

WANG

Special Products

**Model 9093
Dataproducts 1500
Band Printer Interface
Technical Manual**



Special Products

Model 9093 Dataproducts 1500 Band Printer Interface Technical Manual

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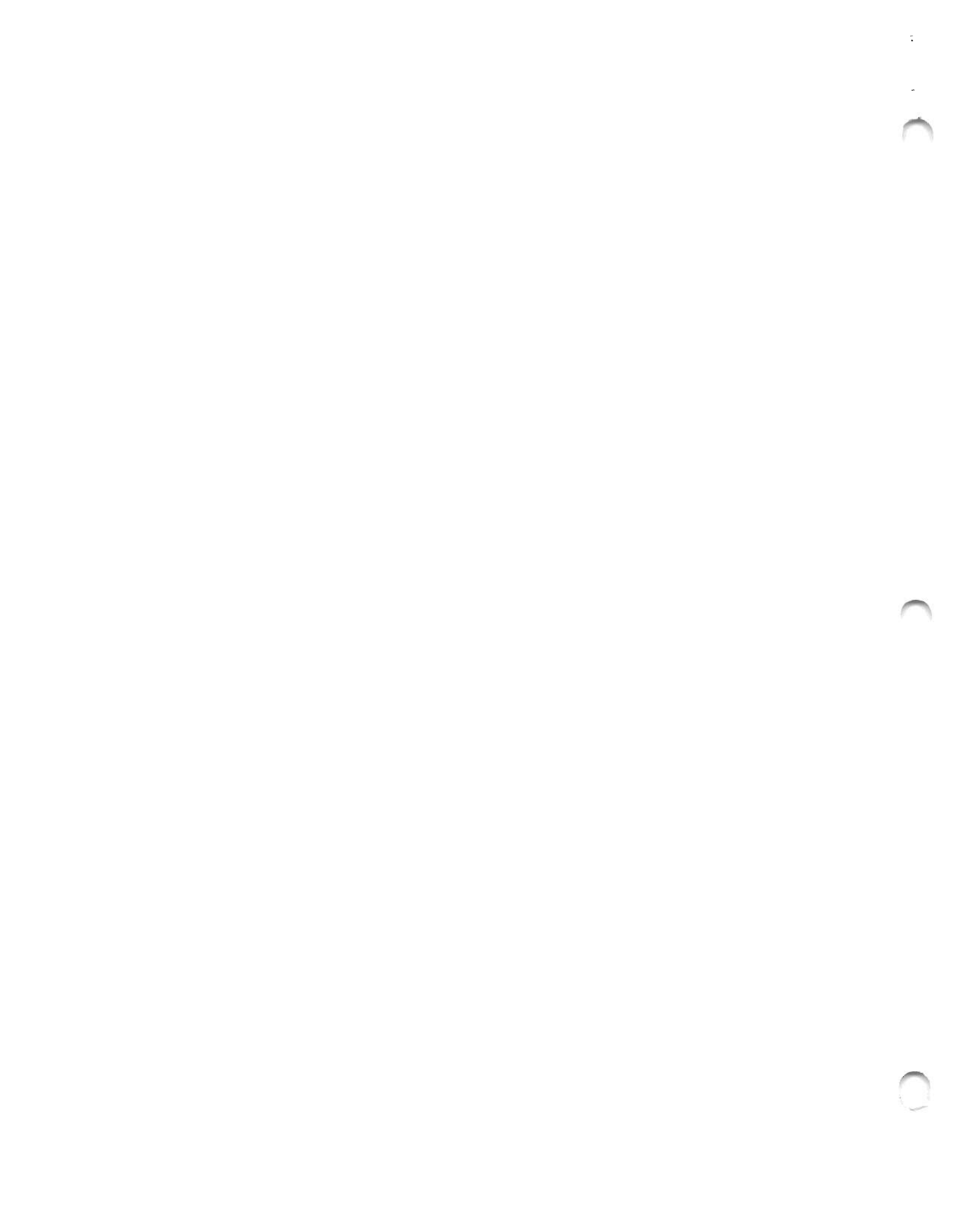
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PREFACE

The Special Products Model 9093 Dataproducts 1500 Band Printer Interface Technical Manual provides information on how to install and service the Model 9093 (part number 190-0333) in the field. This manual deals primarily with the parallel-to-serial conversion kit that provides an interface between a Dataproducts 1500 Band Printer and Wang WPS/OIS and VS Systems.

