

Software Release Note for WGMS XBee Relay			
responsible engineer	Mike Cookson	created	12/11/2009
product name	WGMS XBee Relay	last updated	6/10/2010
software version	1.08	Status	Release
software part number	n/a		
document part number/rev	n/a		

Overview

The WGMS XBee Relay allows the full ICD command set to be communicated between a WGMS instance and a Wave Glider. This allows the standard WGMS UI to be used via XBee as well as Iridium and other transport protocols.

Changes

New Features

Release 1.08

Case XBR-17 "Make XBee relay capable of withstanding port disconnections and reconnections"

Release 1.07

n/a

Release 1.06

n/a

Release 1.05

n/a

Release 1.04

Case #823 "Relays should log the detail of messages sent and received"

Case #824 "Relays should be configurable with respect to socket timeout and set default to 5 seconds"

Case #825 "Relays should re-issue channel status after 30 minutes"

Release 1.03

n/a

Release 1.02

Case #781 "Develop command line utility to transmit a file via relay"

Release 1.01

Case #760 "Add signal strength indicator to XBee Relay"

Release 1.00

Case #692 "Communication Channels: Implement Xbee Relay Application"

Case #703 "Mobile to Mobile: Implement Mobile to Mobile protocol Relay"

1. Interfaces Digi XBee-PRO modem (USB or serial version) and acts like a Coordinator for the purpose of communicating with Wave Gliders.
2. Recruits Wave Gliders with the same PAN ID to the Coordinator's channel automatically.
3. Implements a new "level 3" protocol that can carry WGMS messages in place of the Iridium network.
4. Implements the WGMS Communication Channel specification, which enables it to communicate with a Packet Reflector and offer an alternative route for messages between WGMS and the set of Wave Gliders that are detected in the range of the XBee Coordinator.
5. Implements communication console messages through the "level 3" protocol and offers the ability to open a console window for each Wave Glider in range.
6. Decodes Level 2 messages received from WGMS or from the Wave Glider and displays them in a chat window.
7. The configuration of the relay is stored in the Windows registry; editors for the configuration are available through the relay's GUI.

Bug Fixes

Release 1.08

Case XBR-14 "XBee relay reported that it had to close (UnauthorizedAccess exception)"

Case XBR-18 "XBee relay channels do not automatically disconnect when the modem transitions to a 'not communicating' state"

Release 1.07

Case XBR-15 "XBee relay does not log unhandled exceptions"

Release 1.06

Case HYP-488 "Xbee relay (1.5) console not working with earlier versions of Wave Glider change# 3720"

Case HYP-490 "Provide better descriptions for common relay failure modes"

Case HYP-493 "Selecting a different Wave Glider on the Xbee relay's Overview page does not update details immediately"

Release 1.05

Case HYP-430 "Relay Send Queue times out on 1 MB file read"

Case HYP-432 "Relay fills out Level 3 header's relay address incorrectly" (see HYP-433)

Case HYP-433 "Relay does not require save of address fields on Relay configuration page"

Case HYP-475 "Relay debug window keystrokes do not go through reliably"

Case HYP-485 "Relay's Command Listener continually reprocesses the same message for exceptional level 2 messages"

Case HYP-486 "Longer messages received over Xbee relay are not received reliably"

Release 1.04

Case HYP-426 "Relays should be configurable with respect to socket timeout and set default to 5 seconds"

Case #826 "Relay-reported messages not stored in WGMS database"

Release 1.03

Case #806 "Relay applications fail to execute on Windows 7 (System.UnauthorizedAccessException)"

Case #803 "Relays inappropriately fail send to Packet Reflector if read-back fails"

Case #800 "XBee relay should retry data packet sends in the case of Clear Channel Assessment failure"

Release 1.02

Case #797 "XBee and Iridium relays output logs to the Program Files directory, which is incompatible with Windows 7"

Release 1.01

Case 772 "Channel properties do not show up in XBee relay after introduction of Grid view"

Dependencies

1. The Wave Glider Command and Control module software must be at revision level 01.00.525 or higher; if PIB software is used, it must be at revision 01.00.170 or higher.
2. The relay depends on having a XBee modem (Digi XBee USB Adapter S1 Pro, P/N (1P) XA-A14-CE1P from Digi International, www.digi.com) or functional equivalent.
3. The program must run with administrative privileges.
4. The fix for HYP-430 ("Relay Send Queue times out on 1 MB file read") relies on Wave Glider Command and Control module software revision level 01.02.560.

