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OPERATIONS AND MAINTENANCE MANUAL
WINCH OPERATORS PANEL

AMS3A044
AMS3A048
AMS3A148
AMS3A244
AMS4A044
AMS4A048
AMS4A148
AMS4A244
AMD6A044
AMD6A048
AMD6A244

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While all measures are taken to ensure accurate and complete coverage of the panel functions and specifications, no claim is made to the accuracy or integrity of the information provided in this manual. All instances of query should be directed to the manufacturer, BenchMark Wireline Products Inc, 39220 FM 1093, P.O Box 850, Simonton, Tx 77476, Texas, USA, tel. +1.281.346.4300, url. www.benchmarkwireline.com.

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1.0 INTRODUCTION

1.1 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 is also available on 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.

1.2 REDUNDANT BACKUP SOLID STATE DEVICE

These panels have a backup solid state device that can be enabled in the case that the default drive operating system becomes corrupted and un-bootable. Refer section 1.7 for details.

WARNING – only one device can be enabled at a time or damage will result to both operating systems.

1.3 DUAL BOOT PROCEDURE

Follow these instructions to set up to boot from the second compact flash card.

- Connect a keyboard to the panel.
- Turn power on to the panel.
- Press the “DEL” key on the keyboard until the BIOS settings appear.
- Use the RIGHT ARROW key to select the “BOOT” tab across the top
- Use the DOWN ARROW key and select “Hard Disk Drives” and press “ENTER”
- Select the “1st Drive” and press “ENTER”
- Then select the drive that is listed as the 2nd drive and press ”ENTER”
- Then press “ESC”
- Use the RIGHT ARROW and select ‘Exit” and press “ENTER”
- Select “OK” and press “ENTER”
- The panel should start to Re-boot from the second boot device

For some of the older processors use the following procedure to boot from the second compact flash card.

- Connect a keyboard to the panel.
- Turn power on to the panel.
- Press the “DEL” key on the keyboard until the BIOS settings appear.
- Enter the CMOS setup utility.
- Next proceed to the ‘INTEGRATED PERIPHERALS’ menu and then proceed to the ‘ON-CHIP IDE DEVICE’ menu and disable the ‘ON-CHIP SECONDARY PCI IDE’.
- Enable the ‘ON-CHIP PRIMARY PCI IDE’.
- Press the ‘ESC’ key twice and then navigate to ‘SAVE & EXIT SETUP’ and press ‘Y’ for Yes-save and quit.

1.4 WELLSITE OPERATING SUMMARY

1.4.1 Power up panel and verify it is working properly.

1.4.2 Press Zero Depth and verify that panel tension reads 0. Verify tension is recorded on acquisition system.

1.4.3 Set line size to match cable size installed in head (refer to section 3).

1.4.4 Set Tension Alarm value (refer to section 3).

1.4.5 Set depth adjust value (refer to section 3).

1.4.6 Install cable in measuring head and lay it slack on the ground.

1.4.7 Press Menu – Tension Cal – Tension Zero to zero the tension value.

1.4.8 Press Menu – Tension Cal – Tension Zero and verify that panel tension reads the proper tension value for the chosen head/load pin. Verify tension is being properly recorded on acquisition system.

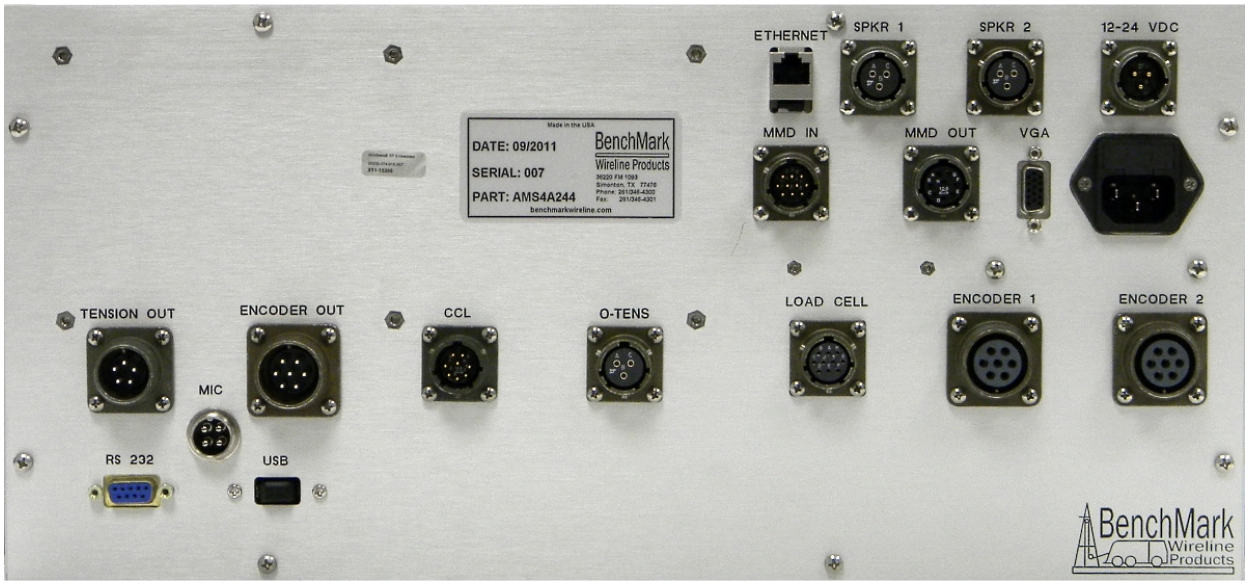
1.4.9 Pull tool to depth 0 position. Press Zero Depth and verify that panel depth reads 0. Set acquisition system depth to 0 at this time.

Make sure encoder direction is properly set.

2.0 TECHNICAL DESCRIPTION AND SPECIFCATIONS

2.1 GENERAL DESCRIPTION

44/244 Series Rear Panel



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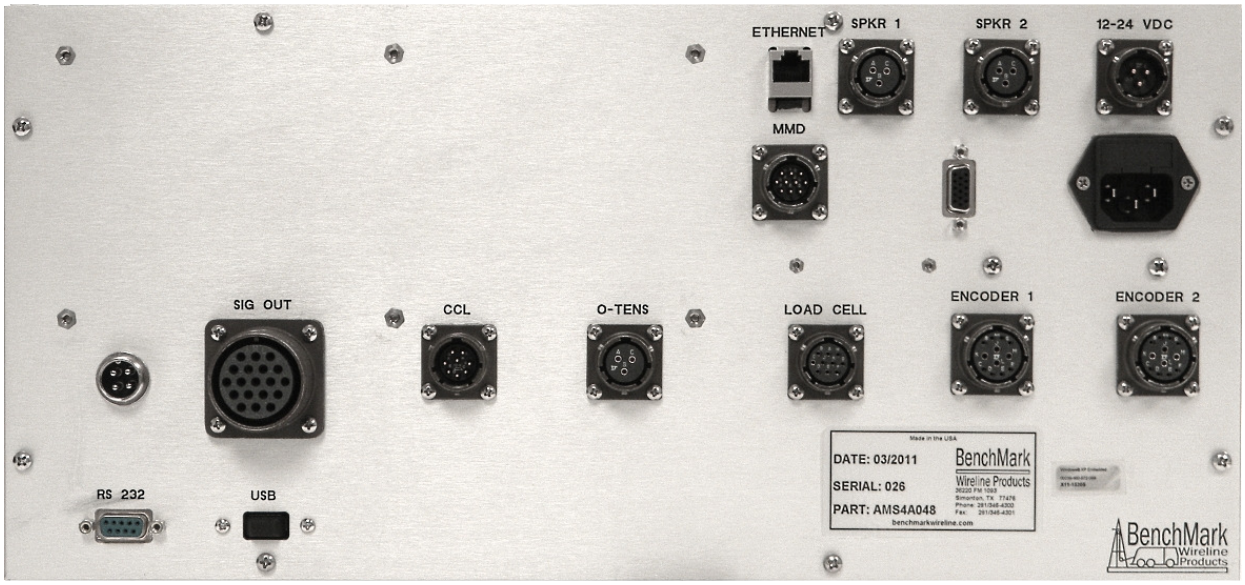
48 Series Rear Panel



This panel is used to acquire and display depth and tension data from a wireline logging winch unit. The panel provides the operator a means to set and make adjustments to the data as necessary. Depth is displayed from data provided from an encoder mounted on a measuring device. The tension data is provided by a load pin and is also passed through to the acquisition system. The panel will operate with the BenchMark Dual Wheel Measuring Devices for slick line, braided line, and cased hole e-line services.

The system consists of two main components, the real time acquisition board and the PC. The acquisition board provides power to and processes the signals from the encoders, load pin, and magnetic mark detector. This board operates independent from the PC and is instantly on when power is applied. It also is connected to displays for depth and tension. This allows depth and tension to be displayed immediately on power up and always be displayed regardless of the PC status.

The PC uses an Intel based high speed processor running MS Windows XP embedded. The PC includes a color touch screen for operator input and command entry. The PC is Ethernet ready for connection to the internet for remote display and control.

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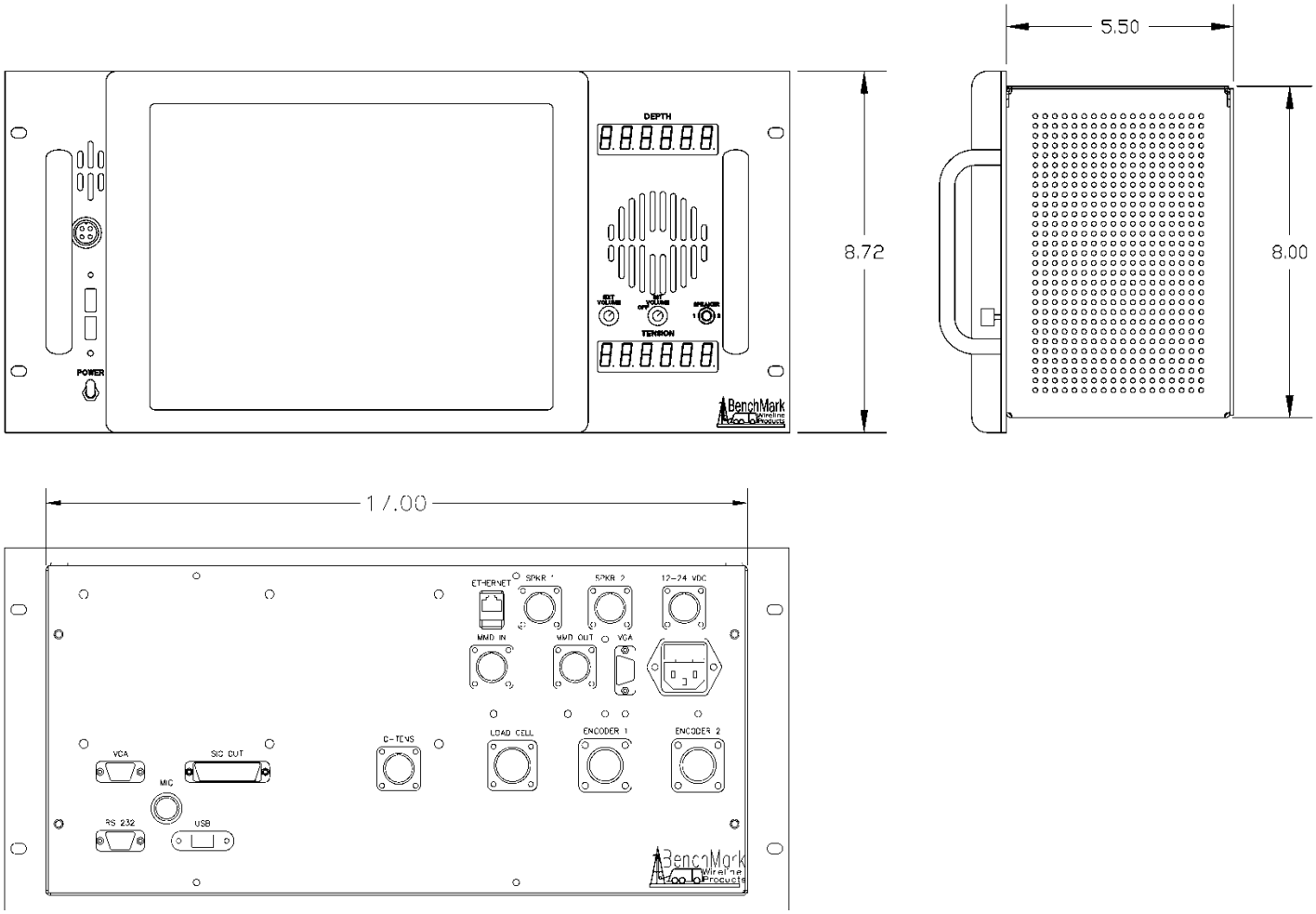
2.2 TECHNICAL SPECIFICATIONS



WEIGHT:

PANEL ONLY:	10 LBS	4.55 KG

POWER REQUIREMENTS:

INPUT VOLTAGE:	12 – 24VDC 120 – 240VAC
INPUT CURRENT:	4 AMPS STARTUP SURGE 3 AMPS NORMAL OPERATION

OPERATING TEMPERATURE

Min	Max	
14	149	degrees F
-10	65	degrees C

STORAGE TEMPERATURE

Min	Max	
-22	158	degrees F
-30	70	degrees C

2.3 HARDWARE FEATURES

12 - 24 VDC Power Input
110/220 VAC 50/60 HZ

Internal PC board
- Intel based personal computer board
- 4 to 16GB solid state media device
- Embedded windows XP or Windows 7 operating system
- Five USB ports (Two inside, two in front, and one on the back)
- 1 RS232 port
- RJ 45 Ethernet port
- USB Mouse / Keyboard included

Color Display
- TFT LCD or LVDS
- LED Backlit
- 400 NITS Sunlight readable

Touch Screen Interface (replaces current key pad)
- 5 wire resistive or Infrared
- USB interface

Real Time Acquisition board
- Benchmark Wireline Products proprietary design
- 8051 Microprocessor based
- Provides power to encoders, load cell
- Processes encoder quadrature, load cell
- Runs independent of PC board
- Overtension Relay Contact Closure output

Analog output interface
- Encoder quadrature output
- 0 – 10vdc tension output
- 4-20ma tension output

Dual Pressure signal inputs

A second 4 to 16GB solid state media device is provided for backup redundancy. Refer to 3.1.29 for information.

2.4 USER INTERFACE FEATURES

Total Tension numeric graphic
Incremental or Differential tension meter graphic
Meter reset button graphic (touch screen control)

Over tension Warnings and Shutdown settings for both Differential and Total Tension readings (touch screen activated)

Tension Calibration Setup Window (touch screen control)

Encoder Resolution Settings (PPR value set by touch screen control)

Approaching Surface

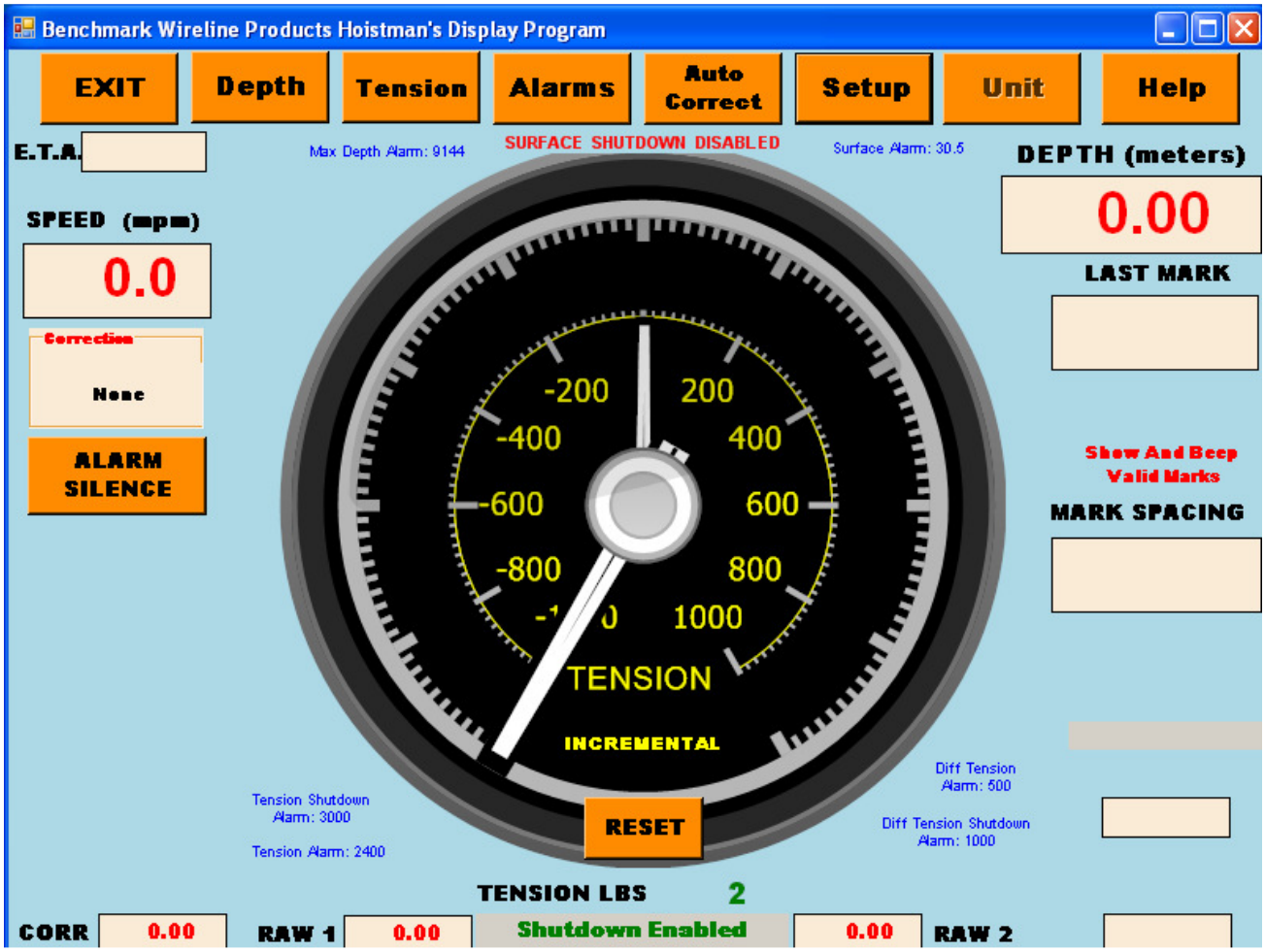
Max Depth

Set Down

3.0 - SOFTWARE OPERATING INSTRUCTIONS

When the system first boots up, the main screen will appear. The main screen will indicate if power is available through the indication of the power input. This can be seen by double-tapping on the two text boxes located on the lower right-hand side of the screen.

If the system is booting up from a power failure, the latest information available from the acquisition board will be displayed based on the stored parameters.



Most of the commands are accessed using the touch buttons across the top of the screen.

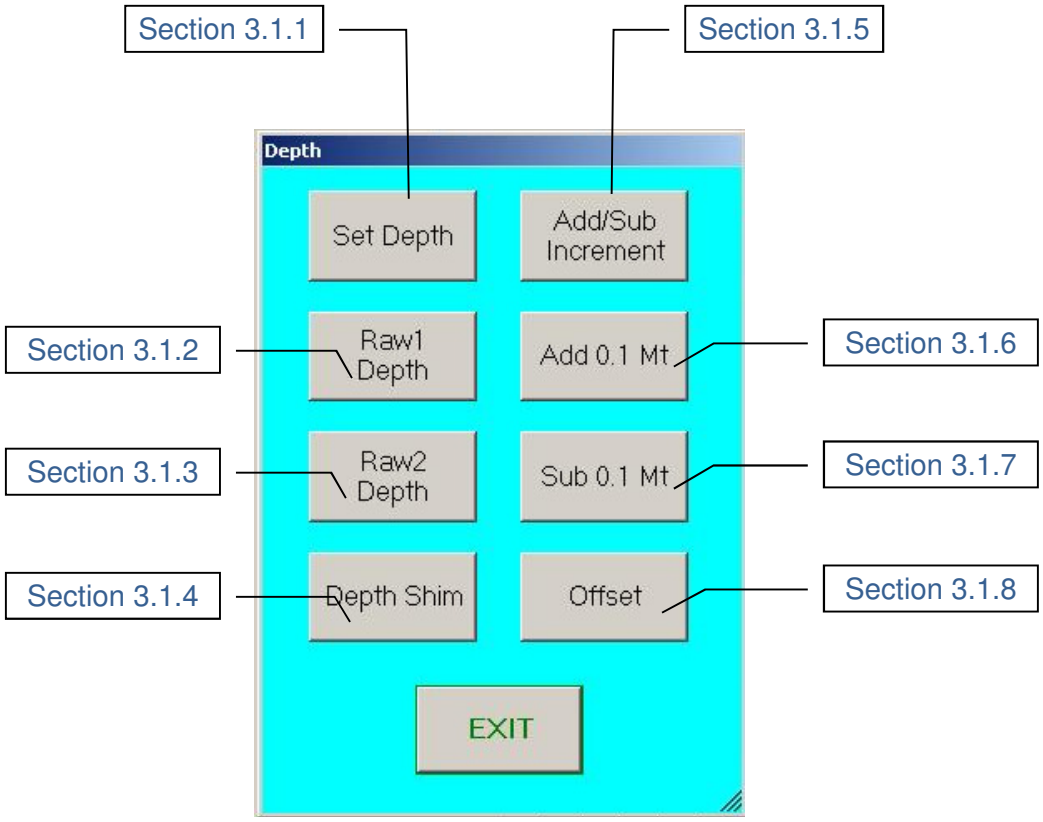
EXIT Exits the program and returns to MS-Windows.

HELP Invokes the Help Screen. This document can be displayed from the help menu. Also, the program revision information is displayed.

3.1 DEPTH

The depth information includes the following:

- encoder derived depth as a conversion of measure wheel pulses,
- depth as derived from the encoder depth conversion,
- the net effect of corrections and operator adjustments.



EXIT returns to the main display screen

3.1.1 SET DEPTH

Invokes the keypad. The new depth can be directly entered using the keypad. The valid range of depths are listed. The depth reset will affect the following read-outs:

- RAW 1
- RAW 2
- DEPTH

3.1.2 RAW1 DEPTH

Displays the current depth derived from Encoder-1 (using the currently valid Encoder-1 calibration). This value will be reset when the depth is reset (Section 3.1.1). The value displayed is the same as RAW 1 displayed at the bottom of the Depth Display.

3.1.3 RAW2 DEPTH

See Section 3.1.2, for Encoder-2.

3.1.4 DEPTH SHIM

Introduces a multiplicative factor to the encoder pulses, adding or subtracting to the calculated depth (from either one or both encoders) continually (having the effect of increasing or decreasing the wheel diameter).

If 1 is entered, then 1 foot or 1 meter will be added every 1,000 feet or 1,000 meters, depending on the units selected.

If -.2 is entered then 0.2 feet or 0.2 meters will be subtracted every 1,000 feet or 1,000 meters.

3.1.5 ADD / SUBTRACT INCREMENT

Used to shift the depth by a set value. Default is 0.1 meters – operator can set this increment up to 1 meter.

3.1.6 ADD .1 MT

Used to shift depth as required, usually when correlating to known depth references.

When the line is moving, the depth increment is applied incrementally at a rate of 1 Ft./10 Ft. irrespective of the direction of line travel.

When the line movement is zero, the increment is applied immediately.

The increments applied are 0.1 meter per 1 meter (0.5 ft per 5 ft) interval.

The gradual correction is not performed until the line moves. Note: If line is moving and the operator presses add 0.1 meter and then presses add 0.1 meter again while the panel is in process of adding the first 0.1 meter, the total will not be 0.2 meters. If line is not moving, the increment is added immediately.

3.1.7 SUBTRACT .1 MT

As per 3.1.6, subtracting from the depth number.

3.1.8 OFFSET

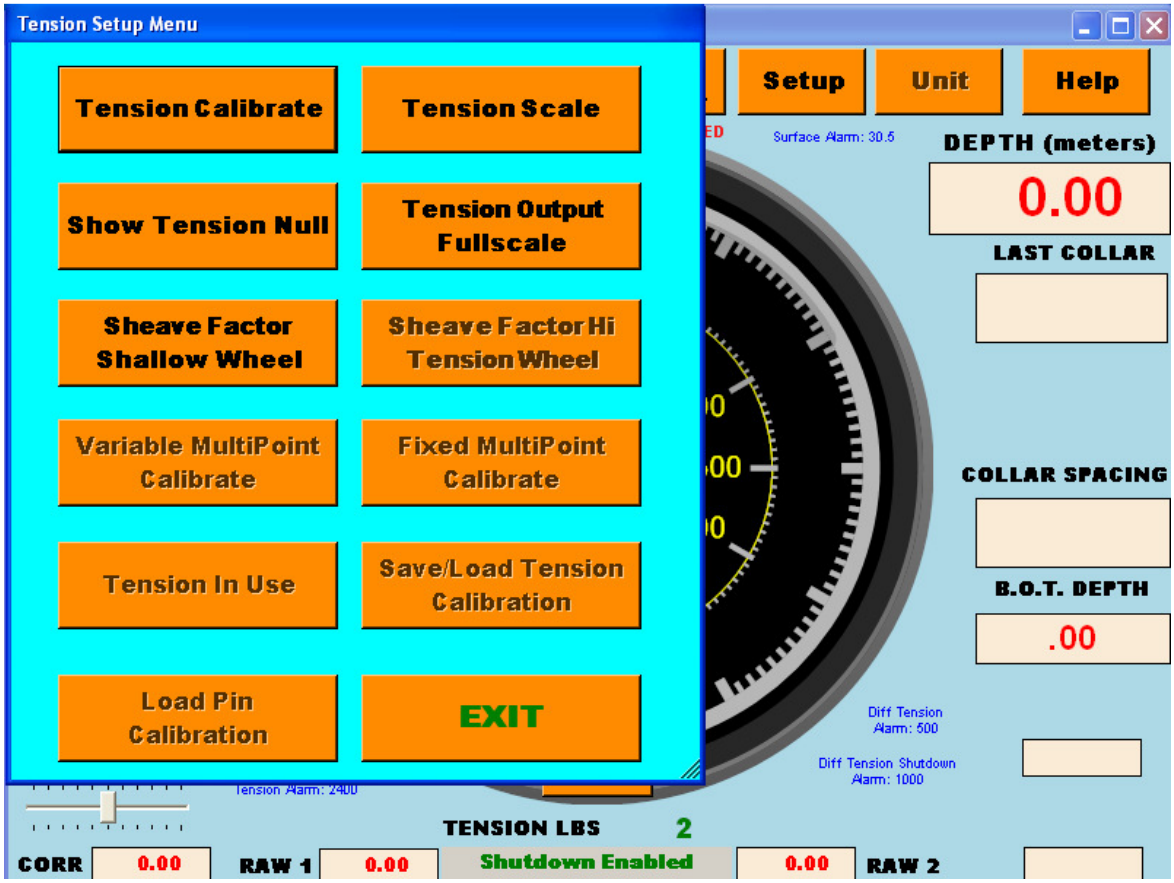
Displays a snapshot of the cumulative additions and/or subtractions that have been performed since zeroing the depth.

3.2 TENSION

Tension includes controls for the display of the tension measurements, the calibration factors associated with the line tension device and controls associated with the tension measurement.

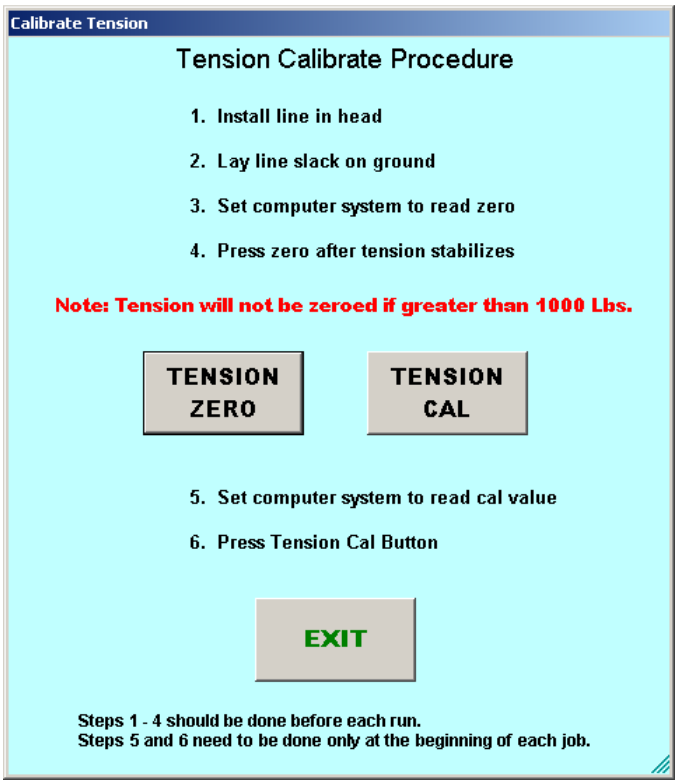
The tension measurement also influences a number of advisory and safety functions.

The calibration factors are applicable to the AM5K and AM3K measure head load pins.



3.2.1 TENSION CALIBRATE

The tension calibrate function is applicable to the AM5K & AMK3K measureheads.



TENSION ZERO will null out any tension offset voltage up to 1,000 lbs (refer to details).

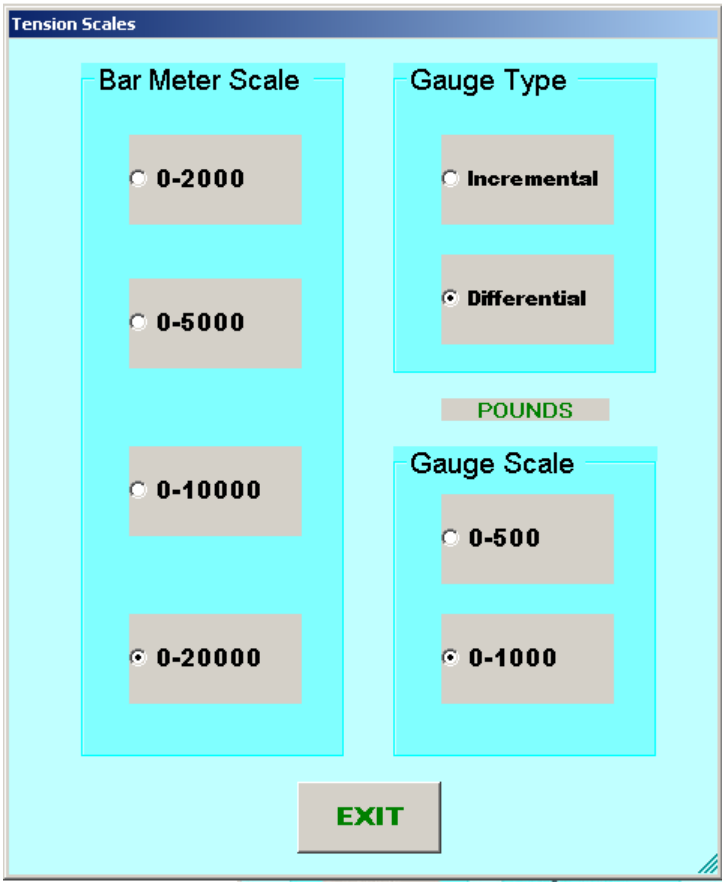
TENSION CAL will activate the tension relay inside the panel which will provide 12 VDC to shunt cal signal on pin G of the tension pin line. The load pin should then return a calibrated signal.

The AM3K Load Pin should return a value of 5000 pounds.

The AM5K Load Pin should return a value of 10,000 pounds.

These returned values are used to verify that the load pin, cable, and panel are functioning properly. Sometimes the returned values may vary slightly but this should not affect the accuracy of the tension measurement.

