



Human Network Technology

M1503 Service Manual

June 2011

HuneTec Co.,Ltd

GENERAL INFORMATION

1. Introduction

- Small Size and Light Weight for Portability
- ReFLEX Two-way Messaging
- Graphic User Interface for Easy Use
- Personal Information Management Support
- PC Connectivity for Data Back-up and Restoring with Desktop PC

2. RF Specification

- Tx Frequency Range: 896 MHz ~902MHz
- Rx Frequency Range: 929 MHz ~932MHz, 935 MHz ~942MHz
- Channel Spacing: 12.5 KHz/10KHz
- Frequency Deviation: 800Hz and 2400Hz
- Signaling Modulation: 4 level FSK

3. Physical Specification

- Operating temperature range: -10°C ~ +50°C (32F~122F)
- Dimensions
 - Size: 77×53×17mm
 - Weight: 65grams
- **Power Consumption**
 - **Batteries: Li-Polymer 800mA rechargeable battery**
 - **Stand-by Time: 10 days**
 - **Recharging Time: 2 hours**
 - **Rx Consumption: 45mA**
 - **Tx Consumption: 800mA**
 - **Idle Current: 1.0mA**

- Display
 - Full-graphics high-contrast screen
 - Resolution 160×64dots
 - Lines by 24 characters
 - LED back lighting
 - 4 gray LCD

- Accessories
 - Belt clip
 - Dock

HuneTec
Human Network Technology

Product Overview

M1503 are Small Size and Light Weight for Portability, microcomputer-controlled frequency modulated transceivers. Each M1503 has a AMPIRE™ Liquid Crystal Display (LCD), and is powered by a BYD™ Li-Polymer battery. The receiver operates in the 929 MHz ~932MHz, 935 MHz ~942MHz range; the transmitter operates in the 896 MHz ~902MHz range.

1. Housing

The M1503 is housed in a high-impact plastic case which offers excellent protection against dust intrusion, vibration, and shock. Small and light weight, the unit is designed to be clipped onto your belt or fit comfortably in a shirt or jacket pocket.

2. Features

- Attractive, miniature styling
- High-contrast, graphic dot-matrix liquid crystal display (LCD)
- High-visibility backlighting
- Microprocessor control with advanced software algorithms
- Out-of-Range and low battery indicators
- Real-time clock with time, date and alarm
- Battery backed message memory with time and date stamp
- User-selectable alert screen with musical alert, chirp alert, standard alert, vibrate, and no alert
- Li-Polymer rechargeable battery

3. Optional Alert Features

The M1503 also provides the following optional alert features:

- Vibrator alert
- No alert
- Reminder alert

4. Liquid Crystal Display (LCD)

The LCD provides a full-graphics high contrast screen, resolution 160×64 dot-matrix display for easy readability. The LCD also features a LED backlight for reading the display in low-light conditions. The LCD is capable of displaying up to line by 24 characters by using multi font(large/small) display.

5. General Operation

This section describes the general operation of the following areas:

- System Acknowledge

The M1503 automatically acknowledges the receipt of a message by transmitting an acknowledge transmission (ACK), indicating the receipt of the message. The M1503 also transmits a negative acknowledge (NACK) when messages are not received correctly. If the transmits a NACK, the system resends the message.

- Acknowledge Read message

M1503 is respond automatically when the user reads the message. A message is considered read when it displays on the read screen or is moved to the personal folder. A message is considered not read when it is merely viewed on the message preview screen.

- User Reply

User reply is an optional feature that routes back to the calling party. The reply is selected from preprogrammed responses stored in the M1503, or multiple choice responses originating from the calling party that are included with the message.

- Signature Tracking

The messaging system uses signature tracking to link sent messages to their responses. Signature expiration ensures that a response to an old message does not mistakenly link to a new message with the same signature.

- Registration Request

Registration allows nationwide systems to track the M1503 from region to region. The system then transmits messages only to that region. Automatic registration is enabled/disabled by the allow auto-registration option.

The registration request message generates on the following occasions:

- A valid zone change – The M1503 monitors the Zone ID field in the ReFLEX25 frame header. When the M1503 recognizes that the frame header has changed, the PIC automatically sends a registration message after a programmable delay.
- Power up – Upon power up, the M1503 automatically transmits a registration request.

