ATR8000

OWNER'S MANUAL

SWP Inc
MICROCOMPUTER PRODUCTS
2500 E. Randol Mill Road — 125
Arlington, Texas 76011
817/469-1181

SWP Microcomputer Products, Inc., reserves the right to make hardware, software and pricing changes without notice.

THE ATR8000 HAS BEEN REVISED. THE FERRITE CORE IS NO LONGER NEEDED.

F C C W A R N I N G

```
**********************************************************************
*                                                                    *
*    WARNING:  THIS EQUIPTMENT GENERATES AND USES RADIO              *
*    FREQUENCY ENERGY AND IF NOT INSTALLED AND USED PRO-             *
*    PERLY, I.E., IN STRICT ACCORDANCE WITH THE INSTRUCTIONS         *
*    MANUAL MAY CAUSE HARMFUL INTERFERENCE TO RADIO COM-             *
*    MUNICATIONS.  IT HAS BEEN TESTED AND FOUND TO COMPLY            *
*    WITH THE LIMITS FOR A CLASS A COMPUTING DEVICE PURSUANT         *
*    TO SUBPART J OF PART 15 OF FCC RULES, WHICH ARE DESIGNED        *
*    TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTER-            *
*    FERENCE WHEN OPERATED IN A COMMERCIAL ENVIRONMENT.              *
*                                                                    *
*    OPERATION OF THIS EQUIPTMENT 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 REQUIRED TO CORRECT THE INTERFERENCE.           *
*                                                                    *
**********************************************************************
```

F C C W A R N I N G

ATARI 800, ATARI 400, ATARI 810 Disk Drive, ATARI 820 Printer, ATARI 822 Printer, ATARI 825 Printer, ATARI 830 Modem, ATARI 850 Interface Module, and ATARI DOS are all registered trademarks of ATARI, Inc.

ATR8000 and CO-POWER-88 are trademarks of SWP Microcomputer Products, Inc. (Formerly Software Publishers, Inc.)

CP/M and CP/M-86 are registered trademarks of Digital Research, Inc.

D.C.Hayes Smart Modem is a trademark of Hayes Microcomputer Products, Inc.

IBM-PC is a trademark of IBM Corporation.

MSDOS is a trademark of Microsoft Corporation.

OS/A+ is a trademark of Optimized Systems Software, Inc.

Percom is a trademark of Percom Data Company.

Tandon is a registered trademark of Tandon Magnetics.

TRS-80 I and III are trademarks of Tandy Corporation.

Z-80 is a trademark of Zilog, Inc.

Table Of Contents

Diagrams

Photos

I. Introduction

Congratulations, you have purchased the most expandable, versatile disk interface available for your ATARI 800/400. The ATR8000 allows you to delve beyond the ATARI microcomputer world into another that offers nearly countless hardware and software options.

Serial or parallel printers can be connected to the ports of the ATR8000. You can choose from medium-speed, economical dot matrix printers to the faster, slightly higher-priced, dot addressable dot matrix printers. OR you can get the quality and printing versatility of a more expensive daisy wheel printer.

For program storage, single, double or quad density, single or double-sided, 5 1/4" or 8" disk drives can be connected to the ATR8000. You're not limited to one type or size of drive because they can be intermixed!

Single density ATARI DOS and double density OS/A+ 4.1 both run on the ATR8000. OS/A+ 4.1 is a double density DOS that runs faster than ATARI DOS and stores twice as much data on a disk. Section III contains supplemental information to each of these DOS's operating manuals. The ATARI DOS portion of Section III has a serial printer driver listing. This driver is for ATARI DOS and OS/A+ printing. An ATARI DOS emulation of the ATR8000 monitor and monitor instructions are also included.

The 64k ATR8000 includes double density CP/M 2.2, complete with the standard CP/M manual. SWP furnishes an additional ATR8000 CP/M Supplement that describes SWP CP/M utility programs. This supplement also contains information for programmers.

To connect the ATR8000, the ATARI 800/400, disk drives and any peripherals you have, follow the basic connection procedure in this section. For more specific connection information, consult Section II.

Detailed information on the construction of the cables used with the ATR8000 system is in Section II.1. Some peripherals, like those connected to the RS-232 Port, require configuring of jumper options on the ATR8000 circuit board. These options are clearly outlined in Section II.7.

