



Group 3 Fax Transfer Protocol

Enea's FAX-Bricks is a portable protocol stack that implements protocols used by Fax group 3 devices for connection to PSTN or ISDN.

Enea[®] FAX-Bricks is fully compliant with ITU-T recommendations: T.30 with Error Correction Mode (ECM), T.4, T.6

Enea FAX-Bricks works with Enea's PSTN (Enea[®]ACU-BRICKS) and ISDN (Enea[®]ISDN-Bricks) signaling software. It also works with Enea's Netbricks Modem and ISDN Terminal Adapter architecture (AT commands driven).

Enea provides drivers for popular modem chipsets (Conexant, Motorola). It also provides a driver for fax modulations (V.21, V.27ter, V.29, V.17) using Enea[®] Softmodem-Bricks and audio processing for PSTN signaling (DTMF, CNG, CED).

Enea provides a set of functions (Fax-toolkit) for image conversions:

- Bitmap 'T4 (mono and bi-dimensional)
- T4 'T6 (MMR)
- ASCII coded text (two fonts) to T4

Enea FAX-Bricks is based on Enea's object-oriented Enea[®] Netbricks architecture. Utilizing message passing for inter-entity communications, Enea FAX-Bricks can process a rough synchronous byte stream or support an HDLC controller.

Enea FAX-Bricks is available with interfaces to most commercial RTOSes, including AMX, Nucleus, OSE, Precise/MQX, PSOS+, RTC, VRTX, and VxWorks. Enea offers custom implementations of Enea FAX-Bricks for OEMs who require an application-specific solution.

Features

Enea FAX-Bricks consists of three primary software entities:

- CF: Control Function

- T30: Fax Group 3 T.30 finite state machine and T.4 checking
- FAXMOD: a convergence entity for mapping to the modem driver

Companion entities:

- MPH-GSTN layer 1 modem driver
- DTE-INT DTE Interface (Serial Port) and AT commands parser
- CC: ISDN Call Control
- ACU: PSTN call control
- DLM: V.42 error correction
- MNP4: V.42 annex A error correction
- DC: Data Compression according to V.42bis and MNP5

PH-GSTN implements layer 1:

- Communication with adjacent entities (SM, FAX-MOD)
- Modulations, tones and DTMF through a modem chipset or calling Enea Softmodem-Bricks functions
- Frame delimitation (HDLC frame)
- HDLC bit stuffing and un-stuffing
- CRC16 calculation and error detection
- Alarm reporting
- Statistics reporting
- Provisioning and re-provisioning
- Supports the following modem chipsets
 - Conexant (Rockwell): RC96 DFX, RC96 EFX, RC144 EFX, RC144, RC144DPI, RC288DPI, R336DPM, RC336 DDP/DPFL, RC56 DDP/DPFL
 - Motorola: MC68356
- Standard: V.21, V.22, V.27ter, V.29, V.17, ISO HDLC 3309

FAXMOD implements the following functions:

- Convergence between T30 and PH-GSTN
- Provisioning and re-provisioning,

T30 implements the following functions:

- T.30 Finite State Machine (FSM),
- Error Correction Mode (ECM) Finite State Machine (FSM)
- T.4 checking
- Page management
- Provisioning and re-provisioning
- Error reporting
- Standards: ITU-T T.30, T.4

CF implements the following functions:

- Internal API to the upper layers
- Coordination between the modem functions and the Fax functions
- Flow control coordination
- Provisioning and Re-provisioning
- Error reporting
- Standards: ITU-T V.42

FAX-Bricks Software Architecture

The Enea FAX-Bricks software architecture is based on the Enea Netbricks architecture, which follows the ISO/CCITT X.200 model.

All the protocol entities are managed as isolated objects communicating through datagram message passing. The message passing is based on FIFO queue communications.

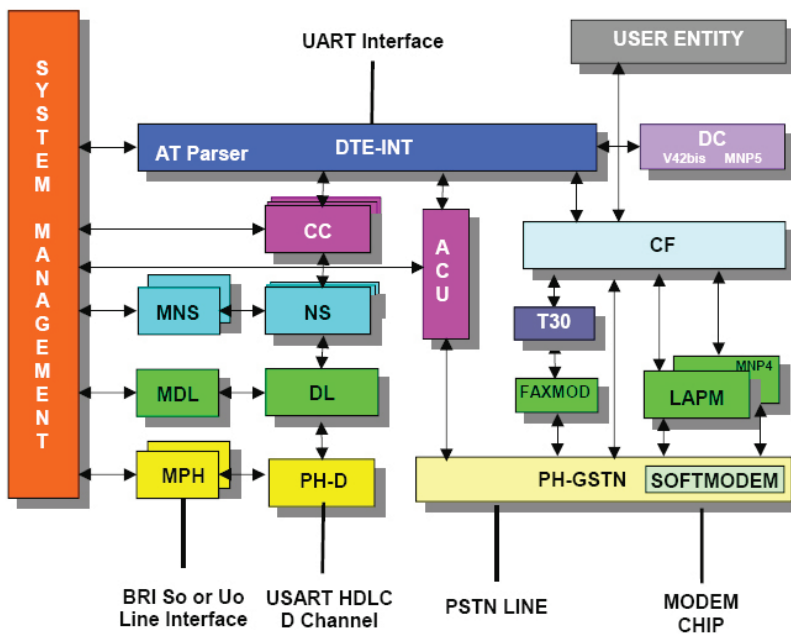
ENEAA[®] FAX-BRICKS

System entities are housed within processes (one or more entities within each process), which are managed by an RTOS real-time multi-tasking kernel. When the origination and destination entities are in the same process, the message passing is done through an internal FIFO without the need for RTOS scheduling. When the two entities are in different processes, message passing is done using RTOS message exchange management.

The figure describes the different protocol stacks and the communications between system entities. The system contains the following stacks and entities:

- System management (SM).
- Signaling stack:
 - ACU: PSTN signaling or ISDN signaling
 - MPH-D physical layer management
 - PH-D physical HDLC D channel protocol

- MDL data link layer management
- DL data link protocol (LAPD)
- MNS network signaling management
- NS network signaling protocol
- CC call control protocol with extension for multiple calls management
- DTE-INT DTE interface with "AT" command set parser
- Fax and Modem stack:
 - PH-GSTN physical modem protocol
 - FAXMOD fax modem control
 - T30: T.30 protocol with Error Correction Mode (ECM)
 - LAPM and MNP4 Error correction protocol (V.42 and MNP4 (V.42 annex A))
 - CF control function
 - DC data compression (V.42bis, MNP5)
 - DTE-INT DTE interface with TR29 class 2 and "AT" modem protocols



Enea FAX-Bricks Client Software Architecture.