3.2.2 TENSION SCALE



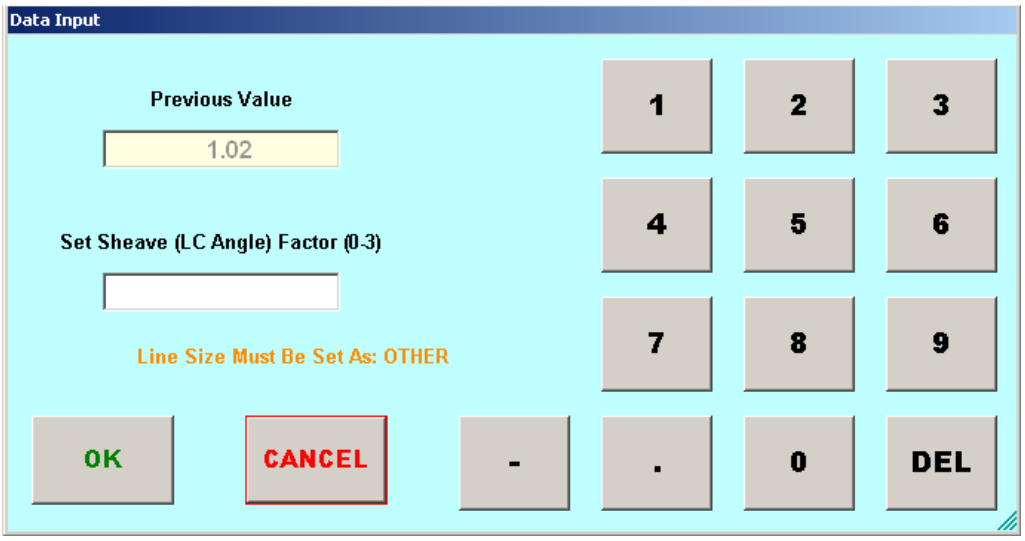
The Tension Scale screen allows the changing of both Bar Meter Scale near the bottom and the Needle Gauge Scale at the center of the screen. It also allows the Gauge Scale to be used either in a Differential or Incremental scale mode.

Incremental tension provides a high resolution tension scale. It must be periodically reset as tension increases or decreases to keep it from “pegging out”.

Differential tension provides a delta tension reading. The meter will slowly reset itself to zero so that normally the reset switch is not necessary.

A note at the middle-right of the screen advises the measurement units, i.e. kilograms or pounds.

3.2.3 SHEAVE FACTOR



The Sheave Factor function is a multiplicative factor used when a sheave wheel load cell is used or in the case of the built-in load pin for different line sizes.

This value can be changed when the Line Size selected (see Section 3.5.1), is **OTHER**.

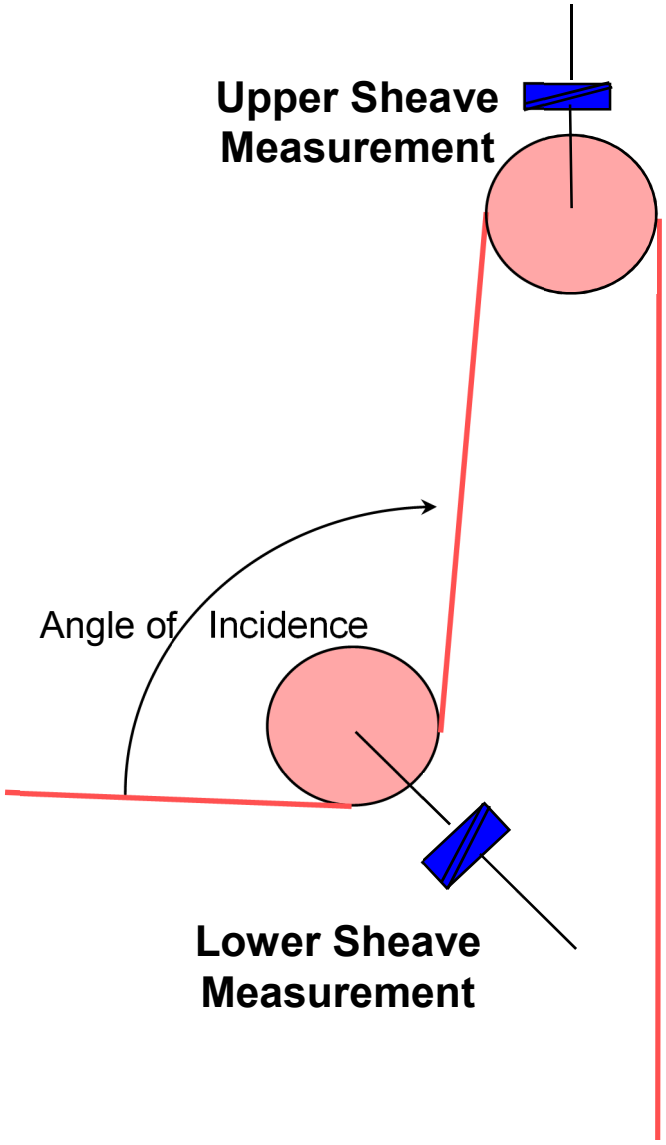
The Sheave Factor is related to the incidence angle of the wireline at the sheave wheel where the tension is measured. The load cell incidence angle factor is used to compensate when a load cell is not hung vertically (i.e. bottom sheave). Enter the value derived from the formula:

$$Sheave\ Factor = \frac{1}{\cos\frac{\emptyset}{2}}$$

$$where\ \emptyset = angle\ of\ incidence$$

Examples:

Ø = 0 degrees (top sheave rig-up)	1.000
Ø = 30 degrees	1.035
Ø = 60 degrees	1.155
Ø = 90 degrees (ideal lower sheave rig-up)	1.414
Ø = 120 degrees (high angle rig-up)	2.000
Ø = 150 degrees	3.864



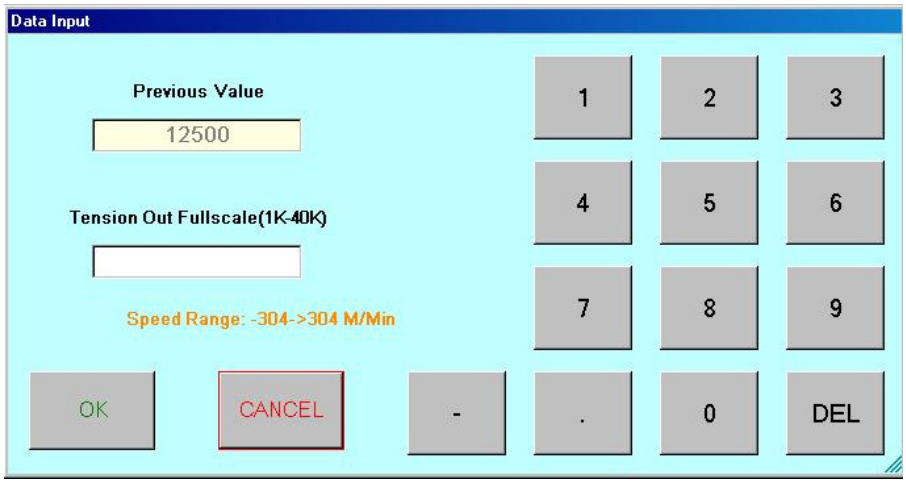
Sheave Factor is pre-determined for the 8 built-in line sizes using the 5K Head Benchmark and cannot be changed.

Also, additionally, a deep grooved wheel factor is used, if enabled, and is pre-determined and built-in and cannot be changed.

Note: Sheave factor (HI) is meaningful when the HI tension wheel option is chosen 'YES'. Refer to section 3.5.1- Line size setup. This wheel option is available only for the 5K head.

3.2.4 TENSION OUTPUT

Tension Output provides a means of defining the maximum full scale tension on the tension display.



The default is 12,500 lbs = 10 volts out (for the AM5K load pin).

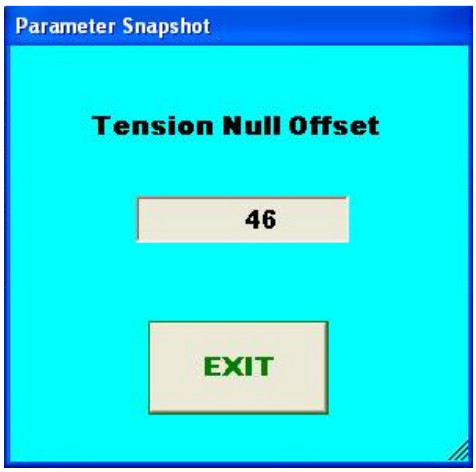
This option would be necessary for jobs where tension is expected to exceed 12,500 lbs.

Note: The AM5K and AM3K load pin and the AMS4A panels need to be calibrated accordingly.

3.2.5 TENSION NULL

Tension Null displays the cumulative value of the tension offset that was 'cancelled-out' when operator pushed the Tension Zero button.

For example, if operator pushes Tension Zero button when tension is 100 lbs. and on the next job pushes Tension Zero button when tension is 200 lbs, the Tension Null display will read 300 lbs. The Tension Null is reset to zero when restore defaults is pressed (refer to Set-Up menu, Section 3.5.11).

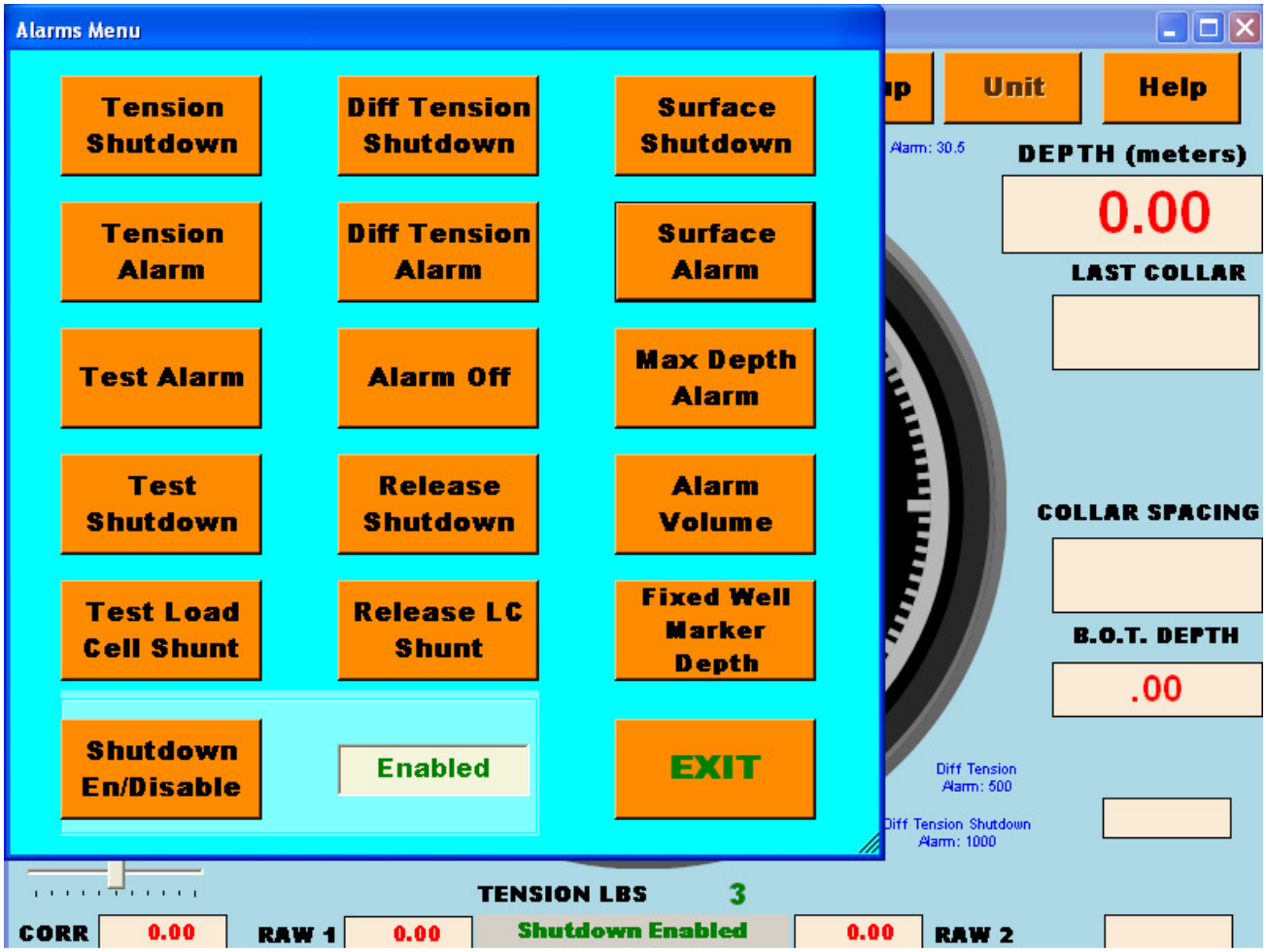


This value displayed is derived from the tension zero function in the tension calibrate menu (see Section 3.2.1).

EXIT returns to the Tension Setup Menu section 3.2.

3.3 ALARMS

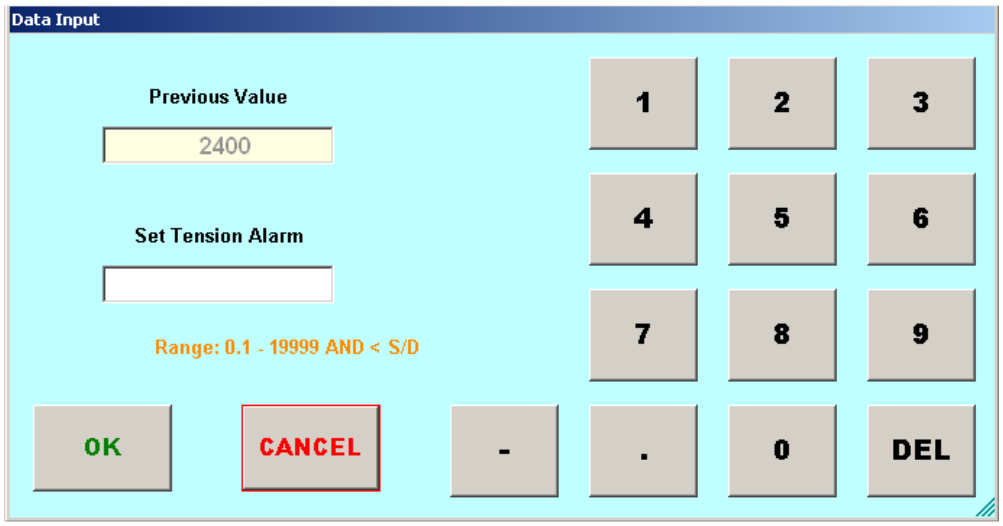
The Alarms menu controls the settings and actions of the various alarm functions available



The units are those as established in the Units menu (Section 3.5.8).

EXIT returns to the main display.

3.3.1 TENSION ALARM



The set tension alarm screen will appear. The range is 0.1 – 19,999 and < S/D

When preset tension value is reached, alarm sounds and "TENSION ALARM" flashes on the screen.

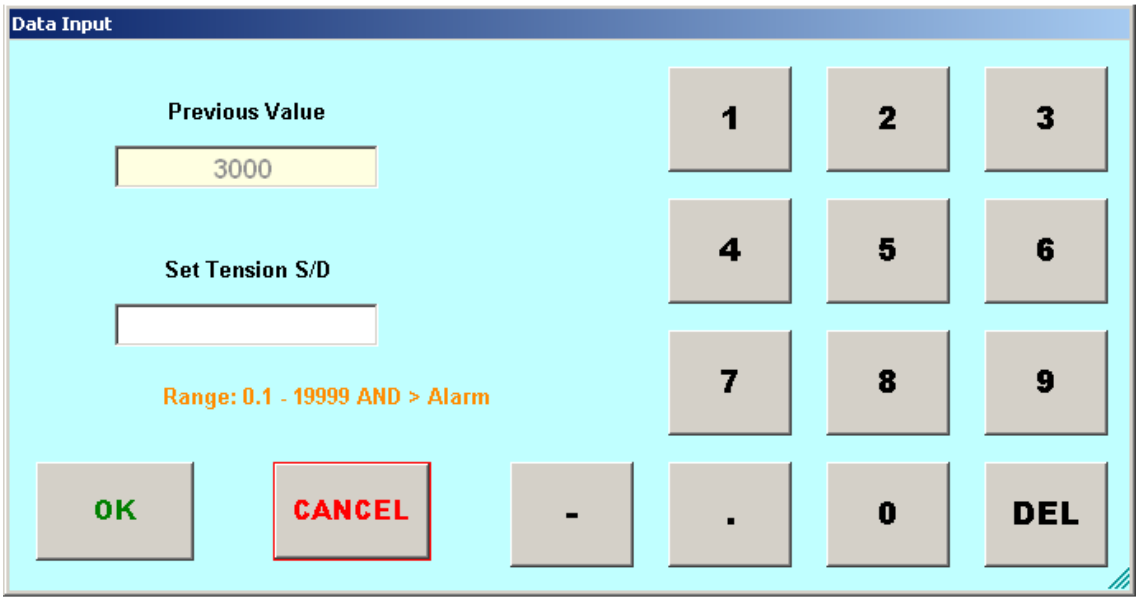
Each cable size has a default Tension Alarm setting.

Note: Only the setting for the cable size selected can be adjusted. The default values are restored when restore defaults is pressed.

Line Size	Default Tension Alarm Setting, Lbs
7/32”	1,500
9/32”	2,400
5/16”	2,400
3/8”	2,400
10.33 mm	2,400
7/16”	2,400
15/32”	2,400
.474 SLAMMER	2,400
OTHER	2,400

The Tension Alarm value entered must be less than the set Tension Shut Down value (see Section 3.3.1).

3.3.2 TENSION SHUTDOWN



TENSION SHUTDOWN provides control of the tension value which will initiate the tension shutdown contact to be closed and an associated visual and audible alarm to be activated.

The shut down contact can be used to control the winch, causing the winch to disengage when activated. This functionality depends on the specifics of the winch control design.

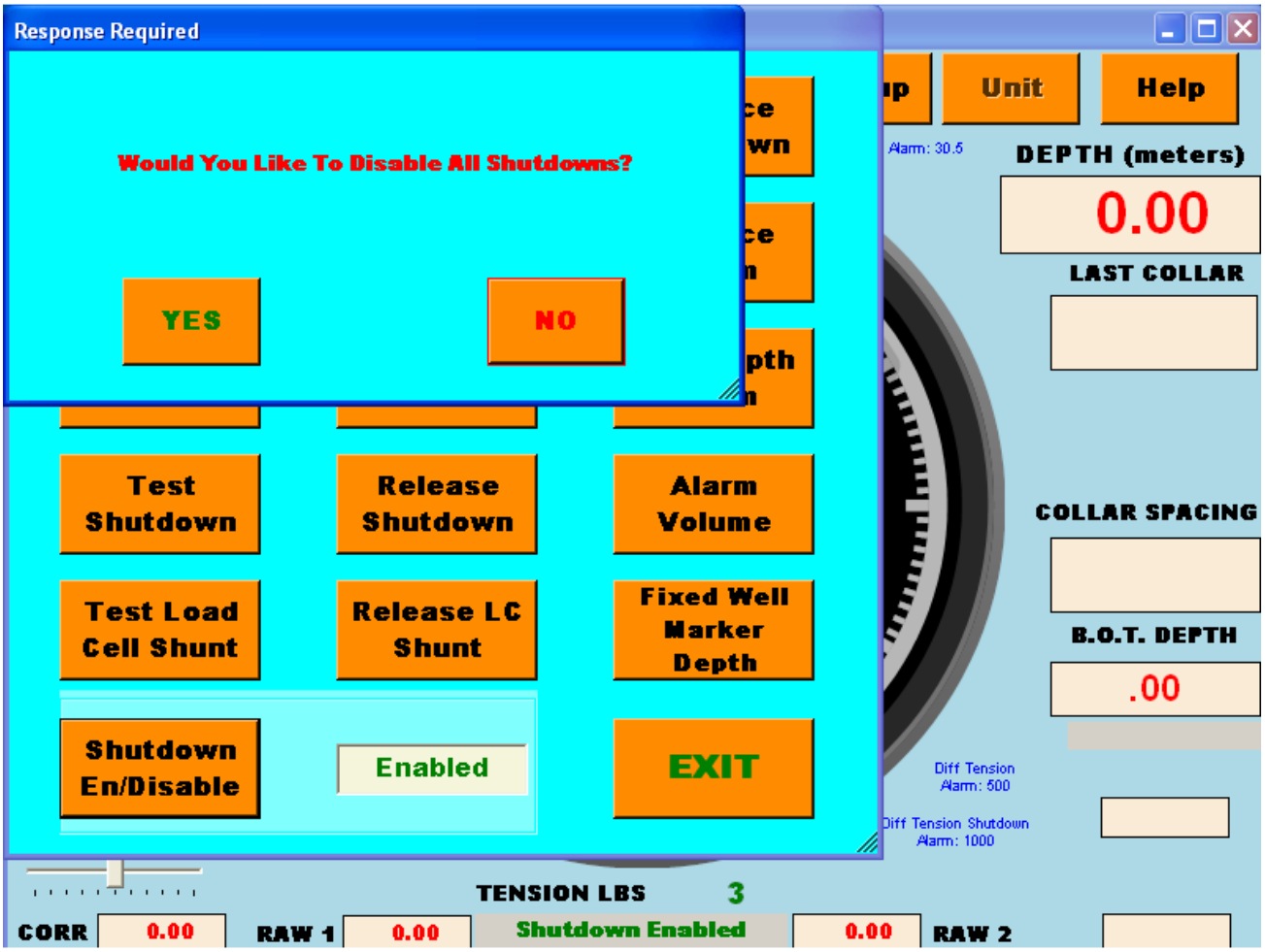
The default setting will depend on the selected cable size (Section 3.5.1).

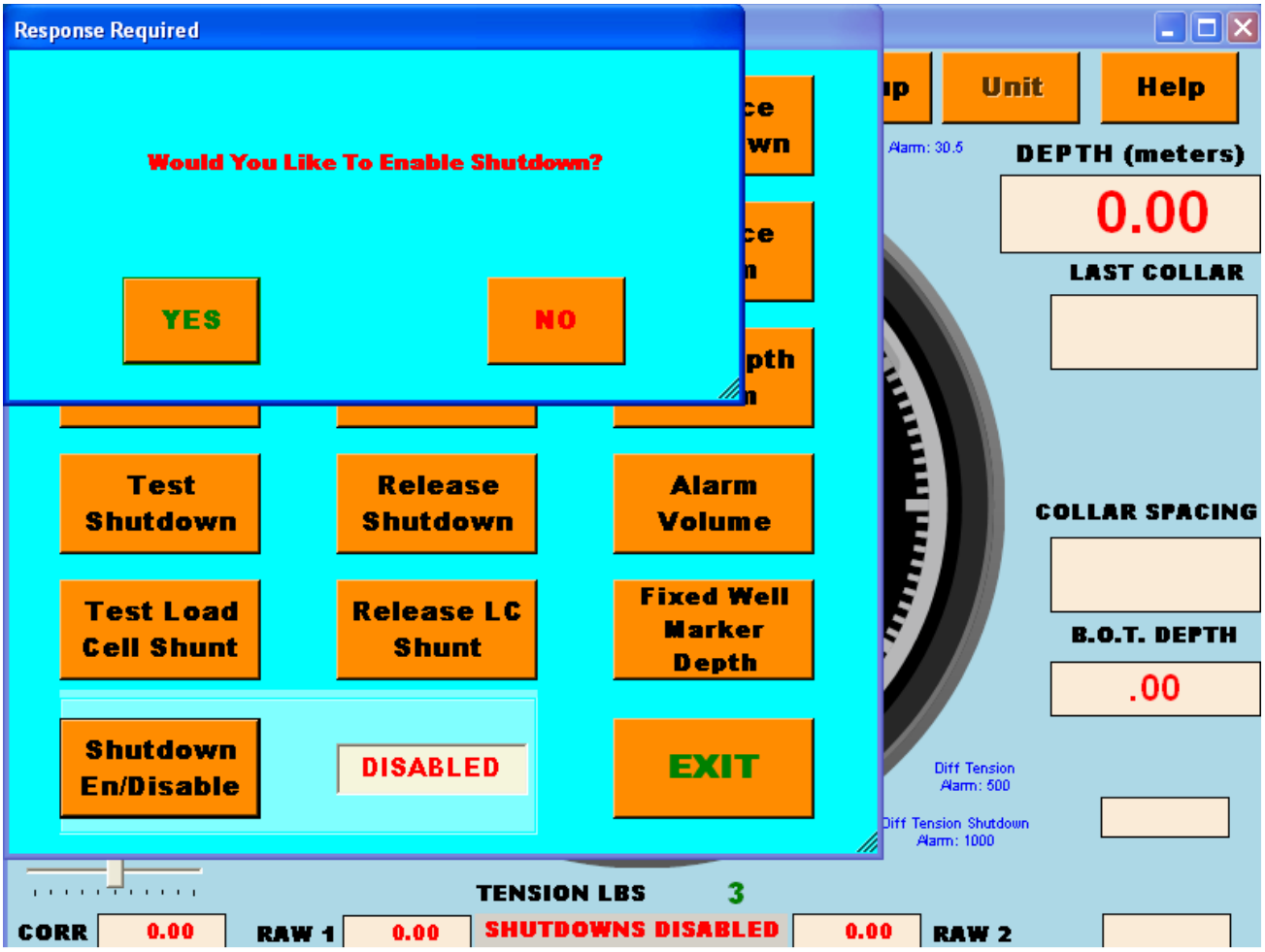
Note: Only the setting for the cable size selected can be adjusted.

Line Size	Default Tension Shut Down Setting, Lbs
7/32”	2,000
9/32”	3,000
5/16”	3,500
3/8”	3,500
10.33 mm	3,500
7/16”	3,500
15/32”	3,500
.474 SLAMMER	3,500
OTHER	3,500

The Tension Shut Down value must be greater than set Tension Alarm value (see Section 3.3.2).

Note: The default values are restored when restore defaults is pressed.





3.3.3 TEST ALARM

This button will sound the alarm when YES is pressed. This can be used to verify the alarm is working and to determine if the volume is adequate.

3.3.4 TEST SHUTDOWN

When this button is pressed, the shutdown relay contacts are shorted when YES is pressed. This can be used to test the winch shutdown mechanism or any other mechanism that uses these contacts.

3.3.5 TEST LOAD CELL SHUNT

This feature is for testing the load cell shunt in load cells and pins that support a shunt function. A tension calibration is not performed with this feature.

3.3.6 DIFFERENTIAL TENSION SHUTDOWN

The Set Differential Tension S/D entry screen will appear. The range is 0.1-5000 AND > Alarm.

The Differential Shut Down value entered must be greater than set Differential Alarm value (see Section 3.3.7).

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

Default is 1,000 for differential tension shutdown. Default is 500 for differential tension alarm.

3.3.7 DIFFERENTIAL TENSION ALARM

The set differential tension alarm screen will appear. The range is 0.1 – 2000 AND < S/D.

The Differential Alarm value entered must be less than the Differential Shut Down value (see Section 3.3.6).

When this setting is reached the alarm sounds and "DIFF TENSION ALARM" flashes on the screen.

3.3.8 ALARM OFF

Press **YES** to silences the alarm, until a new alarm condition occurs.

3.3.9 RELEASE SHUTDOWN

When the **YES** button is pressed, the contact closure pins (A and B) on J8 are open, releasing tension shutdown condition.

3.3.10 RELEASE LOAD CELL SHUNT

This feature is for testing only.

If the load cell shunt is tested, then it must be released using the above menu item. A tension calibration is not performed with this feature.

3.3.11 SURFACE SHUTDOWN

Depending on whether the Surface Shutdown is enabled or disabled, you will see

one of the following two screens.

When the surface alarm depth value is reached, the alarm will sound and tension contact closure switch is closed if this is set to ‘enable’. This can be used to provide a signal to automatically stop the winch.

Default value is ‘disabled’.

3.3.12 SURFACE ALARM

The set surface alarm screen will appear. The range is 0 – 304 Mt. When this depth value is reached, the alarm will sound.

Also, if the surface shutdown is enabled (see section 3.3.11), the shutdown relay contacts will close at this depth.

3.3.13 MAX DEPTH ALARM

The set max depth alarm screen will appear. The range is surface – 9,144 Mt.

When depth value is reached the alarm will sound and a message will flash on the main screen. This value is used to calculate the ETA (estimated time of arrival) when going down hole (to T.D. for example). Note: When going up-hole, ETA is calculated for zero depth.

3.3.14 ALARM VOLUME

This button will bring up a slider bar which is used to adjust the alarm volume. Use the "Test Alarm" button to test the volume.

This slider and the alarm will always revert to ‘loud’ when panel is power cycled or when restore defaults is done (see Section 3.5.10).

3.3.15 FIXED WELL MARKER DEPTH

This feature offers a visual alarm that notifies the operator when a depth of interest is approaching.

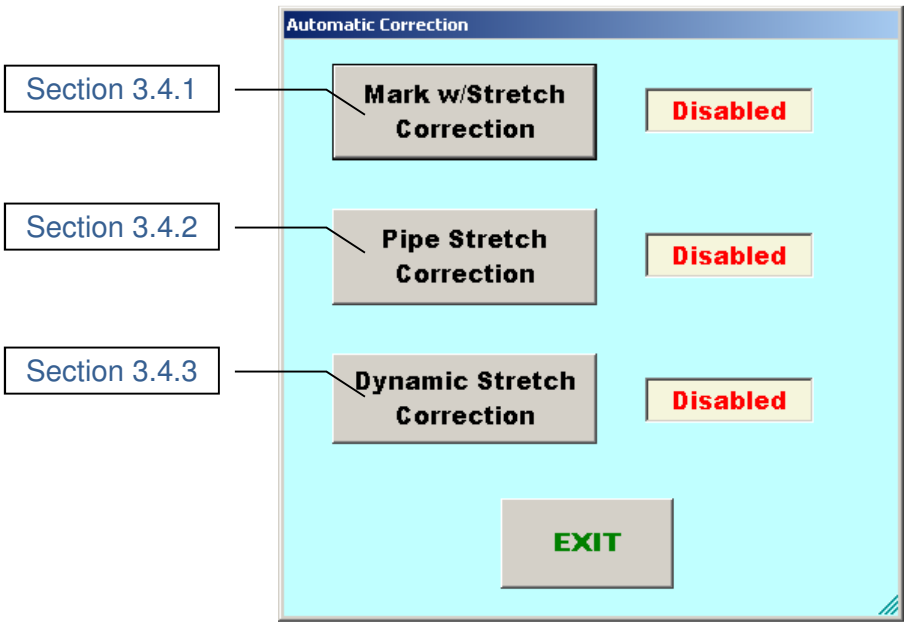
The background color of the depth box will change color when depth is within +/- 20 and +/- 10 meters of the operator inputted fixed well marker depth.

3.4 AUTO CORRECT

Auto Correction is used to generate and implement depth corrections due to magnetic mark correlation and cable stretch.

The depth from the AMS4A panel can be formatted to provide the logging system with depth according to a number of different options.

With no option selected (all options showing **Disabled**), the depth is derived from the encoder depth.



EXIT returns to the main display.

The Marks w/Stretch option will track the cable magnetic marks and provides stretch correction based on the line weight in mud and the tool weight.

The Pipe Stretch Correction applies a correction for cable stretch based on the line weight in mud and the tool weight that corresponds to the pipe stretch correction typically used by drillers, allowing a correction to be made that corresponds to the driller's depths.

The Dynamic Stretch option tracks the surface tension and applies a correction based on the varying line tension experienced during logging.

The stretch correction algorithms used are in two parts: one relating to the line stretch due to line weight, and the other due to the effect of tool weight.

3.4 AUTO CORRECT continued

These are:

$$Line\ Weight\ Stretch = \frac{1}{2}\ (Line\ Weight\ in\ Mud) * Line\ Length * Stretch\ Coefficient$$

$$Tool\ Weight\ Stretch = Tool\ Weight * Line\ Length * Stretch\ Coefficient$$

Note: $$Theoretical\ Surface\ Tension = Line\ Weight\ in\ Mud + Tool\ Weight$$

$$Total\ Stretch = Line\ Weight\ Stretch + Tool\ Weight\ Stretch$$

Both corrections assume the measured depth as defined by marks or by measure wheel.

