D-9 Digital Control Surface

TECHNICAL MANUAL

Wheatstone Corporation

600 Industrial Drive, New Bern, North Carolina, USA 28562

D-9 Digital Control Surface Technical Manual - 1st Edition

WHEATSTONE CORPORATION
600 Industrial Drive
New Bern, North Carolina 28562
tel 252-638-7000 / fax 252-637-1285

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.***

IMPORTANT!

Cleaning the Acrylic Surface

An acrylic surface is a beautiful, lustrous material that is outstanding in durability and break resistance. With proper care, it will retain its attractive appearance for many years to come. This care should include precautions against scratching or contact with objects of high temperature that might mar the surface. A few simple precautions will preserve the beauty of the acrylic.

• FIRST be sure the surface to be cleaned is powered off.

• NEVER spray or pour any liquid directly onto the surface.

• TO AVOID scratching these surfaces, use a soft brush or cloth to gently brush away any larger dirt particles. Alternately the larger particles can be blown from the surface with the use of canned air.

• USE a soft, clean lint free cloth or micro fiber cloth and clean lukewarm water to clean the surface. For stubborn dirt and stains use a mild, nonabrasive soap and water mixture with the gentle cleaning cloth. Use only light pressure when cleaning. Avoid rubbing dirt or grit into the surface. Turn the cloth often and replace with a clean cloth frequently. Dry by blotting gently with a clean, dry cloth.

• AVOID using kleenex, paper towels, sponges or other coarse shop towels, as these materials may contain abrasives that can scratch acrylic surface.

• DO NOT USE ketones, aromatics, esters, halogens, window cleaning sprays, alcohol, kitchen scouring compounds, or solvents (such as acetone, benzene, gasoline, carbon tetrachloride, or thinners).

Caution! Do not use ammonia based cleaning solutions as they can cause the surface to yellow, and became brittle and eventually cause structural damage to the acrylic surface.

Wheatstone will not be liable for damage resulting from improper cleaning and maintenance.

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General Information

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General Information

Introduction

The Wheatstone D-9 Digital Television Audio Control Surface is fully loaded with all the functions and control capability needed by most television broadcast facilities: 5.1 digital surround, a host of mix-minus clean feed outputs, individual channel bus-minus outputs, 6-band digital equalization, digital dynamic processing, and integrated routing that can access literally thousands of sources and feed thousands of destinations. In addition it can be ordered with paging and motorized faders, allowing you to get 40 channels worth of mixing in a 20 channel footprint. The D-9 gives your operators the added convenience of eight stereo subgroups, four stereo auxiliary busses, four additional DCM/MUTE busses, and a full event/memory front panel storage and recall system that doesn't require an external computer to operate. And because it's a live television console, it has extensive communication capability. If there is a mix, you can talk to it. It even has programmable talkback buttons.

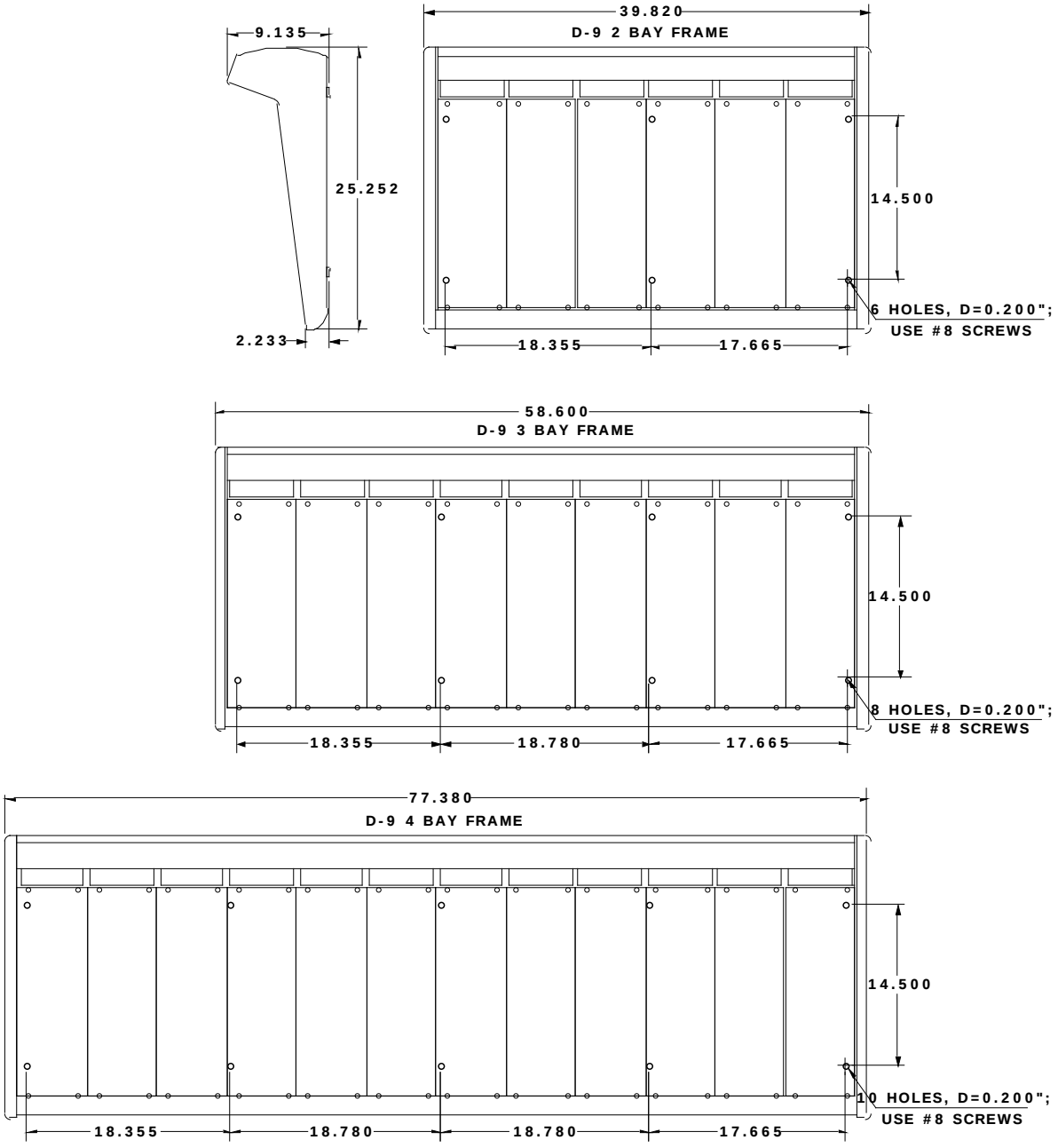
Designed to integrate flawlessly with the Wheatstone BRIDGE digital audio network router, the D-9 control surface allows you to easily create large or small platform-based systems that are exceptionally user-friendly and flexible. Wheatstone BRIDGE network cages house all I/O ports and engine cards, and may be wired in tandem within a single equipment room or interconnected to separate remote locations by means of fiber-optic or CAT-5 cables to provide single wire studio integration schemes.

Once configurated, the system operates entirely independently of external computers. Configuration itself is intuitive and carried out onsite by means of user-friendly graphic interfaces provided by Wheatstone desktop software. The D-9 system also takes full advantage of Wheatstone's exclusive VDip configuration software, so that studio functions (like mutes, fader and timer starts, tally, etc.) are easily accomplished right at your desktop. Once completed, all settings are retained in non-volatile storage, allowing the entire system to run independently. Ethernet protocol is built in, providing interface with automation, scheduling, and hardware controllers as you require.

Control Surface Placement

The D-9 digital audio control surface is designed for countertop mounting. Although the rubber feet on the bottom keep the surface from being easily moved when simply placed on the counter, holes have been provided so that screws may be used to mount the surface securely to the countertop. Carefully remove the appropriate panels from the frame, screw the mainframe to the counter top, and reinstall the removed panels. The three available frame sizes dimensions (in inches) are shown in the drawings below.

Do not connect the D-9 control surface to its power supply (and do not connect the power supply to the AC power line) until instructed to do so.



Power Supply

Front view of the PSR rackmount power supply

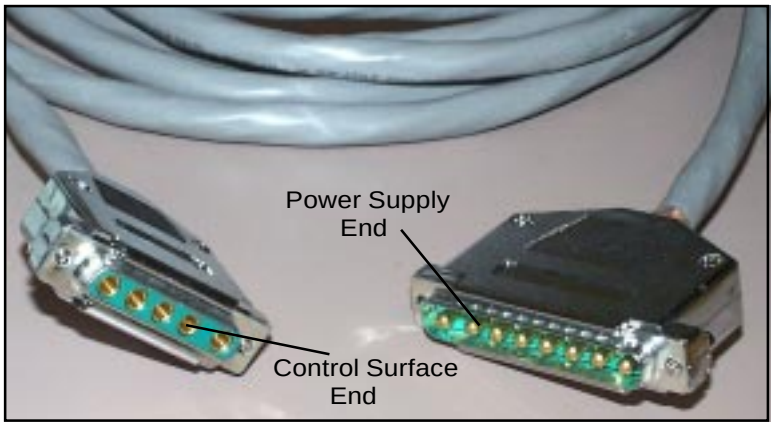
Rear view of the SPS-400 unit

Rear view of the SPS-180 unit

The D-9 control surface is powered by an SPS-180, or SPS-400 power supply installed in a Wheatstone Model PSR rackmount unit. Each PSR houses up to four SPS-180, or up to two SPS-400 power supply units. Mount the power supply in a standard 19" equipment rack, keeping in mind that adequate ventilation is necessary to prevent heat build-up within the rack.

If failsafe redundant supplies have been ordered, you will be installing two SPS-180, or SPS-400 units.

Note the power supply (supplies) should be mounted in an equipment rack within fifteen feet of the control surface (but no closer than 3 feet).



Once the supply is rackmounted, it should be connected to the control surface using the factory supplied cable. The cable has two different types of connectors on it: a 5-pin female connector that connects to the control surface's power supply connector, and an 8-pin male connector that plugs into the PSR power supply. The control surface's two power supply connectors are located at the rear of the control surface, in the middle of the meterbridge bottom pan. If you are using one supply, connect it to one of the control surface connectors (it doesn't matter which one). If you are using the failsafe option, connect one end of a power supply cable to either control surface power connector and connect the other end of the cable to one of the two power supply connectors. Then use the other cable to connect the second power supply connector to the remaining control surface power supply connector. Connect the cable(s) first to the control surface, then to the rear of the rackmount power supply.

PS Cable Pinout

Console End 5-pin Connector *Female*				Power Supply End 8-pin Connector *Male*
PIN			PIN	
RED	1	+V in →	8	RED, YEL
YEL	2	-V in →	7	BLU, BLK
BLU	3		6	N/C
BLK	4		5	N/C
N/C	5		4	N/C
			3	N/C
			2	N/C
			1	N/C

Note each power supply is fitted with a 3-wire grounded AC cord that should be plugged into a "clean" AC power source, that is, an AC source that feeds only the control room audio gear. This source should be a separate feed from those powering lighting, air-conditioning, or any other non-audio machinery. The third pin ground wire of the AC source should be tied to the central system ground point.

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.

Failsafe Dual Redundant Supply

Wheatstone failsafe power supply systems use two SPS-180 or SPS-400 power supplies for each piece of powered equipment. Though either is capable of running a full load on its own, in failsafe operation both units run in tandem: if one fails, the other takes over, assuring uninterrupted operation.

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

Energizing

Assuming the D-9 control surface mainframe is properly placed, and its PSR power supply (or supplies) correctly rackmounted and connected to the control surface, you may now energize the PSR rackmount power supply by plugging it into the AC mains. The control surface's LCD displays will illuminate and individual module switches will assume factory default settings.

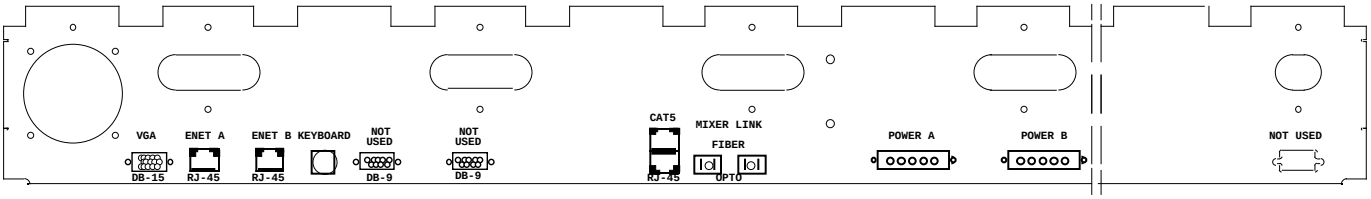
Note: To de-energize the control surface, unplug the rackmount power supply’s AC cord from the AC mains. ***Never de-energize the control surface by disconnecting the cable that connects the control surface and power supply together.***

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

I/O Connections

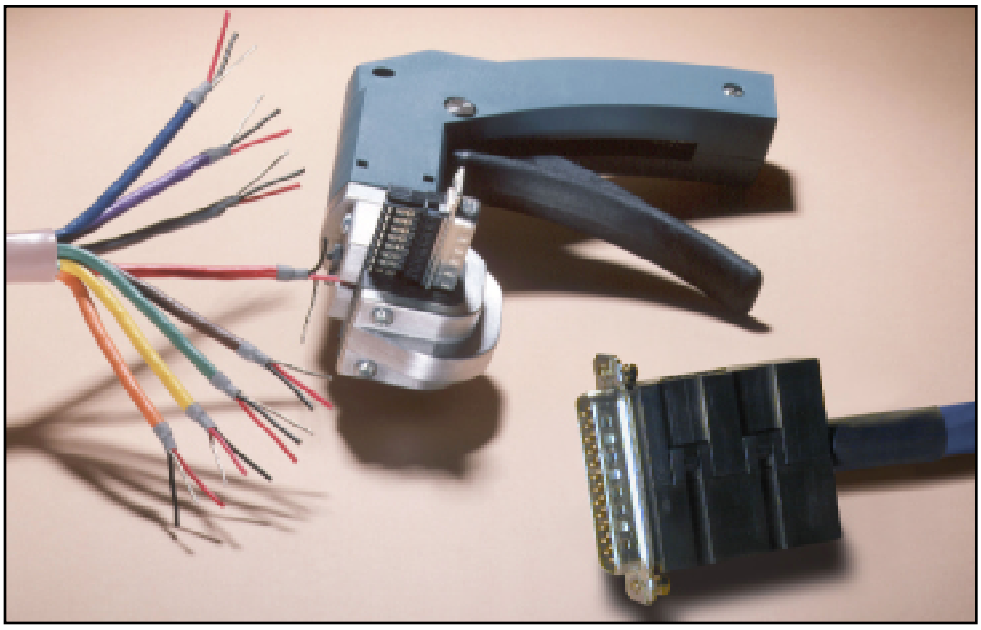
All user wiring to and from the D-9 control surface is made via connectors located on the control surface's rear panel. There are also two RJ-45 connectors for main (ENET A) and failsafe (ENET B - only used if the surface has a redundant CPU) ethernet connections. CAT-5 or multi-mode optical fiber Mixer Link connections are made via RJ-45 or LC type optical connectors. Two 5-pin male connectors are for power supply connections. VGA connections are made via the female DB-15 connector that is mounted next to the ENET A connector. For all wiring pinout connections refer to Chapter 6. The sketch below shows connector locations.

NOTE: Keyboard, VGA, and COM connectors for factory use only.



The Insulation Displacement Connector System

The I/O wiring interface system is based on insulation displacement technology. A special AMP wiring tool is included with each control surface; it is auto-indexing, and allows individual wire connections to be positively made with a single squeeze of the tool's trigger. The



The AMP tool insulation displacement connector system. Note the right angle hood with self-locking tabs. The tool, multipin connectors (with gold plated pins) and latching hoods are supplied with each control surface.

trigger action is ratchet controlled, and will not release until a full connection is made. Once released, the multipin connector held in the tool's jaw automatically indexes to the next connector pin. The technol-

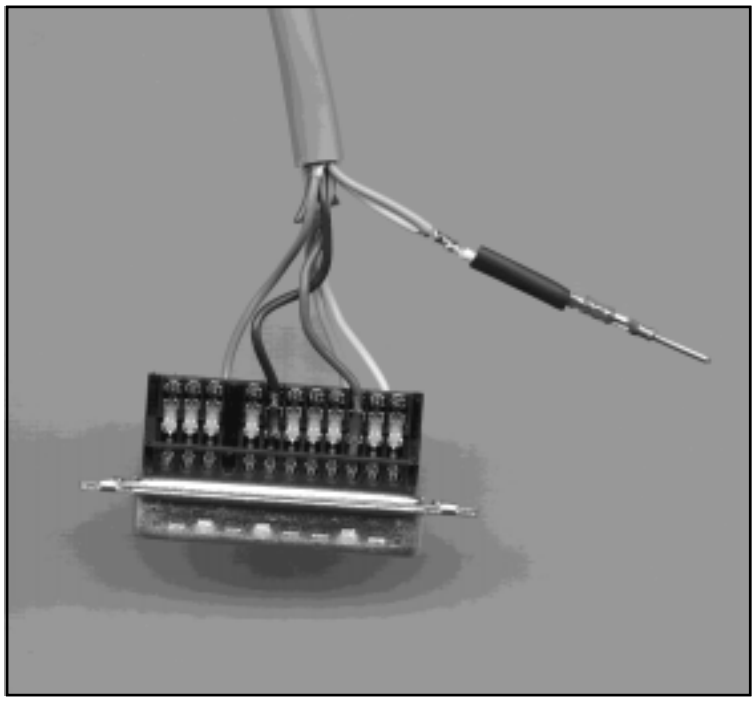
ogy is such that no stripping, soldering, or tinning of wire ends is required; all that is needed is that the wires destined for the connector be snub cut and laid out in order (although tubing should be used on bare drain wires). An empty DB-9 connector is inserted into the tool, indexed to the first pin, and the wires are inserted one by one into the jaw and the trigger squeezed. In this way a single multipin connector can be completely wired up in a minute or two. These connectors will accept wire gauge 22 - 26 AWG.

In the event of a wiring error, connector pins may easily be removed from the shell with the wire still attached, and inserted into the correct position. Observe the side of the connector, with the metal part down. You will see a row of "Vees"—simply press the top of the vee together with a scribe or other sharp instrument; this will unlock the pin from the shell, and it can be removed and inserted into the correct position. Spread the vee apart to lock the pin in the new position. It should never be necessary to discard a connector due to a wiring error.

Note that mating hoods for each connector are also supplied with the system. These have locking screws that hold the connectors securely to their mates.

Wiring Procedure - Double Connection to One Pin

ref: DB-25 male multi-pin connector



Most audio equipment machine interfaces (as well as Wheatstone consoles) use subminiature D-type connectors. Sometimes the interfaces require making two connections to a single DB pin. If the wiring has been set up using punchblocks, this is not a problem; however, for situations where direct machine-to-console wiring is used, Wheatstone recommends the following procedure:

1) **Connect the first wire to the desired pin as you normally would.**
2) **Note connector pins may easily be removed from the DB-25 shell with the wire still attached: Hold the connector with the metal part down and observe its side. You will see a row of "Vees"—simply press the top of the selected vee together with a scribe or other sharp instrument; this will unlock the pin from the shell, allowing it to be removed.**
3) **With the pin removed, strip out a short section of insulation from the connected wire and wrap and solder the second wire to the first as shown above.**
4) **A short piece of heatshrink tubing (pictured here before being slid into place) completes the connection.**
5) **Re-insert the pin into the DB-25 shell, spreading the vee apart to lock it in place.**

Input Panel (IS-D9)

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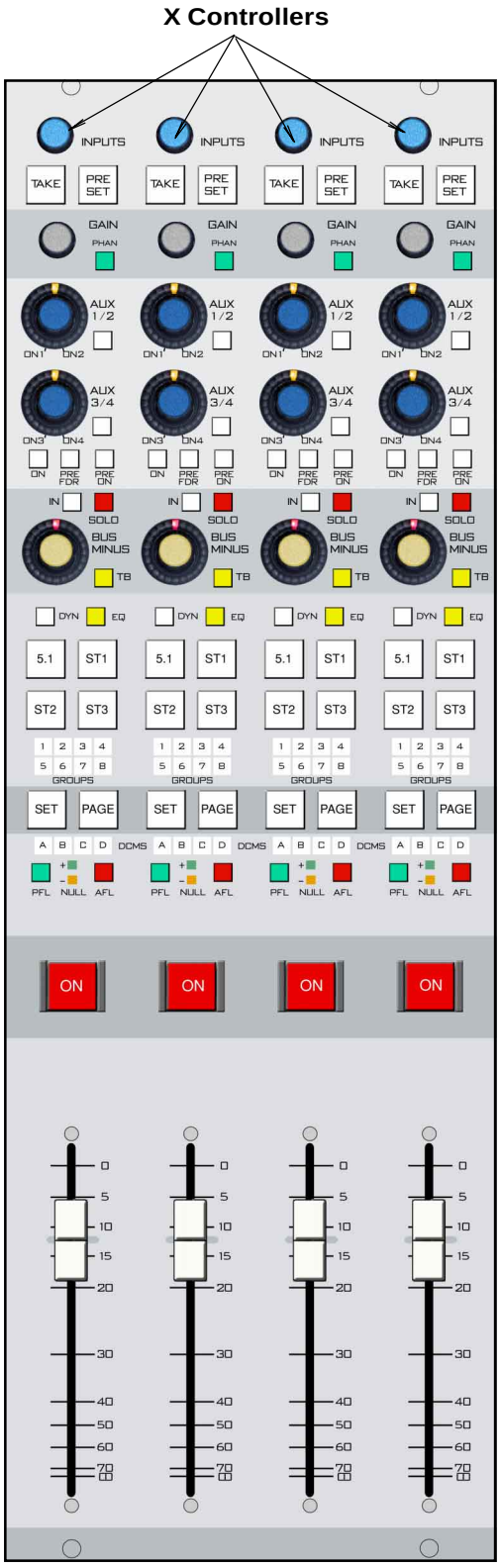
Input Panel (IS-D9)

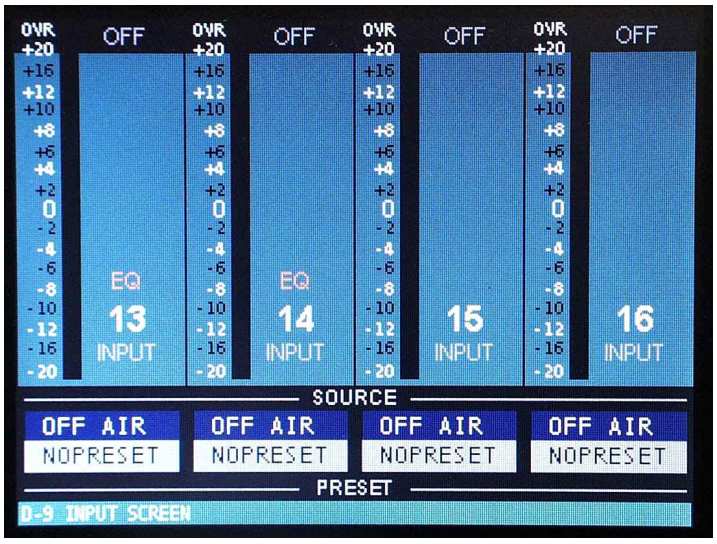


Controls and Functions

Each input panel of the D-9 digital audio control surface has four identical strips representing four input channels.

Input Sources

Each input panel controls four stereo sources. By turning input knobs, called X Controllers in the XPoint Software, the available inputs are displayed in the SOURCE window of the LCD screen above the channel



strip. When the desired input source is scrolled into the SOURCE window, pressing the TAKE button will cause that source to be switched to the input of the channel, and the source name will be displayed in the SOURCE window of the LCD screen.

A second source can be loaded into the PRESET window of the LCD screen. Scroll the INPUT knob as above until the desired source appears in the SOURCE window, then press and hold the PRESET button until this source appears in the PRESET window. Once loaded, this source can be connected at any time by pressing the PRESET button.

Gain Control

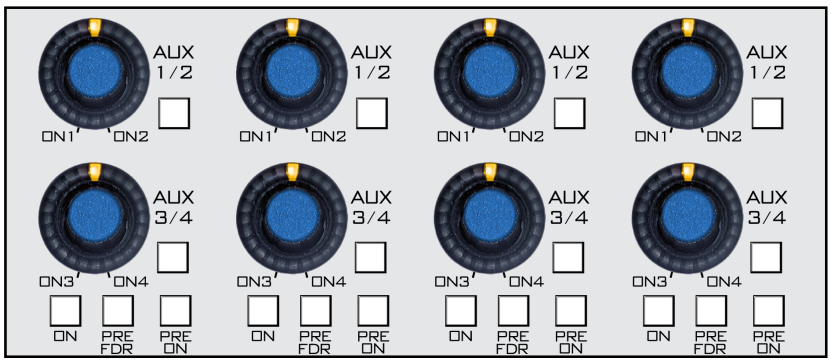
The GAIN level control controls mic or line gain for the selected input source. If the channel's SET buttons is pressed, the relative gain setting can be read from one of the LCD screens (see page 2-4).

Phantom Power

The PHAN On/Off switch applies phantom voltage to any selected microphone. The phantom power attribute stays ON even when the microphone is not selected on the control surface.

AUX

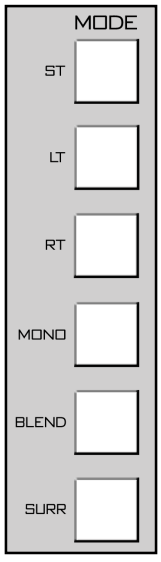
The D-9 Control Surface has (2) AUX encoders, (2) bank select switches (AUX 1/2 and AUX 3/4), and (3) mode switches (ON, PRE FDR, and PRE ON) for controlling the (4) AUX SEND buses. Operation is as follows: first "DOBBY" or momentarily press one of the encoders to select which group of AUX SENDS (AUX 1/2 or AUX 3/4) is being worked on. The LED at the bottom center 6 o'clock position of the encoder knob will light to indicate the active group. Pressing the bank select button will select which AUX SEND within the group is being worked on. A lighted switch indicates you are working on an even numbered group (2 or 4). Once the desired AUX SEND has been selected using these controls, the ON, PRE FDR, and PRE ON switches and the encoder can be adjusted for that particular AUX SEND (without pressing down the encoder, turning it adjusts the level of that channel in the aux send; turning it while pressing the knob down pans the channel between the left and right sides of the stereo aux send bus). Subsequently, the bank select switch can be pressed or the encoder "DOBBIED" to choose the next AUX SEND, and so on.



Tip: DOBBY (pronounce dah-bee) - means to quickly press and release an encoder knob.

Mode Selector Indicator

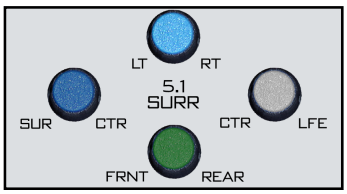
MODE selection switches in the EFS CONTROL panel (see Chapter 3) enable input channels to operate in Mono, Left only, Right only, Blend, and Stereo. The switch lights up to indicate the selected mode. This feature is activated for a given channel by pressing the channel's SET button (see page 2-4).



EFS-D9 Control Panel

Pan/Balance Knob

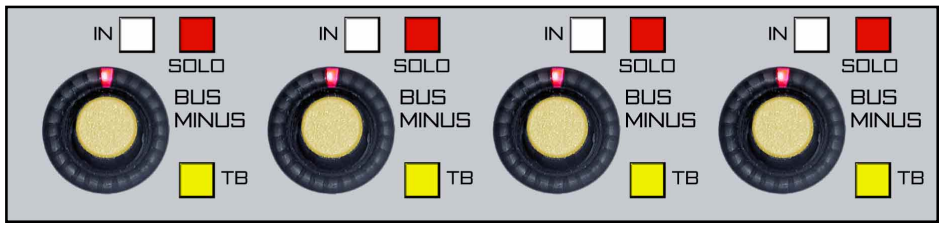
The LT/RT knob (5.1 SURR section in the EFS CONTROL panel) acts as a panpot in MONO, LEFT only and RIGHT only modes, and as a balance control in STEREO mode. In BLEND, both the left and right input signals are sent to both the left and right sides of assigned stereo destinations, with the LT/RT knob acting as a mix



control between the left and right inputs. Once again, this feature is activated for a given channel by pressing the channel's SET button. To easily set the PAN to center, you can press the control twice in rapid succession, like double-clicking a mouse button.

Bus Minus

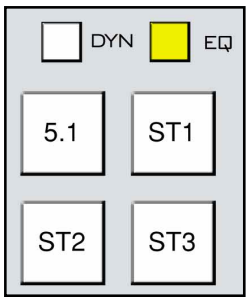
Each input channel can generate its own independent mix-minus output, called BUS MINUS; thus each anchor, each announcer, each host, each guest can have a dedicated mix-minus feed.



Start by assigning any desired input channels to the Bus Minus bus. This is accomplished by pressing the BUS MINUS IN switch, which places a summed signal of those input channels onto a special dedicated mix bus. This bus now becomes available to other input channels for use in their own Bus Minus outputs. Each channel's input signal is omitted from the MIX at it's own direct output. A BUS MINUS encoder controls the level for each of the individual IFB channel/direct outputs. A TB switch lets the control surface operator talk back to that individual IFB/direct output allowing communications between the operator and the talent receiving that mix. A SOLO switch allows the operator to solo monitor the individual channel's IFB feed.

Dynamics and EQ

DYNAMICS (DYN) and EQ buttons allow dynamics and EQ functions which have been set for that channel on the DCM (Chapter 5) and EFS (Chapter 3) control panels to be applied or not to the input channel. The buttons light up when input channel signal processing is active on the channel. Available Dynamics functions include compression and limiting. Available Equalizer functions include 3 band parametric EQ with high-pass and low-pass filters.



Main Bus Assign

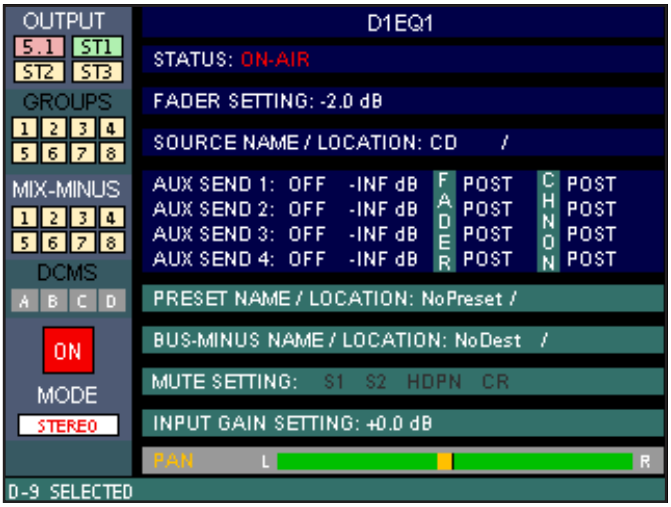
Buttons 5.1, ST1, ST2, and ST3 assign the input channel signal to the four main busses. The buttons light up to show which buses the input channel has been assigned to.

Output Assign Displays

These 8 indicators (GROUPS) show which group(s) the channel has been assigned to using control switches in the BUS ASSIGN section of the EFS panel (page 3-5). The output assigns are accessed by means of the channel SET button.

SET Button

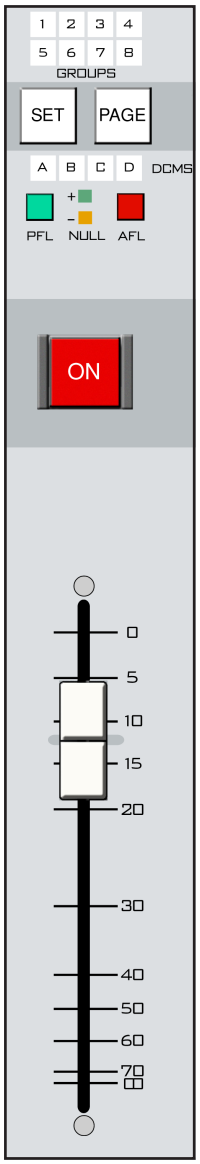
This allows the operator to access various controls and displays on the EFS and DCM panels and apply them to the selected channel. SET can access GROUP, MIX-MINUS, DYNAMICS and EQ functions. To use, press the SET button and then make your appropriate section settings in other areas of the control surface. Once a SET button has been pressed, the button lights up, and all of the central section controls (EQ, MODE, DYNAMICS, SOURCE select, etc.) display the current settings **for that input channel** until a different input SET button is pressed. Or if you don't use any SET-related controls for 20 seconds, the current SET selection will time out and the SET button will go off.



Page Button

The PAGE function allows each physical channel strip to control two strips worth of audio. This would allow a 16 fader control surface, for example, to control 32 channels of audio. Fader #1 would control audio channel 1 when the PAGE button is off, and would control audio channel 17 when the PAGE button is on. Likewise, faders 2-16 would control audio channels 2-16 when their respective PAGE button were off, and audio channels 18-32 with the PAGE button is on. Each audio channel controlled by a fader is controllable separately via the PAGE button, yet both audio channels are available simultaneously. That is, if you have just set the level for channel 17 using fader 1 with the PAGE button on, turning the PAGE button off switches control to channel 1, but channel 17 continues to sound.

On the top of MASTER panel (see Chapter 4) there are page buttons which allow groups of input channels to be paged simultaneously.



DCM (Digital Control Master) Displays

Each channel can be assigned to any combination of the four DCM masters (DCM-D9 panel). The assigned setting is displayed in the DCMS ABCD display group. Any channel that is assigned to a DCM will have its level controlled in a subgroup manner, much like a VCA in an analog control surface. For example, all announcer voices could be on DCM A, all remotes could be assigned to DCM B, and commercial source material could be on DCM C. The channels can then be easily adjusted in groups by means of faders on the DCM panel. Furthermore, these DCMs may be used as group mutes, to cut out or in an entire bank of faders by simply toggling the appropriate MUTE switch on the DCM panel.

Channels are assigned to these DCMs in the following manner: press the channel SET button on the input fader section and then press the desired DCM SET assign button, located in the center of the EFS panel.

PFL (Cue)

This switch lets the control surface operator monitor the channel's pre-fader signal.

AFL (Solo)

This switch lets the control surface operator monitor the channel's post-fader post ON signal.

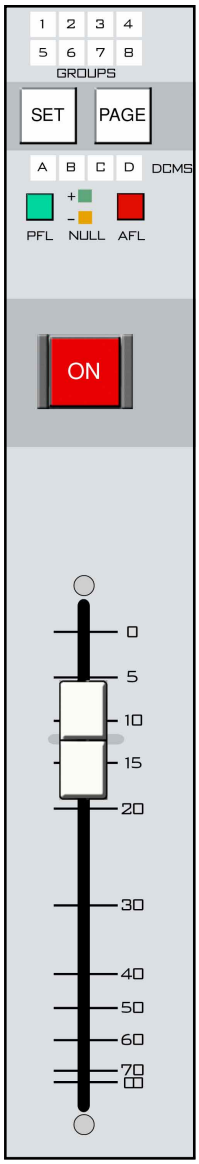
Channel ON Switches

The CHANNEL ON switches turn the channel signal ON and OFF and fires the channel ON (START)/OFF(STOP) logic. The switch LED lights to indicate the channel is ON.

Fader

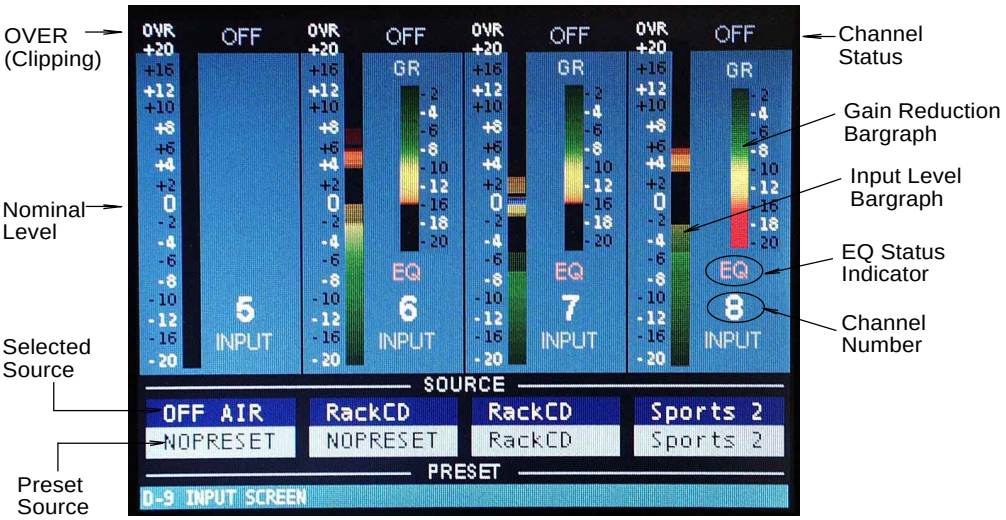
Channel output level is set by a long-throw fader. When the control surface has recalled a preset or is under external serial control from an automation system, the fader NULL LEDs light to show that the channel output level is actually different from what the fader indicates. The channel output level will remain at the computer directed value until the fader is moved to a matching level, after which the fader will control the level. The lit NULL LED indicates which direction to move the fader to regain level control. Once the fader has been moved to the matching level the LED will turn off.

The D-9 control surface can be ordered with optional touch sensitive, long-throw motorized faders for automated level control.



LCD Display

Each input section has an associated LCD display located above the input section in the control surface meterbridge. This display shows input level, selected source, preset source, channel number, channel status, gain reduction, and other information.



Input Level

The pre-fader level of the input signal is shown by the large vertical bargraph on the display. The level is indicated in DB on a calibrated scale beside the bargraph. If the channel is stereo, the bargraph shows the sum of the left and right signals. The bargraph is colored, with green indicating lower levels and red indicating high levels. The nominal level position is in the middle of the range at the "0" scale marking, and shows as a thin blue band in the bargraph. The bargraph itself consists of a moving "DOT" over a solid "COLUMN" where the "DOT" indicates the peak value of the signal, and the "COLUMN" indicates the average value. On the D-9 control surface the average value column has been set to VU timing characteristics. In addition, a bright yellow rectangle will light at the top of the column if digital "OVER" or clipping is detected.

Nominal Level 0dB = +4dBu analog and -20dBFS digital.

Selected Source

The currently selected source name shows on the LCD display underneath the level bargraph. This name is the 8-character name as defined in the Wheatstone Bridge Router configuration.

Preset Source

The currently loaded preset source name shows on the LCD display underneath the currently selected source. Once again, this 8-character name is as defined in the Wheatstone Bridge Router.

Channel Status

Various indicators on the LCD display will show status information for the associated channel. Above the level bargraph the words "ON", "OFF", "ON AIR", or "MUTE" will appear as the channel status changes. "MUTE" indicates that the channel is turned ON and has a mute set. "ON AIR" indicates that the channel is ON and the fader is up. The letters "EQ" will show in the display if equalizer functions are active for the channel, and a smaller bargraph indicating gain reduction will appear if signal dynamics functions (compression, limiting) are engaged.

Channel Number

A large white number shows near the center of the display area indicating the channel number.

