INTERCONNECTION GUIDE

HP 7470A
Graphics Plotter

RS-232-C/CCITT V.24

HP-IB
DESIGNED FOR
SYSTEMS

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Introduction

This interconnection guide is designed to help you connect the HP 7470A Graphics Plotter to your computer and verify communication between them. It is not the purpose of this guide to teach general interfacing theory. Chapters 9 and 10 of the Interfacing and Programming Manual contain detailed information about HP-IB and RS-232-C interfacing.

General instructions which pertain to all systems are given in the following paragraphs. Detailed instructions for connecting the HP 7470A to specific computers follow the general instructions. They are organized alphanumerically by computer manufacturer's name and model number and numerically by plotter interface option number.

Each detailed instruction set lists a required minimum system configuration, gives connection instructions for the hardware, and provides a short program to verify communication between the computer and the plotter. The programs contained in this manual are written with the intention of establishing communication between the computer and the plotter and instructing the plotter to label the message "COMMUNICATION OK". Each program is written in a programming language that is accessible to the majority of users of a specific computer. The programs should not be considered solutions for your general programming needs. Consult the Interfacing and Programming Manual for more general programming and interfacing information.

What If My Computer Isn't Listed?

If your computer isn't listed, there is a good possiblity that it still can be interfaced to the HP 7470A. First, determine which kinds of communication interfaces are available for your computer. If your computer supports an RS-232-C/CCITT V.24 interface or an ANSI/IEEE 488-1978 (HP-IB) interface, then it probably can be interfaced to the HP 7470A. Read the manual that describes the communications equipment for your computer, and then determine how information is sent and received. Next, read either Chapter 9 or 10 in the HP 7470A Interfacing and Programming Manual (depending on which interface you're using) to get a better understanding of how information is sent and received by the plotter. In the RS-232-C environment, pay particular attention to the cabling requirements between the computer and the plotter. Then, choose a computer configuration in this guide that appears similar to yours and use this as a guideline for creating your own communication verification program.

What If My System Configuration Doesn't Match the One in the Guide?

There are many variables in computer systems. Often substituting one piece of hardware or software for another can cause communication problems. Therefore, if you're going to make substitutions, be aware that these may affect the operation of the system or the communication verification program.

If you are having problems getting your system to work with substitute hardware, carefully read the manual on the substitute equipment. Try to identify the difference between the hardware you are using and that which is recommended. Also consult either Chapter 9 or 10 of the Interfacing and Programming Manual to understand what is required to communicate with the plotter. Again, in the RS-232-C environment, pay particular attention to the cabling requirements between the computer and the plotter. Finally, adapt the interconnection and programming information for use with your hardware configuration.

If you are having problems getting the program to work with substitute software, read the software manual, paying particular attention to the sections dealing with programming the communications hardware. There are usually two parts to this type of program — opening the communications port and writing to the communications port. Opening the communications port may require specifying a number of interface parameters, such as baud rate, parity, etc. For more information on what the plotter requires for communication, see Chapter 9 or 10 of the Interfacing and Programming Manual. Writing to the communications port is usually straightforward. The plotter communicates using ASCII code. Find the output statement in your language that can send an ASCII string to the communications port. Then adapt the communication verification program for use with your operating system and/or programming language.

I've Done Everything You Said and It Still Doesn't Work . . .

If you have connected the system as shown, running the verification program should cause the plotter to label "COMMUNICATION OK". If it doesn't, there are a number of things to check:

Is your computer working properly?

• Check the computer by running a program that you know works.

Is your communications hardware and cable working properly?

• Check the interface and cable with another peripheral.

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- Check that none of the connectors on the computer interface, cable, or plotter interface are damaged.
- Try another cable if one is available.
- See that the switches are set properly on your communications hardware.
- Make sure the card is in the proper slot in the computer.

Is your plotter working properly?

- The Operator's Manual describes how to perform the HP 7470A plotter self-test.
- Make sure the switches on the back of the plotter are set properly.
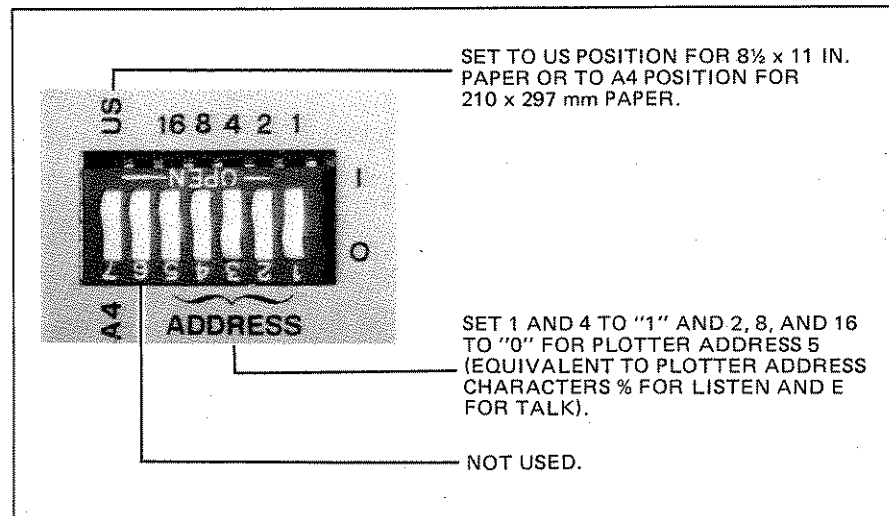- Check to see that the plotter is turned on.

