5554/5558
User's Manual

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OCTAGON SYSTEMS CORPORATION®

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TRADEMARKS

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IMPORTANT!

Please read before installing your product.

Octagon's products are designed to be high in performance while consuming very little power. In order to maintain this advantage, CMOS circuitry is used.

CMOS chips have specific needs and some special requirements that the user must be aware of. Read the following to help avoid damage to your card from the use of CMOS chips.

Using CMOS Circuitry in Industrial Control

Industrial computers originally used LSTTL circuits. Because many PC components are used in laptop computers, IC manufacturers are exclusively using CMOS technology. Both TTL and CMOS have failure mechanisms, but they are different. This section describes some of the common failures which are common to all manufacturers of CMOS equipment. However, much of the information has been put in the context of the Micro PC.

Octagon has developed a reliable database of customer-induced, field failures. The average MTBF of Micro PC cards exceeds 11 years, yet there are failures. Most failures have been identified as customer-induced, but there is a small percentage that cannot be identified. As expected, virtually all the failures occur when bringing up the first system. On subsequent systems, the failure rate drops dramatically.

- Approximately 20% of the returned cards are problem-free. These cards, typically, have the wrong jumper settings or the customer has problems with the software. This causes frustration for the customer and incurs a testing charge from Octagon.

- Of the remaining 80% of the cards, 90% of these cards fail due to customer misuse and accident. Customers often cannot pinpoint the cause of the misuse.

- Therefore, 72% of the returned cards are damaged through some type of misuse. Of the remaining 8%, Octagon is unable to determine the cause of the failure and repairs these cards at no charge if they are under warranty.

The most common failures on CPU cards are over voltage of the power supply, static discharge, and damage to the serial and parallel ports. On expansion cards, the most common failures are static discharge, over voltage of inputs, over current of outputs, and misuse of the CMOS circuitry with regards to power supply sequencing. In the case of the video cards, the most common failure is to miswire the card to the flat panel display. Miswiring can damage both the card and an expensive display.

- **Multiple component failures** - The chance of a random component failure is very rare since the average MTBF of an Octagon card is greater than 11 years. In a 7 year study,

Octagon has never found a single case where multiple IC failures were not caused by misuse or accident. It is very probable that multiple component failures indicate that they were user-induced.

- **Testing "dead" cards** - For a card that is "completely nonfunctional", there is a simple test to determine accidental over voltage, reverse voltage or other "forced" current situations. Unplug the card from the bus and remove all cables. Using an ordinary digital ohmmeter on the 2,000 ohm scale, measure the resistance between power and ground. Record this number. Reverse the ohmmeter leads and measure the resistance again. If the ratio of the resistances is 2:1 or greater, fault conditions most likely have occurred. A common cause is miswiring the power supply.

- **Improper power causes catastrophic failure** - If a card has had reverse polarity or high voltage applied, replacing a failed component is not an adequate fix. Other components probably have been partially damaged or a failure mechanism has been induced. Therefore, a failure will probably occur in the future. For such cards, Octagon highly recommends that these cards be replaced.

- **Other over-voltage symptoms** - In over-voltage situations, the programmable logic devices, EPROMs and CPU chips, usually fail in this order. The failed device may be hot to the touch. It is usually the case that only one IC will be overheated at a time.

- **Power sequencing** - The major failure of I/O chips is caused by the external application of input voltage while the Micro PC power is off. If you apply 5V to the input of a TTL chip with the power off, nothing will happen. Applying a 5V input to a CMOS card will cause the current to flow through the input and out the 5V power pin. This current attempts to power up the card. Most inputs are rated at 25 mA maximum. When this is exceeded, the chip may be damaged.

- **Failure on power-up** - Even when there is not enough current to destroy an input described above, the chip may be destroyed when the power to the card is applied. This is due to the fact that the input current biases the IC so that it acts as a forward biased diode on power-up. This type of failure is typical on serial interface chips.

- **Serial and parallel** - Customers sometimes connect the serial and printer devices to the Micro PC while the power is off. This can cause the failure mentioned in the above section, *Failure upon power-up*. Even if they are connected with the Micro PC on, there can be another failure mechanism. Some serial and printer devices do not share the same power (AC) grounding. The leakage can cause the serial or parallel signals to be 20-40V above the Micro PC ground, thus, damaging the ports as they are plugged in. This would not be a problem if the ground pin is connected first, but there is no guarantee of this. Damage to the printer port chip will cause the serial ports to fail as they share the same chip.

- **Hot insertion** - Plugging cards into the card cage with the power on will usually not cause a problem. (**Octagon urges that you do not do this!**) However, the card may be damaged if the right sequence of pins contacts as the card is pushed into the socket. This usually damages bus driver chips and they may become hot when the power is applied. This is one of the most common failures of expansion cards.

