

**SPECIFICATIONS:**

Protocol: Synchronous.

Speed: 1,200 to 19,200 bps.

Range: Up to 11 miles (17.7 km)

Surge Protection: MSP/FSP models have 600 W power dissipation at 1 msec. and response time less than 1 picosecond.

Control Signals: RTS/CTS delay of 7 or 53 msec.; Carrier continuous or Controlled by RTS; DCD turns "ON" after recognizing the receive signal.

Clocking: Internal, External, or loopback derived from the receive signal.

Operation: 4-wire unconditioned twisted-pair, full- or half-duplex

Connectors: (1) DB25 male or female; (1) RJ-45 female connector.

Transmit Level: -6 dBm

RTS/CTS Delay: 7 or 53 msec.

Power: No power required; uses ultra-low power ( at least 6 volts required) from EIA data and control signals: Pins 2,4,9 and 20.

**DESCRIPTION:**

The Sync SHM-NPR MP features surface-mount technology and a custom VLSI chip. It supports up to 12 drops and is powered by data only. It operates at speeds from 1,200 bps to 19,200 bps. The unit has the best speed-to-distance ratio of any available data-powered sync SHM--11 miles (17.7 km) at low data rates and 4 miles (6.4 km) at 19,200 bps over two 22-AWG twisted-pair wires (conservatively rated).

The SHM-NPR operates at full- or half-duplex and uses three clocking methods: internal, external, and received loopback. It's also transformer-isolated for ground-loop protection. You can select RTS/CTS delay of 7 or 53 msec, and carrier status of constantly ON or RTS-controlled.

**CONFIGURATION:**

The Sync SHM-NPR MP has seven configuration switches, which allow selection of carrier control method, clocking method, RTS/CTS delay, and data rate. This section describes switch locations and explains all possible switch configurations.

For your convenience, all configuration switches are located on a SIP (single in-line package) mounted on the PC board. The figure to the left shows the location of the SIP on the board.

**SWITCH SETTINGS:**

All possible settings for the Sync SHM-NPR's configuration switches are presented in the table below.

Switch 1: Not Used

Switch 2: Carrier Enable: Use switch 2 to specify how the carrier signal is raised. In most point-to-point, full-duplex applications, the carrier signal can remain constantly "high". In a multi-point environment, contention for the line is controlled by RTS.

Switch 2

Setting:

- ON Constant Carrier (Default)
- OFF Controlled by RTS

Switches 3 and 4: Transmit Clock: Use Switches 3 and 4 together to specify the clocking method. The SHM-NPR can provide an internal clock (pin 15), receive an external clock (from pin 24), or loopback a receive clock.

Switch 3

Switch 4

Setting:

- ON ON External Clock
- ON OFF External Clock
- OFF ON Internal Clock (Default)
- OFF OFF Receive Loopback

Switch 5: RTS/CTS Delay: After the host terminal raises a request to send (RTS), the SHM-NPR raises CTS after a slight delay in order to give the remote terminal time to receive an incoming signal. Depending on the type of environment, either a 7- or 53-msec. delay can be selected.

Switch 5

Setting:

- ON 7-msec. (Default)
- OFF 53-msec.

Switches 6, 7, and 8: Data Rate: Switches 6 through 8 are set in combination to allow the SHM-NPR to support data rates from 1,200 to 19,200 bps. The data rate table below shows all the settings.

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# ME735A-M/F with optional Surge Protection (M/FSP)

DATA RATE (bps)	Distance Table in miles (km)		
	WIRE GAUGE		
	19 AWG	24 AWG	26 AWG
19,200	7.5 mi (12.1 km)	3.5 mi (5.6 km)	2.5 mi (4 km)
9,600	10 mi (16.1 km)	3.5 mi (5.6 km)	2.5 mi (4 km)
4,800	10 mi (16.1 km)	7 mi (11.2 km)	4 mi (6.4 km)
2,400	10 mi (16.1 km)	8.5 mi (13.7 km)	5 mi (8 km)
1,200	11 mi (17.7 km)	8.5 mi (13.7 km)	6 mi (9.7 km)

DATA RATE: SWITCHES 6, 7, AND 8			
SETTING	SW-6	SW-7	SW-8
1,200 bps	ON	ON	ON
2,400 bps	ON	ON	OFF
4,800 bps	ON	OFF	ON
7,200 bps	OFF	ON	ON
9,600 bps	ON	OFF	OFF
14,400 bps	OFF	ON	OFF
19,200 bps	OFF	OFF	ON
19,200 bps	OFF	OFF	OFF

## INSTALLATION:

Once the Sync SHM-NPR is properly configured, it is ready to connect to your system. This section tells you how to properly connect the Sync SHM-NPR MP to the twisted-pair and RS-232 interfaces, and how to operate the unit.

### **Twisted-Pair Connection:**

The Sync SHM-NPR supports data-only communication between two RS-232 devices at distances to 11 miles (17.7 km) and data rates to 19,200 bps. There are two essential requirements for installing the Sync SHM-NPR:

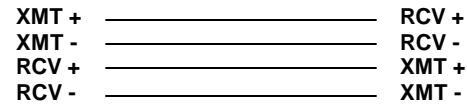
1. These units work in pairs. Therefore, you must have one unit at each end of a two twisted-pair interface.
2. To function properly, the Sync SHM-NPR needs two twisted pairs of metallic wire. These pairs must be unconditioned, dry metallic wire, between 19 and 26 AWG (the higher number gauges may limit distance somewhat).

**Standard dial-up telephone circuits, or leased circuits that run through signal equalization equipment, are not acceptable.**

### **Twisted-Pair Connection using RJ-45**

The RJ-45 jack on the SHM-NPR's twisted-pair interface are pre-wired for a standard telco wiring environment. The signal/pin relationship is shown below.

RJ-45	Signal
1	N/C
2	GND
3	RCV-
4	XMT+
5	XMT-
6	RCV+
7	GND
8	N/C



*If there is a shield around the telephone cable, it may be connected to "G" on the terminal block. We recommend connecting the shield at the computer end only to avoid ground loops. A ground wire is not necessary to properly operate the Driver.*

