



## High Speed Short Range Modem Card



### FEATURES

- Synchronous or asynchronous operation
- Compatible with SRM-8H
- Data rates up to 56 or 64 kbps, selectable
- V.54 diagnostics, including local and remote test
- Internal, external or receive clock
- DCE/DTE switch
- LED indicators for status monitoring
- Transmission range up to 4.5 km (2.8 miles)
- Controlled or continuous carrier
- Isolation transformers
- V.35, V.24/RS-232, X.21 and RS-530 interfaces

### DESCRIPTION

- CMN-C8H, High Speed Short Range Modem card, is suitable for mounting in the CMN-16 rack and is compatible with the SRM-8H miniature modem. CMN-C8H is used for local data distribution, connecting full duplex sync or async terminals, computers or controllers over unconditioned 4-wire dedicated lines. CMN-C8H operates at data rates of 56 or 64 kbps, at distances up to 4.5 km (2.8 miles) (see *Table 1*).
- Four models are available:
  - **CMN-C8H/V.24**, with V.24/RS-232 interface;
  - **CMN-C8H/V.35**, with V.35 interface;
  - **CMN-C8H/X.21**, with X.21 interface;
  - **CMN-C8H/530**, with RS-530 interface.

Each model has a 25-pin D-type connector for the DTE interface. For the V.35 interface, a 45 cm (17.7") cable is supplied, with a 25-pin male connector on one side and a 34-pin, male or female connector on the other side.

For the X.21 interface, a 45 cm (17.7") cable is supplied, with a 25-pin male connector on one side, and a 15-pin X.21, female connector on the other side.

- Five LED indicators are provided to facilitate the following diagnostics:
  - Power
  - Test
  - Data Carrier Detect
  - Receive Data
  - Transmit Data.

- Transmit timing is provided via three sources: an internal oscillator, an external clock or a loopback clock derived from the receive signal. For the X.21 interface, external transmit timing is not valid.
- The carrier is strap-selectable for either continuous operation, or switched operation for passing control signals end-to-end. Switched operation is controlled by the RTS signal.
- CMN-C8H performs diagnostic loops in compliance with the ITU V.54 standard. Two V.54 loops are available: local analog loop (V.54, loop 3) and remote digital loop (V.54, loop 2). The loops are activated by a 3-position switch in all models, or by the DTE interface Circuit 141 (pin 18) and Circuit 140 (pin 21) in all models except CMN-C8H/X.21. The Test LED lights when any diagnostic loop is active.
- Asynchronous transmission is provided by internal conversion from async to sync in compliance with ITU V.14 (V.22 bis) standard. Different async formats are switch-selectable (see *Table 4*).

**Note:** Asynchronous operation is not present in the CMN-C8H/X.21 model.

- Stop bit shortening on the receive end is used to handle frequency differences between an async terminal and the CMN-C8H card, and is selectable to 12.5% or 25% of the stop bit according to ITU V.14.
- CMN-C8H features a jumper-selectable DTE/DCE option. This allows it to operate as a DTE, for connection to another DCE such as a multiplexer port, without requiring a cross cable.

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- The low transmit level minimizes crosstalk onto adjacent circuits within the same cable. Data is transmitted and received using a balanced interface, ensuring high immunity to circuit noise. Additionally, CMN-C8H is coupled to the dedicated line through isolation transformers which, in conjunction with other circuitry, protect against AC or DC overvoltages.

### SPECIFICATIONS

- **Data Rate**  
56 or 64 kbps, selectable  
Supports 57.6 async from PCs
- **Number of Data Bits**  
(Async Mode) 8, 9, 10 or 11, including 1 start and 1 stop bit, with or without parity
- **Frequency Allowance**  
Selectable stop bit shortening on receive end:  
12.5% for -2.5% to +1.0% allowed deviation;  
25% for -2.5% to +2.3% allowed deviation
- **Transmission Line**  
4-wire unconditioned dedicated line (two twisted pairs)
- **Transmission Mode**  
Sync or async, full or half duplex
- **Transmission Controls**  
**DCD** (Circuit 109) turns ON after recognizing the receive signal from the line  
**CTS** (Circuit 106) turns ON 8 msec after the terminal raises RTS (Circuit 105)  
**DSR** (Circuit 107) is ON when the modem is powered and is in the normal mode or in analog loop state. DSR turns OFF when the modem is in digital loopback state  
**TEST Mode** (Circuit 142) turns ON when the modem is in one of its diagnostic loops

