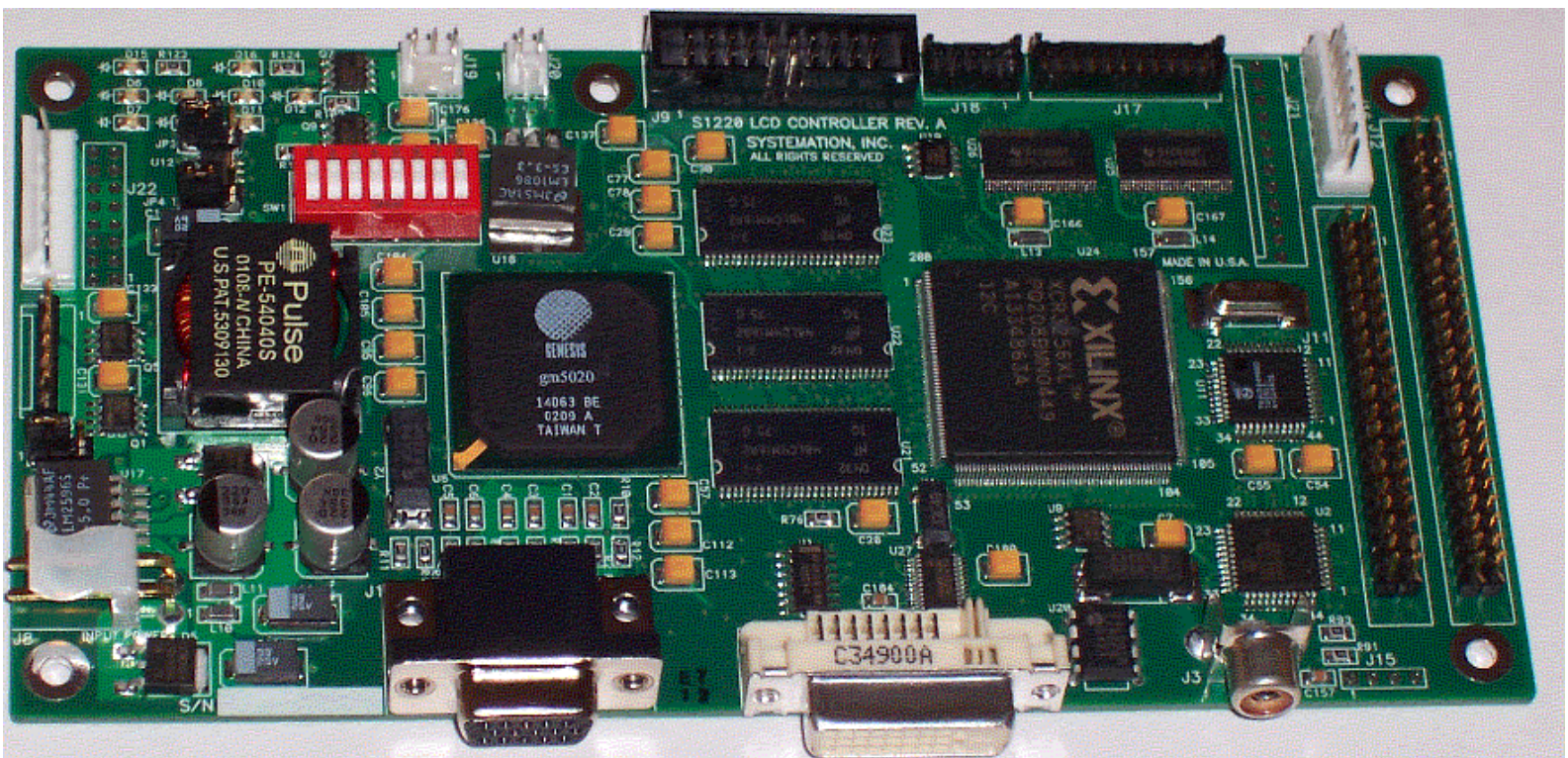


S1220 Multiple Input LCD Controller Board

The S1220 LCD Controller board from Systemation, Inc. provides a full function general purpose LCD Controller that can accept a variety of different video inputs including, Analog VGA (up to 1600 X 1200), DVI (Digital Video Interface), and Composite NTSC or PAL video. The S1220 can drive digital TTL type LCDs or single or dual channel LVDS type LCDs.

User controls are provided using a 3-button interface to an On-Screen Menu.



