SCIENTIFIC DATA SYSTEMS, INC.

Standard Cased Hole CPF Maintenance Panel

Maintenance Manual

STANDARD CASED HOLE CPF MAINTENANCE

Maintenance Manual

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Table of Contents

Introduction

Warrior software Release 7.0 is a second-generation 32-bit program, while Release 8.0 is a Unicode 32-bit and 62-bit release. The Warrior software is a mature logging environment that stresses ease of use, wide versatility, with a true multitasking environment. This software can also be used from a desktop to replay, recalculate and print logs from the raw data or imported data from other systems such as LAS or LIS data. The Warrior software runs on Windows Operating Systems (Windows 2000, Windows XP, Windows 7 32-bit and Windows 7 64-bit. Operators need to be familiar with Windows and logging.

The Warrior Tool Interface and Power Supply Panel is a new generation logging system. This system utilizes the USB Bus (Universal Serial Bus) along with DSP (Digital Signal Processor) technology providing the latest signal recovery technology available. This allows the PC to be upgraded independently as newer and faster PC's become available. Systems can be configured based on the services required at each site. The operator interface remains the same for each configuration, allowing the same look and feel for the operators.

The Warrior Well Logging System consists of a Tool Interface and Power Supply Panel, a computer, a printer and optional depth, line speed, line weight panel, and perforating power supply. The tool interface panel contains the necessary circuits to interface to most cased hole tools, both analog and digital. The depth encoder and line weight interfaces are built into the panel, as is the down hole tool power supply. All functions are digitally controlled from the software, with the power supply having a manual control mode. The panel incorporates data acquisition functions primary DSP based, that interface to the host computer through the industry standard Universal Serial Bus (USB). A nine port USB hub is also incorporated inside the panel allowing a single cable connection to the host computer. A second monitor may usually be attached to provide a Hoist-man’s or client's display.

The system supports most thermal well log plotters and a selection of color printers. An optional depth, line speed and line weight panel is available. This panel provides 12 Vdc. powered, independent depth measurement. It connects to the host computer through the USB and can be synchronized from the host depth or the host depth may be read from the depth panel. The Warrior logging system currently consists of the following components:

CPU – Laptop/Desktop
Monitor
Shooting Panel
Tool Interface and Power Supply (CP/PA/OP/SLAB)
Keyboard
Plotter
Depth, Line Speed and Line Tension Panel (optional)
UPS (optional)

It is strongly suggested that the CPU and monitor (and optionally, the interface panel) be run from an UPS with a capacity of approximately 1000 VA. Do not attempt to use an on-line type UPS with diesel generators unless the manufacturer specifically states that the product is suitable for this application. The (cheaper) switching type UPS seem to work well. Loss of data is guarded against by periodic update of the data base files, however, the use of a UPS allows the system to be shut down in an orderly manner and may also condition the line power to the system, thus eliminating problems due to a noisy power source.

Installation and Safety

Your safety and the safety of others is very important.

We have provided important safety messages on the safe handling and installation of the Standard Cased Hole Panel or “STIP” in this manual. Always read and obey all safety messages.

This is the safety alert symbol
This symbol alerts you to potential hazards that can kill or hurt you and others.
All safety messages will follow the safety alert symbol and either the word DANGER or WARNING.

DANGER	You can be killed or seriously injured if you don’t immediately follow instructions.
WARNING	You can be killed or seriously injured if you don’t follow instructions.

All safety messages will tell you what the potential hazard is, tell you how to reduce the injury, and tell you what you can happen if the instructions are not followed.

Important Safety Instructions

WARNING: To reduce the risk of fire, electric shock, or injury when using your interface panel, follows these precautions

: Plug into a grounded 3 prong outlet.
: Do not remove ground prong.
: Do not use an extension cord.
: Disconnect power before servicing.
: Disconnect power before making any rear panel connections.
: Use nonflammable, plastic safe cleaner
: Keep flammable materials and vapors away.
: Disconnect power before installing panel

SAVE THESE INSTRUCTIONS

WARNING

Explosion Hazard

Keep flammable material and vapors, such as gasoline or solvents away from the STIP. Failure to do so can result in explosion, fire or death.

To ensure proper ventilation for the STIP allow at least ½” (1.25 cm) on each side. When installing STIP allow at least 2” (5 cm) behind the panel.

WARNING

Electrical Shock Hazard

Only certified service personnel should open the panel, persistent high voltage is present.
Connect only to AC voltage as indicated on the rear panel.
Plug into a grounded 3 prong outlet.
Do not remove ground prong.
Do not use an extension cord.
Only Replace Fuses with the fuses of the same rating as indicated on the panel.
Ensure that the AC power supply is properly grounded and hot and neutral wires are properly polarized before installing the panel.
Disconnect panel power before making any rear panel connections.
Ensure there is a sufficient ground connection present at the slip rings as the panel is capable of producing high voltages in excess of 400v DC.

Before installing the panel in its final location, ensure you have a proper electrical connection.

Section
1

1 Panels Hookups

DEPTH CABLE

Depth Panel 7 Pin Female	Interface Panel 7 Pin Male
A	A
B	B
D	D
F	F
G	

ENCODER CABLE

7 Pin Male	Depth Encoder 7 Pin Female
A	A
B	B
D	D
F	F
G	

TENSION CABLE

Depth Panel 5 Pin Female	Interface Panel 5 Pin Male
C	A
D	B
E	E

TENSION TRANSDUCER CABLE (XPRO-HONEYWELL PRESSURE TRASMITER)

5 Pin Male		Pressure Transducer
D		1 (Excite Usually Red)
B		2 (Signal Usually Black)
A	Shield	3 (Case)
E		

TENSION TRASDUCER CABLE (ASCO PRESSURE TRANSMITER)

5 Pin Male	Pressure Transducer
D	3 (Excite Usually Red)
B	2 (Signal Usually Black)
A	Shield
E	

TENSION TRASDUCER CABLE (ASHCROFT PRESSURE TRANSMITER)

5 Pin Male	Pressure Transducer
D	1 (Excite Usually Red)
B	3 (Signal Usually Black)
A	Shield

DC CABLE 12V DC

3 or 2 Pin Male	Battery Truck (12 VDC)
A	Positive
B	Negative
C	NC

LIGHTS CABLE

4 Pin Male	Lights
A	Common
B	RED Light
C	GREEN Light
D	NC

1.1 Interface Cable Wiring

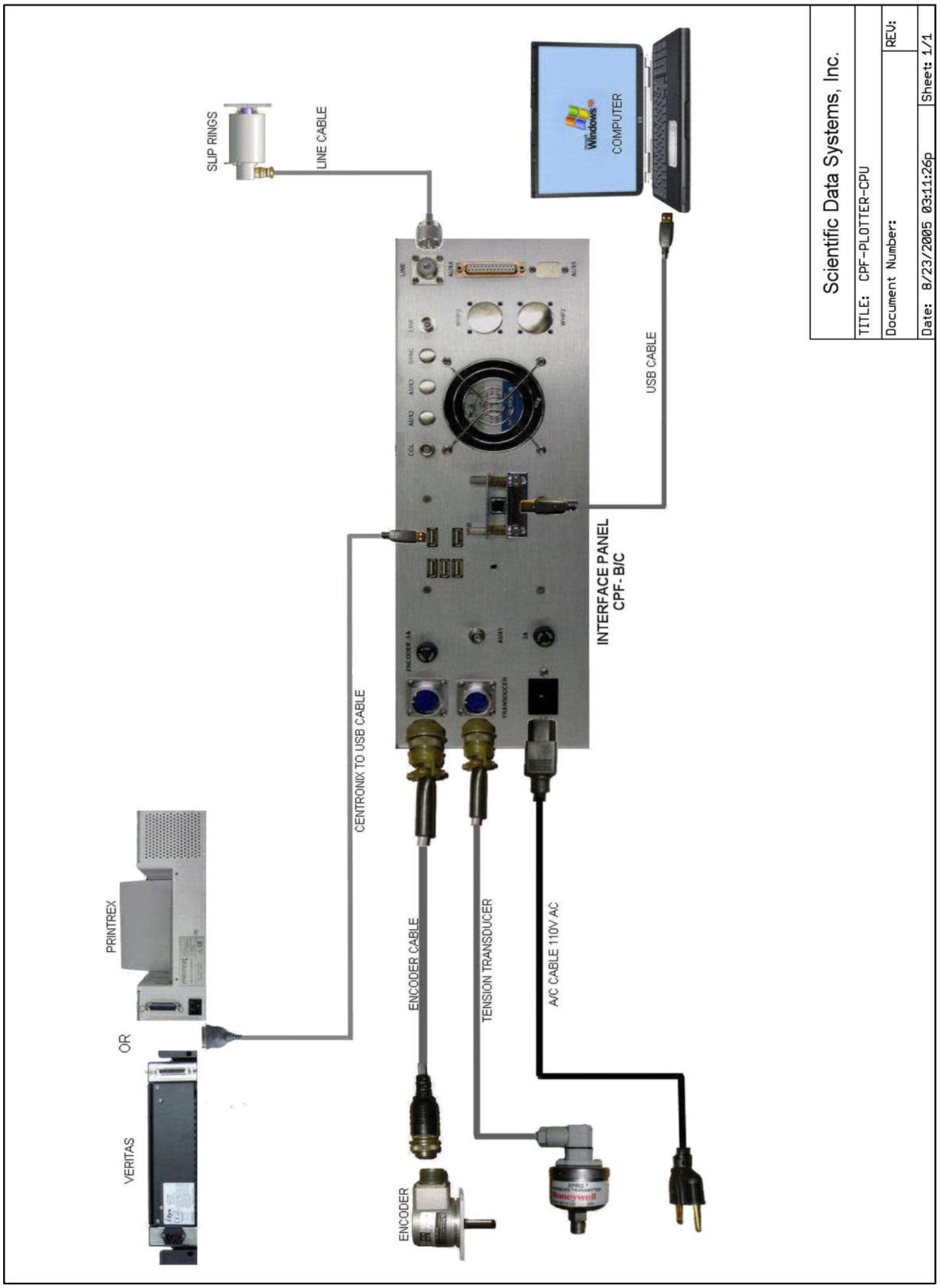


Fig 1.1 CPF-Plotter-CPU

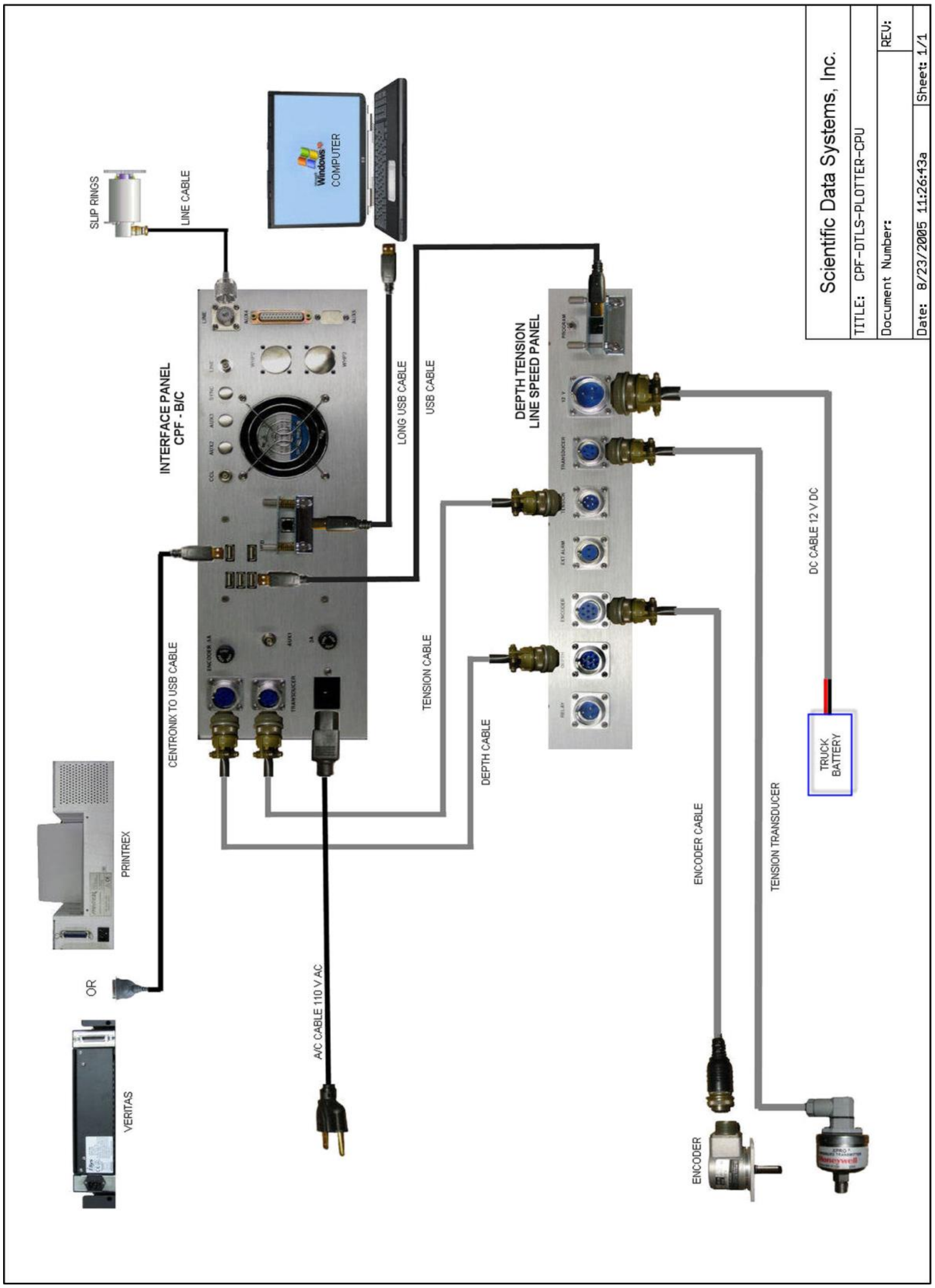


Fig 1.2 CPF-DTLS-Plotter-CPU

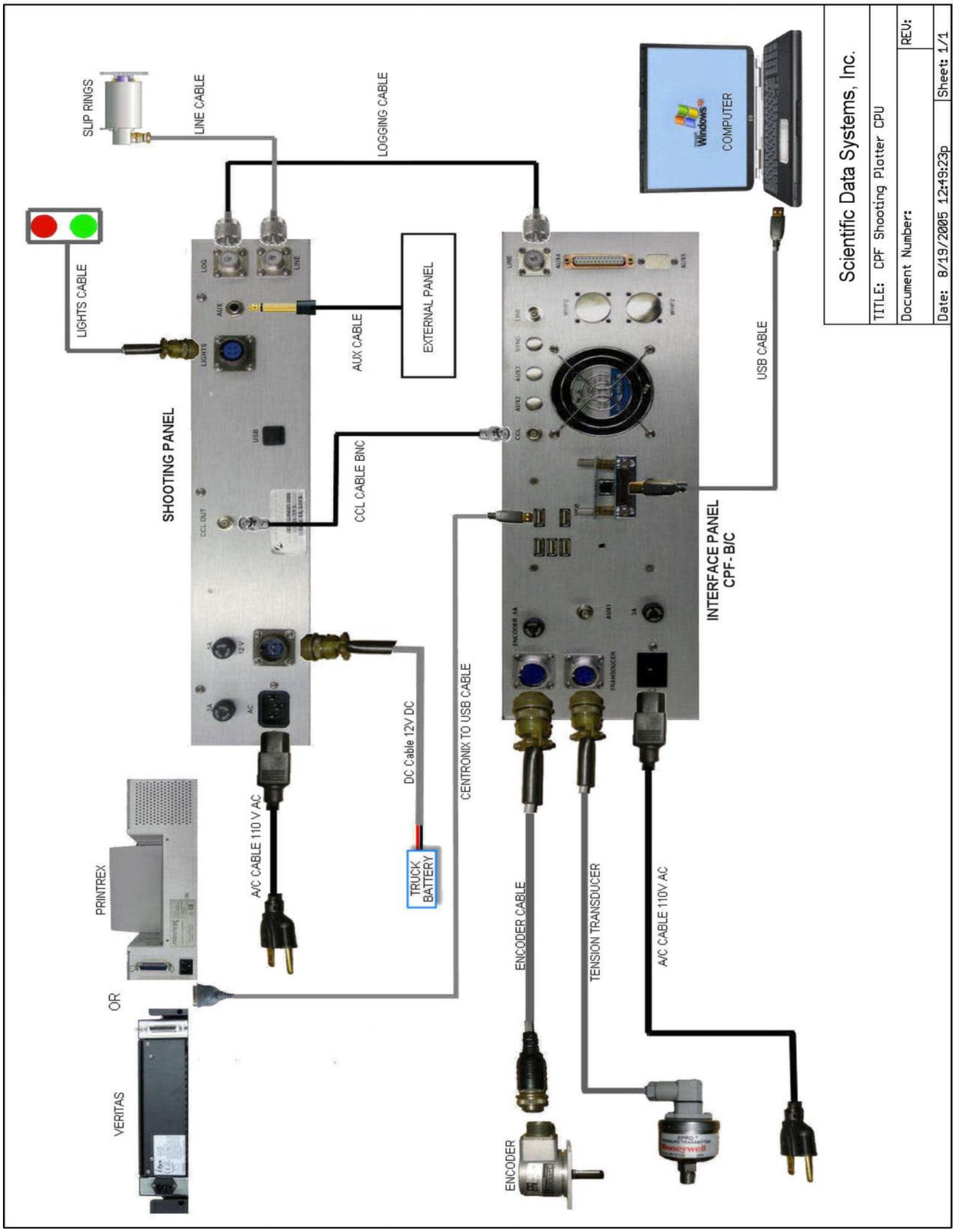


Fig 1.3 CPF-Shooting-Plotter-CPU

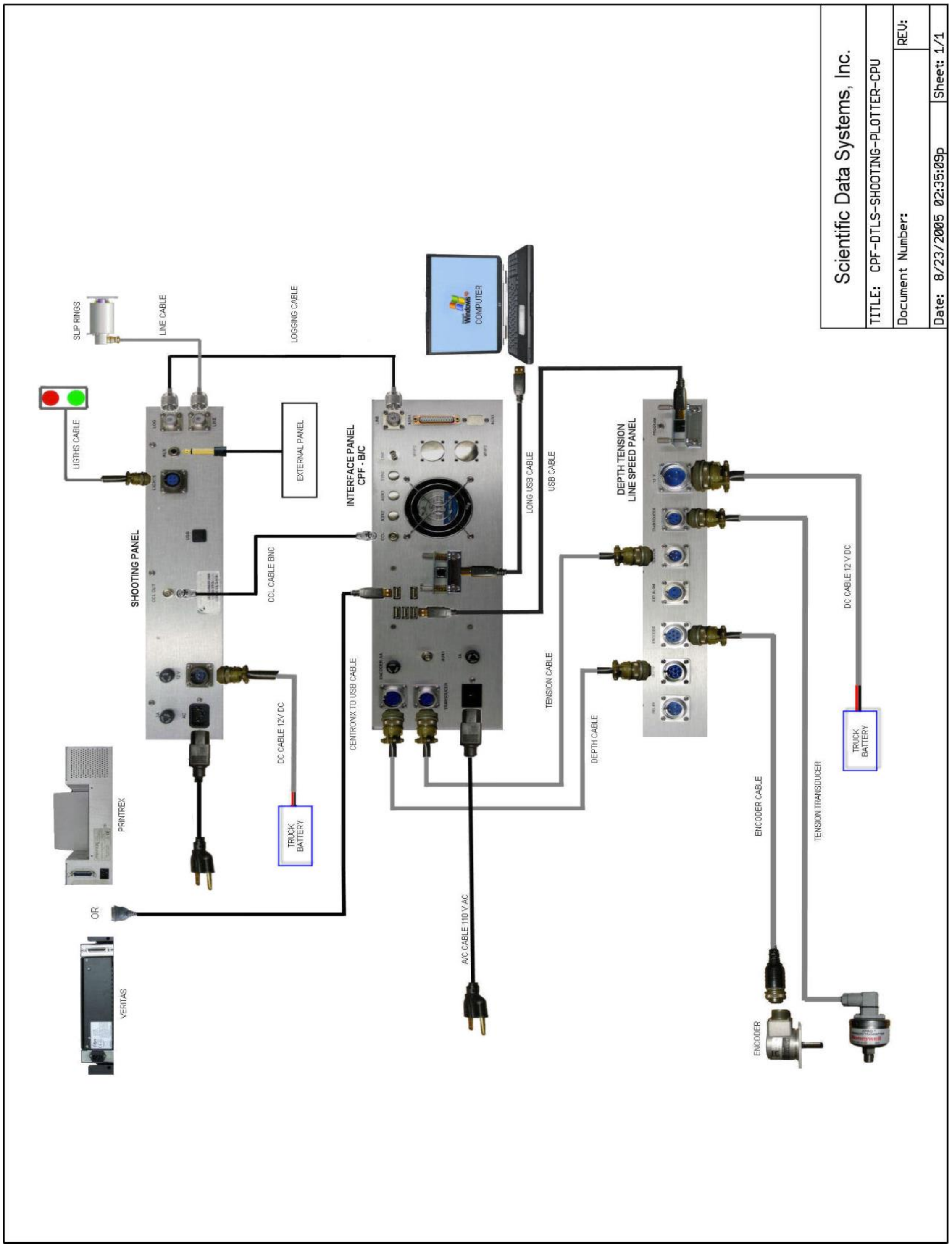


Fig 1.4 CPF-DTLS-Shooting-Plotter-CPU

Section

2

2 TELA Board

2.1 TELA R6

The TELA board amplifies the down-link telemetry signals. Signals from DAC0 via MuxB-2 enter at J1-26. IC1B is a buffer with a gain of 2 that feeds a current amplifier made up of IC1C, IC2 and IC1D. IC1D provides the feedback for the amp. D1 and D2 provide protection from signals over + or – 15 volts. C1 and C2 provide DC decoupling from the line voltage up to 400vdc. The down link can be viewed at TP1 along with the attenuated up-link. K1 is not present "except in upgrade panels" so there should be a jumper across pins 12 and 14.

2.2 TELA R7

The TELA R7 board is similar to the R6 board with the addition IC3 MAX313 analog switch. It is used along with the enable line on J1-11 to enable downloads by bypassing R16 with the low impedance of the switch. When not in use the analog switch is disabled and R16 offers high input impedance to the line so that it does not attenuate signals from other services.

2.3 TELAH R5

The TELAH R5 board is functionally similar to the TELA R7 and R8 boards with the addition of transformer coupling and a slow TELA option for low frequency downlinks that bypasses the transformer.

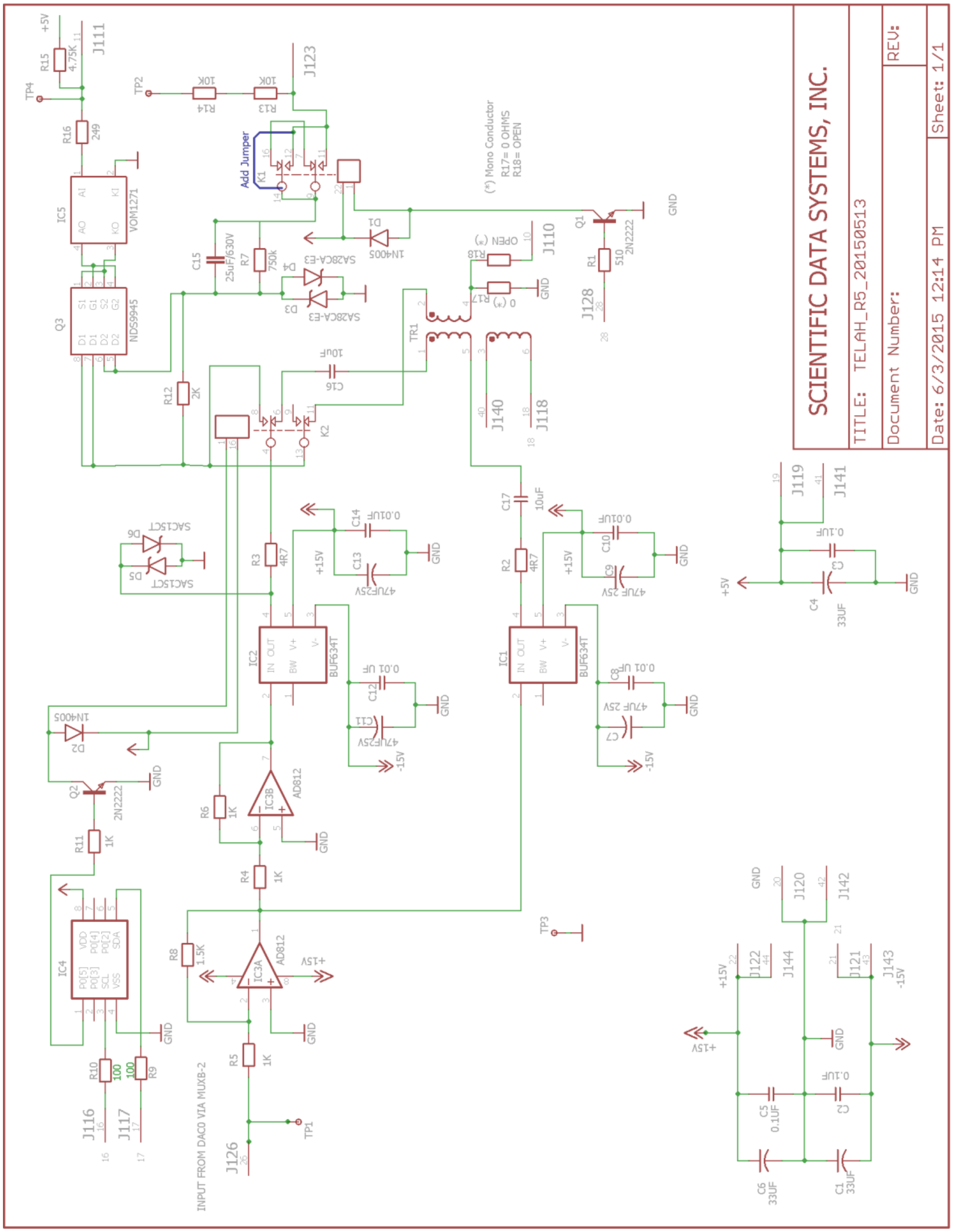


Fig 2.1 Schematic Telah R5

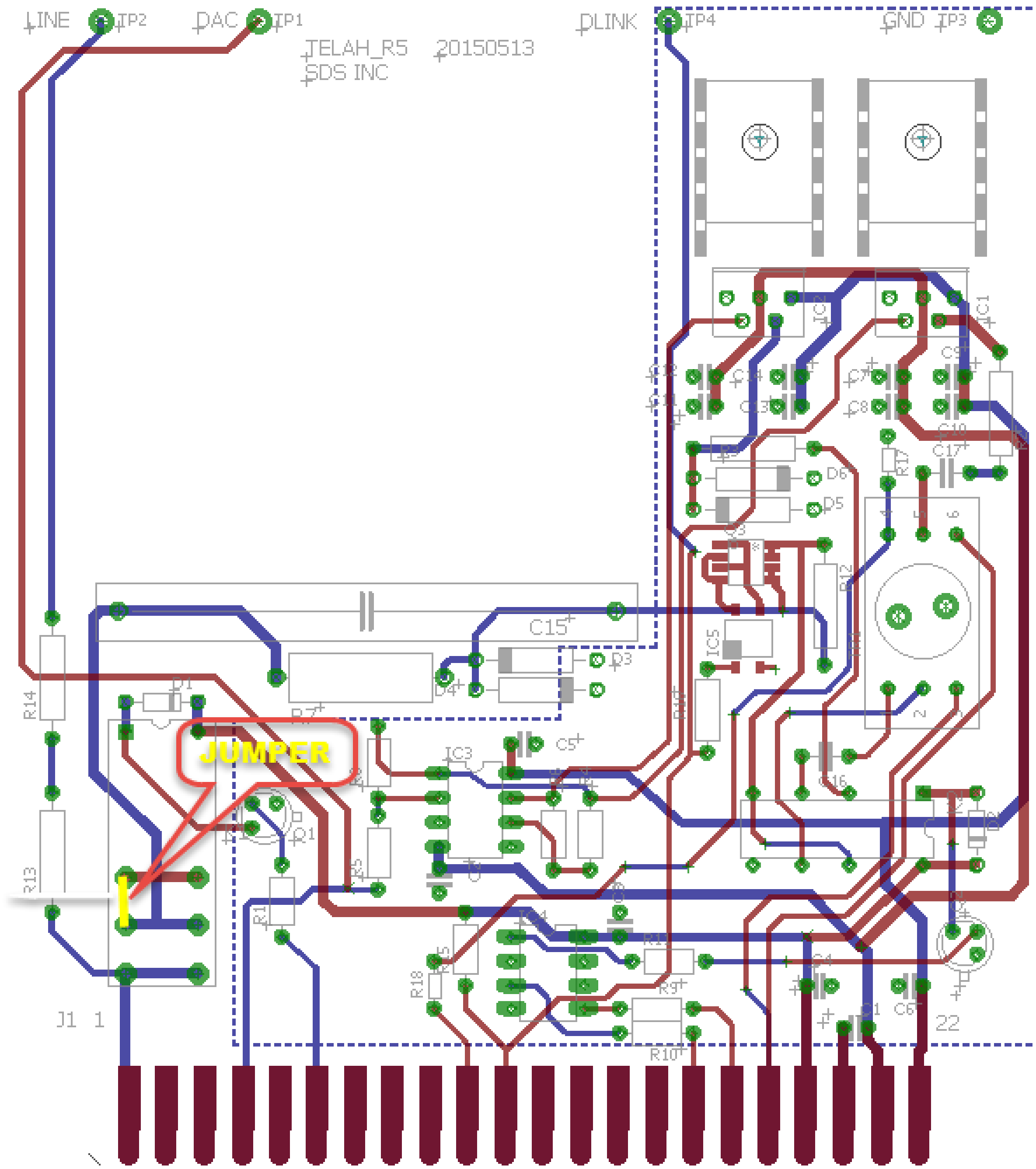


Fig 2.2 Telah R5 board layout

Fig 2.1 Schematic Tela R8

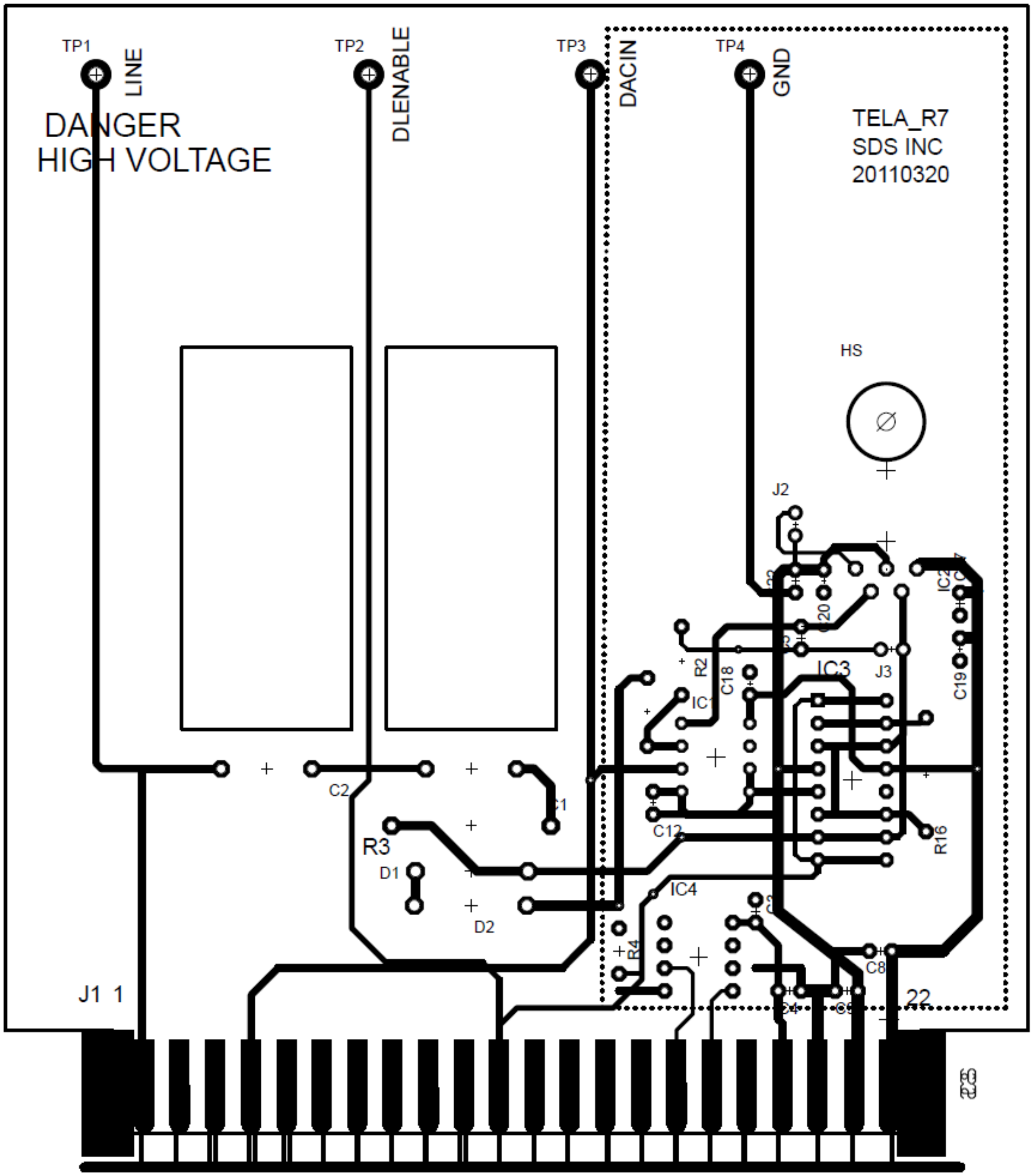


Fig 2.2 Tela R7 board layout

Section

3

3 Pre-Relays Board

This board controls the flow of tool power and tool signal through the interface panel.
The power relays board connects the line input of the tool interface panel to the rest of the circuitry in the panel. Functions of the card include enabling line, controlling line termination, selecting positive or negative power to be applied to tool, and enabling the down-link capabilities of the TELA card.

3.1 Circuit Description

3.1.1Line Input

The line input from the rear panel connectors J7 and J12 connect at pin 27 to one of the contacts of relay K2. In the un-energized state, this connects the line to chassis ground through pin 28. When a high signal level is applied to pin 8 from the PSXD board, K2 is energized and the line connects to pin 26. The second contact of K2, which is connected to +5V connects to pin 24 to supply power to the line enable indicator on the interface front panel.

The line connection at pin 28 connects to the Free Point board pin 12. Unless a free point service is to be run, a relay on the Free Point board connects the line to pin 10 of the Free Point board which returns to the PRELAYS board at pin 30.

From this point, the line is connected to the PSXD board to measure the tool voltage and to the ANASW board to do pre-filtering and conditioning of signals.
The line is also connected from pin 30 to relay K3 at pin 35. When this relay is energized, it connects to pin 34 and allows the downlink telemetry from the TELA board to be driven onto the line.

Relay K4 is used to control the line termination resistance. When K4 is not energized, the tool power passes through both R1 and R2. When K4 becomes energized, pin 30 connects to pin 31, shorting around resistor R2.

Resistor R1 connects to relay K1 at pin 5. Depending upon the state in which the relay is energized, either the positive or the negative side of the tool power supply is connected to R1. The other side of the supply connects through the second contact to pin 1, which goes to the PSXD board and passes through a .1 ohm resistor to chassis ground to measure the amount of current being supplied from the tool power supply.

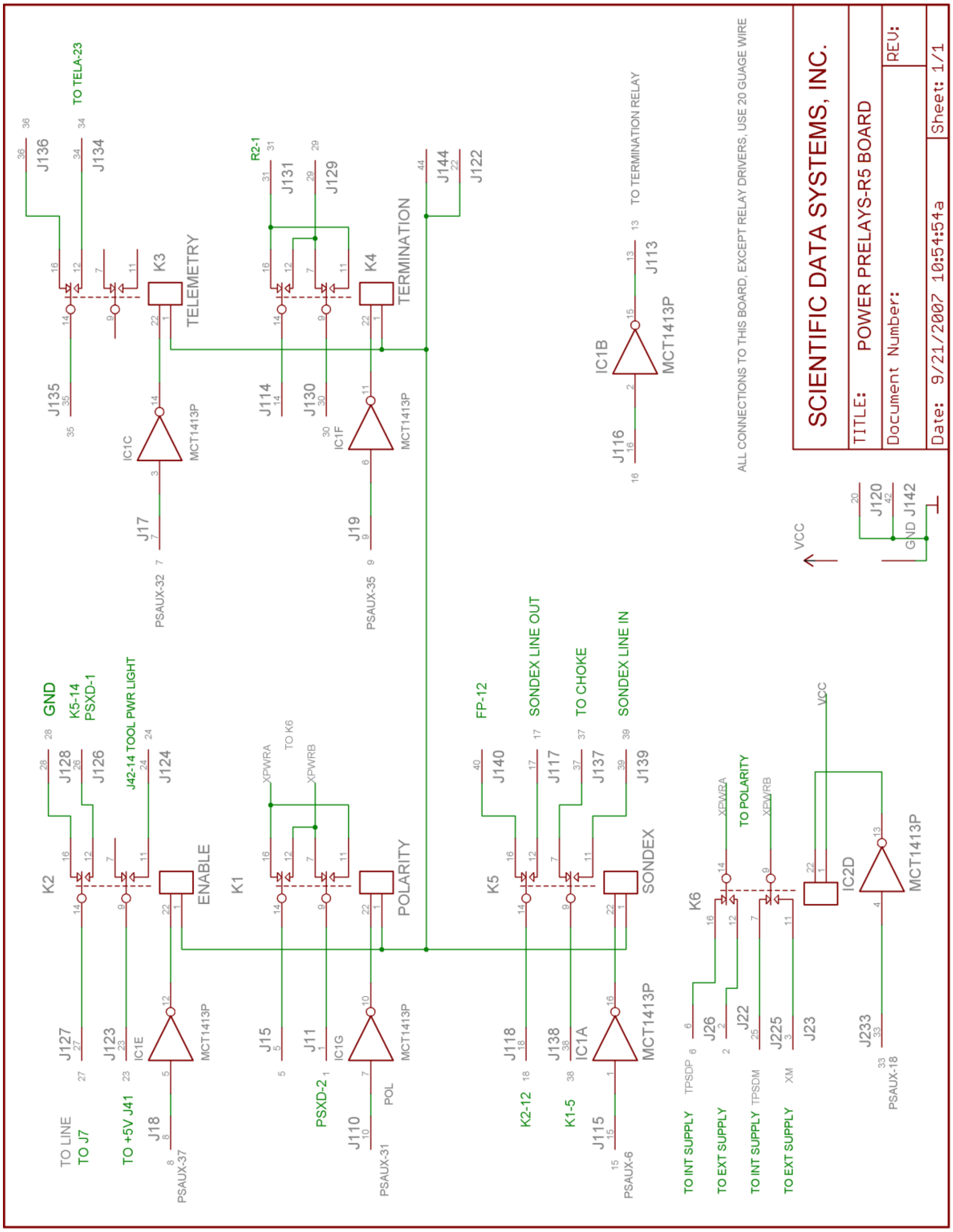


Fig 3.1 schematic Prerelays R5

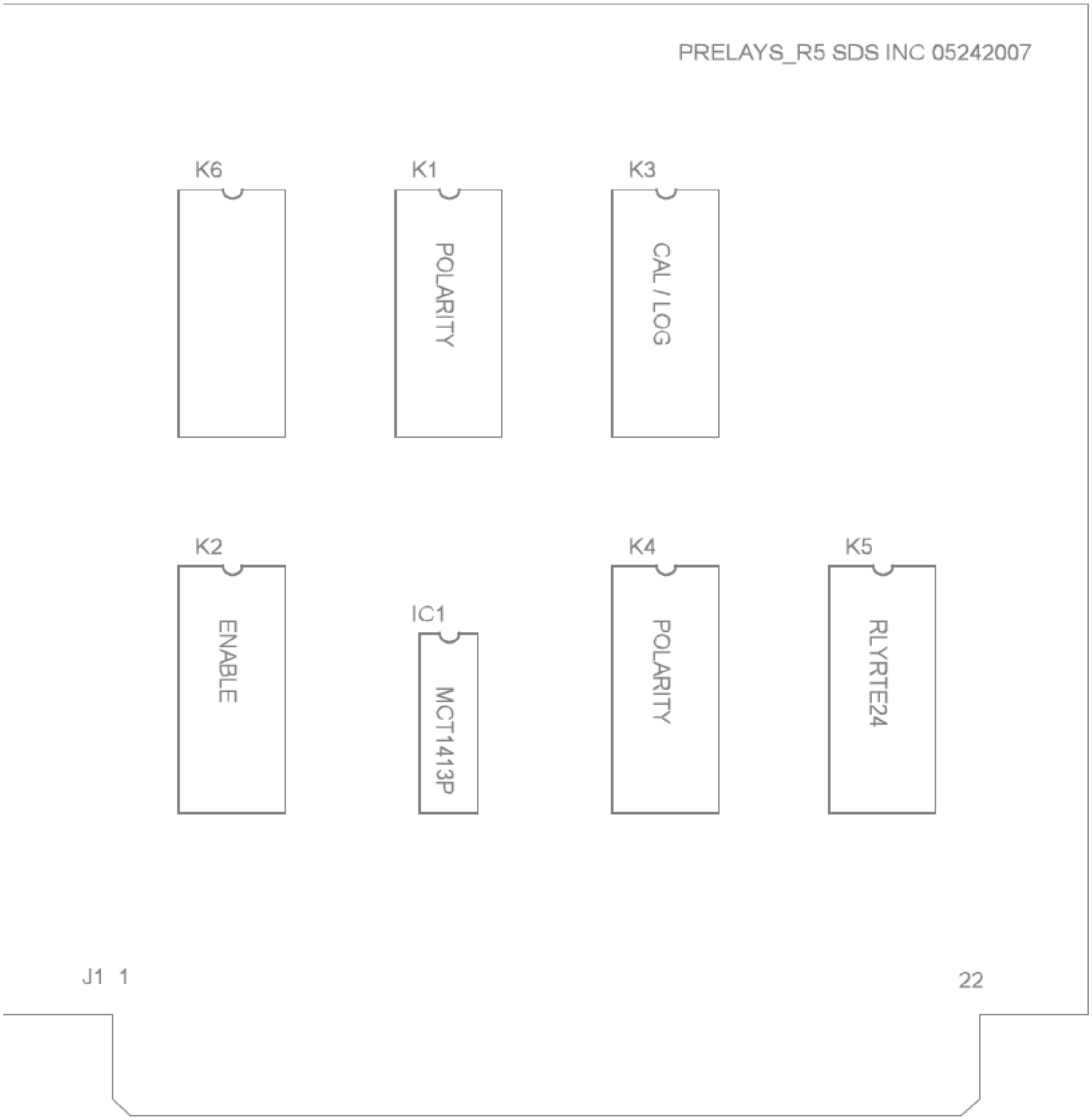


Fig 3.2 Pre-Relay R5 board layout

Section
4

4 Applied Free point Board

This board drives a sine wave down the logging cable to an Applied Electronics or SIE style Free point tool. The response of the tool attenuates the signal. The amplitude of the attenuated signal has a bias applied to it to set a zero reference point. The change in the amount of attenuation is then measured to create an output.
Since the drive of the board must be directly connected to line without the effects of line termination or power supply load, the panel passes the line through a relay on this board to the rest of the panel circuitry or when engaged, connects the electronics on the board directly to the line connection.

Note that the board must be in the interface panel and the K1 relay must not be engaged for the line to connect to the rest of the panel circuitry.

The board also contains circuitry to “Set the tool” through isolated AC input, bridge rectifier and filter that creates a DC voltage. This voltage can then be applied to the line through a second relay.

4.1 Circuit Description

4.1.1 Line Input

The line connection to the panel passes through the line enable relay on the pre-relays board when the line is enabled and connects to J1-12. If K1 is not energized, the line passes through K1 to J1-10, which connects to the tool power supply, line termination resistors, and the ANASW board. When the K1 relay is energized the line connects to the K2 relay which connects either to the signal driver or the DC power supply to set the tool.

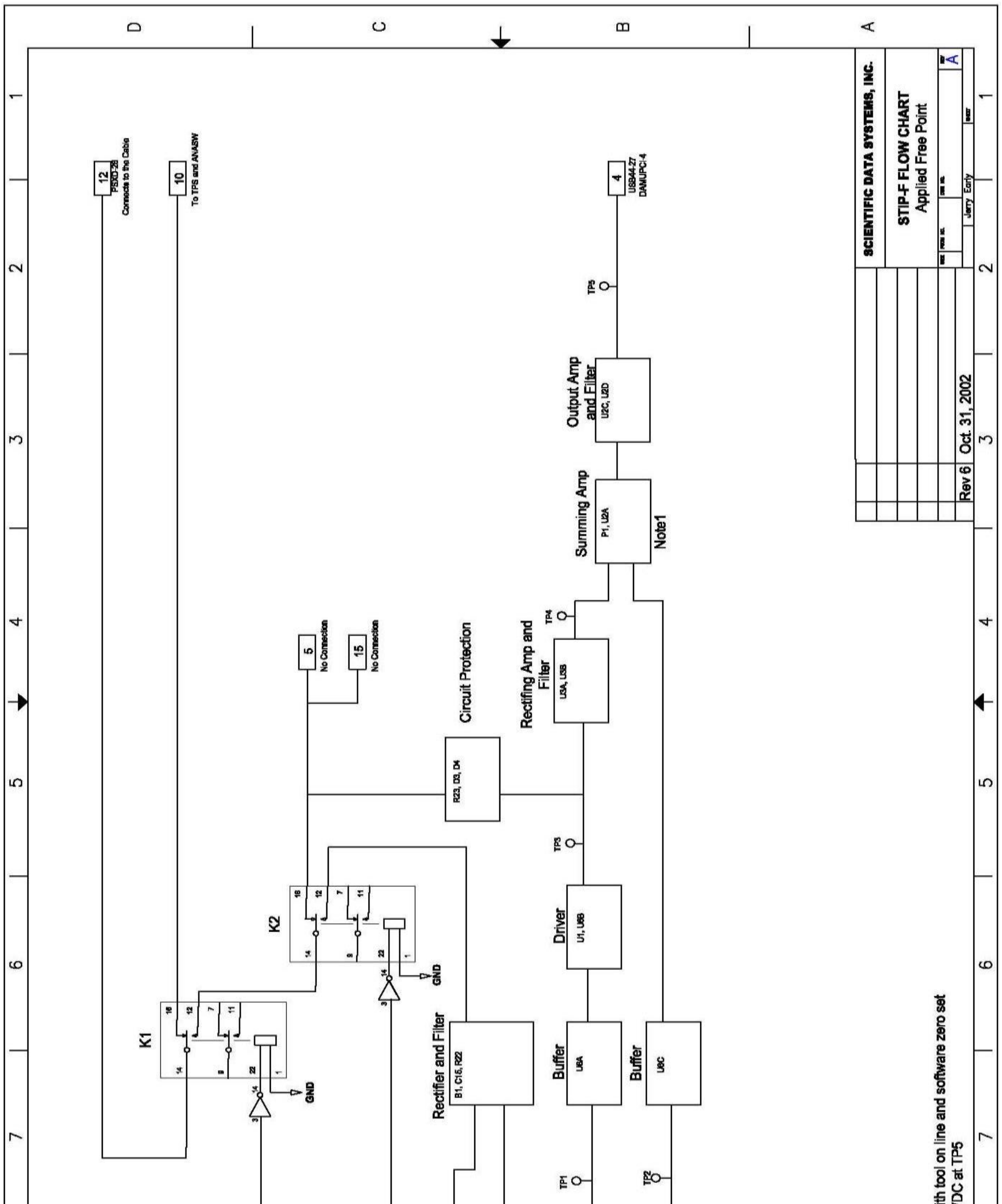
4.1.2 Line Driver and signal measurement

Buffer U6A receives a signal from the DSP with amplitude and frequency set in the DSP script. IC2 and U6B form a current driver that drives the signal though R23 onto the line. D3 and D4 protect the circuitry from voltages inadvertently placed on the line. Amplifier U3A rectifies the signal at TP3, which is then filtered and amplified by U3B and is present at TP4.

Buffer U6C receives a DC level from the DSP, which is controlled by the zero scroll bar via software. The wiper of P1 can be adjusted from the negative rail voltage to the positive rail voltage. U2A sums these voltages together with the rectified and filtered signal at TP4. This signal is then passed through a final stage of filtering and amplification in U2C and U2D.

4.1.3 Adjustments

With a Free point tool on line in a relaxed state and the software zero scroll bars set to mid – range, P1 is adjusted for a 0.0 VDC level at TP5.



SCIENTIFIC DATA SYSTEMS, INC.
STIP-F FLOW CHART
Applied Free Point
Jerry Early
Rev 6
Oct. 31, 2002
Note1: P1 adjusted with tool on line and software zero set to mid-range for 0.0 VDC at TP5
Output Amp and Filter
U2C, U2D
Summing Amp
P1, U2A
Note1
Rectifing Amp and Filter
U3A, U3B
Circuit Protection
R23, D3, D4
Driver
U1, U8B
Buffer
U8A
Buffer
U8C
Rectifier and Filter
B1, C15, R22
K1
K2
GND
GND
No Connection
No Connection
TP1
TP2
TP3
TP4
TP5

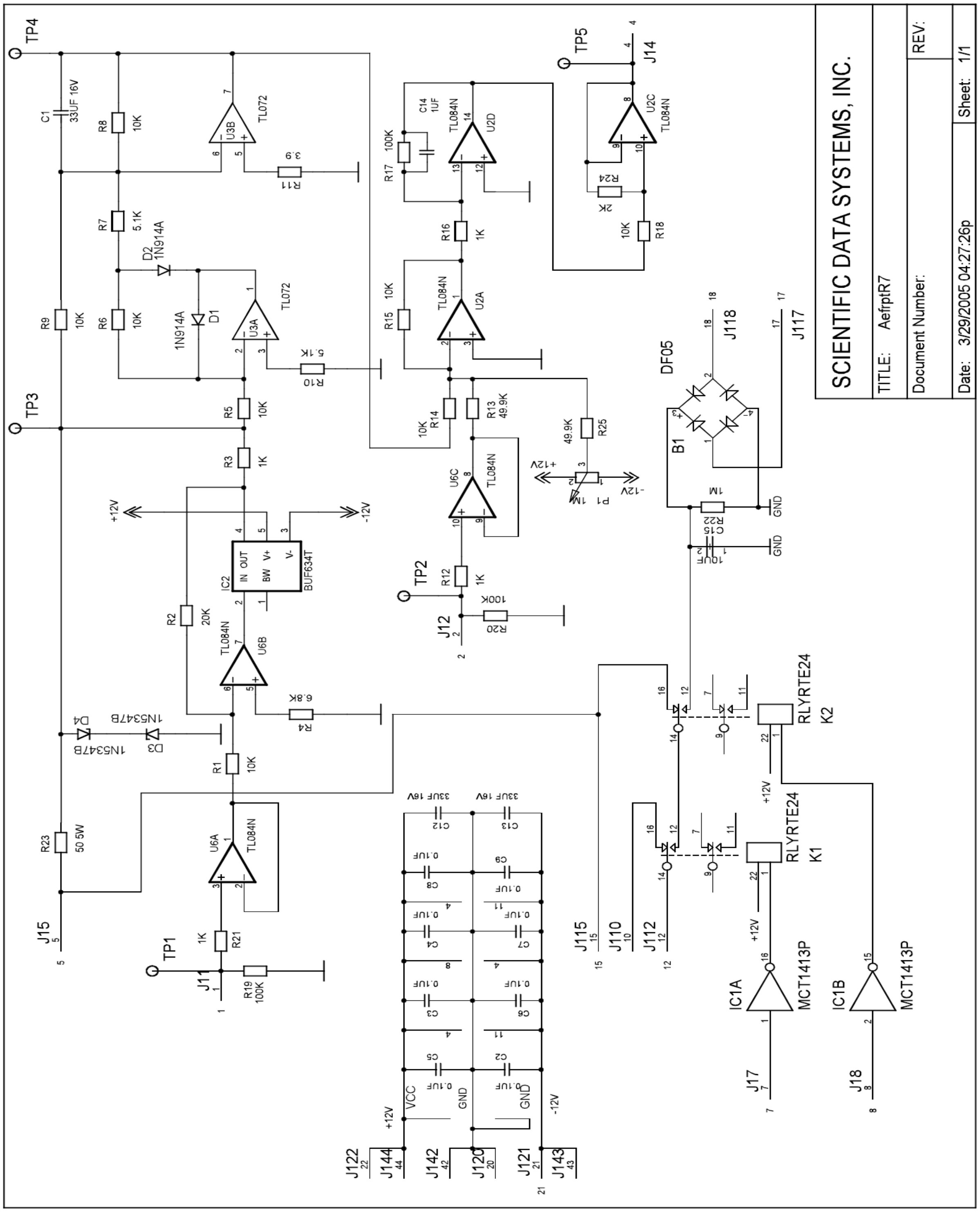


Fig 4.1 Schematic Applied Free point R7

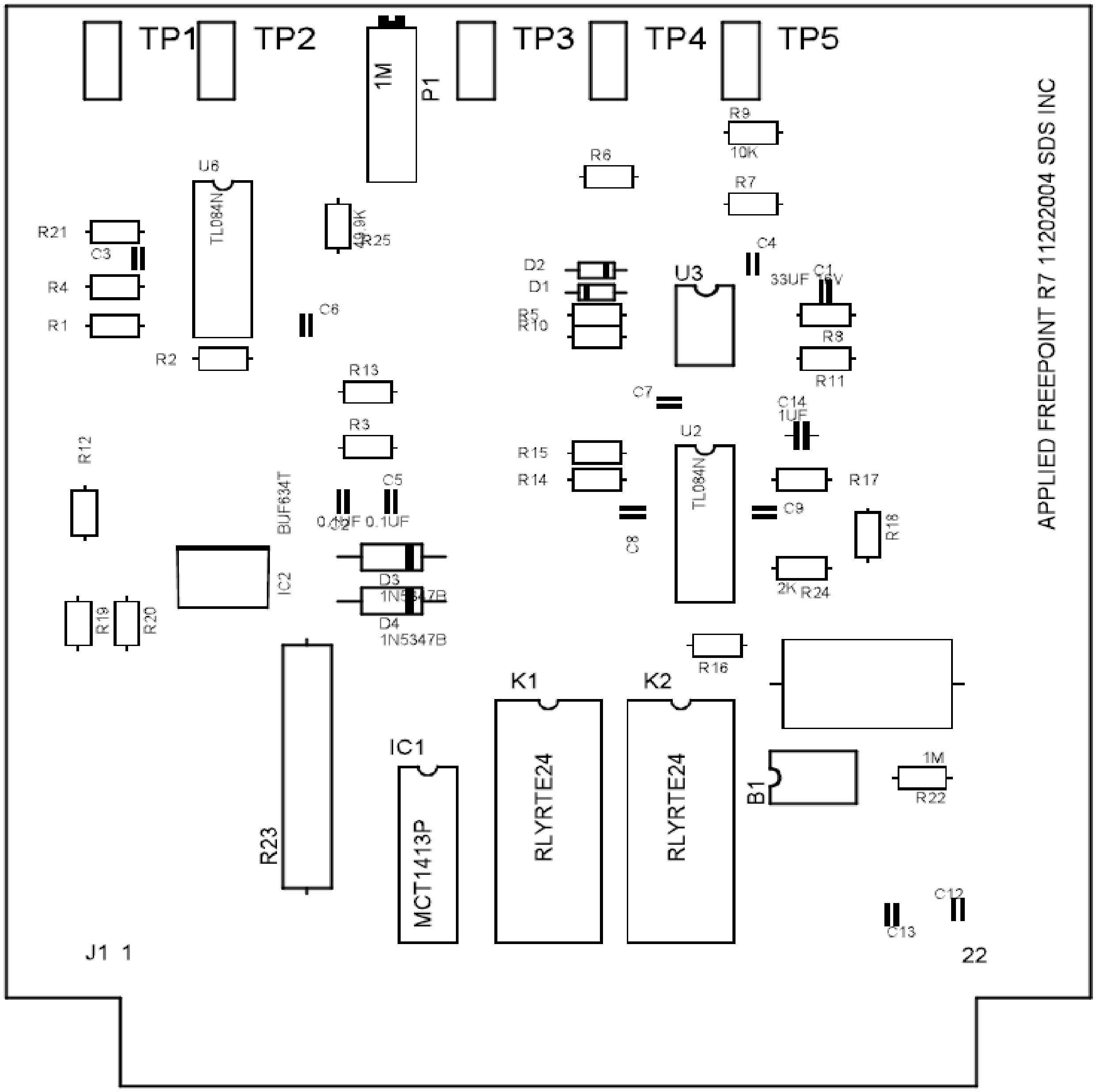


Fig 4.2 Applied Free point R7 board layout

Section

5

5 Power Supply Auxiliary Board

This card receives I2C signals from the USB44 board that control the outputs of the two octal bus drivers. The outputs of these drivers are used as control bits to engage various relays and switches throughout the panel. The I2C signals also control the output of IC3, which supplies software control for the tool power supply.

The card also contains the tool current sense amplifier and the line voltage divider. The outputs from these drive the front panel meters and are also routed to the DAC circuitry on the USB44 board.

There is additional circuitry to control the polarity and the source of control to the tool power supply.

5.1 Circuit Description PSAUX R2

5.1.1 TPS Output and Polarity Control

The I2C Clock and Data signals from the USB44 card are connected to IC5 and IC6 and drivers IC2 and IC7. Most of these signals are connected to edge connector and used to control various relays and switches throughout the panel.

Gates IC1A, IC1B, and IC1C control the tool power supply polarity switching via the tool polarity relay on the PRELAYS board via J1-31.

When the front panel switch is in the POS position, pins 1 and 4 of IC1 are grounded. Pin 8 of IC1 will be set low. With the switch in the NEG position pin 1 of IC1 is pulled high by R13. Pin 8 of IC1 will be set high. With the front panel switch in the center (NC) position, pin 1 of IC1 is held low by R10. Pin 4 of IC1 is held high by R12 and the signal on pin 5 now controls the output state of pin 8. Pin 5 of IC1B is connected to the polarity control bit of bus driver IC2. Additionally with pin 4 pulled high, U6A will take the control voltage from the output of the DAC IC3 and its related amplifiers rather than the front panel voltage control potentiometers. U6B is controlled by the output of IC1C and selects which front panel potentiometer is in control of the power supply when in manual mode.

I2C data is fed into Digital to Analog converter IC3, whose output is amplified through IC4A and IC4B to produce the software voltage control. P6 is used to adjust the signal to 0.0 volts when the software control is set to 0%. P5 is adjusted to 8.0 volts when the software control is set to 100%.

5.1.1 Panel Voltage and Current Measurement

The instrumentation amplifier, U1, amplifies the voltage across R5, the current sense resistor. The output of U2C drives the digital panel meter while the filtered output of U2B is sent to the USB44 ADC input channels.

The line voltage is divided by a factor of 100 by the resistor network consisting of P2, R8, and R9. The output of U2A drive the voltage panel meter while the filtered output of U2D is sent to the ADC on the USB44 board.

5.1.2 Adjustments and Jumpers

Software Tool Power Control

With the front panel switch in the center position, and software control set to 0%, P6 is adjusted for 0.0 VDC at TP1. With software control set to 100%, P5 is adjusted for 8.0 VDC at TP1.

5.1.3 Voltage and Current Measurement

P3 is used to adjust the panel voltage meter with no voltage output. P2 is used to adjust the ratio of the potential divider to give the correct voltage meter reading.

The potentiometer P4 is used to zero the panel current meter with zero current flowing. The potentiometer P1 is used to adjust the panel meter to a known current value.

5.2 PSDXDR7 BOARD

5.2.1New Features

1 Positive Current Regulator range: 0- +400mA

2 Negative Current Regulator range: 0- -400mA

3 Positive Current Trip range: 0- +450mA

4 Negative Current Trip range: 0- -450mA

5 Positive Voltage Trip range: 0- +400Vdc

6 Negative Voltage Trip range: 0 - -400Vdc

7 TVOLT Calibration Gain and Offset save in the board (EEPROM)

8 TCURR Calibration Gain and Offset save in the board (EEPROM)

9 Compatible with Old software and old CPF panels

10 To Enable Line in MANUAL mode the Adjustment control knob must first be rotated fully counter clock wise.

11 To Enable Line in AUTO mode the Slider bar must be in 0Vdc.

12 Allow Instant Voltage check box to bypass the features (10-11-12-13).

5.2.2 General Description

This board receives I2C signals from the USB44, which control the following: Pre-Relay bus board, set zero Voltage, set zero Current, Span Voltage, Span Current, TPS voltage control, set polarity, Line enable, Set voltage, Set Current, Maximum Voltage, Maximum Current, sense Output Voltage , and, sense Output Current.

The IC7 (AD623) senses the current by measuring the voltage across the R5 0.1Ω resistor. The gain of the AD623 is resistor programmed by network R7, R2, and IC8 applies a gain of 10. The Diodes D1, D4, D5, and D6 are high conductance ultra-fast diodes to protect IC7. The output of IC11D drives the digital panel meter while the filtered output of IC11B is sent to the USB44 ADC input channels.

IC11, and IC6 are rail-to-rail high performance op-amps with a high CMRR, which makes them unique among rail-to-rail input amplifiers. Full wave rectification is provided by the circuit IC11A, and D2 for current, the IC11B is a buffer to connect to IC4.

IC1 and IC8 are DS1867 Dual Digital Potentiometers 10K with EEPROM. The DS1867 consists of two digitally controlled potentiometers having 256-position wiper settings. Communication and control of the device are accomplished over a 3-wire serial port SPI bus controlled by IC4, which allows reads and writes of the wiper position. Both potentiometers can be stacked for increased total resistance with the same resolution. One potentiometer set the Zero Voltage and the other set the Zero current.

IC4 PIN_84 (POL) controls the tool power supply polarity switching via the tool polarity relay on the PRELAYS board via J1-31.

When the front panel switch is in the POS position, PIN_93 IC4 is grounded. PIN_93 of IC4 will be set low. With the switch in the NEG position PIN_93 IC4 is pulled high.
With the front panel switch in the center (NC) position, PIN_94 IC4 is held low by R19.
The line voltage is divided by a factor of 100 by the resistor network consisting of R21, R28, R32, R33, and IC8. The output of IC6D drive the voltage panel meter while the filtered output of IC6B is sent to the ADC on the USB44 board.

Full wave rectification is provided by the circuit IC6A, and D3 for Voltage, the IC6B is a buffer to connect to IC4.

IC1 is used to adjust the panel voltage meter with no voltage output. IC8 is used to adjust the ratio of the potential divider to give the correct voltage meter reading.
The potentiometer IC1 is used to zero the panel current meter with zero current flowing. The potentiometer IC8 is used to adjust the panel meter to a known current value.

IC4 save TVOLT Calibration Gain and Offset save in (EEPROM1), TCURR Calibration Gain and Offset save in (EEPROM2), maintains the position of the wipers (IC1, and IC8) in the absence of power. This feature is provided through the use of EEPROM in IC4.

IC4 set the Positive and Negative Voltage Trip V_REF value over R1. Set the Positive and Negative Current Trip I_REF value over R11.

Software Tool Power Control With the front panel switch in the center position, and software control set to 0VDC, IC1_W1 is adjusted for 0.0 VDC at TP3. With software control set to 500 VDC, IC8_W1 is adjusted for 8.0 VDC at TP3.

The IC4 Check-sum is **295B**

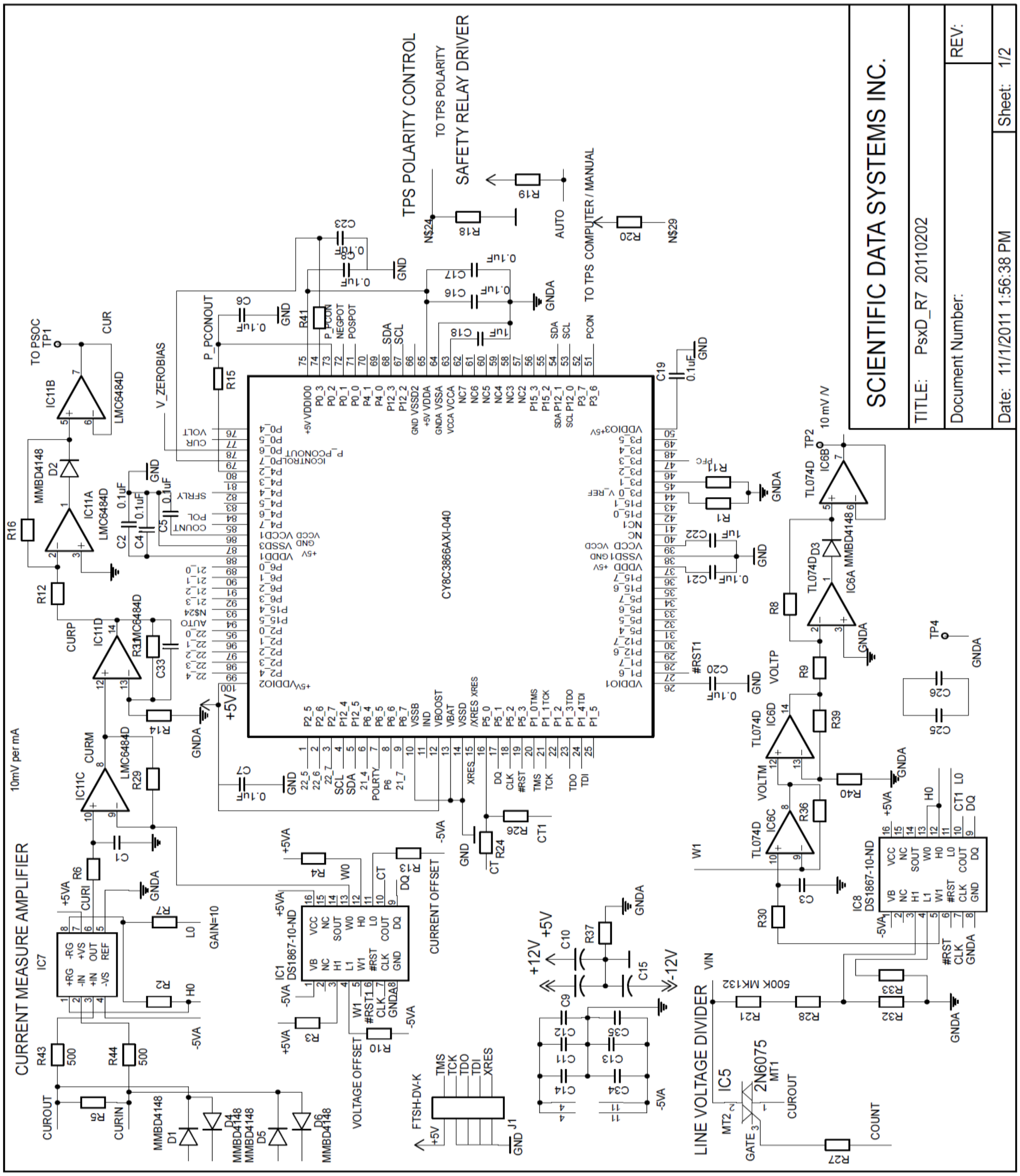
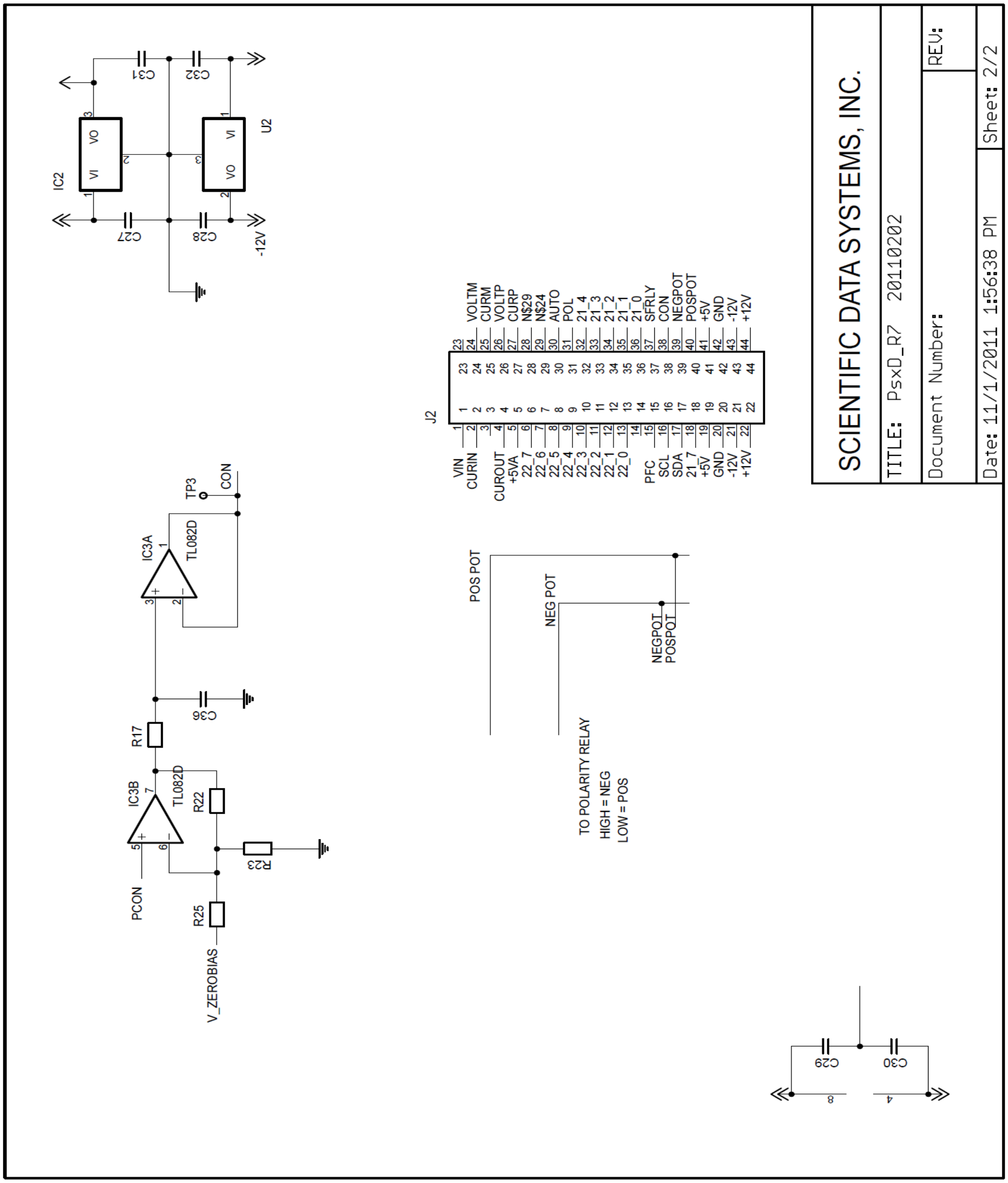


Fig 5.1 Schematic PSDXD R7



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R22
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VOLTP
CURP
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21_0
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+5V
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LOW = POS
C29
C30

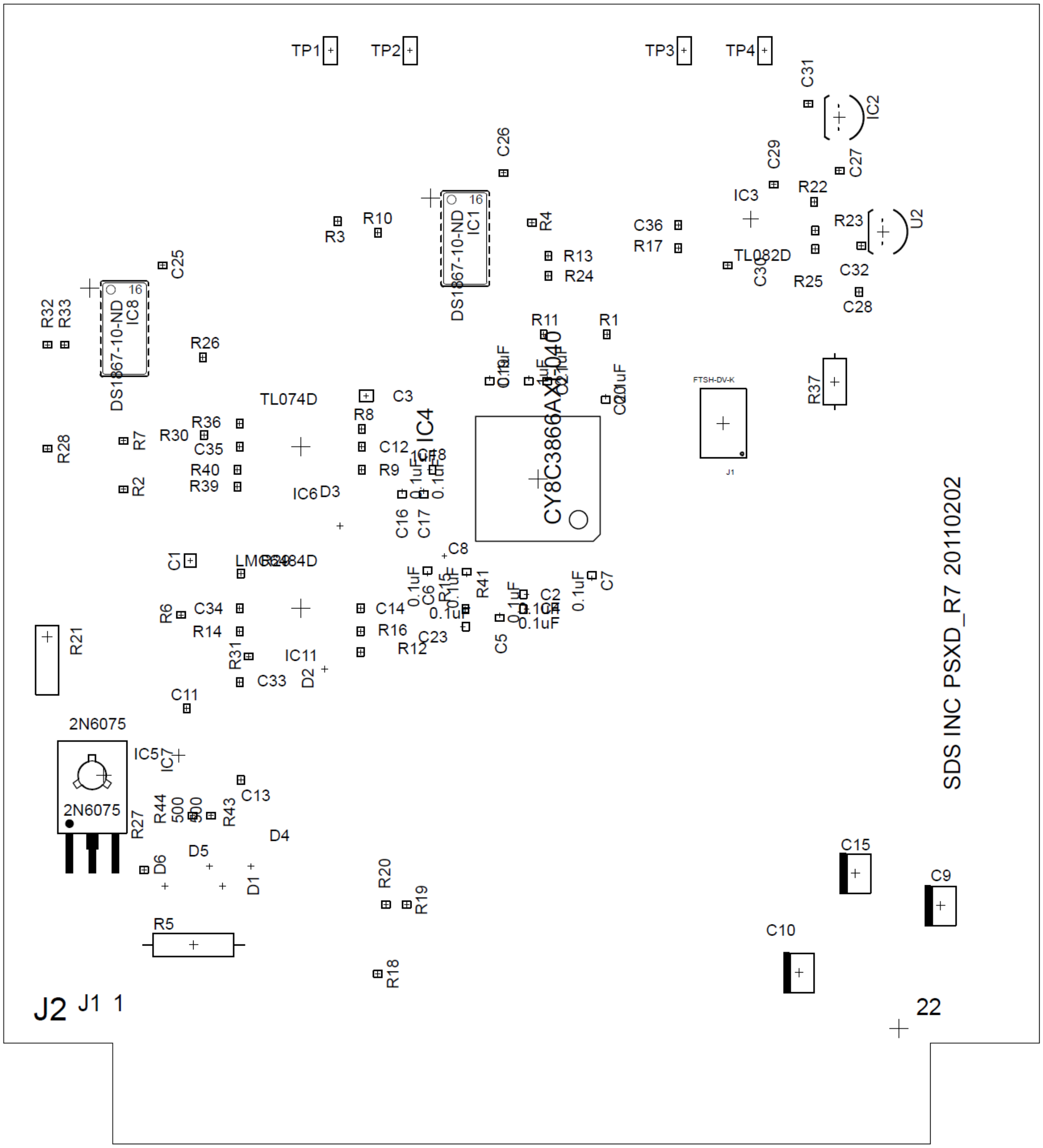


Fig 5.2 PSXD R7 board layout

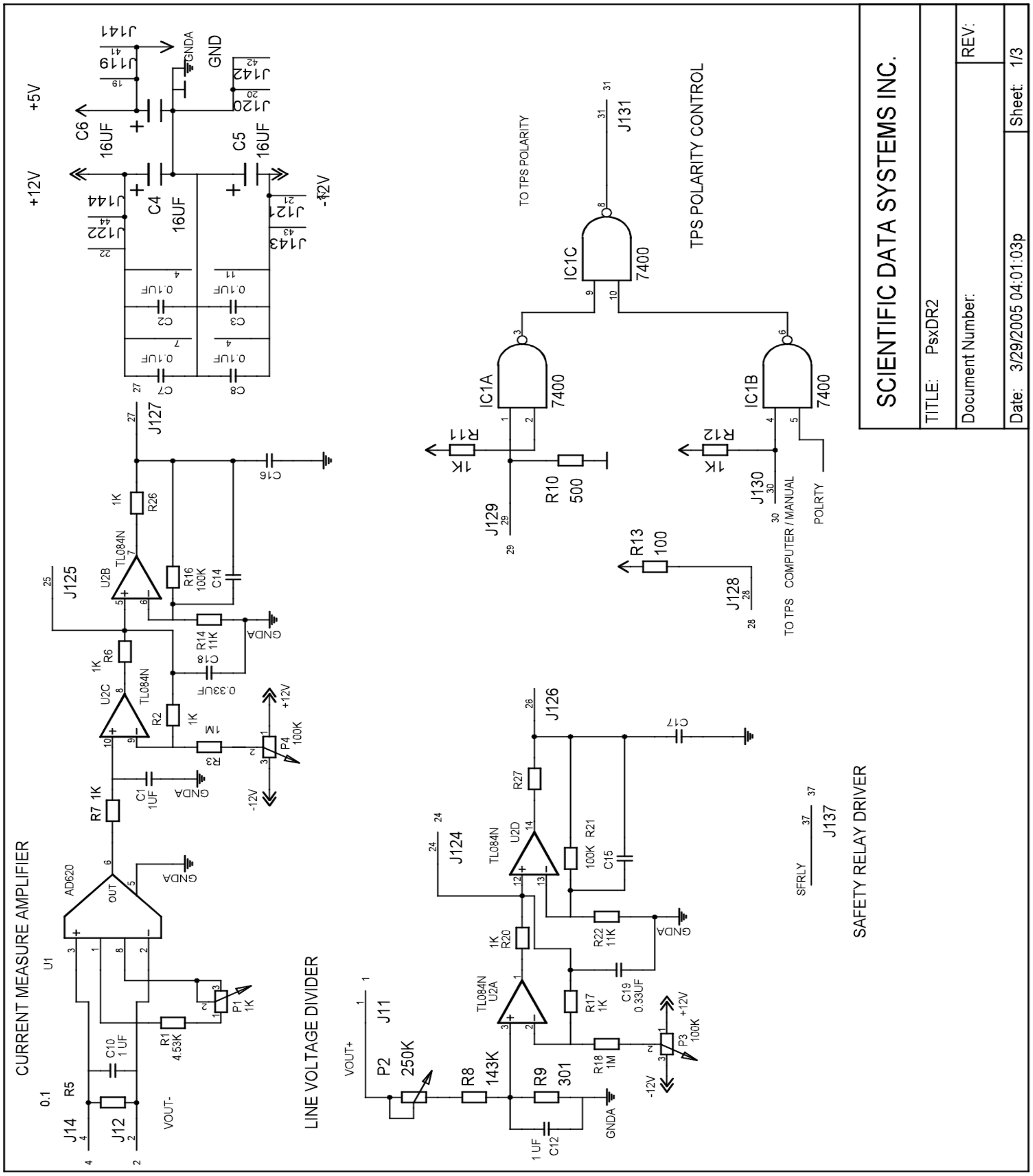
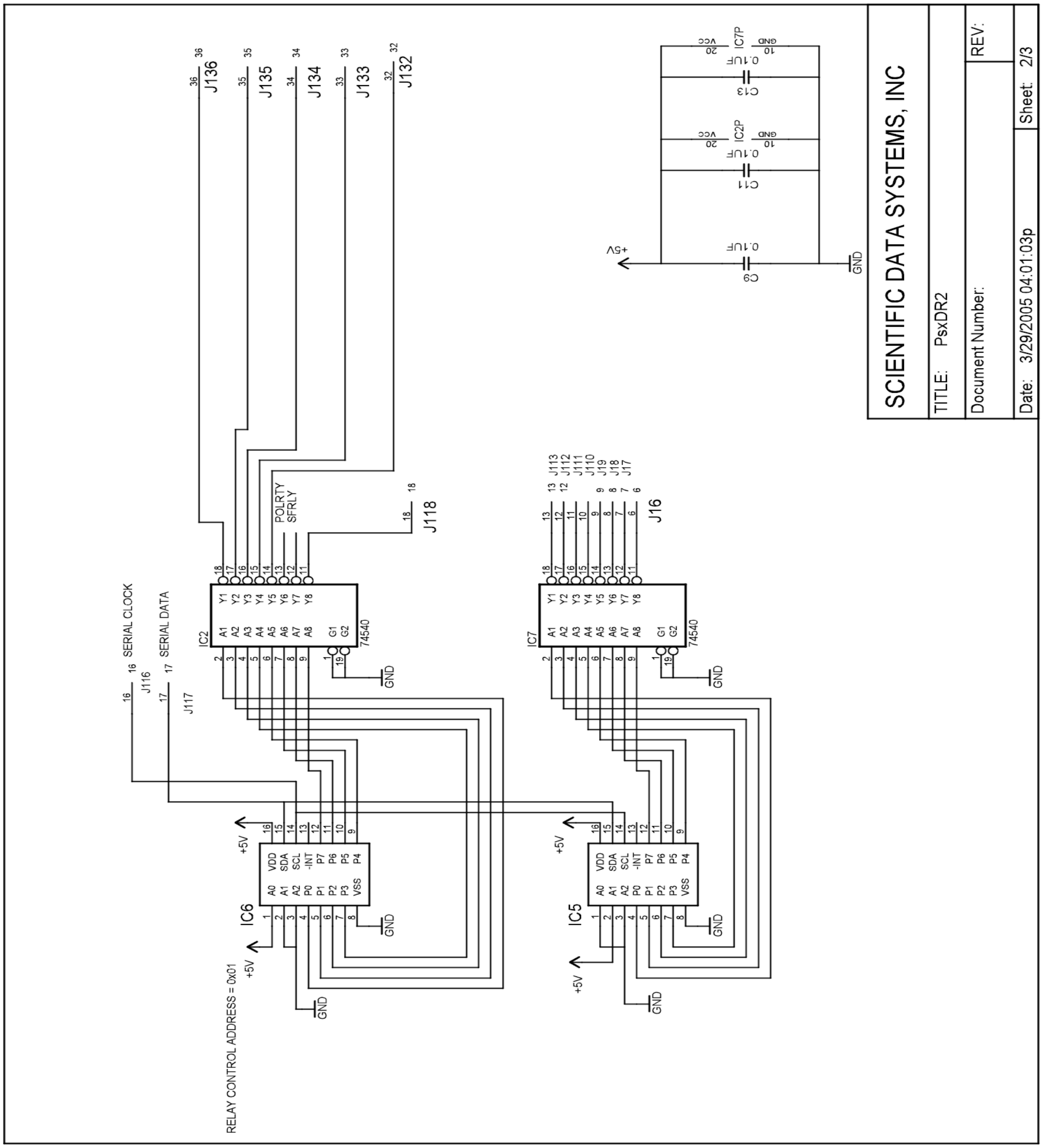


Fig 5.3 Schematic PSDXD R2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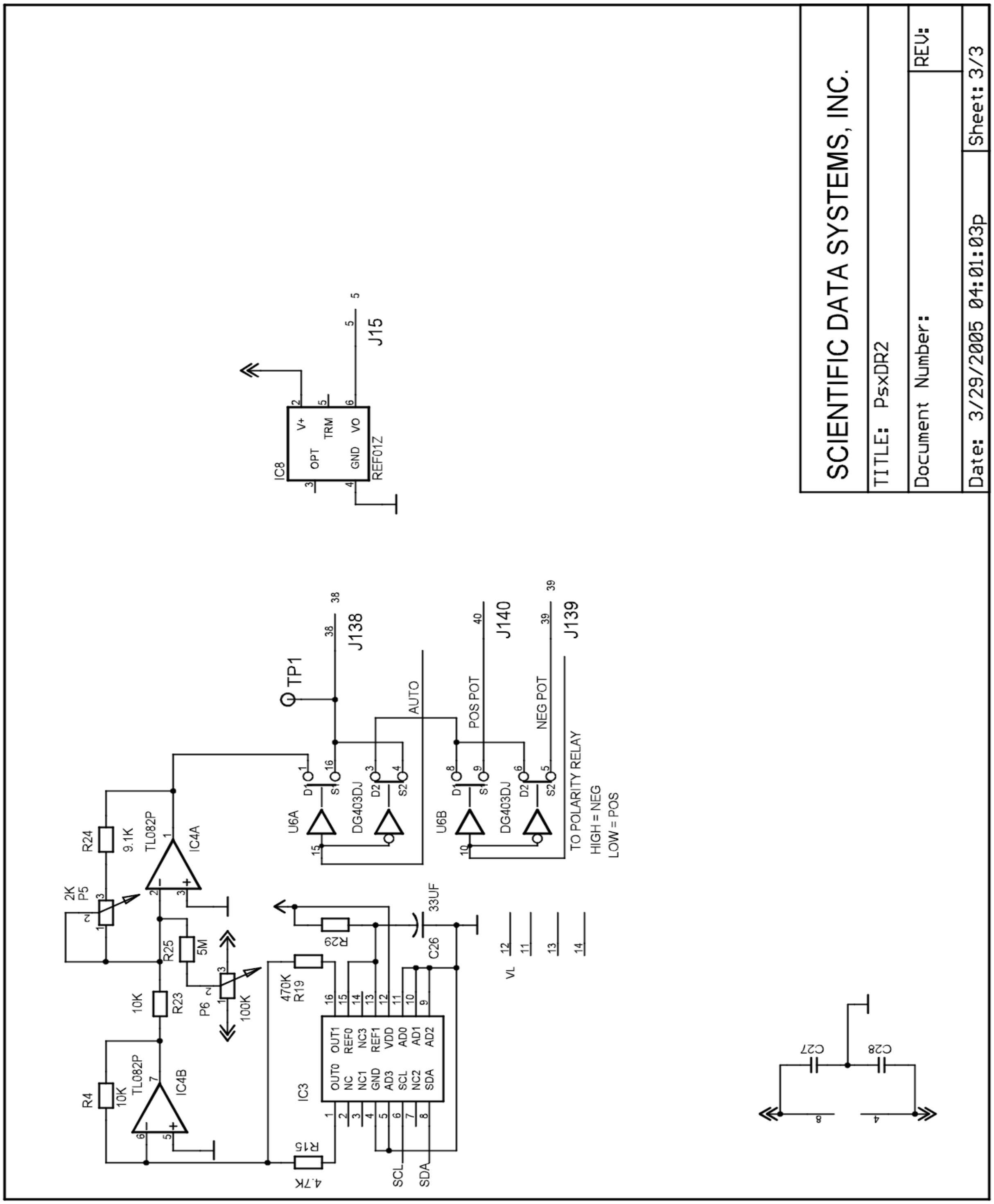
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J139
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U6B
DG403DJ
TO POLARITY RELAY
HIGH = NEG
LOW = POS
IC4A
IC4B
TL082P
R24
9.1K
P5
2K
R25
5M
R23
10K
P6
100K
R4
10K
R15
4.7K
R19
470K
R29
C26
33UF
IC3
SCL
SDA
VL
C27
C28

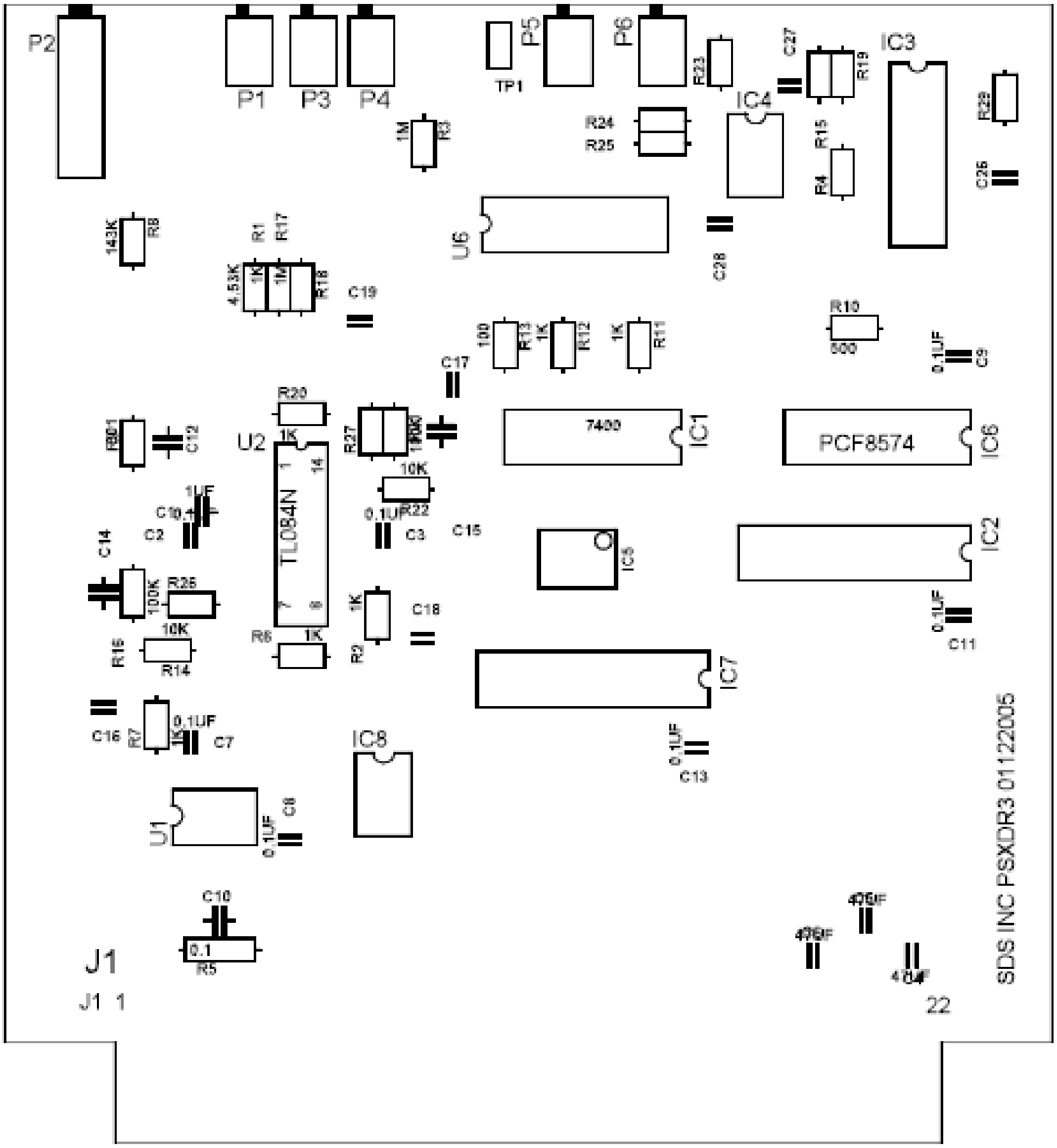


Fig 5.4 PSXD R2 board layout

Section

6

6 Tool Power Supply and ACSW3

The tool power supply consists of a regulator board (TpsDR9.1), four pass transistors, two transformers, and the front panel controls to set positive and negative voltage levels and switch output polarity. If the front panel switch is in the AUTO position then the polarity and voltage may be set under software control. A small DC to DC converter powers the regulator, allowing it to float on the tool voltage. The main power comes from a 1:2 step up isolation transformer. The two transformers, together with the rectifier and smoothing capacitor are mounted on the rear chassis.

