



RT411

Time Signal Distributor

RT411 - Time Signal Distributor is a signal multiplier to synchronize multiple devices in the substation. It works as a time signal transceiver providing IRIG-B demodulated, PPS or any signal with frequencies up to 5 MHz, through optical and electrical outputs with voltage between 0 and 5 V d.c. The RT411 act as a slave from timing signals received from a clock.

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

ELECTRICAL OUTPUTS

Connectors	8x header type 2x BNC (female)
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

OPTICAL OUTPUTS

Connector	10x 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

SAFETY TESTS

Safety	IEC 61010-1
IEC 60255-5	Impulse: -5 kV Dielectric withstand: -3.3 kV dc Insulation: > 100 MΩ

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)

POWER SUPPLY

Operating nominal voltage	100-250 Vdc	24/48 Vdc
	110-240 Vac	
Operating voltage range	80-300 Vdc	18-75 Vdc
	88-264 Vac	
Frequency	50/60 Hz ± 3 Hz	N/A
Power consumption	Max 20 VA	Max 15 W
	Typical 15 W	Typical 10 W

DIMENSIONS AND WEIGHT

Height	1 U
Width (frontal panel)	19"
Width (body)	430 mm (16.9in)
Depth	180 mm (7.1in)
Weight	2.7 Kg (5.9 lbs)

ENVIRONMENTAL CONDITIONS

Temperature range	-40°...+55°C (-40°...+131°F)
Enclosure protection	IP40
Relative humidity	5...95% noncondensing

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



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
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



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

- Compact DIN rail mount
- Sustains 100 nanosecond accuracy of GPS clock
- Robust design for the substation environment
- Converts optical and electrical inputs
- IRIG-B004, PPx, and DCF77 supported

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)
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	24/48 Vdc
Operating voltage range	80-300 Vdc 88-264 Vac	18-75 Vdc
Frequency	50/60 Hz ± 3 Hz	N/A
Power consumption	Max 20 VA	Max 15 W

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: -3.3 kV dc Insulation: > 100 MΩ



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