

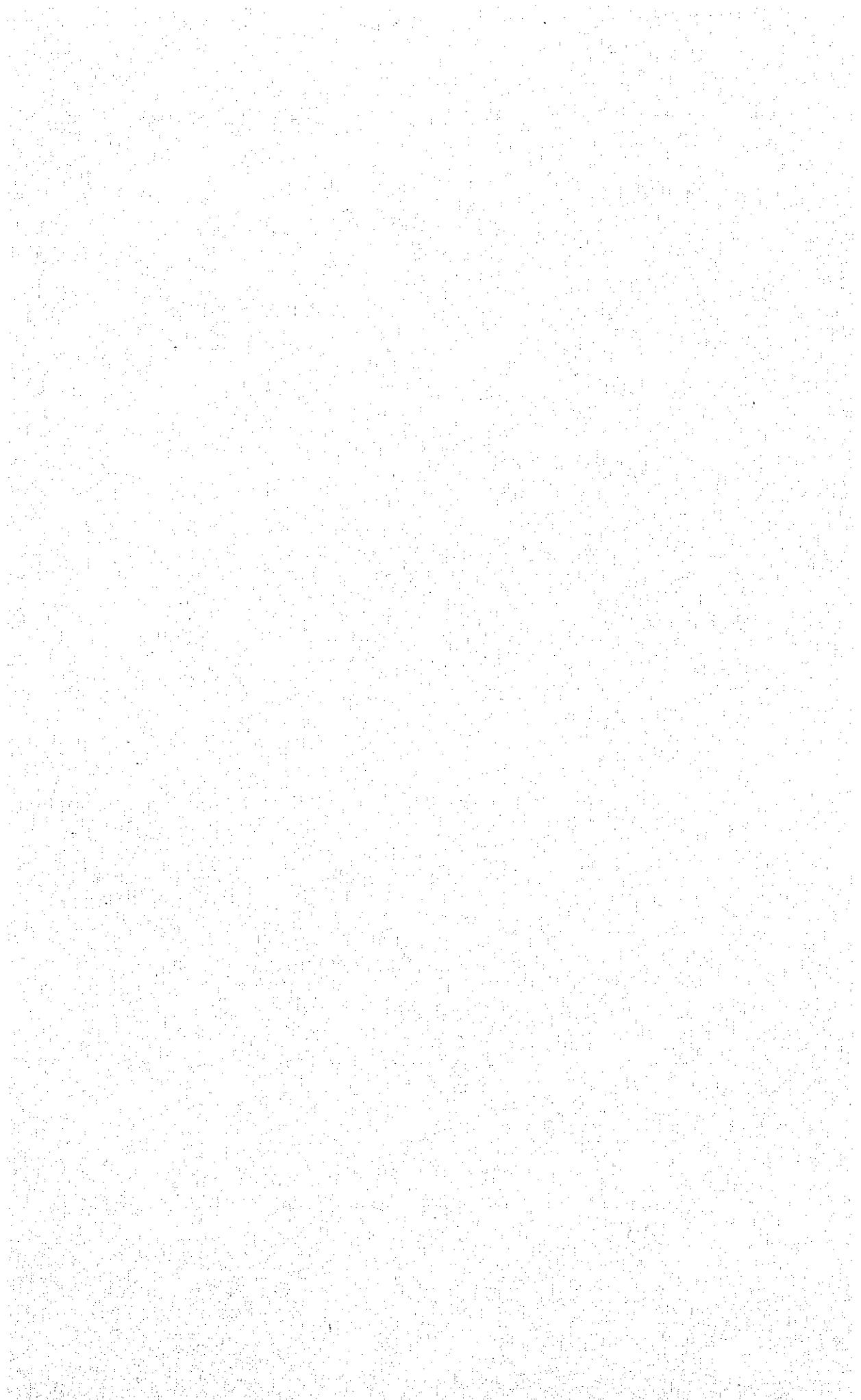
THE KINGDOM OF NEPAL
DETAIL DESIGN REPORT
ON
THE ESTABLISHMENT PROGRAMME
OF
MEDIUM WAVE RADIO BROADCASTING NETWORK

VOLUME I
TECHNICAL SPECIFICATIONS FOR BROADCASTING EQUIPMENT

MARCH 1981

JAPAN INTERNATIONAL COOPERATION AGENCY





No. 8

マイクロ
フィッシュ作成

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FORMATION OF TECHNICAL SPECIFICATIONS

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1. SCOPE OF WORK

This specification stipulates the manufacture, installation, adjustment, and testing of radio broadcasting equipment for the Establishment Programme of Medium Wave Radio Broadcasting Network in the Kingdom of Nepal.

Those broadcasting equipment are to be installed at the following sites under the responsibility of the contractor.

- (1) Kathmandu Studio Centre
- (2) Kathmandu Transmitting Station
- (3) Pokhara Transmitting Station

The contractor shall provide all items of equipment and materials set out in this specification and install, adjust, and deliver them on the turn-key basis as specified.

1-1 KATHMANDU STUDIO CENTRE

The new studio centre is built in the present site of the Radio Nepal building, where is in the Kathmandu city, a place relatively near Patan city. Location of the new studio centre is as follows:

Location : Singh Durbar, Kathmandu
Longitude : 85°19'35" E
Latitude : 27°41'45" N
Altitude : 1,285 m

The new studio centre shall consist of one (1) music studio, two (2) production studios, one (1) talk studio, one (1) master control room with announce studio, power room and others.

1-1-1 Music Studio

Complete music programmes, such as light music, folk song, audience participating programme, etc. and lectures, etc. shall be produceable by using those equipment to be installed at this studio.

1) Mixing Console

A mono type mixing console shall be provided. The console shall have the input signals of sixteen (16) channels of microphone/line. The console shall be made of wood or steel with excellent utility and of good finish.

The console shall be equipped with modular units and other components with suitable arrangement to perform their functions. The console shall be equipped with mechanical type indicators or LED type indication lamps of adequate colors for indicating all necessary operational modes to the operator and other operating personnel.

The console shall have the following functions.

a. Input Module

- a-1. Pre-adjustment of input level.
- a-2. Equalization of low, middle and high frequency ranges for sound effect. (± 12 dB at each frequency, relative to 1 kHz)
- a-3. Input check by means of non-lock button.
- a-4. Programme transfer through switches.

Output signal shall be transferable to the following items.

- * To No.1 master module
 - * To No.2 master module
 - * To No.1 group module
 - * To No.2 group module
 - * FOLD BACK
 - * ECHO
- a-5. Echo out : Can be branched before and after fader. Off position also shall be available.
 - a-6. Fold back : Can be on and off by "Push-lock and Push-release" button.
 - a-7. Fader : Conductive plastic fader, with sufficient durability.

b. Group module

b-1. Fader : The same type as mentioned in item a-7 above.

b-2. Programme transfer through switches. Output signal shall be transferable to the following items.

* To No.1 master module

* To No.2 master module

* FOLD BACK

* ECHO

c. Master module

c-1. Fader : The same type as mentioned in item a-7 above.

c-2. Programme line output

c-3. Fold back output

d. Special effect function

d-1. Echo : For signal transfer from "echo out" of input module or group module to echo machine or echo room.

The output level shall be controllable with fader.

d-2. Fold back : For signal transfer from "fold back out" of input module, group module and master module to floor speaker and headphone.

e. Other function

e-1. Audition : For monitoring the signal of pre-fader of each input and group module.

e-2. Speaker level control.

e-3. VU meter.

e-4. Talk back function.

e-5. Test signal oscillator (50 Hz, 100 Hz, 400 Hz, 1 kHz, 4 kHz, 7 kHz, 10 kHz and 15 kHz)

e-6. Remote control for disc reproducers, open reel tape machines and cassette tape machines.

e-7. Output changeover switch : Programme outputs of No.1 and No.2 master module shall be changeable by change-over switch for the output to master control room.

- e-8. On-air control switch : Signal output switcher for sending the programme to existing master control room and others shall be controllable by depressing the pushbutton. Pre-set also shall be available.
- e-9. Other function necessary for audio mixing equipment shall be included.

2) Disc Reproducer

Two (2) sets of stereo/mono type disc reproducers shall be provided in this studio.

The turntable shall be driven directly by a motor controlled electrically and not by a belt or an idler, to ensure longer service life and higher stability. "PLAY" and "STOP" shall be locally and remotely controllable by pushbutton operation. A less inertia moment turntable and a large-torque low-vibration motor shall be used to ensure quick start and smooth rotation. Rotation fluctuation shall be minimized. Rumbling shall be minimized. The turntable speed control system shall be employed so that the speed can be independent of power supply frequency variation.

Moving magnetic type cartridge shall be employed, which shall allow replacement of stylus. No performance variation shall be caused by stylus replacement.

