

**P922E**

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# ***SERVICE MANUAL***



**The Monitor Specialists**

**EDITION 1  
FEB. 2003**

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

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**1. SCOPE**

This specification defines the design and performance requirements for the 19" SXGA TFT LCD display monitor "P922E " series.

There are two models of "P922E" in each own's project code.

The common features of the "P922E" is listed in the following table :

Feature	Description
1	Universal input AC/DC <b>Adaptor</b>
2	Digital Visual interface ( <b>DVI-D</b> ) TMDS 1 Ch 165MHz
3	Analog RGB interface ( <b>VGA</b> ) 30~92KHz, 59~85Hz, 157.5MHz
4	<b>USB</b> 2.0 module (provided 4 downstraem ports)
5	Built in 1W*2 (L/R) speakers (Stereo)
6	19" SXGA 1280*1024 Patterned Vertical Alignment ( <b>PVA</b> ), TFT LCD panel
7	Function keys * 6 : Power On/Off ESC Δ (up) ▽ (down) ↻ (enter) source
8	Direct Access function keys : Δ for  contrast function, ▽ for  brightness function, "Esc" for mute function
9	Green/Amber LED indicator for power on/power saving
10	Plug & play support with DDC2B protocol installed.
11	Power saving mode compliant with Energy Star
12	OSD (on screen display) MENU operation
12.1	Brightness adjustment
12.2	Contrast adjustment
12.3	Auto tune function (VGA)
12.4	Color selection
12.5	Image adjustment
12.6	Position adjustment (VGA)
12.7	Language selection
12.8	Reset function
12.9	<b>Source</b> selection (DVI/VGA)
13	OSD information of input status
14	Left side <b>Dial</b> volume control
15	<b>ISO/EDIS</b> 13406-2 Class II
16	<b>Tilt</b> (in front bezel) and <b>Swivel</b> (in base) adjustable.
17	Cable wire arrange box

The differential features of the 2 models of P922E are listed in the following table

Model		P922E (ISO13406-2 Class II )	P922E [ ISO13406-2 Class II ] + 0 Pixel Fault
project		LKC19SS2BC03	LKC19SS0BC03
ISO13406-2	View Direction Class	II	II
	Pixel Faults Class	II	I

**2. INPUT REQUIREMENTS**

**2.1 Input Power**

2.1.1. Power Source 100 ~ 240 Vac, + -10%, 50/60 Hz (60W,3.0ϕ plug to monitor.)

2.1.2. Power Consumption

Normal operating mode	1.Audio function and USB 2.0 module are operating at full power	≦	57W
	2.USB 2.0 module all ports aren't connected to any device, and the audio module is operating at full power.	≦	42W
	3. USB 2.0 module all ports aren't connected to any device,and the audio function is operating at no audio signal input.	≦	
Power saving mode	1.USB 2.0 module is operating at full power, the number of active Ports is 4 with 0.5A per port. Audio function is operating at full power.	≦	22W
	2.USB 2.0 module all ports aren't connected to any device, audio function is operating at full power.	≦	9W
	3.USB 2.0 module all ports aren't connected to any device, audio function is operating at no audio signal input.	≦	5W
Power switch off	1. USB 2.0 module upstream port isn't connected to PC or PC off.	<	2W

2.1.3. AC Line Drop Out

Picture must not disappear while AC 100 V input drop out (10ms, 100%)

2.1.4. AC Wave Distortion

2.1.5. In-rush Current

10% max. permitted

2.1.6. Power Cord

50 A max at 240 Vac cold start

2.1.7 DC Power cable

Detachable, 3P with ground type.

Detachable from display unit and captive with AC/DC adapter.

**2.2 Display Input**

2.2.1. RGB Video

Analogue, 0.0 to 0.7 V peak to peak  
Separate RGB  
Input impedance 75 Ohm  
Positive polarity

2.2.2 Sync Signal

Separate horizontal & vertical sync (3.3V & 5V)  
Low level 0.8 V maximum  
High level 2.0 V minimum  
Positive or negative polarity

2.2.3 Analog Input Connection

a. Detachable Mini D-sub 15 pin male in two ends signal cable.

b. A female Mini D-sub 15 pin base .

Pin 1	Red	Pin 9	No Connection
Pin 2	Green	Pin 10	Ground
Pin 3	Blue	Pin 11	No Connection
Pin 4	Ground	Pin 12	SDA
Pin 5	Ground	Pin 13	H. Sync & Composite
Pin 6	R Return		
Pin 7	G Return	sync	
Pin 8	B Return	Pin 14	V. Sync
		Pin 15	SCL

**2.2.4 Digital Input**

Input Interface

DVI-D V.1 TMDS 165MHz 1-Channel

Digital Input connection a. Detachable DVI-D male connector in two ends signal cable

b. A female DVI-D connector in monitor side.

**DVI-D 1-Channel Pin Assignment**

Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S Data 2-	9	T.M.D.S Data 1-	17	T.M.D.S Data 0-
2	T.M.D.S Data 2+	10	T.M.D.S Data 1+	18	T.M.D.S Data 0+
3	T.M.D.S Data 2 Shield	11	T.M.D.S Data 1 Shield	19	T.M.D.S Data 0 Shield
4	NC	12	NC	20	NC
5	NC	13	NC	21	NC
6	DDC Clock	14	+5V Power	22	T.M.D.S. Clock Shield
7	DDC Data	15	Ground	23	T.M.D.S. Clock+
8	NC	16	Hot Plug Detect	24	T.M.D.S. Clock-

**2.3 Audio Input**

2.3.1 Audio Input Signal

Right & Left channels.  
Input level : 1Vrms(typ)  
Input Impedance : 15 Kohm

2.3.2. Audio Input Connection

a. Detachable stereo phone head in two ends signal cable.  
b. A femal stereo phone jack base.

**2.4 USB Input**

USB Rev.2.0\_

2.4.1 USB Input signal

Differential signal D+,D-

2.4.2 USB Input connection

a. Detachable standard USB cable (2.0)  
b. A female standard USB up-stream port base.

2.4.3 USB Output Connection

Four female USB down-stream port bases.

**3. ELECTRICAL CHARACTERISTICS**

**3.1 LCD Panel**

- 3.1.1. Type 19" diagonal, SXGA resolution, color TFT-LCD
- 3.1.2. Pixel structure R/G/B sub-pixels in vertical stripes  
1280 x 1024 array matrix  
a-Si TFT active matrix (PVA)
- 3.1.3. Gray scale 16.7 million colors.
- 3.1.4. Surface treatment 3H hard coating ,anti-static,anti-glare
- 3.1.5. Backlight Integral CCFT ,  
Type to support field replacement.  
Life time 30000 hours @ 25C, 50% of initial value.
- 3.1.6 Pixel Faults

Pixel Faults type		Model	P922E	P922E
			(ISO13406-2 Class II )	(ISO13406-2 Class II + 0 pixel Fault) (Note 1)
Type1	Bright Pixels (Note 2)		≤ 3	0
Type2	Dark Pixels (Note 3)		≤ 3	0
Type3	Fault Pixels / Sub-Pixels(Note 4)		≤ 5	0
Type4	Cluster of type1 or type 2		≤ 0	0
Type5	Cluster of type3 faults (Note5)		≤ 3	0
Type6	Total Pixel Faults		≤ 5	0

Note 1 : 0 pixel fault meets ISO/FDIS 13406-2 Pixel Faults Class I requirements.

Note 2 : Bright pixels in full black pattern.

Note 3 : Dark pixels in full white pattern

Note 4 : fault Pixel / Sub-Pixel : The pixel or sub-pixel is abnormal but not bright/dark pixel.

Note 5 : Fault Cluster : Two or more Pixels/Sub-pixels with faults within 5 \* 5 block of pixels.

**3.2 Modes and Timing Compability**

The monitor shall support an internal scaler to enable the monitor to display lower resolution video modes. The scaler shall convert all lower resolution modes up to 1280x1024. The monitor shall support all the modes listed in Table 1.

