

FST-2207 TestPad T1/T3 Wireless Module

Isolate network problems to speed-up wireless network testing



Key Features

- Monitor the quality of GSM and other digital wireless traffic
- Isolate and troubleshoot physical layer problems associated with data or other services
- Monitor network voice quality and signaling
- Verify proper network routings and signal delays to ensure all fractional T1 channel signals are terminated properly and with the correct timing
- Test the ability of a PBX/switch to handle incoming calls
- Analyze DS1 tributaries at DS3 access points

Clarify GSM (PCS-1900) network quality issues

Difficulty in distinguishing radio problems from access line troubles within wireless networks is a problem that can be solved by the JDSU FST-2207 TestPad T1/T3 Wireless Module (formerly known as the T1/T3 Wireless Services Module 2207). This application module is designed for use with JDSU's FST-2000 test instrument. It configures the FST-2000 for comprehensive testing of global system for mobile communications (GSM), digital wireless networks from a T1 access point. Wireless service difficulties can be diagnosed and differentiated from T1 problems quickly and accurately, without disrupting revenue-generating traffic.

Test and monitor GSM traffic nonintrusively

Service providers can ensure their wireless networks are performing to specification and identify degradation in access line circuits with the comprehensive range of tests that the module provides. Issues affecting quality of service can be isolated and quantified, enabling operators to maintain service levels and customer confidence. Testing of complex mixed wireless and wireline networks is simplified by providing all necessary functions as well as highly integrated programs for individual in-service and out-of-service test routines.

Using a single tool and interface, you can test wireless and wireline networks while isolating the domain

Add wireless test capabilities

The addition of wireless test capabilities to the JDSU FST-2000 creates a highly effective and economic solution for testing digital wireless networks. Using a single tool and interface, you can test wireless and wireline networks while isolating the domain in which problems are occurring. Revenue-generating traffic is not affected since the module is connected nonintrusively at a T1 access point between the base transceiver station and the base station controller (BSC).

Straightforward operation, practical design

The architecture of the FST-2000 provides a highly scalable and effective single-platform solution for testing established and emerging communications technologies. Companies that choose the FST-2207 can expect improved cost management through a user interface that completely eliminates retraining. Testing is further simplified with automated features, an easy-to-use touch screen and an intuitive graphical user interface (GUI). While the system has built in practicality, it has been field-engineered with rugged construction, lightweight design, and battery-powered operation. Dual PCMCIA slots support the easy installation of future upgrades and provide added test functionality and versatility.

Powerful test capabilities

The FST-2207 displays a realtime overview of traffic activity on all 24 DS0 channels and four sub-channels. In addition, the TestMATE function for automated T1 bit error rate testing enables both experienced and novice technicians to install and maintain T1 networks quickly and accurately.

Tests provided include:

- GSM traffic monitoring and testing from a T1 access point, including RF measurements and decodes for Full Rate and Enhanced full-rate vocoders
- DS1 signal analysis and BER testing with standard and advanced stress patterns
- Dual DS1 receivers for in-service monitoring and drop-and-insert testing
- DS3 BER testing analysis with patterns for both M13 and C-bit framing
- DS1 channel drop from a DS3 signal for testing or monitoring
- Monitoring, placement or receipt of calls over T1 voice trunks with analysis of signaling bits
- Transmission and measurement of tones on individual PCM channels
- ISDN PRI call placement and receipt, backup D-Channel and NFAS testing, and Layer 3 (Q.931) results
- VT100 emulation for equipment configuration and results monitoring



Fast, simple, and intuitive, the FST-2207 Module provides your test results

Practical applications

Programmed with highly integrated applications for in-service and out-of-service testing, the test instrument examines both the pipeline and service levels to ensure that your network is performing as advertised. Applications include:

DS1 physical layer testing

Testing the physical layer is normally the first step to verifying proper circuit operation throughout the network when provisioning or troubleshooting T1 service. The FST-2207 helps you ensure the proper performance of T1 network connections on customer premises by performing signal, alarm, and timing tests together with BER analysis at either a network interface unit (NIU) or a remote HDSL transmission unit (HTU-R).

