IMPULSE®·LINK 4.1 WDS

WDS Configurator

Instruction Manual
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Warning and Caution

DISCLAIMER OF WARRANTY

Magnetek, hereafter referred to as Company, assumes no responsibility for improper programming of a drive that resulted from use of this software. This software should only be used by a trained technician who has read and understands the contents of this manual. Normal use of this software may result in the drive parameters becoming modified. Improper programming of a drive can lead to unexpected, undesirable, or unsafe operation or performance of the drive. This may result in damage to equipment or personal injury. Company shall not be liable for economic loss, property damage, or other consequential damages or physical injury sustained by the purchaser or by any third party as a result of the use of this software. Company neither assumes nor authorizes any other person to assume for Company any other liability in connection with the sale or use of this software.

⚠️ WARNING

1. Read this user manual in its entirety before installing IMPULSE®-Link 4.1 Wireless Diagnostic System.
2. DO NOT connect or disconnect wiring, or perform signal checks while the electrical power is ON.
3. Improper programming of a drive through the use of this software can lead to unexpected, undesirable, or unsafe operation or performance of the drive.

Failure to observe these and other precautions indicated in this manual may expose the user to dangerous voltages, which may result in bodily harm. Damage to equipment may also occur.

⚠️ CAUTION

NOTICE

No patent liability is assumed with respect to the use of the information contained herein. Moreover, Magnetek is constantly improving its high quality product; therefore, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this document. Nevertheless, Magnetek assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication.
1 Introduction

This manual provides information and steps to configure the WDS Base and Remote Units:

1. WDS-REMOTE (Part Number: 144-11415)
2. WDS-BASE (Part Number: 144-11416)

Note: Older revisions of this manual describe configuration of old versions the WDS Base and Remote Unit hardware. The new hardware is based on an XBee platform and isn’t backwards compatible with old Xtend hardware. See page 7 and 22 for more information.

Overview

The WDS Configurator is a tool used to set up and troubleshoot your Wireless Diagnostic System (WDS) Remote and Base Unit hardware. This allows you to:

1. Search for the WDS Base Units online on your network.
2. Change the IP Address of the WDS Base Units on your network.
3. Configure your WDS Base and Remote Unit settings, and pair them together.
4. Test that your WDS Base and Remote Units are configured properly.
5. Scan for Magnetek drives online on your network.

WDS Hardware

WDS Base Unit
Model Number: WDS-BASE
Description: NEMA 4/4X/12/13 enclosure consists of an Ethernet-to-wireless Base Unit, power supply, enclosure-mounted antenna, wiring terminal blocks, 12’ crossover Ethernet cable, and cable grips.

WDS Remote Unit
Model Number: WDS-REMOTE
Description: NEMA 4/4X/12/13 enclosure consists of a serial-to-wireless Remote Unit, power supply, enclosure-mounted antenna, wiring terminal blocks, USB cable, and cable grips.

IMPULSE•Link Software and USB License Key
Model Number: IL-4.1-WDS-KIT
Description: USB Flash Drive containing the IMPULSE®•Link 4.1 WDS software and a Wibu hardware key.

Remote Antenna Kit
Model Number: WDS-ANTENNA-3M or WDS-ANTENNA-5M
Description: Hardware and accessories to remotely mount the WDS antenna (3 and 5 meter options).

DC-Powered WDS Remote Unit
Model Number: WDS-REMOTE-DC
Description: NEMA 4/4X/12/13 enclosure consists of a serial-to-wireless Remote Unit, 90-350VDC input power supply, enclosure-mounted antenna, terminal blocks, and cable grips.

RS232-485 Converter & DIN Rail Power Supply
Model Number: WDS-SER-CONV and WDS-SER-CONV-PS
Description: RS-232 to RS-485 converter and DIN rail power supply. Used with Series 2 drives.
2 Basic Setup Procedure

The following procedure will outline the basic steps to verify communication between the WDS Base and Remote Units before and after installing the system on a crane. Reference the IMPULSE Link WDS manual for more detailed information about hardware wiring and navigation of the IMPULSE Link WDS software.

