

# ATR8000

## OWNER'S MANUAL

**SWP**  
*Inc.*  
MICROCOMPUTER PRODUCTS

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

F C C   W A R N I N G

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*****  
*  
*     WARNING:   THIS EQUIPMENT 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 EQUIPMENT 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.     *  
*  
*****
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F C C   W A R N I N G

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## Table Of Contents

	<u>Page</u>
I. Introduction	7
1. The ATR8000 System	8
2. Power Requirements	8
3. Connecting the ATR8000 System: The Basics	9
A. Materials Needed	9
B. Disk Drive Basics	9
C. Printer Basics	10
D. ATARI 850 Basics	10
E. Making the Connections	10
II. The Connection in Detail	12
1. Cable Specifications	13
A. RS-232 Serial Printer Cable	13
B. Standard Centronics Parallel Printer Cable	14
C. Nonstandard Centronics Parallel Printer Cable	14
D. Standard Drive Cable	15
2. ATR8000 Port Specifications	16
A. RS-232 Port	16
B. FLOPPY DISK Port	17
C. PRINTER Port	18
D. The COMPUTER IN and PERIPHERAL OUT Ports	20
3. Peripherals	21
A. Disk Drives	21
1. ATARI 810 Drives	22
2. Percom Drives	22
3. Using All 5 1/4" Drives	24
4. 8" Drives	24

A. Using ATARI 810s, 5 1/4" and 8" Drives	25
B. Modems	26
1. ATARI 830 Modems	26
2. Modems for CP/M	26
C. Printers	27
1. 40 Column Printers: an ATARI 820 or 822	27
2. 80 Column and 132 Column Printers if an ATARI 850 is not Interfaced to the System	27
3. 80 Column and 132 Column Printers if an ATARI 850 is Interfaced to the System	27
D. The ATR8000's Ports and Possible Peripherals	28
4. Internal Drive Configuring	29
A. 5 1/4" Drives	29
1. Configuring 5 1/4" Tandons and Some Percom Drives	30
2. Configuring MPI, Aerocomp and Some Percom Drives	31
3. Configuring Shugart 400s	31
4. Configuring Shugart 460 Drives	32
5. ATARI 810 Drives	32
6. Radio Shack Drives	33
A. Redoing a Model I Drive to Run on Either the TRS 80 or the ATR8000	33
B. Redoing a TRS 80 Drive to be a Standard Disk Drive	36
B. 8" Drives	37
1. 8" Drive Configurations for Shugart 800s and 801s	37
2. Configuring Tandon Thinline Drives (848-1)	37
5. Protection from Radio Frequency Interference	38
A. Radio Frequency Interference on Nonconnected Radio-TV	38
B. Radio Frequency Interference Within the ATR8000 System	38
6. The Connection	40

A.	ATARI, ATR8000, 1+ Standard Drives, Cables, One 8" Adapter for Each 8" Drive	40
B.	ATARI, ATR8000, 1+ Standard Drives, 1+ ATARI 810s, Cables, One 8" Adapter for Each 8" Drive	44
C.	ATARI, ATR8000, 1+ Standard Drives, 1+ ATARI 810s, Printer, Modem, ATARI 850, Cables, One 8" Adapter for Each 8" Drive	44
1.	Connection Without the 850	45
2.	Connection With the 850	45
3.	Connecting a 40 Column Printer	46
D.	Other Connections	47
7.	ATR8000 Jumper Options	49
A.	16k or 64k	49
B.	ATARI or RS-232 Terminal	49
C.	2k or 4k Operating ROM	50
D.	Disabling the ATR8000 Printer Ports	50
E.	RS-232 Configuring	51
8.	Connecting an RS-232 Terminal to the ATR8000	53
III.	Software	54
1.	ATARI DOS	55
A.	Booting ATARI DOS	55
B.	Copying ATARI DOS to an 8" Disk	55
1.	Booting ATARI DOS from an 8" Disk	56
C.	Disks	56
1.	Hard Sectored Disks	56
2.	Flipped Disks	57
D.	Modems	58
1.	PRINTOFF.BAS	59
2.	PRINTON.BAS	60
E.	Printers	61

