

# **Data Communications Test Library**

## **HP 4957A Protocol Analyzer**



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### **Notice**

This application can be used with both the HP 4957A Protocol Analyzer and the HP 4952A Protocol Analyzer. The User's Guide refers to the HP 4952A in the operating procedures but operation is the same on the HP 4957A.



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## Printing History

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New editions are complete revisions of the manual. Update packages are issued between editions. They contain additional and replacement pages to be merged into the manual by the customer. The dates on the title page change only when a new edition or a new update is published. No information is incorporated into a reprinting unless it appears as a prior update. The edition does not change when an update is incorporated.

Many product updates and fixes do not require manual changes and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one-to-one correlation between product updates and manual updates.

Edition 1..... July 1989

### Problems? Call for Help

If you have problems operating your HP protocol analyzer or any of the applications, call the CTD Customer HelpLine or use your fax machine to send your questions.

**HelpLine - (719) 531-4567**  
**Fax - (719) 531-4505**

## Product Introduction

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This package of tests is intended to help you easily apply the power of Hewlett-Packard's protocol analyzers in the solution of common data communication problems. They also provide examples and starting points for you to develop custom tests. The Data Communications Test Library programs are written entirely in HP 4951C Monitor or Simulate menus. They work with the HP 4951C and HP 4952A in Asynchronous, Synchronous, SDLC/HDLC, X.25, and other environments.

This section presents a list of the programs with brief descriptions, grouped by application. A more detailed description of each program, with instructions for use and program results, is in the final section (Section 3) of this manual. It is highly recommended that a copy of the master disc be made. Instructions for copying the master disc, as well as loading, storing, modifying, and printing programs are in Section 2.

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### Looking up a Program

All programs in this collection use the file name format defined below to aid in locating a desired program on a disc. The first letter of the file name indicates the program application listed in the following table.

- A General purpose asynchronous monitor programs
- B General purpose asynchronous simulate programs
- C Async terminal tests
- D Async printer tests
- E Test devices sending to async printers
- F Test async devices across a modem link
- I Interface tests (level 1)
- S SDLC tests
- U Instrument setups
- X X.25 tests

All tests are stored on disc with a comment field that briefly describes the test.

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## Using a Program

If you are not yet familiar with your HP protocol analyzer, instructions for loading programs are presented in the next section. Hewlett-Packard recommends that you make a working copy of your master disc, also covered in Section 2, and then store the master disc in a safe place. Because all programs in the Data Communications Test Library are standard menus, they can be infinitely copied and easily modified for your particular needs. Note that any "Load Menus" or "Store Menus" operation involves Monitor, Simulate, Setup, and Run Menus.

## Data Communications Configuration (Protocol Analyzer Setup)

For consistency and simplicity, all programs in this library are stored with a common set of data communication parameters that are loaded into the analyzer when you load the program. These parameters may be easily changed in the Setup Menu to suit your system. Refer to the Operating Manual for your Hewlett-Packard protocol analyzer for guidance.

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### Note

Changing some parameters, such as Code, Mode, or Character Framing, may require corresponding changes to the Monitor or Simulate menus. Programs modified to take advantage of unique HP 4952A program features may not run on the HP 4951C.

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The parameters loaded with all library programs (except interface tests) are as follows:

9600 bps line speed  
ASCII-7, Odd parity for async  
EBCDIC, DCE supplies DTE clock for SDLC  
ASCII-8, DCE supplies DTE clock for X.25/HDLC

The parameters loaded for interface tests are as follows:

2400 bps line speed  
ASCII-8, no parity



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## Data Communications Test Library

### Program List

Program Name	Program Purpose
	<b>General purpose async monitor</b>
A_COUNTCHR	Count DTE and DCE characters for 1 min
A_COUNTPAR	Count DTE and DCE parity errors for 1 min
	<b>General purpose async simulate</b>
B_ASC7EVER	Send ASCII7 even parity errored string
B_ASC7ODER	Send ASCII7 odd parity errored string
B_AUTOBAUD	Find terminal's or printer's bit rate
B_BRBRPOLE	Send 81 char with Xon/off and DTR -continuous
B_BRBRPOLS	Send 81 char with Xon/off and DTR - 4 pages
B_FOXFLOW	Send QBFox with Xon/off and DTR - continuous
	<b>Async terminal tests</b>
C_ALGNMNT	Send "cross-hair in square" pattern for alignment
C_RESPTIME	Measure avg & instant response time CR - prompt
	<b>Async printer tests</b>
D_BUFFER	Determine printer's buffer characteristics
D_DTR	Exercise printer with DTR flow control
D_XONXOFF	Exercise printer with Xon-Xoff flow control
	<b>Test devices sending to async printers</b>
E_DTRFLOW	Exercise device sending to printer - DTR
	Exercise device sending to printer - Xon/off

F\_BRBRPOLS  
F\_BUFFER

#### Test async devices across a modem link

Send 4 pages 81 char with Xon/off & CTS modem link  
Determine printer's buffer character modem link

#### Interface tests

I\_AVRTSCTS  
I\_AVTURND  
I\_CDOFF  
I\_CD\_TO\_RD  
I\_CD\_TO\_TD  
I\_CTSTD  
I\_CTS\_ERR  
I\_DSR\_DTR  
I\_LCLTURND  
I\_RMT\_TRND  
I\_RTS\_CTS  
I\_RTS\_ERR  
I\_RTS\_TD

Measure average RTS-CTS time - 10 intervals  
Average remote turn-around time -RTS-CD  
Check for CD off while receiving data  
CD on to received data time  
CD off to transmitted data time  
CTS on to transmitted data time  
Check for CTS off before RTS off  
Detect transitions and glitches on DSR & DTR  
Local turn-around time CD off to RTS on  
RTS off to CD on time  
RTS on to CTS on time  
RTS off while transmitting data  
RTS on to transmit data

#### SDLC tests

S\_CNTERRS  
S\_CNTIVALL  
S\_CTSTPRDC  
S\_CTSTPRDT  
S\_HILITFLG  
S\_SNRM  
S\_UTIL

Count DTE & DCE aborts & FCS errors - 60 min  
Count DTE and DCE I-frames and all non I-frames -60 min  
Count DCE XIDs, SNRMs / DTE XIDs, UAs - 60 min  
Count DTE XIDs, SNRMs / DCE XIDs, UAs - 60 min  
Highlight flags on line  
Set leads on, send SNRM, beep on other than UA  
Measure half duplex BOP line utilization -10 min

#### Instrument setups

U\_BURS\_SPS  
U\_BUR\_A\_PS  
U\_IPARS  
U-SYALL7  
U\_SYALL8  
U\_UNISCOPE

Setup for sync Burroughs poll select  
Setup for async Burroughs poll select  
Setup for common IPARS system  
Setup to capture all bits on 7 bit sync link  
Setup to capture all bits on 8 bit sync link  
Setup for Uniscope sync link

### X.25 tests

X_CALLTRYS	Count link attempts and irregular response
X_CNTALLFR	Count DTE + DCE SABM, UA, DISC, FRMR, RNR
X_CNTCALLS	Count DTE & DCE CALLs & CALL ACCEPTs -1 hr
X_CNTCONCT	Count DTE and DCE SABMs and UAs -60 min
X_CNTDCEFR	Count DCE SABM, UA, DISC, FRMR, RNR
X_CNTDCFRT	Count DCE SABM, UA, DISC, FRMR, - 60 min
X_CNTDTEFR	Count DTE SABM, UA, DISC, FRMR, RNR
X_CNTDTFRT	Count DTE SABM, UA, DISC, FRMR - 60 min
X_CNTERRS	Count DCE and DTE aborts and FCS errors - 60 min
X_CNTIVALL	Count DCE and DTE-I frames vs total frames - 10 min
X_DCEUTIL	DCE utilization - 10 min
X_DTEUTIL	DTE utilization - 10 min
X_HILITFLG	Highlight flags
X_LINKUPDN	Bring link up, then down, highlight errors
X_LVLI	Detect control lead and interface problems



## Installing Programs

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Instructions for loading programs are presented in this section. Also covered are directions for copying the master disc, creating a customized test library, and instructions for printing programs.