- **Using desktop PC power supplies** - Occasionally, a customer will use a regular desktop PC power supply when bringing up a system. Most of these are rated at 5V at 20A or more. Switching supplies usually require a 20% load to operate properly. This means 4A or more. Since a typical Micro PC system takes less than 2A, the supply does not regulate properly. Customers have reported that the output can drift up to 7V and/or with 7-8V voltage spikes. Unless a scope is connected, you may not see these transients.

- **Terminated backplanes** - Some customers try to use Micro PC cards in backplanes that have resistor/capacitor termination networks. CMOS cards cannot be used with termination networks. Generally, the cards will function erratically or the bus drivers may fail due to excessive output currents.

- **Excessive signal lead lengths** - Another source of failure that was identified years ago at Octagon was excessive lead lengths on digital inputs. Long leads act as an antenna to pick up noise. They can also act as unterminated transmission lines. When 5V is switch onto a line, it creates a transient waveform. Octagon has seen submicrosecond pulses of 8V or more. The solution is to place a capacitor, for example 0.1 µF, across the switch contact. This will also eliminate radio frequency and other high frequency pickup.

TABLE OF CONTENTS

PREFACE

This manual is a guide to the proper configuration, installation, and operation of your 5554/5558 Quad/Octal Serial Card. The 5554/5558 expansion card is part of the Octagon Micro PC system. It is designed to be used with any other Micro PC Control Cards. You can use your 5554/5558 card in conjunction with other Micro PC expansion cards, tailoring your system for a wide variety of applications. The 5554/5558 card can also be used in an IBM-compatible PC. Micro PC cards are too tall to fit in an XT, but will fit in AT industrial size and other AT-size cases. All Micro PC products are modular, so creating a system is as easy as selecting and plugging in the products you need.

CONVENTIONS USED IN THIS MANUAL

1. Information which appears on your screen (output from your system or commands or data that you key in) is shown in a different type face (note: the line breaks may not match those on your screen, but the message will be similar).

   Example 1:

   ```
   Octagon 5025 ROM BIOS Vers X.XX
   Copyright (c) 1992, 1993 Octagon Systems, Corp.
   All Rights Reserved
   ```

   Example 2:

   ```
   Press the <ESC> key.
   ```

2. Italicized refers to information that is specific to your particular system or program. For example:

   Enter *filename*

   means enter the name of your file. Names of other sections or manuals are also italicized.

3. Warnings always appear in this format:

   WARNING: The warning message appears here.

4. Paired angle brackets are used to indicate a specific key on your keyboard. For example, <ESC> means the escape key; <CTRL> means the control key; <F1> means the F1 function key.

5. All addresses are given in hexadecimal.

SYMBOLS AND TERMINOLOGY

Throughout this manual, the following symbols and terminology are used:

W[-]	Denotes a jumper block and the pins to connect.
NOTE	Information under this heading presents helpful tips for using the 5700 Card.
WARNING:	Information under this heading warns you of situations which might cause catastrophic or irreversible damage.
H	The suffix “H” denotes a hexadecimal number. For example, 1000H in hexadecimal equals 4096 in decimal.
TTL Compatible	Transistor-transistor-logic compatible; 0-5V logic levels.

TECHNICAL SUPPORT

If you have a question about the 5554/5558 expansion card and cannot find the answer in this manual, call Technical Support. They will be ready to give you the assistance you need.

When you call, please have the following at hand:

Your *5554/5558 Quad/Octal Serial Card User's Manual*

A description of your problem

The direct line to Technical Support is 303-426-4521.

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The 5554/5558 Quad/Octal Serial Card is designed for applications which require intensive serial communications such as protocol translation, multiple bar code readers and radio modems. 16–byte transmit–and–receiver FIFOs minimize overhead by the Control Card. The card is 4.5 in. x 4.9 in. and operates over a wide temperature range from –40° to 85° C and requires only 5V for operation.

MAJOR FEATURES

4/8 Serial Ports

The 5554/5558 comes with either four or eight RS–232 serial ports. Two of the ports are jumper selectable to RS–422/485 operation.

RS–485 Operation

Both RS–485 ports use a 5–position terminal block. The blocks are routed to serial ports three and four. Each of the two RS–485 ports can be terminated or unterminated via jumper block W5.

Industry Standard 16C450 UART Compatible

Each of the serial channels can operate either in a polled or interrupt mode. The interrupt mode is enabled via an internal register of the 16C554 controller and associated jumpers. Each of the interrupts is funneled into a single interrupt that can be jumpered to one of the hardware interrupts, IRQ3 to IRQ7. The interrupt request status of all channels can be read from a single “read only” location to resolve which of the channels on the board require service.

