Multi Media Interfaceboard MMIB2B MMIB

DATA SHEET

MMIB2B
Multi Media Interface Board

The products and specifications are subject to change without notice.
Please ask for the latest releases to guarantee the satisfaction of your product requirements.

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Contents

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1. Features

PC input features

- 2nd PC input On-Board.
- Separate HV-Sync, Composite Sync and Sync on Green on both PC Inputs. No additional Hardware required.
- Black&White circuit @ 2nd PC Input (Color information taken from Green Channel is distributed to Red and Blue Channels)
- DVI prepared. (Requires additional DVI input board)

Video input features

- Additional AV (Scart input) at Box-type pin header. With RGB fast blank (FB) support. RGB – C video input also possible. Input Board with 21pin SCART plug is available.
- SDI (serial digital interface @ 270Mhz) prepared. Requires additional SDI Input-Board.

System features

- Temperature Sensor (-20 .. 100°C) On-Board.
- Two High Current Outputs (e.g. vans)
- One general purpose analog output (0..5V)
- Improved Backlight dimming range. Analog output 0..5V.
- RS232 on board

Software features

- Auto adjust of all geometry parameters @ PC Inputs. Includes Phase and Contrast adjustments.
- Supervision of inactive Inputs. (Auto select if a connected device is powered on)
- Firmware Update (e.g. for special customer requirements) via RS232 possible. (PC-Software under development)
- *NEW*: Saturation adjustment @ video Inputs.
- “Motion adaptive”, “spatial” or “static-mesh” De-Interlacing at any input.
- Colortemperatures 3200°K, 5500°K, 6500°K, 9300°K and user adjustable.

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1. Features (continue)

VGA input (PC signals)

- 2x Input connectors: 15pol HD SubD receptacle (R/G/B/Hsync/Vsync)
- VGA to UXGA and an nearly unlimited range of user resolutions
- Up to 140Mhz sample rate
- „Autoadjust“ function
- Multisync capability, due to frame rate conversion, independent from type of connected display

Video inputs:

- Input connectors: 2x Cinch (FBAS), 1x Mini Din 4pol (s-video, Y/C), 1x full featured AV (Scart) Plug prepared.
- PAL-System with automatic recognition of 4:3, various letterboxes and 16:9 formats
- NTSC and SECAM
- 4H comp filter
- motion adaptive deinterlacing and noise reduction (‚Movie‘ mode)
- spatial deinterlaceing (‚Sport‘ mode)
- Horizontal anarmophic scaling/zoom (Panorama View / Waterglass View)
- No movement artifacts like “frame-tearing”

Digital input:

- DVI prepared (requires I&B DVIINP01)

High-Performance-Scaling

- Full screen support for all input resolutions independent of display resolution, achieved by horizontal and vertical independent magnification or downscaling in real-time.

Frame-memory

- Any input frame rate can be converted to the desired output frame rate which is recommended by the display manufacturer

Display output:

- Single and dual pixel port output (18/24, 36/48 bit) applied on 3.3V or 5V high level
- Up to 100Mhz pixel-rate
- Panel Vcc(depends on adapter) 3,3/5/12 V
- Asynchronous output timing in VGA mode, optimized on Panel requirements
- Synchronous output timing on video mode (50/60Hz), to avoid movement artifacts
- Control signals for backlight, PLE, H/V reverse, etc... (depends on display features)

Universal:

- The MMIB2 interface-board is build for running with all displays available in today’s marked.
- Since the display-adapter (see below) decides which display is connected the MMIB could shipped without knowing the destination display.
- Recognition of the connected display is done automatically

Other features:

- Control of brightness, contrast, sharpness
- advanced on screen display
- Help function
- Adjustable gammacorrection (in 10 steps between 0.. 2.5)
- Keyboard with 5 keys, can be mounted horizontal or vertical, includes IR receiver for remote control

Signal Management and Autodetection

- Input search at No Signal
- Auto detection of New Signals at any input
- Power On: Input selection.

DPMS

- Adjustable time to “Suspend mode”
- Adjustable time to “Power down mode”

Temperature Control & Auxiliary Ports

- Temperature Sensor on board
- 2x “digital” 1x analog Auxiliary Ports
- Various functions to control vans, heaters or over/under temperature signaling.
- Also useable for special customer requirements

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1.1 Features summary

The MMIB2 is a High-End interface board for an unlimited range of TFT and Plasma Displays.

Superior composite video performance, the capability to process all know (and unknown) VGA timings and formats, with every possible sync type, guarantees customers satisfaction in most applications.

Additionally the MMIB2 provides all input types (SDI and DVI) for a system which will be "up to date", even tomorrow.

Starting at 6.4" VGA over 21.3" UXGA up to 42" WVGA Displays the MMIB2 represents the ideal solution for Manufacturers with a wide range of monitors.

Similar to the broad range of resolutions and timings are the panel interfaces itself, who are supported. Like: 18/24 36/48 Bit parallel @3.3V or 5V Level, single or dual LVDS and PanelLink. Even analog displays runs with the MMIB.

This is done by a wide range of so called "Adaptersets" including:

- **a small "add on" board (Adapterboard)**
- **Cables to drive the panel.**
- **Cables for Backlight supply and control.**

1.2. Software Revision History

Rev No	Date	Remark	Check
3.040	13.08.2004	Introduction of SAA6712 (see 1.3) Some display wall extra functions (Geometry>wall) Some minor Bugs in downscaling solved	Bühler
3.039	30.07.2004 22.07.2004	Timing replacement list added Video/SDI to 960/720 adjustable	Bühler
3.038	12.07.2004 08.07.2004 25.06.2004 16.06.2004 01.06.2004 28.05.2004	Length of internal H-Sync reduced. The x position of all stored VGA timings will be incorrect and have to be adjusted.The change is necessary to a special 1360x768 Timing. LG LM201U02 added LG LM201U03 added NEC NL10276BC16-01 added CMO V270W1-L04 added LG 42" LC420W02 added FLC43XWC8V-06 added RS232 Broadcast commands improved. The received package is transmitted to the next before processing.	Bühler Sobanski Sobanski Sobanski Sobanski Bühler

3.037	27.05.2005	Samsung LTM213U4-L01 added	Sobanski
	14.05.2004	Bug: Not present inputs (DVI/SDI) could be activated by RS232. This coused erroneous behaviour / system reset. The Bug is fixed,	Bühler
	07.05.2004	Menuitem: Picture->Colors->Output extended: „Blue Only“ / „Green Only“	Bühler
		H17E12-200 added.	Sobanski
		Systemflags (OSD on, No Signal etc) via RS232 accessable. (See Service->Info menu)	Bühler
	06.05.2004	NL8060BC31-28 added	Sobanski
		Bug: Excessive RS232 traffic has caused erroneous Timing detection at VGA inputs. The bug is fixed.	Bühler
	05.05.2004	FLC56XWC8V-01 added.	Sobanski
	02.05.2004	Setting CAM (Video->Optionen->Source): Black Picture will be treated like „no signal“	Bühler
		DPMS Setting -> Power Down: Setting „2 min“ replaced by „immediate“.	
		Menu Picture->Colors: Item „Output“ added. Output allows to adjust the output color resolution. TrueColor, 64 or 8 Colors are possible.	
3.036	24.04.2004	DVI Timing detection improved.	Bühler
	21.04.2004	NL8060BC26-17 added.	Sobanski
		Setting CAM (Video->Optionen-Source) activatet	Bühler
		Bug: Numeric keys for IR26 has been deactivated.	
3.035	20.04.2004	Bug: After videomode a present signal at rgb input is not detected anymore.	Bühler
		Bug: Inputselection by down kay was disabled..	
		LG 20.1" VGA LC201V02	
		AU 20.1" A201SN08	
		Formatselection 4:3->16:9->Original cause changeds in customer settings (Geometry->Display Pixel and Lines).	
		Value for minimum Brightness of BI330 Inverter improved.	
		FPF42C128128UB71 added.	
		LM201U02 LG/Philips 20.1" added	
		Autodetect for 1152x864, 1280x960 and 1400x1050 Resolutions added.	
		Colorvalues for LTM08C351 added	
		DPS control for NL8060 added	
		RS232 ItemNr for following menuitems have changed: power on/off, ir-locked, format (4:3->16:9->Original)	

3.034	16.02.2004	IR-Locked added (see servicemenu) Output aspect ratio: 4:3 and 16:9 selectable (see geometry menu -> display) Power On/Off via IR remote. Command osd items (z.B. autoadjust) also at RS232 available. Free configuration of AUX1 & AUX22 (see 2.6) Avoid of unwanted freeze picture at video input (Input->Options->Source->CAM) AII.9: Items with predefined values added. ChiMei (CMO) M180E1_L01 added	Bühler
3.033	12.01.2004	The former sperate ADVIIB firmware is now compined with the MMIB Firmware. Itemlist functions added. Therefore changes in the OSD keyoptions menu	Bühler Bühler
3.032	18.12.2003 12.12.2003 11.12.2003 25.11.2003	Landmark LM123A (Based on: 12" Sharp) with BI200A Inverter added NL6448BC33-50 with CXA030 added Anti Sticking was disabled since 25.11.2003. Together with our INPDVI01 dvi input board a bug a vga input appear. While inputfrequency was between 24.68Mhz and 25.34 Mhz strong phase distortion appears. Now the bug is solved but a **X Position +/-1 Error** may occur in some cases. Bug: temporary “blue screen” while correct input signal is present. The bug is solved.	Bühler Bühler Bühler Bühler Bühler
3.031	12.11.2003	TM396WX71N32 added WXGA detection for all WXGA Displays (former only for TM396WX71N31)	Bühler
3.030	03.11.2003	Default values for “anti Sticking” changed. Because anti sticking was enabled by default after firmware update. customer specific menu disabled LTA400W01 added. Input to output synchronisation improved. Synchronisation was not available on DVI. Automatically adjustment of the backlight brightness (LDR for environment brightness needed)	Bühler
3.029	19.09.2003 16.09.2003 09.09.2003 04.09.2003	LB104V3 added Automaticaly detection of current videostandard was disabled since rev. 3.027. “Anti Sticking” menu added HT18E220 Timing changed to 45Mhz, with 56Mhz timing erratic artefacts has been appeared while the osd was open customer specific (ttf-input-functions) enabled Samsung 10.4” added	Bühler Bühler Bühler Eller

3.028	18.03.2003 13.08.2003 25.07.2003 21.07.2003 18.07.2003	LC230W01 dazu Chunghwa CLAA150XA03 added Improved code entry for IR26 New adapter versions for analog displays added (ADPANP02 and ADPANC02) 20.1" NEC NL128102AC31_01 (analog) added RS232 Command 0x600B: "Backlight On/Off" added. RS232 Command 0x600A: "Store Displaytiming" added. IB-Remote description added. Menu SYSTEM->MTBF->Reset added. Customer Menü added Menu SYSTEM->INFO changed. Values are now available on RS232 (see also AII.6).	Bühler Bühler Bühler Bühler Bühler
3.027	10.07.2003	Under some conditions was frozen picture is displayed when composite or yc inputs are active. This bug should be resolved now. Also vcr fast forward or rewind replay is improved. But there is no vertical synchronisation on ff or rewind.	Bühler
3.026	26.06.2003 06.06.2003	RS232 item numbers for user adjustable colortemperature (R G B values) in the datasheet corrected. 0x6009: RS232 Restart command added. IR-Accesscode item added. Display-ID added for enable/disable the OSD menu for common IR remote control.	Bühler Bühler Sobanski
3.025	28.04.2003 23.04.2003	C-Sync Filter: Selection "Off" added. OSD Menu "VGA Optionen" changed: Submenu "Details added" - H-Sync edge for sample rate recovery selectable. - Composite Sync Filter added (see OSD description). **This function was former activated by selecting manual SoG manually**. Color profile for NL128102AC31-01 added. Samsung LTM170E5-L03 added. Geometry auto adjust improved.	Bühler
3.023	28.03.2003	Startup Sequence Improved 1..4 SDI Inputs. Some DVI bugs removed: SXGA works correctly. Timing detection works correctly. CXA-0317: Analog range adjusted. ISFT60.15, SINAI43150CBD, HT18E22-200 UB084S01H FLC26XGC6R, LTM08C351,LQ201U1LW01 added.	Bühler
3.018	22.01.2003 21.01.2003	Sharp LQ121S1DG11 Timing debugged. Backlight-Service menu added (see 2.4 Factory related OSD settings) Thosiba LTM07C382J 60Hz Synchronisation debugged and Color profile added. **Sync function changes belongs to every display.** Sharp LQ084S1DH01: Color profile added.	Bühler
3.017	08.01.2003	LQ150X1LW71 & M150XN05 added NL8060-31G: MVA control removed	Bühler

3.016	09.12.2002	Continious phase correction for drifting signals. (see geometry->input->interlaced menu) Fix frequency monitor mode (input->options). RS232 filesystem command 0x6000 improved. RS232 firmware update command 0x7000 added. RS232 filesystem command 0x8000 and 0x9000 added. Samsung 18.1" LTM181E4 added. Unipac 13.3" UB133X01 added.	Bühler
3.014	18.09.2002	Improved timing recognition for VGA (for ROBO CC200/CC300 CNC control units). Support for unknow timing adjustments (see sub menu 1.2.1 input" on page 16).	Bühler
3.013	28.08.2002	30" LG, 15" Mitsubishi added for all 10.4" NEC (Timing 0x03) DPS and MVA menu items are allways enabled (Geometry or Geometry->Display).	Bühler
3.012	14.08.2002	21.3" Samsung added	Bühler
3.011 3.011	07.08.2002	LQ11DW01 (Customer) added On short signal chanes in VGA mode no "blue screen" will be displayed.	Bühler
	23.07.2002	Longer reported bugs: Signal supervision (& search) works not for DVI DVI input not selectable via keyboard (eg. left key) configuration Defaultvalue for Video: Brightness: 32, contrast: 40 all other inputs: Brightness: 32, contrast: 32 (sdi was 0) Improved SoG behavior. ADPLDI01: DIL switch ordering changed. Description of the menus 1.4 Picture & 1.4.1 Colors changed.	Bühler
3.010	17.07.2002	Fujitsu 20.1" + 23"	
3.009	13.06.2002	Pre&Post Coast in VGA options.	
3.004	08.03.2002 01.03.2002	PICTURE: Gamma and Colortemperature. Hotkeys removed. New: OTHER->INPUTSELECTION VGA input range optimized.	Eller
3.001	02.12.2001	File System Commands added. VCR rewind/forward behaivior improved. H-Clamp: adjust clamp time instead of clamp place	Bühler
3.001	22.10.2001	Evaluation Software	Bühler

2. OSD menu and user controls

All the functions of the interface board are selected and adjusted using an advanced on screen display (OSD) and a keyboard or a IR-remote control. The OSD includes an online help window to explain the functionality of the menu items.

