

**HP****Telegra™ M****Multi-Port Fax Load and Analysis System**

**HP Telegra™ M - the world-wide standard for automated testing of fax systems, servers, and networks carrying fax traffic.**

HP Telegra™ M is a multi-port fax load and analysis system used to test multi-port fax networks, active and passive network devices, fax servers, and IP fax systems, all through analog and T1/E1 interfaces. The system is designed for test labs, as well as network and service operational testing, and is controlled by client PCs via direct connection, or remotely via Internet, LAN, or modem connections. HP Telegra™ M is the first product specifically designed to test, analyze and evaluate multi-port fax systems and networks, and networks carrying fax traffic.

**Introduce new products and network services sooner**

HP Telegra™ M 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™ M'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 through easy to use graphical interfaces that provide all the information you need on one screen.

HP Telegra™M is a must, if you are:

- Developing or testing multiport fax modem devices such as fax servers, fax broadcast systems, T.37 or T.38 gateways, or gateways for Voice over IP networks
- Load testing fax servers, networks, or Internet fax products
- 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

## Key Features

- Multiport, rack-mountable test system configurations supporting from four to virtually unlimited number of ports
- Remote control of HP Telegra™M 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 at all ports simultaneously
- Comprehensive test script libraries and network test suites for load 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.
- Rapid identification of errors and violations of standards through highlights in the call browser.
- 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™M systems can be distributed to remote sites or laboratories and remotely controlled via LAN or modem connections. Multiple users can access individual ports in the same system, and can use the complete set of test capabilities.
- Definition and execution of any test via local or remote control through a LAN or modem connection

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.

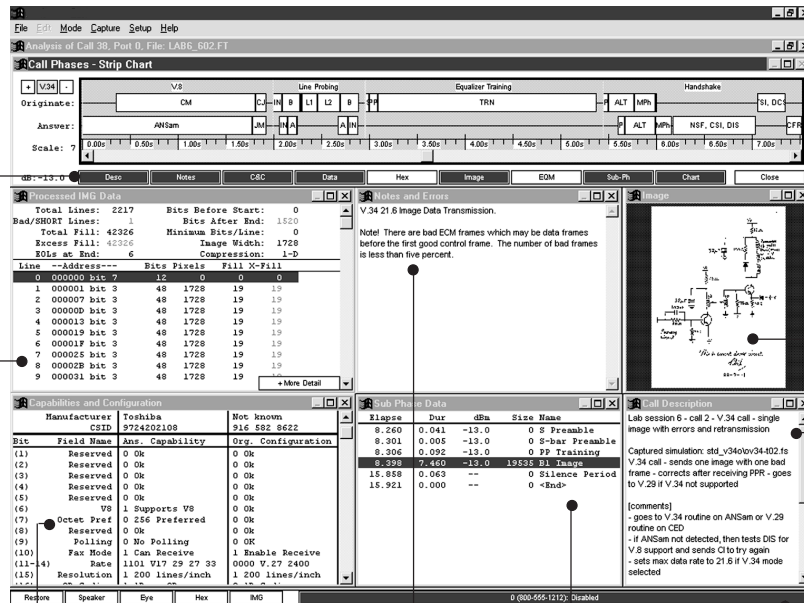
Detailed sub-phase data is shown for V.34 (33.6 kbps) calls.

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

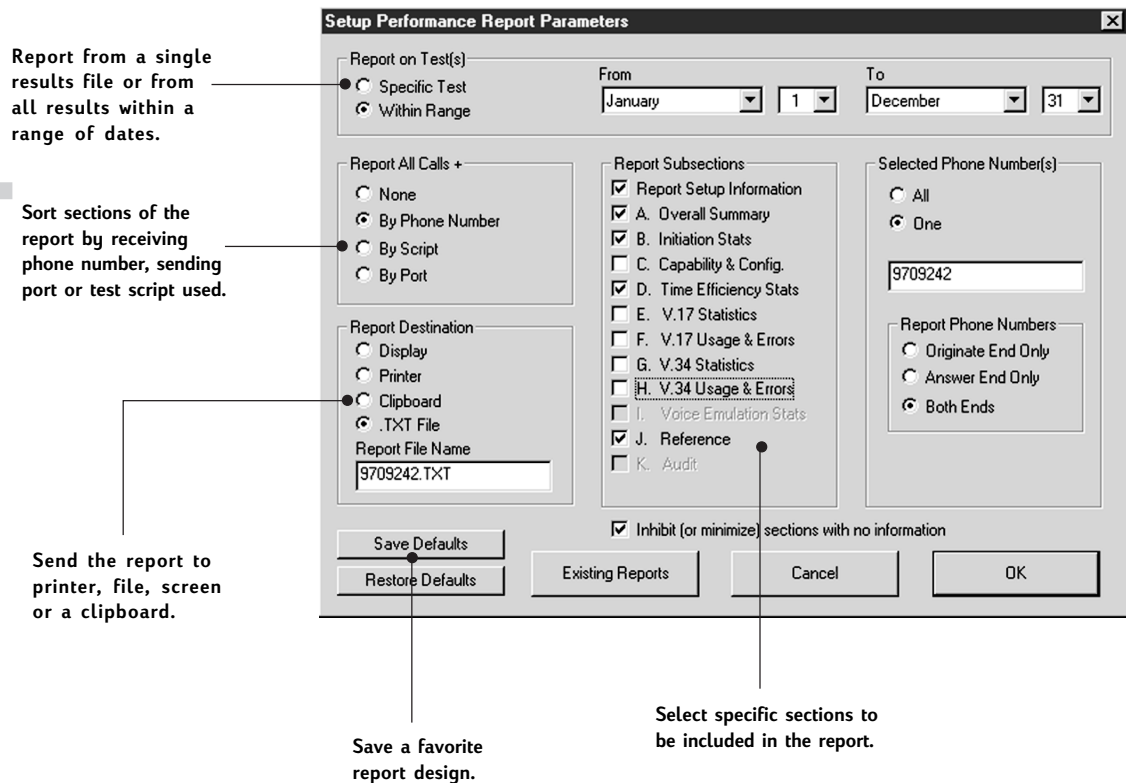
HP Telegra™ M products operate in two modes: call capture and call generation. Call capture monitors, records, and analyzes calls between two fax systems. Call generation automatically originates or answers calls using user designed test scripts or HP's Standard Test Library which can be modified by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

