X.25 Packet Switching Protocol

Advanced Protocols

WAVECOM NACHRICHTENTECHNIK

X.25 Overview

In the childhood of data transmission, analogue line quality was poor so the need for a reliable and safe packet switching protocol was evident. Also network devices at that time did not possess the complex features which in today´s devices are taken for granted. This lead in 1976 to the creation of the fairly complicated X.25 protocol used on the first public data networks and for many years industries like banking and air lines relied heavily on their X.25 networks. Today the protocol has lost its importance, but derivatives are still used, e.g. in GPRS, in amateur radio as AX.25 and in the aeronautical networks.

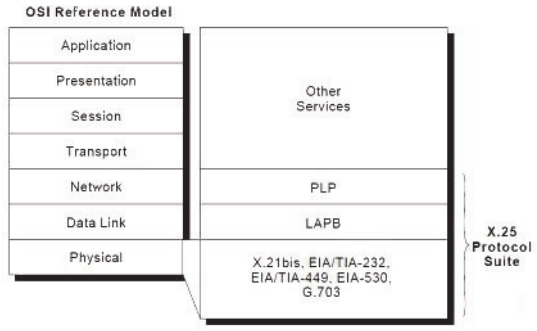

Fig. 1 X.25 protocol stack

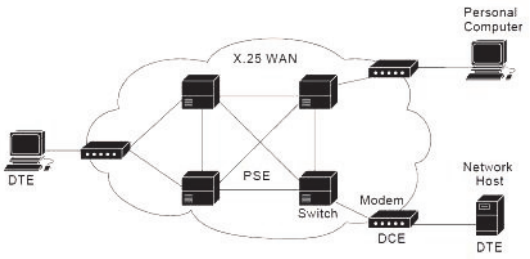

Fig. 2 X.25 WAN and devices

X.25 Architecture

The illustration below shows the X.25 protocol layers compared to the standard OSI Reference Model. The physical layer consists of the various electrical interfaces which allow a device to connect to the network or directly to another device.
At the data link layer the LAPB (Link Access Protocol - Balanced) is an implementation of the ISO HDLC (High-level Data Link Control) bit-oriented protocol. This layer performs link setup and disconnect, error control and data flow control.
The PLP (Packet Layer Protocol) at the network layer takes care of call establishment and tear-down, data transfer and restarts and thus allows users to communicate each other via a network.

In an X.25 network a DTE (Data Transmission Equipment) connects to another DTE via DCEs (Data Circuit-terminating Equipment) and intermediary packet switches (PSEs). Communication takes place on logical channels, either as Switched Virtual Circuits, which are set up at the beginning of a call and maintained for the duration of this call, much similar to a telephone call, or a Permanent Virtual Calls which acts much as a leased line and not requiring call setup or tear-down.
Another characteristic of a X.25 network is the ability of each DTE to multiplex up to 4096 logical connections.

X.25 Frame structure

The LAPB frame contains the fields below. The control field indicates which frame is being transmitted. I-frames contain data and U- and S-frames contain control information.

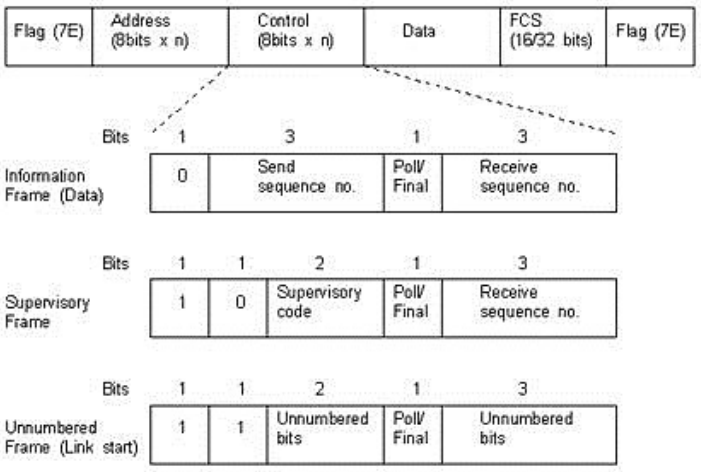

Fig. 3 LAPB frame structure

X.25 Frame format

X.25 provides three frame formats, the difference being the size of the sequence number. The Basic frame has a frame sequence number size of 3 bits, so that the increment of the sequence number is a modulo 8 operation. In case of the Extended frame, the increment is a modulo 128 operation and in case of the Super frame a modulo 32768 operation.