The OSD menu of the MMIB is controlled via a 5 key (Up, Down, Left, Right and Ok) keyboard or IR-Remote.

Since we try to meet a lot of customer requirements there are a lot of ways to configure the keyboard behavior while the OSD is closed.

- **Functionality while OSD is closed (Default):**

Key	Function	Remark
UP	Opens the SOURCE menu.	
LEFT	Opens the INFO menu	see also 2.4 Factory related setup.
RIGHT	Opens the INPUT GEOMETRY menu	
DOWN	Toggles through the inputs	Between which input the key toggles can be selected (See OTHER->KEYBOARD OPTIONS->DOWN and OTHER->INPUTSELECTION)
OK	Opens the MAIN menu.	

- **Functionality while OSD is closed (User adjustable):**

Key	Function	Remark
UP	No function	
LEFT	Adjust contrast or brightness	
	Toggles through the inputs	see also OTHER->INPUTSELECTION
	No function	
RIGHT	Adjust contrast or brightness	
	Toggles through the inputs	see also OTHER->INPUTSELECTION
	No function	
DOWN	Adjust contrast or brightness	see also description for menu item functionlist I
OK	No function	

All user adjustments for the keyboard are available in OTHER->KEYBOARD OPTIONS

- **Functionality while OSD is open.**

Key	Function	Remark
UP	Select the previous menu item. Wrap around is provided at the first item of a menu.	
LEFT	Decrease the actual selected value. Toggle ON/OFF buttons. Select an OPTION button.	
RIGHT	Increase the actual selected value. Toggle ON/OFF buttons. Select an OPTION button.	
DOWN	Select the next menu item. Wrap around is provided at the last item of a menu.	
OK	Close the active menu an return to the previous.	

2. OSD menu and user controls (continue)

Note: Most adjustments are only possible while an input signal is applied.

Adjusted menu items will be saved if
- the sub menu is closed
- an other input format is detected

Since we try to support the customer with all the features possible by the hardware and of lot of special requirements the OSD structure have become really large. So we have designed the OSD structure straight in order of the logical appearance of a desired function.

Therefore always search a desired function in the logical orders:

MAIN->INPUT SIGNAL: Anything according to the input signal. Signal search or supervision settings.

MAIN->GEOMETRY. Anything according to the position and size (geometry). Also the geometry is well structured:

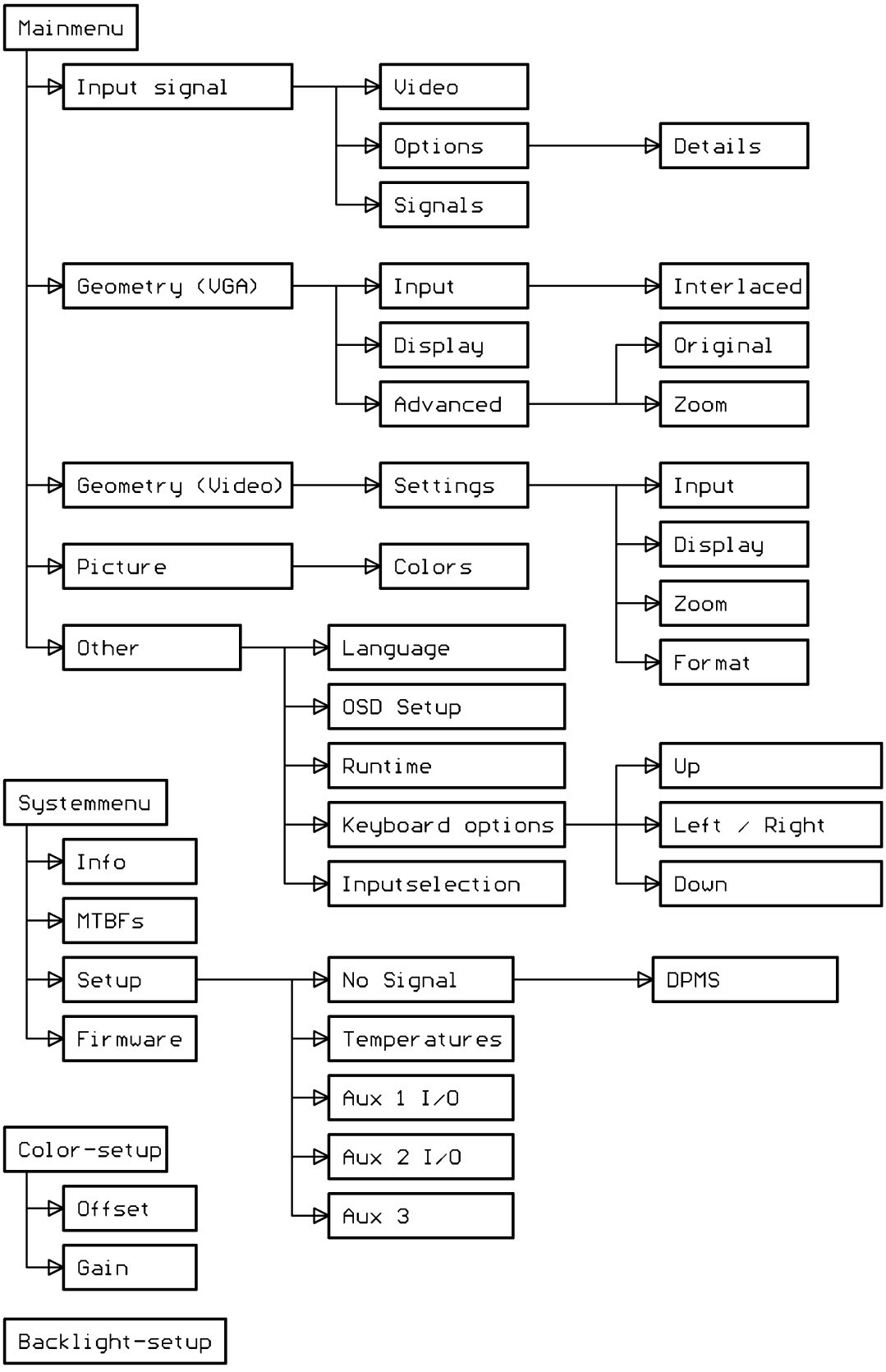
MAIN->GEOMETRY->INPUT: Any parameter to describe the incoming signal.
MAIN->GEOMETRY->DISPLAY: Additional parameters to describe the actual display.
MAIN->GEOMETRY->ADVANCED: How to handle the incoming signal.

MAIN->PICTURE: All the parameters like contrast, brightness, colors and so on.

MAIN->OTHER: System settings like language, OSD position, keyboard options and other details.

Beside the possibility to change the functionality of specific keys. There is also the possibility to lock the OSD complete. This is done by pressing the UP and DOWN key while power up. Access to the OSD is enabled by pressing UP and DOWN again while power up.

2.1 Hierarchical overview



2.2 Rough overview

Function	Menu(s)	Remark
Selecting an input signal the video source and norm	main->input signal main->input signal-sources UP-KEY	VGA, Composite input, s-video input terrestrial, satellite, VCR, PAL, NTSC, SECAM
What happens if no signal is applied on the actual selected input	main->input signal->Signals also servicemenu->setup->No signal	Search another input Background Color Text
What happens on power up	main->input signal->Power On	
While watching video a PC signal is applied	main->input signal->Signals also servicemenu->setup->supervison	Supervision of none selected inputs is possible.
Picture position is wrong adjusted	main->geometry	Phaseshift Samplerate Position Resolution Interlaced
The picture looks like lines are displayed in an wrong order	main->geometry->interlaced	ODD / EVEN spatial deinterlacing temporal deinterlacing static mesh
The picture look dark	main->picture	brightness, contrast, R G B, backlight dimming
OSD language	main->other->language	
OSD style and position	main->other->OSD setup	cascade, transparent, position, color
How long is the display running	main->other->runtime info->maintanance	
Not everyone should have access to the OSD menu.	main->other->keyboard options	LEFT RIGHT DOWN UP

2.3 Detailed OSD description

1. Mainmenu		
Item		**Function**
Input	1.1	Choose the input signal out of 2x VGA, DVI, 2x composite video, s-video, AV (Scart) and SDI are optioninal video connectors. Also some options according to the input signal type or source are available in this menu.
Geometry	1.2 1.3	Adjust frame offset, output format and zoom function. This menu is different in video and VGA operation.
Picture	1.4	Adjust brightness, contrast, sharpness, colors.
Other	1.5	Change language and OSD adjustments.

The main menu is selected by pressing the ‚OK' key on the keyboard or on the remote control while the OSD is off.

Note: DVI, SDI and AV are optional inputs.

2.3 Detailed OSD description (continue)

1.1 Source		
Item		**Function**
VGA 1	1.1.1	Select the 1st VGA (PC) as active input. Timing information is shown if this input is active and this item is selected
VGA 2	1.1.1	Select the 1st VGA (PC) as active input. Timing Information is shown if this input is active and this item is selected.
DVI		Select the DVI (optional) as active input.
Video	1.1.2	To allow the selection of the desired video input an additional submenu appears.
HD-SDI		Select the HD SDI Input as active input.
SDI		Select the SDI (Serial Digital Input) as active input.
Options	1.1.3 1.1.4 1.1.5 1.1.6	VGA Options Video Options SDI Options HD-SDI Options
Signal	1.1.7	Signal management.

Depending on the active input type several options are adjustable.

1.1.1 Timing Information	
Item	**Function**
Resolution	Resolution in Pixel and Lines
H	Horizontal frequency
V	Vertical frequency
S	Type of the synchronization signal.
H V	Separate H-Sync and V-Sync is detected at the input.
H-Comp	Composite Sync signal is detected on the H Input.
on Green	Sync signal is embedded on the Green signal.
H+(V+)	Active High Sync
H-(V-)	Active Low Sync

This information is also taken to save user adjustments for this timing.
A timing is recognized as “known” according to following rules:
Total vertical lines range: +/- 2
Horizontal frequency range: ~ 1%
Same sync type.
if a source provides more than one sync types the used sync is selected in following order (in auto mode see also 1.1.3 VGA options):
1st: Separate H Sync and V Sync.
2nd: Composite Sync.
3rd: Sync on Green

1.1.2 Video input selection	
Item	**Function**
Comp 1	Select the 1st composite input signal as active input.
Comp 2	Select 2nd composite input signal as active input.
Y/C	Select Y/C (s-video) input signal as active input.
AV	Select AV (Scart) input signal as active input.

2.3 Detailed OSD description (continue)

1.1.3 VGA options	
Item	**Function**
Auto Sync Detect	Enables or disables auto detection of the supplied synchronization signal. Supported sync types are: Separate H Sync and V Sync Composite Sync (at H input) Sync on Green.
HV Sync	Manual selection of separate H sync and V sync.
Composite Sync	Manual selection of composite sync.
Sync on Green	Manual selection of sync on green sync.
Details	see 1.1.3.1
Multisync	Default: on. Setting of for very unstable signals.
Timing Infos	This menu shows the actual timing measurements.

This menu is only accessible if a VGA (PC) input is active.

Note: in manual sync type mode no other sync type is detected as the chosen one. This means for e.g.: if composite sync is selected and a sync on green signal is applied the signal is processed as “No Signal”.

For DPMS (power saving) mode: if the source stops H and V sync but not the color signals R G B the color information on the green channel can be taken as synchronization signal in some cases. Therefor the desired sync type should be selected manual.

Setting off the Multi sync function detection of different input timings is only done via the vertical input frequency within a range of -/+ 4 Hz. **This allows to display very unstable signals. Default is ON.**

1.1.3.1 Details	
Item	**Function**
H-Clamp	Horizontal Clamp Place. Only for special purposes. Default value is 8. Attention: Wrong settings may cause color artifacts.
SoG Level	Voltage Level for the “Sync on Green” comperator. Only for special purposes. Wrong settings may result in “No signal”
Coast Lines	Number of serration pulses. If the setting is below the number of serration pulses the picture my be “right shifted” at the top. Default: 7.
Edge	H-Sync edge (leading or trailing) for sample rate recorvery. If this item is changed, in case of SoG sync, H-Clamp has also to be adjusted.
C-Sync Filter	Only for SoG or composite sync! Defaultvalue is HF. In some case there are unusual long pulses during the vertical sync time, which leads to erroneaous sync seperation. In this cases the setting LF maybe helpfull. If the pulses are really short the C-Sync Filter can be disabled.

How C-Sync Filter works:
It specifies a delay time within the C-Sync must stay at his active level before V-sync is detected.

