Microhard Systems Inc.

User Note

Microhard Systems Inc.

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1.0 Overview

This User Note contains information describing how to use the Radio Network Utility.

Radio Network queries may be run over an 'online' radio modem network to gather information related to the operational status of specific (addressable) modem. Also, a specified modem may also be configured remotely. Effect on the network's data throughput is minimal and in direct proportion to the complexity and frequency of the queries and commands.

Wired connection to a given modem, to access the Radio Network data, is via the front panel SERIAL DIAG (RJ45) port.

2.0 Connection to Modem

Note: In order to use the Radio Network program, the computer it is installed on MUST have MS XML 4.0 or later installed. MS XML can be found at the Microsoft website or at the following http address. http://msdn.microsoft.com/XML/XMLDownloads/default.aspx

There are two main types of connection which may be made to the modem:

- **Diagnostics/Configuration**

    The connection most often made between a PC and modem is for diagnostic and configuration purposes. The cable to be used for such a connection is Microhard System Inc. part number MHS044000 (black).

- **Upgrade**

    Modem firmware may be upgraded using the Radio Network utility. The cable required for this connection is different from the cable referenced above. To upgrade firmware, use cable part number MHS044010 (blue).

The SERIAL DIAG port supports connection to a PC COM port. Note that for the Diagnostic/Configuration connection, only RxD, TxD, and SG are utilized.

By Default the diagnostics data is transferred to/from the modem at 115200bps. The only user-selectable option with respect to the communications interface is selection of an available COM port (PC). If a given COM port is in use, the COM port number will be followed by (In Use).

2.0 Connection to Modem (continued)
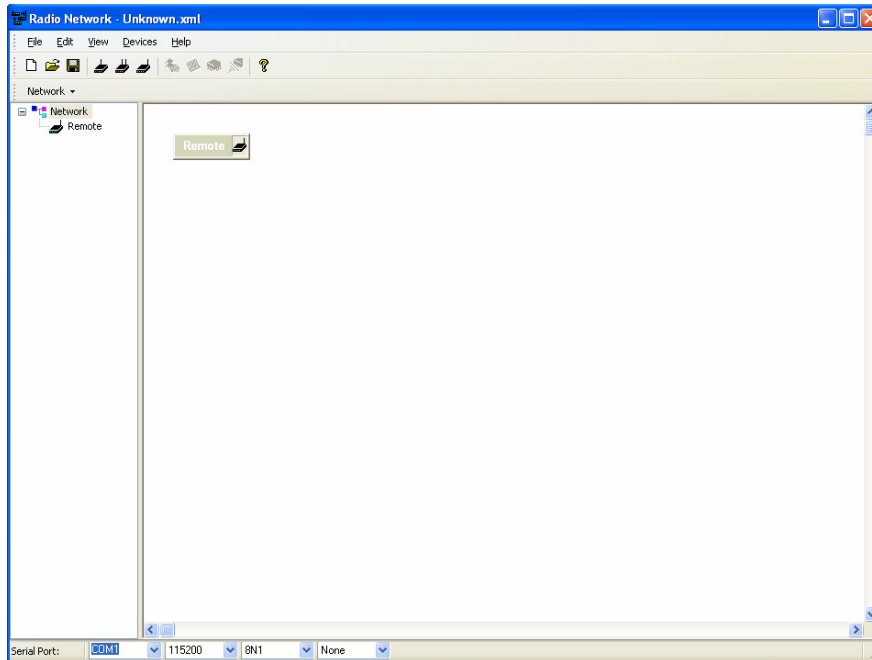
Upon launching the Radio Network Utility, the window shown at left will appear.

In this screen capture the default settings can be seen as: Serial Port: (COM1) (115200) (8N1) (None) as being selected for use.