It is highly recommended that the WDS Base and Remote Units be tested for successful connectivity to each other before installing the system on a crane.

It is also recommended that, with the assistance of your company’s IT Dept, the WDS Base Unit be assigned a static IP address based on the MAC address of the WDS Base Unit. The MAC address of the device will be listed on the label inside the door of the WDS Base Unit enclosure or on the WDS Base Unit itself.

Using the detailed setup information listed in Chapter 4, follow these basic steps:

1. In an area that’s convenient for testing, wire power connections to the WDS Base and Remote Units.

2. Connect the WDS Base Unit’s RJ45 port to the local network on which it will be used. It is preconfigured from Magnetek to DHCP, meaning it will automatically acquire an available IP address. If your IT department assigned it a static IP address based on its MAC Address, it will automatically connect to that IP address.

3. With a PC that’s connected to the same local network as the WDS Base Unit, open the WDS Configurator application. Perform a “WDS Base Search” and the WDS Base Unit should show up on the list. **Note the IP address, as it will be needed for the IMPULSE Link communication profile.**

   **Note:** If the IT Dept cannot set a static IP address for the MAC address, then a static IP address can be assigned internal to the WDS Base Unit. If required, follow step 4; otherwise skip to step 5.

4. To set a static IP address on the WDS Base Unit:
   a. Type the IP address, found in Step 3, into an internet browser.
   b. A “Digi” webpage will load with a side bar of configuration options. Within these menus is a section that will allow a static IP address to be assigned.
   c. After all settings have been set and saved, reboot the WDS Base Unit.

5. Perform a loopback test, as explained in Chapter 4. If this test is successful, the WDS Base and Remote Units are communicating correctly. The WDS Base Unit can now be installed into its permanent location and connected to the local network, and the WDS Remote Unit can be installed on the crane.

6. With the WDS Remote Unit installed on the crane, wire the drives to its green RS-485/422 terminals. Make sure to enable the terminating resistor on the last drive in the chain.

7. With the WDS system properly installed and powered up, use IMPULSE Link WDS, installed on a PC, to configure a TCP/IP to Serial communication profile. The IP Address, from Step 3 or 4, will be prompted for along with the Serial Addresses of the drive(s). The drive’s serial address is set via parameter H05-01. Each drive requires a separate communication profile.

8. Using the newly setup communication profile(s), execute a parameter read. If successful, setup is complete.
# 3 User Interface

## Menus and Navigation

Supported functions can be accessed by the main toolbar, the top menu bar, or through shortcut keys.

- **a. File Menu**  
  Contains exit option.

- **b. WDS Menu**  
  Contains identical items as the toolbar, along with shortcuts.

- **c. Help Menu**  
  About Box option which shows the current version of the application.

- **d. Toolbar**  
  Allows switching between functions.

- **e. Status Bar**  
  Provides indication of the active function on the left, as well as the IP address(es) of the local machines, Network Interface Cards (NIC), or the IP address of the selected NIC.

## Function Overview

**WDS Base Search (Ctrl-M)**  
Provides the ability to scan for WDS Base Units and Drive Communication Cards (such as EtherNet/IP, ProfiNet, Modbus TCP/IP, etc.).

**WDS Base (Ctrl-E)**  
Provides functionality to read and write the radio settings for a WDS Base Unit.

**WDS Remote (Ctrl-S)**  
Provides functionality to read and write the radio settings for a WDS Remote Unit, and pair with a WDS Base Unit.

**Loopback Test (Ctrl-L)**  
Provides functionality to test whether the WDS Base and Remote Units are configured to communicate with each other.

**Drive Scanner (Ctrl-D)**  
Provides functionality to test whether the system is set up correctly. The PC connects to the WDS Base Unit, which communicates to the WDS Remote Unit over RF and finally to the drive(s) via RS-485/422.
WDS Base Unit Search

The **WDS Base Search** function sends a broadcast message, querying for all WDS Base Units and industrial communication cards. All devices found on the network will be shown in the list along with their Type, Description, Version, IP Address, Hardware MAC address, and Access status.