Open Issues

n/a

end-user impacts

1. This relay software depends on the availability of XBee "level 3" protocol running on the Wave Glider, which is a binary protocol. As a result of the binary protocol, users will no longer be able to access the Wave Glider console via XBee except through the XBee relay.

support impacts

n/a

installation/upgrade instructions

Tested Hardware and Software (other configurations may work)

- PC running Windows XP (32-bit) or Windows 7 (64-bit)
- Microsoft .NET 3.5
- 100 Mb of free disk space
- 2 Gb of RAM
- XBee modem (Digi XBee USB Adapter S1 Pro)
- WGMS XBee Relay setup package
- Privileges to install software on the PC
- An internet connection may be required

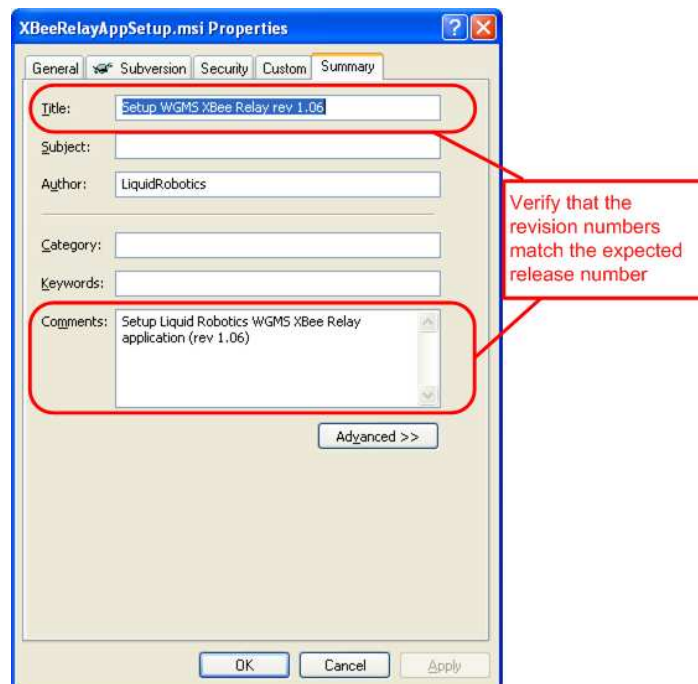
Installation Instructions

