



## Experience, commitment and support—the measure of success

Data communications through wide area networking. Test equipment is an integral piece of this equation that includes installation and maintenance, research and development. Hewlett-Packard has been in the business of building premier test equipment for over forty-five years. We know what it takes. So you can be assured that we are singularly qualified to provide you with a comprehensive line of high quality data communication protocol analyzers, engineered by engineers who understand.

Developing, installing and maintaining computers and data communication networks is our history. Take advantage of our expertise. With the HP 4951C and HP 4952A protocol analyzers for wide area networking data communication testing needs, everything we've learned can be carried to your problem.

Hewlett-Packard realizes that products alone do not define the total solution. Our total solution includes not only quality products of lasting value, but also training seminars and worldwide service and technical support. Our goal is to establish a long-term relationship with every customer—that's our measure of success.

Whether across a room, a block away, a mile distant, an ocean or continent removed, we can help keep the data moving. With the HP 4951C and HP 4952A wide area networking protocol analyzers.



**HP Computer Museum**  
**[www.hpmuseum.net](http://www.hpmuseum.net)**

**For research and education purposes only.**

HP 4951C  
HP 4952A

**HP 4951C and HP 4952A  
troubleshooting environments**

**General product description**

**IBM solutions**

**X.25, X.21, DDCMP solutions**

**Ordering information  
Specifications**





# Portable protocol analyzers to meet a wide range of data communication problems

## Portable field service

Time is of the essence when you have a data communication problem impacting the productivity of your people. Identifying the cause of the problem and resolving it become priority issues for your business. The ability to carry a powerful, easy-to-use piece of test equipment into the field is a necessity. The HP 4951C and HP 4952A provide you with everything you need to locate problems the first time—before they become hot sites.

With the built-in feature set of the HP 4951C and HP 4952A, complicated setup procedures are a thing of the past. Autoconfigure allows single keystroke setup so that monitoring can begin in seconds. The HP 4951C and HP 4952A allow you to concentrate your expertise on solving the problem at hand.

Prewritten tests from our extensive data communication test library exercise common data communications equipment. The HP 4952A's X.25 test library and emulator helps troubleshoot X.25 installations. Software accessories can also help you verify that 3270 terminals and modems are configured and functioning correctly in an IBM environment before users are placed on-line.



*The convenient size, rugged package and adjustable handle of the HP 4951C and HP 4952A allow you to carry the solution to the problem. With the ability to store these instruments under an airline seat or in an overhead compartment, you can quickly transport these protocol analyzers to a customer site.*

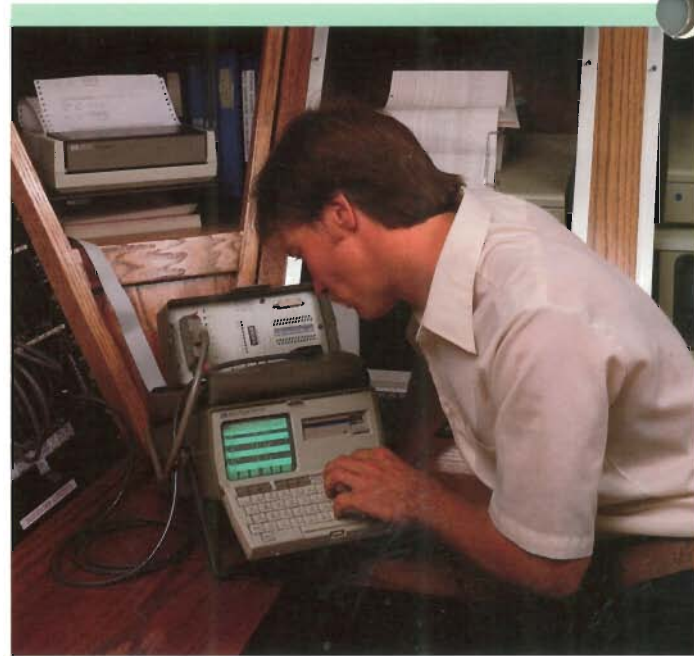
## Data center downtime

Keeping a data communication network up and running is a full time job. When there's a problem, dealing with multiple vendors leads to fingerpointing that increases expensive network downtime. When users are nonproductive due to computer problems, business can come to a virtual halt. In this age of information, you not only have to know how the network works, you have to know what to do when it doesn't.

The HP 4951C and HP 4952A put troubleshooting capabilities needed to help locate network problems in your hands. Once the problem is isolated, you can call in the appropriate vendor to get your network up and running.

With the push of a softkey, autoconfigure helps determine key line parameters, then monitoring begins. Multiple display formats, including custom SNA and X.25 decodes, provide a window into your network through which problems can be clearly seen. Modem links and 3270 networks can be tested without the need of a host computer.

With the remote control capabilities of the HP 4951C and HP 4952A, you can capture data at remote locations and upload it to the data center for analysis by an expert. No longer must highly skilled personnel go to remote locations for troubleshooting, your most valuable resource can work on a problem without the time and expense involved in travel.



*Reducing critical network downtime in a data center is of primary importance to customer satisfaction. When you experience a data communication problem, you need protocol analyzers that help isolate the problem quickly. The HP 4951C and HP 4952A protocol analyzers provide you with the capabilities you need to pinpoint the problem fast.*