Upon selecting a row, the MAC Address and IP Address fields in other tabs are updated with the selected device.

a. **Type**
   Displays the WDS Base Unit/Comms type:
   - XM-X2D-XBee (new)
   - WM-E-01 (old)
   - WM-E-02 (old)
   - WM-E-03 (old)
   - WM-E-04 (old)
   - WM-E-05 (old)
   - WM-X2D (old)
   - WM-T54 (old)
   - SI-EN3 (EtherNet/IP opt. card)
   - SI-EM3 (Modbus TCP/IP opt. card)
   - SI-EP3 (ProfiNet opt. card)

b. **Description**
   Displays the WDS Base Unit/Comms description:
   - WDS Modem
   - EtherNet/IP opt. card (SI-EN3)
   - Modbus TCP/IP opt. card (SI-EM3)
   - ProfiNet opt. card (SI-EP3)

c. **Version**
   Displays the WDS Base Unit firmware version.

d. **IP Address**
   IP Address of the WDS Base Unit

e. **MAC Address**
   MAC Address of the WDS Base Unit.

f. **Access**
   Yes (green): The WDS Base Unit is in the same IP address range as the local machine.
   No (red): The WDS Base Unit is NOT in the same IP address range as the local machine.
   **Either change the IP address of the local machine, or assign an IP address to the WDS Ethernet mode that is in the same range as the local machine.**
WDS Base Unit Configuration

The **WDS Base** tab is used to configure the WDS Base Unit settings.

**The Base S/N will automatically be populated into the WDS Remote section**

![Diagram of WDS Base Unit Configuration](image)

- **a. MAC Address**
  Hardware address of the selected WDS Base Unit.

- **b. IP Address**
  Current IP address of the selected WDS Base Unit.

- **c. Network ID**
  This setting needs to match the Network ID of the WDS Remote Unit(s).

- **d. Base S/N**
  Serial number of the WDS Base Unit. This needs to be copied to the WDS Remote Unit to pair them together.

- **e. Enable Encryption**
  Check the checkbox to enable encryption and enter text into the “Encryption String” box. Press the “Generate Encryption Key” to format the encryption key into the proper format.

- **f. Read**
  Reads the current settings of the WDS Base Unit.

- **g. Write**
  Writes the values chosen in the “WDS Base” tab into the WDS Base Unit.

- **h. WDS Default**
  Reverts the settings to defaults. Will not write these to the WDS Base Unit until “Write” is clicked.
WDS Remote Unit Configuration

The **WDS Remote** tab is used to configure the WDS Remote Unit settings and pair it to a WDS Base Unit. **The Base S/N will automatically be populated from the WDS Base section.**

![WDS Configurator Interface](image)

- **a. WDS Base**
  WDS Base Unit to pair to the WDS Remote Unit.

- **b. COM Port**
  COM port of the WDS Remote Unit connected to your PC via USB cable.

- **c. Serial Port Settings**
  Serial port settings of the WDS Remote Unit that must match the settings of the connected drive(s).

- **d. Network ID**
  This setting needs to match the Network ID of the WDS Base Unit.

- **e. Base S/N**
  Serial number of the WDS Base Unit. This needs to be copied to the WDS Remote Unit to pair them together.

- **f. Enable Encryption**
  Check the checkbox to enable encryption and enter text into the “Encryption String” box. Press the “Generate Encryption Key” to format the encryption key into the proper format.

- **g. Read**
  Reads the current settings of the WDS Remote Unit.

- **h. Write**
  Writes the values chosen in the “WDS Remote” tab into the WDS Remote Unit.

- **i. WDS Default**
  Reverts the settings to defaults. Will not write these to the WDS Remote Unit until “Write” is clicked.
Loopback Test

The purpose of the Loopback Test is to determine whether the WDS Base Unit and Remote Unit are configured to communicate with each other. When Start is pressed, the PC connects to the WDS Base Unit and begins sending a message every second. If the WDS Base and Remote Units are configured to communicate with each other, the WDS Remote Unit will receive the messages and echo them back. If the Loopback adapter is connected to the WDS Remote Unit, every message received is transmitted back to the WDS Base Unit and the Good counter will increment.

