Unique Micro Design

Advanced Thinking Products

Model 164 Quad Coupler
User Manual

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UMD Part Number : 6-0164-993-4

Issue 1 - First release

Revision 2/12/92

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1	2/12/92	First release

1. Introduction

1.1 Scope

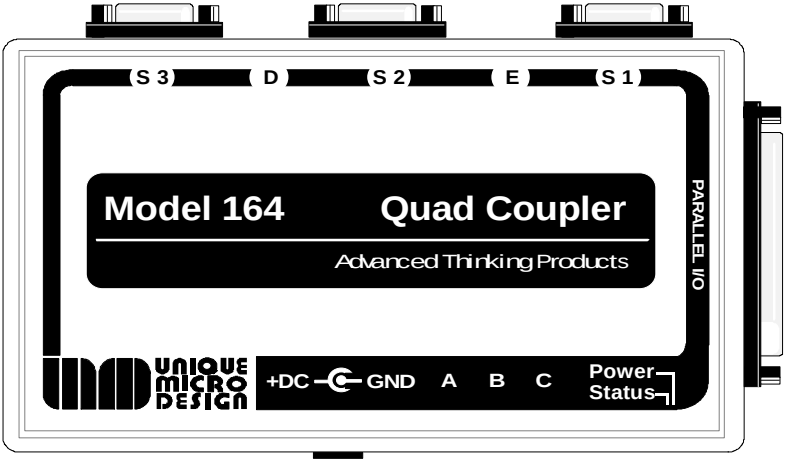
This manual provides installation and configuration details for the *Unique Micro Design Model 164 Quad Coupler.*

1.2 Overview

The *Model 164 Quad Coupler* is a general purpose microcomputer based device which provides three full duplex serial ports and a configurable parallel I/O port. Its multiple operating modes are selected by a series of switches.

This manual describes the *Model 164* operating with the standard firmware. Other firmware options can be provided to suit specific applications.

1.3 Description



The three serial ports on the *Model 164* are designated *S1*, *S2* and *S3*. A parallel port is also provided which can be configured either as an input, designated *PI*, or configured as an output, designated *PO*.

The *Model 164* can operate in a number of modes as configured via the externally accessible switches. These switches are arranged in five banks designated "A" to "E" with each bank comprising four switches, numbered 1 to 4. For example, switch 2 of bank "B" is designated "B-2".

There are two indicators - *power* and *status*. The power indicator lights when power is applied to the unit. The status indicator flashes once on successful power up and flashes in various sequences to indicate error and other conditions.

1.4 Modes of operation

The *Model 164* is a multi-functional device. It can operate as a:

* serial to parallel converter

* parallel to serial converter

* ASCII to PC TERM converter

* simple baud rate converter

* serial wedge

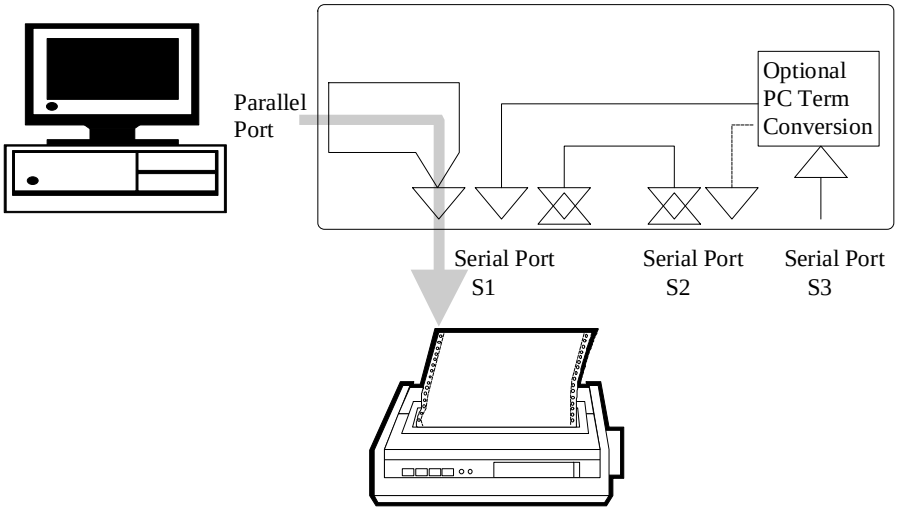
* printer sharer

* code activated switch

There are four basic operating modes with the *Model 164*, numbered from 1 to 4. These modes determine how the parallel I/O and serial ports behave. These modes are selected by switches C-1 and C-2 which are detailed in chapter 2. The following sections describe some typical configurations.