Electronics sections are gathered on circuit boards, and grouped by functions to provide plug-in units.

Most adjustments and operations shall be attainable from the front. Monitoring by loudspeaker shall be available.

3) Open Reel Tape Machine

Two (2) sets of mono type open reel tape machines shall be provided in this studio.

"REC", "PLAY", "STOP", "RWD" and "F. FWD" shall be carried out by pushbutton operation. Remote control also shall be available. In the case of "REC", recording operation shall be started by only depressing the "REC" pushbutton.

Tape speed selection shall be accomplished by switch operation, and amplifier equalizer selection shall be effected in connection with tape speed selection. Tape speed and its control shall be independent of main power supply frequency variation.

Capstan driving shall not employ any consumptive part such as a belt and an idler. No mechanical section shall require lubrication at all.

The magnetic head shall employ three heads (erasing head, recording head and playback head) of 6.3 mm wide oxide tape use and shall be made of ferrite or hard permalloy having an excellent durability.

The tension servo mechanism shall be provided for application of tape tension on the tape supply and take-up sides for protection of magnetic tape.

The recording amplifier, reproduction amplifier, bias oscillator, etc. shall be gathered for respective functions to provide plug-in units.

CCIR cine type and USA type reels shall be used.

Click sound shall be minimized. A particular consideration shall be given to rise-up and fall-down characteristics of the bias oscillator for prevention of recording click from occurrence.

A test oscillator shall be built in to allow to supply test signal to the recording amplifier by switch operation.

Most adjustments and operations shall be achievable from the front.

4) Cassette Tape Machine

Two (2) sets of stereo type cassette tape machines shall be provided in this studio. The cassette tape machine shall be portable (table-top) type.

"REC", "PLAY", "STOP", "RWD" and "F. FWD" shall be carried out by pushbutton operation. Remote control also shall be available.

The tape speed shall be independent of main power supply frequency variation.

Input or output level shall be indicated by VU meters.

The stereo signals of the cassette tape machine shall be mixed by matching box for changing the stereo signal to mono signal.

5) Microphone and Microphone Stand

Microphones to be provided shall be two (2) in type, i.e. moving coil microphone and condenser microphone. Power supplies for condenser microphones shall be provided.

Microphone floor stands and microphone boom stands shall be provided. The microphone floor stand shall be smoothly variable from a height of 1,090 mm up to 1,920 mm and shall allow being fixed at any position in between.

Boom length of the boom stand shall be 2,000 mm or more. Stand of the boom stand shall be able to extend and contract in two (2) steps, and to slide by a length of 1,150 mm to 1,830 mm and shall allow being fixed at any position in between. The boom shall be able to revolve 360 degrees horizontally 100 degrees vertically, with the branching point as its focal point.

6) Monitoring Equipment

Two (2) sets of loudspeakers for studio floor, one (1) set of loudspeaker for talk back, one (1) set of loudspeaker for sub-control room, one (1) set of loudspeaker for line monitor and one (1) set of headphone shall be provided. Loudspeakers except for line monitor and talk back speakers shall be mounted on carriage.

7) Echo Machine

Two (2) sets of mono type echo machines shall be provided. The echo machine shall be portable type to be shared with other studios.

8) Others

The other necessary equipment shall be provided and good earth work, wiring, etc. shall be carried out completely. On-air or rehearsal lamp flashing shall be allowed.

1-1-2 Production Studio No.1 and No.2

A variety of programmes, such as dramas, small scale music programmes, talks and interviews etc. shall be producible by using those equipment to be installed at the respective studios. The equipment and systems of studio No.1 and No.2 shall be identical completely.

1) Mixing Console

A mono type mixing console shall be provided at each studio. The console shall have the input signals of twelve (12) channels of microphone/line. Others shall be conformed to the corresponding item of the music studio mentioned above except for the followings.

- a. Remote control for disc reproducer, open reel tape machines, cartridge tape machine and cassette tape machines shall be available.
- b. An announcer unit shall be able to use.

2) Disc Reproducer

One (1) set of stereo/mono type disc reproducer shall be provided. Others shall be conformed to the corresponding item of the music studio mentioned above.

3) Open Reel Tape Machine

This item shall be conformed to the corresponding item of the music studio mentioned above.

4) Cartridge Tape Machine

One (1) set of single channel cartridge tape machine shall be provided. The cartridge tape machine is used for recording and reproducing of short announcement, spot commercial messages, call-sign etc.

All operation such as play, stop and other necessary items shall be achievable at the front by pushbuttons. Remote control also shall be available.

Recording or playback level shall be indicated by VU meter.

The tape speed shall be independent of main power supply frequency variation by using CVCF.

Cartridge tape eraser shall be provided.

5) Cassette Tape Machine

This item shall be conformed to the corresponding item of the music studio mentioned above.

6) Microphone and Stand

Microphones to be provided shall be conformed to the corresponding item of the music studio mentioned above.

An announcer unit also shall be provided. The announcer unit shall have the function to control the output level of the announcer microphone and shall be equipped with volume control for the headphone and following indication lamps :

- * Connection lamp
- * On-air lamp
- * Microphone on-air lamp
- * Cue lamp

Microphone floor stands, microphone desk stands, microphone suspension equipment and an announcer desk shall be provided. Microphone floor stands shall be conformed to the corresponding item of the music studio mentioned above.

7) Monitoring Equipment

One (1) set of loudspeaker for studio floor, one (1) set of loudspeaker for talk back, one (1) set of loudspeaker for sub-control room, one (1) set of loudspeaker for line monitor and two (2) sets of headphones shall be provided. Loudspeakers except for line monitor and talk back speakers shall be mounted on carriage.

8) Others

This item shall be conformed to the corresponding item of the music studio mentioned above.

1-1-3 Talk Studio

Talk programmes, interviews, information programmes, etc. shall be produceable by using those equipment to be installed in this studio.

1) Mixing Console

A mono type mixing console shall be provided in this studio. The console shall have the input signals of six (6) channels of microphone/line. Others shall be conformed to the corresponding item of the production studio mentioned above except for the followings.

- a. Programme transfer through switches for input module. Output signal shall be transferable to the following items.

- * To No.1 master module

- * To No.2 master module

- * FOLD BACK

- b. No group module shall be provided.
- c. No echo function shall be provided.

2) Disc Reproducer

This item shall be conformed to the corresponding item of the production studio mentioned above.

3) Open Reel Tape Machine

This item shall be conformed to the corresponding item of the music studio mentioned above.

4) Cartridge Tape Machine

This item shall be conformed to the corresponding item of the production studio mentioned above.

5) Cassette Tape Machine

This item shall be conformed to the corresponding item of the music studio mentioned above.

6) Microphone and Stand

Moving coil microphones shall be provided. Others shall be conformed to the corresponding item of the production studio mentioned above.

7) Monitoring Equipment

This item shall be conformed to the corresponding item of the production studio mentioned above except for the following.

A loudspeaker for studio floor shall be shared with talk back speaker.

8) Others

This item shall be conformed to the corresponding item of the music studio mentioned above.

1-1-4 Master Control Room with Announce Studio

Master control room shall have the following functions.

- a. Assignment of programme.
- b. Programme transmission to Kathmandu and Pokhara transmitting station and existing master control room.
- c. Production of programme.
- d. Reproduction of recorded programme.
- e. Monitoring of the operational condition of each studio and master control room.
- f. Monitoring of the on-air programme.
- g. Clock system.
- h. Communication link.

Non-stop operation, by means of battery system, of the minimum system for production and transmission of programme shall be considered at the time of power supply failure. The operation time shall be more than ten (10) minutes.

1) Master Control Console

A master control console shall be provided in the master control room. The console shall be made of wood or steel with excellent utility and of good finish. The console shall be equipped with LED type indication lamps of adequate colour for indicating all necessary operational modes to the operator and other operating personnel. The display of the operational state shall be intelligible, clear and accurate.

Pre-set and on-air assignment system for the signal-output-line to existing master control room and others shall be provided. In the system, any one (1) pre-set signal source shall be shifted to on-air signal source automatically by stop-action of any on-air switch.

The console shall have the following functions.

- a. On-air tallies and operational pushbutton.
- b. Pre-set tallies and operational pushbuttons.
- c. Monitoring switches.
- d. Remote control for disc reproducers, open reel tape machines, cartridge tape machines and cassette tape machines. The remote control shall be inter-locked with on-air and pre-set switchers.
- e. Time signal mix.
- f. Real time display.
- g. VU meter.
- h. Monitor speaker level control.

2) Mixing Console

A mono type mixing console shall be provided. The console shall have the input signals of six (6) channels of microphone/line. Others shall be conformed to the corresponding item of the talk studio mentioned above except for the following.

