# MobileCollect™

## Hardware Components

# User's Guide

MICRORIDGE

*Measurement Collection Specialists*
*Connect Any Gage into Any Software*

# MobileCollect Hardware Components



Created: Monday, September 28, 2020 at 9:40 AM in Sunriver, Oregon.

***This User's Guide has been formatted for double-sided printing.***

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# 1 Introduction

MobileCollect is a wireless data collection system designed for use on the factory floor, in the lab or any location where you need to connect gages or serial devices to a computer through a wireless connection. MobileCollect uses a wireless technology that is very power efficient and allows the user to obtain over 500,000 measurements from the battery in the Mini Mobile Modules. The MobileCollect product line consists of 4 different Bases (receivers), 2 Remotes (transmitters) and 3 different Mobile Modules (transmitters).

The MobileCollect wireless network that is created with the Base, Remotes and Mobile Modules is typically referred to as a Personal Area Network (PAN). The range of the MobileCollect wireless products is approximately 133 feet line-of-site. The actual distance for any application can be influenced by the environment around the wireless system.

### Base Receivers

The MobileCollect receivers are referred to as Bases. There are 4 different Bases that can be used with PCs and tablets.

| | |
|---|---|
| USB Base | Desktop Base that connects directly to a USB port on a PC. This Base is powered by the USB port. The dimensions of this base are 3.63 x 2.61 x 1.10 inches. |
| RS-232/USB Base | Desktop Base that connects directly to a DB9 RS-232 serial port or a USB port on a PC. When using the DB9 port, the Base is powered by a separate AC adapter. The dimensions of this base are 3.63 x 2.61 x 1.10 inches. |
| Wedge/USB Base | Desktop Base that connects directly to a USB port on a PC. This Base contains 2 USB connectors. The connector labeled Serial is used for serial communications. The connector labeled Wedge is used for the Keyboard Wedge mode. This Base is powered by the USB port that is connected to your computer. The dimensions of this base are 3.63 x 2.61 x 1.10 inches. |
| USB MicroBase | Base built into a USB stick. This Base is powered by the USB port. The dimensions of this base are 1.79 x .79 x .42 inches. |

### Mobile Module Transmitters

| | |
|---|---|
| Mini Mobile Module | This module supports multiple brands of digital and some RS-232 gages. Supported brands include Brown & Sharpe, CDI, Fowler, Insize, LMI, Mahr Federal, Mitutoyo, Ono Sokki, Starrett, Sylvac, etc. This module is less than half the size (measured on a volume basis) of a Command or RS-232 Mobile Module. In tests run with a Mini Mobile Module connected to a Mitutoyo caliper, over 500,000 measurements were obtained from the battery. The dimensions of this module are 1.70 x 1.17 x .59 inches. This module uses a CR2032 coin cell lithium battery rated at 240 mAh. |
| Command Mobile Module | This module supports all of the gages supported by the Mini Mobile Module and allows you to send commands from a Base to the Mobile Module. These commands include the ability to tell the Mobile Module to initiate a gage reading, tell the module to go to sleep, etc. The dimensions of this module are 2.13 x 1.47 x .79 inches. This module uses a CR2 Photo lithium battery rated at 750 mAh. |
| RS-232 Mobile Module | This module supports serial devices that output full RS-232 voltage levels. This module is the same size and uses the same battery as the Command Mobile Module. |

### Remote Transmitters

| | |
|---|---|
| Digital Remote | The Digital Remote is used when you have a digital gage in a non-mobile setup that you want to connect to the wireless system. This Remote is powered by a USB AC adapter. The dimensions of this base are 3.63 x 2.61 x 1.10 inches. |
| RS-232 Remote | The RS-232 Remote is used when you have an RS-232 serial device, such as a gage interface or a scale, in a non-mobile setup that you want to connect to the wireless system. This Remote is powered by a USB AC adapter. The dimensions of this base are 3.63 x 2.61 x 1.10 inches. |

### Base to Host Computer Communications Cable

Each Base must be connected to a computer so that the data received by the Base can by sent to and processed by an appropriate application. The USB Base, USB MicroBase and Keyboard Wedge/USB Base are connected to a USB port on your computer. The RS-232/USB Base can be connected directly to a 9-pin serial port or a USB port on your computer.

**If you are connecting to a USB port on your PC for serial communications, be sure to install the USB drivers before you connect the USB device to your computer. The USB drivers are included on your MobileCollect CD. If you are using the Keyboard Wedge/USB Base in the wedge mode, no special drivers are required.**

### Computer

The computer used to capture measurement data from a MobileCollect Base can be any model and it does not matter what operating system you are using. All that matters is that your computer has a serial or USB port. If you are using a USB port, you will need the appropriate drivers to support the USB connection. Remember that whether you are using a serial port or USB port, it all looks like a serial port to your application.

The MobileCollect Setup software requires Microsoft Windows and has been tested on the Windows 7 and later operating systems. This software should also work on Windows XP. If you have any problems with the MobileCollect Setup software, please Contact MicroRidge Systems [91].

### Application Software

You will need an application program to read the data from the serial or USB port. The data formatting options available within the Base allow you to use MobileCollect with virtually any software application.

If you are trying to get the data into an application that only accepts keyboard input, you should install WedgeLink Xpress from the MobileCollect CD. WedgeLink Xpress is a free keyboard wedge software utility that will transfer serial data directly into the application. A very common application that requires the use of a keyboard wedge is Microsoft Excel.

### MobileCollect on the Web

Additional information about MobileCollect options, applications and updates can be found on the MicroRidge web site.

| | |
|---|---|
| MicroRidge Home Page | www.microridge.com |
| MobileCollect | www.microridge.com/wl_mobilecollect.htm |
| Firmware updates | www.microridge.com/wl_downloads.htm |

### MicroRidge RM2.4 Radio Module

All of the currently shipping MobileCollect products use the RM2.4 Radio Module designed by MicroRidge. Prior to the RM2.4 Radio Module, MobileCollect used the ATZB Radio Module manufactured by Atmel. The transition from the ATZB to the RM2.4 Radio Module in MobileCollect products began in January 2016 and was completed in February 2018. All MobileCollect products containing the RM2.4 and ATZB Radio Modules are compatible with each other. The radio used in the RM2.4 Radio Module offers greater capabilities and features than what was available in the prior ATZB Radio Module.

Products containing the RM2.4 Radio Module display this logo on the product label.

### Country Certifications & Approvals

MobileCollect has been approved for use in North America (Canada, United States and Mexico), South America, Europe, Australia and New Zealand. MicroRidge Systems has not obtained approval for operation in other parts of the world. If your application for MobileCollect is for other regions, contact us about the status of the approvals for your area. The radio used in MobileCollect operates in the Industrial, Scientific & Medical (ISM) frequency band at 2.4 GHz.

The approvals allow for the USB Base, USB MicroBase, RS-232 Base, RS-232 Remote and Mobile Modules to be closer than 8.7 inches (22 cm) to an individual.

The following statement is included in this manual for the USB MicroBase and Mobile Modules. A similar statement is already displayed on a label on the bottom of the larger Base units.

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
2. This device may not cause harmful interference, and
3. This device must accept any interference received, including interference that may cause undesired operation.

The wireless approvals for the MobileCollect components are covered under the following:

| | | |
|---|---|---|
| FCC ID:<br>IC: | U6TZIGBIT-A2<br>7036A-ZIGBITA2 | Radio certification numbers for the ATZB Radio Module |
| FCC ID:<br>IC: | VW4A090664<br>11019A-090664 | Radio certification numbers for the ATZB Radio Module |
| FCC ID:<br>IC | 2ACNQRM2<br>12298A-RM2 | Radio certification numbers for the RM2.4 Radio Module |
| C-Tick: | N24679 | Certification number for Australia and New Zealand |

### User's Guide Organization

This User's Guide covers all hardware components and accessories available for MobileCollect. This document has been designed for double sided printing. If you print this document single sided, there will be several blank pages included in the printout.

If you are viewing the PDF version of this User's Guide, you will see page numbers to the right of links within the PDF document. For example the number to the right of the Contact MicroRidge Systems 91 link indicates the actual page number this link is directed to.


All MobileCollect transmitters and receivers are in compliance with the European Union Directive on the restricted use of certain hazardous substances (RoHS/RoHS2 Directive). For more information review the ***RoHS Declaration of Compliance*** document on the MicroRidge web.


Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 is commonly referred to as REACH. REACH stands for the Regulation for Registration, Evaluation, Authorization, and Restriction of Chemicals. The REACH Regulation entered into force on 1st June 2007 to streamline and improve the former legislative framework for chemicals of the European Union (EU) and European Economic Area (EEA) countries.

REACH compliance is only mandatory on products produced in or shipped into the European Union (EU) and member countries. However, since many other jurisdictions have similar or pending legislation and manufacturers' products may eventually find their way into the EU, REACH compliance is having a global effect.

All current MicroRidge produced products are in compliance with REACH and do not contain any of the currently listed SVHC (substance of very high concern) in concentrations of 0.1% or above. For more information review the ***REACH Declaration of Compliance*** document on the MicroRidge web.

## 1.1 Wireless Communications

To obtain the maximum range from MobileCollect, you need to pay close attention to the placement of the Bases, Remotes and Mobile Modules, and the obstacles between the units. It is important to understand what the RF transmission pattern looks like so that you can make appropriate decisions on the placement and use of MobileCollect. The illustration below shows transmitters and receivers with external antennas. The antennas in MobileCollect products are

internal antennas. Even though you may not see the antenna, the same rules apply for both internal and external antennas.


**Role of Transmitter & Receiver**

The transmitter's (Mobile Modules and Remotes) role in wireless communications is to feed a signal to an antenna for transmission. A radio transmitter encodes data into RF waves with certain signal strength (power output) to project the signal to a receiver (USB Base, RS-232 Base, etc.).

The receiver receives and decodes data that comes through the receiving antenna. The receiver performs the task of accepting and decoding designated RF signals while rejecting unwanted ones.

The space between the transmitter and receiver is the system's environment. Physical obstructions and noise (interference) can enter into the environment and limit the system's ability to get information from one place to another. Range-reducing elements are commonly introduced into simple wireless communications systems in the form of walls, people, machinery, etc.

**Visual vs. RF Line-of-Sight**

Attaining RF Line-of-Sight (LOS) between the sending and receiving antennas is essential in achieving the longest possible wireless communication range. There are 2 types of LOS that are generally used to describe an environment:

1. Visual LOS is the ability to see from one site to the other (transmitter to receiver). It requires only a straight linear path between two points.
2. RF LOS requires not only visual LOS, but also a football-shaped path free of obstacles for data to optimally travel from one point to another. This football-shaped path is called the Fresnel zone.

In order to achieve the greatest range, the football-shaped path in which radio waves travel must be free of obstructions. Buildings, walls, machinery or any other obstacles in the path will decrease the communication range. If the antennas are mounted just barely off the ground, nearly half of the Fresnel Zone ends up being obstructed by the earth resulting in significant reduction in range. To avoid this problem, the antennas should be mounted high enough off of the ground so that the earth does not interfere with the central diameter of the Fresnel Zone.

The diameter of the Fresnel Zone (midway between the transmitter and receiver) varies with the frequency of the wireless system and the distance between the transmitter and receiver. The table below shows the diameter for MobileCollect at 2.4 GHz at various distances between the transmitter and receiver.

| Distance, feet | Fresnel Zone Diameter, feet |
|---|---|
| 10 | 1.0 |
| 50 | 2.3 |
| 100 | 3.2 |
| 150 | 3.9 |
| 200 | 4.5 |
| 300 | 5.5 |
| 500 | 7.2 |

**Transmitter & Receiver Placement Guidelines**

The general recommendation is to keep at least 80% of the Fresnel Zone clear of obstructions. You should place the receiver in an elevated location away from metal objects so that the football shaped RF transmission zone is free of obstacles.

When using the Mobile Module, you will always have the best signal strength if the Mobile Module is in direct line-of-sight of the receiver. If you place your body between the Mobile Module and the receiver, you will loose some signal strength.

# 2 Setup Programs

There are 2 Setup Programs available for configuring a MobileCollect system.

| | |
|---|---|
| Xpress Setup | Easy to use Windows based Setup Program that covers the features required by most users. |
| Extended Setup | Windows based Setup Program that covers the all the features supported by MobileCollect. |

When do I need to use a Setup Program?

- If you are using Mobile Modules and/or Remotes to send data to a Base and you want to use the factory defaults (single read and no special formatting), you do not have to use a Setup Program. You will need to pair the Mobile Modules with the Bases by using the Mobile Module Pair-on-the-Fly 34 method. For the Remotes, you will use the Remote Pair-on-the-Fly 26 method.
- If you are only using Bases and Mobile Modules and you need to do some special configuration, you can use either Setup Program. You should try to use the Xpress Setup Program. The Xpress Setup Program is easier to use than the Extended Setup Program and their is a good chance that it will meet your needs.
- If you are using Remotes in your system and you need to do some configuration, you must use the Extended Setup Program to configure your system.
- If you are using the Command Mobile Modules with the Command Mode Enabled, you must use the Extended Setup Program to configure your system.

Each Setup Program is described in its own User's Guide. The User's Guides are available as PDF documents and can be accessed from the MobileCollect CD and the Help menu in the Setup Programs.

- MobileCollect Xpress Setup User's Guide
- MobileCollect Extended Setup User's Guide

# 3 Base Receivers

The Base is in charge of and controls the MobileCollect network. In order for a Remote or Mobile Module to communicate to a Base, the Remote or Mobile Module must be paired with the Base. When a pairing occurs, the network identifiers (RF channel, Network S/N and PAN ID) for the Base are stored in the Remote or Mobile Module. Since each Base unit has a unique set of network identifiers, you can have multiple Bases sitting next to each other and each Base will only process the data from units that have been paired with that Base.

The current MobileCollect Bases are listed below.

- USB Base
- USB MicroBase
- RS-232/USB Base
- Wedge/USB Base

### Baud Rates and Communication Parameters

The Bases can be set to any of the following baud rates. The communication parameters are preset to N-8-1 (parity, data bits and stop bits) and cannot be changed.

- 9600 (factory default)
- 19.2K
- 38.4K

### Setup Programs

If you need to configure a Base, you must use one of the 2 Setup Programs.