Specifically, Chapter 1 contains an overview and specifications for the Model 9093, and Chapter 2 gives a general description of the product as well as descriptions of the PC boards. Chapter 3 describes the appropriate switch, jumper, and lamp settings. The installation procedure is outlined in Chapter 4, while Chapter 5 describes the operation of the Model 9093. Chapter 6 deals with troubleshooting.

Additional information on the Dataproducts 1500 Band Printer can be found in Product Definition DP 1500 Printer specifications.



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CHAPTER 1 INTRODUCTION

1.1 PRODUCT OVERVIEW

The Special Products Model 9093 (part number 190-0333), shown in Figure 1, serves as an interface between a Wang VS System or WPS/OIS to a Dataproducts 1500 Band Printer, which has a parallel interface. A 25-foot dual coaxial cable is provided that exits from the rear of the 9093 interface box and connects to any available slave channel on the rear of the VS or WPS/OIS. A 50-pin D-type connector links the printer to the interface box.

The 9093 interface box houses the memory, CPU, and printer interface circuits. Serial data is converted to parallel data through the interface box prior to being transferred to the printer.

NOTE: Wang does not sell or service the Dataproducts 1500 Band Printer, nor provide any applications software.

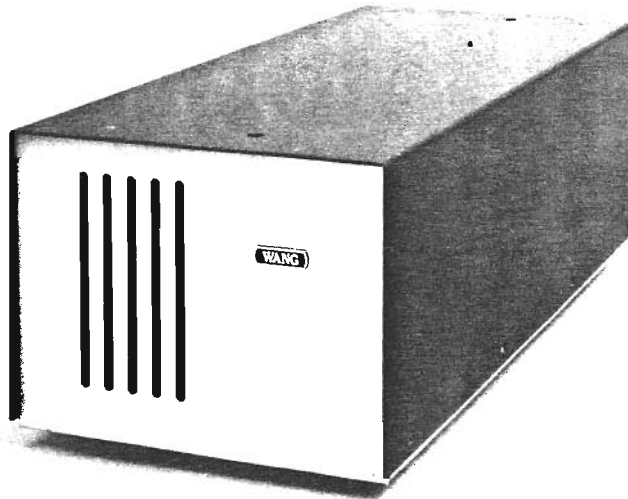


Figure 1. Model 9093

1.2 PHYSICAL SPECIFICATIONS

Height 6.5 in. (16.5 cm)
Length 19 in. (48.3 cm)
Width 9 in. (22.8 cm)
Weight 25 lbs (11.3 kg)

1.3 CABLING

The following are cabling specifications:

- 25-foot dual coaxial cable (interface box to serial I/O port)
- 6-foot cable (part number 220-0438) terminated by a 50-pin D-type connector (interface box to printer)
- 9-foot power cord (interface box to 115 VAC power outlet)

1.4 REFERENCES

A detailed theory of operation of serial/parallel translators is contained in the WP 10/20/30 Maintenance Manual, Vol. III (part number 729-0652). Further information on the interface translator assemblies can be found in Word Processing Newsletter No. 30/30A (part number 729-0541-1).

CHAPTER 2 DESCRIPTION

2.1 GENERAL DESCRIPTION

All printers used on Wang systems are parallel interface machines. On WPS, OIS (130, 140), and VS Systems (with serial IOP), the data is sent out in a serial format. The Dataproducts 1500 Band Printer has a parallel interface. Therefore, a device is needed to convert the serial data from the CPU into the parallel data required by the printer. This conversion is accomplished by a serial-to-parallel translator -- an 8080-controlled device that converts serial data to parallel data and vice versa.

The serial interface requires microcode to perform and carry out functions such as top of form, line feed, select, print, etc. The printer will not operate unless this microcode has been loaded into the memory in the translator. In WPS/OIS, the microcode is loaded into the translator memory when the printer is powered on. In VS Systems with serial IOP, the microcode is not loaded until a document is queued to the printer.

NOTE: This product does not support the optional Printer Vertical Format Unit (VFU).

2.2 PC BOARD DESCRIPTIONS

Model 9093 is a standard interface box (part number 190-0314) with the addition of Special Products Interface Board (210-8036). A description of the CPU, I/O, interface, memory PC boards, and 210-8036 PC board used in the translator assembly follows.