- a. Remote control for disc reproducers, open reel tape machines, cartridge tape machines and cassette tape machines shall be available.

3) Disc Reproducer

This item shall be conformed to the corresponding item of the music studio mentioned above.

4) Open Reel Tape Machine

Three (3) sets of mono type open reel tape machines shall be provided. Others shall be conformed to the corresponding item of the music studio mentioned above.

5) Cartridge Tape Reproducer

Three (3) sets of single channel cartridge tape reproducers shall be provided. Those cartridge tape reproducers shall be arranged with a remote box. All operations such as play, stop and other necessary items shall be achievable at the front by pushbutton. Remote control also shall be available. Playback level shall be indicated by VU meter.

The tape speed shall be independent of main power supply frequency variation by using CVCF.

6) Cassette Tape Machine

This item shall be conformed to the corresponding item of the music studio mentioned above.

7) Microphone and Stand

This item shall be conformed to the corresponding item of the talk studio mentioned above.

8) Monitoring Equipment

One (1) set of loudspeaker for mixing console, one (1) set of loudspeaker for line monitor, one (1) set of loudspeaker for announce booth monitor and two (2) set of headphone shall be provided. The loudspeakers except for announce booth monitor speaker shall be mounted on carriage.

Two (2) sets of all wave receivers with antenna shall be provided for air-monitor.

Four (4) sets of loudspeakers for monitor service also shall be provided at specified rooms.

9) Clock System

A combination of a pulse generator, which shall generate time signal required for broadcast service and pulse signal for driving the second and other clocks necessary for utilizing facilities in this studio centre, and an associate clock system shall be provided.

This clock system shall allow time correction and lead/lag setting by manual operation. Both all together time correction (in which all clocks be corrected at a time) and separate time correction (in which time correction be made at each clock separately) shall be available.

A floating battery shall be built in or externally connectible for use in the event of power failure.

Time signal such as forecast tone and on-the-hour tone can be mixed with output signal by using this clock system.

The following slave clocks at specified location shall be driven by this clock system.

- * Digital clock 1
- * One (1) second step clocks 12
- * Thirty (30) second steps clocks 6

An alarm shall be given in the event of power failure or failure of other important matters.

10) Communication Link

a. Room to room intercom

Room to room intercom system shall be provided between following rooms.

- Existing master control room
- Master control room
- Music studio
- Production studio No.1
- Production studio No.2
- Talk studio

Service room
Power room
Maintenance room
Office

b. Studio to transmitting station link

Communication link from studio centre to Kathmandu transmitting station shall be provided by using of VHF transceivers. Those transceivers shall be driven by both AC and DC power supply. Brawn antenna in studio site, 3-element Yagi antenna in transmitting site and feeders shall be provided.

Communication link from studio centre to Pokhara transmitting station shall be considered by using of telecommunication line. No terminal equipment for telecommunication line shall be included in this contract.

11) Programme Transmission Link

a. Studio centre to Kathmandu transmitting station

A complete programme transmission link shall be provided between studio centre and Kathmandu transmitting station. One-way, one channel link shall be duplicated with automatic changeover facilities in 160 MHz band. 5-element Yagi antennas and feeders shall be provided in both studio centre and transmitting site.

b. Studio centre to Pokhara transmitting station

Both way of programme transmission link between studio centre and Pokhara transmitting station shall be considered by using of telecommunication line. No terminal equipment for telecommunication line shall be included in this contract. However, equalizers shall be provided for the receiving programmes in both studio centre and Pokhara transmitting station.

12) Others

This item shall be conformed to the corresponding item of the music studio mentioned above.

1-1-5 Power Room

City power of 400 V/230 V, 50 Hz, 3 phases, 4 wires and 200 kVA shall be supplied for the power to the studio centre.

In consideration of power supply voltage variation, an induction voltage regulator of 30 kVA shall be provided and power to respective equipment shall be fed through distribution boards. Furthermore, automatic circuit breaker with over voltage relay and over current relay shall be provided for the instantaneous trip of main power.

An 100 kVA engine generator shall be provided to assure power supply in case the city power fails.

For fuel oil tank, one (1) outdoor tank of 2000 l (not included in the scope of work to be implemented by the contractor) and an indoor tank of 200 l shall be provided.

Two (2) sets of battery and chargers shall be provided. One of them shall be used for engine start and emergency lamps, the other shall be used for the non-stop operation of the minimum system for production and transmission of programme at the time of power supply failure.

The scope of work to be covered by the contractor for the power supply system in the studio centre shall be as follows.

- 1) Installation, wiring and piping of incoming panel, induction voltage regulator, power distribution boards, engine generator, generator control panel, battery and chargers, sub-fuel-oil-tank and test dummy.
- 2) Wiring from distribution board of each equipment room to all broadcasting equipment to be installed in the room. (The distribution board in each equipment room and wiring on the main power supply side shall be provided separately by the contractor.)

1-2 KATHMANDU TRANSMITTING STATION

The new Kathmandu transmitting station is built in the new site, where is about 5.8 km away from the new studio centre and about 2.0 km aside from the Ring Road. Location of the new Kathmandu transmitting station is as follows:

Location : Lalitpur, Kathmandu

Longitude : 85°18'30" E

Latitude : 27°39'10" N

Altitude : 1,351 m

This transmitting station shall be operated continuously attended. Control and monitoring of the station shall be made manually on the control console. This transmitting station shall accommodate the main transmitter of 100 kW, the stand-by transmitter of 10 kW and associated equipment such as control/monitoring console, programme input equipment, transmitter dummy load, surge protector, programme transmission link, communication link, main electric power facilities with engine generator, antenna tuning unit, transmitting antenna (not included in the scope of work to be covered by the contractor), clocks, measuring equipment, etc.

1-2-1 Transmitter Room

1) Radio Transmitter

The output power of 100 kW for main transmitter and the output power of 10 kW for stand-by transmitter shall be provided. The whole transmitter system shall operate at 1/10 of the rated power in the event of the main transmitter failure or city power failure by using of the stand-by transmitter.

The modulation system for both transmitters shall be the final stage plate-modulation type. All high power stage tubes of the transmitters shall be forced air cooled tetrodes. Low power stages shall be solid-state circuit.

The transmitters shall be capable of satisfactory operation at the rated power with 100 % modulation. All operation and monitoring of the transmitter shall be achievable at the front. Remote control at the control/monitoring console shall be also available. The transmitter shall be equipped with all means for control and monitoring which can give indications of working state and audio and visual alarms, whenever necessary, as well as the means for material and personnel protections. The relay circuit shall be rationally designed and start of transmitter shall be controlled by depressing a single knob located on the control console or the transmitter control board. All control means and their indicators necessary for looking over the transmitters and their operations shall be functionally situated for ease of servicing and rapid guiding of attendant personnel. Measuring and controlling points shall be provided to allow full detailed checks and easy repair.

A multiple automatic reconnection circuit shall be provided for protection against overload, shortcircuiting, arcing, sparks, aerial mismatching, etc. Three (3) consecutive times of reconnection shall be performed before cutting off the high DC voltage to the transmitter.

2) Control/Monitoring Console

The following functions for control and monitoring of the transmitters shall be provided on the control/monitoring console.

a. Control function

a-1. Start and stop

a-2. Adjustment of audio input level

a-3. Changeover of output power

b. Monitoring function

b-1. Operation mode and working state

b-2. Output power

b-3. Modulation degree

b-4. Audio signal level

b-5. Faults (OLR, NTR, door open, cooling air diminution etc.)

Necessary functions for control and monitoring of other equipment, i.e. power supply equipment, STL, monitor speaker etc. shall be provided on the control/monitoring console.

3) Programme input/Monitoring Equipment

A rack for the following equipment shall be provided.

- * Input programme selection switch
- * Audio level meter and an audio volume control
- * Automatic monitor
- * Line equalizer
- * Limiting amplifier
- * Audio monitor amplifier and speaker
- * Jack panel

4) Dummy Load

An air-cooled type dummy load shall be provided to dissipate safely full modulated power of the transmitter with all accessories to enable the transmitter to check the output power in the matching conditions.

Compensation of stray capacity shall be performed in the dummy cubicle.

Feeder line current meter shall be provided on the front panel of the cubicle.

The 100 kW and 10 kW transmitters shall use the dummy in common.

5) Surge Protector

A surge detector shall be provided at the output of the matching section to detect the reflected wave when the ball gap of the base insulator arcs over or some accident arises in the transmission line.

By action of the surge protector, the exciting voltage to the high power amplifier and modulating power amplifier shall be cut off impulsively several times. Then the arcing shall vanish and abnormal operation can be avoided.

6) Antenna Tuning Unit

The matching equipment shall be provided in the antenna tuning unit room. For the antenna impedance and feeder impedance, the matching equipment shall be matched. The matching equipment also shall be able to carry power and not become overheated or cause sparking.

