

HP Telegra™D Fax Test and Analysis System**HP Telegra™D - the world-wide standard for automated testing of fax systems, servers and networks carrying fax traffic.**

HP Telegra™D is a notebook-sized fax analysis and call generation test system used to test IP fax systems, VoIP gateways, fax servers, fax machines, fax modem devices, and traditional and IP based fax networks. The system can monitor, record, and analyze calls between two fax devices or it can be programmed to act as a sending or receiving fax device with specific performance characteristics. The system is offered either as a single or dual port solution. HP Telegra™D units equipped with two ports can also be programmed to perform end to end network quality and connectivity testing. HP Telegra™D can easily be carried into the field for testing at a customer site using a laptop PC. Or it can be dropped off at any location for remote testing via modem or Internet connections. Connecting via a 10baseT cable, HP Telegra™D can also be used in test labs controlled directly through any PC or LAN.

Introduce new products and network services sooner

HP Telegra™D helps you get products and services to market earlier with higher confidence. Find more problems faster by automating initial and regression testing. Locate subtle problems early in development or deployment when they are much less expensive to fix. HP Telegra™D's comprehensive test capabilities enhance product and service quality, and reliability.

Identify network problems before your customer does.

Increase customer satisfaction by constantly monitoring or actively measuring your network quality and reliability at various points to identify problems before your customer does. Analyze failed calls and quickly identify the cause of the problem through easy to use graphical interfaces that provide all the information you need on one screen.

HP Telegra™D is a must, if you are:

- Designing fax machines, fax modem devices, fax cards, fax servers or systems
- Testing fax systems in QA or production test
- Providing customer support on fax products, systems, or networks
- Developing Internet fax servers or systems
- Developing cellular and satellite networks
- Maintaining international network operations
- Testing remote networks or servers
- Supporting fax transmission on local, wide area, Internet, cellular, satellite or mobile networks
- Testing line quality from the central office or customer premises
- Field testing from a laptop PC

Key Features

- One or two port portable test system.
- Remote control of HP Telegra™D ports by multiple client PCs over any LAN, WAN, the Internet, or via a modem connection.
- Generation and analysis of traffic to test compliance with all ITU-T Group III standards: V.34, V.17, V.33, V.29, V.27, and V.21 modulation, T.30 and V.8 handshaking, and T.4 and T.6 image encoding.
- Origination, reception, or passive monitoring of fax calls.
- Comprehensive test script libraries and network test suites for interoperability testing, test automation, and regression testing.
- Editing tools to design your own scripts for special tests.
- Statistical analysis of all calls to provide a quick review of the overall result as well as detailed analysis of selected individual calls.
- Explanation of highlighted errors in plain English with suggestions for design improvements.
- Easy to read graphical display of send- and receive-message sequences and timing. Message details can be reviewed by clicking any message.
- Presentation of fax device capabilities and call configurations in easy to read table format.
- Display of captured or transmitted fax images including compression codes.
- HP Telegra™D systems can be distributed to remote sites or laboratories and remotely controlled via LAN or modem connections. Up to two users can access individual ports in the same system, and can use the complete set of test capabilities.
- Field testing from a laptop PC.

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Buttons open up to nine types of analysis windows. Favorite windows configurations may be saved.

Image data is shown line by line. A button shows individual run length codes.

Capabilities and call configurations from DIS/DCS messages are shown in table form.

Errors and violations of standards are highlighted in the call browser and described here in plain English with suggested design improvements.