6.1 Circuit Description TPSD

Reference voltage from the PSAUX board enters the power supply at J5-2, it is a 0 to 8 volt input that is buffered and isolated by U3 a opto isolated OP amp. The output side of the amp is powered by PS1 the DC to DC converter. P1 is used to set the output of the power supply to 100volts dc no load with a 2.00v ref. The output of the power supply is fed into a voltage divider R13 and compared to the reference voltage at U4 pin 3 to produce a regulated output. U4 pin 6 feeds the gate of the power FET thru R1 to regulate the output. Power supply current flows thru R2 and R9 to produce an output voltage which when it reaches about .7 volts at the base of Q1 it will limit the current. This voltage is also compared to the .80 volt reference from P2 in 1C1A to switch U5. This output when active will clamp the power supply output thru SCR IC2. Once active the only way to reset the clamp is to power down the power supply.

6.2 Circuit Description ACSW3

The ACSW3 board is used to enable the main power transformer through AC switch THY1. This is software controlled via the I2C buss and the PSXD board. The board also rectifies the AC output with D1, D2, D3 and D4. This output passes through fuse F1 “ 3 amp “ and to inductor filters .

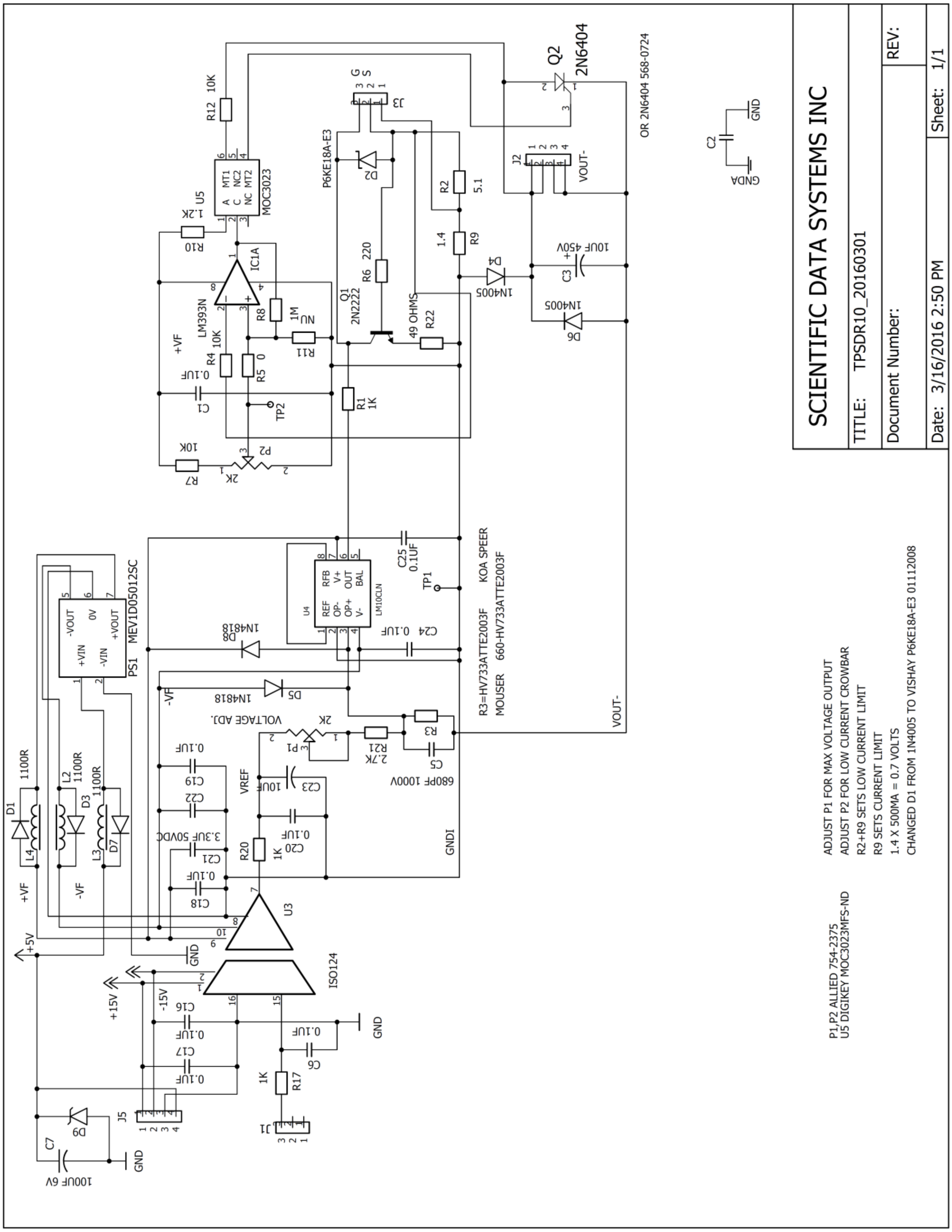


Fig 6.1 Schematic TPSD R10

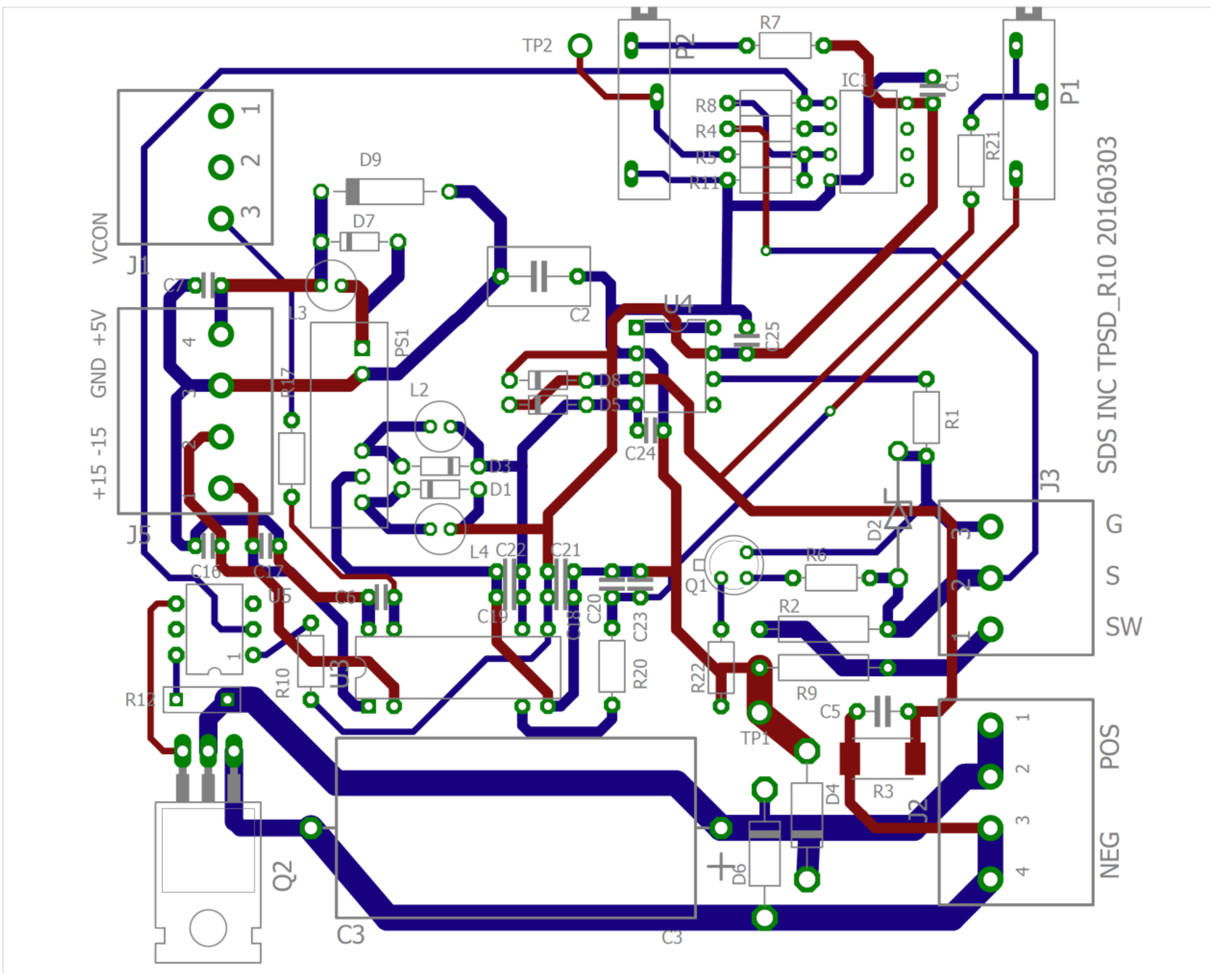


Fig 6.2 TPSD R10 board layout

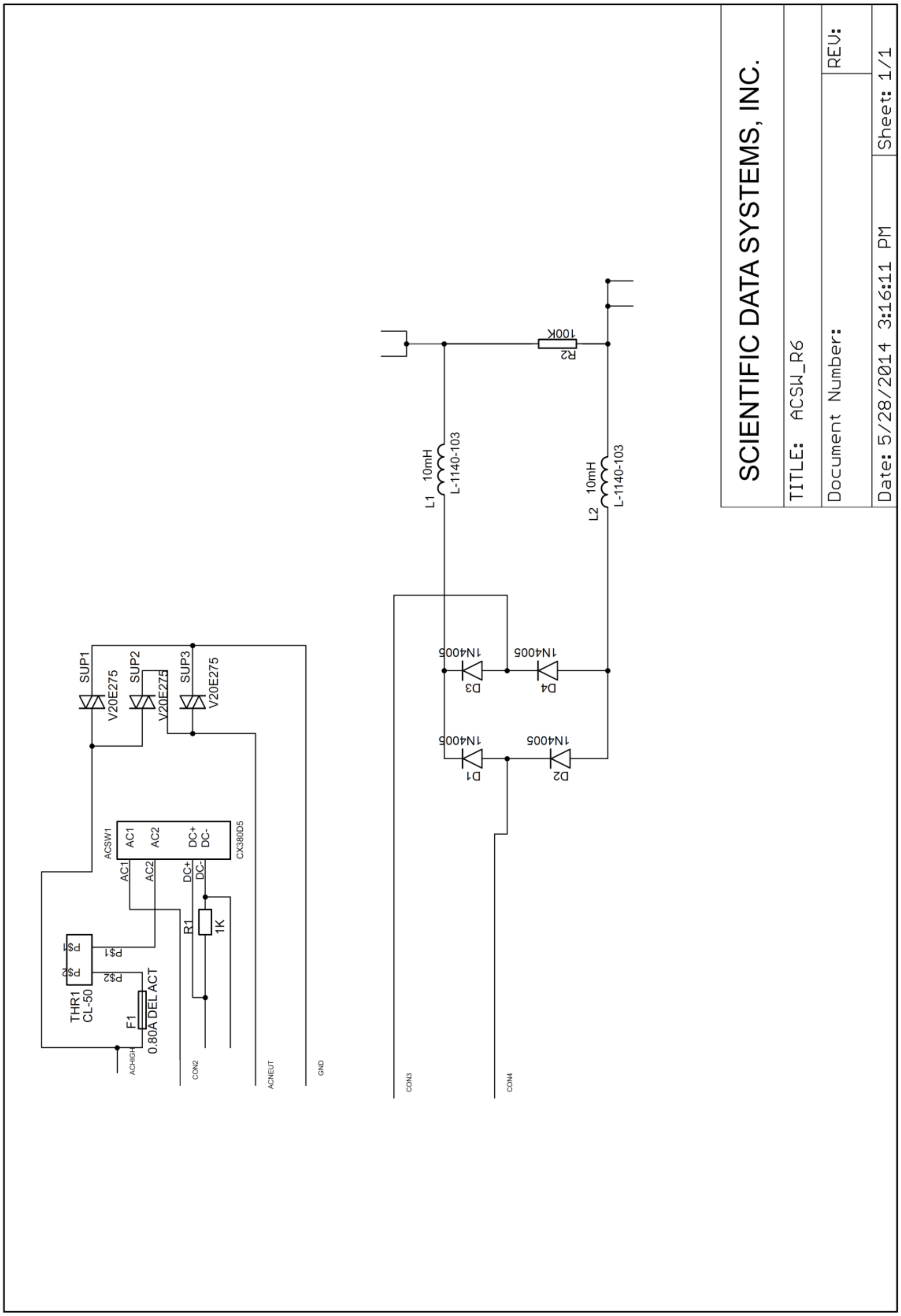
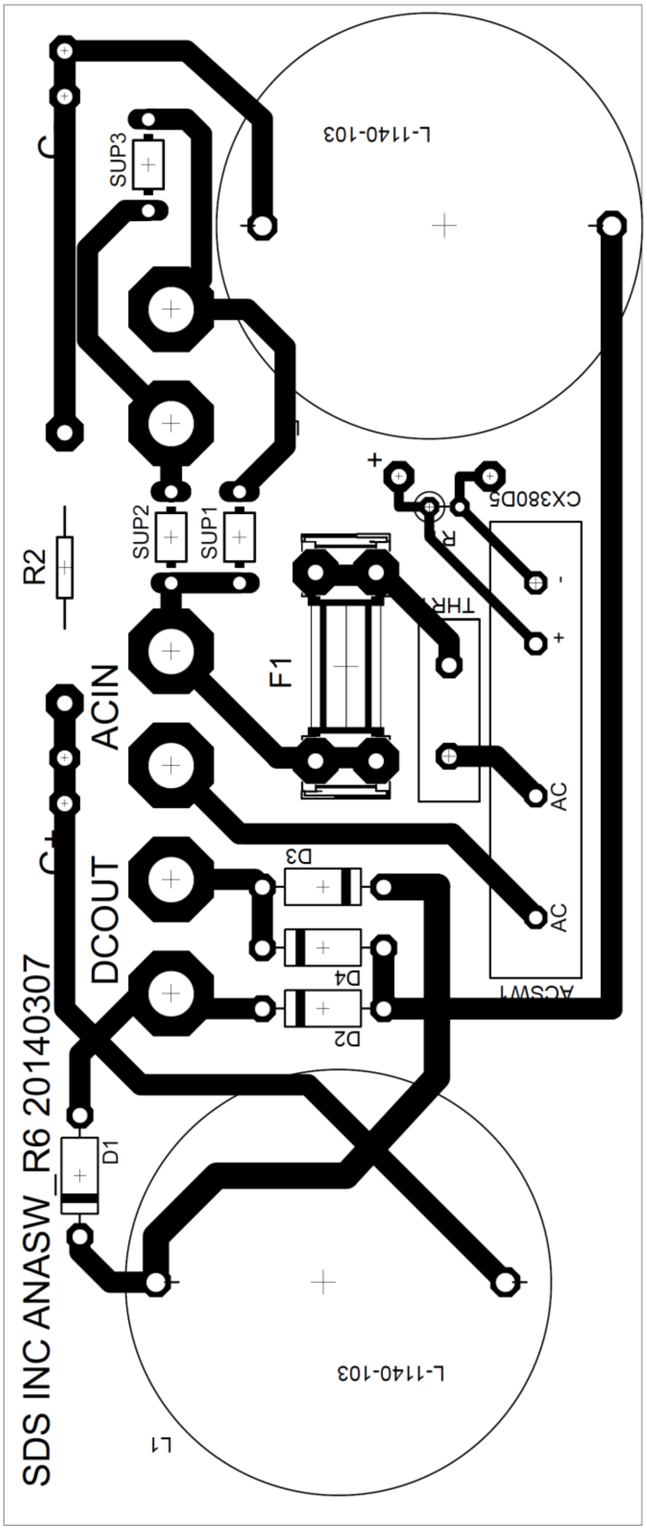


Fig 6.3 ACSW3 Schematic



MATERIAL FR4
THICKNESS 0.093 IN
2 OZ COPPER

Fig 6.4 ACSW6 Board layout

Section

7

7 Analog Switch Interface Board

The analog switch board decouples the tool power voltage from the line signal input and routes it to the various interface boards. The primary outputs of the card are a series of buffered signals that are connected to the other cards of the interface panel. In addition, the card also includes an audio amplifier circuit that is used to amplify the line signal with output to a loudspeaker or headphones. This function is primarily used with audio (noise) surveys.

7i ANASW R16

7i.1 Circuit Description

7i.1.1 Line Input

The line signal enters the card on J1-23 (CC7-23) and is decoupled from the line by capacitor C4. Relay K1 is use to switch a filter in or out of the circuit thru Q3, IC4A andIC3. Zener diodes D1 and D2 limit the signal to about 12 volts, peak to peak. The amplifier U2A provides high input impedance so that signals are passed down to a very low frequency. IC2 is a dual serial DAC. The USB controller on the USB44 card communicates with it on an I2C bus over the serial data (SDA) and the serial clock (SCL) lines. It converts the data into analog voltages that are then used to control gains of scalar U3 for audio signals. U1A, U1B, U1C, U1D, and U2C are unity gain buffers to provide low output impedance to the other interface panel boards.

7i.1.2 Audio Amplifier

The audio amplifier consists of scalar U3 that provides volume control and audio power amplifier IC1. The output of IC1 connects via J1 39 to the output jack and headphones or a loudspeaker. A faceplate potentiometer can be configured to control the level.

7i.1.3 Wellhead Pressure and aux channel

U5 and U7 were added to provide means to process a Wellhead pressure and an Auxiliary channel capable of processing 2 and 20 ma signals. 12 VDC current limited supplies are provided by Q1 and Q2.

7i.1.4 Baker Mod

IC3 and IC4 were added to enable control of simulator routing into the panel from pin 2 on the Aux5 connector.

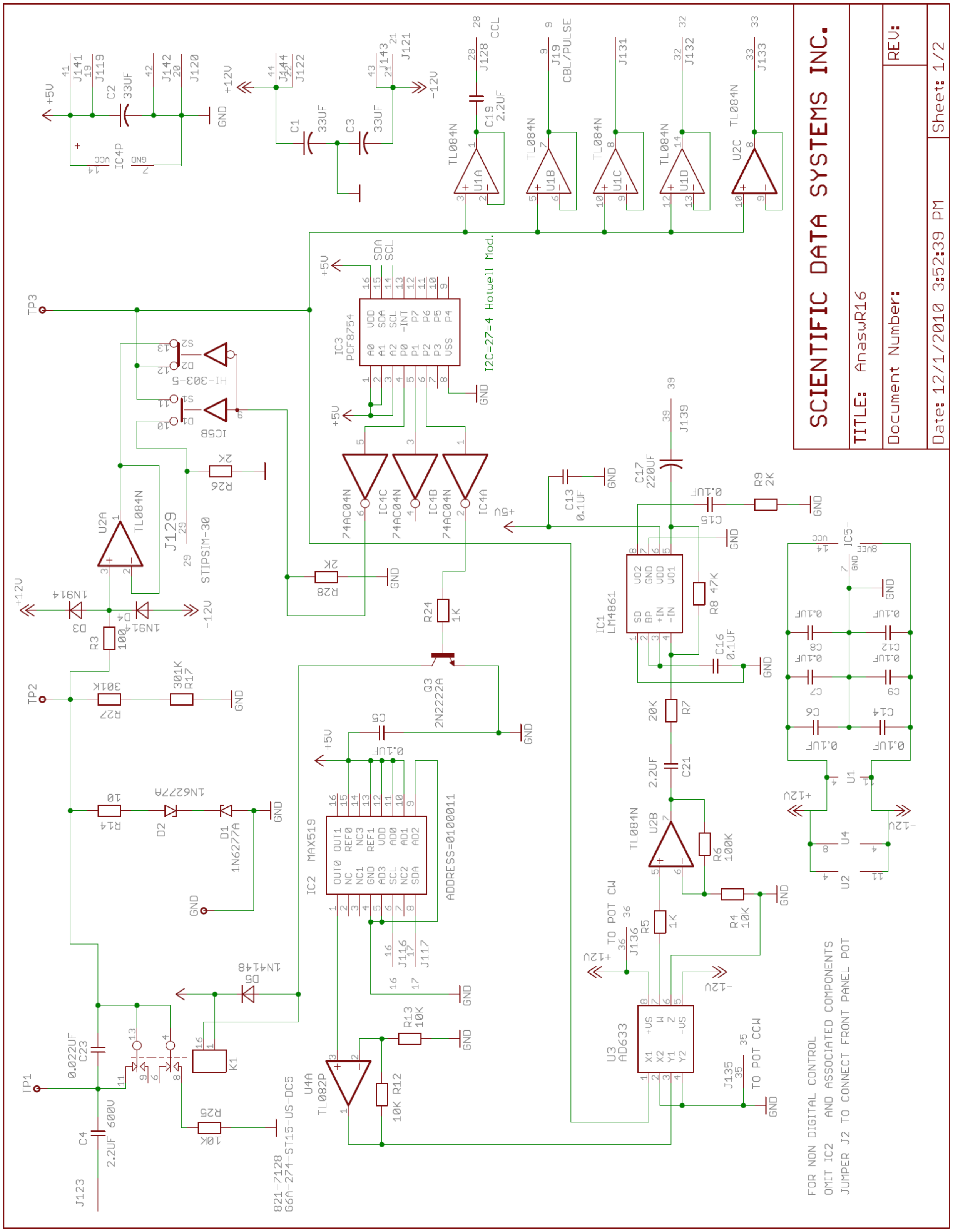
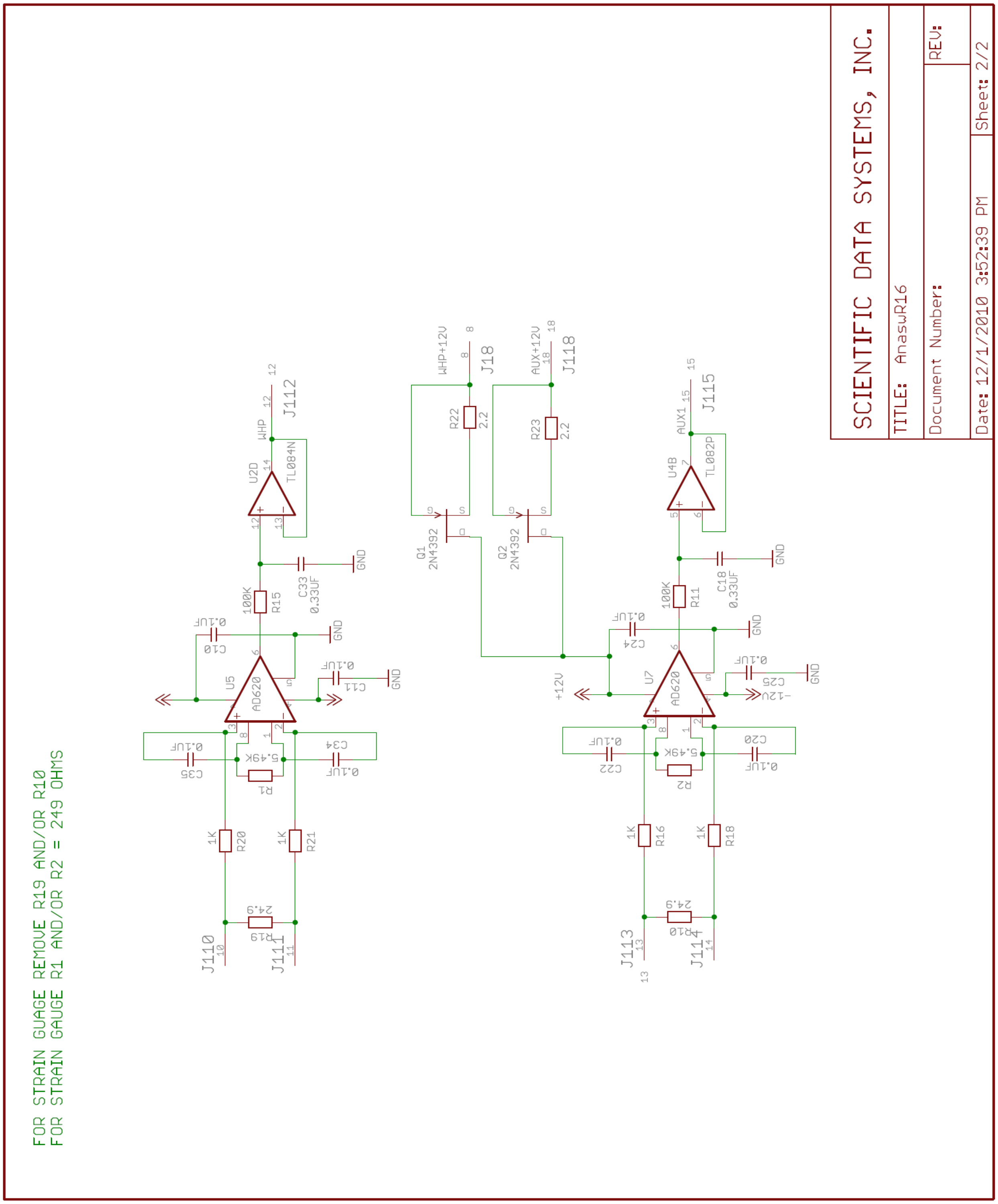


Fig 7i.1 Schematic Analog Switch ANASW R16


FOR STRAIN GUAGE REMOVE R19 AND/OR R10
FOR STRAIN GAUGE R1 AND/OR R2 = 249 OHMS
SCIENTIFIC DATA SYSTEMS, INC.
TITLE: AnaswR16
Document Number:
REV:
Date: 12/1/2010 3:52:39 PM
Sheet: 2/2
J110
J111
J112
J113
J114
J115
J18
J118
R19
24.9
R10
R20
R21
R16
R18
1K
R1
R2
5.49K
C35
C34
C22
C20
0.1UF
U5
U7
AD620
C10
C11
C24
C25
GND
+12V
-12V
R15
R11
100K
C33
C18
0.33UF
U2D
TL084N
U4B
TL082P
WHP
AUX1
Q1
Q2
2N4392
R22
R23
2.2
WHP+12V
AUX+12V

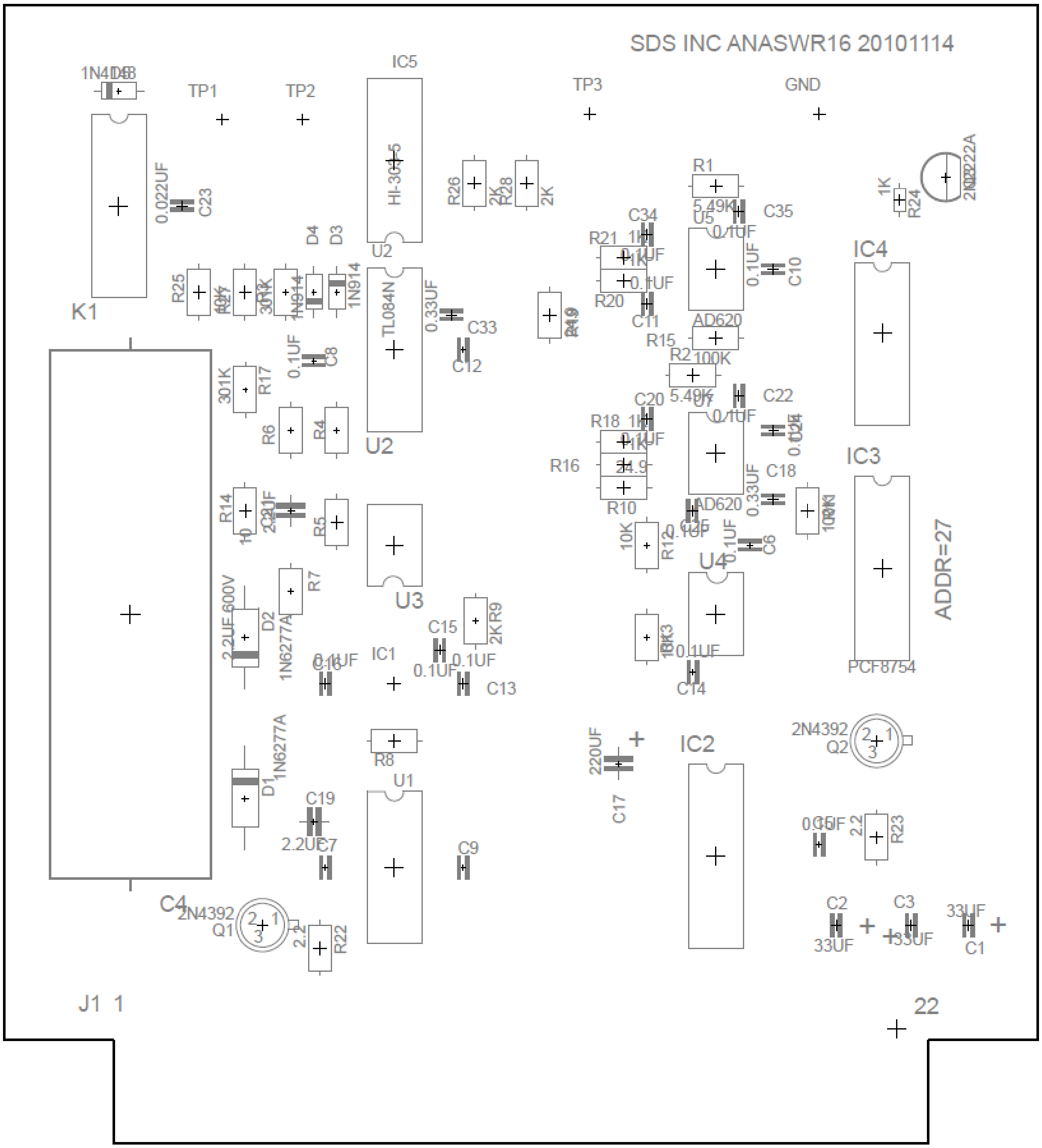


Fig 7i.2 Analog Switch ANASW R16 board layout

7ii ANASW R17

7ii.1 Circuit Description

7ii.1.1 Line Input

The line signal enters the card on J1-23 (CC7-23) and is decoupled from the line by capacitor C4. Relays K1 and K2 are used to switch in the HWFilter , they provide 4 options none, 234Hz, 482Hz and 723Hz 3db role off. The board routes the CCL signal around the HWFilter so that it is still possible to detect an analog CCL when the Filter is engaged. Zener diodes D6 limits the signal to about 12 volts, peak to peak. The amplifier U1A provides high input impedance so that signals are passed down to a very low frequency. The PSOC IC4 receives IC2 commands from the USB44 to control the relays via Q5 and to provide gain slider controls for the speaker output. U6 provides buffered outputs to the CBL, CCL, Audio and MTT boards

7ii.1.2 Audio Amplifier

The audio amplifier consists of scalar U2 that provides volume control and audio power amplifier IC1. The output of IC1 connects via J1 39 to the output jack and headphones or a loudspeaker

7ii.1.3 Wellhead Pressure and aux channel

IC5 and IC6 provide a means to process a Wellhead pressure and an Auxiliary channel capable of processing 4 and 20 ma signals. 12 VDC current limited supplies are provided by IC2 and IC12.

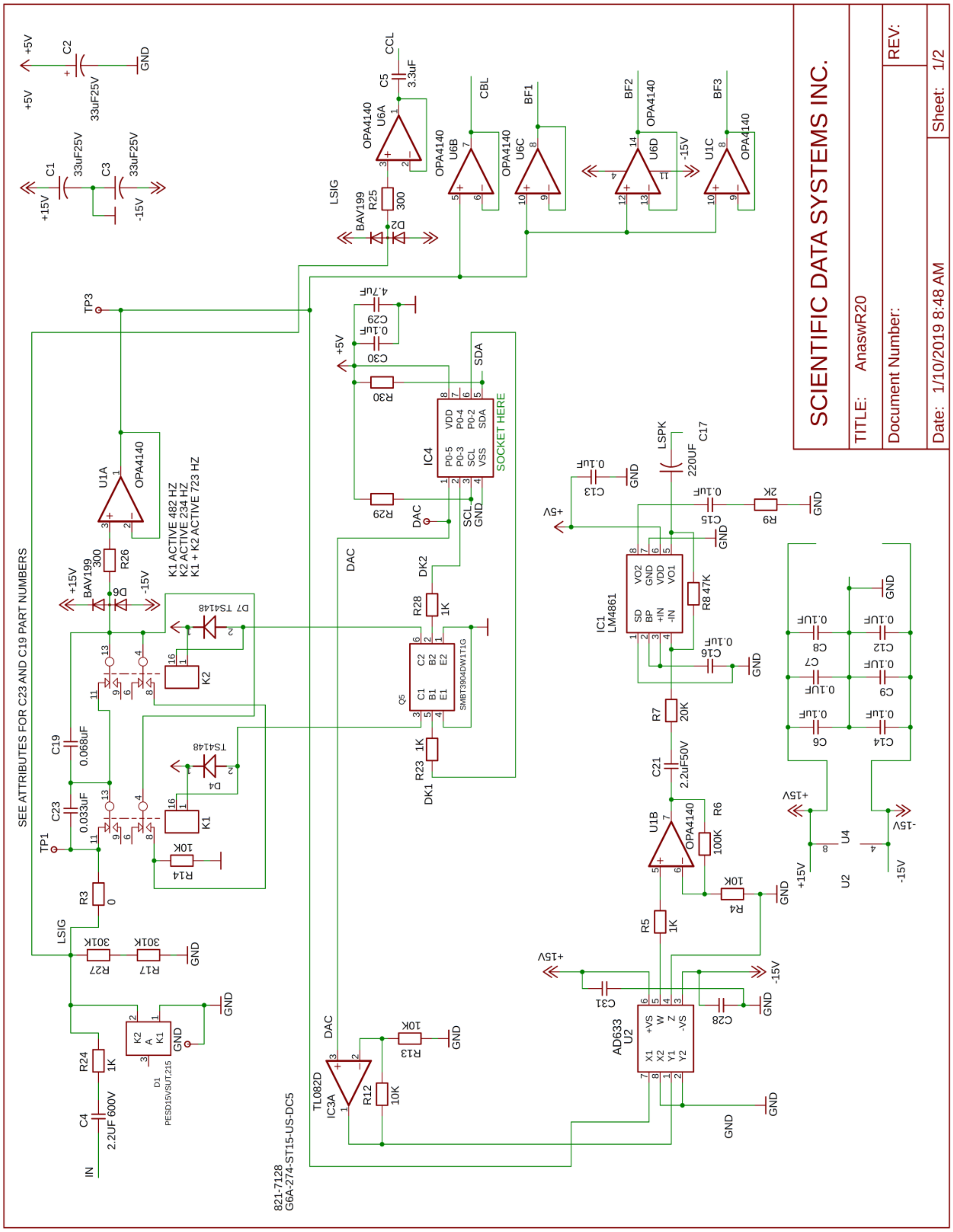
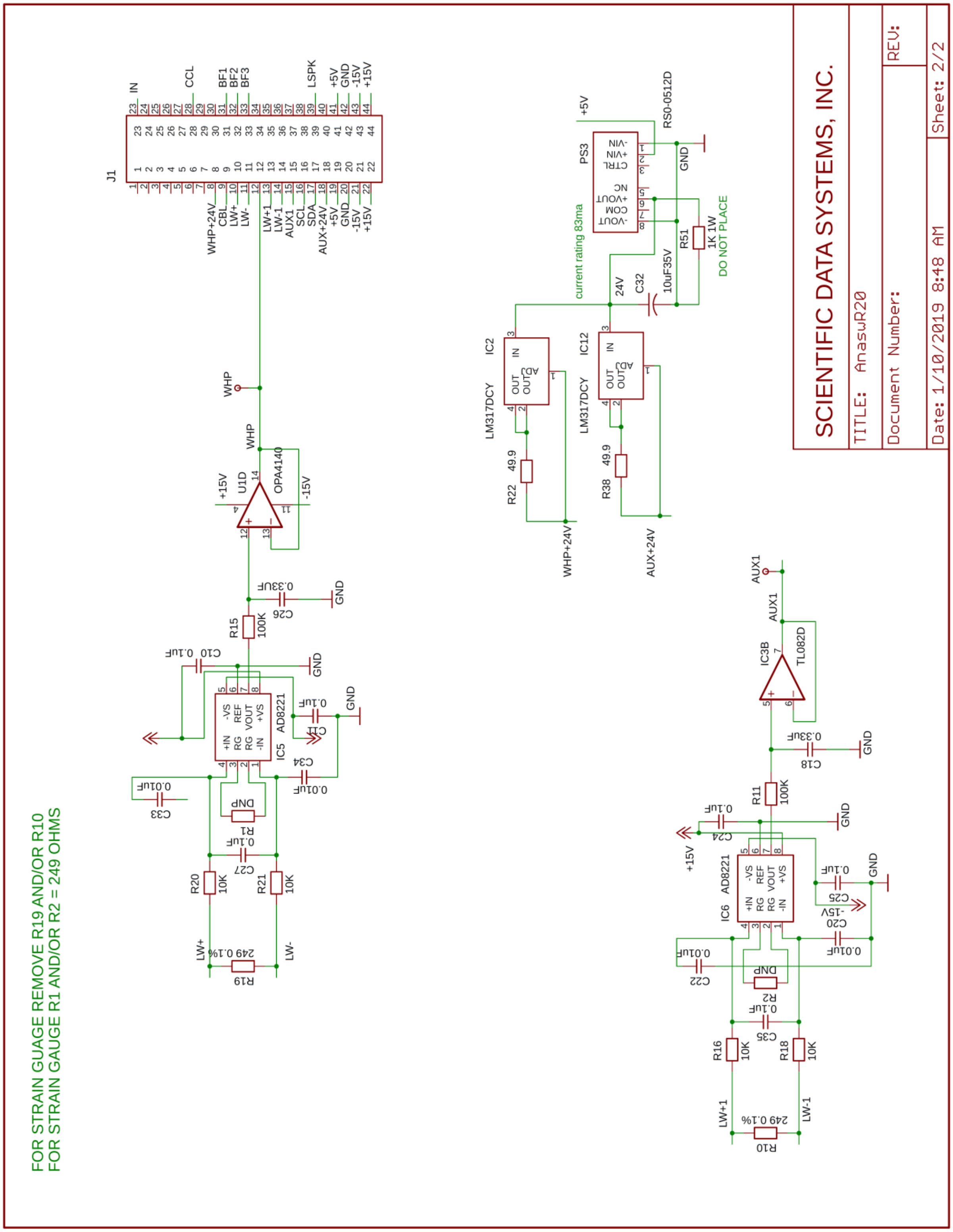


Fig 7ii.1 Schematic Analog Switch ANASW R17


FOR STRAIN GUAGE REMOVE R19 AND/OR R10
FOR STRAIN GAUGE R1 AND/OR R2 = 249 OHMS
J1
WHP+24V
CBL
LW+
LW-
LW+1
LW-1
AUX1
SCL
SDA
AUX+24V
+5V
GND
-15V
+15V
IN
CCL
BF1
BF2
BF3
LSPK
WHP
U1D
OPA4140
IC5
AD8221
IC6
IC3B
TL082D
IC2
IC12
LM317DCY
PS3
RS0-0512D
current rating 83ma
24V
C32
10uF35V
R51
1K 1W
DO NOT PLACE
WHP+24V
AUX+24V
R19
249 0.1%
R10
249 0.1%
DNP
SCIENTIFIC DATA SYSTEMS, INC.
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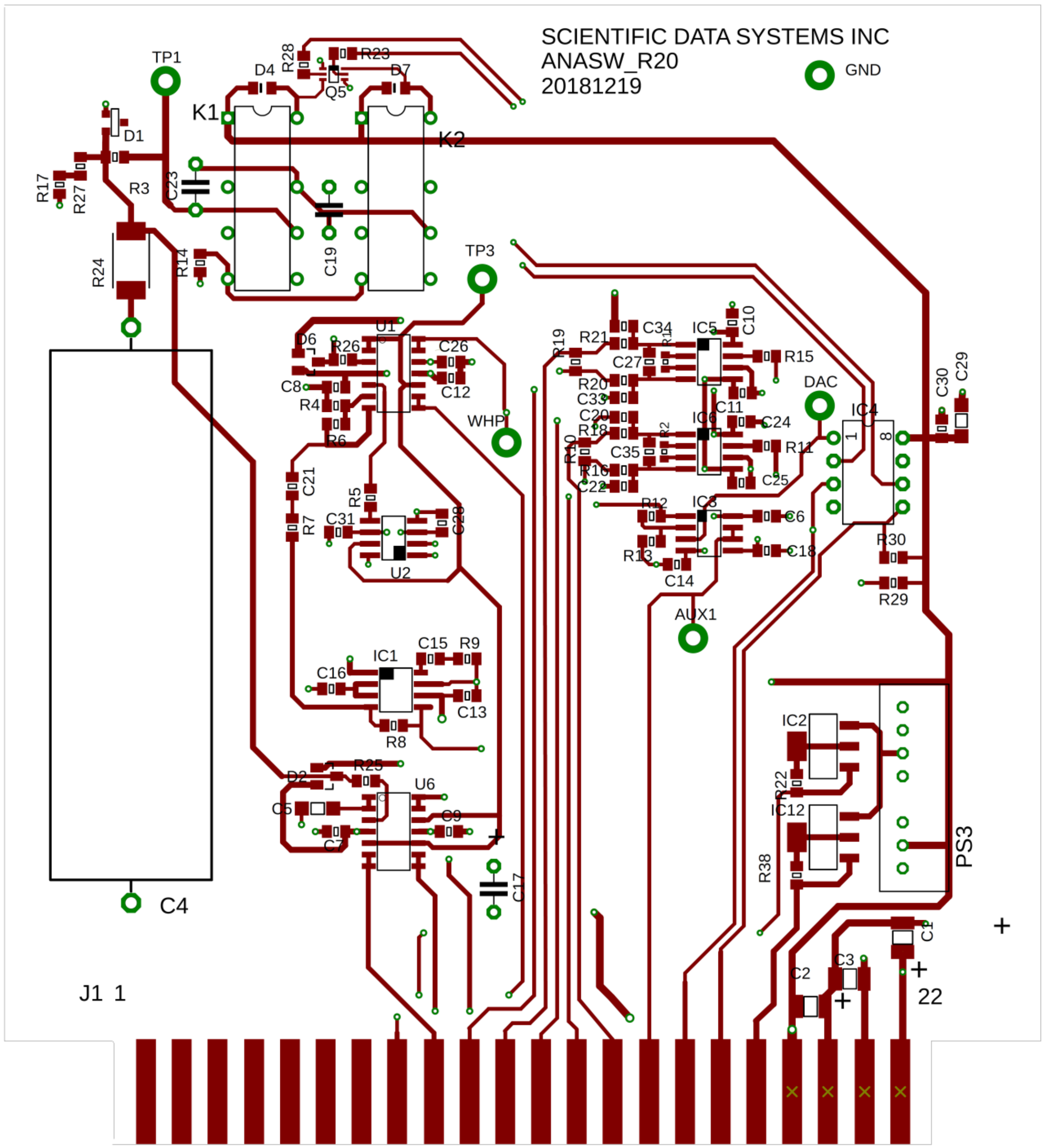


Fig 7ii.2 Analog Switch ANASW R17 board layout

Section

8

8 CCL Board

This card provides filtering and amplification of the casing collar signal when it appears as a low frequency signal imposed on the line or from an external source, such as a shooting panel with CCL output.

Experience has shown that the CCL signal must be sampled at a rate of at least 20 samples per foot in order to obtain a detailed collar log. The sample rate default value is set in the services.ini file.

The CCL card input is connected to the line input via the ANASW card. In addition, there is an auxiliary input, which is connected to a BNC connector at the rear of the STIP. This input is used to provide a passive CCL signal while perforating guns are being run, without the main line enable relay being activated.

The output of the card is a filtered and amplified version of the input CCL signal, which is connected to the ADC on the USB44 card in the interface panel.

8.1 Circuit Description

This card provides 8^{th}–order low-pass filtering (via IC3), and amplification of the casing collar signal when it appears as a low frequency signal imposed on the line or from an external source, such as a shooting panel with CCL output, additionally the signal can be routed by software as an Active CCL or Passive CCL.

The PSoC (IC4) receives control signals from the USB44 via the IC2 buss to select Active CCL (Pin1), Passive CCL (Pin1), corner frequency, CCL gain, and CCL audio.

The clock tunable for low-pass filter can set up with corner frequencies from 1Hz to 20Hz. The PSoC provides the external clock that control the filter’s corner frequencies.

The CCL gain is controlled by IC4 and sent to the scalar U1 to increase or decrease the CCL signal. The scalar output (U1) sends the signal to low-pass filter (IC2).

The output of the card (J1-27) is a filtered and amplified version of the input CCL signal, which is sent to the ADC on the USB44 card in the interface panel.

The PSoC can be programmed via header SL1.The PSOC IC4 has a Check-sum = A43F

8.2 PSoC Block Diagram

The I2C Bus address is 36 (DEC)
The PSoC receives commands via the I2C Bus from USB44 to control various functions.

8.2.1PSoC Pin Out

Pin1 Set control Passive/Active CCL
Pin2 DAC output (0-5Vdc)
Pin 3 SCL I2C Clock (100 KHz)
Pin 4 GND
Pin 5 SDA I2C Data (100 KHz)
Pin 6 P0 (2) NC
Pin 7 P0 (4) Output Freq. (100Hz or 1000Hz) this results in a corner frequency from (1 Hz to 10 Hz)
Pin 8 VCC (5Vdc)

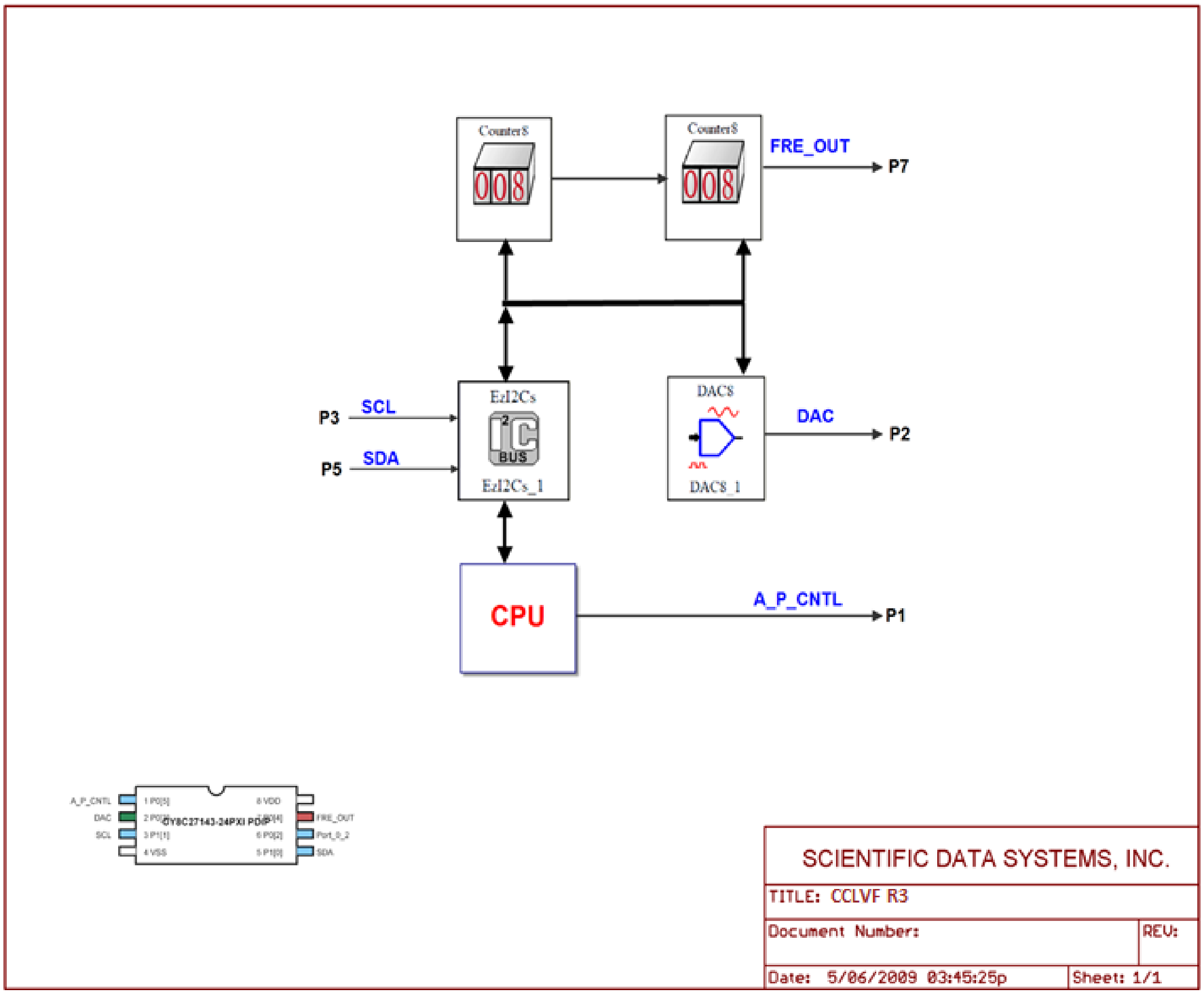


Fig 8.1 Block Diagram CCLVF R3

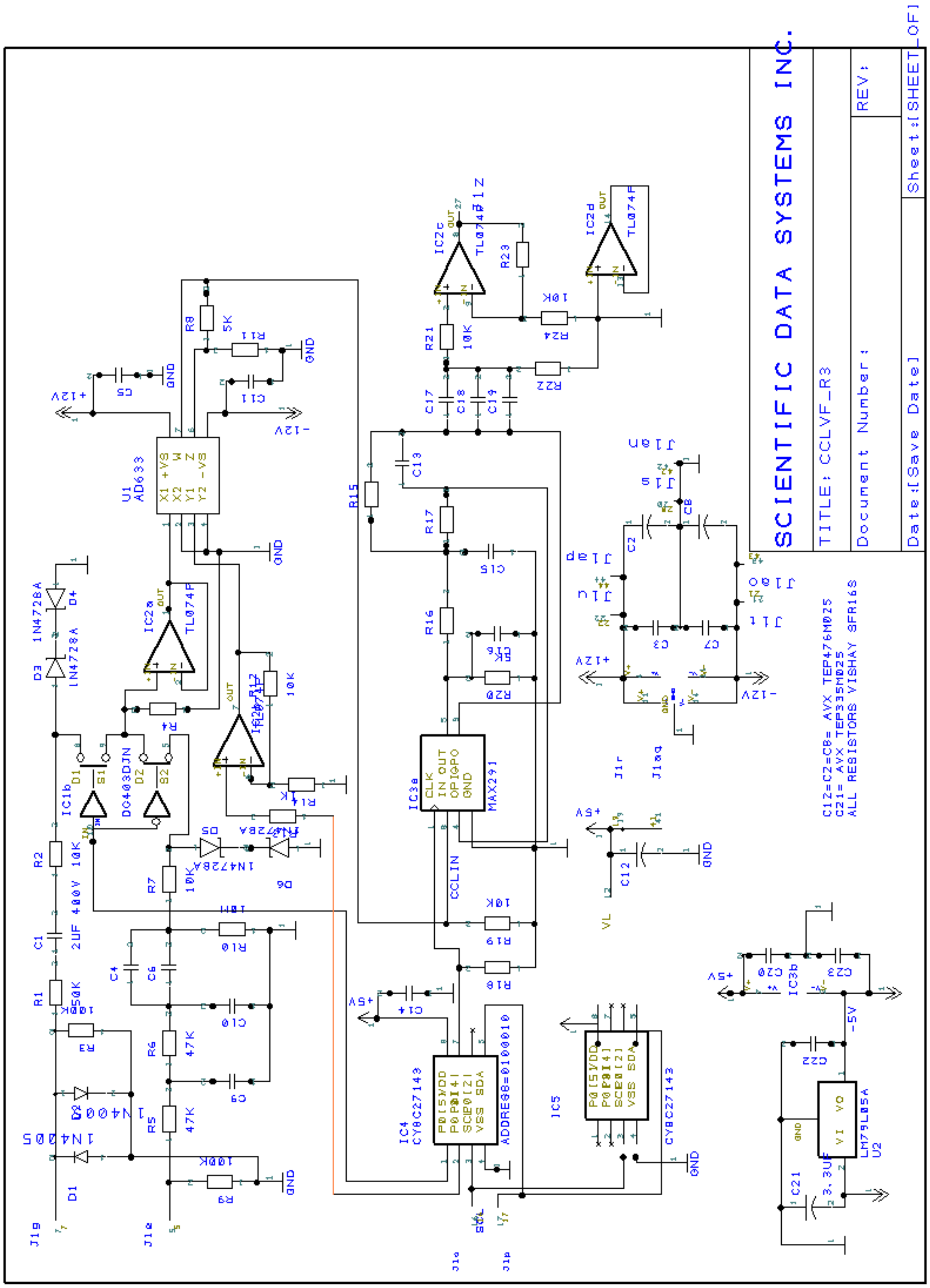


Fig 8.2 Schematic CCLVF R3

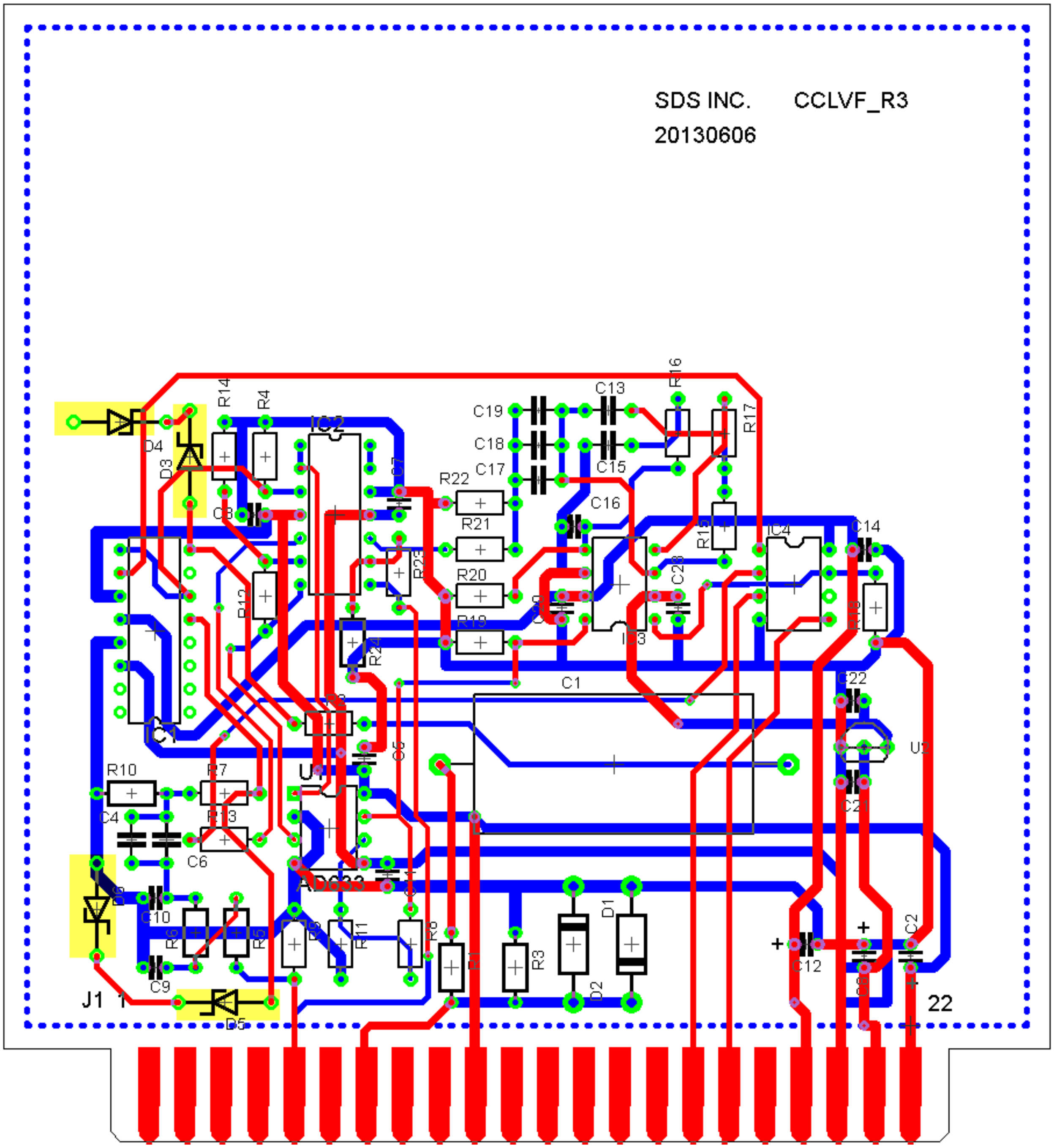


Fig 8.3 CCLVF R3 board layout

Section

9

9 i CBL1 R6 Board

The CBL01 card conditions acoustic and analog pulse signals that are subsequently input to the SDSDSP card for data acquisition. The input to the card is connected to the line via the ANASW card. The card outputs three signal channels that are used for sonic sync pulse detection, analog pulse detection, and two channels of sonic signal for amplitude measurement, waveform recording and travel time measurement. The board has three filter sections that are controlled by Warrior software with the USB I2C bus to allow the greatest degree of flexibility for signal processing from different down-hole tools.

9i.1 Circuit Description

The signal comes from the ANASW board on CC7-9 and arrives on the CBL1DR5 board on CC9-23 (J1-23). It goes to buffer IC2A. The buffer output drives two other buffers, IC2B which drives LINEB, IC2D which goes through selective filtering controlled by IC9 and then to buffer IC2C to become LINESON(acoustic). Signal LINEB supplies the SYNC by going to DAC IC11, pin 18 which controls the gain going to IC3 and IC4, two multiplying DACs, AD7628, configured as programmable filters. IC3, OUTA and OUTB control the gain and Q of the filter made by IC6. IC4, OUTA and OUTB control the cutoff frequency. IC14A, DG403, selects either the high pass output, HPSYNC, or the band pass output, BPSYNC. IC14B allows the SYNC signal to be inverted, if necessary. The SYNC signal is buffered by IC8B and goes off the board on J1-12, SYNC OUT to the CBL02 board.

9i.1.1 LINEB

Signal LINEB also supplies the AUX signal. It goes to pin 4 of DAC IC23 for gain control and on to filter controls IC15 and IC16. The gain of the filter is controlled by IC15, OUTA, the Q is controlled by IC15, OUTB, and the cutoff frequency is controlled by IC16, OUTA and OUTB. The filter has two outputs, HPAUX, high-pass and BPAUX, band-pass. The output is selected by IC18A, DG403, and analog switch. IC18B allows inversion of the signal as needed. The signal leaves the board on J1-30 and goes to the TELA board where telemetry signals are processed. It also goes to DSP INP9, CC14-30.

The three filters are controlled by IC21, PCF8575 data register, and IC20, PCF8575, control register. These devices get data from the I2C bus which comes onto the board on J1-16 and J1-17 from the USB44. The filters are under software control through the USB bus and are set up in the tool configuration panel of the Warrior Software.

9.1.2 LINESON

LINESON is processed the same way by IC11, and IC1 and IC7. The ACOUSTIC channel leaves on J1-18 and goes to the CBL02 on CC10-23, threshold control. It also goes out on J1-10 to CC14-8, amplitude to DSP IN1.

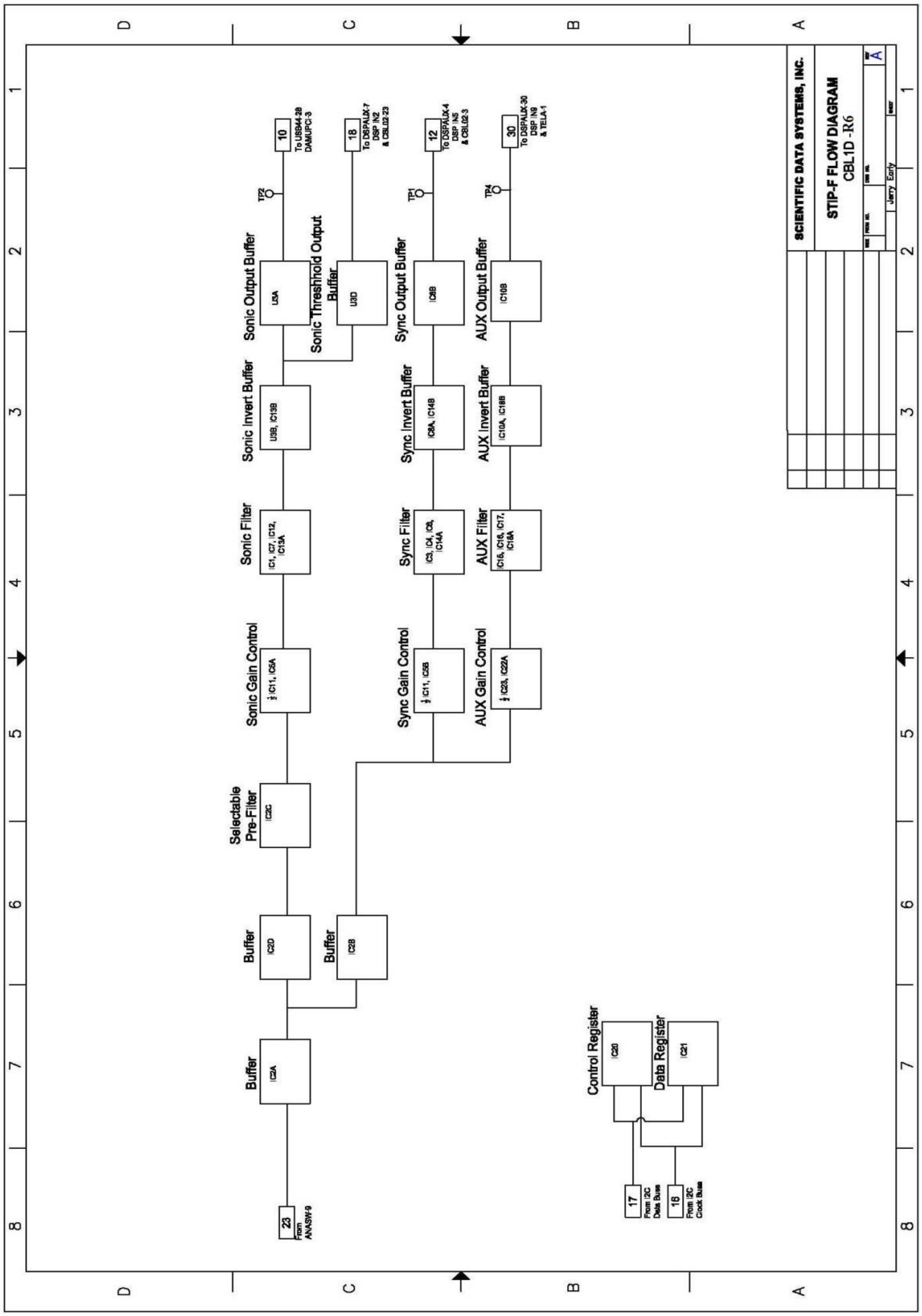
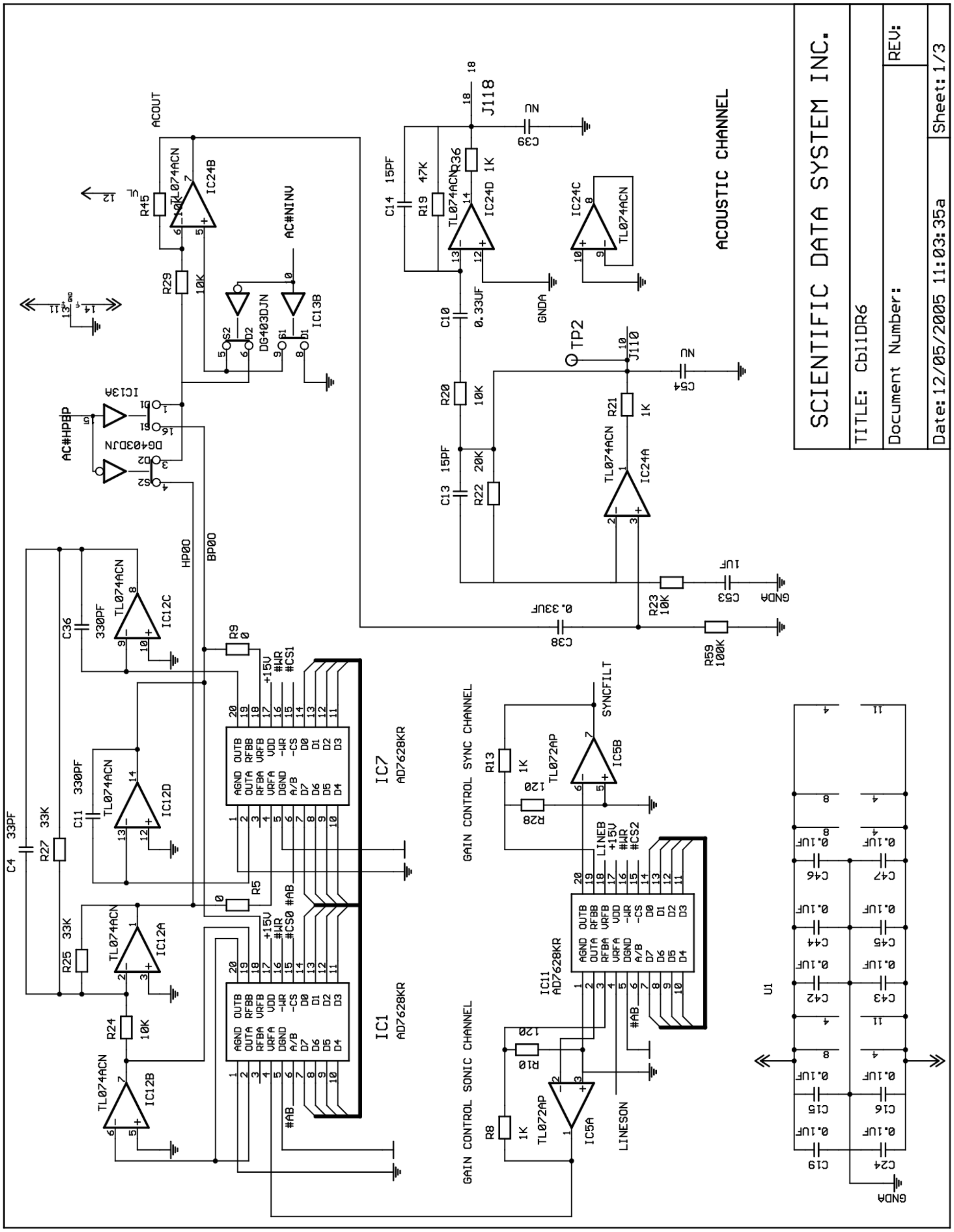


Fig 9i.1 Block Diagram CBL1D R6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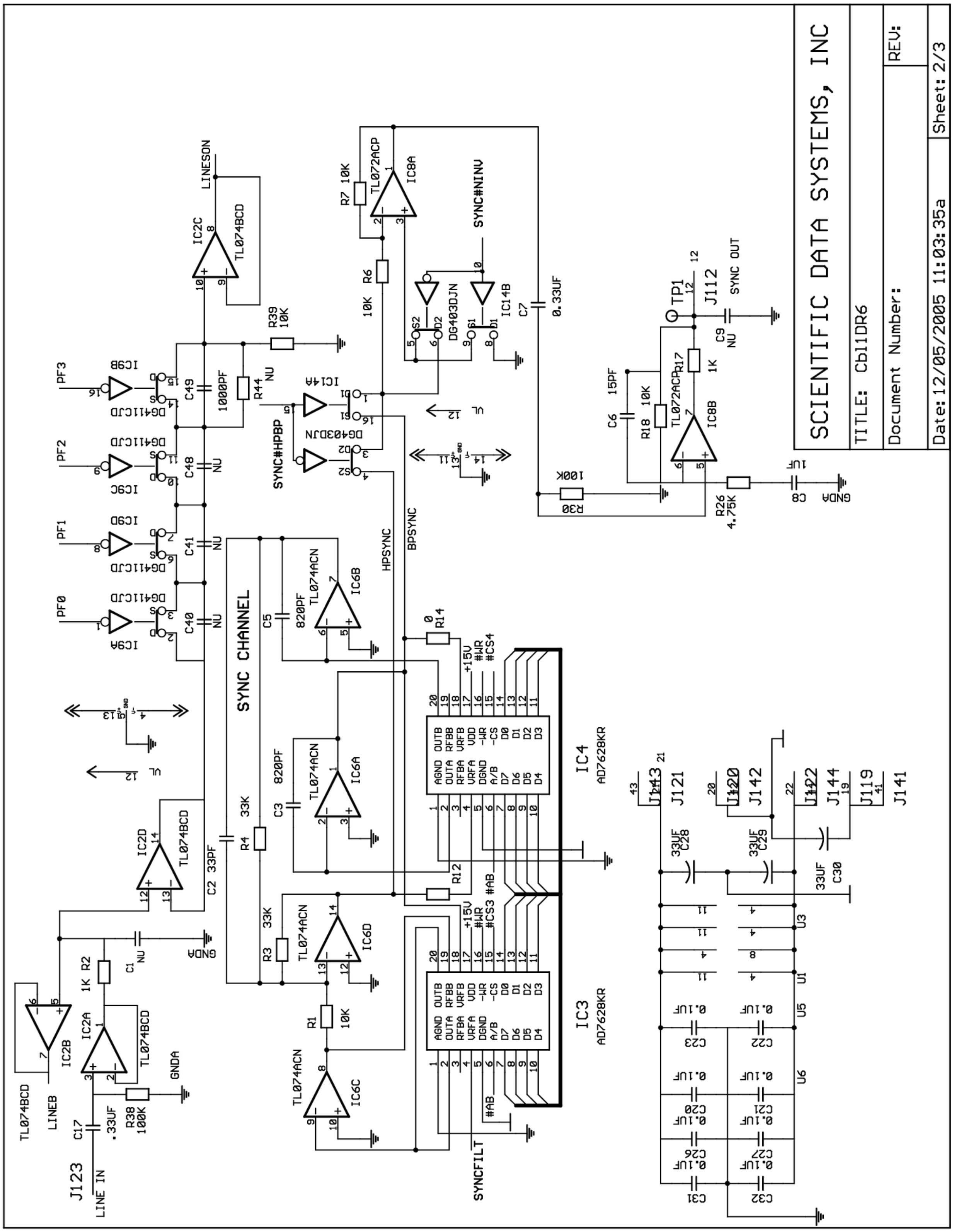
ACOUSTIC CHANNEL
GAIN CONTROL SYNC CHANNEL
GAIN CONTROL SONIC CHANNEL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SYNC CHANNEL

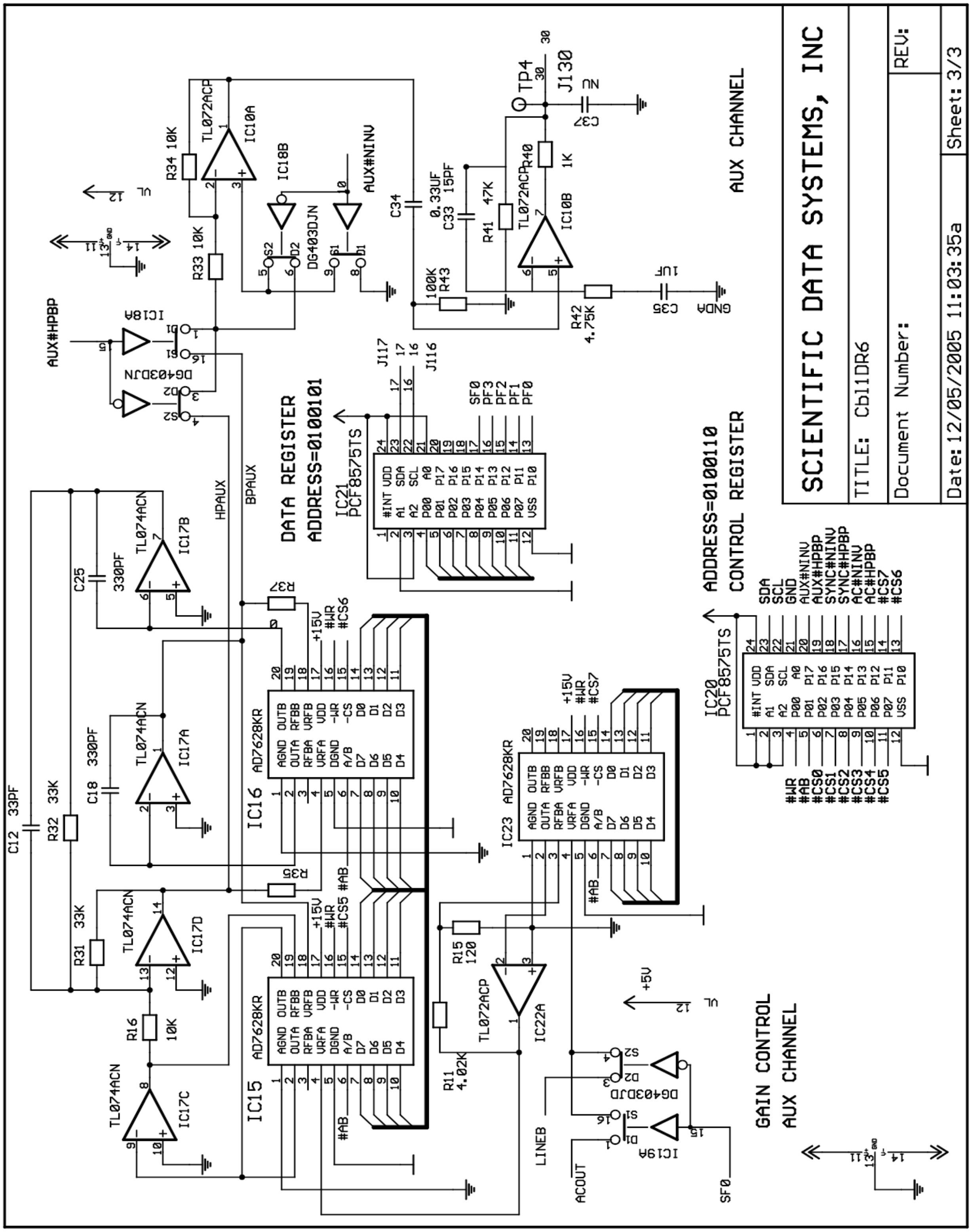


Fig 9i.2 Schematic CBL1D R6

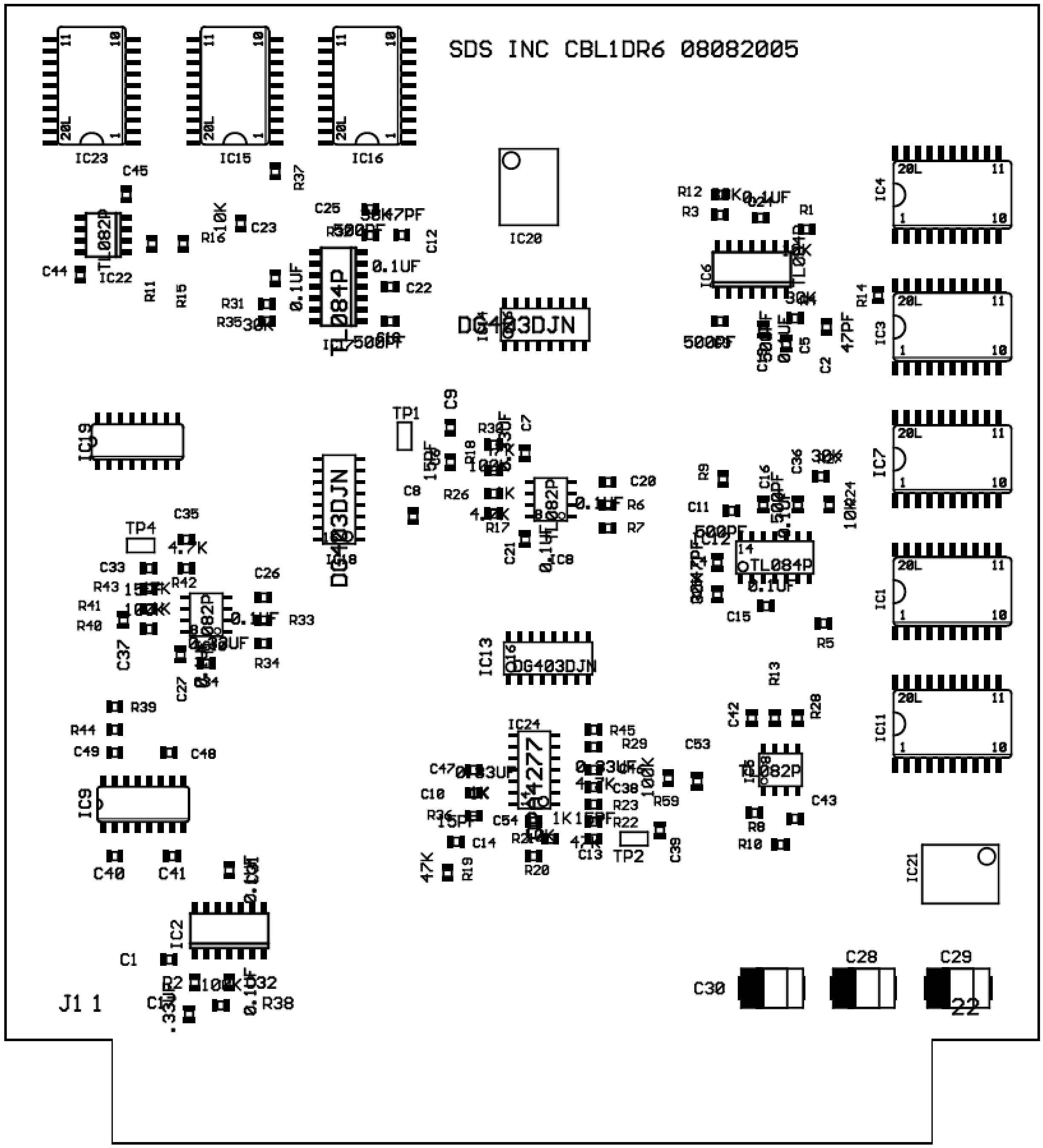


Fig 9i.3 CBL1 R6 board layout

9 ii CBL1 R13 Board

The CBL01 R13 board conditions acoustic, pulse and telemetry signals that are subsequently input to the SDSDSP card for data acquisition. The input to the card is connected to the line via the ANASW card. The card has three outputs. The acoustic output is used for sonic amplitude, travel time and waveform recording in the DSP. The Sync output is used in combination of the CBL_02 and DSP to synchronize SCBL signals. The AUX output is used to either discriminate pulse data or decode telemetry signals in the DSP. The board has three filter sections that are controlled by Warrior software through the USB I2C bus which allows a greater degree of flexibility for signal processing from different down-hole tools.

