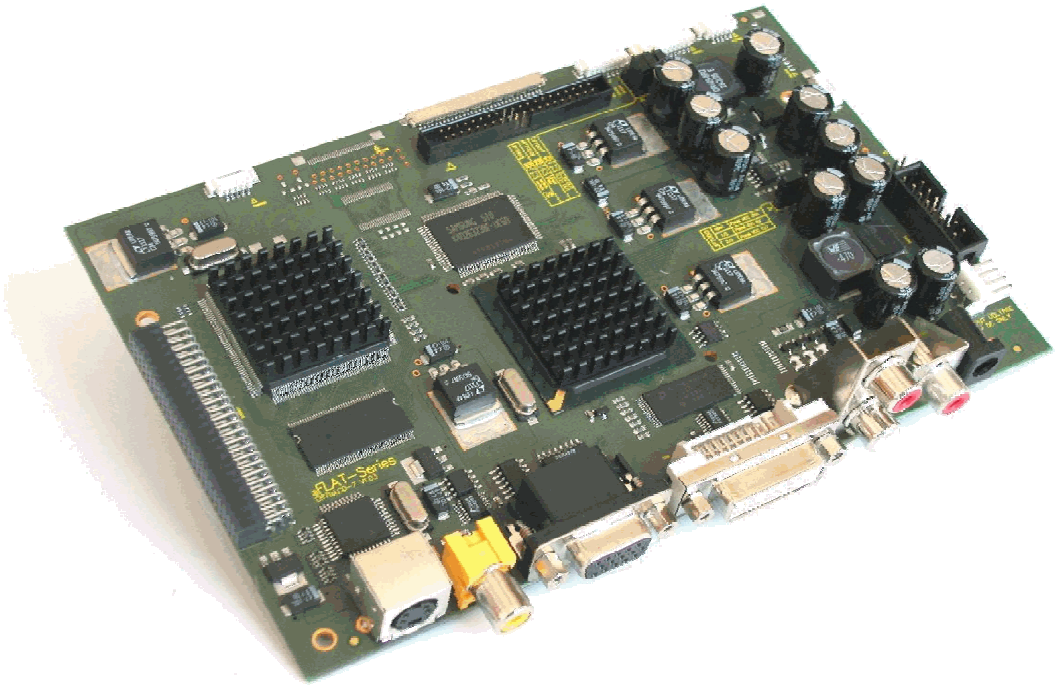
aFLAT-series

Flat Panel Controller

CRT*to*LCD-7



kontron

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General information and important notes

1.1 User Information

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For the circuits, descriptions and tables indicated no responsibility is assumed as far as patents or other rights of third parties are concerned.
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1.4 Warranty

Each board is carefully and thoroughly tested before being shipped. If, however, problems should occur during the operation, please check your user specific settings of all boards included in your system. This is often the source of the fault. If a board is defective, it can be sent to your supplier for repair. Please take care of the following steps:

- The board returned should correspond to the factory default settings since a test is only possible under these settings.
- In order to repair your board as fast as possible, we require some additional information from you. Please fill out the attached Repair Form and include it with the defective board.
- If possible, the board will be upgraded to the latest version without additional cost.
- Upon receipt of the board, please be aware that your user specific settings are changed during the test.

Within the guarantee, the repair is free as long as the guarantee conditions were kept. If no fault has been found, you will be charged with the test cost due to the high test expenditure. Repairs outside of the guarantee will be charged.
This Kontron Embedded Modules product is warranted against defects in material and workmanship for our guaranteed warranty period from the date of shipment. During the warranty period, Kontron Embedded Modules will, at its option, either repair or replace products which prove to be defective.
For warranty service or repair, the product must be returned to a service facility designated by Kontron Embedded Modules.
The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance or handling by buyer, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper installation or maintenance.
Kontron Embedded Modules will not be responsible for any defects or damages due to a faulty Kontron Embedded Modules product other than the products supplied by Kontron Embedded Modules.

2. Introduction

The CRTtoLCD-7 is a highly integrated TFT panel interface controller, which allows an easy adaptation of standard video input sources like S-video, composite video, DVI or analog RGB to a digital TFT panel. The CRTtoLCD-7 only needs one single 12V power supply and incorporates all needed functionality to build up a full featured TFT monitor. The card generates the necessary power sequencing for the flat screen. The highly flexible architecture of the CRTtoLCD-7 panel interface allows adapting nearly any available TFT panel. Therefore a variety of panel adapters and programming are available on request.

Technical Information Summary

Features
- Zoom and shrink scaling (all resolutions from VGA to WUXGA)
- Frame rate conversion
- Integrated 8-bit triple-channel ADC / PLL
- Integrated Ultra-Reliable DVI™ receiver
- Optional Integrated High-bandwidth Digital Content Protection (HDCP)
- On-chip versatile OSD engine
- All system clocks synthesized from a single external crystal
- Programmable gamma correction (CLUT)
- RealColor™ technology provides flesh tone adjustment
- Optional TV-Tuner-Extension board

Analog RGB Input Port
- Supports up to 165MHz (up to UXGA 60Hz and WUXGA 60Hz reduced blanking)
- Support for Sync-on-Green (SOG)
- Can be used as a YUV Input

Ultra-Reliable DVI™ Receiver
- Single link on-chip TMDS Rx up to 160 MHz operation
- Direct connect to all DVI compliant TMDS transmitters
- Optional High-bandwidth Digital Content Protection (HDCP)

NTSC,PAL or SECAM input

- VIDEO DECODER WITH S-VIDEO AND COMPOSITE VIDEO INPUT CAPABILITIES

Output Format
- Support for 8 or 6-bit panels (with high quality dithering)
- One or two pixel output format
- Double Channel LVDS or 18bit TTL Output

Auto-Configuration / Auto-Detection
- Phase and image positioning
- Input format detection
- Compatibility with all graphic cards and standard VESA modes

Frame Store Interface
- 16 MB DDR-SDRAM Frame buffer

On-chip OSD Controller
- Bit-mapped OSD capability - 12 24-bit colors tiles
- Horizontal and vertical stretch of OSD images

RealColor™ Technology
- Color filtering in YUV domain
- Digital brightness, contrast, hue and saturation control for analog, digital and video inputs
- Proprietary flesh tone adjustment

Operating Modes
- Frame rate conversion and scaling of images
- Bypass mode with no filtering and/or frame buffering
- 1:1 centering
- De-interlaced zoom
- Frame Sync and Free Run display synchronization modes

High-Quality Advanced Scaling
- Fully programmable zoom/shrink ratios
- Independent horizontal / vertical zoom and shrink
- Variable sharpness control
- Moire cancellation
- Adjustable scaling algorithms

Genesis FLI2310 Digital Video Format Converter
- High quality conversion of digital video formats
- Adaptive Motion Deinterlacing powered by *Faroudja*
- Motion Adaptive Noise Reduction
- **DCDi™** two dimensional vector interpolation to improve quality of interlaced video formats

Display Interface Features :
- Control signal generation for backlight inverter
- backlight dimming support (PWM and voltage controlled)
- Voltage generation and power sequence control for panel
- Flat screens can be used with either 3.3V, 5V or 12V.
- JILI30/40 (LVDS) and FLEX32 (digital) panel interface (one and double port up to 24 Bit)

Operating Features:
- 5 button user interface (OSD Keypad)
- On Screen Display (OSD) control for all features
- Full multi sync capable
- VESA DPMS and DDC2B support
- Single voltage supply (+12V DC)
- Dynamic Power Management for minimal power consumption via DPMS
- No software drivers needed!

3. Configuration

3.1 Panel Vcc configuration JP7000

Use JP700 to control Panel Vcc			
Connector Double Row 2,54 mm, 3 Contacts, Gold plated Case/Size : Vertical, Through Hole			
1 2 3 Pin	**1-2**	**2-3**	**open**
JP7000 **O O O** **Never unplug/replug this while in use!**	5V **default**	12V	3,3V

3.2 Backlight adjust configuration JP7001

Use JP7001 to control Backlight adjust Voltage			
Connector Double Row 2,54 mm, 3 Contacts, Gold plated Case/Size : Vertical, Through Hole			
1 2 3 Pin	**1-2**	**2-3**	**Delivery Default**
JP7001 **O O O**	5V **Never unplug/replug this while in use!**	12V	1-2 closed 5V

3.3 Backlight Mode configuration JP7002

Use JP7002 to control Backlight Mode PWM/Linear			
Connector Double Row 2,54 mm, 3 Contacts, Gold plated Case/Size : Vertical, Through Hole			
1 2 3 Pin	**1-2**	**2-3**	**Delivery Default**
JP7002 **O O O**	Linear **Never unplug/replug this while in use!**	PWM	1-2 closed Linear

3.4 Backlight ON/OFF configuration JP7003

Use JP7003 to control polarity of backlight ON/OFF			
Connector Double Row 2,54 mm, 3 Contacts, Gold plated Case/Size : Vertical, Through Hole			
1 2 3 Pin	**2-3**	**1-2**	**Delivery Default**
JP7003 O O O	/ON **Never unplug/replug this while in use!**	ON	1-2 closed ON

4. Connectors

4.1 DC Power Supply 4-Pol. CN200

Apply operating voltage using connector CN200 4 Contact Connector, Single Row, Right Angle, Polarization, Through hole			
	Pin	**Name**	**Description**
0 0 0 0	1 2 3 4	NC GND GND +12V	Not connected Power Groundl Power Ground 12V DC Power