1. Locate installation files in an accessible directory. The installation files consist of:

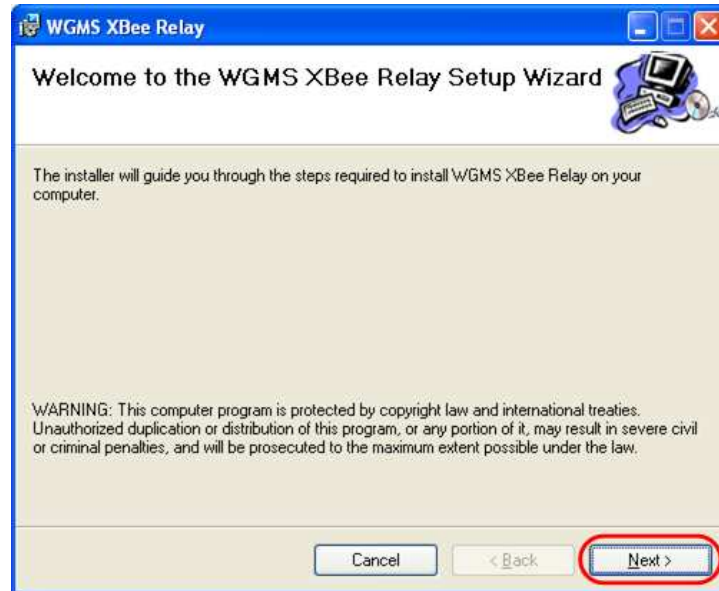
SETUP.EXE

XBeeRelayAppSetup.msi

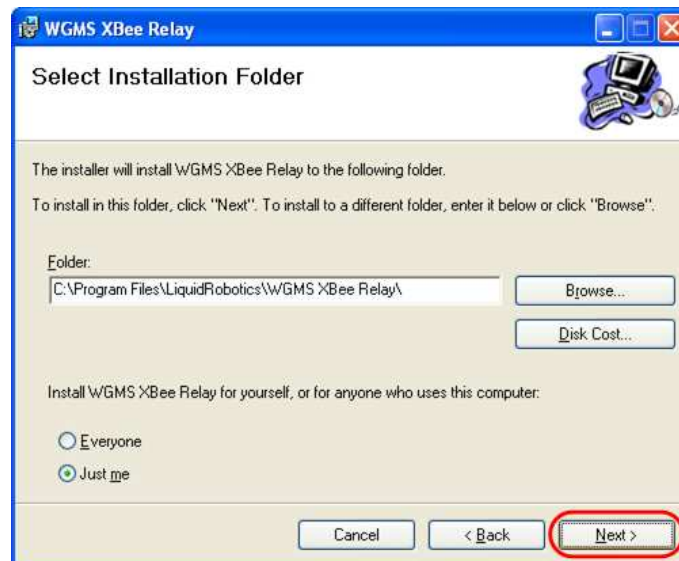
To verify the revision, right click on XBeeRelayAppSetup.msi and select Properties from the popup menu, then examine the output on the Summary tab.



2. Run SETUP.EXE from the directory where the files are located¹:
 - a. Click **Next** on the Welcome screen:

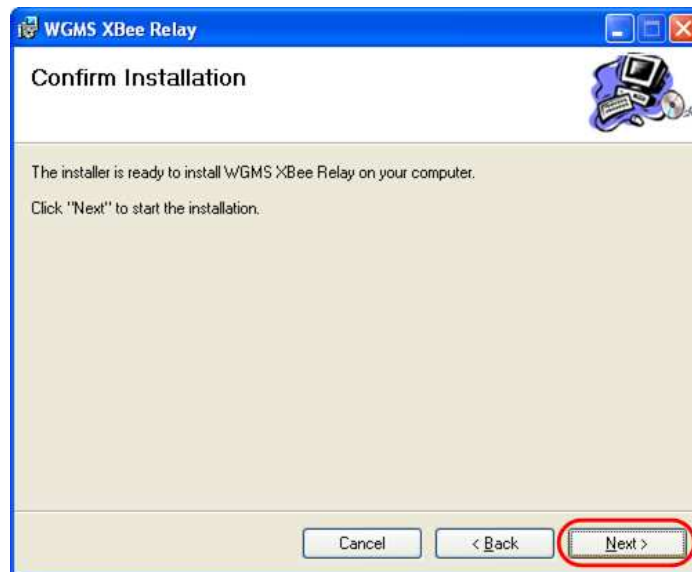


- b. Review the standard installation location and make any changes necessary; then press **Next**:

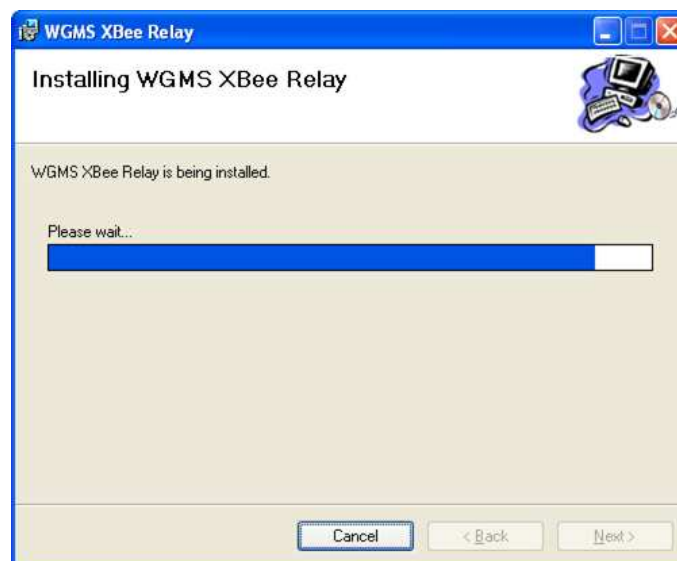


¹ If another version of the software is already installed, you will be prompted to remove it using Control Panel.