The connection between the modem and PC is established when the correct Com Port, and target modem is selected.
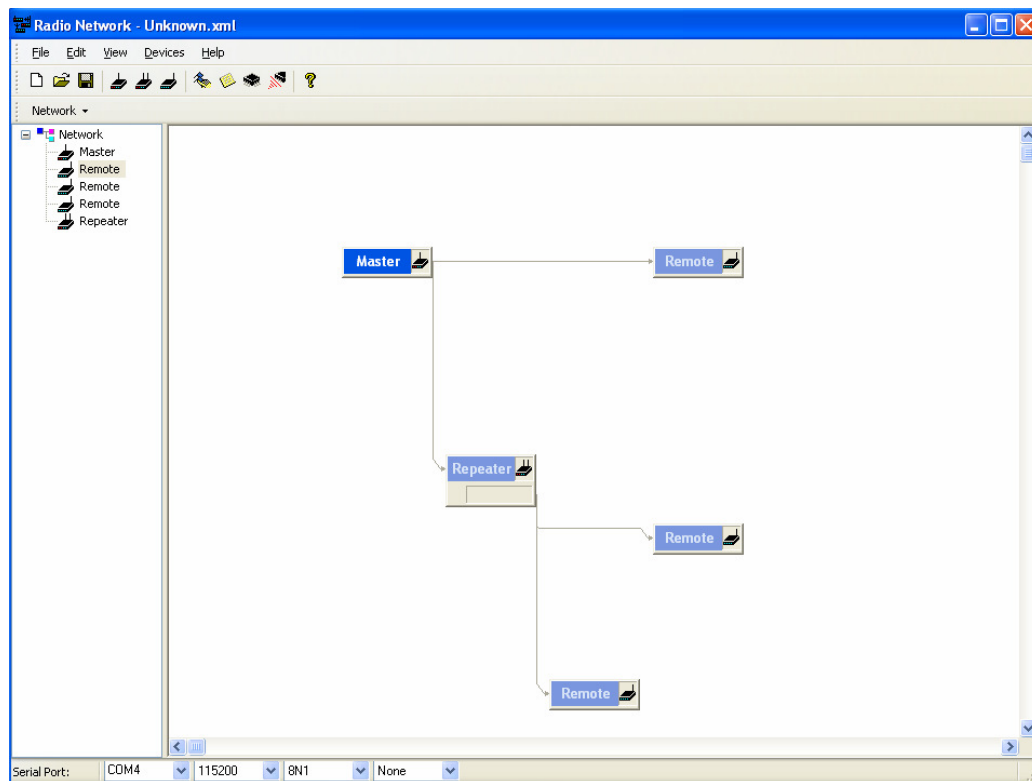
3.0 Network Configuration

The Main screen allows for easy setup of any network configuration. Toolbar tabs allow the user to layout the design and make changes as necessary.

Three buttons on the tool bar labeled 'Main', 'Repeater' and 'Remote' are the only buttons to be concerned with when initially setting up the wireless network.

Left clicking the mouse button on the toolbar icon holds a unit ready to be placed anywhere on the main screen. By left clicking the mouse again releases the unit onto the screen. If a unit needs to be repositioned, click and drag that unit using the mouse to its desired location. Showing connections (upstream/downstream) is done by clicking the picture of the unit and dragging the mouse to the destination unit till a line appears.

