

Frame Relay/Q.922/Q.933 Source Code

Frame Relay drivers, protocol stacks, source code libraries, and device drivers to accelerate development and conformance testing of Frame Relay signaling products.

For:

- Base stations
- Digital loop carrier systems
- Intelligent networks
- Switches
- Networking of remote digital equipment
- Interconnecting servers

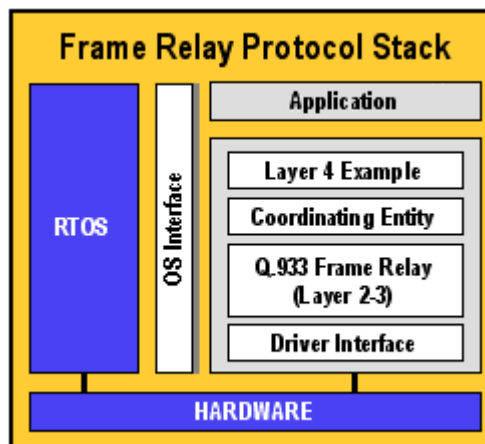
“The TeleSoft code shortened our development time. Their technical support greatly exceeded our expectations in terms of both speed and depth of knowledge – super prompt and incredible technical expertise.” – Dynalec, Sodus, NY

Well-Structured, Maintainable Code

Maintainability and scalability are designed into each TsLink3 stack. Comprehensive comments and documentation support you or a colleague as your product goes forward. The value of TsLink3 stacks will be evident in each phase of your engineering schedule and the product life span.

Shorter Learning Curve & Faster Customization

- **Fully conforms** -> Wide interoperability
 - ANSI T1.617 Annex D
 - ITU-T Q.922 Annex A
 - Sprint
 - Stratacom and Frame Relay Forum Standards
- **Strong adherence to FRF Agreements, ITU-T primitives and software structure** -> Easy to relate TsLink3 code to other ITU-T based protocols (e.g., E1 CAS, X.25, FR).
- **‘C’ switch statements that closely correspond to the ITU-T standard** -> Straightforward to read and modify code, and locate the event/state action points in the ITU-T standard.
- **Adherence to ANSI ‘C’ standards** -> full portability.
- **OS-independence** -> Choice of RTOS, not locked into a single vendor.
- **Processor-independence** -> Mobility across CPU platforms.
- **Simple state machine design** -> Easy to understand and change code for national-specific variants



Faster Debugging

- **Specific defined constants, comment strings and variable naming** -> Supports use of text search techniques to quickly locate a specific section of code and determine the side effects of changes that are being considered.
- **ITU-T primitives and software structure** -> Clear traceable dataflow.
- **Development and testing on TsLink3 hardware** -> Clean, proven "rock solid" code.

Smaller Code Inventory Required

- Co-resident T1, E1, R2, ISDN PRI and BRI switch variants, Frame Relay, X.25, PPP, and ML-PPP stacks.

Frame Relay Features

- DTE (User) Side + DCE (Network) Side
- Dynamic run-time configuration with Forum Local Management Interface (LMI)
- Network Management Interfaces conform with ITU-T Primitive Interfaces
- Permanent Virtual Circuits (PVCs)
- Switched Virtual Circuits (SVCs) per FRF4
- Modular structure easy to customize using defined constants
- Higher-layer independence allows transparent transport of other protocols, including:
 - TCP/IP
 - SNA
 - X.25/X.75
 - ISDN
- Supports testing both sides of the network
- Frame Relay PVC Support
 - Coordinating Entity and Management Entity (CEME)
 - Layer 2 DL-CORE Module
 - Layer 1 Low-Level Driver (LLD) for HDLC device
- Frame Relay SVC Support
 - Frame Relay Forum (FRF4) Subset of Q.933 Supported
- DTE (User) Side implementation of Data Link - CORE and LMI functions
- DCE (Network) Side implementation of Data Link - CORE and LMI functions
- Functions supported:
 - Congestion Control and Explicit Congestion Notification (ECN)
 - Data Link Connection ID (DLCI), up to 922 users
 - Multicast-configurable to network needs
 - Global Addressing
 - Discard Eligibility bit
 - Status Inquiry, Status, and Optional Status Update commands
 - Heartbeat Process to verify physical link integrity
 - PVC monitoring
- 1024 PVC DLCIs for support of up to 255 active connections

- Software configurable using defined constants to support:
 - Stratacom and Multicast
 - Speed optimization
 - PVCs only or PVCs + SVCs

Special Features and Upgrade Modules

Universal Application Programming Interface (UAPI)

TsLink3 code includes a rich message-based Universal API (UAPI) which presents a simple interface for simple applications such as “signaling-only.” UAPI also provides the versatility and power needed to support more complex configurations which combine signaling with data protocols or with specialized hardware. The TsLink3 Universal API coupled with the straightforward structure of the TsLink3 protocol stack enables you to easily follow the API message flow through the code to determine where to make modifications required for your application.

The majority of simple “signaling-only” applications require a very small subset of the TsLink3 API messages and parameters – and the non-applicable messages can be disregarded and unused parameters set to zero. More complex applications benefit from the large set of messages and parameters that we provide as templates.

UAPI is common across all TeleSoft stacks which decreases the time and effort required to add upgrade modules to an existing TsLink3 stack and to develop with additional TeleSoft stacks.

High Availability (HA)

TsLink3 supports High Availability applications for high density switches with multiple modes of HA operation, including the seven key elements of HA. Please refer to the TeleSoft HA White Paper for details. Applications requiring HA will benefit from the TsLink3 stack capacity to support up to 64,000 simultaneous connections and up to 256 ports.

Software Tools

Internal Protocol State Logging Tool and Debugging Tool are invaluable aids during portation and integration, included with every TsLink3 stack at no additional charge.

Purchasing TsLink3 Software

TsLink3 Source Code is supplied in comprehensive, portable packages of 'C' source code modules and interfaces necessary to develop robust products.

Source Code packages provide source code from Layer 1 device driver software up through the Layer 3/Layer 4 interface of the OSI model.

Upgrade and Individual Modules

Completing the solution are upgrade- and individual-modules that increase your market opportunity by increasing your products' connectivity capabilities. Modules include PPP, ML-PPP, X.25, AO/DI, Frame Relay, T1 RBS, E1 CAS, R2, V.120, and Supplementary Services.

Technical and Custom Support

12-month maintenance extensions include code updates and quick-response technical support via E-mail, phone and fax.

Expert Consulting and Customization Services

Consult with our experienced engineers early to avoid expensive pitfalls later.

Documentation

Comprehensive documentation customized for your load. Available in a searchable soft format or in hardcopy. All nomenclature complies with ITU-T.

Price

Cost-effective one-time licensing fee; no royalties or user-fees for TsLink3 source code or the TsRITE operating system.

TeleSoft International specializes in the development of Intelligent WAN solutions specifically for OEMs. We supply source code for DSL, PPPoA, PPPoE, ISDN, Q.931, Q.921, QSIG, ML-PPP, PPP, Frame Relay, T1 RBS, E1 CAS, R2 and X.25 Protocol Stacks for license to manufacturers of telecommunications products around the world.

TeleSoft provides 'C' Language Source Code Stacks and Hardware Reference Designs backed up by comprehensive documentation and expert technical support. TeleSoft solutions accelerate time-to-market, minimize technology risk, and decrease the cost of both product development and product maintenance.