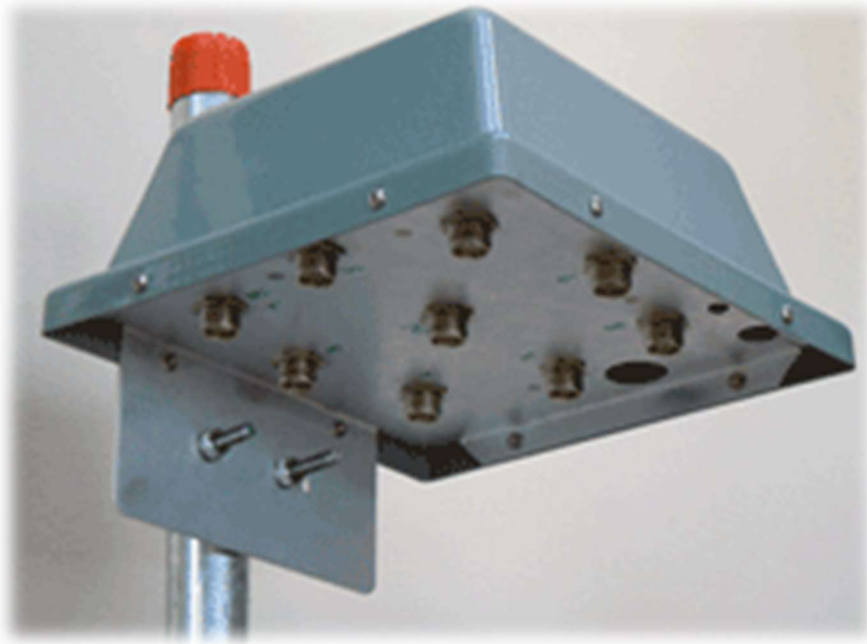


GREEN HERON ENGINEERING LLC



GREEN HERON EVERYWARE SELECT-8 WIRELESS COAX SWITCH USER GUIDE

*Document Revision 1.2
October 7, 2020*

© 2020 Green Heron Engineering LLC

1107 Salt Road, Webster, NY 14580

Phone 585.217.9093

www.GreenHeronEngineering.com

FCC Part 15

This product contains FCC ID: OUR-XBEE or OUR-XBEEPRO

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada (IC)

Contains Model Xbee Radio, IC: 4214A-XBEE or Model Xbee-PRO Radio, IC: 4214A-XBEEPRO

RADIO AND TELEVISION INTERFERENCE

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 the receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

You may also find helpful the following booklet, prepared by the FCC: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402.

Changes and Modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission's rules.

WARRANTY

This product is warranted to be free of defects in materials and workmanship for 1 year. We will repair or replace, at our option, any equipment proven to be defective within the warranty period. All warranty work is F.O.B. Webster, NY, USA. This warranty is exclusive of abuse, misuse, accidental damage, acts of God or consequential damages, etc. Green Heron Engineering LLC liability shall not exceed the original purchase price of the equipment.

TRADEMARKS

All other products, company names, brand names, and trademarks are the property of their respective owners.



We suggest that you look over this document carefully.

Section 1 is a brief overview of the Select-8 and its features

Section 2 is the quick start setup procedure

Section 3 shows the Select-8 optional configurations

Section 4 is the hardware reference drawings

Table of Contents

1.0	OVERVIEW.....	1
1.1	SELECT-8 FEATURES	1
1.2	ORDERING OPTIONS	2
2.0	COMPLETE SELECT-8 INSTALLATION	3
2.1	INSTALL THE GH EVERYWARE BASE UNIT	3
2.2	INSTALL THE "GH EVERYWARE SERVER" SOFTWARE	4
2.3	CONFIGURE YOUR SELECT-8	4
2.4	CREATE A WIO PROFILE FOR YOUR SELECT-8	4
2.5	CONFIGURE GH EVERYWARE SERVER	5
2.6	HOTKEY SHORTCUTS	6
3.0	GH SELECT-8 INSTALLATION OPTIONS.....	7
3.1	+ 12V POWER SUPPLY	7
3.2	(OPTIONAL) WIRELESS (WIO) CHANNEL AND ADDRESS	7
3.3	(OPTIONAL) TERMINATION OF UN-SELECTED PORTS.....	7
4.0	HARDWARE REFERENCE.....	8
4.1	SELECT 8 DRAWINGS	8
APPENDIX A – +12 THROUGH-THE-COAX		10
APPENDIX B – WIO PROFILES		11

