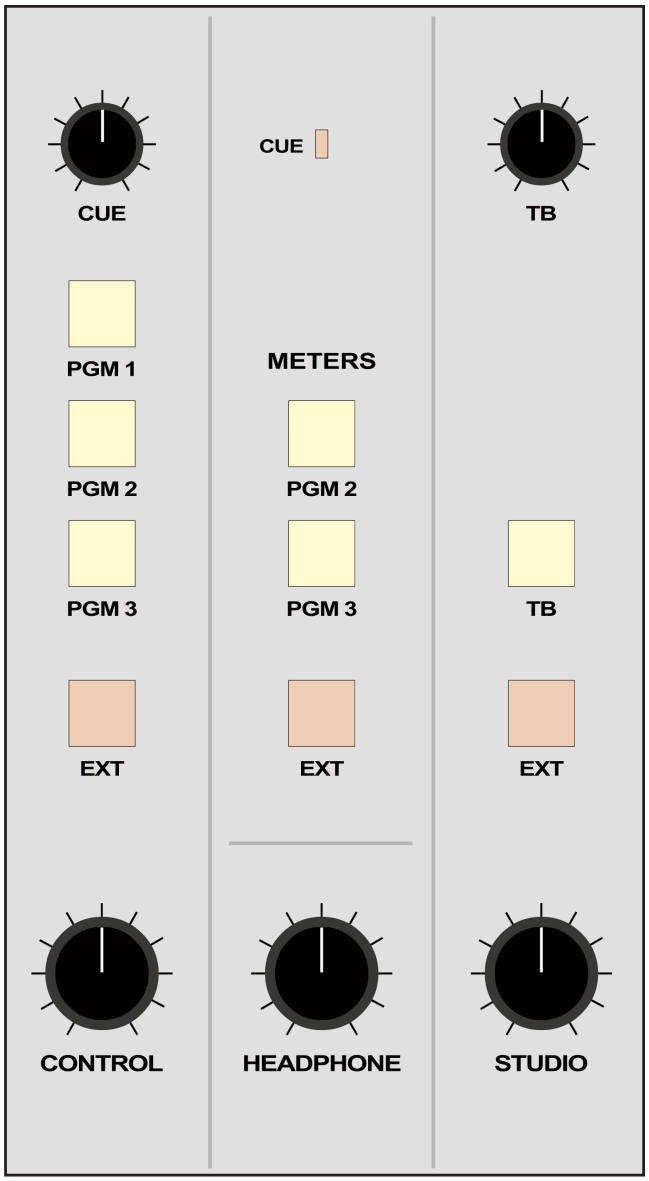
Control Room EXT Switch

Pressing the control room EXT switch allows the operator in the control room to pick up the external balanced input (useful for such items as tape recorders or air returns) to listen. The control room EXT button will light and the selected PGM button light goes off.

Control Room Level Control

The CONTROL 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).

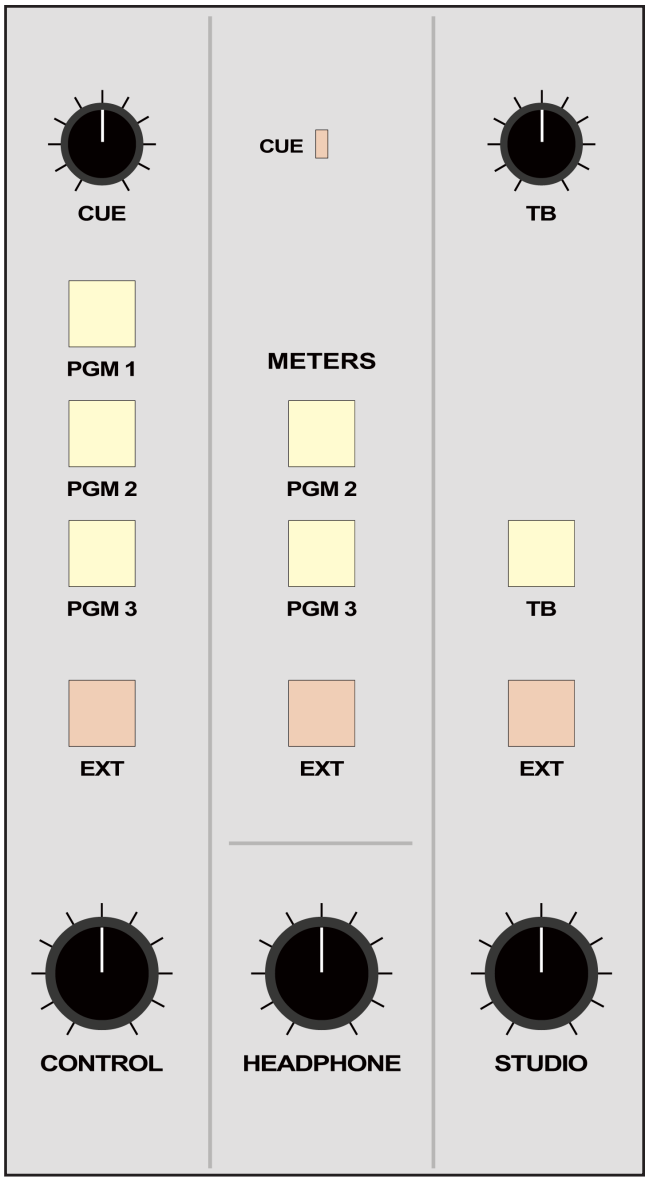
Like the control room speakers, the cue speaker also has the potential for feedback. To avoid this situation, operator mics that mute the control room will also mute the cue speaker if the CUE MUTE position of the MONITOR 1 dipswitch has been set to enable the cue muting function (see page 2-8).

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, PGM 3, 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 EXT Switch

The studio monitor essentially works in one of two modes. In External mode, as indicated by the Studio EXT button being lit, the Studio output monitors the same external audio source that is available to the Control Room, regardless of what source is actually selected for Control Room.

In the Control Room Follow mode, as indicated by the Studio EXT button being off, the Studio output monitors the same source that has been selected for monitoring by the Control Room.

Toggling between the two modes is accomplished by pressing the Studio EXT button until it is on or off as desired.

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.

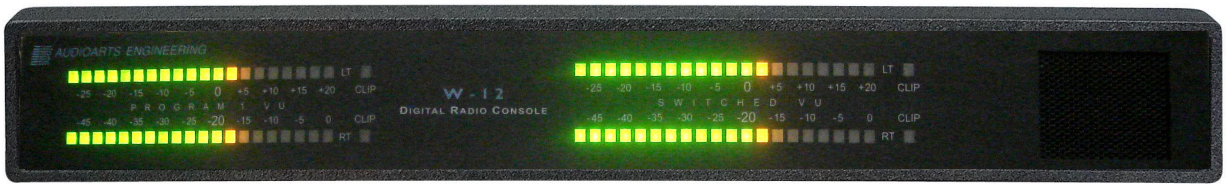
There may be times when the console operator wants to talk to one of the performers in the Studio. When the TB button in the Studio is pressed (it is momentary action), any inputs assigned to the talkback bus (see page 2-9) will interrupt the regular monitor signal being sent to the studio output.

TB Level Control

The TB master level control sets the level of the talkback interrupt signal.

Meters (VU-W12)

The METERS section consists of two VU meter pairs on the console's meterbridge, and three METERS select buttons, plus a CUE indicator, located on the Master panel.



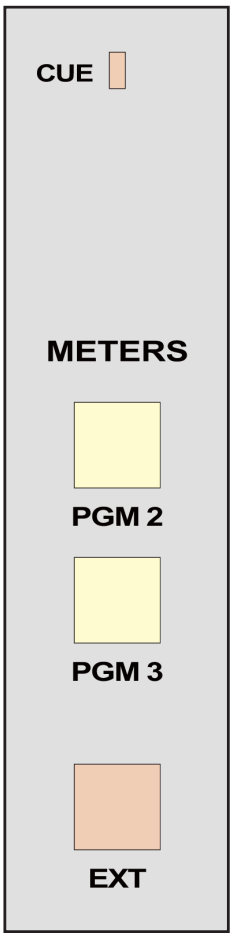
VU Meter Pairs

The two 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) allows the console operator to meter PGM 2, PGM 3, or the console's external stereo line signal (analog, +4dBu balanced).

The Master panel also has a master CUE indicator. Whenever any input channel is placed in cue the CUE indicator lights. At the same time the switched meter pair automatically switches to show the level of audio on the cue bus. While the CUE indicator is lit, the selected switched meter source switch light goes off.

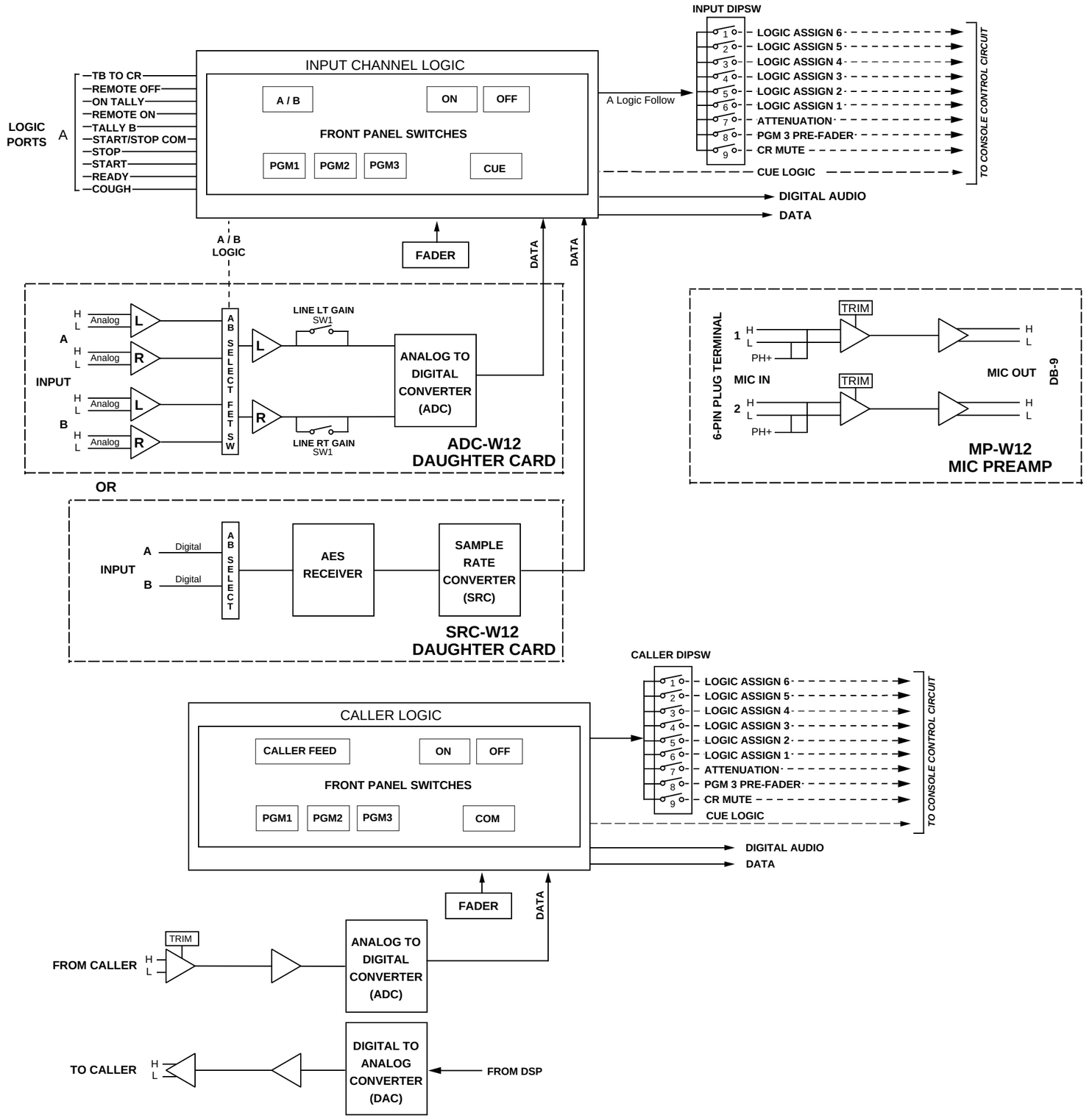


Meters Select Buttons

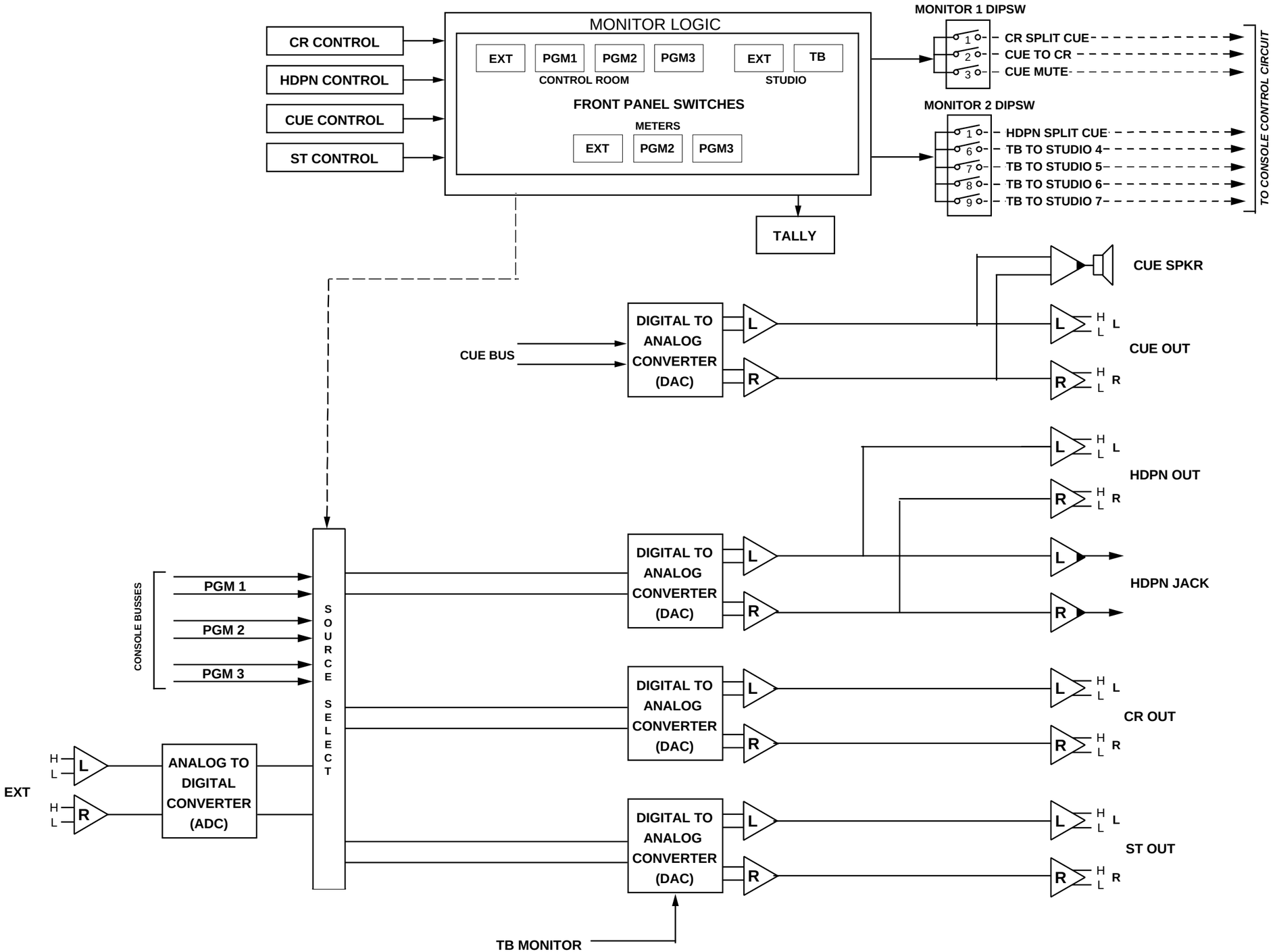
The METERS buttons select the source for the switched meter pair, as indicated above.

