

SCIENTIFIC DATA SYSTEMS, INC.

Depth Tension Line Speed Panel

DTLS Manual

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DTLS Manual

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3401 Bacor Road

Houston, Texas 77084, USA

Phone: 1- 281-398-1612

E-mail: sds.info@warriorsystem.com

Website: www.warriorsystem.com

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Table of Contents

TABLE OF CONTENTS	3
1 DTLS HARDWARE	5
INTRODUCTION	5
DEPTH PANEL OPERATION	5
FIG 1.1 DTLS FACE PLATE	7
FIG 1.2 DTLS REAR PLATE	8
2 DTLS CONNECTOR WIRING	9
INTERCONNECTION CABLES	9
3 DTLS METER PROGRAMING	11
SETUP OF LINE TENSION	15
4 DTLS THROUGH WARRIOR SOFTWARE	17
USB COMMUNICATIONS	17
5 DTLS HARDWARE	19
SCHEMATIC 1	19
SCHEMATIC 2	19
SCHEMATIC 3	19
<i>Fig 6.1 Schematic page 1</i>	21
<i>Fig 6.2 Schematic page 2</i>	22
<i>Fig 6.3 Schematic page 3</i>	23
<i>Fig 6.4 PCB</i>	24

1 DTLS Hardware

Introduction

The Depth, Line Speed and Line Tension Panel uses three industrial process Meters to provide simultaneous digital readout of the three measurements. Meter 1 and Meter 2 are PAXI meters and are setup to read either depth or line speed. Meter 3 senses a 4 - 20 ma signal from a pressure transducer connected to the measure head weight indicator system. Meters for other types of line weight sensor are available.

The panel is intended to be powered by a 12 volt battery and contains a power supply providing regulated 12.0 volts and 5.0 volts for indicator and encoder power. The panel also provides 12 volts excitation for the pressure transducer. The encoder pulses are converted to depth and direction signals and routed to the depth and line speed meters and are also buffered and output to the rear panel connectors for input to the logging system. A retransmitted 4 - 20 ma signal is also available at the rear panel also for input to the logging system.

Depth Panel Operation

Depth entries and alarm setup points are entered from the key pads of each meter. PAXI meters contains the alarm for minimum depth. If the depth counter becomes less than this minimum, it will activate the depth alarm. PAXI meters also contain the alarm for maximum line speed. If the line speed becomes greater than this maximum, it will activate the overspeed alarm. PAXI meters will display both a depth and the line speed, which can be selected by pressing the DSP-key. Any of the alarms will activate an audible alarm, front panel LED, and a rear panel external connector. The audio alarm can be silenced for the duration of the cause of that alarm by pressing the ALM DIS button. Once the alarm condition has passed, the audio alarm will be enable again for the next alarm.

To enter a new preset depth on either depth meter, press the Par-key of that meter until you get to the ACNtLd register. The last preset depth will be displayed. The key directly under each digit will change the value of that digit. After the desired changes have been made, press the Par key to enter the value into preset depth memory. To update the depth to the pre-set value, press the RST key.

To enter new alarm values on either depth meter, press the Par key of that meter. SP1 sets the line speed alarm SP-2 sets the depth alarm. After changes have been made, press the Par key to enter the value into preset alarm memory. To enter a new alarm value on the line tension meter, press the PAR-key. The F1-key and F2-key can then be used to change the value. Press the PAR-key again to store the new alarm value



Fig 1.1 DTLS Face Plate



Fig 1.2 DTLS Rear Plate

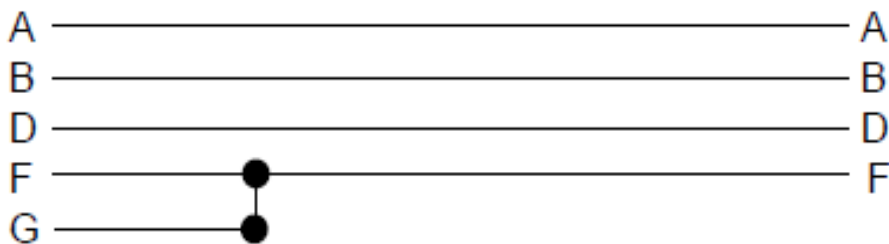
2 DTLS Connector Wiring

Interconnection Cables

The cable to connect the depth panel buffered encoder output to the tool Interface panel has the following connections:

Depth Panel 7 Pin Female

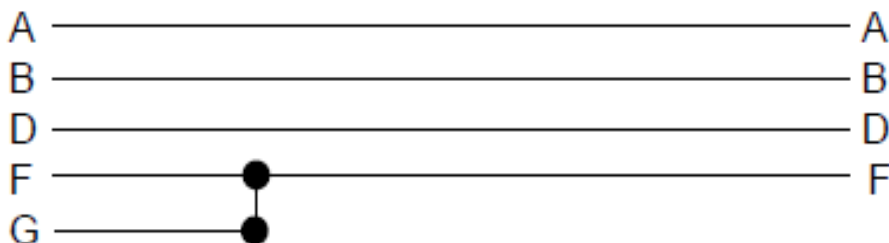
Interface Panel 7 Pin Male



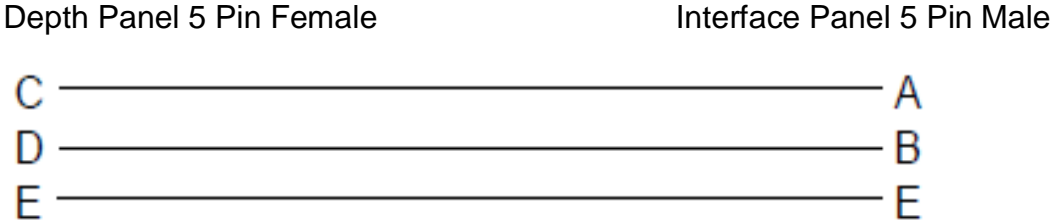
The cable to connect the depth panel encoder input to the depth encoder has the following connections:

Depth Panel 7 Pin Male

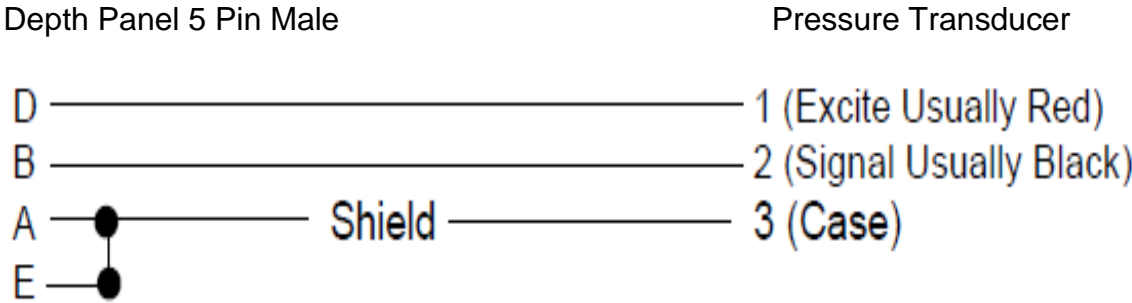
Depth Encoder 7 Pin Female



The cable for the retransmitted line tension from the depth panel to the system Tool interface panel has the following connections:



The cable for the depth panel line tension input to the pressure transducer has the following connections:



3 DTLS Meter Programing

Programming may only be accomplished by activating the 'program enable' switch at the rear of the panel. Other than changing the scale factor, re-programming should only be necessary upon installation of a new meter.

1-INP

ACNt		CNtud	quAd1	Counter x Operating Mode
				reverse depth with quAd1
ArESET		CNtLd		Counter x Reset Action
AsECPt		0.0		Counter x Decimal Position
ASCFAc		.08333		Counter x Scale Factor
ASCALr		1		Counter x Scale Multiplier
ACNTLd		50.0		Counter x Count Load Value
AP-Up		NO		Counter x Reset at Power-up
PrSEN		NO		Prescaler Output Enable
bCNt		NONE		Pre-Scale Value

2-FNC

Usr-1		PLOC		User Inputs
Usr-2		NO		User Inputs
Usr-3		NO		User Inputs
F1		NO		Function Keys
F2		NO		Function Keys
rST		dSPrSt		Function Keys
SC-F1		NO		Function Keys
SC-F2		NO		Function Keys

3-LOC

A CNT		rED		Counter x Display Lock out
b CNT		LOC		Counter x Display Lock out
C CNT		LOC		Counter x Display Lock out
rATE		rED		Rate Display Lock out
Hi		LOC		Max Display Lock out
Lo		LOC		Min Display Lock out
SP-1		ENT		Setpoint 1-4 Access
SP-2		ENT		Setpoint 1-4 Access
ACnLd		ENT		Counter x Count Load Access
bCnLd		LOC		Counter x Count Load Access
CCnLd		LOC		Counter x Count Load Access
ASCFAC		LOC		Scale Factor x Access
bSCFAC		LOC		Scale Factor x Access
CSCFAC		LOC		Scale Factor x Access
d-LEV		LOC		Display Intensity Access
COdE		000		Security Code

4-rtE

rAtEEN		rAtE-A		Rate Assignment
LO-Udt		1.0		Low Update Time
Hi-Udt		2.0		High Update Time
rte DP		0.0		Rate Decimal Position
SE65		0		Linearizer SegmentsRate
rd SP-1		100		Scaling Display
r1Np-1		200.0		Rate Scaling Input
rOUNd		0.10		Rate Display Rounding
LOCUt		0.00		Min Low Cut-out
Hi-t		2.0		Max Capture Delay Time
LO-t		2.0		Min Capture Delay Time

5-CtrC

C CNT		A		Counter C Operating Mode
Cr ESEt		2Er0		Counter C Reset Action
CdECpt		0		Counter C Decimal Position
CSCFAC		1.00		Counter C Scale Factor
CSCALr		0.10		Counter C Scale Multiplier
CCnLd		500		Counter C Count Load Value
C P-Up		NO		Counter C Reset at Power Up

6-SPt

SPSEL	SP-1			Set Point Select
		LIT-1	NOR	Set Point Annunciators
		Out-1	NOR	Out Put Logic
		SUP-1	OFF	Power up State
		Act-1	BOUND	Set Point Action
		ASN-1	rAtE	Set Point Assignment
		SP-1	1.00	Set Point Value
		trC-1	NO	Set Point tracking
		tYP-1	Hi	Boundry Type
		Stb-1	NO	Standby Operation
		HYS-1	0.00	Set Point Hysteresis
		toff-1	0.00	Off Time Delay
		ton-1	0.00	On Time Delay
SPSEL	SP-2			Set Point Select
		LIT-2	NOR	Set Point Annunciators
		Out-2	rEV	Out Put Logic
		SUP-2	OFF	Power up State
		Act-2	BOUND	Set Point Action
		ASN-2	A CNT	Set Point Assignment
		SP-2	10.0	Set Point Value
		trC-2	NO	Set Point tracking
		yYPE-2	Hi	Boundry Type
		Stb-2	NO	Standby Operation

7-SrL

tYPE		rLC		Comms type
BAud		2400		Baud Rate
DAtA		7		Data Bits
Par		Odd		Parity Bit
Addr		00	Meter 1	01 Meter 2
dELAY		0.01		Transmit Delay
AbrV		NO		Abbreviated Printing
Opt		NO		Print Options

8-AnA

9-FC5

d-LEV		3		Display Intensity Level
COD E		50	66 reset	Factory Service Code

With the settings above, to read out in feet (or meters)

*** Scale factor = 10 divided by encoder pulses per foot (or encoder pulses per meter)**

120ppr encoder 1 foot wheel	.08333
240ppr encoder 1 foot wheel	.04166
500ppr encoder 1 foot wheel	.02000
600ppr encoder 1 foot wheel	.01666
1200ppr encoder 1 foot wheel	.00833

***Scale Factors - Note changing 1-INP ACNt from CNTud to quAd1 reverses encoder direction. The lock switch on the rear must be held until the PAR button is pressed to unlock the programing mode.**

With the settings above, to read out in feet per minute (or meters per minute)

*** Scale factor = encoder pulses per foot (or meter) divided by 60 x100**

120ppr encoder 1 foot wheel	200.0
240ppr encoder 1 foot wheel	400.0
500ppr encoder 1 foot wheel	833.3
600ppr encoder 1 foot wheel	1000.0
1200ppr encoder 1 foot wheel	2000.0

Scale factor for the Depth 2 Counter is the same as the Depth 1 Counter above.