4.2 DC Power Supply DC-Jack CN201 or CN201-1

Apply operating voltage using connector CN201/CN201-1 DC POWER JACK, Case/Size : PCB-Mount 2mm Pin Diameter			
	Pin	**Name**	**Description**
0 0	1 2	+12V GND	+12 V DC Power Ground

4.3 VGA/RGB analog Input CN300

High Density Sub-D-Connector 15 Contacts, Receptacle Case/Size : Right Angle, Through Hole			
	Pin	**Name**	**Description**
0	1	RED	Analog input red
0	2	GREEN	Analog Input Green
0	3	BLUE	Analog Input Blue
0	4	ID2	Not Connected
0	5	GND	Analog Ground
0	6	GND	Analog Ground Red
0	7	GND	Analog Ground Green
0	8	GND	Analog Ground Blue
0	9	DDC_5V	+5V Power Supply from Video Card
0	10	GND	Analog Ground
0	11	IDO	Not Connected
0	12	DDC_SDA	DDC Serial Data
0	13	HSYNC	Horizontal Sync input
0	14	VSYNC	Vertical Sync input
0	15	DDC_SCL	DDC Serial Clock

4.4 YUV analog input CN4001/CN4002

3x Chinch Red , Green, Blue Case/Size : Right Angle, Through Hole			
	Pin	**Name**	**Description**
0	1	BLUE	Analog input Pb
0	2	RED	Analog input Pr
0	3	GND	Analog GroundPB/ Pr
0	4	GREEN	Analog input Y
0	5	GND	Analog Ground Y

4.5 DVI input connector CN6

This input supports the connection of DVI capable video cards and supports resolutions from 640x480 up to 1920x1200.

Connector Double Row 2,54 mm, 10 Contacts, Gold plated
Case/Size : Vertical, Through Hole

Description	Name	Pin		Pin	Name	Description
Receiver Signal(-) (RX2-)	RX2-	1	0 0	2	RX2+	Receiver Signal(+) (RX2+)
Power Ground	GND	3	0 0	4	NC	Not connected
Not connected	NC	5	0 0	6	SCL_IN	I^2C clock
I^2C Data	SDA_IN	7	0 0	8	NC	Not connected
Receiver Signal(-) (RX1-)	RX1-	9	0 0	10	RX1+	Receiver Signal(+) (RX1+)
Power Ground	GND	11	0 0	12	NC	Not connected
Not connected	NC	13	0 0	14	+5V	+5V DC from DVI video card
Power Ground	GND	15	0 0	16	HP	Hot Plug
Receiver Signal(-) (RX0-)	RX0-	17	0 0	18	RX0+	Receiver Signal(+) (RX0+)
Power Ground	GND	19	0 0	20	NC	Not connected
Not connected	NC	21	0 0	22	GND	Power Ground
Clock Signal(+) (RXC+)	RXC+	23	0 0	24	RXC-	Clock Signal(-) (RXC-)
Not connected	NC	C1	0 0	C2	NC	Not connected
Not connected	NC	C3	0 0	C4	NC	Not connected
Power Ground	GND	C5	0 0	C5_1	GND	Power Ground

4.6 SVHS Video Input CN12

This input converts NTSC, PAL or SECAM in S-video to digitized component video

	Pin	Name	Description
0 0 0 0	1	GND	Power Ground
	2	GND	Power Ground
	3	Y	Y component of video signal
	4	C	C component of video signal

4.7 Composite video input CN13

This input converts NTSC, PAL or SECAM in composite video to digitized component video.				
Chinch Connector, Right Angle, Yellow				
		Pin	**Name**	**Description**
CN13	0 0	1 2	GND CVBS	Power Ground CVBS Video Signal

4.8 IR input CN1001

This input connects a IR Receiver with the board				
3 Contact Connector, Single Row, Straight, through hole				
		Pin	**Name**	**Description**
CN1001	0 0 0	1 2 2	VCC GND Out	5 Volts output Power Ground Output from the IR receiver

4.9 OSD keypad connector CN102

14 Contacts boxed IDC Connector, double row, Straight, through hole					
Description	**Name**	**Pin**	**Pin**	**Name**	**Description**
+5V DC Power	VCC	1	2	LED	LED Enable (Operating)
Confirm Key (TTL)	KEY	3	4	KEY	OSD Menu key (TTL)
Down Key (TTL)	KEY	5	6	KEY	Up Key (TTL)
ADC Input ***Note1**	ADC_IN	7	8	IR	Output of IR receiver
Switch LED (TTL)	KEY	9	10	KEY	ON/OFF Key (TTL)
Low active Reset (TTL)	/Reset	11	12	+12V	+12V DC Power
Power Ground	GND	13	14	GND	+5V DC from DVI video card

Note1: Input range is 0 - 3V

4.10 OSD keypad connector CN1003

Connector: Molex 53261-1471
Matching Connector: Molex 51021-1400
Connector Single Row, 14 contacts, Case/Size : Right Angle, 1,25mm Pitch

Pin	Name	Description
1	LED2	LED Red (3.3V output)
2	LED1	LED Green (3.3V output)
3	GND	Key Power Ground
4	KEY	Key Button (POWER)
5	GND	Key Power Ground
6	KEY	Key Button (Menu)
7	KEY	Key Button (Right)
8	NC	Not Connected
9	NC	Not Connected
10	KEY	Key Button (Left)
11	KEY	Key Button (Exit)
12	KEY	Key Button (AUTOADJUST)
13	GND	Power Ground
14	VDD	+3.3V Keypad Power Out

4.11 Serial OSD connector CN1002

The OSD (On Screen Display) can be controlled either trough the keypad or the serial connector CN1002 for configuration purposes or mass production. See also chapter 1.5 and chapter 1.9 for detailed description.

Caution! The transmit and receive signals have RS232C level and are crossed!

10 Contacts boxed IDC Connector, double row, straight, through hole

Description	Name	Pin	Pin	Name	Description
Not Connected	NC	1	2	NC	Not Connected
Transmit Signal	COM_TXD	3	4	NC	Not Connected
Receive Signal	COM_RXD	5	6	NC	Not Connected
Not Connected	NC	7	8	NC	Not Connected
Power Ground	GND	9	10	+5VY	+5V DC Power

4.12 JILI40-Interface CN800

All flat screen signals are LVDS compatible						
Connector Double Row 2mm, 40 Contacts, Gold plated Case/Size : Straight, Through Hole						
Description	**Name**	**Pin**		**Pin**	**Name**	**Description**
Enables Backlight	BLON#	1	0 0	2	BLON#	Enables Backlight
Backlight Adjust	BLADJ	3	0 0	4	STX3+	Even Receiver Signal(+) (R2IN 3+)
Even Receiver Signal(-) (R2IN 3-)	STX3-	5	0 0	6	+12V	+12V
Even Clock Signal(+) (CK2IN +)	STXC+	7	0 0	8	STXC-	Even Clock Signal(-) (CK2IN -)
+12V	+12V	9	0 0	10	STX2+	Even Receiver Signal(+) (R2IN 2+)
Even Receiver Signal(-) (R2IN 2-)	STX2-	11	0 0	12	+12V	+12V
Even Receiver Signal(+)(R2IN1+)	STX1+	13	0 0	14	STX1-	Even Receiver Signal(-) (R2IN 1-)
+12V	+12V	15	0 0	16	STX0+	Even Receiver Signal(+) (R2IN 0+)
Even Receiver Signal(-) (R2IN 0-)	STX0-	17	0 0	18	+12V	+12V
Odd Receiver Signal(+)(R1IN 3+)	FTX3+	19	0 0	20	FTX3-	Odd Receiver Signal(-) (R1IN 3-)
Power Ground	GND	21	0 0	22	GND	Power Ground
I^2C clock	DDCSCL	23	0 0	24	DDCSDA	I^2C Data
Power Ground	GND	25	0 0	26	FTXC+	Odd Clock Signal(+) (CK1IN +)
Odd Clock Signal(-) (CK1IN -)	FTXC-	27	0 0	28	GND	Power Ground
Odd Receiver Signal(+)(R1IN 2+)	FTX2+	29	0 0	30	FTX2-	Odd Receiver Signal(-) (R1IN 2-)
Power Ground	GND	31	0 0	32	FTX1+	Odd Receiver Signal(+) (R1IN 1+)
Odd Receiver Signal(-) (R1IN 1-)	FTX1-	33	0 0	34	GND	Power Ground
Odd Receiver Signal(+)(R1IN 0+)	FTX0+	35	0 0	36	FTX0-	Odd Receiver Signal(-) (R1IN 0-)
Power Ground	GND	37	0 0	38	GND	Power Ground
Panel VCC (switched)	Vcc_P	39	0 0	40	Vcc_P	Panel VCC (switched)