2.2.1 210-7348 CPU Board

This board contains the 8080 CPU with its associated data and address busses. The board also contains the following:

- System timing circuits
- Status decoder
- Data and address buffers
- Refresh timing and parity generators and checker
- Part of the data link circuit including line drivers and receivers, data detection circuits and serial/parallel register

2.2.2 210-7446 I/O Board

This board contains portions of the data link logic including the following:

- Instruction register
- Byte timing register
- DMA timing circuits
- In and Out command decoders
- Printer control circuits
- External status gate
- Data out registers

2.2.3 210-7547-A or 210-7747-1A (16K and 32K Memory Boards)

These boards contain printer memory and memory control circuits. Included are the following:

- Bank select
- Address counter
- Refresh counter
- Address mux
- Data in and out buffers
- PROM memory with associated buffers

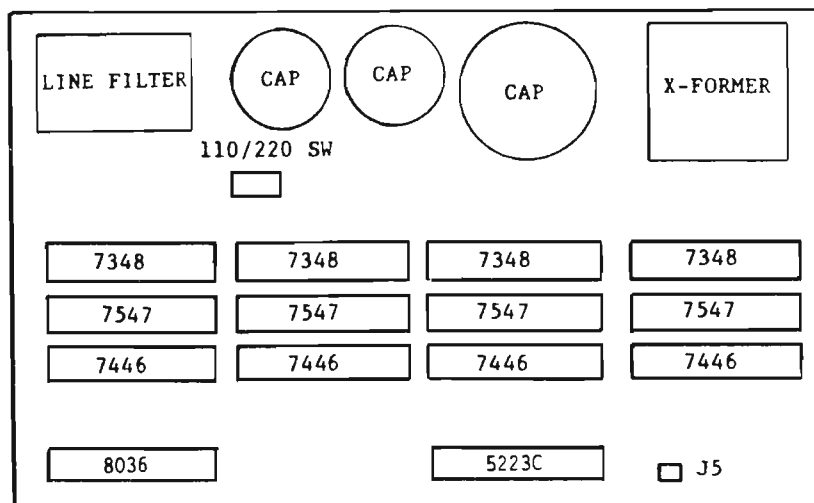


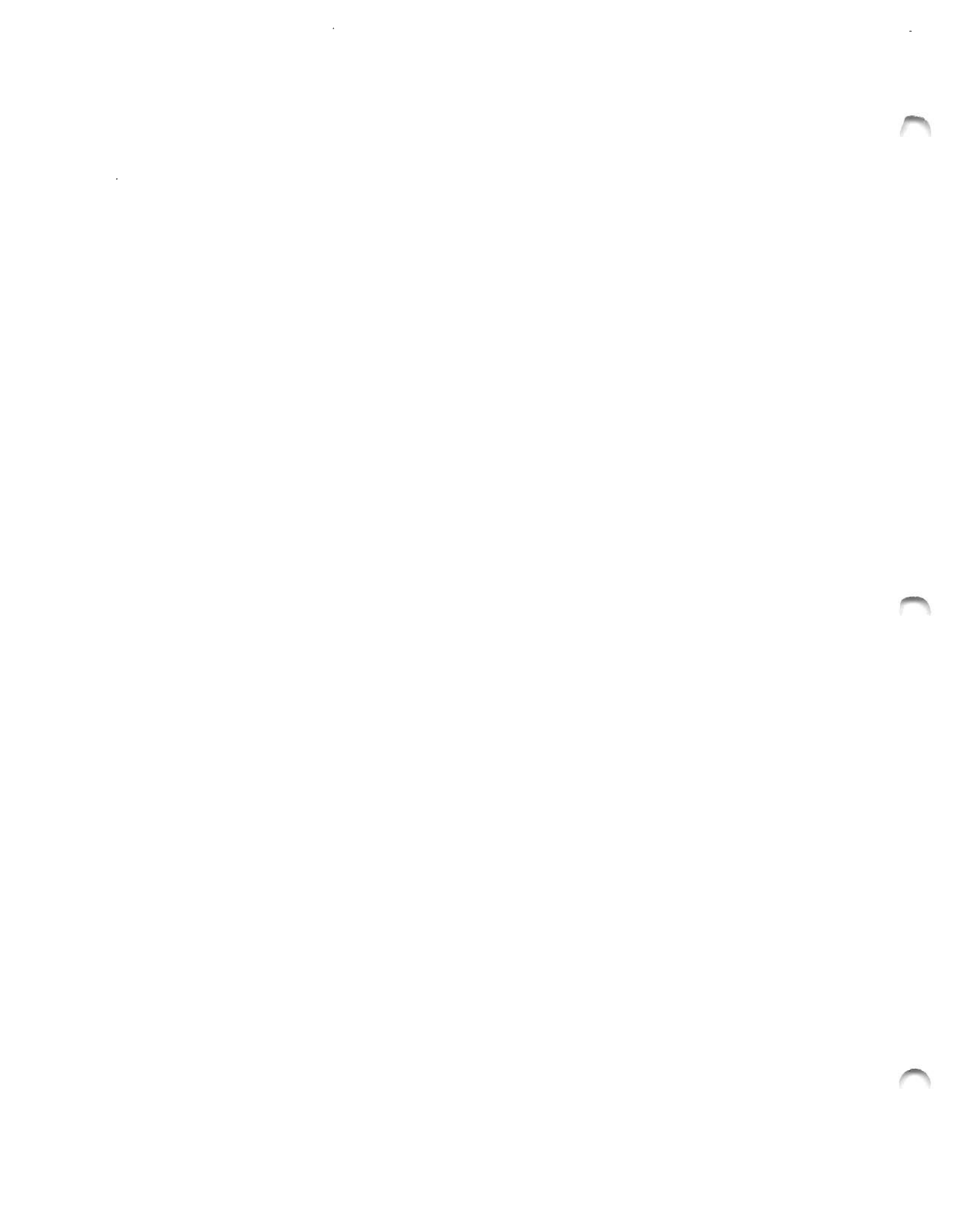
Figure 2. Interface Box Board Location

2.2.4 210-8036 Printer Interface Board

The 210-8036 board is a modified Special Products interface board that contains the SELECT circuitry used for selecting the interface box and other associated interface circuits.

2.2.5 510-5223-C Fingerboard

The 510-5223-C board has jumper wires installed to provide +5V to the 210-8036 PC board.



CHAPTER 3
SWITCHES, JUMPERS, AND LAMP

3.1 INTRODUCTION

Different printer models need different microcode to operate. This is provided for by switch settings on the 210-7348 CPU board. Also, the 210-7446 I/O board has switches that must be properly set and some jumper connections that must be made. Also, for the DP printer to be configured to the VS, switch settings must be made on the DP 1500 parallel interface board (Interface CCA) as described in Section 3.3. Perform the switch settings and jumper installations as outlined in the following sections.

3.2 SWITCH SETTINGS

Set the switch banks (SW1) on the 210-7348 CPU board and the 210-7446 I/O board as shown in Figure 3 (switches are set for device code 300, 5521 matrix printer). The switch bank (SW1) on the 210-8036 Printer Interface board should be set as shown in Figure 4 (three options are available -- even, odd, and no parity).