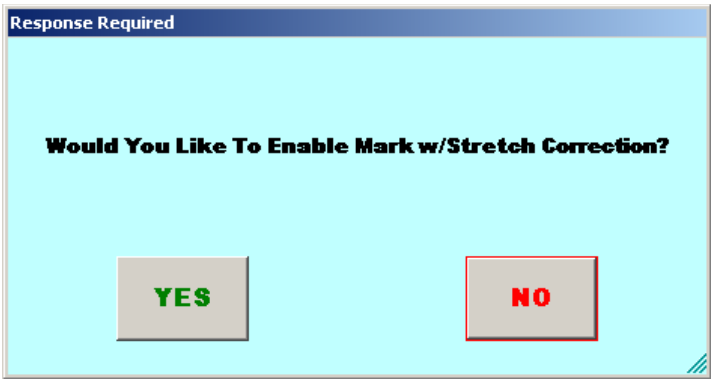
Tool Weight is input as a panel parameter, measured when at surface prior to running in hole, and is a panel input (see Section 3.5.2.1). It is recommended to use tool weight in fluid (mud).

Mud Weight is a panel parameter input (see Section 3.5.2.2).

In the case of dynamic stretch, the cable stretch is calculated real time based on the logged surface tension, and the depth is determined using the measure wheel encoder input and not the magnetic marks. The magnetic mark tracking is disabled. The depth provided by the panel to the logging system will be affected less by stick and pull during logging, and while the drum may be turning (for example at pick-up or when the tool is stuck), the logged tool depth may not move. This can be a source of concern to some observers, and should be explained as may be required prior to operations. However, the provided logged depth is then assumed to be corrected for line tension as well as stick and pull, and gives increased accuracy of tool depth information.

3.4.1 MARK WITH STRETCH CORRECTION

Depending on whether the Stretch Correction is enabled or disabled, you will see one of the following two screens.

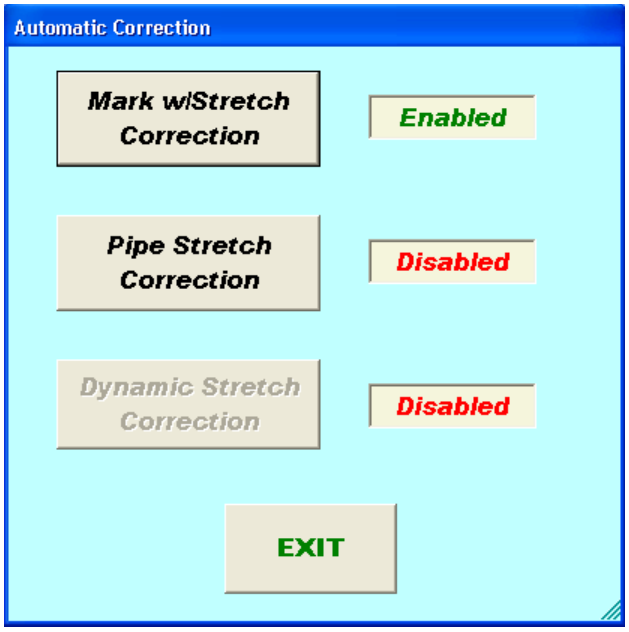


This mode is enabled when the depth is to be corrected to coincide with the magnetic marks on a wireline cable.

It is important to ensure that the entered line size and cable, mud and tool weight parameters are correct to ensure as accurate as possible correction calculation.

3.4.1 MARK WITH STRETCH CORRECTION continued

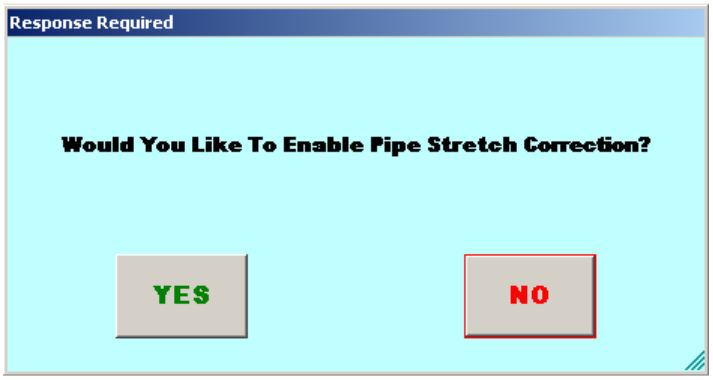
NOTE: When Mark with Stretch Correction is enabled, Dynamic Stretch Correction cannot be enabled.

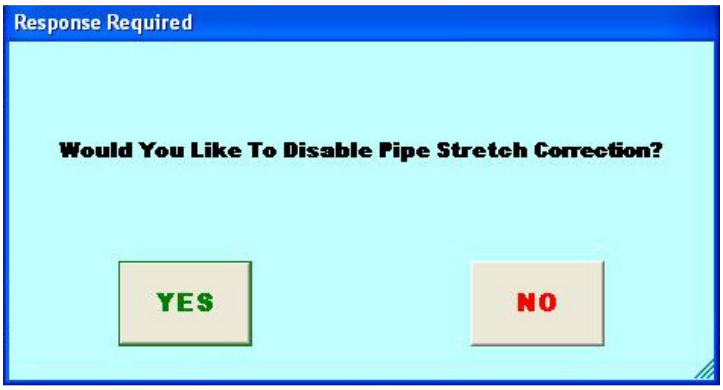


The algorithm used to provide the stretch correction combines the effect of the cable weight in mud with the tool weight to arrive at a cable stretch. This is calculated per magnetic mark depth to arrive at a stretch correction, and hence and effective tool depth per magnetic mark.

3.4.2 PIPE STRETCH CORRECTION

Depending on whether the Pipe Stretch Correction is enabled or disabled, you will see one of the following two screens.



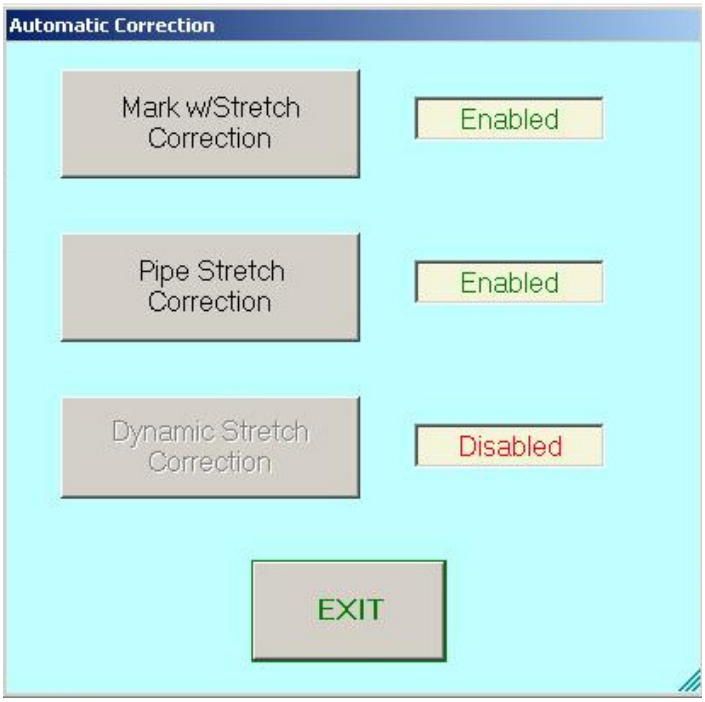


Enabling this causes the stretch algorithm used to correspond to the general stretch algorithm that driller's are used to, and hence the ability to correlate to Driller's Depth is enhanced.

The stretch correction used is an approximation.

3.4.2 PIPE STRETCH CORRECTION - continued

Note that Driller's Depth is not an accurate determinant of well depth, even though it may give a rig-crew acceptable correlation. The depth arrived at is not a calibrated, nor verifiable depth determination.



NOTE: When Pipe Stretch Correction is enabled, Mark with Stretch Correction is automatically enabled, and Dynamic Stretch Correction cannot be engaged.

3.4.3 DYNAMIC STRETCH CORRECTION

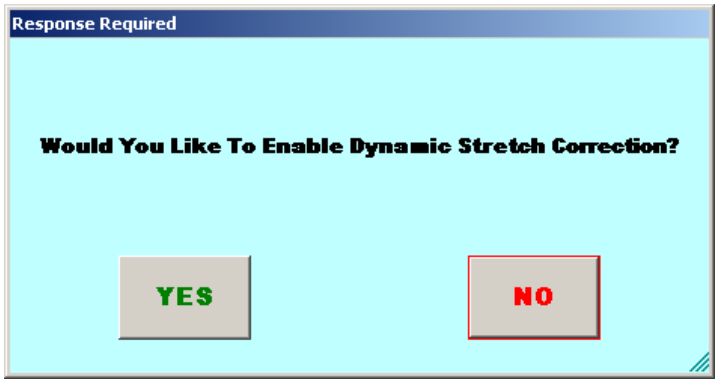
Dynamic stretch correction provides real time correction of the cable stretch to the apparent depth to provide an actual tool depth.

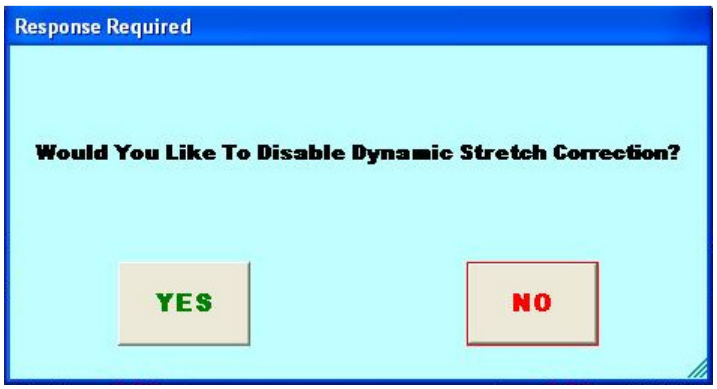
As such, the tool depth may, under certain circumstances, appear not to move even though the drum is turning and cable is being spooled onto the drum. This can occur in circumstances where the tool has stood-up (e.g. at TD) or the string is stuck, and the system has detected that the tool is not moving while cable is being spooled onto the drum.

The tool depth is thus affected by tension pulls and/or slack cable, thus the term 'dynamic stretch' as the tool depth is calculated based on the current dynamically changing tension.

The depth information fed to the logging system from the AMS4A panel will thus reflect calculated tool depth, and not cable spooled. This may result in a log that, while providing more accurate sub-surface mapping, may not necessarily reflect the same sort of characteristics that some users may expect to see in a typical log response.

Depending on whether the Dynamic Stretch Correction is enabled or disabled, you will see one of the following two screens.





Note: Caution should be observed with this setting enabled, because it is not compatible with some wireline logging services (e.g. depth interrupt activated tools).

Note: When Dynamic Stretch Correction is enabled, Mark with Stretch Correction and Pipe Stretch Correction cannot be enabled.

3.5 SET UP SCREEN

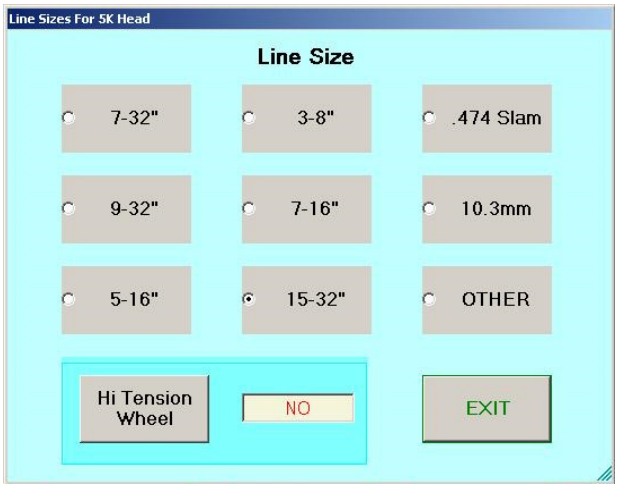
The values entered are saved until otherwise altered, or unless the default parameters values are reset (**RESTORE DEFAULTS**, see Section 3.5.11).

When **OTHER** is selected in the Line Size and Measure Head menus (see Sections 3.3.1 & 3.3.2 resp.), it is recommended to review all the parameters selected to check for accuracy and consistency using the **SUMMARY** (see Section 3.5.17) menu.

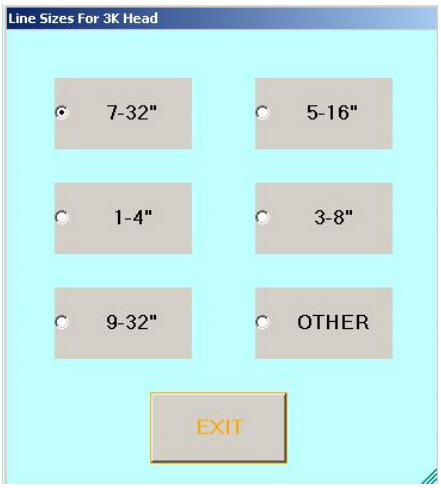
EXIT returns to the main display menu.

3.5.1 LINE SIZE SETUP

The Line Size menu provided will depend on the type of measure head selected (see Section 3.5.2).



Line size menu for AM5K



Line size menu for AM3K

EXIT returns to the Set Up Screen.

The selection of the 9 built-in line sizes and the deep grooved (Hi-Tension) wheel is specifically for use with the BenchMark AM5K Measure Head. Note: **OTHER** should be chosen if not using the Benchmark AM5K or AM3K devices.

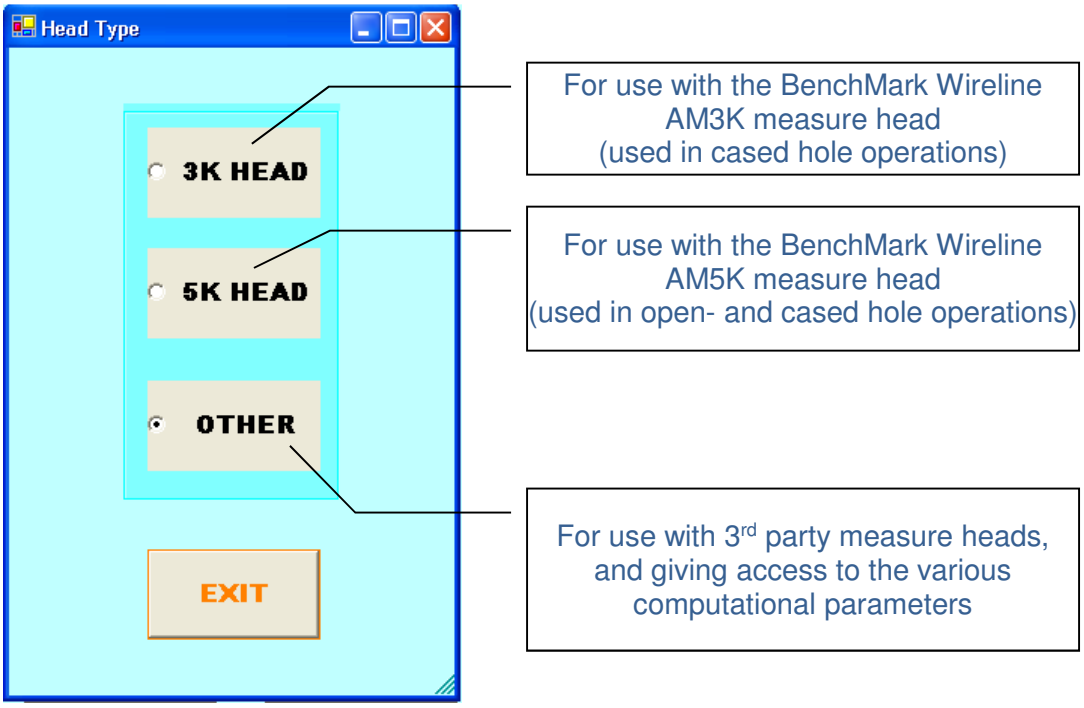
Choice of the line size will provide default parameters that are used elsewhere in the program, such as in the alarm and shut down defaults, and in the stretch correction routines.

Select the line size by pressing the corresponding gray box.

This menu also allows the changing to a deep grooved wheel on the measuring head. Selecting this does NOT change the tension output settings (refer to Section 3.2.4)

Note that Line Size must be set to **OTHER** at this menu to allow various other parameters to be set, as noted on their individual menus.

3.5.2 HEAD TYPE



EXIT returns to the set up menu

If '3K Head' is chosen then the line size for the AM3K head menu is available (see Section 3.5.1).

If '5K Head' is chosen then the line size for the AM5K head menu is available (see Section 3.5.1).

If **OTHER** is chosen there is no corresponding Line Size menu choice and individual Set-Up menus will have to be accessed to set up the panel parameters to read the line, measurehead and tension measurements accordingly. In this case, it is recommended to use the SUMMARY (see Section 3.3.17) to review all the applicable parameters.

3.5.3 STRETCH PARAMETERS

The Stretch Parameter screen provides access to a number of parameters that are used the correction calculations.

3.5.3.1 TOOL WEIGHT

The weight of the tool string at the end of the cable. It is recommended to use tool weight in fluid (mud).

Range is 1 to10,000 lbs (.45 to 4,536 Kg)

3.5.3.2 MUD WEIGHT

The fluid weight of the well bore fluid.

Default is 8.30 lbs/gal (994.56 kg/cu.M.)

Range is 1-100 lb/gal (120 to 12,000 Kg/cu.M)

3.5.3.3 ACTUAL AND CALCULATED STRETCH

These are static displays that provide useful information if a Stretch Adjustment needs to be performed at T.D.

Calculated Stretch is the theoretical stretch based on depth, line size (weight and stretch coefficient), mud weight, and tool string weight and the theoretical surface tension (see Section 3.4, equations).

Actual Stretch is calculated using all of the above parameters, except that the actual tension is used in the stretch calculation (see section 3.4, equations).

3.5.3.4 LINE WEIGHT

If line size and/or head chosen is = OTHER, then this value must be entered for the stretch calculations to be accurate.

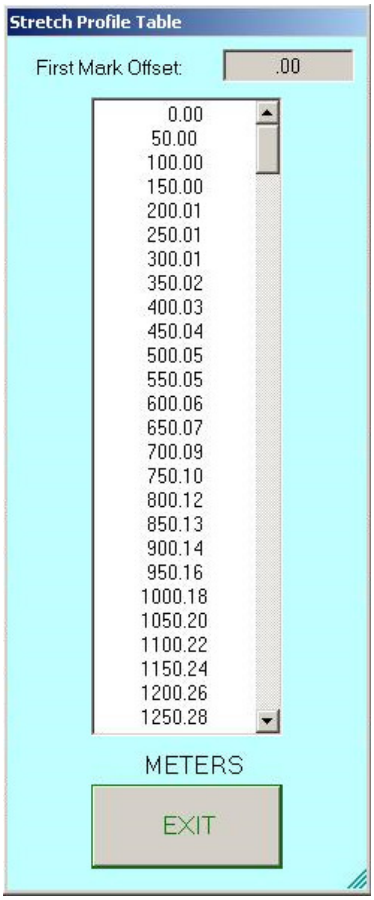
3.5.3.5 LINE VOLUME

If the measure head or line size is = OTHER, then this value must be entered for the stretch calculations to be accurate.

3.5.3.6 STRETCH COEFFICIENT

If line size and/or head chosen is = OTHER, then this value must be entered for the stretch calculations to be accurate. Value units are ft/k.ft/1,000 lbs.

3.5.3.7 View/Save Profile Table



This is the table of the location of the magnetic marks on the cable based on theoretical stretch correction taking into account line size, line weight, line volume, line stretch coefficient, tool weight, and mud weight based on the mark progression as defined by Mark Interval (see Section 3.5.4).

Note the text box labeled ‘FIRST MARK OFFSET’. This value defines the distance of the first mark from the 0.00 value assumed in the calculation of the (mark + stretch) values in the table. Note that this value can be +ve as well as –ve.

Eg. If the value of FIRST MARK OFFSET is 10.00 Meters, then all numbers in the table reflect the FIRST MARK depth plus the theoretical mark spacing plus the associated stretch calculated for each mark depth.

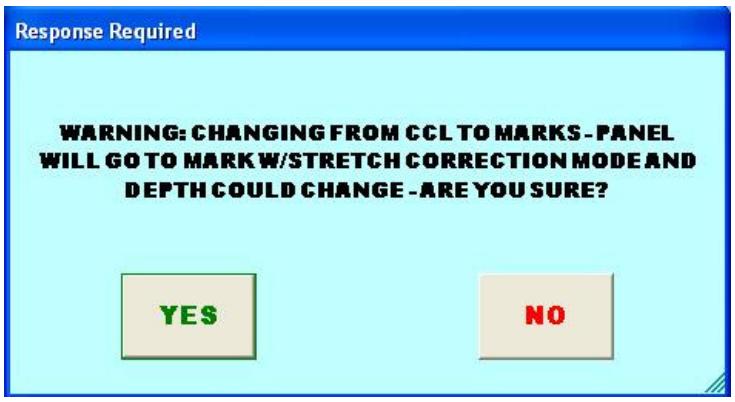
10.00 m + 50 m mark spacing = next mark at 60.00 m, etc.

The table has 300 entries, making the depth range of the table dependant on the mark interval (see Section 3.5.4).

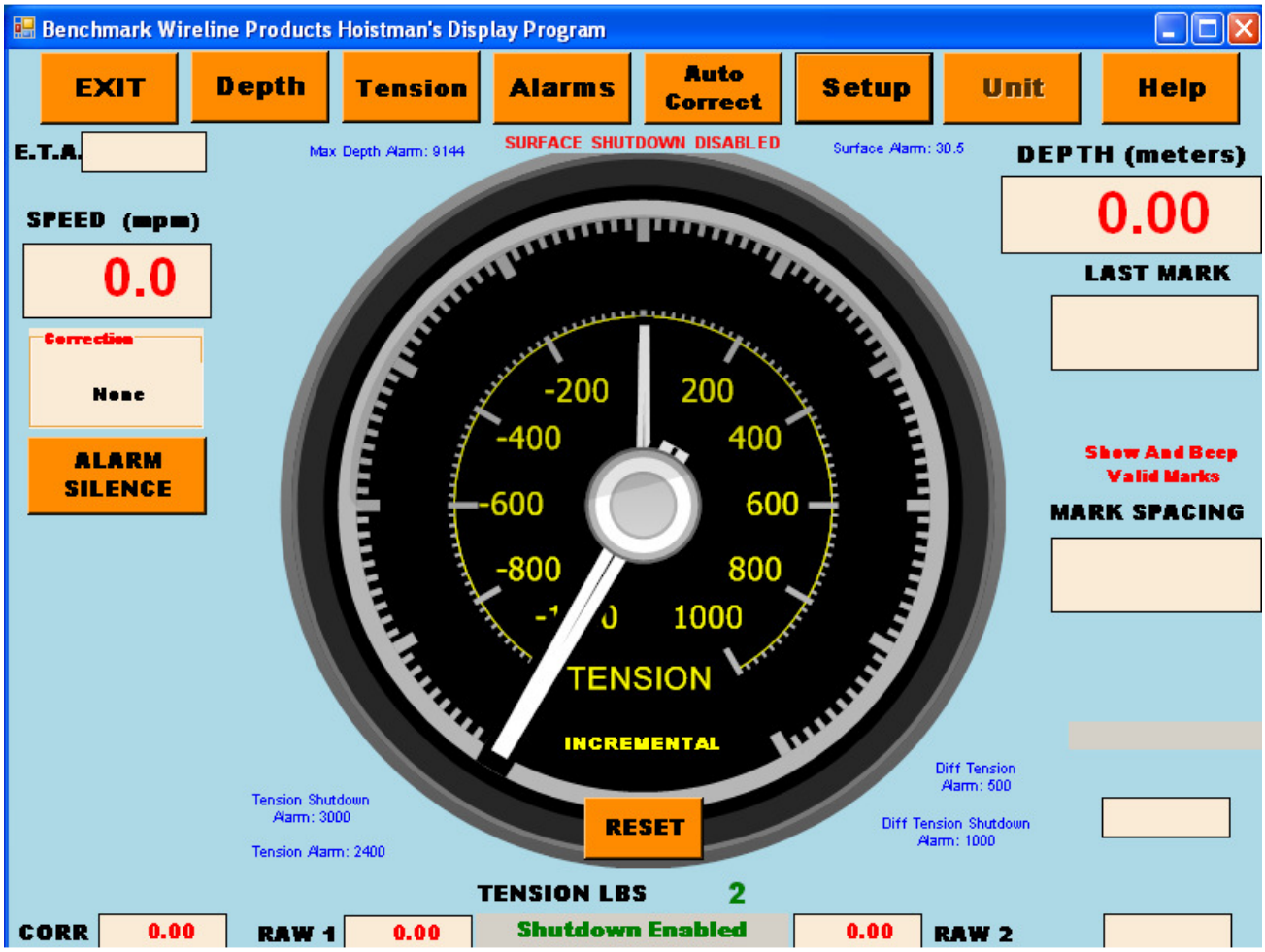
The marks and associated corrections are calculated from surface.

3.5.4 MARK MODE AND PARAMETERS

If the panel is in CCL Mode and Mark Mode is chosen, the following screen will appear.

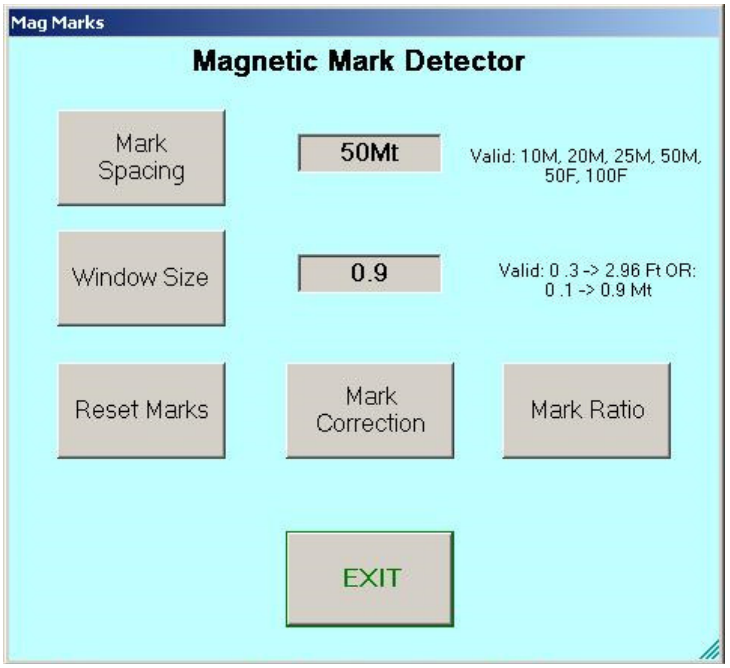


…otherwise, the following screen will appear.



3.5.4.1 MARK SPACING

Supported mark spacing is: 10.00 m, 20.00 m, 25.00 m, 50.00 m, 50 ft and 100 ft



3.5.4.2 WINDOW SIZE

The Window Size determines the length of line along which valid marks can be detected. This is based on the line having been marked at a constant tension in consistent intervals.

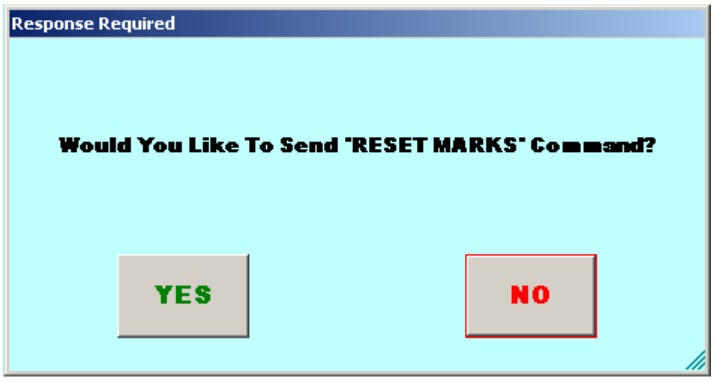
The amount of mark depth correction possible is determined by the mark window interval. After resetting the magnetic mark window the first mark detected is assumed to be a valid mark. If the mark spacing is 100 feet and the window size is 2 feet, the next mark detected after the defined first mark will be between 98 to 102 feet from the first assumed valid mark value. The panel will take the difference between (last mark + (mark spacing)) – current mark and add or subtract this to the depth gradually.

Example: If a mark occurs at the last mark + 102 feet, the panel will subtract 2 feet from the displayed depth in the next 20 feet.

Default window value is 2.89 ft or 0.88 m.
The range is 0.3 ft – 2.96 ft or 0.1 m – 0.9 m.

Note: Magnetic mark with stretch correction must be enabled for the above correction example.

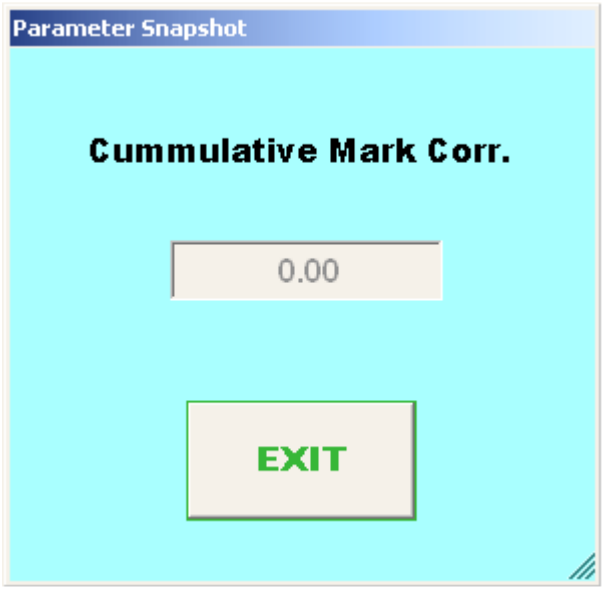
3.5.4.3 RESET MARKS



YES clears the established Mark Table (see section 3.5.5), and opens the mark window. After resetting the magnetic mark window the first mark detected is assumed to be a valid mark.

CAUTION: This should only be done before start of logging.

3.5.4.4 MARK CORRECTION

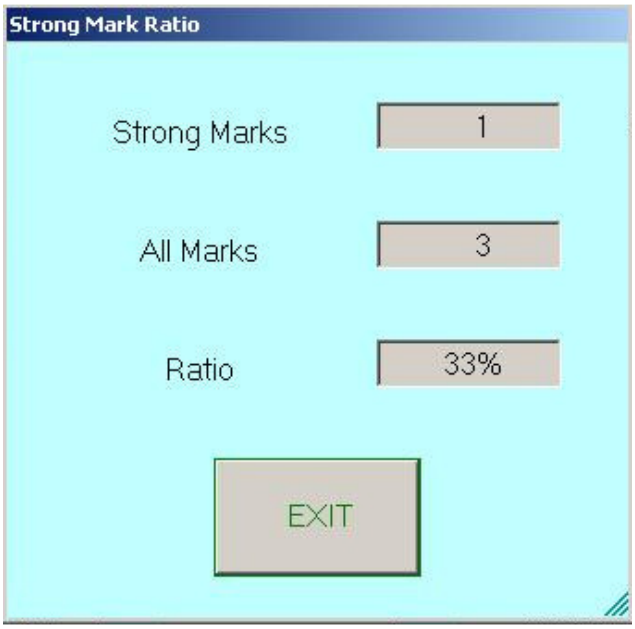


This is the static display of the total of the correction applied to the depth at the current depth. This is the total correction applied to the mark depths compared to the mark value since Set Depth (see Section 3.1.1) or Reset Marks (see Section 3.5.4.3).

Line stretch due to tension is accounted for by entering the tool weight and fluid density. A theoretical tension vs. depth curve is calculated and used to establish the mark locations based on the originally identified mark value. At each mark a correction value is added or subtracted to the depth so that the depth will match the theoretical mark depth.

