

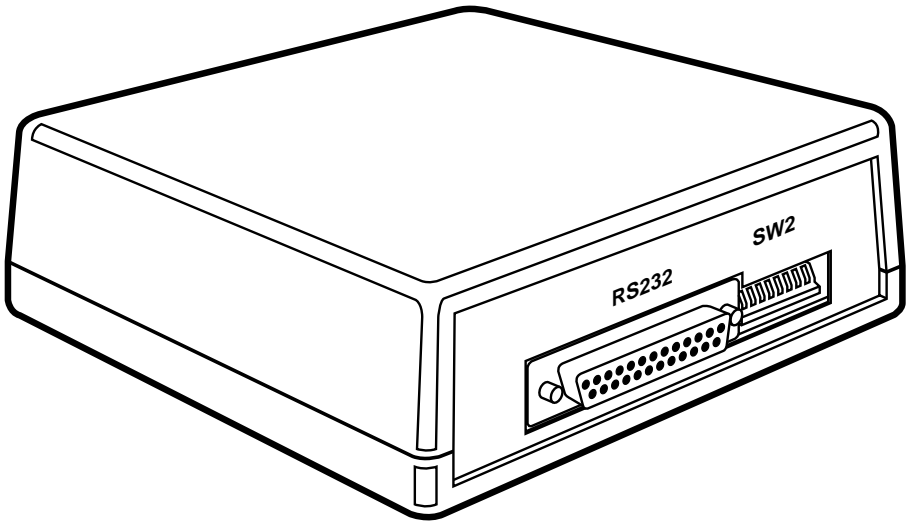


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RS-232 to Keyboard Converter



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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 the Canadian Department of Communications.

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

TRADEMARKS USED IN THIS MANUAL

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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 conectado 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 física 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 líneas de energía.
 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 objetos líquidos 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: Objetos 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.
-

Contents

Chapter	Page
1. Specifications	1
2. Introduction	3
3. Configuration	4
4. Installation	5
5. Operation	7
5.1 Power-Up	7
5.2 Operating with No Translation	7
5.3 Operating with ASCII Translation	7
5.4 The Self-Test	8
6. Troubleshooting	11
6.1 First Steps	11
6.2 Calling Your Supplier	11
6.3 Shipping and Packaging	11

1. Specifications

Compliance —	FCC Part 15 Class A, DOC Class/MDC classe A
Interfaces —	IBM 6-pin keyboard, EIA RS-232 serial (DTE)
Protocol/ Code Set —	Keyboard: Scan modes 1, 2, or 3 (autosensed); Serial: Asynchronous; raw keyboard codes or ASCII (user-selectable)
Data Format —	Serial: Always 1 stop bit; either 8 data bits and no parity or 7 data bits and even or odd parity (user- selectable)
Flow Control —	X-ON/X-OFF (software) only
Data Rates —	Serial: 76,800, 38,400, 19,200, 9600, 4800, 2400, 1200, or 600 bps (user-selectable)
Maximum Distance —	Keyboard: 10 ft. (3 m) to PC's keyboard port, 10 ft. (3 m) to optional keyboard; Serial: 50 ft. (15.2 m) to connected device
User Controls —	(1) Side-mounted 8-position DIP switch for data rate, data format, PC type, translation mode
Diagnostic —	User-triggerable "barber pole" self-test
Connectors —	(1) DB25 female for serial input; (2) 6-pin mini-DIN female: (1) for output to computer's keyboard port (male- to-male keyboard-extension cable is included), (1) for optional input from local keyboard

RS-232 TO KEYBOARD CONVERTER

Leads/Signals Supported —	Serial: Pins 2, 3, 4, 5, 7, and 20 (TD, RD, RTS, CTS, SGND, and DTR respectively)
Power —	From PC: +4.75 to +5.25 VDC, 50 mA
MTBF —	100,000 hours
Altitude Tolerance —	10,000 ft. (3048 m)
Temperature Tolerance —	Operating: 32 to 104° F (0 to 40° C); Storage: -4 to 158° F (-20 to 70° C)
Humidity Tolerance —	Up to 95% noncondensing
Dimensions —	1"H x 5"W x 5"D (2.5 x 12.7 x 12.7 cm)
Weight —	Net: 0.6 lb. (0.3 kg); Shipping: 1 lb. (0.5 kg)

2. Introduction

With the RS-232 to Keyboard Converter, you can translate RS-232 data and send it as input to an IBM® PC as if it were coming from the PC's own keyboard. For example, you can take RS-232 data from a sensor, alarm, barcode reader, or even another PC and pump it into a PC's keyboard port, so that the data goes directly into the software you want to handle it with. The data can be the RS-232 equivalent of raw keyboard codes, or it can be ASCII characters. When it converts the data to keyboard data, the Converter automatically senses which keyboard scan mode to use.

