

FIREBERD[®]



Communications Analyzer



For a smooth-running digital network and a balanced test budget, choose a test strategy that evolves with your network – a TTC® FIREBERD® Communications Analyzer¹. The FIREBERD 6000 and FIREBERD 4000 are known for their excellence in physical layer testing, but TTC is also committed to providing superior test solutions for new technologies, such as frame relay and asynchronous transfer mode (ATM). In fact, using modular plug-in interfaces and mainframe options, you can use a FIREBERD 6000 or FIREBERD 4000 to test circuits and equipment operating at rates from 50 b/s to 52 Mb/s.

You can rest assured that the FIREBERD's easy-to-use, menu-driven test methodology will always be there to meet your test requirements – and because you don't have to master a new instrument when your testing needs change, you level the learning curve and decrease your training costs.

You set high standards for the performance of your digital network. That's why you should select instruments whose quality and reliability have been proven in the field – FIREBERD Communications Analyzers from TTC.

Highlights

- Test ATM, frame relay, ISDN, low-speed data, T1, 2M, and T3 with the same instrument, and recall up to ten of your most frequently used test scenarios with the push of a button.
- Detect hard-to-find bit error rate (BER) problems quickly, and interpret test results easily using customized printouts that show only the results that you specify.
- Reduce response time and extend the reach of your field technicians with remote testing. Distributed Test Manager (DTM) and Remote Test Manager (RTM) software options enable you to perform remote testing from your PC or UNIX workstation.
- Use your FIREBERD to test analog circuits. The TIMS-45 Lid enables you to perform VF and wideband Transmission Impairment Measurement Set (TIMS) tests on analog and digital transmission lines.
- Perform automated testing with your FIREBERD 6000 with LabVIEW drivers available free from National Instruments Corporation.
- The FIREBERD's industry-leading three-year warranty and field-tested quality and reliability allow you to rest easy knowing your FIREBERD is always ready when you need it.



Your partner in digital testing.

¹For information on the TTC FIREBERD 500 Internetwork Analyzer, see your sales engineer, or call TTC at 1-800-638-2049.

At Home in Any Test Environment

The FIREBERD 6000 rises to the occasion whenever and wherever you need it. Perform in-service monitoring and out-of-service testing with one instrument, including loopback and end-to-end testing. Portable and convenient as well as powerful, the FIREBERD goes wherever your network takes you – the field, the lab, the manufacturing floor, and the control center. It's the right instrument for all your testing environments.



In the Field

A single lightweight field service package meets your entire array of test requirements. Whether troubleshooting, benchmarking, or installing circuits, the FIREBERD is an indispensable tool for getting the job done quickly. The FIREBERD's menu-driven design keeps setup time to a minimum – you can even store and recall your most frequently used configurations with the push of a single button. The front-panel display lets you monitor key test results at a glance, and the integrated lid printer gives you hard copy documentation of all your findings. And because the FIREBERD offers such an extensive array of measurements and alarm reports, you can accurately find problems the first time and eliminate the need for a second trip.

In the Lab

With a FIREBERD in your lab, you can easily verify your most demanding specifications and designs. The multifunctional FIREBERD has what you need for research and development testing, right down to jitter generation and TTL testing. Create realistic simulations by setting critical parameters such as line impedance and signal polarity. You can also perform stress tests and select phase changes, inversions, and timing deviations with the built-in frequency synthesizer and inverted clock detection. You'll also have the reassurance of knowing that you're using the same test equipment as telcos, PTT/PTOs, and carriers.



Automated Testing on the Manufacturing Floor

Verify quality on the manufacturing floor to deliver your equipment to your customers with confidence. The FIREBERD excels in an automated IEEE-488.2 testing environment, with industry-standard commands that enable full remote control from a terminal or computer. In addition, LabVIEW drivers used with your computer enable you to send and receive information from a variety of test instruments, including voltmeters and oscilloscopes, and display the results on your computer. The FIREBERD's programmable error and data signal generation lets you customize your acceptance tests, and its print capability lets you capture detailed test events in tabular or graphic format. You can also integrate the FIREBERD into your test environment quickly and easily, with rack mounts and Interface Switching Units (ISUs) that hold up to eight interfaces.



In the Network Control Center

The FIREBERD is an indispensable partner in the network control center environment. Because the FIREBERD lets you monitor all field offices and switch nodes from a central location with DTM or RTM remote control software, you'll find and fix network problems before they disrupt service. You can also immediately detect a variety of alarms using LEDs that reflect present conditions, and obtain verifiable test reports. Additionally, the FIREBERD's optional rack-mount configuration makes it a perfect fit in any network control center.