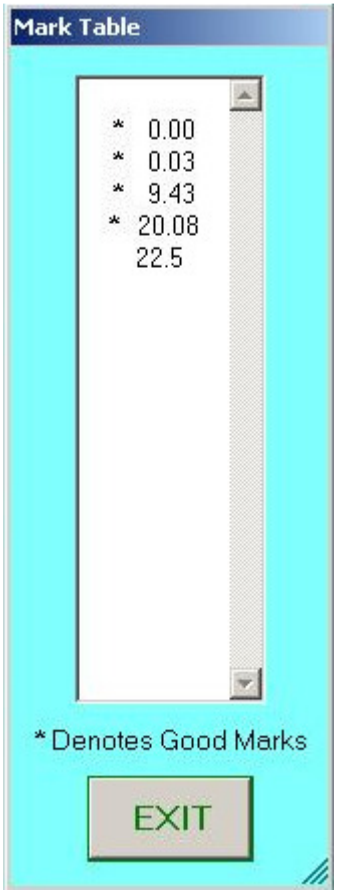
Example: Assuming .464 cable, if a tool weight of 1,000 lbs and fluid weight of 8.3 lbs/gal is used the mark at 10,000 feet is the mark value at surface + 10.8 ft (stretch). At 20,000 ft it is mark value + 43 ft.

3.5.4.5 MARK RATIO



This display is useful for determining if the marks on the line are weakening. The ratio is calculated as the number of “strong” marks divided by the number of all detected marks.

3.5.5 MARK TABLE



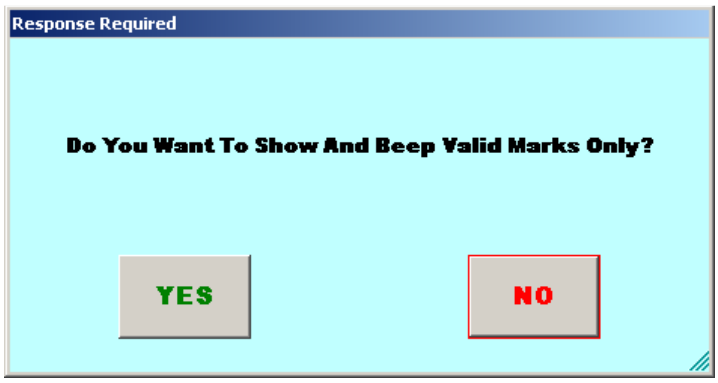
This table allows the viewing of all the magnetic marks detected while logging. The list can help in distinguishing between good and false marks.

All detected marks are listed in the table but only marks with * listed in front are considered good marks, i.e. marks that fall within the mark window, and are used by the system.

Mark Spacing refers to the (corrected) distance between the last detected valid mark and that before.

3.5.6 SHOW AND BEEP MARKS MODE

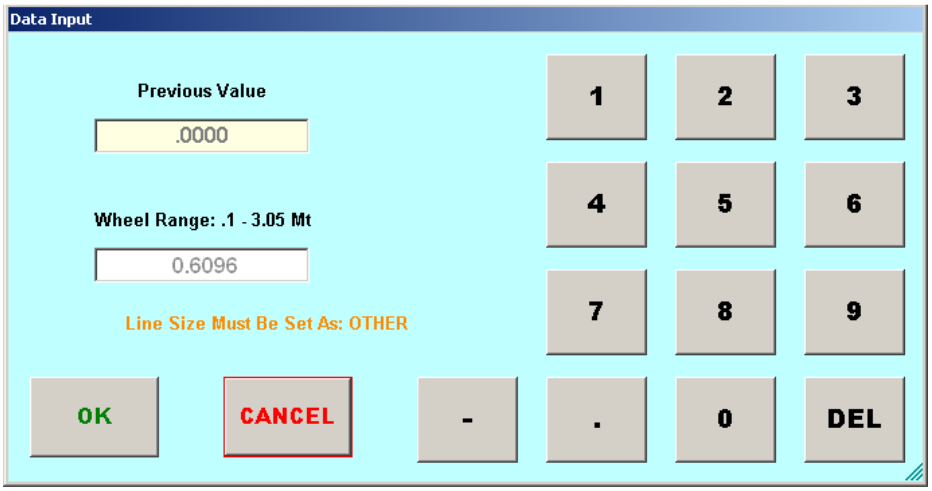
Depending on whether you want to Show and Beep Valid Marks or All Marks, you will see one of the following two screens.



The choices are: to show and beep valid marks (default) or to show and beep on all marks.

There is a new message on the main screen that shows what mode the panel is in.

3.5.7 WHEEL SIZE



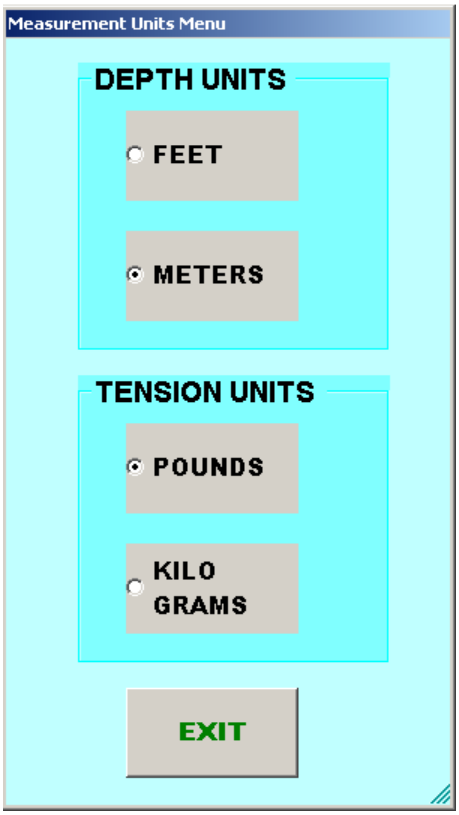
This setting allows you to change the size of the depth measuring wheel that is used to measure depth. To use a different measuring head from the Benchmark head, this setting will need to be changed to match the wheel size of the new head.

To change Wheel Size, the Head Type (see Section 3.5.2) must be **OTHER**. At thistime, the load cell angle sheave factor will also need to be set (refer to section 3.2.3).

Default value is 2 ft or 0.6096 meters

Note: Depth Shim (refer to Section 3.1.4) affects depth in a manner similar to wheel size. Care should be exercised when setting these values.

3.5.8 ENGLISH/METRIC UNITS

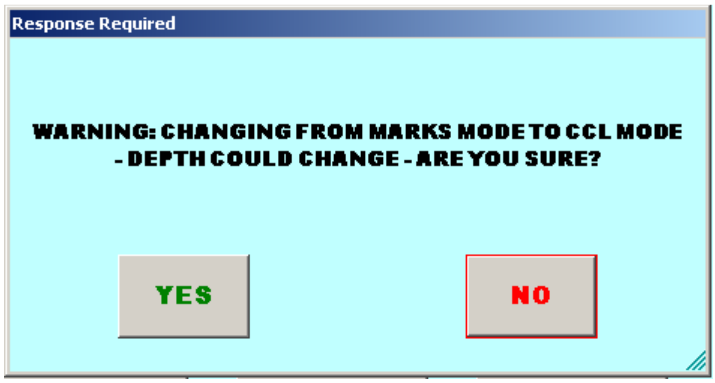


This menu allows you to select the display units for either depth or tension.

EXIT returns to the main display.

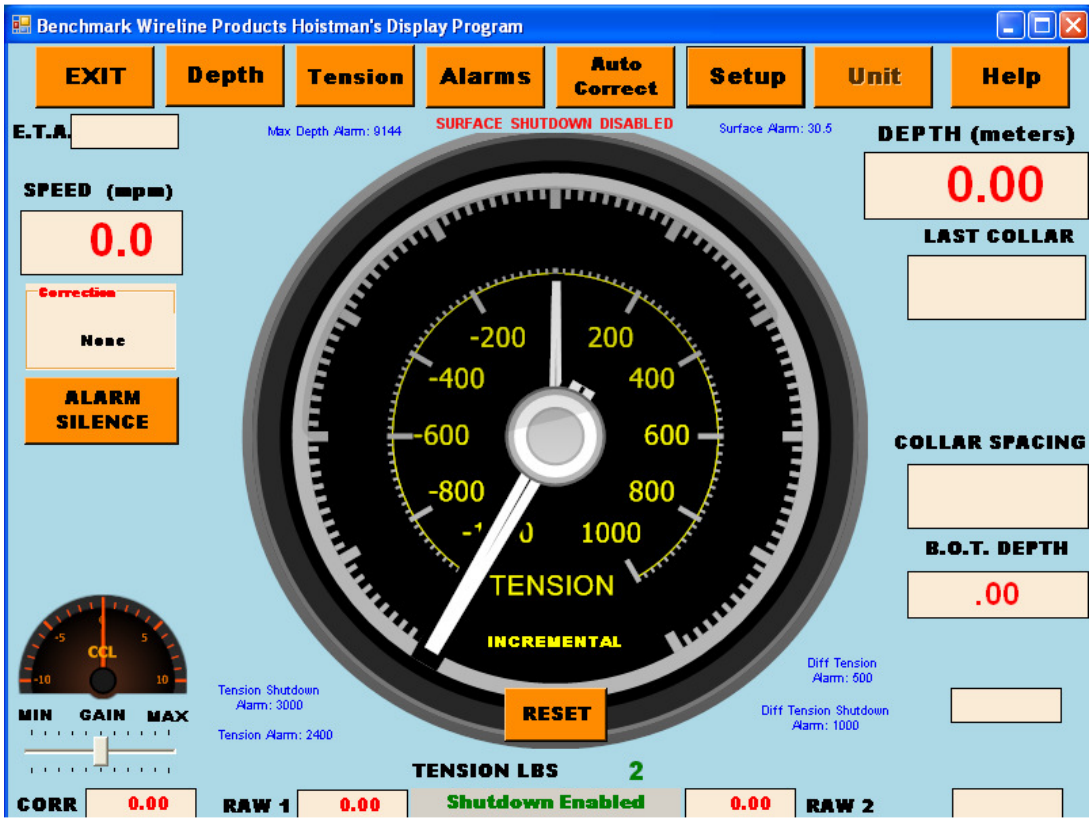
3.5.9 CCL MODE AND PARAMETERS

If the panel is in Mark Mode, the following screen will appear.



The current depth could change when changing from magnetic mark correction mode to CCL mode because magnetic mark and stretch corrections (if any) are zeroed-out when changing to CCL mode. The depth reverts to encoder derived depth (see Section 3.1).

3.5.9 CCL MODE AND PARAMETERS continued



Main Screen in CCL Mode

The last collar depth is that at which a defined collar is identified, and written to the CCL table (see Section 3.5.10). The Collar Spacing gives the most recent interval between located collars.

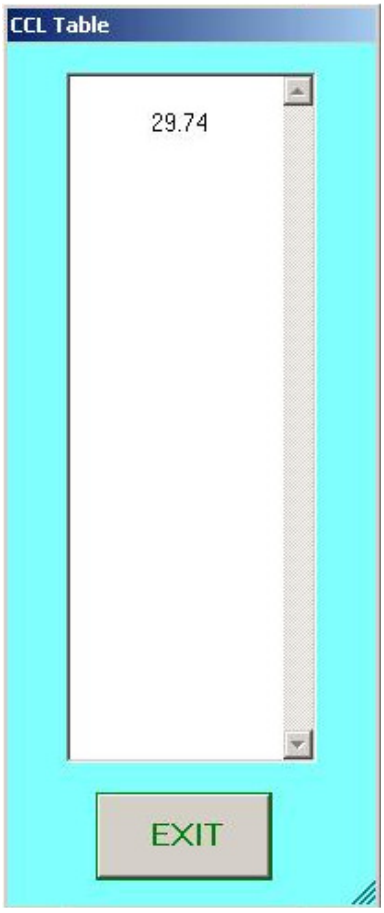
The CCL signal is input into the rear on the CCL connector. The CCL input goes into an operational amplifier and expected voltage levels are typically less than 5 volts.

The CCL signal is used for display and listing in the CCL Table (see Section 3.5.10). The software assumes a CCL when the signal is greater than 75% meter excursion. The screen gain control is available to adjust for signals levels that are either too strong or too weak.

There is a CCL shift that provides as a shift effect on depth.

CCL Offset adds or subtracts from the present depth. There are two offsets that are additive: CCL Offset and CCL Delay. BOT (Bottom Of Tool) depth is synonymous to CCL Offset.

3.5.10 CCL TABLE

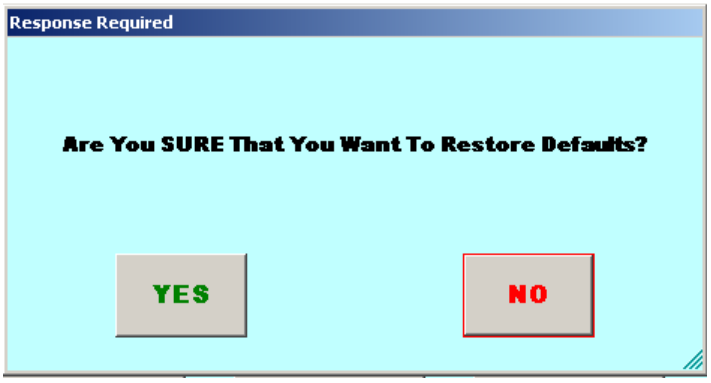


This table allows the viewing of Collars found while logging.

The collar log on the screen can be compared to defined collar depths, and adjustments to depth (see Section 3.1) made accordingly.

Collar Spacing refers to the distance between the last detected collar and that before.

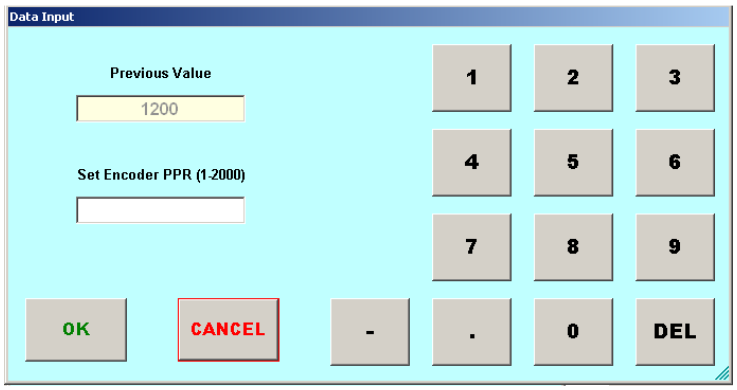
3.5.11 RESTORE DEFAULTS



The setting parameters entered under Section 3.5 are stored unless changed or unless this option is selected.

When **YES** is pressed, all the settings will be restored to their default values. This option functions as a software parameter reset. Depth will also be zeroed.

3.5.12 ENCODER IN PULSES/REV

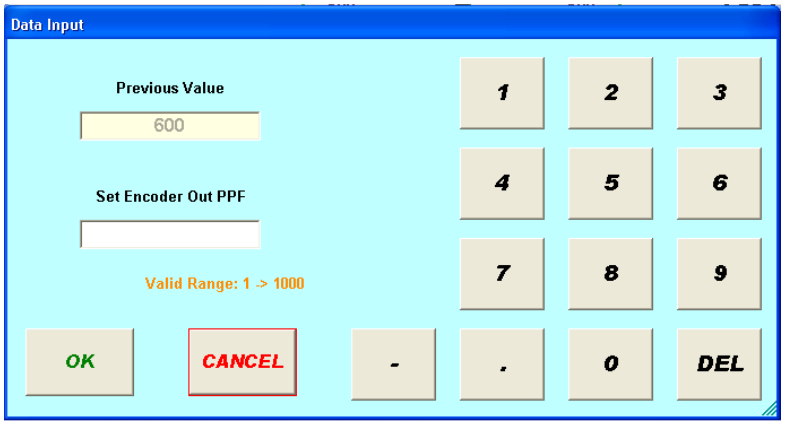


This window allows the number of pulses per wheel revolution to be entered, and is typically used when working with 3rd party encoders or measure heads.

The value entered is that given by the encoder manufacturer for the number of encoder pulses produced by one full revolution.

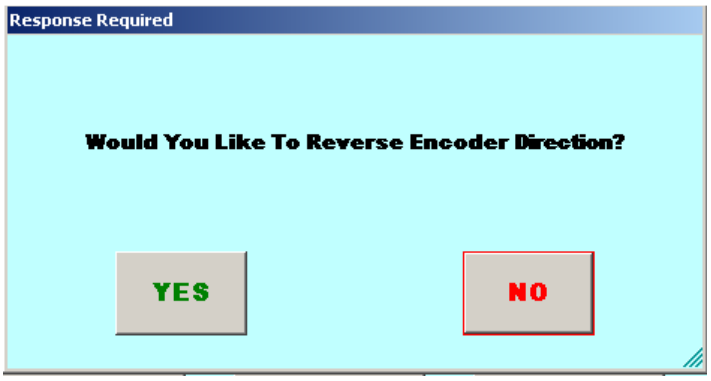
Keep in mind that this parameter and wheel size (refer to Section 3.5.6) determine the encoder pulses per foot. Default is 1200 pulses per revolution.

3.5.13 ENCODER OUT PULSES/FT.



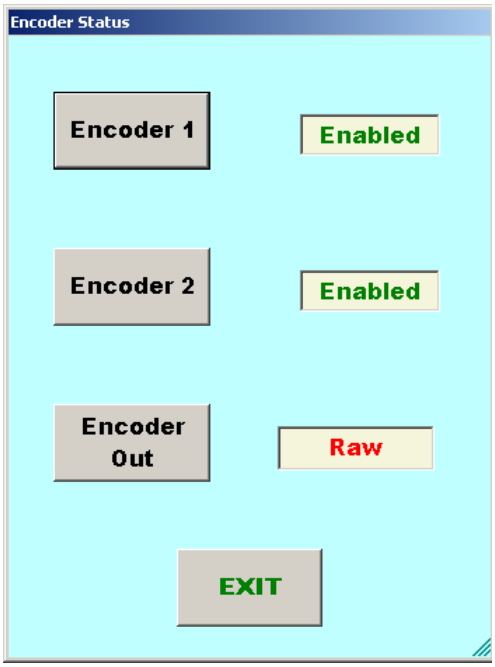
This is the encoder output signal in PPF (pulses per foot) from the panel that is used as the input to other devices using encoder pulse signals. The encoder output signals referred to are Phase A, Phase B, Phase A/, and Phase B/ from the AMS4A panel to the logging system. (Connector J7 pins 2, 3, 14, 15)

3.5.14 ENCODER DIRECTION



This screen allows the direction of the depth as defined by the encoder to be changed. If the depth is changing in the opposite direction to which the line is moving, this option can be used to correct it. On a dual wheel measuring device with two encoders, the encoder on one of the wheels will turn in the opposite direction from the other. This feature is similar to swapping the encoder cables on a dual wheel measuring device.

3.5.15 ENCODER STATUS



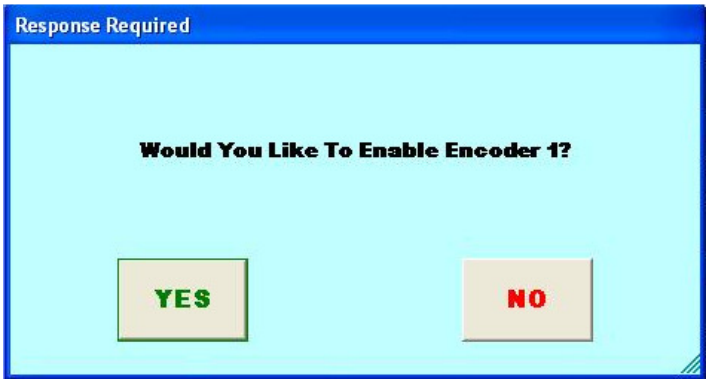
3.5.15.1 ENCODER 1, ENCODER 2

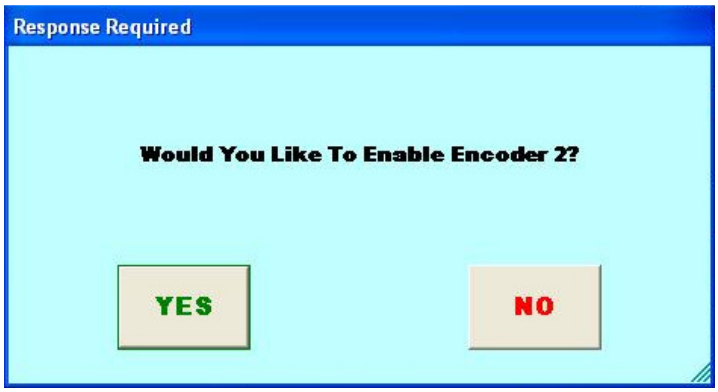
Enables or disables the input of an individual depth encoder. Only one encoder can be disabled at a time.

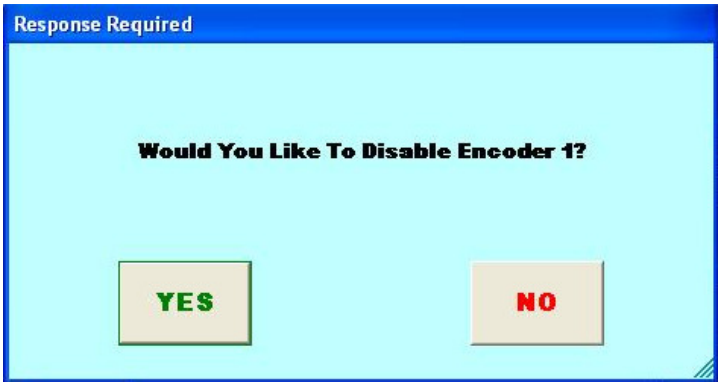
If one encoder is erratic or malfunctioning, the use of that encoder can lead to inaccurate depth reading as the output of both encoders is used in the dual wheel depth calculation.

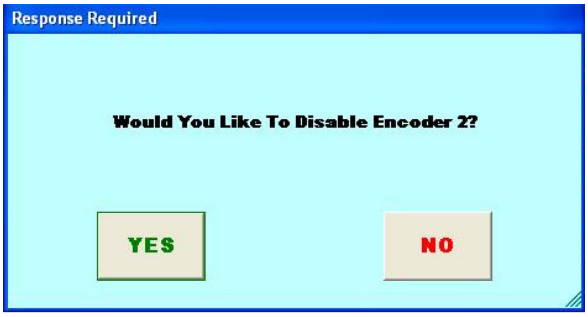
Disabling any one encoder will ensure that the pulse measurements of the enabled encoder will be used in the depth determination.

Depending on whether Encoder 1 or Encoder 2 is enabled or disabled, you will see one of the following four screens.









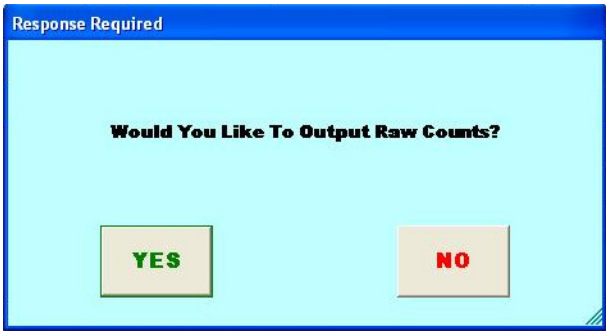
3.5.15.2 ENCODER OUT

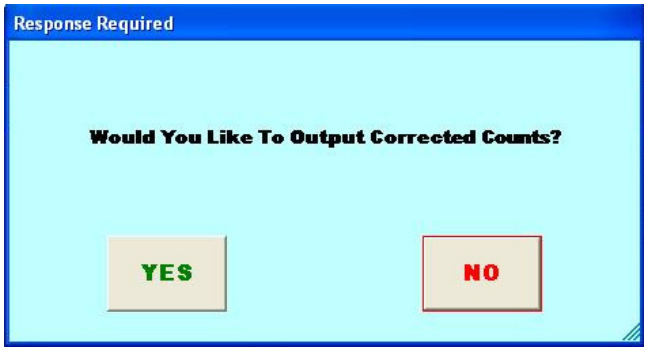
There are two modes to choose: “Raw” or “Corrected”.

“Raw” produces panel output pulses equivalent to uncorrected depth from Encoder 1 only, i.e. equivalent direct Raw pulses from Encoder 1 will go to logging system without any correction or manipulation applied.

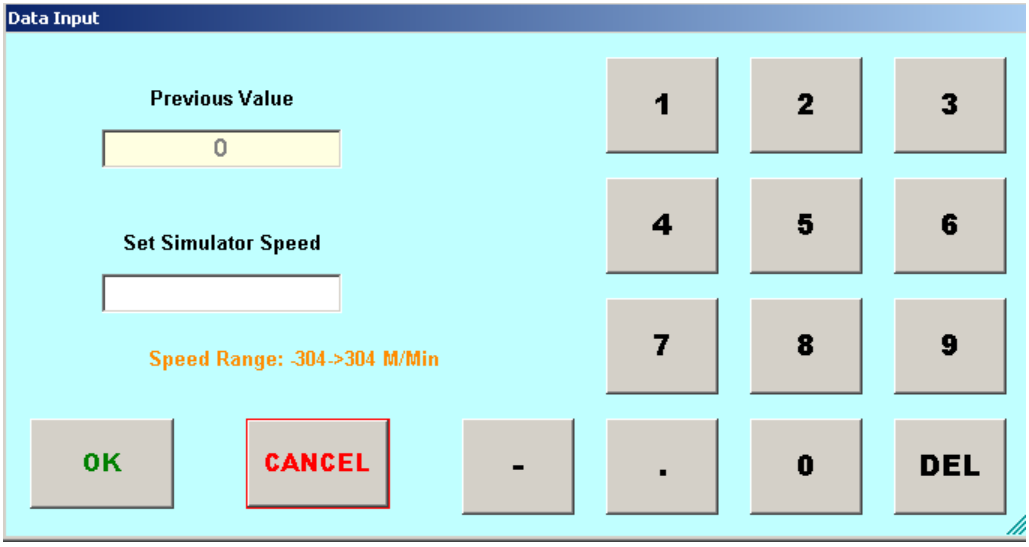
“Corrected” will produce panel output pulses equivalent to the corrected depth shown on the front panel display.

Depending on whether Encoder Out is selected for Raw Counts or Corrected Counts, you will see one of the following two screens.





3.5.16 SIMULATOR



The simulator is useful for testing purposes only. Simulated depth is produced by software and if the panel is set to corrected out mode (refer to Section 3.5.14) the panel will produce simulated corrected output pulses.

Enter speed to be simulated. Range is -304 to >304 m/min or -1,000 to 1,000 ft/min.

The simulator is stopped if 0 is entered as Set Simulator Speed value.

The simulator is stopped and the simulated depth is re-set when the panel is power-cycled.

3.5.17 SUMMARY

The Summary Menu is a quick reference identifying what the values are of the currently used panel parameters. This is a static display.

These values are written into each depth file, and as changes are made to the parameters, these changes are noted in the depth file at the depth where they were entered.

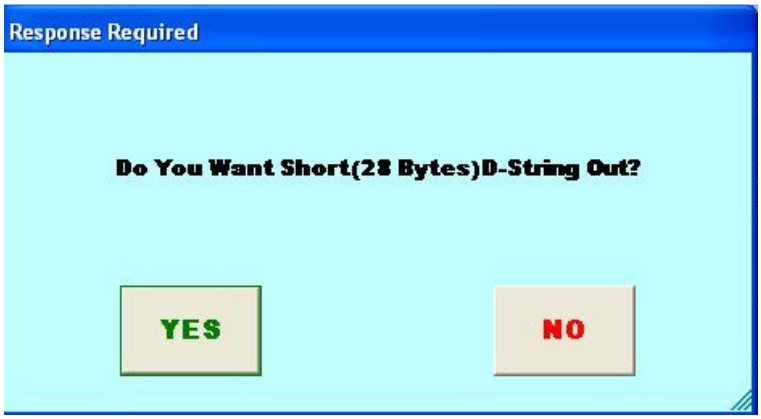
EXIT returns to the main display


Summary Of Parameters
Show/Beep Marks: Valid Marks Only
Wheel Size: .6096
Pipe Correction: Disabled
Dynamic Stretch Corr: Disabled
Tension Units: Pounds
Tension In Use: Standard
Tension Alarm: 1500
Tension S/D: 2000
Diff Tension Alarm: 500
Diff Tension S/D: 1000
Tool Weight: 1000
Mud Weight: 994.56
Line Size: 7/32
Line Weight: 91
Line Volume: 1.95
Line Stretch Coef: 1.80
Hi Tension Wheel: NO
Head Type: 5K
Hi Ten Wheel Factor: 1.00
Shallow Wheel Factor: 1.88
Tension Out 10V = 12500 Lbs
Tension Null: 0
Encoder In PPR: 1200
Encoder 1: Enabled
Encoder 2: Disabled
Encoder Direction: Default
Encoder Out: Raw
Encoder Out PPF: 600
EXIT
Mode
nd
meters
D-String Out Options
Table
Restore Defaults
w And
Marks
ode
Log File Setup
mary
EXIT
Alarm: 1000
0.00
RAW 2

3.5.18 D-STRING OUT

The panel can be programmed to provide a serial output string to match other system requirements. This option allows the operator to select or change the output string to either 28 or 50 bytes.

The system default is the 28 byte string. The 50 byte string contains everything in the 28 byte string plus these 3 data types - Mark Corr: Total Magnetic Mark Correction - Raw1: Raw Encoder 1 Depth - Raw2: Raw Encoder 2 Depth.



3.5.18 D-STRING OUT – 28 BYTE

28 Byte EXAMPLE:

E	m	U	s	+	100.0	30.0	1000
^	^	^	^	^	^	^	^
|	|	|	|	|	I	|	|
|	|	|	|	|	|	|	|
Units	Status	Direction	Command	Sign	Corr Depth	LineSpeed	Tension

DETAILS:

Units:
- E - Feet & Pounds
- G - Feet & Kilograms
- F - Meters & Pounds
- M - Meters & Kilograms

Status:
- M - Good Mark
- m - False Mark
- space - no mark

Direction:
- S - Stopped
- U - Up
- D - Down

Command:
- s - Shutdown Occurred
- space - no shutdown

Sign:
- + - Positive Depth
- - - Negative Depth

3.5.18 D-STRING OUT – 50 BYTE

50 Byte EXAMPLE:

E	m	U	s	+	100.0	30.0	1000	0.0	100.0	100.0
^	^	^	^	^	^	^	^	^	^	^
|	|	|	|	|	|	|	|	|	|	|
|	|	|	|	|	|	|	|	|	|	|

Units	Status	Direction	Command	Sign	Corr Depth	LineSpeed	Tension	Mark Corr	Raw1	Raw2

DETAILS:

Units:
- E - Feet & Pounds
- G - Feet & Kilograms
- F - Meters & Pounds
- M - Meters & Kilograms

Status:
- M - Good Mark
- m - False Mark
- space - no mark

Direction:
- S - Stopped
- U - Up
- D - Down

Command:
- s - Shutdown Occurred
- space - no shutdown

Sign:
- + - Positive Depth
- - - Negative Depth

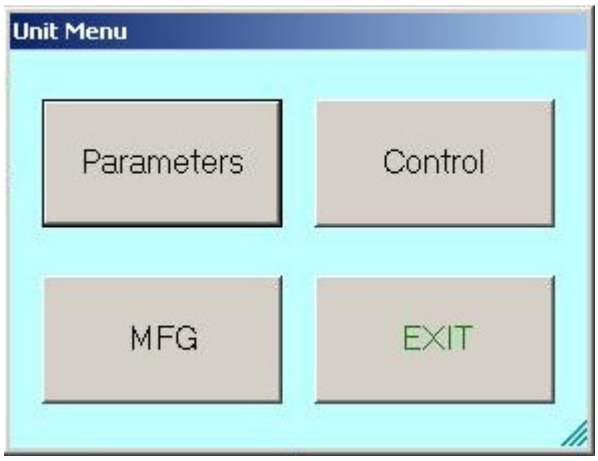
Mark Corr: Total Magnetic Mark Correction

Raw1: Raw Encoder 1 Depth

Raw2: Raw Encoder 2 Depth

THIS CONCLUDES THIS DOCUMENT

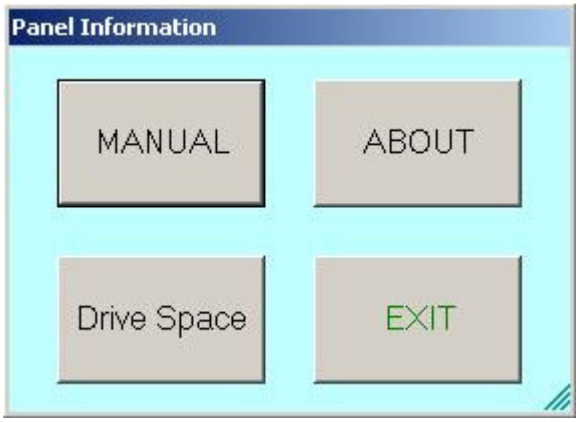
3.6 UNIT MENU



This option is scheduled for future implementation.

