



fjord-e-design

■ mobile communication engineering

TETRA



MMS Protocol Stack



TETRA is a mobile radio standard comparable to GSM (German D1/D2/E-Net) which is mainly used in areas with private radio and trunked mobile radio. Typically it is used for ground radio services at airports, fire department and police radio.

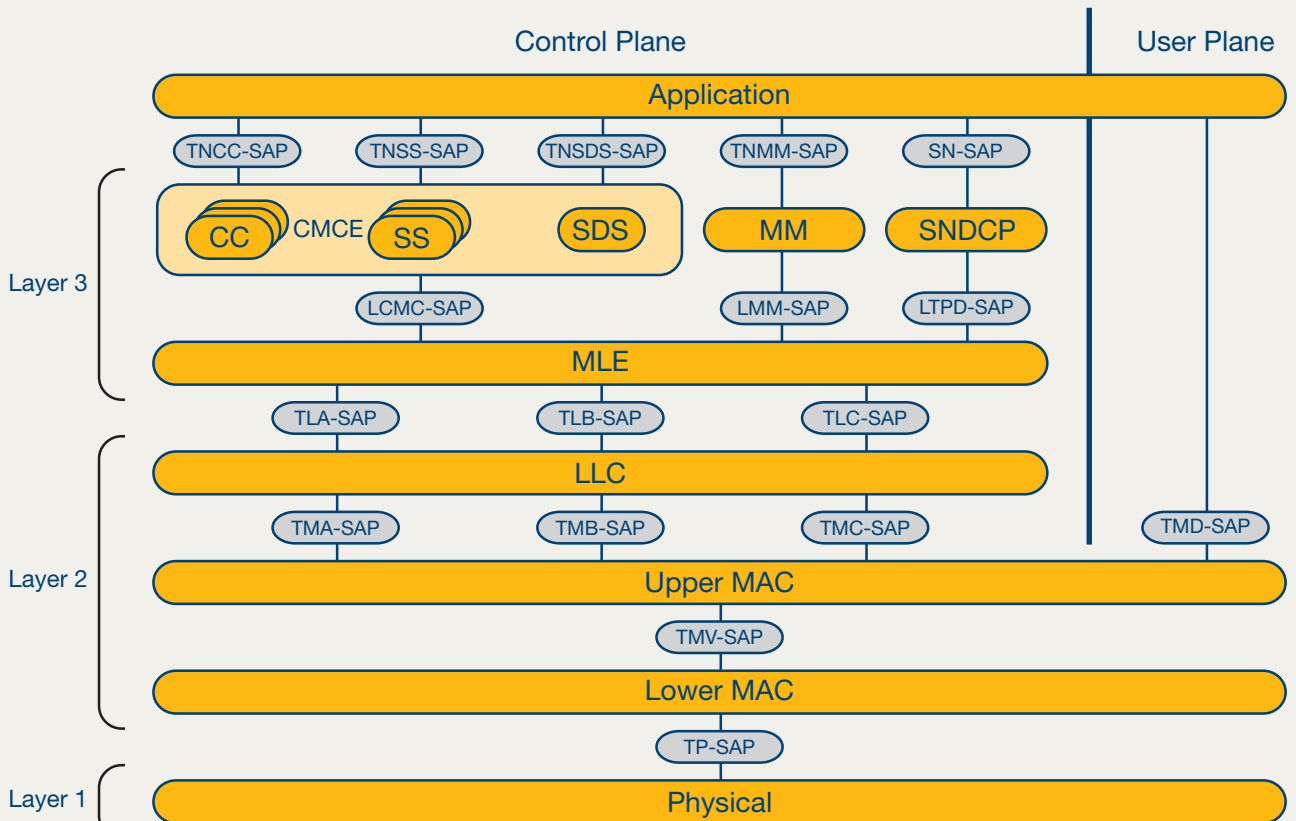
The **TETRA MS Protocol Stack** developed by fjord-e-design is a **TETRA protocol stack conforming to ETSI, which can be used in any TETRA terminal equipment. The protocol stack covers the layers 1 to 3 of the TETRA protocol and offers clearly defined and well structured interfaces (for the application and physical layer).**

The protocol is designed for stable and effective work and can be used universally. It is open for extensions and updates of the standard. Customer specific modifications regarding the interfaces for the application and the physical layer are possible.

