

**PRASAR BHARATI
(BROADCASTING CORPORATION OF INDIA)
DIRECTORATE GENERAL: ALL INDIA RADIO
(P&D UNIT)**

Technical Specification for Digital Transmission Console

1. GENERAL

- 1.1 This specification is for Digital Transmission Consoles for use in transmission studio(s) of All India Radio at various stations. The consoles shall be fully digital and based on the field proven design using state of the art technology. These should be rugged in construction and suitable for reliable operation 24 hours a day and 365 days in a year.
- 1.2 Only professional and branded products manufactured by reputed companies in sound broadcasting equipment field shall be offered.
- 1.3 **The tenderer must submit the following documents along with the tender:**
- (a) **A point-to-point compliance statement as per Annexure highlighting deviations, if any, on all the clauses of specification from the manufacturer of the offered equipment duly signed in original. Actual performance figures should be quoted under remarks column. *If compliance statement is in format other than Annexure -I, the tender will be rejected out rightly.***
 - (b) **Detailed printed literature of the equipment giving complete electrical and mechanical data including detailed dimensions and mounting requirements.**
 - (c) **The quote should either be from the original manufacturer or from their authorized representative/dealer. In case, the quote is from the authorized representative/dealer, a certificate in original from the original manufacturer that the tenderer is authorized representative/dealer for India should be enclosed with the tender.**
- 1.4 The tenderer will be required to demonstrate the complete functioning of the tendered unit at the time of technical evaluation in New Delhi. The tenderer has to demonstrate all the functions and technical parameters of the offered equipment as per the AIR specifications, to establish the compliance of the same on measuring equipment provided by AIR. Non-compliance of equipment demonstration shall disqualify the tender.
- 1.5 Tenderers shall quote consoles of one and only one make.
- 1.6 Incomplete offers will be rejected out rightly.

2. SCOPE OF THE TENDER:

The specification is for supply of Digital Transmission Consoles along with all accessories and mating connectors etc.

2.1 SUPPLY

- 2.1.1 Each console is to be supplied as per the Technical specification given in **Para 3.**
- 2.1.2 Details of accessories needed for consoles have been indicated in **para 3.17.**

3. TECHNICAL SPECIFICATION

3.1 General Features

- 3.1.1 The consoles should be simple in operation and easy to repair.
- 3.1.2 The consoles shall have an attractive ergonomically designed rugged, rust-proof metal pre-painted cabinet/s. It may either be a single composite unit or the main electronics portion may be in a separate 19-inch rack mountable unit.
- 3.1.3 The Console should be suitable for Tabletop mounting.
- 3.1.4 The Design layout of the console shall permit easy access to the wiring and components for easy servicing.
- 3.1.5 The PCB Modules shall be easily removable & replaceable for inspection & servicing.
- 3.1.6 All switches and selection points on the console surface shall be provided with visual (illuminated) status indication.
- 3.1.7 The Faders on the console surface shall be long throw (100 mm) conductive plastic type and shall be of reputed make.
- 3.1.8 All the Audio inputs and outputs shall be with balanced 3-pin XLR / D connectors. The contacts of the connectors shall be gold plated.
- 3.1.9 Input / Output and other connectors shall not be on the working area of the console surface.

3.2 Digital Design Parameters

- 3.2.1 The consoles shall have state-of-the-art digital circuitry.
- 3.2.2 All the internal Audio Processing in the consoles shall be fully DSP (digital signal processing) based.
- 3.2.3 Various Control Circuits in the consoles shall be digital and entire switching shall be through solid-state switches and not through mechanical switches.
- 3.2.4 A to D and D to A converters shall have minimum 24 bit resolution.
- 3.2.5 There shall be in-built word clock for synchronization of external digital devices and provision shall also exist to synchronize the console from an external word clock or AES/EBU source.
- 3.2.6 The controls meant for presenter/DJ like Power On/Off, A or B input source selection, output bus assignment, monitoring, talk-back, signaling etc will be appropriately located on the console. All other controls shall be accessible only to the system administrator.
- 3.2.7 All digital inputs and outputs should conform to AES3-1992 signal format.

