

Documnt Number: DDS-13-019

DRV050-VGA-R02 Drive Board
User manual
Ver 1.1

For Products:

SVGA050/060 SC — Full Color

SVGA050/060 SW — Monochrome White

SVGA050/060 SG — Monochrome Green

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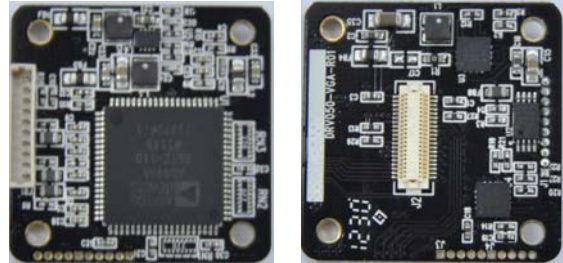
Record of Revision

Revision	Revise Date	Page	Content
Ver 1.0	May 17,2013		Initial release.
Ver 1.0	Jul 16,2013	3	Modified the pin definition of J4;
		4	Delete the KEY_M description

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Features

- **Multi-format composite video input(default is PAL)**
- **Low power consumption**
- **Industrial temperature grade (-40℃~+65℃)**
- **Wide power supply (5V~17V)**
- **Custom Re-configurable**



General description

DRV050-VGA-R02 is an RGB graphics signals input driver board for SVGA Micro-OLED Display. The low power consumption Decoder can automatically detects and converts RGB graphics signals into digital RGB 4:4:4 component video data compatible with the 8-bit ITU-R BT.656 interface standard. Default display setting is RGB graphics signals input, and the resolution is 800x600, support EDID identification, support mono or color signal

Display center is accord to driver PCB center, convenient for design and set up optical system.

Two digital input interface are reserved to allow user to adjust the brightness, contrast of video signal and the brightness of display. One CMOS standard serial communication interface allow user to configure all register of the Decoder and Display. So user can re-configure the driver board flexible.

Low-noise, low-dropout DC/DC convertor can support 5V-17V wide input voltage

Power and consumption

Input voltage	DC 5~17V (typical is 5V)
Typical power consumption	700mW ((Include display)

Input video signal

Video signal	RGB graphics signals
Voltage level	0~1.0 Vpp
Input resistor	75Ω
Output	800×600

Interface (3.3V CMOS standard)

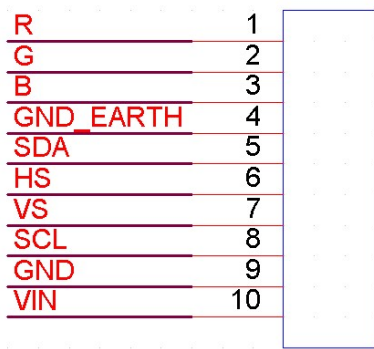
I/O definition (active low)	Function
KEY1	Increase Brightness(++)
KEY2	Reduce Brightness(--)
PGCLK/KEY_F	Increase Signal Contrast(++)
VPP	Hardware Reset
TxD/RxD	CMOS 3.3V RS232 interface
COM Setting	9600/N/8/1

Mechanic dimension

Dimension (L×W)	31mm×31mm
Refer to diagram of mechanism	

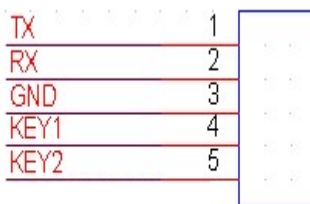
Interface and pin definition

No.	Name	Function	Voltage level
1	R	Red Input	0~1.0V
2	G	Green Input	0~1.0V
3	B	Blue Input	0~1.0V
4	GND EARTH	Input Signal Gnd	0V
5	SDA	EEPROM I2C DATA (EDID)	0/3.3V
6	HS	Horizontal SYNC Input	0/3.3V
7	VS	Vertical SYNC Input	0/3.3V
8	SCL	EEPROM I2C CLK (EDID)	0/3.3V
9	GND	Power GND	0V
10	VIN	Power Input	5~17V