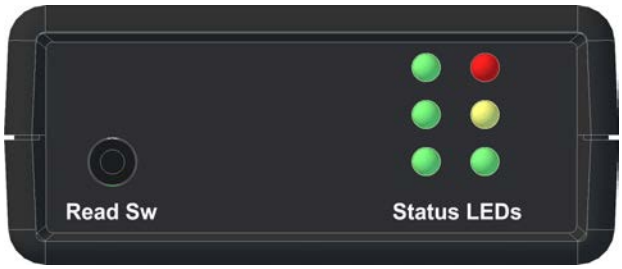
| | |
|---|---|
| Xpress Setup Program 11 | Easy to use Windows based Setup Program that covers the features required by most users. |
| Extended Setup Program 11 | Windows based Setup Program that covers the all the features supported by MobileCollect. |

## 3.1 USB Base


**MobileCollect USB Base**

The USB Base is one of the MobileCollect Base units. You must install USB drivers on your computer prior to connecting the USB Base to a USB port on your computer. The required USB drivers are on the CD included with your wireless system.

### Front Panel




**CAD Drawing of USB Base Front Panel**
**(Labels are shown for reference only)**

The standard MobileCollect USB Base comes with a single read switch connector for a foot or hand switch. There is an option to increase the number of read switch connectors on the USB Base from 1 to 3. Contact MicroRidge Systems [91] about increasing the number of read switch connectors.

There are 2 banks of LEDs on the front of the USB Base. The left bank LEDs are all green and are used to indicate the strength of the signal received from a Mobile Module or Remote. The right bank indicates general information, data reception and power on status.

### Signal Strength LEDs

The signal strength LED patterns have the following meaning:

- Strong to very strong signal
- Moderate to strong signal
- Weak signal

It is desirable to have your system positioned so that you have at least 2 green LEDs come on when data is received. If you only have a single LED come on, you should try to reposition your system to improve the strength of the received signals.

### Data Reception & Power On Status LEDs

The Red/Yellow/Green LEDs indicate general information, data reception and power on status. The function of the red, yellow and green LEDs are as follows:

- Primarily used to indicate that a command is being sent to a Command Mobile Module or a Remote Unit. This LED may also indicated an error condition with the Base.
- RF data packet received.
- A solid green indicates the Base start up has been completed and the Base is ready to receive data. If the LED is flashing about once per second, the Base is in Setup mode.

### Back Panel


**CAD Drawing of USB Base Back Panel**
**(Labels are shown for reference only)**

The USB Base back panel consists of a reset button and USB connector

#### Reset Button

When the reset button is pressed and released, the firmware in the USB Base is restarted and the setup parameters are reloaded from non-volatile memory. Once the Power LED on the front panel shows a steady green, the USB Base is ready to use. This reset button can be used in the Mobile Module Pairing 34 process.

#### USB Connector

The USB Base requires a USB cable with a Type A male connector. This is the same type of USB connector that is used for USB connections on a PC. The USB Base ships with a 3' or 6' USB cable with a Type A male connector at each end of the cable.

The maximum length of a USB cable is based on the version of the USB driver chips. The USB Base uses a USB 2.0 version chip. Most PCs also use USB 2.0 version chips. However, old PCs may be using the USB 1.0 version chips. The USB specifications limit the length of a cable between USB 2.0 devices to 5 meters (16.4 feet) and for USB 1.0 the limit is 3 meters (9.8 feet).

### Power Supply

The USB Base does not require a separate power supply. Power is provided by the connection to the USB port.

## 3.2 USB MicroBase


**MobileCollect USB MicroBase**

The USB MicroBase supports the same functionality found in the USB Base and RS-232/USB Bases with the following exceptions:

- The USB Base does not have a read switch connector
- The USB Base does not have Reset button
- The USB Base has a single green, red and yellow LED rather than 2 LED stacks (3 LEDs per stack)

The USB MicroBase is intended for use with tablet and other computers that require mobility. The USB MicroBase can be used with desktop PCs; however, it is recommended that you use a USB Base or RS-232/USB Base in non-mobile applications. You must install USB drivers on your computer prior to connecting the USB MicroBase to a USB port on your computer. The required USB drivers are on the CD included with your wireless system. These drivers are the same drivers that are used for the USB Base.

### LEDs

There are 3 LEDs located on the USB MicroBase. These LEDs are located inside the enclosure at the lower left-hand corner of the enclosure, When the LEDs are on, they are visible through the translucent enclosure. The LED colors form left to right are .

- A solid green indicates the Base start up has been completed and the Base is ready to receive data. If the LED is flashing about once per second, the Base is in Setup mode.
- This LED turns on briefly when data is received from the PC application that is connected to the MicroBase. When the LED turns on it does not mean the data received by the MicroBase is at the proper baud rate or the MicroBase understands the command being sent to it. When the LED turns on, it does mean that it is receiving something.
- This LED turns on briefly when a valid data packet is received from a Mobile Module or a Remote.

### Power Supply

The USB MicroBase does not require a separate power supply. Power is provided by the connection to the USB port.

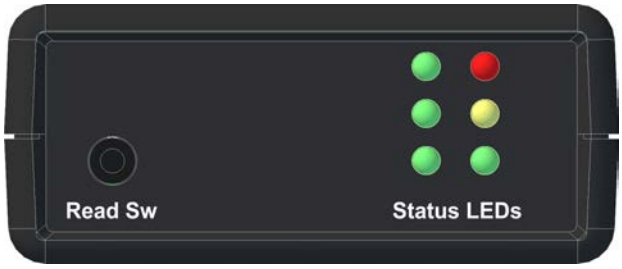
## 3.3 RS-232/USB Base


**MobileCollect RS-232/USB Base**

The RS-232/USB Base is identical to the USB Base with the following exceptions.

- The back panel contains a DB9 female serial port for connecting to a host computer. A standard DB9 serial cable is supplied with this Base.
- An external 5 VDC USB AC adapter and USB is required to power the Base when using the DB9 connection. The AC adapter and USB cable is supplied with the system.

### Front Panel




**CAD Drawing of RS-232/USB Base Front Panel**
**(Labels are shown for reference only)**

The RS-232/USB Base front panel connectors and options are the same as those available with the USB Base.

### Back Panel


**CAD Drawing of RS-232/USB Base Back Panel**
**(Labels are shown for reference only)**

The RS-232/USB Base back panel contains the same components as the USB Base[14] plus a DB9 serial connector. You can connect this Base to a PC via the USB port and it will function like the USB Base. When this Base is connected via the USB Port, the information sent out the USB Port will also be sent out the DB9 Port. The baud rate for both of the ports is always the same.

If you are going to do the communications to the RS-232/USB Base via the DB9 serial port, you must power the Base with the USB AC adapter connected to the USB Port.

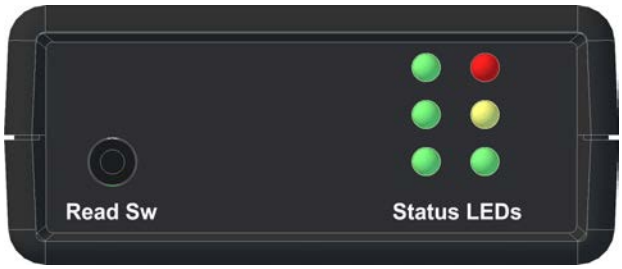
## 3.4 Wedge/USB Base


**MobileCollect Wedge/USB Base**

The RS-232/USB Base is identical to the USB Base with the following exception.

- The back panel contains a second USB connector that provides for the Keyboard Wedge connection.

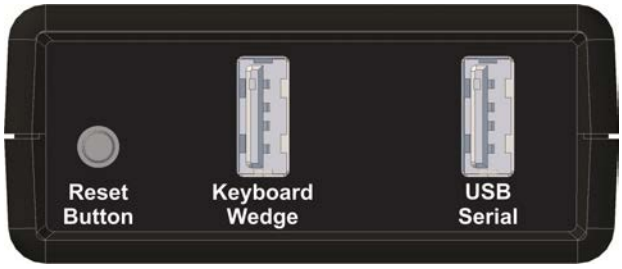
### Front Panel




**CAD Drawing of Wedge/USB Base Front Panel**
**(Labels are shown for reference only)**

The Wedge/USB Base front panel connectors and options are the same as those available with the USB Base.

### Back Panel




**CAD Drawing of Wedge/USB Base Back Panel**
**(Labels are shown for reference only)**

The Wedge/USB Base back panel contains the same components as the USB Base[14] plus a second USB connector for the Keyboard Wedge connection. The USB port that is connected to your PC will determine whether the Base outputs serial or keyboard wedge data. If you connect both of the USB ports to a PC, the Base will only output data via the USB Serial port.

# 4 Remote Transmitters

Remote transmitters capture measurements from digital gages and RS-232 devices and send this measurement data to a Base (receiver). You typically use a Remote when you don't need the mobility provided by a Mobile Module. Unlike the Mobile Module, which is powered by a battery, Remotes are powered by an external USB AC adapter.

A Remote can be configured with the Extended Setup Program[11]. If you are using the factory default setup for the Remote, you do not need to configure the Remote or Base with the setup program.

These are 2 types of Remotes available:

Digital Remotes

The Digital Remote supports digital gages from manufacturers such as Mitutoyo, Mahr Federal, Ono Sokki, Fowler, INSIZE, Starrett, Sylvac, etc. The Digital Remote automatically recognizes the type of gage connected to the front panel input port. The input port for a Digital Remote is a 2x5 connector as shown below.

RS-232 Remotes

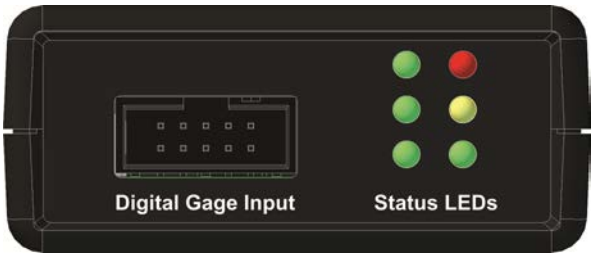
The RS-232 Remote supports gages that have an RS-232 output. The RS-232 Remote can automatically determine the baud rate and communication parameters for the connected RS-232 device (requires a send or print button on the serial device). The input port for a RS-232 Remote is a DB9 male connector as shown below. This DB9 is configured that same as a standard PC DB9 serial port.

## 4.1 Operation

There are several operational procedures and features that are common to both the Digital and RS-232 Remotes. The operational features that are unique to each Remote are described in the Digital Remote[27] and RS-232 Remote[29] sections.

### 4.1.1 Front Panel

The following CAD drawings show the front panels for the Digital and RS-232 Remotes.




**Digital Remote Front Panel**
**(Labels are shown for reference only)**


**RS-232 Remote Front Panel**
**(Labels are shown for reference only)**

#### Input Connectors

Refer to Digital Remote 27 and RS-232 Remote 29 sections for more information about the input connectors.

#### Status LEDs

There are 2 banks of LEDs on the front of a Remote. The left bank LEDs are all green and are used to indicate the strength of the signal received from a Base. The right bank indicates general information, data reception and power on status.

##### Signal Strength LEDs

The signal strength LED patterns have the following meaning:

- 🟢🟢🟢 Strong to very strong signal
- 🟢🟢 Moderate to strong signal
- 🟢 Weak signal

It is desirable to have your system positioned so that you have at least 2 green LEDs come on when data is received. If you only have a single LED come on, you should try to reposition your system to improve the strength of the received signals.

##### Data Reception & Power On Status LEDs

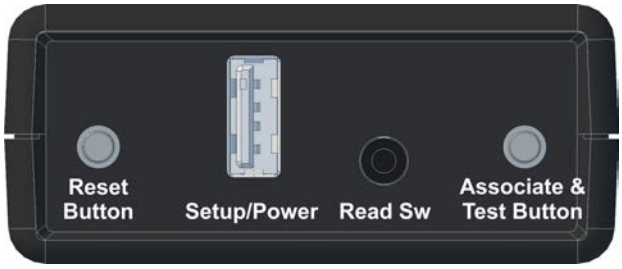
The Red/Yellow/Green LEDs indicate general information, data reception and power on status. The function of the red, yellow and green LEDs are as follows:

- 🔴 This LED will blink if the Remote does not receive a packet received acknowledgment from the Base.
- 🟡 Digital Remote: When data is received from the connected digital gage, this LED will quickly flash.

- RS-232 Remote: Data from the serial port is currently in the RxD buffer. When an end-of-packet condition is detected, the data is sent to the Base unit and the yellow LED is turned off. If this LED does not go off, you have probably incorrectly set the end-of-packet condition in the RS-232 Remote for the data being received from your serial device.
- At start up, several LED are turned on. Once the other LEDs are turned off and this LED is solid green, the Remote start-up process has been completed and the Remote is ready to send and receive data.

### 4.1.2 Back Panel

The back panels are identical for the Digital and RS-232 Remotes.




CAD Drawing of Remote Back Panel
(Labels are shown for reference only)

The Remote back panel consists of a reset button, USB connection for setup and power, read switch connector and a Pairing and Test button.

#### Reset Button

When the reset button is pressed and released, the firmware in the Remote is restarted and the setup parameters are reloaded from nonvolatile memory. This reset button can also be used as part of the Remote Pairing [26] process.

#### USB Connector (Setup/Power)

The USB connector is used when setting up the Remote with the Extended Setup Program [11] and for power when the Remote is in a measurement collection mode.

If you need to configure the Remote, you will connect the Remote to a USB port on your PC with the USB cable supplied with the Remote. The USB port on your PC will supply power to operate the Remote while it is being used with the Extended Setup Program. Prior to connecting the Remote to a USB port, you must install the USB drivers contained on the CD.

When the Remote is collecting measurement information and not connected to a PC USB port, you must power the Remote with the USB AC adapter supplied with the Remote.

### Read Switch

You can connect a foot switch or hand switch to the Remote and use this switch to tell the Remote to take a reading. The setup options for the read switch are different for Digital Remotes and RS-232 Remotes. Refer to Digital Remote[27] and RS-232 Remote[29] sections for more information about the read switch.

### Pairing & Test Button

The Pairing & Test button allows you to pair a Remote with a Base and to force the Remote to send information to the paired Base. Refer to the Pairing[26], Digital Remote[27] and RS-232 Remote[29] sections for more information about the Pairing & Test button.