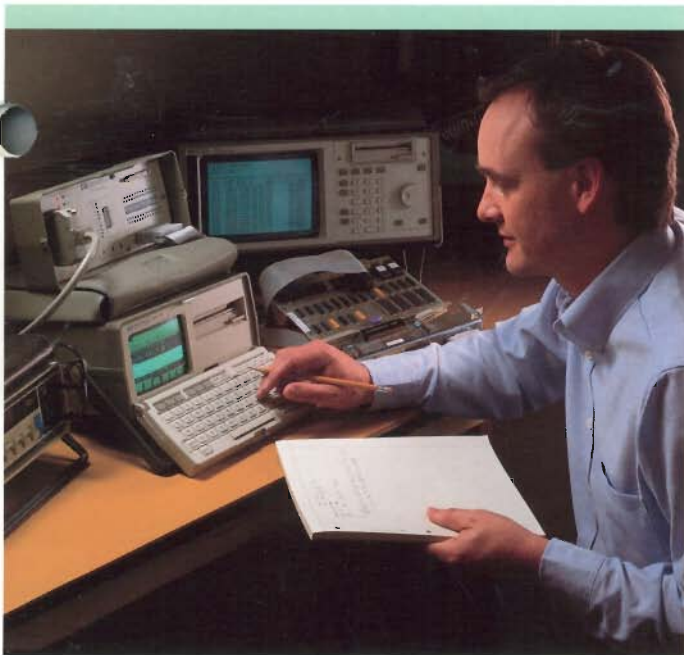
## Data communication design

In the same manner that the multimeter, oscilloscope and logic analyzer have become established bench test tools for the design of electronic equipment, the HP 4951C and HP 4952A protocol analyzers are the standard for data communication test equipment in a research and development environment.

Protocol decodes are provided which give the HP 4951C and HP 4952A the ability to display data transmission in meaningful mnemonics. Engineers no longer must meticulously hand decode fields, bit-by-bit.

Softkey programming flexibility allows routines to be easily written which can analyze and exercise physical interface and link-level protocols. This provides you with the capability to count events, make timing measurements, highlight triggers or sound an alarm on specified events. An X.25 test library and level 2 emulator make the HP 4952A even more powerful for troubleshooting X.25 designs.

For data communication development tool requirements, the HP 4954A high performance protocol analyzer is ideally suited to research and development.



*Bench-test tools are a necessity in design. With the correct complement of tools, development time can be optimized. The HP 4951C and HP 4952A are dedicated protocol analyzers, without the barrier of price to affect your decision.*



*The HP4951C and HP4952A are portable, affordable, and easy-to-use. They support an array of solutions to troubleshoot your wide area network data communication testing needs.*





# HP 4951C and HP 4952A product description

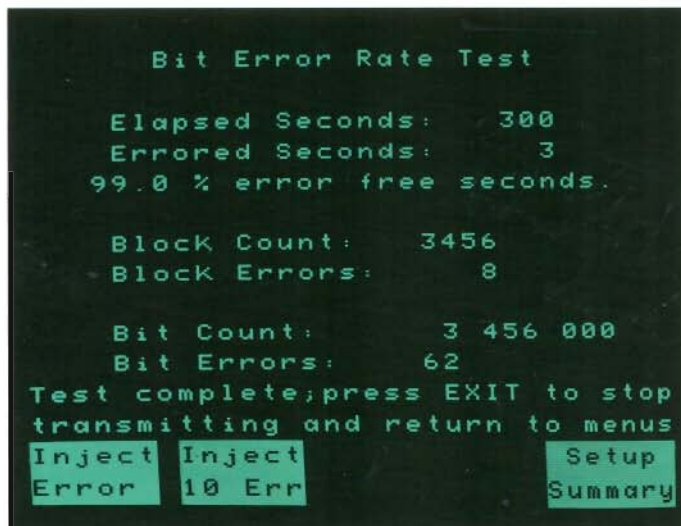
## Common features and benefits of the HP 4951C and HP 4952A

### Designed for ease of use

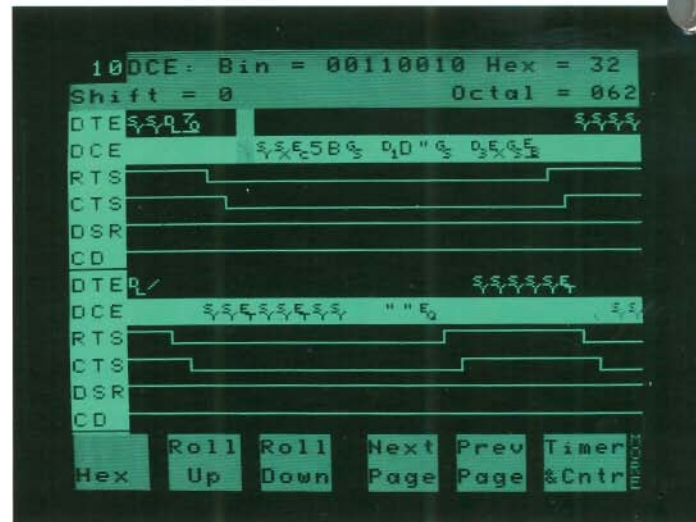
- Microfloppy disc drive to store large amounts of data and configurations for archiving or later analysis.
- Multiple display formats, like data and lead status, to help you find problems quickly, including those due to improper interface handshaking.
- Printer and video outputs when permanent records or a larger display is needed.
- Softkey-guided measurements that require no programming experience.
- Autoconfigure to determine a link's parameters so that you can start testing quickly.

### Developed for data communication testing needs

- 19.2 kbps testing with the HP 4951C.
- 64 kbps testing with the HP 4952A.
- Bit Error Rate Testing (BERT) to evaluate link integrity.
- Flexible monitoring of all major protocols and data codes on all common interfaces to present a window into your network.
- Simulation to exercise network components.
- Remote testing to upload data to a central site for detailed analysis by an expert.
- Data communications test library provides prewritten tests for printer and terminal testing, simple statistics and timing measurements so that you don't have to write programs.
- Asynchronous terminal emulation eliminates the need to carry both an analyzer and a terminal.
- 3270 software products that simplify the installation and maintenance of 3270 components can be purchased to customize your HP 4951C and HP 4952A.
- X.25 and SNA link level performance analysis provides information about the quality and congestion of the link. This is available as optional software for both the HP 4951C and HP 4952A.



Bit error rate testing allows you to perform tests that evaluate the quality of a data link and isolate problems to an individual network component.



