TF-680 is a single chip HD streaming SoC that includes HD video codec and up to 7.1 channels audio. TF-680 supports network connectivity via SDIO, USB or Ethernet interface that enables the different connection methods. TF-680 compresses video and audio data and transmits them to Ethernet or WiFi. It can also decompress video and audio data from WiFi or Ethernet and display them on a TV. Image engine in TF-680 compresses video into MJPEG format and the support resolution of video can be up to HDTV resolution. It decompresses MJPEG files and delivers video to a display. Comparing with other compression methods such as MPEG1/2/4 and H.264, MJPEG delivers very low latency bidirectional interactive mechanism which is the best solution for interactive applications. Lip sync mechanism also designed in the TF-680 guarantees video and audio are in sync.

TF-680 embeds scalar engine that can scale down the captured pictures and then transmits them into network under limited network bandwidth.

Two UART, one I2C and one DDC are used for control purpose. Either AC’97 controller or I2S controller are dedicated for audio input and I2S interface supports up to 7.1 channels audio. The ICE interface provides the easiest way for software engineer to develop firmware and debug it. Ethernet MAC is included in TF-680.

TF-680 has one IR which can be receivers or transmitters. TF-680 has two embedded PLL, one is to generate different timing for different resolution display requirements and the other one is dedicated for SDRAM high performance operations.
System block diagram

A/V Transmitter

HDMI connector

HDMI Rx

RGB

I2S

SPI Flash

TF-680

SDIO

SD Connector

LED

5V DC in

100M PHY

MII

SDRAM

USB Connector

USB

HDMI

HDMI connector

A/V Receiver

HDMI connector

HDMI Tx

RGB

I2S

SPI Flash

TF-680

SDIO

SD Connector

LED

5V DC in

100M PHY

MII

SDRAM

USB Connector

USB

RJ45

IR in

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HARDWARE FEATURES

- **MCU**
  - 32-bit MCU, 160MHz operating frequency
  - 8KB instruction cache and 8KB memory cache
  - 8 multi-functions GPIO ports

- **Image compression / decompression engine, 166MHz operating frequency**
  - Encode/decode image from 16 x 16 to 2M pixel image
  - Input image format
    - RGB 888
    - CCIR656
    - CCIR601
  - Output image format
    - RGB 888
    - RGB 666
  - Image size: supports up to 2M pixel image resolution including the following popular resolutions
    - 640x480 @ 85fps
    - 800x600 @ 85fps
    - 1024x768 @ 75fps
    - 1280x1024 @ 60fps
    - 1600x1200 @ 30fps
    - 720x480 @ 60fps
    - 1280X720 @ 60fps
    - 1920X1080 @ 30fps

- **Scalar**
  - Scale up to any size, maximum resolution up to 2048x2048
  - Scale down to any size

- **Supports external SDRAM 2Mx32, 4Mx32, 8Mx32, and up to 32Mx32**

- **Supports AC’97 controller for audio**

- **I2S master/slave for audio operating up to 7.1 channels**

- **SPI interface for external flash, up to 16M bytes**

- **USB 2.0/1.1 host/device controller**

- **One SDIO host controller**

- **ICE interface**

- **244 balls TFBGA package**

BENEFITS

- Supports up to HDTV resolution
- A lot of hardware engines to increase overall performance without increasing CPU utilization
- Very low latency mechanism for interactive applications
- Highly integrated codec SoC to reduce BOM cost
- Wide spectrum of applications
  - PC2TV
  - HDMI Extender
  - Digital signage
  - Smartphone to TV
  - Tablet PC to TV

For additional information please visit us at [www.taifatech.com](http://www.taifatech.com) or send email to [sales@taifatech.com](mailto:sales@taifatech.com).