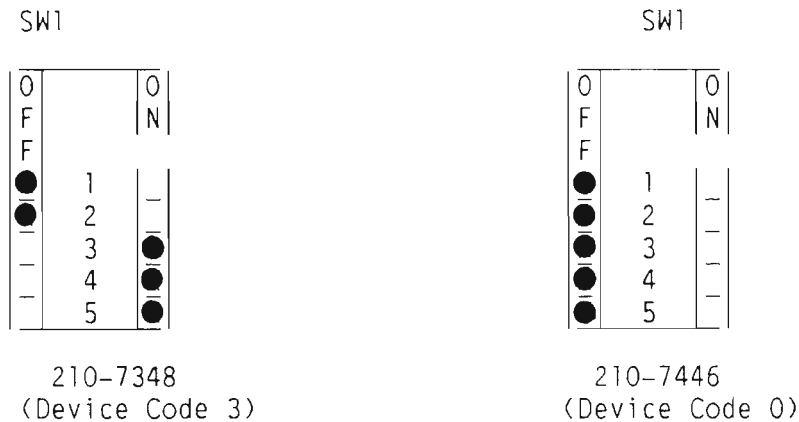


Figure 3. CPU and I/O Board Switch Settings

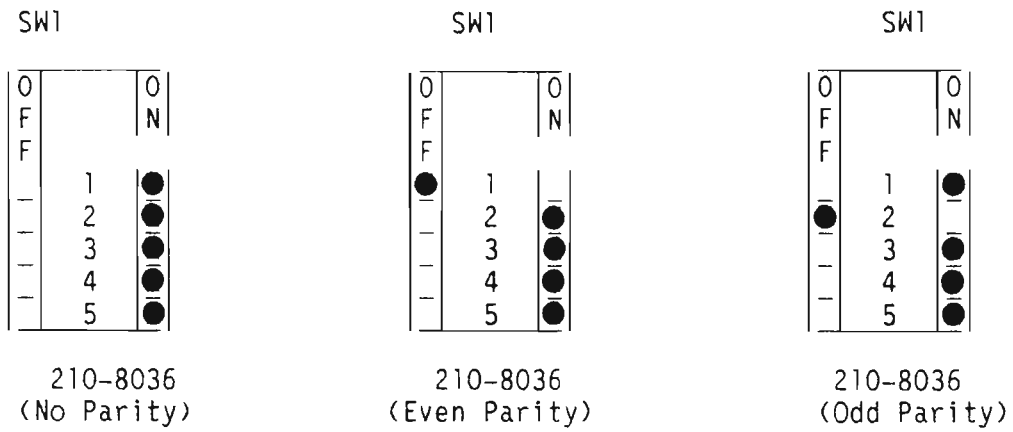


Figure 4. Printer Interface Board Switch Settings

3.3 INTERFACE CCA SWITCH SETTINGS

The configuration switches S4 through S8, on the Interface CCA (parallel interface board), are used to configure the printer according to the Wang VS requirements. Set S4 through S8 on the Interface CCA to the positions illustrated in Figure 5. To locate S4 through S8 on the CCA PC board, see Figure 6. The switches and their functions are listed and described in Table 2-3 of the Dataproducts BP Series Line Printer Maintenance Guide.

INTERFACE CCA PC BOARD SWITCH SETTINGS FOR THE WANG VS				
S4	S5	S6	S7	S8
1 OFF	1 ON	1 OFF	1 OFF	1 ON
2 OFF	2 OFF	2 OFF	2 OFF	2 OFF
3 OFF	3 OFF	3 ON	3 OFF	3 OFF
4 OFF	4 OFF	4 ON	4 OFF	4 OFF
5 ON	5 OFF	5 OFF	5 OFF	5 ON
	6 OFF	6 OFF	6 ON	6
	7 OFF	7 OFF	7 OFF	7
	8 OFF	8 OFF	8 OFF	8

Figure 5. Interface CCA Switch Settings

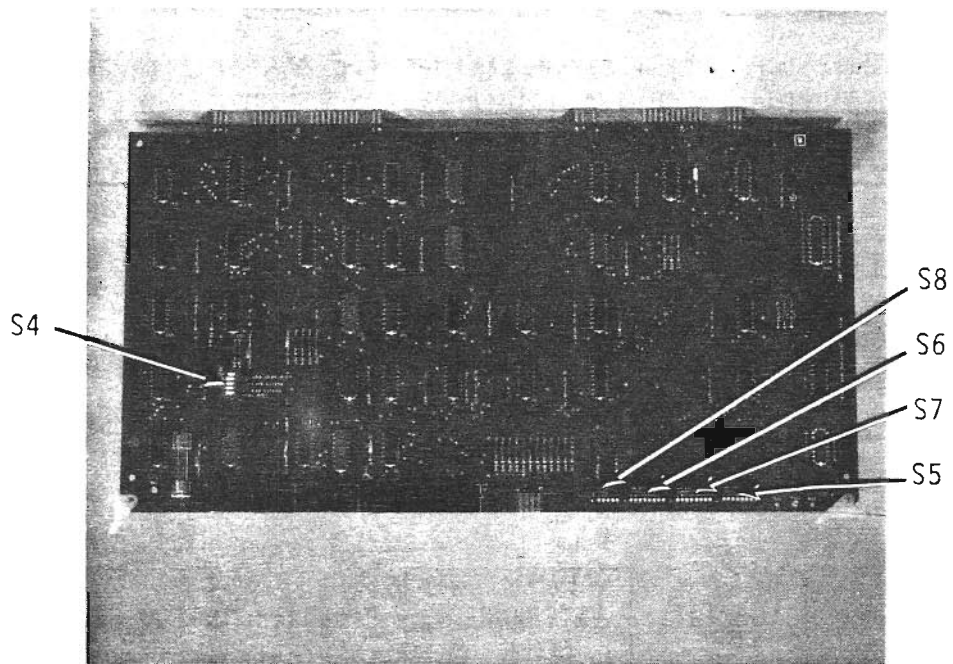


Figure 6. Interface CCA Switch Location

3.4 JUMPER SETTINGS

For the Model 9093 to interface the DP 1500 Printer to a Wang VS or WPS/OIS, you must install the following jumpers on the 7446 and the 7348 boards.

