भारतीय मानक

डिजिटल सैट टौप बॉक्स — विशिष्टि

Indian Standard

DIGITAL SET TOP BOX — SPECIFICATION

ICS 33.060.40

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Price Group 3

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Radio-communication Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

There is no ISO/IEC standard on this subject.

The technical Committee responsible for the formulation of this standard has reviewed the provisions of the following International Publications and has decided that these may be used in conjunction with this standard till Indian Standards on these subjects are published:

IEC 60169-2 (1965) 'Radio frequency connectors: Part 2 Coaxial unmatched connectors [including Amendment No. 1(1982)]'

EN 300429 'Digital video broadcasting (DVB); Framing structure, channel coding and modulation for cable system'

EN 300468 'Digital video broadcasting (DVB); Specification for service information (SI) in DVB systems'

ETR 211 'Digital broadcasting systems for television: Guidelines on implementation and usage of service information (SI) in DVB systems'

ETR 289 'Digital video broadcasting (DVB); Support for use of scrambling and conditional access (CA) within digital broadcasting systems'

The composition of the Committee responsible for formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

DIGITAL SET TOP BOX — SPECIFICATION

1 SCOPE

This standard specifies the requirements for digital set top box (STB) used by subscriber for viewing pay channels through cabled distribution system.

2 REFERENCES

The Indian Standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

3 REQUIREMENTS

3.1 General Requirements

3.1.1 The manufacturer/service provider shall declare to the subscriber the capability of STB and its interoperability on various networks in the instruction manual to be supplied with the STB.

3.1.2 The manufacturer shall ensure compatibility/ interfacing of STB with consumer electronic equipment such as televisions, audio system and VCRs, etc, in the country.

3.1.3 *Forward Path*

The STB shall support reception and processing of DVB-C compliant digitally modulated signal and AM-VSB modulated analog signal received via a cable system in accordance with IS 13420 (Part 1). The forward path shall also carry service information as laid down in EN 300468 and ETR 211.

3.1.4 *Return Path*

For interactive applications, the STB may have the provision of processing signal on return path, if the service for return path is provided by the service provider. The return path signal may be in accordance with IS 14231(Part 8) or any other International Standard.

3.1.5 *Conditional Access/Scrambling*

The conditional access system/scrambling shall conform to DVB-C (EN 300429) and DVB-CSA (ETR-289).

3.1.6 *Middleware*

The manufacturer/service provider shall use a suitable middleware.

3.1.7 *Smart Card*

The STB may have provision for smart card operation. If smart card is provided, it shall be in accordance with IS 14202 (Parts 1, 2 and 3).

3.1.8 *Subscriber Management System (SMS)*

The service provider may opt for any SMS but it shall ensure consumer interest by efficient, responsive and accurate billing and collection. At the same time an arrangement must be made between the broadcaster and service provider for access to relevant data related to the respective channels for billing purpose, etc.

3.2 Performance Requirements

The requirements for various performance parameters for digital set top box shall be as given in Table 1.

3.3 Safety Requirements

The safety requirements of set top box shall conform to IS 13252.

3.4 Electromagnetic Compatibility (EMC) Requirements

The EMC requirements of the STB shall conform to IS 6873 (Part 3).

4 MARKING

4.1 Each STB shall be legibly and indelibly marked with at least the following information:

a) Manufacturer's name or trade-mark (if any);
b) Model designation and serial No.;
c) Country of manufacture;
d) Input supply voltage and frequency;
e) Power consumption;
f) RF input terminal and RF output terminal; and
g) Sockets for audio and video output.

4.2 BIS Certification Marking

The STB may also be marked with the Standard Mark.

4.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulation made thereunder. The details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers and producers may be obtained from the Bureau of Indian Standards.

