THE PEOPLE'S REPUBLIC OF BANGLADESH

# TECHNICAL SPECIFICATION OF NATIONAL BROADCASTING HOUSE

## VOLUME－II

## SPECIFICATION OF BROADCAST EQUIPMENT

FEBRUARY, 1981

Japan International Cooperation Agency

THE PEOPLE'S REPUBLIC OF BANGLADESH

# TECHNICAL SPECIFICATION

# OF

# NATIONAL BROADCASTING HOUSE

## Volume - II

## Specification

## of

## Broadcast Equipment

FEBRUARY 1981

JAPAN INTERNATIONAL COOPERATION AGENCY

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# 1. SCOPE OF WORK

# 1. SCOPE OF WORK

This chapter stipulates the scope of the Contractor's work for supply, installation, testing and handover of the radio broadcasting equipment for National Broadcasting House of the People's Republic of Bangladesh.

## 1-1 STUDIO SYSTEM

9 studio system shall be installed as follows.

(1) Studio A-1 for audience participation programmes.
(2) Studio C-1 for continuity and commercial programme.
(3) Studio C-2 for continuity.
(4) Studio C-3 for continuity.
(5) Studio C-4 for continuity
(6) Studio N-1 and N-2 with a common control booth for news programme.
(7) Studio M-1 for general programme.
(8) Studio ML-1 for general programme and stereophonic recording
(9) Studio ML-2 for general programme.

## 1-2 PROGRAMME PRODUCING EQUIPMENT

### 1-2-1 MIXING CONSOLE

An audio mixing console having vertical sliding type faders shall be installed in each cotrol booth mentioned in the foregoing Clause. Each input circuit of a mixing console shall be acceptable the following audio signals:

- Microphone signals at the level of -70/-60/-50/-40/-30 dBm at the High impeadance, balanced.
- Line signals at the level of 0dBm at the impeadance of 600 ohms, balanced.

The circuit configuration and performance required are shown on the relevant drawings.

## 1-2-2 TAPE-RECORDER AND TURNTABLE

The following tape-recorder and turn-table shall be installed in the control booths, tape editing rooms and tape listening rooms. The quantities for each items are included in the Equipment Composition List.

(1) 1/4 inch open reel recorder/reproducer
(2) Cassette recorder/reproducer
(3) Cartridge recorder
(4) Cartridge reproducer

## 1-2-3 AUDIO MONITOR WITH CASTER

10 watts monitor speaker boxes with a builtin amplifier and caster shall be provided for Studio and Booth except News Studio N-1 and N-2. An wall type speaker box without an amplifier shall be provided for each N-1 and N-2 Studio. The quantities required are indicated in the Equipment Composition List.

## 1-2-4 MICROPHONE AND ASSOCIATED EQUIPMENT

The following equipment shall be provided for studios.
The quantities required for each items are indicated in the Equipment Composition List.

(1) Microphone
- Ribbon microphone
- Condenser microphone
- Dynamic microphone

(2) Microphone Stand
- Desk type
- Floor type
- Boom type

(3) Announce fader
Two announce fader shall be provided for N-1 and N-2 only.

## 1-2-5 AUDIENCE SPEAKER SYSTEM

Four 50 watts speakers shall installed in Studio A-1. Two of them shall be installed at the ceiling at the position prepared by the Building Contractor and the other at the both side of the stage. Four 50 watts Power Amplifier shall installed in the control booth A-1.

## 1-2-6 STAGE LIGHTING EQUIPMENT

The following equipment shall be provided for Studio A-1. The quantities required are indicated on the Equipment Composition List.

(1) Foot Light, 60W x 12 lamps
(2) Fresnel Spotlight with stand, 1kW
(3) Convex Spotlight with stand, 1kW
(4) Follow Spotlight with stand, 1kW

## 1-3 MASTER CONTROL SYSTEM

### 1-3-1 ON-AIR SWITCHER

An 18-input and 6-output electro-magnetic switcher shall be installed in cabinet racks in the Master Control Room. Any one of the 18 input audio signals can be switched to 6 outgoing channels by switching operations at the master control console.

Input signals are fed to the contact points of 6 pairs of outgoing busses and one monitor buss as illustrated on the relevant drawing.

Tally circuits shall be performed corresponding to the formation of the audio contact points.

Terminals of the control circuit shall be prepared for conversion of the on-air switcher into an automatic operation by attaching an automatic control device in future.

### 1-3-2 MASTER CONTROL CONSOLE

A console which controls the on-air switcher and monitors the audio signals shall be installed. It shall have the following parts and performances.

(1) 6 rows of 18 push-buttons for preset operation.
(2) 6 push-buttons (or switches) for selection of operate mode of "Master" or "Local".
(3) 1 push-button for "Master operate".
(4) 6 VU meters for the outgoing channels.
(5) 6 small VU meters for preset channels.
(6) 1 row of 18 push-buttons and 2 rows of 14 push-buttons for monitoring of audio signals.
(7) Display of programme sources of each outgoing channel.
(8) Display of on-air/preset/audition status of each Booth.

### 1-3-3 DISTRIBUTION NETWORK

All incoming and outgoing audio signals to and from the on-air switcher pass through the necessary network devices such as amplifiers, transformers, equalizers, pads and jacks. Studio-to-studio connection and OB-to studio connection shall be available by means of patching at jackfields, with some measures of protection from the connection between the output and input of the same mixing console. Circuits for inserting time-pip signal to outgoing channels shall be provided.

### 1-3-4 TALLY CIRCUIT

Tally circuits shall be provided as follows.

(1) Preset tally: A green lamp is lighted on the mixing console at each control booth when the booth is being preset by the master control console.

(2) On-air tally: A red lamp is lighted on the mixing console at each control booth when the booth is being on-air by the master control console.