The Right Fit in Any Part of Your Network

Equally at home in the control center and in the field, the FIREBERD 6000 has the power and versatility you need to handle an array of testing jobs, including both in-service and out-of-service testing. One instrument does it all:

In-Service Monitoring

Monitor live data at various access locations, from resistor-isolated DSX monitor points to a bridge on a four-wire access point, without disturbing revenue-generating traffic. Ideal for routine maintenance, the FIREBERD offers a variety of in-service measurements, including bipolar violations, timing and level analysis, frame errors, and CRC errors.

End-To-End Testing

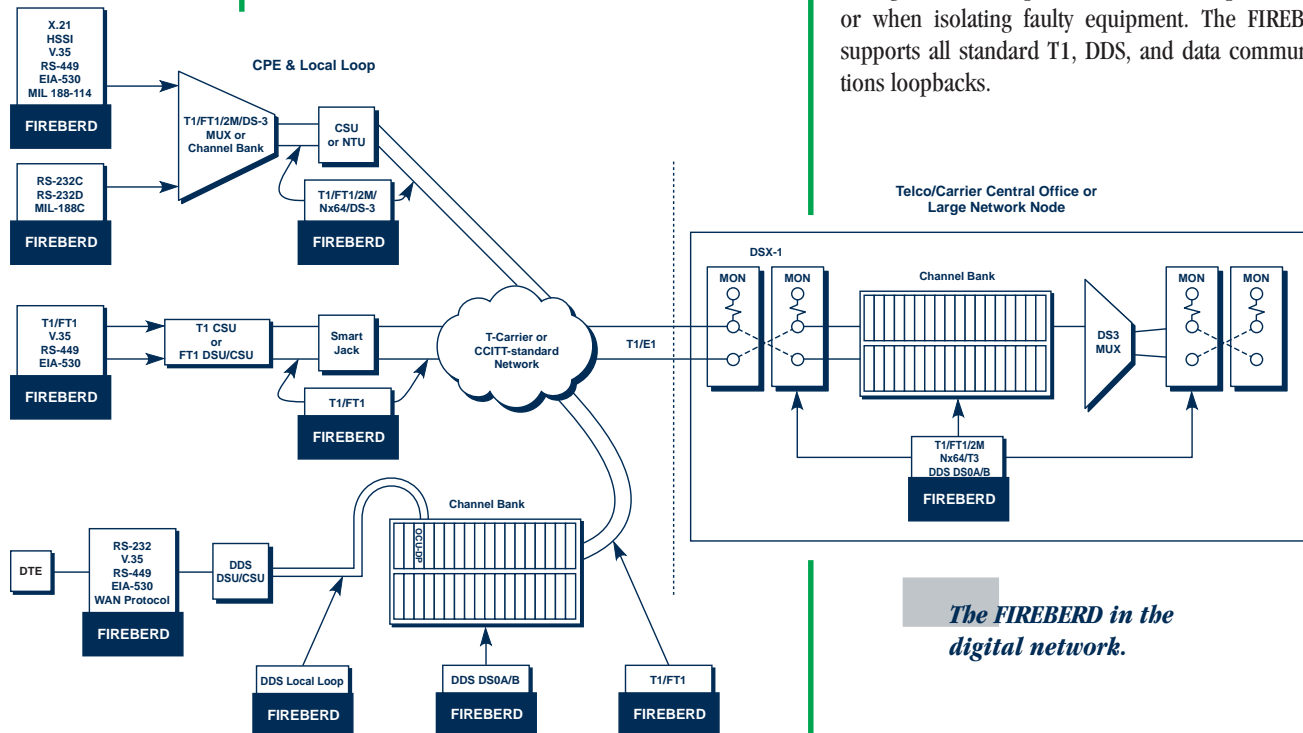
Quickly isolate any problem to a specific direction by analyzing the performance of an entire digital link in both directions. Full-duplex end-to-end testing also serves as an excellent analysis of all circuits and equipment within your network.

Out-of-Service Testing

Perform precise analysis of your circuits and equipment by removing live traffic from the digital link. The FIREBERD offers a variety of bit error results and statistics for the most accurate measurement of circuit performance by any test instrument. The FIREBERD can generate an array of stress patterns to ensure that your circuits and equipment are operating within the limits of applicable standards. In addition, the FIREBERD can generate frame relay frames and ATM test cells to verify an acceptable quality of service for your circuit.

Loopback Testing

Enjoy the convenience of using a single FIREBERD to perform out-of-service testing. Loopback testing is ideal as a quick check of circuit performance or when isolating faulty equipment. The FIREBERD supports all standard T1, DDS, and data communications loopbacks.