Depth Meter Front Panel Settings

SP1 Line Speed Alarm

SP2 Surface Proximity Alarm

SP3 Depth Load

Tension Meter Front Panel Setting

SP1 Tension Alarm

Setup of Line Tension

Programming may only be accomplished by activating the 'program Enable' switch at the rear of the panel. Press the PAR (Parameters) key to enter Program mode and select parameter groups. Use the F1 and F2 keys to change Selections

Set each of the program groups as follows

1-INP Input Parameters

Display	Parameter	Setting
rAn6E	Input Range – 20MA	0.02A
dECPt	Display Resolution – Full Lbs.	0
round	Display Rounding Increment	1
FILtr	Filter Setting	2.0
bAnd	Filter Enable Band	10
PtS	Scaling Points – Use 2 of 16 possible	2
StYLE	Keyboard Entry or Calibration Applied	KEY or APLY
InP 1	Low Input reading in MA	*4.000
dSP 1	Low Display Value in Pounds/Kilos	*0
InP 2	High Input reading in MA	*20.000
dSP 2	High Display Value in Pounds/Kilos	*10000

*Typical values for a 4-20ma sensor and a 0-10000 lb. Calibration.

2-FNC External Input and Function Key Parameters

Display	Parameter	Setting
USr-1	User Input 1	PLOC
USr-2	User Input 2	nO
USr-3	User Input 3	nO
F1	Function Key 1	nO
F2	Function Key 2	nO
rSt	Reset Key	nO
Sc-F1	Secondary Function Key 1	nO
Sc-F2	Secondary Function Key 2	nO

3-LOC Parameter Lockouts

Display	Parameter	Setting
HI	Maximum Reading Display	LOC
LO	Minimum Reading Display	LOC
tOt	Total Reading Display	LOC
SP-1	Setpoint 1 – Entry Enabled	Ent
SP-2	Setpoint 2	LOC
SP-3	Setpoint 3	LOC
SP-4	Setpoint 4	LOC
CodE	Security Code	0

4-SEC Secondary Function Parameters

These parameters are not used at this time.

5-tOt Totalized Parameters

These parameters are not used at this time.

6-SPt Setpoint Parameters

Display	Parameter	Setting
SPSEL	Select Setpoint	SP-1
Act-1	Action for Setpoint – Absolute High	Ab-HI
SP-1	Setpoint Value – Alarm Limit	*1000
Src-1**	Setpoint Source – Net Input Value	rEL
HYS-1	Setpoint Hysteresis	2
tOn-1	On Time Delay	0.0
tOF-1	Off Time Delay	0.0
Out-1	Output Logic	Nor
rSt-1	Reset Action	Auto
Stb-1	Standby Action	no
Lit-1	Output Panel Light	nor

* Alarm limit value that can be changed from front panel after programming

** Feature only available on the newer meters

7-SrL Serial communications Parameters

Display	Parameter	Setting
bAUD	Baud Rate	2400
dAtA	Data Word Length	7
PAr	Parity	Odd
Addr	Meter Address	2
Abrv	Abbreviated Printing	no
OPt	Options	no

8-Out Analog Output Parameters

Display	Parameter	Setting
tYPE	Analog Type	4-20
AS In	Analog Assignment	InP
An-LO	Analog Low Scale Value	0
An-HI	Analog High Scale Value	10000
udt	Update Time	0.0

9-FCS Factory Service Parameters

Display	Parameter	Setting
d-LEv	Display Intensity Level	3
CodE	Factory Service Code	*** 50

*** Normally will show 50. To clear all setting to factory defaults enter 66.

4 DTLS Through Warrior Software

USB communications

The Warrior software communicates with the Depth Tension Line Speed Panel through USB. The panel needs to have a USB cable connected to the computer or through the computer through a USB hub (such as in the Scientific Data Systems, Inc. Interface Panel). The DTLs panel can be found in the Windows Device Manager as a Human Interface Device.

The Depth panel communications must be enabled through the Warrior Depth Control Window by Selecting USB for the Depth Panel - Panel Type and clicking on the [Connect] button.

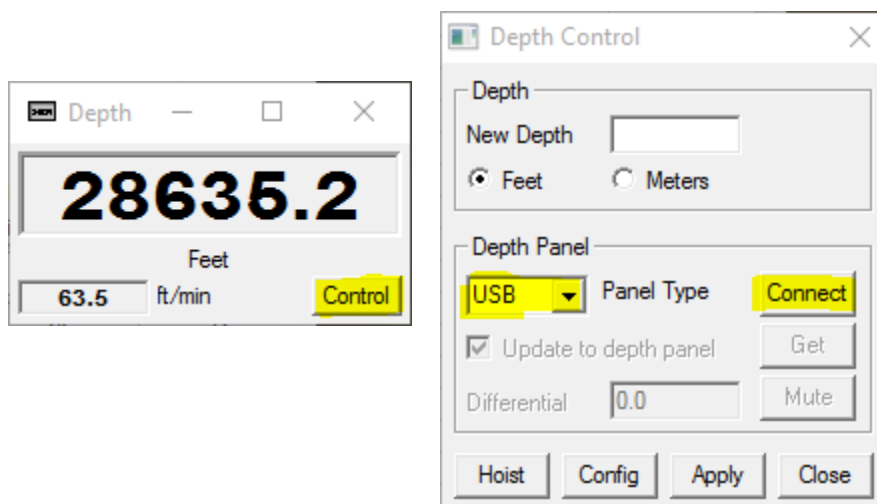


Fig. 4.1 Connecting to Depth Panel

Once the panel has been connected to the software, click the [Config] button to bring up the Depth Configuration Window.

