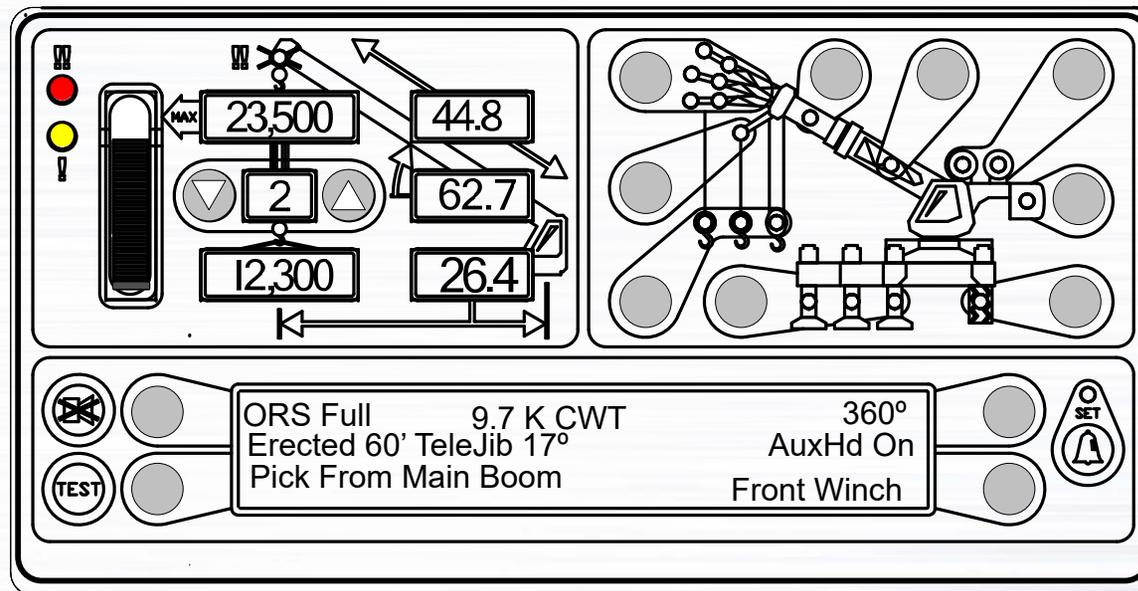


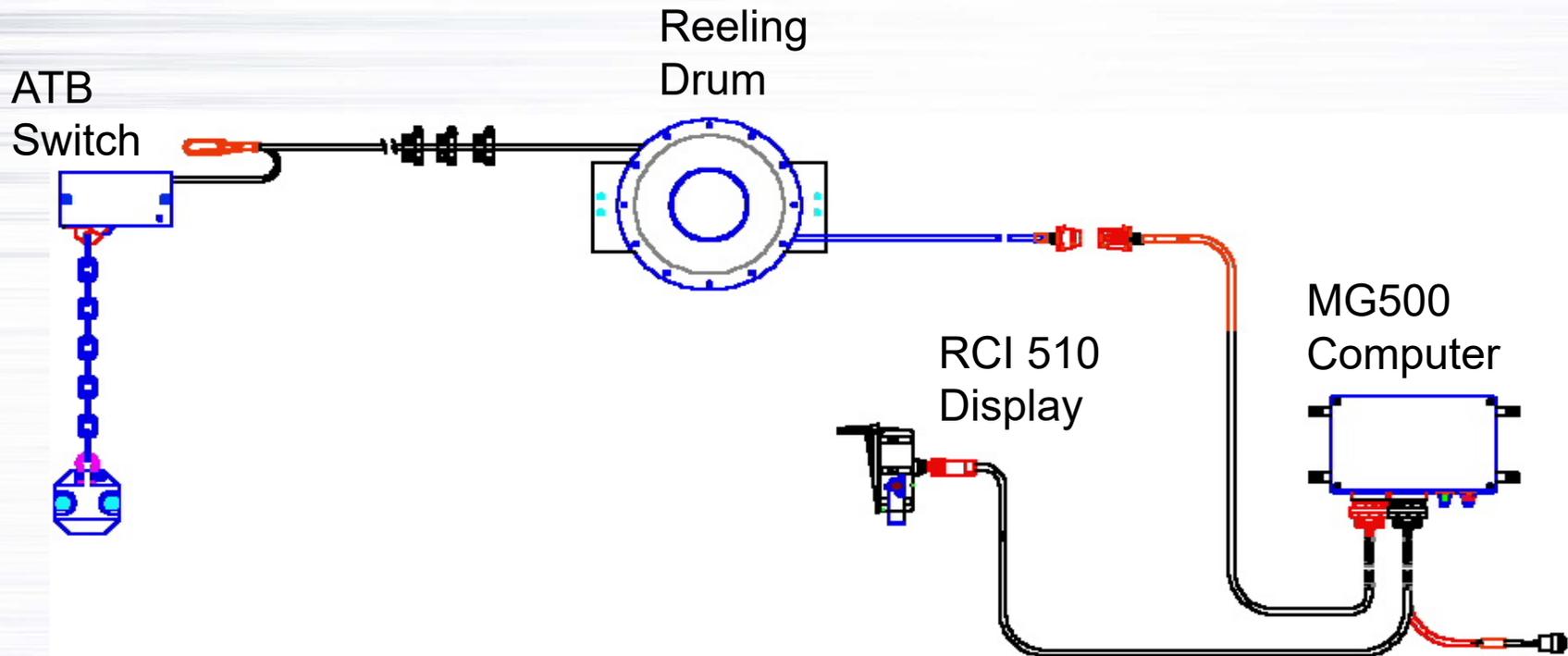


## **RCI 510 Calibration and Maintenance**

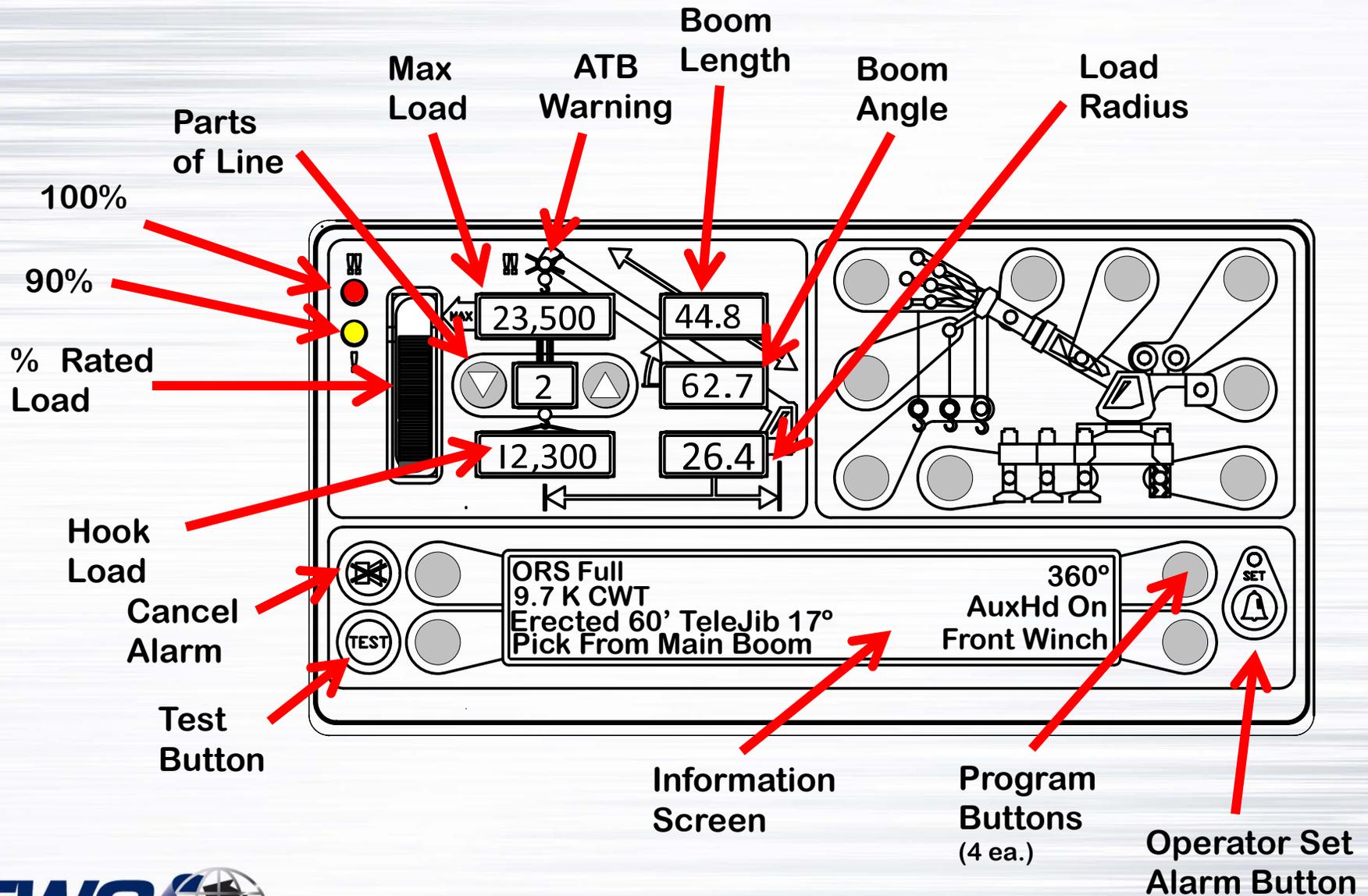
# RCI 510 Operation and Calibration



# What the System Consists Of.....

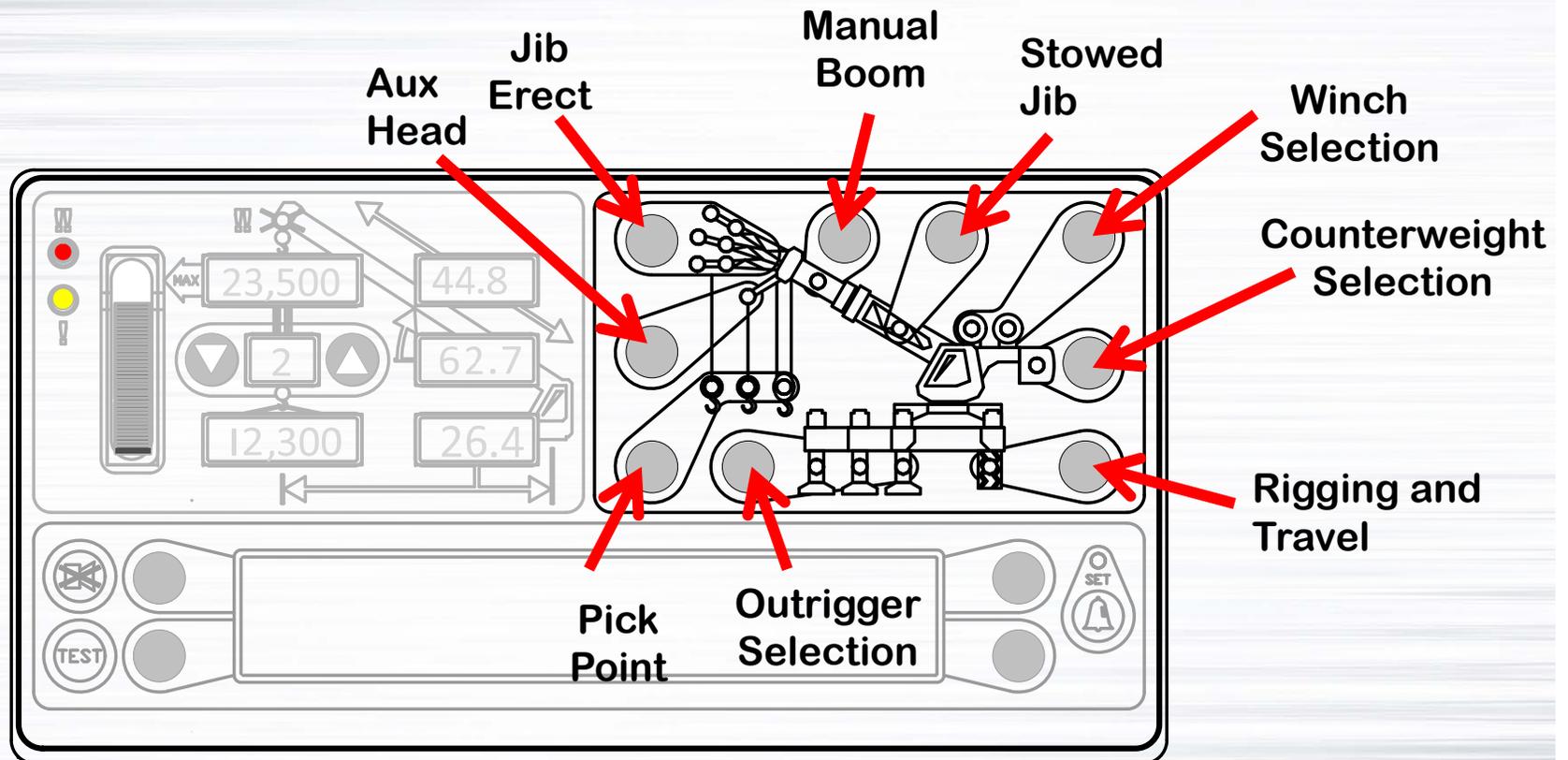


# Setting up the Display/What does It Tell You?



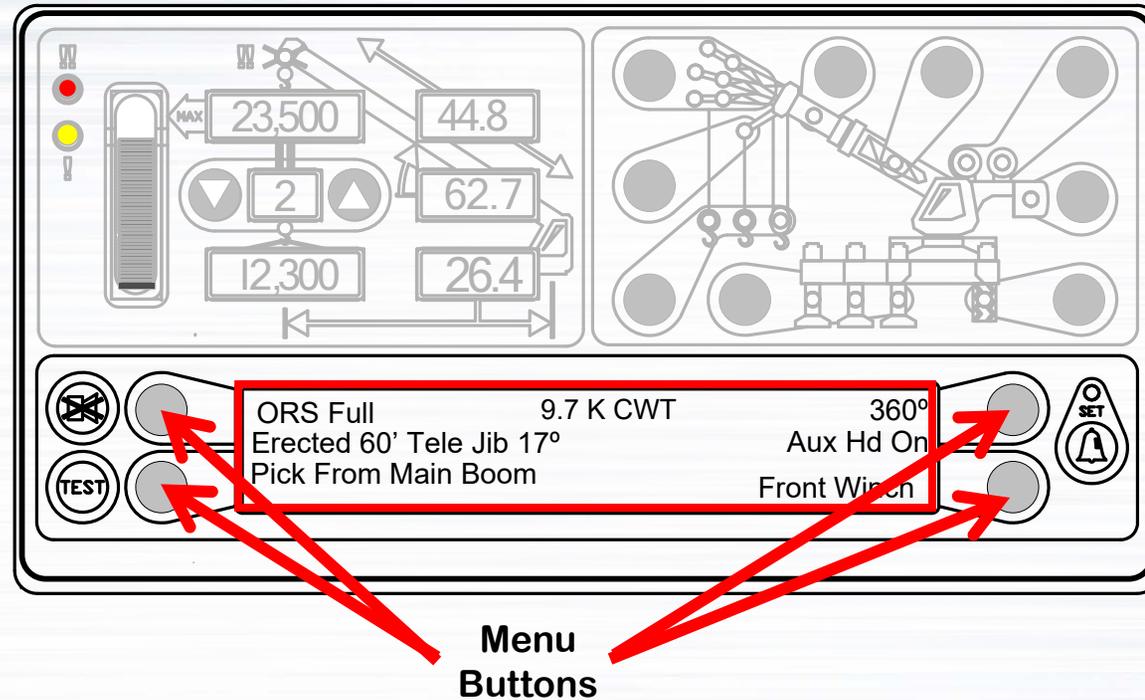
**POWER** to Move the World™

# The “Picto-Gram” and What We Must Tell It!!



Helpful hint- When selecting, a blinking LED is an indicator that more information is needed.

# Using the Information Window



The information window holds a wealth of information!! There are 4 “Menu Buttons” surrounding the window that are used to make selections.

*“The System is an  
Operator Aid....*

*It is NOT a  
Preventative!!”*



## What the System Does For Us

- The RCI 510 is **intended to AID the operator by monitoring the load handling parameters of the machine.**
