BLACK BOX® Catalogue Ltd

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USER GUIDE

PB864 / PB8128 / PB8256

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Introduction

Spriinter is a versatile spooling device whose function is to provide data buffering and interface conversion if needed, between, typically a computer and a printer or plotter. The operator and system time saving benefits of data buffering are well established. These benefits are available to a very wide mix of otherwise incompatible system components with the interface conversion features of Spriinter. These time savings are still relevent even where internal print spooling facilities are available, as this approach dramatically impairs the performance of a microprocessor based system, as any one who has used them will testify.

Facilities are provided within Spriinter for manipulation of the contents of the re-transmitted data stream, providing features such as automatic line-feed insertion/deletion, conversion of incoming characters to different outgoing characters and automatic pagination.

To make Spriinter as general purpose as possible, there are three input ports and three output ports, whose capabilities are as follows:

INPUT	OUTPUT
RS-232-C	RS-232-C
Centronics	Centronics
IEEE-488	IEEE-488

By setting configuration switches, any of the input ports can be 'connected' to any of the output ports, a total of sixteen combinations (counting two types of RS232 flow control). Note that only one input port and one output port can be active at any one time.

Buffer memory is fitted between the input and output ports. Characters are input from the selected input port and stored in the buffer. Whenever characters are available in this buffer, Spriinter will attempt to output them via the active output port. If the rate at which characters are received consistently exceeds the rate at which they are re-transmitted, then the buffer will gradually fill until a point is reached where no more characters can be accepted. When the buffer is nearly full, the source device is stopped using 'handshake' facilities at the input port. It is re-started as soon as a reasonable amount of space becomes avialable.

SPRIINTER is available in the following memory sizes:- 64K, 128K, 256K.

Set Up

After unpacking the unit and inspecting for signs of physical damage, please read this section on the manual. Remember that the switches S3 and S4 are only 'read' by the microprocessor when it is powered on, so if you change these switch settings you must switch the Spriinter off and on again. Switches S1 and S2 may be changed at any time.

Centronics usage.

This type of interface is commonly referred to as 'parallel'. If you are using both the centronic input and output ports you only need to set up switch S3-1,2,3,4 to all ON. No other switch settings affect you! The Centronic connectors are the middle ones on each side, input and outputs are marked on the bottom panel. Plug in computer and printer, power on computer, printer then Spriinter, in that order. Note that the Epson Mx series of printers reserve pin 14 on

their centronics connector as an auto line feed control. If you are missing a line feed after each carriage return, ground the wire to pin 14 of the Epson printer. If you are getting two line feeds, between lines, cut the wire on pin 14 in the cable to the Epson at the printer end.

Several other manufacturers have 'adapted' the Centronic standard somewhat, so in case of difficulty compare the pin out data in Appendix B, with the information provided with your device.

Note that an internal link exists to use /ACK handshake with the peripheral rather than BUSY.

It should be noted that this type of interface is not suitable for sending data over more than 10 feet of ribbon cable, or slightly further if screened multicore is used.

RS 232C usage

This type of interface is often called 'serial'. If you are going to use serial communications on either input or output of the unit you should be aware that although it is in essence a simple reliable type of data transfer, it is 'versatile' to put it most kindly, and may seem complicated to the non-technical. Even engineers have been known to tear out the odd hair! Appendix A details the RS 232 pin connections.

First set S3-1,2,3,4 to suit your required input output selection. From here on 'and/or' will be used in places; only you know whether you are using RS 232 on the input, the output, or both!

It is worth pointing out here that Spriinter will pass characters from the printer back to the computer (reverse channel). These are passed back exactly as sent. Spriinter has a 12 character reverse channel buffer designed to handle typed data from a printer having a keyboard or similar.

To use serial data transfer you must know the baud rate of the sender and/or receiving devices. Set switches S1 and/or S2 appropriately. Only one of the sliders on each of these switches should be ON, i.e. one on S1 and one on S2. Note that the switches are 'upside down' with slider 8 to the left and ON towards you.