Table 1 Performance Requirements

(*Clauses* 3.2, 5.6 *and* 6)

Sl No.	Parameters	Requirements	Method of Tests, Ref to Cl of IS
(1)	(2)	(3)	(4)
i)	Electrical specifications:		–
	a) Input voltage range	90-270 V AC	
	b) Frequency	50 Hz ± 5 percent	
ii)	Bypass of analog free to air RF signal	The STB shall have the capability of bypassing free to air RF signal	–
iii)	Connectors:		–
	a) RF input	75 ohms impedance, female connector (as per IEC 60169 -2)	
	b) Output video	1 X RCA type	
	c) Output audio (L and R)	2 X RCA type	
	d) RF output	75 ohms impedance, female connector (as per IEC 60169 -2)	
iv)	RF characteristics at cable system outlet:		
	a) System	DVB-C	–
	b) Modulation	64 QAM	–
	c) RF carrier signal level	47 dBµV, *Min* for 64 QAM 67 dBµV, *Max* for 64 QAM	4.10.3 of IS 13420 (Part 1)
	d) Carrier level differences between distributed TV channels (47 to 862 MHz range)	3 dB, *Max* for 64 QAM for adjacent channel 13 dB, *Max* for 64 QAM for adjacent channel to AM-VSB channel (QAM signal must be below the level of adjacent AM-VSB channel)	4.10.3 of IS 13420 (Part 1)
	e) Amplitude response within a TV channel	Variation (pp) : 8 dB, *Max* Slope of variation : 1.5 dB/MHz, *Max*	4.2 of IS 13420 (Part 1)
	f) Lowest carrier to interference ratio	35 dB, *Min* for 64 QAM	–
	g) Cross modulation	> 46 + 10 lg (N – 1), N = Number of channels	–
	h) Digital video RF characteristics	Constellations of 16 QAM, 64 QAM and 256 QAM are desirable. Other constellations (32 QAM and 128 QAM) may also be used. The constellations used shall be automatically detected	–
	j) Carrier to noise ratio	31 dB, *Min* for 64 QAM	–
v)	Channel tuner performance characteristics:		
	a) RF input level	Same as mentioned in RF characteristics at cable system outlet in (iv)	–
	b) Input frequency range	47 to 862 MHz	–
	c) RF input channel bandwidth	7 MHz	–
	d) RF input impedance	75 ohms	–
	e) RF input return loss	6 dB, *Min*	4.1.1 of IS 14231 (Part 3)
	f) Frequency assignment download	Optional	
vi)	RF re-modulator output:		
	a) Modulation format	PAL B (for VHF); PAL G (for UHF)	
	b) RF output channel	VHF Channel 3/4 ; Agile/UHF	
	c) RF output level	60 dBµV, *Min* 80 dBµV, *Max*	4.7 of IS 13420 (Part 1)
	d) Carrier to noise ratio	44 dB, *Min*	4.5 of IS 13420 (Part 1)
vii)	Remote control	Optional	
viii)	Operating temperature range	0°C to 50°C	
ix)	Operating humidity range	5 percent to 95 percent (non-condensing)	
x)	Finger printing	Essential but manufacturer/service provider free to choose mechanism	

5 ENVIRONMENTAL TESTS

5.1 Bump Test

The STB shall be subjected to bump test carried out in accordance with IS 9000 (Part 7/Sec 2), the number of bumps being 500 ± 10 and acceleration being 400 m/s^2. After this test the STB shall conform to the performance requirements specified in **5.6**. This test shall be carried out under packed condition.

5.2 Drop Test

The STB shall withstand drop test as given in IS 13252. After this test the STB shall conform to the performance requirements specified in **5.6**.

5.3 Dry Heat Test

The STB shall be subjected to dry heat test of severity +55°C for 16 h, carried out in accordance with IS 9000 (Part 3/Sec 5). After recovery, the STB shall conform to the performance requirements specified in **5.6**. The duration of the recovery shall be 2 h.

5.4 Damp Heat Test

The STB shall be subjected to damp heat cyclic test in accordance with IS 9000 (Part 5/Sec 1). After recovery the STB shall conform to the performance requirements specified in **5.6**. The duration of the recovery shall be 24 h.

5.5 Cold Test

The STB shall withstand, a cold test of severity – 10°C for 2 h carried out in accordance with IS 9000 (Part 2/ Sec 4). After recovery, the STB shall conform to the performance requirements specified in **5.6**. The duration of the recovery shall be 2 h.

