Worldwide Response Center

HP 3000 APPLICATION NOTE #71

ASYNCHRONOUS CABLING

HEWLETT PACKARD

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Asynchronous Cabling

Introduction

Cables are a necessary part of computer life. It is not always obvious as to what cable is necessary for every situation. This Application Note will focus on the ASYNCHRONOUS cabling aspect of the various Hewlett-Packard computer families.

This Application Note is broken into four areas. The first area is the peripheral to system link; the second is the modem to system link; the third is the multiplexer to system link and the fourth is the multiplexer to peripheral link. In each of the four areas we will identify the cables necessary for the Hewlett-Packard CLASSIC computer family (Series 3X, 4X, 5X, 6X and 7X) and the Hewlett-Packard XL computer family the HP 3000 series 9XX.

Terminology Overview

Computer equipment connections are orientated in two ways. The first is called Data Termination Equipment or DTE. All terminal and printers are DTE type products. Usually computers fall into this category but the Hewlett-Packard computer family does not. They fall into the second category called Data Communication Equipment, or DCE, along with devices such as modems and multiplexers.

To hook a DCE to a DTE a straight through cable is necessary. Due to this, terminals and printers require a straight through cable when attaching to an ADCC, ATP or DTC port on a Hewlett-Packard computer system.

To attach a terminal or printer to an HP modem or a multiplexer a straight through cable is needed since modems and multiplexers are DCE devices and terminals and printers are DTE devices.

To attach a modem to an HP 3000 system however, we need a special cross over cable. We need this type of cable because we have a DCE attached to another DCE device.

Remember: DCE to DTE requires a straight through cable that is pin 1 to pin 1, pin 2 to pin 2, pin 3 to pin 3 and so on.

DCE to DCE requires a special CROSS OVER cable to allow the signals to be routed to the proper pins on the other device.

DTE's are : Terminals and RS-232 Printers

DCE's are : ADCC, ATP and DTC ports, Modems, Multiplexers and Data Switches.

Section I PERIPHERAL To SYSTEM Link

Classic Systems

For ADCC or ATP ports configured for use with a TERMINAL or an RS-232 PRINTER we must know whether or not MODEM SIGNALS are active on the port. To tell whether MODEM SIGNALs are active, look at the SUBTYPE field in a SYSINFO or SYSDUMP listing.

```
MODEM signals NOT ACTIVE                MODEM signals ACTIVE

Peripheral    Subtype                   Peripheral    Subtype
----------    -------                   ----------    -------
Terminal      0 (speed sense)           Terminal       1 (speed sense)
Terminal      4 (speed specified)       Terminal       5 (speed specified)

                                        Terminal      10 (speed sense with \
                                                         modem timer off)  \ ATP
                                        Terminal      11 (speed specified,  / ONLY
                                                         modem timer off) /

  Printer     14                        Printer       15
```

MODEM SIGNALS Are NOT Active (Subtype 0, 4 And 14)

Cables For 25 Pin RS-232 ADCC And ATP Ports

A. For HP 262X terminals with 50 pin connectors

```
                 13222N
                 ------
     50 pin MALE         25 pin MALE

        7  --------------  24
        9  --------------  22
       12  --------------   2
       13  --------------   4
       14  --------------  20
       40  --------------  23
       48  --------------   7
```

B. For HP 262X, 239X, 700/9X and PC's with 25 pin connectors and all RS-232 printers, the minimum cable pinout configuration is:

```
                13242Y
                ------
25 pin MALE          25 pin MALE

    1  --------------  1
    2  --------------  2
    3  --------------  3
    7  --------------  7
```

NOTE

The 40242Y cable is the RFI version of the 13242Y cable.

These cables have more pins than the minimum required pinout configuration however, they can be used for system to peripheral links also.