1.0 Overview

The GHE Select-8 is a high performance 8 position remote coax switch suitable for indoor, tower or other outdoor mounting locations. The coax switch comes complete with built-in Green Heron Wireless remote module and built-in Bias 'T' for through-the-coax power supply. A complete 8-position high power remote coax switch that requires ONLY the antenna coax to complete the installation. This unique product allows complete freedom from control cables and tethered control boxes and at no extra cost, provides remote internet access as well.

1.1 Select-8 Features

- 8 antenna ports, selectable individually or in any combination. Useful not only for single antenna at a time selection, but in complex phased arrays, or stack control applications too
- Rated at 2.5 KW with up to 3:1 SWR through 50 MHz
- Port Isolation (typ)
 - Up to 7 MHz > 70 dB
 - 14 MHz = 60 dB
 - 28 MHz = 48 dB
 - 50 MHz = 40 dB
- Insertion SWR < 1.04 (1.10 on 50 MHz)
- Built-in Green Heron Wireless Remote replaces control cable and tethered control boxes when used with a GH Base for complete wireless solution
 - Eliminates potential for conducting unwanted RF and lightning damage into the shack.
 - Included internal antenna for GH Wireless
 - Optional +12 power through the coax
 - Unused antenna ports are grounded for best antenna isolation. Each port has a ground jumper that may be removed, or terminated in a resistance as desired.
 - Allows sharing of the remote coax switch among stations
 - Allows user custom on-screen controls using GH Everywhere software
 - Automatic selection based on radio's frequency when using compatible logging software

- Allows remote access via internet, nothing else to buy. Ideal for remote stations
- Outdoor weather/UV resistant gray PVC enclosure, SS and aluminum heavy duty tower leg bracket included
- High quality construction throughout, all stainless steel fasteners, Amphenol RF connectors
- Capable of conventional wired control if desired

1.2 Ordering Options

- Add: GH Wireless Base

If you already are using a GH Wireless product and therefore, already have a GHE base, then you do not need to have another one to add a Select-8 to your station.

- Add: MFJ 4116 DC injector for power through the coax (shack end)

This inexpensive addition will save you from building your own injector for installations where it is inconvenient to supply +12V to the Select-8 separately.

- Add external antenna option (RPSMA)

Replaces the internal low-gain GH Wireless antenna with an external bottom plate mounted reverse polarity SMA connector for the addition of any external antenna of your choosing. RPSMA are the standard for inexpensive Wi-Fi antenna cable from a variety of on-line sources.

- Add optional screw terminal connector for convenient wired control capability

If you need a convenient way to attach a control cable for conventional wired control for your Select-8, we can provide this screw terminal connector. This connector will eliminate the need to solder the control cable onto the main board.

2.0 Complete Select-8 Installation

This quick start includes installing the Select-8, a GH Base, and the GH Everyware Server software. If you already use GH Everyware for other station components then you already have a base and the software installed. You also know how to configure it all, so you may skip this section entirely and go directly to section 3.0 for configuration options specific to the GH Select-8.