4.13 JILI30-Interface CN7000

All JILI (**J**UMP*tec* **I**ntelligent **L**VDS **I**nterface) signals are LVDS compatible.					
Fine Wire, 30 Contacts, single row, Right Angle, Series : JAE-FI-X30H					
Description	**Name**	**Pin**	**Pin**	**Name**	**Description**
Odd Receiver Signal(-) (R1IN 0-)	FTX0-	1	2	FTX0+	Odd Receiver Signal(+) (R1IN 0+)
Odd Receiver Signal(-) (R1IN 1-)	FTX1-	3	4	FTX1+	Odd Receiver Signal(+) (R1IN 1+)
Odd Receiver Signal(-) (R1IN 2-)	FTX2-	5	6	FTX2+	Odd Receiver Signal(+) (R1IN 2+)
Power Ground	GND	7	8	FTXC-	Odd Clock Signal(-) (CK1IN -)
Odd Clock Signal(+) (CK1IN +)	FTXC+	9	10	FTX3-	Odd Receiver Signal(-) (R1IN 3-)
Odd Receiver Signal(+)(R1IN 3+)	FTX3+	11	12	STX0-	Even Receiver Signal(-) (R2IN 0-)
Even Receiver Signal(+)(R2IN 0+)	STX0+	13	14	GND	Power Ground
Even Receiver Signal(-)(R2IN 1-)	STX1-	15	16	STX1+	Even Receiver Signal(+) (R2IN 1+)
Power Ground	GND	17	18	STX2-	Even Receiver Signal(-) (R2IN 2-)
Even Receiver Signal(+)(R2IN 2+)	STX2+	19	20	STXC-	Even Clock Signal(-) (CK2IN -)
Even Clock Signal(+) (CK2IN +)	STXC+	21	22	STX3-	Even Receiver Signal(-) (R2IN 3-)
Even Receiver Signal(+)(R2IN 3+)	STX3+	23	24	GND	Power Ground
I²C Data	DDCSDA	25	26	DEN	Display Enable
I²C Clock	DDCSCL	27	28	Vcc_P	Panel VCC (switched)
Panel VCC (switched)	Vcc_P	29	30	Vcc_P	Panel VCC (switched)

4.14 FLEX32 CN7003

This connector directly matches through an interface cable for 31/41 pin VGA/SVGA TFT interface. All flat screen signals are LVTTL compatible (3.3V)

Flatfoil Connector 32 Contacts, Right Angle, Bottom Contact
Case/Size : 0,5mm Pitch, Series : 6210 / ZIF

Description	Name	Pin		Pin	Name	Description
Power Ground	GND	1		2	SCLK	Data clock
Latch pulse	LP	3		4	FLM	First Line Marker
Power Ground	GND	5		6	P0	Panel Data R0
Panel Data R1	P1	7		8	P2	Panel Data R2
Panel Data R3	P3	9		10	P4	Panel Data R4
Panel Data R5	P5	11		12	GND	Power Ground
Panel Data G0	P6	13		14	P7	Panel Data G1
Panel Data G2	P8	15		16	P9	Panel Data G3
Panel Data G4	P10	17		18	P11	Panel Data G5
Power Ground	GND	19		20	P12	Panel Data B0
Panel Data B1	P13	21		22	P14	Panel Data B2
Panel Data B3	P15	23		24	P16	Panel Data B4
Panel Data B5	P17	25		26	GND	Power Ground
Data Enable	MOD (DE)	27		28	PANEL_VCC	Panel Power
Panel Power	PANEL_VCC	29		30	R/L	Right/Left
Up/Down rotate	U/D	31		32	NC	Not connected

4.15 Backlight Connector CN7001

Connector: Molex 53261-1071
Matching Connector: Molex 51021-1000
Connector Single Row, 10 Contacts, Case/Size : Right Angle, 1,25mm Pitch

Pin	Name	Description
1	BLON	**BACKLIGHT CONTROL SIGNAL (TTL, REFER TO JP7003)**
2	GND	Power Ground
3	GND	Power Ground
4	Backlight power supply	**TYPICAL. +12V (NOTE SAME AS DC INPUT VOLTAGE , 1 AMPERE PER CONTACT ALLOWED)**
5	Backlight power supply	
6	Backlight power supply	
7	Backlight power supply	
8	GND	Power Ground
9	GND	Power Ground
10	BKLTADJ	analog 0V to +5V or 0V to +12V (refer to JP7001)

4.16 Backlight Connector CN7002

Connector: Molex 53261-0790 Matching Connector: Molex 51021-0700			
Connector Single Row, 7 Contacts, Case/Size : Right Angle, 1,25mm Pitch			
	Pin	**Name**	**Description**
O O O O O O O	**1** **2** **3** **4** **5** **6** **7**	NC BKLTADJ GND Backlight power supply Backlight power supply GND BLON	Not connected analog 0V to +5V or 0V to +12V (refer JP7001) Power Ground Typ. +12V (Note same as DC Input Voltage , 1Amp. Per Contact allowed) Power Ground Backlight control signal (TTL, refer to JP7003) Polarity settings

4.17 GPIO Connector CN 8000

Connector: Molex 53261-0590 Matching Connector: Molex 51021-0500			
	Pin	**Name**	**Description**
O O O O O	**1** **2** **3** **4** **5**	DVD3.3 GND GPIO0 GPIO1 PWM3	3.3 Volt output source (max.50mA) Ground General Purpose I/O General Purpose I/O PWM Outputsignal

4.18 Extension Connector CN8001

Connector Triple Row 2mm, 75 Contacts, Gold plated
Case/Size : Right Angle, Through Hole
For add-on cards (e.g. TVtoLCD)
Additional Information on Request

4.19 ADC Input Connector CN1000 (Light Sensor Input)

Connector: Molex 53261-0590 Matching Connector: Molex 51021-0500			
	Pin	**Name**	**Description**
O O O O O	**1** **2** **3** **4** **5**	GND ADC1 DVDD3.3 ADC2 GND	Power Ground ADC1 Input ***Note1*** 3.3 Volt output source (max.50mA) ADC2 Input ***Note1*** Power Ground

Note1: Input range is 0 - 3V. Onboard pulled up to DVDD3.3 through 4, 7 KΩ resistor.

5. On Screen Display

With the OSD (On Screen Display) you can modify the settings and control the special features of the CRT*to*LCD-7. The OSD uses a number of menus for making changes and turning the special features on or off. The configuration can be done via the OSD-keypad (OSD-Panel-Kit).

To start the OSD press the "OSD" button on the keypad, after switching the power supply on. If a valid flat panel configuration is installed, the OSD Main Menu will be displayed.

To select an menu point, simply use the button "UP" or "DOWN" to move the cursor to the menu point you want and press the button "OSD". To get back to the previous menu point press the "CONFIRM" button.

To select a function, simply use "OSD"-button to select the field.
Use "UP" or "DOWN" to select a value for that field. With the "CONFIRM" button you can exit the current function.

5.1 Main Menue

The OSD always starts with the "Main Menu"-screen.



figure 1: Main Menu

5.2 Input Select

In the “Input Select” menu the sources for the “Main Picture Channel” and for the “PIP” (picture in picture) can be selected.

5.2.1 Input Select - Main Picture Channel



figure 2: Input Select - Main Picture Channel

For the “Main Picture Channel” every possible input source can be selected (VGA, Component, DVI, S-Video, Composite Video, Tuner).

5.2.2 Input Select - Scan Inputs



figure 3: Input Select - Scan Inputs

When “Scan inputs” is switched on the system is continously monitoring all inputs for input signals. The “Main Picture Channel” will be switched to the input that is active at first.

5.2.3 Input Select - PIP Mode



When the “PIP Mode” is activated all options for the “PIP” are available in the menu. There are 2 possible settings for the “PIP”. When the “Picture in Picture”-Mode is selected the “PIP”-video signal will be shown in a window. When “Side by Side” is selected the “Main Picture Channel” and the “PIP Channel” are shown side by side in the same fixed size.

figure 4: Input Select - PIP Mode

5.2.4 Input Select - PIP Channel



For the “PIP Channel” any video source, except the video source that is selected for the “Main Picture Channel”, can be selected.

figure 5: Input Select - PIP Channel

5.2.5 Input Select - PIP Size



Three different window sizes for the “PIP Mode” can be selected (small, medium and large).

figure 6: Input Select - PIP Size

5.2.6 Input Select - PIP hor. Position



The horizontal position of the “PIP” can be set from 0 (left margin) to 100 (right margin).

figure 7: Input Select - PIP hor. Position

5.2.7 Input Select - PIP ver. Position



The vertical position of the “PIP” can be set from 0 (upper margin) to 100 (bottom margin).

figure 8: Input Select - PIP ver. Position

5.2.8 Input Select - Swap Main & PIP



By pressing “Swap Main & PIP” the input signals for the “Main Picture Channel” and the “PIP Channel” are switched.

figure 9: Input Select - Swap Main & PIP

5.3 Image Adjustments

In this section several adjustments of the image position and timing for the “Main Picture Channel”can be made. The settings made in this section don´t affect the “PIP”.

5.3.1 Image Adjustments - Auto Adjust



When the “Auto Adjust” function is selected the system tries to adjust the image (clock, phase, bandwith and position) automatically.

figure 10: Image Adjustments - Auto Adjust

5.3.2 Image Adjustments - Clock



The pixel clock for the “Main Picture Channel” is set here.

figure 11: Image Adjustments - Clock

5.3.3 Image Adjustments - Phase



The phase of the display can be set for the “Main Picture Channel” here.

figure 12: Image Adjustments -Phase

5.3.4 Image Adjustments - Bandwith



The bandwith of the display can be set for the “Main Picture Channel” here.

figure 13: Image Adjustments -Bandwith

5.3.5 Image Adjustments - Hor. Position



The “horizontal Position” of the picture can be set for the “Main Picture Channel” here.

figure 14: Image Adjustments –Hor. Position

5.3.6 Image Adjustments - Ver. Position



The “vertical Position” of the picture can be set for the “Main Picture Channel” here.

figure 15: Image Adjustments –Ver. Position

5.4 Color Adjustment

In this section the color of the picture can be optimized for the “Main Picture Channel”. The settings made in this section don´t affect the “PIP” This section is also only available when VGA is selected as “Main Picture Channel”

5.4.1 Color Adjustment – Brightness



The “Brightness” can be set from 0 (dark) to 100 (light) for the “Main Picture Channel”. The default value is 50.

figure 16: Color Adjustment - Brightness

5.4.2 Color Adjustment – Contrast



The contrast level for the "Main Picture Channel" is set here. The range of adjustment is 0 (very low contrast) to 100 (very high contrast). The default vaule is 50.

