

# **Model HM-502/503 Quad Serial Interface**

## **Installation and Service Instructions**



# **SENTRY INSTALLATION AND SERVICE INSTRUCTIONS**

## **QUAD SERIAL INTERFACE Models HM-502 & HM-503**

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### **1.0 INTRODUCTION**

The Sentry Models HM-502 and HM-503 are four channel serial interfaces for the HM-510 controller or the HM-509 expansion chassis. The HM-503 is an isolated version. They each consist of two parts: a circuit card that attaches to the internal computer buss, and an external terminal board. The terminal board provides connection to four data lines. A ribbon cable is provided for connection between the controller and terminal board. The HM-502 Quad Interface uses the HM-802 terminal board. The HM-503 Isolated Interface mates with the HM-803 terminal board.

Both interfaces utilize balanced differential drivers and receivers to comply with the EIA standard for RS-485 communication. The HM-503's external board provides 500 volts electrical isolation between the Sentry Controller and the connected devices on the data lines.

The model HM-502 is used when its four data lines connect to devices in the same building. The HM-503 must be used when its four data lines are connected to a building on a separate electrical source from the console, or a remote wing.

The HM-502 and HM-503 interfaces are capable of reliable communications over long distances (4000 feet) within electrically noisy environments.

Addressing for the four channels is selected on the internal board by a set of dip switches. The card is set at the factory in accordance with the Sentry Operational Software. Section 5.0 is included as a guide for checking or making a change to the address setting. Inappropriate addresses can interfere with other system functions, never change address settings without consulting Sentry Technical Support.

### **2.0 CARD INSTALLATION and REPLACEMENT**

***CAUTION: CARDS AND COMPONENTS ARE STATIC SENSITIVE. USE PRECAUTION TO KEEP YOURSELF, TOOLS, AND CONNECTIONS GROUNDED.***

***NEVER INSTALL OR REMOVE A CARD FROM THE CONTROLLER WHEN POWER IS ON.***

Turn off the controller's power. Remove cover. Remove screw on bracket to remove card.

- Insert card by placing onto edgcard connector and press firmly in a straight down direction, until card is fully inserted into slot. Replace hold down screw on rear frame bracket.
- Replace controller's cover.

### 3.0 DRIVER / RECEIVER REPLACEMENT

In most cases where one or more entire data loop on the same card fails, the driver and receiver components have failed. This is especially true with cases of lightning. The Interface card is usually repaired simply by replacement of the driver and receiver parts. Always replace all parts at the same time.

The driver/receiver parts are 14 pin, DIP integrated circuits, plugged into sockets for easy field replacement.

**HM-502 CARD:** Three MC1488 parts, designated as U24, U25, and U26. (Sentry component part # 921-705-04)

Five MC1489 parts, designated U19, U20, U21, U22, and U23. (Sentry part # 921-705-03)

**HM-503 CARD:** Two **driver** parts, marked with the numbers **SN75174** or **MC3487**; designated U14 and U15.

Sentry replacement component part no. 921-705-02

Two **receiver** parts, marked: **SN75175** or **MC3486**, designated U16 and U17. (Sentry #921-705-01)

A 75175 can replace the 3486 or vice versa. A 75174 can replace the 3487. Be very careful to replace a driver with a driver part and a receiver with a receiver part.

See section 7.0 for details on channel assignments of each part.

***NOTE: CARDS AND COMPONENTS ARE STATIC SENSITIVE. USE  
PRECAUTION TO KEEP YOURSELF, TOOLS, AND CONNECTIONS GROUNDED.***

With the card removed from the controller, carefully remove the IC with a small screwdriver blade. Carefully insert the new part into the socket, being sure not to bend any leads. Make sure the proper part goes into the designated socket, and all the leads are properly inserted into the receptacle holes. NOTE: Pin 1 on the part is denoted by a dot, a stripe, or a notch. This must be positioned with pin 1 of the socket.

Replace the card into the controller as detailed in section 2.0.

### 4.0 TESTING

1. Check display for service trouble warnings. Give the display screen time to settle before making assumptions, (usually 1 minute maximum).

The message window at the screen's bottom will list any data lines that are not communicating.

If all four data lines of a HM-503 card indicate trouble, check the DC power supply at the HM-803 Terminal Board for proper voltage, (12 to 15 Volts).

