

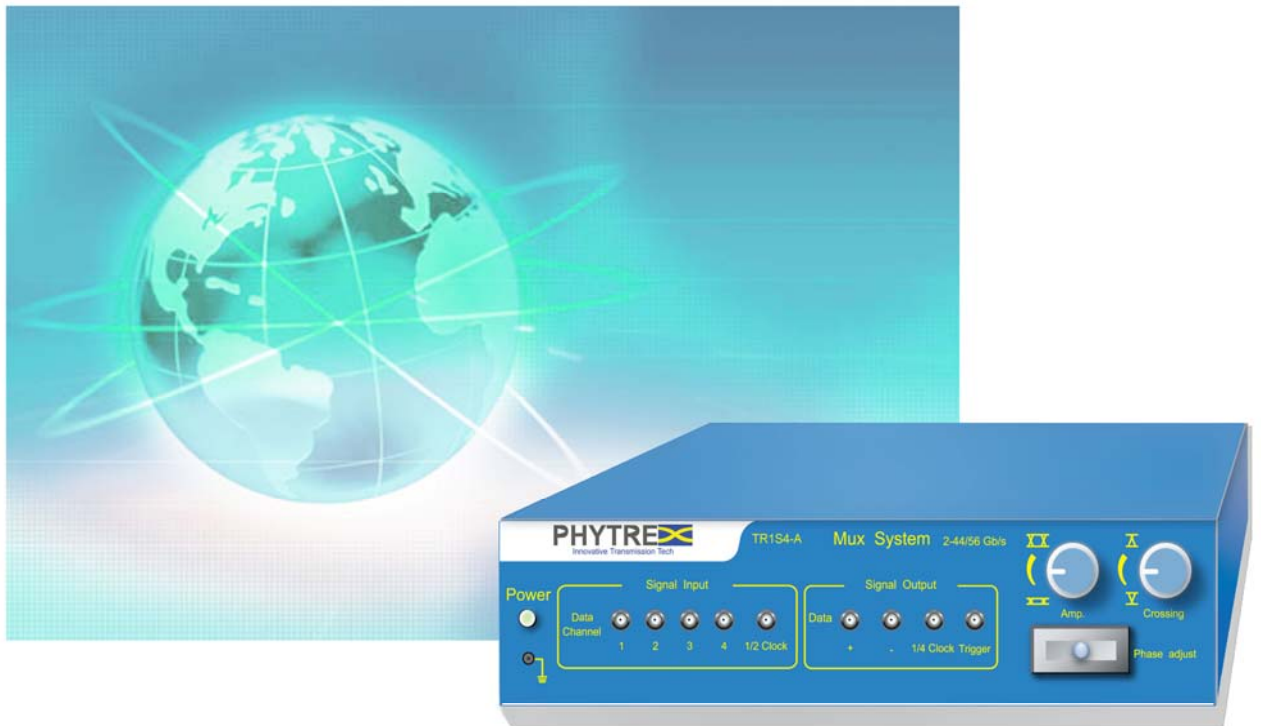
# TR1S4-A

## 44G Mux System

2 to 44Gb/s

Technical Data Sheet

October, 2009



■ **General Information**

The Phytrex TR1S4A Mux system is an accessory which multiplexes from four low speed input bit stream into high speed output bit streams. The input bit stream could be from 0.5Gbps to 11Gbps. The output bit streams would be from 2 to 44Gbps respectively.

The TR1S4A also has clock frequency doublers and dividers. The input clock frequency is half rate of data from 1GHz to 22GHz and output clock frequency is the quarter rate of output data rate from 0.5GHz to 10GHz. TR1S4A also provides 1/32 clock for the trigger source to synchronize the high speed sampling oscilloscope. The half rate input clock and quarter rate clock output are single ended and AC-couple.