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### Loading a Program from Disc

1. Insert the Data Communications Test Library or your customized test library disc (described on the next page) into the disc drive.
2. Press [MORE], then <Mass Store> to display the disc directory.
3. Use the arrow keys to select and highlight the program of your choice. A description of each test is included in the next section.
4. Press <Load>, then <Execute>. The program you chose is loaded. Press [Exit] to return to the top level. Press <Setup> to check or modify datacom link parameters. If you loaded a Monitor Program, press <Mon Menu> to view or modify it. If you loaded a Simulate Program, press <Sim Menu> to view or modify it.
5. To execute the program at the top menu level, press <Run Menu>, then <Monitor> or <Simulate>, depending on which type of test you loaded.

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## Copying the Master Disc

The master disc contains the Data Communications Test Library of programs. You must use the basic loading and storing features of the protocol analyzer to copy the programs to a work disc. If you have access to an HP 4952A Protocol Analyzer, and wish to copy the entire disc, you may use the "Copy Disc" utility supplied with the 4952A.

Hewlett-Packard recommends that you copy the programs that you will use from the master disc to a work disc. This disc will be called your "customized test library". New discs must be formatted before you can store on them.

## Creating Your Customized Test Library

1. Insert your master disc (containing the sample programs) into the disc drive.
2. At the top level menu, press [MORE] and <Mass Store>. The disc is read and the directory of files on the disc is displayed.
3. Use the arrow keys to locate and highlight the first program you wish to load.

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### Note

The order in which you load the programs from the master disc to your customized test library disc will be the order in which they will appear on the disc.

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4. Press <Load> and <Execute>. The program is now in memory in the protocol analyzer. Datacom link parameters should be checked in the <Setup> menu and modified as needed.
5. If you wish to view or modify the program, follow steps a-d below; otherwise, go directly to step 6.
  - a. Press [Exit].
  - b. Press <Mon Menu> or <Sim Menu> (depending on which type of program you have loaded). Make any changes required to the program for your particular application.

## 2 - 2 Installing Programs

- c. Press [Exit].
- d. From the top level menu, press [More], then <Mass Store>.

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**Note** Changing some parameters, such as Code, Mode, or Character Framing, may require corresponding changes to the monitor or simulate menus. Programs modified to take advantage of unique HP 4952A features may not run on the HP 4951C.

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6. Press <Store>. Move the cursor to the File Name line and enter the name you wish to call this program. You may use the given default name if you wish. Be sure the File Type is "Menus".
7. Remove the master disc and insert your customized test library disc into the disc drive.
8. Press <Execute>. When the disc activity stops, the Mass Store menu will return.

Repeat steps 1 through 8 above until you have loaded all the programs you will need on your customized test library disc.

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## Printing a Program

You may print program listings to help modify or understand a program. Do the following to output a monitor (simulate) program listing to a printer.

### Print setup - HP4951C

1. Load the Print Application Program.
  - a. From the top level menu, press [MORE], then <Mass Store>.
  - b. Press [MORE], then <Print Appl>, then <Execute>.

2. Configure the Print Application Program.
  - a. From the top level menu, press [MORE], then <Print>.
  - b. Define the printer parameters.

### **Printing a Monitor (Simulate) Program - HP 4951C.**

1. From the top level menu, press [MORE], then <Print>.
2. Select <Monitor> (<Simulate>), press <Execute>.

### **Print setup - HP 4952A**

1. From the top level menu, press [MORE], then <Remote & Print>.
2. Press <Print Setup> and define the printer parameters.
3. Press the <Save Cnfg> key to save your printer configuration.
4. Press [EXIT] twice to return to the main level menu.

### **Printing a Monitor (Simulate) Program - HP 4952A**

1. Load the program into the protocol analyzer.
2. Press the <Mon Menu> (<Sim Menu>) key.
3. Press [MORE] three times, then <Print Prog> to print the program to the printer.



## **Program Descriptions**

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All programs in this collection use the file name format defined here to aid in locating a desired program on a disc. The first letter of the file name indicates the program application listed in the following table.

- A General purpose asynchronous monitor programs
- B General purpose asynchronous simulate programs
- C Async terminal tests
- D Async printer tests
- E Test devices sending to async printers
- F Test async devices across a modem link
- I Interface tests (level 1)
- S SDLC tests
- U Instrument setups
- X X.25 tests

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**Note** Program names appear in the upper right hand corner on the following program description pages.

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REVISION: (06-25-87)

PROGRAM NAME: A\_COUNTCHAR

PROGRAM PURPOSE: Count DCE and DTE characters for 1 minute (or 10 minutes).  
Useful for checking link throughput, file sizes, etc.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, parity, etc.
2. "Don't Care" characters in Block 2 may be replaced by any desired character string.
3. "Stop Tests" in Block 9 may be removed for 10 minute operation, with minutes counted in counter 1.
4. The first counter 1 test value in Block 9 may be replaced by any desired (minutes - 1) value for different test duration.

Note that high line utilization above 9600 bps may cause the analyzer's buffer to overflow, returning the instrument to top level.

RESULTS:

Counter 1: Minutes of test  
Counter 2: DTE characters x 1  
Counter 3: DTE characters / 1000  
Counter 4: DCE characters x 1  
Counter 5: DCE characters / 1000

Timer 1: Milliseconds of test

$$\text{DTE chars/sec} = \frac{(\text{Counter 3} \times 1000) + \text{Counter 2}}{(\text{Counter 1} \times 60) + \text{Timer 1}/1000}$$

$$\text{DCE chars/sec} = \frac{(\text{Counter 5} \times 1000) + \text{Counter 4}}{(\text{Counter 1} \times 60) + \text{Timer 1}/1000}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: A\_COUNTPAR

PROGRAM PURPOSE: Count DCE and DTE parity errors for 60 seconds (or ten minutes). Parity errors indicate a link problem.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, parity, etc.
2. "Stop Tests" in Block 9 may be removed for 10 minute operation, with minutes counted in counter 1.
3. The first counter 1 test value in Block 9 may be replaced by any desired (minutes - 1) value for other test durations.

RESULTS:

Counter 1: Minutes of test

Counter 2: DTE parity errors x 1

Counter 3: DTE parity errors / 1000

Counter 4: DCE parity errors x 1

Counter 5: DCE parity errors / 1000

Timer 1: Milliseconds of test

$$\text{DTE parity errors/sec} = \frac{(\text{Counter 3} \times 1000) + \text{Counter 2}}{(\text{Counter 1} \times 60) + \text{Timer 1}/1000}$$

$$\text{DCE parity errors/sec} = \frac{(\text{Counter 5} \times 1000) + \text{Counter 4}}{(\text{Counter 1} \times 60) + \text{Timer 1}/1000}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: B\_ASC7EVER**

**PROGRAM PURPOSE:** Continuously send ASCII 7 even parity string in which all "R"s have errored parity. Useful for testing device response to parity errors.

**OPERATING INSTRUCTIONS:** Run simulate

1. Check Setup Menu for proper bit rate.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

**RESULTS:**

All transmitted "R"s have parity errors.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION:(06-25-87)**

**PROGRAM NAME: B\_ASC7ODER**

**PROGRAM PURPOSE:** Continuously send ASCII 7 odd parity string in which all "R"s have errored parity. Useful for testing device response to parity errors.