Always check the address settings match the intended data line addresses in the software table.

If a room number shows under Room Panel Trouble, the data line is operating, but the panel at that address location is not functioning.

2. **Verify data line loops by testing a Host Panel on each new data line, to make sure the proper room number is displayed for that address.**

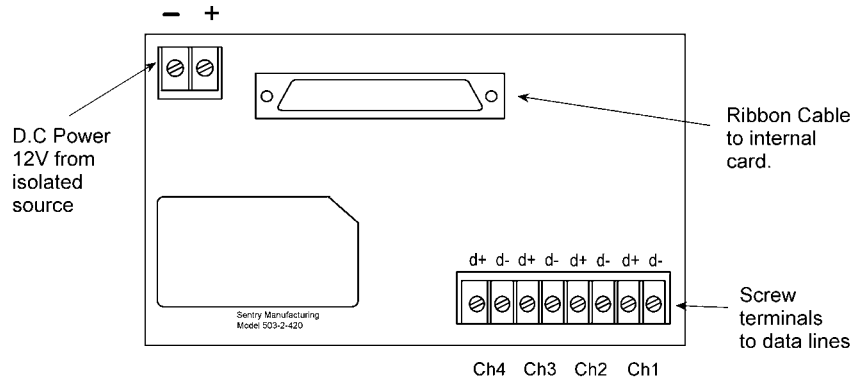


Figure 1. HM-803 Terminal Board Layout Diagram, for the HM-503 Isolated Interface

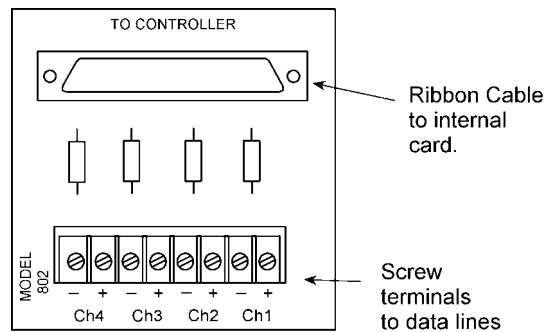


Figure 2. HM-802 Terminal Board Layout Diagram, for the HM-502 Quad Interface

## 5.0 ADDRESSING

NOTE: THIS SECTION IS INCLUDED AS A GUIDE ONLY. SOME I/O ADDRESSES AVAILABLE ON THIS CARD CAN INTERFERE WITH OTHER SENTRY FUNCTIONS. DO NOT ALTER ADDRESSES WITHOUT CONSULTING THE FACTORY.

The HM-502 & HM-503 internal cards have dipswitches for the base address selection of data channel 1. Data channels 2, 3, and 4 are automatically preset at addresses spaced evenly above the base address. The address number is the hexadecimal representation of the controller's internal I/O address. The card must be set to operate at the same I/O addresses as the Sentry Operation program and tables. Most Sentry systems start with the first data line set to address 0220.

ADDRESSING, Section 5.0, continued on next page.

A switch in the "On" position indicates that the corresponding address bit be a logic 0. A switch in the "Off" position forces the bit to a logic 1.

The address selection is set with the two, 6 position dip-switches on the internal board.

- Address are identified by four hexadecimal characters. Sentry uses 0220 thru 02D0.
- The switches allow setting the first & second characters to any range.
- The third character is set with only 3 switches (SW2 #3,4,5), it can only be set to a even number, since the forth bit, (the least significant bit), is internally set to 0 or Off.
- The forth character is internally set to 0, and is non-adjustable.
- Switch #6 of SW2 is not an address switch and must always remain in the Off position.

