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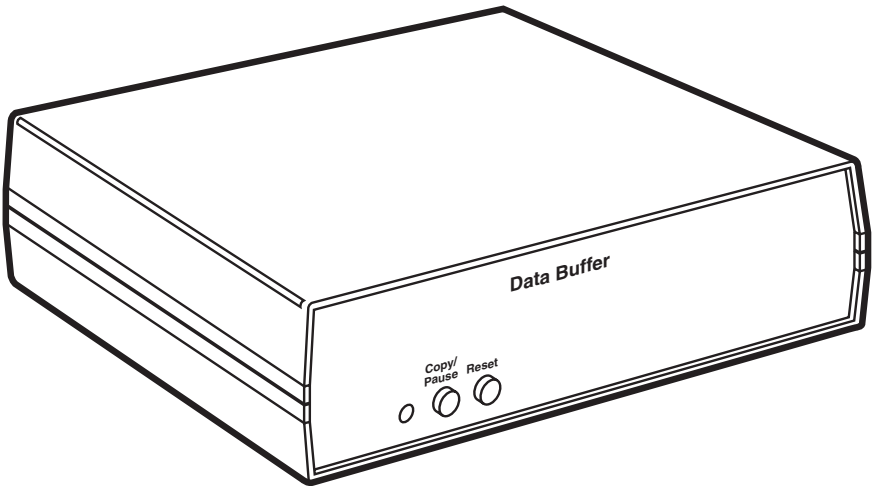
SEPTEMBER 1999

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PI385A(E)  
PI381A(E)  
PI377A(E)  
PI402A(E)  
PI388A(E)  
PI384A(E)

## DataBuffer



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**FEDERAL COMMUNICATIONS COMMISSION  
AND  
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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 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 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.

## TRADEMARKS USED IN THIS MANUAL

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# 1. Specifications

**Compliance** — FCC Part 15 Class A, DOC Class/MDC classe A

**Interfaces** —

PI375, PI376, PI377, PI378, and PI379 models: EIA RS-232 serial (input is DTE and output is DCE);

PI380, PI381, PI382, PI383, and PI384 models: EIA RS-232 serial input (DTE) and IBM PC (Centronics compatible) parallel output;

PI385, PI386, PI387, PI388, and PI389 models: IBM PC (Centronics compatible) parallel input and output;

PI400, PI401, PI402, PI403, and PI404 models: IBM PC (Centronics compatible) parallel input and EIA RS-232 serial output (DCE)

**Protocol** — Serial: Asynchronous

**Data Format** — Serial: Either 8 data bits, 1 stop bit, and no parity or 7 data bits, 1 stop bit, and even, odd, or no parity (user-selectable)

**Flow Control** — Serial: Hardware (DTR/CTS) or software (X-ON/X-OFF), user-selectable

**Data Rate** — Serial: 300, 600, 1200, 2400, 4800, 9600, 19,200, or 38,400 bps (user-selectable)

**Maximum Distances** — 50 ft. (15.2 m) from serial ports to serial devices;  
20 feet (6.1 m) from parallel ports to parallel devices

**Internal Memory** — PI375, PI380, PI385, PI400 models: 128 KB of buffer RAM; PI376, PI381, PI386, PI401 models: 256 KB of buffer RAM; PI377, PI382, PI387, PI402 models: 512 KB of buffer RAM; PI378, PI383, PI388, PI403 models: 1 MB of buffer RAM; PI379, PI384, PI389, PI404 models: 2 MB of buffer RAM

**User Controls** — All models: (2) Front-mounted pushbuttons: Reset and Copy/Pause; PI375, PI376, PI377, PI378, and PI379 models: (2) Rear-mounted 8-position DIP switches for serial-port configuration; PI380, PI381, PI382, PI383, and PI384 models: (1) Rear-mounted 8-position DIP switch for serial-input-port configuration; PI400, PI401, PI402, PI403, and PI404 models: (1) Rear-mounted 8-position DIP switch for serial-output-port configuration

**Diagnostic** — Self-test mode in which test message is continuously transmitted out of output port

**Indicators** — (1) Front-mounted unlabeled Status LED

**Connectors** — (2) Rear-mounted DB25 female (1 input, 1 output)

**Leads Supported**—Serial input ports: 1 through 5, 7, and 20; Serial output ports: 1 through 3, 5 through 8, and 20; Parallel ports: 1 through 13, 15, 16, and 19 through 25

