

# STB Multimeter™

for Set-top Box Testing & Monitoring Automation



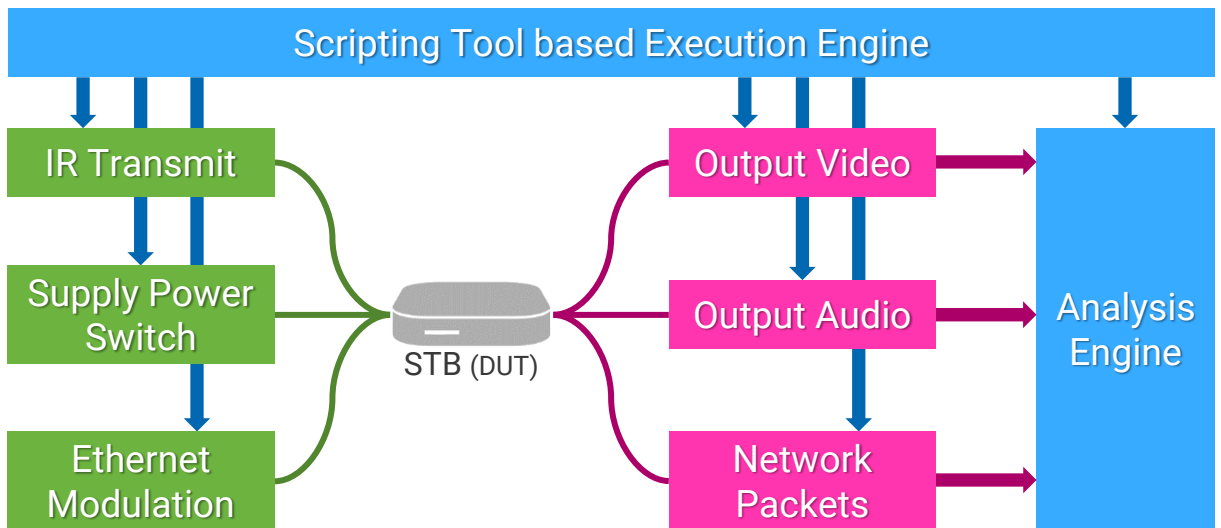
# Highlights

## STB Multimeter at a Glance

As well as measuring the STB's output video, audio and network packets at the same time, STB Multimeter also simulates STB to the desired test environment through automatic IR transmit and supply power control.

With the built-in powerful scripting tool, STB Multimeter can do multiple tests at once and can automate Test Case based BMT.

STB Multimeter can be adopted not only testing, but also monitoring IPTV service 24/7 or STB Software/Hardware QA.



## Key Benefits

### 24/7 Unattended Testing / Monitoring

STB Multimeter enables endless STB testing and IPTV service monitoring. An alarm message is sent to staff instantly when it detects service failure.

### Excellent Testing Productivity

Testers do not require printed Test Case documents and Stopwatch anymore. STB Multimeter's execution engine automatically controls the STB and analyzes following the scripted Test Case.