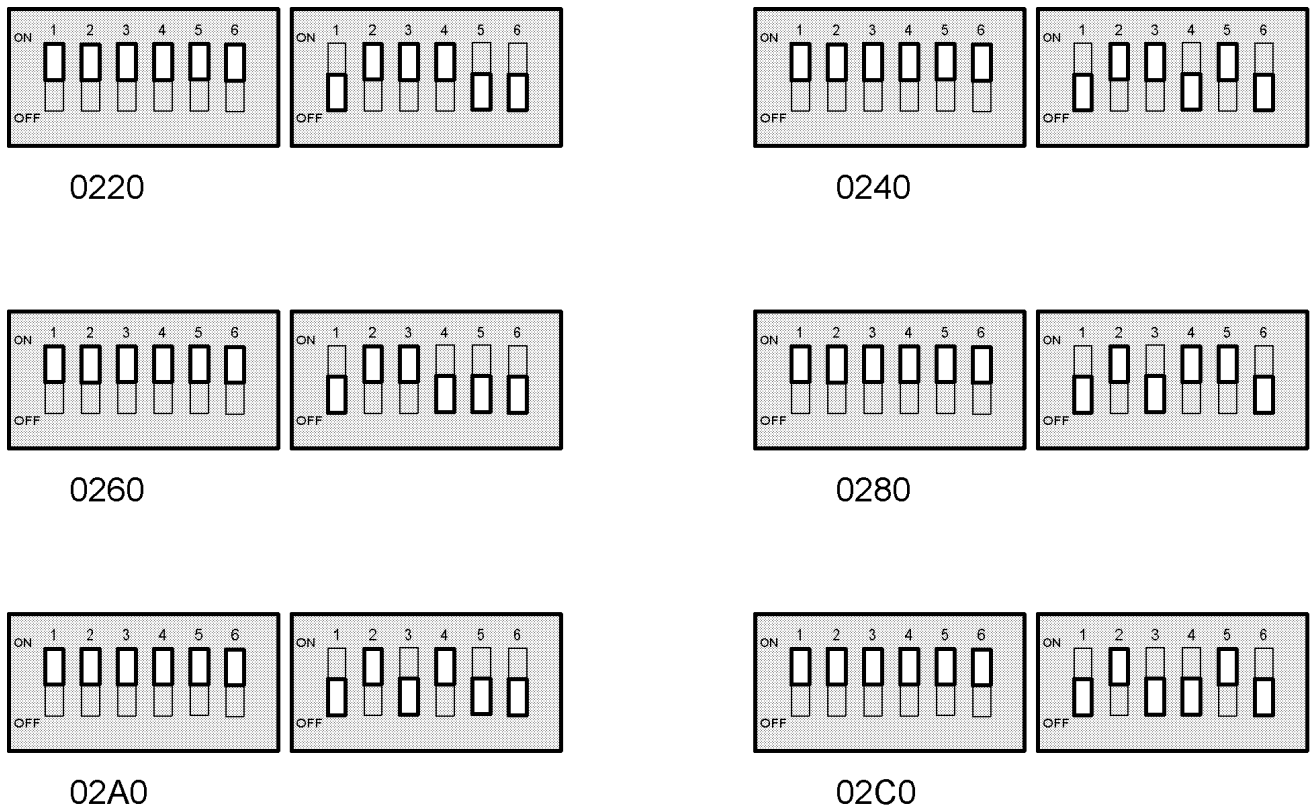


Figure 3 Address Switch Selections

<u>CH</u>	<u>CHANNEL ADDRESS</u>					
1	Base Address	0220H (example shown at 0220 for reference only)				
2	Base Address + 8	0228H				
3	Base Address + 16	0230H				
4	Base Address + 24	0238H				
Base Address:	<u>220</u>	<u>240</u>	<u>260</u>	<u>280</u>	<u>2A0</u>	<u>2C0</u>
Ch 1	220	240	260	280	2A0	2C0
Ch 2	228	248	268	288	2A8	2C8
Ch 3	230	250	270	290	2B0	2D0
Ch 4	238	258	278	298	2B8	2D8

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## 6.0 TERMINAL BOARD MOUNTING

The terminal board is designed to mount into the Sentry Model 59HM-5 Snap Track. This plastic track accommodates a number of Sentry terminal boards for easy installation and servicing. The track is shipped in multiples of 12" lengths.

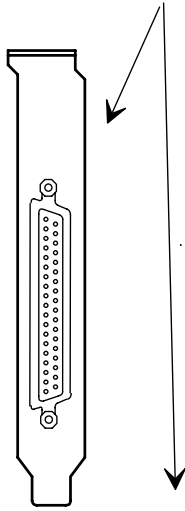
- Attach mounting track to a stable surface near the controller and where the terminations can be easily made by the installer.
- Attach the terminal board by firmly pressing onto the track. It will snap into place.
- Attach the ribbon cable from the internal interface card to the terminal board.
- **On the HM-503 Isolated Interface only**, connect the 12V DC power supply to the + and - DC terminals. NOTE: this supply MUST be isolated from the Sentry Controller. Always use an isolated supply or the DC supply that powers devices connected to these data lines. The model HM-532 plug-in style power supply provides a simple isolated supply for this purpose.
- Connect data line wiring to the proper terminals. Note the d+ and d- designations for data line polarity.