9ii.1 Circuit Description

The signal comes from the ANASW board on CC7-9 and arrives on the CBL1 R13 board on CC9-23 (J1-23). The signal goes through the analog switch IC25 to connect to the two buffers on quad op amp IC2 to output LineSon and Line B. Line B is gain controlled by scaler IC27. LineSon passes through analog switch IC9 to provide Sonic Pre filter selection.

9ii.1.1 LINEB “ Sync “

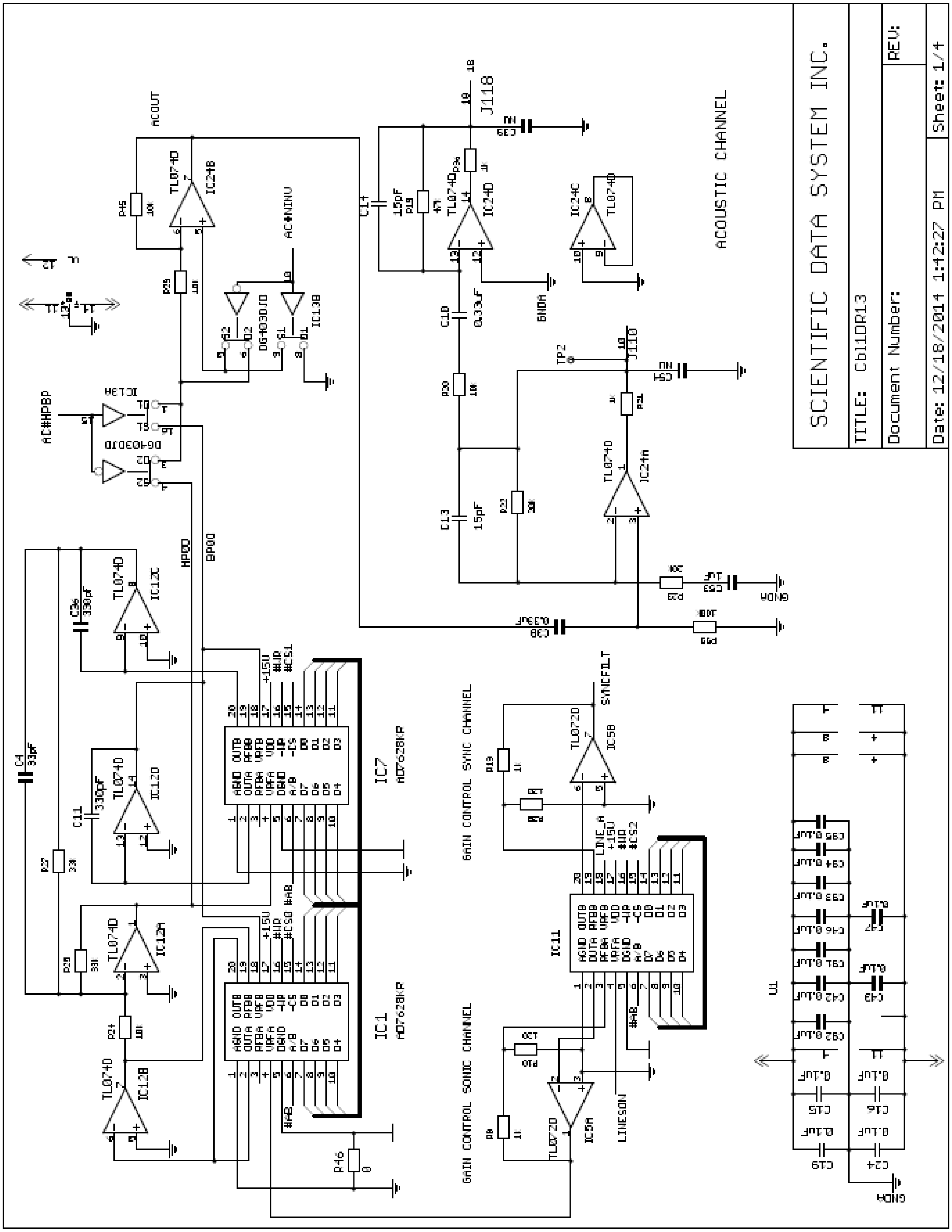
Line B produces the Sync output. It passes through the gain selector IC26 into the band pass filter controlled by IC3, IC4 and IC6. Analog switch IC1 selects via software control either band pass or high pass. IC4 B determines if the sync pulse is invered via software control. The sync output is then buffered by two stages of IC8 out pin 12 to the CBL 2 board.

9ii.1.2 LINESON " Sonic "

LineSon the sonic signal is gain selected by IC11 then routed through the band pass filter IC1, IC7 and IC12 to produce a software controlled output into IC13. IC13 selects via software either band pass or high pass filtering and optional signal inversion. The resultant signal is them buffered by three stages of IC24 and out pin 18 to the DSP.

9ii.1.3 LINE AT " Aux "

The Aux signal is fed out of IC26 into a precision software controlled filter with eight options to optimize pulse and telemetry signals. The filter is composed of three analog switches selecting specific filters made up of three stage filter IC10. This optimized output is buffered and scaled by IC15 , IC19 and scaler IC22. The resultant output leaves on pin 30 to the DSP.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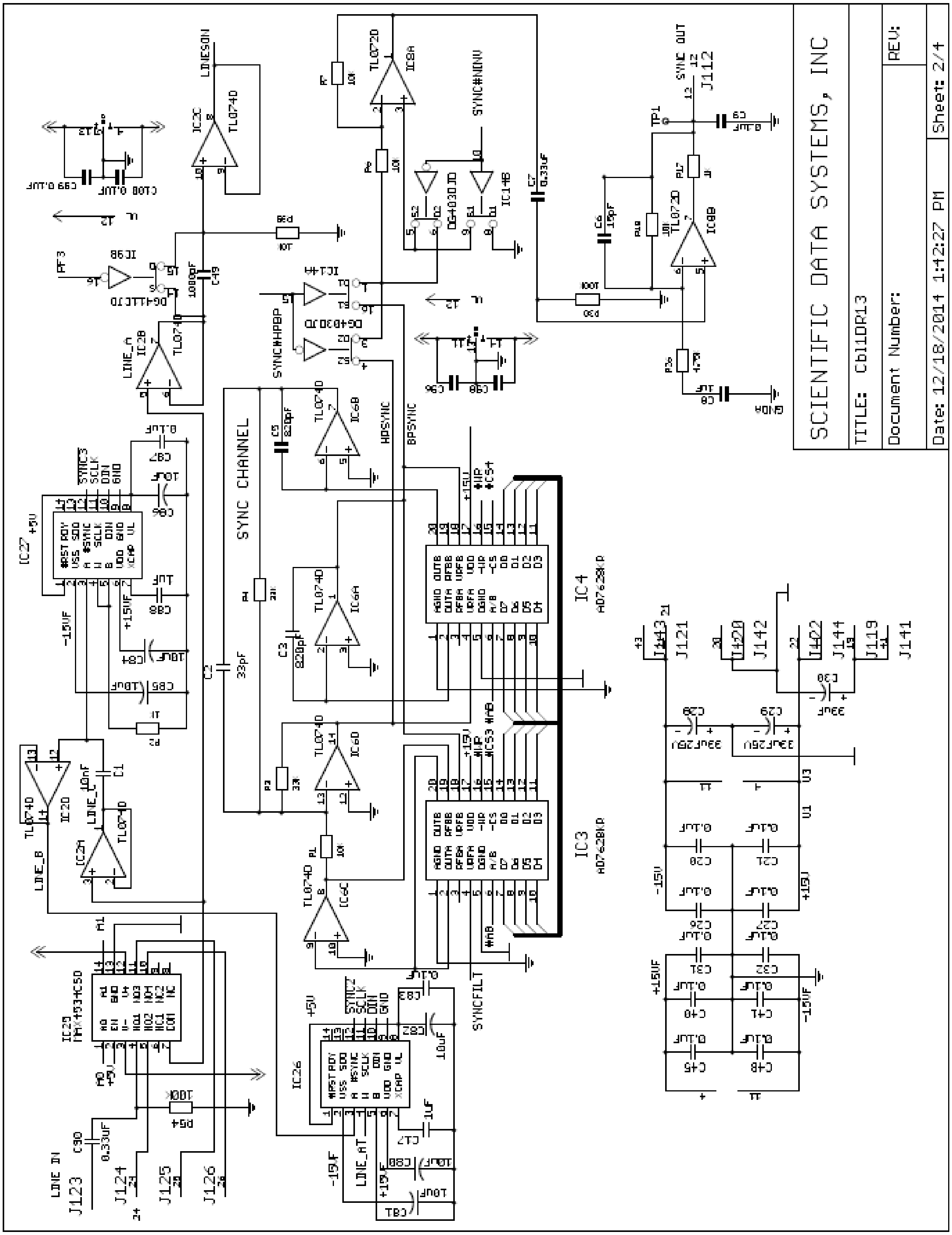
GAIN CONTROL SYNC CHANNEL
GAIN CONTROL SONIC CHANNEL
IC7 AD7628KR
IC1 AD7628KR
IC11
ACOUT
AC#HPBP
AC#INV
J118
J110
SYNCFILT
LINESON
HPOO
BPOO
GNDA
TP2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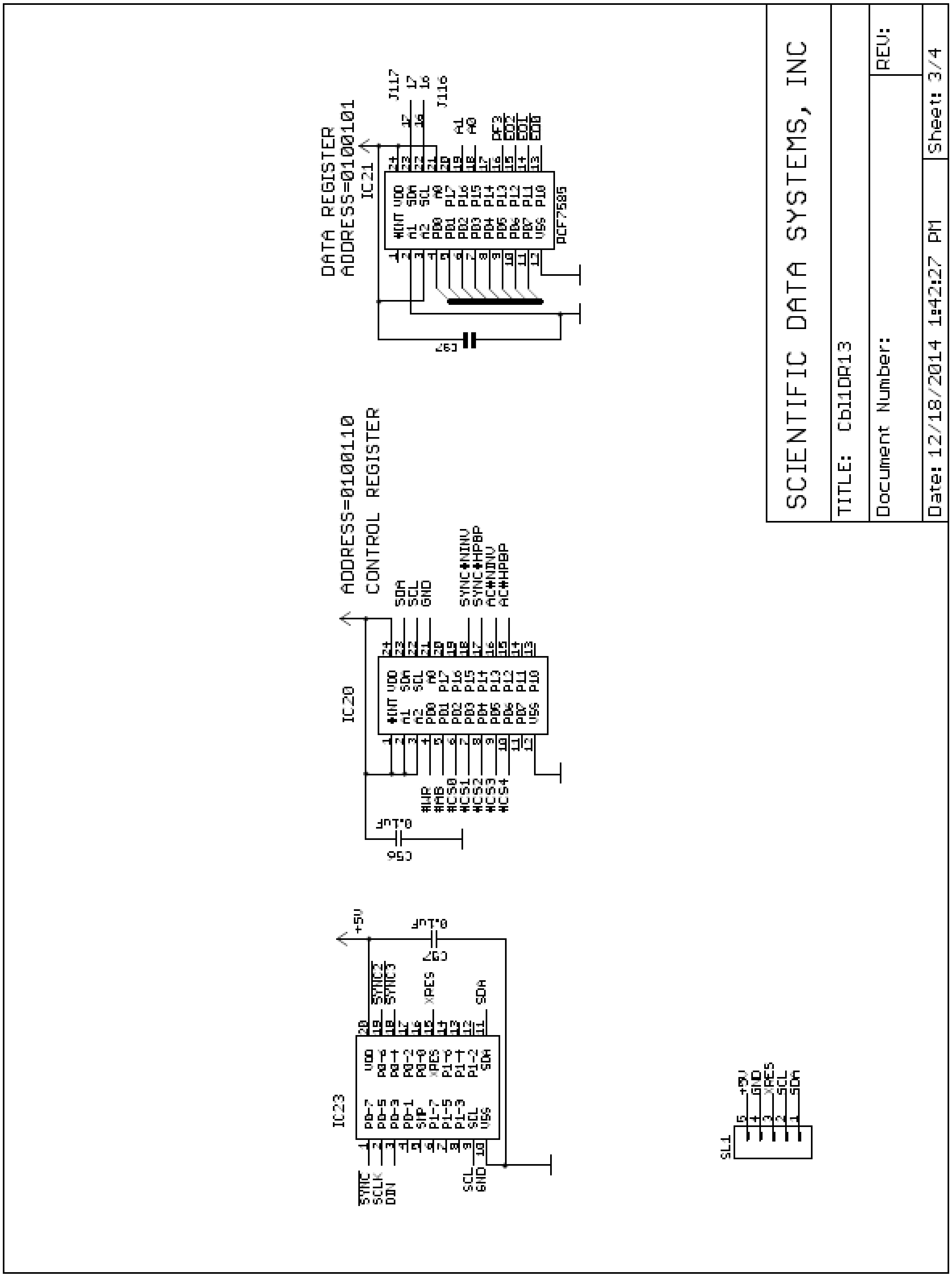

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DATA REGISTER
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IC21
PCF7585
ADDRESS=0100110
CONTROL REGISTER
IC20
IC23
SL1
+5V
GND
XRES
SCL
SDA

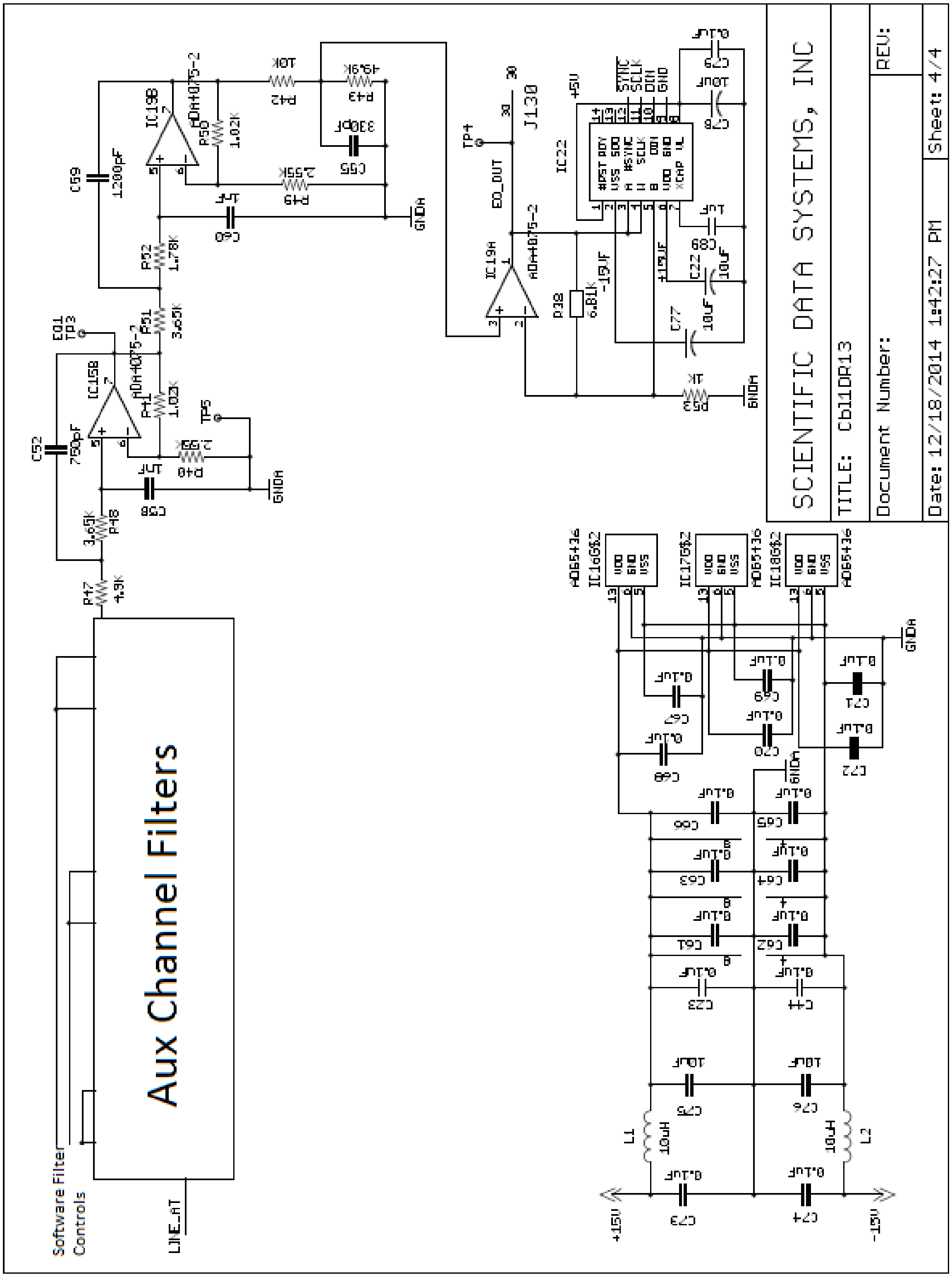


Fig 9ii.2 Schematic CBL1 R13

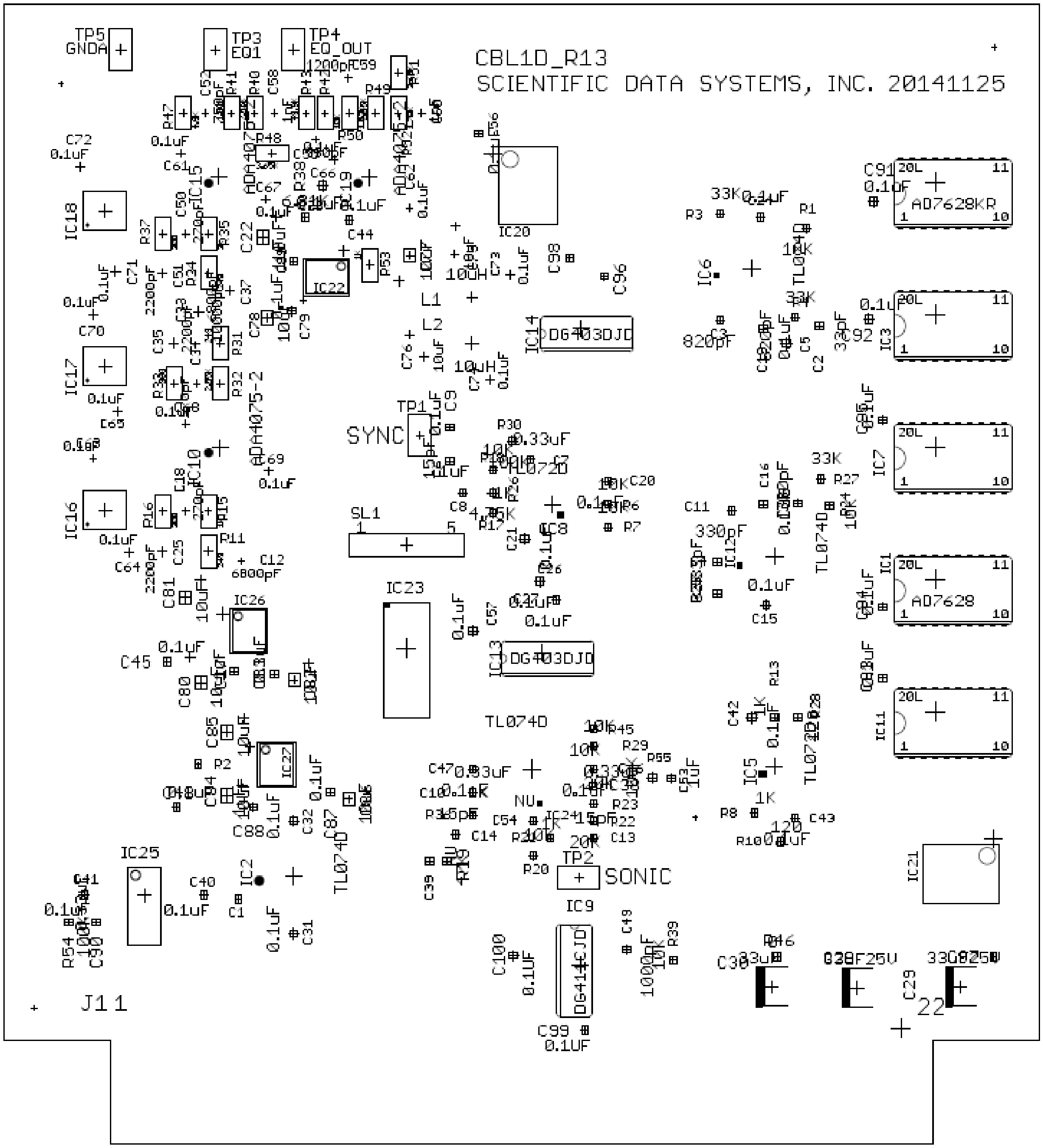


Fig 9ii.3 CBL1 R13 board layout

Section

10

10 CBL2 Board

The CBL02 board provides detection of positive and negative sync pulses.
The CBL02 card receives several inputs and performs the functions of sync pulse detection. It receives acoustic signal inputs from the CBL01DR card and analog and digital control signals from the DSP. The card outputs are positive and negative sync detection signals.

10.1 Circuit Description

10.1.1 Sync. Pulse Detection

The signal from J1-12 of the CBL01 card connects to J1-3 of the CBL02 card and goes to the positive input of buffer U2D and the negative input of U2A. U2D supplies comparator U1B to process positive sync signals, and U2A supplies U1A for negative sync signals. The trigger level(s) of the comparator(s) are controlled by the DSP DAC0 signal that is connected to J1-38. This control signal is applied to the inverting input of U2C and then to the inverting inputs of U1A and U1B. In this way any signal appearing on J1-3 larger in amplitude than DAC0 (either positive or negative) will result in an output pulse at either U1A and/or U1B.
A potential sync pulse, having been detected in this manner, is then digitized and tested by the DSP for further verification. The actual level of the DAC0 signal is controlled by the DSP script (program) and may be varied to accommodate a variety of down-hole tools.

The outputs of U1A and U1B go to IC1A and IC1B, 7400 nand gate. The other inputs to the NAND gates are control signals from the DSP that inhibit the interrupts to avoid false sync signals. NEG SYNC and POS SYNC signals are connected to the SDSDSP board by CC10-37(J1-37) and CC10-35(J1-35).

10.2 Trouble Shooting Hints

10.2.1 Sync. Pulse Detection

The normal signal may be viewed on TP3 and the output of the comparators at test points TP1 and TP2. Comparison of these signals will indicate the correct (or otherwise) operation of the sync-pulse detection circuits.

The DSP DAC signal controlling the detection level may be viewed at pin 38 of the card edge connector.

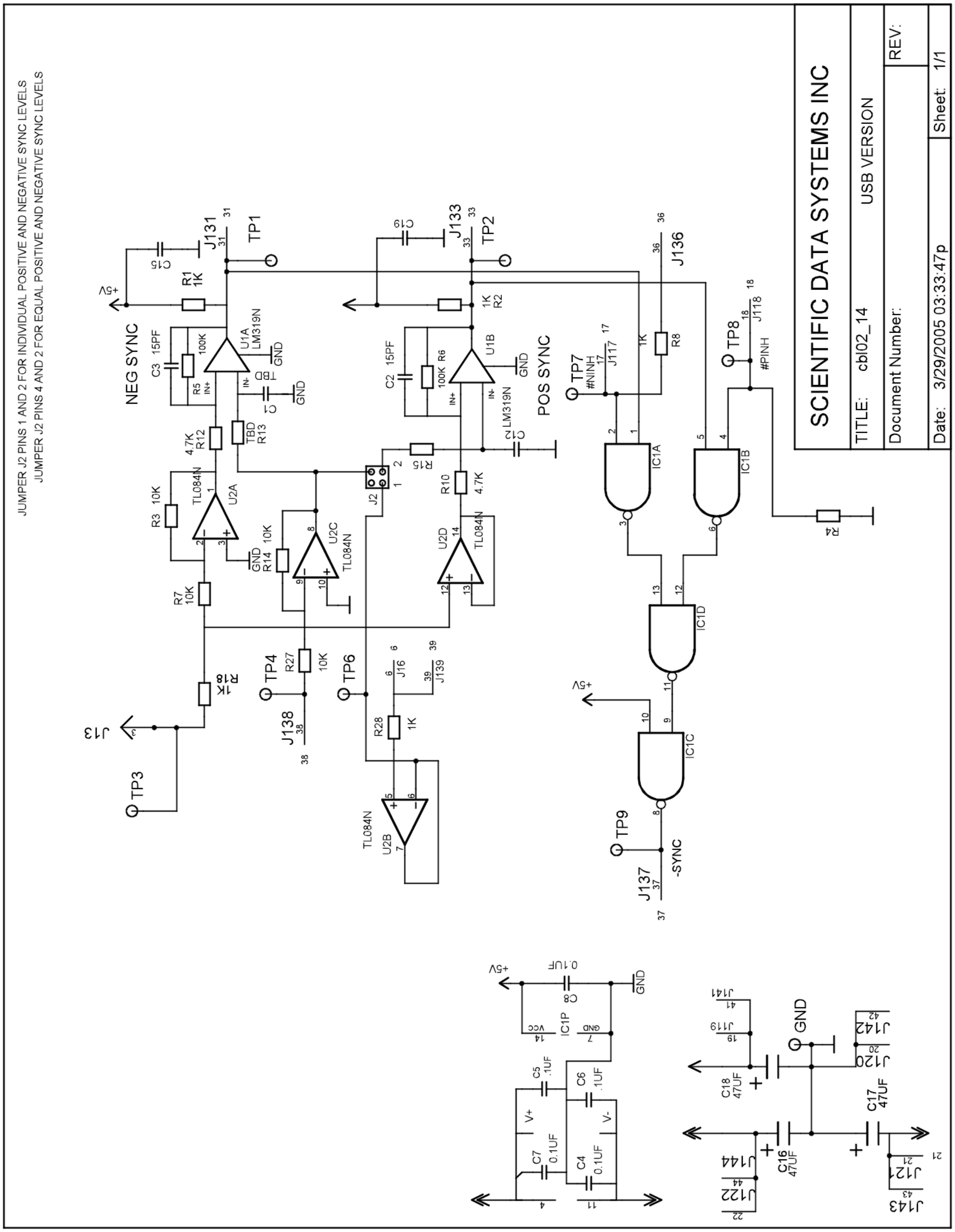


Fig 10.1 Schematic CBL2 R14

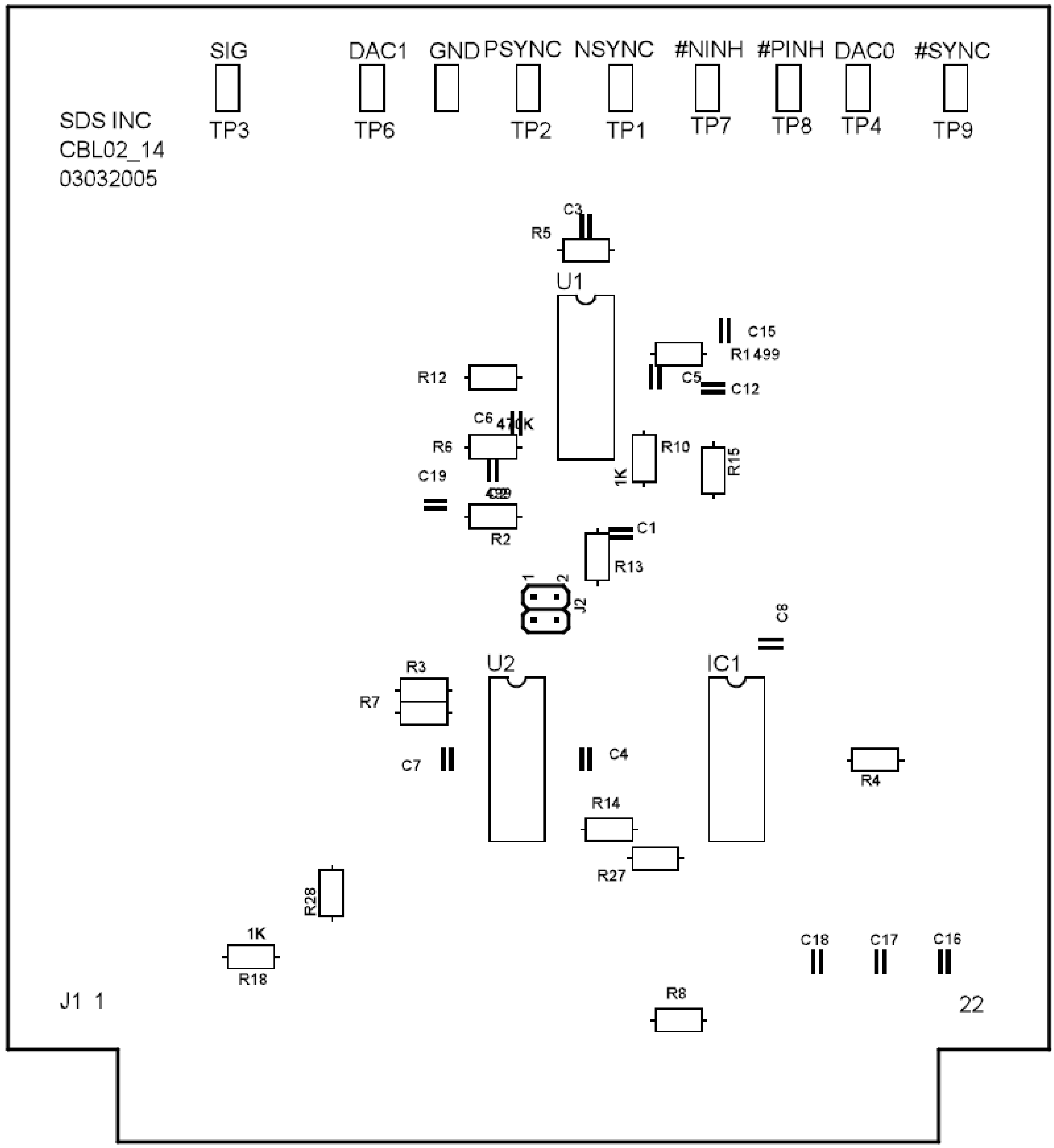


Fig 10.2 CBL2 R14 board layout

Section

11

11 Audio Board

The board consists of a high pass filter with 3db point around 100 Hz followed by a low pass filter with 3 dB point around 20 KHz The noise board has four outputs. Maximum signal input to the DSP is ±2.5 volt DC. With a board input of 20 volt p-p, the range1 output is 5 volt p-p, with gain of 0.25. Range2 is set with a 2 volt p-p input with gain of 2.5. Range3 is 200 mv with gain of 25 and range4 is 20 mv with gain of 250. The software finds the largest signal that is not saturated and uses a Fourier transform to extract the signals in each frequency range.

11.1 Circuit Description

U8 and U9 are voltage regulators that are used to supply the signal amplifiers. They are used to remove any noise that might be on the panel rail supplies so that the noise does not appear on the outputs of the high gain amplifiers.

The signal enters the board at J1-5 from the ANASW board. It first passes through a 100 Hz to 20 KHz band pass filter comprised of U1A and U1B. U2 and U6A provide the Range1 output with a gain of .25. U3 and U6B provide the Range2 output with a gain of 2.5. In addition U3 has an offset adjustment to eliminate a signal offset in the following stages. The output of U6B is also feed into U4 and U7A. This stage has a gain of 10, so that the effective output of Range3 is a gain of 25. The output of U7A is also feed into U5 and U7B. This stage also has a gain of 10, so that the effective output of Range4 is a gain of 250.

U10 and U11 are normally not installed. If the DG403 analog switches are installed in these positions, signals can be brought onto the board on J1-28 through J1-31 and DSP input channels normally used for noise can be used to process these other signals. Selection of signals would be made from software control on J1-25.

11.2 Board Configuration

Make Sure R5 & R8 are 20K ohm resistors

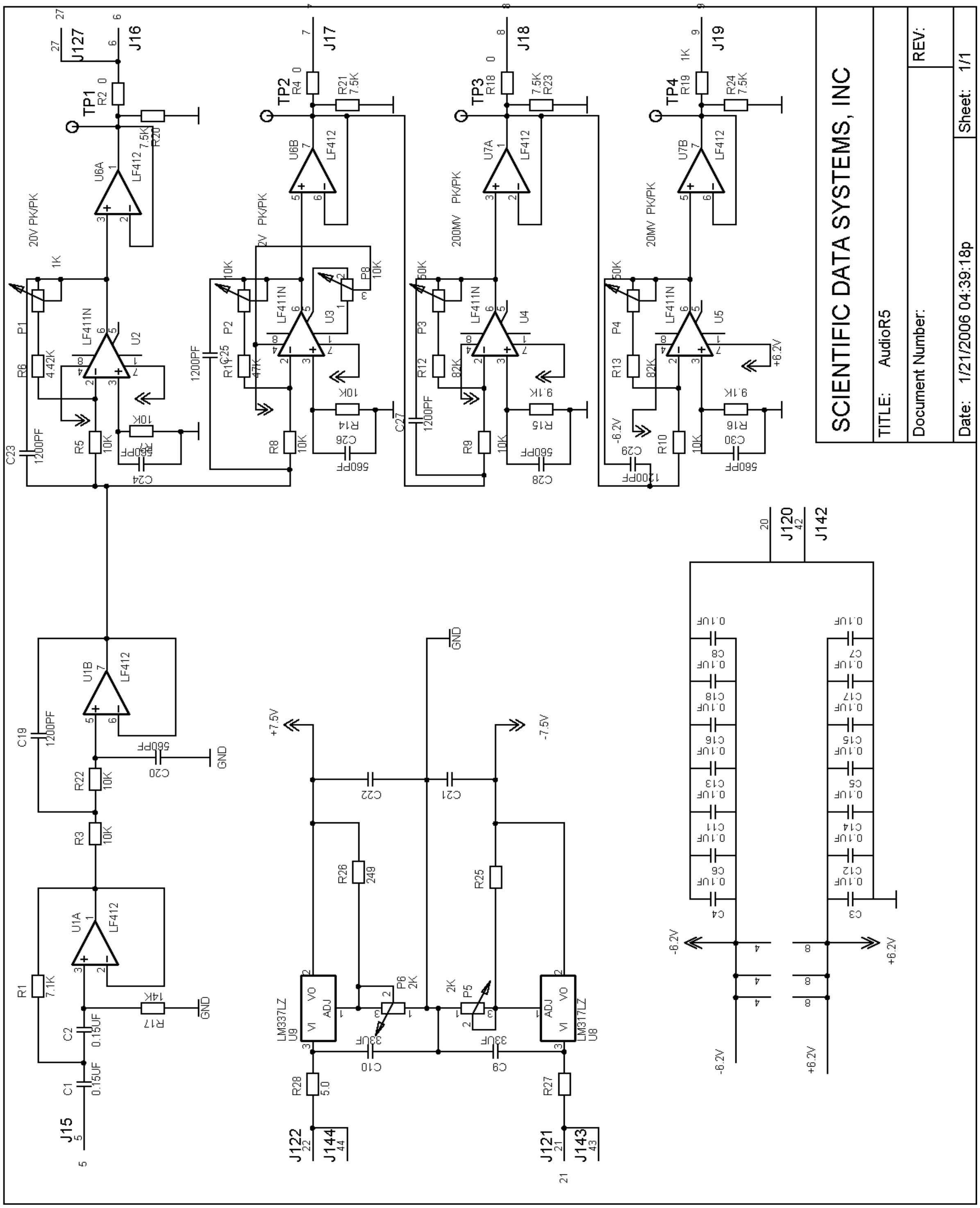


Fig 11.1 Schematic Audio R5

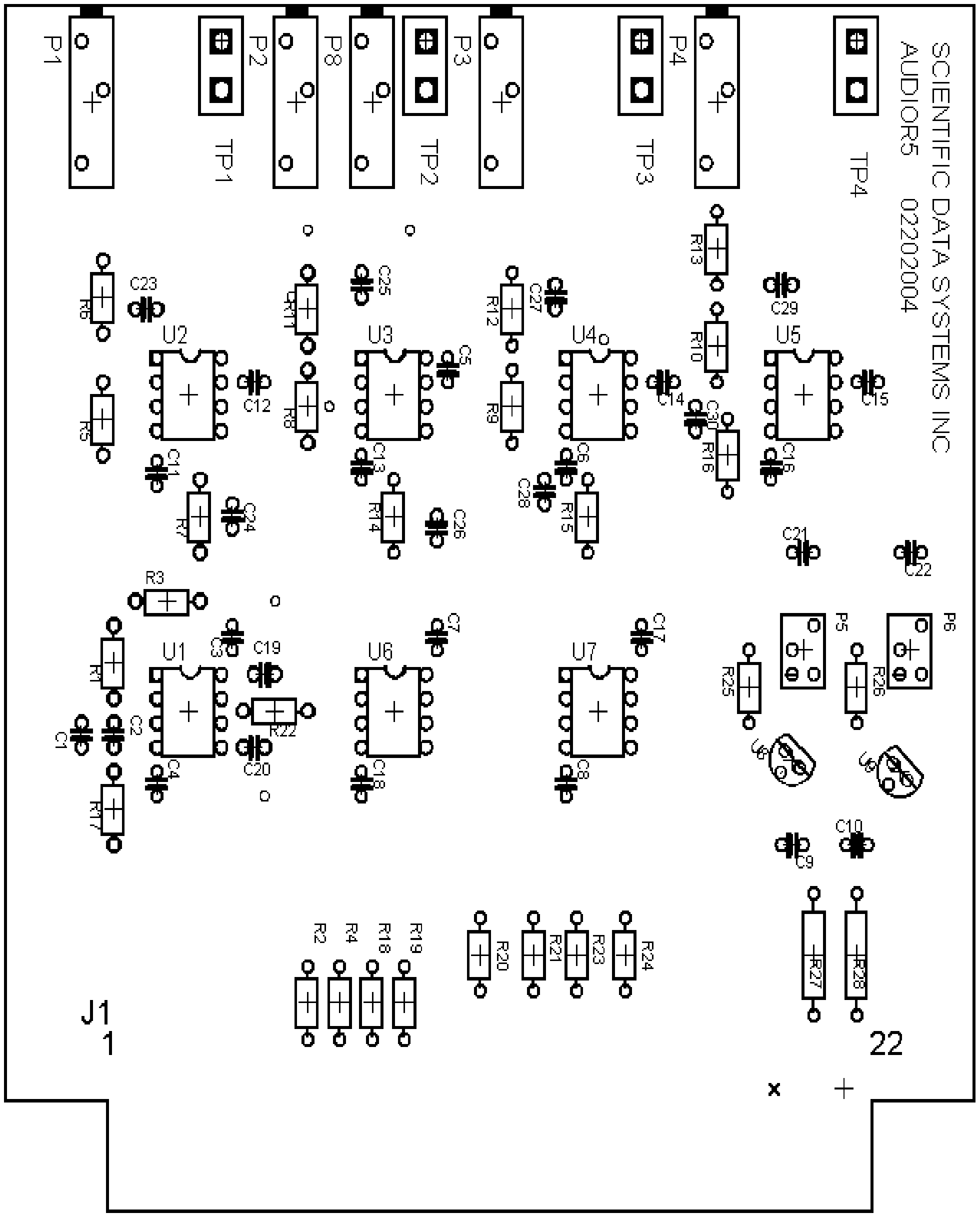


Fig 11.2 Audio Board R5 board layout

Section

12

12 MTT Board

12.1 circuit Description

The MMT signal enters the board at J13-3, P1 sets the gain of U1A and U1B a low pass amplifier so that when the MTTair signal is applied there is 3.5 volts peak to peak signal present at TP2. U1C in combination with D1 provide DC conversion. U2A buffers this DC voltage before it is summed with the reference voltage from U3. U4A and U4B provide a low pass filter for the DC level before it is summed with the output of the pot P3. When the MTTair signal is applied P3 is adjusted for zero volts out of U4C. When the MTT55 test signal is applied gain pot P2 is adjusted for 1.85 volts output.

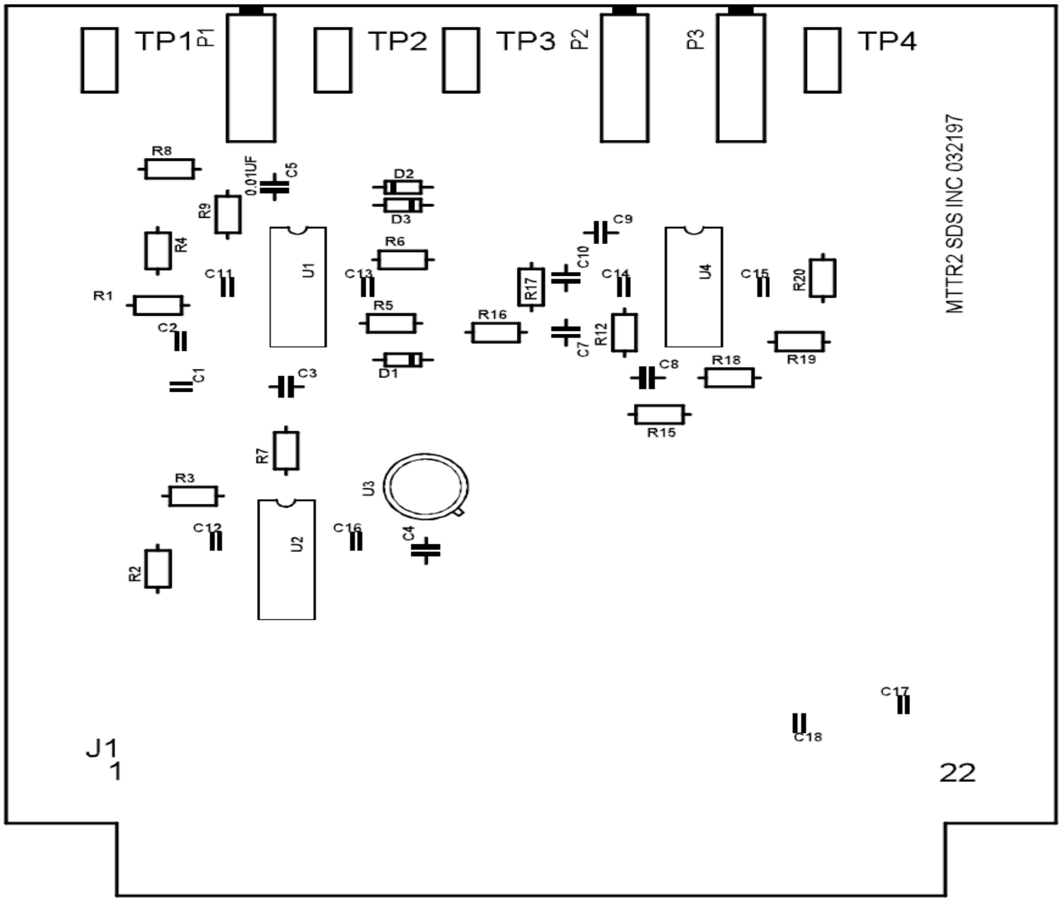


Fig 12.1 MTT R2 board layout

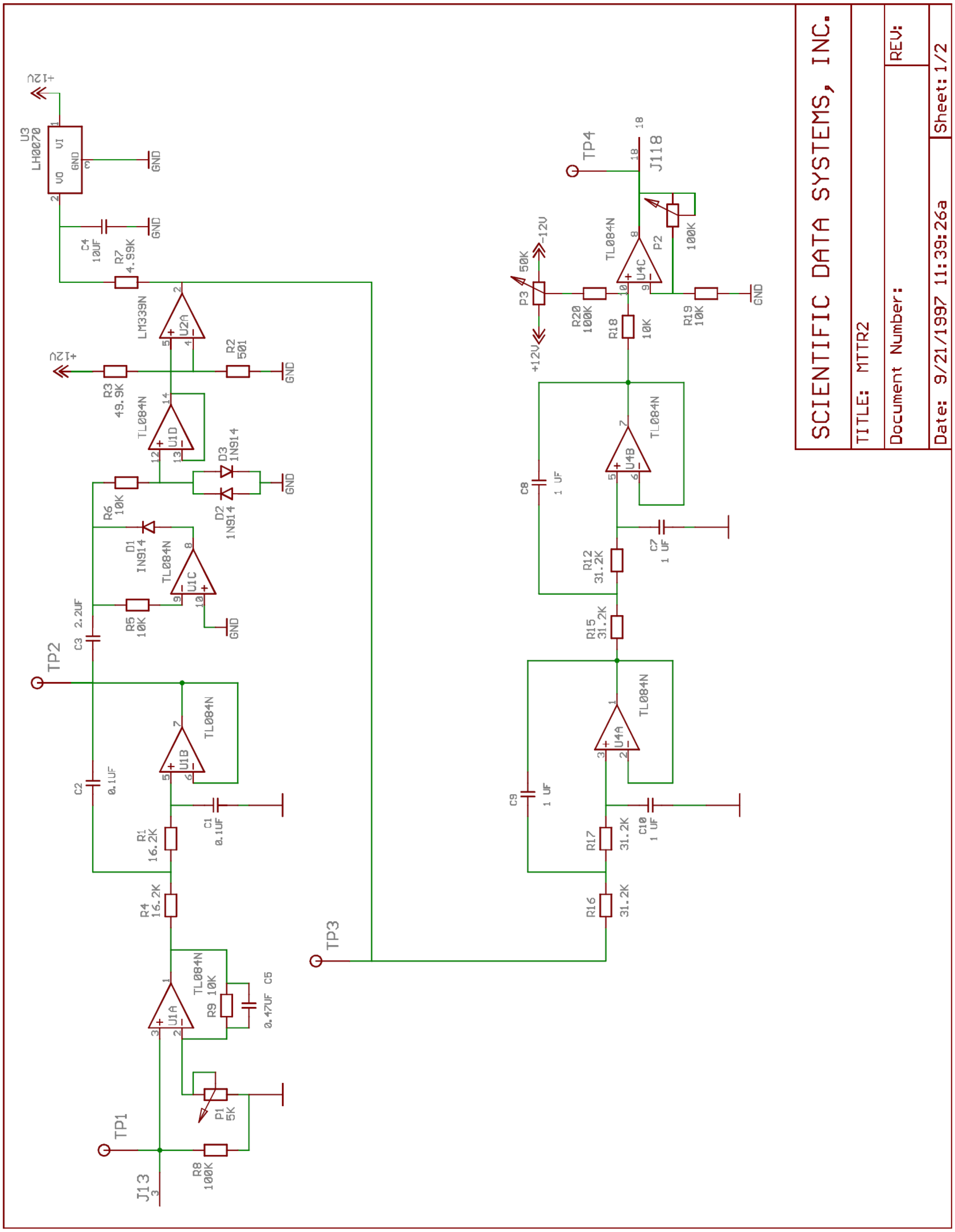
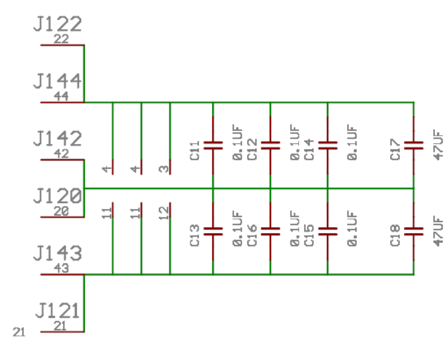


Fig 12.2 Schematic MTT R2



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Document Number:

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Date: 9/21/1997 11:39:26a

Sheet: 2/2

Section

13

13 USB44 Board

13.1 Circuit Description

The USB44 board contains a 16 channel ADC, two three channel counters, and the depth and tension processing circuitry. When the computer is plugged into the USB port the Warrior software will recognize the board and download a program into the USB controller. The controller will continuously monitor these devices and send the information to the PC. The data may be viewed in the MONITOR DEVICES – DAMUPCI window.

13.1.1 Analog Channels

The ADC U3 is a, "AD976AR" it is a 16 bit, 5 usec device. The signals to be digitized come from IC2, HI506, analog multiplexer, which allows processing of 16 channels. Three channels are dedicated to line tension, tool voltage and tool current. The rest are available for customer tool signals. The digitized signals are sent to the PC by the USB controller, IC11. There are two three channel counters, U6, and U7. The Line speed and a 1MHZ clock are processed by IC6. There are three channels are available for pulse tools.

13.1.2 Depth Encoder Input

The depth information comes from a quadrature encoder mounted on the measuring head. Its outputs are pulses that come in on J1-10 and 11 and go to IC7, LS7084, quadrature clock converter. IC7 decodes the direction of cable movement which goes to IC1 as DIR and sends pulses, PPR, to the counter, U6, pin 18, to monitor line speed.

13.1.3 Line Tension Input

The tension signal may be a 4-20 ma current loop, R14, 24.9 ohms installed, or a strain gauge, with C36 - 2uf installed. The signal is amplified by U5 and digitized by U3 channel 6. The USB controller, IC1, sends the depth, line speed, direction and tension information to the PC.

Pull-up resistors, R16 and R17, are provided for encoders with open collector outputs. J2, J6 and J7 are used to select 5 or 12 volt encoder operation. K1 supplies 12 volts to regulator U1.

When the SDS Depth and Line Tension Panel are present the line tension signal, line speed and direction information is generated by this panel and routed to the PC directly on the USB bus.

13.1.4 USB Operation

IC1, the USB controller, is connected to the USBHUB through J1-14 and 15. IC5 contains the identity code for the board so that the Warrior software can identify it and download the proper software into the memory on IC1. The controller is constantly monitoring the counters and the ADC channels. The one MHZ is used as a time base to scale the counts. The controller communicates with the serial DAC's on Analog Switch Board over the I2C serial bus to J1-16 and 17. IC6 is a regulator for the 3.3 volts needed by IC1. IC11 decodes the address for the serial Mux, IC2 selecting the channel to be read by the ADC, U3.

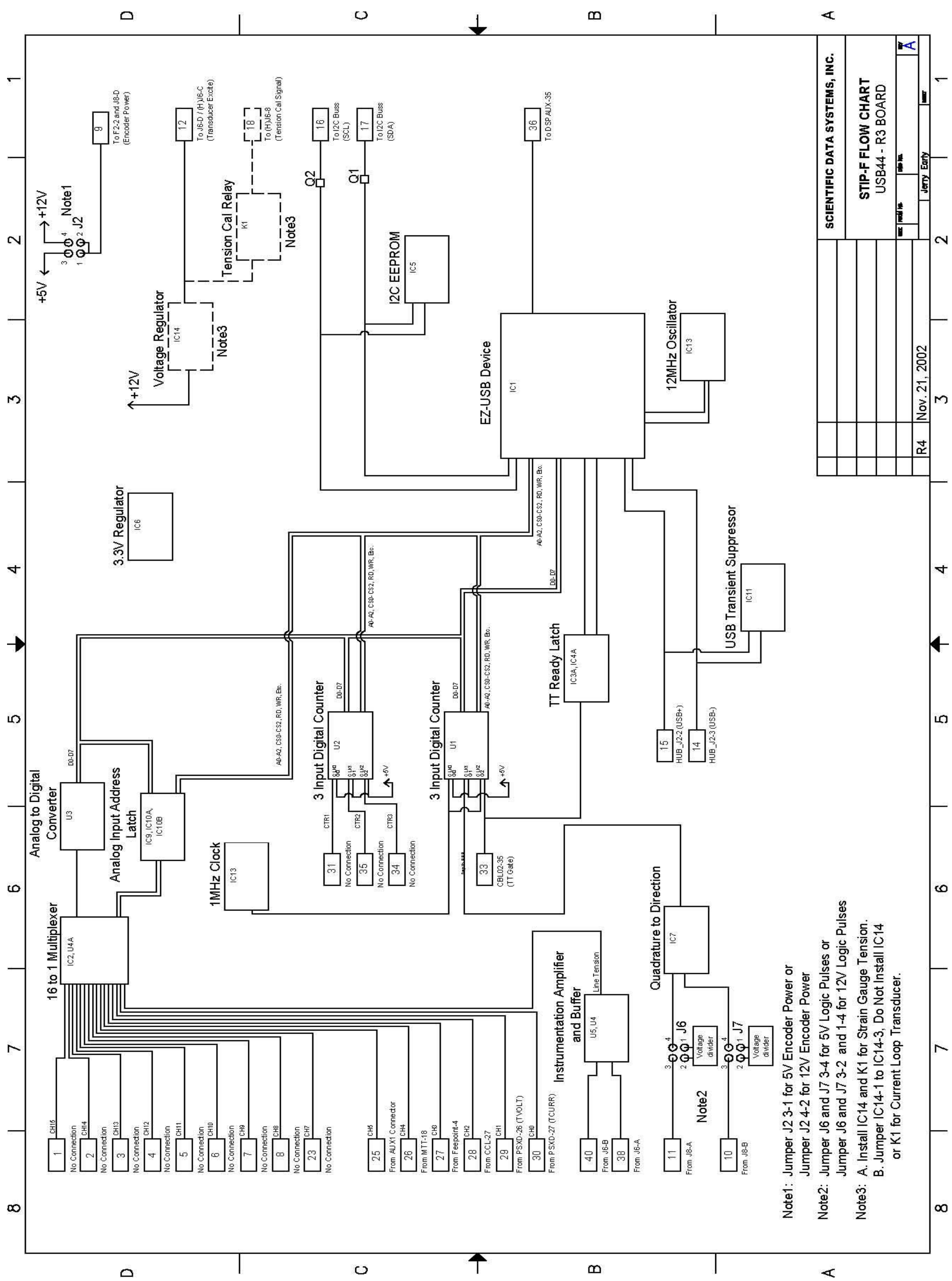


Fig 13.1 Block diagram USB44 Board

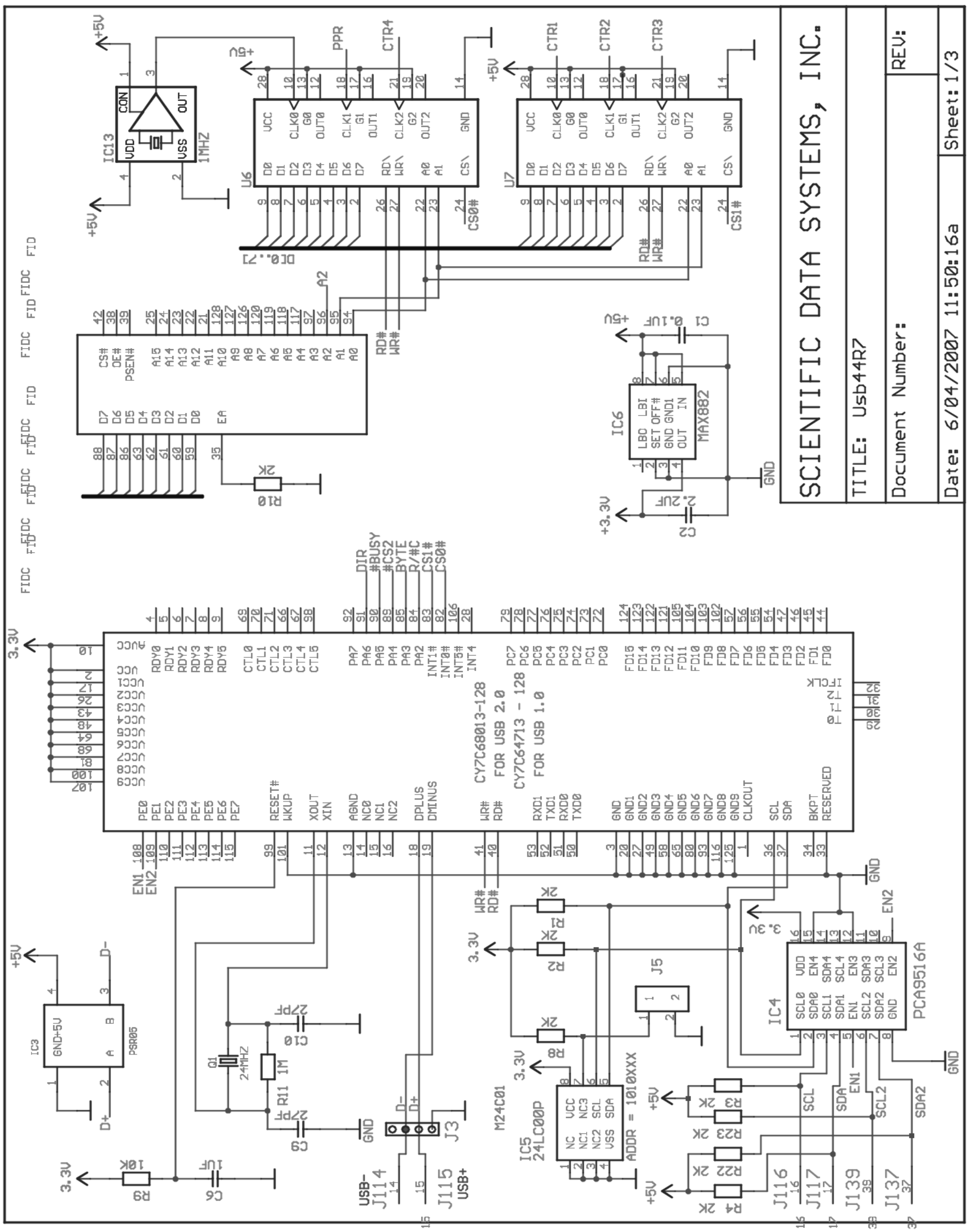
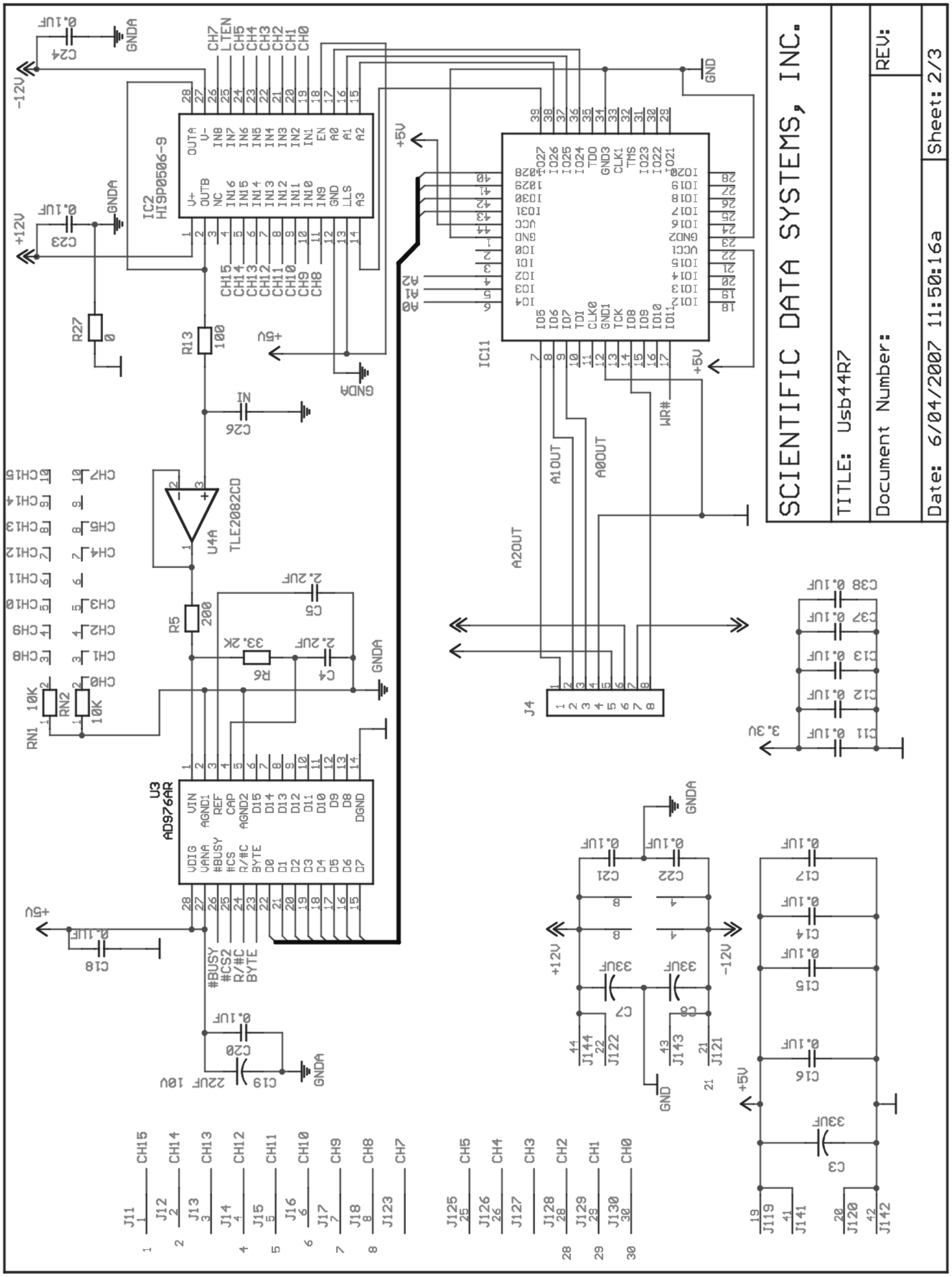


Fig 13.2 Schematic USB44 R7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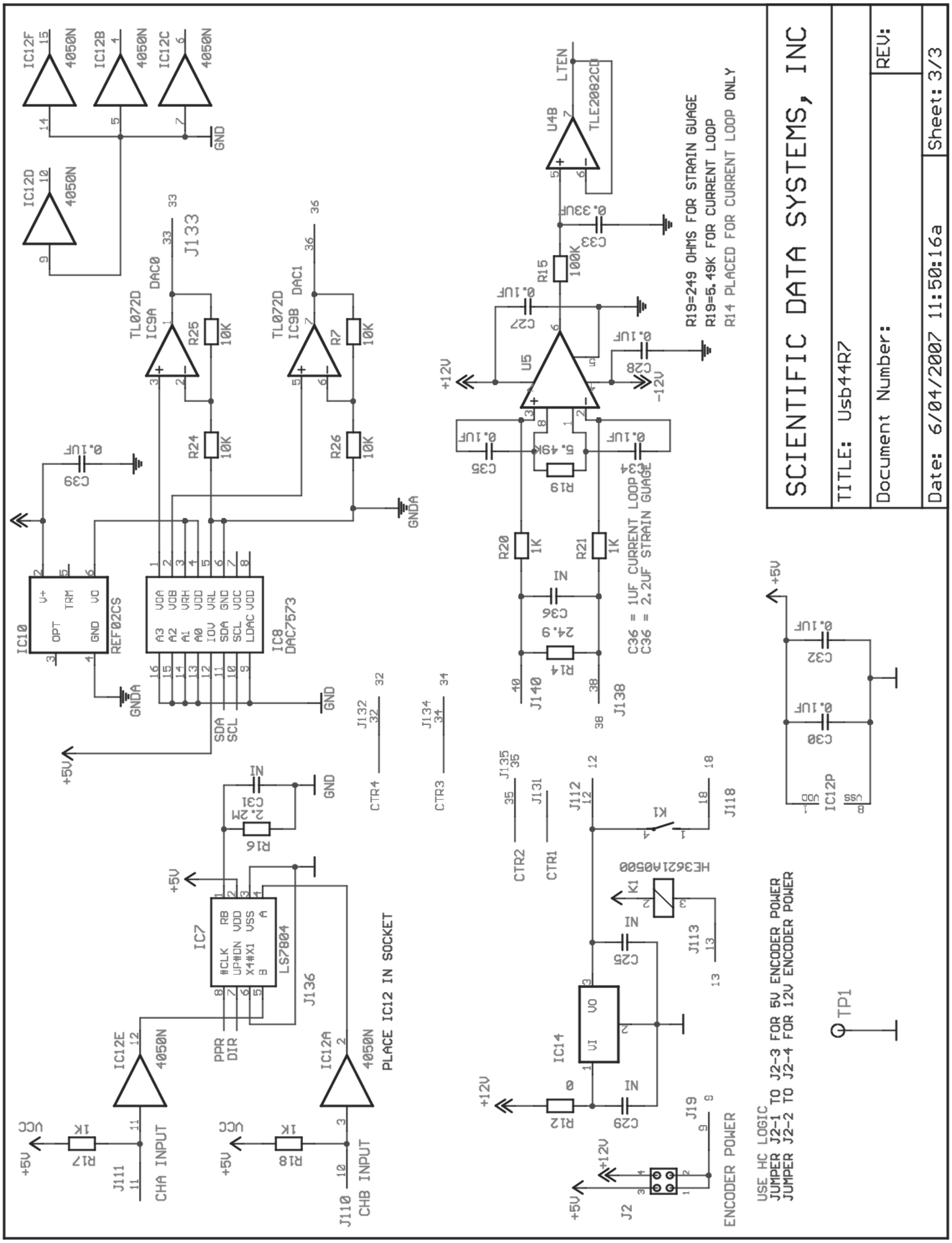
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Document Number:
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Date: 6/04/2007 11:50:16a
Sheet: 3/3
R19=249 OHMS FOR STRAIN GUAGE
R19=5.49K FOR CURRENT LOOP
R14 PLACED FOR CURRENT LOOP ONLY
C36 = 1UF CURRENT LOOP
C36 = 2.2UF STRAIN GUAGE
PLACE IC12 IN SOCKET
CHA INPUT
CHB INPUT
ENCODER POWER
USE HC LOGIC
JUMPER J2-1 TO J2-3 FOR 5V ENCODER POWER
JUMPER J2-2 TO J2-4 FOR 12V ENCODER POWER

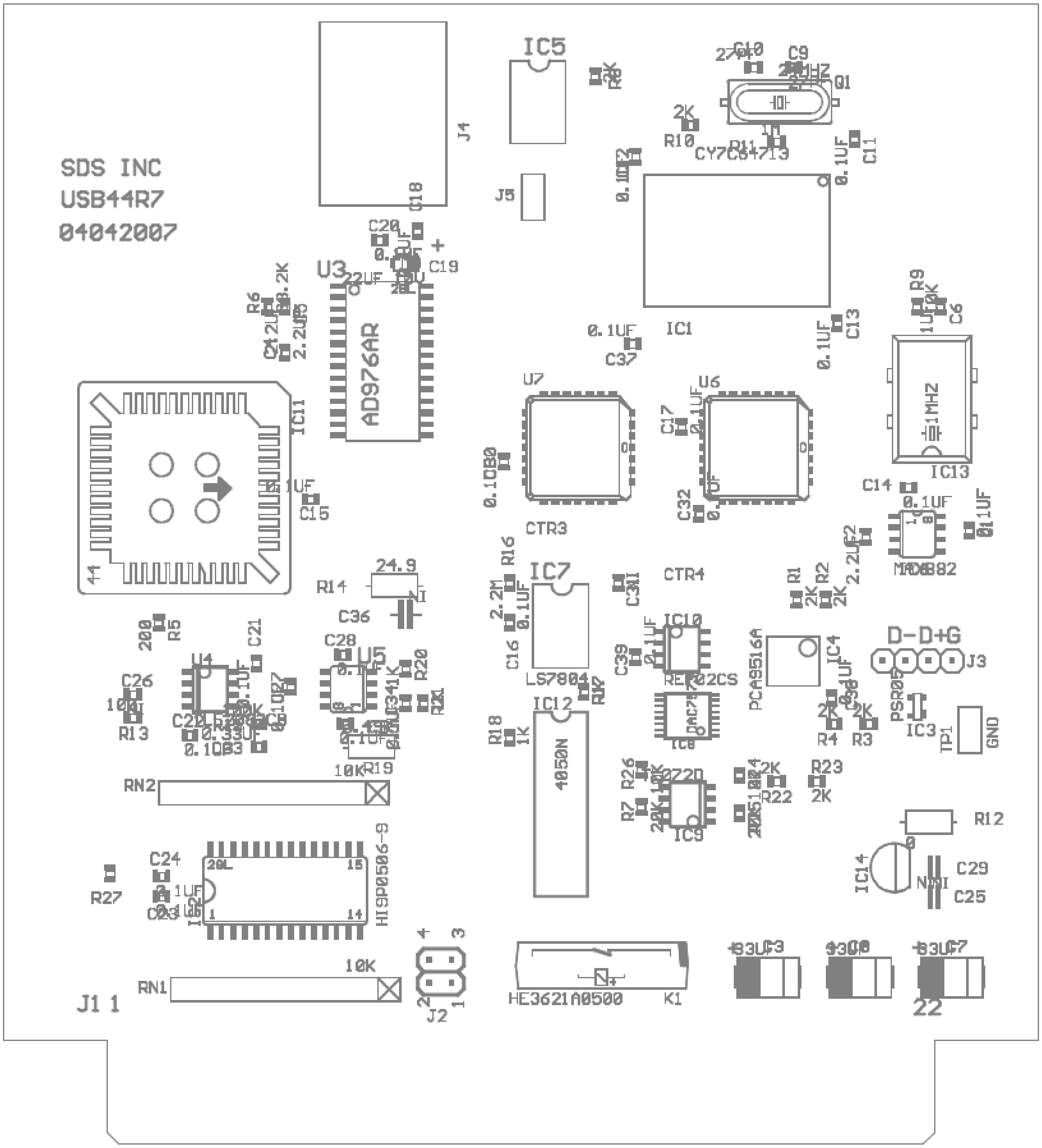


Fig 13.3 USB44 R7 board layout

Section

14

14 DSPAUX Board

14.1 DSPAUX R4

This board contains the signal processing hardware for the DSP. Acoustic signals are digitized and sent to the DSP board where they go to the host computer via the USB port. The ADC is a 12 bit, 1.25 mega samples per second device which allows a maximum sample rate of about one sample per microsecond.

Analog signals, IN1 to IN16, come in on the bottom edge connector, J1, and are routed to IC5, HI516, analog multiplexer, which selects one channel for the DAC IC2, MX7847JN and then on to the ADC IC1, LT1410. The DAC provides variable gain for the ADC. The other DAC channel and both channels from DAC IC3 go out J1 to control gains and filtering on other boards.

The DSP communicates with the ADC through IC9, M4A5-64/32 – FPGA, which contains logic to send #CONVST to start a conversion when #BUSY goes high indicating the ADC is ready. The digitized word is put on the data bus, D (0-11), and goes to FIFOs, IC13 and IC14, 64K x 9, where it is converted to a 16 bit word. The data goes to the DSP over the XD (0-15) bus from J2, 40 pin header connector which is connected to the DSP board. The DSP board passes the data to the PC over the USB bus.

The DSP communicates with the DACs over the XD bus. IC16 decodes the chip select signals for the two DACs. IC11, IC12 and IC15 allow communication via the board edge connector, J1, to other boards in the STIP. These are used control things like signal polarity and sync polarity.

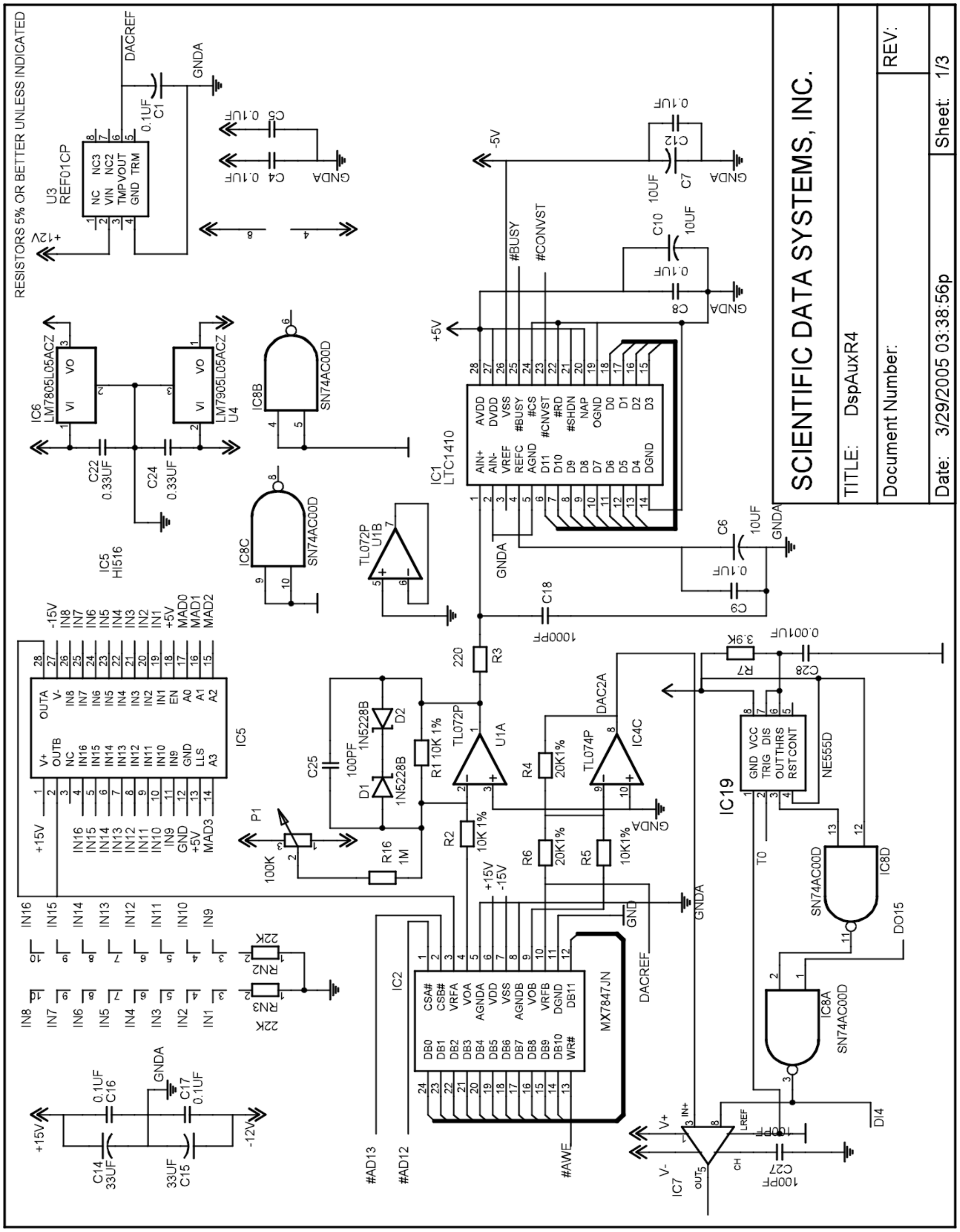
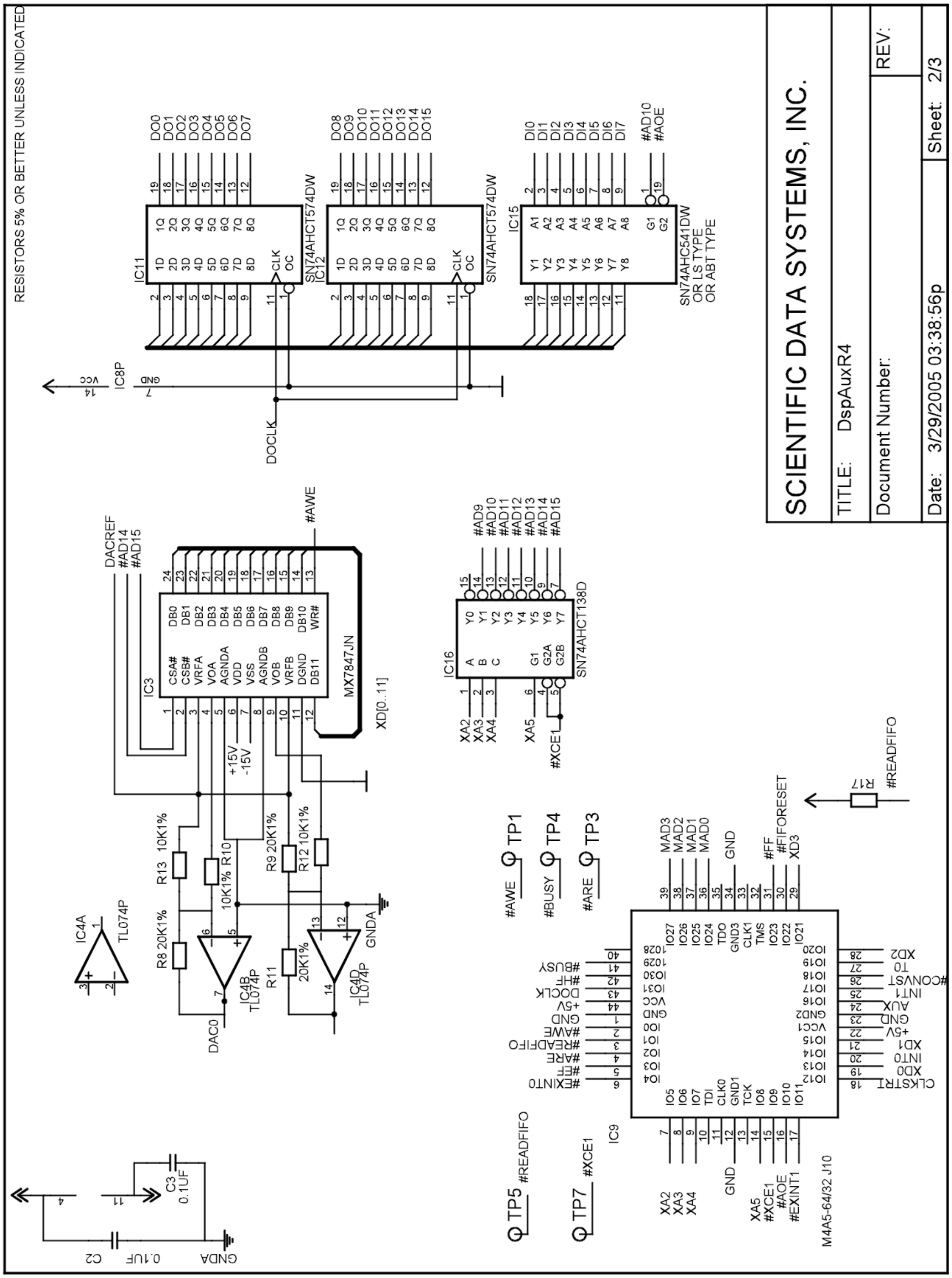


Fig 14.1 Schematic DSPAUX R4


RESISTORS 5% OR BETTER UNLESS INDICATED
SCIENTIFIC DATA SYSTEMS, INC.
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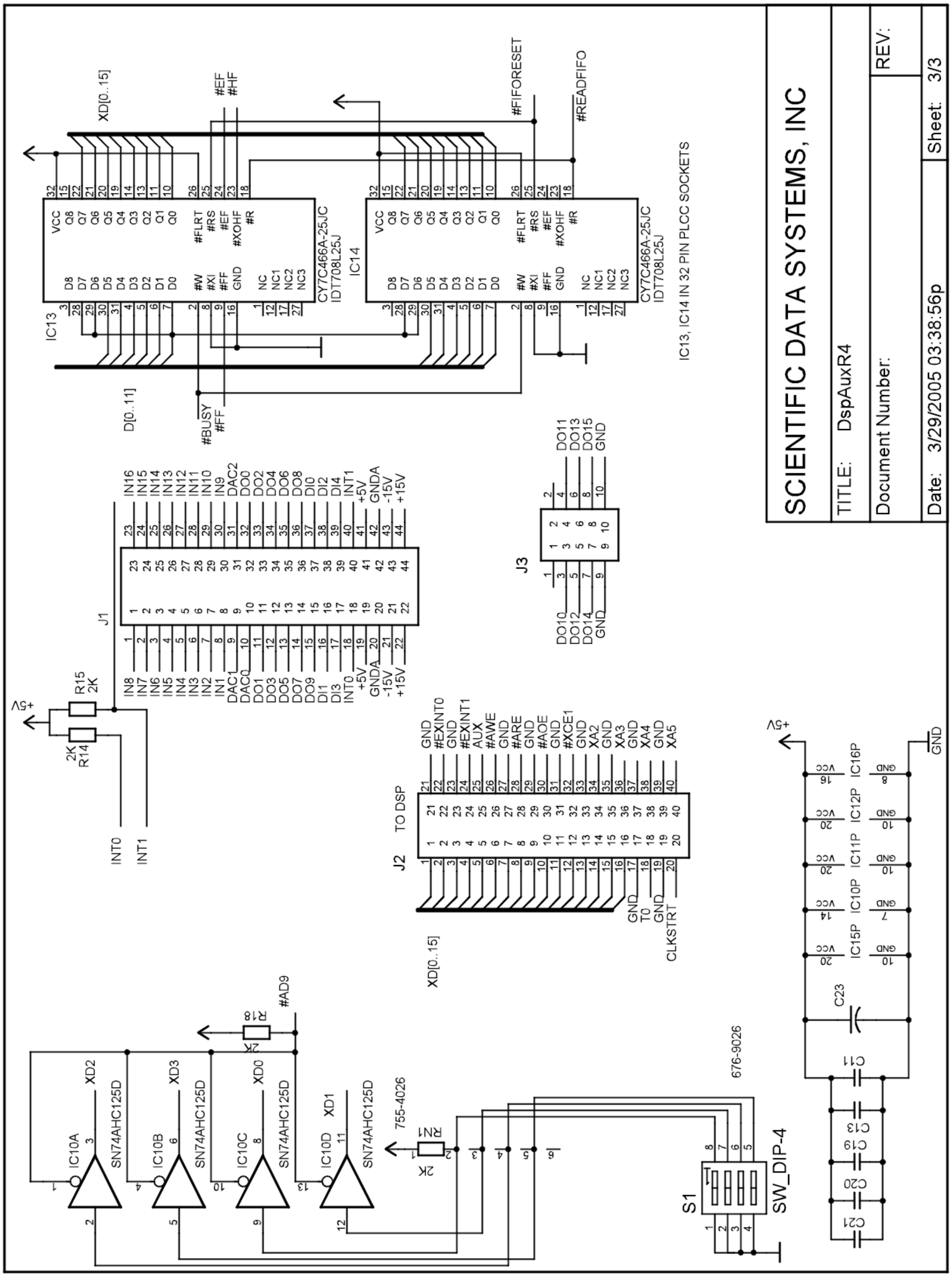
Sheet: 2/3
IC11
SN74AHCT574DW
IC12
SN74AHCT574DW
IC15
SN74AHC541DW
OR LS TYPE
OR ABT TYPE
IC3
MX7847JN
IC16
SN74AHCT138D
IC9
M4A5-64/32 J10
IC4A
TL074P
IC4B
TL074P
IC4D
TL074P
IC8P
DOCLK
DACREF
#AD14
#AD15
#AWE
XD[0..11]
DAC0
GNDA
C2
0.1UF
C3
0.1UF
TP1
TP3
TP4
TP5
TP7
#READFIFO
#XCE1
R17
#FIFORESET


SCIENTIFIC DATA SYSTEMS, INC
TITLE: DspAuxR4
Document Number:
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Date: 3/29/2005 03:38:56p
Sheet: 3/3
IC13, IC14 IN 32 PIN PLCC SOCKETS
CY7C466A-25JC
IDT708L25J
SN74AHC125D
SW_DIP-4
TO DSP

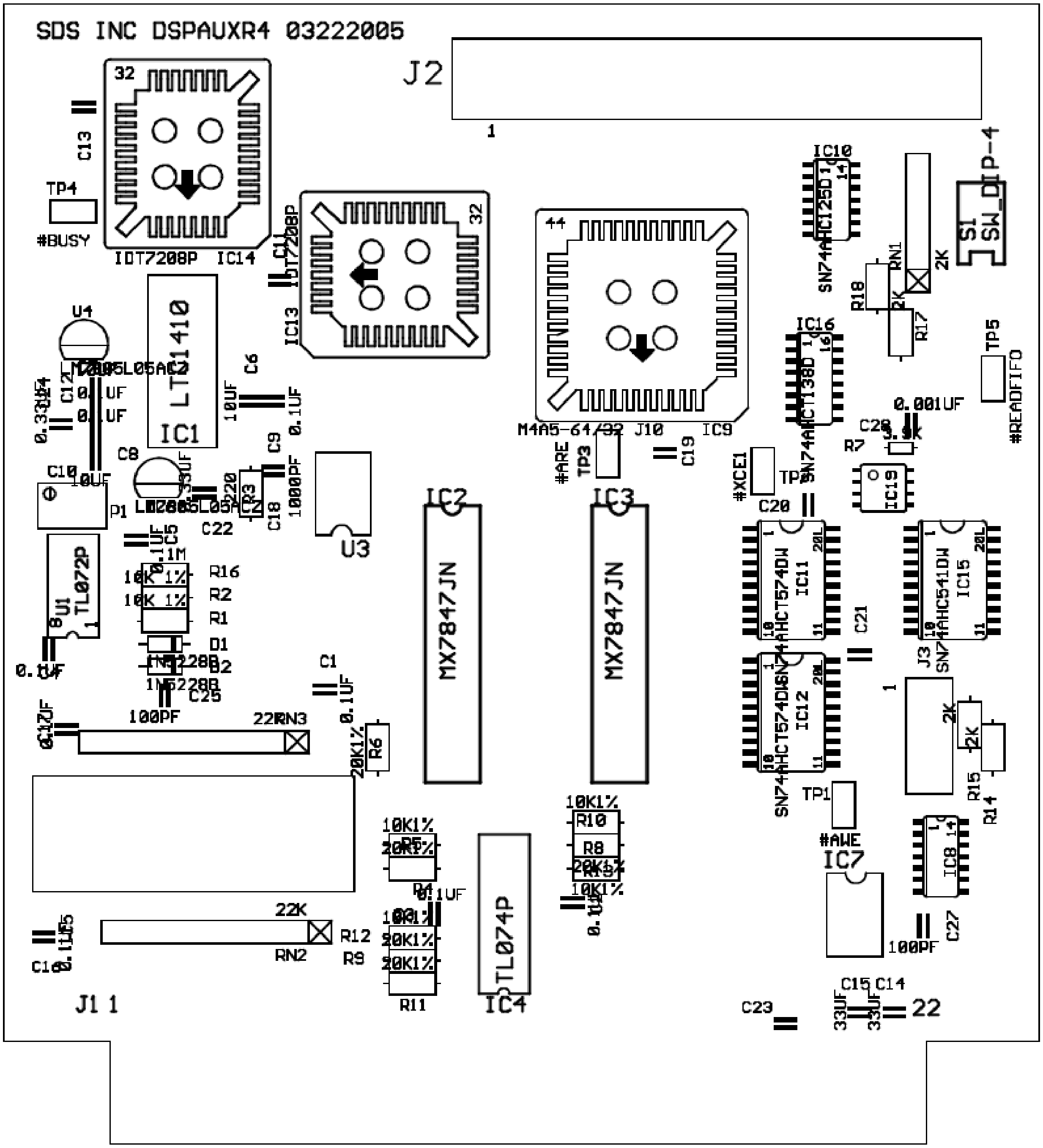


Fig 14.2 DSPAUX R4 board layout

Section

15

15 DSP Board

This card contains a TI DSP which does signal processing tasks to free up PC resources. When a service is selected software for it is downloaded to the DSP external memory over the USB bus. Signal gain and filtering are controlled from here. Pulse, CBL and Telemetry signals are processed here.