On the RS-232 Remote, this button is also used to put the Remote in a mode that can automatically determine the baud rate and communication parameters of the connected serial device.

## 4.1.3 Pairing

A Remote must be paired with a Base before the Base will accept measurements from the Remote. The pairing information (RF channel number, Base network serial number and Base PAN ID) are stored in the Remote. When the Remote sends measurement data to a Base, the address information for the target Base is included in the wireless packet. The wireless packet sent by a Remote may be received by several Bases; however, only the Base that matches the pairing information will process the measurement packet.

There are 2 methods that can be used to pair a Remote with a Base.

- Pairing-on-the-fly.
- Use the Extended Setup Program[11].

### Pairing-on-the-Fly

You can pair a Remote with a Base by using the back panel buttons on the Remote and the Base. If you will be using the Remote factory defaults, you should not have to use the Extended Setup Program. If you do not use the pairing-on-the-fly process, you must use the Extended Setup Program to pair a Remote with a Base.

Follow the steps below to pair a Remote with a Base.

- Be sure the Remote is being powered. The Remote can be connected to a USB port on a PC or powered via the USB AC adapter.
- Remote button presses:
  - Press and hold the Pairing & Test button
  - Press and release the Reset button
  - When the right-hand LED stack starts flashing, release the Pairing & Test button
- Base button presses;

- Press and release the Reset button
- When only the right-hand LED stack is on solid, the Base is ready to receive a pairing request
- At this point, you have 10 seconds to complete the pairing process

- Press and release the Pairinf & Test button on the Remote
- If the pairing was successful, the left-hand LED stack on the Remote will blink multiple times

In order for the pairing process to be successful, the Base and Remote must both be communicating on the same channel

## 4.2 Digital Remote


**MobileCollect Digital Remote**

### Digital Gage Input (Front Panel)

The 2x5 gage connector on the front panel is a standard connector used for digital gages. Gage cable available from Mitutoyo and Mahr Federal (cable with Mitutoyo compatible output) can be plugged directly into the Digital Remote. Gage cables from other manufacturers may have to be purchased from MicroRidge. The digital gage cables used for the Digital Remotes are the same cables that are used for the MicroRidge GageWay Pro interfaces.

### Reset Button (Back Panel)

Before you can get a reading from the connected gage, the Remote must detect the type of connected gage. After you connect a gage to the Remote, press and release the Reset button. If a gage is detected the lower right green LED will blink several times. If a gage is not detected, the upper right red will blink several times. Be sure your gage is turned on before you press the Reset button.

### Read Switch (Back Panel)

By default, the read switch connector is configured to take a single from the connected gage. Use the Extended Setup Program to configure the read switch for continuous read and TIR.

### Pairing & Test Button (Back Panel)

The Pairing & Test button can preform several different function based upon how long the button is pressed and whether the Reset button is pressed. The functions available for the button are:

- Pair the Remote with a Base. This function uses this button and the Reset button. Refer to the Pairing 26 section for more detail.
- Take a test reading. Press and release (within 2 seconds) the Pairing & Test button to take a test reading and send to the paired Base. This function is designed for testing only. The duty cycle of the Pairing & Test button is not designed for thousands of readings.
- Send the string "Test Packet from Digital Gage Remote" to the paired Base. The Pairing & Test button must be held for 10 seconds before this string will be sent.

## 4.3 RS-232 Remote


**MobileCollect RS-232 Remote**

### RS-232 Input (Front Panel)

The DB9 male connector on the front panel is configured like a standard PC DB9 serial port. Gage cables that can be used to connect your serial device to a PC serial port should work with the RS-232 Remote input port. In order for the Remote to receive data from the connected serial device, the Remote baud rate and communication parameters must be set to match those of the serial device. You can manually set the baud rate and communication parameters with the Extended Setup program. If you serial device has a send or print button, you can have the RS-232 Remote automatically detect the required serial port settings with the AutoBaud feature.

### Reset Button & AutoBaud (Back Panel)

When you press and release the Reset button, the RS-232 Remote will enter the AutoBaud mode when the initialization process is complete. When only the right-hand LED stack is on, the RS-232 Remote is in the initialization process. When both of the LED stacks are on, the AutoBaud mode is active. The AutoBaud mode is active for 5 seconds and if you send several RS-232 characters from your serial device, the Remote will automatically determine the baud rate and communication parameters. These serial port values, are then stored in nonvolatile memory in the Remote and are used until they are changed by another AutoBaud calculation, the Extended Setup Program or a cold start (<Z computer command). If the Remote does not receive RS-232 data, the Remote will exit the AutoBaud mode after 5 seconds and restore the previously stored parameters. In order to use the AutoBaud feature, you must have a print or send button on your serial device.

### Read Switch (Back Panel)

In order to use a read switch with the RS-232 Remote, you must use the Extended Setup Program [11] to configure the read switch operation.

### Pairing & Test Button (Back Panel)

The Pairing & Test button can preform several different function based upon how long the button is pressed and whether the Reset button is pressed. The functions available for the button are:

- Pair the Remote with a Base. This function uses this button and the Reset button. Refer to the Pairing 26 section for more detail.
- Take a test reading. Press and release (within 2 seconds) the Pairing & Test button to take a test reading and send to the paired Base. In order to take a test reading, you must have used the Extended Setup Program to enable the read switch and to define the read switch operation. This function is designed for testing only. The duty cycle of the Pairing & Test button is not designed for thousands of readings.
- Send the string "Test Packet from Digital Gage Remote" to the paired Base. The Pairing & Test button must be held for 10 seconds before this string will be sent.

# 5 Mobile Module Transmitters

The Mobile Modules are portable battery operated transmitters that are typically used with gages such as calipers, micrometers, digital indicators, etc. Support is provided for digital and RS-232 gages and devices. The MobileCollect Mobile Modules support more gages than wireless systems from other manufacturers. Gage manufacturers supported included Brown & Sharpe, CDI, Fowler, Insize, LMI, Mahr Federal, Mitutoyo, Ono Sokki, Starrett, Sylvac, etc.

The MobileCollect Mobile Modules include the following models.

| | |
|---|---|
| Mini Mobile Module 39 | This Mobile Module is less than half the size (measured on a volume basis) of a Command or RS-232 Mobile Module. The Mini Mobile Module supports digital gages and some RS-232 devices (devices that output at TTL levels). |
| Command Mobile Module 45 | This Mobile Module supports the same gages as the Mini Mobile Module. The Command Mobile Module has the ability to receive wireless read and sleep commands from a MobileCollect Base. |
| RS-232 Mobile Module 67 | This Mobile Module is used for gages and devices that provided full RS-232 level signals. Digital gages are not supported by this Mobile Module. |

The following sections cover the features and operations that are common to all of the Mobile Modules. Refer to the sections covering the Mobile Modules for a description of the unique features and operation of each of the Mobile Modules.

The enclosures used for the Command and RS-232 Mobile Modules are all the same. The enclosure used for the Mini Mobile Module is smaller than the Command Mobile Module enclosure.

## 5.1 Operation

Features common to all of the Mobile Modules are discussed in this section. Refer to the Mini Mobile Module 39, Command Mobile Module 45 and RS-232 Mobile Module 67 sections for the unique features of the Mobile Module.

### 5.1.1 Buttons & LEDs

The Mobile Modules contains 2 push buttons and 2 LEDs. Each of the LEDs can display a red or green color. The picture below shows the location of the buttons and LEDs for a Mini Mobile Module. The layout of the LEDs and buttons is the same for the Command and RS-232 Mobile Modules.


**Mobile Module Buttons and LEDs**

When the LEDs are off, the lenses over the LEDs will appear clear. When an LED is turned on, it will be a bright red or green as shown in the picture.

The 2 push buttons are located along the top edge of the Mobile Module just to the right of the gage cable. There may also be a third button on your gage cable. Depending on the brand of gage, you may or may not be able to use the button on the gage cable to take a reading. Refer to Getting a Reading from Your Gage 37 for more information.

#### Setup Button

The Setup button is used for setup functions, resetting the Mobile Module and entering the firmware update mode. These functions also require the use of the Read button

#### Read Button

The Read button is mainly used to wake up the Mobile Module and get a reading from the device connected to the Mobile Module. The Read button is also used in conjunction with the Setup button for the functions described above under Setup Button.

### Gage Read LED

The Gage Read LED is a bi-color LED that can display red or green. This LED is primarily used to indicate a reading was obtained from the connected device. When a reading is obtained, the LED will display red for about 150 msec and then turn off. Refer to the LED Codes 38 section for more information about the LED blink codes.

### Host Accept LED

The Host Accept LED is a bi-color LED that can display red or green. This LED is primarily used to indicate the reading was received by the Base. When the Mobile Module receives the acknowledgment from the Base, the LED will display green for about 150 msec and then turn off. Refer to the LED Codes 38 section for more information about the LED blink codes.

## 5.1.2 Batteries & Battery Life

All of the Mobile Modules use disposal lithium batteries. The Mini Mobile Modules uses a CR2032 coin cell and the other Mobile Modules (Command and RS-232) use a CR2 Photo lithium battery. These batteries are commonly available and you do not have to order replacement batteries from MicroRidge.

The battery life for the Mini Mobile Module was determined through actual battery life testing. There are many factors that can affect the Command and RS-232 Mobile Module battery life. The battery life for the RS-232 Mobile Module is greatly reduced for those gages that require the Mobile Module to keep the serial port powered up even when you are not getting a reading from the gage.

| Mobile Module | Battery P/N | Battery Capacity | Battery Life | Comments |
|---|---|---|---|---|
| Mini | CR2032 | 240 mAh | 500,000 readings | Frequent use of Setup Mode and doing firmware update will reduce battery life. |
| Command | CR2 | 800 mAh | Depends on Module usage | Use of command function will reduce battery life. |
| RS-232 | CR2 | 800 mAh | Depends on Module usage | Some RS-232 devices require Module to remain on. Battery life can be very different for various gages. |

### Battery Voltage Levels

The radios used in MobileCollect require a battery voltage between 1.8 and 3.6. The voltage of a brand new battery will be about 3.2 volts. When the battery voltage approaches 2.0 volts, you should replace the battery. The Mobile Module will blink the red gage read LED (  ) 6 times after it gets a reading to indicate that the battery should be replaced.

## 5.1.3 Pairing

A Mobile Module must be paired with a Base before the Base will accept measurements from the Mobile Module. The pairing information (RF channel number, Base network serial number and Base PAN ID) are stored in the Mobile Module. When the Mobile Module sends a measurement to a Base, the address information for the target Base is included in the wireless packet. The wireless packet sent by a Mobile Module may be received by several Bases; however, only the Base that matches the pairing information will process the measurement packet.

There are 3 methods that can be used to pair a Mobile Module with a Base.

- Pairing-on-the-fly.
- Use the Xpress Setup Program[11] for the Mini and RS-232 Mobile Modules.
- Use the Extended Setup Program[11] for the Mini Command and RS-232 Mobile Modules.

### Mobile Module Setup Mode

All of the Mobile Module pairing methods require the Mobile Module to be placed into the Setup Mode. To put the Mobile Module into the Setup Mode follow the steps below:

- Press & hold the Setup button. The Setup button is the button closest to the gage cable.
- While you continue to press the Setup button, press and release the Read button.
- Once both LEDs start to flash, release the Setup button.
- When the Setup Mode is active, both LEDs will flash rapidly. The left LED is red and the right LED is green.

### Pairing-on-the-Fly for MobileCollect Mobile Module

This is a very quick and easy method used to pair a Mobile Module with a Base. With this method, you can pair a Mobile Module with a Base without using any special setup software. This method can be used with the USB Base, RS-232 Base and Wedge Base. This method cannot be used with the USB MicroBase since the MicroBase does not have a Reset button.

- Put the Mobile Module into the Setup Mode.
- Be sure no other Mobile Modules are sending measurements to the Base.
- Press and release the Reset button on the back of the Base.
- When the left status LEDs (green/green/green) go out and the right LEDs (red/yellow/green) are all on, press and release the Setup button on the Mobile Module.

- If the pairing was successful, the LEDs (red/green) on the Mobile Module will blink 5 times and all of the Base LEDs, except for the green Pwr LED will be off.
- If the Base does not receive a pairing request, it will automatically exit the pairing mode after 10 seconds.

#### Pairing by Using the MobileCollect Xpress Setup Program

Using the Xpress Setup Program[11] allows you to pair a Mobile Module with a Base and perform other Mobile Module configuration steps. This Setup Program covers the features required by most users.

#### Pairing by Using the MobileCollect Extended Setup Program

Using the Extended Setup Program[11] allows you to pair a Mobile Module with a Base and perform other Mobile Module configuration steps. This Setup Program provides access to all of the MobileCollect setup features.

### 5.1.4 Resetting to Defaults

You can use the Setup and Read buttons to reset the parameters in a Mobile Module back to the factory defaults. To reset the parameters, follow the steps below. This procedure requires that you keep the Setup button pressed during the entire process.

- Press & hold the Setup button. The Setup button is the button closest to the gage cable.
- While you continue to press the Setup button, press and release the Read button.
- Continue to keep the Setup button pressed and the Host Accept LED should be  .
- After about 10 seconds, the Gage Read  and Host Accept  LEDs will alternately flash. Once this flash begins, you can release the Setup button.
- When all of the LEDs remain off, the parameters in the Mobile Module have been reset to the factory defaults.

### 5.1.5 Firmware Update Mode

If you are going to update the firmware in a Mobile Module, you must put the Mobile Module into the Firmware Update Mode. Once the Mobile Module is in the Firmware Update Mode, you have about 20 seconds to start the firmware update process. Refer to the Firmware Updates[83] section for more information.

To enter the Firmware Update Mode, follow the steps below.

- Press & hold the Setup button. The Setup button is the button closest to the gage cable.
- While you continue to press the Setup button, press and hold the Read button.

- Continue to keep the Setup and Read buttons pressed. The Gage Read LED should be 🔴 and the Host Accept LED should be 🟢.
- After about 10 seconds, both LEDs will turn off and you should then release both of the buttons.
- After the buttons are released, both LEDs will alternate between 🔴 🔴 and 🟢 🟢. You now have about 20 seconds to start the firmware update process.
- If you do not start the update process within the allotted time, the Mobile Module will reset all of its parameters and return to normal operation.