- **IP Address**: Address of the WDS Remote Unit to connect.
- **Start**: Begins the loopback function.
- **Stop**: Closes the connection to the specified device and stops sending the loopback message.
- **Clear Stats**: Clears the counters and status box.
- **Good**: When a response is returned from the Remote Unit after sending a loopback message, the Good counter is incremented.
- **Bad**: If no response is sent within the allotted time (1 second), the Bad counter is incremented.
- **Textbox**: Every message that is read is displayed in the textbox. Valid received messages will display: “ABCDEFGHIJKLMNOPQRSTUVWXYZ”
**Drive Scanner**

The **Drive Scanner** function will scan continuously through all 31 Modbus RTU slave addresses and identify active drives on the network.

![Drive Scanner Diagram]

- **a. IP Address**
  - Address of the WDS Base Unit to connect.

- **b. Start**
  - Begins the scan function.

- **c. Stop**
  - Closes the connection to the specified device and stops scanning.

- **d. Time Out**
  - Specifies the amount of time to wait for a message response. Due to possible Ethernet traffic/delays, this is configurable between 100 ms and 1 second.
    - 100 ms (default)
    - 250 ms
    - 500 ms
    - 1 sec
4 Detailed Setup Procedure Using the WDS Configurator

Step 1: Select NIC Connection

1. Connect the WDS Base Unit’s RJ45 port to the local network on which it will be used. The WDS Base Unit is preconfigured from Magnetek for DHCP, meaning it will automatically acquire an IP address from the network.

2. Connect your PC to the same network as the WDS Base Unit. This will ensure the IP addresses are both in the same range.

3. Launch the WDS Configurator software, and in the lower right corner of the Status Bar, select the network adapter that will be connected to the WDS Base Unit. This will always be an Ethernet adapter.

Step 2: WDS Base Unit Search

1. Click the “WDS Base Search” button and it will begin to search for devices on the network.

2. Click on the desired WDS Base Unit and it will read its settings.
Step 3: WDS Base Unit Configuration

1. Click on the “WDS Base” button.

2. The Ethernet settings will populate and can be manually changed. Click the “Write Ethernet Settings” to apply the changes.

3. A Network ID can be selected. If multiple WDS Base Units are in the facility, they will need unique Network IDs.

4. If encryption is desired, click the “Enable Encryption” check box and enter a key into the “Encryption String” text box. It can be any text. Click the “Generate Encryption Key” to format the key correctly.

5. Click on the “Write” button. The following message will be displayed, if successful.
Step 4: WDS Remote Unit Configuration

1. Connect the PC to the WDS Remote Unit with a USB cable.

2. In WDS Configurator, click the “WDS Remote” button.

3. Select the appropriate COM Port that Windows assigned to the WDS Remote Unit. Check the Device Manager (in Windows) to verify the COM Port that's named “USB Serial Port”.

4. Set the desired Baud Rate and Settings.

5. The Base S/N and any Encryption Settings will have auto-populated from the selected WDS Base Unit.

6. Click the “Read” button to read the S/N from the WDS Remote Unit. The text box will populate, if the read is successful.

7. Click “Write.” The following message will be displayed, if successful, and the WDS Remote Unit should now be paired to the WDS Base Unit.
Step 5: Loopback Test

With the WDS Remote and Base Units linked together, this Loopback Test function will verify the communications have been properly linked.

1. **Unplug** the USB cable between the PC and WDS Remote Unit, and jumper terminals R+ to T+ and R- to T-.

2. Click the “Start” button.

3. If a valid message is received, the Good count will increment, and the textbox will display:

4. “ABCDEFGHIJKLMNOPQRSTUVWXYZ”

5. Click the “Stop” button when done.
Step 6: Drive Scanner

1. Turn OFF the power to the WDS Remote Unit and change the DIP switches to RS-485 (2-wire) or RS485/RS-422 (4-wire), per your application and cycle power.

2. Wire the WDS Remote Unit to your drive network via RS-485 or RS-422 and enable the terminating resistor on the last drive in the chain.