5.6 Post Measurement After Each Environmental Test

After each environmental test (*see* **5.1** to **5.5**), the STB shall meet the safety requirements of **3.3** and the requirements specified in Table 1 for the following parameters:

a) Bypass of free to air RF signal [*see* Sl No. (ii) of Table 1]

b) RF output level [*see* Sl No. (vi) (c) of Table 1], and

c) Carrier to noise ratio [*see* Sl No. (vi) (d) of Table 1].

6 OPERATING LIFE TEST

The STB shall be subjected to operating life test consisting of 5 h operation and 1 h rest period for a total operating period of 1 000 h at rated voltage. At the end of the operating life duration, the requirements specified in **3.3** and Table 1 shall be met with.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
6873 (Part 3) : 1999	Limits and methods of measurement of radio disturbance characteristics: Part 3 Sound and television broadcast receivers and associated equipment (*first revision*)
9000	Basic environmental testing procedures for electronic and electrical items:
(Part 2/Sec 4) : 1977	Cold test, Section 4 Cold test for heat dissipating items with gradual change of temperature
(Part 3/Sec 5) : 1977	Dry heat test, Section 5 Dry heat test for heat dissipating items with gradual change of temperature
(Part 5/Sec 1) : 1981	Damp heat cyclic test, Section 1 16 + 8 h cycle
(Part 7/Sec 2) : 1979	Impact test, Section 2 Bump
13252 : 1992	Safety of information technology equipment including electrical business equipment
13420 (Part 1) : 2002	Cabled distribution systems: Part 1 Methods of measurement and system performance (*second revision*)
14202	Identification cards — Integrated circuit(s) — Cards with contacts:
(Part 1) : 1995	Physical characteristics
(Part 2) : 1995	Dimensions and location of the contacts
(Part 3) : 2002	Electronic signals and transmission protocols
14231	Cabled distribution systems for television and sound signals — Specification:
(Part 3) : 1995	Active coaxial wideband distribution components
(Part 8) : 2002	System performance of return path

ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Radiocommunication Sectional Committee, LTD 20

Organization	*Representative(s)*
All India Radio, New Delhi	SHRI K. M. PAUL (***Chairman***) SHRI A. K. BHATNAGAR (*Alternate*)
Ahuja Radios, New Delhi	SHRI S. J. KALRA
Bharat Electronics Ltd, Bangalore	SHRI D. MURLIDHARAN SHRI SAMEER VERMA (*Alternate*)
Central Electronics Engg Research Institute, Pilani	SHRI S. RAGHUNATH SHRIMATI PRAMILA DHAR (*Alternate*)
Consumer Electronics TV Manufacturers Association (CETMA), New Delhi	REPRESENTATIVE
Directorate of Co-ordination (Police wireless), New Delhi	SHRI K. C. AGNIHOTRI SHRI A. K. GUPTA (*Alternate*)
Department of Information Technology (STQC), New Delhi	REPRESENTATIVE
Development Commisioner Small Scale Industries, New Delhi	SHRI P. P. MALHOTRA SHRI SATYA PAL (*Alternate*)
Directorate General Doordarshan, New Delhi	SHRI R. K. GUPTA SHRI R. K. JAIN (*Alternate*)
Directorate General of Supplies and Disposals, New Delhi	SHRI ANIL GUPTA SHRI H. R. SHARMA (*Alternate*)
Electronic Component Industries Association, New Delhi	DR K. R. SARMA SHRI M. V. KESAVAN (*Alternate*)
Electronics Corporation of India Ltd, Hyderabad	SHRI P. A. RAMAIH SHRI K. JANARDHAN (*Alternate*)
Instituition of Electronics and Telecommunication Engineers, New Delhi	MAJ-GEN YESHWANT DEVA MAJ-GEN K. B. JHALDIYAL (*Alternate*)
ITI Ltd, Bangalore	SHRI C. S. BILAGI SHRI B. S. JAGATHEESAN (*Alternate*)
Ministry of Communication (WPC), New Delhi	DR ASHOK CHANDRA DR S. M. SHARMA (*Alternate*)
Ministry of Defence, DGAQA, Ghaziabad	SHRI A. PRATAP KUMAR SHRI B. HARINATH (*Alternate*)
Ministry of Defence, DGQA , Bangalore	SHRI S. G. JOSHI LT-COL R. S. TRIPATHI (*Alternate*)
Ministry of Defence, DQA(N), New Delhi	LT CDR G. RAM SHRI J. K. CHANDNA (*Alternate*)
National Physical Laboratory, New Delhi	SHRI S. C. GARG SHRIMATI D. R. LAKSHMI (*Alternate*)
Oil & Natural Gas Commission, Mumbai	SHRI G. S. MOMI SHRI R. K. SETHI (*Alternate*)
Research Design & Standards Organization, Lucknow	SHRI PROSUN BANERJI
Telecom Engineering Centre, Department of Telecommunication, New Delhi	SHRI ASHOK KUMAR SHRI ARUN AGARWAL (*Alternate*)
Videsh Sanchar Nigam Ltd, Mumbai	REPRESENTATIVE
BIS Directorate General	SHRI VIJAI, DIRECTOR & HEAD (LTD) [Representing Director General (*Ex-officio*)]