3.2.1 Analog

Table 1. Supported Timing

VESA Standard mode :

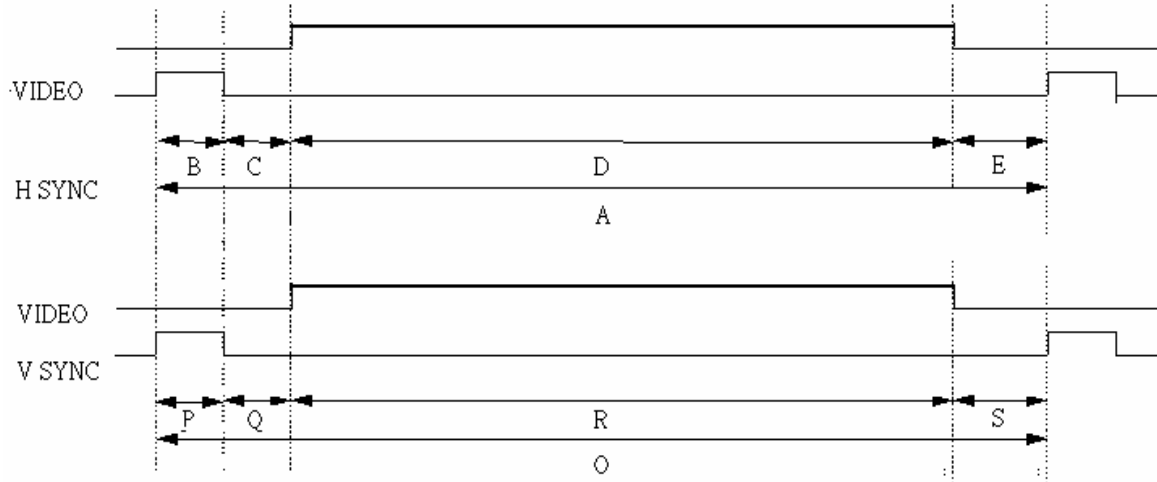
Display Format	IBM VGA		VESA	VESA	VESA	VESA	VESA
Horizontal Dots	720	640	640	640	800	800	800
Vertical lines	400	480	480	480	600	600	600
Horizontal Frequency ( KHz)	31.469		37.861	37.5	37.879	48.077	46.875
Vertical Frequency ( Hz )	70	59.94	72.809	75	60.317	72.188	75.000
Pixel Rate ( MHz )	28.322	25.175	31.5	31.5	40	50	49.5
H. Sync. Polarity	-	-	-	-	+	+	+
A $\mu$ S ( Period )	31.778		26.413	26.667	26.4	20.8	21.333
B $\mu$ S ( Pulse Width )	3.813		1.270	2.032	3.2	2.4	1.616
C $\mu$ S ( Back Porch )	1.907		4.063	3.810	2.2	1.28	3.232
D $\mu$ S ( Active Area )	25.422		20.317	20.317	20.0	16.0	16.162
E $\mu$ S ( Front Porch )	0.636		0.763	0.508	1.00	1.12	0.323
V. Sync. Polarity	+	-	-	-	+	+	+
O ms ( Period )		16.683	13.735	13.333	16.579	13.853	13.333
P ms ( Pulse Width )		0.064	0.079	0.080	0.106	0.125	0.064
Q ms ( Back Porch )		1.048	0.739	0.427	0.607	0.478	0.448
R ms ( Active Area )	12.711	15.253	12.678	12.800	15.840	12.480	12.8
S ms ( Front Porch )		0.318	0.237	0.027	0.026	0.770	0.021

Display Format	VESA	VESA	VESA	VESA	VESA	VESA
Horizontal Dots	1024	1024	1024	1152	1280	1280
Vertical lines	768	768	768	864	1024	1024
Horizontal Frequency	48.363	56.746	60.023	67.5	63.981	79.976
Vertical Frequency	60.004	70.069	75.029	75	60.013	75.025
Pixel Rate ( MHz )	65.0	75	78.75	108	108	135
H. Sync. Polarity	-	-	+	+	+	+
A $\mu$ S ( Period )	20.667	17.707	16.660	14.815	15.631	12.504
B $\mu$ S ( Pulse Width )	2.092	1.813	1.219	1.185	1.180	1.067
C $\mu$ S ( Back Porch )	2.462	1.920	2.235	2.370	2.065	1.837
D $\mu$ S ( Active Area )	15.754	13.653	13.003	10.667	11.797	9.481
E $\mu$ S ( Front Porch )	0.369	0.321	0.203	0.593	0.590	0.119
V. Sync. Polarity	-	-	+	+	+	+
O ms ( Period )	16.666	14.272	13.238	13.333	16.663	13.329
P ms ( Pulse Width )	0.124	0.106	0.050	0.044	0.047	0.038
Q ms ( Back Porch )	0.6	0.513	0.466	0.474	0.594	0.475
R ms ( Active Area )	15.88	13.599	12.795	12.8	16.006	12.804
S ms ( Front Porch )	0.062	0.054	0.017	0.015	0.016	0.012

VGA Support Mode

1280 * 1024 @ 70Hz,72Hz,85Hz
1280 * 960 @ 60Hz,70Hz,72Hz,75Hz,85Hz
1280 * 720 @ 60Hz
1152 * 864 @ 60Hz, 70Hz,72Hz,85Hz
1024 * 768 @ 72Hz,85Hz
800 * 600 @ 70Hz,85Hz
640 * 480 @ 70Hz,85Hz
640 * 350 @ 70Hz

Fig.1 Timing Chart



3.2.2 Digital

DVI Support mode

640 * 480 @60Hz
800 * 600 @60Hz
1024*768 @60Hz
1280*1024@60Hz

**3.3 Plug & Play**

VESA DDC 2B, DVI support DDC 2B+ standard DDC 2B data transmission only for I<sup>2</sup>C BUS interface card.

**3.4 Scanning characteristics**

	VGA	DVI
Horizontal frequency	30KHz to 92KHz	30KHz to 66KHz
Refresh rate	59Hz to 85Hz	59Hz to 61Hz

**3.5 USB 2.0 Module**

3.5.1 The USB 2.0 module provided for 4 down-stream ports and 1 up-stream port.

3.5.2 The USB 2.0 module can detect the status of computer (USB V<sub>BUS</sub> power) to save power.

- 3.5.3 Down-stream port output power :     5V±5% (> 4.75V, < 5.25V)
  
- 3.5.4 Overcurrent detection :             0.6 to 1.25A ( 0.9A typ.) (The USB  
standard defines the max.current is 0.5A for each port)
  
- 3.5.5 Bus transation :                     High speed(480Mbps), full speed(12Mbps)  
low speed(1.5Mbps)

**3.6 Audio Function**

- 3.6.1 Input Level :                         1Vrms, 2.828Vpp(typ.)
  
- 3.6.2 Max. Output Level :                 7.8Vpp, No distortion(Input level :3.76Vpp  
max. volume)
  
- 3.6.3 Output Power :                       1W \* 2 (10% THD,1KHz)
  
- 3.6.4 Total Harmonic Distortion (THD)   0.3%(0.5W\*2, 1KHz)
  
- 3.6.5 Frequency Response                 ± 3dB : 330 ~ 20KHz

**3.7 User Controls and Indicator**





- 3.7.1 Power ON/OFF Switch      The switch control scaler power down and turn off panel. All function will be disable, USB 2.0 module also.
  
- 3.7.2 LED Indicator              The LED color shall indicate power status as shown in paragraph 3.8
  
- 3.7.3 OSD
  - 3.7.3.1 Buttons                  ESC , ▾ , ▴ , ↶ , Signal source
  - 3.7.3.2 OSD Menu Level        See Table 2. P922E OSD Control Map
  
- 3.7.4 Hot Keys Function
  - 3.7.4.1 Contrast (  )      Press “▴ ” to pop up ;then press “▴ ” or “▾ ” to adjust Contrast up or down.
  - 3.7.4.2 Brightness (  )      Press “▾ ” to pop up ;then press “▴ ” or “▾ ” to adjust Brightness up or down.
  - 3.7.4.3 Mute On (  )      Press “Esc” directly to disable speakers, while speaker in normal state.
  - 3.7.4.4 Mute Off (  )      Press “Esc” directly to enable speakers, while speaker in audio mute state.  
“Esc” key is for Mute On and Off function
  - 3.7.4.5 Source Key                Press “ Source” key to select VGA or DVI input.

Table 2 P922E OSD Control Map

1. VGA-D15 input

	Level 1	Level 2	Level 3	Level 4	
Main Menu	Detect Adj.	Brightness			
	Detect Adj.	Contrast			
	Detect Adj.	Audio Mute			
		Auto Tune	Adjustment Scale		
		Color	9300° K		
			6500° K		
			User	R/G/B select	Adjustment Scale
			Moive	Color	Adjustment Scale
				Tint	Adjustment Scale
				Flesh Tone	Adjustment Scale
				(Y) Brightness	Adjustment Scale
				(Y) Contrast	Adjustment Scale
			Reset		
		Auto Tune	Adjustment Scale		
		Image	Clock	Adjustment Scale	
			Phase	Adjustment Scale	
			Smooth	On/Off	
		Position	Image Position	H-Position	Adjustment Scale
				V-Position	Adjustment Scale
				Center	Adjustment Scale
			OSD Position	H-Position	Adjustment Scale
				V-Position	Adjustment Scale
				Center	Adjustment Scale
		Language	English (select)		
			German (select)		
			French (select)		
			Spanish (select)		
			Italiano (select)		
			中文 (option)		
		Reset	Yes/No		
	Source	DVI/VGA (select)			

2.DVI input

	Level 1	Level 2	Level 3	Level 4
Detect Adj.	Brightness			
Detect Adj.	Contrast			
Detect Adj.	Audio Mute			
Main Menu	Color	9300° K		
		6500° K		
		User	R/G/B select	Adjustment Scale
		Moive	Color	Adjustment Scale
			Tint	Adjustment Scale
			Flesh Tone	Adjustment Scale
			(Y) Brightness	Adjustment Scale
			(Y) Contrast	Adjustment Scale
	Reset			
	Image	Smooth	On/Off	
	Position	OSD Position	H-Position	Adjustment Scale
			V-Position	Adjustment Scale
			Center	Adjustment Scale
	Language	English (select)		
		German (select)		
		French (select)		
		Spanish (select)		
Italiano (select)				
中文 (option)				
Reset	Yes/No			
Source	DVI/VGA (select)			

3.7.5 Accessory OSD Indications

Signal out of range	An input signal which is outside the range defined in Section 3.4 shall cause the monitor to display a message <b>Signal Out of Range</b> .
No Signal Input and power down	When the signal cable is not plugged into PC or when the horizontal or vertical sync are absent and when the monitor is turned on. After 5 sec isn't to detect H or V Sync then show " <b>No Signal Input</b> " 3 sec, and then show " <b>Power down</b> " message on screen 2 sec. If first turn on the monitor, shows " <b>No Signal Input</b> " 30 sec.