3. Click the “Start” button and verify that all of the drives on the network appear in the list. The drive scanner verifies that the wiring and drive node address are set correctly.

4. Click “Stop” when done.
**Appendix A: WDS Base Unit Configuration Troubleshooting**

In the event that an error code is returned during a WDS Base Unit configuration operation, the following table contains the possible error codes, a brief description of the code, and possible corrective actions.

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE100 (Device Not Found)</td>
<td>The WDS Base Unit did not respond to the query to enter command mode.</td>
<td>1. Cycle power on the WDS Base Unit and try again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Restart the application and try again.</td>
</tr>
<tr>
<td>CE108 (Timed Out)</td>
<td>The WDS Base Unit failed to respond to a query within the given time.</td>
<td>1. Try again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Cycle power on the WDS Base Unit and try again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Restart the application and try again.</td>
</tr>
<tr>
<td>CE203 (Could not open port)</td>
<td>The Ethernet connection could not be initiated.</td>
<td>1. Restart the application and try again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Verify that the Ethernet port is working/enabled.</td>
</tr>
<tr>
<td>CE205 (Unable to connect)</td>
<td>A TCP connection could not be made and the connection was aborted due to timeout or socket error.</td>
<td>1. Ensure that the WDS Base Unit:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. is powered up.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. cable is connected to the local network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Ping the target IP address.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Cycle power on the WDS Base Unit and try again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Restart the application and try again.</td>
</tr>
<tr>
<td>CE209 (Connection closed by Device)</td>
<td>A connection had been established, but was reset pre-maturely by the target device.</td>
<td>1. Retry.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Check that the cable is secure.</td>
</tr>
<tr>
<td>CE210 (Device did not respond)</td>
<td>While broadcasting a scan request, the target device did not respond.</td>
<td>1. Verify that the MAC address specified matches the WDS Base Unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Verify that the device appears within the “WDS Base Search” results list.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Retry.</td>
</tr>
</tbody>
</table>
# WDS Remote Unit Configuration Troubleshooting

In the event that an error code is returned during a WDS Remote Unit configuration operation, the following table contains the possible error codes, a brief description of the code and possible corrective actions.

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>Corrective Action</th>
</tr>
</thead>
</table>
| CE001      | The communication port specified does not exist on the system. | If you are unsure of the correct port number:  
1. Go to Start->Control Panel  
2. Double-click on "System"  
3. Select the "Hardware" tab.  
4. Click on the "Device Manager" button.  
5. Expand the "Ports" node. Serial port and USB-to-Serial converters will be listed as COM1, COM2, etc.  
For Windows Vista and newer users:  
1. Right click on “Computer” or "My Computer."  
2. Select "Manage."  
3. Expand the "Ports" node. The WDS Remote Unit should be shown as “USB Serial Port” |
| CE002      | The communication port is in use by another application. | 1. Close the application that has the port open and try again.  
NOTE: Only one program has the ability to use a communication port at a time. When the operating system grants access of that port to a user program, that program reserves it until it lets it go. If another program requests access to it, the operating system denies access. |
| CE009      | The specified serial settings are invalid. | 1. Restart the application and try again. |
| CE100      | The WDS Remote Unit did not respond to the query to enter command mode. | 1. Ensure that the WDS Remote Unit:  
a. is powered up  
b. DIP switches are set appropriately for RS-485 or RS-422.  
c. USB cable is connected from the PC to WDS Remote Unit.  
2. Ensure that the correct COM port is specified.  
3. Reset the WDS Remote Unit to default settings by:  
a. Unplugging the device.  
b. Press and hold the reset button (next to the LEDs) while powering it up.  
4. Retry |
| CE108      | The WDS Remote Unit did not respond to queries. | 1. Retry  
2. Check that USB cable is secure. |
Appendix C: Loopback Test Troubleshooting

The Loopback Test is intended to verify that the connection between the WDS Base Unit and WDS Remote Unit match and successfully communicate. An easy method to configure a loopback test is to jumper terminals R+ to T+ and R- to T-, on the terminal block of the WDS Remote Unit.