- It is **never** intended to replace proper operation or good judgment of a properly trained crane operator.
- The crane functions are monitored by high accuracy Sensors.
- Continuously monitors the load on the hook and the allowed load from the load chart.

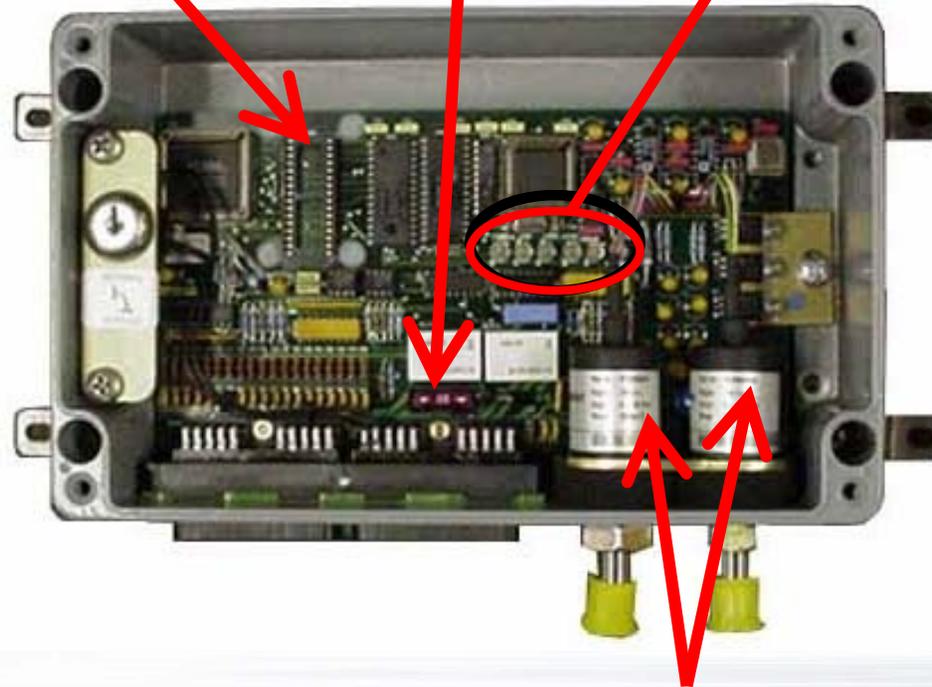
# MG500 Computer

Program  
Chip (IC16)

FKO Fuse

Internal Status  
Indicator  
LED's

*“Use Proper  
Tooling for  
changing  
Program Chip”*



Transducers

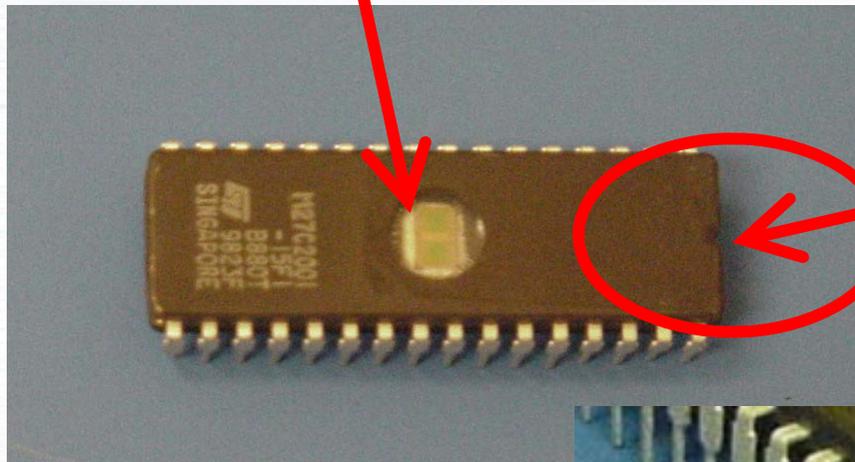


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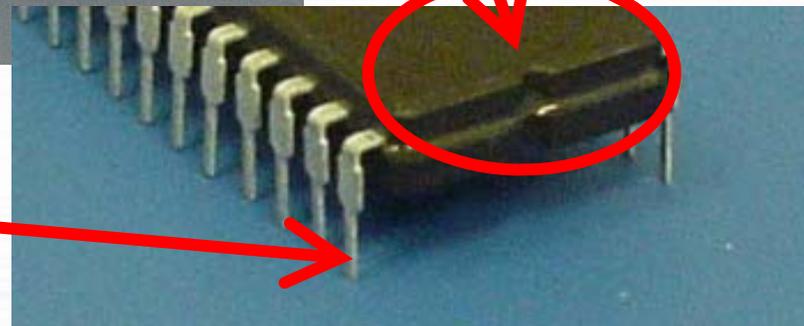
# EPR0M- How it Works

Erasable, Programmable, Read, Only, Memory

Quartz Window



Polarity  
Notch



Contact Pin

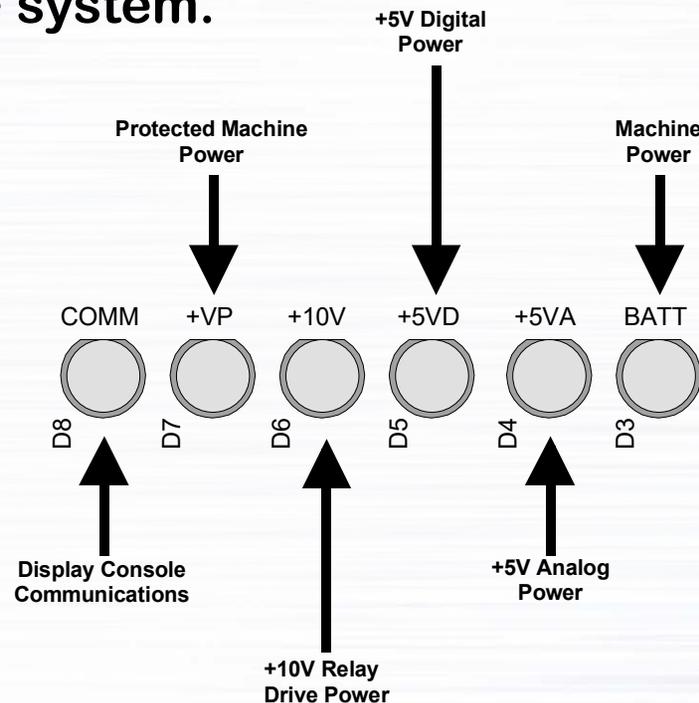


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# Internal Status Indicators

The computer unit contains a row of indicators to aid in checking power supply and communications operation within the system.

