

PLUS-V1 Modem Prototype

Prototype platform for user field trials

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The PLUS-V1 modem prototype platform provides a hardware platform for users to test the PLUS protocol in industrial field trials. It provides avionics standardized housing and connectors. The prototype consists of two PCBs. The top board contains the Xilinx Zynq SoC upon which the PLUS protocol is realized and the Analog Front End (AFE). The bottom board contains the application specific components such as the coupler, power supply unit and specific data interfaces. A capacitive coupler is used to interface to the power line.

PLUS-V1 Modem Data Interfaces

The PLUS-V1 prototype can interface to application equipment through the two available Ethernet interfaces, two CAN interfaces or GPIOs.

PLUS-V1 Modem Management

PLUS-V1 conveniently provides a Linux OS for modem management. Console access is provided either through TCP/IP or UART (over USB). Modem management provides for configuration updates, status information reading and firmware updates to be performed remotely either over the attached Ethernet network or directly over the PLC network.

PLUS-V1 Success Stories

The PLUS-V1 prototype has been successfully operational in the following field trials:

- Passenger train with the rail operator BLS in Bern Medium voltage underground cable distribution grid with the utility BKW in Bern
- DAC4EU test train with a European consortium for testing the Digital Automated Coupling (DAC)

PLUS-V1 Prototype Specification

Aluminum housing based on Mini-MRP system Format: Single Width Single Height (SWSH) Mounting method: Screw mount with mounting feet Dimensions (incl. mounting feet): 168.5mm (length) x 107mm (width) x 48mm (height)	
Input voltage: 9-36VDC Power consumption: 12W nominal Power supply input available on both connectors X1 and X2 Protection: 1.5kV isolated supply	
Data Connector 1 (X1) 20-pin Deutsch DMC-M DMC-LP 20-22P	Data Connector 2 (X2) 20-pin Deutsch DMC-M DMC-LP 20-22P
ETH1 100BASE-TX	ETH2 1000BASE-TX
CAN1 Up to 1Mbps	CAN2 Up to 1Mbps
Two (2) – 5V GPIO	Two (2) – 5V GPIO I2C interface
Reset pin USB-UART USB- JTAG	
Power Connector (X3) 8-pin Deutsch DMC-M DMC-LP 08-16P	
DC Voltage Range: 0-540VDC AC Voltage Range: 0-230VAC	
Differential (1.2/50us): 2 kV, Z_src = 2 Ohm Common Mode (1.2/50us): 4kV, Z_src = 12 Ohm	
Supported N/A – current on the power line is not relevant due to the use of a capacitive coupler	
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