1. If an error code was returned, refer to the following table.

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>Corrective Action</th>
</tr>
</thead>
</table>
| CE203 (Could not open port) | The Ethernet connection could not be initiated. | 1. Restart the application and try again.  
2. Verify that the Ethernet port is working/enabled. |
| CE205 (Unable to connect) | A TCP connection could not be made and the connection was aborted due to timeout or socket error. | 1. Ensure that the WDS Base Unit:  
   a. is powered up.  
   b. cable is connected to the local network.  
2. Ping the target IP address.  
3. Cycle power on the WDS Base Unit and try again.  
4. Restart the application and try again. |
| CE209 (Connection closed by Device) | A connection had been established, but was reset prematurely by the target device. | 1. Retry.  
2. Check that the cable is secure. |

2. Ensure that the antennas are connected.
3. Ensure that terminals R+ and T+ are jumpered together and also R- to T-.
4. Check whether another WDS Base Unit is being configured. If identical Network IDs are being configured, they may be interfering with one another.
5. Re-program WDS Base and Remote Units to the same Radio Network Settings, per the application guide.
Appendix D: Drive Scanner Troubleshooting

The Drive Scanner is a tool meant to assist in the verification and debugging of wiring from the WDS Remote Unit to the drives. Once connected to the WDS Base Unit, the Scanner will continuously check all Modbus RTU nodes with slave addresses within the range (01H ~ 1FH).

1. If an error code was returned, refer to the following table.

<table>
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<th>Description</th>
<th>Corrective Action</th>
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<tbody>
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<td>The Ethernet connection could not be initiated.</td>
<td>1. Restart the application and try again.</td>
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<td></td>
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<tr>
<td>CE205</td>
<td>A TCP connection could not be made and the connection was aborted due to timeout or socket error.</td>
<td>1. Ensure that the WDS Base Unit:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. is powered up.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. cable is connected to the local network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Ping the target IP address.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Cycle power on the WDS Base Unit and try again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Restart the application and try again.</td>
</tr>
<tr>
<td>CE209</td>
<td>A connection had been established, but was reset prematurely by the target device.</td>
<td>1. Retry.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Check that the cable is secure.</td>
</tr>
</tbody>
</table>

2. Ensure that the antennas are connected.
3. Ensure the RS-485 or RS-422 wiring is correct.
4. Ensure that the Drive(s) are set up correctly (refer to the Application Guide).
   a. IMPULSE G+/VG+ Series 2, 3, and 4
      i. H05-01 = Slave Address
      ii. H05-02 = Baud Rate
   b. Power must be cycled on the drive(s) for communication setting changes to take effect.
5. Ensure the WDS Remote Unit DIP switches are set to RS-485 or RS-422, per the drawing (see Appendix F).
6. Ensure that only the last drive in the chain has the termination resistor set.
7. Check whether WDS Base Unit is being configured. If identical Network IDs are being configured, they may be interfering with one another.
## Appendix E: Quick Reference

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Typical Setting</th>
<th>Note:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>G+/VG+ Series 4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modbus Address</td>
<td>H5-01 (01 ~ 1F)</td>
<td></td>
</tr>
<tr>
<td>Baud Rate</td>
<td>H5-02 3: 9600 Baud</td>
<td></td>
</tr>
<tr>
<td>Parity Select</td>
<td>H5-03 0: No Parity</td>
<td></td>
</tr>
<tr>
<td>Shield: IG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **G+/VG+ Series 3** |                       |        |
| Modbus Address  | H5-01 (01 ~ 1F)       |        |
| Baud Rate       | H5-02 3: 9600 Baud    |        |
| Parity Select   | H5-03 0: No Parity    |        |
| Shield: TB4     |                       |        |

| **G+/VG+ Series 2** |                       |        |
| (SI-K2 option card) |                       |        |
| Modbus Address  | H5-01 (01 ~ 1F)       |        |
| Baud Rate       | H5-02 3: 9600 Baud    |        |
| Parity Select   | H5-03 0: No Parity    |        |

| **G+ Mini** |                       |        |
| Modbus Address | H05.01 (01 ~ 1F)       |        |
| Baud Rate       | H05.02 03: 9600 Baud    |        |
| Parity Select   | H05.03 00: No Parity    |        |
| Shield: IG      |                       |        |