1. Printing Features in the ATR8000 ROM	61
2. SERDRV.BAS: a Serial Printer Driver for ATARI DOS and OS/A+	62
F. ATRMON.BAS and the ATR8000 Monitor	64
G. Using More Than Two Drives With ATARI DOS	70
2. OS/A+ 4.1	72
A. Booting OS/A+ 4.1	72
B. Using ATARI 810 Drives With OS/A+ 4.1	73
3. ATR8000 System ROM	74
A. ATR8000 User Accessible Monitor Routines and Variables	74
1. ATR8000 Subroutine Entry Points	74
2. Disk I/O Control Block Format	76
B. ATR8000 Memory Map	77
C. Global Variables	78
IV. Expanding the ATR8000	80
1. Converting to 64K	80
2. Adding Drives, a Printer, or a Modem	80
3. Adding CO-POWER-88™	81
V. Warranty, Software License and Service Policy	82

## Diagrams

	<u>Page</u>
1. The ATR8000 (Back View)	8
2. The Ports of the ATR8000 (Back View)	10
3. RS-232 Serial Printer Cable	13
4. Standard Centronics Parallel Printer Cable	14
5. Nonstandard Centronics Parallel Printer Cable	14
6. Standard Drive Cable	15
7. RS-232 Port Pin Order	16
8. FLOPPY DISK Port Pin Order	17
9. PRINTER Port Pin Order	18
10. PRINTER PORT Pin Order, Centronics	19
11. COMPUTER IN and PERIPHERAL OUT Ports Pin Order	20
12. The Percom ATARI Controller Drive	23
13. Drive Numbering #1	29
14. Drive Numbering #2	29
15. 5 1/4" Tandems and Some Percoms	30
16. Aerocomp, MPI and Some Percom Drives	31
17. Shugart 400s	31
18. Shugart 460s	32
19. Configuring an ATARI 810 Drive	32
20. Front View of the Model I Drive's Board	33
A. Back View of the Model I's Board	34
B. The DPDT Before Connection	35
C. The DPDT Switch After Connection	36
21. Cable Binding for the Television	39
22. Hardware Connection Diagrams	
A. The Ports of the ATR8000 (Back View)	40
B. Making the Connections (for II.6.A.)	40



C. Making the Connections (for II.6.B.)	44
D. Making the Connections (for II.6.C1.)	45
E. Making the Connections (for II.6.C2.)	46
F. Making the Connections (for II.6.C3.)	47
23. Jumper Option Locations	48
24. 16k or 64k — J1, J2, J3, J4, J5, J6, J8	49
25. ATARI or RS-232 Terminal — J7, J10	50
26. 2 or 4k Operating ROM — J9	50
27. Printer Port Disabling — J11	51
28. RS-232 Configuring — J12	51
A. Configuration of J12 to Connect an Epson Serial Printer (the default)	52
B. Configuration of J12 to Connect a RS-232 Terminal to the RS-232 Port to Communicate with the ATARI	52
C. Configuration of J12 to Connect a D.C. Hayes Smart Modem to the RS-232 Port	52
29. ATR8000 Monitor Commands	64

### Photos

	<u>Page</u>
#1 Using the Ferrite Core	39
#2 Connecting the ATR8000 to the ATARI 800/400	41
#3 Connecting the Standard Drive Cable to a 5 1/4" Tandon Drive	42
#4 Connecting an 8" Drive Adapter Board to an 8" Tandon Thinline Drive	42
#5 Plugging the 8" Adapter Board onto the Standard Drive Cable	43
#6 Connecting the Standard Drive Cable to the ATR8000	43

## 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.

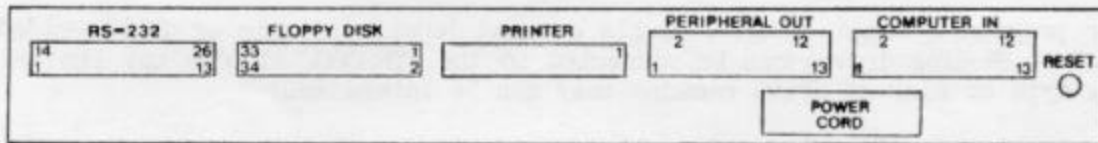
Thoroughly read this manual and carefully follow the instructions contained within to connect the ATR8000 and to start the journey into a broader-based microcomputer world. Because the ATR8000 is immensely versatile, connections can become involved. Use the Table of Contents to locate the specific sections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