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Chapter 2 INSTALLATION

The 5554/5558 Quad/Octal Serial Card uses one slot of the Micro PC card cage. It may be used with any Micro PC Control Card or Microcontroller.

WARNING: The 5554/5558 contains static sensitive CMOS components. The greatest danger occurs when the card is plugged into a card cage. The card becomes charged by the user and the static discharges to the backplane from the pin closest to the card connector. If that pin happens to be an input pin, even TTL inputs may be damaged. To avoid damaging your card and its components:

1. Ground yourself before handling the 5554/5558 Quad/Octal Serial Card.

2. Disconnect power before removing or inserting the 5554/5558 card.

EQUIPMENT

You will need the following equipment (or equivalent) to use your 5554/5558.

- Micro PC Control Card or Microcontroller
- 5554/5558 Quad/Octal Serial Card
- 5554/5558 Utility Disk
- Micro PC Card Cage
- Power Module
- PC SmartLINK or other communications software

INSTALLATION

Before installing the 5554/5558 Quad/Octal Serial Card, refer to Figure 2–1 for the location of various connectors and jumpers and to Figure 2–2 for functional block information:

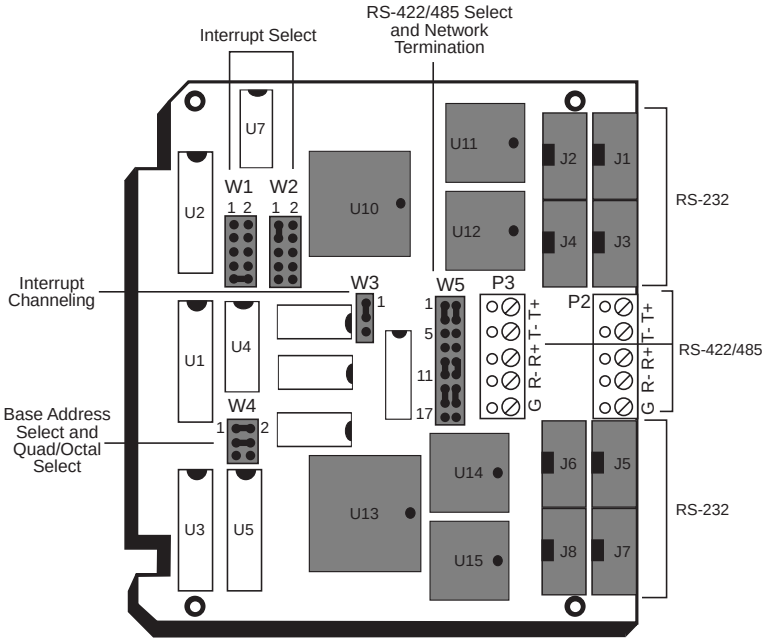

Figure 2–1—5554/5558 Component Diagram

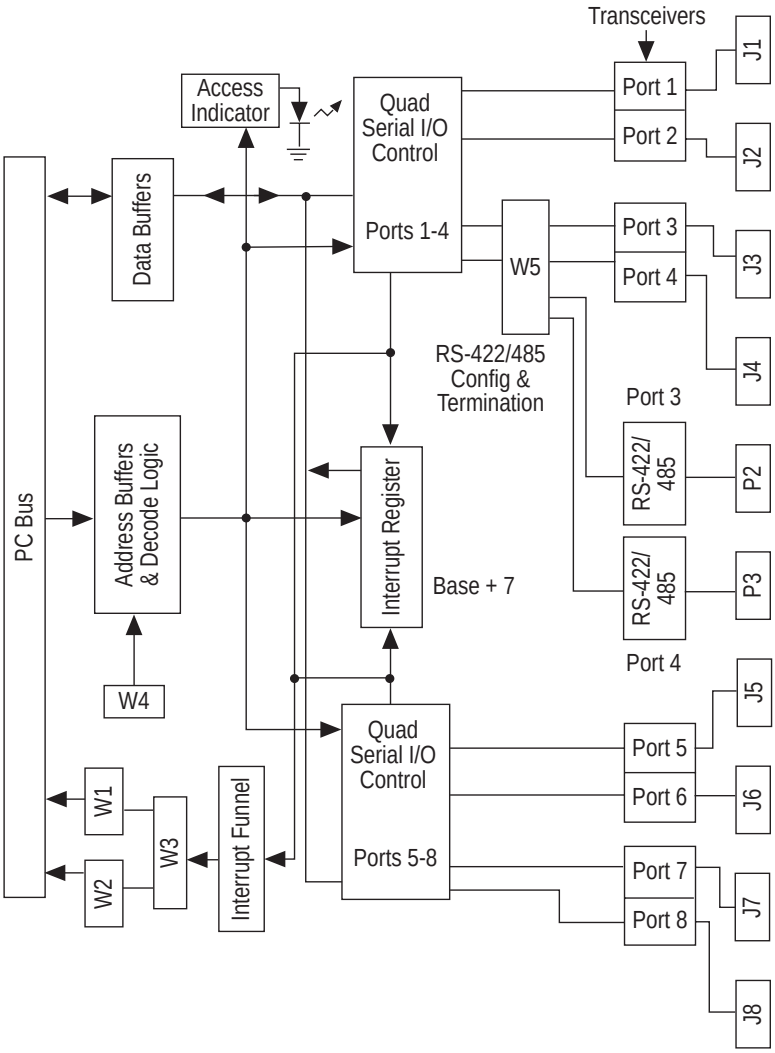

Figure 2–2—5554/5558 Functional Block Diagram

Base Address

The 5554/5558 is configured at the factory to operate in most systems without any jumper changes. Jumper block W4 defines the base address of serial port 1. As shipped, the base address of serial port 1 is 100H, which is jumper configuration W4[1–2][3–4]. If there is another card in your system with a base address of 100H, you must use a different base address for the 5554/5558 or the other expansion card.

W4: Base Address Select		
Pins Jumpered		**Base Address**
5554 Quad	**5558 Octal**	
[1-2] [3-4][5-6]	[1-2][3-4]	100H*
[1-2][5-6]	[1-2]	140H
[3-4][5-6]	[3-4]	180H
[5-6}	Not jumpered	1C0H

* = default

NOTE: Jumpers [5-6] should not be connected on the 5558 Octal Card

Interrupt Selection

There are five interrupts available on the 5554/5558. The following table lists the available interrupts and appropriate jumper settings:

W1 & W2: Interrupt Select			
Pins Jumpered		IRQ	Reserved for DOS
W1	W2		
[1-2]	[1-2]	IRQ 3	COM2 & COM4
[3-4]	[3-4]	IRQ 4	COM1 & COM3
[5-6]	[5-6]	IRQ 5	Hard disk
[7-8]	[7-8]	IRQ 6	Floppy disk
[9-10]*	[9-10]	IRQ 7	LPT **
[1-3]	[1-3]*	No interrupts	NA