figure 17: Color Adjustment - Contrast

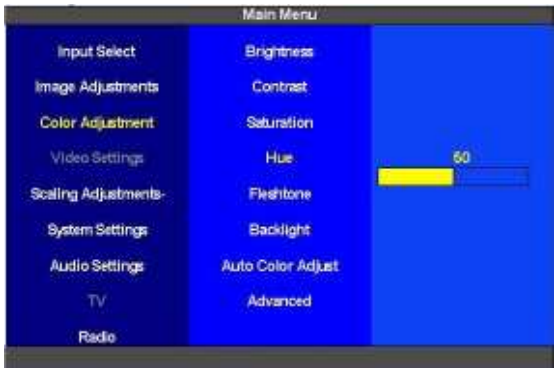
5.4.3 Color Adjustment – Saturation



The color saturation level for the "Main Picture Channel" is set here. The range of adjustment is 0 (low color saturation) to 100 (high color saturation). The dafault vaule is 50.

figure 18: Color Adjustment -Saturation

5.4.4 Color Adjustment – Hue



The hue level for the "Main Picture Channel" is set here. The range of adjustment is 0-100. The default vaule is 50.

figure 19: Color Adjustment - Hue

5.4.5 Color Adjustment – Fleshtone



The “Fleshtone” for the “Main Picture Channel” can be selected here. The range of adjustment is 0 to 3. The dafault vaule is 0.

figure 20: Color Adjustment - Fleshtone

5.4.6 Color Adjustment – Backlight



The backlight brightness for the “Main Picture Channel” is set here. The range of adjustment is 0 (bright backlight) to 100 (dark backlight). The dafault vaule is 25.

figure 21: Color Adjustment - Backlight

5.4.7 Color Adjustment - Auto Color Adjust



The “Auto Color Adjust” function automatically adjusts the colors for the “Main Picture Channel”.

figure 22: Color Adjustment – Auto Color Adjustment

5.5 Advanced Color Adjustment



The “Advanced Color Adjustment” comprises gamma, color space and the color temperature settings. The rates for the 3 fundamental colors can also be set within the “Advanced Color Adjustment”-menu. The “Advanced Color Adjustment” only effects the “Main Picture Channel”.

figure 23: Color Adjustment – Advanced

5.5.1 Color Adjustment – Advanced – Gamma



The gamma correction for the “Main Picture Channel” is set here. It can be turned of (default) or set from 1.8 (bright) to 2.6 (darker) in 0.2 steps.

figure 24: Color Adjustment – Advanced - Gamma

5.5.2 Color Adjustment – Advanced –Color Space



This section is implemented to select the correct “Color Space” for the “Main Picture Channel” (RGB, YUV or YPbPr).

figure 25: Color Adjustment – Advanced – Color Space

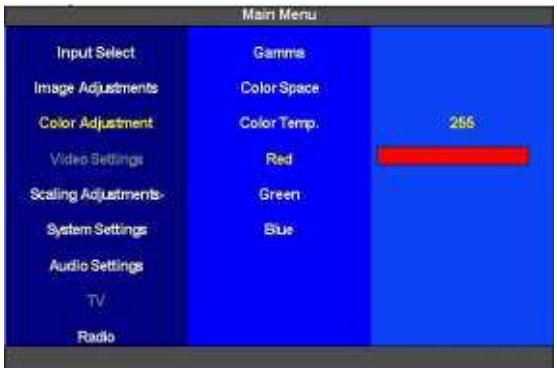
5.5.3 Color Adjustment – Advanced – Color Temp.



To adjust the "Color Temperature" 6 different values can be selected for the "Main Picture Channel"(4200K, 5000K, 5400K, 6500K, 7500K, 9300K). When the "Color Temperature" is set to "User" the color temperature is adjusted by the 3 fundamental colors.

figure 26: Color Adjustment – Advanced – Color Temp.

5.5.4 Color Adjustment – Advanced – Red



The rate of red for the "Main Picture Channel" is set here. The range of adjustment is 0 to 255. The default value is 255.

figure 27: Color Adjustment – Advanced - Red

5.5.5 Color Adjustment – Advanced – Green



The rate of green for the "Main Picture Channel" is set here. The range of adjustment is 0 to 255. The default value is 255.

figure 28: Color Adjustment – Advanced - Green

5.5.6 Color Adjustment – Advanced – Blue



The rate of red for the "Main Picture Channel" is set here. The range of adjustment is 0 to 255. The default value is 255.

figure 29: Color Adjustment – Advanced - Blue

5.6 Video Settings

The "Video Settings" are available when a video source is selected as "Main Picture Channel" (S-Video, Composite Video or TV-Tuner).

5.6.1 Video Settings – Motion Processing



The type of "Motion Processing" is defined here. When "Motion Processing" is set to 0 it is switched off. The default value is 3.

figure 30: Video Settings – Motion Processing

5.6.2 Video Settings – Sharpness



The “Sharpness” of the video signal is set here. The range of adjustment is -15 to 29. The dafault vaule is 0.

figure 31: Video Settings – Sharpness

5.6.3 Video Settings – Film Mode



The “Film Mode” can be switched on or off here. As dafault the film mode is turned on.

figure 32: Video Settings – Film Mode

5.6.4 Video Settings – Noise Reduction



The level of “Noise Reduction” is set here. The range of adjustment is 0 to 6. The default value is 2.

figure 33: Video Settings – Noise Reduction

5.6.5 Video Settings – Mpeg Processing



The level for the “Mpeg Processing” is set here. The range of adjustment is 0 to 15. The default vaulue is 0.

figure 34: Video Settings – Mpeg Processing

5.7 Video Settings – Decoder Settings



In this section several settings for the “Video Decoder” can be set.

figure 35: Video Settings – Decoder Settings

5.7.1 Decoder Settings – Video Brightness



The level for the “Video Brightness” is set here. The range of adjustment is 0 to 100. The default value is 50.

figure 36: Decoder Settings – Video Brightness

5.7.2 Decoder Settings – Video Contrast



The level for the "Video Contrast" is set here. The range of adjustment is 0 to 100. The default value is 50.

figure 37: Decoder Settings – Video Contrast

5.7.3 Decoder Settings – Video Saturation



The level for the "Video Saturation" is set here. The range of adjustment is 0 to 100. The default value is 50.

figure 38: Decoder Settings – Video Saturation

5.7.4 Decoder Settings – Video Hue



The level for the "Video Hue" is set here. The range of adjustment is 0 to 100. The default value is 50

figure 39: Decoder Settings – Video Hue

5.7.5 Decoder Settings – Video Sharpness



The level for the "Video Sharpness" is set here. The range of adjustment is 0 to 7. The default vaulue is 0.

figure 40: Decoder Settings – Video Sharpness

5.8 Video Settings – CRTtoLCD7 multimedia

5.8.1 Video Settings – Motion Processing (CRTtoLCD7 multimedia)



The "Motion Processing" mode is set here. The user has the choice between "Full Motion Processing", "Adaptive Motion Processing" or "No Motion Processing". As default the "Motion Processing" is turned to "Adaptive Motion Processing".

figure 41: Video Settings – Motion Processing (CRTtoLCD7 multimedia)

5.8.2 Video Settings – Film Mode (CRTtoLCD7 multimedia)



The "Film Mode" is set here. The "Film Mode" can be switched on or off here. As default the Film Mode is turned off.

figure 42: Video Settings – Film Mode (CRTtoLCD7 multimedia)

5.8.3 Video Settings – Enhancer (CRTtoLCD7 multimedia)



The “Enhancer” is configured here. It can be switched either on or off. As default the “Enhancer” is turned on.

figure 43: Video Settings – Enhancer (CRTtoLCD7 multimedia)

5.8.4 Video Settings – Sharpness (CRTtoLCD7 multimedia)



The level for the “Sharpness” is set here. The range of adjustment is 0 to 50. The default value is 20.

figure 44: Video Settings – Sharpness (CRTtoLCD7 multimedia)

5.8.5 Video Settings – Cross Color (CRTtoLCD7 multimedia)



The “Cross Color” is set here. It can be switched on or off. As default “Cross Color” is turned on.

figure 45: Video Settings – Cross Color (CRTtoLCD7 multimedia)

5.8.6 Video Settings – Noise Reduction (CRTtoLCD7 multimedia)



The level for the "Noise Reduction" is set here. Three different levels of "Noise Reduction" can be selected (Low, Medium, High) or it can be set to automatic "Noise Reduction". The default value is "Auto".

figure 46: Video Settings – Noise Reduction (CRTtoLCD7 multimedia)

5.8.7 Video Settings – Decoder Settings (CRTtoLCD7 multimedia)

The "Decoder Settings" for the multimadia version of the CRTtoLCD7 are the same as shown in chapter 5.7.

5.8.8 Video Settings – Ext. Deinterlacer (CRTtoLCD7 multimedia)



The "External Deinterlacer" is set here. It can be switched either on or off. As default the "External Deinterlacer" is turned "On".

figure 47: Video Settings – Ext. Deinterlacer (CRTtoLCD7 multimedia)

5.9 Scaling Adjustment

In this section the picture of the “Main Picture Channel” can be scaled.