Its ability to monitor and perform BER testing in both directions of a circuit simultaneously streamlines the identification and isolation of circuit problems from network equipment faults. Troubles within the network can be sectionalized further using standard or user-programmable loopcodes to loopback network equipment. Moreover, network performance is also assured by using common BER testing patterns, such as QRSS, along with several industry-recommended advanced stress patterns, including 55 octet and T1-DALY. An advanced timing analysis also helps users pinpoint signal delays, timing slips, and mismatches between switch and remote equipment.

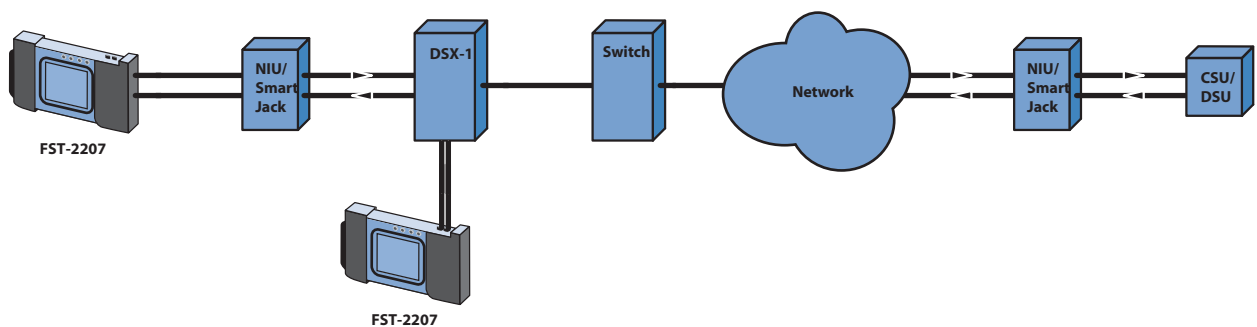


figure 1 Simultaneously monitor and test in both directions on a circuit

GSM testing

Both voice quality and connectivity must be verified when provisioning or troubleshooting GSM networks. The FST-2207 verifies both. Companies can monitor voice conversations and service statistics from a T1 access point without disturbing traffic to verify the Abis interface between the base station transceiver station (BTS) and base station controller (BSC). This provides a comprehensive measure of network and service performance. Simultaneous display of both service and physical layer (T1) results provides quick and easy differentiation between GSM service problems and T1 problems for sectionalizing trouble between different network elements.

The equipment supports the following tests and measurements:

- Full rate and enhanced full rate traffic monitoring
- Display of 24 DS0s and sub-channels for voice, signaling, and data traffic information
- TRAU framing results
- GSM LAP-D signaling results
- GSM measurement report message results such as uplink and downlink signal quality, signal power level, and timing advance
- GSM island detection
- GSM interference
- GSM network balance
- Speaker/microphone or handset functionality for checking voice integrity
- 16 K BERT and drop and insert testing

Fractional T1 channel testing

Fractional T1 service can be qualified to verify proper network routings and signal delays, ensuring that all channel signals are terminated properly and with the correct timing. This is important because typically in rural locations, or on the outer reaches of the service area, engineers need to isolate single-circuit faults without disrupting the entire line.

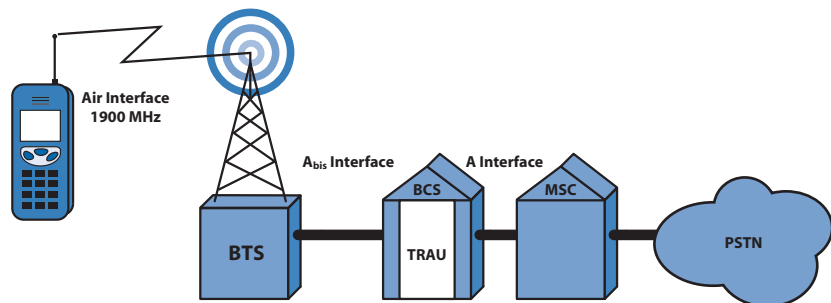


figure 2 The FST-2207 allows you to monitor the quality of GSM service

VF channel access and PCM TIMS

Problems with voice service demand rapid and effective measurement of voice transmissions quality on the network circuit. By monitoring data or signaling bits, the FST-2207 can check and verify individual channels without disrupting network traffic. Using the test instrument's in-service channel access for transmitting and measuring tones on an individual PCM channel affects only the channel under test. It provides a greater level of performance analysis without impacting other revenue-generating channels.