* = default ** = Not used by Datalight ROM-DOS

NOTE: W2 applies to the 5558, ports 5-8.

With the four port 5554, only one interrupt is available. The interrupt signal from each port is combined into one interrupt source. That interrupt source can be jumpered to one of five hardware interrupts at W1. The interrupt channeling at W3 must be set for Quad operation with one interrupt:

W3: Interrupt Channeling	
Pins Jumpered	Interrupts
[2-3]*	Quad - 1 interrupt
[1-2]**	Octal - 1 interrupt
[2-3]	Octal - 2 interrupts

* = default for 5554

** = default for 5558

With the 5558 configured for eight port operation, the interrupt signal from each port can be:

- combined into one interrupt source or
- combined into two interrupt sources: one interrupt for ports 1–4 and one interrupt for ports 5–8.

Depending on the options selected, the interrupt channeling at W3 must be set for either one or two interrupt operation and the hardware interrupt configured at W1 and W2.

NOTE: The IRQ selected by W1 must be different than the IRQ selected by W2. Also, on a 5558 configured for just one interrupt source, W3[1–2] should be jumpered. W2 should also be configured as "No interrupts", pins [1–3].

The following table shows the relationship between the various ports and connectors:

5554/5558 Ports and Connectors	
Port	**Connector**
Port 1	J1
Port 2	J2
Port 3	J3 and P2
Port 4	J4 and P3
Port 5	J5
Port 6	J6
Port 7	J7
Port 8	J8

Installing the 5554/5558

WARNING: Take care to correctly position the 5554/5558 in the card cage. The V_{CC} and ground signals must match those on the backplane. Figure 2–3 shows the relative position of the 5554/5558 as it is installed in the card cage.

1. Verify the base address settings are correct for your application.

2. Turn the card cage power off.

3. Position the cage so that the backplane is away from you, the power module is to the right, and the open side of the cage is closest to you. The lettering on the backplane should be right side up (for example, you should be able to read “A31” on the backplane), with the words “OCTAGON SYSTEMS CORP.” running vertically along the left side of the backplane. This position is “feet down” for a table mount cage and “feet back” for a rear mount.

4. Slide the 5554/5558 into the card cage. The components on the card should face to the left. The lettering on the card (“Octagon Systems Corp.”) should be on the top edge of the card and the gold contact fingers toward the backplane.

