IntraKit-124 Controller card

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1. Introduction

1.1. Scope of the document

This document is written to define and describe the requirement of product specification.

1.2. Project is an A/D board to control flat panel. This product is conformed to the article of RoHS completely.

1.3 Definitions and abbreviations

- A/D: Analog-to-digital
- RTD2023B: Scaler of REALTEK
- TW9906: Video decoder of Techwell
- OSD: On Screen Display
- LVDS: Low Voltage Differential Signaling technology
- RGB: Red/ Green/ Blue
- NTSC: National Television Standards Committee
- PAL: Phase Alternating Line
- TFT: Thin-film Transistor
- LCD: Liquid Crystal Display
- TTL: Transistor-transistor Logic
- VGA: Video Graphics Array (support resolution to 640 X 480)
- SVGA: Super VGA (support resolution to 800 X 600)
- XGA: support resolution to1024 X 768
- SXGA: support resolution to 1280 X 1024
- ADC: Analog-to-digital Converter
- DDC: Display Data Channel
- RoHS: Restriction of Hazardous Substances, the restriction of the use of certain hazardous substances in electrical and electronic equipment by European Union.

2. General Description

This is a flat panel controller which is able to generate all necessary control signals and panel data to drive TFT-LCD panels. It performs image scaling on 24-bit RGB or YUV data stream, and feeds the scaled pixels to LCD panel. In the input way, it accepts standard analog signal by any VGA/SVGA/XGA/SXGA video controller. Also, it accepts NTSC/PAL video sources through a composite Video or S-Video connector. About output interface, it provides Dual LVDS and two channel TTL interface to drive panels. To provide audio function, the stereo audio device is built-in as well. The OSD logic is embedded to provide more pleasing and convenient control. In addition, all the necessary of control turn functions are provided by the graphic user interface, including Brightness, Contrast, Horizontal & Vertical Position, Auto-Adjustment, Clock, Phase, White Balance, Color Temperature and Gamma, etc. Moreover, additional setting function provides various adjustments, such as Setting Recall and Speaker Control. Consequently, R5W is an ideal appliance to conform to the application of TFT-LCD control.

3. Features

- Separate RGB Video signal
- Composite Video Input: Y/C Video(S-Video) input (Optional)
- NTSC and PAL Auto-switching control
- Build-in YUV to RGB color space converter and de-interlace
- 8 bit triple-channel 140MHz ADC/PLL
- Support Dual LVDS and two channels TTL interface output
- Convenient full-function On-Screen Display Control
- Support various panel from VGA to SXGA

- Maximum resolution 1280×1024 (SXGA)
- Automatic mode detection
- 16 Mb frame buffer and de-interlace control
- Automatic input format detection
- Auto adjustment for frequency, phase, H/V position, and white balance
- On chip brightness, contrast and gamma correction
- Embedded dual DDC, supports DDC1, DDC2B, and DDC/CI
- Support auto-alignment
- Build-in stereo audio device
- Flexible firmware is designed to meet any custom design request