The FST-2207 also provides TIMS measurements such as:

- Level
- Frequency
- Signal-to-noise ratio
- Noise (C-message and C-notch filters)

Signaling

After testing the physical layer when provisioning or troubleshooting T1 voice trunks, the transmission and signaling performance of the circuit must also be tested to verify the ability of a CO or PBX switch to handle incoming calls and ensure switch-to-switch communication. By placing, receiving or monitoring voice calls, successful connection can be verified. More comprehensive testing of the voice trunk can also be completed in a matter of minutes as the FST-2207 also displays physical layer results simultaneously. Capture and display of digits, signaling events, and signaling bits provide the most detailed level of analysis, which indicates signaling and voice results, including:

- DP, DTMF, MF digit recognition
- Interevent/digit delay measurements
- Event/digit duration measurements
- Speaker/microphone or handset functionality for checking voice integrity
- Signaling (ABCD) bits

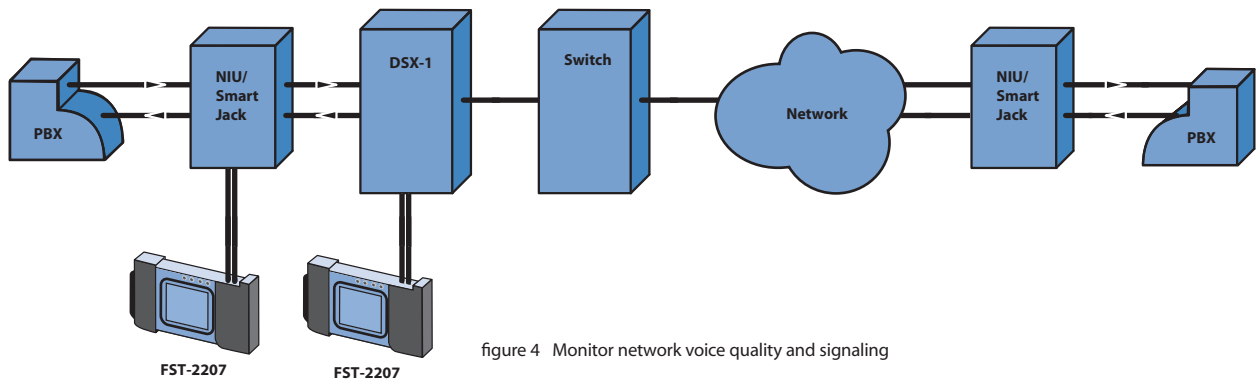


figure 4 Monitor network voice quality and signaling

DS3 testing

The first step in provisioning DS3 circuits is qualifying the physical layer. The FST-2207 provides the ability to qualify DS3 circuits with an array of BER testing patterns for both M13 and C-bit framing and supports the verification of frame synchronization on the circuit. For more comprehensive and flexible testing, you can insert test patterns or tones on single, multiple or all DS1 channels within the DS3 circuit. The FST-2207's DS3 BER testing measurements include:

- DS3 FEAC loopback codes
- Advanced stress patterns
- Signal level and frequency
- Insertion of logic and frame errors

A final level of analysis is provided by dropping DS1 channels from the DS3 signal for testing or monitoring the individual channels.

