TeleSoft International
Protocols for Developers

The TeleSoft Advantage

ROI

TCO

Proven advanced starting points

TsLink3 X.25 SDK   Source Code Stack

The X.25 software protocol defines a very well established global packet-switched network that includes a rigorous error correction mechanism. The ITU-T X.25 specification defines the interface between the user side (Data Terminal Equipment (DTE)) and X.25 network side (Data Communications Equipment (DCE)). DTE-to-DTE connectivity is defined by an X.25 compatible and ISO equivalent protocol to X.25, ISO 8208. ISO 8208 permits operation over additional networks such as ISO 8881 (ISO LAN) and LAPB data link layer.

X.25 supports two types of virtual circuit, Switched Virtual Circuits (SVC) and Permanent Virtual Circuits (PVC). SVCs are established on an as-needed basis through a call establishment and clearing procedure and torn down after the call is complete. PVCs are preconfigured into the network to provide a dedicated connection between end points and are seldom torn down.
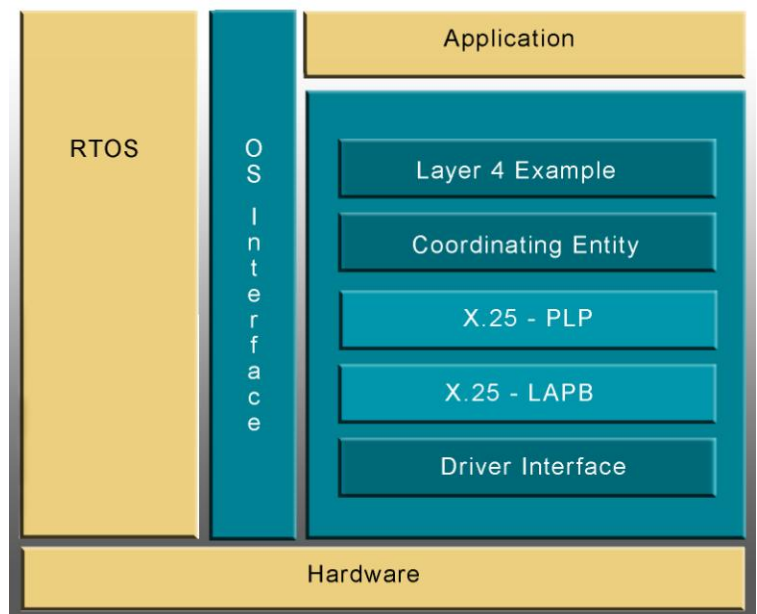
X.25 software has three layers:
♦ Packet layer: The Packet Layer Protocol (PLP) defines the method for exchanging control and user data packets to form a packet-switching network based on virtual calls.
♦ Data link layer: LAPB is a data link layer protocol that consists of the link access procedure for data interchange on the link between a DTE and a DCE. LAPB manages a communication session and controls the packet framing. It is a bit-oriented protocol that provides error correction and orderly delivery.
♦ Physical layer: This layer specifies the physical link between DTE and DCE.

The TsLink3 X.25 Software Development Kit (SDK) source code module is a proven source code development kit that fully complies with the ITU-T standards for X.25 packet switching. TsLink3 X.25 SDK is portable to a wide variety of operating systems and hardware platforms with available abstraction interfaces and physical layer drivers. The complete SDK includes comprehensive documentation and technical support in order to make the porting of the X.25 stack as easy and straightforward as possible.

The TsLink3 X.25 software module is architected for embedded and host-based applications where performance and code size are important.

Typical Applications:
♦ Air Traffic Control systems
♦ Terminal adapters
♦ JTRS radio networks
♦ Point-of-Sale terminals
♦ Network interface cards
♦ Test equipment

RTOS | OS Interface | Application | Layer 4 Example | Coordinating Entity | X.25 - PLP | X.25 - LAPB | Driver Interface | Hardware

Supplied by customer   Supplied by TeleSoft

Note: The Layer 4 example is provided as a template for API interactions.

TsLink3 X.25 Features
♦ X.25/X.31 Networking Layer comprises four modules:
  – Layer 3 Packet Layer Protocol (PLP) and Call Control (CC)
  – Coordinating Entity and Management Entity (CEME)
  – Layer 2 LAPB Module
  – Layer 1 Low-Level Driver (LLD) for HDLC device