Schematic and Load Sheet Drawings

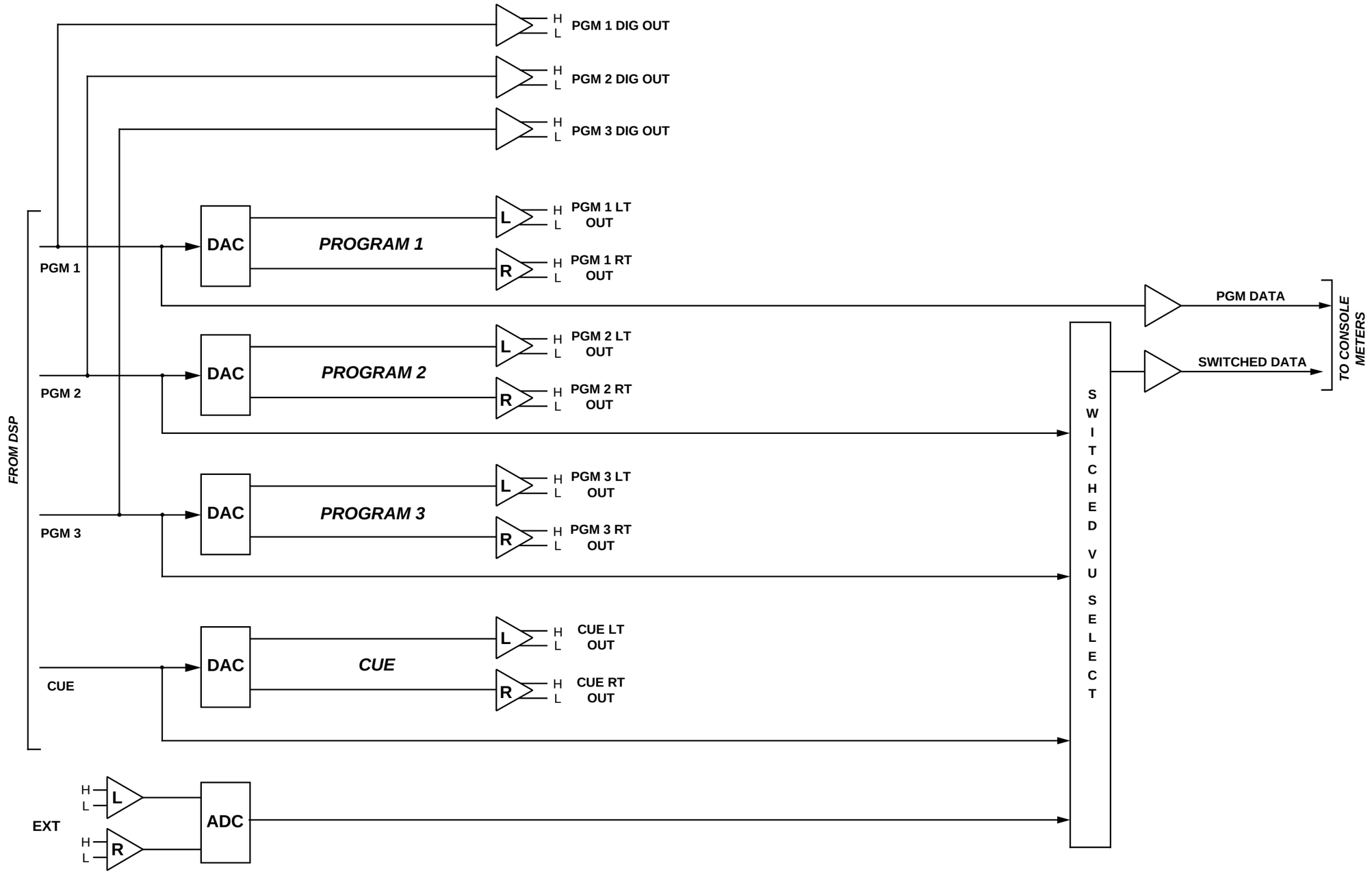
Chapter Contents



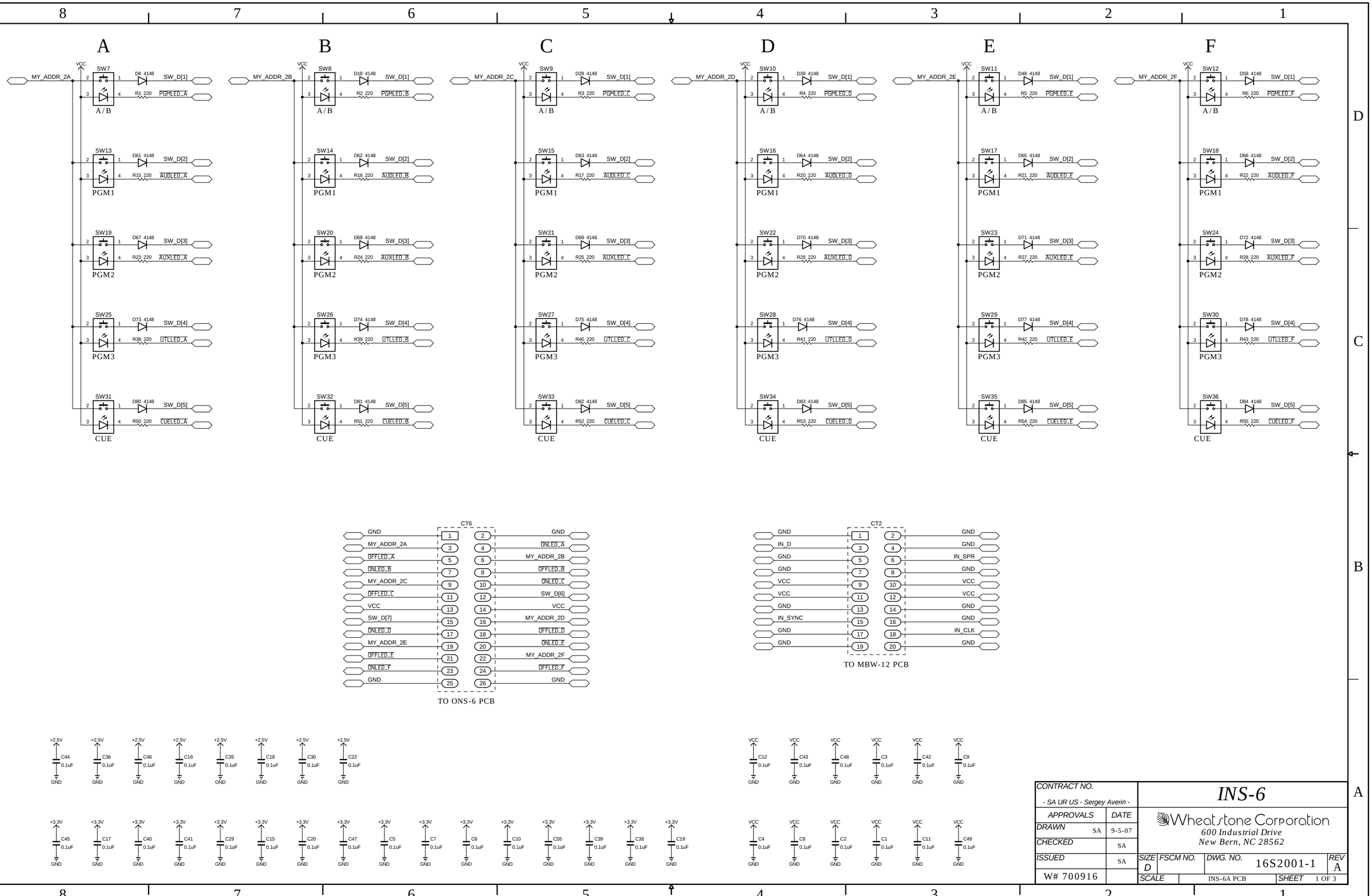
W-12 Signal Flow Diagram - Inputs, Caller Feed, and Channel Logic



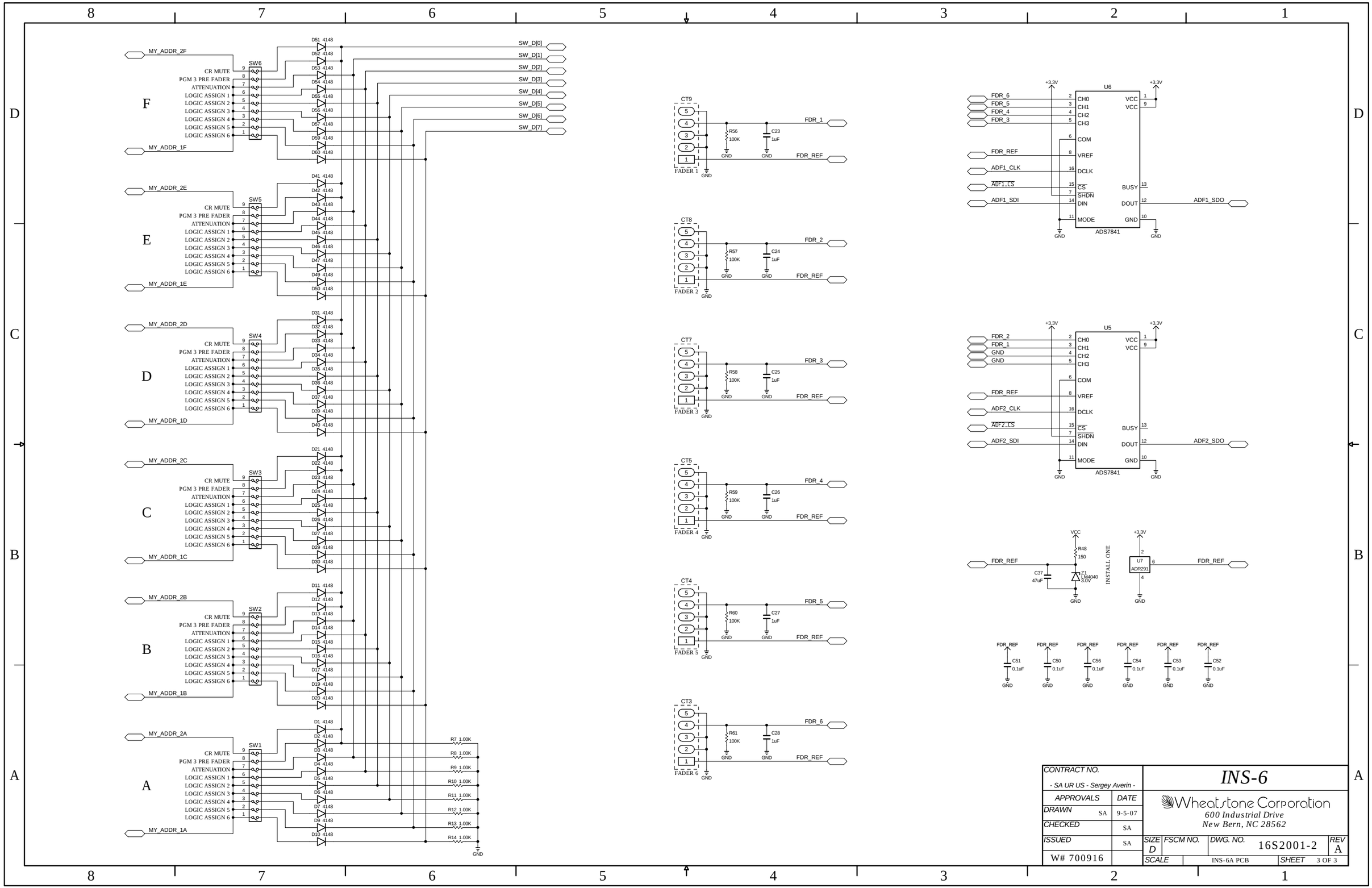
W-12 Signal Flow Diagram - Monitors



W-12 Signal Flow Diagram - Master Outputs



INS-6 Input Panel Switch Board Schematic



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- SA UR US - Sergey Averin -			
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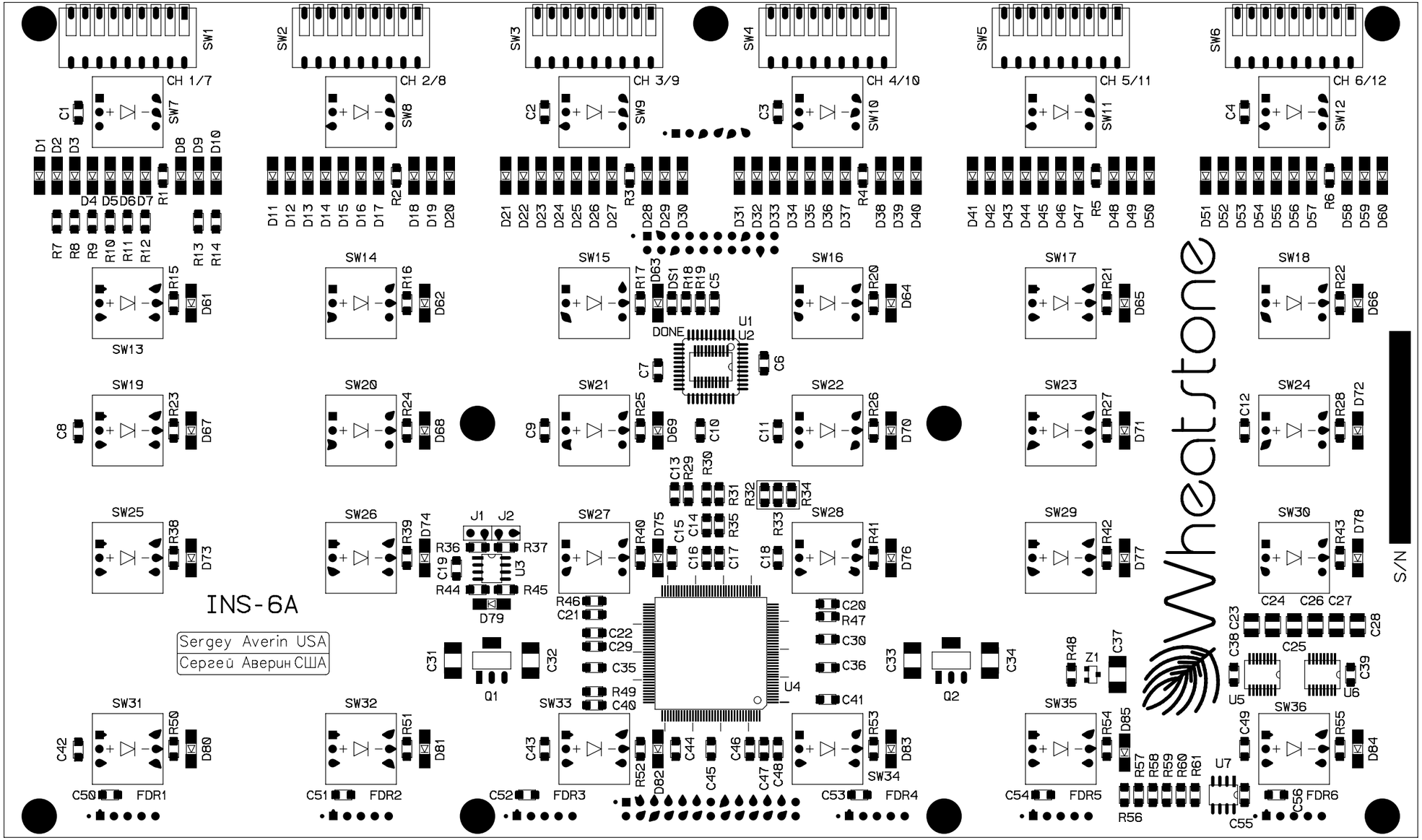
CHECKED	SA	New Bern, NC 28562	
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 16S2001-2 / REV A	
W# 700916		SCALE / INS-6A PCB / SHEET 3 OF 3	

INS-6 Input Panel Switch Board Schematic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SW2
SW3
SW4
SW5
SW6
CH 1/7
CH 2/8
CH 3/9
CH 4/10
CH 5/11
CH 6/12
SW7
SW8
SW9
SW10
SW11
SW12
SW13
SW14
SW15
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SW22
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SW25
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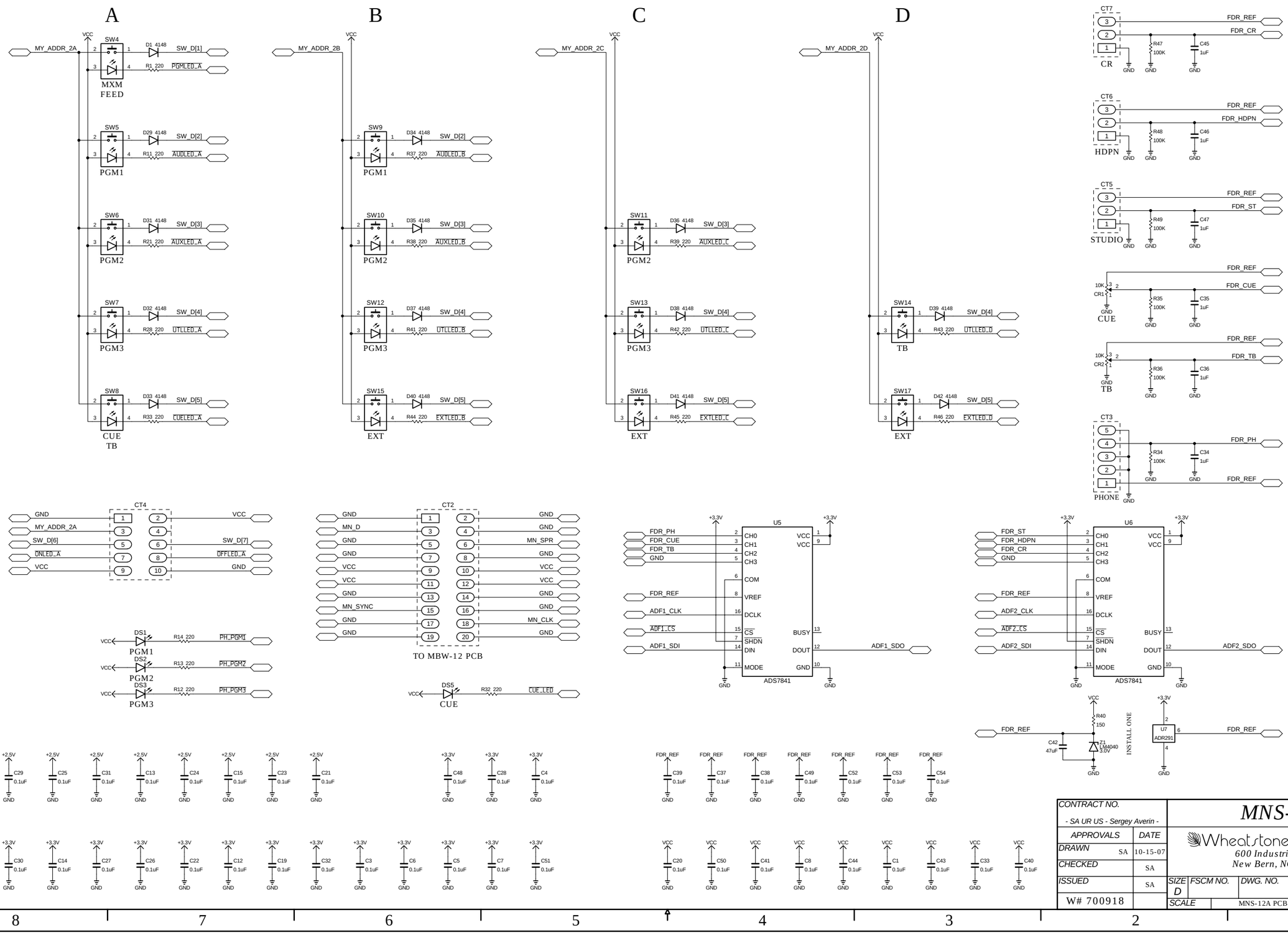
SW27
SW28
SW29
SW30
SW31
SW32
SW33
SW34
SW35
SW36
INS-6A
Sergey Averin USA
Сергей Аверин США
DONE
FDR1
FDR2
FDR3
FDR4
FDR5
FDR6
S/N
Wheatstone