Next set the 'format' of the data. This involves selecting the number of bits per character, the parity, and the number of stop bits required. We recommend that you set Spriinter for 8 bit data, no parity and 2 stop bits (on both input and output) unless you have good reasons to do otherwise. Spriinter will then not interfere with data passing through.
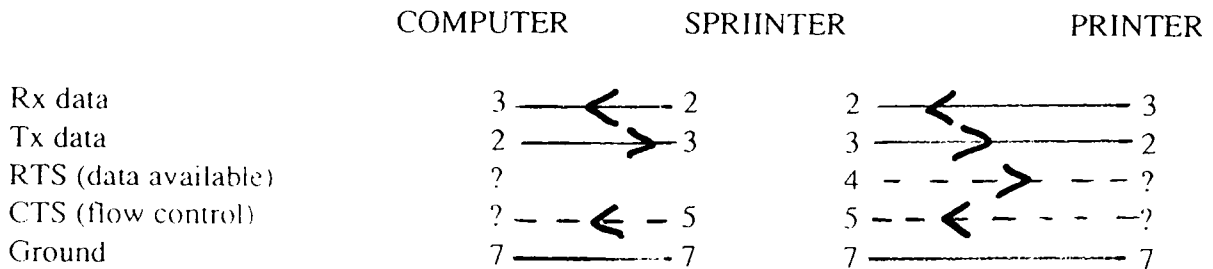
Serial data format is set on switch S4.

You must now connect the Spriinter to the computer and/or printer. Briefly Spriinter passes the data from computer to printer on pins 3, i.e. in on 3 and out 3. Returning data is on pins 2. A ground wire is needed on pin 7. Lastly data flow control ('Handshaking') is on pins 4 and 5. Handshaking signals do the following: on the computer side allow the computer to send data into Spriinter or stop it sending if Spriinter is full. Pin 5 on the input port is actually an output back to your computer and says 'OK to send' when at +12V, and 'Do not send' when at -12V. So although it is on the input port, it is a signal from Spriinter to your computer and should be connected to an INPUT at the computer end, typically CTS.

On the output side flow is controlled by the printer telling the Spriinter to stop and start.. Spriin-

ter monitors pin 5 of its output port, which is an INPUT line, the printer tells Spriinter it is 'OK to send' by setting Spriinter pin 5 'high' ie between +3v and +15v. The printer tells Spriinter to stop sending by taking pin 5 'low' ie between -3v and -15v.

Note also that Spriinter output port pin 4 says 'I have data to send' when it is high or 'I have no data for you' when it is low.

It is possible that the computer will not want to monitor its pin 5 for 'OK to send' and conversely that your printer will not be sending 'OK to send' on its pin 5. You must examine the manual for your computer and/or printer and make a 'cross over cable' to suit these. An example set up is shown.

	COMPUTER	SPRIINTER	PRINTER
Rx data	3 ——<——2	2 ——<———— 3
Tx data	2 ————>—3	3 ————>————2
RTS (data available)	?	4 – – –>– – – ?
CTS (flow control)	? – –<– 5	5 – – <– – – – –?
Ground	7 ————–· 7	7 ———————— 7

No internal link options exist for serial port wiring selections (DTE/DCE i.e. TX pin 2 or 3 choices.) We recommend tailoring specific computers or peripherals to the Spriinter with short custom made cables which plug to the end of your standard cables, and then into the Spriinter. The ends of these can then be labelled to show what they are designed to be used with and which end is which. MUTEK are pleased to supply cables of this type to your needs. We need the technical specification of your device interface to do this.

It's now up to you to read the information on your computer and/or printer and connect the wires appropriately! The most common mistakes are sending data into a pin that is also a sending pin, or ditto for receiving. Getting the flow control wires on the wrong pins results in data loss on long documents, or, if this is done on the printer side, the usual result is readable bits of sentences with lots missing.

Note that RS 232 is suitable for sending data over much longer distances than either Centronics or IEEE-488. The actual distance possible is at least 50 feet, but can be further for lower speeds and electrically 'quiet' environments. We have experienced good results with 9600 baud over 200 feet using screened 4 core cable, in a factory environment.

Spriinter cannot connect directly to a current loop interface and damage will result if this type of interface is connected. An optional RS-232 to current loop converter is available from us and should be specified.