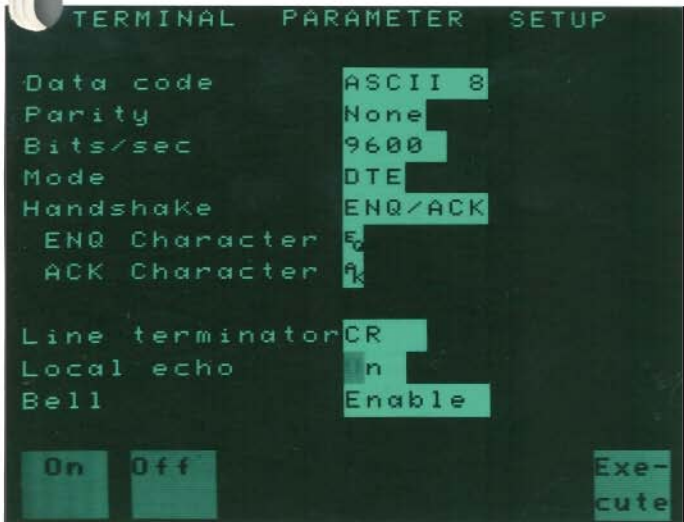
Interface handshaking problems are quickly identified. The data and lead status display shows transmitted data and the status of four major physical interface control leads.

## Additional features and benefits of the HP 4952A

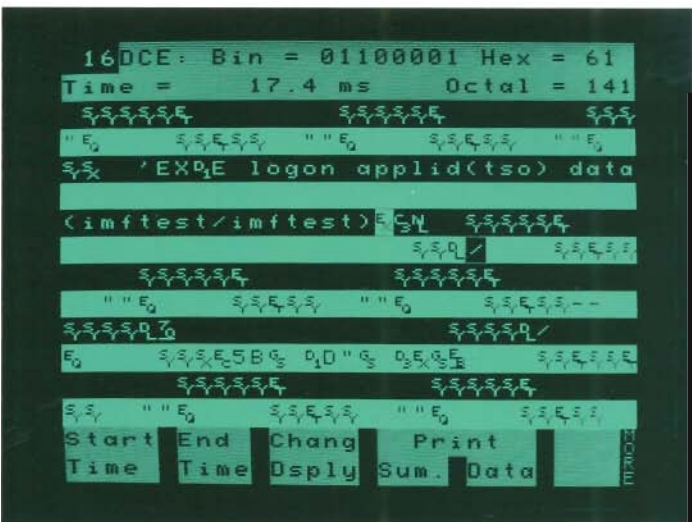
The full feature set of the HP 4952A increases your protocol testing options, adds physical capability and puts more power and flexibility in your hands.

### Designed for maximum troubleshooting capability

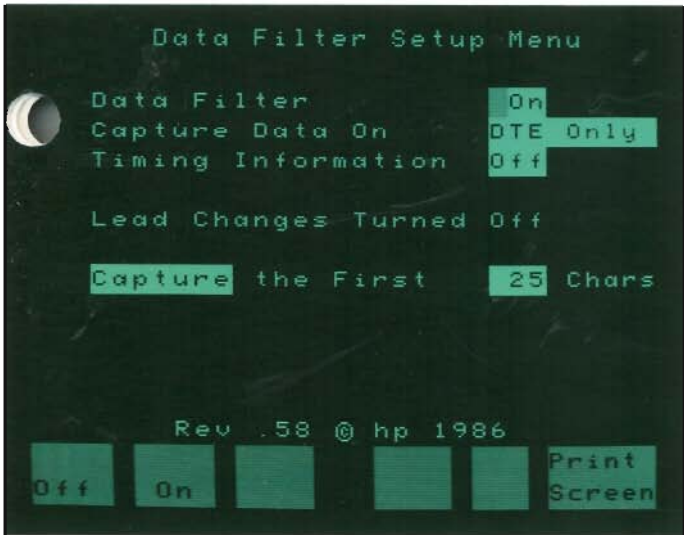
- Adds 64 kbps performance.
- ¾ Mbyte extended capture buffer dramatically increases your ability to capture intermittent failures. This is included in optional feature number 002.
- 128 Kbyte nonvolatile RAM lets you keep frequently used setups and programs resident in your instrument so they are always there when needed. This is included in optional feature number 002.
- Data filtering increases the amount of useful data stored in the instrument by filtering out unwanted events.
- Selective store to disc maximizes disc utilization by capturing only events of interest.
- Cursor timing allows you to identify timing problems quickly.
- Advanced remote control allows you to leave the HP 4952A unattended on remote links. This feature only supports the 32 Kbyte standard buffer; the ¾ Mbyte extended capture buffer cannot be uploaded remotely.
- Enhanced softkey-guided measurements let you develop more sophisticated test-routines to troubleshoot problems. Advanced capabilities let you write subroutines, add user-defined run time comments, and trigger from softkeys.
- Copy disc utility allows field service organizations to quickly duplicate discs with custom prewritten tests for field technicians.
- SNA analysis lets you troubleshoot SNA problems for all standard FID types. Advanced features let you customize the display and analyze SNA running on X.25 packet switched networks. This is an optional software package.
- X.25 enhanced analysis capabilities, test library and level 2 emulator make the HP 4952A a high-level X.25 troubleshooter. These are optional software packages.



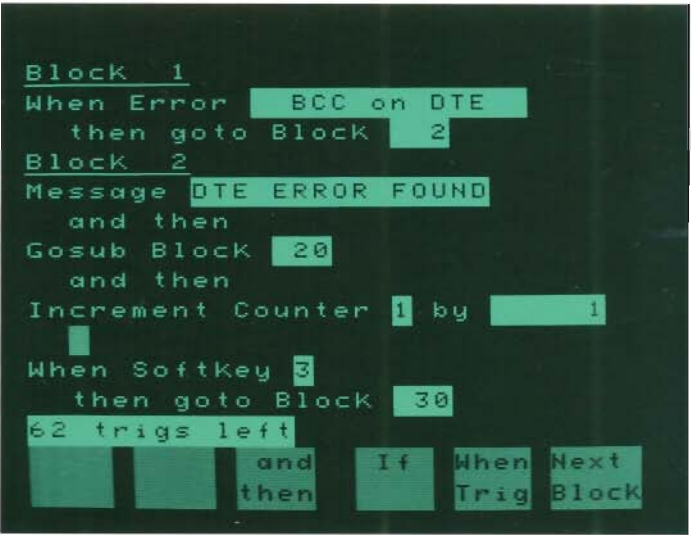
The HP 4951C and HP 4952A can be configured as an asynchronous terminal. This feature can help you configure intelligent devices for your network, communicate with the main office or verify terminal problems.