All the indicators are bright green light emitting diodes.



A missing or dimly lit indication points to a power supply problem. Check the indicator chart in the maintenance manual for any known repair actions.



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# Internal Status Indicators

A missing or dimly lit indication points to a power supply problem, but could also be disguised by wiring harness problems can also cause a light to dim or go out.

<b>Indicator states</b>  = Light OFF  = Light ON	<b>Actions</b>
COMM  +VP  +10V  +5VD  +5VA  BATT 	Check Crane power and circuit breaker.
COMM  +VP  +10V  +5VD  +5VA  BATT 	+VP power to display console shorted to crane ground. Check display console/bargraph cabling.
COMM  +VP  +10V  +5VD  +5VA  BATT 	+10V relay power internal short or regulator failure. Replace Computer.
COMM  +VP  +10V  +5VD  +5VA  BATT 	+5VD digital power internal short or regulator failure. Replace Computer
COMM  +VP  +10V  +5VD  +5VA  BATT 	+5VA analog power/drive to sensors. Check extension reel connection inside reel & wiring to extension reel.



# Computer Fault Codes

System Fault Codes provide one of the most important ways to quickly locate and assess problems in the MicroGuard® System.

## FAULTS- A000 B000 C000 D000

- **A000 Fault-** Analog fault in sensors
- **B000 Fault-** Internal Function and Power Feeds
- **C000 Fault-** Internal Memory Faults
- **D000 Fault-** Chart Selection

### Special Note

Always investigate Faults in the “B” and “C” Groups before continuing with “A” and finally “D” Group Faults



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# Jobs of the Reeling Drum



*The Reeling Drum needs 5 Turns of Pretension in order to retract the cable!!*

- Keep the cable in a neat single layer
- House the Sensors
- Provides ATB Signal to the computer
- Transport sensor analog signals to the computer