IEEE-488 Usage.

IEEE-488 was pioneered by Hewlett Packard Corp. and is sometimes referred to as the HPIB (Hewlett Packard Interface Bus) for this reason.

Select your input/output combination on switch S3-1,2,3,4 as normal. Next select the device address on switch S3,5,6,7,8. This is the address that Spriinter will both listen on and talk on.

You should normally set it to be the same as the address of the printer you are sending to. In Commodore systems this is normally defaulted to be device address 4. This is all that is needed to configure the Spriinter.

Note that Spriinter only listens on its input and only talks on its output, there is no reverse channel.

SWITCH SETTINGS

As explained, before using Spriinter it is necessary to specify which ports are to be used and in what configurations. This is achieved by adjusting the settings of switches accesible on the bottom of the unit. Set the individual switches of switch block S3 for the required combination of input and output ports as shown in Table 2.

Settings of Switches S3-1,2,3,4

Switch S3 position;-   Function

S3-1	S3-2	S3-3	S3-4	INPUT	OUTPUT
on	on	on	on	Centronics	Centronics
on	on	on	off	Centronics	IEEE-488
on	on	off	on	IEEE-488	Centronics
on	on	off	off	IEEE-488	IEEE-488
on	off	on	on	RS232-X	Centronics
on	off	on	off	RS232-X	IEEE-488
on	off	off	on	Centronics	RS232-X
on	off	off	off	IEEE-488	RS232-X
off	on	on	on	RS232	Centronics
off	on	on	off	RS232	IEEE-488
off	on	off	on	Centronics	RS232
off	on	off	off	IEEE-488	RS232
off	off	on	on	RS232	RS232
off	off	on	off	RS232	RS232-X
off	off	off	on	RS232-X	RS232
off	off	off	off	RS232-X	RS232-X

Note:- RS232-X denotes Xon/Xoff handshake.

RS-232-X denotes the software handshake specified when the unit was ordered. If no specific option was specified the RS-232-X denotes X-On/X-Off handshake. Options available include ETX/ACK, ACK/NAK and others.

IEEE-488 port switch settings.

The device number must be specified; this is the IEEE-488 address the Spriinter will respond to and will pass on as a 'listen to' address for the printer. The device number is selected by setting individual switches in DIP switch S3 on the Spriinter printed circuit board according to Table 3.

S3-5	S3-6	S3-7	S3-8	NUMBER
on	on	on	on	0
on	on	on	off	1
on	on	off	on	2
on	on	off	off	3
on	off	on	on	4
on	off	on	off	5
on	off	off	on	6
on	off	off	off	7
off	on	on	on	8
off	on	on	off	9
off	on	off	on	10
off	on	off	off	11
off	off	on	on	12
off	off	on	off	13
off	off	off	on	14
off	off	off	off	15

IEEE-488 device address switch settings

RS-232-C port switch settings.

Standard baud rates in the range from 150 baud to 19K2 baud are available. The table below show the settings of the individual switches in switch blocks S1 and S2 to achieve the desired baud rates.

ONLY ONE switch should be set to ON on each of the 8 position Switches S1 and S2. (Note that ON is in the reverse direction on S1 and S2, than on S3 and S4. The screen printing should be followed.)

