

WC45i-GW-P Ethernet Module

User & Reference Manual



Part Number: LUM0088AA Revision: Mar-2018

Safety Information

The products described in this manual can fail in a variety of modes due to misuse, age, or malfunction and is not designed or intended for used in systems requiring fail-safe performance, including life safety systems. Systems with the products must be designed to prevent personal injury and property damage during product operation and in the event of product failure.

STOP Warning! Remove power before connecting or disconnecting the interface or RF cables.

FreeWave Technologies, Inc. warrants the FreeWave® WC45i-GW-P Ethernet Module (Product) that you have purchased against defects in materials and manufacturing for a period of three years from the date of shipment, depending on model number. In the event of a Product failure due to materials or workmanship, FreeWave will, at its discretion, repair or replace the Product. For evaluation of Warranty coverage, return the Product to FreeWave upon receiving a Return Material Authorization (RMA). The replacement product will remain under warranty for 90 days or the remainder of the original product warranty period, whichever is longer.

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Preface

Contact FreeWave Technical Support

For up-to-date troubleshooting information, check the **Support** page at <u>www.freewave.com</u>. FreeWave provides technical support Monday through Friday, 8:00 AM to 5:00 PM Mountain Time (GMT -7).

- Call toll-free at 1-866-923-6168.
- In Colorado, call 303-381-9200.
- Contact us through e-mail at moreinfo@freewave.com.

Other WAVECONTACT Information

Use the FreeWave <u>http://support.freewave.com/</u> website to download the latest version of these documents.

Registration is required to use this login.

Document	Description	FreeWave Part Number
User Manual	The User Manual provides setup, configuration, and safety information for the WC45i-GW-P.	LUM0088AA
Quick Start Guide	The Quick Start Guide provides the out-of-the-box setup of the WC45i-GW-P.	QSG0038AA

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Document Styles

This document uses these styles:

- Parameter setting text appears as: [Page=radioSettings]
- File names appear as: configuration.cfg.
- File paths appear as: C:\Program Files (x86)\FreeWave Technologies.
- User-entered text appears as: xxxxxxxx.

Caution: Indicates a situation that **MAY** cause damage to personnel, the radio, data, or network.

Example: Provides example information of the related text.

FREEWAVE Recommends: Identifies FreeWave recommendation information.

Important!: Provides crucial information relevant to the text or procedure.

Note: Emphasis of specific information relevant to the text or procedure.



Provides time saving or informative suggestions about using the product.



Warning! Indicates a situation that **WILL** cause damage to personnel, the radio, data, or network.

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1. Overview - WC45i-GW-P Ethernet Module

Thank you for purchasing the WC45i-GW-P Ethernet Module.

The WC45i-GW-P Ethernet Module has these features:

- Wide range DC power input: +6 to +36VDC.
- Power Over Ethernet (POE) support with automatic switchover to DC supply
- Modbus TCP Connection
- · Remote access to the Gateway through the WC Toolkit
- DIN Rail mounted Ethernet module
- Status LEDs

1.1. Operation

The WC45i-GW-P provides a Modbus TCP server allowing all register data contained in the Gateway to be accessed by any Modbus TCP client.

A TCP port allows remote configuration / debug of the Gateway using WC Toolkit.

Note: This provides the same functionality as a direct connection to the Gateway with a serial port.

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2. Equipment

2.1. Included Equipment

The WC45i-GW-P package contains these items:

Included Equipment - WC45i-GW-P		
Qty	Description	
1	WC45i-GW - Gateway with Modbus Interface	
1	WC45i-P - Ethernet Interface Module with Modbus TCP connection	
1	WC45i-GW-P Ethernet Module Quick Start Guide	

2.1.1. User-supplied Equipment

- Small, flathead screwdriver
- Mounting equipment for the WC45i-GW-P.
- CAT5e / CAT6 Ethernet cable
- DC Adapter Power Supply (+6 to +36VDC)
- Barrel connector with Ground and Power flying leads
- Computer for WAVECONTACT device configuration.

Note: See Available Accessories (on page 86) for additional equipment.

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3. WC45i-GW-P Connections

- Connections (on page 10)
- Power and Gateway Connections (on page 13)

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3.1. Connections

Important!: The WC45i-GW-P Ethernet Module is configured using the **WC Toolkit**. Download the **WC Toolkit** software from <u>http://support.freewave.com/</u>. Registration is required to use this login.

Note: The **RS232 Config / Debug** connector on the WC45i-GW **MUST** be used for WC Toolkit access.

The Config / Debug port is accessed over a TCP/IP network using a WC45i-GW-P.

- When used with a WC45i-GW-P Ethernet Module, the 6-position terminal block is connected to the color coded WC45i-GW-485 Modbus Gateway connector on the WC45i-GW-P.
- The WC45i-GW-P Ethernet Module provides screw terminals for connection to a WC45i-GW-485 Modbus Gateway.
 - See Connections WC45i-GW-P (on page 11) to connect the 6 wires to the WC45i-GW-485 Modbus Gateway:

Power is supplied by either:

- the Power Input screw terminals (+6 to +36VDC) and/or
- Power over Ethernet (PoE).



If both power sources are connected, the WC45i-GW-P automatically switches to the active power source if the other power source fails.

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3.1.1. Connections - WC45i-GW-P



Figure 1: WC45i-GW-P Ethernet Module Connections

WC45i-GW-P Ethernet Module Connections			
Location #	Title	Description	
1	Power Input		
	GND	External power ground.	
	+6 to +36VDC Power	Power Source from an external power supply of +6 to +36VDC.	
2	Red	Positive Power (+6 to +36VDC) supply to the Gateway.	
	Black	WC45i-GW-P Ground	
	Orange	RS232 Config / Debug connector TX	
	Yellow	RS232 Config / Debug connector RX	
	Green	RS485 to RSD module	
	Brown	RS485 to RSD module	
3	Status LED	See LEDs (on page 85) for detailed information.	

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WC45i-GW-P Ethernet Module Connections		
Location #	Title	Description
4	Ethernet Link LED	See LEDs (on page 85) for detailed information.
5	Ethernet ACT LED	See LEDs (on page 85) for detailed information.
6	RS232 Config / Debug connector	The RS232 Config / Debug connector is for the USB to Serial DB9 programming cable (FreeWave Part # WC-USB-DB9).
7	RJ-45 Ethernet connector	The RJ-45 Ethernet connector is for Ethernet configuration and retrieving sensor data via Modbus TCP.

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3.2. Power and Gateway Connections

Important!: Verify the items listed in Equipment (on page 8) are available before starting this procedure.

It is assumed that the reader and installer have completed the FreeWave installation and setup training to follow the procedures in this document.

- 1. All wiring should be neat and orderly.
- 2. On the WC45i-GW-P terminal blocks:
 - a. Connect the configuration wires of the Gateway to their respective color-designated screw terminal connections.
 - b. Use the screw terminal connection to connect the Power Source from an external power supply of +6 to +36VDC.
 - c. Use the GND screw terminal connection to connect the External power ground.
- 3. Connect the CAT5e / CAT6 Ethernet cable to the WC45i-GW-P RJ-45 port and the Ethernet connection on the computer.

The WC45i-GW-P connections are similar to Figure 2 and Figure 3:

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Figure 2: WC45i-GW-P Ethernet Module Connections

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4. If this is the first time the WC45i-GW-P is installed, wait for the drivers to install.

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Important!: Depending on the computer and connection, the driver installation can take 3-6 minutes.

- 5. Continue with:
 - WC Toolkit Installation (on page 17)
 - Setup the Computer IP Address Configuration (on page 27)

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4. WC Toolkit Installation

Note: The images in this procedure are for Windows® 7 and/or Firefox®. The dialog boxes and windows may appear differently on each computer.

1. Click <u>http://support.freewave.com/</u>. The **FreeWave Support** site opens.

Important!: Registration is required to use this login.





2. Enter the User Name and Password.

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A successful Login message briefly appears. The **Help Topics** window opens.

4. Click the **Software** link.



Figure 5: Help Topics window

The Software window opens.

5. Click the **WAVECONTACT Toolkit** link.

	SUPPORT	REGISTER	FREEWAVE.COM
	Q Search	the knowledge	base
Software		Can't Find it:	? Contact us!
Tool Suite		Phone: 1.866. Email: <u>suppor</u>	.923.6168 t@freewave.com
WAVECONTACT Toolkit			

Figure 6: Software window

The available software appears in the window.

6. Select and click the attachment.

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FREEWAVE	SUPPORT REGISTER FREE	EWAVE.COM
	Q Search the knowledge base	
WAVECONTACT Toolkit	Can't Find it? Conta	ict us!
Updated on March 19, 2018	Phone: 1.866.923.61 Email: <u>support@freev</u>	68 <u>wave.com</u>
- Article Attachments		
FreeWave WC Toolkit Installer v2.1.2.83	Knowledge Base Ar MM2-M13 Serial Rad User & Reference Ma	ticles io inual
	User & Reference Ma Z9-PC Release Notes	anual

Figure 7: WAVECONTACT Toolkit window

The **Opening** dialog box opens.

Opening FreeWave-WC-Toolkit-Installer-v2.1.2.83.zip
You have chosen to open:
🗼 FreeWave-WC-Toolkit-Installer-v2.1.2.83.zip
which is: Compressed (zipped) Folder (8.8 MB)
from: http://support.freewave.com
What should Firefox do with this file?
○ Open with Windows Explorer (default)
Save File
Do this <u>a</u> utomatically for files like this from now on.
OK Cancel

Figure 8: WC Toolkit Opening dialog box

Note: This procedure shows Firefox® dialog boxes. Other browsers will have different dialog boxes and procedures.

7. Click **OK**.

The Enter name of file to save to dialog box opens.

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 Enter name of file to save to Computer → Computer → Comput	IS (C:) ▶ _WC Toolkit for FW ▶	 ✓ ✓
Organize 🔻 New folder		III - 📀
Desktop Libraries Computer OS (C:)	Name	Date modified
File name: FreeWave-W	C-Toolkit-Installer-v2.1.2.83.zip	•
Save as type: Compressed	zipped) Folder (*.zip)	Save Cancel

Figure 9: Enter name of file to save to dialog box

- 8. Search for and select a location to save the .zip file to and click **Save**. The **Enter name of file to save to** dialog box closes.
- 9. Open a Windows® Explorer window and find the location where the .zip file was saved.
- 10. Double-click the .zip file.
- 11. Extract the .exefile from the .zip file into a parent location.
- 12. Double-click the **.exe** file to run the WC Toolkit installer. The **Open File - Security Warning** dialog box opens.

Open File - Security Warning
Do you want to run this file?
Name: FW\FreeWave WC Toolkit Installer v2.1.2.83.exe Publisher: SignalFire Telemetry, Inc. Type: Application From: C:_WC Toolkit for FW\FreeWave WC Toolkit I
Run Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. Only run software from publishers you trust. What's the risk?

Figure 10: Open File - Security Warning dialog box

13. Click Run.

The User Account Control dialog box opens.

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Figure 11: User Account Control dialog box

14. Click Yes.

The WC Toolkit Setup Wizard starts.

Setup - FreeWave WC Toolkit	
Select Destination Location Where should FreeWave WC Toolkit be installed?	
Setup will install FreeWave WC Toolkit into the following folder.	
To continue, click Next. If you would like to select a different folder, click l	Browse.
C:\Program Files (x86)\FreeWave\FreeWave WC Toolkit	Browse
At least 19.2 MB of free disk space is required.	
Next >	Cancel

Figure 12: WC Toolkit Setup Wizard - Select Destination Location window

15. Click **Next** to continue.

The Ready to Install window opens.

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🔂 Setup - FreeWave WC Toolkit	• 💌
Ready to Install Setup is now ready to begin installing FreeWave WC Toolkit on your computer.	
Click Install to continue with the installation, or click Back if you want to review or change any settings.	
Destination location: C:\Program Files (x86)\FreeWave\FreeWave WC Toolkit	*
< ۲	
< Back Install	Cancel

Figure 13: WC Toolkit Setup Wizard - Ready to Install window

16. Click Install.

The install process is very quick.

The Installation Complete window opens.



Figure 14: WC Toolkit Setup Wizard - Installation Complete window

17. Click **Finish** to open WC Toolkit.

An Update message appears in the WC Toolkit window is an update is available.