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CHECKED	SA		
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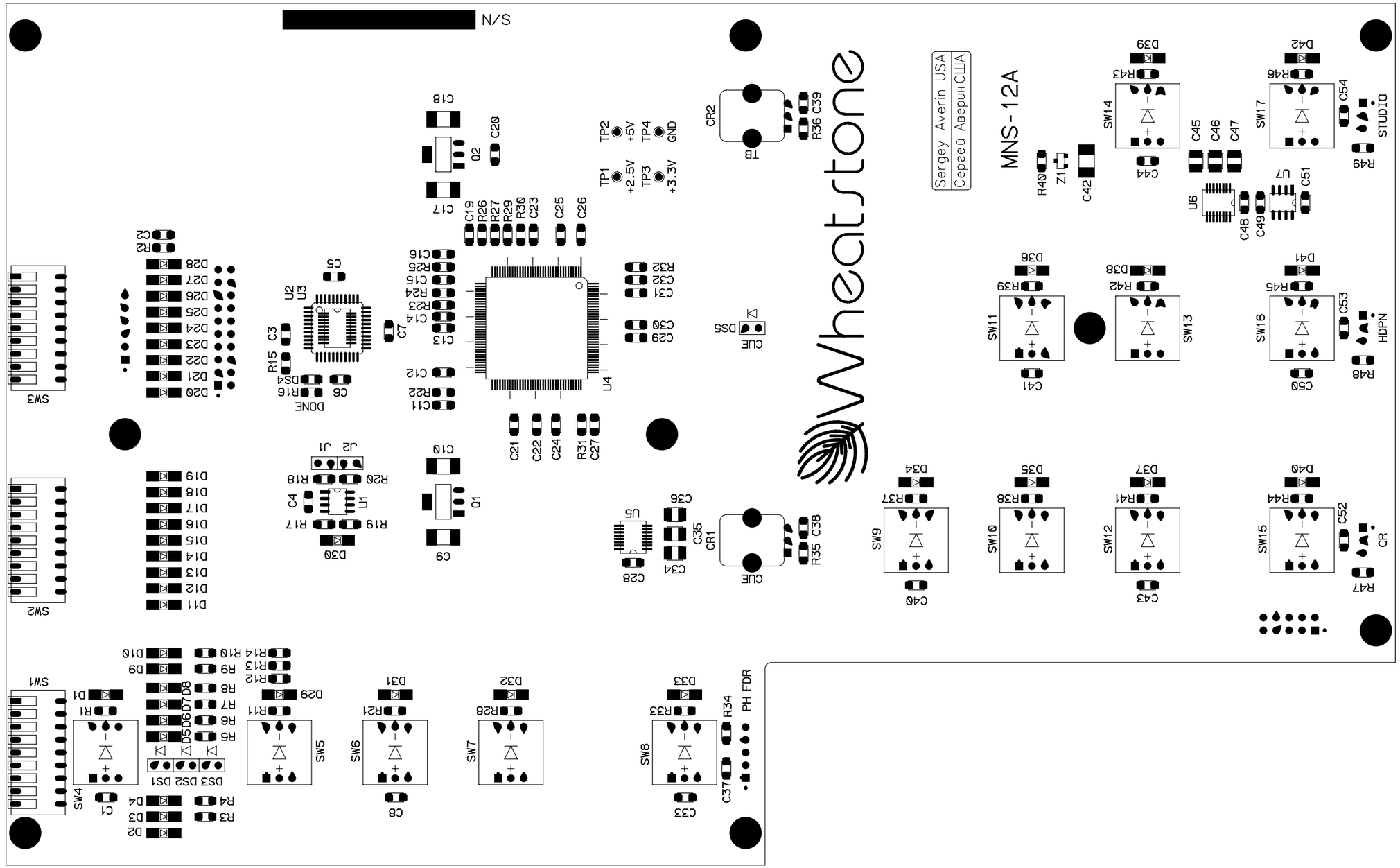
W# 700918		SCALE / MNS-12A PCB / SHEET 1 OF 2	


S/N
Wheatstone
MNS-12A
Sergey Averin USA
Сергей Аверин США
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SW8
SW9
SW10
SW11
SW12
SW13
SW14
SW15
SW16
SW17
U1
U2
U3
U4
U5
U6
U7
Q1
Q2
CR1
CR2
DS1
DS2
DS3
DS4
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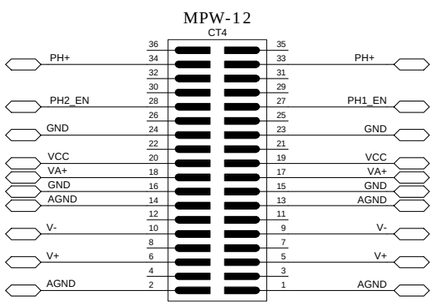
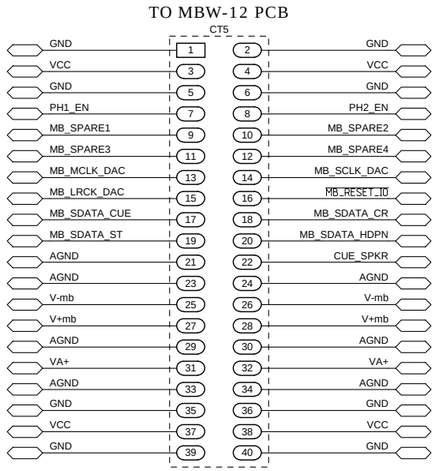
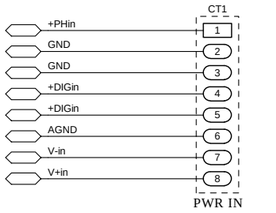
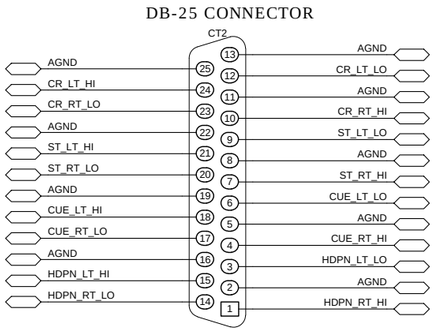
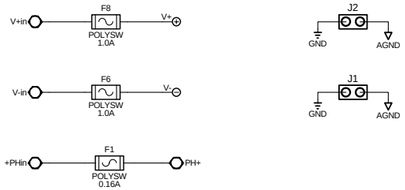
CR
PH FDR
DONE
CUE

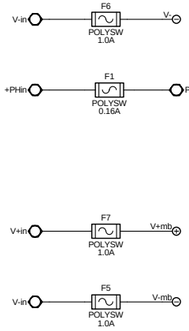


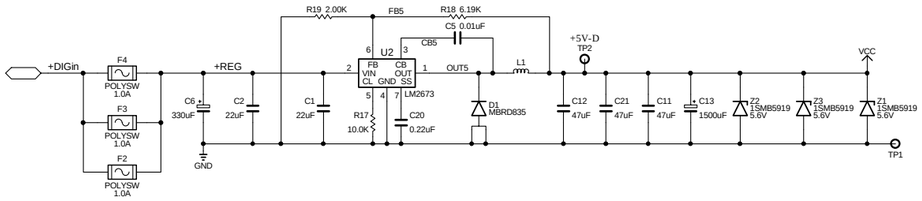


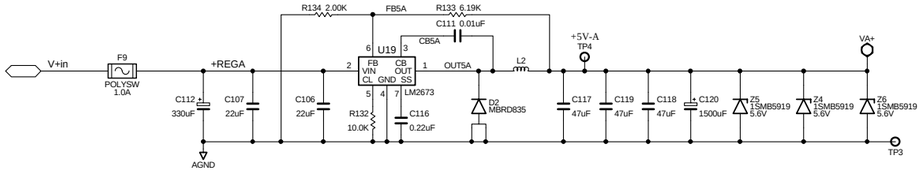


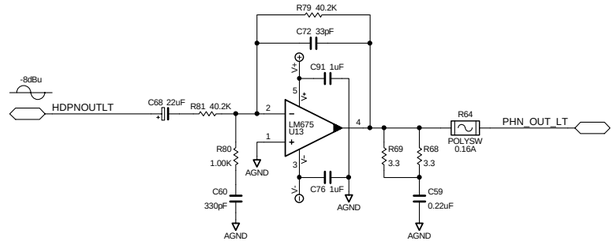


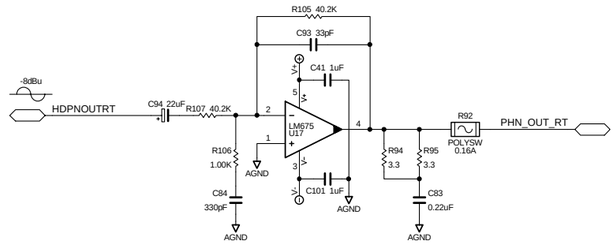


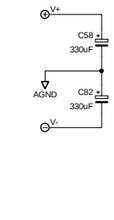


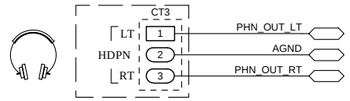


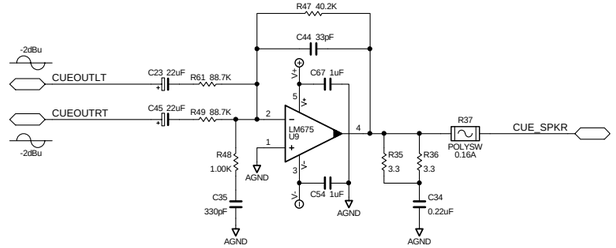




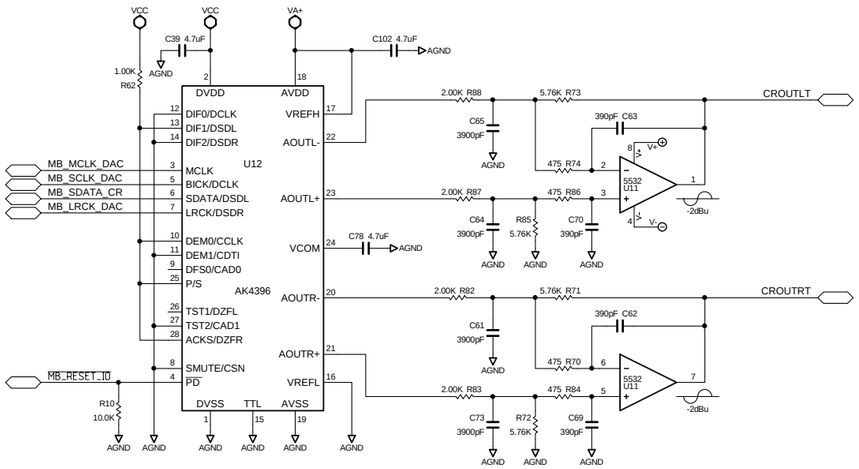


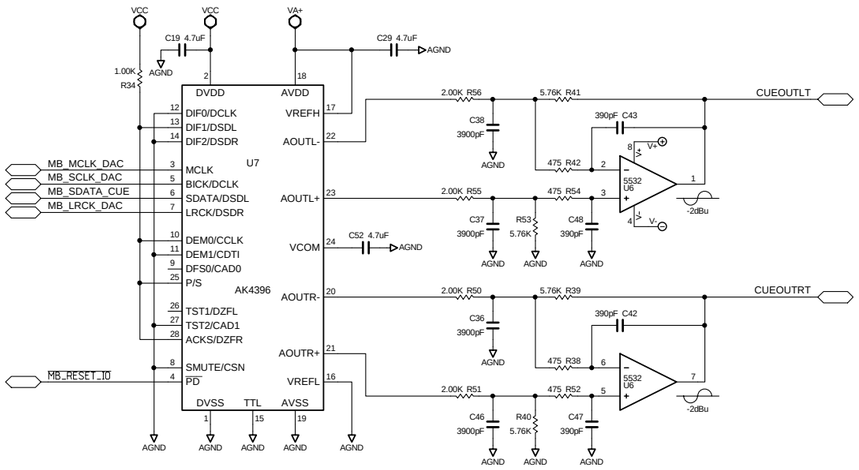


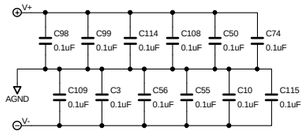


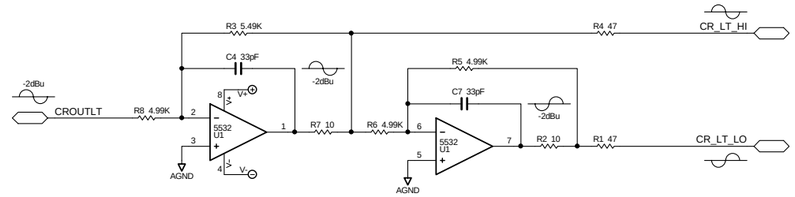


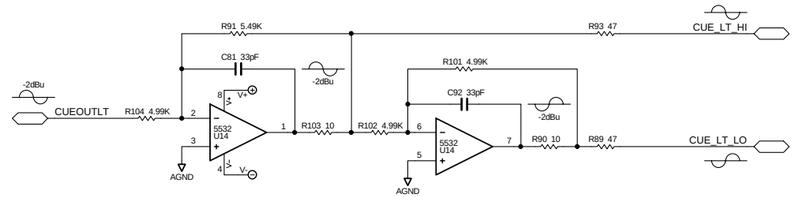
CONTRACT NO. - SA UR US - Sergey Averin -		MNW-12
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562
DRAWN SA	9-4-07	
CHECKED	SA	
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 16S2004-1 / REV —
W# 700919		SCALE / MNW-12 PCB / SHEET 1 OF 3