2.1 Install the GH Everyware Base Unit

1. Connect the Base Unit into an available USB Port on a computer that will be running your Server. You may find that the required drivers are already loaded and nothing much will happen except you will get a new USB Serial Port show up in Device Manager. Make a note of the COM number that is assigned. If you are using an external USB hub, please ensure that you use the hub's additional power module. The Base unit will operate erratically with an un-powered USB hub.
2. If the drivers are not already loaded, you will get "New Hardware Found, USB UART" and New Hardware Wizard will appear on your screen. The exact procedure will vary for different versions of Windows, but in general, the sequence is the same. All versions of Windows contain the FTDI drivers that are needed, either within the original install, or from Windows Update. If for some reason, you can't locate the correct drivers on your system, they are provided in the .zip file download for the current GH Everyware release on our website. The drivers are in the folder named "CDM 2.04.06 WHQL".
3. Follow the directions and load both the "ftdibus" and following that, the "ftdiport" drivers.
4. After installation is complete, verify the COM port using Device Manager. Simply unplug and plug in the Base Unit while watching Device Manager COM ports to see what port is assigned. Note the COM Number.



Note: The COM port number will remain constant whenever you plug this specific Base Unit into any USB port on this computer.

2.2 Install the “GH Everyware Server” Software

System Requirements:

- Windows XP SP2, Windows Vista, Windows 7/8/10
 - Windows .NET environment version 3.0 or higher
1. If the user has Administrator's privileges, double-click the “GH Everyware Server.msi” installation file. If not, right-click the installation file and choose to run as Administrator.
 2. Follow the onscreen directions. In most cases the defaults will be sufficient.

(Note – GH Everyware is a multi-platform Java program, the Java runtime needed is included in the Windows install, so no separate Java installation is required.

2.3 Configure your Select-8.

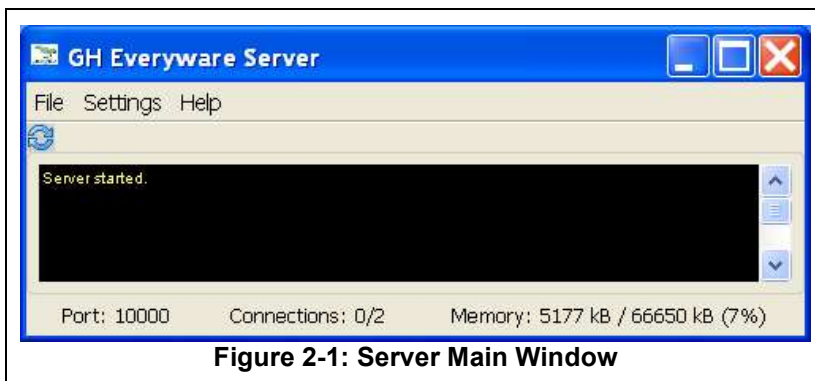
1. Your Select-8 comes from the factory:
 - Remote Channel 'C', Address '1'
 - Jumper JP-9 NOT installed which disables 'through-the-coax' power unless we know that you are going to use a DC Injector at time of purchase. It's a good idea to verify the correct setting of this jumper to be sure.
2. For initial testing, we will have the Base Unit, the Server Computer and Select-8 Unit all within easy viewing and access. The easiest way to power the Select-8 for testing is to remove the cover screws (8), remove the cover and plug the red/black power test cable into the GHE Remote DC Power Connector. Connect a source of +12 to the red and black leads of the test cable.
3. Optional – If you are going to be using your Select-8 internal Bias 'T' that allows for 'through-the-coax' +12, then install jumper JP-9 in the Select-8 and connect the shack end DC Injector with +12 source to the Select-8 via a coax jumper and power supply as shown in appendix A.

2.4 Create a WIO Profile for your Select-8

The WIO Profile defines the way your Select 8 will be presented on your computer screen. For this Quick Start, we will use a sample profile that you will download from the website. The file is named Select_8.xml and it is located in the GH Everyware Support tab on the website. Download this file and place in in your install directory for GHE Everyware Server\wioProfiles\. This WIO Profile is an example of a “Button Switch” selector that can be used to try out your Select-8. You may easily modify this profile to change the “NAME” for your Select-8, and all the position names for your switch as well. (An example of a “Band Switch” profile is in Appendix 'B', and complete information on WIO Profiles is contained in the tutorial of the GH Everyware System Manual, Section 2.)