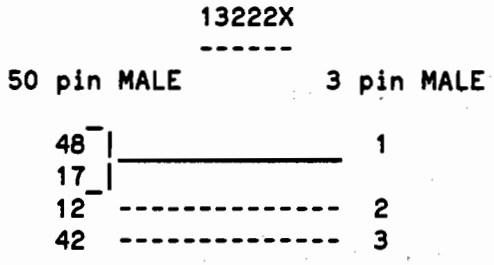
```
                13242N
                ------
25 pin MALE          25 pin MALE

    1  --------------  1
    2  --------------  2
    3  --------------  3
    4  --------------  4
    5  --------------  5
    6  --------------  6
    7  --------------  7
    8  --------------  8
   11  -------------- 19
   12  -------------- 12
   15  -------------- 15
   17  -------------- 17
   19  -------------- 11
   20  -------------- 20
   22  -------------- 22
   23  -------------- 23
   24  -------------- 24
```

NOTE

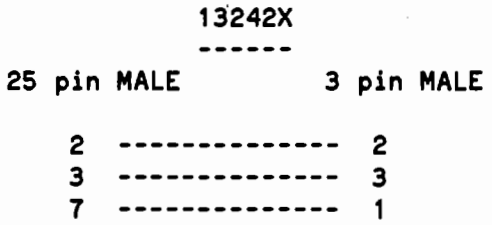
There are other cables similar to the 13242N. These cables are: 13242M, 40242C, 40242M, 92219G and 92219S.

Cables For 3 Pin RS-232 ATP Ports

A. For HP 262X terminals with 50 pin connectors use a:

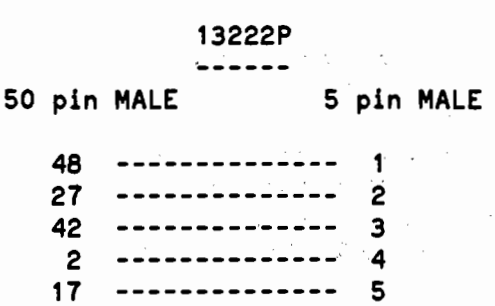


B. For HP 262X, 239X and 700/9X terminals, PC's with 25 pin connectors and all RS-232 printers use a:



Cables For 5 Pin RS-422 ATP Ports

A. For HP 262X terminals with 50 pin connectors use a:



B. For HP 262X, 239X and 700/9X terminals, PC's with 25 pin connectors and all RS-422 printers use a:

```
                13242P
                ------
25 pin MALE          5 pin MALE

    7  --------------  1
    9  --------------  2
    3  --------------  3
   10  --------------  4
   18  --------------  5
    4--|
    5--|  4, 5 and 6 are jumpered together inside the 25 pin connector.
    6--|
```

MODEM SIGNALS ACTIVE (Subtype 1, 5, 10, 10, 11 and 15)

Cables For 25 Pin RS-232 ADCC And ATP Ports

A. For HP 262X terminals with 50 pin connectors use the 13222N cable diagrammed in SECTION I.

B. For HP 262X, 239X and 700/9X terminals, PC's with 25 pin connectors and RS-232 printers use the 13242M, 13242N, 40242C, 40242M, 92219G or 92219S cable. The 13242N cable is diagrammed in section I.

NOTE

Subtype 1, 5, 10, 11 or 15 is not supported on 3 pin RS-232 connections or 5 pin RS-422 connections.

XL SYSTEMS

The DTCs on the XL systems support 3 and 25 pin RS-232 connection along with 5 pin RS-422 connections.

To determine what type of cable is necessary, first we need know what type of connector is on the DTC port we wish to connect to. Second we need to know whether MODEM SIGNALS are active on the DTC port. To determine MODEM SIGNAL activity look in the PROFILE associated with the DTC port. In the PROFILE there is an entry called "TYPE OF MODEM ATTACHED". The numeric values mean the following:

```
  [X]  Type of Modem Attached

If X= [0]  NO MODEM      (No Modem signals active)

      [1]  US MODEM      (Modem signals active for US modem protocol)

      [2]  EUROPEAN MODEM   (Modem signals active for European modem protocol)
                            (***** Typically we do not use this setting *****)
```

MODEM SIGNALS Are NOT ACTIVE "TYPE OF MODEM ATTACHED" Equals 0

Cables For 25 Pin RS-232 DTC Ports

A. For HP 262X terminals with 50 pin connectors use a 13222N cable. This cable is diagrammed in SECTION I under 25 pin ADCC and ATP ports.

B. For HP 262X, 239X and 700/9X terminals, PC's with 25 pin connectors and all RS-232 printers with 25 pin connectors use the 13242Y or 13242N cable. These cables are diagrammed in Section I.

Cables For 3 Pin RS-232 DTC Ports

A. For HP 262X terminals with 50 pin connectors use a 13222X cable. This cable is diagrammed in SECTION I under 3 pin ATP ports.

