2. System block diagram

MM Tuner

YPbPr/RGB IN

TUN_CVBS

AV3 CVBS_IN

SC2/AV3 S-Video IN

SAA7119

SDRAM

Columbus

1Mx16 (USA only)

1Mx16

MST51512

LVDS

DVI HDCP

DDC

PC VGA D-Sub

DDC

HD YPbPr

PVR CVBS_Out

R/G/B/FB

MON_out

TT SAA5630

SC1/AV1_ Audio_IN

SC2/AV2_Audio_IN

PC_Audio_I N

DVI_Audio_IN

MUX

Audio Delay

TPA3008 Audio Amp

TDA1308 HP Amp

MSP34XX

2nd IF

AV3_Audio /HD Audio

PVR Audio L/R

IIC

MCU

DDC IIC

VGA DDC 24C02

Keys/IR/Light sensor

EEPROM
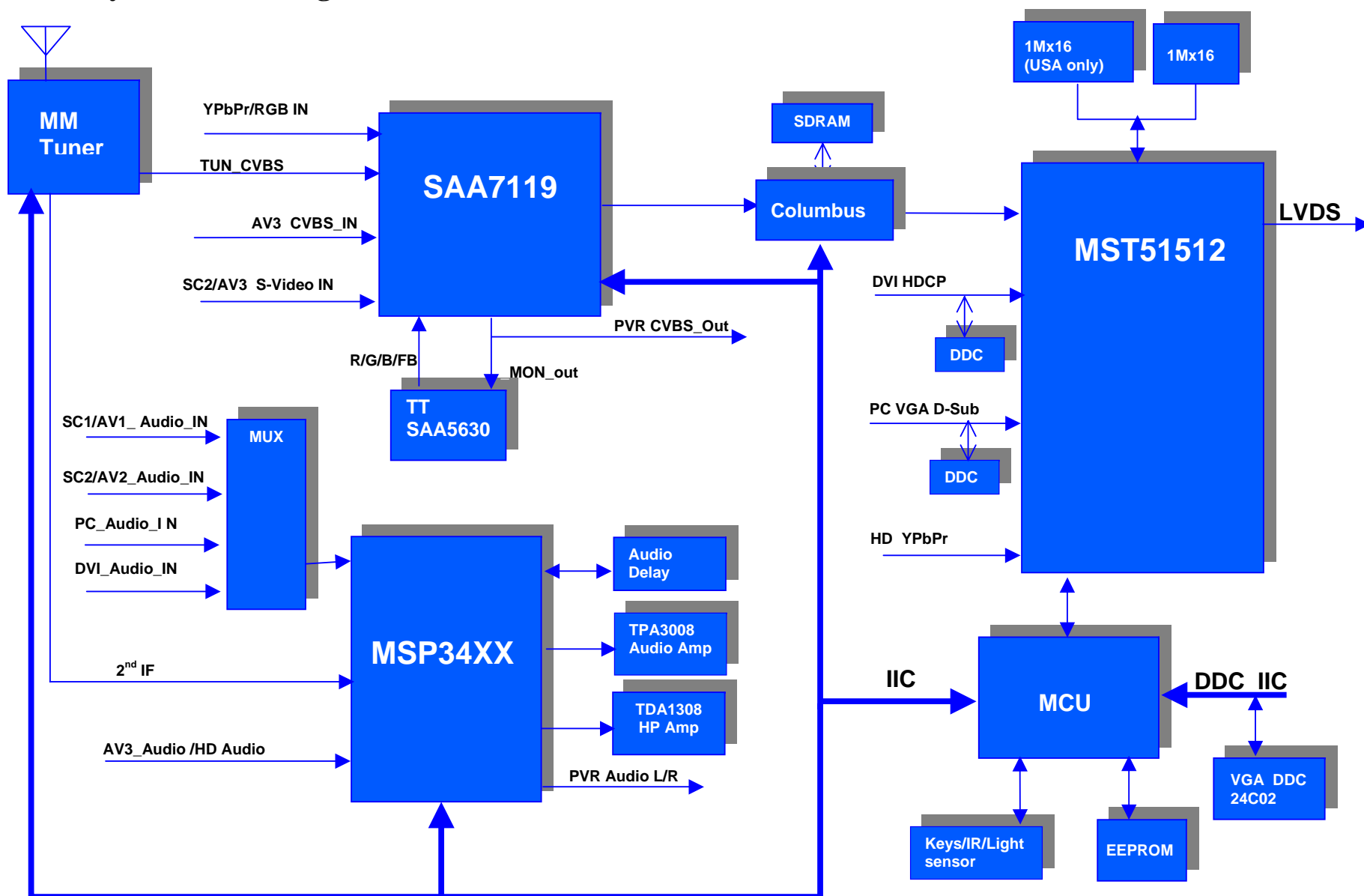
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3. Function description:

- **MM tuner** is used to receive RF wave and output CVBS and 2nd IF signal. CVBS is to video decoder (SAA7119) for color process, 2nd IF is to sound decoder (MSP34x5) for audio process. The tuner control is via IIC ex. Channel tuning. For different TV system, tuner and sound decoder have diversity as above.
- **Standard TV input** (Tuner, S-video, CVBS, SCART) is processed by SAA7119, But YPbPr, SDTV and HDTV (480i, 576i, 480p, 576p, 720p, 1080i), is done by scaler MST51512L ADC. But the signal is still link to SAA7119 if PIP (video in graph) function is requested. Then all YPbPr signal processed by SAA7119 could be the PIP video source. (* May use down sampling in HD0) MV protect is decoded by scaler.
- **Video decoder** SAA7119, is in charge of color decoding, could support PAL, NTSC and SECAM worldwide system. Compare to SAA7118, SAA7119 improve some picture quality, like V-chip CC I2C read-back, LTI, CTI, skin tone correction(see task A), also the HD0 is supported.
- **Teltext function** is for WE model, need a extra IC SAA5360. CVBS input, R/G/B, FB, out. Due to the SAA5360 request input signal 1Vrms and only one input channel, so the CVBS input source is from SAA7119 AOUT (CVBS out with 1Vrms). The R/G/B FB output into SAA7119 by AI22/AI32/AI42, and AI44 could overlay on any video source.
- **Sound decoder** MSP34XX is responsible to sound decode of tuner 2nd IF. It has one 2nd IF, two selectable audio sources input.And one loudspeaker, one scart out. Due to the input port limitation, a MUX is added for AV source select(PC audio in is fix in SC1). If the post audio amplifier is gain fixed type then the volume adjusts will be on MSP34XX.
- **Scaler** MST51512L besides scaling function, PIP, 3D de-interlacer, color enhance are major feature.Even de-interlacer is not so good but for static picture is enough to avoid image sticking.In America market, to avoid patent issue, two SDRAM is necessary for graph frame buffer. But in else region one SDRAM is enough. Of course, if no PC mode in spec, then one SDRAM for all model.The scaler structure limitation, the PIP source only from "video port", 8 bits or 16 bits. The sub window /PIP size can enlarge to half screen.
- **MCU**, NT68F632AL, is 128K flash ROM inside. Power control, RC5 I/O, and key function all done by here, more detail function wills description in chapter 4.later.
- **COLUMBUS** is a combination of a 2D/3D Comb filter for both PAL and NTSC and a spatial /temporal noise reduction system for both colour and luminance signals. COLUMBUS can be used with or without an external 16MBit SDRAM.

All chip communication is by IIC (SDA/SCL), and ISP is via DDCIIC, but if PC mode un-supported, then a reserved 6pin connector is for same application.