If the firmware update process fails once it has started, the Mobile Module will turn off and the Firmware Update Mode will stay enabled. You must successfully complete the firmware update process before you will be able to use the Mobile Module. To retry the firmware update process, press any button on the Mobile Module and both LEDs will alternate between 🔴 🔴 and 🟢 🟢. You now have about 20 seconds to start the firmware update process.

### 5.1.6 Getting a Gage Reading

To get a gage reading from a gage or serial device connected to a Mobile Module you must press a Read button. A Read button is located on the Mobile Module, and additional Read buttons may be located on the gage cable and on the serial device. Additional setup is often required for an RS-232 Mobile Module to receive information from the connected serial device.

The Mobile Module may not support the use of all of the available Read buttons. The table below provides a summary of the available Read buttons that can be used with the Mini, Digital and Command Mobile Modules. For the handheld gages like calipers, micrometers and digital indicators, you can always use the Read button on the Mobile Module.

| Gage Manufacturer & Type | Read Button on Gage Cable | Active Read Buttons | | | Comments |
|---|---|---|---|---|---|
| | | Mobile Module | Gage Cable | Button on Gage | |
| Brown & Sharp Opto | No | X | | | |
| Fowler Opto | No | X | | | |
| LMI | No | X | | | |
| Mitutoyo | Yes | X | X | | Use what is the most convenient. |
| Mahr Federal | No | X | | | Cannot use read button on gage or cable. |
| Starrett TTL | Yes | X | X | | Mobile Module button may be easier to use. Cannot use gage cable button with Mini Mobile Module. |
| Starrett Opto | No | X | | | |
| Sylvac Opto | No | X | | | |

### 5.1.7 LED Codes

There are several LED blink sequences associated with the Mobile Module. These blink sequences provide information to the user about measurement transfer, wireless transmission failure, low battery, etc. Normally the user only needs to be concerned with the single red blink when a gage is read and the single green blink when the Base sends an acknowledgement to the Mobile Module.

The railroad blinks shown in the following table refer to a rapid back and forth blinking of a red and green LED. The pattern is similar to a railroad crossing with 2 flashing red lights.

| Item | Gage Read LED | | Host Accept LED | | LED Action |
|---|---|---|---|---|---|
| | Red | Green | Red | Green | |
| Obtained reading from gage | X | | | | LED on for about 150 msec |
| Could not get gage reading | X | | | | 2 blinks |
| Received acknowledgment from the Base that the reading was accepted. This LED blink can only occur after reading was obtained from the gage. | | | | X | LED on for about 150 msec |
| Did not receive acknowledgment from the Base that the reading was accepted. This LED blink can only occur after reading was obtained from the gage. | | | | X | 5 blinks |
| The Mobile Module is not paired with a Base. This LED blink can only occur after reading was obtained from gage. | | | X | | 5 blinks |
| Enter Setup mode | X | | | X | 5 blinks |
| Exit Setup mode | X | | | X | 3 blinks |
| Low battery warning | X | | | | 6 blink after gage reading LED goes off |
| Press read button with no gage cable connected. This is a warm start | | X | | X | Both green LEDs blink once |
| | X | | X | | Both red LEDs blink once |
| | X | | | X | 4 read/green railroad blinks |
| Cold start (all EEPROM values set to defaults) | X | | | X | 31 red/green railroad blinks |
| | | X | | X | Both green LEDs blink once |
| | X | | X | | Both red LEDs blink once |
| | X | | | X | 4 read/green railroad blinks |
| Boot loader mode. Mobile Module waiting for new firmware upload. | | X | | X | Both green LEDs blink once then both red LEDs blink once. Process repeated for up to 25 seconds. |
| | X | | X | | |
| Radio initialization failed. Can only occur after a restart. | X | | X | | 20 red/red railroad blinks |

# 6 Mini Mobile Module

The Mini Mobile Module is used to capture measurements from virtually any handheld digital gage and handheld serial gages. The Mini Mobile Module supports gages from Brown & Sharpe, CDI, Fowler, Mahr Federal, Mitutoyo, Ono Sokki, Starrett, Sylvac, etc. Other manufacturers also make gages that have compatible outputs and these gages can also be used with the Mini Mobile Module.


**Mini Mobile Module with Mitutoyo Caliper Cable**

### Digital Gages

Digital gages are gages that have outputs that are not RS-232 compatible. The output from these gages consists of 1 or more data lines and a clock line. Unlike RS-232 devices that output data at a uniform rate, the output data rate from a digital gage can be quite variable. The most common gage manufacturers that have gages with digital outputs include Federal, CDI, Mitutoyo, Ono Sokki, etc.

### Serial Gages

The Mini Mobile Module also supports 2 types of RS-232 gages.

- Gages that use an Opto RS-232 cable can typically be used with the Mini Mobile Module. Gages that use the Opto RS-232 cable are available from companies such as Brown & Sharpe, Fowler, Starrett, Sylvac, etc.
- Gages that supply an RS-232 output signal that ranges from 0 to 3.3 volts can typically be used with the Mini Mobile Module. Gages with this type of output are supplied by manufacturers such as Mahr Federal, Starrett, etc.

Gages that have standard RS-232 output signals (typically +/- 5 volts or more) cannot be used with the Mini Mobile Module. These gages with standard RS-232 output levels must be used with the RS-232 Mobile Module 67.

### Differences Between the Mini and Command Mobile Module

The Mini Mobile Module and the Command Mobile Module are very similar. The primary differences between these 2 Mobile Modules are listed below.

- The Mini Mobile Module is less than half the size (measured on a volume basis) of a Command Mobile Module.
- The Command Mobile Module automatically detects the type of gage cable connected. The user must specific (with one of the Setup Programs) the type of gage cable connected to a Mini Mobile Module. Experience has shown that the type of gage cable connected to a Mobile Mobile is rarely changed.
- Most of the gages supported by the Command Mobile Module are also supported by the Mini Mobile Module. A few of the less frequently used gages are not supported by the Mini Mobile Module.
- The gage cables used by the Command Mobile Module cannot be used with the Mini Mobile Module.
- Commands can be sent from a Base to get a reading from a Command Mobile Module. To get a reading from a Mini Mobile Module, you must press the read button on the Mobile Module or the gage cable (Mitutoyo only).

### Gage Cables

There is a very broad range of gage cables that are used to connect the Mini Mobile Module to your gage. Cables are available in lengths from a few inches up to 6 feet. The MobileCollect Selection Tool shows the gage cables required for most of the supported gages. This Selection Tool can be downloaded form the web at www.microridge.com/wl_mc_select.htm.

When you connect a gage cable to the internal Mini Mobile Module gage cable connector, the Mini Mobile Module does not automatically detect the type of cable. If the new cable you are connecting to a Mini Mobile Module is for a different type of gage output, you will have to use one of the Setup Programs 11 to identify the type of cable you are using.

### Mobile Module Setup

Typically the only setup required for a Mini Mobile Module is to pair the module with the target Base. To pair a Mobile Module with a Base, follow the procedures in the Mobile Module Pairing 34 section.

Other setup items that you may need to configure for a Mini Mobile Module are continuous read, TIR and module label. To configure these items in the Mobile Module, you must use the Xpress Setup Program 11 or the Extended Setup Program 11.

## 6.1 Installation on a Caliper

When the Mini Mobile Module is used with a caliper, it is typically mounted on the back side of the caliper as shown in the illustration below.


**Mini Mobile Module Mounted on a Caliper**


**Recommended Adhesive Placement on Module**

The Mobile Module should be mounted so that the 2 LEDs are visible along the top edge of the caliper. These LEDs are used to notify the user that the gage was read and the data was received by the Base. When mounted in this fashion on a caliper, you can still gain access to the batteries and replace the gage cable without having to remove the Mobile Module from the caliper.

The Mobile Module should be attached to the caliper with 2 foam adhesive pads as shown above. There are several sets of these foam adhesive pads supplied with each Mobile Module.

## 6.2 Gage Cable Replacement

The gage cable should be installed as shown in the photo below. The wires coming from the black grommet should clear the threaded insert and not interfere with the battery holder.


***Mini Mobile Module Gage Cable***

To replace a gage cable, follow the steps below:

- Remove the Mobile Module cover with a #2 Phillips screwdriver. One or more of these screwdrivers were shipped with your original order.
- Note how the current gage cable is installed.
- Ground yourself to eliminate any static charge.
- Remove the current gage cable by pulling up on the wires going into the connector.
- Inspect the new gage cable to locate the very small tab located at the edge of the connector that connects to the pins in the Mobile Module. This tab must be up when you install the cable. The cable cannot be installed with this tab facing downward.
- Install your new gage cable.
- Replace the Mobile Module cover. Do not over-tighten the screws.

If you have installed a cable for a gage that has a different type of output than the previous cable, you will have to use a Setup Program [11] to identify the gage type for the Mini Mobile Module. A few examples are shown below.

- Previously you had a cable that connected to a Mitutoyo caliper. The new cable you installed is for a Mahr-Federal uMaxum II. You will have to use a Setup Program to identify the gage type.

- Previously you had a cable that connected to a Mitutoyo caliper. The new cable you installed is for a Mitutoyo digital indicator. Since the Mitutoyo Caliper and Mitutoyo digital indicator has the same output format, no additional setup is required.

## 6.3 Battery Replacement

The battery and gage cable can be accessed by removing the Mobile Module top cover held in place by 4 screws. A small #2 Phillips screwdriver was included with the MobileCollect wireless for loosening the Mobile Module screws. The screws are secured in the bottom assembly of the enclosure by brass inserts. These brass inserts provide a secure method of holding the cover in place and eliminates the possibility of stripping threads in the plastic case.

**Caution: The components within the Mobile Module are subject to damage as a result of static electricity. Be sure to ground yourself before touching any component within the Mobile Module.**

### Battery

The battery used by the Mini Mobile Module is a CR2032, 3 volt lithium coin cell battery. This battery is readily available anywhere batteries are sold. The Mobile Module case shown on the left in the picture below has the battery removed and and is show with the positive (+) terminal facing upward. To install the battery slide the battery into the battery holder from the bottom edge of the case.

**When installing a battery, be sure the positive (+) side of the battery is facing upward.**


***No Battery Installed*** ***Battery Installed***

***Mini Mobile Module Interior***

## 6.4 Reset Button

The Mini Mobile Module contains a Reset button as shown below.


**Mini Mobile Module and Internal Reset Button**

Pressing the Reset button causes the Mobile Module to reboot and restart the firmware. This restart process does not reset the parameters to the factory defaults. If you are working with MicroRidge Technical Support, you may be instructed to use this Reset button as part of a troubleshooting procedure.

# 7 Command Mobile Module

The Command Mobile Module allows you to send commands from a Base to the Command Mobile Module. These commands include the ability to tell the Mobile Module to initiate a gage reading, tell the Mobile Module to go to sleep, etc. By default, the command functionality is disabled in the Command Mobile Module. Even when the command functionality is enabled, the Command Mobile Module has all of the features and functions of the Mini Mobile Module. A Command Mobile Module can only be controlled by a MobileCollect USB Base, USB MicroBase or RS-232 Base.


This command functionality can be configured with the Extended Setup Program[11]. If a Command Mobile Module is configured with the Xpress Setup Program, the command functionality will be disabled. Refer to the MobileCollect Extended Setup User's Guide for more information.

### Methods for Sending Commands

The Base can be told to send a command to the Command Mobile Module through a command from the host computer or by pressing a read switch connected to the Base. When you use commands from a host computer to control a Command Mobile Module, you have access to a very broad range of features and functionality. When you use a read switch or switches to control a Command Mobile Module, you are restricted to a more limited set of features. However, in most applications, you will find that the read switch approach gives you access to the features you really need to use. For the more complex applications, you may find that you need the flexibility that sending commands from the host computer provides. The function of the

read switches are defined through the MobileCollect Setup Program. Refer to the MobileCollect Extended Setup User's Guide for more information.

### Base Read Switches

The standard MobileCollect USB Base and RS-232 Base come with a single read switch connector for a foot or hand switch. The USB MicroBase does not contain any foot or hand switch connectors. The standard read switch connector on the USB Base is located on the rear panel and on the front panel for the RS-232 Base. There is an option to increase the number of read switch connectors on the USB Base from 1 to 4, and on the RS-232 Base from 1 to 3. Contact MicroRidge Systems [91] about increasing the number of read switch connectors.

## 7.1 Module Setup & Operation

When a Command Mobile Module is shipped from MicroRidge, the command functionality is already enabled. To configure a Command Mobile Module you must use the Extended Setup Program [11].

### Pairing with Base

In order for the Command Mobile Module to send measurement data to a Base, it must be paired with the Base. If you are using a read switch connected to a Base to control the Command Mobile Module, you must pair the Command Mobile Module as outlined in the Mobile Module Pairing [34] section. If you are sending commands from a host computer, it is possible to pair the Command Mobile Module using the appropriate command. Refer to the Commands for Command Mobile Module [50] section for a listing of the available commands.

### Module ID & Base Setup Tab

If the Command Mode is enabled and you are sending commands to the Command Mobile Module, you must enter the Command Mobile Module ID on a channel using the Extended Setup Program [11]. This Module ID is entered in the Module ID column on the Base Setup tab.

### Modes of Operation

There are 5 different modes of operation that are used by the Command Mobile Module. Some of these modes can be controlled with the Setup button on the Command Mobile Module. The modes can also be controlled by the Extended Setup Program or commands sent to the Base from the host computer. Each of the modes of operation is described below.

| | |
|---|---|
| Disabled | The command mode is disabled and cannot be used. By default the command mode is enabled. This mode can only be toggled between enabled and disabled in the Extended Setup Program. If a Command Mobile Module is configured with the Xpress Setup Program [11], the command mode will be disabled. |
| Off | The command mode is enabled, but the Mobile Module is currently turned off. The only way to start the command mode is to press & release the Setup button. When the Setup button is |

pressed & released, the Command Mobile Module will enter the Active Mode. The Command Mobile Module must not be in the Setup mode when you try to enter the Active mode.

