BenchMark Wireline Products
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OPERATIONS AND MAINTENANCE MANUAL
WIRELINE WINCH OPERATORS PANEL

60 Series Panels
3A & 4A VERSIONS

AMSXA062 – Differential Load Pin
AMSXA063 – 2 mv/v Load Pin
AMSXA064 – 4-20ma Load Pin
AMSXA067 – passive 2mv/v

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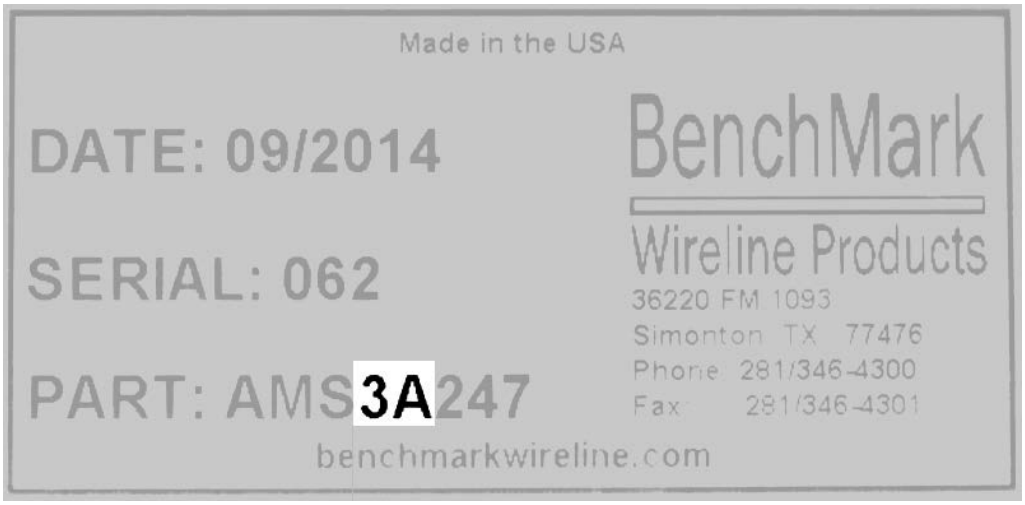
Note - 3A Panel - The current available version of this panel is designated 3A because of its new computer main board. Though the new panel is significantly improved, the user interface and menus are mostly the same as previous models.

4A Panel - All previous versions of this panel were designated 4A. Any specific instructions in this manual that refer ONLY to the 4A panels are highlighted with a Green Background.

You can determine which panel you have by the Part Number on the identification tag on the back of the panel.

If your panel has a 3A in the part number, it's a 3A panel. If it has a 4A in the part number, it's a 4A panel unless it has previously upgraded from a 4A to a 3A.



1.0 QUICK START GUIDE

1.1 Power up panel and verify it is working properly.

1.2 Verify the panel is configured to match the system
- Line size
- Measurement units
- Encoder settings

1.3 Install line in measuring head and set the line size parameter.

1.4 Set Tension Alarm value.

1.5 Set depth adjust value if necessary.

1.6 Ensure that memory card is installed in data recorder. Turn power to panel off then on again. This will write the operating parameters to the memory card.

1.7 Rig up through sheaves, install tool, and slack off weight.

1.8 Set depth to zero.

1.9 Press T-Zero to set tension to zero.

1.10 Press T-CAL and verify that panel tension reads 4000 or 5000 lbs (depending on type of measuring head selected)

1.11 Pull tool to depth 0 position. Press D-Zero to reset the panel depth to 0.

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RECOMMENDED SPARES LIST – 60 SERIES PANELS

All parts listed are Critical Spares and are required to properly maintain this device.

We recommend that all customers stock the quantity indicated in the '**QTY**' column. **IF** you are in a remote location or prefer having immediate availability of all spares, we recommend that you stock at least one of each item.

NOTE – BenchMark may not always have all spares in stock all the time.

P/N	DESCRIPTION	QTY	REF
RECOMMENDED SPARE PARTS FOR ALL LOCATIONS			
AMS4P020	SWITCH SPDT TOGGLE LOCKING MTL-106D ALCO	1	POWER
AMS5P205	SWITCH SPDT TOGGLE ON-ON	1	INC/DIFF
AMS4P044	SWITCH DPDT TOGGLE MOM OFF MOM PANEL MOUNT C&K 7205SYZQE	1	+ / -
40195	SWITCH SPST PB NO MOM LIGHTED NKK HB15SKW01-5C-CB	1	ALARM RESET
AMS5P191	SWITCH SPDT MOM PUSHBUTTON NKK MB2011SS1W01-RO	5	
AMS5P194	SWITCH DPDT MOM PUSHBUTTON NKK MB2061SS1W01-RO	1	T-CAL
AMS5P192	SWITCH CAP SCREW ON BLACK NKK AT407A	5	
AMS5P193	SWITCH CAP SCREW ON RED NKK AT407C	1	DEPTH ZERO
ADDITIONAL RECOMMENDED SPARE PARTS FOR REMOTE LOCATIONS			
AM2KP134	PC BOARD AMS2K ACQUISITION BOARD	1	
AMS7P080	METER ANALOG DIFF TENSION	1	
AMS7P081	METER TENSION ROUND DUAL SCALE	1	
AMS4P128	DISPLAY LED RED 0.5" 14 SEGMNT SERIAL 2" x 3.5" 12 PIN HEADER	4	
ACMU1P06	LED RED DIALIGHT 5V	1	METRIC

OBTAINING TECHNICAL ASSISTANCE

Call BenchMark Wireline Products Inc. at +1 281 346 4300
Or contact by email mail@benchmarkwireline.com
Or fax in request at +1 281 346 4301

Information in the form of user manuals and instructional videos are also available on our website www.benchmarkwireline.com

Parts can be ordered by email, phone, or fax

Equipment can be returned for repair and maintenance. Please notify us by Phone, email, or fax before sending any equipment.

To return equipment to BenchMark, ship it to:
BenchMark Wireline Products
36220 FM 1093
Simonton, Texas 77476
U.S.A.

ADDITIONAL RECOMMENDED SPARE PARTS FOR REMOTE LOCATIONS

1.0 INTRODUCTION

1.1 GENERAL DESCRIPTION

This panel is designed to acquire and display depth and tension from a wireline winch unit. The panel uses a menu system to set and make adjustments to the data as necessary.

When first powered up, each of the menu settings are displayed on the depth and line speed displays.

Depth is displayed from data provided from an encoder mounted on a measuring device. The tension data is provided by a load pin. Depth and tension data can be stored in an internal memory board for playback at a later time. The panel can also be connected to a PC through a serial port for real time acquisition and playback of data.

The system is designed to operate properly from conventional automotive 12-24 vdc electrical power.

Loss of power to the panel during operation will not cause a loss of depth data. The panel continuously stores depth data every 100 milliseconds in and internal battery backed up memory device. When power is applied, the last "Depth" is displayed.

1.2 3A PANEL & NEW 2K BOARD

The new 3A version of the 247 panel contains a newly designed main processor board designated the 2K Board. Because of advances in computer hardware, several small boards on the legacy4A panel have been combined into a single more efficient unit. The limited availability of replacement components on legacy panels necessitated migrating to the newer more efficient design.

Additionally, the new 3A Panel offers several advantages:

2 USB Ports – software updates and data transfers are now simplified with these input/output devices.

Internal Data Recorder –

Simplified Software Updates – Updates will be loaded on a thumb drive, inserted into the proper USB port for downloading and by powering the board off then on, the panel will automatically install updates.

Users will experience almost no difference in user interface, menu selections or function between the new and legacy panels.

1.3 PANEL MOUNTS

The panel is designed to be mounted in a hoist console

Or on a bracket that allows to panel to be mounted overhead or against a wall.

1.4 FEATURES

-- Digital displays for depth, line speed and tension

-- Analog tension meters, 4 inch (108 mm) dia., 270 degree

-- Excessive tension alarm setting allows operator to set tension alarm to a predetermined value. Contact closure is provided for winch shutdown

-- Zero Depth button - sets depth to 0. Depressing button again resets depth to previous setting. Only works when line speed is zero

-- Approaching surface alarm

-- Depth adjust up or down switches. Only works when winch is stopped

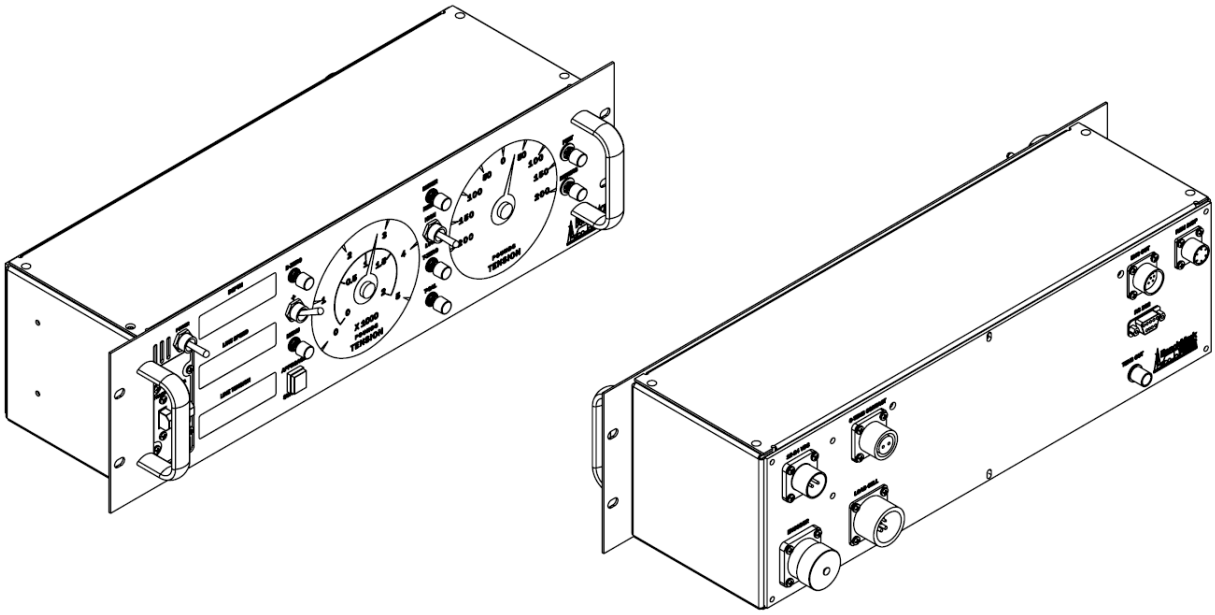
-- Load pin zero & calibrate controls. Only works when there is no load on the cable and the depth is at zero.

-- Depth & tension saved in non-volatile memory at power loss

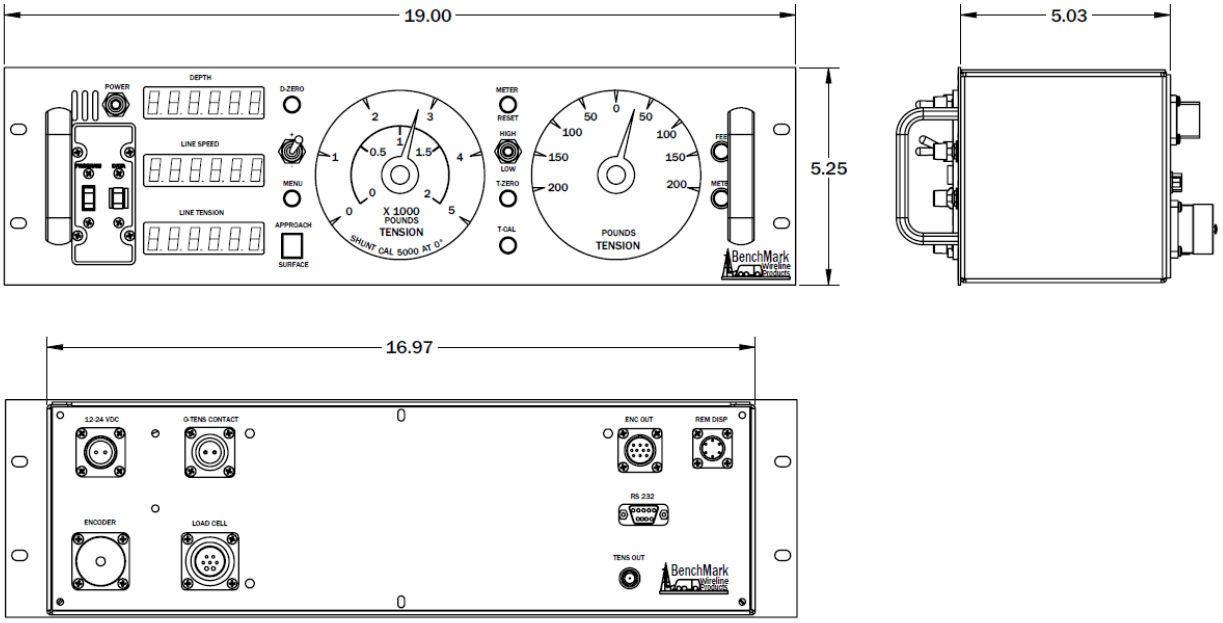
-- RS232 Interface for additional control and data outputs.

-- Can be set to display either English or Metric units.

-- Data recorder which records both depth and tension data to a solid state memory device



1.5 SPECIFICATIONS



1.4.1 TEMPERATURE RATING 20 to 140

1.4.2 POWER SUPPLY 9 – 30 VDC @ 2 AMP MAX

1.4.3 MAXIMUM LINE SPEED 3000 FT/MIN @ 600 PULSES/FT

1.4.4 MINIMUM LINE SPEED .6 FT / MINUTE

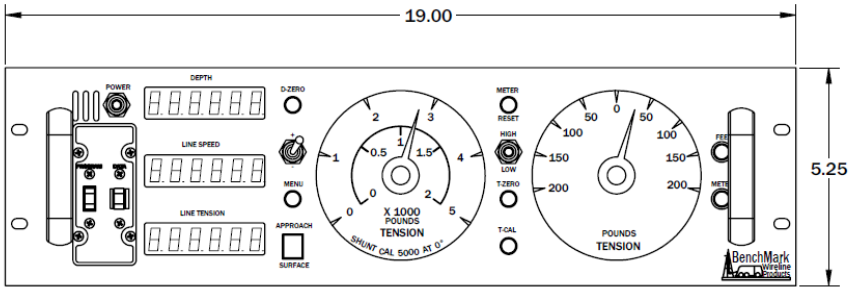
1.4.5 MAXIMUM LINE TENSION 8000 LBS

1.4.6 DIGITAL TENSION 6 DIGITS WITH 1 LB OR 1KG RESOLUTION

1.4.7 DIGITAL LINE SPEED 6 DIGITS WITH .1 FT OR .1 M RESOLUTION

2.0 DETAILED DESCRIPTION OF FEATURES

2.1 FRONT PANEL



2.1.1 POWER ON / OFF SWITCH

This switch turns the panel o (UP position) or also starts the automatic shutdown process (DOWN position). There is a built in delay when powering down which gives the system time to close the media card data files. After the files are closed, the panel will turn itself off.

2.1.2 ANALOG INCREMENTAL TENSION METER

This meter displays incremental tension. This provides a more visual display of tension change.

Incremental tension provides a high resolution tension scale. It must be periodically reset as tension increases or decreases to keep the needle centered.

2.1.3 METER RESET SWITCH

This switch will reset the incremental tension meter to the 0 (center) position.

2.1.4 ANALOG TENSION METER

This meter displays total tension. This provides a visual display of tension which corresponds to the digital tension meter.

This meter is dual scale. A switch is provided to change scales.

If the switch is set to HIGH the outer scale (0-5000 pound) is used.
If the switch is set to LOW the inner scale (0-2000 pound) is used.

Note: Analog meter faces are available with kg increments.

2.1.5 DEPTH DISPLAY

This meter provides a digital display of depth.

2.1.6 LINE SPEED DISPLAY

This meter provides a digital display of line speed. It can be set in feet or meters per minute or per hour.

2.1.7 LINE TENSION DISPLAY

This meter provides a digital display of total line tension.

2.1.8 ZERO DEPTH

Pressing this button will reset the depth to 0. Pressing the button again will reset the depth to the previous setting. The Zero Depth button will only work when the line speed is zero (i.e. winch not moving). If depth is not at zero you cannot calibrate tension.

2.1.9 + / - SWITCH

This switch is used for different functions. It is used to change the depth setting in either an up or down direction. The winch must be stopped before the depth can be set. In menu mode (see section 3.0) the switch is used to set menu parameters.

2.1.10 MENU

Pressing this button will activate the menu software. The software feature to be set will be displayed on the DEPTH display. The features can be toggled through by pressing the menu button until the desired feature is displayed.

2.1.11 APPROACHING SURFACE LED AND ALARM

This LED is lit and an audible alarm is sounded when the depth is less than 100' (30 m). This is a warning to the hoist operator that they are approaching surface and should take care to get the equipment safely out of the well. When the LED is depressed, the alarm will stop but the LED will continue to blink. Once the depth reading is greater than 100' (30 m), both the alarm and the LED will turn off.

2.1.12 ENGLISH / METRIC UNITS

These LEDs will indicate if the panel is in English or metric mode. If units are set to English, the English LED will be lit. If units are set to Metric the Metric LED will be lit.

2.1.13 T-ZERO SWITCH

Use this switch to set the tension to 0 at the start of a run. This will zero out the tension circuit. The line should be slack through the head at this time. Depth must be at zero before this switch and the T-CAL switch will function.

2.1.14 T-CAL SWITCH

This switch will activate the shunt cal circuit in the load pin. 4000 lb will be displayed on the tension display if it is set for the Shark measuring head. 5000 lb will be displayed if the panel is set for MegaMouth or AM3K. 10000 lb will be displayed if the panel is set for AM5K or MAKO.

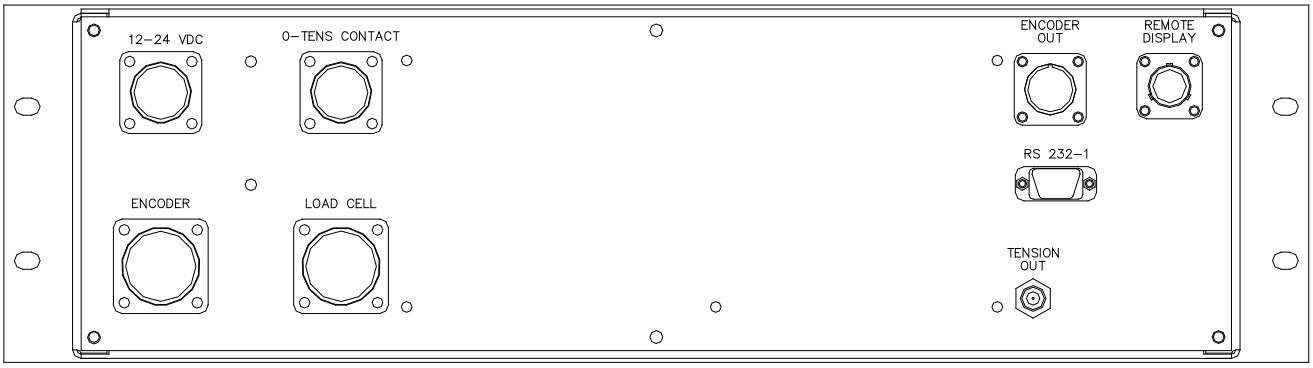
Refer to section 6.8.3 for more information.

2.1.15 PROCESSOR REBOOT

In the event of a panel "lock up" or other malfunction, the processor in the panel can be rebooted by turning off the panel, depressing the T-ZERO and T-CAL buttons simultaneously then turn the power back on while the buttons are depressed. Keep the buttons depressed for at least 5 seconds after power is restored.

When the panel is rebooted, all the menu settings will be returned to the factory default settings. The panel should always be rebooted after new software (eprom) has been installed.

2.2 REAR PANEL – this rear panel drawing shows all connections



2.2.1 12 – 24 VDC

This connector supplies dc power for the panel operation (9 VDC min, 30 VDC max). The panel can operate on either 12 or 24 vdc (12 vdc is U.S. truck standard voltage, 24vdc is European truck standard voltage). Pin A is positive (white wire), pin B is negative (black wire).

2.2.2 OVER TENSION CONTACT

This connector provides a connection to the overtension circuit relay. When an overtension condition is active, the two pins are connected together. In normal position the two pins are open. This feature can be used to interface to the winch unit control system to provide automatic hoist shutdown when an overtension condition is reached.

2.2.3 ENCODER IN

The cable running from the encoder on the measuring head attaches to this connector. From this connector, the panel provides 12 vdc power to the encoder and accepts the encoder quadrature signal input. It is designed to work with standard encoders.

2.2.4 LOAD CELL

This connector is used to connect to the load pin. The panel provides +/-15VDC power to the load pin and gets the tension signal input from this connector

2.2.5 REMOTE DISPLAY

This connector provides an interface to a remote display/pressure display system. The connector provides power, depth, and tension information to the remote unit and reads pressure data from the remote unit. This pressure data can be stored on the internal data recorder and also appended to the end of the D string at the RS232 output.

2.2.6 ENCODER OUTPUT

This connector provides an encoder quadrature output signal. This signal can be used to drive a computer system without requiring a second encoder to be installed on the measuring head. The encoder output signal includes all the corrections made by the panel such as wire and wheel size, stretch correction, shim, etc.

2.2.7 TENSION OUTPUT

This connector provides a tension output signal. This signal can be used to record pressure on a computer system. The signal output can be configured for either 4-20ma output or a 0-10vdc output.

2.2.8 RS232 SERIAL INTERFACE

This connector provides an RS232 interface from the panel to an external computer. A PC can be used to display depth, tension, and line speed data from the panel. The PC can also be used to set panel parameters.

To connect the panel to a computer, connect a serial cable from the PC to J6 on the rear of the panel. A program is available from Benchmark Wireline Products to display this data (see figure below).

2.2.9 USB CONNECTOR

Provides means to download data and set internal clock. Included in later models plus modification for earlier models available.

2.2.10 USB ONLY ON 3A PANELS

USB-A and USB-B connectors available on panel for:

USB-A - upgrading panel software - Refer to section 4.3.6

USB-B - copying the panel log file to a laptop - Refer to section 4.2.9

3.0 MENU COMMANDS

This panel has internal software which allows it to be set for various configurations. To change the settings, press the MENU button. The feature to be set will be displayed on the DEPTH display. Press the MENU button again until the feature you want to set is displayed.

The parameters for each feature will be displayed on the LINE SPEED display. Press the +/- switch to cycle through all the available parameters. When the value you want to select is displayed, press the MENU button. ACCEPT will then be displayed. Press + for yes, - for no. Following is a listing of all the available settings.

Note: The options for the AM3K and the AM5K measuring heads are not identical.

Note: The panel can be configured for use with either the AM3K or AM5K measuring head. On the new 3A panel the measuring head is selected within the Menu Commands.

On the legacy 4A panel, this selection is made by moving the Jumpers on the main board. See section 4.13.2 for instructions on moving the Jumpers.

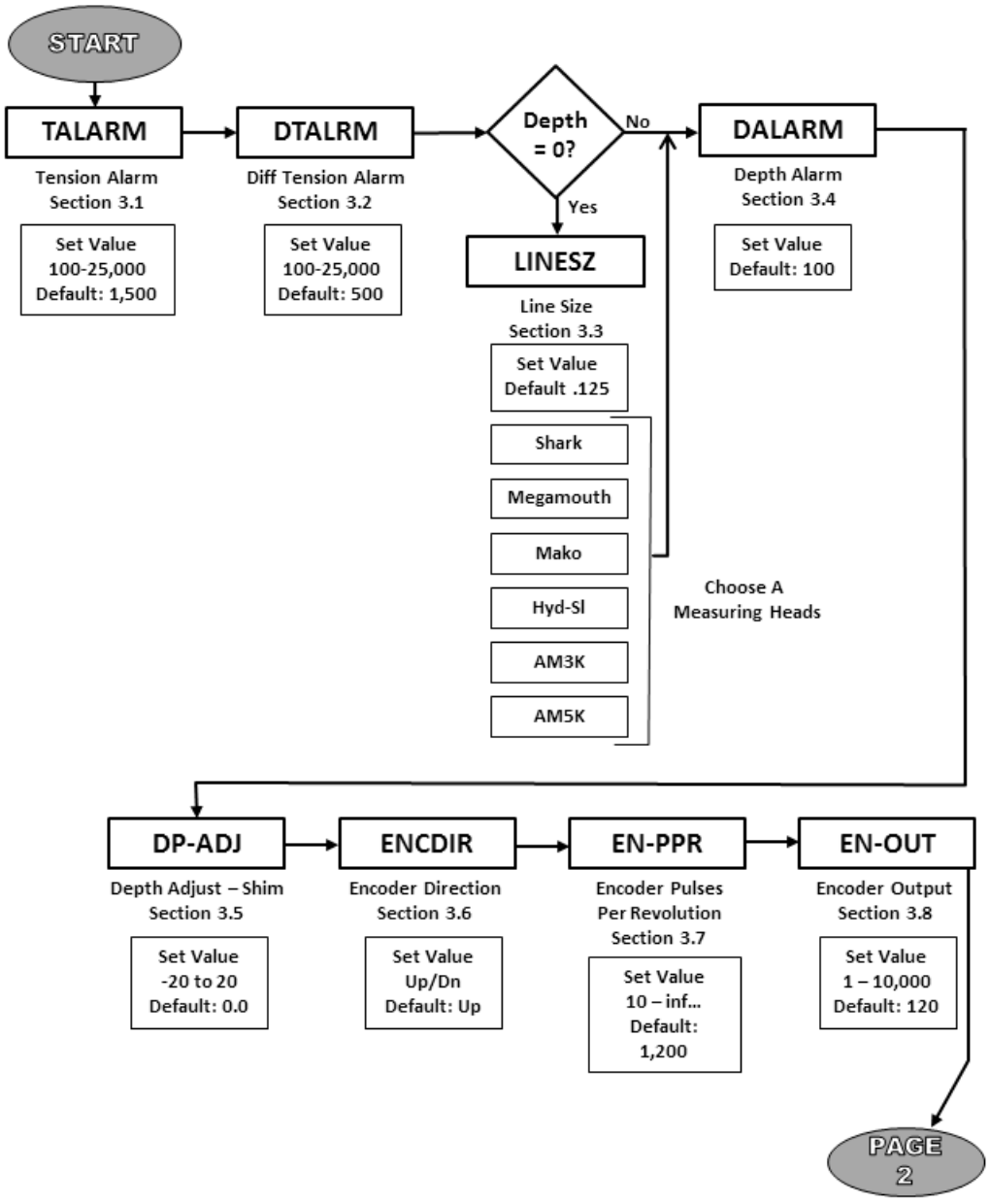
SOFTWARE VERSION

Check the company website to view the Most Recent Version of your Software

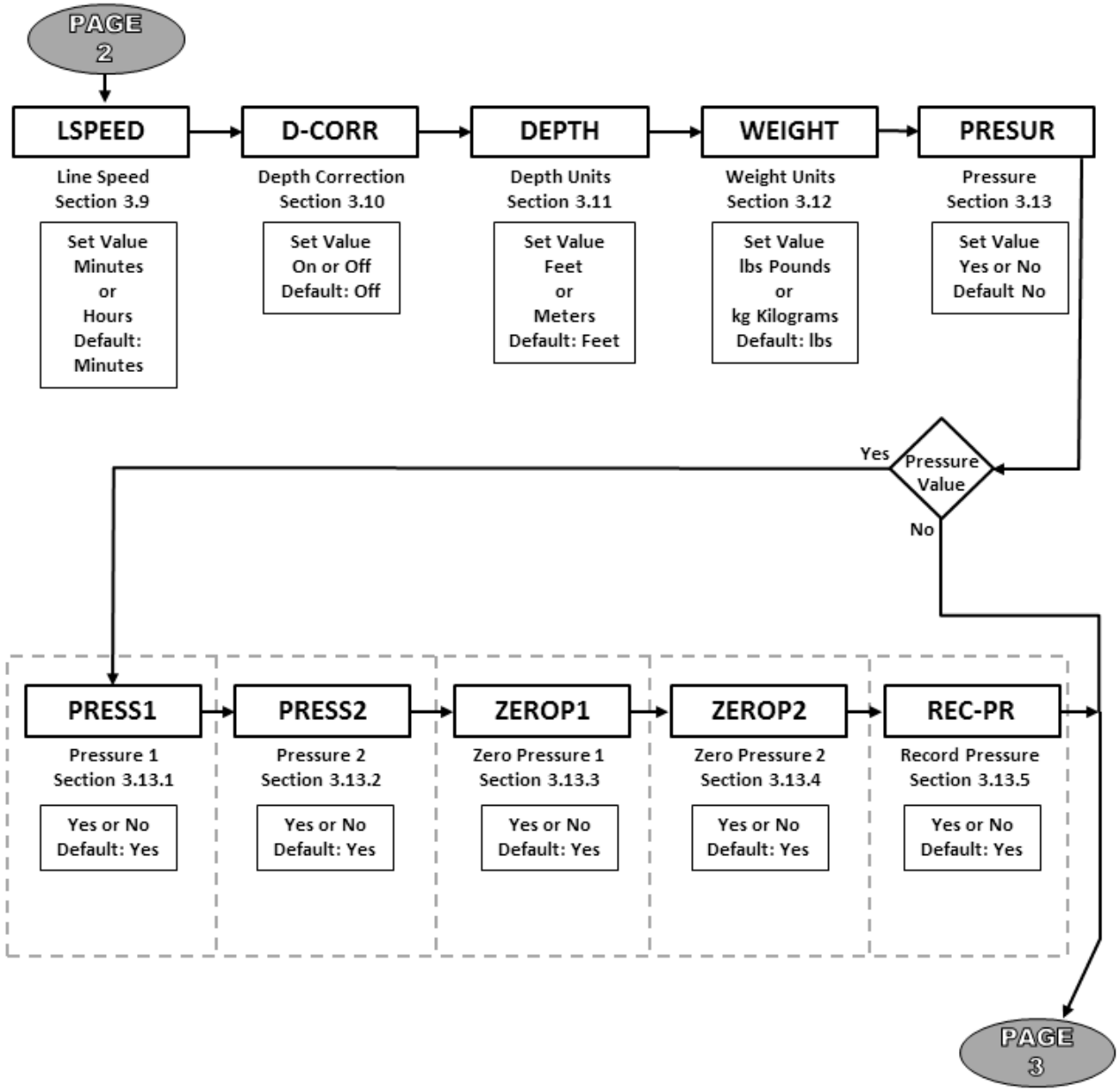
http://benchmarkwireline.com/support.html