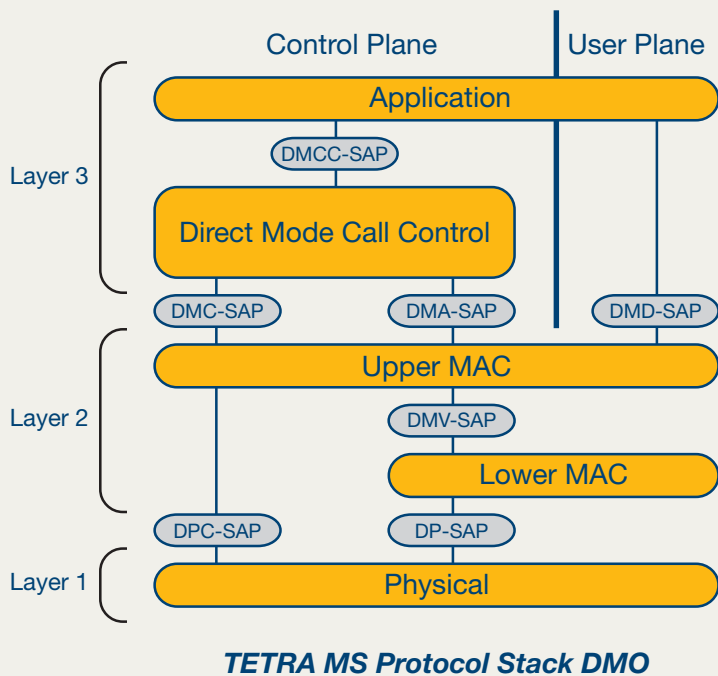
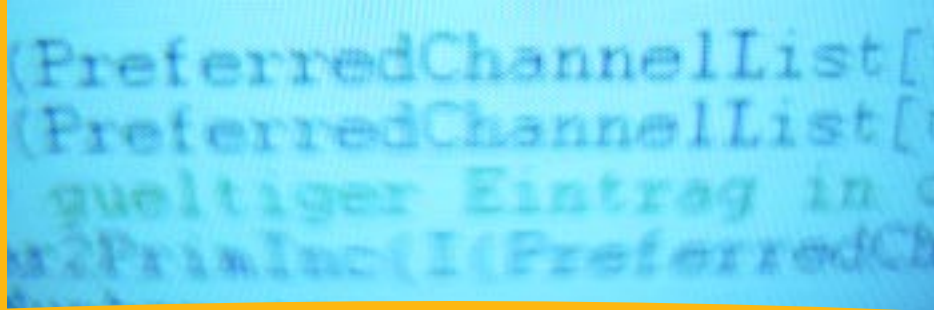
Application

- Development of TETRA terminal equipment
- Manufacturer of TETRA terminal equipment
- Manufacturer of test equipment for the TETRA sector

TETRA MS Protocol Stack



TETRA MS Protocol Stack V+D



Advantages

Both modules for V+D and DMO can be integrated into terminal equipment and the stacks can be instantiated multiple times. The V+D-Stack also contains a multiple instantiated call control for up to four voice and data connections at the same time.

Since we are constantly working in the TETRA field innovations of the standard are instantly adopted for the development of the TETRA MS Protocol Stack. In regard to the functionality and the features of the MS Protocol Stack you are always up to date.

Test and simulation interfaces are integrated into the stack. They simplify the construction and integration immensely. With this stack we therefore offer you the possibility to reach an uncomplicated development and test phase so that you can manufacture a running system with speed and security.

We are also available to help you with the integration of the software into the system and we also allow for an uncomplicated realization of your project.

