AMT630A

Video Display Controller

(Product Specification)

Version 1.1

2014.10

Revision Record:

Date	Revision	Modification Description
2014-09	V1.0	Initial Version
2014-10	V1.1	Add colormatrx registers

Content

1. GENERAL DESCRIPTION

AMT630A is a video decoder and Digital TFT-LCD Panel Control SOC. The AMT630A accept analog NTSC / PAL /

SECAM CVBS from TV tuner, DVD, or VCR sources, including weak and distorted signals. Automatic gain control (AGC) and 9-bit 1-channel A/D converters provide high resolution video quantization, with automatic video source and mode detection, user can easily switch and adjust variety of signal source. Multiple internal adaptive PLL precisely extract pixel clock from video source and perform sharp-and-keen color demodulation. Build-in line-buffer supports adaptive 2-D comb-filter, 2-D sharpening, and synchronization stable in a condense manner. Build-in On Screen Display(OSD) module. The output format of AMT630A directly supports variety of TFT-LCD modules. AMT630A is one excellent efficiency for a low-cost Price and small-area PCB solution.

2. FEATURES

VIDEO DECODER

- Composite video signal(CVBS); Multiple standards supported: NTSC and NTSC-Japan; PAL (B, D, G, H, I, M, N, etc.); SECAM;
- 3 Analog Inputs: 3*CVBS Inputs
- Digital AGC,ACC
- 9-Bit 1-Channel A/D Converters with Fixed Sampling Clock
- Only One Crystal (27 MHz) required for All Standards
- Internal PLL to Generate Video Clock
- Adaptive 2-D Comb Filter for Luminance and Chrominance Separation
- Precise Chrominance Demodulation
- Internal Buffers for Video Stability Control
- Video Noise Reduction

VIDEO ENHANCE

- Frequency Directive Sharpening
- Brightness, Contrast, Color, and Tint Adjustments
- Black-Level Extension and White-Level Extension
- Digital Chrominance Transient Improvement(DCTI) and Digital Luminance Transient Improvement(DLTI)
- 3 – channel Gamma curve adjustment
- Green level enhance
- 3x3 color martrix
- Peaking
- Noise Reduction
- 9 Tap FIR filter

SCALING ENGINE

- Supports digaital panel with the resolution of 480x240, 600x480, 520x288, 800x600, 1024x768 and more.
- Supports horizontal panorama scaling.
- Supports vertical panorama scaling.

OSD BLOCK

- Built-in 512-Character Font ROM (Including Special Font Characters)
- Dynamic OSD font RAM------4096x16 bytes
- Support Font Size upto 24x32

- 16 colors palette ,support 5 osd window
- Support 16 color bitmap
- Blending with OSD Content and Video
- Blinking and Highlight Function

INTERFACE

- Digital TTL/TCON panel
- 8-Bit/10-Bit CCIR 656 Digital Video Output Format Support
- I^2C-BUS interface (slave mode)

