SHM-B Parallel-T
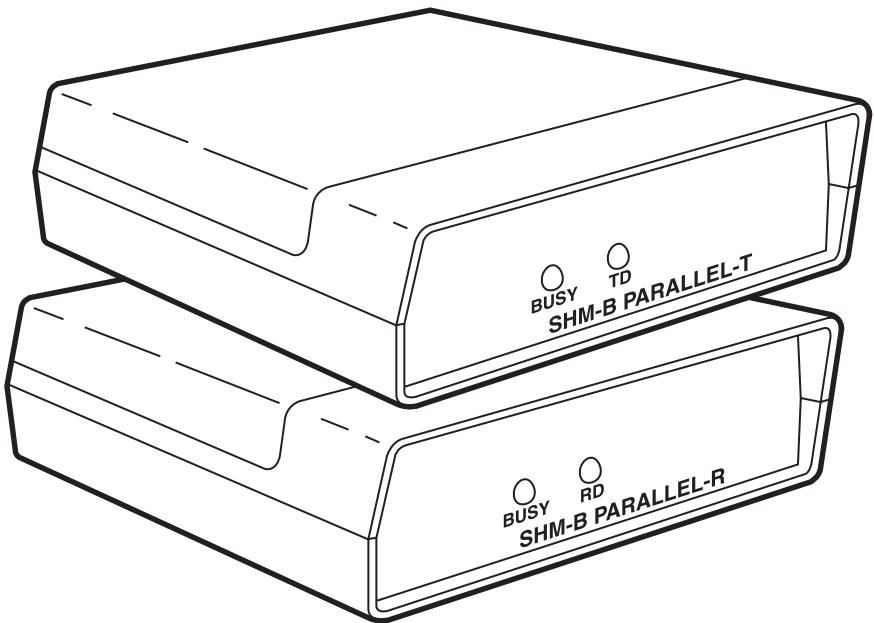# SHM-B Parallel-T Card
SHM-B Parallel-R
SHM-B Parallel-R Card

FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA
RADIO-FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

TRADEMARKS USED IN THIS MANUAL

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Contents

Chapter   **Page**

1. Specifications

Models: ME806A, SHM-B Parallel-T (standalone transmitter)

ME806-C, SHM-B Parallel-T (rackmount transmitter)

ME807A, SHM-B Parallel-R (standalone receiver)

ME807-C, SHM-B Parallel-R (rackmount receiver)

Transmission Distance:

	Bit Rate (bps)			
	2400	4800	9600	19.2 kbps
Distance (miles)	5	3	2	1.1

> ## NOTE
> **These specifications are valid for unshielded twisted-pair telephone cable having 24 or 26 AWG connectors. Shielded twisted-pair cable will reduce the distance to ⅓ of the table value.**

Line Interface: Proprietary balanced 4-wire

Indicators: RD and TD Green and Red = Data transmission.

Green = Mark (idle state).

Red = Error condition. Check cabling.

BUSY   Red = Printer is not online or not ready to receive data.

Off = Printer is ready to receive data and cabling is installed correctly.

Connectors: **Transmitter**   DB25 male, 4-screw terminal block

Receiver   DB25 female, 4-screw terminal block

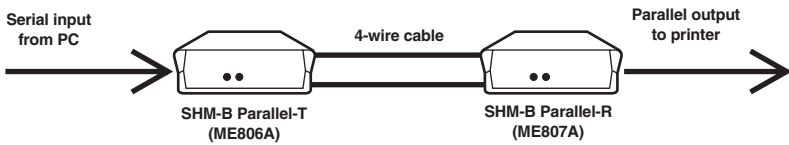**Enclosure:**   High-impact ABS plastic

**Operating
Temperature:**   32 to 112°F (0 to 45°C)

**Operating
Humidity:**   95% relative humidity, noncondensing

Power: 120 VAC ±10%, 60 Hz, 1 watts, wallmount
transformer (230 VAC ±10%, 50/60-Hz option available)

Size: 1.5"H x 4.3"W x 4.6"D (3.8 x 10.9 x 11.7 cm)
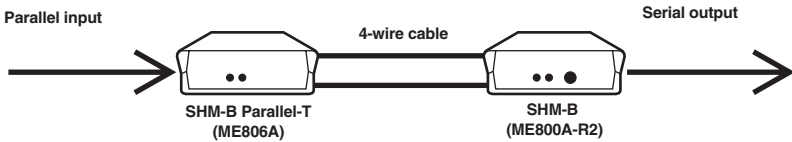
Weight: 1.3 lb. (0.6 kg) with transformer