- ♦ Fully conforms with:
  - – ITU-T X.25 Packet Switching Protocol
  - – ITU-T X.211 Physical Layer Service
  - – ITU-T X.212 Link Layer Service
  - – ITU-T X.213 Network Service
  - – FED STD 1041 US Federal Govt. X.25
  - – ISO 7776 X.25 DTE Frame Level Protocol (LAPB)
  - – ISO 8208
  - – ISO 8348 Network Service Definition
  - – ISO 8878 Connection Oriented Service over X.25
  - – ISO 8881 Used for X.25 over LANs
- ♦ Supports Permanent Virtual Circuits (PVCs) and Switched Virtual Circuits (SVCs)
- ♦ Up to 4096 Virtual Circuits
- ♦ Multi-Port Support (multiple logical links per interface)
- ♦ Multiple Trunk Support
- ♦ Non-default data packet sizes
- ♦ X.31 access to ISDN B-channels
  - – Supports X.31 call control through the ISDN network, removing the need for a permanent connection to an X.25 router
  - – Supports BRI and PRI applications
  - – Network (NT)- and Terminal (TE)-Side Support
- ♦ Packet switched ISDN D-channel access
- ♦ Internal Protocol State Logging and Debugging Tool
- ♦ X.25 configurable in Host (DTE) mode or Network (DCE) mode
- ♦ Conformance tested at Bellcore and AT&T Bell Labs
- ♦ Built-in simulation capability supports testing DTE and DCE endpoints without a router

TeleSoft Advantages

TsLink3 software stacks are specifically architected for all types of embedded and host-based applications and are optimized for excellent performance and small code size.

Written in ANSI C and delivered as source code SDKs with a pre-ported interface to a defined RTOS of your choice, TsLink3 stacks give you an advanced starting point to shorten your development schedule, minimize technical risk and maintain the flexibility to exercise full control over your end product.

All TsLink3 protocol software stacks are based on a Standard Core Architecture (SCA) with a Universal API (UAPI) that enables easy migration between different stacks and portability to different software/hardware platforms.

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.

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.

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 High Availability, PPP, ML-PPP, X.25, MLPP, Frame Relay, T1 RBS, E1 CAS, R2, V.120, and Supplementary Services.
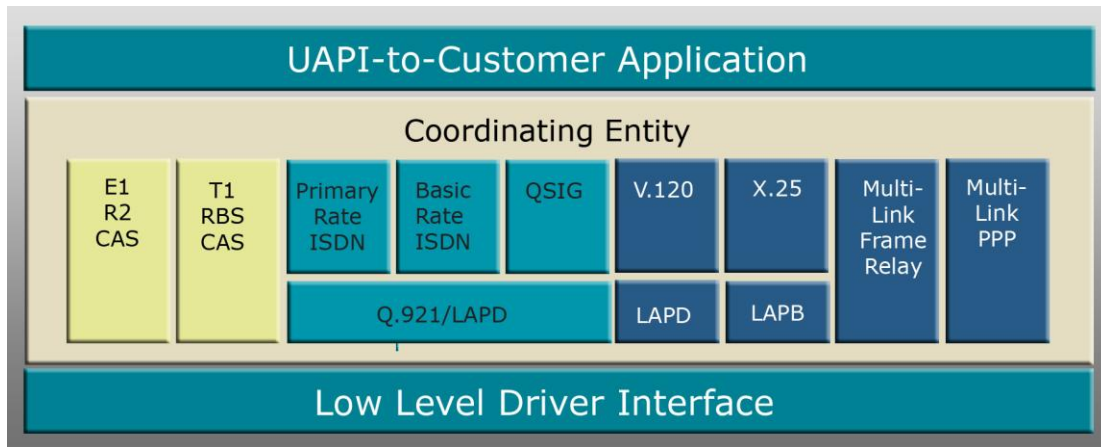
Purchasing TsLink3 Software

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

Well-Structured, Maintainable Code

Maintainability and scalability are designed into each TsLink3 stack. Comprehensive comments and documentation support you 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

- ITU-T primitives and software structure – make it easy to relate TsLink3 code to other ITU-T based protocols.
- ETSI/ECMA compliant code - ensures interoperation with other equipment (e.g., PBX) that is ETSI/ECMA compliant.
- '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 – provides for full portability.
- OS-independence - choice of RTOS, not locked into a single vendor.
- Processor-independence - enables mobility across CPU platforms.
- Simple state machine design - easy to understand and change code for national specific variants.
- Consult with our experienced engineers early to avoid expensive pitfalls later.

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 and robust code.

Smaller inventory

- Each line can be configured at run-time for a different T1, E1, R2, PRI or BRI variant
- Co-resident T1, E1, R2, ISDN PRI and BRI switch variants, Frame Relay, X.25, MLPP, PPP, and ML-PPP stack

Documentation

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

Technical and Custom Support

3-months included with each license. 12-month maintenance extensions include code updates and quick-response technical support via E-mail, phone and fax.

About TeleSoft International

TeleSoft International, Inc., is an industry-leading, US-based provider of field-proven, scalable, standards-based protocol stacks for developers. We specialize in telecom applications, licensing source code stacks to OEMs and ODMs worldwide for VoIP, ISDN, Q.931, Q.921, QSIG, Supplementary Services, ML-PPP, PPP, Frame Relay, T1 RBS, E1 CAS R2, and X.25.

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