**OPERATING INSTRUCTIONS:** Run Simulate

1. Check Setup Menu for proper bit rate.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

**RESULTS:**

All transmitted "R"s have parity errors.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87) PROGRAM NAME: B\_AUTOBAUD**

**PROGRAM PURPOSE:** Send string so that terminal or printer's configured bit rate will appear on tested device. Useful for determining async device speed. Identifies 1200, 2400, 9600, 19200 devices.

**OPERATING INSTRUCTIONS:** Run simulate

Test sends as DCE; may be changed in Simulate Menu to DTE.

**RESULTS:**

Bit rate of tested device will appear on device.

Note that this test was written for 8 bit ASCII and may not work with 7 bit ASCII data codes.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: B\_BRBRPOLE**

**PROGRAM PURPOSE:** Continuously send 81-character string with both Xon/Xoff and DTR flow control. Useful for exercising terminals, printers, and other devices. Lost or errored characters are easily detected visually.

**OPERATING INSTRUCTIONS:** Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

Note that this program sends no carriage-return/line feed and assumes that continuous character strings will be automatically "wrapped" at the end of each line by the device under test.

**RESULTS:**

81-character "stair-step" pattern appears on printer or terminal. This pattern is very visually distinctive; errored or lost characters may be detected visually.

Unlisted Counters and Timers may be used in the program, but their contents have no meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: B\_BRBRPOLS**

**PROGRAM PURPOSE:** Send approximately 4 pages of an 81-character string with both Xon/Xoff and DTR flow control. Useful for exercising terminals, printers and other devices. Lost or errored characters are easily detected visually.

**OPERATING INSTRUCTIONS:** Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

Note that this program sends no carriage-return/line feed and assumes that continuous character strings will be automatically "wrapped" at the end of each line by the device under test.

**RESULTS:**

81-character "stair-step" pattern appears on printer or terminal. This pattern is very visually distinctive; errored or lost characters may be detected visually.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.



**REVISION: (06-25-87)**

**PROGRAM NAME: B\_FOXFLOW**

**PROGRAM PURPOSE:** Send QUICK BROWN FOX message with Xon/Xoff and DTR flow control continuously. Useful for exercising terminals, printers, and other devices. Lost or errored characters are easily detected visually.

**OPERATING INSTRUCTIONS:** Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

**RESULTS:**

QUICK BROWN FOX message sent to terminal or printer. This pattern is very visually distinctive; errored or lost characters may be visually detected.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: C\_ALGNMNT**

**PROGRAM PURPOSE:** Send "cross-hair in square" pattern for terminal display alignment.

**OPERATING INSTRUCTIONS:** Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

**RESULTS:**

"Cross-hair in square" pattern on terminal display.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: C\_RESPTIME

PROGRAM PURPOSE: Measure average and instantaneous response time from DTE carriage-return to DCE prompt. Response time is a key indicator of system loading problems or link errors, and is a major contribution to user dissatisfaction.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test assumes terminal is DTE, host is DCE, carriage-return from terminal gets carriage-return or line-feed, then any prompt character from host.
3. Press Return on terminal as many times as desired.

RESULTS:

Counter 1: Number of responses  
Counter 2: Minutes total resp time

Timer 1: Last response time  
Timer 2: mSec total response time

$$\text{Average response time per/sec} = \frac{(\text{Counter 2} \times 60 + \text{Timer 2}/1000)}{\text{Counter 1}}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: D\_BUFFER**

**PROGRAM PURPOSE:** Determine printer buffer characteristics.

**PROGRAM DESCRIPTION:** Send Xs until Xoff or DTR off, then 60-character string to visually determine printer buffer after Xoff or DTR off. Incompatibilities between the printer buffer and the sending device flow control response may cause lost characters on printouts.

**OPERATING INSTRUCTIONS:** Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

Note that this program sends no carriage-return/line feed and assumes that continuous character strings will be automatically "wrapped" at the end of each line by the device under test.

**RESULTS:**

Counter 1: Characters before first flow off  
Counter 2: Characters between flow on/off  
Counter 3: Number of flow off/on cycles

Printer will print X until it sends a flow off (Xoff or DTR off), then "123456789A123456789B123456789C123456789D123456789E123456789" is sent to the printer. The number of characters of this string that are printed indicates the printer's buffer size after flow off.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: D\_DTR**

**PROGRAM PURPOSE:** Exercise a printer with DTR flow control. Program sends 78-character lines of X with carriage return/line feed at the end of each line. See also General purpose async simulate programs.

**OPERATING INSTRUCTIONS:** Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

**RESULTS:**

Continuous display of 78-character lines of X.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: D\_XONXOFF**

**PROGRAM PURPOSE:** Exercise a printer with Xon/Xoff flow control. Program sends 78-character lines of X with carriage return/line feed at end of each line. See also General purpose async simulate programs.

**OPERATING INSTRUCTIONS:** Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DCE; may be changed in Simulate Menu to DTE.

**RESULTS:**

Continuous display of 78-character lines of X.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: E\_DTRFLOW

PROGRAM PURPOSE: Test devices sending to printers with DTR control. Determine how many characters device sends after DTR off. Incompatibilities between the printer buffer and the sending device flow control response may cause lost characters on printouts.

OPERATING INSTRUCTIONS: Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DTE; may be changed in Simulate Menu to DCE.
3. Send large file from host as if printing.

RESULTS:

Counter 2: Number of DTR cycles

Counter 3: Total chars sent with/DTR off

$$\text{Average characters sent with DTR off} = \frac{\text{Counter 3}}{\text{Counter 2}}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: E\_XONXOFF

PROGRAM PURPOSE: Test devices sending to printers with XON/XOFF control. Find how many characters device sends after Xoff. Incompatibilities between the printer buffer and the sending device flow control response may cause lost characters on printouts.

OPERATING INSTRUCTIONS: Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DTE; may be changed in Simulate Menu to DCE.
3. Send large file from host as if printing.

RESULTS:

Counter 2: Number of Xon/Xoff cycles.

Counter 3: Total characters sent after Xoff.

$$\text{Average characters sent after Xoff} = \frac{\text{Counter 3}}{\text{Counter 2}}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.



REVISION: (06-25-87)

PROGRAM NAME: F\_BRBRPOLS

PROGRAM PURPOSE: Send 81-character string with both Xon/off and CTS flow control, (approximately 4 pages). This is useful for testing printers or other devices across modem links. Lost or errored characters are easily detected visually.

OPERATING INSTRUCTIONS: Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DTE.
3. Test expects DSR, CD, and CTS to be high, but beeps if low.
4. Terminal emulator may be used to dial link.

Note that this program sends no carriage-return/line feed and assumes that continuous character strings will be automatically "wrapped" at the end of each line by the device under test.

RESULTS:

81-character "stair-step pattern appears on the printer or terminal at the other end of modem link.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: F\_BUFFER**

**PROGRAM PURPOSE:** Determine printer buffer characteristics across the modem link. Incompatibilities between the printer buffer and the sending device flow control response may cause lost characters on printouts.

**PROGRAM DESCRIPTION:** Send Xs until Xoff or CTS off, then 60-character string to visually determine printer buffer after Xoff or CTS off.

**OPERATING INSTRUCTIONS:** Run Simulate

1. Check Setup Menu for proper bit rate, parity, etc.
2. Test sends as DTE; may be changed in Simulate Menu to DCE.
3. Test expects DSR, CD, and CTS high, but will beep if they are not.
4. Test raises DTR,RTS.
5. Link may be dialed using terminal emulator.

Note that this program sends no carriage-return/line feed and assumes that continuous character strings will be automatically "wrapped" at the end of each line by the device under test.