**3.8 Power Management**

This monitor will meet the low power specification, including USA governmental requirements

for Energy Star, the NUTEK standard and the VESA DPMS standard which detected the Hori. /Vert. sync signal from host CPU.

A dual color (green/amber) LED is located on the front bezel to indicate the power management states.

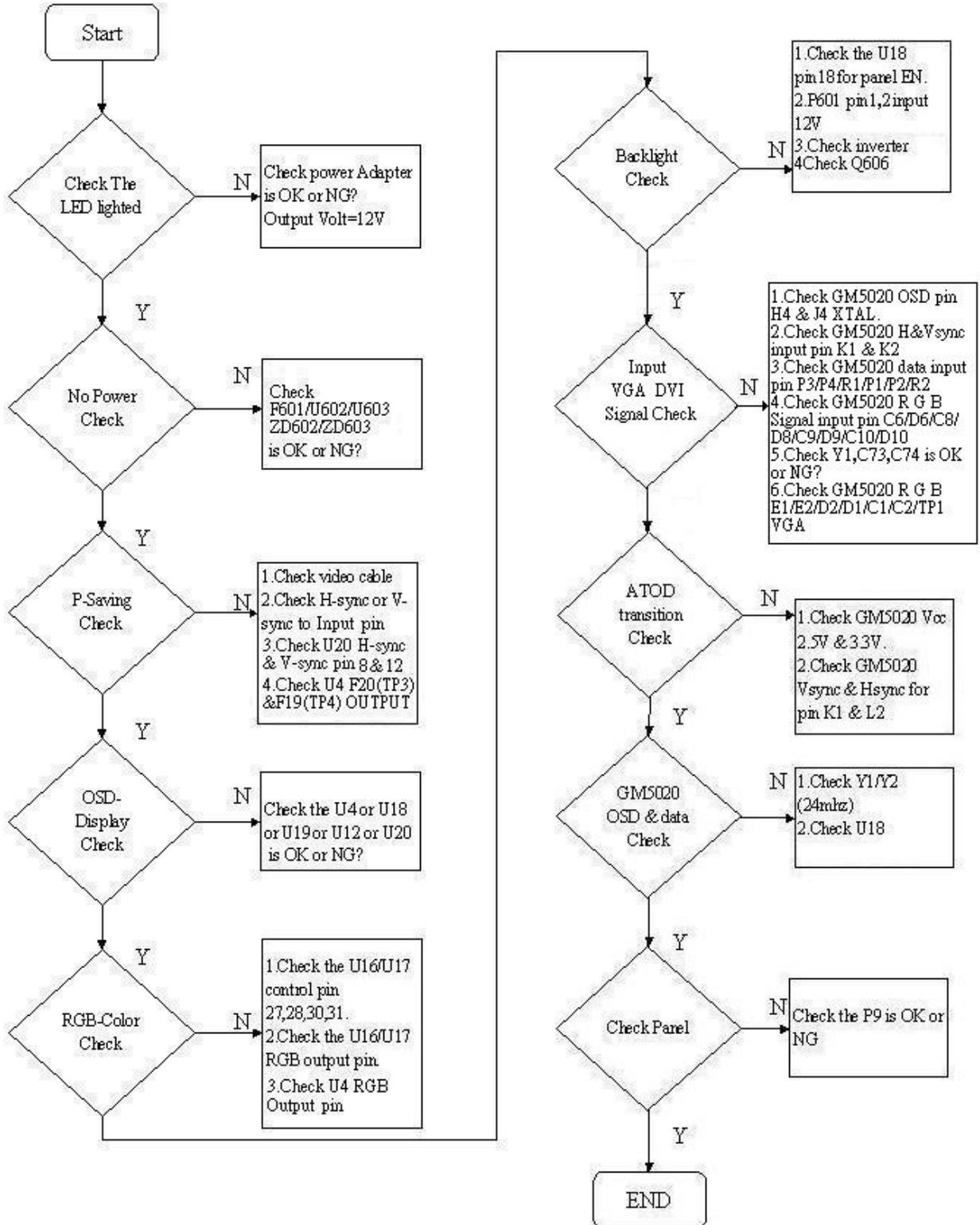
Sync	Power consumption	Power management	Picture Recovery time	LED Color
On	57W max.	ON	-	Green
Off	≤ 5W (Note 1)	Off	≤ 3 sec	Amber

Once "Esc" key initiates under power saving condition, the audio function can be woken up

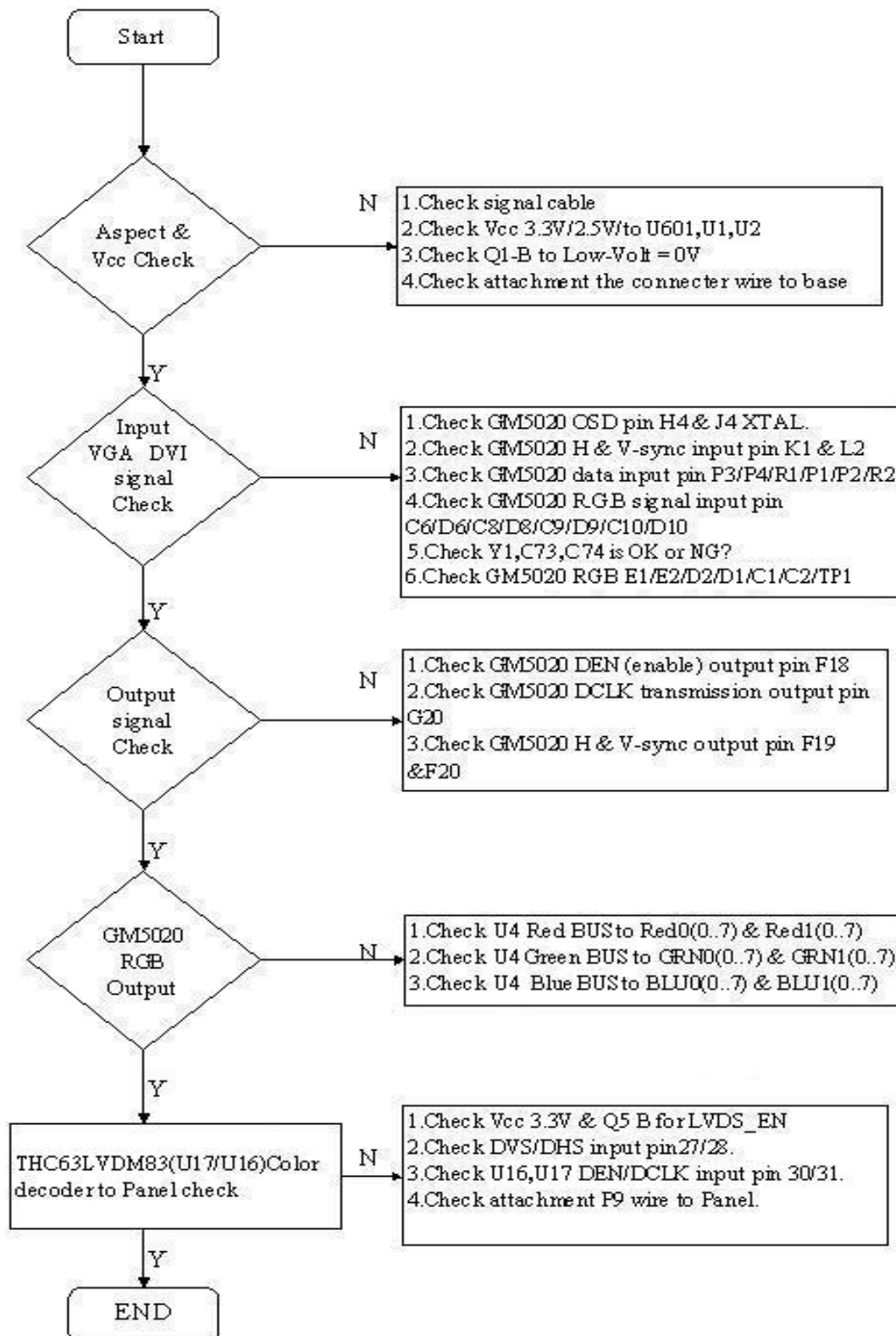
and the power consumption can not be the above definition.

Note1 : USB 2.0 module under power saving mode (or all ports aren't connected to any device), audio function is operating at no audio signal input.