15.1 Series R3 Boards

The early boards use Tyco power supplies to derive the 3.3 volts and the 1.8 volts for the DSP. The 1.8 supply requires a resistor to set the voltage.

15.2 Series R4Boards

The DSP is a TI TMS320C6201GJC200. It is a 352 pin BGA device which is soldered to an adapter so it can be plugged into a socket on the board.
Communication with the board is handled by U15, CY7C64603, USB controller. IC9, M4A3-64/32 FPGA routes control signals to various destinations. IC7, 24LC00P, contains the address of the board so the Warrior software knows what it is and downloads the right data. Each USB device has a unique code except the hub, which is operated as a generic device because it requires no programming. IC8 is a noise suppressor for the USB bus.
U3 and U4 make up 8 MB SDRAM memory for the DSP. IC4 and IC5 make up a 32 bit data transceiver to receive data from the DSPAUX board from J6. The A to D convertors are 12 bit so data is converted to 32 bit for the DSP.

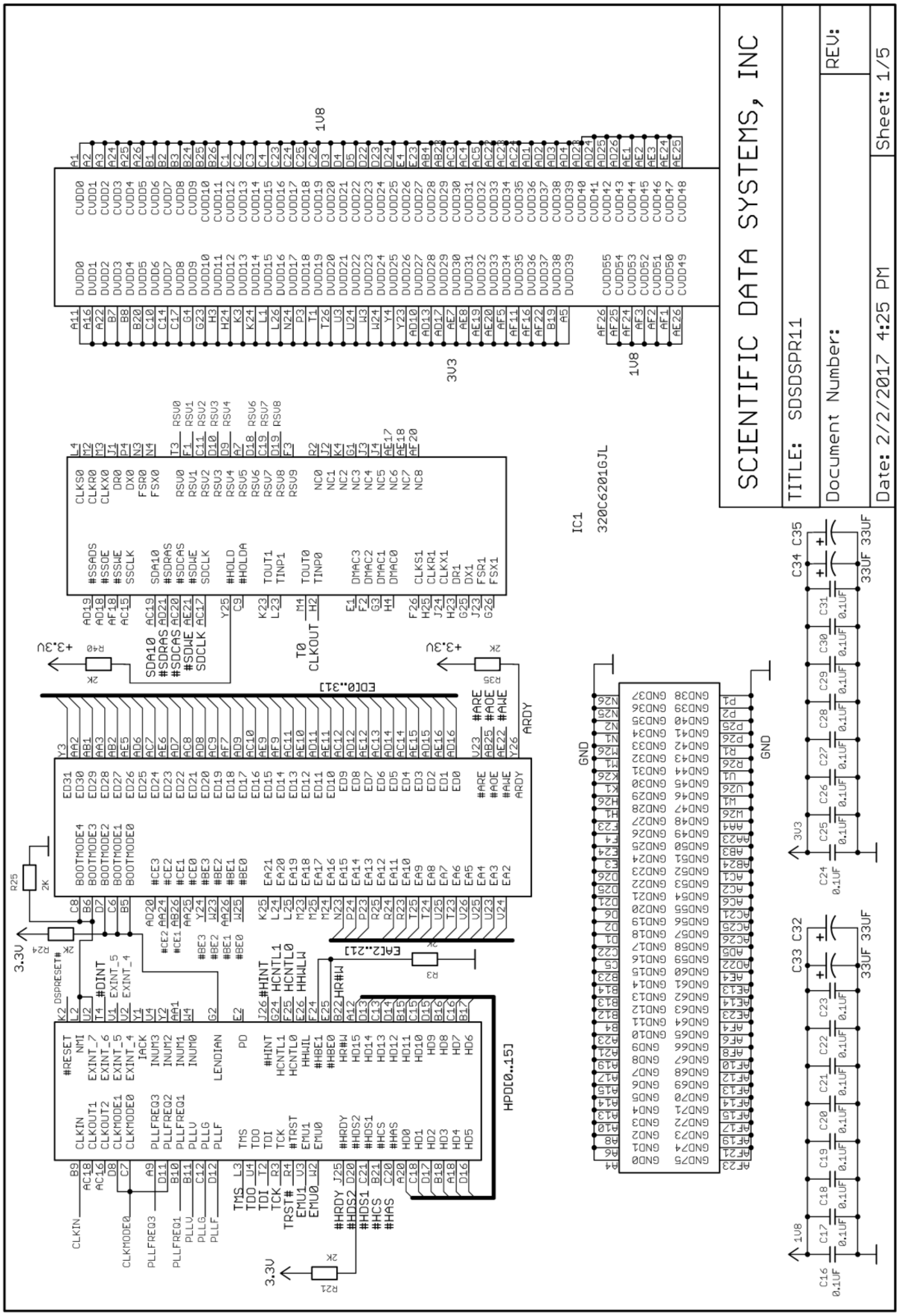
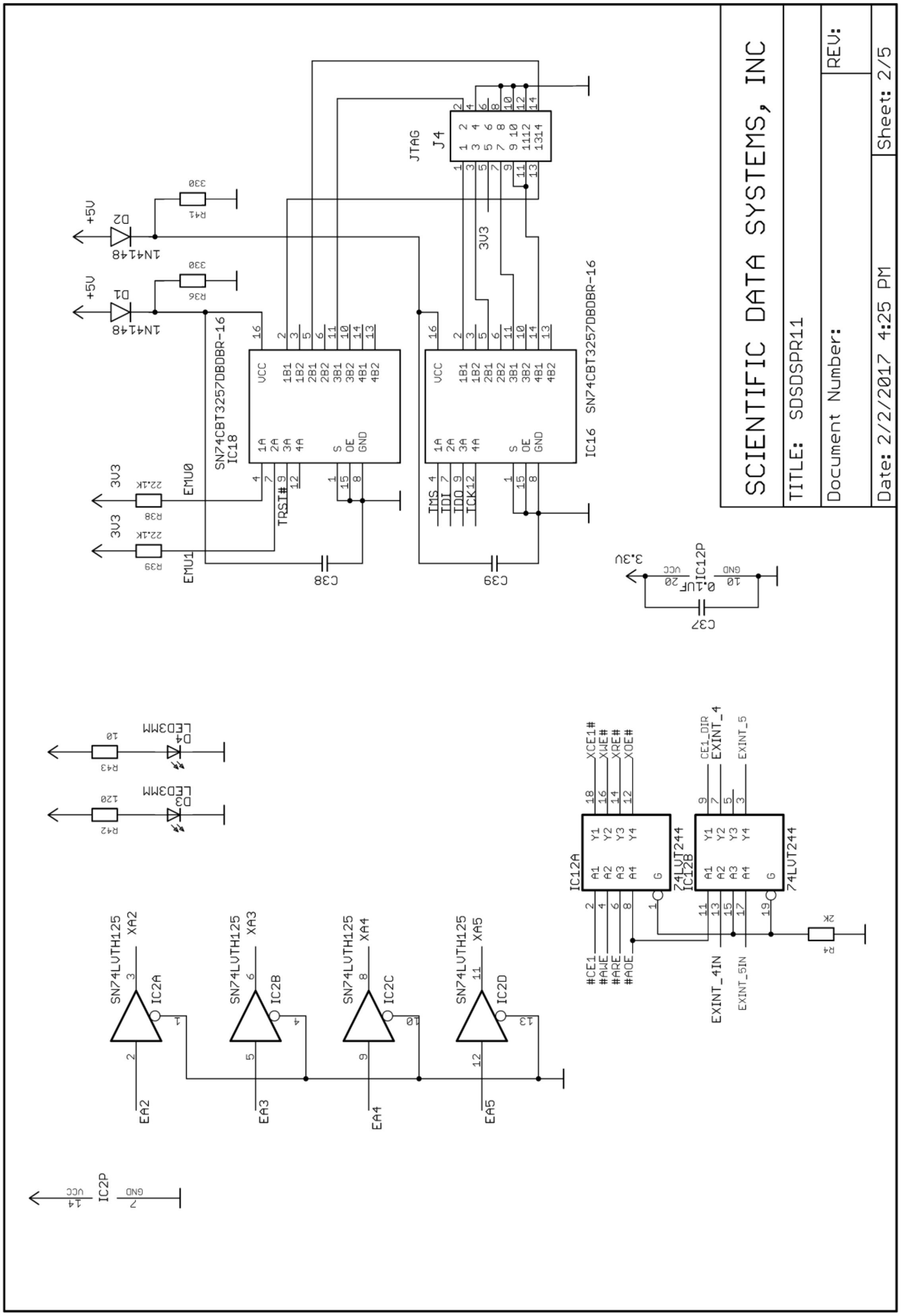


Fig 15.1 Schematic DSP R10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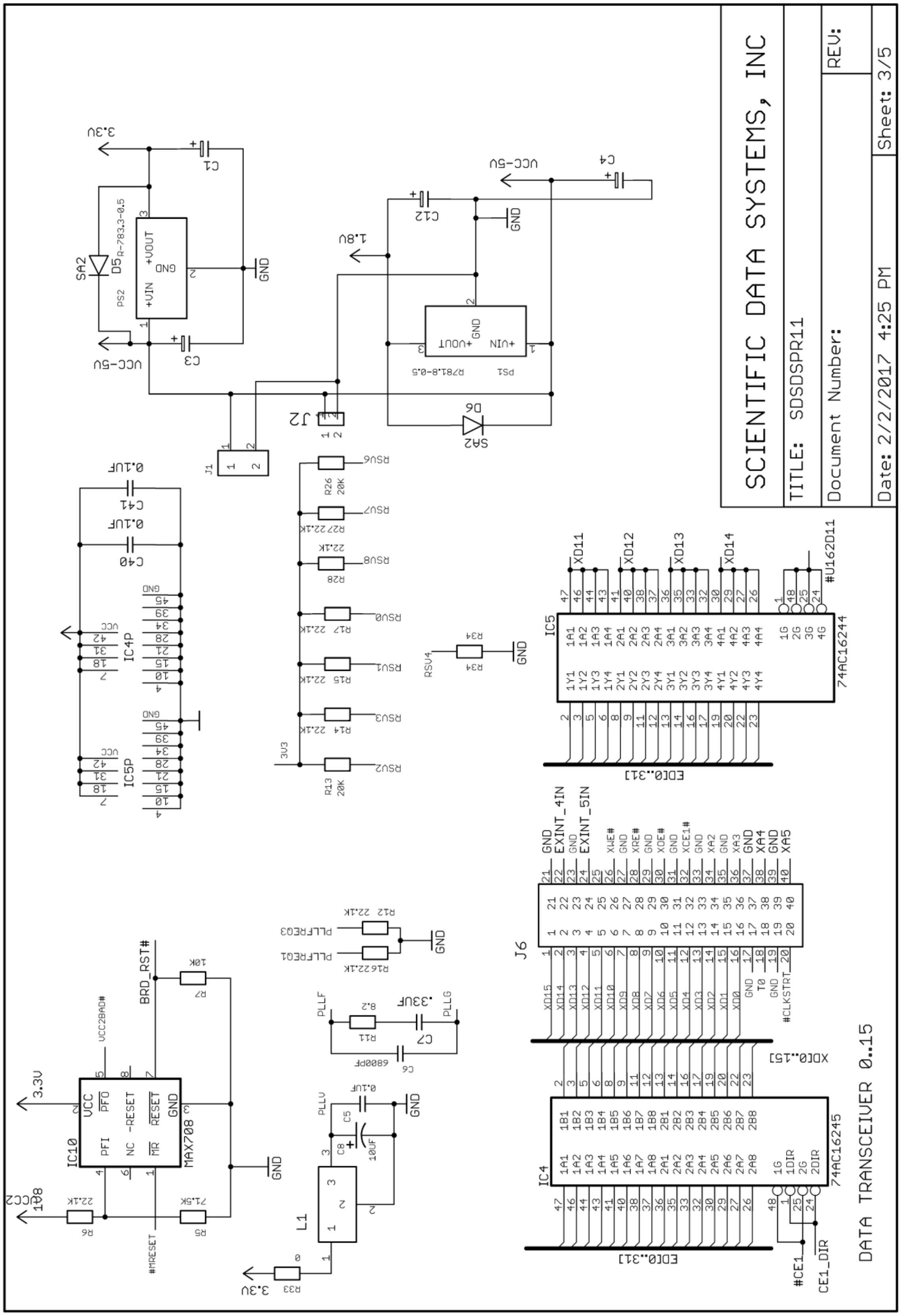
Sheet: 2/5
JTAG
J4
SN74CBT3257DBDBR-16
IC18
IC16
EMU0
EMU1
TRST#
TMS
TDI
TDO
TCK
3V3
+5V
D1
D2
1N4148
R36
R41
330
R38
R39
22.1K
C38
C39
C37
3.3V
IC12P
0.1UF
IC12A
IC12B
74LVT244
#CE1
#AWE
#ARE
#AOE
XCE1#
XWE#
XRE#
XOE#
CE1_DIR
EXINT_4
EXINT_5
EXINT_4IN
EXINT_5IN
R4
2K
SN74LVTH125
IC2A
IC2B
IC2C
IC2D
EA2
EA3
EA4
EA5
XA2
XA3
XA4
XA5
IC2P
D3
D4
LED3MM
R42
R43
120
10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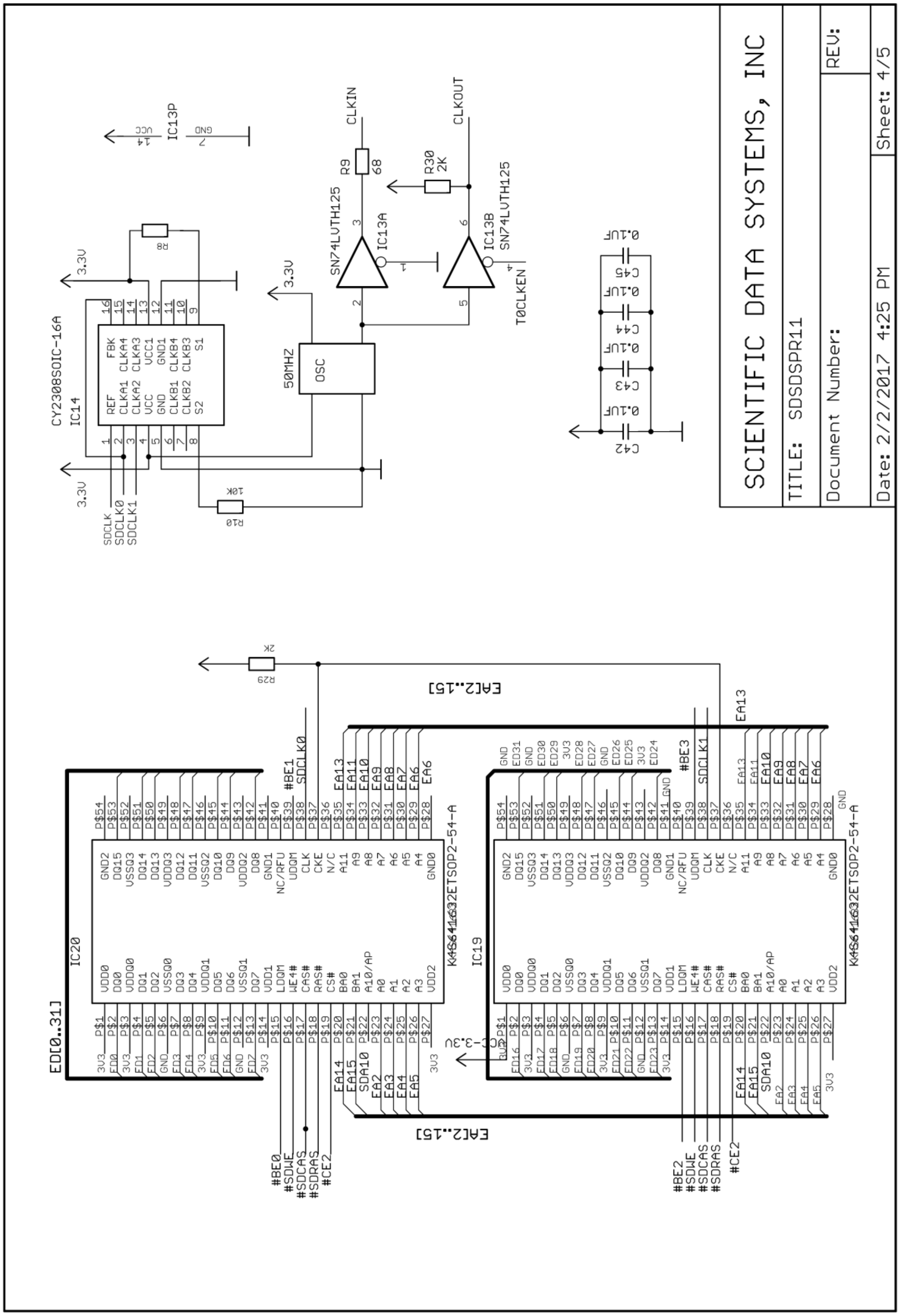
DATA TRANSCEIVER 0..15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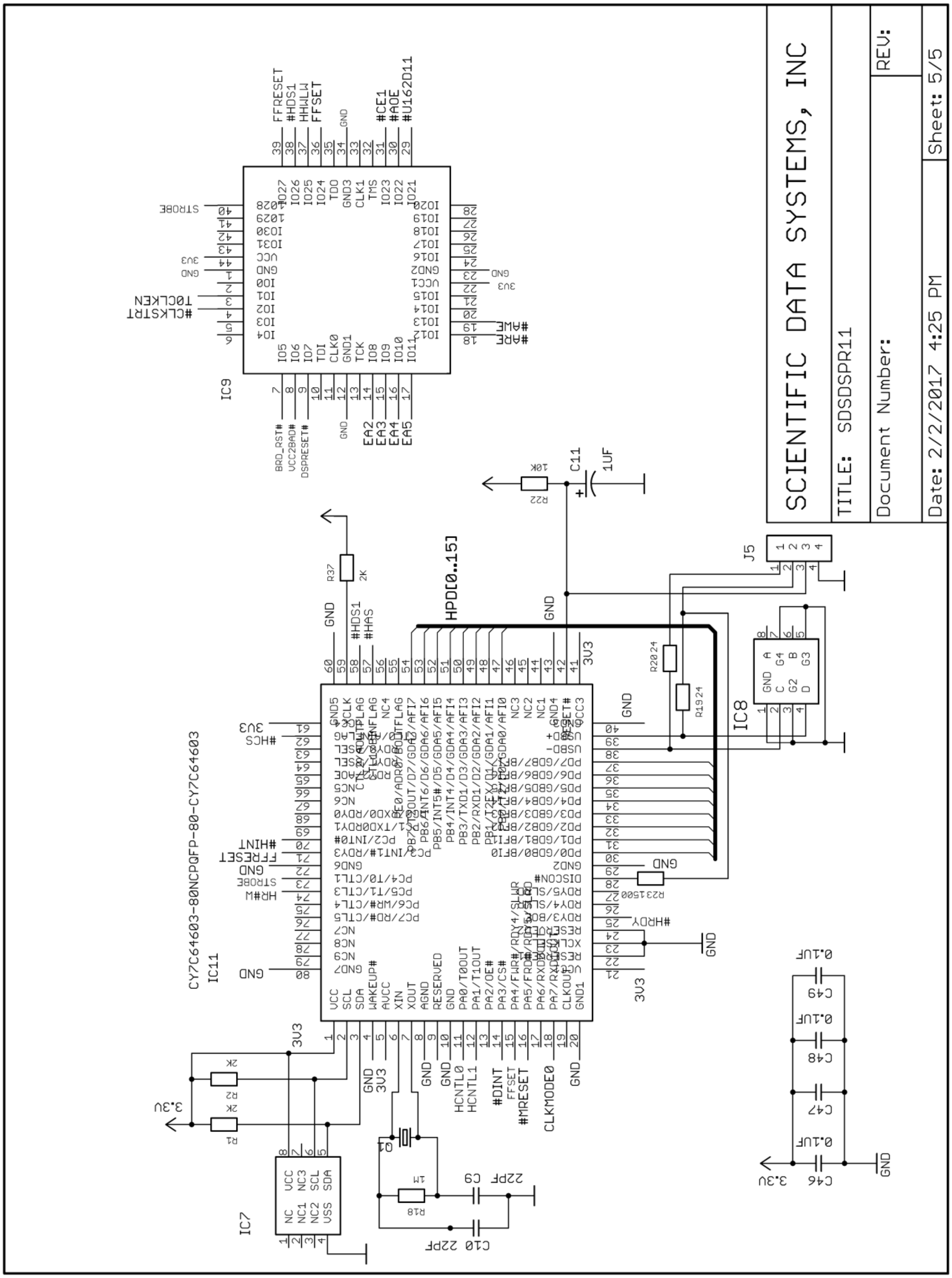
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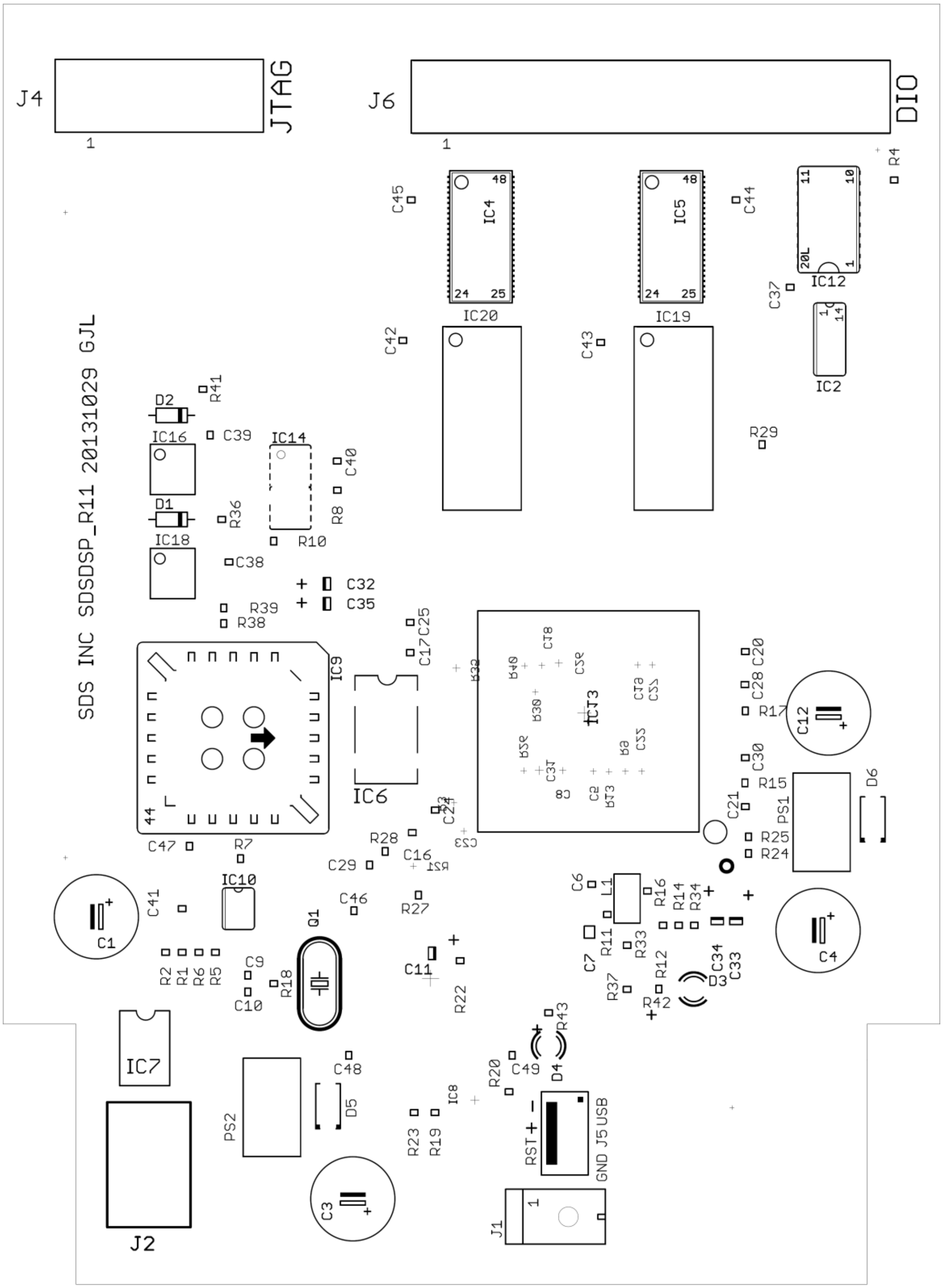


Fig 15.2 DSP R11 board layout

Section

16

16 USBHUB Board

The STIP-F is designed to be operated with a laptop PC over a USB port. The panel has a built in 13 port USB 2 hub. The Hub also has two RS232 ports and two RS485 ports. The USBHUB board is mounted in the back of the STIP. It has one up-link port and seven downlink ports. The up-link port is connected to both the front and the rear of the STIP. Relay K1 disconnects the back port when the front one is used. The five volts supplied by the host USB cable energizes the relay. If the PC does not supply this voltage it will be necessary to use the back port.

IC1 and IC19 form the backbone of the USB controller. As it is a 3.3 volt device IC22, MAX882, voltage regulator, supplies this from the five volt supply. The ECLAMP212's are noise suppressors for the various ports. The downlink ports provide five volts as needed.

There is a dedicated port for the Warrior Software dongle. There are 5 ports used to connect internal devices such as the USB44 board and the DSP board and are not available externally. Five ports are available for external devices such as the Warrior Depth and Tension panel, and plotters which may be operated with a USB to serial cable. The plotter port J7 stays active when the panel is powered down so that printing is still available.

The USBHUB is operated as a generic device because it requires no programming. When the PC is plugged into the STIP-F there will be a momentary pause as the Warrior software recognizes the internal devices and downloads the software necessary to operate them.

There is a jumper JP1 that allows the hub to be buss or self-powered, the default is buss powered. There is also a jumper that will tie the digital ground to the panel ground for if required.

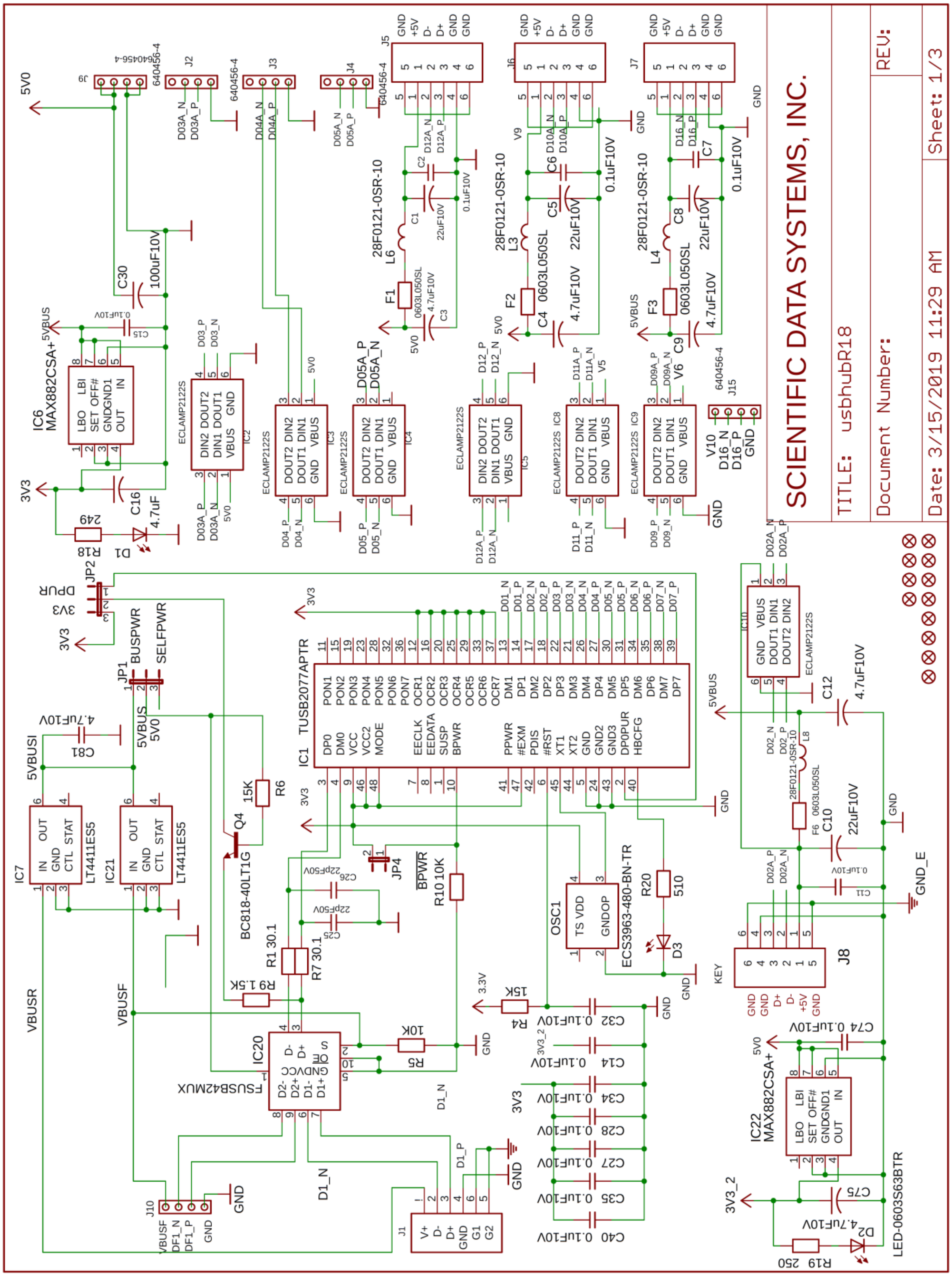
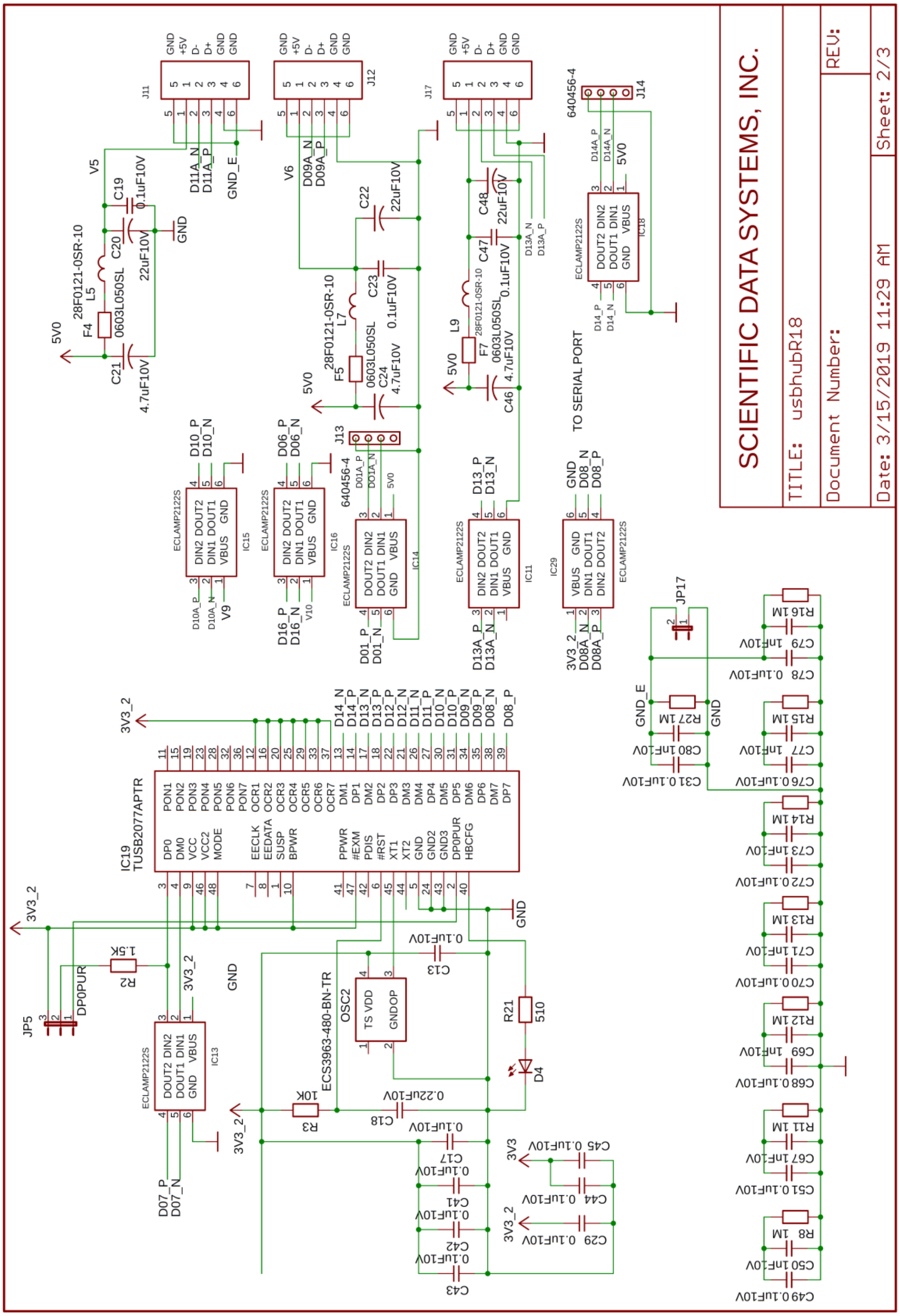


Fig 16.1 Schematic USB2 R18 Hub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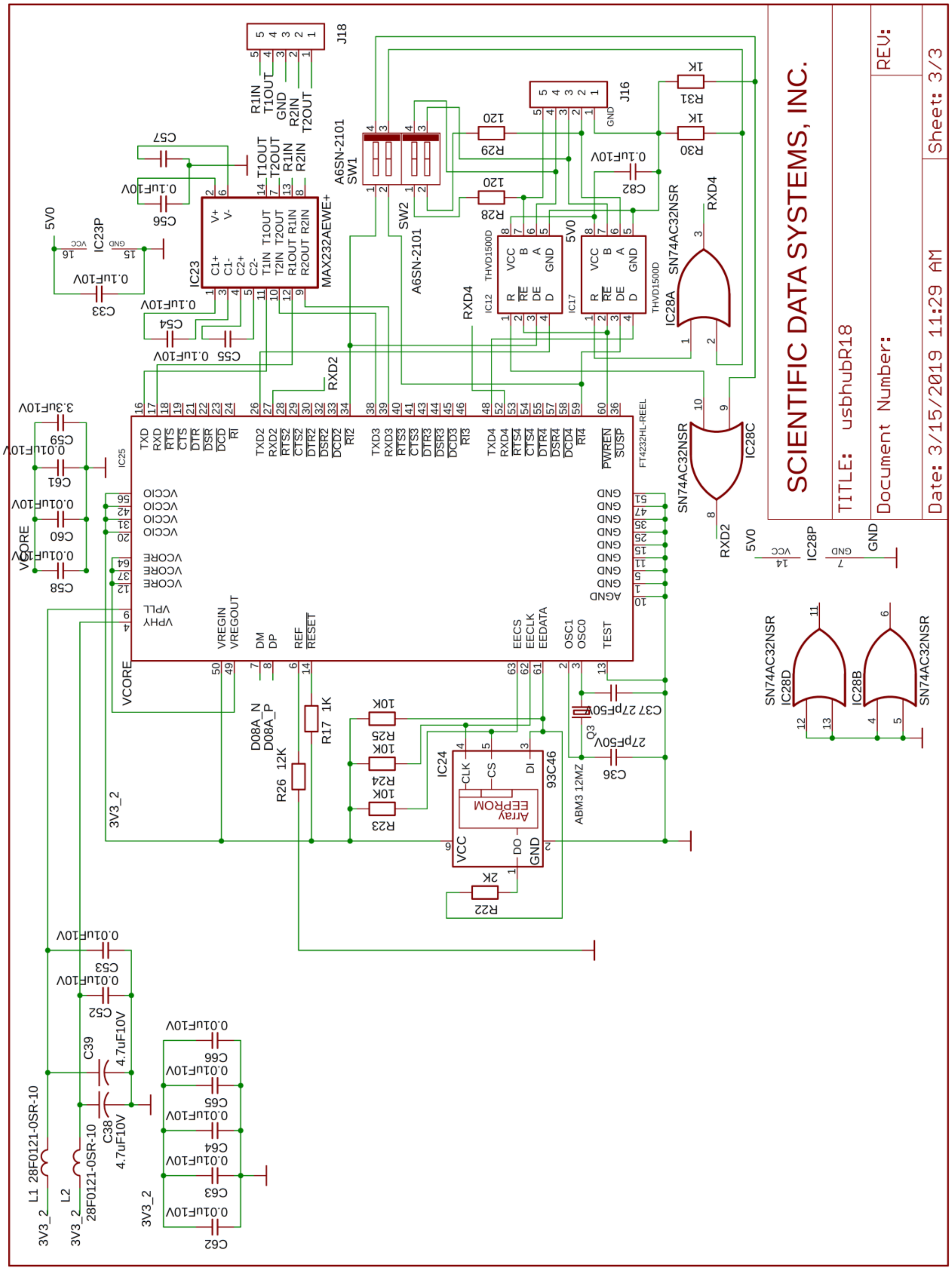
TO SERIAL PORT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SW1
SW2
THVD1500D
IC12
IC17
SN74AC32NSR
IC28A
IC28B
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L1
L2

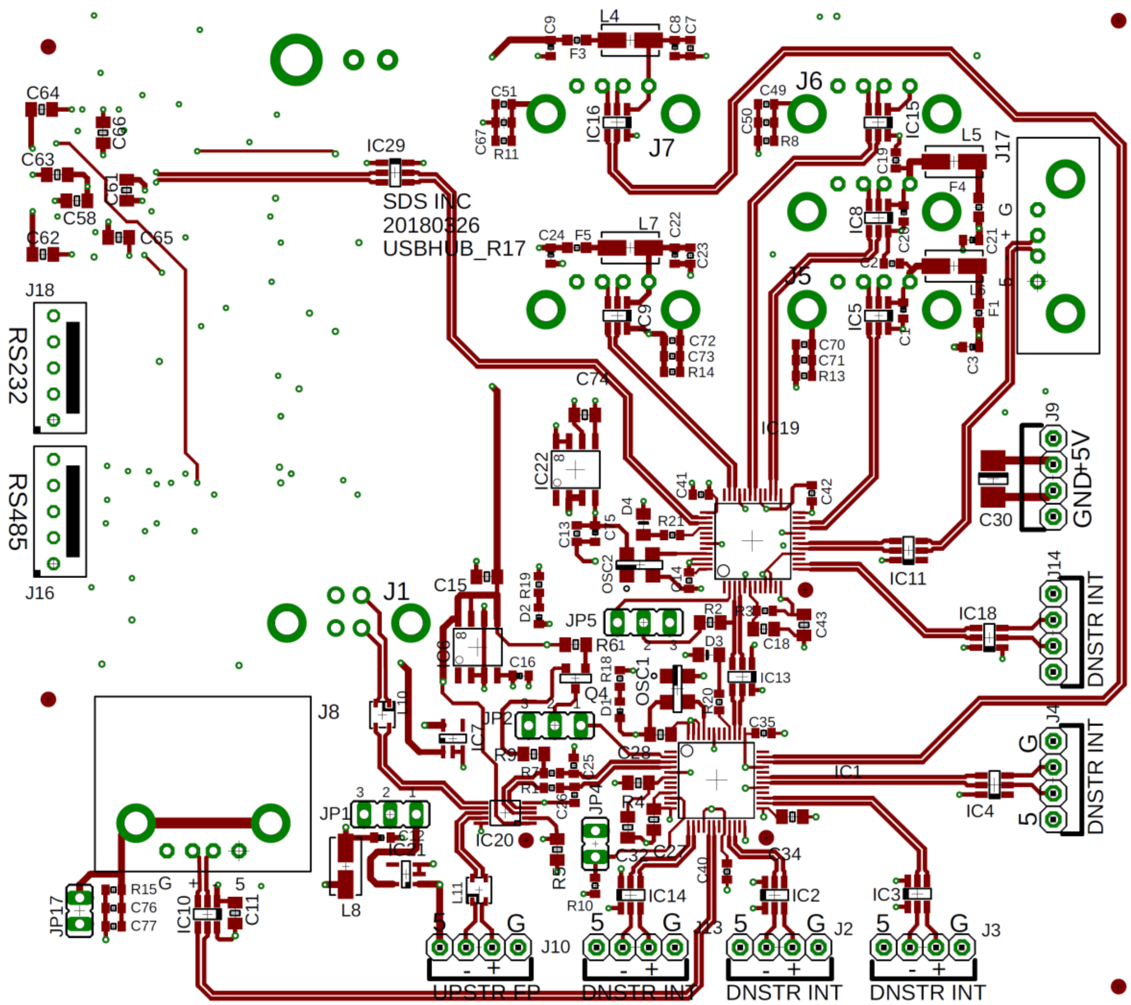


Fig 16.2 USB2 R18 Hub board layout

Section 17

17 Simulator Box

The USB Simulator connects to the USB port of the system pc and receives 5-volt power up to 500ma from it. Tool waveforms can be downloaded and then played back in analog form through the line or directly into the system. Outputs to test the Depth Encoder and Tension are also provided.

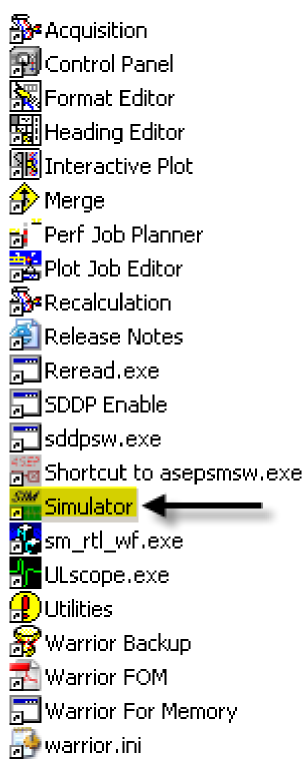


FIG: 17.1 Simulator

When the USB Simulator is powered up by plugging it into the USB port of a PC or the USB HUB of a Warrior Interface panel, it goes through a two-step enumeration according to the device code found on EPROM IC5. Double clicking the SIMULATOR icon in the Warrior panel will bring up the control window.

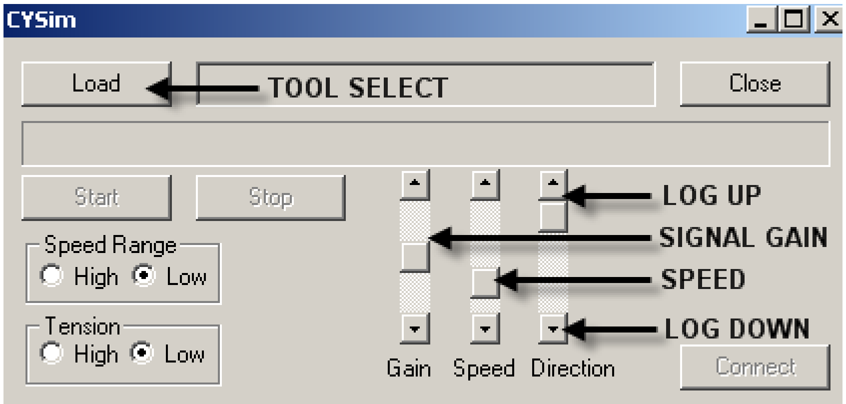


FIG: 17.2 Simulator Controls

Select LOAD and choose the tool waveform from a list. These files are located in the Warrior Bin directory.

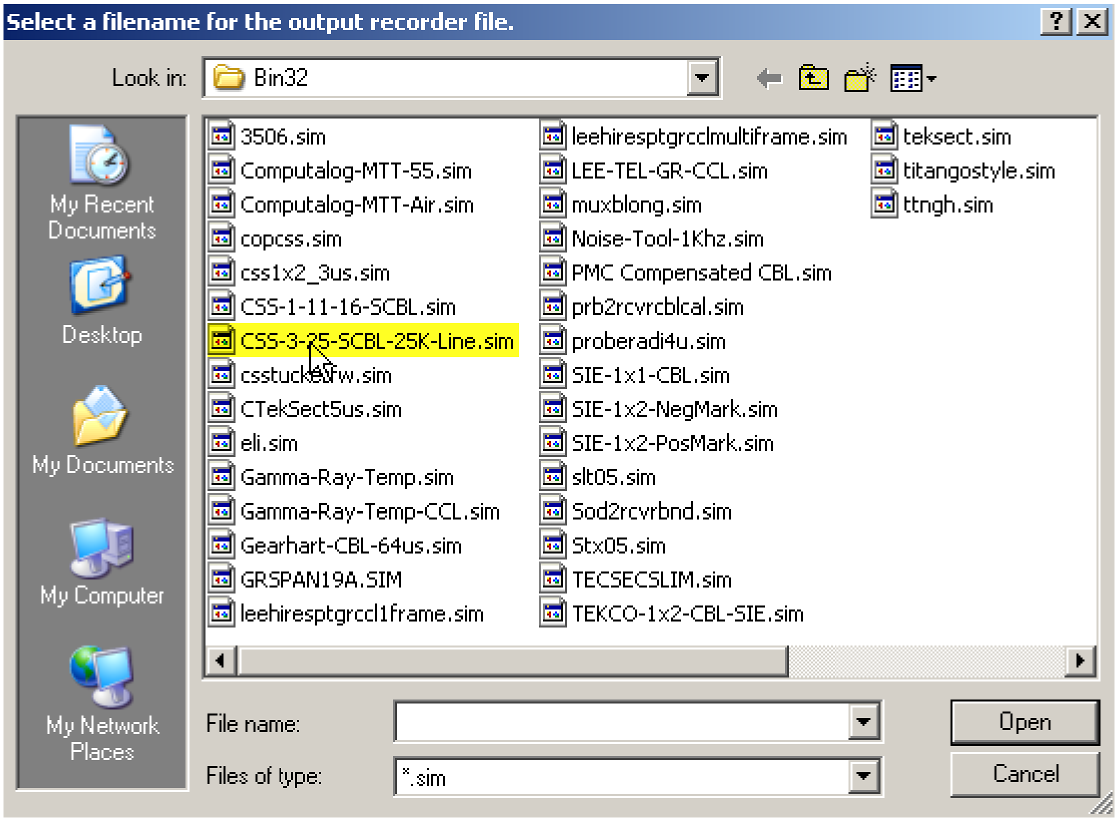


FIG: 17.3 Simulator tool files

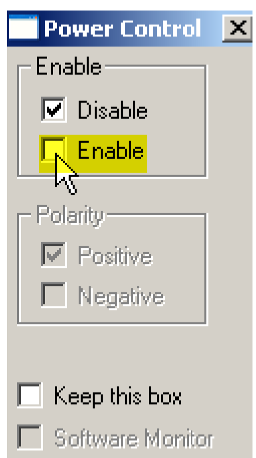
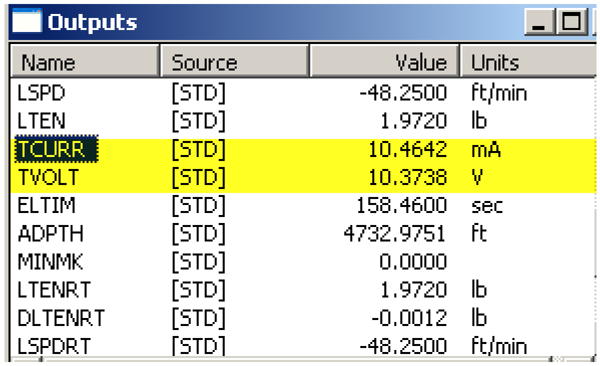


FIG: 17.4 Power Control



Outputs

Name	Source	Value	Units
LSPD	[STD]	-48.2500	ft/min
LTEN	[STD]	1.9720	lb
TCURR	[STD]	10.4642	mA
TVOLT	[STD]	10.3738	V
ELTIM	[STD]	158.4600	sec
ADPTH	[STD]	4732.9751	ft
MINMK	[STD]	0.0000	
LTENRT	[STD]	1.9720	lb
DLTENRT	[STD]	-0.0012	lb
LSPDRT	[STD]	-48.2500	ft/min

FIG: 17.5 Outputs

To playback the waveform press the START button.

There are slides for Encoder Speed and Output Gain. The Encoder speed will depend on what number is input for pulses/foot. 120 should give a reasonable range. If less speed is needed change the number to 600 pulses per foot. There is a button for high and long range. Low range will provide speeds less than 100 feet per minute. There is a button for changing the direction, up/down.

The Depth Encoder power from the interface panel lights an LED or both if it is twelve volts.

17.1 Circuit Description

The simulator gets its intelligence from IC1 – a Cypress AN2131Q EZ-USB controller with 8k of internal ram. An external 128k x 8 static ram, IC2 - CY71019B – is used to store waveform data. IC5 - 24LC00P, EPROM is used to store the USB address code so the device enumerates as a Simulator and not as something else.

IC6 provides 3.3 volts for most of the logic from the USB 5 volt supply. A DC-DC Converter supplies +/- 12 volts from the 5 volts supplied by the USB port. An external 5-volt supply can be used if it is needed.

The encoder frequency is set by OUT0 from DAC, MAX519. The DAC output goes to a voltage divider to reduce the 0 to 5 volt swing to 0 to 1 volt for the V to F converter, IC10, AD654. Software controls the high and low range of the encoder speed. The output frequency goes to IC9B, buffer, and then is split and one side inverted. One side goes to IC12A, and the other to IC12B, SN74LS74, dual D flip flop. These are wired to give two wave trains 90 degrees apart. The A signal goes to Encoder Out A. The B side goes to IC9A where PA5 sets direction. When PA5 is changed the output of IC9A will be inverted. That is how UP/DOWN is controlled. The signal then goes to Encoder Out B. IC7 and IC8 test the ENCODER voltage, lighting one led if it is five volts or both LEDs if it is twelve volts. The encoder pulses are derived from the supply voltage. A 5 volt supply produces 5 volt pulses and a 12 volt supply produces 12 volt pulses.

SDA and SCL from IC1 control the DAC. IC4 address lines: 01000000 address byte.

PA6 controls IC14, DG411, switch. It connects R32 for 20ma and disconnects it for 2ma. The 12 volts from the STIP is converted to a current by IC7, LM317 to furnish the output signal. The circuit will accept a 24 input also.

The data loaded into the ram, IC2, is sent to the DAC a byte at a time and reproduces whatever waveform has been recorded. The chip enable comes off A15 to allow memory paging. It is inverted. Write enable and out enable are active low. A15 is used because we are only interested in high addresses. A16 comes from PC1/TXDO. R36 was added to shift the DC offset of the DAC to zero. The signal is sent from the DAC to U2A, TL082P, op amp, and then to U3, AD633, and voltage multiplier, through a 1K resistor. The multiplier voltage is supplied by IC4, serial DAC, and OUT1, which set the output gain. The signal then goes to U2B and IC3, BUF634, op amps to the line out connector.

Cable to Encoder and Line Weight:

17.2 SIMULATOR Hookups

5 PIN MALE - Tension -------------------------Interface Panel

A – TENSION SIGNAL GROUND REF ----------A
B – TENSION SIGNAL OUT -----------------------B
C – tied to E --C
D – +12 VOLTS IN------------------------------------D
E – GROUND --E

7 PIN MALE – Depth Encoder

A – ENCODER-A
B – ENCODER-B
C – N/C
D – ENCODER POWER IN
E - GROUND

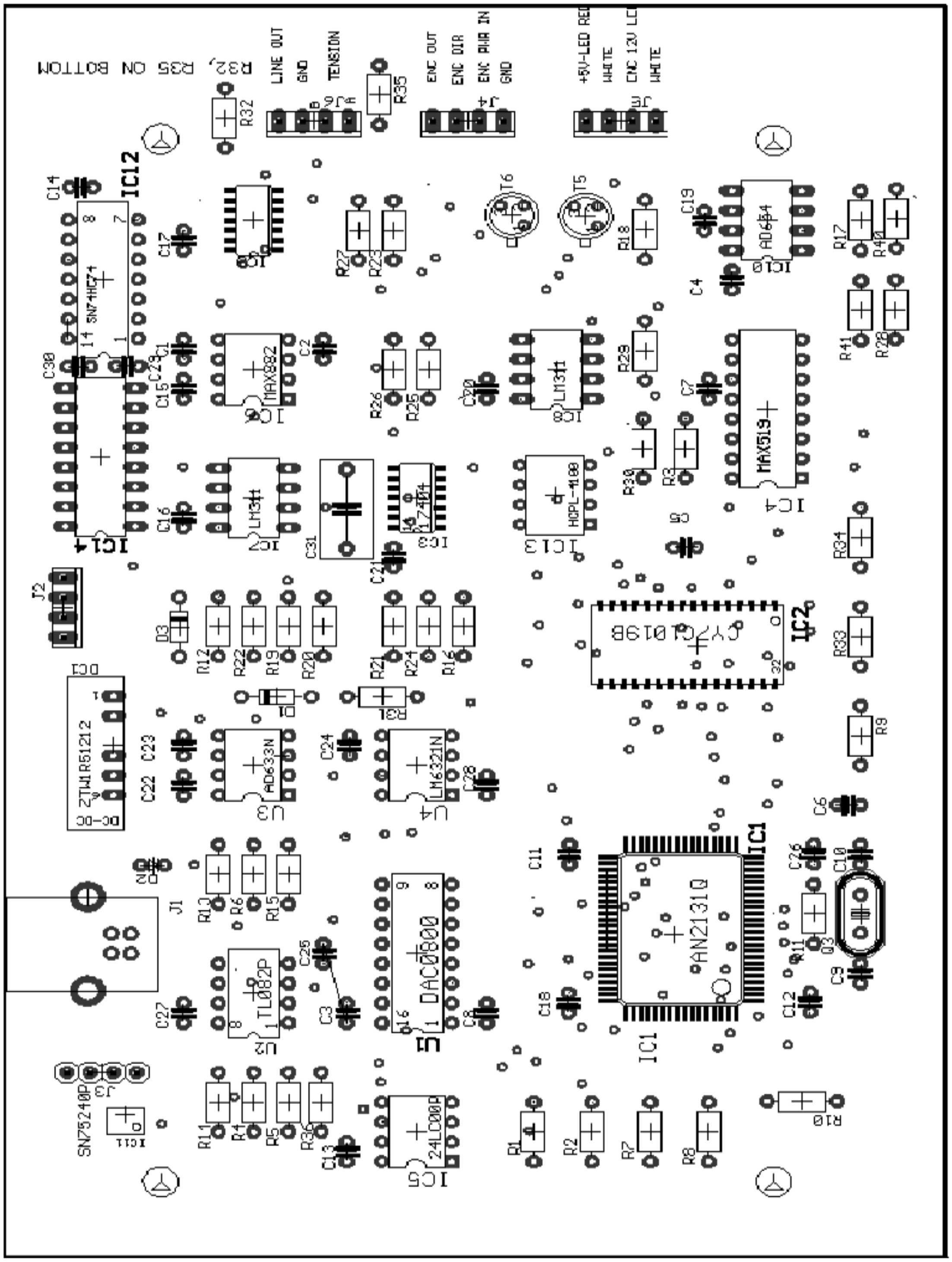


FIG: 17.6 USB SIM R2 board layout

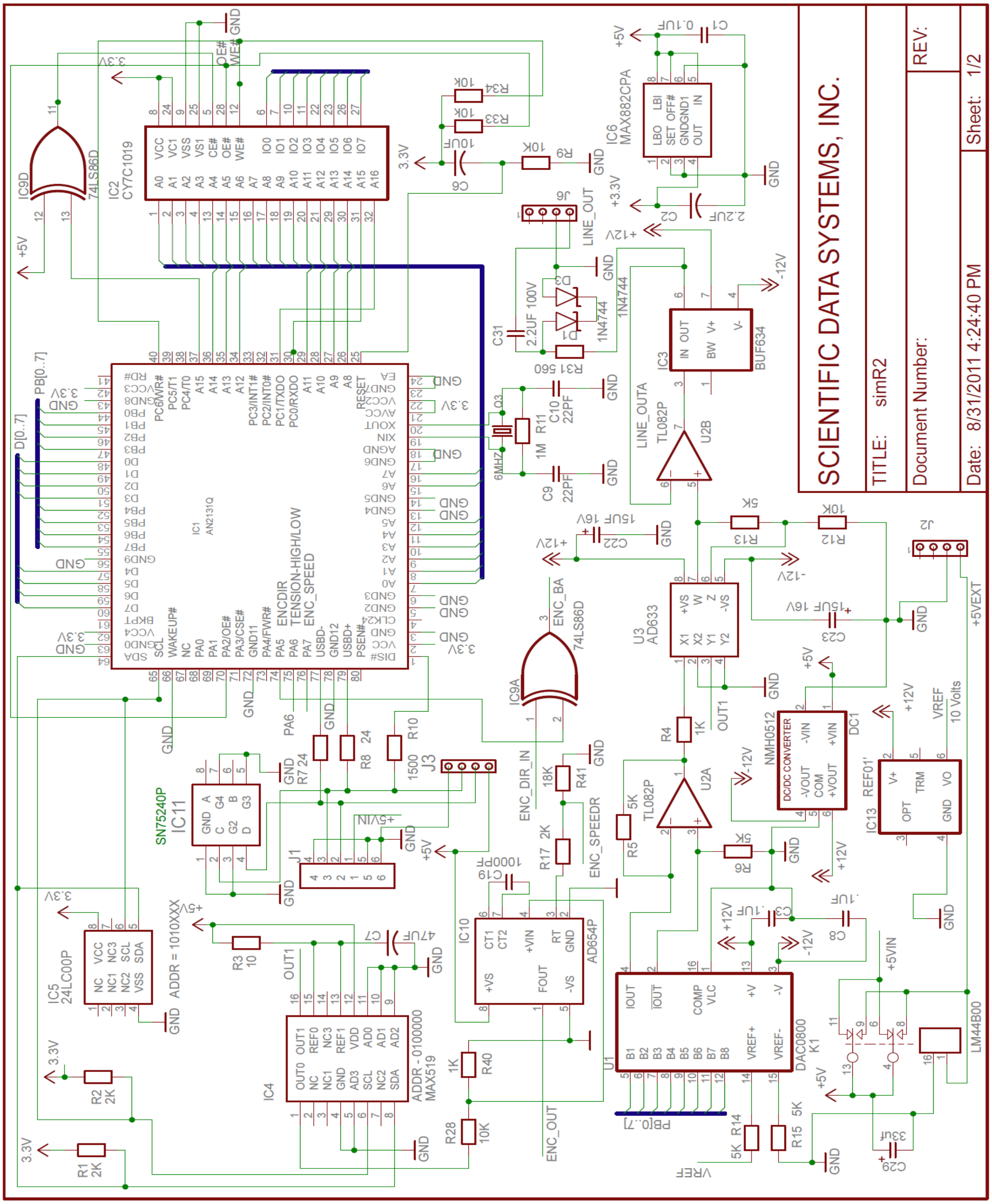
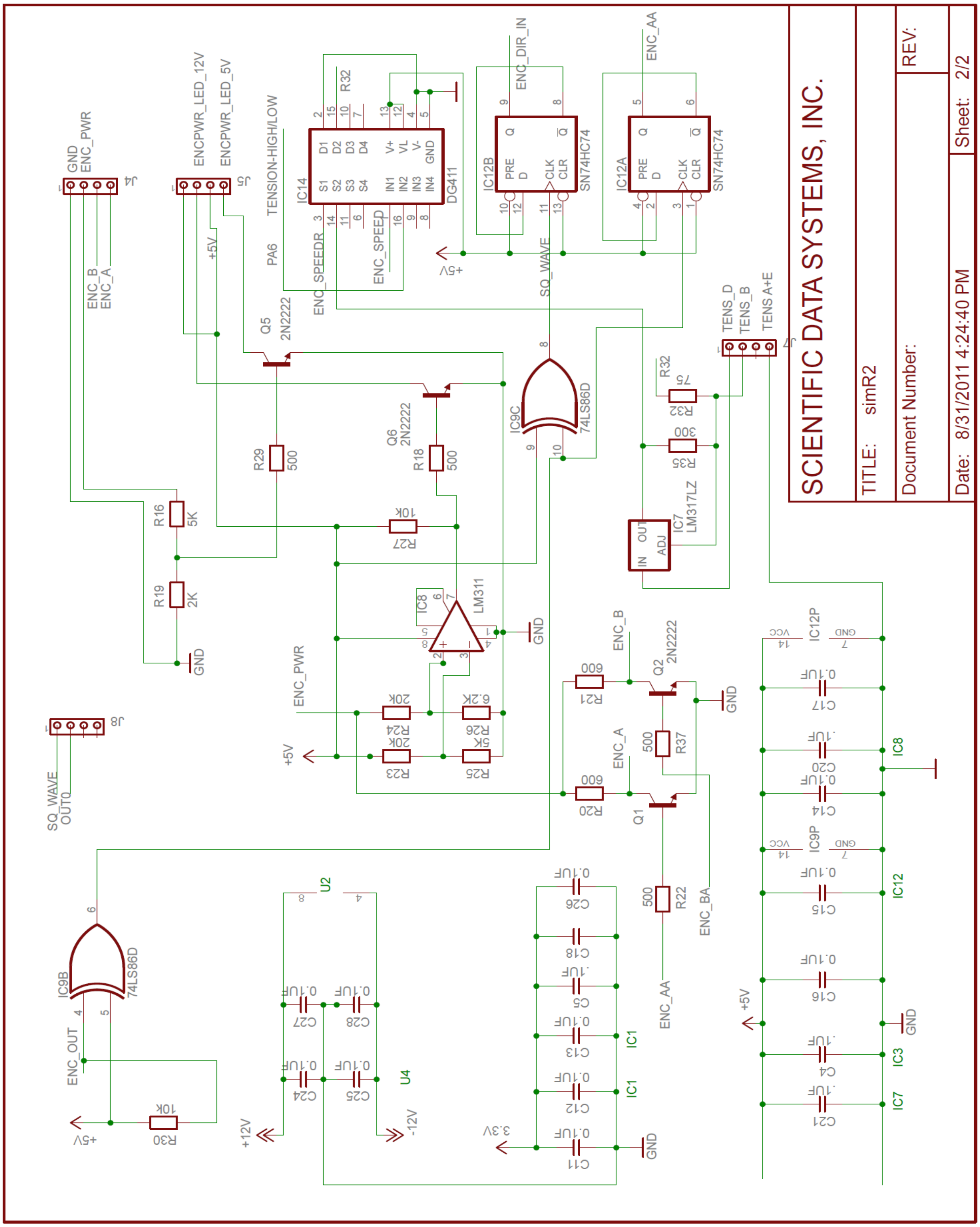


FIG: 17.7 USB SIM R2 Schematic


SCIENTIFIC DATA SYSTEMS, INC.
TITLE: simR2
Document Number:
REV:
Date: 8/31/2011 4:24:40 PM
Sheet: 2/2
IC14 DG411
IC12B SN74HC74
IC12A SN74HC74
IC9C 74LS86D
IC9B 74LS86D
IC8 LM311
IC7 LM317LZ
Q5 2N2222
Q6 2N2222
Q2 2N2222
Q1
ENC_DIR_IN
ENC_AA
ENCPWR_LED_12V
ENCPWR_LED_5V
GND
ENC_PWR
TENSION-HIGH/LOW
PA6
ENC_SPEEDR
ENC_SPEED
SQ_WAVE
ENC_B
ENC_A
TENS_D
TENS_B
TENS A+E
ENC_BA
ENC_OUT
OUT0
+5V
+12V
-12V
3.3V
J4
J5
J7
J8
U2
U4

Section
18

18 Recorder

18.1 Warrior Line Signal Recorder Service

With the Recorder service, it is possible to make a recording of the line signal with minimal filtering. The recording can then be used to make a Simulator file to play back into the system through the Scientific Data Systems Simulator Box. Or the recorded file can be sent to Scientific Data Systems to check the tool telemetry or set up a new service for the tool telemetry. The recorder service is not normally installed as one of the default services. The service can be imported through the Service Editor.

FIG: 18.1 Select Edit logging Details

To install the Service Editor, go to Warrior Utilities and click on [Edit Logging Service Details]. To Import the Recorder Service, Click on Service ->Import. From the Warrior\Config folder, choose the CH USB 70.WSV file and click the [Open] button. From the service import list, choose the Recorder service. It will then be added as the last service in your active service list. The Service Editor and Utilities can now be closed. If Acquisition is open, it will have to be closed and then reopened before the Recorder service will be available.

FIG: 18.2 Service\Import

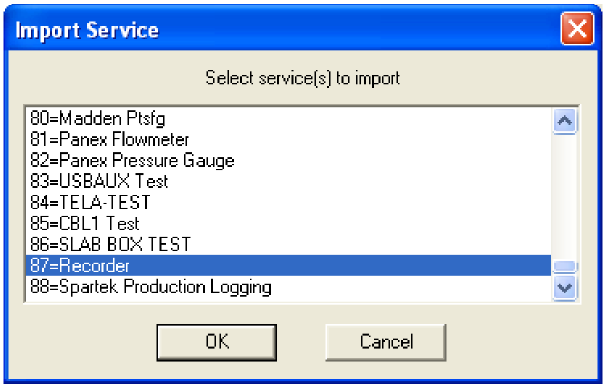


FIG: 18.3 Import Recorder service

To make a line recording, start Acquisition and select Service -> Recorder. When the Tool String editor comes up, click [Save] or [Exit], there are no tools to select or edit. In the Acquisition window click on Action -> Power Control and enable the line in the normal manner. Adjust tool power for proper operating voltage and current for the tool that you are using. The Recorder Threshold window will show a sample of the signal that will be recorded. No adjustments are necessary in the Recorder Threshold window.

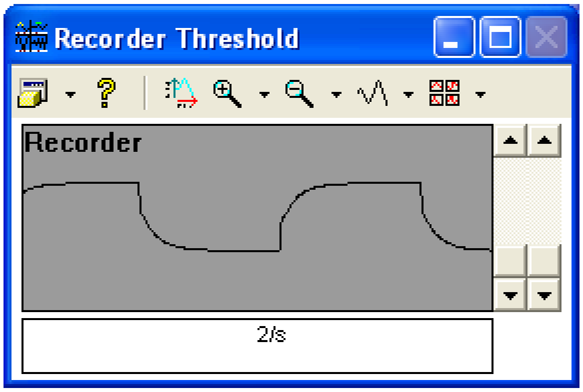


FIG: 18.4 Recorder

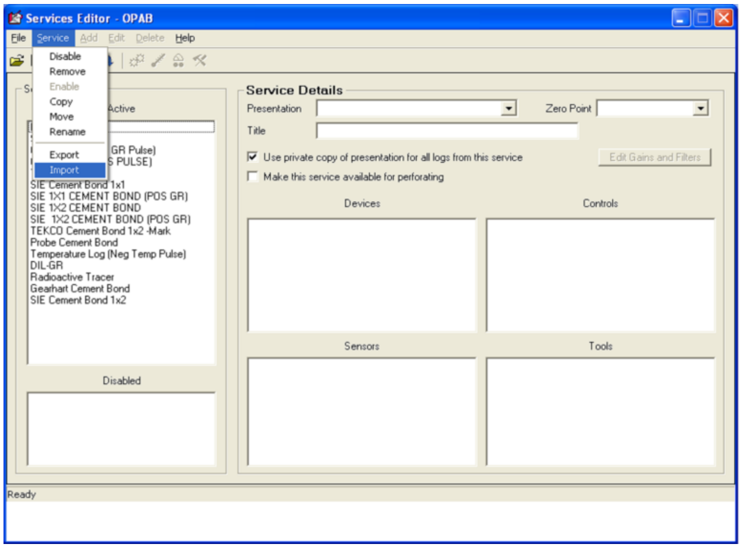


FIG: 18.5 Set up Signal Recorder

There are two other windows that come up when the Recorder service is started. These are the Panel Controls window and the Signal Recorder Setup window. The Panels Controls are not normally used unless the default Input Channel is changed from 15 to a channel that corresponds to the Sync, Aux, or Sonic input channels. This will be discussed further later.

There are 4 settings in the Signal Recorder Setup window that can be adjusted. If any of these settings are changed, the [Apply Settings] button must be clicked before the recording is done; otherwise the original settings are used.
The Input Channel is the selected DSP input channel (0 to 15). These channels are hard wired within the Warrior Interface Panel. Channel 15 comes from the ANASW board. The signal has been capacitive decoupled from the line and ran through a buffer. It is as true a raw signal as the system can digitize.
The Sample Rate is how often the DSP will digitize the incoming signal. A 5us rate is appropriate for most recordings. It should not be set to lower than 3us.
Signals may be attenuated on the DSP before they are digitized. Before doing a recording, the Attenuation setting should be adjusted to maximize the signal in the Recorder Threshold Window. The signal should

not go to the top or the bottom of the window. The smaller the Attenuation setting value, the larger the signal will be. An Attenuation of 100 will not show any signal and will not give a usable recording.
The record time is the number of seconds that the signal is recorded.

When settings have been adjusted as needed and the [Apply Settings] button has been set, the next step is to click the [Record] Button. You will need to select a file name to save the file. It is recommended that the file extension show the sample rate so that the file can be played back at the appropriate rate to give a valid recording such as 5us for a 5-microsecond sample rate. Once the [Save] button is clicked, the recording will start and continue for the number of seconds set in the Record Time setting. The Record Time will count down showing the number of seconds left to record until the recording is complete.

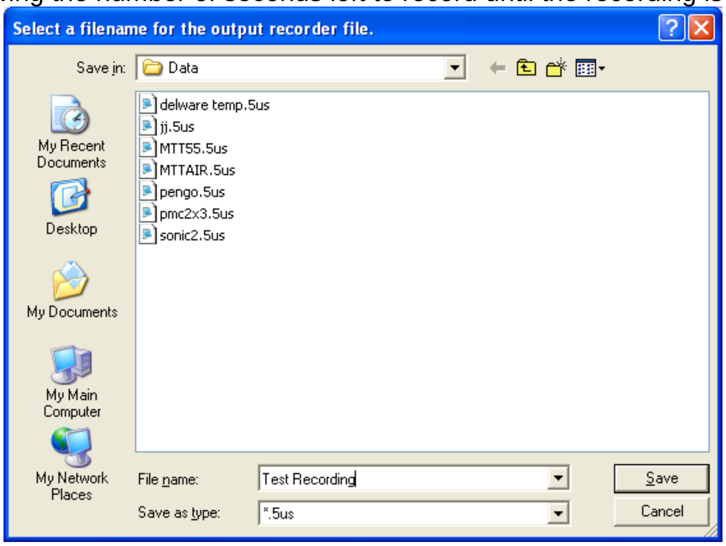


FIG: 18.6 Save the Recorder signal

The following is a list of the Hard Wired DSP channels in the SDS Interface Panel.

Input Channel	Signal	Note
0	Sonic Amplitude	Configurable Filter
2	Audio X10	
3	Audio X1	
4	Sync / Pulse	Configurable Filter
5	Audio X.1	
6	Audio X.01	
8	AUX	Configurable Filter
15	ANASW Signal	Recorder Default

18.2 Converting Recordings to SDS Simulator Box Files

The recording must first be converted from a DSP recording to a WAV file and then the file must be edited to fit a format needed by the simulator box.
In Warrior\Bin32 is SIMConvert.exe that will read in a recording and write a WAV file. Click on the [Load O scope File] button to select the DSP recording. After loading the file and before writing the 8 Bit Wave file, be sure that the sample period matches the sample rate done during the recording. For simple recordings,

the difference in the Start Sample and Stop Sample should be less than 128000, since this is the maximum number of samples the Simulator box can hold. Click the [Write 8 bit Wave] button to write the file. If this is a simple file, it can be saved with a .SIM extension and used directly by the Simulator Box.

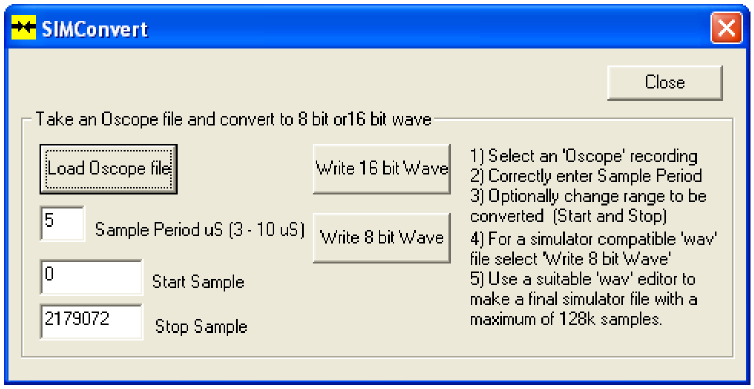


FIG: 18.7 SIM convert

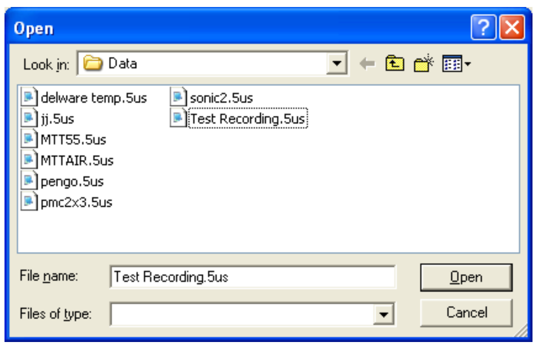


FIG: 18.8 Open

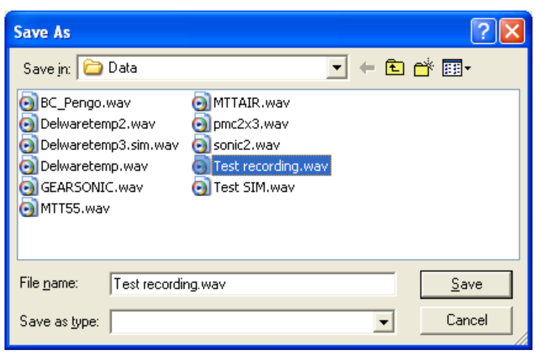


FIG: 18.9 Save As

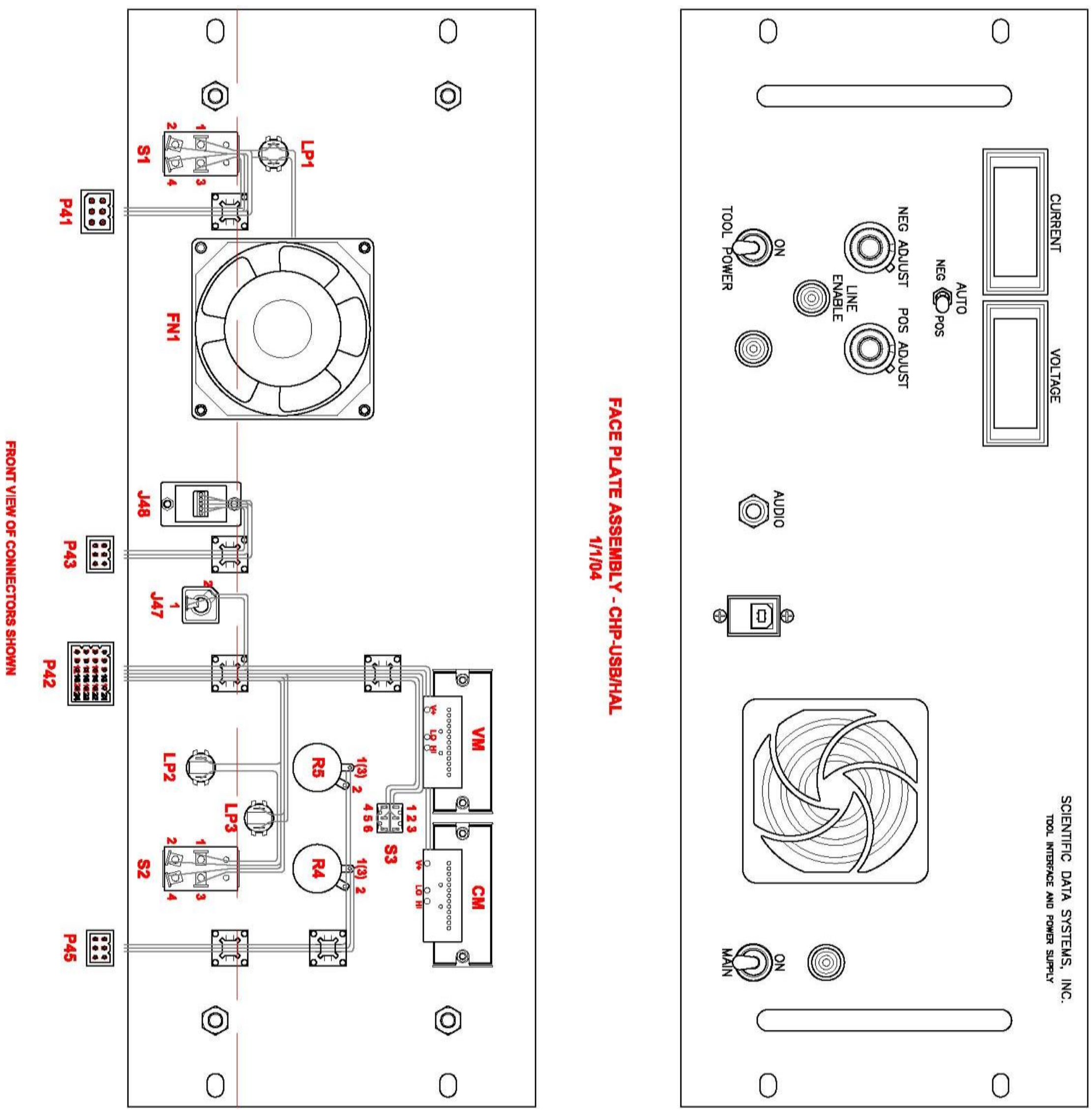
With more complex recordings, it may be necessary to use a Wave Editor to view and modify the recording before converting it to a simulator file. The Warrior software does not include a waveform editor, but there are many free editors available through the Internet. The following Internet link is a down load for a very versatile editor - HTTP: //www.yamahasynth.com/download/twe.html.