The FIREBERD in the digital network.

Advanced Features . . . A Single Modular Architecture

The FIREBERD 6000 Communications Analyzer brings advanced features to today's complex networks. Whether your test requirements include ATM or ISDN testing, physical layer and data link layer analysis of frame relay, or generation and measurement of the jitter tolerance of your T1 or 2M circuits, the capability of the FIREBERD 6000 is as unlimited as the technologies within your network.

The FIREBERD 6000 meets an unparalleled variety of test requirements, from traditional bit error analysis to state-of-the-art signal, performance, and timing measurements. The FIREBERD 6000 is fully programmable, with customized printouts, programmable user patterns, frequency synthesizer, and user-defined flow control.

A FIREBERD gives you the power to analyze the newest and most sophisticated communications equipment within your network – using a single modular architecture. The FIREBERD 6000 enables you to maximize your testing capability and minimize your training costs. There's no better way to protect your network.

Highlights

- **Fast Packet Testing**
ATM and frame relay
- **ISDN Testing**
European and North American basic rate ISDN (BRI)
- **T-Carrier Testing**
DDS, T1/FT1, and DS3
- **E-Carrier Testing**
2M and Nx64, 64 kb/s, and 8M
- **DTE/DCE Datacom Testing**
HSSI, RS-232/V.24, EIA-530, V.35/306, X.21, RS-449/422/423, and MIL-188C



*Protect your network with the
FIREBERD 6000 Communications Analyzer.*

ATM Testing

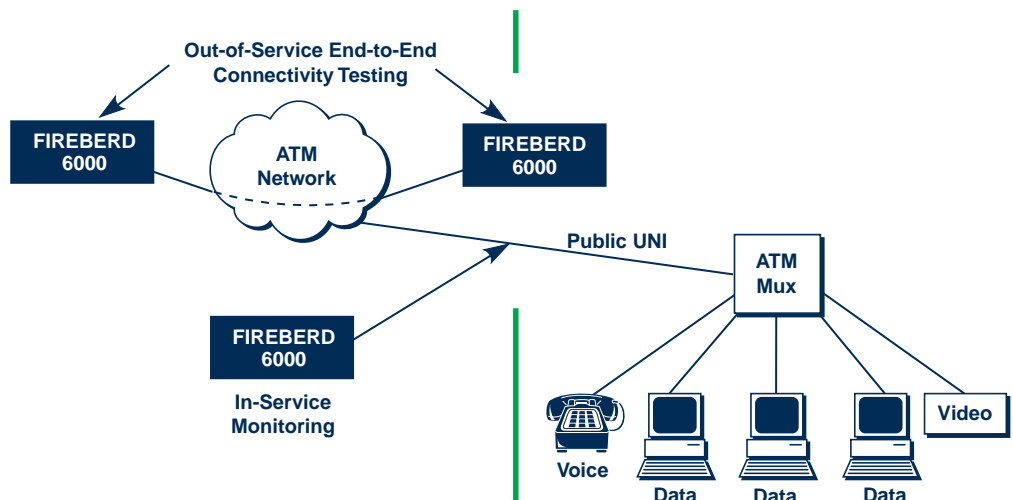
Now you can perform ATM tests with the same instrument that you use for frame relay, ISDN, and other WAN services. The DS1/DS3 and 2M/34M ATM Interface Modules add to the FIREBERD 6000's powerful test capabilities. With the DS1/DS3 Interface Module and 2M/34M Interface Module, you can use your FIREBERD 6000 to test DS1/DS3 and 2M/34M ATM at the edge of the network and perform end-to-end testing from many edge device inputs (e.g., T1/E1, frame relay, etc.) that access the ATM network. This allows you to verify that devices converting non-ATM traffic to ATM traffic are functioning properly.

Adding the capability to test at the ATM layer, transmission convergence (TC) sublayer, and ATM adaptation layer (AAL) to its extensive transmission test capabilities, the ATM Interface Modules make the FIREBERD 6000 the one instrument for your entire migration to ATM – from installation to ongoing maintenance. The FIREBERD's intuitive, menu-driven front panel makes both in-service and out-of-service testing simple.

