**GENERAL INSTRUCTIONS**

(1) Sealed tenders are invited for the procurement of laboratory items of HBTI Kanpur. The tender documents can be bought from the Store Purchase Section, Harcourt Butler Technological Institute Kanpur. Interested tenderers may download the same from the website and submit their offer along with **Tender fee of `1000/- each** (In form of Crossed Demand Draft issued by any Nationalized Bank in favour of Director H.B.T.I., Kanpur). While submitting your offer mark Tender No. and due date on the envelope.

(2) Quotations received without Tender fee will not be considered.

(3) No request for the extension of the due Tender date will be considered.

(4) Each Tender consisted of various schedules and EMD for each schedule is mentioned separately. Tenderers may submit their proposals for **one or more schedules** along with the respective EMD (In form of Crossed Demand Draft issued by any Nationalized Bank in favour of Director H.B.T.I., Kanpur).

(5) The offer submitted for each schedule should be complete in all respect and price quoted for each schedule should be **FOR destination HBTI Kanpur**.

(6) Late/delayed offers will not be accepted.

(7) Tenders received before the deadline shall be opened in the presence of attending Tenderers/their authorized representatives on the same day at scheduled time and venue.

(8) Corrigendum, if issued any for the Tender, shall form part of the Tender document. Corrigendum will be posted only on HBTI Kanpur website (www.hbti.ac.in). Tenderes are requested to visit HBTI Kanpur website regularly and note the corrigendum/amendments to the tender without fail and submit the offer accordingly.

(9) All other terms and conditions are as per the Institute rule.

(9) The Director reserves the right to cancel any or all Tenders without assigning any reason.

**For HBTI Kanpur**

**Tender No.: 09/SPS/EC/2016 Dated: 14.03.2016 due on 04.04.2016 by 01:30 pm**

**Electronics Lab**

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| **Schedule No.** | **Name of Equipment along with specifications** | **Qty.** | **EMD (`)** |
|  |  **30 MHz Two channel Oscilloscope with built in frequency counter** **Operating Modes :** * Channel I, Channel II, Channel I & ll alternate or chopped, X-Y operation (Ratio 1:1 Input via CH II), Add/Sub CH I ± CH II, Invert CH II
* Built in Component tester
* Bandwidth : DC -30 MHz (-3 dB)
* Risetime : 12 ns approximately
* Deflection coefficients : Microcontroller based 12 calibrated steps 5 mV /div. - 20 V / div. (1-2-5 sequence).
* Electronic control. Display on Color LCD
* Accuracy : ±3 %
* Input Impedance : 1 MW | | 30 pF approximately
* Input : two BNC connector leads
* Input coupling : DC-AC-GND
* Maximum Input voltage : 400 V (DC + Peak AC)
 | 20 | 8000 |
|  | **Function Generator****Technical Specifications*** Standard waveforms : Sine, Square, Triangle, Ramp, Pulse, TTL
* Frequency Range : 10 MHz (Sine), 3 MHz(Others)
* Frequency Display Accuracy : + 0.5 %
* Sinewave Distortion : 0.2% (500 KHz),1% (3MHz) typical
* Rise / Fall Time : ≤ 30ns
* Pulse Duty Cycle : 5% - 95% Variable
* Output Level : 10Vpp into 50 Ohm, 20Vpp OC
* Output Impedance : 50 Ohm
* Attenuation : 20dB, 40dB, 60dB & 20dB Variable in
* between (80dB Max.)
* Amplitude Display Accuracy : + 5% + 1 digit
* DC Offset : + 5V adjustable
* Frequency Counter
* Frequency Range : DC to 50 MHz
* Sensitivity : 0.5Vrms
* Input Impedance : 1 MΩ
* Max. Input Voltage : 200 V (DC + AC Peak)
 | 20 | 4000 |
|  | **DC Power Supply*** DC Output : A : 0-30 V, 2 A, continuously variable by means of Coarse and Fine controls, B : 5 V, 2 A adjustable from 4 V - 6 V, C: 0 - ±15 V, 1 A Dual Tracking Variable
* Current Limit : 100 mA - 2 A continuously adjustable for (0-30 V & 5 V) 100 mA - 1 A continuously adjustable for (± 15 V)
* Résolution : Voltage : 100 mV, Current : 10 mA
* Internal Resistance : 15 m Ohm
* Stability : 2.5 mV at (30 V / 2A, 5 V / 2 A, ±15 V / 1 A)
* Recovery Time : < 50 μs
* Load Regulation : +(0.05 %+100 mV)
* Line Regulation : + (0.05 %+100 mV)
* Temp. Coefficient : + (0.05 % + 5 mV / °C)
* Ripple & Noise : <1 mV rms
* Display : 3 digit for voltage & 3 digit for current LED indication for voltage & current
* Accuracy : ± (1% +1 digit)
* Tracking Error : ± (0.1% + 5 mV) for ± 15 V
* Over Range Indication
* Built in Over Heat, Over Voltage and Short Circuit Protections
 | 20 | 4000 |
|  | **Circuit Development board*** Bread Board: Tie points 1680
* Built in Power supply: + 5 V fixed, 1 Amp, + 12 V Fixed 0.5 amp, 0-25 V DC Variable, 0.5 Amp
* Built in AC source: 6-0-6 V, Clock,: TTL Clock, 1 Hz and 0.1 Hz,
* Level Switches: 8 switches for logic low and high with 2 mm output socket
* BCD Decoder, on board common anode seven segment display and driver IC 7447,
* Potentiometer: Two (10 K, 47 K) on front panel
* Power 220 V AC + 10%, 50 Hz.
 | 20 | 3200 |