| **P3 Series 2** |                       |        |
| Modbus Address | n253 (01 ~ 1F)         |        |
| Baud Rate       | n254 2: 9600 Baud      |        |
| Parity Select   | n255 2: No Parity      |        |
| Shield: Chassis Ground |               |        |

| **OmniPulse DDC and MagnePulse DMC** |                       |        |
| Baud Rate       | G16 9600               |        |
| RS232/RS485 Select | G17 RS485               |        |
| Serial Format   | G18 8N1                |        |
| Modbus Address  | G19 (1 ~ 31)           |        |

| Shield: Chassis Ground |               |        |
Appendix F: WDS Remote Unit Hardware References

Terminal & Ports Descriptions

1-03a. Terminal Blocks
Phoenix 6-pin connector.

1-03b. Power Connector
7-30 VDC power connector.

1-03c. RS-485/RS-422 DIP Switches
120 ohms termination for the receiving differential pairs if switch is in the up position. Switch 1 is half duplex (2-wire) termination. Switch 2 is for full duplex (4-wire) termination.

1-03d. Reset Button
The reset button re-boots the WDS Remote Unit. This button only applies when using the configuration tabs of Digi’s XCTU Software.

1-04a. RSSI LEDs
Indicates the signal strength with respect to the WDS Base Unit.

<table>
<thead>
<tr>
<th>LEDS ON</th>
<th>Signal</th>
<th>Fade</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Very Strong</td>
<td>&gt; 30 dB</td>
</tr>
<tr>
<td>2</td>
<td>Strong</td>
<td>&gt; 20 dB</td>
</tr>
<tr>
<td>1</td>
<td>Moderate</td>
<td>&gt; 10 dB</td>
</tr>
<tr>
<td>0</td>
<td>Weak</td>
<td>&lt; 10 dB</td>
</tr>
</tbody>
</table>

1-04b. I/O and Power LEDs
LEDs indicate RF activity:
Yellow: Serial Data Out (to host)
Green: Serial Data In (from host)
Red: Power (Blinks when powered)

1-04c. Commissioning Push Button
Unused

1-04d. USB Mini-B Port
Configuration port.
RS-485 Communication is disabled when the USB cable is plugged in

1-04e. Antenna Port
50Ω RF signal connector for an external antenna. The connector type is RPSMA (Reverse Polarity SMA) female. The connector has threads on the outside of the barrel and a male center conductor.

Note: An easy way to distinguish old generation (Xtrend) WDS hardware from new generation (XBee) WDS hardware is to look for the green terminal block on the WDS Remote Unit. New generation WDS Remote Units have the green terminal block. Old generation WDS Remote Units have a DB9 plug instead.
## Wiring RS-485 & RS-422

### RS485 – Half Duplex (2-wire)

![RS485 connector diagram]

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Signal</th>
<th>Description</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TX/RX+</td>
<td>Positive Data Line</td>
<td>Transmit serial data to and from RF device</td>
</tr>
<tr>
<td>2</td>
<td>TX/RX-</td>
<td>Negative Data Line</td>
<td>Transmit serial data to and from RF device</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>PWR</td>
<td>Power</td>
<td>Optional power input</td>
</tr>
<tr>
<td>3, 4</td>
<td></td>
<td>Not Used</td>
<td></td>
</tr>
</tbody>
</table>

### RS485/RS422 – Full Duplex (4-wire)

![RS485/RS422 connector diagram]

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Signal</th>
<th>Description</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TX+</td>
<td>Transmit Positive</td>
<td>Transmit serial data to RF device (differential)</td>
</tr>
<tr>
<td>2</td>
<td>TX-</td>
<td>Transmit Negative</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>RX+</td>
<td>Receive Positive</td>
<td>Receive serial data from RF device (differential)</td>
</tr>
<tr>
<td>4</td>
<td>RX-</td>
<td>Receive Negative</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>PWR</td>
<td>Power</td>
<td>Optional power input</td>
</tr>
</tbody>
</table>