ISDN PRI testing

After the physical layer has been verified, testing during the provisioning of ISDN service is typically performed at the customer premises by emulating a TE device, such as a PBX, to place and receive voice and data calls. The FST-2207 supports multiple call types and provides call status results and progress reports for an additional level of detail to ensure connections are successfully established. The reports are also useful for troubleshooting calls that are not established. When multiple PRI lines are in use at the same location, it is often necessary to perform backup D-Channel and NFAS testing. By simultaneously providing the user with physical layer (T1), layer 2 (LAPD), and layer 3 (Q.931) results as well as plain text decodes, the FST-2207 provides an efficient means to verify or troubleshoot the ISDN PRI service. It can:

- Test multiple call types including voice, 56 K, 64 K, Nx56 K, Nx64 K, and H0 to verify correct switch translations for both inbound and outbound calls
- Test data services (calls) using BER testing patterns
- Place and receive calls
- Receive call status results to provide a summary of calls
- Receive English decodes of layer 3 cause codes
- Receive full layer 3 (Q.931) decodes, with the ability to print
- Place and receive calls on either T1 (secondary or primary) for NFAS configurations
- Switch from standby D-Channel to in-service D-Channel for verification of D-Channel backup operation in NFAS configurations

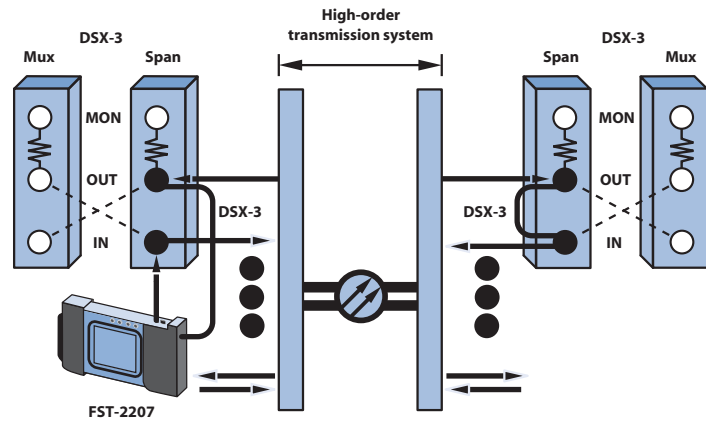


figure 5 With FST-2207, you can qualify DS3 circuits with a host of BER testing patterns

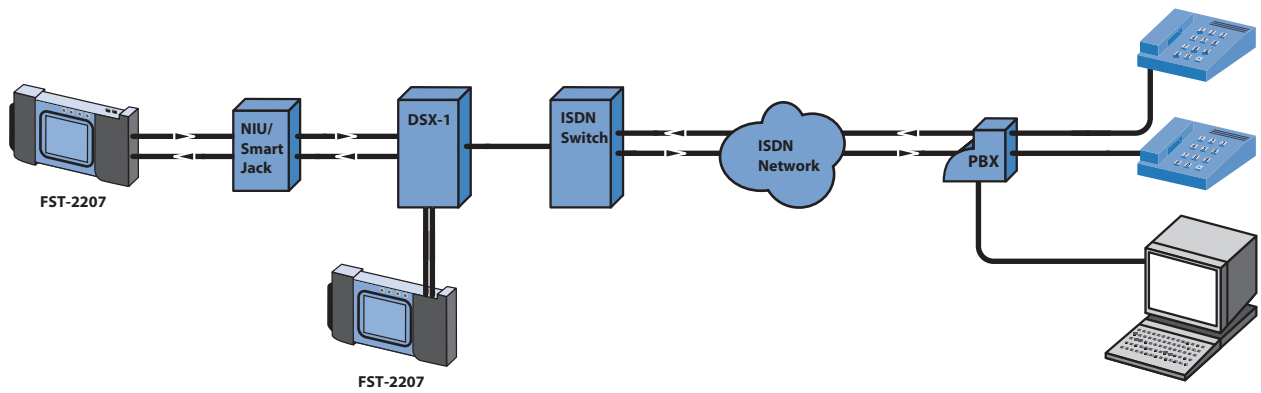


figure 6 Verify or troubleshoot your customers' ISDN PRI service using the FST-2207's ISDN testing capabilities

Technical specifications
Physical characteristics

Overall dimensions 7.5 x 11.5 x 2.25 in
(19 x 29.2 x 5.7 cm)

Weight 4.25 lb (1.93 kg), with battery

Environment

Operating temperature 32 to 122°F (0 to 50°C)

Storage temperature -40 to 167°F (-40 to 75°C)