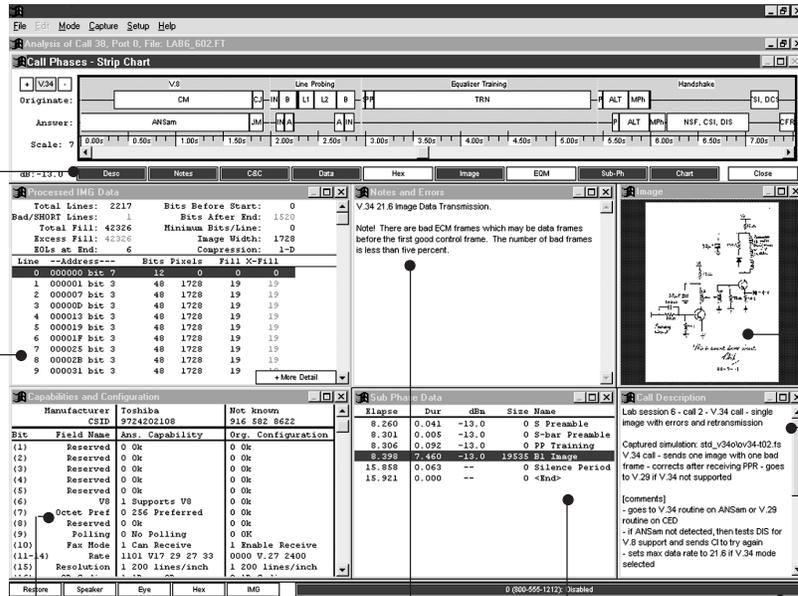
Detailed sub-phase data is shown for V.34 (33.6 kbps) calls.

Real-time status is displayed for all test ports.

Call protocol is displayed in a graphic browser. Click any message to view its contents in other windows.

Fax images can be shown full screen, zoomed, and rotated.

Description of the call is taken from the test script.



Exercise complete control over fax protocols

HP Telegra™ D products operate in two modes: call capture and call generation. Call capture monitors, records, and analyzes calls between two fax systems. Call generation automatically originates or answers calls using user designed test scripts or HP's Standard Test Library which can be modified by the user.

HP Telegra™ D supports all ITU-T Group III standards: V.34, V.17, V.33, V.29, V.27, and V.21 modulation, T.30 and V.8 handshaking, and T.4 and T.6 image encoding.

HP Telegra™ D features powerful regression testing. Fax calls with known behavior are captured and used as references. Subsequent calls are compared automatically with the references, and the differences noted. Calls may even be compared with multiple references at the same site.

Review massive test results automatically

HP Telegra™D performance reports give a complete statistical analysis of calls from selected result files, saving the user from having to review large amounts of data. The report design dialog box, shown below, shows the range of optional content.

Report from a single results file or from all results within a range of dates.

Sort sections of the report by receiving phone number, sending port or test script used.

Send the report to printer, file, screen or a clipboard.

Save a favorite report design.

Select specific sections to be included in the report.

Performance reports measure reliability and pinpoint areas of performance needing attention. Time efficiency statistics help to benchmark economic use of system and network resources. Regression test reference statistics measure how the system compares with a previous release or model behavior.

Understand call failures completely

Fifteen years of continuous involvement with the design and testing of hundreds of fax models has resulted in a knowledge base of unequalled depth and detail. The Expert Notes and Errors window presents a detailed analysis of fax errors and other significant events in the call. In plain English, it explains how the call deviates from ITU-T and PTT standards or from practices necessary to achieve the highest possible level of compatibility. It also recommends specific corrective actions.

HP Telegra™D software records, displays, and analyzes fax calls. Recorded calls are automatically named and indexed by port, month and date for easy retrieval. The protocol is displayed in list form or in a graphical browser that shows both originate and answer messages with a time base that can be zoomed and panned. Clicking on a message displays information about the message in up to nine other specialized analysis windows. For example, the Processed Image Data window decodes fax page images by line or by run length code within lines. Errors in the call are highlighted in red so it is easy to scan for problems.

Emulate behavior of any fax device

Recorded fax calls may be converted into test scripts with a single command allowing the user to select either the originate or answer side of the call. This technique can also be used to generate regression test libraries. It also can be used to capture and emulate behavior of particular fax machine models, which is often a useful supplement to comprehensive worst case stress testing.

Watch fax signals in real time

HP Telegra™D Real Time Monitor displays analog fax signals and corresponding fax protocol phases in real-time using an eye pattern constellation similar to an oscilloscope display. The fax signal may also be recorded and played back over a wide range of speeds for pinpoint analysis. The overall eye quality is also recorded during the call for each fax page transmitted, giving a moment by moment measure of how much the received signal phase and amplitude deviates from an ideal signal. The recorded quality data for any page can be displayed as a graph. The monitor and graph are useful in diagnosing line and analog signal impairments and correlating them with errors in fax calls, replacing additional expensive test instruments.

Real-time eye pattern display.