5.9.1 Scaling Adjustment – Scaling Mode



The “Scaling Mode” for the “Main Picture Channel” is set here. As default the “Main Picture Channel” is set to “Expand”. There are three more possible settings for the “Main Picture Channel”. The picture can be set to “Strech”, “Aspect” or “1:1”.

figure 48: Scaling Adjustment – Scaling Mode

5.9.2 Scaling Adjustment – Picture Flip



In this section the picture of the “Main Picture Channel” can be mirrored horizontal or vertical.

figure 49: Scaling Adjustment – Picture Flip

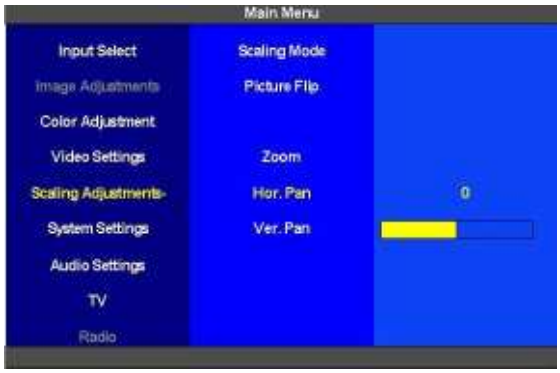
5.9.3 Scaling Adjustment – Zoom



In this section the “Zoom” for the picture of the “Main Picture Channel” is set. The level of adjustment is 0 to 302. The dafault value is 0 (no zoom).

figure 50: Scaling Adjustment – Zoom

5.9.4 Scaling Adjustment – Hor. Pan



In this section the “Horizontal Pan” (position of the display detail) is set. The level of adjustment depends on the selected zoom level. The default “Horizontal Pan” is 0. When “Zoom” is set to 0 the position of the picture can not be changed here.

figure 51: Scaling Adjustment – Hor. Pan

5.9.5 Scaling Adjustment – Ver. Pan



In this section the “Vertical Pan” (position of the display detail) is set. The level of adjustment depends on the selected zoom level. The default “Vertical Pan is 0. When “Zoom” is set to 0 the position of the picture can not be changed here.

figure 52: Scaling Adjustment – Ver. Pan

5.10 System Settings

In this section some general settings for the OSD can be set.

5.10.1 System Settings – OSD Timeout



The "OSD Timeout" is set in this section. The default value for the timout is 30 seconds. The level of adjustment is 0 to 60 seconds in 5 second steps. 0 seconds stands for an infinite value. The OSD won´t be switched of when 0 is selected here.

figure 53: System Settings – OSD Timeout

5.10.2 System Settings – OSD Hor. Pos.



In this section the "Horizontal Position" of the OSD is set. The level of adjustment is 0 (left margin) to 100 (right margin). The default value is 0 (center of the Display).

figure 54: System Settings – OSD Hor. Pos.

5.10.3 System Settings – OSD Ver. Pos.



In this section the vertical position of the OSD is set. The level of adjustment is 0 (upper margin) to 100 (bottom margin). The default value is 0 (center of the Display).

figure 55: System Settings – OSD Ver. Pos.

5.10.4 System Settings – OSD Blend



In this section the level of transperency of the OSD is set. The level of adjustment is 0 (solid OSD) to 15 (clear OSD). The default value for the "OSD Blend" is 3.

figure 56: System Settings – OSD Blend

5.10.5 System Settings – OSD Orientation



In this section the "OSD Orientation" can be modified. There are three different modes for the orientation of the OSD. It can be rotated by 90°, mirrored horizontal or mirrored vertical.

figure 57: System Settings – OSD Orientation

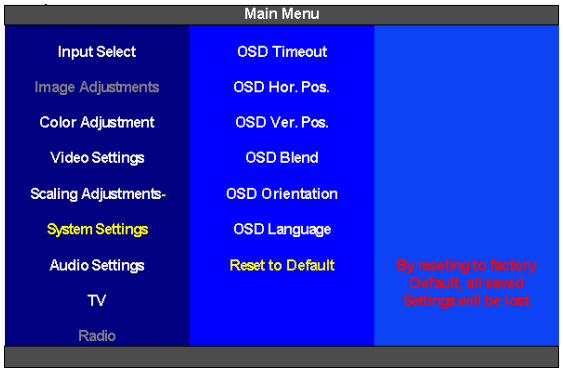
5.10.6 System Settings – OSD Language



The language of the OSD is set here. By default the language is set to English.

figure 58: System Settings – OSD Language

5.10.7 System Settings – Reset to Default



In this section the OSD can be resetted to factory defaults.

figure 59: System Settings – Reset to Default

5.11 Audio Settings

Several audio settings for the TvtoLCD can be set in this section.

5.11.1 Volume



The “Volume” can be set from 0 to 30. The default setting is 10.

figure 60: Audio Settings - Volume

5.11.2 Balance



The “Balance” for the audio output is set in this section. The balance can be set from -120 (left) to +120 (right). The default value is 0 (center).

figure 61: Audio Settings - Balance

5.11.3 Surround



The surround mode is selected in this section. As defalut the surround mode is turned off. There are two different possible surround modes (normal and spatial).

figure 62: Audio Settings - Surround

5.11.4 Loudness



The level of “Loudness” is set in this section. The loudness can be set from 0 (default) to 68 (+17dB).

figure 63: Audio Settings - Loudness

5.11.5 Pseudo Stereo



In this section the “Pseudo Stereo” effect can be set from -120 to +120. The default value for “Pseudo Stereo” is 0 (Pseudo Stereo turned off).

figure 64: Audio Settings – Pseudo Stereo

5.11.6 Mode



In this section three different audio modes can be selected. The user can choose between “Mono”, “Stereo” and “SAP” (second audio source). By default the audio mode is set to “Stereo”.

figure 65: Audio Settings - Mode

5.11.7 Equalizer



In this section the “Equalizer” can be set up. The quota of the different frequencies can be defined here. By default all values are set to a medium level.

figure 66: Audio Settings - Equalizer

5.12 TV

Several settings for the TV-Tuner can be set in this section.

5.12.1 TV - Program



In the “Program” section the user can switch between all saved programs.

figure 67: TV – Program

5.12.2 TV - Channel



In this section the channels can be scanned manually. When a channel needs to be saved as a program it can be added to the list of saved programs by selecting favourites (see chapter 5.12.6).

figure 68: TV - Channel

5.12.3 TV - Frequency



In this section the “Frequency” can be scanned manually. When a “Frequency” needs to be saved it can be added to the list of saved programs by selecting “Favourites” (see chapter 5.12.6)

figure 69: TV - Frequency

5.12.4 TV - System



In this section the different PAL norms are selected. By default the system is set to PAL B/G.

Systems with a NTSC TV-tuner are set to NTSC-M by default.

figure 70: TV - System

5.12.5 TV - Scan Channel



In the “Scan Channel” section the user can choose wether to find the previous or the next channel that has a signal on it.

figure 71: TV – Scan Channel

5.12.6 TV – Favorites



In the “Favourites” section the user can add new programs to the programlist or update the list of favourite programs with all recently found stations. The favourite programs list can also be edited (see chapter 5.12.7).

figure 72: TV – Favorite Edit Menu

5.12.7 TV – Favorite Edit Menu



In the “Favourite Edit Menu” the programs can be rearranged, deleted or renamed.

figure 73: TV – Favorite Edit Menu

5.12.8 TV - Auto install



In this section an “Auto Install” can be started. All found TV-stations will be saved to the favourites list.

figure 74: TV – Auto Install

5.13 Radio

In this section the radio can be set up. When the TV-Tuner is activated the radio settings are not available.



In this menu the radio can be turned on or off. When the radio is activated the TV-Tuner settings are not available.

figure 75: Radio

5.13.1 Radio - Station



In the “Station” section the saved radio-stations can be selected.

figure 76: Radio - Station

5.13.2 Radio - Frequency



In the “Frequency” section the frequency can be scanned manually for radio-stations.

figure 77: Radio - Frequency

5.13.3 Radio - Scan Station



In the “Scan Station” section the user can scan either for the next or for the previous radio-station automatically.

figure 78: Radio – Scan Station

5.13.4 Radio - Save Station



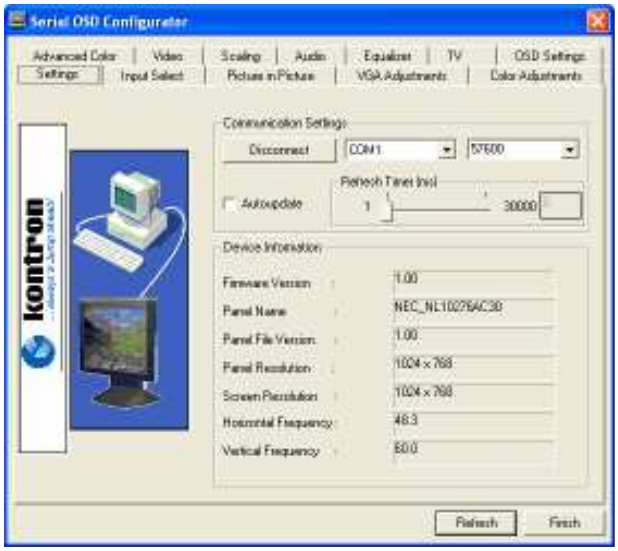
In this section the radio-stations can be saved so they are available in the “Station” menu (see chapter 5.13.1).

figure 79: Radio – Save Station

6. Serial OSD

6.1 Settings

(connection and basic information)



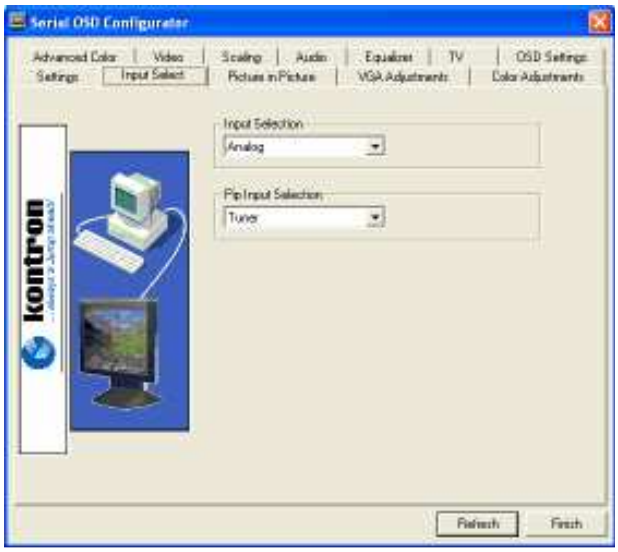
Connect / Disconnect
Let you establish or relieve connection to the CRTtoLCD-7

Auto update
Automatically refreshes OSD settings

Device Information
Shows information about the current Firmware, the Panelfile, physically resolution of the panel and let you see information about the detected input format.