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C	FreeWave WC	Foolkit v2.1.	2.83		- • •
	File Options	Updates	Tools	Help	Update Available
	Auto-Detect Device COM Port: COM1 Select COM Port Auto-Detect De	First to Auto-Deternation Vice on COM F	Refresh ect Port	FR Customer L	EEWAVE
	Select Device				
	WC43-Gateway				

Figure 15: WC Toolkit - Update Available message

18. Continue with the WC Toolkit Update (on page 24) procedure.

5. WC Toolkit Update

If the WAVECONTACT device is connected to the internet, WC Toolkit automatically searches for an update for either the WC Toolkit itself or the connected device's firmware.

An **Update Available** message appears if an update is available.

Note: An **Update Available** message also appears in the Device Configuration window (on page 54) for any connected WAVECONTACT device when an update is available for that device. The update procedure is the same for the device and WC Toolkit.

 Open the WC Toolkit software. The Update Available message appears in the window. (Figure 16)

O FreeWave WC Toolkit v2.1.2.83	
File Options Updates To	ls Help Update Available
Auto-Detect Device COM Port: COM1 Refres Select COM Port to Auto-Detect Auto-Detect Device on COM Port Select Device	FREEWAVE Customer Login: None
WC45i-Gateway	▼ Open Device Window

Figure 16: WC Toolkit - Update Available message

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2. Click the Update Available message link.

O FreeWave WC Toolkit v2.1.2.83	
File Options Updates Tools Help Auto-Detect Device COM Port: COM1 Refresh	Click this link.
Select COM Port to Auto-Detect Auto-Detect Device on COM Port Customer Login: None	
Select Device WC45i-Gateway	

Figure 17: Click the Update Available message link

The Open File - Security Warning dialog box opens.



Figure 18: Open File - Security Warning dialog box

3. Click Run.

The User Account Control dialog box opens.

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Figure 19: User Account Control dialog box

4. Click Yes.

The WC Toolkit update process is very quick.

When the update is completed, WC Toolkit re-opens the **Select Device** window showing the updated software version in the WC Toolkit window. (Figure 20)

O FreeWave WC Toolkit v	- • 🔀
File Options Updates Tools	Help
Auto-Detect Device	•••0
Auto-Detect COM : Success	FREEWAVE
Auto-Detect Device on COM Port	Customer Login: None
Select Device	
WC45i-Gateway	Open Device Window

Figure 20: Select Device window

5. Continue with configuration of the WC45i-GW-P.

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6. Setup the Computer IP Address Configuration

The IP address of the computer used for configuration needs to be set so the computer appears in the same network as the Gateway before configuration can continue.

Note: The images in this procedure are for Windows® 7 and/or Firefox®. The dialog boxes and windows appear differently on each computer.

- 1. On the computer, click the Windows® Start button and select Control Panel.
- View the Control Panel window by Category and click Network and Internet > View Network Status and Tasks.
- 3. Click the Change Adapter Settings link.



Figure 21: Change Adapter Settings Link

4. Double-click the Local Area Connection link.

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Figure 22: Local Area Connection Link

The Local Area Connection Status dialog box opens.

	inection status	
General		
Connection —		
IPv4 Connect	ivity:	No Internet access
IPv6 Connect	ivity:	No network access
Media State:		Enabled
Duration:		01:04:30
Speed:		100.0 Mbps
D <u>e</u> tails		
Activity —		
Activity ———	Sent —	Received
Activity Bytes:	Sent — 102,258,459	Received
Activity Bytes:	Sent — 102,258,459	Received 220,375,045 Diagnose

Figure 23: Local Area Connection Status dialog box

5. Click **Properties**.

The Local Area Connection Properties dialog box opens.

6. Select the Internet Protocol Version 4 (TCP/IPv4) option.

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🕌 Local Area Connection Properties			
Networking Sharing			
Connect using:			
Intel(R) 82579LM Gigabit Network Connection			
Configure			
This connection uses the following items:			
Client for Microsoft Networks			
🗹 📕 QoS Packet Scheduler			
File and Printer Sharing for Microsoft Networks			
Line Internet Protocol Version 6 (TCP/IPv6)			
Internet Protocol Version 4 (TCP/IPv4)			
Ink-Layer Topology Discovery Mapper I/O Driver			
Link-Layer Topology Discovery Responder			
Install Uninstall Properties			
Description			
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.			
OK Cancel			

Figure 24: Local Area Connection Properties dialog box

- 7. Click **Properties**. The **Internet Protocol Version 4 (TCP/IPv4) Properties** dialog box opens.
- 8. Make a note of the current settings (to reverse this procedure later).
- 9. Select the Use the following IP address option button.
- 10. In the **IP Address** text box, enter an IP Address that is **in the same subnet range but a DIFFERENT IP Address** than the device.

Example: Enter an IP Address from 192.168.1.101 to 192.168.111.254 (but NOT 192.168.1.100) and the Subnet Mask to 255.255.255.0.

Note: The default WAVECONTACT IP Address is **192.168.1.100**. The default subnet mask is **255.255.255.0**.

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Internet Protocol Version 4 (TCP/IPv4	4) Properties			
General				
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.				
Obtain an IP address automatical	ly			
• Use the following IP address:				
IP address:	192.168.1.101			
Subnet mask:	255.255.255.0			
Default gateway:				
 O<u>b</u>tain DNS server address autor 	natically			
• Us <u>e</u> the following DNS server add	dresses:			
Preferred DNS server:				
Alternate DNS server:	• • •			
🔲 Vaļidate settings upon exit	Ad <u>v</u> anced			
	OK Cancel			

Figure 25: Local Area Connection Properties dialog box

Note: An IP Address is NOT required in the Default Gateway text box.

- 11. Click to save the changes and close the dialog box.
- 12. Click Close twice to close the Local Area Connection Properties and Local Area Connection Status dialog boxes.
- 13. Continue with these procedures:
 - Change the WC45i-P Password (on page 31)
 - Change to a Different Static IP Address (on page 34)
 - Add a Username (on page 37)
 - Delete a Username (on page 41)
 - IP Address Recovery (on page 44)
 - Remote WC Toolkit Access (on page 46)
 - Remote Endpoint Configuration (on page 49)

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7. Change the WC45i-P Password

STOP

Warning! If the default password is changed, be careful to type the new password correctly and remember it.

If password is lost the device must be returned to FreeWave to be reset.

Procedure

- 1. Complete the Power and Gateway Connections (on page 13).
- 2. On the computer, complete the Setup the Computer IP Address Configuration (on page 27) procedure.
- 3. Open a web browser.
- 4. In the address bar, enter the Gateway IP Address.

Note: The default WAVECONTACT IP Address is 192.168.1.100.

5. Refresh the browser window (press <F5>). The **Authentication Required** window opens.

Authentication	Required	×	
?	http://192.168.1.100 is requesting your username and password. The site says: "config"		
User Name:			
Password:			
	OK Cancel		



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6. Enter the User Name and Password.

Note: The default **User Name** is **admin** and the default **Password** is **freewave**. If the **User Name** or **Password** were changed, enter the applicable information in the appropriate text box.

7. Click OK.

The **FreeWave WC45i Ethernet Module** software opens. The **Device Status** window is active.

Note: See Device Status window for detailed information about this window.

- 8. Click the **HTTP** tab.
- 9. Click the Authentication button. The HTTP Authentication window opens.
- 10. In the **URI** text box, enter a forward slash (/).
- 11. In the Auth Type area, select the Digest option button.
- 12. In the **Username** text box, type admin.
- 13. In the **Password** text box, type the new password.

Note: If the User Name or Password were changed, enter the applicable information in the appropriate text box.

The HTTP Authentication window is similar to Figure 27.

FreeWav	ve WC45i Etheri	net Module	FREEWAVE
Status 🏠 HTTP Line	Statistics Cont	figuration Authentication	[Logout] The HTTP Server can be configured with many different authentication directives. The authentication is bierarchical in that any URI can be
Network System	URI: /		given an authentication directive in order to override a parent URI authentication directive. The URI must begin with (to refer to
Tunnel XML	Auth Type: O None Basic SSL SSL/Basi	<mark>) Digest</mark> ic	the filesystem. The different AuthType values offer various levels of security. From the least to most secure:
	Username: admin Password: •••••••		None no authentication necessary Basic encodes passwords using Base64
	Current Configuration		
	URI:	/ [Delete]	page can only be accessed over SSL (no password)
	Realm:	config	SSL/Basic
	AuthType:	Digest	page can only be accessed over
	Users:	admin [<u>Delete</u>]	Base64) SSL/Digest

Figure 27: HTTP Authentication window with Changed Password

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14. Click the **Submit** button.

The window refreshes with a confirmation message.

FreeW	ave WC45i Etherr	net Module	REEWAVE
Status Statistics Control HTTP Statistics Control Line HTTP Authentication HTTP Authentication Modbus URI: Image: Control Network URI: Image: Control System URI: Image: Control Tunnel Realm: Image: Control XML None Basic Vsername: SSL SSL/Basic Submit Submit Image: Control		iguration Authentication	Logout: The HTTP Server can be configured with many different authentication directives. The authentication is hierarchical in that any URI can be given an authentication directive in order to override a parent URI authentication directive. The URI must begin with / to refer to the filesystem. The dIfferent AuthType values offer various levels of security. From the least to most secure: None no authentication necessary Basic encodes passwords using Base64 Digest encodes passwords using MD5
	Updated the user admin.		page can only be accessed over SSL (no password)
	URI: Realm:	/ [Delete] config	SSL/Basic page can only be accessed over SSL (encodes passwords using Base64)
	AuthType: Users:	Digest admin [Delete]	SSL/Digest page can only be accessed over SSL (encodes passwords using

Figure 28: Updated Confirmation Message

The Authentication Required window opens.

Authentication	Required	×
?	http://192.168.1.100 is requesting your username and password. The site says: "config"	
User Name:		
Password:		
	OK Cancel	



- 15. Enter the User Name and the new Password.
- 16. Click OK.

The **FreeWave WC45i Ethernet Module** software opens. The **Device Status** window is active.

- 17. Optional: Continue with other configuration WC45i-GW-P procedures.
- 18. Logout and close the FreeWave WC45i Ethernet Module software.
- 19. Remove the CAT5e / CAT6 Ethernet cable from the WC45i-P and the computer.
- 20. As applicable, replace the Endpoint cover.
- 21. Mount the Gateway device.

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8. Change to a Different Static IP Address

- 1. Complete the Power and Gateway Connections (on page 13).
- 2. On the computer, complete the Setup the Computer IP Address Configuration (on page 27) procedure.
- 3. Open a web browser.
- 4. In the address bar, enter the Gateway IP Address.

Note: The default WAVECONTACT IP Address is 192.168.1.100.

5. Refresh the browser window (press <F5>). The **Authentication Required** window opens.

Authentication	Required	×	
?	http://192.168.1.100 is requesting your username and password. The site says: "config"		
User Name:			
Password:			
	OK Cancel		

Figure 30: Authentication Required window

6. Enter the User Name and Password.

Note: The default **User Name** is **admin** and the default **Password** is **freewave**. If the **User Name** or **Password** were changed, enter the applicable information in the appropriate text box.

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7. Click OK.

The **FreeWave WC45i Ethernet Module** software opens. The **Device Status** window is active.

Note: See Device Status window for detailed information about this window.

- Click the Network tab. The Network Interface Configuration window opens.
- 9. Verify the correct **Network** is selected (e.g., **Network 1**).
- 10. Click the Interface button.
- 11. Click the **Configuration** button. The **Network Interface Configuration** window opens.
- 12. In the IP Address text box, enter the new static IP Address.
- 13. In the **Default Gateway** text box, enter the new Gateway IP address. The window is similar to Figure 31.
- 14. Click the **Submit** button.

FreeWav	ve WC45i Et	hernet Module	FREEWAVE
Status 💮 HTTP Line Modbus Network System Tunnel		Network 1 Interface Link Status Configuration	[Logout] This page is used to configure the Network interface on the device. To see the effect of these items after a reboot, view the Status page. The following items require a reboot to take effect: BOOTP Client On/Off DHCP Client On/Off
XML	Network 1 (eth0 BOOTP Client: DHCP Client: IP Address:	 Interface Configuration On On On On On On 	IP Address DHCP Client ID If BOOTP or DHCP is turned on, any configured IP Address, Network Mask, Gateway, Hostname, or Domain will be ignored. BOOTP/DHCP will auto-discover
	Default Gateway: Hostname: Domain:		If both BOOTP and DHCP are turned on, DHCP will run, but not BOOTP. When BOOTP or DHCP fails to discover an IP Address, a new
	DHCP Client ID: Primary DNS: Secondary DNS:	Text Binary None> 1500	address Will automatically be generated using AutoIP. This address will be within the 169.254.xx space. IP Address may be entered alone, in CIDR form, or with an explicit mask: 192.168.1.1 (default mask)
	W10.	Submit	192.168.1.1/24 (CIDR) 192.168.1.1 255.255.255.0 (explicit mask) Hostname must begin with a lefter

Figure 31: Changed IP Address and Default Gateway

The window refreshes with a confirmation message.

