

CRB-256M

Call Record Buffer

User's Guide

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1. Introduction

The CRB-256M is a highly reliable, solid state PBX data recorder, designed for remote SMDR/CDR collection from any PBX that sends ASCII data via an RS232 interface. The CRB-256M provides an economical solution for remote sites that produce a low volume of call records.

Internal 2400 Baud Modem

The CRB-256M is equipped with an internal 2400 bps modem to allow easy access to units installed at remote sites. The internal modem automatically adapts to 2400 or 1200 bps to assure a reliable connection, on noisy phone lines.

256K of Non-Volatile Memory

The CRB-256M provides a substantial improvement over cheap DRAM printer buffers. While DRAM buffers can corrupt stored data with the slightest power glitch, the CRB-256M provides 256K of non-volatile, battery backed memory, and can reliably store data for up to 60 days, even when powered off.

Dual Compression Storage

Dual Compression storage can more than double the amount of characters that can be stored. Based on an average call record format, the unit can store approximately 9,800 records.

80% Full Call/Page

When memory becomes 80% full, the unit can dial a user defined modem number and/or send a page to a numeric or alphanumeric pager, allowing prompt response when data must be retrieved.

Data Release Options

Error-free transmission is assured using the ZModem data transfer protocol found in many popular communications programs. Stored data can either be transferred in ASCII text mode, or in compressed block mode for faster transmission throughput. An "unpacking" software routine is available to aid in uncompressing the data.

Other Features:

- Optional Password Controlled Command Access
- User-Defined Location I.D.
- Wrap-Around Memory Option

2. Unit Description

2.1. LED Indicators

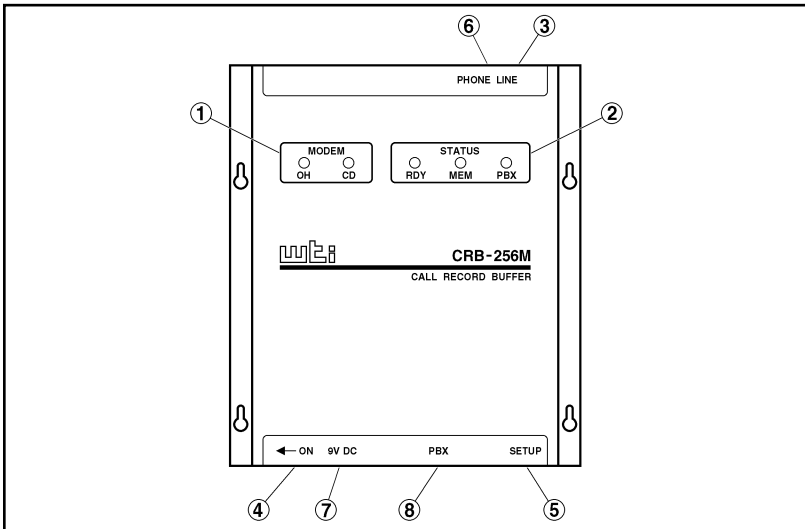


Figure 1: The CRB-256M Unit

① Modem Indicators:

- **OH:** Lights when internal modem is Off Hook.
- **CD:** Lights when carrier is detected.

② Status Indicators:

- **RDY:** Lights when power is applied.
- **MEM:** Indicates approximately how much memory is being used:
 - **Memory Empty:** LED does not blink.
 - **10% Full:** LED will blink once and then pause.
 - **20% Full:** LED will blink twice and then pause.
 - **30% to 90% Full:** LED will blink once for each 10% of memory used and then pause.
 - **100% Full:** LED will remain on continuously.
- **PBX:** Flashes when data is received from the PBX. If the PBX LED does not flash, this may indicate improper connection to the PBX, or that the PBX is not set to transmit data via its SMDR Port.

2.2. Controls

- ③ **Reset Button:** When the Reset Button pressed and held during Power Up, the CRB-256M will perform a memory test, erase stored records and currently defined parameters, and then reset to default parameters.
- ④ **On/Off Switch**
- ⑤ **Setup Switches:** Used to select default baud rates for the PBX Port and Modem. Also used to enable/disable the Password Feature.