Antenna current meter shall be provided. Drain choke coil shall be provided.

Due consideration shall be given to protection against thunder for the antenna tuning unit.

7) Communication Link

a. Room to room intercom

Room to room intercom system shall be provided between following rooms.

Transmitter control room

Office (1)

(2)

(3)

(4)

(5)

(6)

Work shop

Power room

b. Communication link and programme transmission link for studio centre to Kathmandu transmitting station are included in the studio centre equipment.

8) Others

The other necessary equipment shall be provided and good earth work, wiring, etc. shall be carried out completely.

1-2-2 Power Room

This item shall be conformed to the corresponding item of the studio centre except for the followings.

- a. Capacity of city power supply shall be 600 kVA.
- b. Capacity of induction voltage regulator shall be 400 kVA.
- c. Capacity of engine generator shall be 70 kVA.
- d. One (1) set of battery and charger for engine start and emergency lamps shall be provided.

1-3 POKHARA TRANSMITTING STATION

The new Pokhara transmitting station is built in the new site, where is in the city of Pokhara. The location of Pokhara transmitting station is as follows:

Location : Male Patan, Pokhara
Longitude : 83°59'00" E
Latitude : 28°13'10" N
Altitude : 902 m

This transmitting station also shall be operated continuously attended. Control and monitoring of the station shall be made manually on the control console.

This transmitting station shall consist of the same transmitters and associated equipment as Kathmandu transmitting station, one (1) production studio and one (1) set of OB wagon.

1-3-1 Transmitter Room

1) Radio Transmitter

This item shall be conformed to the corresponding item of the Kathmandu transmitting station.

2) Control/Monitoring Console

This item shall be conformed to the corresponding item of the Kathmandu transmitting station.

3) Programme input/Monitoring Equipment

This item shall be conformed to the corresponding item of the Kathmandu transmitting station except for the followings.

- a. No input programme selection switch shall be provided.
- b. No line equalizer shall be provided.

4) Dummy Load

This item shall be conformed to the corresponding item of the Kathmandu transmitting station.

5) Surge Protector

This item shall be conformed to the corresponding item of the Kathmandu transmitting station.

6) Antenna Tuning Unit

This item shall be conformed to the corresponding item of the Kathmandu transmitting station.

7) Others

This item shall be conformed to the corresponding item of the Kathmandu transmitting station.

1-3-2 Production Studio

News, disk jockey, talk and interview programmes etc. shall be produceable by using those equipment to be installed at this studio.

1) Mixing Console

A mono type mixing console shall be provided. The console shall have the input signals of ten (10) channels of microphone/line. Others shall be conformed to the corresponding item of the production studio in the studio centre mentioned above except for the followings.

- a. Remote control for disc reproducers, open reel tape machines, cartridge tape machines, and cassette tape machines shall be available.

b. No echo function shall be provided.

2) Disc Reproducer

This item shall be conformed to the corresponding item of the music studio in the studio centre.

3) Open Reel Tape Machine

This item shall be conformed to the corresponding item of the music studio in the studio centre.

4) Cartridge Tape Machine

One (1) set of single channel cartridge tape machine and one (1) set of single channel cartridge reproducer shall be provided.

Others for cartridge tape machine shall be conformed to the corresponding item of the production studio in the studio centre.

Others for cartridge tape reproducer shall be conformed to the corresponding item of the master control room in the studio centre.

5) Cassette Tape Machine

This item shall be conformed to the corresponding item of the music studio in the studio centre.

6) Microphone and Stand

This item shall be conformed to the corresponding item of the talk studio in the studio centre.

7) Monitoring Equipment

One (1) set of loudspeaker for studio floor, one (1) set of loudspeaker for talk back, one set of loudspeaker for sub-control room and two (2) sets of headphones shall be provided. Loudspeaker except for talk back speaker shall be mounted on carriage.

8) All Wave Receiver

Two (2) sets of all wave receivers and associated equipment shall be provided for receiving of the short-wave

programme of existing Khumaltar transmitting station in case the programme transmission line between Kathmandu studio centre and Pokhara transmitting station fails.

9) Communication Link

a. Room to room intercom

Room to room intercom system shall be provided between following rooms.

Transmitter control room

Office (1)

(2)

(3)

(4)

Work shop

Power room

b. Station to OB Wagon

Communication link from Pokhara transmitting station to OB wagon shall be provided by using of VHF transceivers. Those VHF transceivers for Pokhara transmitting station shall be driven by both AC and DC power supply.

Brawn antenna in transmitting site, whip antenna at OB wagon and feeders shall be provided.

10) Others

This item shall be conformed to the corresponding item of the music studio in the studio centre.

1-3-3 OB Wagon

The wagon loaded light-weight mixing equipment and recording equipment shall be provided for outdoor programme production. The wagon shall employ a powerful diesel engine and 4-wheel-drive car.

An antenna for communication link and DC power supply outlet box to be connected with car battery shall be equipped on the car.

1) Portable Audio Mixer

Two (2) sets of mono type portable mixer shall be provided. The mixer shall have the input signals of four (4) channels of microphone/line. The mixer shall be carried by a man easily. The mixer shall be driven by both AC and DC power supply.

The mixer shall have the following functions.

- a. Pre-adjustment of the input level.
- b. Input and output programme level control.
- c. Headphone monitor.
- d. VU meter.

2) Portable Open Reel Tape Machine

Two (2) sets of portable open reel tape machines shall be provided. The open reel tape machine shall be carried by a man easily and driven by both AC and DC power supply.

The magnetic head shall employ three heads (erasing head, recording head and playback head).

Tape speed selection shall be accomplished by switch operation.

Input or output level shall be indicated by VU meter.

No.5 tape (275 m) shall be usable.

3) Portable Cassette Tape Machine

Two (2) sets of portable cassette tape machines shall be provided. The cassette tape machine shall be carried by a man easily and driven by both AC and DC power supply.

Input and output level shall be indicated by VU meters.

4) Microphone and Stand

Moving coil microphones, condenser microphones with power supply, floor stands and desk stands shall be provided.

5) Monitoring Equipment

One (1) set of loudspeaker and power amplifier and two (2) sets of headphones shall be provided.

6) Others

The other necessary equipment for outdoor programme production such as long microphone cable with reel, long AC supply cable with reel, carrying cases for all equipment, etc. shall be provided.

All equipment for OB wagon shall be usable in the production studio of Pokhara transmitting station.

1-3-4 Power Room

This item shall be conformed to the corresponding item of the Kathmandu transmitting station.

2. GENERAL TECHNICAL REQUIREMENTS

2-1 AUDIO SIGNALS

- (1) The nominal audio signal level at the input and output terminals of the equipment shall be 0 dBm, except for the followings:
 - a. The input level of the programme transmission link and network shall be +4 dBm.
 - b. The input level of the microphone circuit of the audio mixing console shall be between -70 dBm and -40 dBm.
 - c. Others such as, cassette tape machine, portable audio mixer, portable open reel tape machine, etc. shall be specified separately.
 - d. The input level of the transmitter shall be +10 dBm at 100 % modulation.
- (2) The termination impedance of the audio equipment at the input and output terminals shall be 600 ohms unless otherwise specified.

2-2 STANDARD SPECIFICATIONS AND REGULATIONS

The equipment and installations shall be in accordance with the latest issues and amendments of the following standard, recommendations, specifications and regulations, except where they are at variance with any clause in this Technical Specification.

- a. Recommendations of the International Radio Consultative Committee (CCIR)
- b. Recommendations of the International Electrotechnical Commission (IEC)
- c. Japanese Industrial Standards (JIS)
- d. Standard of Electronic Industries Association of Japan (EIAJ)

2-3 POWER SUPPLY

Sites are supplied with the power of 400/230 volts, 50 Hz, 3-phase, 4-wire system.

2-4 OPERATING CONDITION

All items of equipment and installations covered by this Specification shall be designed and constructed to conform to accepted standards of good engineering practice and shall be suitable for continuous operation in non-air-conditioned areas at temperature of 0°C to 45°C and humidities up to 95 %.

2-5 RELIABILITY

Reliability and continuity of service of the equipment are of the utmost importance.

2-6 SIMPLICITY OF OPERATION AND MAINTENANCE

Simplicity of operation and maintenance and ease of fault location are essential. All equipment shall be so constructed and finished that similar type of units, parts, spares and replacements are interchangeable easily and quickly.

2-7 MODULAR CONSTRUCTION AND USE OF SEMI-CONDUCTOR DEVICES

All electronic equipment except high-power section of transmitter shall be of modular construction and use semi-conductor devices instead of electron tubes.

2-8 NOISE AND VIBRATION

The whole plant covered by this Specification shall operate as quietly and as free from vibration as possible.