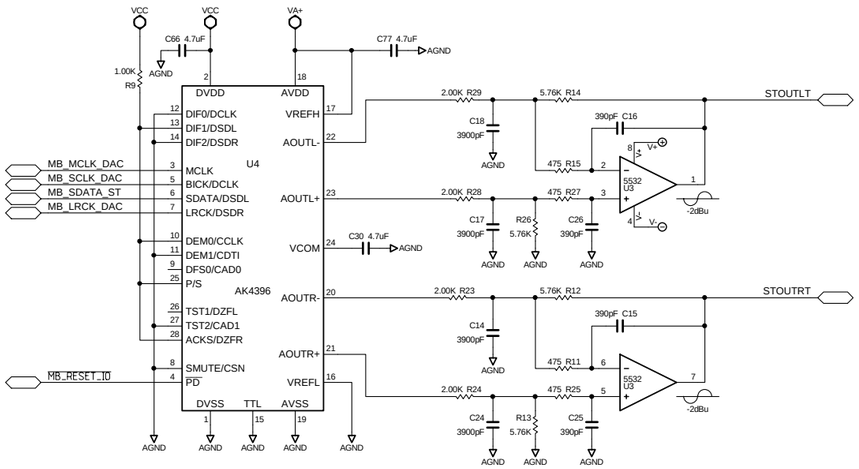


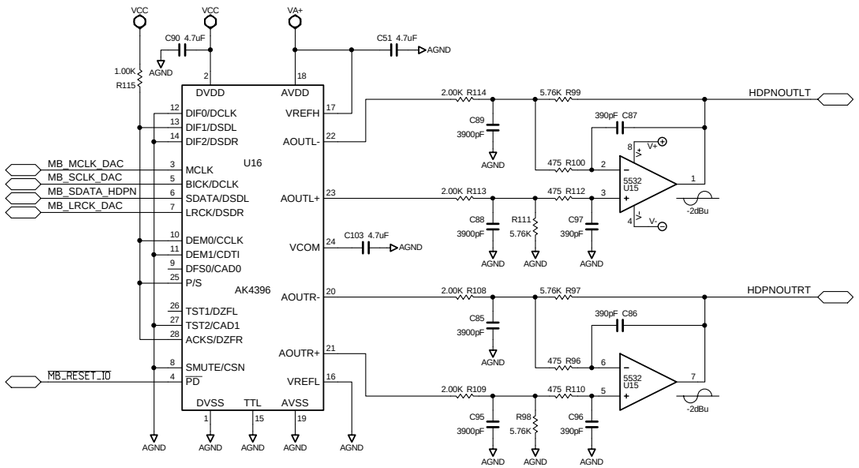


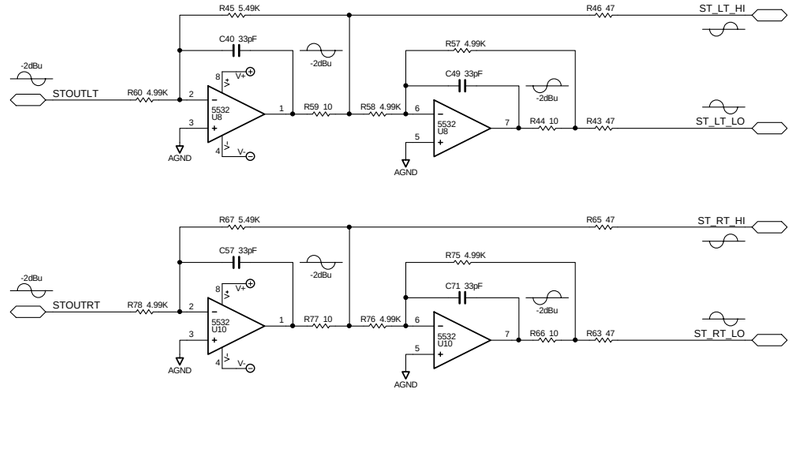


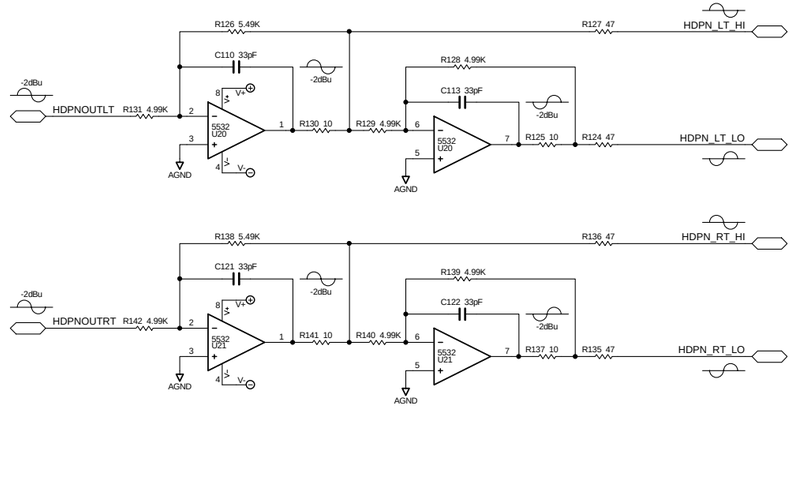


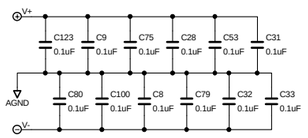
CONTRACT NO. - SA UR US - Sergey Averin -		MNW-12	
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	9-4-07		
CHECKED	SA		
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 16S2004-2 / REV —	
W# 700919		SCALE / MNW-12 PCB / SHEET 2 OF 3	





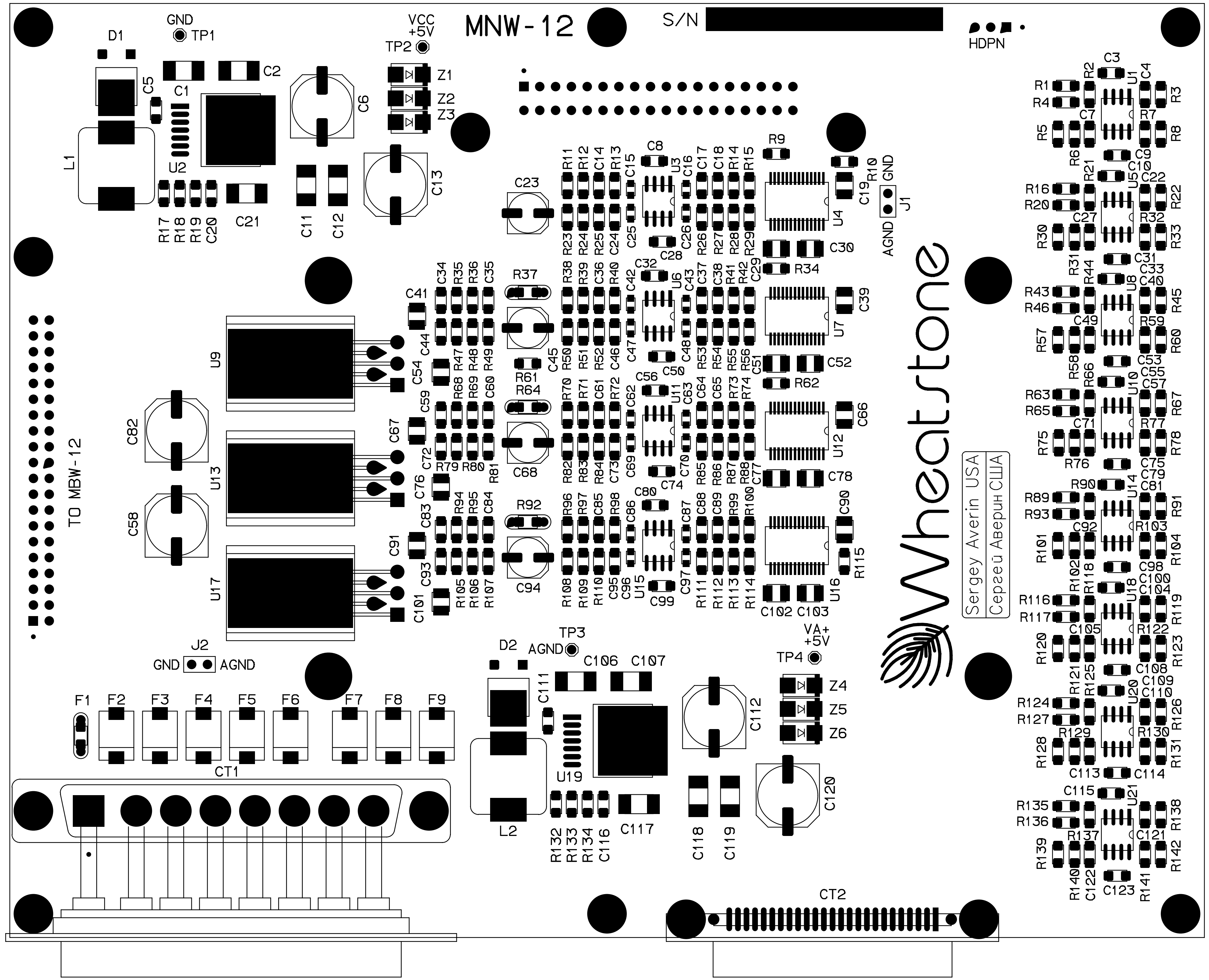




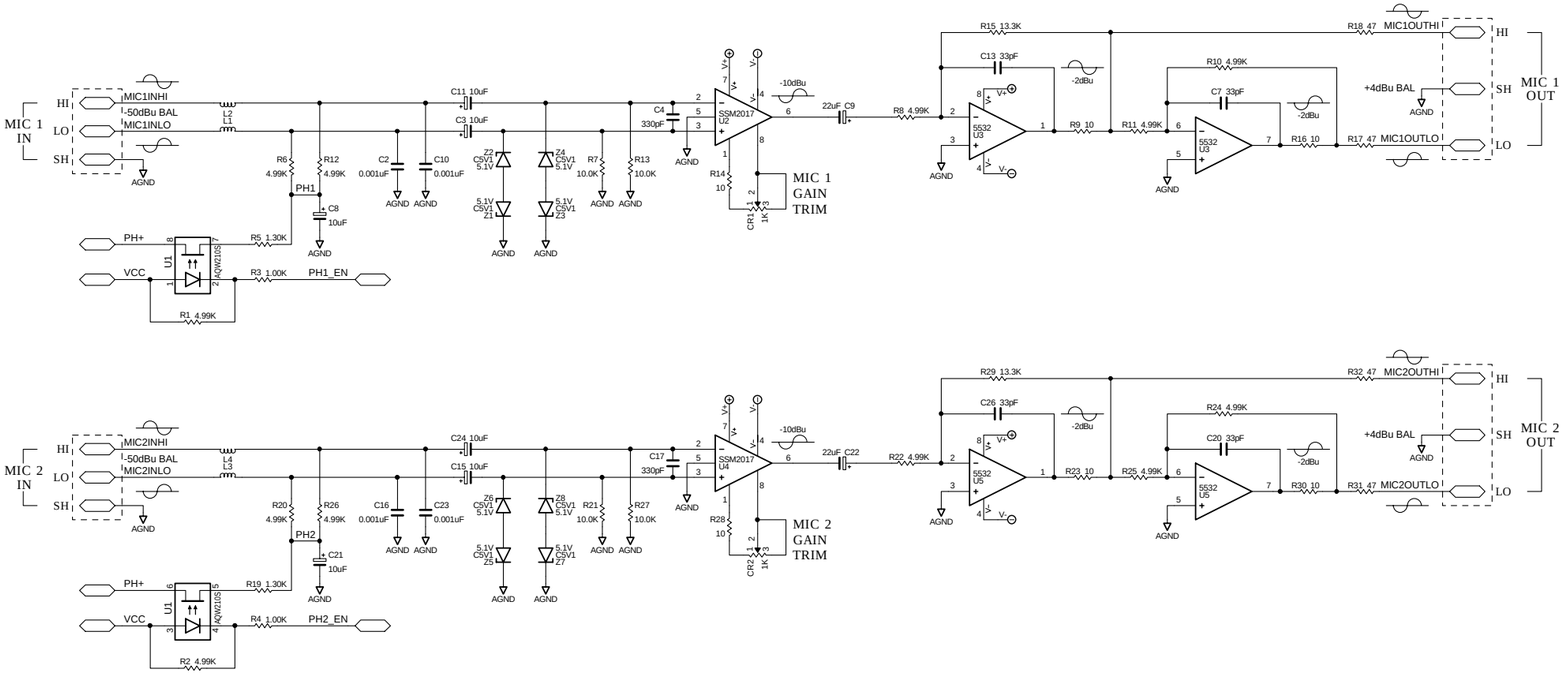


CONTRACT NO. - SA UR US - Sergey Averin -	MNW-12
APPROVALS / DATE	Wheatstone Corporation, 600 Industrial Drive, New Bern, NC 28562
DRAWN SA 9-4-07	
CHECKED SA	
ISSUED SA	SIZE D / FSCM NO. / DWG. NO. 16S2004-3 / REV —
W# 700919	SCALE / MNW-12 PCB / SHEET 3 OF 3

MNW-12 Monitor Board Schematic



MNW-12 Monitor Board Load Sheet

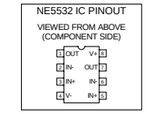


NOTE: PHASE SYMBOLS DENOTE SIGNAL POLARITY

IN PHASE — OUT OF PHASE

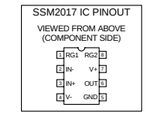
NE5532 IC PINOUT

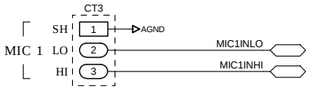
VIEWED FROM ABOVE (COMPONENT SIDE)

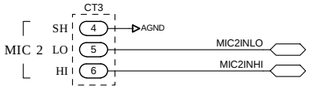


SSM2017 IC PINOUT

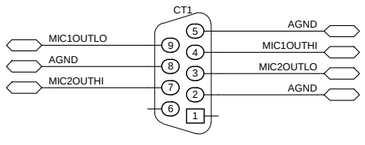
VIEWED FROM ABOVE (COMPONENT SIDE)

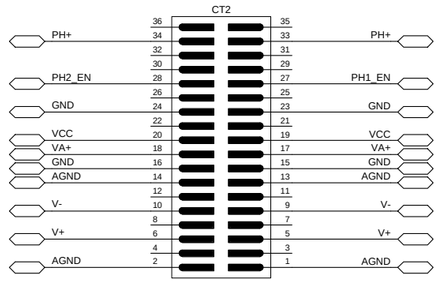


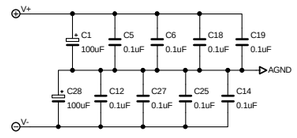




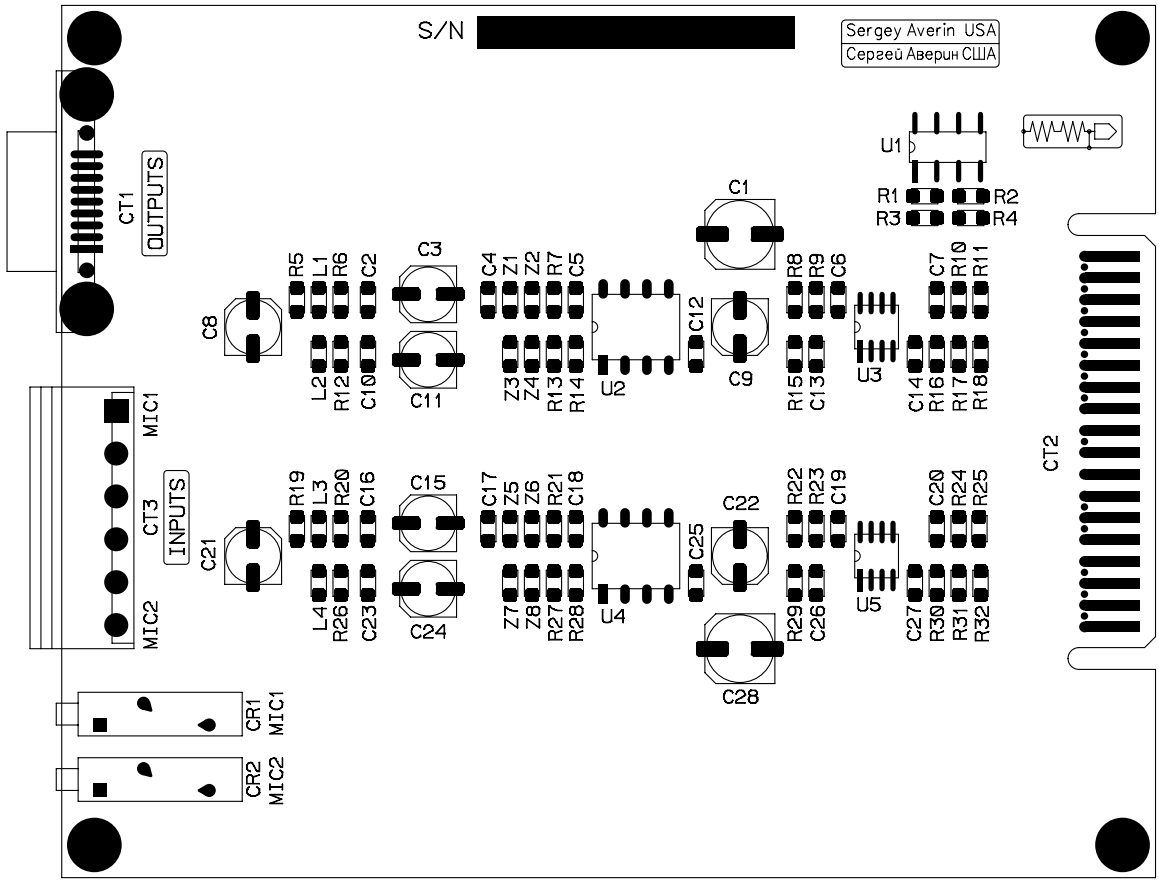
DB-9 CONNECTOR







CONTRACT NO. - SA UR US - Sergey Averin -		MPW-12
APPROVALS	DATE	Wheatstone Corporation, 600 Industrial Drive, New Bern, NC 28562
DRAWN SA	8-13-07	
CHECKED	SA	
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 16S2010 / REV —
W# 700927		SCALE / MPW-12 PCB / SHEET 1 OF 1


