

OCTOBER 2003

PI-1375A

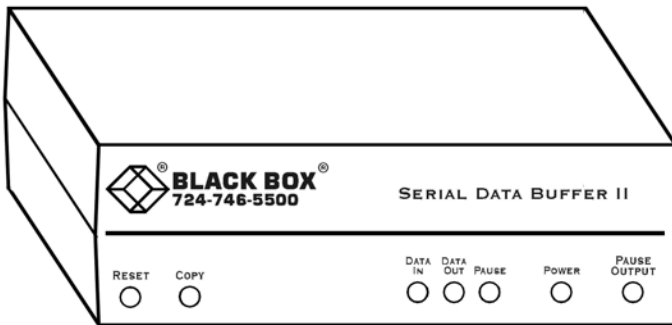
PI-1377A

PI-1405A

PI-1407A

Serial Data Buffer II

HS Serial Data Buffer II



**CUSTOMER
SUPPORT
INFORMATION**

Order toll-free in the U.S. 24 hours, 7 A.M. Monday to midnight Friday: **877-877-BBOX**
FREE technical support, 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mail order: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018

Web site: www.blackbox.com • E-mail: info@blackbox.com

Table of Contents

Overview	1
Front Panel Switches/Indicators	2
Rear Panel Switches/Connectors	2
Installation	3
Configuration	3
Standard Data Buffer Switch Settings (PI137xA)	3
HS Data Buffer Switch Settings (PI140xA)	4
Operation	5
Controls and Indicators	5
Reset Button	5
Copy Button	5
Data In/Out LEDs	5
Flow Control	6
Hardware Flow Control	6
Software Flow Control	6
Self-Test	6
Sample Self-Test Output	7
Expansion Memory	8
Cabling	8
Troubleshooting	9
APPENDIX	10
Input Port Pinouts (DTE)	10
Output Port Pinouts (DCE)	10
Specifications	11
FCC Statement of Compliance	12
NORMAS OFICIALES MEXICANAS (NOM)	13
NOTES	15

- Power LED Shows unit is powered on.
- Pause Switch Stops output when pressed. Data will continue to be buffered.

Rear Panel Switches/Connectors

- DB25F (top) DCE interface for output device.
- DB25F (bottom) DTE interface for host input.
- Serial I/F Config Switches used to configure serial communications (see Table 1).
- DC Power Input Unit requires +9VDC external supply (provided with unit).

Installation

The Serial and HS Serial Data Buffers are designed for use in a standard office environment but should not be located in direct sunlight or in an area of high humidity. The external power supply provided with each model can be plugged into any standard outlet. The input and output data cables used with these Data Buffers are typically limited to 50' as specified by the RS232 standard. The input port functions as a DTE type device whereas the output port functions as a DCE type device. Both input and output connectors are DB25F. Black Box offers many cable options for use with these products. (See Page 8 or call Black Box technical support for assistance). After connecting the data cables to the unit then connect the power supply. The Data Buffer does not have an on/off switch and will, therefore, power up automatically when power is applied. The Data Buffer is designed for continuous operation.

Configuration

The Serial and HS Serial Data Buffers are configured through an 8 position dipswitch located through an opening in the rear panel, labeled *Serial I/F Config*. The switches are read only after the unit is powered up or after the Reset button is pressed. These switches are numbered 1-8, read left to right and are interpreted where 0 is down and 1 is up. The switch settings detailed in Tables 1 and 2 on the following pages apply to both input and output ports.

Table 1 - Standard Data Buffer Switch Settings (PI137xA)

Switch Position →	1	2	3	4	5	6	7	8
Data Rates (Input / Output)								
• 1200 / 600	0	0	0	0				
• 1200 / 300	1	0	0	0				
•								
• 2400 / 1200	0	1	0	0				
• 2400 / 600	1	1	0	0				
• 2400 / 300	0	0	1	0				
•								
• 4800 / 2400	1	0	1	0				
• 4800 / 1200	0	1	1	0				
• 4800 / 600	1	1	1	0				
•								
• 9600 / 9600	0	0	0	1				
• 9600 / 4800	1	0	0	1				
• 9600 / 2400	0	1	0	1				
• 9600 / 1200	1	1	0	1				
•								
• 19.2K / 9600	0	0	1	1				
• 19.2K / 4800	1	0	1	1				
• 19.2K / 2400	0	1	1	1				
• 19.2K / 1200	1	1	1	1				
Flow Control								
• Hardware					1			
• Software					0			
Data Bits								
• 8						1		
• 7						0		
Parity Type								
• Even							1	
• Odd							0	
Parity Enable								
• None								1
• Enable								0

1 = Up; 0 = Down

Note: Character framing of 7-databits and No Parity is not supported.