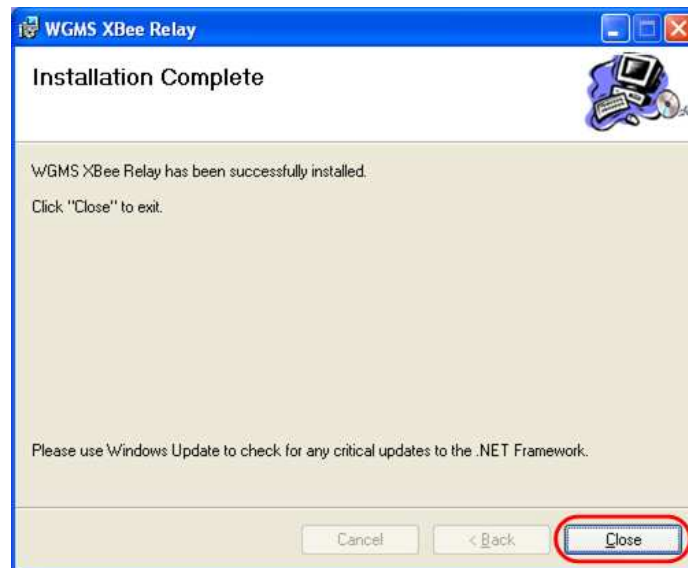
- c. Confirm that you want to install by pressing **Next**:



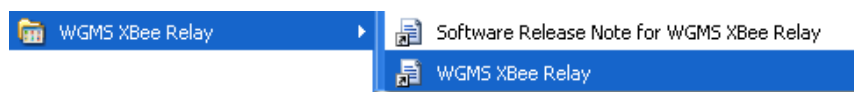
- d. The program is installed; you may be prompted to install the Microsoft .NET 3.5 Framework.



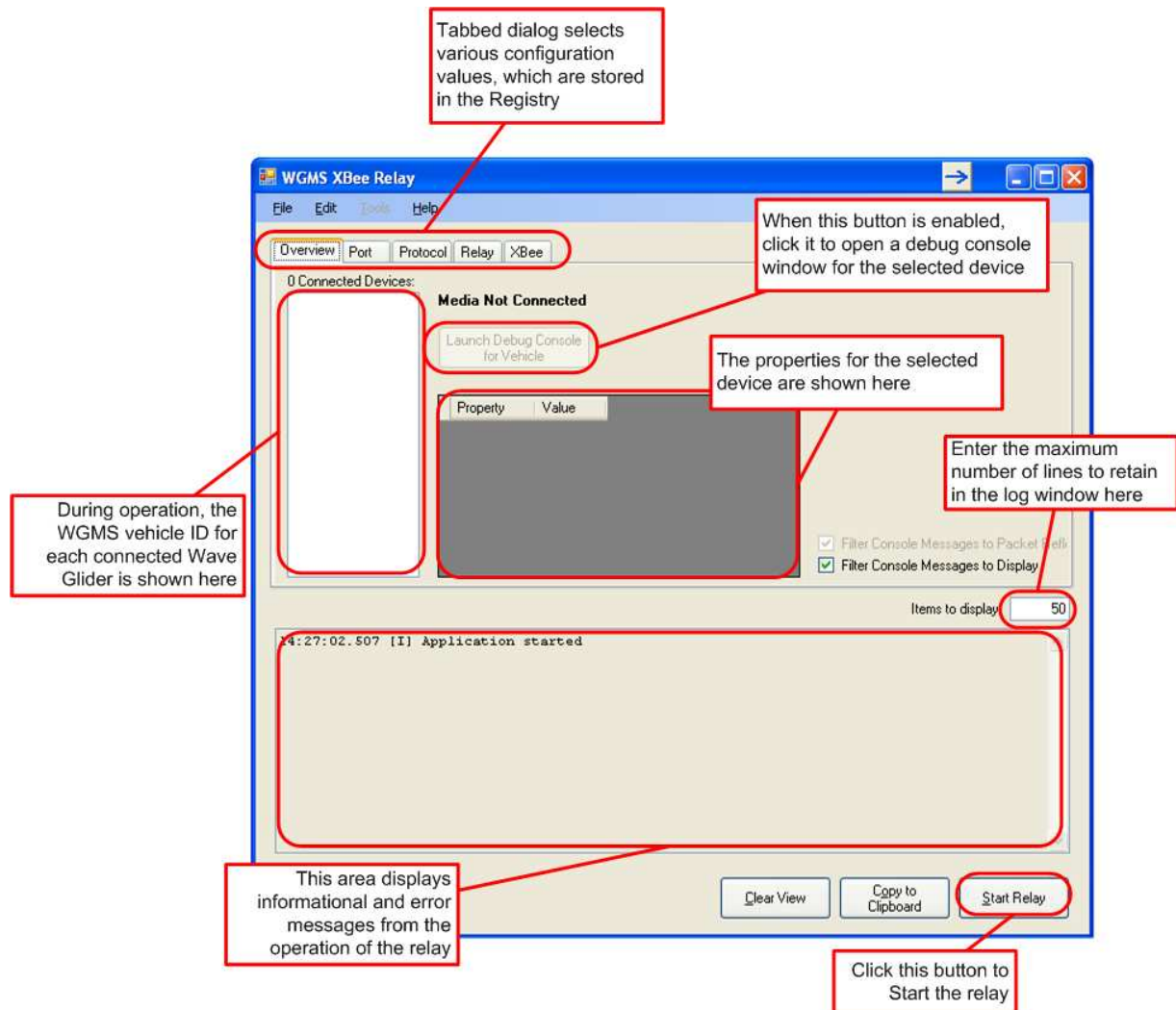
- e. The following screen is displayed when installation completes; press the Close button to dismiss the dialog.