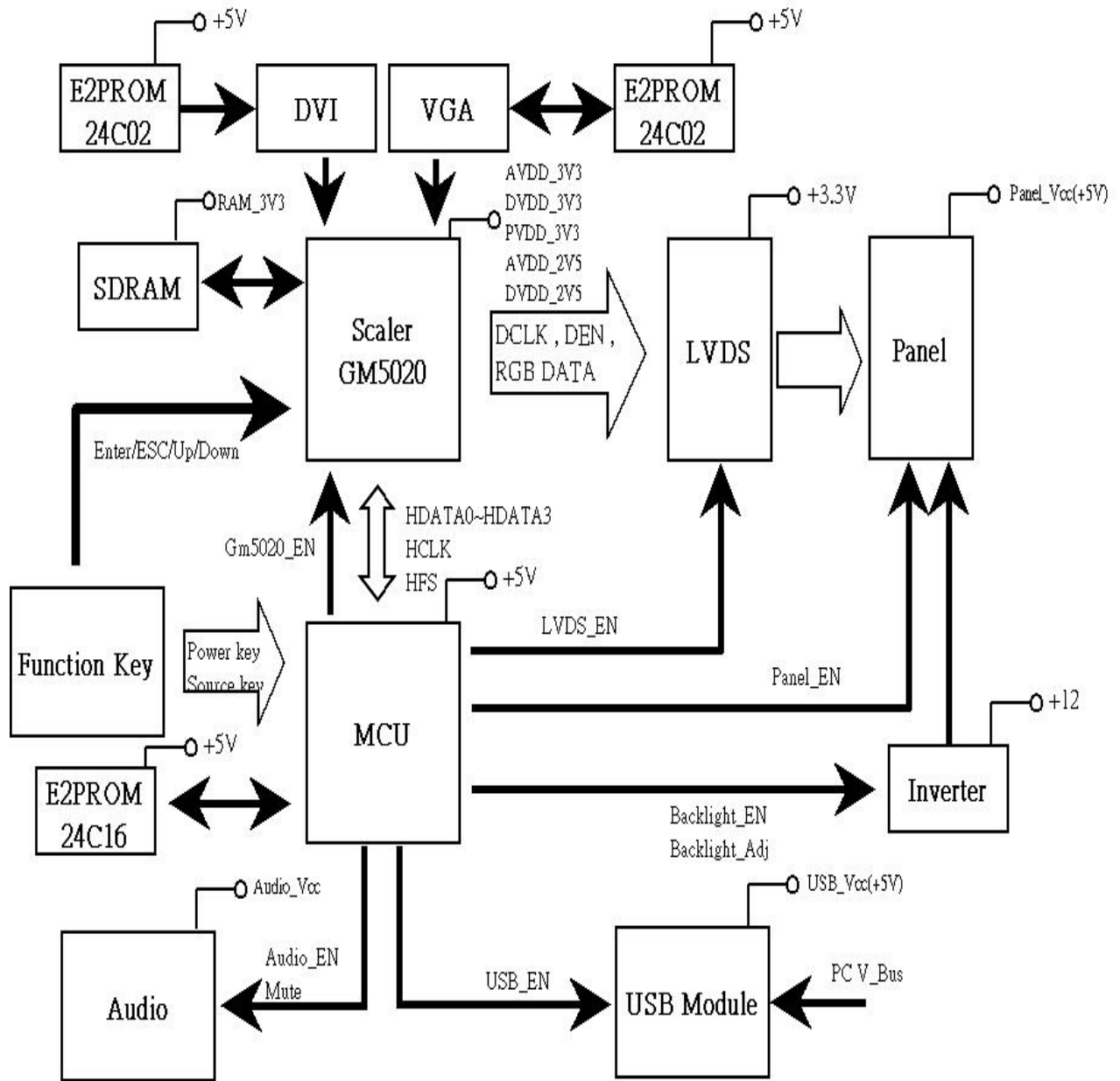
4. TROUBLE SHOOYING  
VIDEO DOES NOT APPEAR



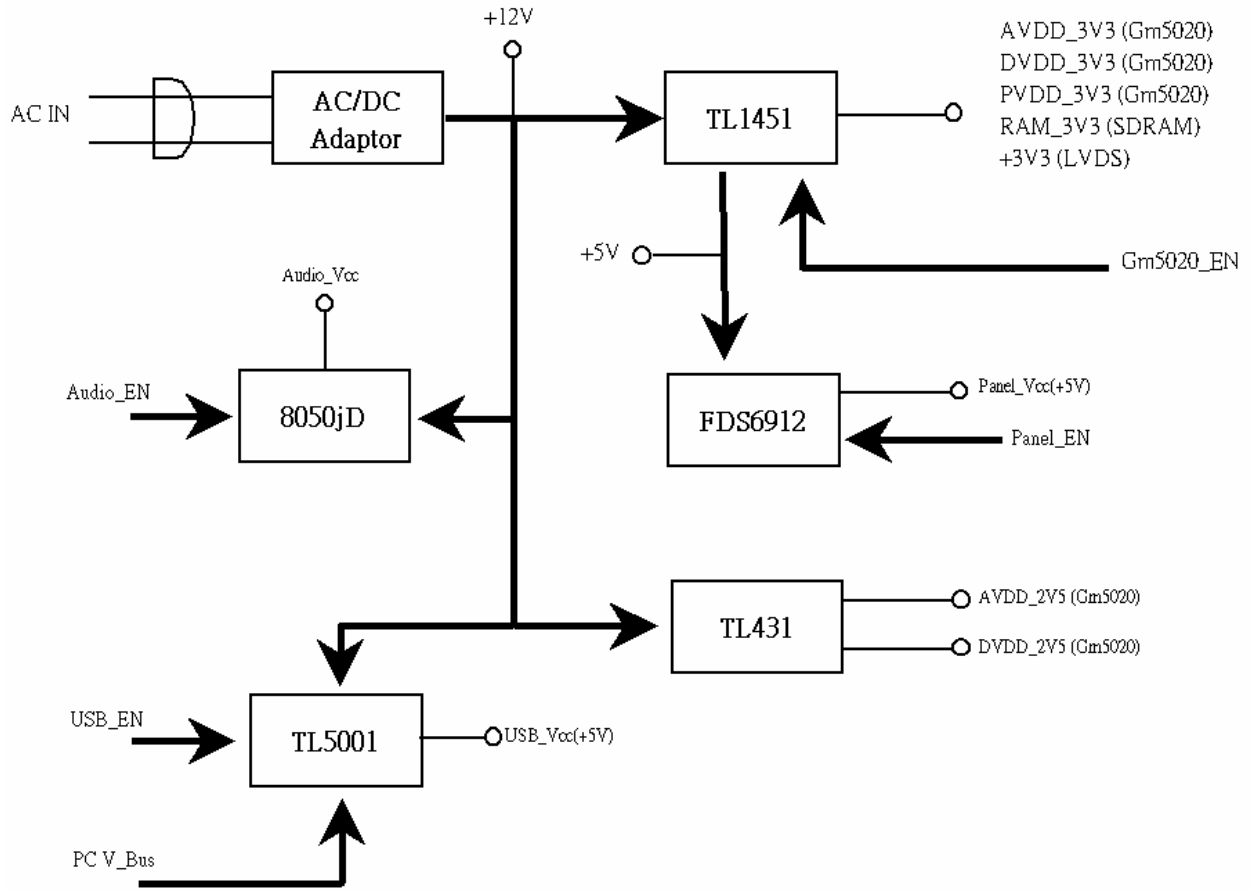
R.G.B is not displayed correctly



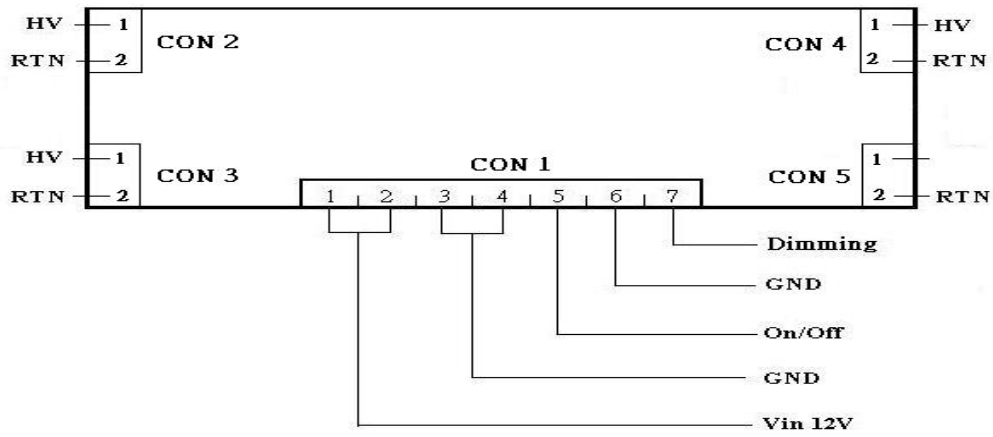
5. SYSTEM BLOCK DIAGRAM  
MAIN SYSTEM



POWER SYSTEM

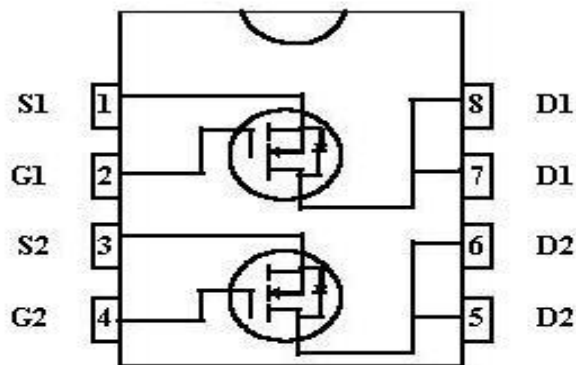


6. INVERTER BOARD I/O CONNECTIONS

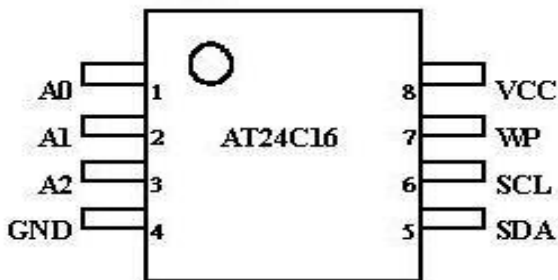