2-9 STANDARDIZATION

Those equipment of an identical type shall be fabricated to consist of identical units, modules, and component parts and to have identical configuration. Also, consideration shall be given in design so that component units, modules and parts can provide interchangeability as much as possible among different types of equipment as well.

2-10 COMPONENT PARTS

Such component parts as resistors, capacitors, and semi-conductors to be employed shall be, in principle, purchaseable in international markets. Supply of component units, modules, and other special component parts of the same type or equivalent shall be guaranteed for at least 10 years after the initial supply of these components.

2-11 WIRING

(1) Arrangement of Wires and Cables

All wirings, including inter-equipment cabling, shall be arranged systematically, excluding the case where such arrangement gives ill-effect over the technical performance.

(2) Inter-equipment Wiring

All inter-unit and inter-equipment cables shall be passed through terminals or connectors.

(3) Interference Suppression

Careful consideration shall be given to spurious radiation and spurious response.

(4) Protection of Cables

Inter-equipment cables shall be laid conduits, floor ducts, wiring ladders or covered with other suitable means for protection from damage.

2-12 LABELS AND IDENTIFICATIONS

(1) Identification of Components

All component units of the equipment and all operating switches, fuses, meters, indicating lamps, socket outlet, and others shall be provided with identification labels showing their functions and readily identified on the relevant circuit diagrams. Labelling of a small component which may be replaced in the course of maintenance shall be on the suitable place adjacent to that component.

(2) Identification of Terminals

All terminals shall be clearly marked with numbers or letters, indicating the wires or circuits accommodated therein and those numbers and letters shall correspond to those shown on the circuit diagram.

2-13 FINISH COLOUR

The equipment shall be finished with "NHK Standard Colour No.2 and/or 3", unless under unavoidable circumstances where the standard colour of the manufacturer may be employed with approval.

2-14 CLEANLINESS

The equipment shall be designed to minimize entry of dust or foreign particles, especially where forced ventilation is used.

2-15 SAFETY REGULATIONS

Particular attention shall be paid to the design and installation of the equipment in order to afford maximum safety to the operational staff and associate personnel in both mechanical and electrical aspects.

(1) Door Switch

Under no circumstances shall it be possible to apply any dangerous voltage to a transmitter when the transmitter doors are open. Power equipment located external to the main cubicles shall be enclosed by protective fences and provided with warning lamps and door switches.

(2) Discharger

All high voltage DC supplies shall be provided with substantial and robust bleeder resistors to prevent danger to operational staff from charged capacitors.

(3) Terminals

Any terminal carrying dangerous potentials and remaining

alive when the access doors are open or units withdrawn shall be properly shrouded and provided with a "DANGER" label in red.

(4) Earthing (Grounding)

All equipment shall be connected with low resistance earth (ground) system.

2-16 APPROVAL DRAWINGS

After the detail discussion with consultant, 4 copies of detail installation drawings shall be submitted to the consultant for approval by contractor. And after the approval of the consultant, 2 copies of them shall be submitted to Kathmandu Headquarters and 1 copy of them shall be submitted to the consultant by the contractor and the contractor also shall keep 1 copy of them himself.

2-17 INSPECTIONS

(1) Factory Inspection

1) The following items of equipment shall undergo factory inspection for their total quantities to be supplied.

Mixing console

Audio control system for assignment

Open reel tape machine

Disc reproducer

Cartridge tape machine

Cassette tape machine

Clock system

STL

Transmitter

Control/monitoring console for transmitter

Programme input/monitoring equipment for transmitter

Dummy load for transmitter

Surge protector for transmitter

Antenna tuning unit

Power supply equipment

OB wagon

- 2) Other items of equipment than mentioned above shall be checked for their external views and quantities. When, necessary, sampling inspection may be performed.
- 3) Inspection shall be conducted in the presence of the inspector. Those equipment rejected by the inspection shall not be shipped off.
- 4) 4 copies of inspection data shall be submitted to Kathmandu Headquarters.

(2) Acceptance Inspection

After completion of the installation, the inspector shall inspect equipment installed and works carried out by the contractor for compliance to the contract. Judgment shall be made by data obtained by the factory inspection. However, when measurement is not achievable with test equipment available at the site, the inspector shall determine by the presence/absence of substantial hindrance.

2-18 INSTRUCTION MANUALS

For each equipment to be supplied to a site, 3 copies of instruction manual describing operation and trouble-shooting shall be supplied to the site. Every instruction manual must have been prepared comprehensible in consideration of convenience of routine work by the operator. In addition to these instruction manuals, 3 copies of completed drawings and tables for the sake of operation and maintenance (including drawings of systems, subsystems, and equipments, parts lists, and other necessary data of all stations) shall be submitted to Kathmandu Headquarters.

2-19 EQUALIZATION

When there may be frequency response degradation in the wiring between subsystem, equalization shall be effected at the input of the subsystem.

2-20 SPARE PARTS

Spare parts recommended by the contractor shall be supplied after the approval of the consultant except for the followings.

- 1) Electron tube : 100% of those in use
- 2) Lamps and fuses : 200% of those in use
- 3) Meters : one set for each type
- 4) Jacks, plugs and connectors : one set for each type
- 5) Relays, switches and keys : one set for each type
- 6) Air filters : 200% of those in use

2-21 ACCESSORIES

The contractor shall supply special tools and gauges required for maintenance and adjustment of the equipment and suitable accessories for good operation of the equipment.

3. PERFORMANCE SPECIFICATIONS OF STUDIO EQUIPMENT

3-1 MIXING CONSOLE

The following performance specifications shall apply to mixing consoles to be provided at music studio, production studio No.1 and No.2, talk studio and master control room in Kathmandu studio centre and at production studio in Pokhara transmitting station.

To be concrete, these specifications shall apply to all audio signal routes to be formed between the input and output jacks.

- 1) Input signal level
 - Microphone : -70 to -40 dBm
 - Line : 0 dBm
- 2) Output signal 0 dBm
- 3) Input impedance
 - Microphone : high impedance
 - Line : 600 Ω
- 4) Output impedance 600 Ω
- 5) Indication of VU meter 0 VU at 0 dBm
- 6) Frequency response within ± 1 dB at the frequency range of 50 to 15,000 Hz, relative to 1,000 Hz.
- 7) Harmonic distortion less than 0.5 % at 0 dBm output
less than 1 % at 15 dBm output
- 8) Signal-to-noise ratio more than 50 dB at a pre-amp input of -70 dBm
- 9) Crosstalk less than -60 dB at 7 kHz
- 10) Polarity same at input to output ends

3-2 AUDIO CONTROL SYSTEM FOR ASSIGNMENT

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

- 1) Input signal level 0 dBm

- 2) Output signal level
 - To existing master control room : 0 dBm
 - Others : 0 dBm
- 3) Input impedance 600 Ω
- 4) Output impedance 600 Ω
- 5) Indication of VU meter 0 VU at 0 dBm
- 6) Frequency response within ± 1 dB at the frequency range of 50 to 15,000 Hz, relative to 1,000 Hz.
- 7) Harmonic distortion less than 0.5 % at 0 dBm output
less than 1 % at 15 dBm output
- 8) Signal-to-noise ratio more than 50 dB at a pre-amp input of -70 dBm
- 9) Crosstalk less than -60 dB at 7 kHz
- 10) Polarity same at input to output ends

3-3 DISC REPRODUCER

The following performance specifications shall apply to disc reproducers.

- 1) Turntable speed 3 speeds (33 1/3, 45 and 78 r.p.m.)
- 2) Adaptable disc outside diameter 40 cm, maximum
- 3) Wow and flutter less than 0.05 %
- 4) Output signal level 0 dBm
- 5) Output impedance 600 Ω
- 6) Frequency response within ± 1 dB in 50 to 15,000 Hz range
- 7) Distortion less than 1 % at 1,000 Hz normal operating level
- 8) Signal-to-noise ratio more than 50 dB at normal operating level

3-4 OPEN REEL TAPE MACHINE

The following performance specifications shall apply to open reel tape machines.

- 1) Tape speed 19 cm per sec. and 38 cm per sec.
- 2) Tape width 6.3 mm

- | | | |
|-----|----------------------------|---|
| 3) | Tape speed deviation | within $\pm 0.2\%$ |
| 4) | Wow and flutter | |
| | 19 cm per sec. | less than 0.1 % |
| | 38 cm per sec. | less than 0.06 % |
| 5) | Input signal level | 0 dBm |
| 6) | Input impedance | 600 Ω |
| 7) | Output signal level | 0 dBm |
| 8) | Output impedance | 600 Ω |
| 9) | Overall frequency response | |
| | 19 cm per sec. | within ± 2 dB 40 to 15,000 Hz |
| | 38 cm per sec. | within ± 2 dB 40 to 18,000 Hz |
| 10) | Signal-to-noise ratio | more than 55 dB |
| 11) | Erasing | 70 dB or more |
| 12) | Total harmonic distortion | less than 2 % at standard recording level of 1,000 Hz |

3-5 CARTRIDGE TAPE MACHINE

The following performance specifications shall apply to cartridge tape machines and cartridge tape reproducers.