B. For HP 262X, 239X and 700/9X terminals, PC's with 25 pin connectors and all RS-232 printers with 25 pin connectors use the 13242X cable. This cable is diagrammed in SECTION I under 3 pin ATP ports.

Cables For 5 Pin RS-422 DTC Ports

A. For HP 262X terminals with 50 pin connectors use a 13222P cable. This cable is diagrammed in SECTION I under 5 pin ATP ports

B. For HP 262X, 239X and 700/9X terminals, PC's with 25 pin connectors and all RS-422 printers with 25 pin connectors use a 13242P cable. This cable is diagrammed in SECTION I under 5 pin ATP ports.

If MODEM SIGNALS are ACTIVE, "TYPE OF MODEM ATTACHED" equals 1, then the following cables can be used:

A. For HP 262X terminals with 50 pin connectors use a 13222N cable. This cable is diagrammed in SECTION I under 25 pin ATP ports

B. For HP 262X, 239X and 700/9X terminals, PC's with 25 pin connectors and all RS-422 printers with 25 pin connectors use a 13242N cable. This cable is diagrammed in SECTION I under 25 pin ATP ports.

SECTION II MODEM To SYSTEM Link

Hewlett-Packard only supports modem operation when the CPU port is correctly configured for MODEM SIGNALS ACTIVE. Please refer to SECTION I under the CLASSIC and XL system headings for information on determining if MODEM SIGNALS are ACTIVE on ADCC, ATP and DTC ports.

The cables outlined below are very different from those needed to attach terminals and printers to ADCC, ATP and DTC ports. The reason for the difference is that we are now attaching a DCE (computer port) to a DCE (modem) where as previously we were attaching a DCE (computer port) to a DTE (terminal/printer).

Classic Systems

Cable For 25 Pin RS-232 ADCC And ATP Ports

The same cable is used to attach a modem to an ADCC or an ATP port. This cable is not symmetrical. This cable has one end that must attach to the ADCC or ATP port. It is marked with the word "COMPUTER on the connector. The other end of the cable attaches to the modem. This end of the cable is marked with the words "DATA SET" on the connector.

```
              30062B                                  This cable is also called
              ------                                  a 30062-60022 cable
"COMPUTER"            "DATA SET"
----------            ----------

25 pin MALE           25 pin MALE

    2  --------------  3
    3  --------------  2
    4  --------------  8
    6  -------------- 20
    7  --------------  7          This cable is not symmetrical
    8  --------------  4
   11  -------------- 12
   12  -------------- 19
   20  --------------  6
   22  --------------  5
   23  -------------- 23
```

Cable For 25 Pin RS-232 DTC Ports

There are two cables that can be used to attach a modem to a 25 pin RS-232 DTC port. These cables are the 30062B (diagrammed previously) and 92219Q cables. These cables are not symmetrical. These cables have one end that must attach to the "COMPUTER" port and one end that must attach to the modem or "DATA SET".

92219Q

"COMPUTER"		"DATA SET"
25 Pin Male		25 Pin Male
1	----------	1
2	----------	3
3	----------	2
4	----------	8
6	----------	20
7	----------	7
8	----------	4
9	----------	22
20	----------	6
22	----------	5
23	----------	23

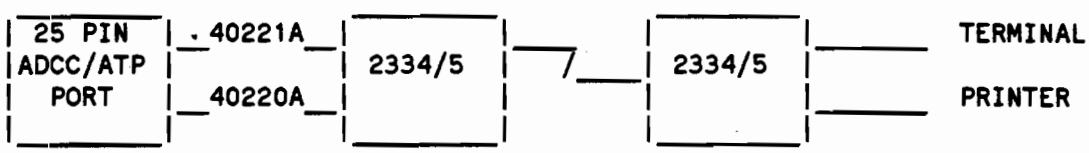
This cable is not symmetrical

SECTION III MULTIPLEXER To SYSTEM Link

For the proper connection between a 233X MULTIPLEXER and an ADCC, ATP or DTC port we need to know whether or not MODEM SIGNALs are ACTIVE on the MULTIPLEXER. To determine this refer to either the 233X MULTIMUX REFERENCE MANUALs or Application Note #59 titled "HP2334A and HP2335A CONFIGURATION RECIPES". Once this is determined then the ADCC, ATP or DTC port must also be appropriately configured for MODEM SIGNAL ACTIVITY. Refer to SECTION I of this Application Note to determine the MODEM SIGNAL ACTIVITY.