1. On the 7446 board, install jumpers as follows (See Figure 7):
 - a. A to B (L28-10 to L42-10)
D to E (L13-2 to L17-14)
H to J (L42-3 to L32-14)
 - b. Install jumper wire from L16 to Pin 12 to ground.
2. Install the fingerboard jumper (510-5223-C) as follows:
B to M
2 to 11

Figure 8 shows the cable for the printer to the interface box.

3.5 INDICATOR LAMP

The indicator lamp located at the rear of the interface box has two designations: when the interface box is powered on, the lamp is dimly illuminated; when the interface box is selected (by turning on the printer), the lamp is brightly illuminated.

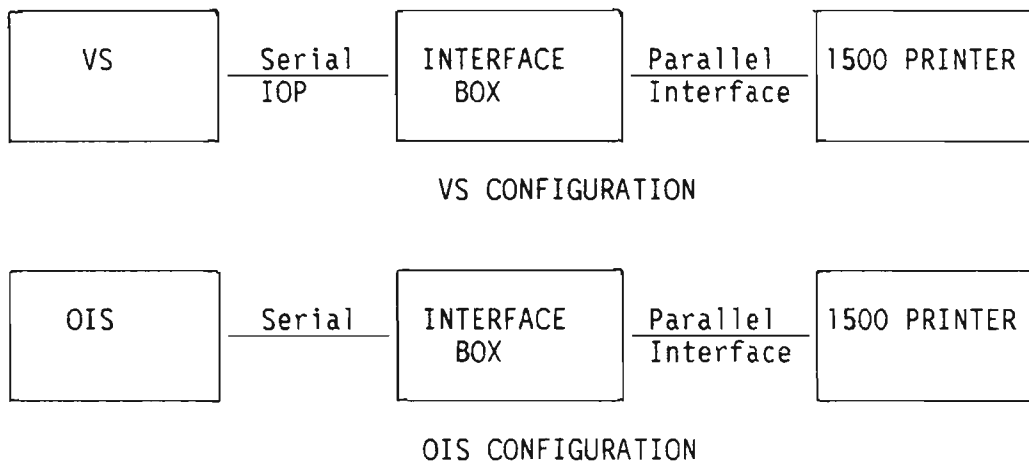


Figure 7. Connection Diagrams

50-Pin D-Type Connector	Signal Name	44 Position Finger Board
19	D1	A
3	RET	1
20	D2	B
4	RET	2
1	D3	C
2	RET	3
41	D4	D
40	RET	4
34	D5	E
18	RET	5
43	D6	F
42	RET	6
36	D7	H
35	RET	7
28	D8	J
48	RET	8
29	PAR	L
13	RET	10
30	PI	M
14	RET	11
38	STB	P
37	RET	13
23	DEMAND	R
7	RET	14
21	ON LINE	T
5	RET	16
22	READY	V
6	RET	18

Figure 8. Cable (Part Number 220-0438) for 1500 Printer to Interface Box



CHAPTER 4 INSTALLATION

4.1 INTRODUCTION

Replace or install equipment in accordance with the procedures and illustrations contained in this chapter. The following sections describe the installation of the interface box, along with cable connections and microcode installation.

4.2 INTERFACE BOX INSTALLATION

You can place the interface box on any level surface. Once you have properly positioned the interface box, perform the steps outlined in Section 4.3.