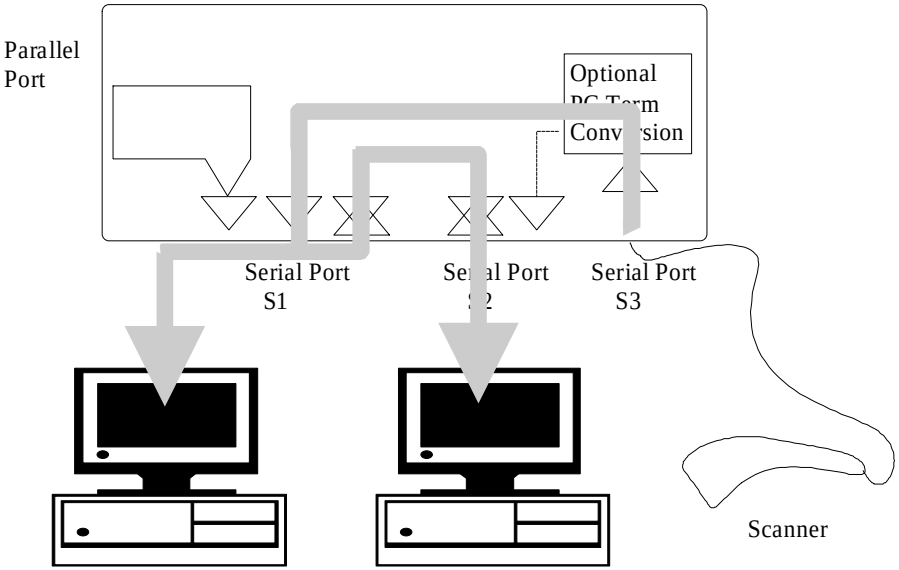
1.5 Parallel to serial converter

Mode 1 has the parallel port configured as an input (ie it connects to the printer port of a PC). Input into this port is output to S1, thereby converting parallel input to serial output.



1.6 Serial wedge

Mode 1 also offers a serial wedging function. Here, S1 and S2 can communicate bidirectionally. Serial port S3 inserts its input into this stream by either outputting to S1 (ie where communication is full duplex with the terminal) or both S1 or S2 (where communication is half duplex). In this way a bar code scanner can insert its data between a terminal and a host computer.

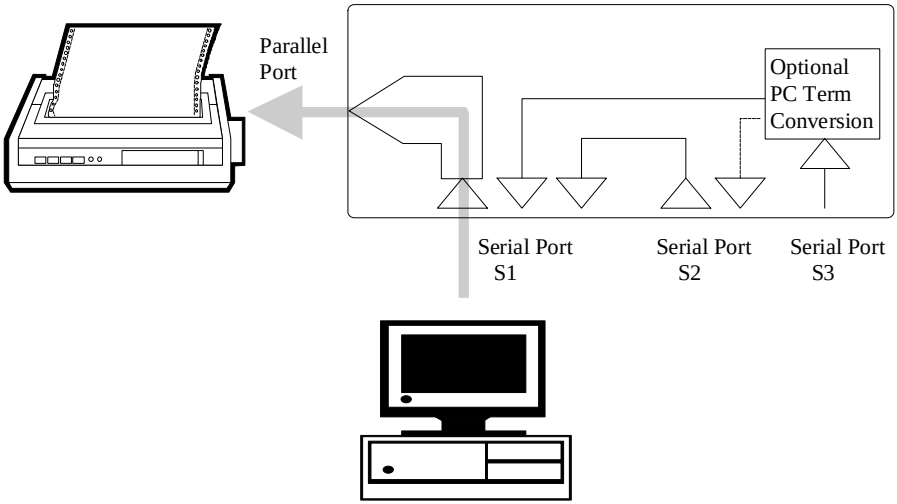


1.7 PC TERM conversion

In *mode 1*, ASCII input to S3 can optionally be converted to *PC TERM* output, allowing bar code scanners and the like to be inserted in between terminals running PC TERM and the multi-user system.