2.5 Configure GH Everyware Server

1. Start GH Everyware Server by double clicking on the Program Icon, or selecting from the Start Menu. "Server Started" will appear in the message window.



2. Select **Settings→Device Manager** from the menu bar. Create an entry on the first line for your Select-8:
 - Give it a name like "Antenna Select"
 - Select the COM port that was assigned in paragraph 2.1
 - Select Device Type "GHE Base"
 - Select Subtype "Select_8" (Or whatever file name you used to create your own WIO Profile)
 - Set WIO Addr to the 1 (or the actual address for the Select-8 if it was changed)
3. Click on the button labeled Disconnect to attempt Connect to your Device
 - If all is well, the button will change to Connect Status, your Wireless Base and Remote Units will light up their LED RSSI indicators (Signal Strength) indicating CONNECT to Server.
4. Close the Device Manager Window and select **Settings→Launch Local Controller**.
 - Your screen will now show the default control for the predefined Select-8 Switch. By clicking on the various buttons, you can change the relay selection as desired. You can hear the relays changing as you do this.

Each button and its name are separate selections from a typical 8 position coax switch. This control can be modified to suit many different needs. Notice that the title bar of the control shows an RSSI value. This is the wireless device signal strength that the Remote Unit is reporting back as to how well it is receiving signal from the Base Unit.

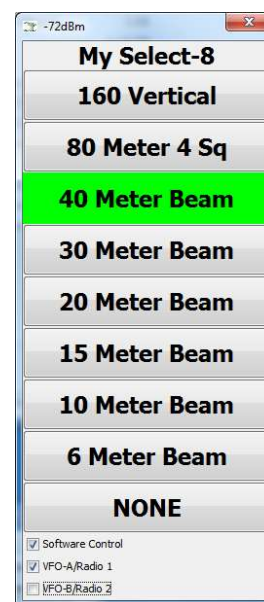


Figure 2-2: Select 8 Switch

2.6 Hotkey Shortcuts

Let's now add a HOTKEY to this control. A HOTKEY will allow you to change your remote switch without having to use the mouse to gain focus. You will assign keys on your keyboard that will (for this exercise) rotate forward through the list of positions on your Select-8. Right click on the Switch Name portion ("Test Switch") and then left click on "Assign keystroke to cycle forward". Now tap F12. From now on, whenever this control is on-screen, pressing F12 will select the next position (down) on your Select-8 Switch. You may assign keys for forward and backwards as well as for each individual (or a single favorite selection, right click on the individual button to assign a HOTKEY for that button.

Note: *Only numeric keypad, special application, function and combination keys using <Shift>, <Ctrl> and/or <Alt> are allowed to be assigned to these HOTKEY functions. You must make sure you don't assign something that will be needed by another program running at the same time on your computer.*

3.0 GH Select-8 Installation Options

3.1 + 12V Power Supply

Your Select-8 requires 12V power for the relays and to power the built-in Wireless Remote. There are three ways to supply power to the unit.

1. Power through-the-coax. Install jumper J4 to enable this feature. For Power through-the-coax, the Select-8 includes a built-in bias 'T' that obtains the voltage and isolates the rest of your antenna system. You will need a DC injector at the other end of the feed-line to insert +12 at that end and to isolate the 12V from your station. We offer the MFJ 4116 as the shack end injector. You may use any DC injector that is capable of 500 ma and is compatible with the RF power and bands you are using with your Select-8.
2. If you have a convenient +12V source near the antenna switch, you may use it instead of power through-the-coax. You will connect +12 as shown in the diagram. If you are replacing an existing switch device, you can use the cable that is no longer needed to supply the 12V. This can save the added cost of the injector. You may always convert to through-the-coax at a later time if desired.
3. For test purposed when the cover is off, you may power the Select-8 through the 2.1mm DC connector on the GH Wireless Remote board. A DC power cable is included for this purpose.