2.3. Connectors

- ⑥ **Phone Line:** For connecting your outside phone line to the CRB-256M's internal modem. The baud rate for outgoing calls is determined by SetUp Switch 3. The data bits/parity/stop bits for outgoing calls is 8/N/1.
- ⑦ **9 VDC Connector:** For connecting the supplied 9 VDC Adapter to the CRB-256M.
- ⑧ **PBX Connector:** For connecting your PBX's SMDR port to the CRB-256M.
 - **DTE Configuration:** The PBX Connector uses a DTE configuration. For a description of the interface, please refer to Section 6.
 - **Communication Parameters:** The default baud rate for the PBX Port is determined by SetUp Switches 1 and 2. The baud rate and bits per character can also be selected via Command ^B02.

3. Installation

3.1. Setup Switches

Note: When SetUp Switches 1 through 3 are changed, new baud rates will not take effect until the unit is Reset, or Command ^B01 is invoked.

3.1.1. PBX Port Baud Rate (Sw1 and Sw2)

Switches One and Two select the default baud rate for the PBX Port. The baud rate for the CRB-256M's PBX Port must match your PBX's SMDR Port. Note that the PBX Port Baud Rate can be re-defined later using the Set Parameters Command (^B02). In the default state, the PBX Port is set for 7/E/1.

PBX Port Baud Rate	Sw1	Sw2
9600 *	Down	Down
2400	Down	Up
1200	Up	Down
300	Up	Up

* Factory Setting

3.1.2. Modem Baud Rate (Sw3)

Switch Three selects the baud rate for outgoing calls. The Modem is set for 8/N/1.

Modem Baud Rate	Sw3
2400 bps *	Down
1200 bps	Up

* Factory Setting

3.1.3. Password Feature (Sw4)

Switch Four enables/disables the password feature. When enabled, a password is required in order to access the command mode. In the default state, the password feature is enabled.

Password Feature	Sw4
Enable*	Down
Disable	Up

* Factory Setting

3.2. Cable Connection

1. Connect an outside phone line to the CRB-256M's Phone Line Connector.
2. Connect an appropriate cable from your PBX's SMDR Port to the CRB-256M's PBX Port.
 - a) Check the configuration of your PBX's SMDR interface. Most PBX SMDR ports are configured to attach directly to a printer (DTE). If this is the case, a straight wired, pin-to-pin cable can be used to connect the PBX.
 - b) Only pin 3 and the Ground line are required. The DTR signal (pin 20) is provided as a positive voltage source, in the event that your PBX requires a READY input in order to release data.
3. Connect the supplied 9 Volt DC adapter to the 9 VDC Connector. Plug the adapter into an appropriate power source. Power on the CRB-256M unit.

Note: Use *only* the power adapter provided with the unit. Using the CRB-256M with a power adapter from another instrument can seriously damage the unit.

4. When installing the CRB-256M for the first time, it is also recommended to reset the unit to default parameters, and clear and test memory as follows:
 - a) With the Power Switch set in the OFF position, press and hold the Reset Button. Place the Power Switch in the ON position, then release the Reset Button.
 - b) The MEM Indicator will blink four times, indicating the Reset/Clear procedure has been successfully completed. The MEM Indicator will blink continuously if a memory error is detected.

4. Operation

4.1. Calling the CRB-256M

1. Start your communications program (e.g. ProComm), set for 2400 baud, 8 bits per character, No parity, 1 Stop Bit.
2. Dial the CRB-256M. If the Password feature is enabled (Sw4 = Down), the unit will send an I.D. Message as shown below.

CRB-256M: 000, User Call-In, 0% Full

Where "000" is the default Site I.D.