4. Application Precautions

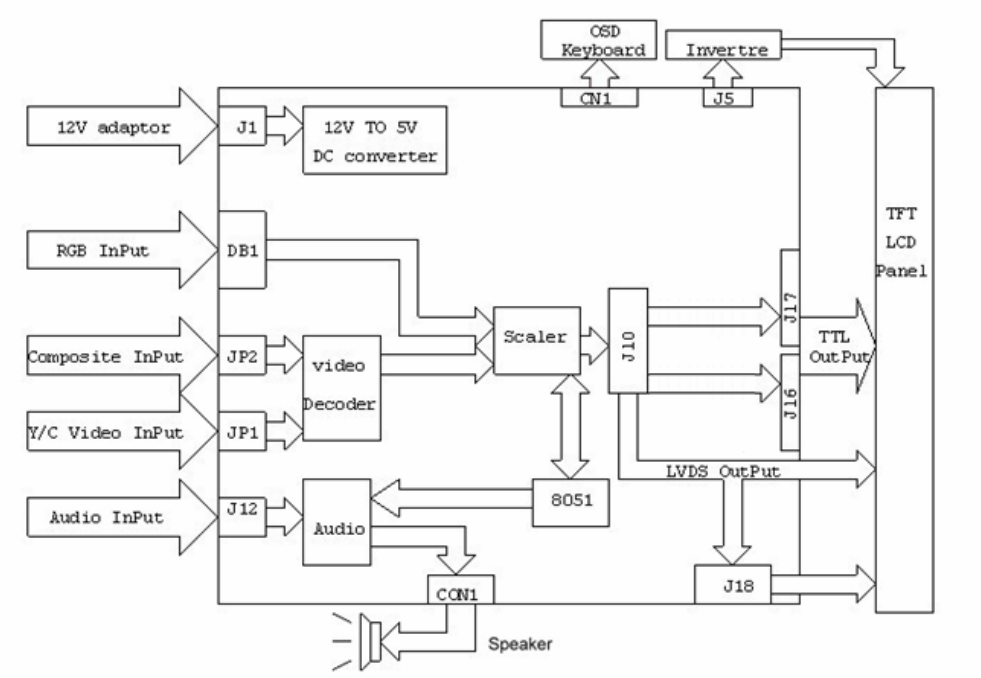
The products covered herein are designed and manufactured for LCD monitors, multimedia monitors and LCD TVs. They are applied in the following application areas:

1. Office electronics
2. Instrumentation and measuring equipment
3. Machine tools
4. Audiovisual equipment
5. Home appliances
6. Communication equipment other than for trunk lines

The Other application that demands high reliability and functionality should first contact a sales representative.

5. System Block

5.1. Block Chart

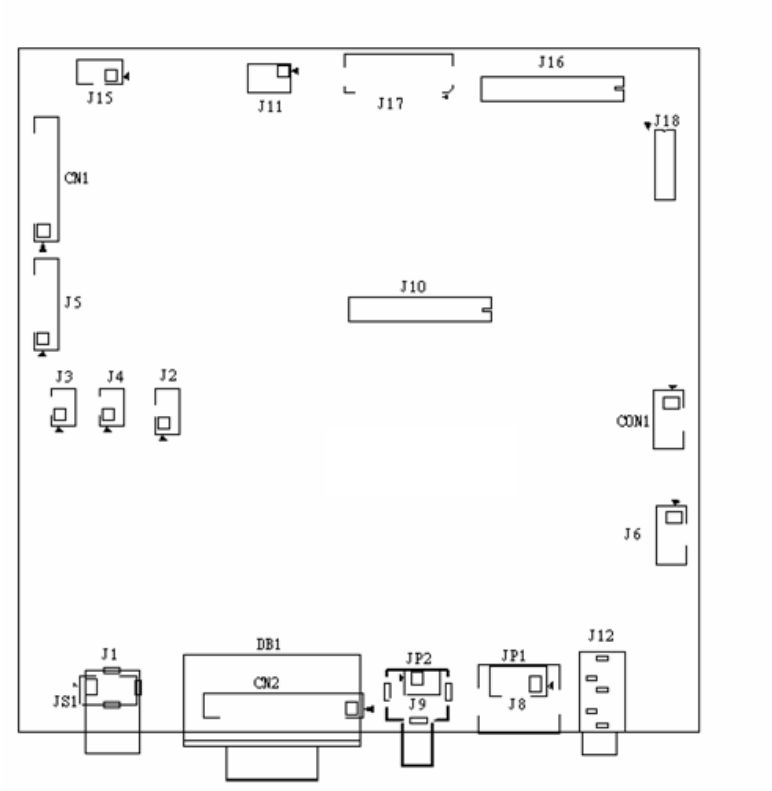


5.2. System Part Model

ITEM	Description	Manufactory
A/D Board		
OSD Board	15 OSD board 5*5	

6. Connector Pin Definition

6.1. A/D Board I/O & Connector



Connector	Description
J1	Power Jack
J2	DC 5V output
J3	DC 12V output
J4	DC 3.3V output
J5	Inverter output connector
J6	I^2C test connector
J8	Composite Video connector
J9	S-VIDEO connector
J10	8Bits LVDS signal output
J11	Output Panel Power Select Jumper
J12	Line in
J15	IR connector
J16	TTL signal output
J17	TTL signal output
J18	LVDS signal output single port
JP1	S-VIDEO connector
JP2	Composite Video connector
JS1	Power IN (Wafer)
CN1	OSD control connector