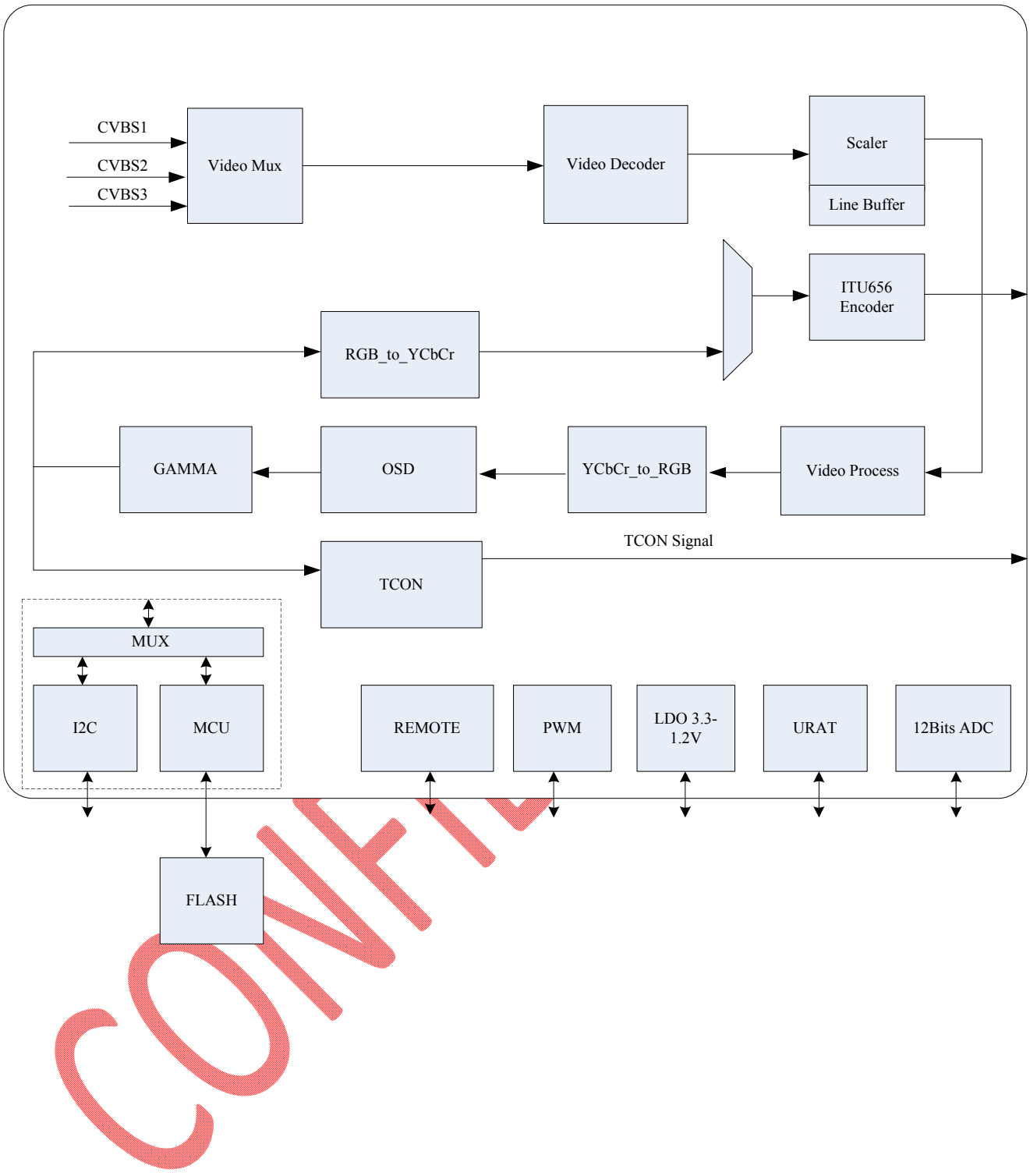
PERIPHERAL

- Build-in MCU & SPI Flash interface.
- Support SPI FLASH on line program
- Build-in 12Bit ADC
- Build-in Display PLL
- Build-in LDO for 1.2v core power
- 4 sets of Built-In PWM circuit: 4*16 bit
- 3.3V power supply only
- LQFP 64pin Package