HP Telegra™ M 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™ M 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™M performance reports give a complete statistical analysis of calls from selected results 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.



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 unequaled 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 recommends specific corrective actions.

HP Telegra™M 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™M 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.

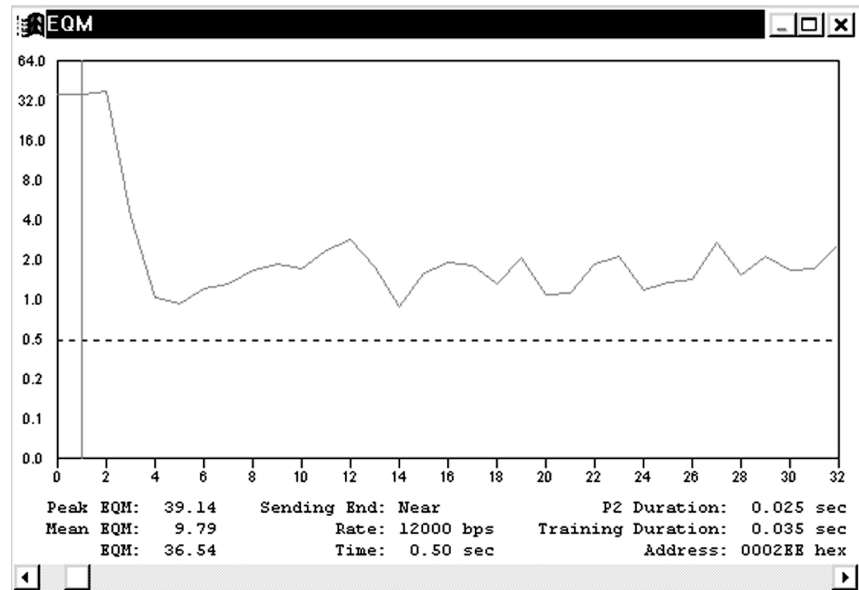
Frame #	Frame Type	Name
1	Answer on Ring	RING
2	Wait	
3	Send Tone	ANS
4	Wait	
5	Send FSK	DIS
6	Listen	
10	Receive FSK	dcs >>DCS
11	Listen	
12	Receive Fax	tcf
13	Wait	
14	Send FSK	CFR
15	Listen	
16	Receive Fax	fax

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 Play Pause Mark Record Settings



## Test to the latest high speed V.34 fax standard

HP Telegra™M 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™M does not operate in a passive 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™M test scripts give the user complete control over the content and timing of every phase of a facsimile 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™M 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™M 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™M systems 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 Internet Advisor 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™M servers 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™M 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™M 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.

## **HP Telegra™M test library**

HP Telegra™M system is powered by an extensive set of pre-defined fax call scripts selected from standard and optional test libraries. These calls incorporate the standard and the anomalous behavior prevalent in the installed base of over 100 million fax machines and PC fax cards and are designed to test to the industry standards, deviations to those standards, and known fax system problems that are in the market today.

HP Telegra™M V.17 embodies HP's worst case stress test philosophy ensuring that, upon successful test completion, the fax server, network device, analog or digital network will be able to communicate reliably and at a high completion rate with the largest population of fax cards, systems and networks in the world.

HP Telegra™M Test Library provides the following standard tests:

### **Functionality**

Provides complete stress testing by sending a collection of test scripts that test all aspects of fax. These calls are provided in a special HP Telegra™M V.17 Test Library. They have been selected from HP's Telegra™D Standard Test Library, Design Verification Library, and include new test scripts that have been created by HP Engineering. Evaluation of results is reported using a simple percentage success rate with guidelines from HP.

### **Load**

Provides load testing on all ports. You may skip individual calls that the system under test can not handle. Evaluation of results is reported using a simple percentage success rate with guidelines from HP.

### **Network**

Provides complete testing of a network or fax server with a special set of end to end test scripts. These suites automatically configure half of the ports to originate calls and the other half to answer the calls made by the originate ports. These scripts are adapted from the powerful HP Telegra™D Network Test Library and have been modified to handle an unlimited number of ports.

### **Special**

Provides tests for special conditions such as "dial a fax server access code and then a fax number" or "test a list of phone numbers for fax capability".



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## **The following libraries are offered as options on the HP Telegra™ M platform**

### **Design verification test library - worst case testing**

This powerful library contains 167 scripts in 17 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: 43.8 W x 45.7 D x 17.8 H cm  
(17.25 W x 18.00 D x 7.00 H inches)  
Weight: 16 kg (35.30 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, FCC part 68 approved
- 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)

# profile

Notes:

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## Ordering Information

- HP J3947A** V.17 and V.34 4- to 36 port rackmount fax bulk call generator and analyzer.
- HP J3948A** V.17 and V.34 48, 96 or 144 port rackmount fax bulk call generator and analyzer.

## Related Literature

- Telegra™ D** Product Overview 5968-5651E

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