RS-232 ↔ Current Loop Interface Converter (232/CL-E)

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 B 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

Any trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

Contents

1. Specifications

Operation—Full- or half-duplex

Interface—RS-232/V.24 (DCE/DTE switch-selectable); Unipolar 20/60 mA (passive) up to 130 VDC

Connectors—(1) DB25 female, (1) 4-screw terminal block

Switches—10-position DIP switch for RS-232 DTE or DCE configuration

Indicators—2 LEDs: RX and TX for Receive Data and Transmit Data

Current Loop—130 VDC (250 VDC maximum) passive only

Power—Input: CL051A: 115 VAC, 60 Hz, 12 watts; CL051AE: 230 VAC, 50 Hz, 12 watts; Output: 18 VAC center-tapped, 8 watts

Size—CL051A, CL051AE: 1.8"H x 5.5"W x 8.5"D (4.6 x 14 x 21.6 cm); CL051C: 7.5"L x 3.6"W (19.1 x 9.1 cm)

Weight—CL051A, CL051AE: 1.5 lb. (0.7 k g); CL051C: 4.5 oz. (127.6 g)

CAUTION

Make sure you have the right power supply for your local power. If not, call Technical Support to get a replacement power supply.

2. Introduction

The RS-232↔Current Loop Interface Converter (232/CL-E) is a bidirectional self-contained unit that enables the interconnection of a current loop interface with an RS-232 interface.

The switch selections allow half-duplex or full-duplex operation. Operation from 65 to 130 VDC, 60 ma, and supports the passive mode only.

You can set the Interface Converter as Data Terminal Equipment (DTE) or Data Communications Equipment (DCE) via a switch. Two LEDs monitor data flow.
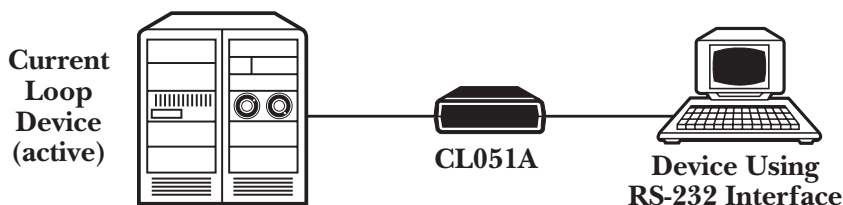
Figure 2-1. Connecting a current loop interface and an RS-232 interface.

3. Installation and Configuration

Follow the steps listed below to install your Interface Converter.

1. Remove the screw located at the center of the bottom cover and remove the top cover.

2. Make sure that switch SWC is set to the desired position as explained in **Section 3.1**.

3. Lift the back panel from its guide and insert the power supply receptacle (with the lip up) into the 4-prong plug near W1 (see **Figure 3-1**).

4. Connect the current loop wires to the 4-screw terminal block near C5 (see **Section 3.2** for terminal descriptions).

5. Insert the back panel into its guide, making sure the power supply cable and current loop cable exit through the holes provided for them.

6. Replace the top cover on the unit and secure with the screw.

7. Plug the power supply into an AC outlet. The unit is now ready for operation.
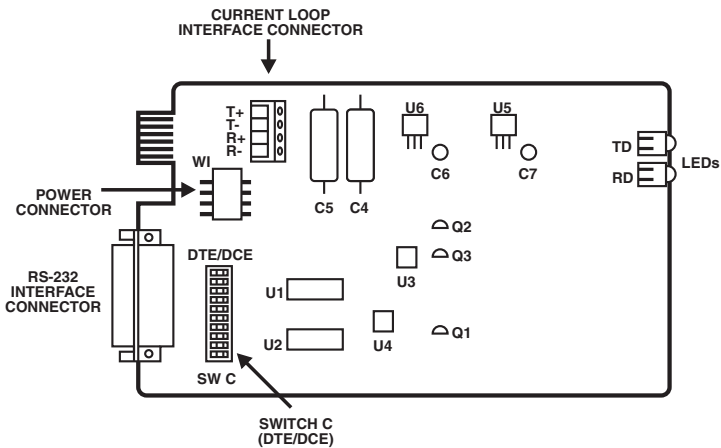

Figure 3-1. Board Layout.

NOTE

The Converter will operate at 130 volts DC, 60-ma as shipped from the factory. For 20-ma operation, remove the 82-ohm resistor that is in parallel to R+ and R- (see Figure 3-1).