**Microprocessor Lab**

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| **Schedule No.** | **Name of Equipment with specifications** | **Qty.** | **EMD (`)** |
| 5. | **Microprocessor kit 8085 with LCD Display*** 8085 CPU operating @6.144MHz or Higher
* ROM 8K
* RAM 8K
* Three channel timer counter 8253
* 48 I/O lines using 8255
* On Board ADC and DAC
* Display LCD 20x2
* Onboard block diagram study
* On board EPROM programmer for 27 series
* Facility of downloading and uploading the files from PC using the software
* Two command mode interface

 - ASCII Keyboard - Serial Mode* Mains Supply : 220 V + 10 % AC, 50 Hz
* Learning Manual hard copy
 | 10 | 2000 |
| 6. | **Microprocessor kit 8086 with LCD Display*** 8086 CPU operating @5MHz
* Socket provision for Co-processors
* RAM 16 K
* ROM 16 K
* 72 parallel I/O Lines through 8255
* Two command mode interface

 - ASCII Keyboard - Serial Mode* Onboard block diagram study
* On board 8253 timer/counter chip
* Display LCD 20x2
* On Board ADC and DAC
* Facility of downloading and uploading the files from PC using the software.
* Mains Supply : 220 V + 10 % AC, 50 Hz
* Learning Manual hard copy
 | 10 | 2000 |
| 7. | **TMS320C5515 DSP Evaluation Module**Hardware details:•TMS320C5515 fixed point low power DSP•On board embedded JTAG emulation to enable the true plug-and-play functionality through just an A-to-mini B USB cable and compatibility of external JTAG emulation interface•TLV320AIC3204 32-bit programmable low power stereo codec•OLED color LCD display (128x128 pixels)•Stereo line in (2) /out (1), headphone out (1) and microphone in (L/R)•Integrated Flash and mobile SDRAM•I2C and SPI EEPROMs•High speed USB 2.0 slave port•MMC/SD slot, CE-ATA connector, RS232 interface•10 user defined push button switches•Analog front end connectors•Two expansion connectors for memory cards•External oscillator socket•Battery Holder•+5V universal power supplySoftware- The TMS320C5515/14/05/04 DSPs Kit Compatible Comprehensive Code Composer Studio development platform, including: •A complete Integrated Development Environment (IDE), an efficient optimizing C/C++ compiler assembler, linker, debugger, integrated CodeWright editor with CodeSense technology for faster code creation, data visualization, a profiler and a flexible project manager•DSP/BIOS(TM) real-time kernel•Chip Support Library•Board Test Package•"Plug-in" ability for application software for additional functionality | 01 | 1000 |
| 8. | **TMS320C6748 Evaluation Module Kit Bundle*** OMAP-L138 SOM-M1 (64 MB mDDR) Software and Tools
* Open source Linux Board Support Package (available from Texas Instruments)
* U-Boot (boot loader/monitor)
* Code Composer Studio (CCS) v3.3 DSP/BIOS
* Board Support Library (BSL) sample programs
* Display: Integrated LCD, touch, and backlight connector for optional Zoom Display Kits
* Audio: Stereo input and output connectors, TLV320AIC3106 audio codec
* SATA: Serial ATA connector
* Network/USB/Serial Connectors: One RJ45 Ethernet jack connector, One USB 2.0 high-speed On-the-Go interface, One USB 1.1 full-speed host, 115.2kbps RS-232 debug serial port
* PC Card Expansion: MMC/SD card
* Debug: Connectors for JTAG interface, XDS100 emulation circuit
* Cables: USB A to mini-B cable
* 5 volt power supply with power adapters
 | 01 | 1000 |
| 9. | **TMS320C6678 Multicore DSP**Eight TMS320C66x DSP Core Subsystems at 1.00 GHz and 1.25GHz * 320 GMAC/160 GFLOP @ 1.25GHz
* 32KB L1P, 32KB L1D, 512KB L2 Per Core
* 4MB Shared L2
* Multicore Navigator and TeraNet Switch Fabric - 2 Tb
* Network Coprocessors- Packet Accelerator, Security Accelerator
* Four Lanes of SRIO 2.1 - 5 Gbaud Per Lane Full Duplex
* Two Lanes PCIe Gen2 - 5 Gbaud Per Lane Full Duplex
* HyperLink - 50Gbaud Operation, Full Duplex
* Ethernet MAC Subsystem - Two SGMII Ports w/ 10/100/1000 Mbps operation
* 64-Bit DDR3 Interface (DDR3-1600) - 8 GByte Addressable Memory Space
* 16-Bit EMIF - Async SRAM, NAND and NOR Flash Support
* Two Telecom Serial Ports (TSIP) - 2/4/8 Lanes at 32.768/16.384/8.192
* UART Interface
* I2C Interface
* 16 GPIO Pins
* SPI Interface
* Sixteen 64-Bit Timers
* Three On-Chip PLLs
 | 01 | 1000 |
| 10. | MENTOR-DSP Software ToolThe software includes real-time features such as sound processing, image capture and interface with a specific DSP hardware platform. It is simple, intuitive and straightforward to use, targeted to students in the field of digital signal processing. Including following Modules: DSPBase (for Basic Theory, NumPro (for numbering formats)SigGen (for Signal Generation), DSPro (for DSP functions)ComPro (for Communication training), MathSTAT (for Statistical DSP)ImageSEE (for image processing) | 1 set | 4000 |
| 11. | DSP Board•dsPIC33F as DSP processor PIC 18FL4550 for USB interface.•16X2 LCD module. PICkit2 programmer connector.•PICtail connector socket. PICtail edge connector.•8 LEDs. Four General purpose switches.•Processor reset switch.Add on Card Features•SD card socket for image processing applications.•Onboard function generator for sine, square and triangular signals (200 Hz to 16 KHz).•Frequency adjustment pot for function generator.•Dual analog input ports.•Microphone input port with onboard amplifier.•Analog output port (12-bit DAC).•PICtail edge connector to connect on base board. | 01 | 650 |