3.1 MENU SELECTION FLOW CHART 1 OF 3

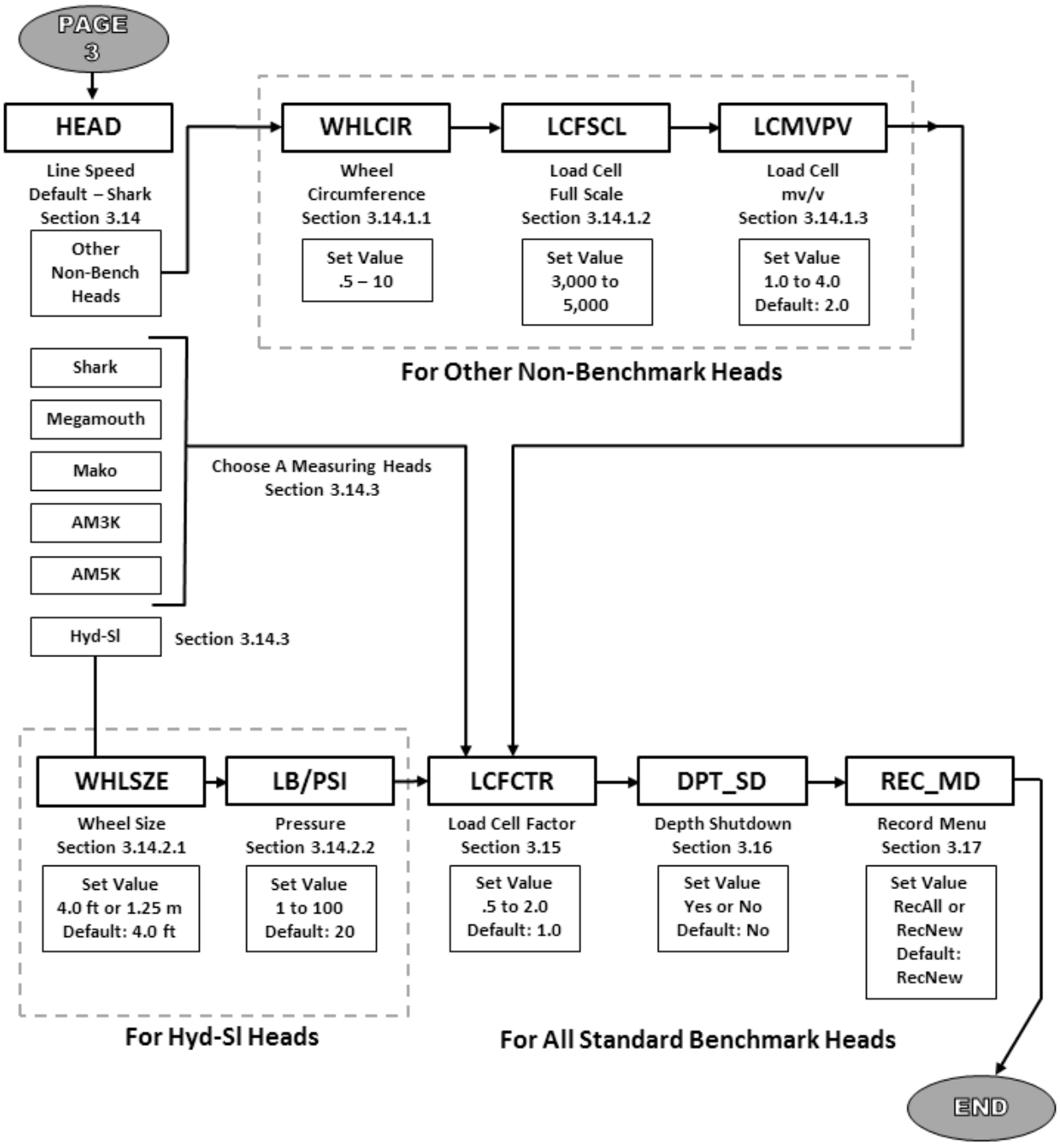
Note – Based on the 1st Rev of the 3A panel or the 4A 67 panel Rev 15



3.1 MENU SELECTION FLOW CHART 2 OF 3



3.1 MENU SELECTION FLOW CHART 3 OF 3



3.2 TALARM - TENSION ALARM

When value is reached an alarm sounds and the tension contact closure switch is closed. This can be used to provide a signal to automatically stop the winch.

Procedure: Use +/- switch to set the tension alarm setting. **This setting does not need to be accepted when changed.**

TALARM will be displayed on the DEPTH display (top) and the value will be displayed on the LINE SPEED display (center) as it is being set.
Default value is 1,500 lbs

3.3 DTALRM - DIFF TENSION ALARM –

NOTE: this is displayed if Depth = 0

3.4 LINESZ - LINE SIZE

Line size selection in conjunction with the wheel size sets the wheel circumference value. The depth must be at 0 before this setting can be changed.
Use +/- switch to select line size.
LINESZ will be displayed on the DEPTH display and the selections will be displayed on the LINE SPEED display.

Line Size Values available for SHARK OR MEGAMOUTH

- .092
- .108 (default setting)
- .125
- 3-16
- OTHER

Line Size Values available for MAKO

- .092
- .108 (default setting)
- .125
- .140
- .150
- .160
- 3-16
- 7-32
- 5-16
- OTHER

When OTHER is selected, the wireline weight and stretch coefficient can be entered at this time. This data should be available for the manufacturers wireline data sheet.

Line Size Values available – AM3K HEAD

- 3-16
- 7-32
- 1/4
- 9-32
- 5-16 – (default setting)
- 3-8

Line Size Values available – AM5K HEAD

- 3-16
- 7-32
- 1/4
- 9-32

5-16 – (default setting)
3-8
7-16
15-32
.472 – HT
.484 – HT
.492 - HT

Note: HT = High Tension and should only be used with the deep grooved tension wheel.

3.5 DALARM - DEPTH ALARM

When depth alarm value is reached, the alarm will sound and LED will flash. Pressing the LED will turn off alarm but the light will continue to flash. The light is reset whenever the depth zero button is depressed.

Use +/- switch to set the depth alarm value.

DALARM will be displayed on the DEPTH display and the value will be displayed on the LINE SPEED display as it is being set.

Default value is 100’

3.6 DP-ADJ - DEPTH ADJUST (Shim)

This parameter is used to correct depth readings for situations such as extremely worn measurement wheels.

The amount selected will automatically be added or subtracted from the depth input.

Use +/- switch to set the DEPTH ADJUST setting.

DP-ADJ will be displayed on the DEPTH display and the value will be displayed on the LINE SPEED display as it is being set. The values are feet / thousand or meters / thousand. The smallest increment is .1 foot per thousand.

Default value is 0.

3.7 ENCDIR - ENCODER DIR

This command will set the encoder direction to UP or Down.

Use +/- switch to toggle the ENCODER direction setting.

ENCDIR will be displayed on the **DEPTH** display and either **UP** or **DN** will be displayed on the **LINE SPEED** display.
Default value is **DN**.

3.8 EN-PPR - ENCODER PULSES PER REVOLUTION

The value selected will automatically be used as the encoder input pulses per revolution (PPR) setting.

Use +/- switch to set the ENCODER Pulse Per Revolution setting.

EN-PPR will be displayed on the DEPTH display and the value will be displayed on the LINE SPEED display as it is being set.
Default value is 1200.

3.9 EN-OUT - ENCODER OUTPUT

The value selected is the encoder out Pulse Per Foot setting.

Use +/- switch to set the ENCODER Output setting.

EN-OUT will be displayed on the DEPTH display and the value will be displayed on the LINE SPEED display as it is being set.

Default value is 600.

3.10 LSPEED - LINE SPEED

This command will set the line speed to either feet/meters per minute of feet/meters per hour.

Use +/- switch to toggle the LINE SPEED setting.

LSPEED will be displayed on the DEPTH display and either MIN or HOUR will be displayed on the LINE SPEED display.

Default value is MIN.

3.11 D-CORR – DEPTH CORRECTIONS (STRETCH CORRECTION)??

This command will turn the STRETCH CORRECTION setting ON or OFF.

Use +/- switch to toggle between ON and OFF.

D-CORR will be displayed on the DEPTH display and either ON or OFF will be displayed on the LINE SPEED display.
Default value is ON.

Stretch is calculated by stretch due to cable weight + stretch due to weight at end of cable

stretch due to cable weight =
stretch coefficient * depth * cable weight / 2

stretch due to weight at end of cable =
stretch coefficient * depth * (tension – cable weight)

When tension is less than cable weight, tension measured is due to cable weight alone.

3.12 DEPTH - DEPTH UNITS

The depth values will be displayed in the units selected.

Use +/- switch to set the DEPTH UNITS setting.

DEPTH will be displayed on the DEPTH display. The selection can be toggled between FEET or METERS. The selection will be displayed on the TENSION display. The ENGLISH (green) LED display will be lit when FEET is selected and the METRIC (red) LED will be lit when METERS is selected.

3.13 WEIGHT – WEIGHT UNITS (TENSION UNITS)??

The tension value will be displayed in the units selected.

Use +/- switch to set the TENSION UNITS setting.

TENSION will be displayed on the DEPTH display. The selection can be toggled between POUNDS and KILOGM. The selection will be displayed on the TENSION display.

Note: Analog meter faces are available with kg increments.

3.14 PRESUR - PRESSURE

This option controls the optional pressure display (if connected).

IF PRESSURE IS “N” go to 3.13

If Y is selected, the following options are available.
IF PRESSURE IS “Y” YES CONTINUE BELOW

3.14.1 PRESS1 – PRESSURE 1 (PRESS1)?

Selecting **N** will blank the PRESS 1 display.

3.14.2 PRESS2 – PRESSURE 2 (PRESS2)?

Selecting **N** will blank the PRESS 2 display.

3.14.3 ZEROP1 – ZERO PRESSURE 1

Selecting **Y** will set the PRESS 1 display to 0 (if the transducer is connected to the PRESS 1 input). This should be performed when no pressure is applied to the transducer.

3.14.4 ZEROP2 – ZERO PRESSURE 2

Selecting **Y** will set the PRESS 2 display to 0 (if the transducer is connected to the PRESS 2 input). This should be performed when no pressure is applied to the transducer.

3.14.5 REC_PR – RECORD PRESSURE

Selecting **Y** will append the pressure data to the internal data recorder.

3.15 HEAD TYPE

If standard Bench measuring head skip to 3.14.3

3.15.1 - OTHER NON-BENCH HEAD

3.15.1.1 WHLCIR – WHEEL CIRCUMFRENCE

Refer to WHLSZE 3.14.2.1

3.15.1.2 LCFSCL – LOAD CELL FULL SCALE

This is the full scale rating that is typically printed on the tension measuring device in pounds.

3.15.1.3 LCMVPV – LOAD CELL MV/V

This is the tension measuring device sensitivity rating in millivolts per volt..

3.15.2 HYD-SL - OTHER NON-BENCH HEAD

3.15.2.1 WHLSZE – WHEEL SIZE

This selection also determines the measuring wheel size used in depth calculation.

Wheel size circumference with wireline installed is calculated by: (Wheel dia. + Line dia * pi

Example: other head wheel with .125 wireline:
(15.153" + .125) * pi = 47.997 inches circumference

When OTHER is selected the WHLCIR can be entered to change the circumference of the measuring wheel. This option allows the panel to be set for a measuring head that uses different sized measuring wheels. Data entered is in feet.

The wheel size will be forced to this value regardless of wireline size selections.
The default value is 1.00 ft.

3.15.2.2 LB/PSI – PRESSURE

This is a function of the pressure transducer and the pressure plate area.

3.15.3 STANDARD BENCHMARK MEASURING HEADS

Choose a measuring head - Five options are available:

SHARK	SHARK - SLICK LINE HEAD
MMOUTH	MEGAMOUTH / DOLPHIN / TIGER SHARK - SLICK LINE / BRAIDED LINE HEAD
MAKO	MAKO / ORCA / THRESHER - SLICK LINE / BRAIDED LINE HEAD
3K	AM3K BRAIDED LINE / E LINE HEAD
5K	AM5K BRAIDED LINE / E LINE HEAD

3.16 LCFCTR

This selection determines the tension scale and tension K factor. Default = 1.0
For Benchmark measuring heads this factor does not need to changed.
For Non-Benchmark measuring heads this factor may need to be changed according to the line size in use.

3.17 DPD_SD – DEPTH SHUTDOWN

Choose a measuring head - Five options are available:

3.18 REC_MD – RECORD MENU

DATA RECORDER OPTION

Either **RECALL** (Record All data) or **RECNEW** (Record only New data) will be displayed on the TENSION display (bottom).

If this option is set to **RECALL,** data will be written to the flash card and front serial port continuously (1 x per second).

If the panel is set to **RECNEW** then only new data will be written. New data is defined as when depth is changed by more than 0.1' or when tension changes by more than 10 pounds. Interpolation can be used to fill in non written records since a DATE and TIME stamp is recorded as a part of each data record.

Default value is **RECNEW**.

4.0 OPERATION, HARDWARE SETUP & MAINTENANCE

4.1 SETUP

4.1.1 PROCESSOR REBOOT

In the event of a panel "lock up" or other malfunction, the processor in the panel can be rebooted by turning off the panel, depressing the T-ZERO and T-TEST buttons simultaneously then turning the power back on while the buttons are depressed. Keep buttons the depressed for at least five seconds after power is restored.

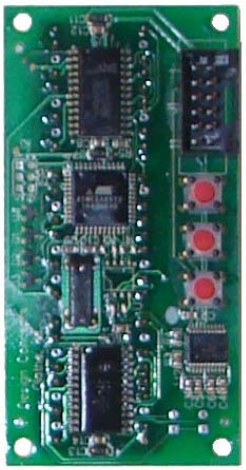
When the panel is rebooted, all the menu settings will be returned to the factory default settings.

The panel should always be rebooted after new software has been installed.

4.1.2 DIGITAL DISPLAY SETUP

The four digital displays can be set for address, baud rate, and brightness

Three buttons are located on the rear of the display which are used to change these settings.



The button nearest the connector selects the parameter (address, baud rate, brightness).
The center button increments the parameter up
The end button increments the parameter down.

After the parameter is set, press the parameter button again to store it.

The addresses should be set as follows:

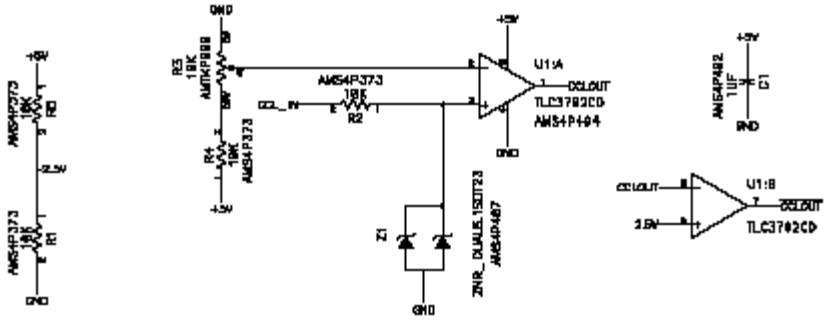
Line Tension = 1
Line Speed = 2
Depth = 3
MMD/CCL = 4

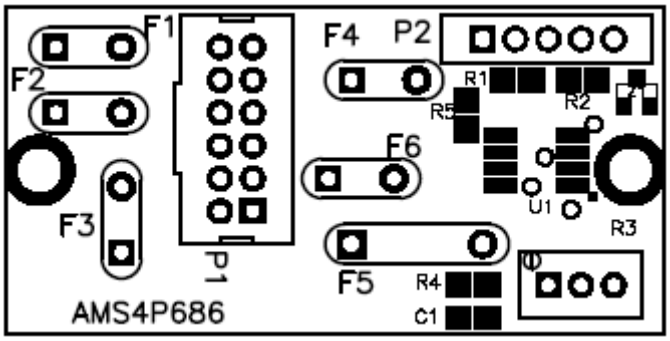
Set Baud Rate to 9600
Set Brightness to 15
Digital Display Pinout

PINS 1, 2, 7, 9	GND
PINS 4, 6, 8, 10	+5 VDC
PIN 3	TXD
PIN 5	RXD

4.1.3 CCL BOARD SETUP - 4A panel

To test the operation of the panel, adjust R3 on the CCL/Fuse board to receive satisfactory collars if needed. The boards were set to a threshold value of approximately +1.5V input to the CCL circuit during testing. Setting the input to +1.5V would be a good starting point to set up the circuit before installing the panel in a unit. CCW adjustments of R3 will raise the threshold voltage required to acquire a CCL mark (less sensitive). Example: If CCL marks are constant as the tools go down hole, adjust R3 CCW until CCL marks are on depth. Example #2: If no CCL marks are found, turn R3 clockwise. An oscilloscope across CCL/Fuse board P2 pin 2 (signal) and 40 board TP1 (ground) will allow you to see the input signal as you make your adjustments.





4.2 INTERNAL DATA RECORDER OPERATION - 4A PANEL

This device records depth and tension data along with other job parameters onto a compact flash card.

4.2.1 DATA FORMAT - 4A PANEL

Data is stored as:
DATE (mm/dd/yy)
TIME (hhmmss.ss
UNITS (E=English, M=Metric)
DIRECTION (U=Up, D=Down, S=Stopped)
DEPTH nnnnn.n
SPEED nnnn.n
TENSION nnnnnn
PRESSURE 1 nnnn (if REC_PR is enabled – refer to page 16)
PRESSURE 2 nnnn (if REC_PR is enabled – refer to page 16)

<CR> - CARRIAGE RETURN, <LF> - LINEFEED

See following example

```
20091202  151415.00 E S + 41.7 0.0 2317
20091202  151416.00 E S + 42.7 0.0 2317
20091202  151417.00 E S + 43.7 0.0 2317
20091202  151418.00 E S + 44.7 0.0 2317
20091202  151419.00 E S + 45.7 0.0 2317
20091202  151420.00 E S + 52.1 0.0 2317
20091202  151555.00 E S + 57.1 0.0 2317
20091202  151556.00 E S + 57.6 0.0 2317 0 0
20091202  151557.00 E S + 57.7 0.0 2317 0 0
20091202  151558.00 E S + 58.7 0.0 2317 0 0
20091202  151559.00 E S + 59.7 0.0 2317 0 0
20091202  151600.00 E S + 60.7 0.0 2317 0 0
20091202  151601.00 E S + 61.7 0.0 2317 0 0
20091202  151616.00 E S + 64.7 0.0 2317 0 0
20091202  151625.00 E S + 0.0 0.0 2317 0 0
20091202  151626.00 E S + 0.8 0.0 2317 0 0
20091202  151627.00 E S + 1.2 0.0 2317 0 0
```

4.2.2 DATA FORMAT - 3A panel

Data is stored as:
DATE (yyyymmdd)
TIME (hhmmss.ss
UNITS (E=English, M=Metric)
DIRECTION (U=Up, D=Down, S=Stopped)
DEPTH nnnnn.n
SPEED nnnn.n
TENSION nnnnnn
<CR> - CARRIAGE RETURN, <LF> - LINEFEED

F10
File # Date/Time Size (bytes)
10 14/09/05 11:38:06 28400

11:38:50 E S + 0.0 0.0 41 0 0
11:38:51 E U + 0.0 0.2 41 0 0
11:38:52 E S + 0.0 0.0 41 0 0
11:38:53 E S + 0.0 0.0 41 0 0
11:38:54 E D + 0.1 14.0 30 0 0
11:38:55 E D + 0.6 30.2 46 0 0
11:38:56 E D + 1.1 30.6 61 0 0
11:38:57 E D + 1.7 31.2 62 0 0
11:38:58 E D + 2.4 51.0 50 0 0
11:38:59 E D + 3.3 51.4 58 0 0
11:39:00 E D + 4.1 51.4 56 0 0
11:39:01 E D + 4.9 39.2 56 0 0
11:39:02 E S + 4.9 0.0 31 0 0
11:39:03 E S + 4.9 0.0 2 0 0
11:39:04 E D + 4.9 0.2 1 0 0
11:39:05 E S + 4.9 0.0 1 0 0
11:39:06 E S + 4.9 0.0 3 0 0
11:39:07 E S + 4.9 0.0 12 0 0
11:39:08 E S + 4.9 0.0 14 0 0
11:39:09 E S + 4.9 0.0 26 0 0
11:39:10 E S + 4.9 0.0 29 0 0
11:39:11 E S + 4.9 0.0 28 0 0
11:39:12 E S + 4.9 0.0 28 0 0
11:39:13 E U + 4.9 0.2 28 0 0
11:39:14 E S + 4.9 0.0 29 0 0

11:39:15 E U + 4.3 53.8 42 0 0
11:39:16 E U + 3.4 55.6 31 0 0
11:39:17 E U + 2.5 57.2 32 0 0
11:39:18 E U + 1.5 57.2 30 0 0
11:39:19 E U + 0.5 57.4 30 0 0
11:39:20 E U - 0.4 57.6 29 0 0
11:39:21 E U - 1.4 58.6 29 0 0
11:39:22 E U - 2.4 59.6 28 0 0
11:39:23 E U - 3.4 59.6 28 0 0
11:39:24 E U - 4.4 59.2 26 0 0
11:39:25 E U - 5.3 59.4 26 0 0
11:39:26 E U - 6.3 54.0 25 0 0
11:39:27 E U - 7.2 54.4 24 0 0
11:39:28 E U - 8.0 43.2 12 0 0
11:39:29 E D - 8.0 0.2 12 0 0
11:39:30 E U - 8.4 38.6 9 0 0
11:39:31 E U - 8.8 17.8 5 0 0
11:39:32 E S - 8.8 0.0 14 0 0 <EOF>

4.2.3 WELL NAME / UNIT NUMBER HEADER DATA - 4A panel

If a header containing information about the well, location, hoist unit number, etc. is desired on the file, connect a PC to the USB connector on the recorder face. When the directory is displayed right click the mouse and choose new file. Enter the data you wish and save the file as “unitdata.txt”. When the recorder board boots up it will look for the file “unitdata.txt” and put whatever is in the file in the new file that will record the data.

4.2.4 DATA RECORD - 4A panel

Data is written to the board 1 time per second. Data is stored in ASCII TEXT format. Each line terminates with CR and LF characters.
To minimize the amount of data written to the board, the panel can be set (see 3.1) to write data only when depth is changed by more than 0.1' or when tension changes by more than 10 pounds. Interpolation can be used to fill in non written records since a DATE and TIME stamp is recorded as a part of each data record.

The panel can also be set to write data continuously so that no interpolation is necessary. This is recommend when if you want to correlate surface depth and tension readings with memory gauge readings.

The RECORD LED on the front of the DATA RECORDER board indicates that it is in RECORD mode.

The DATA LED flashes each time a data record is written.

Before removing the CompactFlash card, turn the panel power off. There is a delay when turning off the power while the data files are being closed. After a short delay, the panel will power itself off.

To continue recording on a new flash card, insert the card then turn the panel off then on. This will put the panel into record mode and write a new header file on the CompactFlash card.

New File – created or power up
YYMMDDXX where XX=0 - 99

4.2.5 DATA EXPORT - 4A panel

Early model 40 Series panels did not have a data collection capability. Log data was passed to the logging system with no data recording taking pace.

Later models recorded date on an internal CompactFlash card. The card could be accessed via an external slot on the panel. The memory board can be removed and data moved onto a PC using a standard CompactFlash Media Reader. The data can be imported into programs such as MS Excel or MS Access.

To remove the compact flash card, Press the release button to eject the flash card.

4.2.6 SETTING RECORDER PARAMETERS

DEPENDING ON THE PANEL MODEL NUMBER - VARIATION 1
To set the parameters, connect a serial cable to the DB9 port on the front of the panel. The wiring is as follows:

DB9 PIN OUT: 2 = TRANSMIT, 3 = RECEIVE, 5 = GROUND

Run a program such as MS Windows HyperTerm using the following parameters

BAUD	19,200
BITS	8
PARITY	N
STOP	1
HANDSHAKING	NONE

When everything is set up, turn the panel power off then back on. At this time you will be given the opportunity to set the parameters by pressing any key. If no key stroke is detected during the panel bootup process the data recorder will enter the record mode.

In record mode, the same data that is written onto the CF card will also be written to the serial port.

If a keystroke is detected, you will be prompted to enter the unit number. This number can represent the hoist unit or well or other designator. The previously entered unit number will be displayed and if a new number is not entered it will remain.

Next you will be prompted to enter s to set time or rtn to keep the current

time. If s is pressed:

Enter the day: 1 – 7 where 1 = Sun and 7 = Sat

To set the year, first enter the tens digit then enter the ones digit (i.e. for 2006 first enter 0 then 6).

To set the month, first enter the tens digit then enter the ones digit (i.e. for Dec. first enter 1 then 2, for Jan. first enter 0 then 1).

To set the day, first enter the tens digit then enter the ones digit (i.e. for the 15th first enter 1 then 5, for the 5th first enter 0 then 5).

To set the hours (24 hour format), enter 0 for 12:00AM to 9:00, 1 for 10:00 to 19:00, 2 for 20:00 to 23:00. Next enter actual hour (i.e. to set the hour to 17:00 first enter 1 then next enter 7, to set the hour to 09:00 first enter 0 then next enter 9).

To set the minutes, first enter the tens digit then enter the ones digit (i.e. for 21 minutes past the hour first enter 2 then 1, for 9 minutes past the hour first enter 0 then 9).

Seconds are set in the same manner.

At this time the system is ready to record data.