### 1-3-5 CLOCK SYSTEM

A clock system consist of a master clock and slave clocks shall be provided. The master clock shall consist of two quartz controled clock units with an automatic changeover circuit. The master clock also generates the time-pip signal. The quantities of the slave clocks are indicated in the Equipment Composition List.

### 1-3-6 ROOM-TO-ROOM INTERCOM

Direct two way talking shall be available between any couples of rooms out of 14 rooms and between Master Control Room and Annex Staff Room and between Booth A-1 and Back Stage of A-1.

## 1-3-7 HOUSE MONITOR SYSTEM

Sound signals of the 6 outgoing channels shall be distributed to the rooms indicated in the relevant drawings at the level of -20dBm. The quantities of house monitors are indicated in the Equipment Composition List.

## 1-4 WIRELESS LINK SYSTEM

### 1-4-1 STUDIO-TRANSMITTER-LINK

In order to perform the Studio-Transmitter-Link for the existing transmitting stations, Nayarhat, Savar and Mirpur, the following equipment shall be provided.

(1) National Broadcasting House
1 set of UHF STL transmitter, 2 sets of parabolla antenna and 1 set of Yagi antenna.

(2) Nayarhat
Existing STL receiver and parabolla are used for receiving. The direction of parabolla shall be adjusted by the Contractor.

(3) Savar
1 set of UHF STL receiver and 1 set of Yagi antenna. The receiver shall be installed in HPT-1 House. An underground audio cable shall be set in order to feed the branched audio signals to the HPT-2 House in the same premises.

(4) Mirpur
1 set of UHF STL receiver and 1 set of Yagi antenna.

### 1-4-2 NEWS TRANSMISSION LINK

In order to perform a link for news transmission from the existing Broadcasting House to the National Broadcasting House, 1 set of FPU transmitter, 1 set of FPU receiver and 2 sets of Yagi antenna shall be provided. The FPU transmitter shall be installed in control booth

of news studio in the existing Broadcasting House and transmitting antenna shall also be installed on the rooftop of the existing House. The FPU receiver shall be installed in MCR of the National Broadcasting House.

1-4-3 WIRELESS INTERCOM

1 unit of 172.45 MHz transceiver shall be provided in the Master Control Room in order to communicate with the existing transceivers at other sites of Radio Bangladesh.

1-5 ALL WAVE RECEIVER

1 set of all wave receiver shall be set in the Master Control Room and 2 sets of all wave receiver shall be set in the News Staff Room. 1 set of receiving antenna shall be set at the roof of the National Broadcasting House and connected to these receivers.

1-6 NON-BREAK POWER SUPPLY

A Non-break power supply equipment consists of a rectifier, a thyrister controlled DC-AC converter and a floating battery system capable of 20 minutes supply without any AC input power shall be provided.

1-7 COMMON-USE EQUIPMENT

Besides the equipment mentioned in the foregoing Clauses, the equipment listed on the Item of Common-use Equipment in the Equipment Composition List shall be supplied. The installation work of this category of equipment is not under the responsibility of the Contractor.

## 1-8 SPARE PARTS

Undermentioned spare parts shall be provided.

(1) 1/10 of the quantities used in the supplied equipment for the following parts. Fraction shall be counted as 1.

- Semiconductor
- IC
- Resistor
- Capasitor
- Transformer
- Fader
- Switch
- Pushbutton
- Connector
- Jack
- Printed Circuit Board
- Connector
- Relay and Contactor
- Fuse Holder

(2) 10 times of the quantities used in the supplied equipment for the following parts.

- Head for Tape Recorder/Reproducer
- Stylus for Turn-table
- Incandescent Lamp
- Fuse
- Consuming Mechanical Parts

(3) The same of the quantities used in the supplied equipment for the following parts.

-Cartridge for turn-table

(4) Other parts recommended by the Contractor.

## 1-9 INSTALLATION WORK

The Contractor shall install the supplied equipment at the indicated position and adjust and test it. The responsibility of the wiring work of the Contractor is as follows.

(1) Wiring for Audio, Tally, Clock, Intercom and House Monitor:
All wiring inside and among the related rooms shall be set through the routes provided by the Building Contractor.

(2) Wiring for High Frequency Signal:
All wiring between the radio equipment and antenna shall be set through the routes provided by the Building Contractor.

(3) Wiring for Power and Earth:
Undermentioned wiring shall be set through the routes provided by the Building Contractor.
- Between the Non-break Power Supply and Power Distribution Board provided by the Building Contractor in the Power Room.
- Between the equipment and the Power switchbox provided by the Building Contractor in each room.
- Between the equipment and the earth terminal provided by the Building Contractor in each room.

## 1-10 INSTRUCTION MANUALS

Three copies of instruction manuals for the equipment supplied including manuals for transistors and ICs shall be provided for each kind of equipment.

# 2. GENERAL TECHNICAL REQUIREMENT

## 2. GENERAL TECHNICAL REQUIREMENT

### 2-1 STANDARDIZATION OF EQUIPMENT

The system and equipment are designed in accordance with the latest CCIR recommendations and Japanese Industrial Standard. The equipment shall be designed to be composed of standardized modules. Those equipment of an identical type shall be fablicated to consist of identical units, modules and components and to have an identical configulation so that to keep the interchangeability of the units, modules and parts.

### 2-2 COMPONENT PARTS

Such component parts as resisters, capacitors, semiconductors and others shall be, in principle, those available in the international markets. Supply of the component units, modules and other special component parts of the same type or equivalent shall be guaranteed for at least 10 years after the completion of this Contract.

### 2-3 POWER SUPPLY STANDARD

All audio equipment and wireless equipment shall operate with a single phase 230 volt, 50 Hz power supply. Tolerance against the variation of voltage and frequency shall be plus minus 10% of the rated value.