The RS-232 to Keyboard Converter is powered by the attached PC, so you don't have to worry about an ungainly power supply. Also, users can select a serial data rate ranging from 600 bps to 76,800 bps.

3. Configuration

Before you install your RS-232 to Keyboard Converter, configure it by setting its DIP switch. (If you change the configuration settings later, you must power the Converter down and back up for the changes to take effect.)

Referring to Table 3-1 below, set positions 1 through 3 for the desired data rate, positions 4 and 5 for your desired data format, position 7 for the desired PC type, and position 8 for your desired translation mode. (Position 6 is used to trigger the unit's self-test; see **Section 5.4.**)

Table 3-1. Possible Settings of the DIP Switch

FUNCTION	DIP SWITCH POSITIONS							
	1	2	3	4	5	6	7	8
Data Rate (bps)								
76,800	OFF	OFF	OFF					
38,400	ON	OFF	OFF					
19,200	OFF	ON	OFF					
9600	ON	ON	OFF					
4800	OFF	OFF	ON					
2400	ON	OFF	ON					
1200	OFF	ON	ON					
600	ON	ON	ON					
Data Format								
8 data bits, no parity				OFF	OFF			
8 data bits, parity				ON	OFF			
7 data bits, odd parity				OFF	ON			
7 data bits, even parity				ON	ON			
Operating Mode								
Normal						OFF		
Self-Test						ON		
PC Type								
AT or PS/2							OFF	
PC/XT							ON	
Translation Mode								
ASCII								OFF
No Translation								ON

4. Installation

Take these steps to install your RS-232 to Keyboard Converter:

1. Place the Converter in a dry place between the devices whose signals you want to convert. It should be within 10 ft. (3 m) of the keyboard port of the PC or other keyboard-input device you want to connect to it. It should be within 50 ft. (15.2 m) of the RS-232 device you want to connect to it. It should also be close enough to any optional keyboard that you can plug the keyboard's native cable directly into the Converter—do not use an extension cable.
2. Make sure the PC or other keyboard-input device that you want to connect is turned off. Then take the included keyboard-extension cable with male 6-pin mini-DIN connectors. Plug one end of this cable into the connector marked "PC" on the Converter. Plug the other end into the keyboard port of the PC or other keyboard-input device.

If you are connecting the Converter to an older computer such as a PC/XT™ that has 5-pin DIN keyboard connectors, use a 6-pin mini-DIN female to 5-pin DIN male adapter (our product code FA212) to make the connection between the extension cable and the PC's keyboard port.

3. Connect the RS-232 device by running cable between it and the Converter. There must be a male DB25 connector on the Converter end of the cable; plug this connector into the female DB25 connector marked "RS-232" on the Converter.

Figure 4-1 on the next page shows the pinout of the Converter's RS-232 port.

4. Lastly, if you want to connect a keyboard, do so by plugging its native output cable into the connector marked "KBD" on the Converter. (The keyboard will be powered from the PC through the extension cable and Converter.)

If you are connecting an older keyboard that has 5-pin DIN connectors, use a 5-pin DIN female to 6-pin mini-DIN male adapter (our product code FA212) to make the connection between the keyboard cable and the Converter.

RS-232 TO KEYBOARD CONVERTER

Table 4-1. Pinout of the Converter's RS-232 Port

Pin No.	Signal Abbrev.	Signal Name	Direction	Notes
2	TD	Transmit Data	OUT	
3	RD	Receive Data	IN	
4	RTS	Request to Send	OUT	Held high
5	CTS	Clear to Send	IN	
7	SGND	Signal Ground	N/A	
20	DTR	Data Terminal Ready	OUT	Held high

5. Operation

5.1 Power-Up

To turn on the RS-232 to Keyboard Converter, turn on the connected PC or keyboard-input device, because the Converter draws its power from its interface with that device. The Converter will begin either operating with no translation (see **Section 5.2**), operating with ASCII translation (see **Section 5.3**), or performing its self-test (see **Section 5.4**).

5.2 Operating with No Translation

When positions 6 and 8 of the RS-232 to Keyboard Converter's DIP switch are both set to OFF, the Converter accepts 8-bit data bytes as RS-232 input to its connector marked "RS-232." The Converter changes the asynchronous RS-232 protocol and RS-232 voltages of these signals to the bit-synchronous protocol and +5-volt level acceptable to a standard PC as keyboard input. It then outputs these signals on its connector marked "PC." Since no translation takes place, the RS-232 data should be (for most applications) the scan codes generated by a PC keyboard.