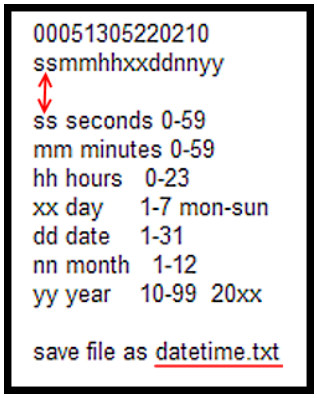
4.2.7 MEDIA CARD - 4A PANEL

The CompactFlash media device used in the data recorder may be ordered using part number AMS4P232. Additionally it may be acquired from any number of other retail sources. 2 GB is the minimum recommended size.

4.2.8 SETTING DATA RECORDER TIME AND DATE - 4A panel

OR VARIATION 2
To change the time and date of the panel follow this procedure:

1. Turn the panel on and make sure there is a flash card plugged into the panel.
2. Connect a PC to the panel using the USB program port on the panel.
3. On the PC, in Windows Explorer you will see the panel shown as an additional drive on the PC. Autoplay may show the card in the panel and click 'explore'.
4. Look for the file/folder 'howtosettime' and open it. Inside you will see the file 'datetime.txt'. Click on that file to open it. It will likely open in either Microsoft Wordpad or Notepad. The file will look like this without the red notations.



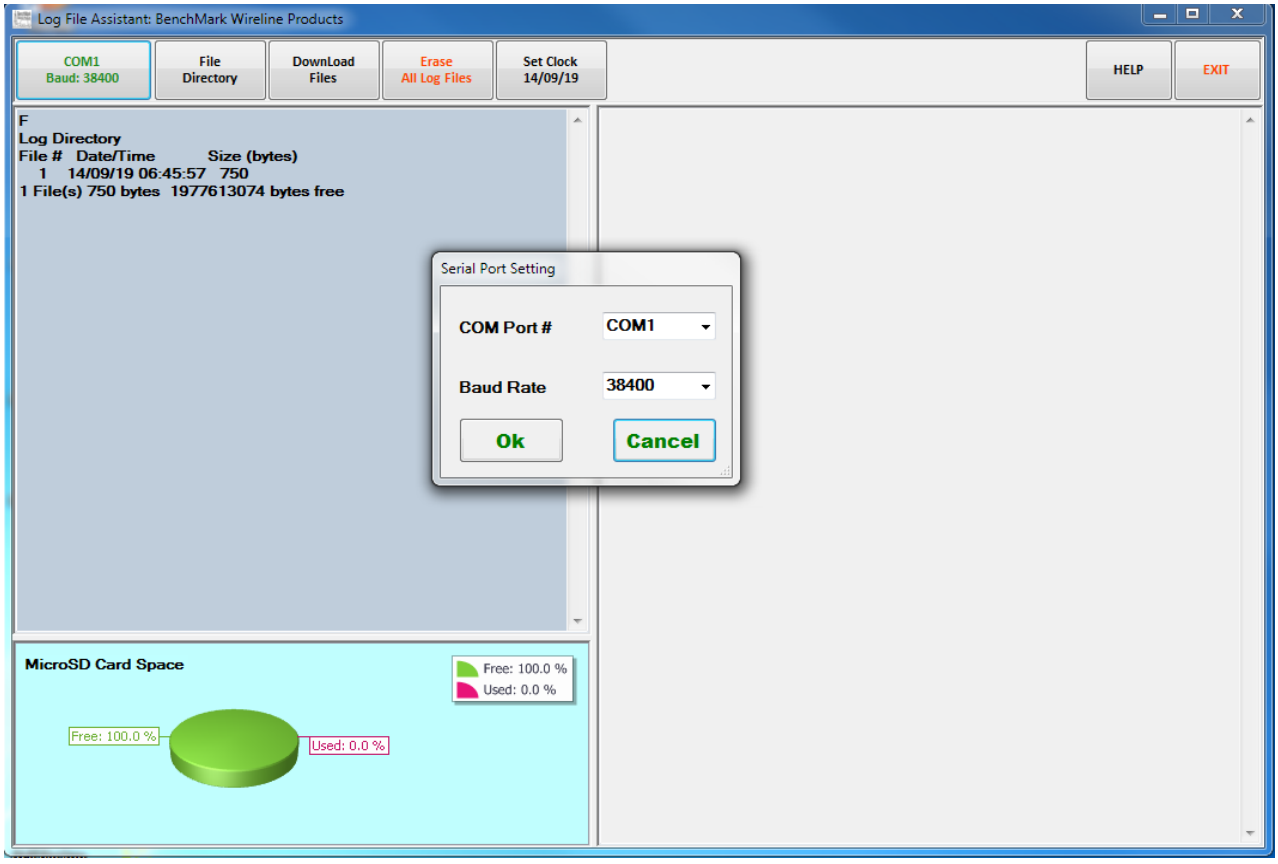
5. Following the pattern shown in the example above, change the number on the 'Top Line' to provide the correct time and date information.
6. When finished, save the updated text file as…'datetime.txt'. Remember you are saving these changes to the flash card located in the display panel.
7. Disconnect the USB cord from the panel, power the panel off then on and the proper time and date will be loaded into the panel. It is now ready to record data.

4.2.9 DATA EXPORT - LOG FILE - USING USB PORT - 3A Panel

The new 3A panels require a Log File Assistant program to help extract the log files from the flash drive for use in Windows based software. Download this file from our website onto the laptop that will extract the data from the panel.

The AMS3A panels have a USB connector labelled 'DATA' that can be connected to a laptop computer USB port with a standard cable with type 'A' to type 'B' connectors. The laptop computer may require a "FTDI Virtual COM Port" driver installation if it does not recognize the USB COM Port when the cable is plugged in with power applied to the AMS3A panel.

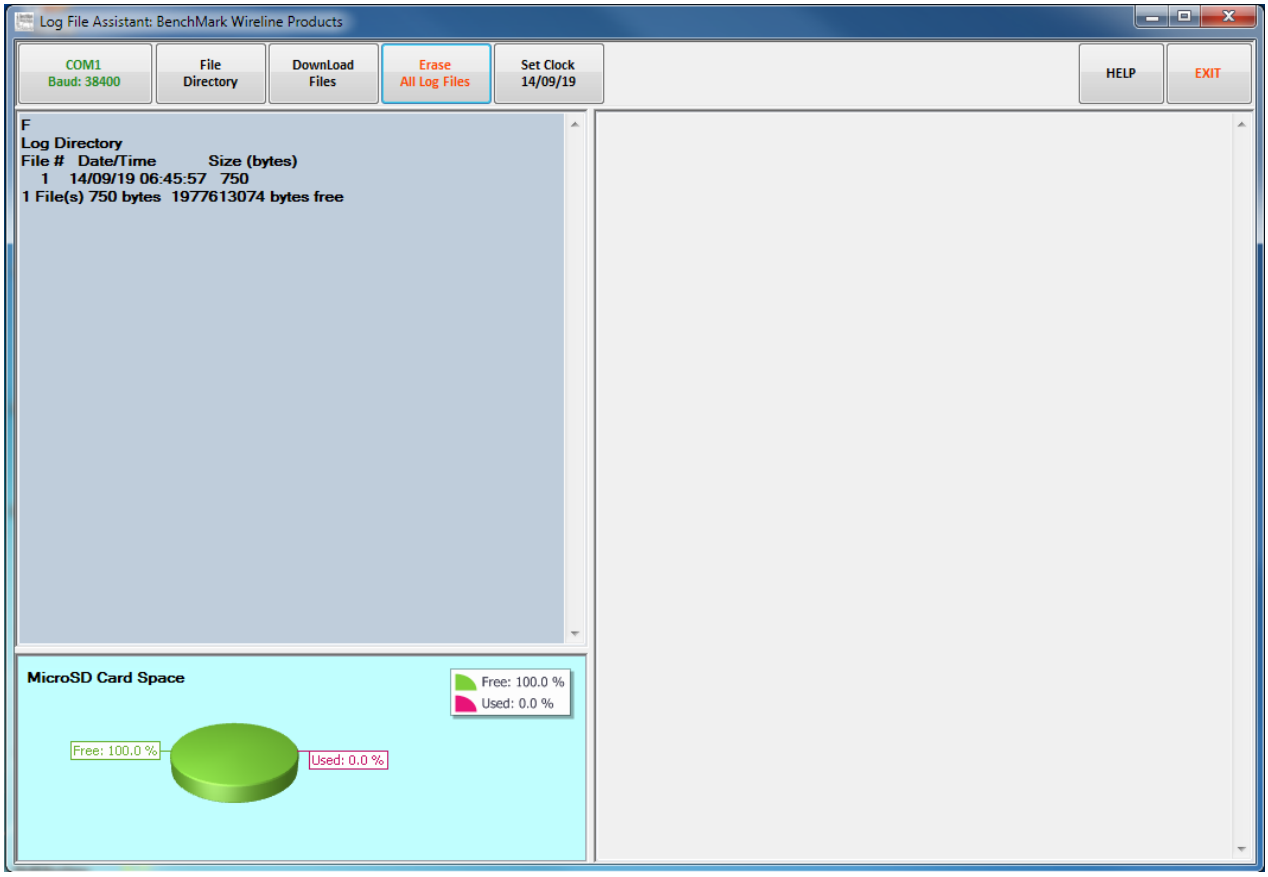
This data file download is available at www.BenchMarkWireline.com/support



Upon program start the available laptop computer COM Ports are searched for availability. If the COM Port button text reports that no connection is made, click on the button and then pull down the COM Port # list box and choose the proper COM Port.

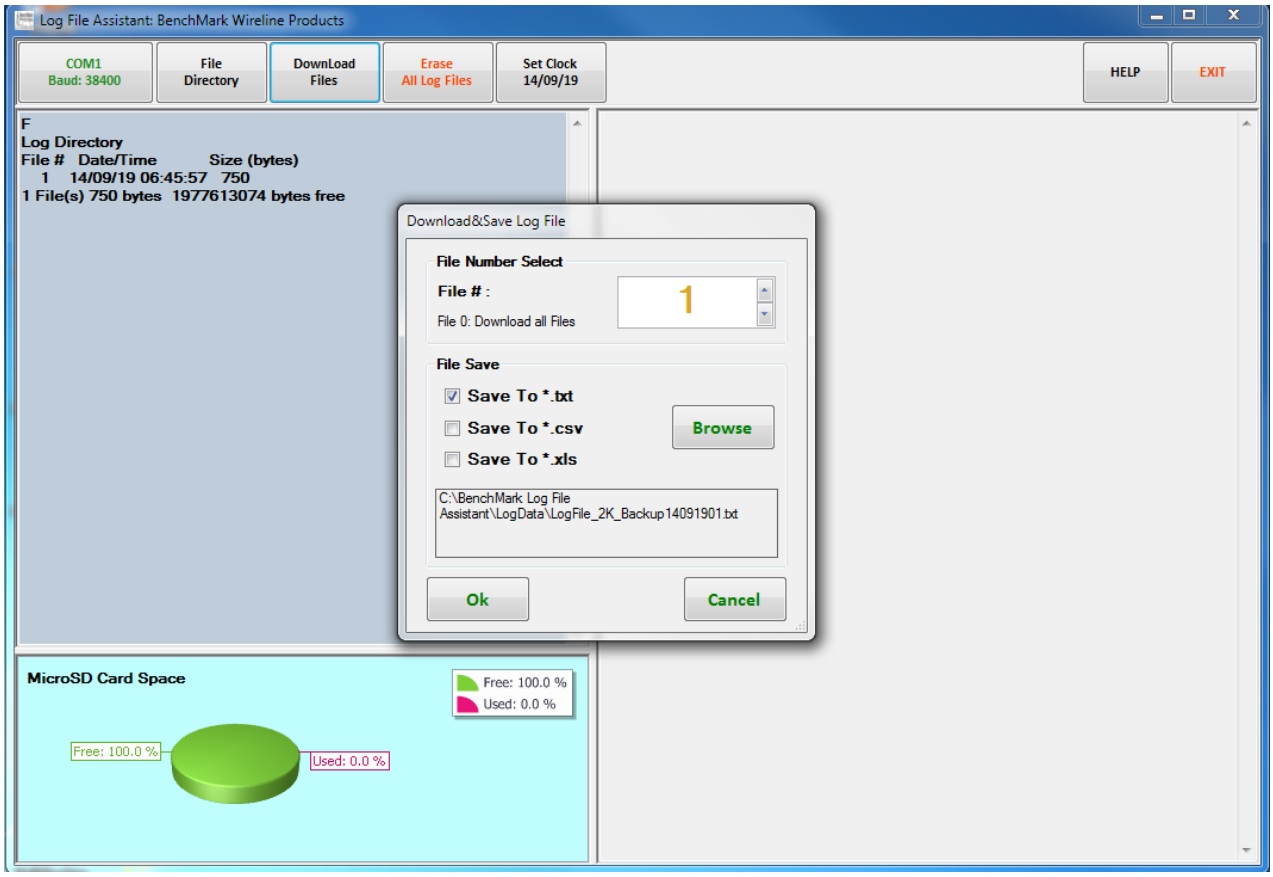
Note that the lower left pane displays the MicroSD card usage – this is where the AMS3A panel's Log Files are stored.

4.2.9 DATA EXPORT – LOG FILE – USING USB PORT 3A - continued



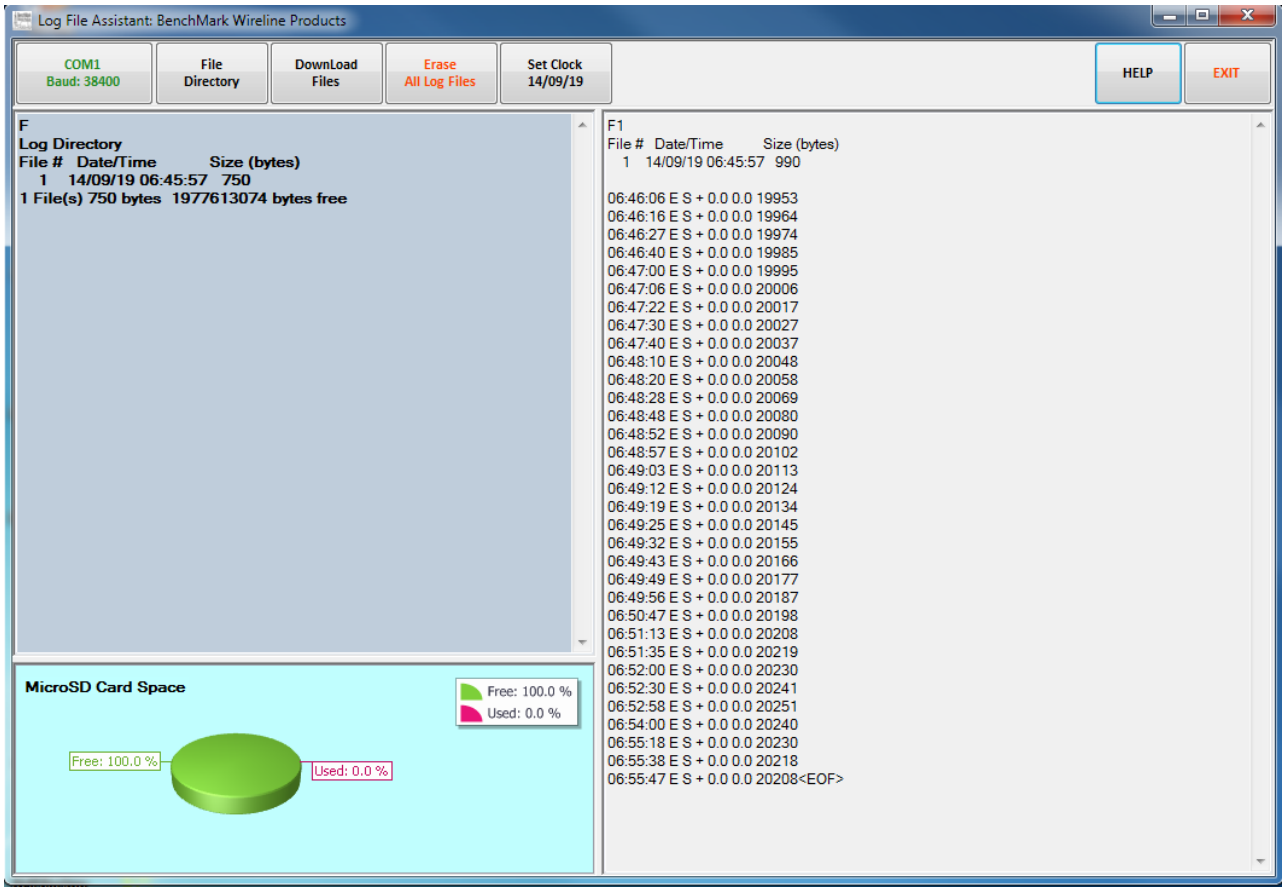
Clicking on the 'File Directory' button results in the listing of all log files in the left pane.

4.2.9 DATA EXPORT – LOG FILE – USING USB PORT 3A - continued



Clicking on the 'Download Files' button will open a new dialog window. A specific log file is then chosen from the list box and the Operator has the option of saving the file in three different file extension formats; and re-naming and re-locating the file using the 'Browse' button.

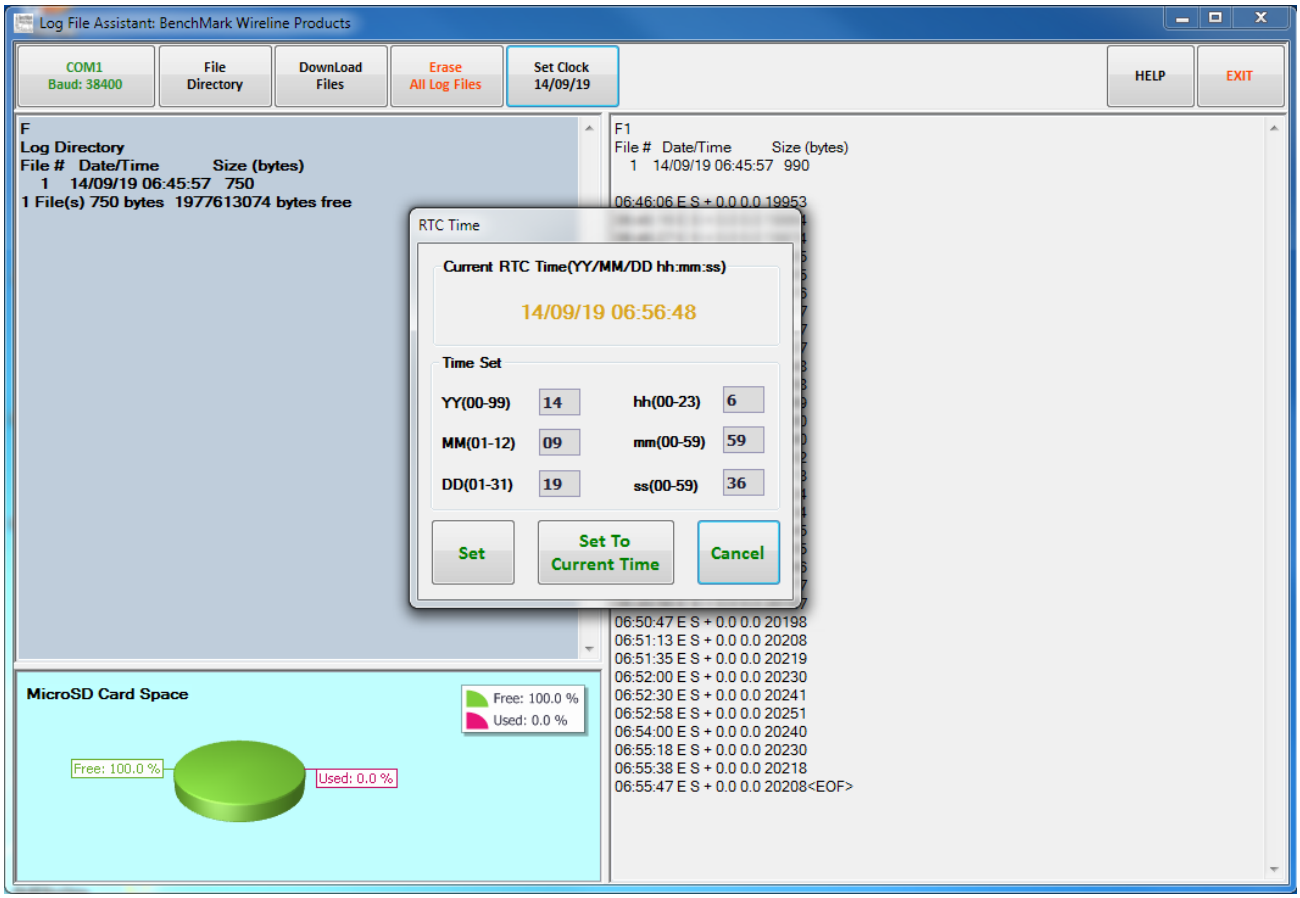
4.2.9 DATA EXPORT – LOG FILE – USING USB PORT 3A - continued



The content of the selected log file is displayed in the right pane.

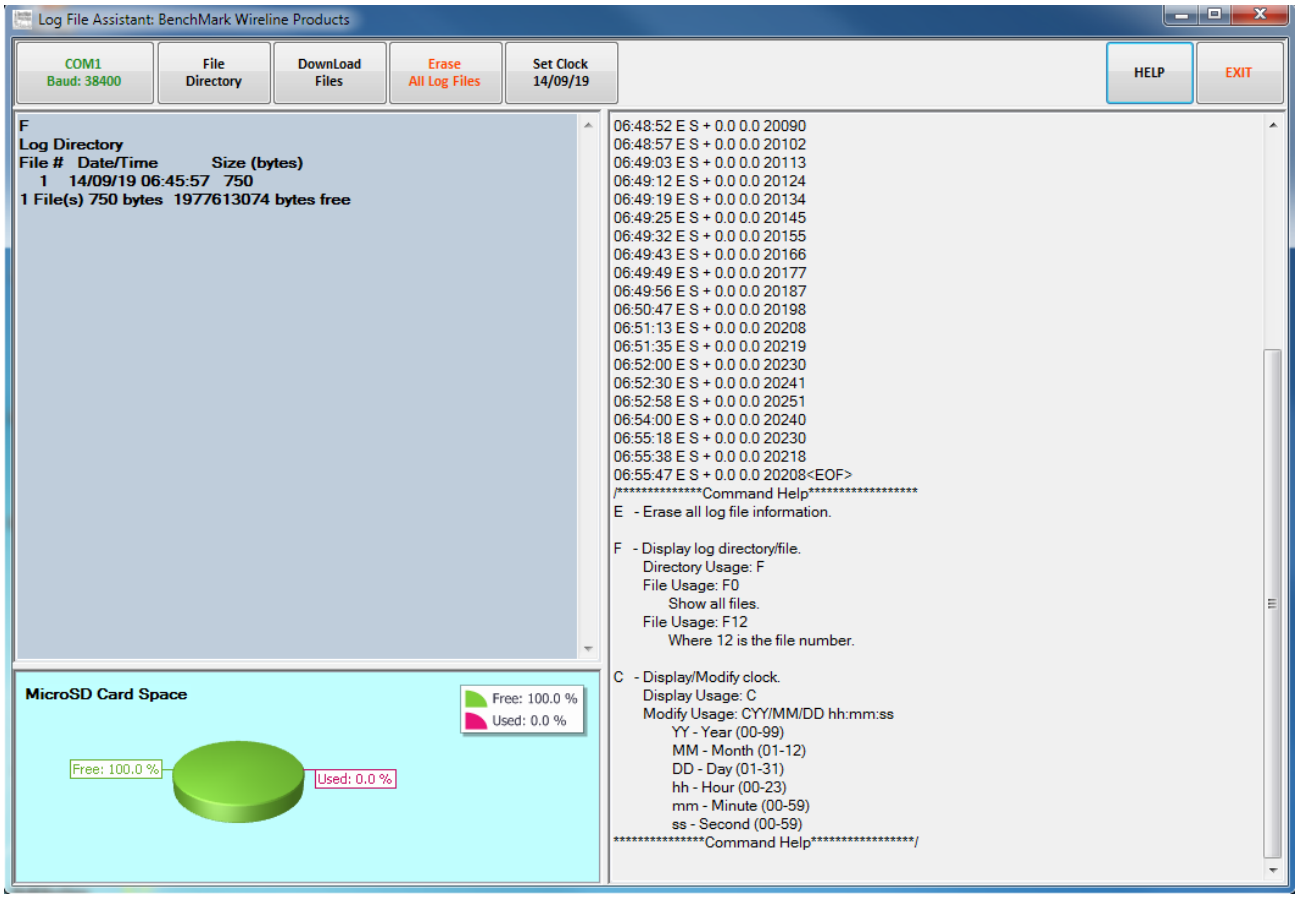
Erase All Log Files Button: Clicking on this button will open a dialog box asking for confirmation to erase all log files.

4.2.9 DATA EXPORT – LOG FILE – USING USB PORT 3A - continued



Clicking on the ‘Set Clock’ button will open a dialog that allows the Operator to set the Date/Time clock to the current Date/Time or to any Date/Time desired.

4.2.9 DATA EXPORT – LOG FILE – USING USB PORT 3A - continued



Clicking on the ‘Help’ button results in the display of the log file related commands for informational purposes only.

Exit Button: Clicking on the ‘Exit’ button will open a dialog box asking for confirmation to exit the Log file Assistant program.

4.3.1 RS232 SERIAL INTERFACE - HELP - 4A panel

DEPENDING ON THE PANEL MODEL NUMBER - VARIATION 1
To connect the panel to a computer, connect a serial cable from the PC to J6 on the rear of the panel. The wiring is as follows:

DB9 PIN OUT: 2 = TRANSMIT, 3 = RECEIVE, 5 = GROUND

Run a program such as MS Windows HyperTerm using the following parameters

BAUD	38,400
BITS	8
PARITY	N
STOP	1

Press H or ? to display the help screen

* * * AMS4A06X Help Screen * * *

H,? - This screen.
D - Display units, direction, depth, speed, and tension.
L - Modify load cell angle (factor) Usage: L1.2
P - Modify encoder pulses/revolution. Usage: P600
V - Verify setup status.
W - Modify wheel size (line other) (feet) Usage: W4.0
Z - Preset depth.Usage: Z0.0 |_|--> New depth.
U - Modify units of measure UF(feet);UM(meters);UP(pounds);UK(kg)
A - Depth Alarm. Usage: A100 |_|--> Depth Alarm.
N - Line Size N0 7/32; N1 9/32; N2 5/16; N3 3/8;N4 7/16;
N5 15/32; N6 15/32HT; N7 SLAM N8 SLAMHT; N9 SSLAM
M - Tension Alarm. Usage: 'M2500' for 2500 pound alarm.
J - Depth Adjust. Usage: 'J-1' for -1 ft per 1000 feet
S - System PPF Usage: 'S125' for 125 PPFoot to system
B - Enter Mud Weight B12.3 lbs/gal
T - Enter Tool Weight T1000 lbs
k - Toggle stretch correction on/off
p - Display depth and stretch data
m - Use MMK Correction

4.3.1 RS232 SERIAL INTERFACE - HELP - 4A panel

OR VARIATION 2

To connect the panel to a computer, connect a serial cable from the PC to J6 on the rear of the panel. The wiring is as follows:

DB9 PIN OUT: 2 = TRANSMIT, 3 = RECEIVE, 5 = GROUND

Run a program such as MS Windows HyperTerm using the following parameters

BAUD	38,400
BITS	8
PARITY	N
STOP	1
HANDSHAKING	NONE

Type H to get the following help screen

```
     *** AMS4A06X Help Screen ***
H,? - This screen.
D   - Display units, direction, depth, speed, and tension.
P   - Modify encoder pulses/revolution. Usage: P600
V   - Verify AMS4A063 status.
Z   - Preset depth.Usage: Z0.0  |_|--> New depth.
A   - Depth Alarm. Usage: A100  |_|--> Depth Alarm.
W   - Wheel Size.
N   - Line Size N0 .092; N1 .108; N2 .125; N3 3/16;
                  N4 7/32; N5 5/16
 U   - Modify units of measure
                  F(feet);UM(meters);UP(pounds);UK(kg)
M   -  Tension Alarm. Usage: 'M2500' for 2500 pound alarm.
J   -  Depth Adjust. Usage: 'J-1' for -1 ft per 1000 feet
X   -  Encoder Direction. X+ or X-
0   -  Tension Zero Cal
T   -  Tension Shunt Cal
I   -  Enable/Disable Stretch Correction
R   –  Toggles data recorder on or off
#   -  Set the serial number of the panel.  Usage #n
```

Type D to get a data string.