Control Panel (EFS-D9)

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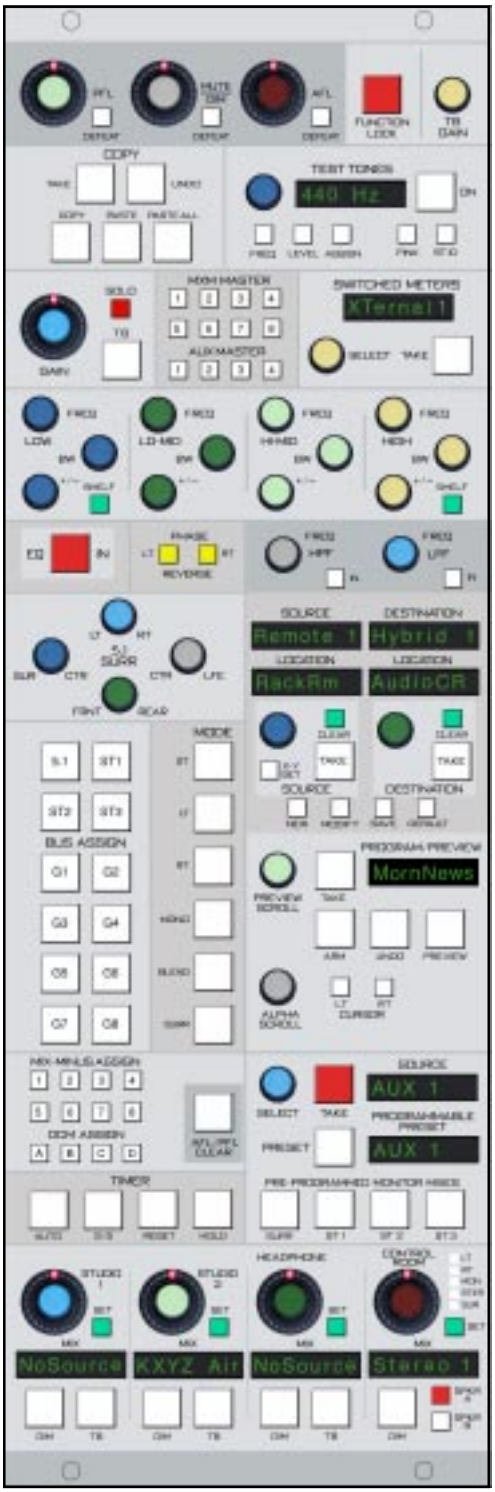
Control Panel (EFS-D9)

Controls and Functions

The D-9 digital audio control surface is equipped with one CONTROL panel. This panel contains MONITOR, BUS ASSIGN, AFL/PFL, SOLO, TALKBACK, EQ, 5,1 SURROUND, MODE, AUX/MXM MASTER OUTPUTS, MXM ASSIGN, XY CONTROLLER, EVENT, TIMER, SWITCHED METERS, COPY, TEST TONES, and FUNCTION LOCK controller sections.



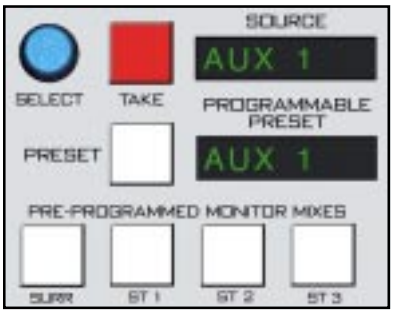
Monitors

There are four monitor outputs available: CONTROL ROOM, STUDIO 1, STUDIO 2, and HEADPHONE.

Each monitor has a LEVEL control, a SET button, a DIM switch, a TB button (but the CR monitor does not have a TB button), and a MIX display that is located on the bottom section of the EFS-D9 panel.

The CR monitor section also contains a mode indicator and two speakers select buttons.

Monitor sources can be selected several ways:

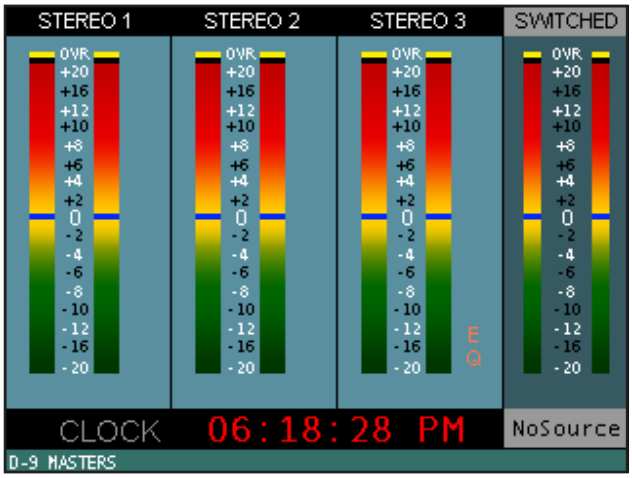


- Four PRE-PROGRAMMED MONITOR MIX switches (SURR, ST1, ST2 and ST3) allow direct access to the main mixes most frequently monitored.
- Sources can be randomly selected with the SELECT knob and its attendant SOURCE display and TAKE button.

• A source can also be loaded as a monitor preset by first selecting it with the SELECT knob and the SOURCE display, and then holding the PRESET button down until the source shows in the PROGRAMMABLE PRESET display. That source can then be monitored by pressing the PRESET button.

To select a source for a monitor by one of the above methods, first press the SET button next to the knob for the desired monitor.

The knob controls the level of the monitor signal.



Control Room Section

In a typical radio or television application the control surface is located in the audio control room. Speakers in the control room allow the control surface operator to listen to the various control surface bus outputs to be assured that the control surface is performing as desired. These speakers are fed by a stereo or 5.1 signal routed from the control surface'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 external cue speaker, or may want to listen via headphones.

In some instances the control surface 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 reamplified 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 in the configuration software to MUTE the control room output to prevent the occurrence of feedback.

CR SET BUTTON - lets the operator select the source to be listened to in the control room speakers.

CR DISPLAY - the eight character display shows the source that is selected for monitoring in the control room.

CR LEVEL CONTROL - determines the overall loudness of the signal being monitored as it appears in the control room speakers.

DIM BUTTON - lets the operator "dim" the control room speakers (drop in level). Actual DIM level is set by the DIM encoder at the top of this panel.

MODE INDICATOR - a set of five LEDs indicates which mode, LEFT, RIGHT, MONO, STEREO, or SURROUND, the CR signal is operating in (see also page 3-5).

SPKR A, SPKR B - these two switches are used to determine which of two outputs will be fed by the CR signal. Each feed may have its mode programmed separately (see Selecting Output Mix Destinations on page 3-11).

Studio Section

In addition to the control room, there may be one or two studios 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 various control surface bus outputs at times that they are not actually on air. These speakers are fed from one of the control surface's stereo studio outputs.

As in the control room, the potential for feedback also exists in the studio. The talent microphones will usually provide a part of the signal that is going out over the air. If that signal is the one being monitored with the studio speakers, feedback will occur. To prevent this, the studio mic faders are usually set to MUTE the studio output in the configuration software to prevent the occurrence of feedback.

ST SET BUTTON - lets the operator select the source to be listened to in the studio.

ST DISPLAY - the eight character display shows the source that is selected for monitoring in the studio.

ST LEVEL CONTROL - determines the overall loudness of the signal being monitored as it appears in the studio speakers.

DIM BUTTON - lets the operator "dim" the studio speakers (drop in level). Actual DIM level is set by the DIM encoder at the top of this panel. Note the DIM function also affects the talkback interrupt. Note also if the studio is muted, talkback cannot be heard. However, if the studio is dimmed, talkback audio could presumably make it from the studio monitor speakers to the open studio mic.

TALKBACK (TB) BUTTON - there may be times when the control surface operator wants to talk to one of the talent in the studio. When the TB button in the studio monitor section is pressed, a predefined signal, usually the operator's mic, will "interrupt" the speaker feed that is normally heard in the studio.

If there is a live mic in the studio which has activated the mute feature, talkback will also be muted in the speakers.

On the top right corner of the EFS control panel is the TB GAIN master level control that sets the talkback output and the level of the talkback interrupt signal. The normal studio feed, which is interrupted by the TB signal, will fall to a level set by the DIM control.

Headphone Section

HDPN SET BUTTON - lets the operator select the source to be listened to in the headphone.

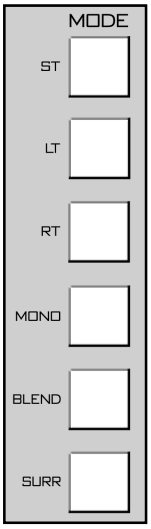
HDPN DISPLAY - the eight character display shows the source that is selected for monitoring in the headphone.

HEADPHONE LEVEL CONTROL - determines the overall loudness of the headphone output signal.

DIM BUTTON - lets the operator "dim" the headphone output signal (drop in level). Actual DIM level is set by the DIM encoder at the top of this panel.

TALKBACK (TB) BUTTON - takes the assigned TB signal and feeds it to the headphone output, allowing direct communication between the operator and talent. The normal headphone feed falls to a level set by the DIM control.

Monitors outputs are normally subject to the control surface's muting and solo/cue interrupt circuits; however, these may be defeated by front panel switching (DEFEAT button - see below and page 3-6).



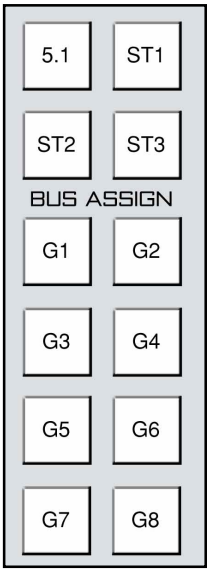
Mode Control and Indicators

These switches and LEDs give local visual control and indication of the selected mode for the various monitors (stereo, mono, left only, right only or surround). Note that the mode status of the CR monitor can always be seen on its mode indicator LEDs next to the CR level control.

Mode may be changed in the following way: press the SET button for the desired monitor and select the allowed MODE button in the center of the panel. Similarly, the mode of an input source is selected by these controls by first pressing the SET button for the desired input channel.

Note that SURR mode requires that the CR be configured for 6 channel operation in software. Not all systems support this mode. Consult factory for details.

Bus Assign Section

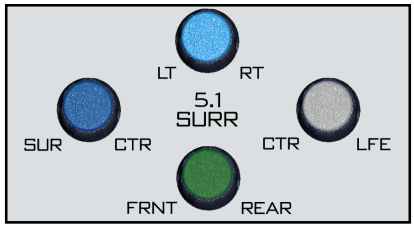


All bus assignment is accomplished through a bank of BUS ASSIGN switches on the EFS-D9 panel, consisting of eight group assign switches and four master assign switches. The switches illuminate to indicate the assign status of the input channel or group whose SET switch is currently active. Indicator windows on the input or group panels show the assign status for each individual source.

Bus assignment may be made in any combination, and is accomplished by first pressing the SET button on the desired input channel (IS-D9 panel) or group (MFS-D9) panel. The switches in the EFS-D9 panel BUS ASSIGN section illuminate to show the source's current bus assignment. Press required switches to create the desired set of bus assigns. The local indicators on the IS-D9 or MFS-D9 panel will change to reflect the new bus assignment.

NOTE: A non-applicable bus assign will flash rapidly to indicate error. Choose an another button.

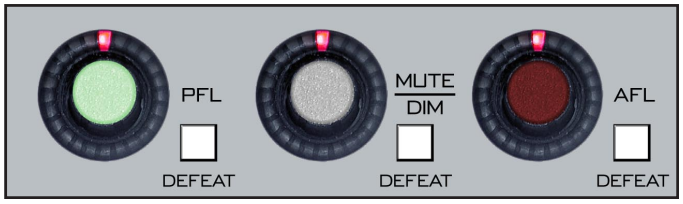
Surround/PAN System



NOTE: The 5.1 Surround panning system is used only for those signal paths assigned to a 5.1 destination.

PROGRAMMING A CHANNEL FOR SURROUND SOUND: Select the channel you with to program by pressing its SET button. Assign it to the 5.1 destination by means of the BUS ASSIGN switchbank. The 5.1 SURROUND section will indicate the current settings of the encoder LT/RT, FRNT/REAR, SUR/CTR, and CTR/LFE knobs. The meterbridge display will also show a multi-color graphic representation of this system. The system can generate 5.1 signals from MONO or STEREO sources, and can modify the 5.1 signal of existing 5.1 input sources.

Solo (AFL)/Mute/Dim/Cue (PFL) Section



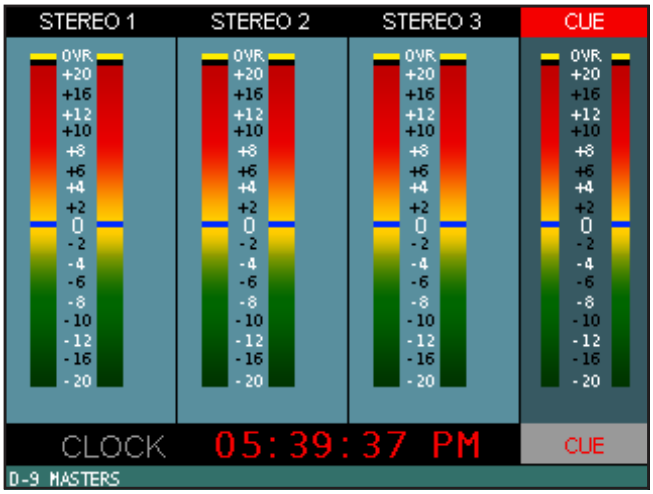
The PFL(CUE) master level control and defeat switch are located on the top section of the EFS panel. The PFL/CUE signal is pre-fader, and is normally used to check signals. When a channel is CUEd, its pre-fader signal will appear in the external cue speaker, and the switched meter array in the master LCD display will show the level of the pre-fader signal.

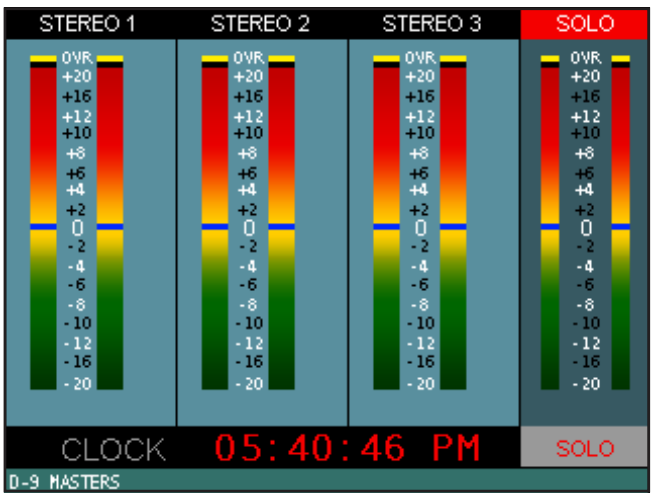
The PFL(CUE) level control determines the overall loudness of the cue signal.

Similar to the control room speakers, the external cue speaker also has the potential for feedback and should be muted (using the configuration software—VDIP menu) whenever the control room speakers are. The PFL DEFEAT switch allows for temporarily overriding, or cancelling, the mute function.

The AFL(SOLO) master level control and defeat switch are also located on the top section of the EFS panel. The AFL/SOLO signal is after fader, and is normally used to check a mix. When an output (such as an AUX SEND) is SOLOed, its post-fader signal will appear in the solo output (and usually, the control room speakers). The switched meter array in the master LCD display will show the level of the mix. The solo defeat switch allows for disabling the control room solo interrupt function.

The DIM master level control and defeat switch are also located on the top of the EFS panel. The DIM level control sets the amount of attenuation applied to a monitor signal (such as control room output) when its DIM switch is engaged, and also sets the level of the normal feed when it is interrupted by the TB signal. The dim defeat switch allows for temporarily overriding the attenuation to bring all DIMmed signals back to their normal level.





Clear AFL/PFL

When any PFL (Cue) or AFL (Solo) button on the control surface is pressed, its light will be illuminated and should flash slowly. The AFL/PFL CLEAR button will also flash synchronously with any active AFL/PFL buttons. Any signal can be released from cue/solo by pressing its individual AFL/PFL button a second time. All AFL/PFL activated buttons can be cleared at once by pressing the AFL/PFL CLEAR button.

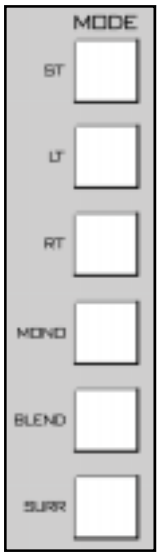
Switched Meters Section

The control surface has provision for a switched meter.

To select a signal to meter, rotate the encoder SELECT. Available sources will be displayed in the eight character SWITCHED METERS display. When the desired signal is displayed, press the TAKE button. The switched meter array will then display the signal level. If, however, after a timeout period of 5 seconds, the TAKE button is not pressed, the array will revert back to its previous selected program.

Any time a channel SOLO/CUE button is pressed, the SOLO/CUE level will be temporarily shown in the switched meter display until the SOLO/CUE button is deactivated.

Mode Select Section

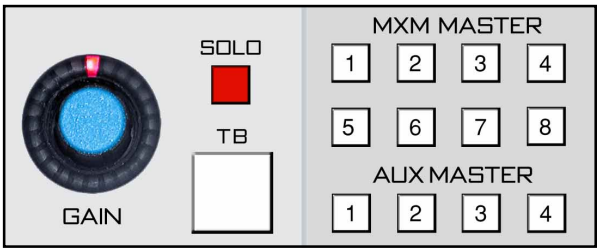


The mode selector switchbank (ST, LT, RT, MONO, BLEND, and SURR buttons) and LT/RT knob are located in the center of the Control panel. There are six available channel modes: STEREO, LEFT ONLY, RIGHT ONLY, MONO, BLEND, and SURROUND. When pressed, the switch will light up to indicate the selected mode.

The LT/RT knob acts as a panpot in MONO, LEFT ONLY and RIGHT ONLY modes, and as a balance control in STEREO mode. In BLEND mode, where both the left and right signals are sent to both the left and right sides of assigned stereo destinations, the LT/RT knob acts as a mix control between the left and right inputs. The LT/RT knob is only used with input channels, and has no effect when setting the mode of the monitor signals.

Mode selection is set centrally. To select a MODE, press the SET button of the desired channel or mix; the SET button will illuminate, and the current mode setting for that channel will be displayed on the MODE switches. MODE can be reconfigured by pressing any allowable button.

AUX/MXM Master Outputs

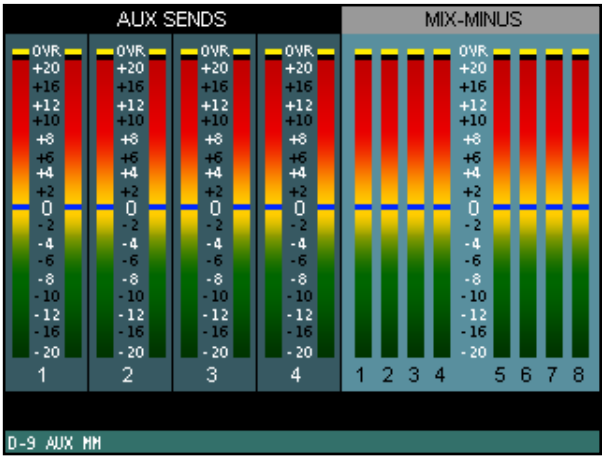


This section is used to control the master GAIN, SOLO, TB, Mode selection, and DESTINATION routing (see Event Section) for the four AUX SEND mixes and the eight MXM mixes. It is comprised of a shared GAIN knob, TB button and SOLO switch. Additionally, there is a bank of four AUX MASTER buttons and a bank of eight MXM MASTER buttons.

To set a GAIN, press any of the four AUX MASTER or eight MXM MASTER buttons and rotate the GAIN knob.

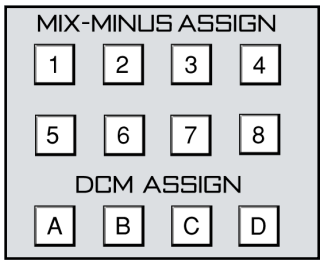
To set a SOLO, again press any of the four AUX MASTER or eight MXM MASTER buttons and then press the SOLO button.

To interrupt a signal with the TB signal, press any of the four AUX MASTER or eight MXM MASTER buttons and then press the TB button.



MIX-MINUS Assign

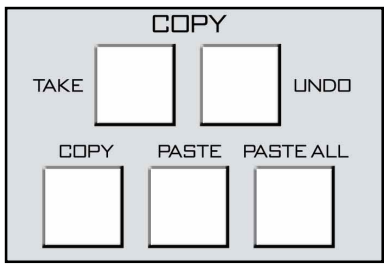
These buttons are used to control the makeup of the eight MIX-MINUS buses. Press the SET button on any input. If that input is assigned to feed an MXM bus, the corresponding MIX-MINUS ASSIGN switch will be lit. Pressing a MIX-MINUS ASSIGN switch will toggle that input's signal into or out of the corresponding MXM bus.



DCM Assign

To assign a DCM to an input, submix or master, place the input, submix or master channel in SET mode and press any combination of the DCM ASSIGN buttons. The appropriate DCMS display cluster on the inputs (IS-D9 panel), or submixes or masters (MFS-D9 panel), will be illuminated, as well as the assign buttons.

Copy Section

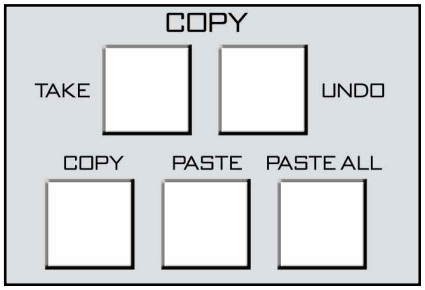


This system provides a convenient means of copying input channel settings and duplicating them to other input channels. To go into COPY MODE, press the COPY button. It will flash. Choose the desired channel to be copied by pressing its SET button (IFS panel). The SET button will then flash in concert with the COPY button and the PASTE and PASTE ALL buttons will light. To go into PASTE mode, press the PASTE button. It will flash, and the COPY and PASTE ALL buttons will go out. Then press the SET button of the target module you wish to copy to. It will begin to flash in concert with the PASTE button, and the TAKE button will light. To accomplish the copy, press the TAKE button.

Note, the copy function does not copy source assigns, destinations, presets, or input gain.

The UNDO button is used to undo a TAKE copy. Simply press UNDO and then TAKE to return the modified channel to its pre-TAKE status. There is only one level of UNDO. If you do a copy operation, then do another copy operation, then press UNDO to go back to the status before the last copy, pressing UNDO again will have no effect.

To Copy Groups



It is possible to take a bank of channels and duplicate it to another channel bank of equal number. Press the COPY button, then press the desired SET buttons on the source bank. The COPY button and the source bank SET buttons will flash in concert. Then press the PASTE button, which will begin flashing; press the desired target channel SET buttons, which will flash in concert with the PASTE button. To execute, press the TAKE button.

This function can be used to copy the settings from any number of channels to an equal size group of channels. The channels in each group do not have to be consecutive, and channels within a group can be a mixture from each PAGE if desired. There can even be overlap; for example, you can choose to copy from channels 1, 2, and 3 to channels 2, 4, and 5. After this copy, channels 1 and 3 would not have changed, channel 2 would be set as channel 1 had been, channel 4 would be set as channel 2 had been, and channel 5 would be set as channel 3 had been.

When selecting channels for the COPY and PASTE sets, the order in which you press the buttons matters. For example, if you selected, in order, channels 1, 2, 4 and 3 for COPY, and then selected, in order, channels 5, 7, 6, and 8 for PASTE, the end result would be that channel 5 would have channel 1 settings, channel 6 would have channel 4 settings, channel 7 would have channel 2 settings, and channel 8 would have channel 3 settings. Not that this is something you would necessarily want to do, but that's what would happen. To reiterate, order matters when selecting the COPY and PASTE sets.

If the size of the COPY and PASTE groups are different, TAKE will not effect the change, except for the special case of Copy One and Paste Many, described next.

To Copy One and Paste Many

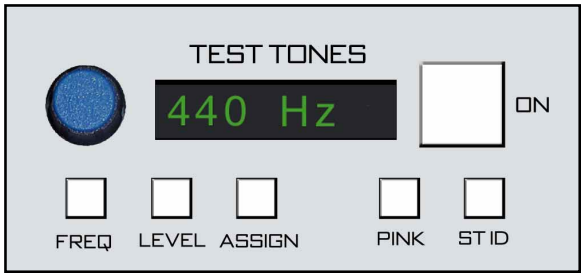
Press the COPY button, and then the desired source channel SET button; both will flash in concert. Then press the PASTE button and the target channel SET buttons, which will flash in concert with the PASTE button. To execute, press the TAKE button.

To Copy One To All

Press the COPY button, and then the desired source channel SET button; both will flash in concert. Then press PASTE ALL, which will commence flashing. To execute the global paste, press TAKE.

NOTE: If the TAKE button is not pressed within a timeout period of 10 seconds, the entire copy/paste operation will cancel out.

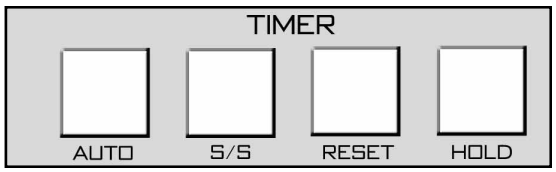
Test Section



The test section, located on the top of the EFS panel, provides adjustable frequency test signals, a pink noise source, and a stereo ID source (a 400Hz tone on the left channel, and a 1KHz tone on the right channel).

Operate as follows: The encoder knob operates as both - a frequency knob and a level control knob. By pressing the FREQ button, the encoder will now adjust the oscillator frequency designated in the TEST TONES display. Its level can then be adjusted by pressing the LEVEL button and using the encoder to adjust the level as displayed in the TEST TONES display. If a pink noise is desired, press PINK button and adjust its level by pressing the LEVEL button. Using the same procedure with ST ID TONES button establishes a STEREO ID tone. The test tone destination is chosen by pressing the SET button at the desired destination location and then the ASSIGN button in the test tone section. To use any of the test tones, press the ON button. When it is lit the selected test tone is available; when not lit the tones are off.

Timer Section



The control surface timer is provided with an AUTO-RESTART function so programmed (via GUI) input modules can automatically reset the timer display to zero and start a new count (if the timer is currently running), allowing the announcer to easily track his own pace.

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

RESET has a dual-mode capability:

- if you depress it while the timer is counting, the display will instantly reset to zero and start a fresh count;

- if the timer is already stopped, depressing this button will reset the timer to zero, where it will hold until start is pressed.

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

Time of Day Clock

The MASTER LCD SCREEN includes the display of a time of day clock. To set the time on this clock you run a Wheatstone utility program, WSTimeSet.exe, on a network computer. The program allows you to set the clocks on multiple control surfaces by specifying the IP addresses of the control surfaces in a list. A single command then updates all specified clocks. Program options allow auto updating at midnight or at the top of the hour. See Appendix 1 for details.

XY Controller Section

This section provides a means of selecting sources for input channels and destinations for output mixes.

Selecting Input Channel Sources

The operator designates the desired input channel by pressing its SET button in the Input section. Its current input source is shown in the SOURCE display and the location of that source shown in the LOCATION display. Input channel meterbridge LCD displays will mirror that same information. A different input source may be chosen by rotating the SOURCE knob. When displaying the current source the CLEAR button lights; when displaying any other source the TAKE button lights. When the desired source is shown in the SOURCE display, pressing the TAKE button will execute the take command on the downstroke, and the new input will be shown in the SOURCE display and in the meterbridge LCD display. This function operates the same as the SOURCE knob on the input panels. To remove the input source from the input channel and leave nothing connected, press the CLEAR button. The connection will be broken and the display will show “NO SOURCE”.

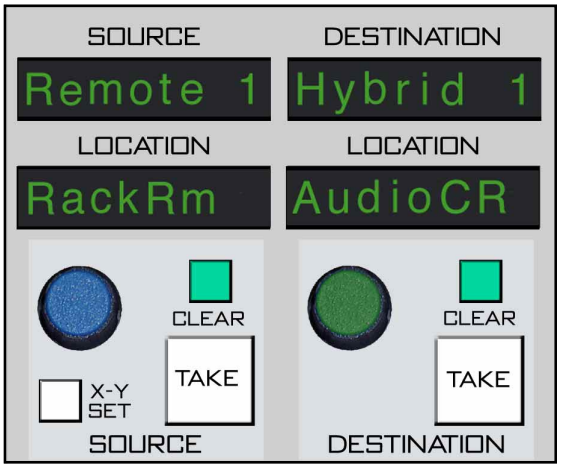
Selecting Output Mix Destinations

When a SET button on an output mix channel (i.e., any of the auxes, monitors, or MXM masters) is pressed, its most current destination will be shown in the DESTINATION display, and the location of that destination will be shown in the LOCATION display. A mix is capable of being sent to one or many outputs. To see all the destinations that the mix feeds, rotate the DESTINATION knob. If the mix feeds the displayed destination the CLEAR button will light; it the mix doesn’t feed the displayed destination the TAKE button will light. You may also “dobby” the DESTINATION knob to step through all of the currently routed destinations.

Tip: DOBBY (pronounce dah-bee) - means to quickly press and release an encoder knob.

EXAMPLE: An example might be a MXM feed routed to several listeners participating in the program, or an AUD bus routed to multiple recording devices.

Changing Output Mix Destinations



Rotate the DESTINATION knob until the desired destination is shown in the DESTINATION display. When the knob is rotated, the CLEAR button will light if the displayed destination is being fed by the mix, and the TAKE button will light if the displayed destination is not being fed by the mix. If the operator wishes to add the destination shown, press the TAKE button to execute the command and the new destination will become the current destination, shown in available displays elsewhere on the control surface. Disallowed destinations (established in the configuration software) will not be shown.

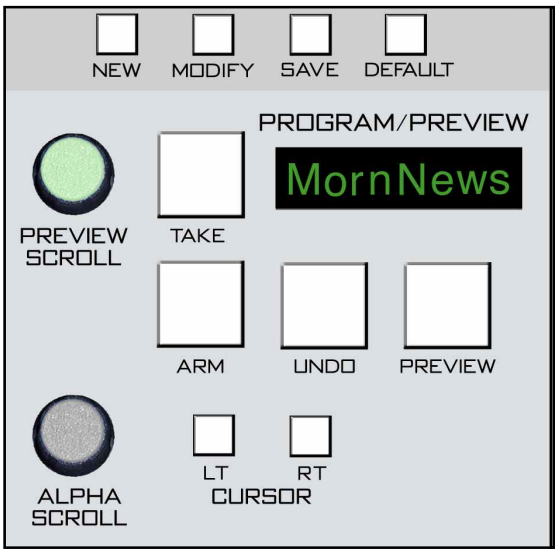
Removing Output Mix Destinations

Press the mix channel's SET button, rotate the DESTINATION selector knob, and the TAKE and CLEAR buttons will indicate which destinations are currently being fed by the mix (see above). When the required destination to be deleted is shown in the DESTINATION display, press the CLEAR button.

X-Y SET Button

Pressing the X-Y SET button allows the source and destination controls to act as a standard X-Y type router controller for making connections between sources and destinations that are not associated with the control surface.

Event Controller Section

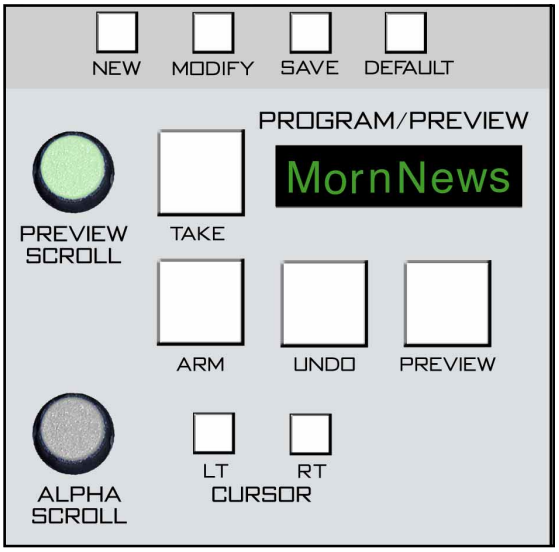


This section provides a means for storage and retrieval of control surface settings, and naming those settings as "events". In this manner complete configuration and setting information that is used repeatedly (for example, morning show) can be saved and recalled. Up to 100 different events can be stored.

Storing an Event

When an event is stored, all of the control surface's current settings are saved and will be recalled when that event is executed through the TAKE command. To create a new event from current control surface settings, hit the NEW button, and then hit the SAVE button. To overwrite an existing event with the current settings, turn the PREVIEW SCROLL knob until the desired event is displayed in the PROGRAM/PREVIEW window, then quickly press MODIFY, then SAVE.

Taking an Event



Rotate the PREVIEW SCROLL encoder until the desired event is shown in the PROGRAM/PREVIEW display. To prevent accidental takes, the ARM button must be pressed to arm the function. The TAKE button will now flash indicating that the panel is ready to act on a take. Then press the TAKE button to execute the EVENT.

Undoing an Event

To recover from a premature or erroneous EVENT take, press the ARM and UNDO buttons. This will return the system to its status prior to the last take, with the last program event being once again the current program event, and the last preview event (the one just taken) becoming the preview event once again. There is only one level of undo. If undo has been done and a subsequent take has not been done, the undo function will do nothing.

Modifying the Currently Selected Event

It is presumed an event has already been executed on the control surface. Modifications to that event can be accomplished by simply adjusting the controls and switches as desired and then pressing the MODIFY button, then the SAVE button. In this way the modified event will overwrite the old event setting and be saved, with the same name, in its place.

Deleting an Event

Rotate the PREVIEW SCROLL encoder until the Event to be deleted is shown in the PROGRAM/PREVIEW display. Press the Modify button, then press the PREVIEW SCROLL knob; the display will ask “DELETE?”. Press the TAKE button to delete the previously displayed Event. Do nothing and Delete mode will time out after approximately 7 seconds. ***Deleted Events may NOT be restored.***

Previewing an Event

Rotate the PREVIEW SCROLL encoder and available EVENT names will be shown in the 8-character PROGRAM/PREVIEW display. When the desired event is shown in the display, press the ARM button, then press the PREVIEW button. This will cause the entire control surface to display all settings associated with that event, without disturbing the current operative event. The preview status will be indicated by illumination of the PREVIEW button and flashing of all source and destination displays, to remind the operator that these would be the intended settings when the change is made. Pressing the PREVIEW button a second time will cancel the preview. ***It should be noted that no audio signals are changed in any way by the preview feature.***

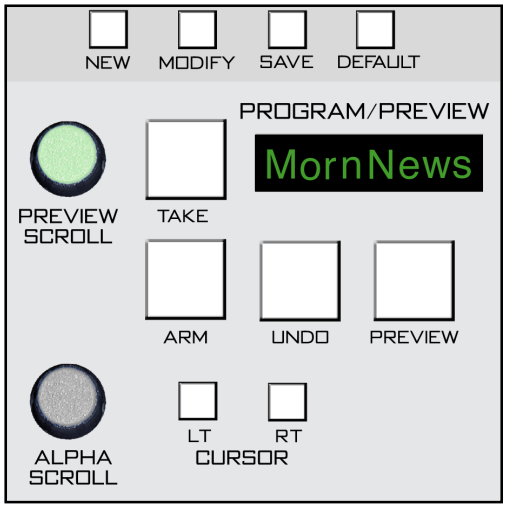
Event Default Button

This control allows rapid access to a default or home control surface setting. Push it, and the TAKE button in the Preview section will flash. Hit the TAKE button and the default setting will be executed.

Establishing the Default Setting

This setting would normally be set only once. For example, it may be desirable to have all controls set to zero, or everything programmed to typical nominal settings. To establish the default setting, adjust all the control surface controls to their desired settings, press the MODIFY button and then the DEFAULT button. The default setting is stored.

Naming an Event



When events are saved, they receive a default event designation number. This way events can be saved quickly without having to name them. However, an event may be custom named when saved, or at a later time. To rename the displayed event, press the ALPHA SCROLL knob. The CURSOR LT and CURSOR RT buttons will light and the cursor, indicated by a flashing character, will be at the beginning of the name. Also, the SAVE button will begin to flash. At any time you can use CURSOR LT and CURSOR RT to move to a character you want to change. Once the cursor is at the desired character, rotate the ALPHA SCROLL encoder until the desired new character is displayed. Once all desired characters have been changed, simply press SAVE to save your changes. The event is stored with the desired name. At any time you can cancel the name edit by pressing the ALPHA SCROLL knob. Also, if you stop making name changes but fail to press the SAVE button, the name edit process will automatically cancel after a delay of several seconds.

Control Modes

The D-9 control surface is operated in one of three modes. In Administrator mode access is allowed to all surface functions. In User mode a limited set of user functions is allowed. The set of functions allowed in User mode is set independently for each console using the Bridge XPoint software (see the Bridge Router manual for details). The third mode, Guest, blocks out MXM level, MXM assign, Event takes, and visibility changes from being controlled by the surface.

To change the control mode, begin by pressing and holding the PREVIEW SCROLL knob until the display reads “Admin” and the TAKE button lights (if the surface is currently in Admin mode the ARM button will also light). Turn PREVIEW SCROLL until the desired new mode (Admin, User, or Guest) is showing in the display and press TAKE. Turn PREVIEW SCROLL again to select the first digit of the

password. Default passwords, which may be changed in XPoint, are "1234" for Admin, "2222" for User, and "0000" for Guest. After dialing up the first character of the password, press TAKE. Then dial up the second digit. Continue this procedure until the four characters have been entered. Upon pressing TAKE after entering the fourth character, the display will read "Okay..." if you were successful and "Sorry..." if you were not. When finished, turn PREVIEW SCROLL until the display reads "<<Exit" and press TAKE to finish the mode select operation.

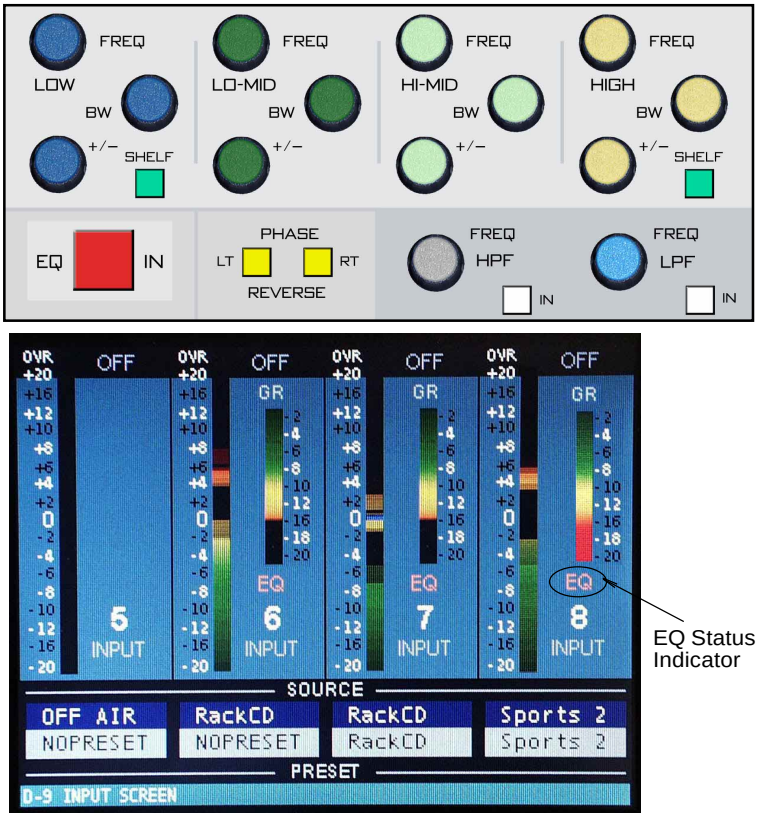
The ARM button lights as you select the mode that the surface is currently in. If you press TAKE when displaying the current mode, the display will switch to "Okay..." and you will not need to enter the password. If you stop partway through the procedure, the mode selection process will time out after about 15 seconds.

Once a given control mode is selected for a surface, that setting will persist through a power cycle or surface reset.

EQ Section

The EQ section consist of a bank of knobs and various associated switches. The EQ system consists of a four-band parametric EQ with low band and high band PEAK/SHELF switching, plus variable frequency high and low pass filters. As any of the controls are adjusted, a real time graphic display is presented on the LCD monitor panel showing the resulting frequency response curves.