S/N
Sergey Averin USA
Сергей Аверин США
CT1
OUTPUTS
MIC1
CT3
INPUTS
MIC2
CR1
MIC1
CR2
MIC2
CT2
U1
R1
R2
R3
R4
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
C27
C28
L1
L2
L3
L4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R31
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Z1
Z2
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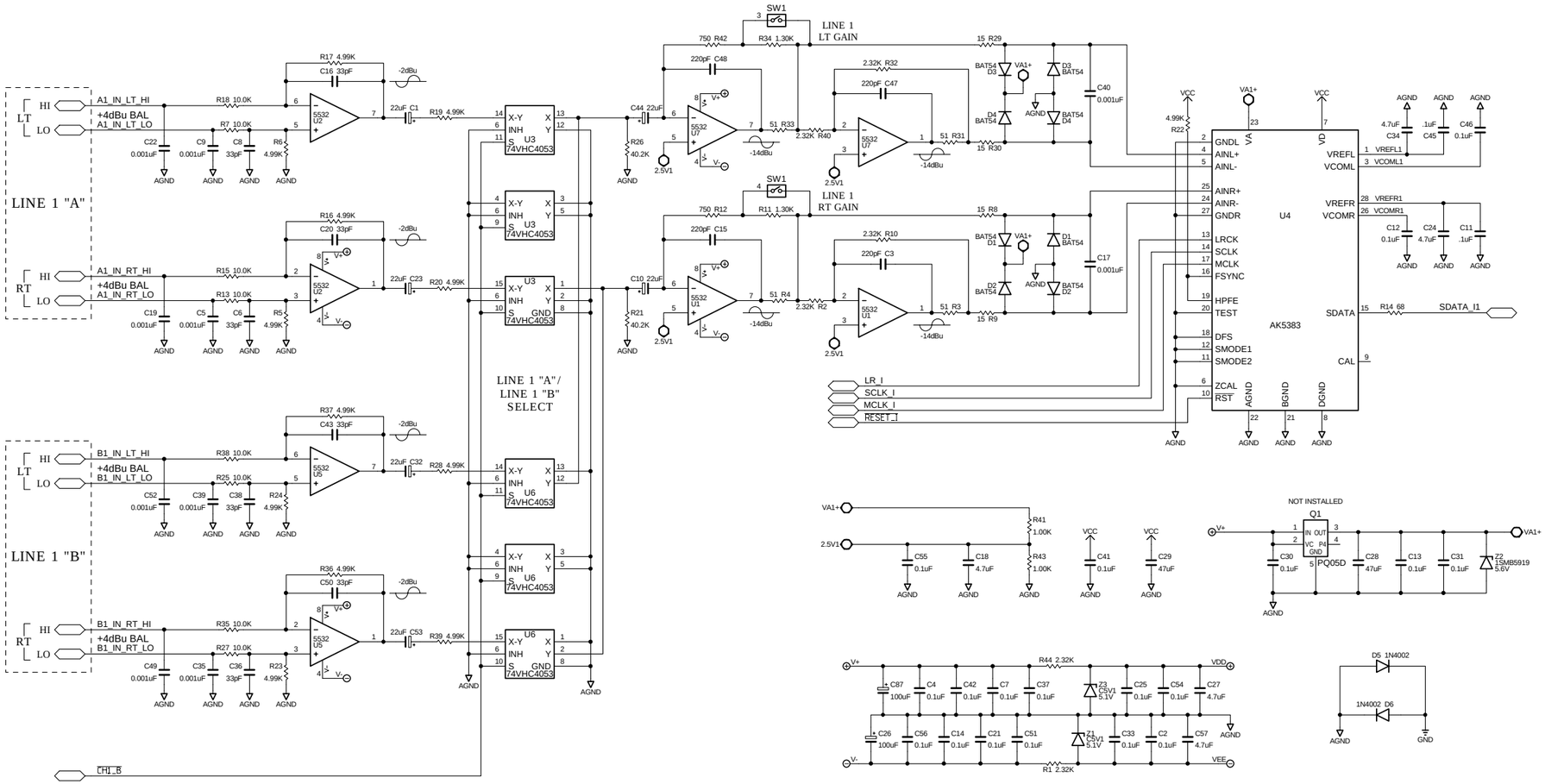
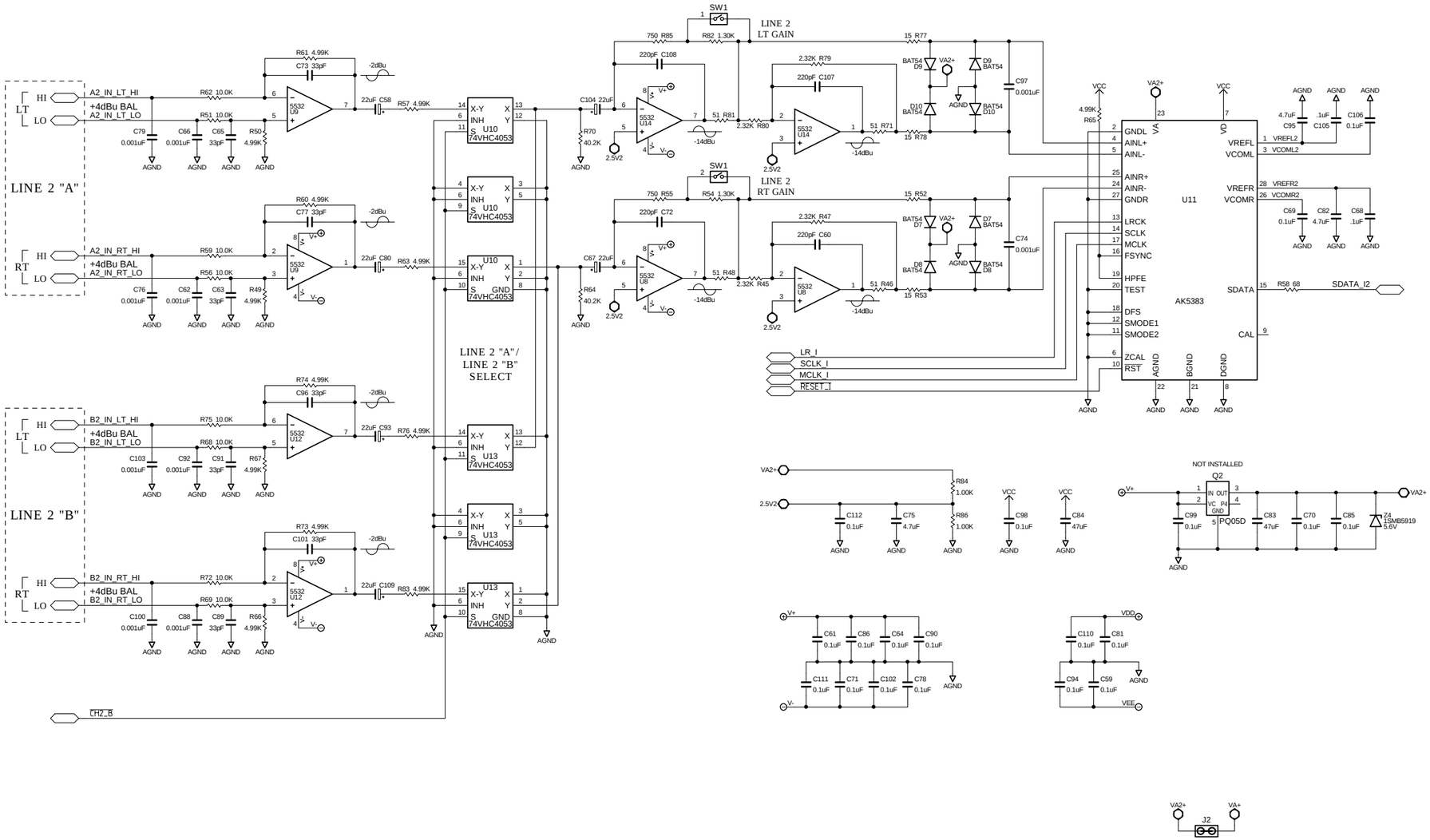
Z4
Z5
Z6
Z7
Z8
U2
U3
U4
U5



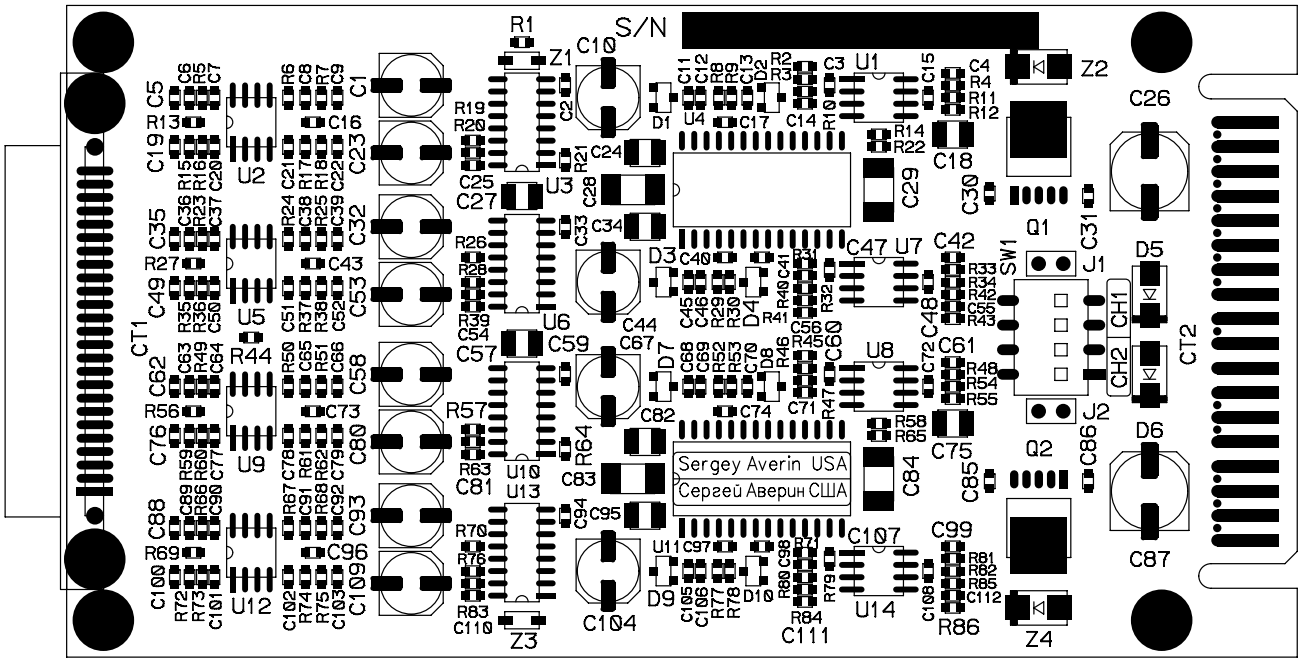
CONTRACT NO.		ADCW-12	
- SA UR US - Sergey Averin -			
APPROVALS	DATE	Wheatstone Corporation	
DRAWN SA	10-15-07	600 Industrial Drive	
CHECKED	SA	New Bern, NC 28562	
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 16S2008-1 / REV —	
W# 700925		SCALE ADCW-12 PCB / SHEET 1 OF 2	

ADCW-12 2 A/B Analog Inputs Schematic

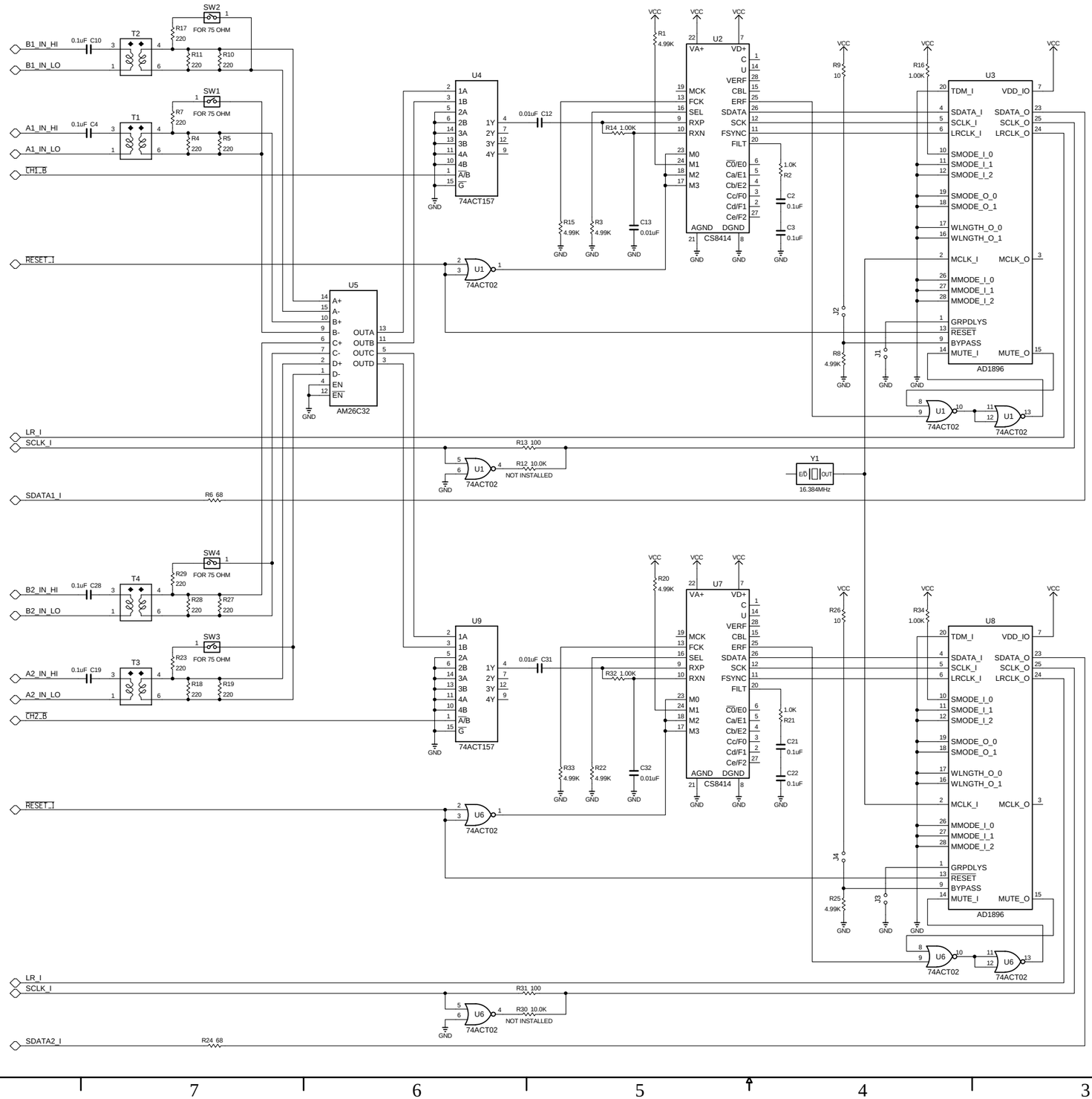


CONTRACT NO. - SA UR US - Sergey Averin -	ADCW-12
APPROVALS / DATE	Wheatstone Corporation, 600 Industrial Drive, New Bern, NC 28562
DRAWN SA 10-15-07	
CHECKED SA	
ISSUED SA	SIZE D · FSCM NO. · DWG. NO. 16S2008-2 · REV —
W# 700925	SCALE ADCW-12 PCB · SHEET 2 OF 2