Are you using the proper operating system and programming language?

- Check to see if you are using the operating system and/or programming language listed in the guide.

If you are still having problems, contact your salesperson. Your salesperson will probably be able to help solve your problem or refer you to someone who can.

General Instructions

The switch settings shown in the following illustration should be considered as part of the specific instruction set for all HP 7470A Option 002 interconnection examples.
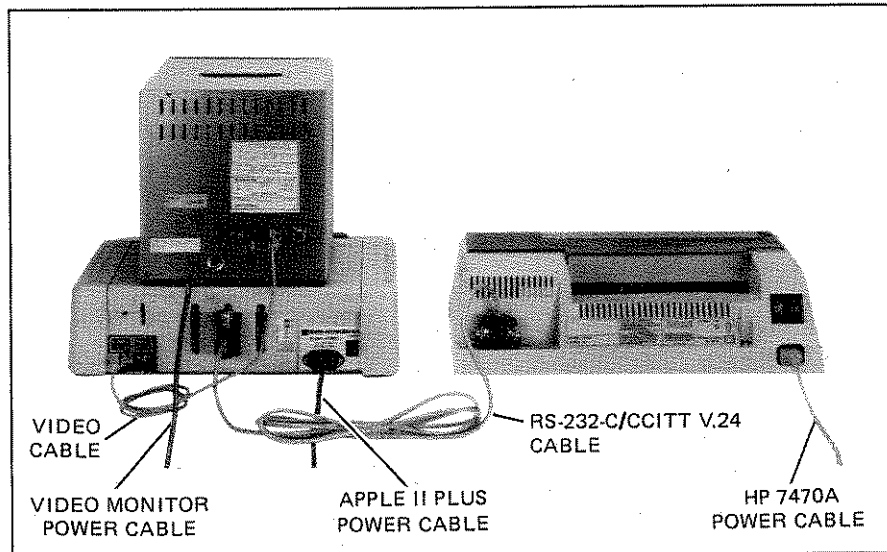

SET TO US POSITION FOR 8½ x 11 IN. PAPER OR TO A4 POSITION FOR 210 x 297 mm PAPER.

SET 1 AND 4 TO "1" AND 2, 8, AND 16 TO "0" FOR PLOTTER ADDRESS 5 (EQUIVALENT TO PLOTTER ADDRESS CHARACTERS % FOR LISTEN AND E FOR TALK).

NOT USED.

Computer: Apple II Plus
Plotter Interface Option: HP 7470A-001
(RS-232-C/CCITT V.24)

Minimum System Configuration

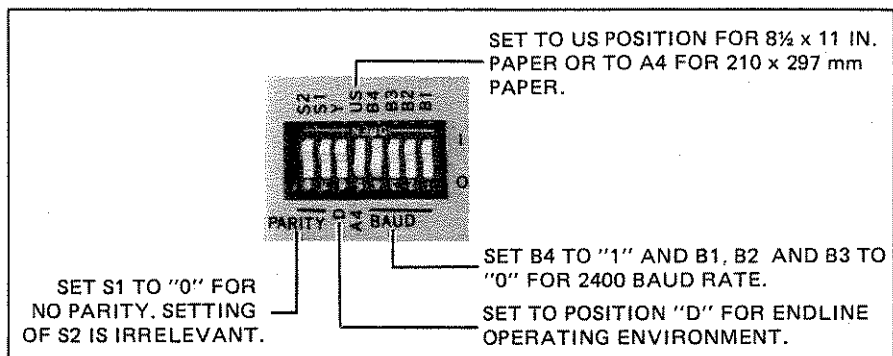| Equipment	Model/Order Numbers
Graphics Plotter	HP 7470A-001
Apple II Plus Computer	A2S1016 or A2S1016P
Video Monitor	VM 4509 or equivalent
Apple Super Serial Card	A2B0044
Male-to-Male RS-232-C Cable	HP 8120-3258

Connection Instructions

The illustration below shows how the HP 7470A-001 plotter is to be connected to your Apple II Plus computer.

RS-232-C/CCITT V.24 Cable Connection

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Set the plotter switches as follows:

SET TO US POSITION FOR 8½ x 11 IN. PAPER OR TO A4 FOR 210 x 297 mm PAPER.

SET S1 TO "0" FOR NO PARITY. SETTING OF S2 IS IRRELEVANT.

