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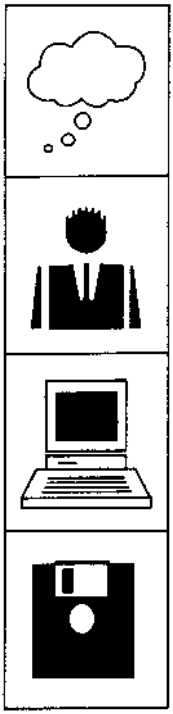


The Serial Port with Atomwide Ltd.

High Speed Serial Card Fitting Instructions and User Guide

SerialFit (PCC) *Revision 8, February 1997*

Introduction

The Serial Port High Speed Serial Card provides one, two or three additional high-speed serial ports for your Acorn RISC computer. Each of these ports is capable of transmitting and receiving data at speeds of up to 460,800 bits per second - more than fast enough to keep up with even the latest modems.

The ports have 16-byte FIFO buffers on both send and receive channels, greatly easing the interrupt load on the host machine. The complete card is powered from +5v only, using charge pumps to generate the +/- 12v required by the RS232 specification.

Support software is supplied on ROM. This provides easy access to the card's capabilities from C, BASIC or assembler.

Access to the high speed serial ports is available from any software that uses serial block drivers. This includes The Serial Port's ARCterm7 and ANT's Internet Suite, as well as ArcBBS, ArcFax, HearSay, Termite, Voyager and InterTalk.

What you should have received...

- A high speed serial card, fitted with 1, 2 or 3 serial ports
- A "loopback plug" (inserted in PORT 0 of the card)
- A disk containing a test program and the latest version of the serial block drivers
- A half-width blanking plate for use with A300, A400, A500 and A5000 computers.
- These instructions!

Hardware Installation

This expansion card can be installed by anyone with a working knowledge of screwdrivers. However, the supplier cannot accept any responsibility for damage resulting frorr incorrect installation. If you have any doubts, either your local dealer or Atomwide can install the podule for you.

You will need:

- Number 2 cross-head screwdriver

For more information about disassembling your computer and fitting a podule, consult the Welcome Guide that was supplied with your computer.

Installing the card in an A300/400/540/5000 series machine

- Turn off the computer, unplug all the cables from the back (and front!) of it, and put the system box down on a clear, flat surface.
- Remove the screws that secure the cover. On an A300/ 400/540 computer there are five: just behind the front panel (next to the vents) on each side, and along the top of the back of the case. On an A5000 there are six screws: three along each side on the base of the machine.
- Now slide the lid backwards (away from the front panel) and off the computer. If it is stuck - don't worry, just wiggle it from side to side and it should come off.
- At this point, if you are an A300 series owner you might discover that you need to buy a podule backplane -

this is a vertical PCB that sticks up from a connector on the main board about halfway along the case, parallel with the back panel. Note: if you are ever going to fit an internal hard disk, make sure you get a backplane kit that includes a fan, otherwise things will get a bit hot inside the computer!

- Next, you need to find a vacant expansion slot into which the podule can be fitted. Given a choice, it is best to pick one located as near as possible to the motherboard connector; that is, towards the bottom left as you look at the back of the computer. Remove the blanking plate that covers the position where you want to fit the podule. If no other podules are installed on that row, you will need to remove the double-width plate that covers the whole row, and attach the supplied single-width podule blanking plate to the Serial Card to fill the gap. Push the card into the chosen slot, making sure that the connector is fully inserted into the backplane, then secure it with the screws provided.

- Replace the lid of the computer by sliding it on from the back, and replace the case screws if you can find them.

Installing the card in an A7000

- It is only possible to fit a High Speed Serial Card in an A7000 if it **does not** have a CD-ROM drive fitted, and **does** have a backplane fitted.

- Remove the two marked screws from the back of the computer, and angle the back plastic panel up so that it can be removed. With this out of the way, the whole beige cover can be lifted up and off to expose the chassis.