Cables For 25 Pin RS-232 ADCC And ATP Ports

There are two 25 pin cables used to attach 233X ports to an ADCC or ATP port. The two cables are the 40220A (used for PRINTERS) and the 40221A (used for TERMINALS).



In this configuration the ADCC or ATP port has modem signals active. Refer to SECTION I of this Application Note to determine whether modem signals are active. The 2334/5 connected to the ADCC or ATP port also will have modem signals active. Please refer to Application Note #59 titled "HP2334A and HP2335A Configuration Recipes" or the Reference Manuals for the various 233X products.

```
                40220A
                ------
   ADCC/ATP                HP233XA

   25 Pin Male             25 Pin male

        1  ----------------  1
        2  ----------------  3
        3  ----------------  2
DCD     4  ----------------  8  DCD
        5  ---------------- 20  DTR
DTR     6
        7  ----------------  7
RTS     8  ----------------  4  RTS
DSR    20  ----------------  5  CTS
```

```
                40221A
                ------
ADCC/ATP                HP233XA

25 Pin Male             25 Pin Male

     1  ----------------  1
     2  ----------------  3
     3  ----------------  2
DCD  4  ----------------  8  DCD
     5
DTR  6  ---------------- 20  DTR
     7  ----------------  7
RTS  8  ----------------  4  RTS
DSR 20  ----------------  5  CTS
```

This cable is not symmetrical

If modem signals are not active on both the ADCC/ATP and the 233X the 40220A or the 40221A cable can be used for either TERMINAL or PRINTER connections. The reason for this is because only pins 2,3 and 7 are necessary for a DIRECT CONNECT connection between the ADCC/ATP port and the 233X. If neither cable is available the 92219H cable can be used.

```
                92219H
                ------
ADCC/ATP                HP233XA

25 Pin Male             25 Pin Male

     1  ----------------  1
     2  ----------------  3
     3  ----------------  2
     7  ----------------  7
```

Cables For 3 Pin RS-232 ATP Ports

If modem signals are not active on both the ADCC/ATP and the 233X and the ATP has a 3 Pin RS-232 port then the cable diagrammed below can be used. This cable is not manufactured by Hewlett-Packard.

```
ATP                     HP233X

3 Pin Male              25 Pin Male

   1  ---------------  7
   2  ---------------  3
   3  ---------------  2
```

Cables For DTC Ports

The cables necessary for MULTIPLEXER to DTC connections are the same as those for the ATP's, regardless of whether modem signals are active or not. The only difference is that a 30062B cable can be used in place of the 40221A cable. However, the 40221A will also work with the DTC.

SECTION IV
MULTIPLEXER To PERIPHERAL Link

The HP233X has DCE type ports identical to ADCC, ATP and DTC ports. TERMINALS and PRINTERS are DTE type devices. Due to this, the MULTIPLEXER to PERIPHERAL connection needs a straight through cable.

A. For HP 262X terminals with 50 pin connectors use a 13222N. This cable is diagrammed in SECTION I of this Application Note.

B. For HP 262X, 239X, 700/9X and PC's with 25 pin connectors and all RS-232 printers use the 13242N cable if modem signals are active on the HP233X. If modem signals are not active use the 13242Y cable. These cables are diagrammed in SECTION I of this Application Note.

Published Application Notes

HP 3000

Following is a list of the Application Notes published to date. If you would like to order single copies of back issues please use the *Request Form* attached and indicate the number(s) of the note(s) you need, and the part number(s).