Future planned features include the ability to choose Hydraulic Winch Control, Manufacturer, and control communications parameters.

3.7 HELP MENU

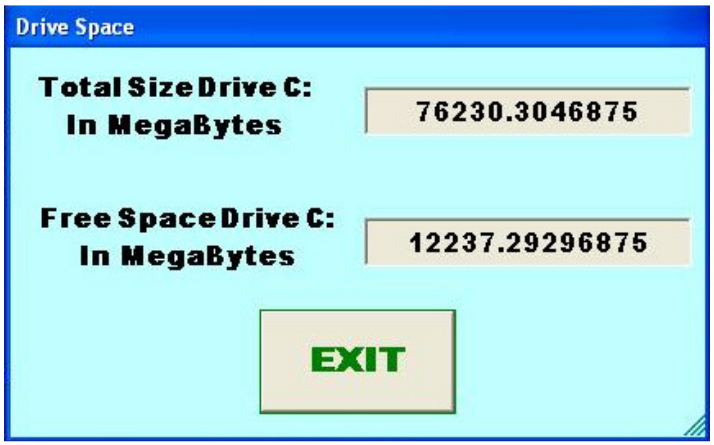


The HELP button will display the three options displayed above.

MANUAL will invoke the adobe acrobat reader and will load the manual located in the root directory of drive C with the file name “manual.pdf”.

ABOUT will show the software revision version. There are two programs running in the panel: the acquisition CPU software and the hoistman display GUI software. Ensure that the panel uses the latest released version of software. Note: older software versions, or mismatched versions, may not function properly.

DRIVE SPACE provides details on the memory space available.



3.7.1 MANUAL

The manual button will bring up this manual. You can scroll up or down to find the information you need.

The file “manual.pdf” must reside in the C:\ root directory of the panel’s compact flash drive.

If the manual revision displayed when Manual is pressed is different than this revision (Dec-16), then replace the “manual.pdf” file currently in C:\ with the correct version.

3.7.2 ABOUT MENU

ABOUT displays the software revision levels.

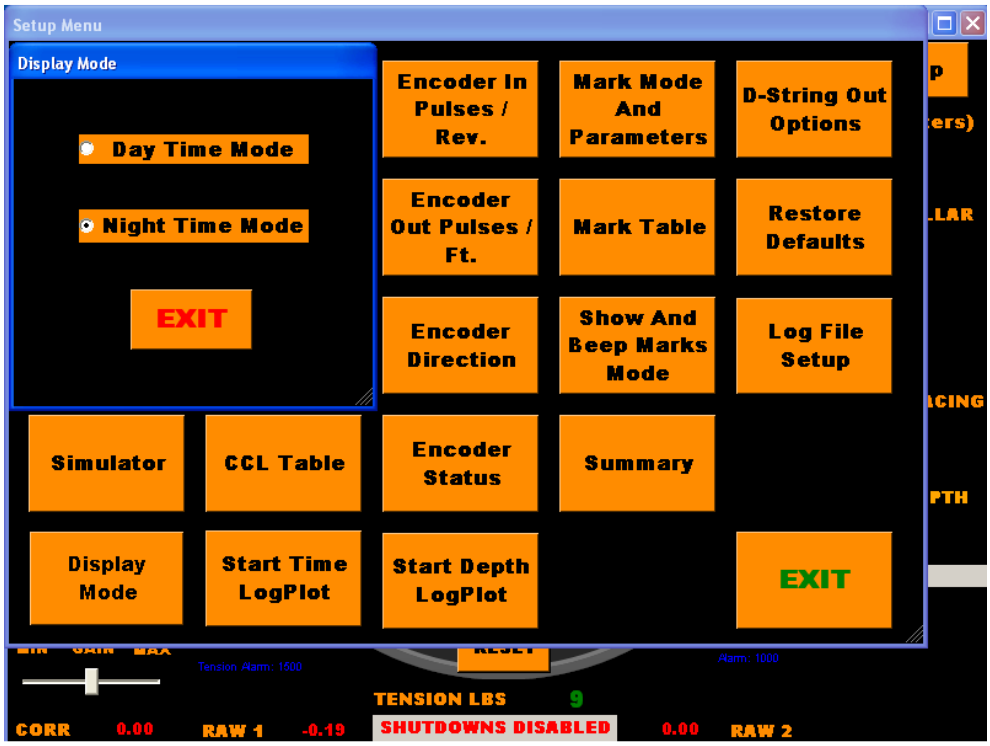
There are two programs that can be updated, the HOISTMAN program which is run by the PC and the ACQUISITION program that is run by the Real Time Board.

The Hoistman display.exe is located in the C:\ProgramFiles\Kerr subdirectory and the acquisition program S480000.HEX is typically found in the C:\ root directory of the panel compact flash drive.

The hyperterminal program is typically used to program the acquisition CPU on the Real Time Board with the S480000.HEX program (refer to programming instructions in section 7.2).

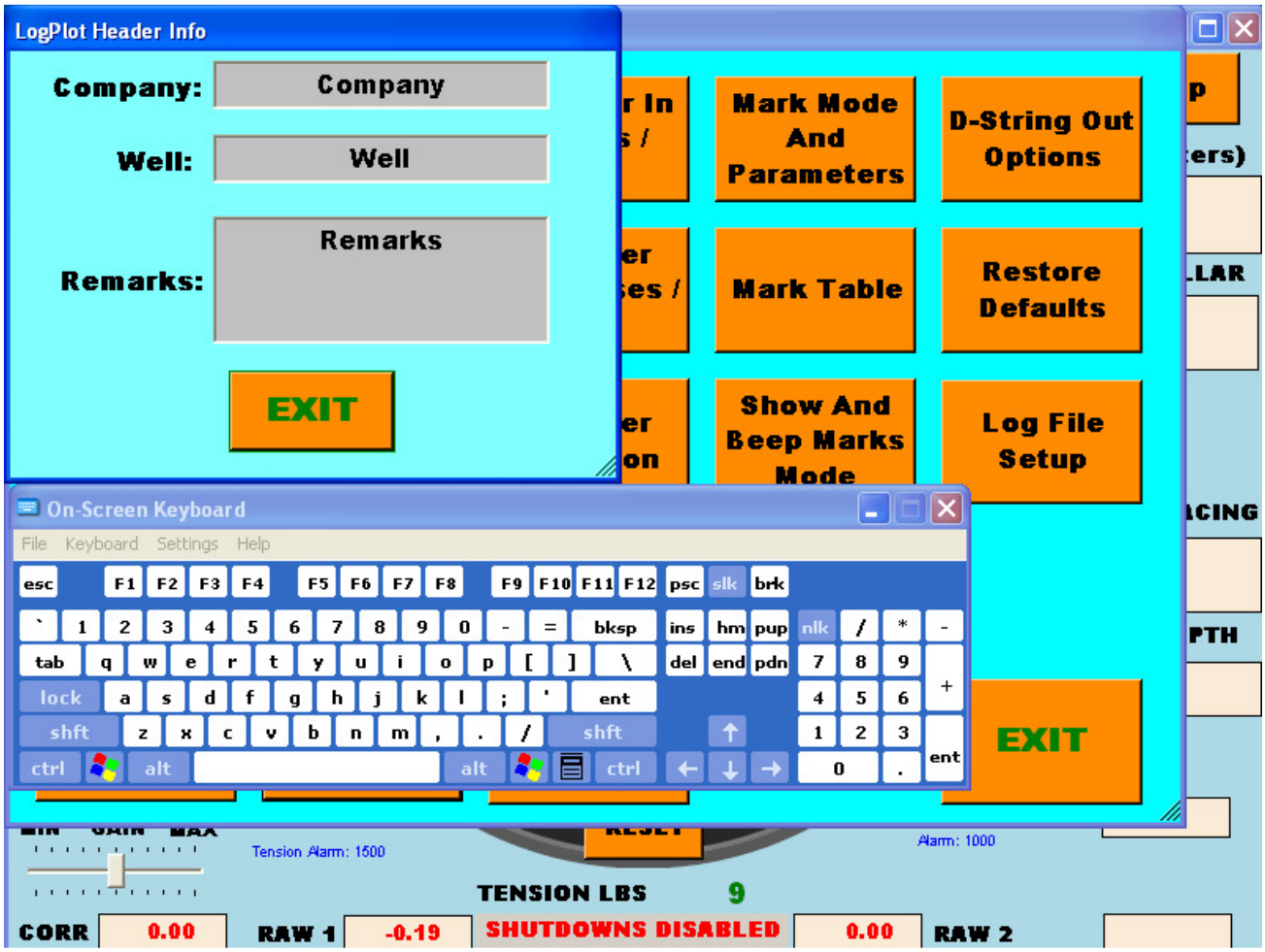
3.8 DAY / NIGHT SCREENS

Pressing the Display Mode button will allow you to select either of the two screens

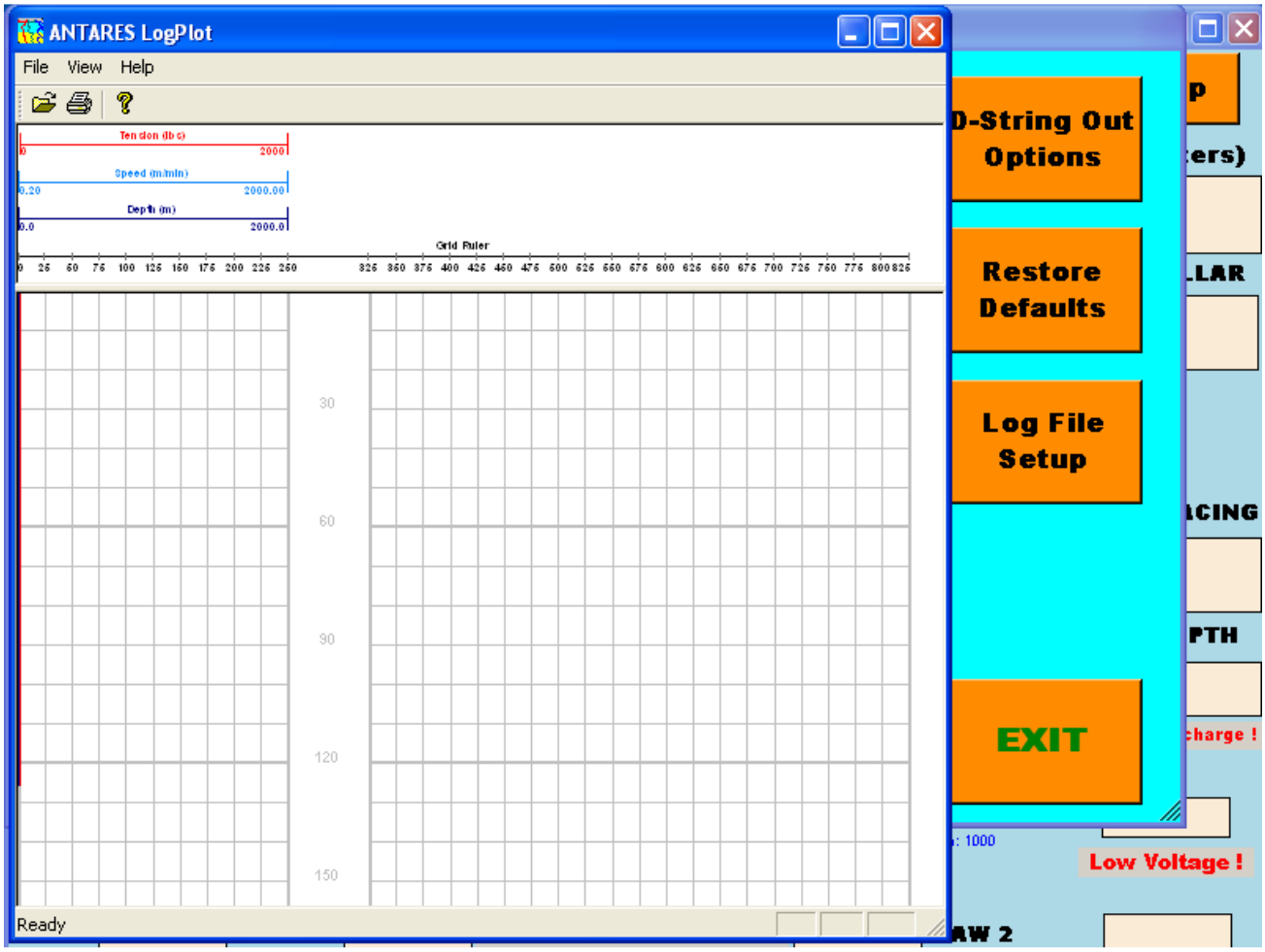


3.9 LOG PLOT MENUS

When Start Log Plot (time or depth) is pressed the following screen will be displayed to allow you to input well information



The depth, tension, and line speed data can be displayed on an API scale.



You will then have the option to select either a time based or depth based plot

You will be able to select the amount of data stored –

Once per second continually

Only new data (if nothing has changed no data will be written)

3.10 DESCRIPTION OF ALGORITHMS

3.10.1 ENCODER DEPTH DETERMINATION

The depth value derived from the currently valid encoder(s) using the encoder PPF value (see Section 3.5.12) is seen as RAW1 and RAW 2 at the bottom of the main display.

When two encoders are in use (Enc.1 & Enc.2), the output from both encoders is compared every 10 msec, and the higher of the two values is used. This value is accumulated to provide the input to the depth measurement through the encoder/depth conversions and corrections (see Section 3.1.4, 3.5.7 & 3.5.12). This number is the displayed, and output, depth value before any correction is applied. This number is used as the input to the mark correction algorithm and stretch correction algorithms.

When a single encoder is utilized (as in the case of the AM3K measurehead, or if there is an encoder failure, see Section 3.5.15), the depth is derived from the single encoder selected.

The final (corrected) depth output of the panel, as displayed in the panel, is used as the depth provided to the acquisition panel (see Section3.5.13).

3.10.2 DYNAMIC STRETCH CORRECTION ALGORITHM

Stretch in the wireline is compensated in the following manner:

As the tool is lowered into the well the depth traveled is measured using the optical encoders 10 times a second. The tension is used to “back out” the stretch on the wireline for that segment and a non stretched depth is calculated by keeping a tally of all of the segments.

This summed value is used in the following manner to calculate the depth:

If the surface tension is less than the calculated line weight the tool is assumed to be floating or supported in some other manner. The tension used is then assumed to the line weight so the stretch added is

$$Stretch = \frac{1}{2} x\ line\ weight\ x\ measured\ depth\ x\ stretch\ coefficient$$

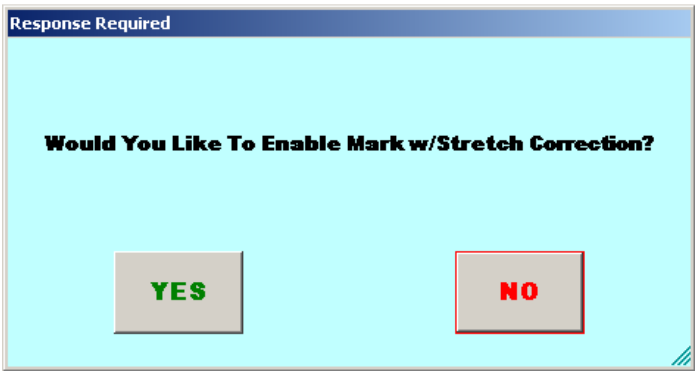
If the tension is greater than the line weight the stretch due to the line weight is calculated as above and all other weight is assumed to be acting over the entire length of the cable:

$$Stretch = \left(\left(\frac{1}{2} x\ line\ weight\right) + \ tension\ line\ weight\right)$$
$$x\ measured\ depth\ x\ stretch\ coefficient$$

3.10.3 MAGNETIC MARK DETECTION

The panel can be set to detect and correct depth using magnetic marks or to detect and display marks but make no corrections.

If set for detection only, magnetic marks are displayed in the MMK Depth window but the depth is not corrected or changed in any way.



If magnetic mark with stretch correction is enabled the maximum amount of correction possible is determined by the mark window width. After resetting the magnetic mark (find 1st
mark) the first mark detected is assumed to be a valid mark (put on when the line was marked.)

If the mark interval is 100 feet and the window width is 2 feet, the first mark detected from 98 to 102 feet from the first mark is assumed to be a valid mark. The panel will add or subtract the difference between the last mark +100 feet – current mark.

If the current mark occurs at the last mark + 102 feet, the panel will subtract 2 feet from the displayed depth in the next 20 feet. If the panel output is ‘corrected’ the panel quadrature output will be 2 x 600 pulses less than the output would have been if the panel output was ‘raw’ (assuming encoder out PPF is set to 600).

When enabled, the panel will automatically correct depth to the magnetic marks detected on the wireline. The following parameters need to be entered:

TOOL WEIGHT: The weight of the tool string at the end of the cable. It is recommended to use tool weight in fluid (mud).

MUD WEIGHT: The weight of the well bore fluid. This is used to calculate the weight of the wireline and tool string in fluid.

3.10.3 MAGNETIC MARK DETECTION continued

LINE SIZE: Ensure that line size is set properly.

Line stretch due to tension calculated using actual line tension and a simulated tension assuming the apparent line depth, tool weight and fluid density to arrive at a theoretical line surface tension. Both values are available (see Section 3.5.3.2).

The calculated tension vs. depth curve is used to establish the stretch at each mark interval (see Section 3.5.2.7) and this is then used together with the Mark Offset (see Section 3.5.2.7) to arrive at a mark depth. At each mark the correction is added or subtracted to the depth so that the depth will match the theoretical mark depth.

E.g. assuming a 0.464 line, a tool weight of 1,000 lbs and fluid weight of 8.3 lbs/gal is used the mark at 10,000 feet is the value of the surface mark + 10.8 ft. At 20,000 feet it is surface mark + 43 ft.

The **Add 0.1 M** & **Subt 0.1 M** depth add/subtract feature (see Section 2.1.6 & 3.1.7) allows the operator to add /subtract depth while logging (se Section 3.17 & 3.17).

Panel Demonstration Example - To demonstrate the panel operation, set MMD correction on, window width to 2 feet, and encoder out to corrected. Zero the panel depth, the system depth and reset the MMD. Rotate the encoder so that the depth says 100.0 feet. Advance the depth to 198 and simulate a mark. Advance the panel depth to 220. The system will read 220 feet, but the raw encoder counts will read 218 feet. The panel added the 2 feet to make up for the error at depth 198.

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

4.0 - WELLSITE SETUPW

4.1 RIG UP

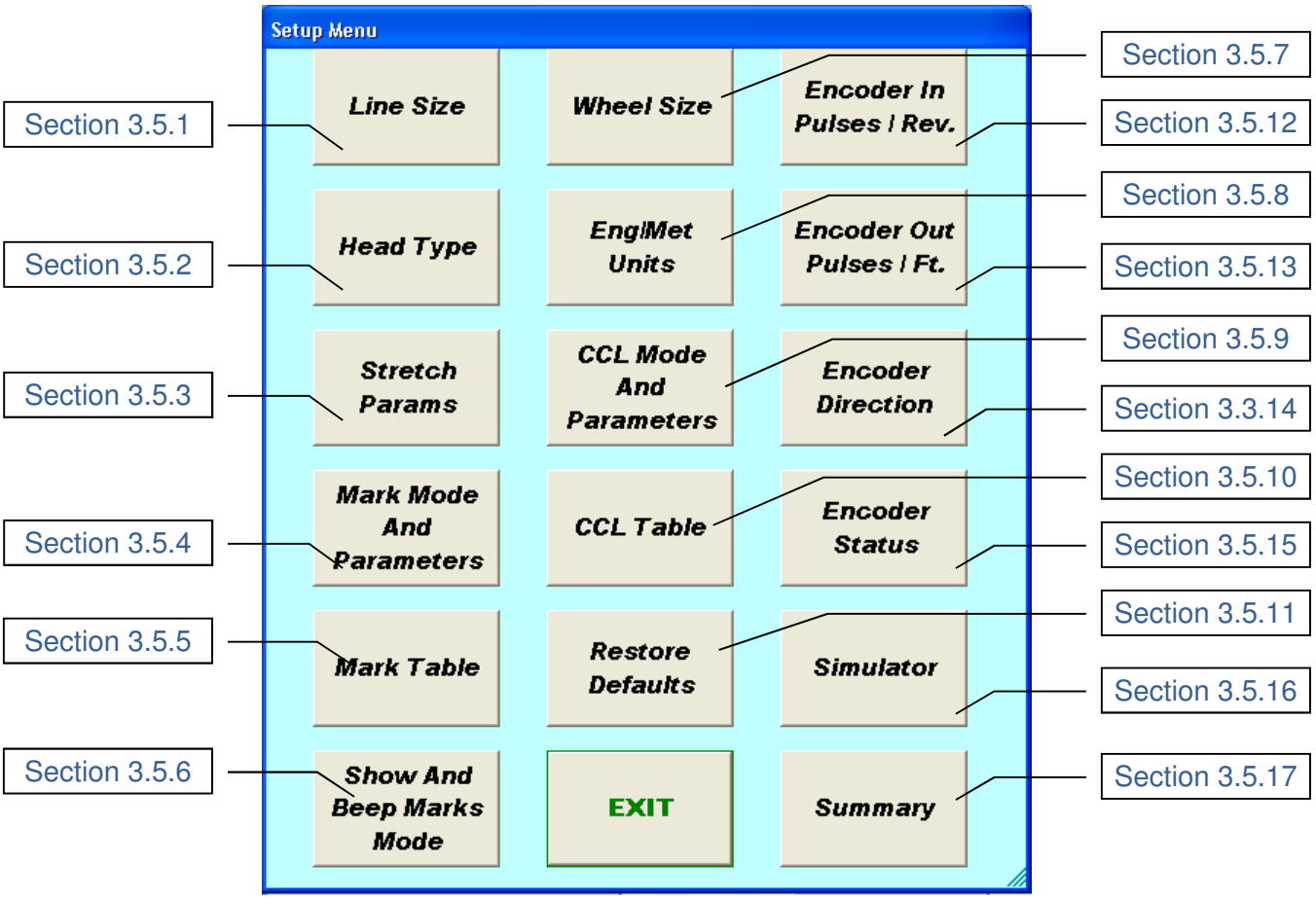
4.1.1 Power up panel and verify it is working properly.

4.1.2 Verify the panel is configured to match the measuring head in use (see Section 3.5.2).

Check Encoder PPR setting matches the encoders on the measuring head (see Section 3.5.12).

If the measuring wheel is not a 2 ft circumference wheel then select Line Size = OTHER (see Section 3.5.1.) and measure head = OTHER (see Section 3.5.2).

If using a sheave mounted load cell, set the load cell angle sheave factor (see Section 3.2.3) and check the calibration set up for tension measurement (see Section 3.2.1).



4.1.3 Check that Line Size matches the cable being used (see Section 3.5.1).

4.1.4 If applicable, check that the Mark Mode parameters includes the mark spacing interval of the cable being used (see Section 3.5.4).

4.1.5 Enter stretch parameters as may be required (see Section 3.5.3).

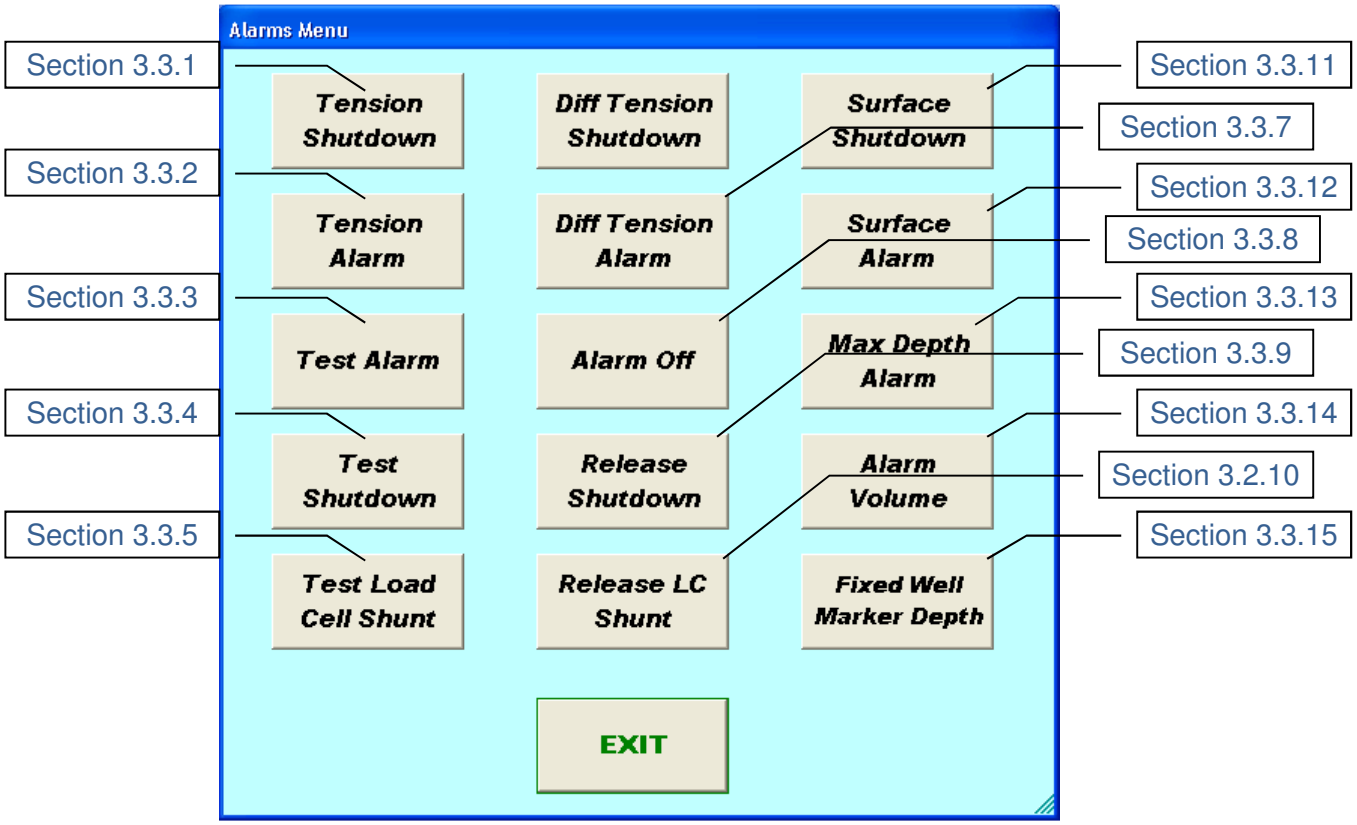
4.1.6 Verify the panel is configured to match the system (Acquisition System, encoder, etc.).

Check System PPF out (see Section 3.5.13)
Direct or Correct out (see Section 3.5.15.2)
Tension Out (see Section 3.2.4)

4.1.7 Set up acquisition system to match panel outputs.

E.g. If system PPF is set to 600, set the Acquisition system to a 1 foot wheel and a 600 PPR encoder.

4.1.8 Check Tension Alarm and Shut Down values (see Section 3.3.2 & 3.3.7).



4.1.9 Check all values by reading off the Summary (see Section 3.5.20)

4.1.10 Install cable in measuring head and lay it slack on the ground.

4.1.11 Press T-Zero and verify that panel tension reads 0. Verify tension is recorded on acquisition system.

4.1.12 Press T-Test and verify that panel tension reads 10,000 lbs. Verify tension is being properly recorded on acquisition system. Note: some load cells/pins shunt at a value different than 10,000 lbs.. Verify tension is being properly recorded on acquisition system.

4.1.13 During rig-up, check:

1. encoder direction is correct and values are consistent (see Section 3.3.13)
2. tension measurement is functional, and gives expected values
3. the acquisition system is reading the panel indicated depth and tension values.

4.1.14 Rig-up tool string, and zero the instrument depth. Set Depth Zero (see Section 3.1.1). Set acquisition system to Depth Zero.

4.1.15 With tool in the derrick at surface, check that total tool weight is equal to indicated Surface Tension (and cable head tension, if available). Record value, and enter tool weight (see Section 3.5.3.1) after lowering into fluid (mud).

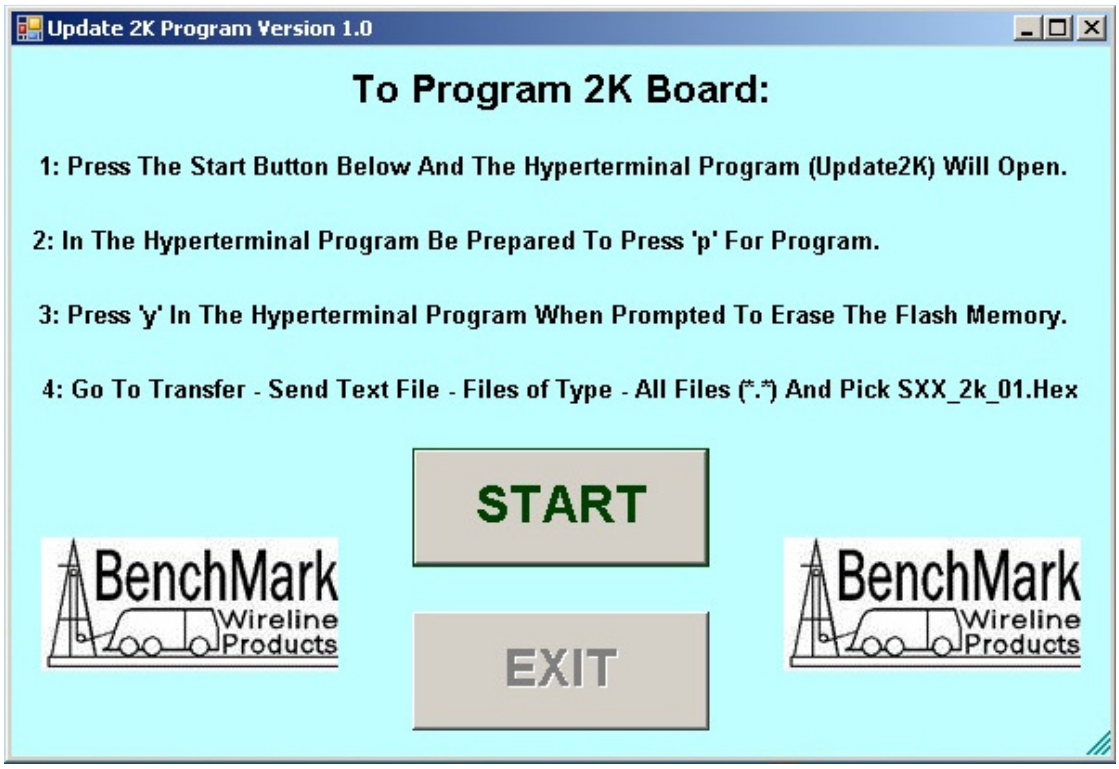
4.1.16 Double check the alarm and shutdown settings and functionality.

4.1.17 Run in hole, as required. When below Surface Shutdown and Surface Alarm depths, engage these (see Section 3.3.11 & 3.3.12) if required.

5.0 SOFTWARE UPDATE PROCEDURES AND BIOS SETTINGS

NOTE: A USB KEYBOARD IS RECOMMENDED FOR SOFTWARE INSTALLATION.
The Hoistman Program is released as a .MSI installation file. The Operator double-clicks on the .msi file and the installation will proceed. It is recommended to use the default location (C:\Benchmark Hoistman\) for the installation.

