FCC ID: QRM-WEX-10-EXT

Exhibit 9

User's Manual

WAVECELL

Neptune WEX-10 CDPD Modem User Guide

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Neptune WEX-10 CDPD Modem User Guide

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1. Introduction

This manual is designed to assist the modem end user with the installation, configuration and use of WaveCell Neptune CDPD modem.

With a data transfer rate up to 19,200 bits per second, Neptune offers fast, real-time access to mission-critical information in both fixed and mobile environments.
The core of the Neptune product is the high quality, low power consumption CDPD Expedite OEM module from Novatel Wireless.
With a 3-year proven track record in CDPD, Expedite's built-in error correction ensures data transmission is reliable, accurate and delivered in real-time. In addition, the CDPD network employs multiple security features including frequency hopping, Reed Solomon encoding and RC4 encryption to ensure privacy.

2. Physical Specifications

2.1. Size & Construction

Size	150mm x 83mm x 28mm
Construction	Both the enclosure extrusion and the end plates are made out of anodized Aluminum alloys
Antenna Connector Type	Mini-UHF (MPL)

2.2. Front and Rear modem views with panel descriptions

Front Panel		Rear Panel	
POWER	Power (Red) LED	POWER	Power Input - Molex Micro-Fit Connector
Tx/Rx	Transmit / Receive (Green) LED	RS-232	DB9 Serial Port Connector
		ANTENNA	Radio Antenna Mini-UHF (MPL) Connector

2.3. LED functional description

The Neptune CDPD modem is equipped with only 2 LEDs – Red and Green, to conserve power for in vehicle applications.

2.3.1. Red – Power / Fault LED

Indicates normal or abnormal operation of the modem.
During a normal operation, this LED remains steady ON.

If the circuitry detects a faulty Expedite CDPD module or the module doesn't power up, on powering the Neptune the red LED will blink several times and then turn itself off.
If the modem is subjected to excessive heat it will blink in 0.5-second intervals. If a short is detected the modem will blink every 0.5-second for about 45 seconds, then it will try to reset the modem and try normal operation cycle again. If the abnormal power/short condition persists for 5 cycles, the modem will turn itself off to prevent electrical fire and indicate Power Fault by slow and rapid blinks. The only way to reset modem at this point is to cycle modem power.

2.3.2. Green – Transmit / Receive LED

The Green LED only indicates activity on RS232 Serial port when a host (Terminal emulator or a WaveCell mobile unit) communicates with the modem.

3. Host Interface Specifications

3.1. RS232 Interface

Baud Rate (bits/second)	1200, 2400, 4800, 9600, 19200, 38400
Data bits	7, 8
Parity	Even, None, Odd Mark
Stop Bits	1, 2

3.2. RF Antenna Connector

50 Ohm Mini-UHF (MPL)

4. Radio Specifications

4.1. RF Power Class

Class	Class III (0.6 Watt Rated) (CDPD System Specification Version 1.1 part 409, paragraph 4.3)
Modulation	GMSK

4.2. Airlink Data Rate

Rate	19200 bits per second
Error correction	Reed Solomon (63,47)
Transmission standard	CDPD System Specification Part 401, Section 4.5

4.3. Mode Frequency Range

Transmit	824 MHz - 849 MHz
Receive	869 MHz - 894 MHz

4.4. Duplex Mode

0.6 Watt Rated, Full Duplex (CDPD System Specification Version 1.1 part 409, paragraph 4.2)

4.5. Wireless Protocols

CDPD Specification Version 1.0 and 1.1

4.6. Communication Protocols

AT command interface with resident TCP/IP, UDP, SLIP and PPP stacks

5. Power Specifications and Requirements

Neptune CDPD Modem is permanently powered when connected to the power supply.

Input Voltage	4.9V - 42V
Input Current	60mA – 400mA
Typical Transmit	305 mA at 12V DC
Idle / Receive	60 mA at 12V DC
Undervoltage	Correct operation of Neptune modem in communication mode is not guaranteed if input voltage falls below 4.9V
Overvoltage	The modem is protected against voltage over 42Volts.

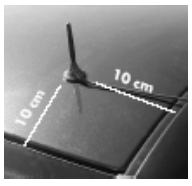
6. Radio Antenna

6.1. Antenna Type

The following antenna was used for Regulatory FCC testing:

Antenna Manufacturer	Smarteq Wireless AB, Sweden
Type	Minimag Dual Band 800/1900 MHz
Polarization	Linear vertical
Impedance	50 ohm nominal
Base	Magnetic base with 2.6 Meter RG174 cable

6.2. Radio Antenna Location



When choosing a location for the antenna, consideration must be given to metal obstructions. Fewer the obstructions, the better the operation.
The recommended location is on the car roof or a flat ground plane, at least 10cm away from any uneven surface.
The MiniMag magnetic mount antenna stays on safely at speeds of over 200 km/h (125 MPH).