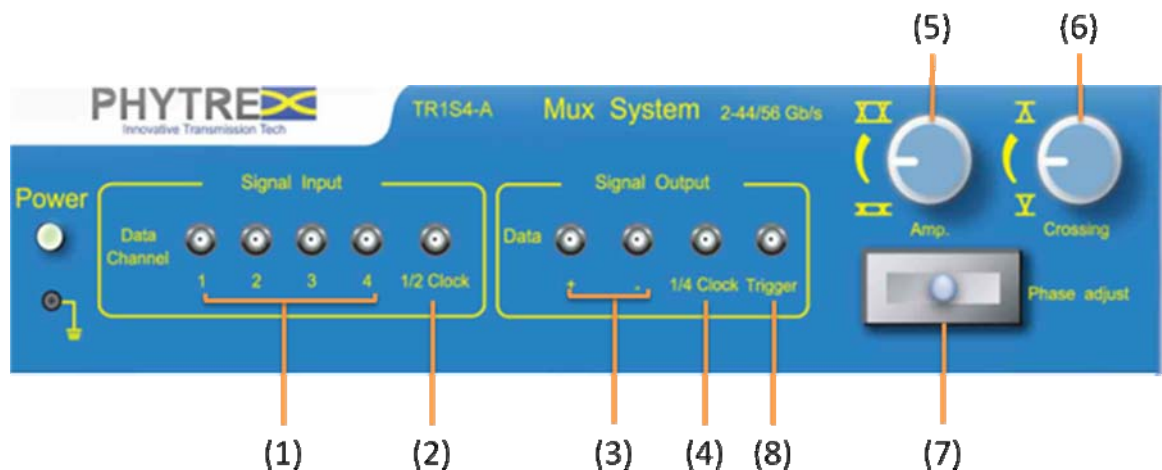
TR1S4A has linear amplitude adjustment knob locate on front panel. It can provide 12dB adjustment on output data channel from 500mVpp to 2Vpp single ended. \*

Eye crossing adjustment provide to optimize the duty cycle distortion effect through the front panel knob. The eye crossing range is from 40%~60%.

Phase adjustment can offer the capability to adjust the clock phase alignment to multiplex element precisely. TR1S4-A provide 60°/GHz tuning range to adjust the input clock phase into the data mux element.

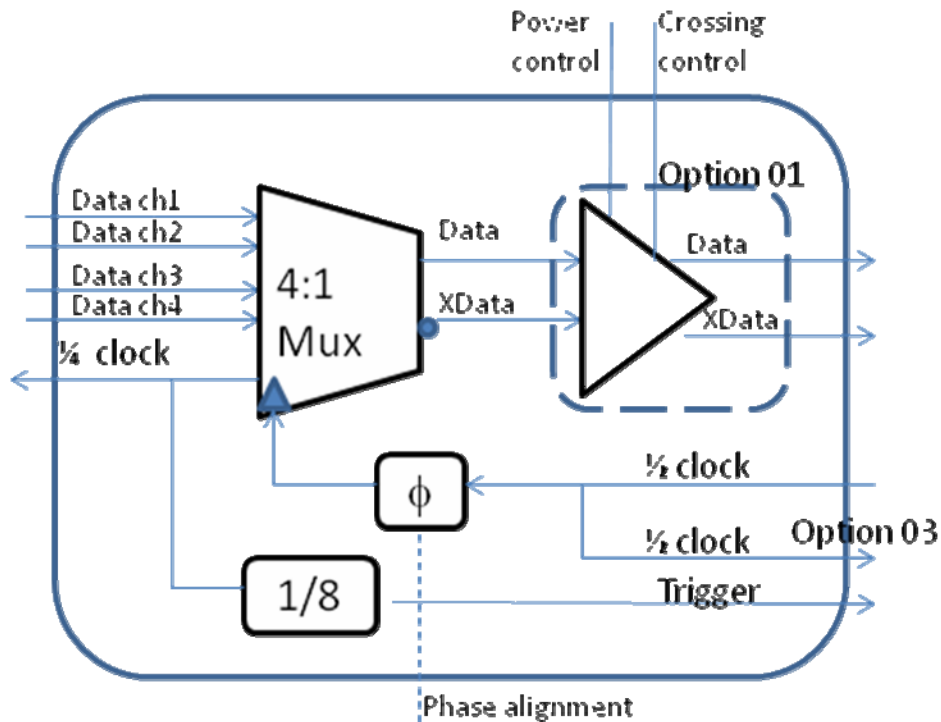
\* The function should order option 01

■ **Front Panel**



- 1) Ch1~4 Data Input  $\Rightarrow$  0.5~11/14 Gb/s, 200mVpp (min)
- 2)  $\frac{1}{2}$  Clock Input  $\Rightarrow$  1~22/28 Gb/s, 200mVpp (min)
- 3) Data Output (V type)  $\Rightarrow$  2~44/56 Gb/s, 0.5~2Vpp
- 4)  $\frac{1}{4}$  Clock Output  $\Rightarrow$  0.5~11/14G Hz 300mVpp (typ)
- 5) Data Output Amp.  $\Rightarrow$  0.5~2Vpp
- 6) Eye Crossing Adjustment  $\Rightarrow$  35~65%
- 7) Clock phase alignment with Data mux adjustment  $\Rightarrow$  60°/GHz
- 8) Trigger output  $\Rightarrow$  1/32 clock output