## 7.0 CHANNEL ASSIGNMENTS FOR REPLACEABLE PARTS

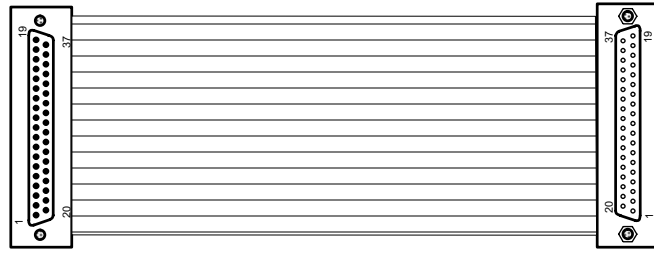
<b>HM-502</b>		<u>Ch 1</u>	<u>Ch 2</u>	<u>Ch 3</u>	<u>Ch 4</u>	<u>Sentry component part no.</u>
MC1488	Driver	U24	U2	U26	U26	921-705-04
MC1489	Rcvr's	U19	U19	U20	U21	921-705-03
	"	U23	U20	U21	U22	" "
<b>HM-503</b>		<u>Ch 1</u>	<u>Ch 2</u>	<u>Ch 3</u>	<u>Ch 4</u>	
3487 / 75174	Driver	U14	U14	U15	U15	921-705-02
3486 / 75175	Rcvr's	U16	U16	U17	U17	921-705-01

REAR VIEW OF THE CARDS IN THE HM-550 CONTROLLER

HM-502  
QUAD  
SERIAL  
INTERFACE  
CARD

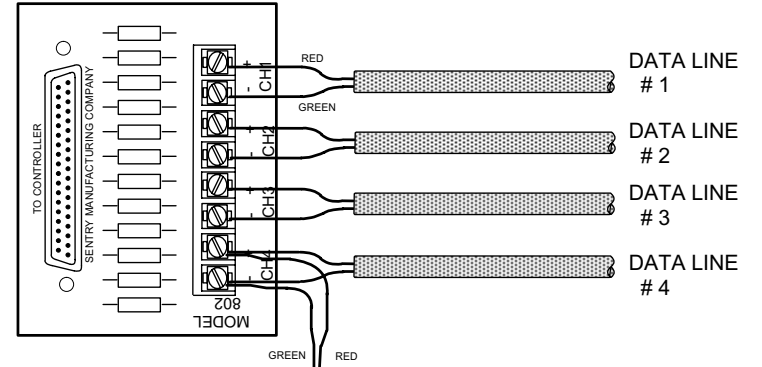


HM-811-243  
RIBBON CABLE

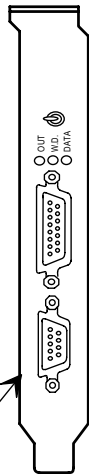


HM-802 QUAD  
TERMINAL  
BOARD

DATA LINES TO APARTMENT  
PANELS. EITHER DIRECTLY  
OR VIA TERMINAL BOARD.

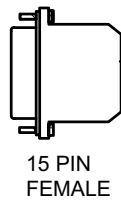


HM-504  
CONSOLE  
CONTROL  
CARD



CONNECTOR FOR  
CONSOLE ALARM  
PANEL

DATA LINE  
MONITOR

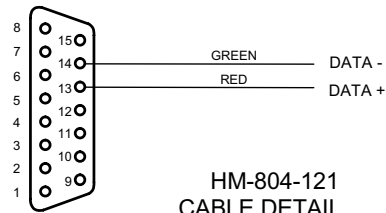
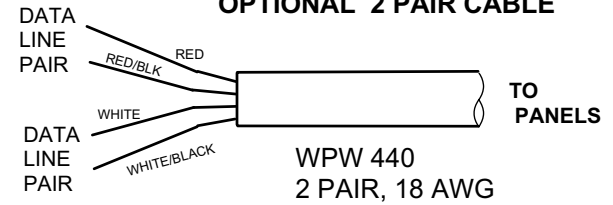