- a) After the I.D. Message is displayed, the password must be entered within 30 seconds. Key in the password (Default = **SMDR**, all upper-case) and press **[Enter]**. Note that the password feature is case sensitive.
 - b) If an incorrect password is entered, the CRB-256M will re-display the I.D. Message. If the correct password is not keyed in within 30 seconds, or after 10 attempts, the unit will disconnect.
 - d) If the Password feature is disabled (Sw4 = Up), the I.D. Message will not be displayed.
4. The CRB-256M will display the Help Screen (Figure 2) and the "**^B06 For Help) CRB-256M:**" prompt will appear, indicating the unit is ready to accept commands.

```
CRB-256M Commands
=====
^B00      Clear All Memory
^B01      Default Parameters
^B02      Set Parameters
^B03      Display Status
^B04      Download Parameters
^B05,R    Read Data (Single Record Mode)
^B05,C    Read Data (Continuous Mode)
^B05,Z    Download Data (ZModem)
^B06      Display Help Menu
^B07      Set Immediate Callback
^B08      Send Test Pattern
^B09      Disconnect
^B10      Alphanumeric Pager Test
```

Figure 2: The Help Screen

```

CRB-256M Status                               Version 1.0
=====                                       =====
Records Stored: 0
Memory Usage:   0

SW-1  SW-2  SW-3  SW-4
DOWN  DOWN  DOWN  DOWN

Password:           SMDR
Phone #:
Pager #:
Pager ID#:
Site ID:           000
End Character:     ^J
80% Call/Page:    No
Wrap Around:      No
Command Echo:     Yes

PBX Port:          9600,E,7,1

```

Figure 3: The Status Screen (Default Values Shown)

4.2. Display Status

Command **^B03** displays the Status Screen (Figure 3), which lists memory usage and currently defined parameters. To display the Status Screen, type **^B03 [Enter]** at the **CRB-256M:** command prompt. When the Status Screen appears, review listed parameters to determine if they fit your application.

4.3. Changing Parameters

The Set Parameters Command (**^B02**) allows the user to change parameters such as the Password, Site I.D., and other features. To change system parameters, proceed as follows:

Note:

- If the password is re-defined, make certain to record the new password.
- If the password is lost or forgotten, place SetUp Switch 4 in the Up position to temporarily disable the Password feature. Call the CRB-256M and invoke command **^B03** to display parameters including the current Password. After you have determined the Password, return SetUp Switch 4 to the Down position to re-enable the Password feature.

When the **CRB-256M**: prompt appears, type **^B02** ([**Ctrl**] plus [**B**], then **02**) and then press [**Enter**]. The unit will display a series of prompts as described below.

Note:

- To change a parameter, key in the new value and press [**Enter**].
- To exit the Set Parameters routine, press [**Esc**].
- To skip a prompt without changing its parameter, press [**Enter**] without keying in a new value.
- For more information on the 80% Full Call/Page features, please refer to Section 4.5.

1. **Password:** (Up to 8 characters, Default = **SMDR**)
2. **Phone #:** (Up to 32 char.) Defines the number that will be called when an 80% Full Call is initiated (Section 4.5).
3. **Pager #:** (Up to 32 char.) Defines the number that will be called when an 80% Full Page is initiated (Section 4.5).
4. **Pager ID#:** (Up to 32 char.) Defines the Pager I.D. number that will be used when an 80% Full Page is sent to an alphanumeric pager (Section 4.5).
5. **Site I.D.:** (Up to 8 char., Default = 000) Used to indicate the installation location.
6. **End Character:** (Default = ^J, Line Feed) Defines the End-of-Record Character. When defining the EOR character, key in the ^ character and then the desired letter (e.g. ^M for carriage return). Do not press the [**Ctrl**] key to create the ^ character.
7. **80% Call/Page:** Enables/Disables the 80% Full Call/Page option. When enabled, the unit will dial the number defined at the **Phone #** and/or **Pager #** prompts when memory becomes 80% full. Type **Y** to enable, or **N** to disable. In the default state, this feature is disabled. For more information, please refer to Section 4.5.
8. **Wrap Around:** Enables/Disables the Wrap Around feature. When enabled, the unit will recycle available memory by overwriting records (starting with oldest records) when memory becomes full. In the default state, this feature is disabled.