Highlights

- Generate constant bit rate (CBR) traffic based on peak cell rate
- Generate variable bit rate (VBR) traffic based on peak cell rate, sustained cell rate, and maximum burst size
- Perform quality of service (QoS) analysis including cell loss ratio, cell error ratio, cell misinsertion rate, cell transit delay, and cell delay variation
- Obtain statistics at the ATM layer, AAL, TC layer, and physical layer (e.g., total cell count, OAM cell count, AAL CRC errors, average PDU length, framing alarms and errors, and receive frequency)
- Characterize the latency of your network with round trip delay measurements
- Perform GCRA "leaky bucket" conformance analysis
- Transmit over three VPI/VCIs on the link
- Generate correctable and uncorrectable HEC Errors
- Generate or monitor OAM cells
- Generate 0.191 test cells with the 2M/34M Interface Module

*The FIREBERD 6000
in the ATM network.*



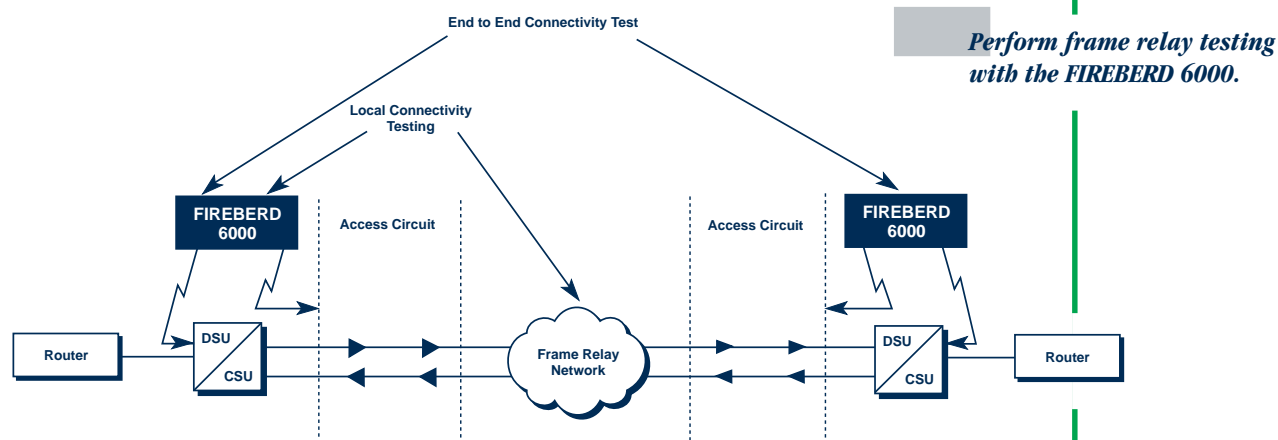
Frame Relay Testing

Successful frame relay deployment begins with the proven transmission test capability of the FIREBERD 6000. With the Frame Relay Option, you can easily perform frame relay turn-up and troubleshooting tests over a permanent virtual circuit (PVC). The Frame Relay Option is compatible with the T1/FT1, 2M/Nx64, DDS, V.35, X.21, RS-449, and most other FIREBERD interface modules. A HSSI option is also available to test high speed links that provide fractional T3/E3 and NxT1/Nx64 frame relay service.

The FIREBERD 6000 can test at both the User-to-Network Interface (UNI) and the Network-to-Network Interface (NNI) – including out-of-service and in-service testing. With the FIREBERD 6000 Frame Relay Option, you can easily perform a “ping” test to determine end-to-end PVC connectivity and to measure round trip delay.

Highlights

- Perform test frame generation (fixed rate and burst modes for emulating specific traffic patterns), while controlling the status of the FECN, BECN, C/R, and DE bits
- Perform lost frame analysis
- Transmit InARP packets and provide replies to incoming InARP packets
- Transmit ICMP echo packets (“ping” packets) and provide echo replies to incoming ICMP echo packets
- Perform link management emulation (ANSI T1.617 Annex D, ITU Q.933 Annex A, and LMI)
- Gather PVC status messages and determine PVC state (i.e., active, inactive, new, or deleted)
- Emulate the network side or CPE side of a UNI (unidirectional polling)
- Emulate an NNI frame relay switch, including both bidirectional polling and full status message interpretation
- Simultaneously display physical and data link layer results
- Collect frame relay statistics on one specific data link connection identifier (DLCI) or on all DLCIs
- Monitor frame relay performance and link management statistics at the UNI and NNI
- Perform out-of-service testing of line speeds up to 52 Mb/s with the HSSI option



ISDN Testing

The growth of basic rate ISDN (BRI) is being driven by the rapidly increasing demands of expanding applications such as telecommuting, videoconferencing, and Internet access. That's why you need the TTC FIREBERD 6000. Equipped with the NI-1/Euro ISDN Interface Module, the FIREBERD offers a full range of BRI ISDN testing functions.

