
SeaSwitch

User's Manual



Chetco Digital Instruments

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WARNING!

USE THIS UNIT ONLY AS AN AID TO MONITORING ENGINE PERFORMANCE INFORMATION.

CAUTION

When showing sensor data, this unit will only show information based on the sender used and its installed position.

The operating and storage temperature for your unit is from -4 degrees to +167 degrees Fahrenheit (-20 to +75 degrees Celsius). Extended storage temperatures higher or lower than specified will cause the liquid crystal display to fail. Neither this type of failure nor its consequences are covered by the warranty. For more information, consult the factory customer service department.

All features and specifications subject to change without notice.

Chetco Digital Instruments may find it necessary to change or end our policies, regulations, and special offers at any time. We reserve the right to do so without notice.

All screens in this manual are simulated.

NOTICE!

Free software upgrades will be available on our website at <http://www.seagauge.com> as they are released. Please check our website periodically for these and other information as they become available.

Thank you for choosing Chetco Digital Instruments

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the factory customer service department for help.

SPECIFICATIONS

Dimensions: 6.76" W x 2.28" H x 3.0" D

Input Voltage: 10 - 15 vDC, 12-volt Nominal

Processor Frequency: 18.432 MHz

Maximum Current:..... 1200 mA

Display: 6"W x 1"H Monochrome 2 char H x 24 char W

Operating and Storage Temperature . -4 to +167 degrees Fahrenheit
-20 to +75 degrees Celsius

Switched Circuits : 8 @ 15 amps 24 volts DC/120 volts AC

Max Label length: 8 characters

NMEA 2.0 Instrumentation Sentences \$IIXDR,S

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Introduction

Welcome

Thank you for purchasing a Chetco Digital Instruments product. SeaSwitch™ provides custom instrumentation in a rugged compact design. Its menu driven functions allow it control many different circuits from a single location. Optional built-in wireless capability allows control and real-time display from remote locations.

What You Get

Unit

SeaSwitch head unit with power and 8 circuit inputs. The unit provides user defined text labels to represent each of 8 switch positions. A built-in microprocessor monitors a sealed silicone button and presents a switch label on the 24X2 character display each time the button is pressed. Once a desired circuit is displayed – pressing a second sealed button will toggle the switch label on/off and activate the associated relay. If the switch was previously off – the unit will display the label in a predefined position on the display and energize the relay to close the contacts. If the switch is on – the unit will remove the label and de-energize the relay which will open the contacts. This process is repeated in similar fashion for all of the 8 switch labels.

Cables

SeaSwitch is supplied with 10 water resist cables for installation. The power and switched circuit cables are un-terminated and will need to be modified for you installation. The serial interface cable will connect directly to any RS232 computer interface.

Operation

SeaSwitch will allow control of up to eight 15-Amp circuits from a single labeled location. Each circuit is identified by a user configured text label which can be up to 8 characters in length. Two sealed silicone buttons provide menu driven control of all functions.

A 48 character display (24 X 2) provides menu selection and switch status information. A built-in microprocessor monitors the two sealed buttons and displays user defined switch names in an 8 character menu area in the upper left corner. Active switch labels are displayed in the 40 character status area as switches are toggled on/off using the bottom right button.

All switch names and positions are user configurable using menu driven setup modes which allow customization of order of appearance. Switch settings can be reconfigured in the field without a computer hookup as often as needed. A built-in serial port or wireless interface also allows the unit to be connected to a computer or PDA for remote programming and display.

Each switch position drives a 15-Amp 110 Volt relay circuit. The mapping of switch positions to relays can be changed at anytime to allow for reassignment. This feature is useful if it is desired for one switch position to drive multiple relays or to remap a failed circuit.



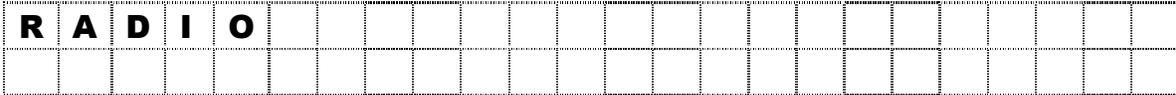
Select

The top right button is used for switch and menu selection. Pressing the button for 0.5 seconds will select the next switch label or menu item. This information is displayed in the first 8 positions starting from the upper left corner (MEMU area). Continuing to hold the button down will automatically scroll to the next switch or menu. The remaining 40 positions form a STATUS area. If a switch is ON – it's label will appear in the STATUS area.