9. **Command Echo:** Enables/Disables the Command Echo Feature. Type **Y** to enable, or **N** to disable. The command echo can also be suppressed for individual commands by substituting a **^A** for the **^B** at the beginning of the command (e.g. **^A03** instead of **^B03**).
10. **PBX Baud Rate:** (300, 1200, 2400, or 9600 bps) Sets the Baud Rate for the PBX Port. The *default* PBX Port Baud Rate is determined by SetUp Switches 1 and 2.
11. **PBX Bits/Char.:** (7 or 8) Note that the seven bit setting provides more efficient data compression.

4.4. Data Release

4.4.1. ASCII Mode

ASCII data can be released in either Record-by-Record Mode, or in Continuous Release Mode.

- **^B05,R [Enter]** — **Record-by-Record Mode:** Releases one record at a time for each XON character received.
- **^B05,C [Enter]** — **Continuous Release Mode:** Releases data records in continuous mode. XON/XOFF used for flow control.

When releasing ASCII data in the Record-by-Record Mode or Continuous Release Mode, note the following:

- An XON is required to begin data output. This allows time for the user to prepare polling software for ASCII download.
- XON/XOFF handshaking is used for flow control.
- To terminate data release, press the **[Esc]** key.
- Data is erased as it is read.

4.4.2. ZModem Download

To use ZModem protocol to release data, proceed as follows:

1. Start your communications program (e.g. ProComm) and select ZModem protocol. Call the CRB-256M unit, if the Password Feature is enabled, key in the password (Default = **SMDR**) and press [**Enter**].
2. When the **CRB-256M:** prompt appears, type **^B05,Z** [**Enter**].
 - a) If the communications program is set for auto-downloading, the download will now start and complete without further intervention.
 - b) If the communications program is *not* set for auto-downloading, start the ZModem download.

When using ZModem protocol, note the following:

- Files are named automatically using the following format:

sssbbbb . CRB

Where:

sss The first three characters of the Site ID.

bbbb The block number of the first block transmitted.

CRB The "CRB" extension is used to identify downloaded files.

- ZModem protocol includes automatic error correction. If line noise causes data corruption, the data will be automatically re-transmitted until it is sent correctly.
- ZModem protocol includes crash recovery capability. If the line is lost during download, the user can call the unit back and re-enter the download command. The download will pick up where it left off, without losing or duplicating data.
- Data will be automatically erased from the CRB-256M's memory only after the communications program has acknowledged a successful download.
- Downloaded files are sent in compressed binary format to conserve time and storage space. Although compressed binary files cannot be directly viewed or printed, WTI can provide a convenient, DOS based decompression program. Please contact WTI Technical Support for more information.

4.5. 80% Full Call/Page Features

When memory becomes 80% full, the CRB-256M can call your remote modem and/or send an alphanumeric or numeric page. The parameters entered under command ^B02 determine whether the unit will call your modem, send a numeric page, or send an alphanumeric page.

Note that the CRB-256M can perform *both* an 80% Full Call and 80% Full Page if both options are correctly configured as described in the Sections that follow.

4.5.1. 80% Full Call

To instruct the CRB-256M to call your remote modem when memory becomes 80% full, define the following parameters under command ^B02:

- **Phone #:** Note that the phone number can include Dial Commands, such as @ (5 Second "No-Talk" Delay), comma (2 Second Dialing Delay), and # (Pound Key).
- **80% Call/Page:** Enabled. In the default state, this feature is disabled.

If the CRB-256M is unable to successfully connect with the defined phone number, the unit will continue to re-dial the number until three attempts have been made. There is no delay between dials except for the time required to hang-up and wait for the modem to settle.

After the third unsuccessful attempt, the unit will wait 10 minutes and then begin another cycle of three dials. The unit will continue this process until a successful call is placed, or memory drops below 80% full.

When the CRB-256M places a successful call to your remote polling device, an I.D. message will be sent, which lists the site I.D., reason for call (80% Full or Immediate), and the amount of memory currently in use.