Highlights

- Comprehensive European (ETSI) and North American BRI ISDN test and measurement capabilities
- Troubleshoot B and D channel signaling at the S/T reference point
- Easily verify important physical layer parameters such as signal level, power feeding status, and INFO state
- Test voice and data simultaneously: The FIREBERD 6000 can test either B channel in voice or data mode, as well as verify D channel performance
- Decrease troubleshooting time with a comprehensive list of error and status messages
- Self call provides the ability to test two B channels simultaneously with one test instrument
- Perform bit error and G.821 performance analysis on any active B channel
- Call status messages verify that a call has been successfully established or help you determine why a call was not completed
- Call control support for National ISDN (NI-1), ETSI (Euro), AT&T custom, and Northern Telecom custom

DDS Testing

For testing at a D4 channel bank, the DDS DS0A/B Module enables the FIREBERD to analyze DDS subrate circuits, with DS0A, DS0B, and clear channel compatibility for all data rates. The module provides complete loopback support, which allows a DDS circuit to be completely sectionalized in either direction using alternating and latching loopbacks. For testing DDS four-wire facilities to the customer premises, the DDS Local Loop Module emulates a DSU/CSU at all data rates, including 64 kb/s clear channel service. Unique stress and signal capabilities provide quick detection of marginal circuits and equipment. You can perform frame relay testing from any DDS access point – both the DDS DS0A/B Module and the DDS Local Loop Module are completely compatible with the FIREBERD 6000's Frame Relay Option.

Highlights

- Perform comprehensive BER testing
- Test and maintain the digital cards of a D4 channel bank such as an OCU-DP, DSU-DP, and DS0-DP
- Test the DSU/CSU or four-wire facility of a DDS circuit at the customer premises
- Test the entire range of DDS service from 2.4 kb/s to 64 kb/s, with or without secondary channel
- Sectionalize circuit problems using comprehensive loop-code generation and auto response
- Detect excessive signal attenuation and sealing current problems on the four-wire local loop
- Send or report network condition codes with byte encoder and result display

T1 and FT1 Testing

The T1/FT1 Module enables you to analyze the entire range of T1 and FT1 services regardless of data rates and formats, with features like level and current measurements, G.821 performance measurements, voice applications, and jitter generation and measurement. You can perform Nx56 kb/s or Nx64 kb/s bit error rate (BER) analysis without disrupting live traffic on the remaining channels. The ESF data link far-end Performance Report Message Option lets you monitor and report on far-end status, as defined by the ANSI T1.403 standard.

Highlights

- Perform comprehensive bit error rate testing (BERT) with the T1/FT1 Module's full selection of BERT patterns
- Quickly identify circuit troubles with test results such as bit error rate, pattern and timing slips, voltage level, simplex current, and round-trip transmission delay
- Frame relay test support
- In-band, out-of-band, and V.54 loopback support
- Test unframed, D4, ESF, or SLC[®]-96 circuits encoded in AMI or B8ZS format
- Replace a CSU at the customer premises during troubleshooting and installation
- Detect network synchronization problems or improper multiplexer configuration for in-service loop timing, and verify end-to-end network synchronization (out of service)
- Measure jitter at the rate of 1.544 Mb/s; Generate jitter at a single frequency or automatically sweep jitter over the frequency range

DS3 Testing

The DS3 Module thoroughly tests your 45 Mb/s circuits and equipment and lets you troubleshoot difficult problems quickly. One FIREBERD equipped with this module can analyze any T3 format. With frame, BPV, and parity results, you can monitor your network while it's up and running.

Highlights

- Perform full DS3 BER testing
- Insert errors or BPVs at programmable rates or individually, so you can easily analyze the protection switching recovery time of your DS3 equipment and simulate transmission impairments
- Multiple framing formats create an all-in-one test instrument for unframed, M13, or C-bit parity environments
- Use one FIREBERD to transmit and decode FEAC bit sequences (including alarm conditions and loopbacks), and perform bit error analysis
- Select three sources of signal timing: the FIREBERD's internal clock, your network, or an external clock

2M and Nx64 Testing

Keep your 2M ITU-standard network running smoothly, with features like drop & insert, complete G.821 performance analysis, automatic histograms, delay and timing measurements, signal analysis, and jitter testing. When equipped with the 2.048 Mb/s/Nx64 kb/s Module, the FIREBERD offers complete G.821 bit error analysis, with over 60 test results that enable full correlation between errors and their specific causes. You can perform Nx64 kb/s or Nx56 kb/s analysis from any 2M circuit access point and take advantage of an auto-configuration feature that immediately identifies how Nx64 kb/s circuits and equipment are configured.