7. IC Pin Configuration

U1 FDS6912A



U12 8-lead TSSOP

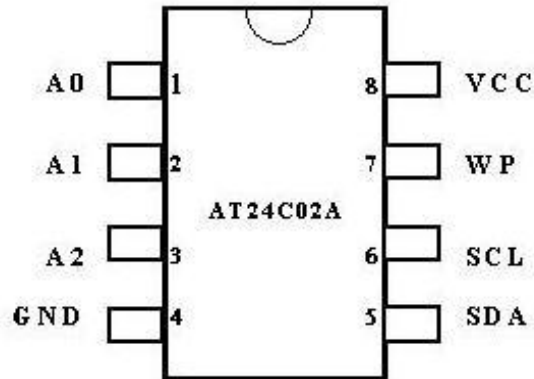


Pin Configurations

Pin Name	Function
A0 - A2	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect

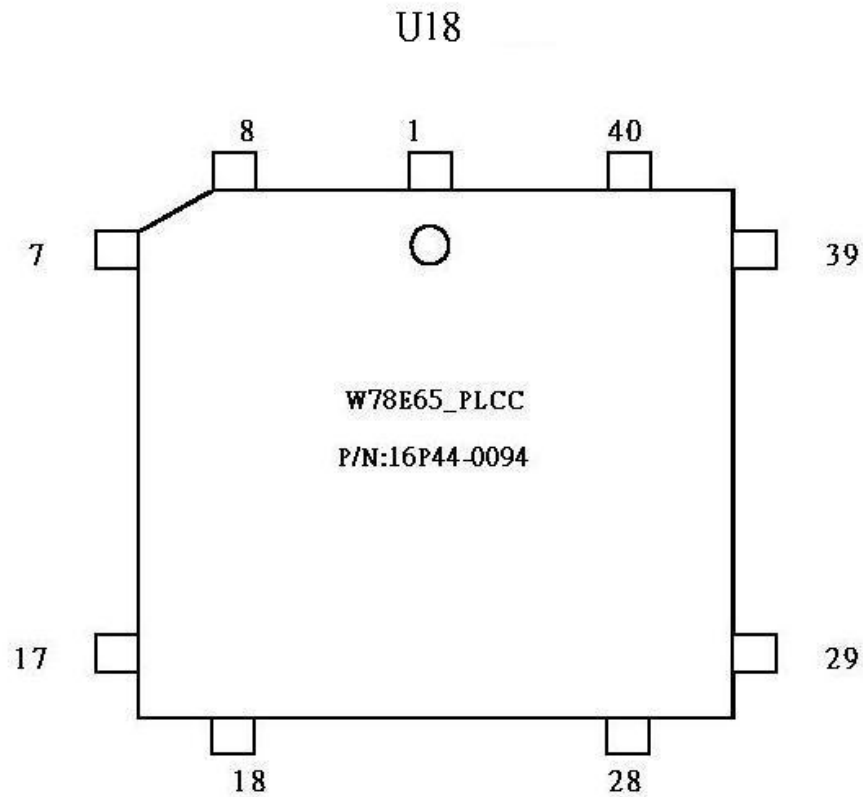
U8

8-Pin PDIP



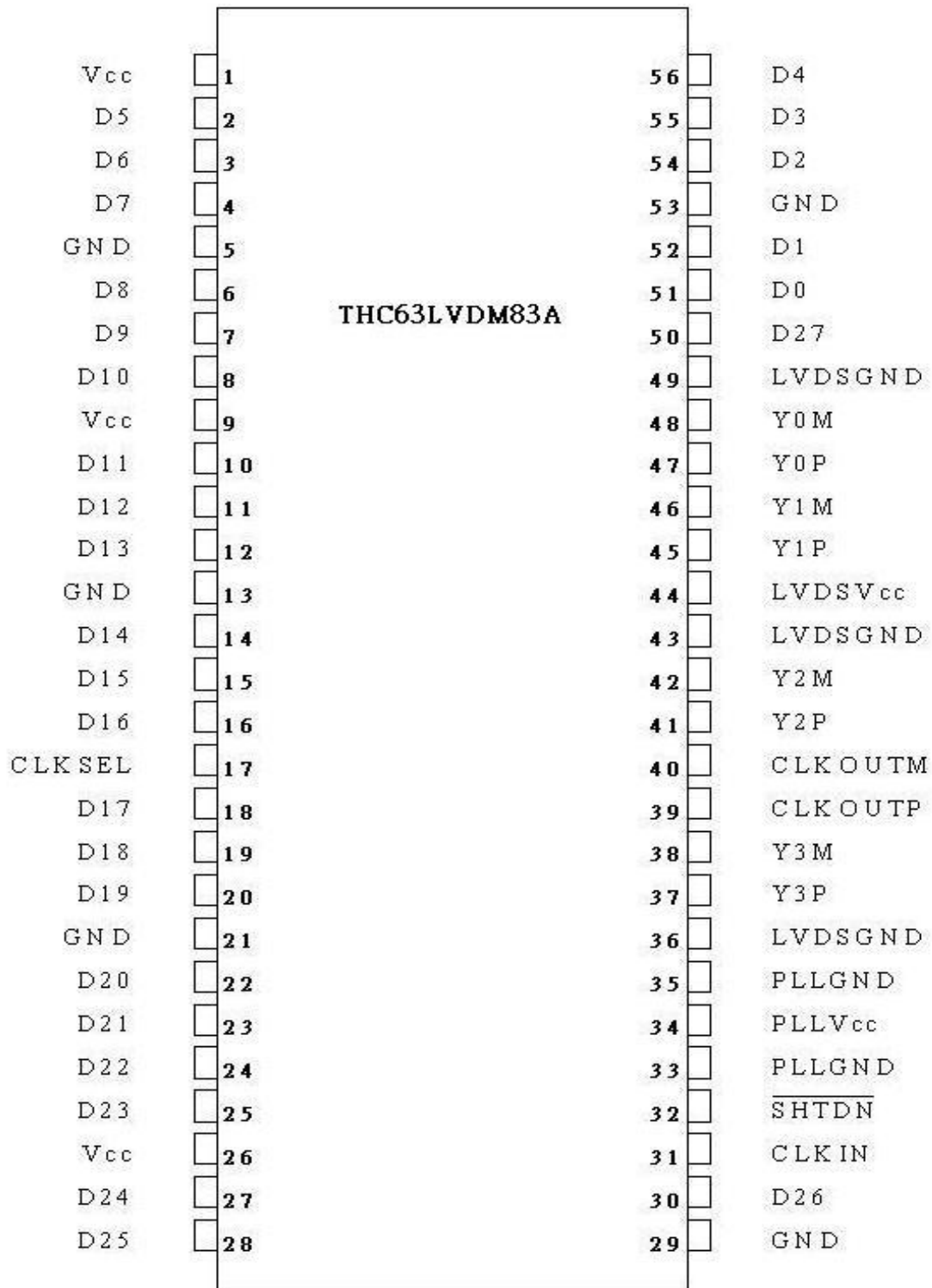
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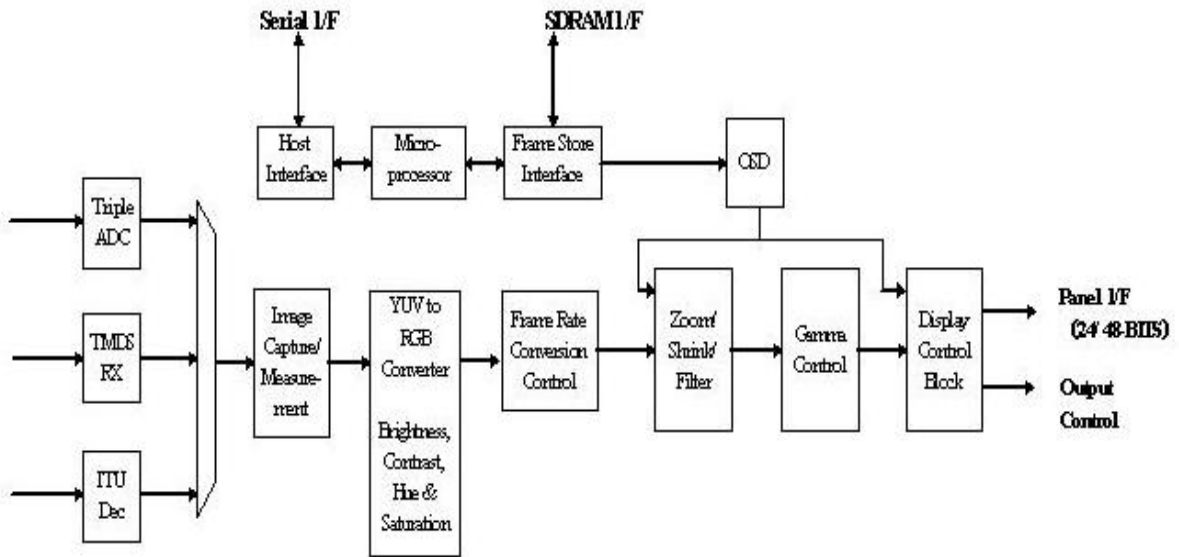


