Indian Standard
DIGITAL SET TOP BOX—SPECIFICATION

ICS 33.060.40

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAILADUR SIIH ZAFAR MARG
NEW DELHI 110002
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
and 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
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- 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.
3.1.7 Smart Card

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

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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>
<thead>
<tr>
<th>Requirements</th>
<th>Method of Test, Ref to Cl of IS</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-270 V AC</td>
<td>4.1.1 of IS 14231</td>
</tr>
<tr>
<td>50 Hz ± 5 percent</td>
<td></td>
</tr>
<tr>
<td>The STB shall have the capability of bypassing free to air RF signal</td>
<td></td>
</tr>
<tr>
<td>75 ohms impedance, female connector (as per IEC 60169-2)</td>
<td></td>
</tr>
<tr>
<td>1 X RCA type</td>
<td></td>
</tr>
<tr>
<td>2 X RCA type</td>
<td></td>
</tr>
<tr>
<td>75 ohms impedance, female connector (as per IEC 60169-2)</td>
<td></td>
</tr>
<tr>
<td>DVB-C</td>
<td></td>
</tr>
<tr>
<td>64 QAM</td>
<td></td>
</tr>
<tr>
<td>47 dBµV, Min for 64 QAM</td>
<td>4.10.3 of IS 13420 (Part 1)</td>
</tr>
<tr>
<td>67 dBµV, Max for 64 QAM</td>
<td></td>
</tr>
<tr>
<td>3 dB, Max for 64 QAM for adjacent channel</td>
<td>4.10.3 of IS 13420 (Part 1)</td>
</tr>
<tr>
<td>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)</td>
<td>4.2 of IS 13420 (Part 1)</td>
</tr>
<tr>
<td>Variation (pp) ; 8 dB, Max</td>
<td></td>
</tr>
<tr>
<td>Slope of variation : 1.5 dB/MHz, Max</td>
<td></td>
</tr>
<tr>
<td>35 dB, Min for 64 QAM</td>
<td></td>
</tr>
<tr>
<td>10 log (N-1), N = Number of channels</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td></td>
</tr>
<tr>
<td>31 dB, Min for 64 QAM</td>
<td></td>
</tr>
<tr>
<td>Same as mentioned in RF characteristics at cable system outlet in (iv)</td>
<td></td>
</tr>
<tr>
<td>47 to 562 MHz</td>
<td></td>
</tr>
<tr>
<td>7 MHz</td>
<td></td>
</tr>
<tr>
<td>72 ohms</td>
<td></td>
</tr>
<tr>
<td>6 dB, Min</td>
<td>4.7 of IS 13420 (Part 1)</td>
</tr>
<tr>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>PAL B (for VHS); PAL G (for UHF)</td>
<td></td>
</tr>
<tr>
<td>VIIIF Channel 34 ; Agile UHF</td>
<td></td>
</tr>
<tr>
<td>60 dBµV, Min</td>
<td></td>
</tr>
<tr>
<td>80 dBµV, Max</td>
<td>4.5 of IS 13420 (Part 1)</td>
</tr>
<tr>
<td>44 dB, Min</td>
<td></td>
</tr>
<tr>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>0°C to 50°C</td>
<td></td>
</tr>
<tr>
<td>5 percent to 95 percent (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Essential, but manufacturer/service provider free to provide free of charge mechanism</td>
<td></td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Requirements</th>
<th>Method of Tests Ref in Cl of IS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bypass of analog free to air RF signal</td>
<td>4.10.3 of IS 13420</td>
</tr>
<tr>
<td>2</td>
<td>Electrical specifications:</td>
<td>3.6 of IS 13420</td>
</tr>
<tr>
<td></td>
<td>a) Input voltage range</td>
<td>4.1.1 of IS 13421</td>
</tr>
<tr>
<td></td>
<td>b) Frequency</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>90-270 V AC</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>50 Hz ± 5 percent</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>3</td>
<td>The STB shall have the capability of bypassing free to air RF signal</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Connectors:</td>
<td>4.2 of IS 13420</td>
</tr>
<tr>
<td></td>
<td>a) RF input</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>b) Output video</td>
<td>4.3 of IS 13420</td>
</tr>
<tr>
<td></td>
<td>c) Output audio (L and R)</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>d) RF output</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>5</td>
<td>RF characteristics at cable system outlet:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) System</td>
<td>4.4 of IS 13420</td>
</tr>
<tr>
<td></td>
<td>b) Modulation</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>c) RF carrier signal level</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>d) Carrier level differences between distributed TV channels (47 to 362 MHz range)</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>e) Amplitude response within a TV channel</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>f) Lowest carrier to interference ratio</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>g) Cross modulation</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>h) Digital video RF characteristics</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>6</td>
<td>Carrier to noise ratio</td>
<td>4.5 of IS 13420</td>
</tr>
<tr>
<td>7</td>
<td>Channel tuner performance characteristics:</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>a) RF input level</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>b) Input frequency range</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>c) RF input channel bandwidth</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>d) RF input impedance</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>e) RF input return loss</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>f) Frequency assignment download</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>8</td>
<td>RF modulator output:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Modulation format</td>
<td>5.4 of IS 13420</td>
</tr>
<tr>
<td></td>
<td>b) RF output channel</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>c) RF output level</td>
<td>(Part 1)</td>
</tr>
<tr>
<td></td>
<td>d) Carrier to noise ratio</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>9</td>
<td>PAL II (for VHF): PAL I (for UHF)</td>
<td>5.5 of IS 13420</td>
</tr>
<tr>
<td>10</td>
<td>VIIIF Channel 34: Agile UHF</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>11</td>
<td>60 dBuV, Min</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>12</td>
<td>80 dBuV, Max</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>13</td>
<td>44 dB, Min</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>14</td>
<td>Optional</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>15</td>
<td>Remote control</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>16</td>
<td>Operating temperature range</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>17</td>
<td>0°C to 50°C</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>18</td>
<td>Operating humidity range</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>19</td>
<td>5 percent to 95 percent (non-condensing)</td>
<td>(Part 1)</td>
</tr>
<tr>
<td>20</td>
<td>Finger printing</td>
<td>(Part 1)</td>
</tr>
</tbody>
</table>
ENVIRONMENTAL TESTS