S P E C I F I C A T I O N S

- 1 – Video Inputs: VGA Analog Type (HD-15 Connector)
 RGBHV Format
 RGBS Format
 RGsB Format
 DVI-D Type (DVI Connector)
 Composite NTSC/PAL (Phonojack Connector)
 S-Video input available on a non-populated header
- 2 – Resolution: Up to 1600 X 1200
- 3 – Colors: 8 bits per color (16.67M colors)
- 4 – LCD Output: TTL, 48-bits
 LVDS single/dual channel LVDS
- 5 – Input Power: 12VDC (Typical)
 9VDC to 14VDC (Range)
 Current at 12V is 0.2A (excluding LCD)
- 6 – User Controls: 3-button selection to On-Screen Menu
 (Up, Down, Select Buttons)
- 7 – Optional Controls: - RS-232 commands for remote control
 - Additional Controls for fans, heaters, etc.
- 8 – Image Processing: Any image of any resolution can fit automatically
 on any resolution LCD.
- 9 – Fan Control: Connector J19 is a 12VDC fan control. The 12VDC
 voltage will switch ON when the S1220 board
 temperature reaches 40C and back OFF at 35C.

- 10 – Heater Control: Connector J20 is a 12VDC heater control. The 12VDC voltage will switch ON when the board temperature goes below 0C and back OFF when at 5C.
- 11 – Environmental: Operating Temperature 0 to 70C
Note: The video controller chip is rated 0 – 70C by the manufacturer, however, Systemation has tested the board from –40C to +90C running at 1280x1024 with no problems. Care must be taken at higher temperatures to heat sink the video chip.
- Relative Humidity up to 95% non-condensing
Note: This board is available conformally coated. Consult the factory for details.

NOTE: The 3.3 Volt output from this board is limited to 1Amp. If more current is needed please contact Systemation.

INSTALLATION and SETUP

There are a few jumpers and switch settings that must be set for proper operation of the S1220. Prior to setting up the board, knowledge of the LCD is required:

1 – LCD POWER

On the TTL output connectors and on the LVDS connectors are power pins. These power pins can be either 3.3VDC or 5.0VDC. A 2-pin shunt must be placed across 2 of the pins on the 3-pin jumper JP2:

JP2	Setting
1-2	5.0VDC
2-3	3.3VDC

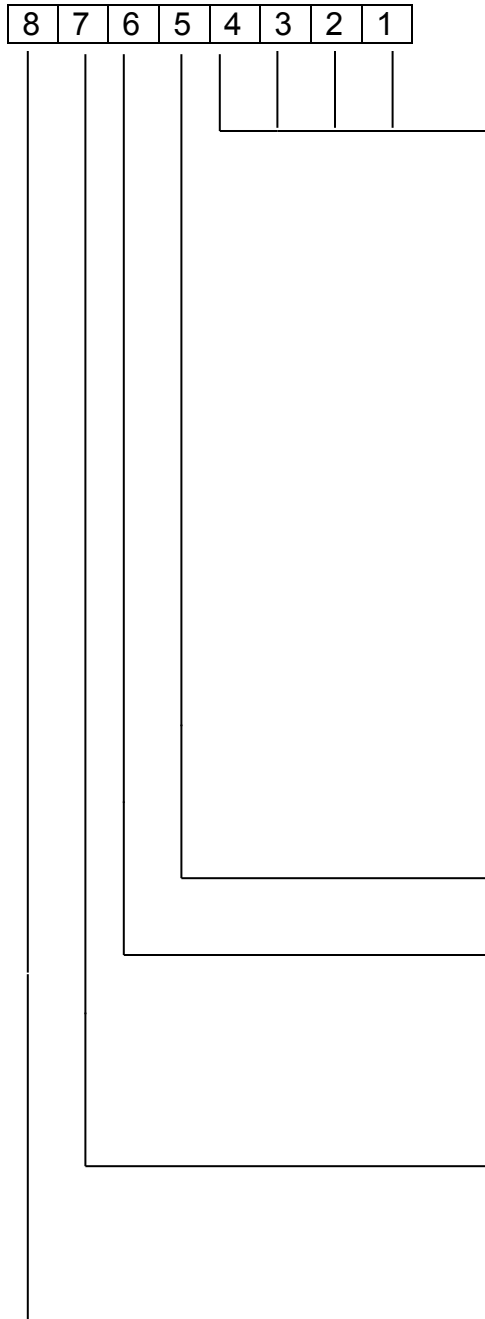
2 – BACKLIGHT INVERTER BRIGHTNESS CONTROL

The backlight inverter interface connector J5 has a brightness control signal on pin 5. This signal can be configured a number of ways to match the requirements of the backlight inverter used. A set of 2 each 2-pin shunts are used on jumpers JP3 and JP4. In addition, the signal range can be inverted using DIP switch position 8. The list of possible configurations are shown below:

JP3	JP4	SW8	Signal Function (J5-5)
OFF	1-2	OFF	10K Resistor, range 0 ohm -> 10K
OFF	1-2	ON	10K Resistor, range 10K -> 0 ohm
1-2	1-2	OFF	5V, range 0V -> 5V
1-2	1-2	ON	5V, range 5V -> 0V
2-3	1-2	OFF	2.5V, range 0V -> 2.5V
2-3	1-2	ON	2.5V, range 2.5V -> 0V
OFF	2-3	OFF	PWM Control Signal

3 – CONFIGURATION DIP SWITCH

This 8 position switch selects the timing and drive for the LCD that is connected.