To access EQ on individual input channels, press the appropriate channel's SET button and make the desired adjustments in the EQ Section. To actually place the adjusted EQ in the signal chain, press the EQ IN button. The input channel's EQ button will light, and its LCD display will show "EQ". Either the input channel EQ switch or the master EQ switch on the EFS panel can be used to engaged/disengaged the EQ functions on a channel.



High-Pass Filter

This is a 24dB/octave variable high-pass filter with Butterworth characteristics, tunable between 16.1Hz and 500Hz, and with a separate in/out switch ("HPF" switch). The relatively high order of filter is necessary to allow definite and decisive removal of unwanted low-frequency artifacts (air-conditioning rumble, line hum, traffic or footstep impacts) with minimal effect on the required program.

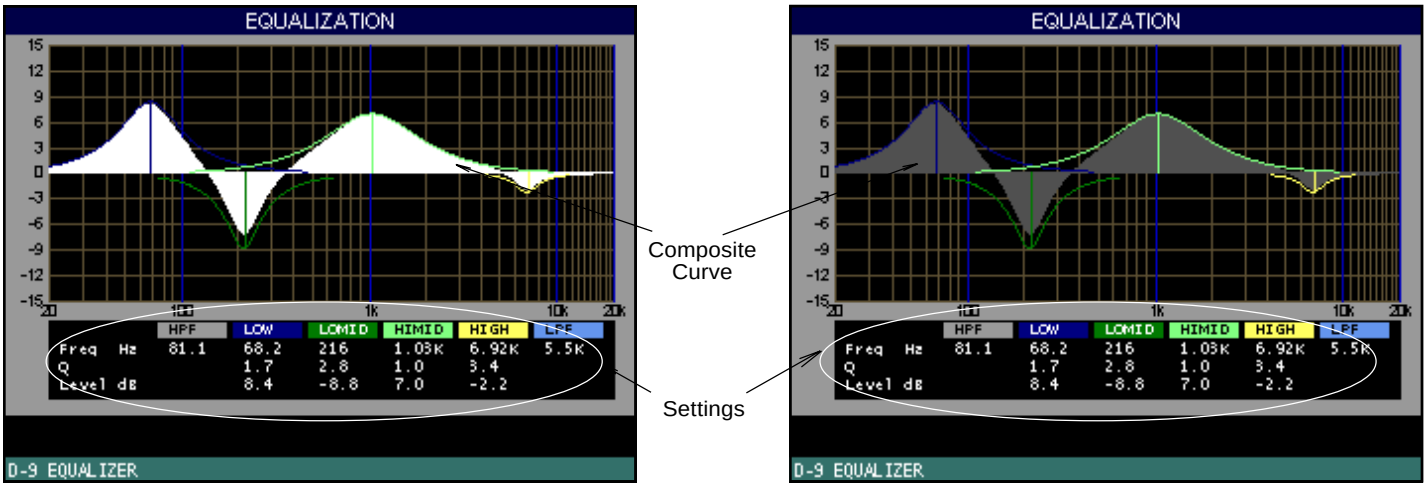
Note: Butterworth Filters typically yield excellent flatness, no ripple in the pass band and a rounded amplitude response near the cutoff frequency.

Low-Pass Filter

This is a 24dB/octave variable low-pass filter with Butterworth characteristics, tunable between 1KHz and 20.2KHz. This filter is used to remove unwanted high frequency artifacts (noise, squeaks, etc.) with minimal effect on the required program.

Equalizer

This consists of four bands of parametric control used for modifying the sonic qualities of a signal. Each band has +/-14dB of BOOST/CUT capabilities (+/- knob), sweepable center frequency over the range of 16.1Hz to 20.2kHz, and with a filter "Q" or sharpness [BW (Band Width) knob] sweepable between 0.3 and 5.0 octaves. The LOW and HIGH bands also have a shelving function. The composite effect of any EQ adjustments, as well as text describing the equalizer settings, are shown on the LCD screen.



EQ IN **EQ OUT**

Phase

A pair of switches, one for left and one for right, are provided to cause the reversal of absolute phase of the signal path.

Function Lock

It is a necessity under some circumstances that non-technical personnel be prevented from adjusting a control surface's signal processing; even with qualified personnel at the helm, locking out the controls can prevent an inadvertent mid-show disaster.

This is achieved by the FUNCTION LOCK switch on the upper right corner of the EFS panel. The control surface operator can lock out functions that may be undesirable to accidentally activate. To lock out a function, first press the FUNCTION LOCK button. This causes the

FUNCTION LOCK button to flash. Then press the control you wish to lock out. If you fail to press a target control within about five seconds, the operation will be canceled.

When you press a locked control, the FUNCTION LOCK button flashes to let you know you have tried to access a locked control. To unlock the control, press the FUNCTION LOCK button once. The locked control is released. If you fail to press the FUNCTION LOCK button within about five seconds of pressing the locked control, the operation will time out and the control will remain locked.

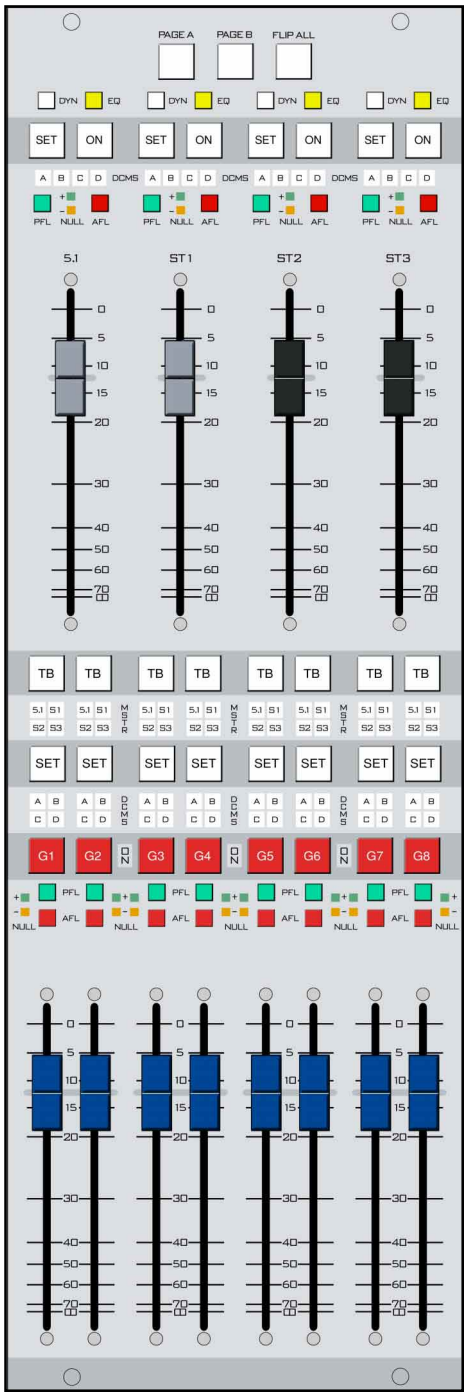
Master Panel (MFS-D9)

Chapter Contents

Master Panel (MFS-D9)

Controls and Functions

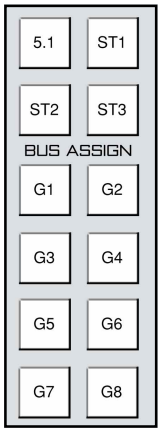
The D-9 digital audio control surface is equipped with one MASTER panel. This panel houses four master program outputs and eight submixes group outputs.



Master Program Outputs

Mix Destination 5.1 Surround

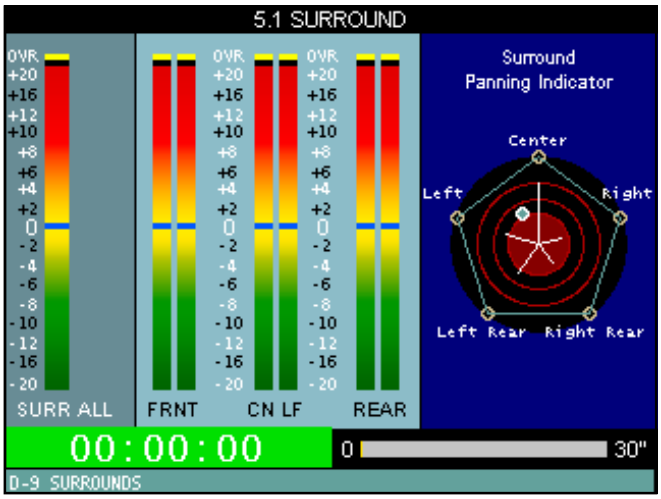
NOTE: There are four different mix destinations: 5.1 Surround, Stereo 1 (ST 1), Stereo 2 (ST 2) and Stereo 3 (ST 3). For descriptive purposes we will be discussing the controls for one section only, 5.1 Surround, with occasional references to other sections. Control descriptions for one section also apply to identical controls at the other three destinations on the MFS panel.



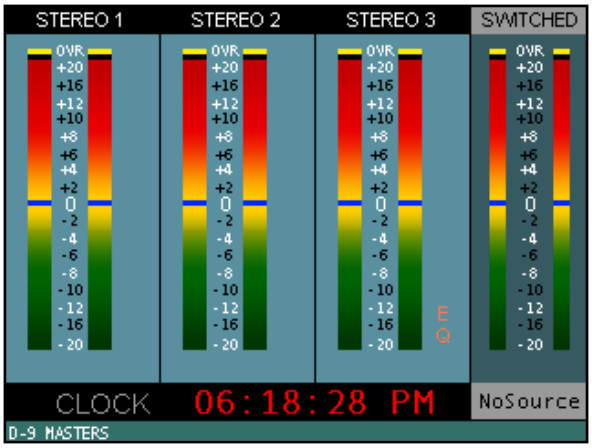
EFS-D9 Panel

Input channels are assigned to the 5.1 Surround master by means of BUS ASSIGN button “5.1” (BUS ASSIGN section on the EFS panel). Mono input sources would pan between the left front and right front. Stereo inputs would route to left front/right front.

Mono and stereo inputs may be processed into 5.1 Surround signals by means of the 5.1 SURROUND section on the EFS panel. 5.1 input sources would preferably route to the SURROUND output unmodified. Groups may also be routed to the masters (including the 5.1).



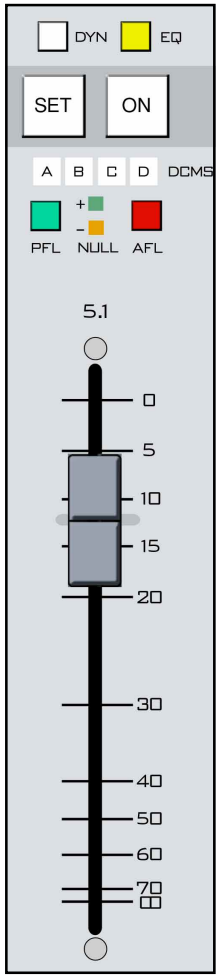
Master Mix Destinations



Output destinations are selected by pressing the SET button. The DESTINATION display (EFS-D9 panel) will show the most *recent* output destination assigned. It should be noted, however, that a mix channel can go to multiple destinations, and for this reason the entire list of destinations that channel is assigned to is displayed in the LCD display when that channel's SET button is active. If the mix is not assigned anywhere the display will show "NoDest".

As you rotate the DESTINATION knob in the EFS-D9 panel the names of allowable destinations will appear in the DESTINATION display. If 5.1 is not currently routed to the displayed output, the TAKE button will be lit; if 5.1 *is* currently routed to the displayed output, the CLEAR button will be lit. Press the TAKE button when lit to add the currently displayed output as a 5.1 destination, or press the CLEAR button when lit to delete that output as a 5.1 destination.

Destinations for the remaining master outputs are handled in a like manner.



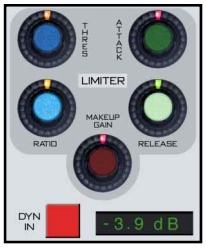
Channel Master ON/OFF

The ON switch turns the channel signal ON; pressing it again turns the channel signal OFF. The switch LED lights to indicate the channel is ON.

DYN

This switch inserts dynamic functions that have been preset by the operator in the DCM panel. When any knob is rotated, the display automatically shows the proper setting units and parameters for the active knob. The display settings (and the settings themselves) change as the knob is rotated.

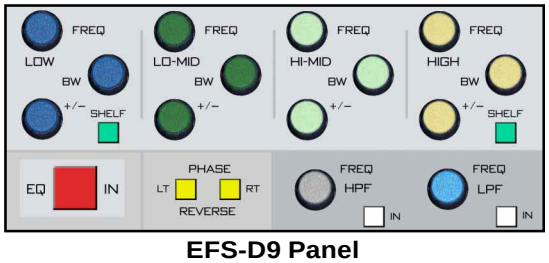
The dynamics settings are also shown graphically on the LCD screen.



DCM-D9 Panel

EQ

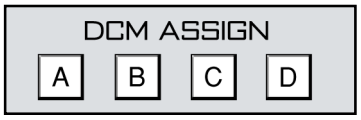
This switch inserts EQ functions that have been preset by the operator in the EQ section of the EFS panel. When any knob of the EQ section is rotated, the LCD displays a graphical representation of the EQ settings.



EFS-D9 Panel

DCM Master Displays

Each channel can be assigned to any combination of the four DCM masters (EFS panel). The assigned setting is displayed by the four indicators of the DCMS display group. Channels are assigned to these DCMs by pressing the channel SET button and then pressing the desired DCM ASSIGN button (EFS panel).



EFS-D9 Panel

PFL (Cue)

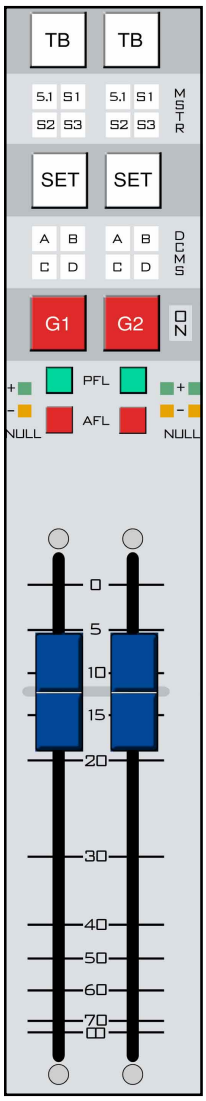
This switch lets the control surface operator monitor the master's pre-fader signal.

AFL (Solo)

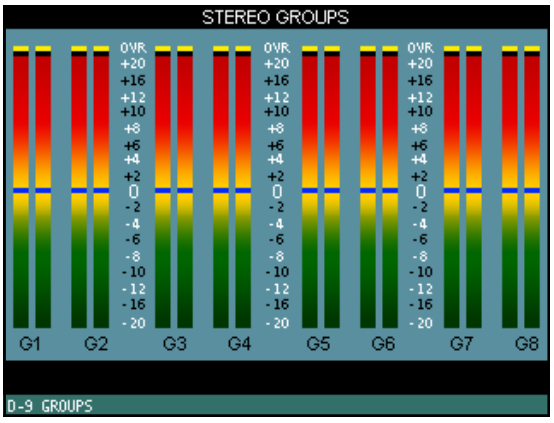
This switch lets the control surface operator monitor the master's post-fader signal.

Master Faders

These linear controls set the levels of the master channels. When the control surface has recalled a preset or is under external serial control from an automation system, the fader NULL LEDs light to show that the master output level is actually different from what the fader indicates. The master output level will remain at the computer directed value until the fader is moved to a matching level, after which the fader will control the level. The lit NULL LED indicates which direction to move the fader to regain level control. Once the fader has been moved to the matching level the LED will turn off.



Submixes (Groups) Output



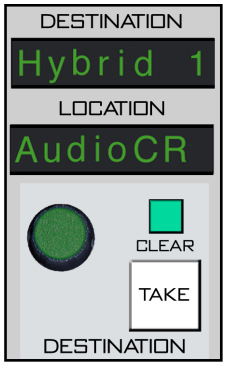
Generally the 8 audio submixes would operate in stereo mode. They may be mixed to two duplicate mono channels by means of the channel SET button and mode buttons in the MODE section of the EFS panel. The current mode will be shown by the LED indicators in the MODE buttons.

TB

Pressing the TB button will allow the announcer's mic to talk directly to the group output.

Output Destinations, Group 1 Example

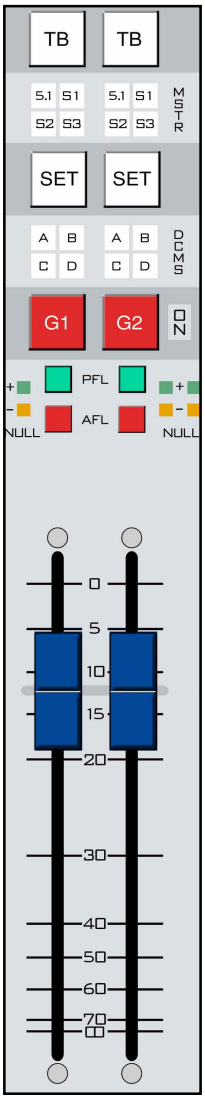
EFS-D9 Panel



Output destinations are selected by pressing the SET button. The DESTINATION display (EFS-D9 panel) will show the most *recent* output destination assigned. It should be noted, however, that a mix channel can go to multiple destinations, and for this reason the entire list of destinations that channel is assigned to is displayed in the LCD display when that channel's SET button is active. If the mix is not assigned anywhere the display will show "NoDest".

As you rotate the DESTINATION knob in the EFS-D9 panel the names of allowable destinations will appear in the DESTINATION display. If G1 is not currently routed to the displayed output, the TAKE button will be lit; if G1 *is* currently routed to the displayed output, the CLEAR button will be lit. Press the TAKE button when lit to add the currently displayed output as a G1 destination, or press the CLEAR button when lit to delete that output as a G1 destination.

Destinations for the remaining master outputs are handled in a like manner.



Groups Output Display

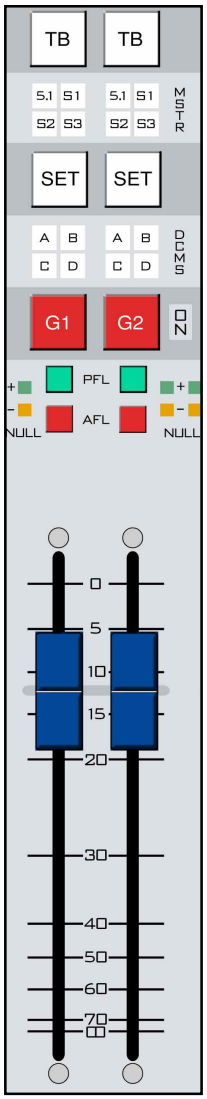
Each group can be assigned to any of the four main stereo output buses in the center section of the EFS panel. The assigned setting is displayed by the four indicators of the MSTR display group.

DCM Group Displays

Each submix channel can be assigned to any combination of the four DCM masters (EFS panel). The assigned setting is displayed by the four indicators of the DCMS display group. Channels are assigned to these DCMs by pressing the group's SET button and then pressing the desired DCM ASSIGN button, located in the EFS-D9 panel.

ON (G1-G8) Switch

The ON switch turns the group channel signal ON, pressing it again turns the group channel signal OFF. The switch LED lights when the group is ON.



PFL(Cue)

This switch lets the control surface operator monitor the group's pre-fader signal.

AFL(Solo)

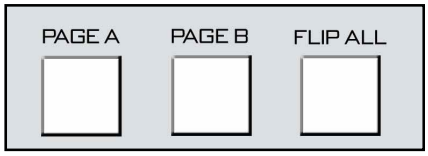
This switch lets the control surface operator monitor the group's post-fader signal.

Submix (Group) Faders

These linear controls set the output levels of the submix channels. When the control surface has recalled a preset or is under external serial control from an automation system, the fader NULL LEDs light to show that the master output level is actually different from what the fader indicates. The master output level will remain at the computer directed value until the fader is moved to a matching level, after which the fader will control the level. The lit NULL LED indicates which direction to move the fader to regain level control. Once the fader has been moved to the matching level the LED will turn off.

Page Buttons

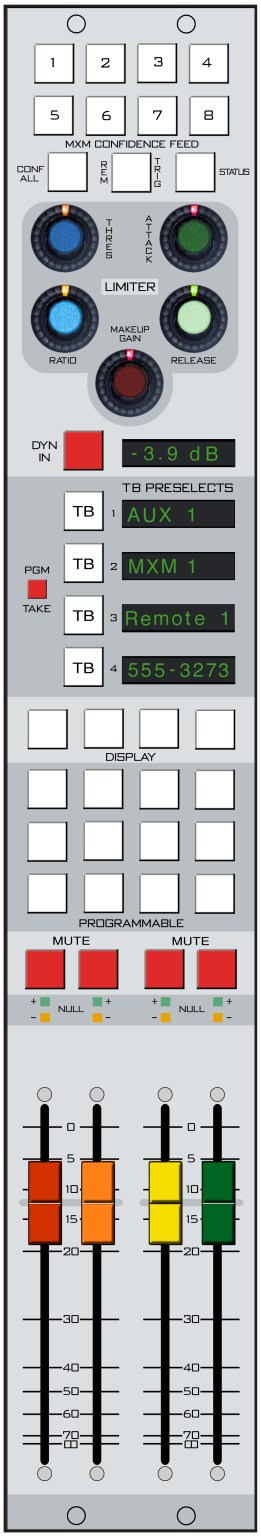
The three page buttons located on the top of the MFS panel and used to simultaneously toggle groups of individual input channel PAGE buttons at once. The PAGE A button places all input channels in Page A mode, the PAGE B button places all input channels in B Mode, and the FLIP ALL button toggles each individual input channel page button to its opposite state (i.e., A becomes B, B becomes A). Useful for instant LIVE to BREAK setups.



Dynamics Processing Control Panel (DCM-D9)

Chapter Contents

Dynamics Processing Control Panel (DCM-D9)



Controls and Functions

The DCM panel provides compression and limiting functions for individual input channels. This section can be accessed by means of the SET buttons on the desired input channels. As you turn the knobs in this section, the LED display next to the DYN IN button displays the current settings of that knob for the channel currently in SET mode. The knobs may be pressed to obtain a display reading without actually turning them. Any current settings of the active channel will also be graphically shown in real time on the flat panel display.

This panel also contains the MXM confidence feed section, the talkback preselects section, the display buttons, the programmable buttons and the DCM section.

Compressor/Limiter

The compressor algorithm used in the D-9 control surface is designed to:

- allow smooth, inaudible, and unobtrusive level control on uneven sources;

- be able to act as a peak limiter for inadvertent overload control;

- enable deep effects if required.

The DCM-9 panel compressor section is a compound of many diverse dynamics elements.

The level detector is a pseudo-RMS averaging type with its own symmetrical-in-time attack-and-release characteristic adjustable between 0.1mS and 330mS ("Attack" control). At the slower end of its range, by itself it achieves a nouveau-classic "dbx" style syllabic-rate level control. As the time-constant is shortened, it becomes progressively shorter in relation to the lower audio frequencies themselves; the effect is to turn the detector into more of a peak-level detector, necessary for limiting or wilder effects. A secondary effect at intermediate to fast attack-times is that low frequencies are peak sensed while high frequencies are average sensed resulting in an effective high-frequency bias (up to as much as 6dB differential) which helps to mitigate the detrimental limiting effect of the resulting audio seeming "bottom heavy" normal to most compressors.

While the overall gain-reduction scheme is “feed-forward”, the heart of the detector stage itself is a feedback limiter; this allows for this carefully-contrived loosely-damped servo-loop to permit far more interesting dynamic effects.

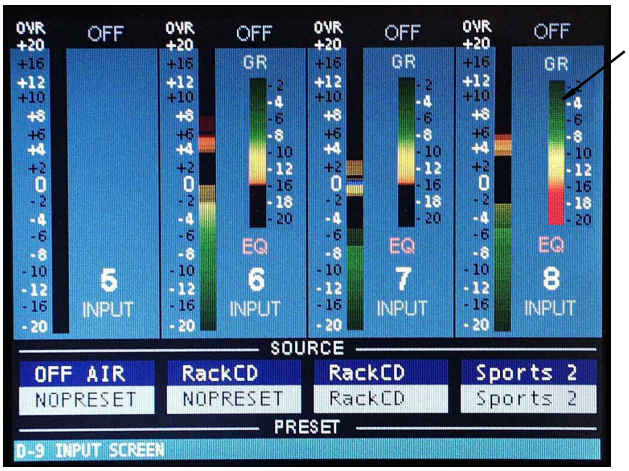
The compressor is “soft-knee”, meaning the compression ratio increases slowly with increasing applied level, greatly easing the sonic transition into full compression; it helps avoid the “snatching” and “pumping” at threshold that many “hard-knee” dynamics units exhibit.

A full range of controls is available over the compressor’s behavior:

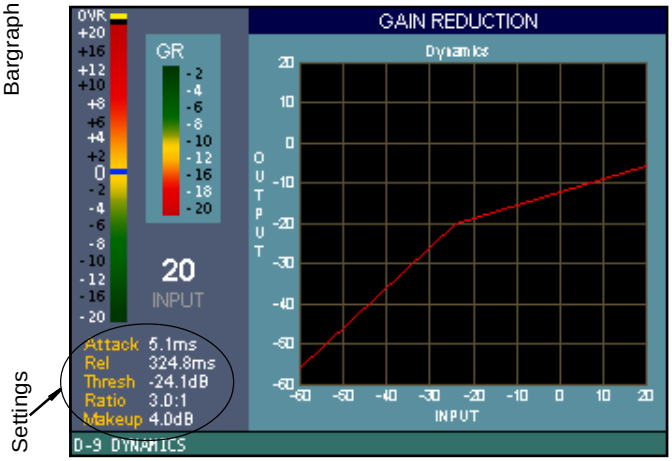
DYN IN

A DYN IN button toggles the settings in and out of the signal path. Each input channel also has its own “DYN” button to allow engaging these functions directly from the input panel. Whenever dynamic functions are engaged, the input channel LCD display will show a gain reduction bargraph meter, indicating both that the dynamics functions are active, and the amount of gain reduction being generated.

In addition, the DCM master LCD display will show a diagram of the gain reduction functions and text for the various knob settings.



Input LCD Display



Dynamics LCD Display

THRESHOLD

The THRES knob sets the level at which the compressor is fully into compression of whatever ratio is set. This can be set anywhere in the range of -30.0 to + 10.0 dB

ATTACK

This control determines how quickly (between nominally 0.1mS and 330mS) the compressor reacts to signals. Faster attack times result in “tighter” and more obvious control; longer attack times lend themselves well to gentler automatic volume control.

RATIO

This control determines how much the compressor's gain is reduced in relation to the applied signal. For instance, if the ratio is set at 3:1 and the input level above threshold changes by 12dB, the output level will changed by 4dB. Normal usage is between approximately 2:1 and 4:1; anything greater than, say, 7:1 may be considered "limiting". The ratio can be set anywhere from 1.0 : 1 to 20.0 : 1.

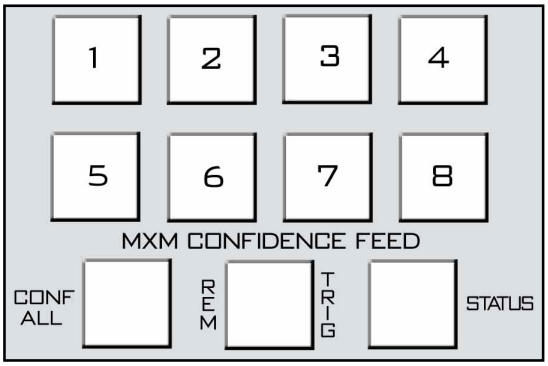
RELEASE

This knob determines the nominal time the compressor takes to recover after excitation (between 50.0mS and 3.0 Seconds). Short release times make for more intense, denser, obvious processing; longer release times are better suited to automatic gain control.

MAKEUP GAIN

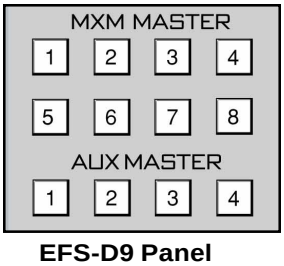
When fairly deep compression is invoked (large gain reduction) it can be necessary to increase the compressor's output level back up to nominal system signal level; up to 20dB of output gain is available to allow this.

MXM Confidence Feed



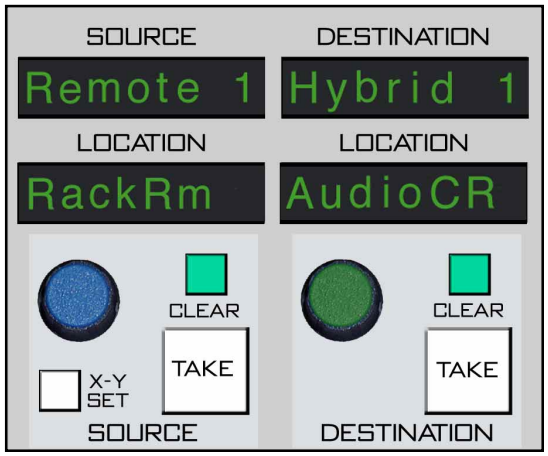
This system provides a means of sending an external signal to any or all of the 8 MXM outputs. This is typically used during show setup or airtime operations so talent can remain confident that their MXM feeds are active and working. (A typical confidence feed signal might be master control audio.)

A bank of 8 buttons allows individual activation of confidence feeds to any of the MXM outputs. Each feed can be unique. Additionally, all 8 can be put into confidence mode by means of a CONFIDENCE ALL switch. Also, the CONFIDENCE ALL feed function can be triggered from an external contact closure and armed for such action by means of the REM TRIG button. All Confidence Feed programming is included in the EVENT storage.



EFS-D9 Panel

To set and store a confidence feed signal, go to MXM MASTER section of the EFS panel, and hit the corresponding button to establish a programming mode. Select the desired source in the EVENTS section of the EFS panel by rotating the SOURCE knob until the desired signal is shown in the SOURCE display, at which time the TAKE button will light. Pressing that TAKE button will now program the corresponding MXM to receive the selected source. Repeat



EFS-D9 Panel

the process for each of the 8 MXM outputs in the MXM MASTER section on the EFS panel.

To DEselect a source, select that source by means of SOURCE knob, and press the CLEAR button.

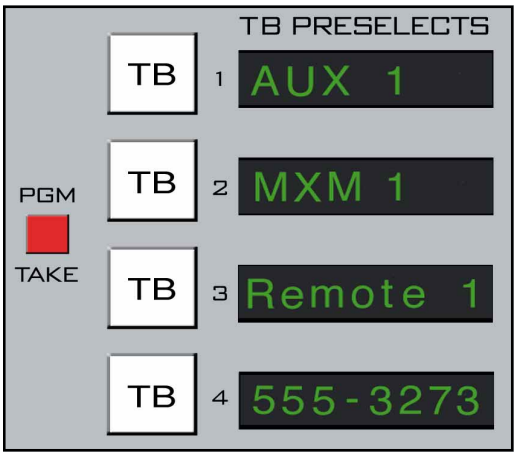
After a timeout period of 5 seconds the INPUT NAME display will revert to the current channel that's in SET mode elsewhere on the control surface.

Talkback Preselects

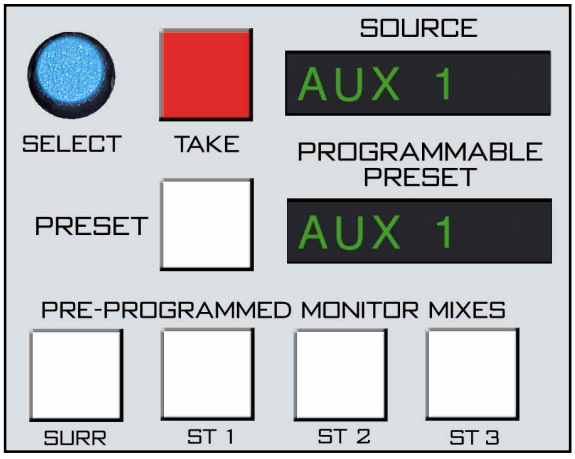
These four switches allow for a dedicated Bridge Router output to be designated as a destination for the talkback signal. Once a specific output has been programmed into the preselector, the talkback signal can be sent to that output at any time by pressing the corresponding switch.

Each of the four TB buttons can be individually programmed, and then the entire programmed bank of four can be stored and recalled in the EVENT CONTROLLER section (see pages 3-12 to 3-14). Each individual TB button is programmed as follows: press the PGM/TAKE button (this button will light), then press the TB button you want to program (the TB button and its associated display will flash). Then rotate the SELECT knob (programmable section on the EFS panel) and available destinations will be shown in the SOURCE display. When the desired channel is shown, press TAKE button located next to the SELECT knob (EFS-D9 panel), and the appropriate TB PRESELECTS display will then match what is shown in the SOURCE display on the EFS panel. Repeat this procedure for each of the four TB buttons. The procedure will time out after about 5 seconds if you fail to complete one of the steps.

When EVENTS are stored, the four TB preselects as displayed at the time of the EVENT SAVE action will be also stored and can be recalled with that EVENT.



DCM-D9 Panel



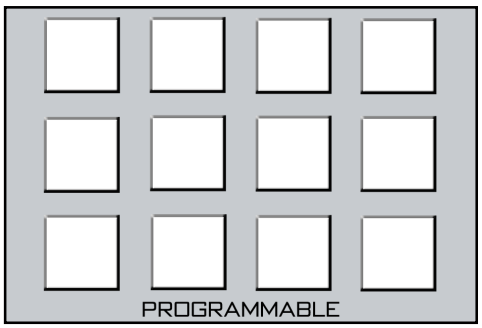
EFS-D9 Panel

Display Buttons

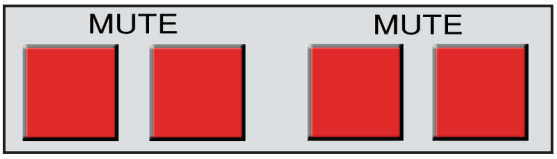
These switches control the display modes for the LCD monitor.

Programmable Buttons

These (12) momentary switches and indicating LEDs are designed for user accessible external functions (GPIs). With these switches the user can fire Salvos or make a temporary crosspoint without having to wire any physical logic ports. These switches may also be mapped to control physical Logic card output ports, and the LEDs on the Spare buttons may also be lit by a remote device connected to a Logic card input port. See the Bridge Router manual for details.

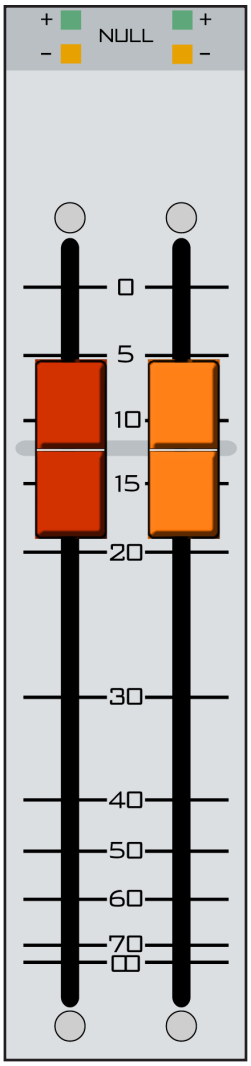


Mute Group



The MUTE switch for each DCM provides a rapid way to mute a group of signals. Any signals that are assigned to a DCM will be muted when the MUTE switch is on.

Fader



DCM level is set by a long-throw fader. When the control surface has recalled a preset or is under external serial control from an automation system, the fader NULL LEDs light to show that the DCM level is actually different from what the fader indicates. The DCM level will remain at the computer directed value until the fader is moved to a matching level, after which the fader will control the level. The lit NULL LED indicates which direction to move the fader to regain level control. Once the fader has been moved to the matching level the LED will turn off.

Host CPU (HC-9)

Chapter Contents

All devices in the system must be set to the same sample rate!

Host Controller (HC-9)

Overview

The host controller card used in the D-9 incorporates a PC/104 computer mounted on the HC-9 PCB. The host computer utilizes RAM, a flash disk (which emulates a standard IDE hard drive) and an Ethernet port. There is no hard disk drive. Keyboard, floppy controller and video ports are for factory use only.

The purpose of the host controller is to provide control of the D-9 control surface. The HC-9 communicates to the XPoint Configuration PC via TCP/IP over Ethernet through a standard ethernet hub or switch. It also communicates to the Bridge Router system via a special mixer link connection.

Hardware and software configuration, as well as real time crosspoint information, is saved in non-volatile storage on the HC-9 card and is restored at power up or reset. This configuration information provides details to the host application running on the HC-9, such as the specific audio hardware available and serial port allocation. The HC-9 host controller card can be fitted with an optional 2nd PC/104 computer for redundancy.

HC-9 BIOS Settings/Format

BIOS Setup and formatting of the Host CPU is completed prior to the testing of your D-9 control surface at the Wheatstone factory. There are no user adjustable settings.

Ethernet IP Addressing

The Wheatstone D-9 control surface ships with the host controller IP address set. Stand-alone systems (not interfaced to a station's existing network) require no IP address changes.

Ethernet Interface Wiring

Networked systems are connected to the network hub or switch via a straight (pin to pin) CAT-5 cable. Typical CAT-5 cable pinouts are included in the "Hook-Ups" section near the end of this chapter. These connections are for communicating with the configuration computer; a separate ethernet connection should be provided for each control surface.

Mixer Link Wiring

This RJ-45 (or optical) connection provides the control link between the control surface and the Bridge Router system. All settings and commands generated on the control surface pass through this link. A special CAT-5 cable wired in "crossover" fashion is used for this link. This special cable connects the RJ-45 jack on the control surface to the matching RJ-45 jack on the Bridge Router system. Please note that, in a typical system, there will be many RJ-45 jacks in the Bridge Router, and for proper operation, the control surface must be connected to the specific RJ-45 jack defined for it in the system configuration.

Internal Programming Options

All internal programming options are made via PCB mounted dipswitches.

Switch Settings

DIPSW1 - SW4 & SW9 - Not Used

The four positions of dipswitches SW1-SW4 and SW9 are reserved for future use.

SW5 - SW8 - CAT5 vs. Fiber & Transceiver Select

These slide switches can be used to select the CAT5 or fiber optic mixer link connection.

To set MIXER LINK 1 for CAT 5 connection slide switches SW6 - TX and SW8 - RX to the up position (toward the surface's rear). Sliding these switches down selects fiber optic connection for transceiver 1.

To set MIXER LINK 2 for CAT 5 connection slide switches SW5 - TX and SW7 - RX to the up position (toward the surface's rear). Sliding these switches down selects fiber optic connection for transceiver 2.

Note that the setting of these switches and SW12 pos 4 (see below) must be made to the same selection. The Mixer Link is <u>either</u> CAT5 or FIBER.

SW10 - Master Reset

This switch can be used to force takeover by the backup CPU if the main CPU has failed and automatic failover has not been accomplished.

SW11 - CPU Reset

This switch can be used to reset the host controller's main CPU without powering down the system. If the system is running from the backup CPU this switch will NOT cause the main CPU to take over again. To do that you must recycle the surface power.

SW12 Position 1 - Sample Rate

This dipswitch position must be set to agree with the sample rate of the system. The switch is off for a sample rate of 44.1kHz and on for a sample rate of 48kHz.

All devices in the system must be set to the same sample rate!

SW12 Position 2 - Not Used

This dipswitch position is reserved for future use.

SW12 Position 3 - Redundant CPU

To enable automatic failover from the main CPU to the backup CPU this switch position must be on.

SW12 Position 4 - CAT5 vs. Fiber

The mixer link can be connected via CAT5 cable or fiber optic cable. Set position 4 of SW12 on if you are using CAT5 or off if you are using fiber. Note that switches SW5 - SW8 must also be set to agree with the SW12 position 4 setting.

