Xeta8 Radio Module

User Manual

V3.1

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XETAWAVE

CUSTOM RF SOLUTIONS

About This Manual

Congratulations on your decision to use XetaWave, LLC's innovative technology platform. The team at XetaWave has designed, built, and supported over 1,000,000 radios across multiple industries worldwide, and we are committed to providing unsurpassed customer service and support.

This manual is intended for use by XetaWave authorized personnel in the development and documentation of products that include the Xeta8 radio module.

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1 Overview

This user manual covers the operation of the Xeta8 radio module.

1.1 Family of Products

XetaWave typically categorizes its radio products into families based on the frequency bands they support. These families are designated Xeta1, Xeta2, Xeta4, Xeta8, and Xeta9, for example.

This manual covers only the Xeta8 radio module.

Model	Description
Xeta8	FCC/IC certified 896-901/935-940 MHz RF module, 2 TTL serial ports, 24-pin header, 10 VDC input.

1.2 Specifications

This section provides an overview of the general specifications of the Xeta8 Radio Module.

XETA8 RADIO MODULE SPECIFICATIONS

Frequency Range	896 – 901 & 935 – 940 MHz		
RF Output Power	3000 mW		
RF Data Rate	**Modulation**	**Sensitivity**	**Bandwidth**
10 kbps	MSK	-116 dBm	12.5 kHz
65 kbps	64QAM	-88 dBm	12.5 kHz
15 kbps	MSK	-113 dBm	25 kHz
105 kbps	64QAM	-86 dBm	25 kHz

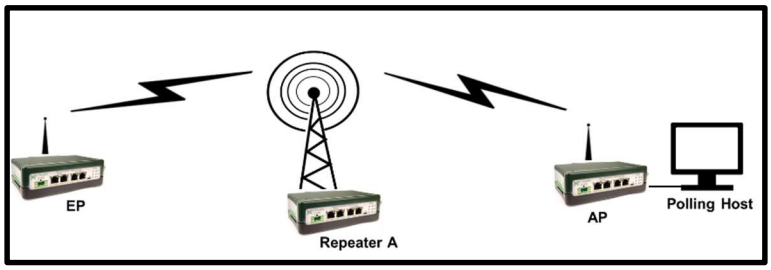
2 Networks

The XetaWave radios support a variety of networks to include point to point, point to multipoint, and peer to peer.

2.1 Point to Point

In a point to point network, there is one access point (master) and one endpoint (slave) linked together. Both radios are configured the same except each has a unique radio ID and upstream and downstream IDs are set opposite.

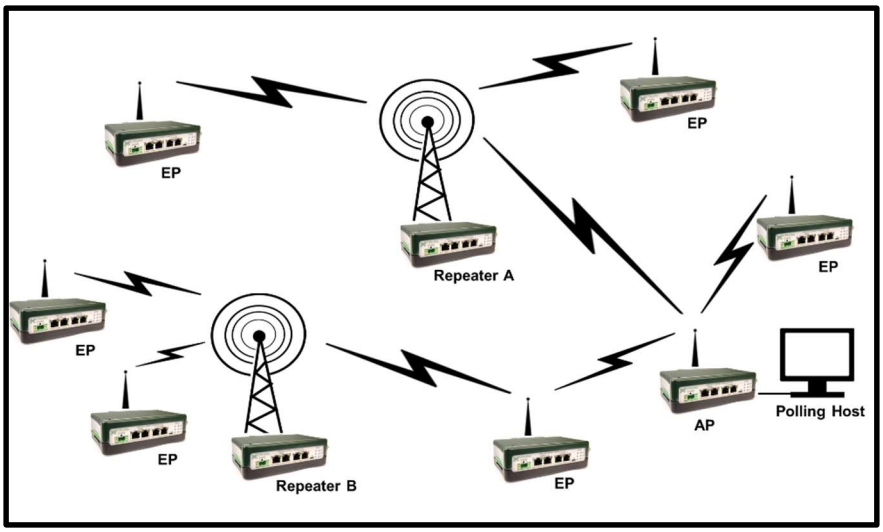
For a licensed radio, a point to point network can have one repeater. The ID in the endpoint radio is set to the appropriate repeater ID.



2.2 Point to Multipoint

In a point to multipoint network, there is one access point (master) and one or more endpoints (slaves). All endpoint radios with a uniquely programmed ID are configured to communicate with one access point.

A point to multipoint network can have one or more repeaters. When an endpoint is configured to communicate with the access point via a repeater, the ID in that endpoint radio is set to the appropriate repeater ID.



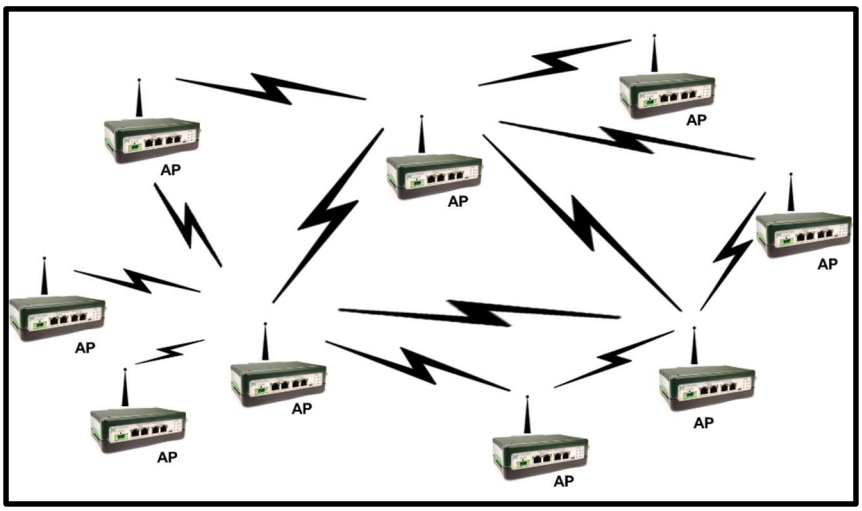
With the multispeed multipoint capability, endpoints operating at different over-the-air transfer rates can communicate with an access point over the same network.

Enhanced multipoint is the same as point to multipoint with a few of the automatic features removed to reduce the overhead and make it more efficient to increase the overall throughput and reduce latency. Enhanced multipoint is only available in licensed radios.

2.3 Peer to Peer

In a peer to peer network, all radios are treated as access points (masters) with each assigned a unique ID. All other settings should be the same. The peer to peer mode uses a CSMA algorithm that checks to determine that the RF channel is idle before transmitting. All radios that are within line of sight of a transmitting radio will receive and process the transmission.

It is the responsibility of the devices connected to the radios to handle the message protocol.



Peer to peer mode is intended for use with radios operating on a single channel.

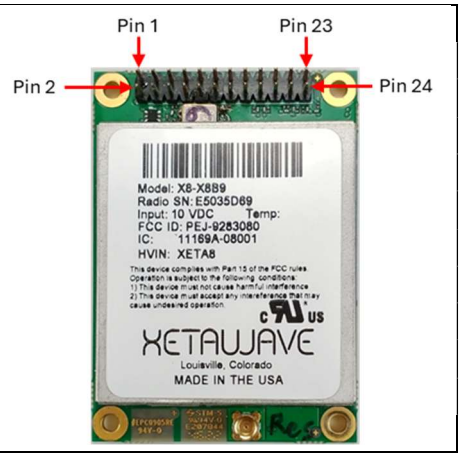
3 Interface Ports

The interface ports and LED indicators are described within this section. The interface ports include power, serial data and diag ports, and the RF port.