HM-804-121

DATA LINE MONITOR CABLE

CONNECT DATA MONITOR  
CABLE TO ANY ACTIVE  
SERIAL LINE, (SHOWN ON  
CH4 FOR REFERENCE ONLY)

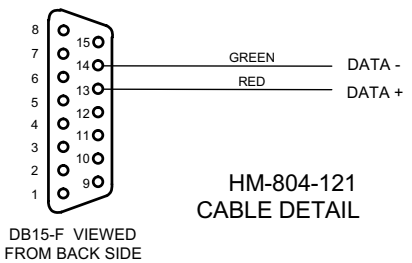
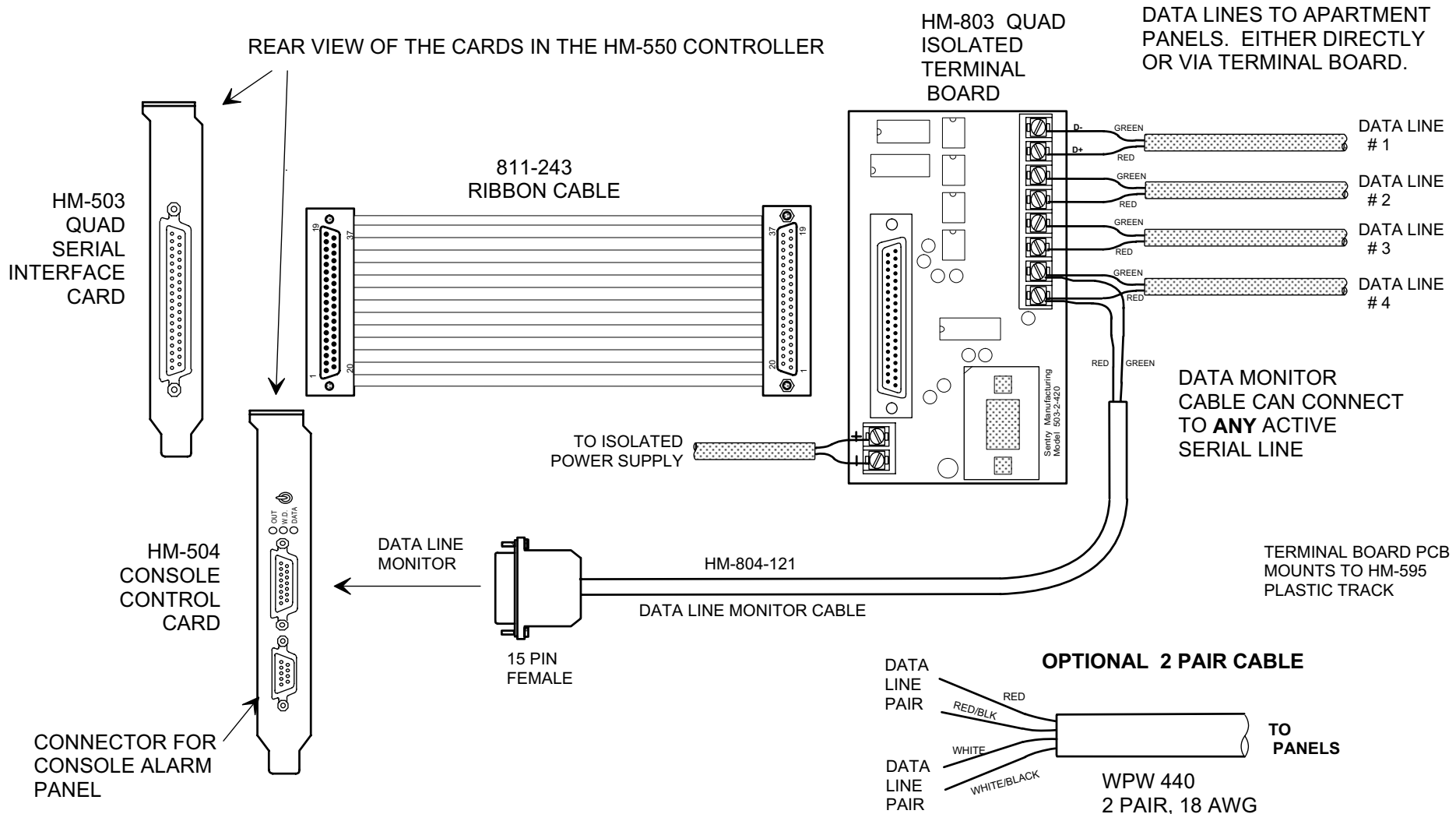
OPTIONAL 2 PAIR CABLE