Hook-Ups

All user wiring to and from the host controller is made via I/O connectors located on the control surface rear. There are two RJ-45 Ethernet connectors. CAT5 or multi-mode optical fiber Mixer Link connections are made via RJ-45 or LC type optical connectors. The pinout drawing on page 6-7 shows all wiring connections at a glance.

"ETH A" RJ-45—Main Ethernet Connector

Pin 1 – TXD +
Pin 2 – TXD -
Pin 3 – RXD +
Pin 4 – N/C
Pin 5 – N/C
Pin 6 – RXD -
Pin 7 – LN LED
Pin 8 – LK LED

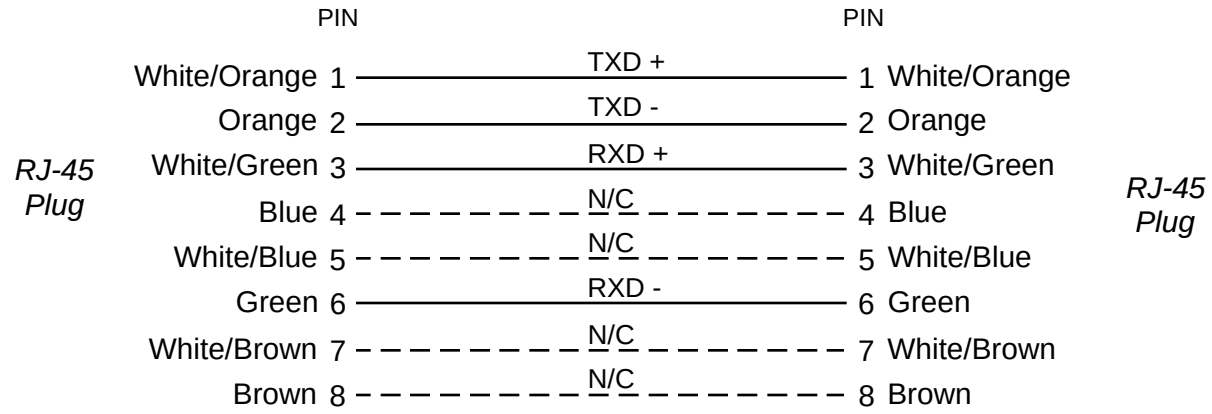
"ETH B" RJ-45—Optional Redundant Computer Ethernet Connector

Pin 1 – TXD +
Pin 2 – TXD -
Pin 3 – RXD +
Pin 4 – N/C
Pin 5 – N/C
Pin 6 – RXD -
Pin 7 – LN LED
Pin 8 – LK LED

"CAT5" RJ-45—Mixer Link Connector

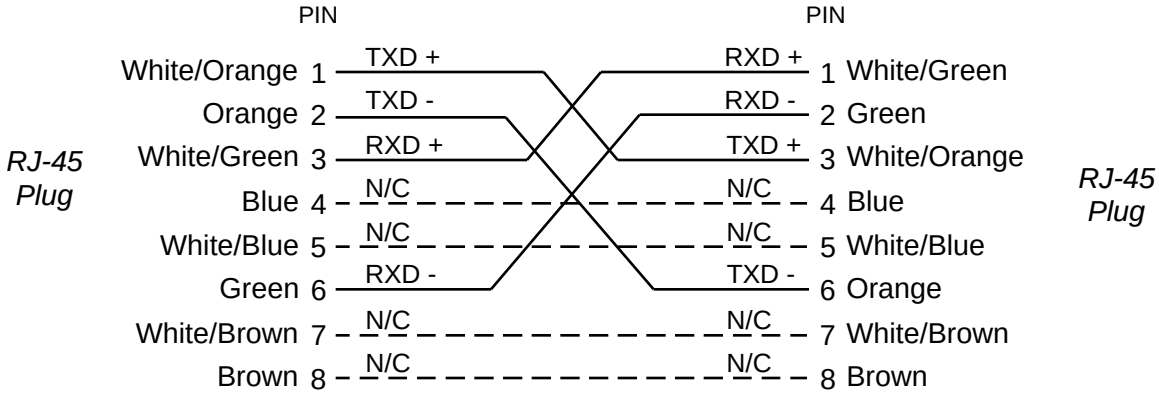
Pin 1 – TXD +
Pin 2 – TXD -
Pin 3 – RXD +
Pin 4 – N/C
Pin 5 – N/C
Pin 6 – RXD -
Pin 7 – N/C
Pin 8 – N/C

TYPICAL ETHERNET CABLE



USED FOR CONNECTING THE HOST CONTROLLER TO YOUR NETWORK HUB.

TYPICAL CROSSOVER CABLE



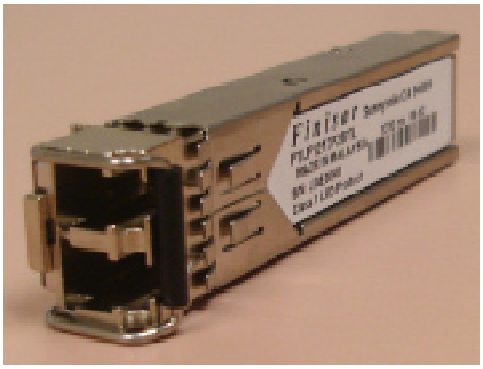
USED FOR MIXER LINK CONNECTOR.

Optical Fiber Interface

The D-9 control surface supports an optional fiber connection to the Bridge Router. The D-9 surface uses an SFP module interface with integral LC connectors. Note that the QOT-2001 rear panel on the Bridge router uses SC connectors, so a patch cable fitted with LC connectors on one end and SC connectors on the other end is required.

Optical Transceiver

Optical Transceivers convert physical signals from electrical to optical (and vice-versa) in a network and couple the optical signals into (and out of) optical fiber. Small form factor pluggable (SFP) transceivers, used in the D-9 surface, are designed to be hot-swappable in industry standard cages and connectors (for easy field repair), and offer high speed and physical compactness.



Optical Transceiver

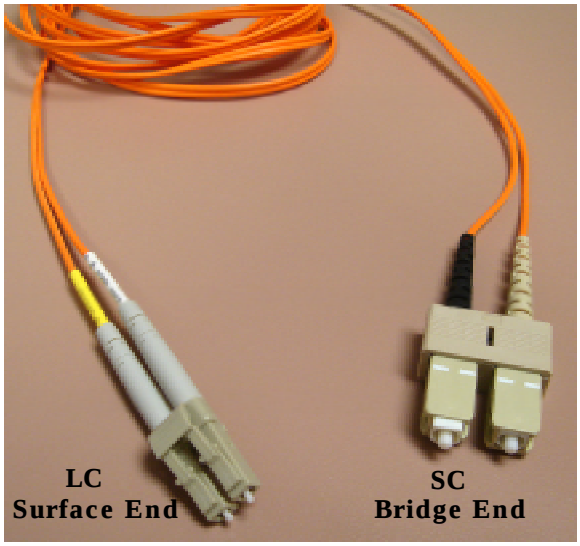
Connectors Type

The high-density *LC Duplex* connector has a tabbed locking mechanism similar to what you would find on a phone jack. This enables secure connectivity and easy removal.

The *SC* (subscription channel) *Duplex* connector is a low insertion loss connector using a push/pull locking mechanism.

Optical Fiber Cable

The SC-LC optical fiber cable required in this application is a multimode duplex fiber optic patch cable with a core/cladding size *62.5/125 micron* suitable for low-to-moderate-speed data links (≤100Mbps). The following Fiber Instrument Sales, Inc. part number X2YLM3FISC may be used to reference the physical characteristics of the required cable assembly. The full-duplex nature of the audio network interface requires one fiber for transmit, and one for receive; hence dual zip cables are recommended.



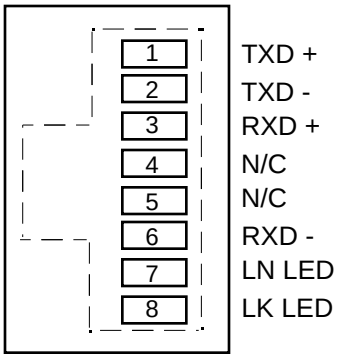
Optical Fiber Cable

Optical fiber cables are manufactured with a variety of jacket materials, which directly affect cable cost, including Thermoplastic Elastomer (TPE), Kynar® and Teflon® FEP. Physical properties of the jacket material determine a cable's resistance to abrasions, flame retardancy, etc. *Check local codes to be sure the cable you plan on using is compliant in your application.*

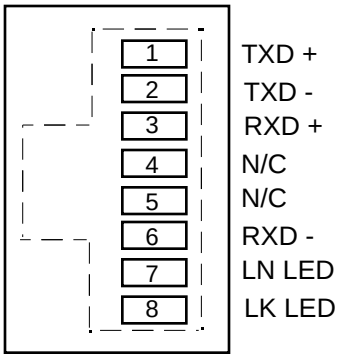
HC-9 Host Controller I/O Connections

Ethernet Connections

"A" Main Ethernet Connector (RJ-45)

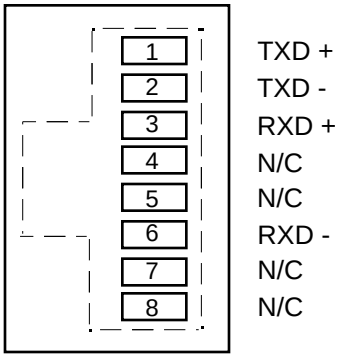


"B" Optional Redundant Computer Ethernet Connector (RJ-45)



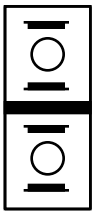
Mixer Link Connections

CAT5 Connector (RJ-45)



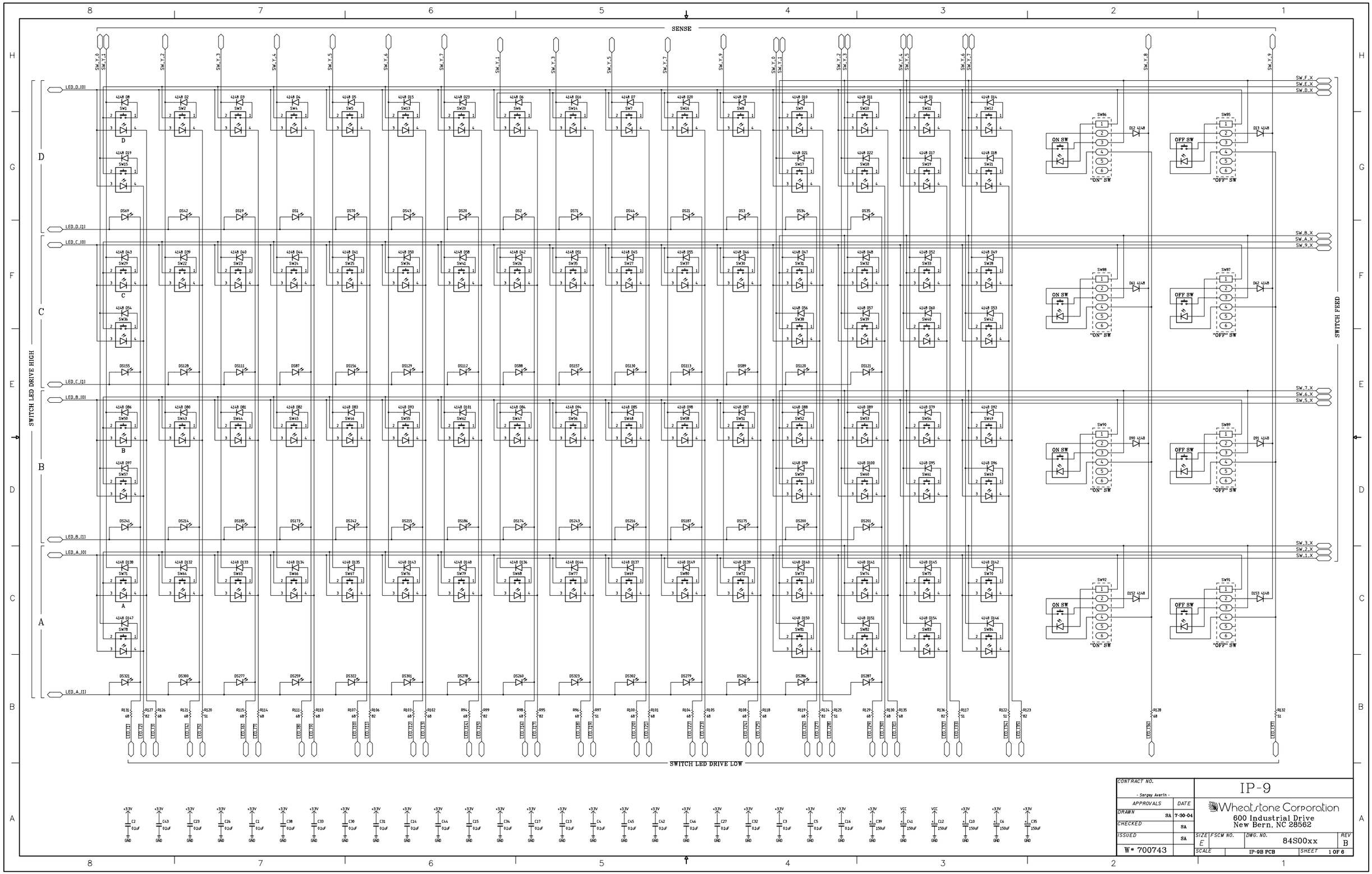
(crossover)

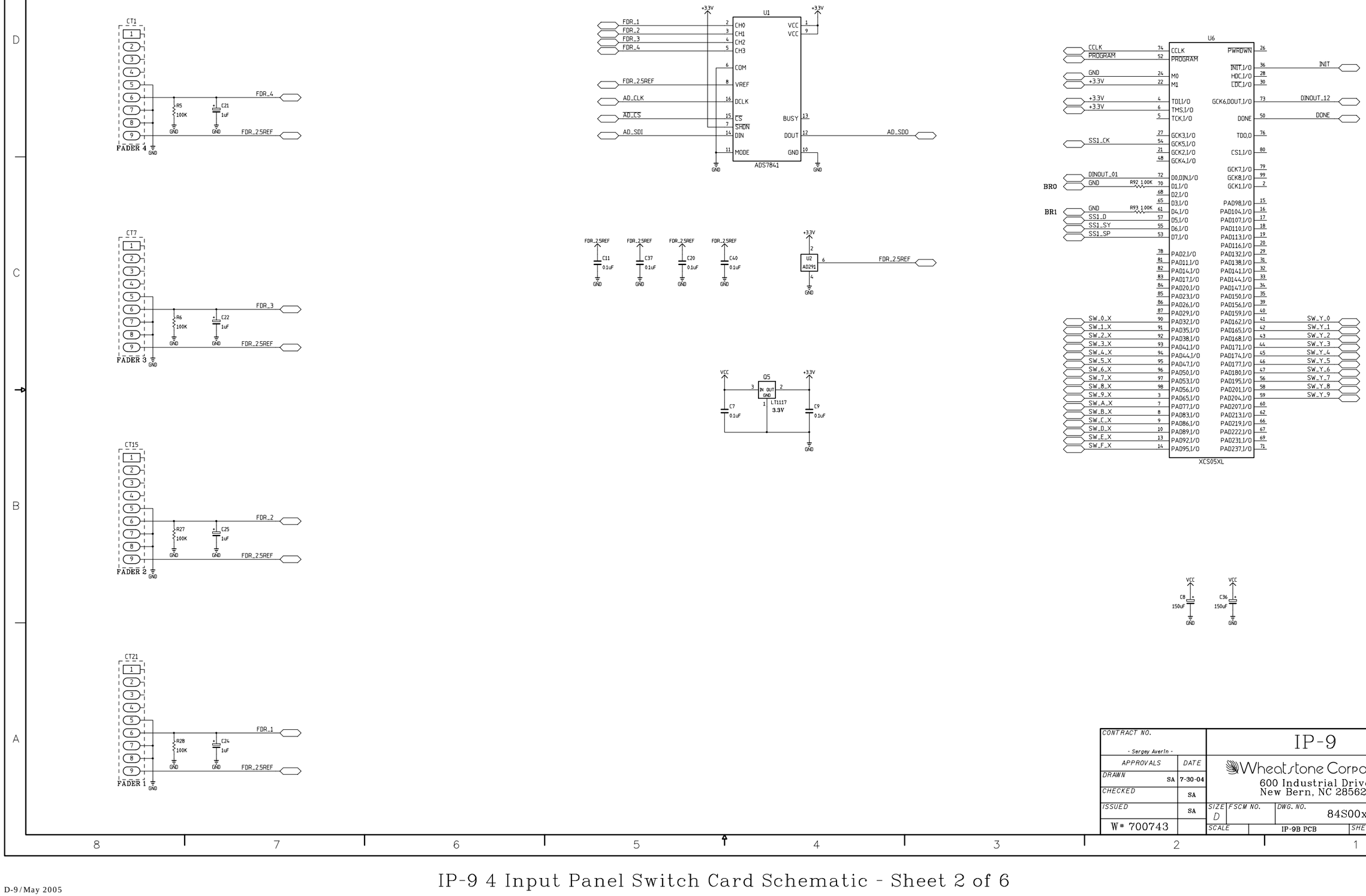
Optional Optical FIBER (LC Connector)



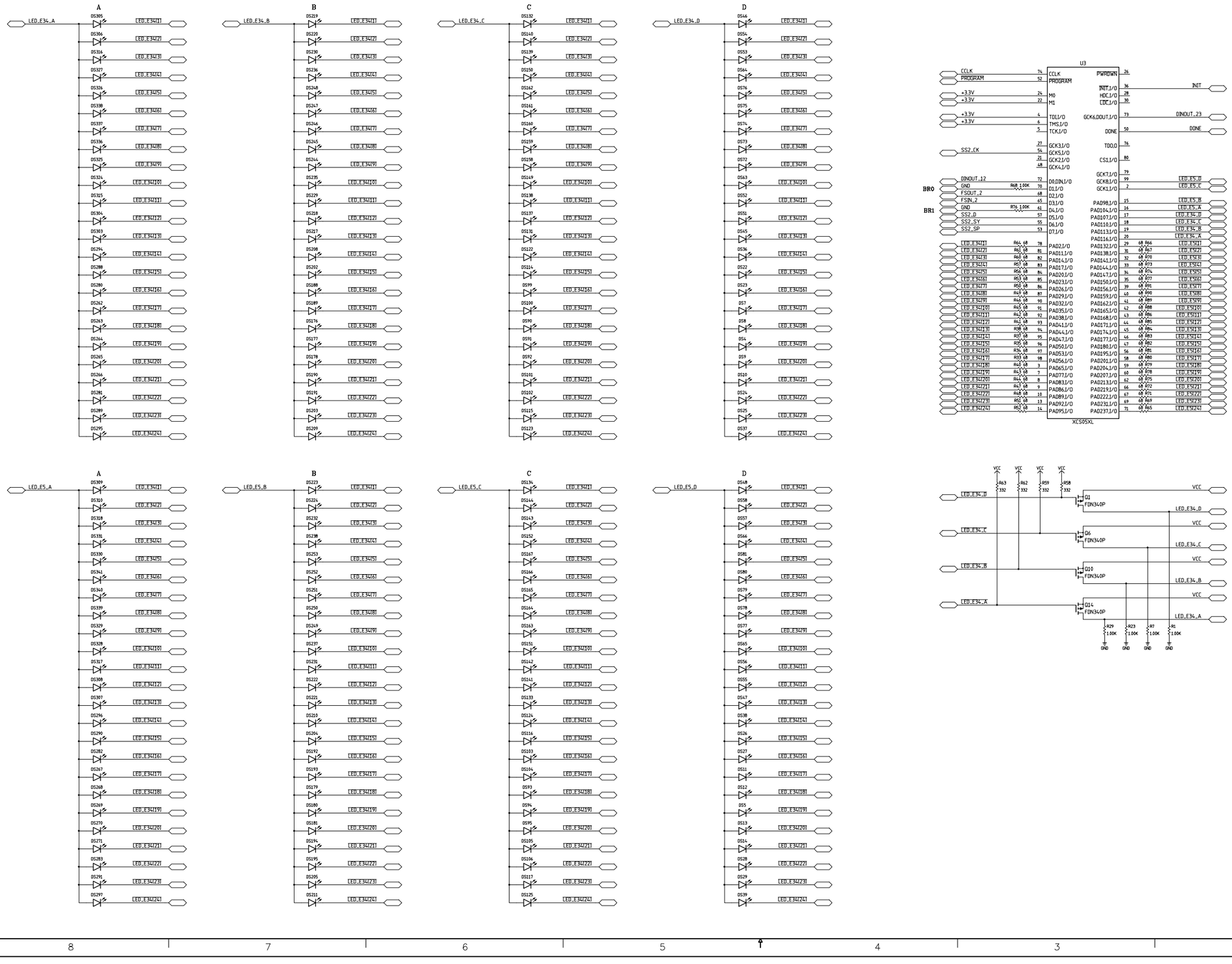
Schematic and Load Sheet Drawings

Chapter Contents


SENSE
SWITCH LED DRIVE HIGH
SWITCH LED DRIVE LOW
SWITCH FEED
LED_D_[0]
LED_D_[1]
LED_C_[0]
LED_C_[1]
LED_B_[0]
LED_B_[1]
LED_A_[0]
LED_A_[1]
SW_F_X
SW_E_X
SW_D_X
SW_B_X
SW_A_X
SW_9_X
SW_7_X
SW_6_X
SW_5_X
SW_3_X
SW_2_X
SW_1_X
ON SW
OFF SW
"ON" SW
"OFF" SW
CONTRACT NO.
- Sergey Averin -
APPROVALS
DATE
DRAWN
SA
7-30-04
CHECKED
SA
ISSUED
SA
W* 700743
IP-9
Wheatstone Corporation
600 Industrial Drive
New Bern, NC 28562
SIZE
E
FSCM NO.
DWG. NO.
84S00xx
REV
B
SCALE
IP-9B PCB
SHEET
1 OF 6



CONTRACT NO.		IP-9	
- Sergey Averin -			
APPROVALS	DATE	Wheatstone Corporation	
DRAWN	SA 7-30-04	600 Industrial Drive New Bern, NC 28562	
CHECKED	SA		
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 84S00xx / REV B	
W# 700743		SCALE / IP-9B PCB / SHEET 2 OF 6	



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- Sergey Averin -			
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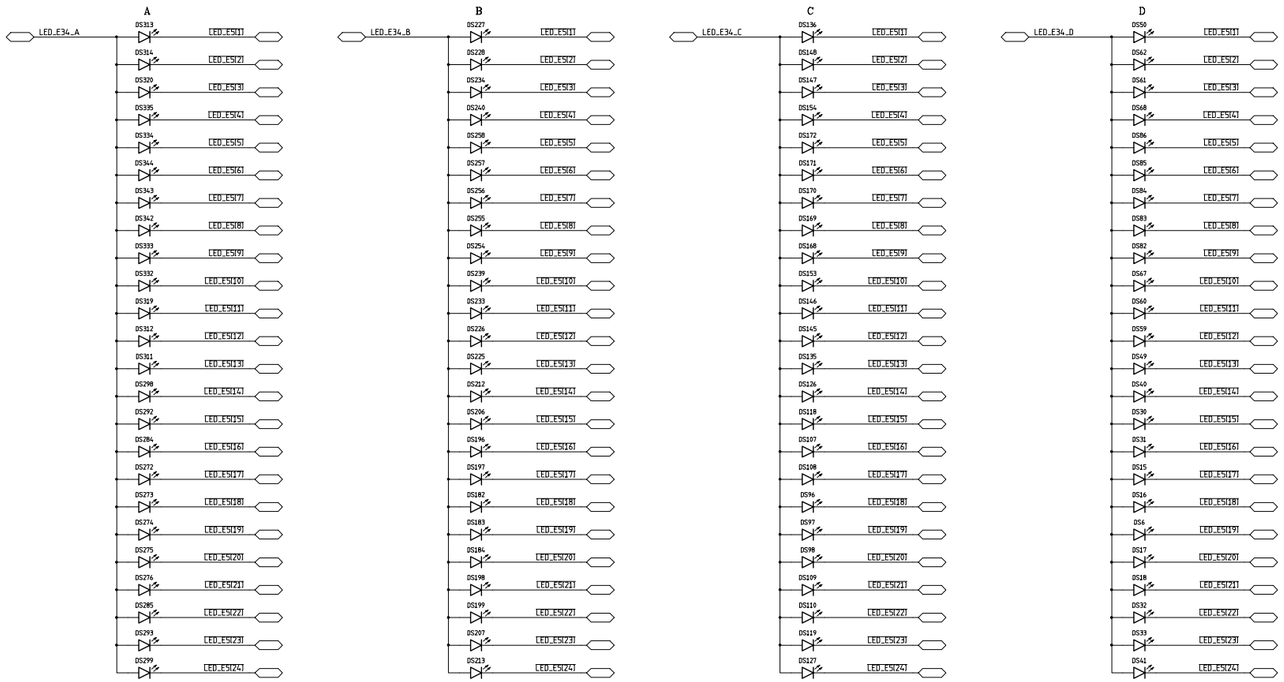
W# 700743		SCALE / IP-9B PCB / SHEET 3 OF 6	



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- Sergey Averin -			
APPROVALS	DATE	Wheatstone Corporation	
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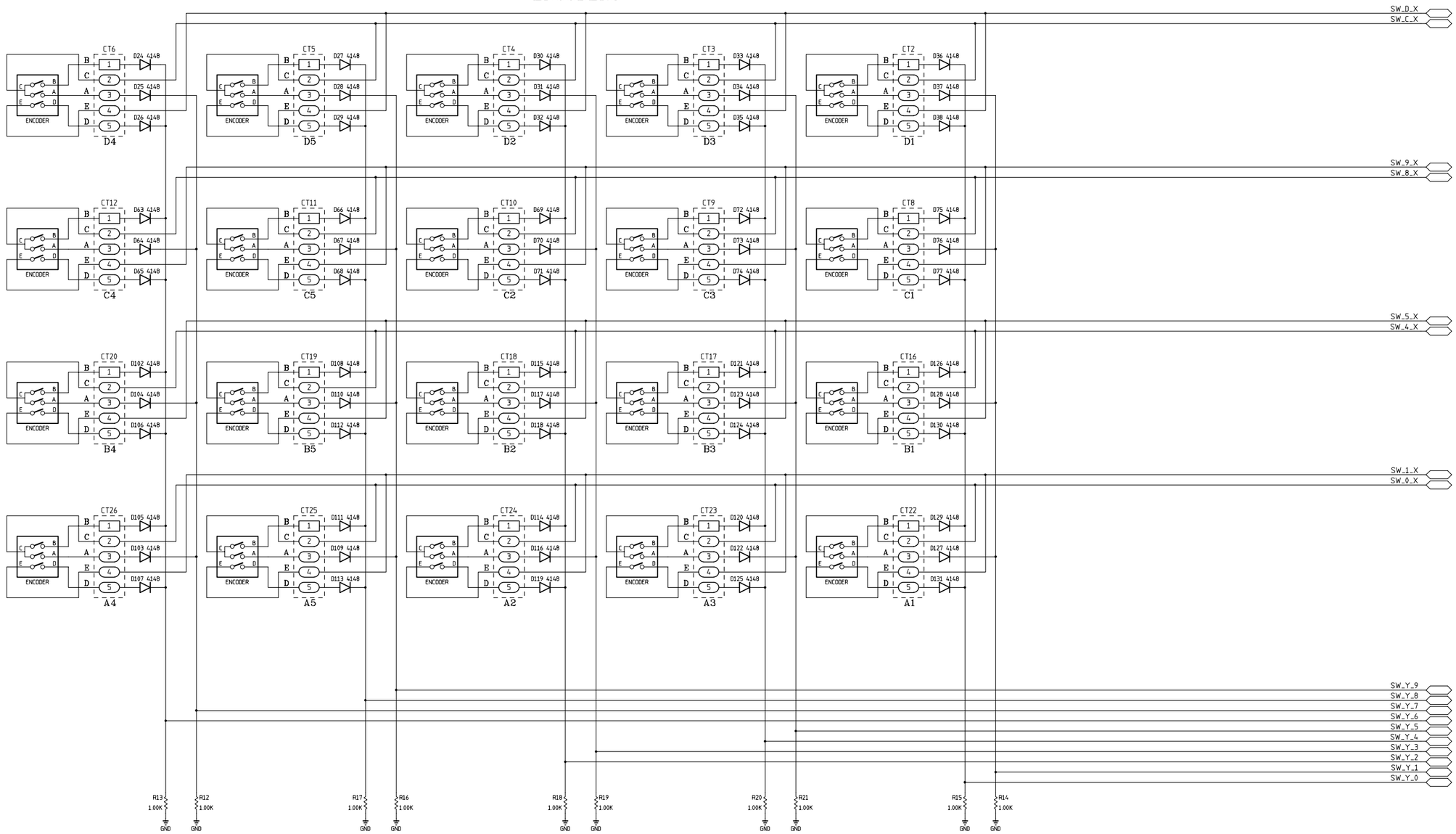
CHECKED	SA	New Bern, NC 28562	
ISSUED	SA	SIZE E / FSCM NO. / DWG. NO. 84S00xx / REV B	
W# 700743		SCALE / IP-9B PCB / SHEET 4 OF 6	

ENCODERS



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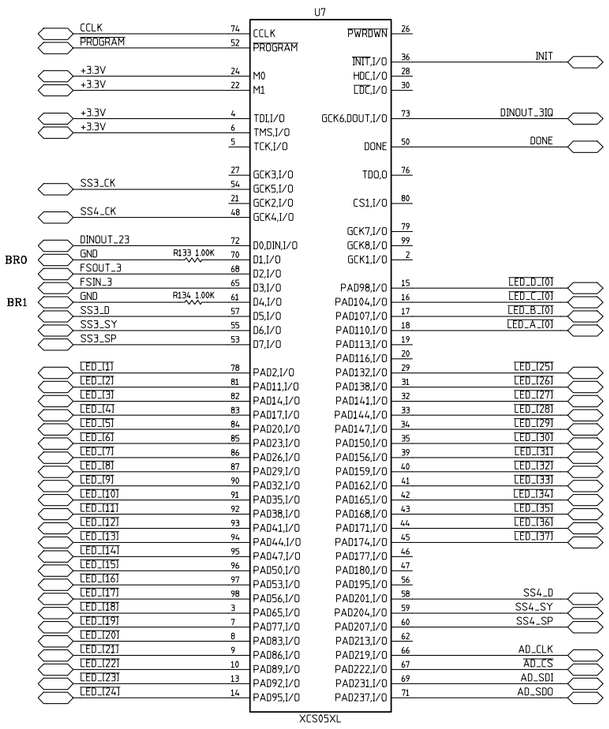
DRAWN SA	7-30-04	
CHECKED SA		
ISSUED SA		SIZE D · FSCM NO. · DWG. NO. 84S00xx · REV B
W# 700743		SCALE · IP-9B PCB · SHEET 5 OF 6

IP-9 4 Input Panel Switch Card Schematic - Sheet 5 of 6



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CHECKED	SA	New Bern, NC 28562	
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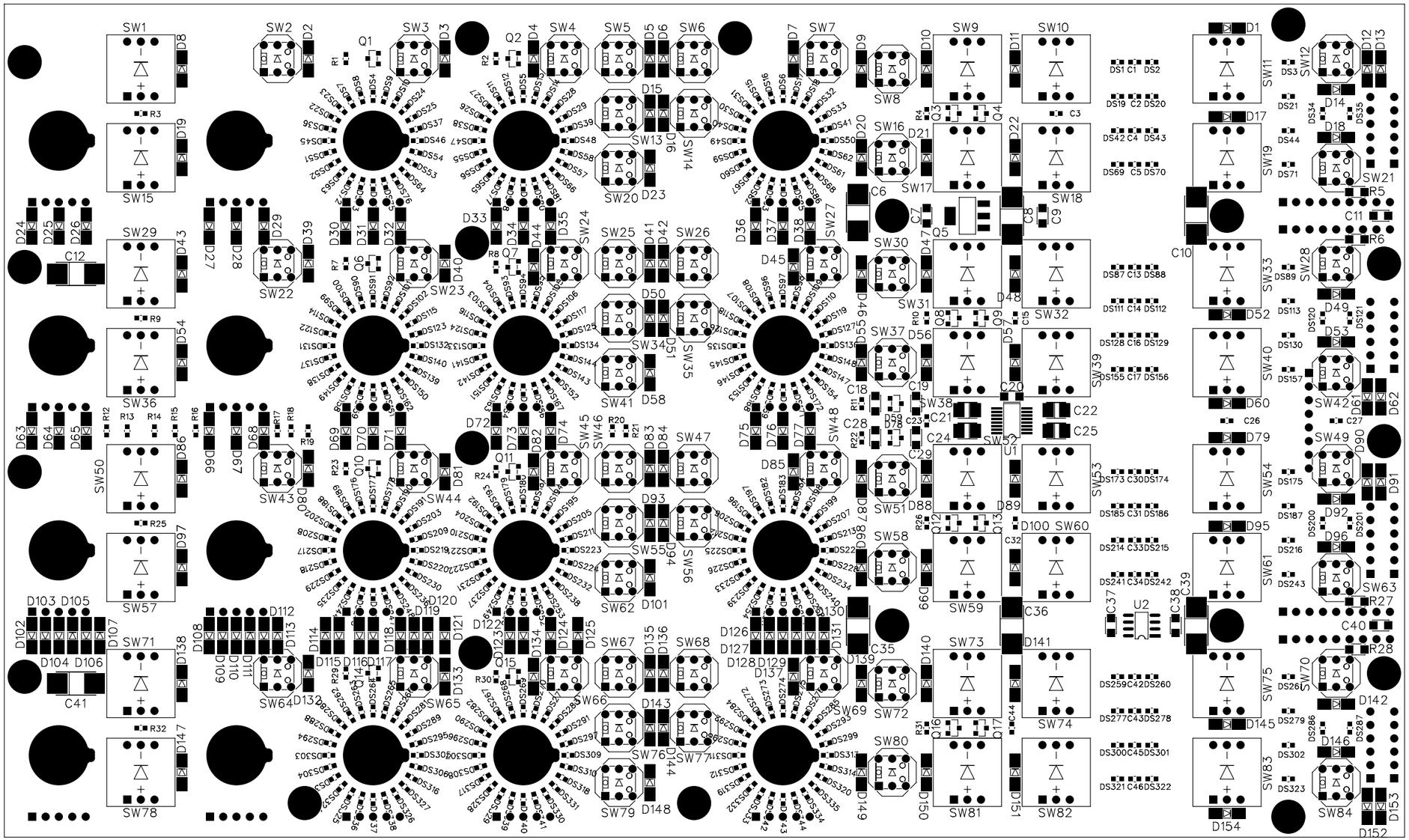
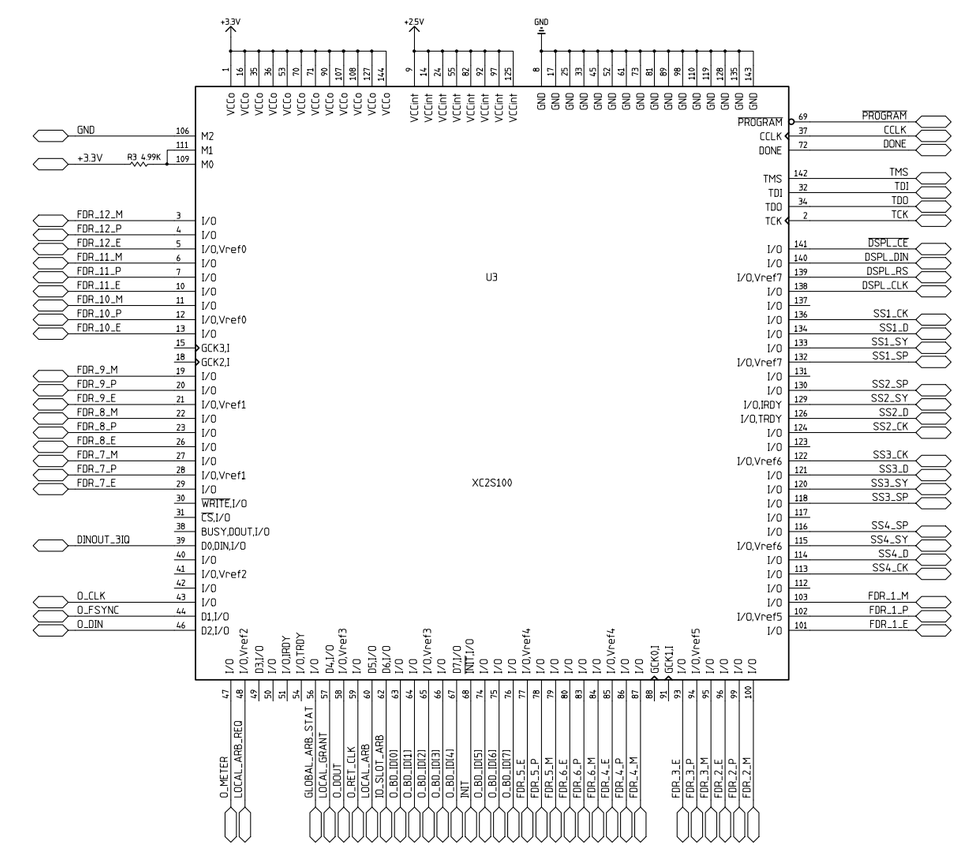
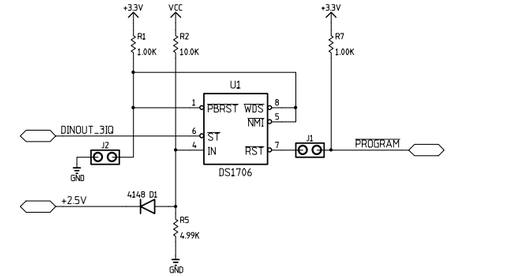
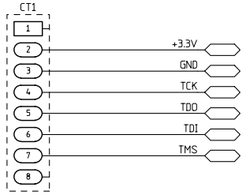
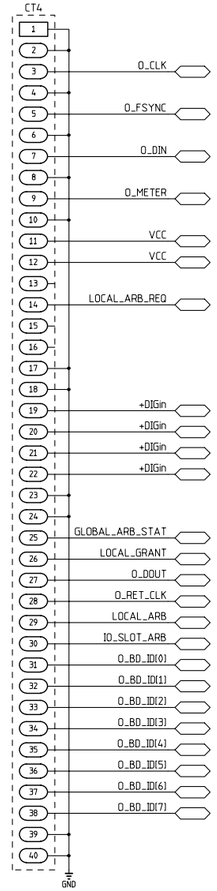
W# 700743		SCALE / IP-9B PCB / SHEET 6 OF 6	