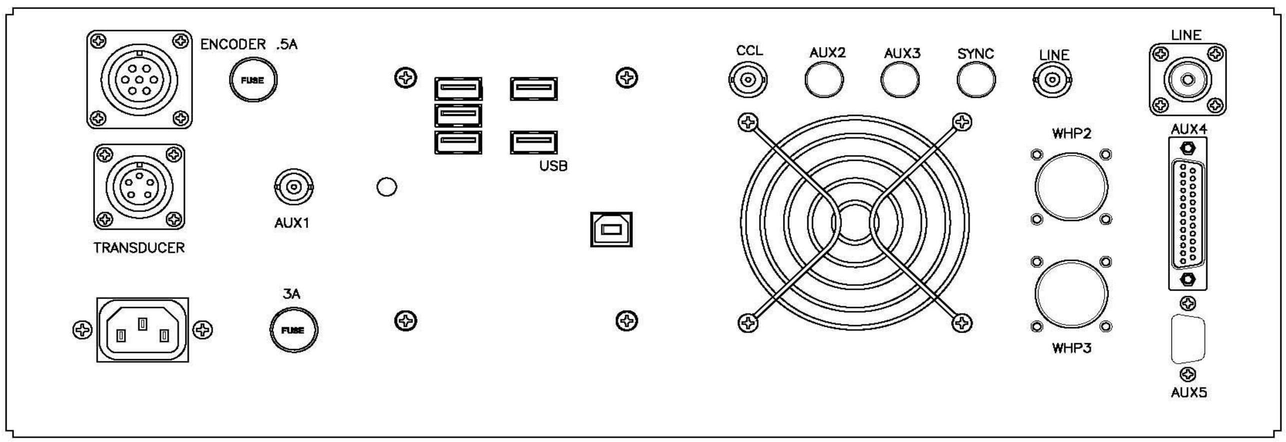
If the signal being recorded has a periodic rate, the waveform should be edited to start before a given point in the period of the signal and to end before the same point at a number of cycles later in time and keep below the 128,000-sample limit of the Simulator Box. The waveform editor could also be used to adjust the amplitude of the recording or insert or enhance features in the recording, such as gamma pulses in a bond tool recording.

Section

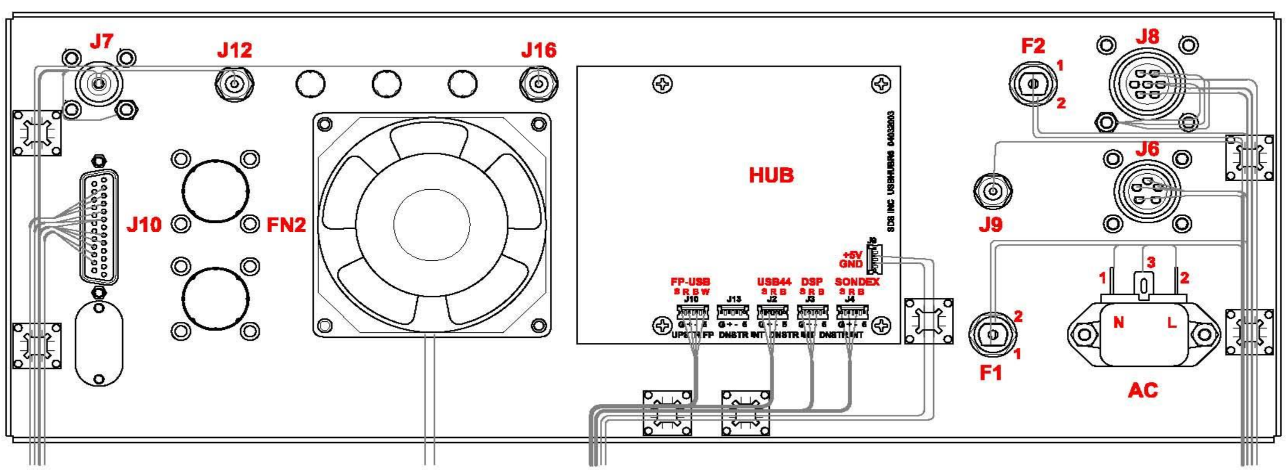
19

19 CPF Wiring Diagrams

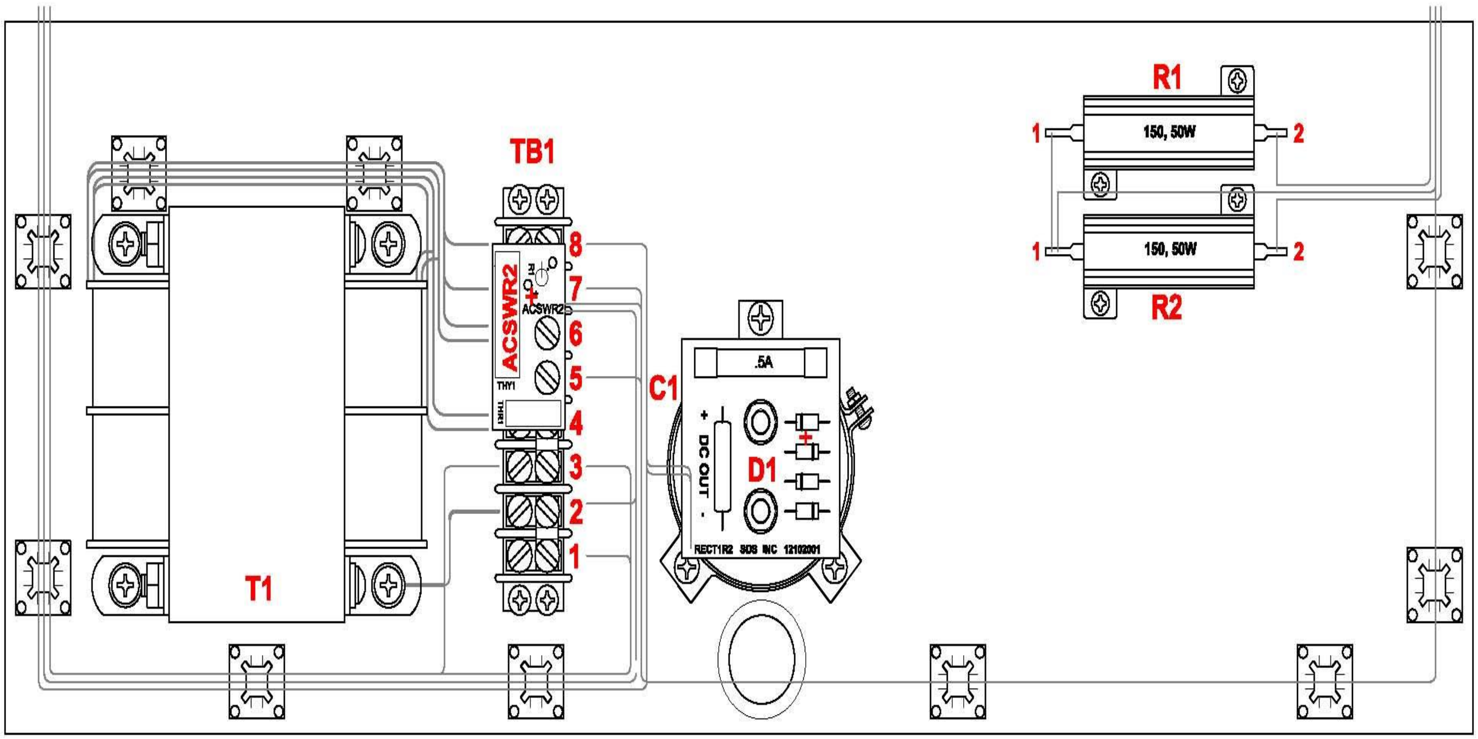


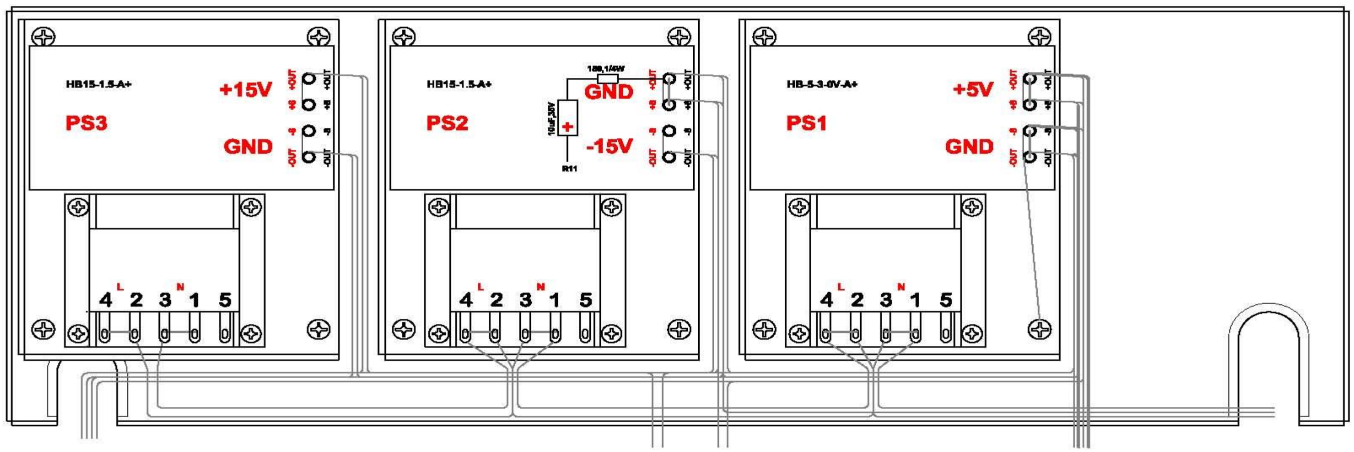


REAR PLATE ASSEMBLY - CHP-USB
1/1/06

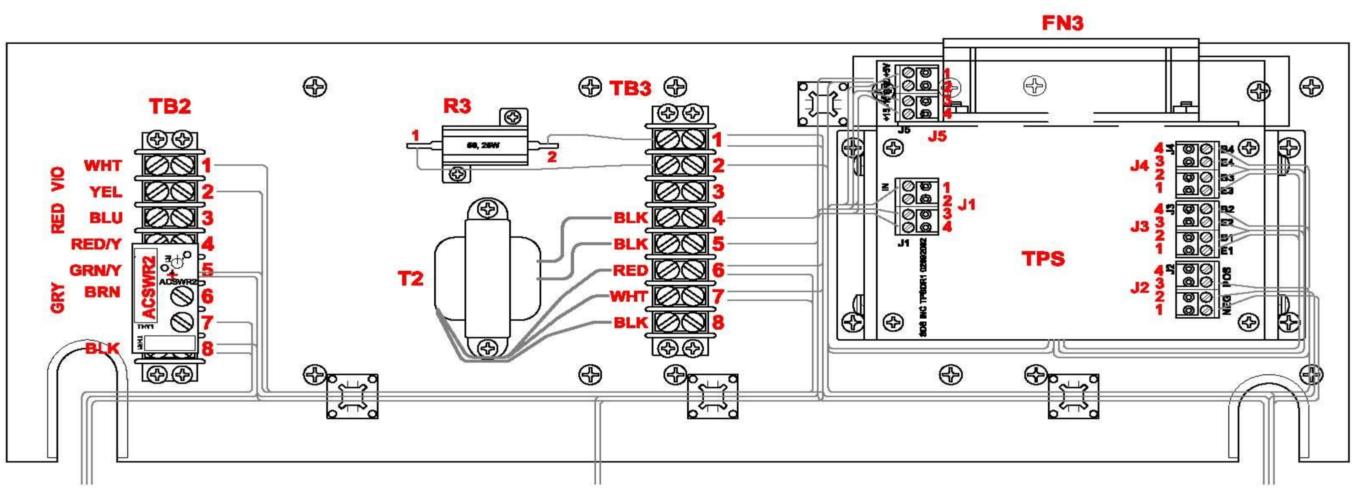


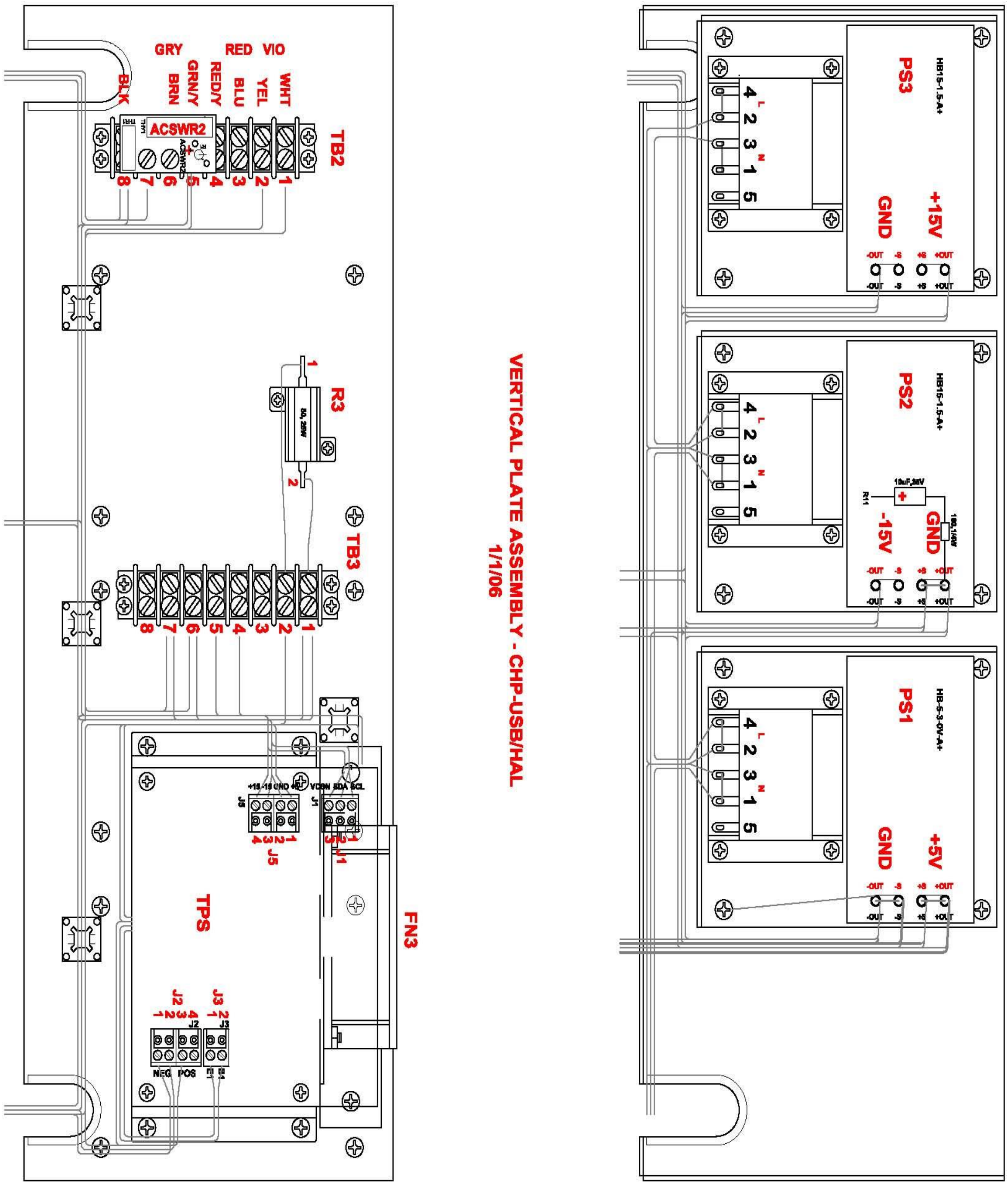
HORIZONTAL PLATE ASSEMBLY - CHP-USB/HAL
1/1/06





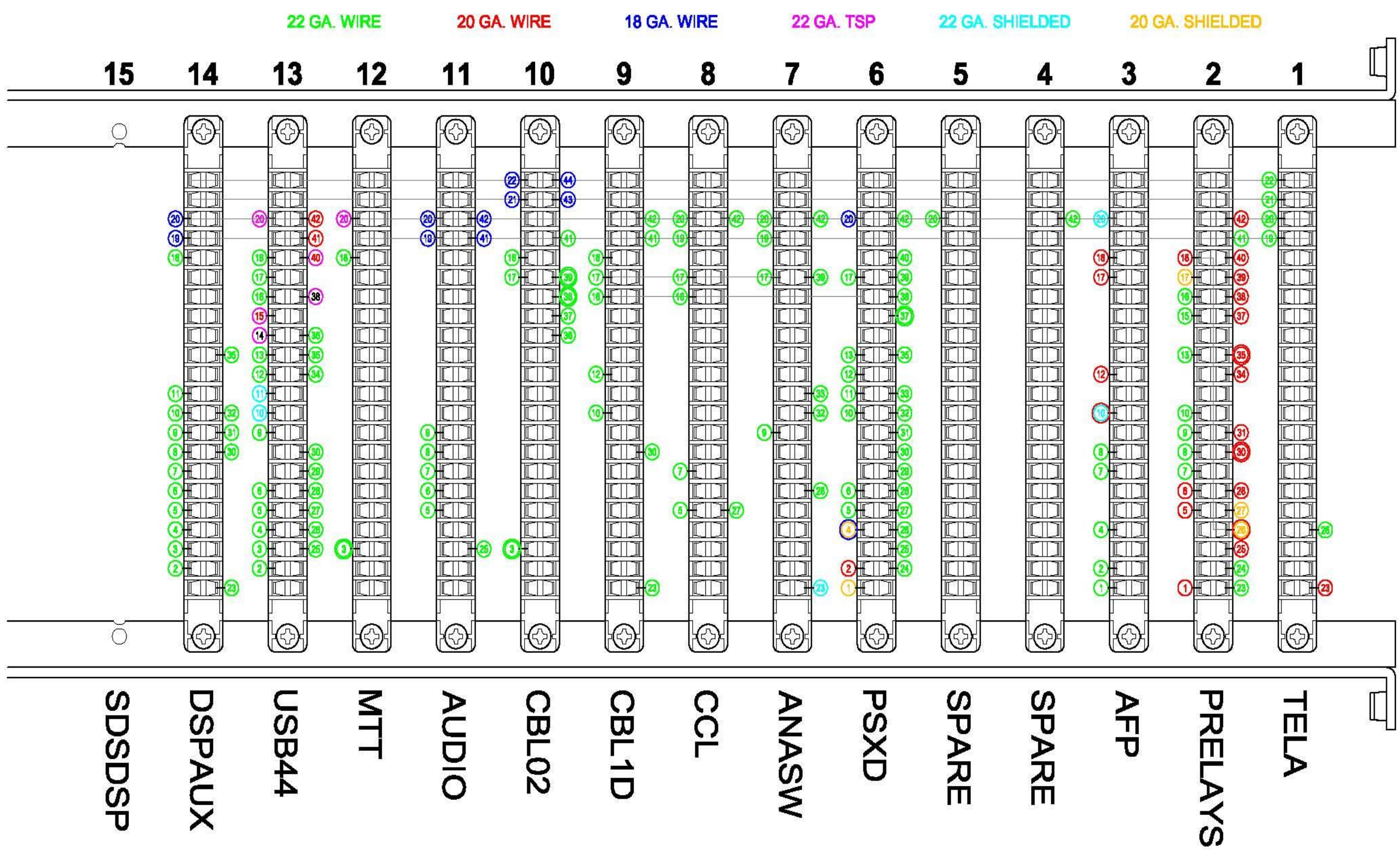
VERTICAL PLATE ASSEMBLY - CHP-USB/HAL
1/1/04




VERTICAL PLATE ASSEMBLY - CHP-USB/HAL
1/1/06
TB2
ACSWR2
GRY
RED
VIO
BLK
BRN
GRN/Y
RED/Y
BLU
YEL
WHT
R3
TB3
TPS
FN3
J5
J1
J2
J3
NEG
POS
PS3
PS2
PS1
GND
+15V
-15V
+5V
HB15-1.5-A+
HB-5-3-OV-A+

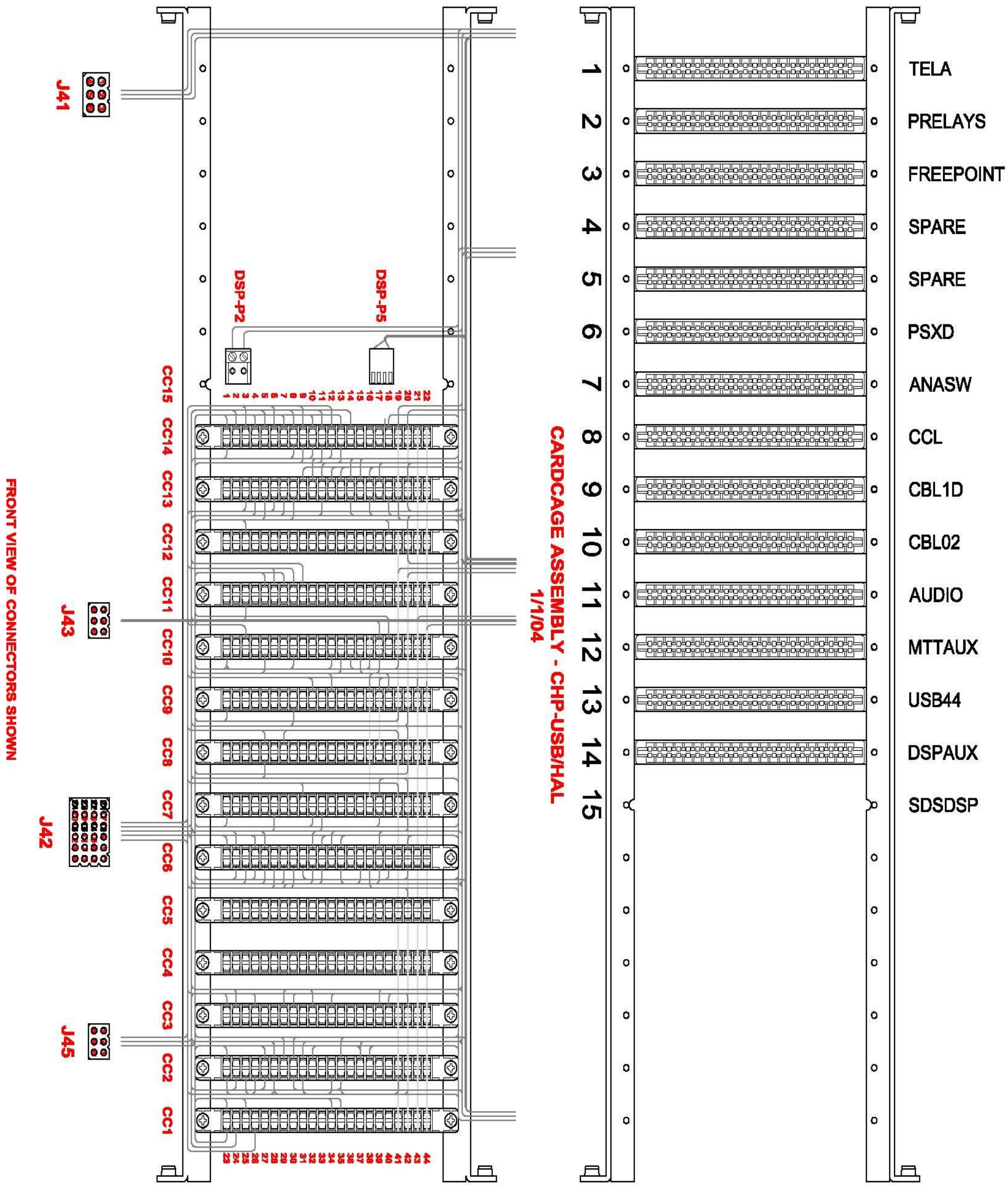
CHP-USB CARDCAGE WIRING

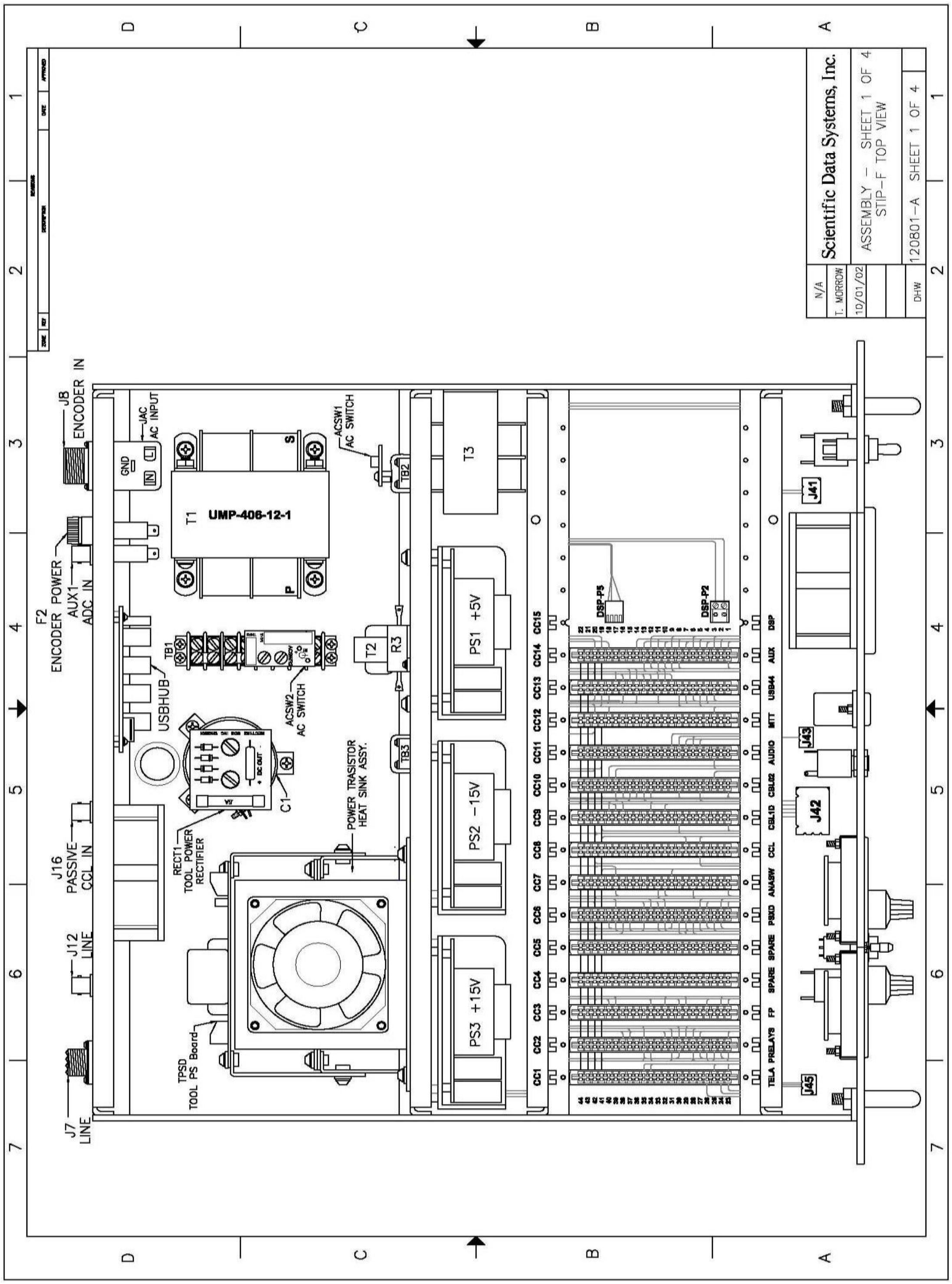
1/1/06



CC13-18 - HALLIBURTON PANELS ONLY

BOTTOM VIEW OF CARDCAGE SHOWN


CARDCAGE ASSEMBLY - CHP-USB/HAL
1/1/04
FRONT VIEW OF CONNECTORS SHOWN
J41
J43
J42
J45
DSP-P2
DSP-P5
CC15
CC14
CC13
CC12
CC11
CC10
CC9
CC8
CC7
CC6
CC5
CC4
CC3
CC2
CC1
1 TELA
2 PRELAYS
3 FREEPOINT
4 SPARE
5 SPARE
6 PSXD
7 ANASW
8 CCL
9 CBL1D
10 CBL02
11 AUDIO
12 MTTAUX
13 USB44
14 DSPAUX
15 SDSDSP



Scientific Data Systems, Inc.
ASSEMBLY - SHEET 1 OF 4
STIP-F TOP VIEW
120801-A SHEET 1 OF 4
N/A
T. MORROW
10/01/02
DHW
J8 ENCODER IN
JAC AC INPUT
GND
F2 ENCODER POWER
AUX1 ADC IN
T1
UMP-406-12-1
ACSW1 AC SWITCH
TB1
USBHUB
ACSW2 AC SWITCH
TB2
T3
T2
R3
TB3
PS1 +5V
PS2 -15V
PS3 +15V
C1
RECT1 TOOL POWER RECTIFIER
POWER TRASISTOR HEAT SINK ASSY.
J16 PASSIVE CCL IN
J12 LINE
J7 LINE
TPSD TOOL PS Board
CC1
CC2
CC3
CC4
CC5
CC6
CC7
CC8
CC9
CC10
CC11
CC12
CC13
CC14
CC15
DSP-P5
DSP-P2
TELA PRELAYS
FP
SPARE
SPARE
PSXD
ANASW
CCL
CBL1D
CBL02
AUDIO
MTT
USB44
AUX
DSP
J41
J42
J43
J45

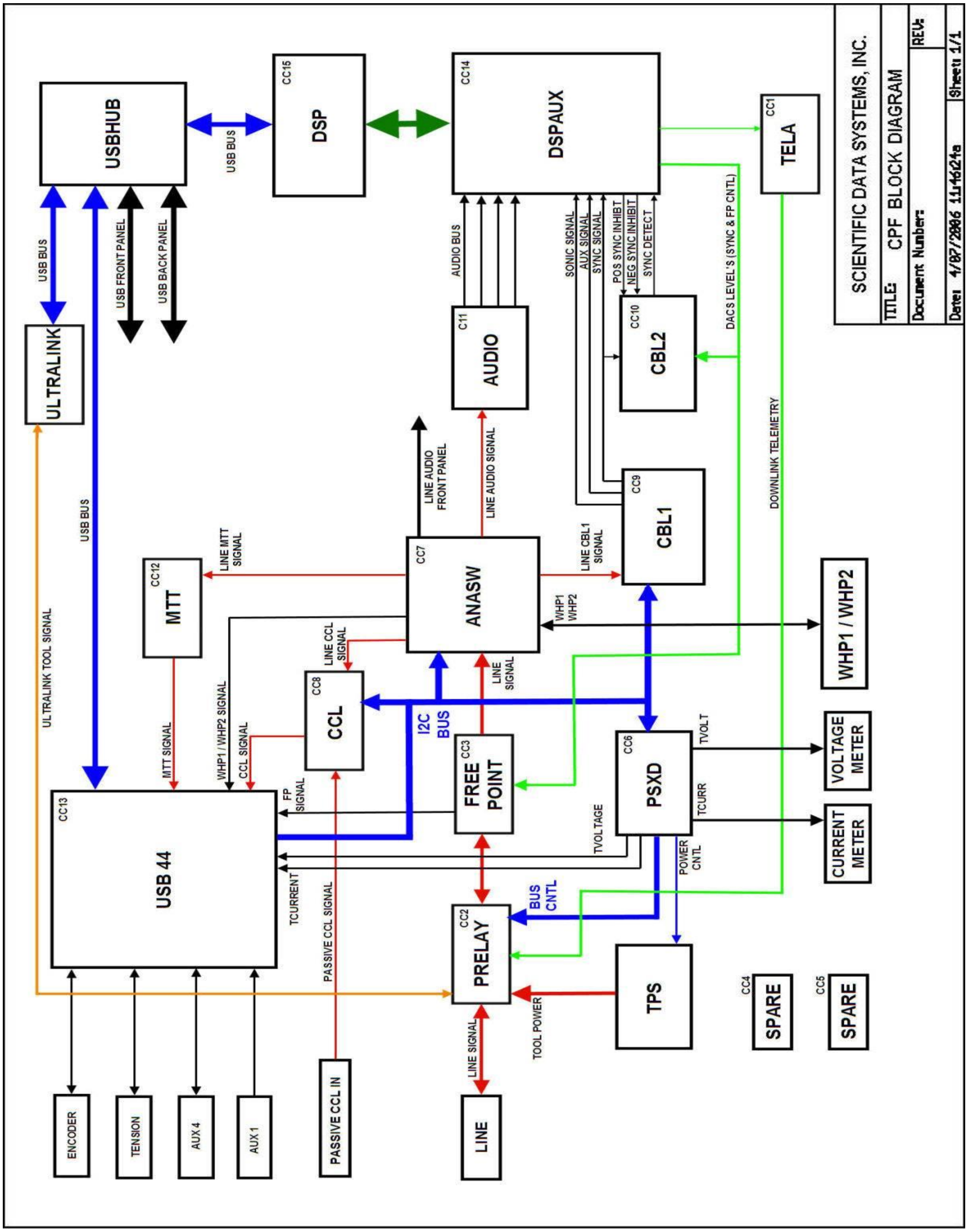


Fig 19.1 CPF Block Diagram

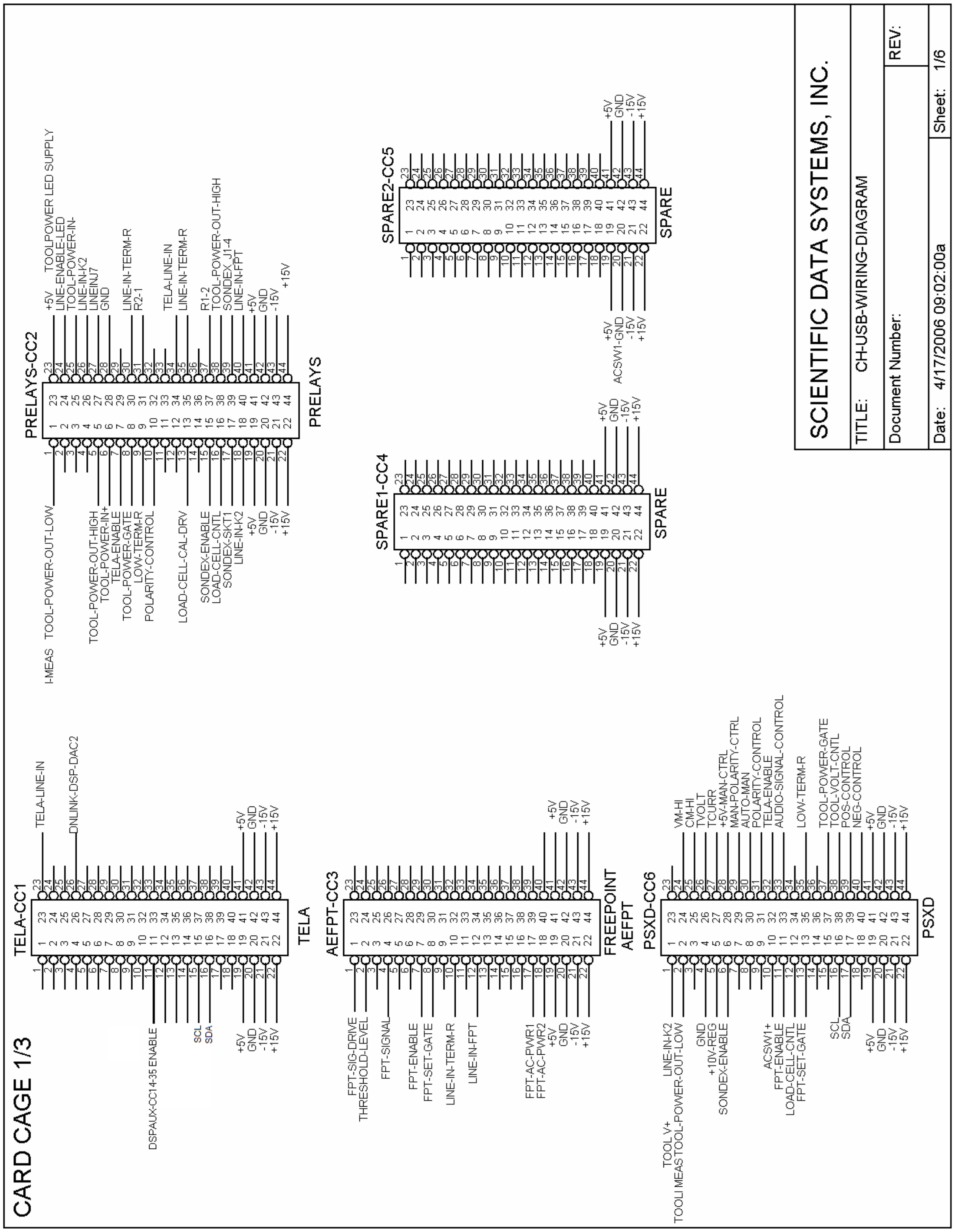
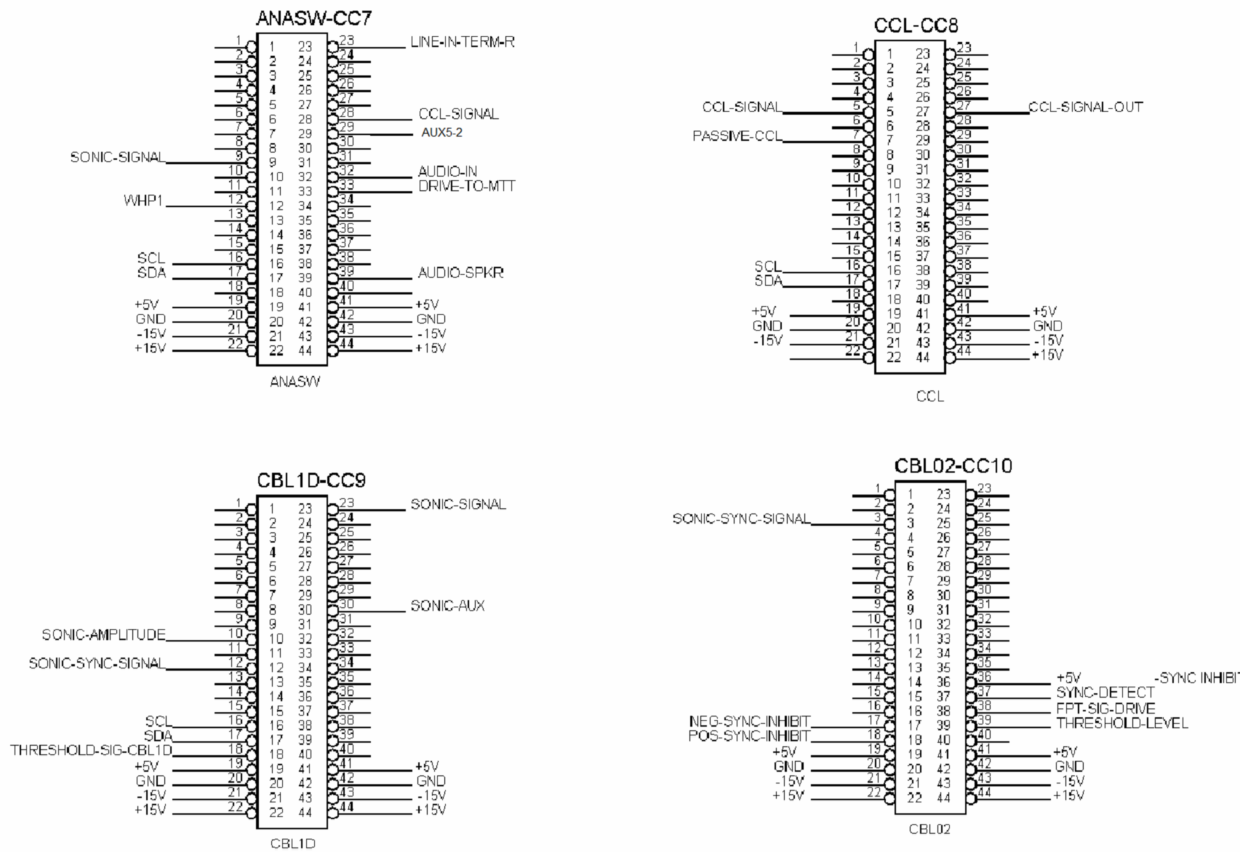


Fig 19.2 CPF Wiring Diagram

CARD CAGE 2/3



SCIENTIFIC DATA SYSTEMS, INC.

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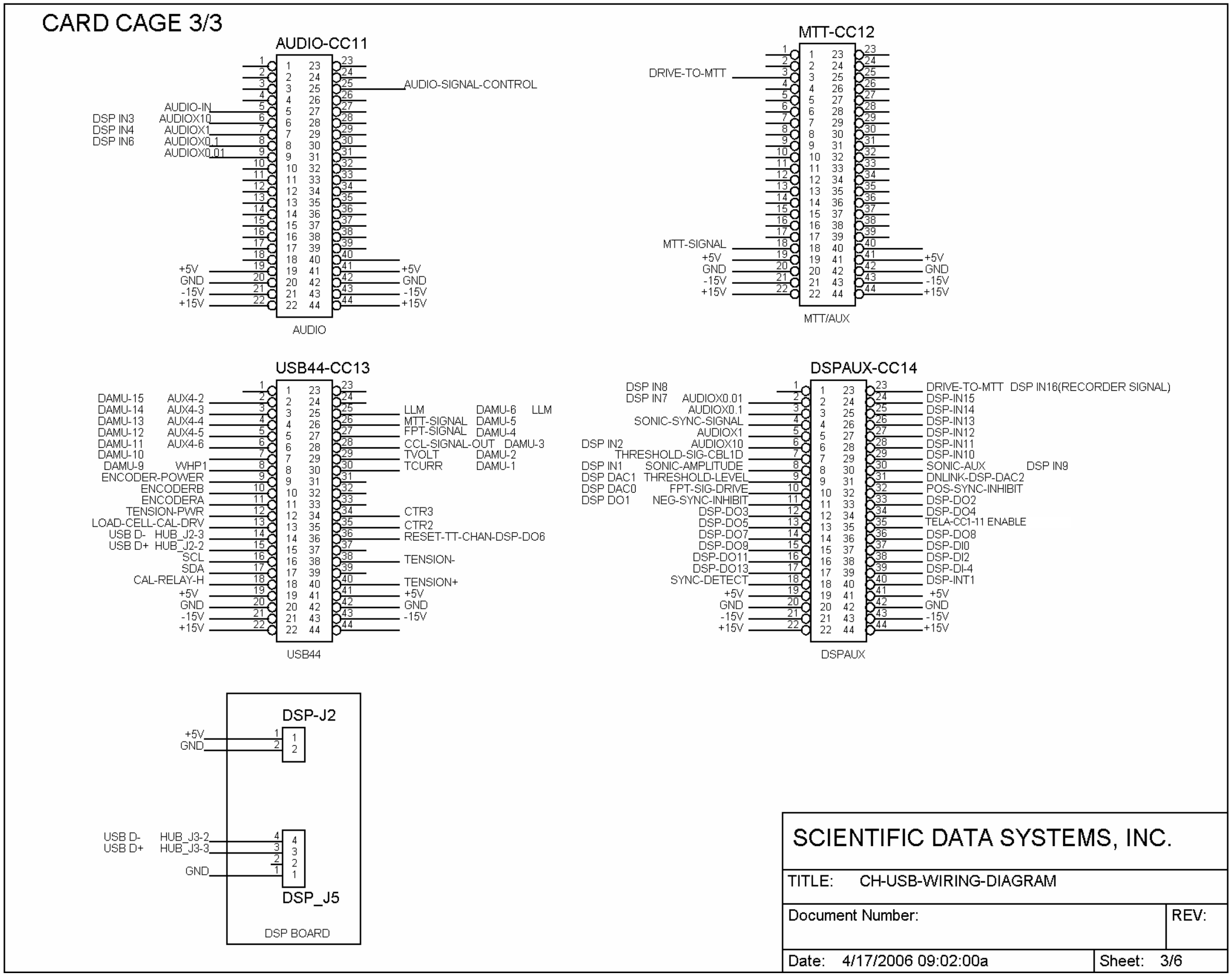
Document Number: REV:

Date: 4/17/2006 09:02:00a Sheet: 2/6


CARD CAGE 3/3
AUDIO-CC11
AUDIO-SIGNAL-CONTROL
AUDIO-IN
DSP IN3 AUDIOX10
DSP IN4 AUDIOX1
DSP IN6 AUDIOX0.1
AUDIOX0.01
+5V
GND
-15V
+15V
AUDIO
MTT-CC12
DRIVE-TO-MTT
MTT-SIGNAL
MTT/AUX
USB44-CC13
DAMU-15 AUX4-2
DAMU-14 AUX4-3
DAMU-13 AUX4-4
DAMU-12 AUX4-5
DAMU-11 AUX4-6
DAMU-10
DAMU-9 WHP1
ENCODER-POWER
ENCODERB
ENCODERA
TENSION-PWR
LOAD-CELL-CAL-DRV
USB D- HUB_J2-3
USB D+ HUB_J2-2
SCL
SDA
CAL-RELAY-H
LLM DAMU-6 LLM
MTT-SIGNAL DAMU-5
FPT-SIGNAL DAMU-4
CCL-SIGNAL-OUT DAMU-3
TVOLT DAMU-2
TCURR DAMU-1
CTR3
CTR2
RESET-TT-CHAN-DSP-DO6
TENSION-
TENSION+
USB44
DSPAUX-CC14
DSP IN8
DSP IN7 AUDIOX0.01
AUDIOX0.1
SONIC-SYNC-SIGNAL
AUDIOX1
DSP IN2 AUDIOX10
THRESHOLD-SIG-CBL1D
DSP IN1 SONIC-AMPLITUDE
DSP DAC1 THRESHOLD-LEVEL
DSP DAC0 FPT-SIG-DRIVE
DSP DO1 NEG-SYNC-INHIBIT
DSP-DO3
DSP-DO5
DSP-DO7
DSP-DO9
DSP-DO11
DSP-DO13
SYNC-DETECT
DRIVE-TO-MTT DSP IN16(RECORDER SIGNAL)
DSP-IN15
DSP-IN14
DSP-IN13
DSP-IN12
DSP-IN11
DSP-IN10
SONIC-AUX DSP IN9
DNLINK-DSP-DAC2
POS-SYNC-INHIBIT
DSP-DO2
DSP-DO4
TELA-CC1-11 ENABLE
DSP-DO8
DSP-DI0
DSP-DI2
DSP-DI4
DSP-INT1
DSPAUX
DSP-J2
USB D- HUB_J3-2
USB D+ HUB_J3-3
DSP_J5
DSP BOARD
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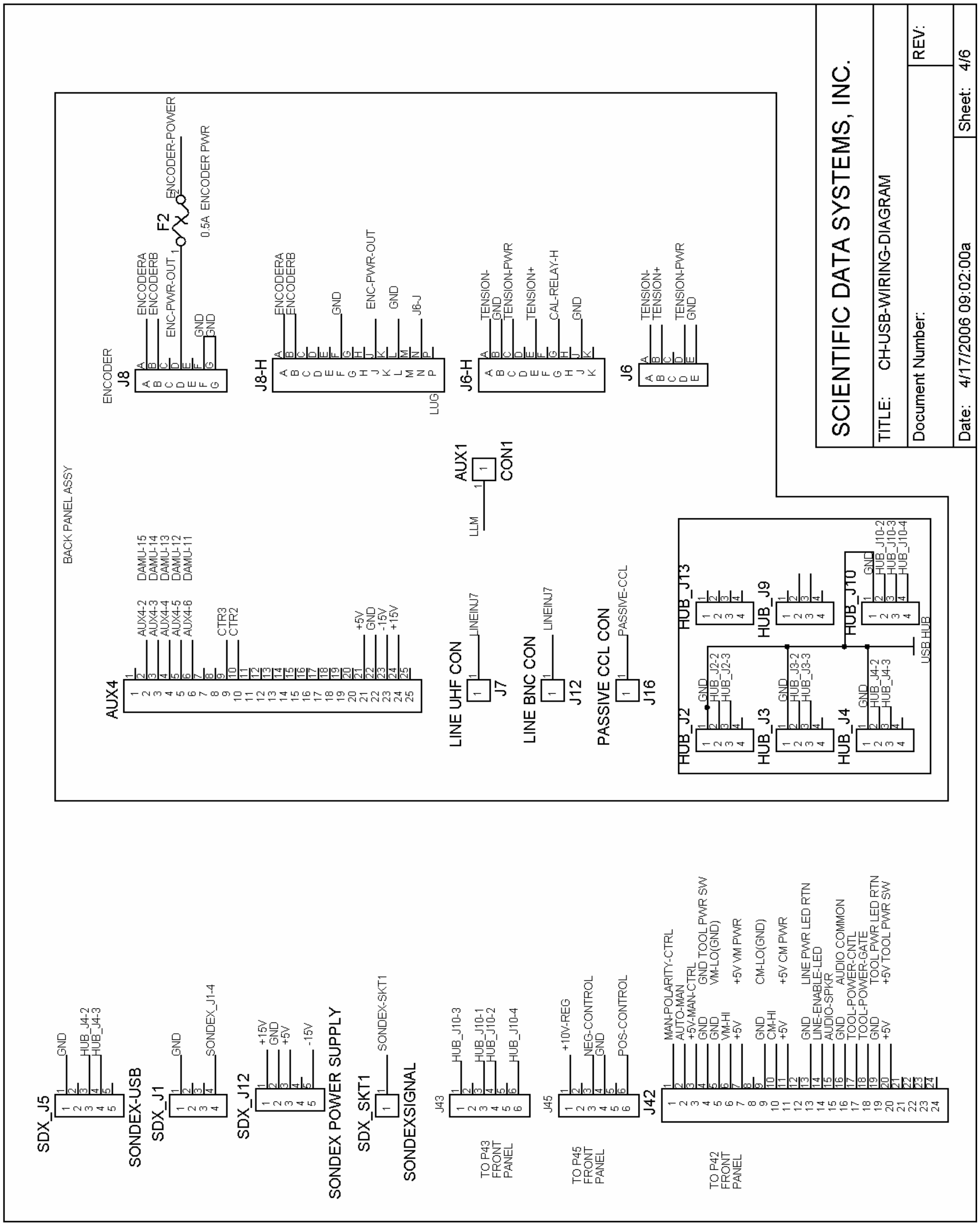
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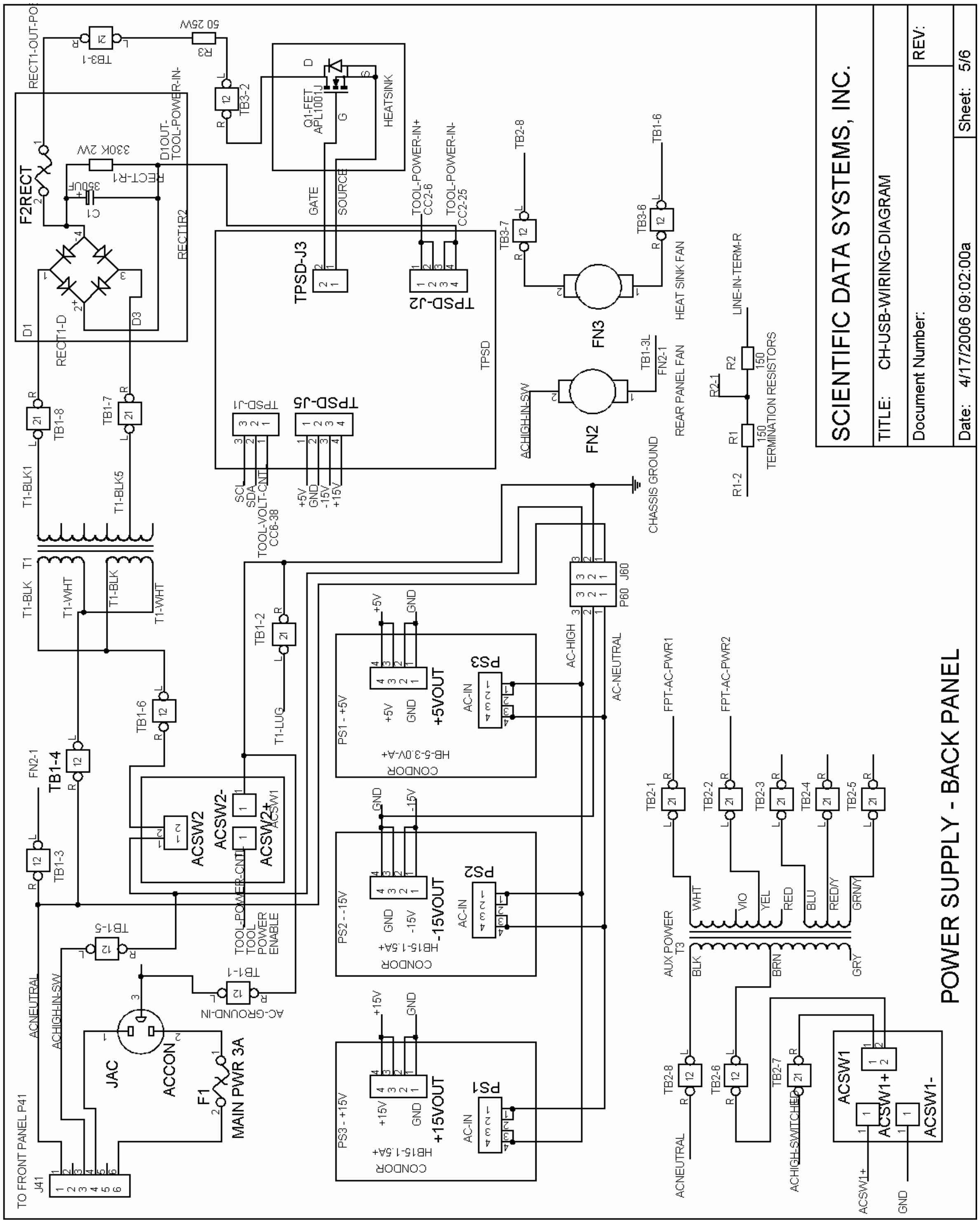
ENCODER J8
J8-H
J6-H
J6
F2
0.5A ENCODER PWR
AUX4
AUX1 CON1
LINE UHF CON J7
LINE BNC CON J12
PASSIVE CCL CON J16
HUB_J2
HUB_J3
HUB_J4
HUB_J13
HUB_J9
HUB_J10
USB HUB
SDX_J5 SONDEX-USB
SDX_J1
SDX_J12 SONDEX POWER SUPPLY
SDX_SKT1 SONDEXSIGNAL
J43 TO P43 FRONT PANEL
J45 TO P45 FRONT PANEL
J42 TO P42 FRONT PANEL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TITLE: CH-USB-WIRING-DIAGRAM
Document Number:
REV:
Date: 4/17/2006 09:02:00a
Sheet: 5/6
POWER SUPPLY - BACK PANEL
TPSD
TPSD-J3
TPSD-J2
TPSD-J5
TPSD-J1
FN2
FN3
REAR PANEL FAN
HEAT SINK FAN
TERMINATION RESISTORS
CHASSIS GROUND
PS1
PS2
PS3
+5VOUT
-15VOUT
+15VOUT
ACSW1
ACSW2
JAC
ACCON
F1
MAIN PWR 3A
F2RECT
AUX POWER
T3
TO FRONT PANEL P41
J41
P60
J60
HEATSINK
Q1-FET
APL1001J

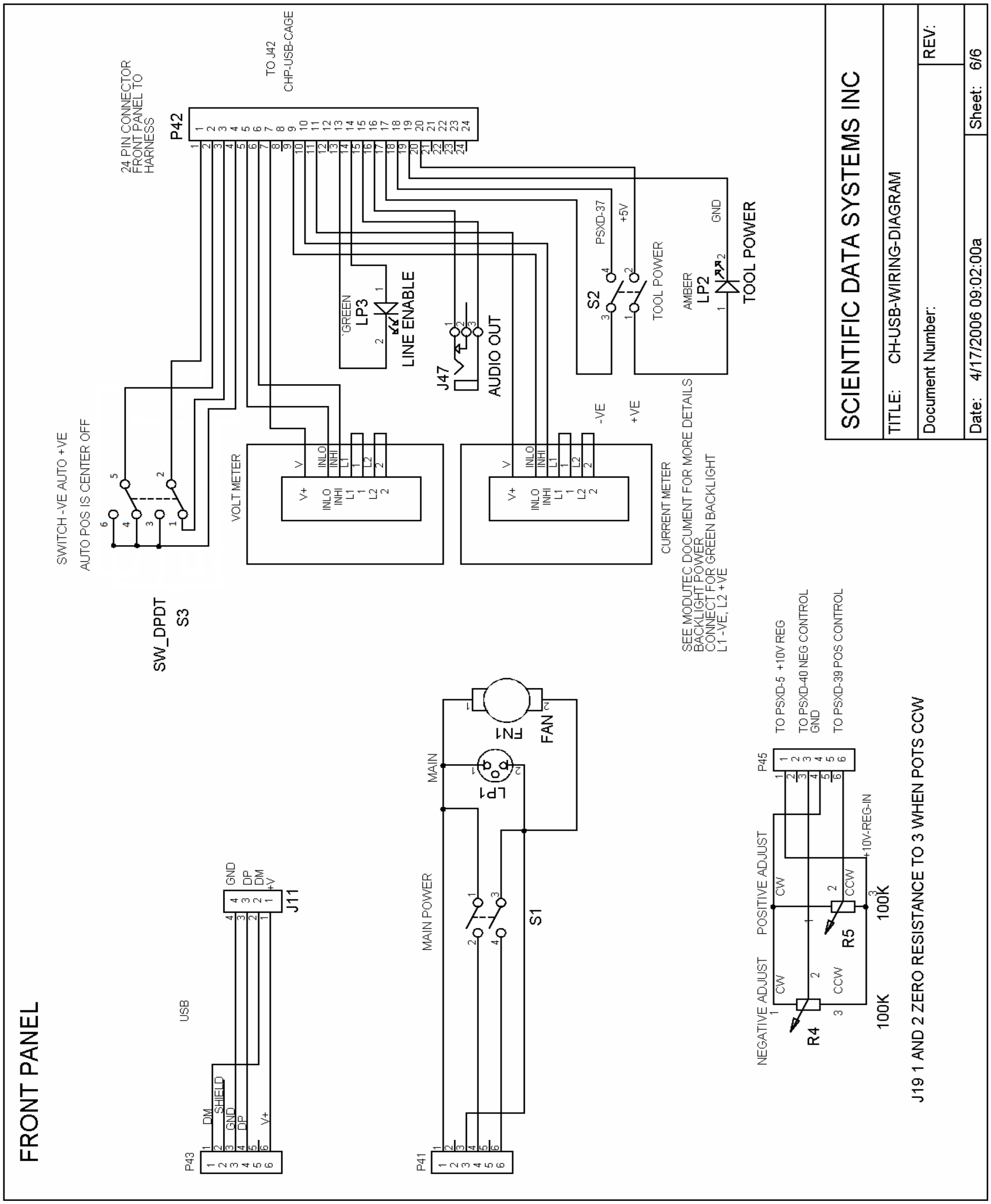


Fig 19.4 CPF Front Panel Wiring Diagram

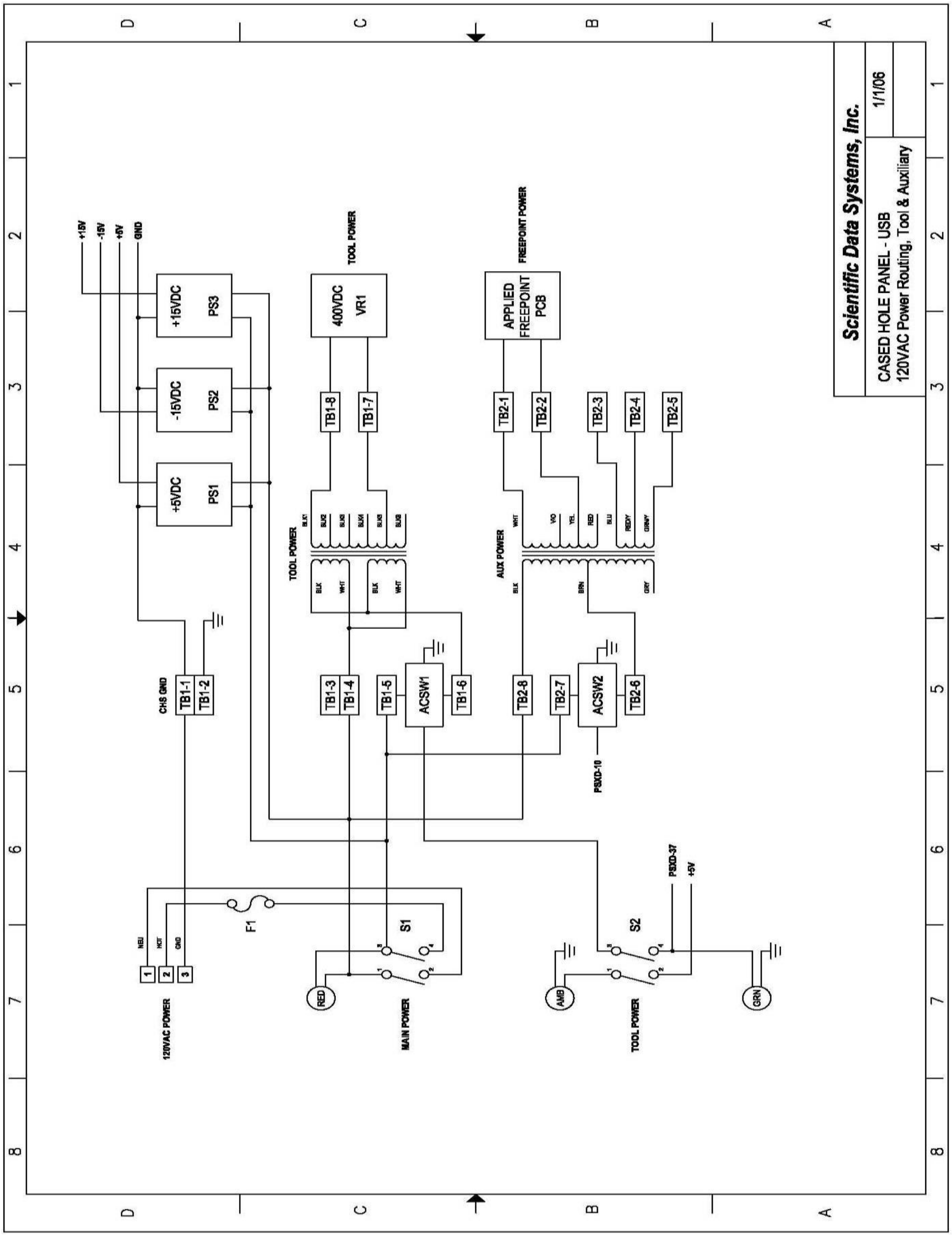


Fig 19.4 CPF Power Supply Wiring Diagram

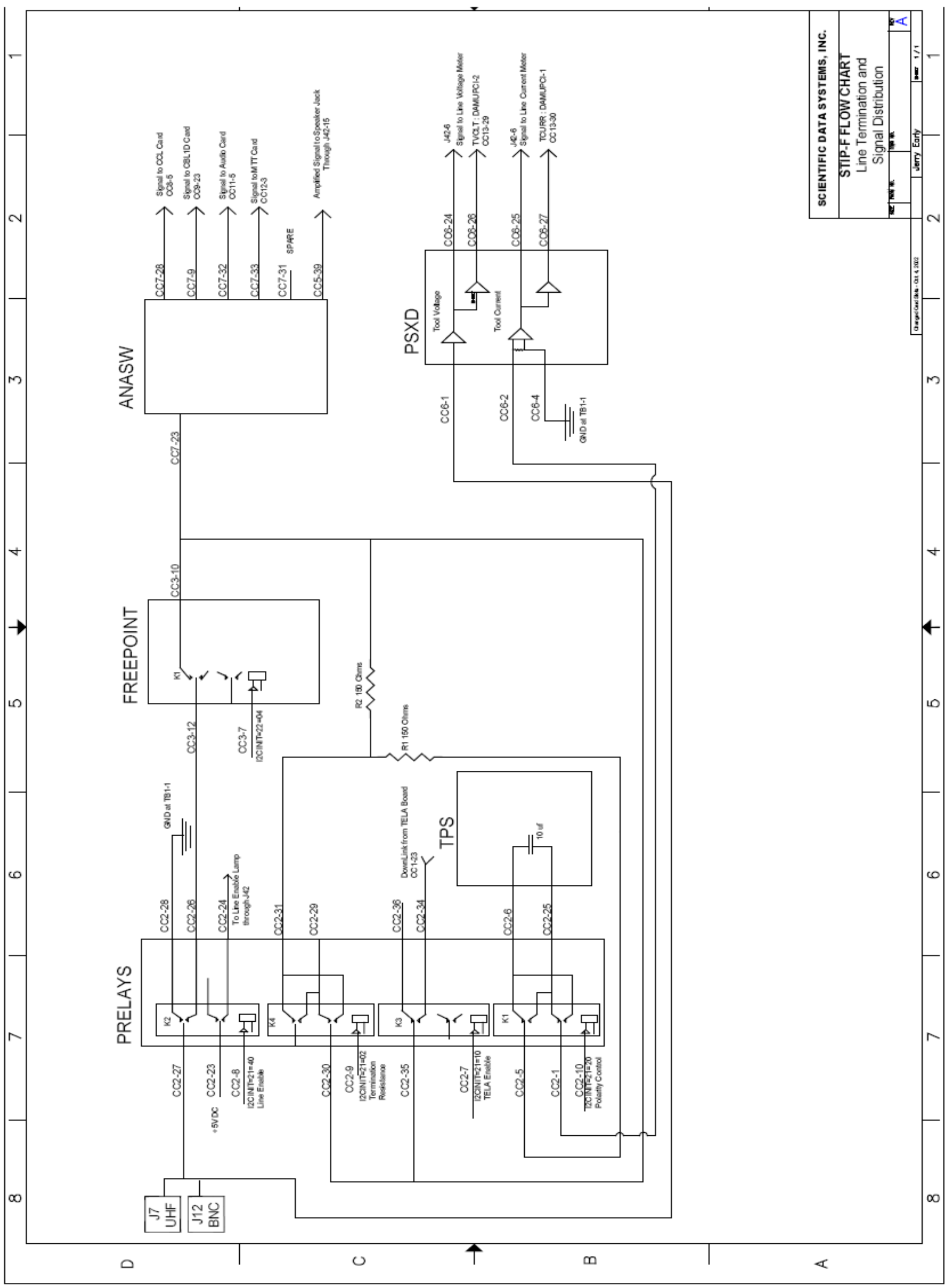


Fig 19.5 CPF Flow Chart

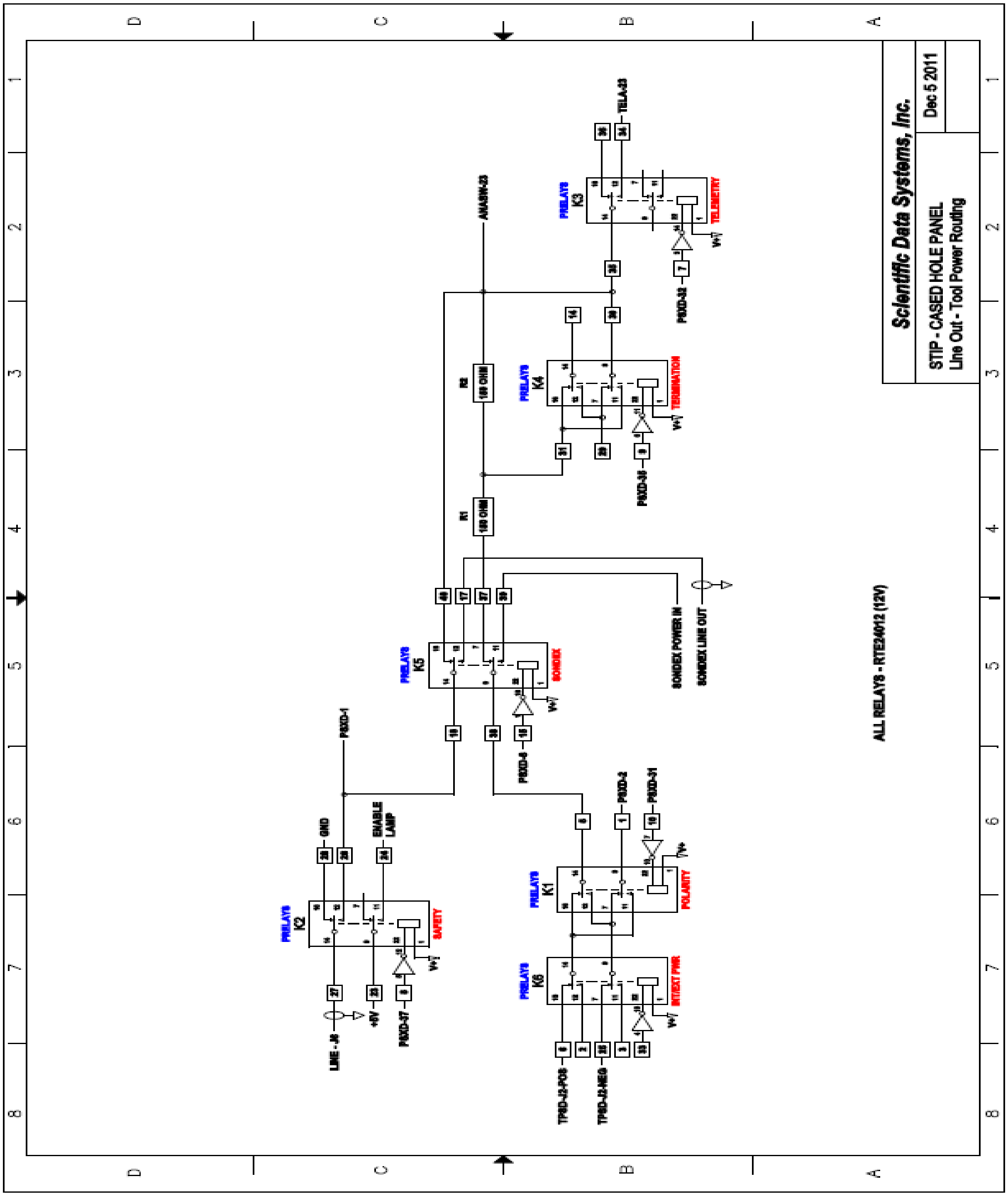
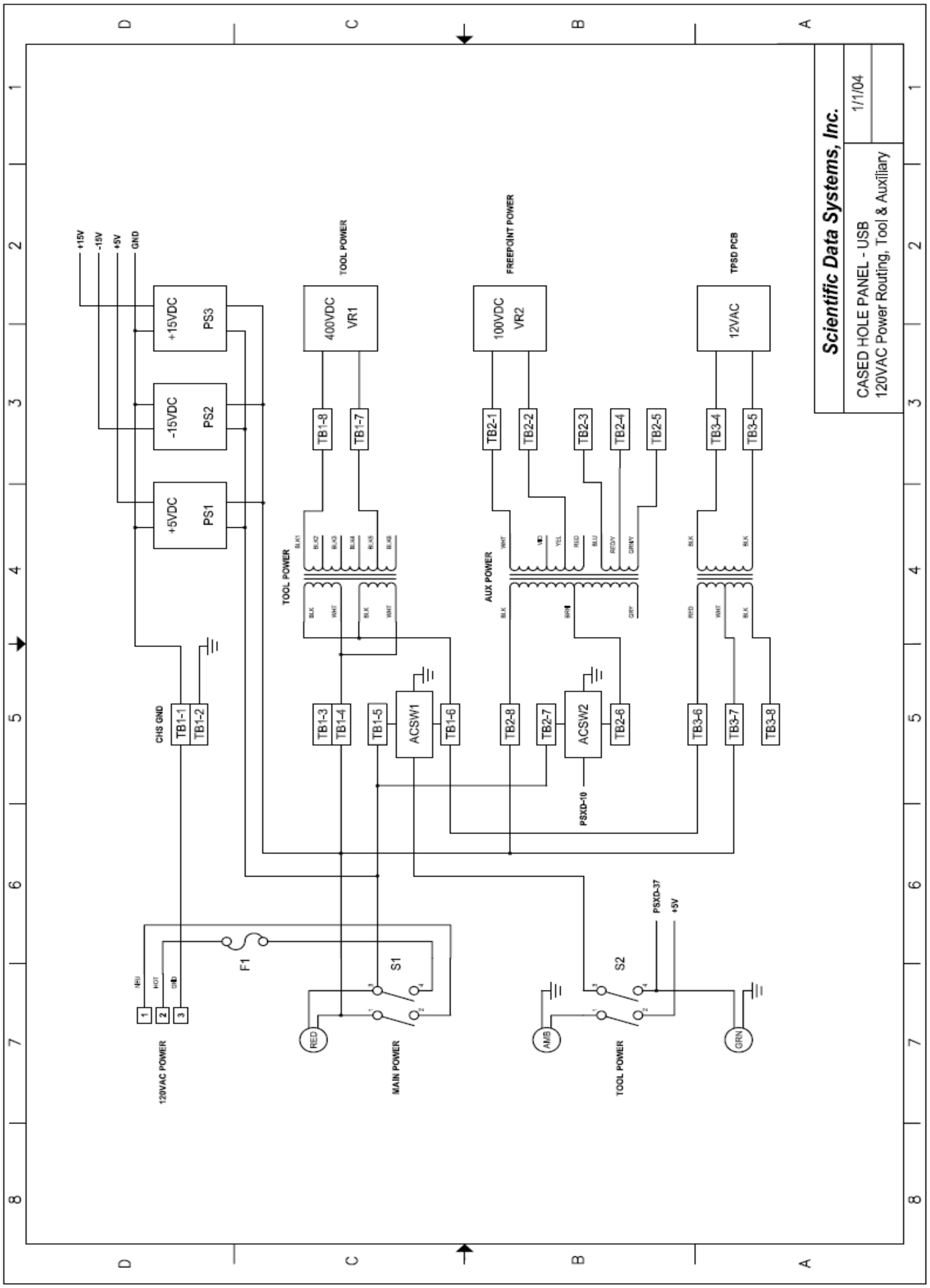
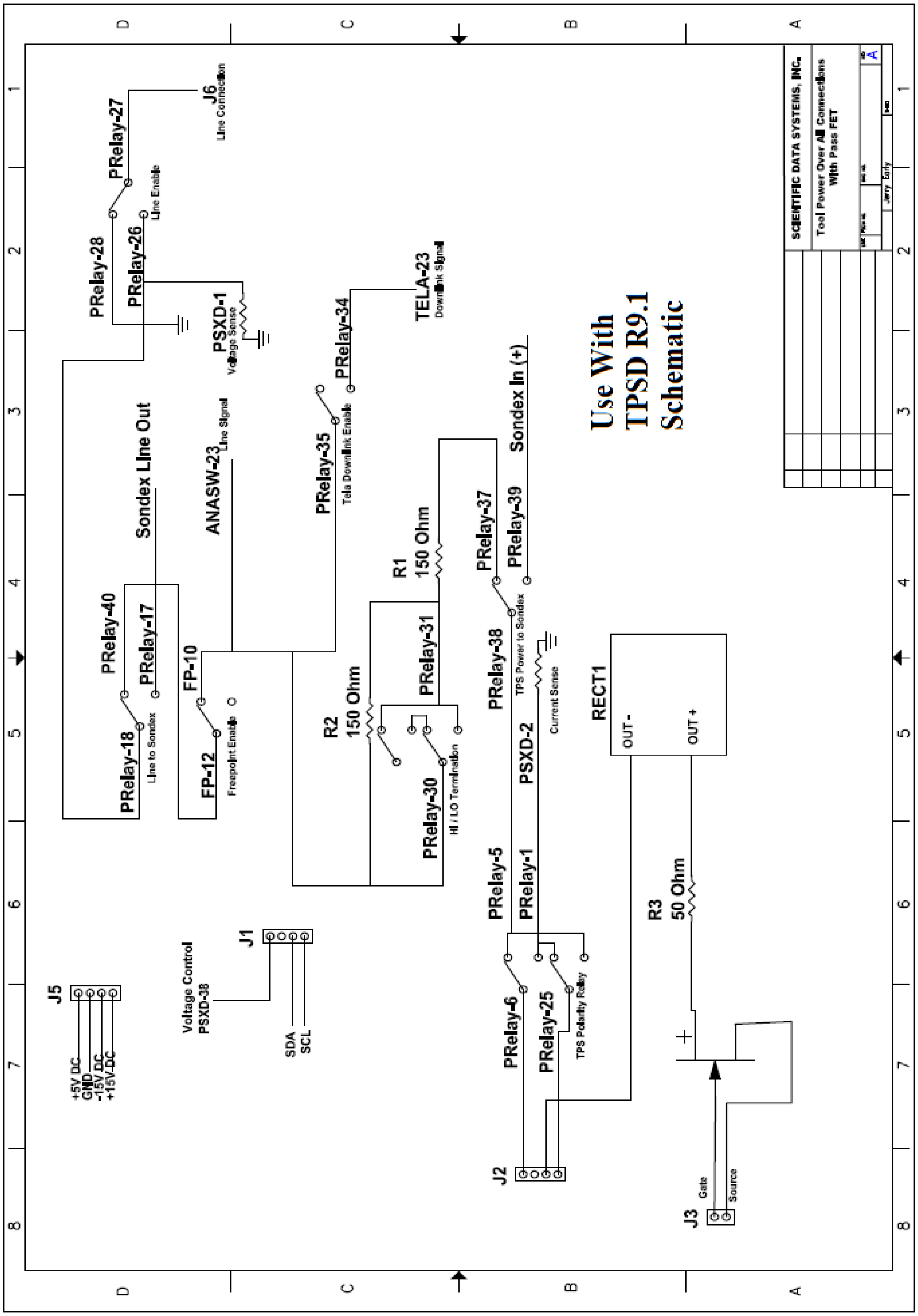


Fig 19.6 CPF Line Out Routing


Scientific Data Systems, Inc.
CASED HOLE PANEL - USB
120VAC Power Routing, Tool & Auxiliary
1/1/04
+15VDC
PS3
-15VDC
PS2
+5VDC
PS1
+15V
-15V
+5V
GND
400VDC
VR1
TOOL POWER
100VDC
VR2
FREEPOINT POWER
12VAC
TPSD PCB
TB1-8
TB1-7
TB2-1
TB2-2
TB2-3
TB2-4
TB2-5
TB3-4
TB3-5
TOOL POWER
AUX POWER
CHS GND
TB1-1
TB1-2
TB1-3
TB1-4
TB1-5
ACSW1
TB1-6
TB2-8
TB2-7
ACSW2
TB2-6
TB3-6
TB3-7
TB3-8
PSXD-10
PSXD-37
+5V
F1
S1
S2
RED
AMB
GRN
120VAC POWER
MAIN POWER
TOOL POWER



Use With
TPSD R9.1
Schematic
SCIENTIFIC DATA SYSTEMS, INC.
Tool Power Over All Connections
With Pass FET
Jerry Early
PRelay-27
PRelay-28
PRelay-26
Line Enable
J6
Line Connection
PSXD-1
Voltage Sense
PRelay-34
TELA-23
Downlink Signal
Sondex Line Out
ANASW-23
Line Signal
PRelay-35
Tela Downlink Enable
Sondex In (+)
PRelay-39
PRelay-37
R1
150 Ohm
PRelay-40
PRelay-17
PRelay-18
Line to Sondex
FP-10
FP-12
Freepoint Enable
R2
150 Ohm
PRelay-31
PRelay-30
HI / LO Termination
PRelay-38
TPS Power to Sondex
PSXD-2
Current Sense
RECT1
OUT -
OUT +
PRelay-5
PRelay-1
R3
50 Ohm
J1
Voltage Control
PSXD-38
SDA
SCL
J5
+5V DC
GND
-15V DC
+15V DC
PRelay-6
PRelay-25
TPS Polarity Relay
J2
J3
Gate
Source

Section

20

20 Wire List for STIP-F USB

Wire list for STIP-F USB -
(H)Halliburton
(B)Baker
Single conductor Tool Interface Panel
5/17/2018

BACK PANEL ASSEMBLY

JAC - AC Input

JAC-1	J41-4		BLUE	{S1-2}	AC Neutral
JAC-2	F1-1		BLACK		AC Line
JAC-3	TB1-1L		GREEN		Ground

F1 - Main Power (3 Amp)

F1-1	JAC-2		BLACK		AC Load
F1-2	J41-6		BLACK	{S1-4}	Fused AC Load

F2 - Encoder Power (.5 Amp)

F2-1	J8-D	(H)J8-J	BLACK		Fused Encoder Power
F2-2	CC13-9		BLACK		Encoder Power

J6 - Tension Input

J6-A	CC13-38			(BLK)	Line Tension Input Negative
J6-B	CC13-40			(RED)	Line Tension Input Positive
J6-C					
J6-D	CC13-12				Line Tension +15V Excitation
J6-E	CC12-20			(SHLD)	Ground

(H)J6 - Tension Input

(H)J6-A	CC13-38			(BLK)	Line Tension Signal-
(H)J6-B	CC12-20			(SHLD)	Ground
(H)J6-C	CC13-12				Line Tension +15V Excitation
(H)J6-D					
(H)J6-E	CC13-40			(RED)	Line Tension Input Positive
(H)J6-F					
(H)J6-G	CC13-18				Cal Relay
(H)J6-H					
(H)J6-J	(H)J8-LUG				Shield
(H)J6-K					