DATA STRING DESCRIPTION

123456789012345678901234567890123456

U D Zddddd.d ssss.s tttttt<CR><LF>

WHERE:
U – UNITS (Depth and Tension)
'E' - English, English, 'G' - English, Metric,
'M' - Metric, Metric, 'F' - Metric, English
D - DIRECTION ('U' - UP; 'D' - DOWN; 'S' - STOPPED)
Z - ZERO DEPTH REF. ('+' BELOW GROUND;'-' ABOVE GROUND)
d - DEPTH
s - LINE SPEED
t - TENSION
<CR> - CARRIAGE RETURN, <LF> - LINEFEED

4.3.2 RS232 SERIAL INTERFACE - HELP - 3A panel

To connect the panel to a computer, connect a serial cable from the PC to J6 on the rear of the panel. The wiring is as follows:

DB9 PIN OUT: 2 = TRANSMIT, 3 = RECEIVE, 5 = GROUND

Run a program such as MS Windows HyperTerm using the following parameters

BAUD	38,400
BITS	8
PARITY	N
STOP	1

Press H or ? to display the help screen

* * * AMS4A06X Help Screen* * *

```
H,? - This screen.
D   - Display units, direction, depth, speed, and tension.
P   - Modify encoder pulses/revolution. Usage: P600
V   - Verify " WDDU_NAME " setup status.
Z   - Preset depth.Usage: Z0.0  |_|--> New depth.
A   - Depth Alarm. Usage: A100  |_|--> Depth Alarm.
N   - LineSize,N0-092,N1-108,N2-125,N3-3/16,N4-7/32,N5-1/4,
                N6-9/32,N7-5/16,N8-140,N9-160,N10-OTHR
K  -  Stretch Coeff(in/100#/100ft) Usage:'K.456' for .456 in/100#/100ft
l  -  Line weight (#/1000ft) Usage: 'l25 for 25#/1000ft
W   - Enter Wheel Dia for Other Usage: W3.5 for 3.5 foot circ wheel
L   - Enter line dia (inches) Usage: 'L.25' for .25 in diameter line
U  -  Units Usage: 'UE' ft/lb 'UM' meter/kg 'UG' ft/kg 'UF meter/lb
M  -  Tension Alarm. Usage: 'M2500' for 2500 pound alarm.
J  -  Depth Adjust. Usage: 'J-1' for -1 ft/Meter per 1000 feet/Meter)
X  -  Encoder Direction. X+ or X-
0  -  Tension Zero Cal
T  -  Tension Shunt Cal
I  -  Enable/Disable Stretch Correction
E   - Erase all log file information.
F   - Display log directory/file.
```

AMS3A06X Help Screen continued

```
Directory Usage: F
      File Usage: F0
                  Show all files.
      File Usage: F12
                  Where 12 is the file number.
a   - Display analog values.
C   - Display/Modify clock.
      Display Usage: C
      Modify Usage: CYY/MM/DD hh:mm:ss
            YY - Year (00-99)
            MM - Month (01-12)
            DD - Day (01-31)
            hh - Hour (00-23)
            mm - Minute (00-59)
            ss - Second (00-59)
#n  where n = 0-AMS3A062 1-AMS3A063 2-AMS3A064 3-AMS3067
mTH     Total Meter Hi scale Usage:mTH20000<rtn> for 20k# or 20000kg
mTL     Total Meter Hi scale Usage:mTL4000<rtn> for 4000# or 4000kg
mDH     Diff Meter scale Hi Usage:mDH2000<rtn> for 2000# or 2000kg
mDL     Diff Meter scale Lo Usage:mDL200<rtn> for 200# or 200g
```

4.3.3 RS232 SERIAL INTERFACE - VERIFICATION - 4A panel

DEPENDING ON PANEL MODEL NUMBER USE VARIATION 1
Press V to display the Verification Screen

* * * AMS4A06X Setup Status * * *

Software revision	S4100.01
Line Size =	slam
Depth Units =	Feet
Depth Units =	Pounds
Depth alarm =	100 ft
Tension alarm =	2400 lbs
Tension shutdown =	3500 lbs
Encoder PPR =	1200
Depth Adjust =	0.0
Wheel Circumference =	2.000 feet
Load Cell Angle Factor =	1.00
System Pulse per Foot =	600.0
Cable volume =	2118 cubic inches per 1000 feet
Cable weight =	1.0
Weight fluid =	8.300
Cable weight fluid =	1.000
Tool weight =	1000
Stretch Corr is	OFF
MMK correction is	OFF
Line stretch tool =	8.3

4.3.3 RS232 SERIAL INTERFACE - VERIFICATION - 4A panel

OR VARIATION 2

Type V to get the following verification screen

```
* * * AMS4A06X Setup Status * * *

Load Cell Angle-Factor        1.000
Wheel Size:                   4’
Encoder PPR:                  600
Line size =                   .108
Serial Number =               1
Units =                       English
Depth_adjust =                0.0
Linespeed =                   0
Tension Alarm =               2500
Depth Alarm =                 100
Data Recorder is              ON
Stretch Correction            Enabled
```

4.3.4 RS232 SERIAL INTERFACE - VERIFICATION - 3A panel

* * * AMS3A06X Status Verification* * *

Software Revision 4100.24

Line Size =	.474
Depth Units =	Feet
Depth alarm =	200 ft
Tension Units =	Pounds
Tension alarm =	2400 lbs
Encoder PPR =	1200
Depth Adjust =	0.0
Wheel Circumference =	2.000 feet
Load Cell Angle Factor =	1.00
System Pulse per Foot =	600.0

H

4.2.5 RS232 SERIAL INTERFACE- DATA SCREEN - 4A panel & 3A panel

Press D to display the Data Screen

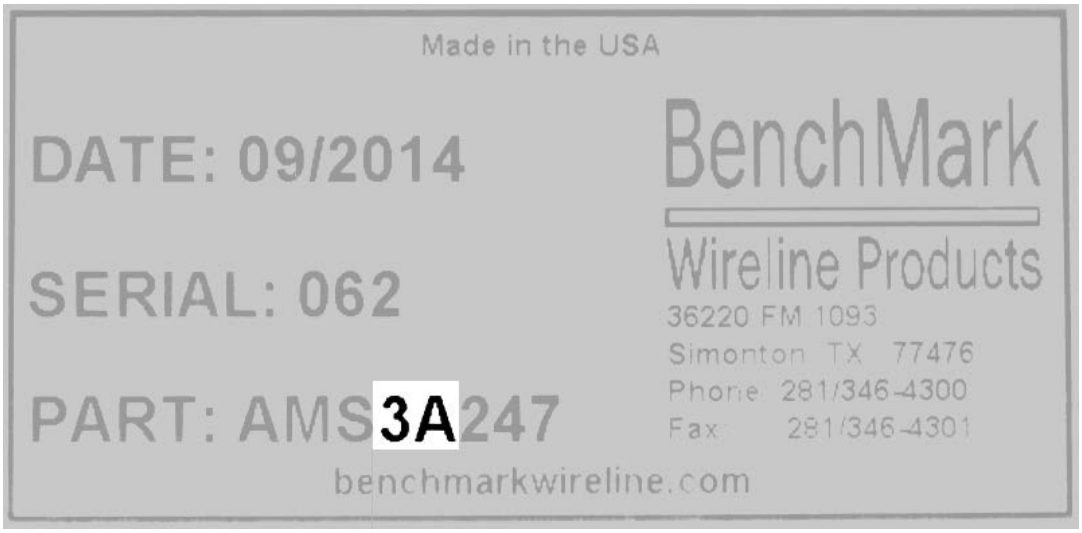
```
DATA STRING DESCRIPTION
12345678901234567890123456
U D Zddddd.d ssss.s tttttt<CR><LF>

WHERE:
U – UNITS (Depth,   Tension)
      'E' - English, English,   'G' - English, Metric,
      'M' - Metric,  Metric,      'F' - Metric,  English
D - DIRECTION     ('U' - UP; 'D' - DOWN; 'S' - STOPPED)
Z - ZERO DEPTH REF. ('+' BELOW GROUND; '-' ABOVE GROUND)
d - DEPTH
s - LINE SPEED
t - TENSION
<CR> - CARRIAGE RETURN, <LF> - LINEFEED
```

4.3.6 SOFTWARE UPDATES - USING USB PORT - 3A panel

This procedure is for periodic software updates on Benchmark wireline display panels. It pertains to 40 series, 50 series, and 60 series display panels with the new 3A board.

You can easily tell if you have a 3A series panel by looking at the silver identification tag on the panel. If there is a 3A in the part number it is a 3A panel.

If it has a 4A in the part number use the software update method described in the manual for that panel.



3A panels contain a new generation computer board that simplifies the process of software updates.

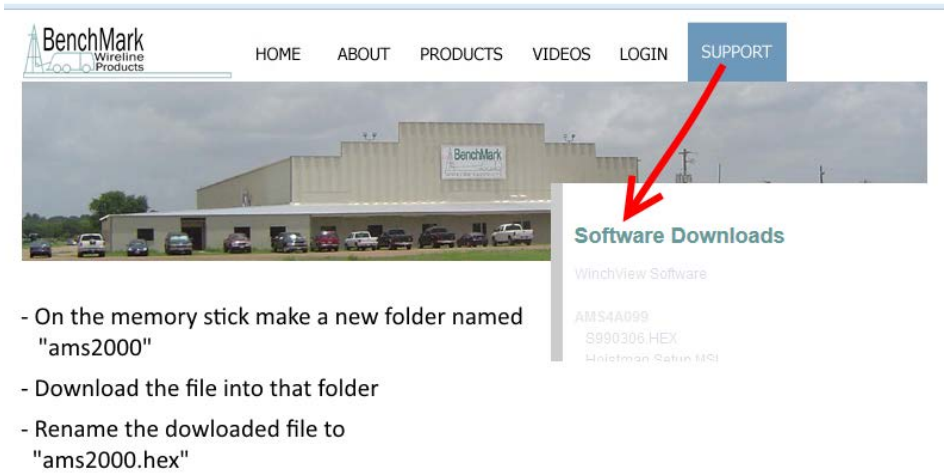
NOTE – if you have a legacy 4A panel that has been upgraded with the new 3A board, use the 3a panel instructions.

The 3A panels have 2 usb ports, an “A” and a “B”. The B is for data collection. The A is for updating software and that is one we’ll be using.

Depending on the model of panel the “A” USB port may be on either the front or back of the panel.

You will need a common USB memory stick also called a thumb or flash drive.

Go to the BenchMarkWireline.com website and then Support and Software Downloads. Insert the memory stick in that computer. On the memory stick make a new folder named “ams2000” in lower case. Locate the software update file for your panel. Then download the file into the new folder on the memory stick. Then rename the downloaded file “ams2000.hex” all lower case.



Make sure the panel is turned OFF.
On your panel then locate the USB “A” port…and plug the USB stick into it. Note - the position of the USB “A” on the back of your panel may be different from this picture.

Now Power ON the panel and it will go through an automatic boot cycle on the **Depth Display**. Very quickly it will recognize the presence of the memory stick and will begin a 10-0 countdown on the **Line Tension** display. Note – these 2 displays may be in different positions on your panel.

When it hits zero, the panel will automatically erase the current software from memory.. It will also automatically upload the necessary files from the memory stick to the panel. This may take up to 5 minutes.

When the update process is complete it will briefly show a **PASS** notification. This means that the update process is complete and was successful.

Now power the display panel **OFF**.

Remove the memory stick.

Now power the display panel back **ON** and the update will be complete.

Periodically check the BenchMark website for software updates.
Use this same software update process for all 40, 50 and 60 series 3A panels.

4.3.7 SOFTWARE UPDATES - USING THE RS232 SERIAL PORT - REPROGRAMMING CURRENT CHIP - 4A panel

PREREQUISITES:

1.The real-time data acquisition board must have a socket for the MicroController and a CPU piggy-back PCB installed in that socket with a DS98C450 MicroController installed.

PROCEDURE:

1. Transfer the new revision HEX file to a PC with a serial port or a USB to serial adapter.

2. Turn power on to the Hoistman's panel.

3. Connect your PC to the serial port at the rear of the panel.

4. Open a Hyperterminal session. Use the following settings:

Serial Port: COM1
Baud Rate: 57600
Data Bits: 8
Parity: None
Stop Bits: 1
Flow Control: None

5. Set the switches on the CPU PCB to PROGRAM mode as follows:

1 - AWAY FROM CPU
2 - AWAY FROM CPU
3 - TOWARD CPU

6. Open the Hyperterminal connection and then press the keyboard ENTER key. The MicroController ROM Loader will respond with a banner and then a '>' prompt.

7. Type an uppercase 'K' and the ENTER key and the ROM Loader will Klean-erase the Flash.

8. Type an uppercase 'L' and the ENTER key and the ROM Loader will wait to Load a HEX file.

9. Pull down the Hyperterminal TRANSFER menu and choose: Send Text

BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton,Texas 77476
Phone: 281.346.4300
Fax: 281.346.4301
benchmarkwireline.com

File. The file browser will open, so ensure that the file filter is set to: Files of type - All files (*.*) and then go to the C:\ root directory and choose the new revision HEX file to transfer.

10. The ROM Loader will begin programming the Flash and will report a GOOD status for the duration of the programming procedure as follows:

GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGG

11. After the ROM Loader is finished programming the Flash set the switches on the CPU piggy-back PCB as follows:

1 - TOWARD CPU
2 - TOWARD CPU
3 - AWAY FROM CPU

12. To operate from an EPROM instead of the Micro-Controllers internal memory, set the switches on the CPU piggy-back PCB as follows:

1 - TOWARD CPU
2 - TOWARD CPU
3 - TOWARD CPU

4.3.8 SOFTWARE UPDATES – INSTALLING PRE-PROGRAMMED REPLACEMENT CHIP - 4A panel

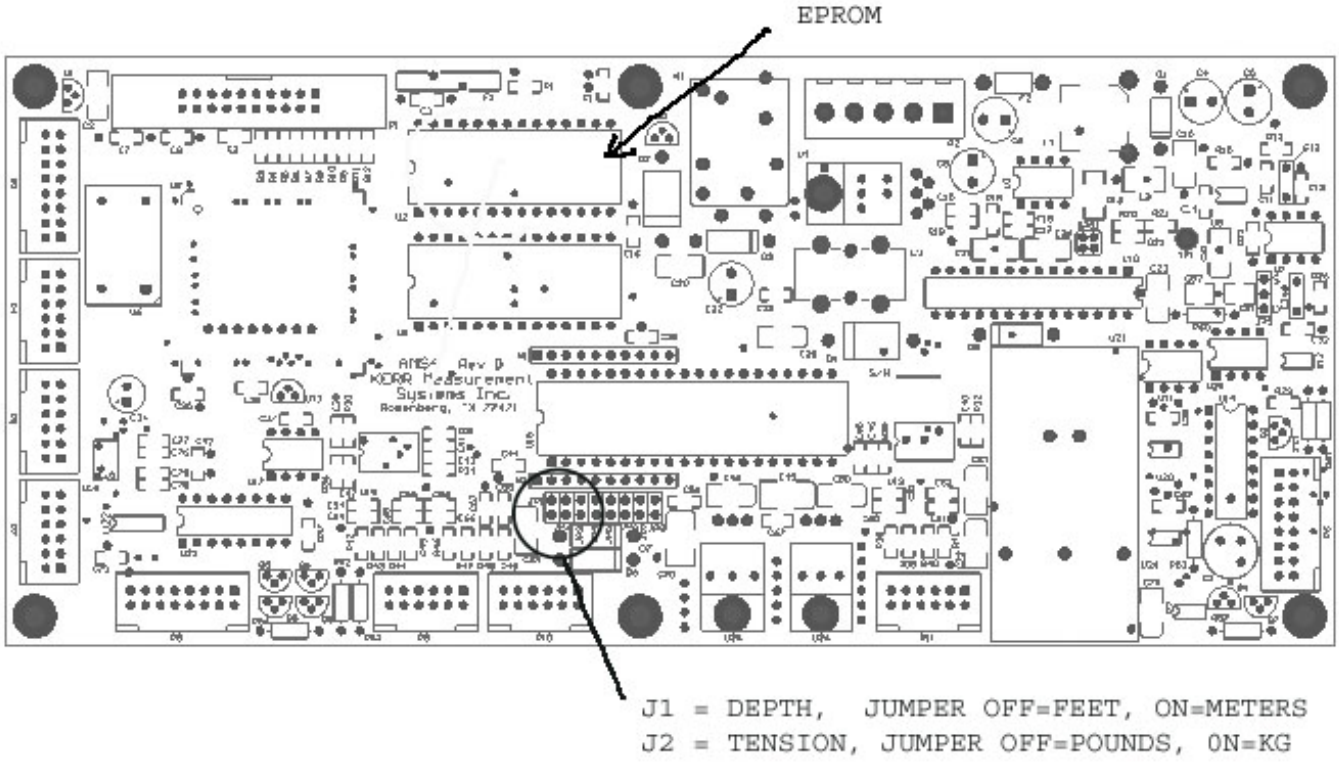
For older panels without CPU piggyback PCB w/3 switches, the software that controls this panel is stored in an EPROM Integrated Circuit (see drawing below). To upgrade the software to a new version, simply remove the eprom I.C. and install a new eprom I.C. (be careful not to bend the legs during installation).

After new software is installed, make sure and "reboot" the panel (refer to step 6.7.3).

NOTE: For newer panels with the cpu piggyback PCB with 3 switches,(refer to section 6.8 and 7.2.22 programming procedures).

4.3.9 CHANGING ADDITIONAL SETTINGS WITH PROCESSOR BOARD - 4A panel

In addition to updating software, for older software that does not have menu selections for TENSION, DEPTH, HEAD TYPE AND LOAD PIN TYPE, you can also change these values by changing jumpers on the board.



Jumpers are used to select default depth and tension units as well as Head Type and Load Pin type.. These units can also be set with the menu commands (see section 3) but when the panel is rebooted, it will be reset to the Jumper settings.

DEPTH - Jumper J1 determines the depth units.

A shorting bar across J1 will set the units to meters
No shorting bar will set the units to feet.

TENSION - Jumper J2 determines the tension units

A shorting bar across J2 will set the units to Kilo Grams
No shorting bar will set the units to pounds.

HEAD TYPE - Jumper J3 determines the type of measuring head.

A shorting bar across J3 will configure the panel for an AM3K
No shorting bar will configure the panel for an AM5K.

LOAD PIN TYPE - Jumper J4 determines the type of load pin.

A shorting bar across J4 will configure the panel for a non amplified non linearized load pin.
No shorting bar will configure the panel for an amplified and linearized load pin.

5.0 PARTS LIST

5.1 AMS4A062 PANEL PARTS LIST

PART	DESCRIPTION	QTY	REF
AMS4A062	PANEL HOIST OPERATOR DISPLAY SLICKLINE CONFIG 0-1.5V TEN		
AMS4P134E	PC BOARD AMS40 REV E W/2xRS232 RS485 4WIRE, MMD, DIFF WEIGHT	1	
AMS7P080	METER ANALOG DIFF TENSION	1	
AMS7P081	METER TENSION POUND DUAL SCALE	1	
AMS4P128	DISPLAY LED RED 0.5" 14 SEGMNT	3	
ACMU1P06	LED RED DIALIGHT 5V	1	METRIC
AMS4P211	SONALERT PS-580 MALLORY	1	
AMS4P028	SWITCH DPDT TOGGLE LOCKING	1	POWER
AMS4P020	SWITCH SPDT TOGGLE LOCKING	1	METER HI/LO
AMS4P018	SWITCH SPDT PUSH MOM MPA-106F	0	REF
AMS4P044	SWITCH DPDT TOGGLE MOM OFF MOM	1	+ / -
AMS4P021	SWITCH CAP ALCO C-22 BLACK	0	SHUNT, ZERO , MENU
ACMU3P01	CONN MS3102E14S-9P RECEPT	1	J1 - POWER IN
ACMU3P02	CONN MS3102E14S-9S RECEPT	1	J3 -OVER TENSION OUT
AMS4P164	CONN DB9S CRIMP AMP USED WITH	1	J6 - RS232
ACMU2P06	CONN MS3102E18-1P 10 PIN	1	J2 - ENCODER IN
F244889000	HANDLE OVAL 1-1/2 X 3 AL	2	
AMS4M063	PANEL FRONT SLICKLINE OP PNL	1	
AMS4M168	PANEL REAR SLICKLINE W SIG OUT	1	
AMS4M062	PANEL TOP WINCH OP SLICKLINE	1	
AMS4M061	CHASSIS WINCH OP PNL SLICKLINE	1	
AMS4A266	ASSY MEM CARD FCB COMP FLASH	1	
AMS4M069	PLATE CVR MEM CARD SLOT SLICK	0	REF OPTION
C276P152	LED GREEN DIALIGHT 12V	1	ENGLISH

5.1 AMS4A062 PANEL PARTS LIST continued

PART	DESCRIPTION	QTY	REF
AMS4P041	SWITCH SPST PB NO MOM LIGHTED C&K 1.15116.021	1	APPROACHING SURFACE
AMS4P042	LENS RED C&K SWITCH	1	
AMS4P043	LED RED FOR C&K PUSHBUTTON SW	1	1.90691.026
AMS4A102	PCB ASSY FUSE BOARD	1	
C276P402	DIODE ZENER 6.8V 5W 1N5342B	0	
AMS4P170	CONN KPSE02E12-10P RECEPTACLE	1	J5 - ENCODER OUT
ALS1P029	CONN AMP BNC FRONT MOUNT	1	J8 - TENSION OUT
AMS4A204	PCB ASSY IN CIRCUIT PROGRAMMG	1	
AMS4A889-C	PCB ASSY LD CELL 10V REGULATOR	1	
AMS5P191	SWITCH SPDT MOM PUSHBUTTON	5	
AMS5P192	SWITCH CAP SCREW ON BLACK	4	
AMS5P193	SWITCH CAP SCREW ON RED	1	D-ZERO
AMS5P225	DUSTCAP PLUG CAPUSB-B	1	USB DUST CAP

5.2 AMS4A063 PANEL PARTS LIST

PART	DESCRIPTION	QTY	REF
AMS4A063	PANEL HOIST OPERATOR DISPLAY SL - LOW VOLTAGE LOAD CELL		
SW-623408	SOFTWARE FOR THE AMS4A062/6364 SLICKLINE WINCH PANEL	1	
AMS4P134E	PC BOARD AMS40 REV E W/2xRS232 RS485 4WIRE, MMD, DIFF WEIGHT	1	
AMS7P080	METER ANALOG DIFF TENSION	1	
AMS7P081	METER TENSION POUND DUAL SCALE	1	
AMS4P128	DISPLAY LED RED 0.5" 14 SEGMNT	3	
ACMU1P06	LED RED DIALIGHT 5V	1	METRIC
AMS4P211	SONALERT PS-580 MALLORY	1	
AMS4P028	SWITCH DPDT TOGGLE LOCKING	1	POWER
AMS4P020	SWITCH SPDT TOGGLE LOCKING	1	METER HI/LO
AMS4P044	SWITCH DPDT TOGGLE MOM OFF MOM	1	+ / -
AMS7P021	CONN 102398-4 AMP 12 POS PCB	11	102398-4
AMS7P013	CONN MS3102E18-9P LOAD CELL	1	J4 - LOAD PIN INPUT
AMS4P264	CONN KPSE02E10-6S RECEPTACLE	1	J7 - REMOTE DISPLAY
AMS7P068	SCREW JACK D-CONNECTOR KEYSTON	2	
ACMU3P01	CONN MS3102E14S-9P RECEPT	1	J1 - POWER IN
ACMU3P02	CONN MS3102E14S-9S RECEPT	1	J3 -OVER TENSION OUT
AMS4P164	CONN DB9S CRIMP AMP USED WITH	1	J6 - RS232
ACMU2P06	CONN MS3102E18-1P 10 PIN	1	J2 - ENCODER IN
F244889000	HANDLE OVAL 1-1/2 X 3 AL	2	
AMS4M063	PANEL FRONT SLICKLINE OP PNL	1	
AMS4M168	PANEL REAR SLICKLINE W SIG OUT	1	
AMS4M062	PANEL TOP WINCH OP SLICKLINE	1	
AMS4M061	CHASSIS WINCH OP PNL SLICKLINE	1	
AMS4A266	ASSY MEM CARD FCB COMP FLASH	1	
C276P152	LED GREEN DIALIGHT 12V	1	ENGLISH

5.2 AMS4A063 PANEL PARTS LIST continued

PART	DESCRIPTION	QTY	REF
AMS4P041	SWITCH SPST PB NO MOM LIGHTED	1	APPROACHING SURFACE
AMS4P042	LENS RED C&K SWITCH	1	
AMS4P043	LED RED FOR C&K PUSHBUTTON SW	1	1.90691.026
AMS4A102	PCB ASSY FUSE BOARD	1	
C276P402	DIODE ZENER 6.8V 5W 1N5342B	1	
AMS4P170	CONN KPSE02E12-10P RECEPTACLE	1	J5 - ENCODER OUT
ALS1P029	CONN AMP BNC FRONT MOUNT	1	J8 - TENSION OUT
AMS4A204	PCB ASSY IN CIRCUIT PROGRAMMG	1	
AMS4A927B	PCB ASSY DIFF TNSN METER DRIVE	1	PLUG IN P6 ON 40 PCB
AMS4A889-C	PCB ASSY LD CELL 10V REGULATOR	1	
AMS5P191	SWITCH SPDT MOM PUSHBUTTON	4	
AMS5P192	SWITCH CAP SCREW ON BLACK	4	
AMS5P193	SWITCH CAP SCREW ON RED	1	D-ZERO
AMS5P194	SWITCH DPDT MOM PUSHBUTTON	1	T-CAL (SW5)

5.3 AMS4A064 PANEL PARTS LIST

PART	DESCRIPTION	QTY	REF
AMS4A064	PANEL HOIST OPERATOR DISPLAY SLICKLINE CONFIGURATION 4-20MA		
AMS4P134E	PC BOARD AMS40 REV E W/2xRS232 RS485 4WIRE, MMD, DIFF WEIGHT	1	
AMS7P080	METER ANALOG DIFF TENSION	1	
AMS7P081	METER TENSION POUND DUAL SCALE	1	
AMS4P128	DISPLAY LED RED 0.5" 14 SEGMNT	3	
ACMU1P06	LED RED DIALIGHT 5V	1	METRIC
AMS4P211	SONALERT PS-580 MALLORY	1	
AMS4P028	SWITCH DPDT TOGGLE LOCKING	1	POWER
AMS4P020	SWITCH SPDT TOGGLE LOCKING	1	METER HI/LO
AMS4P044	SWITCH DPDT TOGGLE MOM OFF MOM	1	+ / -
AMS7P013	CONN MS3102E18-9P LOAD CELL	1	J4 - LOAD PIN
AMS4P264	CONN KPSE02E10-6S RECEPTACLE	1	REMOTE DISPLAY
ACMU3P01	CONN MS3102E14S-9P RECEPT	1	J1 - POWER IN
ACMU3P02	CONN MS3102E14S-9S RECEPT	1	J8 -OVER TENSION OUT
AMS4P164	CONN DB9S CRIMP AMP USED WITH	1	J6 - RS232
ACMU2P06	CONN MS3102E18-1P 10 PIN	1	J2 - ENCODER
F244889000	HANDLE OVAL 1-1/2 X 3 AL	2	
AMS4M063	PANEL FRONT SLICKLINE OP PNL	1	
AMS4M068	PANEL REAR SLICKLINE WINCH OP	1	
AMS4M062	PANEL TOP WINCH OP SLICKLINE	1	
AMS4M061	CHASSIS WINCH OP PNL SLICKLINE	1	
AMS4A266	ASSY MEM CARD FCB COMP FLASH	1	
C276P152	LED GREEN DIALIGHT 12V	1	ENGLISH