Off: 3.2µs
HF: 6.4µs
LF: 20.0µs

2.3 Detailed OSD description (continue)

1.1.4 Video options	
Item	**Function**
Source	Optimize color recovery for VCR, satellite- or terrestrial video sources. Also an option “CAM” is available.
Auto	Detection of the video norm PAL, NTSC, SECAM with also their sub-standards
Norm	Shows the incoming video norm. If Auto is disabled the desired norm can be selected manual.
Auto Format	Allows the detection of several 16:9 and so called “letterbox” formats. For this formats the top and bottom blacklines are suppressed via vertical expansion.
AV	Operation modes of the AV (Scart) plug.

This menu is only accessible if a video input is active.

Every video source has a delay between the luminance and chrominance information. The option CAM enables continously supervision of the incoming signal. This ensures that always a Live picture is displayed.

Following Video norms are supported:
PAL NTSC M SECAM NTSC 44
PAL M PAL N PAL 60 NTSC
Mono 50Hz Mono 60Hz

The AV (Scart) input can operation in following modes:
Standard: the composite video from the scart plug is showed. RGB Fast blanking is supported.
RGB: only the RGB information is supported. A sync Signal has be provided at the composite input. E.g. for RGB camera applications.
YUV: Like RGB mode, but the color information is treated as YUV signals. E.g. for DVD players etc...

1.1.5 SDI options	
Item	**Function**
Format	Shows the SDI formats: 625-50Hz 525-60Hz
SMTP	
NRZI	
DESC	

This menu is only accessible if a SDI input is active.

SMTP, NRZI and Desc(rambling) are optionions for non-standard applications. They are only needed for special customer requirements. **Wrong settings may result in corrupt picture or loss of signal.**

2.3 Detailed OSD description (continue)

1.1.6 HD-SDI Options	
	Funktion
HD-Output	Available Settings: **Loop**: outputs the reclocked input signal („Loop Through“). **Testpicture**: outputs a test picture from an build in testpicture generator. **Selftest**: Like „Testpicture“ but the Signal from the Input is displayed. This means an external loop from output to input plug is required for correct operation.
Format	At Loop mode: Shows the Format of the incoming HD-SDI Signal. At Testpicture/Selftest: Selection of the desired Format.
Standard	Show the according Standard (SMPTE xxx)
Clock	Show the current pixelclock (27, 74.17, 74.25 MHz)
Pattern	Only at Testpicture/Selftest: Selection of the Testpicture (SMPTE +100%, +I, -I+Q), Colorbar, Pathological test pattern.

This Menu is only available if the HD-SDI Input is available and activated.

An additional HD SDI Input Board is required for this functions.

For a detailed description of the HD SDI Input Board please refer „Data-HDSDI-DEU.PDF“ datasheet.

1.1.7 Signal management	
Item	**Function**
Power On	Which input is selected at power on. Last means the last active input will be select again.
Search	Allow search of active inputs if no signal is supplied at the current input. (See also 1.5.5 Input selection.)
Supervision	Enables auto selection of other inputs if new signals are detected. Remark: Supervision of inactive inputs is only possible for inputs which are not in the same group as the active input. (See also 1.5.5 Input selection.)

2.3 Detailed OSD description (continue)

1.2 Frame geometry (for VGA)		
Item		**Function**
Input	1.2.1	Adjust pixelrate, pixel, lines position... (All parameters which defines the input format.)
Display	1.2.2	Active display area definition
Advanced	1.2.3	Choose display modes: *standard, original, zoom*
Wall	1.2.4	All setting for display wall functionality.

Only in VGA mode.

Geometry means all parameters which describes the size and position of the displayed picture.

Geometry is divided into three groups:

Input: Means all parameters which describe the incoming picture.

Display: Means all parameters of the monitors geometry.

Advanced: Select the display modes

2.3 Detailed OSD description (continue)

1.2.1 Input	
Item	**Function**
Pixelrate	Adjust pixelrate until the whole frame appears the same. **Hint** : Use windows Shut Down Picture for adjustment.
Phaseshift	Adjust phaseshift to get best picture quality.
X-Position	Adjust horizontal frame position.
Y-Position	Adjust vertical frame position.
Pixel	Number of active pixels of the incoming PC signal. e.g. SXGA: 1280.
Lines	Number of active lines of the incoming PC signal. e.g. SXGA: 1024. "i" indicates interlaced signals.
Interlaced 1.2.1.1	Some adjustments for interlaced input signals.
Auto	Self adjust - all geometry parameter - phase-shift - contrast - Black&White (only 2nd VGA) detection

These items represent all parameters which describes the incoming pictures.

This menu can be selected directly by pressing the right key on the keyboard or on the remote control while the OSD is off.

Contrast adjustment:
The intention is to adjust signals within an input range betwenn 0.5 to 1V (full scale). You get best results with images of large, full scale, homogen areas.

A recommended procedure how to adjust pixelrate, pixels, lines and x/y-position at unkown input formats:

There is a support mode for pixelrate adjustment available. Activate “original mode” (see menu 1.2.3 Advanced). Go back to item pixelrate. Now the phaseshift is continueselly increased from 0 to 31 (with wrap around). One cycletime is around one second.

A detailed look on the display shows following behavior:

- The pixel is sampled more then one time if the pixelrate is much too high. In this case decreasing of the pixelrate is recomended. Attention: while the phaseshift is increased form 0 to 31 the x-position changes smooth by one. The overflows from 31 to 0 the results in an abrupt step back to the former x-position. Do not missjudge this behavior with oversampling.
- The pixel disappears if the pixelrate is much too low. In this case increasing of the pixelrate is recommended.

If the pixelrate is really near to the correct setting a distortion moves like a “wave” over the picture. If the direction of the wave is definable from left to right decrease the pixelrate. Otherwise, if the direction is definable form right to left, increase the pixelrate.
In any case if the direction of the “wave” changes you have passed the correct setting.

Hint: Evaluation is easy with one single pixel in horizontal direction (eg. vertical line).

- After the pixelrate is correct adjusted change back to original mode and adjust number of pixels, lines and x/y position to get a full screen displayed image.

2.3 Detailed OSD description (continue)

Correct Phaseshift:

If there is a unstable picture for nearly every phase setting the quality can be improved by:

- Selecting the other H-Sync edge as reference edge for pixel clock recovery. (See VGA options->details).
- Adjust SoG Level for Sync on Green signals (see VGA options->details). Note: After adjusting SoG Level Phaseshift has also to be adjusted.

1.2.1.1 Interlaced	
Item	**Function**
Interlaced	Selection of interlaced or none-interlaced input formats.
PC	Optimized de-interlacing for PC-Signals (static mesh).
Sport	Optimized de-interlacing for fast moving RGB video signals (temporal de-interlacing).
Movie	Optimized de-interlacing for less moving RGB video signals (spatial de-interlacing).
Auto Phase	Enabling and time period of automatic phase sencing. This function detects phase distoration +/- 2 steps around the actual phase setting. Note: Correct operation depends on various parameters. Due to this correct functionality could not be guranted. Correct operation has to be ensured be testing this function with the target application.

1.2.2 Display	
Item	**Function**
Format	Selection of the output aspect ratio: Original, 4:3 and 16:9
Pixel	Number of active display pixel per line. Maximum possible value is the true display resolution.
Lines	Number of active display lines. Maximum possible value is the true display resolution.
X-Position	Output: if active display area is chosen smaller than its real resolution, the horizontal position can be adjusted.
Y-Position	Output: if active display area is chosen smaller than its real resolution, the vertical position can be adjusted.
Mirror	Enabled mirrored display. Note: Not available for all inputs resolutions.

These items represent all parameters which describes the output (monitor) pictures.

Mirror (H reverse) due to some scaler restrictions this function is not possible if the vertical downscaler is running. This happens if there are more input-lines than output lines.

2.3 Detailed OSD description (continue)

1.2.3 Advanced		
Item		**Function**
Standard		In every case the input signal will be displayed on the whole display.
Original	1.2.3.1	The input frame will be displayed 1:1. If the input resolution is larger than the display resolution, only a part of the picture is displayed. If the input resolution is smaller than the display resolution, a window is placed in the display.
Zoom	1.2.3.2	Magnification of the input frame, especially useful for display walls.

1.2.3.1 Original	
Item	**Function**
X-Position	Adjust horizontal position of the displayed window.
Y-Position	Adjust vertical position of the displayed window.

1.2.3.2 Zoom	
Item	**Function**
X-Factor	Magnifing factor in horizontal direction
Y-Factor	Magnifing factor in vertical direction
X-Position	Adjust horizontal position of the displayed window.
Y-Position	Adjust vertical position of the displayed window.

2.3 Detailed OSD description (continue)

1.2.4 Display wall	
	Function
Display wall	Enable or disable the display wall function.
Display no.	Position of the current display with the display wall. Counts up from left to right, from top to bottom
Displays horizontal	Number of displays in horizontal direction.
Displays vertical	Number of displays in vertical direction.
Border horizontal	Means the border of ONE display in percent of the active width.
Border vertical	Means the border of ONE display in percent of the active height.

Display No:

1 2 1 2 3
3 4 4 5 6
7 8 9

With the border settings a diagonal line would be displayed with an offset.

Note: Due to some limitations of the scaling accuracy picture information can be displays on the right the of one screen as well as one the left side of the next screen. This can be covered with the border settings.

2.3 Detailed OSD description (continue)

1.3 Geometry (for video)		
Item		**Function**
Default		Normal display of video input.
Zoom 1		Slightly zoomed picture to reduce black lines at the borders.
Zoom 2		As zoom 1, but more zoomed.
Settings	1.3.1	Manual adjustments for the picture geometry, only for special purposes.
Mirror		Enabled mirrored display. Note: Not available for all inputs resolutions.
Sports		Selects **de-interlacing** with no moving but few flicker artifacts. Best setting for pictures with fast moving contents (like News-tickers or some sports games). Technical term: “spatial de-interlacing”
Movie		Selects **de-interlacing** with some moving but no flicker artifacts. Also some noise reduction is done in this mode. Best for normal movies. Technical term: “motion adaptive de-interlacing”

Only in video and SDI mode.

This menu can be selected directly by pressing the right key on the keyboard or on the remote control while the OSD is off.

Mirror (H reverse) due to some scaler restrictions this function is not possible if the vertical downscaler is running. This happens if there are more input-lines than output lines.

Settings: For special requirements the user is able to adjust all the input and output frame parameters. These adjustments are saved according to the actual selected mode **Default**, **Zoom1** or **Zoom2**

1.3.1 Geometry (Settings)		
Item		**Function**
Input	1.3.1.1	Adjust active pixel, lines and position.
Display	1.3.1.2	Definition of the active display area
Zoom	1.3.1.3	Input frame magnification
Format	1.3.1.4	Adjust the frame format correction factors
Wall	see 1.2.4	
Default		Resets all geometry adjustments to their factory defaults.

Geometry is divided into four groups:

Input: Means all parameters which describe the incoming picture.

Display: Means all parameters of the monitors geometry.

Zoom: Adjust magnification factors and position.

Format: Special parameter for format conversion.

2.3 Detailed OSD description (continue)

1.3.1.1 Input (video)	
Item	**Function**
Pixel	Number of pixel of the incoming video signal.
Lines	Number of lines of the incoming video signal.
X-Position	Adjust horizontal frame position.
Y-Position	Adjust vertical frame position.

1.3.1.2 Display (video)	
Item	**Function**
Format	Selection of the output aspect ratio: Original, 4:3 and 16:9
Pixel	Number of active display pixel per line. Maximum possible value is the true display resolution.
Lines	Number of active display lines. Maximum possible value is the true display resolution.
X-Position	Output: if active display area is chosen smaller than its real resolution, the horizontal position can be adjusted.
Y-Position	Output: if active display area is chosen smaller than its real resolution, the vertical position can be adjusted.

1.3.1.3 Zoom (video)	
Item	**Function**
X-Factor	Magnifing factor in X-direction
Y-Factor	Magnification factor in Y-direction
X-Position	Adjust horizontal position of the displayed window.
Y-Position	Adjust vertical position of the displayed window.

1.3.1.4 Format (video)	
Item	**Function**
Parameter 1	Format correction achieved by adding black lines or columns.
Parameter 2	Format correction achieved by cropping lines or columns.
Parameter 3	Format correction achieved by panorama or waterglass view. Technical term: “anamorphic scaling”

2.3 Detailed OSD description (continue)

1.4 Picture		
Item		**Function**
Brightness		Brightness of the displayed Picture, Default is 32
Contrast		Contrast of the displayed Picture, Default is 32
Gamma		Gamma correction factor. Note: if this item is disabled no color gammut was available at this time for your specific display. Ask for latest software version. Possible values are: off, 1.8 and 2.2
Colortemperature		Settings are 3200°K (for TV studio purposes), 5600°K, 6500°K, 7100°K (medical applications) and 9300°K. If this item is set to "user" the color temperature can be adjusted by their R, G and B values (see 1.4.1).
Sharpness		Adjust scaling algorithm for up-scaling. 0-> smooth scaling 8-> scaling done by pixel doubling.
Colors	1.4.1	Select color temperature by adjusting red, green and blue RGB offsets.
Backlight		Adjust backlight brightness.

1.4.1 Colors	
Item	**Function**
Saturation	(only for video)
Black & White	Create a monochrome picture of the green channel (only if 2nd VGA input is active) Create a monochrome picture (set saturation to zero, only in video mode)
Edges	Edge enhancment (only for video)
Contrast R	Color offset for red channel
Contrast G	Color offset for green channel
Contrast B	Color offset for blue channel

Note: In some cases no item of this submenu is adjustable. In this cases you can not enter this menu. This is because:

1. **SATURATION and EDGES are only for video**
2. **R, G, B are only adjustable if colortemperature is set to "user"**
3. **BLACK&WHITE is only for 2nd VGA and Video**

Contrast R, G and B values are only adjustable if colortemperature is set to "user".