SET B4 TO "1" AND B1, B2 AND B3 TO "0" FOR 2400 BAUD RATE.

SET TO POSITION "D" FOR ENDLINE OPERATING ENVIRONMENT.

Install the Apple Super Serial Card in slot #1. Set the two banks of switches on the Super Serial Card as follows:

	1	2	3	4	5	6	7
SW1	OFF	ON	OFF	ON	OFF	ON	ON
SW2	ON	OFF	OFF	ON	OFF	OFF	OFF

This sets the Super Serial Card to 2400 baud, no parity, 8 data bits, etc.

Check to see that the arrow on the Super Serial Card's jumper block is pointing toward the word "TERMINAL." If it isn't, reverse its direction.

NOTE: Pressing the **RESET** key on your Apple II Plus computer turns on the plotter's **ERROR** light. This error condition does not affect the operation of the plotter. The error may be cleared and the error light turned off by pressing the **ENTER** button simultaneously with the **VIEW** button on the plotter.

Communication Verification

Load pens and paper and run the following Applesoft BASIC program:

```
10   PR# 1
20   PRINT "IN;SP1;PA500,500;"
30   PRINT "LBCOMMUNICATION OK" + CHR$(3)
40   PRINT "SP0;PA0,0;"
50   PR# 0
60   END
```

Plotter labels: COMMUNICATION OK

Computer: Apple II Plus
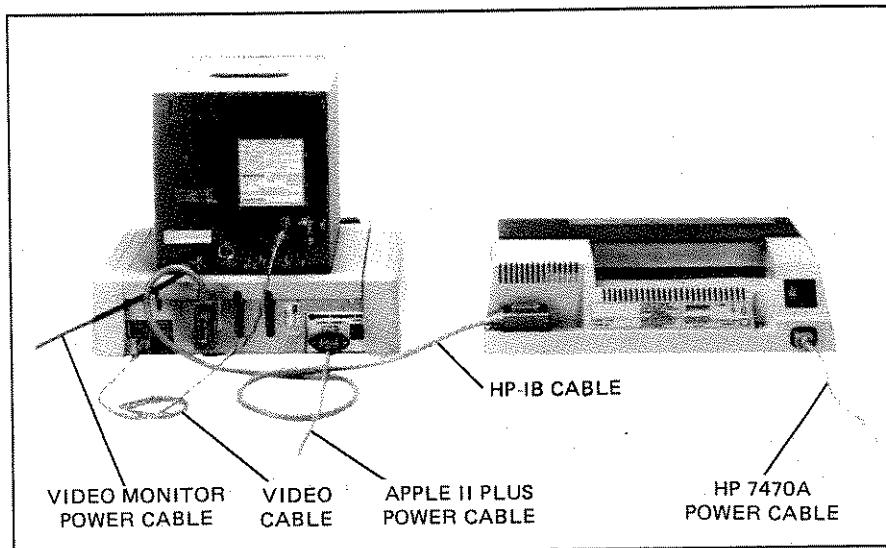# Plotter Interface Option: HP 7470A-002
(HP-IB)

Minimum System Configuration

Equipment	Model/Order Numbers
Graphics Plotter	HP 7470A-002
Apple II Plus Computer	A2S1016 or A2S1016P
Video Monitor	VM 4509 or equivalent
Apple II/II Plus IEEE-488	A2B0015
Interface Card	
HP-IB Cable	HP 10833A,B,C, or D

Connection Instructions

The illustration below shows how the HP 7470A-002 plotter is to be connected to your Apple II Plus computer.

NOTE: It is assumed the IEEE-488 interface card is installed in connector slot #3.

HP-IB Cable Connection

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Communication Verification

Load pens and paper in the plotter and run the following Applesoft BASIC program.

```
10 PR# 3: IN# 3
20 PRINT "WT%" + CHR$ (26);
30 PRINT "IN;SP1;PA500,500;";
40 PRINT "LBCOMMUNICATION OK" + CHR$(3);
50 PRINT "SP0;PA0,0;";
60 PRINT CHR$(13);
70 PR# 0: IN# 0
80 END
```