CN2	VGA Connector (wafer)
CON1	SPEAKER output connector
DB1	VGA Connector

6.2. I/O & Connector Pin Definition

Power Jack (J1)

Used connector: 3pin DC Power JACK, inside diameter: 2.5mm; outside diameter: 5.5mm.Related connector:

Pin No.	SYMBOL	Description
1	+12V	12V dc input
2	GND	Power Ground
3	GND	Power Ground

DC 5V output (J2)

Used connector: JST-B2B-PH-K-S or equivalent.
Related connector: JST-PHR-2 or equivalent.

Pin No.	Symbol	Description
1	VCC	+DC5V Output
2	GND	GROUND

DC 12V output (J3)

Used connector: JST-B2B-PH-K-S or equivalent.
Related connector: JST-PHR-2 or equivalent.

Pin No.	Symbol	Description
1	VCC	+DC12V Output
2	GND	GROUND

DC 3.3V output (J4)

Used connector: JST-B2B-PH-K-S or equivalent.
Related connector: JST-PHR-2 or equivalent.

Pin No.	Symbol	Description
1	VCC	+DC3.3V Output
2	GND	GROUND

Inverter output connector (J5)

Used connector: JST-B7B-PH-K-S or equivalent.
Related connector: JST-PHR-7 or equivalent.

Pin No.	Symbol	Description
1	12V	For 12V input inverter
2	12V	For 12V input inverter
3	12V	For 12V input inverter
4	GND	Ground
5	BRIGHT	Brightness control
6	GND	Ground
7	ON/OFF	Inverter on/off control

I^2C test connector (J6)

Used connector: 1×4 pin header, 2.0 pitch

Pin No.	Symbol	Description
1	SCL	Serial bus clock
2	SDA	Serial bus data
3	+5V	5V power
4	GND	Ground

Composite Video connector(Wafer) (J8)

Used connector: JST-B2B-PH-K-S or equivalent.
Related connector: JST-PHR-2 or equivalent l

Pin No.	Symbol	Description
1	CVBS	VIDEO SIGNAL INPUT
2	GND	ANALOG GROUND

S-VIDEO connector (Wafer) (J9)

Used connector: JST-B4B-PH-K-S or equivalent.
Related connector: JST-PHR-4 or equivalent l

Pin No.	Symbol	Description
1	GND	ANALOG GROUND
2	Y	LUMINANCE SIGNAL
3	C	CHROMINANCE SIGNAL
4	GND	ANALOG GROUND

8 Bits LVDS signal output (J10)

Used connector: Hirose-DF13DP-1.25V
Related connector: Hirose-DF13-40DS-1.25C or equivalent.

Pin No.	Symbol	Description
1	Vpnl	Panel power
2	BTX0-	LVDS negative even bit 0
3	Vpnl	Panel power
4	BTX0+	LVDS positive even bit 0
5	GND	Ground
6	BTX1-	LVDS negative even bit 1
7	GND	Ground
8	BTX1+	LVDS positive even bit 1
9	GND	Ground
10	BTX2-	LVDS negative even bit 2
11	GND	Ground
12	BTX2+	LVDS positive even bit 2
13	GND	Ground
14	BCLKTX-	LVDS negative even clock
15	GND	Ground
16	BCLKTX+	LVDS positive even clock
17	GND	Ground

18	BTX3-	LVDS negative even bit 3
19	GND	Ground
20	BTX3+	LVDS positive even bit 3
21	GND	Ground
22	ATX0-	LVDS negative odd bit 0
23	GND	Ground
24	ATX0+	LVDS positive odd bit 0
25	GND	Ground
26	ATX1-	LVDS negative odd bit 1
27	GND	Ground
28	ATX1+	LVDS positive odd bit 1
29	GND	Ground
30	ATX2-	LVDS negative odd bit 2
31	GND	Ground
32	ATX2+	LVDS positive odd bit 2
33	GND	Ground
34	ACLKTX-	LVDS negative odd clock
35	GND	Ground
36	ACLKTX+	LVDS positive odd clock
37	NC	No connection
38	ATX3-	LVDS negative odd bit 3
39	NC	No connection
40	ATX3+	LVDS positive odd bit 3