6.2 Input Select

(Main and PIP default input selection)

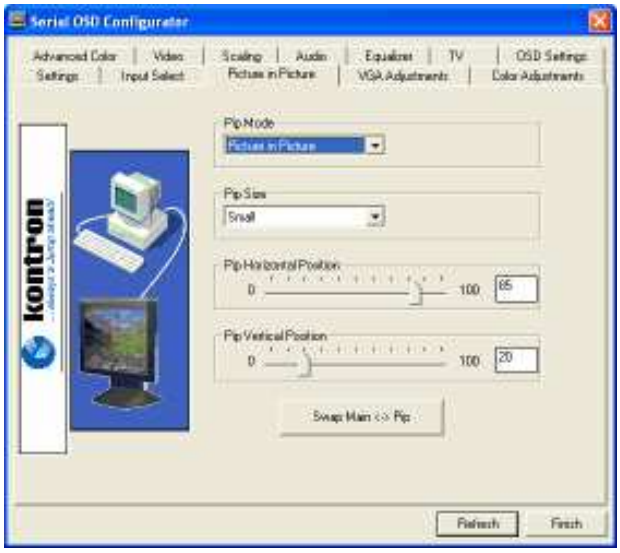


Input Selection
Select source for main input

PIP Input Selection
Select source for Picture In Picture input

6.3 Picture in Picture

(Select view, size and position of the PIP)



Pip Mode
Choose appearance of PIP-Window

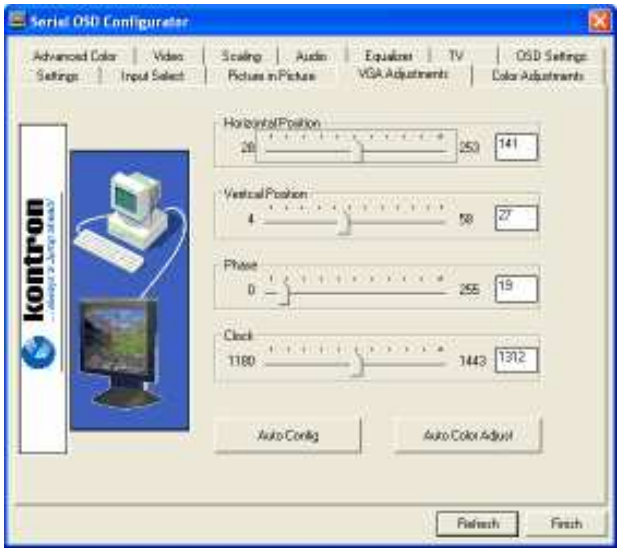
Pip Size
Select size of PIP

Pip Horizontal Position
Adjust horizontal position of PIP-Window in percent

Pip Vertical Position
Adjust horizontal position of PIP-Window in percent

6.4 VGA Adjustment

(Adjust VGA dependent settings)



Horizontal / Vertical Position
Adjust horizontal and vertical position of VGA image

Phase
Adjust phase of VGA signal

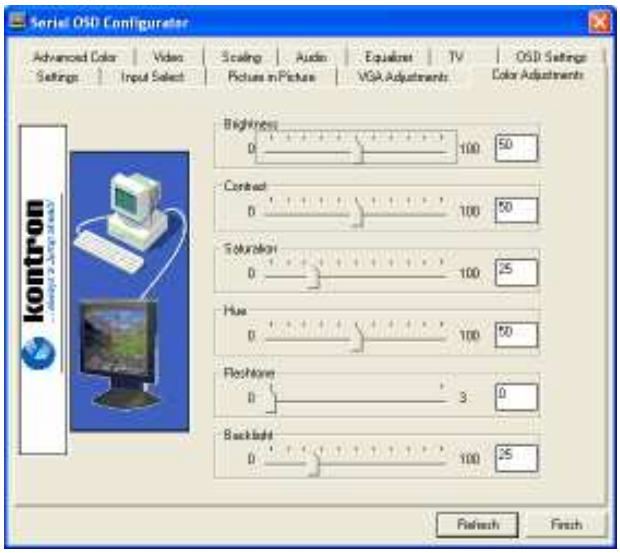
Clock
Adjust between min.and max. Clock cycle

Auto Config
Perform auto adjust

Auto Color Adjust
Perform auto color adjust

6.5 Color Adjustment

(Basic color settings for each main input)

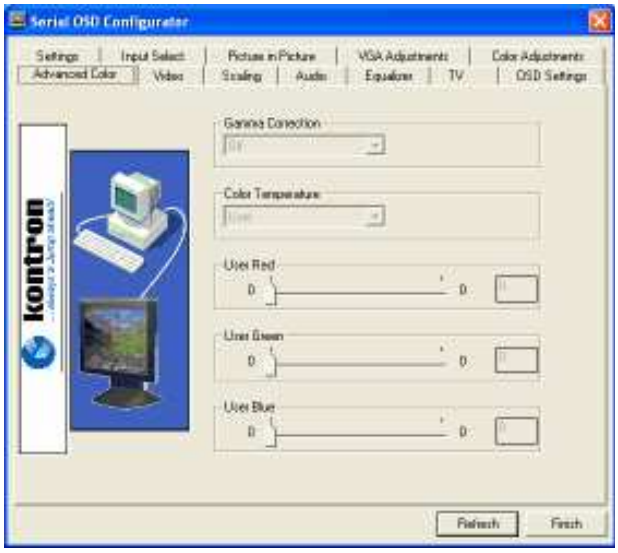


Adjustable are all necessary color settings.

These settings can be adjusted independently for each main input.

6.6 Advanced Color

(Advanced color settings for all inputs)



Gamma Correction
Select default Gamma settings

Color Temperature
Select predefined or user defined color temperature settings

User color temperature (Red/Green/Blue)
Adjust user color temperature for each color component

6.7 Video

(Define video input depending parameters for video processing)



External Deinterlacer
Switch external deinterlacer (On/Off)

Motion Processing
Select motion processing

Film Mode
Switch film mode (On/Off)

Enhancer
Switch enhancer (On/Off)

DCDi
Switch DCDi (On/Off)

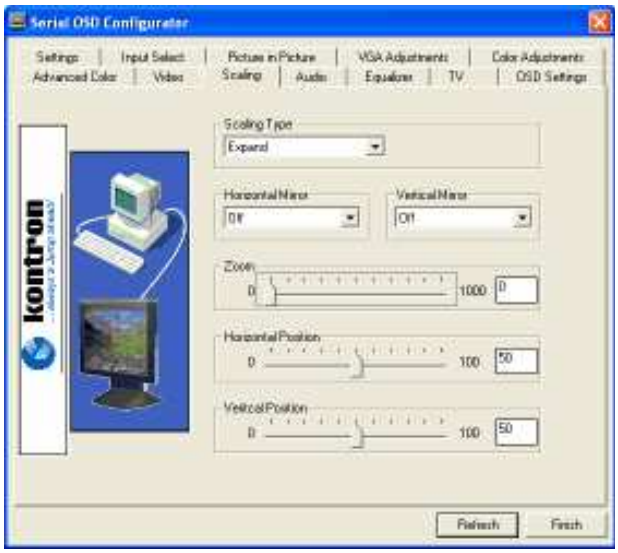
Noise Reduction
Select noise reduction

Cross Color
Switch cross color (On/Off)

Sharpness
Adjust level of sharpness

6.8 Scaling

(Adjust scaling and orientation of displayed image)



Scaling Type
Select the type of scaling

Horizontal / Vertical Mirror
Flip image horizontally and vertically

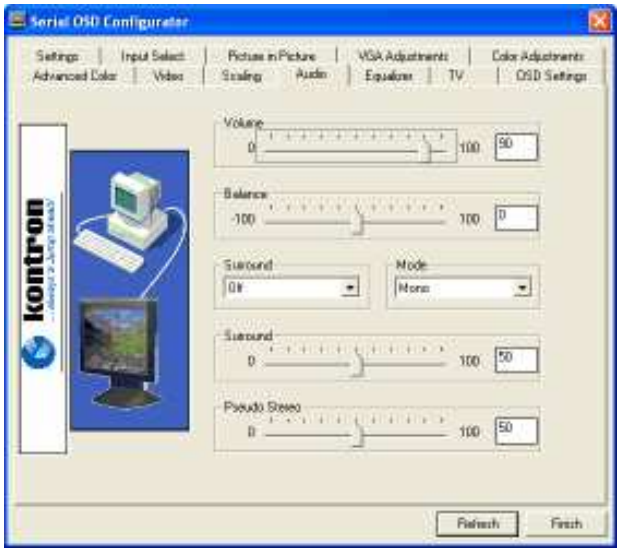
Zoom
Zooms into the image

Horizontal Position
Move clipping in horizontal position

Vertical Position
Move clipping in vertical position

6.9 Audio *

(Audio mode and volume settings)