1.8 Serial to Parallel converter

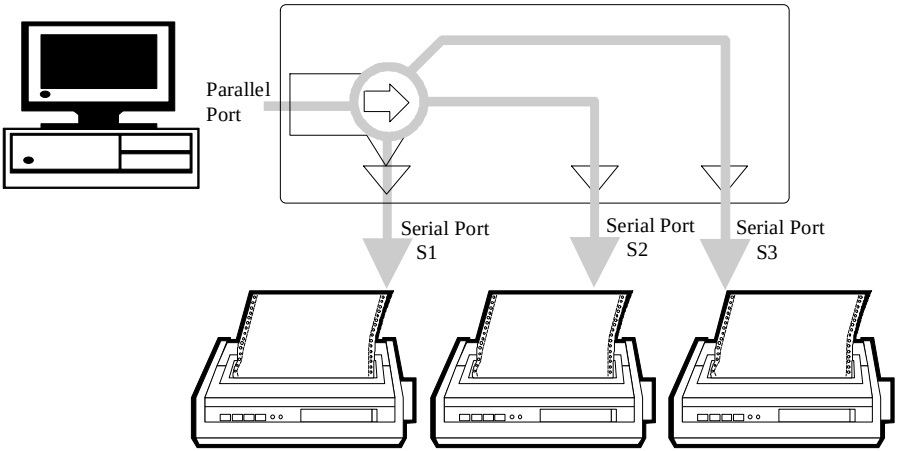
With *mode 2* the parallel port is configured as an output (ie it connects to a parallel printer). This mode provides serial input conversion to parallel output.



As *Mode 2* has input from serial port S2 directed to S1, a host computer could communicate with a parallel printer whilst receiving input from a bar code scanner.

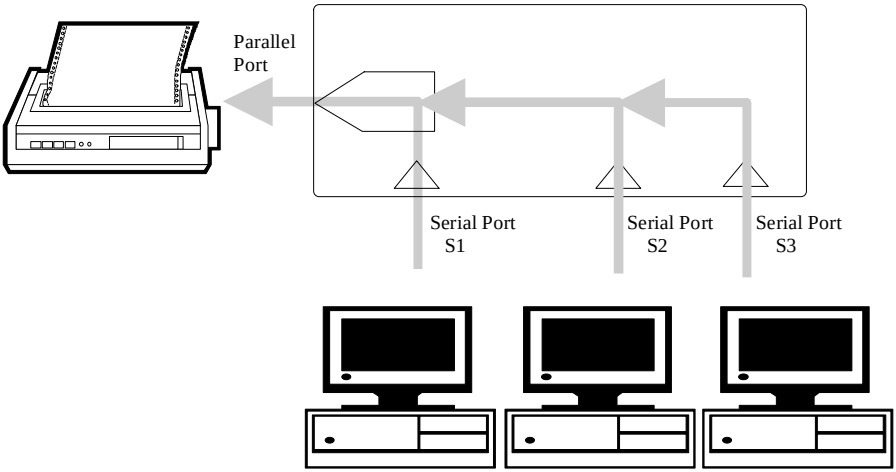
1.9 Code activated switch

Mode 3 provides *code activated switch* functionality where parallel input is interpreted for codes which direct output to a selected serial port.



1.10 Printer sharer

Mode 4 provides printer sharing functionality. Here input to S1, S2 and S3 is directed to the parallel output port. Port contention is resolved by time out, ie if say, S1 is outputting to the printer then S2 is locked out from sending information until S1 finishes its job. Job completion is determined by having no activity for a selected time out period.


Parallel
Port
Serial Port
S1
Serial Port
S2
Serial Port
S3

2. Configuration

2.1 Mode 1 - Serial Wedge/Parallel to Serial Converter

With mode 1, the parallel port is configured as an input with its data being directed to S1 providing parallel to serial conversion.

Mode 1 also provides serial wedging. Here S1 and S2 are cross-linked which provides Host to Terminal communications. S3 is wedged between S1 and S2, allowing scanner (or other) input into the data stream. Optional PC TERM conversion may be enabled on S3 input to allow ASCII devices to communicate with PC TERM Host systems.

C-1	C-2	C-3	C-4	
OFF	OFF			Mode 1
		OFF		S3 no conversion
			OFF	S3 to S1 (full duplex)
			ON	S3 to S1 & S2 (half duplex)
		ON		S3 PC Term conversion (S3 to S1)
			OFF	No intercharacter delay
			ON	Intercharacter delay of 30 mS

2.1.1 PC TERM conversion handshake

When PC TERM conversion is invoked, software handshake (when enabled) will use the PC TERM protocol. Hardware handshaking operates as normal. The Host (running PC TERM) must be connected to S1 and the terminal to S2. The software handshake only operates for data travelling from S1 to S2, ie there is no terminal/scanner to Host software flow control. For this reason, switch C-4 enables an intercharacter delay to slow down data input from S3 if needed.