Plotter labels: COMMUNICATION OK
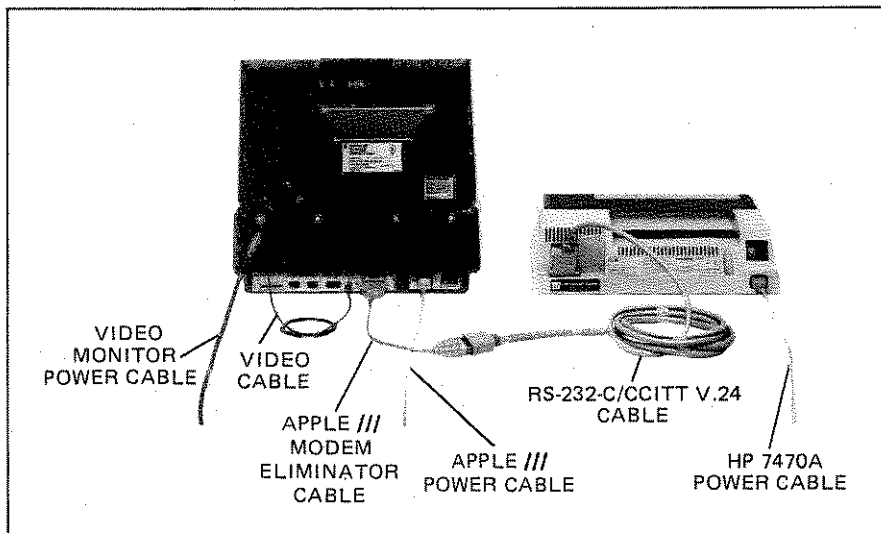
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Computer: Apple *III*
Plotter Interface Option: HP 7470A-001
(RS-232-C/CCITT V.24)

Minimum System Configuration

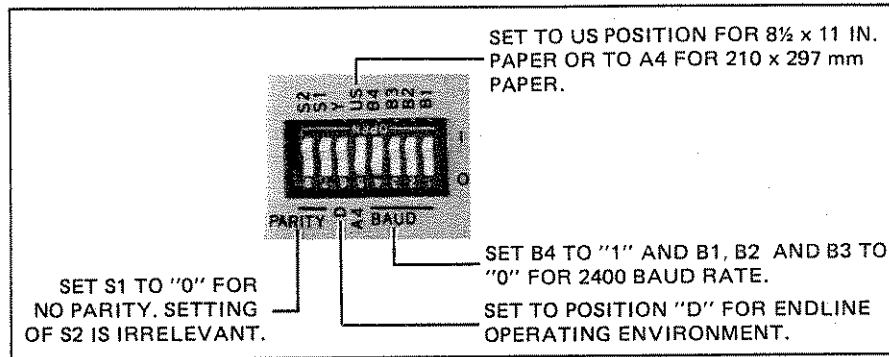| Equipment	Model/Order Numbers
Graphics Plotter	HP 7470A-001
Apple *III* Computer	A3S0128
Monitor *III*	A3M0005
Male-to-Male RS-232-C Cable	HP 8120-3258
Apple *III* Modem Eliminator Cable	A3M0019

Connection Instructions

The illustration below shows how the HP 7470A-001 plotter is to be connected to your Apple *III* Computer.

RS-232-C/CCITT V.24 Cable Connection

Set the plotter switches as shown below.

SET TO US POSITION FOR 8½ x 11 IN. PAPER OR TO A4 FOR 210 x 297 mm PAPER.

SET B4 TO "1" AND B1, B2 AND B3 TO "0" FOR 2400 BAUD RATE.

SET S1 TO "0" FOR NO PARITY. SETTING OF S2 IS IRRELEVANT.

SET TO POSITION "D" FOR ENDLINE OPERATING ENVIRONMENT.

Using the Apple *III* System Configuration Program, modify the RS-232-C Serial Driver by setting the Driver Configuration Block as follows (for more details, see the Apple *III* Standard Device Drivers Manual):

Byte	0	1	2	3	4	5	6	7	8	9	A	B
Value	0A	2E	00	00	00	00	00	00	00	00	00	80

This sets the driver to 2400 baud, 7 data bits, space for parity, and hardwire handshaking.

Communication Verification

Run the following Apple Business BASIC program.

```
10 OPEN #1, ".RS232"
20 PRINT #1; "IN;SP1;PA500,500;"
30 PRINT #1; "LB COMMUNICATION OK" + CHR$(3)
40 PRINT #1; "PA0,0;SP0;"
50 CLOSE #1
60 END
```

Plotter labels: COMMUNICATION OK

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Computer: Commodore PET 2001
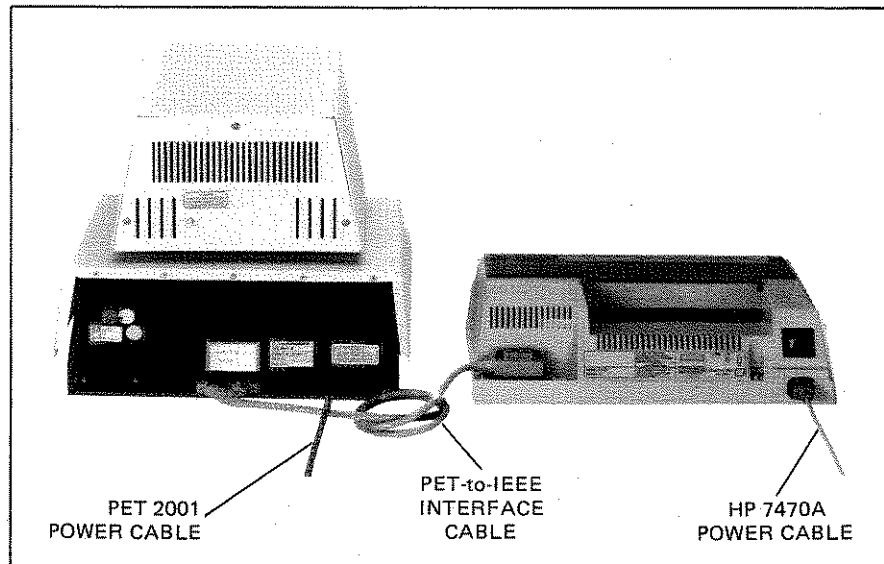# Plotter Interface Option: HP 7470A-002
(HP-IB)