■ TR1S4-A Internal Block Diagram



■ Connection Block Diagram (with Anritsu MP1800A)

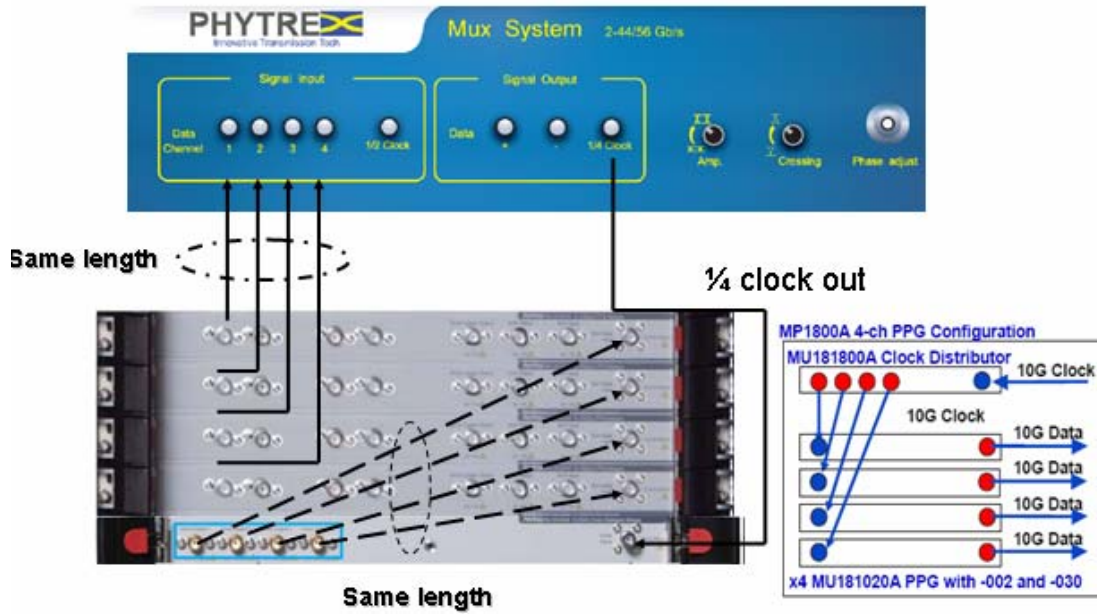


Fig 1. Cable connection with Anritsu MP1800A PPG



■ Performance

(1) Data output waveform @5Gb/s (500mVpp) ,four 1.25Gb/s PRBS input

(2) Data output waveform @28Gb/s (500mVpp) ,four 7Gb/s PRBS input

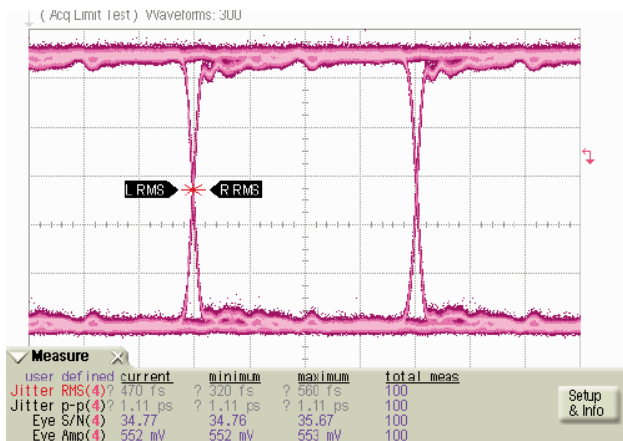


Fig 2. 5Gb/s Eye

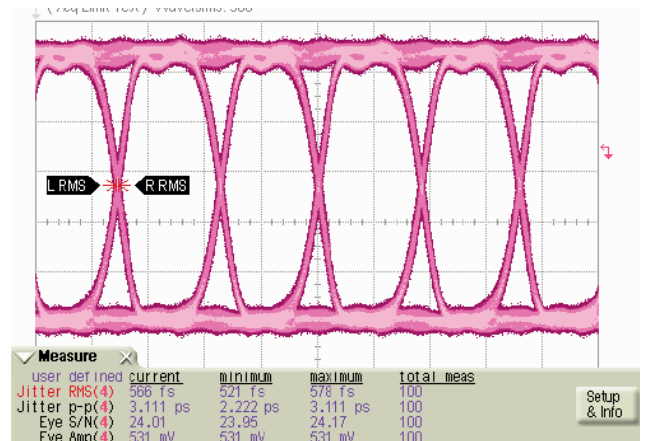


Fig 3. 28Gb/s Eye

(3) Data output waveform @40Gb/s (500mVpp) ,four 10Gb/s PRBS input

(4) Data output waveform @40Gb/s (2Vpp)