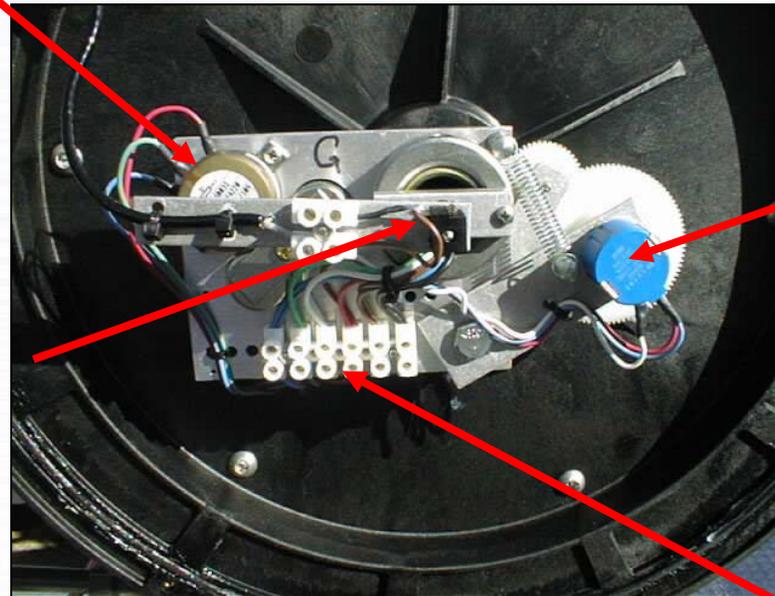


# Boom Reel Internal

Angle Sensor

Extension  
Sensor

ATB  
Swivel Assy



Terminal  
Strip

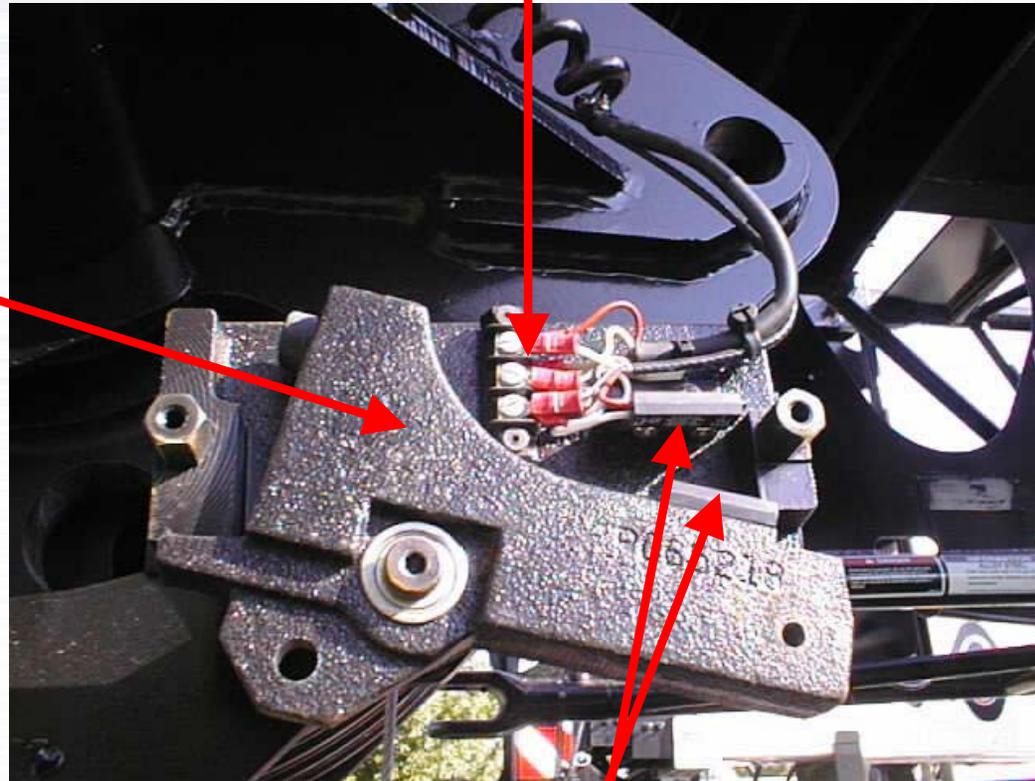


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# Anti-Two Block Switch

Terminal Strip

Counter-Balance Weight

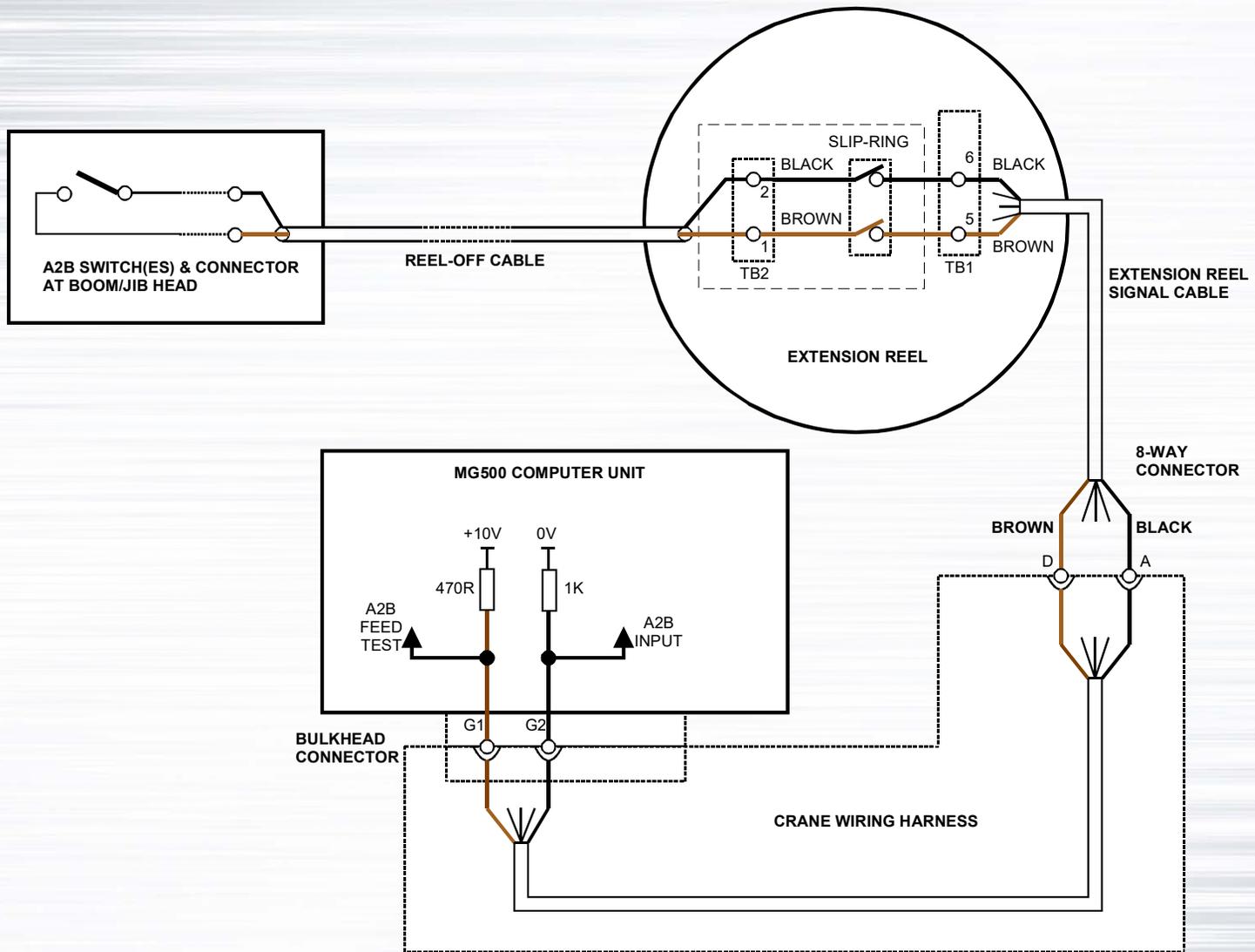


Magnetic Reed Switch

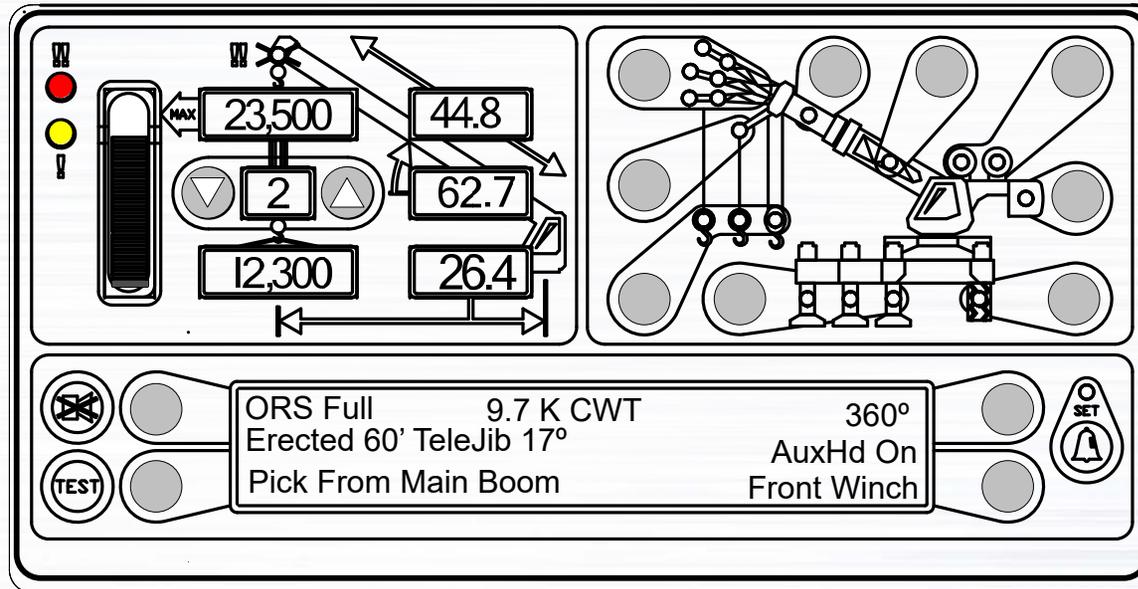


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# 2 Block Circuit



# RCI 510 Setup Calibration Procedure



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## Why Zero and Span?

In order for the computer to accurately measure length and angle, we must insert accurate start and stop points for it to measure from and to. To accomplish it the Microguard® RCI 510 display uses a very simple menu system for the calibration. The Menu screen is arranged so that the 4 keys surrounding the information screen can be used as function select buttons.

**The menus used in the setup calibration are as follows:**

**Menu 2- Zero Sensors**

**Menu 3- Span Sensors**

**Menu 4- Swing Pot Calibration**

The menu in use is noted at the top of the information screen. You must use the menu up and menu down function to first locate the menu number and the sensor number to assure that you are calibrating the proper sensor. Sensors for the system are as follows:

**Sensor 2 = Boom Extension**

**Sensor 3 = Boom Angle**

### **⚠ CAUTION**

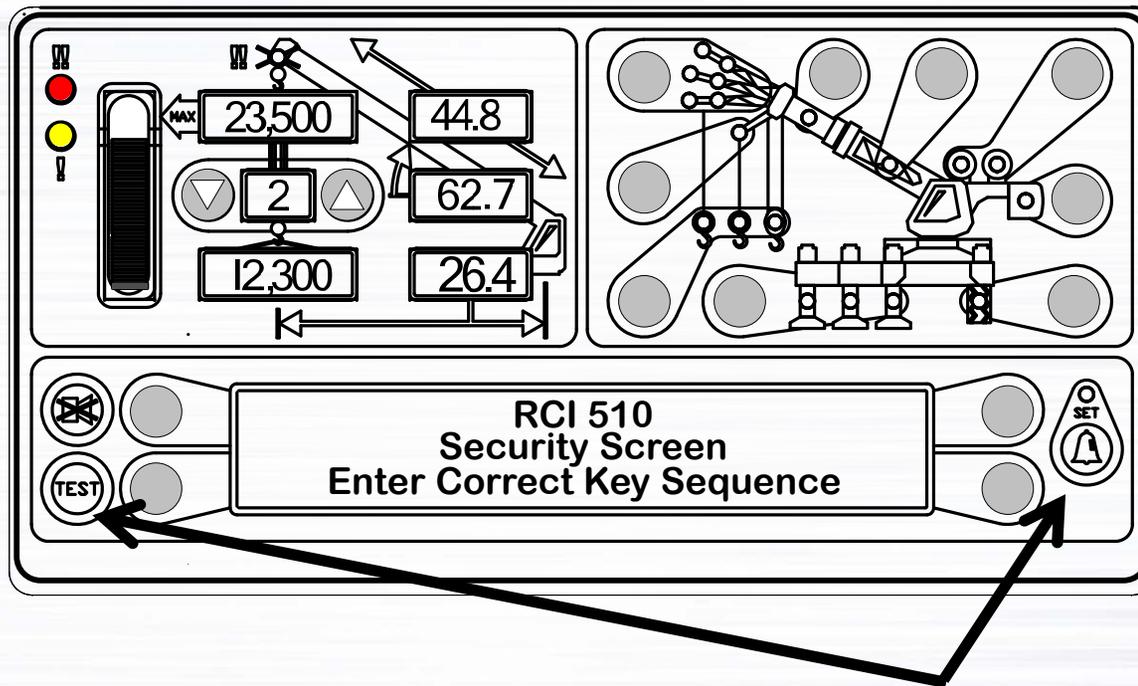
In order to calibrate the system, the unit should be set up on firm level ground and the outriggers at their fully extended position. It is acceptable for the Side-Folding Jib to be in place, as long as it is noted in the display setup as a stowed jib. For the first steps of the calibration procedure set the boom at 0° (perfectly level), using a digital level that is accurate within .1° degree. The boom should be fully retracted.



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# Entering the Calibration Mode

Press the Test and Operator Alarm Buttons simultaneously and the MicroGuard® RCI 510 console will request a security code be entered in order to get into the calibration routine. You will then have 5 seconds to enter the proper button pushing sequence, and when this is done, the information screen will show “Entering Calibration Mode”

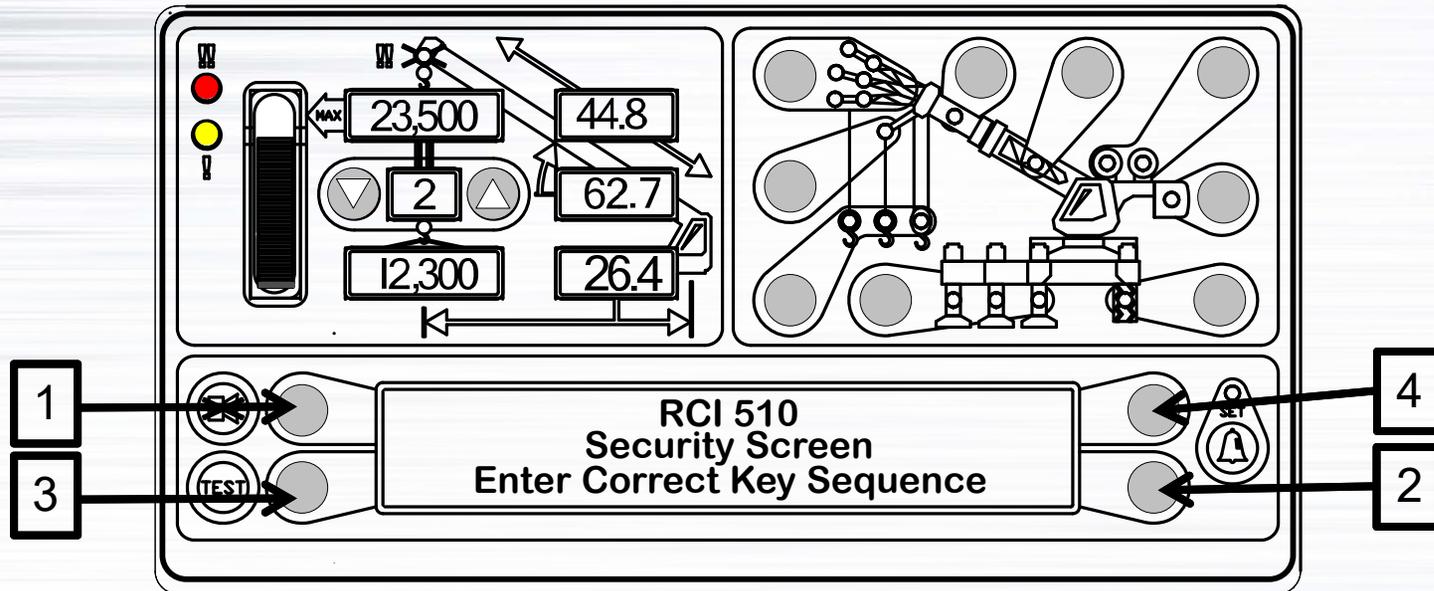


Press and Hold the Test and Set buttons together Until Security Screen Appears



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# Entering the Calibration Mode



Enter the key sequence within 5 seconds as follows:

1. Upper Left
2. Lower Right
3. Lower Left
4. Upper Right

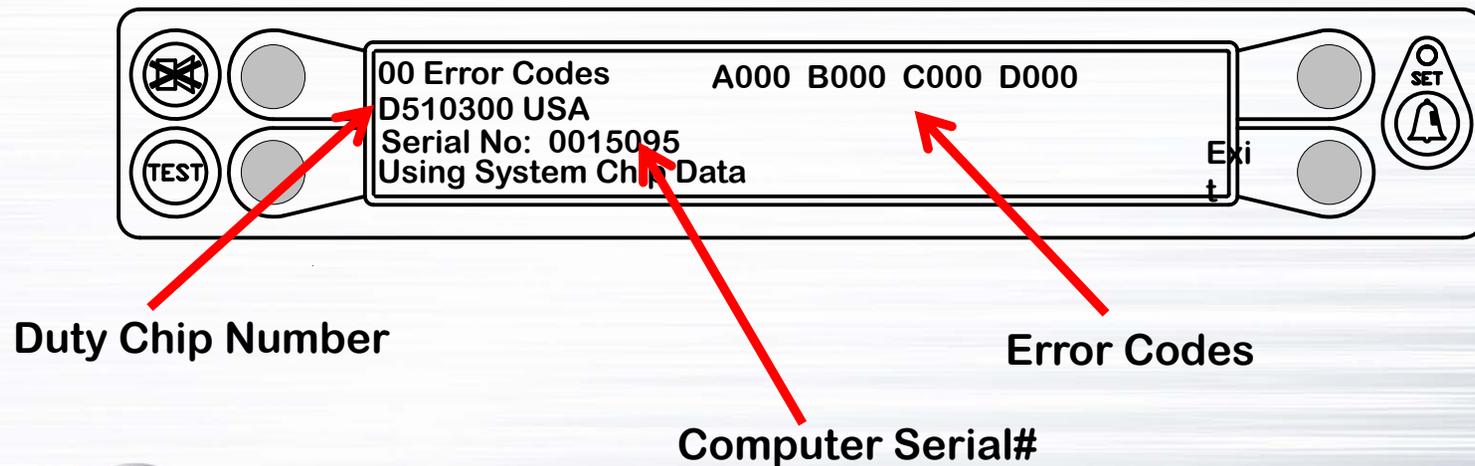


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The first screen to appear after the entry into the calibration mode will be the error code screen. This screen, when selected, will have error codes lined up across the top of the information screen like the illustration below.