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FreeWa	ave WC45i E	thernet Module	FF	REEWAVE	
Status f HTTP Line Modbus		Network 1 Interface Link		[Logout] This page is used to configure the Network interface on the device. To see the effect of these items after a reboot, view the Status page. The following items require a reboot	
System Tunnel XML	Status Configuration Network 1 (eth0) Interface Configuration Changed IP Address to "192.168.1.200/24". Changed Default Gateway to "192.168.1.2". eth0 IP Address change will take effect on the next reboot. The changes have been written to Flash.		to take effect: BOOTP Client On/Off DHCP Client On/Off IP Address DHCP Client ID If BOOTP or DHCP is turned on, any configured IP Address, Network Mask, Gateway, Hostname, or Domain will be ignored. BOOTP/DHCP will auto-discover		
	BOOTP Client:	© On . ● Off		and eclipse those configuration items.	
	DHCP Client:	© On		If both BOOTP and DHCP are turned on, DHCP will run, but not BOOTP.	
	IP Address:	192.168.1.200/24		When BOOTP or DHCP fails to	
	Default Gateway:	192.168.1.2		discover an IP Address, a new address will automatically be generated using AutoIP. This	

Figure 32: Network Interface Configuration window with Changed IP Address

- 15. Reboot the WC45i-P for the changes to take effect.
- Refresh the browser window (press <F5>).
 The Authentication Required window opens.
- 17. Enter the User Name and Password.
- Click OK. The FreeWave WC45i Ethernet Module software opens. The Device Status window is active.
- 19. Optional: Continue with other configuration WC45i-GW-P procedures.
- 20. Logout and close the FreeWave WC45i Ethernet Module software.
- 21. Remove the CAT5e / CAT6 Ethernet cable from the WC45i-P and the computer.
- 22. As applicable, replace the Endpoint cover.
- 23. Mount the Gateway device.

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9. Add a Username

- 1. Complete the Power and Gateway Connections (on page 13).
- 2. On the computer, complete the Setup the Computer IP Address Configuration (on page 27) procedure.
- 3. Open a web browser.
- 4. In the address bar, enter the Gateway IP Address.

Note: The default WAVECONTACT IP Address is 192.168.1.100.

5. Refresh the browser window (press <F5>). The **Authentication Required** window opens.

Authentication	Required	×
?	http://192.168.1.100 is requesting your username and password. The site says: "config"	
User Name:		
Password:		
	OK Cancel	

Figure 33: Authentication Required window

6. Enter the User Name and Password.

Note: The default **User Name** is **admin** and the default **Password** is **freewave**. If the **User Name** or **Password** were changed, enter the applicable information in the appropriate text box.

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7. Click OK.

The **FreeWave WC45i Ethernet Module** software opens. The **Device Status** window is active.

Note: See Device Status window for detailed information about this window.

- 8. Click the **HTTP** tab.
- 9. Click the Authentication button. The HTTP Authentication window opens.
- 10. In the **URI** text box, enter a forward slash (/).
- 11. In the Auth Type area, select the Digest option button.
- 12. In the Usernametext box, enter the new Username.
- 13. In the **Password** text box, enter the password for the new Username.

Note: If the User Name or Password were changed, enter the applicable information in the appropriate text box.

The HTTP Authentication window is similar to Figure 34.

itatus			
ITTP	Statistics	Configuration Authentication	The HTTP Server can be configure with many different authentication
ine Iodbus	HTTP Authentica	tion	directives. The authentication is hierarchical in that any URI can b given an authentication directive
vstem	URI: /		order to override a parent URI authentication directive.
unnel	Realm:		The URI must begin with / to refe
ML	AuthType: ONONE OBa	asic <mark> </mark>	The different AuthType values of various levels of security. From th
	Username: freewave Password:		None no authentication necessary
	Submit		Basic encodes passwords using Base
	Current Configuration		Digest encodes passwords using MD5
	URI:	/ [Delete]	page can only be accessed over
	Realm:	config	SSL (no password)
	Auth Type:	Digest	page can only be accessed over
	Lisers'	admin [Delete]	SSL (encodes passwords using

Figure 34: HTTP Authentication window with Changed Username

14. Click the **Submit** button.

The window refreshes with a confirmation message.

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岱 Statis	tics Configuration Authentication	[Logout The HTTP Server can be configured with many different authentication
HTTP Auther	ntication	directives. The authentication is hierarchical in that any URI can be given an authentication directive in order to override a parent URI authentication directive.
Realm:		The URI must begin with / to refer to the filesystem.
Auth Type: ONOne	e	The different AuthType values offer various levels of security. From the least to most secure:
Username: Password:		None no authentication necessary
Submit		Basic encodes passwords using Base64
Current Configu	ration	Digest encodes passwords using MD5 SSI
Added the user free	Nave.	page can only be accessed over SSL (no password)
URI:	/ [Delete]	SSL/Basic page can only be accessed over
Realm:	config	SSL (encodes passwords using Base64)
AuthType:	Digest	SSL/Digest
Users:	admin [Delete] freewave [Delete]	page can only be accessed over SSL (encodes passwords using MD5)
		When changing the parameters of Digest or SSL/Digest authentication it is often best to close and reonen

Figure 35: New Username Added Confirmation Message

15. Click the **Logout** link.



Figure 36: Logout Link

A confirmation message appears.

16.





17. Click OK to logout.

The window refreshes with a confirmation message.

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Figure 38: Logged Out Confirmation Message

18. Click the **Login** link.

The Authentication Required window opens.

Authentication	Required	×
?	http://192.168.1.100 is requesting your username and password. The site says: "config"	
User Name:		
Password:		
	OK Cancel	

Figure 39: Authentication Required window

- 19. Enter the User Name and Password of the added user.
- 20. Click **OK**. The **FreeWave WC45i Ethernet Module** software opens. The **Device Status** window is active.
- 21. Optional: Continue with other configuration WC45i-GW-P procedures.
- 22. Logout and close the FreeWave WC45i Ethernet Module software.
- 23. Remove the CAT5e / CAT6 Ethernet cable from the WC45i-P and the computer.
- 24. As applicable, replace the Endpoint cover.
- 25. Mount the Gateway device.

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10. Delete a Username

- 1. Complete the Power and Gateway Connections (on page 13).
- 2. On the computer, complete the Setup the Computer IP Address Configuration (on page 27) procedure.
- 3. Open a web browser.
- 4. In the address bar, enter the Gateway IP Address.

Note: The default WAVECONTACT IP Address is 192.168.1.100.

5. Refresh the browser window (press <F5>). The **Authentication Required** window opens.

Authentication	Required	×
?	http://192.168.1.100 is requesting your username and password. The site says: "config"	
User Name:		
Password:		
	OK Cancel	

Figure 40: Authentication Required window

6. Enter the User Name and Password.

Note: The default **User Name** is **admin** and the default **Password** is **freewave**. If the **User Name** or **Password** were changed, enter the applicable information in the appropriate text box.

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7. Click OK.

The **FreeWave WC45i Ethernet Module** software opens. The **Device Status** window is active.

Note: See Device Status window for detailed information about this window.

- 8. Click the **HTTP** tab.
- 9. Click the Authentication button. The HTTP Authentication window opens.
- 10. Click the **Delete** link next to the User to remove.

FreeW	/ave WC45i E	thernet Module	FREEWAVE
Status HTTP Line Modbus	Statistic HTTP Authent	cation	[Logout] The HTTP Server can be configured with many different authentication directives. The authentication is hierarchical in that any URI can be
Network System	URI:		given an autoentication directive in order to override a parent URI authentication directive.
Tunnel XML	Realm:	Racic Digest	the filesystem.
	AuthType: SSL Username:	SSL/Basic SSL/Digest	The different Auth type values offer various levels of security. From the least to most secure:
	Password:		None no authentication necessary
	Submit		Basic encodes passwords using Base64
	Current Configura	tion	encodes passwords using MD5
	URI:	/ [Delete]	page can only be accessed over
	Realm:	config	SSL (no password)
	AuthType:	Digest	page can only be accessed over
	Users:	admin [<u>Delete]</u> freewave [<u>Delete]</u>	SSL (encodes passwords using Base64) SSL/Digest
			page can only be accessed over

Figure 41: Delete User from List

A confirmation message appears.

Are you SURE you want to delete this information?	?
OK Cancel	



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11. Click **OK** to confirm the deletion.

The window refreshes with a confirmation message.

FreeW	ave WC45i Eth	ernet Module	FREEWAVE
Status HTTP Line Modbus Network System Tunnel XML	Statistics HTTP Authentica URI: Realm: Auth Type: SSL SS Username: Password: Submit	Configuration Authentication tion asic Oigest L/Basic SSL/Digest	Logout The HTTP Server can be configured with many different authentication directives. The authentication is hierarchical in that any URI can be given an authentication directive in order to override a parent URI authentication directive. The URI must begin with / to refer to the filesystem. The different AuthType values offer various levels of security. From the least to most secure: None no authentication necessary Basic encodes passwords using Base64 Digest encodes passwords using MD5
	The user freewave has bee	en deleted under /.	SSL page can only be accessed over SSL (no password)
	URI:	/ [Delete]	SSL/Basic page can only be accessed over
	Realm:	config	SSL (encodes passwords using Base64)
	Auth Type:	Digest	SSL/Digest
	Users:	admin [Delete]	page can only be accessed over SSL (encodes passwords using MD5)

Figure 43: Delete Confirmation message

- 12. Optional: Continue with other configuration WC45i-GW-P procedures.
- 13. Logout and close the FreeWave WC45i Ethernet Module software.
- 14. Remove the CAT5e / CAT6 Ethernet cable from the WC45i-P and the computer.
- 15. As applicable, replace the Endpoint cover.
- 16. Mount the Gateway device.

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11. IP Address Recovery

At bootup, the WC45i-GW-485 Modbus Gateway reads the IP Address settings from the WC45i-GW-P Ethernet Module and stores the settings in the WC45i-GW-485's memory.

Important!: DO NOT connect the RS232 cable when the WC45i-P is powered on.

- 1. On the computer, complete the Setup the Computer IP Address Configuration (on page 27) procedure.
- 2. Complete the Power and Gateway Connections (on page 13).
- 3. Verify the WC Toolkit software is installed on the computer connected to the WC45i-GW-P.
- 4. Connect to the WC45i-Gateway using WC Toolkit.
- 5. On the Tools menu, click Detect Ethernet Gateways.

O FreeWave WC Toolkit v	
File Options Updates Tools Auto-Detect Device De COM Port: COM22 F Auto-Detect COM22: Success Auto-Detect Device on COM Port Select Device	Help etect Ethernet Gateways Ctrl+E ustomer Login Customer Login: None
WC45R-Gateway	

Figure 44: Tools menu > Detect Ethernet Gateways

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The Detect Ethernet Gateways window opens.

Note: See Detect Ethernet Gateways window (on page 61) for detailed information about this window.

6. Click the **Detect Local Gateways** button.

The IP Address assigned to the WC45i-GW-P Ethernet Module is detected. (Figure 45)

C	Detect Ethe	rnet Gateways	- • •
	IP Address	MAC Address	Detect Local Gateways
	192.168.1.100	00:80:A3:B2:1D:A2	Connect to Gateway
			Launch Config Page

Figure 45: Detect Ethernet Gateways window

Note: The **Detect Ethernet Gateways** window shows the IP Address from when the Gateway was last powered on.

Important!: If the IP Address settings are changed, the system must be powered down for at least 15 seconds and then powered back up for the WC45i-P to read the new IP Address settings.

- 7. Optional: Continue with these procedures:
 - Change the WC45i-P Password (on page 31)
 - Change to a Different Static IP Address (on page 34)
 - Add a Username (on page 37)
 - Delete a Username (on page 41)
 - IP Address Recovery (on page 44)
 - Remote WC Toolkit Access (on page 46)
 - Remote Endpoint Configuration (on page 49)

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12. Remote WC Toolkit Access

This procedure allows remote access to the Gateway Config / Debug connector port.

Procedure

1. Verify the WC Toolkit software is installed on the computer connected to the WC45i-GW-P.

Note: See WC Toolkit Installation (on page 17) and WC Toolkit Update (on page 24).

