

# Easy Pixel EPX-L Board

## Technical Specifications

RoHS Compliant.

## Summary

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**Review page**

<b>Index</b>	<b>Date</b>	<b>Description</b>
0.0	10.10.06	First draft
0.1	11.10.06	Verification
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## Technical specifications

The TFT easy pixel controller board allows direct interfacing of analogue graphic signal (VGA), digital graphics (DVI\_I), composite video signals (CVBS) and S\_Video (YC) with a wide range of LCD TFT displays, with resolutions up to 1600 x 1200 pixels.

- Possibility of piloting TFT panels with LVDS 6/8 bit inputs featuring Single or Double channel with resolutions up to 1600 x 1200.
- Possibility of piloting TFT panels with TTL 18/24/48 bit RGB inputs with resolutions up to 1600 x 1200.
- Possibility of accepting graphic formats with separate synchronisms, composite synchronisms and sync on green.
- Automatic detection of the input format.
- Auto adjustment.
- "Auto sleeping" energy saving function in no-signal condition.
- Single 12 V. power supply.
- Full-screen image expansion for displays with formats below panel resolution capability.
- Image compression for displays with formats above panel resolution capability.
- Function control using keys on the board, external GUI interface and RS 232.
- Multilingual GUI with selection option (Italian/English/German).
- Possibility of configuring various backlight adjustments to jumpers.
- Fitted for IR receiver.
- Constant update with new TFT models.
- Possibility of displaying a logo when switched on.
- Fitted for tuner interface.

## Inputs

- Analog graphic : VGA - SVGA - XGA 75 Hz SXGA - UXGA 60 Hz 0.7 V. 1 V. Plug & Play compatible DDC 1/2B
- Digital graphic : DVI-I. Plug & Play compatible DDC 1/2B
- Graphic inputs with TTL separate - TTL composite - Sync On Green
- Video: multistandard CVBS (PAL - SECAM - NTSC)
- Video: multistandard S.Video (PAL - SECAM - NTSC)

## Outputs

- Panels signals : LVDS 6 / 8 Bit Single or Double channel - TTL 18/24/48 Bit (TMDS optional)
- Panel resolutions : 640x480-800x600-1024x768-1280x768-1280x1024-1600x1024 18/24/48 Bit. 4:3/16:9
- TFT power supply : 3.3 V. - 5 V. - 12 V. Power saving compatible vesa DPMS
- Inverter power supply : 12V. or 5V. - Enable pin 3.3 V. / 5 V. TTL / PWM or linear dimmig

## Alimentazione

- Single 12 V. (Min. 10.8 V. - Max 14.4 V.)

## Working/Storage conditions

- Working temperature : - 5°C : + 60°C
- Storage temperature : -10°C : + 70°C
- Humidity : 10% : 80% uncondensed
- Altitude : 3.000 m.