### 2-4 AMBIENT CONDITIONS

The equipment shall operate stably without any practical hindrance in a temperature rage of 10 to 40 degrees Centigrade and relative humidity of up to 95%.

### 2-5 WIRING

Wiring inside equipment or between equipment shall all be accomplished in good order not to cause interference between the wires no to hinder maintenance.

## 2-6 IDENTIFICATION MARK

Operational component parts such as switches, meters and indication lamps shall have marks to identify their functions on the components themselves or at their mounting locations.

All component parts shall have the description of their part numbers corresponding to those given on the relevant drawings in the instruction manuals.

## 2-7 FINISHING COLOR

The equipment shall be finished with the manufacturer's standard color.

# 3. EQUIPMENT COMPOSITION LIST

## 3-1 MASTER CONTROL ROOM (MCR)

| Item | Description | Q'ty |
|---|---|---|
| 1. | Distribution Network (Incoming) | 1set |
| 2. | Jack Panel | 1set |
| 3. | On-Air Switcher | 1set |
| 4. | Distribution Network (Outgoing) | 1set |
| 5. | Tally System | 1set |
| 6. | Master Control Console | 1set |
| 7. | Monitoring System | 1set |
| 8. | All Wave Receiver (Professional type) | 1set |
| 9. | Receiving Antenna ( H.F, M.F ) | 1set |
| 10. | Intercom System | 1set |
| 11. | Central Clock System | |
| | Master Clock | 1set |
| | 30 cm Slave Clock, 1 second step | 28 |
| | 30 cm Slave Clock, 30 second step | 11 |
| | 45 cm Slave Clock, 30 second step | 1 |
| | Digital Clock, 1 minute step | 1 |
| 12. | Wireless Intercom (50W) | |
| | 172.45MHz transceiver with Antenna and cables | 1unit |
| 13. | Operation Chair | 2 |
| 14. | Headphone | 2 |

## 3-2 CONTINUITY STUDIO ( C - 1 )

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Mixing Console | 10ch input | 1 |
| 2. | Tape recorder | Console type | 1 |
| 3. | Cartridge Tape-recorder | 1ch | 2 |
| 4. | Cartridge Tape-reproducer | 5ch | 3 |
| 5. | Turn-table | Single type | 2 |
| 6. | Audio Monitor with caster | | 3 |
| 7. | Microphon Vari-directional ribbon type | | 1 |
| 8. | Microphone Stand | Desk type | 1 |
| 9. | Operation Chair | | 1 |
| 10. | Lighted Studio sign (On-Air) | | 2 |
| 11. | Cabinet Rack for Cartridge Tape-recorder | | 1 |
| 12. | Headphone | | 1 |

## 3-3 CONTINUITY STUDIO ( C - 2 )

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Mixing Console | 10ch input | 1 |
| 2. | Tape-recorder | Console type | 2 |
| 3. | Cassette Tape-recorder | | 2 |
| 4. | Turn-table | Single type | 2 |
| 5. | Audio Monitor with caster | | 3 |
| 6. | Microphone | Vari-directional ribbon type | 1 |
| 7. | Microphone Stand | Desk type | 1 |
| 8. | Operation Chair | | 1 |
| 9. | Lighted Studio sign | | 2 |
| 10. | Headphone | | 1 |

## 3-4 CONTINUITY STUDIO ( C - 3 )

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Mixing Console | 10ch input | 1 |
| 2. | Tape-recorder | Console type | 2 |
| 3. | Turn-table | Single type | 2 |
| 4. | Audio Monitor with caster | | 3 |
| 5. | Microphone Vari-directional ribbon type | | 1 |
| 6. | Microphone Stand | Desk type | 1 |
| 7. | Operation Chair | | 1 |
| 8. | Lighted Studio sign | | 2 |
| 9. | Headphone | | 1 |

## 3-5 CONTINUITY STUDIO ( C - 4 )

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Mixing Console | 10ch input | 1 |
| 2. | Tape-recorder | Console type | 2 |
| 3. | Turn-table | Single type | 2 |
| 4. | Audio Monitor with caster | | 3 |
| 5. | Microphone Vari-directional Ribbon type | | 1 |
| 6. | Microphone Stand | Desk type | 1 |
| 7. | Opration Chair | | 1 |
| 8. | Lighted Studio Sign | | 2 |
| 9. | Headphone | | 1 |

## 3-6 NEWS STUDIO ( N - 1, 2 )

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Mixing Console | 10ch input | 1 |
| 2. | Tape-recorder | Console type | 1 |
| 3. | Cassette Tape-recorder | | 2 |
| 4. | Turn-table | Single type | 1 |
| 5. | Audio Monitor | Wall type | 4 |
| 6. | Microphone Vari-directional | Ribbon type | 2 |
| 7. | Microphone Stand | Desk type | 2 |
| 8. | Announce Fader Unit | | 2 |
| 9. | Operation Chair | | 1 |
| 10. | Lighted Studio Sign | | 4 |
| 11. | Headphone | | 3 |

## 3-7 MEDIUM STUDIO ( M - 1 )

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Mixing Console | 12ch input | 1 |
| 2. | Tape-recorder | Console type | 2 |
| 3. | Turn-table | Single type | 2 |
| 4. | Microphone | | |
| | Vari-directional | Ribbon type | 1 |
| | Uni/Omni directional | Condenser | 2 |
| | Uni-directional | Dynamic type | 2 |
| 5. | Microphone Stand | Floor type | 2 |
| | | Boom type | 2 |
| 6. | Audio Monitor with caster | | 3 |
| 7. | Power supply for condenser microphone | | 1 |
| 8. | Operation Chair | | 1 |
| 9. | Lighted Studio Sign | | 2 |
| 10. | Headphone | | 1 |