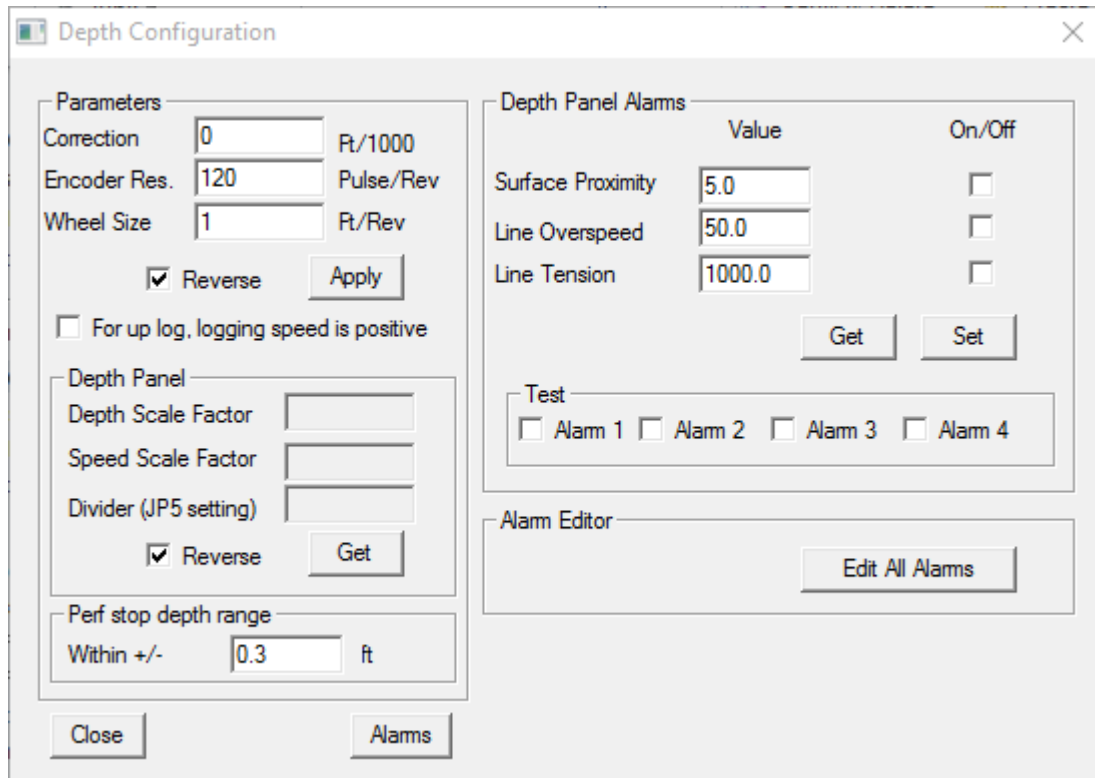


Fig. 4.2 Depth Configuration Window

If the [Apply] button is clicked in the parameters section, new scale factors will be written to the Depth 1 meter, Depth 2 meter, and the Line Speed section of the Depth 2 meter. The “Reverse” check box reverses the depth direction of the depth panel meters and the depth direction of the Warrior software.

By clicking on the [Get] button in the Depth Panel section, the scale factors of the meters may be read to verify settings. The “Reverse” check box reverses the depth direction of the depth panel meters only.

The alarms in the depth panel may be set through the Depth Panel Alarms section. Enter the desired alarm limits in the value windows and select whether the alarm is to be on or off (off sets unreachable limits in the panel meters) then click the [Set] button to set the alarms. Current alarm values may be read by clicking the [Get] button. Note that no alarms will sound until at least one depth pulse has been received after the panel has been turned on.

The Test section has several alarm sequences that may be tested. Again note that the alarms will not sound until the panel has received at least one depth pulse after the panel has been turned on.

5 DTLS Hardware

Schematic 1

Encoder pulses are buffered and fed into a quadrature detector ICI used to detect ppr and direction before being divided down by the jumper selection at J5. The buffered outputs as well as the outputs of the quadrature detector are all buffered out through IC7 to J1.

The voltage output to the encoder is selected by the J7 and is either +12v or +5v. IC6 is a voltage input detector, if more than +12v is applied to the panel SCR Q1 is triggered shorting the input power and tripping the fuse.

U1 is a 12v to 5v converter used to provide circuit power as well as encoder panel is selected.

Schematic 2

IC11 and IC10 handle the RS232 communications which are not used with the PAXI meters. To use the PAXI meters IC11 must be removed and pins 8 and 7 jumpered. The communications for the meters depth, line speed and tension are now all done using the RS485 port IC12.

Input alarms from the three meters enter on J9, they are connected to pull up resistors before being buffered into the micro controller. Outputs from the micro controller to the SON and LMP alarms are also buffered out through J9.

The combination of IC13 and IC3 is used to prevent the occurrence of false alarms.

Schematic 3

This page contains the micro controller and associated hardware.

IC9 is the serial EPROM used to program the microcontroller on power up.

IC15 is a diode protection for the incoming and outgoing USB signals.

IC14 is a 5v to 3.3v dc to dc converter used to power the microcontroller, EPROM and usb protection circuit.