LCD Selection

4	3	2	1	
OFF	OFF	OFF	OFF	= VGA 1 LCD
OFF	OFF	OFF	ON	= SVGA TTL LCD
OFF	OFF	ON	OFF	= XGA 1 LCD
OFF	OFF	ON	ON	= XGA 2 LCD
OFF	ON	OFF	OFF	= XGA 3 LCD
OFF	ON	OFF	ON	= XGA 4 LCD
OFF	ON	ON	OFF	= SXGA LCD
OFF	ON	ON	ON	= UXGA LCD
ON	OFF	OFF	OFF	= SXGA 2 LCD
ON	OFF	OFF	ON	= UXGA 2 LCD
ON	OFF	ON	OFF	= WUXGA LCD
ON	OFF	ON	ON	= WSXGA LCD
ON	ON	OFF	OFF	= SVGA LVDS LCD
ON	ON	OFF	ON	= VGA 2 LCD
ON	ON	ON	OFF	= XGA 5 LCD
ON	ON	ON	ON	= 1280x800 LCD

Reserved

Up/Down Button Operation with no OSD menu present:
 OFF = LCD brightness Control
 ON = Image Flip

Backlight Timeout when No Video
 OFF = Backlight Off in 30 seconds
 ON = Backlight Stays On

Backlight Inverter Control
 (See above)

Supported LCDs:

This section is a representative list of LCDs that can be driven by the S1220 and their category. This list is intended to aid in the selection of the LCD type.

- 1 – VGA – All generic 640X480 TTL type LCDs
- 2 - VGA 2 – Other 640X480 TTL type LCDs
NEC – NL64448AC20-06
- 3 – SVGA – All generic 800X600 TTL Type LCDs
- 4 – SVGA 2 – All generic 800X600 LVDS type LCDs
Mitsubishi AA121SN02
- 5 – XGA 1 – Single pixel per clock 1024X768 LCDs
NEC – NL10276BC20-04
NEC – NL10276BC16-01
Sharp – LQ150X1LGN2A
- 6 – XGA 2 – Single pixel per clock 1024X768 LCDs
NEC – NL10276BC30-17
Toshiba – LTM10C306L
Toshiba – LTM10C313S/U
Siemens – iSFT100i.10x
- 7 – XGA 3 – Two pixels per clock 1024 X 768 LCDs
NEC – NL10276AC30-07
- 8 – XGA 4 – Two pixels per clock 1024 X 768 LCDs
Sharp – LQ150X1DG16
- 9 – SXGA – All generic two pixel per clock 1280x1024 LCDs
Sharp LQ181E1LW31
NEC NL128102AC28-07
NEC NL128102BC29-01
- 10 – SXGA 2 Other generic 2 pixel per clock 1280x1024 LCDs
Samsung LTM17E06
- 11 – UXGA – All generic two pixel per clock 1600x1200 LCDs
Sharp LQ201U1LW01
Fujitsu FLC51UXC8V -10
- 12 – UXGA 2 – Other 1600x1200 UXGA LCDs

Fujitsu FLC59UXC8V
Sharp LQ201U1LW21

13 – WUXGA – Wide UXGA LCDs, 2 pixels per clock 1920x1200
Samsung LTM240W1

14 – SXGA + - SXGA Plus LCD (1440 x 1050), 2 pixels per clock
AU Optronics B150PG03

On-Screen Controls

The 3-button board is used to operate and change the functions on the On-Screen Menu. The buttons are UP, DOWN and SELECT.

The MAIN MENU appears when the SELECT button is pressed. Functions on the Main Menu are:

- LCD Brightness (Backlight inverter control)
- Horizontal Position
- Vertical Position
- Brightness (Image Brightness)
- Contrast (Image Contrast)
- Color (Color Level)
- Options Menu
- Video Status
- Video Input

The OSD menu will only remain on the screen for 10 seconds after a button press. Any button activity will cause the OSD to remain on the screen.

The VIDEO STATUS screen shows the currently displayed video parameters as well and the S1220 board temperature and the Firmware version number.

The Options Menu allows the user the ability to change:

- Horizontal Image Size
- Clock Phase
- Horizontal Smoothing
- Vertical Smoothing
- Auto Position

Load Factory Defaults Sync Tuning RGSB/RGBS

The AUTO POSITION function causes the board to re-position the currently displayed video image.

