

Documnt Number: DDS-13-006

DRV050-CV-R03 CVBS Drive Board
User manual
Ver 1.0

For Products:

- SVGA050SC — Full Color
- SVGA050SW — Monochrome White
- SVGA050SG — Monochrome Green

Yunnan North OLiGhTEK Opto-Electronic Technology Co., LTD

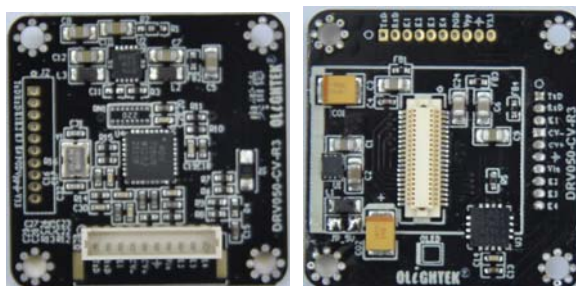
May 14, 2013

Record of Revision

Revision	Revise Date	Page	Content
Ver 1.0	May 14,2013		Initial release.

DRV050-CV-R03 CVBS Drive Board

User manual



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-CV-R03 is an analog composite video input driver board for SVGA050 OLED microdisplay. The low power consumption decoder can automatically detects and converts standard analog baseband television signals compatible with worldwide NTSC, PAL, and SECAM standards into digital YCbCr 4:2:2 component video data compatible with the 8-bit ITU-R BT.656 interface standard. Default driver board setting is PAL input, and the resolution is 768x576, support mono or color signal.

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

The six input pins allow user to adjust the brightness, contrast of the 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 5V~17V
Typical power consumption	500mW (Include display)

Input video signal

Video signal	Composite video
Voltage level	0~1.0 Vpp
Input resistor	75Ω
Output (PAL)	768×576

Interface (3.3V CMOS standard)

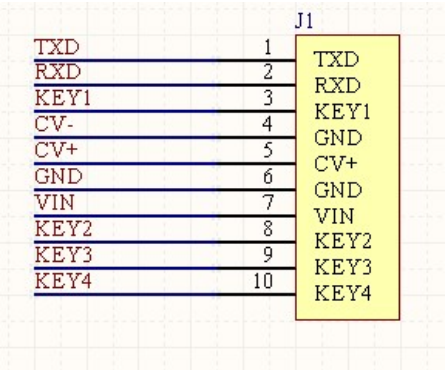
I/O definition (active low)	Function
KEY1	Reduce Signal Contrast(--)
KEY2	Increase Brightness(++)
KEY3	Reduce Brightness(--)
KEY4	Increase Signal Contrast(++)
TxD/RxD	CMOS 3.3V RS232 interface
COMS Setting	9600/N/8/1

Mechanic dimension

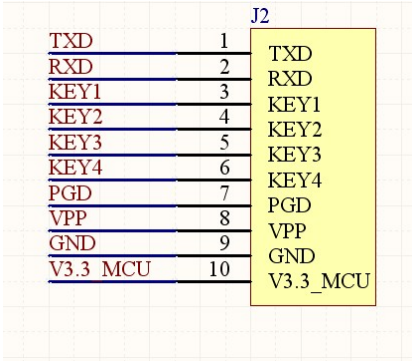
Dimension (L×W)	29mm×29mm
Display center is accord to drive PCB center	

Interface and pin definition

No.	Name	Function	Voltage level
1	TxD	RS232 Send Pin	0/3.3V
2	RxD	RS232 Received Pin	0/3.3V
3	KEY1	Reduce signal contrast	0/3.3V
4	CV-	Video input-	0V
5	CV+	Video input+	0~1.0 Vpp
6	GND	Power Gnd	0V
7	Vin	Power input	5V~17V
8	KEY2	Increase Brightness	0/3.3V
9	KEY3	Reduce brightness	0/3.3V
10	KEY4	Increase signal contrast	0/3.3V



No.	Name	Function	Voltage level
1	TxD	RS232 Send Pin	0/3.3V
2	RxD	RS232 Received Pin	0/3.3V
3	KEY1	Reduce signal contrast	0/3.3V
4	KEY2	Increase Brightness	0/3.3V
5	KEY3	Reduce brightness	0/3.3V
6	KEY4	Increase signal contrast	0/3.3V
7	PGD	Preset	0/3.3V
8	Vpp	Refresh Power	0/3.3V
9	GND	I/O Cnd	0V
10	V3.3_MCU	3.3V output	3.3V



Note: 1. It remarks the first pin as 1 in the Connector. Which is 53047-1010 made by Molex.

2. J1 used 10Pin connector, but it could use the different connector by customer need.

3. J2 does not solder component, and it could solder by customer need.

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.