### Checking for Error Codes

When properly calibrated, all error codes should be “0” s. The Duty Chip number should appear, as well as the serial number of the computer system installed on the unit. The button adjacent to “Exit” will take you back to the main menu.



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# Preparation for Zero of Extension Sensor

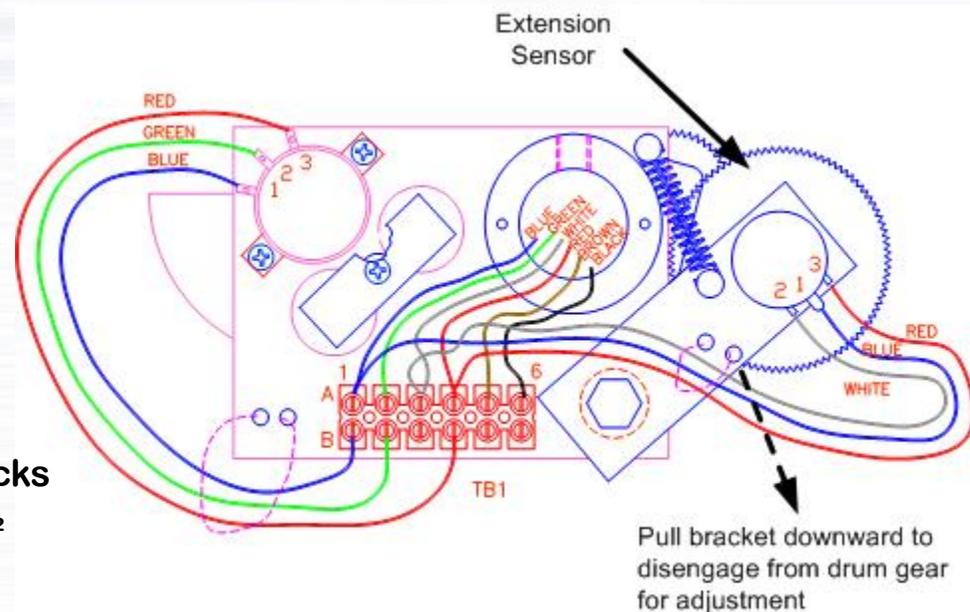
Position Crane Boom in Fully Retracted Position and set to "0.0" Position using Digital Level

Remove the cover from the reeling drum exposing the sensor plate and locate the extension sensor.

Rotate the Extension Sensor gear Clockwise, until the clutch drags/clicks and then rotate Counterclockwise  $\frac{1}{2}$  turn.

The voltage reading between the blue wire (Dr-) and White wire (Ext. signal) on the terminal block should measure about .25 to .35 Volts. Rotate the gear to attain proper voltage reading.

**Note:** This voltage signal is used to signal a problem, should the ATB cable break and the sensor suddenly hit the zero voltage position. The clutch prevents damage to the sensor potentiometer.



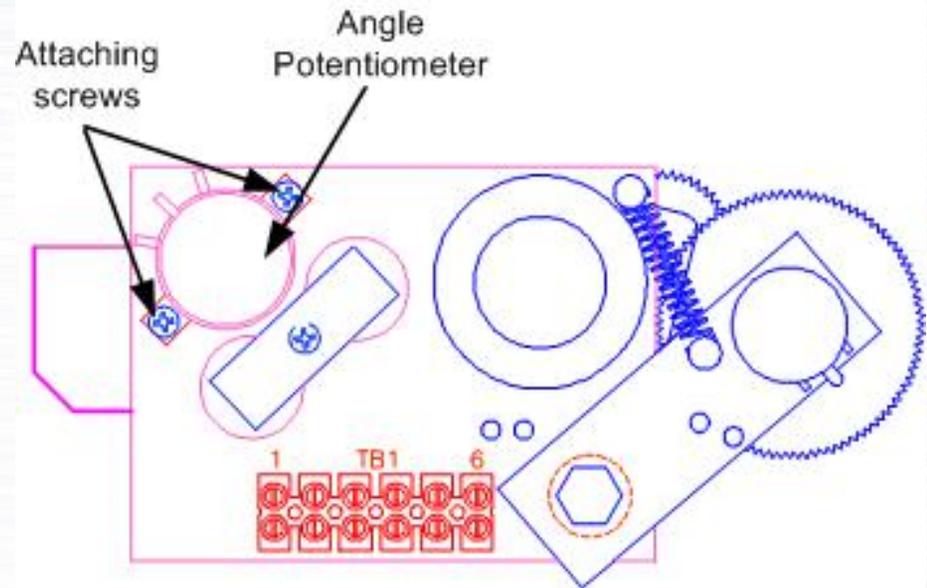
**POWER** to Move the World™

# Preparation for Zero of Angle Sensor

## Zero of Angle Sensor

Before leaving the factory, all angle sensors are preset to “0.0” Setting on the Pot. Since the Pot has limited travel, if anyone has turned the pot, this setting could be affected, and will not span properly.

To avoid this situation, with the boom elevated to “0.0” degrees (using digital level) check the voltage between the blue wire (DR-) and the Green Wire (Angle Output). The digital volt meter should indicate between **.475 and .500** Volts to be in the correct position.



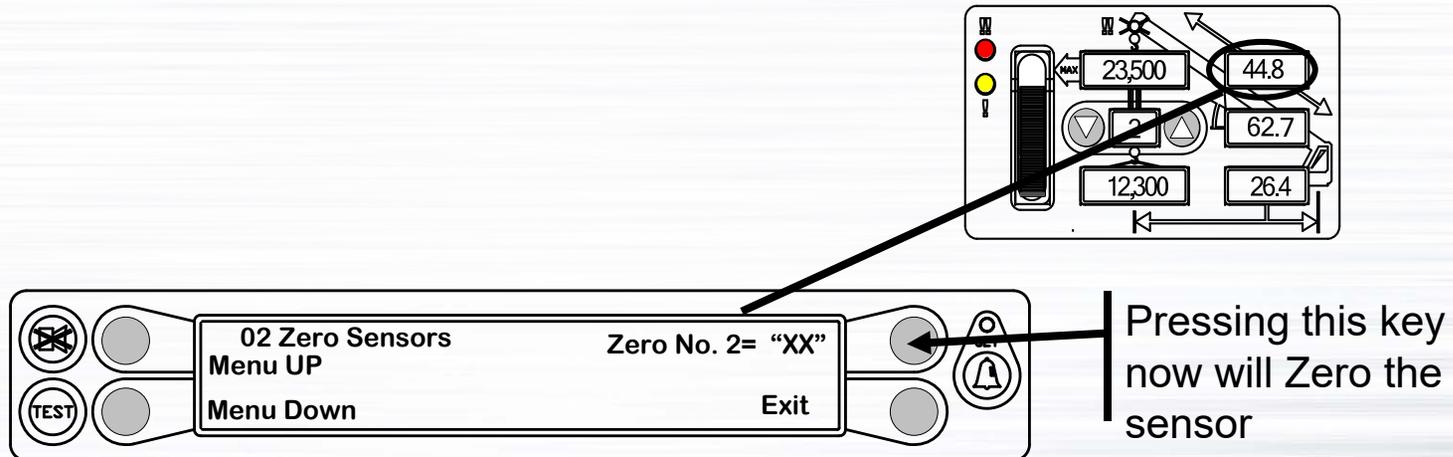
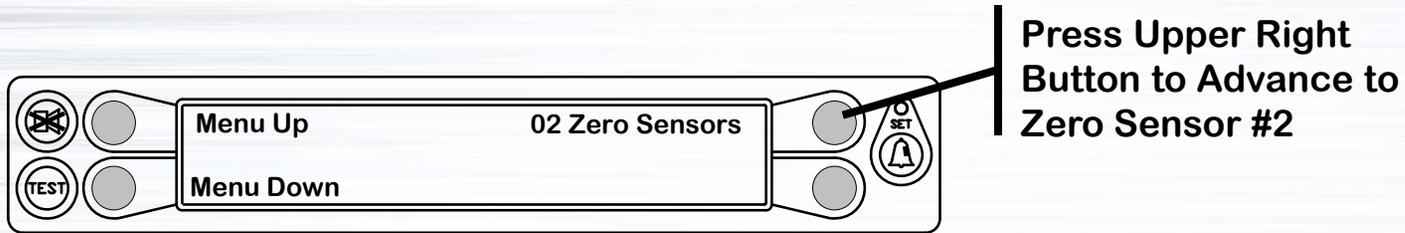
If the factory setting has been disturbed, it can be re-established by loosening the attaching screws as shown above and rotating the Pot until the desired voltage reading is attained.



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# Zero Menu for Extension

Start the unit and put the console into the calibration mode and menu up until you reach “02 Zero Sensors” menu on the right side of the information window.



**\*\* Press Menu Up Key to Advance to Angle “0” Set**



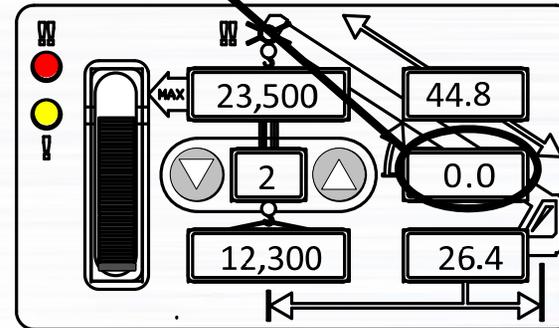
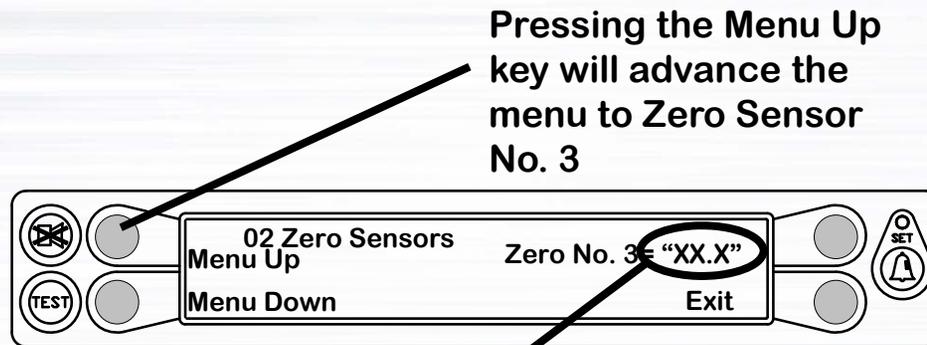
**POWER to Move the World™**

# Zero Menu for Angle

After scrolling up to the Angle Menu the display should look like the picture at the right, and with the boom at “0.0” using the digital level

Press the upper right button and the Zero No. 3 will reflect the proper reading of “0.0” on the display.