- 2. Complete the Power and Gateway Connections (on page 13).
- 3. Connect the Serial end of the WC-USB-DB9 cable to the **RS232 Config / Debug** connector port and the USB connection to the computer.
- 4. On the computer, complete the Setup the Computer IP Address Configuration (on page 27) procedure.
- Open the WC Toolkit software. The Select Device window opens. (Figure 46)

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O FreeWave WC Toolkit v	
File Options Updates Tools	Help
Auto-Detect Device COM Port: COM Refresh Auto-Detect COM : Success	FREEWAVE
Auto-Detect Device on COM Port	Customer Login: None
Select Device	
WC45i-Gateway	Open Device Window

Figure 46: Select Device window

- 6. Click the Select Device list box arrow and select WC45i-P.
- 7. Click the **Open Device Window** button to open the Device Configuration window (on page 54).
- 8. Click the TCP Connection check box to specify that the connection is made via Ethernet.
- 9. Click the IP Addr: Port list box arrow and select the IP address of the WC45i-Gateway.
- 10. Do one of these actions:
 - Click the **Open** button to re-connect the WAVECONTACT device to the IP Address.
 - Click the **Connect / Update** button to re-connect to the IP Address of the WAVECONTACT device.

The **Device Configuration** window updates to show the connected Endpoints.



Figure 47: Device Configuration window: WC45i-GW-P

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Note: When the connection is made to the IP Address, full access to the Gateway is available as if a direct serial connection is used. This includes full remote configuration capability.

- 11. Optional: Continue with Remote Endpoint Configuration (on page 49).
- 12. Logout and close the FreeWave WC45i Ethernet Module software.
- 13. Remove the CAT5e / CAT6 Ethernet cable from the WC45i-P and the computer.
- 14. As applicable, replace the Endpoint cover.
- 15. Mount the Gateway device.

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13. Remote Endpoint Configuration

The allows configuration changes to be made to any of the connected WAVECONTACT remote Endpoints wirelessly.

- The requires an initial configuration using the Config / Debug connector.
 - The Config / Debug port is accessed over a TCP/IP network using a WC45i-GW-P.

Note: This procedure assumes WC Toolkit has been installed. Download the **WC Toolkit** software from <u>http://support.freewave.com/</u>. Registration is required to use this login.

Procedure

Note: The terms node and Endpoint are used interchangeably in this document.

- 1. Open the Device Configuration window (on page 54).
- 2. In the **Configure** column, select the check-box next to the Endpoint to configure.

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IP Addr:Port 192.168.	1.100:10002 👻	Double-clic	ives Reporting k a Row to View Re	gisters						Auto Refresh	efresh List
Connection	n Paused	Slave ID	Node Type	Node Name	RSSI (dBm)	Register Quantity	Checkin Interval	TTL (min): Current/Max	Mainboard Firmware	Radio Firmware	Configure
Open Clos	se Offline	1	WC30i-Pres	Node_1	-34	34	5 sec	2/2	0.78	2.50 (sleeping)	
✓ TCP Connection	Clear Saved IPs	2	WC20i-HART		-47	18	7 sec	2/2	0.56	2.50 (sleeping)	
Connect/	Update			1							
Product	GATEWAY(STICK)										
Supply Voltage	8.841										
Bootloader Version	2.00										
Sateway Version	8.08										
ateway Version Date	21-June-2017										
Radio Version	2.50										
Radio Address	28521										
Corporate ID	<encrypted></encrypted>										
Radio Network	1										
Radio Network Radio Network Group	1 10										
Radio Network Radio Network Group Radio Power (dBm)	1 10 5										
Radio Network Radio Network Group Radio Power (dBm) Sateway Slave ID	1 10 5 247										
Radio Network Radio Network Group Radio Power (dBm) Gateway Slave ID RS485 Baud Rate	1 10 5 247 9600										
Radio Network Radio Network Group Radio Power (dBm) Sateway Slave ID RS485 Baud Rate RS485 UART Mode	1 10 5 247 9600 8N1										
Radio Network Radio Network Group Radio Power (dBm) Gateway Slave ID RS485 Baud Rate RS485 UART Mode Registers in Use	1 10 5 247 9600 8N1 52 of 4700										
Radio Network Radio Network Group Radio Power (dBm) Gateway Slave ID RS485 Baud Rate RS485 UART Mode Registers in Use Slave Entries in Use	1 10 5 247 9600 8N1 52 of 4700 2 of 240										
Radio Network Radio Network Group Radio Power (dBm) Gateway Slave ID RS485 Baud Rate RS485 UART Mode Registers in Use Slave Entries in Use Radio Packets/Minute	1 10 5 247 9600 8N1 52 of 4700 2 of 240 18										
Radio Network Radio Network Group Radio Power (dBm) Gateway Slave ID RS485 Baud Rate RS485 UART Mode Registers in Use Slave Entries in Use Radio Packets/Minute Remote Sensor Config	1 10 5 247 9600 8N1 52 of 4700 2 of 240 18 Unlocked										
Radio Network Radio Network Group Radio Power (dBm) Gateway Slave ID RS485 Baud Rate RS485 UART Mode Registers in Use Slave Entries in Use Radio Packets/Minute Remote Sensor Config Settings	1 10 55 247 9600 8N1 52 of 4700 2 of 240 18 Unlocked									Dente Cofe	
Radio Network Radio Power (dBm) Sateway Slave (D S4585 Baud Rate RS455 Baud Rate RS455 UART Mode Registers in Use Slave Entrites in Use Radio Packets/Minute Remote Sensor Config Settings Radio Network Radio Network Group	1 10 5 5 9600 8N1 52 of 4700 2 of 240 18 Unlocked 10 ↓ Set	- Set Encrypt	ion Key	Help	Gateway RS48 Gateway Slave	5 Settings		ateway Slave ID W. High Word/High E	ord/Byte Order hyte (ABCD)	Remote Configu	ration

Figure 48: Detail of Endpoint in Modbus Slaves Reporting Table

- 3. Click the Start Configuration button to activate a Remote Configuration session.
 - If the Endpoint has a **Non-Sleeping** radio, the **Remote Configuration** session is ready immediately.
 - If it is a **Sleeping** device, wait for the Endpoint to either check-in or send a beacon so it can be commanded into **Configuration** mode.
 - A WC20i Endpoint sends a beacon every 21/2 minutes.
 - All other **Sleeping** Endpoints send a beacon every 5¹/₂ minutes.
 - When the device has entered a **Remote Configuration** session, a message indicating the **Slave is Ready** appears.

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Add: Port 192 168 1 100 100	Modbus Sk	ives Reporting	nistera						Auto Refresh	Refresh List	
Connected to 192 168 1 100	10002 Slave	Node	Node	RSSI	Register	Checkin	TTL (min):	Mainboard	Radio	Configuro	
	ID	Туре	Name	(dBm)	Quantity	Interval	Current/Max	Firmware	Firmware	Conligure	
Open Close	Offline 1	WC30i-Pres	Node_1	-34	34	5 sec	2/2	0.78	2.50 (sleeping)		
7 TCP Connection Clear S	aved IPs 2	WC20i-HART		-47	18	7 sec	2/2	0.56	2.50 (sleeping)		
Connect/Update											
educt GATEW	AVISTICIO										
upply Voltage 9.075	riteriery										4
oppy volicityc 3.075											
ateway Version 9.00											
ateway Version Data 17 Mar 1	2017										
adio Version 2.50											
adio Address 27076											
amorate ID	ad >										
orporate to cencryp	(60)										4
adio Network 1											4
adio Network Group Tu											4
adio Power (dbm) 5											4
ateway slave ID 250											4
15465 Baud Hate 9600											4
S485 UART MODE 8NT											4
egisters in Use 22 of 47	00										4
lave Entries in Use 1 of 240											4
ladio Packets/Minute I lemote Sensor Config Unlocke	a										
attions											
Radio Natwork 1	Set Encrypt	ion Key	Help	iateway RS48	5 Settings	G	iateway Slave ID W	ord/Byte Order	Remote Configu	ration	h.
	Set			Sateway Slave	ID- 250 -		High Word/High F	Ryte (ABCD)		Dents	
Radio Network Group 10	-			atoway Jiavo	10.200 •		High Word/Low B	Me (BADC)	\ Slave is	e Heady	
			Set E	laud Rate:	9600 -	Set	Low Word/High B	te (CDAB) Set			
	Ke	r: freewave	(JART Mode:	8N1 -		Low Word/Low B	yte (DCBA)	Gonfigure	End	
cess									1	_	
									Rei	mote Config	guration
										Claure	in Dandy
									1	Slave	is neauy

Figure 49: Remote Configuration area - Slave is Ready

4. Click the **Configure** button to open the Edit Configuration window (on page 63).

Important!: The **Remote Configuration** session automatically times out after 10 minutes of inactivity and the Endpoint will resume normal operation.

Note: The **Edit Configuration** window is unique for the selected Endpoint device. Figure 50 shows the **Edit Configuration** window for a WC20i-HART Endpoint.

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Sensor A On Time (sec) 2 Sensor Power Mode COM - Control Vision Set	Additional Settings Node Type: WC20-HART ^{IM} Force Device to Che Current Configuration: Mainboard Version Radio Version Radio Version Radio Address Corporate ID Radio Network Radio Network Group Checkin Interval Slave ID Node Name Radio Mode	Installers 5 ckin to Gateway Refresh 0.56 2.50 (sleeping) 27013 <encrypted> 1 10 1 minute 1 Sleeping</encrypted>	HART Sensor Configuration Remote Sensor Configuration Virtual Serial Port Driver is Not Installed Tx ■ Rx Start PACTware 4.1 Start Rosemount Radar Master General Checkin Interval 1 minute ▼ Set Slave ID 1 Set Node Name Radio Mode Sleeping ▼ Set Sensor AOn Time (sec) 2 Sensor AOn Time (sec) 2 Sensor AOn Time (sec) 2 Sensor ADn	Passed HART Configuration Scan for HART Device Set Polling Address to Sensor Loop must be powered ON Analog Sensor Zero - Channel B (C1D1) (a) 4 - 20mA Sensor 1 - 5V Sensor Zero Value: MA Set Read Zero Offset: Erase Zero Offset Zero Offset: Unknown Analog 4-20mA/1-5V Scaling Scale B Type None Leavier
Loop Power OFF Manual Loop Power Control Turn On	Sensor A On Time (sec) Sensor Power Mode Loop Power	2 LOW OFF	Sensor B On Imme (sec) Set Sensor Power Mode LOW - Set Manual Loop Power Control Tum On	Scaling B Low Value Set

Figure 50: Edit Configuration window - WC20i-HART

- 5. Make any necessary changes in the active areas of the window and click the corresponding **Set** button to save the changes.
- 6. When finished changing the configuration, close the **Edit Configuration** window and return to the **Device Configuration** window.
- 7. Click the End button to stop the Remote Configuration session.

Note: The Remote Configuration session automatically times-out after 10 minutes of inactivity.

- 8. Optional: On the Endpoint, press the **Check-in** button to apply power to the configured sensor, read the sensor values, and send the collected sensor data to the Gateway.
- 9. Verify the Gateway is communicating with the Endpoints.

Note: A successful connection on the WAVECONTACT Endpoint is indicated with Green blinking ⊖ TX and ACT lights and a Red blinking ⊝ light for RX.

If the connection is NOT successful, a Green blinking \ominus TX light appears for 10 seconds.

- 10. Close the WC Toolkit software.
- 11. Remove the CAT5e / CAT6 Ethernet cable from the WC45i-P and the computer.
- 12. As applicable, replace the Endpoint cover.
- 13. Mount the Gateway device.

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14. WC Toolkit Software Environment

The WC Toolkit software environment uses these windows to configure all WAVECONTACT devices:

- Device Configuration window (on page 54)
- Detect Ethernet Gateways window (on page 61)
- Edit Configuration window (on page 63)

14.1. Device Configuration window

The **Device Configuration** window is used to configure the settings on the WC45i-GW-P.

- If one or more remote Endpoints are configured with the correct network settings they send their data to the Gateway.
- The Gateway shows the Endpoint type, Endpoint name, RSSI signal strength, programmed Endpoint check-in interval, the Time To Live (TTL), and the Endpoints radio and main firmware versions.

Access and Window Description

1. Verify the WC Toolkit software is installed on the computer connected to the WC45i-GW-P.

Note: See WC Toolkit Installation (on page 17) and WC Toolkit Update (on page 24).