HP 4952A cursor timing helps you quickly identify timing problems. To make a timing measurement between events in the data capture buffer, just move the cursor.



HP 4952A data filtering combined with the 3/4 Mbyte extended capture buffer allows you to capture even the most elusive intermittent problems.



HP 4952A enhanced softkey-guided measurements give you additional power to reduce troubleshooting time and effort.





# An array of solutions for your data communication testing needs

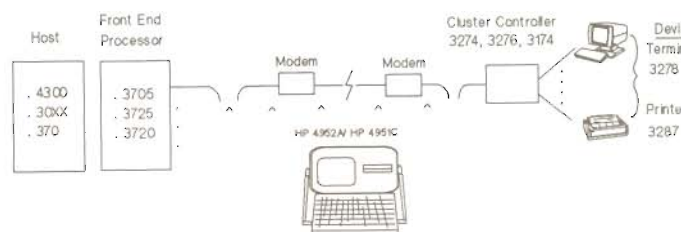
The reality of the data communication environment is the variety of equipment in use, often from multiple vendors, and often running a variety of protocols. In addition to the already powerful standard feature set of the analyzers, the selection of software for the HP 4951C and HP 4952A allows you freedom to meet any combination of needs you may have across the physical, data link and network layers of a data communication network. Choose what you need from our selection of protocol solutions on the following chart. IBM, X.25, DDCMP and X.21 solutions are discussed with displays to illustrate software features. Detailed descriptions can be found in the HP 4951C/HP 4952A technical supplement (5952-5135).

## HP 4951C and HP 4952A protocol solutions

Solution	Nonintrusive/ Intrusive	HP 4951C	HP 4952A
<b>IBM</b>			
SDLC statistics	N	HP 18333D	HP 18264A
SDLC decode	N	standard	standard
SDLC simulate	I	standard	standard
SDLC softkey assist	N/I	HP 18331D	standard
SNA decode	N	HP 18331D	HP 18261A
SNA framed in	N	X	HP 18261A
X.25 decode			
SNA 3270 testing	I	HP 18332D	HP 18263A
BSC monitor	N	standard	standard
BSC simulate	I	standard	standard
BSC 3270 testing	I	HP 18332D	HP 18263A
<b>X.25</b>			
Frame statistics	N	HP 18333D	HP 18264A
Frame decode	N	standard	standard
Frame simulate	I	standard	standard
Frame softkey assist	N/I	HP 18331D	standard
Frame emulate	I	X	HP 18267A
Packet decode, realtime	N	HP 18331D	standard
Packet expanded decode	N	X	HP 18266A
Packet softkey assist	N/I	HP 18331D	standard
Packet simulate	I	standard	standard
Packet test library	I	X	HP 18267A
<b>DDCMP</b>			
Level 2 simulate	I	HP 18331D	HP 18265A
Level 2 decode	N	HP 18331D	HP 18265A
<b>X.21</b>			
Decode	N	X	HP 18260A
Simulate	I	X	HP 18260A

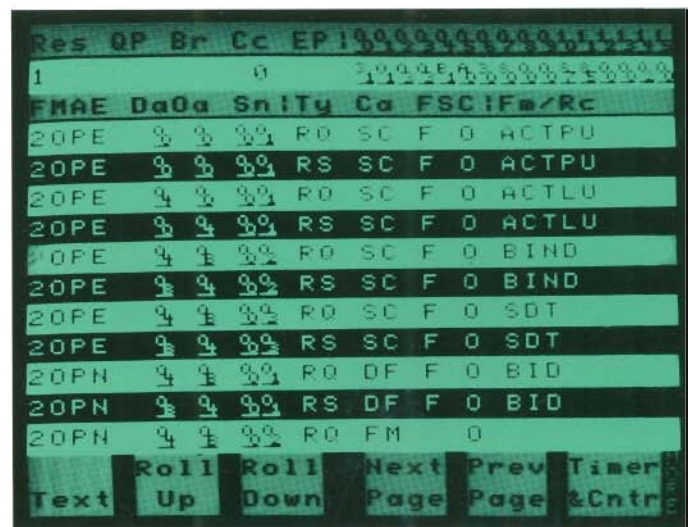
## IBM and compatible solutions

Whether you need to test IBM's Binary Synchronous Communications (BSC) or Systems Network Architecture (SNA), Hewlett-Packard has you covered. **Nonintrusive** testing solutions provide softkey-assisted string entry for triggers as well as decodes of the standard Synchronous Data Link Control (SDLC) and SNA fields and statistical displays of link-level data. **Intrusive** testing solutions include both SNA and BSC 3270 canned tests and simulation menus with link-level softkey-assisted string entry.



The HP 4951C and HP 4952A can be connected for troubleshooting at many locations in the IBM network. They provide a complete set of testing solutions for SDLC, BSC and SNA protocols.

## Nonintrusive testing solutions



In addition to the SDLC frame-level decode provided standard in both the HP 4951C and HP 4952A, SNA decodes are available which analyze and display the Transmission Header (TH), Request/response Header (RH) and Request/response Unit (RU). This provides a window through which your SNA network can be viewed and problems can be identified.