Section II also details how to connect an RS-232 terminal to the 64k ATR8000. Section IV explains how to expand the ATR8000. You'll find the system easy to add to so you can build up a computer system that will meet your expanding needs. The last section, Section V, contains warranty information and the software license. Complete the enclosed warranty card and return it to us within 10 days to ensure that your ATR8000 is under warranty.

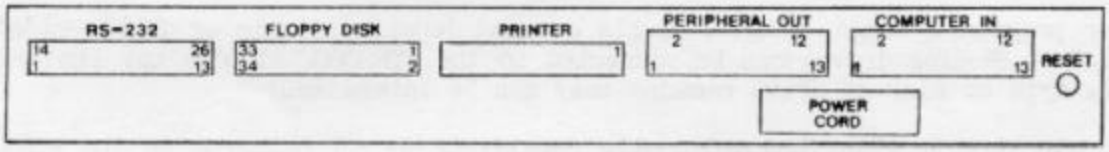
Thoroughly read this manual and carefully follow the instructions contained within to connect the ATR8000 and to start the journey into a broader-based microcomputer world. Because the ATR8000 is immensely versatile, connections can become involved. Use the Table of Contents to locate the specific sections that will help you understand your ATR8000 system.

Happy computing!

I.1 The ATR8000 System:

ATR8000 - the basic unit. It is a 4MHz, Z80 processor available in two models: 16k or 64k RAM. (The 64k version includes CP/M 2.2.) The ATR8000 has a COMPUTER IN port for connecting the ATARI 800/400 or a RS-232 terminal, a PERIPHERAL OUT port for connecting the ATARI Daisy Chain Cable, a parallel PRINTER port, a FLOPPY DISK serial port for connecting disk drives, and an RS-232 port. A cable for connecting the ATR8000 to the ATARI 800/400 or to a terminal is included.

DIAGRAM 1: The ATR8000 (Back View)



64k UPGRADE - upgrades the 16k ATR8000 to 64k RAM. CP/M configured for the ATR8000 is included, along with a CP/M manual and the ATR8000 CP/M Supplement. SWP supplies several double density system programs for CP/M users. CP/M is available on both 5 1/4" and 8" disks.

OS/A+ 4.1 - a double density DOS for ATARI from Optimized Systems Software, Inc. This DOS is faster than ATARI DOS and stores twice as much data on a disk. A separate manual detailing the use of this DOS is included. This DOS is available on both 5 1/4" and 8" disks.

DISK DRIVES - high-quality 5 1/4" drives with power supplies are available in one and two-drive custom enclosures. Two 8" Tandon Thinline drives with power supplies are available in a custom, ventilated enclosure.

PRINTER CABLES - we manufacture both serial and parallel printer cables to connect a printer to the ATR8000.

STANDARD DRIVE CABLES - daisy chain drive cables that plug into the FLOPPY DISK Port. Available in 2-connector and 4-connector styles.

8" ADAPTERS - used to connect an 8" drive to the Standard Drive Cable. These special adapters connect between the 50-pin edge connector of an 8" drive and the 34-conductor drive cable ribbon. This allows both 5 1/4" and 8" drives to be connected on the same cable, so both can be run at the same time.

I.2 Power Requirements

The ATR8000 and all SWP peripherals requiring power plug into regular wall sockets (115-120 volts AC). The ATR8000 has a built-in MOV (Metal Oxide Varistor) to supress power surges and to keep voltage at a safe level to protect sensitive circuit components.

I.3. Connecting the ATR8000 System: The Basics

This section describes the basic ATR8000 connection procedure. Section II contains more specific connection information. If you have any questions about the basic procedure, refer to the Table of Contents to find where the specific information you need is in Section II.

I.3.A. Materials Needed:

You will need the following to connect the ATR8000 system:

- An ATR8000-ATARI cable if connecting to an ATARI or an ATR8000-Terminal cable if connecting to an RS-232 terminal.
- If connecting any ATARI 810 drives, an ATARI Daisy Chain Cable.
- A Standard Drive Cable.
- One 8" Drive Adapter Board for each 8" drive.
- If you have a parallel printer, a parallel printer cable. If you have a serial printer, a serial printer cable.
- If internal drive numbering will be necessary, a screwdriver for removing the drive cover.
- If you are using a television for a monitor, a ferrite core (included with the ATR8000).