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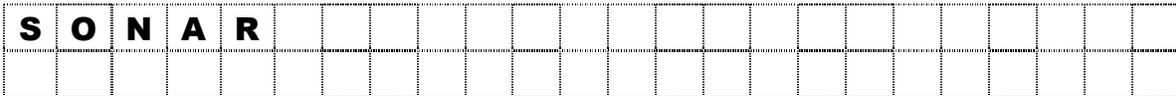
Pressing the top button shows the first switch label in the upper left MENU display area.



Pressing the top button again will erase the first label and show the next



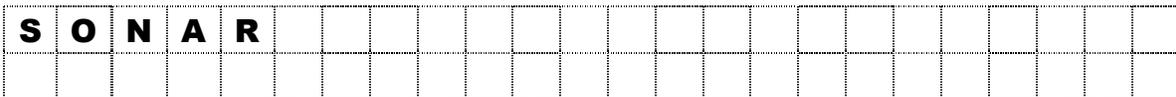
Pressing the top button again will show the next label



Pressing the bottom button whenever a switch label is displayed in the upper left MENU area will toggle the switch on/off. If the switch was off – pressing the bottom button will turn it on and display the label in the predetermined position on the display STATUS area.



If the switch was on – pressing the bottom button will turn it off and remove the label from the display. The current switch label will remain in the upper left corner until the top button is pressed



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Once you enter the display sub-mode the unit will current label assigned to each of the 8 displays. Each label can have up to 8 characters. The display will flash on the current character starting from the first position. Pressing the top right button will advance to the next character position. Once you advance you can not go backwards. You must advance through all 8 characters for all 8 labels (64 positions) before you can exit the SET DISPLAY mode.

S	E	T		D	I	S	P	L	A	Y	(	0	)	S	O	N	A	R		

In this example the cursor is in the “S” position. Pressing the top right button would advance the cursor to the “O” position. Pressing the top right button again would advance to the “N” position and so on.

S	E	T		D	I	S	P	L	A	Y	(	1	)	G	P	S				

Once you advance through all eight positions for a selected label the display will change to the next label.

To change a character for any position (flashing cursor) press the bottom right button to select the next character from the character set.

S	E	T		D	I	S	P	L	A	Y	(	1	)		P	S				

In this example the bottom button was pressed once to select the space character. This is a special character since it used to indicate that this position is not to be displayed. By using the space character in the correct position you can shorten any display string to less then 8 characters. In this example the last 5 characters will not be displayed which will create room for additional display labels. By using the space character you can control exactly how long each label is on the display.

S	E	T		D	I	S	P	L	A	Y	(	1	)		A	P	S			

Pressing the bottom button again increments to the “A” character and so-on.

There are 85 possible characters to choose from in the following order:

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DO NOT USE POSITIONS 0 – 7 ROW 1 AS ARE ASSIGNED TO THE MENU FUNCTION AND WILL OVERWRITE YOUR LABELS.

S	E	T		P	O	S	I	T	I	O	N								
S	O	N	A	R				R	O	W	(	1	)	P	O	S	(	18)

In this example the bottom button was pressed once to increment the RPM label over one position to the right.

S	E	T		P	O	S	I	T	I	O	N								
S	O	N	A	R				R	O	W	(	1	)	P	O	S	(	19)

Once the desired position is selected, pressing the top button shows the next display label and currently assigned position.

S	E	T		P	O	S	I	T	I	O	N								
B	I	L	G	E				R	O	W	(	2	)	P	O	S	(	0)

You must cycle through all 8 display labels using the top button before you can save any changes

Save Positions mode – This sub-mode to save any changes made in any of the positions sub-modes. Any changes made up to this point have not been permanently saved and will be lost if the unit is reset or if you exit this sub-mode. Pressing the top right button (NO) will erase all changes and exit the SET POSITIONS setup mode.