3.3 Input Fader Channel

The console shall have the following minimum provisions:

- 3.3.1 Switch on front panel for A/B input selection of any of the two input (A/B) sources, with indication on the console surface for the selected input on all faders.
- 3.3.2 Selection for routing any input to any of the **three** independent output buses (excluding mix-minus output).
- 3.3.3 Channel On/Off switch on console surface.
- 3.3.4 Two mix-minus buses shall be provided. Provision should exist for at least two faders for mix-minus selection of that particular input.
- 3.3.5 Provisions of fader start facility for the machines connected on selected high-level analogue as well as digital inputs. The fader should provide two independent control signals simultaneously for each of the selected inputs. On fade in '0' level logic should get extended in these contacts.
- 3.3.6 Pre Fade Listening (PFL) facility for line inputs.

3.4 Input Configuration

The consoles shall have minimum 10 faders. In case the frame size is not exactly matching the requirement of input fader channels, higher frame size may be offered. The minimum requirement of number of faders along with type and number of audio sources is listed in Table below.

Input Source Type	Number of Sources required	Number of Faders Required	Remarks
Mono Mic Input	3	3*	*The other three sources on these faders may be mono mic or line inputs
Stereo Analog Line Input	4	2	
Digital Line Input (AES/EBU)	10	5	

3.4.1 Mono Mic Inputs

- 3.4.1.1 Each Mono Mic Input shall be connected to a separate Fader.
- 3.4.1.2 Each Mono Mic Input channel shall have built in switch-able Phantom Supply of 48 V.
- 3.4.1.3 Provision for muting of various monitoring speakers as detailed in section 3.12 shall be provided.
- 3.4.1.4 Level should be between -60 dBu to -35 dBu. (Ref. 0 dBu = 0.775V rms).
- 3.4.1.5 Input Impedance: >1 K ohms balanced.

3.4.2 Stereo Analog Inputs

- 3.4.2.1 Nominal level should be + 4 dBu. Input should be adjustable from - 10 dBu to +10 dBu with sensitivity control. Maximum input for undistorted output = +24 dBu.
- 3.4.2.2 Stereo Line Channel Input Impedance: >10 K ohms balanced. (For Both Left & right channel)

3.4.3 Digital Inputs

For each Digital Input (Reference 0dBu analog = - 24dBFS)
Input channel should have on board sampling rate converter (SRC) from 32 kHz to 48 kHz for AES/EBU Format.

3.5 Output Configuration

3.5.1 Output Channels (Buses)

Each console shall provide the following Outputs:

- | | | |
|-----|-------------------|--|
| (a) | Programme outputs | 3 independent buses, each in analogue as well as in digital format |
| (b) | Mix-Minus Output | 2 no. in analogue |

3.5.2 Analog Output

For each Analogue Output

3.5.2.1 Nominal level + 4 dBu with 10 dB reserve gain in Fader

3.5.2.2 Maximum level + 24 dBu

3.5.2.3 Output Impedance \leq 50 ohms.

3.5.3 Digital Output

For each Digital Output (Reference 0dBu analog = - 24dBFS)

Output channels should provide digital audio in AES / EBU Format and output level should match the analogue output, as mentioned under para 3.5.2.

3.6 Frequency Response (20 Hz-20 kHz w.r.t 1 kHz) at nominal input and nominal output levels.

- | | | |
|-----|---|---------------------|
| (a) | Mic & Analogue line inputs to program outputs | within \pm 0.5 dB |
| (b) | Digital Inputs to program outputs | within \pm 0.5 dB |

3.7 Total Harmonic Distortion + Noise (20 Hz-20 kHz) at maximum specified output level.

- | | | | |
|-----|--|---|---------------|
| (a) | Mic Channels (complete chain) | : | \leq 0.01 % |
| (b) | Analogue/digital high level channels
(Complete chain) | : | \leq 0.01% |

3.8 Equivalent Input Noise Level and Signal to Noise Ratio

- (a) For microphone channels, with nominal input level of -60 dBu and nominal output of +4 dBu (rest of the input faders in off position) and measurement band limited to 20 Hz-20 kHz.
Equivalent input noise shall be better than: -125dBu
- (b) With nominal input level of +4 dBu in line channel and +4 dBu output and rest of the input faders in off position and measurement band limited to 20 Hz-20 kHz.
Signal to Noise Ratio for Line Channel: \geq 80 dB

3.9 Inter-channel Cross Talk

Better than 90 dB, with nominal input and output and measurement band limited to 20 Hz-20 kHz.