I.3.B. Disk Drive Basics

#1 If you have more than one disk drive, decide what each drive's number will be (1 - 4). D1 must be used to boot.

HINTS: ATARI 810 drives are best designated as the higher drive numbers.
An ATARI 810 can boot ATARI DOS.
A standard 5 1/4" drive can boot ATARI DOS, OS/A+ and CP/M.
An 8" drive can boot OS/A+ and CP/M. It can also boot ATARI DOS if the DOS is copied to an 8" disk. (See Section III.)

#2 Each drive needs to be configured. Standard drives are configured internally for drive number. Numbers for ATARI 810 drives are set by positioning the switches at the back of the drive. For each standard drive, set the following:

- one drive select. Drive selects are labeled as DS 1-4 or DS 0-3 on a drive's circuit board.
- head load with motor on.

#3 The last connector on the standard drive cable must have a drive connected

to it. If this drive is a 5 1/4" drive, it must have a terminating resistor pack in it. If this drive is an 8" drive it must have the terminating resistors set.

I.3.C. Printer Basics

#1 A parallel printer connects to the PRINTER Port. There is a parallel printer driver in the ATR8000 ROM for ATARI DOS and OS/A+ printing.

#2 A serial printer connects to the RS-232 Port. Set the printer for no parity, 8 bits and 1200, 2400, 4800, or 9600 baud. A serial printer driver for ATARI DOS and OS/A+ printing is listed in Section III.

#3 An 820/822 printer connects to the ATARI Daisy Chain Cable. [To print jumper J11 on the ATR8000 circuit board or run PRINTOFF.BAS.]

#4 If an ATARI 850 is connected, connect the serial or parallel printer to the 850. To print, activate J11 or run PRINTOFF.BAS.

For CP/M printing, the printer must be directly connected to the ATR8000.

I.3.D. ATARI 850 Basics

#1 An ATARI 850 connects between the ATARI and COMPUTER IN.

#2 If the 850 is connected, the printer must be connected to the 850 rather than directly to the ATR8000.

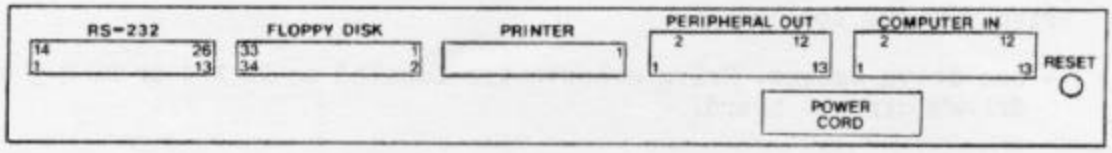
#3 The 850 cannot be connected when the system is running CP/M.

I.3.E. Making the Connections

When connecting cables, it is important that Pin 1 on each cable is connected to Pin 1 of the corresponding port. Pin 1 on most cables is marked on the inside of the connectors. Some cables have a contrasting color on one edge of the cable, denoting that it leads to Pin 1.

The following Diagram shows Pin 1 locations for each of the ATR8000's ports.

DIAGRAM 2: The Ports of the ATR8000 (Back View)



Connections:

#1 This step is only for those who are using an ATARI 800/400 and a television as a monitor.

Unplug the cable that connects the ATARI to the television. On the television end of the cable, loop the cable through the ferrite core five times. Replug the cable to the television.

#2 ATARI users: Connect the ATR8000 to the ATARI with the ATR8000-ATARI cable. (The cable that has an "ATARI" connector at each end.)

RS-232 terminal users: Connect the ATR8000 to the RS-232 terminal with the ATR8000-Terminal cable. Before powering the system, refer to Section II.7.B to properly jumper the ATR8000.

#3 Connect the Standard Drive Cable to the standard drives. Plug an 8" Drive Adapter Board onto each 8" drive before connecting 8" drives to the cable. The last connector on this cable must have a drive attached to it and this drive must have the terminating resistors set.

#4 Set each drive for drive number and head load with motor on.

#5 Connect the Standard Drive Cable to the FLOPPY DISK Port.

#6 Connect any ATARI 810s to the ATARI Daisy Chain Cable. Connect this cable to PERIPHERAL OUT. Set each ATARI 810 for drive number.

