INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
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PR No. 1000026806 **Rfx No. 6100001152**

Technical Specifications for Add-on components of existing Cryogen-free dilution refrigerator setup.

A. QBoard:

1. Modular sample holder system for spin-Qubit chips and super conducting circuits with 48 DC channels and up to 1Ghz capable 16 high frequency channels.
2. Motherboard with 2 51-Pin nano D connectors.
3. Bias tees for all RF lines
4. Room for mounting tank circuit resonators.
5. Daughterboard with 0.5 mm chip cavity for placing samples and gold-plated bottom cavity for superior grounding.
6. Right-angle mini SMP to SMP cable single ch.30 cm (Note: Length has to be adjusted)
7. Custom jumper cable, 51 pin female nano-D to 2x25 pin female micro-D titanium shell, nonmagnetic, PTFE wires, customer specifies length and mating.
8. 8-channel Mini-Coax right angle jack/plug to SMP jack cable assembly, 40 cm
9. Grounding plate for wire bonding should be included
10. Interposer for use of the grounding plate should be provided.

B. QFilter:

1. 24 channel low-pass filter comprised of one low frequency (RC) filter board and one radio frequency (RF) filter board for optimum performance.
2. 25-pin micro-D connectors, pin-out compatible with most dilution refrigerators.
3. Typically reduces electron temperatures to 5-10mK above the mixing chamber temperature**.**
4. Designed for easy mounting on or below the mixing chamber plate in dilution refrigerators.
5. High conductivity copper enclosure, with non-magnetic gold plating.
6. Compatible with low temperatures and high magnetic fields.
7. Non-magnetic, shielded, titanium connectors.

C. Low Frequency low pass filter bank (RC)

1. One reactive 7-pole Pi and two dissipative RC filter stages, individually shielded.
2. Transmits below 65 kHz.
3. Total resistance (room temp.): 1700±10 Ω. Isolation to ground and other channels ≥ 2 GΩ. Maximum current 6mA,
4. Maximum voltage 10V at room temperature, 150V below 4K.

D. Radio Frequency low pass filter bank (RF)

1. Three reactive 7-pole Pi filter stages, individually shielded.
2. Transmits below 225 MHz.
3. Total resistance (room temp.): 2.0±0.5 Ω. Isolation to ground and other channels ≥ 2 GΩ. Maximum current 10mA at cryogenic temperatures. Maximum voltage 10V at room temperature,150V below 4K

E. QBox:

1. Cable assembly 24 ch. male Fischer to male Fischer, double-shielded twisted pairs, with ground, 3 meters

F. Warranty: One year from the date of successful installation/commissioning of equipment.