**RESULTS:**

Counter 1: Characters before first flow off  
Counter 2: Characters between flow on/off  
Counter 3: Number of flow off/on cycles

Printer will print X until it sends a flow off (Xoff or DTR off) then "123456789A123456789B123456789C123456789D123456789E123456789" is sent to the printer. The number of characters of this string that are printed indicates the printer's buffer size after flow TSoFF.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: I\_AVRTSCTS

PROGRAM PURPOSE: Measure average RTS to CTS time for 10 intervals. On half duplex systems, RTS to CTS delay is one major factor in link efficiency. Longer time reduces throughput, shorter time increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Counter 1: Number of RTD to CTS periods

Timer 1: Total RTS to CTS time

$$\text{Average RTS to CTS time} = \frac{\text{Timer 1}}{\text{Counter 1}}$$

Transitions are highlighted in the data and state display.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: I\_AVTURND

PROGRAM PURPOSE: Measure average remote turn-around time (RTS off to CD on) on half duplex link for 5 turn-arounds. Link efficiency is highly affected by turn-around time. Longer time decreases throughput, shorter time increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Counter 1: Number of turn-arounds

Timer 1: Total turn-around time

$$\text{Average turn-around time} = \frac{\text{Timer 1}}{\text{Counter 1}}$$

Transitions are highlighted in the data and state display.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: I\_CDOFF**

**PROGRAM PURPOSE:** Check if CD is off while data is being received. In most systems, CD should be on when receiving data.

**OPERATING INSTRUCTIONS:** Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

**RESULTS:**

Counter 1: Number of characters with Cd off

Characters received with CD off are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: I\_CD\_TO\_RD**

**PROGRAM PURPOSE:** Measures time from CD on to received data on half duplex system.  
Longer time delay reduces throughput, shorter time delay increases error probability.

**OPERATING INSTRUCTIONS:** Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

**RESULTS:**

Timer 1: CD on to received data time

Lead transition and first received character are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: I\_CD\_TO\_TD

PROGRAM PURPOSE: Measure time from CD off to transmitted data on half duplex system. Longer time delay reduces throughput, shorter time delay increases error probability.

OPERATING INSTRUCTIONS: Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

RESULTS:

Timer 1: CD off to transmitted data time

Lead transition and first received character are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: I\_CTSTD**

**PROGRAM PURPOSE:** Measure time from CTS on to transmitted data on half duplex system. Longer time delay reduces throughput, shorter time delay increases error probability.

**OPERATING INSTRUCTIONS:** Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

**RESULTS:**

Timer 1: CTS on to transmitted data time

Lead transition and first received character are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.



**REVISION: (06-25-87)**

**PROGRAM NAME: I\_CTS\_ERR**

**PROGRAM PURPOSE:** Detect CTS drop before RTS to indicate link or modem problem.

**OPERATING INSTRUCTIONS:** Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

**RESULTS:**

Counter 1: Number of illegal transitions

Illegal lead transitions are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: I\_DSR\_DTR**

**PROGRAM PURPOSE:** Detect transitions and glitches on DSR and DTR. In modem link, these leads should generally stay on. Detect "on" to "off" transitions.

**OPERATING INSTRUCTIONS:** Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

**RESULTS:**

Counter 1: DTR transitions

Counter 2: DSR transitions

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: I\_LCLTURND**

**PROGRAM PURPOSE:** Measure local turn-around (Cd off to TRS on) on half duplex system. Longer time delay reduces throughput, shorter time delay increases error probability.

**OPERATING INSTRUCTIONS:** Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

**RESULTS:**

Timer 1: Turn-around time

Lead transitions are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: I\_RMT\_TRND**

**PROGRAM PURPOSE:** Measure time from RTS off to CD on in half duplex system and number of polls before a response. Longer time delay reduces throughput, and shorter time delay increases error probability.

**OPERATING INSTRUCTIONS:** Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

**RESULTS:**

Counter 1: Number of polls

Timer 1: First RTS off to Cd on

Timer 2: Last poll RTS off to CD on

Lead transitions are highlighted.

If there is only one poll, time measurement is in Timer 1.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: I\_RTS\_CTS**

**PROGRAM PURPOSE:** Measure time from RTS on to CTS on in half duplex system and number of polls before a response. Longer time delay reduces throughput, shorter time delay increases error probability.

**OPERATING INSTRUCTIONS:** Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

**RESULTS:**

Timer 1: First RTS on to CTS on

Lead transitions are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: I\_RTS\_ERR**

**PROGRAM PURPOSE:** Detect RTS off while transmitting data. RTS off while DTE is transmitting indicates DTE problem.

**OPERATING INSTRUCTIONS:** Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

**RESULTS:**

Counter 1: Number of characters with RTS off

Characters with RTS off are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: I\_RTS\_TD**

**PROGRAM PURPOSE:** Measure time from RTS on to transmitted data. Longer time delay reduces throughput, shorter time delay increases error probability.

**OPERATING INSTRUCTIONS:** Run Monitor

1. Check Setup Menu for proper bit rate, parity, etc.

**RESULTS:**

Timer 1: Time from RTS on to transmitted data

Lead transitions and characters are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION (06-25-87)

PROGRAM NAME: S\_CNTERRS

PROGRAM PURPOSE: Count DCE and DTE aborts and FCS errors for 60 minutes.  
Aborts may indicate DTE problems, FCS error may indicate link problems.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test  
Counter 2: DTE aborts  
Counter 3: DCE aborts  
Counter 4: DTE FCS errors  
Counter 5: DCE FCS errors

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.



**REVISION: (06-25-87)**

**PROGRAM NAME: S\_CNTIVALL**

**PROGRAM PURPOSE:** Count DCE/DTE I frames- and all non I-frames for 60 minutes.  
System throughput increases with the number of I frames per total frames.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

**RESULTS:**

Counter 1: Minutes of test

Counter 2: DTE all non I-frames

Counter 3: DTE I-frames

Counter 4: DCE all non I-frames

Counter 5: DCE I-frames

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: S\_CTSTPRDC

PROGRAM PURPOSE: Count DCE XIDs SNRMs / DTE XIDs, UAs for 60 minutes. This test assumes primary (host) is DCE.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test

Counter 2: DCE XIDs

Counter 3: DTE XIDs

Counter 4: DCE SNRMs

Counter 5: DTE UAs

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: S\_CTSTPRDT**

**PROGRAM PURPOSE:** Count DTE XIDs SNRMs / DCE XIDs, UAs for 60 minutes. This test assumes primary (host) is DTE.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

**RESULTS:**

Counter 1: Minutes of test

Counter 2: DTE XIDs

Counter 3: DCE XIDs

Counter 4: DTE SNRMs

Counter 5: DCE UAs

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: S\_HILITFLG**

**PROGRAM PURPOSE:** Highlight and capture/display only flags on line. Absence of flags indicates inactive device.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.

**RESULTS:**

Flags (hex 7E) are highlighted in buffer.  
Only flags are captured or displayed.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: S\_SNRM**

**PROGRAM PURPOSE:** Set leads on, send SNRM, beep on receipt of other than UA, indicating error on part of secondary. This test assumes primary (host) as DCE.

**OPERATING INSTRUCTIONS:** Run Simulate

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Timeout of 3000 ms may be changed in Timer 1 test in Block 1.

**RESULTS:**

Beep on timeout (3000 ms) or response other than UA.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: S\_UTIL**

**PROGRAM PURPOSE:** Measure half duplex bit oriented protocol line utilization for 10 minutes.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 10 minutes by changing the statement in Block 3, "If Counter 1 >9".

**RESULTS:**

Counter 1: Minutes of test  
Counter 2: Minutes used by DTEs  
Counter 3: Minutes use by DCE

Timer 1: mSec of test  
Timer 2: mSec used by DTE  
Timer 3: mSec used by DCE

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: U\_BURS\_SPS**

**PROGRAM PURPOSE:** Setup for synchronous Burroughs poll/select link.

**REVISION: (06-25-87)**

**PROGRAM NAME: U\_BUR\_A\_PS**

**PROGRAM PURPOSE:** Setup for asynchronous Burroughs poll/select link.

**REVISION: (06-25-87)**

**PROGRAM NAME: U\_IPARS**

**PROGRAM PURPOSE:** Setup for common IPARS system.

**REVISION: (06-25-87)**

**PROGRAM NAME: U\_SYALL7**

**PROGRAM PURPOSE:** Setup to capture all bits on 7-bit framed synchronous link. Useful for preliminary analysis of unknown or disfunctional protocol. To maximize buffer utilization, Hewlett-Packard protocol analyzers do not store some data, i.e. bits between frames in bit-oriented setups.

