# N-Bit Variable RF-Photonic Time Delay System

## Product Description

This RF-Photonic Time Delay system is customized to achieve high bit resolution of true time delay in input RF signal. This system is composed of RF-photonic and photonic-RF conversion module, switchable fiber optic delay module as well as the optical amplification. The RF modulated laser beam is switched to pass through N fiber segments, therefore providing N-bit resolution of digitally variable time delay. The fiber optic amplifications are used in this module to compensate optical loss through optic fiber segments and switches.

The system has built-in temperature sensors and the capability to initially check the switchable delay segments through USB interface. All high repeat rate of switching will be controlled by the external TTL signals through D connector.

## Features

· High Resolution
· High Speed
· Large Time Delay Range
· High Reliability
· Low Insertion Loss

## Applications

· Phase-Array Antennas
· Instrumentation

## Performance Specifications

| RF-Photonic Time Delay | Min | Typical | Max | Unit |
|---|---|---|---|---|
| RF frequency range | 0.1 | | 20 | GHz |
| RF Insertion Loss [1] | | 0 | | dB |
| Delay bit resolution | | | 20 | Bit |
| Delay increment [2] | | 1 | | ns |
| Delay accuracy [3] | | 1 | 10 | ns |
| System intrinsic delay [4] | | | 100 | ns |
| Switching Time [5] | | 50 | | us |
| Delay Time Range [2] | | Customized | | |
| RF response flatness | | +/- 0.5 within 1GHz | | dB |
| Noise Figure [6] | | 40 | | dB |
| SFDR | | 90 | | dB/Hz$^{2/3}$ |
| Operating Temperature | 0 | | 50 | ºC |
| Storage Temperature | -40 | | 85 | ºC |
| Power supply | | 120~240 | | AVC |
| Package Dimension [7] | | 19" mount rack | | |

[1]: It is defined for 10GHz and 12-bit system.
[2]: It can be customized up to ms.
[3]: Accuracy from 0.1ns to 10ns depending on the full delay range.
[4]: Depending on the bit number N, such as 100ns for 19-bit, 80ns for 17-bit, 70ns for 16-bit.
[5]: Defined for CL type switch. 200ns or 10ms for NS or MEMS type switch
[6]: It highly depends on RF specs, please contact us for technical detal.
[7]: The height of 19" mount rack will be determined per the total delay range.

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## Control Interface

USB or RS232 or TTL control interface is available. TTL control will be performed through D-type connector, which can realize the fast speed to switch the delays. The other control interface can be customized, please contact us.
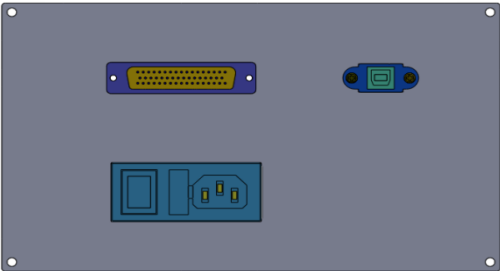
## Mechanical  Dimensions (mm)

(Typical 6RU 19' mount rack for the customized 16 ~19-bit delay system)



Front Panel (TBD)

| | |
|---|---|
| a. Width of panel: | 482mm |
| b. Width of rack: | 420mm |
| c. Max. deep of rack: | 550mm |
| d. 6U height of rack: | 266mm |



Rear Panel (TBD)

*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

## Ordering Information

| RPTD- | ☐ | ☐ | ☐ | 0 | ☐☐ | 0 | 1 |
|---|---|---|---|---|---|---|---|
| | **Resolution** | **Frequency** | **Control interface** | **Package** | **Switch type** | **Delay Range** | **RF Connector** |
| | 19-bit = 19<br>17-bit = 17<br>16-bit = 16<br>......<br>8-bit = 08 | 0.1 ~10GHz = 1<br>0.1 ~20GHz = 2<br>0.1~ 40GHz = 3 | TTL = 1<br>USB = 2<br>RS232 = 3<br>Special = 0 | Customized = 0 | CLSW = CL<br>NSSW = NS<br>MEMS = ME | Customized = 0 | SMA = 1<br>Special=0 |

RPTD:    **R**F-**P**hotonics **T**ime **D**elay System