2.3 Detailed OSD description (continue)

1.5 Others		
Item		**Function**
Language	1.5.1	Select OSD language
OSD Setup	1.5.2	Select OSD settings
Freeze mode		Generate still picture
Runtime	1.5.3	Show runtime of display and backlight. Remark: the runtime of the backlight can be reset in the MTBFs menu.
Keyboard options	1.5.4	Several options for the key functionality while the OSD is off.
Input selection	1.5.5	Activate or Deactivate specific inputs for selection by • down, left or right key • search signal • input supervision

In keyboard option there are a lot of possibilities like:

- Enable or disable specific keys
- Input selection can be enabled for several keys.

1.5.1 Language	
Item	**Function**
Deutsch	Select German language for OSD
English	Select English language for OSD

1.5.2 OSD setup	
Item	**Function**
Cascade Menus	Select cascaded menus
Transparency	Select transparent OSD
Default colors	Select between two OSD color settings
X-Position	Horizontal placement of OSD
Y-Position	Vertical placement of OSD
OSD timeout	Close the OSD automatically after a definable delay, if no key is pressed.
Help	For most menu items a short explanation is available.

1.5.3 Runtime	
Item	**Function**
Runtime	Actual runtime.
Backlight	Actual backlight runtime (see also 2.2 Maintenance)
Temperature	Actual system temperature

Only for users information. No item is adjustable.

2.3 Detailed OSD description (continue)

1.5.4 Keyboard options		
Item		**Function**
Up	1.5.4.1	Options for the UP key
Left Right	1.5.4.2	Options for the Left and Right key
Down	1.5.4.3	Options for the Down key

While OSD is off, it's possible to assign a lot of functionality to the keys.

1.5.4.1 UP	
Item	**Function**
Default	The default function open the INPUT SOURCE menu when the UP key is pressed
Disabled	No functionality while the OSD is closed.

1.5.4.2 Left Right	
Item	**Function**
Default	LEFT: Open the menu INFO RIGHT: Open the menu GEOMETRY.
Disabled	No functionality while the OSD is closed.
Inputs	Toggling through the inputs. (see also 1.5.5 Input selection)
Contrast	Adjust Contrast
Brightness	Adjust Brightness
Itemlist	Activate and adjust first item of the Itemlist

See also 2.4 factory related OSD descrition

See also 2.5 for detailed itemlist functions.

1.5.4.3 Down	
Item	**Function**
Default	Toggling through the inputs. (see also 1.5.5 Input selection)
Disabled	No function while OSD is closed.
Itemlist	Activate the itemlist or select next item

See also 2.5 for detailed itemlist functions.

Note: the former items brightness, contrast and invers are removed now. This because the same functionality can easily be achieved by the itemlist.

2.3 Detailed OSD description (continue)

1.5.5 Configuration		
Item		**Function**
Function		Select the function (Keys DOWN, LEFT, RIGHT or SEARCH and SUPERVISION) the inputs, listen below, should be included or not.
VGA 1		Include VGA 1
VGA 2		Include VGA 2
DVI		Include DVI
Video	1.5.5.1	Video Inputs
SDI		Include SDI

1.5.5.1 Video Inputs	
Item	**Function**
Comp 1	Include Comp 1
Comp 2	Include Comp 2
Y/C	Include Y/C
AV	Include AV (Scart)

2.3 Detailed OSD description (continue)

2. Systemmenue		
Item		**Function**
Info	2.1	Show system information. This submenu provides no adjustable item and is therefore not selectable.
MTBFs	2.2	Adjust/reset backlight MTBF
Setup	2.3	
Firmware	2.4	

To access this menu see 2.0 user controls **access mode**

2.1 Info	
Item	**Function**
Interfaceboard	Show current version of the interface-board
Panel Number	Show the select display number.
Software Rev	Show software release number
Date	Show software release date
Panelclock	Show panelclock frequency
Panel H	Show horizontal frequency of the display in normal operation mode.
Panel V	Show vertical frequency of the display in normal operation mode.

Software Rev:
<date> <h.><xxx>

<date> date of release
<h.> Hardware id

nothing: means MMIB1 with SAA6721V1

<2.> means MMIB1 with SAA6721V2

<3.> means MMIB2

<xxx>: release number

2.2 Maintenance	
Item	**Function**
Backlight MTBF	Adjust MTBF of the backlight. Not functional, only to remember.
Backlight reset	Set the backlight runtime to 0
IR-Accesscode	Settings 1..99 disable the OSD menu for common IR remote control. The correct ID has to be entered via the figure keys of the IR Remote. Entering the code 00 shows the actual ID of the display. Note: Allways two digits has to be entered.
IR-Locked	Disables the IR remote control. Pressing OK during power up enable IR access temporary
Reset	Reset to factory default settings: Attention: all user adjustments will be deleted.

Own settings can be stored as factory defaults. Load up the filesystem. Change the FlashID from 0xAX to 0xBX and save the settings back. Now the 0xBX settings will be take as factory defaults.
If no user factory settings are available the default settings will be taken.

2.3 Detailed OSD description (continue)

2.3 Setup		
Item		**Function**
No signal	2.3.1	Several options if no signal is applied at the current input.
Temperatures	2.3.2	Define desired system temperature ranges.
Aux 1 I/O	2.3.3	Options for the 1st Auxiliary port
Aux 2 I/O	2.3.4	Options for the 2nd Auxiliary port
Aux 3	2.3.5	Options for the 3rd (analog) Auxiliary port.
Anti Sticking	2.3.6	Checkerboard overlay adjustement to prevent image sticking artefacts
Backlight	2.3.7	Auto backlight settings.

AUX1 & 2:
The functionality can be freelly defined due to filesystem functions. Refer 2.6 Auxilary functions.

2.3.1 No signal		
Item		**Function**
DPMS	2.3.1.1	Power Save Options
Blue		Background color if no signal is applied at the current input.
Black		Background color if no signal is applied at the current input.
User	2.3.1.2	A user defined background color is displayed if no signal is applied at the current input.
Text		Show message “No Signal”

See also **1.1.6 Signal management** and **1.5.5 Inputselection** for “No Signal” behavior.

2.3.1.1 DPMS	
Item	**Function**
Suspend	Disable or select time to suspend mode after “no signal” condition. Suspend mode means luminance of the backlight is turned to a minimum, which reduces power consumption.
Power Down	Disable or select time to power down mode after system is turned to “suspend mode”. Power down mode means the backlight is turned off, display is disabled and no timing signals are longer provided. This puts the display in a minimum power consumption state.

For some possible problems with Sync on Green refer 1.1.3 (VGA options) commend.

2.3.1.2 User	
Item	**Function**
Red	
Green	
Blue	

User defined background color for “No signal” condition.

2.3 Detailed OSD description (continue)

2.3.2 Temperatures	
Item	**Function**
Actual	Current system temperature.
Lowest	Lower system temperature limit
Highest	Upper system temperature limit
Backlight Down	Driving down the luminance of the backlight if system temperature approaches the upper limit

2.3.3 Aux 1 Configuration	
Item	**Function**
Input High	Input signal select if Aux1 is at HIGH level
Input Low	Input signal select if Aux 1 is at LOW level.
Temperature	Value for Aux1 output operation.

The Auxiliary Port 1 can be configured as input as well as for output.
For input operations Aux1 is used to select two signal inputs.

In output mode Aux1 operates as switch:
"**Above**:" switch closed if system temperature reach the (also) adjustable value.
"**Below**:" switch closed if system temperature falls below the (also) adjustable value.

2.3.4 Aux 2 Configuration	
Item	**Function**
No Function	
Over / Under temp.	Switch closed if system temperature exceeds the lower or upper limits (see 2.3.3 temperatures).
On above temp.	Switch closed if system temperature reaches the temperature defined at the last item.
On below temp.	Switch closed if system temperature falls below the temperature defined at the last item.
Temperature	Value for "On above" and "On below operation.

The Auxiliary Port 2 is only recommended for operating in output mode. According to Aux1 Port 2 operates also as switch.

2.3.5 Aux 3 Configuration	
Item	**Function**
0V Temperature	
5V Temperature	

Auxiliary Port 3 is an analog voltage output.

2.3 Detailed OSD description (continue)

2.3.6 Anti Sticking	
	Funktion
Mode	Selection of invers or white view in antisticking mode.
Period	Period of time til activation of antisticking mode. Possible values are: On (permanent), 5 sec, 5min, 10min, 30min, 1h, 8h, 12h and Off.
Duration	Adjustable values like at „Period“
Off	Allows deaktivation of the antisticking mode through keypressed.
Active	Total antisticking active time.
Rotation	Enables „Pixel rotation“. This means the picture moves from upper-left to upper-right to lower-right to lower-left and back to upper-left position. Time between position changeds is adjustable with same values as „Period“.
Pixel	Number of Pixels for rotation. Adjustable values are 2,4,6 and 8.

Settings for Antisticking and Pixel rotation mode.

2.3.7 Auto Backlight	
	Funktion
Auto	Enable automatic backlight adjustment.
Min Helligkeit	Sensorvalue for minimum backlight brightness.
Max Helligkeit	Sensorvalue for maximum backlight brightness.
Sensorwert	Actual measurement of the photo transistor
Backlight	Resulting backlight adjustment. Default range is 0 to 15.

2.4 Firmware	
Item	**Function**
Baudrate	Adjust of Baudrate: Remark Only for Firmware Update. The settings for all other RS232 operations is 9600. Selection could be made between: 9600 19200 38400 115.2K
Download	Starts download.
Transmitted	Total number of bytes received
Byte Errors	
Status	Idle: nothing happens Running: download is active Successful: Download complete.

This menu provides the functionality for updating the firmware itself.

Note: Abort the Download is no problem. The downloaded software is stored in a second bank area. After reaching the status successful the old firmware is erased and the new is copied to the destination area. In this time power should be supplied until MMIB restarts itself.

2.4 Factory releated OSD description

There are some settings not recommended to be adjusted by the user. For these types there are serveral additional menus. Depending on the selected access mode they are reached with the LEFT key (while users OSD is closed).

MODE 0: No menu
MODE 1: Servicemenu (functionality for the manufacturer, regarding the systems performance)
MODE 2: Color setup menu (to improve analog offset and gain settings for the VGA channels, also to adjust display whitepoint)
MODE 3: Backlight-Setup (to adjust customer specific backlight inverter)
MODE 4: Customer specific.

The access mode is toggled to the next stage by pressing LEFT key while power up.

3. Color-Setup		
Item		**Function**
VGA 1		Select 1st VGA input
VGA 2		Select 2nd VGA input
B&W		Black & White
Brightness		Actual brightness
Contrast		Actual contrast
Offset	3.1	Black point adjustment
Gain	3.2	White point adjustment
Display	3.3	Display White point adjustement

To optimize color performance a fine adjustment of the VGA Analog to digtial converter (AD9888) can be done.

- Black point: The offset value for all the color channels red, green and blue should be adjusted to get a digital 0x00 value for a defined black level. It's recommended to do this adjustment for a brightness setting of 32.
- White point. The gain value for all three color channels red, green and blue should be adjusted to get a digtial 0xFF value for a defined white level. For optimum results it's recommended to keep this value as small as possible. Therefore the contrast value should be adjusted to the very first value befor 0xFF appears.

This adjustments has to be done three times. For 1st VGA , 2nd VGA inputs and 2nd VGA in B&W mode.

To support the procedure a special output mode is established.
Incomming digtal 0x00 is displayed as 0x00 "black"
Incomming 0x01 to 0xFE is displayed as 0x80 "grey"
Incomming 0xFF is displayed as 0xFF (white)

So there are only three luminance levels which have to be distinguised: black, grey and white. This allows an easy adjustment.

2.4 Factory releated OSD description (continue)

Following procedure is recommended:

Image: Black background, white center box

1. Black point.

Select Auto adjust. The black background should be black (few artefacts are allowed). increase/decrease the value (R G and B) the color changes should be clear to see.

3.1 Pre-Offset 3.2 Pre-Gain (similar)	
Item	**Function**
Auto	Auto black point adjustment for red, green and blue channels
Offset R	black point value for red
Offset G	black point value for green
Offset B	black point value for blue

.

2. White point.

Select Auto adjust. Check (R G and B) values. The white box should be white (artefacts are allowed!). Increase the values if the white box is not mostly white. A deacrease of 1 should change the color from white to mangenta, cyna or yellow.

3.3 Display WP	
Item	**Function**
Whitepoint x	
Whitepoint y	
Default	Set settings to their initial values

x/y values for display whitepoint. CIE x y Y color space is used.

2.4 Factory releated OSD description

4. Backlight-Setup	
Item	**Function**
Min. brightness	Voltage level for minimum brightness.
Max. brightness	Voltage level for maximum brightness.
Steps	Steps for backlight adjustment. Default are 16.
On/Off Control	Backlight turn on/off control signal polarity and availability.
DPMS value	If turn on/off signal is not available analog “off” voltage level for power down mode.
Defaultvalues	Reset all backlight items to their default values.
Backlight	Backlight brightness (same as menu item Main->Picture).

To access this menu see 2.0 user controls **access mode**

All adjustments done in this menu are stored depending on the actual selected display number. (See how to select your disred display).

2.5 Itemlist functions

The itemlist allows quick access to several menuitems without activating the OSD menu. Depending on the keyoption settings the itemlist can be activated a. with the DOWN key or b. with the LEFT and RIGHT (+ and -) keys. The next item in the list is selected always with the DOWN key. The selected item together with the current value is displayed with transparent background style. With the OK (MENU) key or after 4 seconds the item is cleared.

As Factory defaults there a following items available:

Input	Items
VGA	backlight, contrast, phase
VIDEO	backlight, contrast, saturation
SDI	backlight, contrast
DVI	backlight, contrast

User can define his own itemlist via the Filesystem functionality (See Appendix III).