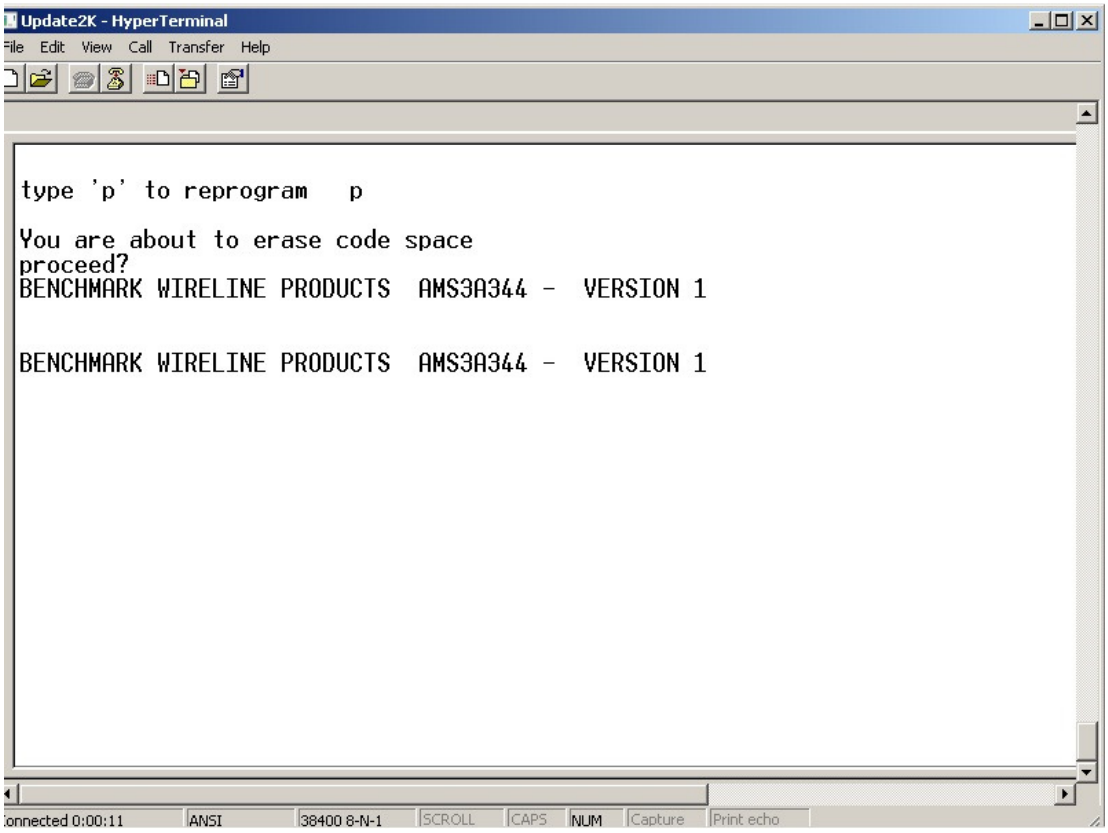
5.1 LAS AND HLOG, DATA FILES AND REC FILES
Files located in C:\benchmark hoistman\logdata



NOTE: A USB KEYBOARD IS RECOMMENDED FOR SOFTWARE INSTALLATION.

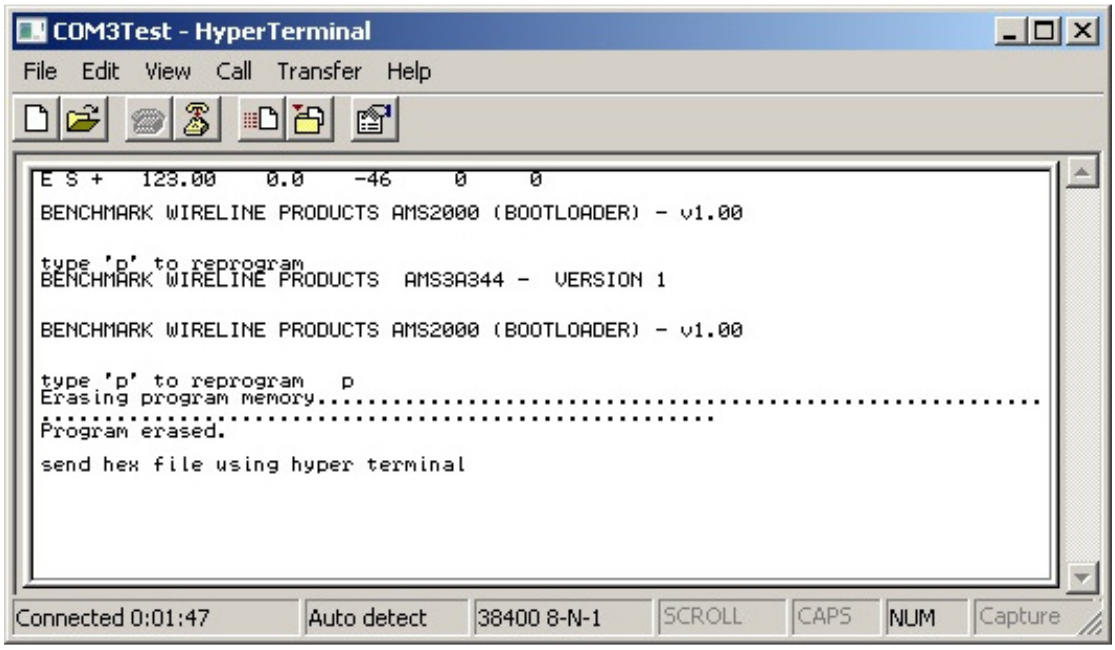
The Hoistman Program is released as a .MSI installation file. The Operator double-clicks on the .msi file and the installation will proceed. It is recommended to use the default location (C:\Benchmark Hoistman\) for the installation.

5.2.1 UPDATE 2K PART 1



The Acquisition program is installed using the Software Install Utility which can be accessed by double-clicking the Desktop icon "Software Install". The utility screen contains the instructions for re-programming the Acquisition board. Upon pressing the 'Start' button the utility will automatically open a Hyperterminal session and then send a re-boot command to the Acquisition board.

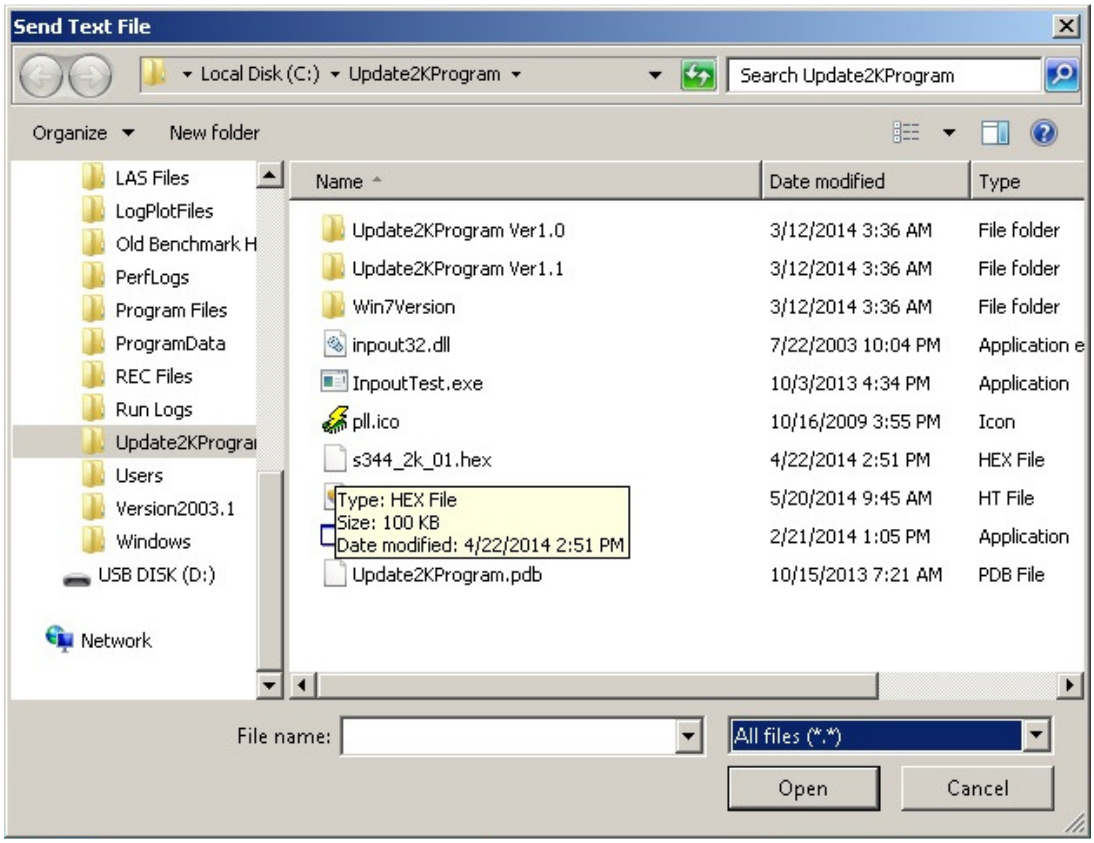
5.2.2 UPDATE 2K PART 2



The Operator must be prepared to quickly type a 'p' as soon as the message appears on the Hyperterminal screen. If the opportunity to press 'p' passes, repeat the procedure from the start again.

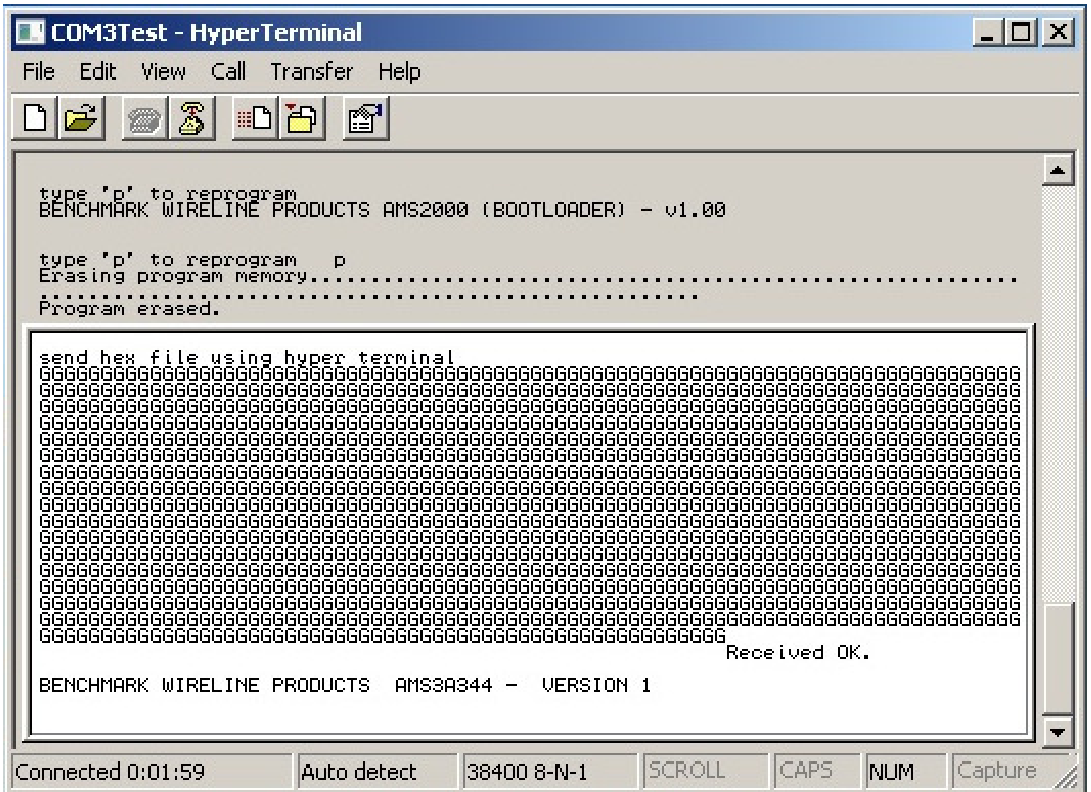
After receiving the 'p' the utility will respond with this message:
Erasing Program
Memory.....
.....
Program Erased.
send hex file using hyperterminal

5.2.3 UPDATE 2K PART 3



After receiving the above message from the utility proceed to the Hyperterminal 'Transfer' pull-down menu and choose 'Send Text File' and then pull-down 'Files Of Type' and choose 'All Files(*.*)' and then choose the latest revision hex file (hint: s344_2k_XX.hex).

5.2.4 UPDATE 2K PART 4



This figure shows a successful Acquisition board re-programming. The following illustrates 'GOOD' sector writes and finally the 'Reveived OK' message and then the Acquisition board re-boots with the new version software.

GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGG

Received OK.

BENCHMARK WIRELINE PRODUCTS AMS3A344 - VERSION 1

5.3 BIOS INSTRUCTIONS

Introduction

AMIBIOS has been integrated into a slew of motherboards for over two decades. With the AMIBIOS Setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the PCM-9363 BIOS setup screens.

AMI's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This information is stored in battery-backed CMOS so it retains the setup information when the power is turned off.

Entering Setup

Turn on the computer and check for the “patch" code. If there is a number assigned to the patch code, it means that the BIOS supports your CPU. If there is no number assigned to the patch code, please contact an Advantech application engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid. After ensuring that you have a number assigned to the patch code, press <DEL> and you will immediately be allowed to enter setup.

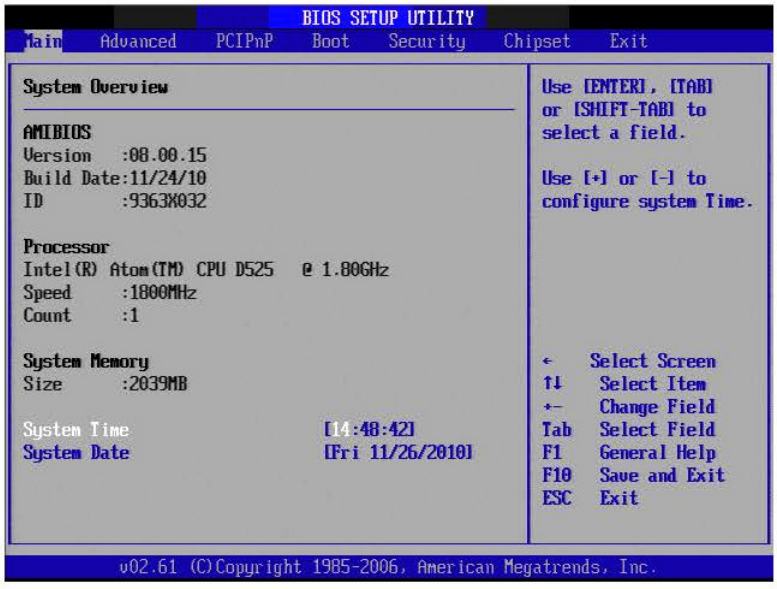


Figure 3.1 Setup program initial screen

5.3 BIOS INSTRUCTIONS continued

Main Setup

When you first enter the BIOS Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.

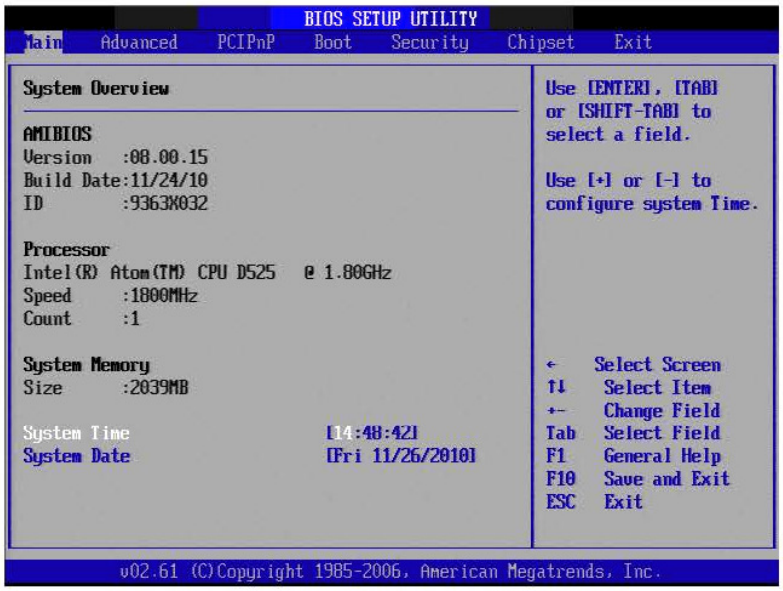


Figure 3.2 Main setup screen

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

System Time / System Date

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

5.3 BIOS INSTRUCTIONS continued

Hardware Health Configuration

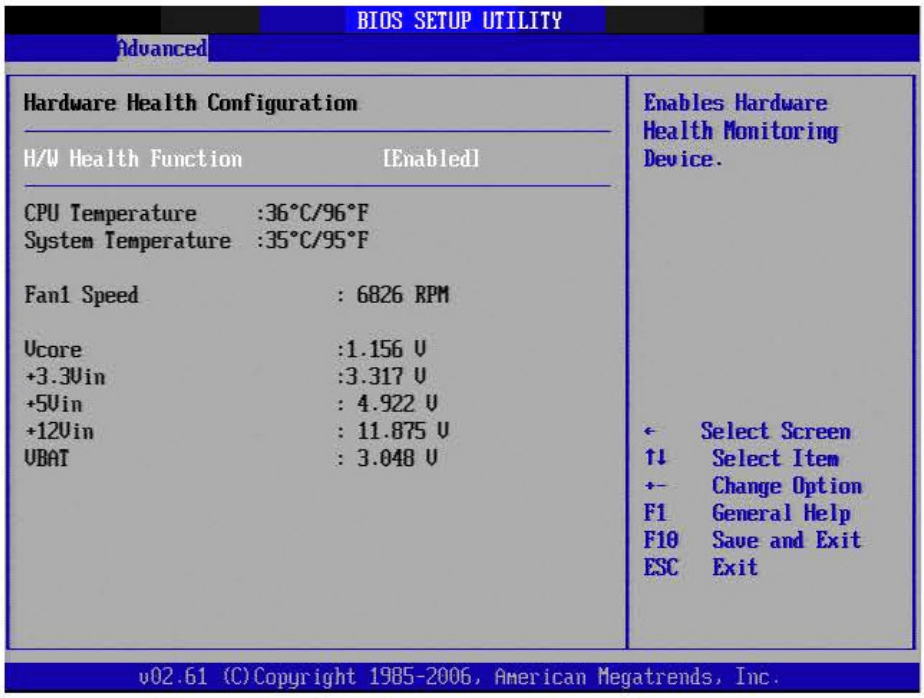


Figure 3.7 Hardware health configuration

- **H/W Health Function**
  This item allows you to control H/W monitoring.
- **Temperature & Voltage show**
  CPU/System Temperature
  Vcore / +3.3 Vin / +5 Vin / +12 Vin / VBAT
- **Fan1 Speed show**
  Display Fan1 Speed RPM.

5.3 BIOS INSTRUCTIONS continued

DMA Channel 0 / 1 / 3 / 5 / 6 / 7

When set to Available will specify which DMA is available to be used by PCI/PnP devices. When set to Reserved will specify which DMA will be reserved for use by legacy ISA devices.

Reserved Memory Size

This item allows you to reserve the size of memory block for legacy ISA device.

Boot Settings

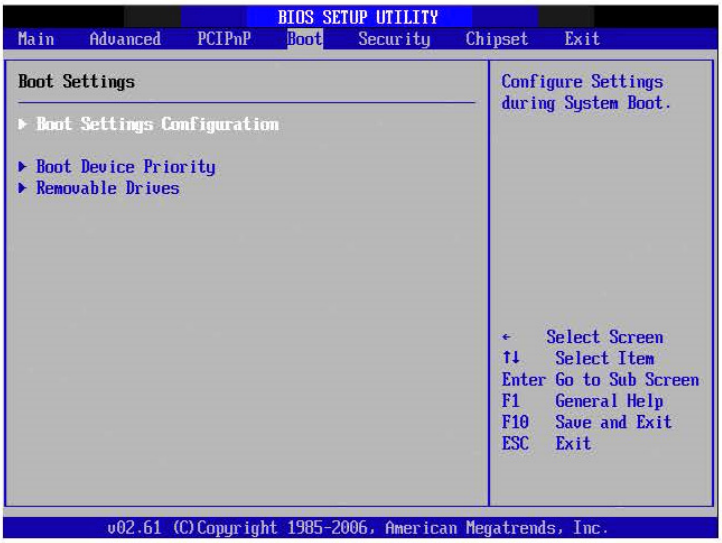


Figure 3.20 Boot Setup Utility

Boot Settings Configuration

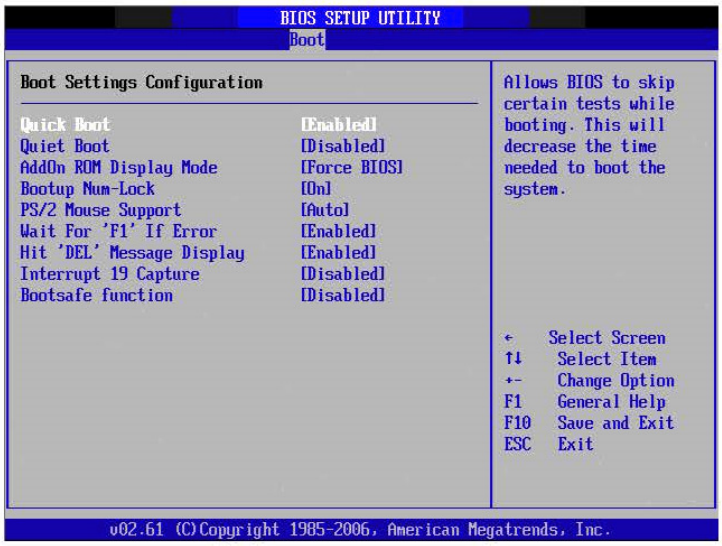


Figure 3.21 Boot Setting Configuration

5.3 BIOS INSTRUCTIONS continued

- **Quick Boot**
  This item allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
- **Quiet Boot**
  If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **AddOn ROM Display Mode**
  Set display mode for option ROM.
- **Bootup Num-Lock**
  Select the Power-on state for Numlock.
- **PS/2 Mouse Support**
  Select support for PS/2 Mouse.
- **Wait For 'F1' If Error**
  Wait for the F1 key to be pressed if an error occurs.
- **Hit 'DEL' Message Display**
  Displays -Press DEL to run Setup in POST.
- **Interrupt 19 Capture**
  This item allows options for ROMs to trap interrupt 19.
- **Bootsafe function**
  This item allows you to enable or disable the bootsafe function.

Security Setup

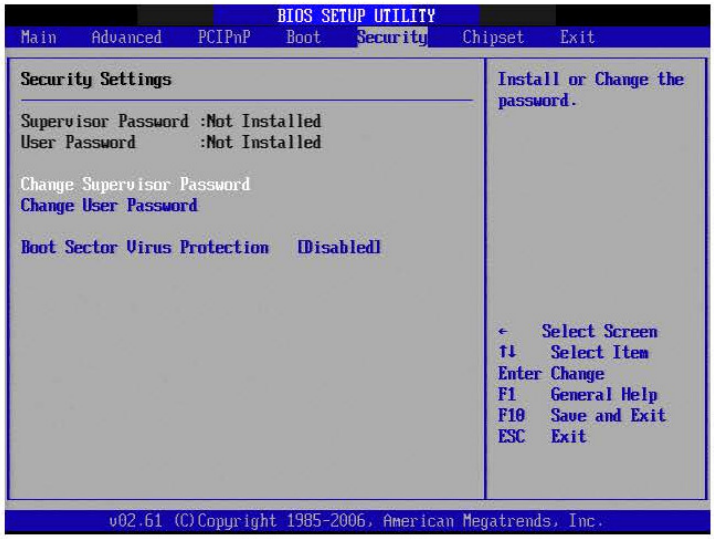


Figure 3.22 Password Configuration

Select Security Setup from the PCM-9363 Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>:

5.3 BIOS INSTRUCTIONS continued

Change Supervisor / User Password

- **Boot Sector Virus protection**
  The boot sector virus protection will warn if any program tries to write to the boot sector.

Advanced Chipset Settings

Figure 3.23 Advanced Chipset Settings

North Bridge Chipset Configuration

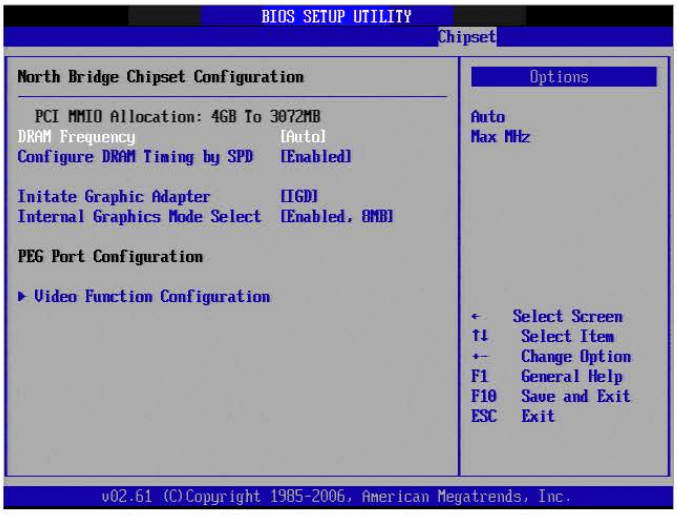


Figure 3.24 North Bridge Configuration

- **DRAM Frequency**
  This item allows you to manually change DRAM frequency.
- **Configure DRAM Timing by SPD**
  This item allows you to enables or disable detection by DRAM SPD.

5.3 BIOS INSTRUCTIONS continued

Exit Option

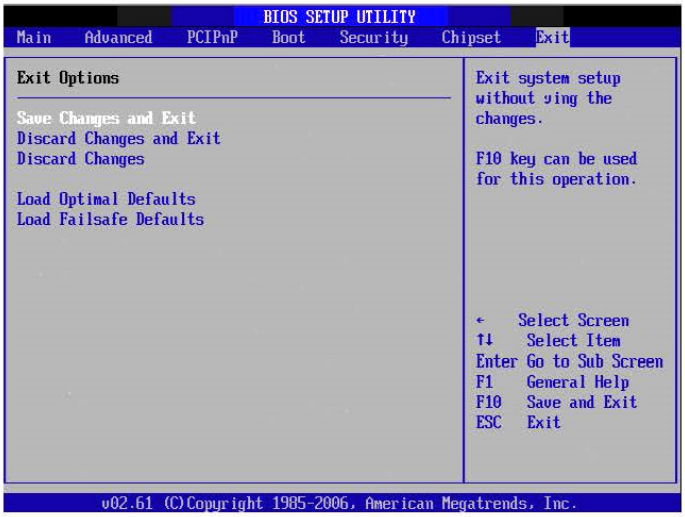


Figure 3.27 Exit Option

Save Changes and Exit

When you have completed system configuration, select this option to save your changes, exit BIOS setup and reboot the computer so the new system configuration parameters can take effect.

1. Select Exit Saving Changes from the Exit menu and press <Enter>.
   The following message appears:
   Save Configuration Changes and Exit Now?
   [Ok] [Cancel]
2. Select Ok or cancel.

Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

1. Select Exit Discarding Changes from the Exit menu and press <Enter>.
   The following message appears:
   Discard Changes and Exit Setup Now?
   [Ok] [Cancel]
2. Select Ok to discard changes and exit. Discard Changes
3. Select Discard Changes from the Exit menu and press <Enter>.

Load Optimal Defaults

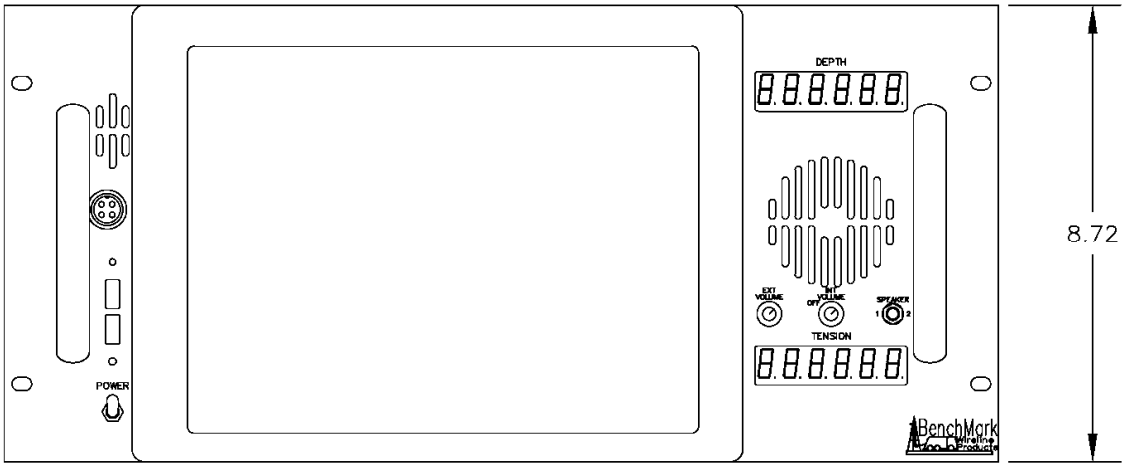
The PCM-9363 automatically configures all setup items to optimal settings when you select this option. Optimal defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if your computer is experiencing system configuration problems. Select Load Optimal Defaults from the Exit menu and press <Enter>.

Load Fail-Safe Defaults

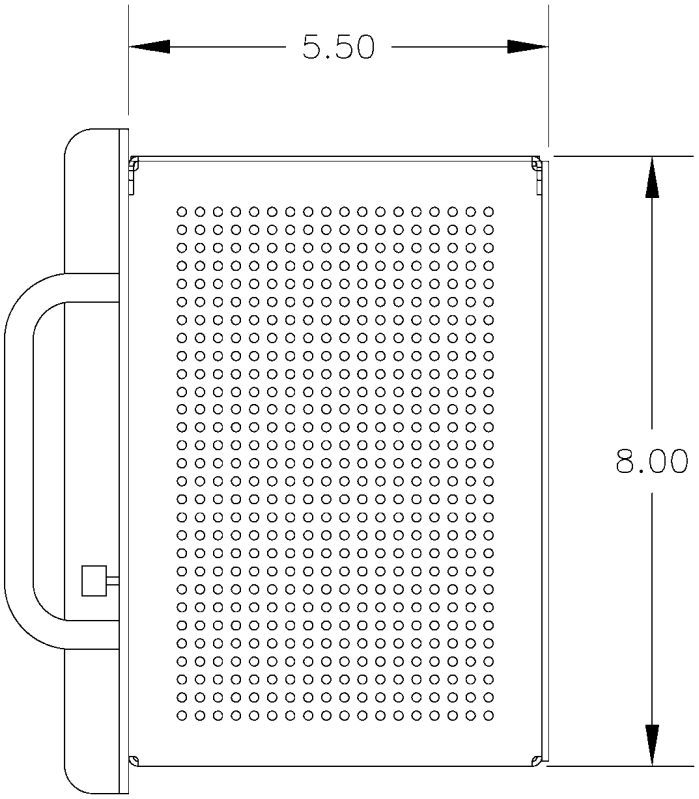
The PCM-9363 automatically configures all setup options to fail-safe settings when you select this option. Fail-Safe Defaults are designed for maximum system stability, but not maximum performance. Select Fail-Safe Defaults if your computer is experiencing system configuration problems.