Pressing the button a second time will verify that you want to calibrate Zero Point (Yes Calibrate). Angle “0” should appear in the Angle window as in the graphic at the right



# Spanning of the Angle and Extension Sensors



Setting spans for the system, requires that you have the boom at high angles, and often in the fully extended mode. Assure that there are no stability issues associated with these actions.

**Check the Area for Overhead Obstructions**

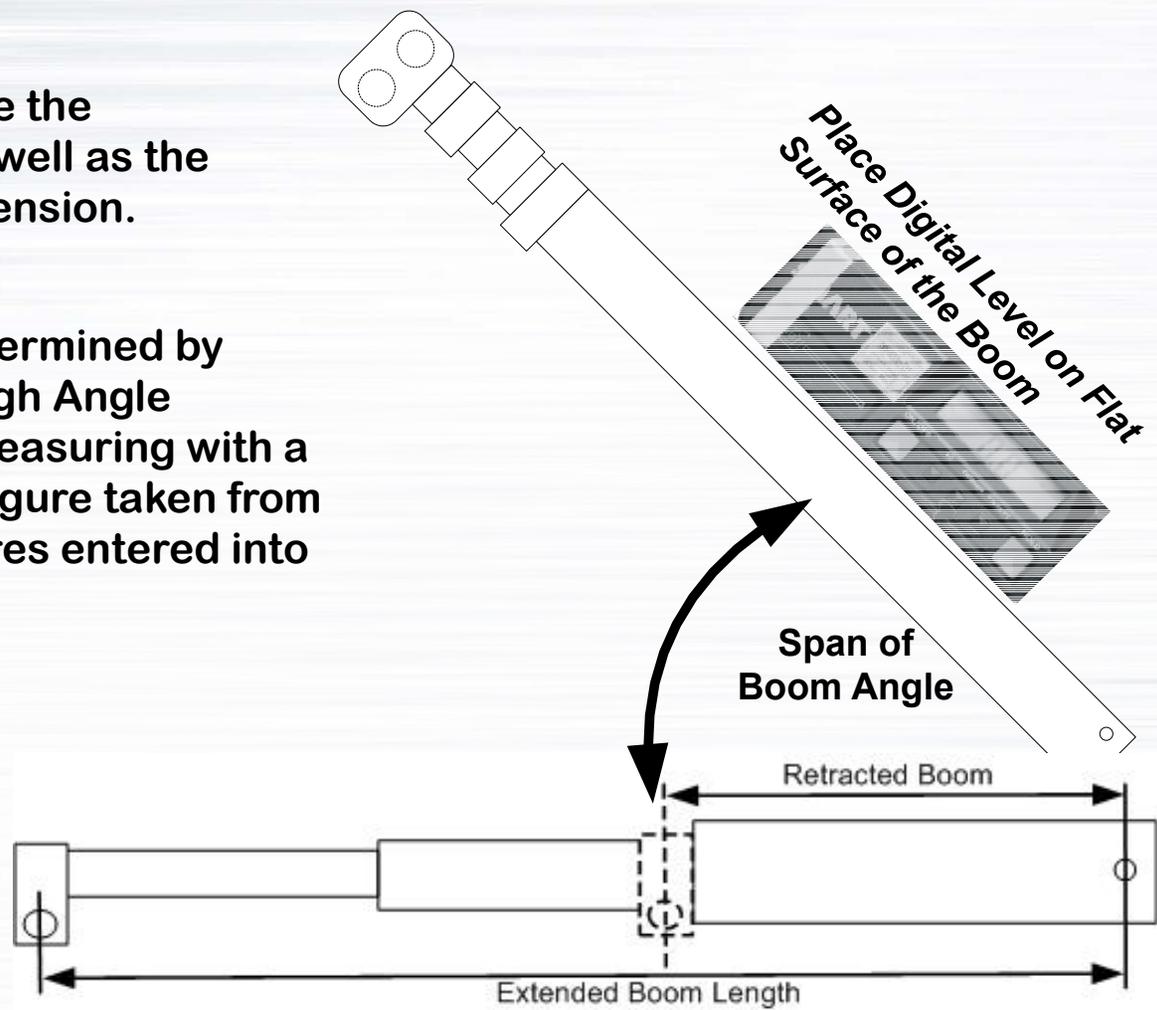


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# Span Angle/Extension

Next you must determine the “Span” of the Angle, as well as the “Span” of the Boom Extension.

Span of the Angle is determined by raising the boom to a High Angle (Between 60-65°) and measuring with a digital level. The span figure taken from the level will be the figures entered into the calibration screen.



Span of the Extension is a simple calculation:  
**EXTENDED LENGTH - RETRACTED LENGTH = SPAN**



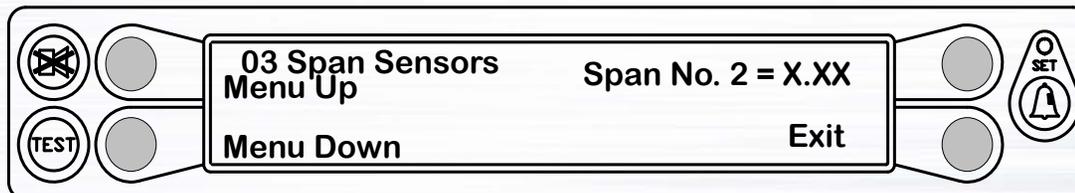
**POWER** to Move the World™

# Entering a Span in the Calibration

With zero procedure completed, you can move on to the “*Spanning Routine*”, which is menu No. 3 on your display.

Using the Menu Up button Scroll to the “03 Span Sensors Menu”. This menu will let you input information for the Span of the Angle and Extension Sensors, allowing the computer to correctly calculate Boom Length and Boom Angle.

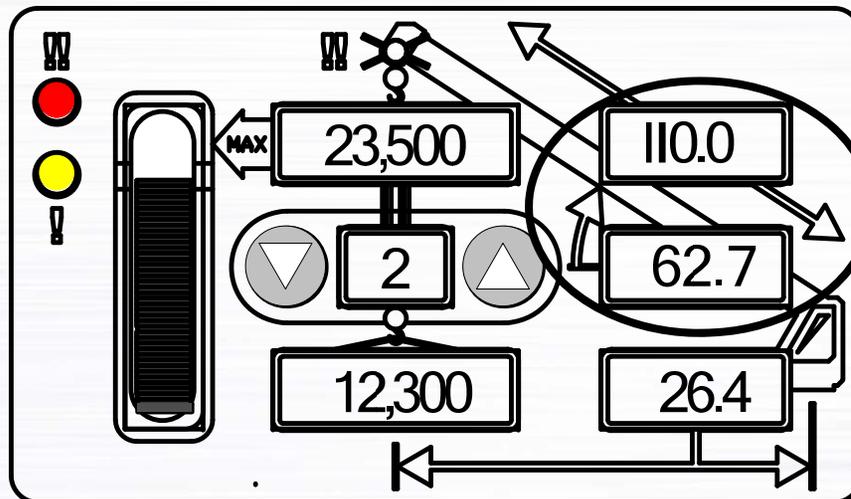
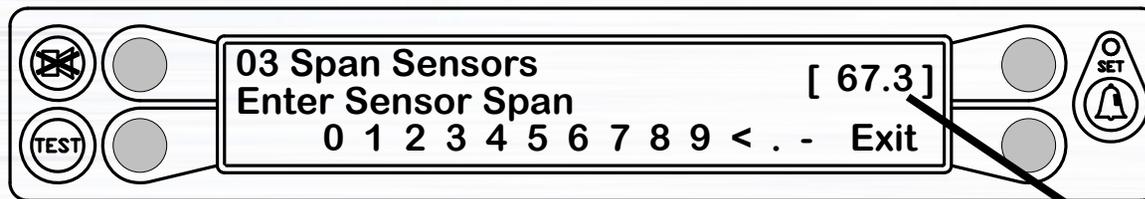
Press Upper Right Button to enter the Spanning Routine



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# Finalizing Number Entry in Spans

After the desired numbers are selected and put into the brackets, Pressing the upper right button again, will enter the numbers into memory. This same operation is used for Boom Length and Boom Angle. (Choose the proper sensor number).



These numbers will be entered into the computers memory

Extended Boom Length or Proper Boom Angle will be displayed in the appropriate window.

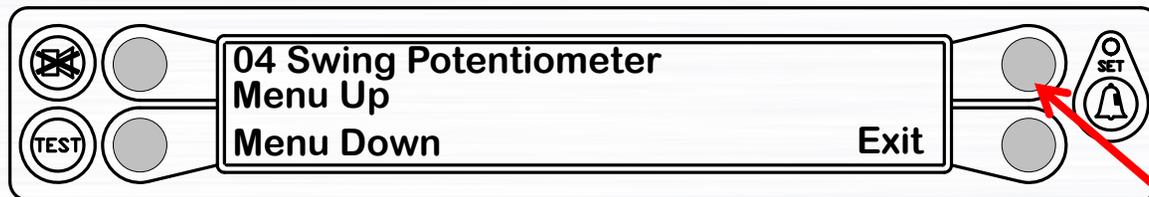


**POWER** to Move the World™

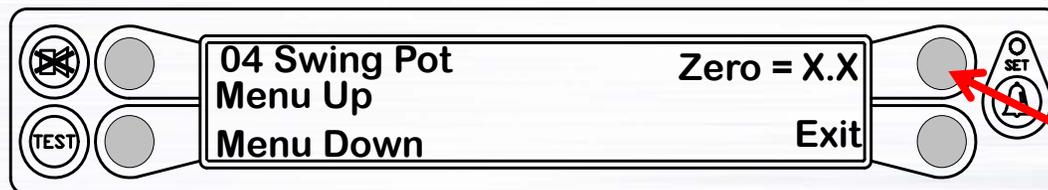
# Setting Zero/Direction on the Swing Pot

After the spanning routine is completed, the boom may be placed in the “Stowed”, or “Roading” position. From this position, the House Lock on the rotation should be set to assure agreement with the display.