Frame #	Frame Type	Name
1	Answer on Ring	RING
2	Wait	
3	Send Tone	ANS
4	Wait	
5	Send FSK	DIS
6	Listen	
10	Receive FSK	dcs >>DCS
11	Listen	
12	Receive Fax	tcf
13	Wait	
14	Send FSK	CFR
15	Listen	
16	Receive Fax	fax

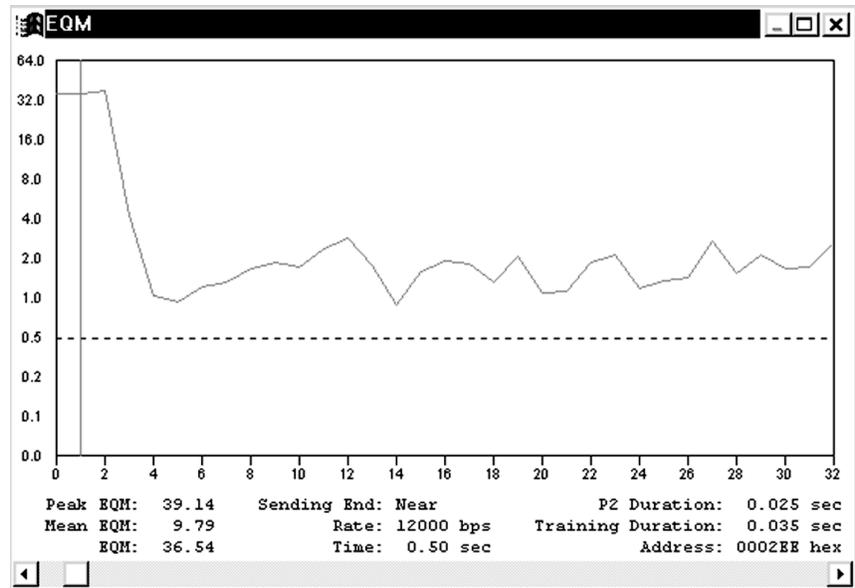
Frame types are identified in a real-time scrolling list.

Control playback speeds and display "persistence".

Record and playback the pattern.

Time: 51.037 Power: -18.7 dBm Speed: 100 % Window: 100ms Mark: 0.000
 Playback: Playback controls are only active when the analysis window is open.
 Real-Time Record
 Play Pause Mark Settings

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Test to the latest high speed V.34 fax standard

HP Telegra™D offers the option to originate, answer, and capture calls using V.34 modulation at speeds up to 33.6 kbps in addition to operating at all lower speeds. Since V.34 operates in part in a full duplex mode, HP Telegra™D does not operate in a capture only mode for V.34 calls, but must actively participate as either the originating or answering fax device. In the Call Phases chart view of the V.34 protocol, V.8 handshaking is shown hierarchically in phases that can be expanded into a sub-phase view or collapsed into an overview.

Design your own tests easily

A structured editor for test scripts that is fully integrated into the software allows the user to create and modify scripts. Scripts are created as a series of standard commands, using dialog boxes to select among eleven frame types, choose parameters, timing and power levels for the frame, edit binary and hex data, and manage flow of control. HP Telegra™D test scripts give the user complete control over the content and timing of every phase of a fax call, down to the bit and millisecond level. The user can generate normal, difficult and abnormal calls and emulate any kind of fax system behavior. The scripts and suites in all HP Telegra™D test libraries are provided in “source code” form so the user can understand and modify them.

Perform fully automated, unattended testing

Testing can be orchestrated with batteries of test calls by creating test suites using the integrated suite language. The user controls the flow of testing with labels and flow control statements and can run tests at a scheduled time or periodically. Powerful commands allow the user to manage large numbers of test ports, vary operating conditions between calls, and control serially interfaced test equipment (such as TAS network emulators) without having to change the underlying scripts. All ports can work independently, or ports may be grouped to run the same test.

During testing, HP Telegra™D logs the operation of suites in a results file, summarizing test results from all calls. The details of each call are captured in an individual analysis file. Automatic review and selective retention of analysis files permits thousands of calls to be made in unattended fashion without exhausting mass storage.

Test fax systems located anywhere, from anywhere.

