# SET TOP BOX

Set Top Box or STB is the electronic device that helps to see the Television programmes in digital quality. It is a complex embedded system that connects the external source of signals to the television and converts the signals into contents. It has around 30 hardware blocks and a number of software drivers. Modern STBs are capable of features like time shift mode viewing, recording, video on demand, HD definition Video output etc. The Set Top Box connects the television and an external source of signal and converts the signals into video and audio contents to display on the screen. The signals from the cable are decoded by the Set To box since the TV cannot understand the digital data.

STBs can make it possible to receive and display TV signals, connect to networks, play games via a game console, surfing the Internet etc. The STB uses the decoding technology using three decoders like Video decoder, Audio decoder and Data decoder. The Video decoder converts the video packages into images viewable in CRT or LCD monitor of the TV. The Audio decoder decompresses the Audio bit stream and the Data decoder is used to select the channels.

## Signal Source for STB

The signal source for the STB may be Ethernet, Satellite Dish or Coaxial cable of cable TV providers, Broadband, DSL or a VHF or UHF Antenna. Usually the STB has the following components:

1. **Front End**

   The front end of the STB is the receiver section that receives the broadcast signal through the cable. The front end demodulates the signal and output the digital data for the Decoder. The front end has three blocks like tuner, demodulator and forward error correction circuit for data recovery.

2. **Front panel set up**

   It is different in various types of STBs. Generally it has an LCD or LED display, IR sensor for remote operation and manual switches. The working of the front panel set up is controlled by the decoder chip.

## 3. Power supply unit

The power supply section converts 230 or 110 volt AC to 12 volts DC. The power supply section generates different voltages for the different sections of the STB.



## 4. Decoder

Decoder is the heart of the STB. Its level of integration is called SoC (System on Chip). This chip has many circuits including the Demultiplexer. To save storage space, disk bandwidth and network bandwidth etc, the Programme should be encoded in a compressed form during transmission. The decoder in the STB, then decode or uncompress the data in the incoming signal to view in the TV. The decoding includes Demodulation, Demultiplexing etc.

## 5. Demultiplexer or DMUX

It receives a single signal carrying many channels and separates the channels into multiple output signals.

## 6. Flash

This system is used to store memory, as boot loader and to store other non volatile datas. Flash system has a storage memory ranging from 8 MB to 64 MB.

## 7. Rapid Access Memory

The RAM is used to store datas such as decoded video or audio informations. In many cases, the main application informations are also copied to the RAM to speed up the operation. Generally 32 MB RAM is used but in HD STBS it may go up to 256 MB.
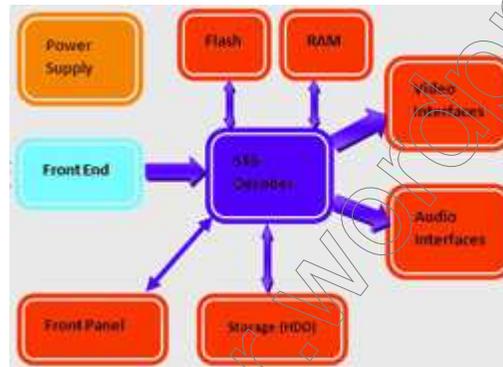


## 8. Video and Audio Interfaces

The output from the decoder may be in analog or digital format. So the interfaces like filter and physical connectors are required to make the signals compatible with the external devices. STBs are capable to give video formats like CVBS, Component video, HDMI etc. The audio output from the decoder may be in digital or Analog formats. To convert the digital audio informations into analog data, programmes like DAC is used. Digital data can be also transmitted using SPDIF standard.

## 9. RF Modulator

This is used to modulate the audio and video signals into RF signals. This is mainly used for old type TV with RF inputs.

**Some important Terminology**

**1. Encoder**

The Encoder may be a Programme or device that changes a signal or data into a code compatible for the computerized device. The encoded data in the encoder is manipulated using a Decoder in the receiving device. The signals from the cable are decoded by the Set To box since the TV cannot understand the digital data.

**2. Codec**

It is the Compression – decompression Algorithm that carries a list of instructions to identify the method of compression of data into a few bites or decompressing the data. By following the instructions of the Codec, the Media players can compress and decompress the datas. Codec is useful to decrease the size of the digital data into bit rates that can be stored in small file size. The Media player like Real player uses the codec for encoding or compressing the files.