Active

This is the mode that is used to get measurements from the attached gage and send them to the Base. When the Command Mobile Module is in this mode, the Command Mobile Module will wake up every 0.5 seconds and listen for 0.050 seconds for a command from the Base. Each time the Command Mobile Module wakes up to listen, the green Host Accept LED will quickly flash. If the Command Mobile Module receives a command from its paired Base, the green Gage Read LED will turn on. If the Setup button is pressed & released, the Command Mobile Module will remain in the Active Mode and restart its timeout timer.

Standby

The Standby mode is designed to be a power saving mode. No gage reading can be obtained when the Command Mobile Module is in this mode. This mode can only be entered with a command from the paired Base. This command can come from the host computer[62] or it can be initiated by pressing a read switch connected to the Base[62]. When the CMM is in the Standby mode, the CMM will wake up every 10 seconds and listen for 0.050 seconds for a command from the Base. To help the user know that the CMM is in the Standby mode, the CMM will blink LEDs every 2 seconds. If both green LEDs (Gage Read & Host Accept) blink, the CMM is just notifying the user that the CMM is enabled. When the CMM actually listens for a command from the Base, only the green Host Accept LED will blink. If you press the Setup button when the CMM is in the Standby mode, the CMM will switch to the Active mode and restart its timeout timers.

Extended Standby

The Extended Standby mode is designed to be a power saving mode. No gage reading can be obtained when the CMM is in this mode. This mode can only be entered with a command from the paired Base.[50] This command must come from the host computer. When the Command Mobile Module is in the Extended Standby mode, the Command Mobile Module will wake up every 60 seconds and listen for 0.050 seconds for a command from the Base. To help the user know that the Command Mobile Module is in the Extended Standby mode, the Command Mobile Module will blink LEDs every 4 seconds. If both green LEDs (Gage Read & Host Accept) blink, the Command Mobile Module is just notifying the user that the Command Mobile Module is enabled. When the Command Mobile Module actually listens for a command from the Base, only the green Host Accept LED will blink. If you press the Setup button when the Command Mobile Module is in the Extended Standby mode, the Command Mobile Module will switch to the Active mode and restart its timeout timers.

### Mobile Module Push Buttons

The 2 push buttons (Setup & Read) on the Command Mobile Module support all of the functions of the Mini Mobile Module. In addition to these functions, the Setup button is also used to control the Command Mobile Module command mode.

- To exit the current command mode and enter the Off mode, press and hold the Setup button for 5 seconds. When you press the Setup button, the green Host Accept LED will turn on. When the green Host Accept LED turns off, the Command Mobile Module has entered the Off command mode.
- To enter or restart the Active mode, press and release the Setup button. When you press and release the Setup button, the timeout times are also reset.

When using the Setup button to control Command Mobile Module functions, the Command Mobile Module must not be in the Setup Mode.

### Timeout Timers

The Active, Standby and Extended Standby modes have a timeout timer that controls when the Command Mobile Module will exit its current mode and go to the Off mode.

| Mode | Wakeup Interval | Default Timeout | Description |
|---|---|---|---|
| Active | 0.5 seconds | 10 minutes | The mode used for measurement taking. This mode wakes up every 0.5 seconds. |
| Standby | 10 Seconds | 5 minutes | Power saving mode that listens for a Base command every 10 seconds. |
| Extended Standby | 60 seconds | 3 Minutes | Power saving mode that listens for a Base command every 60 seconds. |
| Keep Awake | -- | 2 seconds | Maximum amount of time a Command Mobile Module will stay awake after it receives a command from the Base. This waiting period should be sufficient to receive and process all the commands from a Base. |

When a Command Mobile Module receives a command from a Base, the Command Mobile Module will reset its timeout timers. For example, let's assume the Command Mobile Module is in the Active mode and the Active timeout is set to 15 minutes. If you always send a command to the Command Mobile Module every 12 minutes, the Command Mobile Module will never turn off. If you stop sending commands to the Command Mobile Module, the Command Mobile Module will enter the Off mode after 15 minutes.

To maximize the battery life of the Command Mobile Module, you should keep the timeout values as low as possible. If a Command Mobile Module does go into the Off mode, you must press the Setup button on the Command Mobile Module to wake it up and put it into the Active mode.

The wakeup times are set in the CMM Controls section on the Main Setup tab of the Extended Setup Program.

### Sending Commands from a Base to a Command Mobile Module

It is important to understand how long a Base is actually sending commands to a Command Mobile Module. If the Base has been instructed to communicate with a Command Mobile Module that is in the Active mode, the Base will send out a series of Attention commands for a period of about 0.6 seconds. Since the Command Mobile Module only wakes up and listens every 0.5 seconds, the commands from the Base must be broadcast for a period slightly longer than 0.5 seconds. The commands actually sent from the Base take about 0.001 seconds (1 msec) to send and this transmission is repeated about every 0.010 seconds (10 msec) for the 0.6 seconds.

If the Base is trying to send commands to a Command Mobile Module that is in the Extended Standby mode, the Attention commands must be sent for a period just over 60 seconds.

### RF Channel

It is recommended that you use a unique RF channel for each Base and the Command Mobile Modules that are being controlled by the Base. If you are only using a single Base in your facility, using the default channel 21 would be OK. If you have 2 Bases controlling Command Mobile Modules and these Bases are located within a few hundred feet of each other, you should use a different RF channel for each Base and its Command Mobile Modules. By using separate RF channels, you eliminate the conflicts that can occur when a Base is sending attention commands to a Command Mobile Module. Remember, that when a Base is trying to communicate to Command Mobile Modules that are in the Extended Standby mode, the Base will be sending attention commands for just over 60 seconds.

## 7.2 Base Setup & Operation

The Base is used to set the Command Mobile Module timeout times and control a Command Mobile Module. By default, the Base is enabled to control a Command Mobile Module. To control a Command Mobile Module, you must send specific commands to the Base from the host computer or configure read switches 62 for sending commands. The following sections describe the Command Mobile Module commands and their usage.

When using a Mini Mobile Module, you can make use of the Global channel for pairing and do not need to define the Mobile Module ID on a specific channel in the Base Setup Tab of the Extended Setup Program 11. For the Command Mobile Module, you must define the Module ID for each Command Mobile Module on a different channel in the Base Setup Tab of the Extended Setup Program.

### 7.2.1 Commands for Command Mobile Module

The commands that can be sent to a Base from the host computer to control the operation of a Command Mobile Module are listed below. In most cases the Command Mobile Module must be paired with the Base before the Command Mobile Module will process the command from the Base.

Sending commands to a Command Mobile Module is a 2 step process. You must first define the information that is to be sent and then you must tell the Base to send the information to the Command Mobile Modules.

### Read Commands

The read commands are used to define what channels you want to get readings from.

---

Description: Get a number of readings (nn) from channel xx

Command: <@Rnnxx

Parameters: nn = Number of readings, 00 to 99

00 = Remove previous read request

01 = Single reading

14 = 14 readings as fast as possible

xx = * for all channels or 2 digit channel number (Chan 1 = 01, Chan 2 = 02, etc.)

Other Info: Read request is sent to Command Mobile Modules when Base receives <@PR command. Command Mobile Modules must be in Active mode.

Example: To get a single reading from each Command Mobile Module paired with a Base, send the following commands from the host computer to the Base:

<@R01* <@PR

---

Description: Number of times to repeat read command

Command: <@Nnnn

Parameters: nnn = Number of time to repeat the read command, 001 to 100

Other Info: You must also define what channels to read with the <@Rnnxx command. Request is sent to Command Mobile Modules when Base receives <@PR command. Command Mobile Modules must be in Active mode.

---

| | |
|---|---|
| Description: | Send read request to Command Mobile Modules |
| Command: | <@PR |
| Parameters: | None |
| Other Info: | Command Mobile Modules must be in Active mode. Command Mobile Module Active timeout timer is reset when Command Mobile Module receives this command. |

**Output Format**

Set the output format to be used for all channels.

| | |
|---|---|
| Description: | Set output format for all channels |
| Command: | <@Fxx |
| Parameters: | xx = Output format<br>00 = Disabled, used what is defined in Setup program<br>01 = Measurement (10 char), Channel number (2 char), Module ID (6 char), Units (4 char), Battery voltage (4 char), Signal strength (3 char), Attempts (1 char)<br>Each field is separated by a comma and a carriage return is sent at the end of the string<br>02 = Measurement (10 char), Module ID (6 char)<br>Each field is separated by a comma and a carriage return is sent at the end of the string<br>03 = Measurement (10 char), Channel number (2 char)<br>Each field is separated by a comma and a carriage return is sent at the end of the string<br>04 = Channel number (2 char), Measurement (10 char)<br>Each field is separated by a comma and a carriage return is sent at the end of the string |

### Base Setup Tab

These commands can be used to configure parameters in the Base Setup Tab.

---

| | |
|---|---|
| Description: | Add a Mobile Module ID to a channel |
| Command: | <@Mxxiiiiii |
| Parameters: | xx = 2 digit channel number (Chan 1 = 01, Chan 2 = 02, etc.)<br>iiiiii = 6 character Mobile Module ID. Valid characters are 0 to 9 and A to F |

---

| | |
|---|---|
| Description: | Remove the Mobile Module ID from a channel |
| Command: | <@Exx |
| Parameters: | xx = * for all channels or 2 digit channel number (Chan 1 = 01, Chan 2 = 02, etc.) |

---

| | |
|---|---|
| Description: | Set a channel as active or inactive |
| Command: | <@Aaxx |
| Parameters: | a = Active/Inactive state ( 0 = Inactive, 1 = Active)<br>xx = * for all channels or 2 digit channel number (Chan 1 = 01, Chan 2 = 02, etc.) |
| Other Info: | The channel must have a Mobile Module ID defined for the active/inactive state to be changed. |

### Status Information

Get status information from the Base.

| | |
|---|---|
| Description: | Send the battery status to the host computer in a table format |
| Command: | <@BT |
| Parameters: | None |
| Other Info: | Output format:<br>Channel (2 char), Module ID (6 char), Channel enabled flag (1 char), Last battery voltage (4 char)<br>Each field is separated by a comma and a carriage return is sent at the end of the string<br>If a Command Mobile Module is in the Active mode, the current battery voltage is obtained from the Command Mobile Module. If the Command Mobile Module is not in the Active mode or the Base has received a measurement on channels 1 to 20 from a Command Mobile Module, the voltage reported is the last voltage value received. No voltage is reported for the Global channel (channel 00). |

| | |
|---|---|
| Description: | Get the Mobile Module ID and active status defined for each channel |
| Command: | <@Ixx Note: The I in the command is a capital i. |
| Parameters: | xx = * for all channels or 2 digit channel number (Chan 1 = 01, Chan 2 = 02, etc.) |
| Other Info: | Output format:<br>Channel number (2 char), Module ID (6 char), Active status (1 char, 0 = Inactive, 1 = Active)<br>Each field is separated by a comma and a carriage return is sent at the end of the string |

| | |
|---|---|
| Description: | Send the Command Mobile Module control que to the host computer |
| Command: | <@Qxx |
| Parameters: | xx = * for all channels or 2 digit channel number (Chan 1 = 01, Chan 2 = 02, etc.) |
| Other Info: | Output format:<br>Channel (2 char), Module ID (6 char), Channel enabled flag (1 char), Read order (2 char), Number of readings (2 char), Last battery voltage (4 char), Last reported mode (1 char), Pairing state (1 char)<br>Each field is separated by a comma and a carriage return is sent at the end of the string |

---

| | |
|---|---|
| Description: | Send the Command Mobile Module control que to the host computer in a table format for easy reading |
| Command: | <@QT |
| Parameters: | None |
| Other Info: | The data provided is the same as provided by the <@Qxx command |

### Operational Modes

Change the operational mode of the Command Mobile Module and the Base.

| | |
|---|---|
| Description: | Set the Base operational mode. The mode will automatically be reset to Active after an <@PM is received by the Base. The Base operational mode will automatically be reset to Active after all other <@Pxx commands are processed by the Base. |
| Command: | <@CBn |
| Parameters: | n = New operational mode:<br>A = Active mode<br>S = Standby mode<br>E = Extended standby mode |
| Other Info: | If you want to send a command to a Command Mobile Module that is in the Standby or Extended Standby, you must put the Base into the appropriate mode before the command is sent to the Command Mobile Module. |

| | |
|---|---|
| Description: | Set the Command Mobile Module operational mode. |
| Command: | <@CMniiiiii |
| Parameters: | n = New operational mode:<br>A = Active mode<br>S = Standby mode<br>E = Extended standby mode<br>O = Turn the CMM off (this is a capital letter O)<br>iiiiii = * for all CMMs or 6 character CMM ID. Valid characters are 0 to 9 and A to F |
| Other Info: | Read request is sent to Command Mobile Module when Base receives <@PM command. If you are setting the mode in individual Command Mobile Modules, you must send the <@PM command after each <@CMniiiiii command.<br>Example:<br>This will work: <@CMS* <@PM<br>This will work: <@CMS6F647F <@PM <@CMSD5AEAE <@PM<br>This will not work: <@CMS6F647F <@CMSD5AEAE <@PM (only D5AEAE get changed) |

---

| | |
|---|---|
| Description: | Enable or disable the Base command mode. |
| Command: | <@Dn |
| Parameters: | n = Enable/Disable state ( 0 = Disabled, 1 = Enabled) |
| Other Info: | If the Base command mode is disabled, no <@Px command will be processed |

---

| | |
|---|---|
| Description: | Send the change mode request to Command Mobile Module(s) |
| Command: | <@PM |
| Parameters: | None |
| Other Info: | Be sure the Base has been set to the mode that matches the Command Mobile Module you are trying to send the command to. |

### Change or Restart the Timeout Times

Change the Command Mobile Module timeout times or restart the timers.

| | |
|---|---|
| Description: | Change the timeout times for the Command Mobile Module Active, Standby or Extended Standby modes. When a Command Mobile Module does not receive any commands for the timeout time, the Command Mobile Module will go to the Off mode. |
| Command: | <@Tmnnnn |
| Parameters: | m = Ooperational mode:<br>A = Active mode<br>S = Standby mode<br>E = Extended standby mode<br>nnnn = Times in minutes<br>Active mode valid range = 0001 to 0500 minutes (8.33 hours)<br>Standby mode valid range = 0001 to 2000 minutes (1.39 days)<br>Extended Standby mode valid range = 0001 to 6000 minutes (4.17 days) |
| Other Info: | If you want to reset the times for a Command Mobile Module that is in the Standby or Extended Standby mode, you must put the Base into the appropriate mode before the command is sent to the Command Mobile Module. The timeout times are included with all of the commands sent to Command Mobile Modules. You can send a <@PT to the Command Mobile Modules to update the times and restart the timers.<br>Example: The following commands will set the Active time to 20 minutes and the Standby time to 60 minutes. For this example, it is assumed that the Command Mobile Modules are currently in the Standby mode. After the <@PT command has been processed by the Base, the Base will return to the Active mode.<br><@CBS <@TA0020 <@TS0060 <@PT |

| | |
|---|---|
| Description: | Change the number of seconds the Command Mobile Module should stay awake after the Command Mobile Module receives an Attention command. |
| Command: | <@Knnn |
| Parameters: | nnn = Times in seconds. Valid range is 002 to 010. Factory default = 002. |
| Other Info: | This is the amount of time a Command Mobile Module will stay awake after it receives a command from the Base the Command Mobile Module is paired with.<br>This Keep Awake time is included with all of the commands sent to Command Mobile Modules.<br>It unlikely that you should ever need to change this time value. |

---

| | |
|---|---|
| Description: | Send the reset timeout timers to all paired Command Mobile Modules |
| Command: | <@PT |
| Parameters: | None |
| Other Info: | Be sure the Base has been set to the mode that matches the Command Mobile Module you are trying to send the command to. |

### Module Pairing

If you are not sending commands to the Command Mobile Module, you must pair the Command Mobile Module with the target Base by using the procedures outlined in the Mobile Module Pairing 34 section. If you will be sending commands to the Command Mobile Module, you must also enter the Command Mobile Module Module ID in the appropriate channel in the Base Setup Tab in the Extended Setup Program 11. It is recommended that you use the Mobile Module Setup function in the Setup Program to pair a Command Mobile Module with the Base. When a Command Mobile Module is paired with a Base using the Setup Program, a file is created on your PC that allows you to select the Command Mobile Module Module ID from a list when entering the Module IDs in the Base Setup Tab.