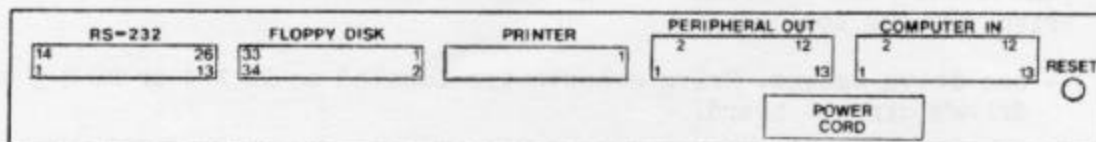
- #1 An ATARI 850 connects between the ATARI and COMPUTER IN.
- #2 If the 850 is connected, the printer must be connected to the 850 rather than directly to the ATR8000.
- #3 The 850 cannot be connected when the system is running CP/M.

### 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 ATR80000 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.

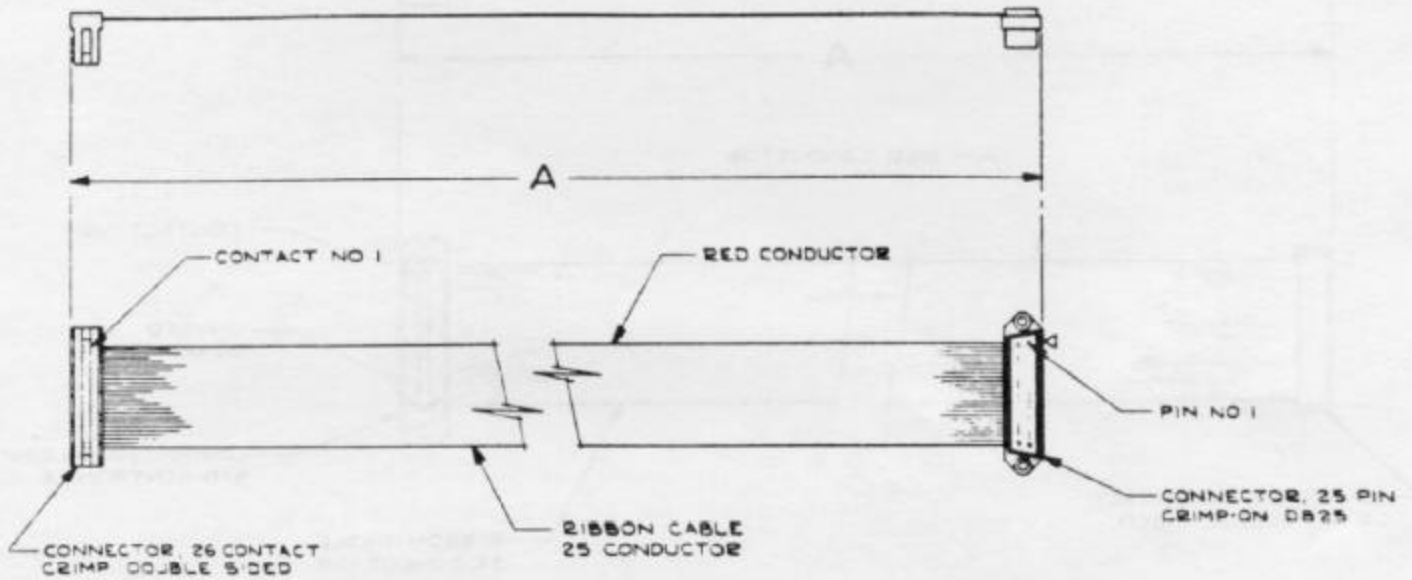
Detailed instructions for connecting the ATR8000 system are in Subsection 6. These instructions include step-by-step connection photos. After the cables have been connected, the ATR8000's jumper options need to be considered. These options and their settings are described in Subsection 7.