## 3-8 MEDIUM-LARGE STUDIO ( ML - 1 )

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Mixing Console ( stereo ) | 16ch input | 1 |
| 2. | Tape-recorder ( stereo ) | Console type | 2 |
| 3. | Turn-table (stereo ) | Single type | 2 |
| 4. | Microphone | | |
| | Vari-directional Ribbon type | | 2 |
| | Uni/Omni Directional Condenser | | 4 |
| | Uni-directional Dynamic type | | 2 |
| 5. | Microphone Stand | Floor type | 4 |
| | | Boom type | 4 |
| 6. | Audio Monitor with caster | | 4 |
| 7. | Power supply for condenser microphone | | 2 |
| 8. | Operation Chair | | 1 |
| 9. | Lighted Studio Sign | | 2 |
| 10. | Headphone | | 1 |

## 3-9 MEDIUM-LARGE STUDIO (ML - 2)

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Mixing Console | 12ch input | 1 |
| 2. | Tape-recorder | Console type | 2 |
| 3. | Turn-table | Single type | 2 |
| 4. | Microphone | | |
| | Vari-directional Ribbon type | | 1 |
| | Uni/Omni Directional Condenser | | 2 |
| | Uni-directional Dynamic type | | 2 |
| 5. | Microphone Stand | Floor type | 2 |
| | | Boom type | 2 |
| 6. | Audio Monitor with caster | | 3 |
| 7. | Power supply for condenser microphone | | 1 |
| 8. | Operation Chair | | 1 |
| 9. | Lighted Studio Sign | | 2 |
| 10. | Headphone | | 1 |

## 3-10 AUDIENCE PARTICIPATING STUDIO ( A - 1 )

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Mixing Console | 16ch input | 1 |
| 2. | Tape-recorder | Console type | 3 |
| 3. | Turn-table | Single type | 2 |
| 4. | Microphone | | |
| | Vari-directional Ribbon type | | 2 |
| | Uni/Omni Directional Condenser | | 3 |
| | Uni-directional Dynamic type | | 5 |
| 5. | Microphone Stand | Desk type | 1 |
| | | Floor type | 5 |
| | | Boom type | 1 |
| 6. | Audio Monitor with caster | | 3 |
| 7. | Power Supply for Condenser Microphone | | 2 |
| 8. | Operation Chair | | 2 |
| 9. | P.A System | | |
| | Ceiling Speaker | | 2 |
| | Stage Speaker with caster | | 2 |
| | Power Amplifier 50W | | 4 |
| | Sound Field Equalizer | | 2 |
| 10. | Simple Lighting System | | |
| | Footlight | 60W x 12 | 5 |
| | 1KW Fresnel Spotlight with Stand | | 2 |
| | 1KW Convex Spotlight with Stand | | 2 |
| | 1KW Follow Spotlight with Stand | | 2 |
| | Floor Pocket | 30A x 3 | 6 |
| | Wall Pocket | 30A x 2 | 5 |
| 11. | Headphone | | 1 |

## 3-11 ASSOCIATED ROOMS

| Item | Description | Q'ty |
|---|---|---|
| 1. | Editting Room 1, 2 | |
| | Tape-recorder Console type | 4 |
| | Cassette Tape-recorder | 2 |
| | Audio Monitor | 4 |
| 2. | Listening Room 1, 2 | |
| | Tape-recorder Console type | 2 |
| | Audio Monitor with caster | 2 |
| 3. | News Staff Room | |
| | All Wave Receiver (Semi-professional type) | 2 |
| | Audio Monitor for News Transmitting Link | 1 |
| 4. | Other Rooms | 20 |
| | House Monitor (input 6ch) | |

3-12 COMMON USE (1)

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Portable Audio Mixer | 4ch input | 2 |
| 2. | Tape-recorder | Console type | 2 |
| 3. | Tape-recorder | Portable type | 2 |
| 4. | Cassette Tape-recorder | Portable type | 2 |
| 5. | Cartridge Tape-recorder | 1ch | 1 |
| 6. | Turn-table | Single type | 1 |
| 7. | Reverberation Unit | | 2 |
| 8. | Microphone | | |
| | Vari-directional | Ribbon type | 3 |
| | Uni/Omni Directional | Condenser | 3 |
| | Uni- directional | Dynamic type | 3 |
| 9. | Microphone Stand | Desk type | 4 |
| | | Floor type | 2 |
| | | Boom type | 2 |
| 10. | Audio Monitor with caster | | 4 |
| 11. | Wireless Microphone System ( 403.03MHz ) for portable Cassette Tape-recorder | | 2 |
| 12. | Walky Talky (172.45MHz ) 1W | | 2 |
| 13. | Magnetic Telephone | | 1set |

## 3-12 COMMON USE (2)

| Item | Description | | Q'ty |
|---|---|---|---|
| 14. | Test and Measuring Equipment | | |
| | Distortion Meter/Osc | | 2 |
| | Audio Attenuater | | 2 |
| | Electronic Voltmeter | | 2 |
| | Frequency Counter | (10Hz - 600MHz) | 2 |
| | Oscilloscope | | 2 |
| | Wow Flutter Meter | | 2 |
| | Field Strength Meter | (25MHz - 1700MHz) | 1 |
| | Spectrum Analyzer | (10kHz - 1700MHz) | 1 |
| | Signal Generater | (50kHz - 1040MHz) | 1 |
| | FM Linear Detector | (20MHz - 1000MHz) | 1 |
| | RF Attenuater | (DC - 1500MHz) | 1 |
| | Multimeter | | 5 |
| | Mobile Trolley | | 2 |
| | Megger 1000V | | 1 |
| 15. | Tape Recorder Accessories | | |
| | Head Eraser | | 3 |
| | Tape Eraser for Open tape | | 2 |
| | Tape Eraser for Cartridge tape | | 1 |
| | Splicing Tape | | 50 |