The filesystem Block identifier is 01AA (VGA), 02AA (Video), 03AA (SDI) and 04AA (for DVI). The itemnumbers are the same as for RS232 item read or write commands. Therefore refer Appendix II.

As example the default vga setting as filesystem line:

:01AA 03B4 03AA 039E FFFF FFFF FFFF ...

And the default video setting:

:02AA 03B4 03AA 04C3 FFFF FFFF FFFF ...

The first FFFF after the itemlist is the end of list indicator.As result one itemlist can achieve the maximum number of up to 30 items.

Important notice:
1. each number block as to contain 4 digits (dont forget the leading zero).
2. Like any other filesystem line each line as to contain 32 blocks.
3. After download the new filesystem file restart the interfaceboard.

2.6 Auxilary functions

In addition to the options for AUX1 and AUX2 given by the OSD, the user can freely define AUX1&2 functions with using the filesystem. The filesystem Block identifier is 01A3 (VGA), 02A3 (Video) , 03A3 (SDI) and 04A3 (DVI). For each AUX port three words are needed:

1. Itemnumber:The same as for RS232 item read or write commands. Refer Appendix II
2. “low” value: Items value if input is low / the output shall became low.
3. “hige” value: Items value if input is high / the output shall bcame high.

BlockID	AUX1			AUX2			...
01A3	Itemno.	Lo Value	Hi Value	Itemno	Lo Value	Hi Value	...

To configure the auxilary port as output add 0x8000 to the item number. It is also possible to configure only AUX2. Therefore leave the three words for AUX1 at 0xFFFF. If one or both AUX ports are defined in the filesystem the correspondig OSD item is disabled.

Examples:

For Video inputs AUX 1 shall toggle between 4:3 and 16:9 output format and AUX 2 shall select backlight minum and maximum brightness:

:02A3 0AB7 0000 0001 03B4 0000 000F FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF

For VGA inputs AUX 1 is configured by OSD settings and AUX 2 shall perform geometry autoadjust:

:01A3 FFFF FFFF FFFF 039F 0001 0001 FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF

Please refer also 2.5 “important notice”

2.7 Timing replacement list

Due to the fact, that there are a lot of timings with non auto detectable resolutions we have developt a possibility to create a customer specifc timing replacement list in the filesystem:

Block ID	Timing replacement list 1				Timing replacement list 2				...
FFA2	Auto X	Auto Y	X	Y	Auto X	Auto Y	X	Y	...

After the MMIB detects a new timing the microcontroller investigate the incoming resolution (640x480, 800x600, 1024x768 etc...). After this the Timing replacment list is checked wheter the detected resolution (e.g. 1024x768) should be replaced)1368x768) or not. It is also possible to choice the display mode „Standard“ or „Original“. This is done by setting Bit 12 of the Y value. Bit 12 = 0 means „Standard“. Bit 12=1 means original.

Here an example to relace XGA resolution with 1368x768 display in original mode:

:FFA2 0400 0300 1558 0300 FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF
FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF

Hex 400 is equal to 1024, Hex 300 is equal to 768.
Hex 558 is equal to 1368.
The value Hex 1558 results in 1368 pixel displayed in „Original“ mode. If this value has been Hex 558 1368 Pixel in „Standard“ mode would be displayed.

Please refer also 2.5 “important notice”

3. How to select your desired Display

The digital output of the MMIB very flexible due to free selection of:

- Timing (H / V / DE / polarities)
- Resolution
- Port width (18 / 24 / 36 / 48 Bit)
- Additional control signals are supported by the microcontroller unit.
- Analog voltage for backlight adjustment.

To satisfy the requirements of the various available Displays we support various adapter-boards for a wide range of Displays. These adapter-boards placed on the top of the MMIB board. Additionally every adapter-board has a DIL-switch which allows to select one out of fifteen Displays. At power on, the MMIB automatically recognize:

- which adapter-board is connected
- the desired display via the number selected by the DIL-switch.

At first please refer to the order information (INFO-MMIB2A) document. There you get an overview over all actual adapted Displays. Refer 3. Available adaptersets, TFT or 4. Available adaptersets PLASMA. Get a look on the column **Display No. Lets explain on following example:**

Fujitsu 15.1" XGA Display (FLC38XGC6V-06): 0x3**5** 0101

The number 0x35 is hexadecimal notation (and base). The (so called) upper nibble (0x30) is regardless for customers. But the lower nibble the 5 is the number which desided about the disired display. To help out we supply the binary notation of the number. This is the 0101. What means:
Set switch 4 off
Set switch 3 on
Set switch 2 off
Set switch 1 on

Next table shows all possibilities:

Display No	**DIP-SWITCH**			
	1	2	3	4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
A	OFF	ON	OFF	ON
B	ON	ON	OFF	ON
C	OFF	OFF	ON	ON
D	ON	OFF	ON	ON
E	OFF	ON	ON	ON
F	ON	ON	ON	ON

Remark: You find the display number (0x35) within the information menu (SERVICE->INFO).

4. Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
VCC (1)	supply voltage		9	12	15	V
Ivcc	supply current (without display and backlight)	@12V		400		mA
Vin_video (p-p) (2)	input video signal voltage (peak to peak)			1		V
Vin_vga (p-p) (2)	input video signal voltage (peak to peak)			0.7		V
Vin sync	input sync signal voltage, for VGA signals		3.3		5	V
Ri	input signal termination			75		Ohm
Fh	horizontal frequency for VGA signals		15		100	khz
Fclk	sampling rate for VGA signals		140			MHz
B	analog bandwidth for VGA signals	3dB		400		MHz
Usw	voltage at AUX1/2 in/out		0		24	V
Isw	current at AUX1/2 out				2	A
Uswt	threshold voltage at AUX1/2 in		0.8	1.4	2	V
Tcom	commercial operating temperature		-10		65	°C
Tind (3)	industrial operating temperature		-40		80	°C
L	length (of PCB)			132		mm
W	width (of PCB)			142		mm
H	height (above PCB)			20		mm
Hadp	mounting height for adapter boards			13.8		mm
Hmo	mounting height for MMIB above mounting plane		4			mm
Ifuse	recommended fuse			1.25 (4)		A

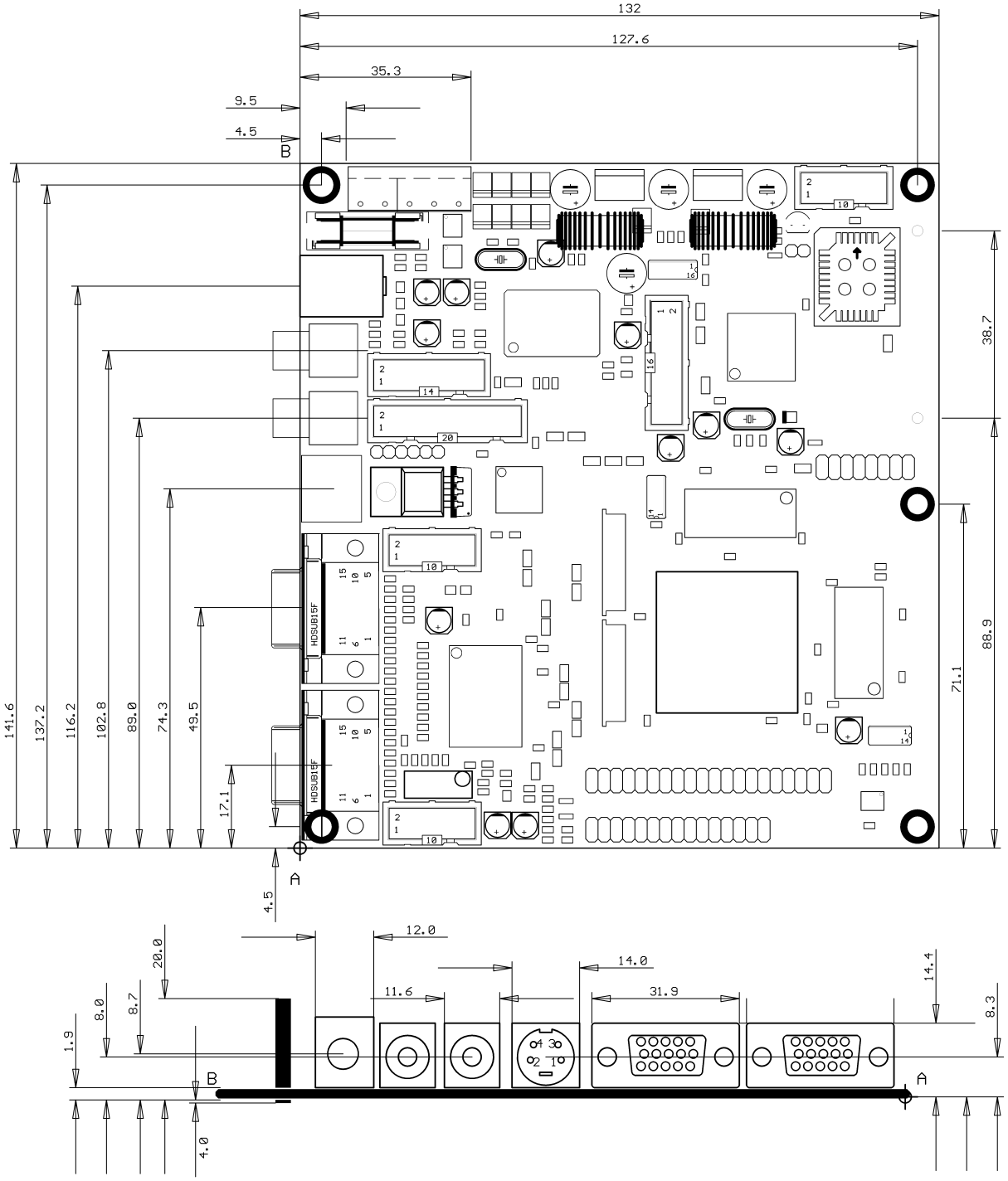
Notes :

1: VCC supplied via Connector X1 or CON1. Depending on the Display adapter, this voltage is used to directly feed the backlight converter. In these cases, the min and max values also have to correspond to the specs of the inverter.
2: Input signals may be AC-coupled or DC-coupled. DC-offset has to be less than +/-2V.
3: Boards with industrial temperature range are available on request.
4: depends used adapter board,display and backlight inverter.

Proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

Multi Media Interfaceboard MMIB2B MMIB

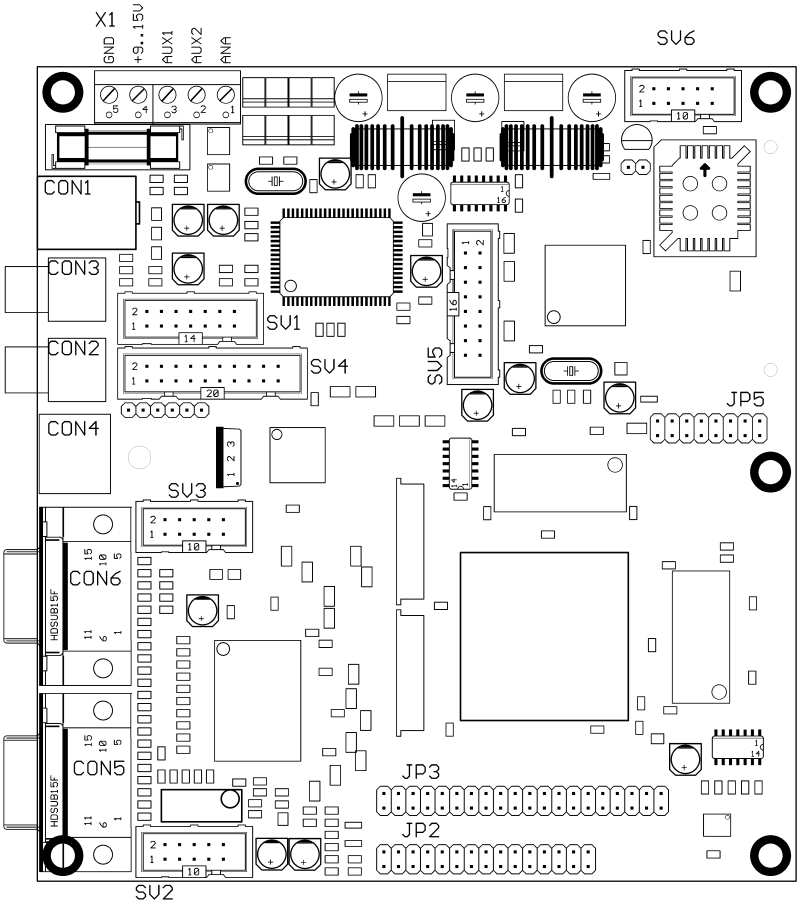
5. Mechanical drawings



Unit: mm

The maximum high (20.8 mm) of the MMIB is given by some capacitors within the switch mode supply unit. But some Display Adapter Boards may exceed this limit. So ensure that there is enough high in your design for both MMIB and the required adapter board.