**Note:** Async mode is not available in CMN-C8H/X.21, and the transmission controls CTS, DSR, TEST are not used.

- **Transmission Level**  
0 dBm

- **Front Panel LED Indicators**  
PWR Power  
XMT Transmit Data  
RX Receive Data  
DCD Data Carrier Detect  
TST Test
- **Controls**  
The front panel loop switch controls the CMN-C8H test modes, giving access to normal operation (NOR), local analog loop (ANA) and remote digital loop (REM), from the front panel.
- **Transmission Range**  
Up to 4.5 km (2.8 miles) over 24 AWG cable (0.5 mm)  
Up to 3.2 km (2 miles) over 26 AWG cable (0.4 mm)
- **Terminal Interface**  
ITU V.24/EIA RS-232-C, integral 25-pin D-type connector, female;  
V.35 interface is provided via a mating cable, 45 cm (17.7") long, terminated with a 34-pin male or female connector;  
ITU RS-530, integral 25-pin D-type connector, female;  
X.21 interface is provided via a mating cable, 45 cm (17.7") long, terminating with a 15-pin female connector
- **Line Interface**  
RJ-45 socket (see *Table 1*)
- **Physical**  
Length: 177 mm / 6.9 in  
Width: 67 mm / 2.6 in  
Height: 15 mm / 0.6 in  
Weight: 90g / 3.1 oz
- **Power Requirement**  
1.5W, derived from the CMN-16 power supply
- **Environment**  
Temperature: 0-50°C / 32-122°F  
Humidity: Up to 90%, non-condensing

### INSTALLATION

1. CMN-C8H is factory set to DCE. For DTE operation, set the switch to the required position (see *Table 4*).
2. Set the Loop Switch to the NOR position for normal operation and make sure that the Test LED is OFF.

#### FOR SYNC MODE:

- 3a. Set XMT timing (INT, EXT, RCV) using S1, S2 and S3.
- 4a. Set the data rate to 56 kbps or 64 kbps using S4.
- 5a. Set Carrier to be constantly ON or controlled by RTS, using S8 (see *Figure 1 and Table 3*).

**Note:** Switches 5, 6 and 7 are not relevant for sync operation. EXT XMT timing is not available with the CMN-C8H/X.21.

#### FOR ASYNC MODE:

- 3b. Set the XMT TIMING to async mode, using S1, S2 and S3.
- 4b. Set the data rate using S4.
- 5b. Set the frequency allowance and the character length (see *Table 2 and Table 3*) using S5, S6 and S7.  
Set the carrier to be constantly on or controlled by RTS, using S8.

**Note:** Personal computers working at high speed in async mode operate at 57.6 kbps (instead of 56 kbps). In such cases, the PC should be set to **two** stop bits and CMN-C8H should be strapped for a character length with **one** stop bit. The data rate of CMN-C8H should be strapped to 56 kbps. Set the rest of the switches according to mode (see below for Sync or Async mode).

6. Insert the card through the rear of CMN-16 rack.
7. Install the front panel which is supplied with the card.
8. Connect the RS-232/V.24 cable to the 25-pin socket.
9. Connect the line cable to the RJ-45 jack (see *Table 1 and Figure 2*) (the XMT pair on the CMN-C8H to the RCV pair on the remote SRM-8H and vice versa).

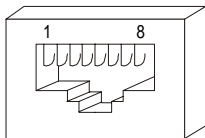
**High Speed Short Range Modem Card**

**Table 1. RJ-45 Connections**

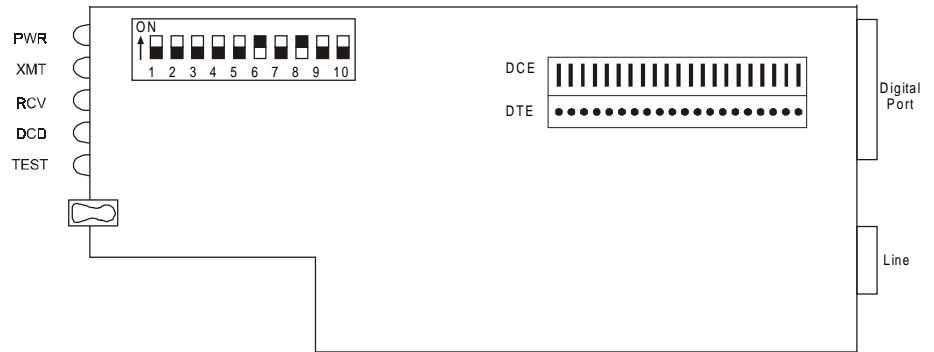
Pin No.	Signal Name	Description
1, 7, 8	N.C.	
2	GND	Ground
3	RCV	Receive
4	XMT	Transmit
5	XMT	Transmit
6	RCV	Receive