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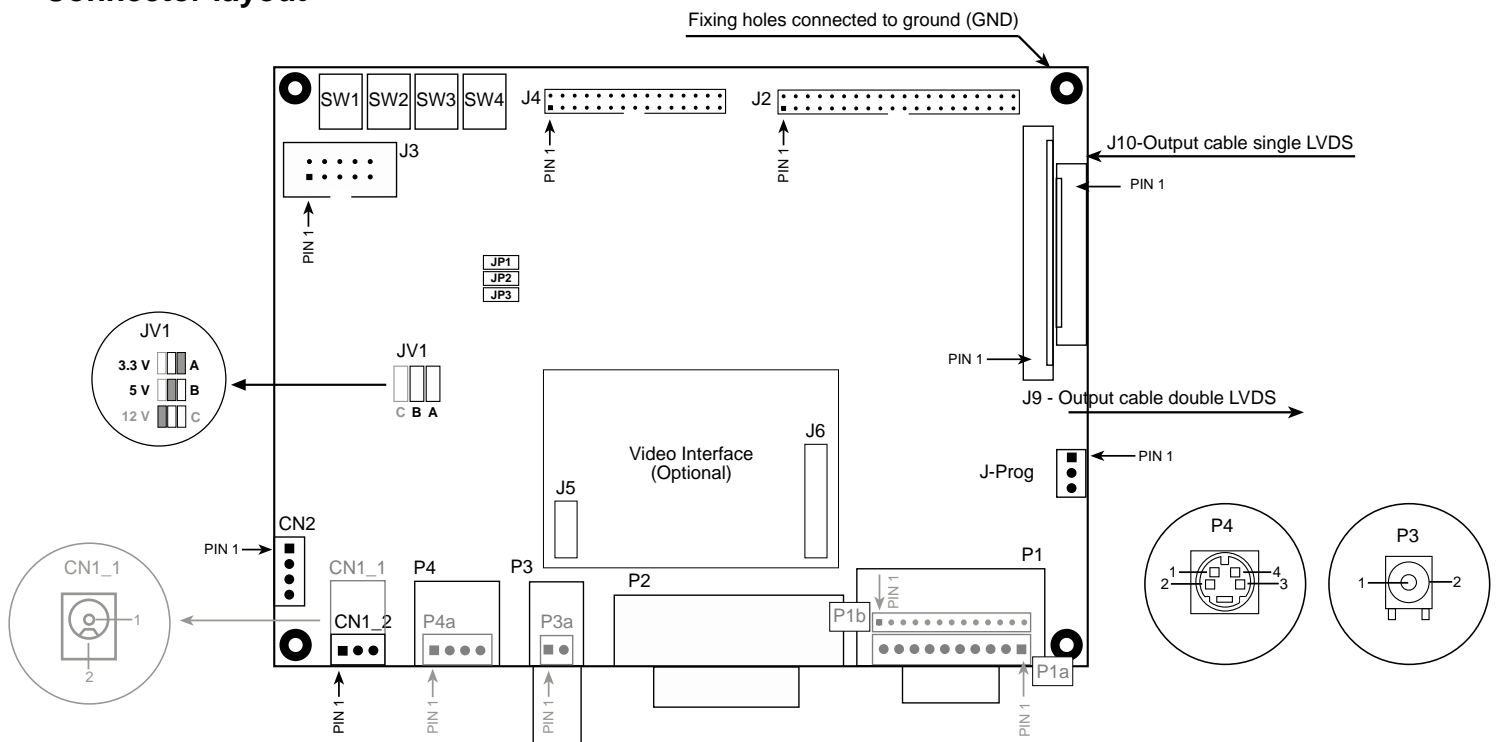
**Main specifications of available models**

Modello			Inputs / Connectors				Max resolution TFT		Outputs / TFT Connectors			LVDS Bit Ord.	
			VGA P1	DVI-I P2	CVBS P3	S.Video P4	1024x768	1280x1024	TTL J2	LVDS J10	LVDS J9	A normal standard	B Jeida standard
EPX-L	10*	TTL	•				•		•				
	15												
EPX-L	10*	L18/L19	•				•			•		•	
		L24/L25	•				•			•			
	15	J24/J25	•				•			•		•	
EPX-L	15	L48/L49	•					•			•		
		J48/J49	•					•			•	•	
EPX-L	20	TTL	•	•			•		•		•		
		L18/L19	•	•			•			•		•	
		L24/L25	•	•			•			•		•	
		J24/J25	•	•			•			•		•	
		L48/L49	•	•				•			•	•	
		J48/J49	•	•				•			•	•	
EPX-L	30	TTL	•		•		•		•		•		
		L18/L19	•		•		•			•		•	
		L24/L25	•		•		•			•		•	
		J24/J25	•		•		•			•		•	
		L48/L49	•		•			•			•	•	
		J48/J49	•		•			•			•	•	
EPX-L	35	TTL	•		•	•	•		•				
		L18/L19	•		•	•	•			•		•	
		L24/L25	•		•	•	•			•		•	
		J24/J25	•		•	•	•			•		•	
		L48/L49	•		•	•		•			•	•	
		J48/J49	•		•	•		•			•	•	
EPX-L	40	TTL	•	•	•	•	•		•				
		L18/L19	•	•	•	•	•			•		•	
		L24/L25	•	•	•	•	•			•		•	
		J24/J25	•	•	•	•	•			•		•	
		L48/L49	•	•	•	•		•			•	•	
		J48/J49	•	•	•	•		•			•	•	

\* The 10 version CANNOT be used to feed 5V panels and/or inverters.

