

RT412

Optical Transceiver



The RT412 is an electrical-optical and optical-electrical optical-electrical converter for time synchronization pulses, whose characteristics allow multiplication of GPS clock outputs and distribution of time sync across the substation where there are significant distances between panels. It converts a twisted pair electrical input to ST optical fiber output, or conversely it converts an optical input to electrical output.

Customer Benefits

- Sustains 100 nanosecond accuracy of GPS clock
- 10 TTL electrical outputs
- 10 fiber optic outputs
- Robust design for the substation environment
- Converts optical and electrical inputs whilst extending the number of outputs available

Technical Specification

OPTICAL INPUT	
Connector	1x ST
Wavelength	820nm
Multimode fiber type	50/125µm, 62.5/125µm, 100/140µm or 200µm HCS
Sensitivity	-24 dBm
Input Selection	Opened (without jumper)

ELECTRICAL INPUT	
Connector	1x Header type
Voltage level	TTL
Impedance	> 500 Ω
Input Selection	Closed (with a jumper)

ENVIRONMENTAL TESTS	
IEC 60068-2-1	-40°C, 16 hours (Cold)
IEC 60068-2-2	+85°C, 16 hours (Dry heat)
IEC 60068-2-30	95% no condensation, +55°C (Damp heat)
IEC 60068-2-14	-40°C to +85°C / 9 hours / 2 cycles (Change of temperature)

ENVIRONMENTAL TESTS	
IEC 60255-21-1	Class 2 (Vibration)
IEC 60255-21-2	Class 1 (Shock)

OPTICAL OUTPUTS	
Connector	1x ST
Wavelength	820nm
Multimode fiber type	50/125 µm, 62.5/125 µm, 100/140 µm or 200 µm HCS
Output power	-17.8 dBm (50/125 µm) -14.0 dBm (62.5/125 µm) -8.5 dBm (100/140 µm) -5.7 dBm (200 µm HCS)
Optical Fiber Length	up to 2 km

ELECTRICAL OUTPUTS	
Connectors	2x header type
Drive	150 mA
High level	Between 4.5 Vdc and 5 Vdc
Low level	< 0.2 Vdc
Impedance	18 Ω
Electrical Cable Length	Up to 100m



DIMENSIONS AND WEIGHT	
Height	117mm
Width	51mm
Depth	95mm
Weight	1 kg

POWER SUPPLY	
Operating nominal voltage	100-250 Vdc 110-240 Vac
Operating voltage range	80-300 Vdc 88-264 Vac
Frequency	50/60 Hz ± 3 Hz
Power consumption	Max 20 VA

ENVIRONMENTAL CONDITIONS	
Operating temperature range	-240°...+55°C (-13°...+131°F)
Maximum operating altitude	2000 m (6560 ft)
IP rating (IEC 60529)	IP20
Relative humidity	5...95% noncondensing

SAFETY TESTS	
Safety	IEC 61010-1
IEC 60255-5	Impulse: 5 kV Dielectric withstand: 2.8 kV dc Insulation: > 100 MΩ

TYPE TEST	
EMC tests were performed according to IEC 60255-26 referring to the following standards	
IEC 61000-4-2:2008	6 kV contact / 8 kV air
IEC 61000-4-3:2006	10 V/m
IEC 61000-4-4:2012	2 kV @ 5 kHz
IEC 61000-4-5:2005	Differential mode: 1 kV Common mode: 2 kV
IEC 61000-4-6:2008	10 V
IEC 61000-4-8:2009	30 A/m continuous 300 A/m @ 1 s

TYPE TEST	
IEC 61000-4-11:2004 IEC 61000-4-29:2000	- A.C. and D.C. voltage dips Test level: 0% residual voltage Duration time A.C.: 1 cycle D.C.: 16,6 ms - Test level: 40% residual voltage Duration time A.C.: 12 cycles D.C.: 200ms - Test level: 70% residual voltage Duration time A.C.: 30 cycles D.C.: 500 ms - A.C. and D.C. voltage interruptions Test level: 0% residual voltage Duration time A.C.: 300 cycles D.C.: 5 s
IEC 61000-4-17:1999	Test level: 15% of rated DC value Test frequency: 120 Hz, sinusoidal waveform
IEC 61000-4-18:2006	Voltage oscillation frequency: 1 MHz Differential mode: 1 kV peak voltage; Common mode: 2.5 kV peak voltage
IEC 60255-26	Shut-down ramp: 60 s Power off: 5 m Start-up ramp: 60 s
CISPR11:2009	Radiated emission Limits: 30 to 230 MHz – 50 dB (µV/m) quasi peak at 3 m 230 to 1000 MHz – 57 dB (µV/m) quasi peak at 3 m

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