## 3-12 COMMON USE (3)

| Item | Description | | Q'ty |
|---|---|---|---|
| 16. | Blank Tape | | |
| | Open Reel | | |
| | Blank tape | ( 185m ) | 150 |
| | | ( 370m ) | 200 |
| | | ( 150m ) | 150 |
| | Test tape | ( 19cm CCIR ) | 3 |
| | | ( 38cm CCIR ) | 3 |
| | Cartridge | | |
| | Blank tape NAB Asize | ( 60second ) | 100 |
| | | ( 180second ) | 100 |
| | | ( 300second ) | 100 |
| | | ( 420second ) | 100 |
| | | ( 600second ) | 100 |
| | Test tape | ( CCIR ) | 2 |
| | Cassette | | |
| | Blank tape | | 300 |
| | Test tape | | 4 |
| 17. | Spare Parts | | 1set |
| 18. | Tool Kit | | 5sets |

## 3-13 STUDIO TRANSMITTER LINK (STL)

| Item | Description | Q'ty |
|---|---|---|
| 1. | Studio Transmitter Link (STL) | |
| 1-1 | N.B.H | |
| | Multi-channel(4ch) Transmitter 473MHz | 1 |
| | 3.0m Parabolic Antenna with supporting metal (to SPT) | 1 |
| | 3.0m Parabolic Antenna with supporting metal (to HPT-1,2) | 1 |
| | 5-element Yagi Antenna with supporting metal (to LPT) | 1 |
| | Flexible coaxial cable (7/8") with connectors | 60m x 3 |
| | Splitter (6 : 6 : 1) | 1 |
| | Coaxial Switching Equipment and Dummy Load | 1 |
| 1-2 | H.P.T - 1,2 | |
| | Multi-channel(4ch) Receiver 473MHz | 1 |
| | 8-element Receiving Yagi Antenna with supporting metal (from NBH) | 1 |
| | Flexible coaxial cable (1/2") with connectors | 60m |
| | Audio distribution network | 1 |
| | Audio cable | 150m |
| 1-3 | L.P.T | |
| | Multi-channel(4ch) Receiver 473MHz | 1 |
| | 8-element Receiving Yagi Antenna with Antenna Mast (from NBH) | 1 |
| | Flexible coaxial cable (1/2") with connectors | 50m |

## 3-14 NEWS TRANSMISSION LINK

| Item | Description | | Q'ty |
|---|---|---|---|
| 2. | News Transmission Link | | |
| 2-1 | N.B.H | | |
| | VHF-FPU Receiver | 148.7MHz | 1 |
| | 5-element Yagi antenna with supporting metal | (from B.H) | 1 |
| | Flexible coaxial cable with connectors | | 70m |
| 2-2 | B.H | | |
| | VHF-FPU Transmitter | 148.7MHz | 1 |
| | 3-element Yagi Antenna with Antenna mast | (to N.B.H) | 1 |
| | Flexible coaxial cable with connectors | | 50m |

## 3-15 POWER SUPPLY

| Item | Description | | Q'ty |
|---|---|---|---|
| 1. | Non-break Power Supply | 20kVA | 1 set |

# 4. PERFORMANCE SPECIFICATIONS OF EQUIPMENT

## 4. PERFORMANCE SPECIFICATIONS OF EQUIPMENT

### 4-1 AUDIO CONTROL SYSTEM FOR ASSIGNMENT

The following performance specifications shall be applied to all audio signal routes to be formed between the input and output audio jacks in the master assignment system.

| | |
|---|---|
| (1) Input signal level: | 0 dBm 600 ohms balanced |
| (2) Output signal level: | +4dBm 600 ohms balanced |
| (3) Indication of VU meter: | 0 VU at +4dBm |
| (4) Frequency response: | within ±1dB at 40 to 15,000Hz |
| (5) Harmonic distortion: | less than 0.5% at +4dBm output<br>less than 1.0% at 15dBm output |
| (6) Signal-to-noise ratio: | more than 60dB |
| (7) Crosstalk: | less than -70dB at 8,000Hz |

### 4-2 MIXING CONSOLE FOR STUDIO

The following performance specifications shall be applied to all audio signal routes to be formed between the input and output audio jacks of Mixing Consoles which are set in Continuity studio 1,2,3,4 and News studio, Medium studio, medium-large studio 1(stereo), 2 and Audience Participating studio of N.B.H.

(1) Input signal and impeadance

| | |
|---|---|
| Microphone: | -70, -60, -50, -40, -30 dBm<br>whichever selected by switch,<br>High impeadance, balanced. |
| Line: | 0 dBm 600 ohms balanced |

(2) Output signal level and impeadance:

0 dBm 600 ohms balanced

(3) Indication of VU meter: 0 VU at 0 dBm

(4) Frequency response: within ±0.5dB 40 to 15,000Hz

(5) Signal-to-noise ratio: 52dB or more at mic input (using 20kHz LPF and 600 ohms termination)

(6) Harmonic distortion: 0.5% or less at 40 to 15,000Hz when the input level is raised by 15dB above the rated level.