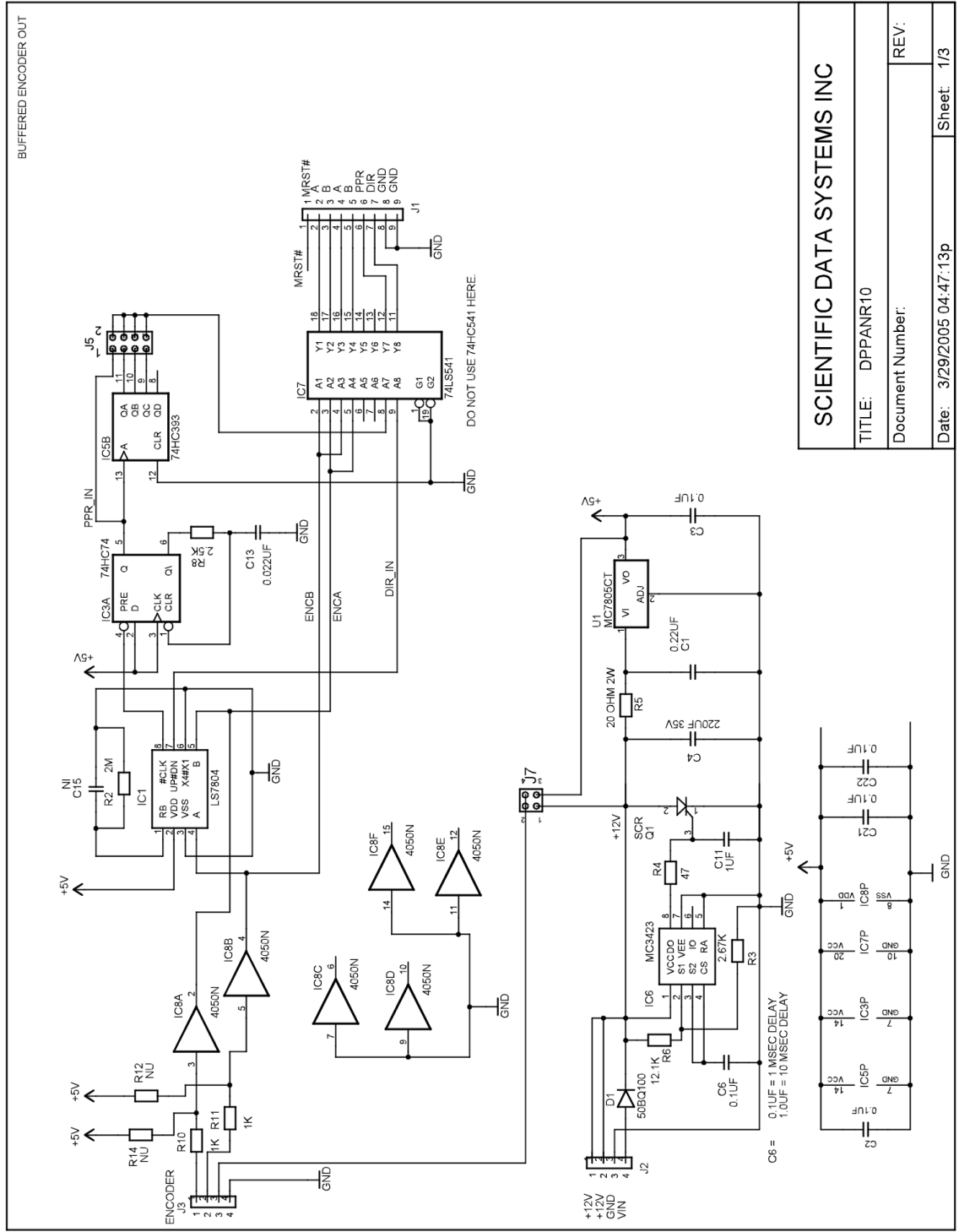
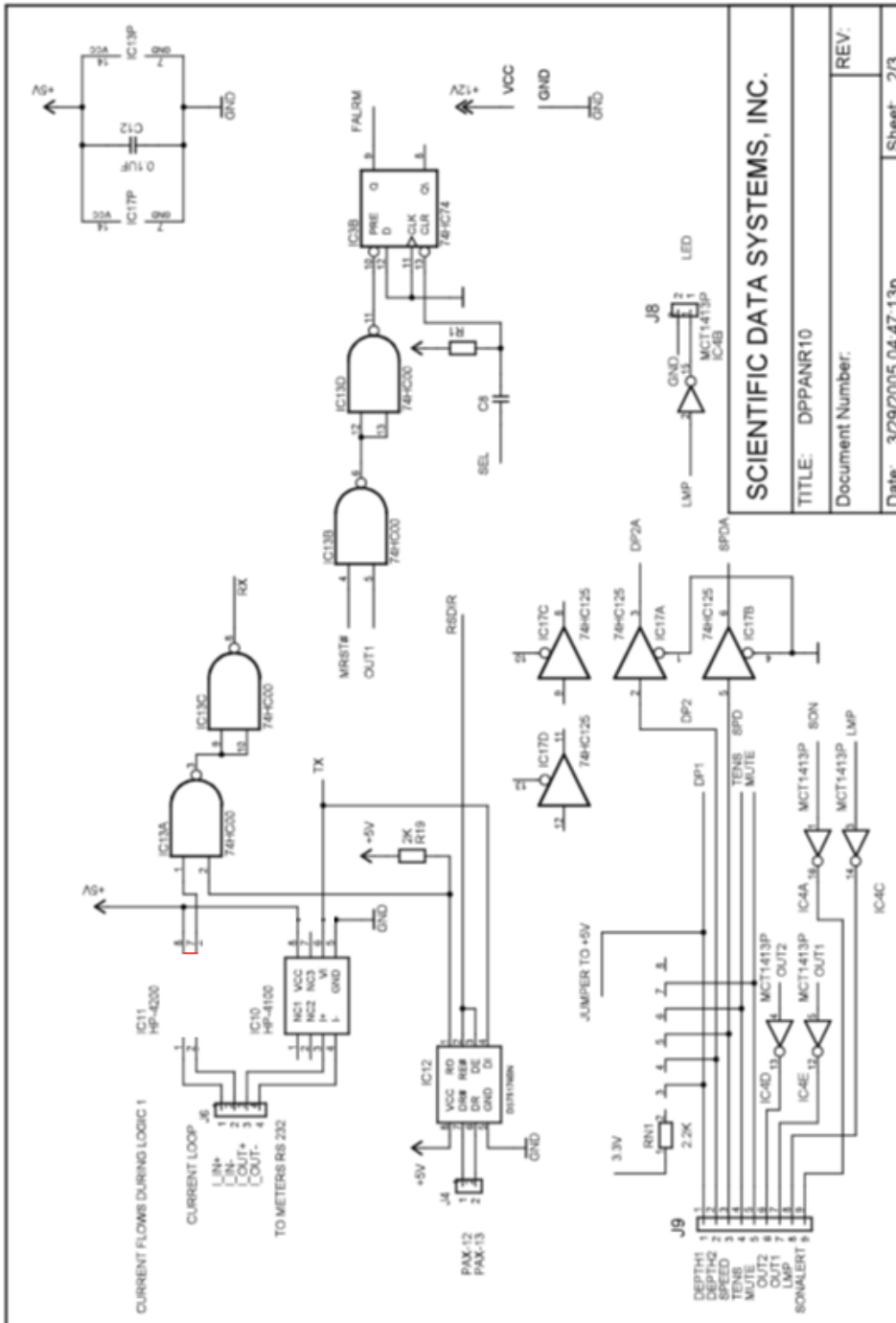