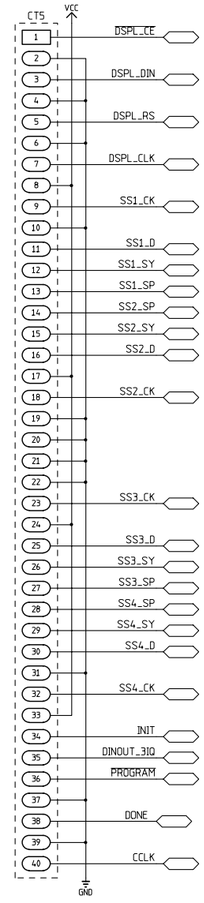


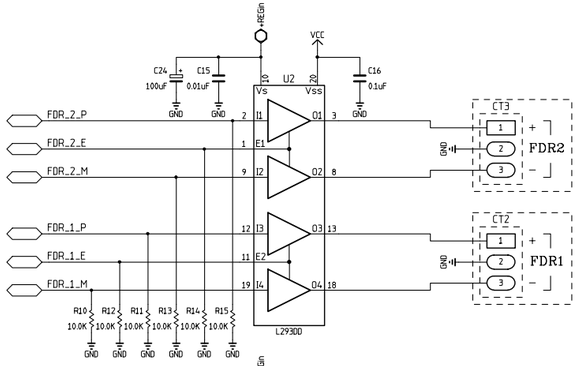


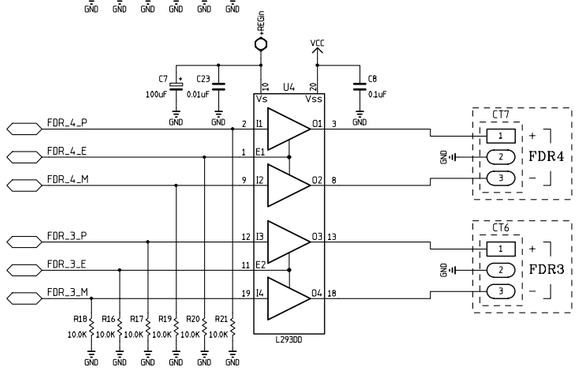


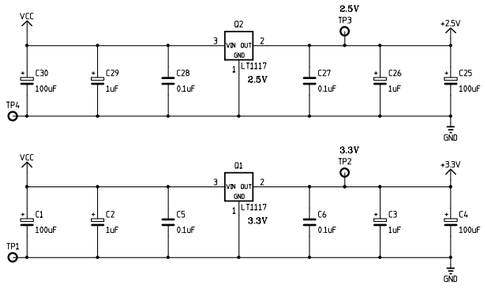


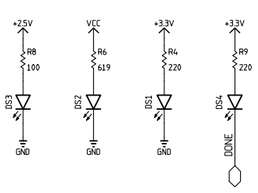


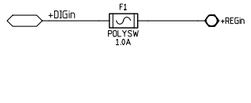


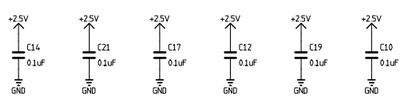


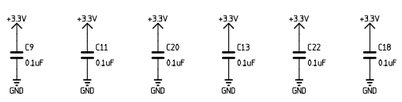




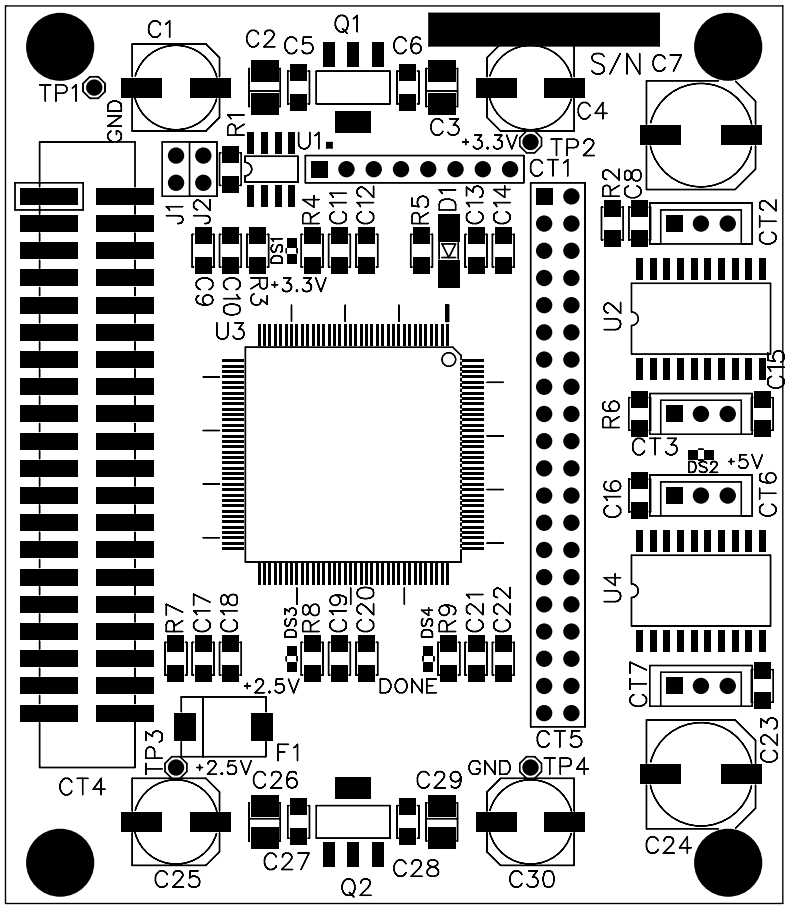








CONTRACT NO. - Sergey Averin -		IQ-9	
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	5-12-03		
CHECKED	SA		
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 84S00xx / REV A	
W# 700748		SCALE / IQ-9A PCB / SHEET 1 OF 1	



IQ-9 IQ Card Load Sheet

SENSE

SWITCH LED DRIVE HIGH

SWITCH LED DRIVE LOW

SWITCH FEED

LED_D_(0)

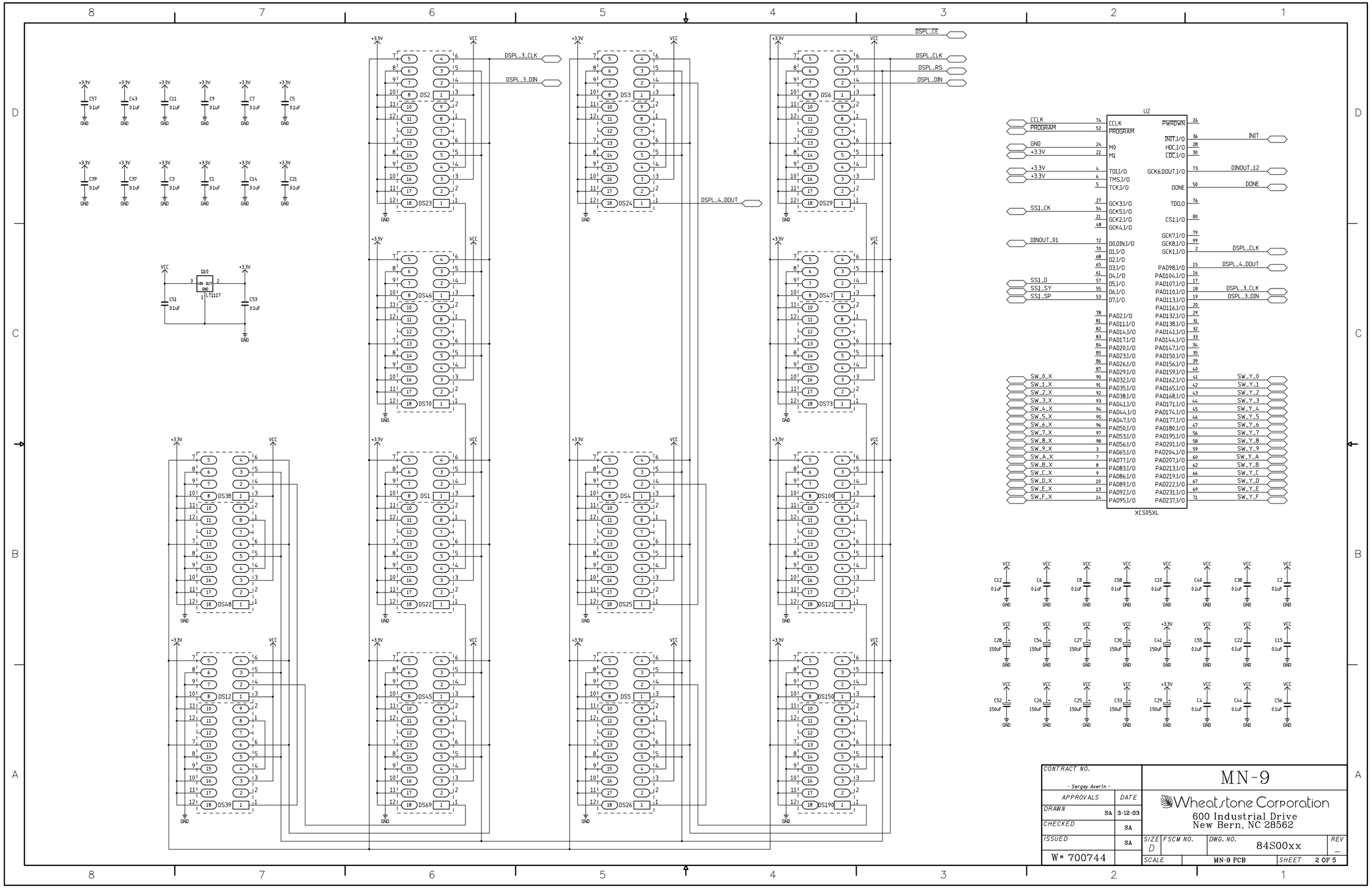
LED_C_(0)

LED_B_(0)

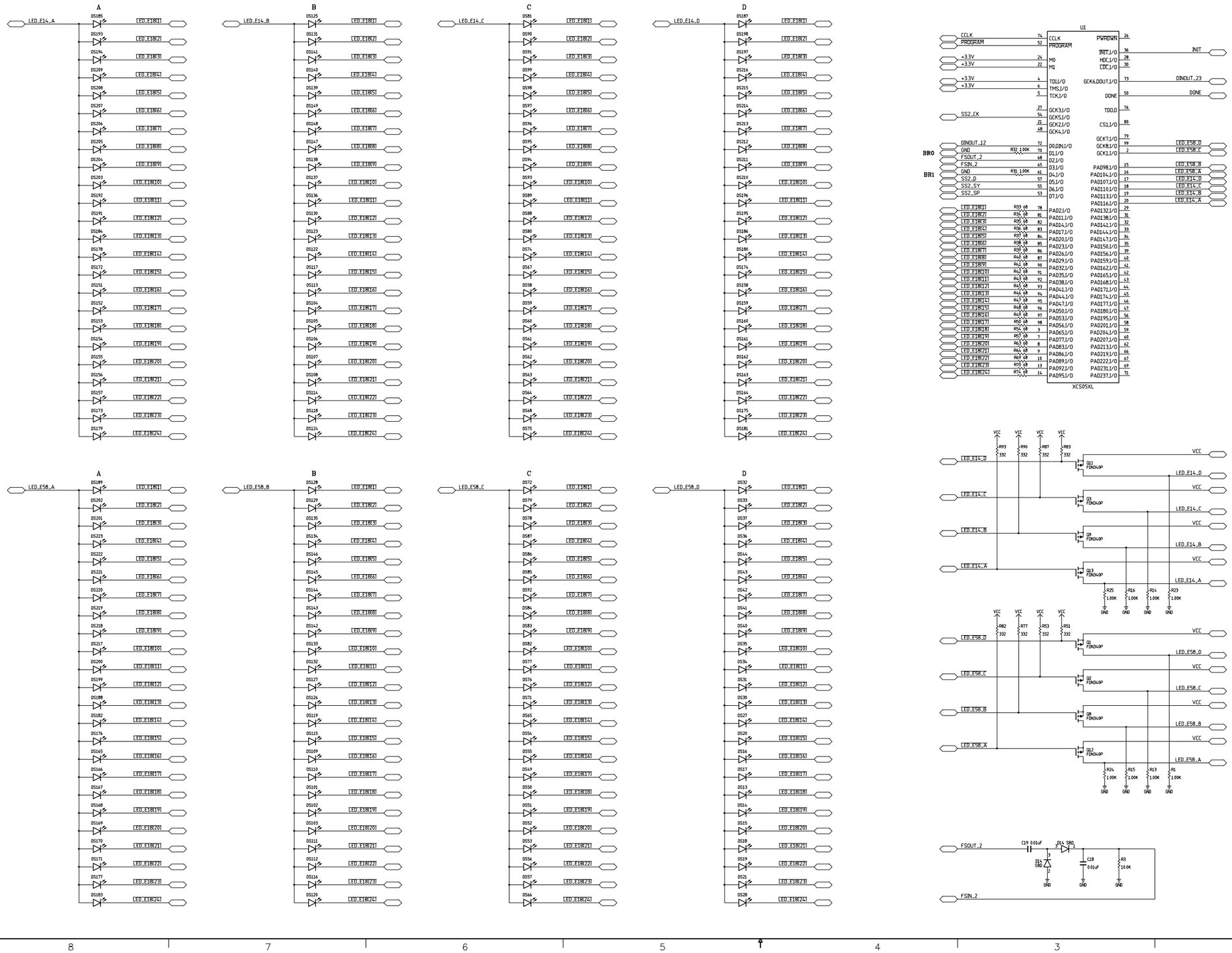
LED_A_(0)

SW_F_X
SW_E_X
SW_B_X
SW_A_X
SW_7_X
SW_6_X
SW_3_X
SW_2_X

CONTRACT NO.	MN-9
- Sergey Averin -	
APPROVALS / DATE	Wheatstone Corporation
DRAWN SA 3-12-03	600 Industrial Drive
CHECKED SA	New Bern, NC 28562
ISSUED SA	SIZE E / FSCM NO. / DWG. NO. 84S00xx / REV –
W# 700744	SCALE / MN-9 PCB / SHEET 1 OF 5

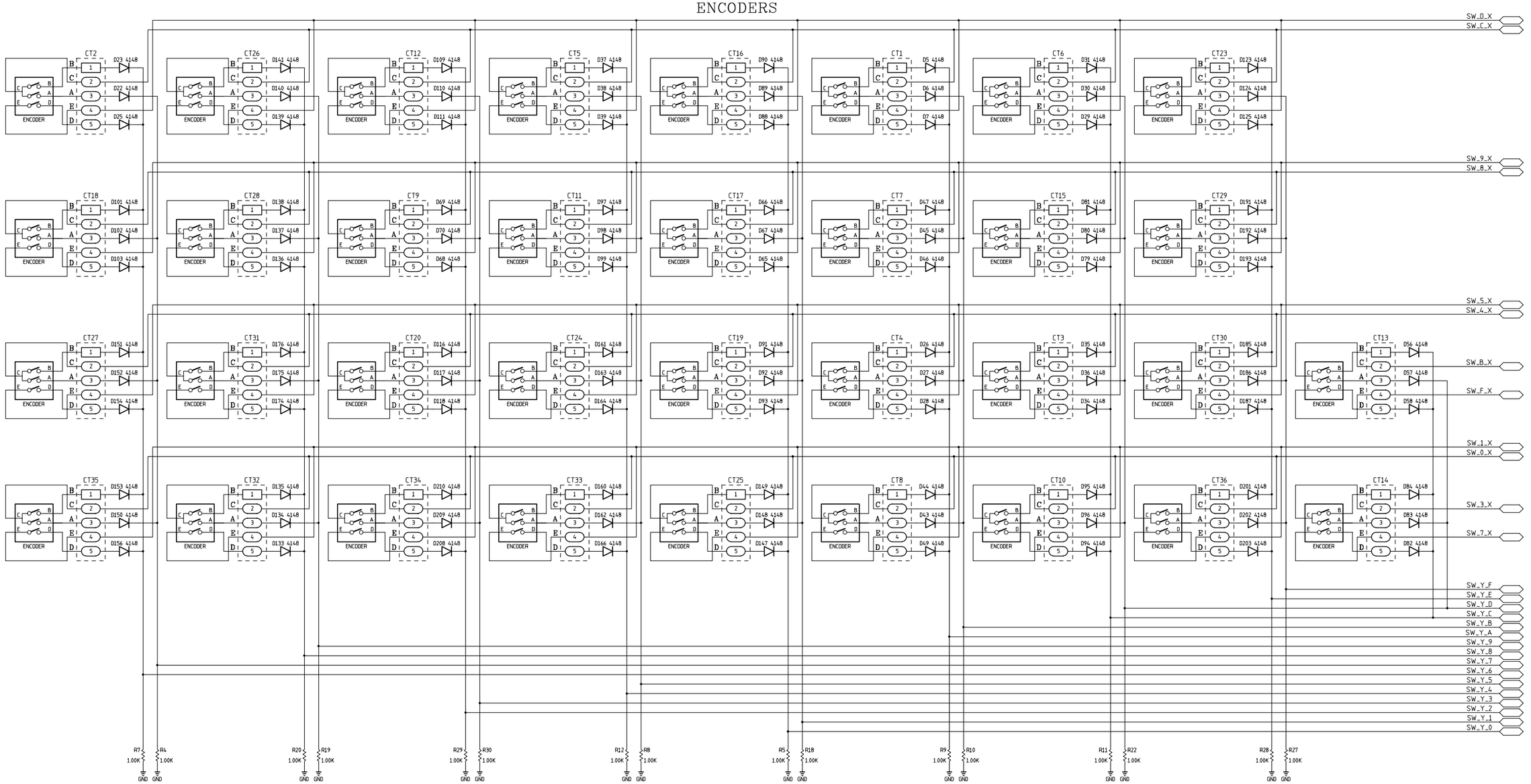


CONTRACT NO.	MN-9
- Sergey Averin -	
APPROVALS / DATE	Wheatstone Corporation
DRAWN SA 3-12-03	600 Industrial Drive
CHECKED SA	New Bern, NC 28562
ISSUED SA	SIZE D · FSCM NO. · DWG. NO. 84S00xx · REV —
W# 700744	SCALE · MN-9 PCB · SHEET 2 OF 5

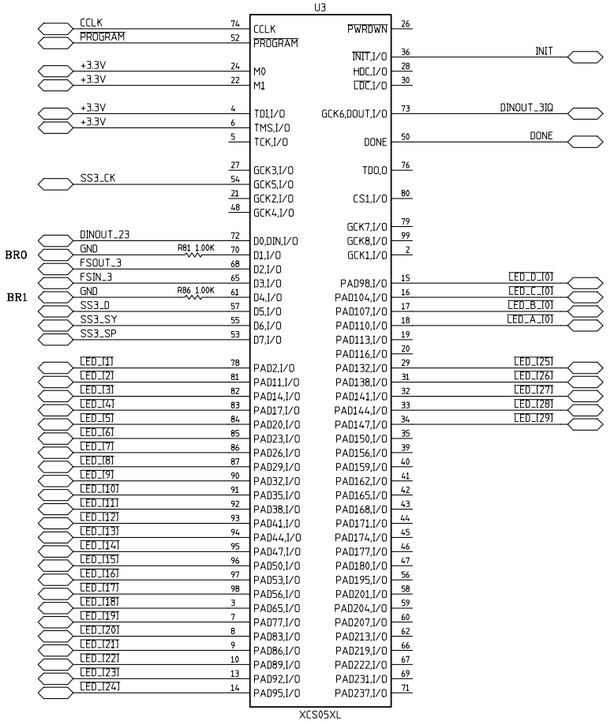


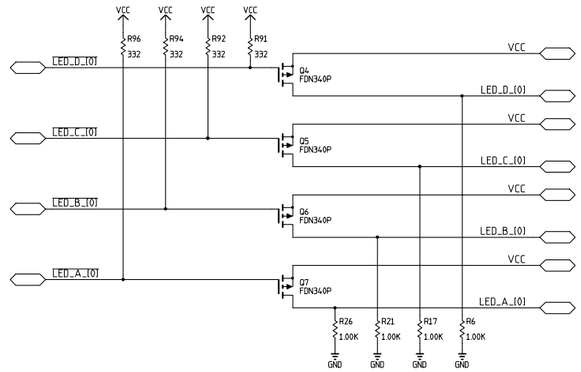
CONTRACT NO.		MN-9	
- Sergey Averin -			
APPROVALS	DATE	Wheatstone Corporation	
DRAWN	SA 3-12-03	600 Industrial Drive	
CHECKED	SA	New Bern, NC 28562	
ISSUED	SA	SIZE E / FSCM NO. / DWG. NO. 84S00xx / REV –	
W# 700744		SCALE MN-9 PCB / SHEET 3 OF 5	

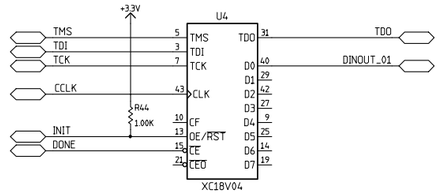
ENCODERS

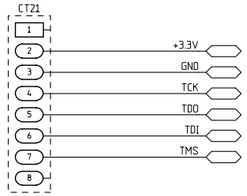


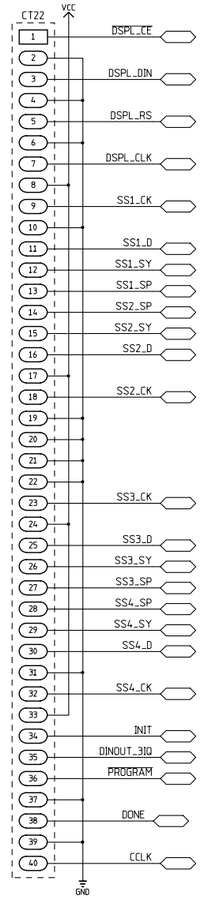
CONTRACT NO. - Sergey Averin -		MN-9
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562
DRAWN SA	3-12-03	
CHECKED SA		
ISSUED SA		SIZE D · FSCM NO. · DWG. NO. 84S00xx · REV —
W# 700744		SCALE · MN-9 PCB · SHEET 4 OF 5



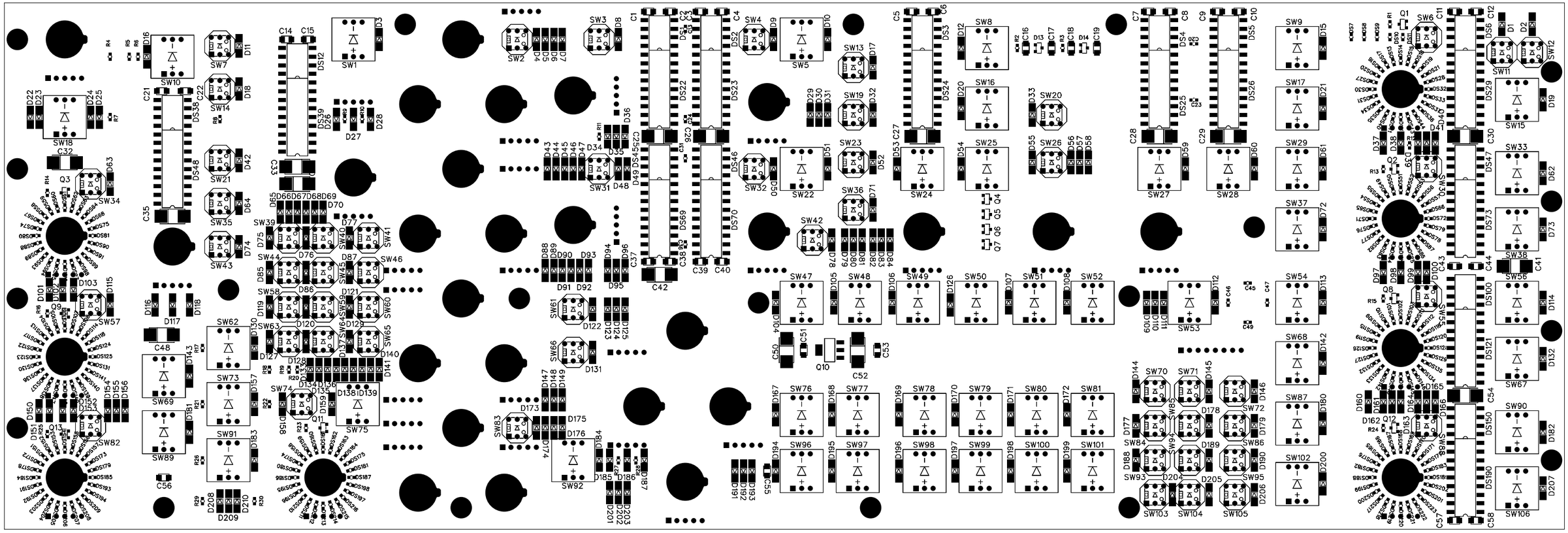


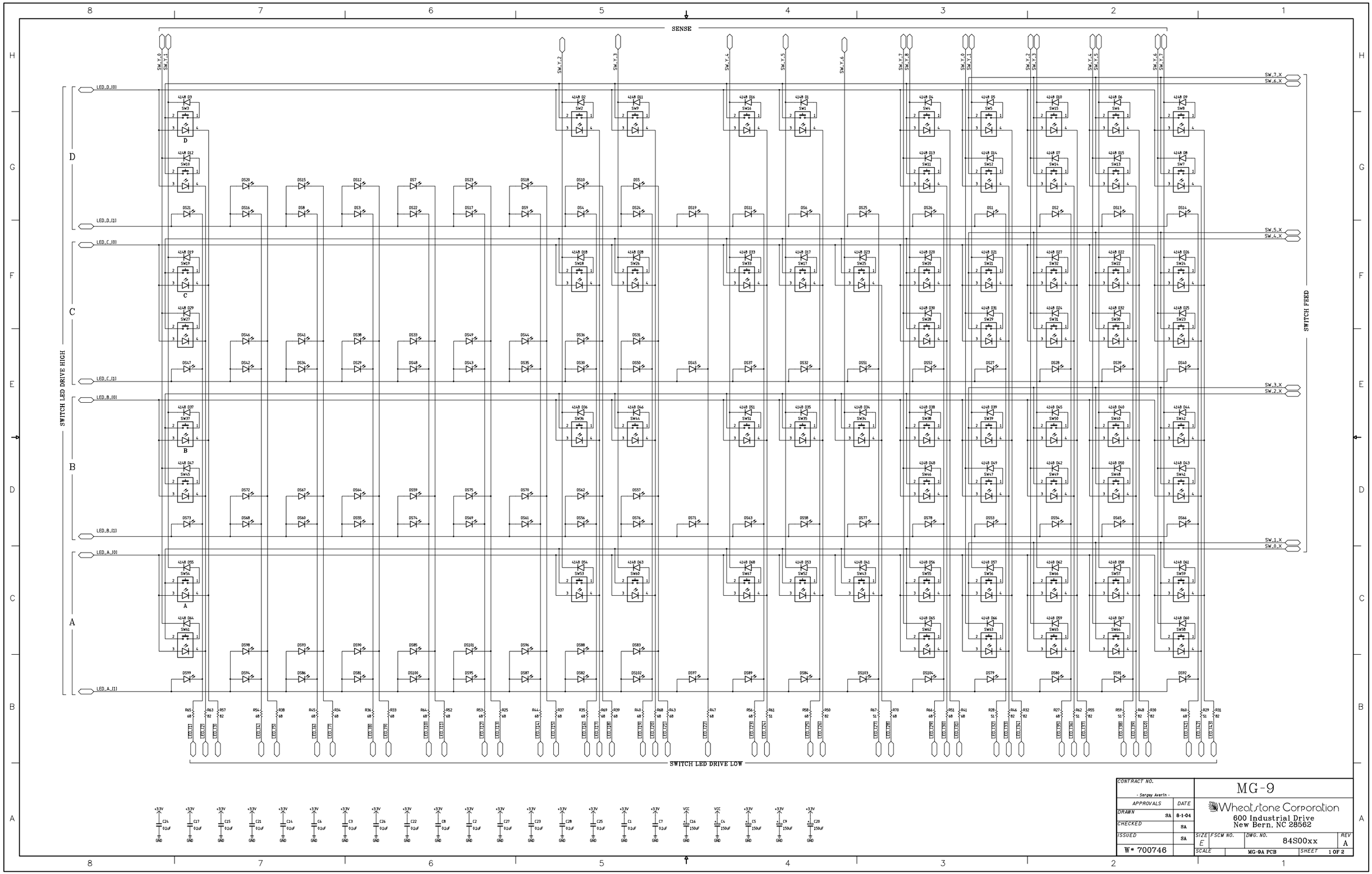


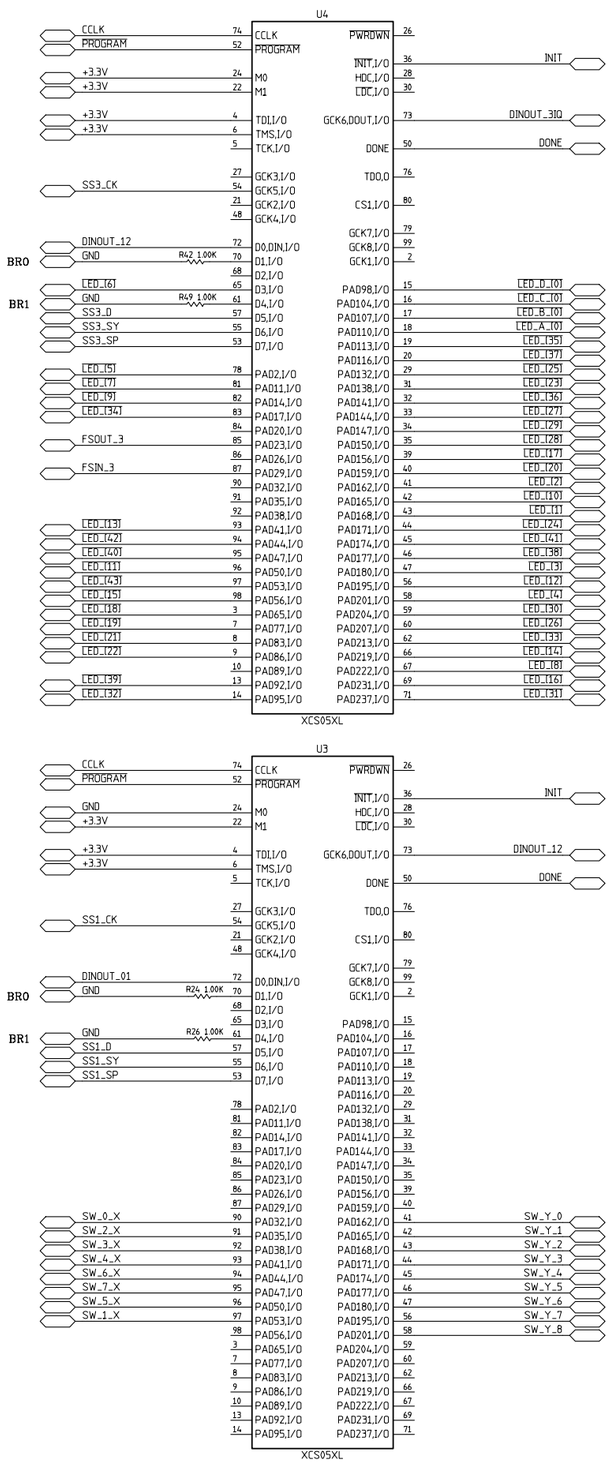




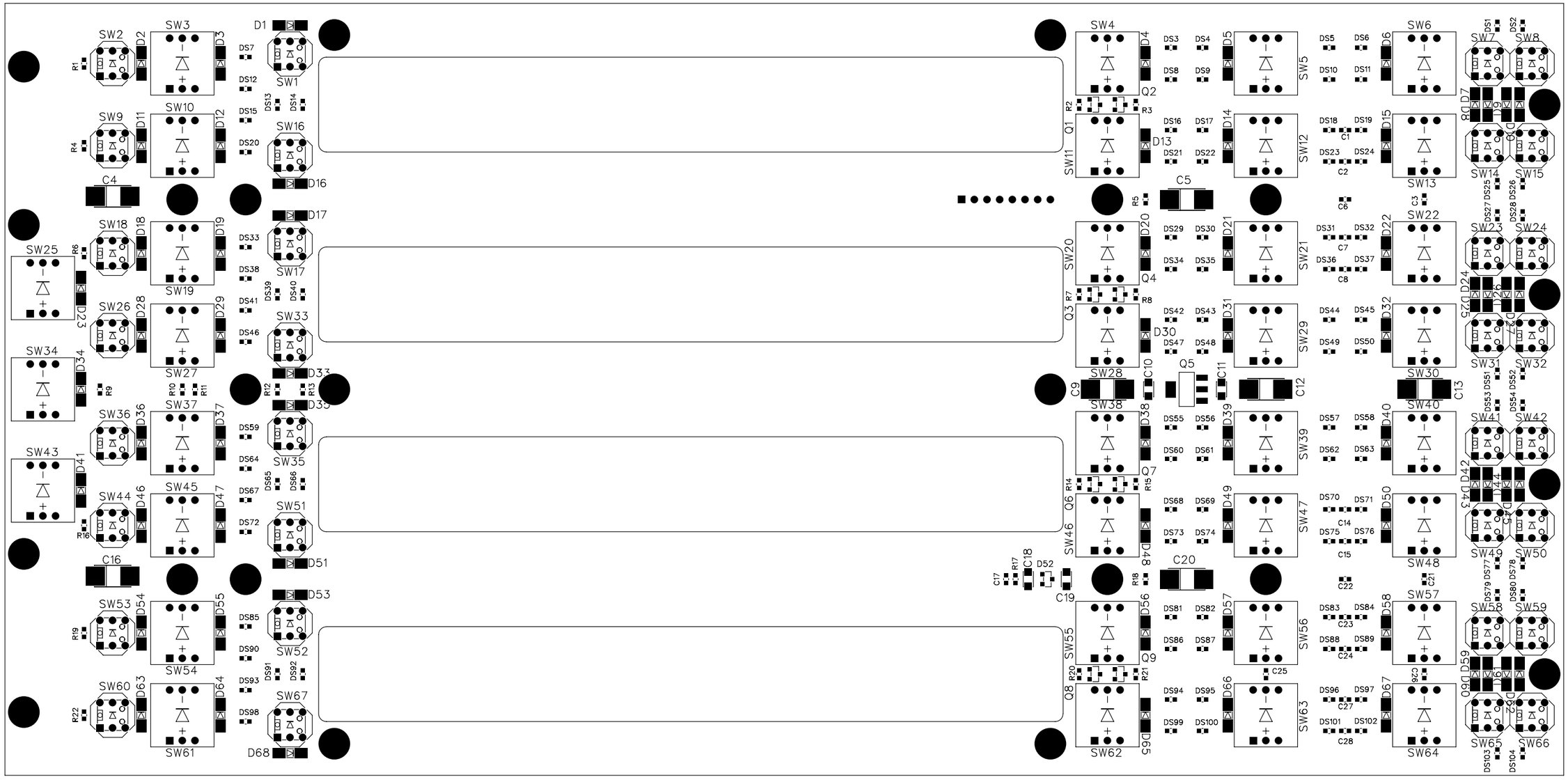
CONTRACT NO. - Sergey Averin -		MN-9
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562
DRAWN SA	3-12-03	
CHECKED	SA	
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 84S00xx / REV –
W# 700744		SCALE / MN-9 PCB / SHEET 5 OF 5




SENSE
SWITCH LED DRIVE HIGH
SWITCH FEED
SWITCH LED DRIVE LOW
LED_D_[0]
LED_D_[1]
LED_C_[0]
LED_C_[1]
LED_B_[0]
LED_B_[1]
LED_A_[0]
LED_A_[1]
SW_7_X
SW_6_X
SW_5_X
SW_4_X
SW_3_X
SW_2_X
SW_1_X
SW_0_X
CONTRACT NO.
- Sergey Averin -
APPROVALS
DRAWN SA 8-1-04
CHECKED SA
ISSUED SA
W* 700746
MG-9
Wheatstone Corporation
600 Industrial Drive
New Bern, NC 28562
SIZE E
FSCM NO.
DWG. NO. 84S00xx
REV A
SCALE
MG-9A PCB
SHEET 1 OF 2



CONTRACT NO.		MG-9
- Sergey Averin -		Wheatstone Corporation
APPROVALS	DATE	600 Industrial Drive
DRAWN SA	8-1-04	New Bern, NC 28562
CHECKED SA		
ISSUED SA		SIZE D · FSCM NO. · DWG. NO. 84S00xx · REV A
W# 700746		SCALE · MG-9A PCB · SHEET 3 OF 2


