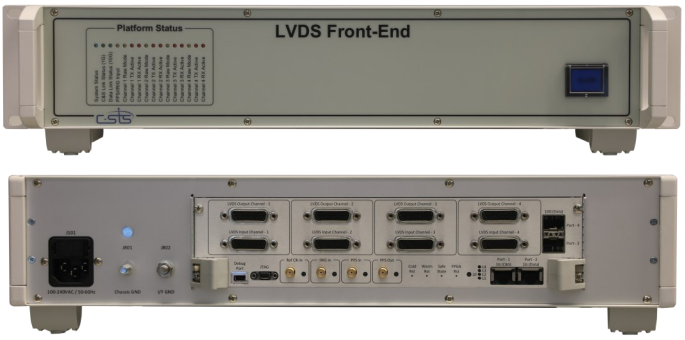
Parallel LVDS Front-End

The Parallel LVDS Front-End (PLFE) provides multi-channel data reception and generation capabilities with rates of over 2Gbps per channel. The PLFE provides up to four 8-bit or two 16-bit parallel data busses in both directions (reception and generation). The PLFE is part of the suite of latest generation EGSE products from Celestia Satellite Test & Simulation (C-STS).

The PLFE operates as the electrical interface towards flight equipment and can be used on all AIT levels (module, unit, instrument, panel and satellite). The PLFE provides the electrical, data extraction, protocol handling and status annotation functions . The recovered data (or data to be generated) is offloaded from the PLFE using a 10Gbit TCP/IP streaming interface (SFP+, optical or copper) to a commercial server platform for data storage (or replay) to local disks (SSD or HDD).



The standard 2U/19" enclosure provides a small footprint and can be used in a table top setup (with feet) or integrated into an 19" rack (feet removed).

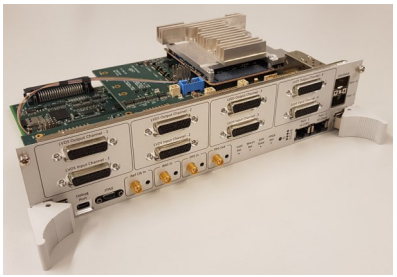
The PLFE parallel LVDS inputs supports up to four 8-bit data + clock interfaces in parallel, where the input clock for each channel can run in excess of 125MHz. In addition it is possible to team two channels (1+2 and/ or 3+4) to operate as a single 16-bit data + clock interface (same clock frequency range). The Parallel LVDS inputs supports optional flow-control signals to provide handshaking functions if required. The PLFE supports full complementary parallel LVDS outputs providing the same amount of channel, signals and teaming support (incl. handshaking). The Parallel LVDS output clock can be user programmed (run-time) in 1Hz steps.

The PLFE can be upgraded with custom protocols to support the needs of the program/project, such as CADU or CCSDS Packet extraction. Using the available time synchronisation inputs (PPS and IRIG), the PLFE maintains an accurate hardware time (CUC) that is used to timestamp the recorded data, or to release data for transmission.

The back-end interface is implemented using a low-latency TCP/IP implementation directly within the hardware, capable of providing >9Gbps sustained data streaming. This provides back-end independence , allowing commercial servers with standard 10G ethernet cards to be used. The PLFE is standard delivered with back-end software (Windows Server 2012/2016) for data storage and replay.

All LVDS in– and outputs are fully isolated (with respect to the chassis/safety ground) and provide satellite level fault voltage emissions and tolerances. The unit is provided with an FMEA report.

The heart of the Parallel LVDS Front-End is based on a C-STS designed and developed hardware carrier module. This module offers the combination of high I/O count interfacing, galvanic isolation and FPGA based data routing & processing. Next to the FPGA technology, the module includes an multi-core ARM9 embedded processor running Linux and multiple 1G and 10G ethernet ports supporting TCP/IP.



The Parallel LVDS Front-End is part of the suite of latest generation EGSE products from C-STS that provides a wide range of onboard interface front-ends, such as Discretes, Power (LCL), RS-422 (SDI), CAN, MIL-STD-1553, SpaceWire, WizardLink, SpaceFibre and many more.

Technical Specifications

General

- Modular Implementation
- Gigabit LAN for Control and Monitoring via TCP/IP (via RJ45)
- 10Gbit LAN for Data Streaming via TCP/IP (via SFP+)
- External Time/Reference inputs, such as 10MHz, PPS and IRIG
- PPS output for synchronisation of external equipment
- FMEA Report Available

Parallel LVDS Inputs

- Up to 4 Parallel LVDS Inputs (8-bits Data and Clock)
- Optional LVDS Flow Control for all Channels supported
- Teaming of 2 channels to 16-bit Parallel Interfaces
- Hardware timestamping of received data blocks
- Input clocking in excess of 125MHz
- Input Data Bandwidths:
  - 8-bit Parallel >1Gbps per channel
  - 16-bit Parallel >2Gbps per channel
- All LVDS I/O's are Electrically Isolated from Chassis/Safety Ground
- Standard HDD26 Female Connector for each Channel
- TIA/EIA-644-A Compliant LVDS Interfaces

Parallel LVDS Outputs

- Identical specifications as Parallel LVDS Inputs
- Clock programmable in excess of 125MHz in 1Hz steps

Project Specific Customisations (upon request)

- Custom protocols and data processing can be supported in FW
- In-the-field upgrading supported (electronic distribution)

Environmental and Physical Specifications

Dimensions H x W x D	88.9 x 435 x 400 mm
Weight	5.3kg
Input Power Range	100-240VAC 50-60Hz
Operating Temperature Range	+10°C to +40°C
Operating Humidity	30% to 85% (non-condensing)
Storage Temperature	-20°C to +60°C
Storage Humidity	Up to 85% (non-condensing)

Experience

Building on over 30 years of experience in spacecraft EGSE systems; C-STS provides innovative high-tech solutions for ground-based systems in the domains of spacecraft simulation and testing as well as modem (spacecraft communication) and data processing systems. Supporting all phases of the spacecraft lifetime, from integration to flight and all phases in between.

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