Minimum System Configuration

Equipment	Model or Part Number
Graphics Plotter	HP 7470A-002
Commodore PET Computer	PET 2001
PET-to-IEEE Interface Cable	320101

Connection Instructions

The illustration below shows how the HP 7470A-002 plotter is to be connected to your Commodore PET 2001 computer.

PET-to-IEEE Cable Connection

Communication Verification

Load pens and paper in the plotter and run the following BASIC program.

```
10 OPEN 5,5
20 PRINT#5,"IN;SP1;"
30 PRINT#5,"PA500,500;"
40 PRINT#5,"LBCOMMUNICATION OK";CHR$(3)
50 END
```

Plotter labels: COMMUNICATION OK

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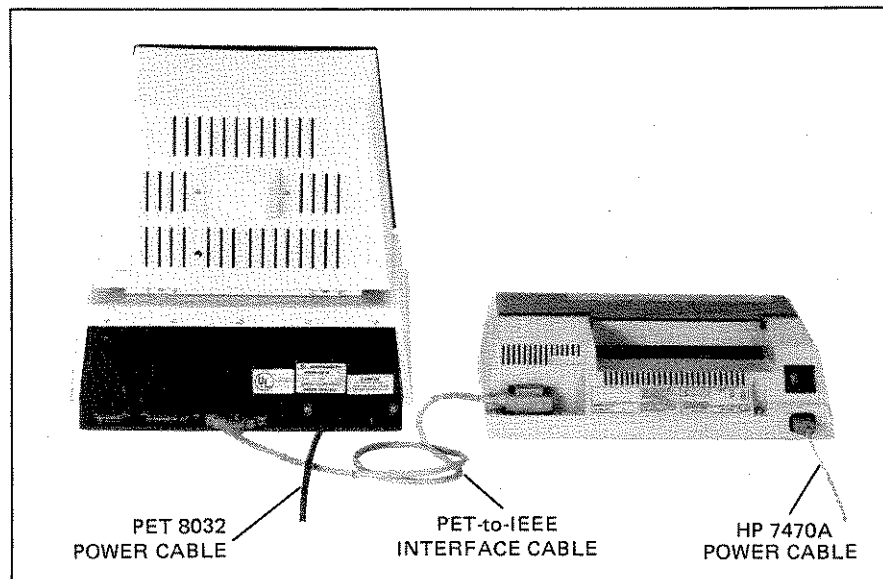
Computer: Commodore PET 8032
Plotter Interface Option: HP 7470A-002
(HP-IB)

Minimum System Configuration

Equipment	Model or Part Number
Graphics Plotter	HP 7470A-002
Commodore PET Computer	PET 8032
PET-to-IEEE Interface Cable	320202

Connection Instructions

The illustration below shows how the HP 7470A-002 plotter is to be connected to your Commodore PET 8032 computer.

PET-to-IEEE Cable Connection

Communication Verification

Load pens and paper in the plotter and run the following BASIC program.

```
10 OPEN 5,5
20 PRINT#5, "IN;SP1; "
30 PRINT#5, "PA500,500; "
40 PRINT#5, "LBCOMMUNICATION OK";CHR$(3)
50 END
```
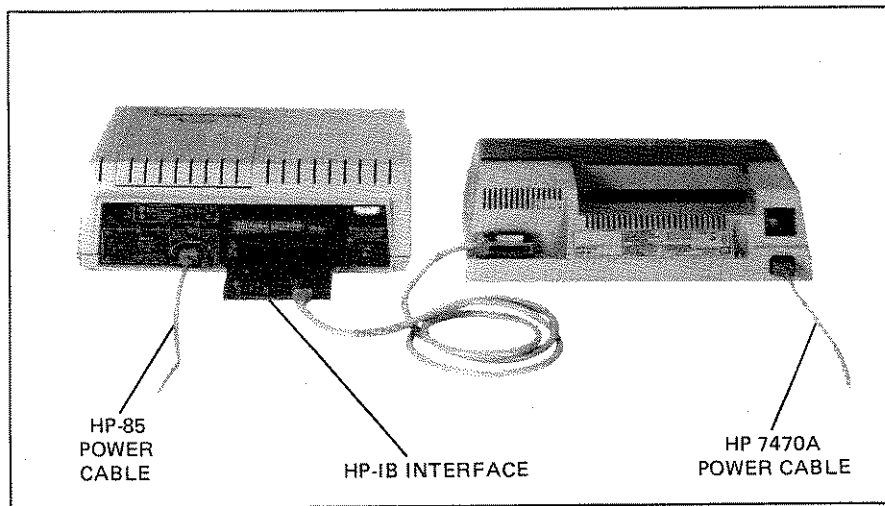
Plotter labels: COMMUNICATION OK