**REVISION: (06-25-87)**

**PROGRAM NAME: U\_SYALL8**

**PROGRAM PURPOSE:** Setup to capture all bits on 8-bit framed synchronous link. Useful for preliminary analysis of unknown or disfunctional protocol. To maximize buffer utilization, Hewlett-Packard protocol analyzers do not store some data, i.e. bits between frames in bit-oriented setups.

**REVISION: (06-25-87)**

**PROGRAM NAME: U\_UNISCOPE**

**PROGRAM PURPOSE:** Setup for Uniscope synchronous link.

**REVISION:** (06-25-87)

**PROGRAM NAME:** X-CALLTRYS

**PROGRAM PURPOSE:** Detect and count link attempts and irregular responses. Irregular response to SABM includes non-UA and non-SABM frames from either side and timeouts. Irregular responses are highlighted. Test duration is 60 minutes.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

**RESULTS:**

Counter 1: Minutes of test

Counter 2: DTE link attempts (SABMs)

Counter 3: Irregular response to DTE

Counter 4: DCE link attempts (SABMs)

Counter 5: Irregular response to DCE

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.



REVISION: (06-25-87)

PROGRAM NAME: X\_CNTALLFR

PROGRAM PURPOSE: Count DTE plus DCE total (SABMs, UAs, DISCs, FRMRs, and RNRs). In general, all these numbers should be low.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. This test must be stopped manually [HALT/EXIT].

RESULTS:

Counter 1: (DCE & DTE) total SABMs  
Counter 2: (DCE & DTE) total UAs  
Counter 3: (DCE & DTE) total DISCs  
Counter 4: (DCE & DTE) total FRMRs  
Counter 5: (DCE & DTE) total RNRs

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: X\_CNTCALLS**

**PROGRAM PURPOSE:** Count DTE and DCE CALLS and CALL ACCEPTs for 60 minutes. Difference between number of CALLS and CALL ACCEPTs on either side indicates unsuccessful CALLS.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

**RESULTS:**

Counter 1: Minutes of test

Counter 2: DTE CALLS

Counter 3: DCE CALL ACCEPTs

Counter 4: DCE CALLS

Counter 5: DTE CALL ACCEPTs

Timer 1: mSec of test

In general, on an X.25 link, the count in counter 2 should be close to the count in counter 3, and the count in counter 4 should be close to the count in counter 5.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: X\_CNTCONCT

PROGRAM PURPOSE: Count DTE and DCE SABMs and UAs for 60 minutes. Number of SABMs and UAs should be close to each other, and low for each side.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

RESULTS:

Counter 1: Minutes of test

Counter 2: DTE SABMs

Counter 3: DCE UAs

Counter 4: DCE SABMs

Counter 5: DTE UAs

Timer 1: mSec of test

In general, on an HDLC (X.25) link, the count in counter 2 should be close to the count in counter3, and the count in counter 4 should be close to the count in counter 5.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: X\_CNTDCEFR

PROGRAM PURPOSE: Count DCE SABM, UA, DISC, FRMR, and RNR. In general, all should be fairly low numbers.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. This test must be stopped manually [HALT/EXIT].

RESULTS:

Counter 1: DCE SABMs  
Counter 2: DCE UAs  
Counter 3: DCE DISCs  
Counter 4: DCE FRMRs  
Counter 5: DCE RNRs

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: X\_CNTDCFRT**

**PROGRAM PURPOSE:** Count DCE SABM, UA, DISC, FRMR for 60 minutes. In general, all should be fairly low numbers.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 . 59".

**RESULTS:**

Counter 1: Minutes of test

Counter 2: DCE SABMs

Counter 3: DCE UAs

Counter 4: DCE DISCs

Counter 5: DCE FRMRs

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: X\_CNTDTEFR

PROGRAM PURPOSE: Count DTE SABM, UA, DISC, FRMR and RNR. In general, all should be fairly low numbers.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. This test must be stopped manually [HALT/EXIT].

RESULTS:

Counter 1: DTE SABMs  
Counter 2: DTE UAs  
Counter 3: DTE DISCS  
Counter 4: DTE FRMRs  
Counter 5: DTE RNRs

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: X\_CNTDTFRT**

**PROGRAM PURPOSE:** Count DTE SABM, UA, DISC, FRMR for 60 minutes. In general, all should be fairly low numbers.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3 "If Counter 1 > 59".

**RESULTS:**

Counter 1: Minutes of test

Counter 2: DTE SABMs

Counter 3: DTE UAs

Counter 4: DTE DISCs

Counter 5: DTE FRMRs

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION (06-25-87)**

**PROGRAM NAME: X\_CNTERRS**

**PROGRAM PURPOSE:** Count DCE and DTE aborts and FCS errors for 60 minutes.  
Aborts may indicate DTE problems, FCS error may indicate link problems.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

**RESULTS:**

Counter 1: Minutes of test  
Counter 2: DTE aborts  
Counter 3: DCE aborts  
Counter 4: DTE FCS errors  
Counter 5: DCE FCS errors

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.



**REVISION: (06-25-87)**

**PROGRAM NAME: X\_CNTIVALL**

**PROGRAM PURPOSE:** Count DCE/DTE I frames vs total frames. System throughput increases with the number of I frames per total frames. Test duration is 60 minutes.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 60 minutes by changing the statement in Block 3, "If Counter 1 > 59".

**RESULTS:**

Counter 1: Minutes of test  
Counter 2: DTE all frames  
Counter 3: DTE I-frames  
Counter 4: DCE all frames  
Counter 5: DCE I-frames

Timer 1: mSec of test

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: X\_DCEUTIL**

**PROGRAM PURPOSE:** Measure full duplex DCE side bit-oriented protocol line utilization for 10 minutes.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 10 minutes by changing the statement in Block 3, "If Counter 1 > 9".

**RESULTS:**

Counter 1: Minutes of test  
Counter 2: DCE utilized minutes

Timer 1: mSec of test  
Timer 2: mSec utilized DCE

$$\text{DCE utilization} = \frac{\text{Counter 2} \times 60 + \text{Timer 2} \times 1000}{\text{Counter 1} \times 60 + \text{Timer 1} \times 1000}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: X\_DTEUTIL

PROGRAM PURPOSE: Measure full duplex DTE side Bit-Oriented Protocol line utilization for 10 minutes.

OPERATING INSTRUCTIONS: Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test duration may be changed from 10 minutes (D-1=9) in first counter limit of Block 3.

RESULTS:

Counter 1: Minutes of test  
Counter 2: DTE utilized minutes

Timer 1: mSec of test  
Timer 2: mSec utilized DTE

$$\text{DTE utilization} = \frac{\text{Counter 2} \times 60 + \text{Timer 2} \times 1000}{\text{Counter 1} \times 60 + \text{Timer 1} \times 1000}$$

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: X\_HILITFLG**

**PROGRAM PURPOSE:** Highlight and capture/display only flags on line. Absence of flags indicates inactive device.

**OPERATING INSTRUCTIONS:** Run Monitor (Line or Buffer)

1. Check Setup Menu for proper bit rate, clock sources, etc.

**RESULTS:**

Flags (hex 7E) are highlighted in buffer.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

REVISION: (06-25-87)

PROGRAM NAME: X\_LINKUPDN

PROGRAM PURPOSE: Bring link up, then down, "beep" and highlight errors.