DB15-F VIEWED  
FROM BACK SIDE

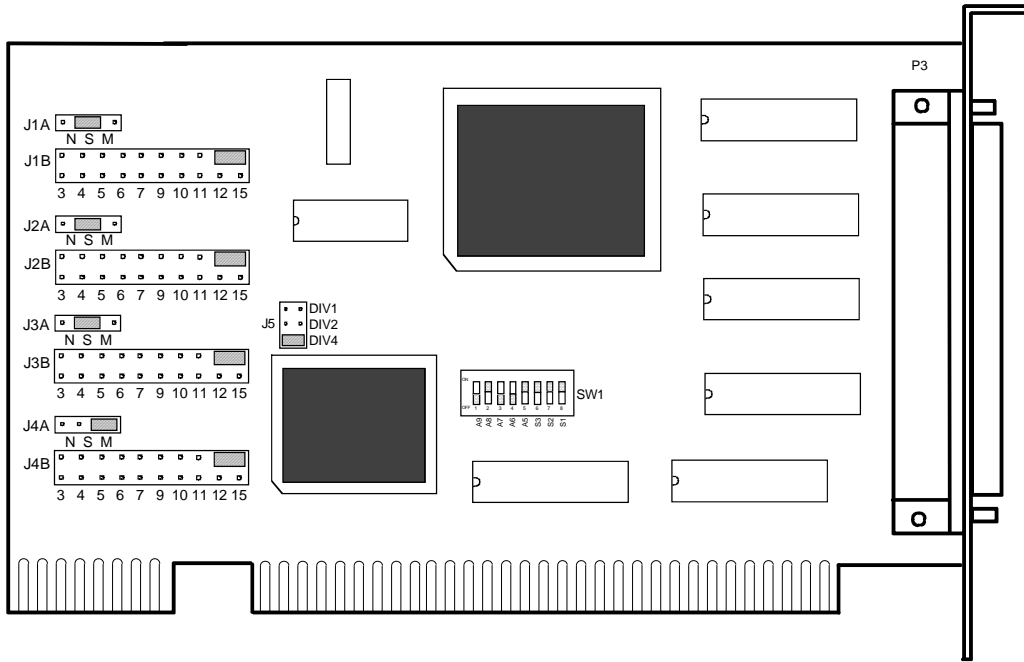
HM-804-121  
CABLE DETAIL

<b>SENTRY EMERGENCY CALL</b>			<b>HERITAGE MEDCALL, INC.</b> TAMPA, FLORIDA		
DATE	SCALE	REV	CHECKED	DRAWN BY	
12-27-94	N/A	A		KJL	
<b>HM-502 QUAD SERIAL INTERFACE CARD</b> WIRING CONNECTIONS					
WITH WATCHDOG DATA MONITOR				DWG NO <b>802-01</b>	



 <b>SENTRY EMERGENCY CALL</b>			<b>HERITAGE MEDCALL, INC.</b> TAMPA, FLORIDA		
DATE	SCALE	REV	CHECKED	DRAWN BY	
2-06-95	N/A	A		KJL	
TITLE <b>HM-503 QUAD ISOLATED SERIAL INTERFACE CARD WIRING</b>					
WITH WATCHDOG DATA MONITOR				DWG NO <b>803-01</b>	

The following pages will discuss the new Sentry Quad Serial Interface Card model HM-503A that replaces model HM-503.



HM-503A Quad Serial Interface Card

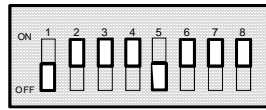
### 1.0 Address Selection

NOTE: THIS SECTION IS INCLUDED AS A GUIDE ONLY. SOME I/O ADDRESSES AVAILABLE ON THIS CARD CAN INTERFERE WITH OTHER SENTRY FUNCTIONS. DO NOT ALTER ADDRESSES WITHOUT CONSULTING THE FACTORY.