Note #	Part Number	Topic
1	5958-5824	Printer Configuration Guide - Version 1
2	5960-2841	Terminal types for HP 3000 HPIB Computers - Version 1
3	5960-2842	Plotter Configuration Guide
4	5960-2843	Printer Configuration Guide - Version 2
5	5960-2844	MPE System Logfile Record Formats
6	5960-2845	Stack Operation
7	5960-2846	COBOL II/3000 Programs: Tracing Illegal Data
8	5960-2847	KSAM Topics: COBOL's Index I/O: File Data Integrity
9	5960-2848	Port Failures, Terminal Hangs, TERMDSM
10	5960-2849	Serial Printers - Configuration, Cabling, Muxes
11	5960-2850	System Configuration or System Table Related Errors
12	5960-2851	Pascal 3000 - Using Dynamic Variables
13	5960-2852	Terminal Types for HP 3000 HPIB Computers - Version 2
14	5960-2853	Laser Printers - A Software and Hardware Overview
15	5960-2854	FORTRAN Language Considerations - A Guide to Common Problems
16	5960-2855	IMAGE: Updating to TurboIMAGE & Improving Database Loads
17	5960-2856	Optimizing VPLUS Utilization
18	5960-2857	The Case of the Suspect Track for 792X Disc Drives
19	5960-2858	Stack Overflows: Causes & Cures for COBOL II Programs
20	5960-2859	Output Spooling
21	5960-2860	COBOLII and MPE Intrinsics
22	5960-2861	Asynchronous Modems

Note #	Part Number	Topic
23	5960-2862	VFC Files
24	5960-2863	Private Volumes
25	5960-2864	TurboIMAGE: Transaction Logging
26	5960-2865	HP 2680A, 2688A Error Trailers
27	5960-2866	HP Trend: An Installation and Problem Solving Guide
28	5960-2867	The Startup State Configurator
29	5960-2868	A Programmer's Guide to VPLUS 3000
30	5960-2869	Disc Cache
31	5960-2870	Calling the CREATEPROCESS Intrinsic
32	5960-2871	Configuring Terminal Buffers
33	5960-2872	Printer Configuration Guide - Version 3
34A	5960-2873	RIN Management (Using COBOLII Examples) (A)
34B	5960-2874	Process Handling (Using COBOLII Examples) (B)
35	5960-2875	HPDESK IV (Script files, FSC, and Installation Considerations)
34C	5960-2876	Extra Data Segments (Using COBOLII Examples) (C)
36	5960-2877	Tips for the DESK IV Administrators
37	5960-2878	AUTOINST: Trouble-free Updates
38	5960-2879	Store/Restore Errors
39	5960-2880	MRJE Emulates a HASP Workstation
40	5960-2881	HP 250 / 260 to HP 3000 Communications Guidelines
41	5960-2882	MPE File Label Revealed
42	5960-2883	System Interrupts
43	5960-2884	Run Time Aborts
44	5960-2885	HPPA Patching Conventions for HP3000 900 Series Processors - Version 1
45	5960-2886	Vplus & Multiplexers
46	5960-2887	Setting Up an HPDesk HPTelex for the First Time
47	5960-2900	Customizing Database Data Items & Changing Passwords in JCL Files
48	5959-9215	Printer Configuration - Version 4
49	5959-9227	Configuring DATACOMM Products Into MPE
50	5959-9228	VFC's for Serial Printers

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Note #	Part Number	Topic
51	5959-9237	Terminal Types for the HP 3000 HPIB Computers
52	5959-9242	Configuring MRJE
53	5959-9245	Using Special Characters on the 700/9x Series Terminals
54	5959-9251	Improving Database Performance
55	5959-9258	Customized Message Catalogs and Help Facilities
56	5959-9266	BRW Tips for Beginners
57	5959-9270	Configuring the HP 2334A Plus & HP 2335A As a Statistical Multiplexer
58	5959-9274	HPPA Pathing Conventions for HP3000 900 Series Processors - Version 2
59	5959-9289	HP 2334A and HP 2334A Configuration Recipes
60	5959-9301	TurboIMAGE's I-FILES and J-FILES
61	5959-7385	HPDeskManager - Looking Behind the Scenes
62	5959-7803	Setting Up a System Dictionary
63	5959-7834	Configuring Telesupport Modems for MPE V/E Systems
64	5960-1816	Finding Solutions in HP SupportLine
65	5960-1817	Using the Electronic Call Feature of HP SupportLine
66	5960-1818	Using the Feedback Feature of HP SupportLine
67	5960-1819	Printing Documents from HP SupportLine
68	5960-1820	HP SupportLine Commands
69	5960-2901	Nonsystem Volume Sets and the Migration of Private Volumes to an S9000 HP 3000
70	5960-2907	Modem Links for Remote Console and Standard DTC Connections on Commercial XL HPPA Systems
71	5960-2918	Asynchronous Cabling

NOTES

NOTES

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