



# 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: 2.8 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 110-240 Vac
Operating voltage range	80-300 Vdc 88-264 Vac
Frequency	50/60 Hz ± 3 Hz
Power consumption	Max 20 VA Typical 15 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)
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#### 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



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