WHP1 - Well Head Pressure #1 {Not Normally Installed}

WHP1-A	CC7-11		WHITE	(BLK)	-(4-20MA) Input Negative
WHP1-B	CC7-10		WHITE	(RED)	+(4-20MA) Input Positive
WHP1-C					
WHP1-D	CC7-8		WHITE		WHP1 +15V Excitation
WHP1-E	CC7-20		WHITE	(SHLD)	Ground

WHP2 - Well Head Pressure #2 {Not Normally Installed}

WHP2-A	CC7-14		WHITE	(BLK)	-(4-20MA) Input Negative
WHP2-B	CC7-13		WHITE	(RED)	+(4-20MA) Input Positive
WHP2-C					
WHP2-D	CC7-18		WHITE		WHP2 +15V Excitation
WHP2-E	CC7-42		WHITE	(SHLD)	Ground

J7 - Line UHF Connector

J7	CC2-27	J12	BLACK		Logging Cable Connections
	Connect Shield to J7 Lug				

J12 - Line BNC Connector

J12	J7	{CC2-27}			Logging Cable Connections

J16 - CCL Passive Input BNC

J16	CC8-7		WHITE		Passive CCL Input

J8 - Encoder Input

J8-A	CC13-11				Encoder Phase A
J8-B	CC13-10				Encoder Phase B
J8-C					
J8-D	F2-1		BLACK		Fused Encoder Power
	F2-2	CC13-9	BLACK		
J8-E					
J8-F	J8 GND LUG		GREEN		Ground
J8-G	J8 GND LUG		GREEN		Shield Ground
J8-LUG	Connect Shield from J8-A&B to Connector screw		GREEN		

(H)J8 - Encoder Input

(H)J8-A	CC13-11				Encoder Phase A
(H)J8-B	CC13-10				Encoder Phase B
(H)J8-C					
(H)J8-D					
(H)J8-E					
(H)J8-F	J8 GND LUG				Ground
(H)J8-G					
(H)J8-H					
(H)J8-J	F2-1				Fused Encoder Power
(H)J8-K					
(H)J8-L	J8 GND LUG				Shield Ground
(H)J8-M					
(H)J8-LUG	(H)J6-J				
	Connect Shield from (H)J8-A&B to J8 GND LUG				

AUX1 - LLM or -10 to +10 Analog Signal

AUX1	CC13-25		WHITE		

AUX4 - Auxiliary Inputs

AUX4-2	CC13-2		WHITE		BASE - 15
AUX4-3	CC13-3		WHITE		BASE - 14
AUX4-4	CC13-4		WHITE		BASE - 13
AUX4-5	CC13-5		WHITE		BASE - 12
AUX4-6	CC13-6		WHITE		BASE - 11
AUX4-9	CC13-34		WHITE		CTR4
AUX4-10	CC13-35		WHITE		CTR3
AUX4-21	CC1-19		BLACK		+5V
AUX4-22	CC1-20		GREEN		GND
AUX4-23	CC1-21		BLACK		-15V
AUX4-24	CC1-22		BLACK		+15V

FN2 - Rear Fan

FN2-1	TB1-3L				AC Neutral
FN2-2	TB1-5L				AC Line

Top RS232

3	HUB_J18-1		WHITE		Tx Typically “C”
2	HUB_J18-2		WHITE		Tx Typically “C”
5	HUB_J18-3		GREEN		GND

Middle RS232

3	HUB_J18-4		WHITE		Tx Typically “A”
2	HUB_J18-5		WHITE		Tx Typically “A”
5	HUB_J18-3		GREEN		GND

RS485

1	HUB_J16-4		WHITE		D+ Typically “B”
2	HUB_J16-5		WHITE		D- Typically “B”
6	HUB_J16-2		WHITE		D+ Typically “D”
7	HUB_J16-3		WHITE		D- Typically “D”
5	HUB_J16-1		GREEN		GND

USB Hub

HUB J9 - To USB44

HUB_J2-1	CC13-20			{Shield}	
HUB_J2-2	CC13-15			{Red}	
HUB_J2-3	CC13-14			{Black}	
HUB_J2-4					

HUB J10 - To DSP

HUB_J3-1	DSP_J5-1			{Shield}	
HUB_J3-2	DSP_J5-3			{Red}	
HUB_J3-3	DSP_J5-4			{Black}	
HUB_J3-4					

HUB J1 - Sondex Ultralink

HUB_J4-1	SDX_J5-1			{Shield}	
HUB_J4-2	SDX_J5-3			{Red}	
HUB_J4-3	SDX_J5-4			{Black}	
HUB_J4-4					

HUB J15 J4 J2 - Spare

HUB_J4-1					
HUB_J4-2					
HUB_J4-3					
HUB_J4-4					

HUB J7 - Hub Power

HUB_J9-1					
HUB_J9-2	CC13-42		GREEN		GND
HUB_J9-3	CC13-41		BLACK		+5V
HUB_J9-4					

HUB J8 - FacePlate USB

HUB_J10-1	J48-BLK			
HUB_J10-2	J48-GRN			
HUB_J10-3	J48-WHT			
HUB_J10-4	J48-RED			

HUB J16 - RS232

HUB_J16-1	Top RS232 3		WHITE		Tx Typically “C”
HUB_J16-2	Top RS232 2		WHITE		Tx Typically “C”
HUB_J16-3	Both Ports		GREEN		GND
HUB_J16-4	Top RS232 3		WHITE		Tx Typically “A”
HUB_J16-5	Top RS232 2		WHITE		Tx Typically “A”

HUB J18 – RS485

HUB_J18-1	RS485 5		GREEN		GND
HUB_J18-2	RS485 6		WHITE		D+ Typically “D”
HUB_J18-3	RS485 7		WHITE		D- Typically “D”
HUB_J18-4	RS485 1		WHITE		D+ Typically “B”
HUB_J18-5	RS485 2		WHITE		D- Typically “B”

(B) AUX5 -PFC Input

AUX5-2	CC7-29				PFC Signal
AUX5 Lug	(CC7-29) Shield				Shield

(H) J1 -Extermal Power

J1-A	TB1-2R				Ground
J1-B	CC2-2				EXT Power High
J1-C					
J1-D					
J1-E	CC2-3				EXT Power Low

Sondex Ultralink Wiring

SDX_J5 - Sondex USB

SDX_J5-1	HUB_J4-1			{Shield}	
SDX_J5-2					
SDX_J5-3	HUB_J4-4			{Red}	
SDX_J5-4	HUB_J4-3			{Black}	
SDX_J5-5					

SDX_J1 -

SDX_J1-1	TB1-1L		GREEN		Ground
SDX_J1-2					
SDX_J1-3					
SDX_J1-4	CC2-39		BLACK		Tool Power

SDX_SKT1 - Sondex Signal

SDX_SKT1	CC2-17				

SDX_J12 - Sondex DC Supply Power

SDX_J12-1	TPSD-J5-2	{PS2-S-}	BLACK		-15V
SDX_J12-2					
SDX_J12-3	TPSD-J5-4	{PS1-S+}	BLACK		+5V
SDX_J12-4	TPSD-J5-3	{PS3-S-}	GREEN		GND
SDX_J12-5	TPSD-J5-1	{PS3-S+}	BLACK		+15V

HORIZONTAL PLATE ASSEMBLY

TB1

TB1-1L	JAC-3	SDX_J1-1	GREEN		Ground
TB1-1R	TB1-2R	J60-2	GREEN		Ground
TB1-2L	T1-Lug		GREEN		Ground
TB1-2R	TB1-1R		GREEN		Ground
TB1-3L	FN2-1	J41-1	BLUE		AC Neutral (Switched)
TB1-3R	TB1-4R	J60-1	BLUE		AC Neutral (Switched)
TB1-4L	T1-P1 BLK	T1-P2 RED			AC Neutral (Switched)
TB1-4R	TB1-3R	TB3-7R	{FN3-1}		AC Neutral (Switched)
TB1-5L	FN2-2	J41-3	BLACK		AC Line (Switched)
TB1-5R	J60-3	ACSW3-ACIN	BLACK		AC Line (Switched)
TB1-6L	T1-P1 BRN	T1-P2 ORG			Switched Tool Power Primary
TB1-6R	TB3-6R	{FN3-2}	BLUE		Switched Tool Power Primary
TB1-7L	T1-S1 GRN	ACSW3-ACIN			AC Tool Power Secondary (1)
TB1-7R	ACSW3-ACOUT				AC Tool Power Secondary (1)
TB1-8L	T1-S1 YEL				AC Tool Power Secondary (2)
TB1-8R	ACSW3-ACOUT				AC Tool Power Secondary (2)

J60 - AC Power to DC Supplies

J60-1	TB1-3R		BLUE		AC Neutral (switched)
J60-2	TB1-1R		GREEN		AC GND
J60-3	TB1-5R		BLACK		AC Line (switched)

T1 - Tool Power Transformer

T1-P1 BLK	TB1-4L				Primary 1 Black
T1-P1 BRN	TB1-6L				Primary 1 Brown
T1-P2 RED	TB1-4L				Primary 2 Red
T1-P2 ORG	TB1-6L				Primary 2 Orange
T1-S1 GRN	TB1-7L				Secondary 1 Green
T1-S2 YEL	TB1-8L				Secondary 1 Yellow
T1-S3 BLU		N/C			Secondary 1 Blue

ACSW3

ACSW3-IN	TB1-5R		BLACK		AC Line
ACSW3-IN	TB1-6R		BLUE		AC Tool Power Primary
ACSW3OUT	TB1-7R				AC Tool Power Secondary
ACSW3OUT	TB1-8R				AC Tool Power Secondary
ACSW3-R+	J42-17		BLACK		Switched Line Enable
ACSW3-R-	CC4-20		GREEN		Ground
ACSW3-C+	C1(+)		BLACK		DC Voltage HIGH
ACSW3-C+	TB3-2R	{R3}	BLACK		DC Voltage HIGH
ACSW3-C-	C1(-)		BLACK		DC Voltage LOW
ACSW3-C-	TPSD-J2-NEG		BLACK		DC Voltage LOW

R1 - 150 Ohm Termination

R1-1	R2-1	{CC2-31}	BLACK	(H)L1-1	
R1-2	CC2-37		BLACK		

R2 - 150 Ohm Termination

R2-1	R1-1	CC2-31	BLACK		
R2-2	CC2-35	{CC2-30}, {CC3-10}, {CC6-1}, {CC7-23}	BLACK		Line input

(H)L1 -35mh

L1-1	R1-1	CC2-31			
L1-2	CC2-35	{CC2-30}, {CC3-10}, {CC6-1}, {CC7-23}			Line input

C1- 320uf @ 450 VDC

C1(+)	ACSW3-C+		BLACK		
C1(-)	ACSW3-C-		BLACK		

TPSD - Tool Power Supply Regulator

TPSD - J1

J1-1	CC6-38		WHITE		TPSD Voltage Control
J1-2	CC8-17		WHITE		SDA - I2C Data
J1-3	CC8-16		WHITE		SCL - I2C Clock

TPSD - J2

J2-1/2	CC2-6		BLACK		TP High Side
J2-2/1					TP High Side
J2-3/4	ACSW-C-		BLACK		TP - Low Side
J2-4/3	CC2-25		BLACK		TP - Low Side

TPSD - J3

J3-1	TPSD-J3-2	(B)J65-3	BLACK	{(B)S4-5}	PFC Limit Switch
J3-2	Q1-S	TPSD-J3-1	BLACK	(B)J65-1	omit J3-1 and 2 jumper for Baker
J3-3	Q1-G				

TPSD - J5

J5-1	PS1-S+	SDX_J12-3	BLACK		+5V
J5-2	PS3-S-	SDX_J12-2	GREEN		GND
J5-3	PS2-S-	SDS_J12-5	BLACK		-15V
J5-4	PS3-S+	SDX_J12-1	BLACK		+15V

Heat Sink - Q1

Q1-S	TPSD-J3-2		BLACK		
Q1-G	TPSD-J3-3		BLACK		
Q1-D	TB3-1R	{ACSW3-C+}	BLACK		

Fan #3 - Heat Sink Fan

FN3-1	TB3-6R				
FN3-2	TB3-7R				

VERTICAL PLATE ASSEMBLY

P60 - AC Power to DC Supplies

P60-1	PS1-1		BLUE		AC Neutral
P60-2	PS2-S+		GREEN		AC GND
P60-3	PS1-2		BLACK		AC Line

TB3

TB3-1	R3-2	Q1-D	BLACK		DC to Pass FET
TB3-2	R3-1	ACSW3-C+	BLACK		DC Supply

TB3-3					
TB3-4					
TB3-5					
TB3-6	FN3-1	TB1-6R			Switched Tool Power Primary
TB3-7	FN3-2	TB1-4R			120V Switched Tool Power Primary
TB3-8					

R3 - 50 Ohm

R3-1	TB3-2L		BLACK		DC to Pass Transistors
R3-2	TB3-1L		BLACK		DC Supply

PS1 - (+)5 Volt Supply

PS1-1	P60-1	PS1-3	BLUE		AC Neutral (Switched)
PS1-2	P60-3	PS1-4	BLACK		AC Line (Switched)
PS1-3	PS2-1	PS1-1	BLUE		AC Neutral (Switched)
PS1-4	PS2-2	PS1-2	BLACK		AC Line (Switched)
PS1-S+	CC11-19	CC13-19	BLACK	TPSD-J5-1 DSP_J2-1	+5 Volt
PS1-S-	PS2-S+	CC13-20	GREEN	GND LUG DSP_J2-2	Ground

PS2 - (-)15V Supply

PS2-1	PS1-3		BLUE		
PS2-2	PS1-4		BLACK		
PS2-3	PS3-3		BLUE		
PS2-4	PS3-2		BLACK		
PS2-S+	P60-2	PS3-S- PS1-S-	GREEN	CC11-20	Ground
PS2-S-	CC10-21	TPSD-J5-3	BLACK		-15 Volt

PS3 - (+)15V Supply

PS3-1	PS3-3		BLUE		
PS3-2	PS2-4		BLACK		
PS3-3	PS2-1		BLUE		
PS3-4	PS3-2		BLACK		
PS3-S+	CC10-22	TPSD-J5-4	BLACK		+15 Volt
PS3-S-	PS2-S+	TPSD-J5-2	GREEN		Ground

CARD CAGE ASSEMBLY

CC1 – TELA

CC1-11	CC14-35		WHITE		Down link termination control
CC1-16	CC3-16		WHITE		I2C Clock
CC1-17	CC3-17		WHITE		I2C Data
CC1-19	CC1-41	CC2-41	BLACK		+5V
CC1-20	CC1-42	CC2-42	GREEN		GND
CC1-21	CC1-43	CC2-43	BLACK		-15V
CC1-22	CC1-44	CC2-44	BLACK		+15V
CC1-23	CC2-34		BLACK		TELA Downlink to Line
CC1-26	CC14-31		WHITE		Downlink Telemetry (DSP DAC2)
CC1-41	CC1-19	AUX4-21	BUSS		+5V
CC1-42	CC1-20	AUX4-22	BUSS		GND
CC1-43	CC1-21	AUX4-23	BUSS		-15V
CC1-44	CC1-22	AUX4-24	BUSS		+15V

CC2 – PRELAYS

CC2-1	CC6-2		BLACK		(I Meas In+)
CC2-2	(H)J1-B				(H) EXT Power High
CC2-3	(H)J1-E				(H) EXT Power Low
CC2-5	CC2-38		BLACK		Tool Power to Sondex Relay
CC2-6	TPSD-J2-2	{TPSD-J2-1}	BLACK		TP High Side
CC2-7	CC6-32		WHITE		TELA Enable Control - I2CInit=21=10
CC2-8	CC6-37	{J42-18}	WHITE		Tool Power Gate - I2CInit=21=40
CC2-9	CC6-35		WHITE		Low Termination - I2CInit=21=02
CC2-10	CC6-31		WHITE		Polarity Control - I2CInit =21=20
CC2-13	CC13-13		WHITE		Load Cell Cal Drive - I2CInit=22=02
CC2-15	CC6-6		WHITE		Sondex Enable - I2CInit=22=80
CC2-16	CC6-12		WHITE		Load Cell Cal Control - I2CInit=22=02
CC2-17	SDX_SKT1				Sondex
CC2-18	CC2-26	{CC6-1}	BLACK		Enabled Line
CC2-19	CC2-41	CC3-41	BUSS		+5V
CC2-20	CC2-42	CC3-42	GREEN		GND
CC2-21	CC2-43	CC3-43	BUSS		-15V

CC2-22	CC2-44	CC3-44	BUSS		+15V
CC2-23	CC2-41		BLACK		(+5V) TP Light Supply
CC2-24	J42-14		BLACK		(LP3-2+) Tool Power Light
CC2-25	TPSD-J2-4	{TPSD-J2-3}	BLACK	{ACSW3-C-}	Low Side Reg. Tool Power
CC2-26	CC2-18	CC6-1	BLACK		Enabled Line
CC2-27	J7	{J12}			(Line Input)
CC2-28	CC2-42		GREEN		Line To Ground
CC2-30	CC2-35	CC2-40	BLACK	{R2-2}, {CC7-23}	(Line Input) Termination Resistor
CC2-31	R2-1	{R1-1}	BLACK	(H)L1-1	Line Termination
CC2-33(H)	CC6-18(H)				External Power Enable - I2CInit=21=80
CC2-34	CC1-23		BLACK		TELA Downlink
CC2-35	CC2-30	R2-2	BLACK	{CC2-40}, {CC7-23}	(Line Input) Termination Resistor
CC2-37	R1-2	(H)L1-2	BLACK		Line Termination
CC2-38	CC2-5		BLACK		Tool Power to Sondex Relay
CC2-39	SDX_J1-4		BLACK		Sondex Tool Power
CC2-40	CC2-30	CC3-12	BLACK	{CC2-30}{CC2-35}	
CC2-41	CC2-19	CC1-19	BLACK	CC2-23	+5V
CC2-42	CC2-20	CC1-20	GREEN	CC2-28	GND
CC2-43	CC2-21	CC1-21	BUSS		-15V
CC2-44	CC2-22	CC1-22	BUSS		+15V

CC3 -Line Aux (Not Installed)

CC3-4	CC13-27		WHITE		Signal Out (Base-4)
CC3-7	CC6-11		WHITE		I2CInit=22=04
CC3-8	CC6-13		WHITE		I2CInit=22=01
CC3-10	CC3-12	CC7-23	BLACK		Line Input
CC3-12	CC3-10	CC2-40	BLACK	{CC2-30}{CC2-35}	Line Input
CC3-16	CC1-16	CC6-16	WHITE		I2C Clock
CC3-17	CC1-17	CC6-17	WHITE		I2C Data
CC3-19	CC3-41	CC4-41		(B)J45-2	+5V
CC3-20	CC3-42	CC4-42	BUSS		GND
CC3-21	CC3-43	CC4-43			-15V
CC3-22	CC3-44	CC4-44	BUSS		+15V
CC3-41	CC2-19	CC3-19	BUSS		+5V
CC3-42	CC2-20	CC3-20	GREEN		GND
CC3-43	CC2-21	CC3-21	BUSS		-15V

CC3-44	CC2-22	CC3-22	BUSS		+15V

CC4 - SPARE

CC4-19	CC4-41	CC5-41	BLACK		+5V
CC4-20	CC4-42	CC5-42	GREEN		GND
CC4-21	CC4-43	CC5-43	BUSS		-15V
CC4-22	CC4-44	CC5-44	BUSS		+15V
CC4-41	CC3-19	CC4-19	BUSS		+5V
CC4-42	CC3-20	CC4-20	GREEN		GND
CC4-43	CC3-21	CC4-21	BUSS		-15V
CC4-44	CC3-22	CC4-22	BUSS		+15V

CC5 – SPARE

CC5-19	CC5-41	CC6-41	BUSS		+5V
CC5-20	CC5-42	CC6-42	GREEN		GND
CC5-21	CC5-43	CC6-43	BUSS		-15V
CC5-22	CC5-44	CC6-44	BUSS		+15V
CC5-41	CC4-19	CC5-19	BUSS		+5V
CC5-42	CC4-20	CC5-20	GREEN		GND
CC5-43	CC4-21	CC5-21	BUSS		-15V
CC5-44	CC4-22	CC5-22	BUSS		+15V

CC6 - PSXD

CC6-1	CC2-26	{CC2-18}	BLACK		Ve Meas In+
CC6-2	CC2-1		BLACK		I Meas In+
CC6-5	J45-1		BLACK		+5V Regulated to tool Voltage pots
CC6-6	CC2-15		WHITE		I2CInit=22=80 (Sondex Enable)
CC6-7					I2CInit=22=40
CC6-8					I2CInit=22=20
CC6-9					I2CInit=22=10
CC6-10					I2CInit=22=08
CC6-11	CC3-7		BLACK		I2CInit=22=04
CC6-12	CC2-16		WHITE		I2CInit=22=02 (LLM Relay Control)
CC6-13	CC3-8		WHITE		I2CInit=22=01
CC6-15	(B)J45-5				PFC Switch Indicator
CC6-16	CC3-16	CC9-16	BUSS	CC7-38	SDA - I2C Clock
CC6-17	CC3-17	CC7-17	WHITE		SCL - I2C Data
CC6-18(H)	CC2-33(H)				I2CInit=21=80 (Halliburton External Pwr)
CC6-19	CC6-41	CC7-41	BUSS		+5V
CC6-20	CC6-42	CC7-42	GREEN	CC6- 4	GND

CC6-21	CC6-43	CC7-43	BUSS		-15V

CC6-22	CC6-44	CC7-44	BUSS		+15V
CC6-24	J42-6		WHITE		VM-HI
CC6-25	J42-10		WHITE		CM-HI
CC6-26	CC13-29		WHITE		TVOLT (Base-2)
CC6-27	CC13-30		WHITE		TCURR (Base-1)
CC6-28	J42-3		WHITE		+5V PU for Manual Polarity Control
CC6-29	J42-1		WHITE		High -> POS, GND -> NEG
CC6-30	J42-2		WHITE		Open -> AUTO, GND -> Pos/Neg
CC6-31	CC2-10		WHITE		I2CInit=21=20 (Polarity w/ Manual Override)
CC6-32	CC2-7		WHITE		I2CInit=21=10 (TELA Enable)
CC6-33	CC11-25		WHITE		I2CInit=21=08 (Audio Signal Control)
CC6-34					I2CInit=21=04
CC6-35	CC2- 9		WHITE		I2CInit=21=02 Low Termination
CC6-36					I2CInit=21=01
CC6-37	CC2-8	J42-18	WHITE		I2CInit=21=40 (Line Enable Control)
CC6-38	TPSD-J1-1		WHITE		Voltage Control to TPS
CC6-39	J45-6		BLACK		Pos Control
CC6-40	J45-3		BLACK		Neg Control
CC6-41	CC5-19	CC6-19	BUSS		+5V
CC6-42	CC5-20	CC6-20	GREEN	J42-4	GND
CC6-43	CC5-21	CC6-21	BUSS		-15V
CC6-44	CC5-22	CC6-22	BUSS		+15V

CC7 - ANASW

CC7-8	WHP1-D		WHITE		WHP1 Excitation
CC7-9	CC9-23		WHITE		Signal to CBL01
CC7-10	WHP1-B		WHITE		+(4-20MA) Input Positive
CC7-11	WHP1-A		WHITE		-(4-20MA) Input Negative
CC7-12	CC13-8		WHITE		WHP1 Signal
CC7-13	WHP2-B		WHITE		+(4-20MA) Input Positive
CC7-14	WHP2-A		WHITE		-(4-20MA) Input Negative
CC7-15	CC13-7		WHITE		WHP2 Signal
CC7-16	CC7-38	CC8-38	BUSS		SCL - I2C Clock
CC7-17	CC6-17	CC8-39	BUSS		SDA - I2C Data
CC7-18	WHP2-D		WHITE		WHP2 Excitation

CC7-19	CC7-41	CC8-41	BUSS	J42-7	+5V
CC7-20	CC7-42	CC8-42	WHITE	J42-5 WHP1-E	GND
CC7-21	CC7-43	CC8-43	BUSS		-15V
CC7-22	CC7-44	CC8-44	BUSS		+15V
CC7-23	CC3-10	{R2-2}, {CC2-30}, {CC2-35}	BLACK		Line Input
CC7-28 CC7-29	CC8-5 (B)AUX5-2		WHITE		Signal to CCL PFC Signal
CC7-31					Spare output
CC7-32	CC11-5		WHITE		Drive to Audio
CC7-33	CC12-3	{CC14-23}	WHITE		Drive to MTT
CC7-38	CC6-16	CC7-16	BUSS		SDA - I2C Data
CC7-39	J42-15		BLACK		Audio Speaker Phono Jack
CC7-41	CC6-19	CC7-19	BUSS		+5V
CC7-42	CC6-20	CC7-20	GREEN	J42-16 WHP2-E	GND
CC7-43	CC6-21	CC7-21	BUSS		-15V
CC7-44	CC6-22	CC7-22	BUSS		+15V

CC8 - CCLVF

CC8-5	CC7-28		WHITE		Signal from ANASW
CC8-7	J16		WHITE		Passive CCL Input
CC8-10					+15V
CC8-16	CC8-38	CC9-38	WHITE	TPSD-J1-1	SCL - I2C Clock
CC8-17	CC8-39	CC9-39	WHITE	TPSD-J1-2	SDA - I2C Data
CC8-19	CC8-41	CC9-41	BLACK	J42-11	+5V
CC8-20	CC8-42	CC9-42	GREEN	J42-9	GND
CC8-21	CC8-43	CC9-43	BUSS		-15V
CC8-22	CC8-44	CC9-44	BUSS		+15V
CC8-27	CC13-28		WHITE		CCL Signal (Base-3)
CC8-38	CC7-16	CC8-16	BUSS		SDA - I2C Data
CC8-39	CC7-17	CC8-17	BUSS		SCL - I2C Clock
CC8-41	CC7-19	CC8-19	BUSS		+5V
CC8-42	CC7-20	CC8-20	WHITE	J42-13	GND
CC8-43	CC7-21	CC8-21	BUSS		-15V
CC8-44	CC7-22	CC8-22	BUSS		+15V

CC9 - CBL1D

CC9-10	CC14-8		WHITE		Sonic Amplitude Signal (DSP IN1)
CC9-12	CC10-3	{CC14-4}	WHITE		Sync/Pulse Signal
CC9-16	CC9-38	CC13-16	BUSS		SCL
CC9-17	CC9-39	CC13-17	BUSS		SDA - I2C Data
CC9-18	CC14-7		WHITE		Threshold Signal
CC9-19	CC9-41	CC10-41	BUSS		+5V
CC9-20	CC9-42	CC10-42	BUSS		GND
CC9-21	CC9-43	CC10-43	BUSS		-15V
CC9-22	CC9-44	CC10-44	BUSS		+15V
CC9-23	CC7-9		WHITE		Signal from ANASW
CC9-30	CC14-30		WHITE		Sonic AUX (DSP IN9)
CC9-38	CC8-16	CC9-16	BUSS		SDA - I2C Data
CC9-39	CC8-17	CC9-17	BUSS		SCL - I2C Clock
CC9-41	CC8-19	CC9-19	BLACK	J42-20	+5V
CC9-42	CC8-20	CC9-20	GREEN	J42-19	GND
CC9-43	CC8-21	CC9-21	BUSS		-15V
CC9-44	CC8-22	CC9-22	BUSS		+15V

CC10 - CBL02

CC10- 3	CC9-12	CC14-4	WHITE		Sync Signal
CC10-17	CC14-11		WHITE		Neg Sync Inhibit (DSP DO1)
CC10-18	CC14-32		WHITE		Pos Sync Inhibit (DSP DO0)
CC10-19	CC10-41	CC11-41	BUSS		+5V
CC10-20	CC10-42	CC11-42	BUSS		GND
CC10-21	CC10-43	CC11-43	BLACK	PS2-S-	-15V
CC10-22	CC10-44	CC11-44	BLACK	PS3-S+	+15V
CC10-31					NEG Sync
CC10-33					POS SYNC
CC10-36	CC10-41		BLACK		+5V (-SYNCINH)
CC10-37	CC14-18		WHITE		Sync Detect
CC10-38	CC14-10		WHITE		Sync Level (DSP DAC0)
CC10-39	CC14- 9		WHITE		Threshhold Level (DSP DAC1)
CC10-41	CC9-19	CC10-19	BLACK	CC10-36	+5V
CC10-42	CC9-20	CC10-20	BUSS		GND
CC10-43	CC9-21	CC10-21	BUSS		-15V
CC10-44	CC9-22	CC10-22	BUSS		+15V

CC11 – AUDIO

CC11-5	CC7-32		WHITE		Signal from ANASW
CC11-6	CC14-6		WHITE		AUDIO x 10 (DSP IN3)
CC11-7	CC14-5		WHITE		AUDIO x 1 (DSP IN4)
CC11-8	CC14-3		WHITE		AUDIO X .1 (DSP IN6)
CC11-9	CC14-2		WHITE		AUDIO X .01 (DSP IN7)
CC11-19	CC11-41	CC12-41	BLACK	PS1-S+	+5V
CC11-20	CC11-42	CC12-42	GREEN	PS2-S+	GND
CC11-21	CC11-43	CC12-43	BUSS		-15V
CC11-22	CC11-44	CC12-44	BUSS		+15V
CC11-25	CC6-33		WHITE		Audio Signal Control (I2CInit=21=08)
CC11-41	CC10-19	CC11-19	BUSS		+5V
CC11-42	CC10-20	CC11-20	BUSS		GND
CC11-43	CC10-21	CC11-21	BUSS		-15V
CC11-44	CC10-22	CC11-22	BUSS		+15V

CC12 -MTT/AUX

CC12-3	CC7-33	CC14-23	WHITE		Input Signal
CC12-18	CC13-26		WHITE		MTT Signal (Base-4)
CC12-19	CC12-41		BUSS		+5V
CC12-20	CC12-42	J6-E/(H)J6-B (SHLD)	BUSS		GND
CC12-21	CC12-43	CC13-43	BUSS		-15V
CC12-22	CC12-44	CC13-44	BUSS		+15V
CC12-41	CC11-19	CC12-19	BUSS		+5V
CC12-42	CC11-20	CC12-20	BUSS		GND
CC12-43	CC11-21	CC12-21	BUSS		-15V
CC12-44	CC11-22	CC12-22	BUSS		+15V

CC13 - USB44

CC13-1					BASE - 16
CC13-2	AUX4-2		WHITE		BASE- 15
CC13-3	AUX4-3		WHITE		BASE - 14
CC13-4	AUX4-4		WHITE		BASE - 13
CC13-5	AUX4-5		WHITE		BASE - 12
CC13-6	AUX4-6		WHITE		BASE - 11
CC13-7	CC7-15		WHITE		BASE - 10 (WHP2)
CC13-8	CC7-12		WHITE		Base - 9 (WHP1)
CC13-9	F2-2	{J8-D, (H)J8-J}	BLACK		Encoder Power to Fuse
CC13-10	J8-B	(H)J8-B	WHITE		Encoder Phase B
CC13-11	J8-A	(H)J8-A	WHITE		Encoder Phase A
CC13-12	J6-D/(H)J6-C		WHITE		Tension Excitation +
CC13-13	CC2-13		WHITE		Load Cell Cal Drive - I2CInit=22=02
CC13-14	HUB_J2-3			{Black}	USB Telemetry
CC13-15	HUB_J2-2			(Red}	USB Telemetry
CC13-16	CC9-16		WHITE		SCL - I2C Clock
CC13-17	CC9-17		WHITE		SDA - I2C Data
CC13-18	(H)J6-G				Cal Relay
CC13-19	CC13-41	CC14-41	BUSS	PS1-S+	+5V
CC13-20	CC13-42	CC14-42	BUSS	PS1-S-	GND
	{Shield}	HUB_J2-4			
CC13-21	CC13-43	CC14-43	BUSS		-15V
CC13-22	CC13-44	CC14-44	BUSS		+15V
CC13-23					BASE-8
CC13-25	AUX1		WHITE		BASE-6
CC13-26	CC12-18		WHITE		BASE-5 (MTT)
CC13-27	CC3-4		WHITE		BASE-4 (LineAux Signal)
CC13-28	CC8-27		WHITE		BASE-3 (CCL)
CC13-29	CC6-26		WHITE		BASE-2 (TVOLT)
CC13-30	CC6-27		WHITE		BASE-1 (TCURR)
CC13-31					CTR2
CC13-32					CTR1
CC13-33					
CC13-34	AUX4-9		WHITE		CTR4
CC13-35	AUX4-10		WHITE		CTR3
CC13-36					
CC13-38	J6-A/(H)J6-A			(BLK)	Line Tension Input Negative
CC13-40	J6-B/(H)J6-E			(RED)	Line Tension Input Positive
CC13-41	CC13-19	HUB_J9-3	BLACK		+5V
CC13-42	CC13-20	HUB_J9-2	GREEN		GND

CC13-43	CC12-21	CC13-21	BUSS		-15V
CC13-44	CC12-22	CC13-22	BUSS		+15V

CC14 – DSP-AUX

CC14-1					DSP IN8 (Script Ch7)
CC14-2	CC11-9		WHITE		DSP IN7 (Script Ch6) Audio x .01
CC14-3	CC11-8		WHITE		DSP IN6 (Script Ch5) Audio x .1
CC14-4	CC10-3	{CC9-12}	WHITE		DSP IN5 (Script Ch4) Sync/Pulse Signal
CC14-5	CC11-7		WHITE		DSP IN4 (Script Ch3) Audio x 1
CC14-6	CC11-6		WHITE		DSP IN3 (Script Ch2) Audio x 10
CC14-7	CC9-18		WHITE		DSP IN2 (Script Ch1) Threshold Signal
CC14-8	CC9-10		WHITE		DSP IN1 (Script Ch0) Sonic Amplitude
CC14-9	CC10-39		WHITE		DSP DAC1
CC14-10	CC10-38		WHITE		DSP DAC0
CC14-11	CC10-17		WHITE		DSP DO1 (Neg Sync Inhibit)
CC14-12					DSP DO3
CC14-13					DSP DO5
CC14-14					DSP DO7
CC14-15					DSP DO9
CC14-16					DSP DI1
CC14-17					DSP DI3
CC14-18	CC10-37		WHITE		DSP INT0 - Sync Detect
CC14-19	CC14-41		BLACK		+5V
CC14-20	CC14-42		BUSS		GND
CC14-21	CC14-43		BUSS		-15V
CC14-22	CC14-44		BUSS		+15V
CC14-23	CC12-3	{CC7-33}	WHITE		DSP IN16 (Script Ch15) Recorder Sig.
CC14-24					DSP IN15 (Script Ch14)
CC14-25					DSP IN14 (Script Ch13)
CC14-26					DSP IN13 (Script Ch12)
CC14-27					DSP IN12 (Script Ch11)
CC14-28					DSP IN11 (Script Ch10)
CC14-29					DSP IN10 (Script Ch9)
CC14-30	CC9-30		WHITE		DSP IN9 (Script Ch8) Sonic AUX

CC14-31	CC1-26		WHITE		DSP DAC2 (TELA Downlink Telemetry)
CC14-32	CC10-18		WHITE		DSP DO0 (Pos Sync Inhibit)
CC14-33					DSP DO2
CC14-34					DSP DO4
CC14-35	CC1-11		WHITE		DSP DO6 Downlink Termination
CC14-36					DSP DO8
CC14-37					DSP DI0
CC14-38					DSP DI2
CC14-39					DSP DI4
CC14-40					DSP INT1
CC14-41	CC13-19	CC14-19	BUSS	HUB_J9-2	+5V
CC14-42	CC13-20	CC14-20	BUSS	HUB_J9-3	GND
CC14-43	CC13-21	CC14-21	BUSS		-15V
CC14-44	CC13-22	CC14-22	BUSS		+15V

CC15-SDSDSP

DSP J2

DSP_J2-1	PS1-S+		GREEN		
DSP_J2-2	PS1-S-		BLACK		

DSP_J5

DSP_J5-1	HUB_J3-1			{Shield}	
DSP_J5-2					
DSP_J5-3	HUB_J3-2			{Red}	
DSP_J5-4	HUB_J3-3			{Black}	

J41 - AC Power

J41-1	TB1-3R		BLUE	{S1-1}	Switched Neutral
J41-2					
J41-3	TB1-5L		BLACK	{S1-3}	Switched AC Load
J41-4	JAC-1		BLUE	{S1-2}	AC Neutral
J41-5	LUG		GREEN		
J41-6	F1-2		BLACK	{S1-4}	Fused AC Load

J42 - Voltage Meters and Controls Power

J42-1	CC6-29		WHITE		High -> POS, GND -> NEG
J42-2	CC6-30		WHITE		Open -> AUTO, GND -> Pos/Neg
J42-3	CC6-28		WHITE		+5V PU
J42-4	CC6-42	{S3-3,4,6}	GREEN		GND (TP Switch)
J42-5	CC4-20		GREEN		GND (VM-LO)
J42-6	CC6-24		WHITE		VM-HI
J42-7	CC7-19		BLACK		+5V (VM-V+)
J42-7	CC7-19		GREEN		+5V (VM-V+)
J42-8	CC4-42		GREEN		
J42-9	CC8-20		WHITE		GND (CM-LO)
J42-10	CC6-25		BLACK		CM-HI
J42-11	CC8-19		GREEN		+5V (CM-V+)
J42-12	CC5-20		GREEN		
J42-13	CC8-42		GREEN		GND (LP3-1-) Enable Lamp
J42-14	CC2-24		BLACK		LP3-2+
J42-15	CC7-39		BLACK		Audio Speaker
J42-16	CC7-42		GREEN		GND (Speaker Gnd)
J42-17	ACSW3-R+		BLACK		Tool Power Enable
J42-18	CC6-37	{CC2-8}	WHITE		Safety CNTL
J42-19	CC9-42		GREEN		GND (LP2-1-)
J42-20	CC9-41		BLACK		+5V (TP Switch)

J43-USB Face Plate

J43-1	HUB_J8-3	{Black}		{White}	USB-
J43-2				{Shield}	SHIELD
J43-3	HUB_J8-1	{Shield}		{Black}	GND
J43-4	HUB_J8-2	{Red}		{Green}	USB+
J43-5					
J43-6	HUB_J8-4	22 GA		{Red}	+5V

J45 - Voltage Control Pots

J45-1	CC6-5		BLACK		+5V Regulated
(B)J45-2	(B)CC4-41				+5V PFC Switch
J45-3	CC6-40		BLACK		Neg Control
J45-4	CC3-20		GREEN		GND to Voltage Pots
J45-5	(B)C6-15		GREEN		PFC Switch Indicator
J45-6	CC6-39		BLACK		Pos Control

(B)J65 - PFC Switch

(B)J65-1	(B)TPSD-J3-2			{S4-5}	
(B)J65-2					
(B)J65-3	(B)TPSD-J3-1			{S4-6}	

FACE PLATE ASSEMBLY

P41 - AC Power

P41-1	S1-1	{LP1-1} {FN1-1}	BLUE	{TB1-3}	Switched Neutral
P41-2					
P41-3	S1-3	{LP1-2} {FN1-2}	BLACK	{TB1-5}	Switched AC Load
P41-4	S1-2	{JAC-1}	BLUE		AC Neutral
P41-5	LUG		GREEN		
P41-6	S1-4	{F1-2}	BLACK		Fused AC Load

S1 - AC Power Switch

S1-1	S1-1	{LP1-1} {FN1-1}	BLUE	{TB1-3}	Switched Neutral
S1-2			BLUE		
S1-3	S1-3	{LP1-2} {FN1-2}	BLACK	{TB1-5}	Switched AC Load
S1-4	S1-2	{JAC-1}	BLACK		AC Neutral

LP1 - AC Power Indicator

LP1-1	S1-1	FN1-1	BLACK	{P41-1}	
LP1-2	S1-3	FN1-2	BLACK	{P41-3}	

FN1 - Faceplate Fan

FN1-1	P41-3	LP1-2	BLACK	{FN1-2}	Switched AC Load
FN1-2	P41-6		BLACK		Fused AC Load

P42 - Voltage Meters and Controls

P42-1	S3-2	{CC6-29}	WHITE		High -> POS, GND -> NEG
P42-2	S3-5	{CC6-30}	WHITE		Open -> AUTO, GND -> Pos/Neg
P42-3	S3-1	{CC6-28}	WHITE		+5V PU
P42-4	S3-4	{S3-3}{S3-6}	GREEN	{CC6-42}	GND (TP Switch)
P42-5	VM-J1-4	{CC4-20}	GREEN		GND (VM-LO)
P42-6	VM-J2-2	{CC6-24}	WHITE		VM-HI
P42-7	VM-J1-6	{CC7-19}	BLACK		+5V (VM-V+)
P42-8	CC4-42		GREEN		VM-GRN-P2-4-42
P42-9	CM-J1-4	{CC8-20}	GREEN		GND (CM-LO)
P42-10	CM-J2-2	{CC6-25}	WHITE		CM-HI
P42-11	CM-J1-6	{CC8-19}	BLACK		+5V (CM-V+)
P42-12	CC5-20		GREEN		CM-GRN-P4-4
P42-13	LP3-1(-)	{CC8-42}	GREEN		GND (LP3-1-) Enable Lamp
P42-14	LP3-2(+)	{CC2-24}	BLACK		LP3-2+ Enable Lamp
P42-15	J47-1	{CC7-39}	BLACK		Audio Speaker Phono Jack
P42-16	J47-2	{CC7-42}	GREEN		GND (Speaker Gnd)
P42-17	S2-3	{ACSW3-R+}	BLACK		Tool Power Control
P42-18	S2-4	{CC6-37}	WHITE		Safety CNTL
P42-19	LP2-1(-)	{CC9-42}	GREEN		GND (LP2-1-) Tool Power Lamp
P42-20	S2-2	{CC9-41}	BLACK		+5V (TP Switch)

S2 - Tool Power Switch

S2-1	LP2-2(+)		BLUE		
S2-2	P42-20	{CC9-41}	BLACK		+5V
S2-3	P42-17	{ANSW3-R+}	BLUE		Tool Power Control
S2-4	P42-18	{CC6-37}	BLACK		

LP2 - Tool Power Switch Indicator

LP2-1(-)	P42-19	{CC9-41}	GREEN		GND
LP2-2(+)	S2-1		BLACK		

S3 - Auto / Manual Polarity Switch

S3-1	P42-3	{cc6-28}	WHITE		+5 PU
S3-2	P42-1	{CC6-29)	WHITE		High -> POS, GND -> NEG
S3-3	S3-4	S3-6	GREEN	{P42-4}	GND

S3-4	S3-3	S3-6	GREEN	P42-4	GND
S3-5	P42-2		WHITE		Open -> AUTO, GND -> Pos/Neg
S3-6	S3-3	S3-4	GREEN	{P42-4}	GND

VM - Panel Voltage Meter (Old Style)

VM-INLO	P42-5		WHITE		GND (VM-LO)
VM-INHI	P42-6		WHITE		VM-HI
VM-V+	P42-7		WHITE		+5V (VM-V+)

CM - Panel Current Meter (Old Style)

CM-INLO	P42-9		WHITE		GND (CM-LO)
CM-INHI	P42-10		WHITE		CM-HI
CM-V+	P42-11		WHITE		+5V (CM-V+)

VM - Panel Voltage Meter (Red Segment Style)

VM-J1-4	P42-8		GREEN		GND (VM-LO)
VM-J1-6	P42-7		BLACK		+5V (VM-V+)
VM-J2-1	P42-5		GREEN		VM-LO
VM-J2-2	P42-6		WHITE		VM-HI
VM-J2-5	VM-J2-6				Ref Out
VM-J2-6	VM-J2-5				Ref In

CM - Panel Current Meter (Red Segment Style)

CM-J4-4	P42-12		GREEN		GND (CM-LO)
CM-J4-6	P42-11		BLACK		+5V (CM-V+)
CM-J3-1	P42-9		GREEN		CM-LO
CM-J3-2	P42-10		WHITE		CM-HI
CM-J3-5	CM-J2-6				Ref Out
CM-J3-6	CM-J2-5				Ref In

LP3- Line Enable Lamp

LP3-1(-)	P42-13	{CC8-42}	GREEN		GND (LP3-1-)
LP3-2(+)	P42-14	{CC2-24}	BLACK		LP3-2+

J47 - Audio Jack

J47-1	P42-15	{CC7-39}	BLACK		Audio Speaker
J47-2	P42-16	{CC7-42}	GREEN		GND (Speaker Gnd)

P43-USB Faceplate Connector {OLD}

P43-1	J48-WHT				USB-
P43-2	J48-GRY				SHIELD
P43-3	J48-BLK				GND
P43-4	J48-GRN				USB+
P43-5					
P43-6	J48-RED				+5V

P45 - Voltage Control Pots

P45-1	R4-3	{R5-3}{CC6-5}	BLACK		+5V Regulated
(B)P45-2	(B)S4-2	{CC4-41}	WHITE		+5V
P45-3	R4-2	{CC6-40}	BLACK		Negative Control
P45-4	R4-1	{R5-1}{CC3-20}	GREEN		GND
P45-5	S4-1	{(B)CC6-15}	GREEN		PFC Switch
P45-6	R5-2	{CC6-39}	BLACK		Positive Control

R4- Negative Voltage Adjust

R4-1	R5-1	P45-4	GREEN	{CC3-20}	GND
R4-2	P45-3	{CC6-40}	BLACK		Negative Control
R4-3	R5-3	P45-1	BLACK	{CC6-5}	+5V Regulated

R5- Positive Voltage Adjust

R5-1	R4-1	{P45-4}{CC3-20}	GREEN		GND
R5-2	P45-6	{CC6-39}	BLACK		Positive Control
R5-3	R4-3	{P45-1}{CC6-5}	BLACK		+5V Regulated

(B)P65 - PFC Switch

(B)P65-1	(B)S4-5	(B)TPSD-J3-2			
(B)P65-2					
(B)P65-3	(B)S4-6	(B)TPSD-J3-1			

(B)S4 - PFC Switch

(B)S4-1	(B)P45-5	{(B)CC6-15}			
(B)S4-2	(B)P45-2	{CC4-41}			
(B)S4-3					
(B)S4-4					
(B)S4-5	(B)P65-1	{(B)TPSD-J3-2}			
(B)S4-6	(B)P65-3	{(B)TPSD-J3-1}			

Section

21

21 Checks-Out Procedure

A. Panel Information

Company: ____________________ Checked By: ___________________
Panel Type: ________ Serial#: _________________ Key#:____________
Date: ____/___/_____Key Code#: ________________________________

A. Record version of all boards installed – "X" indicates not installed

- **Panel must be "OFF" – No power on – before removing or installing any boards, during this procedure.**
- **Acquisition should be closed, every time that it calls for "Turning Panel OFF"**
- **Attach P - Touch Card Slot Identification Tape, plotter label, and panel type labels.**
- **Remove all boards from the Card Cage located inside the Interface Panel**

BOARD	VER.	BOARD	VER.	BOARD	VER.
USBHUB		TPSD		DSPAUX	
SDSDSP		USB44		PSXD	
PRELAYS		ANASW		CCL	
CB1D		CBL02		AUDIO	
AFP		MTT		TELA	

TPSD, USBHUB are permanent boards located at the rear of the panel

BOARDS FROM LEFT TO RIGHT

CC1-	TELA
CC2-	PRELAYS
CC3-	FREEPOINT
CC4-	SPARE
CC5-	SPARE
CC6-	PSXD
CC7-	ANASW
CC8-	CCL
CC9-	CBL1D
CC10-	CBL02
CC11-	AUDIO
CC12-	MTT
CC13-	USB44
CC14-	DSPAUX
CC15-	DSP

B. Check Power Supplies voltages on card connectors

+15 Volts	@ pin 22 - 44
-15 Volts	@ pin 21- 43
Ground	@ pin 20- 42
+ 5 Volts	@ pin 19- 41

C. Sondex Ultralink Board Pre-Wiring

(**OPEN BACK PLATE OF THE PANEL TO DO THE FOLLOWING)**
Verify the following connections:

Connector SDXJ1 Wiring (4 pin connector)

J1-1 to CC2-39.
J1-4 to TB1-1

Connector SKT1 Wiring

SKT1 (Coaxial cable) center conductor to CC2-17.

Connector SDX J12 Wiring (5 pin connector)

J12-3 (AWG 22) connect to TPSD-J5-4 (+5 VDC)
J12-4 (AWG 22) connect to TPSD-J5-3 (GND)
J12-1 (AWG 22) connect to TPSD-J5-2 (-15VDC)
J12-5 (AWG 22) connect to TPSD-J5-1 (+15 VDC)

Connector SDXJ5 Wiring (5 pin connector)

J5-5 (White AWG 22) connect to HUB-J9-4
J5-3 (Red AWG 22) connect to HUB-J9-3
J5-2 (Black AWG 22) connect to HUB-J49-2

D. USBHUB-R13 Pre-Check and USBHUB

Close All in acquisition software and Turn Interface Power **"OFF"**

All USB44-R7 – before installing, check for the following.
- J2 – Place jumper pin on 1-3 (right side)
- Make sure C26 is **NOT** installed (near U4)
- Jumper Near to C23 and C24

Standard USB44-R7 – before installing, check for the following.
- IC14 = Pin 1-3 shorted
- R12 = shorted
- R14 = 24.9 ohms
- R19 = 5.6 Kohms
- C25 = Not Installed
- C29 = Not Installed
- K1 = Not Installed

Halliburton USB44-R7 – before installing, check for the following.
- IC14 = LM78L12 Installed
- R12 = 3.9 Ohm Installed
- R14 = Not Installed
- R19 = 249 Ohm Installed
- C25 = .01 UF Installed
- C29 = .33 UF Installed
- K1 = Installed

Make sure Interface is **“OFF”** – No Power

Install USB44 board
Install DSPAUX and SDSDSP boards. DSPAUX- should be on an extender board with an extender ribbon to the DSP board.
Check polarity of Power Connectors to DSP board J2.
Looking at component side of the board, left pin is ground and right pin is +5VDC.
On DSP board the two white wires of J2 should go up towards the top of the board. On J5 white wire is ground.

With Interface Panel Power **“OFF”**
Open Windows Device manager, Click on Universal Serial Bus controllers
Connect USB cable from computer to front of panel
Two new Generic USB Hubs should appear
Safenet Inc. Hardlock Key should appear
Connect USB Device to “Printer” USB port of Hub on rear of panel
That Device should appear

Turn Interface Panel Power **“ON”**
Scientific Data Systems CyStdFX1 Device should appear
Scientific Data Systems LOGFX-DSP Device should appear
Check remaining 4 USB Port to a response of a USB device
Turn Interface Panel Power **“OFF”**
Connect USB cable from computer to rear of panel
Turn Interface Panel Power **“ON”** – Recheck all of the above devices

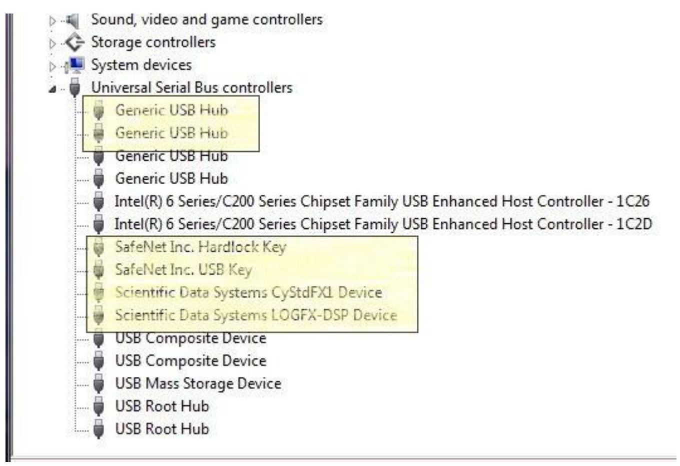


Fig. D.1 Universal Serial Bus Controllers

E. USB44 Checks

Standard Panel - Check for +15VDC at Pin “D” of tension connector. Check for +5VDC at Pin “D” of encoder connector.

Halliburton Panel –

Check for +12V DC at pin “C’ of tension connector.

Check for +5V DC ad pin “J’ of the encoder connector

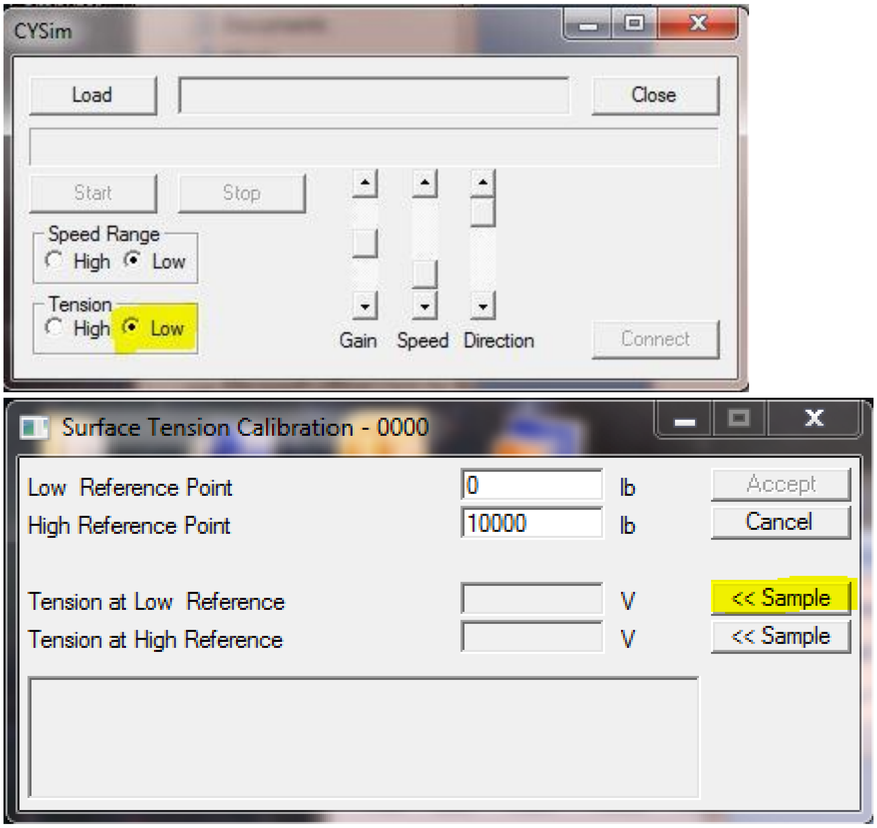
Put Sample DC Voltage on J9 (Rear Panel BNC-labeled AUX-1). Start Acquisition and verify Base-6 response by clicking “Monitor”-> Devices - Base-6 = Sample DC Voltage +/-0.2

Device: DAMUPCI

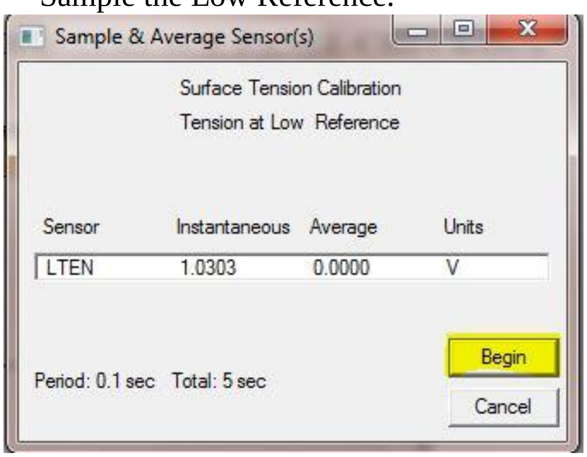
DAMUPCI-1	TCURR	0.002	V
DAMUPCI-2	TVOLT	0.003	V
DAMUPCI-3	CCL	0.003	V
DAMUPCI-4		0.002	V
DAMUPCI-5		0.002	V
DAMUPCI-6		8.834	V
DAMUPCI-7	LTEN	6.226	V
DAMUPCI-8		0.005	V
DAMUPCI-9		0.003	V
DAMUPCI-10		0.002	V
DAMUPCI-11		0.001	V
DAMUPCI-12		0.000	V
DAMUPCI-13		0.000	V
DAMUPCI-14		0.001	V
DAMUPCI-15		0.002	V
DAMUPCI-16		0.002	V
DAMUPCI-17		0.000	cps
DAMUPCI-18		0.000	cps
DAMUPCI-19		0.000	usec
DAMUPCI-20		0.000	usec
DAMUPCI-21		0.000	usec
DAMUPCI-22		0.000	usec
DAMUPCI-23		0.000	usec
DAMUPCI-24		0.000	usec
DAMUPCI-25		0.000	usec
DAMUPCI-26		0.000	usec
DAMUPCI-27		0.000	usec
DAMUPCI-28		0.000	usec
DAMUPCI-29		0.000	usec
DAMUPCI-30		0.000	usec
DAMUPCI-31		0.000	usec
DAMUPCI-32		0.000	usec
DAMUPCI-33		0.000	usec
DAMUPCI-34		0.000	usec
DAMUPCI-35		0.000	cps
DAMUPCI-36	LSPD	0.000	ft/min
DAMUPCI-37	ELTIM	490.580	sec
DAMUPCI-38	ADPTH	12183.158	ft

Fig. E.1 DAMUPCI

Connect Simulator Box and start Simulator Program. Set Simulator Tension to Low. Open Acquisition. Click on “Action -> Calibrate -> Surface Line Tension”. Set calibration values to 0 and 10000. Check that depth responds to Speed and Direction controls.



Sample the Low Reference.



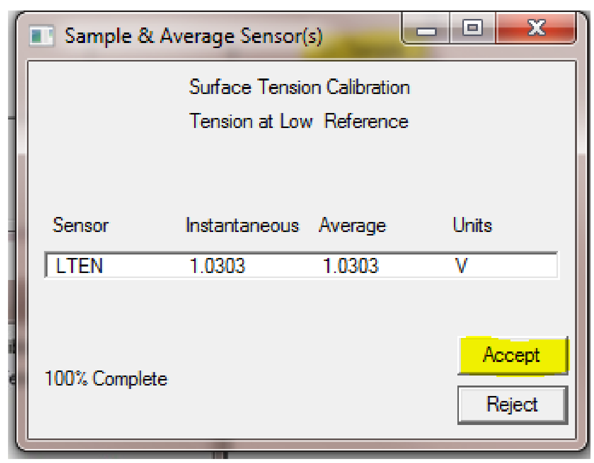


Fig. E.2 Surface Tension Calibration

Click [Begin] to start sampling. When 10 second sampling is complete, click [Accept] to accept the sample

In the Simulator window, Set the tension to High. From the calibration window, sample the high reference.

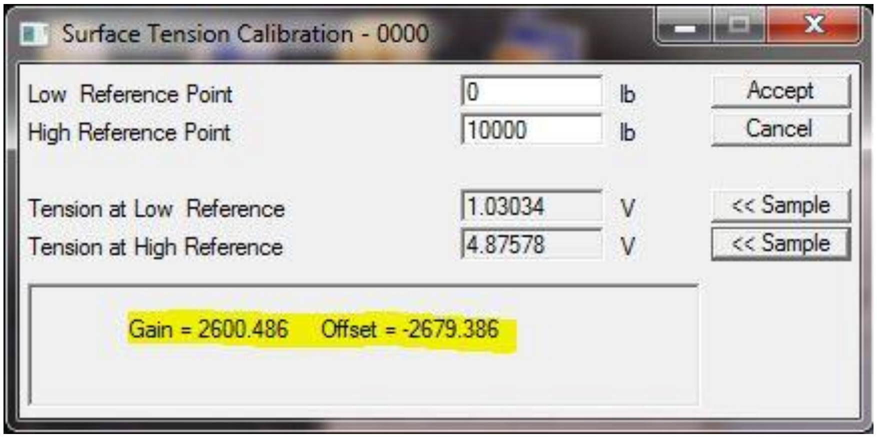


Fig. E.3 Surface Tension Calibration

The calibrations should have a gain in the order of 2500 with a negative offset of the same magnitude. If valid, click on [Accept] to finish the calibration.

Baker Tension

Turn Panel “OFF”. Pull USB44 board and remove R19 and R14 so board accepts + 5 Volt tension input. Re-install board and turn panel “ON”.

Connect Baker Line Tension Check connector to tension input. From Acquisition, click on Monitor -> Sensors. Check that the LTEN sensor reads 1.4 V.

AUX4 - Auxiliary Input Connector

From Acquisition click on Monitor ->Devices -> Base and check the following table for high and low inputs from the test box

Channel	LOW Switch		HIGH Switch	
Base-11	0.57		3.63	
Base -12	0.73		1.73	
Base -13	0.98		0.000	
Base -14	1.31		-1.71	
Base -15	1.78		-3.63	

Device: CYSTD

Source	Name	Value	Units
BASE-1	TCURR	0.0171	V
BASE-2	TVOLT	0.0076	V
BASE-3	CCL	0.0040	V
BASE-4		-10.0000	V
BASE-5		-0.0018	V
BASE-6		-0.0003	V
BASE-7	LTEN	0.0027	V
BASE-8		0.0000	V
BASE-9		0.0000	V
BASE-10		0.0052	V
BASE-11		0.5667	V
BASE-12		0.7343	V
BASE-13		0.9760	V
BASE-14		1.3129	V
BASE-15		1.7841	V
BASE-16		0.0003	V
BASE-17		0.0003	V
BASE-18		0.0003	V
BASE-19		0.0003	V
BASE-20		0.0003	V
BASE-21		0.0003	V
BASE-22		0.0003	V
BASE-23		0.0003	V
BASE-24		0.0000	V
BASE-25		0.0000	V
BASE-26		0.0000	V
BASE-27		0.0000	V
BASE-28		0.0000	V
BASE-29		0.0000	V
BASE-30		0.0000	V
BASE-31	CTR1	0.0000	cps
BASE-32	CTR2	0.0000	cps
BASE-33	CTR3	1002.8462	cps
BASE-34	CTR4	1002.8462	cps
BASE-35		99.9876	cps

Fig. E.4 CYSTD Low Values

Connect function generator to test points on test box, with 5 volt square wave @ 1 KHz
Note response on Base-33 and Base-34 CTR3 / CTR4.
Set the switch in HI

Device: CYSTD

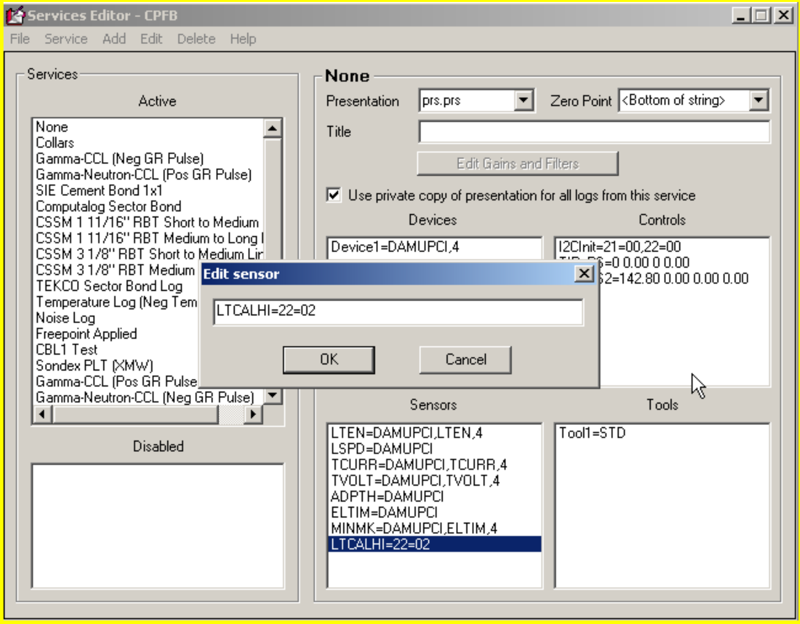
Source	Name	Value	Units
BASE-1	TCURR	0.0159	V
BASE-2	TVOLT	0.0079	V
BASE-3	CCL	0.0055	V
BASE-4		-10.0000	V
BASE-5		-0.0018	V
BASE-6		-0.0003	V
BASE-7	LTEN	0.0027	V
BASE-8		0.0000	V
BASE-9		0.0009	V
BASE-10		0.0049	V
BASE-11		3.6298	V
BASE-12		1.7343	V
BASE-13		0.0049	V
BASE-14		-1.7169	V
BASE-15		-3.6169	V
BASE-16		-0.0003	V
BASE-17		0.0000	V
BASE-18		0.0000	V
BASE-19		0.0000	V
BASE-20		0.0000	V
BASE-21		0.0003	V
BASE-22		0.0000	V
BASE-23		0.0003	V
BASE-24		0.0000	V
BASE-25		0.0000	V
BASE-26		0.0000	V
BASE-27		0.0000	V
BASE-28		0.0000	V
BASE-29		0.0000	V
BASE-30		0.0000	V
BASE-31	CTR1	0.0000	cps
BASE-32	CTR2	0.0000	cps
BASE-33	CTR3	1001.8360	cps
BASE-34	CTR4	1001.8360	cps
BASE-35		99.9876	cps

Fig. E.5 CYSTD Low Values

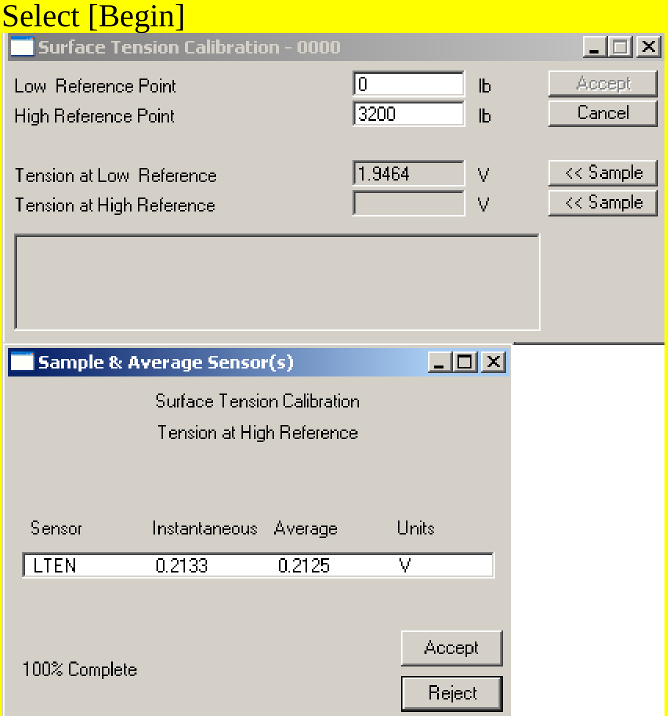
Close All in acquisition software and Turn Interface Power **"OFF"**

Halliburton Tension Test

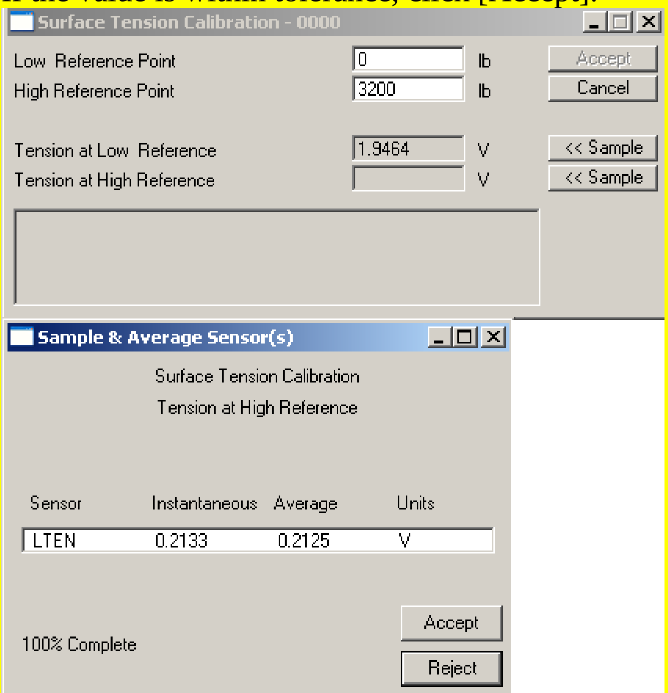
Select Utilities -> Edit Logging Service Details
Select the NONE Service
Click on “Add -> Control.
Scroll down the dropdown Control key word list and select LTCALHI.
Click [OK] and save the service.



Start Acquisition in the None Service
Select “Action -> Calibrate -> Surface Line Tension”
Set Low Reference Point = 0
Set High Reference Point = 3200
Click on [<<Sample] for the Tension at Low Reference
Expected value should be 1.9 ± 0.1
Select [Begin]



If the reading is in tolerance, click [Accept].
Click on [<<Sample] for the Tension at High Reference.
Click on [Begin]
Expected value should be .22 + 0.1.
If the value is within tolerance, click [Accept].

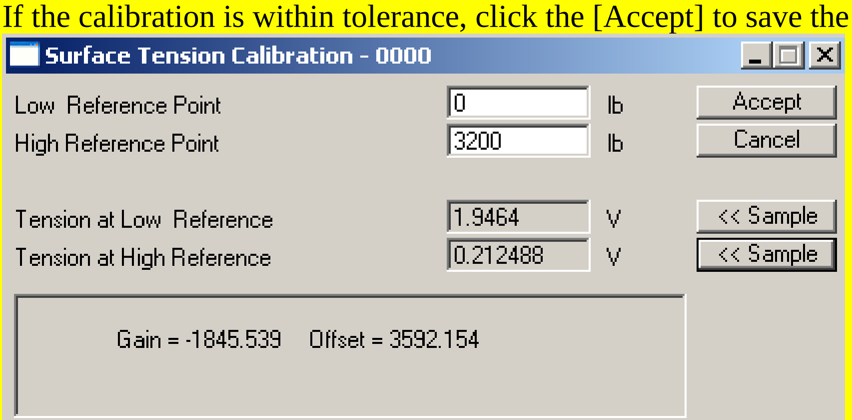


Typical calibration value should be as follows:

Gain = -1860 ± 50

Offset = 3600 ± 100

If the calibration is within tolerance, click the [Accept] to save the calibration



From Acquisition, select "File-> Close All" and turn the interface power **OFF**.

Fig. E.6 Halliburton Surface Tension Calibration

F. DSPAUX and SDSDSP Checks

Install DSPAUX board on extender card and connect with the DSP Board through extension cable

Turn Interface Power **"ON"** – Start Acquisition

Select Gamma CCL Service – Do not enable the line.

At PMON window, Click on the – Show Axis Icon

Click on the Enlarge Icon until scales are as shown below

Adjust P1 on DSPAUX board to adjust the baseline to 0 volts

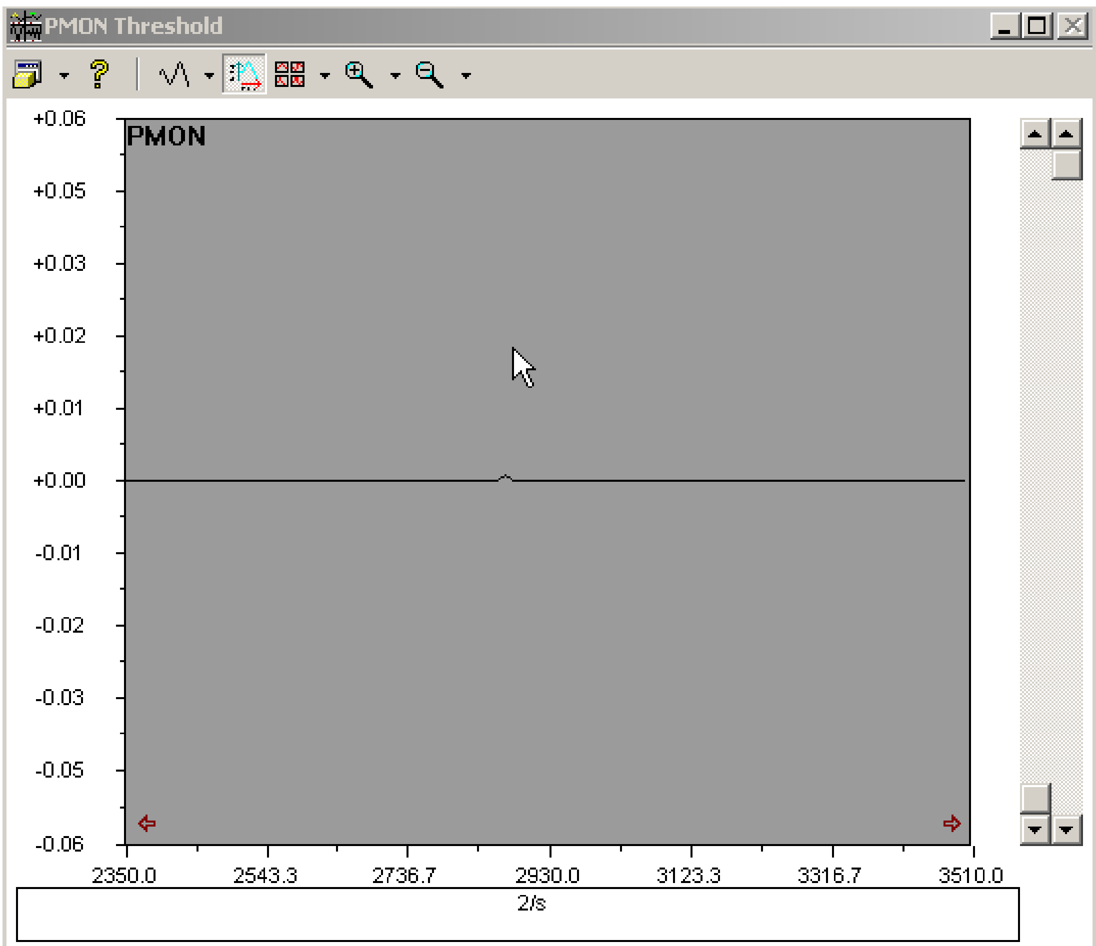


Fig. F.1 DSPAUX Adjustment

<u>**Close All**</u> in acquisition software and Turn Interface Power **"OFF"**

G. PSXD-R2 or PSXD-R7 - PRELAYS-R5 – TPSD-R6

Check PSXD.R2, C16 and C17 should be .047 uF

For Halliburton panels, check R8 being 200k ohm

Check for Jumper on CC3 between Pins 10 and 12. If no jumper, install FreePoint Board
Install PSXD board on CC6 slot. Install PRELAYS board on extender card in CC2 slot.
Set tool voltage Polarity to Auto – Turn Interface **"ON"**

Open Acquisition to the "None " Service
Edit-Calibrations – Set TVOLT and TCURR gains to 1.0 and Offset =0

Open "Utilities" -> "Edit Logging Service Details"
Click on the "None" Service
Check that Line Termination Control is set to "High" and Save

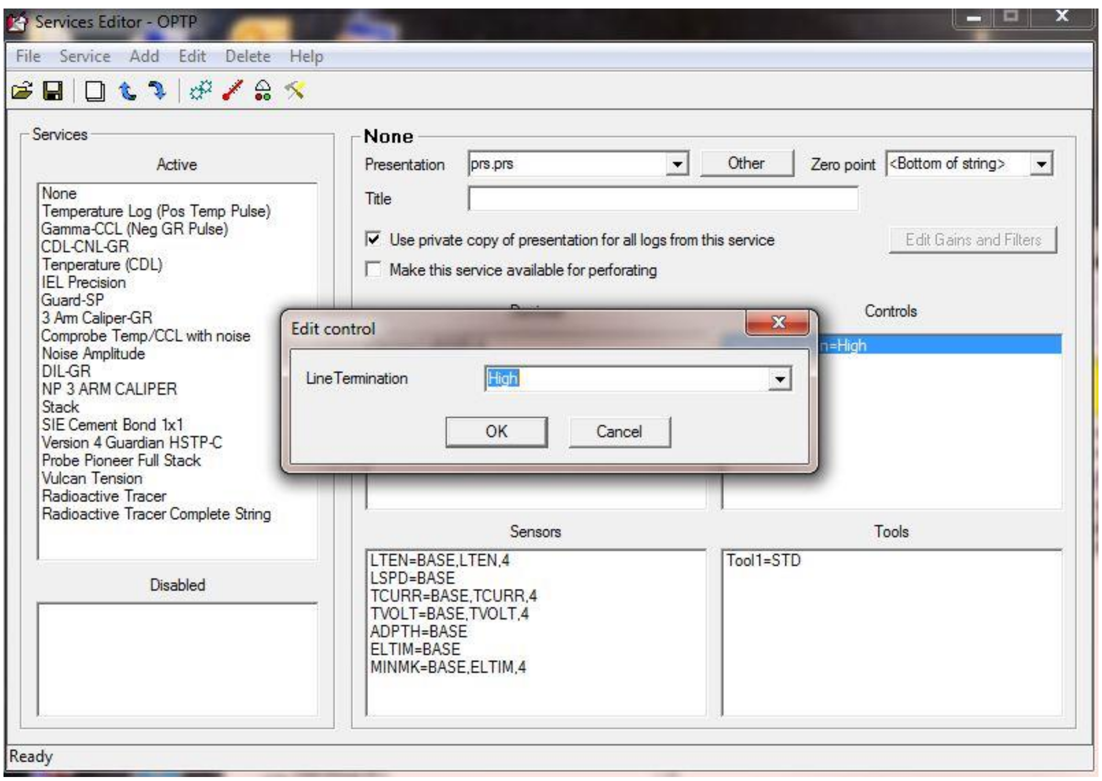


Fig. G.1 Line Termination Control

On PRELAYS board measure 300 ohms between pin 5 and pin 26.

Halliburton panels should read 150 Ohms

Edit “Controls” set Line Termination to “Low” – SAVE
Reload “None Service”

On PRELAYS board measure 150 ohms between pin 5 and pin 26

Halliburton panels should read 1.9 Ohms.

Edit “Controls” set Line Termination to “High” – SAVE
Reload “None Service”
On PRELAYS board measure 300 ohms between pin 5 and pin 26.

Halliburton panels should read 150 Ohms

Close All in acquisition software and Turn Interface Power “OFF”
Place PRELAYS board in CC2 slot

G 1. PSXD-R2 - PRELAYS-R5 – TPSD-R9

Turn Interface **“ON”**
Reload “None Service”
Click on “Action -> Power Control”. Click on “Keep this box” to keep window open.
Enable the line (Tool Voltage Polarity Switch should be in “Auto”)
Measure the voltage across TPSD TP1 and TP2, Adjust P2 to .80 V DC
Set Software control to 0% - Adjust P6 on PSXD for 0.0 V at TPI on PSXD
Set Software control to 100% - Adjust P5 on PSXD for 8.0 VDC at TPI.
Adjust P3 on PSXD for 0.0 VDC on front panel voltage meter
Adjust P4 on PSAUX for 0.0 milliamps on front panel current meter
Adjust software control to 25%
Turn **“ON”** Tool Power Switch – with no load
Adjust P1 on TPSD.R1 board back panel for 100 VDC at line input connector
Adjust P2 on PSAUX board for 100 VDC at front panel voltage meter
Switch polarity to “POS” position; verify positive voltage control with knob
Switch polarity to “NEG” position; verify negative voltage control with knob
Turn Tool Power **“OFF”**
Switch Polarity to **“AUTO”**
Attach 1k-load box to line input
Turn Tool Power **“ON”**
Adjust Software control for 100 VDC at front panel voltage meter Close to 30.0%
Adjust P1 on PSXD board for 100 milliamps at front panel current meter

Edit Calibrations TVOLT / TCURR. Set Gain =1 and Offset =0
Set Software control to 100%
Verify Maximum voltage of approximately 275 VDC @ 275 ma to 300VDC @ 300 ma
Set Software control to 0%, disconnect load box
Attached 100 ohms load resistor to input line
Set Software control to 100% for approximately 48 V DC @ 480 mas Max.
Check both polarities (Positive and Negative)
Adjust Software control for 40Vdc @ 400 ma at front panel voltage meter
Check both polarities (Positive and Negative).
Set Software control 0% and Switch polarity to “POS” position
Set positive voltage with knob close to 3.3 for 40Vdc @ 400 ma leave test one hour.
Switch polarity to “NEG” position.
Set negative voltage with knob close to 3.3 for -40Vdc @ -400 ma leave test one hour.
Calibrate tool voltage and current (if computer is to be shipped with system)
Close All in acquisition software and Turn Interface Power **“OFF”**

G 2. PSXD-R7 and TPSD-R9

Start acquisition and start the PSXD PSAUX setup service. Place tool Polarity switch in AUTO.
Click on “Action -> Power Control”, Click check “Keep this box open”
“Click -> Open Configuration” and set all values to 400 and ramp time to .3 then click [Apply].

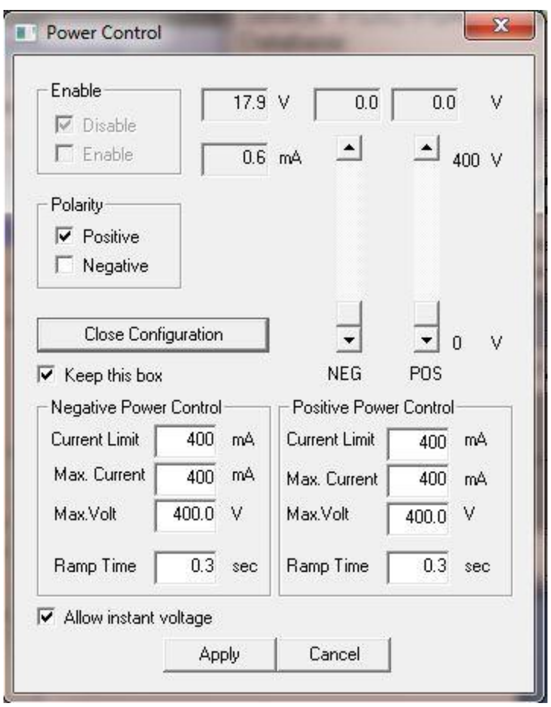
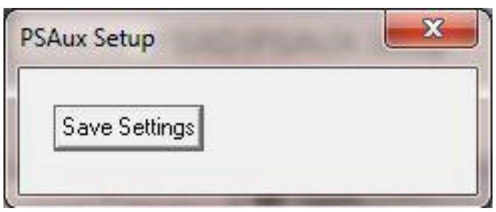


Fig. G2.1 Power Control Configuration

Set Software control to 0%
Enable line but do not turn on Tool Power Switch
On TPSD R9.1 adjust P2 to .80vdc between TP1 and TP2
Adjust VZero Slider for 000 volts on the front panel
Adjust IZero Slider for 000 ma on the front panel
Adjust VZeroBias Slider for 0.000vdc on PSXD TP3 (± -002V)
Adjust Software control for 100vdc and check PSXD TP3 for 2.00vdc (±.01vdc)
Turn on the Tool Power switch and adjust P1 on TPSD board for 100vdc on the rear panel line connector.
Adjust VSetPoint Slider for 100v on the front panel
Switch Polarity switch to POS and verify POS voltage control
Switch Polarity switch to NEG and verify NEG voltage control
Return Polarity switch to Auto and connect 1Kohm load.
Adjust software for 100vdc on the front panel meter and adjust ISetPoint slider for 100ma on front panel.
From Acquisition Click on Edit -> Device Configuration -> SDSTIP
Click on [Save Settings] to save current PSXD settings to the EPROM on the PSXD board.