The LOAD DEFAULTS function puts all the image position/size/phase and color values to their original value. By setting the horizontal and vertical position to defaults, causes the board to automatically re-position each video mode and video rate when each mode/rate appears. An AUTO POSITION message will appear on the screen for a second when this operation occurs.

The HORIZONTAL and VERTICAL SMOOTHING adjustments are useful with moving images on the screen.

The SYNC TUNING function is used when using RGSB (RGB Sync-on-Green) or RGBS (Composite Sync). This adjustment is used when tearing is noticed on the top of the screen when using these input types.

The VIDEO INPUT selection on the main menu allows the user to set the board to search for an available input or to select and ONLY look for a specific video input. The selections are:

- VGA RGBHV
- VGA RGSB
- VGA RGBS
- DVI
- NTSC/PAL
- SEARCH FOR INPUT

In the SEARCH FOR INPUT mode, the board will display the first input it recognizes. When a specific input is selected only that input will be displayed. If that input is not being received, the NO VIDEO message will appear. The user can press the SELECT button to activate the Main Menu and then go to the VIDEO INPUT function and change the video input.

Note: The board will Auto Position the video image the first time a video mode is detected. After that the video will remain positioned on the screen. Manual adjustments are sometimes necessary.

Cables

The following is a list of available cables to various LCDs. In some cases these cables include the cable for the backlight inverter:

Cable	Description
ADP-01	VGA LCD 31 Pin Hirose Cable to S1220 TTL Data
ADP-02	SVGA LCD 41 Pin Hirose Cable to S1220 TTL Data
ADP-07	LVDS Data and Backlight Cable for Siemens 10.4 XGA
ADP-08	LVDS Data for Toshiba LTM10C306L 10.4" XGA
ADP-09	TTL Data for NEC NL10276AC30-07 15" XGA
ADP-21	LVDS Data for NEC NL128102BC23-03 15.4" SXGA
ADP-22	LVDS Data for Sharp LQ181E1LW31 18" SXGA
ADP-26	TTL Data for Toshiba LTM08C351 8.4" SVGA
ADP-27	LVDS Data for NEC NL10276BC20-04 10.4" XGA and NEC NL10276BC16-01 8.4" XGA
ADP-29	LVDS Data and Power for Hydis HT18E22 18" SXGA
ADP-30	LVDS DATA for Toshiba LTM10C313S 10.4" XGA and Hydis HT10X21 10.4" XGA
ADP-31	TTL Data, Power, and Backlight for NEC NL6448AC63-01 20" VGA
ADP-32	LVDS Data for Optrex T-51639D084U-FW-A-AA 8.4" XGA
ADP-33	LVDS Data and Backlight for Fujitsu FLC51UXC8V

20.1" UXGA

ADP-35	LVDS Data and Backlight for Samsung LTM213U4 23.1" UXGA
ADP-36	LVDS Data and Backlight for Fujitsu FCL59UXC8V 23" UXGA
ADP-37	LVDS Data and Backlight for NEC NL128102AC28-07 18" SXGA
ADP-38	LVDS Data for NEC 19" NL128102BC29-01 Fujitsu 19 " FLC48SXC8V LG LM190E03 & LM170E01 Samsung LTM190E05
ADP-39	LCDS Data and Backlight for Innvoa (I-91315) 15" high-bright XGA
ADP-40	LVDS Data for Sharp LQ201U1LW01 20.1" UXGA
ADP-41	LVDS Data for AU Optronics B150PG03 15" 1440 x 1050 LCD
ADP-42	LVDS Data for Sharp LQ201U1LW21 20.1" UXGA
ADP-43	LVDS Data and Backlight for Sharp LQ150X1LGN2A 15" XGA or NEC NL10276BC30-17 Mitsubishi AA121SN02
ADP-44	LVDS Data and Backlight for Fujitsu FLC59UXC8V 23" UXGA LCD
ADP-45	LVDS Data Cable for AUO M190EG01 19" SXGA LCD
ADP-46	LVDS Data Cable for Optrex T-52107D121J-FW-AAN 12.1" SVGA LCD

Operational Notes:

- If the DIP switches are ever changed, the board will re-load factory defaults assuming that the supported LCD has changed and new table values are required.
- The board supports many different video resolutions and refresh rates. The first time after Load Defaults that the board detects a video resolution or refresh rate for the first time, it automatically Auto Positions the image. Auto Position will not be performed again unless done manually through the OSD menu or by applying Load Defaults.
- By pressing all 3 menu buttons at the same time, the Load Defaults function will be performed. This is usually not necessary.

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