3.2 (Optional) Wireless (WIO) Channel and Address

The Select-8 is shipped on our default WIO Remote channel 'C' and Address '1'. If you also purchased a new Base unit with the Select-8, then it was shipped on channel 'C', and is correctly configured to connect without change. Should you already be using other GH Everywhere wireless units, then you may need to change the Channel and/or Address so as not to conflict with other GHE wireless controllers.. This is accomplished using the 'Test and Configuration' software and is described in the main GH Everywhere Manual, Section 5.1. Both of these items are always available on our website in the SUPPORT section.

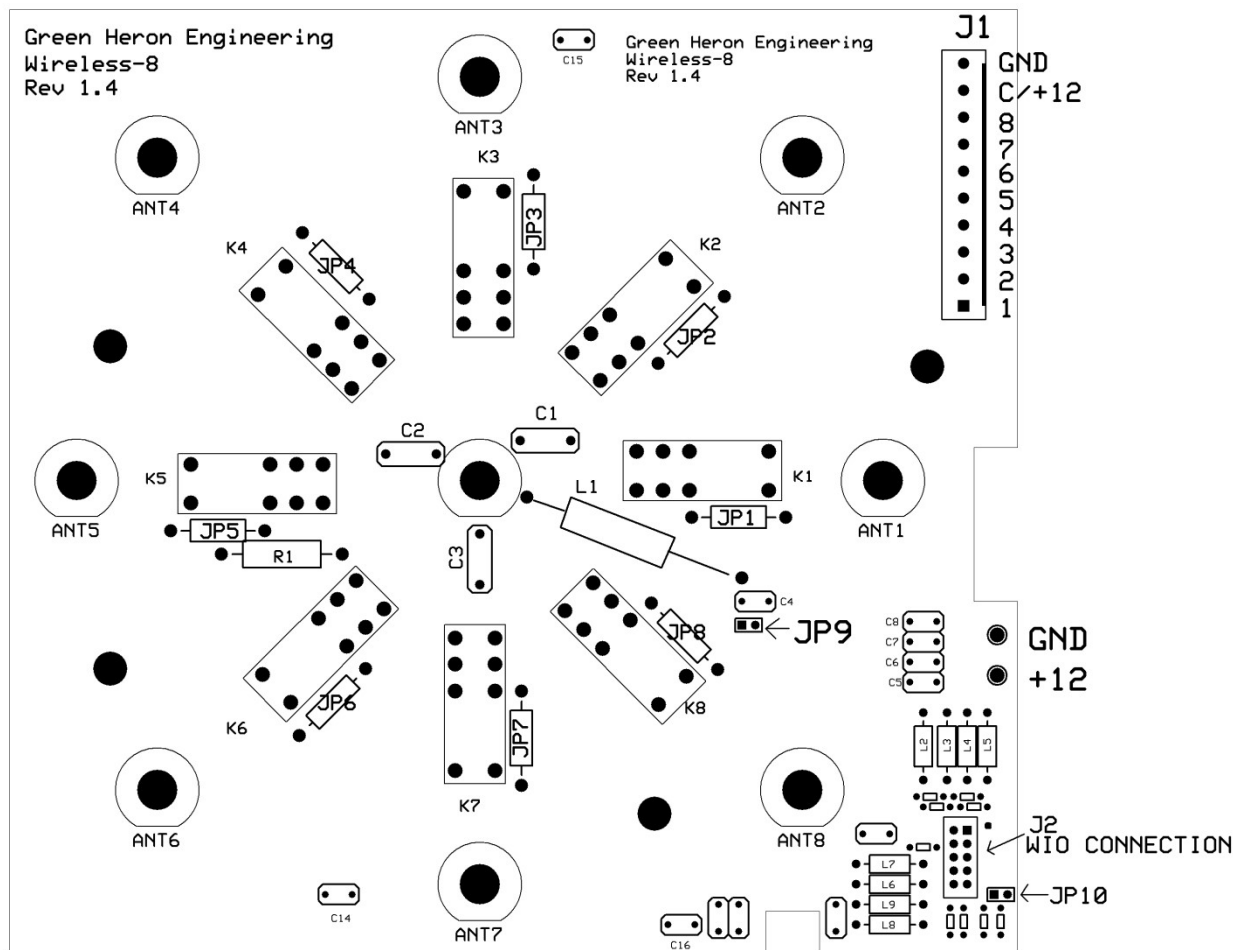
Note: *The easiest way to reprogram the Channel/Address is to temporarily install the radio module into a GHE Base unit. The Base unit usb connection to pc and powers the unit through the usb. After changing to the new Channel/Address, return the radio module to the Select-8.*