Press Menu Up until the “04 Swing Potentiometer” menu is reached. Pressing the upper right button on the display will take you to the “Zero =0” potentiometer command. Pressing the button a second time will be the starting point for measurement of the Swing Circle.



Pressing the upper right button will move you to the “0” Screen



Pressing the upper right button again will “0” the Potentiometer

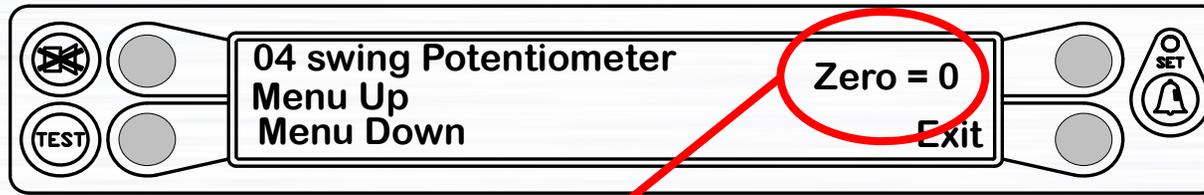


**POWER** to Move the World™

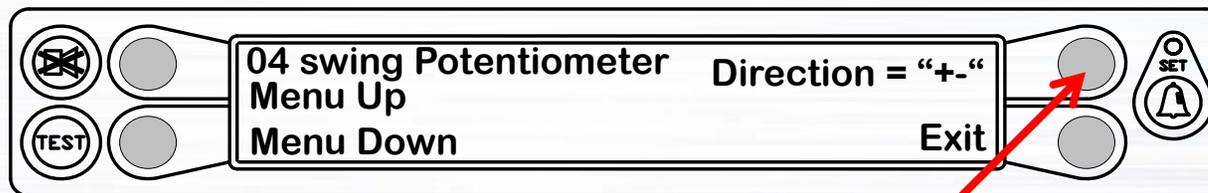
# Other Functions of the Swing Menu

Once the swing has had the “0” calibration done, the direction of swing should be checked.

When the boom is raised and rotated to the right, the swing numbers should count up (1,2,3, etc.). If they do not, menu up will take you to the next screen for reversing the direction.



Rotating to the right should make the numbers count upward (1,2,3, etc.)

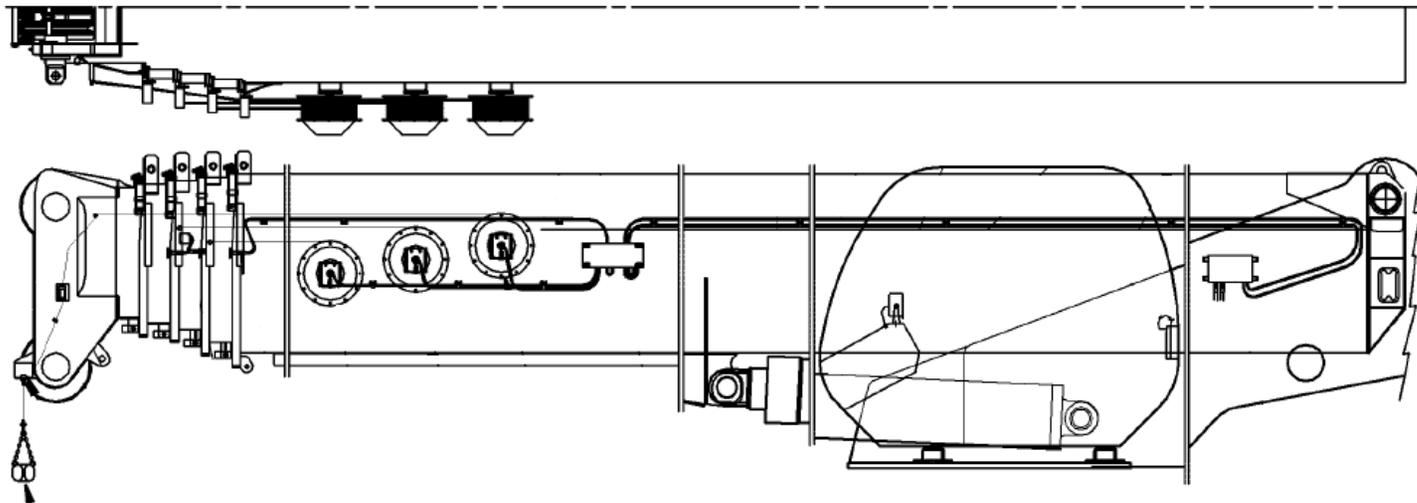


If the direction is wrong, Pressing this key will reverse the direction.

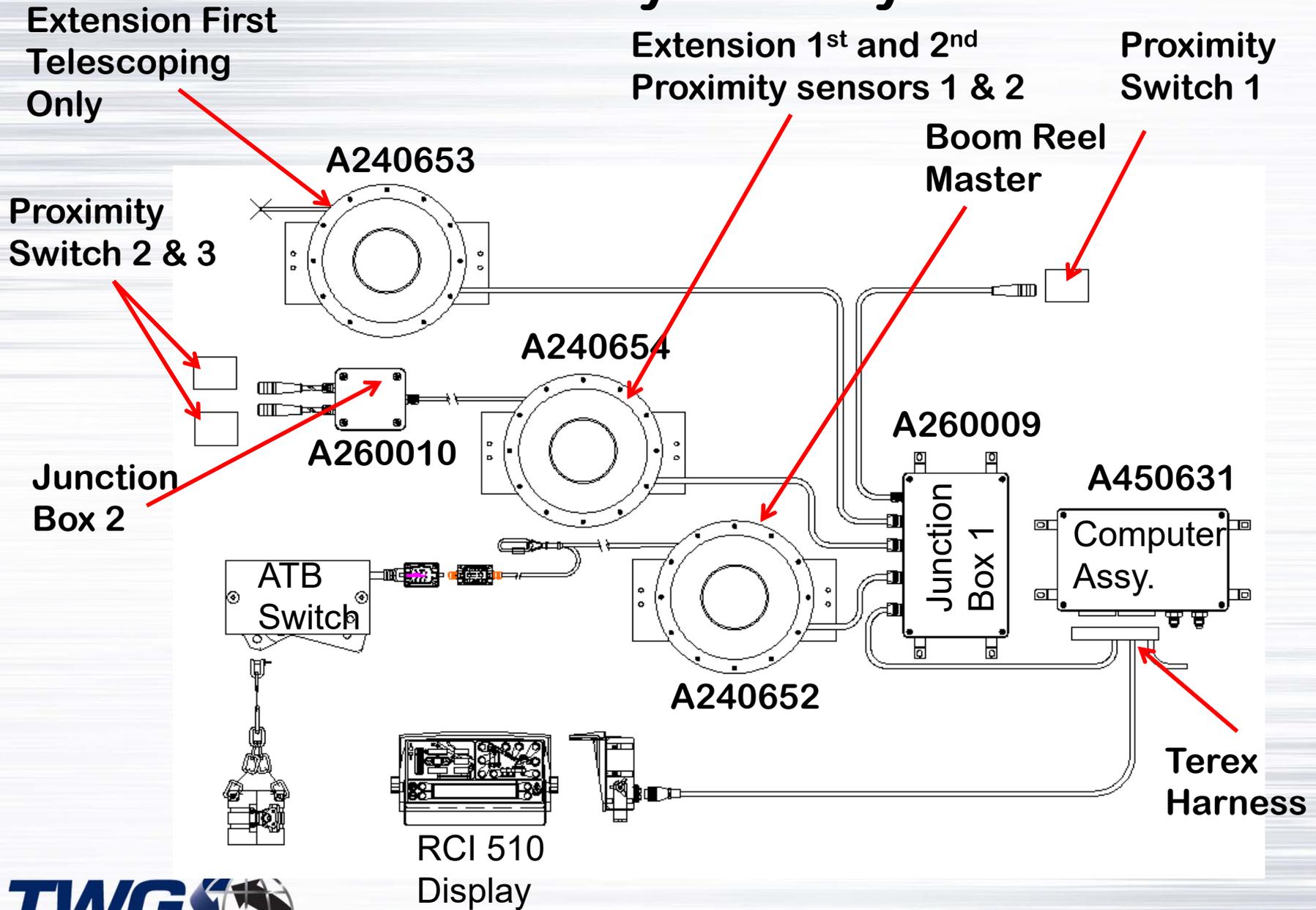


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# RT1120 Synchronous Extension CAN bus System



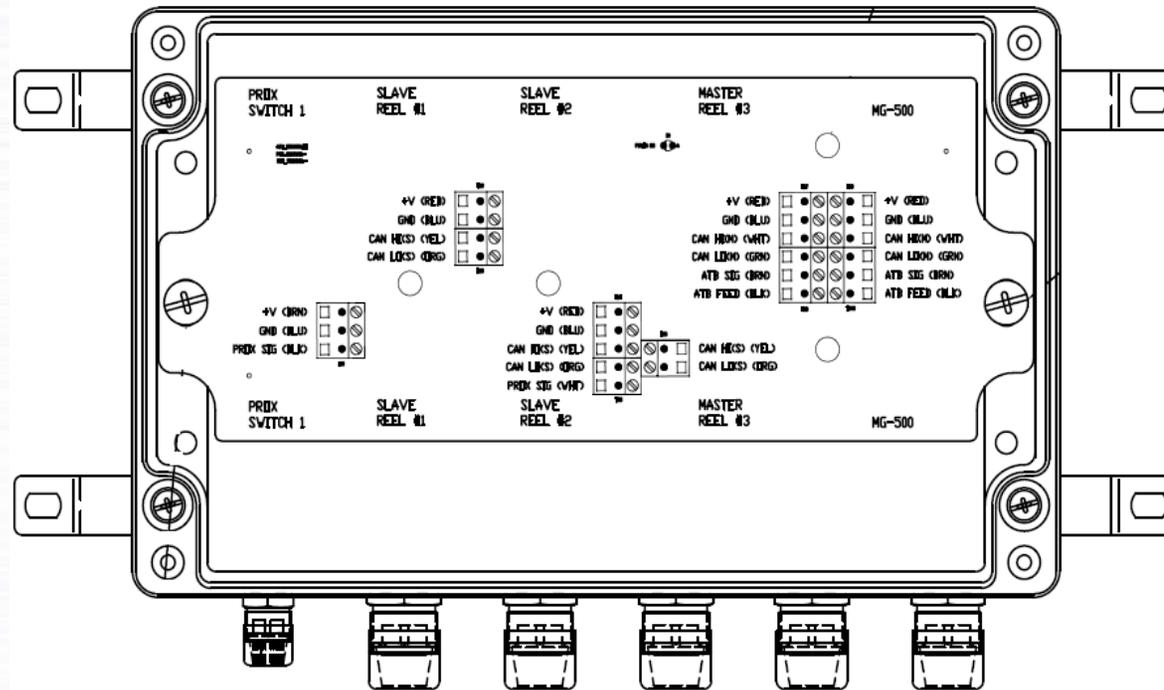
# RT1120 System Layout



# Main Junction Box



The Junction Box collects all of the signals from the reeling drums and flows this information through the Can Bus information lines to be sorted by the computer.