- Remove the two screws that retain the metal podule blanking plate. Lift the plate out (beware of possible sharp edges!), then slide the Serial Card in through the gap. Locate the podule connector with the backplane and push it firmly home. Refit the two screws to hold the card securely in place.
- Re-attach the main computer casing and back panel by reversing the above procedure. These parts often require some rather careful alignment, but should not need to be forced into place.

Installing the card in a RiscPC

- Remove the lid by rotating the two rear locking pegs until they are perpendicular to the body of the case, then lifting the rear edge of the lid and sliding it backwards.

- Choose an expansion slot into which the Serial Card will be installed. It is usual to choose the lowest unoccupied slot. Undo the two screws that secure the relevant blanking plate, then remove the plate. Beware of possible sharp edges!

- Slide the Serial Card into the expansion slot and push it firmly home into the backplane connector. Now fix the card in place using the two screws.

- Replace the lid by pushing its front edge at an angle into the front of the case. Lower the rear edge, ensure that the lid is correctly seated, then turn the locking pegs back so that they are flush with the back of the computer.

Testing the card

Switch on the computer; it should boot up normally. When the desktop appears, press F12 to provide a * prompt at the bottom of the screen. Type PODULES and press RETURN. The listing that is produced should have an entry which says "Atomwide/Serial Port multiport serial. card" . If this
is not the case, turn off the computer and check that the Serial Card is properly and completely inserted into the backplane. If the problem persists, contact Atomwide.

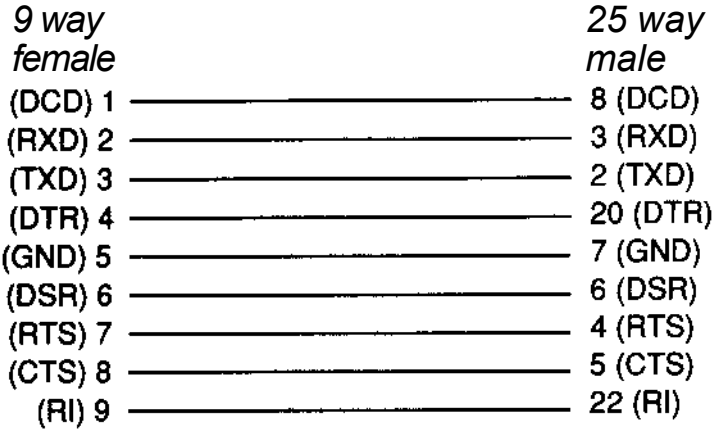
Return to the desktop by pressing RETURN. Now insert the driver disk that was supplied with the Serial Card and click on the floppy disk icon to bring up a directory display. Double-click on the !CardTest application.

Looking at the back of the computer, the ports are numbered from left to right, starting with 0. A port is fitted if it has an identifying label stuck above the connector. Insert the supplied loopback test plug into the port which you wish to test, then key in Its number and press RETURN.

An on-screen counter will run from 1 to 100 as the data in/out circuitry is tested. If the program reports "Data lost" then check that the loopback plug is correctly fitted. If the counter stops and the computer halts, you should first check all connections, and secondly run !CardTest after completing a clean boot (ie. start the machine with Shift held down). If problems persist, contact Atomwide.

Once the loopback test has completed successfully, you should remove the test plug and connect your modem to the port. If you do not have a modem, press Esc to quit the

press any key. Communication with the modem should be established, and the highest usable speed will be determined. If this falls, check that you are using a fully (and correctly) wired cable. The following diagram shows the recommended cable pinning (equivalent to PC-wiring):



Setting up the software

The key piece of software for accessing the high speed serial ports is the supplied `!SerialDev` application. If you have any copies of this on your system already, you should replace them with this new version. Note that with some software, its copy of `!SerialDev` is stored inside the application. After bringing every `!SerialDev` up to date, reboot your system to ensure that only the latest copy has been seen.