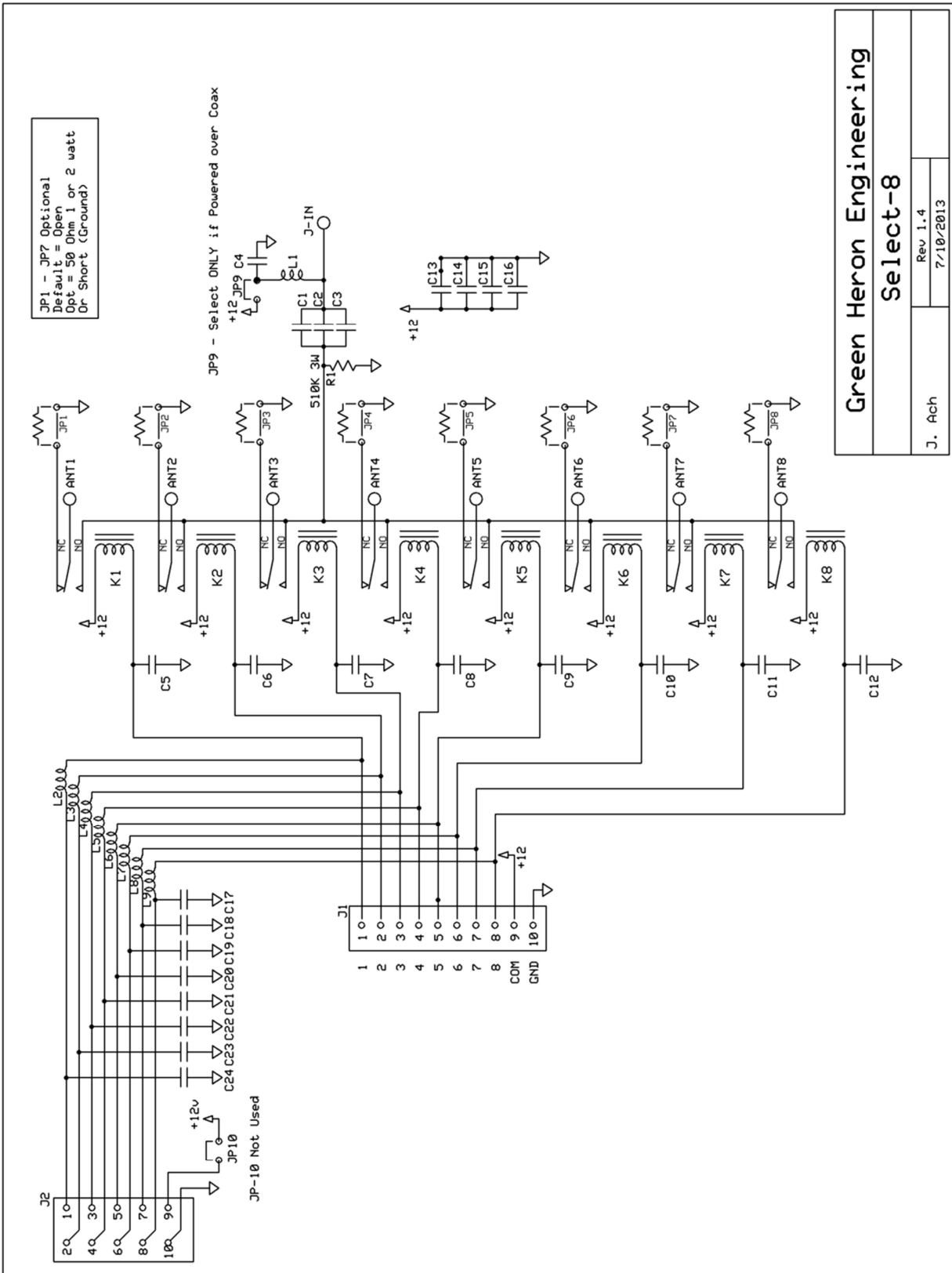
3.3 (Optional) Termination of un-selected ports