- 2. Complete the Power and Gateway Connections (on page 13).
- 3. Connect the Serial end of the WC-USB-DB9 cable to the **RS232 Config / Debug** connector port and the USB connection to the computer.
- 4. On the computer, complete the Setup the Computer IP Address Configuration (on page 27) procedure.
- 5. Open the **WC Toolkit** software. The **Select Device** window opens. (Figure 51)

O FreeWave WC Toolkit v	- • 💌
File Options Updates Tools	Help
Auto-Detect Device COM Port: COM Refresh Auto-Detect COM : Success	FREEWAVE
Auto-Detect Device on COM Port	Customer Login: None
Select Device	
WC45i-Gateway	Open Device Window

Figure 51: Select Device window

- 3. Click the **Refresh** button to have WC Toolkit search for and list the available COM ports reported by Windows and connected devices in the **COM Port** list box.
- 4. Click the **COM Port** list box arrow and select the COM port on the computer associated with the connected WC45i-P.
- 5. Click the **Auto-Detect Device on COM Port** button to have WC Toolkit connect the device to the COM Port selected in the **COM Port** list box.

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Note: Optional: Click the Select Device list box arrow and select WC45i-P.

The **Device Configuration** window opens for the selected device.

								1		
WC45i-Gateway										
File Options Settings U	odates l'ools	Help								Passed
	Modhus St	aver Reporting								
IP Addr:Port 192.168.1.100:10002	 Double-clic 	k a Row to View Re	egisters						Auto Refresh	Refresh List
Connected to 192.168.1.100:1000	Slave	Node Type	Node Name	RSSI (dBm)	Register Quantity	Checkin Interval	TTL (min): Current/Max	Mainboard Firmware	Radio Firmware	Configure
Open Close Offic	1	WC30i-Pres	Node 1	-34	34	5 sec	2/2	0.78	2.50 (sleeping)	E1
TCP Connection Clear Saved	s 2	WC20i-HART		-47	18	7 sec	2/2	0.56	2.50 (sleeping)	
Connect/Update										
Product GATEWAY(S	сю									
Supply Voltage 8.841									2	
Bootloader Version 2.00									5	
Gateway Version 8.08									-	
Gateway Version Date 21-June-2017										
Radio Version 2.50										
Radio Address 28521										
Comprate ID (Encrypted)										
Badio Network 1										
Badio Network Group 10										
Badio Power (dBm) 5										
Gateway Slave ID 247										
BS485 Baud Bate 9600										
RS485 LIART Mode 8N1										
Registers in Lise 52 of 4700										
Slave Entries in Lise 2 of 240										
Badio Packets/Minute 18										
Remote Sensor Config Unlocked										
Themate benadi coming Childened										
Settings	-)			C				101.01	Damata Cardon	
Radio Network 1 -	Set Encryp	tion Key	Help	Gateway HS48	o Settings		sateway slave ID w	ord/Byte Order	Nemote Coring	uration
Radio Network Group 10 -	et			Gateway Slave	ID: 247 -		High Word/High E	Syte (ABCD)	Re	eady
	_		Set	Baud Rate:	9600 -	Set) High Word/Low B	yte (BADC) Se		
	Ker	v: freewave		UART Mode:	RN1	31 1 2	Low Word/High B Low Word (Low D)	yte (CDAB)	Start Co	oficuration
							Cow word/Low b	Ne (DCBA)		anger doorn
Success		•			+				<u> </u>	•
					-					
										<u>-</u>
								_		
5		h			7			3		

Figure 52: Device Configuration window: WC45i-GW-P

Device Configuration	Device Configuration window: WC45i-GW-P				
Control Area	Control Title	Control Description			
	Set button	Click the Set button to save the information.			
1 - Status of Last Operation text boxtext box		The Status of Last Operation text box indicates whether the last command from the WC Toolkit to the connected device is Active or has Passed .			
		Note : A Firmware Update Available message appears in this text box when the WC Toolkit has detected that a newer version of firmware is available for download than what is installed on the device.			
		Note: This information is read-only.			
2 - IP Addr: Port Settings area		The IP Addr:Port Settings area shows the connected Ethernet IP Address and is used to re-connect to that IP Address if the connection is lost.			
2 - IP Addr: Port Settings area	IP Addr: Portlist box	Click the IP Addr: Port list box arrow and select the IP address of the WC45i-Gateway.			

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Device Configuration	Device Configuration window: WC45i-GW-P				
Control Area	Control Title	Control Description			
2 - IP Addr: Port Settings area	Connected to text box	The Connected to text box shows the IP Address the WC45i-GW-P is connected to. Note: This information is read-only.			
2 - IP Addr: Port Settings area	Open button	Click the Open button to re-connect the WAVECONTACT device to the IP Address.			
2 - IP Addr: Port Settings area	Close button	Click the Close button to disconnect the WAVECONTACT device from the IP Address.			
2 - IP Addr: Port Settings area	Offline button	Click the Offline button to disconnect the WAVECONTACT device from the IP Address but continue to configure the device offline.			
2 - IP Addr: Port Settings area	TCP Connection check box	Click the TCP Connection check box to specify that the connection is made via Ethernet.			
2 - IP Addr: Port Settings area	Clear Saved IPs button	Click the Clear Saved IPs button to clear the list of IP addresses that were previously accessed.			
2 - IP Addr: Port Settings area	Connect / Update button	Click the Connect / Update button to re-connect to the IP Address of the WAVECONTACT device. Note : When the connection is made to the IP Address, full access to the Gateway is available as if a direct serial connection is used. This includes full remote configuration capability.			
3 - Modbus Slaves Reporting table		The Modbus Slaves Reporting table shows all connected remote Endpoints. Note: This information is read-only. See the Modbus Slaves Reporting table (on page 59) for detailed information about the table.			
4 - Information area		The Information area of the Device Configuration window shows connection information about the connected WAVECONTACT device. Note: This information is read-only.			
5 - Settings area		The Settings area is used to define the radio mode and radio network.			

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Device Configuration	on window: WC45i-G	W-P
Control Area	Control Title	Control Description
5 - Settings area	Radio Network list box	Click the Radio Network list box arrow and select 0 (zero) to 7 for the assigned number. Note : The default value is 1.
		Important!: The Radio Network and Radio Network Group settings are selected by the user but MUST MATCH the existing Gateway network for successful communication between the Gateway and Endpoint. See WAVECONTACT Network Frequencies (on page 75) for additional information.
5 - Settings area	Radio Network Group list box	Click the Radio Network Group list box arrow and select 0 (zero) to 29 for the network group assigned number.
		Note: The default value is 10.
		ImportantI: The Radio Network and Radio Network Group settings are selected by the user but MUST MATCH the existing Gateway network for successful communication between the Gateway and Endpoint. See WAVECONTACT Network Frequencies (on page 75) for additional information.
6 - Set Encryption Key area		The Set Encryption Key area is used to activate and define the encryption key for the WAVECONTACT device.
6 - Set Encryption Key area	Help button	Click to open the Encryption Help message.
6 - Set Encryption Key area	Key text box	In the Key text box, enter the encryption key for the device using 6 to 16 characters.
		Important!: A Key CANNOT contain spaces or angle brackets. The Gateway and Endpoints only communicate if they are configured with the same Key .

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Device Configuration	on window: WC45i-G	N-P
Control Area	Control Title	Control Description
7 - Gateway RS485 Settings area		The Gateway RS485 Settings area is used to define the RS485 settings and communication timing.
		Note : The Gateway has registers that are read for diagnostics. They are not often used except when remapping Modbus data. When remapping, read all data from this Slave ID.
7 - Gateway RS485 Settings area	Gateway Slave ID list box	Click the Gateway Slave ID list box arrow and select the Modbus Slave ID for the Gateway.
7 - Gateway RS485 Settings area	Baud Rate list box	Click the Baud Rate list box arrow and select the baud rate for the RS485 Modbus port.
7 - Gateway RS485 Settings area	UART Mode list box	Click the UART Mode list box arrow and select the number of data bits, parity, and stop bits used with the RS485 Modbus port.
8 - Gateway Slave ID Word / Byte Order area		The Gateway Slave ID Word / Byte Order area is used to set communication timing by selecting one of the byte order options for transmission of Modbus data.
8 - Gateway Slave ID Word / Byte Order area	High Word / High Byte (ABCD) option button	Select the High Word / High Byte (ABCD) option button to transmit the Modbus data in a High Word / High Byte order.
8 - Gateway Slave ID Word / Byte Order area	High Word / Low Byte (BACD) option button	Select the High Word / Low Byte (BACD) option button to transmit the Modbus data in a High Word / Low Byte order.
8 - Gateway Slave ID Word / Byte Order area	Low Word / High Byte (CDAB) option button	Select the Low Word / High Byte (CDAB) option button to transmit the Modbus data in a Low Word / High Byte order.
8 - Gateway Slave ID Word / Byte Order area	Low Word / Low Byte (DCBA) option button	Select the Low Word / Low Byte (DCBA) option button to transmit the Modbus data in a Low Word / Low Byte order.
9 - Remote Configuration area		The Remote Configuration area is used to start and end a Remote Configuration session.

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Device Configuration	Device Configuration window: WC45i-GW-P				
Control Area	Control Title	Control Description			
9 - Remote Configuration area	Start Configuration	Click the Start Configuration button to activate a Remote Configuration session.			
	button	 If the Endpoint has a Non-Sleeping radio, the Remote Configuration session is ready immediately. 			
		 If it is a Sleeping device, wait for the Endpoint to either check-in or send a beacon so it can be commanded into Configuration mode. 			
		 A WC20i Endpoint sends a beacon every 2¹/₂ minutes. 			
		 All other Sleeping Endpoints send a beacon every 5¹/₂ minutes. 			
		 When the device has entered a Remote Configuration session, a message indicating the Slave is Ready appears. 			
9 - Remote Configuration area	Configure button	Click the Configure button to open the Edit Configuration window (on page 63).			
9 - Remote Configuration area	End button	Click the End button to stop the Remote Configuration session.			
		Note : The Remote Configuration session automatically times-out after 10 minutes of inactivity.			

14.1.1. Modbus Slaves Reporting table

Device Configura	Device Configuration window: Modbus Slaves Reporting table				
Control Title	Control Description				
Auto Refresh check box	Select the Auto Refresh check box to automatically update the information in the table every 10 seconds.				
Refresh List button	Click the Refresh or Refresh List button to update the information in the table.				
Slave ID column	The Slave ID column / text box shows the remote source Endpoint Modbus Slave ID selected in the Settings area of the Device Configuration window.				
Node Type column	The Node Type column shows the type of Endpoint attached to the WC45i-Gateway.				
Node Name column	The Node Name column / text box shows the name assigned to the Endpoint in the Settings area of the Device Configuration window.				

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Device Configura	ation window: Modbus Slaves Reporting table
Control Title	Control Description
RSSI (dbm) column	The RSSI (dbm) column / text box shows the signal strength received from the Endpoint to its neighbor (e.g., a neighbor could be the Gateway if it is not hopping).
	Example : The RSSI is adjusted so if a 500mW device is communicating to a 40mW device the RSSI is shown as being equal in both directions at the lower signal strength.
	Notes
	 All communications are bi-directional so messages are needed in both directions for communications.
	 The RSSI and TTL values are color coded (green, yellow, orange, red) to indicate the relative link quality of an Endpoint. Red=Bad link, Yellow=OK link, Green=Good link.
Register Quantity column	The Register Quantity column shows the number of Modbus register data points available the Endpoint has reported to the Gateway.
Checkin Interval column	The Checkin Interval column shows the check-in time selected in the Checkin Interval list box of the Settings area of the Device Configuration window.
TTL (min): Current / Max	The TTL Current is set to the TTL Max each time an update is received from that Endpoint.
column	 The TTL Current indicates the number of minutes remaining until the Endpoint is timed out of the Gateway if no updates are received. The TTL Max indicates the maximum TTL for that Endpoint.
	Note : The RSSI and TTL values are color coded (green, yellow, orange, red) to indicate the relative link quality of an Endpoint. Red=Bad link, Yellow=OK link, Green=Good link.
Mainboard Firmware column	The Mainboard Firmware column shows the version of firmware currently installed on the mainboard of the Gateway.
Radio Firmware column	The Radio Firmware column shows the version of radio firmware currently installed on the Endpoint.
Configure column	In the Configure column, select the check-box next to the Endpoint to configure.

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14.2. Detect Ethernet Gateways window

The **Detect Ethernet Gateways** window is used to discover Ethernet Gateways currently connected to the network.