3.1 Switch C: RS-232 Connector Configuration (DCE/DTE)

The Interface Converter comes from the factory configured as a DTE device. The switches are set as shown in **Table 3-1**.

Table 3-1. DIP-Switch C Settings for DTE (Factory Configuration).

Switch	Setting	Description
SW1	Not Used	
SW2	CLOSED	W/SW3 OPEN; Data Out is on Pin 2
SW3	OPEN	SW2 and SW3 are ALWAYS in opposite positions
SW4	CLOSED	W/SW5 OPEN, Data IN is on Pin 3
SW5	OPEN	SW4 and SW5 are ALWAYS in opposite positions
SW6	CLOSED	Places High on Pin 4 (RTS)
SW7	OPEN	Pin 5 (CTS) not connected
SW8	CLOSED	Places High on Pin 20 (DTR)
SW9	OPEN	Pin 6 (DSR) not connected
SW10	Not Used	

When the device is configured as a DCE, all switches will normally be switched to the opposite of the factory setting.

Table 3-2. DIP-Switch C Settings for DCE.

Switch	Setting	Description
SW1	Not Used	
SW2	OPEN	SW2 and SW3 are ALWAYS in opposite positions
SW3	CLOSED	W/SW2 OPEN, Data Out is on Pin 3
SW4	OPEN	SW4 and SW5 are ALWAYS in opposite positions
SW5	CLOSED	W/SW4 OPEN, Data In is on Pin 2
SW6	OPEN	Pin 4 (RTS) not connected
SW7	CLOSED	Ties Pin 5 (CTS) to Pin 20 (DTR)
SW8	OPEN	Removes High on Pin 20 (DTR). If system does not use DTR, raise CTS by CLOSING both SW7 and SW8
SW9	CLOSED	Ties High Pin 6 (DSR)
SW10	Not Used	

3.2 Current Loop Interface

The current loop connections are shown in **Table 3-3**. The current loop connections are accomplished by connecting the current loop cable to the closed entry terminal block. Unless very fine stranded wire cable is used, wire tinning is not required.

Table 3-3. Current Loop Cable Connections.

232/CLE	Terminals			
Computer Equipment Connections	**1 (+T)**	**2 (-1)**	**3 (+R)**	**4 (-R)**
Full Duplex	+ Receive	- Receive	+ Transmit	- Transmit
Half Duplex	+ Loop	Jumper to 3	Jumper to 2	- Loop

3.3 Indicators

When the RX LED is flashing, data is flowing from the RS-232 interface to the current loop interface. When the TX LED is flashing, data is flowing from the current loop interface to the RS-232 interface. If TX is steadily lit, no current is flowing on the receive pair of wires. Check the current loop wiring.

3.4 RS-232 Interface

The RS-232 interface is described in **Table 3-4** and **Figure 3-2**.

Table 3-4. RS-232 Interface Pinning.

Pin	Circuit	Description	Direction
1	AA	Protective ground	—
2	BA	Transmit Data	To DCE
3	BB	Receive Data	From DCE
4	CA	Request to Send	To DCE
5	CB	Clear to Send	From DCE
6	CC	Data Set Ready	From DCE
7	AB	Signal Ground/ Common Return	—
20	CD	Data Terminal Ready	To DCE

RS-232 Interface (Female)

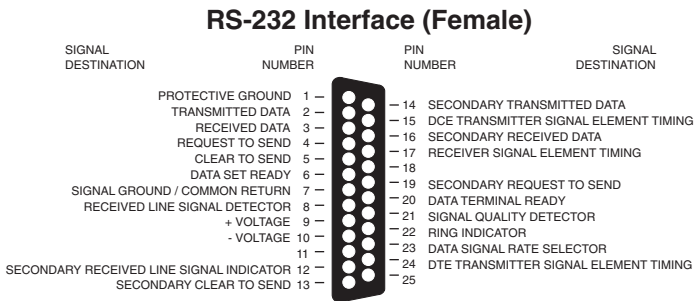| SIGNAL DESTINATION	PIN NUMBER		PIN NUMBER	SIGNAL DESTINATION
PROTECTIVE GROUND	1		14	SECONDARY TRANSMITTED DATA
TRANSMITTED DATA	2		15	DCE TRANSMITTER SIGNAL ELEMENT TIMING
RECEIVED DATA	3		16	SECONDARY RECEIVED DATA
REQUEST TO SEND	4		17	RECEIVER SIGNAL ELEMENT TIMING
CLEAR TO SEND	5		18	
DATA SET READY	6		19	SECONDARY REQUEST TO SEND
SIGNAL GROUND / COMMON RETURN	7		20	DATA TERMINAL READY
RECEIVED LINE SIGNAL DETECTOR	8		21	SIGNAL QUALITY DETECTOR
+ VOLTAGE	9		22	RING INDICATOR
- VOLTAGE	10		23	DATA SIGNAL RATE SELECTOR
	11		24	DTE TRANSMITTER SIGNAL ELEMENT TIMING
SECONDARY RECEIVED LINE SIGNAL INDICATOR	12		25	
SECONDARY CLEAR TO SEND	13			