- Code Description
- TTL Output TTL 18/24 bit
- L18 Output single LVDS Jeida standard 18 bit
- L19 Output single LVDS Jeida standard 18 bit + selection bit
- L24 Output single LVDS normal standard 24 bit
- L25 Output single LVDS normal standard 24 bit + selection bit
- J24 Output single LVDS Jeida standard
- J25 Output single LVDS Jeida standard + selection bit
- L48 Output double LVDS normal standard
- L49 Output double LVDS normal standard + selection bit
- J48 Output double LVDS Jeida standard
- J49 Output double LVDS Jeida standard + selection bit

**Connector layout**



**Connectors description**

SYMBOL	DESCRIPTION	MODEL	CORRESPONDING
CN1_2	Power supply	Conn. 3 pin male 2.54 mm	Molex 22-01-3037
CN1_1	Power supply optional	DC power Jack - A = 2.1 x 5.5 / B = 2.5 x 5.5	DC Plug male
CN2	Inverter power supply	Conn. 4 pin male 2.54 mm	Molex 22-01-3047
P1	Input VGA signals	Conn. D-sub female 15 pin	Mini D_Sub15 male
P1a	Input VGA signals optional	Conn. 10 pin male 2.54 mm	Molex 22-01-3107
P1b	Input VGA signals optional	Conn. 13 pin male 2.00 mm	Female JST S3B-PH
P2	Input DVI-I signals	Jack DVI-I	Female Plug DVI-I
P3	Input CVBS signals	Jack RCA	Female Plug RCA
P3a	Input CVBS signals optional	Conn. 2 pin male 2.54 mm	Molex 22-01-3027
P4	Input S.Video signals	Jack Mini DIN-4	Female Plug Mini DIN-4
P4a	Input S.Video signals optional	Conn. 4 pin male 2.54 mm	Molex 22-01-3047
J-Prog	Serial port	Conn. 3 pin male 2 mm	Female JST S3B-PH
J2	Digital output TTL 8 bit	Conn. 40 pin IDC male 2 mm	Female IDC
J3	Output external GUI	Conn. 10 pin IDC male 2.54 mm	Female IDC
J4	Digital output TTL 8 bit dual pixel clock	Conn. 30 pin IDC male 2 mm	Female IDC
J9	Output LVDS - Double channel	Conn. HRS - DF14 - 30 pin	HRS DF14-30S Female
J10	Output LVDS - Single channel	Conn. HRS - DF14 - 20 poli	HRS DF14-20S Female
JV1	Selection TFT power supply	Pin strip 2 x 3 pin 2.54 mm	Jumper passo 2.54 mm
JP1/JP3	Selection range inverter backlight	Pin strip 2 x 3 pin 2.54 mm	Jumper passo 2.54 mm
J5 / J6	Predisposition Video Interface	Conn. 2 x 5 / 2 x 10 pin female 2 mm	

**Descrizione tasti**

SW1	Key menu selection
SW2	Key increase +
SW3	Key decrement -
SW4	Key exit

**Inputs - Outputs**

## CN1 - Power supply

PIN	SYMBOL
1	+ 12 V. DC
2	GND
3	GND

## CN1a - Power supply optional

PIN	SYMBOL
1	+ 12 V. DC
2	GND

## CN2 - Inverter power supply - control

PIN	SYMBOL
1	VCC 12 V. Inverter power Max 2 A
2	GND
3	On / Off control
4	Dimmer Adjustment

## P1 - Input VGA signals

PIN	SYMBOL
1	RED
2	GREEN
3	BLUE
4	N.C.
5	GND
6	GND
7	GND
8	GND
9	N.C.
10	GND
11	N.C.
12	DDC_DAT
13	Horizontal Sync
14	Vertical Sync
15	DDC_CLOCK

## P1a - Input VGA signals optional

PIN	SYMBOL
1	RED
2	GND
3	GREEN
4	GND
5	BLUE
6	GND
7	GND
8	Horizontal Sync
9	GND
10	Vertical Sync

## P2 - Input DVI-I signals

PIN	SYMBOL
1	DATA 2-
2	DATA 2+
3	GND
4	N.C.
5	N.C.
6	DDC_CLK
7	DDC_DATA
8	A_V SYNC
9	DATA 1-
10	DATA 1+
11	GND
12	N.C.
13	N.C.
14	+ 5 V.
15	GND
16	H_PLUG_DET
17	DATA 0-
18	DATA 0+
19	GND
20	N.C.
21	N.C.
22	GND
23	CLK +
24	CLK -
C1	A_RED
C2	A_GREEN
C3	A_BLU
C4	A_H SYNC
C5	GND