The client/server architecture allows the user to place HP Telegra™D units at remote sites, such as network nodes, customer premises, or test laboratories and access them from any Windows® 95 or NT based PC. All HP Telegra™D features are available to the user through client software running on the user's PC. Clients talk to servers through a LAN, the Internet, an Intranet, or any other TCP/IP network. This permits testing resources to be easily shared by several members of a project team. Quality assurance, production, and support staff can instantly share test capabilities and test results with engineering staff. Test ports can be placed at two or more remote nodes on a landline, cellular, or satellite network and the user can selectively test the paths between them. Network operations staff can monitor critical nodes in a network from the network operations center. Or users may just want the convenience of working from PCs in their offices or from notebook computers in the field. The user can control which clients are allowed to access HP Telegra™D ports and all communications are encrypted for additional security.

Test Libraries

HP's test libraries are collections of test scripts and suites that are used by HP Telegra™D to generate "originate" and "answer" test calls for testing functionality, compliance with a variety of different standards, and compatibility with thousands of releases of fax equipment models.

Standard test library

These tests are included with all HP Telegra™D systems and exercise all areas of fax functionality. Suites include over 100 scripts in the following categories: Originate, Answer, ECM Originate, ECM Answer, ITU-T Test Images, Operator Interrupt, and Single Ended Tests. A complete library of the eight test images defined in the ITU recommendations is included.

The Following Libraries are Offered as Options on the HP Telegra™D Platform

Network test library

This library, designed for use with dual port HP Telegra™D units, provides special test scripts and suites for the complete end-to-end testing of networks carrying fax traffic, including PSTN and data networks using landlines, cellular, satellite, and microwave transmission. Problems that the tests reveal include noise and other line impairments, echo, conflicts in handshaking due to delay, modification of signals by intelligence in the network, inappropriate echo suppressors, and carrier dropouts (in cellular and other wireless systems). The Library consists of twelve test suites for testing normal operation, FSK messages and irregularities, image irregularities, intercarrier wait times, carrier gaps, polling, transmission parameters, TCF pattern handling, and ECM operations.

Design verification test library - worst case testing

This powerful library contains 167 scripts in seventeen test suites that test fax systems for conformance with ITU-T recommendations T.30, T.4, and T.6, and for interoperability with fax machines exhibiting the most commonly found design errors and deviations from the standards.

V.34 test library

This library tests V.34 functionality and conformance with V.34 high-speed transmission and V.8 handshaking protocols. Originate and answer scripts test normal and abnormal handshaking and retraining, at all possible symbol and data rates.

ETSI conformance test library

Fax resellers and major suppliers to many European Union countries generally prefer to market systems that comply with the European Telecommunications Standard ETS 300-242. Tests cover T.30 protocol handling, scanning, print resolution, data rate, fall back, gap timing, TCF patterns, fax parameters, abnormal FSK message, preamble/sync anomalies, short image lines, etc.

French telecom standard 110 test library

Fax equipment resellers in France generally require manufacturers to comply with the French Test Standard NT/SPT/SCE/STD/110. These stringent standards include requirements that exceed and clarify interpretation of ITU-T standards. The library also includes TCF training patterns and test images used in the test.

Technical Specifications

Physical Characteristics

Dimensions: 24 W x 30 D x 7.3 H cm
(9.5 W x 11.88 D x 2.88 H inches)
Weight: 3.6 kg (8 pounds)

Temperature

Operating: 0°C to + 55° C (32° F to 131° F)
Non-operating: -40°C to + 70° C (-40° F to 158° F)

Humidity 15 to 95%

Regulatory compliances

EMC, Safety: CE, CSA pending
Telecomm: FCC 68 pending

Interfaces

- Four RJ-11 rear panel connectors per card
- Standard analog, loop start, tip and ring interface.
- Line interface input impedance approximately:
 - Call Generate Mode: 600 ohms
 - Monitor Mode: >6000 ohms

PC System Requirements (not provided)

- PC running Windows® 95/98 or NT
- 50 MB free hard disk space
- VGA or Super VGA (preferred) color display, supported resolutions: 800x600, 1024x768, 1280x1024
- 10BaseT TCP/IP network interface card (NIC)

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Notes:

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Expanding Possibilities

Ordering Information

HP J3935A Single or dual port V.17 and V.34 fax analyzer

Related Literature

Telegra™M Product Overview 5968-5652E

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