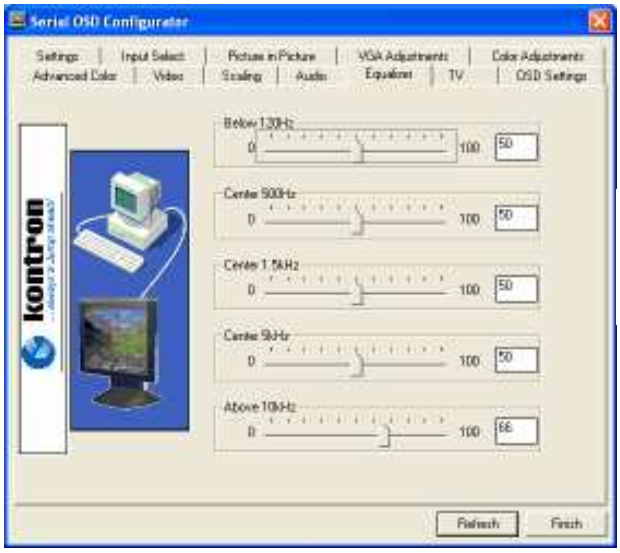


Volume
Adjust master volume
Balance
Adjust balance between left and right
Surround
Select Surround mode. If surround mode was selected, the surround effect efficiency can be adjust
Mode
Select audio output mode
Pseudo Stereo
Adjust efficiency of pseudo stereo effect

*only activated when used in combination with TV-Tuner-Extension

6.10 Equalizer *

(Basic settings for the equalizer)

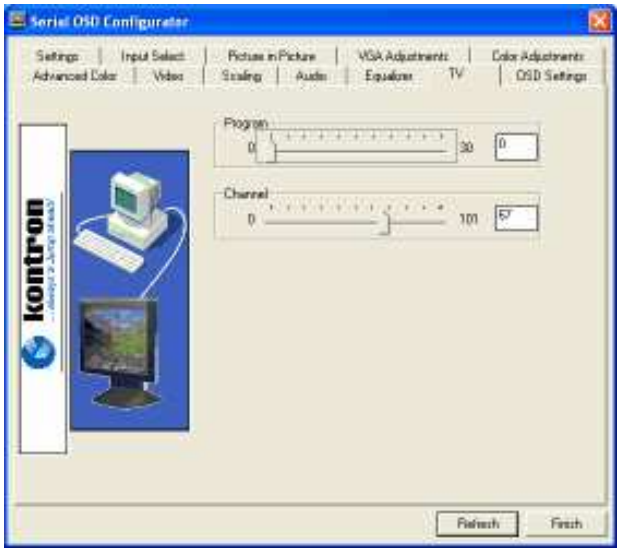


Adjustable are all necessary sound settings for the 5 band equalizer

*only activated when used in combination with TV-Tuner-Extension

6.11 TV *

(Set default program or channel for the TV-Tuner)

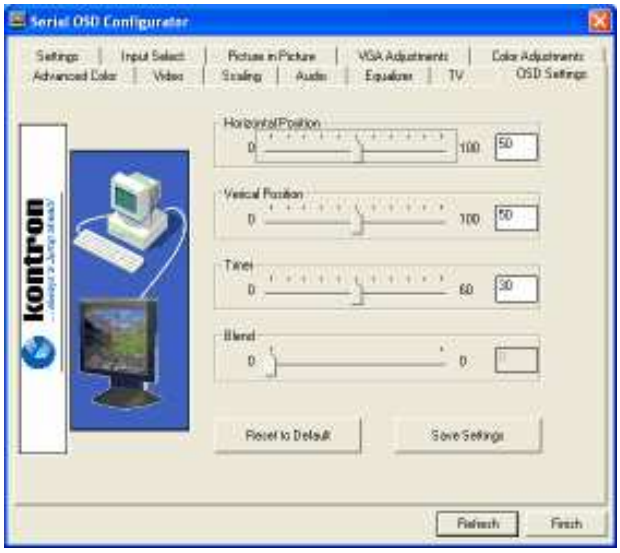


Program
Select program for the TV-Tuner

Channel
Select channel

*only activated when used in combination with TV-Tuner-Extension

6.12 OSD Settings



Horizontal / Vertical Position
Set the position of the OSD-Menu
Timer
Adjust time till the OSD-Menu will be closed if no changes were made
Blend
Adjust transparency of the OSD-Menu
Reset to Default
Do a factory reset
Save Settings
Save all settings as default OSD values to the non volatile memory

7. Technical Specifications

These values were measured with OSD-Panel attached and without flatpanel and backlight inverter.

- **Supply voltage at 25˚C :**

Minimum supply voltage	+ 11,4 V DC
Typical supply voltage	+ 12,0 V DC
Absolute Maximum supply voltage	+ 12.6 V DC

- **Typical Input current at 25˚C:**

CRT*to*LCD-7- OSD-keypad, input signal SXGA:	680mA
CRT*to*LCD-7- OSD-keypad, power down:	380mA

- **Supply voltage ripple:** 100 mV peak to peak 0 – 20 MHz

VGA connector signals :	
Sync input voltage low :	0.8 V
Sync input voltage high:	2.4 V
RGB input voltage:	0 – 0.7 V with 75 Ohm external termination
RGB input current:	0 – 5 mA

- **Current Rating of Flatpanel Power supply:**

PANEL VCC Steady State 3V / 5V and 12V @ +-5% : 3A
PANEL VCC 5sec. -5% 3V3 @5,6A
PANEL VCC 5sec. -5% 5V @ 5,15A
PANEL VCC 5sec. -2% 12V @ 4A
Note: Output power without any switch or short circuit breaker

- **Current Rating of the output circuits:**

Direct +12V Output voltage without any switch or short circuit breaker
CN7001: Maximum output current 4A
CN7002: Maximum output current 2A

- **Temperature:**

ambient:	0˚C – 60˚C (*1)
non operating:	-10˚C – 85˚C

(*1) The maximum operating temperature is the maximum measurable temperature on any spot on the module surface. It is the user responsibility to keep this temperature within the above specification.

- **Temperature gradient:**

operating:	25˚C per hour
non operating:	40˚C per hour

- **Relative Humidity:**

operating:	10% - 90% RH non-condensing
non operating:	5% - 95% RH non-condensing

- **Mechanical:**

Shock:	5G/20ms square wave maximum
Vibration:	1G/0-600Hz, dwell not to exceed

- **Dimensions of the printed circuit board:**

Width:	114.29 mm
Length:	179.07 mm
Thickness:	1.50 mm

- **Dimensions of the module:**

Width:	119.50 mm
Length:	179.07 mm
Height:	16.50 mm max. 35mm

Note : The dimension of the module may vary depending on P/N or change if cable, Adapter or Keypad plugged in!