Access and Window Description

1. Verify the WC Toolkit software is installed on the computer connected to the WC45i-GW-P.

Note: See WC Toolkit Installation (on page 17) and WC Toolkit Update (on page 24).

- 2. Complete the Power and Gateway Connections (on page 13).
- 3. Connect the Serial end of the WC-USB-DB9 cable to the **RS232 Config / Debug** connector port and the USB connection to the computer.
- 4. On the computer, complete the Setup the Computer IP Address Configuration (on page 27) procedure.
- Open the WC Toolkit software. The Select Device window opens. (Figure 53)

O FreeWave WC Toolkit v	
File Options Updates Tools	Help
Auto-Detect Device COM Port: COM Refresh Auto-Detect COM Success	FREEWAVE
Auto-Detect Device on COM Port	Customer Login: None
Select Device	
WC45i-Gateway	Open Device Window

Figure 53: Select Device window

- 3. Connect the WC45i-GW-P Ethernet Module to the network. It will automatically obtain an IP Address from a DHCP server.
- 4. On the Tools menu, click Detect Ethernet Gateways.

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O FreeWave WC Toolkit v	
File Options Updates Tools Auto-Detect Device D COM Port: COM22 F Auto-Detect COM22: Success Auto-Detect Device on COM Port Select Device WC45i-Gateway	Help etect Ethernet Gateways Ctrl+E ustomer Login Customer Login: None

Figure 54: Tools menu > Detect Ethernet Gateways

The Detect Ethernet Gateways window opens.

Detect Ethernet Gateways	
IP Address MAC Address	Detect Local Gateways
192.168.1.100 00:80:A3:B2:1D:A2	Connect to Gateway
	Launch Config Page
	Launch Confi

Figure 55: Detect Ethernet Gateways window

Detect Ethernet Gateways window				
Control Title	Control Description			
Ethernet Gateways table	Note: The information in this table is read-only.			
	IP Address column			
	The IP Address column / text box shows the detected IP Address of the WC45i-GW-P.			
	MAC Address column			
	The MAC Address column / text box shows the detected MAC Address of the WC45i-GW-P.			
Detect Local Gateways button	Click the Detect Local Gateways button to discover the Ethernet Gateways currently connected to the network.			
Connect to the Gateway button	Click the Connect to the Gateway button to connect to the selected Gateway IP address.			
Launch Config Page button	Click the Launch Config Page button to open a new web browser window to access the Gateway IP address selected in the Detect Ethernet Gateways window.			

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14.3. Edit Configuration window

The Edit Configuration window is used to configure individual Endpoints in the network.

Access and Window Description

- 1. Open the Device Configuration window (on page 54).
- 2. In the **Configure** column, select the check-box next to the Endpoint to configure.
- 3. Click the **Start Configuration** button to activate a **Remote Configuration** session.
 - When the device has entered a **Remote Configuration** session, a message indicating the **Slave is Ready** appears.

F MUULFUL 132.100.1	.100:10002 -	Modbus Sk Double-clic	aves Reporting k a Row to View Re	gisters						Auto Refresh	Refresh List	
Connected to 192.	168.1.100:10002	Slave	Node	Node	RSSI (dBm)	Register	Checkin	TTL (min): Current/Max	Mainboard	Radio	Configure	
Open Clos	e Offine	1	WC20i Drog	Nede 1	24	24	Ease	2/2	0.79	2 EQ (algoring)	27	
J TCP Connection	Clear Saved IPe		WCOUPPIES	INOUR_1	-34	J4	5 580	2/2	0.70	2.50 (sleeping)		
•] Ter connectori (Clear Saved It's	2	WC20i-HART		-47	18	/sec	2/2	0.56	2.50 (sleeping)		
Connect/	Update											
Product	GATEWAY(STICK)											
Supply Voltage	9.075											
Bootloader Version	2.01											
Sateway Version	8.02											
Gateway Version Date	17-Mar-2017											
Radio Version	2.50											
Radio Address	27076											
Corporate ID	<encrypted></encrypted>											
Radio Network	1											
Radio Network Group	5											
Cateway Slave ID	260											
Saleway Slave ID SSA95 Raud Rate	250											
RS405 LIART Mode	9N1											
Registers in Lise	22 of 4700											
Save Entries in Use	1 of 240											
Radio Packets/Minute	1											
Remote Sensor Config	Unlocked											
Settings				_						1		
Radio Network	1	Set Encrypt	tion Key	Help	Sateway RS48	85 Settings		iateway Slave ID W	ord/Byte Order	· Hemote Confi	guration	1.
Radio Network Group	10 - Set				Gateway Slave	e ID: 250 🔻		High Word/High B	Byte (ABCD)	Slave	is Ready	
				Set	Baud Rate:	9600 -	Set) High Word/Low E	Byte (BADC) Set			
		Ke	y: freewave		JART Mode:	8N1 -	1 2	Low Word/High E	syte (CDAB)	Gonfigure	End	1
) LON 11010/ LON D				
cess												
										Re	emote Conf	iguration
										i		
										1	Slav	e is Ready
										1		
											Slav	e is Ready

Figure 56: Remote Configuration area - Slave is Ready

4. Click the **Configure** button to open the **Edit Configuration** window.

The **Edit Configuration** window opens with device-specific control options depending on the connected sensor:

- Edit Configuration window General Sensor (on page 64)
- Edit Configuration window HART Sensor (on page 70)

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Success

O Edit Configuration	
Additional Settings Tools Node Type: WC20-Digital	Szero Both Counters Zero Counter 1 Zero Counter 2 Passer
Force Device to Checkin to Gat	Node Name Set Z
Current Configuration: Refr	rresh Radio Mode Sleeping
Mainboard Version 0.56 Radio Version 2.50 (slee Radio Address 22503 Corporate ID <encrypte Radio Network 1 Radio Network Group 1 Checkin Interval 1 minute Slave ID 1 Node Name Radio Mode Sleeping State Change Checkin Off</encrypte 	aping) ed> Sensor A On Time (sec) Sensor A On Time (sec) Sensor A On Time (sec) Set Sensor B On Time (sec) Set Sensor Power Mode Set Sensor Power Mode Set Sensor Power Mode Set Scale A Type Scale A Type Scale A Type Scale A Type Scale B
Digtal I/O State Change Checkin Off Channel 1 Mode Channel 2 Mode	Analog Sensor Zero Analog Sensor Zero Analog Sensor Zero Analog Sensor Zero Analog Sensor Zero Analog Sensor Zero Marchannel A Channel B Zero Value: MA Set Read Zero Offset Zero Offset Zero Offset Zero Offset

14.3.1

Figure 57: Edit Configuration window

Sensor Loop must be powered ON

Edit Configurati	Edit Configuration window - General Sensor				
Control Area	Control Title	Control Description			
	Set button	Click the Set button to save the information.			
Status of Last Operation text box		The Status of Last Operation text box indicates whether the last command from the WC Toolkit to the connected device is Active or has Passed. Note: A Firmware Update Available message appears in this text box when the WC Toolkit has detected that a newer version of firmware is available for download than what is installed on the device. Note: This information is read-only.			

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Edit Configuration	Edit Configuration window - General Sensor				
Control Area	Control Title	Control Description			
2 - General area	Checkin Interval list box	Click the Checkin Interval list box arrow and select how often the Endpoint wakes up, reads the , and transmits the data to the Gateway.			
2 - General area	Slave ID text box	In the Slave ID column / text box, enter the remote source Endpoint Modbus Slave ID.			
		Important!: Verify there are no duplicate Slave IDs in a given network. The Gateway only caches one set of data for each Slave ID. A duplicate is overwritten.			
2 - General area	Node Name text box	In the Node Name text box, enter a name for the Endpoint using a maximum of 10 characters.			
2 - General area	Radio Mode list box	Click the Radio Mode list box arrow and select either Sleeping or Non-Sleeping .			
3 - WC45i-GW- 485 Information area		The Information area of the Device Configuration window shows connection information about the connected WAVECONTACT device.			
		Note: This information is read-only.			
3 - WC45i-GW- 485 Information area	Force Device to Checkin to Gateway button	Click the Force Device to Checkin to Gateway button to force the Endpoint to send data to the WC45i-GW-485, WC45i-GW-AN, or WC45i-GW-DIN.			
3 - WC45i-GW- 485 Information area	Refresh button	Click the Refresh button to update the information in this area.			
4 - Sensor Power area	Sensor A On Time (sec) text box	In the Sensor A On time (sec) text box, enter the number of seconds . FREEWAVE Recommends: Accept the default Sensor A On time (sec) value of 2 seconds for most devices. However, radar sensors often require a longer warm-up time.			

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Edit Configurati	Edit Configuration window - General Sensor				
Control Area	Control Title	Control Description			
4 - Sensor Power area	Sensor Always On check box	Select the Sensor Always On check box to make the sensor always have power no matter what type of power source is connected to the device.			
		useful for rapid data collection on a sensor that has a long warm-up time. However, it will shorten the battery life dramatically unless a Solar Powered WC20i is used.			
4 - Sensor Power area	Sensor B On Time (sec) text box	In the Sensor B On Time (sec) text box, enter the number of seconds a second sensor powers on before its value is read.			
4 - Sensor Power area	Sensor Power Mode list box	Click the Sensor Power Mode list box arrow and select either HIGH or LOW volts for the WC20i.			
		Note: HIGH outputs 18.5 volts to the sensor and LOW outputs 12.5 volts.LOW results in longer battery life but some sensors require a higher voltage.In 4-20mA mode HIGH is automatically selected and is the only option.It will supply a minimum of 13.5V to the sensor at full load.			
4 - Sensor Power area	Manual Loop Power Control	Click the Manual Loop Power Control button to send power to the sensor so the sensor can be configured.			
	button	Note : The loop times out after a short time if it is not shut off.			
4 - Sensor Power area	Channel A option button	Select the Channel A option button to assign the changed settings to Channel A in a 2-channel device.			
4 - Sensor Power area	Channel B option button	Select the Channel B option button to assign the changed settings to Channel B in a 2-channel device.			
5 - Analog 4- 20mA / 1-5V Scaling area	Scale A Type list box	Click the Scale A Type or Scaling B Type list box arrow and select either a 4-20mA or 1-5V sensor to scale to an engineering unit equivalent (e.g., 4-20mA = 0-1000 PSI).			
		Note : If None is selected, there is no scaling of the analog readings to engineering units.			

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Edit Configurati	on window - Gene	ral Sensor
Control Area	Control Title	Control Description
5 - Analog 4- 20mA / 1-5V	Scaling A Low Value text box	In the Scaling A or B Low Value text box, manually enter the sensor's lower range value.
Scaling area		Note: By default, the Scaling A or B Low Value corresponds with the lowest reading from the sensor, either 4mA or 1V, depending on the selection in the Scale A Type list box or Scale B Type list box.
5 - Analog 4- 20mA / 1-5V	Scaling A High Value text box	In the Scaling A or B High Value text box, manually enter the sensor's upper range value.
Scanng area		Note: By default, the Scaling A or B High Value corresponds with the highest reading from the sensor, either 20mA or 5V, depending on the selection in the Scale A Type list box or Scale B Type list box.
5 - Analog 4- 20mA / 1-5V Scaling area	Scaling B Type list box	Click the Scale A Type or Scaling B Type list box arrow and select either a 4-20mA or 1-5V sensor to scale to an engineering unit equivalent (e.g., 4-20mA = 0-1000 PSI).
		Note : If None is selected, there is no scaling of the analog readings to engineering units.
5 - Analog 4- 20mA / 1-5V	Scaling B Low Value text box	In the Scaling A or B Low Value text box, manually enter the sensor's lower range value.
Scamy alea		Note : By default, the Scaling A or B Low Value corresponds with the lowest reading from the sensor, either 4mA or 1V, depending on the selection in the Scale A Type list box or Scale B Type list box.
5 - Analog 4- 20mA / 1-5V	Scaling B High Value text box	In the Scaling A or B High Value text box, manually enter the sensor's upper range value.
Scamy alea		Note: By default, the Scaling A or B High Value corresponds with the highest reading from the sensor, either 20mA or 5V, depending on the selection in the Scale A Type list box or Scale B Type list box.
6 - Digital I/O area	State Change Checkin list box	Click the State Change Checkin list box arrow and select Yes to check on a change of state at the input rather than waiting for the check in time to expire.
6 - Digital I/O area	Channel 1 Mode list box	Click the Channel 1 Mode list box arrow and select either INPUT (analog or digital) or OUTPUT (relay control) for Channel 1.