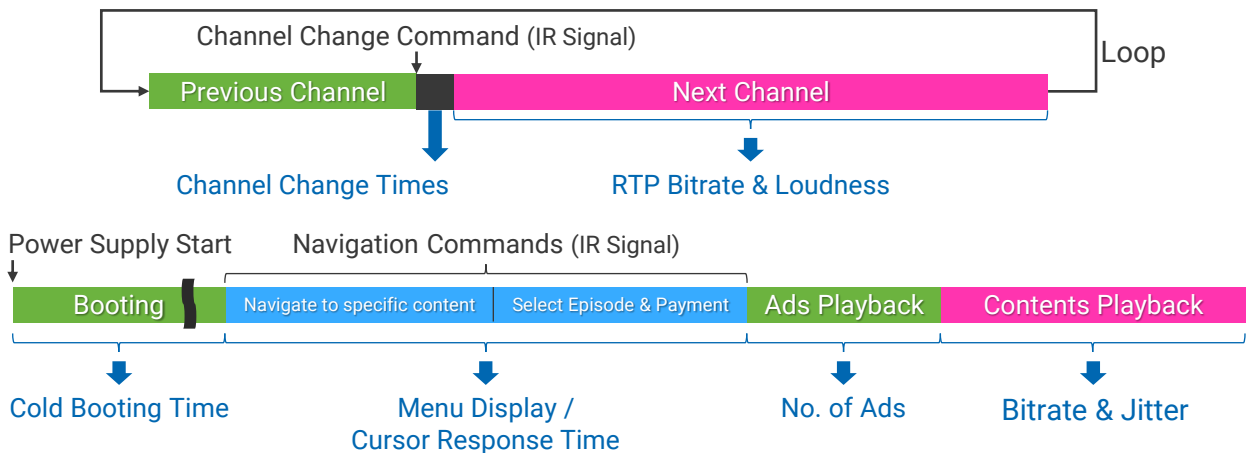
### Outstanding Economic Feasibility

STB Multimeter provides verified STB QoS, QoE measurement functions in one device, as well as automatic STB control functions.

## Key Features

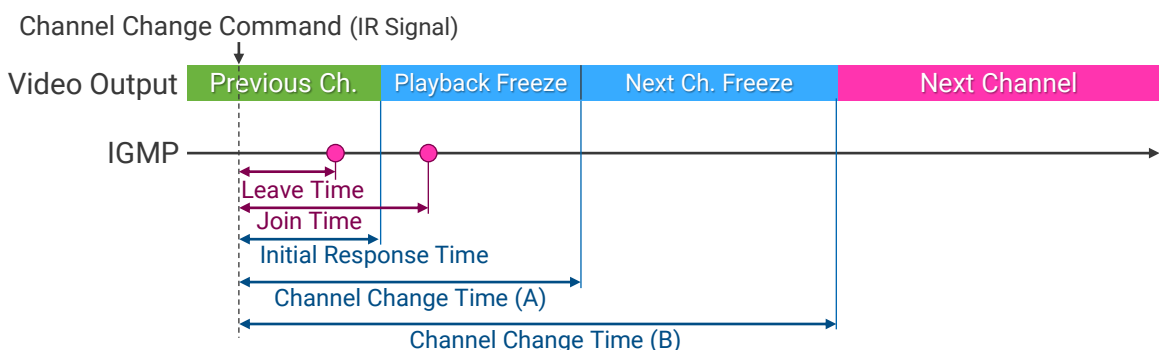
### Supports Complex Test Scenarios

With a powerful scripting tool, STB Multimeter covers a wide-range of Test Scenarios.



### Simultaneous QoS and QoE Measurement

STB Multimeter can provide both QoS and QoE analysis results with a single execution.



# Features

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## Video-based Measurement

### Channel Change Time (Channel Zapping)

Measure elapsed time from IR command transmit time to each step of channel change procedure. IGMP Leave & Join time regarding IR command transmit time also can be measured.

Moreover, adjacent and non-adjacent Change Time can be obtained.

### UI Response Time

Measure elapsed time from IR command transmit time to STB UI's reaction start/finish time. For example:

- Home(Main) Menu Display Time
- Cursor Movement Time
- Menu Transition Time

### Booting Time

By using automatic STB supply power control, Cold Booting Time also can be measured.

## Audio-based Measurement

### Loudness (ITU-R BS.1770 Compatible)

VOD contents and Broadcasting channels' Loudness can be measured as LKFS unit. Specific indicators are:

- Short Term (S-LKFS)
- Integrated (I-LKFS)

## Network-based Measurement

### RTP Streaming Packet Analysis

Measure MPEG2-TS packets and analyze following indicators.

- Loss Packet Count, Streaming Bandwidth
- Delay(ms), Jitter(ms, Max./Min./Mean.)

### ETSI TR 101 290 Analysis

Analyze based on ETSI TR 101 290 1<sup>st</sup> Priority.