6. Connectors (overview)



Symbol	Type	Description	Remark
CON1		power supply	
CON2	Chinch receptacle	2nd Composite input	
CON3	Chinch receptacle	1st Composite input	
CON4	4-pin S-video (Mini Din)	S-video (Y/C) input	
CON5	HDSUB15 receptacle	2nd PC signal input	
CON6	HDSUB15 receptacle	1st PC signal input	
X1		power supply, Aux	
SV1	Box type pin header 2x7 pins	Video, Scart extension	
SV2	Box type pin header 2x5 pins	2nd PC signal input extension	
SV3	Box type pin header 2x5 pins	1st PC signal input extension	
SV4	Box type pin header 2x10 pins	CCIR655 input	
SV5	Box type pin header 2x8 pins	Keyboard	
SV6	Box type pin header 2x5 pins	RS232	
JP2	Pin header 30 pins, double row	Digital Output PORTB	connector for display specific adapter board
JP3	Pin header 40 pins, double row	Digital Output PORTA	connector for display specific adapter board
JP4	Pin header 2pins, single row	Flash Chip Select	**for factory use only**
JP5	Pin header 16 pins, double row	Display and backlight control	connector for display specific adapter board

6.1 Supply connectors

CON1: Supply voltage			
Pin	Symbol	Description	Level
1	VCC	(inner) Supply voltage	9..15V
2	GND	(outer) Ground	

X1 – Supply voltage and Auxiliary Ports			
Pin	Symbol	Description	Level
1	GND	Ground	
2	VCC	Supply voltage	9..15V
3	AUX1	(refer 2.3.4 AUX1 configuration)	
4	AUX2	(refer 2.4.5 AUX2 configuration)	
5	AUX3	(refer 2.4.6 AUX3 configuration)	

6.2 Video signal input connectors

CON4: Y/C (s-video) input			
Pin	Symbol	Description	Level
1	GND	Ground	
2	GND	Ground	
3	Y	Luminance	1V(p-p)
4	C	Chrominance	0.3V(p-p)

CON2, CON3: composite video input			
Pin	Symbol	Description	Level
1	Comp	Composite video input	1V(p-p)
2	GND	Ground	

SV1: AV (Scart) extension			
Pin	Symbol	Description	Level
1	U12	12V (taken from main supply)	
2	COoutAV	Composite video out, for AV	
3	U5A	5V analog supply	
4	FB	Fast Blank Input, 4k7 termination to gnd	
5	U3	3.3V supply	
6	Blue	Blue component of RGB (Fastblank) input	
7	GND		
8	Green	Green component of RGB (Fastblank) input	
9	COin2	2nd composite video input (parallel to CON2)	
10	Red	Red component of RGB (Fastblank) input	
11	COin1	1st composite video input (parallel to CON3)	
12	COinAV	Composite video input for AV	
13	Cin	Chrominance input (parallel to CON4)	
14	Yin	Luminance input (parallel to CON 4)	

SV4 – SDI input extension			
Pin	Symbol	Description	Level
1	Locked	Receiver PLL locked	TTL
2	U12	12V (taken from main supply)	
3	D0	CCIR656 Data, LSB	
4	GND	Ground	
5	D1	CCIR656 Data	
6	U5	5V supply	
7	D2	CCIR656 Data	
8	GND	Ground	
9	D3	CCIR656 Data	
10	U3	3.3V supply	
11	D4	CCIR656 Data	
12	GND	Ground	
13	D5	CCIR656 Data	
14	SCL	I²C Bus clock line	
15	D6	CCIR656 Data	
16	GND	Ground	
17	D7	CCIR656 Data, MSB	
18	SDA	I²Bus data line	
19	CLK	Clock for CCIR656 Data	
20	GND	Ground	

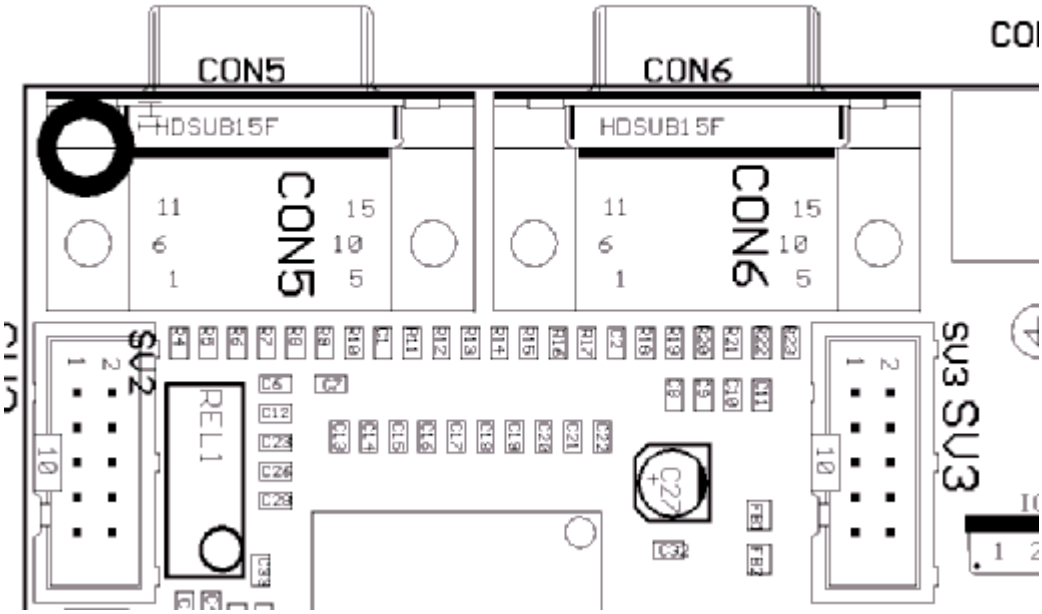
The SV1 connector supplies all video inputs and all connections necessary for the I&B AVINP01 (AV Input Board).

The SV4 connector supplies a CCIR656 interface and provides all connections necessary to connect the I&B SDIINP01 (SDI Input board) which is necessary for SDI operations.

6.3 VGA signal input connectors

SV2, SV3: Analog VGA input (box type pin header)			
Pin	Symbol	Description	Level
1	GND	Ground	
2	R	Red input signal	0.7Vpp
3	GND	Ground	
4	G	Green input signal	1Vpp
5	GND	Ground	
6	B	Blue input signal	0.7Vpp
7	GND	Ground	
8	H Sync	Horizontal or Composite Sync Signal	LVTTL/ TTL
9	GND	Ground	
10	V Sync	Vertical Sync Signal	LVTTL/ TTL

CON5, CON6 Analog VGA input (HD subD type)			
Pin	Symbol	Description	Level
1	R	Red input signal	0.7Vpp
2	G	Green input signal	1Vpp
3	B	Blue input signal	0.7Vpp
4	n.c.	no connection	
5	n.c.	no connection	
6	R gnd	Ground for red signal	
7	G gnd	Ground for green signal	
8	B gnd	Ground for blue signal	
9	n.c.	no connection	
10	GND	Common ground	
11	n.c.	no connection	
12	n.c.	no connection	
13	H Sync	Horizontal or Composite Sync Signal	LVTTL/ TTL
14	V Sync	Vertical Sync Signal	LVTTL/ TTL
15	n.c.	no connection	



Termination Resistors:

VGA 1 (CON6, SV3) : R18 R20 R22 (75Ohm)
VGA 2 (CON5, SV2) : R4 R6 R8 (75Ohm)

6.4. Peripheral connectors

SV5: keyboard connector (box type pin header)			
Pin	Symbol	Description	Level
1	TIIO2	must be left open	TTL
2	GND	Ground	
3	TIIO1	Green LED, (LED is driven to GND)	TTL
4	TIO0	I/O (for special customer requirements)	TTL
5	TIIO0	Red LED, (LED is driven to GND)	TTL
6	TIN4	Input „OK“ key	TTL
7	AD1	Analog to Digital Converter Input (for special customer requirements)	0-5V
8	TIN3	Input for „Right“ key	TTL
9	AD0	Analog to Digital Converter Input (for special customer requirements). Normally used as digital input.	0-5V TTL
10	TIN2	Input for „Left“ key	TTL
11	SCL	Clock line for I2C-bus	TTL
12	TIN1	Input for „Down“ key	TTL
13	SDA	Data line for I2C-bus	TTL
14	TIN0	Input for „Up“ key	TTL
15	U5	5V supply voltage	
16	IRREC	Input for IR receiver diode	TTL

SV6 – RS232 connector (box type pin header)			
Pin	Symbol	Description	Level
		D-Sub 9 (female)	
1	loop1	1, DCD	
2	loop1	6, DTR	
3	TxD	2, transmit line	+/-10V
4	loop2	7, CTS	
5	RxD	3, receive line	
6	loop2	8, RTS	+/-12V
7	loop1	4, DSR	
8	GND	9, ground	
9	GND	5, ground	
10	Boot	open	**only for factory use**

The pin out of the SV6 is prepared for operation as **DCE (Data Carrier Equipment).** Connect D-Sub 9 (female, crimpable) with a ribbon cable to SV. Leave pin 10 open.
All necessary Null-modem loops (loop1 and loop2) are provided.
Connect the RS232 interface with a standard 1:1 cable to the PC interface.
(See also chapter 7: RS232 communication

6.5. Display connectors

Since the MMIB is recommended for use with display specific adapter boards, display and backlight should not connected directly without advice from Imm & Bühler Elektronik.

Attention: For pin numbers refer to drawing above. Numbering is inverse to box-type pin headers.

JP2: Digital output PORTB (double row pin header)

Pin	Symbol	Description	Level
1	U5	5V supply voltage	
2	GND	Ground	
3-10	PBR7..0	Red Data 7..0	3.3V CMOS
11	U3	3.3V supply voltage	
12	GND	Ground	
13-20	PBG7..0	Green Data 7..0	3.3V CMOS
21	U5	5V supply voltage	
22	GND	Ground	
23-30	PBB7..0	Blue Data 7..0	3.3V CMOS

JP3: Digital output PORTA (double row pin header)

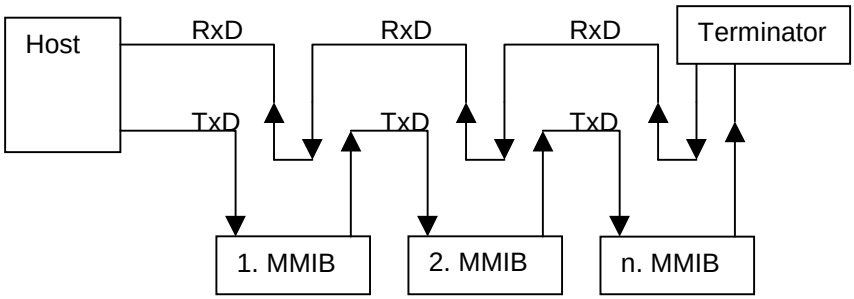
Pin	Symbol	Description	Level
1	U3	3.3V supply voltage	
2	GND	Ground	
3-10	PAR7..0	Red Data 7..0	3.3V CMOS
11	U5	5V supply voltage	
12	GND	Ground	
13-20	PAG7..0	Green Data 7..0	3.3V CMOS
21	U3	3.3V supply voltage	
22	GND	Ground	
23-30	PAB7..0	Blue Data 7..0	3.3V CMOS
31	U12	12V supply voltage (directly of input CON1/X1)	
32	GND	Ground	
33	DIO0	I/O	TTL
34	DA1	Analog output	
35	DIO1	I/O	TTL
36	DA2	Analog output	
37	PCLK	Display Clock	3.3V CMOS
38	PDE	Data Enable	3.3V CMOS
39	PVS	Vertical sync signal	3.3V CMOS
40	PHS	Horizontal sync signal	3.3V CMOS

JP5: Display and Backlight control lines

Pin	Symbol	Description	Level
1	DA3	Analog output	0..5V
2	DOUT0	Output	TTL
3	SCL	Clock line for I2C	TTL
4	DOUT1	Output	TTL
5	SDA	Data line for I2C	TTL
6	DOUT2	Output	TTL
7	DINT0	Input	TTL
8	TIO0	I/O	TTL
9	DIN2	Input	TTL
10	DIO2	I/O	TTL
11	AD2	Analog input	0..5V
12	DIO3	I/O	TTL
13	AD3	Analog input	0..5V
14	DIN0	Input	TTL
15	GND	Ground	
16	DIN1	Input	TTL

7. RS232 communication

The RS232 communication offers an additional way to adjust an control the OSD settings.
Therefore a simple RS232 protocol is used. Each data stream has a fixed length of 10 bytes.
To allow to connect more than one MMIB to the RS232 port of an host (e.g. personal computer) an RS232 „ring“ technique is to use. Since RS232 is not recommended for more than two terminals each client must repeat the incoming messages for the next client.



Recommended COM port settings	
Baud-rate	9600
Parity	Even
Data-bits	8
Stop-bits	1

Note: If you build up a session in a ring you should perform a “PING” command at first, to ensure that all MMIB’s have a unique number.