6.0 MAINTENANCE, ASSEMBLY DRAWINGS & BOM

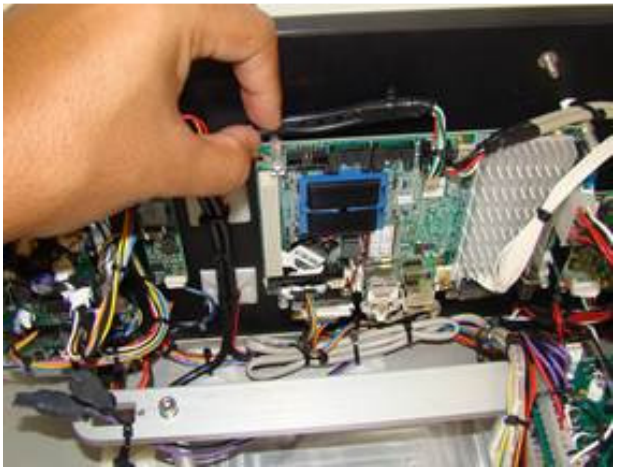
6.1 FRONT VIEW



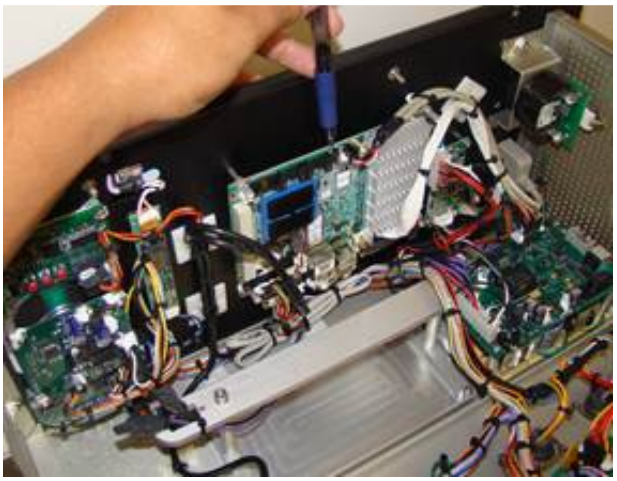
6.2 SIDE VIEW



6.3 REPLACING ENTERNAL FLASH CARD

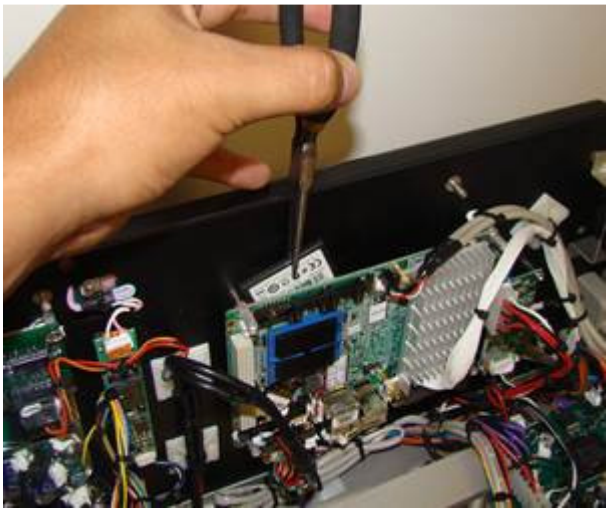


6.3.1 Locate the PC processor board mounted to the front panel. Remove zip tie from the top left corner. The card is on the back side of this board.

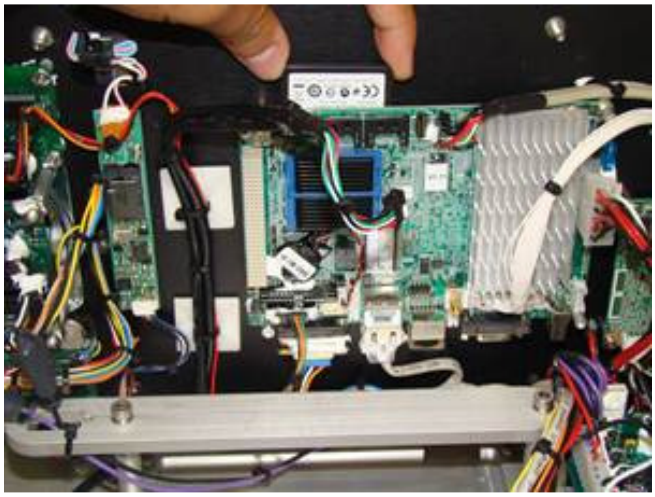


6.3.2 Using a pen or small screwdriver press the reject tab. The card will then pop out of the holder.

6.3 REPLACING ENTERNAL FLASH CARD continued



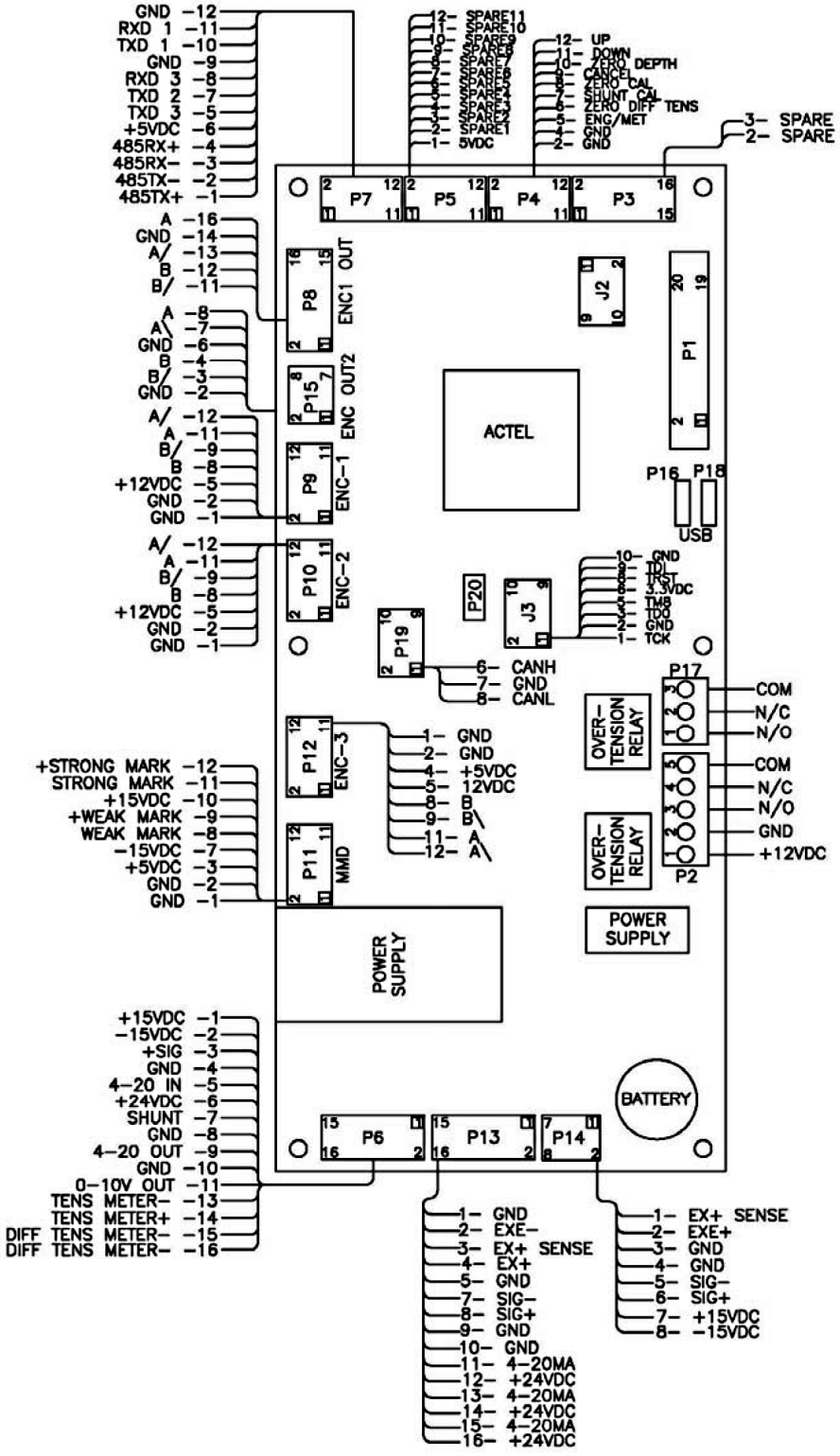
6.3.3 The card can now be removed using small needle nose pliers.



6.3.4 To re-install a card place it in the slot, then press it in until you feel it latch into place. A small screwdriver or pen may be required to fully insert.

7.0 SCHEMATICS, WIRING DIAGRAMS & WIRELIST

7.1 AM2KP134 ACQUISITION BOARD SCHEMATIC



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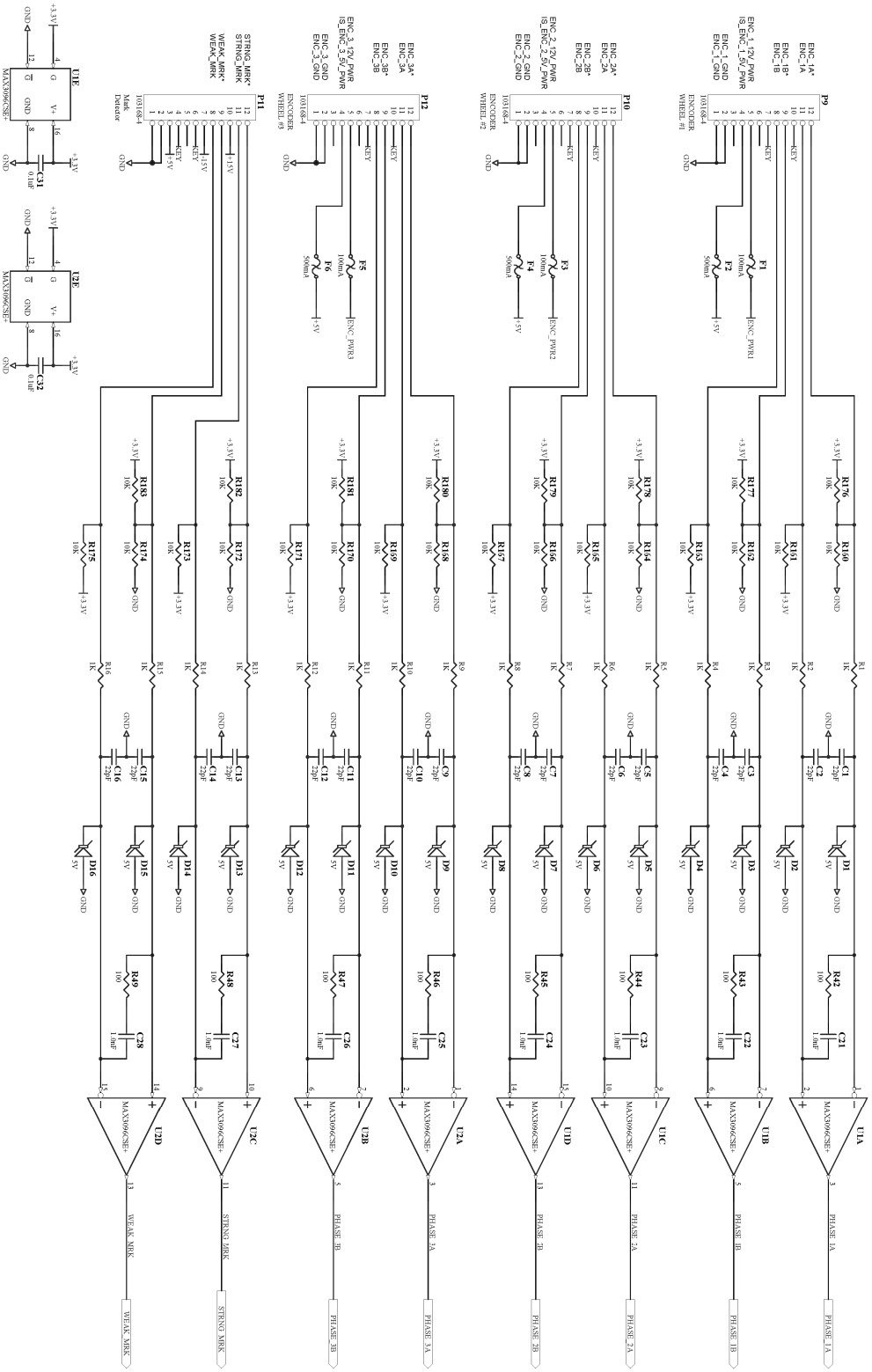
36220 FM 1093
P. O. BOX 850
Simonton,Texas 77476
Phone: 281.346.4300
Fax: 281.346.4301
benchmarkwireline.com



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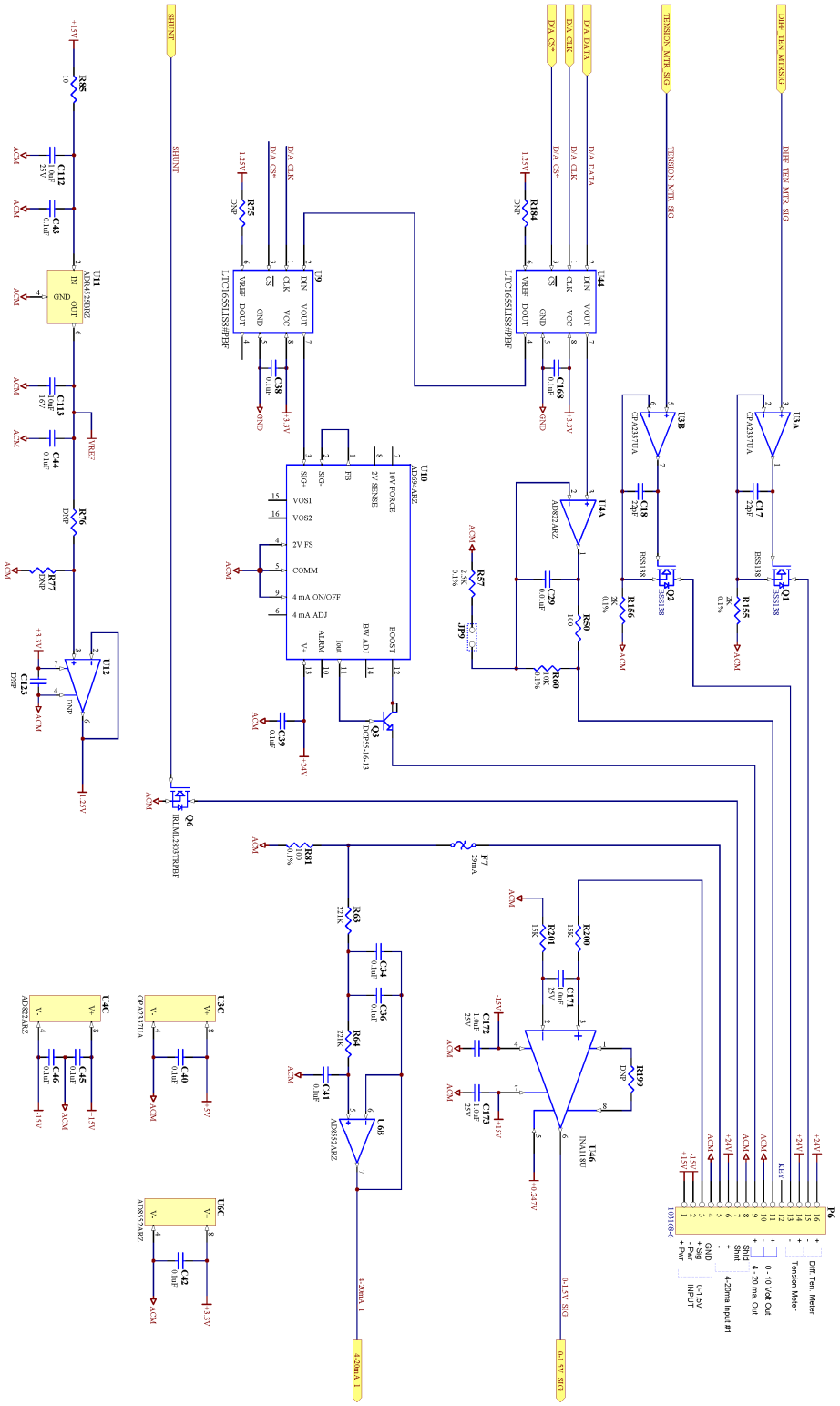

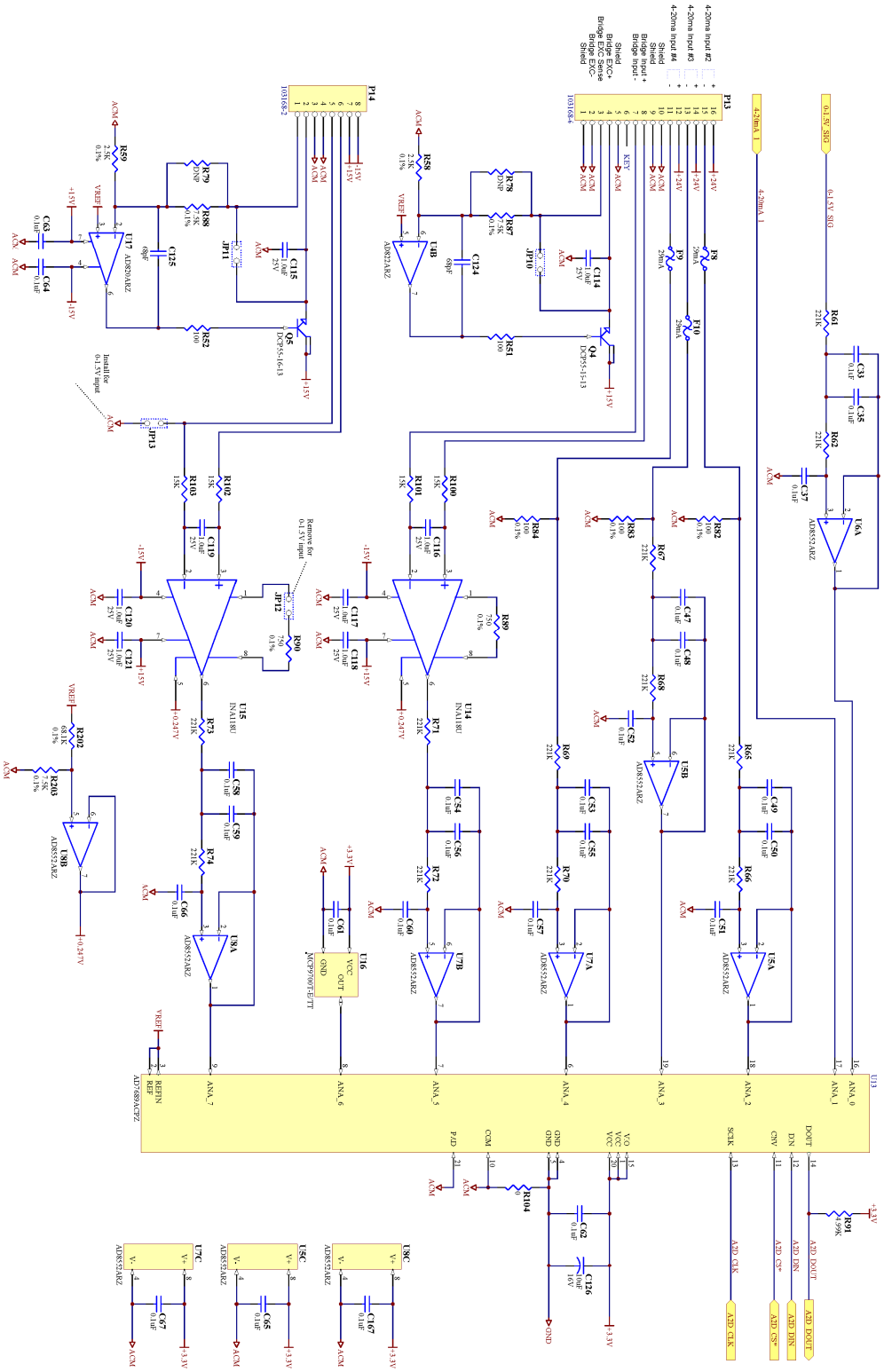

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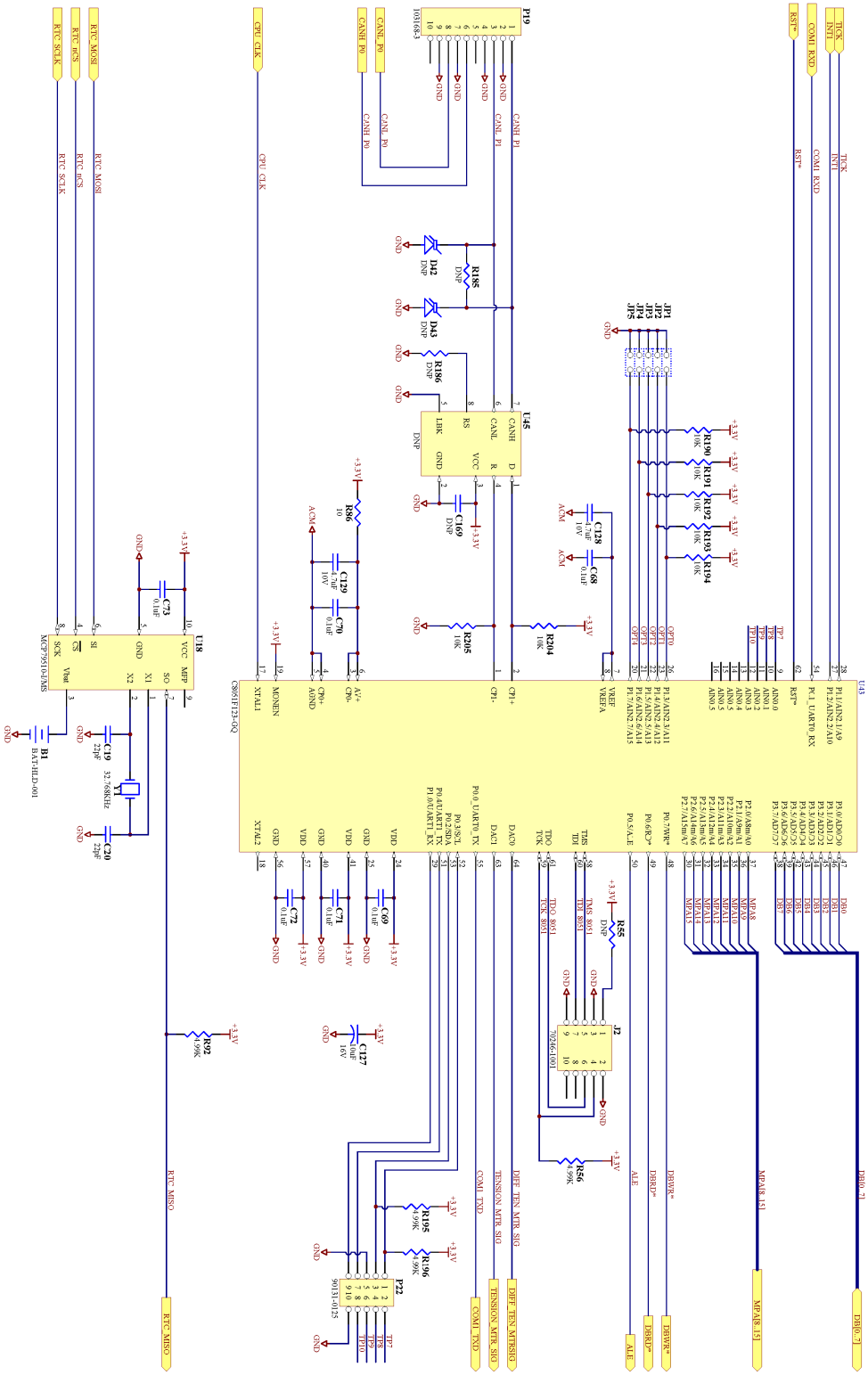

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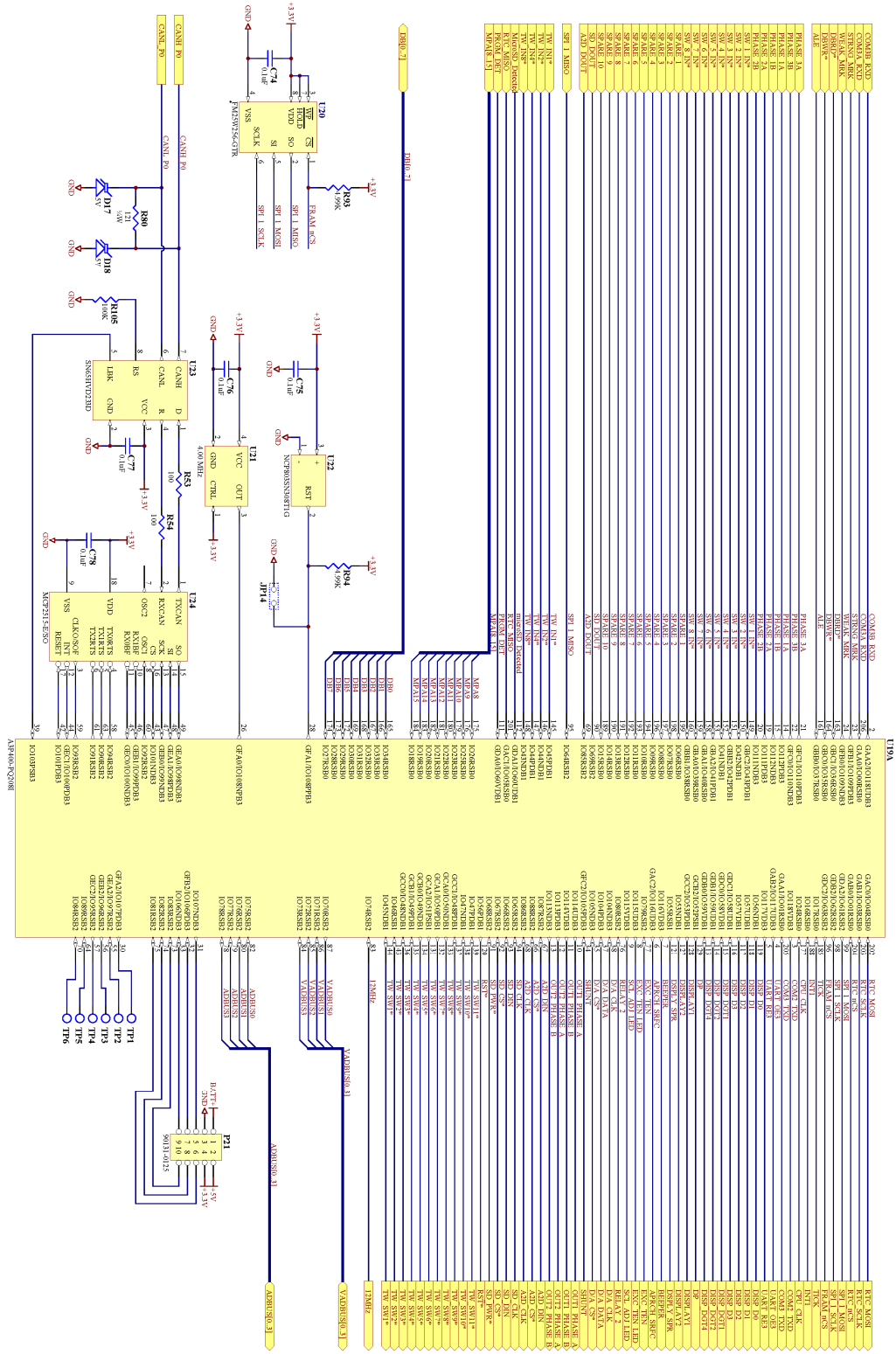

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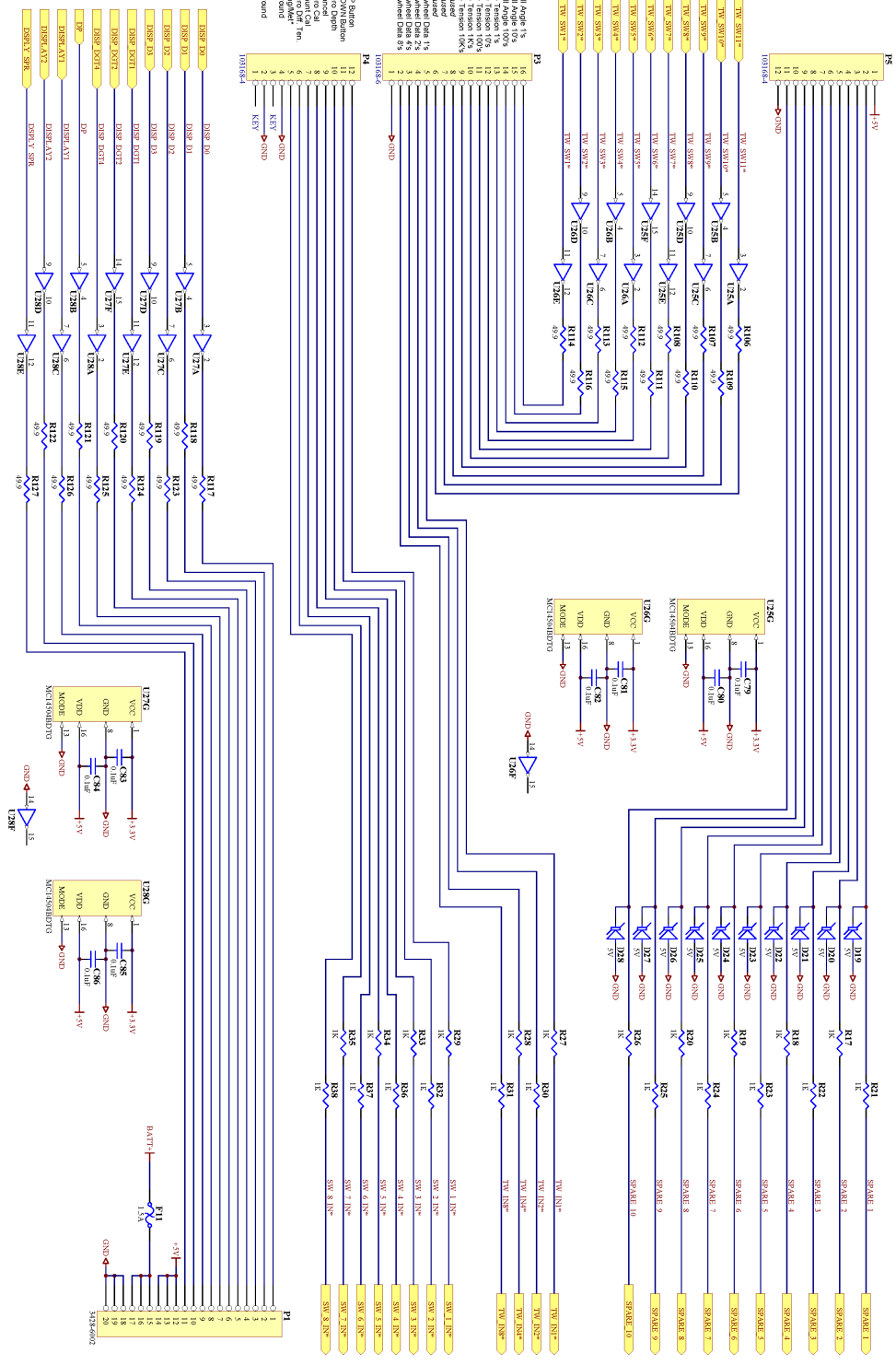