Pressing the lower right button (YES) will save the changes and reset the unit.

S	A	V	E		P	O	S	I	T	I	O	N							N	O	>	
																			Y	E	S	>

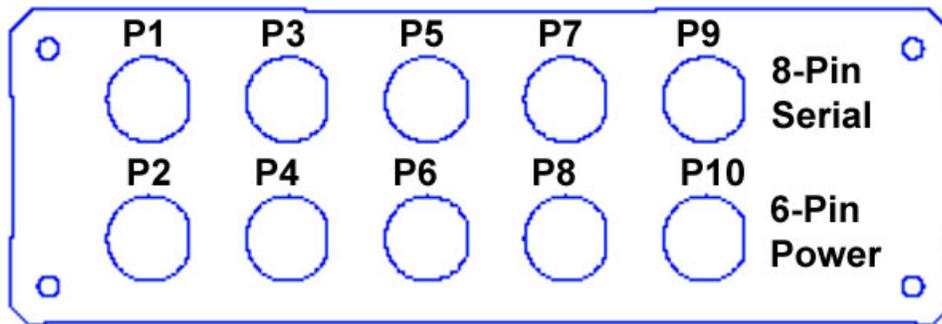
Set Channel

This setup mode is used to set the input pin for each of switch labels. . You can skip this mode by pressing the top right button (NO) or enter the 8 channel sub-modes by pressing the bottom right button (YES). Once you enter the sub-modes you must go through all of them before you exit though you do not need to make any changes.

Connectors

The SeaSwitch unit has 10 water-resist quick-connect connectors on the rear panel. Each connector is keyed to ensure proper alignment when attaching the supplied cables. Never force a cable in. Rotate the cable until the keys align and it should smoothly insert.

The serial cable (P9) can be left disconnected under normal operation. Only connect the serial cable when programming the unit or attachment to a computer for remote display. The optional Bluetooth serial adaptor can also be attached to this interface.



Connector	Function	Pins
P1	Switched Signal 0	2
P2	Switched Signal 1	2
P3	Switched Signal 2	2
P4	Switched Signal 3	2
P5	Switched Signal 4	2
P6	Switched Signal 5	2
P7	Switched Signal 6	2
P8	Switched Signal 7	2
P9	Power	6
P10	Serial	8

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System Power

System power is supplied via the 6-pin power connector.



6-#20

POWER (P2)				
Pin	Color	Function	Direction	Volt
1	Black	Ground	OUT	0
2	-	Not connected	-	-
3	Orange	Not Used	OUT	0-3.3
4	Green	Not Used	IN	0-3.3
5	Red	Power	IN	12-14
6	White	Reference Voltage	OUT	3.3 or 5

The Power wire is connected to battery (+12 volts) via a switched 3 Amp fuse circuit. Never connect directly without providing a fused circuit. Circuit should be powered when key is on and power removed when key is off.

The ground wire should be connected to a solid ground bus located near the unit. The case is grounded and can be connected to system ground. Be sure to connect the ground wire from the cable and never rely on the case for ground.

The reference voltage is used to supply senders that require a regulated 5 volt source. Some senders like pressure, position, and fuel level may require fixed reference voltage. Never connect the reference without a 1 Amp fuse. Maximum current supplied by the reference is 850 mAmps.

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Switch Ports



2-#16

SIGNAL (P1-P8)				
Pin	Color	Function	Direction	Volt
1	Red	Switch Lead 0	OUT	0-120
2	Black	Switch Lead 1	IN	0-120

Ports

The serial port connector provides the interface to a computer RS232 interface for command and status control of the unit. The unit can be remotely controlled via this interface using ASCII command sequences or the optional software utilities. Status information is transmitted out this interface using NMEA 0185 \$IIXDR sentences. Status information includes current gauge readings and display labels.

Cables are supplied for connection to this interface and there should be no need to interface directly. A serial interface cable is normally used to remotely control the unit or to collect status information in NMEA 0185 format. A separate reprogramming (FLASH) cable is used if the unit needs to be reprogrammed. This cable is compatible with RS232 protocols but requires special software to provide this function. This cable is supplied only with the purchase of the development kit.



