File no: CSIO30092025IHP24000813 / 2025-26   **Date:01-10-2025**

Tender for "Customised design and fabrication of integrated signal generation and output summing module"

Quantity:1

Specifications: As per annexure-1

Other Terms & Conditions

    (a) Delivery: F.O.R. CSIR-CSIO Chandigarh**, within 10 weeks from the date of purchase order**
    (b) Payment Terms: As per CSIO terms
    (c) Validity: Validity of quote should be minimum 60 days

Kindly provide the best quote **with compliance sheet** in the name of The Director CSIR-CSIO, Sec-30C, Chandigarh by email to surjitkaman.csio@csir.res.in latest by **October 06, 2025**

Technical Specification:

1. General Overview: A dual-channel, microcontroller-based signal generation and conditioning system intended for generating analog waveforms (Atleast sine, ramp) with appropriate buffering and output interfacing. The system should support up to 50 kHz bandwidth.

2. System Components and Specifications

A. Microcontroller Unit (MCU):

- Type: ARM Cortex-M-based microcontroller with DMA support
- Interface: USB 2.0 /higher device for PC communication

Functionality:

- Control of waveform generation (sine, saw-tooth, Triangular, pulse) with control for amplitude, phase, frequency, offset.
- DAC interfacing and data streaming
- Real-time signal control and monitoring

B. Input Type:

Either using MCU or two Input SMA to be given on the circuit for external signals.

C. Digital-to-Analog Converters (DACs):

- Channels: Two independent DACs
- Resolution: Minimum 12-bit; higher the better
- Sampling Rate: ≥250 kSps (to cleanly support atleast 10 kHz bandwidth)
- Output Range: Configurable output range: 0–5 V (unipolar)

D. Summing Amplifiers:

- Configuration: Op-amp-based summing amplifiers
- Bandwidth: ≥100 kHz to avoid phase distortion
- Slew Rate: Sufficient for 50 kHz signal fidelity (≥1 V/µs)
- Should be able to sum two input signals from external SMA input (jumper to be provided)

E. Buffer Amplifiers:

- Function: Impedance matching and drive capability
- Type: Unity gain buffer with high input impedance, low output impedance
- Bandwidth: ≥100 kHz

F. Output Interface:

- Connectors: Two SMA female output connectors
- Impedance: 50 Ω matched output
- Output Signal Bandwidth: DC to 50 kHz
- **Coupling: Selectable AC/DC coupling**

G. Power Supply:

- Input: 5 V from USB or external regulated power supply.
- On-board Regulation: 3.3 V and/or ±5 V for analog sections if required

3. Performance Requirements

- Waveform Support: Atleast Sine, sawtooth, Triangular, Pulse
- Max Output Bandwidth: 50 kHz (flat ±1 dB response)
- Output Noise: ≤1mVrms typical
- Latency (USB to output): ≤5 ms, jitter <100 µs
- **Long-Term Drift: ≤50 ppm/°C**

4. Software Interface

- Optional PC-side application (via USB) for waveform selection, amplitude, frequency control, phase, offset.
- Support for firmware update via USB

Additional:

- **Possibility to interface or integrate with external GUI for controlling the input and output.**
- **Small form factor OEM board**