#7 If you are using an ATARI 850: Connect the 850 between the ATARI and COMPUTER IN. To print while the 850 is connected, connect the printer to the 850, not to the PRINTER Port or the RS-232 Port.

If you are not using an ATARI 850: Connect a parallel printer to the PRINTER Port using a parallel printer cable. Connect a serial printer to the RS-232 Port using a serial printer cable. [The RS-232 port is default configured for an Epson serial printer. More information is in Section II.7.]

#8 A modem can be connected to the RS-232 port. It can also be connected to an 850.

II. The Connection in Detail

Each of the following subsections contains specific information about the components of the ATR8000 system. Use the Table of Contents to find information about your system. If you do not thoroughly understand any information pertaining to your system, reread and study the information until you have a working knowledge of the stipulations. (For unresolvable difficulties, consult your dealer.)

Unplug all of the components before connecting and configuring the ATR8000. If a component is turned off but is still plugged into an electrical socket, you can be shocked.

For all connections it is important that the cables are correctly interfaced to the ATR8000. Subsection 1 contains diagrams showing the construction of each type of cable that connects to the ATR8000. Pin 1 on each cable is marked. (On some types of cables, Pin 1 is denoted by a colored wire on an outside edge of the cable.)

Subsection 2 contains ATR8000 port information. The order of each port's pins is shown along with a listing of the pin signals. Pin 1 of the port must be connected to Pin 1 of the interfacing cable.

Specific data about disk drives, modems and printers is discussed in Subsection 3. This information MUST be considered before making any connections. Drive configuring is done in Subsection 4. Each drive must have a unique and valid number. Subsection 5 tells you how to avoid radio frequency interference.

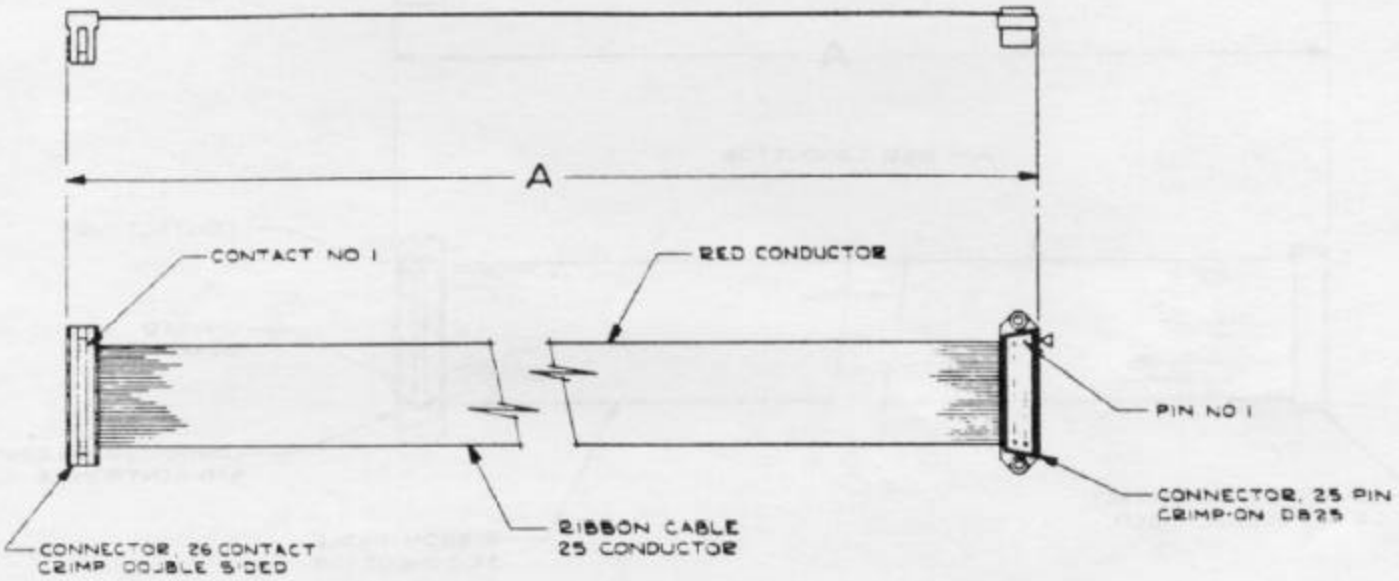
Detailed instructions for connecting the ATR8000 system are in Subsection 6. These instructions include step-by-step connection photos. After the cables have been connected, the ATR8000's jumper options need to be considered. These options and their settings are described in Subsection 7.