- TS Sync Loss, Sync Byte Error, PAT Error
- PID Error, PMT Error, Continuity Count Error



## Automatic STB Control

### IR Signal Generation

STB Multimeter controls STB UI via IR signal generation. New signals can be easily learned with a built-in reader.

### STB Supply Power Control

Automatically controls the supply power. As well as measuring Cold Booting Time, this function is useful to reset the STB remotely when it is malfunctioning.

### Network Modulation

STB Multimeter also can modulate the network environment connected to the STB.

- Changes Delay Time or Bandwidth
- Controls Specific Head End (IP Address) / Port Connection

## Test Automation

- Script-based Test Scenario Creation
- Scheduling : Repeat Times, Loop between the specified period
- Issue Test Reports to each Test Cases
- Send Notifications when an Abnormal Status is Detected(e.g., IPTV Service Failure such as VOD Contents Purchasing Failure) : NMS, SNMP, Email or Slack
- When connecting to Management Server : Centralized Multi STB Multimeters control & Integrated collection of Test Results are available



# Specifications

## STB Support Specifications

## BTIPTV-PA

Network Interface	RJ-45 (~1Gbps)
STB Output Interface	HDMI (up to 60FPS@FHD)
Remote Control Frequency	38~56kHz, 850nm
Power Input	Any type of AC plug

## Physical Specifications

Dimensions (mm)	W220 X H134.5 X D224
Weight (kgf)	2.61
No. of Fans Inside	2 (temperature sensitive)

## Environmental Specifications

Power Consumption	~62Wh
Certifications	CE, RoHS

## Basic Functions

Test Automation	<ul style="list-style-type: none"> <li>• Scripting Tool : Provides Test Case Creation and Execution</li> <li>• Basic Image Processing Functions : Image Matching, OCR Recognition</li> <li>• Test/Monitoring Scheduling</li> <li>• Test/Monitoring Results Reporting</li> <li>• Alarm Notifications : NMS<sup>1)</sup>, SNMP, Email, Slack</li> </ul>
Automatic STB Control	<ul style="list-style-type: none"> <li>• IR Signal Learning / Transmitting</li> <li>• STB Supply Power On/Off Control</li> </ul>
Video-based Measurement	<ul style="list-style-type: none"> <li>• Channel Change Time (Channel Zapping) (incl. IGMP Leave-Join Time)</li> <li>• UI Reaction Time</li> <li>• Booting Time : Cold, Warm</li> </ul>

## Audio Functions (Option)

Loudness Measurement (ITU-R BS.1770 Compatible)	<ul style="list-style-type: none"> <li>• Short Term LKFS (S-LKFS)</li> <li>• Integrated LKFS (I-LKFS)</li> </ul>
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## Network Functions (Option)

Network Modulation	<ul style="list-style-type: none"> <li>• Delay, Bandwidth</li> <li>• Specific Head End (IP Address) / Port Connection Control</li> </ul>
Network Measurement	<ul style="list-style-type: none"> <li>• RTP Streaming Packet : Loss Packet Count, Streaming Bandwidth, Delay, Jitter</li> <li>• ETSI TR 101 290 1<sup>st</sup> Priority : TS Sync Loss, Sync Byte Error, PAT Error, PID Error, PMT Error, Continuity Count Error</li> </ul>

1) Surcharge may be applied



**Package Contents**





- All Models
- STB Multimeter
  - Cradle
  - Power adapter with corresponding power cord

**Ordering Information** BTIPTV - PA - {A} - {B}

**Function Options {A}**

Basic (if not choosing any options)	BTIPTV - PA - B - {B}
└ Audio Option	BTIPTV - PA - BA - {B}
└ Network Option	BTIPTV - PA - BN - {B}
└ Audio + Network Options	BTIPTV - PA - BAN - {B}

**Power Cord Options {B}**

Type F 	BTIPTV - PA - {A} - F
Type G 	BTIPTV - PA - {A} - G
Type B 	BTIPTV - PA - {A} - B
Type I 	BTIPTV - PA - {A} - I

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