OPERATING INSTRUCTIONS: Run Simulate

1. Check Setup Menu for proper bit rate, clock sources, etc.
2. Test is DTE.

RESULTS:

Leads not up, or improper response to SABM, are highlighted.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

**REVISION: (06-25-87)**

**PROGRAM NAME: X\_LVL1**

**PROGRAM PURPOSE:** Detect control lead and interface problems.

**OPERATING INSTRUCTIONS:**

1. Connect analyzer to X.25 link that should be active.
2. Run monitor program.
3. DTE clock is expected to be supplied by the DCE; it may be changed in the setup menu.

**RESULTS:**

1. No beep indicates all needed leads are high, and presence of flags with clock on both sides of the line.
2. If DSR, CD, or CTS is not high (DCE leads), counter 1 is set to 1 and the analyzer beeps.
3. If DTR or RTS is not high (DTE leads), counter 1 is set to 2 and the analyzer beeps.
4. If no flags are present on the DCE side (pin 3), counter 2 is set to 1 and the analyzer beeps.
5. If no flags are present on the DTE side (pin 2), counter 2 is set to 2 and the analyzer beeps.
6. If flags are not present on either side, check for clocks on POD on pins 15 and 17, or on pin 24 if DTE supplies its own clock.

Counter 1 or 2: value of 1 indicates a modem problem.

Counter 1 or 2: value of 2 indicates a terminal problem.

Unlisted Counters and Timers may be used in the program, but their contents have no user meaning.

# SALES OFFICES

Alphabetically by Country

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#### Omiya

Yokogawa-Hewlett-Packard Ltd.  
Mitsui-seimei Omiya Miyamachi  
Bldg.  
2-96-1 Miyamachi Omiya-shi  
**Saitama** 330  
Tel: (81/48) 645-8031  
Fax: (81/48) 645-8001

#### Osaka

Yokogawa-Hewlett-Packard Ltd.  
Chuo Bldg.  
5-4-20 Nishinakajima  
Yodogawa-ku  
**Osaka** 532  
Tel: (81/6) 304-6021  
Fax: (81/6) 304-0216

#### Sapporo

Yokogawa-Hewlett-Packard Ltd.  
Sumitomo-seimei Sapporo Chuo  
Bldg.  
1-1-14 Nanjo-higashi Chuo-ku  
**Hokkaido** 060  
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#### Shinagawa

Yokogawa-Hewlett-Packard Ltd.  
Tokyo-Nissan-Minato Bldg.  
1-6-34 Konan, Minato-ku  
**Tokyo**, 108  
Tel: (81/3) 3458-5411  
Fax: (81/3) 3458-1998

#### Suwa

Yokogawa-Hewlett-Packard Ltd.  
Daimon Bldg.  
139-1 Yaginishi Shimosuwa-cho  
**Suwa-Gun** 393  
Tel: (81/266) 28-8851  
Fax: (81/266) 28-8873

#### Takaido

Yokogawa-Hewlett-Packard Ltd.  
3-29-21 Takaido-higashi  
Suginami-ku  
**Tokyo** 168  
Tel: (81/3) 3331-6111  
Telex: 232 2024 YHPTOK

#### Takasaki

Yokogawa-Hewlett-Packard Ltd.  
Takasaki Daiichi-seimei Bldg.  
116-1 Shin-Machi Takasaki-shi  
**Gunma** 370  
Tel: (81/273) 26-5166  
Fax: (81/273) 26-5417

#### Tohoku

Yokogawa-Hewlett-Packard Ltd.  
Yamaguchi Bldg.  
1-1-31 Ichibancho Aoba-ku  
**Sendai** 980  
Tel: (81/22) 225-1011  
Fax: (81/22) 225-1616

#### Tokyo

Yokogawa-Hewlett-Packard Ltd.  
Shinjuku Daiichi-seimei Bldg.  
2-7-1 Nishi-Shinjuku  
Shinjuku-ku  
**Tokyo** 163  
Tel: (81/3) 3348-4611  
Fax: (81/3) 3348-7969

#### Toyota

Yokogawa-Hewlett-Packard Ltd.  
Toyota-Tokyo-kaijo Bldg.  
1-179 Miyuki-honmachi  
**Toyota** 473  
Tel: (81/565) 27-5611  
Fax: (81/565) 27-5400

#### Tsukuba

Yokogawa-Hewlett-Packard Ltd.  
Tsukuba-Mitsui Bldg.  
1-6-1 Takezono  
**Tsukuba** 305  
Tel: (81/298) 51-5141  
Fax: (81/298) 51-5381

#### Utsunomiya

Yokogawa-Hewlett-Packard Ltd.  
Chiyodaseimei-Utsunomiya Bldg.  
2-3-1 Odori  
**Utsunomiya** 320  
Tel: (81/286) 33-1153  
Fax: (81/286) 33-1175

#### Yokohama

Yokogawa-Hewlett-Packard Ltd.  
No. 2 Yasuda Bldg.  
3-32-13 Tsuruyacho  
Kanagawa-ku Yokohama-shi  
**Kanagawa** 221  
Tel: (81/45) 312-1252  
Fax: (81/45) 311-0279

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**Jordan**

Scientific & Medical Supplies Co.  
P.O. Box 1387

**Amman**

Tel: (962/6) 62-49-07  
Fax: (962/6) 62-82-58  
Telex: 21456 sabco jo

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**Korea**

Samsung Hewlett-Packard Co.  
Ltd.

Samsung Building, 10-16/F  
25-12 Yoido-dong  
Youngdeung po-ku  
**Seoul**, 150-010

Tel: (82/2) 769-0114  
Fax: (82/2) 784-7084  
Telex: SAM HP K25166

Samsung Hewlett-Packard Co.  
Ltd.

13/F Taegu Bank Bldg.  
118, 2-Ka, Suseong-dong  
Suseong-ku, **Taegu**  
Tel: (82/53) 754-2666  
(82/53) 752-2696  
Fax: (82/42) 752-4696

Samsung Hewlett-Packard Co.  
Ltd.

3rd F, Hong In Officetel  
536-9, Bong Myung-dong  
Yusung-gu, **Taejeon**  
Tel: (82/042) 828-6710-4  
Fax: (82/042) 828-6709

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**Kuwait**

Al-Khaidiya Electronics &  
Electricals Equipment Co.  
P.O. Box 830

**Safat** 13009  
Tel: (965/24) 59 815  
Fax: (965/24) 59 852

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**Lebanon**

Computer Information Systems  
S.A.L.

Jai-El-Dib, Main Road  
CIS Bldg.  
Beirut 6274  
P.O. Box 11-6274

**Dora-Beirut**

Tel: (961/1) 405-413  
Fax: (3579) 514-256  
Telex: 42309 chacis le

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**Malawi**

Handled by HiPerformance,  
South Africa

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**Malaysia**

Hewlett-Packard Sales (M) SDN  
BHD

9/F Chung Khiaw Bank Bldg.  
Section 46, Jalan Raja Laut  
GPO Box 11119  
50736 **Kuala Lumpur**  
Tel: (60/3) 298-6555  
Fax: (60/3) 291-5495  
Telex: MA 31Q11

Hewlett-Packard Sales (M) SDN  
BHD

6/F Wisma Penang Garden  
42 Jalan Sultan Ahmad Shah  
10050 **Penang**  
Tel: (60/4) 376-532  
(60/4) 376-887  
Fax: (60/4) 371-027  
Telex: MA 41111

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**Mauritius**

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South Africa

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**Mexico**

Hewlett-Packard de Mexico  
Monte Peivoux No. 111  
Col. Lomas de Chapultepec  
11000 **Mexico**, D.F.  
Tel: (52 5) 326-4000  
Fax: (52 5) 540-4208

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**Morocco**

SICOTEL  
Complexe des Habous  
Tour C, avenue des Far  
**Casablanca** 01  
Tel: (212) 231-22-70  
Fax: (212) 231-65-45  
Telex: 27604