Pin	Function	Pin	Function	Pin	Function
1	$\overline{\text{INT3}}$ , P4.2	16	T0, P3.4	31	A15, P2.7
2	T2, P1.0	17	T1, P3.5	32	$\overline{\text{PSEN}}$
3	T2EX, P1.1	18	$\overline{\text{WR}}$ , P3.6	33	ALE
4	P1.2	19	$\overline{\text{RD}}$ , P3.7	34	P4.1
5	PWM0, P1.3	20	XTAL2	35	$\overline{\text{EA}}$
6	PWM1, P1.4	21	XTAL1	36	AD7, P0.7
7	PWM2, P1.5	22	VSS	37	AD6, P0.6
8	PWM3, P1.6	23	P4.0	38	AD5, P0.5
9	PWM4, P1.7	24	A8, P2.0	39	AD4, P0.4
10	RST	25	A9, P2.1	40	AD3, P0.3
11	RXD, P3.0	26	A10, P2.2	41	AD2, P0.2
12	$\overline{\text{INT2}}$ , P4.3	27	A11, P2.3	42	AD1, P0.1
13	TXD, P3.1	28	A12, P2.4	43	AD0, P0.0
14	$\overline{\text{INT0}}$ , P3.2	29	A13, P2.5	44	VDD
15	$\overline{\text{INT1}}$ , P3.3	30	A14, P2.6		

U16,U17



**U4 gm5020 Functional Block Diagram**



TEST CONDITION : AC LINE IN: 110V/60Hz  
PATTEN:FULL WHITE

Unit: Volt

IC	U1 (FDS6912A)							
PIN	1	2	3	4	5	6	7	8
MODE								
640*480 31K/60Hz	5.09	10.98	2.50	4.41	3.34	3.34	5.11	5.11
1024*768 60K/75Hz	5.09	10.98	2.50	4.43	3.34	3.34	5.11	5.11
1280*1024 91K/85Hz	5.09	10.98	2.50	4.45	3.34	3.34	5.11	5.11

IC	U5 (AT24C02)							
PIN	1	2	3	4	5	6	7	8
MODE								
640*480 31K/60Hz	0	0	0	0	4.98	4.96	5.11	5.11
1024*768 60K/75Hz	0	0	0	0	4.98	4.96	5.11	5.11
1280*1024 91K/85Hz	0	0	0	0	4.98	4.96	5.11	5.11

IC	U8 (AT24C02N)							
PIN	1	2	3	4	5	6	7	8
MODE								
640*480 31K/60Hz	0	0	0	0	0.05	4.86	0	5.12
1024*768 60K/75Hz	0	0	0	0	0.05	4.86	0	5.12
1280*1024 91K/85Hz	0	0	0	0	0.05	4.86	0	5.12

IC	U12 (AT24C16N)							
PIN	1	2	3	4	5	6	7	8
MODE								
640*480 31K/60Hz	0	0	0	0	5.11	5.11	0	5.11
1024*768 60K/75Hz	0	0	0	0	5.11	5.11	0	5.11
1280*1024 91K/85Hz	0	0	0	0	5.11	5.11	0	5.11

IC	U13 (W981616BH-6)									
PIN	1	2	3	4	5	6	7	8	9	10
MODE										
640*480 31K/60Hz	3.34	0.89	0.80	0	0	0	3.34	2.11	2.13	0
1024*768 60K/75Hz	3.34	1.32	0.67	0	0.33	0.22	3.34	2.56	2.83	0
1280*1024 91K/85Hz	3.34	1.68	1.47	0	1.10	1.19	3.34	1.84	2.93	0

IC	U13 (W981616BH-6)									
PIN	11	12	13	14	15	16	17	18	19	20
MODE										
640*480 31K/60Hz	2.19	2.21	3.34	0.01	3.32	3.32	3.31	0	1.66	0.01
1024*768 60K/75Hz	2.80	2.82	3.34	0.02	3.31	3.31	3.30	0	1.60	0.02
1280*1024 91K/85Hz	2.94	2.94	3.34	0.04	3.29	3.30	3.28	0	0.70	0.02

IC	U13 (W981616BH-6)									
PIN	21	22	23	24	25	26	27	28	29	30
MODE										
640*480 31K/60Hz	1.23	1.34	1.03	1.25	3.34	0	1.17	1.37	1.31	1.18
1024*768 60K/75Hz	1.08	1.06	0.73	0.76	3.34	0	1.23	0.92	1.09	1.26
1280*1024 91K/85Hz	0.60	0.59	0.44	0.42	3.34	0	0.91	0.84	0.90	0.99

IC	U13 (W981616BH-6)									
PIN	31	32	33	34	35	36	37	38	39	40
MODE										
640*480 31K/60Hz	1.74	1.60	0	3.34	1.53	0.01	0	3.34	0.92	1.25
1024*768 60K/75Hz	1.62	1.66	0	3.34	1.53	0.02	0	3.34	1.55	0.87
1280*1024 91K/85Hz	1.68	1.67	0	3.34	1.53	0.04	0	3.34	2.14	0.80

IC	U13 (W981616BH-6)									
PIN	41	42	43	44	45	46	47	48	49	50
MODE										
640*480 31K/60Hz	0	0.01	2.19	3.34	0.03	2.18	0	2.17	2.19	0
1024*768 60K/75Hz	0	0.01	2.86	3.34	0.02	2.82	0	2.84	2.82	0
1280*1024 91K/85Hz	0	0.28	2.93	3.34	0.01	2.94	0	2.94	2.94	0

IC	U14 (W981616BH-6)									
PIN	1	2	3	4	5	6	7	8	9	10
MODE										
640*480 31K/60Hz	3.34	0.89	0.80	0	0	0	3.34	2.11	2.13	0
1024*768 60K/75Hz	3.34	1.32	0.67	0	0.33	0.22	3.34	2.56	2.83	0
1280*1024 91K/85Hz	3.34	1.68	1.47	0	1.10	1.19	3.34	1.84	2.93	0

IC	U14 (W981616BH-6)									
PIN	11	12	13	14	15	16	17	18	19	20
MODE										
640*480 31K/60Hz	2.19	2.21	3.34	0.01	3.32	3.32	3.31	0	1.66	0.01
1024*768 60K/75Hz	2.80	2.82	3.34	0.02	3.31	3.31	3.30	0	1.60	0.02
1280*1024 91K/85Hz	2.94	2.94	3.34	0.04	3.29	3.30	3.28	0	0.70	0.02

IC	U14 (W981616BH-6)									
PIN	21	22	23	24	25	26	27	28	29	30
MODE										
640*480 31K/60Hz	1.23	1.34	1.03	1.25	3.34	0	1.17	1.37	1.31	1.18
1024*768 60K/75Hz	1.08	1.06	0.73	0.76	3.34	0	1.23	0.92	1.09	1.26
1280*1024 91K/85Hz	0.60	0.59	0.44	0.42	3.34	0	0.91	0.84	0.90	0.99

IC	U14 (W981616BH-6)									
PIN	31	32	33	34	35	36	37	38	39	40
MODE										
640*480 31K/60Hz	1.74	1.60	0	3.34	1.53	0.01	0	3.34	0.92	1.25
1024*768 60K/75Hz	1.62	1.66	0	3.34	1.53	0.02	0	3.34	1.55	0.87
1280*1024 91K/85Hz	1.68	1.67	0	3.34	1.53	0.04	0	3.34	2.14	0.80

IC	U14 (W981616BH-6)									
PIN	41	42	43	44	45	46	47	48	49	50
MODE										
640*480 31K/60Hz	0	0.01	2.19	3.34	0.03	2.18	0	2.17	2.19	0
1024*768 60K/75Hz	0	0.01	2.86	3.34	0.02	2.82	0	2.84	2.82	0
1280*1024 91K/85Hz	0	0.28	2.93	3.34	0.01	2.94	0	2.94	2.94	0

IC	U15 (W981616BH-6)									
PIN	1	2	3	4	5	6	7	8	9	10
MODE										
640*480 31K/60Hz	3.34	0.89	0.80	0	0	0	3.34	2.11	2.13	0
1024*768 60K/75Hz	3.34	1.32	0.67	0	0.33	0.22	3.34	2.56	2.83	0
1280*1024 91K/85Hz	3.34	1.68	1.47	0	1.10	1.19	3.34	1.84	2.93	0

IC	U15 (W981616BH-6)									
PIN	11	12	13	14	15	16	17	18	19	20
MODE										
640*480 31K/60Hz	2.19	2.21	3.34	0.01	3.32	3.32	3.31	0	1.66	0.01
1024*768 60K/75Hz	2.80	2.82	3.34	0.02	3.31	3.31	3.30	0	1.60	0.02
1280*1024 91K/85Hz	2.94	2.94	3.34	0.04	3.29	3.30	3.28	0	0.70	0.02