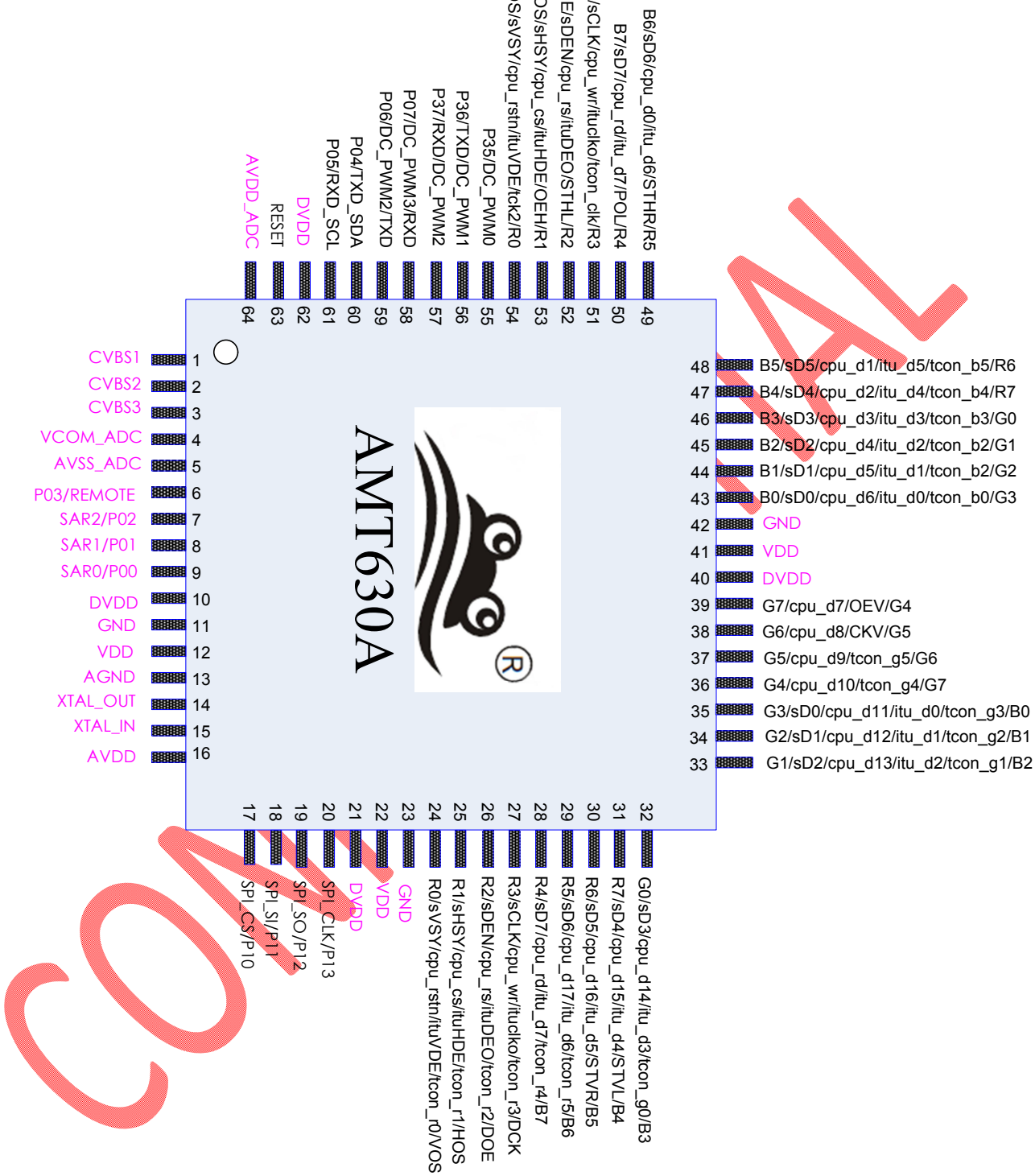
3. APPLICATION FIELD

- Portable DVD
- Small to medium sized LCD TV
- Car entertainment
- Digital photo frame
- Other application using analog panel as the display unit