8-#20*

SERIAL (P3)				
Pin	Color	Function	Direction	Volt
1	Grey	BTPOWER	OUT	3.3
2	Brown	Flash TX	OUT	0-3.3
3	Brown	Serial RX	IN	0-3.3
4	Yellow	Serial Ground	IN	0
5	Red	Serial TX	OUT	0-3.3
6	Red	Flash RX	IN	0-3.3

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7	Green	DEBUG	IN	0-3.3
8	Yellow	Flash Ground	IN	0

BTPOWER is a 3.3 volt regulated output to provide power for the optional BLUETOOTH serial adapter. This signal should not be used for any other purpose. Maximum output is 200 mA and is not fuse protected.

FLASHTX is the serial transmit line for reprogramming the unit. It is compatible with standard RS232 transmit protocols

FLASHRX is the serial receive line for reprogramming the unit. It is compatible with standard RS232 receive protocols

FLASHGND is the serial ground when reprogramming the unit.

SERIALTX is the serial transmit line for status information from the unit. It is compatible with standard RS232 transmit protocols

SERIALRX is the serial receive line for control information to the unit. It is compatible with standard RS232 receive protocols

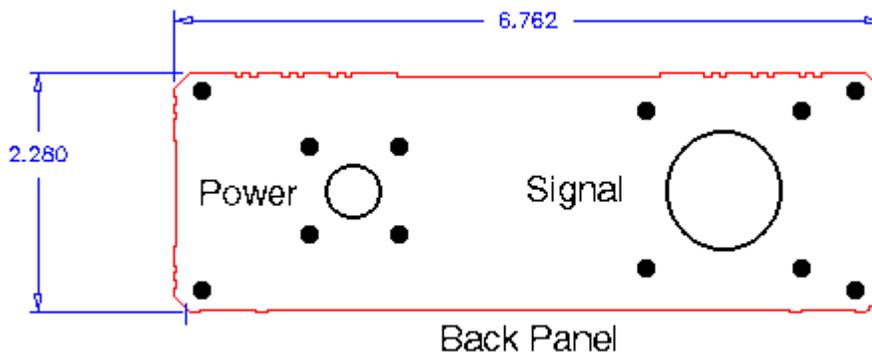
SERIALGND is the serial ground. It is compatible with standard RS232 transmit protocols

DEBUG is for internal use only and should not be connected.

Installation

Cutout

SeaSwitch can be mounted directly in the dash by performing a rectangular cut out as shown in the figure. The bezel lip is only 0.25" from the cutout dimensions so care must be taken to not make the cutout any larger than specified. It is a good idea to practice on scrap material before cutting into the panel. You must allow for the 3" depth of the unit plus another 4" to support the cables for a total of 7" behind the dash.