The Select-8 default is for un-selected ports to be left open. The Select-8 provides PCB locations to add jumpers or termination components as desired for advanced applications. JP-1 though JP-8 provide room for jumpers to ground or components like a 3 watt resistor for a resistance termination on the N/C side of each relay as desired.

4.0 Hardware Reference

4.1 Select 8 Drawings





APPENDIX A – +12 THROUGH-THE-COAX

CAUTION:

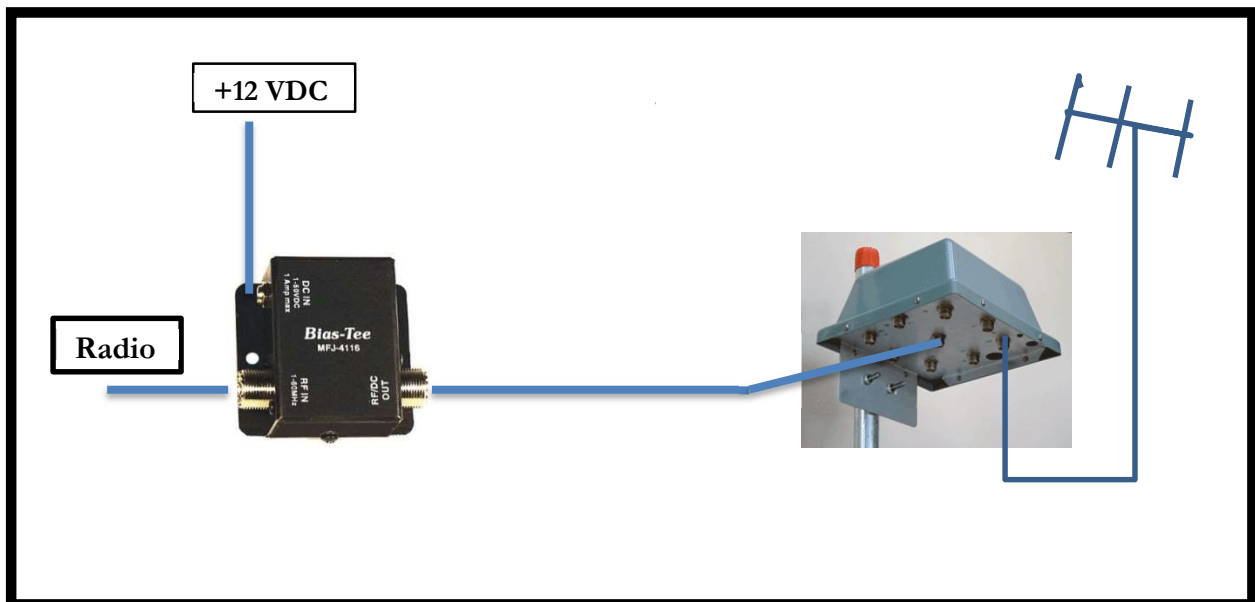
When you utilize Power through-the-coax (POC) option, you must be certain that you don't:

1. Get +12 applied directly to a radio where it might damage the radio. Some radios have low current DC chokes or other ESD protection devices to ground on the antenna inputs, and these could be damaged by the direct application of +12VDC.
2. Have the +12 connect into an antenna or other device that is DC grounded. This would short out the +12 so that our Select-8 would get none.