Highlights

- Test Nx64 kb/s or Nx56 kb/s from any access point on a 2M circuit. Select contiguous or non-contiguous timeslots, independently select Tx and Rx timeslots, and program idle codes
- Frame relay test support
- Extensive BERT test capabilities
- Obtain network status with multiple measurements: FAS word errors, REBES, received FAS word, timing slips, code errors, MFAS word errors, received NFAS word, network jitter, CRC errors, 2M alarms, and received MFAS word
- Perform both level measurements and timing slip analysis
- Test unframed, framed, and both CRC-4 and TS-16 (MFAS) multiframed formats
- Maximize network utilization during testing by inserting patterns on selected timeslots without disrupting traffic on remaining channels
- Monitor and transmit voice and ABCD signaling bits to verify the quality of VF circuits
- Use a referenced 2M signal to identify timing slips
- Measure jitter at the rate of 2M; Generate jitter at a single frequency or automatically sweep jitter over the frequency range

64 kb/s and 8.448 Mb/s Interface Modules

This family of G.703/G.704 Modules can thoroughly test your ITU-standard network, including extensive BERT test capabilities. Operating at rates of 64 kb/s and 8.448 Mb/s, these modules enable the FIREBERD to analyze G.703 links, network termination equipment (NTE), and multiplexed signal paths quickly and easily.

ITU G.703 64 kb/s Module

- Simultaneously measures bit errors, pattern slip alarms, and conformance to G.821 standards
- Meets ITU recommendations for codirectional, centralized clock, and contradirectional facilities

ITU G.703 8.448 Mb/s Module

- Tests unframed 8.448 Mb/s lines
- Frame relay test support
- Counts HDB3 coding violations in service or analyzes bit error rate performance out of service
- Isolates timing problems by recording occurrences of pattern slips

High Speed Serial Interface (HSSI) Testing

Now, in addition to providing HSSI transmission testing, the FIREBERD 6000 provides frame relay test capability for high speed links. Because of the growth in popularity of fractional T3 and E3 frame relay service, especially among Internet service providers (ISPs), many CSU/DSUs are now providing a HSSI interface to the customer, providing access to these high speed links. In addition, both switch and router manufacturers are providing HSSI access, to allow customers to seamlessly access these fractional T3 and E3 links. The FIREBERD 6000 accommodates turn-up testing for these applications and more.

Highlights

- $2^{15}-1$, $2^{20}-1$, $2^{23}-1$, and QRSS pseudorandom patterns
- Frame relay test support
- Isolate network components using local data terminating equipment (DTE), local line (LA), and remote line (LB) loopbacks
- Perform high speed DTE emulation
- Generate frame relay traffic over multiple DLCIs at an aggregate rate of 8 Mb/s
- Characterize the latency of your network

Data Communications Testing

With the FIREBERD 6000, you can test an array of interface standards, including RS-232/V.24, EIA-530, V.35/306, X.21, RS-449/422/423, and MIL-188C at speeds up to 15 Mb/s. The V.35/306/RS-449/X.21 Module fully supports end-to-end and loopback testing, with built-in remote and local loopback modes.

The Recovered Clock Option operates with DTE/DCE interfaces at rates of 520 kb/s or less and allows the FIREBERD to recover timing (and proceed with data analysis) by extracting a clock from the receiver data. This provides a powerful method of differentiating timing problems from transmission problems.

Highlights

- Supports all standard loopback, clock recovery, and clock/data inversion tests
- Comprehensive BERT test capability
- Frame relay test support
- Built-in data inversion detection and correction identifies and compensates for improper received inverted data
- Complete flow-control troubleshooting, with user-controllable signaling leads (CTS, RTS, DTR, and DSR), LED status indicators, and CTS-RTS delay measurement
- V.35/306/RS-449/X.21 Module features software-selectable DTE and DCE emulation and six different operating modes

TIMS-45 Analog Lid Option

The TIMS-45 Option enables you to perform both VF and wideband TIMS tests on analog and digital transmission lines with your FIREBERD 6000 or FIREBERD 4000. New filters and a frequency range between 50 Hz and 300 kHz enable you to test high-bit-rate digital subscriber line (HDSL), DDS, and ISDN circuits. The TIMS-45 mounts on the FIREBERD's front panel, so you can use it anywhere. The large screen enables you to view all test setups and results at a glance. You can print test results to any printer with the RS-232 port. With the external power adapter, you can even use the lid as a stand-alone tester.

Software

- **DTM Option**

The DTM Option enables you to perform remote testing from your PC, expanding the field service capabilities of the FIREBERD 6000 or FIREBERD 4000 into network control centers. Compatible with all interface modules and mainframe options, Windows-based DTM software makes your PC a cost-effective platform for wide area transmission tests and extends the reach of your field technicians.