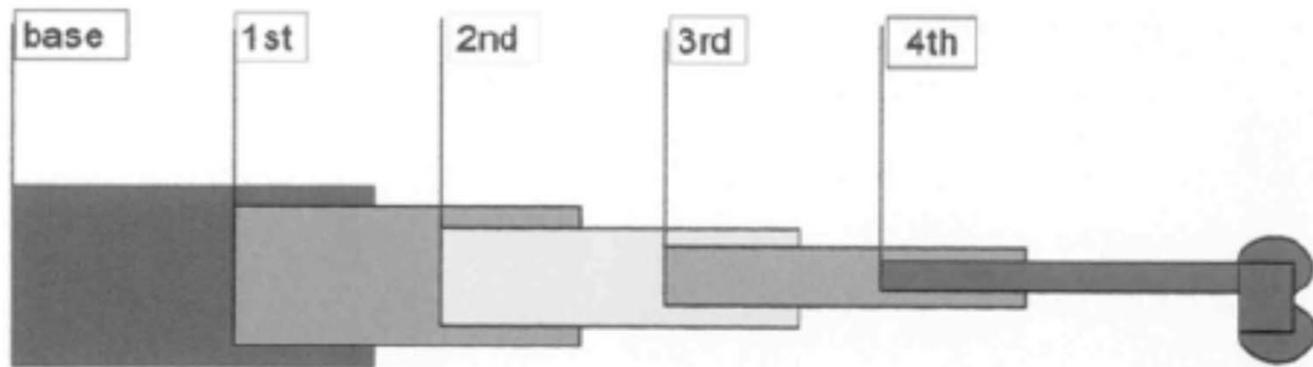


# Modes of Operation

RT 1120



# The Synchronous Boom Mode

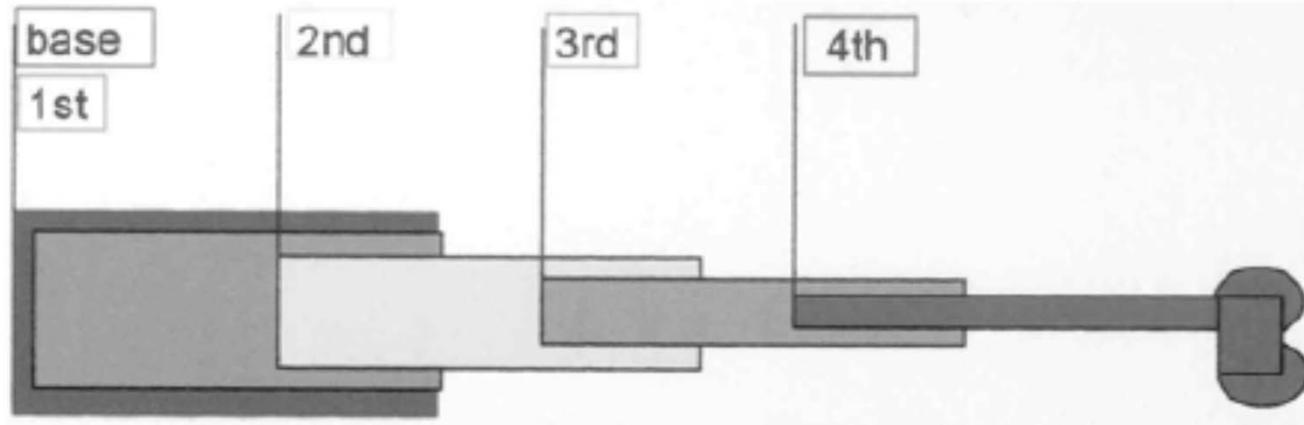


Select Mode 1 by switching the boom mode switch on the lower right of the dash to Position 1. In this mode all cylinders extend synchronously.



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# Stability Telescoping Mode

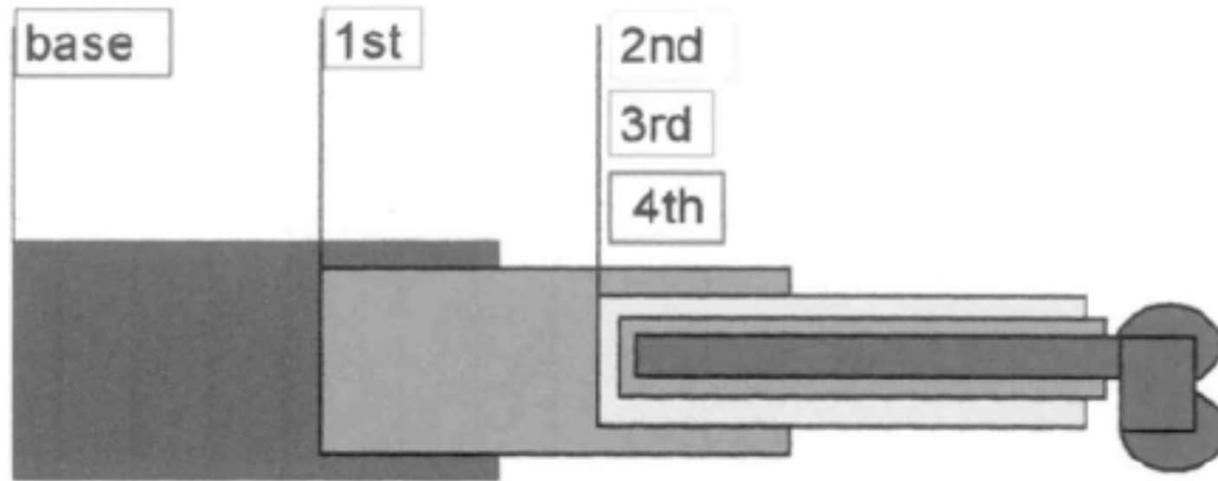


Select Mode 2 by switching the boom mode switch on the lower right of the dash to Position 2. In this mode cylinders B and C extend first synchronously up to 100%. Then cylinder A follows up to 100%.



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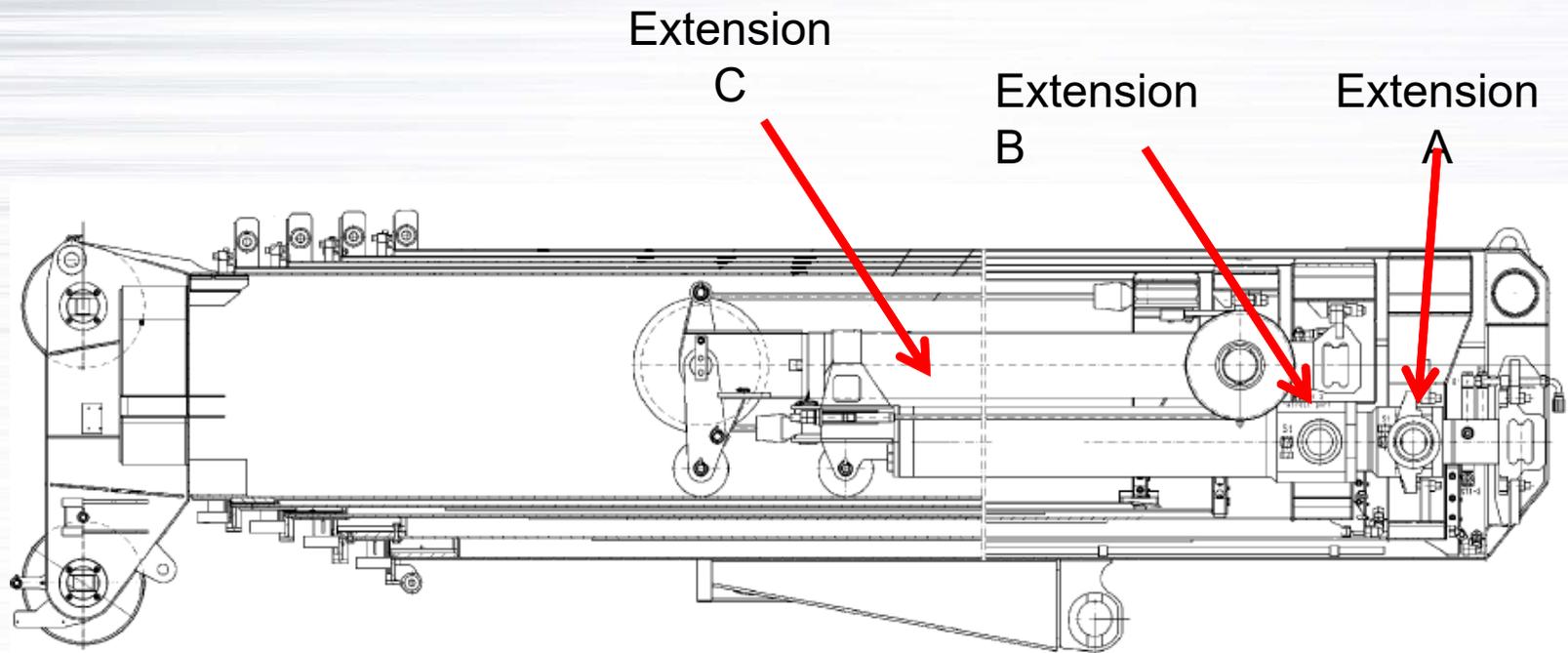
# Strength Telescoping Mode



Select Mode 3 by switching the boom mode switch on the lower right of the dash to Position 3. In this mode cylinders A and B extend first synchronously up to 100%. Then cylinder C follows up to 100%.

***All three modes use different load charts. The correct load chart must be referenced for the boom mode selected.***

# Boom Extension Cylinders



The last two boom extensions extend proportionally utilizing a cable/chain system



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# Synchronization Faults

If a fault develops, the red fault light will come and the respective fault message will appear on the RCI 510 display. The system will detect a fault if a difference of 2" occurs from the extended length of each cylinder.  
i.e....

The system will detect a fault if a difference greater than 2" occurs from the extend length of each cylinder. The most common cause of this is the lack of grease on the boom slider pads and the boom stick and jumps when retracting and extending.



Fault Indicator

Mode Selector Switch

**SECT'N NOT SYNC'D- EXTEND  
"A" .5  
"OUT OF MODE = RETRACT  
BOOM TO RESET"**



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# Synchronization Faults



## CORRECTION PROCEDURE

1. Use the key operated Cylinder Selector Switch, located near the right shoulder of the operator's seat, to select the indicated cylinder.

2. Use the boom extend and retract pedal to move the cylinder the needed amount. This can be monitored on the RCI 510 Display.
3. Return the selector switch to Auto position to check for error. If indicator light is still illuminated
4. If the fault light is still illuminated after correction...you may have over corrected. Shut system down and reboot system.

Boom Mode  
Switch

Manual Over  
Ride Switch



**End of Presentation**



**Questions???**