**MTBF** — 100,000 hours

**Altitude Tolerance** — 15,000 ft. (4572 m)

**Temperature Tolerance** — Operating: 32 to 77°F (0 to 25°C);  
Storage: 32 to 104°F (0 to 40°C)

**Power** — For 120-VAC operation: From wallmount power supply; Input: 115 VAC, 60 Hz, rated at 100 mA; Output: 5 VDC at 600 mA; Consumption: up to 3 VA; For 230-VAC operation: From desktop power supply PS112E: Input: 230 VAC, 50 Hz, rated at 100 mA; Output: 5 VDC at 1 A; Consumption: Up to 5 VA

**Size** — 2.4"H x 8.1"W x 6.3"D (6.1 x 20.6 x 16 cm)

**Weight** — 2.5 lb. (1.1 kg)

## 2. Introduction

The DataBuffer is a versatile buffering device that accepts data from your computer and sends it to a printer or plotter. The DataBuffer also takes data from or sends data to other devices such as scanners and modems. The DataBuffer comes in the following models:

- DataBuffer 128K-S/S (PI375A(E))— serial to serial version with 128 KB of memory.
- DataBuffer 128K-S/P (PI380A(E))— serial to parallel version with 128 KB of memory.
- DataBuffer 128K-P/P (PI385A(E))— parallel to parallel version with 128 KB of memory.
- DataBuffer 128K-P/S (PI400A(E))— parallel to serial version with 128 KB of memory.
- DataBuffer 256K-S/S (PI376A(E))— serial to serial version with 256 KB of memory.
- DataBuffer 256K-S/P (PI381A(E))— serial to parallel version with 256 KB of memory.
- DataBuffer 256K-P/P (PI386A(E))— parallel to parallel version with 256 KB of memory.
- DataBuffer 256K-P/S (PI401A(E))— parallel to serial version with 256 KB of memory.
- DataBuffer 512K-S/S (PI377A(E))— serial to serial version with 512 KB of memory.
- DataBuffer 512K-S/P (PI382A(E))— serial to parallel version with 512 KB of memory.
- DataBuffer 512K-P/P (PI387A(E))— parallel to parallel version with 512 KB of memory.
- DataBuffer 512K-P/S (PI402A(E))— serial to parallel version with 512 KB of memory.
- DataBuffer 1M-S/S (PI378A(E))— serial to serial version with 1MB of memory.

- DataBuffer 1M-S/P (PI383A(E))— serial to parallel version with 1 MB of memory.
- DataBuffer 1M-P/P (PI388A(E))— parallel to parallel version with 1 MB of memory.
- DataBuffer 1M-P/S (PI403A(E))— parallel to serial version with 1 MB of memory.
- DataBuffer 2M-S/S (PI379A(E))— serial to serial version with 2 MB of memory.
- DataBuffer 2M-S/P (PI384A(E))— serial to parallel version with 2 MB of memory.
- DataBuffer 2M-P/P (PI389A(E))— parallel to parallel version with 2 MB of memory.
- DataBuffer 2M-P/S (PI404A(E))— parallel to serial version with 2 MB of memory.

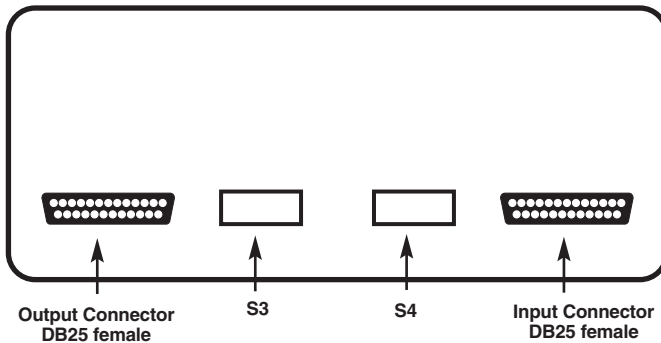
### 3. Configuration

Only the serial ports of the DataBuffer need to be configured. If your DataBuffer is a parallel-only (PI385, PI386, PI387, PI388, or PI389) model, go to **Chapter 4**.

Your unit's serial ports must be individually configured for data rate, number of data bits, parity, and flow control. Use the DIP switch(es) on its rear panel to do this. These are labeled S3 and S4; set S3 to configure the output port, and S4 to configure the input port. (Parallel ports do not have associated DIP switches.) For the individual switch positions, up is open (OFF) and down is closed (ON).