5.3 Operating with ASCII Translation

When position 8 of the RS-232 to Keyboard Converter's DIP switch is set to ON and position 6 is set to OFF, the Converter accepts ASCII codes as RS-232 input to its connector marked "RS-232." The Converter changes these codes into the equivalent PC-keyboard scan codes, which it outputs on its connector marked "PC." While the Converter is in this operating mode, RS-232 devices that transmit ASCII can drive a PC's keyboard input. Table 5-1 on pages 9 and 10 shows the correspondences between ASCII codes and the keyboard keystrokes they are converted to.

5.4 The Self-Test

When position 6 of the RS-232 to Keyboard Converter's DIP switch is set to ON and the Converter is powered down and then back up again, the Converter begins performing a barber-pole self-test and sends the test data (continuously repeating strings of the basic ASCII character set) out of its RS-232 port.) The first line of the self-test shows the Converter's product name, the version number of its software, and a binary representation of the current settings of its DIP switch.

Table 5-1. ASCII to Keyboard-Scan-Code Conversion

To read this table, read across to the first hex digit, then down to the second hex digit, to find the keyboard character represented by a particular ASCII code. For example, ASCII 6B will be converted to the keyboard code for lowercase “k.” This page covers codes 00 to 7F; see page 10 for 80 to DF.

HEX	0	1	2	3	4	5	6	7
0			[Space]	0	@	P	`	p
1			!	1	A	Q	a	q
2			"	2	B	R	b	r
3			#	3	C	S	c	s
4			\$	4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			'	7	G	W	g	w
8	[Back-space]		(	8	H	X	h	x
9	[Tab]		)	9	I	Y	i	y
A			*	:	J	Z	j	z
B		[Escape]	+	;	K	[	k	{
C			,	<	L	\	l	|
D	[Enter]		-	=	M	]	m	}
E			.	>	N	^	n	~
F			/	?	O	_	o	[Delete]

RS-232 TO KEYBOARD CONVERTER

This page covers “extended ASCII” codes 80 to DF. The Converter does not do anything with codes E0 to FF. The characters from C0 to CF, marked with an *(N)*, are the characters generated by the numeric keypad.

HEX	8	9	A	B	C	D
0	[Ctrl/ Alt/ Delete]		[F1]	[Num Lock]	[Enter] <i>(N)</i>	[Insert]
1	[Make Left Ctrl]	[Break Left Ctrl]	[F2]	[Caps Lock]	/ <i>(N)</i>	[Home]
2	[Make Left Shift]	[Break Left Shift]	[F3]	[Scroll Lock]	* <i>(N)</i>	[End]
3	[Make Left Alt]	[Break Left Alt]	[F4]		9 <i>(N)</i>	[Page Up]
4	[Make Right Ctrl]	[Break Right Ctrl]	[F5]		8 <i>(N)</i>	[Page Down]
5	[Make Right Shift]	[Break Right Shift]	[F6]		7 <i>(N)</i>	[Up Arrow]
6	[Make Right Alt]	[Break Right Alt]	[F7]		6 <i>(N)</i>	[Down Arrow]
7			[F8]		5 <i>(N)</i>	[Left Arrow]
8			[F9]		4 <i>(N)</i>	[Right Arrow]
9			[F10]		3 <i>(N)</i>	[Print Screen]
A			[F11]		2 <i>(N)</i>	[Pause]
B			[F12]		1 <i>(N)</i>	
C					0 <i>(N)</i>	
D					- <i>(N)</i>	
E					+ <i>(N)</i>	
F					[Del] <i>(N)</i>	

6. Troubleshooting

6.1 First Steps

If you have difficulty with the RS-232 to Keyboard Converter, first make sure that its DIP switch is set correctly and that all cables connected to it are firmly and securely attached at both ends. If these things are OK, have the Converter perform its self-test as described in **Section 5.4**. If the Converter fails its self-test, or if it passes but problems persist, call your supplier as described in **Section 6.2**.

6.2 Calling Your Supplier

If you determine that your RS-232 to Keyboard Converter is malfunctioning, *do not attempt to alter or repair it*. Contact your supplier. The problem might be solvable over the phone.

Before you do, make a record of the history of the problem. Your supplier will be able to provide more efficient and accurate assistance if you have a complete description, including:

- The nature and duration of the problem.
- When the problem occurs.
- The components involved in the problem.
- Any particular application that, when used, appears to create the problem or make it worse.

6.3 Shipping and Packaging

If you need to transport or ship your RS-232 to Keyboard Converter:

- Package it carefully. We recommend that you use the original container.
- Before you ship a unit for repair or return, contact your supplier to get a Return Materials Authorization (RMA) number, and make sure you include everything you received with the unit when you ship it.

