Applications

- Test and verification of on-board Telemetry and Command systems within an overall checkout environment (EGSE)
- Qualification of the space borne TMTC Subsystem

Product Description

- The TM/TC Front End is a high performant sub-system within Electrical Ground Support Equipment (EGSE). It interfaces to the Overall Check Out Equipment (OCOE) through a flexible communication protocol giving total control of the Front End. A local GUI allows for test status monitoring, control and displays of key parameters.
- The Telemetry Processor is fully compliant to CCSDS & PCM / ESA Standards, and full spread spectrum capability compatible with TDRS, and CCSDS packetized data format.
- Full Telemetry Packet & Frame level simulation; a loop back compare/test function (incl. BER testing) and coded/uncoded bit stream outputs are provided.
- The Telecommand Encoding is fully compliant to ESA/CCSDS standard. COP1, CMM modes and PLOP are supported. Monitoring of data and error injection at all layers of the TC stack including Segments, Packets, Frames, CLTU’s and Raw Stream Access is provided.
- Triple DES encryption (optional)
- Comprehensive Telecommand logging options (TC/CLTU/segments/packets from the outgoing bit stream)
- TC Echo feedback of transmitted Telecommands with associated CLTU generation time for full end-to-end process verification.

Main characteristics

- Full packet and frame simulation
- Secured Triple DES encrypted link
- ESA/CCSDS fully compliant

Fig. 1: TMTC Front End
(one channel version)
Product Specifications

- **Input/Output**
  - RS-422, (or IF input 65 – 75 MHz)
  - NRZ-L, Bi-Phase Coding options
  - Serial bit stream outputs to multiple interfaces (simultaneously/individually)

- **Error Correction**
  - Convolutional encoding / VITERBI decoding (K=7; R=1/2)
  - CCSDS Reed-Solomon (255,223) comparison & correction

- **Frame Synchronization & processing**
  - Configurable frame synchronization parameters
  - Sustained Bit rate up to 64 kbps (TM & TC simultaneously)
  - Normal/Inverse auto-detection
  - Multiple stream processing possible
  - Non-Standard Frame Lengths possible
  - Randomization/De-Randomization (enable/disable)
  - Customer specific De-Ciphering and other processing can be implemented.

- **Time Tagging**
  - IRIG-B decoder
  - Internal/external clock reference (better than 1us accuracy)

- **IF Interface**
  - 65 – 75 MHz IF Receiver/Transmitter
  - IF Input level : –100 dBm to –20 dBm
  - IF Output level : 0 dBm to –30 dBm, adjustable in steps of 0.5 dB
  - PM modulation and demodulation of SPL coded signals
  - Built-in SPL coding and decoding
  - ESA Ranging support for PM modulated carrier (other standard possible)
  - Max. Doppler rate : 40 kHz/s
  - External sub-carrier/SPL input
  - 5 or 10 MHz external or internal reference (auto switch over if external reference fails)
  - Digital Signal Processing
    - BER within 0.5 dB of theoretical limit
    - Selectable hard or soft-decision outputs
    - Serial Input/Outputs support ECL, LVDS and RS-422 (configuration dependent)
    - 10/100 Ethernet LAN interface for external control/status

- **Monitor & Control System**
  - Graphical User Interface
  - Integrated TM/TC packet editors
  - TM/TC packet generation
  - TM/TC viewers at CLTU level
  - Quick-look Packet TM parameter decoder
  - Independent TM and TC process status windows
  - Configuration and operational status
  - On-line and off-line printing to a printer/file
  - Agency & Industry standard Remote interface can be tailored to user needs
  - Optional API for easy third party integration

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For further information, please contact

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