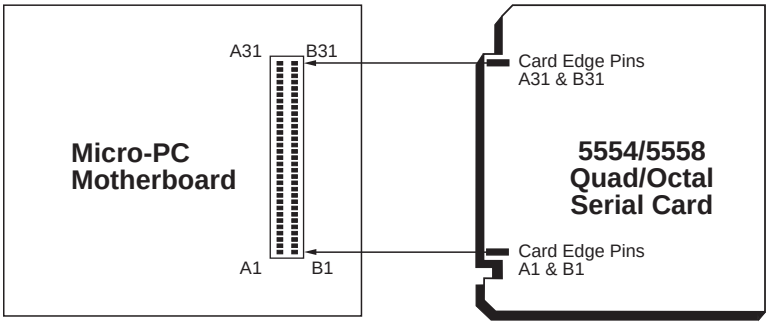

Figure 2–3—Card Edge Orientation

5. Power on the system.

6. The 5554/5558 Utility Disk contains example QuickBASIC and C programs for accessing the serial ports. To verify, test the 5554/5558, download the program 5558TST.EXE to your Control Card, and execute the program. Refer to your Control Card user's manual for more information on downloading files. Refer to the READ.ME on the utility disk for more information on the example programs.

7. The amber LED will light briefly whenever the 5554/5558 card is accessed (input or output).

RS–422/485 COMPATIBILITY

With the 5554/5558 you can change port 3 and/or port 4 from RS–232 operation to RS–422/485. The RS–422/485 compatible ports are accessed through P2 and P3. You can connect up to 32 units on a multidrop RS–485 network. However, only one transmitter can be active at a time. Although no wire type or maximum wire length is specified in the EIA 485 specification, the EIA 422 specification (which is very similar) lists a maximum length of 4000 ft. Jumper block W5 configures the card for the RS–422/485 option and also installs or removes the termination network. A termination network must be installed at the last receiver of the network. Failure to do so may cause spurious oscillation on the receive line and corrupt incoming data.

W5: RS-422/485 Select and Network Termination		
Port	**Pins Jumpered**	**Description**
P2	[10-12]*	RS-422/485 inactive
P2 Active & Terminated	[8-10] [13-15]* [14-16]*	Receive data at port 3 Plus termination Minus termination
P2 Active & Unterminated	[8-10] [15-17] [16-18]	Receive data at port 3 Plus termination Minus termination
P3	[9-11]*	Inactive
P3 Active and Terminated	[7-9] [1-3]* [2-4]*	Receive data at port 4 Plus termination Minus termination
P3 Active & Unterminated	[7-9] [3-5] [4-6]	Receive data at port 4 Plus termination Minus termination

* = default

NOTE: When activating the RS–422/485 option, serial I/O ports at J3 and/or J4 are not available.

OPERATING PRECAUTIONS

The transmitter and receiver are not optically isolated so you must avoid ground loops. Power grounds cannot be used as a reference ground for RS–485 signals. Establish a common ground reference before implementing your 485 network. The maximum common mode voltage output is +/–7V. Refer to the EIA 485 specification for further details on grounding and safety procedures.

Baud Rate

The 5554/5558 supports software selectable baud rates of 300, 1200, 2400, 4800, 9600, 19.2K, 38.4K, 56K and 115.2K.

Two or Four Wire Communication

The 5554/5558 ports 3 and 4 can be configured for either two wire, half duplex, or four wire, full duplex, communication. The choice of the configuration is application specific and also dependent on the protocol of the network software. Figures 3–1 and 3–2 show how to configure your system for either two or four wire communication.

