

Proven advanced starting points

TsLink3 QSIG SDK

Source Code Stack

TsLink3 QSIG/Q.SIG/PSS1

TsLink3 QSIG or Q.SIG, also known as Private Signaling System No.1 (PSS1), drivers, protocol stacks, source code libraries, and associated device drivers give the developer full flexibility to modify the QSIG/PSS1 software to meet their unique product requirements, and accelerate both development and successful conformance testing.

Available integrated with the proven TsLink3 QSIG Software Development Kit (SDK) source code module, are proven software modules for: Q.931 and Q.921, Supplementary Services, AutoSPID, Autoswitch Detection, NFAS, D-Channel Backup and Physical Layer drivers.

TeleSoft's TsLink3 QSIG/PSS1 Source Code stacks provide advanced starting points for a wide range of communications products. TsLink3 QSIG SDKs are fully compliant with their respective ITU-T, ETSI and ECMA software standards and are available for both PRI and BRI interfaces.

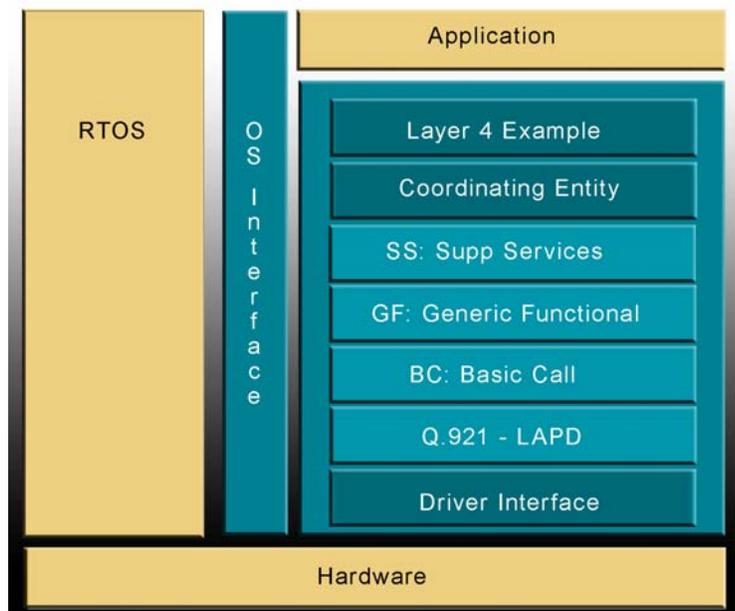
TsLink3 SDKs have been extensively tested at many conformance centers in Europe, North America, Japan and Australia and TsLink3 SDKs are deployed worldwide in millions of products.

High Availability

TsLink3 QSIG supports High Availability (HA) 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 7,900 simultaneous connections and up to 256 ports.

Typical Applications

- ◆ Multi-vendor ISDN PBX based private networks
- ◆ Networking of remote ISDN PBXs
- ◆ IP-PBX to QSIG gateways
- ◆ Supporting mobility in corporate networks
- ◆ TransEuropean Trunked Radio (TETRA)



Supplied by customer (yellow) Supplied by TeleSoft (blue)

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

QSIG Terminology, Architecture and Reference Points

QSIG adds two reference points to the standard ITU-T ISDN reference points, called "Q" and "C", which are necessary to define the PBX to PBX signaling in private ISDNs. The "Q" reference point is the logical signaling point between two PBXs. The physical connection to the PBXs is made at the "C" reference point. The connection between the PBXs can be either dedicated channels (analog or digital) or switched connections (for Virtual Private Networks).

Using the public ISDN the two end PBXs are connected through two reference points using different ISDN protocols; namely ETSI DSS1 at the "T" reference point and ISUP within the public ISDN at the "N" reference point. For private ISDNs, only one protocol is necessary as the QSIG protocols have sufficient functionality to be used both within the network and on the outside. At the "C" Reference point a variety of interface dependent protocols can occur, however it is generally assumed that a digital circuit is used.

QSIG Protocol Stack

QSIG standards specify a signaling system at the "Q" reference point which is primarily intended for use on a common channel interface. However, QSIG will work on any suitable method of connecting the PBX equipment. The QSIG protocol stack follows the same ISO reference model as the ETSI DSS1 protocol stack. Because QSIG is defined for a "logical" reference point the protocol stack can be implemented for a variety of physical interfaces.