2. Introduction

The SHM-B Parallel performs three functions:

• The SHM-B Parallel-T accepts parallel data from the PC, converts it to serial data, and sends the serial data over twisted-pair cable to the SHM-B Parallel-R. The SHM-B Parallel-R receives the serial data, converts it back to parallel data, and sends it to the the parallel printer.

```
Serial input                        4-wire cable              Parallel output
  from PC                                                        to printer

              SHM-B Parallel-T          SHM-B Parallel-R
                 (ME806A)                  (ME807A)
```
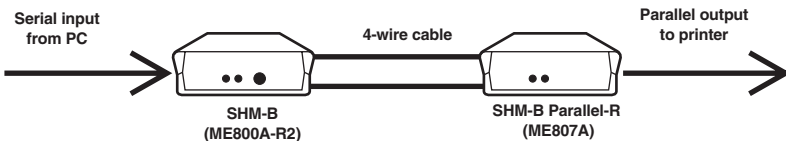
• The SHM-B Parallel-T accepts parallel data from the PC, converts it to serial data, and sends the serial data over twisted-pair cable to the SHM-B. The SHM-B receives the serial data, converts it to RS-232 specifications, and sends the data to the RS-232 serial printer.

```
Parallel input                      4-wire cable                Serial output

              SHM-B Parallel-T            SHM-B
                 (ME806A)               (ME800A-R2)
```

• The SHM-B accepts the RS-232 data from the PC, converts it to serial data, and sends it over the twisted-pair cable to the SHM-B Parallel-R. The SHM-B Parallel-R receives the serial data, converts it to parallel data, and sends it to the parallel printer.

```
Serial input                        4-wire cable              Parallel output
  from PC                                                        to printer

                  SHM-B                SHM-B Parallel-R
               (ME800A-R2)                (ME807A)
```

SHM-B PARALLEL-T, SHM-B PARALLEL -R

The SHM-B Parallel performs data transmission at bit rates from 1200 to 19,200 baud. It can be configured for either 7- or 8-bit word length and Even, Odd, or No parity. The SHM-B Parallel features advanced optically-isolated integrated circuitry, which eliminates damaging ground-loop currents and substantially reduces signal noise for improved data integrity.

The SHM-B Parallel transmitter/receiver pair requires only two twisted-pair wires to transmit and receive data. Optimum performance is obtained with 24 or 26 AWG twisted-pair telephone cable, but nearly any twisted-pair cable can be used with little or no performance degradation.

NOTE

When operating serial to parallel or parallel to serial, the serial device has to run hardware flow control. Software flow control (X-ON/X-OFF, etc.) is not supported.

3. Installation

3.1 Standalone and Rackmount Versions

The SHM-B Parallel is available in a standalone version and a rackmount version. The standalone transmitter and receiver are packaged in small, lightweight ABS plastic cases and equipped with wallmount transformers, for use on a desktop or shelf. The printed circuit card can be removed from the case and the transformer discarded, enabling the card to be installed in a rack if desired. The rackmount version slips easily into an 8- or 16-card rack or enclosure.

3.2 Connectors

Each unit is equipped with a DB25 connector and a 4-wire terminal block.

The DB25 connector conforms to the IBM® PC parallel interface pinout, using the Centronics® interface protocol. The 4-wire terminal block is the serial interface to the twisted-pair line.

3.3 Installation Procedure

Before installing the receiver or transmitter, make certain the unit is not plugged into the power source, and the equipment that you are going to attach to them is turned off.

Each unit is ready to use as it comes from the factory. No changes are necessary when used as a modem set to transmit data from a parallel device to another parallel device at distances of up to 1.1 mile (1.8 kg). However, for installations in which the loop length exceeds 1.1 mile, data corruption may occur due to excessive line noise and/or capacitance. In this case, reduce the transmission baud rate, using the configuration procedure described in **Section 3.6**.

Installation is accomplished in the following three steps:

1. Connect Cabling

For installation, connect a 4-wire twisted-pair cable between the transmitter and the receiver.