3.1 Connector Pinout

The Xeta8 is a board level radio module that is intended to be integrated into a higher-level assembly. XetaWave designs and manufactures all of the products in which the Xeta8 is integrated.

GPIO	23	24	GPIO
GPIO	21	22	GPIO
Signal GND	19	20	Baud Clk
Diag RX	17	18	Diag TX
Data RTS	15	16	Data CTS
Data RX	13	14	Data DCD
Data TX	11	12	RSSI
Data DTR	9	10	Power GND
Power In	7	8	Do Not Use
RX LED	5	6	No Connect
TX LED	3	4	RX LED
Link LED	1	2	Link LED



The Xeta8 multipin interface is a 2-row 24-pin header with Samtec part number MTMM-112-05-L-D-186.

Diag TX and RX – configuration port for accessing the menus to set up the radio and to retrieve radio statistics. The configuration port is always configured for **RS232** with a baud rate of **115200**, **8** bits per character, **no** parity bits, **1** stop bit, and no flow control. This port uses non-standard RS-232 voltage levels (0V/3.3V).

Data TX and RX – data port transmit and receive pins for serial data to be transmitted and serial data that has been received.

Data RTS and CTS – data port pins to implement hardware flow control, configurable via the configuration port (default is enabled).

Data DTR and DCD – data port auxiliary pins, when used (default is not implemented for normal data port operation).

Signal GND – this pin is the return (ground) pin for the configuration and data ports

Power In and Power GND – power input for the Xeta8 radio module.

Product	Input Voltage
Xeta8 Radio Module	10 Vdc ± 5%

The Xeta8 radio module has an area on the bottom of the board which is to be used for heat sinking. This aids in dissipation of heat from the module. When the Xeta8 is integrated into a host product, the host includes the necessary provisions for heat dissipation required by the radio module.

3.2 RF Port

The RF port is an MMCX female connector. This port may be interconnected within the host product to its external RF port with a shielded 50 ohm coaxial cable.

3.3 Status LEDs

This section provides information on the status LEDs for the Xeta8 radio module.

3.3.1 LED Definitions

The Xeta8 Radio Module has four LEDs which are identified as LINK, XMIT, RCV, and UP OK.

Link – For an access point, a green LED indicates that the radio is operational. For an endpoint, a green indicates connection to an access point and a red indicates no connection to a network.

XMIT – a red indication means that the radio is actively transmitting. The faster the LED flashes, the more data that is being transmitted.

RCV – a green indication means that the radio is actively receiving. The faster the LED flashes, the more data that is being received.

UP OK – a green indication means that the microprocessor is running.

4 User Interface

The Xeta8 User Interface (UI) is accessed via the diag serial port.

4.1 Operating Menu

The main Operating Menu provides information and status about the unit. The information includes model, firmware version, and serial number. The status includes the RF data rate and modulation, forward and reverse RF power, supply voltage, temperature, link state, and link statistics.

```
                    Operating Menu
          X8-X8B9 rev 0, firmware 1.87.29131, SN E5035D69
                 Mode: Slave (2) to Master (1)

Frequency      896012500 Hz
Xmit mode      64QAM   65 kbps      Link state       up
Recv mode      64QAM   65 kbps      RSSI            -75 dBm
Fwd power            3000 mW        Noise         -127 dBm
Rev power              42 mW        Xmit rate      16.6 kbps
Supply               9952 mV        Recv rate      16.6 kbps
Amp temp               39 C         Cur success   100.0 %
Board temp             35 C         Avg success    99.4 %

0  : Enter configuration/utilities menu
1  : Update radio status
2  : Reset all statistics
3  : Enable or disable automatic status updates

Enter selection:
```

Selection 0 – pauses radio RF operation and opens the configuration and utilities menu.

Selection 1 – manually initiate a refresh of the Operating Menu.

Selection 2 – resets all radio statistics.

Selection 3 – enable/disable automatic refreshing of the Operating Menu.

4.2 Configuration/Utilities Menu

The Configuration/Utilities Menu provides all the sub-menus used to configure the unit, and it also provides utilities for testing.

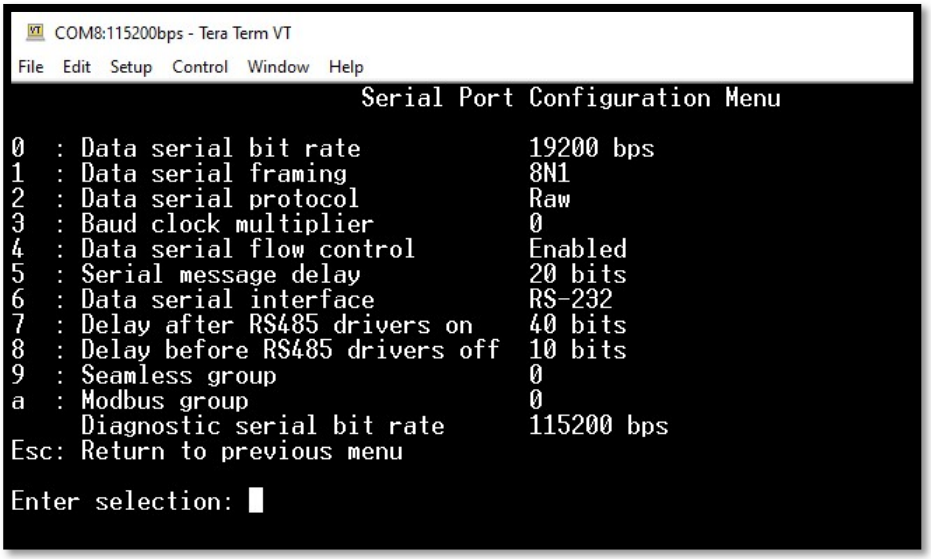
Configuration/Utilities Menu
X8-X8B9 rev 0, firmware 1.87.29131, SN E5035D69
Mode: Slave (2) to Master (1)

0 : Serial port configuration menu
1 : RF and hopping menu
2 : Bit rate and modulation type menu
3 : Network menu
4 : Advanced menu
5 : Utilities menu
Esc : Return to previous menu

Enter selection:

4.2.1 Serial Port Configuration Menu

The Serial Port Configuration Menu provides all the sub-menus to configure the data serial port.



4.2.1.1 Data Serial Bit Rate

The Data Serial Bit Rate menu is used to change the baud rate of the serial data (traffic) interface. Even though the radio may allow for selections up to 3 Mbps, it may be necessary to limit the selection to a maximum of 921600 bps due to external equipment limitations.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Data Serial Bit Rate

This parameter specifies the serial bit rate in bits/second for the data port.

Current selection: 38400 bps

0  :   1200 bps                    b  : 1049479 bps
1  :   2400 bps                    c  : 1259375 bps
2  :   4800 bps                    d  : 1574219 bps
3  :   9600 bps                    e  : 2098958 bps
4  :  19200 bps                    f  : 3148438 bps
5  :  38400 bps                    g  : Enter a bit rate
6  :  57600 bps
7  : 115200 bps
8  : 230400 bps
9  : 460800 bps
a  : 921600 bps
Esc: Return to previous menu

Enter selection:
```

4.2.1.2 Data Serial Framing

The Data Serial Framing menu allows you to select the character length in bits, the parity, and the number of stop bits.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Data Serial Framing

This parameter specifies the serial framing to use for the data port.
Word length can be set to 5-8 bits.  Parity can be set to Even,
Odd, or None.  Stop bits can be set to 1 or 2 with 6-8 bit words, and
1 or 1.5 with 5 bit words

Current setting: 8N1
Enter new setting or Esc to exit:
```

4.2.1.3 Data Serial Protocol

The Data Serial Protocol menu is used to select the protocol to be used over the data serial port. For most serial applications, raw should be selected.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Data Serial Protocol

This parameter specifies the protocol to use for serial port data.
- Raw serial protocol transmits all serial data received, with no framing.
- Ethernet frame protocol expects Ethernet frames with headers inserted by the
Xetawave Ethernet card, and breaks them into fragments for transmission.
- Serial message protocol uses pauses in the serial data stream to detect
and indicate message boundaries, improving performance of message-oriented
protocols such as Modbus or DNP3.
- Seamless serial protocol allows serial slave radios to coexist in a network
with Ethernet master and slave radios.

