**Department of Physics, Indian Institute of Technology**

 **IIT.P.O. Madras-600 036**

Ref. No. Date: 14 / 04 / 2017

|  |  |  |  |
| --- | --- | --- | --- |
| **PHY** | **2017** | **010** | **STORES** |

To,

Dear Sir,  **Due date: 30 / 04 / 2017**

Please find below the specification of an oscilloscope we require for purchase. Kindly send us a quotation by the due date mentioned above.

Minimum specification for **Gated Integrator** (Quantity 1 – 5 nos. please quote unit price)

|  |  |  |
| --- | --- | --- |
| **S. No** | **Parameter** | **Value** |
|  | **Trigger** |
| 1 | Internal trigger | 0.5 Hz to 20 kHz |
| 2 | Line trigger | The gate generator may be triggered from AC line with adjustable phase. |
| 3 | External trigger | 1 MΩ input impedance. Trigger threshold adjustable from 0.5 to 2 V. Input protected to ±100 VDC. Trigger pulse must be over threshold for >5 ns with a rise time <1 µs. |
| 4 | Manual trigger | The unit will trigger if trigger threshold is scanned through 0 VDC. |
| 5 | Trigger LED | LED blinks with each trigger. |
|  | **Delay** |
| 6 | Delay scale | 1 ns to 10 ms |
| 7 | Delay multiplier | 0 to 10× using 10-turn dial |
| 8 | Insertion delay | 25 ns |
| 9 | Accuracy | 2 ns or 5 % of full-scale delay, whichever is larger |
| 10 | Jitter | <20 ps or 0.01 % of full-scale delay, whichever is larger |
| 11 | Ext. delay control | Rear-panel 0 to 10 VDC input overrides front-panel delay multiplier. Input is used by SR200 or SR245 to scan the gate. |
|  | **Gate Width** |
| 12 | Width scale | 1, 3, 10, 30, 100, 300 ns, 1, 3 µs |
| 13 | Width multiplier | Adjustable from 1× to 5× |
| 14 | Width accuracy | 2 ns or 20 % of full scale, whichever is greater |
| 15 | Minimum width | 2 ns, FWHM |
|  | **Signal** |
| 16 | Sensitivity (Vin/Vout) | 1V/V to 5mV/V in a 1-2-5 sequence |
| 17 | Accuracy | 3 % for gate widths >10 ns, decreasing to 50 % for a 2 ns gate |
| 18 | Filter | DC coupled, or AC coupled above 10 Hz or 10 kHz |
| 19 | Offset control | ±0.4 VDC using 10-turn dial. |
| 20 | Over range LED | Indicates input is >2 VDC or LAST SAMPLE is greater than 10 VDC |
|  | **Last Sample** |
| 21 | Output | ±10 VDC, 10 mA (20 mA short circuit limit), impedance <1 Ω |
| 22 | Polarity switch | Inverts LAST SAMPLE output |
| 23 | Responsivity | 95 % (no more than 5 % of the previous last sample remains) |
|  | **Averaging** |
| 24 | Type | Exponential moving average |
| 25 | No. of samples | 1, 3, 10, 30, … to 10,000. LAST is selected for no averaging. |
| 26 | Average output | ±10 VDC full scale, 10 mA (20 mA short circuit limit). Impedance <1 Ω |
| 27 | Droop rate | When no ext. triggers are present, droop rate is <1 % per minute (1 to 30 samples), and <0.01 % per minute (100 to 10,000 samples). |
| 28 | Average polarity and baseline subtraction | Rear-panel switch sets polarity of LAST SAMPLE before it is added to the average. Can also be used to invert polarity of average output. In TOGGLE position, every other sample is subtracted from the average. By triggering at twice the experiment's rep rate, baseline will be sampled on alternate triggers and subtracted from the average. |
| 29 | Toggle output | Rear-panel TTL signal changes state with each trigger. Output used with Active Baseline Subtraction feature to indicate if next sample will be added to, or subtracted from, the moving average. Toggle output can drive 50 Ω loads to +2 VDC. |
| 30 | Reset button | Resets average to zero |
| 31 | Remote reset | Rear-panel input resets average with a TTL low or switch closure. |
|  | **Signal Input and Output** |
| 32 | Signal input | 1 MΩ input impedance, ±2 VDC usable range, protected to 100 VDC. Input offset drift <0.5 mV/hr. after 20 minute warm-up. Shot noise at input <0.5 mV. Coherent pickup <5 mV (easily canceled with offset knob in fixed gate applications). |
| 33 | Signal output | SIGNAL OUTPUT is the input signal delayed by 3.5 ns. (Used to terminate input signal and to time gate with respect to signal output.) |
|  | **Gate and Busy Outputs** |
| 34 | Gate output | 200 mV pulse marks exact position of gate with respect to signal output. ±1 ns accuracy (50 Ω load) |
| 35 | Busy output | TTL signal indicates output data is ready. Stays high from trigger until unit is ready for next trigger. (45 µs min., longer for long delays or gate widths.) Drives 50 Ω load to 2 VDC. |
|  | **General** |
|  36 | Power supplies | Both NIM and standalone modules will be accepted. NIM modules should be compatible with  |
|  37 | Warranty | Three years: parts and labor on defects in materials and workmanship |

**Accessories**

The vendor may quote optional accessories which may be required with the instrument mentioned for purchase together but will not be used for price comparison.

Please provide a clear warranty statement.

Please send the quotation (technical and price details) by email (signed and scanned) OR hard copy before the due date.

Please mark reference number on top of the quotation.

 Yours Sincerely,

**Sivarama Krishnan**

**Co-ordinator**

 Department of Physics,
 Indian Institute of Technology Madras,
 Chennai -  600036, India.
 Telephone : +91 44 2257 4856