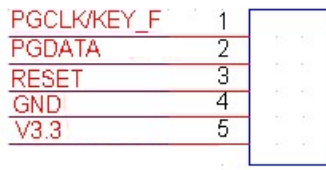
J1

No.	Name	Function	Voltage level
1	Tx	RS232 Send Pin	0/3.3V
2	Rx	RS232 Received Pin	0/3.3V
3	GND	Power GND	0V
4	KEY1	Increase Brightness(++)	0/3.3V
5	KEY2	Reduce Brightness(--)	0/3.3V



J3

No.	Name	Function	Voltage level
1	PGCLK/KEY_F	Increase Signal Contrast	0/3.3V
2	PGDATA	Reserve	0/3.3V
3	Reset	Hardware Reset	0/3.3V
4	GND	Power GND	0V
5	V3.3	V3.3 Output	3.3V



J4

Note: 1. It remarks the first pin as 1 in the Connector.

2. There are no component in J3 and J4, If customer need ,we can solder them.

Function key description

All of the Keys are active low pulse, and must be not less than 20ms. If the low pulse is more than 20ms, MCU will do the same operate continually by every 20ms.

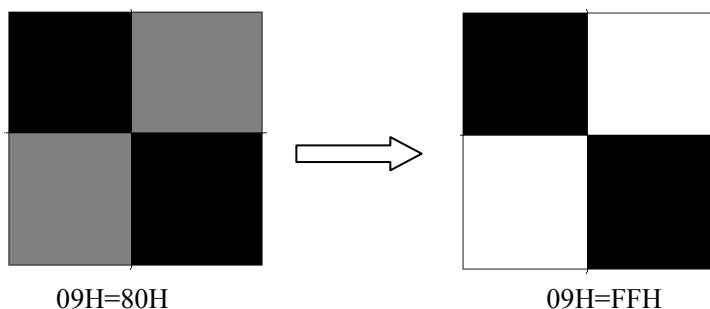
KEY1: Decrease display 19H register value: (19H)--, adjust range is $\pm 28H$. It's effect to adjust display common cathode voltage, and make the display brightness circle change from darkest (Reg(19H)+28H) to brightest (Reg(19H)-28H).

KEY2: Increase display 19H register value: (19H)++, adjust range is ±28H. It's effect to adjust display common cathode voltage, and make the display brightness circle change from brightest (Reg(19H)-28H) to darkest ([Reg(19H)]+28H).

KEY_F: Increase display 09H register: (09H) ++, adjust range is ±20H. It's effect to adjust the contrast of input video signal, and make the display contrast circle change from darkest (Reg(09H)-20H) to brightest (Reg(09H)+20H).

$$\text{Output} = \text{Input} \times (\text{Reg}(09\text{H}) / 80\text{H})$$

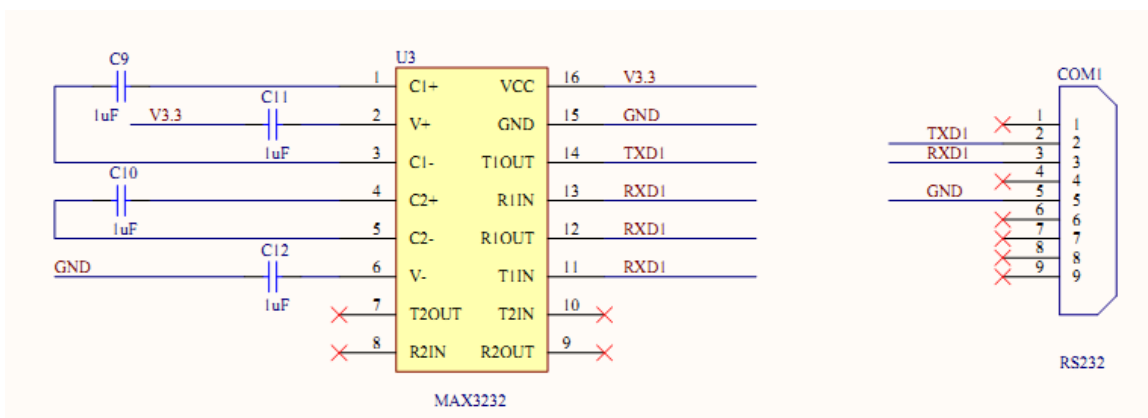
Reg(09H)	Result
00H	Black screen
80H	Signal is no change
FFH	Twice the gain of signal contrast