Current selection: Raw

0  : Raw serial
1  : Ethernet frames
2  : Serial message
3  : Seamless serial raw
4  : Seamless serial message
Esc: Return to previous menu

Enter selection: 
```

4.2.1.4 Baud Rate Clock Multiplier

The Baud Rate Clock Multiplier menu is used to modify the output clock that is synchronous to the data serial port. The output clock may be used to synchronize higher level hardware to the radio clock when necessary.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Baud Rate Clock Multiplier

This parameter sets the frequency of the BAUD_CLK output signal from the
radio, as a multiple of the Data Serial Bit Rate.

Current selection: BAUD_CLK frequency = 0 x bit rate

0  : BAUD_CLK frequency =  0 x bit rate (BAUD_CLK off)
1  : BAUD_CLK frequency =  1 x bit rate
2  : BAUD_CLK frequency =  2 x bit rate
3  : BAUD_CLK frequency =  4 x bit rate
4  : BAUD_CLK frequency =  8 x bit rate
5  : BAUD_CLK frequency = 16 x bit rate
Esc: Return to previous menu

Enter selection: 
```

4.2.1.5 Data Serial Flow Control

The Data Serial Flow Control menu is used to enable or disable hardware flow control. Hardware flow control is encouraged in cases where external hardware has RTS and CTS flow control signals.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Data Serial Flow Control

This parameter enables or disables hardware flow control for the data port.
Flow control should be enabled except in cases where the attached hardware
does not provide the flow control signals RTS and CTS.  When flow control
is disabled, serial port data may be lost if the receiving device is unable
to keep up with the incoming data rate.

Current selection: Disabled

0   : Enable flow control
1   : Disable flow control
Esc: Return to previous menu

Enter selection: 
```

4.2.1.6 Serial Message Delay

The Serial Message Delay menu is used to specify the number of serial bit delay between messages on the data serial port. This parameter only applies when the Data Serial Protocol is set to serial message or seamless serial message.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Serial Message Delay

This parameter specifies the delay in serial bits between messages on the data
serial port, when the Data Serial Protocol parameter is set to Message.
When Data Serial Protocol is Raw or Ethernet, this parameter is not used.
The radio requires at least this amount of idle time between received serial
messages, and inserts at least this time between transmitted serial messages.
Note:  The radio requires a minimum of 1.75 milliseconds idle time between
received serial messages, regardless of the value of this parameter.

Current value = 35 bits

Enter new value (15 - 50000) or Esc to exit: 
```

4.2.1.7 Data Serial Interface

The Data Serial Interface is used to select between RS-232, RS-422, and RS-485. This parameter is used in conjunction with serial interface hardware present in a host product to select the serial interface type for the host product. It does not affect the radio module data serial interface.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Data Serial Interface

This parameter specifies the type of electrical interface for the data port.
Selecting RS-422 or RS-485 requires using the Xetawave serial carrier card,
which provides the RS-422/485 driver.
When using a Xetawave Ethernet card, select RS-232.

Current selection: RS-232

0  : RS-232
1  : RS-422
2  : RS-485
Esc: Return to previous menu

Enter selection: ▌
```

4.2.1.8 Delay After RS-485 Drivers On

The Delay After RS-485 Drivers On menu is used to specify the minimum delay in serial bits between turning on the RS-485 drivers and the start of data transmission.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Delay After RS-485 Drivers On

When Data Serial Interface is set to RS-485, this parameter specifies the
minimum delay in serial bits between turning on the RS-485 drivers and the
start of data transmission.  For other interfaces, this parameter is not used.
A typical value for this parameter is 40 bits.

Current value = 40 bits

Enter new value (5 - 255) or Esc to exit: ▌
```

4.2.1.9 Delay Before RS-485 Drivers Off

The Delay Before RS-485 Drivers On menu is used to specify the minimum delay in serial bits between the end of the data transmission and turning off the RS-485 drivers.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Delay Before RS-485 Drivers Off

When Data Serial Interface is set to RS-485, this parameter specifies the
minimum delay in serial bits between the end of data transmission and turning
off the RS-485 drivers.  For other interfaces, this parameter is not used.
A typical value for this parameter is 10 bits.

Current value = 10 bits

Enter new value (5 - 255) or Esc to exit: ▌
```

4.2.1.10 Seamless Group

The Seamless Group menu is used to specify the group to which the radio belongs. This

is used when operating in one of the seamless serial protocols.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Seamless Group

This parameter specifies the group to which this radio belongs, for use
when seamless serial protocol is enabled.

Current value = 0

Enter new value (0 - 65535) or Esc to exit:
```

4.2.1.11 Modbus Group

The Modbus Group menu is used to specify the group to which the radio belongs. This is used when operating in one of the seamless serial protocols or the Ethernet protocol to remotely share radio statistics using Modbus RTU when the radio is configured as an end point.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Modbus Group

This parameter specifies the seamless group used for the radio's internal
Modbus RTU, when seamless serial or Ethernet protocol is enabled.
To enable the radio to respond to Modbus polling, set this parameter
to a value that is not zero and not equal to the Seamless Group parameter.
To disable, set this parameter to zero.