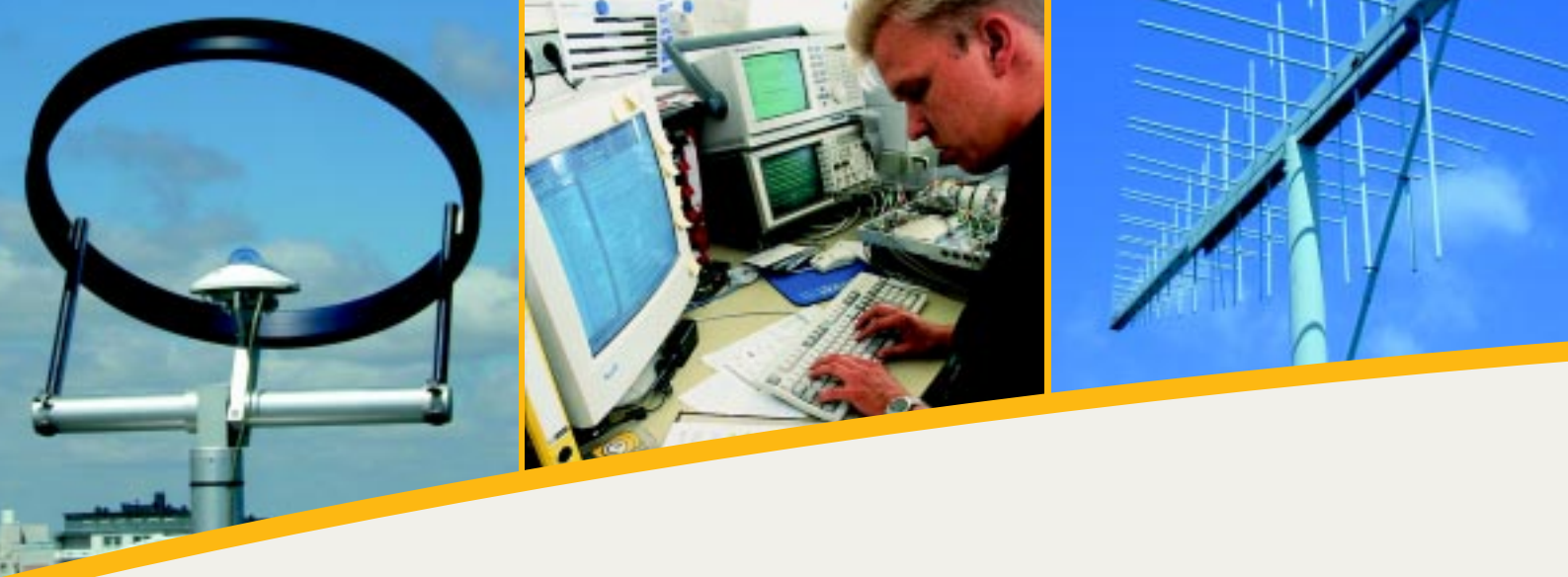
The stack can be delivered using different configuration levels, so that by using a less complex configuration level the integration into the system will be easier. After completing the integration it is possible to carry out the adjustment to the desired configuration level. We also offer very specific adjustments to your systems or modified features carried out within a very short time frame.

Outline

- Complete support for voice and data requirements (TETRA V+D and DMO in one terminal equipment)
- Stack which can be instantiated several times with multiple instantiated call control
- Integrated test and simulation interfaces
- Self documenting, SDL-based structure
- Open for extensions
- Well structured, portable ANSI C Code, easy to integrate
- Well defined interfaces above, below and between the layers

Benefits





Features Protocol Stack

Layer 1 (Physical):

Modulation, demodulation, synchronization, burst generation for continuous and discontinuous operation (with PA-bits generation), burst defitting, filtering, equalizer

Layer 2 (Lower MAC, Upper MAC, LLC):

Channel coding and decoding (forward error correction) of all logical channels with the function blocks:

- Block de-/ interleaving
- De-/ interleaving over N blocks
- RCPC de-/ coding
- Block coder for CRC security
- Scrambling
- Reed Muller decoding

V+D:

Frame synchronization, multiplexing, channel allocation, address management for layer 2, fragmentation, transmitting power, access control for the physical resources, control of energy saving mode, stealing, logical link handling, basic link, advanced link, acknowledgement of data, segmentation

DMO:

Frame synchronization, carrier monitoring, access control for the carrier, frequency efficient mode, address management, fragmentation, circuit mode traffic transit, stealing, transmitting power, timing adjustment

Layer 3 (MLE, CMCE, MM, [SNDP], DMCC):

V+D:

Activation, deactivation, data transfer, access for upper layer 3, scanning, cell selection, cell reselection, monitoring, cell surveillance, neighbor cell procedures, protocol control procedures, call control, call setup, call maintenance, DTMF encoding and sending, PTT handling, change of tele/bearer services within a call, SDS reception and transmission, registration, de-registration, authentication, group procedures, energy mode management, dual watch mode management, enable/disable

DMO:

Short data service reception and transmission, normal call setup, call setup with presence check, late entry pre-emption, changeover, individual and group call

Features

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