Remove the SHM-B card from the case or rack, exposing the terminal connector on the card. (For instructions on opening the standalone unit's case, see step 2 in **Section 3.6**.) Strip $\frac{1}{8}$ to $\frac{3}{16}$ inch of the insulation from the end of all four of the cable wires. Insert the wires into the terminal block and tighten the screw terminals. Depending on your application, connect the terminals on the transmitter to the terminals on the receiver as shown in Figure 3-1, 3-2, or 3-3.
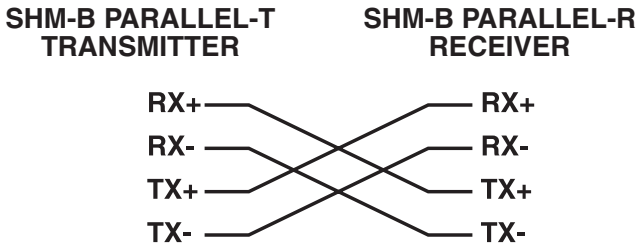
SHM-B PARALLEL-T   **SHM-B PARALLEL-R**
TRANSMITTER   **RECEIVER**

RX+ ———————————— RX+
RX- ———————   ——— RX-
TX+ ———————   ——— TX+
TX- ———————————— TX-

Figure 3-1. Parallel-to-Parallel Installation

SHM-B   **SHM-B PARALLEL-R**
TRANSMITTER   **RECEIVER**

RX+ ———————————— RX+
RX- ———————   ——— RX-
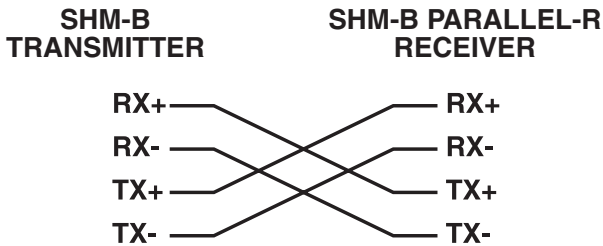TX+ ———————   ——— TX+
TX- ———————————— TX-

Figure 3-2. Serial-to-Parallel Installation

When you have made the connections, thread the nylon cable tie (provided) through the tie-down holes in the card and around the wires. Pull tightly until the cable tie has secured the wires to the card. Remove the excess tie.
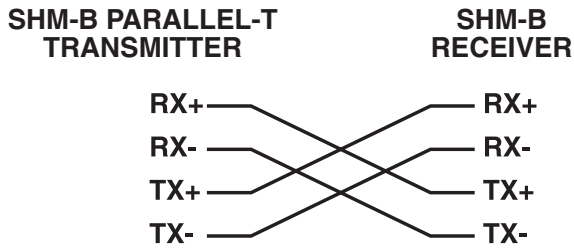
SHM-B PARALLEL-T
TRANSMITTER

SHM-B
RECEIVER

RX+ ——————— RX+

RX- ————   ———— RX-

TX+ ———   X   ———— TX+

TX- ————————— TX-

Figure 3-3. Parallel-to-Serial Installation

NOTE

When operating serial to parallel or parallel to serial, the serial device has to run hardware flow control. Software flow control (X-ON/X-OFF, etc.) is not supported.

2. Test the Cabling

To test the 4-wire cable and connections, remove the cable connecting the PC to the transmitter. When the modems are turned on, the following LED display should be seen:

TD   on the transmitter will light green;

RD   on the receiver will light green;

BUSY   will not light on either unit.

3. Connect Your PC and Printer

The parallel interface on the SHM-B Parallel and on IBM PC/XT™, PC/AT®, PS/2®, and compatibles is similar to the Centronics standard, but uses a DB25 connector instead of a 36-pin Centronics connector. To connect these devices to the SHM-Parallel, use a 25-pin straight-through cable with a DB25 female connector on the SHM-B Parallel transmitter side and a DB25 male connector on the PC side.
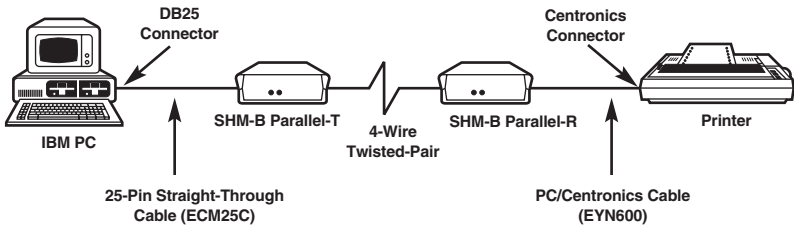
Figure 3-4. IBM PC to Printer Connection

