



Overview

The WT8871-C/WT8871-E is a highly integrated video display controller for small size LCD display application, such as portable DVD player and car TV application. It has built-in video decoder, scaler, de-interlacer, TCON, 8-bit MCU, OSD, PWM and DC-to-DC converter functions. WT8871-C/WT8871-E has triple DAC and VCOM output for analog LCD panel application.

Features

- **Video input port**
 - 6 analog inputs
 - Support CVBS and S-video input
 - Support RGB input for GPS module and component input
 - Digital input: 8-bit 4:2:2 ITU-BT.656 or BT.601 interface
 - Support 720x480i and 720x516i input resolution
- **LCD panel interface**
 - Triple 8-bit DACs output RGB signals for analog panel
 - Programmable timing controller for different type of panels
 - Programmable gamma table for panel compensation
- **2D video decoder**
 - 10-bit ADC
 - Supports CVBS, S-video and RGB input
 - Decodes NTSC (M, Japan, 4.43), PAL (B, G, D, H, I, Nc), and SECAM
 - Multi-standard adaptive 2D comb filter
 - Safe Hsync, Vsync and field signal outputs when VCR trick mode
 - Auto detection and decodes Macrovision copy protection
 - Chroma Transient Improvement (CTI)
 - Luma Transient Improvement (LTI), edge/sharpness improvement
 - Luma Coring noise reduction
- **Display format conversion**
 - Programmable horizontal and vertical zoom ratio
 - Support non-linear scaling for 4:3 to 16:9
 - Convert interlaced input to progressive
- **Luminance and chrominance adjustment**
 - Contrast adjustment with black/white level stretch
 - Brightness adjustment
 - Sharpness adjustment
 - Hue adjustment
 - Saturation adjustment
- **OSD**
 - Character based OSD
 - Font size: 12x18 dots
 - Font ROM: 512 single color fonts



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- Display RAM : display up to 512 characters
- User-font RAM : up to 142 single color fonts
- Support 2-bit multi-color font
- Shadow and border effect of character
- Two display windows
- Programmable background window
- Support alpha blending
- Support blinking effect
- Support fade in/out effect
- Support external OSD interface
- **MCU**
- Built-in 8051 CPU
- Data memory: 384 bytes RAM
- Support external program memory with serial flash memory via 4-wire interface
- Internal MCU can be disable by pin mode0 and mode1
- 8-bit ADC for keypad scanning and others
- Two slave mode I2C interfaces, up to 400KHz - Interface for ISP, ICE and other I2C master
- Standard UART port support.
- Support Infra-Red remote control
- Four PWM outputs including one low frequency PWM
- Built-in self test pattern generator
- Two DC-DC boost circuits for VGH and VGL
- General purpose I/Os
- Spread spectrum PLL for panel clock, lower EMI
- Crystal oscillator- 24MHz
- **Package type:**
- 128-pin LQFP, 14mm(L) x 14mm(W) x 1.4mm(H)
- Green package available