5.3 AMS4A064 PANEL PARTS LIST continued

PART	DESCRIPTION	QTY	REF
AMS4P041	SWITCH SPST PB NO MOM LIGHTED	1	APPROACHING SURFACE
AMS4P042	LENS RED C&K SWITCH	1	
AMS4P043	LED RED FOR C&K PUSHBUTTON SW	1	1.90691.026
AMS4A102	PCB ASSY FUSE BOARD	1	
C276P402	DIODE ZENER 6.8V 5W 1N5342B	1	
AMS4A204	PCB ASSY IN CIRCUIT PROGRAMMG	1	
AMS7P068	SCREW JACK D-CONNECTOR KEYSTON	2	
AMS4A927B	PCB ASSY DIFF TNSN METER DRIVE	1	PLUG IN P6 ON 40 PCB
AMS5P191	SWITCH SPDT MOM PUSHBUTTON	5	
AMS5P192	SWITCH CAP SCREW ON BLACK	4	
AMS5P193	SWITCH CAP SCREW ON RED	1	D-ZERO
AMS5P225	DUSTCAP PLUG CAPUSB-B	1	USB DUST CAP
AMS4A889-C	PCB ASSY LD CELL 10V REGULATOR	1	

5.4 AMS4A067 PANEL PARTS LIST

PART	DESCRIPTION	QTY	REF
AMS3A067	PANEL HOIST OPERATOR DISPLAY AM2K PCB		
SW-6X2K003	SOFTWARE 6X PANEL AM2K PCB	1	
AM2KP134	PC BOARD AMS2K ACQUISITION BOARD	1	
AMS7P080	METER ANALOG DIFF TENSION	1	
AMS7P081	METER TENSION POUND DUAL SCALE	1	
AMS4P128	DISPLAY LED RED 0.5" 14 SEGMNT	3	
ACMU1P06	LED RED DIALIGHT 5V	1	
AMS4P211	SONALERT PS-580 MALLORY	1	
AMS4P028	SWITCH DPDT TOGGLE LOCKING	1	
AMS4P020	SWITCH SPDT TOGGLE LOCKING	1	
AMS3A067-900	HARNESS WIRE AMS3A067 PANEL	1	
AMS4P044	SWITCH DPDT TOGGLE MOM OFF MOM	1	
AMS4P139	CABLE ASSY USB TYPE A TO B	1	
AMS4P738	DUSTCAP PLUG CAPUSB-A	1	
AMS4P170	CONN KPSE02E12-10P RECEPTACLE	1	
AMS4P264	CONN KPSE02E10-6S RECEPTACLE	1	
AMS7P068	SCREW JACK D-CONNECTOR KEYSTONE	4	
AMS4P169	CONN KPSE02E12-3P RECEPT	1	
AMS4P179	CONN KPSE02E12-3S RECEPTACLE	1	
AMS4P164	CONN DB9S CRIMP AMP USED WITH	1	
AMS4P172	CONN KPSE02E14-12S RECEPTACLE	1	
AMS4P198	SPACER UNTHREADED RND NYLON #4	12	
AMS4M076	WINDOW LED RECESSED SERIAL	3	
F244889000	HANDLE OVAL 1-1/2 X 3 AL	2	
AMS4M063	PANEL FRONT SLICKLINE OP PNL	1	
AMS4M172	PANEL REAR SLICKLINE W SIG OUT	1	
AMS4M062	PANEL TOP WINCH OP SLICKLINE	1	

5.4 AMS4A067 PANEL PARTS LIST continued

PART	DESCRIPTION	QTY	REF
AMS4M061	CHASSIS WINCH OP PNL SLICKLINE	1	
AMS4M369	PLATE USB CONN SLICKLINE	1	
C276P152	LED GREEN DIALIGHT 12V	1	
40195	SWITCH SPST PB NO MOM LIGHTED	1	
AMS4P166	CONN DB25S CRIMP AMP USED WITH	1	
FSU1P026	NUTPLATE SHELL 10 4-40	1	
FSU1P027	NUTPLATE SHELL 12 4-40	3	
FSU1P028	NUTPLATE SHELL 14 4-40	1	
AMS5P191	SWITCH SPDT MOM PUSHBUTTON	4	
AMS5P192	SWITCH CAP SCREW ON BLACK	4	
AMS5P193	SWITCH CAP SCREW ON RED	1	
AMS5P194	SWITCH DPDT MOM PUSHBUTTON	1	

5.5 RECOMMENDED SPARES LIST – 60 SERIES PANELS

All parts listed are Critical Spares and are required to properly maintain this device.

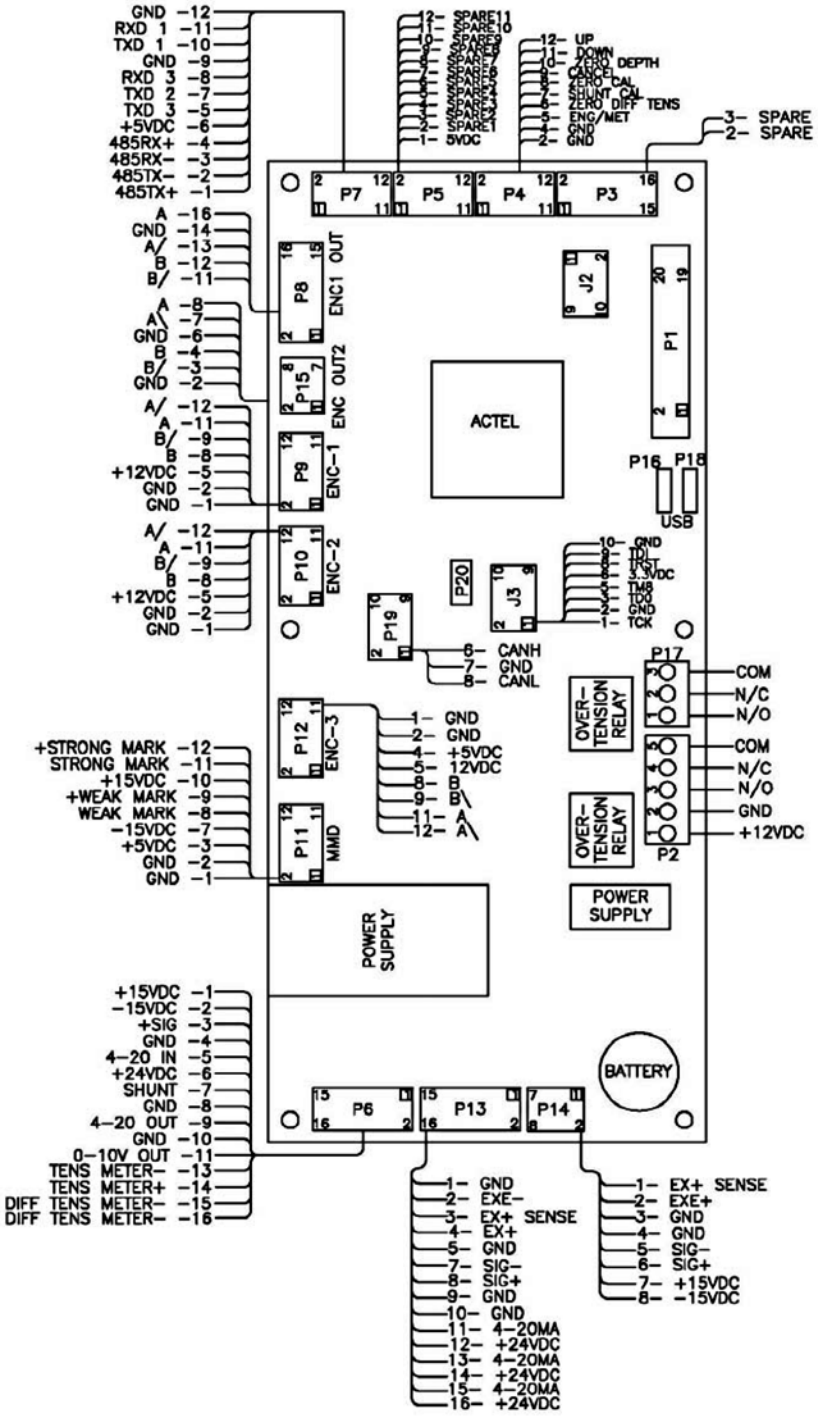
We recommend that all customers stock the quantity indicated in the '**QTY**' column. **IF** you are in a remote location or prefer having immediate availability of all spares, we recommend that you stock at least one of each item.

NOTE – BenchMark may not always have all spares in stock all the time.

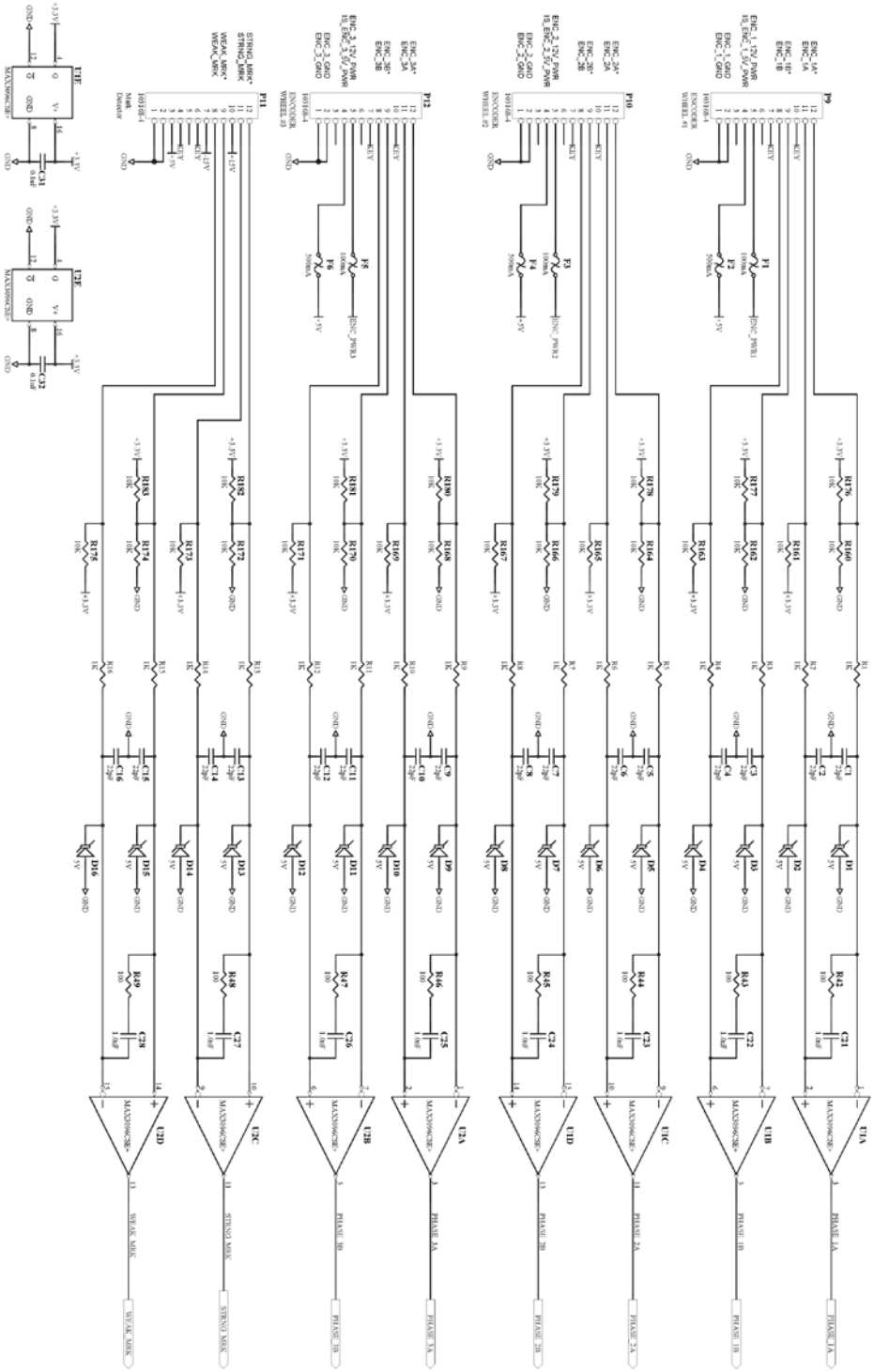
P/N	DESCRIPTION	QTY	REF
RECOMMENDED SPARE PARTS FOR ALL LOCATIONS			
AMS4P020	SWITCH SPDT TOGGLE LOCKING MTL-106D ALCO	1	POWER
AMS5P205	SWITCH SPDT TOGGLE ON-ON	1	INC/DIFF
AMS4P044	SWITCH DPDT TOGGLE MOM OFF MOM PANEL MOUNT C&K 7205SYZQE	1	+ / -
40195	SWITCH SPST PB NO MOM LIGHTED NKK HB15SKW01-5C-CB	1	ALARM RESET
AMS5P191	SWITCH SPDT MOM PUSHBUTTON NKK MB2011SS1W01-RO	5	
AMS5P194	SWITCH DPDT MOM PUSHBUTTON NKK MB2061SS1W01-RO	1	T-CAL
AMS5P192	SWITCH CAP SCREW ON BLACK NKK AT407A	5	
AMS5P193	SWITCH CAP SCREW ON RED NKK AT407C	1	DEPTH ZERO
RECOMMENDED SPARE PARTS FOR REMOTE LOCATIONS			
AM2KP134	PC BOARD AMS2K ACQUISITION BOARD	1	
AMS7P080	METER ANALOG DIFF TENSION	1	
AMS7P081	METER TENSION ROUND DUAL SCALE	1	
AMS4P128	DISPLAY LED RED 0.5" 14 SEGMNT SERIAL 2" x 3.5" 12 PIN HEADER	4	
ACMU1P06	LED RED DIALIGHT 5V	1	METRIC

6.0 CONNECTOR PINOUTS AND PANEL WIRING DIAGRAMS

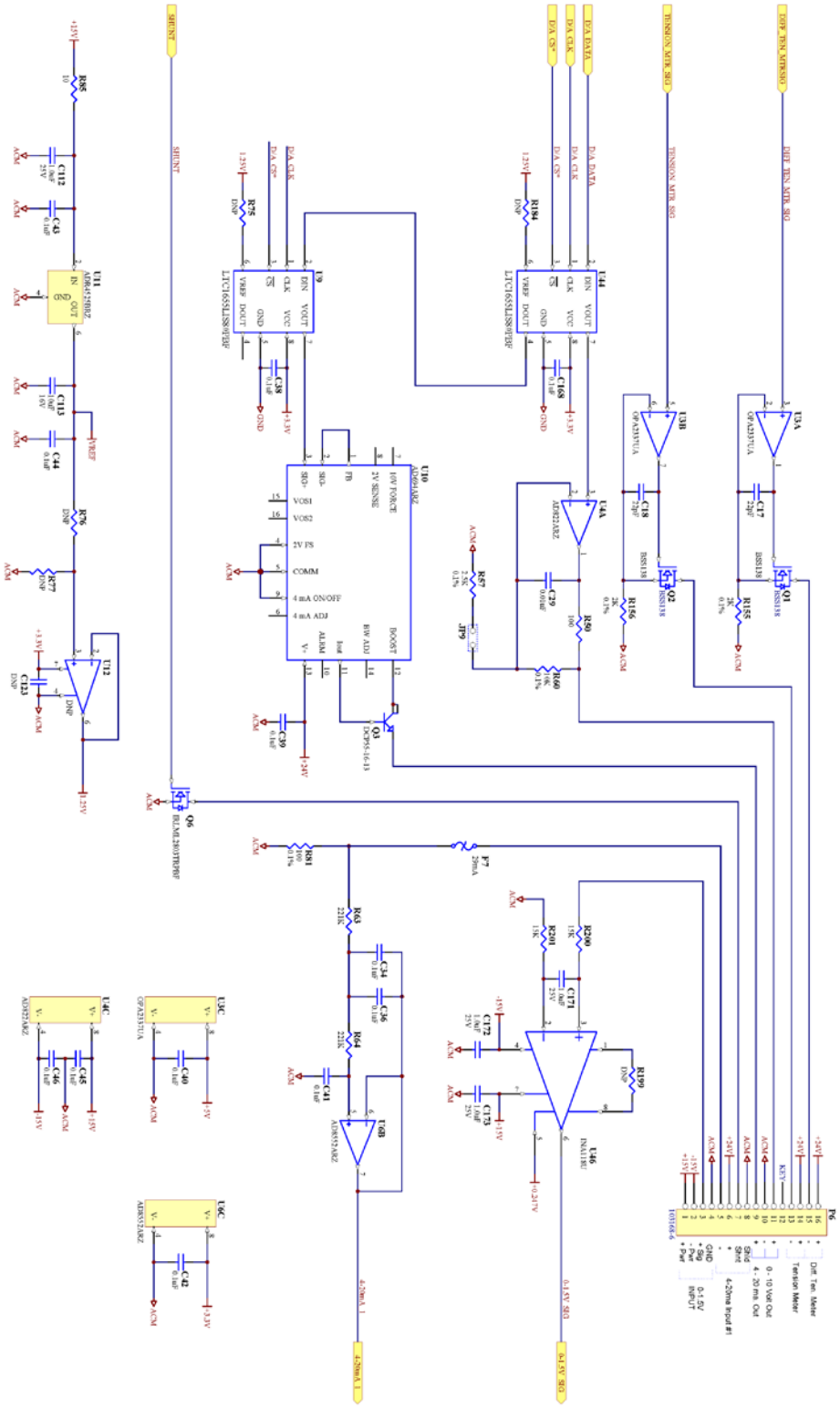
6.1.1 AM2KP134 ACQUISITION BOARD SCHEMATIC – 3A PANEL



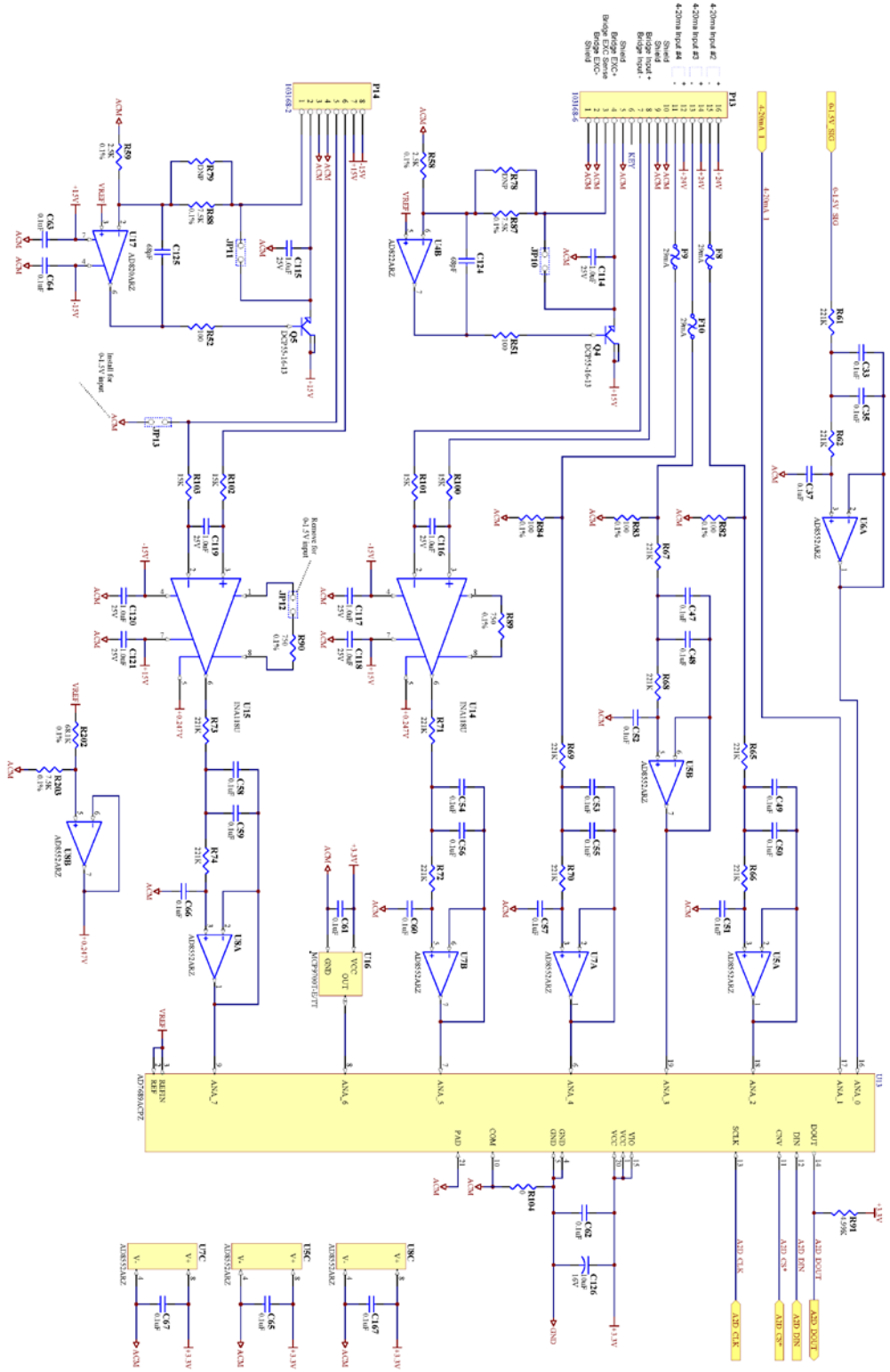
6.1.2 AM2KP134 ACQUISITION BOARD SCHEMATIC – 3A PANEL



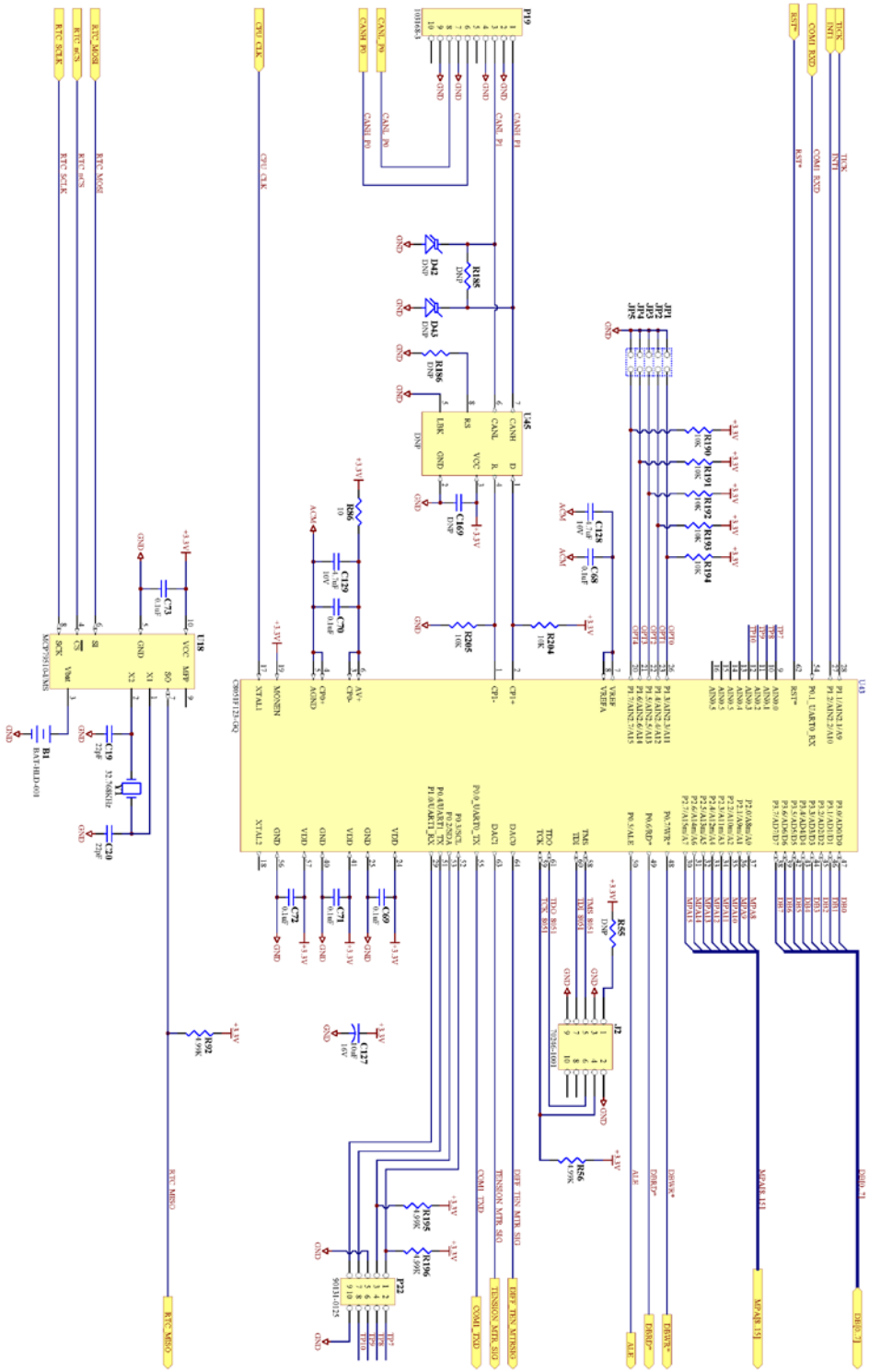
6.1.3 AM2KP134 ACQUISITION BOARD SCHEMATIC – 3A PANEL



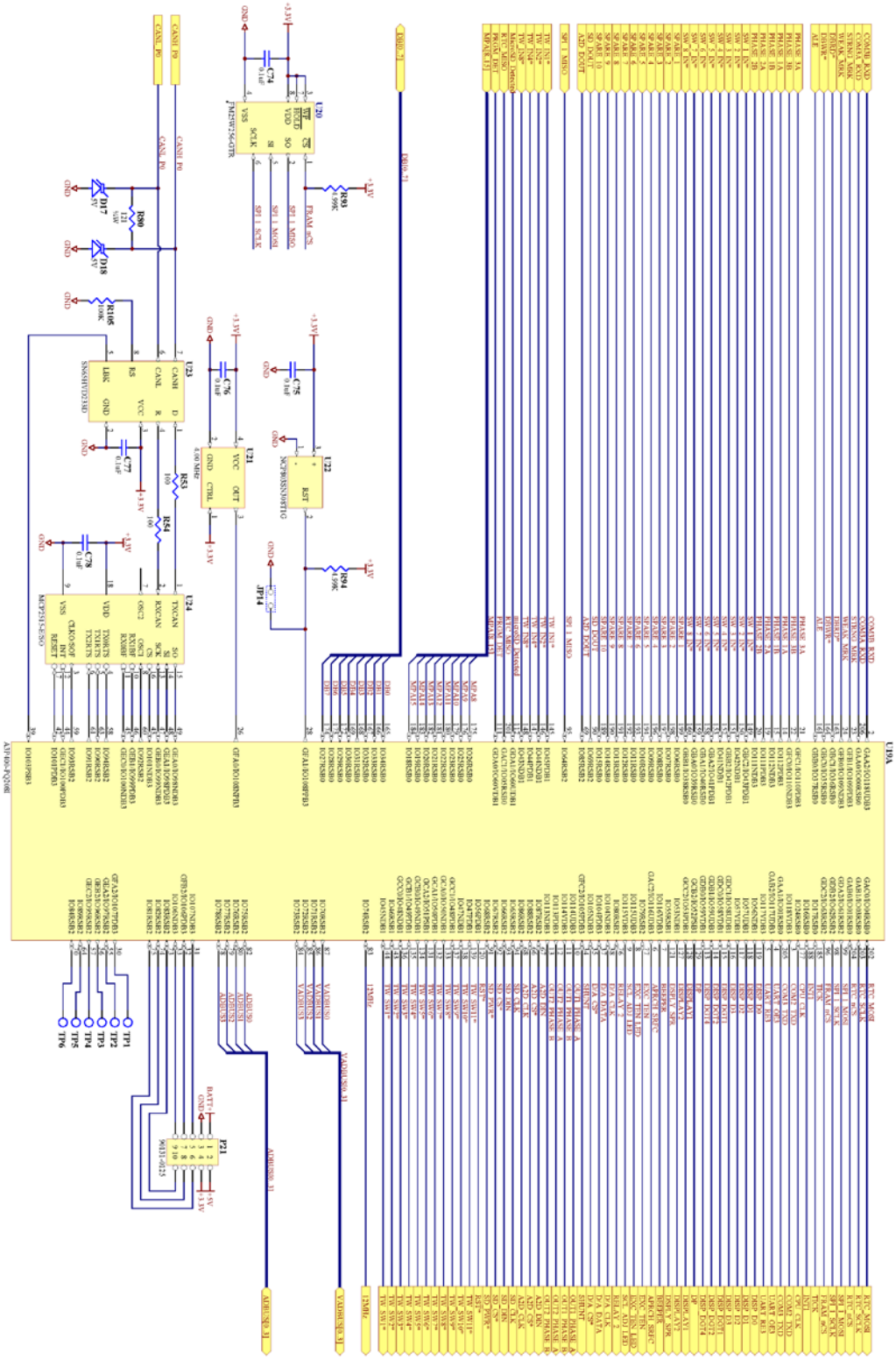
6.1.4 AM2KP134 ACQUISITION BOARD SCHEMATIC – 3A PANEL