Fig 6.1 Schematic page 1

Fig 6.2 Schematic page 2



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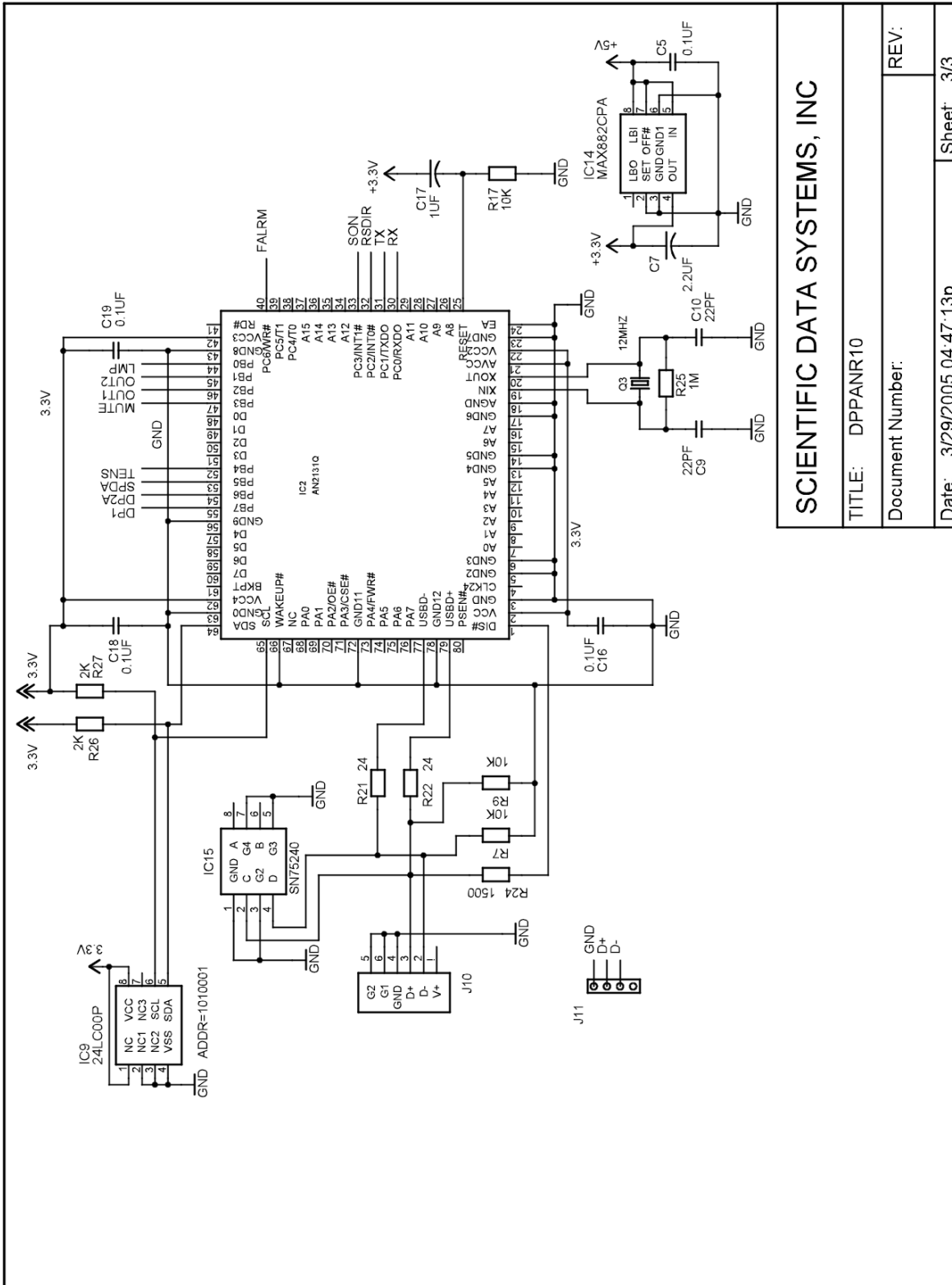
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Fig 6.3 Schematic page 3

