

FIREBERD:

**PERFORMANCE
AND VALUE
IN ANY TEST
ENVIRONMENT**

V.35/RS-449/X.21 COMBINED DATA INTERFACE MODULE



ALL-IN-ONE DATA COMMUNICATIONS TESTING WITH THE COMBINED DATA INTERFACE MODULE

during out-of-service testing. The module also features full support of end-to-end and loopback testing, with V.54, and RS-449, remote and local loopback modes built-in. Add software-selectable DTE or DCE emulation, six different operating modes, and the FIREBERD's built-in RS-232 Interface, and you've got complete data communications testing in a single unit.

Whether tuning up a new site, performing routine maintenance, benchmarking, or performing production line testing, the Combined Data Interface Module provides a cost-effective and convenient solution for increasing network availability and verifying component integrity.

The Combined Data Interface Module makes the FIREBERD a versatile, all-in-one data communications test instrument. Operating at rates up to 15 Mb/s, this interface module permits the FIREBERD to replace almost any V.35, RS-449, or X.21 device

BENEFITS

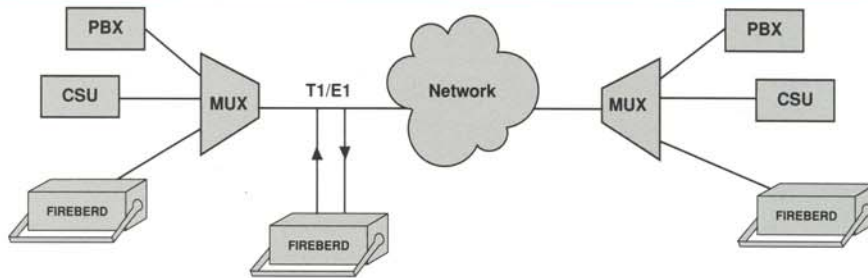
- Convenience – a single interface module provides universal data communications test access.
- Save troubleshooting time using the FIREBERD's recovered clock feature, which lets you solve network clocking problems quickly and easily.*
- Get it right the first time with over 60 simultaneous performance results. Establish realistic network performance criteria and evaluate long-term error conditions.
- Quickly detect hard-to-find problems. FIREBERD stress patterns allow for component and network stress testing from the customer premise.

FEATURE SUMMARY

- Software-selectable DTE or DCE emulation enables convenient testing of network components.
- Built-in remote and local loop codes for RS-449, and V.35 (V.54), allow easy sectionalization and testing from a single access point.
- Built-in clock and data inversion detection and correction identify and compensate for improper phasing between clock and data.
- Complete flow-control troubleshooting, with user-controllable signaling leads (CTS, RTS, DTR, and DSR), LED status indicators, and CTS-RTS delay measurement.
- Round-trip delay accurately measures signal propagation time and verifies both component buffers and network design parameters.
- Terminal Timing (TT) and Send Timing (ST) operating modes (RS-449 only) provide clocking source flexibility for all rates from 50 b/s to 15 Mb/s.
- When used with the PDS-45 for protocol monitoring, the Combined Data Interface Module provides complete in-service and out-of-service data communications testing.

*FIREBERD 6000 only.

FIREBERD™
FROM TELECOMMUNICATIONS TECHNIQUES CORPORATION



The Combined Data Interface Module allows the FIREBERD to replace any DTE or DCE, such as a host computer, terminal, CSU, or PBX, and fully test in end-to-end or loopback mode. When emulating a DTE, the FIREBERD can apply a loopback to the local or remote DCE. DCE emulation allows the FIREBERD to replace the DCE for testing in the direction of the DTE. The

round-trip delay measurement is useful for verifying sub-rate channel routing and component buffer requirements. When used with a FIREBERD and either the T1/FT1 Interface Module or the E1/FE1 Nx64/Nx56 Interface Module, this module also allows access at the channel side for drop and insert testing and additional timing, sectionalization, voice, and signaling analysis.