Current value = 0

Enter new value (0 - 65535) or Esc to exit:
```

4.2.2 RF Menu

The RF Menu allows for selection of the transmit and receive frequencies, the maximum distance between radios, and the RF transmit output power.

RF Menu

Bandwidth: 12500 Hz

0	: RF band	Licensed
1	: Maximum separation	10 km
2	: Transmit power	3000 mW
3	: Master transmit frequency	935012500 Hz
4	: Slave transmit frequency	896012500 Hz
c	: Error correction	Disabled

Esc: Return to previous menu

Enter selection:

4.2.2.1 RF Band

The RF Band menu is used to select the radio frequency band of operation. For the XETA8, the only selection available is Licensed.

RF Band

This parameter specifies which RF band to use.

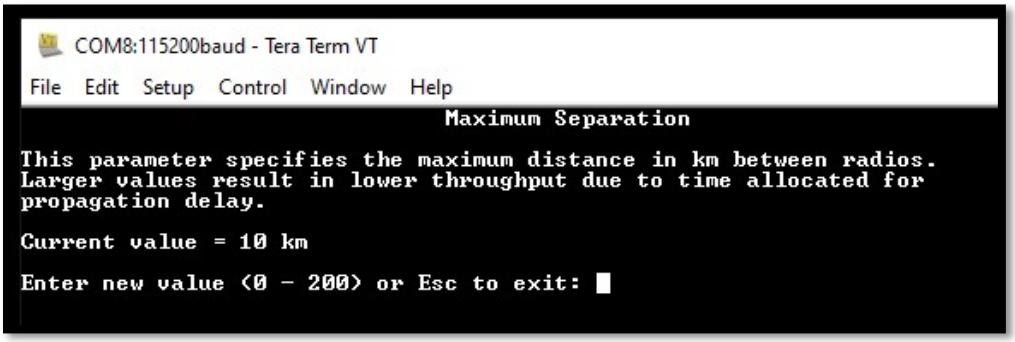
Current selection = Licensed

1 : Licensed
Esc: Return to previous menu

Enter selection:

4.2.2.2 Maximum Separation

The Maximum Separation menu is used to enter the maximum distance in km between an access point and the furthest endpoint when operating in point to point or point to multipoint mode or the furthest distance between radios when operating in peer to peer mode. All radios within a network need to have this set the same.



4.2.2.3 Transmit Power

The Transmit Power menu provides a means to enter the RF transmit output power level in mW. For protection, thermal monitors continuously measure the internal temperature of the radio. If the internal temperature rises above a factory-defined threshold, transmit power may be temporarily reduced to prevent damage to the radio or spurious operation.

The Xeta8 is limited to a maximum power level of 3000 mW to comply with FCC regulations.

Transmit Power

This parameter specifies the desired transmit power in milliwatts for the radio.

Current value = 3000 mW

Enter new value (50 – 3000) or Esc to exit:

4.2.2.4 Master Transmit Frequency

The Master Transmit Frequency menu is used to enter the access point (master) transmit frequency. This is the frequency that the access point will use to transmit and the endpoints will use to receive.

Master Transmit Frequency

This parameter specifies the transmit frequency in Hz (or MHz) to use
for the master radio. The slave radio uses this as its receive frequency.

Current value = 935012500 Hz

Enter new value (896000000 - 901000000; 935000000 - 940000000) or Esc to exit:

4.2.2.5 Slave Transmit Frequency

The Slave Transmit Frequency menu is used to enter the endpoint (slave) transmit frequency. This is the frequency that the endpoint will use to transmit and the access point will use to receive.

Slave Transmit Frequency

This parameter specifies the transmit frequency in Hz (or MHz) to use
for a slave radio. The master radio uses this as its receive frequency.

Current value = 896012500 Hz

Enter new value (896000000 - 901000000; 935000000 - 940000000) or Esc to exit:

4.2.2.6 Error Correction

The Error Correction menu allows for enabling or disabling forward error correction (FEC) and selecting between Golay, small block, and several Reed-Solomon type FECs.

```
COM8:115200bps - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Error Correction

This parameter selects the type of error correction used in the network.
It must be set the same for all radios.

Current selection: Disabled

0  : Disabled
1  : Golay
2  : Small block
3  : RSX Low
4  : RSX Medium
5  : RSX High
Esc: Return to previous menu

Enter selection:
```

4.2.3 Bit Rate and Modulation Type

The Bit Rate and Modulation Type menus allow selection of the over-the-air RF data rate, modulation, and channel size.

The screenshot below identifies the selections of over-the-air RF data rate, modulation, and channel size currently available for the XETA8.

Bit Rate and Modulation Type (FCC)

This menu selects the bit rate and modulation type mode(s) to use. Enabling multiple modes allows the radio to switch modes as needed for best performance.

0 : 10 kbps, MSK, 12.5 kHz
1 : * 65 kbps, 64QAM, 12.5 kHz
2 : 15 kbps, MSK, 25.0 kHz
3 : 105 kbps, 64QAM, 25.0 kHz
Esc: Return to previous menu

Enter selection to enable or disable:

4.2.4 Network Configuration Menu

The Network Configuration menu is used to define the operating mode, network type and address, maximum payload sizes, and the various device addresses.

Network Configuration Menu

0	: Operating mode	Slave
1	: Network type	Point-to-point
2	: Network address	11235
3	: Upstream device address	1
4	: Downstream device address	2
5	: Maximum payload size, master	128 bytes
6	: Maximum payload size, slave	128 bytes
7	: Our device address	2
8	: Radio name	MyRadio
9	: Network uses slave/repeaters	No
a	: Encryption	Disabled

Esc: Return to previous menu

Enter selection:

4.2.4.1 Operating Mode

The Operating Mode menu allows configuring the radio as an access point (master), endpoint (slave), or repeater (slave/repeater). In a point to point, point to multipoint, and an enhanced multipoint network, there must be one access point. In peer-to-peer mode, all radios are treated as access points.

Operating Mode

This selection determines the role that this radio assumes in the network.

Current selection = Slave

0 : Master
1 : Slave
2 : Slave/Repeater
Esc: Return to previous menu

Enter selection:

4.2.4.2 Network Type

The network type menu identifies the selection of network types currently available for the XETA8.

Network Type

This selection determines the type of network desired.

Current selection = Point-to-multipoint

```
0  : Point-to-point          - one master and one slave radio
1  : Point-to-multipoint     - one master and multiple slave radios
2  : Full-duplex transmit    - co-located pair of radios, transmitter role
3  : Full-duplex receive     - co-located pair of radios, receiver role
4  : Peer-to-peer            - multiple peer radios with no master
5  : Listen before talk      - multipoint with channel busy check before transmit
a  : Mesh                    - multiple synchronized peer radios
b  : Enhanced multipoint     - one master and multiple slave radios
Esc: Return to previous menu

Enter selection:
```

Selection 0 (Point-to-point) – a network that has one access point and one endpoint.

Selection 1 (Point-to-multipoint) – a network that has one access point and multiple endpoints or repeaters.

Selection 2 (Full-duplex transmit) – for use by licensed radios where the radio is assigned the transmit role. For full-duplex operation another co-located radio is operating in the full-duplex receive mode. Two radios are required at both ends.

Selection 3 (Full-duplex receive) – for use by licensed radios where the radio is assigned the receive role. For full-duplex operation another co-located radio is operating in the full-duplex transmit mode. Two radios are required at both ends.

Selection 4 (Peer-to-peer) – for use by a radio operating in single channel mode where all radios within LOS can communicate with each other. In this mode, all radios are treated like access points.

Selection 5 (Listen before talk) – multipoint mode in which the radio that wishes to transmit determines that the channel is not busy before transmitting.

Selection a (Mesh) – peer-to-peer network of radios operating in a mesh configuration.

Selection b (Enhanced multipoint) – same functionality as the point-to-multipoint mode except some overhead is eliminated resulting in increased throughputs and lower latencies.

4.2.4.3 Network Address

The Network Address menu allows for entry of the network address. Each network should have a unique address assigned.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Network Address

This parameter specifies a unique identifier for this network that prevents
interference between networks operating within range of each other.

Current value = 11235

Enter new value (0 - 65535) or Esc to exit:
```

4.2.4.4 Upstream Device Address

The Upstream Device Address menu allows entry of the access point device address in which the endpoint or repeater will link with. If the radio is set to master, this setting is ignored.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Upstream Device Address

This parameter specifies the device address of the immediate upstream radio.
It applies only when Operating Mode is set to Slave or Repeater; a Master
has no upstream radio.

Current value = 1

Enter new value (1 - 65534) or Esc to exit:
```

4.2.4.5 Downstream Device Address

The Downstream Device Address menu allows entry of the endpoint or repeater device address when operating in point-to-point mode.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Downstream Device Address

This parameter specifies the device address of the immediate downstream
radio.  It applies only when Operating Mode is set to Master or Repeater;
a Slave has no downstream radio.

Current value = 0

Enter new value (1 - 65534) or Esc to exit:
```

4.2.4.6 Maximum Payload Size Master

The Maximum Payload Size Master menu allows entry of the maximum number of bytes that can be transmitted by the access point during each over-the-air transmit packet.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Maximum Payload Size for Master

The Maximum Payload Size for Master/Slave parameters specify the maximum
number of payload bytes per transmitted packet, separately for the Master and
Slave radios.
For example, in an application requiring greater throughput from the master
to the slave, set the master parameter to the maximum value (1600) and the slave
parameter to a lower value (minimum 64).  The time saved transmitting smaller
packets in one direction will increase throughput in the other direction.
For symmetric throughput, set both parameters to the maximum value.
These parameters must be set the same for all radios in the network.