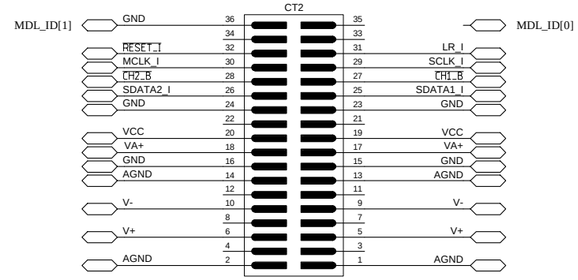
ADCW-12 2 A/B Analog Inputs Schematic



ADCW-12 2 A/B Analog Inputs Load Sheet

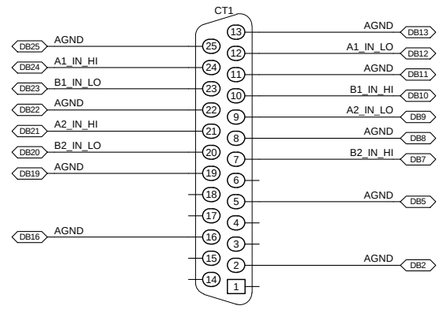


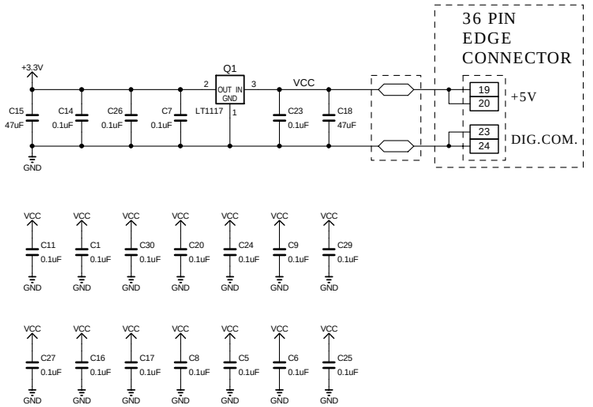
EDGE CONNECTOR



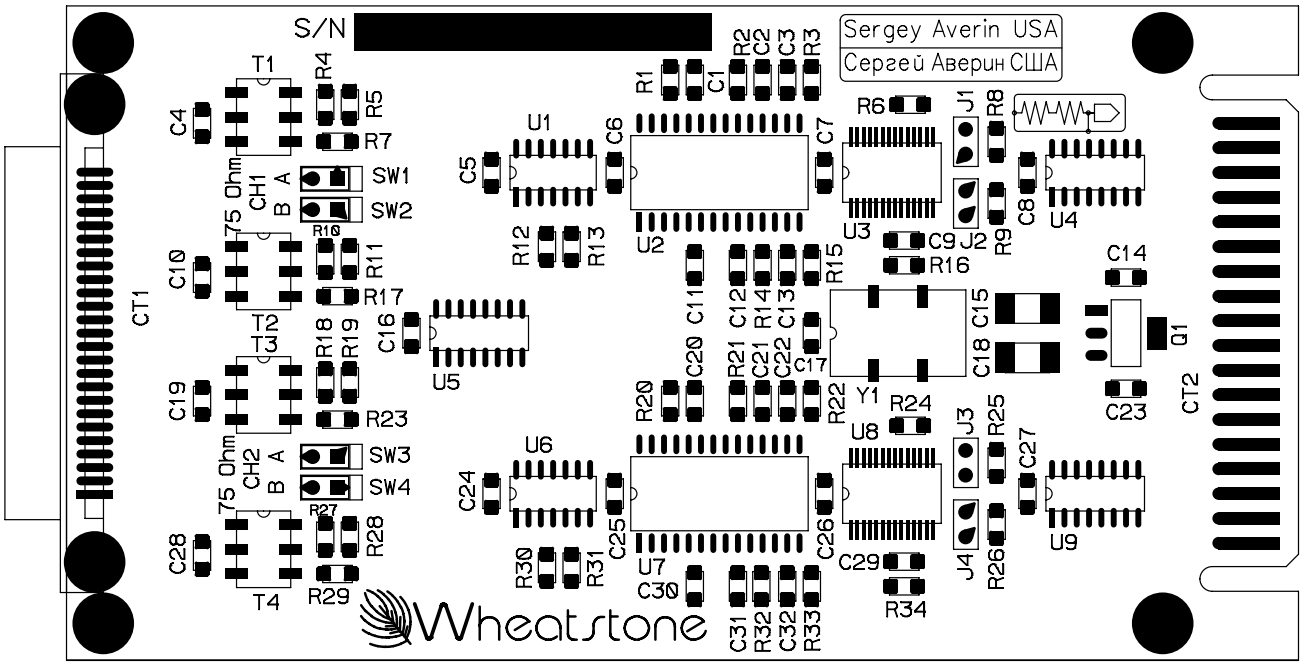
MDL ID BIT - 1,0
NO PCB - H,H
SRC - L,H
SLADC - H,L
MMADC - L,L (*)

DB-25 CONNECTOR

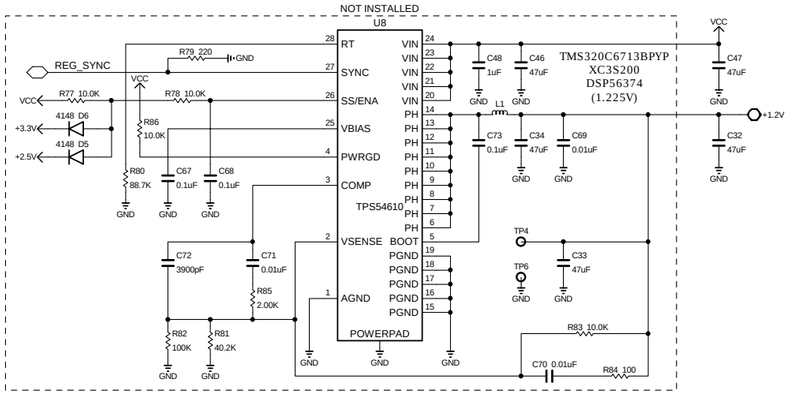


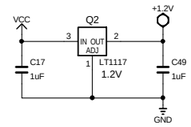


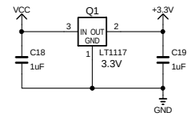
CONTRACT NO.		SRCW-12
- SA UR US - Sergey Averin -		
APPROVALS	DATE	Wheatstone Corporation
DRAWN SA	5-23-07	600 Industrial Drive
CHECKED	SA	New Bern, NC 28562
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 16S2009 / REV _
W# 700926		SCALE / SRCW-12 PCB / SHEET 1 OF 1

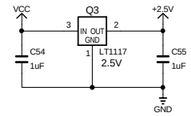


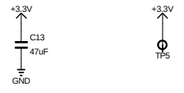
SRCW-12 2 A/B Digital Inputs Load Sheet

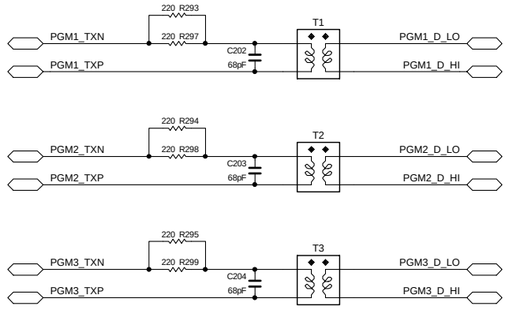


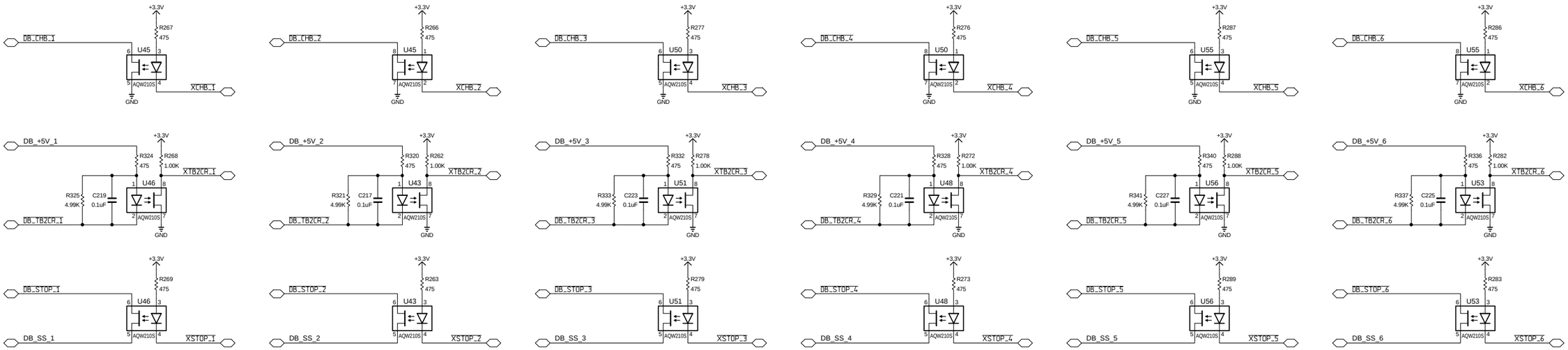






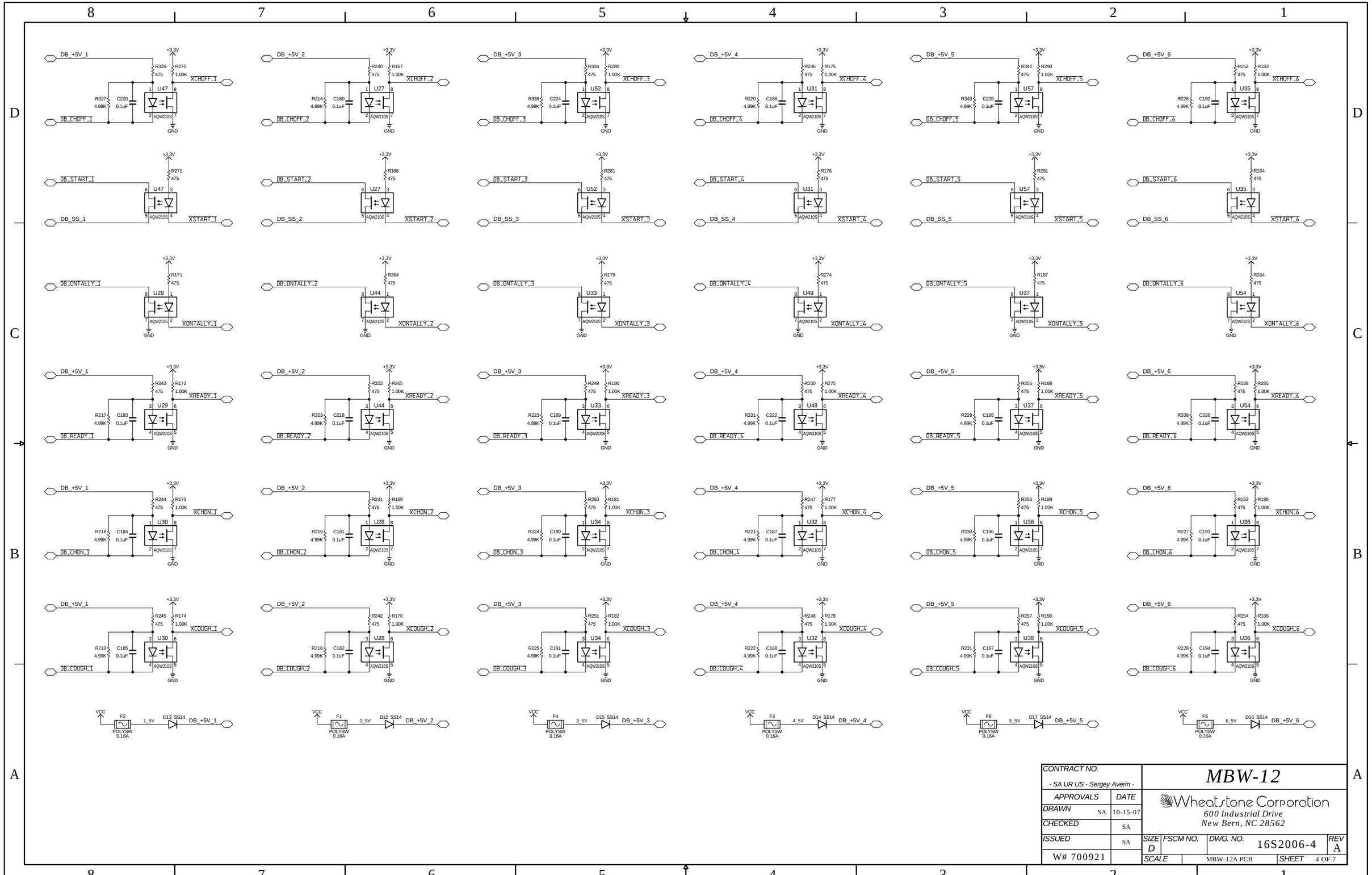






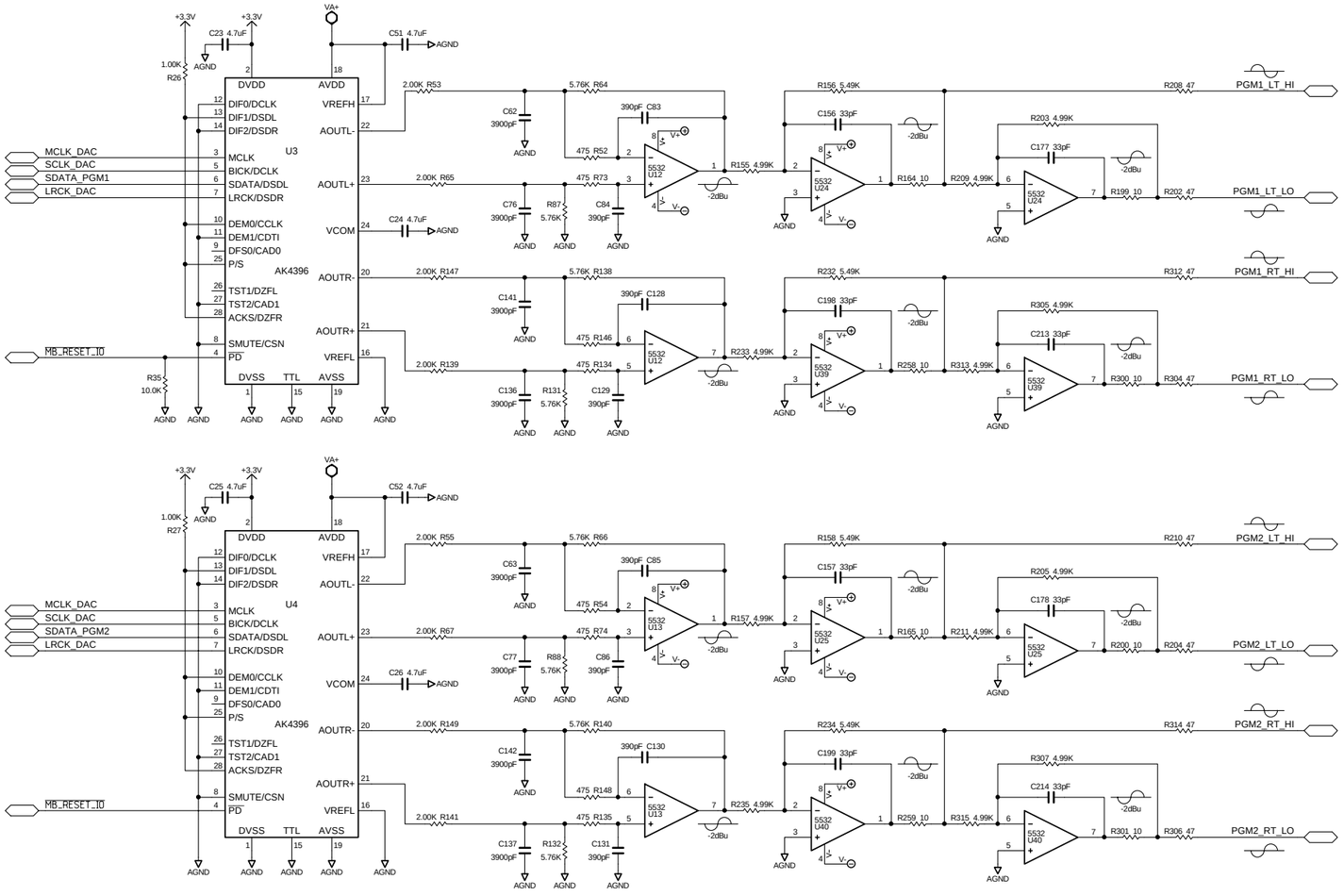
CONTRACT NO. - SA UR US - Sergey Averin -		MBW-12
APPROVALS	DATE	Wheatstone Corporation, 600 Industrial Drive, New Bern, NC 28562
DRAWN SA	10-15-07	
CHECKED SA		
ISSUED SA		SIZE D / FSCM NO. / DWG. NO. 16S2006-3 / REV A
W# 700921		SCALE MBW-12A PCB / SHEET 3 OF 7

MBW-12 Mother Board

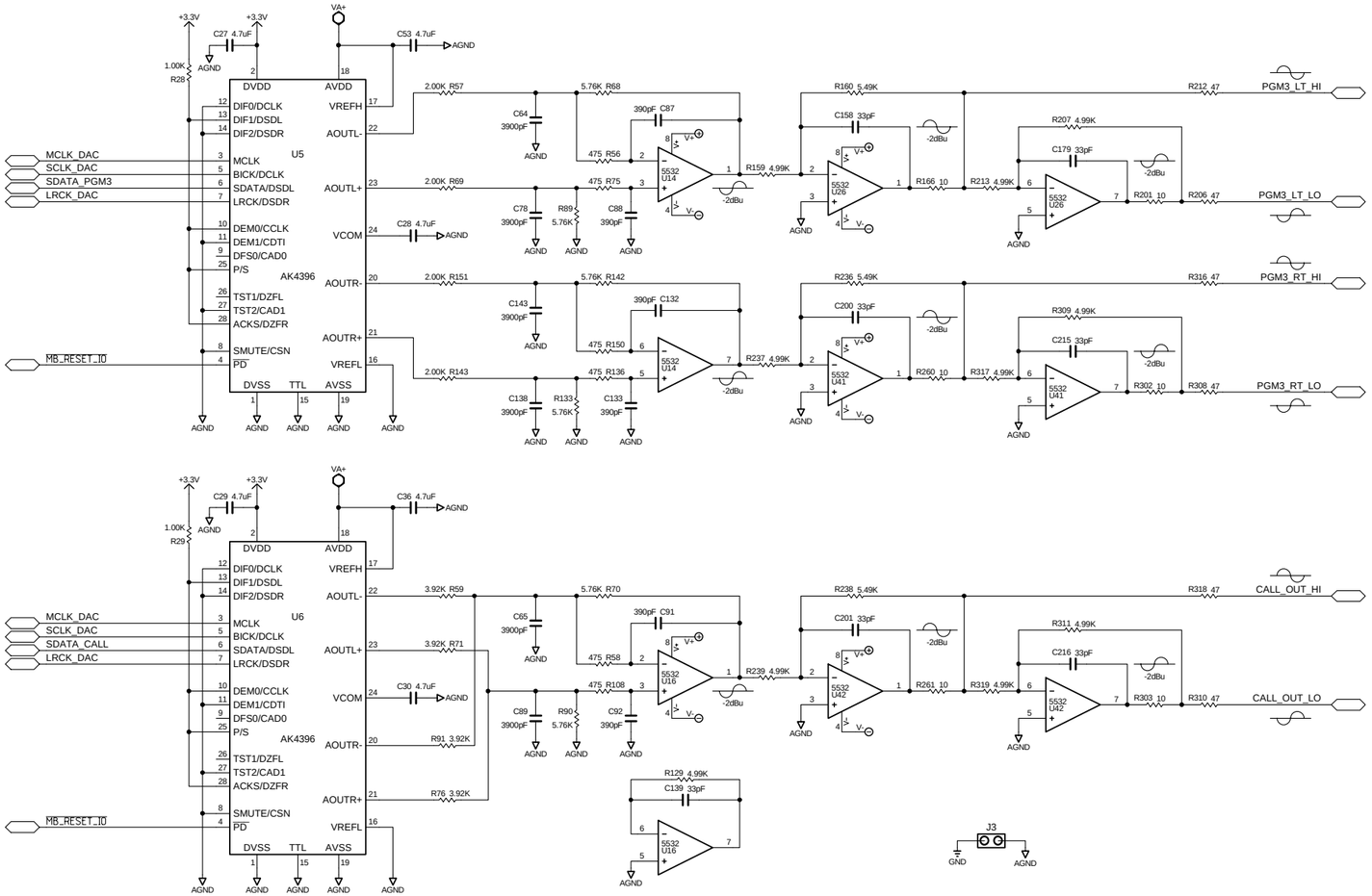


CONTRACT NO. - SA UR US - Sergey Averin -		*MBW-12*
APPROVALS	DATE	Wheatstone Corporation, 600 Industrial Drive, New Bern, NC 28562
DRAWN SA	10-15-07	
CHECKED SA		
ISSUED SA		SIZE D / FSCM NO. / DWG. NO. 16S2006-4 / REV A
W# 700921		SCALE MBW-12A PCB / SHEET 4 OF 7