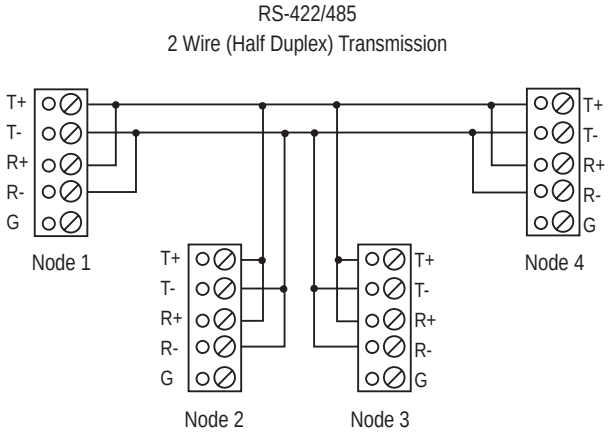

Figure 3–1—Two Wire Communication

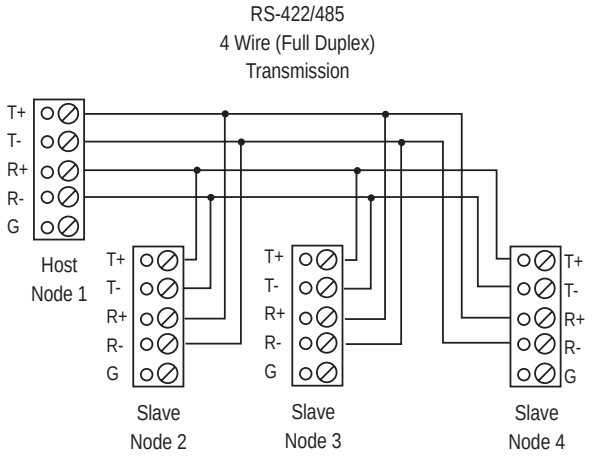

Figure 3–2—Four Wire Communication

Transmission Timing

The transmitter must be enabled prior to transmitting a message and disabled immediately after the stop bit of the last character of the message has been sent. The transmitter of the RS–422/485 is enabled/disabled using the DTR control for the associated port. The register for the DTR signal is located at address Base + 24H for P2 and Base + 34H for P3. Bit 0 of the register must be cleared to a 0 to enable the RS–422/485 transmitter.

After the last byte of the information is sent, the transmitter must be disabled. Before disabling the transmitter, make sure the following conditions exist:

- The UART transmitter holding register is empty.
- The UART shift register is empty.

To disable the transmitter, set bit 0 of the register to a 1. This algorithm works for both two and four wire, talker and listener modes of operation.

NOTE: When modifying DTR, do not modify other bits in the register.

PROGRAMMING EXAMPLE

The following QuickBASIC program shows how to initialize the port for 9600 baud, no parity, 8 data bits and 1 stop bit. It also sets ports 3 and 4 for RS–485 communication. Also refer to the 5554/5558 Utility Disk file 5554QB.BAS for PRINTS, PRINTSL code.

```
DECLARE SUB PRINTS (A$)
DECLARE SUB PRINTSL (A$)

'$INCLUDE: 'BQ.BI'

DECLARE SUB sendstring (port!,A$)
DECLARE SUB rcvchars ()
DECLARE SUB initports()

DIM rcbuf(8, 80)
DIM rcvcnt(8)
DIM rs485(8)
COMMON SHARED boardadd, statusadd, maxports
COMMON SHARED rcvbuf(), rcvcnt(), rs485()

boardadd=&H100
statusadd=boardadd+7
maxports=8

CALL initports
CALL PRINTSL("Sending COM1 outport 1")
CALL sendstring(1,"COM1")
CALL PRINTSL("Waiting to receive from any port")
CALL PRINTSL("Press any key to end test.")
DO
   CALL rcvchars 'go get some characters
   FOR port=1 TO maxports
      IF (rcvcnt(port) <> 0) THEN
         CALL PRINTS(STR$(port)+"-")
         FOR I=1 to rcvcnt(port)
            CALL PRINTS(CHR$(rcvbuf(port, I)))
         NEXT I
         CALL PRINTS("")
         rcvcnt(port)=0
      END IF
   NEXT port
LOOP WHILE (INKEY$="")
CALL PRINTSL("")
END
```

```
SUB initports()
FOR port=1 TO maxports
  rs485(port)=0                'default all ports not rs485
NEXT
rs485(3)=1:  rs485(4)=1        'set ports 3–4 to rs485

N81=3                              'no parity, 8 data bits, 1
stop bit
DTR=1                              'DTR enable in line control
reg
RTS=2                              'RTS enable in line control
reg
RD=1                               'receive data interrupt
INTRPT=8'interrupt enable bit
bdmsb=0:  bdlsb=12                 '12=9600 baud

FOR port=1 TO maxports
  portadd=boardadd+((port–1)*8)
  OUT (portadd+3), &H80            'enable divisor latch (DLAB)
  OUT (portadd), bdlsb             'set divisor latch LSB
  OUT (portadd+1), bdmsb           'set divisor latch MSB
  OUT (portadd+3), N81             'set parity, data bits, stop bit
  OUT (portadd+1), RD              'receive data interrupt
  OUT (portadd+4), RTS+DTR+INTRPT     'set RTS, DTR,
intrpt
  rcvcnt (port)=0                  'initialize receive buffer count
NEXT
'enable fcv/transmit fifo. clear fifos, set rcv fifo (int) level to 1
FOR port=1 TO maxports
  portadd=boardadd+((port–1)*8)
  OUT (portadd+2), 7
NEXT
END SUB

SUB sendstring (port, a$)
  portbase=boardadd+((port–1)*8)

  IF (rs485(port)=1) THEN      'turn DTR off on 485
    OUT (portbase+4), &HA
  END IF

  FOR I=1 TO LEN (a$)
    'check if transmitter holding register is empty before
transmitting
    WHILE ((INP(portbase+5) AND &H20)=0)
    WEND
```

```
    OUT (portbase), ASC(MID$(a$,I,1))
  NEXT

  IF (rs485(port)=1) THEN 'turn DTR off
    'make sure last char went out; test shift register is empty
    WHILE ((INP(portbase+5) AND &H20)=0)
    WEND
    WHILE ((INP(portbase+5) AND &H40)=0)
    WEND
    OUT (portbase+4), &HB 'turn DTR on when done for 485
  END IF
END SUB

SUB rcvchars()

  status=INP(statusadd)
  DO
    port=1
    portadd=boardadd
    'poll to receive characters
    WHILE (status<>0)
      IF (status AND 1) THEN
        rcvcnt (port)=rcvcnt(port)+1
        rcvbuf(port,rcvcnt(port))=INP(portadd)
      END IF
      status=INT(status/2)
      portadd=portadd+8
      port=port+1
    WEND
    status=INP(statusadd)
  LOOP WHILE (status<>0)

END SUB
```