## P3 - Input CVBS signals

PIN	SYMBOL
1	GND
2	CVBS 75 Ohm

## P3a - Input CVBS signals optional

PIN	SYMBOL
1	GND
2	CVBS 75 Ohm

**Inputs - Outputs**

## P4 - Input S.VIDEO signals

PIN	SYMBOL
1	CHROMA
2	LUMA
3	GND
4	GND

## P4a - Input S.VIDEO signals optional

PIN	SYMBOL
1	CHROMA
2	GND
3	GND
4	LUMA

## J-Prog - Serial port

PIN	SYMBOL
1	TX (Conn. at pin 3 of DB9 of PC)
2	RX (Conn. at pin 2 of DB9 of PC)
3	GND (Conn. at pin 5 of DB9 of PC)

## J3 - Output external GUI

PIN	SYMBOL
1	Led Red (IRRCVR)
2	Led Green
3	Key STD_BY
4	Key SW1
5	Key SW2
6	Key SW3
7	key SW4
8	Key SW5 Selection inputs
9	+5 V.
10	GND

## JV1 - Selection TFT power supply

PIN	SYMBOL
A	GND
B	VCC Panel 5 V.
C	VCC Panel 12 V. optional

## SW5 - Selection inputs

PIN	SYMBOL
1	GND
2	Selection inputs

**Jumper Backlight**

## JP1 / JP3 Setting range Backlight

JP1	JP2	JP3	Range Backlight MAX - MIN
			Range A: MAX 0 V. - MIN 3.3 V.
•			Range B: MAX 3.3 V. - MIN 0 V.
	•		Range C: MAX 0 V. - MIN 2.5 V.
•	•		Range D: MAX 1.9 V. - MIN 1.5 V.
		•	Range E: MAX 0 V. - MIN 3.0 V.
•		•	Range F: MAX 2.5 V. - MIN 0 V.
	•	•	Range G: MAX 1.2 V. - MIN 2.5 V.
•	•	•	Reserved



**Pin\_out TTL panels**

J2 - Digital output 8 bit

PIN	SIGNAL
1	SCL
2	SDA
3	ENAB
4	H Sync
5	V Sync
6	CLK
7	GND
8	RE0
9	RE1
10	RE2
11	RE3
12	GND
13	RE4
14	RE5
15	RE6
16	RE7
17	GND
18	GE0
19	GE1
20	GE2
21	GE3
22	GND
23	GE4
24	GE5
25	GE6
26	GE7
27	GND
28	BE0
29	BE1
30	BE2
31	BE3
32	GND
33	BE4
34	BE5
35	BE6
36	BE7
37	GND
38	VCC pan
39	VCC pan
40	VCC 3.3

J4 - Dig. output 8 bit dual pixel

PIN	SIGNAL
1	RO0
2	RO1
3	RO2
4	RO3
5	GND
6	RO4
7	RO5
8	RO6
9	RO7
10	GND
11	GO0
12	GO1
13	GO2
14	GO3
15	GND
16	GO4
17	GO5
18	GO6
19	GO7
20	GND
21	BO0
22	BO1
23	BO2
24	BO3
25	GND
26	BO4
27	BO5
28	BO6
29	BO7
30	GND

**Pin\_out LVDS panels single / dual channel**

J10 - Output LVDS single channel

PIN	SYMBOL
1	PNL PWR
2	PNL PWR
3	GND
4	GND
5	A0 -
6	A0 +
7	GND
8	A1 -
9	A1 +
10	GND
11	A2 -
12	A2 +
13	GND
14	CLK1 -
15	CLK1 +
16	GND
17	A3 -
18	A3 +
19	GND
20	GND