If your PC or other device (such as a mainframe computer) has a Centronics connector on the parallel output port, use the Centronics-to-DB25 female cable described in Table 3-1 to connect to the SHM-B Parallel transmitter.
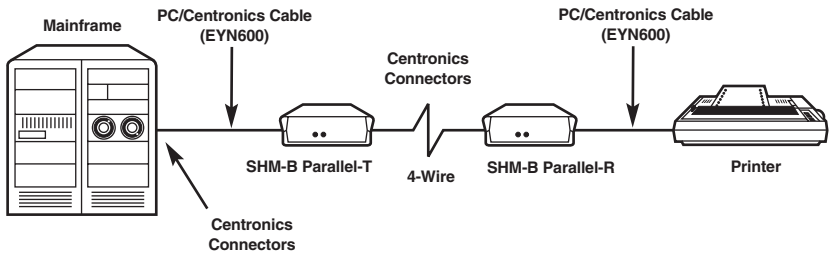
Figure 3-5. Mainframe-to-Printer Connection

Use a DB25 male-to-Centronics cable described in Table 3-1 to connect the SHM-B Parallel receiver to any parallel device equipped with a Centronics connector.

NOTE

The standard genders for EYN600 are DB25 male to Centronics male. To use with the mainframe as shown in the above diagram, specify EYN600 with a DB25 female and a Centronics male when ordering the cable.

When your cables are connected, no change in the LEDs will occur until data transmission begins, and then the TD and RD LEDs should light green and red simultaneously.

Table 3-1. Centronics Parallel Adapter Cable

Signal	25-Pin DB25 Connector Pin #	36-Pin Centronics Connector Pin #
STROBE	1	1
DATA 1	2	2
DATA 2	3	3
DATA 3	4	4
DATA 4	5	5
DATA 5	6	6
DATA 6	7	7
DATA 7	8	8
DATA 8	9	9
ACKNOWLEDGE	10	10
BUSY	11	11
PAPER END	12	12
SELECT	13	13
AUTO FEED	14	14
PRIME	15	32
FAULT	16	31
SELECT IN	17	36
GROUND	18	33
DATA 1 RTN	19	19
GROUND	20	21
GROUND	21	23
GROUND	22	25
GROUND	23	27
GROUND	24	29
GROUND	25	30

3.4 LED Indicators

The SHM-B Parallel-T has two status indicators:

TD (Transmit Data) indicates data signal activity

BUSY indicates flow control signal activity

The SHM-B Parallel-R has two status indicators:

RD (Receive Data) indicates data signal activity

BUSY indicates flow control signal activity

In the idle condition, the TD and the RD LEDs will light green. When transmitting, they will light green and red. When the printer cannot accept any more data, the Busy LED on the transmitter and on the receiver will light red and the data transmission will stop.

When used for serial-to-parallel data conversion, the Busy LED on the receiver will light to indicate that the device connected to its parallel port is not ready to receive data.

3.5 Rack Mounting

The rackmount version will occupy 5.25 inches of vertical rack space.

Connect the cabling to each card according to the procedures in **Section 3.3**. It is usually easier to feed all of the necessary wires and cables through the rack, then work with the cards in front of the rack to make the connections. After each card is wired, it can be inserted into an open slot in the rack. Be certain that the card has mated with the power pins on the rack before applying force to fully seat the board; otherwise damage to the card and power pins can result.

When all cards have been wired and plugged into the rack, plug the wall transformer into its power source.

3.6 Configuration

The SHM-B Parallel can be configured to transmit serial data streams at baud rates from 1200 to 19,200 bps with 7- or 8-bit word length and Even, Odd, or No parity. The SHM-B Parallel-R is hardwired for either 1 or 2 stop bits, the transmitter for 2 stop bits. The factory setting is 19,200 baud, 8-bit word length, and No parity. If you experience signal degradation over long loop distances, you must reconfigure the SHM-B Parallel to a slower baud rate. Always configure the transmitter and receiver the same.