TECHNICAL SPECIFICATIONS

Environmental

–40° to 85° C operating
–50° to 90° C nonoperating
RH 5% to 95%, noncondensing

Power Specification

5554: 5V +/– 5% at 80 mA max.
5558: 5V +/– 5% at 150 mA max.

Size

4.5 in. x 4.9 in.

I/O Map

5554/5558 I/O Map

Serial Card	Port	W4 [1-2][3-4]	W4 [1-2]	W4 [3-4]	W4 None
		Base=100H	Base=140H	Base=180H	Base=1C0H
5558 Octal	Port 1	100	140	180	1C0
	Port 2	108	148	188	1C8
	Port 3	110	150	190	1D0
	Port 4	118	158	198	1D8
	Port 5	120	160	1A0	1E0
	Port 6	128	168	1A8	1E8
	Port 7	130	170	1B0	1F0
	Port 8	138	178	1B8	1F8
5554 Quad	Port 1	100	140	180	1C0
	Port 2	108	148	188	1C8
	Port 3	110	150	190	1D0
	Port 4	118	158	198	1D8

NOTE: W4[5-6] must be on for 5554 Quad only.

JUMPER SETTINGS

W1 & W2: Interrupt Select			
Pins Jumpered		IRQ	Reserved for DOS
W1	W2		
[1-2]	[1-2]	IRQ 3	COM2 & COM4
[3-4]	[3-4]	IRQ 4	COM1 & COM3
[5-6]	[5-6]	IRQ 5	Hard disk
[7-8]	[7-8]	IRQ 6	Floppy disk
[9-10]*	[9-10]	IRQ 7	LPT **
[1-3]	[1-3]*	No interrupts	NA

* = default ** = Not used by Datalight ROM-DOS

NOTE: W2 applies to the 5558, ports 5-8.

W3: Interrupt Channeling	
Pins Jumpered	Interrupts
[2-3]*	Quad - 1 interrupt
[1-2]**	Octal - 1 interrupt
[2-3]	Octal - 2 interrupts

* = default for 5554

** = default for 5558

W4: Base Address Select		
Pins Jumpered		Base Address
5554 Quad	5558 Octal	
[1-2] [3-4][5-6]	[1-2][3-4]	100H*
[1-2][5-6]	[1-2]	140H
[3-4][5-6]	[3-4]	180H
[5-6}	Not jumpered	1C0H

* = default

NOTE: Jumpers [5-6] should not be connected on the 5558 Octal Card

W5: RS-422/485 Select and Network Termination		
Port	Pins Jumpered	Description
P2	[10-12]*	RS-422/485 inactive
P2 Active & Terminated	[8-10]	Receive data at port 3
	[13-15]*	Plus termination
	[14-16]*	Minus termination
P2 Active & Unterminated	[8-10]	Receive data at port 3
	[15-17]	Plus termination
	[16-18]	Minus termination
P3	[9-11]*	Inactive
P3 Active and Terminated	[7-9]	Receive data at port 4
	[1-3]*	Plus termination
	[2-4]*	Minus termination
P3 Active & Unterminated	[7-9]	Receive data at port 4
	[3-5]	Plus termination
	[4-6]	Minus termination

* = default

CONNECTOR PINOUTS

Serial Ports: J1-J8		
Pin #	**Function**	**Direction**
1	DCD	In
2	DSR	In
3	RxD*	In
4	RTS	Out
5	TxD*	Out
6	CTS	In
7	DTR	Out
8	RI	In
9	Gnd	
10	+5V	

* = active low

RS-422/485: P2 & P3	
Pin #	**Function**
R-	Receive -
R+	Receive +
T-	Transmit -
T+	Transmit +
G	Gnd