Subsection 8 explains the optional connection of an RS-232 serial terminal to the 64k ATR8000 (in place of the ATARI). The 64k ATR8000 and an RS-232 terminal can be used for CP/M operation. [The terminal must be 9600 baud, odd parity and 7 bits.]

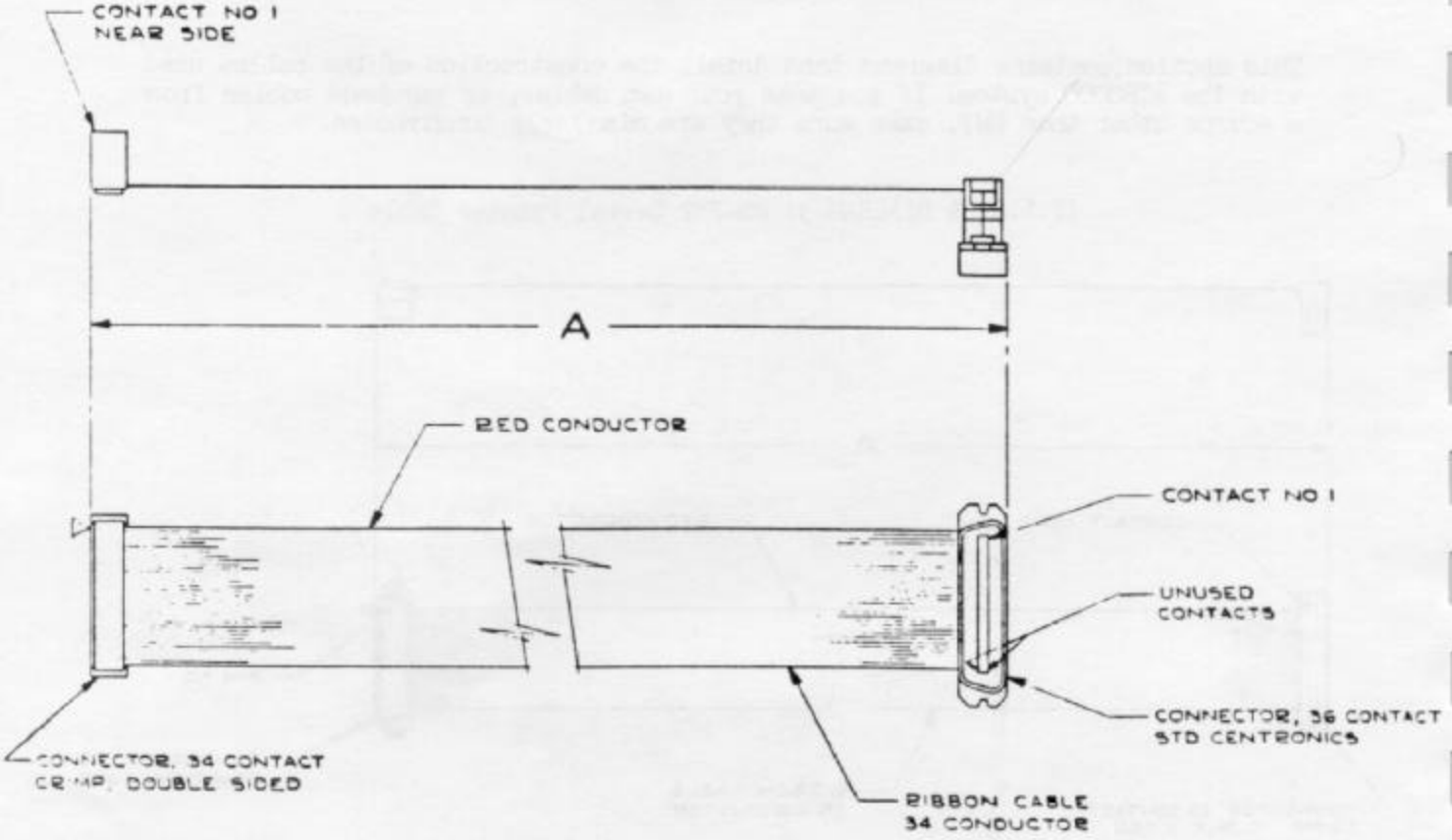
II.1. Cable Specifications

This section contains diagrams that detail the construction of the cables used with the ATR8000 system. If you make your own cables, or purchase cables from a source other than SWP, make sure they are similarly constructed.