Using `!SerialDev`, many communications packages will be able to use the additional ports provided by the Serial Card immediately. Information about how to adjust other popular software follows. To find out how to use the Serial Card with other applications, consult the manual or authors of the program in question.

ANT Internet Suite

The Internet Suite automatically detects the presence of a Serial Card. Just run `!InetSuite` and open the Apps panel by clicking on the Internet icon, then double-click on Configuration to open the setup window(s).

for Release 1 (v0.54b or earlier):

Click on the button to the right of the "Port" entry in the Modem driver window. This will give a menu including `Internal` and one or more `SP_Dual` entries which correspond to ports 0 to 2 on the Serial Card. Select the one that you wish to use, increase the "Speed" setting if appropriate, then click save in the `Network configuration` window.

for Release 2:

Click on the "Modem setup" icon to open a further dialogue box. Now click on the button to the right of the " Port" entry in this box. This will give a menu including `Internal` and one or more `SP_Dual` entries which correspond to ports 0 to 2 on the Serial Card. Select the one that you wish to use, increase the "Speed" setting if appropriate, then click `Close`. Finally, click on `Save` in the main Internet Suite configuration window.

Argonet Voyager

Shift-double-click on the `!Voyager` application to open it, then open the `BlockDrvrs` directory. Delete the copy of `!SerialDev` that you find here, and copy the new version supplied on the Serial Card's disk into its place.

Now run `!Voyager` and open the `Preferences » Modem...` window from the icon bar menu. Choose `Serial Port Dual` from the `Interface` pop-up menu, then the desired port number from the `Port` menu. Click on `Save` to store the new settings.

Doggysoft Termite

A copy of `!SerialDev` will have been placed in the main Termite directory during the software's original installation. This should be deleted, and replaced with the new version that is supplied on the Serial Card's disk.

Now run `!Termite` and select `Style editor...` from the icon bar menu. The window that opens contains lines labelled "Receive" and "Transmit". For each of these, click on the menu button to the right, and follow the arrow across from `1/2/3 port serial` (either Acorn cable or PC cable, depending on your particular configuration). Enter o, `1` or `2` in the small box to select the port that you wish to use, then press RETURN. Finally, click on `Save` to store the new settings.

ARCterm7

You require version 1.44 or later of ARCterm7 to work with the Serial Card. All you need to do is pick the appropriate driver from the `Configuration » Serial port » Port driver` menu: either `1/2/3 port serial (Acorn cable)` for Acorn-wired cables or `1/2/3 port serial ( PC cable)` for PC-wired cables. Then enter the port number that you wish
to use in the `Configuration » Serial port » Port number` menu. To make this configuration permanent, use

Hearsay

You require version 2.17 or later of Hearsay to work with the Serial Card. The current method of selecting the serial driver is as follows: open the Hearsay application directory (by holding down `Shift` and double-clicking on the icon) then open the `!Hearsay. Library` directory. Shift-drag the `!Serial` file from inside `!Hearsay .Library` directory to the `! Hearsay` directory. Shift-drag the `!SerialDev` **file** from inside `!Hearsay` to the `!Hearsay.Library` directory. Next, load the `!SerialDev` **file** into `!Edit` and go to the bottom of the file. You will see a block which looks something like this:

```
if (!osclis(s))
    {swi13(device_register ,1,0,0);
    serialdevinit(1);
    setserialdev("internal",0);
    devblockmode=serialdevread(0xC4) & 0x40;
    return(0);
    }
```

Change the "internal" to "sp_dual" if you are using an Acorn-wired serial cable, or "sp_dualpc" if you are using a PC-wired serial cable like the one shown on page 7. Note that the character between the sp and dual is an underscore (SHIFT-hyphen).

Also change the , o to a comma followed by the port number that you want to use. For example, the fourth line would say:

```
setserialdev("sp_dual",1);
```

if you wanted to use the middle port of a Serial Card with an Acorn-wired cable.