Output Panel Power Select Jumper (J11)

Used connector: HIROSE A1-6PA-2.54DSA or Equivalent
Related Jumper: HIROSE HIF3GA-2.54SP or Equivalent

Pin No.	Symbol	Description
1-2	12V	+12V Panel Power
3-4	5V	+5V Panel Power
5-6	3.3V	+3.3V Panel Power

Line in(PC) (J12)

Used connector: WTJ-035-30AZ-GREEN or equivalent.

Pin No.	Symbol	Description
1	GND	Ground
2	LINE_IN	Audio source input
3	NC	NC
4	LINE_IN	Audio source input
5	NC	NC

IR connector (J15)

Used connector: JST-B3B-PH-K-S or equivalent.
Related connector: JST-PHR-3 or equivalent.

Pin No.	Symbol	Description
1	IR	IR data
2	GND	Ground

3	VCC	5V power

TTL signal output (J16)

Used connector: Hirose-DF13-40DP-1.25V
Related connector: Hirose-DF13-40DS-1.25C or equivalent.

Pin No.	Symbol	Description
1	GND	Ground
2	GND	Ground
3	RA1	Red odd bit 1
4	RA0	Red odd bit 0
5	RA3	Red odd bit 3
6	RA2	Red odd bit 2
7	RA5	Red odd bit 5
8	RA4	Red odd bit 4
9	RA7	Red odd bit 7
10	RA6	Red odd bit 6
11	GND	Ground
12	GND	Ground
13	GA1	Green odd bit 1
14	GA0	Green odd bit 0
15	GA3	Green odd bit 3
16	GA2	Green odd bit 2
17	GA5	Green odd bit 5
18	GA4	Green odd bit 4
19	GA7	Green odd bit 7
20	GA6	Green odd bit 6
21	GND	Ground
22	GND	Ground
23	BA1	Blue odd bit 1
24	BA0	Blue odd bit 0
25	BA3	Blue odd bit 3
26	BA2	Blue odd bit 2
27	BA5	Blue odd bit 5
28	BA4	Blue odd bit 4
29	BA7	Blue odd bit 7
30	BA6	Blue odd bit 6
31	GND	Ground
32	GND	Ground
33	Vpnl	Panel Power
34	P-VS	Vertical Sync Signal
35	Vpnl	Panel Power
36	P-HS	Horizontal Sync Signal
37	GND	Ground
38	DE-IN	Data enable
39	GND	Ground
40	CLK	Pixel CLOCK

TTL signal output (J17)

Used connector: ELCO 08-6810-030 or Equivalent (below contact type)
Related connector: 30 pin FFC

Pin No.	Symbol	Description
1	CLK	Pixel CLOCK
2	P-HS	Horizontal Sync Signal
3	P-VS	Vertical Sync Signal
4	GND	GROUND
5	RA2	Red Bus A bit 2
6	RA3	Red Bus A bit 3
7	RA4	Red Bus A bit 4
8	RA5	Red Bus A bit 5
9	RA6	Red Bus A bit 6
10	RA7	Red Bus A bit 7
11	GND	GROUND
12	GA2	Green Bus A bit 2
13	GA3	Green Bus A bit 3
14	GA4	Green Bus A bit 4
15	GA5	Green Bus A bit 5
16	GA6	Green Bus A bit 6
17	GA7	Green Bus A bit 7
18	GND	GROUND
19	BA2	Blue Bus A bit 2
20	BA3	Blue Bus A bit 3
21	BA4	Blue Bus A bit 4
22	BA5	Blue Bus A bit 5
23	BA6	Blue Bus A bit 6
24	BA7	Blue Bus A bit 7
25	GND	GROUND
26	DE-IN	Data enable
27	Vpnl	Panel Power
28	Vpnl	Panel Power
29	U/D	Up/Down SCAN
30	L/R	LEFT/RIGHT SCAN