Current value = 128

Enter new value (64 - 1600) or Esc to exit: 
```

4.2.4.7 Maximum Payload Size Slave

The Maximum Payload Size Slave menu allows entry of the maximum number of bytes that can be transmitted by an endpoint during each over-the-air transmit packet.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Maximum Payload Size for Slave

The Maximum Payload Size for Master/Slave parameters specify the maximum
number of payload bytes per transmitted packet, separately for the Master and
Slave radios.
For example, in an application requiring greater throughput from the master
to the slave, set the master parameter to the maximum value (1600) and the slave
parameter to a lower value (minimum 64).  The time saved transmitting smaller
packets in one direction will increase throughput in the other direction.
For symmetric throughput, set both parameters to the maximum value.
These parameters must be set the same for all radios in the network.

Current value = 128

Enter new value (64 - 1600) or Esc to exit: 
```

4.2.4.8 Our Device Address

The Our Device Address menu allows entry of the device address for the radio. Within a network, each radio should be assigned a unique device address.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Our Device Address

This parameter specifies the device address of this radio within the network.
It is set in the factory based on the radio's serial number.

Current value = 1

Enter new value (1 - 65534) or Esc to exit: 
```

4.2.4.9 Radio Name

The Radio Name menu allows entry of a name to be associated with the radio.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Radio Name

This parameter sets a name for this radio.  It has no effect on radio
operation, but may be used for identification purposes.  It can be any
string up to thirty-one characters long.

Current value =

Enter new value or Esc to exit:
```

4.2.4.10 Network Uses Slave/Repeaters

The Network Uses Slave/Repeaters menu allows enabling or disabling of repeater mode.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Network Uses Slave/Repeaters

This parameter selects whether the network uses slave/repeaters or not.
Using slave/repeaters increases network range, but reduces throughput.
This parameter must be set the same for all radios in the network.

Current selection: Network does not use slave/repeaters

0  : Network does not use slave/repeaters
1  : Network uses slave/repeaters
Esc: Return to previous menu

Enter selection:
```

4.2.4.11 Encryption

The Encryption menu allows enabling or disabling of RF packet encryption and entering of the key phrase.

```
COM9:115200bps - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Encryption

This parameter enables or disables encryption of radio packets.
When enabling encryption, you can also set the key phrase.
The key phrase can contain any characters and must be 6 to 51 characters long.

Current selection: Disabled

0  : Disable encryption
1  : Enable encryption and set key phrase
Esc: Return to previous menu

Enter selection:
```

4.2.5 Advanced Settings Menu

The Advanced Settings Menu provides the ability to enable and configure multi-master sync, beacon period, dynamic payload, auto configuration, roaming, and low overhead.

```
COM8:115200bps - Tera Term VT
File  Edit  Setup  Control  Window  Help
                          Advanced Settings Menu

0  : Multi-master sync mode          No sync
1  : Idle beacon period              1
2  : Dynamic payload mode            Disabled
3  : Auto-configuration              Disabled
4  : Roaming                         Disabled
5  : Low overhead mode               Disabled
6  : Short preamble mode             Disabled
7  : Power mode                      0
8  : Dynamic transmit power          Disabled
Esc: Return to previous menu

Enter selection: 
```

4.2.5.1 Multi-master Sync Mode

The Multi-master Sync Mode menu allows enabling or disabling multi-master sync and configuring the access points for internal or external synchronization.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Multi-Master Sync Mode

This parameter enables synchronized operation between multiple co-located
radios.  When using synchronization:
- Radios must have their sync pins wired together, and if external sync is
selected, a sync source must be connected to the sync pins.
- Enable sync for all radios (master and slave) in the network.
- Use a different value for the Hop Offset parameter setting in each network.
Note: a slave radio may also be enabled to generate a sync signal to a
co-located master radio.

Current selection: No sync

0  : No synchronization (normal single master operation)
1  : External synchronization (from sync source or another radio)
2  : Generate synchronization pulse (send sync signal to other masters)
3  : Intelligent Network Synchronizer (INS) provides synchronization
Esc: Return to previous menu

Enter selection: 
```

4.2.5.2 Idle Beacon Period

The Idle Beacon Period menu allows selection of how many transmit slots the access point skips between the transmission of the synchronization beacon. Generally, a lower value results in higher data throughputs.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Idle Beacon Period

This parameter controls the number of time slots that the master radio
skips transmitting in when idle.  For example, a period of 5 causes the
master radio to transmit a packet, then skip transmitting in the next four
slots.  A period of 1 causes the master radio to transmit in every slot.
Setting a larger value for the period reduces the master radio's usage of
the available spectrum, making it easier to coexist with other networks.

Current value = 1 slot

Enter new value (1 - 15) or Esc to exit:
```

4.2.5.3 Dynamic Payload Mode

The Dynamic Payload Mode menu allows for enabling or disabling dynamic payload. When dynamic payload is enabled, any unused bytes allocated to the access point are made available for use by the endpoints.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Dynamic Payload Mode

This parameter enables or disables the dynamic payload mode.
When this mode is enabled, if the master radio transmits a short packet,
a slave radio may use the extra time to transmit a packet longer than its
maximum payload length would otherwise allow.
When this mode is disabled, the length of transmitted packets is always
limited by the maximum payload length.
This parameter must be set the same for all radios in the network.

Current selection: Disabled

0  : Disable dynamic payload mode
1  : Enable dynamic payload mode
Esc: Return to previous menu

Enter selection:
```

4.2.5.4 Auto-Configuration

The Auto-Configuration menu allows for enabling or disabling auto configuration. Auto configuration allows endpoints in a point-to-multipoint or listen before talk networks to receive settings over-the-air from the access point.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Auto-Configuration

Enabling auto-configuration allows slave radios to receive their settings
automatically over the air from the master radio, for point-to-multipoint and
listen before talk networks.
Enabling in compatibility mode ensures compatibility with older radios that
do not support auto-configuration, but may prevent auto-configuration of
changes to the band start/stop or exclude frequency settings.

Current selection: Disabled

0  : Disable
1  : Enable
2  : Enable in compatibility mode
Esc: Return to previous menu

Enter selection: 
```

4.2.5.5 Roaming

This feature is not applicable to the Xeta8.

4.2.5.6 Low Overhead Mode

The Low Overhead Mode menu allows for enabling and disabling of the low overhead mode. Enabling low overhead improves performance by reducing packet and processing overhead. All radios in the network must have this set the same.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Low Overhead Mode

This parameter enables or disables low overhead mode.
Enabling low overhead mode reduces packet and processing overhead, resulting
in improved performance, especially with small payloads at high bit rates.
Disabling low overhead mode ensures backward compatibility with older radios
that don't support it.
This parameter must be set the same for all radios in the network.

Current selection: Disabled

0  : Disable low overhead mode
1  : Enable low overhead mode
Esc: Return to previous menu

Enter selection: 
```

4.2.5.7 Short Preamble

The Short Preamble menu allows the enabling and disabling of short preamble. Enabling short preamble improves performance by reducing packet overhead. All radios in the network must have this set the same.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Short Preamble

This parameter enables or disables short preamble.
Enabling short preamble reduces packet overhead, resulting in improved
performance, especially with small payloads at high bit rates.
Disabling short preamble ensures backward compatibility with older radios
that don't support it.
This parameter must be set the same for all radios in the network.