**Communication Lab**

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| **Schedule No.** | **Name of Equipment along with specifications** | **Qty.** | **EMD (`)** |
| 12. | Optical Fiber Training System with Power SupplyComplete Functional Block diagram showing different stages of communication system should be printed with test points to access the blocks for signal monitoring and feeding in. Expansion ports should be available for user interfacing of signals and blocks. The marker settings should be provided as programmable for reliable operation instead of switch selectable. Single marker and double marker generation for false marker study should be provided.Latching type data switches for 8 bit data input that allows either feeding in ‘1’ or ‘0’ data for continuous transmission of ‘1’ or ‘0’. Provision for feeding in TTL data from Function generator through one or two bits of these data switches. BNC ports for all I/O operations are required, to avoid cluttering on the functional block diagram kit.12 (64Kbits/sec) channels, including one slot for 16-bit Marker, Two 8-bit programmable markers in the alternate frame, Manchester Coding / Decoding, 768 Kbits/sec, 1.5 Mbits/sec after Manchester coding, Two PCM voice channels ( with 2 telephone handsets)A-law ( Voice Coding Technique )Wavelength: 850nm and 650nm Infra-red LED, Si PIN Diode Photo Detector , 1000 micron plastic Fiber( Standard 1m & 3m), Max Data Rate 2Mbits/sec (NRZ)With RS232C interface module for OFT | 2 | 2800 |
| 13. | **Frequency Modulation Transmitter and Receiver Kit**Generator :Waveforms: SineAmplitude: Adjustable from 0 - 4 VppFrequency: Adjustable from 0.1 to 1 KHz & 1 to 10 KHzVCO 1:Output signal: SineFrequency: 400 KHz to 1500 KHzAmplitude: Adjustable from 0-2 VPPInputs: Modulating signalVCO 2:Output signal: SineFrequency: Switching on 2 ranges 400 KHz to 500 KHz and 500 KHz to 1500 KHzAmplitude: Adjustable from 0- 2 VPPInput: Modulating Signal, MarkerRF Detector: Input level adjustableBalanced Modulator: Adjustable output amplitude & Adjustable carrier nullFilter: Central frequency 455 KHzBandwidth: 3 ±1 KHzLow pass filter : Cut off frequency 10 KHzPLL Detector: 1 Nos.Interconnections: banana socketsTest Points Power Supply: 230 V ±10 %, 50 Hz Learning material: Hard Copy (Theory, procedure, reference results, etc), Online Functional Blocks Indicated On Board | 2 | 800 |
| 14. | **Amplitude Modulation Transmitter and Receiver Kit.**Self-contained platform with built in power supplyOn-board sine generatorOn board DSB, DSBSC, SSB, modulators and demodulatorsCrystal controlled carrier frequency generatorEnvelope detectorsOn board low pass filtersInput-output & test points provided on boardSwitched faults2 Year WarrantyManual including details of experiments (Hard Copy)Functional Blocks Indicated On Board | 2 | 800 |