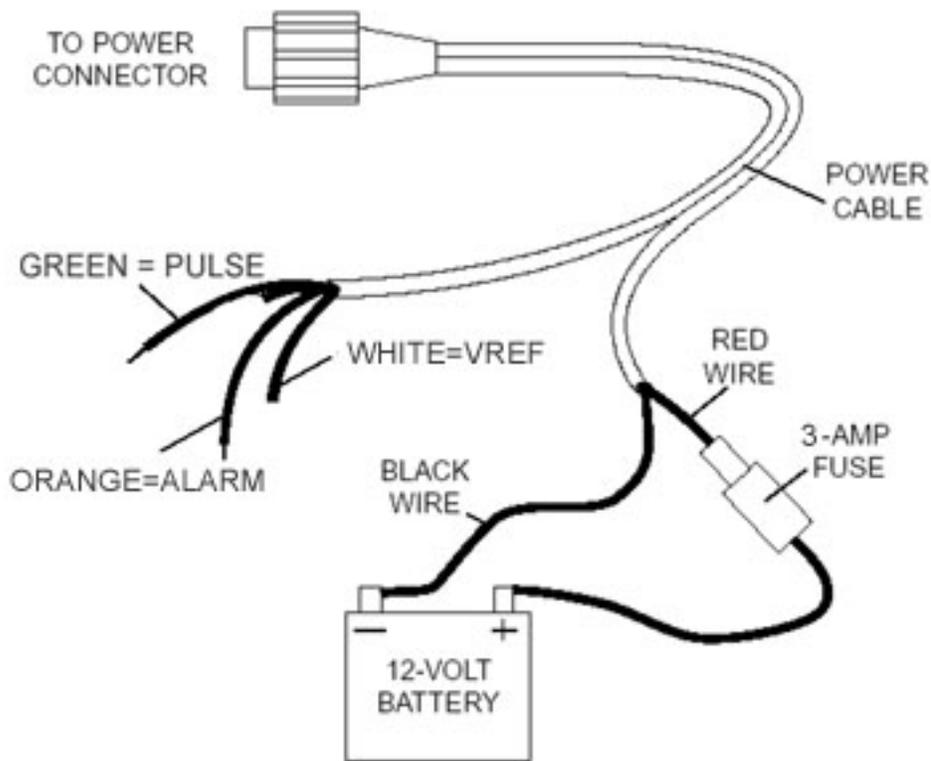
The unit can be secured in place by using slotted "L" brackets in the threaded gimbal holes on either side of the unit. Be careful not to tighten down the supplied screws into the holes without a washer or "L" bracket or else damage to the internal seal will result.

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Power

Power is supplied from the accessory bus via a 3 amp fuse. Never attempt to connect power without providing a fused input or serious damage may result. Unit should have power applied when key is in the accessory or run position and power removed when key is off.

Be sure to attach ground lead to a solid ground bus for proper operation. All sensor/sender grounds should be attached to the same ground buss.



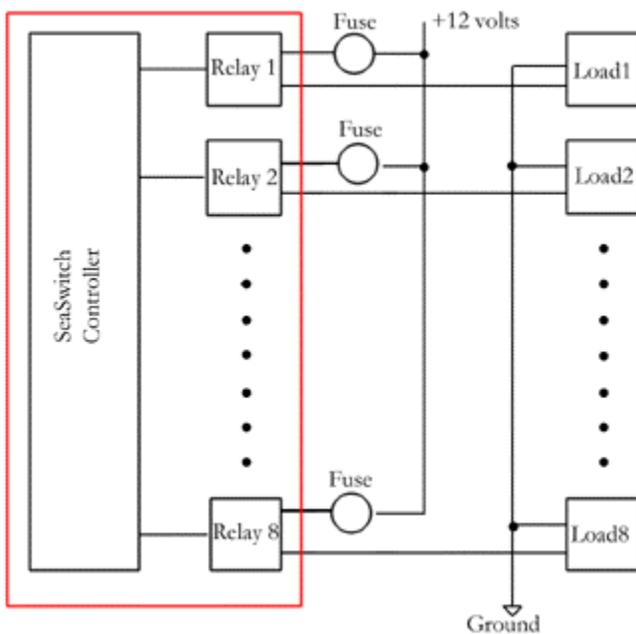
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Signals

The unit supports up to eight 15 amp circuits. A separate two-pin cable is provided for each circuit. Each circuit is isolated and there is no common power bus. The circuit is a simple SPST relay. If you need to drive a current load greater than 15 amps then use the SeaSwitch circuit to drive a higher rated relay.

Always use a 15 amp fuse on each circuit or permanent damage will result. No internal fuses are provided.

Switch labels are mapped to relay numbers with label 1 mapped to relay 1 and so forth



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Serial Port Protocols

The serial port interface of the SeaSwitch unit can be used for real-time status and reprogramming. The status information is sent in NMEA 0183 format using the \$IIXDR,S sentence format which supports switching instrumentation. Custom NMEA control sentences are used to control the unit via the serial port interface.

To access the serial port information – connect the supplied cable to computer RS232 port. Set the baud rate of the computer interface to match the baud rate of the unit (4800 or 9600). Use the standard 8 bits, no parity, and 1 stop bit (8-N-1). Start a serial interface program such as HyperTerminal with these settings then power up the unit. If the connection is correct you will see a status message from the unit –

SeaSwitch Version 1.02. This indicates the settings are correct.