The configuration switches are all contained in a single block of DIP switches. The switch block is located on the printed circuit card, and is labeled SW1. After removing the card from the case or rack, locate the switch block on the card. Refer to Figure 3-6 for assistance locating the switch block. To attain the desired switch settings, follow the steps below:

1. Disconnect the unit from the power supply.

2. Remove the unit from the card rack or standalone case. The standalone version of both models is shipped assembled in the case with the faceplate

installed. To remove the faceplate and expose the card, apply pressure at the top front of the unit to separate the top and the bottom halves of the case, then push on the rear connector to force out the front panel and printed circuit assembly.
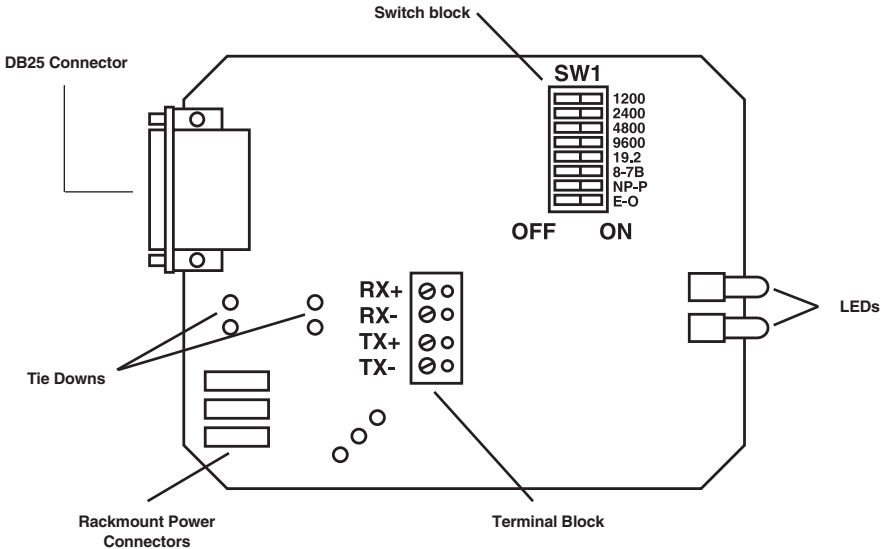
Figure 3-6. SHM-B Parallel Component Layout

3. Locate the baud-rate selector switches. The baud-rate options are 1200, 2400, 4800, 9600, and 19,200 bps. Only one baud-rate selection is permissible. Press the rocker switch down to the right to select the desired baud rate. When a switch is pressed down on the left, it is in the Off position.

4. Locate the Word Length selector switch labeled 8-7B. Press down on the left side of the switch to select 8-bit word length; on the right to select 7-bit word length.

5. Locate the Parity Enable/Disable selector switch labeled NP-P. Press down on the right side of the switch to enable parity (P); on the left to disable (NP).

6. Locate the Even/Odd Parity selector switch labeled E-O. When the NP-P switch is in the NP position, the E-O switch has no effect. This switch is enabled by the Parity Enable/Disable selector switch. When parity is enabled, press the switch down on the left to select Even parity; on the right to select Odd parity.

4. Troubleshooting

Before installing the SHM-B Parallel, verify that the source of the parallel data works correctly with the destination equipment when no modem link is installed. This isn't always possible, but be certain that all equipment is plugged-in and powered on, and that all cables are securely connected. The most likely problems and their causes are discussed below.

No data transfer

1. Incorrect wiring on the 4-wire circuit. See Figures 3-1 through 3-3. When the lines are properly connected, both the TD and the RD LED on the units will light Green in the idle state.

2. Incorrect baud rate, parity, or word length settings.

3. Distance/baud rate recommendations exceeded. Refer to **Chapter 1** to determine recommended loop distance and baud rates.

4. Printer is off-line (Busy LED is lit red).

Garbled data (all data erroneous)

1. Incorrect wiring on the 4-wire circuit (wrong polarity).

2. Incorrect baud rate, parity, or word length settings.

Occasional data errors

1. Distance/baud rate capacity exceeded.

2. Poor quality loop (4-wire circuit); try different circuit or wire, try lower baud rate.

3. Excessive signal noise or crosstalk on the loop.

4. Marginal AC power source; check transformer output.

Busy LED stays on

1. Printer off-line or not operational.

2. Incorrect wiring on the 4-wire circuit (wrong polarity).

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