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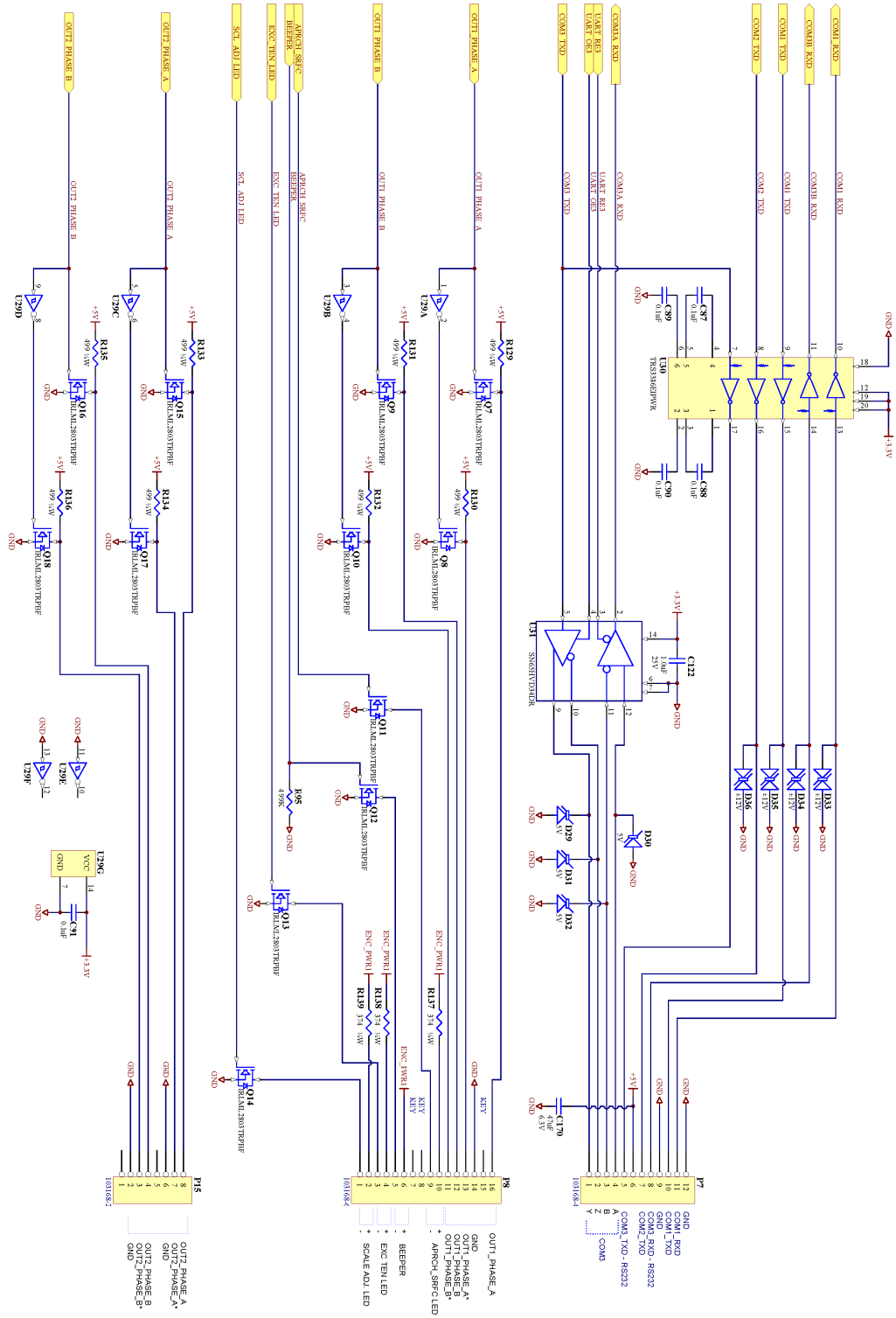

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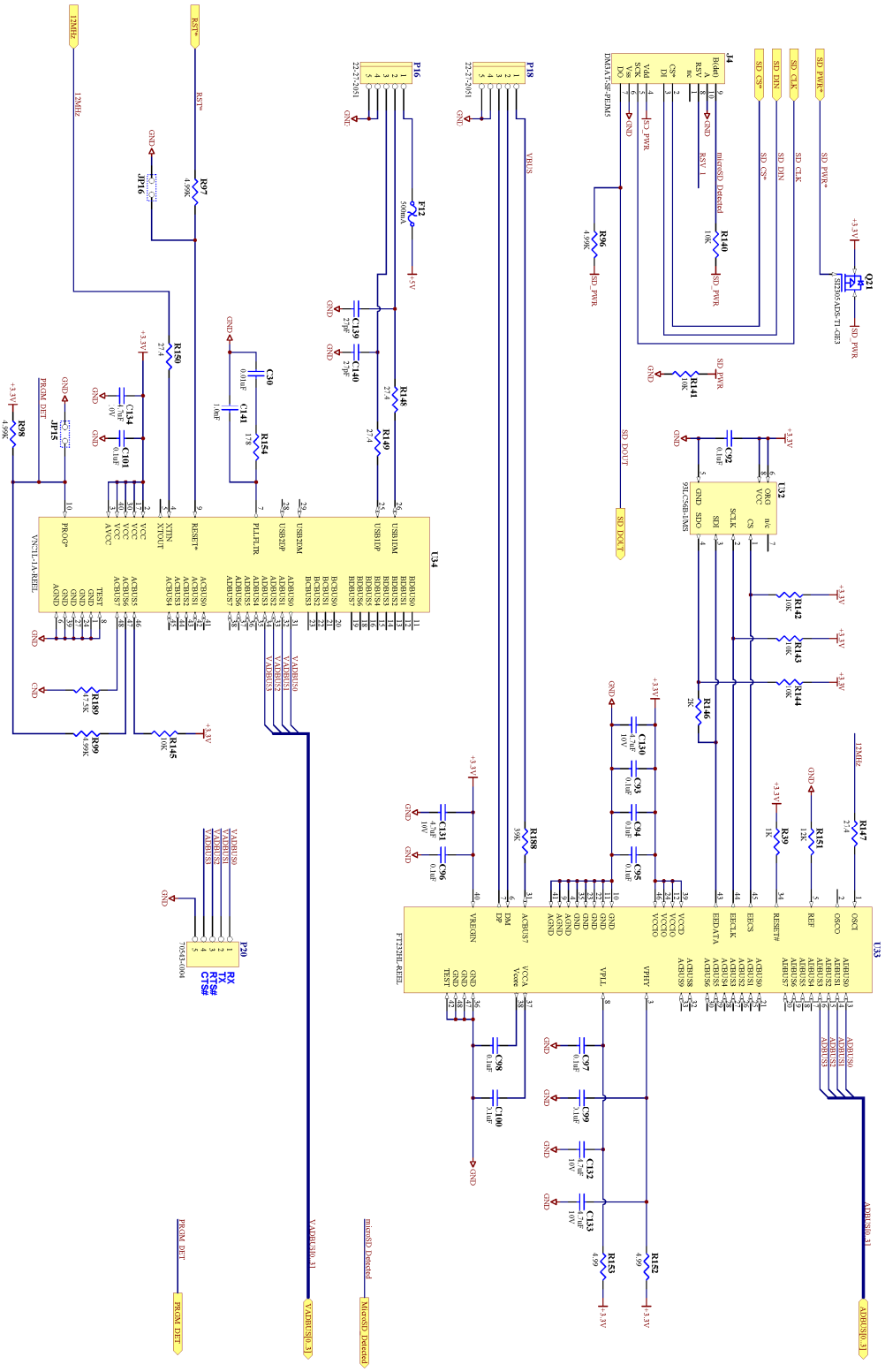

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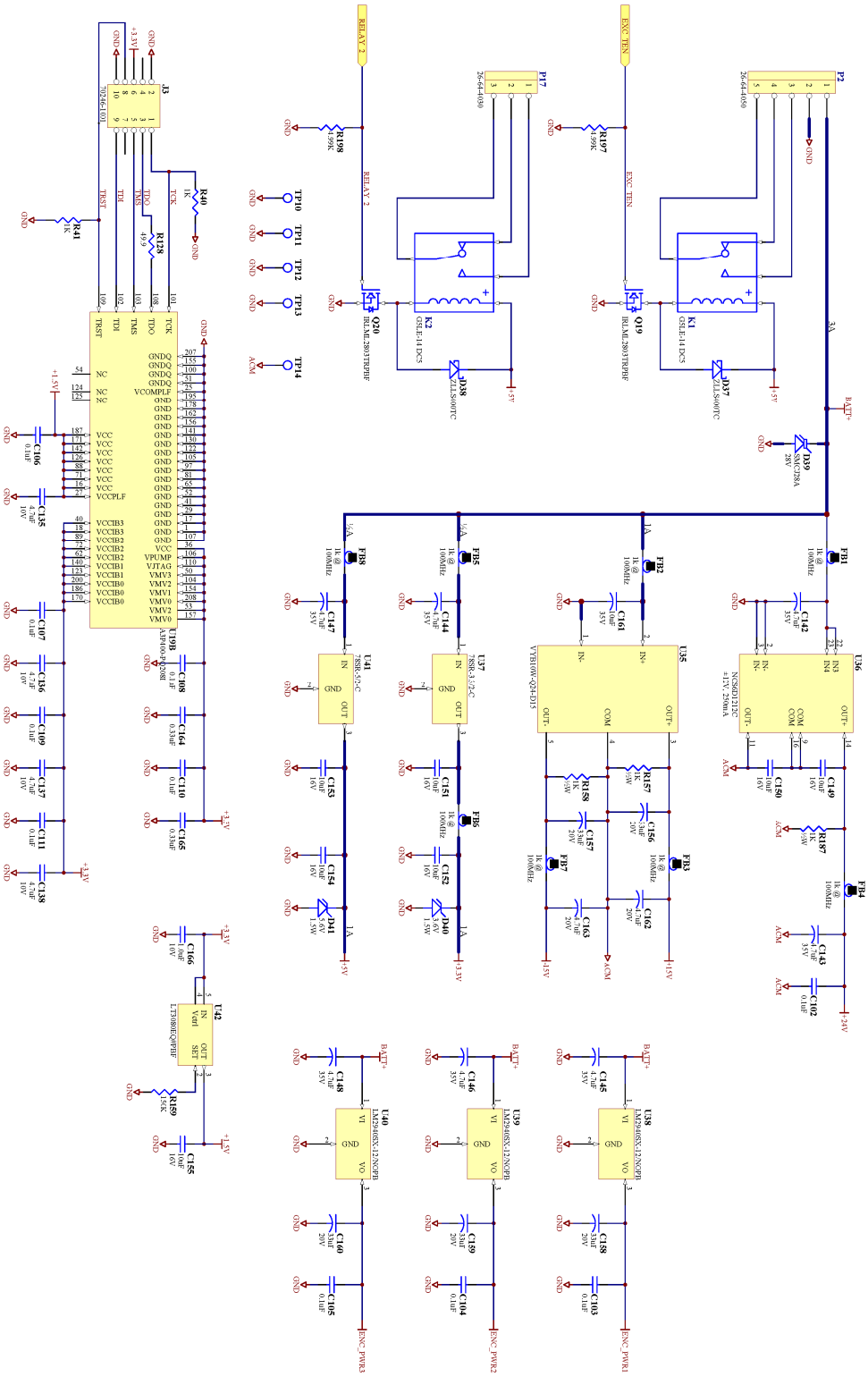
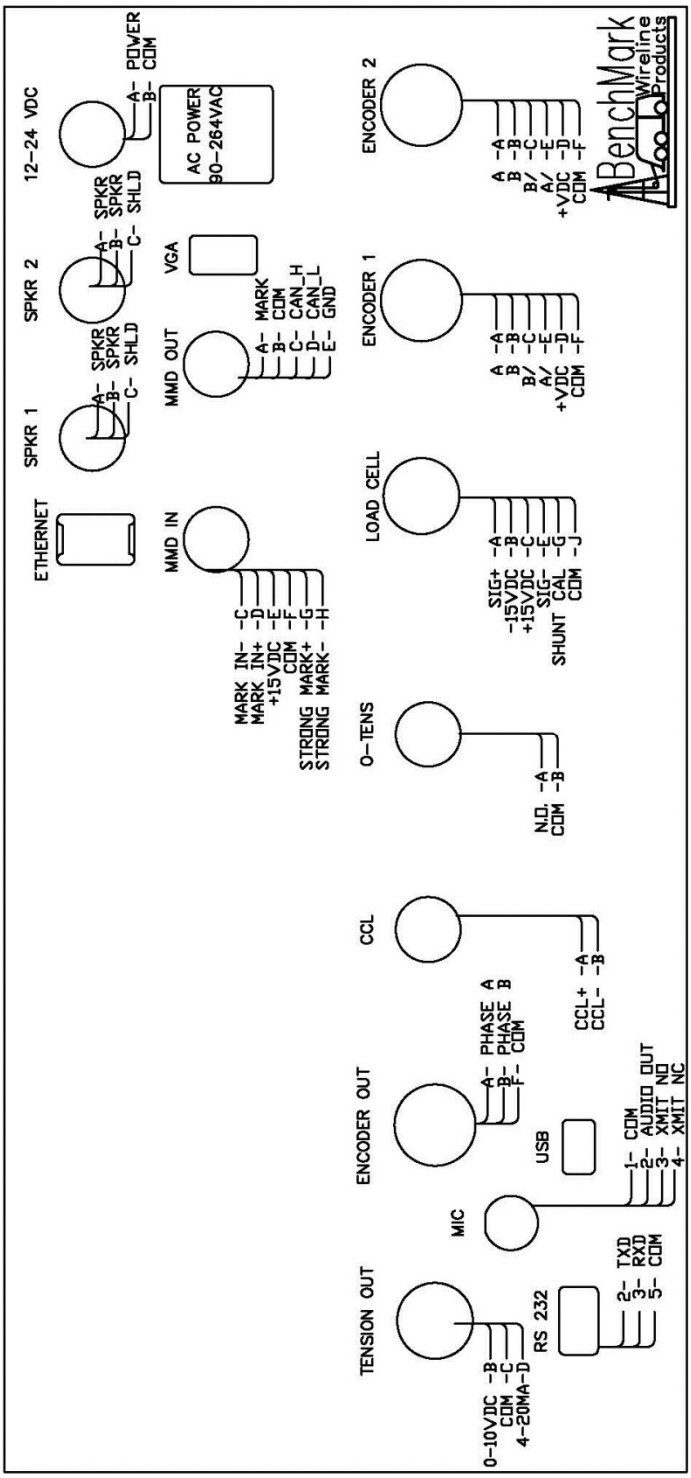


7.2 BACK PANEL CONNECTIONS

AMS3A044, AMS4A044, AMS6A044, AMD6A044 REAR PANEL PIN OUT



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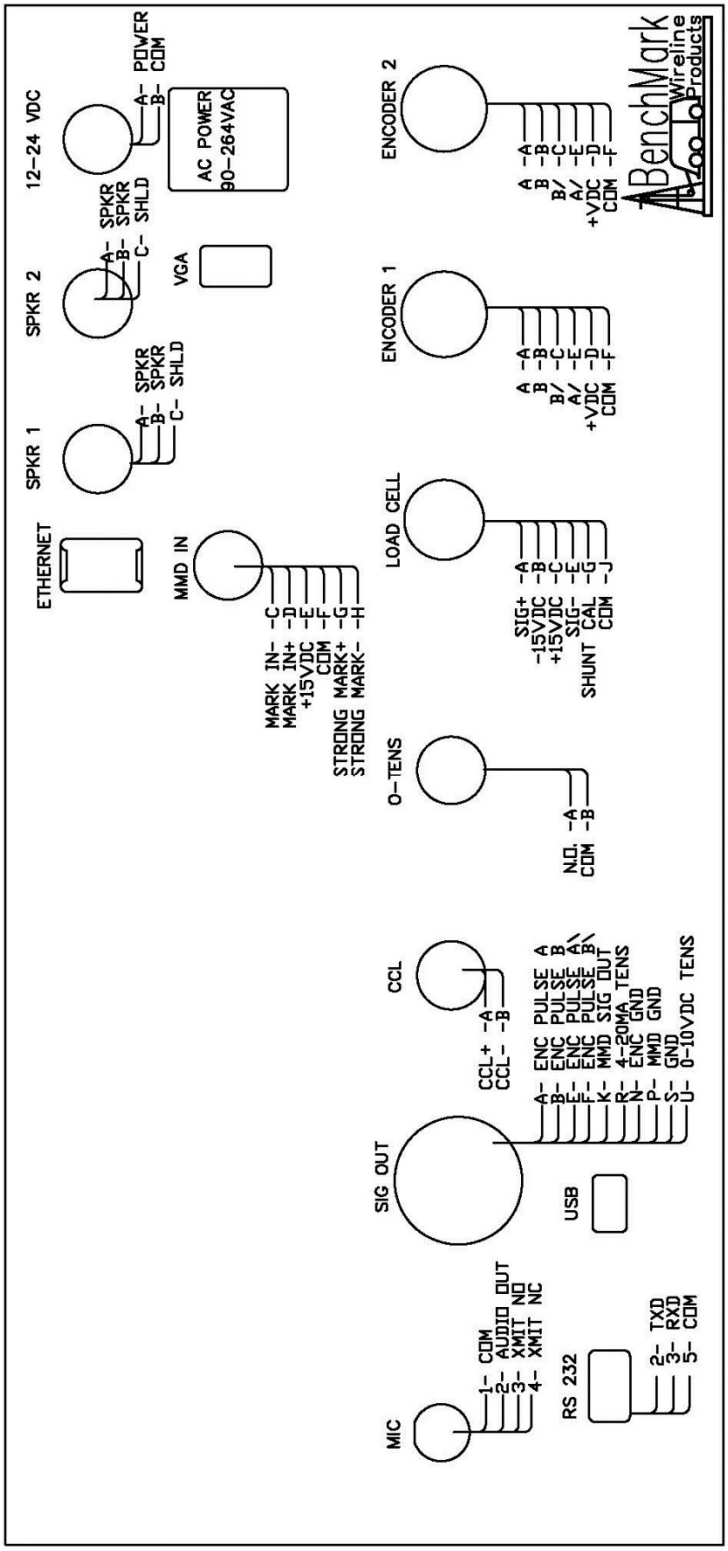
AMS3A048, AMS4A048, AMS6A048, AMD6A048 REAR PANEL PIN OUT



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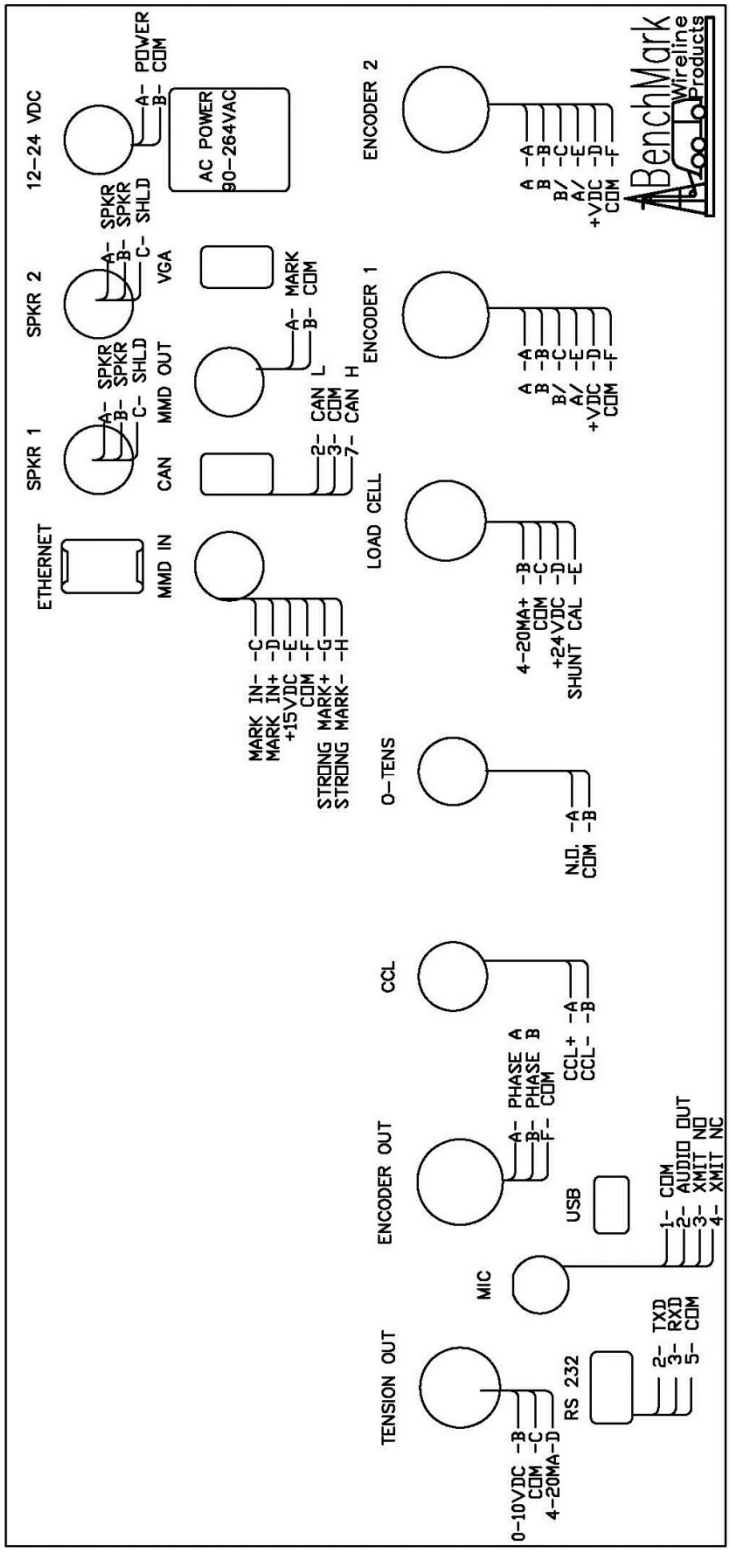
AMS4A148, AMS3A148



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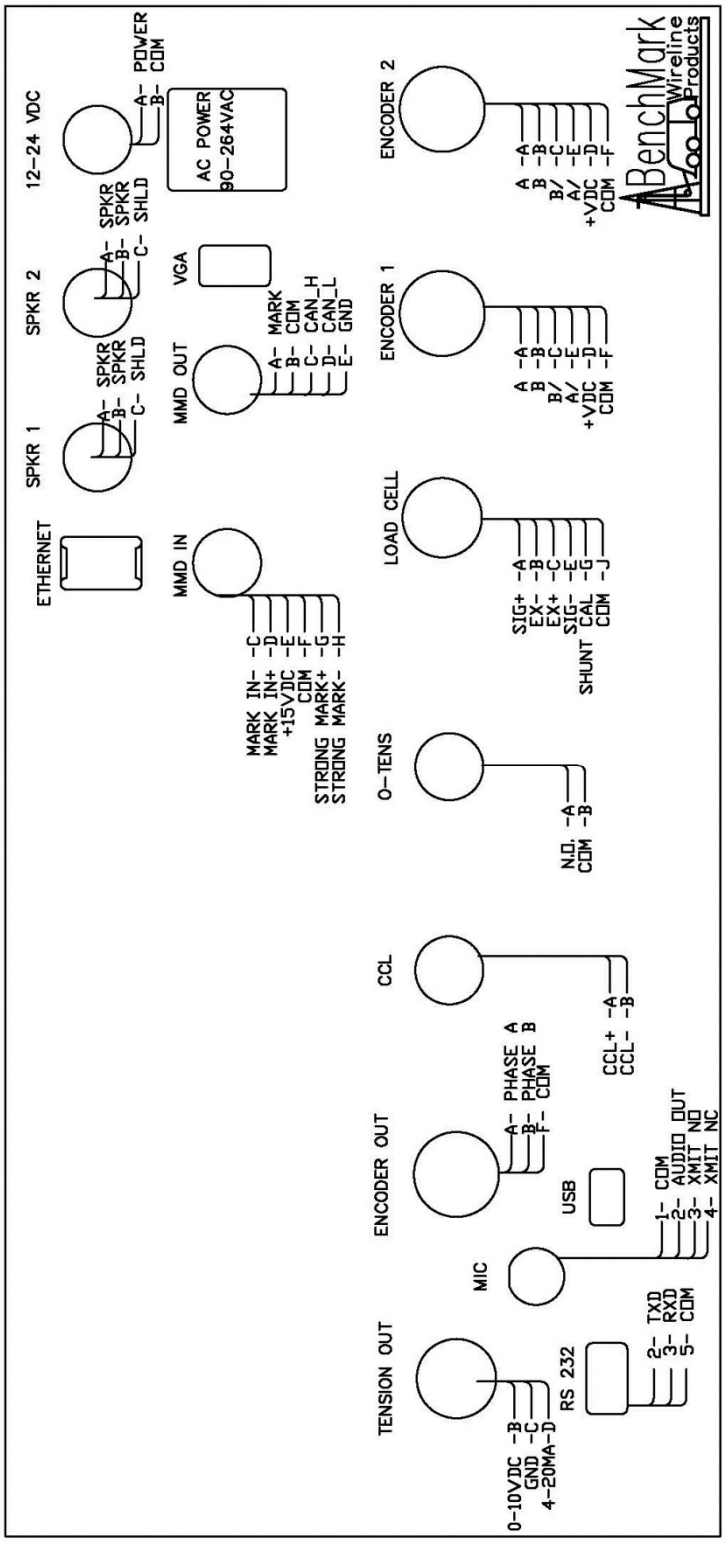
AMS3A244, AMS4A244, AMS6A244, AMD6A244 REAR PANEL PIN OUT

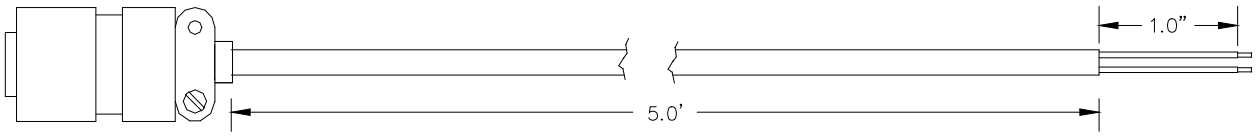


7.3 WIRELIST

Contact Benchmark at Benchmarkwireline.com for this information. When contacting Benchmark, specify the model number of your panel.

8.0 CABLES

8.1 AMS4A827 CABLE ASSEMBLY – DC POWER IN



A – WHITE
B – BLACK

A = +
B = -

P/N	DESCRIPTION	QTY
AMS4P177	CONN KPSE06J12-3S STR PLUG SOCKET	1
AMS7P061	CABLE 16-2 SJ CORD	25

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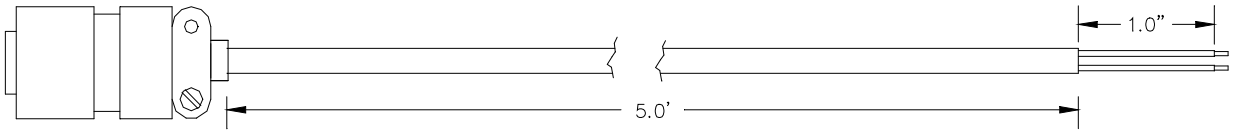
Phone: 281.346.4300
Fax: 281.346.4301
benchmarkwireline.com

8.2 AMS4A826 CABLE ASSEMBLY – OVER TENSION SHUTDOWN



A – WHITE
B – BLACK

P/N	DESCRIPTION	QTY
AMS4P178	CONN KPSE06J12-3P STR PLUG PINS	1
AMS7P061	CABLE 16-2 SJ CORD	30

9.0 WIRELINE OPERATIONS AND DEPTH CORRECTION DESCRIPTIONS

Wireline depth is measured using a measure head that registers the movement of wireline from and onto the drum of a wireline unit. The measurement provides an indication of the amount of cable that passes into, and is withdrawn from, a well. Other associated measurements provide additional information, such as magnetic marks, surface tension and cable head tension, which helps to provide corrections. The BenchMark Standard Touch Screen panel is a modern device designed to accurately and easily provide these measurements.

The panel also provides a number of automated operational warnings and safety features as well as hoist unit to rig-floor communications.

This manual provides information on how the panel is employed in operations, how to use the panel controls, its specifications and maintenance/service.

9.1 WIRELINE OPERATIONS

There are various forms of depth information available to operators at the well site. Wireline (meaning slick line as well as braided and electric wireline) provides a form of depth measurement that can be calibrated, verified and corrected for various effects in a consistent and repeatable fashion.

The BenchMark panels facilitate these measurements and provides additionally a number of commonly used corrections.

Calibrated wireline depth is provided through the calibration of the measure wheel of the measure head as well as through the definition of calibrated lengths of cable through magnetic marking.

The measure wheel is typically pressed against the wireline, or the wireline wraps around the measure wheel, so that movement of the cable is translated into movement of the measure wheel. The measure wheel is attached to an encoder that then produces electronic pulses reflecting movement of the wheel, and hence the wireline depth.

Many measure heads utilize two measure wheels, each independently equipped with an encoder. The panel can utilize both encoder inputs and compare each of these to determine when there is a discrepancy between the measurements that may indicate slippage of the wireline relative to the measure wheel movement. The AMS4A panel is then able to correct for this slippage, further improving the apparent depth derived.

Note however that this relies on each measure wheel having exactly the same effective diameter. As each measure wheel may have very slight diameter differences (manufacturing, wear, etc.), the panel is able to utilize different pulse counts for each wheel to accommodate the differences that may occur per wheel.

Magnetic marks are magnetic fields put into a wireline (typically electric wireline) at fixed distances apart under a constant tension, allowing the wireline itself to be used as a depth measurement device through the noting of the magnetic marks that pass through a magnetic mark detector. Because the tension of the wireline is known during the length definition, the amount of stretch that the cable undergoes can be inferred through measuring the tension of the wireline.

When depth is defined without magnetic marks, the measurement is derived from the measure wheel movement. When used with magnetic marks, the depth is defined by the magnetic marks being read and then the position of the wireline between the marks is defined by the measure wheel movement.

9.1 WIRELINE OPERATIONS continued

The panel can be used in one of several modes:

- Based on measure wheel movement, without correction
- Based on measure wheel movement , with correction
- Based on magnetic marks, without correction
- Based on magnetic marks, with correction

In practice, magnetic marks are only used on multi-conductor electric wireline. Magnetic marks can be put onto other types of wireline, but these are erased and become impractical particularly in cased hole environments where the magnetic fields of the equipment used and tubulars affect the cable marking integrity.

Corrections are applied when the depth measurement being made is for primary depth definition purposes. Corrections are not normally applied when a depth definition has been determined and the wireline service will be applied referenced to this. Note however that using corrections can make the tie-in of services easier and more efficient as the measured depth can be more accurately correlated to the already defined depth.

9.2 MEASURE WHEEL MOVEMENT WITHOUT CORRECTION

When operating using measure wheel only, it is usual to tie into known, or defined, markers or depth definitions (e.g. CCL, GR log, in hole tubular equipment such as nipple, tubing shoe).

In this case the depth is derived using Enc.1 or Enc.2 or Enc.1&2. Tension is not used.

When two encoders are used (Enc.1 & Enc.2), the depth is derived from the wheel with the highest number of pulses based on a time period.

9.3 MEASURE WHEEL MOVEMENT WITH CORRECTION

Correction is typically applied when tying in to existing depth definition, but with more accuracy. It can also be used when defining depth in-hole using cable with an accurately known stretch coefficient and a known cable head weight (or tension device).

This is often the case where marks are not available on a logging cable. The assumption is, however that the running in tension is known, constant and as low as possible. This allows the calculated stretch to be assumed from zero, giving the tool depth as being the un-stretched cable length plus the total of the stretch correction.

9.4 MAGNETIC MARK DEPTH, WITHOUT CORRECTION

Marked cable is used without correction when the stretch characteristics are unknown, or are to be applied post-logging. Examples of this may be in difficult logging situations, or where the tension regime is expected to be complex. Example of this may be pipe conveyed logging, highly deviated wells and in horizontal logging. In this case the emphasis is on accurate logging of the amount of cable in the well.

This method can also be applied with new cable, with the corrections applied post logging (including initial permanent deformation corrections that cannot be applied during logging).

9.5 MAGENTIC MARK DEPTH, WITH CORRECTION

Depth determination using marks and correction is advised for first primary and depth re-definition surveys. For highest accuracy, cable head tension information should be available. Stretch correction can be applied manually as well as automatically with the panel.

Line stretch due to tension is accounted for by entering the tool weight and fluid density. A theoretical tension vs depth curve is calculated and used to establish the mark locations. At each mark the error is added or subtracted to the depth so that the depth will match the theoretical mark depth. As an example, if a tool weight of 1000# and fluid weight of 8.3 lbs/gal is used the mark at 10000 feet is 10.8 feet + the mark at surface. At 20000 feet it is 43 feet + mark at surface.

The amount of correction possible is determined by the mark window width. After resetting the magnetic mark window the first mark detected is assumed to be a valid mark (put on when the line was marked.) If the mark interval is 100 feet and the window width is 5 feet, the first mark detected from 95 to 105 feet from the first mark is assumed to be a valid mark. The panel will add or subtract the difference between the last mark +100 feet – current mark. If the current mark occurs at the last mark + 103 feet, the panel will subtract 3 feet from the displayed depth in the next 30 feet.

The MMD window determines when the next mark can be detected. The cable must travel at least the distance of the value set before a mark can be detected. Marks can only be detected if they occur within this window. I.E. If the window is set for 95', the cable must travel 95' from the last mark before a new mark can be detected.

Default value is 5’

Pressing the MMD reset button clears the last mark setting.