Save this file then Hearsay should use the Serial Card. If the program reports "Can't find Serial Devices", just double-click on !SerialDev. If you have other problems, try changing the devblockmode= line to say devblockmode=0.

ArcFax

You require version 1.06 or later of ArcFax to use the Serial Card. If you have a version after 1.06, but before 1.16, then follow the instructions for Hearsay, but treat every reference to the !Hearsay directory as if it said !ArcFax.

If you have version 1.16 or later, then the relevant section of the !SerialDev **file** will look like this:

```
int device_initiate(void) {
    serialdevinit(1);
    setserialdev("sp_dual",0);
    devblockmode=serialdevread(0xC4) &
    0x40;
// Uncomment the next line if your card has
bug in block read/writes
// devblockmode=0;
    return(0);
}
```

However, you still only need to change the `setserialdev` line. iust as described in the Hearsav section.

Acorn InterTalk

Shift-double click on the `!mailserv` application to open it, then load the !`Run` file into !`Edit`.

You will need a line saying:

```
set Intertalk$blockdriver sp_dual
```

if you have an Acorn-wired cable, or

```
set Intertalk$blockdriver sp_dualpc
```

if you have a PC-wired cable.

Additionally, there should be a line:

```
set Intertalk$blockport n
```

where *n* is the number of the port that you wish to use.

Save the edited !`Run` file, then restart the software.

Using the Serial Card from a PC card

The driver disk contains a directory called PCcard which holds the necessary resources to access the High Speed Serial Card's ports from DOS and Windows.

There is a single module called !SerialCOM which, when loaded before !PCx86 is run, will map ports 0 to 2 to COM2:, COM3: and COM4: respectively. However, to avoid clashes with the PC card, COM2: and COM4: use non-standard interrupt (IRQ) settings.

Note that this driver is still in development, and some bugs may remain. Please read the text files on the disk for the latest information. If you believe you have found a problem, please contact Atomwide with full details.

Registering the Serial Card

From time to time, upgrades to the main Serial Driver and PC card Driver will become available. These will be sent to you automatically if you register your purchase of an Atomwide Serial Card by sending an email to support@atomwide.co.uk

Serial Card * commands

The following commands can be useful when testing and/or performing advanced configuration on High Speed Serial Cards. Note that all commands are case-insensitive.

```
*Help SerialDriver
```

This command will provide brief information about the Serial Card driver which is currently loaded. A typical response is:

```
==> Help on keyword SerialDriver

Module is: SerialDriver 0.52 (29 Jan
1996) for Atomwide/Issue 1 or 2 cards

Commands provided:
SeriallnputBuffer SerialOutputBuffer
```

The two commands mentioned above affect all ports of a Serial Card, and can be used from the command line, within Obey files, or within programs.

```
*SeriallnputBuffer n
```

This command, allocates a serial input buffer of *n* bytes. The default value is 16384.

```
*SerialOutputBuffer n
```

This command allocates a serial output buffer of *n* bytes. The default value is 4096

The block driver interface

Block drivers provide a means by which any program can use almost any serial device without code alterations; they simply load a driver and call it, passing instruction codes and data, to perform operations with the serial device. If you are implementing support for serial devices in a program, we STRONGLY recommend that you do not use the SWIs that follow, but instead you use block drivers. They are easily called from C, BASIC or assembler, and the full specification is provided on the drivers disk enclosed with this card.

The SWIs provided by the serial card are detailed on the following **pages:**

SPSerial_Speed (SWI &44A40)

Sets the specified speed on the port.

On entry

R0 = port number
R1 = baud rate to set or -1 to read

On exit

R1 = old baud rate

Note that the serial card does NOT support split baud rates.

Possible rates are:

50, 75, 110, 134, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 38400, 57600, 115200, 230400 and 460800 (on issue 2 boards).

SPSerial_Format (SWI &44A41)

Sets the specified word format on the port.