LVDS CONNECTOR(SINGLE PORT) (J18)

Used connector: HIROSE DF13-20DP-1.25V or Equivalent
Related connector: HIROSE DF13-20DS-1.25C or Equivalent

Pin No.	Symbol	Description
1	GND	GROUND
2	ATX0-	LVDS negative odd bit 0
3	GND	GROUND
4	ATX0+	LVDS positive odd bit 0
5	GND	GROUND
6	ATX1-	LVDS negative odd bit 1
7	GND	GROUND
8	ATX1+	LVDS positive odd bit 1
9	GND	GROUND
10	ATX2-	LVDS negative odd bit 2
11	NC	No Connect

12	ATX2+	LVDS positive odd bit 2
13	Vpnl	Panel Power
14	ACLKTX-	LVDS negative odd clock
15	Vpnl	Panel Power
16	ACLKTX+	LVDS positive odd clock
17	Vpnl	Panel Power
18	ATX3-	LVDS negative odd bit 3
19	Vpnl	Panel Power
20	ATX3+	LVDS positive odd bit 3

S-VIDEO Connector (JP1)

Used connector: 4pin Miniature Jack .
Related connector: S-VIDEO terminal

Pin No.	Symbol	Description
1	GND	ANALOG GROUND
2	GND	ANALOG GROUND
3	Y	LUMINANCE SIGNAL
4	C	CHROMINANCE SIGNAL

Composite Video connector (JP2)

Used connector: RCA JACK
Related connector: Video terminal

Pin No.	Symbol	Description
1	CVBS	VIDEO SIGNAL INPUT
2	GND	ANALOG GROUND

POWER IN(Wafer) (JS1)

Used connector: JST-B4B-PH-K-S or equivalent.
Related connector: JST-PHR-4 or equivalent l

Pin No.	Symbol	Description
1	+12V	12V dc input
2	+12V	12V dc input
3	GND	Power Ground
4	GND	Power Ground

OSD control connector (CN1)

Used connector: JST-B10B-PH-K-S or equivalent.
Related connector: JST-PHR-10 or equivalent.

Pin No.	Symbol	Description
1	PWR	Power LED
2	PWR_SW	Power on/off control
3	>	Right key
4	+	Increase
5	-	Decrease

6	NC	No connection
7	<	Left key
8	STB	Standby LED
9	GND	Ground
10	DC5V	5V input

VGA Connector(Wafer) (CN2)

Used connector: JST-B13B-PH-K-S or equivalent.
Related connector: JST-PHR-13or equivalent

Pin No.	Symbol	Description
1	RIN	ANALOG RED INPUT
2	AGND	ANALOG GROUND
3	GIN	ANALOG GREEN INPUT
4	AGND	ANALOG GROUND
5	BIN	ANALOG BLUE INPUT
6	AGND	ANALOG GROUND
7	DDCSDA	DDC SERIAL DATA
8	HS	H-SYNC
9	VS	V-SYNC
10	NC	NO-CONNECTION
11	DDCSCL	DDC SERIAL CLOCK
12	GND	DIGITAL GROUND
13	VGA_DE	VGA DETECT

SPEAKER output connector (CON1)

Used connector: JST-B4B-PH-K-S or equivalent.
Related connector: JST-PHR-4 or equivalent.

Pin No.	Symbol	Description
1	LOUT+	Speaker LOUT+
2	LOUT-	Speaker LOUT-
3	ROUT-	Speaker ROUT-
4	ROUT+	Speaker ROUT+

VGA Connector (DB1)

Used connector: Standard 15pin D-sub connector 8.89mm, right angle.
Related connector: 15pin D-Sub, male.

