TPI-570 ISDN PRI Service

Fully featured, compact, handheld test set for PRI and BRI ISDN services

The increasing complexity of ISDN infrastructures makes meeting customer requirements for service and reliability more challenging than ever before. In addition, the increased use of HDSL and HDSL2 fed T1 lines, have driven costs down and demand up. An increasing number of customers are choosing to satisfy their voice and data needs with ISDN PRI service, due to its flexibility and upgradeability in the future. In this high demand and competitive telecommunications environment, technicians require an easy-to-use, portable test set that can handle the installation of the ISDN service, the first time out.

The TPI-570 enables testing of primary rate ISDN circuits at the customer premises or at the central office cross connect panels. It tests 23B+D circuit configuration or a NFAS 23+D and 24B configuration, and verifies bearer services carried on a BRI ISDN circuit. It can test BER across any combination of channels and can emulate a network,

NT2 or the CPE. Furthermore, support for all US call controls, including National ISDN provides unmatched flexibility in turning-up and troubleshooting ISDN services. With the basic rate ISDN option, it can be used at either the 2-wire U interface, or at the 4-wire S/T interface. The TPI-570 can support test call placement, errored second testing, network originated loopback testing, and BERT for both services.

This compact, handheld instrument can be used for PRI and BRI testing both at the consumer premises equipment (CPE) and also at the central office (CO). An all-weather solution, the TPI-570 is ideal for portable ISDN BRI testing and can be used in all conditions, from inside an office environment to a noisy, wet outdoor span repeater. A built-in speaker and microphone enable hands-free operation and an optional handset can be used in high-noise areas. For protection, connectors are secured behind a weather-resistant lid.

Highlights

– Supports PRI voice and data calls, including non-facility associated signaling (NFAS) and NFAS w/D-Channel back-up.

– Supports both ISDN PRI and BRI service testing

– Layer 1, 2, and 3 results, including plain English decodes of D-channel cause codes

– Transmits and receives 40 KHz tone for loop loss testing

– Provides BRI and PRI full-duplex D-Channel monitoring

– Provides a compact, lightweight and weather resistant design optimized for the field technician

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Features

- It determines line quality with BER testing on any combination of channels, and conducts non-facility associated signaling (NFAS) testing, including back-up D-channel service
- Supports simultaneous B-channel calls for multimedia applications, such as video conferencing
- Monitors U, S/T, and T1 interfaces
- Transmits and measures 40 Khz tone, while measuring S/T receive signal level, U-line voltage, S/T receive signal level, and PS1, PS2, and PS3 power sources
- With the BRI option you can have the instrument function at the U interface as a network termination (NT1), as terminal equipment (TE), both (NT1/TE), or line termination (LT)
- It functions at the U interface as a NT1 and TE combination, at the S/T interface as TE when equipped with the BRI option

Applications

Line qualification

The T1 facility that transmits the ISDN PRI signal can be qualified using a number of BERT patterns, such as QRSS, 1 in 8, and 3 in 24. The TPI-570 has an internal T1 clock signal and can also respond to CSU in-band loopback commands making it ideal for end-to-end or loopback BER testing. These tests will help to identify unwanted bridgetaps and other anomalies that can affect the service.