J9 - Output LVDS dual channel

PIN	SYMBOL
1	GND
2	GND
3	CLK2 +
4	CLK2 -
5	A7 +
6	A7 -
7	A6 +
8	A6 -
9	A5 +
10	A5 -
11	A4 +
12	A4 -
13	GND
14	GND
15	A3 +
16	A3 -
17	CLK1 +
18	CLK1 -
19	A2 +
20	A2 -
21	A1 +
22	A1 -
23	A0 +
24	A0 -
25	GND
26	GND
27	PNL PWR
28	PNL PWR
29	PNL PWR
30	PNL PWR

**LVDS type A data order**

Even LVDS Data assignment  
Single / Dual channel

Signal	LVDS
RE0	A0-
RE1	
RE2	
RE3	
RE4	
RE5	
GE0	A0+
GE1	
GE2	
GE3	
GE4	
GE5	
BE0	A1-
BE1	
BE2	
BE3	
BE4	
BE5	
H Sync	A1+
V Sync	
ENAB	
RE6	
RE7	
GE6	
GE7	A2-
BE6	
BE7	
CLK	CLK1- CLK1+

Odd data assignment  
Dual channel

Signal	LVDS
RO0	A4-
RO1	
RO2	
RO3	
RO4	
RO5	
GO0	A4+
GO1	
GO2	
GO3	
GO4	
GO5	
BO0	A5-
BO1	
BO2	
BO3	
BO4	
BO5	
H Sync	A5+
V Sync	
ENAB	
RO6	
RO7	
GO6	
GO7	A6-
BO6	
BO7	
CLK	CLK2- CLK2+

Input Odd or Even data depending on the display position on the LCD

**LVDS type B data order - JEIDA standard**Even LVDS Data assignment  
Single / Dual channel

Signal	LVDS
RE2	A0-
RE3	
RE4	
RE5	
RE6	
RE7	
GE2	
GE3	A1-
GE4	
GE5	
GE6	
GE7	
BE2	
BE3	
BE4	A2-
BE5	
BE6	
BE7	
H Sync	
V Sync	
ENAB	
RE0	A3-
RE1	
GE0	
GE1	
BE0	
BE1	
CLK	CLK1- CLK1+

Odd data assignment  
Dual channel

Signal	LVDS
RO2	A4-
RO3	
RO4	
RO5	
RO6	
RO7	
GO2	
GO3	A5-
GO4	
GO5	
GO6	
GO7	
BO2	
BO3	
BO4	A6-
BO5	
BO6	
BO7	
H Sync	
V Sync	
ENAB	
RO0	A7-
RO1	
GO0	
GO1	
BO0	
BO1	
CLK	CLK2- CLK2+

Input Odd or Even data depending on the display position on the LCD

## GUI (Graphical user interface) use

- Press the SW1 key to display the GUI
- Press SW2 - SW3 to select the required menu
- Press SW1 to confirm the menu
- Press SW2 - SW3 to select the required submenu
- Press SW1 to confirm the submenu
- Press SW2 - SW3 to carry out the desired adjustments
- Press SW4 to deselect the menu/submenu and exit the GUI

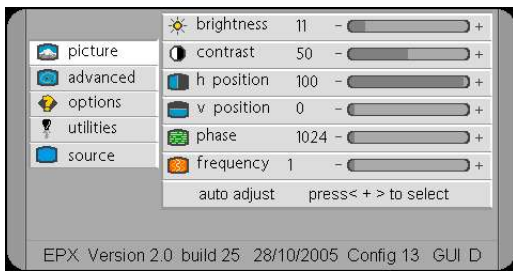
If there is no signal, it is only possible to access the Options and Utilities menus

## GUI Quick menu



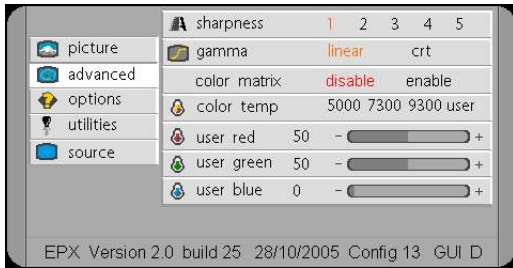
- Press SW2 - SW3 to display the Contrast/brightness fast menus
- Press SW1 to change the fast menu
- Press SW2 - SW3 to carry out the desired adjustments