SW1
SW2
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Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
C1
C2
C3
C4
C5
C6
C7
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R1
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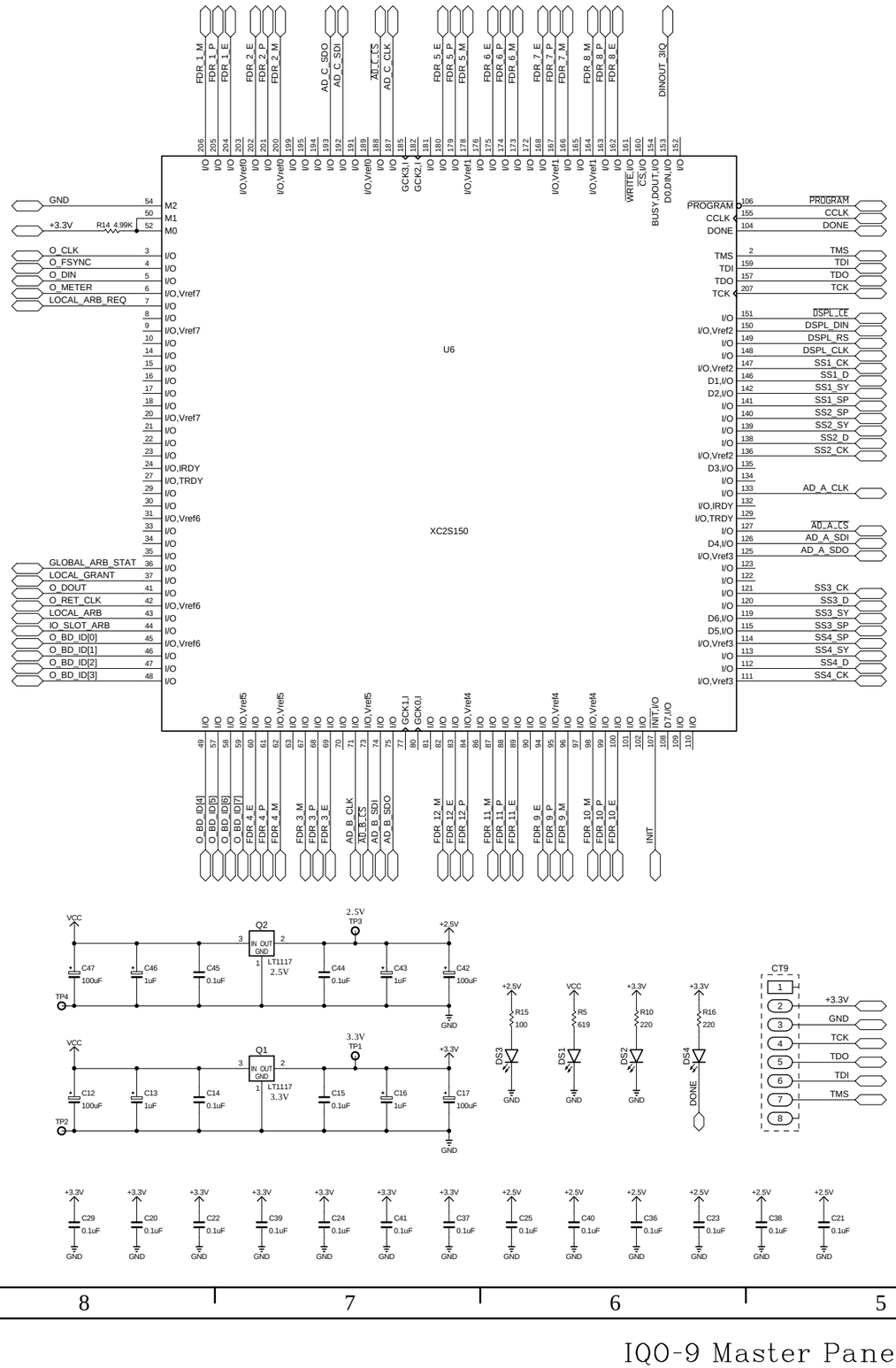
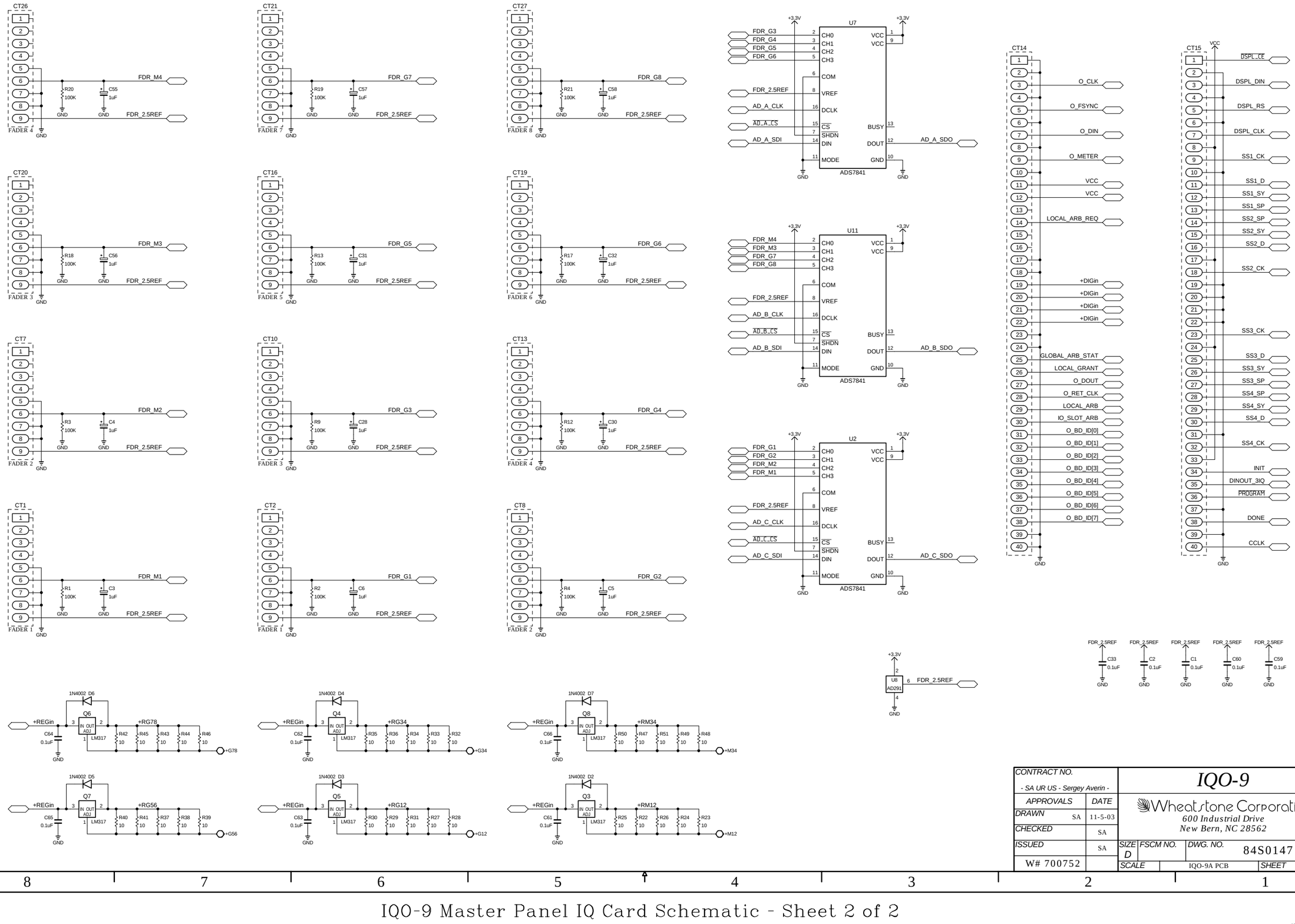
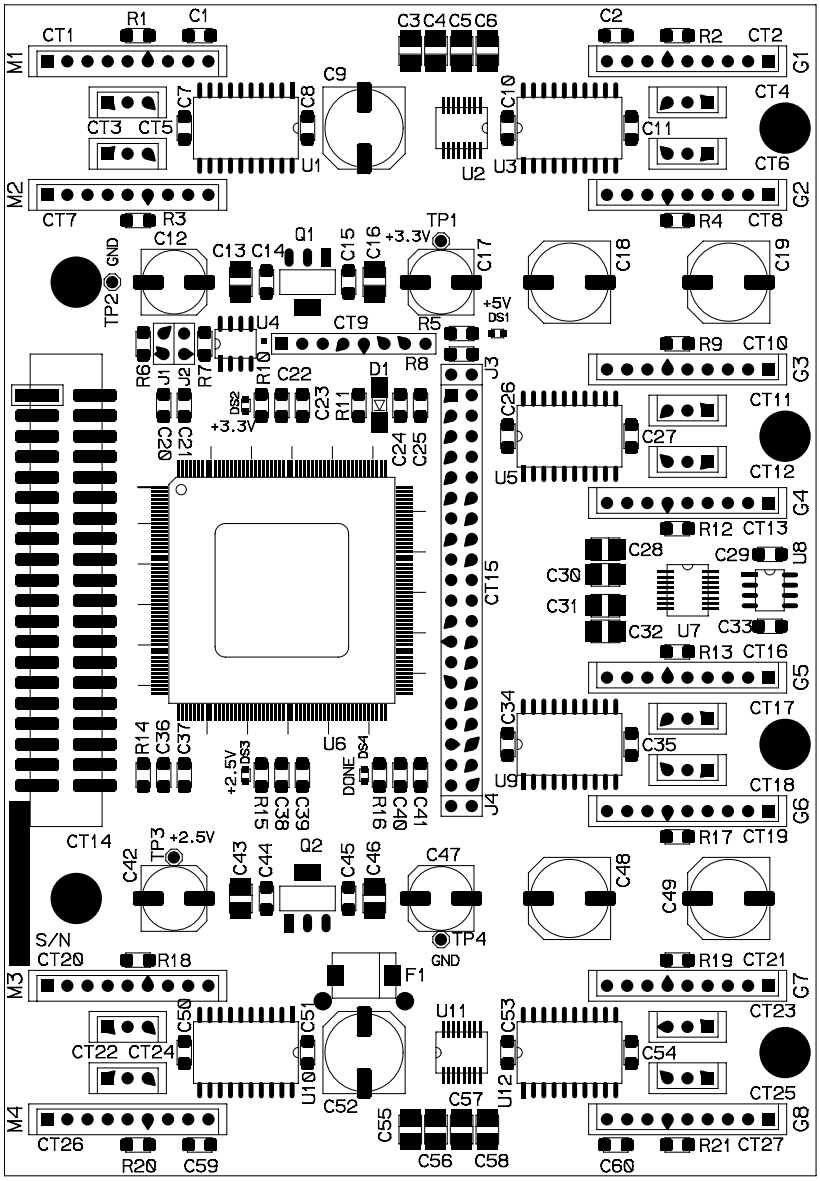
DS103
DS104



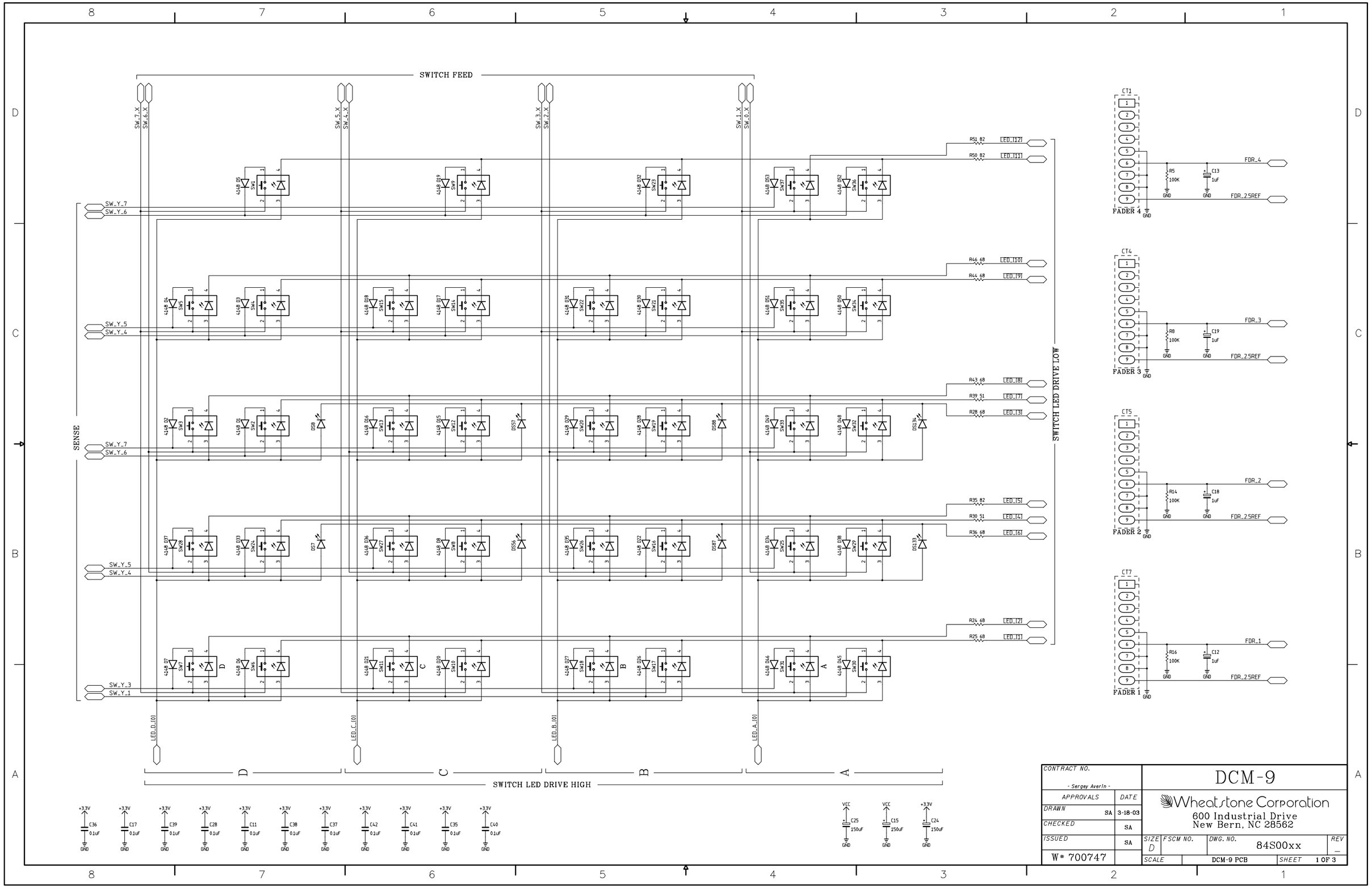
CONTRACT NO.	IQO-9
- SA UR US - Sergey Averin -	
APPROVALS / DATE	Wheatstone Corporation
DRAWN SA 11-5-03	600 Industrial Drive
CHECKED SA	New Bern, NC 28562
ISSUED SA	SIZE D · FSCM NO. · DWG. NO. 84S0146 · REV A
W# 700752	SCALE · IQO-9A PCB · SHEET 1 OF 2



CONTRACT NO. - SA UR US - Sergey Averin -		IQO-9	
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	11-5-03		
CHECKED	SA		
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 84S0147 / REV A	
W# 700752		SCALE IQO-9A PCB / SHEET 2 OF 2	

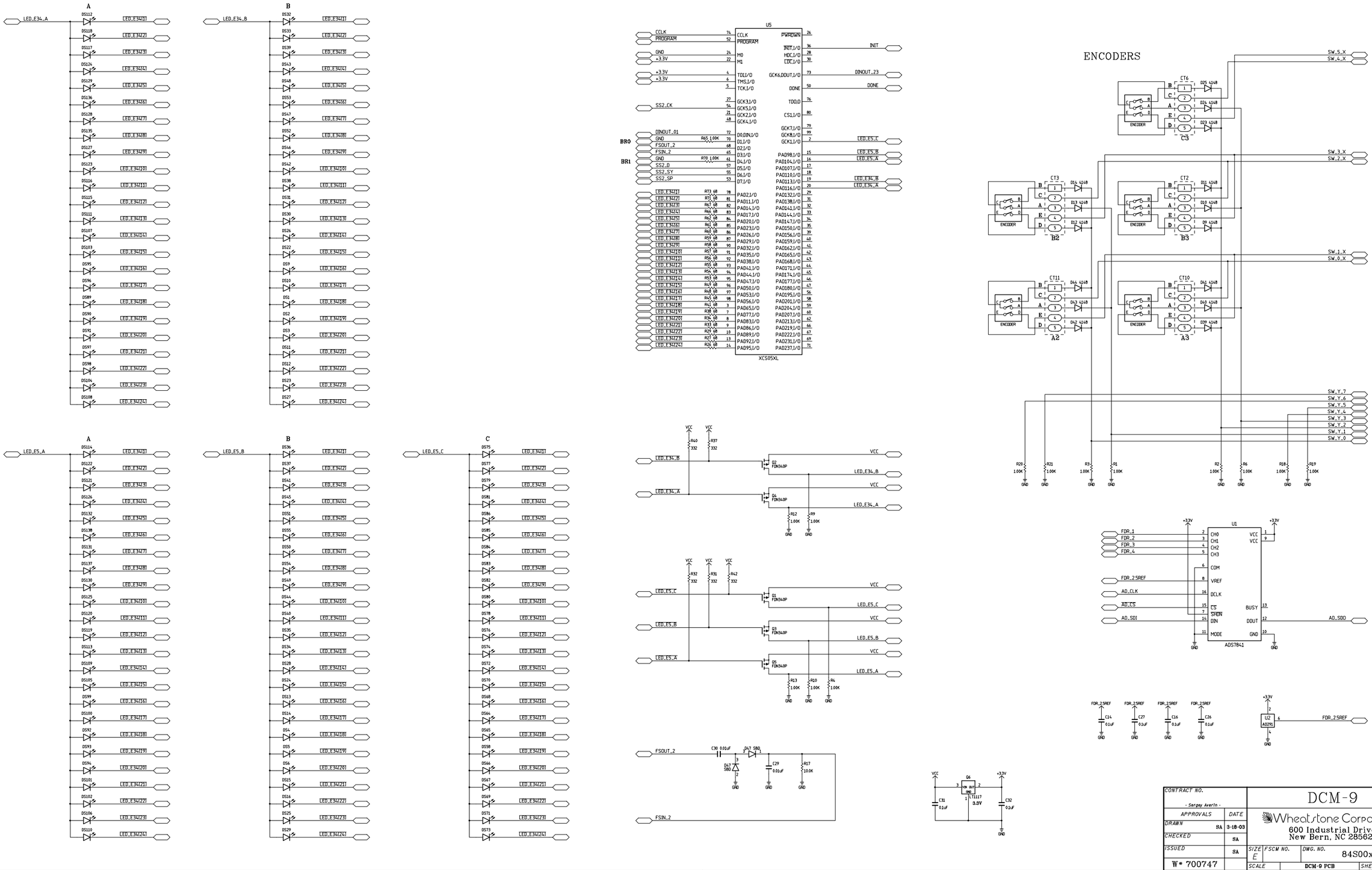


IQO-9 Master Panel IQ Card Load Sheet

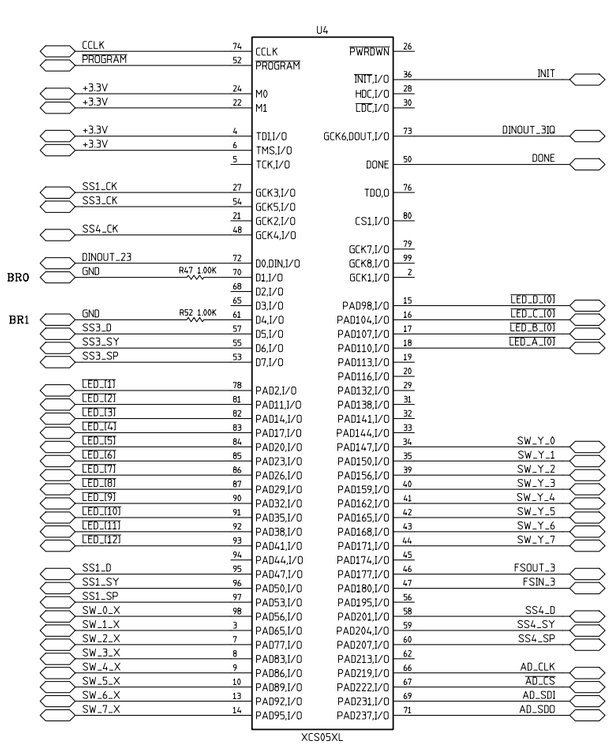


CONTRACT NO.		DCM-9	
- Sergey Averin -			
APPROVALS	DATE	Wheatstone Corporation	
DRAWN	SA 3-18-03	600 Industrial Drive	
CHECKED	SA	New Bern, NC 28562	
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 84S00xx / REV _	
W# 700747		SCALE DCM-9 PCB / SHEET 1 OF 3	

DCM-9 DCM Panel Switch Card Schematic - Sheet 1 of 3



CONTRACT NO.		DCM-9	
- Sergey Averin -			
APPROVALS	DATE	Wheatstone Corporation	
DRAWN	SA 3-18-03	600 Industrial Drive	
CHECKED	SA	New Bern, NC 28562	
ISSUED	SA	SIZE E / FSCM NO. / DWG. NO. 84S00xx / REV —	
W* 700747		SCALE / DCM-9 PCB / SHEET 2 OF 3	



CONTRACT NO. - Sergey Averin -

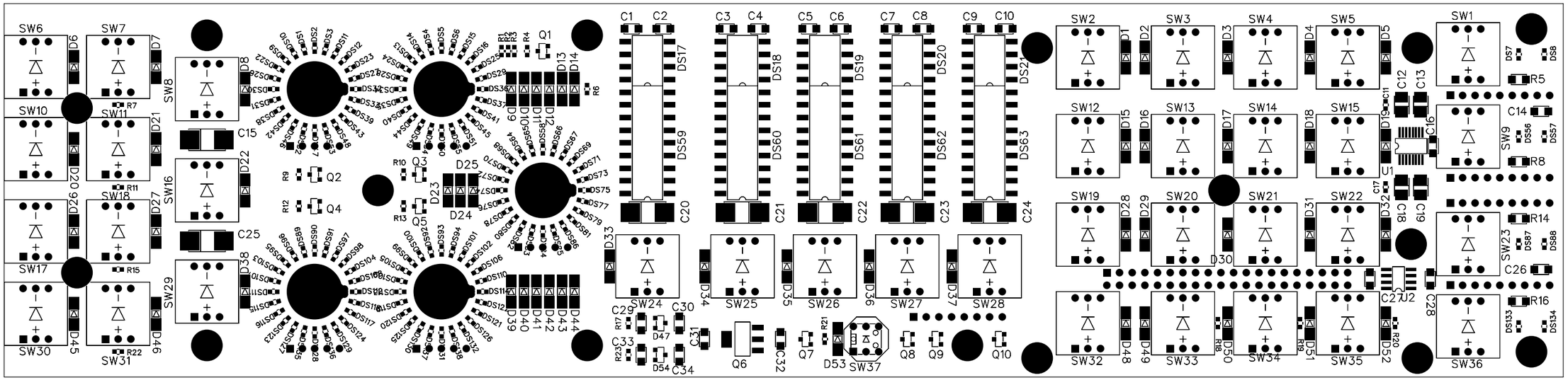
APPROVALS	DATE
DRAWN SA	3-18-03
CHECKED	SA
ISSUED	SA

W# 700747

DCM-9

Wheatstone Corporation
600 Industrial Drive
New Bern, NC 28562

SIZE	FSCM NO.	DWG. NO.	REV
D		84S00xx	—
SCALE	DCM-9 PCB	SHEET	3 OF 3


SW1
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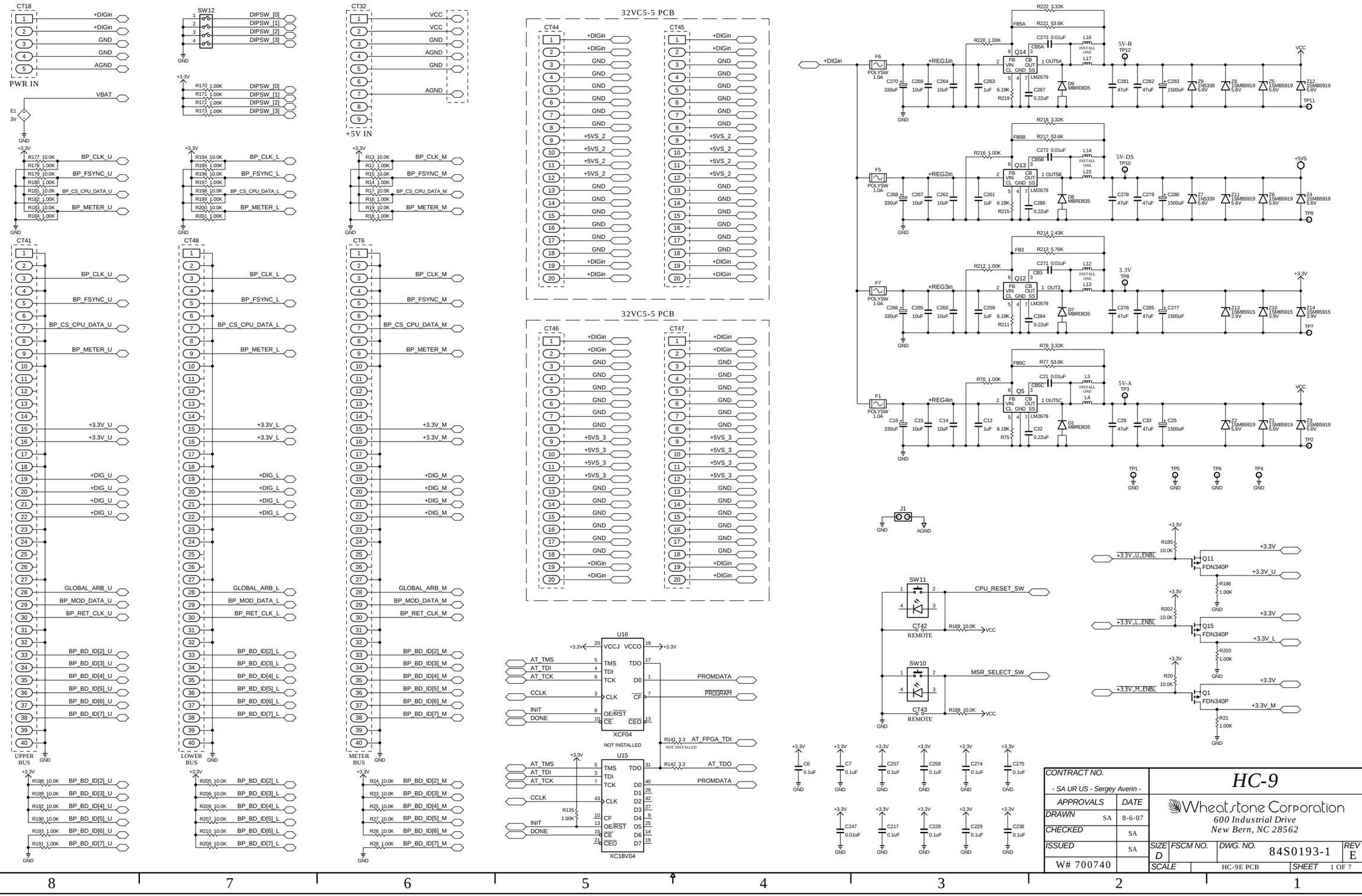
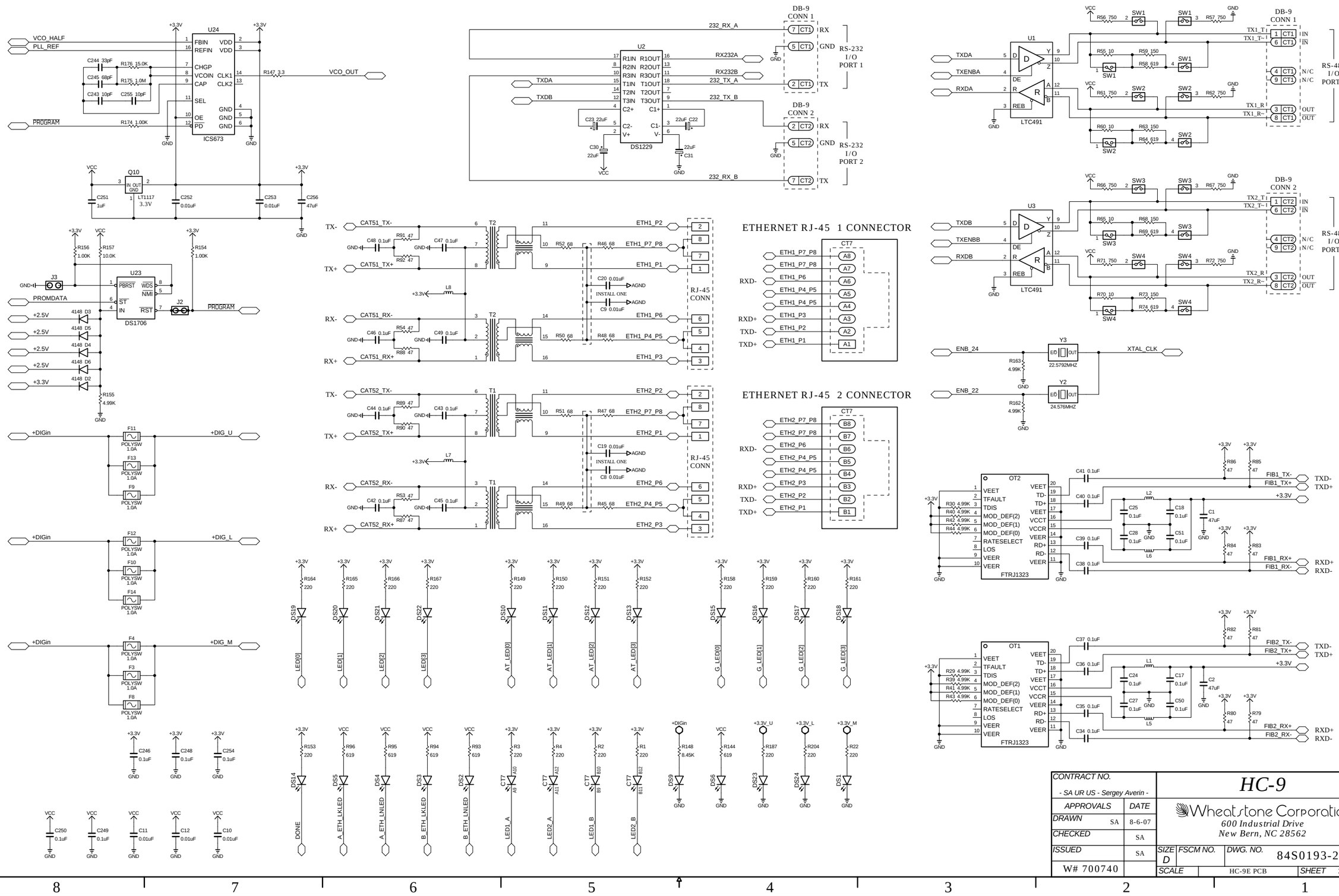
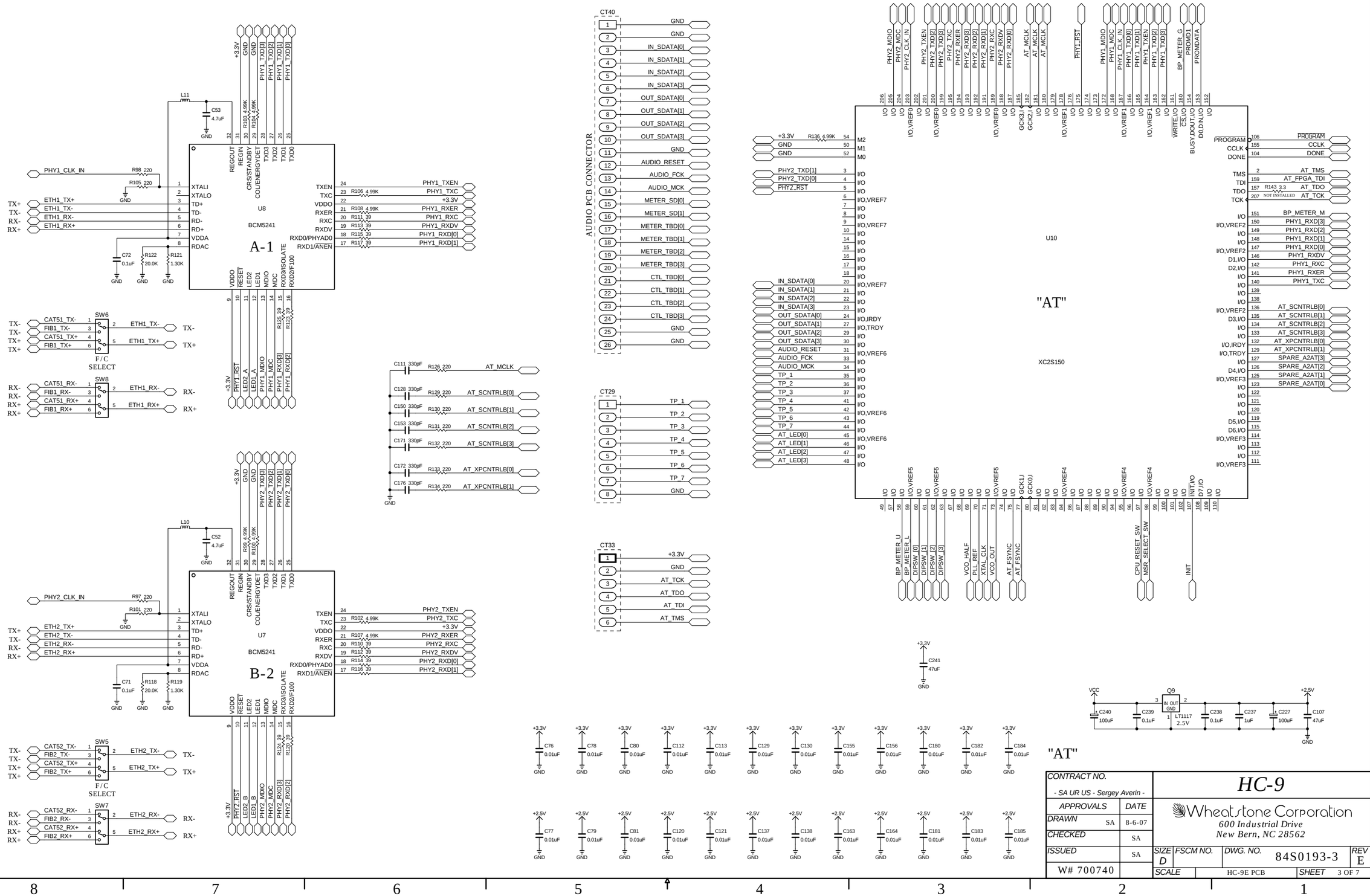
R20
R21
R22
U1
U2



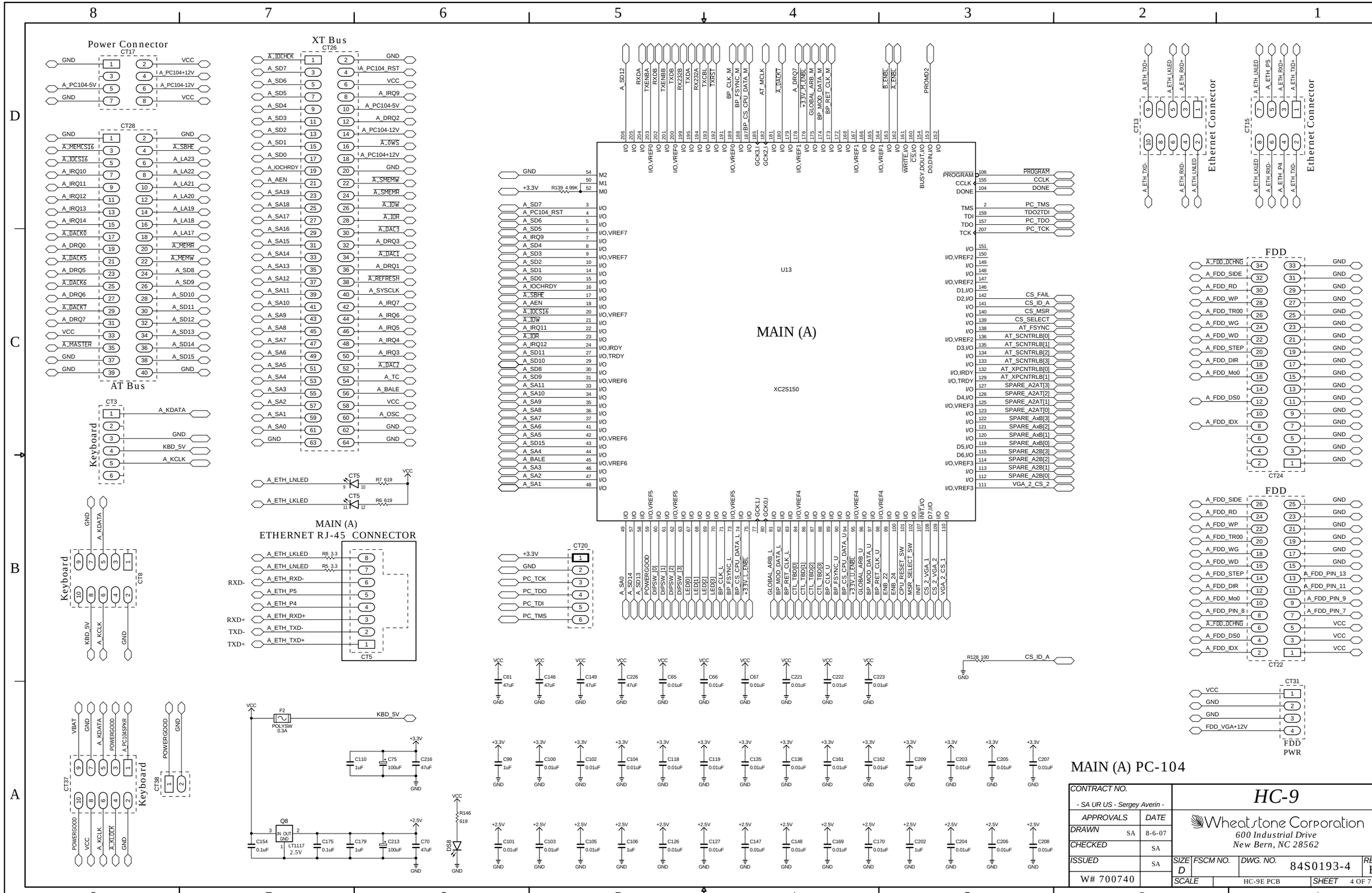
HC-9 Host Controller Card Schematic - Sheet 1 of 7



CONTRACT NO.	*HC-9*
- SA UR US - Sergey Averin -	
APPROVALS / DATE	Wheatstone Corporation
DRAWN SA 8-6-07	600 Industrial Drive
CHECKED SA	New Bern, NC 28562
ISSUED SA	SIZE D · FSCM NO. · DWG. NO. 84S0193-2 · REV E
W# 700740	SCALE HC-9E PCB · SHEET 2 OF 7