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**Mozambique**

Handled by HiPerformance,  
South Africa

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**Nambia**

Handled by HiPerformance,  
South Africa

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**The Netherlands**

Hewlett-Packard Nederland B.V.  
Postbox 667  
1180 AR **Amstelveen**  
Tel: (31/20) 547-6969  
Fax: (31/20) 647-8706

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**New Zealand**

Hewlett-Packard (N.Z.) Ltd.  
186-190 Willis Street  
P.O. Box 9443  
**Wellington**  
Tel: (64/4) 382-0400  
Fax: (64/4) 384-3380

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**Nigeria**

Management Information Systems  
Co. Ltd.  
3 Gerrard Road  
P.O. Box 53386  
Ikoyi, **Lagos**  
Tel: 01/685 488  
Fax: 01/685 487 (8)  
Telex: 23582 DATEC NG

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**Norway**

Hewlett-Packard Norge A/S  
Drammensveien 169  
P.O. Box 60 Skoeyen  
N-0212 **Oslo**  
Tel: (47) 22-73-56-00  
Fax: (47) 22-73-56-19

Hewlett-Packard Norge A/S  
Boehmergt. 44  
N-5037 **Solheimsviken**  
Tel: (47) 55-29-00-90  
Fax: (47) 55-29-10-72

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**Oman**

IMTAC LLC  
P.O. Box 51196  
Mina al Fahal

**Muscat**

Tel: (968) 707-727  
(968) 707-723  
Fax: (968) 796-639  
(968) 797-709

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**Pakistan**

Mushko Electronics (PVT) Ltd.  
68-W Sama Plaza  
Blue Area, G-7  
**Islamabad** 44000  
Tel: (92/51) 816-190  
(92/51) 828-459  
Fax: (92/51) 821-201  
Telex: 54001 Muski Pk

Mushko Electronics (PVT) Ltd.  
Oosman Chambers  
Abdullah Haroon Road  
**Karachi** 74400  
Tel: (92/21) 524-131  
(92/21) 524-132  
Fax: (92/21) 568-2298  
Telex: 29094 MUSKO PK

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**Panama**

Electronico Balboa, S.A.  
Ave. El Paiscal #30  
Edificio El Dorado  
Apartado 4929  
**Panama** 5  
Tel: (507) 36-0722  
Fax: (507) 36-1820  
Telex: 368-3483 ELECTRON PG

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**Paraguay**

ECSA Equipos Contables S.A.  
Calle Estados Unidos No. 961  
**Asuncion**  
Tel: (595-21) 49-0076  
Fax: (595-21) 49-7849

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**Peru**

Cia Electro Médica, S.A.  
Los Flamencos No. 145  
Oficina 301-302  
San Isidro, **Lima** 1  
Tel: (51-14) 41-4325  
Fax: (51-14) 42-5745  
Telex: 39425257 PE PB SIS

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**Philippines**

The Online Advanced Systems  
Corp.  
2/F, Electra House  
115-117 Esteban Street  
Legaspi Village, Makati  
Metro **Manila**  
Tel: (63/2) 815-3810 to 16  
Fax: (63/2) 816-0590  
Telex: 63/2 663-274 ONLINE PN

## SALES OFFICES

Alphabetically by Country (cont'd)

### Poland

Hewlett-Packard Polska  
Ul. Newelska 6  
01-447 **Warszawa**  
Tel: 22/375065  
Fax: 22/374783  
Telex: 813919

### Portugal

Hewlett-Packard Portugal S.A.  
Rua Gregório Lopes, Lote 1732A  
Torre de Santo António  
1400 **Lisboa**  
Tel: (351/1) 301 7330  
Fax: (351/1) 301 6332/3

### Puerto Rico

Hewlett-Packard Puerto Rico  
(3175)  
Metro Office  
Texaco Plaza, Suite 100  
**Caparra Heights**, PR 00920-1705  
Tel: (809) 793-7800  
Fax: (809) 749-5325

### Qatar

Qatar Datamations Systems  
KDS Bldg. 2  
Mezzanine Floor  
Chartered Bank Bldg.  
Al-Sudd Str.  
P.O. Box 350  
**Doha**  
Tel: 974/44 19 16  
Fax: 974/44 12 19  
Telex: 4833-

### Romania

Barbatan (Romania) Technics Srl  
Hewlett-Packard Distributor  
Caiea Dorobanti 103-105  
Et. 6, Cam. 610, Sec. 1  
**Bucuresti**  
Tel: 1/3111291  
Fax: 1/3110185

### Saudi Arabia

Modern Electronics Establishment  
P.O. Box 2769  
King Abdul Azia Street  
**Al-Khobar** 31952  
Tel: (966/3) 895-6548  
(966/3) 895-1764  
Fax: (966/3) 894-4658  
Telex: 871106 HPMEEK SJ  
Cable: ELECTA, AL-KHOBAR

Modern Electronics Establishment  
P.O. Box 1228  
Zaben Bldg., Tahliah Street  
**Jeddah** 21431  
Tel: (966/2) 661-1447  
Fax: (966/2) 661-0857  
Telex: 602712 FARNAS SJ  
Cable: ELECTA, JEDDAH

Modern Electronics Establishment  
P.O. Box 22015  
Prince Musad Ibn Abdulaziz Street  
**Riyadh** 11495  
Tel: (966/1) 476-3030  
Fax: (966/1) 476-7649  
(966/1) 476-2570  
Telex: 402049 MEERYD SJ  
Cable: ROUFKO

### Singapore

Hewlett-Packard Singapore  
(Sales) Pte. Ltd.  
150 Beach Road  
#29-00 Gateway West  
**Singapore** 0718  
Tel: (65) 291-9088  
Fax: (65) 296-8903  
(65) 292-4526  
Telex: 087-34209 HPSGSO RS

### Slovak Republic

High Performance Systems  
Hewlett-Packard Distributor  
Polianky 5  
844 14 **Bratislava**  
Tel: 7/760217  
Fax: 7/763408

### Slovenia, Croatia, Macedonia

Hermes-Plus  
Hewlett-Packard Distributor  
Celovska 73  
61000 Ljubljana  
**Slovenia**  
Tel: 61/193322  
Fax: 61/55597

### South Africa

HiPerformance Systems (Pty.)  
Ltd.  
P.O. Box 120, Howard Place  
7450 **Cape Town**  
Tel: (27/21) 685-7922  
Fax: (27/21) 685-3785

HiPerformance Systems (Pty.)  
Ltd.  
Private Bag, Wendywood  
2144 **Sandton**  
Tel: (27/11) 806-1000  
Fax: (27/11) 806-1213

### Spain

**Barcelona**  
Hewlett-Packard Española, S.A.  
Avenida Diagonal, 605  
08028 **Barcelona**  
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Fax: (34/3) 430-84-68  
Telex: 52603

### Bilbao

Hewlett-Packard Española, S.A.  
Edificio El Abra, 4  
48930 Las Arenas, **Guecho**  
Tel: (34/4) 481-80-00  
Fax: (34/4) 481-80-40  
Telex: 33032

### Madrid

Hewlett-Packard Española, S.A.  
Carretera Nacional VIQKm 16.500  
28230 Las Rozas  
**Madrid**  
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Fax: (34/1) 626-18-30  
Telex: 23515

### Sevilla

Hewlett-Packard Española, S.A.  
c/Luis de Morales, 32  
Edificio Forum  
41018 **Sevilla** Luis de Morales,  
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Tel: (34/54) 53-29-10  
Fax: (34/54) 53-30-92  
Telex: 72933

### Valencia

Hewlett-Packard Española, S.A.  
Plaza de America, 2-5ª Planta  
46004 **Valencia**  
Tel: (34/6) 395-74-75  
Fax: (34/6) 395-42-11  
Telex: 63435