GUI organisation with RGB graphic inputs



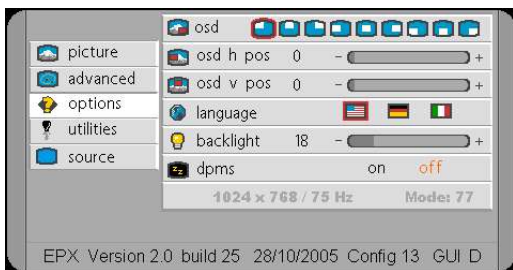
Menu Picture

- **Brightness** : adjusts the brightness
- **Contrast** : adjusts the contrast
- **H position** : adjusts the horizontal image shift
- **V position** : adjust the vertical image shift
- **Phase** : adjusts the phase
- **Frequency** : adjusts the horizontal frequency
- **Auto adjust** : (normally carried out automatically when the board is first switched on or whenever there is a format change)



Menu Advanced

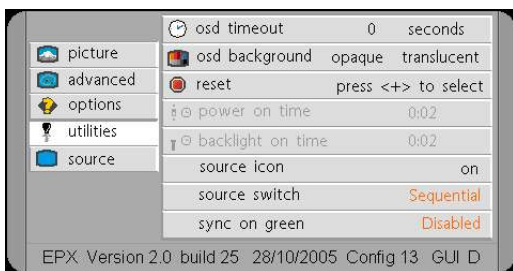
- **Sharpness** : adjusts the image definition
- **Gamma** : sets the range correction between linear and CRT
- **Color matrix** : enables or disables the possibility of changing the colour temperature
- **Color temp** : adjusts the colour temperature to default setting
- **User red/green/blue** : adjusts the temperature for each individual colour (function enabled only when Color matrix is selected)



Menu Options

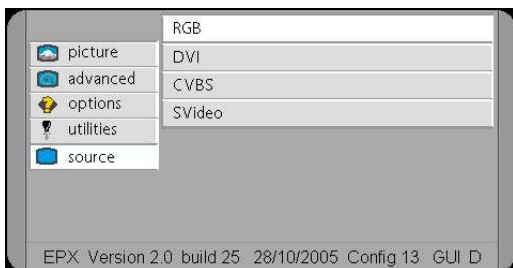
- **Osd** : chooses from 9 OSD positions (On-Screen-Display)
- **Osd h pos** : adjusts the horizontal OSD shift
- **Osd v pos** : adjusts the vertical OSD shift
- **Language** : selects the OSD language
- **Backlight** : adjusts the bulb intensity
- **Dpms** : allows you to disable the sleeping function\*
- **Mode** : indicates the resolution, the vertical frequency and the displayed mode number

\* this function allows the controller to enter energy saving mode after a time lapse of more than 15 seconds without an input signal



Menu Utilities

- **Osd timeout** : selects the OSD display time
- **Osd background** : make the OSD semitransparent/opaque
- **Reset** : reconfigures default parameters
- **Power on time** (optional) : allows the controller usage time to be stored
- **Backlight on time** (optional) : allows the bulb usage time to be stored
- **Source icon** : allows you to disable the selected input icon
- **Source switch\*\*** : selects the type of input switching
  - Sequential : RGB-CVBS-S.Video switching sequentially when the SW5 key is pressed on the external GUI keypad
  - CVBS / S.Video : CVBS with SW5 open - S.Video with SW5 closed
  - CVBS / HD15 : CVBS with SW5 open - RGB with SW5 closed
- **Sync on green** : enables synchronisation to green



Menu Source

- Allows you to select the input type to display among the available ones

\*\* This function is only present on models with RGB/video inputs

## GUI organisation with VIDEO inputs



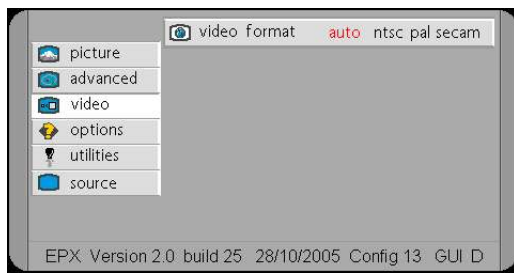
### Menu Picture

- **Brightness** : adjusts the brightness
- **Contrast** : adjusts the contrast
- **H position** : adjusts the horizontal image shift
- **V position** : adjust the vertical image shift
- **Color** : adjusts the percentage of color
- **Tint** : compensates the NTSC tint errors
- **Sharpness** : adjusts the image definition