HC-9 Host Controller Card Schematic - Sheet 3 of 7


Power Connector
CT17
GND
A_PC104-5V
GND
VCC
A_PC104+12V
A_PC104-12V
VCC
CT28
A_MEMCS16
A_IOCS16
A_IRQ10
A_IRQ11
A_IRQ12
A_IRQ13
A_IRQ14
A_DACK0
A_DRQ0
A_DACK5
A_DRQ5
A_DACK6
A_DRQ6
A_DACK7
A_DRQ7
VCC
A_MASTER
A_SBHE
A_LA23
A_LA22
A_LA21
A_LA20
A_LA19
A_LA18
A_LA17
A_MEMR
A_MEMW
A_SD8
A_SD9
A_SD10
A_SD11
A_SD12
A_SD13
A_SD14
A_SD15
AT Bus
XT Bus
CT26
A_IOCHCK
A_SD7
A_SD6
A_SD5
A_SD4
A_SD3
A_SD2
A_SD1
A_SD0
A_IOCHRDY
A_AEN
A_SA19
A_SA18
A_SA17
A_SA16
A_SA15
A_SA14
A_SA13
A_SA12
A_SA11
A_SA10
A_SA9
A_SA8
A_SA7
A_SA6
A_SA5
A_SA4
A_SA3
A_SA2
A_SA1
A_SA0
A_PC104_RST
A_IRQ9
A_DRQ2
A_0WS
A_SMEMW
A_SMEMR
A_IOW
A_IOR
A_DAC3
A_DRQ3
A_DAC1
A_DRQ1
A_REFRESH
A_SYSCLK
A_IRQ7
A_IRQ6
A_IRQ5
A_IRQ4
A_IRQ3
A_DAC2
A_TC
A_BALE
A_OSC
CT3
A_KDATA
KBD_5V
A_KCLK
Keyboard
CT8
CT37
CT38
VBAT
A_PC104SPKR
POWERGOOD
A_KCLOCK
A_ETH_LNLED
A_ETH_LKLED
CT5
R7 619
R6 619
MAIN (A)
ETHERNET RJ-45 CONNECTOR
R8 3.3
R5 3.3
A_ETH_RXD-
A_ETH_P5
A_ETH_P4
A_ETH_RXD+
A_ETH_TXD-
A_ETH_TXD+
RXD-
RXD+
TXD-
TXD+
F2
POLYSW 0.3A
KBD_5V
Q8
LT1117 2.5V
C154 0.1uF
C175 0.1uF
C110 1uF
C75 100uF
C216 47uF
C179 1uF
C213 100uF
C70 47uF
R146 619
DSR
A_SD12
RXDA
TXENBA
RXDB
TXENBB
TXDB
RX232B
TXDA
RX232A
TXCBL
TXRST
BP_CLK_M
BP_FSYNC_M
BP_CS_CPU_DATA_M
AT_MCLK
A_DACK7
A_DRQ7
+3.3V_M_ENBL
GLOBAL_ARB_M
BP_MOD_DATA_M
BP_RET_CLK_M
B_ENBL
A_ENBL
PROMD2
GND
+3.3V
R139 4.99K
M2
M1
M0
I/O
I/O,VREF7
I/O,VREF6
I/O,IRDY
I/O,TRDY
I/O,VREF5
I/O,VREF4
I/O,VREF0
I/O,VREF1
I/O,VREF2
I/O,VREF3
WRITE_I/O
CS_I/O
BUSY_DOUT_I/O
D0_DIN_I/O
U13
MAIN (A)
XC2S150
PROGRAM
CCLK
DONE
TMS
TDI
TDO
TCK
PC_TMS
TDO2TDI
PC_TDO
PC_TCK
D1_I/O
D2_I/O
D3_I/O
D4_I/O
D5_I/O
D6_I/O
CS_FAIL
CS_ID_A
CS_MSR
CS_SELECT
AT_FSYNC
AT_SCNTRLB[0]
AT_SCNTRLB[1]
AT_SCNTRLB[2]
AT_SCNTRLB[3]
AT_XPCNTRLB[0]
AT_XPCNTRLB[1]
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SPARE_A2AT[2]
SPARE_A2AT[1]
SPARE_A2AT[0]
SPARE_AxB[3]
SPARE_AxB[2]
SPARE_AxB[1]
SPARE_AxB[0]
SPARE_A2B[3]
SPARE_A2B[2]
SPARE_A2B[1]
SPARE_A2B[0]
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CT15
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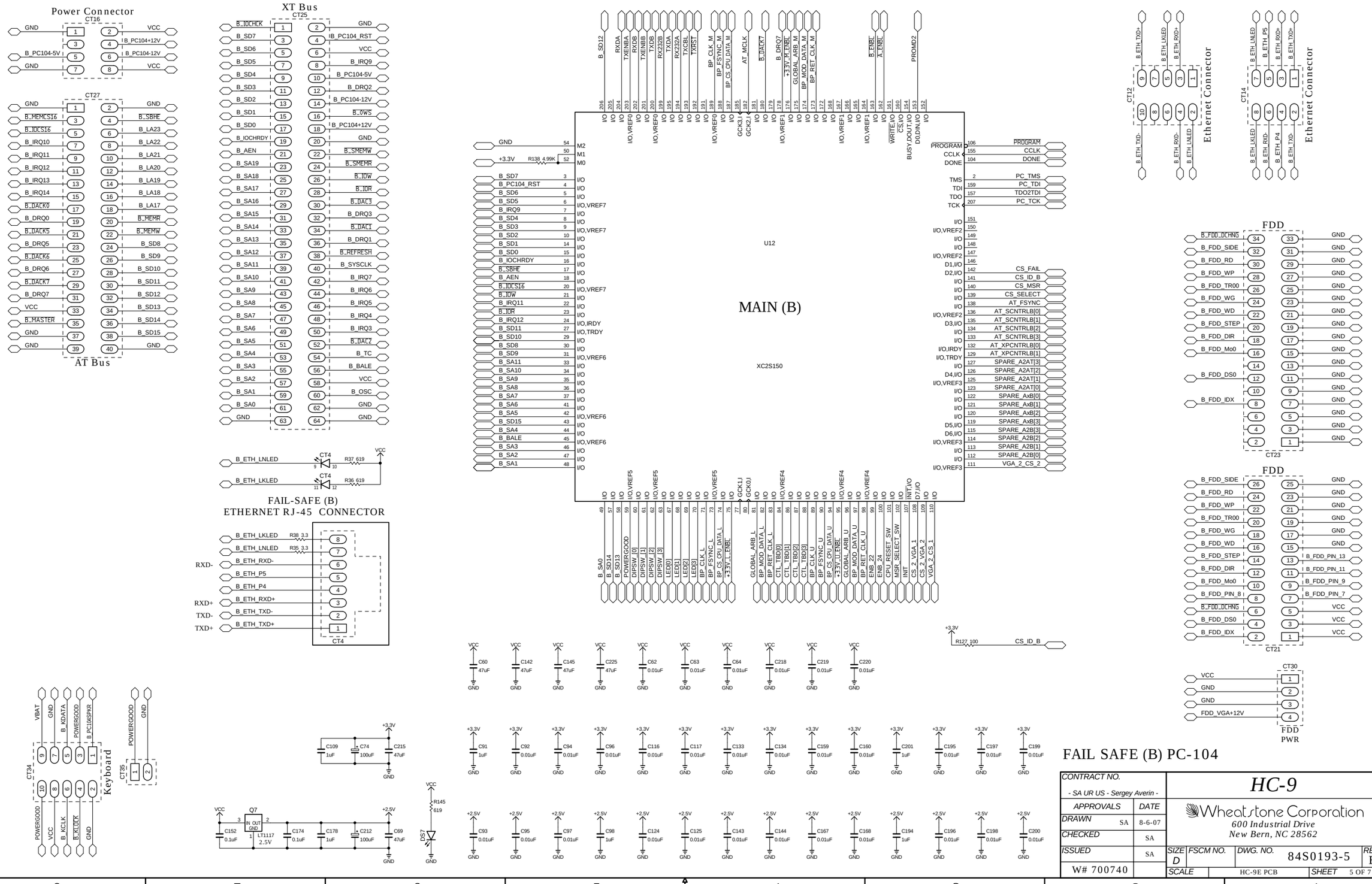
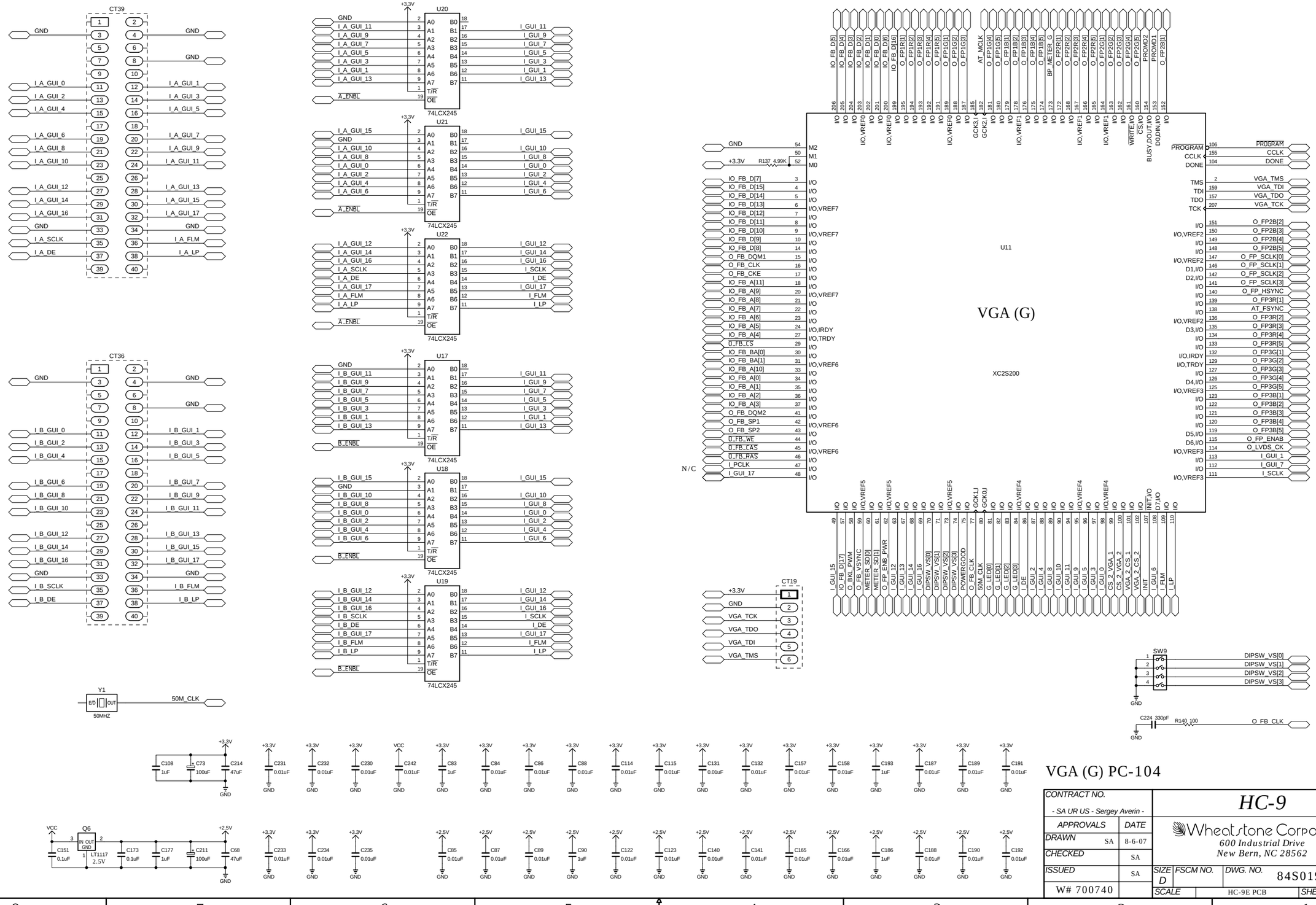
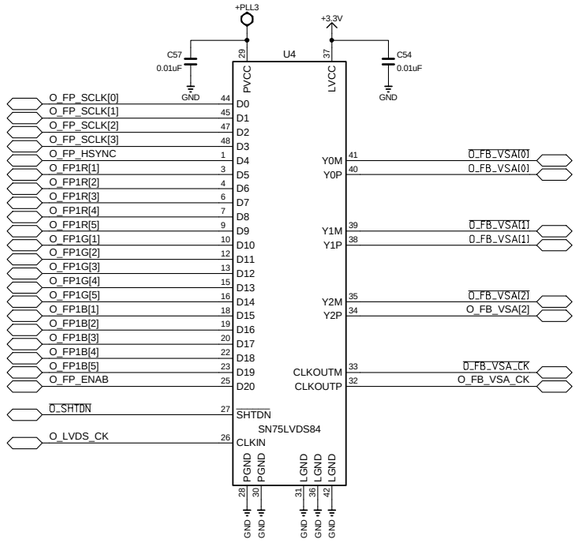
A_ETH_LNKED
A_ETH_RXD+
A_ETH_TXD-
A_ETH_RXD-
A_ETH_LNKED
A_ETH_LNLED
A_ETH_P5
A_ETH_P4
A_ETH_LKLED
Ethernet Connector
FDD
CT24
CT22
A_FDD_DCHNG
A_FDD_SIDE
A_FDD_RD
A_FDD_WP
A_FDD_TR00
A_FDD_WG
A_FDD_WD
A_FDD_STEP
A_FDD_DIR
A_FDD_Mo0
A_FDD_DS0
A_FDD_IDX
A_FDD_PIN_13
A_FDD_PIN_11
A_FDD_PIN_9
A_FDD_PIN_7
CT20
+3.3V
GND
PC_TCK
PC_TDO
PC_TDI
PC_TMS
R128 100
CS_ID_A
C61 47uF
C146 47uF
C149 47uF
C226 47uF
C65 0.01uF
C66 0.01uF
C67 0.01uF
C221 0.01uF
C222 0.01uF
C223 0.01uF
C99 1uF
C100 0.01uF
C102 0.01uF
C104 0.01uF
C118 0.01uF
C119 0.01uF
C135 0.01uF
C136 0.01uF
C161 0.01uF
C162 0.01uF
C209 1uF
C203 0.01uF
C205 0.01uF
C207 0.01uF
C101 0.01uF
C103 0.01uF
C105 0.01uF
C106 1uF
C126 0.01uF
C127 0.01uF
C147 0.01uF
C148 0.01uF
C169 0.01uF
C170 0.01uF
C202 1uF
C204 0.01uF
C206 0.01uF
C208 0.01uF
CT31
FDD PWR
VCC
GND
FDD_VGA+12V
MAIN (A) PC-104
CONTRACT NO.
- SA UR US - Sergey Averin -
APPROVALS
DATE
DRAWN SA 8-6-07
CHECKED SA
ISSUED SA
W# 700740
HC-9
Wheatstone Corporation
600 Industrial Drive
New Bern, NC 28562
SIZE D
FSCM NO.
DWG. NO. 84S0193-4
REV E
SCALE HC-9E PCB
SHEET 4 OF 7

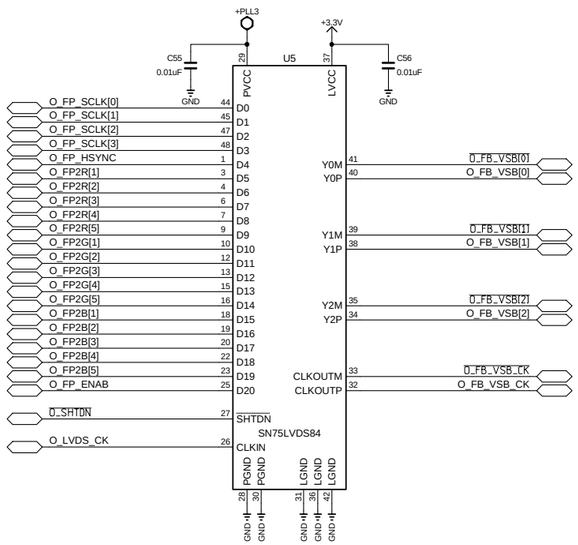


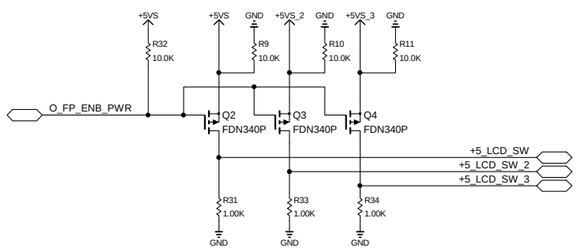
HC-9 Host Controller Card Schematic - Sheet 5 of 7

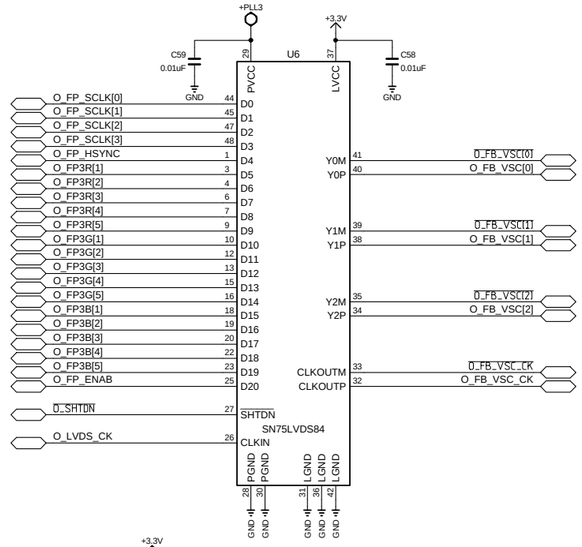


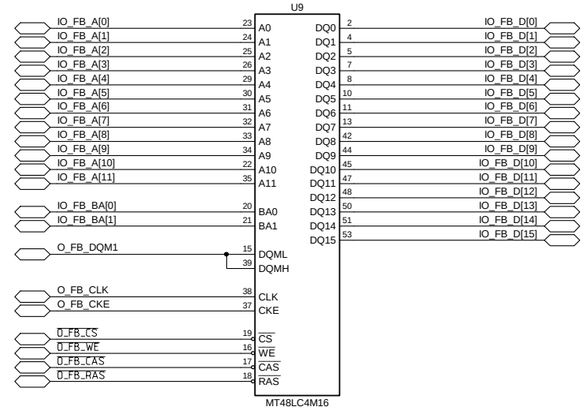
HC-9 Host Controller Card Schematic - Sheet 6 of 7

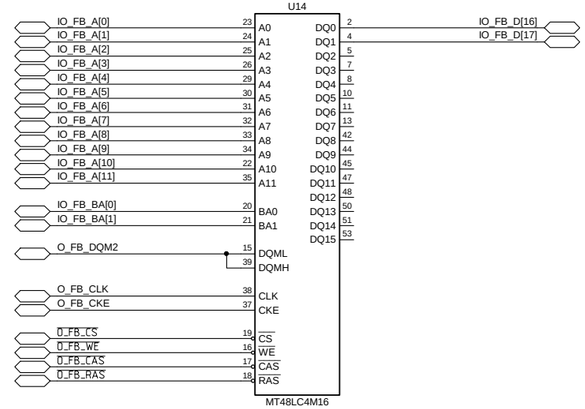


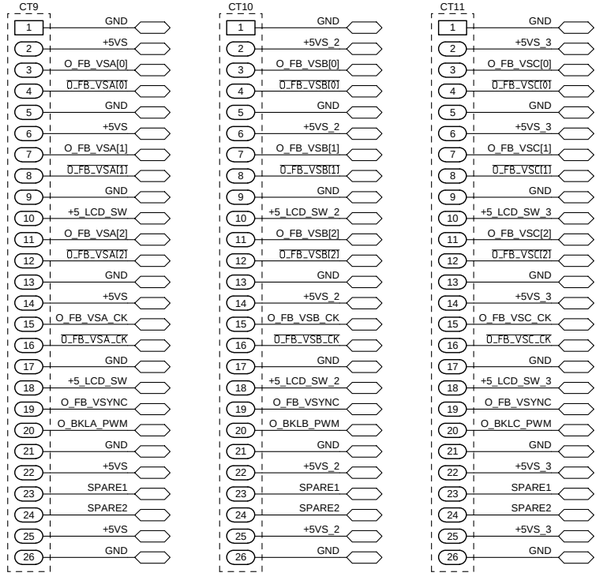


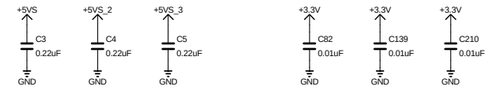






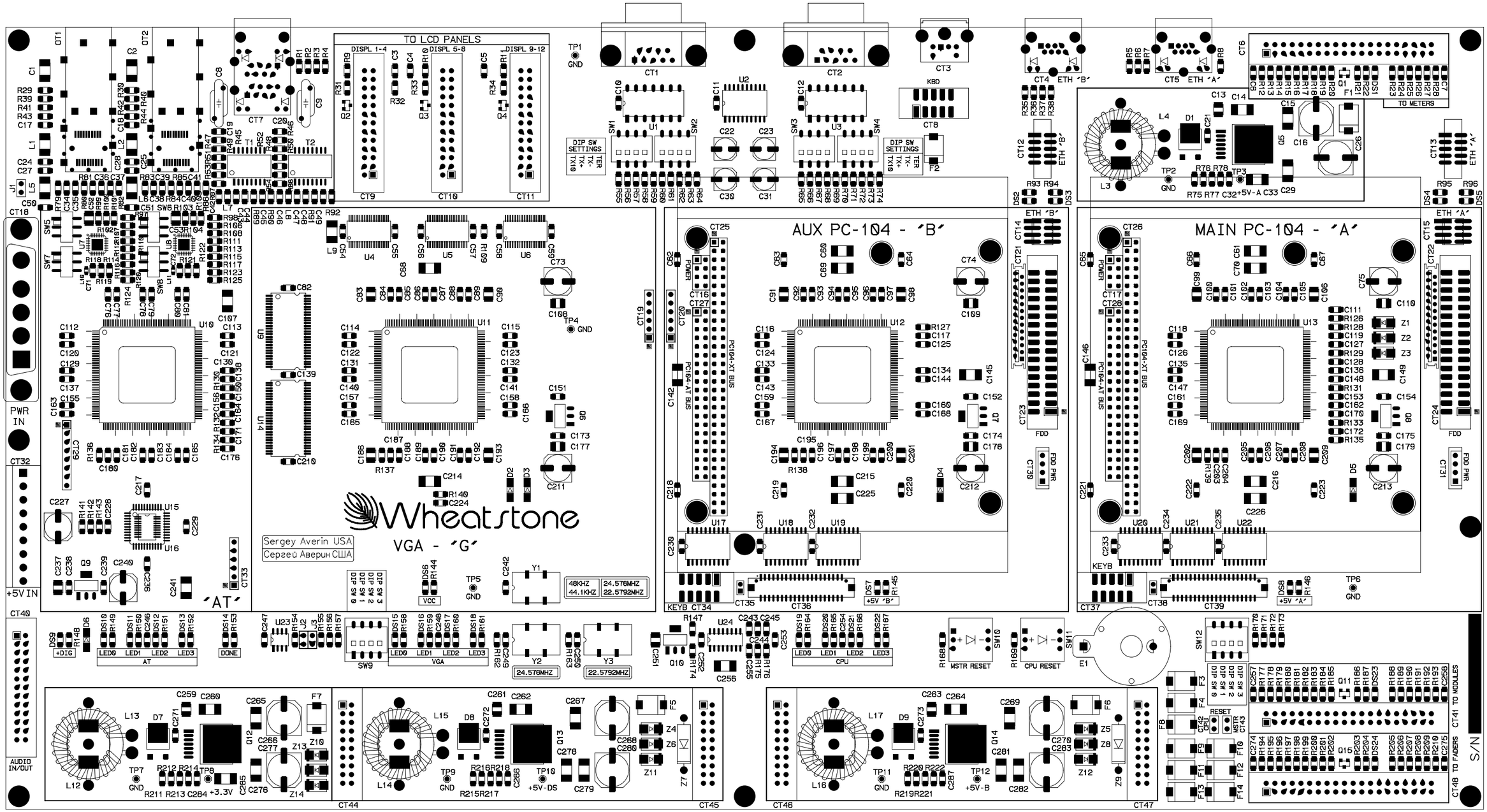


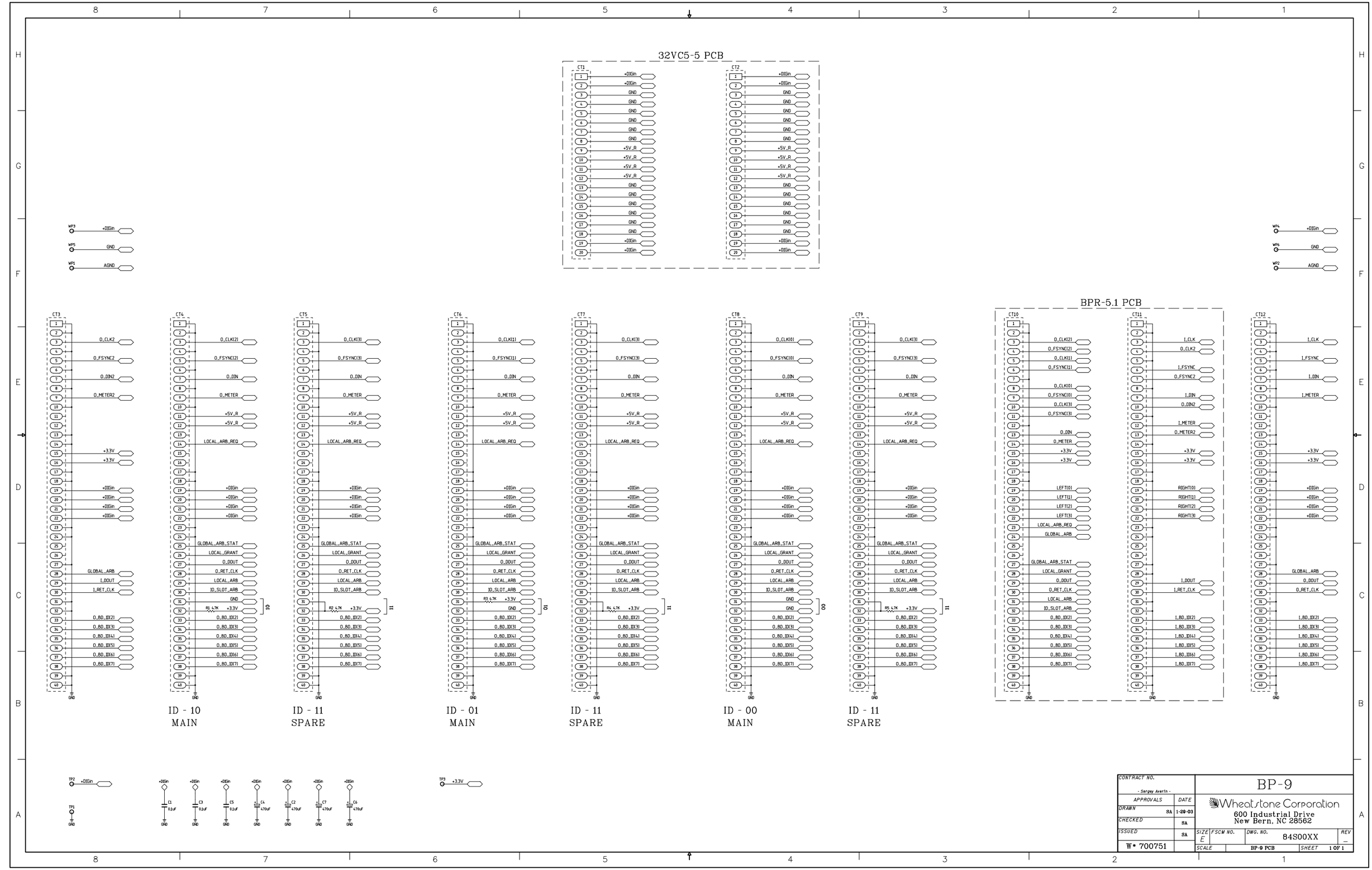




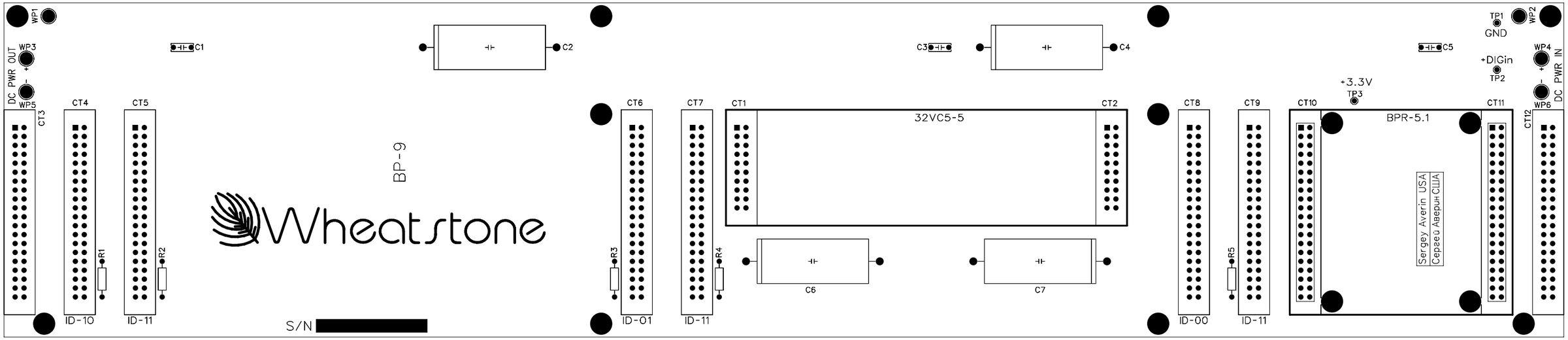
CONTRACT NO. - SA UR US - Sergey Averin -		HC-9	
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	8-6-07		
CHECKED	SA		
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 84S0193-7 / REV E	
W# 700740		SCALE / HC-9E PCB / SHEET 7 OF 7	

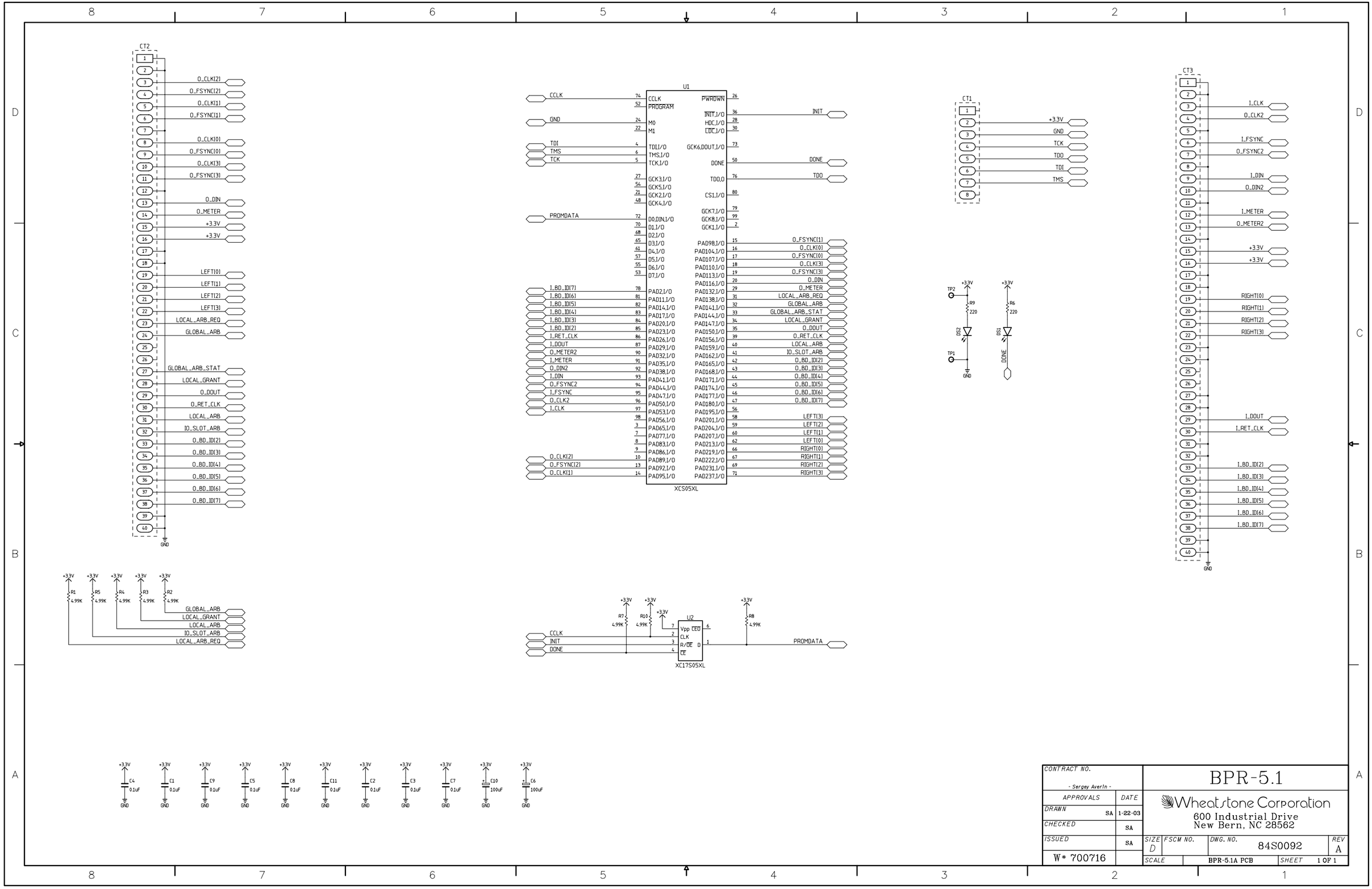
HC-9 Host Controller Card Schematic - Sheet 7 of 7


TO LCD PANELS
DISPL 1-4
DISPL 5-8
DISPL 9-12
CT9
CT10
CT11
CT1
CT2
CT3
CT4 ETH 'B'
CT5 ETH 'A'
CT6
TO METERS
CT7
CT8
KBD
DIP SW SETTINGS
CT12 ETH 'B'
CT13 ETH 'A'
CT14 ETH 'B'
CT15 ETH 'A'
CT18
PWR IN
CT32
+5V IN
CT40
AUDIO IN/OUT
AUX PC-104 - 'B'
MAIN PC-104 - 'A'
PC104-AT BUS
PC104-XT BUS
POWER
KEYB
FDD
FDD PWR
TO METERS
TO MODULES
TO FADERS
S/N
Wheatstone
VGA - 'G'
Sergey Averin USA
Сергей Аверин США
AT
VGA
CPU
MSTR RESET
CPU RESET
RESET
+5V-A
+5V-B
+5V-DS
+3.3V
48KHZ
44.1KHZ
24.576MHZ
22.5792MHZ
CT44
CT45
CT46
CT47
CT48



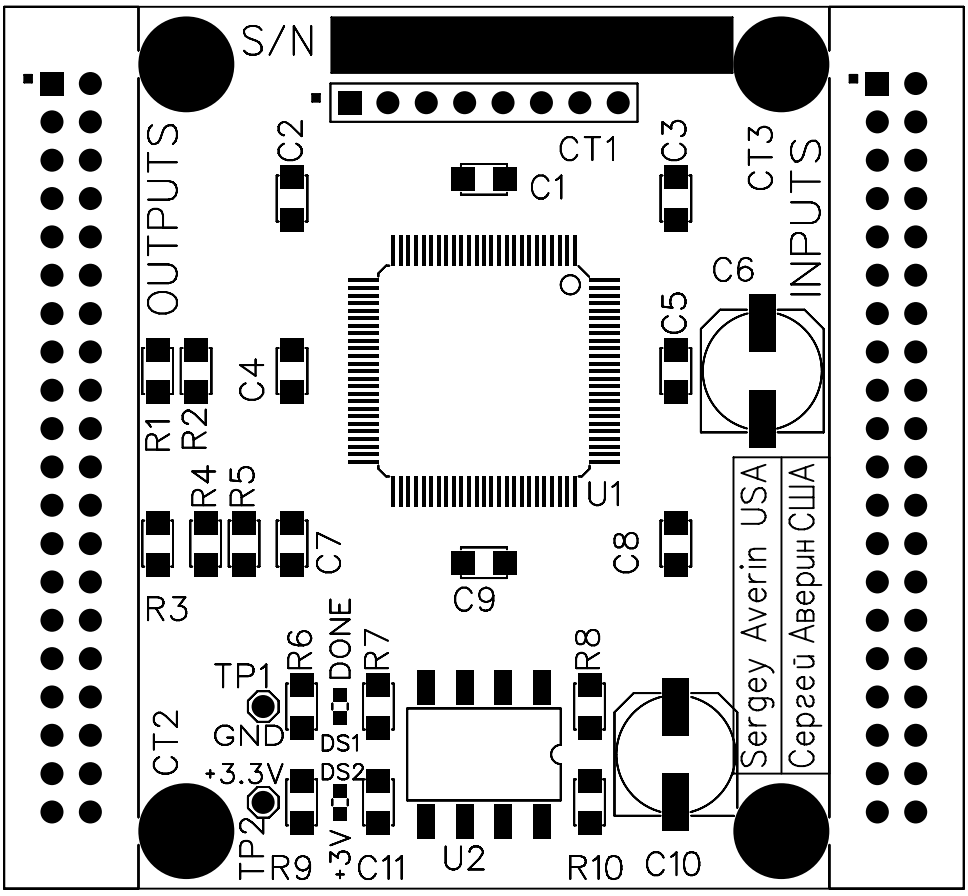
CONTRACT NO.		BP-9	
- Sergey Averin -			
APPROVALS	DATE	Wheatstone Corporation	
DRAWN	SA 1-29-03	600 Industrial Drive	
CHECKED	SA	New Bern, NC 28562	
ISSUED	SA	SIZE E / FSCM NO. / DWG. NO. 84S00XX / REV –	
W* 700751		SCALE BP-9 PCB	SHEET 1 OF 1


WP1
WP3
DC PWR OUT
WP5
C1
C2
C3
C4
C5
TP1
GND
WP2
WP4
+DIGin
TP2
DC PWR IN
WP6
+3.3V
TP3
CT1
CT2
CT3
CT4
CT5
CT6
CT7
CT8
CT9
CT10
CT11
CT12
32VC5-5
BPR-5.1
BP-9
Wheatstone
S/N
R1
R2
R3
R4
R5
C6
C7
ID-10
ID-11
ID-01
ID-11
ID-00
ID-11
Sergey Averin USA
Сергей Аверин США

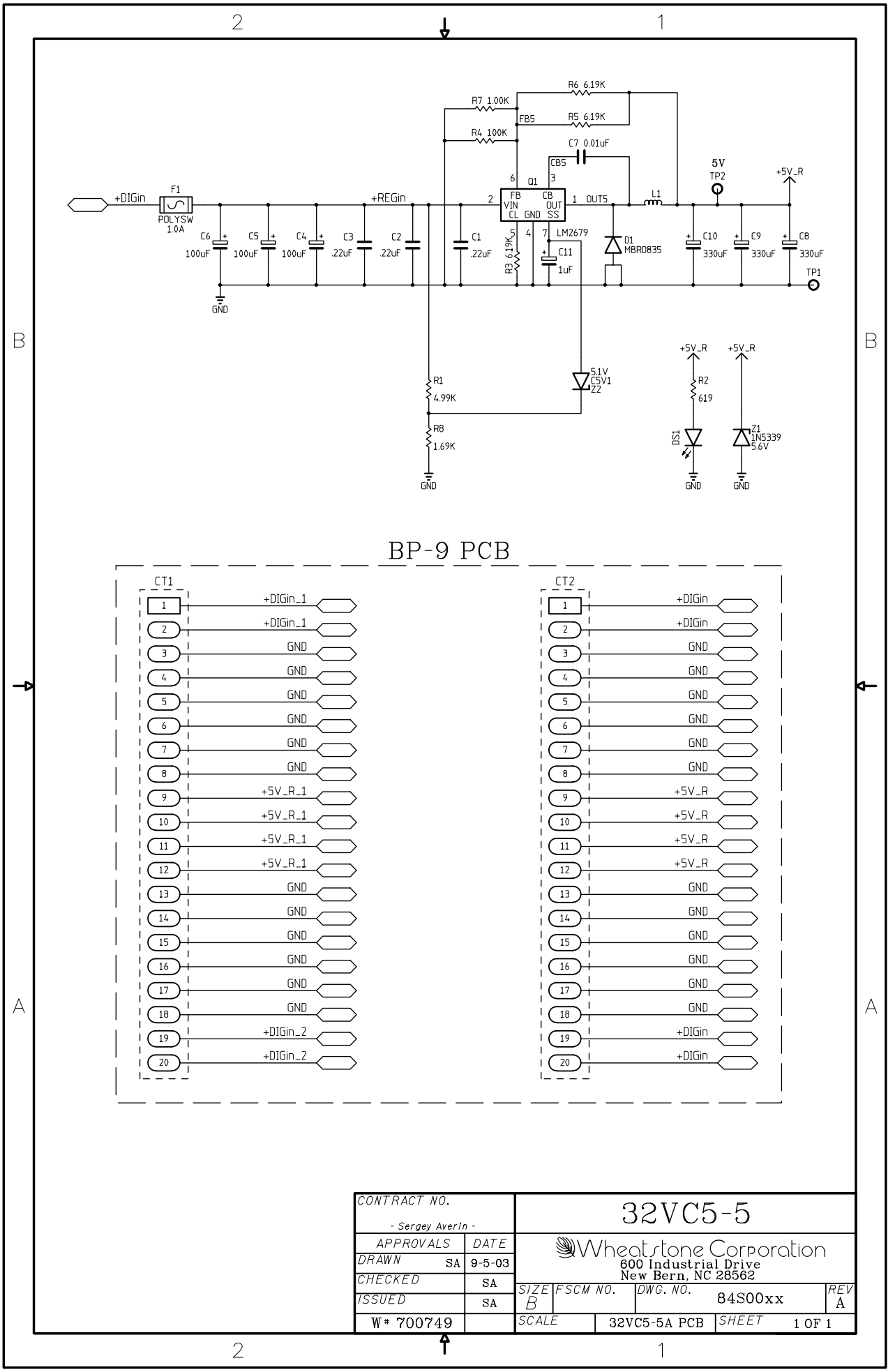


CONTRACT NO.		BPR-5.1	
- Sergey Averin -			
APPROVALS	DATE	Wheatstone Corporation	
DRAWN SA	1-22-03	600 Industrial Drive	
CHECKED	SA	New Bern, NC 28562	
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 84S0092 / REV A	
W# 700716		SCALE / BPR-5.1A PCB / SHEET 1 OF 1	

BPR-9 Back Plane Repeater Card Schematic - Sheet 1 of 1

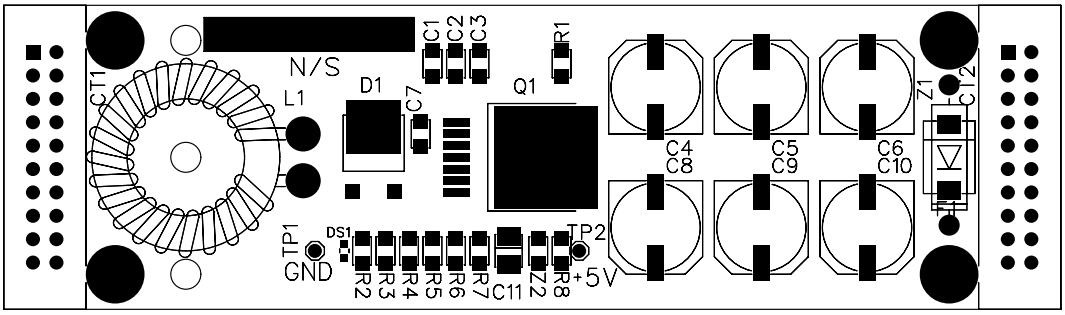


BPR-9 Back Plane Repeater Card Load Sheet

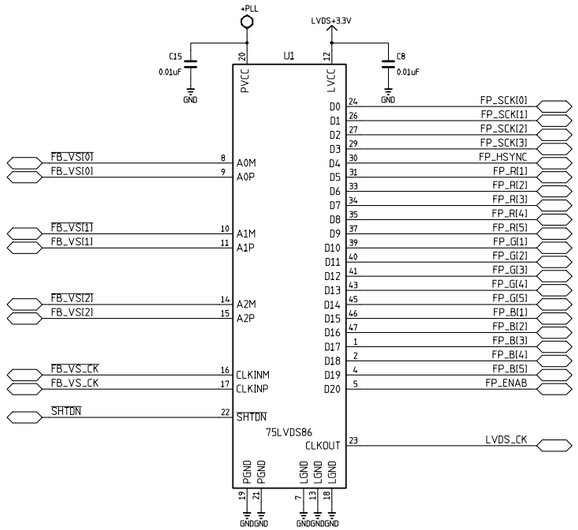


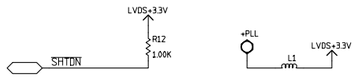
CONTRACT NO. - Sergey Averin -		32VC5-5	
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	9-5-03		
CHECKED	SA		
ISSUED	SA	SIZE B / FSCM NO. / DWG. NO. 84S00xx	REV A
W* 700749		SCALE / 32VC5-5A PCB	SHEET 1 OF 1