- | | | |
|-----|----------------------------|---|
| 1) | Tape speed | 19 cm per sec. |
| 2) | Tape speed deviation | within $\pm 0.5\%$ |
| 3) | Wow and flutter | less than 0.2 % |
| 4) | Input signal level | 0 dBm |
| 5) | Input impedance | 600 Ω |
| 6) | Output signal level | 0 dBm |
| 7) | Output impedance | 600 Ω |
| 8) | Overall frequency response | within ± 2 dB 40 to 12,000 Hz |
| 9) | Signal-to-noise ratio | more than 50 dB |
| 10) | Total harmonic distortion | less than 2 % at standard recording level of 1,000 Hz |

3-6 CASSETTE TAPE MACHINE

The following performance specifications shall apply to cassette tape machines.

- | | | |
|----|------------|-----------------|
| 1) | Tape speed | 4.8 cm per sec. |
|----|------------|-----------------|

- 2) Wow and flutter less than 0.1 %
- 3) Overall frequency response within ± 3 dB 40 to 15,000 Hz
- 4) Total harmonic distortion less than 2 % at standard recording level of 1,000 Hz
- 5) Signal-to-noise ratio more than 50 dB

3-7 LOUDSPEAKER

The following performance specifications shall apply to the loudspeakers for sub-control room of each studio and for mixing console and line monitor in master control room.

- 1) Frequency response within ± 3 dB 100 to 15,000 Hz
- 2) Signal-to-noise ratio more than 60 dB
- 3) Harmonic distortion less than 1 % at rated output

3-8 ALL WAVE RECEIVER

The following performance specifications shall apply to all wave receivers for Kathmandu studio centre, Kathmandu transmitting station and Pokhara transmitting station.

- 1) Frequency range 100 kHz to 30 MHz
- 2) Sensitivity less than 6 μ V for 20 dB S/N at 1.6 MHz to 30 MHz
less than 100 μ V for 20 dB S/N at 100 kHz to 1599.9 kHz
- 3) Frequency stability within 300 Hz after one (1) hour operation
- 4) Image rejection ratio more than 50 dB at 100 kHz to 1599.9 kHz
more than 70 dB at 1.6 MHz to 30 MHz
- 5) Input impedance 75 Ω
- 6) Line output impedance 600 Ω

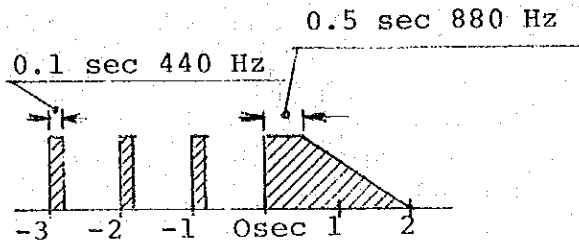
3-9 MASTER CLOCK

The following performance specifications shall apply to master clock in master control room.

- 1) Time accuracy $\pm 1 \times 10^{-7}$
- 2) Time stability $\pm 1 \times 10^{-6}$ /week (0.09 sec/day)

3) Output signal

On-the-hour tone including forecast tone 0 dBm x 1 channel



On-the-hour tone only 0 dBm x 1 channel
 Every second signal 500 msec interval contact output x 1 channel
 Every minute signal 1 sec interval contact output
 Every hour signal 1 sec interval contact output
 One second slave clock output 3 sec cycle 24 V
 Thirty second slave clock output polarized 24 V

3-10 PROGRAMME TRANSMISSION LINK

The following performance specifications shall apply to programme transmission link for Kathmandu studio centre to Kathmandu transmitting station.

a. Characteristics of transmitter

- 1) Rated output power 10 W
- 2) Modulation FM modulation with variable reactance
- 3) Maximum frequency deviation ± 40 kHz
- 4) Frequency stability $\pm 10 \times 10^{-6}$
- 5) Spurious radiation -60 dB or less relative to fundamental signal
- 6) Distortion less than 1 % at 100 Hz to 7.5 kHz
 less than 1.5 % at 50 Hz to 10 kHz

- 7) Signal-to-noise ratio more than 55 dB at 400 Hz
100 % modulation
 - 8) Pre-emphasis 75 μ s
 - 9) Input impedance 600 Ω
 - 10) Input level
 - Microphone input level -60 dBm
 - Line input level + 4 dBm
 - 11) Output impedance 50 Ω unbalanced
- b. Characteristics of receiver
- 1) Type of receiver single superheterodyne
 - 2) Selectivity more than 20 dB at \pm 150 kHz
more than 70 dB at \pm 250 kHz
 - 3) Sensitivity less than 30 dB for 50 dB S/N
 - 4) Distortion
 - less than 1 % at 100 Hz to 7.5 kHz
 - less than 1.5 % at 50 Hz to 10 kHz
 - 5) Squelch shall operate below 10 dBu of incoming signal level
 - 6) Input impedance 50 Ω
 - 7) Output impedance 600 Ω
 - 8) Line output level 0 dBm

3-11 INDUCTION VOLTAGE REGULATOR

The following performance specifications shall apply to induction voltage regulator for Kathmandu studio centre.

- 1) Capacity (line capacity) 30 kVA
- 2) Input voltage variation 400 V/230 V \pm 20 %
- 3) Output voltage variation 400 V/230 V \pm 2 %
- 4) Overall efficiency more than 90 %
- 5) Insulation more than 5 M Ω
- 6) Dielectric strength test 1.5 kV for one (1) minute

3-12 ENGINE GENERATOR

The following performance specifications shall apply to engine generator for Kathmandu studio centre.

a. AC Generator

- 1) Output 100 kVA
- 2) Voltage 400 V/230 V \pm 2 %
- 3) Number of phase 3 (4 wires)
- 4) Frequency 50 Hz
- 5) Number of poles 4
- 6) Speed 1500 rpm
- 7) Power factor 0.8
- 8) Excitation self-excitation

b. Diesel Engine

- 1) Output 125 ps
- 2) Speed 1500 rpm
- 3) Cooling radiator cooling
- 4) Starting method cell-motor starting
- 5) Number of cylinder 6

3-13 PORTABLE AUDIO MIXER

The following performance specifications shall apply to portable audio mixer for OB wagon.

- 1) Input signal level
 - Microphone -70, -50 dBm
 - Line 0 dBm
- 2) Output signal level
 - Line 0 dBm
 - Aux -20 dBm
- 3) Input impedance
 - Microphone high impedance
 - Line 600 Ω
- 4) Output impedance 600 Ω
- 5) Indication of VU meter 0 VU at 0 dBm

- 6) Frequency response within ± 1 dB at the frequency range of 50 to 15,000 Hz, relative to 1,000 Hz.
- 7) Harmonic distortion less than 1 % at 15 dBm output
- 8) Signal-to-noise ratio more than 50 dB against each input level
- 9) Crosstalk less than -60 dB at 7 kHz
- 10) Polarity same at input to output ends

3-14 PORTABLE OPEN REEL TAPE MACHINE

The following performance specifications shall apply to portable open reel tape machine for OB wagon.

- 1) Tape speed 19 cm per sec. and 9.5 cm per sec.
- 2) Tape width 6.3 mm
- 3) Wow and flutter less than 0.1 %
- 4) Overall frequency response within ± 3 dB 40 to 15,000 Hz
- 5) Signal-to-noise ratio more than 50 dB
- 6) Total harmonic distortion less than 2 % at standard recording level of 1,000 Hz
- 7) Maximum adaptable reel No. 5 reel

3-15 PORTABLE CASSETTE TAPE MACHINE

The following performance specifications shall apply to portable cassette tape machine for OB wagon.

- 1) Tape speed 4.8 cm per sec
- 2) Wow and flutter less than 0.1 %
- 3) Overall frequency response within ± 3 dB 40 to 12,000 Hz
- 4) Total harmonic distortion less than 2 % at standard recording level
- 5) Signal-to-noise ratio more than 50 dB

4. PERFORMANCE SPECIFICATIONS OF TRANSMITTING EQUIPMENT

4-1 RADIO TRANSMITTER

The following performance specifications shall apply to main and stand-by radio transmitter for Kathmandu transmitting station and Pokhara transmitting station.