3. The program shortcut appears on the Start menu under **WGMS XBee Relay**:



4. Start the relay. The startup screen looks like this:



5. Ensure that the XBee modem (Digi XBee USB Adapter S1 Pro) has been connected, and note which serial port is used. If necessary, use Digi diagnostics software X-CTU to detect and configure the modem (available from Digi at <http://www.digi.com>)

6. Before starting the relay, the port and network configurations must be correctly set:
 - a. Click the Port tab and verify that the correct Serial Port is selected (i.e. the one that is provided by the Digi modem.) Only the detected serial ports are listed in the drop-down menu. Click the Apply button to save any changes made.²

The screenshot shows the 'Port' configuration tab. It includes fields for Serial Port (COM4), Baud Rate (115200), Data Bits (8), Stop Bits (2), Parity (None), Parity Replace (00), Handshake (None), Read Buffer (4096), and Write Buffer (4096). There are checkboxes for 'Enable RTS' and 'Enable DTR', both of which are checked. 'Apply' and 'Revert' buttons are on the right.

- b. Click the XBee tab and verify that the PAN ID is correct (be sure to add "0x" for hexadecimal numbers; for example, 0x5000 for hexadecimal 5000, which is 20480 decimal.) If desired, a specific communication channel can be chosen by un-ticking the Scan for Clear Channel checkbox and specifying one of the available channels; by default, the modem scans for the clearest channel and uses that. Click the Apply button to save any changes made.

The screenshot shows the 'XBee' configuration tab. It includes a 'Scan for Clear Channel' checkbox (checked), a 'Fixed Channel' dropdown (12), a 'PAN ID' text box (0x5000), and several timeout fields: 'Modem Prompt Timeout' (00:00:02.000), 'Modem Response Timeout' (00:00:03.000), 'Scan Timeout' (00:01:00.000), 'Coordinator Restart Timeout' (00:00:05.000), and 'Configuration Timeout' (00:00:01.000). 'Apply' and 'Revert' buttons are on the right.