4. BLOCK DIAGRAM



5. PIN DIAGRAM


AMT630A
1 CVBS1
2 CVBS2
3 CVBS3
4 VCOM_ADC
5 AVSS_ADC
6 P03/REMOTE
7 SAR2/P02
8 SAR1/P01
9 SAR0/P00
10 DVDD
11 GND
12 VDD
13 AGND
14 XTAL_OUT
15 XTAL_IN
16 AVDD
17 SPI_CS/P10
18 SPI_SI/P11
19 SPI_SO/P12
20 SPI_CLK/P13
21 DVRD
22 VDD
23 GND
24 R0/sVSY/cpu_rstn/ituVDE/tcon_r0/VOS
25 R1/sHSY/cpu_cs/ituHDE/tcon_r1/HOS
26 R2/sDEN/cpu_rs/ituDEO/tcon_r2/DOE
27 R3/sCLK/cpu_wr/ituclko/tcon_r3/DCK
28 R4/sD7/cpu_rd/itu_d7/tcon_r4/B7
29 R5/sD6/cpu_d17/itu_d6/tcon_r5/B6
30 R6/sD5/cpu_d16/itu_d5/STVR/B5
31 R7/sD4/cpu_d15/itu_d4/STVL/B4
32 G0/sD3/cpu_d14/itu_d3/tcon_g0/B3
33 G1/sD2/cpu_d13/itu_d2/tcon_g1/B2
34 G2/sD1/cpu_d12/itu_d1/tcon_g2/B1
35 G3/sD0/cpu_d11/itu_d0/tcon_g3/B0
36 G4/cpu_d10/tcon_g4/G7
37 G5/cpu_d9/tcon_g5/G6
38 G6/cpu_d8/CKV/G5
39 G7/cpu_d7/OEV/G4
40 DVDD
41 VDD
42 GND
43 B0/sD0/cpu_d6/itu_d0/tcon_b0/G3
44 B1/sD1/cpu_d5/itu_d1/tcon_b2/G2
45 B2/sD2/cpu_d4/itu_d2/tcon_b2/G1
46 B3/sD3/cpu_d3/itu_d3/tcon_b3/G0
47 B4/sD4/cpu_d2/itu_d4/tcon_b4/R7
48 B5/sD5/cpu_d1/itu_d5/tcon_b5/R6
49 B6/sD6/cpu_d0/itu_d6/STHR/R5
50 B7/sD7/cpu_rd/itu_d7/POL/R4
51 DCK/sCLK/cpu_wr/ituclko/tcon_clk/R3
52 DOE/sDEN/cpu_rs/ituDEO/STHL/R2
53 HOS/sHSY/cpu_cs/ituHDE/OEH/R1
54 VOS/sVSY/cpu_rstn/ituVDE/tck2/R0
55 P35/DC_PWM0
56 P36/TXD/DC_PWM1
57 P37/RXD/DC_PWM2
58 P07/DC_PWM3/RXD
59 P06/DC_PWM2/TXD
60 P04/TXD_SDA
61 P05/RXD_SCL
62 DVDD
63 RESET
64 AVDD_ADC