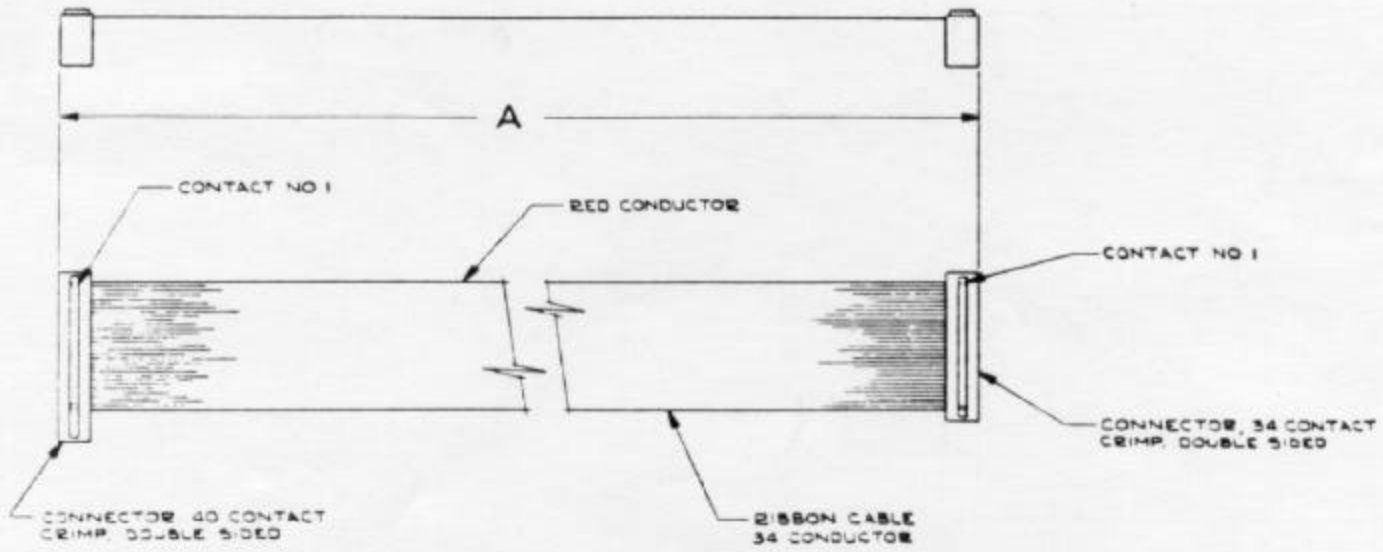
II.1.A. & DIAGRAM 3: RS-232 Serial Printer Cable