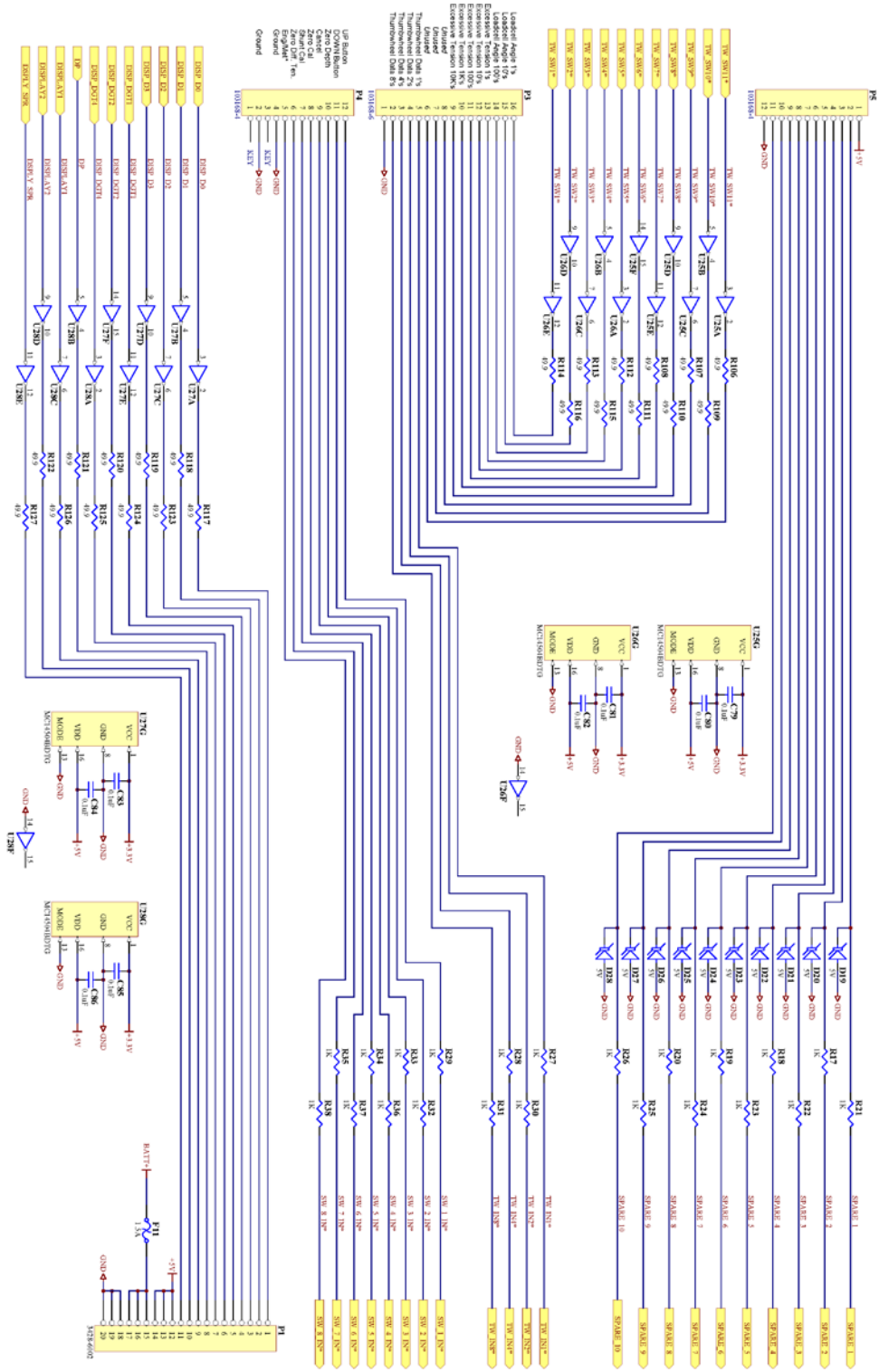
6.1.5 AM2KP134 ACQUISITION BOARD SCHEMATIC – 3A PANEL



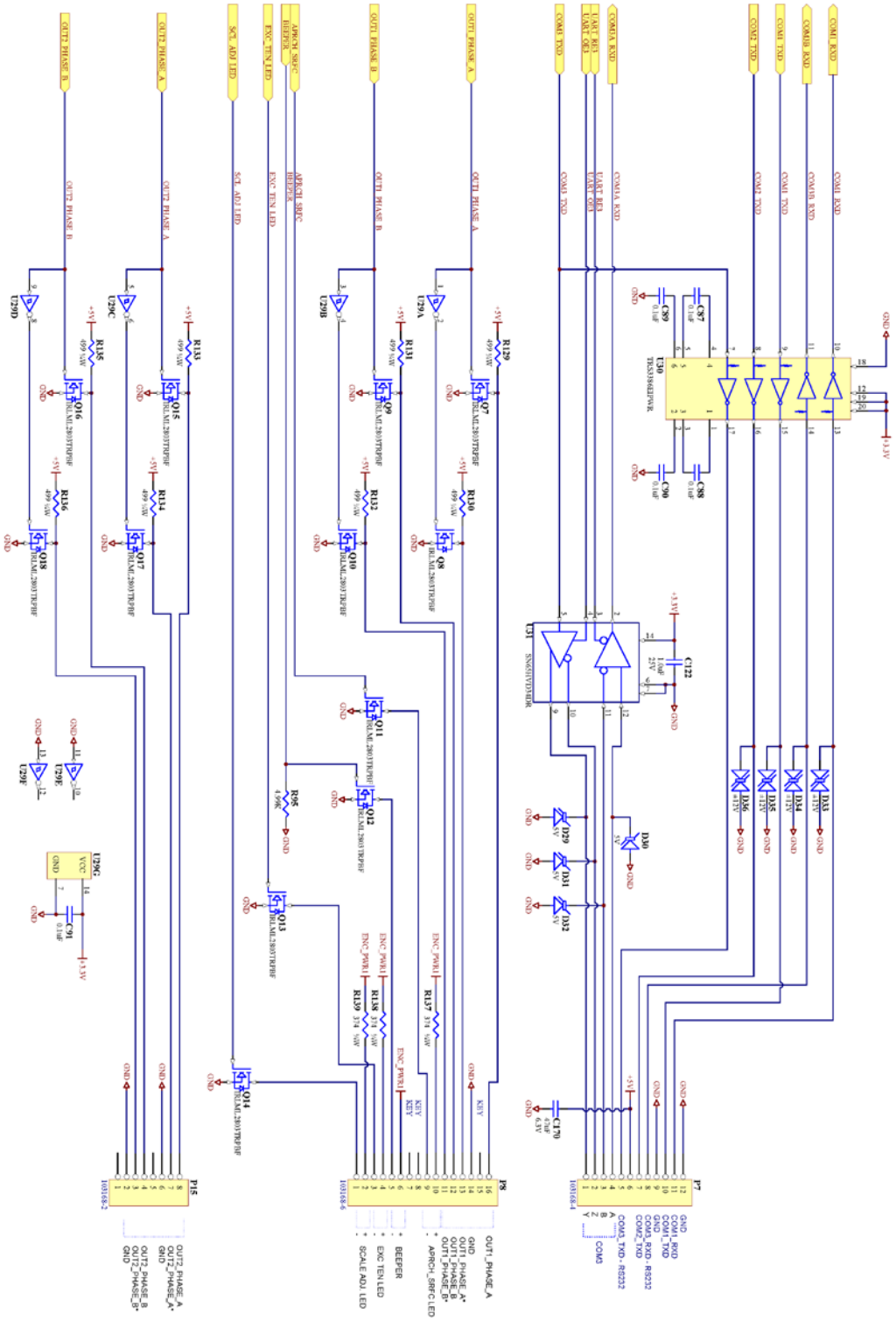
6.1.6 AM2KP134 ACQUISITION BOARD SCHEMATIC – 3A PANEL



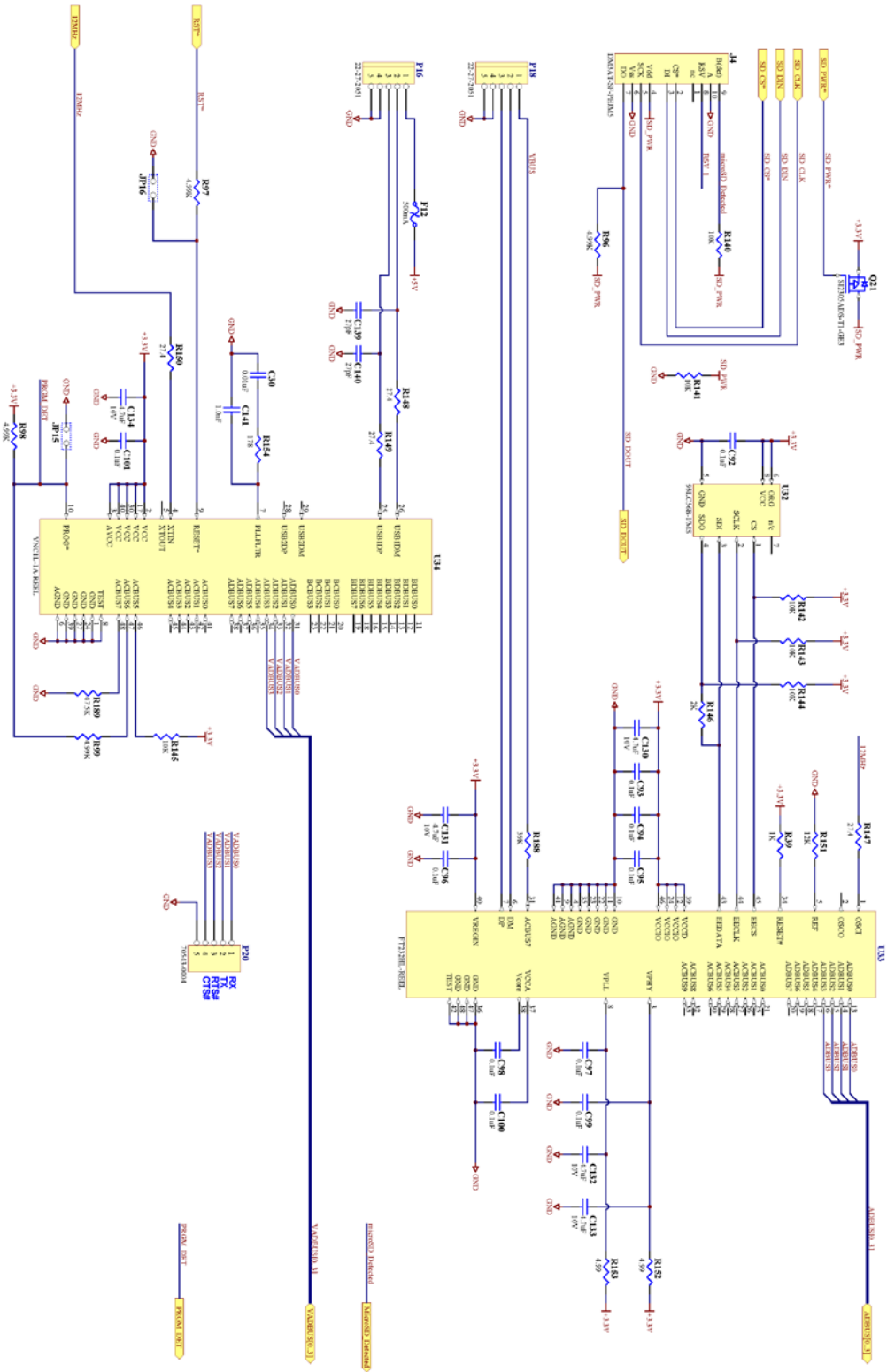
6.1.7 AM2KP134 ACQUISITION BOARD SCHEMATIC – 3A PANEL



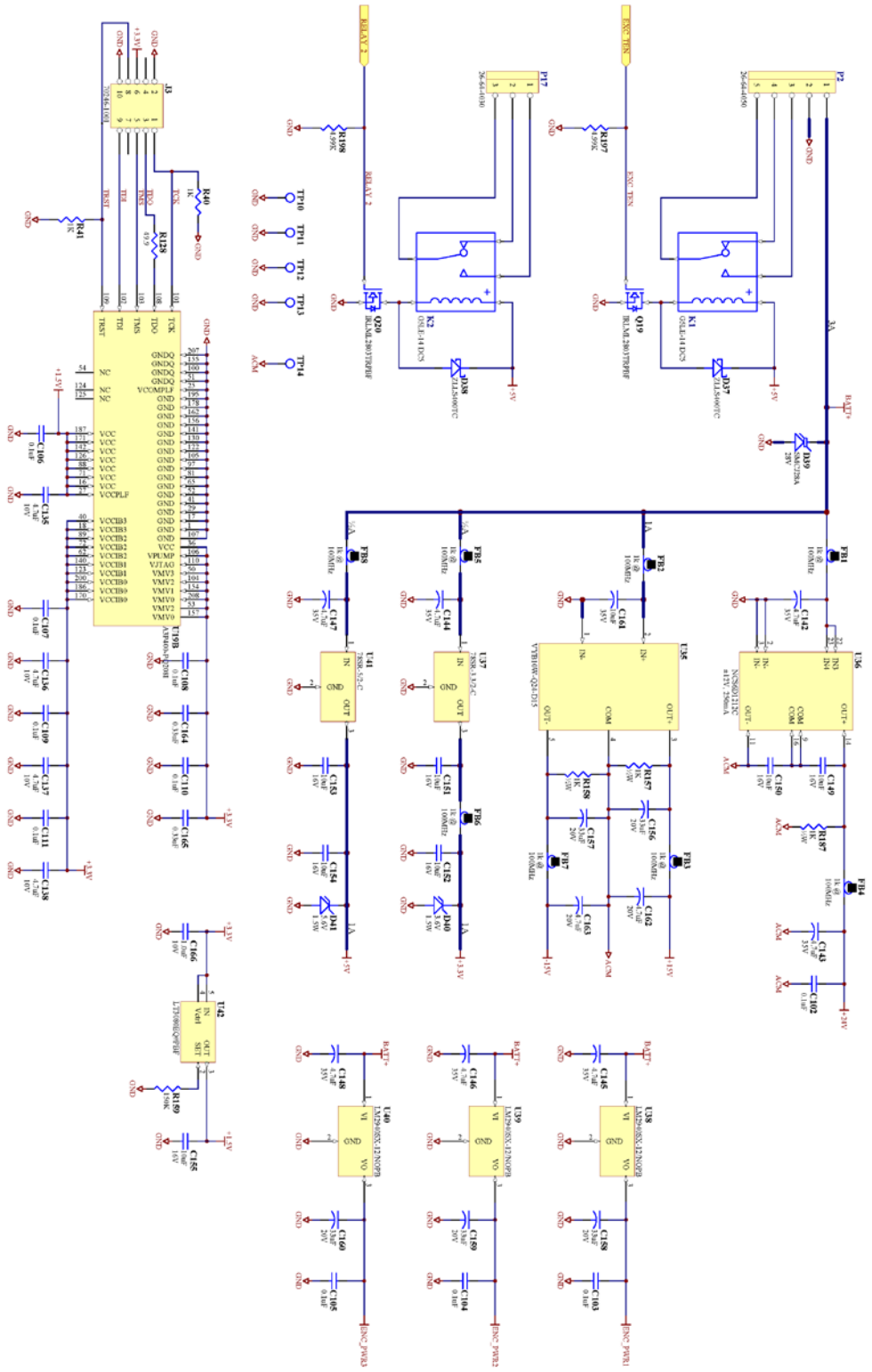
6.1.8 AM2KP134 ACQUISITION BOARD SCHEMATIC – 3A PANEL



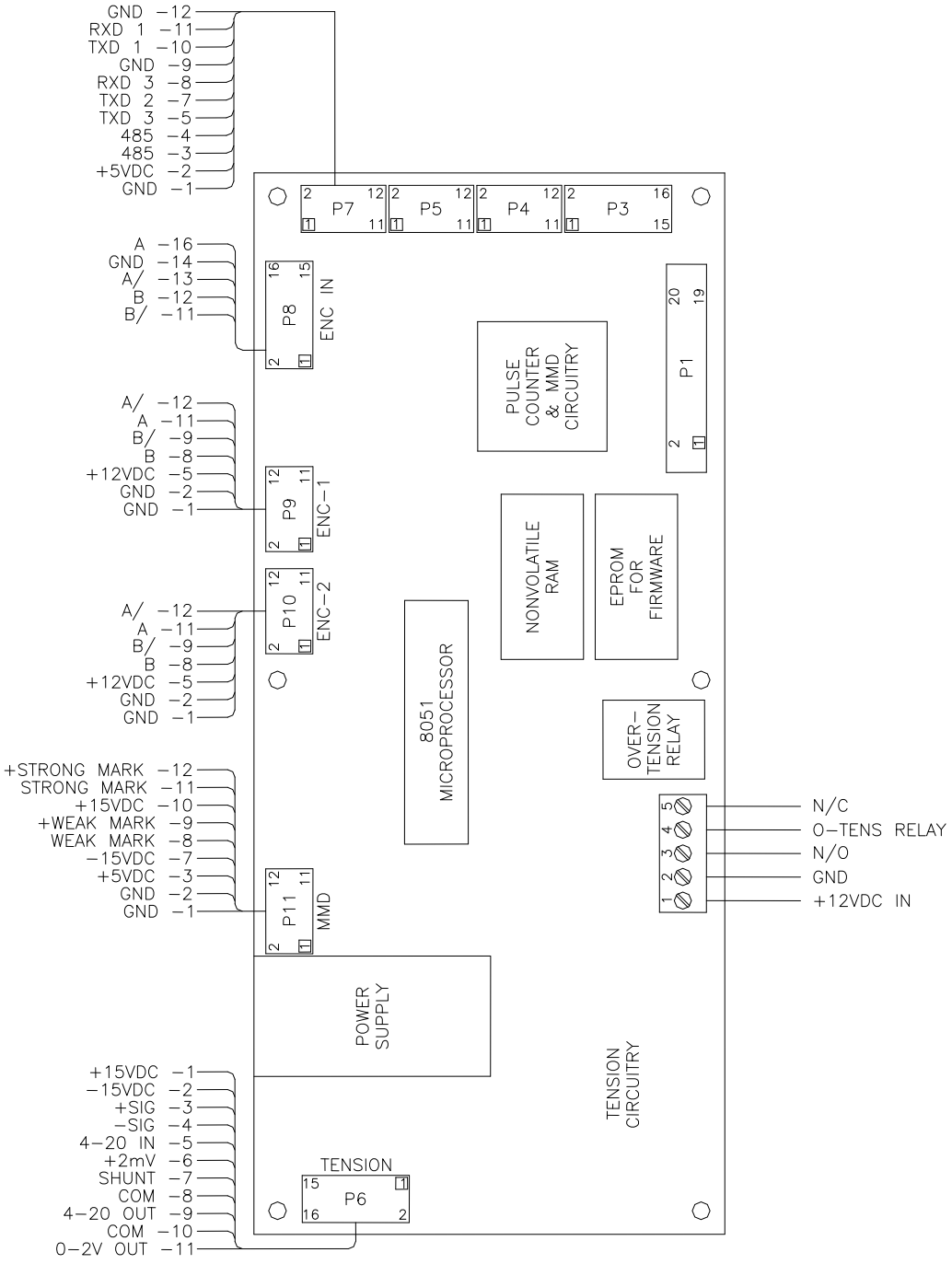
6.1.9 AM2KP134 ACQUISITION BOARD SCHEMATIC – 3A PANEL



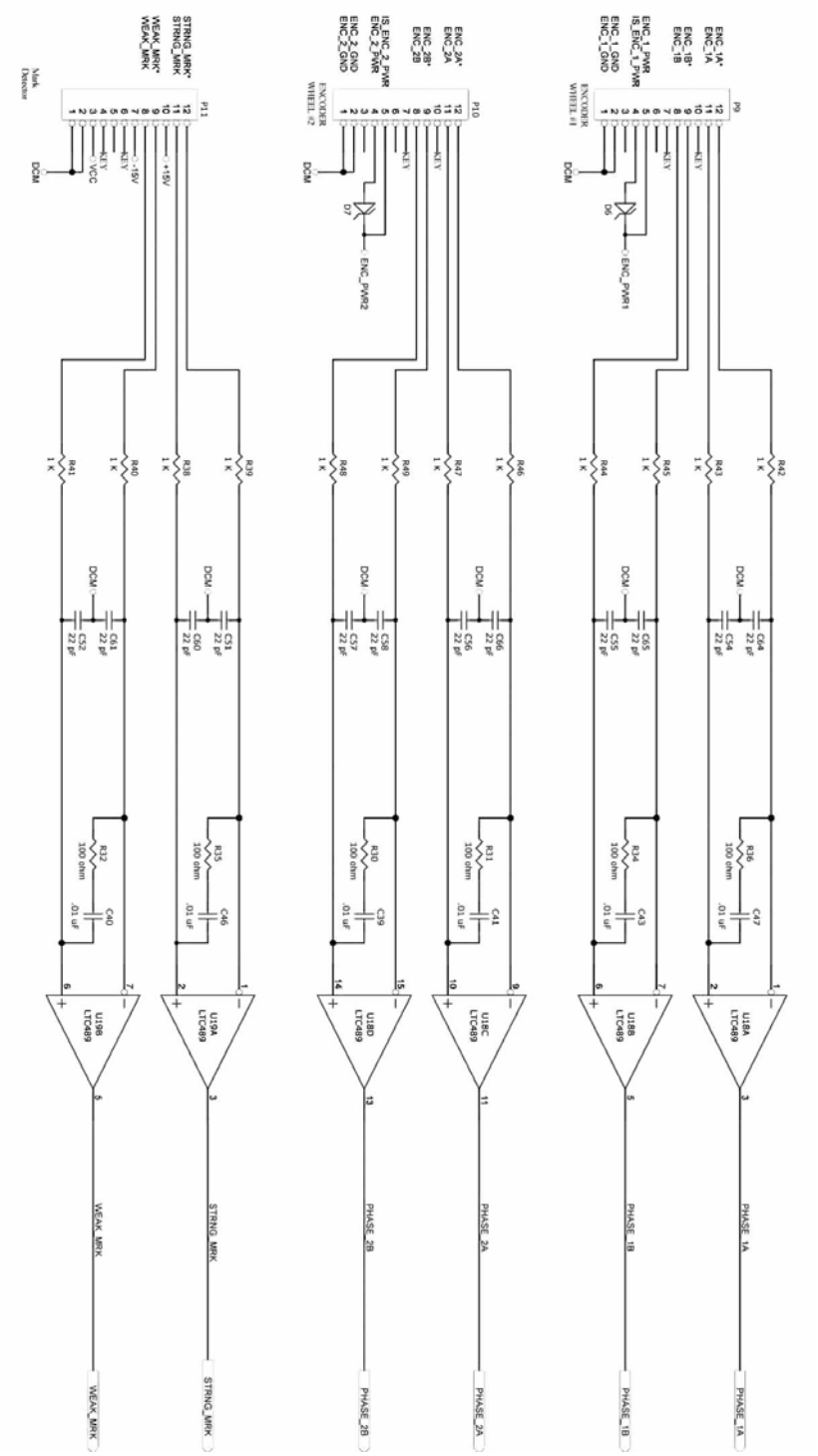
6.1.10 AM2KP134 ACQUISITION BOARD SCHEMATIC – 3A PANEL



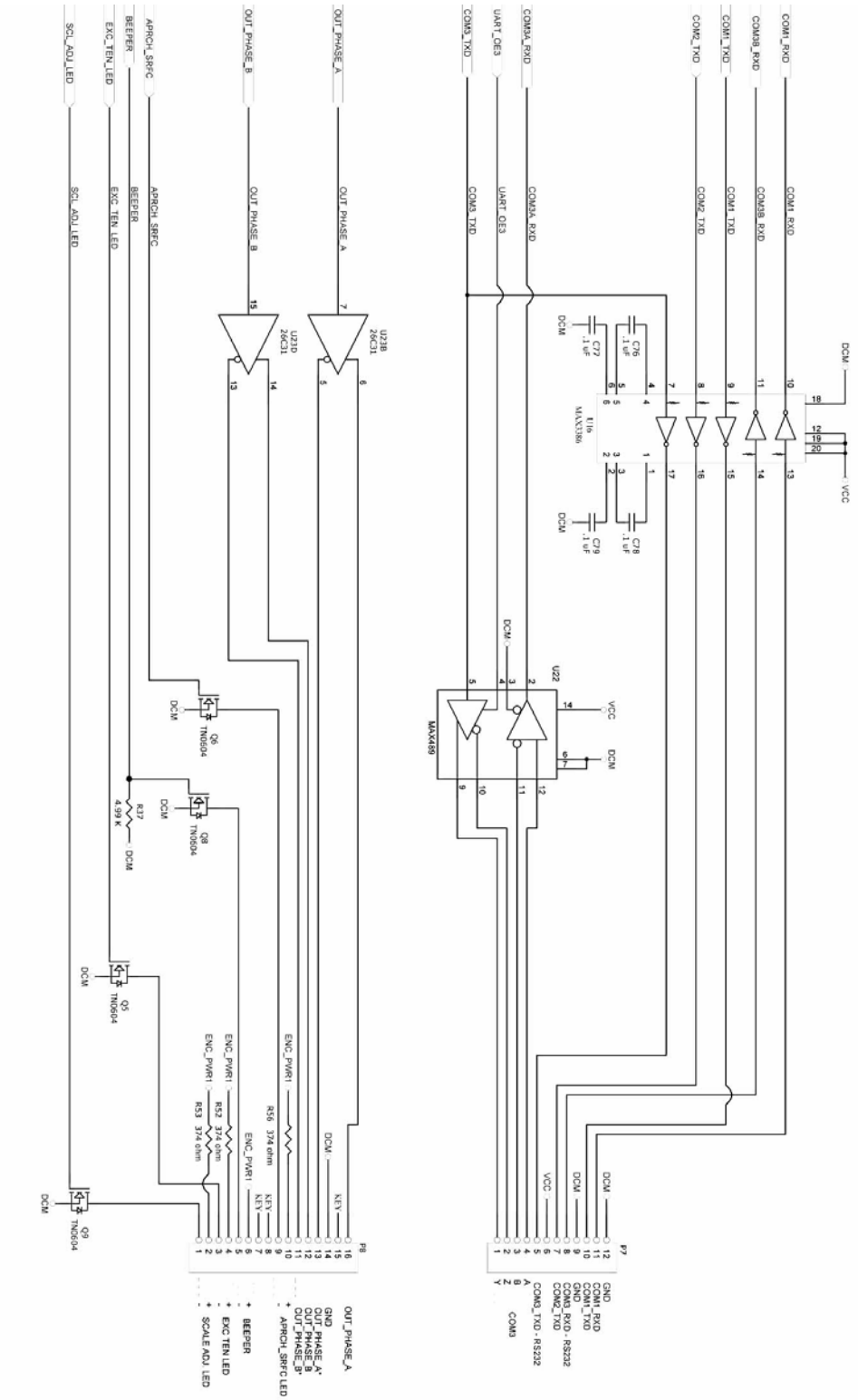
6.2.1 INTERNAL PROCESSOR BOARD PINOUT – 4A PANEL