Completed Example of a Network setup

3.0 Network Configuration (continued)

At anytime new unit(s) can be added to the system by placing the new modem(s) and making a connection to its destination modem(s).
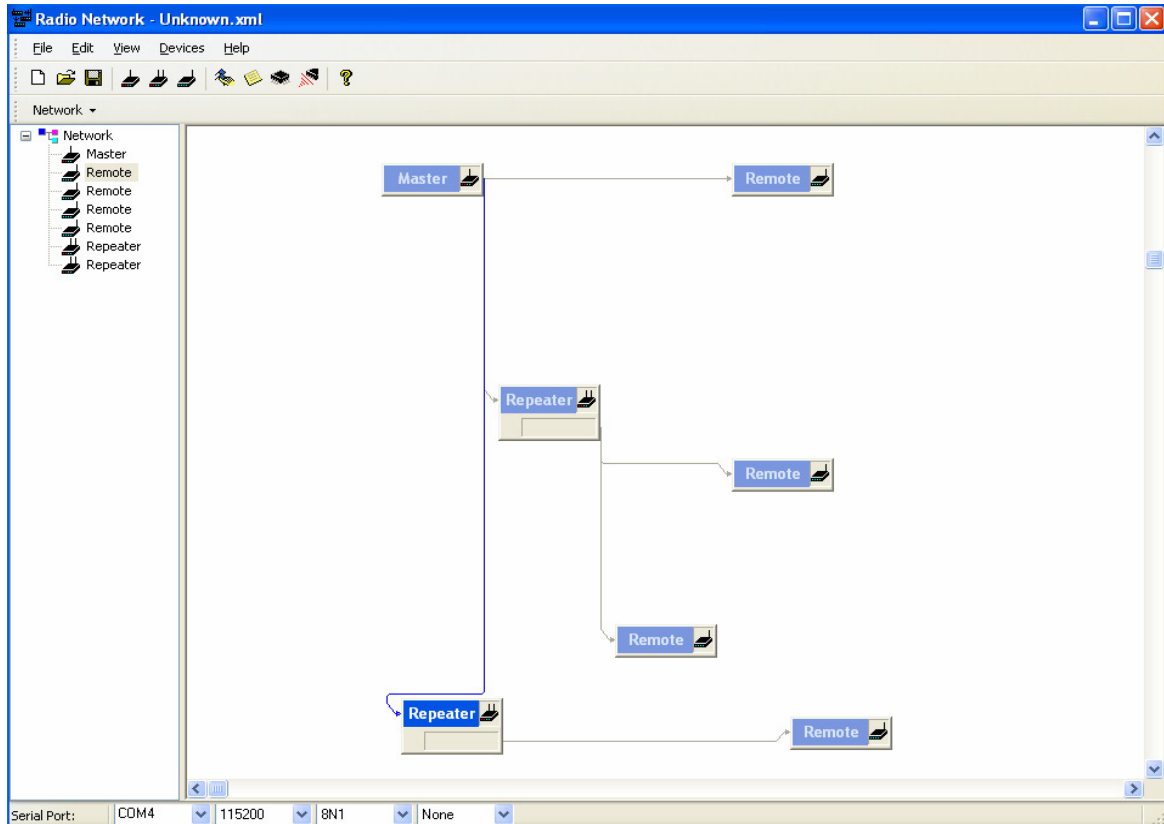
The modems can be renamed to make it easier to identify them individually. This can be done by either right clicking on the unit you wish to rename or using the option from the toolbar (see below).


Once the design of the network is completed you are ready to configure your modems, initially with the diagnostic cable. But once setup, changes to modems can be made over the air as well as diagnostics and updates.

4.0 Modem Configuration

The properties button on the toolbar will bring up information on the selected modem in your network (see image below).