S1 selects the OUTPUT baud rate and S2 selects the INPUT baud rate

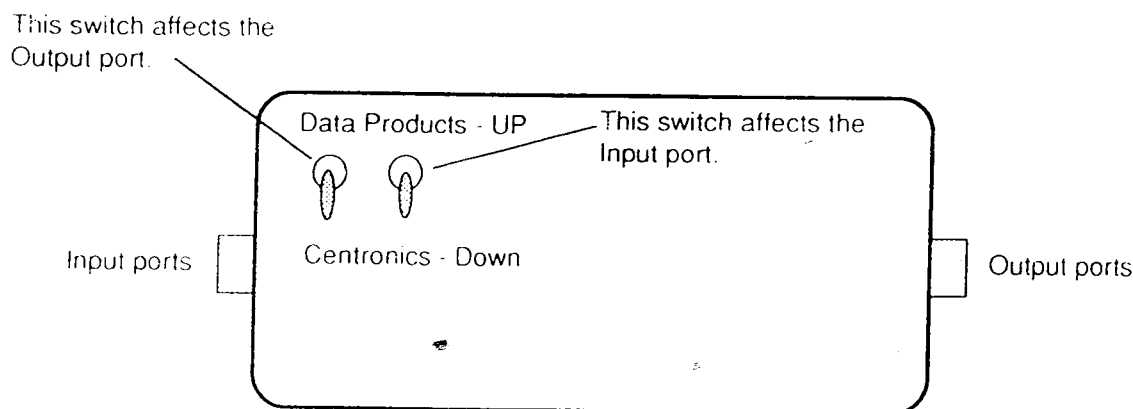| S1/2 position ON	Baud rate selected
1	19,200
2	9,600
3	4,800
4	2,400
5	1,200
6	600
7	300
8	150

The transmission format (number of data bits, number of stop bits, parity bit sense) must be defined. Tables below show the settings of individual switches in switch block S4 with the corresponding character format -

S4 POSITION	FUNCTION	SETTING MEANS
1	Input parity on/off	ON=none, OFF=enabled
2	Input parity odd/even	ON=odd, OFF=even
3	Input no. of stop bits	ON=1, OFF=2
4	Output parity on/off	ON=none, OFF=enabled
5	Output parity odd/even	ON=odd, OFF=even
6	Output no. of stop bits	ON=1, OFF=2
7	Output 7/8 data bits	ON=7, OFF=8
8	Input 7/8 data bits	ON=7, OFF=8

DATAPRODUCTS OPTION, SWITCH SETTINGS

The unit is fitted with parallel input and output ports. The toggle switches on the rear of the unit allow these ports to be set for either the Centronic interface standard (normal), or the DataProducts interface. The latter is not presented on the Amphenol style 36 pin connector fitted to the unit, so adaptor cables must be used. A range is available - see appendix E for details. Toggle switches - when up (position 1) the unit is set for Dataproducts parallel, when down (position 2) it is set for Standard Centronics parallel.

This switch affects the Output port.

Data Products - UP   This switch affects the Input port.

Input ports

Centronics - Down

Output ports

Rear view of unit showing DataProduct / Centronic select switches.

Power on.

Shortly after switching on mains power to Sprinter, the front panel status LED should begin to flash. After a certain number of flashes, which depends on the amount of memory fitted, the LED will stay on continuously. The table below defines the number of flashes versus the amount of memory tested and found to be good. If the LED continues to flash there is a fault condition within Sprinter. Do not attempt to use the unit, return it to the supplier for service.

No. of flashes	Memory size	Time before done
1	64K	2.5 secs
3	128K	5 secs
5	192K	7.5 secs
7	256K	10 secs

Additional features.

Additional features available from Mutek are -

> ESC ESC code recognition
> Automatic character code conversion
> Reset (clear) buffer contents
> Reprint buffer contents
> Paper feed (line feed) for registration
> Form feed (when paging)
> Reconfigure Spriinter input/output configuration

Please call with your special application.

FAULT FINDING

This section assumes you have read section 1 at least, and have set up the unit ready for use.

The section is in two parts; getting data from your computer into Spriinter, and then getting it from Spriinter to the printer.

First connect Spriinter to the mains but leave the printer and computer-disconnected from Spriinter. Power on and ensure that the status Lamp and power lamp come on, flash to show the correct amount of memory and then stay steady. Check your power supply if no power light appears.

To verify that data may be sent to Spriinter, connect Spriinter to your computer, on the selected input port, but leave the printer disconnected. Turn on the computer and then Spriinter, and ensure the staus LED comes on and stays steady. Now send something from your computer to Spriinter (ie print something). The Spriinter now has data (hopefully) in its memory that it cannot output so it flashes the status lamp slowly. This is the verification that data has been received, no flashing lights, no data.

The next step, having achieved the step above, and having a flashing LED, is to verify that the Spriinter can talk to your printer. Connect the printer to the Spriinter, taking great care that the serial cable is correct if you are using an RS-232 printer, and ensure that the data you sent is printed.