7. General Safety

Do not expose modem to water, rain, spilled beverages, it is not waterproof.
Do not place the modem alongside computer discs, credit cards or other magnetic media. The information contained on the magnetic media may be affected by the modem.
If the Neptune Modem is installed in the vehicle, the RF signals may affect improperly installed or shielded equipment.
If incorrectly installed in the vehicle the modem could interfere with the correct functioning of vehicle electronics. To avoid such problems, ensure that the installation has been performed by qualified personnel.

8. Choosing the right place to mount the Neptune CDPD Modem

The modem must be mounted in an area protected from the elements. Mounting inside the passenger compartment or trunk is acceptable.
Mounting inside the engine compartment or on the exterior of the vehicle is not permissible.

9. Making the Connections – Wiring

The operation of the Neptune CDPD Modem requires connection to Power, RS232 cable and Radio Antenna.

9.1. Applying Power

The power can be supplied to the modem in one of 3 ways:

1	Connect the Neptune Power cable directly to the vehicle power
2	It is recommended to use UL, CSA certified AC-DC converter or power supply with the following parameters: Output Power: 12V, 1200mA (not included with the product)
3	Connect to Power output of WaveCell M15 or M45-ext Telematics hardware.

9.2. Power Cable

The physical power connection is made using the power cable that plugs into the 4-pin Molex Micro-Fit 3.0 connector on the modem back plate.
Connect red wire to 12V (battery +) through a 1.5A fuse.
Connect black wire to the vehicle's ground (battery -).

9.3. Serial RS232 Connections

Modem is connected to DCE device (WaveCell M15/M45 or PC) using a straight-through DB9 Female – DB9 Female serial cable.
This cable is provided with Neptune CDPD modem, but can also be purchased in different lengths at most computer stores.

9.3.3. RS232 Connector Pin Assignment

The following chart shows the Neptune CDPD Modem DB9 connector pin assignments:

Pin #	Signal Name	Type	Signal Description
1	DCD	Output	Data Carrier Detect – Not connected
2	TxD	Output	Transmitted Data
3	RxD	Input	Received Data
4	DTR	Input	Data Terminal Ready
5	GND	Ground	Signal and power ground
6	DSR	Output	Data Set Ready
7	RTS	Input	Request To Send
8	CTS	Output	Clear To Send
9	RI	Output	Ring Indicator – Not connected

9.4. Radio Antenna Connection

The radio antenna connects to the female Mini-UHF (MPL) connector labeled as "ANTENNA" located on the rear end plate of the Neptune modem.

10.Configuring the modem

Depending on an application, the modem can be configured using terminal emulator software or is automatically configured for operation by WaveCell M15 or M45 Telematics mobile unit.

10.1. Terminal Emulator configuration

Using straight DB9F-DB9F cable connect the Neptune modem to a personal computer. Configure HyperTerminal or other terminal emulation software for 9600 baud, 8 bits, No Parity, 1 stop bit.
Open a terminal emulation session using a free COM port (port not in use) on your PC.

10.2. Configuring IP address

TCP/IP address must be obtained from your CDPD network operator.
Before being able to program the IP address you have to Enter Modem Program (Config) Mode.
Enter Modem Program (Config) Mode permits the user to change S register parameters that affect the modems operation. Program mode was created as a means of protecting the configuration of the modem from spurious or unwanted attempts to change them. The addition of the password protects the equipment from unauthorized access and modification. While in program mode, the modem is disconnected from the network. Data cannot be sent or received over the wireless link.

The password field is case sensitive. In the above example, NRM6812 is the default password. NRM must be entered as capital letters otherwise the password will not be

accepted. Passwords should be more than six characters, however the software will accept any number of characters up to 8.

To enter the Modem Program (Config) Mode type:
AT\APROG,NRM6812
The modem will respond with OK.

The modem connects directly to the Internet, therefore it needs to have an IP address to define where data can be sent. Static IP addressing is used by CDPD modems. Register S110 is reserved for specifying the active IP address for the NRM. The optional 'port extension' is the TCP/UDP listen port number. The IP address must be specified before the modem can register with the network. Please contact your network provider to receive your IP address. This number is assigned to the modem and must remain unique as you cannot load the same IP address into more than one modem and have them work. The IP address cannot be ported or transferred to another modem without alerting your issuing carrier of the change and the associated Electronic Identifier (EID) numbers of the modems. Once registered on the Network, the EID and IP must remain in the same modem until the Network is told to "Trust enable" the modem or "Reset Authentication Parameters" for the modem. During initial registration of the modem, first time registration, the typical process has the Network accepting the modem's EID without checking it and henceforth using that value along with the IP and authentication keys. This will remain in effect until the Network administrator is instructed to change the IP, EID or reset the credentials.

To set modem IP address enter:
ATS110=xxx.xxx.xxx.xxx/xxxxx
Example: ATS110=198.230.140.95/1025
The modem will respond with OK.