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Edit Configurati	Edit Configuration window - General Sensor				
Control Area	Control Title	Control Description			
6 - Digital I/O area	Channel 2 Mode list box	Click the Channel 2 Mode list box arrow and select either INPUT (analog or digital) or OUTPUT (relay control) for Channel 2.			
7 - Analog Sensor Zero area	4-20mA option button	Select the 4-20mA option button to apply the designated sensor reading entered in the Zero Value text box when using a 4-20mA input.			
7 - Analog Sensor Zero area	1-5V option button	Select the 1-5V option button to apply the designated sensor reading entered in the Zero Value text box when using a 1-5V input.			
7 - Analog Sensor Zero area	Scaled Units option button	Select the Scaled Units option button to scale to an engineering unit equivalent (e.g., 4-20mA = 0-1000 PSI).			
7 - Analog Sensor Zero area	Channel A option button	Select the Channel A option button to assign the changed settings to Channel A in a 2-channel device.			
7 - Analog Sensor Zero area	Channel B option button	Select the Channel B option button to assign the changed settings to Channel B in a 2-channel device.			
7 - Analog Sensor Zero area	Zero Value text box	In the Zero Value text box, enter what the sensor should be reading.			
7 - Analog Sensor Zero area	Read Zero Offset button	Click the Read Zero Offset button to force the sensor to use the setting in the Zero Value text box.			
7 - Analog Sensor Zero area	Erase Zero Offset button	Click the Erase Zero Offset button to erase the value entered in the Zero Value text box.			
8 - Relay Settings area	Comm Failsafe (min) list box	Click the Comm Failsafe (min) list box arrow and select the time to set the outputs to a de-energized state if the link is lost with the Gateway after the set time.			
		Note: This setting is used for Remote Shutdown Device.			

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Edit Configuration window - General Sensor				
Control Area	Control Title	Control Description		
8 - Relay Settings area	Message Failsafe (min) list box	Click the Message Failsafe (min) list box arrow and select the time to set the outputs to a de-energized state if messages are lost from the Gateway after the selected time.		
		Caution: If a time is selected in the Message Failsafe (min) list box, the time entered must be set higher than the Modbus Coil Write and Analog Output Write frequency of the Modbus master device.		
8 - Relay Settings area	Relay 1 Control or Relay 2 Control Energize button	Click the Relay 1 Control or Relay 2 Control Energize button to manually test (energize) the relays.		
8 - Relay Settings area	Relay 1 Control or Relay 2 Control De- Energize button	Click the Relay 1 Control or Relay 2 Control De-Energize button to manually test (de-energize) the relays.		
9 - HART Configuration area	Scan button	Click the Scan button to scan for the HART ID and show it in the first Polling Address list box so it can be changed later using this same window.		
		Important!: The HART ID must be set to 1 for the WC20i to communicate with the HART sensor.		
9 - HART Configuration area	Polling Address list boxes	Click the second Polling Address list box arrow and select the new HART ID to change the HART sensor to.		

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14.3.2. Edit Configuration window - HART Sensor

Additional Settings	Installers	HART Sensor Configuration	Passed
Additional Settings	Installers	HART Sensor Comiguration	Tusseu
Node Type:		Remote Sensor Configuration	HART Configuration
WC20i-HART""	5	Virtual Serial Port Driver is Not Installed	Scan for HART Device
		Tx 🔳 Rx 🔳	
	\longrightarrow	Start PACTware 4.1	
Force Device to Cher	ckin to Gateway	Shart Bassemaurat Badas Martas	Set Polling Address 🔻 to 🔻
		Start Rosemourit Radar Master	/ /
Current Configuration:	Refresh	General	Sensor Loop must be powered ON
Mainboard Version	0.56	Checkin Interval 1 minute - Set	Analys Server Zerr, Channel B (C1D1)
Radio Version	2.50 (sleeping)	Slave ID 1 Set	Analog Sensor Zero - Channel B (CTDT)
Radio Address	27013	Nada Nama	
Corporate ID	<encrypted></encrypted>		Zero Value: mA Set 🗲
Radio Network	1	Radio Mode Sleeping Set	Read Zero Offect
Radio Network Group	10		Read Zero Unset
Checkin Interval	1 minute	Sensor Power	Zero Offset: Unknown
Slave ID Node Name	1	Sensor A On Time (sec) 2	Analog 4-20mA/1-5V Scaling
Radio Mede	Classing	Sensor Always On	Scale B Type None 👻
Sensor A On Time (sec)	2	Sensor B On Time (sec) Set	Scaling B Low Value
Sensor Power Mode	10W	Sensor Power Mode	Scaling B High Value
Loop Power	OFF		
		Manual Loop Power Control	Digital I/O
		Channel A Channel B	State Change Checkin 🔹 Set

Figure 58: Edit Configuration window - WC45i-GW-485 - HART

Edit Configuration window - WC45i-GW-485 - HART			
Control Area	Control Title	Control Description	
	Set button	Click the Set button to save the information.	
Status of Last Operation text box		The Status of Last Operation text box indicates whether the last command from the WC Toolkit to the connected device is Active or has Passed .	
		Note: This information is read-only.	
2 - Remote Sensor Configuration area	Tx check box	The TX check box shows the transmission of the PACTware [™] or RadarMaster. Note: This information is read-only.	
2 - Remote Sensor Configuration area	Rx check box	The Rx check box shows the receiving of the PACTware [™] or RadarMaster. Note: This information is read-only.	

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Edit Configuration window - WC45i-GW-485 - HART			
Control Area	Control Title	Control Description	
2 - Remote Sensor Configuration area	Start PACTware™ 4.1 button	Click the Start PACTware™ 4.1 button to start PACTware™ used for configuring remote sensors that have a PACTware DTM.	
2 - Remote Sensor Configuration area	Start Rosemount Radar Master button	Click the Start Rosemount Radar Master button to start RadarMaster used for configuring a remote Emerson Sensor.	
3 - HART Configuration area	Scan button	Click the Scan button to scan for the HART ID and show it in the first Polling Address list box so it can be changed later using this same window.	
3 - HART Configuration area	Polling Address list boxes	Click the second Polling Address list box arrow and select the new HART ID to change the HART sensor to.	
4 - WC45i-GW- 485 Information area		The Information area of the Device Configuration window shows connection information about the connected WAVECONTACT device.	
		Note : This information is read-only.	
4 - WC45i-GW- 485 Information area	Force Device to Checkin to Gateway button	Click the Force Device to Checkin to Gateway button to force the Endpoint to send data to the WC45i-GW-485, WC45i-GW-AN, or WC45i-GW-DIN.	
4 - WC45i-GW- 485 Information area	Refresh button	Click the Refresh button to update the information in this area.	
5 - General area	Checkin Interval list box	Click the Checkin Interval list box arrow and select how often the Endpoint wakes up, reads the , and transmits the data to the Gateway.	
5 - General area	Slave ID text box	In the Slave ID column / text box, enter the remote source Endpoint Modbus Slave ID.	
		Important!: Verify there are no duplicate Slave IDs in a given network. The Gateway only caches one set of data for each Slave ID. A duplicate is overwritten.	
5 - General area	Node Name text box	In the Node Name text box, enter a name for the Endpoint using a maximum of 10 characters.	
5 - General area	Radio Mode list box	Click the Radio Mode list box arrow and select either Sleeping or Non-Sleeping .	

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Edit Configuration window - WC45i-GW-485 - HART			
Control Area	Control Title	Control Description	
6 - Analog Sensor Zero - Channel B (C1D1) area	4-20mA Sensor option button	Select the 4-20mA Sensor option button to apply the designated sensor reading entered in the Zero Value text box when using a 4-20mA input.	
6 - Analog Sensor Zero - Channel B (C1D1) area	1-5V Sensor option button	Select the 1-5V Sensor option button to apply the designated sensor reading entered in the Zero Value text box when using a 1-5V input.	
6 - Analog Sensor Zero - Channel B (C1D1) area	Zero Value text box	In the Zero Value text box, enter what the sensor should be reading.	
6 - Analog Sensor Zero - Channel B (C1D1) area	Read Zero Offset button	Click the Read Zero Offset button to force the sensor to use the setting in the Zero Value text box.	
6 - Analog Sensor Zero - Channel B (C1D1) area	Erase Zero Offset button	Click the Erase Zero Offset button to erase the value entered in the Zero Value text box.	
7 - Sensor Power area	Sensor A On Time (sec) text box	In the Sensor A On time (sec) text box, enter the number of seconds .	
		FREEWAVE Recommends: Accept the default Sensor A On time (sec) value of 2 seconds for most devices. However, radar sensors often require a longer warm-up time.	
7 - Sensor Power area	Sensor Always On check box	Select the Sensor Always On check box to make the sensor always have power no matter what type of power source is connected to the device.	
		Note: Having the Sensor Always On selected is useful for rapid data collection on a sensor that has a long warm-up time. However, it will shorten the battery life dramatically unless a Solar Powered WC20i is used.	
7 - Sensor Power area	Sensor B On Time (sec) text box	In the Sensor B On Time (sec) text box, enter the number of seconds a second sensor powers on before its value is read.	

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Copyright © 2018 FreeWave
Edit Configurati	Edit Configuration window - WC45i-GW-485 - HART						
Control Area	Control Title	Control Description					
7 - Sensor Power area	Sensor Power Mode list box	Click the Sensor Power Mode list box arrow and select either HIGH or LOW volts for the WC20i.					
		 Note: HIGH outputs 18.5 volts to the sensor and LOW outputs 12.5 volts. LOW results in longer battery life but some sensors require a higher voltage. In 4-20mA mode HIGH is automatically selected and is the only option. It will supply a minimum of 13.5V to the sensor at full load. 					
7 - Sensor Power area	Manual Loop Power Control	Click the Manual Loop Power Control button to send power to the sensor so the sensor can be configured.					
	button	Note : The loop times out after a short time if it is not shut off.					
7 - Sensor Power area	Channel A option button	Select the Channel A option button to assign the changed settings to Channel A in a 2-channel device.					
7 - Sensor Power area	Channel B option button	Select the Channel B option button to assign the changed settings to Channel B in a 2-channel device.					
8 - Analog 4- 20mA / 1-5V Scaling area	Scaling B Type list box	Click the Scale A Type or Scaling B Type list box arrow and select either a 4-20mA or 1-5V sensor to scale to an engineering unit equivalent (e.g., 4-20mA = 0-1000 PSI).					
		Note : If None is selected, there is no scaling of the analog readings to engineering units.					
8 - Analog 4- 20mA / 1-5V Scaling area	Scaling B Low Value text box	In the Scaling A or B Low Value text box, manually enter the sensor's lower range value.					
		Note : By default, the Scaling A or B Low Value corresponds with the lowest reading from the sensor, either 4mA or 1V, depending on the selection in the Scale A Type list box or Scale B Type list box.					
8 - Analog 4- 20mA / 1-5V Scaling area	Scaling B High Value text box	In the Scaling A or B High Value text box, manually enter the sensor's upper range value.					
		Note: By default, the Scaling A or B High Value corresponds with the highest reading from the sensor, either 20mA or 5V, depending on the selection in the Scale A Type list box or Scale B Type list box.					

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Edit Configuration window - WC45i-GW-485 - HART					
Control Area	Control Title	Control Description			
8 - Digital I/O area	State Change Checkin list box	Click the State Change Checkin list box arrow and select Yes to check on a change of state at the input rather than waiting for the check in time to expire.			

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15. WAVECONTACT Network Frequencies

The frequencies used by the WAVECONTACT network vary depending on the **Radio Network** and **Radio Network Group** selected in the Device Configuration window (on page 54).

Example: Using the Radio Network Group Selection: 0, 1, 2, or 3 (on page 76) table, the Radio Network and Radio Network Group settings of 0 (zero) and 0 (zero) (respectively) uses the frequencies between 908.20 and 918.20. The Radio Network and Radio Network Group settings of 0 (zero) and 2 (respectively) uses 905.00 to 915.00.

- Radio Network Group Selection: 0, 1, 2, or 3 (on page 76)
- Radio Network Group Selection: 4, 5, 6, or 7 (on page 77)
- Radio Network Group Selection: 8, 9, 10, 11 (on page 78)
- Radio Network Group Selection: 12, 13, 14, 15 (on page 79)
- Radio Network Group Selection: 16, 17, 18, or 19 (on page 80)
- Radio Network Group Selection: 20, 21, 22, 23 (on page 81)
- Radio Network Group Selection: 28 or 29 (on page 83)

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15.1. Radio Network Group Selection: 0, 1, 2, or 3

In the Device Configuration window (on page 54), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 0, 1, 2, or 3.