As an added precaution, you should limit the current that can be supplied by the 12V DC injection delivery scheme, and the Select-8 JP9 jumper is shipped from the factory with POC (Power over coax) NOT USED. Do not jumper JP9 unless you are going to use POC and have the proper DC injector inserted into the POC feed-line with nothing but coax or DC pass components in place between the injector and the Select-8. Make sure you install the injector the correct way so that +12 is properly isolated from your radio equipment.

You should never connect a source of +12 that is capable of more than 1A. You may use a commercial DC Injector (we can supply the MFJ 4116).

Included here is a diagram of the components when POC is implemented.



APPENDIX B – WIO PROFILES

This appendix describes a WIO Profile that implements a “Band Switch” control for your Select-8. A Band Switch will allow automatic antenna selection based on frequency information from your logging program. See The GH Everywhere Wireless Cable User Guide for complete information on WIO Profiles and software control setups.

WIO Profile

Go to Device Manager and select **Edit→Wio Profile Editor**. Next select **File→Open** and open up the GHE_Select_8 profile from the list.

The WIO Profile is where the display position names and the display type are selected. You can change the names of each position, and the name displayed on the header bar of the control also.

If your Select-8 has a single unique position for a band, then you may change the Display Type to “Band Switch” and then the switch selection may be made automatic when using compatible software. You set the frequency ranges that select each switch position right into the WIO Profile as shown here.

The screenshot shows the 'Wio Profile Editor -- Select_8.xml' window. The 'Device Type' is set to 'Select_8'. The 'Display Type' is set to 'Band Switch' (selected with a radio button). The window contains a table for configuring the profile.

Name of Setting	Bidirectional	Degrees	Beamwidth	Outputs								Freq. (MHz)		
				1	2	3	4	5	6	7	8	Lower	Upper	
160 Vertical	<input type="checkbox"/>	0	0	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1.8	2.0
80 Meter 4 Sq	<input type="checkbox"/>	0	0	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3.5	4.0
40 Meter Beam	<input type="checkbox"/>	0	0	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	7.0	7.5
30 Meter Beam	<input type="checkbox"/>	0	0	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	10.1	10.15
20 Meter Beam	<input type="checkbox"/>	0	0	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	14.0	14.5
15 Meter Beam	<input type="checkbox"/>	0	0	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	21.0	21.5
10 Meter Beam	<input type="checkbox"/>	0	0	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	28.0	29.7
6 Meter Beam	<input type="checkbox"/>	0	0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	50.0	54.0
NONE	<input type="checkbox"/>	0	0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	0.0	0.0
	<input type="checkbox"/>	0	0	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C		
	<input type="checkbox"/>	0	0	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C		
	<input type="checkbox"/>	0	0	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C		
	<input type="checkbox"/>	0	0	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C		
	<input type="checkbox"/>	0	0	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C		
	<input type="checkbox"/>	0	0	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C		

Done

- N/C (no change) – The state of this bit is not changed for this position
- ON – This bit is on, or relay is picked
- OFF – This bit is off, or relay is dropped
- MOM – This bit is turned on for ½ second (momentary), then back off

Note: *The N/C is used to allow more than 1 switching device to share a single Remote Unit using different bits or outputs. All outputs used for a Select-8 MUST be ON, OFF. The use of N/C is ONLY for bits that are used in another profile that is used with the same remote. N/C defines those bits that should NOT be changed when operating this control.*

Note: See the GH Everyware manual for specific setup instructions for N1MM and WinTest, or other sources of frequency data for automatic switching control for your Select-8.

GREEN HERON ENGINEERING LLC

© 2020 Green Heron Engineering LLC

1107 Salt Road, Webster, NY 14580
Phone 585.217.9093
www.GreenHeronEngineering.com