(7) Crosstalk: 70dB or more at 8,000Hz

## 4-3 PORTABLE AUDIO MIXER

(1) Input signal level and impeadance:

| | | |
|---|---|---|
| Microphone: | -70, -50 dBm | high impeadance, balanced |
| Line: | 0 dBm | 600 ohms balanced |

(2) Output signal level and impeadance:

0, +4dBm 600 ohms balanced

(3) Frequency response: within ±1dB 40 to 15,000Hz

(4) Signal-to noise ratio: 50dB or more at mic input

(5) Harmonic distortion: 0.75% or less at 50 to 15,000Hz
Increasing the input level up to 35dB and output level up to 15dB respectively

(6) Crosstalk: 60dB or more at 8,000Hz

## 4-4 TAPE-RECORDER CONSOLE TYPE

| | |
|---|---|
| (1) Recording system: | AC bias system at 200kHz approx |
| (2) Tape speed: | 19cm/s (7.5ips) and 38cm/s (15ips) |
| (3) Tape speed deviation: | ±0.2% or less at stipulated tape speed |
| (4) Wow and flutter: | 19cm/s 0.055% w.r.m.s or less<br>38cm/s 0.035% w.r.m.s or less |
| (5) Tape width: | 6.3mm (1/4 inch) |
| (6) Track configuration: | |
| Mono: | Full track |
| Stereo: | 2 track, to be based upon CCIR STD. |
| (7) Line input and output | |
| line input: | 600 ohms, 0dBm balanced |
| line output: | 600 ohms, 0dBm balanced |
| (8) Playback equalization: | CCIR 19cm/s 70us, 38cm/s 35us |
| (9) Overall frequency response: | |
| | 19cm/s 30 to 15,000Hz ±2dB<br>38cm/s 30 to 18,000Hz ±2dB |
| (10) Overall signal-to-noise response: | |
| Mono: | 66dB or more (at 520nWb/m, ASA-A weighted) |
| Stereo: | 63dB or more |
| (11) Overall total harmonic distortion: | 0.8% or less at 400Hz |
| (12) Channel separation: | 50dB or more at 1kHz on the nomal operation level. (Stereo) |

## 4-5 CARTRIDGE TAPE-RECORDER

| | |
|---|---|
| (1) Recording system: | AC bias system |
| (2) Tape speed: | 19cm/s (7.5 IPS) |
| (3) Tape speed deviation: | ±0.5% or less |
| (4) Wow and flutter: | 0.15% w.r.m.s or less |
| (5) Tracks: | two(2) tracks<br>First track for aural signal<br>Second track for cue signal |
| (6) Input signal: | 0dBm 600 ohms, balanced |
| (7) Output signal: | 0dBm 600 ohms, balanced |
| (8) Playback equalization: | CCIR (70us) |
| (9) Frequency response: | ±2dB at 40 to 12,000Hz |
| (10) Signal-to-noise ratio: | 50dB or more |
| (11) Total harmonic distortion: | 1.5% or less at 0dB, 1000Hz |
| (12) Crosstalk: | -50dB or more between cue track and audio track |
| (13) Remote control: | START or SEQUENCE START<br>STOP, RECORD, CUE,<br>MODE SELECTION (SEQUENCE/RANDOM)<br>STAND-BY (NEXT/CONTINUE)<br>RESET, SHIFT |

## 4-6 CASSETTE TAPE-RECORDER

| | |
|---|---|
| (1) Recording system: | AC bias system |
| (2) Tape speed: | 4.8cm/s |
| (3) Wow and flutter: | 0.06% w.r.m.s or less |
| (4) Tracks: | 4-track 2-channel stereo |
| (5) Input signal: | -70dBm 600 ohms balanced(Portable type)<br>0dBm 600 ohms balanced(Stationary type) |
| (6) Output signal: | 0.3V 47K ohms |
| (7) Overall frequency response: | ±3dB at 40 to 15,000Hz |
| (8) Overall total harmonic distortion: | 1.5% or less |
| (9) Overall signal-to-noise ratio: | 55dB or more |

## 4-7 PORTABLE TAPE-RECORDER (OPEN REEL TYPE)

| | | |
|---|---|---|
| (1) | Recording system: | AC bias system |
| (2) | Tape speed: | 19.5cm/s (7.5ips) |
| (3) | Tape speed deviation: | ±0.5% or less servo-controlled |
| (4) | Wow and flutter: | 0.1% w.r.m.s or less |
| (5) | Track: | Full track mono |
| (6) | Input: | -70dBm 600 ohms balanced |
| (7) | Output: | -20dBm 600 ohms balanced |
| (8) | Playback equalization: | CCIR 70us |
| (9) | Frequency response: | $^{+2}_{-4}$dB 40 to 12,500Hz |
| (10) | Signal-to-noise ratio: | 50dB or more |
| (11) | Harmonic distortion: | 2% or less |
| (12) | Power requirements: | DC 12V<br>AC 230V 50Hz (with the AC adaptor) |

## 4-8 TURN-TABLE

| | |
|---|---|
| (1) Type: | Stereo/Mono Switchable |
| (2) Speeds: | 33-1/3, 45, and 78rpm |
| (3) Speed deviation: | within 0.01% (33-1/3 and 45rpm)<br>within 0.5% (78rpm) |
| (4) Driving system: | Quartz controled direct drive AC servo-motor (33-1/3 and 45 rpm quartz lock, except 78rpm) |
| (5) Line output: | 0dBm 600 ohms balanced |
| (6) Equalization: | RIAA and SP |
| (7) Wow and flutter: | 0.04% or less w.r.m.s |
| (8) Frequency response: (Amplifier) | RIAA 50 to 15,000Hz ± 1dBm<br>SP 50 to 8,000Hz ± 1dBm |
| (9) Signal-to-noise ratio: | 50dB or more (33-1/3rpm) |
| (10) Harmonic distortion: (Amplifier) | 0.8% or less at 1,000Hz |

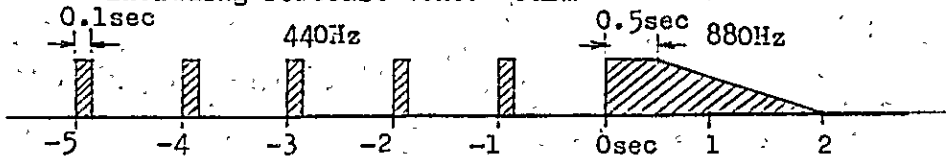
## 4-9 CENTRAL CLOCK SYSTEM

(1) Time accuracy: $\pm 1 \times 10^{-7}$

(2) Time stability: $\pm 1 \times 10^{-6}$/week (0.09sec/day)

(3) Output signal:

3-1 On-the-hour tone
including forecast tone: 0dBm




3-2 On-the-hour tone only: 0dBm

3-3 Every second signal: 500msec interval contact output

3-4 Every minute signal: 1sec interval contact output

3-5 Every hour signal: 1sec interval contact output

3-6 One second slave clock
output: 3sec cycle 24V

3-7 30second slave clock output: polarized 24V

(4) Master clock time indication monitor

Time indication signal for transmission of on the hour tone shall be monitored by digital indication, The indication shall be given on a given hour with the period being 24hours.