Radio Network selection	Radio Network Group selection: 0 or 1	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 2 or 3	Low Frequency	High Frequency
0	0	908.20	918.20	0	2	905.00	915.00
1	0	908.40	918.40	1	2	905.20	915.20
2	0	908.60	918.60	2	2	905.40	915.40
3	0	908.80	918.80	3	2	905.60	915.60
4	0	909.00	919.00	4	2	905.80	915.80
5	0	909.20	919.20	5	2	906.00	916.00
6	0	909.40	919.40	6	2	906.20	916.20
7	0	909.60	919.60	7	2	906.40	916.40
0	1	909.80	919.80	0	3	906.60	916.60
1	1	910.00	920.00	1	3	906.80	916.80
2	1	910.20	920.20	2	3	907.00	917.00
3	1	910.40	920.40	3	3	907.20	917.20
4	1	910.60	920.60	4	3	907.40	917.40
5	1	910.80	920.80	5	3	907.60	917.60
6	1	911.00	921.00	6	3	907.80	917.80
7	1	911.20	921.20	7	3	908.00	918.00

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15.2. Radio Network Group Selection: 4, 5, 6, or 7

In the Device Configuration window (on page 54), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 4, 5, 6, or 7.

Radio Network selection	Radio Network Group selection: 4 or 5	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 6 or 7	Low Frequency	High Frequency
0	4	908.20	918.20	0	6	905.00	915.00
1	4	908.40	918.40	1	6	905.20	915.20
2	4	908.60	918.60	2	6	905.40	915.40
3	4	908.80	918.80	3	6	905.60	915.60
4	4	909.00	919.00	4	6	905.80	915.80
5	4	909.20	919.20	5	6	906.00	916.00
6	4	909.40	919.40	6	6	906.20	916.20
7	4	909.60	919.60	7	6	906.40	916.40
0	5	909.80	919.80	0	7	906.60	916.60
1	5	910.00	920.00	1	7	906.80	916.80
2	5	910.20	920.20	2	7	907.00	917.00
3	5	910.40	920.40	3	7	907.20	917.20
4	5	910.60	920.60	4	7	907.40	917.40
5	5	910.80	920.80	5	7	907.60	917.60
6	5	911.00	921.00	6	7	907.80	917.80
7	5	911.20	921.20	7	7	908.00	918.00

15.3. Radio Network Group Selection: 8, 9, 10, 11

In the Device Configuration window (on page 54), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 8, 9, 10, or 11.

Radio Network selection	Radio Network Group selection: 8 or 9	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 10 or 11	Low Frequency	High Frequency
0	8	908.20	918.20	0	10	905.00	915.00
1	8	908.40	918.40	1	10	905.20	915.20
2	8	908.60	918.60	2	10	905.40	915.40
3	8	908.80	918.80	3	10	905.60	915.60
4	8	909.00	919.00	4	10	905.80	915.80
5	8	909.20	919.20	5	10	906.00	916.00
6	8	909.40	919.40	6	10	906.20	916.20
7	8	909.60	919.60	7	10	906.40	916.40
0	9	909.80	919.80	0	11	906.60	916.60
1	9	910.00	920.00	1	11	906.80	916.80
2	9	910.20	920.20	2	11	907.00	917.00
3	9	910.40	920.40	3	11	907.20	917.20
4	9	910.60	920.60	4	11	907.40	917.40
5	9	910.80	920.80	5	11	907.60	917.60
6	9	911.00	921.00	6	11	907.80	917.80
7	9	911.20	921.20	7	11	908.00	918.00

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15.4. Radio Network Group Selection: 12, 13, 14, 15

In the Device Configuration window (on page 54), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 12, 13, 14, or 15.

Radio Network selection	Radio Network Group selection: 12 or 13	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 14 or 15	Low Frequency	High Frequency
0	12	908.20	918.20	0	14	905.00	915.00
1	12	908.40	918.40	1	14	905.20	915.20
2	12	908.60	918.60	2	14	905.40	915.40
3	12	908.80	918.80	3	14	905.60	915.60
4	12	909.00	919.00	4	14	905.80	915.80
5	12	909.20	919.20	5	14	906.00	916.00
6	12	909.40	919.40	6	14	906.20	916.20
7	12	909.60	919.60	7	14	906.40	916.40
0	13	909.80	919.80	0	15	906.60	916.60
1	13	910.00	920.00	1	15	906.80	916.80
2	13	910.20	920.20	2	15	907.00	917.00
3	13	910.40	920.40	3	15	907.20	917.20
4	13	910.60	920.60	4	15	907.40	917.40
5	13	910.80	920.80	5	15	907.60	917.60
6	13	911.00	921.00	6	15	907.80	917.80
7	13	911.20	921.20	7	15	908.00	918.00

15.5. Radio Network Group Selection: 16, 17, 18, or 19

In the Device Configuration window (on page 54), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 16, 17, 18, or 19.

Radio Network selection	Radio Network Group selection: 16 or 17	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 18 or 19	Low Frequency	High Frequency
0	16	908.20	918.20	0	18	905.00	915.00
1	16	908.40	918.40	1	18	905.20	915.20
2	16	908.60	918.60	2	18	905.40	915.40
3	16	908.80	918.80	3	18	905.60	915.60
4	16	909.00	919.00	4	18	905.80	915.80
5	16	909.20	919.20	5	18	906.00	916.00
6	16	909.40	919.40	6	18	906.20	916.20
7	16	909.60	919.60	7	18	906.40	916.40
0	17	909.80	919.80	0	19	906.60	916.60
1	17	910.00	920.00	1	19	906.80	916.80
2	17	910.20	920.20	2	19	907.00	917.00
3	17	910.40	920.40	3	19	907.20	917.20
4	17	910.60	920.60	4	19	907.40	917.40
5	17	910.80	920.80	5	19	907.60	917.60
6	17	911.00	921.00	6	19	907.80	917.80
7	17	911.20	921.20	7	19	908.00	918.00

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15.6. Radio Network Group Selection: 20, 21, 22, 23

In the Device Configuration window (on page 54), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 20, 21, 22, or 23.

Radio Network selection	Radio Network Group selection: 20 or 21	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 22 or 23	Low Frequency	High Frequency
0	20	908.20	918.20	0	22	905.00	915.00
1	20	908.40	918.40	1	22	905.20	915.20
2	20	908.60	918.60	2	22	905.40	915.40
3	20	908.80	918.80	3	22	905.60	915.60
4	20	909.00	919.00	4	22	905.80	915.80
5	20	909.20	919.20	5	22	906.00	916.00
6	20	909.40	919.40	6	22	906.20	916.20
7	20	909.60	919.60	7	22	906.40	916.40
0	21	909.80	919.80	0	23	906.60	916.60
1	21	910.00	920.00	1	23	906.80	916.80
2	21	910.20	920.20	2	23	907.00	917.00
3	21	910.40	920.40	3	23	907.20	917.20
4	21	910.60	920.60	4	23	907.40	917.40
5	21	910.80	920.80	5	23	907.60	917.60
6	21	911.00	921.00	6	23	907.80	917.80
7	21	911.20	921.20	7	23	908.00	918.00

15.7. Radio Network Group Selection: 24, 25, 26, 27

In the Device Configuration window (on page 54), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 24, 25, 26, or 27.

Radio Network selection	Radio Network Group selection: 24 or 25	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 26 or 27	Low Frequency	High Frequency
0	24	908.20	918.20	0	26	905.00	915.00
1	24	908.40	918.40	1	26	905.20	915.20
2	24	908.60	918.60	2	26	905.40	915.40
3	24	908.80	918.80	3	26	905.60	915.60
4	24	909.00	919.00	4	26	905.80	915.80
5	24	909.20	919.20	5	26	906.00	916.00
6	24	909.40	919.40	6	26	906.20	916.20
7	24	909.60	919.60	7	26	906.40	916.40
0	25	909.80	919.80	0	27	906.60	916.60
1	25	910.00	920.00	1	27	906.80	916.80
2	25	910.20	920.20	2	27	907.00	917.00
3	25	910.40	920.40	3	27	907.20	917.20
4	25	910.60	920.60	4	27	907.40	917.40
5	25	910.80	920.80	5	27	907.60	917.60
6	25	911.00	921.00	6	27	907.80	917.80
7	25	911.20	921.20	7	27	908.00	918.00

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15.8. Radio Network Group Selection: 28 or 29

In the Device Configuration window (on page 54), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 28 or 29.

Radio Network selection	Radio Network Group selection: 28 or 29	Low Frequency	High Frequency
0	28	908.20	918.20
1	28	908.40	918.40
2	28	908.60	918.60
3	28	908.80	918.80
4	28	909.00	919.00
5	28	909.20	919.20
6	28	909.40	919.40
7	28	909.60	919.60
0	29	909.80	919.80
1	29	910.00	920.00
2	29	910.20	920.20
3	29	910.40	920.40
4	29	910.60	920.60
5	29	910.80	920.80
6	29	911.00	921.00
7	29	911.20	921.20

Appendix A: Technical Specifications

WC45i-GW-P Ethernet Module Technical Specification						
Specification	Description					
Network Interface	 Ethernet 10/100 base TX with Auto Negation 					
	HP Auto MDIX. RJ45 Connector					
Network Standards	TCP/IP, DHCP, Telnet, and HTTP					
Supply	 +6 to +36VDC (screw terminals) (80mA at 12VDC) 					
	 Power Over Ethernet with auto switchover 					
Serial Port	RS232 serial port provides direct communication to the Gateway using WC Toolkit.					
Modbus TCP Server	The Modbus TCP server supports 16 simultaneous server connections.					
Default Settings						
IP Address	DHCP or (192.168.1.100 if ordered with default static IP)					
Host Name	WAVECONTACT GW					
Modbus TCP Port	502					
SignalFire Toolkit Port	10002					
Web Configuration Login	admin					
Web Configuration Password	freewave					

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Appendix B: LEDs

Status LEDs	Description
Slow Flash (3 second pause) (≥0 €)	System is running and at least one remote Endpoint is connected.
Fast Flash (1 second pause) (👀	System is running but no remote Endpoints have connected.
Solid On (🗕)	No communication with the Endpoint.
Ethernet Link	
Solid On (🗕)	Valid Ethernet Link detected.
Off	No Ethernet Link detected.
Ethernet ACT	
Blink On (⊖)	Blinks On to indicate Ethernet traffic.

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Appendix C: Available Accessories

Available Accessories	
FreeWave Part #	Description
WC-USB-DB9	USB to Serial DB9 programming cable
WC45-Whip	Whip Antenna
	Suitable for use in fiberglass or plastic enclosure with direct mount to DIN mounted card.
WC45-PM	Panel Mount Antenna
	Mount outside of an enclosure.

These accessories are available from FreeWave for the WAVECONTACT products.

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Appendix D: FreeWave Legal Information

Export Notification

FreeWave Technologies, Inc. products may be subject to control by the Export Administration Regulations (EAR) and/or the International Traffic in Arms Regulations (ITAR). Export, re-export, or transfer of these products without required authorization from the U.S. Department of Commerce, Bureau of Industry and Security, or the U.S. Department of State, Directorate of Defense Trade Controls, as applicable, is prohibited. Any party exporting, re-exporting, or transferring FreeWave products is responsible for obtaining all necessary U.S. government authorizations required to ensure compliance with these and other applicable U.S. laws. Consult with your legal counsel for further guidance.

FCC Notifications

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.

The content of this guide covers FreeWave Technologies, Inc. models sold under FCC ID: N/A.

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 of these 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 dealer or an experienced radio/TV technician for help.

FCC Notification of Power Warning

The WC45i-GW-P Ethernet Module covered in this document has a maximum transmitted output power of +14dBm.

The antennas used MUST provide a separation distance of at least 20 cm from all persons and MUST NOT be co-located or operate in conjunction with any other antenna or transmitter.

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IC Notifications

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a maximum (or lesser) gain approved for this transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.r.i.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industri e Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les ri sques de brouillage radioélectrique à l'intention des autres utilisat eurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établisseme nt d'une communication satisfaisante.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Ce dispositif est conforme aux normes permis-exemptes du Canada RSS d'industrie. L'opération est sujette aux deux conditions suivantes : (1) ce dispositif peut ne pas causer l'interférence, et (2) ce dispositif doit accepter n'importe quelle interférence, y compris l'interférence qui peut causer le fonctionnement peu désiré du dispositif.

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