Likewise, a 40Khz can be sent or received to ensure that the U interface meets the loss requirements ISDN BRI service. The TPI-570 can be placed into an LT or NT mode to provide a method of emulating the 2B1Q BRI signal and running a BER test using patterns such as 2047, and EOC loopback features.
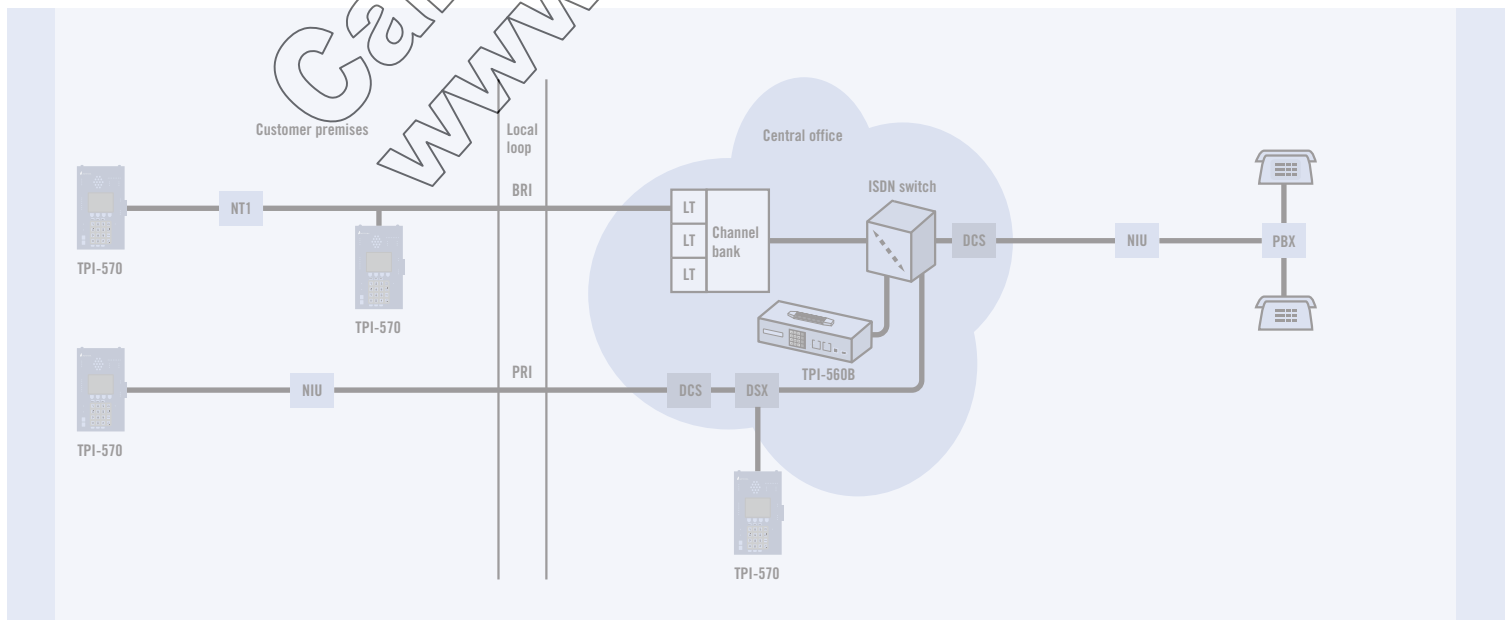
Service Verification

Once the physical layer has been tested, the actual ISDN service can be tested by placing and receiving calls, which verifies proper switch translations. The TPI-570 can place and receive these voice and data calls to a known telephone number or to an automated test line such as the TPI-560B/P. The TPI-560 will automatically answer an incoming call, provide a voice identification of the calling number and call type, and then immediately return a call to the TPI-570, thereby verifying switch translations. Using the TPI-560B/P, much of the hassle and delay of testing with a centralized tester or a central office tester can be avoided, decreasing installation time. BER testing and a voice path via a handset is provided to qualify these data and voice calls, respectively.

Troubleshooting

Nonintrusive bidirectional monitoring of in-service D-channel signaling messages also makes troubleshooting a new ISDN turn-up easier. For ISDN PRI circuits, the technician can access live D-channel lines through monitor jacks on a DSX patch panel. Likewise, they can be accessed from the U interface for BRI. Results can be stored, displayed on the LCD screen, or output through the optional RS-232 data port. If the problem can't be isolated, then sectionalization can be accomplished by using the various emulation modes of the TPI-570 to access the T1, U and S/T interfaces. This enables the technician to sequentially replace each piece of premise equipment to identify the source of errors.

Lastly, by using the remote ViTL software, a technician can leave a tester on the circuit for long-term monitoring and remotely access the unit for real-time and historical results. This access also enables a remotely located technician to effectively assist technicians in the field — reducing time to trouble resolution.

Technical specifications
Acterna TPI-570 ISDN PRI Service Tester

Physical characteristics

Overall Dimensions	8.5 x 5.5 x 4.5 in
	(21.6 x 13.9 x 11.4 cm)
Weight	6 lb (2.2 kg)

Power requirements

Internal lead acid rechargeable battery
Battery charger/AC Adapter	(12 vDC, 500 mA)
Battery rechargeable	12 to 14 hours (overnight)
Recharge	at least once every two months
Continuous use on	
fully-charged battery	10 hours

Auto shut-off mode (with manual override)

Line connectors

8-pin jack and dual mini-bantam jack [PRI-A]
8-pin jack and dual mini-bantam jack [PRI-B]
8-pin jack [BRI 2-wire "U" interface]
8-pin jack [BRI 2-wire U Monitor]
8-pin jack [BRI 4-wire "S/T" interface]
Handset 4-pin modular jack
DB25/RS-232 connector