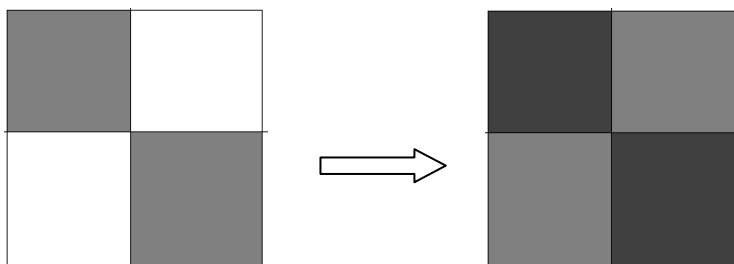
KEY2: Decrease display 19H register value: (19H)--, adjust range is $\pm 28H$. It's effect to adjust display common cathode voltage, and make the display brightness circle change from darkest (Reg(19H)+28H) to brightest (Reg(19H)-28H).

Key3: 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).

Key1: Decrease 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 brightest (Reg(09H)+20H) to darkest (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

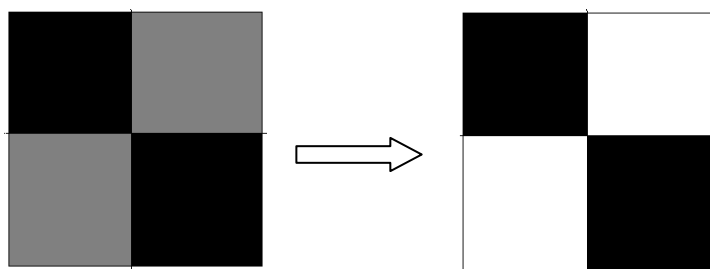


09H=80H

09H= 40H

The comparison picture of reducing contrast

Key4: 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).



09H=80H

09H=FFH

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 :

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			
	42h	Reset decoder			
	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

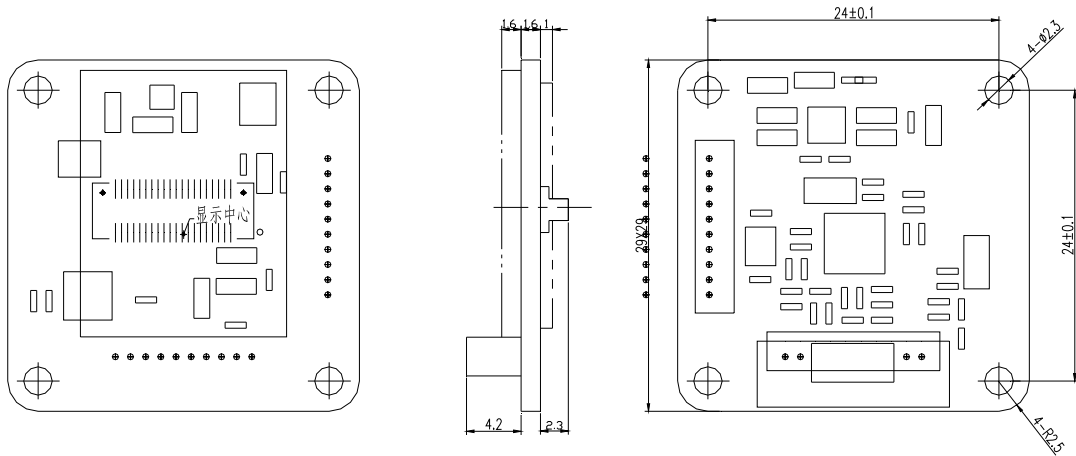
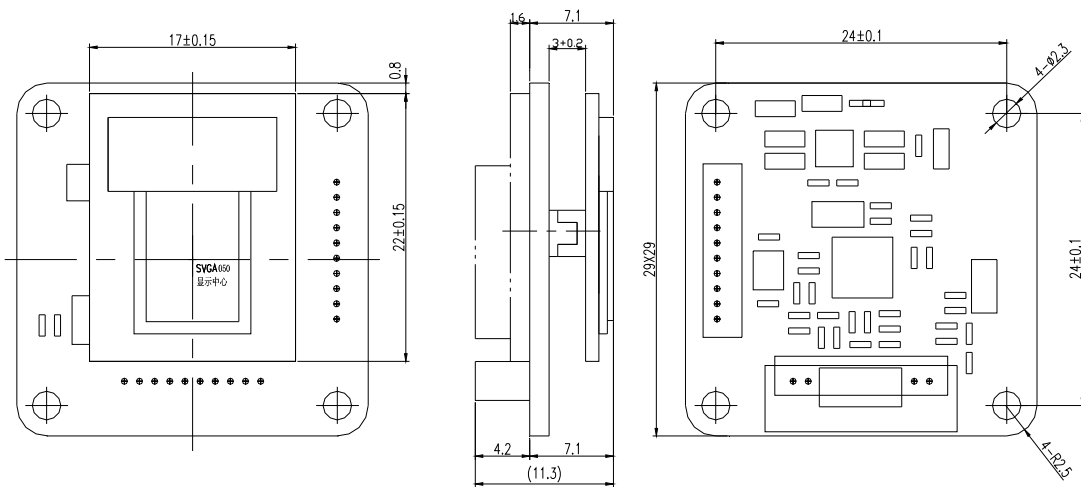


Diagram of mechanism



Installation diagram with SVGA050 OLED