Humidity 10 to 90% relative humidity,
noncondensing

Power requirements

AC adapter 100-220 at 60 Hz or
200-240 at 50 Hz
VAC to 19 VDC, 2.37 amps

Charging time Maximum of 2 hours
from full discharge

Battery type 10.8 V NiMH

Operating time Typically 3 hours on a full
charge (DS1 operation only)
Typically 2 hours on a full
charge (DS3 operation only)

Display

6-in diagonal graphic LCD color display

Input and output connectors

Bantam (4) and RS-232 (printer operation)

Input impedance

Bridged 1000 ohms

Terminated 100 ohms $\pm 5\%$

DSX-monitor 100 ohms $\pm 5\%$

Receive level

Bridged or terminated +6 to -35 dBdsx

DSX-monitor +6 to -24 dBdsx
(of resistive loss)

Transmit

Output level Isolated T1 pulse is 3.0 V peak ± 0.6 V at 0 dBdsx
(conforms with ANSI T1.102-1993
and ITU-T G.703-1998)

LBO level Line build out (LBO)
of 7.5, 15.0 and 22.5 dB
measured in a 3 kHz ± 1 kHz
band centered at 772 kHz

LBO tolerance ± 2 dB at 7.5, 15.0, and 22.5 dB

Transmit timing sources

Internal clock, recovered clock

Line codes

AMI, B8ZS

DS3 options

Input and output connectors WECO 560A

Impedance

75 ohms nominal, unbalanced to ground

Receiver (single frequency)

44.736 Mbps ± 300 ppm

Level (from output or monitor jack)

High Accepts nominal 1.2 Vp,
0 ft of cable from high source

DSX Accepts nominal 0.6 Vp,
450 ft of cable from high source

Low Accepts nominal 0.3 Vp, 900 ft of cable from high
source

Transmitter (single frequency)

44.736 Mbps ± 200 ppm

Line build out (LBO)

High Nominal 1.2 Vp signal meets ANSI specification
T1.102-1993 and ITU-T G.703
when subjected to 450 ft of cable loss

DSX Nominal 0.61 Vp signal meets ANSI specification
T1.102-1993 and ITU-T G.703

Low Nominal 0.31 Vp

Line code

B3ZS

Ordering information
User interface module
Part number description

2000V-3 FST-2000 with color display
(includes kickstand, AC adapter/changer,
hanging trap, and printer cable)

Application modules

TB2207-DS1 DS1 Communications Analyzer

TB2207-DS3 DS1/DS3 Communications Analyzer

Additional TestPad Application Modules available

FST-2510 High Speed Optical Analyzer

FST-2310 Sonet Services Module

FST-2416 SDH Services Module

FST-2802 Gigabit Ethernet Services Module

FST-2209 T1/T3 Services Module

FST-2109 Copper Analyzer Module

FST-2230 E1 Data Communications Module

FST-2357 DSL Broadband Services Module

BAT-2700 Base Station and Air Interface Test Module

Analyzer options

TB2207-ASP Advanced Stress Patterns

TB2207-F1 Fractional T1

TB2207-TIM VF PCM TMS

TB2207-SIG Signaling

TB2207-PRI Primary Rate ISDN

TB2207-ILE Intelligent Line Equipment

TB2207-GSM PCS-1900 (GSM) VF Option

TB2207-HDLC Fractional HDLC Option

TB2207-VT100 VT100 Emulation

TB2207-EXPERT TestMATE

Optional accessories

AC-31705 external battery charger

AC-31905 cigarette lighter adapter/charger

BA-014081 replacement battery

CC-44581 carrying case/tilt stand
(includes adjustable strap)

CC-44605 carrying case, large soft

CC-45158 carrying case, multimode (soft)

Package descriptions

2207-P1 field service package

2207-P2 DS3/DS1 package

2207-P3 DS1 package

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Test & Measurement Regional Sales

NORTH AMERICA TEL: 1 866 228 3762 FAX: +1 301 353 9216	LATIN AMERICA TEL: +55 11 5503 3800 FAX: +55 11 5505 1598	ASIA PACIFIC TEL: +852 2892 0990 FAX: +852 2892 0770	EMEA TEL: +49 7121 86 2222 FAX: +49 7121 86 1222	WEBSITE: www.jdsu.com
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