LED INDICATORS

The two LED's are used as follows;-

ON LED - Indicates that power is applied to the unit.

OK LED - Shows buffer status. Power on flashes show the amount of memory fitted as described elsewhere. Flashing slowly at other times shows that Spriinter has received data that it cannot output.

APPENDICES

APPENDIX A RS-232 -C Pin Connections

The following table lists the connections to pins on the input and output 25 way D-type connectors for the RS-232-C interface.

	Input connector	Pin no.	Output connector	
	Ground	1	Ground	
CONFIGURED AS	Tx Data (o/p)	2	(i/p) Rx Data	CONFIGURED AS
DTE	Rx Data	3	Tx Data	DCE
	n.c.	4	Ready	
	Busy (o/p)	5	(i/p) Busy	
	+12V	6	n.c.	
	Ground	7	Ground	
	+12V	8	n.c.	
	n.c.	9	n.c.	
	n.c.	10	n.c.	
	n.c.	11	n.c.	
	n.c.	12	n.c.	
	n.c.	13	n.c.	
	n.c.	14	n.c.	
	n.c.	15	n.c.	
	n.c.	16	n.c.	
	n.c.	17	n.c.	
	n.c.	18	n.c.	
	n.c.	19	n.c.	
	n.c.	20	n.c.	
	n.c.	21	n.c.	
	n.c.	22	n.c.	
	n.c.	23	n.c.	
	n.c.	24	n.c.	
	n.c.	25	n.c.	

APPENDIX B Centronics Pin Connections

Input connectors	Pin no.		Output connector
/Strobe	1		/Strobe
Data 0	2		Data 0
Data 1	3		Data 1
Data 2	4		Data 2
Data 3	5		Data 3
Data 4	6		Data 4
Data 5	7		Data 5
Data 6	8		Data 6
Data 7	9		Data 7
/ACK (o/p)	10	(i/p)	/ACK
BUSY (o/p)	11	(i/p)	BUSY
Paper out/low (o/p)	12	(i/p)	Paper out/low
SELECT (o/p)	13	(i/p)	SELECT
n.c.	14		n.c.
n.c.	15		n.c.
Ground	16		Ground
Ground	17		Ground
n.c.	18		n.c.
Ground	19		Ground
Ground	20		Ground
Ground	21		Ground
Ground	22		Ground
Ground	23		Ground
Ground	24		Ground
Ground	25		Ground
Ground	26		Ground
Ground	27		Ground
Ground	28		Ground
Ground	29		Ground
Ground	30		Ground
/PRIME	31		/PRIME
/FAULT(o/p)	32	(i/p)	FAULT
Ground	33		Ground
n.c.	34		n.c.
n.c.	35		n.c.
n.c.	36		n.c.

Note: / before a signal name indicates that it is active low.

Note that all signals are compatible with Standard TTL levels.

APPENDIX C IEEE-488 Pin Connections

Input connector	Pin no.		Output connector
Data in 1	1		Data out 1
Data in 2	2		Data out 2
Data in 3	3		Data out 3
Data in 4	4		Data out 4
/EOI	5		/EOI
/DAV	6		/DAV
/NRFD (o/p)	7	(i/p)	/NRFD
/NDAC (o/p)	8	(i/p)	/NDAC
/IFC	9		/IFC
n.c.	10		n.c.
/ATN	11		/ATN
Ground	12		Ground
Data in 5	13		Data out 5
Data in 6	14		Data out 6
Data in 7	15		Data out 7
Data in 8	16		Data out 8
/REN	17		/REN
Ground	18		Ground
Ground	19		Ground
Ground	20		Ground
Ground	21		Ground
Ground	22		Ground
Ground	23		Ground
Ground	24		Ground

Note: / before a signal name indicates that it is active low.

Note that all signals are electrically terminated in accordance with the IEEE-488 standard, however, the output drive capability is limited to 20mA and outputs are NOT disabled to a high impedance state.