AMT630A PAD Definition

PAD NAME	TYPE	64D	复用功能
CVBS1	A	1	CVBS1
CVBS2	A	2	CVBS2
CVBS3	A	3	CVBS3
VCOM_ADC	A	4	VCOM_ADC
AVSS_ADC	P	5	AVSS_ADC
REMOTE	D	6	P03/REMOTE
SAR2	A	7	SAR2/P02
SAR1	A	8	SAR1/P01
SAR0	A	9	SAR0/P00
DVDD_0	P	10	DVDD
VDD_0	P	11	VDD
VSS_0	P	12	GND
AGND	P	13	AGND(AVSS33_ANA)
XTAL_OUT	A	14	XTAL_OUT
XTAL_IN	A	15	XTAL_IN
AVDD	P	16	AVDD
pad17	D	17	SPI_CS/P10
pad18	D	18	SPI_SI/P11
pad19	D	19	SPI_SO/P12
pad20	D	20	SPI_CLK/P13
DVDD_1	P	21	DVDD
VDD_1	P	22	VDD
VSS_1	P	23	GND
pad24	D	24	R0/VOS/tcon_r0/ituVDE/sVSY/cpu_rstn/P14
pad25	D	25	R1/HOS/tcon_r1/ituHDE/sHSY/cpu_cs/P15
pad26	D	26	R2/DOE/tcon_r2/ituDEO/sDEN/cpu_rs/P16
pad27	D	27	R3/DCK/tcon_r3/ituclko/sCLK/cpu_wr/P17
pad28	D	28	R4/B7/tcon_r4/itu_d7/sD7/cpu_rd/P20
pad29	D	29	R5/B6/tcon_r5/itu_d6/sD6/cpu_d17/P21
pad30	D	30	R6/B5/STVR/itu_d5/sD5/cpu_d16/P22
pad31	D	31	R7/B4/STVL/itu_d4/sD4/cpu_d15/GPIO0
pad32	D	32	G0/B3/tcon_g0/itu_d3/sD3/cpu_d14/GPIO1
pad33	D	33	G1/B2/tcon_g1/itu_d2/sD2/cpu_d13/GPIO2
pad34	D	34	G2/B1/tcon_g2/itu_d1/sD1/cpu_d12/GPIO3
pad35	D	35	G3/B0/tcon_g3/itu_d0/sD0/cpu_d11/GPIO4
pad36	D	36	G4/G7/tcon_g4/cpu_d10/P23
pad37	D	37	G5/G6/tcon_g5/cpu_d9/P24
pad38	D	38	G6/G5/CKV/cpu_d8/P25
pad39	D	39	G7/G4/OEV/cpu_d7/P26
DVDD_3	P	40	DVDD

VDD_2	P	41	VDD
VSS_2	P	42	GND
pad43	D	43	B0/G3/tcon_b0/itu_d0/sD0/cpu_d6/GPIO5
pad44	D	44	B1/G2/tcon_b1/itu_d1/sD1/cpu_d5/GPIO6
pad45	D	45	B2/G1/tcon_b2/itu_d2/sD2/cpu_d4/GPIO7
pad46	D	46	B3/G0/tcon_b3/itu_d3/sD3/cpu_d3/GPIO8
pad47	D	47	B4/R7/tcon_b4/itu_d4/sD4/cpu_d2/GPIO9
pad48	D	48	B5/R6/tcon_b5/itu_d5/sD5/cpu_d1/GPIO10
pad49	D	49	B6/R5/STHR/itu_d6/sD6/cpu_d0/P27
pad50	D	50	B7/R4/POL/itu_d7/sD7/cpu_rd/P30
pad51	D	51	DCK/R3/tcon_clk/ituclko/sCLK/cpu_wr/P31
pad52	D	52	DOE/R2/STHL/ituDEO/sDEN/cpu_rs/P32
pad53	D	53	HOS/R1/OEH/ituHDE/sHSY/cpu_cs/P33
pad54	D	54	VOS/R0/tck2/ituVDE/sVSY/cpu_rstn/P34
pad55	D	55	P35/DC_PWM0
pad56	D	56	P36/TXD/DC_PWM1
pad57	D	57	P37/RXD/DC_PWM2
pad16	D	58	P07/DC_PWM3/RXD
pad15	D	59	P06/DC_PWM2/TXD
pad13	D	60	P04/TXD/SDA
pad14	D	61	P05/RXD/SCL
DVDD_6	P	62	DVDD
pad12	D	63	RESET
	P	64	AVDD_ADC

6. Register Descriptions

6.1 Global Register(I2C Address: 0xB0 MCU Address: 0xFDXX)

Global Register Description:

Addr	Val	Bits	Name	Description	App note
0x00	00h	[7:0]	RSTN_REG	5Ah : Soft reset Else : No action if other values	
0x01	01h	[7:1]	reserved	可以用来做变量寄存器	
		[0]	chip_en	0. 关闭 BK,ADC 等模拟电路，屏蔽部份 CLK. 1. 正常工作	
0x02	00h	[7:1]	reserved	可以用来做变量寄存器	