IC	U15 (W981616BH-6)									
PIN	21	22	23	24	25	26	27	28	29	30
MODE										
640*480 31K/60Hz	1.23	1.34	1.03	1.25	3.34	0	1.17	1.37	1.31	1.18
1024*768 60K/75Hz	1.08	1.06	0.73	0.76	3.34	0	1.23	0.92	1.09	1.26
1280*1024 91K/85Hz	0.60	0.59	0.44	0.42	3.34	0	0.91	0.84	0.90	0.99

IC	U15 (W981616BH-6)									
PIN	31	32	33	34	35	36	37	38	39	40
MODE										
640*480 31K/60Hz	1.74	1.60	0	3.34	1.53	0.01	0	3.34	0.92	1.25
1024*768 60K/75Hz	1.62	1.66	0	3.34	1.53	0.02	0	3.34	1.55	0.87
1280*1024 91K/85Hz	1.68	1.67	0	3.34	1.53	0.04	0	3.34	2.14	0.80

IC	U15 (W981616BH-6)									
PIN	41	42	43	44	45	46	47	48	49	50
MODE										
640*480 31K/60Hz	0	0.01	2.19	3.34	0.03	2.18	0	2.17	2.19	0
1024*768 60K/75Hz	0	0.01	2.86	3.34	0.02	2.82	0	2.84	2.82	0
1280*1024 91K/85Hz	0	0.28	2.93	3.34	0.01	2.94	0	2.94	2.94	0

IC	U16 (THC63LVDM83A)									
PIN	1	2	3	4	5	6	7	8	9	10
MODE										
640*480 31K/60Hz	3.33	2.42	2.42	0.95	0	2.06	0.04	2.42	3.33	2.42
1024*768 60K/75Hz	3.33	2.42	2.42	1.12	0	1.45	0.01	2.42	3.33	2.42
1280*1024 91K/85Hz	3.33	2.39	2.39	1.63	0	0.69	0.01	2.39	3.33	2.39

IC	U16 (THC63LVDM83A)									
PIN	11	12	13	14	15	16	17	18	19	20
MODE										
640*480 31K/60Hz	2.42	0	0	2.42	1.21	2.42	0	2.42	0.51	0.10
1024*768 60K/75Hz	2.42	0	0	2.42	1.18	2.42	0	2.42	0.48	0.45
1280*1024 91K/85Hz	2.39	20	0	2.39	1.52	2.39	0	2.39	1.55	1.48

IC	U16 (THC63LVDM83A)									
PIN	21	22	23	24	25	26	27	28	29	30
MODE										
640*480 31K/60Hz	0	0.09	2.25	2.42	0	3.34	3.31	3.32	0	2.42
1024*768 60K/75Hz	0	0.55	1.80	2.42	0	3.34	3.31	3.32	0	2.42
1280*1024 91K/85Hz	0	1.42	0.60	2.39	0	3.34	3.31	3.32	0	2.39

IC	U16 (THC63LVDM83A)									
PIN	31	32	33	34	35	36	37	38	39	40
MODE										
640*480 31K/60Hz	1.57	3.35	0	3.33	0	0	1.31	1.22	1.29	1.24
1024*768 60K/75Hz	1.57	3.35	0	3.33	0	0	1.31	1.22	1.29	1.24
1280*1024 91K/85Hz	1.57	3.34	0	3.33	0	0	1.31	1.22	1.29	1.24

IC	U16 (THC63LVDM83A)									
PIN	41	42	43	44	45	46	47	48	49	50
MODE										
640*480 31K/60Hz	1.31	1.20	0	3.33	1.21	1.30	1.25	1.27	0	2.42
1024*768 60K/75Hz	1.31	1.22	0	3.33	1.21	1.30	1.25	1.27	0	2.42
1280*1024 91K/85Hz	1.31	1.21	0	3.33	1.21	1.30	1.24	1.27	0	2.39

IC	U16 (THC63LVDM83A)					
PIN	51	52	53	54	55	56
MODE						
640*480 31K/60Hz	1.10	1.90	0	2.41	2.38	0
1024*768 60K/75Hz	1.35	0.83	0	2.41	2.41	0
1280*1024 80K/75Hz	0.88	0.15	0	2.38	2.39	0

IC	U17 (THC63LVDM83A)									
PIN	1	2	3	4	5	6	7	8	9	10
MODE										
640*480 31K/60Hz	3.33	2.42	2.42	0.95	0	2.06	0.04	2.42	3.33	2.42
1024*768 60K/75Hz	3.33	2.42	2.42	1.12	0	1.45	0.01	2.42	3.33	2.42
1280*1024 91K/85Hz	3.33	2.39	2.39	1.63	0	0.69	0.01	2.39	3.33	2.39

IC	U17 (THC63LVDM83A)									
PIN	11	12	13	14	15	16	17	18	19	20
MODE										
640*480 31K/60Hz	2.42	0	0	2.42	1.21	2.42	0	2.42	0.51	0.10
1024*768 60K/75Hz	2.42	0	0	2.42	1.18	2.42	0	2.42	0.48	0.45
1280*1024 91K/85Hz	2.39	20	0	2.39	1.52	2.39	0	2.39	1.55	1.48

IC	U17 (THC63LVDM83A)									
PIN	21	22	23	24	25	26	27	28	29	30
MODE										
640*480 31K/60Hz	0	0.09	2.25	2.42	0	3.34	3.31	3.32	0	2.42
1024*768 60K/75Hz	0	0.55	1.80	2.42	0	3.34	3.31	3.32	0	2.42
1280*1024 91K/85Hz	0	1.42	0.60	2.39	0	3.34	3.31	3.32	0	2.39

IC	U17 (THC63LVDM83A)									
PIN	31	32	33	34	35	36	37	38	39	40
MODE										
640*480 31K/60Hz	1.57	3.35	0	3.33	0	0	1.31	1.22	1.29	1.24
1024*768 60K/75Hz	1.57	3.35	0	3.33	0	0	1.31	1.22	1.29	1.24
1280*1024 91K/85Hz	1.57	3.34	0	3.33	0	0	1.31	1.22	1.29	1.24

IC	U17 (THC63LVDM83A)									
PIN	41	42	43	44	45	46	47	48	49	50
MODE										
640*480 31K/60Hz	1.31	1.20	0	3.33	1.21	1.30	1.25	1.27	0	2.42
1024*768 60K/75Hz	1.31	1.22	0	3.33	1.21	1.30	1.25	1.27	0	2.42
1280*1024 91K/85Hz	1.31	1.21	0	3.33	1.21	1.30	1.24	1.27	0	2.39

IC	U17 (THC63LVDM83A)					
PIN	51	52	53	54	55	56
MODE						
640*480 31K/60Hz	1.10	1.90	0	2.41	2.38	0
1024*768 60K/75Hz	1.35	0.83	0	2.41	2.41	0
1280*1024 91K/85Hz	0.88	0.15	0	2.38	2.39	0

IC	U18 (W78E65)									
PIN	1	2	3	4	5	6	7	8	9	10
MODE										
640*480 31K/60Hz	5.11	5.11	5.11	5.11	4.97	5.11	5.11	5.11	5.11	0
1024*768 60K/75Hz	5.11	5.11	5.11	5.11	4.97	5.11	5.11	5.11	5.11	0
1280*1024 91K/85Hz	5.11	5.11	5.11	5.11	4.97	5.11	5.11	5.11	5.11	0

IC	U18 (W78E65)									
PIN	11	12	13	14	15	16	17	18	19	20
MODE										
640*480 31K/60Hz	0	5.11	4.86	5.11	5.11	5.11	5.11	0.02	0.02	2.17
1024*768 60K/75Hz	0	5.11	4.86	5.11	5.11	5.11	5.11	0.02	0.02	2.17
1280*1024 91K/85Hz	0	5.11	4.86	5.11	5.11	5.11	5.11	0.02	0.02	2.17

IC	U18 (W78E65)									
PIN	21	22	23	24	25	26	27	28	29	30
MODE										
640*480 31K/60Hz	2.18	0	5.11	0.05	0.11	0.11	0.11	2.77	5.11	0.11
1024*768 60K/75Hz	2.18	0	5.11	0.05	0.11	0.11	0.11	2.77	5.11	0/11
1280*1024 91K/85Hz	2.18	0	5.11	0.05	0.11	0.11	0.11	2.77	5.11	0.11

IC	U18 (W78E65)									
PIN	31	32	33	34	35	36	37	38	39	40
MODE										
640*480 31K/60Hz	5.11	5.11	1.65	5.11	5.11	0.60	5.11	2.61	2.95	0.98
1024*768 60K/75Hz	5.11	5.11	1.65	5.11	5.11	0.60	5.11	2.61	2.95	0.92
1280*1024 91K/85Hz	5.11	5.11	1.65	5.11	5.11	0.60	5.11	2.61	2.95	0.89

IC	U18 (W78E65)									
PIN	41	42	43	44						
MODE										
640*480 31K/60Hz	0.98	1.09	1.29	5.11						
1024*768 60K/75Hz	0.98	0.93	1.29	5.11						
1280*1024 91K/85Hz	1.03	0.91	1.29	5.11						