APPENDIX D Technical Specification

Physical Data: Height 90mm; Length 330mm; Width 180mm; Weight 1.5Kg

Power Supplies: Interface power requirements are either 240VAC 50Hz 0.5VA (optionally 120VAC 60Hz 0.5VA.) The unit is fully isolated from the mains supply.

Input and Output Interfaces:

Centronics standard via 36-way female connector.
IEEE-488 conforming to L4 listener extended via 24-way female connector.
RS-232-C to EIA standard via 25-way D-type female connector. Character format selectable independently of the output channel providing 5,67 or 8 data bits; odd, even or no parity bit; 1 or 2 stop bits; standard baud rates (150, 300, 600, 1200, 2400, 4800, 9600, EXT)

APPENDIX E DataProducts adaptor cables.

Dataproducts interface cable - Amp 36 plug/skt to DB37 plug/skt (DEC LP37)

Wire number	From Amp36	To DB37	Signal name
1	1	8	strobe
2	19	29	rtn
3	2	26	data 0
4	20	30	rtn
5	3	20	data 1
6	21	34	rtn
7	4	22	data 2
8	22	28	rtn
9	5	1	data 3
10	23	33	rtn
11	6	24	data 4
12	24	35	rtn
13	7	23	data 5
14	25	4	rtn
15	8	5	data 6
16	26	25	rtn
17	9	n/c	data 7
18	27	n/c	rtn
19	11	18	demand
20	29	37	rtn
21	13	12	on line
22	28	32	rtn
23		6 / 27	Printer inst (link 6-27)
24		14 / 36	i/f verify (link 14-36)

Note

Only fit 6-27 link on interface - printer cable not computer - interface

Dataproducts interface cable - Amp 36 plug/skt to DB50 plug/skt

Wire number	From Amp36	To DB50	Signal name
1	1	38	strobe
2	19	37	rtn
3	2	19	data 0
4	20	3	rtn
5	3	20	data 1
6	21	4	rtn
7	4	1	data 2
8	22	2	rtn
9	5	41	data 3
10	23	40	rtn
11	6	34	data 4
12	24	18	rtn
13	7	43	data 5
14	25	42	rtn
15	8	36	data 6
16	26	35	rtn
17	9	28	data 7
18	27	44	rtn
19	11	23	demand
20	29	7	rtn
21	13	21	on line
22	28	5	rtn
23		30 / 14	Printer inst. (link 30-14)

Notes -

1) Only fit 30 - 14 link on cable from interface to printer not computer - interface cable.
2) If the printer is only capable of printing 128 characters (of 256 possible), ground data line 7 (pin 23 at the printer end).

Dataproducts interface cable - Amp 36 plug/skt to Winchester M50 plug/skt							
Wire number	From Amp36	To M50	Signal name	Wire number	From	To	Signal name
1	1	j	strobe				
2	19	m	rtn				
3	2	B	data 0				
4	20	D	rtn				
5	3	F	data 1				
6	21	J	rtn				
7	4	L	data 2				
8	22	N	rtn				
9	5	R	data 3				
10	23	T	rtn				
11	6	V	data 4				
12	24	X	rtn				
13	7	Z	data 5				
14	25	b	rtn				
15	8	n	data 6				
16	26	k	rtn				
17	9	u	data 7				
18	27	c	rtn				
19	11	E	demand				
20	29	C	rtn				
21	13	y	on line				
22	28	AA	rtn				
23		p	Printer inst				
		s	(link p-s)				
24		x	i/f verify				
		v	(link x-v)				

Notes -
1) Only fit p-s link on cable from interface to printer not computer - interface cable.
2) If the printer is only capable of printing 128 characters (of 256 possible), ground data line 7 (pin u at the printer end).

INVERTED

APPENDIX E

Standard part numbers for adaptor cables are:-

EY322A   Centronics Male on Cable (from spriinter)
            DB50 Male on Cable (into printer)

EY324A   Centronics Male on Cable (into spriinter)
            M50 Winchester Female on Cable (from computer)

EY326A   Centronics Male on Cable (into Spriinter)
            DB50 Female on Cable (from computer)

EY328A   Centronics Male on Cable (from Sprinter)
            M50 Winchester Male on Cable (into printer)

DB37   Types are to Special order only.