2.1.2 S3 blocking in modes 1 & 2

In modes 1 and 2, input received on serial channel S3 may be *blocked*. Here input is buffered until a *terminator character* is received, which in the standard firmware option is the carriage return control character (ie hexadecimal 0D, decimal 13).

Once the terminating character is received, the optional *preamble* character string is output followed by the buffered characters (*excluding* the terminating character) followed by the optional *postamble* character string.

The received block may be manipulated as determined by the *block modifier routine* given in the table below. A Spectra-Physics bar code symbology id stripping modifier is provided as standard, other routines can be provide upon request.

Input from Spectra Physics Scanner

FF12234567890<CR>

Output

<STX>1234567890<ETX>

Example of block modifer 2 with <STX> preamble and <ETX> postamble

Block modifier routine	Description
1	No manipulation
2	Spectra-Physics bar code symbology id characters removed
3	reserved

Block modifier routines

Switch Setting		Blocking type
A-3	A-4	
OFF	OFF	none
ON	OFF	[preamble] [modified BLOCK using routine 1] [postamble]
OFF	ON	[preamble] [modified BLOCK using routine 2] [postamble]
ON	ON	[preamble] [modified BLOCK using routine 3] [postamble]

A-1	A-2	Description
OFF	OFF	Reserved
ON	OFF	Reserved
OFF	ON	Reserved

ON	ON	Reserved

Switch bank A in Modes 1 & 2
Blocking selection

2.1.3 Pre- and post-amble strings

Switch bank B is used to select the pre- and post-amble character strings which are sent with blocked data in modes 1 and 2.

Switch Setting		Preamble (valid when blocking enabled)
B-1	B-2	
OFF	OFF	none
ON	OFF	<STX>
OFF	ON	reserved
ON	ON	reserved

B-3	B-4	Postamble (valid when blocking enabled)
OFF	OFF	none
ON	OFF	<ETX>
OFF	ON	<CR>
ON	ON	<CR><LF>

where	Code	Hexadecimal	Decimal
	<STX>	02	2
	<ETX>	03	3
	<LF>	0A	10
	<CR>	0D	13

Switch definitions
Pre/post-amble string selection

2.2 Mode 2 - Serial to Parallel Converter

With mode 2, the parallel port is configured as an output and accepts input from S1. The operation of S3 is the same as mode 1.

C-1	C-2	C-3	C-4	
ON	OFF			Mode 2
		OFF		S3 no conversion
			OFF	S3 to S1
			ON	S3 to S1 & S2
		ON		S3 PC Term conversion (S3 to S1)
			OFF	No intercharacter delay
			ON	Intercharacter delay of 30 mS

2.3 Mode 3 - Code Activated Switch

With mode 3, the parallel port is configured as an input.

In this mode, the *Quad Coupler* is operating as a *code activated switch*. Input is accepted from the parallel port and is directed to either serial port S1, S2 or S3 as selected by a designated two character sequence.

The first character in the sequence is the *selection code* which is determined by the binary pattern given in switch banks A and B. The second character determines which port to select: ASCII "1" (ie hexadecimal 31, decimal 49) selects S1, ASCII "2" selects S2 and ASCII "3" selects S3.

If it is desired to send the selection code character through to the selected output port, two of these selection code characters need to be sent in sequence.

With switch C-3 on, the selection code is only interpreted after a selected idle time. In this way, graphic data which may contain a valid selection code will not be interpreted.

C-1	C-2	C-3	C-4	
OFF	ON			Mode 3
		OFF		Selection code always interpreted
		ON		Selection code only interpreted after idle timeout

			OFF	30 second idle timeout
			ON	10 second idle timeout

OFF = 1 bit, ON = 0 bit							
A-1	A-2	A-3	A-4	B-1	B-2	B-3	B-4
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

Switch bank A and B in Mode 3
Selection code character

2.4 Mode 4 - Printer Sharer

With mode 4, the parallel port is configured as an output.

In this mode the *Quad Coupler* is operating as a *printer sharer.* Here the parallel output port is shared between the three serial input ports. Contention is resolved on a first come, first served basis with the first active serial port being assigned to the printer port. After no activity on the active input port for the selected idle timeout period, the parallel port is released for allocation to the next active serial port.

Switch C-3 selects whether a form feed control character is sent after a print job.

C-1	C-2	C-3	C-4	
ON	ON			Mode 4
		OFF		No form feed sent after idle timeout

		ON		Form feed sent after idle timeout
			OFF	30 second idle timeout
			ON	10 second idle timeout

2.5 Communications parameters

For serial channel S3, the serial communications parameters are fixed at 9600 baud, 8 data bits with no parity and one stop bit with hardware handshaking. For serial channels S1 & S2, switch bank D and E determine their parameters.