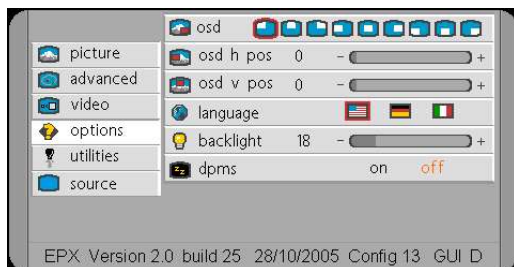
### Menu Advanced

- **Sharpness** : adjusts the image definition
- **Gamma** : sets the range correction between linear and CRT
- **Color matrix** : enables or disables the possibility of changing the colour temperature
- **Color temp** : adjusts the colour temperature to default setting
- **User red / green / blue** : adjusts the temperature for each individual colour (function enabled only when Color matrix is selected)



### Menu Video

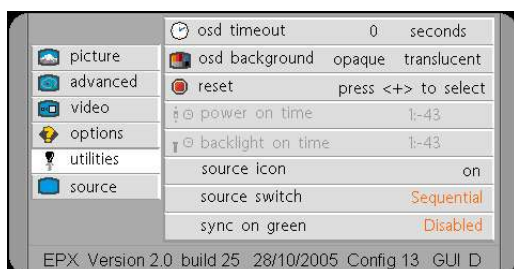
- **Video format** : selects video standard colour coding recognition
- **Sharpness** : adjusts the image definition
- **Gamma** : sets the range correction between linear and CRT
- **Color matrix** : enables or disables the possibility of changing the colour temperature
- **Color temp** : adjusts the colour temperature to default setting
- **User red/green/blue** : adjusts the temperature for each individual colour (function enabled only when Color matrix is selected)



### Menu Options

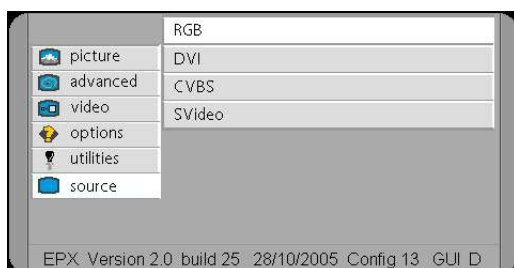
- **Osd** : chooses from 9 OSD positions (On-Screen-Display)
- **Osd h pos** : adjusts the orizontal OSD shift
- **Osd v pos** : adjusts the vertical OSD shift
- **Language** : selects the OSD language
- **Backlight** : adjusts the bulb intensity
- **Dpms** : allows you to disable the sleeping function\*

\* this function allows the controller to enter energy saving mode after a time lapse of more than 15 seconds without an input signal