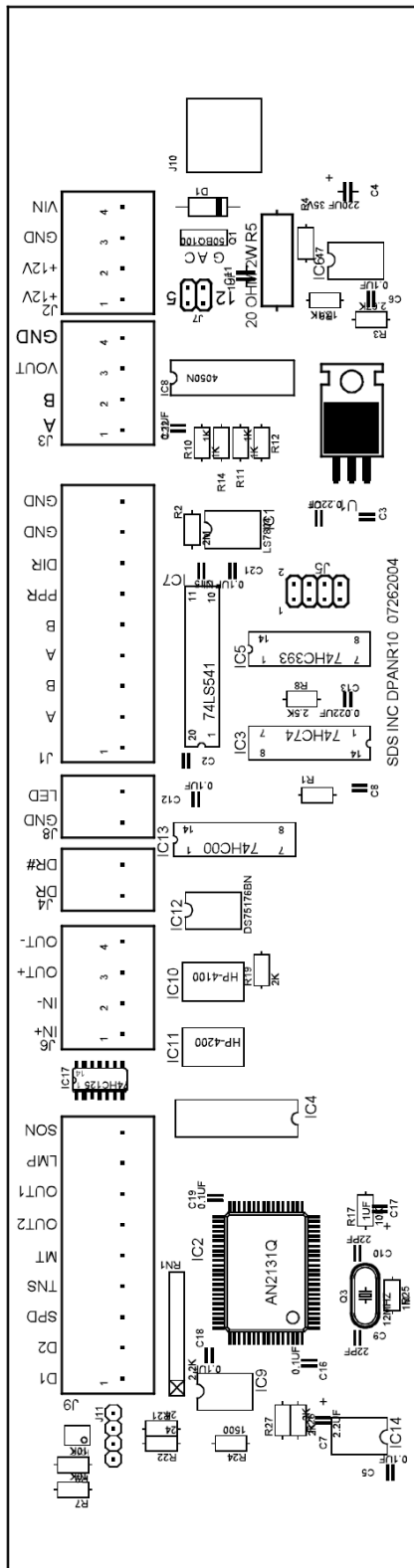


Fig 6.4 PCB

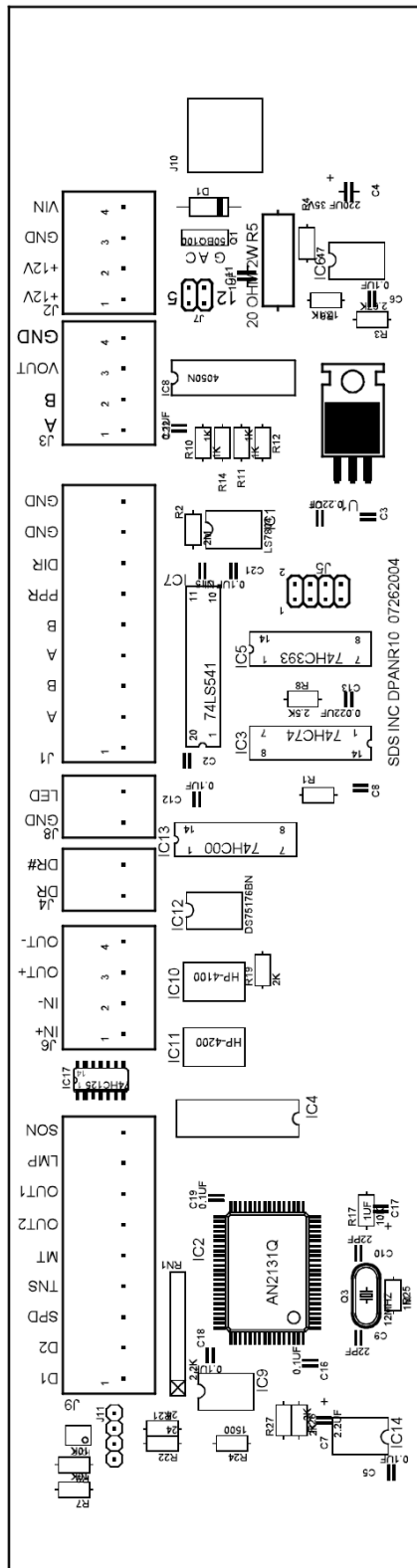
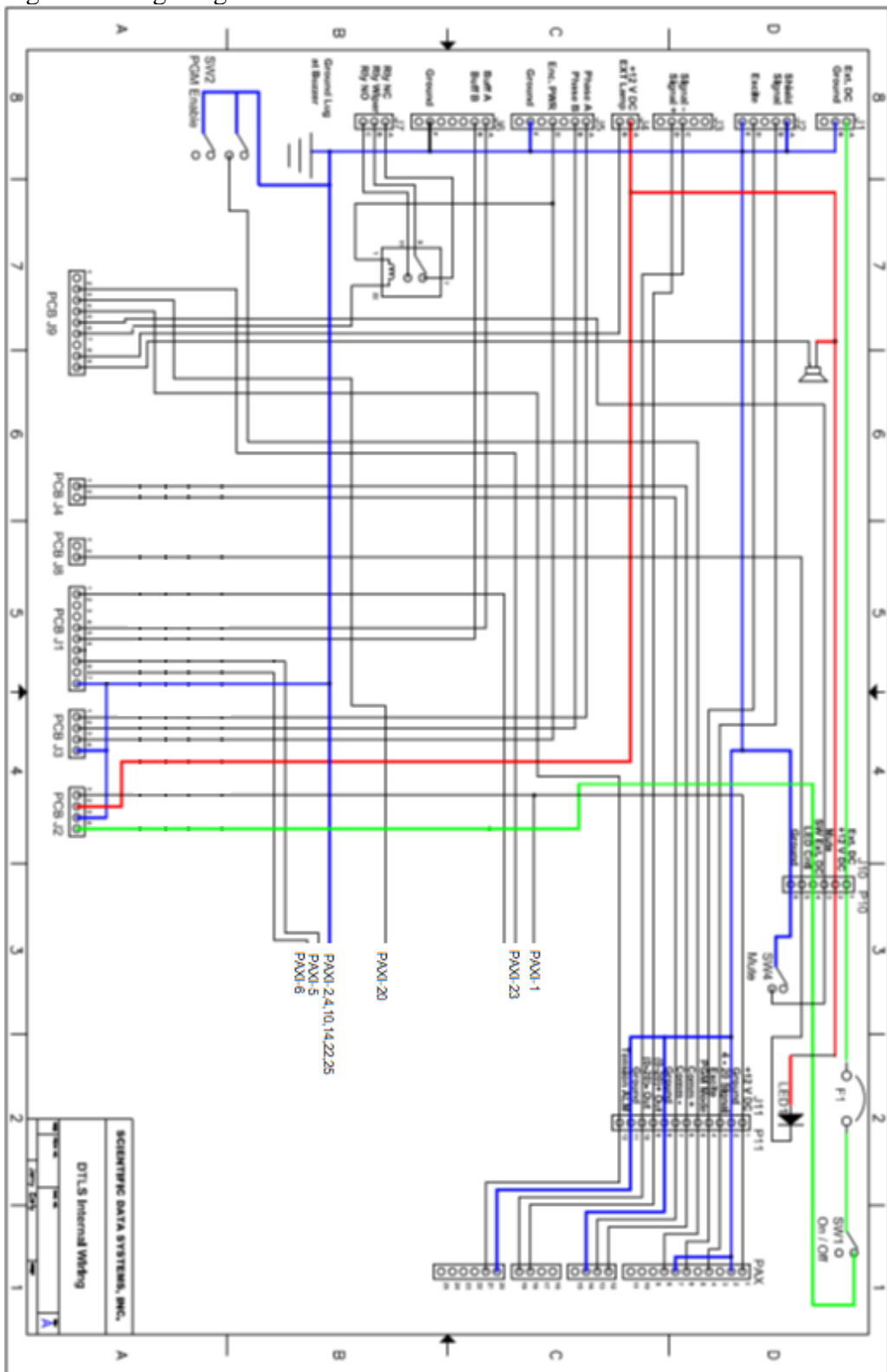