Table 2 - HS Data Buffer Switch Settings (PII40XA)

Switch Position →	1	2	3	4	5	6	7	8
Data Rates (Input / Output)								
• 9600 / 9600	0	0	0	0				
• 9600 / 4800	1	0	0	0				
• 19.2K / 19.2K	0	1	0	0				
• 19.2K / 9600	1	1	0	0				
•								
• 38.4K / 38.4K	0	0	1	0				
• 38.4K / 19.2K	1	0	1	0				
• 38.4K / 9600	0	1	1	0				
•								
• 57.6K / 57.6K	1	1	1	0				
• 57.6K / 38.4K	0	0	0	1				
• 57.6K / 19.2K	1	0	0	1				
• 57.6K / 9600	0	1	0	1				
•								
• 115.2K / 115.2K	1	1	0	1				
• 115.2K / 57.6K	0	0	1	1				
• 115.2K / 38.4K	1	0	1	1				
• 115.2K / 19.2K	0	1	1	1				
• 115.2K / 9600	1	1	1	1				
Flow Control								
• Hardware					1			
• Software					0			
Data Bits								
• 8						1		
• 7						0		
Parity Type								
• Even							1	
• Odd							0	
Parity Enable								
• None								1
• Enable								0

1 = Up; 0 = Down

Note: Character framing of 7-databits and No Parity is not supported

Operation

Upon the first receipt of data, the Data Buffer will initialize a timer and begin storing data into its memory. It will not begin sending the stored data to the output device until the buffer is full or when no data is received for five seconds, whichever occurs first. When the Data Buffer begins outputting stored data, it will flow control the host using the selected approach to prevent any new input. When the buffer has been emptied, flow control with the host will be restored. Note that for large print jobs that exceed the Data Buffer's capacity, a timeout may occur in the host that may appear as if the printer is off line. For this reason, it is recommended that the unit be configured to accommodate the largest frequently occurring print job.

The Data Buffer will support simultaneous bi-directional serial communications at the selected data rates. It was designed primarily, however, for applications in which 90% of the communications traffic flows in the forward direction (i.e. from Input to Output). Forward throughput will slow dramatically with large amounts of reverse flow data (i.e. from Output to Input). The Data Buffer has the capability of asserting flow control to the output device when the reverse flow buffer is full.

Controls and Indicators

Reset Button

The Reset button is used to reset the Data Buffer to initialize memory, to re-read the dipperswitches, to enable the copy feature, or to initiate the internal self-test.

Copy Button

The Copy button is used to automatically create multiple copies of a given print job or to repeat the most recent job printed. To have the Data Buffer create multiple copies, press the Reset button to clear all previous settings. Then, within 3 seconds and before sending data, press the Copy button once for each copy desired. The Data In LED will blink each time the Copy switch is pressed. After pressing the Copy switch the desired number of times, the unit will then wait indefinitely for the data stream to begin. Note that the internal copy counter is limited to 255. The Data Buffer will begin outputting the specified number of copies five seconds after receipt of data has stopped. The Data Buffer will not accept new data input while it is outputting data.

As an added convenience, the Copy button can also be used to repeat the last print job. To create another copy of the latest job, simply press the Copy button after the job is done but prior to the next job. Note that only that data contained in the internal buffer will be output when this feature is used.

Data In/Out LEDs

The Data In LED will flicker as data is being input into the buffer. The Data Out LED will flicker when data is being sent to the output device.

Flow Control

The Data Buffer is designed to function transparently and to continually accept data until its buffer is full. Although this typically occurs at a faster rate than supported by the attached output device, flow control will never be asserted to the host unless the buffer is full. The Data Buffer will respond as needed to flow control requests from the output device. To prevent data overruns, both input and output hosts/devices must support the same flow control method.

Hardware Flow Control

The Data Buffer uses DTR and RTS in tandem to control the flow of data with the host. When its buffer is full, the Data Buffer will lower DTR and RTS (pins 20 and 4). This action will signal the host to immediately stop sending data. When the buffer has been emptied, DTR and RTS will be restored high to allow input to resume. Similarly, the Data Buffer will monitor DTR (Pin 20) on the output port while it sends data to the output device. If the Data Buffer detects that the output device has lowered DTR, it will stop sending data until the output device raises DTR again.

The Data Buffer will support bi-directional communications. Consequently, it will receive and buffer data from the output device that is destined for then input host. When the limited “reverse-flow” buffer is full, the Data Buffer will lower DSR and CTS thereby signaling to the output device to stop sending data. When the accumulated data has been successfully transmitted to the host, DSR and CTS will be restored.

Software Flow Control

The Data Buffer supports software flow control as an alternative to hardware flow control through the special ASCII control codes X-ON and X-OFF. When its buffer is full, the Data Buffer will send the X-OFF character to the host to signal it to stop sending data. When the Data Buffer is ready to accept data, it will send the complementary X-ON character. The Data Buffer will similarly screen data received from the output device for these characters to control output.

Self-Test

The Data Buffer has a comprehensive self-test feature that will output the selected configuration, test the internal buffer memory, and generate ASCII test patterns to confirm overall operability. The self-test feature is activated through a special sequence involving the Reset and Copy buttons and the Data In LED and typically requires use of both hands to activate. Note that since the output of the self-test will be directed to the output port, it is important that the device, typically a printer, is turned on and ready before the self-test is started. To activate the self-test, press and hold in the Copy button, then momentarily press and release the Reset button only. When the Data In LED illuminates after a few seconds, release the Copy button and the test will begin. The self-test can be terminated at any time by momentarily pressing and releasing the Reset button.