### Menu Utilities

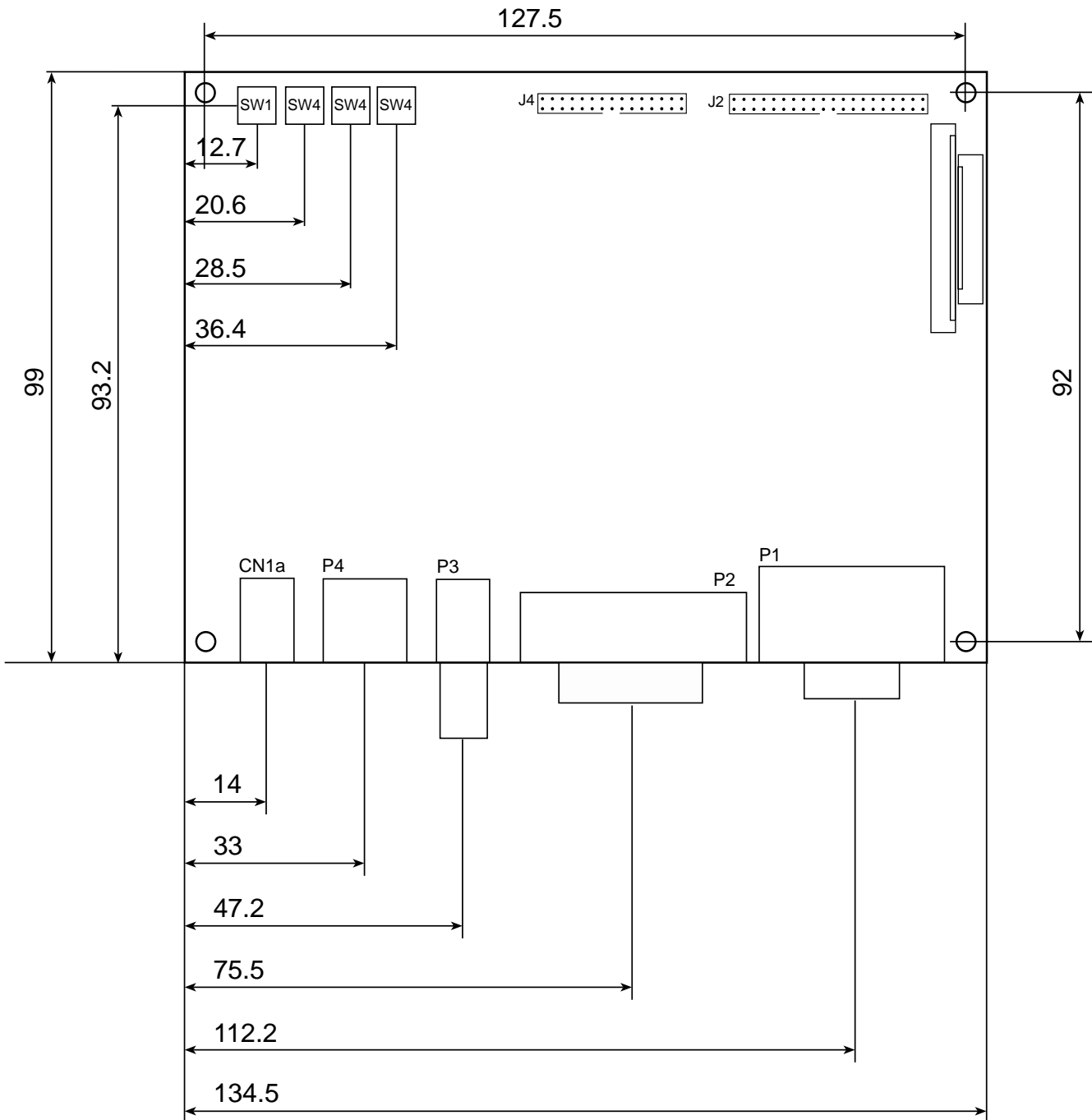
- **Osd timeout** : selects the OSD display time
- **Osd background** : make the OSD semitransparent/opaque
- **Reset** : reconfigures default parameters
- **Power on time** (optional) : allows the controller usage time to be stored
- **Backlight on time** (optional) : allows the bulb usage time to be stored
- **Source icon** : allows you to disable the selected input icon
- **Source switch** : selects the type of input switching  
Sequential : RGB-CVBS-S.Video switching sequentially when the SW5 key is pressed on the external GUI keypad  
CVBS / S.Video : CVBS with SW5 open - S.Video with SW5 closed  
CVBS / HD15 : CVBS with SW5 open - RGB with SW5 closed
- **Sync on green** : enables synchronisation to green



### Menu Source

- Allows you to select the input type to display among the available ones

Clearance



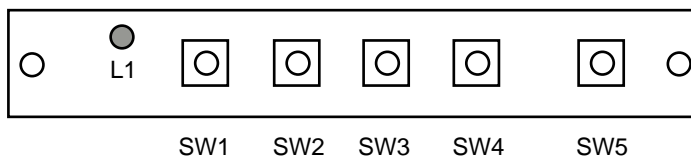
- 3.2 mm fixing hole diameter
- 15 mm maximum height (including video interface)



**External GUI keypad**

Models	Available keys				
	SW1	SW2	SW3	SW4	SW5
<b>EPX-OSD304</b>	•	•	•	•	
<b>EPX-OSD305</b>	•	•	•	•	•

Standard cable length 300 mm.



DESCRIPTION  
 SW1 - Menu selection key  
 SW2 - Increase key +  
 SW3 - DecreaseKey -  
 SW4 - Exit Key  
 SW5 - Select inputs Key (optional)  
 L1 - Warning LED (red)

**External GUI keypad clearance**