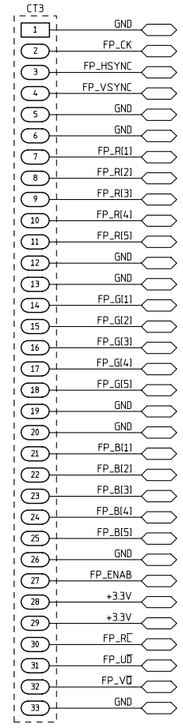
32VC5-5 +5V DC to DC Convertor Schematic - Sheet 1 of 1

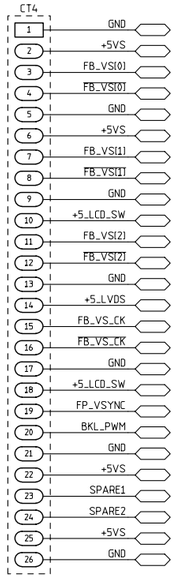


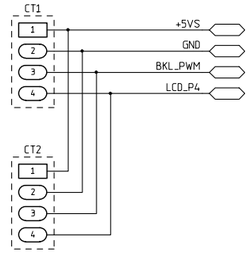
32VC5-5 +5V DC to DC Converter Card Load Sheet

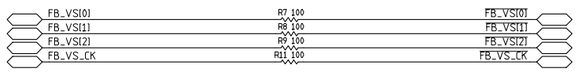


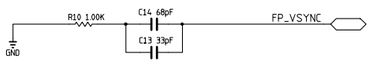


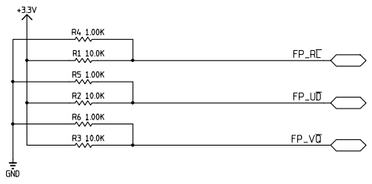


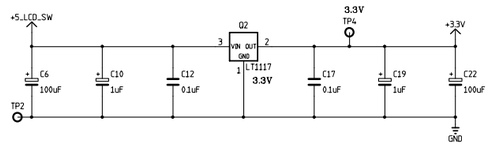


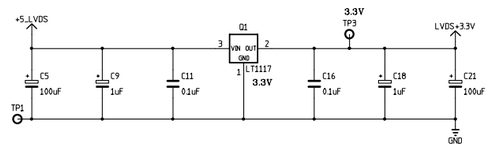


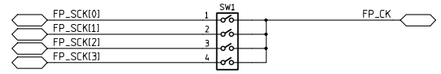




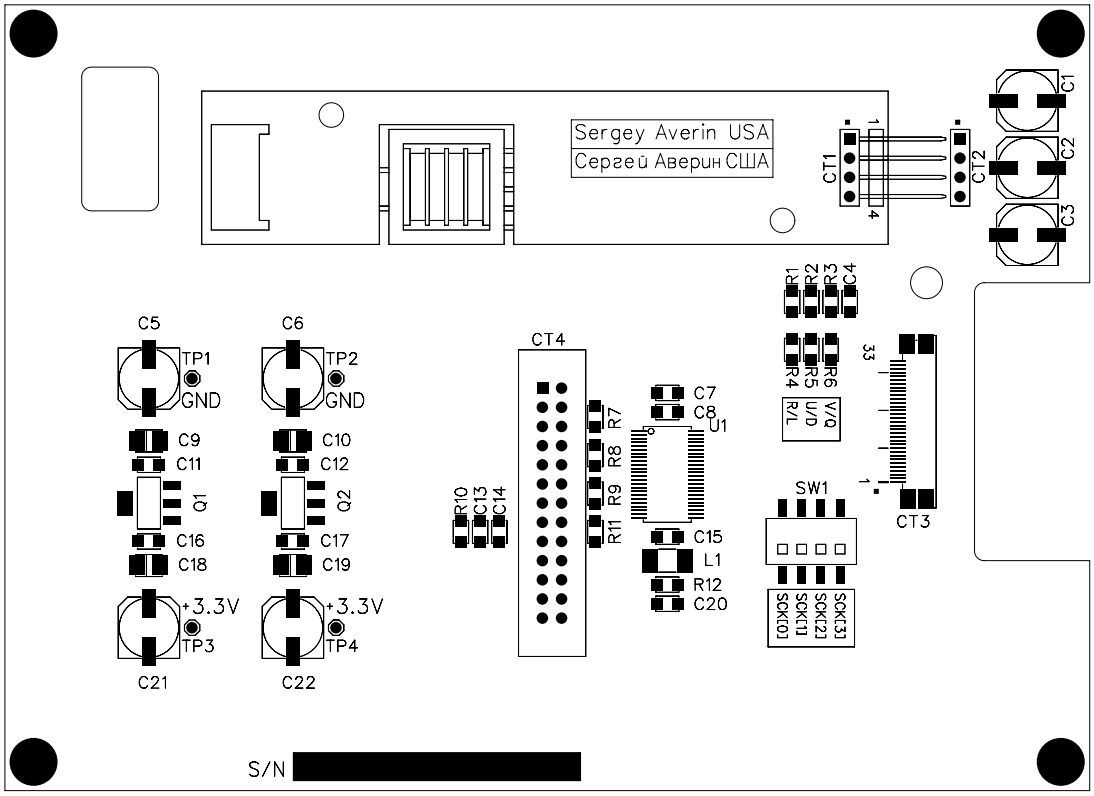




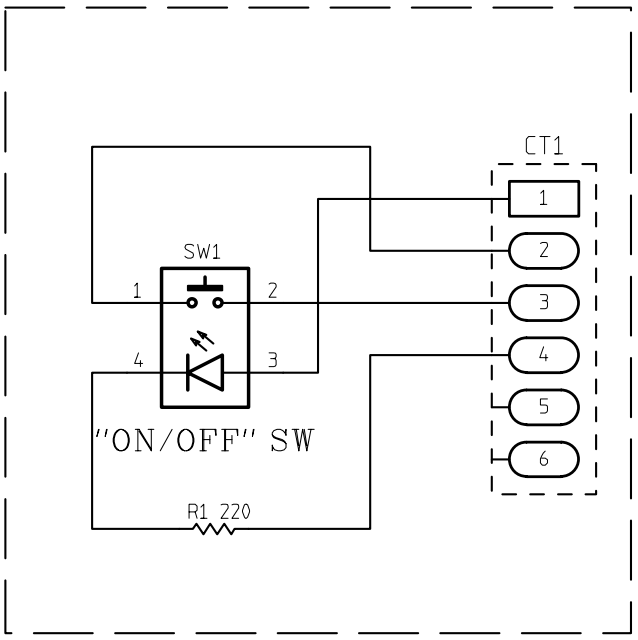




CONTRACT NO. - Sergey Averin -		VU-9	
APPROVALS	DATE	Wheatstone Corporation 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	1-8-03		
CHECKED	SA		
ISSUED	SA	SIZE D / FSCM NO. / DWG. NO. 84S0141 / REV –	
W# 700745		SCALE / VU-9 PCB / SHEET 1 OF 1	

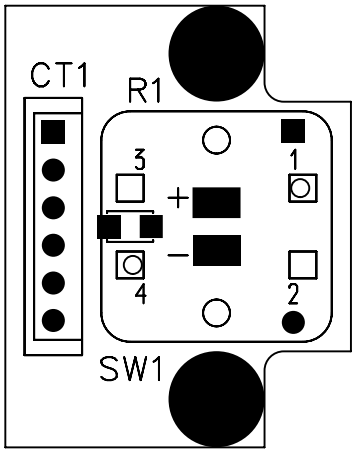


VU-9 VU Receiver Card Load Sheet



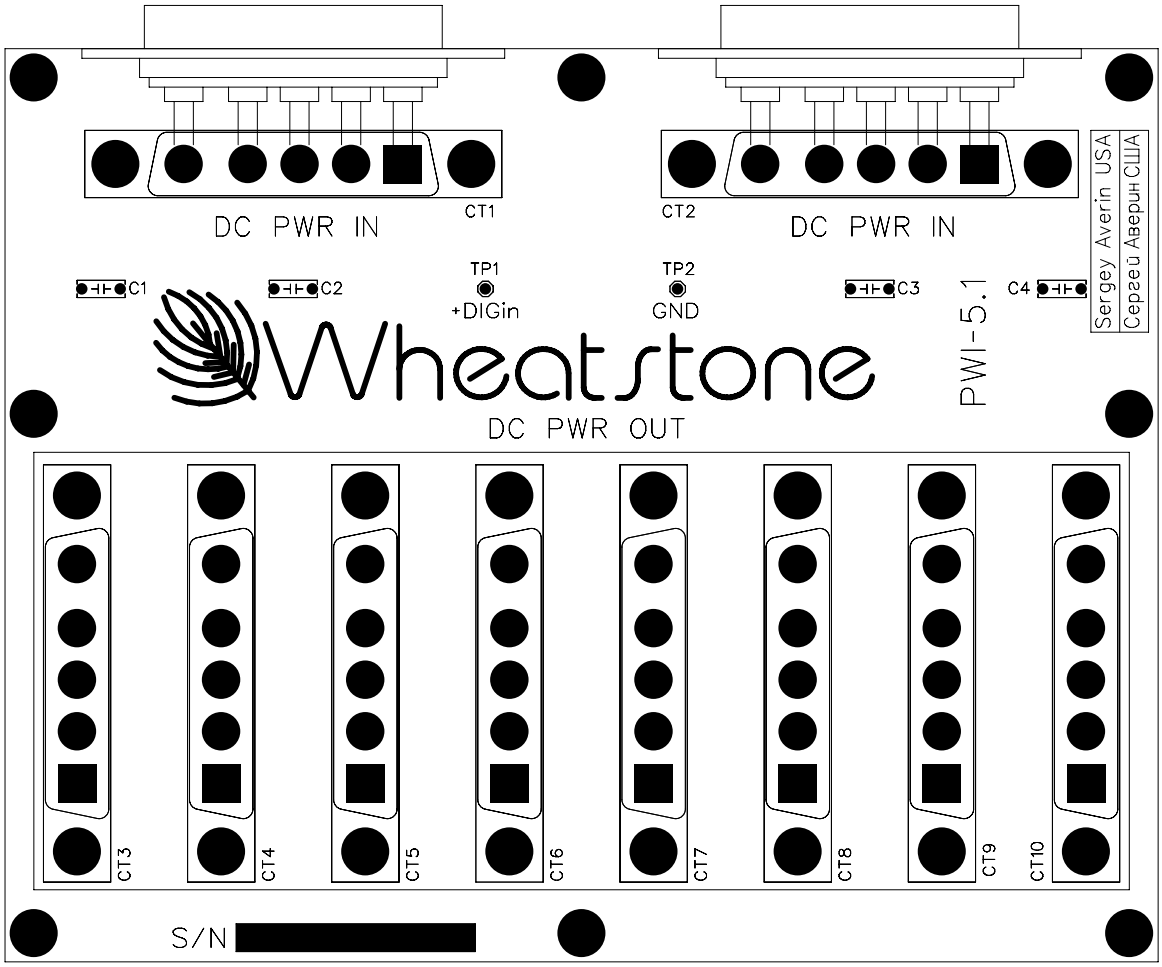
CONTRACT NO.		SW1-700	
APPROVALS	DATE	AUDIOARTS ENGINEERING 600 Industrial Drive New Bern, NC 28562	
DRAWN SA	2-15-02		
CHECKED	SA		
ISSUED	SA		
W# 700689		SIZE A / FSCM NO. / DWG. NO. 14S2029 / REV A	
		SCALE / SW1-700A PCB / SHEET 1 OF 1	

SW1-700 Switch Card Schematic - Sheet 1 of 1



SW1-700 Switch Card - Load Sheet

PWI-5.1 Power Interface Card Schematic - Sheet 1 of 1



PWI-5.1 Power Interface Card Load Sheet

Appendices

Appendix 1

Appendix 2

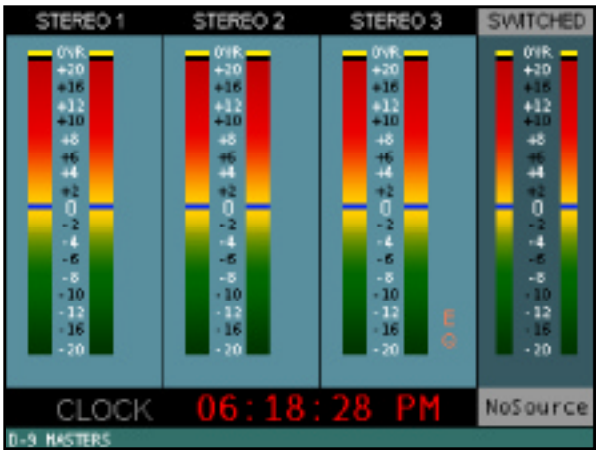
Appendix 3

Appendix 1

Contents

Control Surface Clock

The display of a time of day clock located on the bottom of the MASTER LCD screen.



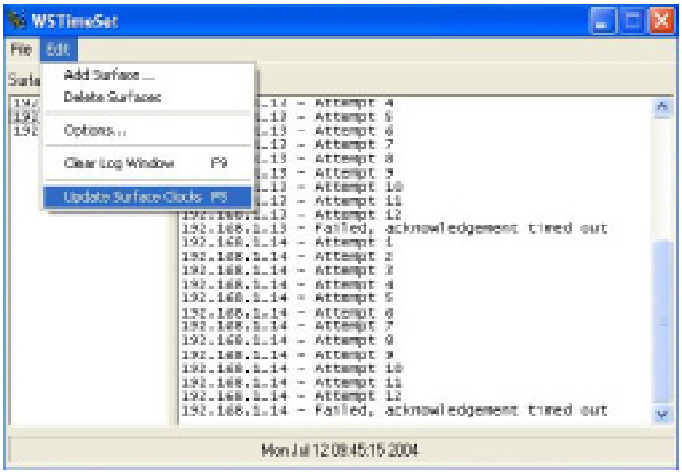
Setting the Time

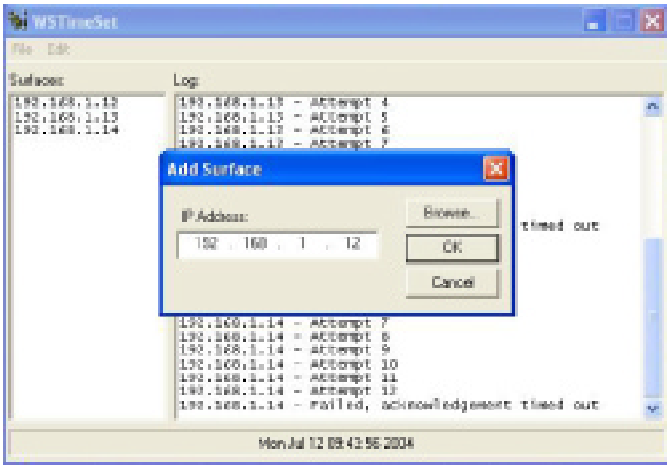
Setting the time of the control surface's clock is made via the Wheatstone Surface Time Manager software:

1. Select *Edit / Add Surface...* from the Main Menu, which will display the following form.

2. Enter an IP address of the control surface.

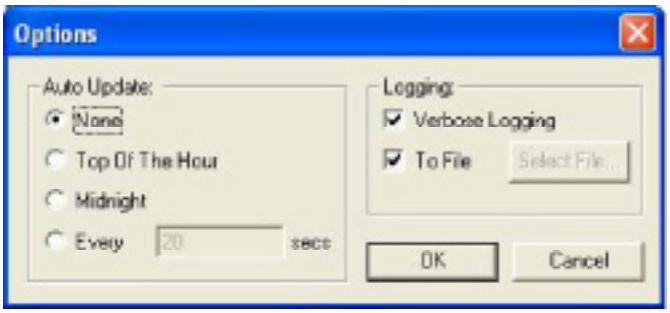
3. Select *Edit / Update Surface Clocks* or press *F5* key to update all surface clocks.





Update Options

Select *Edit / Options...* from the Main Menu. The Options form gives you different auto update options. Select the appropriate option for your application.



Synchronize

For the best accuracy synchronize the PC's clock to a master clock system. Refer to your master clock documentation for more information.

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Appendix 2

Contents

Options Text File

Introduction

There are a number of operational features on the D-9 surface that are controlled by the contents of the Options Text File (D9_OPTS.TXT) that resides on the surface's flash drive. In order to configure these features it is necessary to modify this file.

Modifying The Options Text File

There are several steps involved in modifying the file:

1. Establish an FTP (File Transfer Protocol) session with the surface. This is best done using an FTP program with a graphical interface, such as FTP Surfer by Whisper Technology. You will set up an anonymous session using the following information:

   Name: something useful, assuming you will save the setup
   Address: use the IP address of the surface
   User name: knockknock
   Password: whosthere

2. When the FTP session connects you will see a list of files and folders that are on the surface. One of those files is the Options Text file, named as specified above. Drag this file over to your PC's desktop so you can save a copy.
3. Make any required changes to the copy of the file on your desktop, according to the information in the following sections, then save the file and drag its icon back to the FTP window to send the modified file back to the surface.
4. Once the modified file is on the surface, wait a minute to be sure that the file has actually been written to the surface's flash memory. Then close the FTP session.
5. Reboot the surface for the changes to take effect.
6. If the surface has a backup CPU you should also save the same modified file to the backup CPU, which needs to be accessed by a separate FTP session using its IP address. You can wait to reboot the surface until you have sent the modified file to both surfaces; in this way you need only reboot the surface once.

A Simple Example From The File

As a simple example let's look at the MUTE_METHOD option. Scroll through the Options Text File (or look at the sample file listing at the end of this Appendix) until you see the following three lines of code:

```
// Syntax: MUTE_METHOD:?
// ? 0 (default) = ON button, 1 = ON AIR.
MUTE_METHOD:0
```

The first line describes the syntax for this option. It starts with two slashes, which are interpreted as the start of a comment line. Comment lines are made for **us** to read, and the surface CPU ignores them. This line shows that the syntax for the option is the keyword MUTE_METHOD followed by a colon (:) followed by some character, as represented by the '?' character.

The next line indicates that the '?' can be replaced by a '0' (a zero, not the letter O) if a muting channel being ON will trigger the mute, or a '1' if the muting channel must be both ON and assigned to a main bus (thus making it ON AIR) before it will trigger the mute. This specific example shows that the default setting is '0' for this option. Please note that this may or may not be the case for your particular surface, as the default option is subject to change. The **idea** of how to use the file remains true.

The third line is not a comment; this is the line the surface CPU actually reads from the file. This line, as shown, sets the muting method to ON (channel must be ON to activate a mute, but need not be ON AIR). If this is not the desired operation, this line must be edited. Change the '0' to a '1' and the muting method will change so that a channel is required to be ON AIR before it will activate a mute. As indicated in the instructions above for modifying the file, the actual change to operation will not happen until the surface has been rebooted and has read the modified file.

The edited line must follow the established syntax precisely or the surface may not behave as expected.

A Second Example

As a second example, lets look at something a little more involved. Once again, scroll through the Options Text File to find the following code (please note that some surfaces may have a different number of code lines in this section; the following is just for the purposes of example):

```
// Syntax: SPARE#:?
// # is the spare button number (1 - 12)
// ? is the mode (default = 2)...
//   0 = None, Button presses are ignored, LED controlled by DIO
//   1 = Toggle, Button state toggles on each press, LED controlled by Surface
//   2 = Momentary, Button is active when held down, LED controlled by Surface
//   3 = Momentary, Button is active when held down, LED controlled by DIO
//   4 = Automation, Button & LED are controlled by automation interface
//   5 = Preset Select, Button selects pre-configured preset, LED controlled by Surface
SPARE1:2
SPARE2:2
SPARE3:2
SPARE4:2
SPARE5:2
SPARE6:2
SPARE7:2
SPARE8:2
SPARE9:2
SPARE10:2
SPARE11:2
SPARE12:2
```

Once again, our first line is a comment line that shows the syntax used for this particular option. In this case there are several code lines, each one referring to a different spare (or programmable) button. Thus the '#' in the example syntax is replaced with a number on the actual code line to indicate which of the spare buttons that particular code line refers to. This fact is described on the second comment line.

The third comment line explains that a number indicating button mode will be used in place of the '?' on each actual code line.

The next few comment lines explain the possible modes that the spare buttons can operate in. You may have fewer or greater modes available depending on the surface model and vintage. In any event you can select the same or a different mode from the available modes for each programmable button on the surface.

An Example File - Complete

The following listing shows a typical Options Text File for the surface type covered by this manual. Your actual Options Text File may be somewhat different, depending on vintage, but the general ideas involved in editing the file will apply.

```
// --------------------------------
// MIX MINUS OPTIONS
// --------------------------------
// Syntax: MM#:?
// # is the mix minus bus number (1 - 8)
// ? is the mode (default = Ø)...
//   Ø = Post Fader, Post ON (default mode)
//   1 = Pre  Fader, Post ON
//   2 = Post Fader, Pre  ON
//   3 = Pre  Fader, Pre  ON
MM1:Ø
MM2:Ø
MM3:Ø
MM4:Ø
MM5:Ø
MM6:Ø
MM7:Ø
MM8:Ø
// --------------------------------
// SPARE OPTIONS
// --------------------------------
// Syntax: SPARE#:?
// # is the spare button number (1 - 12)
// ? is the mode (default = 2)...
//   Ø = None, Button presses are ignored, LED controlled by DIO
//   1 = Toggle, Button state toggles on each press, LED controlled by Surface
//   2 = Momentary, Button is active when held down, LED controlled by Surface
//   3 = Momentary, Button is active when held down, LED controlled by DIO
//   4 = Automation, Button & LED are controlled by automation interface
//   5 = Preset Select, Button selects pre-configured preset, LED controlled by Surface
SPARE1:2
SPARE2:2
SPARE3:2
SPARE4:2
SPARE5:2
SPARE6:2
SPARE7:2
SPARE8:2
SPARE9:2
SPARE1Ø:2
SPARE11:2
SPARE12:2
```

```
// --------------------------------
// BUS MINUS OPTIONS
// --------------------------------
// Syntax: DIRECT_OUT#:?
// # is the input fader number (1 - 40)
// ? is the mode (default = 0)...
//   0 = Normal bus minus mode
//   1 = Fader direct mode
DIRECT_OUT1:0
DIRECT_OUT2:0
DIRECT_OUT3:0
DIRECT_OUT4:0
DIRECT_OUT5:0
DIRECT_OUT6:0
DIRECT_OUT7:0
DIRECT_OUT8:0
DIRECT_OUT9:0
DIRECT_OUT10:0
DIRECT_OUT11:0
DIRECT_OUT12:0
DIRECT_OUT13:0
DIRECT_OUT14:0
DIRECT_OUT15:0
DIRECT_OUT16:0
DIRECT_OUT17:0
DIRECT_OUT18:0
DIRECT_OUT19:0
DIRECT_OUT20:0
DIRECT_OUT21:0
DIRECT_OUT22:0
DIRECT_OUT23:0
DIRECT_OUT24:0
DIRECT_OUT25:0
DIRECT_OUT26:0
DIRECT_OUT27:0
DIRECT_OUT28:0
DIRECT_OUT29:0
DIRECT_OUT30:0
DIRECT_OUT31:0
DIRECT_OUT32:0
DIRECT_OUT33:0
DIRECT_OUT34:0
DIRECT_OUT35:0
DIRECT_OUT36:0
DIRECT_OUT37:0
DIRECT_OUT38:0
DIRECT_OUT39:0
DIRECT_OUT40:0
```

```
// --------------------------------
// MISC OPTIONS
// --------------------------------
// Syntax: SET_TIMEOUT:?
// ? 1 (default) = 2Ø sec set button timeout enabled, Ø = no timeout.
SET_TIMEOUT:1
// Syntax: ALPHA_SORT:?
// ? 1 (default) = XY controller alpha sorting enabled, Ø = no sort.
ALPHA_SORT:1
// Syntax: USE_HELP:?
// ? 1 (default) help system enabled, Ø = no help.
USE_HELP:1
// Syntax: ONE_VIS:?
// ? 1 = one visibility for all presets, Ø (default) visibility stored for each preset.
ONE_VIS:1
// Syntax: XCHAN_VIS_DISABLE:?
// ? Ø = do not allow X visibility disable, 1 (default) allow X visibility disable.
XCHAN_VIS_DISABLE:1
// Syntax: ONE_VDIP:?
// ? 1 = one vdip config for all presets, Ø (default) vdip config stored for each preset.
ONE_VDIP:1
// Syntax: XYC_CHECKSUM:?
// ? 1 (default) = use checksum in XYC messages, Ø no checksum.
XYC_CHECKSUM:1
// Syntax: VU_RANGE:?
// ? Ø (default) = -2Ø to 2Ødb, 1 = -4Ø to 2Ødb.
VU_RANGE:Ø
// Syntax: MUTE_METHOD:?
// ? Ø (default) = ON button, 1 = ON AIR.
MUTE_METHOD:Ø
// Syntax: PRESET_PLAY:?
// ? 1 = new preset playback method, Ø old preset core dump method.
PRESET_PLAY:1
// Syntax: HDW_LOGGER:?
// ? 1 = use hardware logger, Ø (default) no hardware logger.
HDW_LOGGER:Ø
// Syntax: CLOCK_24HR:?
// ? Ø (default) = 12 hour clock, 1 = 24 hour clock.
CLOCK_24HR:Ø
// Syntax: MXM_BY_SIGNAL:?
// ? Ø = (default) MxM assigns stored by fader, 1 change MxM assigns as sources change.
MXM_BY_SIGNAL:Ø
// Syntax: POPUP_BASE_LCD:?
// ? -1 = (default) rightmost popup over monitor panel
//  or  Ø-9 LCD panel for rightmost popup (Ø right most LCD).
POPUP_BASE_LCD:-1
// Syntax: SURROUND_UNFOLD:?
// ? Ø = disable surround unfold
// ? 1 = (default) enable surround unfold
SURROUND_UNFOLD:1
```

```
// Syntax: DCM_MUTE_LEVEL:?
// ? INF or -8Ø to -6 = (-6Ø default) dB level considered
//  muted for DCM assign LED indication.
DCM_MUTE_LEVEL:-6Ø
// Syntax: FRAME_RATE:?
// ? 6Ø (default) = 6Ø Hz (NTSC), 5Ø = 5Ø Hz (PAL).
FRAME_RATE:6Ø
// Syntax: ACI_DISABLE_MSS:?
// ? Ø (default) = send machine start/stop DIOs whenever input channels go on/off.
//   1 = supress machine start/stop DIOs when input channels on/off via ACI.
//   2 = supress machine start/stop DIOs when input channels on/off via remote on/off DIO
//   3 = supress machine start/stop DIOs when input channels on/off via ACI and/or DIO.
ACI_DISABLE_MSS:Ø
```

Appendix 3

Contents

For the most part there are no user-replaceable parts in the D-9 control surface. 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 is shown on the next page. Contact Wheatstone technical support for further information.

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

REPLACEMENT PARTS — D-9 CONTROL SURFACE

COMPONENT	DESCRIPTION	*WS P/N*
IS-D9 PANEL	COMPLETE INPUT PANEL WITH STANDARD FADERS	***"005214"***
IS-D9M PANEL	COMPLETE INPUT PANEL WITH MOTORIZED FADERS	***"005210"***
EFS-D9 PANEL	COMPLETE CONTROL PANEL	***"005211"***
DCM-D9 PANEL	COMPLETE DYNAMICS CONTROL PANEL WITH STANDARD FADERS	***"005215"***
DCM-D9M PANEL	COMPLETE DYNAMICS CONTROL PANEL WITH MOTORIZED FADERS	***"005212"***
MFS-D9 PANEL	COMPLETE MASTER PANEL WITH STANDARD FADERS	***"005216"***
MFS-D9M PANEL	COMPLETE MASTER PANEL WITH MOTORIZED FADERS	***"005213"***
BK3.12 BLANK PANEL	FACEPLATE ASSEMBLY	***"005318"***
BK6.25 BLANK PANEL	FACEPLATE ASSEMBLY	***"005319"***
IS-D9 LOADED CARD	INPUT PANEL LOADED CARD ASSEMBLY	***"005250"***
EFS-D9 LOADED CARD	CONTROL PANEL LOADED CARD ASSEMBLY	***"005251"***
DCM-D9 LOADED CARD	DYNAMICS CONTROL PANEL LOADED CARD ASSEMBLY	***"005252"***
MFS-D9 LOADED CARD	MASTER PANEL LOADED CARD ASSEMBLY	***"005253"***
IQ-9M LOADED CARD	IQ LOADED CARD ASSEMBLY FOR PANEL WITH MOTORIZED FADERS	***"005273"***
IQ-9 LOADED CARD	IQ LOADED CARD ASSEMBLY FOR PANEL WITH STANDARD FADERS	***"005275"***
IQO-9 LOADED CARD	IQ LOADED CARD ASSEMBLY FOR MASTER PANEL WITH STANDARD FADERS	***"005276"***
IQO-9M LOADED CARD	IQ LOADED CARD ASSEMBLY FOR MASTER PANEL WITH MOTORIZED FADERS	***"005277"***
EI-5.1 LOADED CARD	ENCODER LOADED CARD	***"005030"***
SW1-700 LOADED CARD	LOADED SWITCH CARD	***"001977"***
HC-9 LOADED CARD	LOADED CARD ASSEMBLY WITH COMPUTER	***"005270"***
HC-9NC LOADED CARD	LOADED CARD ASSEMBLY W/O COMPUTER	***"005294"***
BP-9 LOADED CARD	LOADED CARD ASSEMBLY	***"005272"***
BPR-9 LOADED CARD	LOADED CARD ASSEMBLY	***"005278"***
VU-9 LOADED CARD	LOADED CARD ASSEMBLY	***"005271"***
VC5-5HC LOADED CARD	LOADED CARD ASSEMBLY	***"005262"***
VC5-5 LOADED CARD	LOADED CARD ASSEMBLY	***"005274"***
PWI-5.1 LOADED CARD	LOADED CARD ASSEMBLY	***"005059"***
PSR POWER SUPPLY RACK UNIT	RACK CAGE FOR SPS POWER SUPPLIES	***"007232"***
SPS-180	POWER SUPPLY UNIT FOR USE IN PSR RACK	***"007231"***
SPS-400	POWER SUPPLY UNIT FOR USE IN PSR RACK	***"007233"***
SPS/PWI POWER CABLE	SPS DB TO CONTROL SURFACE PWI POWER CABLE	***"007261"***
FLAT RIBBON CABLE	50 CONDUCTOR FLAT RIBBON CABLE	***"150007"***
FLAT RIBBON CABLE	26 CONDUCTOR FLAT RIBBON CABLE	***"150083"***

REPLACEMENT PARTS — D-9 CONTROL SURFACE

COMPONENT	DESCRIPTION	*WS P/N*
REPLACEMENT FADER ASSEMBLY	WIRED NON-MOTORIZED FADER	***"005296"***
REPLACEMENT FADER ASSEMBLY	WIRED MOTORIZED FADER	***"005297"***
REPLACEMENT FADER KNOB	BLACK FADER KNOB	***"520001"***
REPLACEMENT FADER KNOB	BLUE FADER KNOB	***"520002"***
REPLACEMENT FADER KNOB	GREEN FADER KNOB	***"520003"***
REPLACEMENT FADER KNOB	GREY FADER KNOB	***"520004"***
REPLACEMENT FADER KNOB	ORANGE FADER KNOB	***"520005"***
REPLACEMENT FADER KNOB	RED FADER KNOB	***"520006"***
REPLACEMENT FADER KNOB	WHITE FADER KNOB	***"520007"***
REPLACEMENT FADER KNOB	YELLOW FADER KNOB	***"520008"***
REPLACEMENT SWITCH	ON/OFF SWITCH	***"510109"***
SWITCH RED BUTTON	ON BUTTON	***"530097"***
RED LED LAMP REPLACEMENT	ON LED LAMP	***"600027"***
SWITCH	SINGLE POLE MOMENTARY SWITCH W/RED LED	***"510106"***
SWITCH	SINGLE POLE MOMENTARY SWITCH W/HOLES FOR LED, NO LED INSTALLED	***"510293"***
NKK SWITCH	JB15 SWITCH W/BRIGHTER GREEN LED AND SILICON GASKET	***"510289"***
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"***
ENCODER	11MM ROTARY ENCODER, 20MM SHAFT LENGTH, ORDER W# 005030	
ENCODER KNOB	11MM BLACK PUSH-ON KNOB	***"520105"***
ENCODER LIGHT PIPE	24 SEGMENT LIGHT PIPE FOR DTVM ENCODER	***"520104"***
ENCODER CAP	PLAIN BLUE CAP FOR 11MM COLLET KNOB	***"530291"***
ENCODER CAP	PLAIN GREEN CAP FOR 11MM COLLET KNOB	***"530292"***
ENCODER CAP	PLAIN GRAY CAP FOR 11MM COLLET KNOB	***"530293"***
ENCODER CAP	PLAIN PASTEL GREEN CAP FOR 11MM COLLET KNOB	***"530294"***
ENCODER CAP	PLAIN CREAM CAP FOR 11MM COLLET KNOB	***"530295"***
ENCODER CAP	PLAIN PALE BLUE CAP FOR 11MM COLLET KNOB	***"530296"***
ENCODER CAP	PLAIN BURGUNDY CAP FOR 11MM COLLET KNOB	***"530315"***
LUMA BUTTON	WHITE LUMA BUTTON	***"530274"***
LUMA BUTTON	RED LUMA BUTTON	***"530275"***
LUMA BUTTON	YELLOW LUMA BUTTON	***"530276"***
LUMA BUTTON	GREEN LUMA BUTTON	***"530277"***

REPLACEMENT PARTS — D-9 CONTROL SURFACE		
COMPONENT	**DESCRIPTION**	***WS P/N***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "1"	***"530297"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "2"	***"530298"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "3"	***"530299"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "4"	***"530300"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "5"	***"530301"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "6"	***"530302"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "7"	***"530303"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "8"	***"530304"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "A"	***"530321"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "B"	***"530322"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "C"	***"530323"***
LUMA BUTTON	STYRENE WITH UV INHIBITOR BUTTON PRINTED "D"	***"530324"***
PLUG	5 PIN PLUG FOR #26 AWG	***"230030"***
PLUG	6 PIN PLUG FOR #26 AWG	***"230031"***
PLUG RIBBON	26 PIN RIBBON PLUG	***"250043"***
PLUG RIBBON	40 PIN RIBBON PLUG	***"250053"***
HEADER	40 PIN BOXED HEADER, STRAIGHT	***"250056"***
HEADER	5 PIN JST HEADER	***"250064"***
HEADER	6 PIN JST HEADER	***"250065"***
HEADER	9 PIN JST HEADER	***"250066"***
RECEPTACLE HOUSING	5 POSITION RECEPTACLE HOUSING	***"200113"***
POWER SOCKET	40 AMP SOLDER CUP POWER SOCKET	***"200118"***
DISPLAY	4 SEGMENT GREEN ALPHA NUMERIC DISPLAY	***"610016"***
LED SUPERBRIGHT GREEN	GREEN LED WITH UNCUT LEADS	***"610075"***
LED SUPERBRIGHT YELLOW	YELLOW LED WITH UNCUT LEADS	***"610076"***
LCD DISPLAY	5.7" TFT 320 X 240 6 BIT DIGITAL INPUT DISPLAY	***"940028"***
FAN	60MM SQUARE 12VDC FAN	***"840019"***
MANUAL	OWNER'S MANUAL	***"005299"***

SPARE PARTS KIT — D-9 CONTROL SURFACE

W# 055275 w/NON-MOTORIZED FADER
W# 055276 w/MOTORIZED FADER

COMPONENT	DESCRIPTION	QTY	*WS P/N*
SW1-700/RED LOADED CARD	LOADED SWITCH CARD	**2**	***"001977"***
EI-5.1 LOADED CARD	ENCODER LOADED CARD	**4**	***"005030"***
PLUG	DB-25 CONNECTOR PLUG	**6**	***"200022"***
HOOD	DB-25 CONNECTOR HOOD	**6**	***"200025"***
RETAINING KIT	MALE SCREW RETAINER KIT	**6**	***"200035"***
Q2017_IC	2017 MIC PREAMP IC	**6**	***"320003"***
Q2142_IC	2142 BALANCED LINE DRIVER IC	**6**	***"320004"***
QLH1522AB	LH1522AB DUAL FET OPTO COUPLER 10Ω ON RESISTANCE (SOLID STATE RELAY)	**6**	***"340020"***
*FADER_NON-MOTORIZED	NON-MOTORIZED FADER ASSEMBLY	**1**	***"005296"***
*FADER_MOTORIZED	MOTORIZED FADER ASSEMBLY	**1**	***"005297""***
FADER KNOB	BLACK FADER KNOB	**1**	***"520001"***
FADER KNOB	BLUE FADER KNOB	**1**	***"520002"***
FADER KNOB	GREEN FADER KNOB	**1**	***"520003"***
FADER KNOB	GREY FADER KNOB	**1**	***"520004"***
FADER KNOB	ORANGE FADER KNOB	**1**	***"520005"***
FADER KNOB	RED FADER KNOB	**1**	***"520006"***
FADER KNOB	WHITE FADER KNOB	**1**	***"520007"***
FADER KNOB	YELLOW FADER KNOB	**1**	***"520008"***
ENCODER KNOB	11MM BLACK PUSH-ON KNOB	**4**	***"520105"***
ENCODER CAP	PLAIN BLUE CAP FOR 11MM COLLET KNOB	**1**	***"530291"***
ENCODER CAP	PLAIN GREEN CAP FOR 11MM COLLET KNOB	**1**	***"530292"***
ENCODER CAP	PLAIN GREY CAP FOR 11MM COLLET KNOB	**1**	***"530293"***
ENCODER CAP	PLAIN PASTEL GREEN CAP FOR 11MM COLLET KNOB	**1**	***"530294"***
ENCODER CAP	PLAIN CREAM CAP FOR 11MM COLLET KNOB	**1**	***"530295"***
ENCODER CAP	PLAIN PALE BLUE CAP FOR 11MM COLLET KNOB	**1**	***"530296"***
ENCODER CAP	PLAIN BURGUNDY CAP FOR 11MM COLLET KNOB	**1**	***"530315"***
DISPLAY	4 SEGMENT GREEN ALPHA NUMERIC DISPLAY	**1**	***"610016"***
SCR_440X3/16_PH_PAN_BLK_S/S	PHILLIPS PANHEAD S/S SCREW BLACK	**10**	***"820088"***
SCR_440X3/16_PH_FLAT_S/S	440 X 3/16 PHILLIPS FLATHEAD S/S SCREW	**10**	***"820095"***
SCREW_M3X5_PH_PAN_S/S	PHILLIPS PANHEAD STAINLESS STEEL METRIC SCREW	**10**	***"820122"***
THUMB SCREW KNOB_ 832	832 X 1/4" BLACK THUMB SCREW KNOB	**2**	***"823069"***
NUT_SPANNER_ENCODER	9.52MM (3/8") BRASS SLOTTED COLLAR NUT	**8**	***"850074"***

* SPARE PARTS KIT INCLUDES EITHER THE MOTORIZED OR THE NON-MOTORIZED FADER ASSEMBLY, BUT NOT BOTH.