**Table 3-1** on the next page shows the possible settings of these switches.

If you change the DIP switch settings later, while the DataBuffer is on, press the Reset button to put the changes into effect (see **Section 5.1.1**).



**Figure 3-1.** Rear Panel of the DataBuffer.

**Table 3-1. Settings of Switches S3 and S4.**

Switch Position	1	2	3	4	5	6	7	8
Data rate (bps)								
38,400	OFF	OFF	OFF					
19,200	ON	OFF	OFF					
9600	OFF	ON	OFF					
4800	ON	ON	OFF					
2400	OFF	OFF	ON					
1200	ON	OFF	ON					
600	OFF	ON	ON					
300	ON	ON	ON					
Data bits								
8				OFF				
7				ON				
Parity								
Even					OFF			
Odd					ON			
Parity								
None						OFF		
Enable*						ON		
Flow Control								
Hardware							OFF	
Software							ON	
Port Type								
Serial								OFF
[N/A†]								[ON]
<p>*In the “Enable” (ON) setting, parity is even or odd depending on the setting of position 4.          †Position 8 must be set OFF for the Switch to function properly.</p>								

## 4. Installation

To install your DataBuffer, first place it in a dry, well-ventilated, temperature-controlled location close to an electrical outlet. You must place it within 50 ft. (15.2 m) of any serial devices that are sending or receiving the data you want to buffer. You must place it within 20 ft. (6.1 m) of any sending or receiving parallel devices.

After placing your DataBuffer, cable your devices to it:

- For serial PC/XT™ input to the DataBuffer, run PC/XT to HP® LaserJet® cable (our product code EVMBXL).
- For serial AT® input to the DataBuffer, run AT serial-printer cable (our product code EVMBPC).
- For modem input to the DataBuffer, parallel PC/XT or AT input to the DataBuffer, or DataBuffer output to a serial printer or plotter, run RS-232 cable (our product code ECM25C-MM).
- For DataBuffer output to a modem, run RS-232 tail-circuit cable (our product code EYN255C).
- For DataBuffer output to a PC/XT, run IBM PC serial-modem cable (our product code EVMBSM).
- For DataBuffer output to an AT, run IBM AT serial-modem cable (our product code EVMBMC).
- For DataBuffer output to a parallel printer, run IBM PC parallel-printer cable (our product code EYN600).

When you finish cabling, plug the power supply's output cord into the appropriate connector on the rear panel of the unit, then plug the power supply into an outlet. The DataBuffer will power up automatically, because it has no ON/OFF switch.

This concludes your DataBuffer installation. Your DataBuffer should be ready for continuous operation.

# 5. Operation

## 5.1 Controls and Indicators

The DataBuffer has two main controls and one main indicator on its front panel that you can use to control and monitor the DataBuffer's operation.

### 5.1.1 THE RESET BUTTON

When you press the Reset button, the DataBuffer resets itself. This means that it clears all data in its buffer and clears the copy feature (see **Section 5.1.2**). If it is a serial model, it also “reads” the settings of the DIP switches on the rear panel. (Any time you change the settings of these DIP switches, you must press the Reset button to activate those changes.)

### 5.1.2 THE COPY/PAUSE BUTTON

You can use this button to have the DataBuffer print multiple copies of a job. First press the Reset button to clear all previous settings. Then, before you send the data, press the Copy/Pause button once for each copy you want printed, up to a maximum of 99 copies. The Status LED (see **Section 5.1.3**) blinks each time you add a copy.

There is no limit to how long the interval can be between when you press Copy/Pause and when you send the job you want multiple copies of, so long as Reset is not pressed during the interval. However, once you begin sending data, if the DataBuffer doesn't receive anything on its input port for seven seconds, it considers the current job ended, sends the number of copies of that job that you selected, and resets the number of copies to 1.

You can also press the Copy/Pause button once *after* the data has been sent to have the DataBuffer send one additional copy of the most recent job in the buffer to the printer. (Do *not* press Reset before you press the Copy/Pause button for this purpose, or the data in the buffer will be lost.)

### 5.1.3 THE STATUS LED

The Status LED indicator is normally steadily lit while the DataBuffer is ON. It blinks when you use the Copy/Pause button to have extra copies of a job printed (see **Section 5.1.2**).



## 5.2 The Self-Test

The DataBuffer also has a self-test feature. To begin the self-test, press and hold the Reset button while you press and hold the Copy/Pause button. Release Reset, then release Copy/Pause. The unit transmits the test message out of the output port only. The DataBuffer continues to transmit the test message until you press the Reset button again.