Application

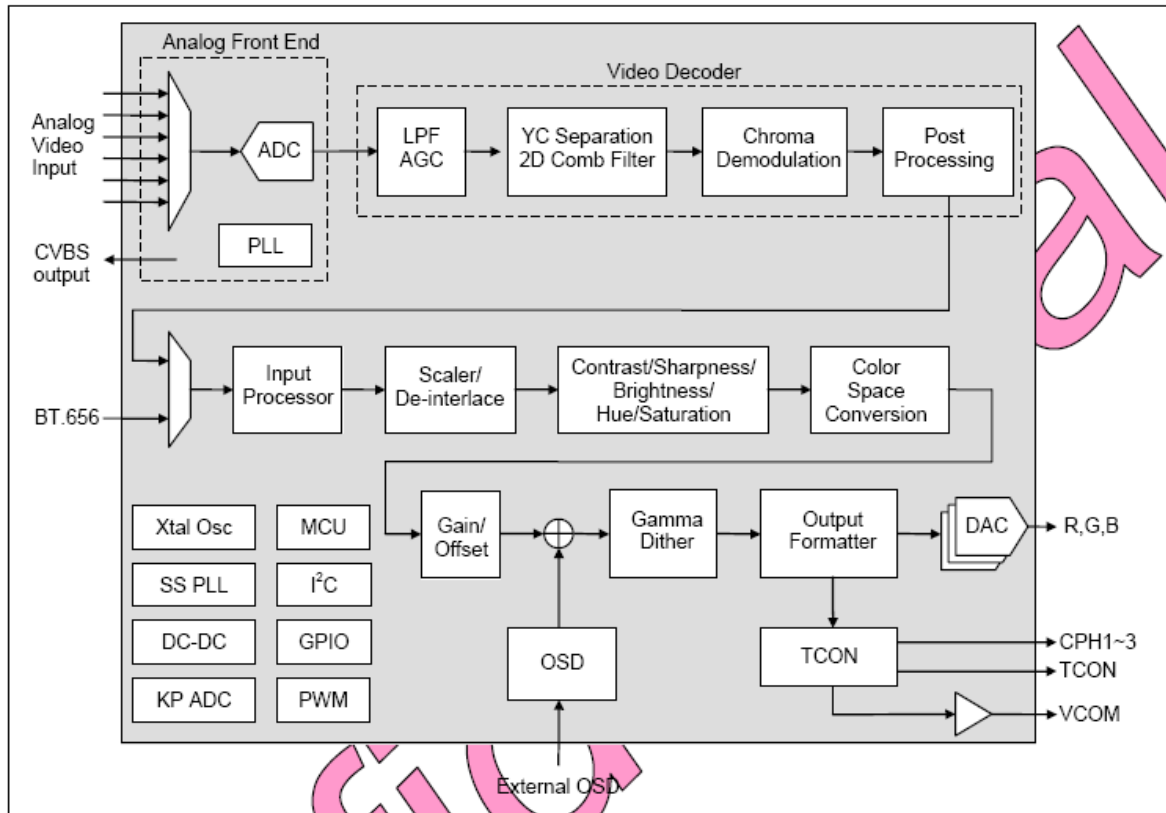
- Portable DVD Player
- Car information, entertainment system
- Portable DTV
- Digital photo frame