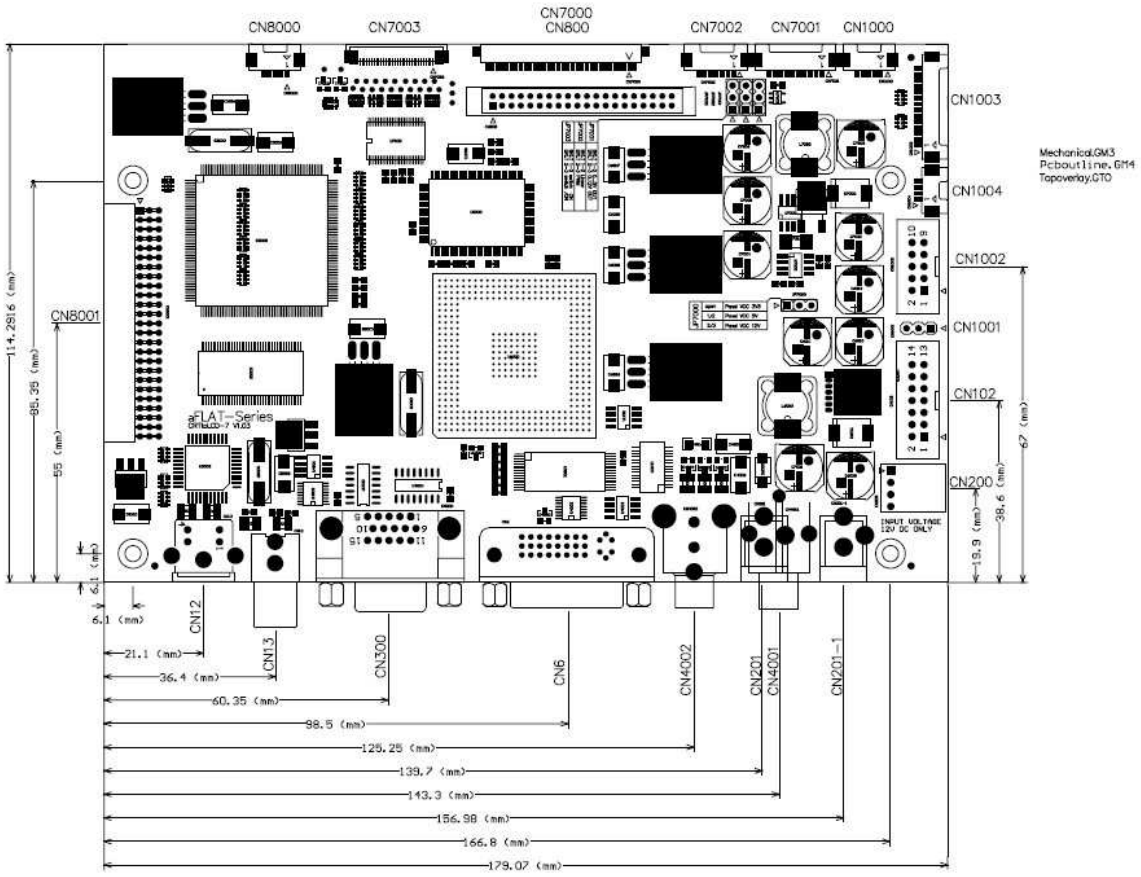
8. Supported Video Modes

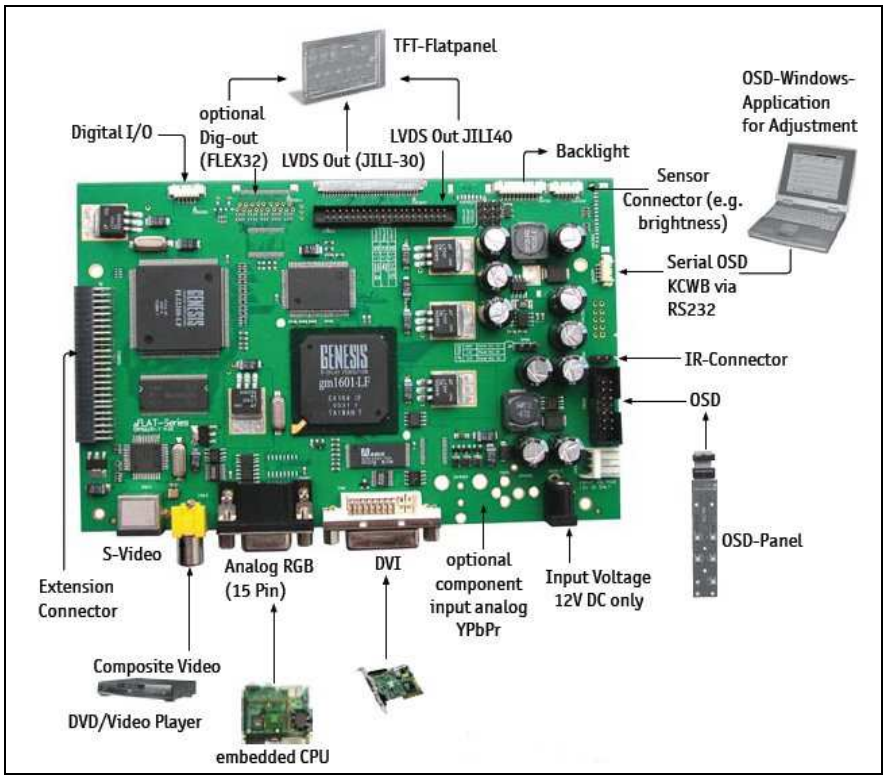
Generally all VESA compatible video modes are supported. If modes are not supported the controller displays "Invalid Mode" on the flat panel. In this case use the Kontron Configuration Workbench (KCWB), available on request, to add this special mode to the supported mode table.

Following modes are tested:

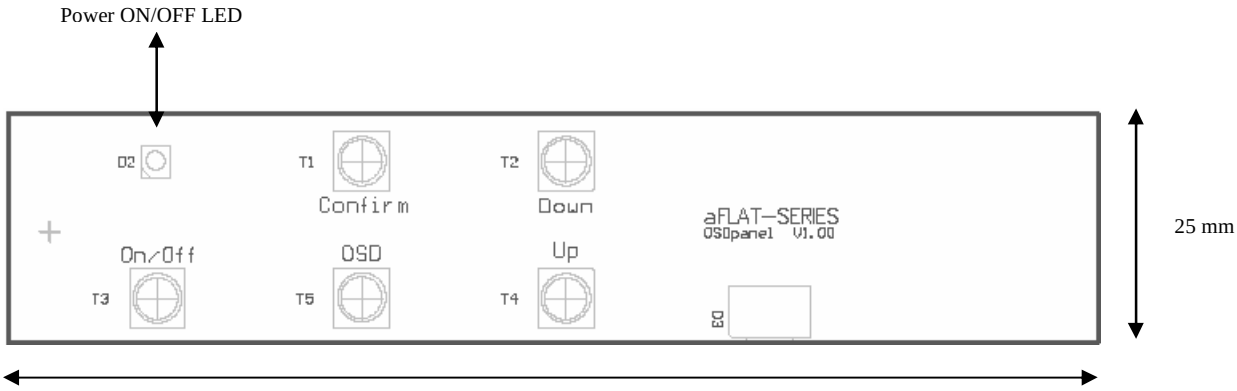
Video Mode Input	Vertical refresh rate	Mode standard
720 x 400	70 Hz	DOS
640 x 350	70 Hz	DOS
640 x 400	70 Hz	DOS
640 x 480	59,9 Hz	VGA
640 x 480	60 Hz	VGA
640 x 480	72 Hz	VGA
640 x 480	72,8 Hz	VGA
640 x 480	75 Hz	VGA
640 x 480	85 Hz	VGA
800 x 600	56,25 Hz	SVGA
800 x 600	60 Hz	SVGA
800 x 600	70 Hz	SVGA
800 x 600	72 Hz	SVGA
800 x 600	75 Hz	SVGA
800 x 600	85 Hz	SVGA
1024 x 768	60 Hz	XGA
1024 x 768	70 Hz	XGA
1024 x 768	72 Hz	XGA
1024 x 768	75 Hz	XGA
1024 x 768	85 Hz	XGA
1152 x 864	75 Hz	
1280 x 1024	60 Hz	SXGA
1280 x 1024	70 Hz	SXGA
1280 x 1024	75 Hz	SXGA
1280 x 1024	85 Hz	SXGA
1600 x 1200	60 Hz	UXGA
1920 x 1200	60 Hz	WUXGA

9. Layout / Schematics

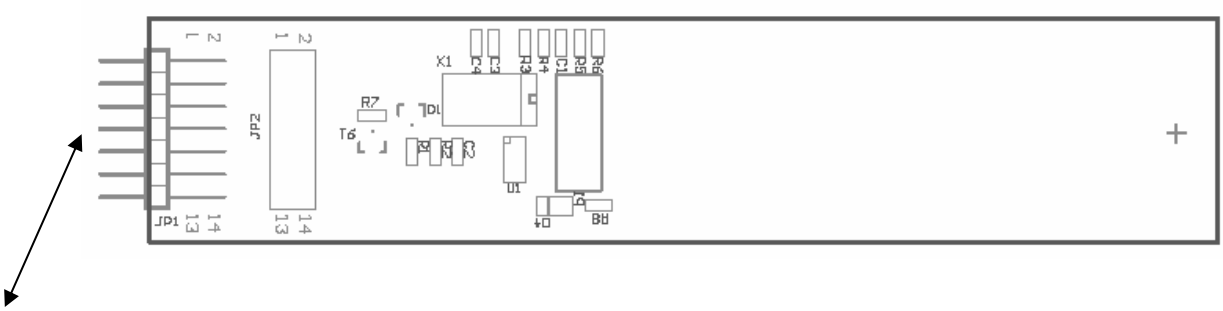




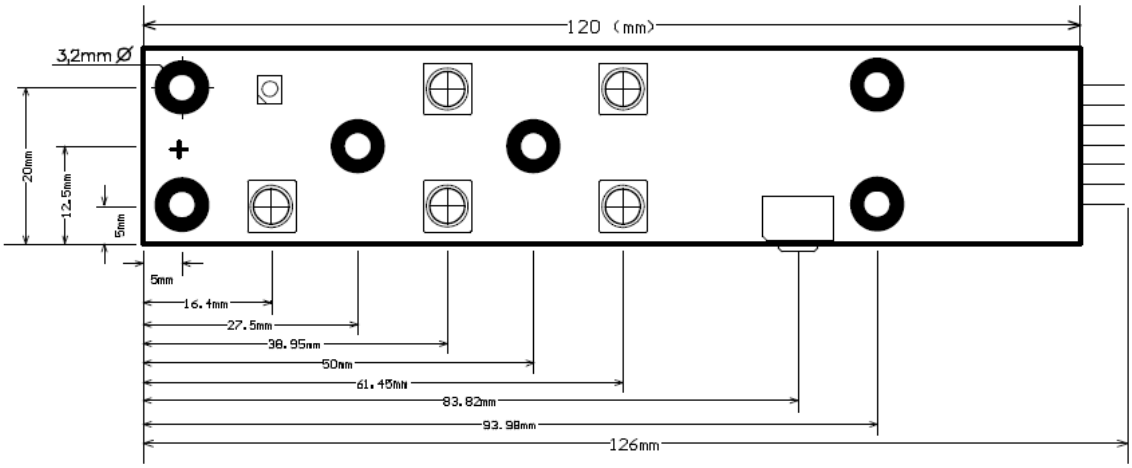
OSD-KEYPAD "OSD-PANEL"



120 MM



Keypad JP1 connected to CN2 of CRTtoLCD-7!



Technical Support

Please report any errors or problems to this email address:
sales_graphic@kontron.com.
Normally, there is no telephone support. In your email message, please include the following information:

- Company Name
- Your Name
- Address
- Email
- Telephone/Fax
- Exact description of the hardware, etc.
- Exact description of the software in use (for example: WinXP with driver XYZ)
- Exact description of the error.

10. Revision History

Date	Author	Version	Description
20.09.2006	L.Trotter	1.0	Initial Release
02.02.2007	M.Hagemann	1.1	Added Description of OnScreenDisplay (OSD); new layout
20.06.2007	N. Abels	1.3	Molex-Ordercode Update