The Properties screen brings up 3 tabs. On the 'Settings' tab we can read the information from the radio, make changes necessary and write this information back to the radio. Options on the left are shown below.
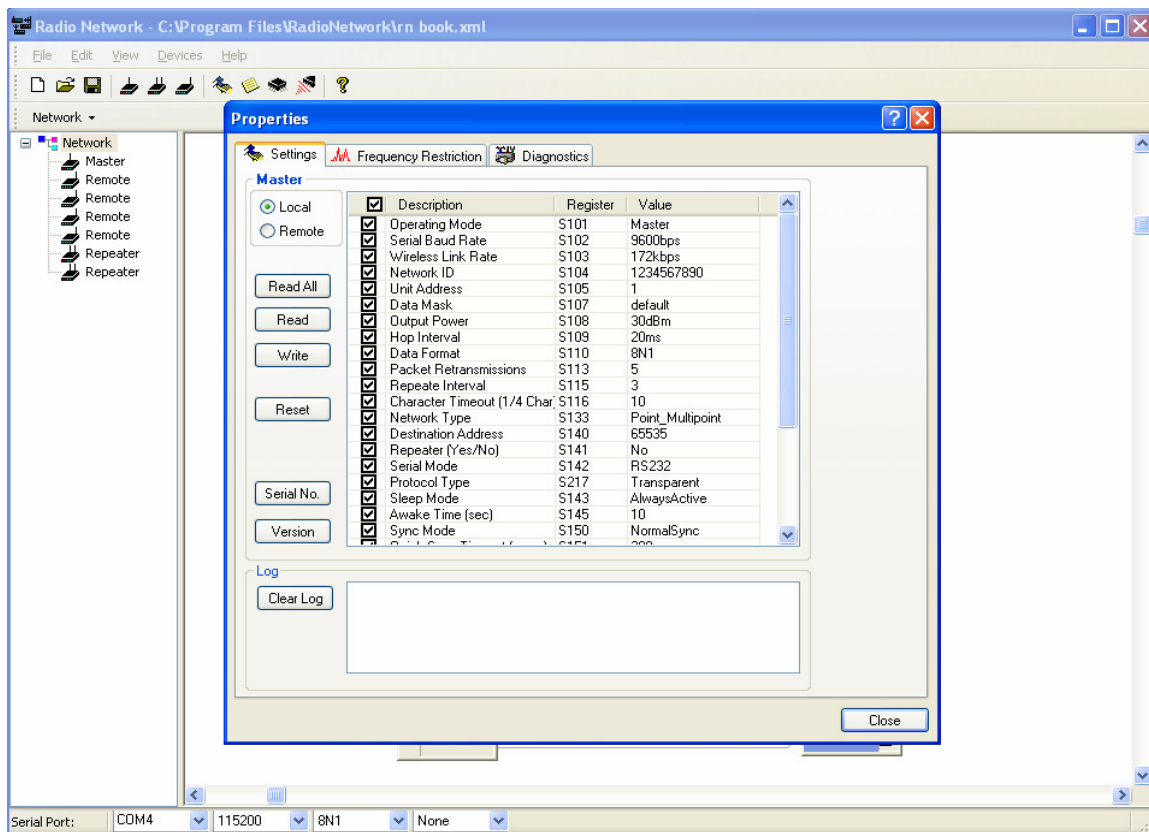
- Local or Remote

  Access to the radio is determined here, either 'Local' with the cable or 'Remote' over the air.

- READ All

  Selecting this 'button' will result in a query being sent to the specified modem interrogating All the parameters.

4.0 Modem Configuration (continued)

- READ

  Query is sent requesting values of the checked box parameters shown above. Note that a box next to the register must be checked in order to read or write that information to or from the modem.

- Write

  Information in the checked boxes is sent to the modem and written into memory.

- Reset

  Resets the modem. It is good practice to RESET then READ after a WRITE to verify that pa rameters have all been set as desired within a given modem.

- Serial No.

 Query is sent requesting the serial number of the modem.

- Version

  Query is sent requesting the version of the firmware of the modem.

- Clear Log

  This 'button' clears all information from the log screen.