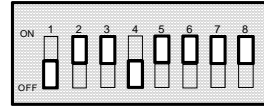
The HM-503A internal cards have dipswitches for the base address selection of data channel 1. Data channels 2, 3, and 4 are automatically preset at addresses spaced evenly above the base address. The address number is the hexadecimal representation of the controller's internal I/O address. The card must be set to operate at the same I/O addresses as the Sentry Operation program and tables. Most Sentry systems start with the first data line set to address 0220.

**QUAD SERIAL  
INTERFACE  
Model HM-503  
Rev. A only**

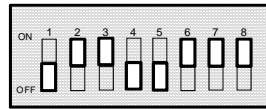
Address selection is done using SW1 on the HM-503A. A switch in the "On" position indicates that the corresponding address bit be a logic 0. A switch in the "Off" position forces the bit to a logic 1.



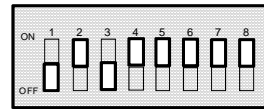
0220



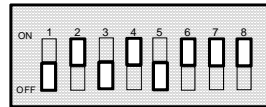
0240



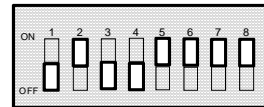
0260



0280



02A0



02C0

CH

CHANNEL ADDRESS

1	Base Address	0220H (example shown at 0220 for reference only)
2	Base Address + 8	0228H
3	Base Address + 16	0230H
4	Base Address + 24	0238H

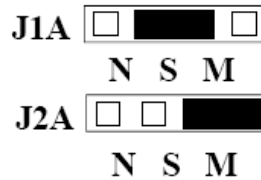
Base Address:	<u>220</u>	<u>240</u>	<u>260</u>	<u>280</u>	<u>2A0</u>	<u>2C0</u>
Ch 1	220	240	260	280	2A0	2C0
Ch 2	228	248	268	288	2A8	2C8
Ch 3	230	250	270	290	2B0	2D0
Ch 4	238	258	278	298	2B8	2D8

## 2.0 Jumper Selections

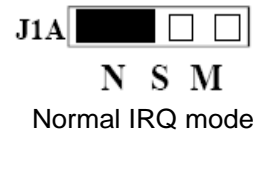
Headers J1B through J4B select the interrupt request for each serial port. Any two or more ports can share a common IRQ by placing the jumpers on the same IRQ and setting the appropriate jumpers J1A through J4A.



IRQ Header J1B - J14B



IRQ Share Jumper J1A-J4A



Normal IRQ mode

Headers J1A through J4A select the interrupt modes for each port. Each port must be set in the correct mode to insure proper operation. In a typical Sentry system, interrupts are not required for data LOOP's and LCD's.

"N" indicated the normal, single interrupt per port mode. "S" indicates the shared interrupt mode, which allows more than one port to access a single IRQ. "M" indicates the inclusion of a 1K ohm pull-down resistor required on one port when sharing interrupts.

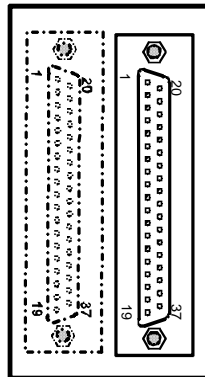
Header J5 selects the Baud rates commonly associated with COM ports: place the jumper in the divide by 4 mode (DIV4).