On entry

R0 = port number
R1 word format to set or -1 to read

On exit

R1 = old word format
The word format is a bitset as follows:

bits 0-1: Word length (00=8 bit, 01=7 bit, 10=6 bit, 11=5 bit)
bit 2: Number of stop bits (0=one stop bit, 1=two stop bits)
bits 3-4: Parity select (00, 10=no parity, 01=odd, 11=even)
bit 5: Stick parity (if set & bit 4 set then space is parity, if set and bit 4 clear then mark is parity)

SPSerial_Control (SWI &44A42)

Set/read control lines and flow control methods

On entry

R0 = port number
R1 = EOR mask
R2 = AND mask

On exit

R1 = old bitset

The new status bitset is calculated like this: new=(old AND R2) EOR R1

bit 0: DTR setting (1 for on)
bit 1: RTS setting (1 for on)
bit 2: send break level if set
bit 3: use CTS for TX flow control
bit 4: use XON/XOFF for TX flow control
bit 5: use RTS for RX flow control
bit 6: use XON/XOFF for RX flow control

bit 7: cable compatibility mode. If set, DSR is used as the CTS pin and R1 is used as the DCD pin. This is for compatibility with serial cables wired to work with the Archimedes serial port.

The following bits are read only: bit 16: CTS state (DSR if bit 7 set) bit 17: DSR state (CTS if bit 7 set) bit 18: RI state (DCD if bit 7 set) bit 19: DCD state (RI if bit 7 set) bit 20: we've been XOFF'ed bit 21: we've sent an XOFF

SPSerial_TX (SWI &44A43)

Writes data to the transmit buffer - data is automatically sent under interrupt control.

On entry

R0 = port number
R1 = byte (if R1<256) or pointer to block
R2 = block length if R1 is pointer

On exit

(if R1 was data byte on entry)
- CC - byte inserted
- CS - byte not inserted

(if R1 was pointer on entry)
- R1 = pointer to last byte inserted+1
- R2 = number of bytes not inserted
- CC if all data was inserted
- CS if not all data was inserted

SPSerial_RX (SWI &44A44)

Reads received data from the buffer.

On entry

R0 = port number
R1 = 0 to read one byte, otherwise pointer to block
R2 = maximum number of bytes to read if R1 is block pointer

On exit

(if R1=0 on entry)

CC and R1 = data byte if data available
CS and R1 = -1 if no data available

(if R1 is pointer on entry)

R1 = pointer to last byte removed+1
R2 = decremented to indicate number of bytes removed
CC if all data requested was removed
CS if not all data requested was removed

SPSerial_TXPeek (SWI &44A45)

Parameters as for SPSerial_RX, this call looks at the bytes at the head of the queue (just about to go to the serial chip) without disturbing them.

SPSerial_RXPeek (SWI &44A46)

Parameters as for SPSerial_RX, this call looks at the bytes that would be removed by a similar call to SPSerial_RX, but without actually removing them from the buffer.

SPSerial_TXPurge (SWI &44A47)

Clears the output buffer of the specified port.

On entry

RO = port number

On exit n/a

SPSerial_RXPurge (SWI &44A48)

Clears the input buffer of the specified port.

On entry

RO = port number

On exit

n/a

SPSerial_TXCount (SWI &44A49)

Checks the status of the port's transmit buffer

On entry

R0 = port number

On exit

R1 = bytes used in buffer
R2 = bytes free in buffer
R3 = size of buffer

SPSerial_RXCount (SWI &44A4A)

Checks the status of the port's receive buffer

On entry

R0 = port number

On exit

R1 = bytes used in buffer
R2 = bytes free in buffer
R3 = size of buffer

SPSerial_Info (SWI &44A4B)

Gives information on the serial system

On entry

No conditions

On exit

R0 = maximum valid port number
R1 = maximum speed supported (bps)

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The serial driver software is a complex suite of programs which are under continuous development and, while every effort is made to ensure it functions as detailed, neither The Serial Port nor Atomwide can accept any liability for any loss or damage resulting from the use of its serial card, or the information in this manual.

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