5.0 Frequency Restriction

The next tab on the Properties screen is the Frequency Restriction tab. This gives the user the ability to restrict the modems from using certain frequencies on the network. The following is an example of entering Frequency Restrictions on the Radio Network utility.
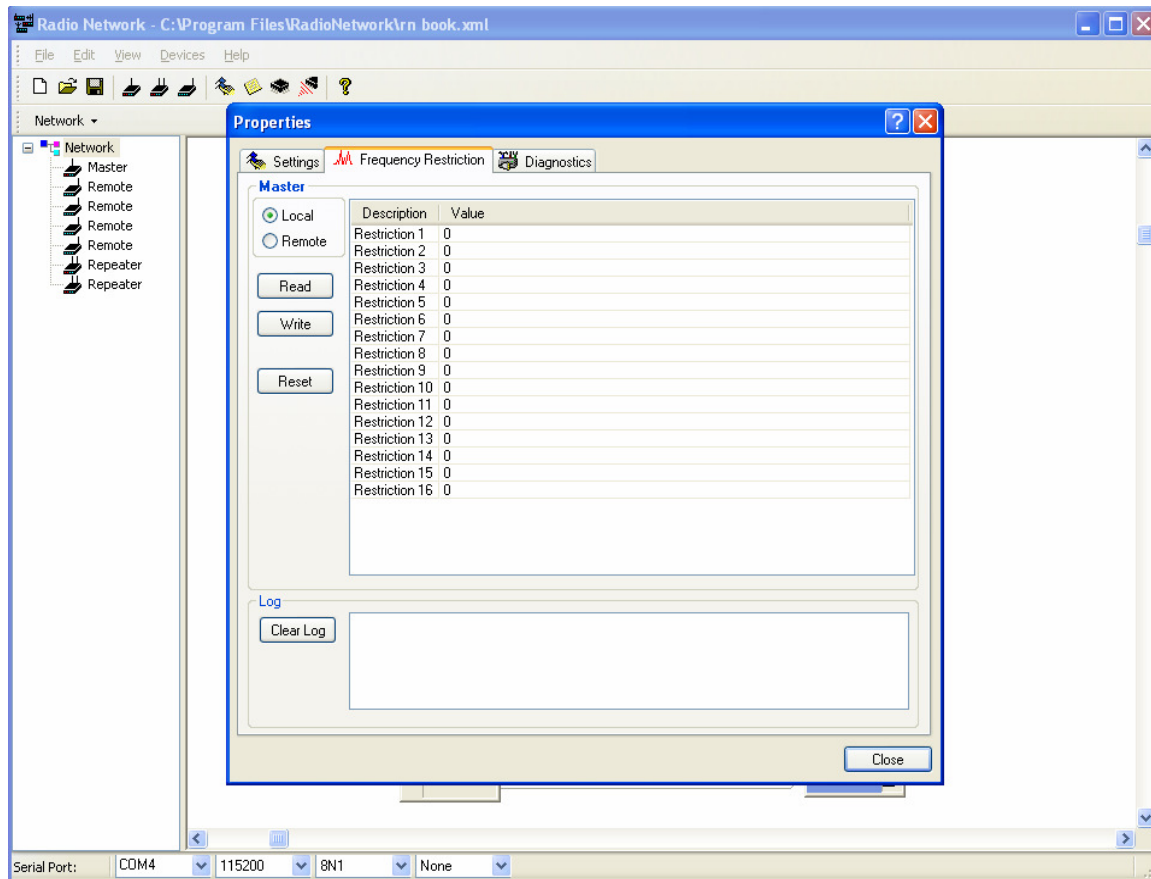
Note: All modems in the network must have the same frequency restrictions in them.

The Format for restricting is to name the unit address, the frequency you wish to start restricting and the end frequency you wish to restrict, next start frequency, next end frequency, etc

UA:StartFreq1,EndFreq1,StartFreq2,EndFreq2,StartFreq3,EndFreq3…..   Where UA is the Unit Address, StartFreq1 is the Starting Frequency to restrict, EndFreq1 is the Ending Frequency to restrict.
Example:
2:902400,903400

You would then Write this configuration into the memory of the modem.