### Sri Lanka

Precision Technical Services  
(PVT) Ltd.  
65/14, Park Street  
**Colombo** 2  
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(941) 687711  
Fax: (941) 687731

### Suriname

Surtel. Co., Inc.  
Grote Hofstraat 3-5  
P.O. Box 155  
**Paramaribo**  
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Fax: (597) 42-0053

### Sweden

**Göteborg**  
Hewlett-Packard Sverige AB  
Vadursgatan 6  
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402 27 **Göteborg**  
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Fax: (46/31) 35-18-99

### Malmö

Hewlett-Packard Sverige AB  
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### Switzerland

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Fax: (41/22) 780-4770  
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**Bern**

Hewlett-Packard (Schweiz) AG  
Meriedweg 11  
CH-3172 **Niederwangen/Bern**  
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**Meyrin**

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CH-1217 **Meyrin 1**  
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**Urdorf**

Hewlett-Packard (Schweiz) AG  
In der Luberzen 29  
CH-8902 **Urdorf**  
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**Taiwan, ROC**

Hewlett-Packard Taiwan Ltd.  
11/F, 456 Chung Hsiao 1st Road  
**Kaohsiung**  
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Hewlett-Packard Taiwan Ltd.  
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Ping-Chen 32404

**Taoyuan Hsien**

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Fax: (886/3) 492-8087

Hewlett-Packard Taiwan Ltd.  
10/F 540, Sec. 1  
Wen-Hsin Road

**Taichung**

Tel: (886/4) 327-0153  
Fax: (886/4) 326-5274

Hewlett-Packard Taiwan Ltd.  
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Fax: (886/2) 718-2928  
Telex: 078 924439 HEWPACK

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Hewlett-Packard (Thailand) Ltd.  
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140 Sukhumvit Road  
**Bangkok 10110**  
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Fax: (66/2) 254-6731  
Telex: 086 22094 HPTLSO TH

**Trinidad and Tobago**

Borde Communications  
1 Valsayn Road  
Curepe, P.O. Box 897  
**Port-of-Spain, Trinidad**  
Tel: (809) 663-2087  
Fax: (809) 625-3352

**Tunisia**

Precision Electronique  
5, rue de Chypre—Mutuelle Ville  
1002 **Tunis Belvedere**  
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(216/1) 890-672  
Fax: (216/1) 780-241  
Telex: (0409) 18238 TELECN TN

**Turkey****Ankara**

Hewlett-Packard  
Bilgisayar ve Olcum Sistemleri  
A.S.  
Paris Cad No3 D.9  
06670 **Kavaklidere Ankara**  
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Fax: 090 (4) 425-47-45  
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Hewlett-Packard  
Bilgisayar ve Olcum Sistemleri  
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19 Mavis Caddesi, Nova/Baran  
Plaza K. 12  
Sisli 80220  
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Fax: (1) 224 59 39

**United Arab Emirates**

Emitac Ltd.  
P.O. Box 2711  
**Abu Dhabi**  
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Fax: (971/2) 72-30-58  
Telex: 46306

Emitac Ltd.  
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Zabel Road  
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Fax: (971/4) 37-08-99  
Telex: 48710

**United Kingdom****England****Bracknell**

Hewlett-Packard Limited  
Cain Road

**Bracknell**

Berkshire RG12 1HN  
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Fax: (44/344) 362-852  
Telex: 849 555

**Manchester**

Hewlett-Packard Limited  
Heathside Park Road  
Cheadle Heath

**Stockport**

Cheshire SK3 0RB  
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Fax: (44/61) 495-5009  
Telex: 668 068

**United States****Alabama**

Hewlett-Packard Co. (3114)  
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**Huntsville, AL 35806**  
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Fax: (205) 971-8899

**Arizona**

Hewlett-Packard Co. (2401)  
8080 Pointe Parkway West  
**Phoenix, AZ 85044**  
Tel: (602) 273-8000  
Fax: (602) 273-8022  
(602) 438-2355

Hewlett-Packard Co. (2406)  
3400 E. Britannia Drive  
Bldg. C, Suite 124  
**Tucson, AZ 85706**  
Tel: (602) 573-7400  
Fax: (602) 573-7429

**California**

Hewlett-Packard Co. (2403)  
1421 S. Manhattan Avenue  
**Fullerton, CA 92631**  
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Fax: (714) 758-7559

Hewlett-Packard Co. (2438)  
130 Cremona, Suite A  
**Goleta, CA 93117**  
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Fax: (805) 685-6163

**Irvine (see Fullerton)**

Hewlett-Packard Co. (2417)  
5245 Pacific Concourse Drive,  
Suite 100  
**Los Angeles, CA 90045**  
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Fax: (310) 535-2601

Hewlett-Packard Co. (2407)  
351 E. Evelyn Avenue,  
Bldg. 333  
**Mountain View, CA 94039**  
Tel: (415) 694-2000  
Fax: (415) 694-3594

Hewlett-Packard Co. (2415)  
3831 N. Freeway Blvd.  
**Sacramento, CA 95834**  
Tel: (916) 567-8500  
Fax: (916) 567-8777  
(916) 567-8778

Hewlett-Packard Co. (2404)  
9606 Aero Drive  
**San Diego, CA 92123**  
Tel: (619) 279-3200  
Fax: (619) 268-8487  
(619) 279-0560

**Santa Barbara (see Goleta)**

Hewlett-Packard Co (2428)  
5805 Sepulveda Blvd., Suite 690  
**Van Nuys, CA 91411**  
Tel: (818) 786-5800  
Fax: (818) 779-2350

**Ventura (see Van Nuys)****Colorado**

Hewlett-Packard Co. (2441)  
3005 Center Green Drive, Suite  
205  
**Boulder, CO 80301**  
Tel: (303) 938-3065  
Fax: (303) 938-3025

Hewlett-Packard Co. (2411)  
24 Inverness Place East  
**Englewood, CO 80112**  
Tel: (303) 649-5000  
Fax: (303) 649-5787

**Connecticut**

Hewlett-Packard Co. (4457)  
4 Stamford Forum, 9th Floor  
**Stamford, CT 06901**  
Tel: (203) 324-1003  
Fax: (203) 325-5680

## SALES OFFICES

Alphabetically by Country (cont'd)

### United States (cont'd)

Hewlett-Packard Co. (4458)  
115 Glastonbury Blvd.  
**Glastonbury, CT** 06033  
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Fax: (203) 659-6087

**District of Columbia**  
(see **Rockville, MD**)

### Florida

#### Latin America Headquarters Office

Hewlett-Packard Co.  
5200 Blue Lagoon Drive, 9th Floor  
**Miami, FL** 33126  
Tel: (305) 267-4245  
Fax: (305) 267-4288

Hewlett-Packard Co. (3179)  
5900 N. Andrews, Suite 100  
**Fort Lauderdale, FL** 33309  
Tel: (305) 938-9800  
Fax: (305) 938-2293

Hewlett-Packard Co. (3171)  
255 E. Drive, Suite B  
**Melbourne, FL** 32904  
Tel: (407) 729-0704  
Fax: (407) 952-7801

Hewlett-Packard Co. (3177)  
6177 Lake Ellenor Drive  
**Orlando, FL** 32809  
Tel: (407) 859-2900  
Fax: (407) 826-9309

Hewlett-Packard Co. (3166)  
5550 Idlewild, Suite 150  
**Tampa, FL** 33634  
Tel: (813) 884-3282  
Fax: (813) 889-4445

### Georgia

Hewlett-Packard Co. (3108)  
1995 N. Park Place  
**Atlanta, GA** 30339  
Tel: (404) 955-1500  
Fax: (404) 980-7010

### Hawaii

Hewlett-Packard Co. (2409)  
3660 Waialae Avenue, Suite 102  
**Honolulu, HI** 96816  
Tel: (808) 732-1566

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