Block Diagram

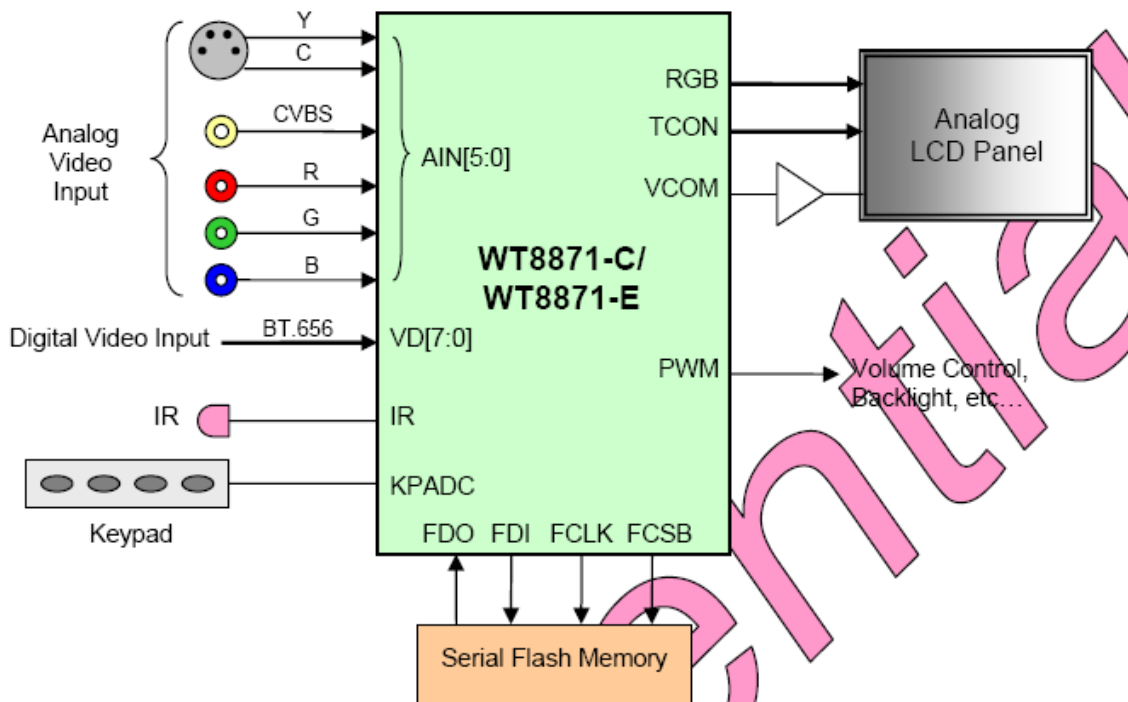


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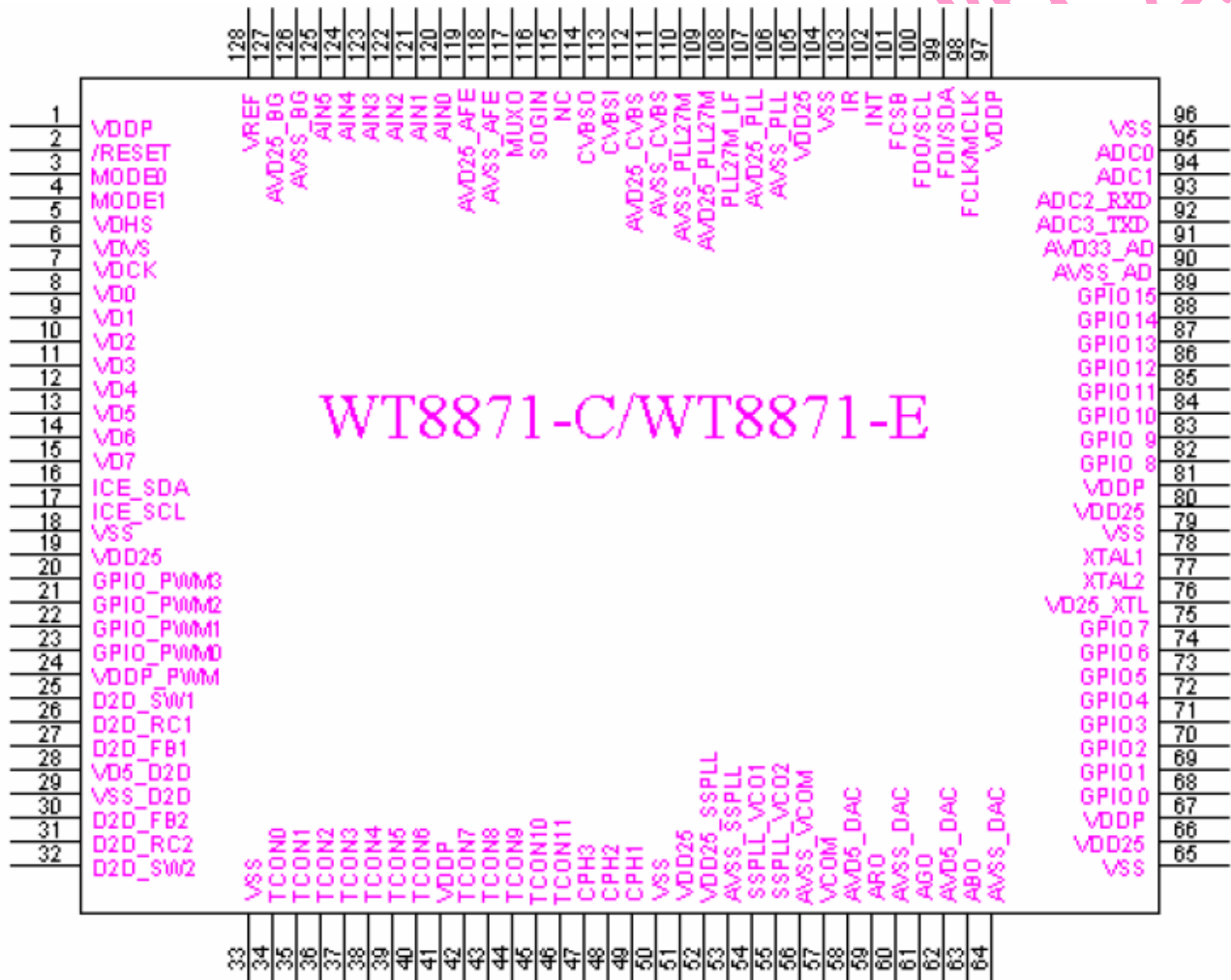
Application Example