4.5.2. 80% Full Page

In addition to the 80% Full Call, the CRB-256M can also send either a numeric or alphanumeric page when memory becomes 80% full.

4.5.2.1. Numeric Pagers

In order for the CRB-256M to call a numeric pager when memory becomes 80% full, the following parameters must be defined under command ^B02:

- **Pager #:** Note that the pager number can also include Dial Commands, such as @ (5 Sec. "No-Talk" delay), comma (2 Sec. Dialing Delay), and # (Pound Key).
- **80% Call/Page:** Enabled. In the default state, this feature is disabled.

Note: In order to perform a numeric page, the **Pager ID#:** field *must* be left blank. If the **Pager ID#:** field is defined, the unit will attempt to perform an alphanumeric page.

If your numeric paging service requires an I.D. Code to identify the pager and/or location, this is defined under the **Pager #:** prompt as shown in the example below:

<Pager Number>@<ID Code>#

For example, to send an 80% Full Page to "555-1212" with the I.D. Code "111", the **Pager #:** field would contain the following:

5551212@111#

When an 80% Full Page is sent to a numeric pager, the CRB-256M will dial the pager once every ten minutes until memory drops below 80% full.

4.5.2.2. Alphanumeric Pagers

In order for the CRB-256M to call an alphanumeric pager when memory becomes 80% full, the following parameters must be defined under command ^B02:

- **Pager #:** Note that the pager number can include Dial Commands, such as @ (5 Sec. "No-Talk" Delay), comma (2 Sec. Dialing Delay), and # (Pound Key).
- **Pager ID #:** The I.D. number for your alphanumeric pager.
- **80% Call/Page:** Enabled. In the default state, this feature is disabled.

If the CRB-256M is unable to successfully connect with the defined pager number, the unit will continue to re-dial the number until three attempts have been made. There is no delay between dials except to the time required to hang-up and wait for the modem to settle.

After the third unsuccessful attempt, the unit will wait 10 minutes and then begin another cycle of three dials. The unit will continue this process until a successful page is completed, or memory drops below 80% full.

When the CRB-256M reaches your alphanumeric pager, the unit will send the message "**Site 000 is 80 Percent Full**", where **000** is the currently defined Site I.D..

5. Command Summary

Note:

- All CRB-256M commands begin with the "^B" character. To create the "^B" character, press both the [Ctrl] key and the [B] key simultaneously.
- To temporarily suppress the echo for any CRB-256M command, enter a ^A character in place of the ^B character (e.g. ^A 01 instead of ^B01).

^B00 Clear All Memory

Clears all call record data from memory. Does not clear user-defined parameters. Before executing this command, the CRB-256M will display a "Sure?" prompt. Type **Y** to proceed or **N** to abort the command, and then press [Enter].

^B01 Default Parameters

Sets all parameters to factory defaults. PBX Port Baud Rate and Modem Baud Rate will be set as specified by the SetUp Switches. Does not effect stored call record data. Before executing this command, the CRB-256M will display a "Sure?" prompt. Type **Y** to proceed or **N** to abort the command, and then press [Enter].

^B02 Set Parameters

Defines system parameters as described in Section 4.3. The CRB-256M will display a series of prompts that allow the user to define the password, pager number and other parameters. If an inappropriate value is entered for any prompt, the CRB-256M will respond with the "**INVALID ARGUMENT**" message.

^B03 Display Status

Displays the Status Screen as shown in Figure 3.

^B04 Download Parameters

Downloads parameter settings in a command string format, which can be stored in an ASCII file and later uploaded to re-configure the unit.

^B05 Read Data

Releases stored call data as described in Section 4.4. After data has been released, it will be automatically cleared from the CRB-256M's memory. Command ^B05 offers the following options:

- **^B05 ,R [Enter]** — Data sent in ASCII format, one record at a time. XON required to release each record.
- **^B05 ,C [Enter]** — Data sent in ASCII format in continuous mode. XON/XOFF used for flow control.
- **^B05 ,Z [Enter]** — Data sent using ZModem protocol.