- 1) Type of emission A3
- 2) Rated output power
 - Main transmitter 100 kW
 - Stand-by transmitter 10 kW
- 3) Output frequency
 - Kathmandu 792 kHz
 - Pokhara 684 kHz
- 4) Frequency Stability within ± 5 Hz
- 5) Audio input level + 10 dBm at 100 % modulation
- 6) Audio input impedance 600 Ω balanced
- 7) Audio frequency response within ± 1 dB 50 to 7,500 Hz at 50 % modulation
- 8) Modulation capability continuous operation at 40 % modulation and 20 minutes at 100 % modulation for 1,000 Hz
- 9) Audio frequency distortion less than 2 % at 80 % modulation for 50 to 7,500 Hz
- 10) Signal-to-noise ratio better than 55 dB at 100 % modulation for 1,000 Hz
- 11) Carrier shift less than 3 % at 0 to 100 % modulation for 1,000 Hz
- 12) Non-essential radiation less than 0.3 mV/m at a distance of 5 km from the antenna tower for full power operation
- 13) Efficiency more than 50 % at 0 %, 40 % and 100 % modulation

4-2 LIMITING AMPLIFIER

The following performance specifications shall apply to limiting amplifier for Kathmandu transmitting station and Pokhara transmitting station.

- 1) Frequency range 50 to 15,000 Hz

- | | |
|--------------------------|---|
| 2) Input impedance | 600 Ω balanced |
| 3) Output impedance | 600 Ω balanced |
| 4) Distortion | less than 0.5 % until + 20 dBm
output at unlimited |
| | less than 1 % until -14 dBm
input at limited |
| 5) Limiter attack time | less than 50 microsec |
| 6) Limiter release time | 0.3 to 2.5 sec |
| 7) Thump to signal ratio | less than 5 % |
| 8) Compression ratio | more than 15 |
| 9) Signal-to-noise ratio | more than 65 dB |

4-3 INDUCTION VOLTAGE REGULATOR

The following performance specifications shall apply to induction voltage regulator for Kathmandu transmitting station and Pokhara transmitting station.

- | | |
|-----------------------------|---------------------------|
| 1) Capacity (line capacity) | 400 kVA |
| 2) Input voltage variation | 400 V/230 V \pm 20% |
| 3) Output voltage variation | 400 V/230 V \pm 2 % |
| 4) Overall efficiency | more than 90 % |
| 5) Insulation | 5 M Ω |
| 6) Dielectric strength test | 1.5 kV for one (1) minute |

4-4 ENGINE GENERATOR

The following performance specifications shall apply to engine generator for Kathmandu transmitting station and Pokhara transmitting station.

a. AC Generator

- | | |
|--------------------|-----------------------|
| 1) Output | 70 kVA |
| 2) Voltage | 400 V/230 V \pm 2 % |
| 3) Number of phase | 3 (4 wires) |
| 4) Frequency | 50 Hz |
| 5) Number of poles | 4 |
| 6) Speed | 1500 rpm |

- 7) Power factor 0.8
- 8) Excitation self-excitation
- b. Diesel Engine
 - 1) Output 86.5 ps
 - 2) Speed 1500 rpm
 - 3) Cooling radiator cooling
 - 4) Starting method cell-motor starting
 - 5) Number of cylinder 6

5. EQUIPMENT COMPOSITION LIST

5-1 KATHMANDU STUDIO CENTRE

5-1-1 Music Studio

<u>Item</u>	<u>Q'ty</u>
Mixing Console (16 ch)	1
Disc Reproducer	2
Open Reel Tape Machine	2
Cassette Tape Machine	2
Matching Box for above	2
Microphone	
Moving Coil Microphone	10
Condenser Microphone	10
Power Supply for above	5
Microphone Extention Cord	16
Microphone Stand	
Microphone Floor Stand	16
Microphone Boom Stand	4
Monitoring Equipment	
Loudspeaker with carriage	3
Wall Mounted Loudspeaker	2
Headphone	1
Echo Machine	2
Rack	1
Shelf for Tape Machine	1
Operatoin Chair	4
Conductor Console	1

5-1-2 Production Studio No. 1

<u>Item</u>	<u>Q'ty</u>
Mixing Console (12 ch)	1
Disc Reproducer	1
Open Reel Tape Machine	2
Cartridge Tape Machine	1
Power Supply (CVCF) for above	1

<u>Item</u>	<u>Q'ty</u>
Cartridge Tape Eraser	1
Cassette Tape Machine	2
Matching Box for above	2
Microphone	
Moving Coil Microphone	4
Condenser Microphone	4
Power Supply for above	2
Microphone Extention Cord	8
Announcer Unit	1
Microphone Stand	
Microphone Floor Stand	8
Microphone Desk Stand	2
Microphone Suspension Equipment	1
Monitoring Equipment	
Loudspeaker with carriage	2
Wall Mounted Loudspeaker	2
Headphone	2
Desk and Chair for Announcer	1 set
Rack	1
Shelf for Tape Machine	1
Operation Chair	4

5-1-3 Production Studio No.2

<u>Item</u>	<u>Q'ty</u>
Mixing Console (12 ch)	1
Disc Reproducer	1
Open Reel Tape Machine	2
Cartridge Tape Machine	1
Power Supply (CVCF) for above	1
Cartridge Tape Eraser	1
Cassette Tape Machine	2
Matching Box for above	2

<u>Item</u>	<u>Q'ty</u>
Microphone	
Moving Coil Microphone	4
Condenser Microphone	4
Power Supply for above	2
Microphone Extention Cord	8
Announcer Unit	1
Microphone Stand	
Microphone Floor Stand	8
Microphone Desk Stand	2
Microphone Suspension Equipment	1
Monitoring Equipment	
Loudspeaker with carriage	2
Wall Mounted speaker	2
Headphone	2
Desk and Chair for Announcer	1 set
Rack	1
Shelf for Tape Machine	1
Operation Chair	4

5-1-4 Talk Studio

<u>Item</u>	<u>Q'ty</u>
Mixing Console (6 ch)	1
Disc Reproducer	1
Open Reel Tape Machine	2
Cartridge Tape Machine	1
Power Supply (CVCF) for above	1
Cartridge Tape Eraser	1
Cassette Tape Machine	2
Maching Box for above	2
Microphone	
Moving Coil Microphone	2
Microphone Extention Cord	2
Announcer Unit	1

<u>Item</u>	<u>Q'ty</u>
Microphone Stand	
Microphone Floor Stand	2
Microphone Desk Stand	2
Microphone Suspension Equipment	1
Monitoring Equipment	
Loudspeaker with carriage	1
Wall Mounted Loudspeaker	2
Headphone	2
Desk and Chair for Announcer	1 set
Rack	1
Shelf for Tape Machine	1
Operation Chair	4

5-1-5 Master Control Room with Announce Studio

<u>Item</u>	<u>Q'ty</u>
Master Control Console	1
Mixing Console (6 ch)	1
Disc Reproducer	2
Open Reel Tape Machine	3
Cartridge Tape Reproducer	3
Remote Control Box	1
Power Supply (CVCF) for above	3
Cassette Tape Machine	2
Matching Box for above	2
Microphone	
Moving Coil Microphone	2
Microphone Extention Cord	2
Announcer Unit	1
Microphone Stand	
Microphone Floor Stand	1
Microphone Desk Stand	1
Microphone Suspension Equipment	1

<u>Item</u>	<u>Q'ty</u>
Monitoring Equipment	
Loudspeaker with carriage	2
Wall Mounted Loudspeaker	1
Headphone	2
All Wave Receiver with Antenna	2
Test Signal Generator	1
Clock System	
Master Clock	1
Slave Clock	
Digital Clock	1
One (1) Second step clock	12
Thirty (30) seconds step clock	6
Communication Link	
Room to room intercom	1 set
VHF Transceiver for Studio Centre	5
VHF Transceiver for Kathmandu Transmitting Station	2
Brawn Antenna with Feeder for Studio Centre	1 set
3-element Yagi Antenna with Feeder for Kathmandu Transmitting Station	1 set
Programme Transmission Link	
Transmitter for Studio Centre	2
Automatic Changeover Facility for above	1
Receiver for Transmitting Station	2
Automatic Changeover Facility for above	1
5-element Yagi Antenna with Feeder for Studio Centre	1 set
5-element Yagi Antenna with Feeder for Transmitting Station	1 set
Loudspeaker for Monitor Service	4
Desk and Chair for Announcer	1 set
Rack	3
Shelf for Tape Machine	1
Operation Chair	6

5-1-6 Power Room

<u>Item</u>	<u>Q'ty</u>
Engine Generator 100 kVA	1
Dummy Load for above	1
Generator Control Panel	1
Incoming Panel	1
Distribution Panel	2
IVR ± 20 % 30 kVA (load)	1
Battery and Charger	2 sets
Sub-fuel-oil-tank (200 l)	1