10.3. Configuring Registration Channel Scan Side Preference

This parameter must be obtained from your CDPD network operator.

AT\N1	To set the unit to A side Only
AT\N2	To set the unit to B side Only
AT\N3	To set the unit to A side Preferred
AT\N4	To set the unit to B side Preferred

The modem will respond with OK.

Example:
AT/N2
OK

11. AT Command Set

Please refer to Expedite CDPD AT command set from Novatel Wireless included with this document as an appendix. The AT command set is also available at this link:
http://www.novatelwireless.com/support/download/Expedite_AT_Commands_PS-01016529%20Rev%201.PDF

12. Testing the installation

12.1. Terminal emulator configuration and cabling

To verify your terminal emulator configuration and cabling, type "AT" and press return key on your keyboard.
The modem should return OK or 1 depending on the AT Command Response Format mode it is configured for (ATV0 or ATV1).

12.2. Testing your modem over the CDPD Network

The easiest way to find out if the modem is configured properly and registered on CDPD network is to use a ping command.
At the DOS Prompt of your test computer connected to the Internet or private CDPD network type "ping **xxx.xxx.xxx.xxx".**

Example:

```
C:\>ping 198.230.140.109
Pinging 198.230.140.109 with 32 bytes of data:

Reply from 198.230.140.109: bytes=32 time=731ms TTL=42
Reply from 198.230.140.109: bytes=32 time=719ms TTL=42
Reply from 198.230.140.109: bytes=32 time=1124ms TTL=42
Reply from 198.230.140.109: bytes=32 time=629ms TTL=42

Ping statistics for 198.230.140.109:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 629ms, Maximum = 1124ms, Average = 800ms
```

The IP address of your CDPD modem should reply back.

13. Troubleshooting

13.1. Modem doesn't respond to AT commands

- Check your RS232 and power cables, make sure these are correctly plugged in
- See if your modem is powered up
- Verify that you are using the right Serial port on your PC not used by any other device.
- Verify that you have configured a correct baud rate (9600 baud is the default)

13.2. Modem doesn't communicate over CDPD network

If modem doesn't respond to ping command try following:

- Check the CDPD antenna connections, examine for damage and replace antenna if necessary
- Verify your modem setting by typing AT&V. The modem will dump it's profile. Verify IP address, side preference settings
- If all settings seem correct, you can try to ask your CDPD network operator for reset and flush on your IP address.

14. Technical Support

For technical support please provide detailed description of the problem you are experiencing and E-mail to support@wavecell.com, or call (613) 860-7007 to speak to customer support representative.

15. Warranty

15.1. Standard Warranty

WaveCell International Corp. ("WaveCell") warrants that the product, when used in accordance with the owner's manual and instructions, shall be free from manufacturing defects for a period of one (1) year from the original date of purchase.

This warranty does not include and shall become void if WaveCell determines, in its sole discretion, that the product has been subject to modification, misuse, abuse, neglect, accident, improper installation or de-installation, unauthorized repair, similar improper uses or defaced serial number.

Where any product with a manufacturing defect covered by this Warranty is provided to WaveCell during the warranty period, WaveCell shall repair or replace the product, at WaveCell's sole discretion, without charge, including return transportation. This is WaveCell's entire warranty and the repair or replacement represents WaveCell's sole obligation and total liability pursuant to this warranty.

If WaveCell receives the product and determines that there is no manufacturing defect covered by this warranty, WaveCell will return the product to you at your expense.

15.2. Extended Warranty Plan

An extended Warranty is available on an annual basis at a cost of ten percent (10%) of the product's original purchase price.

15.3. Out of Warranty Servicing

Repair service for out of warranty product can be obtained at a cost of $CDN 120/hr. A minimum two (2) hour (CDN$240 charge) will apply.

Procedure for Warranty and repair service:

1. Carefully de-install the Neptune CDPD modem, taking great care not to damage the unit and thus voiding your warranty protection.
2. Please phone WaveCell at 1-877-588-0288 to receive a Return Authorization Number and be prepared to supply: the product's serial number, the reason for repair and any other information you can provide to us with respect to the problem.
3. Package the product in secure packaging consistent with the packaging in which it was originally delivered
4. Ship the product (freight pre-paid) to:
   WaveCell Repair
   111 Redpath Drive
   Ottawa, Ontario
   Canada K2G 6K4

   Please include up to date contact information with your shipment.

   When we receive the product we will contact your Dealer with a time estimate as to when the product will be returned to you.

16. Regulatory Information

This device complies with parts 15 & 22 FCC specifications.

While this device is in operation, a separation distance of at least 20 centimeters is maintained between radiating antennas and the body of the user or nearby person in order to meet the FCC RF exposure guidelines.

All WaveCell devices are designed to be compliant with rules and regulations in locations they are sold and will be labeled as required.
Any changes or modifications to WaveCell equipment not expressly approved by WaveCell could void the user's authority to operate the equipment.