**Table 2. Async Character Length Setting (see Table 3, ASY Length)**

Start Bit	Data Bits	Parity	Stop Bit	No. of Bits
1	5	None	2	8
1	6	None	1, 1.5, 2	8
1	6	Odd Even	1, 1.5, 2	9
1	7	None	1, 1.5, 2	9
1	7	Odd Even	1, 1.5, 2	10
1	8	None	1, 1.5, 2	10
1	8	Odd Even	1, 1.5, 2	11



**Figure 2. RJ-45 Socket Pins**



**Figure 1. Strapping Diagram**

**Table 3. Strap Selection**

Strap Identity	Function	Possible Settings	Factory Setting
XMT	Selects timing clock	S1	
CLOCK	Selects timing clock and async mode	S2 S3 ON OF OFF OFF F OFF OFF OF ON OFF F OFF OF F ON	External <b>Internal</b> Receive Async
Data Rates	Selects data transmit rate	S4 ON - 56 kbps OFF - 64 kbps	64
Async Length	Selects the amount of stop bit shortening to be used in async mode	S5 ON- 12.5% OFF- 25%	25%
	Selects the character length in async mode (see Table 4)	S6 S7 Bits OFF OFF 8 OFF ON 9 ON OFF 10 ON ON 11	10 bits
CAR	Selects carrier constantly ON or controlled by RTS	S8 ON - ON OFF- CNT	ON
Loop activation from DTE interface	ANA Enables DTE control of analog loop REM Enables DTE control of remote digital loop	S9 ENABLE-PIN 18 DISABLE-SWITCH S10 ENABLE-PIN 21 DISABLE-SWITCH	DISABLE DISABLE

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**Table 4. DTE/DCE Switch Configuration**

Pin No.	Signal Name	DCE Position	DTE Position
2	TD	To Modem	From Modem
3	RD	From Modem	To Modem
4	RTS	To Modem	From Modem
5	CTS	To Modem	N.C.
6	DSR	From Modem	To Modem
7	GND	GND	GND
8	CD	From Modem	To Modem
15	TX CK	From Modem	To Modem
17	RX CK	From Modem	To Modem
18	ANA LOOP	To Modem	To Modem
20	DTR	To Modem	To Modem
21	REM LOOP	To Modem	To Modem
24	EXT CK	To Modem	From Modem
25	TEST	From Modem	From Modem

## OPERATION

### GENERAL

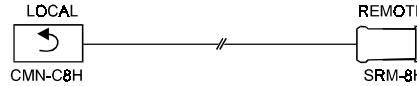
CMN-C8H has ten dip switches, a 3-position loop activation switch and DTE/DCE jumpers.

### TEST MODE

CMN-C8H performs two of the V.54 test loops: analog Loop - ANA (V.54 Loop 3) and remote digital Loop - REM (V.54 Loop 2). The red TEST LED lights when the modem is in one of the diagnostic loops. The unit is factory-strapped for test loops control via the front panel switch. Alternatively, you can activate the loops from the DTE interface (Pins 18 & 21) controlled by S9 and S10 of the dip switches (see Table 3).

### ANALOG LOOP (V.54 Loop 3)

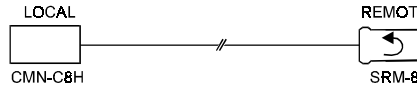
This loop tests the local modem only. The XMT signal to the line is looped back to the receiver.



**Figure 3. Local Loop Test**

### REMOTE DIGITAL LOOP (V.54 Loop 2)

This loop tests the local modem, the line and the remote modem.



**Figure 4. Remote Loop Test**

To perform a loopback test via the front panel:

1. Run the loopback test by setting the front panel switch to either ANA or REM position.
2. To return to normal operation, set the front panel switch to the NOR position.

The TEST LED will then go off.

To perform loopback test via DTE interface:

1. Set the S9 (for Analog Loop) or S10 (for Digital Loop) dip switches to Enable.
2. Perform the Local Loop Test by connecting a 5V external power supply to the DTE Pin 18 (for Analog Loop) or Pin 21 (for Digital Loop).
3. To return to normal operation, remove the external 5V power supply from the DTE.

The TEST LED will then go off.

**Note:** Switches 9 and 10 are not active in CMN-C8H/X.21.

## ORDERING

### CMN-C8H/\*

High Speed Short Range Modem Card for CMN-16 Rack

- \* Specify Interface
  - V24** for V.24 interface
  - V35M** for V.35 interface male connector
  - V35F** for V.35 interface, female connector
  - X21F** for X.21 interface, female connector
  - 530** for RS-530 interface



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