3.10 Monitoring Facilities

3.10.1 Announcer Monitor

Stereo monitoring facility shall be available on external speakers as well as on stereo headphones. It should be possible to select any of the output buses and from two external stereo sources on the monitor. Volume control shall be provided on the control surface for monitoring on headphones/speakers.

3.10.2 Studio Monitor

Stereo monitoring facility shall be provided for artists in studio for any one of the program outputs selected.

3.10.3 PFL Monitor

Facility to monitor PFL signal of all input channels on a built in PFL speaker as well as on headphones shall be provided along with level control.

3.11 Talk-Back

Talkback facility with control room shall be available.

3.12 Mute Controls

PFL, Talkback and Announcer monitor speakers in Transmission studio shall get muted when any announcer mic channel is faded in. Similarly studio monitor shall be muted when any artist mic is faded in.

3.13 Signaling & Warning Lights

Provision for a 'red light' (On-Air) indication on the console surface (by receiving 0 logic, controlled from the console in control room) shall be provided.

Provision for generating at least two warning light signals (0 logic) controlled from announcer and artist mics respectively.

3.14 Metering

Two numbers of high-resolution indicators to provide the VU and PPM (selectable) shall be available to meter the level on any of the output buses.

3.15 Power Supply

3.15.1 The console shall work on 230V \pm 10 %, 48 to 52 Hz single phase A.C. supply.

3.15.2 The power supply unit of the console shall be protected against overload, short circuit and over-voltage.

3.15.3 Power supply unit/module should either be external or in case of internal, temperature of operating surface should not exceed by 5degree Celsius when power is on.

3.16 Climatic Conditions

The console shall generally work in air-conditioned environment. However, the console shall perform satisfactorily in the dry temperature range of 5⁰C to 40⁰ C and humid conditions of 85% RH at 40⁰ C. A test certificate in this regard shall have to be produced from an approved Test House.

3.17 Accessories

Each console shall be supplied with following accessories / items and their cost shall be included in quotation:

- 3.17.1 One complete set of mating connectors (with gold plated contacts) and power chord etc.
- 3.17.2 One set of operation manual and service manual.
- 3.17.3 Any other item including interconnecting cables etc. required for making the console fully operational shall be supplied with each console.

4. GUARANTEE

The equipment shall be guaranteed for trouble free operation for a minimum period of one year from the date of supply. Replacement / servicing shall be effected free of cost at site for hardware and software during the guarantee period.

5. PRE-DESPATCH INSPECTION

Pre-dispatch inspection would comprise of complete testing of the console to be supplied including functional tests and various measurements at manufacturer's premises before shipment by authorized representatives of All India Radio. The Acceptance Test Procedure (ATP) shall be prepared by the tenderer and got approved from the indenter after the firm order is placed.. The testing shall include:

- (a) Physical test.
- (b) Functional test.
- (c) Performance test.

The tenderer will give a notice in writing to the indenter at least 10 weeks before the commencement of factory inspection. The tenderer shall provide all equipment, materials and manpower as may be required for performing various tests as per ATP.

In case of imported equipment, the expenses on air travel, accommodation and daily allowances for AIR's inspecting officers would be borne by All India Radio.

6. SPARES

Essential required spares may be recommended .The spares shall be quoted separately. The list should include name and part no. of the parts / components with quantity and its unit cost. The tenderer shall ensure availability of spares in India for the quoted equipment for a period of at least **5 years** from the date of supply of last equipment. The cost for software upgrades, if any, shall also be quoted as an option.

7. TRAINING

The tenderer shall be required to train at least 16 AIR persons, free of cost, at locations specified by DG: AIR, on operation, maintenance and repair of the equipment.

ANNEXURE

S.No.	Para no. of AIR specification	Tenderer's solution		
		Complied (yes/no)	Actual Values of the offered product	Remarks

(V S Nagar) (Y Trihan)
Dy. Director Engg.(MR) Station Engineer (NBH)

(V P Singh)
Director Engg.(SMS)

(A.K. Dixit)
Director Engg.(SD)