It is also possible to pair or unpair a Command Mobile Module with a Base through the use of a computer command.

---

| | |
|---|---|
| Description: | Pair/Unpair a Command Mobile Module with the current Base. |
| Command: | <@Laiiiiii |
| Parameters: | a = Pairinf instruction (0 = Unpair from Base, 1 = Pair with Base)<br>iiiiii = 6 character CMM ID. Valid characters are 0 to 9 and A to F |
| Other Info: | There is only a single buffer location in the Base for the Command Mobile Module ID (iiiiii in the <@Laiiiiii command). After sending each <@Laiiiiii command to the Base, you must then send a <@PS command. |

---

| | |
|---|---|
| Description: | Send the pairing command to the Command Mobile Module specified in the <@Laiiiiii command. |
| Command: | <@PS |
| Parameters: | None |
| Other Info: | Be sure the Base has been set to the mode that matches the Command Mobile Module you are trying to send the command to. |
| Example: | To pair the Remote with the Module ID of EC49A9 sent the following commands to the Base from the Host computer:<br><@L1EC49A9 <@PS |

### 7.2.2 Using Commands

You can use the commands in the previous section to control a Command Mobile Module. If you are using an off-the-shelf data acquisition program, you may be limited to (due to the typical limitations we see in these software packages) the number and types of commands that can be used. If you are developing your own application, you will be able to use any of the commands.

The easiest way to become familiar with these commands is to send the commands from ComTestSerial[81] to the Base. Most of the commands for the Command Mobile Module must be sent with very little time gap between the characters. Normally you cannot type fast enough to send a completed command. When using ComTestSerial to send a command, you should enter the command in the Local commands window and then press the Send button to send the command to the Base.

You can also use read switches to tell the Base to send a command to the Command Mobile Modules. Refer to the Using Read Switches[62] for more information.

### 7.2.3 Using Read Switches

Read switches connected to a MobileCollect USB Base or RS-232 Base can be used to control the operation of the Command Mobile Module. The standard USB Base and RS-232 Base each contain a single read switch connector. There is an option to install additional read switch connectors on each of these bases. The USB Base can have 1 or 4 read switch connectors. The RS-232 Base can have 1 or 3 read switch connectors. Contact MicroRidge[91] if you need to increase the number of read switch connectors on a Base.

#### Read Switch Functions for Command Mobile Modules

The read switch functions that are available for controlling a Command Mobile Module are listed below. The function for each of the Base read switches is defined in the Read Switch Control dialog in the Extended Setup Program[11].

| | |
|---|---|
| Read channel C | Read the Command Mobile Module paired with channel C. C can be any channel from 1 to 4. |
| Read all gages | Get readings from all of the Active Command Mobile Modules paired with the Base. When you configure the read switch, you can specify from 1 to 99 readings. |
| Set all to Active | Switch all of the Command Mobile Modules that are in the Standby mode to the Active mode. The Command Mobile Module must be in the Active mode before the Command Mobile Module will respond to a read request from the Base. |
| Set all to Standby | Switch all of the Command Mobile Modules that are in the Active mode to the Standby mode. |
| Turn off all | Turn off all of the Command Mobile Modules that are in the Active or Standby mode. To turn on a Command Mobile Module, you must press and release the Setup button on the Command Mobile Module. |

Most applications that use the Command Mobile Modules, will be able to use read switches to control their operation.

## 7.3 Installation on a Caliper

When the Command Mobile Module is used with a caliper, it is typically mounted on the back side of the caliper as shown in the illustration below.


**Mobile Module Mounted on a Caliper**

**Recommended Adhesive Placement on Module**

The Mobile Module should be mounted so that the 2 LEDs are visible along the top edge of the caliper. These LEDs are used to notify the user that the gage was read and the data was received by the Base. When mounted in this fashion on a caliper, you can still gain access to the batteries and replace the gage cable without having to remove the Mobile Module from the caliper.

The Mobile Module should be attached to the caliper with 3 foam adhesive pads as shown above. There are several sets of these foam adhesive pads supplied with each Mobile Module.

## 7.4 Gage Cable Replacement

The gage cable should be installed as shown in the photo below. The wires coming from the black grommet should press against the positive battery contact and then curve toward the top of the case.


***Gage Cable Connected to Command Mobile Module with RM2.4 Radio***


***Gage Cable Connected to Command Mobile Module with ATZB Radio***

To replace a gage cable, follow the steps below:

- Remove the Mobile Module cover.
- Note how the current gage cable is installed.
- Ground yourself to eliminate any static charge.
- Remove the battery from the Mobile Module.
- Remove the current gage cable by pulling up on the wires going into the connector.
- Press and release the Setup or Read button to remove stored voltage in the Mobile Module.
- Install your new gage cable.
- Replace the battery. Be sure to put the negative end of the battery into the case before pushing the positive end into position.
- Replace the Mobile Module cover.
- Press and release the Setup button. You should see the green LEDs blink once, then the red LEDs blink once and then the red & green LEDs do 4 railroad blinks (see description in LED Codes 38) as the Mobile Module does a Warm Start.

When the Mobile Module does a Warm Start, it will identify the gage cable connected to the Mobile Module. During a Warm Start, none of the user defined setup parameters are modified.

## 7.5 Battery Replacement

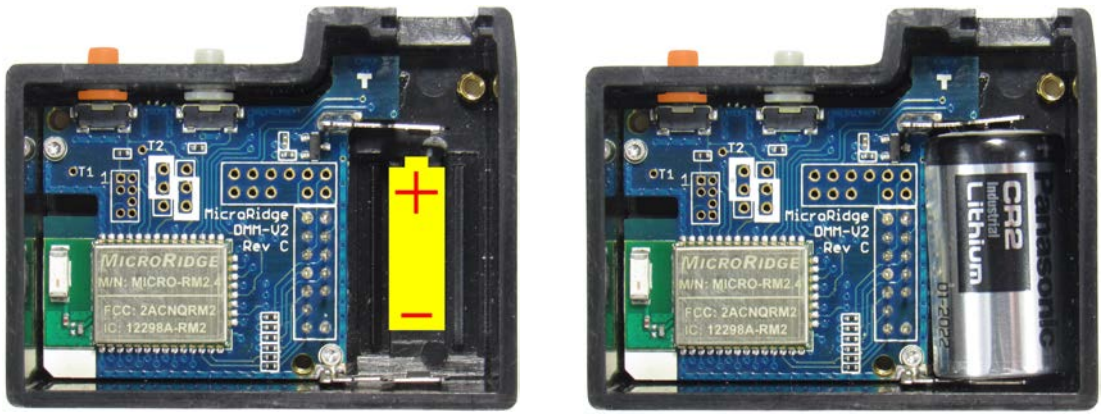
The battery and gage cable can be accessed by removing the Mobile Module top cover held in place by 3 screws. These screws are captive panel screws and should only be loosened enough to remove the cover from the bottom assembly of the enclosure. A small screwdriver is included with the Base for loosening the Mobile Module screws. The screws are secured in the bottom assembly of the enclosure by brass inserts. These brass inserts provide a secure method of holding the cover in place and eliminates the possibility of stripping threads in the plastic case.

**Caution: The components within the Mobile Module are subject to damage as a result of static electricity. Be sure to ground yourself before touching any component within the Mobile Module.**

### Battery

The battery used by the Mobile Module is a CR2, 3 volt photo lithium battery. This battery is readily available anywhere photo batteries are sold. The Mobile Module case shown on the left in the picture below has the battery orientation highlighted in the picture. The negative terminal is on the flat side of the battery and is the same as found on standard AA, C and D cell batteries. The positive terminal must be installed toward the top of the case.

**When installing a new battery, insert the negative (-) end of the battery first and then push down on the positive (+). This procedure will help prevent damage to the negative battery contact.**




***No Battery Installed*** ***Battery Installed***

***Interior of Command Mobile Module with RM2.4 Radio Module***

# 8 RS-232 Mobile Module

The RS-232 Mobile Module is used to capture measurements from gages and serial devices that output full RS-232 level signals. RS-232 output levels typically range from 5 to 8 volts down to -5 to -8 volts. Special components are required to handle these voltage levels and are included as part of the RS-232 Mobile Module design.


The gages that use the proximity interface from Sylvac must be used with the RS-232 Mobile Module. This interface is used on handheld gages such as calipers. Gages that use this interface are available from Fowler, Starrett, etc.

The RS-232 Mobile Module only supports RS-232 devices. You cannot use gages supported by the Command and Mini Mobile Modules (Mitutoyo, CDI, Ono Sokki, etc.) with the RS-232 Mobile Module. RS-232 gages that use the Opto connector (Fowler, Starrett, Sylvac, etc.) have low voltage outputs and are used with the Command and Mini Mobile Module rather than the RS-232 Mobile Module. A few RS-232 gages from Mahr Federal are also used with the Command and Mini Mobile Module rather than the RS-232 Mobile Module.

The RS-232 Mobile Module uses the same enclosure that is used for the Command Mobile Module. The battery life for an RS-232 Mobile Module will be different than the battery life experienced with a Command Mobile Module. The power demands for a device outputting full RS-232 voltage levels is much high than the power required by a Mitutoyo compatible gage.

Refer to the Mobile Module Operation 31 for information about the operation common to all of the Mobile Modules.

### Mobile Module Setup

You must set up an RS-232 Mobile Mobile with one of the Setup Programs[11]. The baud rates and communication parameters used by RS-232 devices vary widely and may not be preset for an RS-232 Mobile Module.

If you are using a gage with the Sylvac proximity interface, no baud rate or communication parameters set up is required. The gage cable used with these devices tell the RS-232 Mobile Module to configure the serial port at 4800-E-7-2.

## 8.1 Installation on a Caliper

When the RS-232 Mobile Module is used with a caliper, it is typically mounted on the back side of the caliper as shown in the illustration below. The illustration below shows a Command Mobile Module on the caliper. The size of the RS-232 Mobile Module is identical to the Command Mobile Module and the mounting procedure is the same for both of the Mobile Modules.


**Mobile Module Mounted on a Caliper**

**Recommended Adhesive Placement on Module**

The Mobile Module should be mounted so that the 2 LEDs are visible along the top edge of the caliper. These LEDs are used to notify the user that the gage was read and the data was received by the Base. When mounted in this fashion on a caliper, you can still gain access to the batteries and replace the gage cable without having to remove the Mobile Module from the caliper.

The Mobile Module should be attached to the caliper with 3 foam adhesive pads as shown above. There are several sets of these foam adhesive pads supplied with each Mobile Module.

## 8.2 Gage Cable Replacement

The gage cable should be installed as shown in the photo below. The wires coming from the black grommet should press against the positive battery contact and then curve toward the buttons.