Pin No.	Symbol	Description
1	RIN	ANALOG RED INPUT
2	GIN	ANALOG GREEN INPUT
3	BIN	ANALOG BLUE INPUT
4	NC	NO-CONNECTION
5	GND	DIGITAL GROUND
6	AGND	ANALOG GROUND
7	AGND	ANALOG GROUND
8	AGND	ANALOG GROUND
9	VGA_DE	VGA DETECT
10	GND	DIGITAL GROUND

11	NC	NO-CONNECTION
12	DDCSDA	DDC SERIAL DATA
13	HS	H-SYNC
14	VS	V-SYNC
15	DDCSCL	DDC SERIAL CLOCK

7. General Specification

7.1. Absolute maximum ratings

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Voltage	Vin	+9	15	V	Note 1
Video signal	Vi1	-	2.0	Vp-p	Note 2
	Vi2	-	2.0	V	Note 3
Digital signal	ViL	-0.3	1.0	V	Note 4
	ViH	2.75	5.3	V	Note 5

Note 1: Power input terminal
Note 2: Composite signal terminal
Note 3: Rin, Bin, Gin terminals
Note 4: Digital signal logic low
Note 5: Digital signal logic high

7.2. Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit.	Remark
Input Voltage		Vin	+11	+12	+13	V_{DC}	Note 1
Analog input voltage		VCVS	-	1.0	1.1	Vp-p	Note 2
		VRGB	-	0.7	1.1	Vp-p	Note 2,3
Digital input signal	H-level	Vih	2.75	-	5.0	V_{DC}	Note 4
	L-level	Vil	0	-	1.0	V_{DC}	

Note 1 : Power input
Note 2 : Composite and standard RGB video signal input impedance: 75Ω
Note 3 : RIN, GIN, BIN terminals (RGB video signals)
Note 4 : HS, VS, DDCSDA, DDCSCL

7.3. Power Consumption

Parameter	Min.	Typ.	Max.	Unit.	Remark
Operating Mode	3.5	4	4.5	Watt	
Sleep Mode	-	-	2	Watt	
Off Mode	-	-	2	Watt	

7.4. Separate RGB Video Signal(VGA) Input Timing

Input Timing Range: H: 30-80KHz; V: 50-75Hz

Mode	Resolution	Remark
Mode 1	640×350@70Hz	

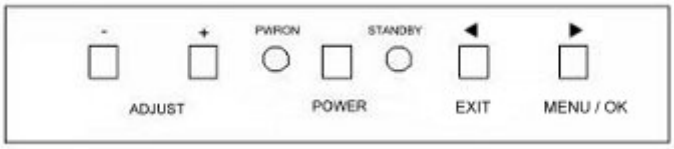
Mode 2	640×400@70Hz	
Mode 3	640×480@60Hz	
Mode 4	640×480@72Hz	
Mode 5	640×480@75Hz	
Mode 6	720×400@70Hz	
Mode 7	800×600@56Hz	
Mode 8	800×600@60Hz	
Mode 9	800×600@72Hz	
Mode 10	800×600@75Hz	
Mode 11	1024×768@60Hz	
Mode 12	1024×768@70Hz	
Mode 13	1024×768@75Hz	
Mode 14	1280×1024@60Hz	
Mode 15	1280×1024@75Hz	
Mode 16		

7.5. Composite Video Input (Video Terminal), Y/C Video input (S-Video)

Video Format	Resolution	Frequency	Country Support
NTSC	525×60	3.58MHz	U.S., Mexico, Japan, many others
PAL	625×50	4.433MHz	China, Germany, many others

8. OSD Key Definition

8.1. OSD Key Pad



1. MENU / ENTER ►

Press the ► button to display the OSD main menu when it is on the regular screen viewing

2. ADJUST +/−

After the OSD menu display, press these two buttons to shift the selection up or down.
+: Press this button to shift the selection up
−: Press this button to shift the selection down
Press these two buttons to adjust the selected function for optimal viewing:
+: Press this button to decreasing value of setting
−: Press this button to increasing value of setting

3. EXIT ◄

Press the ◄ button to exit the current item or exit OSD directly.

4. POWER

Press the power switch button to turn the power ON or OFF. It is recommended turning your PC system power on first, then the LCD monitor.