## 5.3 Flow Control (Models with Serial Ports Only)

The DataBuffer's serial ports usually accept data much faster than the output devices (printers, plotters, modems, etc.) attached to them can. For this reason, these DataBuffers use one of two types of "flow control" (also called "handshaking"—the types are described below) to keep from overflowing the attached devices with more data than they can take. We highly recommend that the input and output devices you attach to your DataBuffer support one of these types of flow control. Set DIP switches S3 and S4 for the type of flow control used by your output and input devices (see **Chapter 3**), then press the Reset button (see **Section 5.1.1**).

### 5.3.1 HARDWARE (DTR) FLOW CONTROL

When the DataBuffer's buffer is nearly full of input data, the DataBuffer changes the voltage on the input port's Pin 20 (the DTR signal) from high to low. This tells the input device to stop sending data. When the output device has drawn enough data out of the buffer to leave room for more, the DataBuffer raises the voltage on Pin 20 to tell the input device to start sending again.

Similarly, the DataBuffer monitors Pin 20 of the output port while it sends data to the output device. If the DataBuffer detects that the output device has lowered the signal on Pin 20, it stops sending data until the output device raises the signal on Pin 20 again.

### 5.3.2 SOFTWARE (X-ON/X-OFF) FLOW CONTROL

When the DataBuffer's buffer is nearly full of input data, the DataBuffer sends a special X-OFF character to the input device on the input port's Pin 2. This character tells the input device to stop sending data. When the output device has drawn enough data out of the buffer to leave room for more, the Switch sends an X-ON character on Pin 2 to tell the input device to start sending again.

Similarly, the DataBuffer monitors Pin 2 of the output port while it sends data to the output device. If the DataBuffer detects that the output device has sent it an X-OFF character, it stops sending data until the output device sends it an X-ON character.

# 6. Troubleshooting

## 6.1 Calling Black Box

If you determine that your DataBuffer is malfunctioning, *do not attempt to alter or repair it*. Contact Black Box Technical Support at 724-746-5500. The problem might be solvable over the phone.

Before you call, make a record of the history of the problem. Black Box 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.

## 6.2 Shipping and Packaging

If you need to transport or ship your DataBuffer:

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

# Appendix: Port Pinouts

This appendix lists the pinouts of the types of ports found on different models of the DataBuffer. **Section A.1** shows the pinout of the serial input ports, **Section A.2** shows the pinout of the serial output ports, and **Section A.3** shows the pinout of the parallel ports.

## A.1 Serial Input Ports (DTE)

Pin	Signal	Name	Direction/Notes
1	PGND	Protective Ground	
2	TD	Transmit Data	Output from unit
3	RD	Receive Data	Input to unit
4	RTS	Ready to Send	Held high
5	CTS	Clear to Send	Input to unit
7	SGND	Signal Ground	
20	DTR	Data Terminal Ready	Output from unit

## A.2 Serial Output Ports (DCE)

Pin	Signal	Name	Direction/Notes
1	PGND	Protective Ground	
2	TD	Transmit Data	Input to unit
3	RD	Receive Data	Output from unit
5	CTS	Clear to Send	Held high
6	DSR	Data Set Ready	Held high
7	SGND	Signal Ground	
8	CD	Carrier Detect	Held high, tied to Pin 6
20	DTR	Data Terminal Ready	Input to unit

### A.3 Parallel Ports

Pin	Signal	Name	Notes
1	STB	Strobe	
2	DATA0	Data 0	
3	DATA1	Data 1	
4	DATA2	Data 2	
5	DATA3	Data 3	
6	DATA4	Data 4	
7	DATA5	Data 5	
8	DATA6	Data 6	
9	DATA7	Data 7	
10	ACK	Acknowledge	
11	BUSY	Busy	
12	PE	Paper End	Tied to ground (held low)
13	SELECT	Select	Held high
14	AUTO LF	Automatic Line Feed	No connection
15	ERROR	Error	Held high
16	INIT	Initialize Printer	Held high
17	SELIN	Select Input	No connection
18	GND0	Ground 0	No connection
19	GND1	Ground 1	
20	GND2	Ground 2	
21	GND3	Ground 3	
22	GND4	Ground 4	
23	GND5	Ground 5	
24	GND6	Ground 6	
25	GND7	Ground 7	