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Computer: HP-85
Plotter Interface Option: HP 7470A-002
(HP-IB)

Minimum System Configuration

Equipment	Model Number
Graphics Plotter	HP 7470A-002
Personal Computer	HP-85
ROM Drawer	HP 82936A
Plotter/Printer ROM	HP 00085-15002
HP-IB Interface	HP 82937A

Connection Instructions

The illustration below shows how the HP 7470A-002 plotter is to be connected to your HP-85 computer.

HP-IB Interface Cable Connection

Communication Verification

Load pens and paper in the plotter and run the following BASIC program.

```
10 PLOTTER IS 705
20 PEN 1
30 MOVE 5,10
40 LABEL "COMMUNICATION OK"
50 END
```

Plotter labels: COMMUNICATION OK

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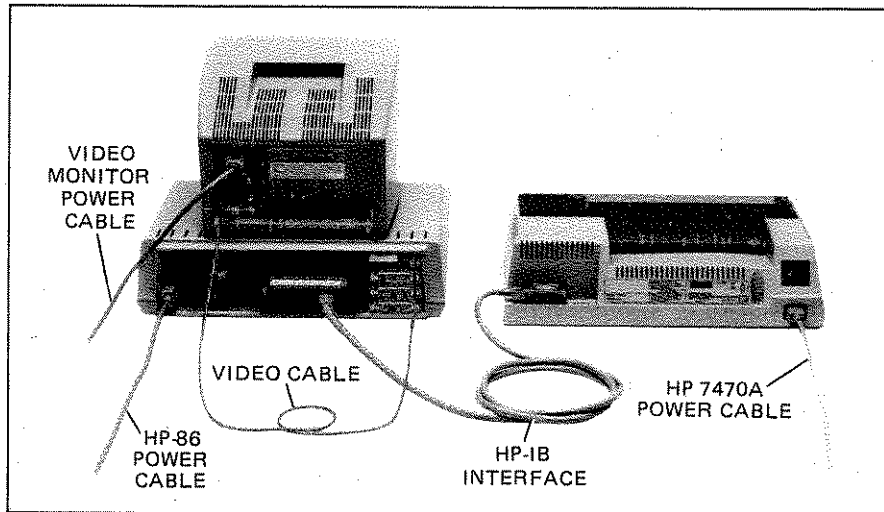# Computer: HP-86
Plotter Interface Option: HP 7470A-002
(HP-IB)

Minimum System Configuration

Equipment	Model Number
Graphics Plotter	HP 7470A-002
Personal Computer	HP-86
Video Monitor	HP 82913A
ROM Drawer	HP 82936A
Plotter ROM	HP 00087-15002
HP-IB Interface	HP 82937A

Connection Instructions

The illustration below shows how the HP 7470A-002 plotter is to be connected to your HP-86 computer.

NOTE: The select code of the HP-IB interface should be set to 3.

HP-IB Interface Cable Connection

Communication Verification

Load pens and paper in the plotter and run the following BASIC program.

```
10 PLOTTER IS 305
20 PEN 1
30 MOVE 5,10
40 LABEL "COMMUNICATION OK"
50 END
```
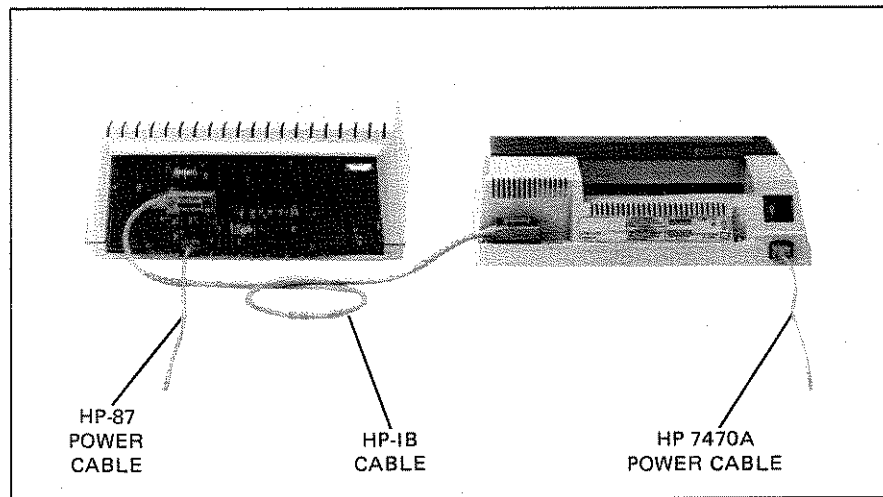
Plotter labels: COMMUNICATION OK

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Computer: HP-87
Plotter Interface Option: HP 7470A-002
(HP-IB)

Minimum System Configuration

Equipment	Model Number
Graphics Plotter	HP 7470A-002
Personal Computer	HP-87
ROM Drawer	HP 82936A
Plotter ROM	HP 00087-15002
HP-IB Cable	HP 10833A,B,C, or D

Connection Instructions

The illustration below shows how the HP 7470A-002 plotter is to be connected to your HP-87 computer.