SPECIFICATIONS

RS-449 DATA INTERFACE

Maximum Speed

Balanced (RS-422):
 Synchronous: 50 b/s to 15 Mb/s
 Asynchronous: 50 b/s to 20 kb/s
 Recovered: 50 b/s to 520 kb/s*

Unbalanced (RS-423):
 Synchronous: 50 b/s to 128 kb/s
 Asynchronous: 50 b/s to 20 kb/s
 Recovered: 50 b/s to 128 kb/s*

*FIREBERD 6000 only.

Unbalanced Drivers

Short Circuit Current:
 150 mA maximum

Output Level (Both States):
 0.9 V_o (into 450 Ω)

Output Rise Time (Clock Drivers):
 1.2 μs typical

Open Circuit Voltage (V_o): 5.5 + 0.5 V_s

Balanced Drivers

Short Circuit Current:
 150 mA maximum

Differential Output Signal Swing:
 2 V minimum (with a 100 Ω load)

Output Rise and Fall Time:
 20 ns maximum

Open Circuit Voltage: 6 V maximum

Average DC Offset: 0 V ± 0.4 V

Receivers

Termination Resistance
 (specified with fail-safe networks):
 100 Ω
 >7000 Ω for signaling

Input Impedance:
 >8000 Ω (RCV DATA, RCV CLK EXT
 TX CLK)

Input Threshold:
 ±0.2 V (A vs. B)

V.35/306 DTE/DCE Data Interface

Maximum Data Rates

306 Mode:
 Synchronous: 15 Mb/s
 Asynchronous: 20 kb/s
 Recovered: 520 kb/s

V.35 Mode:
 Synchronous: Cable length-dependent
 Asynchronous: 20 kb/s
 Recovered: 520 kb/s

Clock and Data Tolerances

Delay, SCT to SD:
 Approximately 70 ns typical

Skew, SCTE to SD:
 Approximately 20 ns typical

Balanced Drivers

Signal Swing (bipolar): ±0.55 V ±0.1V
 into 100 Ω

Short Circuit Current: Less than 100 mA

Rise Time: Less than 20 ns

Generator Impedance: 100 Ω

Balanced Receivers

Load Resistance: 100 Ω

Rise Time: Greater than 20 ns

Generator Impedance: Less than 100 Ω

Short Circuit Current: Less than 100 mA

Output Level: ±10V typical
 (7k Ω load)

X.21 DATA INTERFACE

Maximum Speed

Synchronous: Cable length-dependent
 Asynchronous: 20 kb/s
 Recovered: 520 kb/s

Drivers

Short Circuit Current:
 150 mA maximum

Differential Output Signal Swing:
 2 V minimum (with a 100 Ω load)

Output Rise and Fall Time:
 20 ns maximum

Open Circuit Voltage: 6 V maximum

Average DC Offset: 0 V ± 0.4 V

Receivers

Termination Resistance
 (specified with fail-safe networks):
 100 Ω
 >7000 Ω for signaling

Input Impedance:
 >8000 Ω (RCV DATA, RCV CLK EXT
 TX CLK)

Input Threshold:
 ±0.2V (Avs. B) or 188C/UNBAL.MODE

Measurements

Alarms:
 Receiver Data Losses

Receiver Clock Losses

Receiver Clock-Data Phase Changes

Pattern Losses

Power Losses

Error:

Average Bit Error Rate
 Average Block Error Rate
 Bit Error Rate
 Bit Errors

Performance:

G.821 Results

Time & Signal:

Date
 Delay*
 Elapsed Seconds
 Errored Seconds
 Generator Clock Frequency
 Pattern Loss Seconds
 Percent Pattern Loss Seconds
 Receiver Clock Frequency
 Test Seconds
 Time

*FIREBERD 6000 only.

Cables

10419	V.35/306 34-pin male-to-male (10')
10417	RS-449 37-pin male-to-male (10')
31271	X.21 15-pin D male-to-male (10')

Module Information

Part No.	Description
42522	V.35/RS-449/X.21 Combined Data Interface Module
REV. J/6	Minimum software revision requirement

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