- **RTM Option**

RTM software enables you to control the operation of FIREBERD 6000 or FIREBERD 4000 mainframes in real time from a remote UNIX platform. RTM enables your technicians to dial up remote sites from their desktops, displaying multiple FIREBERDs simultaneously for complete control of an end-to-end test. RTM

supports all of the TTC test instrument's analysis functions, giving you complete transmission testing capabilities for a broad range of digital network technologies. Using RTM, you can improve response time, reduce travel expenses, and optimize your test resources.

- **LabVIEW Drivers**

LabVIEW[®] drivers available free from National Instruments[®] Corporation enable you to communicate with your FIREBERD 6000 through the IEEE-488 (GPIB) interface. Using LabVIEW with your computer allows you to send and receive information from a variety of test instruments, including voltmeters and oscilloscopes, and display the results on your computer. And you can speed up your automated testing using predefined test scripts – the graphical interface makes programming simple.



The TIMS-45 Analog Lid Option.

ISU 6000-4 and ISU 6000-8 Interface Switching Units

ISUs offer maximum convenience when using more than two interfaces by enabling you to switch among up to eight different interface modules. Select these interfaces from the FIREBERD 6000's front panel or under remote control for added versatility. ISUs can be rack-mounted in a standard 19" rack.

Rack Mounts

A variety of sturdy rack mounts are available for both plastic case and metal case FIREBERD mainframes and printers, standard at 19". A rack mount extension kit expands available space to 23".



Rack-mounted Interface Switching Units for the FIREBERD 6000.

Printers

- **PR-45A Lid Printer**

The PR-45A Lid Printer is a thermal, dot matrix printer that mounts on the front panel of the FIREBERD 4000 and 6000A with a spring-loaded hinge and receives power from the mainframe. The PR-45A features alphanumeric and graphical printout capability.

- **PR-40A Printer**

The PR-40A Printer offers all of the features of the PR-45A in a stand-alone format. This printer is powered by a built-in nickel-cadmium battery or an AC adapter (included).

- **PR-35 Rack Mount Printer**

The PR-35 is a rack mountable printer with all of the features of the PR-45A. It can be rack mounted in a standard 19" rack or, using extenders, installed in a 23" rack.

- **PR-2000A Thermal Printer (FIREBERD MC-6000 Only)**

The PR-2000A Thermal Printer is an alphanumeric, non-impact thermal printer that prints the full ASCII character set with up to 20 characters per line. This printer may be rack mounted along with the FIREBERD in the MC-6000 Rack Mount unit. An RS-232 cable is included, to allow direct connection to the FIREBERD's built-in RS-232 interface.

IEEE-488.2 Remote Control Option

The FIREBERD IEEE-488.2 Remote Control Option gives you the ability to control your FIREBERD 6000 or FIREBERD 4000 via computer for automated testing. Ideal for the manufacturing environment, the option lets you control as many as 15 devices with a single controller.

FIREBERD 4000 Communications Analyzer

The FIREBERD 4000 Communications Analyzer is the affordable, easy-to-use answer to many test applications, offering a variety of simultaneous test results, including bit errors, frame errors, synchronization losses, and signal analysis. The simple menu structure lets you set up any test quickly and easily. And a streamlined results summary eliminates the need to scroll through long lists of test measurements. An optional lid printer provides hard copy test results.

An optional second interface slot allows two modules to be installed in the unit at the same time. Plus, when equipped with the X.50 Option, the FIREBERD 4000 can isolate and troubleshoot problems on X.50 leased lines and subrate channels quickly and easily.

Highlights

- Easy-to-use menu-driven architecture streamlines any test setup
- Two results displays allow you to view results quickly under difficult field conditions
- Do-it-yourself field-installable software will keep your instrument test-ready
- Full print capabilities provide hard-copy proof of your field service measurements, complete with histograms, status prints, controls prints, and results prints
- Setup summary automatically supplies your current test configuration
- Programmable auxiliary functions provide enhanced operational capability
- Features an optional set of performance measurements compatible with ITU Recommendation G.821
- The X.50 Option allows simultaneous in-service tests on 2M lines and X.50 subrates and full error performance tests for X.50 Divisions 2 and 3, and X.50 bis



The FIREBERD 4000 Communications Analyzer with optional lid printer.