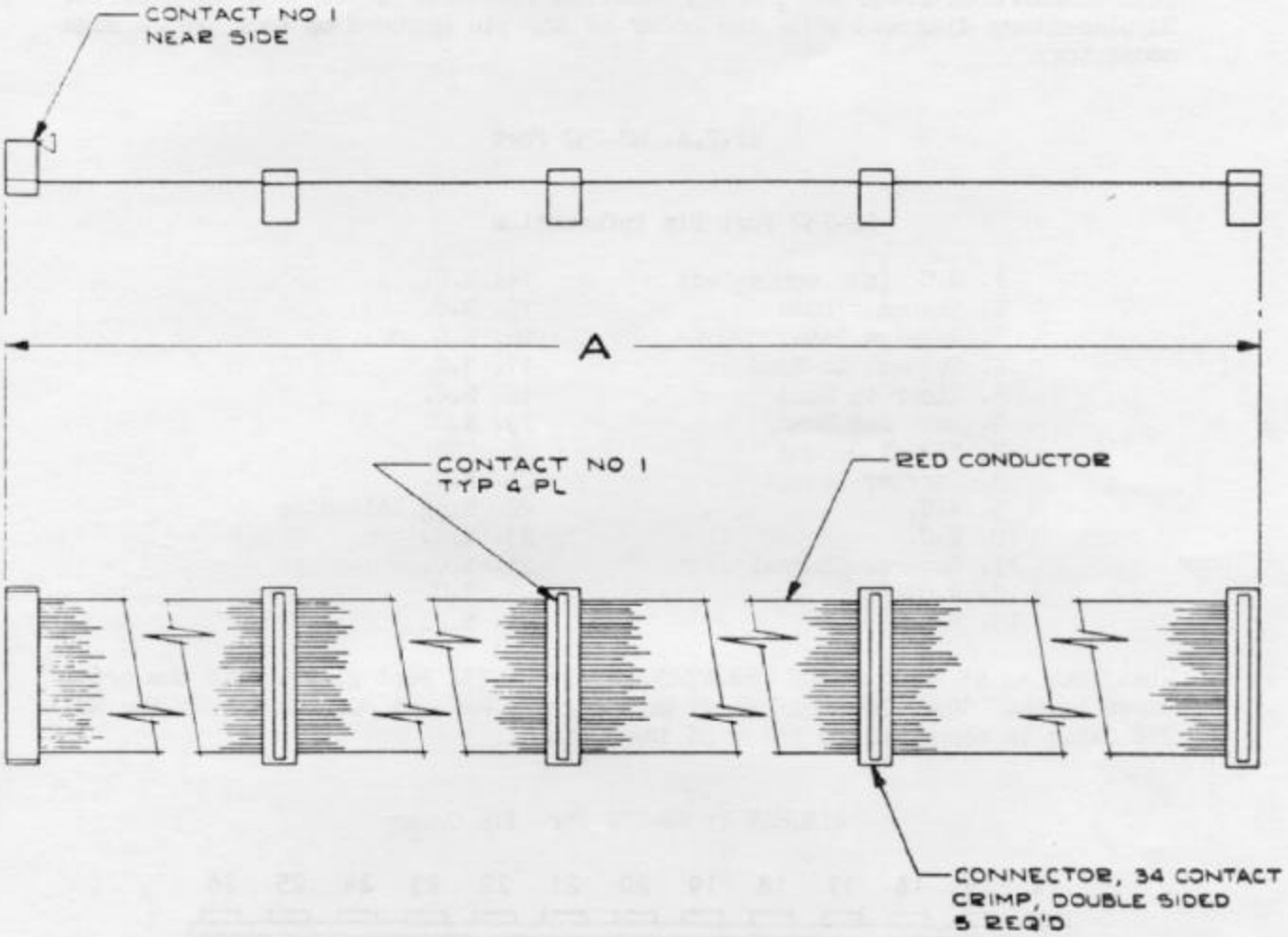
II.1.B. & DIAGRAM 4: Standard Centronics Parallel Printer Cable



II.1.C. & DIAGRAM 5: Nonstandard Centronics Parallel Printer Cable



II.1.D & DIAGRAM 6: Standard Drive Cable (4-connector cable shown)



II.2 ATR8000 Port Specifications

This subsection lists the pin information for each of the ATR8000's ports. Supplementary diagrams show the order of the pin numbers on each port's edge connector.

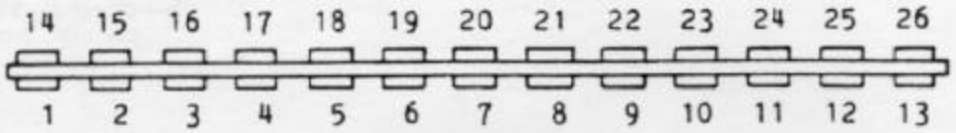
II.2.A. RS-232 Port

RS-232 Port Pin Information

1. N.C. (not connected)
2. Transmit Data
3. Receive Data
4. Request to Send
5. Clear to Send
6. Data Set Ready
7. Signal Ground
8. Carrier Detect
9. N.C.
10. N.C.
11. Reverse Channel
12. N.C.
13. N.C.
14. N.C.
15. N.C.
16. N.C.
17. N.C.
18. N.C.
19. N.C.
20. DTR
21. N.C.
22. Ring Indicator
23. N.C.
24. N.C.
25. N.C.
26. N.C.

When looking at the back of the ATR8000, the RS-232 Port pins are in the order shown below. When interfacing to this port, make sure that Pin 1 on the RS-232 cable is connected to Pin 1 of the port.