NMEA 0183 support custom message formats for command and control of propriety equipment. SeaSwitch uses the sentence structures:

\$PCDIC,X - for control where X is the control command

- **N** = Next menu. Same as pressing the top button
- **S** = Set function. Same as pressing the bottom button
- **G** = Start dumping NMEA \$IIXDR sentences in real-time at two updates per second
- **P** = Initiate programming the unit
- **B** = Initialize the Bluetooth module.

\$PCDIS,YYYYY – for status where YYYYY is the returned status information

- \$PCDIS,SEASWITCH,0001.100,*,79 = Model Name and Firmware revision

Instrumentation data is returned using the standard NMEA \$IIXDR,S sentence structure:

\$IIXDR,S,DATA,U,LABEL,CHECKSUM

- **S** = NMEA SWITCH instrument indicator
- **DATA** = switch state = ON or OFF
- **U** = unit of measurement not used here
- **LABEL** = 8 character switch label and a 1 character number representing the channel
- **CHECKSUM** = NEMA check sum calculation on the string

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NEXT MENU

The **\$PCDIC,N** command is used to command the unit to display the next menu or group. It functions exactly the same as pressing the top button on the unit

SET Function

The **\$PCDIC,S** command is used to enter Set-up mode or increment a setting. It operates the same as pressing the bottom button on the unit.

Real-time data

The **\$PCDIC,G** command is used to view real-time instrumentation from the serial port. When the unit is first powered up it will start listening to the default serial port (RS232 or Bluetooth) for commands. It will not dump data until it receives the **\$PCDIC,G** command. To view real-time data type this command in HyperTerminal after you see the prompt. Data for each of the switches will immediately begin to be displayed in NMEA 0183 \$IIXDR,S sentence format. The unit will dump data for all 8 switches every 0.5 seconds.

```
$IIXDR,S,OFF ,B,BILGE 2,*67
```

Indicates switch labeled "BILGE" on relay channel 2 is OFF

```
$IIXDR,S,ON ,C,SONAR 6,*67
```

Indicates switch labeled "SONAR" on relay channel 6 is ON

HyperTerminal allows capture of real-time data to a text file. First enable the Capture Text command under the Transfer menu. Select the file name and location to capture to. Next enter the **\$PCDIC,G** command string to start dumping data to the specified file.

Program Mode

The **\$PCDIC,P** command is used to put the unit into reprogramming mode. Once in this mode a programming file can be sent to the unit to update Switch labels, Label positions, or channel assignments.

Use caution when using this command as improper use will erase the unit and it will have to be sent back for reprogramming.

Programming files can be obtained from Chetco Digital Instruments for use in this mode. These are in a special propriety format and can not be constructed or edited in the field. Contact Chetco Digital Instruments for more information on this option.

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Download of new table information requires three steps:

- Enter program mode
- Erase existing table
- Load new table

Program mode is entered by using the \$PCDIC,P command from HyperTerminal. If this command is successful the unit will display:

- **READY->**

At this point the unit will wait to receive the starting and ending pages to erase. Page numbers are 512 bytes and can be calculated by dividing the starting page memory location by 512. The following table will help you determine the table page numbers.

Table	Address	Start Page	End Page	Erase Command
Switch Labels	C000	60	60	*6060
Not Used	C200	61	61	*6161
Label Positions	C400	62	62	*6262
Not Used	C600	63	63	*6363
Channels	C800	64	64	*6464
Parameters	CA00	65	65	*6565

To erase the memory you must enter a "*" symbol followed by the start and end page values with no spaces. For example to erase the Switch labels table enter:

- ***6060**

Once you have entered the 5 characters the unit will erase the memory and respond with

- **ERASED->**

At this point the unit will wait to receive the data to reprogram the unit. Use the HyperTerminal Send Text File function to transfer the appropriate file to reprogram the memory. As the file is transferring data the unit will display the memory address for each update. The display should increment till it reaches the end of file and then reset if no errors occur.

Bluetooth module initialization

The \$PCDIC,B command is used to reinitialize the optional Bluetooth module. This mode should only be used if the module is replaced or other reprogramming required..

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