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

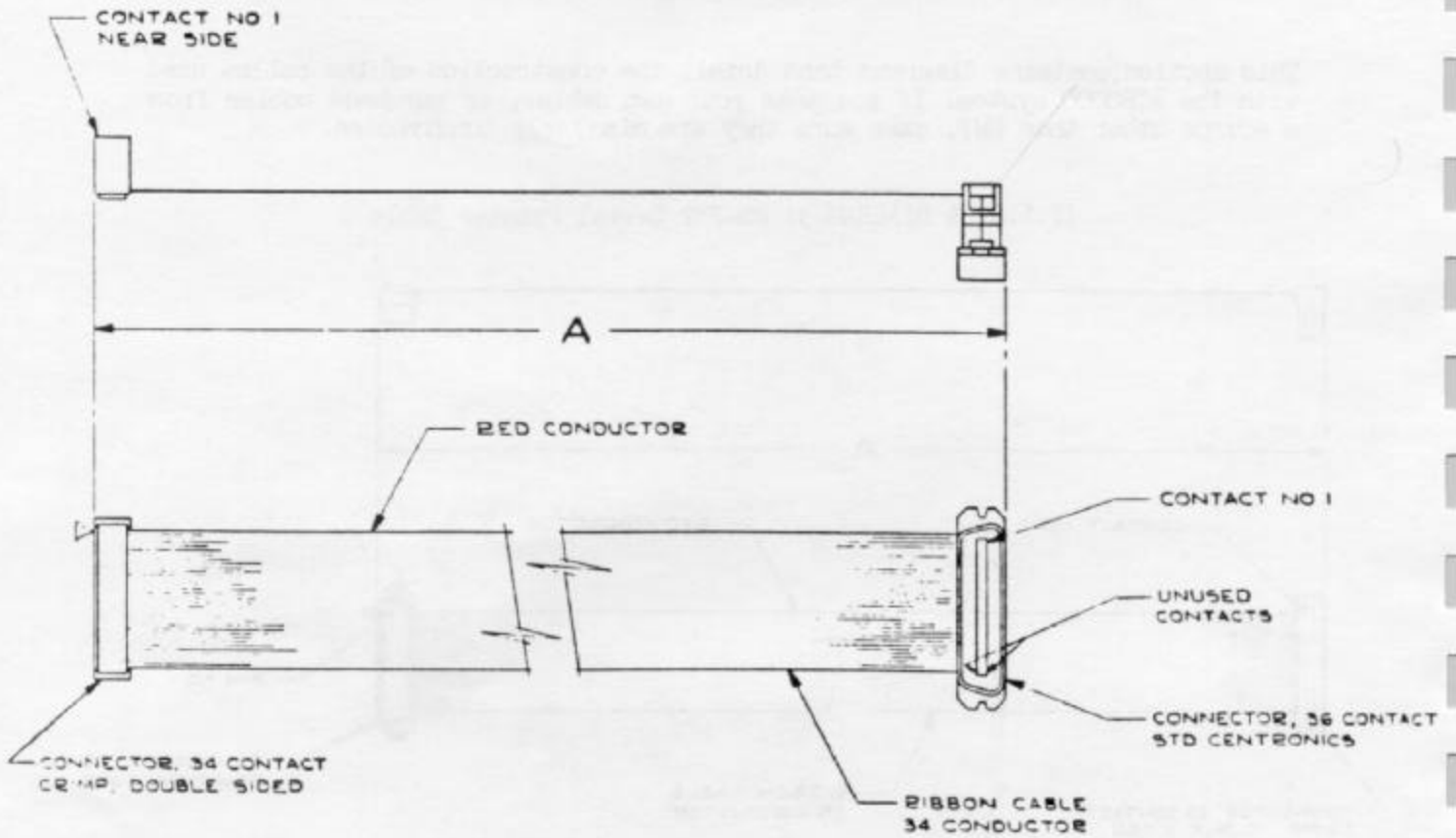
This section contains diagrams that detail the construction of the cables used with the ATR8000 system. If you make your own cables, or purchase cables from a source other than SWP, make sure they are similarly constructed.