Current selection: Enabled

0   : Disable short preamble
1   : Enable short preamble
Esc: Return to previous menu

Enter selection: 
```

4.2.5.8 Power Mode

The Power Mode menu is a feature that allows the enabling and disabling of low power modes which reduce the amount of current consumption during operation.

```
COM8:115200bps - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Power Mode

This parameter enables low power options.  They apply when the radio is a
slave in a point-to-multipoint network, unless indicated otherwise below.

Available power modes:
  0 = normal operation, no low power options
  1 = turn off or pulse link/Rx/Tx LEDs (all radios/networks)
  2 = maximize time spent idle when not receiving
  4 = turn off synthesizer chip during idle time
  8 = turn off power/OK LED (all radios/networks)

Modes can be added together.  For example, setting mode 3 enables modes 1 + 2.

Current value: 0


Enter new value (0 - 15) or Esc to exit: 
```

4.2.5.9 Dynamic Transmit Power

The Dynamic Transmit Power menu is a feature that allows the enabling and disabling of dynamic transmit power control in Endpoint radios.

```
COM8:115200bps - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Dynamic Transmit Power

This parameter allows a slave radio to adjust its transmit power based on
reports of its signal strength from the master radio.
It has effect only for licensed band, point-to-multipoint networks.

Current selection: Disabled

0   : Disable dynamic transmit power
1   : Enable dynamic transmit power
Esc: Return to previous menu

Enter selection: 
```

4.2.6 Utilities Menu

The Utilities Menu provides features that allow evaluation of link performance, perform firmware updates, and reset to factory default parameters.

```
COM8:115200bps - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Utilities Menu

0   : Scan RF band
1   : Download firmware update
2   : Scan the network
3   : Ping a radio on the network
4   : Run throughput test
5   : Show throughput statistics
6   : Dump all radio settings
r   : Restore factory defaults
Esc: Return to previous menu

Enter selection: 
```

4.2.6.1 RF Scan

The RF Scan menu allows using the radio to scan the RF environment. Standard radio functions are temporarily disabled while running the RF scan, and the results reported are the receive signal strength across the frequency band supported by the radio.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                                RF Scan

This utility scans the currently selected RF band and displays an ASCII-graphic
view of received signal strength across the band.  The scan runs continuously
until you press Esc to stop it.

0   : Run continuous RF scan
Esc: Return to previous menu

Enter selection: 
```

4.2.6.2 Download Firmware Update

The Download Firmware Update menu is used to update the radio module firmware.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                        Download Firmware Update

This utility allows you to download a firmware update to the radio.
When the prompt "Xmodem ready" appears, use your terminal program's
Xmodem (checksum) option to download the file 'xfw.bin'.  When the prompt
appears again, download the file 'xfw_flash.bin'.
If the download procedure completes successfully, the radio will reboot
itself in order to activate the new firmware.


0   : Start download process
Esc: Return to previous menu

Enter selection: 
```

4.2.6.3 Scan Network

The Scan Network menu is used to scan the network and retrieve information about the direct connected EPs. The information can include serial number, device ID, internal model number, hardware revision, and firmware revision.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                                Scan Network

On a master or slave/repeater radio, this utility requests and displays
information from this radio's immediate downstream linked radios.  On a slave
radio, it requests and displays information from this radio's immediate
upstream master or slave/repeater.

Press enter to start the scan, or Esc to exit: 
```

4.2.6.4 Ping a Radio

The Ping a Radio menu is used to ping a radio within the network. RF ping is a diagnostic tool for directly testing the connectivity and signal quality between an AP and a remote EP. The RF ping test can be initiated from either side of the link.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Ping a Remote Radio

This utility sends four RF ping requests to another directly linked radio and
displays the responses.  Information displayed includes round-trip ping time
in milliseconds, remote and local received signal and noise levels, and the
remote radio's name.

Enter device address of a radio to ping, or Esc to exit: 
```

4.2.6.5 Run Throughput Test

The Run Throughput Test menu is used to evaluate the throughput between two radios. The RF throughput utility allows direct testing of the link performance between an AP and a remote EP. The test can be initiated from either side of the link.

```
COM8:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Throughput Test

This utility runs a throughput test between this radio and another directly
linked radio.  A slave radio always tests its direct upstream radio.

0   : Transmit-only throughput test
1   : Receive-only throughput test
2   : Bidirectional throughput test
Esc: Return to previous menu

Enter selection: 
```

4.2.6.6 Throughput Statistics

The Throughput Statistics menu provides transmit and receive statistics of the wireless communications.

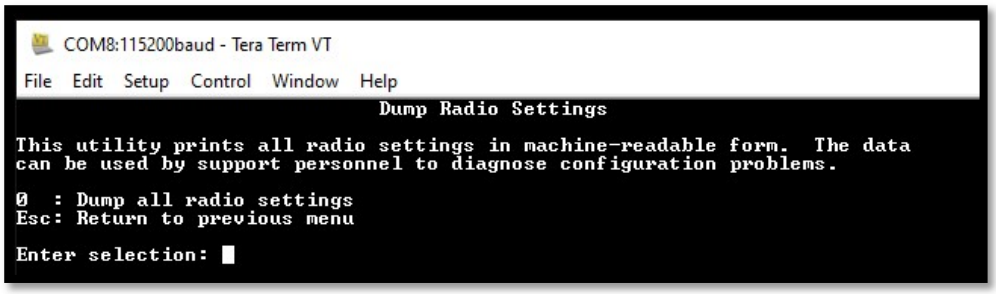
```
COM8:115200bps - Tera Term VT
File  Edit  Setup  Control  Window  Help
                    Throughput Statistics


            ------ Transmit ------   ------ Receive -------
Data:       First% Repeat%  Payld%   First% Repeat%  Payld%
eth bcast     0.0     0.0     0.0      0.0     0.0     0.0
eth addr      0.0     0.0     0.0      0.0     0.0     0.0
seamless      0.0     0.0     0.0      0.0     0.0     0.0
raw           0.0     0.0     0.0      0.0     0.0     0.0
control       0.0     0.0              0.0     0.0
Non-data:
link down   100.0                    100.0
idle          0.0                      0.0
protocol      0.0                      0.0
missed        0.0                      0.0
error         0.0                      0.0
busy          0.0                      0.0
maint         0.0                      0.0