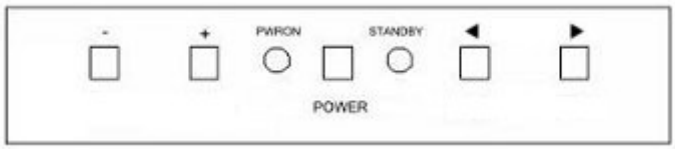
5. Power STAND-BY Mode LED (Orange Light)

Indicates when the power is in the stand-by mode.

6. Power ON LED (Green Light)

Indicates when the power is in the ON position.

8.2. Hot Key Definition



1. AUTO Adjustment

On regular screen viewing, press this key（◄）to trigger the function for automatic adjustment.

2. Volume Adjustment

On regular screen viewing, press this key（+）to trigger the function for volume adjustment.

3. Source Switch

On regular screen viewing, press this key（−）to trigger the function for source switch.

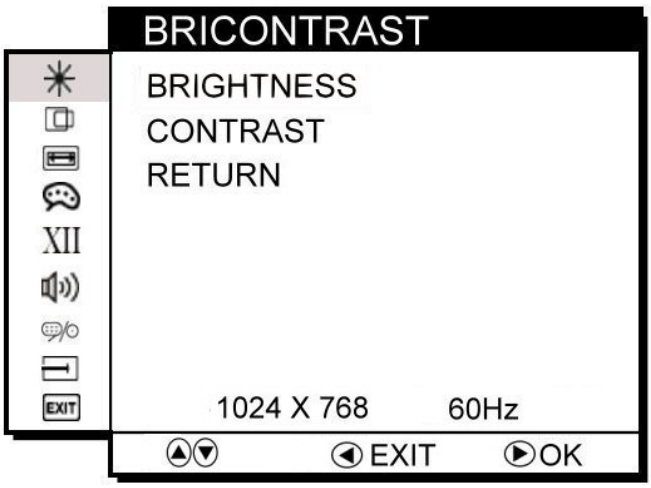
4. Firmware Burn In

On regular screen viewing, when it is power on and signal input, press this compound key（◄&►）to trigger the function for F/W burn in. The burn in function would be disabled if signal input.

5. All Mode Reset

On regular screen viewing and AC Input, use this compound key （− &+）to trigger the function for all mode reset. It will show the BIOS version and then complete all mode reset.

8.3. Navigating the OSD Menu



a. Display the main menu
Press the MENU button（►）to display the main menu on the screen.

b. Select the menu you want to adjust
Press the +/− button to shift the item selections up or down until it is desired, and then press the button（►） again to enter the item.

c. Adjust the item setting
Press the +/− button again to adjust the value of setting. Once you adjust the setting of value, the setting will be stored.

d. Exit the OSD menu
Select the “EXIT OSD” item or press the Exit Button (◄) directly to exit OSD menu then return to regular screen viewing. If there is no command respond for 30 seconds, the menu will close automatically.

8.4. OSD Menu on VGA Mode

	Main Menu Items	Sub-Menu Items
✳	**BRICONTRAST**	BRIGHTNESS CONTRAST
	POSITION	H-POSITION V-POSITION
	IMAGE	AUTO CLOCK PHASE WHITE BALANCE
	COLOR	USER └ RED GREEN BLUE 9300K 6500K ADC BRIGHTNESS
XII	**GAMMA**	GAMMA 0 GAMMA 1 GAMMA 2 GAMMA 3
	AUDIO	VOLUME ADJUST SPEAK ON/OFF
	CHANNEL	ANALOG DVI CVBS S-VIDEO
	RECALL	YES NO

EXIT	**OSD EXIT**	YES NO

✳ BRICONTRAST

You can adjust the screen's brightness and contrast. Select "RETURN" to return the main menu.

Item	Action Description
BRIGHTNESS	Press the +/− button to adjust the screen's brightness
CONTRAST	Press the +/− button to adjust the screen's contrast

POSITION

You can adjust the screen's position by horizontal and vertical manually. Select "RETURN" to return the main menu.

Item	Action Description
H-POSITION	Press the +/− button to adjust the image to the left or right on the screen
V-POSITION	Press the +/− button to adjust the image up or down on the screen

IMAGE

You can adjust the value of screen quality automatically. Select "RETURN" to return the main menu.

