



TSU IQ

Frame Relay T1-FT1 DSU/CSU

Product Features

- Real-time measurement of throughput, bandwidth utilization, bursting, congestion, and network delay on each PVC
- Bandwidth utilization by protocol and top talkers
- End-to-end network round trip delay measurements for network optimization
- N-Form™ provides a web-based, cost-effective, easy-to-use management platform
- True non-intrusive in-band transmission of statistics
- Embedded SNMP and Telnet through SLIP/PPP port or optional Ethernet interface
- Optional Dial Backup to avoid service interruption
- Standard V.35 DTE Interface
- Easy configuration from Front Panel, SNMP, Telnet or VT100
- Standard five-year warranty

ADTRAN's industry-leading and award-winning DSU/CSU family continues to provide more flexibility with the TSU IQ.

The TSU IQ provides the visibility and control you need for both the physical and logical connections made in Frame Relay networks. This intelligent solution for managed Frame Relay access allows you to enjoy the monetary savings of Frame Relay without giving up management visibility and control.

Real-time measurements of Frame Relay metrics are stored in the TSU IQ. These metrics include statistics on throughput and utilization per port and PVC, availability, utilization by protocol, top talkers lost frames and PVC state, excess bursting above CIR, network congestion (FECN, BECN, and DE), and end-to-end delay on any or all PVCs. This data is crucial for pinpointing specific traffic demands and problem sources in the network, for analyzing traffic patterns, and for general maintenance and troubleshooting of the Frame Relay circuit.

The statistics are stored in the TSU IQ in a standard ASN.1 format making the statistics available to any SNMP management platform or trend analysis package. ADTRAN offers N-Form, a powerful proactive network management software suite. Modular in design, N-Form combines the features of a complete SNMP management platform, with a network trend analysis tool, in an easy-to-use, web-based, low cost package.

The TSU IQ supports multiple ways to access the collected performance data. This management flexibility accommodates both the service provider and the end user in any

type of network configuration. Options include simple VT100 connection, front panel, management access through inband dedicated or shared PVCs, SLIP/PPP or ethernet, and combination management. Combination management allows for simultaneous and independent management by the service provider and the end user.

The IQ family provides automatic dial backup upon interruption of Frame Relay services. The TSU IQ monitors both the physical link and the Frame Relay signal to determine if an interruption has occurred. Once detected, the unit automatically initiates a dial-up call around the Frame Relay network. A host IQ unit initiates and accepts calls to and from IQ units at remote sites. Once connected, the host unit merges backup traffic with the primary traffic still being received from unaffected remote sites. The router or Frame Relay device connected to the TSU IQ still receives all data as Frame Relay traffic over the primary connection, allowing a virtually transparent transition. Once the failed condition has been cleared and the Frame Relay interruption is over, the IQ unit automatically restores traffic to the primary link.

Additional features such as an easy-to-use front panel interface and modular option cards combined with the quality, service and support that ADTRAN is known for makes the TSU IQ the obvious choice for Frame Relay monitoring. The IQ series also includes the IQ Probe, DSU IQ™, TSU IQ+™, and the NxIQ module for the TSU multiplexer family.



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Product Specifications

Operating Modes

- 100 DLCIs supported
- T1/FT1 Frame Relay
- Auto LMI/Annex D detection

Frame Relay Statistics

Access Line Statistics

- T1 BPVs, CRCs, ES, SES, UAS, %AS, %EFSEC, Alarm, Errors
- Telco loop test in progress

PVC Statistics

- PVC state
- Bytes Tx/Rx; frame Tx/Rx
- Frames with BECN/FECN/DE
- Max/Min/Avg frame size
- Throughput/bandwidth utilization per PVC
- Lost frames/Sequence check
- Continuous PVC delay measurement
- Max/Min/Avg end-to-end PVC delay
- Burst rate
- Congested seconds

Port Statistics

- Byte Tx/Rx; frame Tx/Rx
- Throughput/utilization
- Frame size violations (invalid frames)
- CRC errors/abort frames
- Non-octet aligned frames

LMI Statistics

- LMI state/state changes
- Polls in; Responses in
- Timeouts/link integrity frames
- Polls with protocol error

Layer 3 Statistics

- Monitor protocols on port and pvc
- Protocols supported: IP/IPX, ARP, SNA, other
- Top Talkers

Diagnostics

Frame Relay

- PVC loopback w/ test pattern/sequence check
- PVC round trip delay

Network/User

- CSU loopbacks

Line Interface

- RJ48S, 4 wire
- Timing derived from the Frame Relay Network
- **Formatting:** SF/ESF with auto detection
- **ESF format:** AT&T 54016, ANSI T1.403
- **Line coding:** AMI/B8ZS
- **Input signal:** 0 to -36dB
- **DS0 Assignment:** contiguous or alternate

DTE Interface

- V.35 Winchester M block female
- 56 to 1.536, Nx56 or Nx64 kbps (N=1 to 24)

Configuration

- Front Panel
- Local and Remote VT 100 terminal via the Control port
- Remote configuration via frame relay network connection
- Telnet and SNMP

SNMP/Telnet

- Embedded SNMP and Telnet inband access through shared or dedicated PVC
- Integrated SLIP/PPP (async) port
- Optional 10BaseT interface
- RFC 1213 MIB II, RFC 1315 compliant
- ADTRAN Enterprise MIB for frame monitoring and TSU control

Agency Approvals

- FCC Part 68, Part 15 Class A
- Industry Canada CS03
- UL1950 and CUL

Environment

- **Operating Temperature:** 0° to 50° C, (32° to 122° F)
- **Storage Temperature:** -20° to 70° C, (-4 to 158° F)
- **Relative Humidity:** Up to 95%, non-condensing

Physical

- **Dimensions:** 10.4" D, 8.0" W, 2.4" H
- **Weight:** 4.5 lbs
- **Power:** 115 vAC, 60 Hz, 7W

Product Includes

- Two 8-pin to 8-pin modular cables, modular to female DB-25 adapter and user manual

Ordering Information

Equipment	Part #
TSU IQ™	1200215L1
V.34 DBU card	1204002L2
SW56 DBU card	1204001L1
ISDN BRI DBU card	1204004L1
ISDN PRI DBU Card	1204008L1
External DBU card	1204006L1
Ethernet card	1204005L1
TSU IQ RM	1200277L1
TSU IQ RM w/PRI DBU	4200277L1



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