HP-IB Interface Cable Connection

Communication Verification

Load pens and paper in the plotter and run the following BASIC program.

```
10 PLOTTER IS 705
20 PEN 1
30 MOVE 5,10
40 LABEL "COMMUNICATION OK"
50 END
```

Plotter labels: COMMUNICATION OK

Computer: HP 125
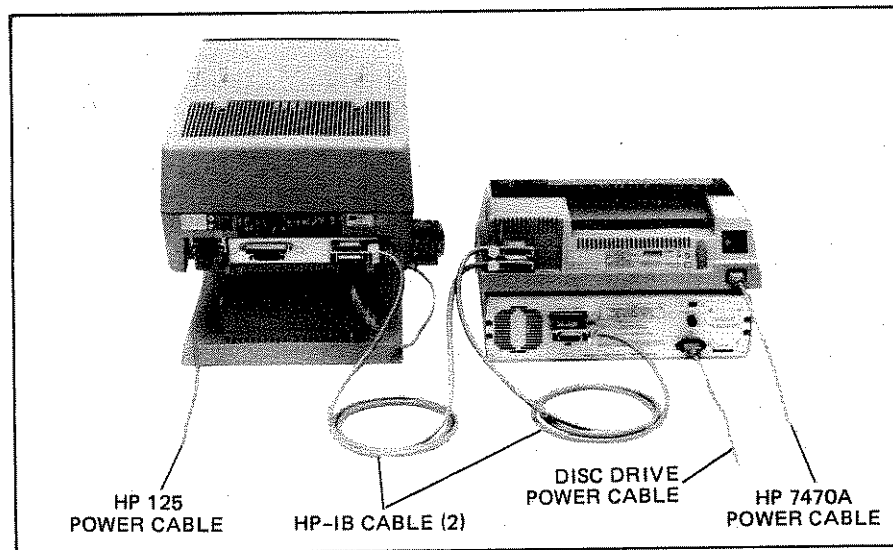# Plotter Interface Option: HP 7470A-002
(HP-IB)

Minimum System Configuration

Equipment	Model/Order Numbers
Graphics Plotter	HP 7470A-002
Personal Computer	HP 125
Disc Drive	HP 82901M
HP-IB Cable (2 required)	HP 10833A,B,C, or D
GRAPHICS/125	HP 45532A

Connection Instructions

The illustration below shows how the HP 7470A-002 plotter is to be connected to your HP 125 computer.

HP-IB Cable Connection

Communication Verification

Use GRAPHICS/125 to verify communication. See the GRAPHICS/125 manual for examples.

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Computer: HP 9826A
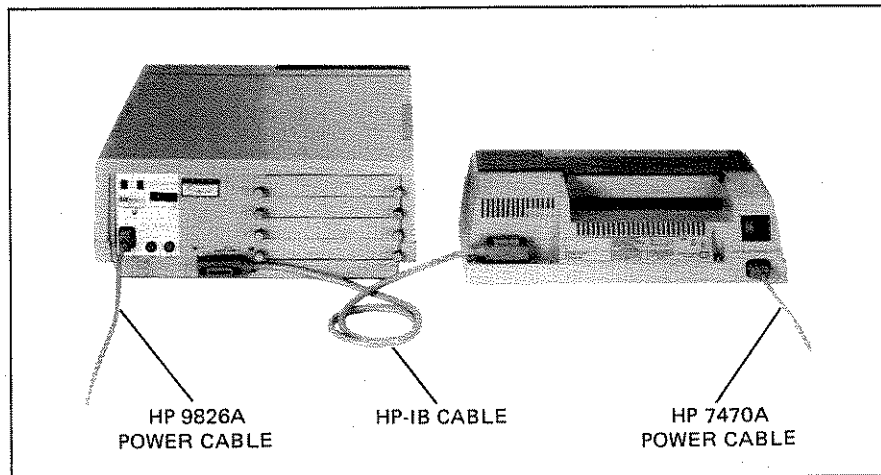# Plotter Interface Option: HP 7470A-002
(HP-IB)

Minimum System Configuration

Equipment	Model Number
Graphics Plotter	HP 7470A-002
Desktop Computer	HP 9826A (BASIC or HPL)
HP-IB Cable	HP 10833A,B,C, or D

Connection Instructions

The illustration below shows how the HP 7470A-002 plotter is to be connected to your HP 9826A computer.

