

**TENDER SPECIFICATION OF DIGITAL COMMUNICATION TRAINER- BNS SHAHEED
MOAZZAM (ELECTRICAL SCHOOL)**

1. **Name of the Equipment.** Digital Communication Trainer.
2. **Purpose/Function.** The trainer system will be used by the trainees to study signal sampling and reconstruction as well as to study the aspects of time division multiplexing and pulse code modulation. The trainer must be composed of a set of components, accessories and instruments and can be used as a laboratory test bench to conduct various experiments.
3. **Quantity.** 01 (One) complete set including all necessary tools, accessories and reference manuals/ books.
4. **Type** : Portable.
5. **Brand** : To be mentioned.
6. **Model** : To be mentioned.
7. **Manufacturing Country** : France, Canada, Denmark, Finland, Germany, Italy, Japan, Netherlands, Norway, Sweden, UK and USA (Country to be mentioned).
8. **Country of Origin** : France, Canada, Denmark, Finland, Germany, Italy, Japan, Netherlands, Norway, Sweden, UK and USA (Country to be mentioned).
9. **Supplier** : Name & Full Address is to be mentioned.
10. **Year of Manufacturing** : 2022 or later.
11. **Qualification of Bidder.** Manufacturers of Digital Communication Trainer or their authorized distributor/ agent can submit quotations through their authorized local agent in Bangladesh. In case of offer from distributor/ agent, certificate of dealership/ agency ship from Original Equipment Manufacturer (OEM) is to be submitted with the offer.
12. **Scope of Supply.**
 - a. 01 x Complete set of Digital Communication Trainer (as per paragraph 13 to 18).
 - b. Documentation (as per paragraph 22, 26, 28 and 29).
 - c. Installation, Test/Trial and Acceptance (as per paragraph 23 and 24).
 - d. Local Training (as per paragraph 25).
13. **General Features.** The system should have the following features but not limited to:
 - a. Investigation of the Characteristics of first, second and fourth order filters.
 - b. Synchronization in Pulse Code Modulation (PCM) Systems.
 - c. Sampling and quantization noise.
 - d. Compare the performance of sample amplifiers and sample & hold amplifiers.
 - e. Error detection and correction.
 - f. Timing circuit and Phase Locked Loop (PLL) technology.
14. **Basic Composition.** The Digital Communication Trainer should have (but not limited to) the following major units:
 - a. 01 X Signal Sampling and Reconstruction Trainer.
 - b. 01 X Time Division Multiplexing (TDM) Transceiver Trainer.
 - c. 01 X PCM Transmission Trainer.
 - d. 01 X PCM Receiver Trainer.



15. **Environmental Condition.**

- a. Ambient Operating Temperature : 5° C to + 55° C.
- b. Storage Temperature : To be mentioned.
- c. Relative Humidity : Up to 95 % (Non condensing).

16. **Technical Specification and Experiment Features.**a. **Sampling and Reconstruction Trainer:**

- (1) Sampling Frequencies : 1, 2, 4, 8 & 16 KHz (selectable).
- (2) Audio Generator: Sine Wave (Frequency & Amplitude Adjustable).
- (3) Sampling Signal Duty cycle : Changeable.
- (4) Low Pass Filters : 2nd & 4th order.

b. **TDM Transceiver Trainer:**

- (1) PC-PC communication using USB-UART interface.
- (2) Core type: Step indexed multimode PMMA plastic cable.
- (3) Infrared Receiver : Universal IR Receiver.
- (4) Data generator : 8-Bit NRZ type.
- (5) Modulation : FSK Modulation.
- (6) Carrier : 300 KHz.

c. **PCM Transmission Trainer:**

- (1) Clock Frequency : 64KHz.
- (2) Frame Sync : 8KHz.
- (3) A/D Converter : 8-Bit Monolithic.
- (4) Multiplexer : 8-Bit Parallel in Serial Out.
- (5) Audio Source : 500Hz Audio Generator, Microphone.
- (6) Modulation Type : Pulse Coded.

d. **PCM Receiver Trainer:**

- (1) Clock Frequency : 64KHz.
- (2) Frame Sync. : 8KHz.
- (3) D/A Converter : 8-Bit Monolithic.
- (4) PCM Input : Serial Input.
- (5) Low Pass Filter : 5th order (cut off frequency 3.4KHz).

e. The Trainer should be used for following (but not limited to) experiments:

- (1) Signal sampling and reconstruction.
- (2) Study of sample and hold signal.



- (3) Signal pulse code modulation and demodulation.
- (4) TDM multiplexing.
- (5) PCM modulation and demodulation.

17. **Power Supply Available in the Lab/ Installation Site.** Available power supply in the installation site is 400V, 50Hz, 3 Phase and 220V, 50Hz, 1 Phase. The other power supply unit (if necessary) for the trainer is to be provided by the Supplier.

18. **Standard Accessories.** Standard accessories must include every item and accessories, which are essential to make the offered trainer system completely operational to conduct all possible experiments, whether those are mentioned in the specification or not. A list of such items/ accessories is to be provided with the quotation.

19. **Optional Items.** Optional Items/ accessories if needed to be quoted separately with item wise price.

20. **Spares.** Original Equipment Manufacturer (OEM) recommended spares for 05 (Five) years trouble free operation is to be quoted showing item wise price.

21. **Special Tools.** 01(One) set of special tools (If required) for operation, maintenance and repair of the item is to be included with the scope of supply. List of special tools is to be provided with quotation indicating price of each item.

22. **Documents.** 01 (One) set of following documents and manuals in English are to be provided with the Digital Communication Trainer at the time of delivery:

- a. Training Manual (the manual must include theoretical concepts and detail procedure of all the possible experiments).
- b. Operating Manual.
- c. Technical Manual with Circuit Diagram (At least upto module level) and Parts Catalogue.