Click on the red Windows Close button to close the PSAux Setup window.
Calibrate the Voltage and current at 0vdc at 0ma and 100vdc at 100ma. ** This step is important since these values are stored on the EPROM of the PSXD board and are used when a service is loaded. **
Verify that the gains for TVOLT and TCURR are approximately 100 and the offsets are approximately 0

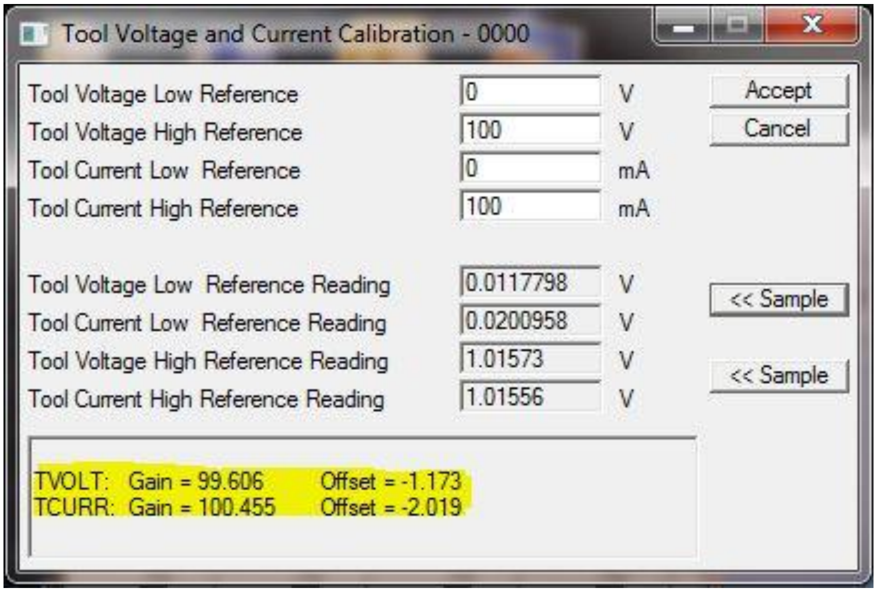


Fig. G2.2 Power Calabration

Check for voltage and current max near 250 volts @ 250 ma.
Attach a 100ohm load and verify a current limit of near 400ma.
Set software controls to 0 Volts and switch polarity to “POS” position
Set positive voltage with knob close to 3.3 for 40 VDC @ 400 ma and test for 1 hour
Monitor Sensors – Check that TVOLT=.4 and TCURR=4.0

Baker Hughes Panel Check - TPSD PFC Current Limit

Normal operation of the panel is with the PFC Current Limit Switch in the up position. With the switch in the down position, Check that the PFC Current Limit light comes on. Attach a 1k Ohm dummy load to line input of the panel. Enable line and check for current limit at 100 ma (+ 5 ma)

H. ANASW-R17

Open Utilities -> Edit Logging Service Details

Click on the “None” Service. Check that the SDSTIP device has SPKRVOL enabled.

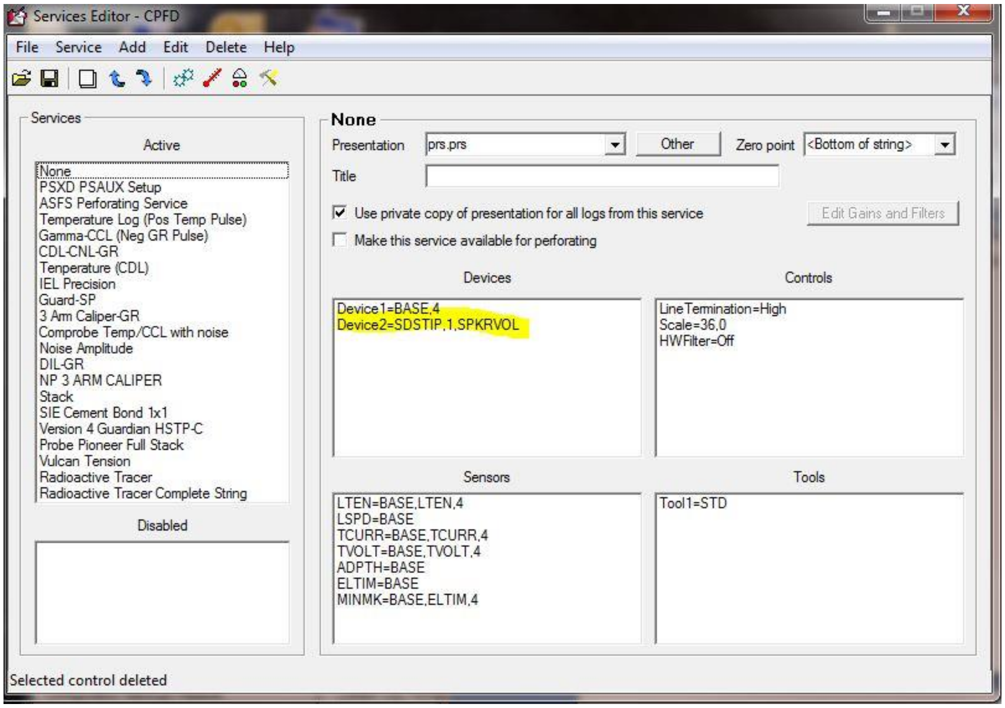


Fig. H.1 Service Editor

Click on Add -> Control. Select HWFilter=Off. Click [OK]

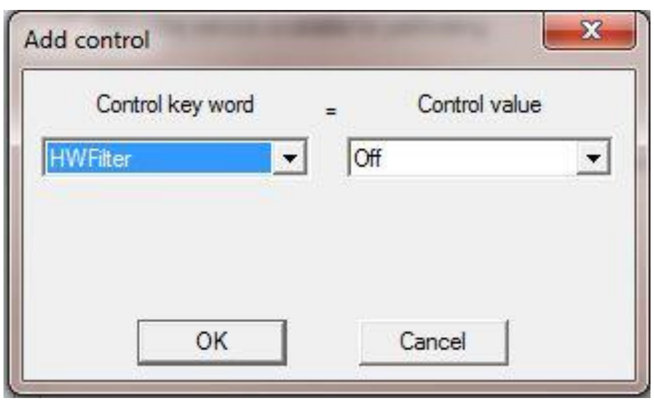


Fig. H.2 Service Editor Add Control

Save the service.
Turn Interface **“ON”,** and Tool Power **“OFF”**
Load the “None” Service. Click on Action -> Power Control -> Enable
Attach function generator to line-input
Apply 1 kHz, 1V peak to peak at ANASW-TP-1
Check 1Vpp @ 1 KHz at TP1and TP2
Check Audio Speaker output and Speaker Volume slider control.
In the Service Editor, Change the HWFilter=ON or High
Save the edited service and restart the “None” service in Acquisition
Apply 1 kHz, 1V peak to peak at ANASW-TP-1
Place the oscilloscope test lead on test point 2 and reduce the frequency until you reach .5V p-p, the frequency should be about 375 Hz
Repeat test while setting HWFilter to Med and Low.
The .5V p-p point should be 250Hz and 100Hz respectively.
With the HWFilter in either On, High, Med or Low confirm that the Active CCL works.
In the Service Editor, Change the HWFilter=OFF
Save the edited service.

Well Head Pressure Checks

Attach Simulator Box Tension connector to WHP1 connector. From Acquisition click on Monitor -> Devices -> Base. Check that BASE-9 reads ~1.0 V at low tension setting and ~5.0 V at high tension setting.

Move the tension connector to WHP2 connector. Check that Base-10 reads ~1.0 V at low tension setting and ~5.0 V at high tension setting.

From Acquisition, Click on File -> Close All

Baker Hughes Panel Checks – Panel Type CBHA

AUX5 Inputs
Connect DB-9 Connector to AUX5 Input and connect to simulator box.
(Pin 2 is signal and Pin 3 is Ground or shield)

Using the Service Editor, Copy the Temperature Log (Neg Temp Pulse) service and rename to Baker Test.

Click on Add -> Control. Select Control Key Word “PFCInput” with the value “Yes”

Start the simulator and load “Gamma Ray – Temp – CCL.sim”

Start a log pass and note response of Gamma, Temp, and CCL

I. CCLVF-R2 CHECKLIST

Install CCL board

Turn Interface **“ON”** and TOOL POWER **OFF**

Attach function generator to line in

Start Acquisition and Load CCL Service –“Collars”

Select -> Action -.Power Control ->Enable

Adjust function generator to apply 2 Hz, 1 volt peak to peak signal at ANASW-TP-1

Set CCL slider to maximum. Edit calibration set Gain =1 and Offset =0

Start a log pass with scales set from –10 to 10

Check for CCL Gain slider bar control

Check for cut-off frequency of 10 Hz

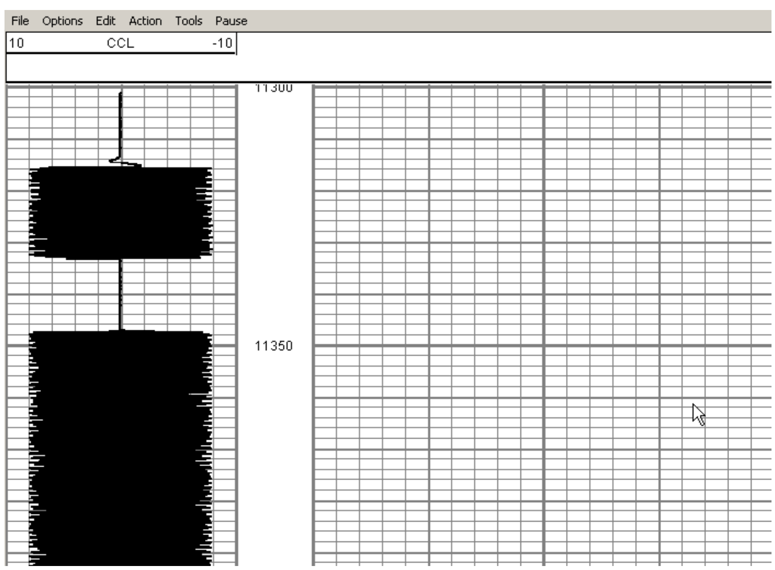


Fig. I.1 Sample Log Collars Service

Disable line and connect the function generator to the Passive CCL input

Go to Utilities -> Edit Logging service details

Check that the “Shooting Collars” service has the following Controls

CCLInput=Passive

CCLFilterFq=10

Start Acquisition and load “Shooting Collars” service

Start a log pass with scales set from –10 to 10

Check the signal should be –9 to 9 on the Log

Check that the CCL Gain slider responds

Check for frequency cut off starting at 10 Hz

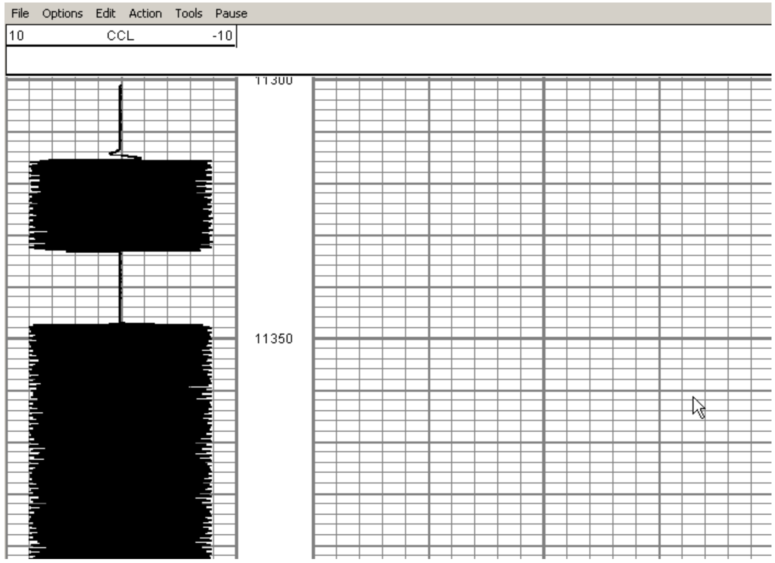


Fig. I.2 Sample Log Shooting Collars Service

<u>Close All</u> in acquisition software and Turn Interface Power **“OFF”**

Ji. CBL1 R6 and CBL02

On CBL02_14 check J2 jumper should be on top (1-2)
Install both CBL boards – CBL1D-R6 and CBL02-14
Attach function generator to line
Load CBL1-Test service and enable the line
Apply 1 KHz 0.5vpp sine wave to ANASW TP1
Set Panel Controls and SDS TIP as follows:

Click Edit -> Device Configuration -> SDSTIP
For each of Sonic, Sync, and Aux – Set Gain, Q, Fc, and Highpass as shown
Set all Gain slider bars to maximum at 255

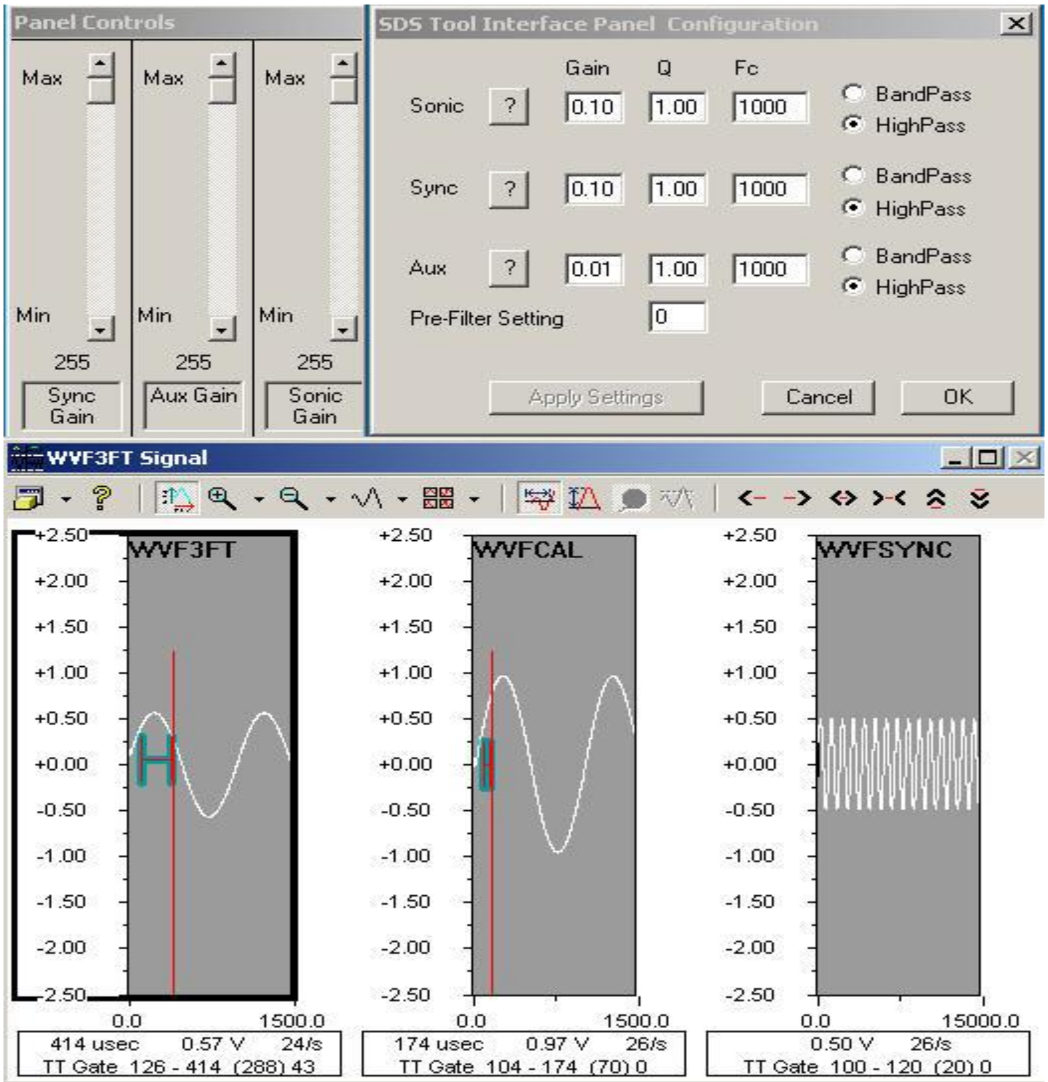


Fig. Ji.1 CBL1-Test Service 1Khz .5Vpp

Set the Panel Controls to 125 and verify that the signal size decreases to one half as shown in the following

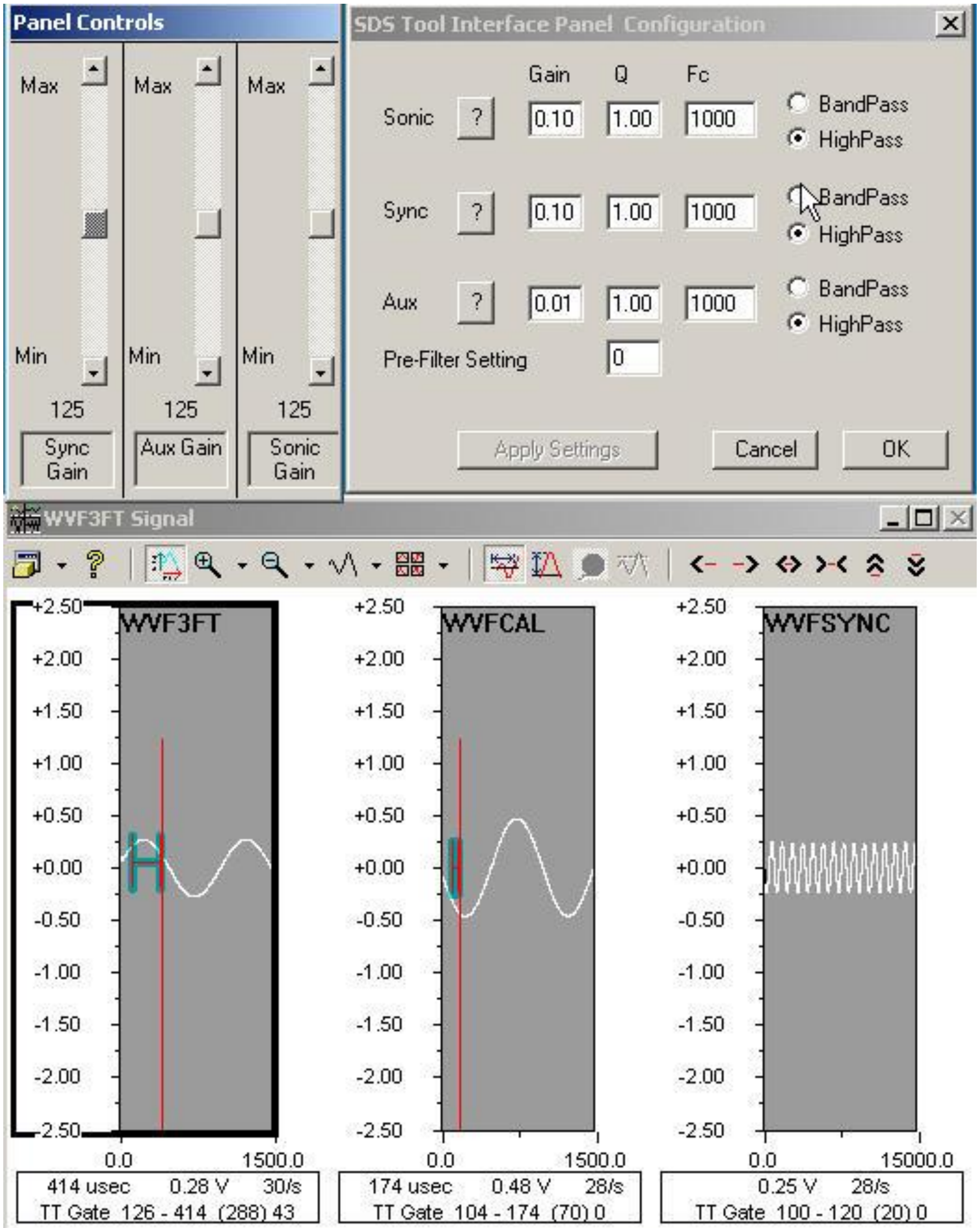


Fig. Ji.2 CBL1-Test Service 1Khz .5Vpp 50% Panel Control

Set the Panel Controls to 25 and verify the following

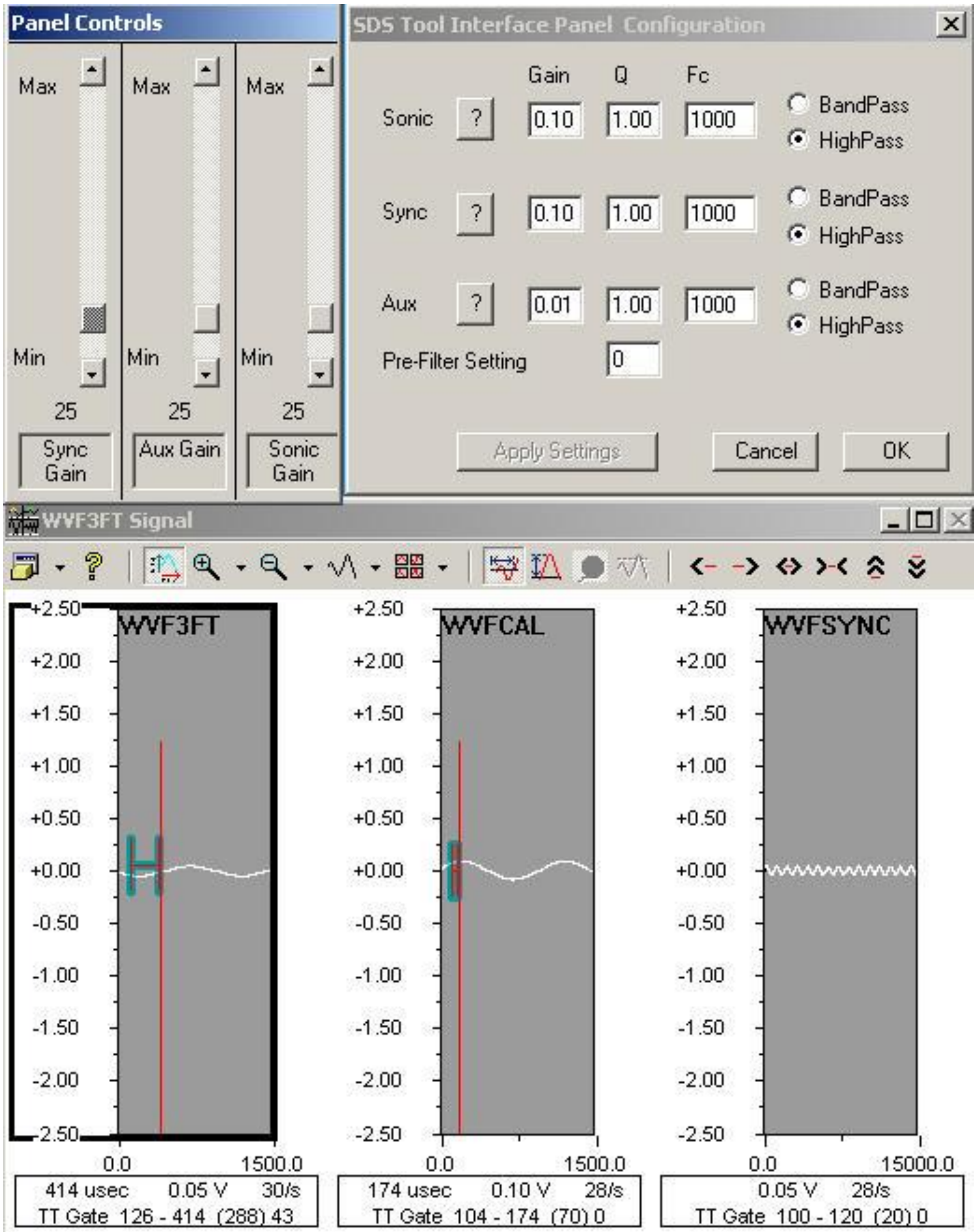


Fig. Ji.3 CBL1-Test Service 1Khz .5Vpp 25% Panel Control

Change the input frequency to 2 KHz, Set the Panel Controls to Max, and verify the following:

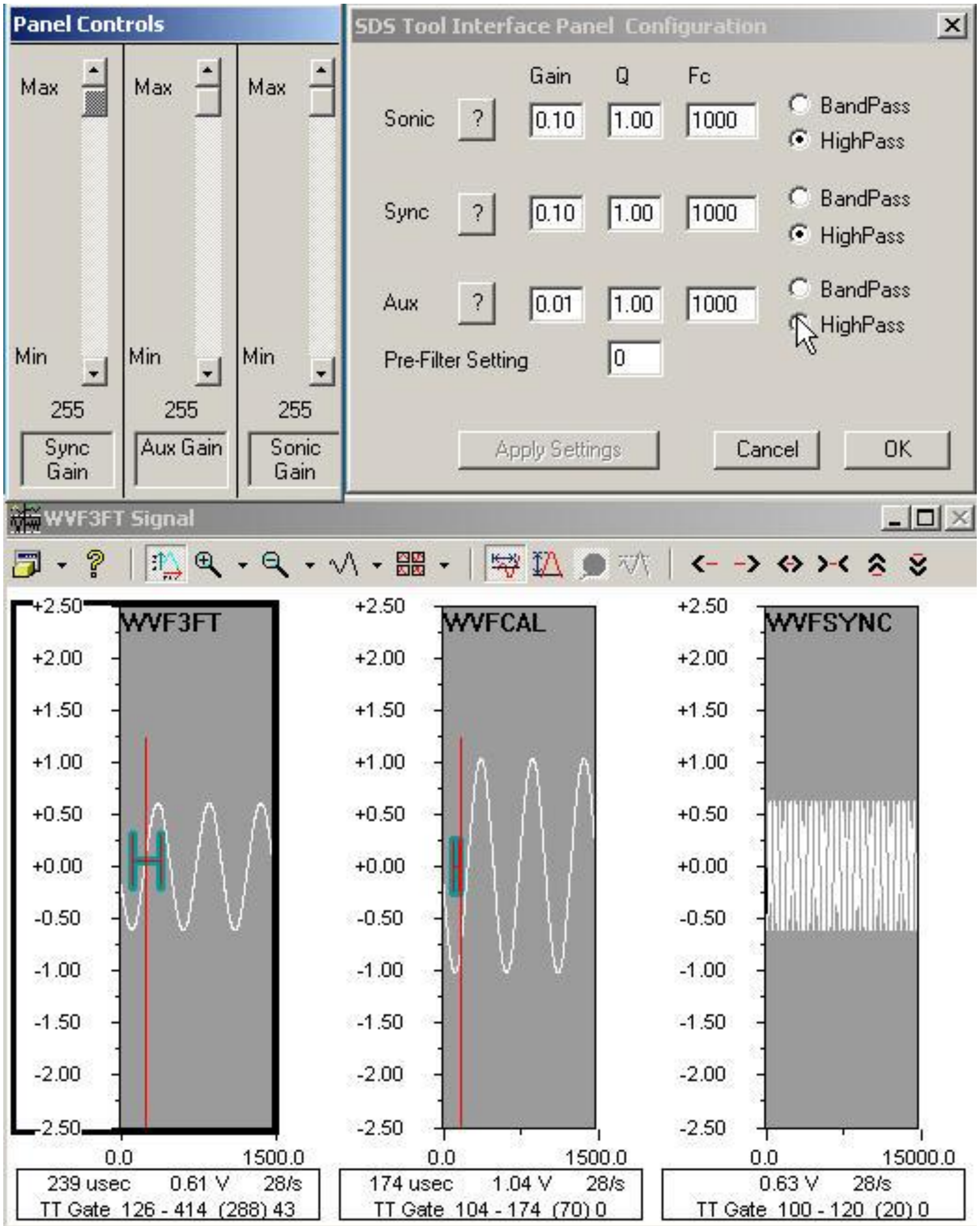


Fig. Ji.4 CBL1-Test Service 2Khz .5Vpp

Change the input frequency to 500 Hz, and verify the following;

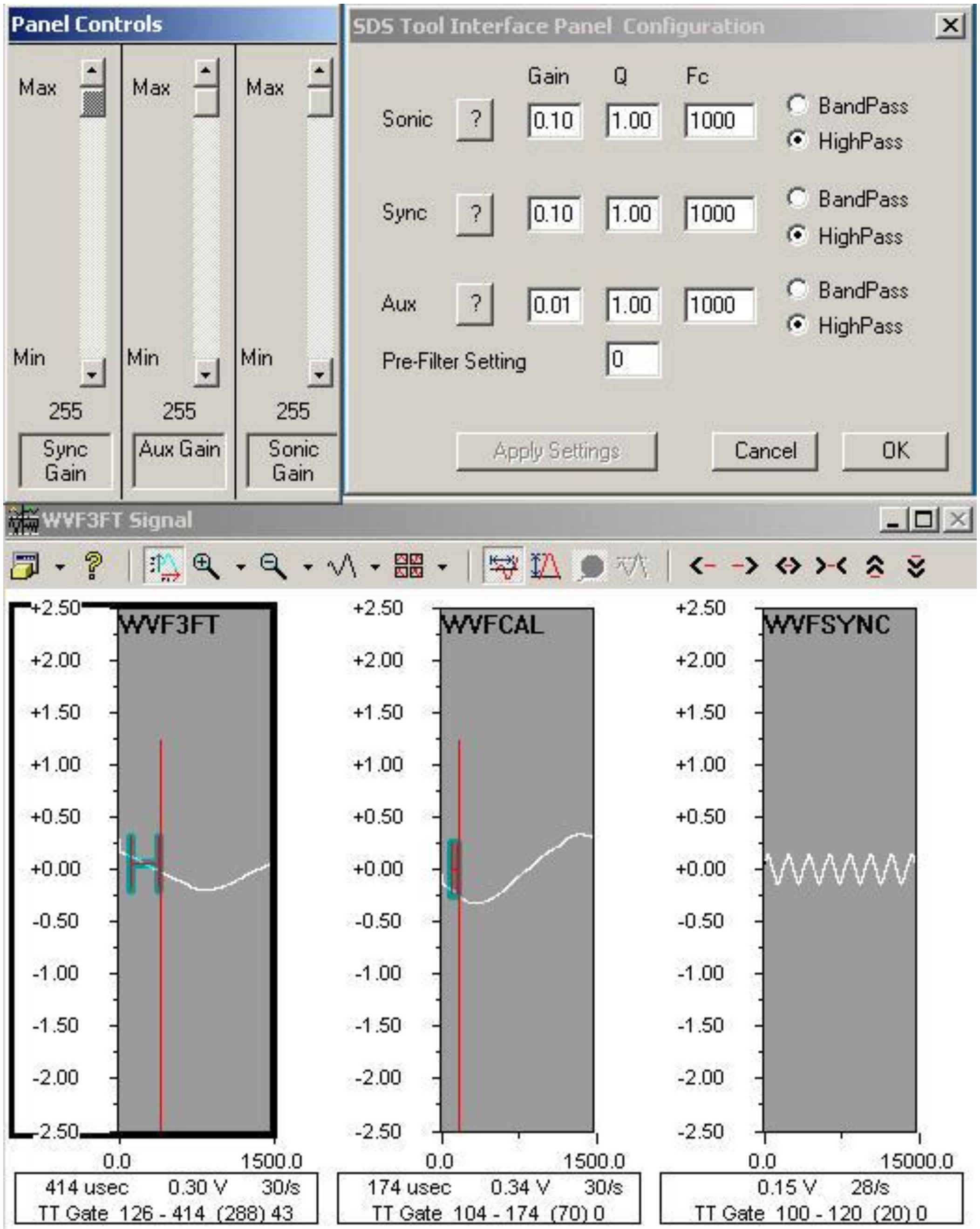


Fig. Ji.5 CBL1-Test Service 500hz .5Vpp

Change the input frequency to 1 KHz, Set the SDS TIP, and verify the following:

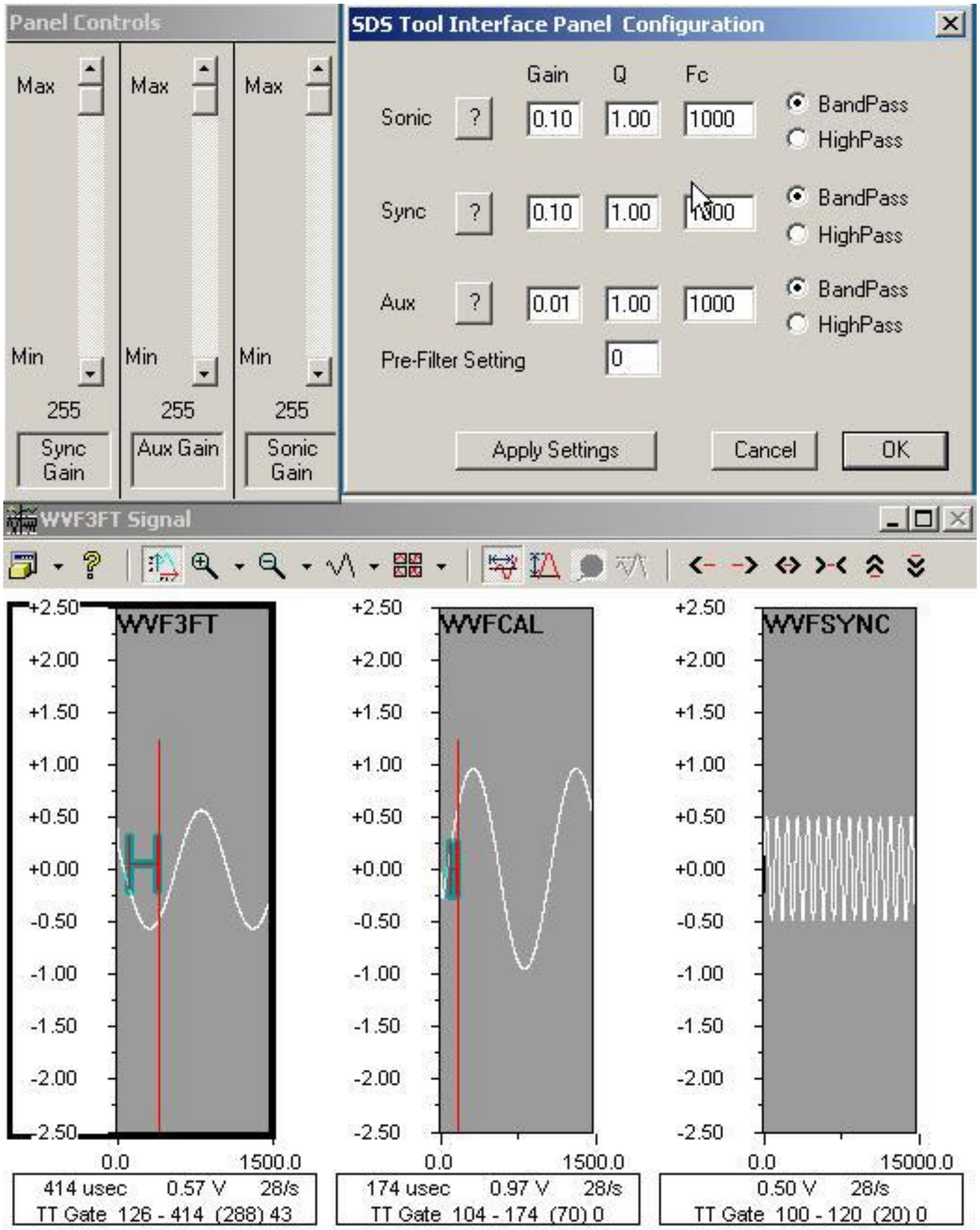


Fig. Ji.6 CBL1-Test Service 1Khz .5Vpp band Pass

Change the input frequency to 2 KHz, and verify the following:

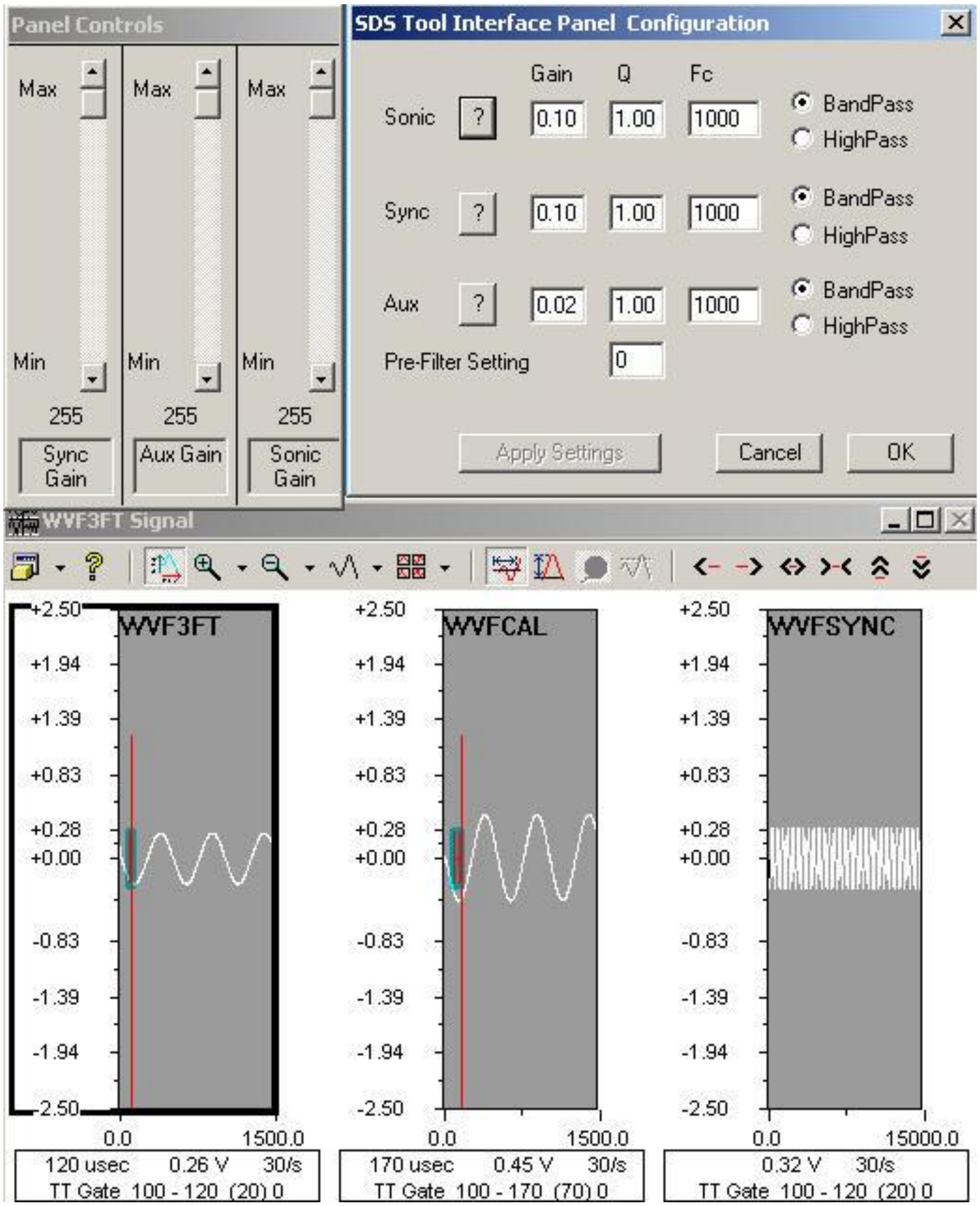
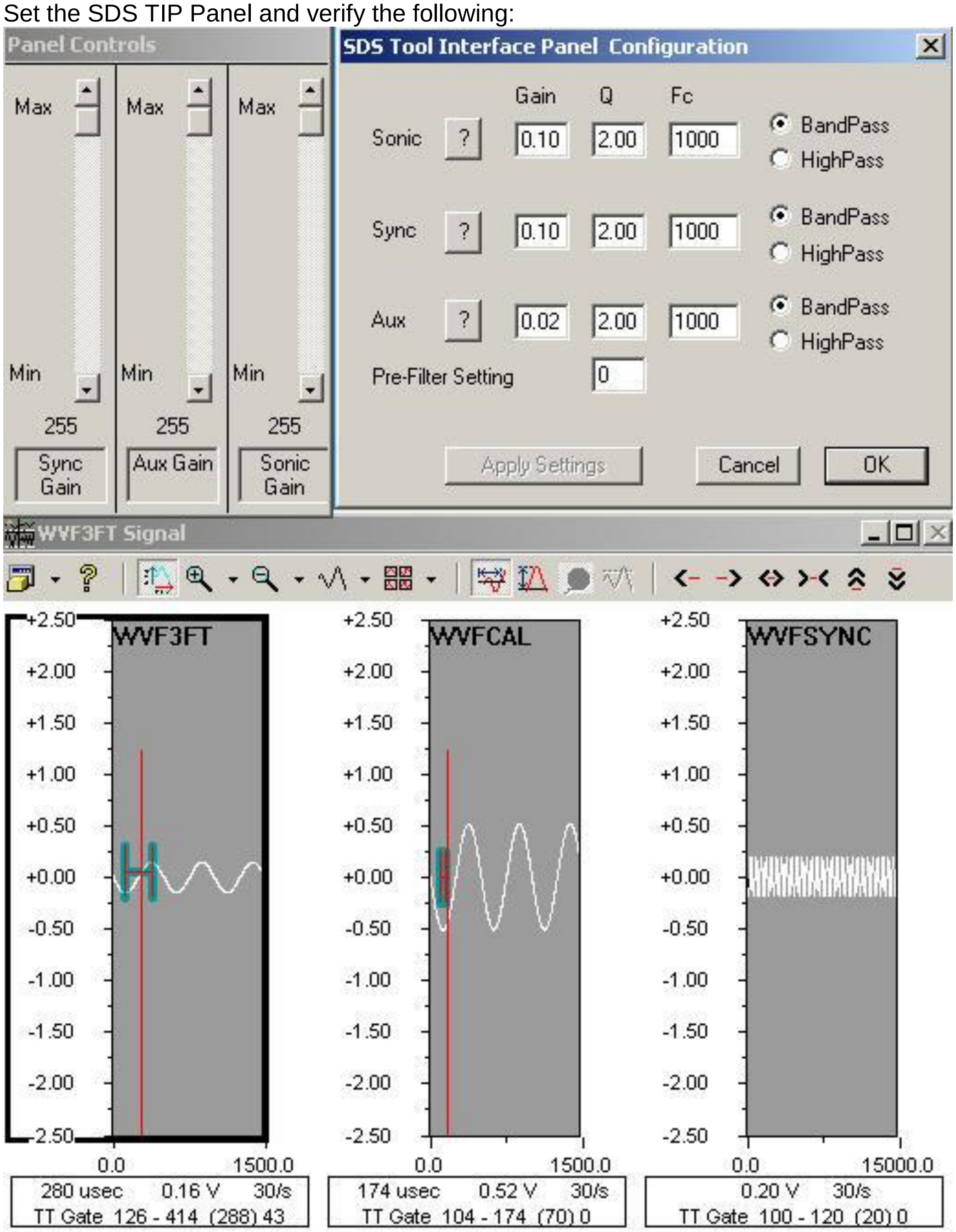


Fig. Ji.7 CBL1-Test Service 2Khz .5Vpp band Pass

Set the SDS TIP Panel and verify the following:



Change the input frequency to 200 Hz, and verify the following:

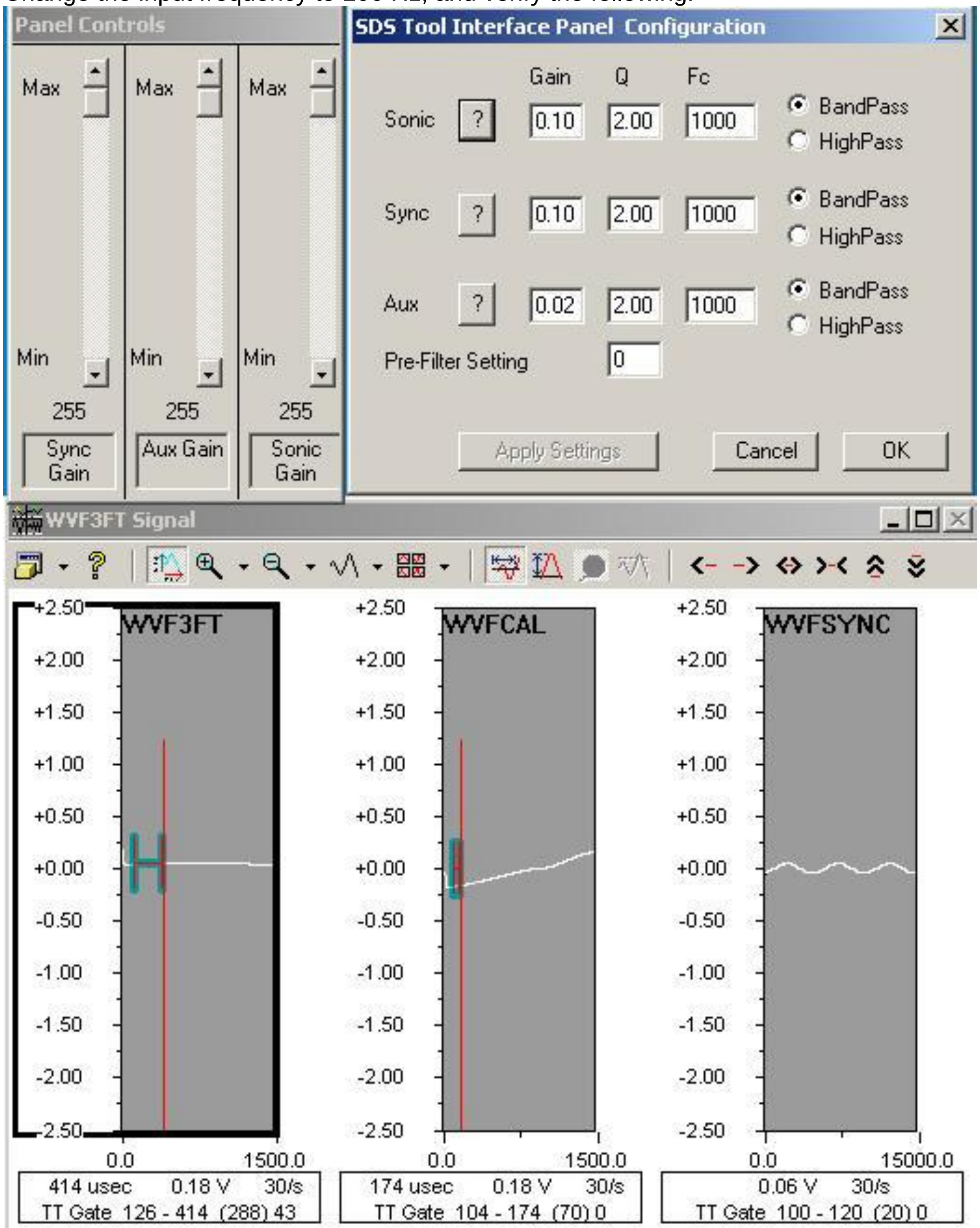


Fig. Ji.8 CBL1-Test Service 200 hz .5Vpp Band Pass

Change the input frequency to 15 KHz, Set the SDSTIP Panel, and verify the following:

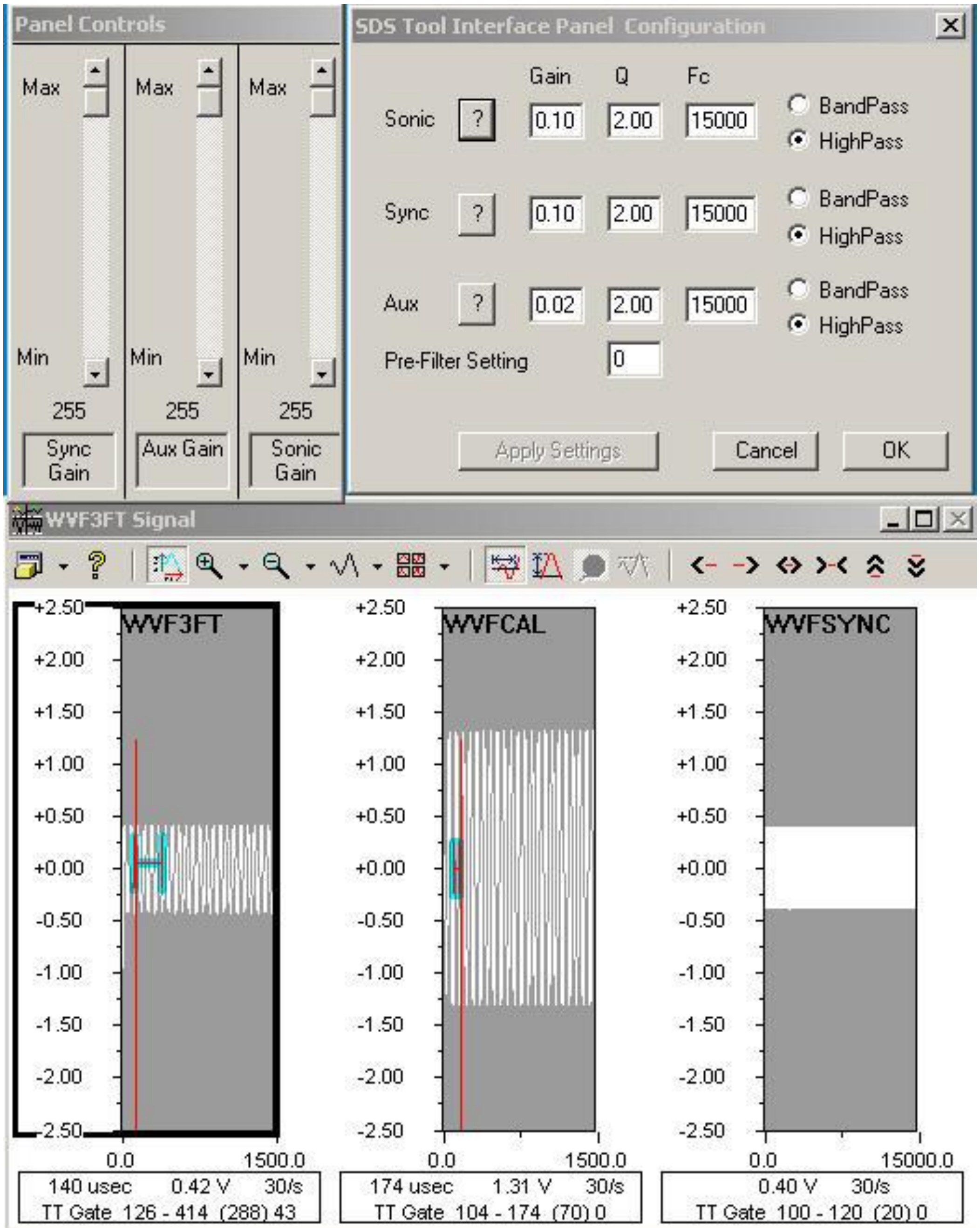


Fig. Ji.9 CBL1-Test Service 15 khz .5Vpp

Change the input frequency to 20 KHz

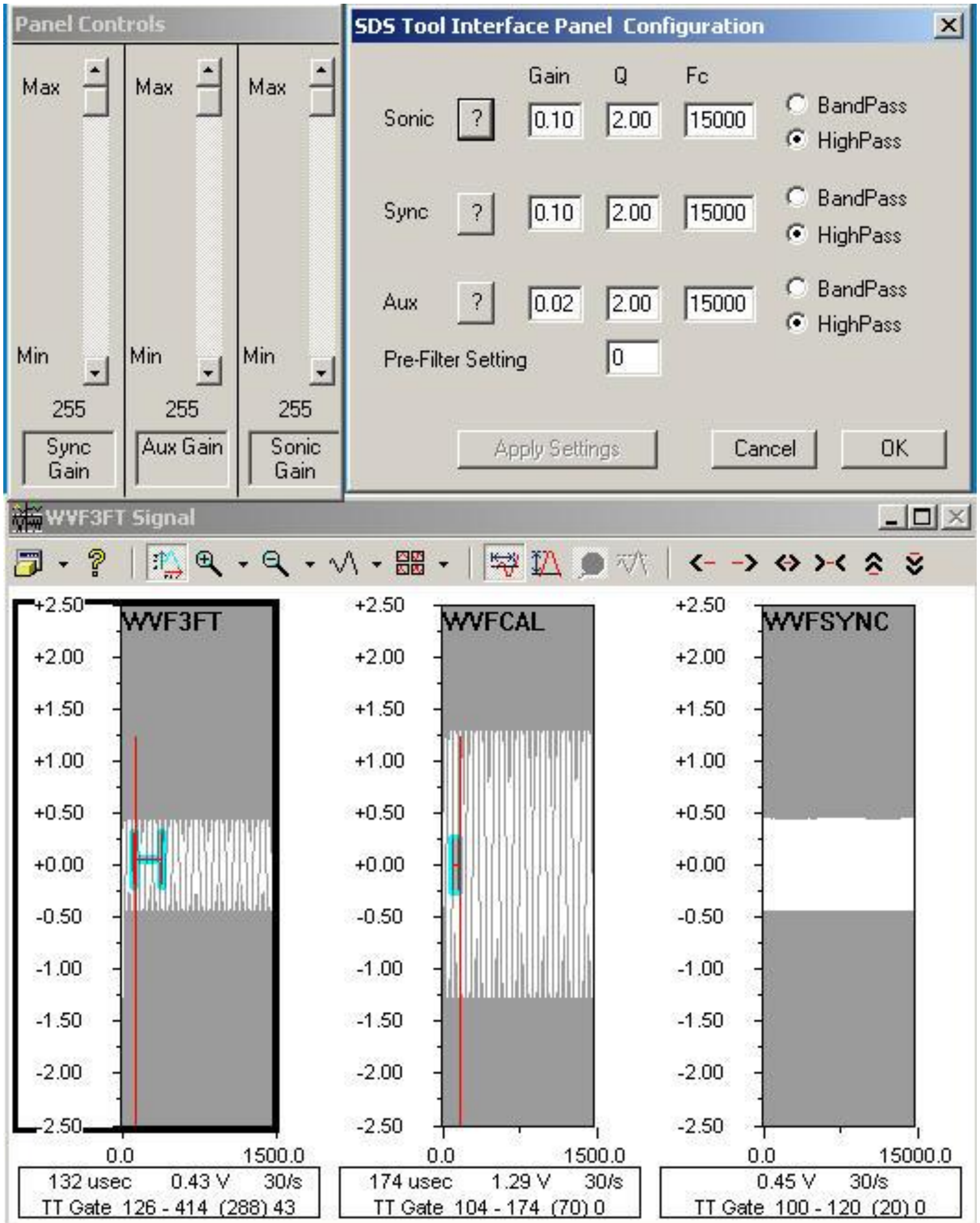


Fig. Ji.10 CBL1-Test Service 20 khz .5Vpp

Change the input frequency to 5 KHz

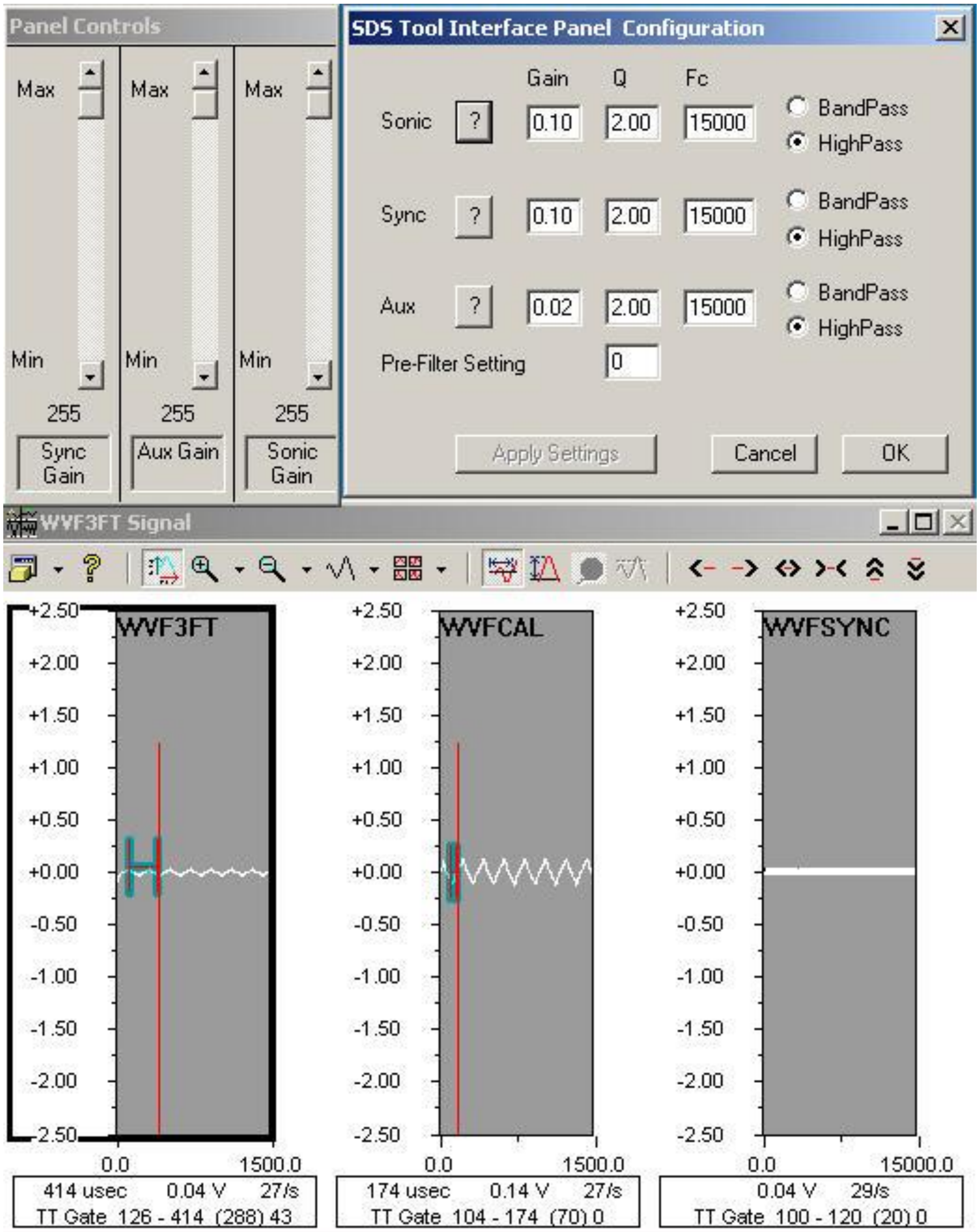


Fig. Ji.11 CBL1-Test Service 5 khz .5Vpp

Change the input frequency to 15 KHz, set the SDS TIP, and verify the following:

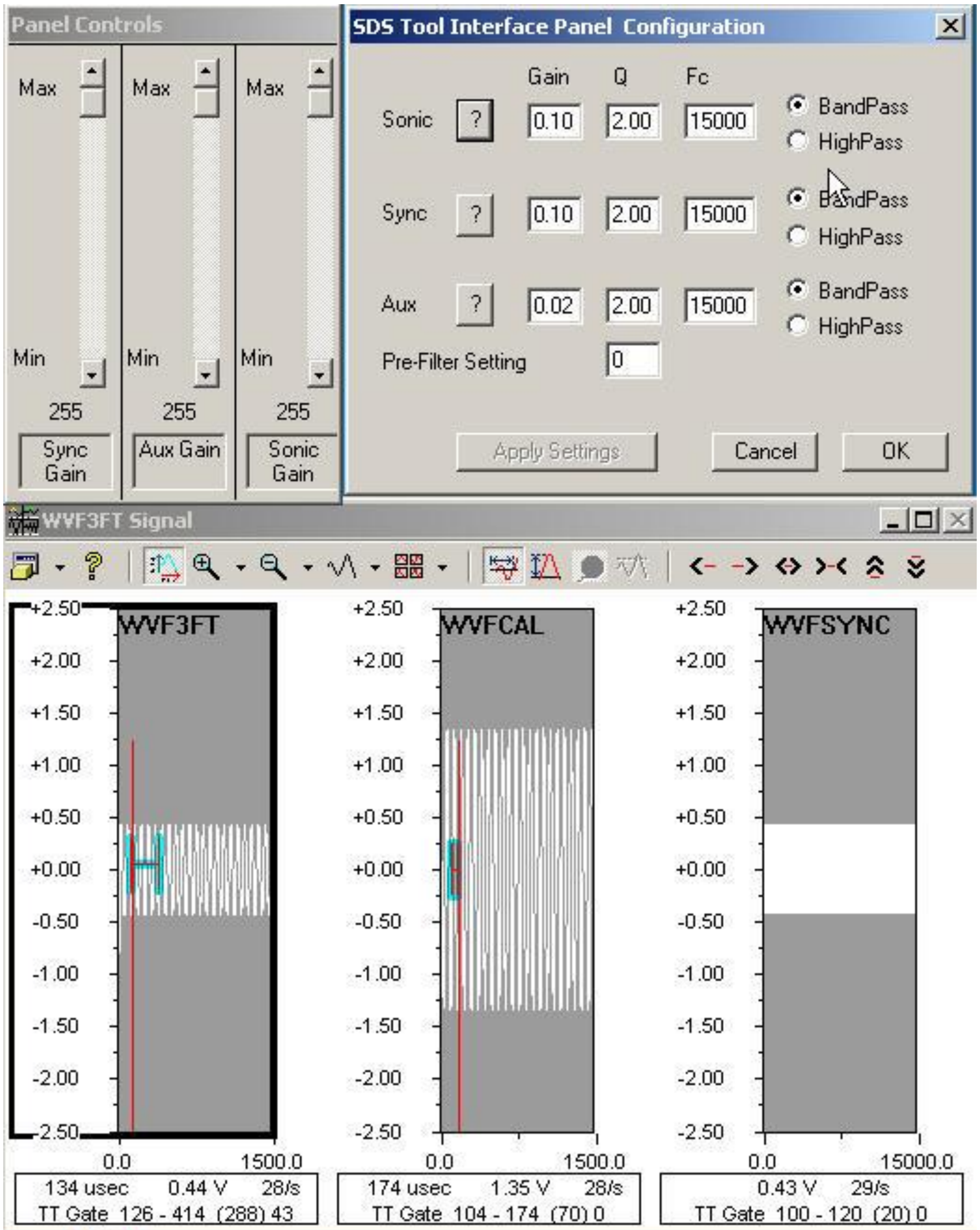


Fig. Ji.12 CBL1-Test Service 15 khz .5Vpp Band Pass

Change the input frequency to 30 KHz, and verify the following:

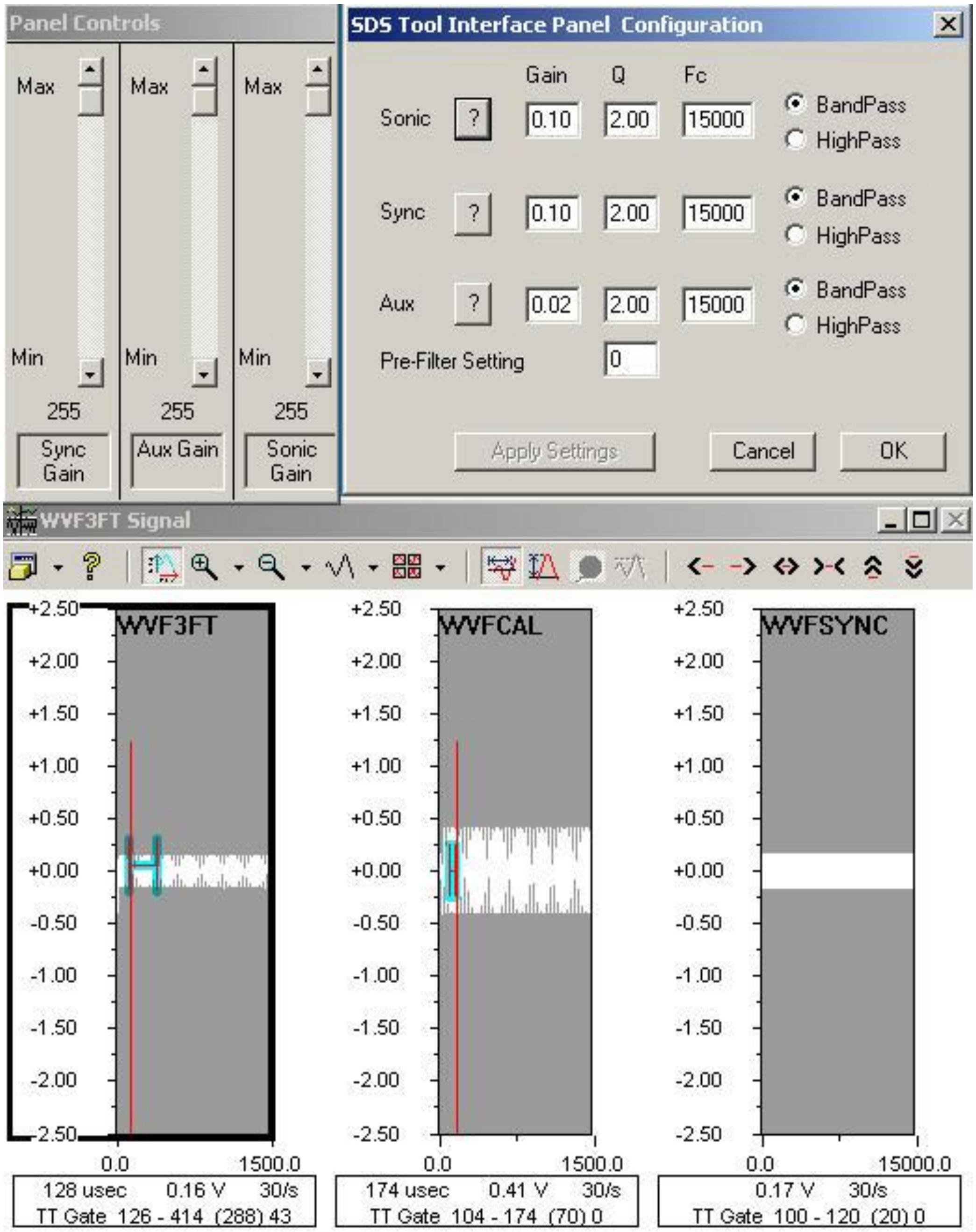


Fig. Ji.13 CBL1-Test Service 30 khz .5Vpp Band Pass

Change input frequency to 5 KHz, and verify the following:

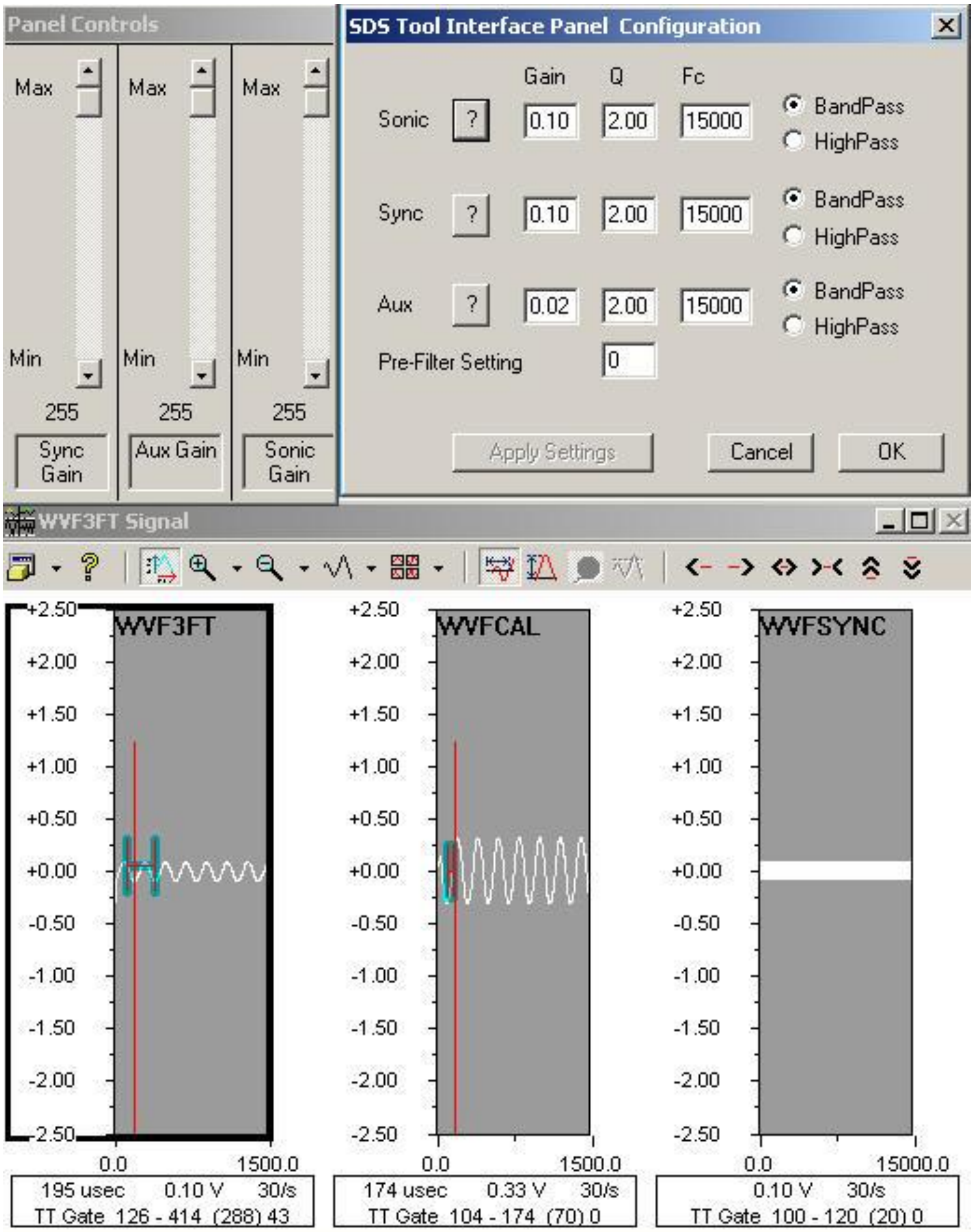


Fig. Ji.14 CBL1-Test Service 5 khz .5Vpp Band Pass

Change the input Frequency to 1 KHz, set the SDS TIP, and verify the following:

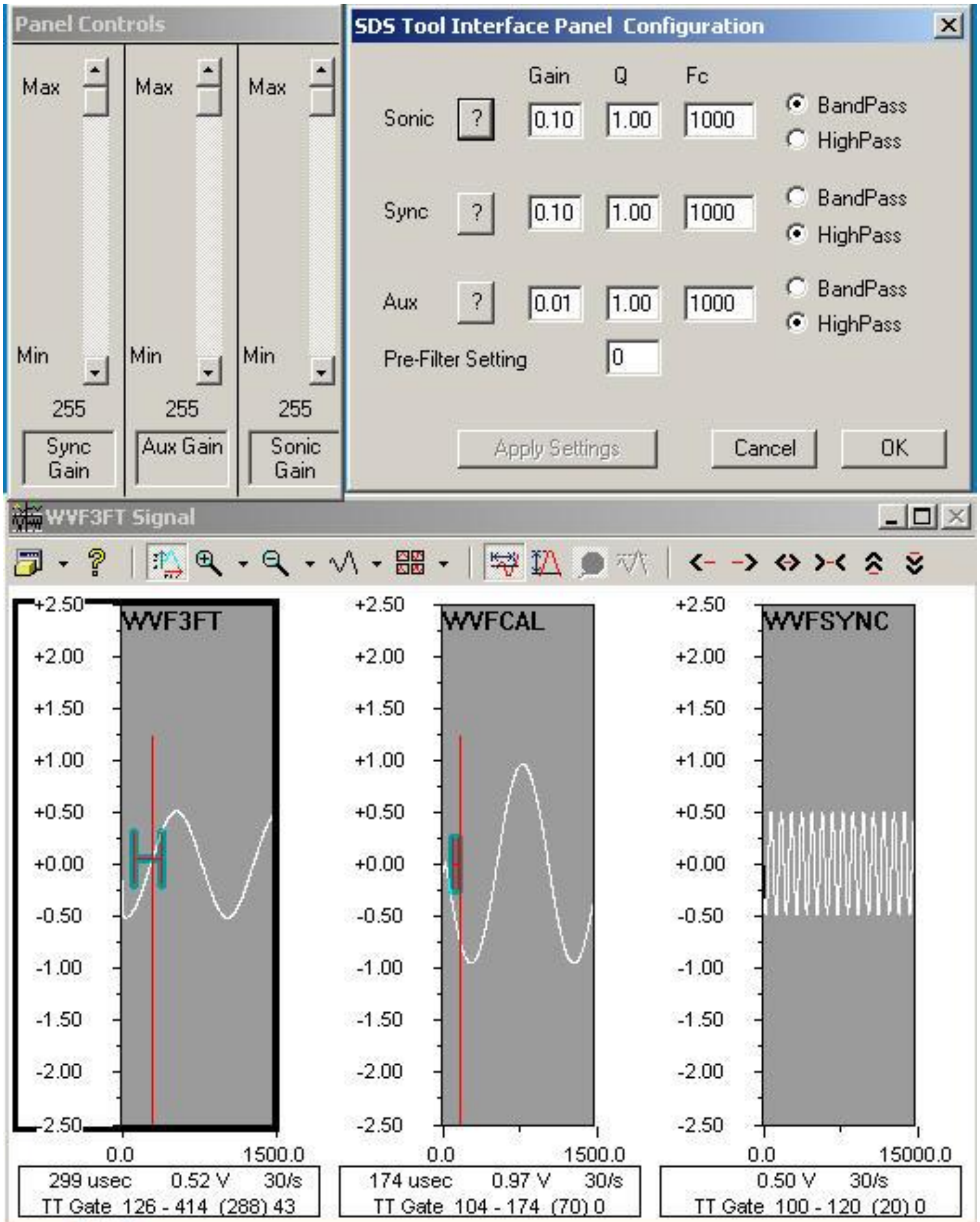


Fig. Ji.15 CBL1-Test Service 1Khz .5Vpp

Set the SDSTIP Panel, and verify the Following:

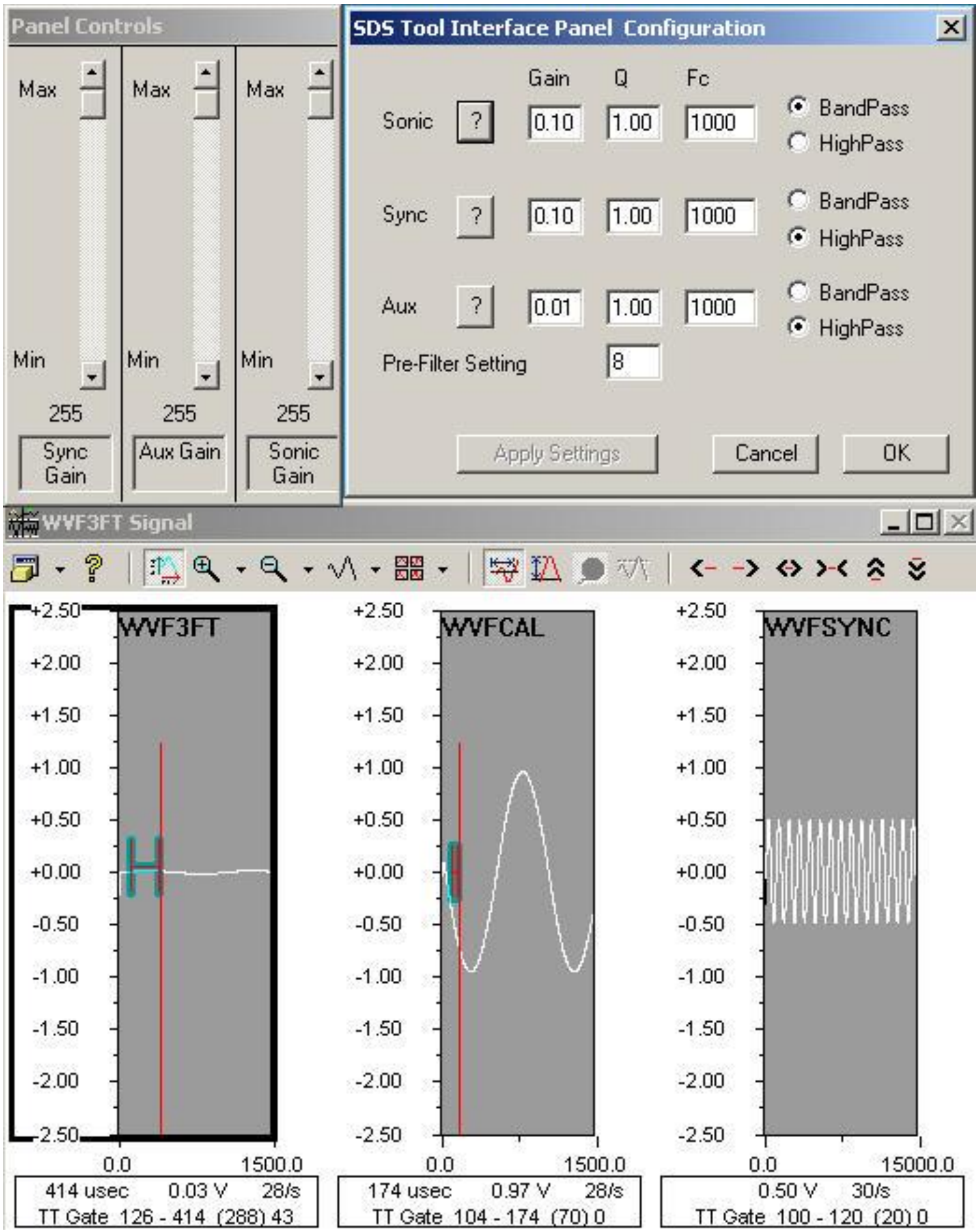


Fig. Ji.16 CBL1-Test Service 1Khz .5Vpp Pre Filter Setting 8

Jii. CBL1 R13 and CBL02

On CBL02_14 check J2 jumper should be on top (1-2)
Install both CBL boards – CBL1D-R13 and CBL02-14
Attach function generator to line
Load "CBL1 Test1"- service and enable the line
Apply 1 KHz 500mv pp sine wave measured at the ANASW TP1
Set Panel Controls and SDS TIP as follows:

Click Edit -> Device Configuration -> SDSTIP
For each of Sonic and Sync – Set Gain, Q, Fc, and High Pass as shown
Set all Gain slider bars to maximum at 255

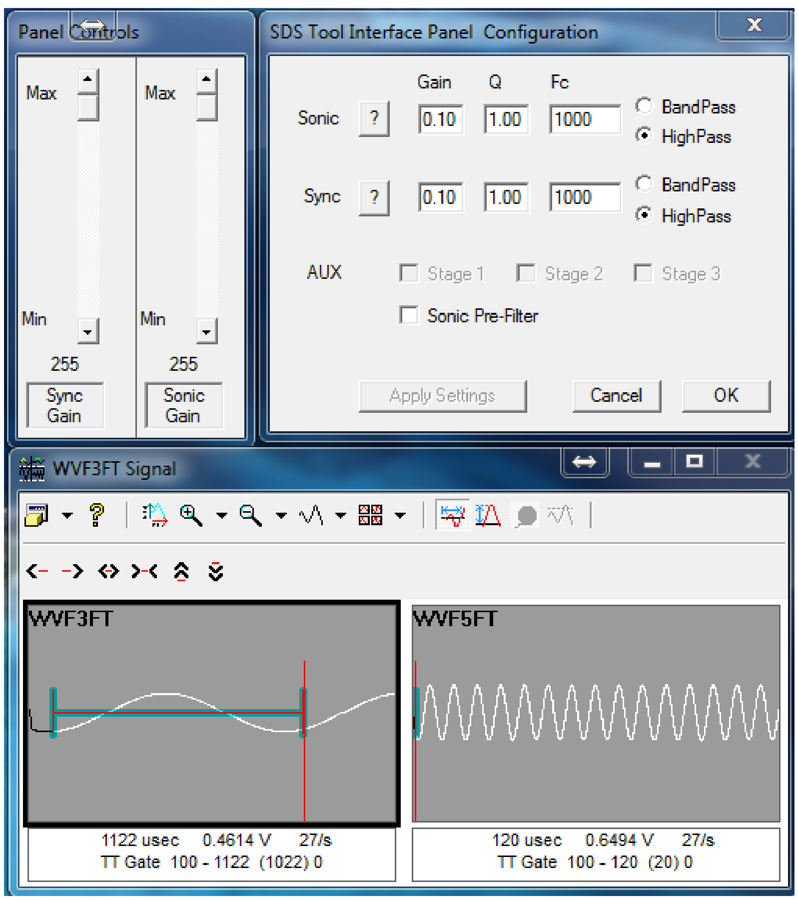


Fig. Jii.1 CBL1 Test1 Service 1Khz 500mv pp

Start a time Recording.
Slowly reduce the Sync Gain slider to 0 and back up to 255 verify the output.

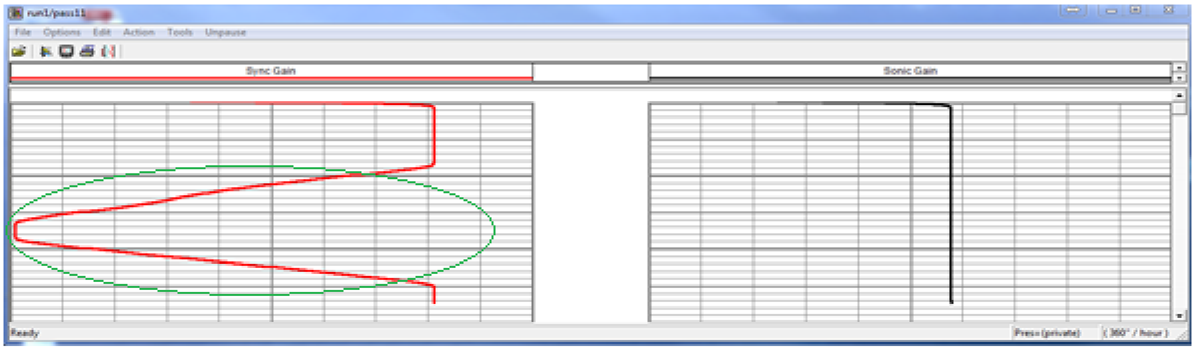


Fig Jii.2 Sync Slider

Slowly reduce the Sonic Gain Slider to 0 and back up to 255 verify output.