FIREBERD 6000

<i>Model No.</i>	<i>Description</i>
Mainframes	
FB6000A ¹	FIREBERD 6000 (Plastic Case)
FB6000R ¹	FIREBERD 6000 (Remote Control only)
MC6000	FIREBERD 6000 (Metal Case)

Mainframe Options

6001	DS1 Wideband Jitter Measurement
6002	DS1 Jitter Spectral Analysis
6003	DS1 Jitter Generation
6004 ¹	Clock Recovery
6005 ¹	IEEE-488 Remote Control
6006 ¹	Precision Time Base
6007 ¹	G.703 Wideband Jitter Measurement and Generation
6008 ¹	G.703 Jitter Spectral Analysis
6009 ¹	ANSI T1.403 PRMs

FIREBERD 4000

Mainframes	
FB4000 ¹	FIREBERD 4000 (Plastic Case)
MC4000	FIREBERD 4000 (Metal Case)

Mainframe Options

4001 ¹	Second Interface Slot
4002	IEEE-488 Remote Control Option
4003 ¹	FIREBERD 4000 Precision Time Base
4004 ¹	G.821 Performance Analysis
4005 ¹	Frequency Synthesizer
4006 ¹	Synchronous Long User Patterns

Options for Both FIREBERD 6000 and FIREBERD 4000**Interface Modules**

30524	ITU G.703 8.448 Mb/s
30608 ¹	ITU G.703 64 kb/s
30609	ITU G.704 2.048 Mb/s Framing
30678	DDS DS0A/B
40200	RS-449 (422/423) DTE/DCE
40202	V.35/306 DTE/DCE
40204	Lab (TTL)
42242	Diphase
40540	DS1/T1/D4/ESF/SLC [®] -96
41131B	DDS Local Loop
41400	RS-449/530/MIL
41440A ¹	T1/FT1 Drop & Insert
41800 ¹	ITU 2M/Nx64 kb/s Drop & Insert
41900	T1/E1 Test Access
41945 ¹	T3 Transmission Test
42219A	HSSI
42522 ¹	V.35/306/RS-449/X.21 DTE/DCE

Model No. Description
Mainframe Options, Continued

6010 ¹	Frame Relay New Unit Option
6011 ¹	Frame Relay Factory Upgrade
6220	220-V Setting

Interface Modules

31650 ¹	2M/34M ATM
41075 ¹	ISDN S/T TE (Euro/N1-1)
41075UPG	Factory Upgrade for No. 41075
43440 ¹	DS1/DS3 ATM

Accessories

RM-6000	Rack Mount for plastic case and PR-2000A Printer (19")
RM-6000A	Rack Mount for plastic case (19")
RM-MC6000	Rack Mount for metal case and PR-2000A Printer (19")
PR-2000A	Thermal Compact Rack Mount Printer

Mainframe Options, Continued

4007 ¹	X.50 Test Support
4220	220V Setting

Accessories

RM-4000	Rack Mount for plastic case (19")
RM-MC4000	Rack Mount for metal case (19")

¹CE Compliant²RTM software is also available in multi-user configurations for 4, 8, 12, 16, or 20 users

Customer Care

When you buy a TTC product, you are getting not just a world-class test instrument, but also unsurpassed TTC service.

- **Warranty and Repair Service**

TTC service excellence starts with an industry-leading three-year warranty on all mainframes¹. We also offer extended warranty options, as well as customized maintenance/calibration plans. As part of our ISO 9001 approved quality system, all components are screen-tested before installation and each instrument is rigorously tested before being shipped.

- **Technical Support**

To complement our instruments and systems, TTC offers superior technical support. In North America our engineers offer expert consultation on any technical problem from 8 a.m. to 8 p.m. Monday through Friday, ET (**1-800-638-2049 or 301-353-1550**). In Europe, technical support is provided through our UK office (44-1189-759696). In Asia, call our Hong Kong office (852-2892-0990).

- **Training**

The right technical training can make you more productive and your FIREBERD more effective. Whether your goal is to shorten installation time, reduce downtime, or increase productivity, TTC's instructors can provide practical, hands-on training tailored to meet your needs, at any location you designate.

Summary

Digital networks present unique challenges for installation and maintenance. To help you meet these challenges, we designed the FIREBERD Communications Analyzer to be a rugged, portable, easy-to-use, multi-purpose testing tool. No matter what your network testing requirements, there is one instrument you can always rely on – the TTC FIREBERD Communications Analyzer – the test strategy that evolves with your network.

Thank you for your interest in the FIREBERD. If you have any questions about TTC or about the FIREBERD's features, specifications, and capabilities, call **1-800-638-2049**, talk to your local sales engineer, or visit us on the Internet at www.ttc.com.

¹See product manual for a description of limitations and exclusions.



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TTC Products Are
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