



NETBRICKS

V42-BRICKS

INTRODUCTION

NETBRICKS *V42-BRICKS* is a portable protocol stack implementing protocols used by Modem Client or server devices for connection to PSTN or ISDN.

V42-BRICKS is fully compliant with ITU-T recommendations : V.42, V42bis and de facto standards MNP4 and MNP5.

V42-BRICKS is designed to work with PSTN (ACU-BRICKS) and ISDN (ISDN-BRICKS) signaling provided by Netbricks and with Netbricks FAX-BRICKS and ISDN Terminal Adapter architecture (AT commands driven).

Netbricks provided a drivers for modem chipsets (Conexant, Motorola) and a driver for supporting modem modulations : V.21, V.22, V.22bis, V.32, V.32bis using SOFTMODEM-BRICKS and also Audio processing for PSTN signaling (DTMF, CNG, CED).

V42-BRICKS architecture is based on NETBRICKS architecture using object oriented design and a message passing mechanism for inter-entity communication. *V42-BRICKS* is designed to process a rough synchronous byte stream or to support HDLC controller. Interfaces to most of commercial RTOS are provided : AMX, Nucleus, OSE, Precise/MQX, PSOS+, RTC, VRTX, WxWorks, ...

V42-BRICKS is addressed to the OEM market. Netbricks can develop any custom product based on *V42-BRICKS* technology according Customer's specifications.

FEATURES

V42-BRICKS consists of the following main software entities :

- ❑ CF : Control Function
- ❑ DLM : V.42 error correction
- ❑ MNP4 : MNP4 Error correction (V.42 annexe A)
- ❑ DC : Data Compression according to V.42bis and MNP 5

And companion entities :

- ❑ MPH-GSTN : layer 1 driver
- ❑ DTE-INT : DTE interface using AT parser and serial port
- ❑ CC : ISDN Call Control
- ❑ ACU : PSTN call control
- ❑ T30 : Fax Group 3
- ❑ FAXMOD : Fax group 3 convergence function

PH-GSTN implements layer 1 :

- ❑ Communication with Adjacent entities (SM,
- ❑ Driving of modulations, tones and DTMF through a modem chipset or calling 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,
- ❑ Support of the following modem chipsets :
 - ◆ Conexant (Rockwell) : RC2324, RC9623 DP, RC144 DP, RC144 DPI, RC288 DPI, RC336 DDP/DPFL RC56 DDP/DPFL,
 - ◆ Motorola : MC68356,
- ❑ Standard : V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.34, V.90, ISO HDLC 3309

DLM and MNP4 implement the following functions :

- ❑ Data Link error correction protocol,
- ❑ V.42 Finite State Machine (FSM),
- ❑ V.42 annex A Finite State Machine (FSM) (MNP4),
- ❑ XID parameter negotiation,
- ❑ TEST command option,
- ❑ SREJ option,
- ❑ Statistics reporting,
- ❑ Provisioning and Re-provisioning,
- ❑ Standards : ITU-T V.42

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

DC implements the following functions :

- ❑ Data compression according to V.42bis and MNP5,
- ❑ Dictionary management,
- ❑ Flow control management,
- ❑ Provisioning and Re-provisioning,
- ❑ Error reporting,
- ❑ Standards : ITU-T V.42bis and De-facto MNP5.

V42-BRICKS SOFTWARE ARCHITECTURE

The software architecture is based on the *NETBRICKS* architecture which is close to the ISO/CCITT X.200 model.

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

The entities of the system are housed in processes (one or several entities in one process) 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 need for RTOS scheduling, when the two entities are in different processes the message passing is done using RTOS message exchange management.

The "*protocol entity architecture*" figure describes the different stacks of protocols and the communication between the entities of the system. The following stacks and entities are in the system :

- . System management SM.

- . Signaling stack :
 - . ACU : PSTN signaling
 - or
 - . 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.

- . Modem and Fax protocol stack :
 - . PH-GSTN Physical modem protocol,
 - . LAPM and MNP4 Error correction protocol (V.42 and MNP4 (V.42 annex A)),
 - . CF control function,
 - . DC data compression (V.42^{bis}, MNP5),
 - . FAXMOD fax modem protocol,
 - . T30 T.30 protocol with Error Correction Mode (ECM),
 - . DTE-INT DTE interface with TR29 class 2 and "AT" modem protocols.

V42-BRICKS CLIENT SOFTWARE ARCHITECTURE