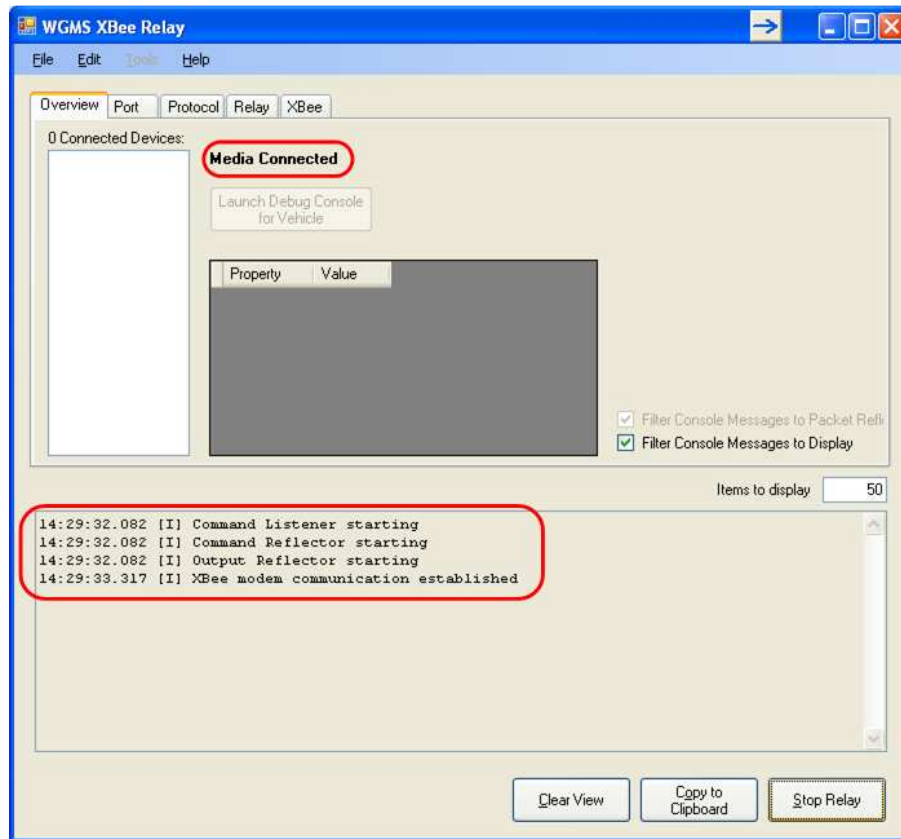
² Note that if the XBee module is configured for 115,200 baud, the serial port clock rate matches better if programmed for 111,111

- c. Click the Relay tab to enter the correct address and port for the Packet Reflector and for the Relay. Click **Suggest Relay IP** to use the first IP Address available on the Relay computer; for the Packet Reflector Address, use the IP Address and IP Port provided separately by Liquid Robotics or by your IT staff. IP Ports for the same IP Address should not be used.