2 . Package Type and Pin Description

2.1. Pin Configuration



2.2 Pin Description



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WT8871-C/ WT8871-E	Pad Name	I/O	Pull up/down	Description
1	VDDP			3.3V Power.
2	RESETB	I	pull-up	Reset pin. Active low.
3	MODE0	I	pull-down	Operating mode selection.
4	MODE1	I	pull-down	00 : Internal MCU mode using external flash 01 : Reserved 10 : External MCU mode 11 : Reserved
5	VDHS/OSDHS	I/O	pull-down	BT.601 Hsync I/O or Hsync output for external OSD. Shared with GPIO.
6	VDVS/OSDVS	I/O	pull-down	BT.601 Vsync I/O or Vsync output for external OSD. Shared with GPIO.
7	VDCK/OSDCK	I/O	pull-down	BT.656/601 clock I/O or clock output for external OSD. Shared with GPIO.
8	VD[0]/OSDBIN	I/O	pull-down	BT.656/601 video data I/O or external OSD blue input. Shared with GPIO.
9	VD[1]/OSDGIN	I/O	pull-down	BT.656/601 video data I/O or external OSD green input. Shared with GPIO.
10	VD[2]/OSDRIN	I/O	pull-down	BT.656/601 video data I/O or external OSD red input. Shared with GPIO.
11	VD[3]/OSDINT	I/O	pull-down	BT.656/601 video data I/O or external OSD intensity input. Shared with GPIO.
12	VD[4]/OSDFB	I/O	pull-down	BT.656/601 video data I/O or external OSD fast blanking input. Shared with GPIO.
13	VD[5]	I/O	pull-down	BT.656/601 video data I/O. Shared with GPIO.
14	VD[6]	I/O	pull-down	BT.656/601 video data I/O. Shared with GPIO.
15	VD[7]	I/O	pull-down	BT.656/601 video data I/O. Shared with GPIO.
16	ICE_SDA	I/O	pull-up	I ² C data pin.
17	ICE_SCL	I/O	pull-up	I ² C clock pin.
18	VSS			Ground.
19	VDDC			2.5V Power.
20	PWM[3]	I/O	pull-up	PWM output or 8051 P1[3]. Shared with GPIO.
21	PWM[2]	I/O	pull-up	PWM output or 8051 P1[2]. Shared with GPIO.
22	PWM[1]	I/O	pull-up	PWM output. Shared with GPIO.
23	PWM[0]	I/O	pull-up	PWM output or low frequency PWM output. Shared with GPIO.
24	VDDR_PWM			3.3V or 5V Power.
25	D2D_SW1	O		DC-to-DC switching pulse.
26	D2D_SS1	I/O		DC-to-DC soft start pin. Shared with GPIO.
27	D2D_FB1	I/O		DC-to-DC feedback pin. Shared with GPIO.
28	VD5_D2D			3.3 or 5V Power for DC-to-DC.
29	VSS_D2D			Ground for DC-to-DC.
30	D2D_FB2	I/O		DC-to-DC feedback pin. Shared with GPIO.
31	D2D_SS2	I/O		DC-to-DC soft start pin. Shared with GPIO.
32	D2D_SW2	O		DC-to-DC switching pulse.
33	VSSP			Ground.
34	TCON[0]	I/O	pull-down	TCON output. Shared with GPIO.
35	TCON[1]	I/O	pull-down	TCON output. Shared with GPIO.
36	TCON[2]	I/O	pull-down	TCON output. Shared with GPIO.
37	TCON[3]	I/O	pull-down	TCON output. Shared with GPIO.
38	TCON[4]	I/O	pull-down	TCON output. Shared with GPIO.
39	TCON[5]	I/O	pull-down	TCON output. Shared with GPIO.