## Intrusive Testing Solutions

```

Monitor

Block 1
When DCE 1510000001
then goto Block 2

60 trigs leftS-frameType= RR
RR RNR REJ Don't SREJ
Care
  
```

If triggering on specific events is required, link-level softkey-assisted string entry is provided, allowing strings to be easily entered without the need for a link-level bit-pattern conversion chart.

```

Simulate DTE

Block 1
Send 100000000160

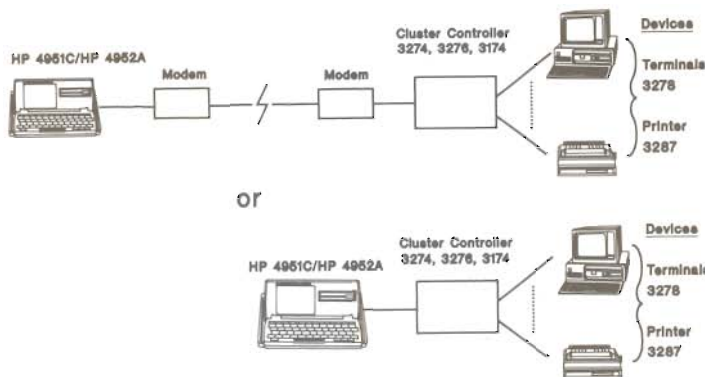
63 trigs leftS-frameType= RR
RR RNR REJ SREJ
  
```

Simulation is often required when troubleshooting equipment or network problems. The simulate menu of the HP 4951C and HP 4952A allows a DTE or DCE to be simulated. Link-level softkey-assisted string entry makes building SDLC frames easy.

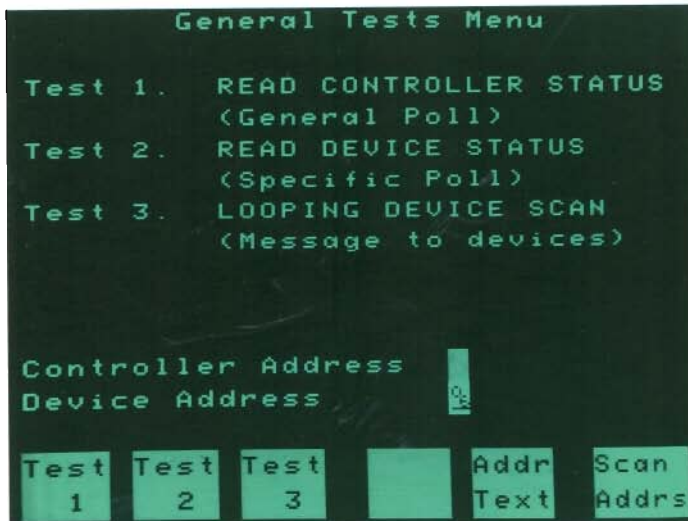
Link Stats - BUFF:		RESULTS	
	DCE	DTE	
Bad FCS	0	0	
Abort	0	0	
I-Frame	232	13	
nonI-Frame	328	315	
Frame Utilization			
DCE	0	50	100  0%
DTE			0%
Elapsed Time		00:00:42	
Monitor Period		00:00:00	
Frnm	To-		Prnt
Lnth	tals		Scrnr
			Help

SDLC link-level statistics count thirteen link-level events simultaneously, displaying any four at run time. Frame utilization and information field length are tracked by bar charts.

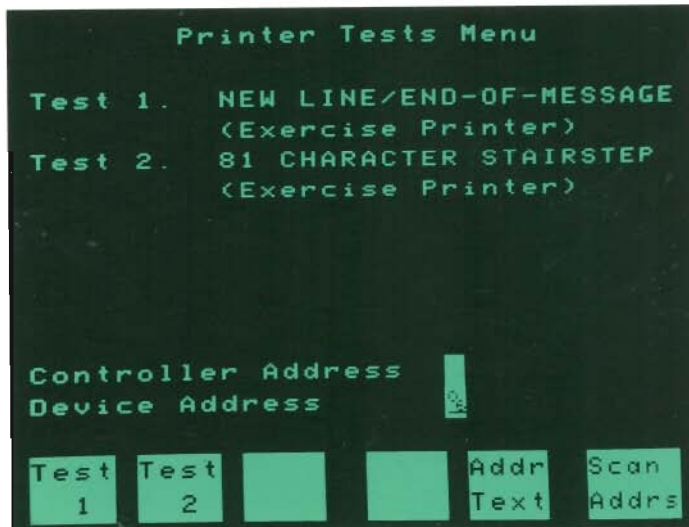
## 3270 Installation and Maintenance



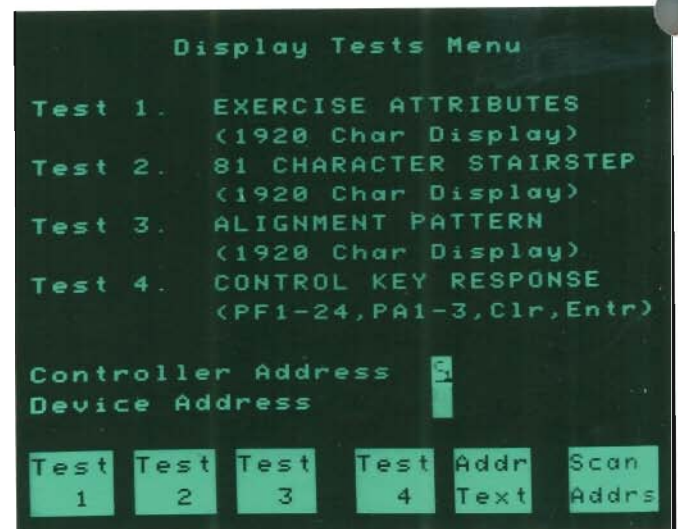
The HP 4951C and HP 4952A allow offline testing of SNA and BSC 3270 equipment. The protocol analyzers simulate the host, or replace the host, front end processor and modem link.