*Gage Cable Connected to RS-232 Mobile Module with RM2.4 Radio*


*Gage Cable Connected to RS-232 Mobile Module with ATZB Radio*

To replace a gage cable, follow the steps below:

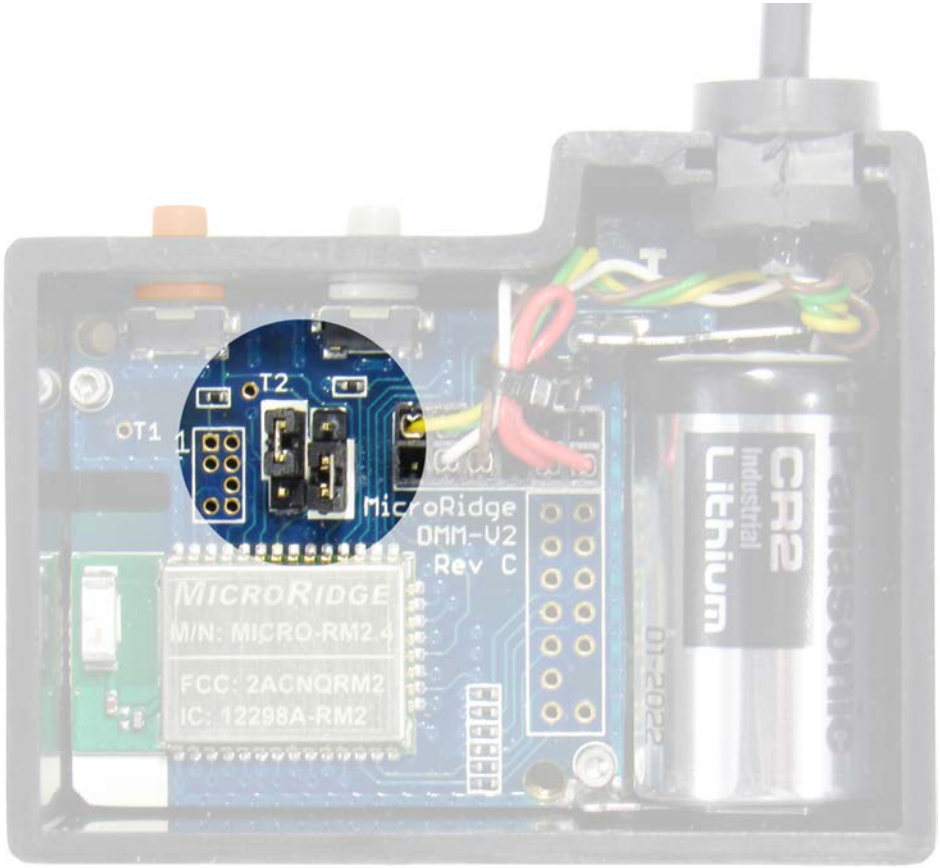
- Remove the Mobile Module cover.
- Note how the current gage cable is installed.
- Ground yourself to eliminate any static charge.
- Remove the battery from the Mobile Module. Be careful not to disconnect the adapter board the gage cable is connected to.
- Carefully remove the current gage cable. Be careful not to disconnect the adapter board from the main board.
- Press and release the Setup or Read button to remove stored voltage in the Mobile Module.
- Install your new gage cable.
- Replace the battery. Be sure to put the negative end of the battery into the case before pushing the positive end into position.
- Replace the Mobile Module cover.

- Press and release the Setup button. You should see the green LEDs blink once, then the red LEDs blink once and then the red & green LEDs do 4 railroad blinks (see description in LED Codes[38]) as the Mobile Module does a Warm Start.

When the Mobile Module does a Warm Start, it will identify the gage cable connected to the Mobile Module. You may have to setup the Mobile Module using one of the Setup Programs[11].

## 8.3 Null Modem Jumpers

There are 2 null modem jumpers on the RS-232 V2 Mobile Module that allow you to reverse the transmit (TxD) and receive RxD) data lines.




**Null Modem Jumpers Shown in the Default Positions**

The jumpers in the picture are shown in the default positions. To reverse the transmit (TxD) and receive (RxD) data lines, move the left jumper to the lower position and the right jumper to the upper position. Do not put the jumpers side by side.

## 8.4 Battery Replacement

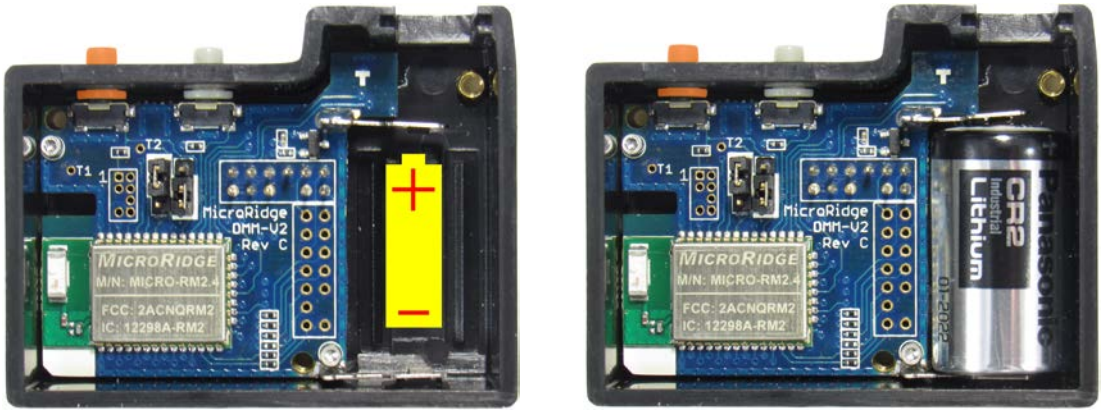
The battery and gage cable can be accessed by removing the Mobile Module top cover held in place by 3 screws. These screws are captive panel screws and should only be loosened enough to remove the cover from the bottom assembly of the enclosure. A small screwdriver is included with the Base for loosening the Mobile Module screws. The screws are secured in the bottom assembly of the enclosure by brass inserts. These brass inserts provide a secure method of holding the cover in place and eliminates the possibility of stripping threads in the plastic case.

**Caution: The components within the Mobile Module are subject to damage as a result of static electricity. Be sure to ground yourself before touching any component within the Mobile Module.**

### Battery

The battery used by the Mobile Module is a CR2, 3 volt photo lithium battery. This battery is readily available anywhere photo batteries are sold. The Mobile Module case shown on the left in the picture below has the battery orientation highlighted in the picture. The negative terminal is on the flat side of the battery and is the same as found on standard AA, C and D cell batteries. The positive terminal must be installed toward the top of the case.

**When installing a new battery, insert the negative (-) end of the battery first and then push down on the positive (+). This procedure will help prevent damage to the negative battery contact.**




*No Battery Installed* *Battery Installed*

***Interior of RS-232 Mobile Module with RM2.4 Radio Module***

# 9 Computer Commands

Each MobileCollect Base and Remote supports a specific set of commands that can be used to get information from the unit. These commands can be sent from ComTestSerial[81] for testing and setup purposes. Since ComTestSerial requires that its baud and communication parameter settings match those of the Base or Remote, it is recommended that you follow the steps below to start ComTestSerial.

- Start the MobileCollect Xpress or Extended Setup Program. If you will be communicating with a Remote, you must use the Extended Setup Program.
- If ComTestSerial is currently open, close it.
- Connect the Base to a serial port on your PC and press the appropriate Find button.
- Start ComTestSerial form the Setup Program Utility menu. ComTestSerial will start with the same serial port, baud rate and communication parameters for the currently located Base or Remote.

Most commands can be started with an Esc character or < character. The characters following the Esc or < character can be upper or lower case. A carriage return (Enter key) does not have to be sent after the end of the command. There are a few exceptions to these rules and these exceptions will be noted as necessary.

### Supported MobileCollect Products

The versions of each of the MobileCollect products supported by the commands described in this section are as follows:

- Bases Version 5.30
- Remotes Version 5.12
- Mobile Modules Version 4.09

The commands for older versions of the MobileCollect products may be slightly different. If you need a manual for older MobileCollect versions, contact MicroRidge Systems[91].

## 9.1 Base Commands

The commands available for use with a Base are listed below. In addition to the commands listed below, there are additional commands that are intended to be used with the Command Mobile Module. Refer to the Command Mobile Module[80] section for additional details.

### Display the Active Channels, Remote Types and Remote IDs

Command: <C

Sample output:
```
Active channels, Remote types and Remote ID's:
  Global   Mobile Module
     1     Mobile Module   6F647F
     2     Mobile Module   UM0467
```

---

### Blink each LED Bank

Command: <L

Sample output: LEDs will blink

---

### Send Command to Remote

Description: Send a command to a Digital or RS-2322 Remote.

The Digital Remote supports commands for a single read (R), begin continuous read (B), start TIR reading (T) and stop continuous or TIR reading (S).

When this command is sent to the RS-232 Remote, the command portion (dd) is sent to the connected serial device.

Command: <Pvvvvvvnndd

vvvvvv = 6 character Remote ID. Characters should be upper case. You can use the Extended Setup Program to determine the 6 character Remote ID for your Remote

nn = Number of characters in the command. Must be 2 characters in length. i.e.: 01, 05, 13, etc.

dd = Command. The length of the command must be nn characters.

Sample commands: Digital Remote:

<PDE303101R (Get a reading from the connected gage)

RS-232 Remote:

<P61494203<R* (Send the 3 character command <R* to the connected serial device)

---

### Set the Run Mode

Command: <Rx where x is defined as

N = Normal mode

S = Setup mode

Sample output: Normal mode = Green power LED is always on
Setup mode = Green power LED flashes (on for 1 second, off for 1 second)

---

### Firmware Version

Command: <V

Sample output: MC-USBB-00, 4.03

---

### Warm Start

Description: Sending this command is the same as pressing the reset button or disconnecting and reconnecting the AC adapter or USB cable.

Command: <W

Sample output: All LEDs will turn on. In just under 1 second, the signal strength LEDs (left stack of green LEDs) will turn off. The right stack of LEDs (red/yellow/green) will remain on for about 10 seconds. While the right stack of LEDs are on, you can pair a Mobile Module with the Base.

---

### Cold Start

Description: Sending this command will reset all of the Base configuration parameters to the factory defaults.

Command: <Z

Sample output: All LEDs will turn on. While the parameters in EEPROM are being reset, the left stack of LEDs will be on and the right stack will blink 32 times. After the parameters have been reset to the factory defaults, the left stack of LEDs will turn off and the right stack will turn on. While the right stack of LEDs are on, you can pair a Mobile Module with the Base.

---

### Copyright & Configuration Information

Command: <*

Sample output:

```
MobileCollect USB Base @ 2.4 GHz
Copyright (C) 2009-2013 MicroRidge Systems, Inc.
All rights reserved.
  Model number.......  MC-USBB-00
  Firmware version...  4.07
  Firmware date......  11- 7-13    8:00:00
  Serial number......  MC-USB-DC000013EFCCC001
  Operational mode...  Base mode
  Run mode...........  Normal
  Radio status.......  On-line
  Description........  MobileCollect USB Base

  CMM Control........  Enabled
   Current mode......  Active
   Keep awake........  2 seconds
   Active time.......  10 minutes
   Standby time......  5 minutes
   Extended time.....  3 minutes

  Setup source.......  Setup Xpress
  Active channels....  1
   M/Module chan.....  1 (Global channel is active)
   Remote chan.......  0

  Station ID.........  DCCCC0
  Network S/N........  dc000013-efccc001
  PAN ID.............  9fff

  RF Channel.........  21

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        www.microridge.com     541-593-1656
```

## 9.2 Remote Commands

The commands available for use with a Remote are listed below. These commands can only be used when the Remote is connected to a PC with the USB cable. Normally you would use ComTestSerial[81] to send the command to the Remote. The baud rate and communication parameters for the Remote USB connection are fixed at 9600-N-8-1.

---

### Send Firmware Model and Version Information

| | |
|---|---|
| Command: | <V or {Esc}V |
| Sample output: | MC-RDIG-01, 5.12 (Response from a Digital Remote) |
| | MC-R232-01, 5.12 (Response from a RS-232 Remote) |

---

### Warm Start

| | |
|---|---|
| Description: | Sending this command is the same as pressing the reset button or disconnecting and connecting the power. |
| Command: | <W or {Esc}W |
| Sample output: | The right-hand LED stack will turn on when the Remote is restarting. |

---

### Cold Start

| | |
|---|---|
| Description: | Sending this command will reset all of the Remote configuration parameters to the factory defaults. |
| Command: | <Z or {Esc}Z |
| Sample output: | The right-hand LED stack will turn on when the Remote is initializing its parameters. |

---

### Copyright & Configuration Information

Description: This output from this command provides version, configuration and current setting information.

Command: <* or {Esc}*

Sample output for RS-232 Remote:

```
MobileCollect RS-232 Remote with RM2.4 Radio @ 2.4 GHz
Copyright (C) 2010-2017 MicroRidge Systems, Inc.
All rights reserved.
  Model Number.........  MC-R232-01
  Firmware version.....  5.12
  Firmware date........  3- 8-17   14:09:59
  Serial number........  MC-RM2-6116092009494010
  Operational mode.....  Remote mode
  Run mode.............  Normal

  Auto baud detect.....  Enabled
  RS-232 setup.........  9600-N-8-1
  End-of-packet........  CR

  Description..........  MobileCollect RS-232 Remote
  Remote ID............  614940
  Network S/N..........  61160920-09494010

  Base Description.....  MobileCollect RS-232/USB
Base
  Base ID..............  A91350
  Base Network S/N.....  a9150623-14135010

  PAN ID...............  7aa3
  RF Channel...........  21

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        www.microridge.com     541-593-1656
```

## 9.3 Mobile Module Commands

You can get the copyright and configuration information from a Mobile Module by placing the Mobile Module in the Setup Mode and sending the information to a Base. In order for the Base to display the information, the Base must also be in the Setup Mode.

The procedure for getting the Mobile Module copyright and configuration information are as follows.