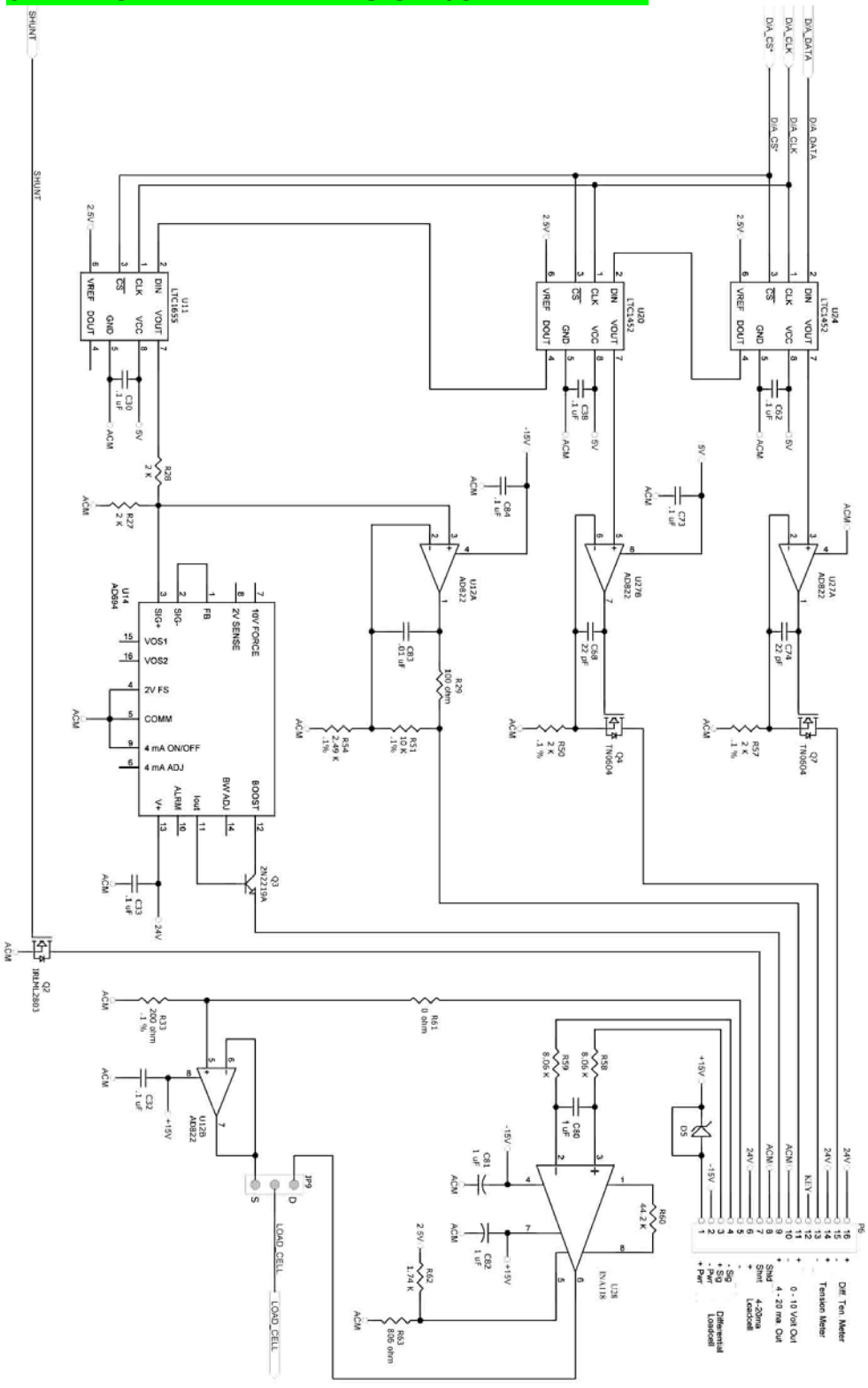
6.2.2 ENCODER AND MMD INPUTS – 4A PANEL



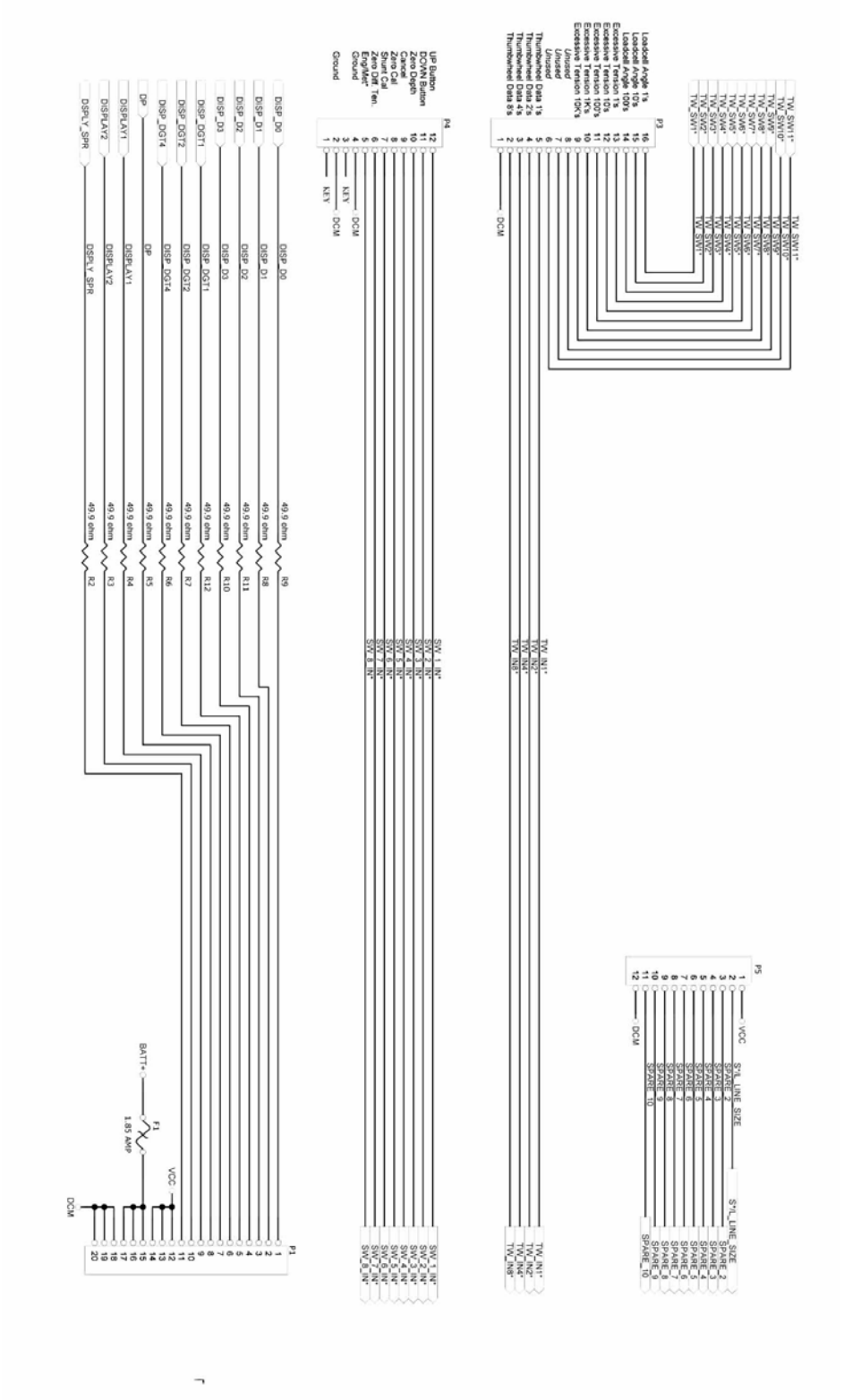
6.2.3 ENCODER OUTPUT AND COM PORT I/O – 4A PANEL



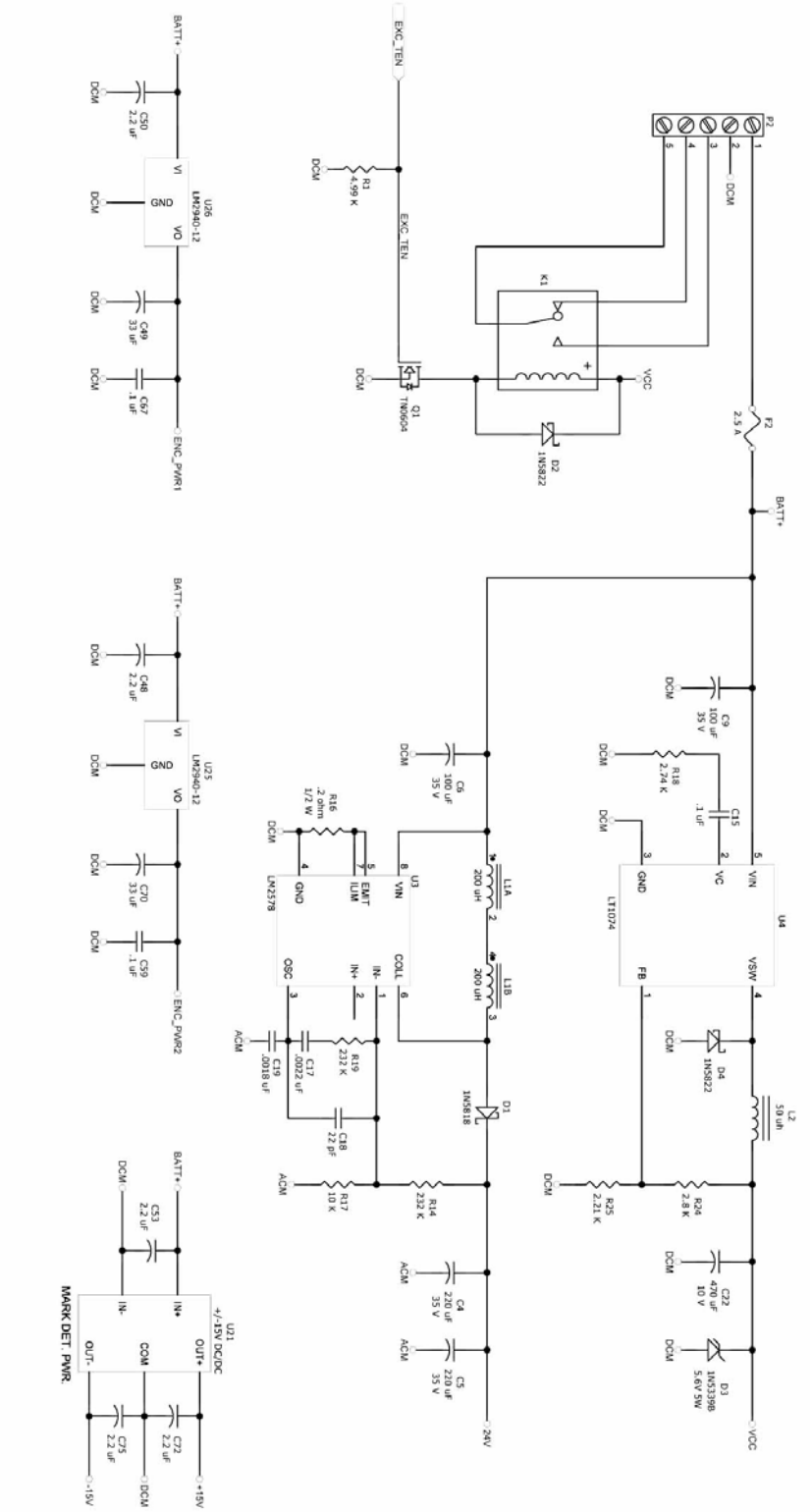
6.2.4 LOAD PIN AND TENSION I/O – 4A PANEL



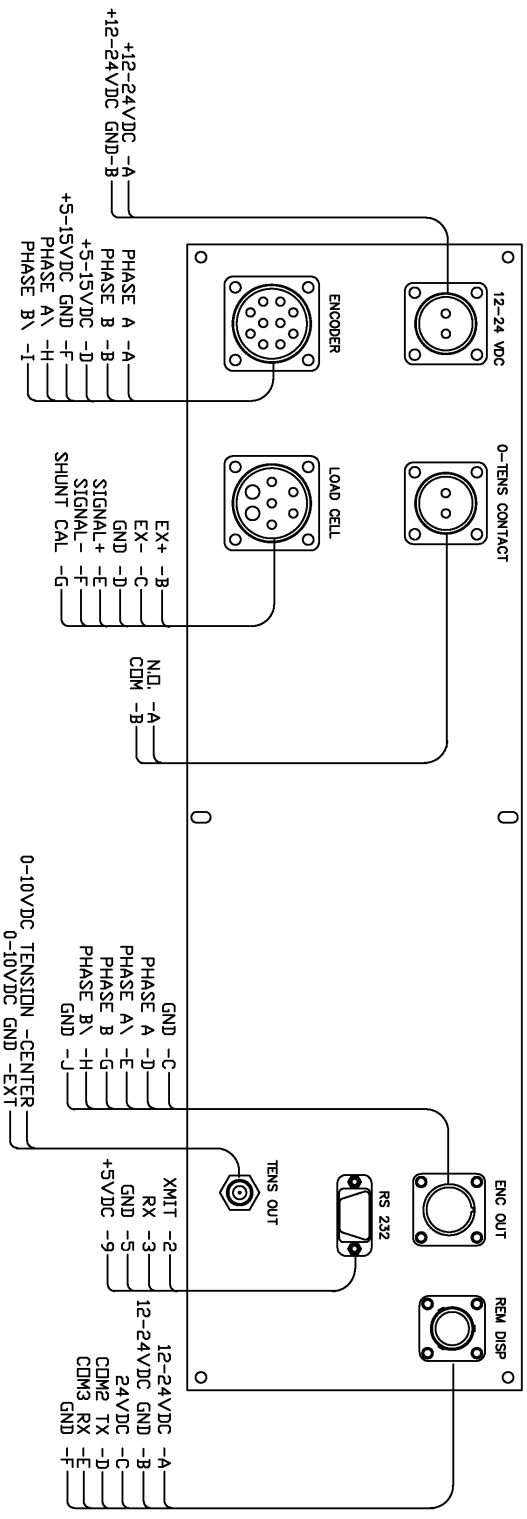
6.2.5 PANEL – BUTTONS – 4A PANEL



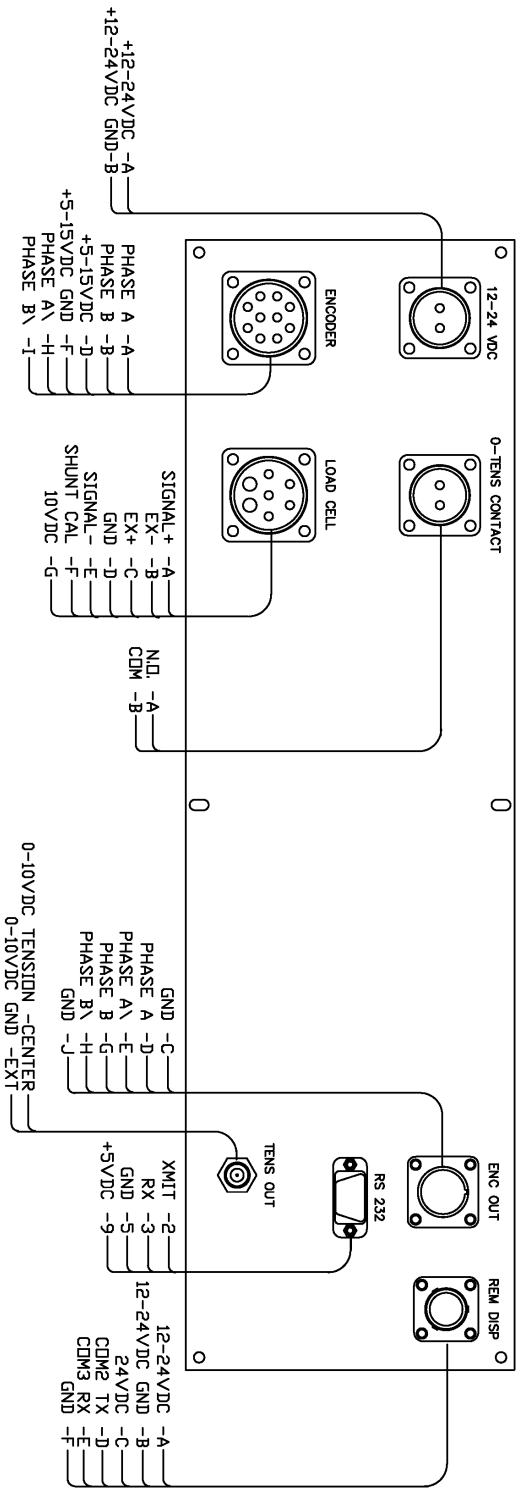
6.2.6 POWER SUPPLIES – 4A PANEL



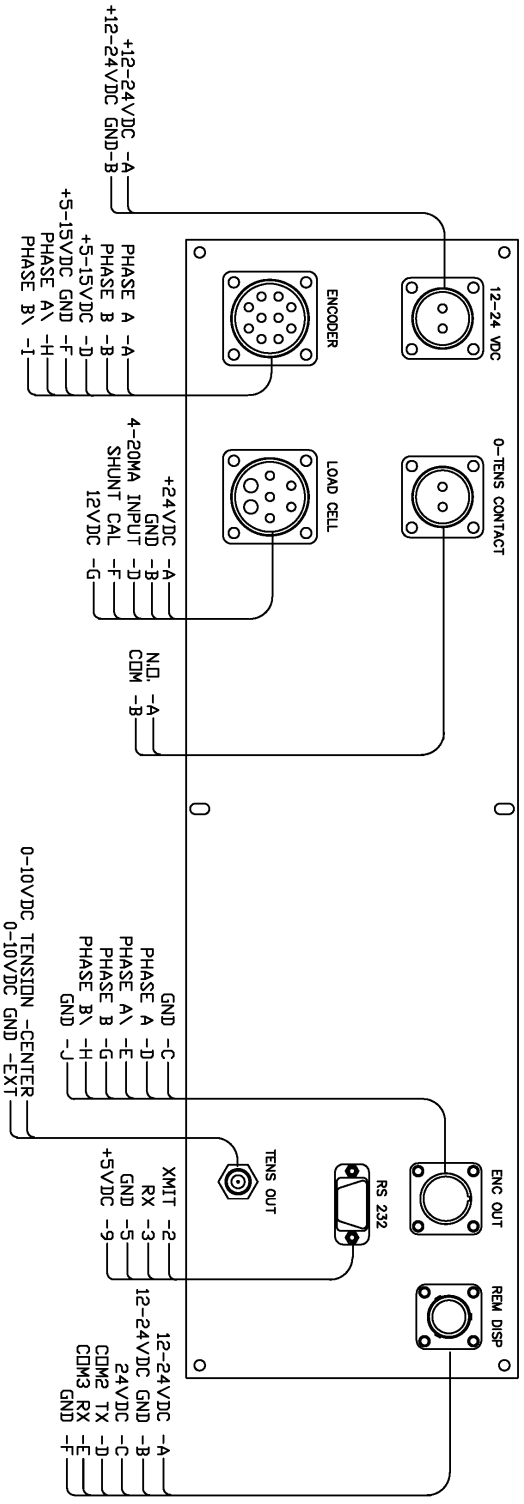
6.3.1 REAR PANEL WIRING – AMSXA062



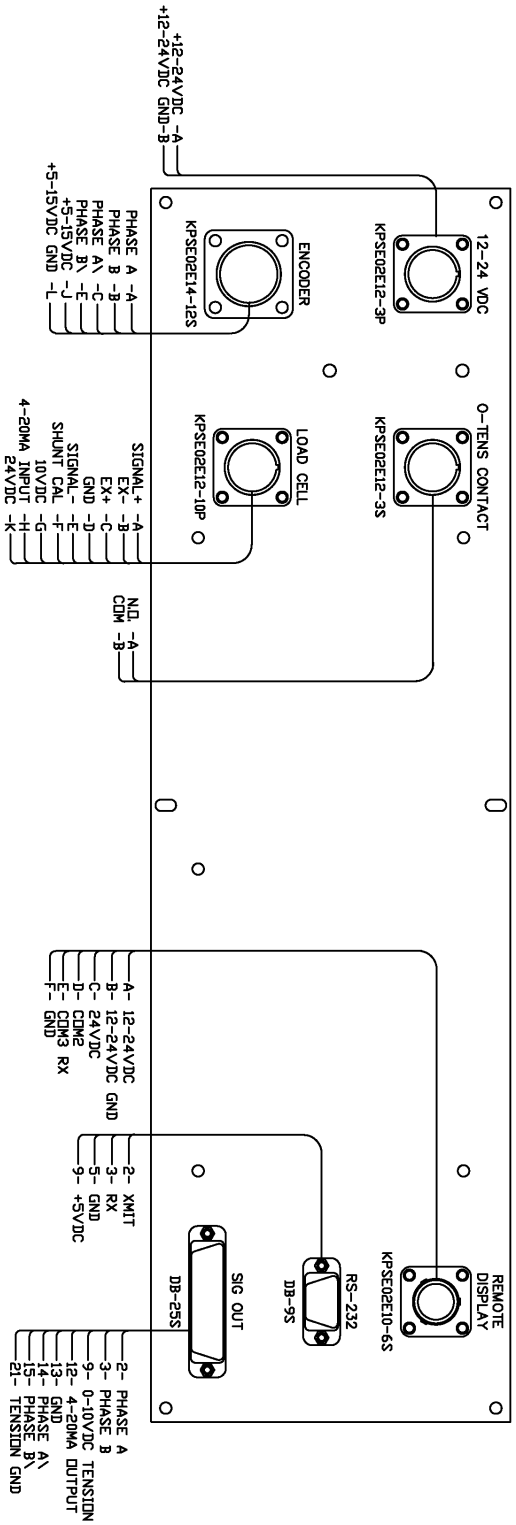
6.3.2 REAR PANEL WIRING – AMSXA063



6.3.3 REAR PANEL WIRING – AMSXA064



6.3.4 REAR PANEL WIRING – AMSXA067



6.4 PANEL WIRING DIAGRAMS

J1	12 - 24 VDC IN
J2	ENCODER IN
J3	OVER TENSION OUT
J4	LOAD CELL IN
J5	ENCODER OUT
J6	RS232 SIGNAL
J7	REMOTE DISPLAY / PRESSURE
J8	TENSION OUT

P2 - Screw Terminal Block MAIN PC BOARD				
P2 -1	BATT +	RED	P1 - 7 (FUSE BRD), J7 - A	SWITCHED POWER
P2 - 2	BATT -	BLK - B	J1 - B, J7 - B	12 V GROUND
P2 - 3	CONTACT CLOSURE N.O.	GRN - B	J3 - A	Tension Contact Closure Back Panel
P2 - 5	CONTACT CLOSURE COM	BRN - A	J3 - B	Tension Contact Closure Back Panel
				Power Switch - When switch is up the 2 bottom pins should read together - up 0-red 0-red

P4 - USER SWITCHES				
P4 - 2	DCM BLK	BLK		FEET LED, SW4, SW2, SW6, SW5, SW9, SW7, SW8, SW10,
P4 - 5	HI / LO DIFF TEN RANGE	VIO	SW2 N.O.	RANGE SWITCH FOR DIFFERENTIAL TENSION
P4 - 6	METER RESET	GRY	SW4 N.O.	
P4 - 7	T CAL	GRN	SW5A - N.O.	SW5 (DPDT)
P4 - 8	T ZERO	BRN	SW6 N.O.	
P4 - 9	CANCEL DEPTH ALARM	BLU	SW10 N.O	
P4 - 10	ZERO DEPTH	YEL	SW9 N.O.	