Member Secretary
SHRIMATI REENA GARG
Deputy Director (LTD), BIS

(*Continued on page 6*)

(*Continued from page 5*)

Panel for Cabled Distribution System, LTD 20/P7

Organization	*Representative(s)*
In personal capacity (*291 MIG Flats, Prasad Nagar, New Delhi*)	SHRI M. M. ASTHANA (*Convener*)
Cable Operators Federation of India (COFI), New Delhi	LT COL K. K. SHARMA
Canal-Plus Technologies Ltd, Mumbai	SHRI NICOLAS ANDRIEU SHRI FRANCOIS MOREAU (*Alternate*)
Catvision Products Ltd, Noida	SHRI ATHAR ABBAS SHRI RAJESH KHER (*Alternate*)
Central Electronics Engg Research Institute, Pilani	SHRI S. RAGHUNATH SHRIMATI PRAMILA DHAR (*Alternate*)
Consumer Electronics TV Manufacturers Association (CETMA), New Delhi	SHRI SANJEEV KAINTH SHRI ANOOP KUMAR (*Alternate*)
Department of Information Technology (STQC), New Delhi	REPRESENTATIVE
Directorate General Doordarshan, New Delhi	SHRI D. P. SINGH SHRI S. P. AHUJA (*Alternate*)
Electronics Research and Development Centre, Thiruvananthapuram	SHRI RAJAN T. JOSEPH SHRI S. SUKESAN (*Alternate*)
Himachal Futuristic Communications Ltd, New Delhi	SHRI NASEEM AHMAD SHRI DEEPAK BAJAJ (*Alternate*)
Ministry of Communication (WPC), New Delhi	DR K. R. SHARMA SHRI M. V. KESAVAN (*Alternate*)
Motorola India Pvt Ltd, New Delhi	SHRI GAUTAM CHHABRA SHRI S. P. S. RAGHAVA (*Alternate*)
National Cable and Telecommunications Association, New Delhi	SHRI VIKKI CHAUDHARY
N. G. Technologies Ltd, New Delhi	SHRI G. R. SEHGAL SHRI G. S. HIRA (*Alternate*)
Philips Semiconductors Ltd, New Delhi	SHRI ARUN THIPSAY SHRI G. P. DESHPANDE (*Alternate*)
Research Department (All India Radio & DD), New Delhi	SHRI R. C. BHATNAGAR
Shyam Communication Systems, New Delhi	SHRI RAJIV MEHROTRA
Siti Cable Network Limited, New Delhi	SHRI RAJIV KHATTAR SHRI V. V. S. NARAYANA (*Alternate*)
Star India Pvt Ltd, Mumbai	SHRI TONY D. SILVA SHRI A. JAWED (*Alternate*)
Telecom Engineering Centre, Department of Telecommunication, New Delhi	DEPUTY DIRECTOR GENERAL (R) DIRECTOR (R) (*Alternate*)
In personal capacity (*B-406 Ramvihar, Sector 30, Noida*)	COL V. C. KHARE