Expansion Memory

The Data Buffer has four 40-pin headers inside the enclosure to accommodate memory modules of either 128K or 512K memory in any combination. Expansion modules can be separately purchased and are user-installable. Memory modules must be installed in consecutive positions from left to right. An 8-position dipswitch inside the enclosure, labeled “*SW2 - Memory Config.*” is used to set the memory configuration. These switches must be set any time the memory capacity has changed.

The switches are set as follows:

<- OFF	ON ->			
1	First Module	- Off = 128K;	On = 512K	
2	Second Module	- Off = Present;	On = Not Present	
3	“	- Off = 128K;	On = 512K	
4	Third Module	- Off = Present;	On = Not Present	
5	“	- Off = 128K;	On = 512K	
6	Fourth Module	- Off = Present;	On = Not Present	
7	“	- Off = 128K;	On = 512K	
8	Not Used			

Cabling

Black Box offers many cable options for use with its serial Data Buffer products. The following represent the most commonly used:

- For connection with a Personal Computer serial port (i.e. COMx) as the input device (DTE to DTE) - order product code EVMBPC.
- For connection with a Personal Computer serial port (i.e. COMx) as the output device (DCE to DTE) - order product code EVMBMC.
- For connection with a serial printer as the output device with DB25F connector (DCE to DTE) - order product code ECM12C.
- For connection with a modem as the output device (DCE to DCE) - order product code EYN255.
- For connection with a modem as the input device (DCE to DTE) - order product code ECM12C.

Troubleshooting

Calling Black Box

If you determine that your Data Buffer is malfunctioning, do not attempt to alter or repair the unit. It has no user-serviceable parts. Contact Black Box Technical Support at 724-746-5500.

Before you do, make a record of the history of the problem. We 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 equipment involved in the problem;
- any particular application that, when used, appears to create the problem or make it worse; and
- the results of any testing you've already done.

Shipping and Packaging

If you need to transport or ship your Data Buffer:

- Package it carefully. We recommend that you use the original container.
- If you are returning the unit, include every thing you received with it. Before returning the unit back to Black Box for repair or return, contact us to get a Return Materials Authorization (RMA) number.

Appendix

Input Port Pinouts (DTE)

Pin	Signal	Description	Comment
1	Ch-Gnd	Chassis Ground	not used
2	TXD	Transmit Data	Output to Host
3	RXD	Receive Data	Input from Host
4	RTS	Request to Send	Tied to DTR, used for hardware flow
5	CTS	Clear to Send	not used
7	GND	Signal Ground	
8	CD	Carrier Detect	not used
20	DTR	Data Term. Ready	Tied to RTS, used for hardware flow

Output Port Pinouts (DCE)

Pin	Signal	Description	Comment
1	Ch-Gnd	Chassis Ground	not used
2	RXD	Receive Data	Input from attached Output device
3	TXD	Transmit Data	Output to printer/attached device
4	RTS	Request to Send	not used
5	CTS	Clear to Send	Tied to DSR, used for hardware flow
6	DSR	Data Set Ready	Tied to CTS, used for hardware flow
7	GND	Signal Ground	
8	CD	Carrier Detect	not used
20	DTR	Data Terminal Ready	Monitored for output readiness

Specifications

Compliance:	FCC Part 15 Subpart J Class A Conforms with UL Safety Standard 60950
Interfaces:	EIA RS-232 DTE input; EIA RS-232 DCE output
Protocol:	Serial Asynchronous
Data Format:	8 Data Bits with even, odd, or no parity; 7 Data Bits with even or odd parity. 1 stop, 1 start bits
Flow Control:	Hardware (DTR/RTS) or Software (X-ON/X-OFF)
Data Rates:	Standard Model - 300 to 19.2Kbps; High Speed Model - 4800 to 115.2Kbps. 16 predefined input/output pairings
Memory:	Async. SRAM, 128K x 8, 512K x 8 modules. Four modules max up to 2MB total. Used in any combination.
Indicators:	Green LEDs for DC Power, Data In, and Data Out, Red LED for Pause Status
Controls:	Push-button momentary contact Reset and Copy; Push-button, alternate-action Pause.
Connectors:	Input - DB25F, Output - DB25F
Diagnostics:	Integral Self-Test with DCE output port reporting
Power:	Requires external +9VDC 1.2A mp supply provided with unit. Consumption: ~3 Watts
Size & Weight:	6.5"W x 5.0"D x 2.25"H; 1.25 lbs.
Temp.:	0° to 70°C (32° to 158° F)
Humidity:	20% to 80% non-condensing
Models:	PI-1375A: Standard Model with 128KB PI-1377A: Standard Model with 512KB PI-1405A: High Speed Model with 128KB PI-1407A: High Speed Model with 512KB PI-1300: 128K B Expansion Memory Module PI-1301: 512K B Expansion Memory Module

FCC Statement of Compliance

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.

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.

NOTES



Black Box Corporation. All rights reserved.



1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-146-0746