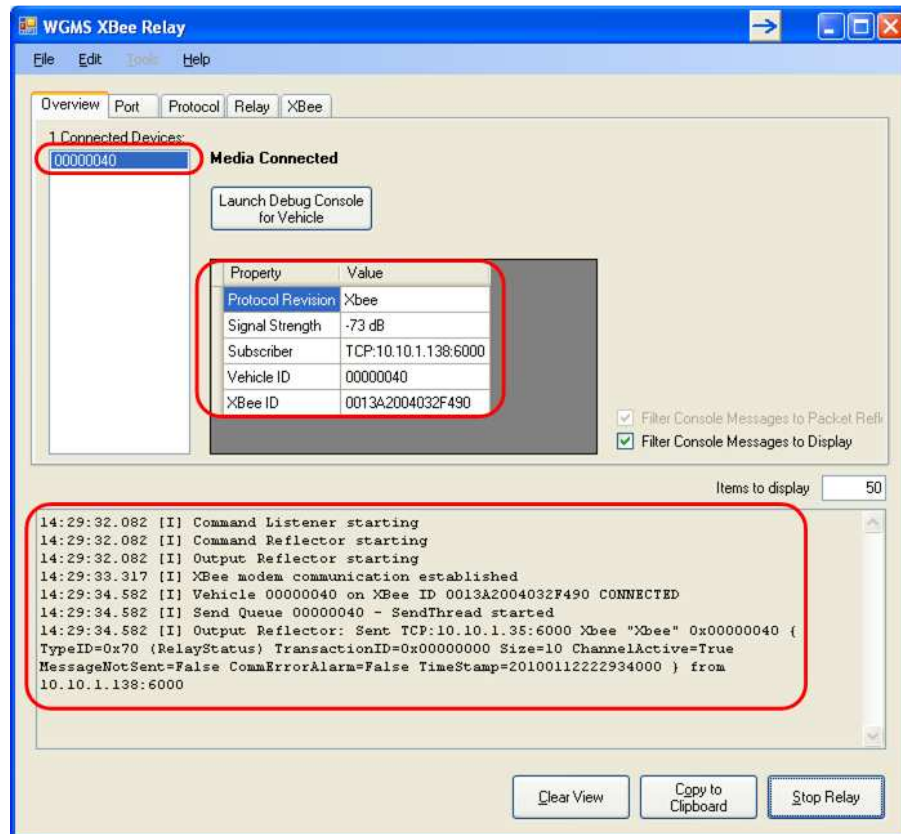
The screenshot shows the 'Relay' configuration window. It has tabs for Overview, Port, Protocol, Relay (selected), and XBee. The window is divided into two main sections: 'Packet Reflector Address' and 'Relay Address'. The 'Packet Reflector Address' section contains fields for IP Address (127.0.0.1), IP Port (6123), and Protocol (TCP). The 'Relay Address' section contains fields for IP Address (10.10.1.172), IP Port (6000), and Protocol (TCP). Below these sections are fields for Input Queue Size (1000), Output Queue Size (1000), Output Retry Buffer Size (1000), and Socket Timeout (00:00:05.000). There is a checkbox for 'Show Port Communications' which is currently unchecked. On the right side, there are buttons for 'Apply', 'Revert', 'Suggest Relay IP', and 'Set Loopback Addresses'.

Click the Apply button to save any changes made.

7. When the changes have been saved, click the Start Relay button. Some configuration values are grayed out during execution. The log display shows events as they occur, along with a time stamp. When communication is established with the modem, the bold indicator field changes to **Media Connected** and the log shows **XBee modem communication established**.



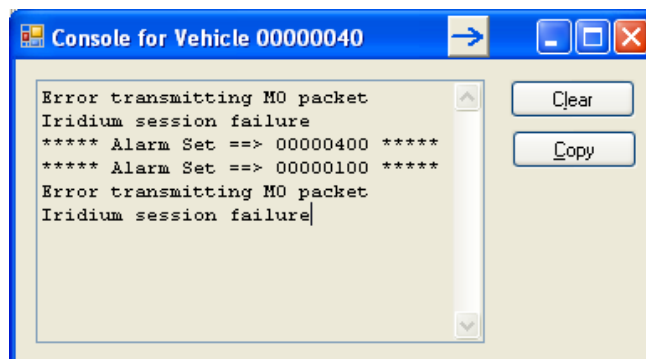
Any Wave Gliders with active XBee modems and that are in range connect automatically; details of the selected device are shown in the adjacent control.



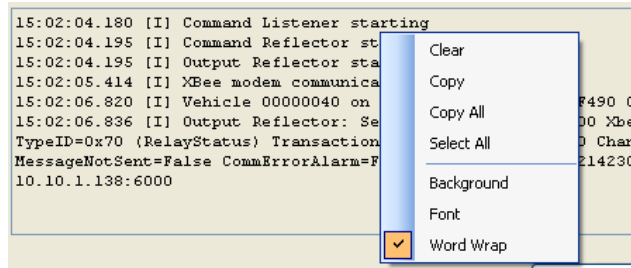
The "Output Reflector: Sent" notification indicates transmission to the Packet Reflector. If the notification is "Added" instead of "Sent", the relay is not able to successfully send to the Packet Reflector.

Note that XBee is not the default communication channel path, so Telemetry is not sent via XBee, by default. WGMS can issue a command to set the default channel for a Wave Glider.