7.1. Hardware connection

Refer chapter 6.4 (Pheriperal connector SV6)

7.2. RS232 protocol

Standard read / write protocol:

<STARTC>	<MMIB-NO>	<CMD+ITEM>	<VALUE>	<CKS>	<STOPC>
2 bytes	1 byte	2 bytes	2bytes	1byte	2 bytes

Communication lost or timeout

<STARTC>	<MMIB-NO>	<0xAAAA>	<0x5555>	<0xAA>	<0x0055>
2 bytes	1 byte	2 bytes	2bytes	1byte	2 bytes

protocol item	value/range		description	treated as
<STARTC>	0x55AA		start condition	
<MMIB-NO>	0x00		broadcast; transmission to all MMIBs in the RS232 ring	unsigned char
	0x01 .. 0xFF		Transmission to the specific MMIB	
<CMD+ITEM>	0x0 .. 0xF	Bit 15 .. 12	command (see table 7.1)	unsigned char
	0x0 .. 0xFFF	Bit 11 .. 0	item to read/write (see Appendix II) or keycode (see table 7.2) or transmission for filesystem access	signed integer
<VALUE>	0x0000 .. 0xFFFF		value to be set / read	signed integer
	0x0000	for items which enable or disable a function	function will be / is disabled	Boolean
	0x0001 .. 0xFFFF		function will be / is enabled	
<CKS>	0x00 .. 0xFF		Checksum	unsigned char
	= (<MMIB-NO> + LOBYTE(<CMD+ITEM>) + HIBYTE(<CMD+ITEM>)+ LOBYTE(<VALUE>)+ HIBYTE(<VALUE>)) AND 0xFF			
<STOPC>	0x00FF		stop condition from HOST	
	0x00FE		ACK stop condition form CLIENT	
	0x0055		NACK stop condition from CLIENT; communication was lost or timeout has occurred	

Table 7.1: commands

code	Description
0x0	Read menu item, from client (MMIB) (see also CMD 0x4) (also Appendix II)
0x1	Write menu item, to client (MMIB) (see also CMD 0x4) (also Appendix II)
0x2	key, simulate keystroke on client (MMIB)
0x3	repeated key, simulate repeated keystroke on client (MMIB) (steps will be greater)
0x4	Save, necessary if items adjusted over CMD 0x0 and 0x1
0x5	ping, automatically numbering all clients (MMIB) in the RS232 ring (in physical order)
0x6	Filesystem Command
0x7	Firmware Update
0x8	RAM Read (simplified Read Current 0x6007 command) See Appendix III for details
0x9	RAM Write (simplified Write Current 0x6008 command). See Appendix III for details
0xA	NACK (read only)

Table 7.2: keycodes

code	Description	function while OSD is off
0x0B6	Left	OSD starts with “input geometry” menu
0x08B	Up	OSD starts with “source menu”
0x0B7	Right	OSD starts with “input geometry” menu
0x08D	Down	OSD starts with customer menu (if required)
0x08C	Ok	OSD starts with “main menu”

Table 7.3: Monitorwall command

To accelerate the access to the wall functionality there is one special monitorwall command:

CMD	ITEM	VALUE
0x3xxx	0: Monitor No. is not changed 1..1024 Monitor is the # with in the Monitorwall (0x001..0x400) 1025 (0x401): Numbering is done automaticaly within the wall. (like „Ping“ but for Monitornumber within the wall). 1)	Bit(5..0) number of monitors in X direction. Bit(7..6) not used Bit(13..8) number of monitors in Y direction. Bit(14) Force Black (0: normal 1: black) Bit(15) Monitorwall off/on (0: Off 1:On)

Notes:

Broadcast command 0x3000 allows configuration of all monitors within a wall with:
Number of Monitors in both directions, Monitorwall on/off, force Monitors to black (to avoid arctefacts during reprogramming).

1)
Command 0x3401 alllows additinaly to configure even the monitor number for each monitor with the wall. This command should NOT be broadcasted. For this it is necessary that the RS232 ring is build in the same order like the monitors have in the wall.

Additionally there are the known Menuitem Read and Write commands to access each parameter.

Table 7.4: Filesystem commands

cmd+item	description	Further
0x6000	Find file system entry 1) VALUE == 0 VALUE != 0 Possible return values 0x0000 0xFFFF other	Value defines the data block type Allows to search a specifc data block. Note: Use together with “Stop/Init session” for blocks which exist only one time. Find any entry Find spezific entry (see MMIB2CFG for FlashID details) Entry not found EOF End of active file entry. FlashID&ExtFlashID 1)
0x6001	Read Word (2 bytes)	
0x6002	Write Word (2 bytes)	
0x6003	Delete file system entry	Delete the latest found data block. Necessary if a existing data block has to be updated. Also if a communication error appears while transmitting data.
0x6004	Create new entry 1)	Value defines the data block type. Create a data block header.
0x6005	Stop/Init session	
0x6007	Read Current	Similar to 0x6001 but access to the RAM part
0x6008	Write Current	Similar to 0x6002 but access to the RAM part. Initialisation of the new values is done automaticaly.
0x6009	Restart System	Downloaded settings will take only affect after system restart. (software reset)
0x600A	Store Displaytiming	The current used displaytimig is stored in the filesystem.
0x600B	Value==0 Value!=0	Turn Backlight Off Turn Backlight ON
0x600C	Store Timing Infos	Storing the actual Timing measurments. Usefull if customer specifc timings are not correctly recognized. Value = Number of measurment to store (keep the value below 128).

1) VALUE Low Byte: FlashID, VALUE High Byte ExtFlashID (see MMIB2CFG.TXT)
Explenation:
All settings done via the OSD are saved in the flash file system data blocks, with a maximum length of 64 Bytes. There are different block types for all the necessary information which has to be stored. While some blocks exist only one time there are others e.g. for geometry settings which exist a lot of times. To determine the different blocks there identification headers which allows to identify the disired blocks. For detailed description of the specific data blocks refer to the MMIB2CFG.TXT document. Since a flash has to be treated as ROM it’s necessary that new or updated information has allways to be written in an unused area. Therefor the old position has to be found and deleted before the new entry is created (see recommended write sequences). For easier upload sequences set FlashID and ExtFlashID to 0x00 to find any active memory block.

Table 7.5: Firmware update command

cmd+item	Description	Value
0x7000	Start Firmware Update	0x0000 with 9600 Baud 0x0004 with 19200 Baud 0x0008 with 38400 Baud 0x000C with 115200 Baud

7.3. Protocol examples

Note: Low Bytes (LSB) should transmit/received first.

Example 1: Set Item 3 of MMIB 1 to a value of 0xFF

HOST:

<START>	<MMIB-No>	<CMD+ITEM>	<VALUE>	<CKS>	<STOP>
0x55AA	0x01	0x1003	0x00FF	0x13	0x00FF

at line: 0xAA 0x55 0x01 0x03 0x10 0xFF 0x00 0x13 0xFF 0x00

CLIENT: (returns)

<START>	<MMIB-No>	<CMD+ITEM>	<VALUE>	<CKS>	<STOP>
0x55AA	0x01	0x1003	0x00FF	0x13	0x00FE

at line: 0xAA 0x55 0x01 0x03 0x10 0xFF 0x00 0x13 0xFE 0x00

Example 2: Read value of Item 4 form MMIB 2

HOST:

<START>	<MMIB-No>	<CMD+ITEM>	<VALUE>	<CKS>	<STOP>
0x55AA	0x02	0x0004	0x0000	0x06	0x00FF

Note: At read commands value should always be zero. (0x0000)

CLIENT:

<START>	<MMIB-No>	<CMD+ITEM>	<VALUE>	<CKS>	<STOP>
0x55AA	0x02	0x0004	0x0500	0x0B	0x00FE

7.3. Protocol examples (continue)

Example 3: Press OK at MMIB 1

HOST:

<START>	<MMIB-No>	<CMD+ITEM>	<VALUE>	<CKS>	<STOP>
0x55AA	0x01	0x208C	0x0000	0xAD	0x00FF

CLIENT: (if key has no effect to any value)

<START>	<MMIB-No>	<CMD+ITEM>	<VALUE>	<CKS>	<STOP>
0x55AA	0x01	0x208C	0x0000	0xAD	0x00FE

CLIENT: (if key has effected a value, the new value will be returned)

<START>	<MMIB-No>	<CMD+ITEM>	<VALUE>	<CKS>	<STOP>
0x55AA	0x01	0x208C	0x0500	0xB2	0x00FE

Example 4: Ping

Pinging allows numbering and counting of all MMIB's available in the RS232 Ring.

HOST:

<START>	<MMIB-No>	<CMD+ITEM>	<VALUE>	<CKS>	<STOP>
0x55AA	0x00	0x5000	0x5500	0xA5	0x00FF

Note: At pinging <MMIB-No> as no affect, <VALUE> must be set to 0x5500.

CLIENT1:

<START>	<MMIB-No>	<CMD+ITEM>	<VALUE>	<CKS>	<STOP>
0x55AA	0x00	0x5000	0x5501	0xA6	0x00FE

Note: Low Byte of value returns the (new) number of the MMIB in the RS232 Ring.

CLIENT2:

<START>	<MMIB-No>	<CMD+ITEM>	<VALUE>	<CKS>	<STOP>
0x55AA	0x00	0x5000	0x5502	0xA7	0x00FE

Note: Low Byte of value returns the (new) number of the MMIB in the RS232 Ring.

7.3. Protocol examples (continue)

Example 5: Read sequences for the entire file system:

CMD+Item, Value

1. 0x6005, 0x0000 “Stop/Init Session”
2. 0x6000, 0x0000 “Find **ANY** file system entry”

Entry not found -> Step 4

3. 0x6001, 0xFFFF “Read Word” repeat for 32 times.

Repeat with step 2

4. 0x6005 “Stop/Init Session”

Writing is similar. If a communciation error appears until writing a block the “Delete Entry” command ensures that there is no block with incorrect data. This ensures correct operation.

Example 6: Recommended writing sequences for file system:

1. 0x6005 “Stop/Init Session”
2. 0x6000 “Find file system entry”

3. Block Exist (YES)-> 0x6003 “Delete entry”

4. 0x6004 “Create New entry”
3. 0x6002 “Write Word” repeat for 31 times. until the hole block is written
4. 0x6005 “Stop/Init Session”

Remarks:

After a “Find Entry” command the first “Read Word” command reads out the header word. This is different to “Create New Entry” where the header is written.

Also the “Read Current” and “Write Current” starts with the respective data values. Additionally the ExtFlashID descripte in MMIB2CFG.TXT is not necessary.

For “Write Current” no “Create New Entry” command is necessay.

7.4 Firmware Update

MMIB Settings for firmware update:

Open the OSD menu “Service->Firmware”.

The Baudrate for the firmware download is selectable between 9600, 19200, 38400 and 115.2Kbaud (see also table 7.4). Starting the download sequence is possible via OSD command or via RS232. For RS232 (see command 0x7000 description) remember the the “normal” command are allway transmitted with 9600 Baud.

Activate download to start the receiving of RS232 data. Status change to “Running”. After receiving the complete firmware file the status change to “Successfull”. Now the MMIB copies the received program file from a buffer memory to the working memory. After ~3 seconds this copy process is complete and the MMIB restarts automatically.
!!! Avoid power failure during this “copy” time. A loss of firmware data will be the result !!!

If communication is lost or the transmitter is not active a timeout occurs after 5 seconds. Status change to “Timeout”. During reception the number of received bytes is displayed in the OSD menu.

RS232 protocol description:

Updating the firmware is completely different to the know software protocol. The advantage is asimplified and fast protocol with less transfer overhead. The disadvantage is that firmware updating work not in the known rs232 ring concept. One MMIB has to be connected directly to the RS232 PC interface.

The basic functionality is to transfer the h86 file line for line via the rs232 to the MMIB. To ease explanations lets take a look on some h86 lines:

:020000020000FC
:10000000FA005CDBCB00CB00000000000000000029
:10001000000000000000000000000000000000E0
:10002000000000000000000000000000000000D0

Since the h86 files are readable with any ascii editor the programm information has to be converted from ascii character to real hex data. This means that one byte of programm data is represented by two ascii charaters in the h86 file.
For example the last two charaters of the first line (“FC”) is one hexadecimal coded number 0xFC (252).

1. Read current line of the h86 file.
2. ignore “:”
3. Convert two ascii charaters “02” to one byte (hexstring to byte function)
4. repeat step 3 until end of line.
5. Wait for ACK or NACK answer.

The last byte of each line is the checksum byte. After receiving a complete line the MMIB answers with ACK (0xFF) if the checksum is correct otherwise with NACK (0x00). If the MMIB answers with NACK it is possible to repeat transmission of the same line again.

6. Read next line until end of file and repeat with step 2.

Some notes:

- Firmware update can be aborted any time until status “Successfull”

8. Warranty

Imm und Bühler Elektronik GmbH guarantees a warranty of 6 months starting at shipment.

9. Special applications

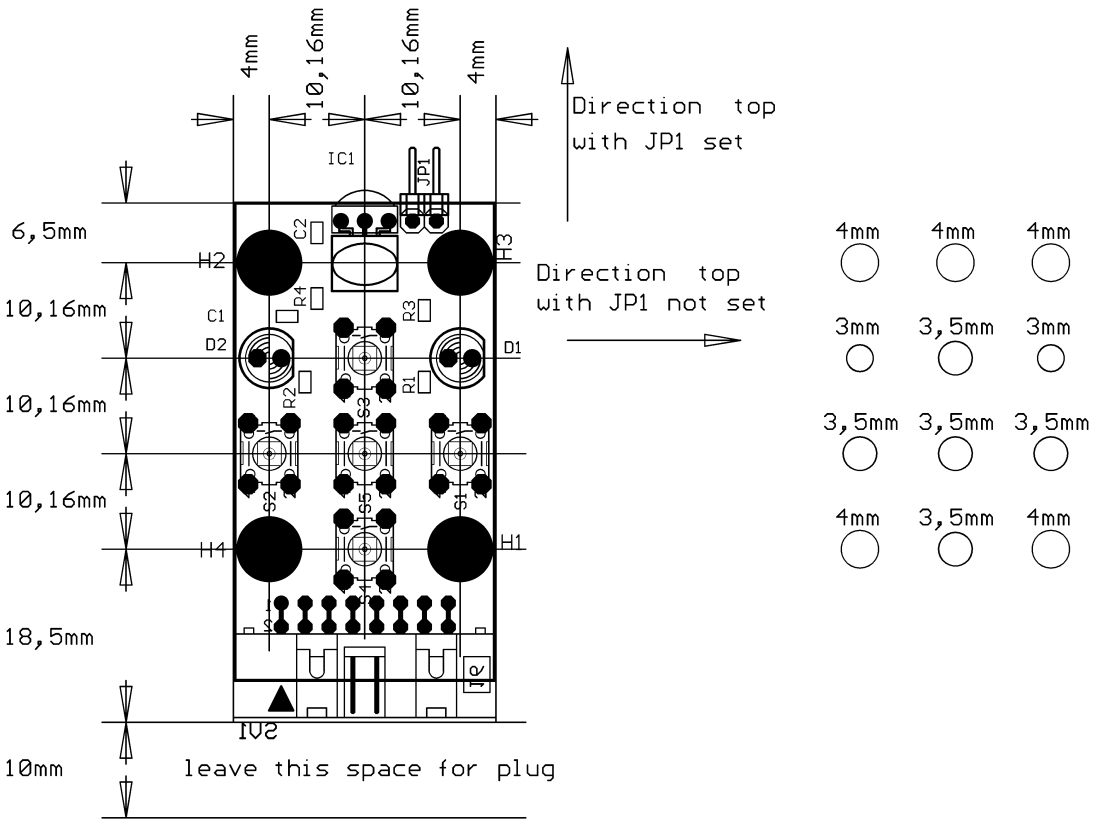
CAUTION: customers considering the use of our products in special applications where failure or abnormal operation may directly affect human lives or cause physical injury or property damage, or where extremely high levels of reliability are demanded (such as aerospace systems, atomic energy controls, sea floor repeaters, vehicle operating controls, medical devices for life support, etc.) are requested to consult with Imm und Bühler Elektronik before such use.