- Start the MobileCollect Xpress or Extended Setup Program.
- If ComTestSerial is currently open, close it.
- Connect the Base to a serial port on your PC and press the appropriate Find button.
- Start ComTestSerial form the Setup Program Utility menu. ComTestSerial will start with the same serial port, baud rate and communication parameters for the currently located Base or Remote.
- Press the Setup Mode button in ComTestSerial.
- Put the Mobile Module into the Setup Mode.
  - Press & hold the Setup button. The Setup button is the button closest to the gage cable.
  - While you continue to press the Setup button, press and release the Read button.
  - Once both LEDs start to flash, release the Setup button.
  - When the Setup Mode is active, both LEDs will flash rapidly. The left LED is red and the right LED is green.
- Press and release the Setup button. The copyright and configuration information will be sent to the Base and displayed in ComTestSerial.
- To save battery power, you should press the Read button to turn off the Mobile Module as soon as ComTestSerial has received the information. A Mobile Collect Mobile Module will automatically turn off after a period of no activity,

A sample of the output from a Command Mobile Module copyright and configuration information command is shown below. The output from a Digital, Mini or RS-232 Mobile Module does not contain the information about the command mode.

```
MobileCollect Command Mobile Module @ 2.4 GHz
Copyright (C) 2009-2013 MicroRidge Systems, Inc.
All rights reserved.
  Model number.........  MC-CMM-00
  Firmware version.....  3.12
  Firmware date........  11-11-13    8:00:00
  Wireless library ver..  L01.006
  Wireless library date.   9-18-13   15:18:00
  Serial number........  MC-CMM-DA000013EE476201
  Battery voltage......  3.00/3.00 volts (radio on/off)
  Description..........  Command Mobile Module

  Read mode............  Single

  Command mode.........  Active
   Keep awake..........  2 seconds
   Active time.........  10 minutes
   Standby time........  5 minutes
   Extended time.......  3 minutes

  Gage type............  Mitutoyo
  Gage cable ID........  1-0

  Module ID............  DA4762
  Module label.........  DA4762
  Network S/N..........  da000013-ee476201

  Base ID..............  DCCCC0
  Base Network S/N.....  dc000013-efccc001
  PAN ID...............  9fff

  RF Channel...........  21
```

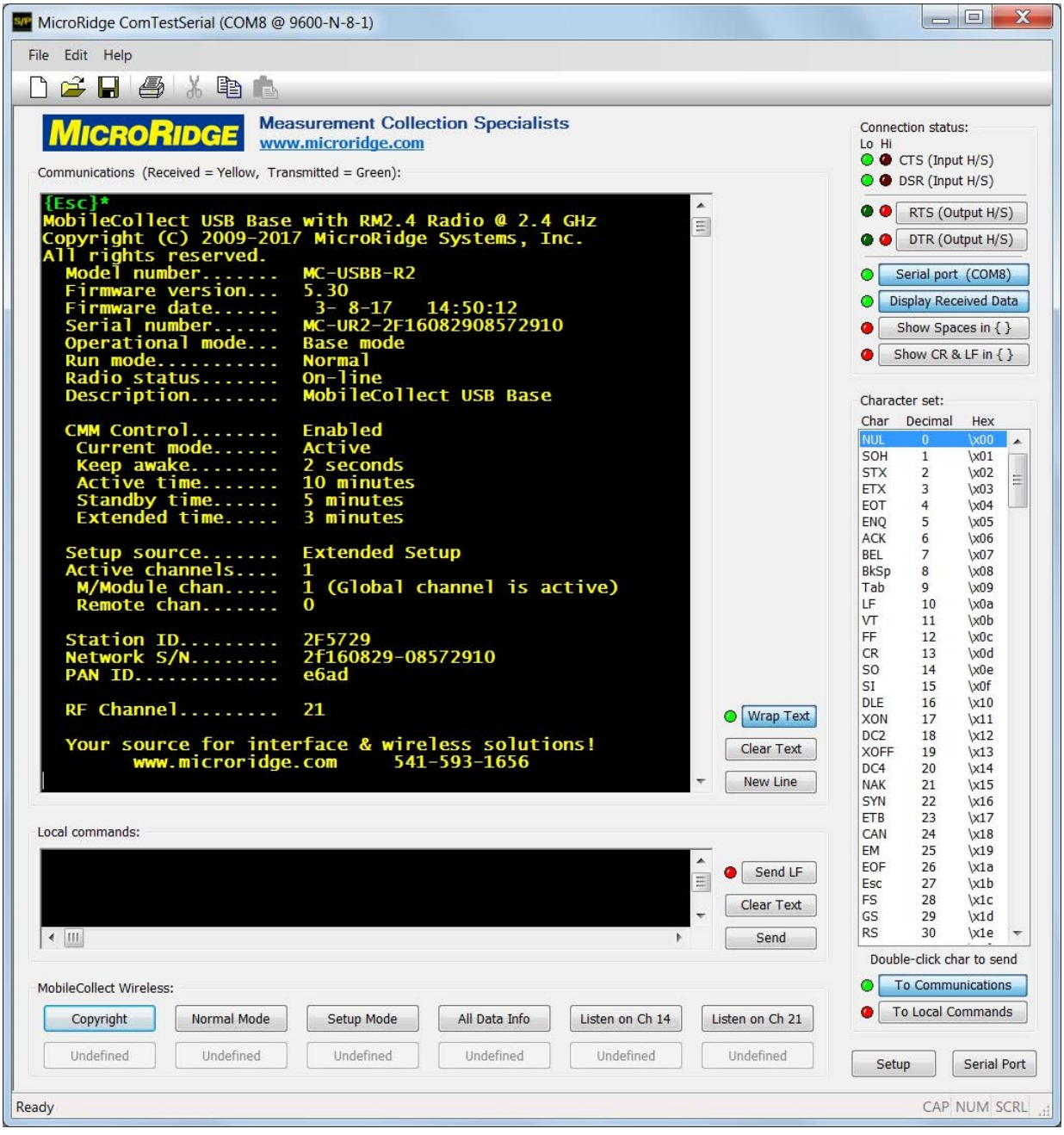
## 9.4 Command Mobile Module

The commands that can be sent to a Base for controlling a Command Mobile Module are detailed in the Commands for Command Mobile Module 50 section in the Command Mobile Module 45 chapter.

# 10 ComTestSerial

A serial communications test program is included on the MobileCollect CD and will be installed when you install a Setup Program. ComTestSerial can be started directly from the Setup Program Utility menu.

ComTestSerial can be loaded on as many computers as required. To install ComTestSerial on other computers, select the ComTestSerial installation option on the CD. ComTestSerial is designed for use on Windows XP and later.



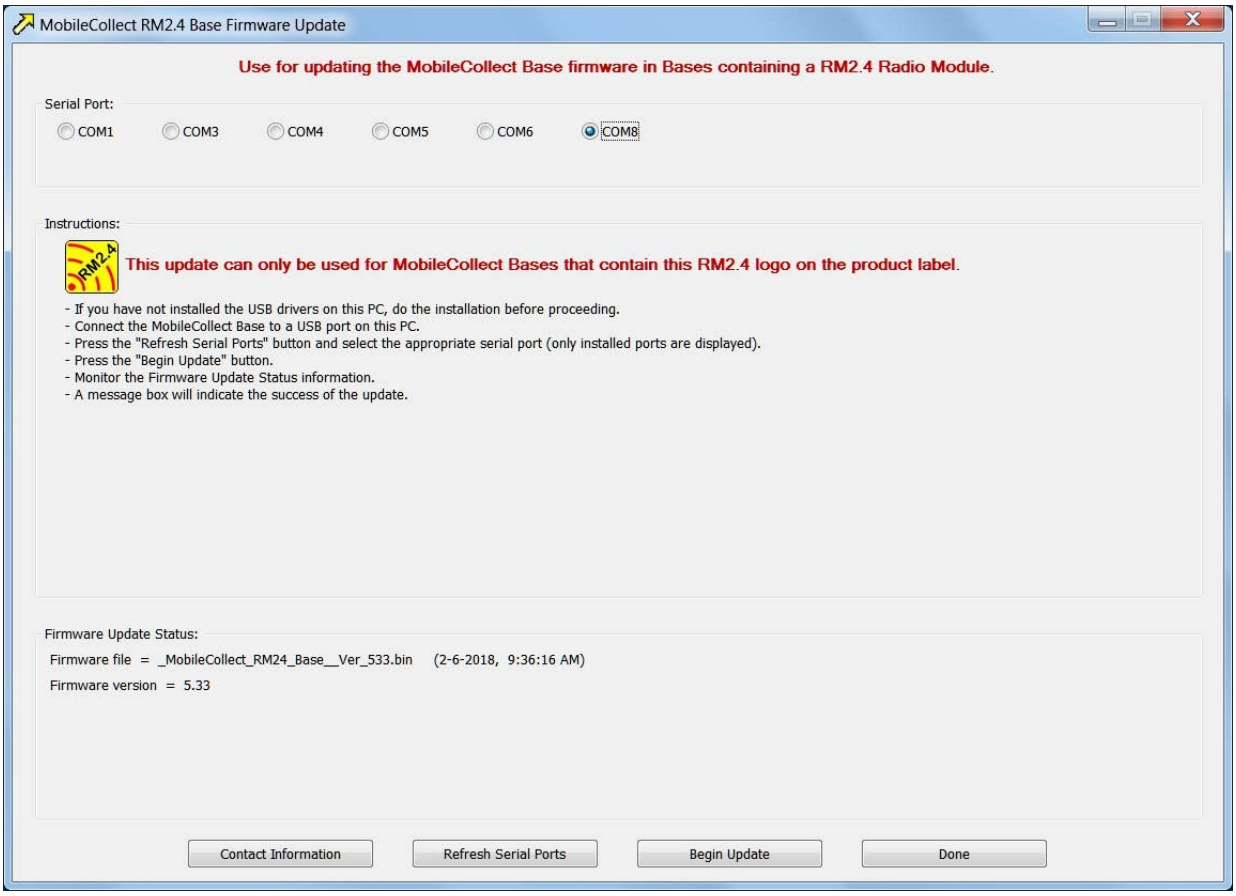
# 11 Firmware Updates

The firmware is the software that runs in the Bases, Remotes and Mobile Modules. There are different firmware updates required for MobileCollect with the RM2.4 Radio Module, MobileCollect with the ATZB Radio Module, and GageWay Wireless. The most current firmware updates for the wireless products can be downloaded from the MicroRidge web site at www.microridge.com/wl_downloads.htm.

In addition to the web, firmware updates for Bases, Remotes and Mobile Modules are also available from the following sources. Please be aware that the firmware updates available from these other sources may not be the latest updates available.

- CD shipped with the wireless system. The firmware on the CD is only for Bases, Remotes and Mobile Modules that contain the RM2.4 Radio Module.
- Xpress Setup Program. When this Setup Program is installed, the firmware updates are also installed. The firmware installed with the Xpress Setup Program is only for Bases and Mobile Modules that contain the RM2.4 Radio Module.

All of the firmware updates are installed via a firmware update utility. The screen below shows the firmware update for Bases that contain the RM2.4 Radio Module. The firmware update procedure is designed so that you cannot install an incorrect firmware update in any of the MobileCollect products.




The firmware update process for the Bases and Remotes takes less than 15 seconds. The firmware update process for the Mobile Module has a few more steps involved with the update. Be sure to read the instructions included with the firmware update utilities.

# 12 Accessories & Spare Parts

Several accessories and spare parts are available for use with MobileCollect. Some of these items may be included as standard components with a Base, Remote or Mobile Module.

### Purchase On the Web

Most of these items are available for purchase directly from the MicroRidge web site at one of the following stores:

| | |
|---|---|
| Wireless store: | www.microridge.com/store_mobilecollect.htm |
| USB & RS-232 cables store: | www.microridge.com/store_usb_rs232_cables.htm |

---

### USB Cable

Type A male/male USB cable. This cable is used to connect the USB Base to a USB port on a PC or laptop. Available lengths include 3' and 6'.

---

### 9-Pin Serial Extension Cable

This is a straight-through serial extension cable. A 6-foot version of this cable is included with each RS-232 Base and Remote. Lengths longer than 6 feet are also available. Contact MicroRidge Systems for specific lengths available.

### Hand Switch

The hand switch is used with a Base to send a command to a Remote, host computer or command Mobile Module. The hand switch is used with a Remote to tell the Remote to send a predefined command to the serial device.

### Foot Switch

The foot switch is used for the same functions as the hand switch.

## Gage Cables

*No Photo Available*

Some people think that if you are not flexing the gage cable on the Mobile Module, this cable will last as long as the caliper or the gage it is connected to. Unfortunately, this is not necessarily true and gage cables must be considered consumables. You should always have spare gage cables available.

We have been selling a very specialized measurement capture device since 1990 that mounts directly on a caliper. We have sold hundreds of these devices and thousands of replacement cables. Our experience says, “Your cable will eventually fail. Keep spare cables available at your facility”.

When using cables for Mitutoyo gages that contain a read button on the cable, the most common item to failure is the read button. The read button on the Mobile Module can be used in conjunction with the cable read button. The read button on the Mobile Module is rated for 1 million cycles.

The unique design of the Mobile Module allows you to access the gage cable by removing a few screws. To replace the cable, simply unplug the defective cable and plug in a new cable.

# 13 Warranty Information

The standard MicroRidge warranty for products it manufactures and resells is described below:

- MicroRidge warrants that equipment manufactured by MicroRidge to be free from defects in material and workmanship, when properly maintained under normal use, for a period of twelve (12) months from date of purchase of the product (the “warranty period”). Some products sold and distributed by MicroRidge are warranted by the manufacturer of the products.
- Warranty for gage and RS-232 interface cables is 30 days from date of shipment.
- Products which do not conform to their description or which are defective in material or workmanship will, by MicroRidge decision, be replaced or repaired, or, at MicroRidge’s option, credit for the original purchase price may be allowed provided that customer notifies MicroRidge in writing of such defect within thirty (30) days of discovery and returns such products in accordance with the MicroRidge instructions. No products may be returned without MicroRidge prior written authorization.
- This warranty does not apply to any product which has been subjected to misuse, abuse, negligence or accident by the customer.
- MicroRidge makes no other warranty or representation of any kind with respect to the products, either express or implied, including without limitation, that of merchantability or fitness for a particular use. Failure to make any claim in writing, or within the thirty (30) day period set forth above, shall constitute an irrevocable acceptance of the products and an admission by the customer that the products fully comply with all terms, conditions and specifications of customer’s purchase order. MicroRidge shall not be liable for direct, indirect, incidental, special or consequential damages, under any circumstances, including, but not limited to, damage or loss resulting from inability to use the products, increased operating costs or loss of sales, or any other damages. To make a claim under this warranty, customer must notify MicroRidge in writing within the warranty period.
- Customer will pay all shipping charges (and duty and taxes) for equipment returned to MicroRidge for warranty service. MicroRidge will pay shipping charges for equipment returned to customer in North America. Customers outside the USA are responsible for duty and taxes on equipment returned to them.
- Software developed by MicroRidge is warranted to operate in accordance with the software documentation on the hardware specified in such documentation, for a period of six (6) months from date of shipment. During the warranty period, MicroRidge will at no charge correct any programming error in the software that interferes with normal operation of the software provided that MicroRidge is able to reproduce such error on MicroRidge computer.

# 14 Contact MicroRidge

**Email:**

| | |
|---|---|
| Support: | support@microridge.com |
| Sales: | sales@microridge.com |
| Information: | info@microridge.com |

**Phone:**

| | |
|---|---|
| Support: | 541.593.1656 |
| Sales: | 541.593.3500 |
| Main office: | 541.593.1656 |
| Fax: | 541.593.5652 |

**Mailing Address:**

MicroRidge Systems, Inc.

PO Box 3249

Sunriver, OR 97707-0249

**Shipping Address:**

MicroRidge Systems, Inc.

56888 Enterprise Drive

Sunriver, OR 97707

Note: There is no mail delivery to this address. This address should only be used for UPS and FedEx package delivery services.

**Web:** www.microridge.com

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