PC BUS PINOUTS

Micro PC "A"					
Pin #	**Description**	**Signal**	**Pin #**	**Description**	**Signal**
A1	I/O CH CK*	I	A17	A14	O
A2	D7	I/O	A18	A13	O
A3	D6	I/O	A19	A12	O
A4	D5	I/O	A20	A11	O
A5	D4	I/O	A21	A10	O
A6	D3	I/O	A22	A9	O
A7	D2	I/O	A23	A8	O
A8	D1	I/O	A24	A7	O
A9	D0	I/O	A25	A6	O
A10	I/O CH RDY	I	A26	A5	O
A11	AEN	O	A27	A4	O
A12	A19	O	A28	A3	O
A13	A18	O	A29	A2	O
A14	A17	O	A30	A1	O
A15	A16	O	A31	A0	O
A16	A15	O			

* = active low

Micro PC "B"					
Pin #	**Description**	**Signal**	**Pin #**	**Description**	**Signal**
B1	GND	I	B17	DACKI*	O
B2	RESET	O	B18	DRQ1	I
B3	+5V	I	B19	DACK0*	O
B4	IRQ2	I	B20	CLOCK	O
B5	-5V	Not used	B21	IRQ7	I
B6	DRQ2	I	B22	IRQ6	I
B7	-12V	Not used	B23	IRQ5	I
B8	Reserved	Not used	B24	IRQ4	I
B9	+12V	Not used	B25	IRQ3	I
B10	Analog Gnd	Not used	B26	DACK2*	I
B11	MEMW*	O	B27	T/C	I
B12	MEMR*	O	B28	ALE	O
B13	IOW*	O	B29	Aux +5V	Not used
B14	IOR*	O	B30	OSC	O
B15	DACK3*	O	B31	Aux Gnd	I
B16	DRQ3	I			

* = active low

WARRANTY

Octagon Systems Corporation (Octagon), warrants that its standard hardware products will be free from defects in materials and workmanship under normal use and service for the current established warranty period. Octagon's obligation under this warranty shall not arise until Buyer returns the defective product, freight prepaid to Octagon's facility or another specified location. Octagon's only responsibility under this warranty is, at its option, to replace or repair, free of charge, any defective component part of such products.

LIMITATIONS ON WARRANTY

The warranty set forth above does not extend to and shall not apply to:

1. Products, including software, which have been repaired or altered by other than Octagon personnel, unless Buyer has properly altered or repaired the products in accordance with procedures previously approved in writing by Octagon.
2. Products which have been subject to power supply reversal, misuse, neglect, accident, or improper installation.
3. The design, capability, capacity, or suitability for use of the Software. Software is licensed on an "AS IS" basis without warranty.

The warranty and remedies set forth above are in lieu of all other warranties expressed or implied, oral or written, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for a particular purpose, which Octagon specifically disclaims. Octagon neither assumes nor authorizes any other liability in connection with the sale, installation or use of its products. Octagon shall have no liability for incidental or consequential damages of any kind arising out of the sale, delay in delivery, installation, or use of its products.

SERVICE POLICY

1. Octagon's goal is to ship your product within 10 working days of receipt.
2. If a product should fail during the warranty period, it will be repaired free of charge. For out of warranty repairs, the customer will be invoiced for repair charges at current standard labor and materials rates.
3. Customers that return products for repairs, within the warranty period, and the product is found to be free of defect, may be liable for the minimum current repair charge.

RETURNING A PRODUCT FOR REPAIR

Upon determining that repair services are required, the customer must:

1. Obtain an RMA (Return Material Authorization) number from the Customer Service Department, 303-430–1500.
2. If the request is for an out of warranty repair, a purchase order number or other acceptable information must be supplied by the customer.
3. Include a list of problems encountered along with your name, address, telephone, and RMA number.
4. Carefully package the product in an antistatic bag. (Failure to package in antistatic material will VOID all warranties.) Then package in a safe container for shipping.
5. Write RMA number on the outside of the box.
6. For products under warranty, the customer pays for shipping to Octagon. Octagon pays for shipping back to customer.
7. Other conditions and limitations may apply to international shipments.

NOTE: PRODUCTS RETURNED TO OCTAGON FREIGHT COLLECT OR WITHOUT AN RMA NUMBER CANNOT BE ACCEPTED AND WILL BE RETURNED FREIGHT COLLECT.

RETURNS

There will be a 15% restocking charge on returned product that is unopened and unused, if Octagon accepts such a return. Returns will not be accepted 30 days after purchase. Opened and/or used products, non-standard products, software and printed materials are not returnable without prior written agreement.

GOVERNING LAW

This agreement is made in, governed by and shall be construed in accordance with the laws of the State of Colorado.

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