| 15. | **PAM/PWM/PPM Modulation and Demodulation Kit**On-board Sampling: 8 KHz, 16 KHz,Frequencies (Pulse): 32 KHz, 64 KHzOn-board Generator : Sine wave: 1 KHz & 2 KHz (Gain adjustable)Square wave: 1KHz & 2 KHzLow Pass FilterVoice communication: Voice link using dynamic mic & speakerAC Amplifier With adjustable Gain ControlDC Output: 0-4 V (variable)Switched Faults Interconnections: banana socketsTest Points Mains Supply: 220 V ±10 %, 50 Hz,Accessories Patch cord Main cord Head phone Microphone Manual including details of experiments (Hard Copy)Functional Blocks Indicated On Board | 2 | 800 |
| 16. | **ASK/PSK/FSK Modulation and Demodulation Kit**Data Simulator: Onboard 8-bit variable NRZ pattern Crystal Oscillator: 32.768 MHz Data Clock: 256 KHz Data Format: NRZ (L) Onboard Carrier Sine Waves: 1MHz (0°), 1MHz (180°), 500 KHz (0°) Carrier Modulation: ASK, FSK, PSK Carrier Demodulation: ASK, FSK, PSKIntermediate Signal: During demodulation Power Supply: +12V,-12, +5V, GND Switch Banks: 1 Reset Switch: 1 Test Points Manual including details of experiments (Hard Copy)Functional Blocks Indicated On Board | 2 | 800 |
| 17. | **PCM Kit**TransmitterCrystal Frequency: 16 MHzOn Board Analog Signal: 2 KHz, 4 KHz (Sine wave synchronized to sampling pulse Adjustable amplitude and separate variable DC level)Input Channels: 2 nos.Multiplexing: Time Division MultiplexingModulation: Pulse Code ModulationSync Signal: Pseudo Random Sync Code GeneratorError Check Code: Off - Odd - Even - HammingOperating Mode: Fast: 320 KHz / channel approximatelySlow: 1.9 Hz / channel approximatelyTest Interconnections: SocketsPower Supply: 220 V, ±10%, 50 HzAccessories :Patch cords Power Supply: 1 no. Mains cord: 1 no.ReceiverInput Channel: Time Division Multiplexed serial Input Demodulation: Pulse Code DemodulationClock Regeneration: By Phase Locked loopOperating Speeds: Fast - 320 KHz/Channel, Slow 1.9 Hz / ChannelError Detection (Single bit): Off-Odd- Even parity & Hamming codeError Correction: Hamming codeTest Points Interconnections socketsPower Supply: 220 V ±10%, 50HzIncluded Accessories :Patch cordsMains cord Power Supply: 1 no. Manual including details of experiments (Hard Copy)Functional Blocks Indicated On Board  | 2 | 800 |
| 18. | **Delta Modulation and Demodulation Kit**Crystal Frequency: 6.400 MHzSampling Clock Frequency: 50, 100, 200 & 400 KHz (Switch selectable)On board Generator: Synchronized Sine wave (1, 2, 3 and 4 KHz) with adjustable amplitude and Variable DC level +/-5VIntegrator: Four integrator gain settings Normal, X 2, X 4, X 8Low Pass Filter: Fourth order Butterworth (Cut Off Frequency 4.8 KHz)Test PointsInterconnections socketPower Supply: 220 V ±10%, 50HzAccessories :Patch cordsPower Supply: 1 no.Mains cord: 1 no.Manual including details of experiments (Hard Copy)Functional Blocks Indicated On Board  | 2 | 800 |