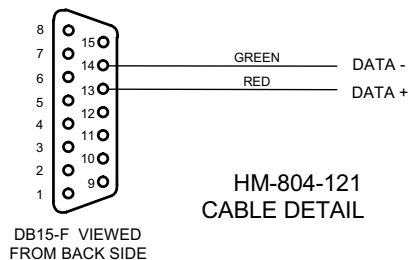
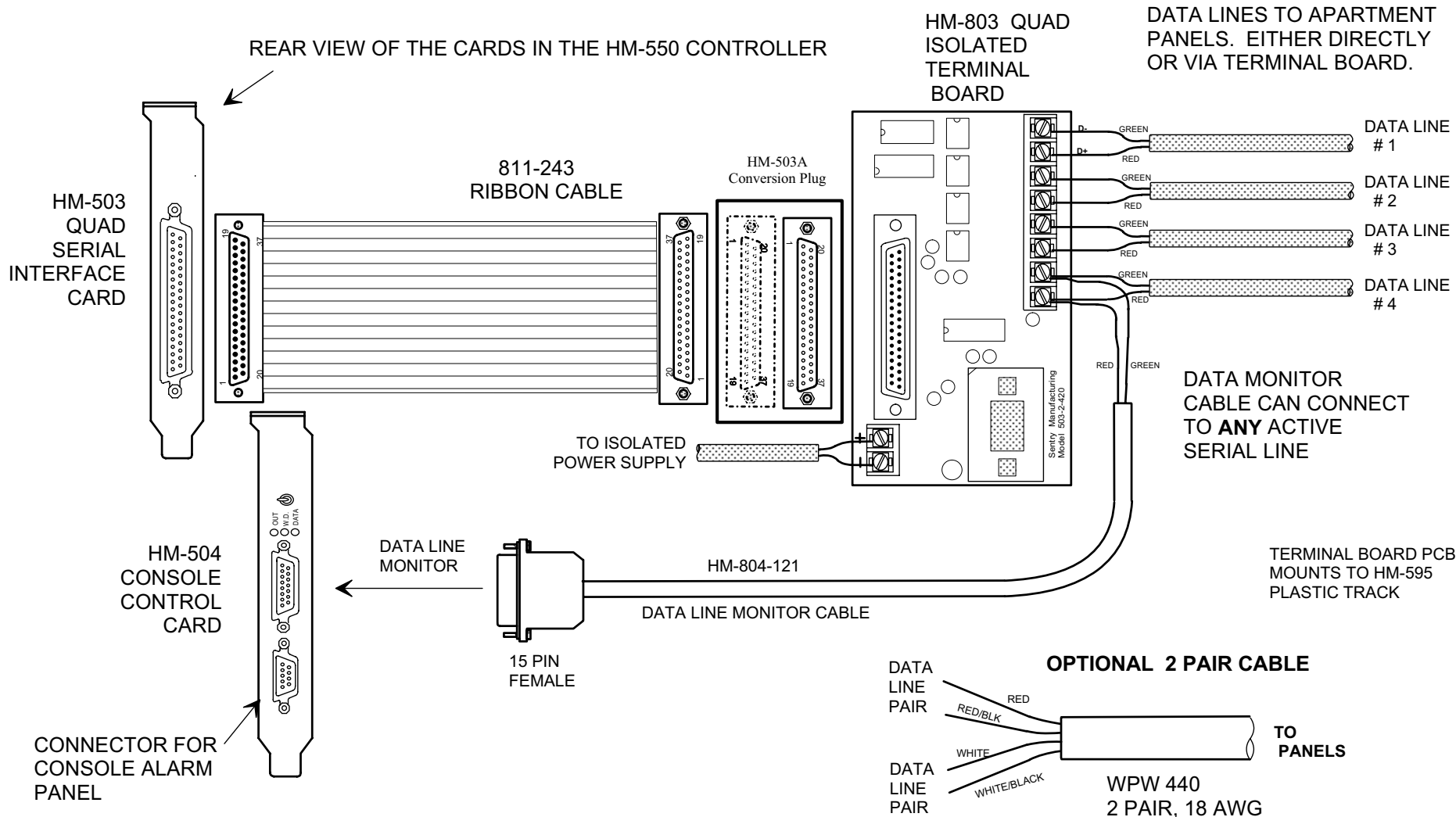
J5 Selection

## 3.0 Installation Notes

Installation and wiring of the HM-503A requires a terminal block conversion plug which is included with the HM-503A. This plug is placed in-between the ribbon cable and the HM-803a terminal board



HM-803a  
Conversion Plug



<b>SENTRY EMERGENCY CALL</b>			<b>HERITAGE MEDCALL, INC.</b> TAMPA, FLORIDA		
DATE	SCALE	REV	CHECKED	DRAWN BY	
2-06-95	N/A	A		KJL	
TITLE <b>HM-503A QUAD ISOLATED SERIAL INTERFACE CARD WIRING</b>					
WITH WATCHDOG DATA MONITOR				DWG NO <b>803-01a</b>	