MBW-12 Mother Board

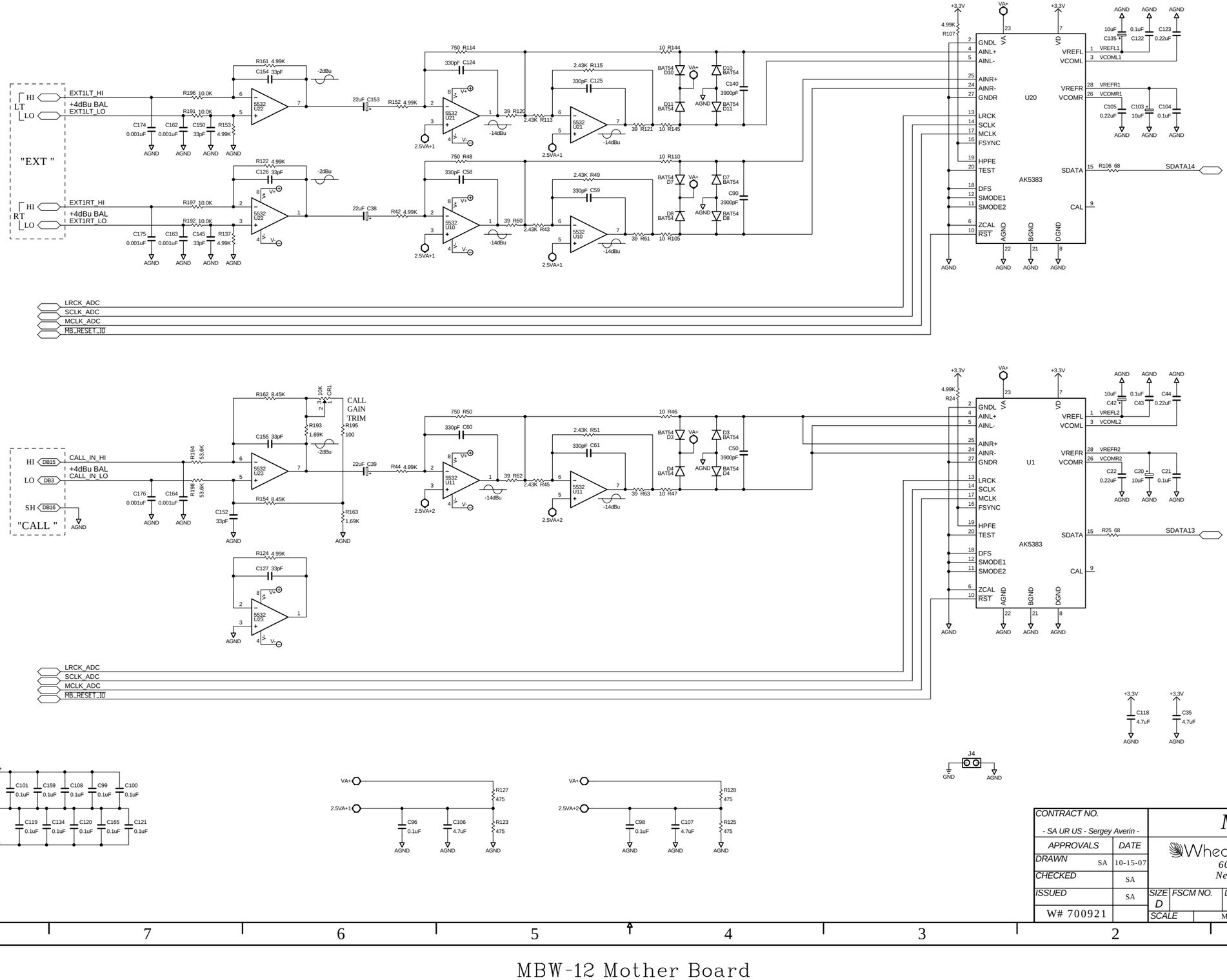


CONTRACT NO. - SA UR US - Sergey Averin -		MBW-12	
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	10-15-07		
CHECKED	SA		
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 16S2006-5 / REV A	
W# 700921		SCALE MBW-12A PCB / SHEET 5 OF 7	



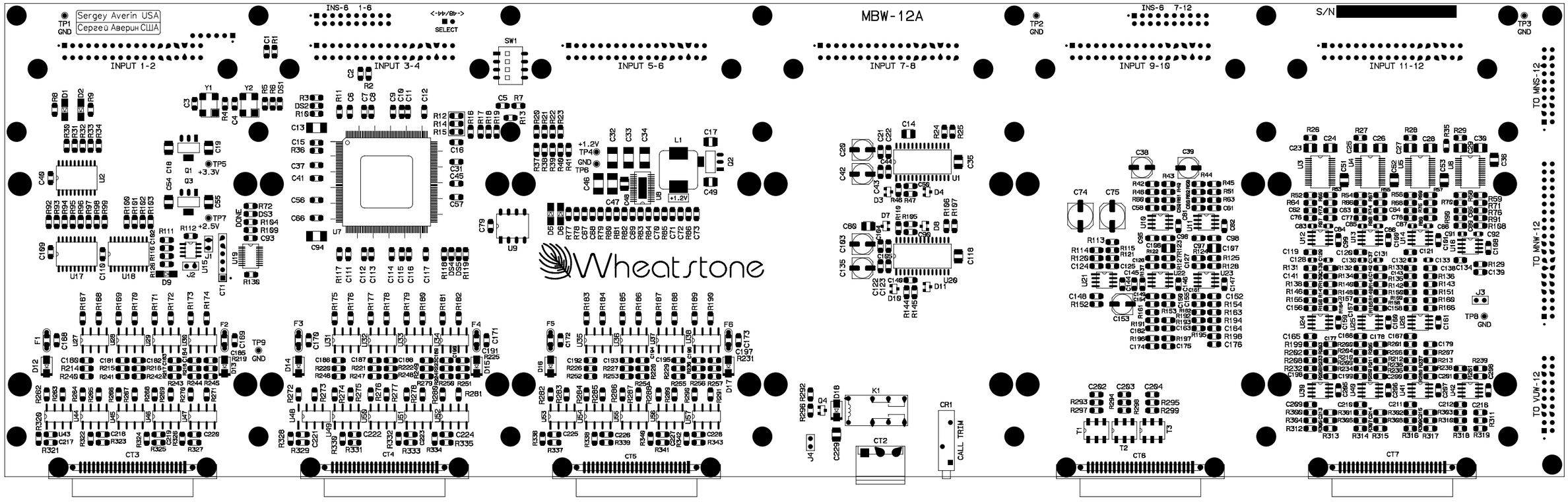
CONTRACT NO. - SA UR US - Sergey Averin -		MBW-12	
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	10-15-07		
CHECKED	SA		
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 16S2006-6 / REV A	
W# 700921		SCALE / MBW-12A PCB / SHEET 6 OF 7	

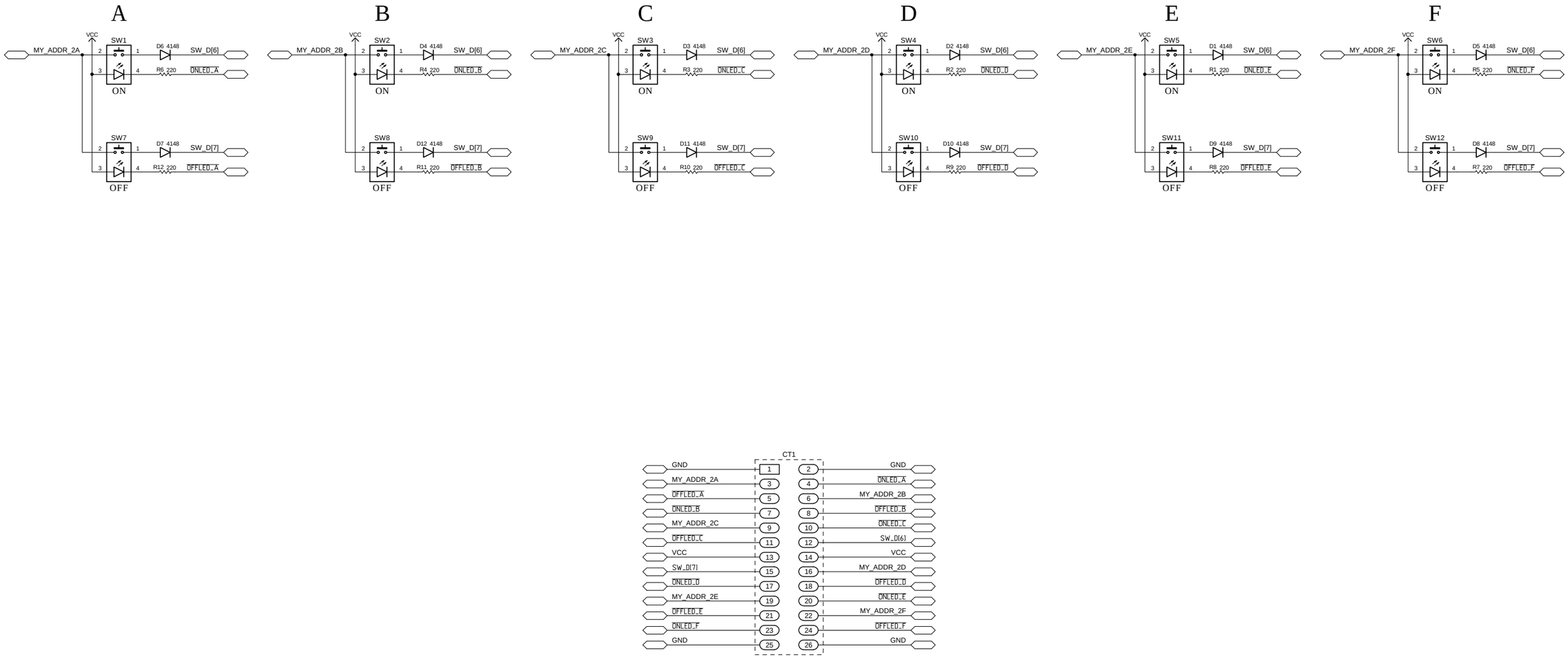
MBW-12 Mother Board



CONTRACT NO.		*MBW-12*	
- SA UR US - Sergey Averin -			
APPROVALS	DATE	Wheatstone Corporation	
DRAWN SA	10-15-07	600 Industrial Drive	
CHECKED	SA	New Bern, NC 28562	
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 16S2006-7 / REV A	
W# 700921		SCALE / MBW-12A PCB / SHEET 7 OF 7	

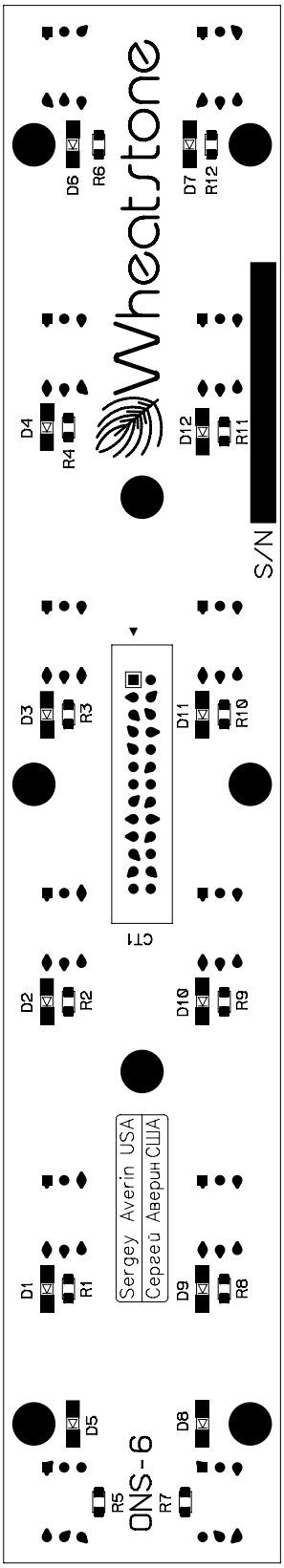
MBW-12 Mother Board


Sergey Averin USA
Сергей Аверин США
MBW-12A
S/N
INPUT 1-2
INPUT 3-4
INPUT 5-6
INPUT 7-8
INPUT 9-10
INPUT 11-12
SELECT
TO MNS-12
TO MNW-12
TO VUW-12
Wheatstone



CONTRACT NO.	*ONS-6*
- SA UR US - Sergey Averin -	
APPROVALS / DATE	Wheatstone Corporation
DRAWN SA 3-21-07	600 Industrial Drive
CHECKED SA	New Bern, NC 28562
ISSUED SA	SIZE D · FSCM NO. · DWG. NO. 16S2001 · REV –
W# 700917	SCALE ONS-6 PCB · SHEET 1 of 1

ONS-6 On/Off Switch Card Schematic



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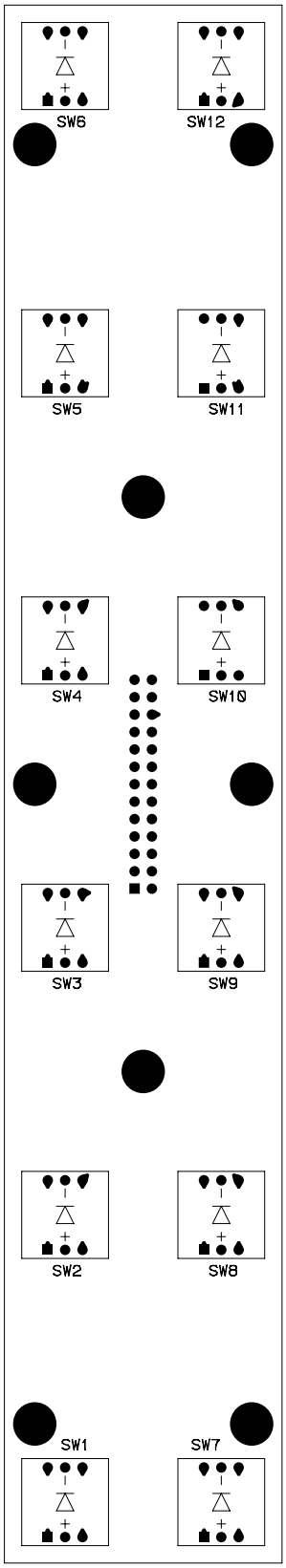
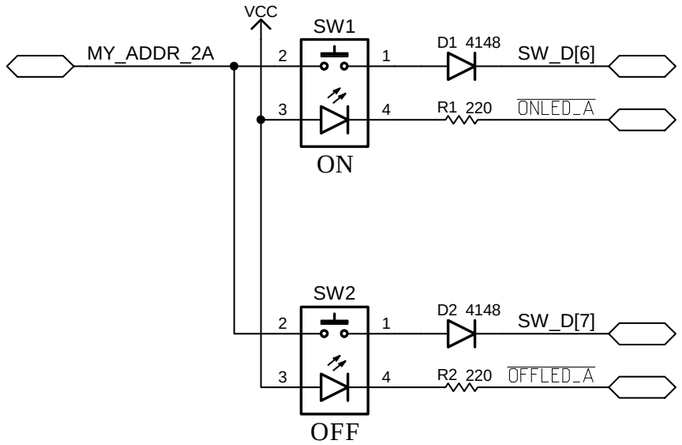
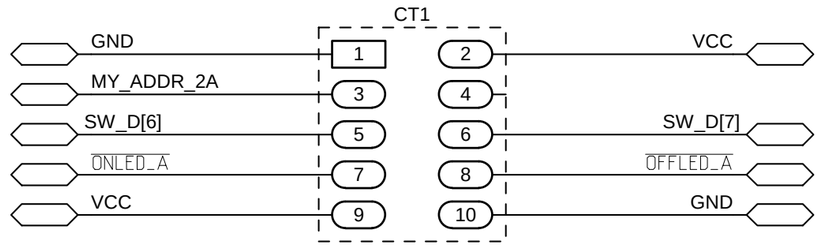