4.3 CABLE CONNECTIONS

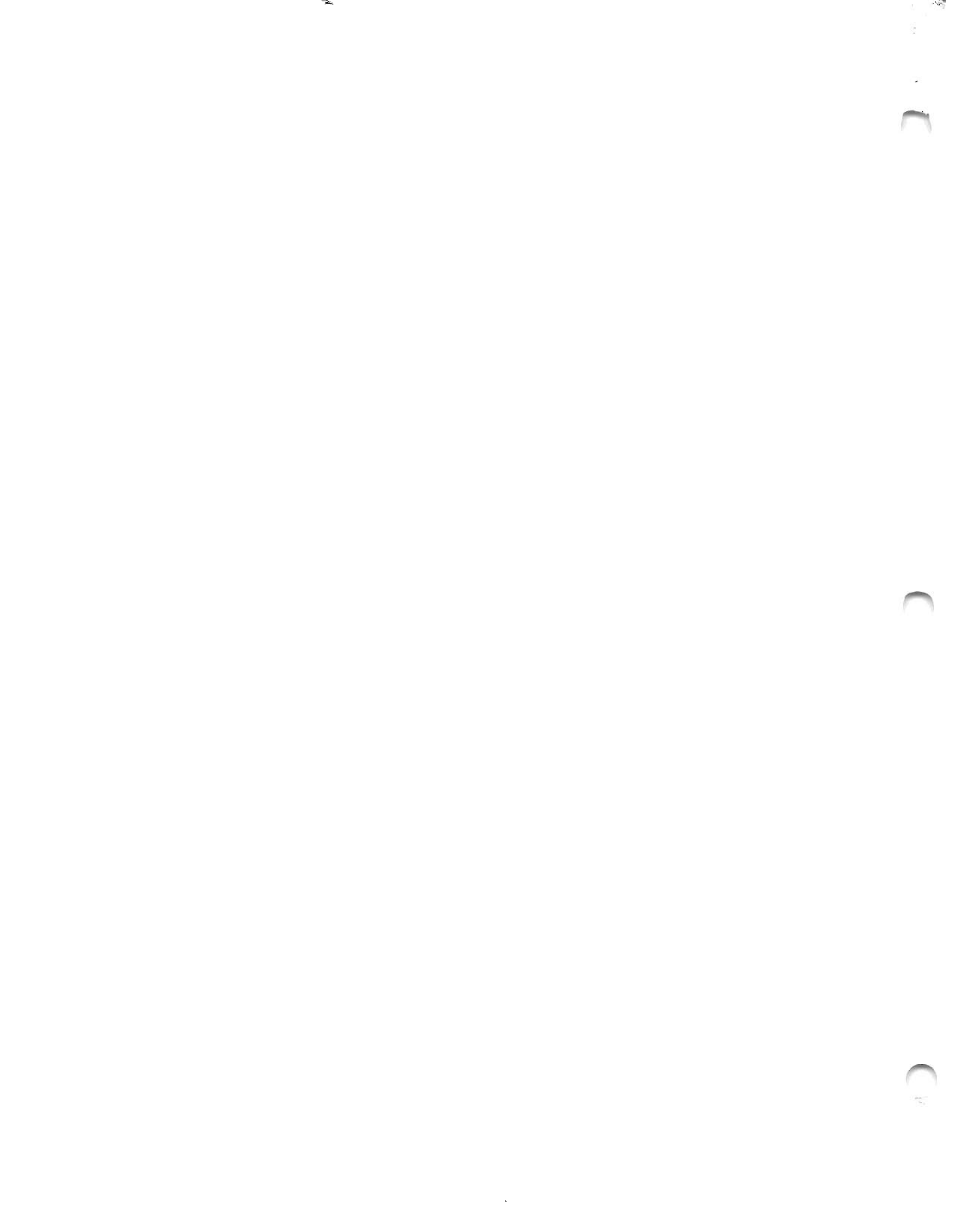
Make the following cable connections:

1. Connect a 25-foot dual coaxial cable between the Model 9093 and any available slave channel on the WPS/OIS or VS System.
2. Connect the I/O cable from the Model 9093 to the connector, located at the rear left side of printer.

4.4 VS MICROCODE INSTALLATION

Update the "@MC2221S" file by mounting the diskette (part number 706-0010) labelled "DSK: SP9088/9093 Microcode" (the volume is "PRINT", the library is "SPECIAL", and the file is "@MC2221S") onto the VS disk drive and copying the file onto the system fixed and removable disk.

NOTE: The "@MC2221S" file consists of a translation table that is loaded into the interface box when it is turned on.



CHAPTER 5 OPERATION

5.1 WPS/OIS

Follow these steps to operate the printer with WPS or OIS:

1. Turn on the 9093 interface box and the printer.
2. From the workstation, select "Control Functions". Then select "Device Control" from the Control Functions menu. The Device Control table should show that the 9093 is a Matrix Printer device, with a device type 300. If the table does not show this, check the switch setting on the 7446 and 7348 PC boards.
3. The printer is now ready to print. Select "Print Document" from the Word Processing main menu. Select "Line Printer" as the device type, and character set "2". Figure 9 shows the printable characters using character set 2.

```
! " # $ % & ' ( ) . * + , - . /
0 1 2 3 4 5 6 7 8 9 : ; < = > ?
@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ ] ^ _
` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ \
```

Figure 9. Printable Characters on WPS/OIS, Character Set 2

5.2 VS SYSTEMS

For VS Systems, you must install the microcode software (refer to Section 4.4).