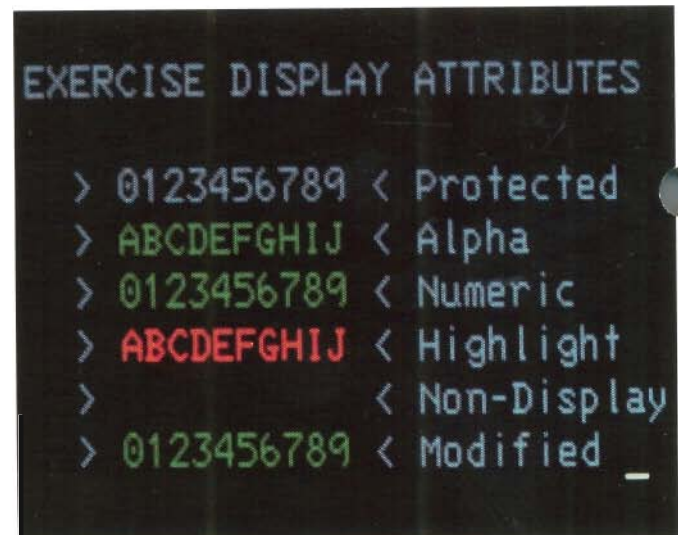
Three prewritten, general 3270 tests are provided. Tests are made at the touch of a softkey.



Two printer tests are easily made on your 3270 printer.



Four display and keyboard tests are available through the display tests menu.



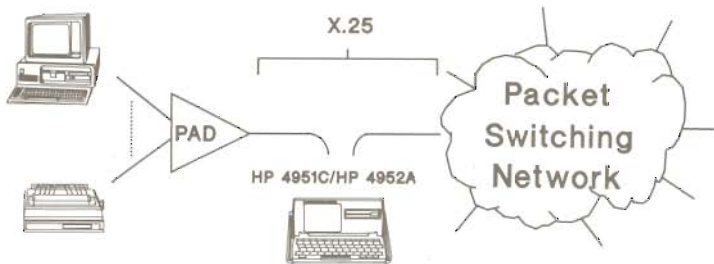
The 3270 equipment-under-test verifies the test when complete. Here a 3270 terminal display shows results of display test 1, the exercise attributes test.



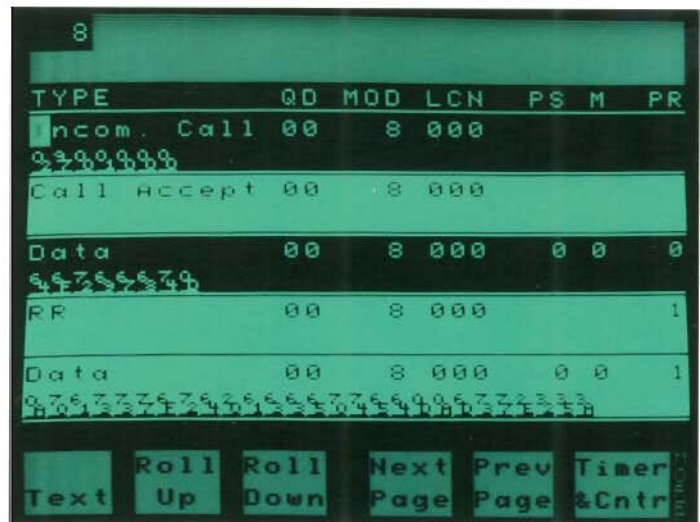
# An array of solutions for your data communication testing needs.

## Packet switched network solutions for X.25

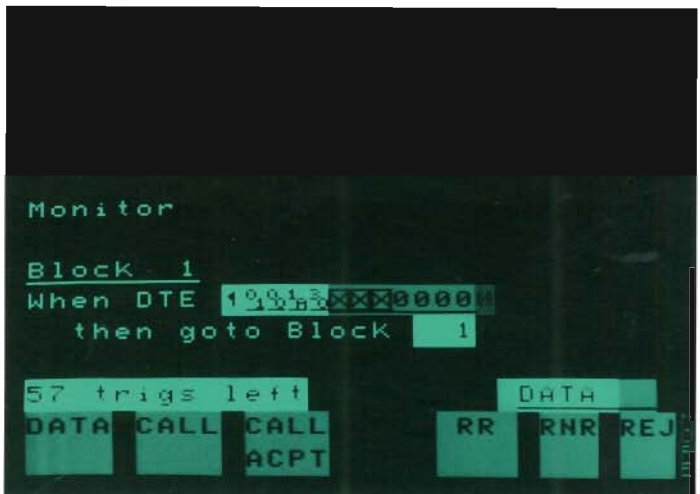
Troubleshooting X.25 packet switched networks can be difficult without proper tools. The HP 4951C and HP 4952A combined with an array of X.25 solutions provide a complete toolset for your use. The solutions for X.25 include link and packet-level decodes (enhanced decode on the HP 4952A), softkey-assisted string entry, link-level statistics, a test library and level 2 emulator (on the the HP 4952A). Refer to the protocol solutions chart and protocol analyzer displays for details on the solutions available.



The HP 4951C and HP 4952A can be connected to the X.25 packet switched network for nonintrusive or intrusive troubleshooting.

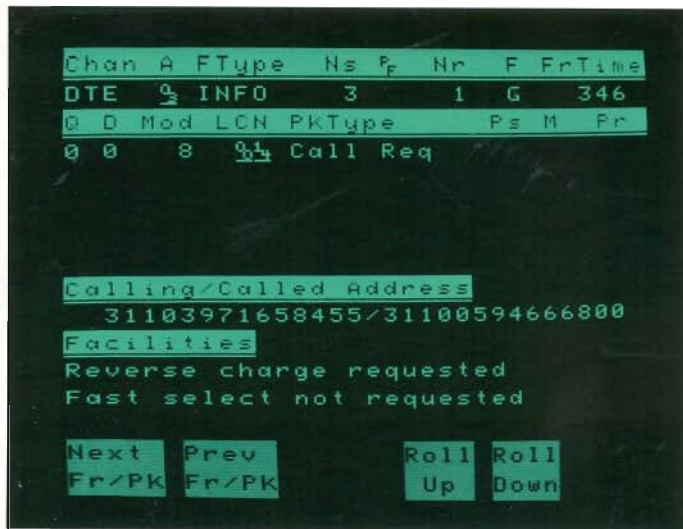


Frame and packet-level decodes (packet level pictured here) on the HP 4951C and HP 4952A show all fields in an easy-to-read format, making frame and packet level troubleshooting more manageable.

