PRELIMINARY

General Features

The D515 acts as LoRaWAN™ end device (ED), enabling up to two Ethernet-based devices to communicate wirelessly with a LoRa® Concentrator/Gateway. The gateway is equipped with a 32-bit embedded softcore processor, that handles the communication stacks and the complete gateway application. The integrated Ethernet controllers, designed by duagon, feature hardware prioritisation and very low jitter.

Fully-certified LoRa® interface, supporting Class A and Class C end devices according to LoRaWAN™ specifications. The gateway offers frequency band 868 MHz for Europe or 915 MHz for the US.

The Ethernet interfaces comply to IEEE 802.3 and the internal logic is prepared for the future "Ethernet on traction vehicles" standard IEC 61375-3-4.

The D515 is designed for the harsh traction environment and conforms to the EN 50121, EN 50155, IEC 61373 standards, e.g. by:

- -40 to +70°C operating temperature
- coating against humidity
- enhanced EMI and vibration robustness

The gateway is integrated in a stainless-steel housing that is mounted on a DIN rail or by using M4 screws. The device can directly be powered by the vehicle battery or over Ethernet (PoE).

In case the D515 is powered over battery, it is able to supply connected devices with power over Ethernet (PoE).

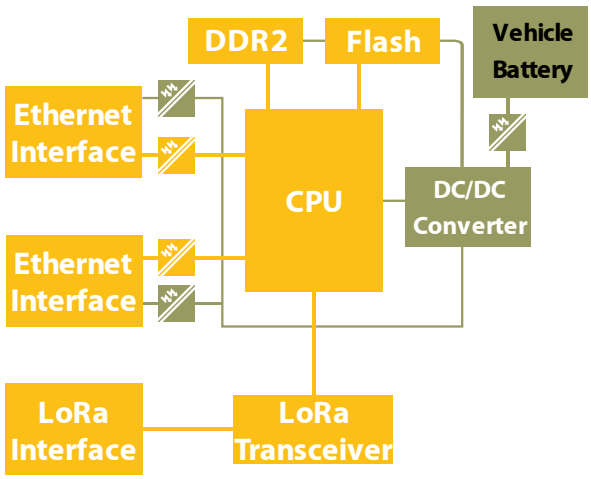
Key Benefits

- Hardware prioritisation within the duagon own Ethernet controller
- Proprietary high-performance UDP Stack (optimised for cyclic process data telegrams)
- Robust wireless communication based on LoRa® technology modulation
- Fully compliant to IEEE 802.3, EN 50155, EN 50121, IEC 61373 and LoRaWAN™ 1.0

Application Examples

- Generic wireless connection for Ethernet-based devices, e.g. sensors or actuators
- Legacy and retrofitting projects in which Ethernet networks are not readily available

D515 Hardware Architecture



Life Cycle Cost

The use of an FPGA with included duagon own soft-IP minimizes the risk and costs in case of component obsolescence. Data access and firmware updates are easily done through a service interface or directly via one of the available train buses. Further, to avoid service expenses, the Gateways have strictly been designed without the usage of electrolytic capacitors.

Technical Data

CPU base System	– 32-bit soft-CPU – 128 MB DDR2 RAM – 32 MB Flash memory
Ethernet Interface 1 + 2	– Provides up to two independent Ethernet interfaces ETH0 (X10) and ETH1 (X11) with M12 connectors (with D coding) – Fully compliant with IEEE 802.3 and IEC61375 – 10/100 Mbit/s – Auto-Negotiation, Auto-Polarity, Auto-Crossing – Galvanic isolation to internal logic
Ethernet Protocols	– TCP/IP, UDP Sockets – IPTCom – EtherNet/IP – CIP – PROFINET* – TRDP
LoRaWAN Interface	– Fully-certified according to LoRaWAN™ specification 1.0 – Supporting both Class A and Class C end devices – Operating in 868 MHz or 433 MHz frequency bands for Europe (optionally 915 MHz frequency band for the US) – Support for Over-the-Air-Activation (OTAA) or Activation by Personalization (ABP)
Diagnostic/ Service	– Firmware update via Ethernet – Temperature sensor on board for temperature supervision – JTAG and serial line available
Supply Voltage	– Powered directly from battery (24V – 110V) – Power over Ethernet (PoE)
Power Consumption	– P_{max} <5 Watt – Interruption Class C2 ceramic capacitor on board, no need to replace capacitors due to aging
Operating Conditions	– Ambient temperature: –40 to +70°C (EN 50155, class TX) – Relative humidity: 75%, max 95% for 30 days per year (conformal coating) EN 60068 – Shock and vibration: According to IEC 61373 category 1, class B – EMI: According to EN 50121 and EN 50155
Physical Characteristics	– Housing: Metal, IP30 protection – Dimensions: approx. 120 × 106 × 32 mm – Weight: 415 g
Environment	– Fully compliant to RoHS and REACH

d-041506-041541

Product Ordering Table

Product Type:: **D515** - **I** - **I** - **N** - **EU** - **LV**

Example: D515-I-I-N-EU-LV[1]

Ethernet Interface 1[2]		Ethernet Interface 2[2,3]		Web Services		Frequency Band		Power Supply	
TCP/IP, UDP Sockets	I	none	N	none	N	868 MHz	EU	24 – 36 Vdc	LV
IPTCom*	B	TCP/IP, UDP Sockets	I			433 MHz*	EUL	48 – 110 Vdc	HV
EtherNet/IP – CIP*	C	IPTCom	B			915 MHz*	US	PoE*	PoE
TRDP*	TR	EtherNet/IP – CIP*	C						
PROFINET*	R	TRDP*	TR						
		PROFINET*	R						
		Daisy Chain/Ring*	O						

[1] default order options
[2] Ethernet „Sockets" is included in all interfaces
[3] Interface two is optional
* contact duagon for lead times and availability

Related Documents

Data Sheet D515 D515_DS.pdf
Product Ordering Guide order_ug.pdf

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