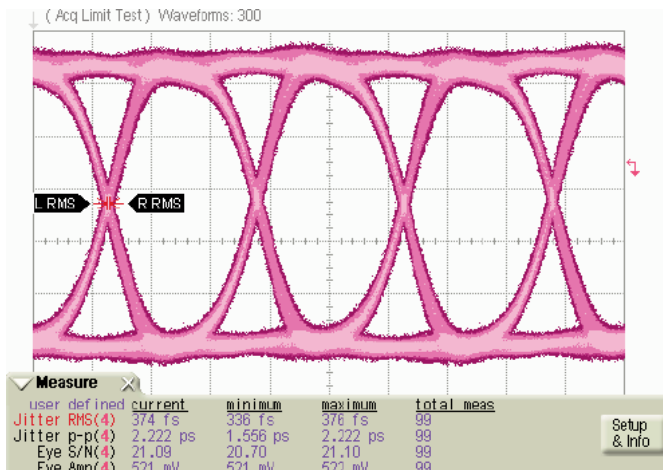


Fig 4. 40Gb/s Eye @ 521mVpp

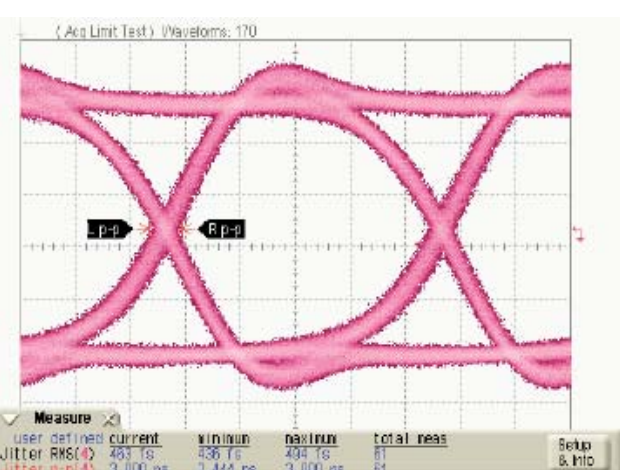


Fig 5. 40Gb/s Eye @ 2Vpp



## ■ Specification

| Parameter       |              | Value   |
|-----------------|--------------|---|
| Data Output     | Bit Rate     | 2Gb/s ~ 44Gb/s ,                                |
|                 | Jitter (rms) | <700fs (with 86107A precession timebase module) |
|                 | Rise time    | < 12ps (20%~80%)                                |
|                 | Amplitude    | 450mVpp (standard) 0.5Vpp ~ 2Vpp (option)       |
|                 | Connector    | 2.4 mm  |
| Clock Output    | Frequency    | 0.5GHz ~ 11GHz                                  |
|                 | Amplitude    | 350mVpp (typ.)                                  |
| Trigger Output  |              | 1/32 clock , 350mVpp                            |
| Data Input      | Bit Rate     | 0.5Gb/s ~ 11Gb/s                                |
|                 | Amplitude    | 0.1~1Vpp  |
| Clock Input     | Frequency    | 1GHz ~ 22GHz                                    |
|                 | Amplitude    | 0.5 ~ 1.5Vpp                                    |
| Operation Temp. |              | 20~30 centigrade                                |

Note: The measuring result is conjunction with Agilent 86116A and 86107A

## ■ Ordering Information

| Model                               | Name                    | Qtn.  |
|-------------------------------------|-------------------------|-------|
| TR1S4-A                             | Main Frame              |       |
|                                     | 44Gb/s Mux (Fix output) | 1     |
|                                     | Standard Accessories    |       |
|                                     | Coaxial Cable           | 5 pcs |
|                                     | V Type Terminator       | 1 pcs |
|                                     | SMA Terminator          | 2 pcs |
| Option 01<br>Option 02<br>Option 03 | Option                  |       |
|                                     | Variable Output         | 1     |
|                                     | Extend to 56Gb/s        | 1     |
|                                     | 1/2 clock output        | 1     |