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. (vii) (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.
<table>
<thead>
<tr>
<th>IS No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>6873</td>
<td>Limits and methods of measurement of radio disturbance characteristics: Part 3 Sound and television broadcast receivers and associated equipment (first revision)</td>
</tr>
<tr>
<td>9000</td>
<td>Basic environmental testing procedures for electronic and electrical items: Cold test, Section 4 Cold test for heat dissipating items with gradual change of temperature (Part 2/Sec 4): 1977</td>
</tr>
<tr>
<td></td>
<td>Dry heat test, Section 5 Dry heat test for heat dissipating items with gradual change of temperature (Part 3/Sec 5): 1977</td>
</tr>
<tr>
<td>13252</td>
<td>Safety of information technology (Part 7/Sec 2): 1979</td>
</tr>
<tr>
<td>13420</td>
<td>Equipment including electrical business equipment (Part 1): 2002</td>
</tr>
<tr>
<td></td>
<td>Cabled distribution systems: Part 1 — Methods of measurement and system performance (second revision) — Identification circuit(s) — Cards with contacts: Physical characteristics (Part 1): 1995</td>
</tr>
<tr>
<td></td>
<td>Dimensions and location of the contacts (Part 2): 1995</td>
</tr>
<tr>
<td></td>
<td>Electronic signals and transmission protocols (Part 3): 2002</td>
</tr>
<tr>
<td></td>
<td>System performance of return path (Part 8): 2002</td>
</tr>
</tbody>
</table>
ANNEX B

COMMITTEE COMPOSITION

Radiocommunication Sectional Committee, LTD 20

Organization

All India Radio, New Delhi

Ahuja Radios, New Delhi

Bharat Electronics Ltd, Bangalore

Central Electronics Engg Research Institute, Pilani

Consumer Electronics TV Manufacturers Association (CETMA), New Delhi

Directorate of Co-ordination (Police wireless), New Delhi

Department of Information Technology (STQC), New Delhi

Development Commissioner Small Scale Industries, New Delhi

Directorate General Doordarshan, New Delhi

Directorate General of Supplies and Disposals, New Delhi

Electronic Component Industries Association, New Delhi

Electronics Corporation of India Ltd, Hyderabad

Institution of Electronics and Telecommunication Engineers, New Delhi

IT Ltd, Bangalore

Ministry of Communication (WPC), New Delhi

Ministry of Defence, DGAQA, Ghaziabad

Ministry of Defence, DGQA, Bangalore

Ministry of Defence, DQAN, New Delhi

National Physical Laboratory, New Delhi

Oil & Natural Gas Commission, Mumbai

Research Design & Standards Organization, Lucknow

Telecom Engineering Centre, Department of Telecommunication, New Delhi

Tech Sanchar Nigam Ltd, Mumbai

S Directorate General

Representative

Shri K. M. Paul (Chairman)

Shri A. K. Bhattacharya (Alternate)

Shri S. J. Karki

Shri D. Mukhopadhyay

Shri S. Samson Verma (Alternate)