**Simulation Lab**

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| **Schedule No.** | **Name of Equipment along with specifications** | **Qty** | **EMD (`)** |
| 19. | **Computer Desktop with Core i7 Processor*** Processor: 3rd generation Intel (R) coreTM i7-3770 Processor (8M Cache, up to 3.00GHz)
* Motherboard Chipset: Intel (R) Q77 Express Chipset
* Video: Integrated HD graphics
* Network: Integrated Intel (R) 82579 LM Ethernet LAN 10/100/1000
* Ports: 4 External USB, 3.0 Ports and 6 External USB 2.0 Ports
* USB 2.0 (MT/DT/SFF/ATX only); 1 RJ-45; 1 Serial; 1 VGA; 1display or better; 2 PS/2: 2 Line-in (Stereo/microphone); 2 Line-out (headphone/speaker)
* Sound Controller: Integrated Audio
* Memory: 8GB 1600MHz upgradable up to minimum 16 GB
* Storage: 1TB 7200 RPM SATA HDD
* Optical Derive: 16xDVD +/- RW Drive
* Key Board and Mouse: USB Optical Mouse and Standard Key Board
* Monitor: 19.5 inch (Viewable) Wide Screen Monitor with LED Backlight)
* Power Management: Min. 240 Watt with active PFC
* System Chassis: Tool less Desktop Chassis
* Operating System: Windows 8 Professional with Media and Microsoft Office 10 with License
* Warranty: 3 Years
* Security: Trusted Platform Module 6 (TPM) 1.2, Data Protection axis, Data Protection Encryption/Self Encrypting Capabilities; Chassis lock slot support, Optional Chassis intrusion switch, setup/BIOS password, Anti-Theft Technology
* Manageability: WOL, PXE 2.1
* Certification: EPEAT GOLD; FCC; UL or equivalent approved in India
* Anti Virus: 3 years Licensed; Norton Antivirus with internet security.
 | 30 | 30000 |
| 20. | MATLAB R2012a Software with following tool boxes* Simulink
* Signal Processing Toolbox
* Signal Processing Blockset
* Communication Toolbox and CDMA toolbox
* Communication Blockset
* Filter Design Toolbox
* Real Time Workshop
* Real Time Workshop Embedded Coder
* Embedded IDE Link
* Target Support Package
* Fixed Point Toolbox
* Simulink Fixed Point
* Control System Tool Box
 | One set 05 users | 16000 |
| 21. | **Cadence University PG Bundle**Complete Analog & Digital Front end & Back end tools for PG courses**PG Bundle Tools:*** Virtuoso Multi‐mode Simulation with AP Simulator : 90003
* Virtuoso(R) Schematic Editor XL : 95115
* Virtuoso(R) Analog Design Environment XL : 95210
* Virtuoso(R) Layout Suite XL : 95310
* AMS Designer with Flexible Analog Simulation : 70020
* Virtuoso AMS Designer Verification Option : 70030
* Incisive Enterprise Simulator ‐ XL : 29651