Line interfaces

DS1 — per ANSI T1.403 (1989)
BRI Option 2-wire 2B1Q — per ANSI T1.601 (1988)
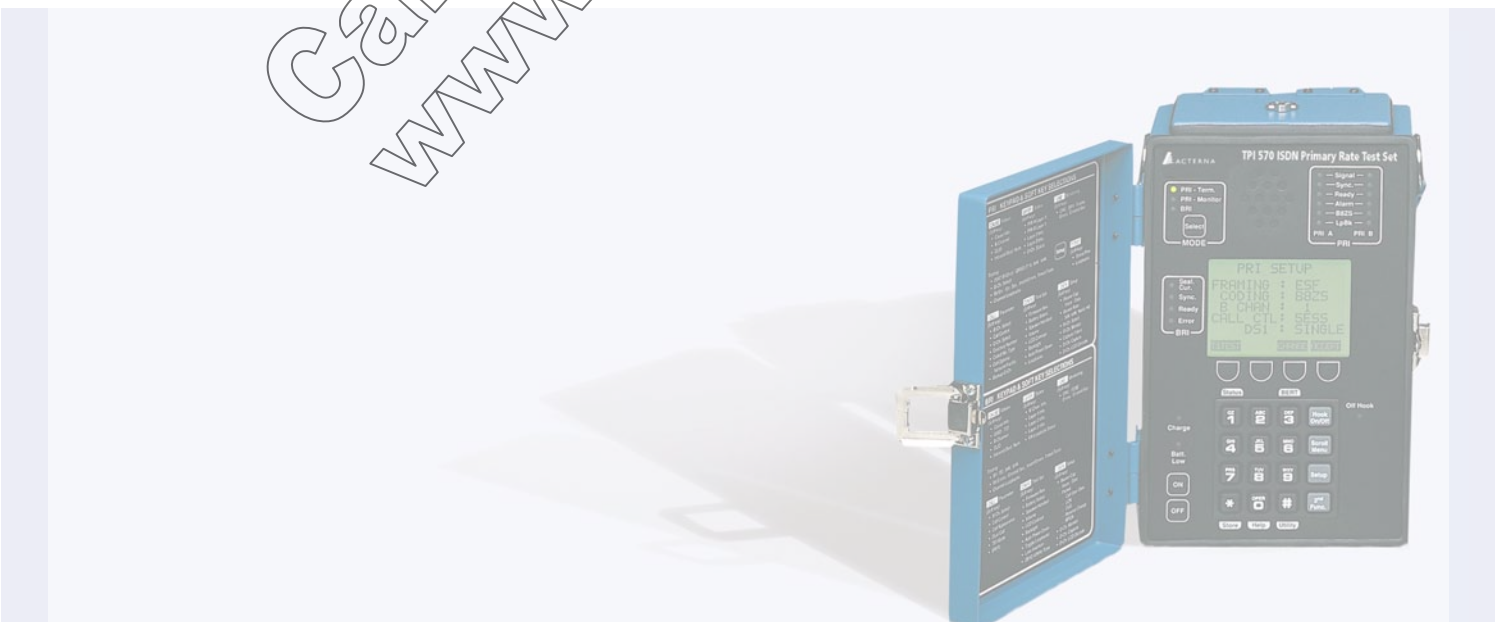BRI Option 4-wire S/T — per ANSI T1.605 (1989)

BRI line build-out (attenuation)

Line	0 to 6 dB (2 dB steps)
S/T	0 to 6 dB (2 dB steps)

26 AWG cable simulators

Modes of operation

PRI Terminate
PRI Monitor
BRI (Option)

Call controls

5ESS per 235-900-342
NTI-F per NT NIS-A211-1
NAT'L (National) per vendor documents
and Bellcore SR-NWT-002120

LCD

Dot Matrix Display   192 x 128

Physical layer analysis (PRI/BRI)

Layer 1 states
Layer 2 (LAPD) states
Layer 3 (call status) states
Cause messages
Loopbacks
D-channel location select (PRI)
D-channel backup testing (PRI)
NFAS support (PRI)
RS-232 data port
D-channel monitor
D-channel message capture/LCD display/store

Voice capability (PRI/BRI)

Hands-free operation and handset interface
Simultaneous call capability
Dual call capability
Multi-call feature
Network emulation capability
Speed dialing (10, 30-digit numbers)
Redial
B-channel selection

Data capability (PRI)

Selectable bandwidth (N x 64, contiguous, flexible)
Speed dial/redial
Simultaneous call capability
Dual call capability
Multi-call feature
Network emulation capability
B-channel selection

Data capability (BRI)

Circuit switched data calls
Packet data calls
Dual call capability
Simultaneous call capability
Multi-call feature
Network emulation capability
B-channel selection

ISDN testing

Call controls: National, AT&T, and NTI custom
Modes: Terminate, Monitor, PRI, BRI
DS1: CRC/BPV/frame errors and errored seconds
Bit Error Testing
Timed tests
Network loopbacks
User configured loopbacks
Line build-out (dB loss selection)
Margin analysis (BRI)
U-line voltage
S/T signal level
PS1, PS2, PS3 voltage/polarity
40 kHz test tone (send and receive)

Facilities testing

Bit error rate testing   T1 (511, 2047, 2^{15-1}, 2^{20-1}, 2^{23-1}, 1 in 8, 2 in 8, 3 in 24, zeros, ones, QRSS)

Ordering information
TPI-570 ISDN PRI Service Tester

Base Instrument
TPI 570   ISDN PRI Services Test Set
Optional Features
570-BRI2   Enhanced BRI Option
TPI-VITL   Virtual Test Link Software

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