DIAGRAM 7: RS-232 Port Pin Order



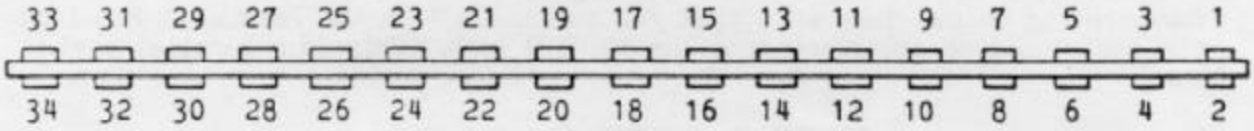
II.2.B. FLOPPY DISK Port

FLOPPY DISK Port Pin Information

1. Ground
2. N.C. (not connected)
3. Ground
4. N.C.
5. Ground
6. Drive Sel 4
7. Ground
8. Index
9. Ground
10. Drive Sel 1
11. Ground
12. Drive Sel 2
13. Ground
14. Drive Sel 3
15. Ground
16. Motor On
17. Ground
18. Direction Select
19. Ground
20. Step
21. Ground
22. Write Data
23. Ground
24. Write Gate
25. Ground
26. Track 00
27. Ground
28. Write Protect
29. Ground
30. Read Data
31. Ground
32. Side Sel
33. Ground
34. N.C.

When looking at the back of the ATR8000, the FLOPPY DISK Port pin numbers are as shown below. When connecting a disk drive cable to the port, make sure that Pin 1 on the cable matches Pin 1 on the port.

DIAGRAM 8: FLOPPY DISK Port Pin Order



II.2.C. PRINTER Port

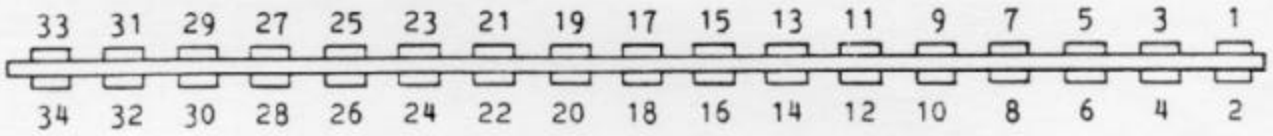
The following information is for a printer cable that is constructed from standard 34-conductor ribbon cable and a standard 34-pin connector. Pin information for a standard Centronics cable that uses a Centronics D connector is on the following page.

PRINTER Port Pin Information

1. Strobe	18. Ground
2. Ground	19. D3 In
3. D0 Out (Data 0)	20. Ground
4. Ground	21. D7 In
5. D1 Out	22. Ground
6. Ground	23. D6 In
7. D2 Out	24. Ground
8. Ground	25. D5 In
9. D3 Out	26. N.C.
10. Ground	27. Ground
11. D4 Out	28. D4 In
12. Ground	29. D2 In
13. D5 Out	30. D1 In
14. N.C. (not connected)	31. N.C.
15. D6 Out	32. D0 In
16. Ground	33. N.C.
17. D7 Out	34. N.C.

When looking at the back of the ATR8000 at the PRINTER Port, the pins are numbered as below. Make sure that you match Pin 1 on the Port with Pin 1 on the cable used to interface into the PRINTER Port. (This is a parallel port.)

DIAGRAM 9: PRINTER Port Pin Order



PRINTER Port Pin Information for a Centronics Cable

1. Strobe	19. Ground
2. DO Out (Data 0)	20. Ground
3. D1 Out	21. Ground
4. D2 Out	22. Ground
5. D3 Out	23. Ground
6. D4 Out	24. Ground
7. D5 Out	25. Ground
8. D6 Out	26. Ground
9. D7 Out	27. Ground
10. D3 In	28. Ground
11. D7 In, Busy	29. Ground
12. D6 In	30. Ground
13. D5 In	31. N.C.
14. N.C.	32. D4 In
15. D2 In	33. D1 In
16. N.C.	34. DO In
17. N.C.	35. N.C.
18. *	36. *

* These two pins are not used and are not on the ATR8000 PRINTER Port's edge connector. When plugging a 36-pin connector on this edge connector, align Pin 1s.

[A Centronics printer uses eight data outs (DO - D7), but only four data ins (DO - D3). The other data ins are included to make the PRINTER Port a full parallel port.]

A Centronics D connector orders pins in a different sequence than those listed in DIAGRAM 9. For this connector, use the following pin order:

DIAGRAM 10: PRINTER Port Pin Order, Centronics