Switch setting			Baud rate
D-1	D-2	D-3	
ON	ON	ON	38.4K
OFF	OFF	OFF	19.2K
OFF	OFF	ON	9600
OFF	ON	OFF	4800
OFF	ON	ON	2400
ON	OFF	OFF	1200
ON	ON	OFF	600
ON	OFF	ON	300

Switch definitions
Serial ports S1 & S2 baud rate

Switch setting	Description
D-4	Data bits
OFF	8
ON	7

E-1	Parity
OFF	Enabled
ON	Disabled

E-2	Parity type
OFF	Even
ON	Odd

E-3	S1 handshake
OFF	Hardware DTR/CTS
ON	Software XON/XOFF

E-4	S2 handshake
OFF	Hardware DTR/CTS
ON	Software XON/XOFF

Switch definitions
S1 & S2 communications parameters

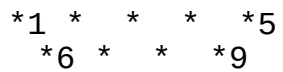
4. Interfaces

4.1 Serial interfaces

The serial interfaces use +/- 10 Volt levels. The pin consigment on the DB9 plug (male) is a subset of the PC/AT serial interface.

Pin	I/O	Description
1	-	no connection
2	i/p	RxD
3	o/p	TxD
4	o/p	DTR (input data stream handshake)
5	-	Ground
6	-	no connection
7	o/p	RTS (ie always asserted) tied to +5V (can power external devices)
8	i/p	CTS (output data stream handshake)
9	-	no connection
case	-	Ground

Serial interface
DB9 plug connector

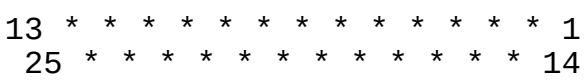


Front view of DB9 plug

4.2 Parallel Interface

Pin	Description	As output	As input
1	Strobe(-)	O	I
2	Data 0	O	I
3	Data 1	O	I
4	Data 2	O	I
5	Data 3	O	I
6	Data 4	O	I
7	Data 5	O	I
8	Data 6	O	I
9	Data 7	O	I
10	Acknowledge(-)	I	O
11	Busy	I	O
12	Paper end	I=GND	O=GND
13	Select	I n/c	O n/c
14	Autofeed(-)	O n/c	I n/c
15	Error(-)	I n/c	O n/c
16	Initialise(-)	O n/c	I n/c
17	Select input(-)	O n/c	I n/c
18-25	Ground	-	-

Parallel I/O interface
DB25 socket connector



Front view of DB25 socket

4.3 External power interface

The *Model 164* requires 6 to 9 volts DC at 300 mA to operate. The external power connector connects to standard plug packs with centre pin grounded.

4.4 Typical cables

4.4.1 To serial port of Printer

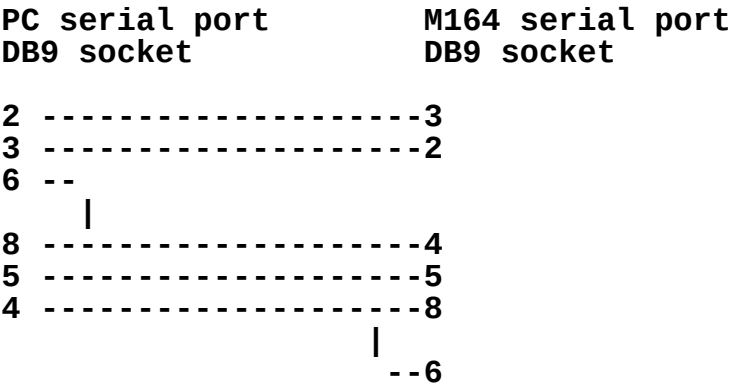
```
PC serial port          M164 serial port
DB25 plug               DB9 socket

2 --------------------2
3 --------------------3
7 --------------------5
20-------------------8
```

4.4.2 To serial port of PC

```
PC serial port          M164 serial port
DB25 socket             DB9 socket

2 --------------------2
3 --------------------3
5 --
    |
6 --------------------4
7 --------------------5
20-------------------8
```



4.4.3 To Centronics printer

A standard PC parallel printer cable should be used to connect the parallel port of the Model 164 to a Centronics printer.

4.4.4 To parallel port of PC

A straight through pin to pin DB25 plug to DB25 plug cable is used to connect the parallel port of a PC to the parallel input port of the Model 164.