Shri S. Raghunath

Shri Satish Pramila Dhar (Alternate)

Shri K. C. Agnihotri

Shri A. K. Gupta (Alternate)

Representative

Shri P. P. Malik

Shri Satya Pratap (Alternate)

Shri R. K. Gupta

Shri R. K. Juyal (Alternate)

Shri Ankur Gupta

Shri H. R. Shamas (Alternate)

Dr. R. K. Singhal

Shri M. V. Kesavan (Alternate)

Shri P. A. Ramabhadran

Shri K. Janardhan (Alternate)

Maj-Gen V. V. R. Divya

Maj-Gen K. V. I. Naik (Alternate)

Shri C. S. B. Bhat

Shri B. S. Jagatheswaran (Alternate)

Dr. Ashok Chandra

Dr. S. M. Sharma (Alternate)

Shri A. Pratap Kumar

Shri B. Harinath (Alternate)

Shri S. G. Joshi

Lt. Col. R. S. Tripathi (Alternate)

Lt Col G. Ram

Shri J. K. Chandra (Alternate)

Shri S. C. Garg

Shri D. R. Lakshmi (Alternate)

Shri G. S. Mose

Shri R. K. Singh (Alternate)

Shri Pradeep Bajpai

Shri Ashok Kumar

Shri A. A. Agarwal (Alternate)

Representative

Shri V. V. Chandra, Director Head (LTD)

[Representing Director General (Ex-officio)]

Member Secretary

Shri B. N. Singh

Deputy Director (LTD), BIS
Panel for Cabled Distribution System, LTD 20/P7

Organizers:

- In personal capacity (291 MG Flats, Prasad Nagar, New Delhi)
- Cable Operators Federation of India (COFI), New Delhi
- Canal-Plus Technologies Ltd, Mumbai
- CTVision Products Ltd, Noida
- Central Electronics Engg Research Institute, Pilani
- Consumer Electronics TV Manufacturers Association (CETMA), New Delhi
- Department of Information Technology (STQC), New Delhi
- Directorate General Doordarshan, New Delhi
- Electronics Research and Development Centre, Thiruvananthapuram
- Himachal Futuristic Communications Ltd, New Delhi
- Ministry of Communication (WPC), New Delhi
- Motorola India Pvt Ltd, New Delhi
- National Cable and Telecommunications Association, New Delhi
- N. G. Technologies Ltd, New Delhi
- Philips Semiconductors Ltd, New Delhi
- Research Department (All India Radio & DD), New Delhi
- Shyam Communication Systems, New Delhi
- Siti Cable Network Limited, New Delhi
- Star India Pvt Ltd, Mumbai
- Telecom Engineering Centre, Department of Telecommunication, New Delhi
- In personal capacity (8-406 Ramvihar, Sector 10, Noida)

Representatives:

- Shri M. M. Asthana (Convenor)
- Lt Col R. K. Singh
- Shri Nicolaos Andreou
- Shri Francis Moreau (Alternate)
- Shri Atul Abas
- Shri Rajesh Kher (Alternate)
- Shri S. Raghunath
- Shrimati Pratima Dhar (Alternate)
- Shri Sanjeev Kasiv
- Shri Anoop Kumar (Alternate)
- Representative
- Shri D. P. Singh
- Shri S. P. Ahrje (Alternate)
- Shri Rajan T. Joseph
- Shri S. Sukeshan (Alternate)
- Shri Naseem Afzal
- Shri Deepak Balak (Alternate)
- Dr K. R. Sivakumar
- Shri M. V. Kesavan (Alternate)
- Shri Gautam Chatterjee
- Shri S. P. S. Rachavan (Alternate)
- Shri Yuvraj Chaudhary
- Shri G. R. Singh
- Shri G. S. Hira (Alternate)
- Shri Arun Bhandarkar
- Shri G. P. Deshpande (Alternate)
- Shri R. C. Bhattacharya
- Shri Ravi Mehrotra
- Shri Ravi Khattar
- Shri V. V. S. Narayana (Alternate)
- Col Tony D. Silva
- Shri A. Jawed (Alternate)
- Deputy Director General (R)
- Director (R) (Alternate)
- Col V. C. Kale
Bureau of Indian Standards

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of ‘BIS Catalogue’ and ‘Standards: Monthly Additions’.

This Indian Standard has been developed from Doc : No. LTD 20 (1995).

Amendments Issued Since Publication

<table>
<thead>
<tr>
<th>Amend No.</th>
<th>Date of Issue</th>
<th>Text Affected</th>
</tr>
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BUREAU OF INDIAN STANDARDS

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Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002
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