HP 9826A POWER CABLE   HP-IB CABLE   HP 7470A POWER CABLE

HP-IB Interface Cable Connection

Communication Verification

Load pens and paper in the plotter and run the program which corresponds with the currently selected language.

BASIC

```
10 PLOTTER IS 705, "HPGL"
20 PEN 1
30 MOVE 5,10
40 LABEL "COMMUNICATION OK"
50 END
```

Plotter labels: COMMUNICATION OK

HPL

```
0: pclr
1: pen# 1
2: plt 1,2,1
3: lbl "COMMUNICATION OK"
4: end
```
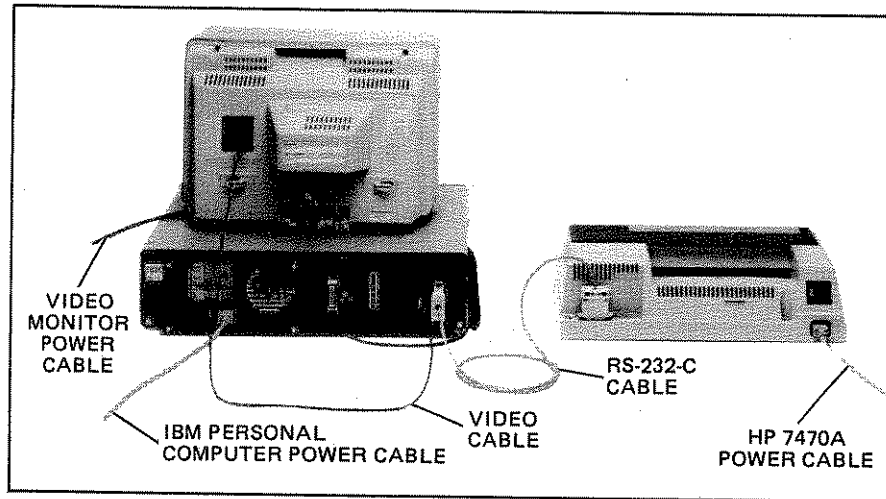
Plotter labels: COMMUNICATION OK

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Computer: IBM Personal Computer
Plotter Interface Option: HP 7470A-001
(RS-232-C/CCITT V.24)

Minimum System Configuration

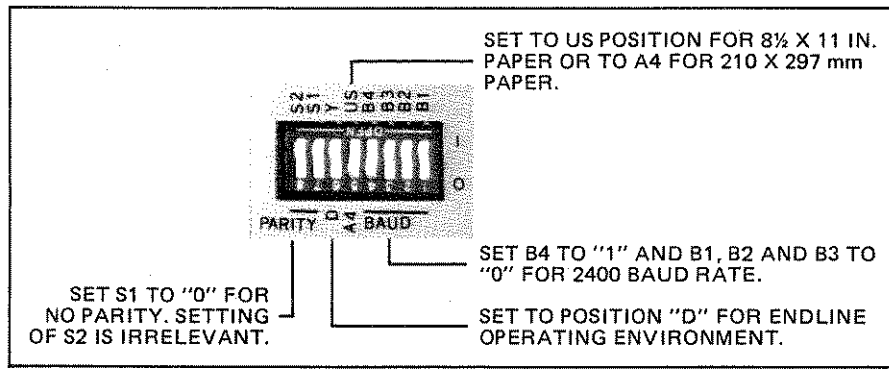| Equipment	Model/Order Numbers
Graphics Plotter	HP 7470A-001
IBM Personal Computer	—
Video Monitor	ZVM-121 or equivalent
IBM Asynchronous Communications Adapter	—
Male-to-female RS-232-C Cable	HP 17255A

Connection Instructions

The illustration below shows how the HP 7470A-001 plotter is to be connected to your IBM Personal Computer.

RS-232-C Cable Connection

Communication Verification

Set the plotter switches as shown below, load pens and paper, and run the following BASIC 1.10 program.

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SET TO US POSITION FOR 8½ X 11 IN. PAPER OR TO A4 FOR 210 X 297 mm PAPER.

SET B4 TO "1" AND B1, B2 AND B3 TO "0" FOR 2400 BAUD RATE.

SET S1 TO "0" FOR NO PARITY. SETTING OF S2 IS IRRELEVANT.

SET TO POSITION "D" FOR ENDLINE OPERATING ENVIRONMENT.

```
10 OPEN "COM1:2400,S,7,1,RS,CS65535,DS,CD" AS #1
20 PRINT #1, "IN;SP 1; PA 500,500;"
30 PRINT #1, "LBCOMMUNICATION OK"+CHR$(3)
40 PRINT #1, "SP 0;PA 0,0;"
50 END
```

Plotter labels: COMMUNICATION OK

Notes