(5) Slave clock output monitor

Signal to 1second slave clock and 30second slave clocks shall be monitored.

(6) Slave clocks

6-1 One(1) second clock with a second hand.
This clock shall be able to indicate time in minutes in combination with the master clock.

6-2 Thirty(30) second clock
This clock shall be able to indicate time in minutes in combination with the master clock.

6-3 Digital clock
This clock shall be able to indicate time in minutes in combination with the master clock for studio A-1.

4-10 AUDIO MONITOR WITH CASTER

This equipment shall consist of a speaker and an amplifier accommodated in the same cabinet.

| | |
|---|---|
| (1) Input level: | -20 to 0 dBm continuously adjustable |
| (2) Input impeadance: | 600 ohms and 10k ohms switchable |
| (3) Maximum output level: | 10 watts |
| (4) Frequency response: | Within ±1.0 dB 50 to 10,000Hz |
| (5) Signal-to-noise ratio: | 60 dB or more |
| (6) Harmonic distortion: | 1.0% or less at rated output |

4-11 AUDIO MONITOR (WALL TYPE)

| | |
|---|---|
| (1) Input power: | Maximum 10 watts |
| (2) Speaker impeadance: | 8 ohms |
| (3) Frequency range: | 50 to 15,000Hz |
| (4) Cabinet: | Bass Reflective Type |

4-12 HOUSE MONITOR

| | |
|---|---|
| (1) Type: | Wall-mount type 6ch input |
| (2) Input: | -23 dBm 600 ohms balanced |
| (3) Maximum output: | 2 watts |
| (4) Frequency response: | Within ±1.0 dB 300 to 10,000Hz referenced to 1,000Hz |
| (5) Signal-to-noise ratio: | 46dB or more at 2watts output |
| (6) Harmonic distortion: | 2% or less at 1,000Hz output of 2 watts and 8 ohms load |

## 4-13 SPEAKER AMPLIFIER AND SOUND FIELD EQUALIZER FOR AUDIENCE SPEAKER SYSTEM

(1) Speaker

Speaker shall consist of a High frequency sectoral horn speaker and a Low frequency front loading corn speaker with bass reflective cabinet.

| | | |
|---|---|---|
| 1-1. | Input signal: | 65 watts or more |
| 1-2. | Frequency response: | 45 to 20,000Hz (crossover 1,200Hz) |
| 1-3. | Pressure sensitivity: | 100dB SPL or more |
| 1-4. | Impeadance: | 8 ohms |
| 1-5. | Horizontal and Vertical distribution: | 40° x 90° |

(2) Amplifier

| | | |
|---|---|---|
| 2-1. | Input signal: | 0dBm 600 ohms or 10K ohms (switchable) |
| 2-2. | Output power: | 50 watts or more |
| 2-3. | Frequency response: | ±1 dB 50 to 15,000Hz |
| 2-4. | Signal-to-noise ratio: | 60 dB or more |
| 2-5. | Harmonic distortion: | 0.5% or less at rated output |

(3) Sound Field Equalizer

| | | |
|---|---|---|
| 3-1. | Type: | 1/3 octave 28 point |
| 3-2. | Input: | 0 dBm 600 ohms balanced |
| 3-3. | Output: | 0 dBm 600 ohms balanced |
| 3-4. | Frequency response: | ±1 dB 30 to 15,000Hz |
| 3-5. | Signal-tonoise ratio: | 60 dB or more |
| 3-6. | Harmonic distortion: | 0.5 % or less at rated output |

## 4-14 STUDIO-TRANSMITTING-LINK (STL)

This STL system utilized UHF band frequency and 4 audio programs shall be transmitted by one UHF carrier by mean of FM-FM multiple modulation

STL transmitter

(1) Transmission terminal equipment

1-1 Limitter amplifier

| | |
|---|---|
| Audio input: | +4dBm 600 ohms balanced |
| Audio output: | +4dBm 600 ohms balanced |

1-2 FM modulation down converter

| | |
|---|---|
| Intermediate frequency: | 6.8 MHz |
| Type of modulation: | FM |
| Frequency deviation: | ±7.5kHz at 1kHz 100% |
| Local oscillator frequency: | see fig.1 |
| Sub-carrier frequency: | see fig.1 |
| Sub-carrier output: | 1V r.m.s 75 ohms |
| Audio input: | +4dBm 600 ohms balanced |
| Audio frequency response: | ±0.5dB at 50 to 10,000Hz |
| Audio distortion: | less than 1% 50 to 10,000Hz |
| Sprious response: | less than -60dBm |

1-3 System performance

| | |
|---|---|
| Audio response: | ±1dB at 50 to 10,000Hz |
| Audio distortion: | less than 3% 50 to 10,000Hz |
| Audio signal-to-noise ratio: | more than 50dB |
| Crosstalk: | more than 50dB |

(2) Wide band transmitter

| | |
|---|---|
| Carrier frequency: | 473 MHz |
| Output power: | 25 watts |
| Frequency stability: | $\pm 2 \times 10^{-4}$ |
| Sprious: | less than 1mW |
| Modulation: | FM |
| Frequency deviation: | ±1 MHz |
| Multiplex input: | 1V p-p |
| Input impeadance: | 75 ohms unbalanced |