TsLink3 QSIG Layer 3 and Sublayers 1-3

QSIG Basic Call (QSIG BC) is the first sublayer. QSIG BC extends the public ISDN access protocol for use in private ISDNs. Unlike DSS1, QSIG BC is a symmetrical protocol (i.e. both the user side and the network side of the interface are identical) which is designed for peer-to-peer operation. QSIG BC provides support for call setup, teardown, information, and maintenance. TsLink3 QSIG Basic Call is fully conformant with their respective ECMA and ETS standards.

QSIG Generic Functional Procedures (QSIG GF) is the second sublayer. QSIG GF provides a standardized mechanism to exchange signaling information for the control of supplementary services and additional network features over a corporate network. QSIG GF protocol supports both a connection-oriented and a connectionless transport mechanism for call-independent supplementary services. QSIG GF enables transparent passage of facility and notify messages and forwards SS messages to the next network or terminal node in the circuit. TsLink3 QSIG Generic Functional Procedures is fully conformant with their respective ECMA and ETS standards.

QSIG Supplementary Services (QSIG SS) is the third sublayer. QSIG SS, only required in terminating nodes, defines specific QSIG procedures at the "Q" reference point for individual supplementary services. QSIG SS generates and interprets Supplementary Services messages. The "terminating" or "terminal node" is located at one of the ends of a circuit. The terminal node may either be a PBX/PABX/public switch that is providing the SS functions or an ISDN telephone. TsLink3 QSIG Supplementary Services are fully conformant with their respective ECMA and ETS standards.

TsLink3 QSIG Supplementary Services supported include:

- ◆ Calling Line Identification Presentation (CLIP)
- ◆ Calling Line Identification Restriction (CLIR)
- ◆ Call Diversion Suite (DIV)
- ◆ Message Waiting (MWI)
- ◆ Call Transfer (CT)
- ◆ Call Forward Unconditionally (CFU)
- ◆ Call Forward on Busy (CFB)
- ◆ Call Forward on No Reply (CFNR)
- ◆ Call Deflection (CD)
- ◆ Calling Name ID Presentation (CNIP)
- ◆ Connected Name ID Presentation (CONP)
- ◆ Calling ID Restriction (CNIR)
- ◆ Connected ID Restriction (CONR)
- ◆ Call Priority Interruption (CPI)
- ◆ Call Priority Interruption Protection (CPIP)

QSIG Layer 2

TsLink3 QSIG Layer 2 conforms to the ECMA and ETSI standard for the link layer, ETS 300 125.

QSIG Layer 1

TsLink3 QSIG Layer 1 is the physical layer which incorporates low level drivers for the required interface devices. Conforms to ETS 300 012. Please refer to TsLink3 Device Drivers for a complete list of available drivers.

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.

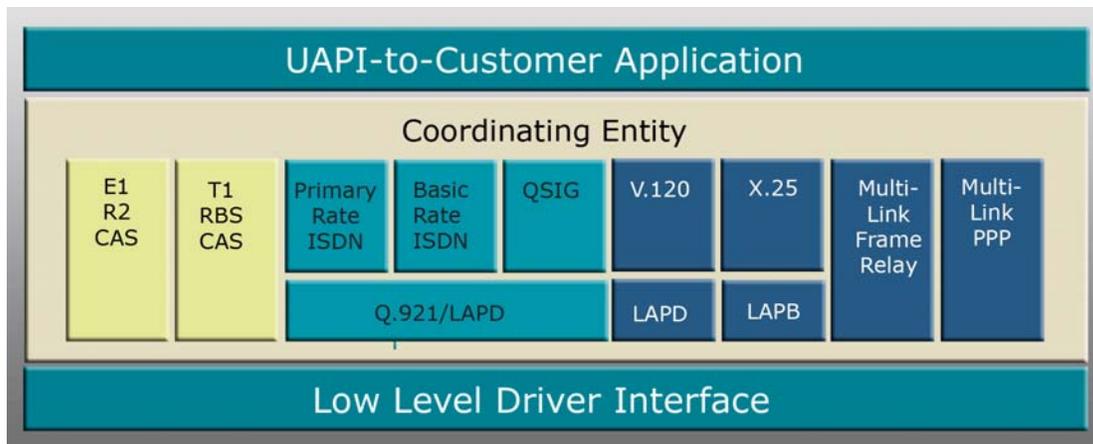
All TsLink3 protocol software stacks are based on a Standard Core Architecture (SCA) with a Universal API (UAPI) that enables easy migration between different stacks and portability to different software/hardware platforms.

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 stacks.

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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