P4 - 11	DEPTH ADJ DOWN (+)	WHT	SW7 N.O. DN	Dn Contact of SW7
P4 - 12	DEPTH ADJ UP (-)	ORN	SW7 N.O. UP	Up Contact of SW7

P5 - SPARE				
P5 - 1	+5V	RED	D1 - 4	DISPLAY POWER
P5 - 2	MENU	VIO	SW8 N.O.	MENU SELECT
P5 -12	DCM	BLK	D1 - 1	DISPLAY GND

P6 - ANALOG IN/OUT – AMS4A063 PANEL				
P6 - 3	LOAD PIN SIG+	RED	J4 - A	LOAD PIN SIGNAL+
P6 - 4	LOAD PIN SIG-	GRN	J4 - E	LOAD PIN SIGNAL-
P6 - 6	LOAD CELL 24V	BLU	J7 - C	24V TO PRESSURE TRANSDUCERS
P6 - 7	SHUNT CAL	GRN	J4 - F	SHUNT CAL
P6 - 8	ACM	BLK	J4 - B	LOAD PIN COMMON

P6 - ANALOG IN/OUT – AMS4A062 PANEL				
P6 – 1	LOAD PIN POWER +	P1 12 ENCDR BRD	LOAD PIN POWER	
P6 – 2	LOAD PIN POWER -	P1 11 ENCDR BRD	LOAD PIN POWER	
P6 – 3	LOAD PIN SIG+	J3 E	LOAD PIN SIGNAL+	
P6 – 4	LOAD PIN SIG-	J3 F	LOAD PIN SIGNAL-	
P6 – 7	SHUNT CAL ENABLE	J3 G	SHUNT CAL	
P6 – 8	ACM	J3 D	LOAD PIN COMMON	

P6 - ANALOG IN/OUT - AMS4A064 PANEL				
P6 - 5	4to20IN	J4 - D	4 TO 20 TESNION SIGNAL	
P6 - 6	LOAD CELL 24V	P1-10, P1-3 FUS BRD	2 WIRES, 4 TO 20 MA POWER & REMOTE 24V	

P6 - 7	SHUNT CAL ENABLE	J4-E	SHUNT CAL	
P6 - 8	ACM	J4-B	GND	P6 - 8
P6 - 9	4to20OUT	BRN	J8 - N/C	TIE WIRE NEAR J8 BUT DO NOT CONNECT
P6 - 10	ACM	BLK	J8 - GND	TENSION OUT GROUND
P6 - 11	0-10V OUT (TENSION)	BLU	J8 - CENTER	TENSION OUT
P6 -13	TENSION METER-	VIO	M2-	
P6 -14	TENSION METER+	ORN	M2+	
P6 - 15	DIFF TENSION METER -	YEL	M1 -	
P6 - 16	DIFF TENSION METER +	BLU	M1 +	

P7 - COMMUNICATIONS				
P7 - 1	RS485 TX+	GRY	J7	
P7 - 2	RS485 TX-	BLK	J7	
P7 - 3	RS485RX-	GRN	J7	
P7 - 4	RS485RX+	BLU	J7	
P7 - 5	COM3 TXD	GRN	CARD READER DATA PORT J1 - 2	
P7 - 6	5V ENCDR PWR - FUSE BRD	YEL	P1 - 2 FUSE PCB	FUSE BOARD P1-2
P7 - 7	COM2 TXD	ORN	D1 - 5, D2 - 5, D3 - 5, J7 - D	DISPLAY DATA - THREE WIRES CONNECTED TOGETHER
P7 - 8	COM3 RXD	WHT	J7 - E	PRESSURE SIGNAL IN FROM REMOTE DISPLAY
P7 - 9	GND	BLK	CARD READER DATA PORT J1 - 3	RS485 GND (2 WIRES)
P7 -10	COM1 TXD	BRN	J6 - 2	RS232 TRANSMIT
P7 - 11	COM1 RXD	WHT	J6 - 3	RS232 RECEIVE
P7 - 12	GND	BLK	J6 - 5	RS232 GND

P8 - QUADRATURE OUT / INDICATORS				
P8 - 1	METRIC LED	BRN		METRIC LED CATHODE (-)
P8 - 2	ENC_PWR1	ORN	METRIC LED+ & 6.8VZ Cathode	METRIC LED ANODE & 6.8VZ Cathode 6.8VZ Anode to ENGLISH LED +
P8 - 5	BEEPER	GRN Beeper	ALM1 -	BEEPER
P8 - 6	ENC_PWR1	YEL	ALM1 +	BEEPER
P8 - 9	APPROACHING SURF	VIO	SW10	APPROACHIN SURF LED- +1 (inline with silver plate)
P8 - 10	ENC_PWR1	BLU	SW10	APPROACHING SURFACE LED+ -1 (OPPOSITE with silver plate)
P8 - 11	PHASE 1B\	WHT	J5 - H	ENCODER OUT
P8 - 12	PHASE 1B	GRY	J5 - G	ENCODER OUT
P8 - 13	PHASE 1A\	ORN	J5 - E	ENCODER OUT
P8 - 16	PHASE 1A	BRN	J5 - D	ENCODER OUT

P9 - ENCODER 1				
P9 - 1	DCM	BLK	J2 - F	Encoder Ground
P9 - 2	DCM	BLK	J5 - J, J5 - C, J7 - F	DIGITAL GROUND (Encoder + RS232)
P9 - 5	ENCODER PWR - TO FUSE	YEL	P1 -10 FUSE PCB	
P9 - 8	ENCODER 1B	BLU	J2 - B	Encoder input
P9 - 9	ENCODER 1B \	GRN	J2 - I	Encoder input
P9 - 11	ENCODER 1A	ORN	J2 - A	Encoder input
P9 - 12	ENCODER 1A\	RED	J2 - H	Encoder input

P10 - ENCODER 2				
P10 - 1		BLK	CARD READER J3 - 1	GND
P10 - 5		WHT	CARD READER J3 - 2	+12VDC

D1 DISPLAY - DEPTH				
D1 - 2	GND	BLK	D2 - 1	GND
D1 - 6	+5V OUT	RED	D2 - 4	POWER OUT

D2 DISPLAY - LINE SPEED				
D2 - 2	GND	BLK	D3 -1	GND
D2 - 6	+5V OUT	RED	D3 - 4	+5V OUT

POWER SWITCH				
SW1A - NO	MAIN POWER ON/OFF	RED	J1 - A	
SW1A - C	WIPER TO FUSE BOARD	RED	FUSE PCB P1 - 1	

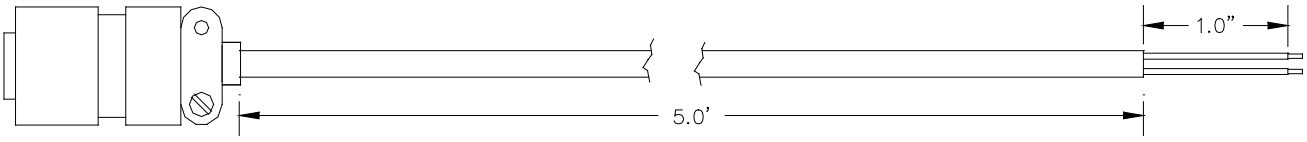
FUSE BOARD				
P1 - 4	ENCODER1 PWR FUSED	YEL	J2 - D	FUSED LOAD CELL POWER OUT (24V)
P1 - 12	12VDC (FUSED)	RED	J4 - C, SW5B - COM	LOAD PIN EXCITATION

SWITCH 5 (DPDT PUSH BUTTON)				
SW5B - NO	12 VDC POWER (FUSED)	RED	J4 - G	SHUNT CAL (12 VDC)

J2 - CARD READER				
J2 - 1		BRN	DB9F - 2 ON THE FRONT PANEL	RS232 RX
J2 - 2		WHT	DB9F - 3 ON THE FRONT PANEL	RS232 TX
J2 - 3		BLK	DB9F - 5 ON THE FRONT PANEL	GND

7.0 CABLES

7.1 AMS7A022 CABLE ASSEMBLY – DC POWER IN

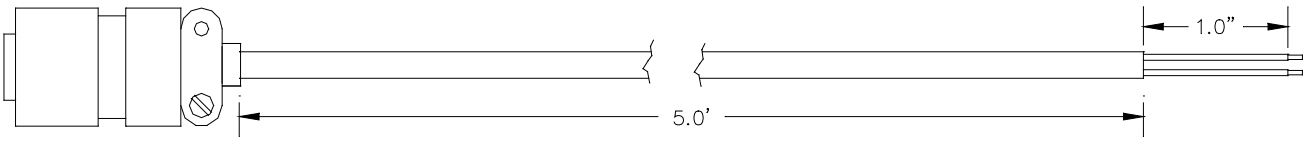


A – WHITE
B – BLACK

A = +
B = -

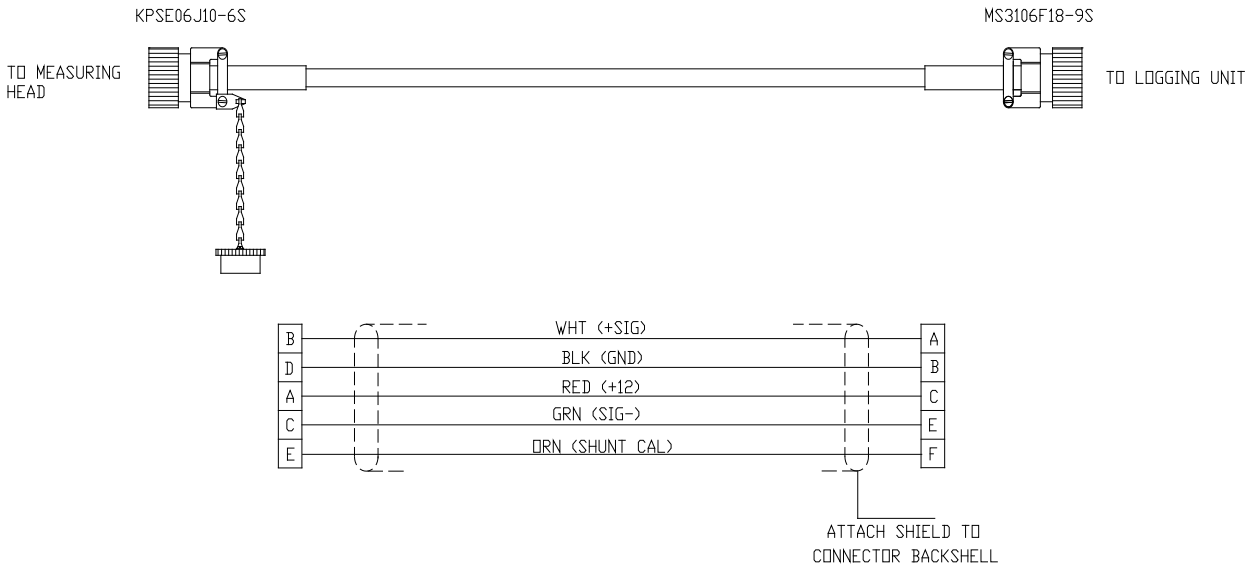
P/N	Description	Qty	
AMS7P061	CABLE 16-2 SJ CORD BELDEN 8472	5	FT
AMS7P044	CONN MS3106E-14S-9S	1	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	1	EA

7.2 AMS7A023 CABLE ASSEMBLY – OT SHUTDOWN



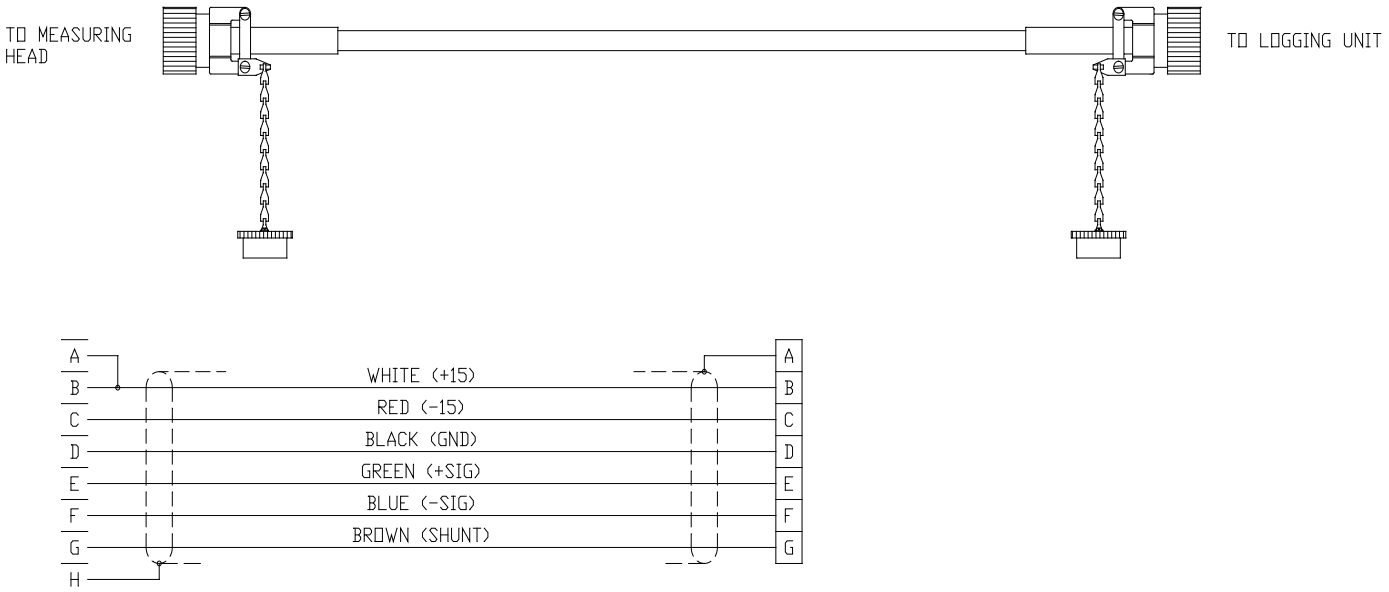
P/N	Description	Qty	
AMS7P061	CABLE 16-2 SJ CORD BELDEN 8472	5	FT
AMS7P045	CONN MS3106E-14S-9P	1	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	1	EA

7.3 AMS4A353 2mv / v CABLE ASSEMBLY – LOAD PIN



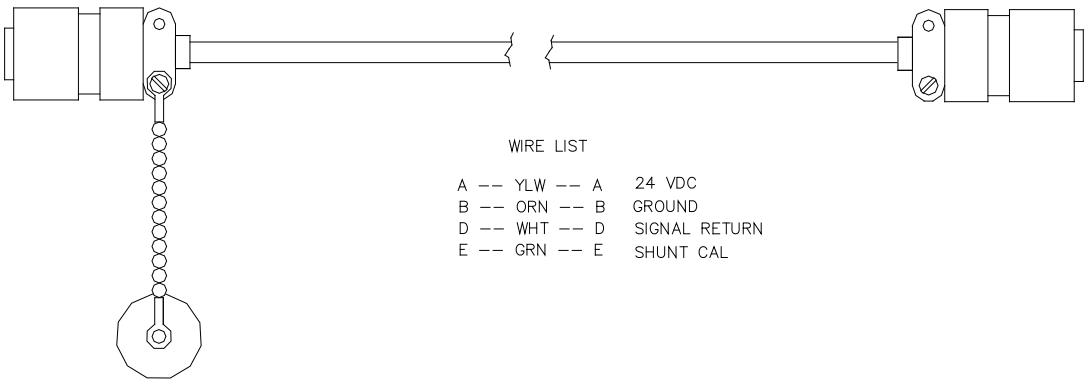
P/N	Description	Qty	
AMS4P266	CONN KPSE06J10-6S STR PLUG	1	EA
AMS7P014	CONN MS3106F-18-9S LOAD CELL	1	EA
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK	20	FT
AMS4P209	TUBING SHRINK 0.75 ADH LINED	1	IN
AM5KP059	DUST CAP KPT8010C CANNON	1	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	1	EA
ACMU1P89	TUBING SHRINK 1.50 ADH LINED	1	EA
C276P318	TERMINAL #RA18-6 #6 RING	1	EA

7.4 AMS8A024 1.5v DIFFERENTIAL TENSION CABLE ASSEMBLY – LOAD PIN



P/N	Description	Qty	Ref
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK SHIELDED	20 FT	
AMS8P057	CONN KPT06A16-8S STR PLUG	1 EA	PIN END
AMS7P014	CONN MS3106E-18-9S LOAD PIN	1 EA	PNL END
AMS8P060	DUST CAP CANNON SHELL SIZE 16	1 EA	

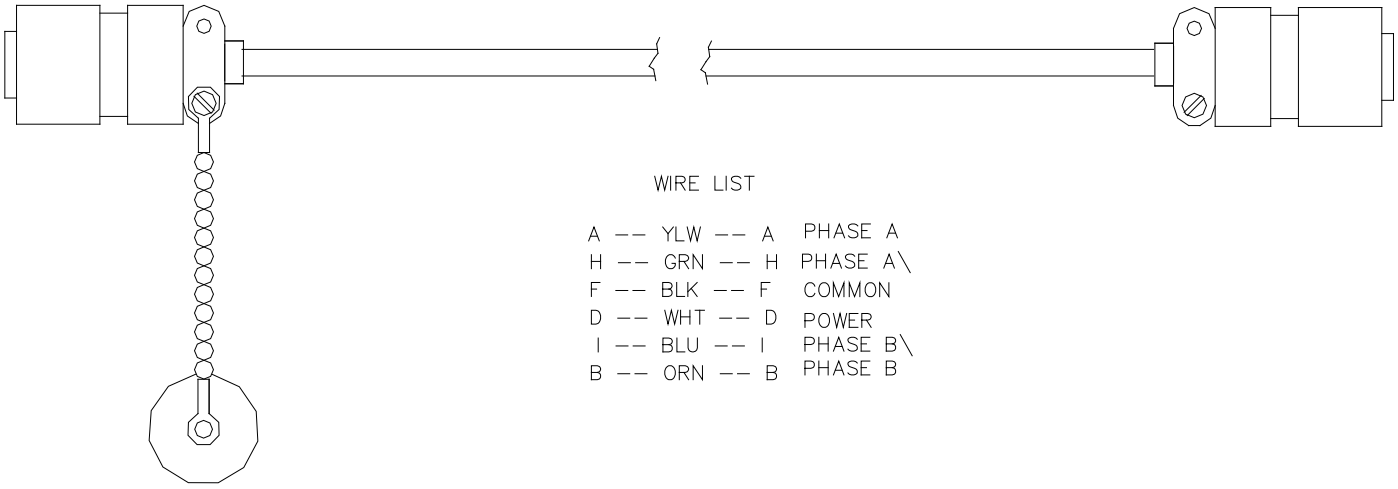
7.5 AMS7A031 4-20MA CABLE ASSEMBLY – LOAD PIN



P/N	Description	Qty	
AMS7P014	CONN MS3106F-18-9S LOAD CELL	2	EA
AMS1P029	DUST CAP MS25042-18DA	1	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	4	EA
AMS7P064	BUSHING #9779-513-8 AMPHENOL	2	EA
ACMU2P23	BUSHING #9779-513-10 AMPHENOL	2	EA
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK	20	FT

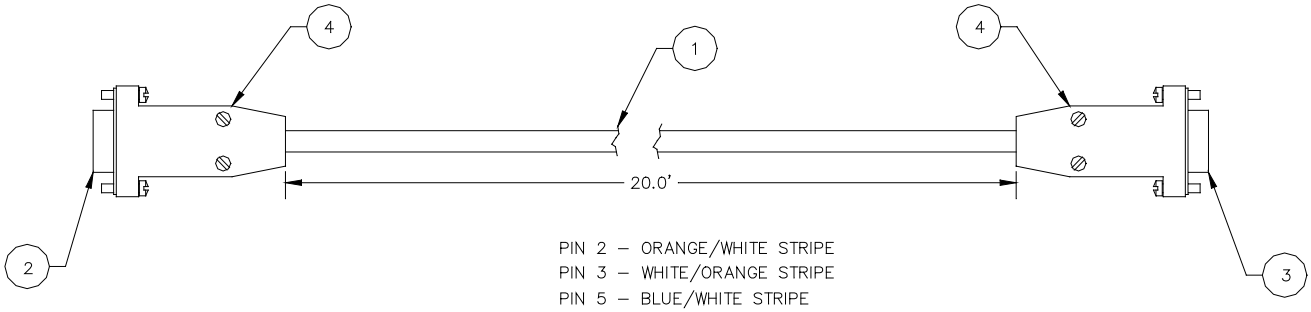
BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.346.4300
Fax: 281.346.4301
benchmarkwireline.com

7.6 AMS4A125 CABLE ASSEMBLY - ENCODER



P/N	Description	Qty	
AMS1P028	CONN MS3106E-18-1S	2	EA
AMS1P029	DUST CAP MS25042-18DA	1	EA
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK SHIELDED	20	FT

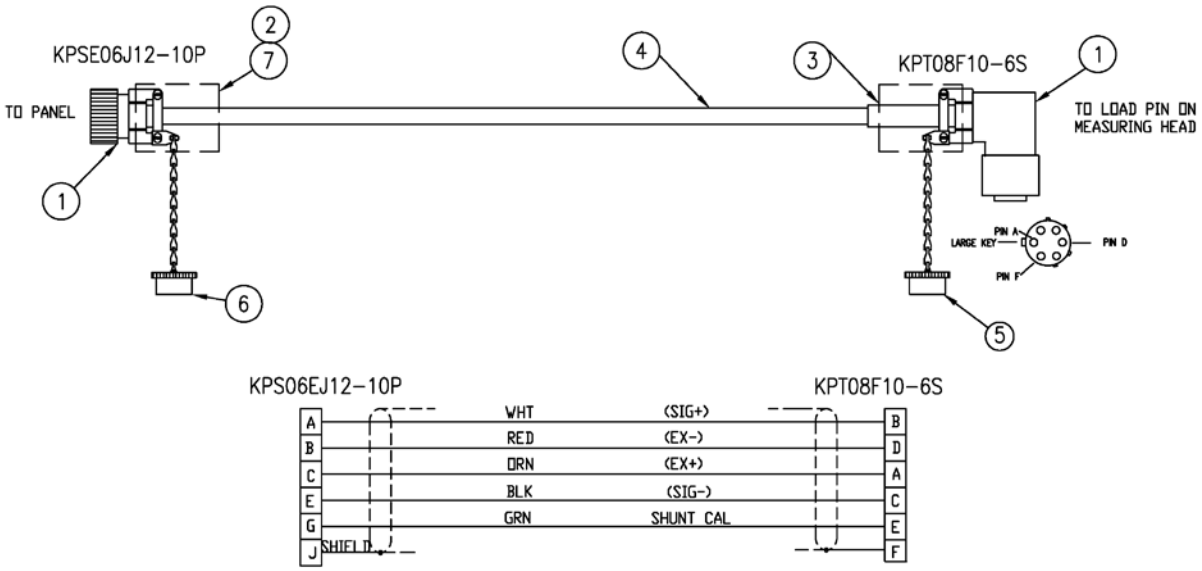
7.7 AMS7A024 CABLE ASSEMBLY – RS232



PIN 2 – TXD
PIN 3 – RXD
PIN 5 - GND

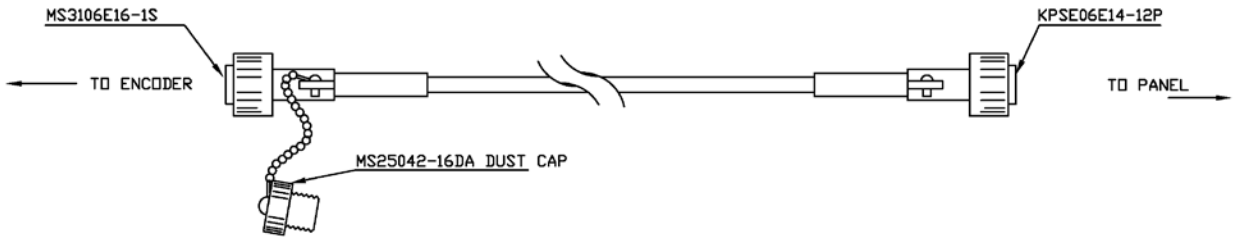
P/N	Description	Qty	
AMS7P062	CABLE 24/2P STNDED PE/PVC	20	FT
AMS7P016	CONN DE-9P	1	EA
AMS7P015	CONN DE-9S	1	EA
AMS7P067	CONNECTOR AMP CABLE CLAMP	2	EA

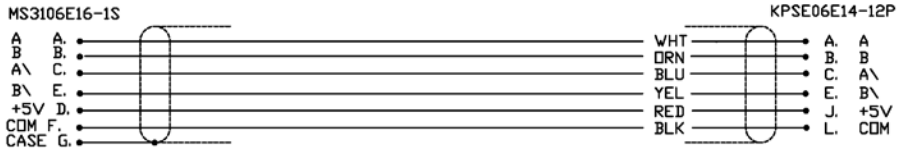
7.8 AMS8A013B CABLE ASSEMBLY – RT ANGL TENSION IN



P/N	DESCRIPTION	QTY	
ALS8A013-20	CABLE ASSY TENS LV IN TO PNL 6 PIN LV LOADPIN TO 99/244 PNL		
AMS4P181	CONN KPSE06J12-10P STR PLUG 10 PINS TENSION PANEL END	1	EA
AM5KP238	CONN KPT08F10-6S RT ANGLE PLUG W/STRAIN RELIEF OR EQUIVALENT LOAD CELL END	1	EA
ACMU1P88	TUBING SHRINK 1.00 ADH LINED 3:1 BLACK 3.00"	2	EA
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK SHIELDED 0.31OD	20	FT
AM5KP059	DUST CAP KPT8010C CANNON MS3180-10CA	1	EA
AM5KP070	DUST CAP KPT8012C CANNON MS3180-12CA	1	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	1	EA
AMS4P209	TUBING SHRINK 0.75 ADH LINED 3:1 BLACK	1	IN

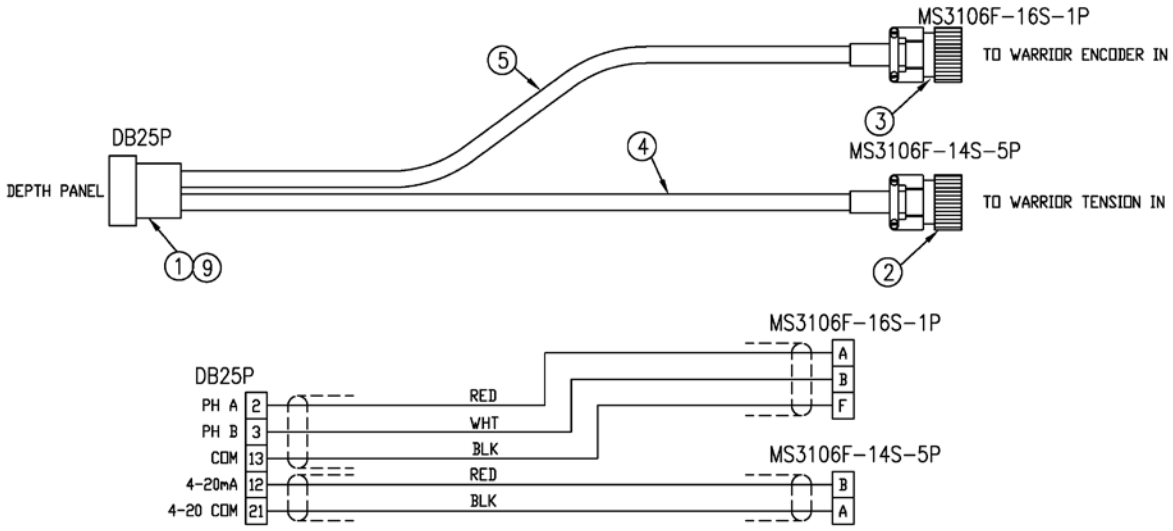
7.9 AMS4A150A CABLE ASSEMBLY – CABLY ASSY ENCODER OUT





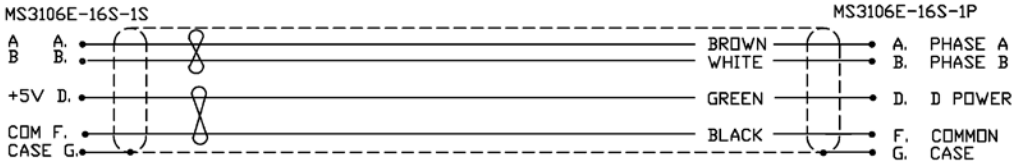
P/N	DESCRIPTION	QTY	
AMS4A150-20	CABLE ASSY ENCODER TO PANEL AMS4A067 PANEL		
AMS4P184	CONN MS3106F16S-1S 7 SOCKETS ENCODER END	1	EA
AMS4P182	CONN KPSE06J14-12P STR PLUG 12 PINS PANEL END	1	EA
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK SHIELDED 0.31OD	20	FT
AM5KP113	DUST CAP MS25042-16DA ENCODER END	1	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	2	EA
ACMU1P88	TUBING SHRINK 1.00 ADH LINED 3:1 BLACK 2 @ 3"	2	EA

7.10 AMS4A117C CABLE ASSEMBLY – DB25 OUT TO WARRIOR



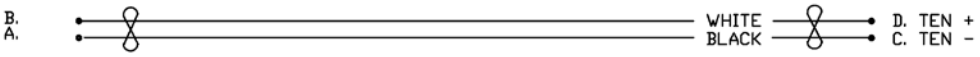
P/N	DESCRIPTION	QTY	
AMS4A117-20	CABLE ASSY DEPTH PNL DB25 OUT TO WARRIOR		
AMS4P165	CONN DB25P CRIMP AMP USED WITH PIN 205089-1	1	EA
AMS4P185	CONN MS3106F14S-5P 5 PINS TO WARRIOR	1	EA
AMS4P183	CONN MS3106F16S-1P TO WARRIOR	1	EA
ACMU1P83	CABLE 2C ALPHA 2412C SPIRAL SHIELD	20	FT
AMS7P093	CABLE 22/2P BELDEN 8723 SHIELDED (500 FT SPOOL)	20	FT
AMS4P167	PIN AMP M39029/64-369 USED WITH 205162-1	25	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	2	EA
ACMU1P88	TUBING SHRINK 1.00 ADH LINED 3:1 BLACK 2 @ 3"	2	EA
AMS4P462	CONN BACKSHELL DB-25 METAL 0.525 OD CABLE MAX	1	EA
AM5KA034	BUSHING #9779-513-4 AMPHENOL	2	EA

7.11 AMS4A107C CABLE ASSEMBLY – ENCODER OUT TO WARRIOR



P/N	DESCRIPTION	QTY	
AMS4A107-20	CABLE ASSY ENCODER TO WARRIOR		
AMS4P184	CONN MS3106F16S-1S 7 SOCKETS ENCODER END	1	EA
AMS4P183	CONN MS3106F16S-1P PANEL END	1	EA
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK SHIELDED 0.31OD	20	FT
AMS7P063	BUSHING #9779-513-6 AMPHENOL	2	EA

7.12 AMS4A111B CABLE ASSEMBLY – TENSION OUT TO WARRIOR



P/N	DESCRIPTION	QTY	
AMS4A111-20	CABLE ASSY TEN OUT TO WARRIOR		
AMS4P186	CONN MS3106F14S-5S TO PANEL	1	EA
AMS4P185	CONN MS3106F14S-5P 5 PINS TO WARRIOR	1	EA
AMS7P061	CABLE 16/2 SJ CORD BELDEN 8472	20	FT
AMS7P063	BUSHING #9779-513-6 AMPHENOL	2	EA

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