- A change from out-of-range to in-range - When the M1503 goes out of forward—channel range, and then returns within forward-channel range, it automatically transmits a registration request after a programmable delay.
- Failed reply causes the M1503 to try and register

6. Paging Operation

M1503 can be configured to accept alphanumeric-display, numeric-display. When a message is received, the M1503s a 2 or 12 second alert depending on M1503 programming.



Theory of Operation

The M1503 consists of a Radio Frequency (RF) transceiver and a microcomputer-controlled decoder, referred to as the controller.

Messages are received from an RF carrier that is frequency modulated by a coded binary sequence. The circuits in the transceiver section, through a triple-conversion process, convert the RF signal to a low frequency signal that is passed on to the controller. The controller processes the coded data using digital techniques, and controls message memory, Liquid Crystal Display (LCD), and alert tones.

The controller processes coded messages, and forwards the messages to the transmitter. The transmitter section generates a modulated RF carrier signal, amplifies the signal, and then radiates the signal through the antenna.

The following describes the general theory of operation for the M1503 circuit descriptions, detailed functional block diagrams, and schematics for the transceiver and controller are explained in the applicable sections of this manual.

1. Operating Power

The transceiver and controller circuit board obtain power from the following sources: A 3.7 volt rechargeable Li-Polymer battery Provides power to the 3-volt regulator and the transmitter power amplifier.

FCC Compliance Information

This device complies with Part 15 of 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

Information to User

“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.

Caution : The user who makes Changes or Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

SAR INFORMATION

THIS MODEL WIRELESS PAGER MEETS THE GOVERNMENT'S REQUIREMENTS FOR EXPOSURE TO RADIO WAVES.

Your wireless pager is a radio transmitter and receiver. It is designed and manufactured not to exceed the emission limits for exposure to radiofrequency (RF) energy set by the Federal Communications Commission of the U.S. Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

The exposure standard for wireless pager employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6 W/kg. * Tests for SAR are conducted with the wireless pager transmitting at its highest certified power level in all tested frequency bands. Although the SAR is determined at the highest certified power level, the actual SAR level of the wireless pager while operating can be well below the maximum value. This is because the wireless pager is designed to operate at multiple power levels so as to use only the power required to reach the network. In general, the closer you are to a wireless base station antenna, the lower the power output.

Before a wireless pager model is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the government adopted requirement for safe exposure. The tests are performed in positions and locations (e.g., at the ear and worn on the body) as required by the FCC for each model. The worn on the body, as described in this user guide, is 1.110mW/g. (Body-worn measurements differ among wireless pager models, depending upon available accessories and FCC requirements). While there may be differences between the SAR levels of wireless pager and at various positions, they all meet the government requirement for safe exposure.

The FCC has granted an Equipment Authorization for this model wireless pager with all reported SAR levels evaluated as in compliance with the FCC RF exposure guidelines. SAR information on this model wireless pager is on file with the FCC and can be found under the Display Grant section of <http://www.fcc.gov/oet/fccid> after searching on FCC ID: RNGM1503RFX

Additional information on Specific Absorption Rates (SAR) can be found on the Cellular Telecommunications Industry Association (CTIA) web-site at <http://www.wow-com.com>.

* In the United States and Canada, the SAR limit for wireless pager used by the public is 1.6 watts/kg (W/kg) averaged over one gram of tissue. The standard incorporates a sub-stancial margin of safety to give additional protection for the public and to account for any variations in measurements.

BODY-WORN OPERATION

This device was tested for typical body-worn operations with the back of the wireless pager kept 1.0 cm from the body. To maintain compliance with FCC RF exposure requirements, use only belt-clips, holsters or similar accessories that maintain 1.0 cm separation distance between the user's body and the back of the wireless pager, including the antenna. The use of belt-clips, holsters and similar accessories should not contain metallic components in its assembly. The use of accessories that do not satisfy these requirements may not comply with FCC RF exposure requirements, and should be avoided. For more information about RF exposure, please visit the FCC website at www.fcc.gov.