Fig 6.5 Wiring Diagram



6 DTLS Hardware

WIRELIST DEPTH PANEL-USB-PAXI

J1	DC Power In		
	J1-A	J10-1	+12V Battery
	J1-B	CHS GND	Chassis Ground
J2	Line Weight Input from Transducer		
	J2-A	J2-E	
	J2-B	J11-3	4-20ma Signal
	J2-D	J11-4	+12V Excite
	J2-E	J2-A CHS GND	Chassis Ground
J3	Line Weight Retransmit to System		
	J3-C	J11-10	PAX Analog 19 -(0-20)Out
	J3-D	J11-9	PAX Analog 18 +(0-20)Out
J4	External Lamp or Alarm		
	J4-A	PCB_J2-2 BZ+	+12V Reg
	J4-B	PCB_J9-8	External Lamp
J5	Quadrature Encoder Input		
	J5-A	PCB_J3-1	Encoder A
	J5-B	PCB_J3-2	Encoder B
	J5-D	PCB_J3-3	Encoder Power
	J5-F	PCB_J3-4 J6-F	GND
J6	Buffered Quadrature to System		
	J6-A	PCB_J1-4	Buffered A
	J6-B	PCB_J1-5	Buffered B
	J6-F	J5-F J7-F	GND
	J6-G		
J7	Buffered Quadrature Spare		
	J7-A	PCB_J1-2	Buffered A
	J7-B	PCB_J1-3	Buffered B
	J7-F	J6-F CHS GND	GND
J8	USB Port to Computer to Computer		
	Connected Directly yo Board		
J10	Front Panel Controls		
	J10-1	J1-A	+12V Battery
	J10-2	BZ+	Reg 12V - LED
	J10-3	PCB_J9-5	Mute Switch
	J10-4	PCB_J2-4	Switched 12 Volt
	J10-5	PCB_J8-1	Led Control
	J10-6	CHS GND	GND
P10	Front Panel Controls		
	P10-1	F1-2	+12V Battery
	P10-2	LED-RED	Reg 12V - LED
	P10-3	SW4-2	Mute Switch
	P10-4	SW1-1	Switched 12 Volt
	P10-5	LED-WHT	Led Control
	P10-6	SW4-1	GND

J11		Line Tension Meter	
J11-1	PCB_J2-1	Reg 12 Volt	
J11-2	GND Lug	GND	
J11-3	J2-B	4-20ma Signal	
J11-4	J2-D	+12V Excite	
J11-5	SW2-3	PGM Mode	
J11-6	PCB_J4-1	DR+	
J11-7	PCB_J4-2	DR-	
J11-8	GND Lug	GND	
J11-9	J3-D	PAX Analog 18 +(0-20)Out	
J11-10	J3-C	PAX Analog 19 -(0-20)Out	
J11-11	GND Lug	GND	
J11-12	PCBJ9-4	TNS ALM	

P11		Line Tension Meter	
P11-1	PAX-1	Reg 12 Volt	
P11-2	PAX-2	GND	
P11-3	PAX-4	4-20ma Signal	
P11-4	PAX-6	+12V Excite	
P11-5	PAX-8	PGM Mode	
P11-6	PAX-12	DR+	
P11-7	PAX-13	DR-	
P11-8	PAX-14	GND	
P11-9	PAX-18	+(0-20)Out	
P11-10	PAX-19	-(0-20)Out	
P11-11	PAX-20	GND	
P11-12	PAX-21	TNS ALM	

PAX		Line Tension Meter	
PAX-1	P11-1	Reg 12 Volt	
PAX-2	P11-2	GND	
PAX-4	P11-3	4-20ma Signal	
PAX-6	P11-4	+12V Excite	
PAX-7	PAX-2		
PAX-8	P11-5	PGM Mode	
PAX-12	P11-6	DR+	
PAX-13	P11-7	DR-	
PAX-14	P11-8	GND	
PAX-18	P11-9	+(0-20)Out	
PAX-19	P11-10	-(0-20)Out	
PAX-20	P11-11	GND	
PAX-21	P11-12	TNS ALM	

PAXI both PAXI's wired the same			
PAX-1	P12/P13-1	PCB J2-1	+12volt
PAX-2	P12/P13-3	GND	PCB J2-3 2,4,10,14,22,25
PAX-4	GND	GND	2,4,10,14,22,25
PAX-5	P12/P13-4	PCB J1-2	Phase A
PAX-6	P12/P13-5	PCB J1-3	Phase B
PAX-7	P12/P13-12		Switch Program Mode
PAX-10	GND	GND	2,4,10,14,22,25
PAX-12	P12/P13-7	J4-1	D+
PAX-13	P12/P13-8	J4-2	D-
PAX-14	GND	GND	2,4,10,14,22,25
PAX-20	P12/P13-10	PCB J9-2	Depth Alarm
PAX-22	GND	GND	2,4,10,14,22,25
PAX-23	P12/P13-11	PCB J9-3	Speed Alarm
PAX-25	GND	GND	2,4,10,14,22,25
J9-1	J1-1		DTLS add wire

PCB_J1		Encoder Connections		
PCB_J1-2	J7-A	PAXI-5	Buffered A	
PCB_J1-3	J7-B	PAXI-6	Buffered B	
PCB_J1-4	J6-A		Buffered A	
PCB_J1-5	J6-B		Buffered B	
PCB_J1-9	PCB_J9-1		GND	

PCB_J2		12 Volt Power Distribution		
PCB_J2-1	J11-1	PAXI-1	Reg 12 Volt	
PCB_J2-2	J4-A	J10-2	Reg 12V - LED & Buzzer	
PCB_J2-3	PAXI-2	CHS GND	GND	
PCB_J2-4	J10-4		Switched 12 Volt	

PCB_J3				
PCB_J3-1	J5-A		Encoder A	
PCB_J3-2	J5-B		Encoder B	
PCB_J3-3	J5-D		Encoder Power	
PCB_J3-4	J5-E		GND	

PCB_J4				
PCB_J4-1	J11-6	PAXI-12	DR+	
PCB_J4-2	J11-7	PAXI-13	DR-	

PCB_J6				
NC				

PCB_J9				
PCB_J9-1	PCB_J1-9		GND	
PCB_J9-2	PAXI-20		Depth ALM	
PCB_J9-3	PAXI-23		SPD ALM	
PCB_J9-4	J11-12		TNS ALM	
PCB_J9-5	J10-3		Mute Switch	
PCB_J9-8	J4-B		External Lamp	
PCB_J9-9	BZ-		Buzz Control	

F1		Fuse		
F1-2	P10-1		Fused +12V	
F1-2	SW1-2		+12V Battery	

SW1		Power on/off		
SW1-1	P10-4		Switched 12 Volt	
SW1-2	F1-2		Fused +12V	

SW2		Program Mode		
SW2-2	SW2-5	CHS GND	GND	
SW2-3	J11-5		PGM Mode	
SW2-5	SW2-2	CHS GND	GND	
SW2-6	PAXI-7		PGM Mode	

SW4		Mute Button		
SW4-1	P10-6		GND	
SW4-2	P10-3		Mute Switch	

LED		Alarm Indicator		
RED	P10-2		Reg 12V - LED	
WHT	P10-5		Led Control	

BUZZER		Alarm Indicator		
BZ+	J4-A		Reg +12	
BZ-	PCB_J9-9		Buzz Control	