6.0 Diagnostics

As with Settings and Frequency Restriction, the Diagnostic function is available. I.e. whether directly-connected to a specific modem or querying a distant modem connected to the network wirelessly, the user is able to see a 'snapshot' or poll the modem, information necessary to see how well the modem is functioning.
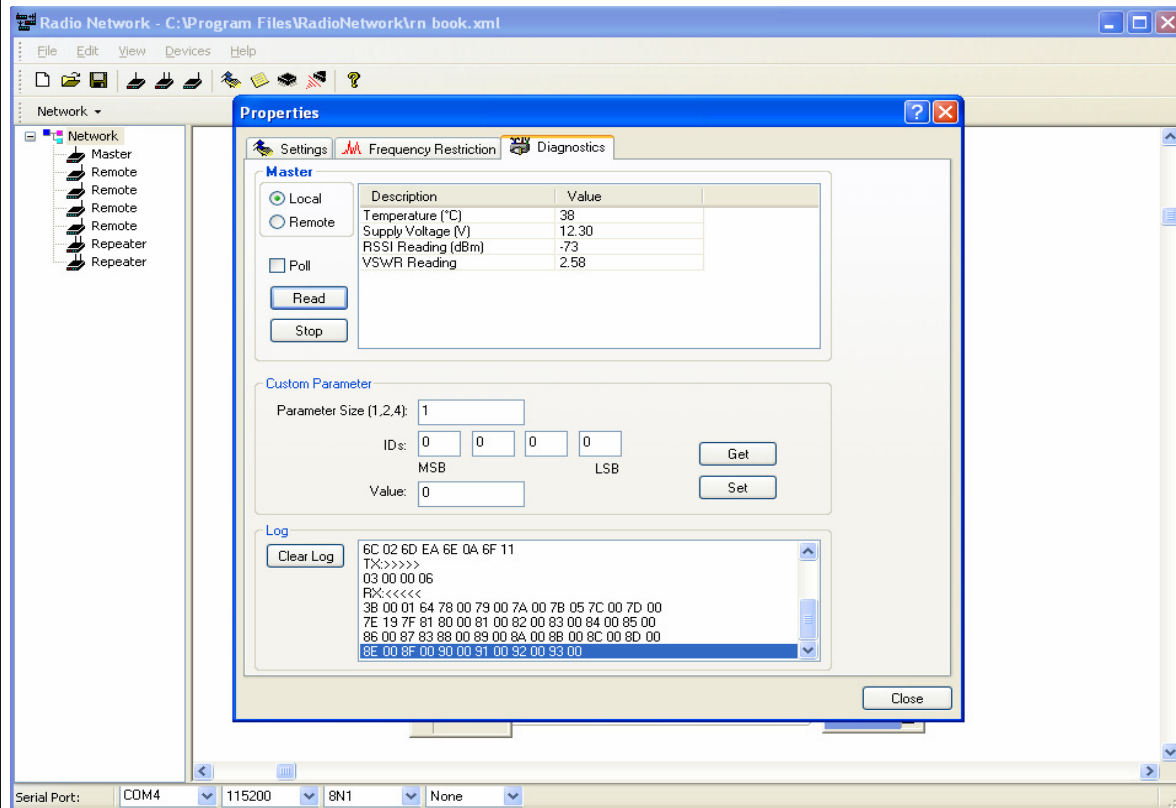
Values which may be interrogated are: Temperature (internal) (degrees Celsius), Supply Voltage (VDC), RSSI (receive signal strength) (dBm) and VSWR (reflected power) (mW).

A quick query of all parameters may be done by selecting 'Read".

For Regular updates of a modem check the box beside 'Poll'.

Clicking the 'Stop' button will stop the program from downloading any further diagnostic information.

The *Custom Parameter* section is used to change individual registers and make improvements on a configuration that requires special circumstances, and should not be used unless instructed to do so by Microhard Systems Inc. Support Personnel.

7.0 Firmware Upgrade

Firmware upgrades may be accomplished via the Radio Network utility, along with the required firmware upgrade cable and an appropriate .bin firmware file.

*Note that this program can also upgrade software over the air, via the Remote Upgrade toolbar button.

The procedure to upgrade locally is as follows:

1. Connect firmware upgrade cable (Blue cable) between PC (running Radio Network utility) and target modem.
2. Select the 'Hard Upgrade' tab on the main screen toolbar.
3. BROWSE to the desired .bin file.
4. Select the 'PROGRAM' button.
5. There will be 'upgrade status' text scrolling in the text box... WAIT until an UPGRADE COMPLETED message appears. At that time the upgrade will have been successfully completed.
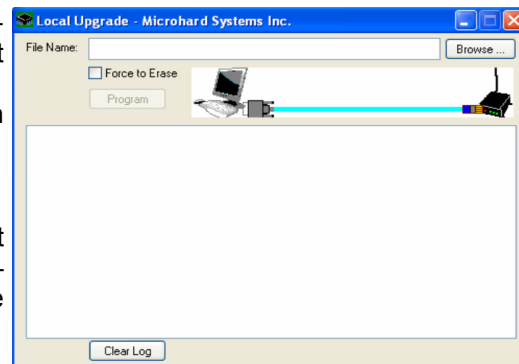
The procedure to upgrade over the air is as follows:
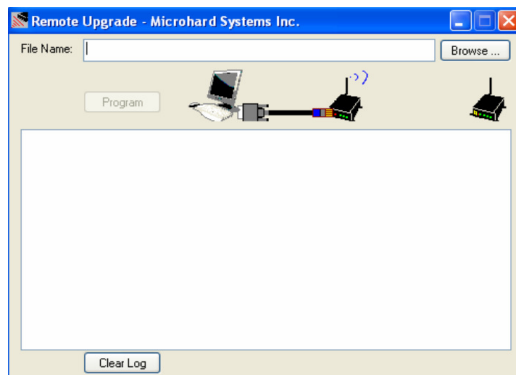
1. Connect diagnostic cable (Black cable) between PC (running Radio Network utility) and modem.
2. Select the target modem and read all information from the modem.
3. Select the 'Soft Upgrade' tab on the main screen toolbar.
4. Browse to the desired .bin file.
5. Select the 'PROGRAM' button.
6. There will be 'upgrade status' text scrolling in the text box… WAIT until an 'UPGRADE COMPLETED' message appears. At that time the upgrade will have been successfully completed

Appendix A: S Registers

S0
Auto Answer
modem will power-up in command mode
*modem will power-up in data mode

S2
Escape Code
contains ASCII value of escape character
*'43' is default value, which represents the ASCII character '+'
values greater than 127 disable the escape feature and prevent
user from returning to command mode
changes cannot be stored to non-volatile memory

S101
Operating Mode
Master
Repeater
Slave

S102
Serial Port Baud Rate (bps)
- 230400
- 115200
- 57600
- 38400
- 28800
- 19200
- 14400
- *9600

S103
Wireless Link Rate (bps)
19200
115200
*172800
230400

- 4800
- 4800
- 3600
- 2400
- 1200
- 600
- 300

S104
Network ID
0-4,000,000,000
*1234567890

S105
Unit Address
2-65534 (master is 1, broadcast is 65535)

S107
Bit Mask
-up to 16 characters

S108
Output Power Level
20-30dBm
*30 (1W)

S110
Data Format (of Asynchronous serial input to modem)
- *8N1
- 8N2
- 8E1
- 8O1
- 7N1
- 7N2

S113
Packet Retransmissions
0-65535
*5

S118
Roaming
65535-roaming enabled
1-254-fixed upstream unit
*1

- 7E1
- 7O1
- 7E2
- 7O2
- 9N1

S123
RSSI Value (dBm, read only)

S133
Network Type
Point-to-Multipoint (PMP)
Point-to-Point (PP)
Peer-to-Peer (P2P)

S140
Destination Address
1-65535

S141
Repeater Existence
*no repeater
1 or more repeaters exist

S142
Serial Channel Mode
*RS-232 interface
half-duplex RS-485
full-duplex RS-485

S143
Sleep Mode
*alwaysactive (no sleep)
sleep mode 1, stays awake on local and air data
sleep mode 2, stays awake only on local data (no longer sup-
    ported?)
sniff mode 1, stays awake on local and air data
sniff mode 2, stays awake only on local data
new sleep modes, developed for application, not 100% defined

***Notes Default setting

***Notes Default setting

Appendix A: S Registers (Continued)

S144
Sleep Duration (seconds)
0-65535
*60

S145
Awake Timeout (seconds)
0-65535
*10

S149
LED Brightness (%)
0-100
*100

S151
Quick Sync Timeout (ms)
100-65534
*200

S153
Address Tag
Enable
*Disable

S237
Sniff Duration (hops)
1-255
*10

S158
FEC Mode
*None
Hamming(7,4)
Hamming(15,11)
Hamming(37,24)
Binary BHC(47,36)
Golay(23,12,7)
ReedSoloman(15,11)

&K
Hardware Handshaking
*None
Hardware

&S
DSR Signaling
*AlwaysOn
DataModeOn
RemoteDTR

&D
DTR Signaling
*DTR Ignored
Command Mode Control

*Notes Default setting

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