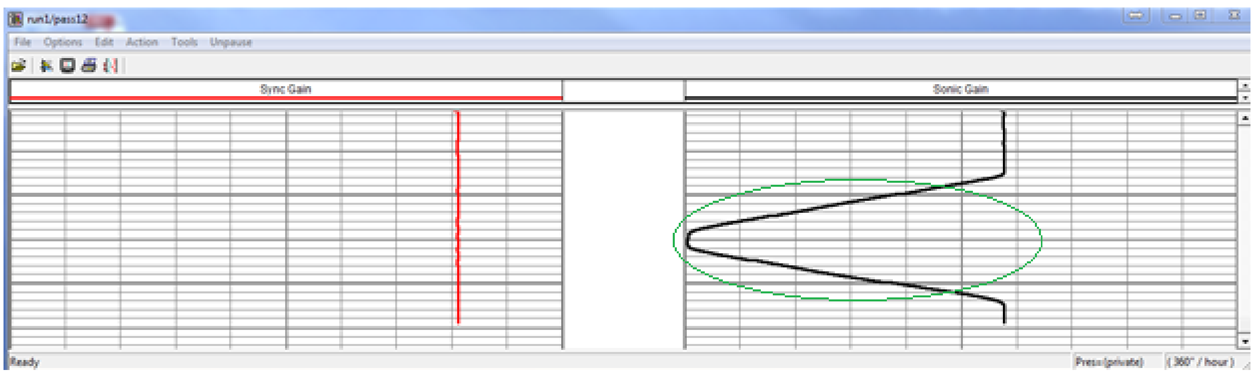
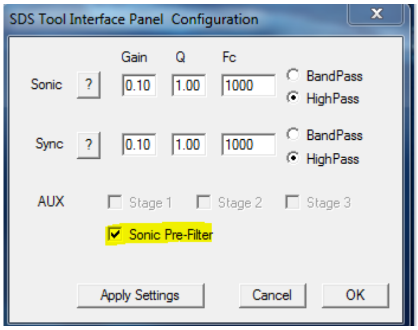


Fig Jii.3 Sonic Gain Slider

On the SDS Tool Interface window put a check in the Sonic Pre-Filter Check box and then uncheck.



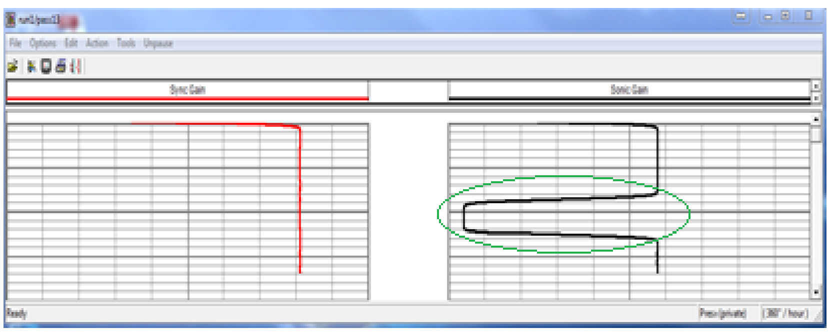


Fig Jii.4 Sonic Pre Filter Radio Button

Adjust the frequency output from 200 Hz to 2k Hz and then return to 1k Hz.

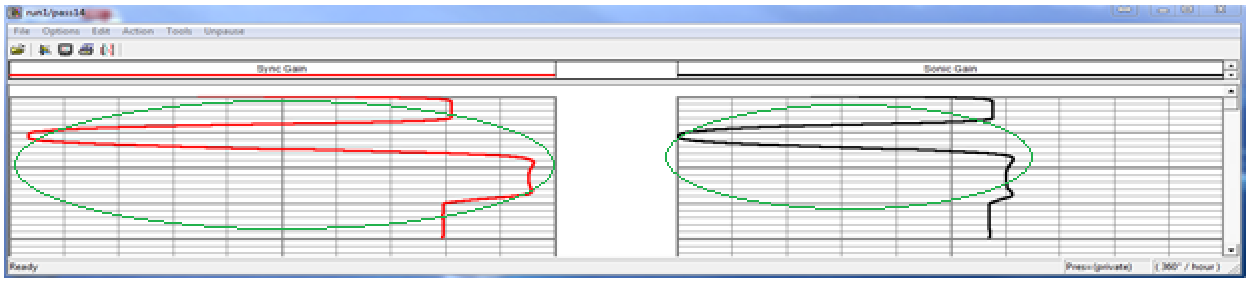


Fig Jii.5 200-2k Hz frequency sweep Q=1 High Pass

Change to the Band Pass radio button and adjust the frequency output from 200 Hz to 2k Hz and then return to 1k Hz.

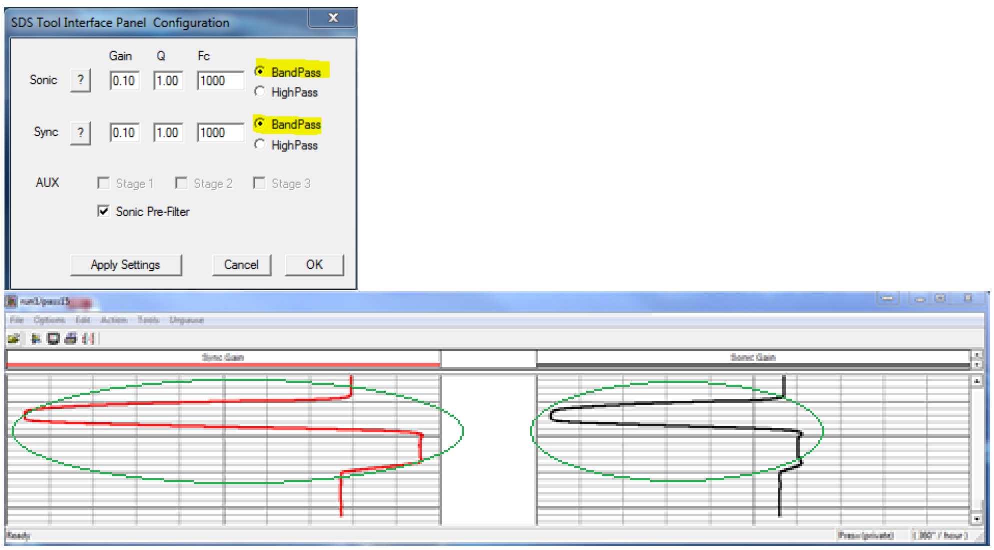
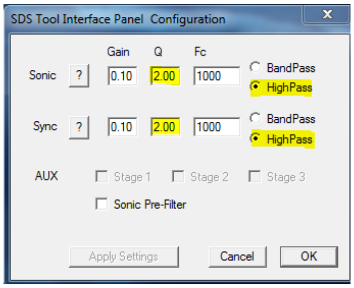


Fig Jii.6 200-2k Hz frequency sweep Q=1 Band Pass

Change the Radio buttons back to High pass and change the Q to 2.00. Once again slowly change the frequency from 2—to 2k hz and back to 1k hz.



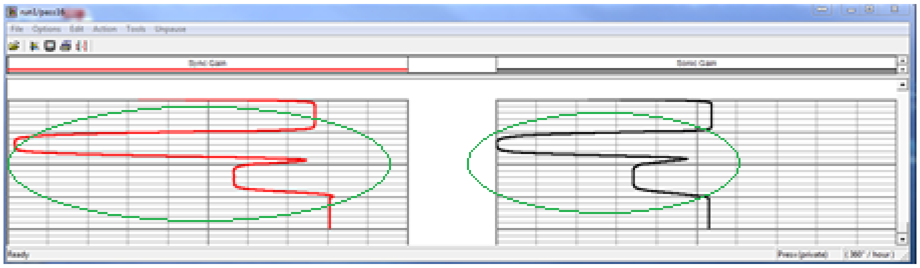
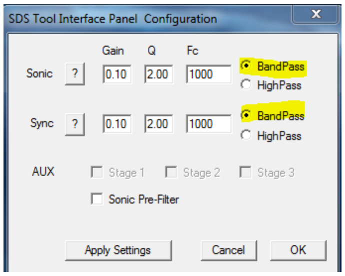


Fig Jii.7 200-2k Hz frequency sweep   Q=2 High Pass

Change the Radio buttons to Band pass. Once again slowly change the frequency from 2—to 2k hz and back to 1k hz.



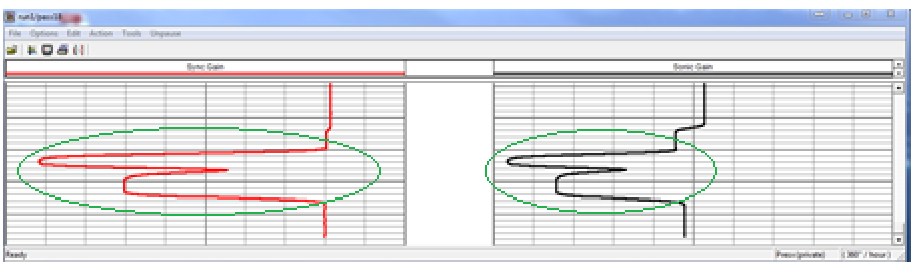
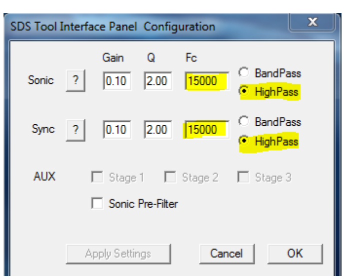


Fig Jii.8 200-2k Hz frequency sweep Q=2 Band Pass

Apply 15k Hz and adjust the Fc to 15000 for both Sonic and Sync inputs. Slowly sweep to 5k Hz to 20k Hz and back to 15k Hz.



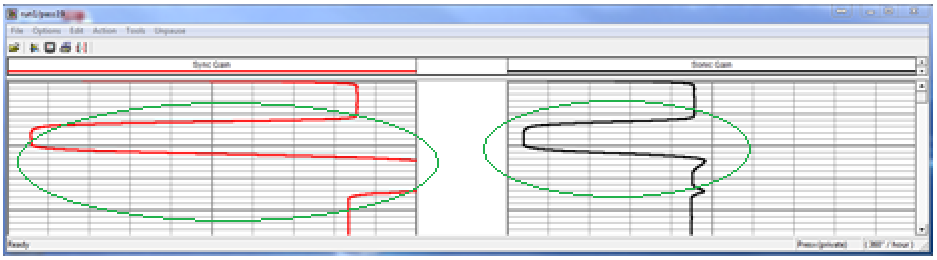
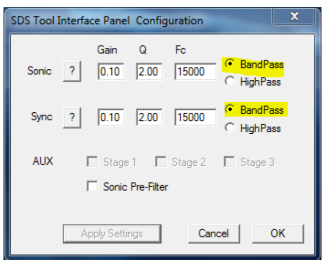


Fig Jii.9 5k -20k Hz frequency sweep   Q=2 High Pass

Change to Band pass and slowly sweep to 500 Hz to 20k Hz and back to 15k Hz.



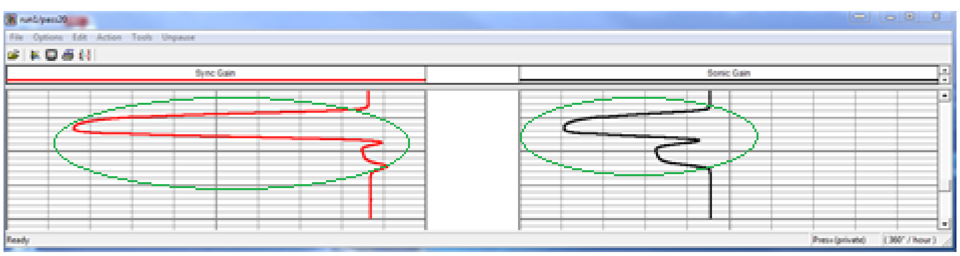


Fig Jii.10 5k -20k Hz frequency sweep   Q=2 Band Pass

Return the SDS Tool Interface Panel Configuration to its original state.

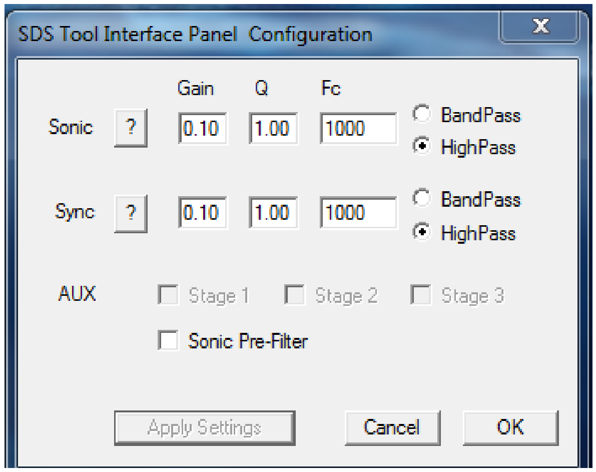


Fig Jii.11 Default settings

All Time recordings may be done as one complete log, separate passes were used for demonstration purposes.

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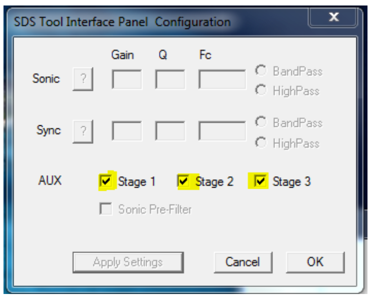
CBL1 R13 Aux Chanel test

Close the CB1 Test1 service and open the CBL1 Test2 Service.
Enable the wireline and adjust the signal at the ANASW TP1 for 200mv @ 20k Hz

Put a check in all three Stage radio buttons, Start a Time log and slowly move the slider from max to min and back to max.



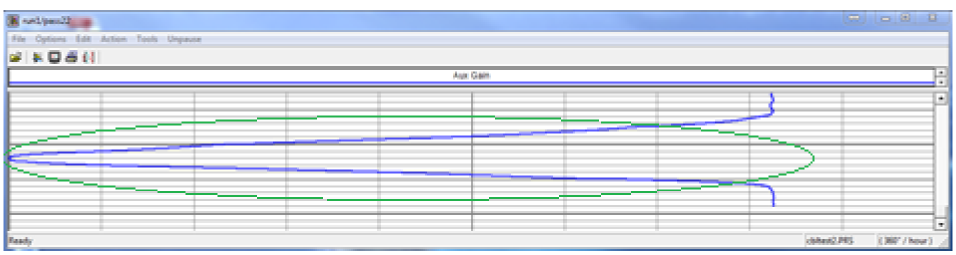
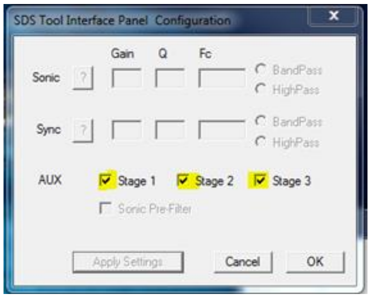


Fig Jii.12 Slider Sweep

Start a time drive and sweep the frequency input from 2kHz to 100kHz.
The output should resemble the log below.



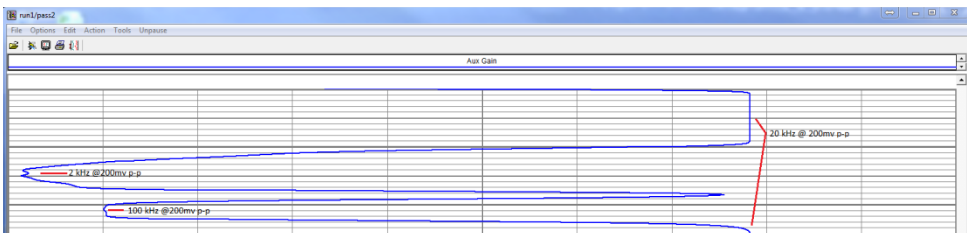
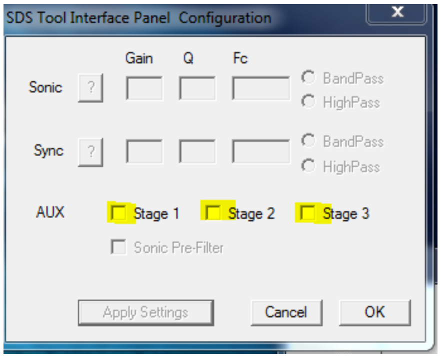


Fig Jii.13 Frequency Sweep 2 kHz -100 kHz

Start a time log and enable the Stage radio buttons in sequence to cover all 8 options remembering to Apply between each change



Stage 1	Stage 2	Stage 3
X	X	X
Y	X	X
X	Y	X
Y	Y	X
X	X	Y
Y	X	Y
Y	Y	Y

Fig Jii.14 Stage settings

Your output should resemble the Log.

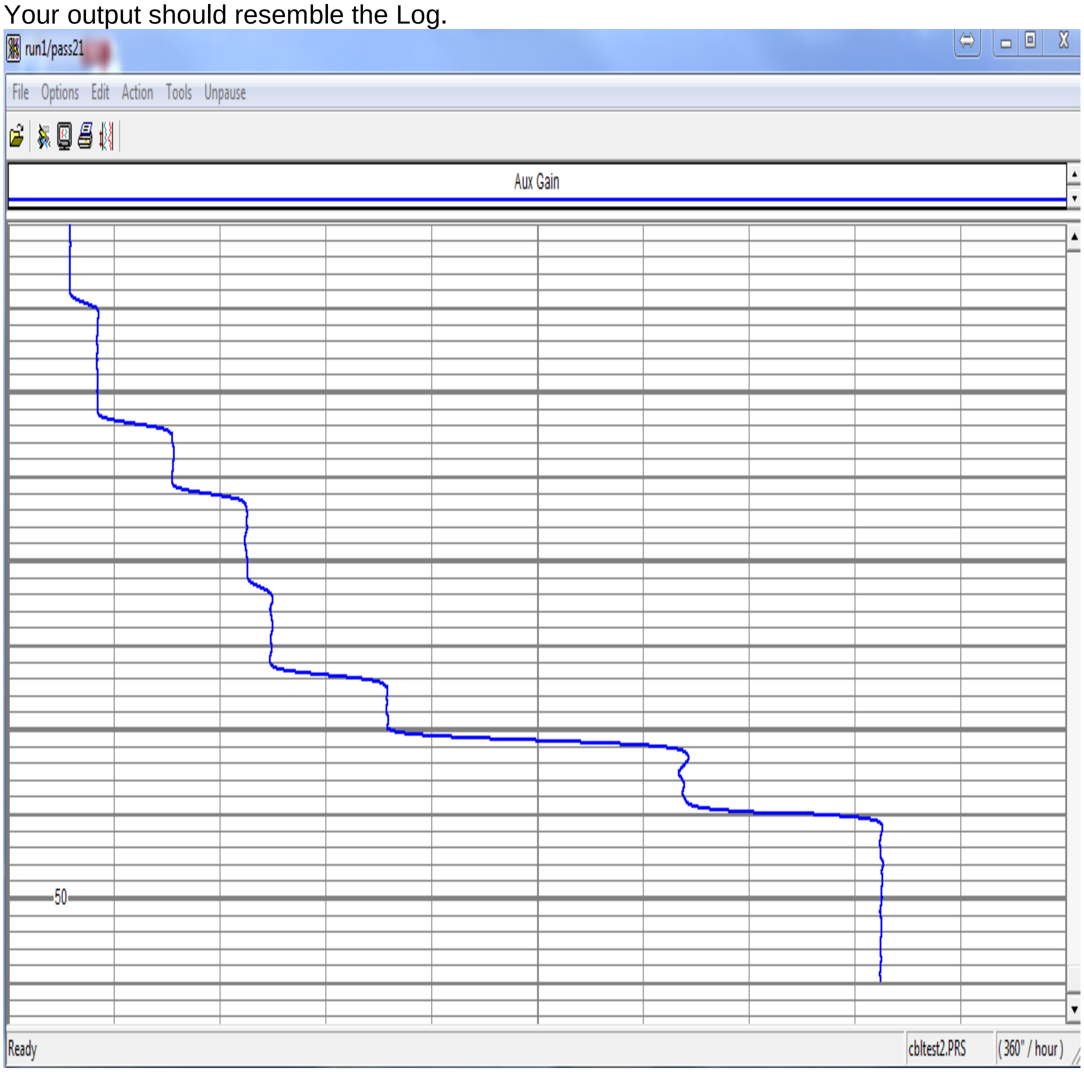


Fig Jii.15 Stage settings changed @ 20k Hz 50mv pp

K. SIE 1x1 and CSSM 3 1/8 Bond

Load SIE1x1 service from simulator box
Select the “SIE cement Bond 1x1”, and Enable the Line
Start Simulator
Check travel time- check invert of signals with tool editor

Set the panel control and SDS Tool Interface Panel
Record at least 200 ft of a log pass

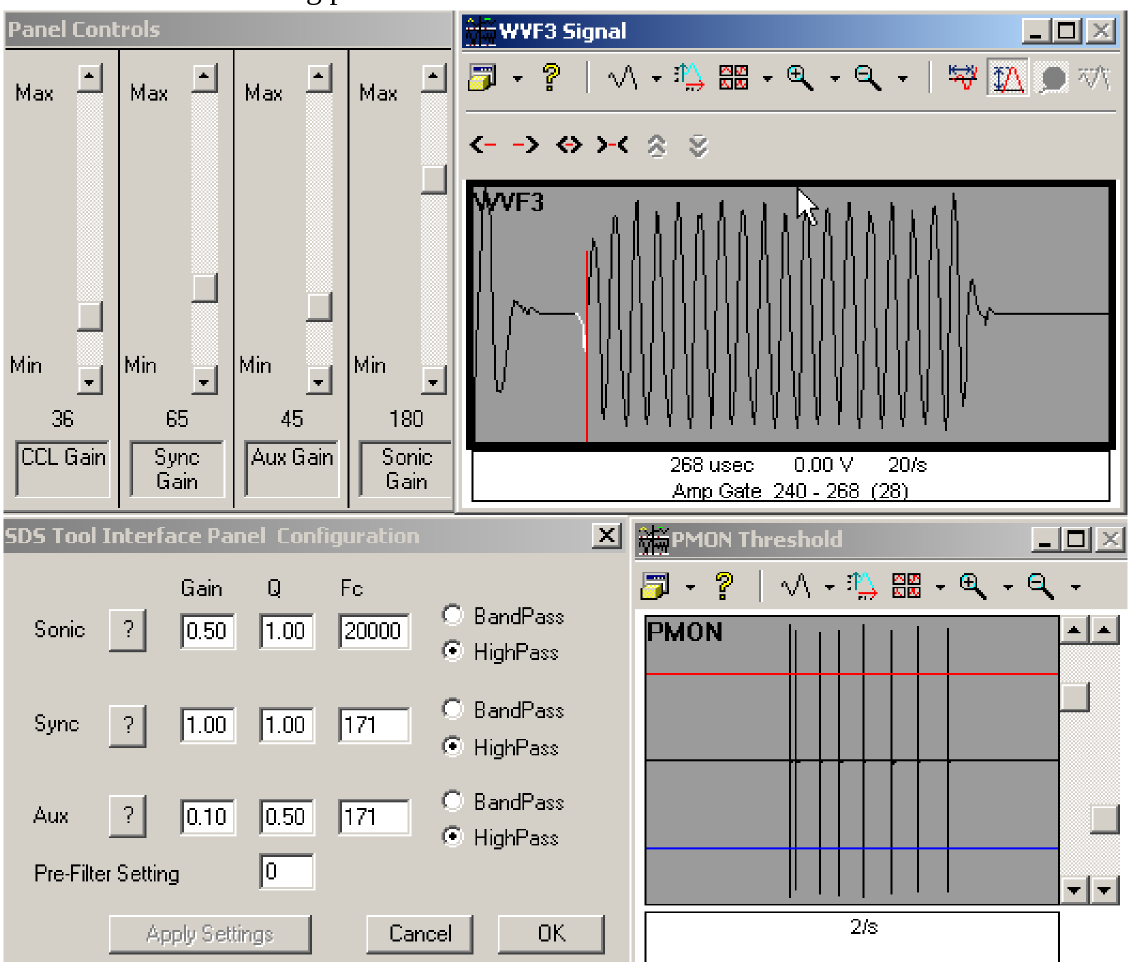


Fig. K.1 SIE 1x1 Bond Signal

Select service CSSM 3 1/8 RBT medium to long lines
Open the simulator program and load the tool css25.sim

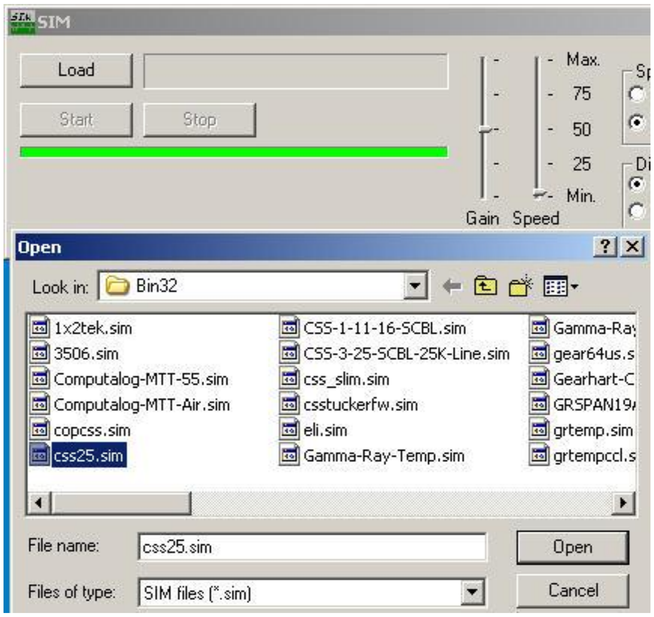
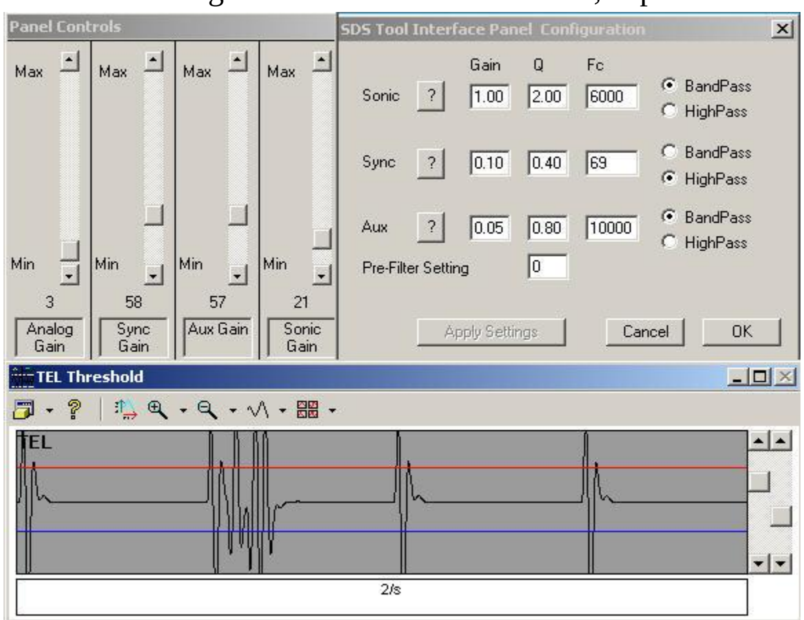


Fig. K.2 Load CSS Sim

Enable the line, and Start Simulator

Adjust Pulse Monitor PMON, and Set the panel control and SDS Tool Interface Panel

Set the following values simulator at - 45 ft/m, depth 8000 ft and record up for at least 4 hours.



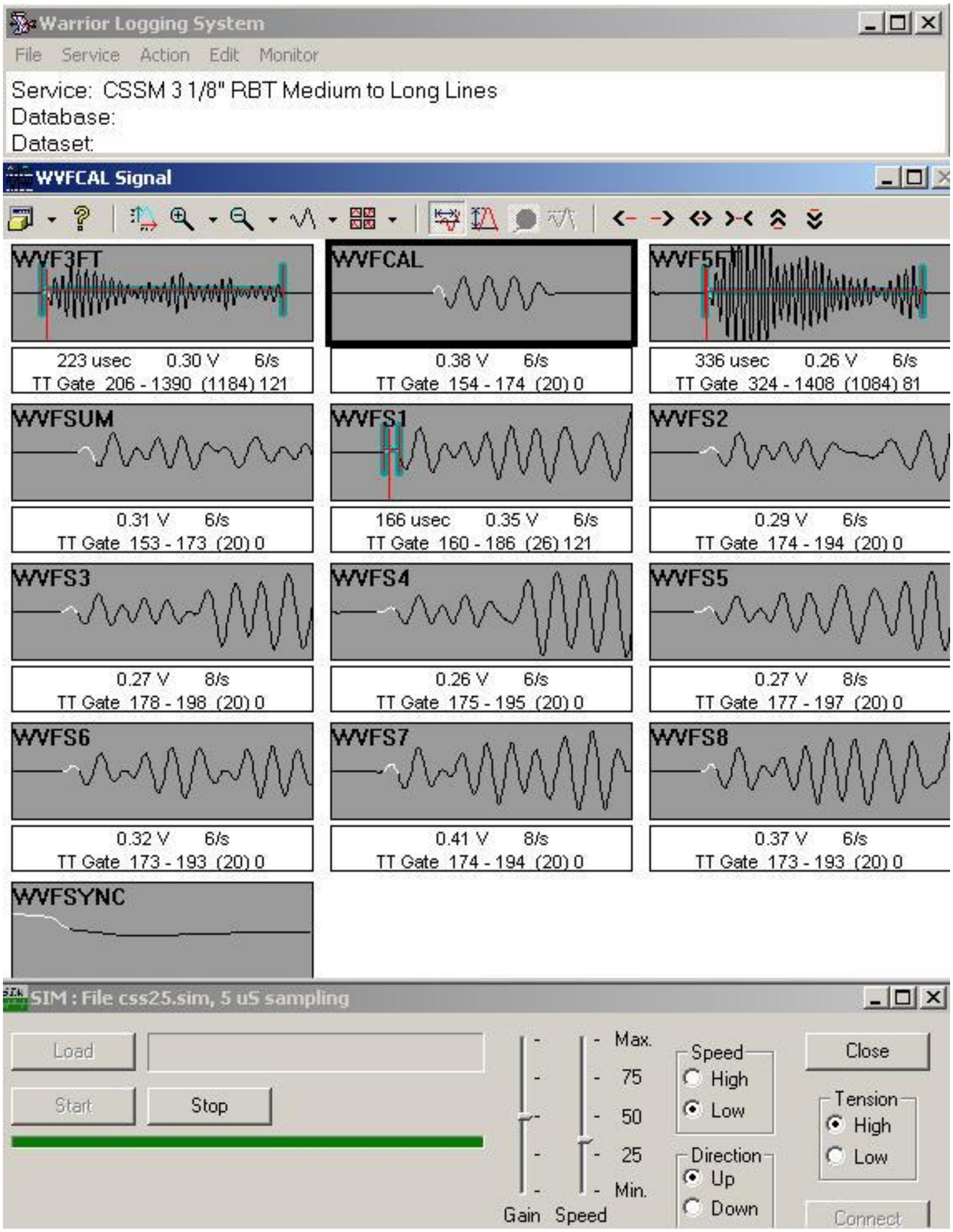


Fig. k.3 CSS Bond Signal

Check for readings on CCL – Travel time –Err count – Gamma ray

On - Monitor – Devices – SDSDSP

Device: SDSDSP

Source	Name	Value	Units
DSP-6	TEL1	0.0000	
DSP-7	TEL2	12.0000	
DSP-8	TEL3	0.0000	
DSP-9	TEL4	0.0000	
DSP-10	TEL5	7785.0000	
DSP-11	TEL6	12341.0000	
DSP-12	TEL7	12019.0000	
DSP-13	TEL8	2029.0000	
DSP-14	TEL9	-32768.0000	
DSP-15	TEL10	-32756.0000	
DSP-16	CCL1	7785.0000	
DSP-17	ErrCnt	0.0000	
DSP-18	ErrCode	0.0000	

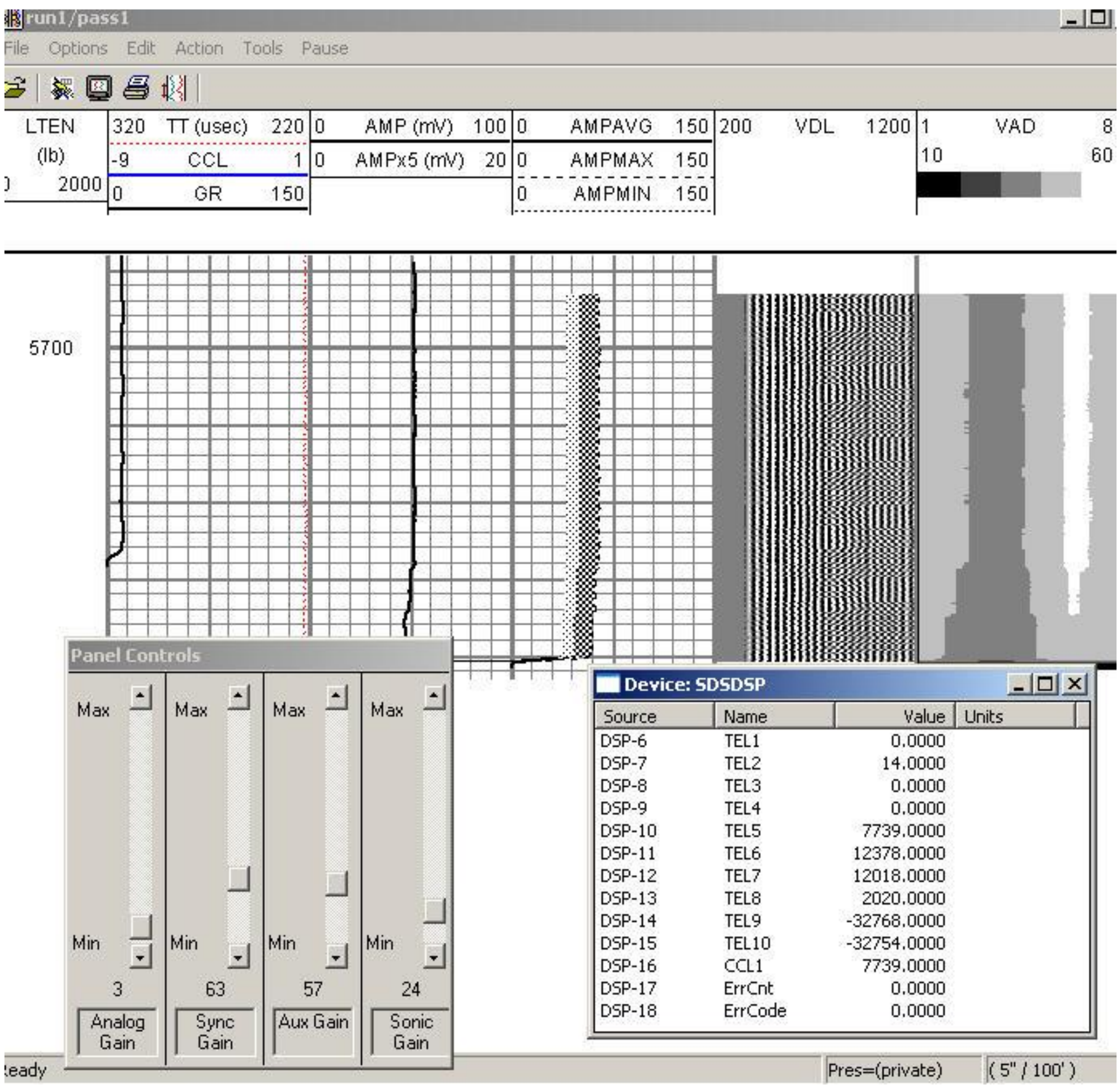


Fig. K.4 CSS Log and DSP Signals

L. AUDIO

Adjust P6 so that output of U9 is + 7.5 volts D.C.

Adjust P5 so that output of U8 is –7.5 volts D.C.

With the power supply disabled adjust P8 for zero offset on TP4

With signal generator connected to “Line in” at 1 kHz, apply voltage to read 10 volts Peak-to-peak at pin 5

Select the NOISE LOG service and Enable the Line

On the Audio board, Place scope probe at TP1 and adjust P1 for 2.5 volts peak to peak

Ground input (at Line in) and adjust P8 for zero offset at TP4. Check offsets at TP2 and TP3

Adjust signal generator so that signal at TP1 is 0.500 volts peak-to-peak

Place scope at TP2 and adjust P2 for 5 volts peak-to-peak output

Adjust signal generator so that signal at TP2 is 0.500 volts peak-to-peak

Place scope probe at TP3 and adjust P3 for 5 volts peak-to-peak output

Adjust signal generator so that signal at TP3 is 0.500 volts peak-to-peak

Place scope at TP4 and adjust P4 for 5 volts peak-to-peak output

Select [Start Sampling}

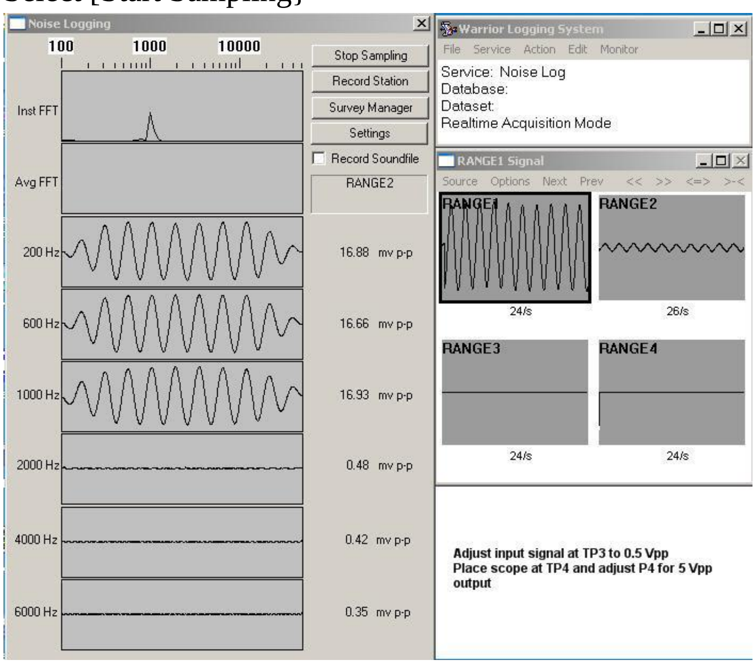


Fig. L.1 .5vpp 1 khz @ TP3

Set Generator 6 KHz

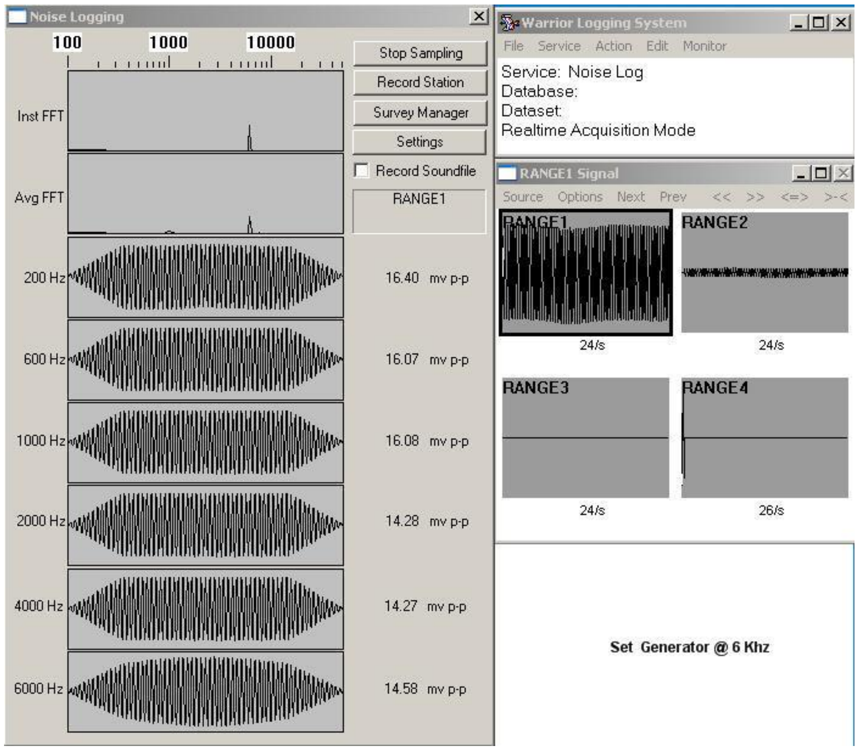


Fig. L.2 .5vpp 6 khz @ TP3

Set Generator 1 KHz @ 250 mv peak-to-peak at Pin 5 the Audio Board

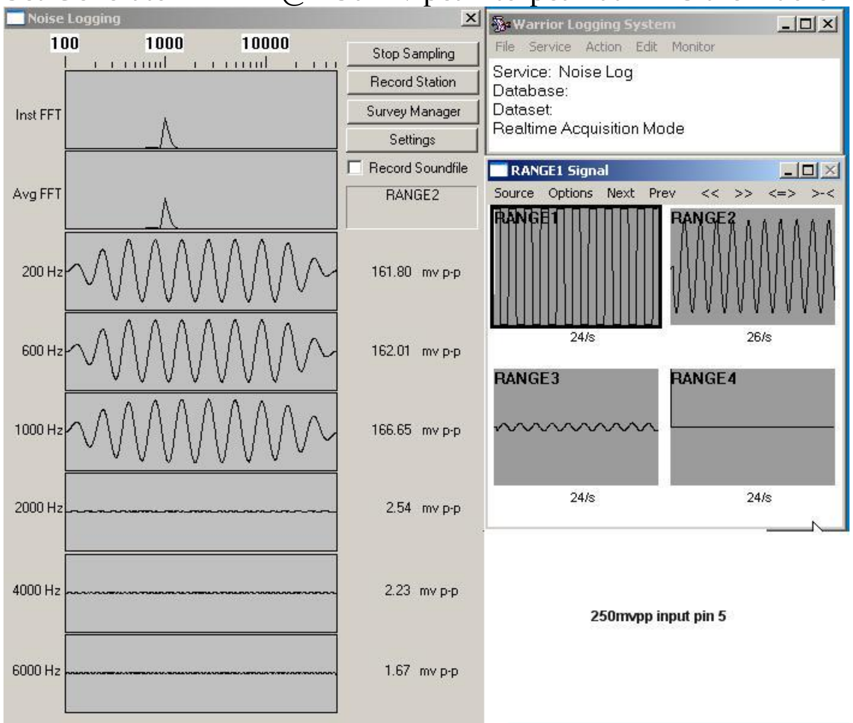


Fig. L.3 1 KHz @ 250 mvpp at Pin 5 the Audio Board

Set Generator 1 KHz @ 1.5V peak-to-peak at Pin 5 the Audio Board

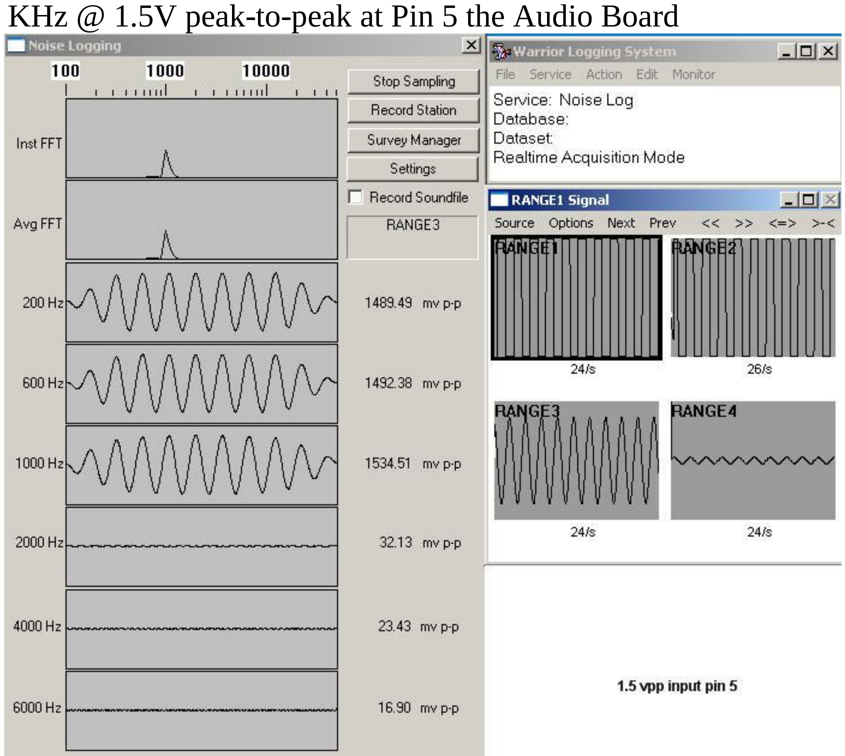


Fig. L.4 1 KHz @ 1.5 vpp at Pin 5 the Audio Board

Set Generator 1 KHz @ 10V peak-to-peak at Pin 5 the Audio Board

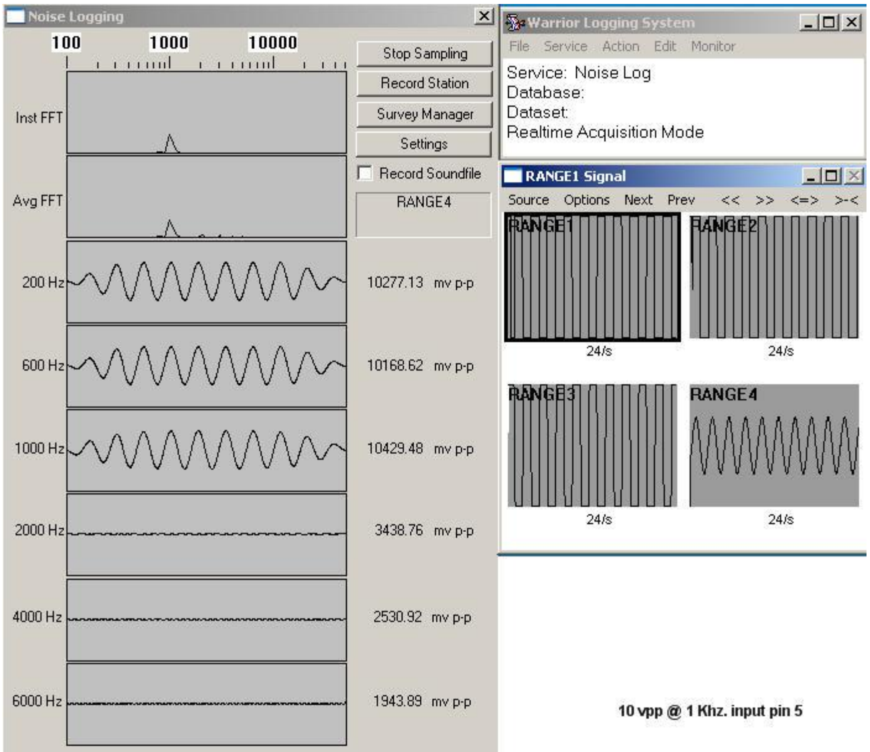


Fig. L.4 1 KHz @ 10vpp at Pin 5 the Audio Board

Set Generator 10 KHz @ 10V peak-to-peak at Pin 5 the Audio Board

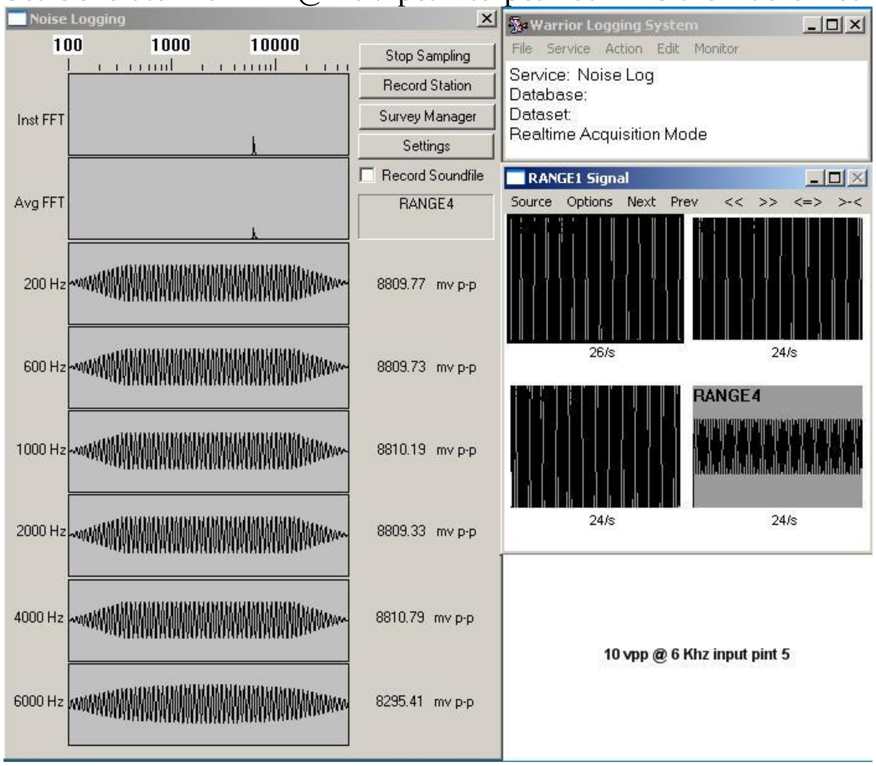


Fig. L.4 10 KHz @ 10vpp at Pin 5 the Audio Board

Apply 1 kHz, .5V peak to peak at ANASW-TP-1
Check 12V peak to peak at TP-3
Connect the speaker to Audio out
Increase and decrease the volume with the slider speaker control

M. APPLIED FREEPOINT

Setup Freepoint tool to run through the shop line
Tool Power Switch Must be ON
Select Service /Freepoint Applied
Select [Setup]
Set in Raw reading = 10

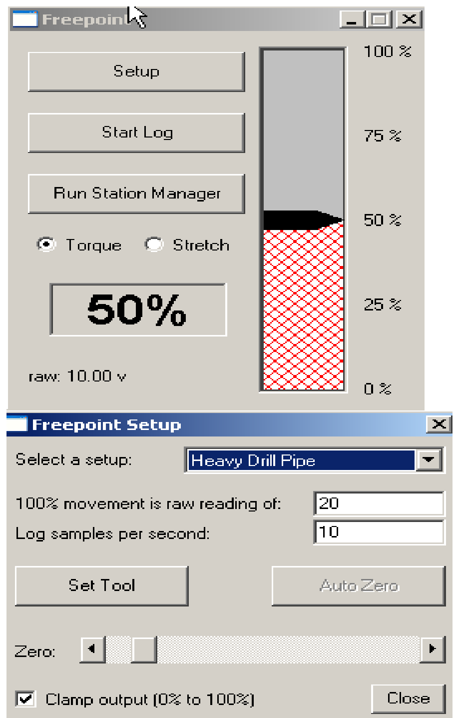


Fig. M.1 Freepoint

Click [Set Tool]

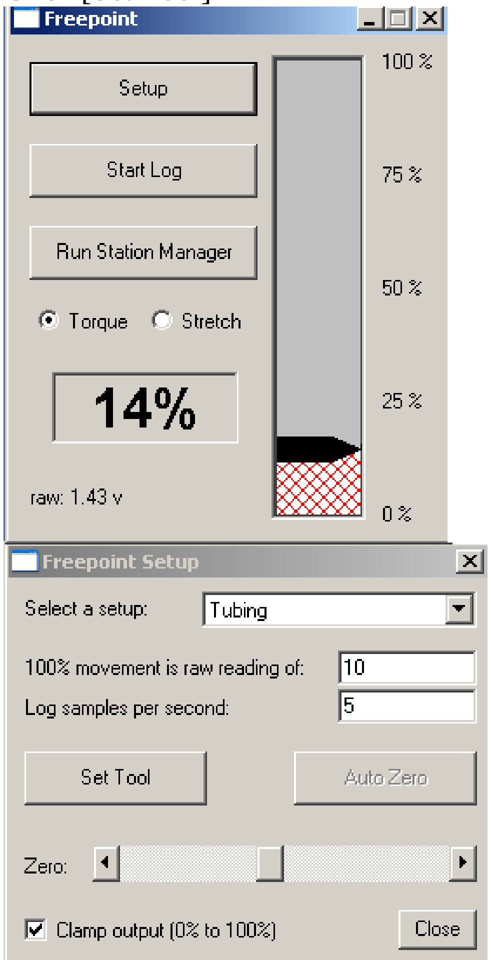


Fig. M.2 Freepoint Adjustment

Make sure that the Set Power is reaching the tool
After setting the tool Adjust P1 so that the gauge indicator zeros in the middle
Select [Set Tool] once more and check that gauge returns to previous position.

Click [Start Log] and record a pass. While recording adjust the torque o the tool to indicate change as shown.

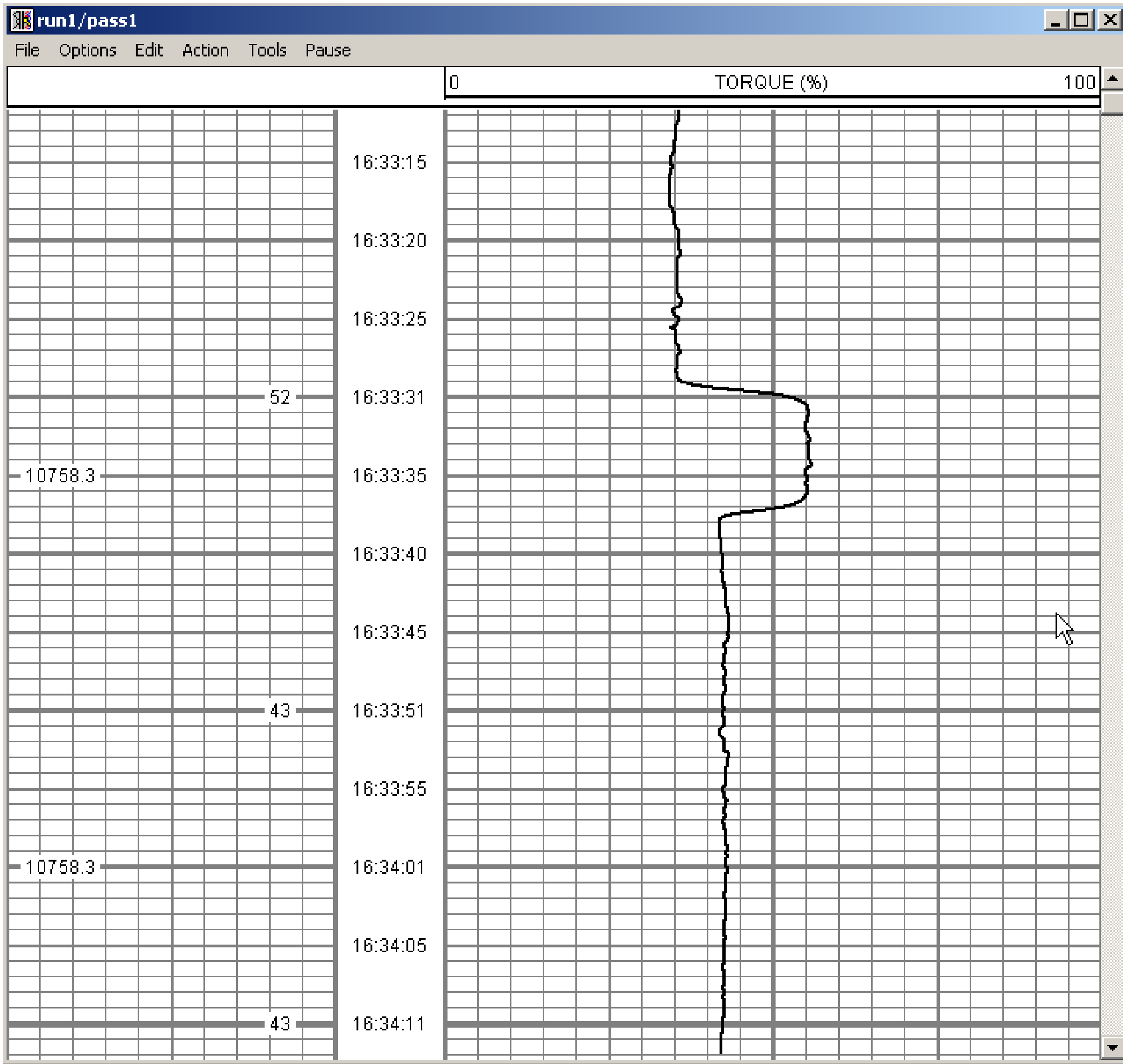


Fig. M.3 Freepoint Log

N. TELA

Check the Capacitor C24 has been replaced by a jumper.
Check the jumper on K1 (12-14) and Install the TELA board.

Turn Interface **"ON",** Power Control Enable, and TOOL POWER **"OFF"**
Load TELA-TEST USB PANEL Service, and Enable line
Check the Signal in TP7 (IN)

Fig. N.1 TELA Signal

Check the Signal in TP6 (OUT) and @ LINE connector on Rear of the Panel

Fig. N.2 TELA Signal

O. MTT

Select Computalog MTT/Caliper
Action/Power Control/Enable
Load simulator mttair.sim
Select MTT / Caliper service, enable line power and adjust discriminators.
Place scope probe at TP2 and adjust P1 to 3.5 Volts Peak to Peak

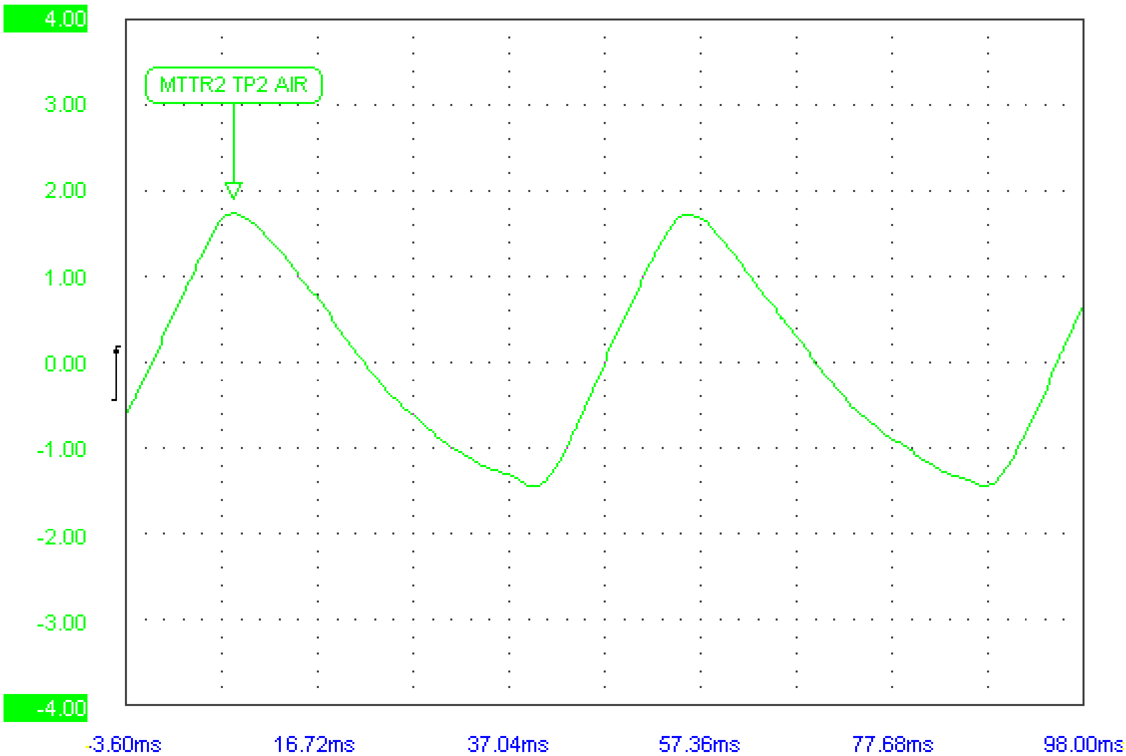
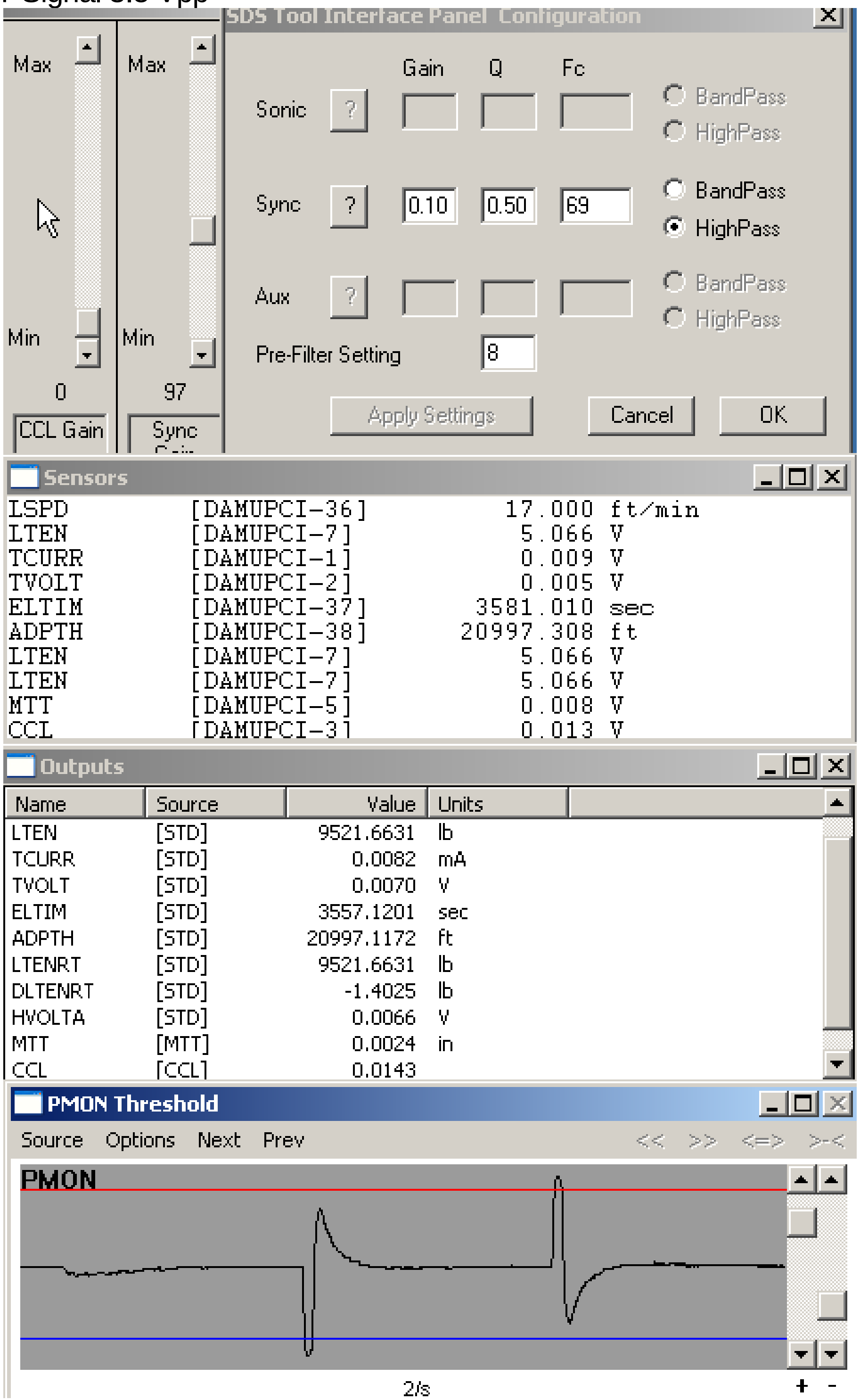

4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
MTTR2 TP2 AIR
-3.60ms
16.72ms
37.04ms
57.36ms
77.68ms
98.00ms

Fig. O.1 MTT Signal 3.5 Vpp



Adjust P3 for 0.0 volt offset at TP4. Monitor the output window for MTT as close to 0 inch and 0 volt on sensor window.

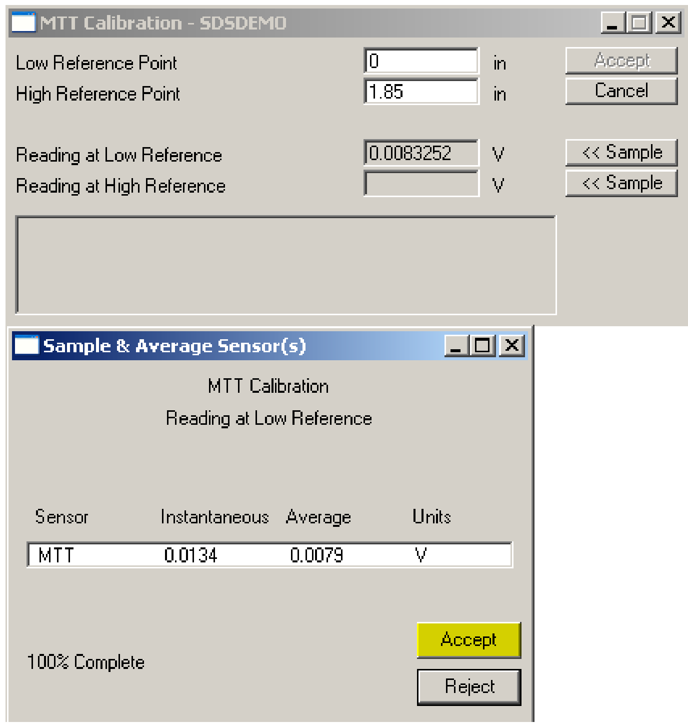


Fig. O.2 MTT Calibration

Calibrate MTT. Enter 0 inch for low reference point, click sample, begin, and accept buttons to finish the first part of calibration process.

Load simulator mtt55.sim, and Start simulator

Adjust P2 until 1.85 Volts is read at sensor window or 1.85 inches at sensor window.

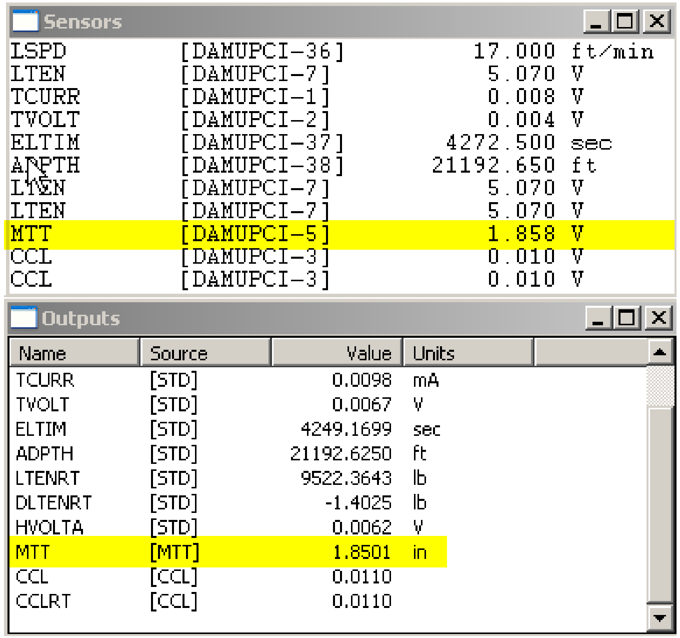


Fig. O.3 MTT Sensor and Output readings

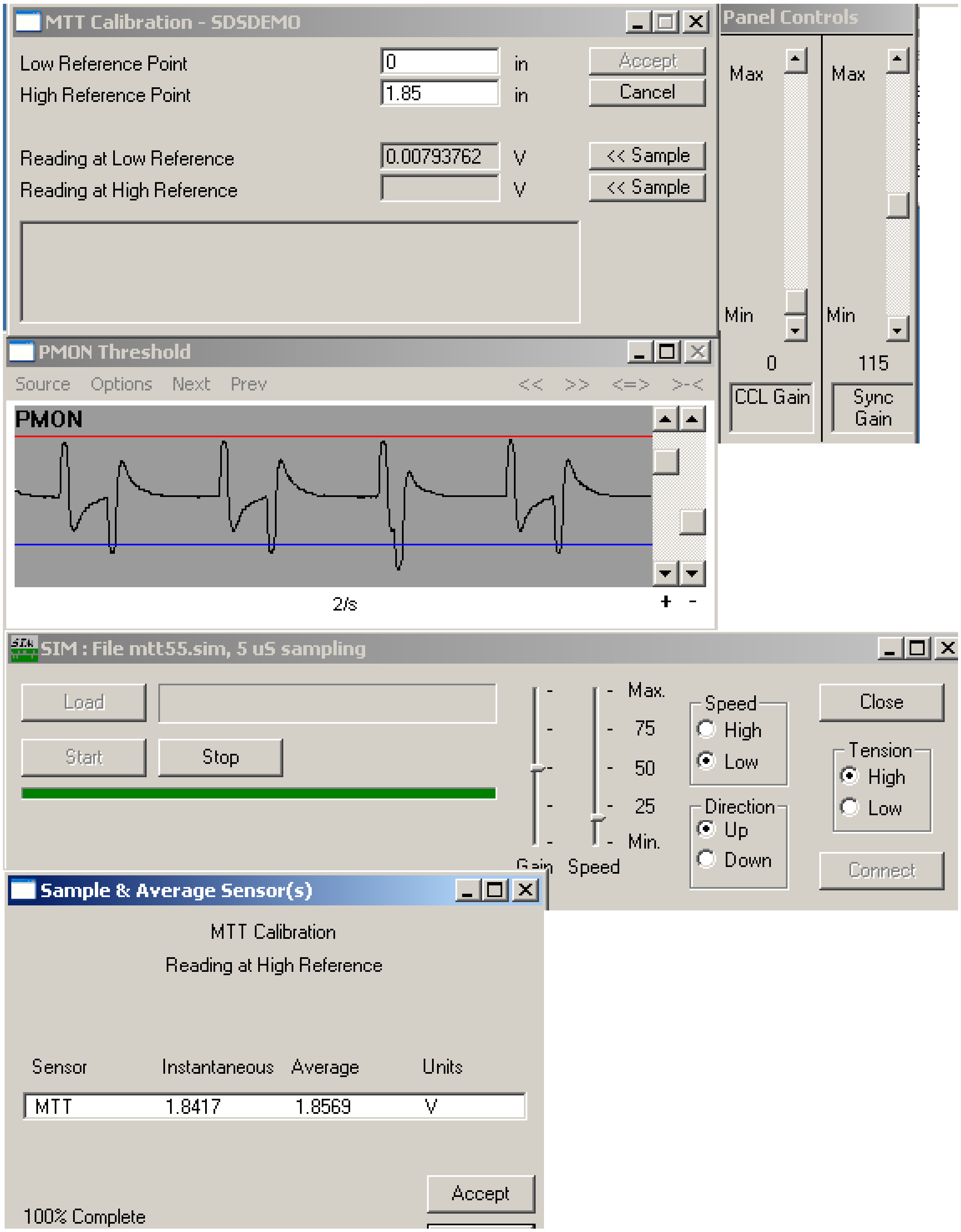
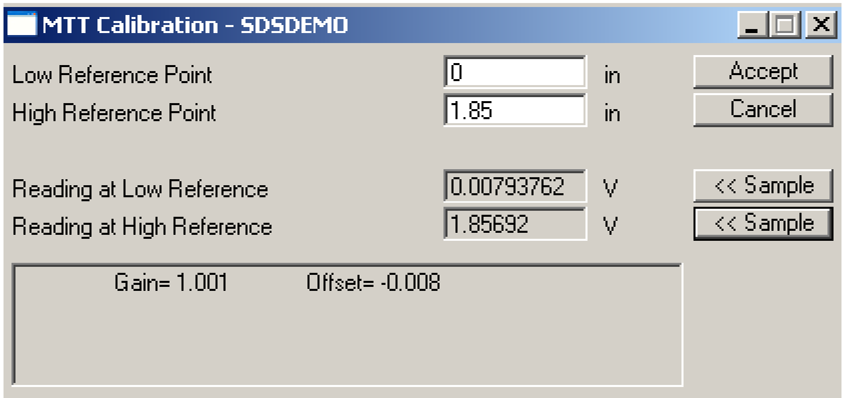


Fig. O.4 MTT Calibrations

Calibrate MTT. Enter 1.85 in for high reference point. Click sample, begin, and accept buttons to finish the calibration process



At this point the MTT should read as 1.85 volts on sensor window and 1.85 inches on monitor window

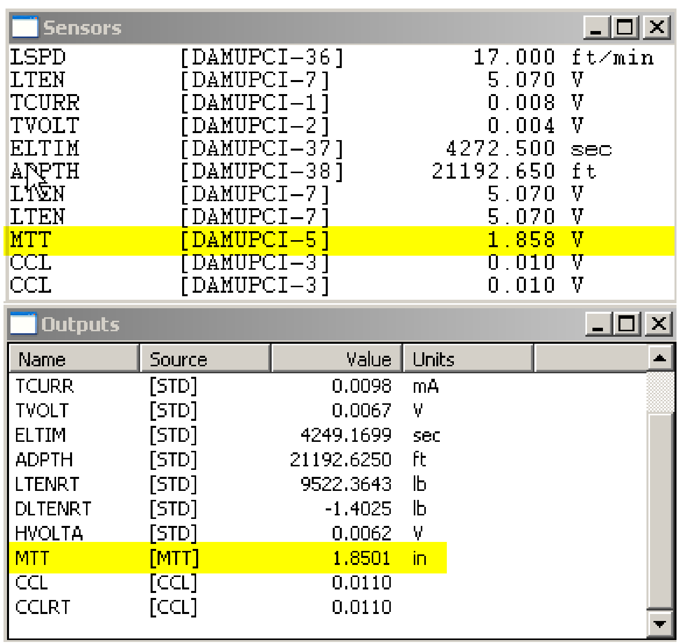


Fig. O.5 Calibrated MTT Values

Select simulator and Load simulator mttair.sim At this point the MTT should read as 0 volt on sensor window and 0 inch on monitor window.

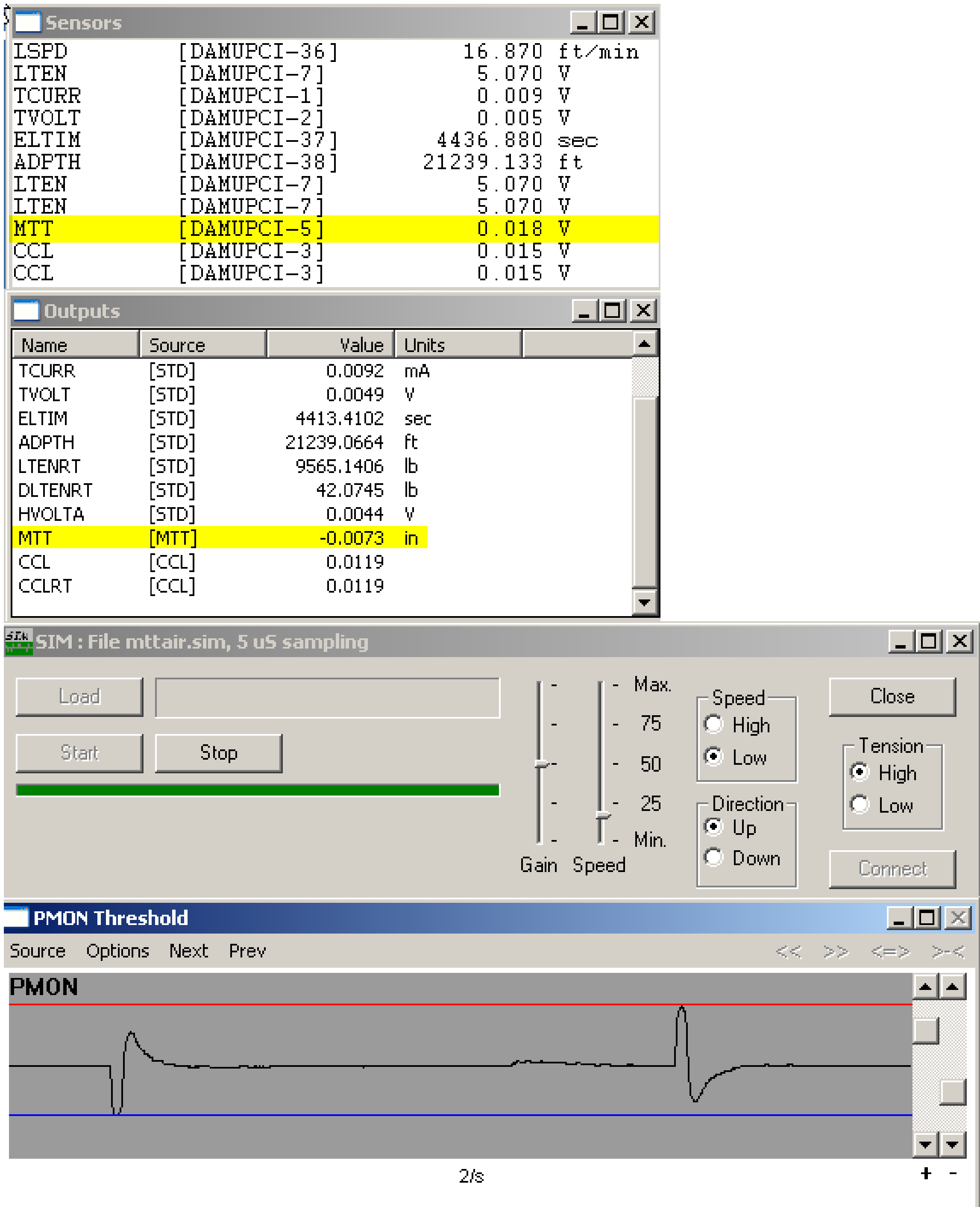


Fig. O.6 MTT Zero Calibration Check

P. Recorder Service

Select the Recorder service.
Set the Attenuation to 0 %.
Attach function generator to line and enable line.
Apply a 1 KHz, 2 V P-P sine wave measured at ANASW TP1.
Check that a 2 V P-P signal is in the Recorder window

Q. External Power Supplies

Halliburton External Power Supply and special notes

Note the TELA board must have the high voltage 600V capacitors installed

Make sure nothing is connected to the line or EXT PS connectors then turn panel on.

Make sure that the panel type in the control panel is **CPFH.**

Go to utilities and edit logging service details.

Verify the service **External Power Test** exist "if not copy the none service as such"

Verify that the following are present in the External Power Test service

Devices:	**Device3=SDSTIP,4**
Controls:	**Over Current=2000**
	Over Voltage=600
	External Power=YES

Go to >>>Acquisition >>>Services >>> External Power Test
Connect the External Power Supply to the EXT PS connector
Connect the 300 ohm resistor to line out
Go to >>>Acquisition >>> Action >>> Power Control >>>Enable
Switch Polarity to Auto and leave the tool power switch OFF
Turn on the external power supply.
Push the OUTPUT button twice.

Connect a voltmeter to the line and slowly adjust the output to 400 V DC and 1amp.

Do not leave output at 400 V for more than 1 minute, adjust the output back to zero.

Check that the front panel meters match the voltage and current applied.

Power down the external power supply and disconnect the 300ohm load.

R. RS232 and RS485

Attach the RS232 loopback jumper to the two ports.

Load the RS232 RS485 Loop Back service, vary the line speed and tine tension and check for the correct response from LtLoop, LsLoop, LtLoopBack and LsLoopBack. The LtLoop and LsLoop should be the same as line tension and line speed. The LtLoopBack LsLoopBack should be 10 times the respective value.

Set the ports as following for the RS232

SERMON	WWSA_STIP A
ASCTEL	WWSA_STIP A
SERMON2	WWSA_STIP C
ASCTEL2	WWSA_STIP C

Set the ports as follows for the RS485

SERMON	WWSA_STIP B
ASCTEL	WWSA_STIP B
SERMON2	WWSA_STIP D
ASCTEL2	WWSA_STIP D

Appendix

Rack mounting

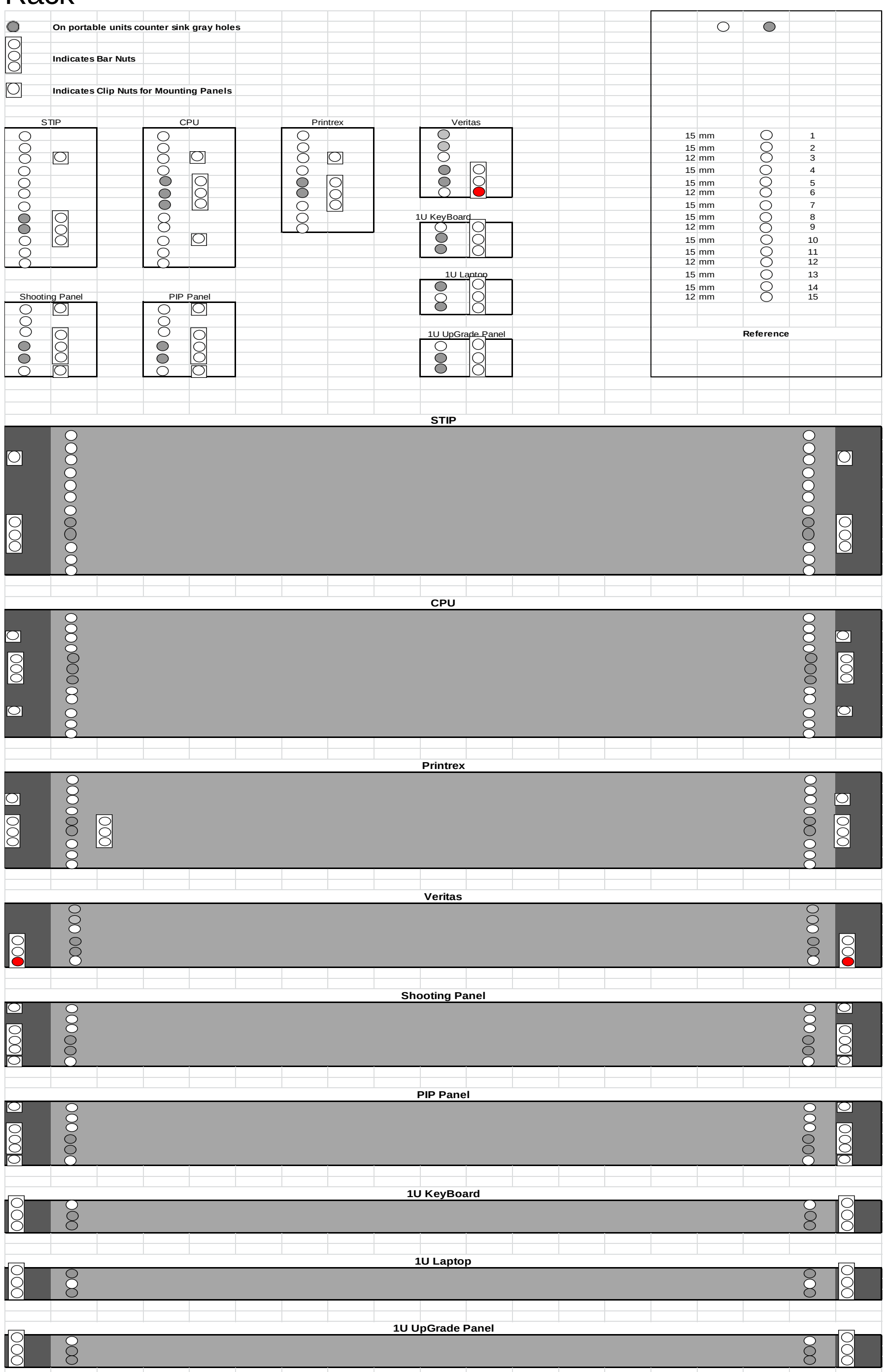


Fig. 1 Panel layouts