Press enter to update, or ESC to exit: 
```

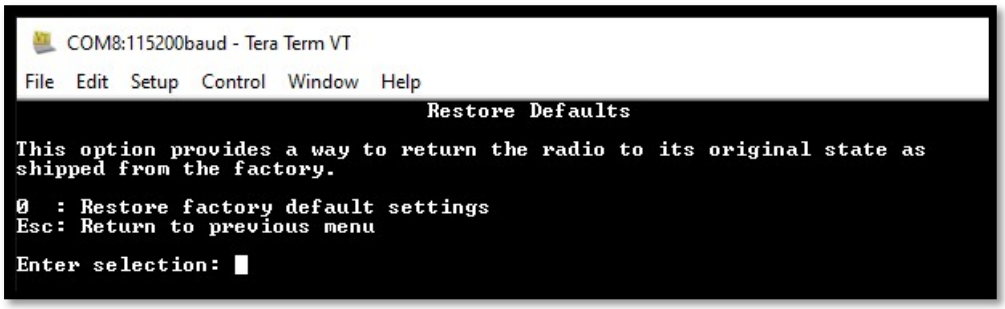
4.2.6.7 Dump All Radio Settings

The Dump All Radio Settings menu allows for displaying all the radio's settings.



4.2.6.8 Restore Factory Defaults

The Restore Factory Defaults menu allows reconfiguration of the radio settings back to the original factory defaults.



5 Module Integration Requirements

This section provides information for the integration of the Xeta8 radio module into a host product or assembly, including regulatory labeling requirements and user notifications and statements which must be included in the host product user manual.

5.1 RF Port Connection

When the radio module RF port is connected to a separate external connector on the host product, a high quality shielded coaxial cable or shielded RF adapter(s) must be used. When an interconnecting cable is used, it is recommended to minimize the total cable length for best performance. The insertion loss of the cable and adapters should be considered since these losses will degrade receiver sensitivity and transmitter output power. In general, coaxial cable with a larger diameter has lower loss, but has a larger minimum bend radius and may be more difficult to integrate into a host product.

The nominal characteristic impedance of the coaxial cable and/or RF adapters must be 50 ohms, and they must be rated for operation up to a minimum of 1 GHz.

5.2 Antenna Specification

The antenna used with the Xeta8 is not limited to any specific type or radiation pattern; however, antennas with very high gain may violate FCC and/or IC regulations regarding human RF exposure. The antenna must have a rated frequency range that includes 896-901 MHz and 935-940 MHz at a minimum. The nominal characteristic impedance of the antenna and any external interconnecting cables, as measured at the mating connector that is connected to the Xeta8 radio module, must be 50 ohms. In order to comply with FCC/IC requirements for RF exposure in uncontrolled environments, the antenna gain must be restricted to 13 dBi or less.

The antenna selection should be based on the radio system design and wireless link requirements that are specific to each radio installation. The maximum effective radiated power (ERP) or effective isotropic radiated power (EIRP) permitted by the user's license should also be considered in antenna selection.

If a high gain antenna is used, the power setting of the Xeta8 may need to be reduced to meet the user's licensed ERP (or EIRP) limit. The ERP and EIRP may be calculated from the formulas:

$$ERP = P * G$$
$$EIRP = ERP * 1.62$$

where:
ERP = effective radiated power in milliwatts
EIRP = effective isotropic radiated power in milliwatts
P = Xeta8 power setting in milliwatts

G = maximum linear antenna gain, referenced to a dipole

Antenna gain is usually specified in dBd or dBi. Linear antenna gain, referenced to a dipole, may be calculated from the following formulas:

For antenna gain specified in dBd: $G = 10^{\frac{GdBd}{10}}$

For antenna gain specified in dBi: $G = 10^{\frac{Gdb}{10}} .1$

5.3 USA and Canada Regulatory Statements

5.3.1 FCC Regulatory Labeling Requirements

When the Xeta8 radio module is installed or integrated in a host product that will be sold in the USA, the following FCC statements must appear on an external label affixed to the host product:

Contains Transmitter Module FCC ID: PEJ-9283080

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.

It is the responsibility of the host product manufacturer (XetaWave) to ensure that the host product (with integrated Xeta8 radio module) complies with part 15 of the FCC rules (if required). The Xeta8 radio module's FCC modular certification applies only to the intentional transmitter regulatory requirements (Part 90) of the host product in which the Xeta8 is integrated.

5.3.2 FCC Digital Device/Peripheral Information Statement

If the host product is a Class A digital device or peripheral, the following statement must be included in a prominent location in the host product user manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

If the host product is a Class B digital device or peripheral, the following statement must be included in a prominent location in the host product user manual:

Note: This equipment has been tested and found to comply with the limits for a Class B

digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- **Reorient or relocate the receiving antenna.**
- **Increase the separation between the equipment and 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.**

5.3.3 Statement Regarding Changes or Modifications

The host product user manual must include a statement cautioning the user against changes or modifications, such as the following:

Changes or modifications which are not expressly approved by XetaWave LLC will invalidate the user's authority to operate the equipment.

5.3.4 IC Regulatory Labeling Requirements

When the module is installed inside of another device, then the outside of the device into which the module is installed must display a label referring to the enclosed module.

Lorsque le module est installé à l'intérieur d'un autre périphérique, l'extérieur du périphérique dans lequel le module est installé doit afficher une étiquette faisant référence au module inclus.

For XETA8 models, the exterior label will use the wording "**Contains IC: 11169A-08001**" and "**HVIN: XETA8**".

Pour les modèles XETA8, l'étiquette extérieure utilisera le libellé "**Contient IC: 11169A-08001**" et "**HVIN: XETA8**".

5.3.5 IC Regulatory Statement

This device contains a licence-exempt transmitter(s)/receiver(s) that comply with the Innovation, Science, and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient un ou plusieurs émetteurs/récepteurs sans licence qui sont conformes aux RSS sans licence d'Innovation, Sciences et Développement économique Canada. L'exploitation est soumise aux deux conditions suivantes :

1. Cet appareil ne doit pas provoquer d'interférences.
2. Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.

5.4 RF Exposure Statements

5.4.1 FCC Radiation Exposure Statement

When the host product is marketed in the USA, the following RF exposure information must be included in the user manual.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. To comply with the FCC RF exposure compliance requirements, the separation distance between the antenna and a person's body (including hands, wrists, feet, and ankles) must be 63 cm (24.8 inches).