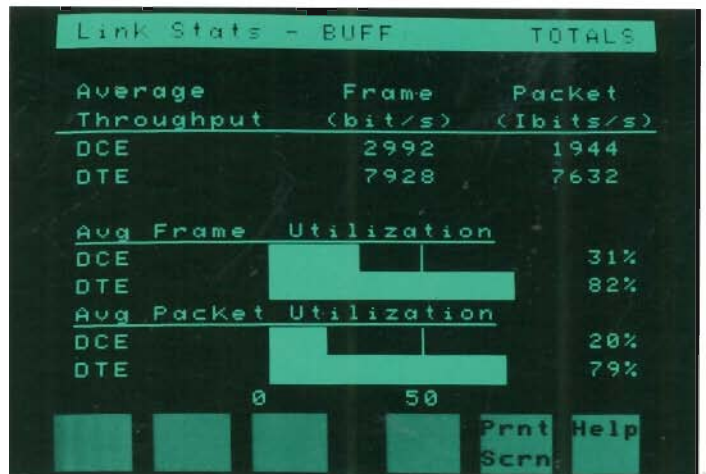


When triggering on specific frame or packet-level events is needed, softkey-assisted string entry is a powerful tool. Packet-level softkey assist is shown here. Frame-level softkey assist is also provided by both the HP 4951C and HP 4952A.

## Nonintrusive testing solutions



The HP 4952A optionally adds two powerful capabilities for X.25 network-level troubleshooting. The enhanced X.25 analysis allows the user to decide what fields to display in the one or two column display format. Frame arrival time is displayed and X.25 extended control is decoded and simulated. The facilities field, cause and diagnostic codes, user data and calling/called addresses are decoded in English. An X.25 test library and emulator is also available to make X.25 installation and troubleshooting fast.



Frame-level statistics for troubleshooting X.25 packet switched networks are available. Frame and packet throughput and utilization are only part of the statistics provided.

# Specifications

## Operating characteristics

### Protocols

#### Data transmission modes

Data transfer rates (bps) for all monitoring, simulation, BERT and triggering

#### Data rate exceptions (bps)

### Data codes

#### Capture memory to store data, timing and lead status (circular)

- nonvolatile
- volatile

#### Mass storage

- microfloppy disc to store data, timing, lead status, setups and programs
- nonvolatile RAM to store setups, programs and applications

#### Lead status stored

### Character framing

#### Parity

#### Error checking

#### Triggers

#### Highlights

#### Timers

#### Counters

#### Keyboard

#### Display

#### Display formats

#### Send strings

#### Remote capability

Bit Error Rate Testing—(BERT) simultaneously measures bit errors, block errors, errored seconds and percent error free seconds for synchronous, asynchronous or isochronous data links

- Block size
- Pseudo random sequence patterns
- Character framing
- Inject error function

#### Video output

#### Printer output

#### Bit sense

#### Bit order

#### Control line pulse width

#### Self test

### Interfaces supported

## HP 4951C

X.25, SNA, SDLC, HDLC, IPARS, BSC, DDCMP, async, + most character sync protocols

synchronous, asynchronous, NRZI

50, 75, 110, 134.5, 150, 200, 300, 600, 1200, teletext 1200/75, 1800, 2000, 2400, 3200, 3600, 4800, 7200, 9600, 12000, 14400, 16000, 19200

no async: 12000

no NRZI: 50, 12000, 14400, 16000

no async BERT: 150, 12000, 16000, teletext 1200/75

the HP 4951C can capture a complete bufferful of data at line speeds up to 64 kbps (bit-oriented protocol only, no triggering)

ASCII, EBCDIC, Baudot, SBT, IPARS, EBCD, HEX, JIS, EBCKIK

32 Kbytes

—

618 Kbytes (circular or fill and stop)

—

RTS, CTS, DTR, DSR and CD for RS-232C/V.24 and V.35

CS, RS, RR, TR and DM for RS-449

—

5, 6, 7, 8 information bits plus parity. 1, 1.5, 2 stop bits for asynchronous systems

odd, even, none and ignore

CRC-CCITT, CRC-16, CRC-12, CRC-6, LRC and parity

63 for characters, errors, timeouts, interface lead transitions

63 most recently highlighted trigger events

5 each with a maximum count of 65535. Resolution 1 msec.

5 each with a maximum count of 9999

full ASCII with six softkeys and cursor control

high resolution 13 cm (5 in.) diagonal with 16 lines and 32 characters per line

DTE data over DCE data, data and lead status, DTE data only, DCE data only, DCE data only, frame and packet decode. Software accessories provide additional display formats

up to 255 characters per string maximum; 1750 characters total

remotely controlled by another HP protocol analyzer or a computer to transfer data, setups and applications

63, 511, 1000, 2047

63, 511, 2047

None, 5, 6, 7 or 8 bits per character and parity single error or a burst of ten errors

RS-170

RS-232C/V.24 ASCII output

normal or inverted (MIL-188C)

MSB or LSB first

minimum of 0.5 msec for detection

extensive self test and functional verification routines will isolate failures to the functional component group, built-in signature analysis permits fault isolation to the component level

RS-232C/V.24, MIL-188C, RS-449/422A/423A, V.35

## HP 4952A

same + X.21

same + externally clocked NRZI

50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2000, 2400, 3200, 4800, 7200, 9600, 12000, 14400, 16000, 19200, 38400, 48000, 56000, 64000

no async: 12000, 16000, > 38400

no NRZI: 50, 12000, 16000

no async BERT: 12000, 16000

The HP 4952A can monitor data at line speeds up to 128 kbps FDX (bit-oriented protocol only, no triggers, display turned off)

same

32 Kbytes

¾ Mbytes (opt 002)