23. **Installation, Supervision & STW.**

- a. Technical documents (Installation drawings, Installation instruction, specifications etc) required for installation of the Digital Communication Trainer is to be supplied by the manufacturer well in advance.
- b. Installation of the items will be done by the manufacturer's/ supplier representative under the supervision of the purchaser.
- c. Cost of supervision of installation works, setting to work are to be quoted separately.

24. **Test, Trial and Acceptance.** On completion of installation, setting to work, HAT are to be conducted in the presence of supplier/ manufacturer representative. All expenses of supplier representative are to be borne by the supplier. Final acceptance will be given by BN after satisfactory Test and Trial of the set.

25. **Local Training.** The manufacturer's/ supplier is to send one competent representative who will provide onboard operation and maintenance training in a BN premises to a group of BN personnel for duration of 05 working days after necessary test/ trial and commissioning. The training should include (but not limited to) the following:


- a. System composition, configuration, principle of operation and troubleshooting.
- b. Software installation, operation and configuration for smooth conducting of all the experiments/ tests.
- c. Lab sheets preparation and conducting various experiments.
- d. Theoretical concept and procedure of experiments/ tests (practical).
- e. Repair and maintenance.


26. **Supply Assurance Certificate.** The bidder should submit necessary governmental license for the concerned components/ items are free for sale with obligation for supply of spare parts, technical advice etc in future.
27. **Technical Support.** Technical support is to be provided to solve any maintenance and operational problem arising within the warranty period. An assurance by the Bidder stating agreement in this respect is to be submitted with the offer.
28. **Quality Assurance Certificate.** Quality Assurance Certificate in respect of the associated equipment in regards to its manufacturing and performance is to be provided at the time of delivery of the items.
29. **Certificate.** The bidder will provide following certificates:
- Manufacturer's Authorization Certificate with the offer.
 - Pre-delivery Inspection Certificate (in English) prior to delivery are to be provided by the supplier.
30. **Delivery.**
- The supplied items are to be delivered within 09 (Nine) months after signing the contract to the following consignee:

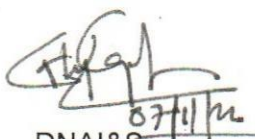
The Commanding Officer Naval Stores Depot New Mooring, Chittagong, Bangladesh	or	Officer In Charge Naval Stores Sub Depot Dhaka Naval Unit Khilkhet Namapara, Dhaka-1229, Bangladesh
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 - Incase of CFR, the supplier will carry the items from Chittagong sea port/ air port as applicable) to NSD Chittagong/ NSSD Dhaka (as applicable) at the cost and risk of supplier.
 - Port of Shipment.** To be mentioned. Port of Shipment is from country of manufacturer, or country of origin.
31. **Brochures/ Booklet.** One set of original brochures/ booklets in English having details technical information including pictures of different parts of the equipment, system connection diagram etc, about the quoted of Digital Communication Trainer is to be provided along with the quotation for evaluation/ assessment.
32. **Guarantee of Supply of Spares.** The supplier is to give guarantee of continued supply of spares for at least 05 (Five) years at a reasonable price.
33. **Warranty.**
- 12 (Twelve) Months warranty for trouble free operation is to be provided by the manufacturer for the item from the date of acceptance by the buyer. If any component of the supplied items becomes defective during the warranty period, the warranty shall be extended automatically (for relevant component) for the period of the subject component remains defective.
 - For warranty repair/ replacement, the supplier will collect the defective item from NSD, Chittagong/ NSSD, Dhaka (as applicable) and re-supply the same to collecting place after warranty repair or for replacement within 90 (ninety) days from the date of defect at no cost to the purchaser.
34. **Validity.** The offer shall remain valid till 30 June 2023.
35. **Source of supply.** Source of supply of Digital Communication Trainer is to be mentioned.
36. **Price.** If the item is imported against this tender, price to be quoted without import duties.
37. **Terms of Payment.** 100% Payment will be made in local currency after final acceptance by BN.


38. **Compliance Statement.** A clear and complete compliance statement of the tender supported by the product catalogue and Brochure with necessary specification and drawing/ diagram is to be submitted for evaluation of the quotation. Incomplete compliance statement will attribute to cancellation of the offer. If any clause of this specification does not commensurate with offered item practically, the deviation has to be spelt out clearly.


MAREFIN IBNE NAZIM
Lt Commander BN
Staff Officer (Electrical)
Director of Naval Weapons
and Electrical Engineering
NHQ, Banani, Dhaka-1213
Member Secy
Date 06/11/2022

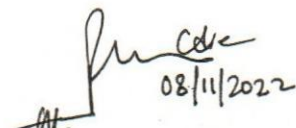

MEHRAB HASSAN
Lt Commander BN
Staff Officer (NS-2)
Naval Headquarters
Banani, Dhaka-1213
DNS (Rep)
Member
Date 07/11/22


MD. ASIB RAIHAN
Lt Commander BN
Staff Officer (Plans-II)
Naval Headquarters
Banani, Dhaka-1213
DNP (Rep)
Member
Date 07-11-22


AHAMMED ABDULLAH
Captain BN
Director of Naval Armament
Inspection and Supply
NHQ, Banani, Dhaka-1213
DNAI&S
Date 07/11/22


M. MOHIDUL HASAN
Commodore BN
Director of Engineering
Naval Headquarters
Banani, Dhaka-1213
DNIT
Member
Date 7/11/22


Date 08/11/2022


M. RUHUL MINHAZ
Commodore BN
Director of Naval Weapons
and Electrical Engineering
NHQ, Banani, Dhaka-1213
DNW&EE
President
Date 08/11/2022