(3) Antenna system

3-1 Transmitting antenna for NAYARHAT and SAVAR

| | |
|---|---|
| Frequency: | 473 MHz |
| Type of antenna | 3.0meter parabolic antenna |
| Gain: | 21dB or more |
| Impeadance: | 50 ohms VSWR less than 1.15 |
| Plane of polarization: | Horizontal |
| Wind-resistant charactristic: | The antenna is to withstand wind velocity of 60m/sec |

3-2 Transmitting antenna for MIRPUR

| | |
|---|---|
| Frequency: | 473 MHz |
| Type of antenna: | 5-element Yagi antenna |
| Gain: | +9dB |
| Impeadance: | 50 ohms VSWR less than 1.2 |
| Plane of polarization: | Horizontal |
| Wind-resistant charactristic: | The antenna is to withstand wind velocity of 60m/sec |

3-3 Splitter

| | |
|---|---|
| Dividing ratio: | 6 : 6 : 1 |
| Frequency: | 473MHz |
| Impeadance: | 50 ohms VSWR less than 1.1 |
| Insertion loss: | less than 0.3dB |

STL receiving system

(1) Reception terminal equipment

1-1 Program audio amplifier

| | |
|---|---|
| Audio input: | 0.1V r.m.s 75 ohms |
| Audio output: | +4dBm 600ohms balanced |
| Audio frequency response: | ±0.5dB at 50 to 10,000Hz |
| Audio distortion: | less than 1% 50 to 10,000Hz |

1-2 FM demodulator up converter

| | |
|---|---|
| Intermediate frequency: | 6.8 MHz |
| Type of modulation: | FM |
| Frequency deviation: | ±15kHz at 1kHz 100% |
| Local frequency: | See fig. 1 |
| Sub carrier frequency: | See fig. 1 |
| Sub carrier input: | 0.1V r.m.s 75 ohms |
| Audio output: | +4dBm 600 ohms |
| Audio frequency response: | ±0.5dB 50 to 10,000Hz |
| Audio distortion: | 1% 50 to 10,000Hz |

1-3 System performance

| | |
|---|---|
| Audio response: | ±1dB at 50 to 10,000Hz |
| Audio distortion: | less than 3% 50 to 10,000Hz |
| Audio signal-to-noise ratio: | more than 50dB |
| Crosstalk: | more than 50dB |

(2) Wide band receiver

| | |
|---|---|
| Receiving frequency: | 473 MHz |
| Input level: | -60 dBm |
| Modulation of receiving wave: | FM |
| Noise figure: | 10dB normal |
| Frequency stability: | $\pm 1 \times 10^{-5}$ |
| Intermediate frequency: | 70 MHz |
| AGC range: | input level -70dBm to -30dBm |
| Multiplex output: | 1V p-p |
| Output impeadance: | 75 ohms unbalanced |

(3) Antenna system

3-1 Receiving antenna for Mirpur and Savar

| | |
|---|---|
| Frequency: | 473 MHz |
| Type of antenna: | 8-element Yagi antenna |
| Impeadance: | 50 ohms VSWR less than 1.4 |

Fig. 1 SUB-CARRIER FREQUENCY AND LOCAL FREQUENCY

| CHANNEL | Freq of Sub-Carrier | Freq of Local |
|---|---|---|
| | AUDIO SIGNAL | |
| 1. | 58.5 KHz | 6741.5 KHz |
| 2. | 145.5 KHz | 6654.5 KHz |
| 3. | 247.5 KHz | 6552.5 KHz |
| 4. | 337.5 KHz | 6462.5 KHz |

## 4-15 NEWS TRANSMISSION LINK

(1) Transmitter

| | |
|---|---|
| Frequency: | 148.7MHz |
| Power output: | 5 watts |
| Modulation system: | FM |
| Frequency stability | within $\pm 2 \times 10^{-5}$ |
| Spurious radiation | more than 60dB |
| RF output impeadance | 50 ohms |
| Audio input | |
| Microphone: | -50dBm 600 ohms balanced |
| Line: | -20, 0dBm 600 ohms balanced |
| Frequency deviation: | 140 kHz |
| Distortion: | less than 1.5% 100 to 10,000Hz |
| Pre-emphasis: | Within +1.0dB to -2.0dB of time constant 75us pre-emphasis characteristics from 50 to 10,000Hz |

(2) Receiver

| | |
|---|---|
| Receiving frequency: | 148.7MHz |
| Intermediate frequency: | 10.7 MHz |
| Local oscillator stability: | within $10 \times 10^{-6}$ |
| Noise figure: | more than 8dB |
| Signal-to-noise ratio: | more than 60dB |
| Spurious rejection: | more than 65dB |
| Audio Frequency response: | within +0.5dB to -2.0dB of time constant of 75us de-emphasis characteristices from 50 to 10kHz at reference 400Hz |
| Audio distortion: | less than 1% |
| Audio output: | 0dBm 600 ohms balanced |

## 4-16 NON-BREAK POWER SUPPLY

| | |
|---|---|
| (1) AC input: | 400V ± 10%<br>50Hz ± 2Hz 3-phase 3-wire system |
| (2) AC output: | 230V ± 2%<br>50Hz ± 0.5%<br>Single phase 2-wire system |
| (3) Output capacity: | 20kVA |
| (4) Power factor: | More than 0.85 |
| (5) Waveform distortion: | less than 5% under rated opreation |
| (6) Instantaneous voltage variation: | At ±30% instantaneous load variation and at failure and recovery switching within ±8% ratedvoltage, recovery time within 200ms |
| (7) Cooling system: | Natural air cooling |
| (8) Battery operation time: | 20minutes under full load |
| (9) Type of battery: | Pocket plate type nikel alkaline battery 170cells |