Item	Action Description
AUTO	Use to choose the best settings for the current input signal
CLOCK	Press the +/− button to adjust the value of horizontal image
PHASE	Press the +/− button to adjust the phase control (Phase adjustment may be required to optimize the display quality)
WHITE BALANCE	Use to set RGB signal voltage level

COLOR

You can select the screen's color level of the white color field from the default color temperature settings. Also, you can fine tune the color temperature by USER option if necessary. Select "RETURN" to return the main menu.

Item	Action Description
USER	Choose RED/GREEN/BLUE and press the +/− button to set value of color temperature to suit you own preference
9300K	Press the +/− button to set value of monitor for the CIE

	coordinate 9300 color temperature
6500K	Press the +/− button to set value of monitor for the CIE coordinate 6500 color temperature
ADC Brightness	Press the +/− button to set value of monitor for ADC Brightness

XII GAMMA

You can adjust the value of GAMMA; there are four default value groups for your choice. Select “RETURN” to return the main menu.

AUDIO

You can adjust the setting of speaker, including volume and mute. Select “RETURN” to return the main menu.

Item	Action Description
VOLUME ADJUST	Press the +/− button to adjust the volume of speaker
SPEAK ON/OFF	Use to make the speaker work or mute

CHANNEL

You can switch the setting of signal input channel. Select “RETURN” to return the main menu.

Item	Action Description
ANALOG	Use to change the input signal to Analog mode
DVI	Use to change the input signal to DVI mode
CVBS	Use to change the input signal to Composite mode
S-VIDEO	Use to change the input signal to S-Video mode

RECALL

You can recall the factory default setting by selecting “YES”. Select “NO” to return the main menu.

EXIT OSD EXIT

You can exit the OSD menu by selecting “YES”. Select “NO” to return the main menu.

8.5. OSD Menu on AV (CVBS/S-Video) Mode (Option)

	Main Menu Items	Sub-Menu Items
✳	**BRICONTRAST**	BRIGHTNESS

		CONTRAST
	SHARPNESS	
	SATURATION	
	HUE	
XII	**GAMMA**	GAMMA 0 GAMMA 1 GAMMA 2 GAMMA 3
	AUDIO	VOLUME ADJUST SPEAK ON/OFF
	CHANNEL	ANALOG DVI CVBS S-VIDEO
	RECALL	YES NO
EXIT	**OSD EXIT**	YES NO

✳ BRICONTRAST

You can adjust the screen's brightness and contrast. Select "RETURN" to return the main menu.

Item	Action Description
BRIGHTNESS	Press the +/− button to adjust the screen's brightness
CONTRAST	Press the +/− button to adjust the screen's contrast

SHARPNESS

You can increase or decrease the value of sharpness. This function allows the user to optimize the sharpness of the image.

SATURATION

You can increase or decrease the value of chroma gain.

HUE

You can use this function to obtain the desired color settings. The HUE is defined as a phase shift of the sub-carrier with respect to the burst.

XII GAMMA

You can adjust the value of GAMMA; there are four default value groups for your choice. Select "RETURN" to return the main menu.

AUDIO

You can adjust the setting of speaker, including volume and mute.

Select “RETURN” to return the main menu.

Item	Action Description
VOLUME ADJUST	Press the +/− button to adjust the volume of speaker
SPEAK ON/OFF	Use to make the speaker work or mute

CHANNEL

You can switch the setting of signal input channel. Select “RETURN” to return the main menu.

Item	Action Description
ANALOG	Use to change the input signal to Analog mode
DVI	Use to change the input signal to DVI mode
CVBS	Use to change the input signal to Composite mode
S-VIDEO	Use to change the input signal to S-Video mode

RECALL

You can recall the factory default setting by selecting “YES”. Select “NO” to return the main menu.

OSD EXIT

You can exit the OSD menu by selecting “YES”. Select “NO” to return the main menu.

9. Environment Characteristics

Operating Temperature: 0 ~ +50 °C

Relative Humidity: ≦95% RH

Storage Temperature: -20 ~ + 60°C

Relative Humidity: 0 ~ 95% RH

10. Mechanical Drawing