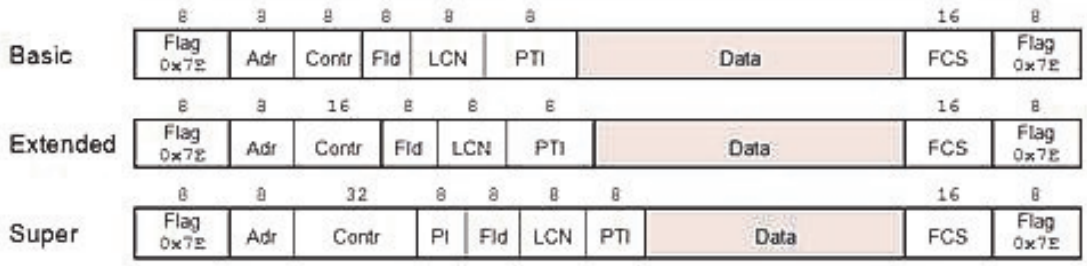

Fig. 4 X.25 Frame format

X.25 Packet structure

A X.25 packet constitutes the data field of a LAPB (HDLC) frame with a size of 64 to 4096 bytes. The GFI (General Format Identifier) field contains general information of the packet format, the LCI (Logical Channel Identifier) field contains information on the logical channel and the PTI (Packet Type Identifier) field contains information on the PLP packet type.

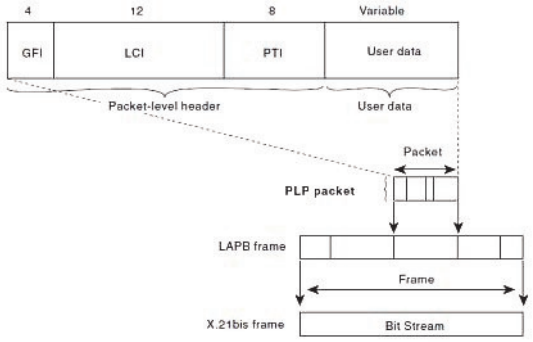

Fig. 4 X.25 PLP encapsulation in a LAPB frame

The W-CODE implementation of the X.25 decoder features options to select the frame and display format. The screen shot below is an example of the displayed data.

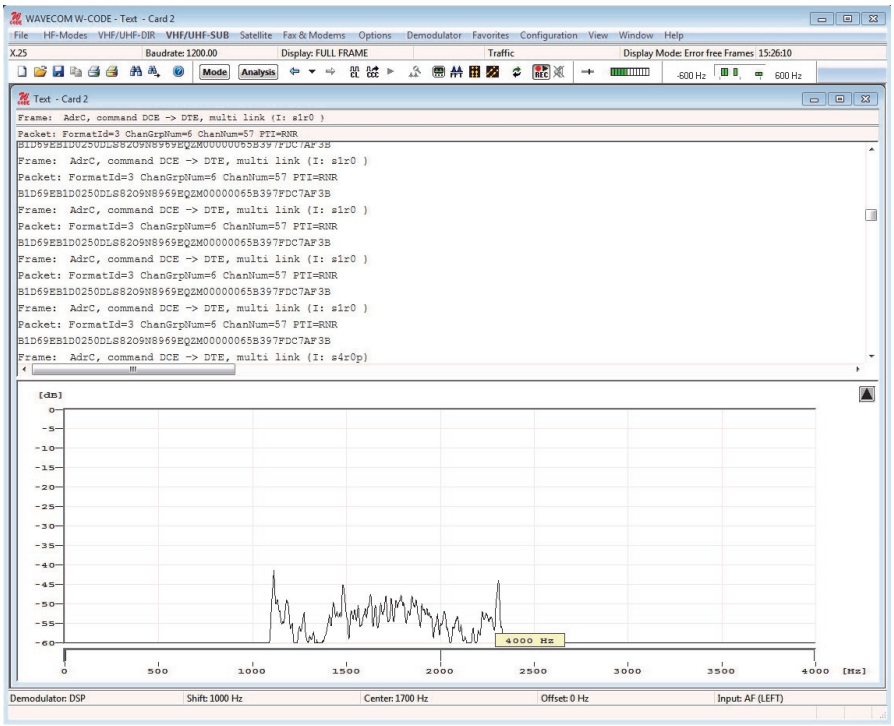

Fig. 5 W-CODE implementation

Since more than thirty years Wavecom Elektronik AG has developed, manufactured and distributed high quality devices and software for the decoding and retrieval of information from wireless data communication in all frequency bands. The nature of the data communication may be arbitrary, but commonly contains text, images and voice. The company is internationally established within this industry and maintains a longstanding, world-wide network of distributors and business partners.

Product Information

Products	http://www.wavecom.ch/product-summary.php
Datasheets	http://www.wavecom.ch/brochures.php
Specifications	http://www.wavecom.ch/product-specifications.php
Documentation	http://www.wavecom.ch/manuals.php
Online help	http://www.wavecom.ch/content/ext/DecoderOnlineHelp/default.htm
Software warranty	One year free releases and bug fixes, update by DVD
Hardware warranty	Two years hardware warranty
Prices	http://www.wavecom.ch/contact-us.php

System Requirements

	Minimum	*Recommended*
CPU	Core i5 or Core i7 2.8 GHz	Core i7-6700 3.4 GHz
Memory	4 - 8 GB RAM	16 - 32 GB RAM
OS	Windows 7	Windows 10 32-bit or 64-bit

Distributors and Regional Contacts

You will find a list of distributors and regional contacts at http://www.wavecom.ch/distributors.php

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