IC	U20 (74F14D)								
PIN	1	2	3	4	5	6	7	8	
MODE									
640*480 31K/60Hz	4.93	0.15	0	3.92	4.31	0.58	0	3.42	
1024*768 60K/75Hz	0.09	3.91	0	3.91	0.42	3.60	0	0.41	
1280*1024 91K/85Hz	0.09	3.90	0	3.90	0.52	3.52	0	0.48	

IC	U20 (74F14D)								
PIN	9	10	11	12	13	14			
MODE									
640*480 31K/60Hz	0.58	3.89	0	3.88	0.15	5.11			
1024*768 60K/75Hz	3.60	3.89	0	0.15	3.88	5.11			
1280*1024 91K/85Hz	3.52	3.89	0	0.14	3.88	5.11			

IC	U601 (TL1451ACNSR)								
PIN	1	2	3	4	5	6	7	8	
MODE									
640*480 31K/60Hz	1.74	0.98	1.25	1.24	1.89	1.71	9.02	0	
1024*768 60K/75Hz	1.74	0.98	1.25	1.24	1.89	1.71	9.02	0	
1280*1024 91K/85Hz	1.74	0.98	1.25	1.24	1.89	1.71	9.02	0	

IC	U601 (TL145ACNSR)								
PIN	9	10	11	12	13	14	15	16	
MODE									
640*480 31K/60Hz	11.01	7.50	1.65	1.79	1.25	1.25	0.19	2.49	
1024*768 60K/75Hz	11.01	7.50	1.65	1.79	1.25	1.25	0.19	2.49	
1280*1024 91K/85Hz	11.01	7.50	1.65	1.79	1.25	1.25	0.19	2.49	

IC	U602 (9435A)							
PIN	1	2	3	4	5	6	7	8
MODE								
640*480 31K/60Hz	12.01	12.01	12.01	8.62	5.15	5.15	5.15	5.15
1024*768 60K/75Hz	12.01	12.01	12.01	8.62	5.15	5.15	5.15	5.15
1280*1024 91K/85Hz	12.01	12.01	12.01	8.62	5.15	5.15	5.15	5.15

IC	U603 (9435A)							
PIN	1	2	3	4	5	6	7	8
MODE								
640*480 31K/60Hz	12.03	12.03	12.03	9.72	3.39	3.39	3.39	3.39
1024*768 60K/75Hz	12.03	12.03	12.03	9.71	3.39	3.39	3.39	3.39
1280*1024 91K/85Hz	12.03	12.03	12.03	9.69	3.39	3.39	3.39	3.39

IC	U702 (TL5001A)							
PIN	1	2	3	4	5	6	7	8
MODE								
640*480 31K/60Hz	12.01	0	0.07	0	0	0	0	0
1024*768 60K/75Hz	12.01	0	0.07	0	0	0	0	0
1280*1024 91K/85Hz	12.01	0	0.07	0	0	0	0	0

TR	U801(SI8050JD)					U703(IRF9Z34N)		
PIN	1	2	3	4	5	G	D	S
MODE								
640*480 31K/60Hz	12.01	6.84	0	5.02	2.41	12.01	0	12.01
1024*768 60K/75Hz	12.02	6.84	0	5.02	2.41	12.02	0	12.01
1280*1024 91K/85Hz	12.01	6.84	0	5.02	2.41	12.01	0	12.01

IC	U802 (TDA7053A)							
PIN	1	2	3	4	5	6	7	8
MODE								
640*480 31K/60Hz	0	1.08	0	2.40	6.84	2.39	0	1.08
1024*768 60K/75Hz	0	1.08	0	2.40	6.84	2.39	0	1.08
1280*1024 91K/85Hz	0	1.08	0	2.40	6.84	2.39	0	1.08

IC	U802 (TDA7035A)							
PIN	9	10	11	12	13	14	15	16
MODE								
640*480 31K/60Hz	3.30	0	0	3.40	3.38	0	0	3.52
1024*768 60K/75Hz	3.30	0	0	3.40	3.38	0	0	3.52
1280*1024 91K/85Hz	3.30	0	0	3.40	3.38	0	0	3.52

TR	Q2 (MMBT3906LT1)			Q3 (MMBT3906LT1)			Q4 (2N3904)		
PIN	E	C	B	E	C	B	E	C	B
MODE									
640*480 31K/60Hz	5.12	0.30	5.12	5.12	5.06	4.22	0	0.04	0.75
1024*768 60K/75Hz	5.12	0.30	5.12	5.12	5.06	4.22	0	0.04	0.75
1280*1024 91K/85Hz	5.12	0.30	5.12	5.12	5.06	4.22	0	0.04	0.75

TR	Q5 (2N3904)			Q6 (2N3904)			Q9 (2N3904)		
PIN	E	C	B	E	C	B	E	C	B
MODE									
640*480 31K/60Hz	0	3.33	0.11	0	10.96	0.02	0	4.28	0.11
1024*768 60K/75Hz	0	3.33	0.11	0	10.96	0.02	0	4.28	0.11
1280*1024 91K/85Hz	0	3.33	0.11	0	10.96	0.02	0	4.28	0.11

TR	Q10 (2N3904)			Q602 (MMBT3906LT1)			Q603 (BC817-25)		
PIN	E	C	B	E	C	B	E	C	B
MODE									
640*480 31K/60Hz	0	0.03	0.68	9.74	0	9.72	9.74	12.03	9.72
1024*768 60K/75Hz	0	0.03	0.68	9.72	0	9.70	9.72	12.03	9.70
1280*1024 91K/85Hz	0	0.03	0.68	9.71	0	9.68	9.71	12.03	9.68

TR	Q606 (2N3904)			Q612 (MMBT3906LT1)			Q613 (BC817-25)		
PIN	E	C	B	E	C	B	E	C	B
MODE									
640*480 31K/60Hz	0	5.03	0.03	8.64	0	8.53	8.64	12.03	8.53
1024*768 60K/75Hz	0	5.03	0.03	8.64	0	8.53	8.64	12.03	8.53
1280*1024 91K/85Hz	0	5.03	0.03	8.64	0	8.53	8.64	12.03	8.53

TR	Q631 (MMBT3906LT1)			Q632 (2N3904)			Q702 (2N3904)		
PIN MODE	E	C	B	E	C	B	E	C	B
640*480 31K/60Hz	12.04	12.01	11.34	0	0	0.71	9.42	11.82	9.42
1024*768 60K/75Hz	12.04	12.01	11.34	0	0	0.71	9.42	11.82	9.42
1280*1024 91K/85Hz	12.04	12.01	11.34	0	0	0.71	9.42	11.82	9.42

TR	Q703 (MMBT3906LT1)			Q704 (MMBT3906LT1)			Q705 (2N3904)		
PIN MODE	E	C	B	E	C	B	E	C	B
640*480 31K/60Hz	12.04	0	13.14	12.05	0	12.05	12.05	12.05	12.05
1024*768 60K/75Hz	12.04	0	13.14	12.05	0	12.05	12.05	12.05	12.05
1280*1024 91K/85Hz	12.04	0	13.14	12.05	0	12.05	12.05	12.05	12.05

TR	Q706 (2N3904)			Q707 (2N3904)			Q804(2N3904)		
PIN MODE	E	C	B	E	C	B	E	C	B
640*480 31K/60Hz	0	8.58	0.05	0	10.10	0	0	1.08	0.11
1024*768 60K/75Hz	0	8.58	0.05	0	10.10	0	0	1.08	0.11
1280*1024 91K/85Hz	0	8.58	0.05	0	10.10	0	0	1.08	0.11

TR	Q805 (2N3904)								
PIN MODE	E	C	B						
640*480 31K/60Hz	0	2.43	0.11						
1024*768 60K/75Hz	0	2.43	0.11						
1280*1024 91K/85Hz	0	2.43	13.14						

**9. PARTS LIST**

<b>ITEM</b>	<b>PART NUMBER</b>	<b>DESCRIPTION</b>
1	AC1920-D01	MAIN PCBA
2	GC1920-D01	DISPLAY PCBA
3	HC1920-D01	USB
4	UC1920-D01	HEAD PHONE PCBA
5	10A19-042A	LCD TFT 1280*1024(LTM190E1-L01)
6	47I00-016S	INVERTER
7	0800063000	CABINET BACK
8	0820110001	CABINET FRONT
9	SSBASE-422	SUB ASSY BASE
10	SZADPT-102B	SUB-Z ASSY ADAPTER
11	0400748300	CARTON 570*278*532
12	0510154800	HOLDER (R)
13	0510153800	HOLDER (L)
14	0670474000	LABEL CARTON (XC1920-D01)
15	0670492000	LABEL CARTON (XC1920-D10)
16	0670349500	LABEL CARTON (CIRCLE-BLUE)
17	0670469000	LABEL CARTON (ISO134062-II)
18	65S10-1805Z	CABLE SIGNAL 15D-15D 180CM
19	65SA0-1801Z	CABLE SIGNAL DVI-D 18P 180CM
20	SZ0013-003	SUB-Z SPEAK(L) WITH WIRE(WHITE)
21	SZ0013-004	SUB-Z SPEAK(R) WITH WIRE(RED)