* Encounter RTL compiler : RC200
* Encounter RTL Compiler Low Power Option : RC300
* Encounter Conformal Low Power ‐ XL : CFM500
* Encounter (TM) Conformal ‐ XL (a.k.a Conformal Ultra) : CFM200
* Encounter Low Power GXL Option : EDS10
* Encounter Mixed Signal GXL Option : EDS20
* Voltus IC Power Integrity Solution – XL (VTS‐XL) : VTS200
* Encounter Digital Implementation System XL : EDS200
* Tempus Timing Signoff Solution XL : TPS200
* Cadence® Physical Verification System Design Rule Checker XL : 96210
* Cadence® Physical Verification System Layout vs. Schematic Checker XL : 96220
* Virtuoso QRC Extraction ‐X L : QRCX300
* Virtuoso Liberate Server : ALT110
* Virtuoso Liberate Client : ALT111
* Virtuoso Variety Server : ALT210
* Virtuoso Variety Client : ALT211
* Virtuoso Liberate MX Server : ALT410
* Virtuoso Liberate MX Client : ALT411
* Virtuoso Variety MX Server : ALT510
* Virtuoso Variety MX Client : ALT511
* Virtuoso Liberate LV Server : ALT610
* Virtuoso Liberate LV Client : ALT611
 | 10 | 33000 |
| 22. | **LCD Projector*** Wireless capability
* Multi Projector
* Display via USB
* Luminance 4000
* Number of Pixels: 786,432 (H1024xV768)
* resolution-1024x768 Color Pixels (XGA)
* Lamp 210 W UHP
* Contrast Ratio 3000:1
* Manual Zoom-x 1.2
* input- VGA, USB with speaker
* 6x4 feet Mountable Screen
 | 2 | 2000 |
| 23. | **Heavy Duty Printer with scanner*** Print technology: Laser
* Functions: Print, copy, scan, fax, walk-up USB
* Print speed black (normal, A4): Up to 33 ppm
* Print speed black (normal, letter): Up to 35 ppm
* Duplex printing: Automatic (standard)
* Processor speed: 800 MHz
* **SCAN**
* Scan size (flatbed), maximum: 216 x 297 mm
* Scan resolution, hardware Up to 1200 x 1200 dpi (color and mono, flatbed); Up to 300 dpi (color and mono, ADF)
* Scan resolution, optical Up to 1200 dpi (color and mono, flatbed); Up to 300 dpi (color and mono, ADF)
* Levels of grayscale: 256
* Color scanning: Yes

FAX * Fax transmission speed 3 sec per page
* Fax resolution Up to 300 x 300 dpi (halftone enabled)
* Compatible with: Windows 8, Windows 7 (32-bit/64-bit), Windows Vista (32-bit/64-bit): 1 GHz (32-bit) (x86) or (64-bit) (x64) processor, 1 GB RAM (32-bit) or 2 GB RAM (64-bit), 400 MB free hard disk space, CD/DVD-ROM or Internet, USB or Network port; Windows XP (32-bit) (SP2): Pentium® 233 MHz processor, 512 MB RAM, 400 MB free hard disk space, CD/DVD-ROM or Internet, USB or Network port
 | 2 | 800 |