Figure 3-2. RS-232 Interface.

4. Current Loop Rack and Cards

4.1 Description

The RM005 Rack can hold up to 16 CL051C printed circuit cards and fits in a standard 19-inch equipment rack. The RM005 comes complete with its own built-in AC power supply. The operation of the CL051C is the same as the CL051A.
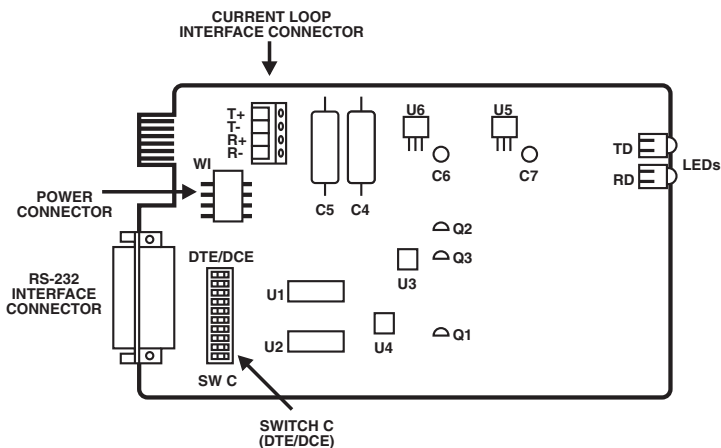

Figure 4-1. Component Layout.

WARNING!

Do not apply primary power until after you have properly configured the RM005 power supply.

For 115 VAC ±15% primary power: Set 115/230 voltage selector switch to 115 and make sure the input fuse is rated at 1 A.

For 230 VAC ±15% primary power: The voltage selector switch must be set to 230 and the fuse must be rated 0.5 A.

Inside the fuseholder are two fuses. Open the fuseholder by pressing down on the cover, then release. The fuse closest to the cover is a spare. Select the correct fuses and place them in the Fuse Retaining Cover.

Discard the incorrect fuses.

4.2 Specifications (RM005)

Power—115/230 VAC, 60/50 Hz, switch-selectable

Rack Size—Overall Width: 19" (48.3 cm)
              Inside Width: 17" (43.2 cm)
              Depth: 10.5" (26.7 cm)
              Height: 5.25" (13.3 cm)

PC Card Size—Length: 7.5" (19.1 cm)
                 Width: 3.6" (9.1 cm)

Rack Weight—19.6 lb. (8.9 kg) (without cards installed)

PC Card Weight—4.5 oz. (128 g)

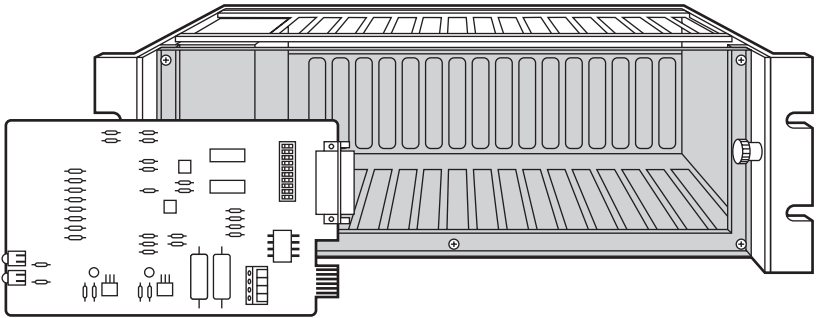**Rack Switches**—On/Off Power Switch, 115/230-VAC Selector Switch

Rack Indicators—None

Figure 4-2. RM005 with CL051C.

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