This transmitter must not be co-located, or operating in conjunction with, any other antenna or transmitter. The availability of specific channel and/or operational frequency bands are country-dependent, and are firmware programmed at the factory to match the intended destinations. The firmware setting is not accessible to the end user.

5.4.2 ISED Radiation Exposure Statement

When the host product is marketed in Canada, the following RF exposure information must be included in the user manual.

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment per ISED RSS-102 Issue 6. To comply with the ISED RF exposure compliance requirements, the separation distance between the antenna and a person's body (including hands, wrists, feet, and ankles) must be 47.0 cm (18.5 inches).

This transmitter must not be co-located, or operating in conjunction with, any other antenna or transmitter. The availability of specific channel and/or operational frequency bands are country-dependent, and are firmware programmed at the factory to match the intended destinations. The firmware setting is not accessible to the end user.

Cet équipement est conforme aux limites d'exposition aux rayonnements d'ISDE établies pour un environnement non contrôlé selon ISED RSS-102 numéro 6. Pour se conformer aux exigences de conformité en matière d'exposition aux RF d'ISDE, la distance de séparation entre l'antenne et le corps d'une personne (y compris les mains, les poignets, les pieds et les chevilles) doit être de 47,0 cm (18,5 pouces).

Cet émetteur ne doit pas être colocalisé ou fonctionner en conjonction avec une autre antenne ou émetteur. La disponibilité de canaux spécifiques et/ou de bandes de fréquences opérationnelles dépend du pays et est programmée par micrologiciel en usine pour correspondre aux destinations prévues. Les paramètres du micrologiciel ne sont pas accessibles à l'utilisateur final.

6 Warranty and Regulatory

This section provides details on FCC and IC compliance.

6.1.1 Warranty

XetaWave, LLC warrants your XetaWave product against defects in materials and manufacturing for a period of three years from the date of purchase. In the event of a product failure due to materials or workmanship, XetaWave will, at its discretion, repair or replace the product.

In no event will XetaWave, LLC, its suppliers or its licensors, be liable for any damages arising from the use of or the inability to use this product. This includes business interruption, loss of business information, or other loss which may arise from the use of this product. XetaWave products should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. XetaWave, LLC accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the XetaWave product, or for the failure of such product to transmit or receive such data.

Warranty policy may not apply if:

- Product repair, adjustments, or parts replacement is required due to accident, neglect or unusual physical, electrical or electromagnetic stress.
- Product is used outside of XetaWave specifications.
- Product has been modified, repaired, or altered by the customer unless XetaWave specifically authorized such alterations in each instance in writing.

The warranty period begins from the date of shipment and is defined per the standard warranty policy stated above.

Information in this document is subject to change without notice.

No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, or for any purpose without the express written permission of XetaWave, LLC.

This product is approved for use in the United States, Canada, and other countries designated by XetaWave, LLC. Diversion contrary to U.S. law is prohibited. Shipment or re-export of this product outside of the United States may require authorization by the U.S. Bureau of Export Administration. Contact XetaWave for assistance and further information.

6.1.2 Regulatory

6.1.2.1 FCC Compliance

FCC Declaration of Conformity

XetaWave, LLC, located at 258 South Taylor Ave, Louisville, CO 80027 (www.xetawave.com) declares under sole responsibility that the Xeta8 complies with the FCC standards as noted.

Model Number	Authorization	FCC ID
Xeta8	Title 47 CFR § Parts 1, 15, and 90; Specifically, 47 CFR § 1.1310, Table 1, Limits for General Population/Uncontrolled Exposure	PEJ-9283080

The Xeta8 complies with Title 47 CFR § Part 90 of the Code of Federal Regulations for licensed operation as an intentional transmitter in the 896-901 MHz and 935-940 MHz frequency bands.

The Xeta8 complies with Title 47 CFR § Part 15 of the Code of Federal Regulations as a Class B digital device when it is not operating as an intentional transmitter (e.g. during operation as a receiver).

The Xeta8 is approved for use only when installed in products designed by XetaWave, LLC. All products in which the Xeta8 is integrated must be installed and configured professionally. Changes or modifications not expressly approved by XetaWave LLC will invalidate the user's authority to operate the equipment.

6.1.2.2 IC Compliance

XetaWave, LLC, located at 258 South Taylor Ave, Louisville, CO 80027 (www.xetawave.com) declares under sole responsibility that the Xeta8 complies with the IC standards as noted.

Family Number	Authorization	IC ID
Xeta8	RSS-GEN, RSS-102, RSS-119, SRSP-506, and ICES-003	11169A-08001

These devices must be operated as supplied by XetaWave, LLC. Any changes or modifications made to the device without the express written approval of XetaWave, LLC may void the user's authority to operate the device.

Ces appareils doivent être utilisés comme fournis par XetaWave, LLC. Toute modification ou modification apportée à l'appareil sans l'approbation écrite expresse de XetaWave, LLC peut annuler l'autorité de l'utilisateur pour exploiter l'appareil.

The XETA8 has been tested and found to comply with the limits for a Class B digital device, pursuant to RSS-GEN, RSS-102, RSS-119, and ICES-003.

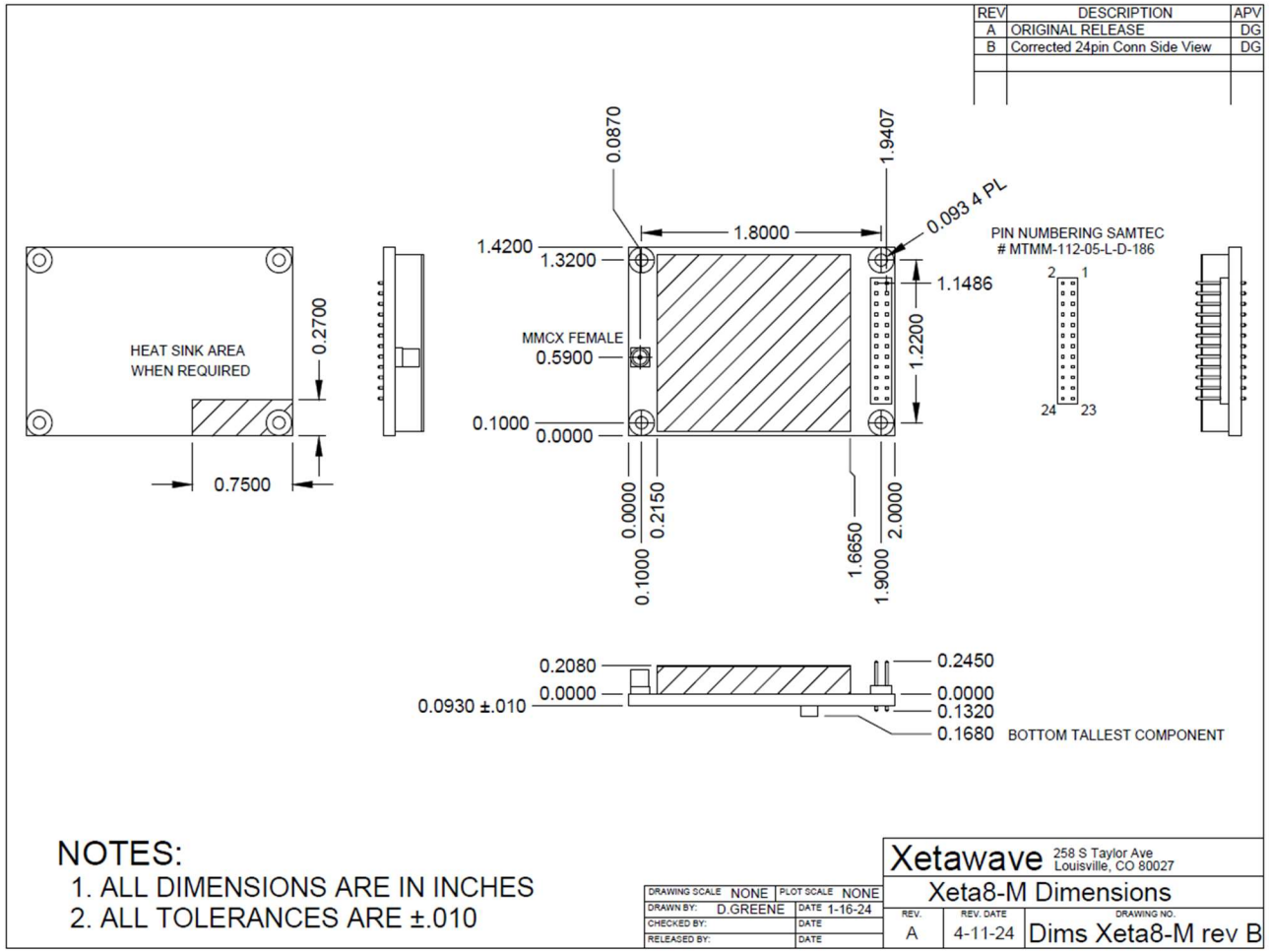
Le XETA8 ont été testés et jugés conformes aux limites d'un appareil numérique de classe B, conformément au RSS-GEN, RSS-102, RSS-119 et ICES-003.

7 Mechanical Design

This section offers information on the dimensions and best practices of the Xeta8 Radio Module.

7.1 Heat Sink

The Xeta8 has an area on one side of the board used to distribute heat from the unit. It is necessary to ensure that this designated area is mated to a surface that will allow heat to be dissipated away from the module.

7.2 Xeta8 Outline Drawing

The Xeta8 Radio Module footprint with mounting and interfacing details.