Note: The modified @MC2221S file has to be loaded from the diskette supplied by Special Products.

Printing in the DP and WP modes is described in the following subsections.

NOTE: This product does not support the optional Printer Vertical Format Unit (VFU).

5.2.1 DP Mode

Follow these steps for printing in the DP mode:

1. The Model 9093 uses one of the channels of the Serial IOP (22V17), and it is emulated to use the software of a matrix printer (5521). Therefore, device 5521 should be included in the Serial IOP configuration. If 5521 is not shown under the 22V17 IOP, you have to run the "GENEDIT" program and include the 5521 in the configuration.
2. To test the 9093, run the "PRTEST" program, or simply enter SF key 15 for the Print Command screen. The printer should print after you select it.

5.2.2 WP Mode

For printing in the WP mode, the printer works using WP software on the VS System. To print a document, select "Print Document". Then select "Line Printer" as the device type, and character set "2".

CHAPTER 6 TROUBLESHOOTING

When a printer fails to operate, the problem could lie in the master CPU or IOP, in the cables connecting the serial/parallel translator to the CPU or to the printer, in the translator itself, or in the printer itself. A failure of the printer to IPL generally indicates that no code is being loaded into it. This condition could be caused by a problem in the master controller, in the translator or in the cabling between the two.

If the problem appears to be on the translator, there is no easy way to troubleshoot this unit in the field, except by substituting suspected bad modules with known good ones. In the case of a WPS/OIS, run the "Slave Channel Diagnostic" to check the interface box. In the case of a VS System, run the "Printer Test Diagnostic" to check the interface box. Check all cabling and internal voltages before you replace a board. Check the switches and jumpers on a replacement board for correct configuration before you insert it.

NOTE: Wang does not sell or service the Dataproducts 1500 Band Printer.



APPENDIX A
BILL OF MATERIALS

The following constitutes a copy of the Bill of Materials for the Model 9093 Dataproducts 1500 Band Printer Interface.

REQUESTOR ID *** 190-0333

SINGLE LEVEL BILL OF MATERIAL

PAGE 100

OPTIONS- EFFECTIVITY & DATE ITEM TYPE 1

PARENT ITEM NUMBER	ITEM DESCRIPTION	ITEM TYP	ITEM CLS	ITEM STAT	UM	ENG MFG REV	DEM ISS REV	DSGN D43	OPR	CTL	SRCE	NUMBER	REV LVL	NUM	EFF	DATE
190-0333	9093 INTOP PSC-8P1500 PTR 1	1	2	EA	AA	1	1									
FIND COMPONENT NO	ITEM NUMBER	ITEM Q	CLS T	JTY	UM	TYP/J	OP	SC	OFF	CNTR	OPER	CTL	CTL	CTL	CTL	REV DATE
000 289-0360	SP9093 VS TO PSC-8P-1500	1	1	1.0000	EA	1	00	00	000			1	1	1	1	06/27/84
000 291-0203	AUTO ENCL: SP9093 OP 1500	1	1	1.0000	EA	1	00	00	000			1	1	1	1	08/23/84

REQUESTOR ID *** 291-0203

SINGLE LEVEL BILL OF MATERIAL

OPTIONS- EFFECTIVITY & DATE ITEM TYPE 1

PARENT ITEM NUMBER	ITEM DESCRIPTION	ITEM TYP	ITEM CLS	ITEM STAT	UM	ENG MFG REV	DEM ISS REV	DSGN D43	OPR	CTL	SRCE	NUMBER	REV LVL	NUM	EFF	DATE
291-0203	AUTO ENCL: SP9093 OP 1500 PTR INTF	1	2	EA	AA	1	1									
FIND COMPONENT NO	ITEM NUMBER	ITEM Q	CLS T	JTY	UM	TYP/J	OP	SC	OFF	CNTR	OPER	CTL	CTL	CTL	CTL	REV DATE
000 804-C006	SP9093 DP 1500 PTR INTF	1	1	1.0000	EA	1	00	00	000			1	1	1	1	12/05/83