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

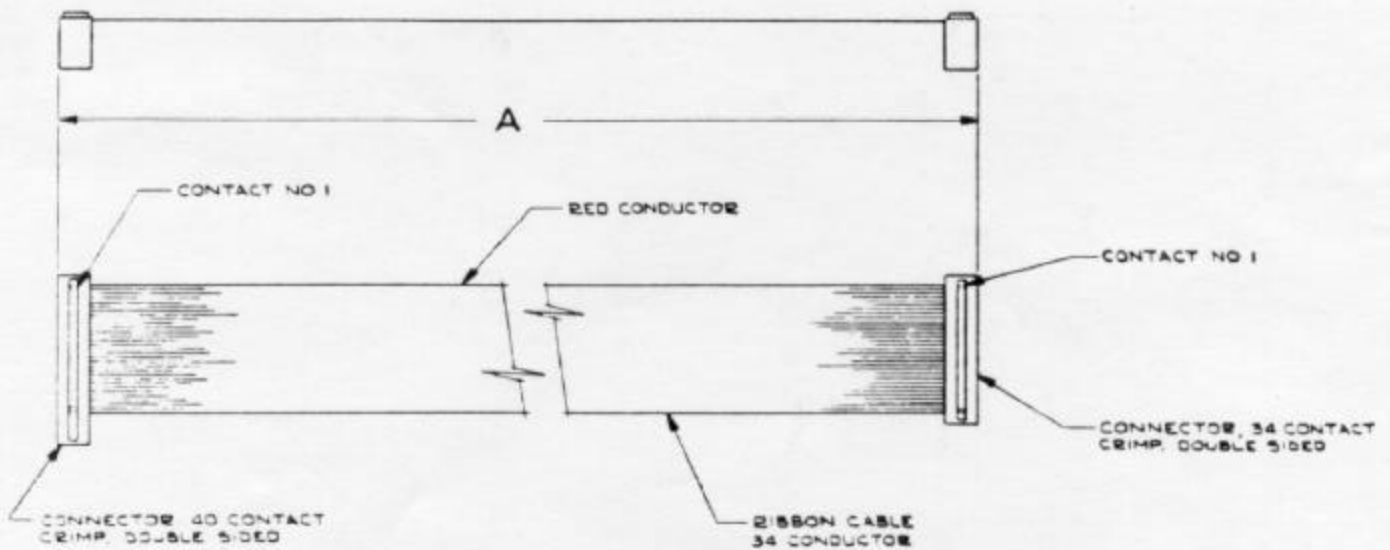




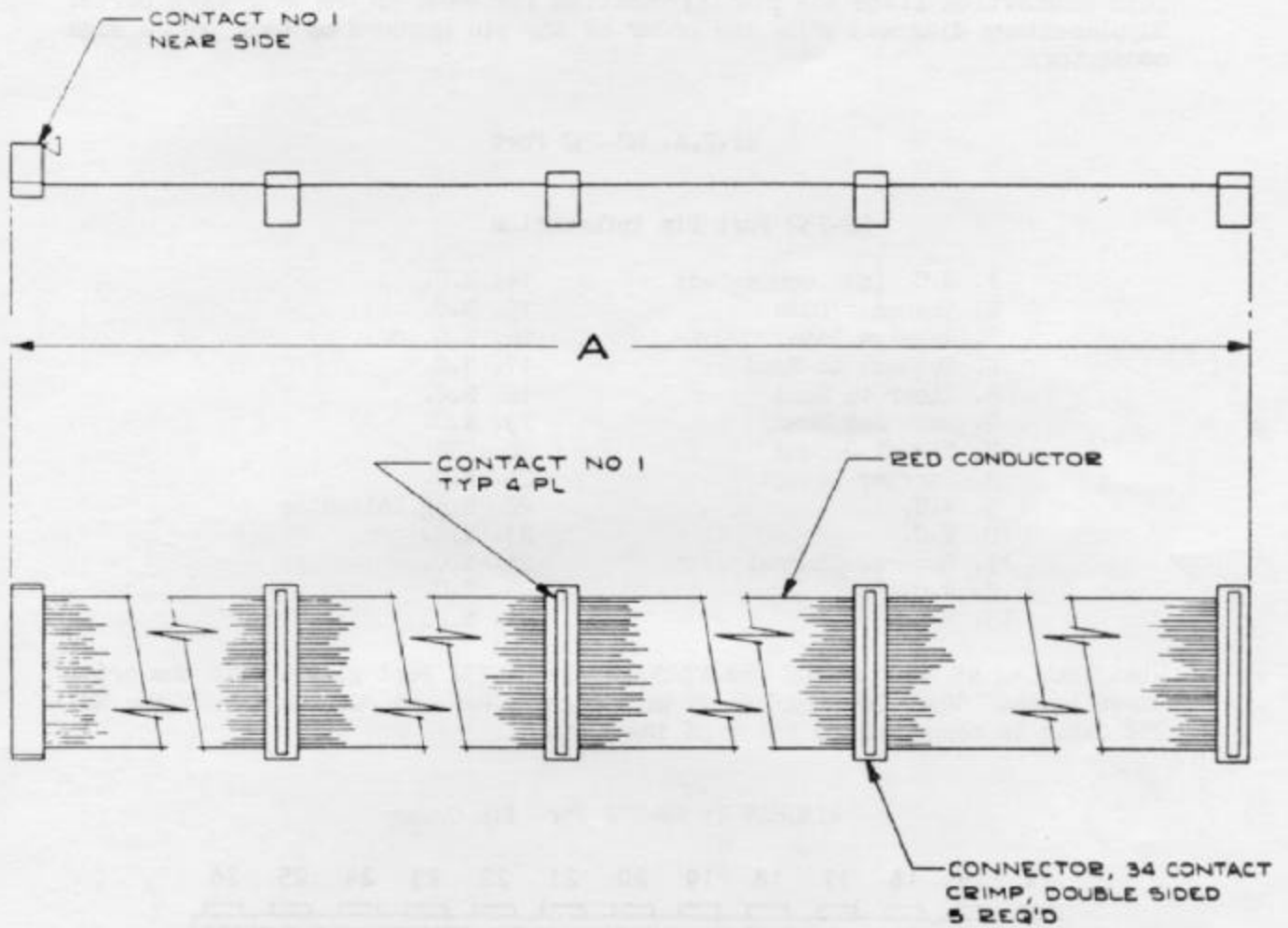
II.1.B. & DIAGRAM 4: Standard Centronics Parallel Printer Cable



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.

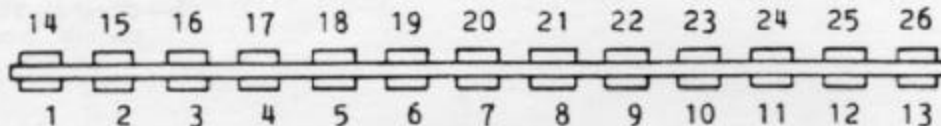
### II.2.A. RS-232 Port

#### RS-232 Port Pin Information

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



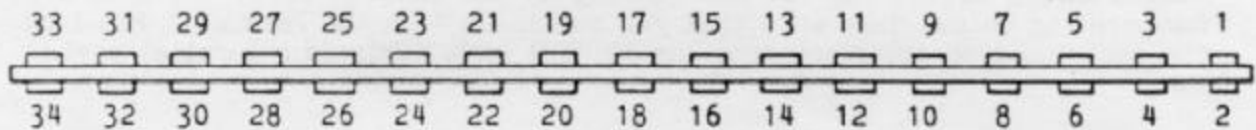
## II.2.B. FLOPPY DISK Port

### FLOPPY DISK Port Pin Information

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

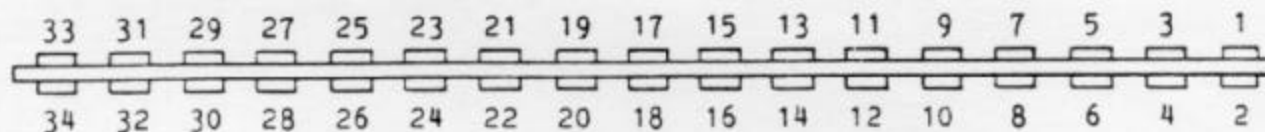
The following information is for a printer cable that is constructed from standard 34-conductor ribbon cable and a standard 34-pin connector. Pin information for a standard Centronics cable that uses a Centronics D connector is on the following page.

### 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 ATR3000 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. D0 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. D0 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 (D0 - D7), but only four data ins (D0 - 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