^B06 Display Help Menu

Displays a screen which lists all CRB-256M commands as shown in Figure 2.

^B07 Set Immediate Callback

Instructs the unit to call back immediately after hang up. Note that the Immediate Callback phone number is entered independently, and may differ from the 80% Full Call/Page numbers. To set an immediate Callback, type **^B07 [Enter]**. The unit will prompt the user to enter the Immediate Callback number. Key in the desired phone number and then press **[Enter]**.

Note:

- If the ^B07 command is invoked more than once during a given session, the CRB-256M will use the last number entered.
- After disconnect, the unit will dial the Immediate Callback Number three times, delaying only long enough to reset the modem between attempts. If all three attempts are unsuccessful, the Immediate Callback is canceled.

^B08 Send Test Pattern

Sends a test pattern out the Modem (Phone Line) Port. To abort the test pattern, press [Esc] at any time. The test pattern can be sent as a continuous stream, or sent one line at a time as described below:

- **Single Line:** Type **^B08 ,R [Enter]**. XON required to release each record.
- **Continuous Stream:** Type **^B08 ,C [Enter]**. XON/XOFF used for flow control.

^B09 Disconnect / Hang Up

Exits from command mode and disconnects (hangs up) the modem.

^B10 Pager Test

Performs an Alphanumeric or Numeric Pager test, depending on the values entered at the **Phone #:**, **Pager #:**, and **Pager ID#:** prompts as described in Section 4.5. After command ^B10 is invoked, the user must disconnect (hang-up) in order for the pager test to be performed. To cancel a pager test, simply invoke command ^B10 again prior to hanging up.

6. RS-232 Interface

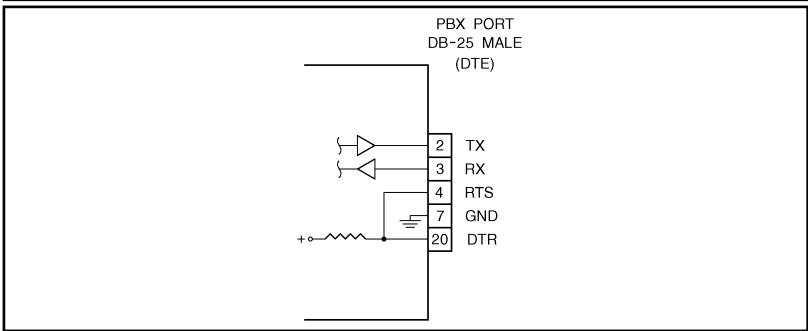


Figure 4: RS-232 Interface (PBX Port)

Pin	Signal	I/O
2	TXD	Out
3	RXD	Input
4	RTS	Out
7	GND	—
20	DTR	Out

(All other pins are open)

7. Specifications

Interface:

PBX Port: RS-232, DB-25 Male, DTE, 7 or 8 bits (selectable).

Phone Line: RJ11 Jack, 8 bits, No parity, fixed.

Data Rate: (Dip Switch Selectable)

PBX Port: 300, 1200, 2400, 9600 bps

Modem: 1200, 2400 bps

Memory: 256K Static RAM, Battery Backed.

Battery: Three Year Life

Size: 2.20" x 4.50" x 6.00" (H x W x D)

Weight: 1 lb.

Power: AC Adapter, 9 VDC @ 300 ma

Temperature: 50°F to 104°F (10°C to 40°C) Operating

Humidity: 20% to 80% Relative Humidity

8. Customer Service

Customer Service hours are from 8:00 AM to 5:00 PM, PST, Monday through Friday. When calling, please be prepared to give the name and make of the unit, its serial number and a description of its symptoms. If the unit should need to be returned for factory repair it must be accompanied by a Return Authorization number from Customer Service.

WTI Customer Service
5 Sterling
Irvine, California 92618

Local Phone: (949) 586-9950
Toll Free Service Line: 1-888-280-7227
Service Fax: (949) 457-8138

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