618 Kbytes (fill and stop)

128 Kbytes (opt 002)

same

same

T, R, I and C for X.21

same

same

same + CRC-CCITT preset 0

same + softkeys

same

same

5 each with a maximum count of 65535

same

same

same + packet-only decode, software accessories provide additional display formats

same

same + unattended remote control (except upload of extended memory) and remotely controlled bit error rate testing

511, 1000, 2047

same + 4095

same

same

same

same

same

same

same

same

same + X.21

## Physical specifications

Weight (including interface pod and cable)

Dimensions (height x width x depth)

Temperature:

—operating  
—nonoperating

Microfloppy discs

—operating  
—nonoperating

Power requirements

Electromagnetic compatibility

## HP 4951C

net 6.7 kg (14.8 lb), shipping 12.2 kg (27 lb)

16.0 x 27.9 x 34.3 cm (6.3 x 11.0 x 13.5 in.)

0° C to +55° C, (+32° F to +131° F)  
-40° C to +75° C, (-40° F to +167° F)

+5° C to +50° C, (+41° F to +122° F)  
-4° C to +53° C, (-39° F to +127° F)

100 to 240 VAC, ± 10%

48 to 66 Hz single phase

Typically less than 15 VA, maximum less than 35 VA

VDE 0871/6.78 limit B compliance

licensed per FTZ 1046/84

## HP 4952A

net 7.0 kg (15.4 lb), shipping 12.5 kg (27.6 lb)

same

0° C to +40° C, (+32° F to +104° F)  
-40° C to +75° C, (-40° F to +167° F)

+5° C to +40° C, (+41° F to +104° F)  
same

same

same

Typically less than 20 VA, maximum less than 35 VA

same

same

## Interface pod specifications

HP 18160A (RS-232C/V.24, V.35) Interface activity indicators are the same leads as the HP 18179A and HP 18177A.

HP 18174A (RS-449/422A/423A) Balanced RS-422A drivers. Interface activity indicators: SD, RD, ST, RT, RS, CS, TR, DM and RR.

HP 18177A (V.35) Interface Activity indicators: DTE, DCE, SCE, SCT, SCR, RS, DTR, CS, DSR and CD.

HP 18179A (RS-232C/V.24, MIL-188C) Full breakout box with 25 switches. Interface activity indicators: DTE, DCE, TC, RC, RTS, CTS, DTR, DSR, CD and ETC.

HP 18180A (RS-232C/V.24 and RS-449/422A/423A) Activity indicators are the same leads as the HP 18179A and HP 18174A.

HP 18260A (X.21 and RS-232C/V.24) X.21 interface activity indicators: T, R, I, S; RS-232C/V.24 activity indicators are the same leads as the HP 18179A. This is available only for the HP 4952A.



## HP Sales and Support Offices

For more information, call your local HP sales office listed in your telephone directory or an HP regional office listed below for the location of your nearest sales office.

### United States:

Hewlett-Packard Company  
4 Choke Cherry Road  
Rockville, MD 20850  
(301) 670-4300

Hewlett-Packard Company  
5201 Tollview Dr.  
Rolling Meadows, IL 60008  
(312) 255-9800

Hewlett-Packard Company  
5161 Lankershim Blvd.  
No. Hollywood, CA 91601  
(818) 505-5600

Hewlett-Packard Company  
2015 South Park Place  
Atlanta, GA 30339  
(404) 955-1500

### Canada:

Hewlett-Packard Ltd.  
6877 Goreway Drive  
Mississauga, Ontario L4V1M8  
(416) 678-9430

### Japan:

Yokogawa-Hewlett-Packard Ltd.  
29-21, Takaido-Higashi 3-chome  
Suginami-ku, Tokyo 168  
(03) 331-6111

### Latin America:

Latin American Region Headquarters  
Monte Pelvoux Nbr 111  
Lomas De Chapultepec  
11000 Mexico, D.F. Mexico  
(905) 596-79-33

### Australia/New Zealand:

Hewlett-Packard Australia Ltd.  
31-41 Joseph Street  
Blackburn, Victoria 3130  
Melbourne, Australia  
(03) 895-2895

### Far East:

Hewlett-Packard Asia Ltd.  
22-30/E, West Tower  
Bond Centre  
89 Queensway  
Central, Hong Kong  
(5) 8487777

### Germany:

Hewlett-Packard GmbH  
Vertriebszentrale Deutschland  
Hewlett-Packard-Strasse  
Postfach 1641  
6380 Bad Homburg v.d.H.  
Federal Republic of Germany  
06172/400-0

### France:

Hewlett-Packard France  
Parc d'activité du Bois Briard  
2, avenue du Lac  
91040 EVRY Cedex, France  
01/60 77 83 83

### United Kingdom:

Hewlett-Packard Limited  
Enquiry Group  
Customer Support Centre  
Eskdale Road  
Winnersh Triangle  
Wokingham  
Berkshire RG11 5DZ  
0734/69 66 22

### Italy:

Hewlett-Packard Italiana S.p.A.  
Via G. di Vittorio, 9  
20063 Cernusco Sul Naviglio (MI)  
Milano  
02/923691

### European Multi Country Region:

Hewlett-Packard S.A.  
Route du Nant d'Avril 150  
1217 Meyrin 2—Geneva  
Switzerland  
(41) 22/83 81 11

## Or write to:

### United States:

Hewlett-Packard Company  
P.O. Box 10301,  
Palo Alto, CA 94303-0890

### Europe/Middle East/Africa:

Hewlett-Packard Company  
Central Mailing Department  
P.O. Box 529  
1180 AM Amstelveen  
The Netherlands

### For all other areas:

Hewlett-Packard Company  
Intercontinental Headquarters  
3495 Deer Creek Rd.  
Palo Alto, CA 94304  
U.S.A.