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40	TCON[6]	I/O	pull-down	TCON output. Shared with GPIO.
41	VDDP			3.3V power for PAD
42	TCON[7]	I/O	pull-down	TCON output. Shared with GPIO.
43	TCON[8]	I/O	pull-down	TCON output. Shared with GPIO.
44	TCON[9]	I/O	pull-down	TCON output. Shared with GPIO.
45	TCON[10]	I/O	pull-down	TCON output. Shared with GPIO.
46	TCON[11]	I/O	pull-down	TCON output or panel data enable. Shared with GPIO.
47	CPH3	I/O	pull-down	TCON clock 1 or panel hsync. Shared with GPIO.
48	CPH2	I/O	pull-down	TCON clock 2 or panel vsync. Shared with GPIO.
49	CPH1	I/O	pull-down	TCON clock 3 or panel clock. Shared with GPIO.
50	VSSP			Ground.
51	VDD25			2.5V Power.
52	AVD25_SSPLL			2.5V Power.
53	AVSS_SSPLL			Ground.
54	SSPLL_VCO1			Loop filter 1 of spectrum PLL.
55	SSPLL_VCO2			Loop filter 2 of spectrum PLL.
56	AVSS_VOVM			Ground.
57	VCOM	AO		VCOM Output.
58	AVD5_DAC			5V power.
59	ARO	AO		Analog Red signal output
60	AVSS_DAC			Ground for DAC
61	AGO	AO		Analog Green Output
62	AVD5_DAC			5V power for DAC
63	ABO	AO		Analog Output
64	AVSS_DAC			Ground.
65	VSS			Ground.
66	VDDC			2.5V Power.
67	VDDP			3.3V Power.
68	GPIO[0]	I/O	pull-down	GPIO.
69	GPIO[1]	I/O	pull-down	GPIO.
70	GPIO[2]	I/O	pull-down	GPIO.
71	GPIO[3]	I/O	pull-down	GPIO.
72	GPIO[4]	I/O	pull-down	GPIO.
73	GPIO[5]	I/O	pull-down	GPIO.
74	GPIO[6]	I/O	pull-down	GPIO.
75	GPIO[7]	I/O	pull-down	GPIO.
76	VD25_XTE			2.5V Power.
77	XTAL2	O		Crystal oscillator output.
78	XTAL1	I		Crystal oscillator input.
79	VSS			Ground
80	VDDC			2.5V Power.
81	VDDP			3.3V Power.
82	GPIO[8]	I/O	pull-down	GPIO.
83	GPIO[9]	I/O	pull-down	GPIO.
84	GPIO[10]	I/O	pull-down	GPIO.
85	GPIO[11]	I/O	pull-down	GPIO.
86	GPIO[12]	I/O	pull-down	GPIO.
87	GPIO[13]	I/O	pull-down	GPIO.
88	GPIO[14]	I/O	pull-down	GPIO.
89	GPIO[15]	I/O	pull-down	GPIO.
90	AVSS_KP			Ground.
91	AVDD_KP			3.3V power.



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92	KPADC[3]/TXD	I/O	pull-up	Keypad ADC input or UART TXD. Shared with GPIO.
93	KPADC[2]/RXD	I/O	pull-up	Keypad ADC input or UART RXD. Shared with GPIO.
94	KPADC[1]	I/O	pull-up	Keypad ADC input or 8051 P1[0]. Shared with GPIO.
95	KPADC[0]	I/O	pull-up	Keypad ADC input or 8051 P1[0]. Shared with GPIO.
96	VSS			Ground.
97	VDDP			3.3V Power.
98	FCLK	I/O	pull-up	Connects to serial flash clock.
99	FDI	I/O	pull-up	Connects to serial flash data output.
100	FDO	I/O	pull-up	Connects to serial flash data input.
101	FCSB	I/O	pull-up	Connects to serial flash chip select.
102	INTB	I/O	pull-up	Interrupt input.
103	IR	I/O	pull-up	IR input. Shared with GPIO.
104	VSS			Ground
105	VDDC			2.5V Power.
106	AVSS_PLL			Analog power for analog front end PLL.
107	AVD25_PLL			Analog power for analog front end PLL.
108	PLL27M_LF			Loop filter for 27MHz PLL.
109	AVD25_27M			2.5V power..
110	AVSS_27M			Ground.
111	AVSS_CVBS			Ground.
112	AVD25_CVBS			2.5V power.
113	CVBSI	AI		CVBS buffer input
114	CVBSBO	AO		CVBS buffer output
115	NC			No connect.
116	SOGI			SOG input. Composite sync input.
117	CVBSMO	AO		CVBS mux Output
118	AVSS_AFE			Ground.
119	AVDD_AFE			2.5V power.
120	AIN[0]	AI		analog video input.
121	AIN[1]	AI		analog video input.
122	AIN[2]	AI		analog video input.
123	AIN[3]	AI		analog video input.
124	AIN[4]	AI		analog video input.
125	AIN[5]	AI		analog video input.
126	AVSS_BG			Ground.
127	AVDD_BG			2.5V power.
128	AVREF	AO		Reference voltage of analog front end.