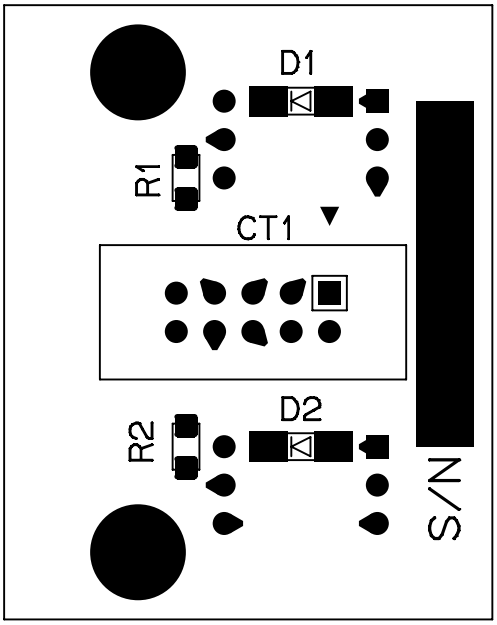
Bottom

ONS-6 On/Off Switch Card Load Sheet





CONTRACT NO. - SA UR US - Sergey Averin -		PHONS-12	
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	3-21-07		
CHECKED	SA		
ISSUED	SA		
W#700920		SIZE B / FSCM NO. / DWG. NO. 16S2005 / REV _	
		SCALE / PHONS-12 PCB / SHEET 1 OF 1	



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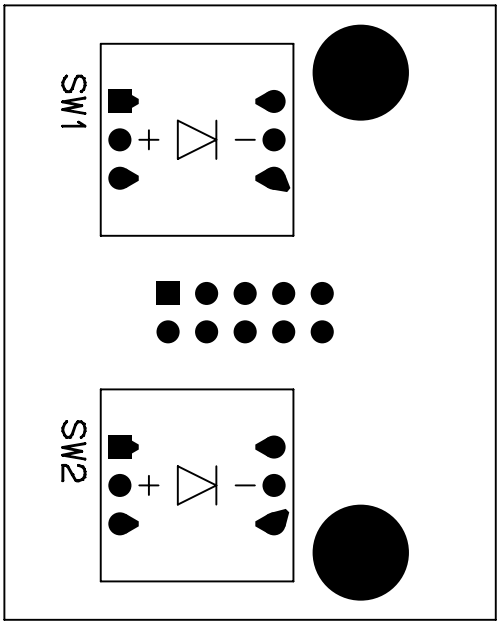

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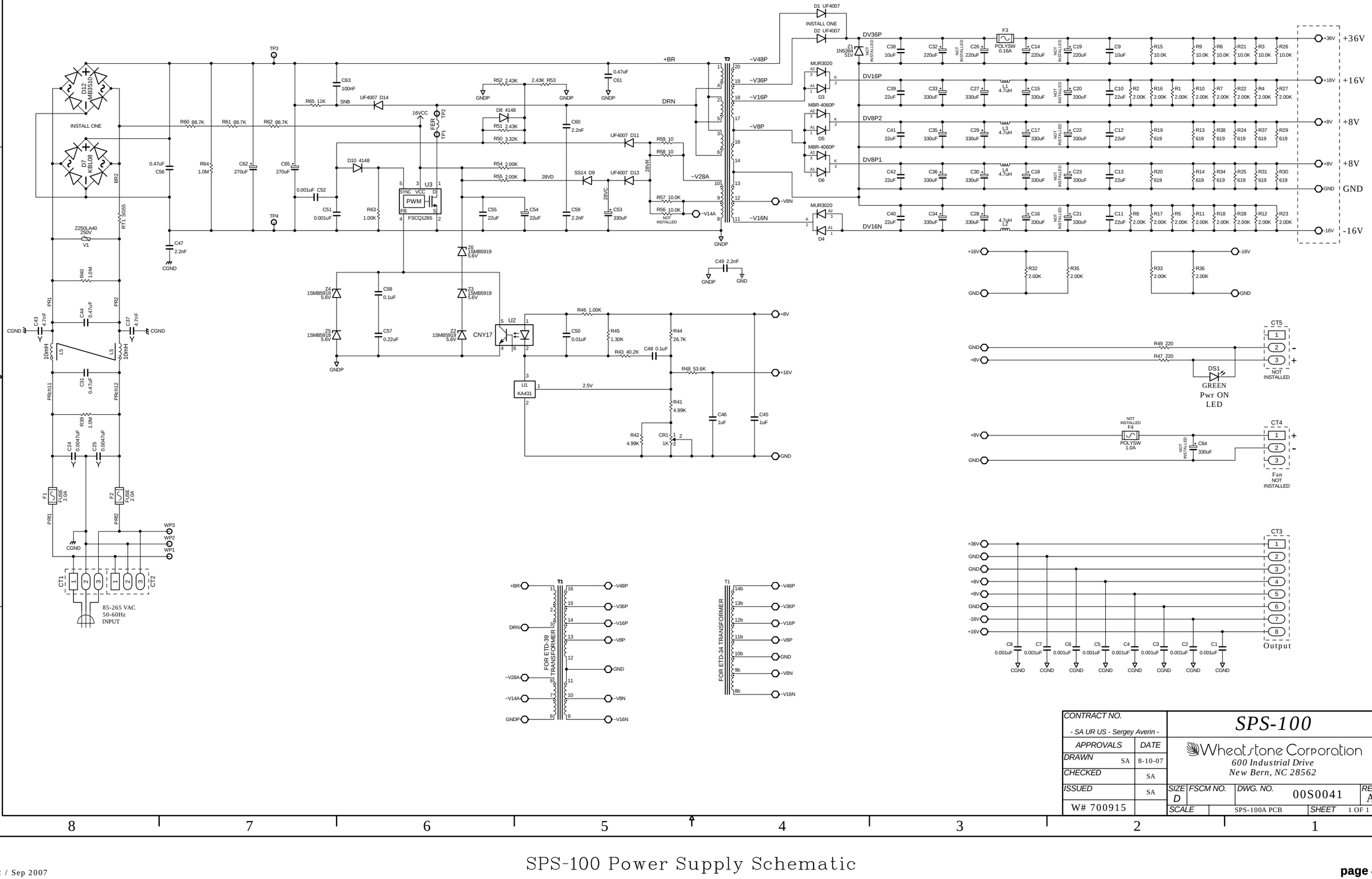
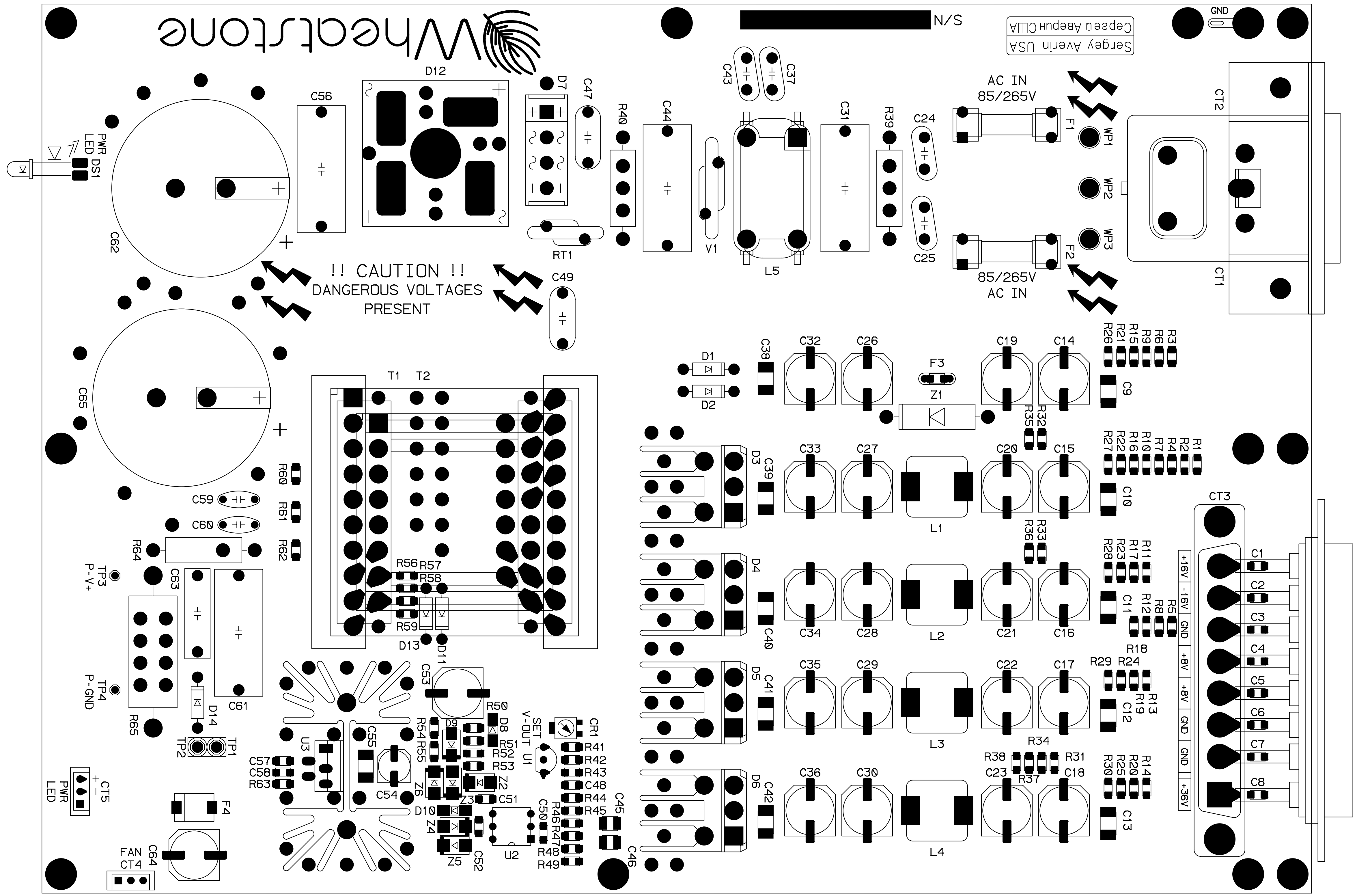


CONTRACT NO.		SPS-100
- SA UR US - Sergey Averin -		
APPROVALS	DATE	Wheatstone Corporation
DRAWN SA	8-10-07	600 Industrial Drive
CHECKED	SA	New Bern, NC 28562
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 00S0041 / REV A
W# 700915		SCALE SPS-100A PCB / SHEET 1 OF 1



SPS-100 Power Supply Load Sheet

Appendix

Contents

For the most part there are no user-replaceable parts in the W-12 console. Exceptions are those controls and components that in the course of normal use may need maintenance (i.e., faders, pots, ON/OFF switches, etc.). A complete list of available components follows. 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, or electronic mail “techsupport@wheatstone.com”.

REPLACEMENT PARTS — W-12 CONSOLE

COMPONENT	DESCRIPTION	*WS P/N*
IP-W12 MODULE	COMPLETE INPUT MODULE	***"009702"***
MST-W12 MODULE	COMPLETE MASTER MODULE	***"009703"***
INS-W12 LOADED CARD ASSY	INPUT PANEL LOADED CARD ASSEMBLY	***"009751"***
MST-W12 LOADED CARD ASSY	MASTER PANEL LOADED CARD ASSEMBLY	***"009755"***
ADC-W12 LOADED CARD ASSY	A-TO-D CONVERTER DAUGHTER BOARD FOR ANALOG STEREO LINE INPUTS	***"009716"***
SRC-W12 LOADED CARD ASSY	SAMPLE RATE CONVERTER DAUGHTER BOARD FOR DIGITAL INPUTS	***"009717"***
MP-W12 LOADED CARD ASSY	MICROPHONE PREAMP CARD ASSEMBLY	***"009718"***
MN-W12 LOADED CARD ASSY	MONITOR CARD ASSEMBLY	***"009719"***
MB-W12 LOADED CARD ASSY	MOTHER BOARD CARD ASSEMBLY	***"009749"***
VU-W12 LOADED CARD ASSY	VU METERS LOADED CARD ASSEMBLY	***"009753"***
ONS6 LOADED CARD ASSY	ON/OFF SWITCH LOADED CARD ASSEMBLY FOR INPUT CHANNELS	***"009752"***
PHONS-12 LOADED CARD ASSY	ON/OFF SWITCH LOADED CARD ASSEMBLY FOR CALLER	***"009756"***
SPS-100 POWER SUPPLY	RACKMOUNT POWER SUPPLY	***"007360"***
SPS-100 POWER CABLE	RACKMOUNT POWER SUPPLY CABLE	***"007222"***
FADER	10K LINEAR TAPER MONO CARBON FADER	***"540043"***
FADER KNOB	WHITE FADER KNOB WITH BLACK LINE FOR LINE INPUT	***"520047"***
FADER KNOB	BLUE FADER KNOB WITH WHITE LINE FOR CALLER INPUT	***"520042"***
POT	"CONTROL"/"HEADPHONE"/"STUDIO" CONDUCTIVE PLASTIC DUAL LINEAR 10K POT NO C/D, 1/8" shaft rohs compliant	***"500124"***
POT	"CUE"/"TB" 10K SINGLE LINEAR VERTICAL POT	***"500126"***
POT KNOB	FOR "CONTROL"/"HEADPHONE"/"STUDIO" POT	***"520126"***
POT KNOB	15MM BLACK PUSH-ON KNOB FOR "CUE"/"TB" POT	***"520125"***
POT CAP	11MM BLACK CAP W/WHITE LINE FOR "CUE"/"TB" POT	***"530037"***
POT CAP	21MM BLACK CAP W/WHITE LINE FOR "CONTROL"/"HEADPHONE"/"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	RED SWITCH CAP	***"530003"***
SWITCH CAP	WHITE SWITCH CAP	***"530004"***
RCA CONNECTORS	4X2 RCA JACK ASSEMBLY FOR ANALOG I/O CONNECTIONS	***"260070"***
DB-25 CONNECTOR	MONITOR OUTPUT CONNECTOR	***"200018"***
RTS JACK	HEADPHONE JACK	***"260005"***

REPLACEMENT PARTS — W-12 CONSOLE

COMPONENT	DESCRIPTION	*WS P/N*
POWER CONNECTOR	8 POSITION RECEPTACLE HOUSING	***"200121"***
POWER CONNECTOR PIN	40 AMP RIGHT ANGLE PCB MOUNT PLUG LONG	***"200117"***
HEADER	26 PIN PC MOUNT STRAIGHT HEADER ROHS COMPLIANT	***"250044"***
HEADER	40 PIN BOXED HEADER, STRAIGHT ROHS COMPLIANT	***"250056"***
HEADER	3 PIN HEADER	***"250062"***
HEADER	5 PIN HEADER	***"250064"***
HEADER	6 PIN HEADER	***"250065"***
HEADER	20 PIN RIGHT ANGLE BOXED HEADER, ROHS COMPLIANT	***"250084"***
HEADER	10PIN BOXED HEADER, STRAIGHT ROHS COMPLIANT	***"250077"***
HEADER	6 POSITION RIGHT ANGLE BOXED HEADER CLOSED END UNMARKED ROHS COMPLIANT	***"260073"***
HEADER	3 POSITION RIGHT ANGLE BOXED HEADER CLOSED END UNMARKED ROHS COMPLIANT	***"260079"***
PLUG TERMINAL	6 POSITION EURO STYLE MARKED TERMINAL BLOCK ROHS COMPLIANT	***"260072"***
PLUG TERMINAL	3 POSITION EURO STYLE TERMINAL BLOCK ROHS COMPLIANT	***"260078"***
PLUG	5 PIN PLUG FOR #26 AWG	***"230030"***
PLUG	6 PIN PLUG FOR #26 AWG	***"230031"***
PLUG	20 PIN RIBBON PLUG	***"250041"***
PLUG	26 PIN RIBBON PLUG ROHS COMPLIANT	***"250043"***
FLAT RIBBON CABLE	26 COND FLAT RIBBON CABLE ROHS COMPLIANT	***"150083"***
FLAT RIBBON CABLE	20 COND FLAT RIBBON CABLE ROHS COMPLIANT	***"150201"***
SPEAKER	CONSOLE METERBRIDGE SPEAKER	***"960016***
MANUAL	TECHNICAL MANUAL FOR W-12 CONSOLE	***"009798"***