5-1-7 Measuring Equipment and Maintenance Tool

<u>Item</u>	<u>Q'ty</u>
Audio Test Set	2
Variable Attenuator	2
Oscilloscope with cart	2
Electric Voltmeter	2
Circuit Tester	6
Megger	1
Measuring Equipment for Link Equipment	
RF Attenuator	1
Fixed Attenuator	1 set
FM Linear Detector	1
FM Standard Signal Generator	1
Electric Voltmeter	1
Power Meter	1
Electric Cleaner	6
Tool Kit	5
Tool Set for Power Supply	1

5-1-8 Others

<u>Item</u>	<u>Q'ty</u>
Test Tape and Disc	
Test Tape for Open Reel Tape Machine	2
Test Tape for Cartridge Tape Machine	2

<u>Item</u>	<u>Q'ty</u>
Test Tape for Cassette Tape Machine	2
Test Record	2
Recording Material	
Open Reel Tape	100
Cartridge Tape	100
Cassette Tape	100
Standard Accessories	1 lot
Installation Materials	1 lot
Spare Parts	1 lot

5-2 KATHMANDU TRANSMITTING STATION

5-2-1 Transmitter Room

<u>Item</u>	<u>Q'ty</u>
100 kW AM Radio Transmitter	1
Operational Tube for above	1 set
10 kW AM Radio Transmitter	1
Operational Tube for above	1 set
100 kW/10 kW HF Exchange Switcher	1
100 kW/10 kW Air-cooled Dummy Load	1
High-speed Surge Protector	1
Transmitter Cooling Equipment	1 set
Antenna Tuning Unit	1 set
Control/Monitoring Console	1
Programme input/Monitoring Equipment	1 set
Loudspeaker for Monitor	1
Rack	2
Operation Chair	2

5-2-2 Power Room

<u>Item</u>	<u>Q'ty</u>
Engine Generator 70 kVA	1
Dummy Load for above	1
Generator Control Panel	1
Incoming Panel	1

<u>Item</u>	<u>Q'ty</u>
Distribution Panel	2
IVR ± 20 % 400 kVA (load)	1
Battery and Charger	1
Sub-fuel-oil-tank (200 l)	1

5-2-3 Measuring Equipment and Maintenance Tool

<u>Item</u>	<u>Q'ty</u>
Rack Mounted Measuring Equipment	
Audio Test Set	1
Variable Attenuator	1
Frequency Counter	1
AM Modulation Monitor	1
Oscilloscope	1
Rack	1
Portable Type Measuring Equipment	
R.F. Bridge	1
Oscillator	1
Field Strength Meter	1
AC Volt-ammeter	1
Oscilloscope	1
Megger	1
Circuit Tester	5
Tool Kit	5
Tool Set for Transmitter	1 set
Tool Set for Power Supply	1 set
Binoculars	1
Electric Cleaner	5

5-2-4 Others

<u>Item</u>	<u>Q'ty</u>
Room to room intercom	1 set
Clocks	5
Standard Accessories	1 lot
Installation Materials	1 lot
Spare Parts	1 lot

5-3 POKHARA TRANSMITTING STATION

5-3-1 Transmitter Room

<u>Item</u>	<u>Q'ty</u>
100 kW AM Radio Transmitter	1
Operational Tube for above	1 set
10 kW AM Radio Transmitter	1
Operational Tube for above	1 set
100 kW/10 kW HF Exchange Switcher	1
100 kW/10 kW Air-cooled Dummy Load	1
High-speed Surge Protector	1
Transmitter Cooling Equipment	1 set
Antenna Tuning Unit	1 set
Control/Monitoring Console	1
Programme input/Monitoring Equipment	1 set
Loudspeaker for Monitor	1
Rack	2
Operation Chair	2

5-3-2 Production Studio

<u>Item</u>	<u>Q'ty</u>
Mixing Console (10 ch)	1
Disc Reproducer	2
Open Reel Tape Machine	2
Cartridge Tape Machine	1
Power Supply (CVCF) for above	1
Cartridge Tape Reproducer	1
Power Supply (CVCF) for above	1
Cartridge Tape Eraser	1
Cassette Tape Machine	2
Matching Box for above	2
Microphone	
Moving Coil Microphone	6
Microphone Extention cord	6
Announcer Unit	1

<u>Item</u>	<u>Q'ty</u>
Microphone Stand	
Microphone Floor Stand	6
Microphone Desk Stand	2
Microphone Suspension Equipment	1
Monitoring Equipment	
Loudspeaker with carriage	2
Wall Mounted Loudspeaker	1
Headphone	2
All Wave Receiver and Associated Equipment	2 sets
Communication Link	
Room to room intercom	1 set
VHF Transceiver for Transmitting Station	2
VHF Transceiver for OB Wagon	2
Brawn Antenna with Feeder for Transmitting Station	1 set
Whip Antenna with Feeder for OB Wagon	1 set
Rack	1
Shelf for Tape Machine	1
Desk and Chair for Announcer	1 set
Operation Chair	4
Clock	2

5-3-3 OB Wagon

<u>Item</u>	<u>Q'ty</u>
Portable Audio Mixer	2
Portable Open Reel Tape Machine	2
Portable Cassette Tape Machine	2
Matching Box for above	2
Microphone	
Moving Coil Microphone	4
Condenser Microphone	2
Power Supply for above	1
Microphone Extention Cable with reel (100 m)	4
Microphone Extention Cord	4

<u>Item</u>	<u>Q'ty</u>
Microphone Stand	
Microphone Floor Stand	4
Microphone Desk Stand	4
Monitoring Equipment	
Loudspeaker	1
Power Amplifier for above	1
Headphone	2
AC Power Supply Extention Cable with reel (50 m)	2
Vehicle with Accessories	1 set

5-3-4 Power Room

<u>Item</u>	<u>Q'ty</u>
Engine Generator 70 kVA	1
Dummy Load for above	1
Generator Control Panel	1
Incoming Panel	1
Distribution Panel	2
IVR \pm 20 % 400 kVA (load)	1
Battery and Charger	1 set
Sub-fuel-oil-tank (200 l)	1

5-3-5 Measuring Equipment and Maintenance Tool

<u>Item</u>	<u>Q'ty</u>
Rack Mounted Measuring Equipment	
Audio Test Set	1
Variable Attenuator	1
Frequency Counter	1
AM Modulation Monitor	1
Oscilloscope	1
Rack	1
Portable Type Measuring Equipment	
R.F. Bridge	1
Oscillator	1
Field Strength Meter	1

<u>Item</u>	<u>Q'ty</u>
AC Volt-ammeter	1
Oscilloscope	1
Megger	1
Circuit Tester	5
Measuring Equipment for Link Equipment	
Electric Voltmeter	1
Mobile Radio Test Set	1 set
Tool Kit	5
Tool Set for Transmitter	1 set
Tool Set for Power Supply	1 set
Binoculars	1
Electric Cleaner	5
Test Tape and Disc	
Test Tape for Open Reel Tape Machine	2
Test Tape for Cartridge Tape Machine	2
Test Tape for Cassette Tape Machine	2
Test Record	2
Recording Material	
Open Reel Tape	50
Cartridge Tape	50
Cassette Tape	50
Clocks	4
Standard Accessories	1 lot
Installation Materials	1 lot
Spare Parts	1 lot

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in the context of public administration and government operations. The text highlights how detailed records can help identify inefficiencies, prevent fraud, and ensure that resources are used effectively.

2. The second part of the document focuses on the role of technology in modern record-keeping. It explores how digital systems and software solutions can streamline the process of data collection, storage, and retrieval. The author notes that while technology offers significant advantages, it also presents challenges such as data security, system integration, and the need for staff training. The document suggests that a balanced approach, combining traditional methods with modern technology, is often the most effective.

3. The third part of the document addresses the legal and regulatory requirements surrounding record-keeping. It discusses various laws and standards that govern how records must be maintained, including issues related to data privacy, retention periods, and access rights. The text stresses that organizations must stay up-to-date with these regulations to avoid legal penalties and ensure compliance. It also touches upon the importance of having clear policies and procedures in place to guide record-keeping practices.

4. The fourth part of the document discusses the impact of record-keeping on decision-making and strategic planning. It argues that high-quality records provide a wealth of data that can be analyzed to identify trends, patterns, and areas for improvement. This information is crucial for leaders and managers who need to make informed decisions based on evidence. The document also mentions that good records can help in forecasting future needs and allocating resources more effectively.

5. The fifth and final part of the document concludes by summarizing the key points and reiterating the importance of record-keeping. It emphasizes that while it may seem like a tedious task, maintaining accurate records is a fundamental responsibility for any organization, especially in the public sector. The document encourages organizations to invest in the necessary infrastructure and training to ensure that their record-keeping practices are robust and reliable.