The comparison picture of increasing contrast

Communication description

Communication interface support master controller to read/write the register value of Display, Decoder and EEPROM. The change of the Decoder and Display will effect immediately, but when power down or reset, it will lost. The change of the EEPROM is equal to modify the default setting, will effect after power up in next time or reset. We have to make a board which used for voltage transform like below max3232 :



Note: RxD and TxD pin are work in COMS 3.3V standard, it cannot connect to PC RS232 port directly.

Every command must be sending in 600ms and total bytes must be less than 64 bytes, otherwise, will receive the error code.

Common Command

- (1) Read display brightness 02 11 03 19 01 03
 Succeed Response 02 11 03 06 XX 03 (XX is the brightness value)
- (2) Modify the display contrast 02 21 03 09 XX 03
 (XX is the value which we want to set, adjust range is 00H~FFH)
- (3) Modify the brightness of display 02 24 03 00 XX 03
 (XX is the value which we want to set, Adjust range is 00H~FFH, and the 00H is more dark than FFH.)
 Note: After send this command, the brightness change of the Display will effect immediately, it save the setting in EEPROM at the same time.
- (4) Modify the display scan direction 02 21 03 10 XX 03
 (XX is the value which we want to set, adjust range is 00H~03H,the default setting is 00H)
 Up-Down mirror 02 21 03 10 02 03
 Left-Right mirror 02 21 03 10 01 03
 Up-Down and Left-Right mirror 02 21 03 10 03 03
- (5) Open temperature compensation(TC) 02 43 03 01 00 03
 Close temperature compensation (TC) 02 43 03 00 00 03
 Note: The setting will effect immediately, but when power down or reset, it will lost. If you want to save the setting of TC, please modify the register DEH and D0H,D0H is the checksum register. The default setting is open TC.)
- (6) Resume the factory setting 02 80 03 00 00 03
- (7) Reset 02 55 03 00 00 03

Communication mnemonic symbol

Mnemonic	Code(Hex)	Signification	Error Code		Signification
			Mnemonic	Code(Hex)	
STX	02h	Start symbol	Err_Head	F0h	Start symbol error
ETX	03h	End symbol	Err_End	F1h	End symbol error
ACK	06h	ACK symbol	Err_CMD	F2h	CMD symbol error
NAK	07h	NAK symbol	Err_DateLen	F3h	Data Length error
CMD	00h	Read soft version	Err_Frame	F4h	Frame error
	11h	Read Display	Err_FIFO	F5h	FIFO overflow
	12h	Read Decoder	Err_RxProc	F6h	CMD process error
	13h	Read EEPROM	Err_TimeOut	F7h	CMD timeout
	21h	Write Display	Err_Waiting	F8h	CMD not finished
	22h	Write Decoder	Err_Unknow	FFh	Unknown CMD
	23h	Write EEPROM			
	24h	Write Brightness of display			
	30h	Switch PAL to NTSC			

	31h	Switch NTSC to PAL			
	41h	Reset display			
	43h	Open/Close temperature compensation			
	55h	Reset			
	80h	Resume factory setting			

Communication command formatting

Send: STX + CMD + DataLen + Data + ETX
 -----> DataLen

Response: STX + CMD + DataLen + ACK/NAK + Data + ETX
 -----> DataLen

Command usage

1. Read command (All command are fixed in 6 bytes)

Send:

STX	CMD	Length	Add0	ReadLen	ETX
02	00/11/12/13	03	00~FF	01~FF	03

Succeed Response:

STX	CMD	Length	ACK	Data0	.....	Datan	ETX
02	00/11/12/13	03~FF	06	00~FF	.....	00~FF	03

Error Response:

STX	ErrCode	Length	NAK	ETX
02	F0~FF	02	07	03

Read command examples:

Read Display register from 00H to 0FH: 02 11 03 00 10 03
 Read Decoder register from 00H to 20H: 02 12 03 00 21 03

2. Write Command (6 ≤ Total Bytes ≤ 64)

Send:

STX	CMD	Length	Add0	Data0	.....	Addn	Datan	ETX
02	21/22/23	03~3C	00~FF	00~FF	.....	00~FF	00~FF	03

Succeed Response:

STX	CMD	Length	ACK	ETX
02	21/22/23	02	06	03

Error Response:

STX	ErrCode	Length	NAK	ETX
02	F0~FF	02	07	03

Write command example:

Write Display register (01H) = 41H, (19H) = A0H: 02 21 05 01 41 19 A0 03

MECHANICAL CHARACTERISTICS

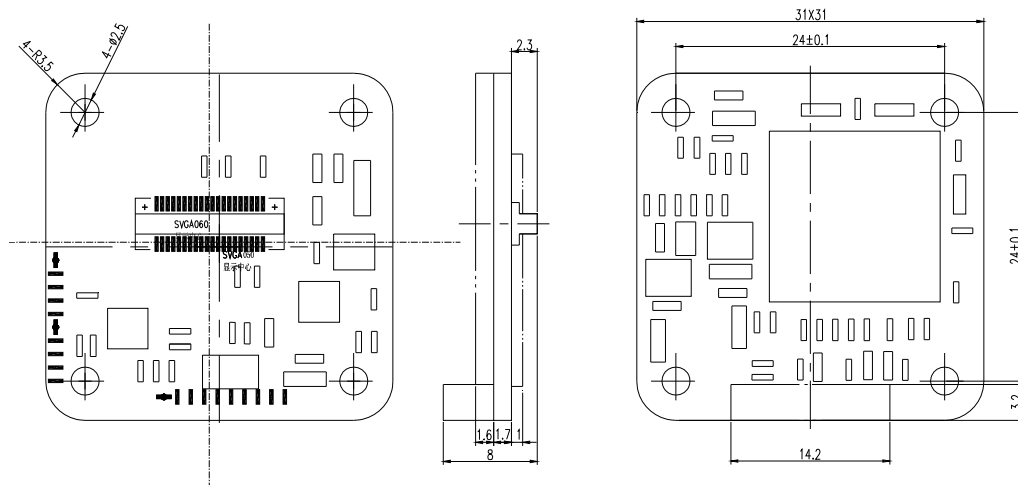
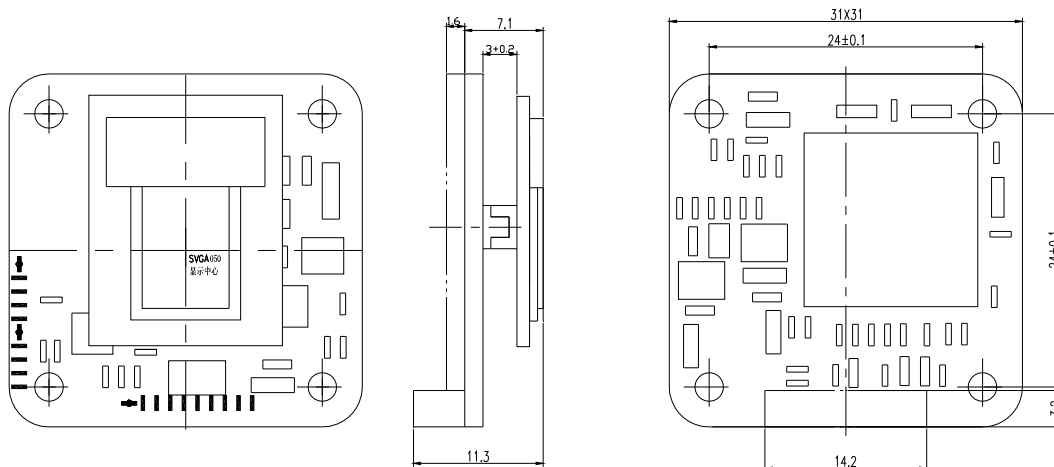


Diagram of mechanism



Installation diagram with SVGA050 OLED