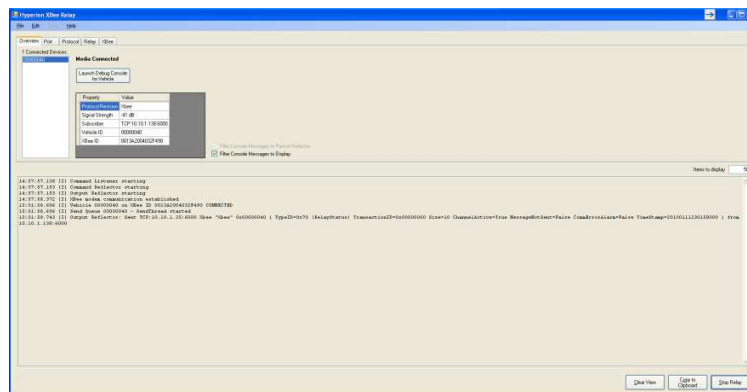
8. To communicate to the Wave Glider's command line console, select a connected device in the device list and press the **Launch Debug Console for Vehicle** button:



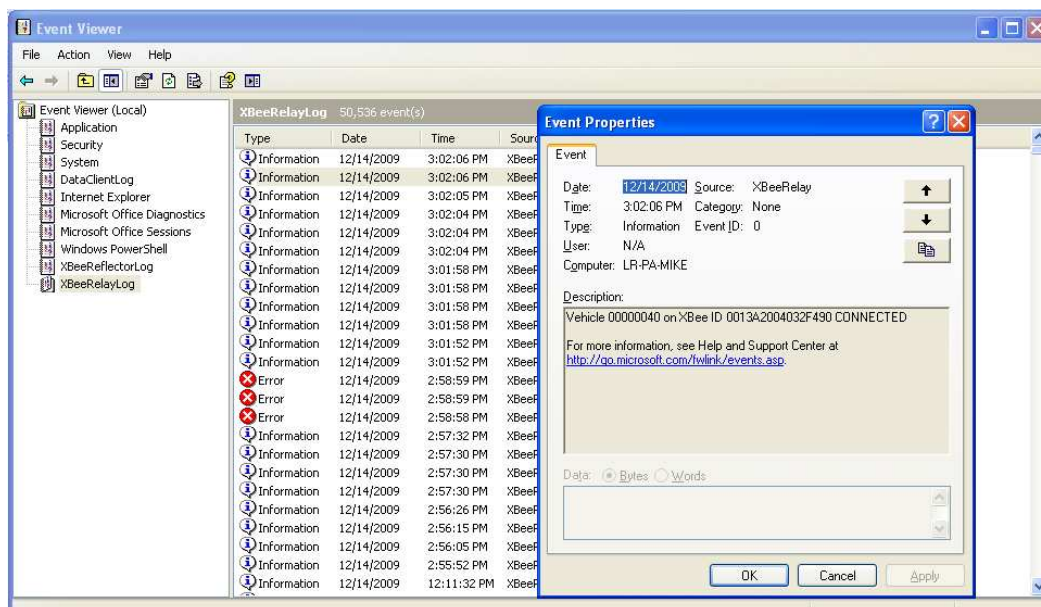
Console and event log windows use the same graphical control that allows the Font and Color to be set; right-click on the window and select the desired function from the pop-up menu:



9. The application can be resized to take best advantage of the user's screen resolution:



10. The events are saved in the system event log under **XBeeRelayLog**, and can be viewed using the Event Viewer applet, which can be accessed from the Administrative Tools folder in Control Panel:



history

date	changes made	author
12/11/2009	Draft	Mike Cookson
1/11/2010	Updates for 1.01 release	Mike Cookson
1/12/2010	Corrected application name	Mike Cookson
1/27/2010	Updates for 1.02 release	Mike Cookson
2/2/2010	Updates for 1.03 release	Mike Cookson
2/15/2010	Updates for 1.04 release	Mike Cookson
3/17/2010	Updates for 1.05 release	Mike Cookson
3/25/2010	Updates for 1.06 release	Mike Cookson
5/31/2010	Updates for 1.07 release	Mike Cookson
6/10/2010	Updates for 1.08 release	Mike Cookson