The company will not be responsible for damages arising from use of their products.

Like any other technical device our products has an inherent chance of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention over-current levels and other abnormal operating conditions.

Multi Media Interfaceboard MMIB2B MMIB

Appendix I: Keyboard and IR-Remote



Ref	Description	Remark
JP1	Assembly direction	closed: horizontal open: vertical
D1	LED red	Key-pressed feedback
D2	LED green	Power On
S1..S5		Left Right Up Down Ok
H1..H4	Assembly holes	M3 screws recommended
SV1	Box Type pin header, 16pin	for 2,54mm flat ribbon cable

IR-Remote Control IR06:
Supply 2x1,5 micro AA cells

After exchanging the cells the IR06 needs to be programmed to the MMIB specific device code (166).
Therefore press [P] and [OK] together until the red LED (H1) is permanent on. Then press in following order:
1x [-]
6x [Up]
6x [+]
To quit the programming mode press [OK].

Note: [P] has no function in normal operation.

Appendix I: Keyboard and IR-Remote IR28

Cells: 2x 1,5 Micro AA

Programming:

Before first use or after exchanging the cells the remote has to be programmed. Therefor press ON/OFF and OK for 3 seconds. ON/OFF lights up. Enter “2 7 0”. To complete programming press ON/OFF again. ON/OFF flashes one time for acknowledge. The remote is ready for use.

Keys:	Function
1 2 3 4 5 6 7 8 9 0	Digit keys. Use to enter for IR-Access Code (see chapter 2.3 „OSD Menu“: Menu 2.2 Maintenance)
ON/OFF	Backlightpower on/off.
P (up)	UP
P (down)	DOWN
-	LEFT
+	RIGHT
OK, MUTE	OK
All other keys are not used this time.	

For a detailed key function description refer chapter 2. OSD Menu (Key) “**Functionality“.**

Multi Media Interfaceboard MMIB2B MMIB

Appendix II: Item Numbers for RS232

Appendix II.1: Submenu SOURCE items
Appendix II.2: Submenu GEOEMETRY items (VGA)
Appendix II.3: Submenu GEOMETRY items (video)
Appendix II.4: Submenu PICTURE items
Appendix II.5: Submenu OTHER items
Appendix II.6: Submenu SYSTEMMENU items
Appendix II.7: Color Setup items
Appendix II.8: Submenu BACKLIGHT SETUP items

(d): for details see AII.9 “items with predefinded values”

AII.1: Submenu SOURCE items

ItemNo	Menu	Item	Description
38Dh	Source	VGA 1	Show {1st PC} input signal.
49Ah	Source	VGA 2	Show {2nd PC} input signal.
4B9h	Source -> Video	COMP 1	Show {1st composite} input signal.
4Bah		COMP 2	Show {2nd composite} input signal.
4BBh		Y/C	Show {Y/C} input signal.
4BCh		AV	Show {AV} input signal.
73Ah	Source	DVI	Show {DVI} input signal.
4A0h	Source	SDI	Show {SDI} input signal.
8Ceh		SDI 1	Show {SDI 1} input signal.
8CFh		SDI 2	Show {SDI 2} input signal.
8D0h		SDI 3	Show {SDI 3} input signal.
8D1h		SDI 4	Show {SDI 4} input signal.
3B9h	Source -> Mode Info (read only)	H Frequency	in ¼ Hz
3BAh		V Input Frequency	in Hz * 100
5B1h		S ***(d)***	Sync Type and Polarity
4B0h	Source ->Video options	Source ***(d)***	Optimize color recovery for {VCR}, {satellite}- or {terrestrial} television.
4A7h		Auto Norm	Detection of the Videostandards {PAL}, {NTSC} and {SECAM}.
3CDh		Norm	Selection of the desired videostandards.
5D7h		Auto Format	Detection of {16:9} or {Letterbox formats}.
4A8h		AV	{Standard} shows the {composite} signal of the {AV} input. {RGB & YUV} shows the {component} signals of the {AV} input.
4Aah	Source ->VGA options	Auto Sync Detect	Enables auto detection of the supplied synchronization signal. Supported: {Separate HV-Sync}, {C-Sync} or {Sync on Green}.
4Abh		HV Sync	
4Ach		Composite Sync	
4Adh		Sync on Green	
4Aeh		Auto Black&White	Detection of monochrome pictures supplied on the {green} channel.
5B7h		H-Clamp	Horizontal Clamp Place. Only for special purposes. Default value is 8. {Attention: Wrong settings may cause color artifacts}
4B4h	Source -> SDI options	Format	
4B5h		SMPTE	
4B6h		NRZI	
4B7h		DESC	
4Beh	Source ->Signal management	Power On ***(d)***	Which input will be select at power on. {Last} means the last active input will be select again.
4BFh		Search	Allow search of active inputs at {No signal}.
4C0h		Supervision	Enables auto selection of other inputs if new signals are detected. {Remark:} Supervision of inactive inputs is only possible for inputs which are not in the same group as the active input.

AII.2: Submenu GEOEMETRY items (VGA)

ItemNo	Menu	Item	Description
399h	Geometry ->Input	Pixelrate	Adjust pixelrate until the whole frame appears the same. {Hint}: Use Windows Shut Down Picture for adjustment.
39Eh		Phaseshift (for VGA 1)	Adjust phaseshift to get best picture quality.
5B6h		Phaseshift (for VGA 2)	Adjust phaseshift to get best picture quality.
39Ch		X-Position	Horizontal frame offset.
39Dh		Y-Position	Vertical frame offset
39Ah		Pixel	Number of pixel of the incoming PC signal. For e.g. SXGA: 1280.
39Bh		Lines	Number of lines of the incoming PC signal. For e.g. SXGA: 1024. {l} or {i} indicates {interlaced} signals.
433h	... ->Interlaced	Non-Interlaced	
437h		PC	Optimized picture for {PC} signals.
438h		Sport	Optimized picture for fast moving {video} frames.
439h		Movie	Optimized picture for less moving {video} frames.
891h		Autophase ***(d)***	0->off 1->1sec 2->16sec 3->4min
39Fh	Geometry ->Input	Auto	Selfadjustment of the {geometry parameter}, {phaseshift} and {contrast}. Color values will be set to their default values.
ABFh	Geometry ->Display	Format ***(d)***	Aspect ratio. 4:3/16:9/original
3A1h		Pixel	Number of active display pixel per line.
3A2h		Lines	Number of active display lines.
3A3h		X-Offset	Output: if active display area is chosen smaller than its real resolution, the horizontal position can be adjusted.
3A4h		Y-Offset	Output: if active display area is chosen smaller than its real resolution, the vertical position can be adjusted.
3A5h		Mirror	Enable mirrored display. {Note:} Not available for all input resolutions.
3A6h	Geometry ->Advanced ...-> Original	Standard	In every case the input signal will be displayed on the whole display.
3A7h		Original	The Input Frame will be displayed 1:1.
3BCh		X-Position	Horizontal position for scanning the input frame.
3BDh		Y-Position	Vertical position for scanning the input frame.
3A8h		Zoom	Magnification of the input frame.
3C0h	...->Zoom	X-Factor	Horizontal magnification factor.
3C1h		Y-Factor	Vertical magnification factor.
3Beh		X-Position	Horizontal position for the magnified input frame.
3BFh		Y-Position	Vertical position for the magnified input frame.
ACCh	Geometry-> Display wall	Display wall	Enable or disable of the display wall function.
AC7h		Displayno.	Position of the current display within the display wall. Counts up from left to right, from top to bottom.
AC8h		Displays horizontal	Number of displays in horizontal direction.
AC9h		Displays vertical	Number of displays in vertical direction.
ACAh		Border horizontal	Means the border of ONE display in percent of the active width.
ACBh		Border vertical	Means the border of ONE display in percent of the active height.

AII.3: Submenu GEOMETRY items (video)

ItemNo	Menu	Item	Description
3D6h	Geometry	Default	
3D7h		Zoom 1	
3D8h		Zoom 2	
3DBh		Settings	define your own frame format. {Only for special purposes.}
3E1h	...->Input	Pixel	
3E2h		Lines	
3E3h		X-Position	
3E4h		Y-Position	
AC0h	...->Display	Format ***(d)***	Aspect ratio
3E5h		Pixel	
3E6h		Lines	
3E7h		X-Position	
3E8h		Y-Position	
3EAh	...->Format	Parameter 1	Format correction achieved by adding black lines or columns.
3EBh		Parameter 2	Format correction achieved by cropping lines or columns.
3ECh		Parameter 3	Format correction achieved by panorama or waterglass view.
3F5h	...->Zoom	Zoom	
3F1h		X-Position	
3F2h		Y-Position	
3F3h		X-Factor	
3F4h		Y-Factor	
ACCh	...-> Display wall	Display wall	Enable or disable of the display wall function.
AC7h		Displayno.	Position of the current display within the display wall. Counts up from left to right, from top to bottom.
AC8h		Displays horizontal	Number of displays in horizontal direction.
AC9h		Displays vertical	Number of displays in vertical direction.
ACAh		Border horizontal	Means the border of ONE display in percent of the active width.
ACBh		Border vertical	Means the border of ONE display in percent of the active height.
3DCh	Geometry	Mirror	Enable mirrored display. {Note:} Not available for all input resolutions.
3D9h		Sports	Optimized picture for fast moving frames.
3DAh		Movie	Optimized picture for less moving frames.

AII.4: Submenu PICTURE items

ItemNo	Menu	Item	Description
3A9h	Picture	Brightness	
3AAh		Contrast	
3ABh		Gamma ***(d)***	Compensation of the color difference from TFT to CRT displays. {Remark:} the default value is about 8.
5A0h		Colortemperature ***(d)***	0->User 1->3200 2->5500 3->6500 4->9300 5->7100
3Ach		Sharpness	
4C3h	...->Colors	Saturation	
5F0h		Red	
5F1h		Green	
5F2h		Blue	
4AFh 763h		Black&White (VGA) Black&White (Video)	Generates monochrome Pictures. If {VGA} is active only the {green} color signal is processed.
4C4h		Edges ***(d)***	
		Output ***(d)***	Several output color options
3B4h	Picture	Backlight	Adjust backlight brightness

AII.5: Submenu OTHER items

ItemNo	Menu	Item	Description
3C8h	Other	Deutsch	
3C9h	-> Language	English	
3FBh	Other	Cascade Menus	
3FEh	->OSD Setup	Transparency	
3FFh		Default-colors	
3FCh		X-Position	
3FDh		Y-Position	
3C4h	Other	Freeze mode	{Remark:} Adjustments in geometry or picture parameter will clear freeze mode.
3C5h		Help	Use{ up}, {down} to select a menu item. Use {left}, {right} to change the value or to reach the next submenu. Use {ok} to go back to the previous menu or to close the OSD.
3C7h	Other		
47Dh	...->Inputs	VGA 1	
47Ch		VGA 2	
47Eh		COMP1	
47Fh		COMP2	
480h		Y/C	
5AFh		AV	
5B0h		SDI	
461h	...Keyboard	Default	
463h	options-> Left	Disabled	
464h	Right	Inputs	
465h		Contrast	
466h		Brightness	
AB3h		List	
467h	... Keyboard	Default	Opens the {INPUT} OSD-menus.
469h	options ->Up	Disabled	The {Up} key is only available while OSD-menu is open. {Attention:} Be sure that there is always one key left which can open the OSD-menu.
476h	... Keyboard	Default	Toggles between the inputs.
478h	options -> Down	Disabled	
AB4h		List	

AII.6: Submenu SYSTEMMENU items

ItemNo	Menu	Item	Description
8E4h	Info	Interfaceboard ***(d)***	
8E5h		Display number	
8E6h		Software Rev	
8E7h		Date	
8E8h		Panel clock	
8E9h		Panel H	
8EAh		Panel V	
AC5h		Flags Bit 0: PwrOff Bit 1: Supsend Mode Bit 2: Power Down Mode Bit 4: OSD on Bit 5: No Signal	This Item is not visible in the OSD menu!!! But it allows access to some system conditions (“No Signal” OSD On/Off usw...) via RS232 Power Off: Backlight is switched off manually Backlight brightness is reduced due to “no Signal” / DPMS Settings Backlight is switched off due to “no Signal” / DPMS Settings OSD is visible No signal at the current input.
418h	Maintenance	Backlight reset	Resets backlight MTBF counter.
8D6h		IR-Accesscode	Settings 1..99 disable the OSD menu for common IR remote control. The correct ID has to be entered via the figure keys of the IR Remote. Entering the code 00 shows the actual ID of the display. {Note:} Allways two digits has to be entered.
AC1h		IR-Locked	
8E2h		Reset	Reset to factory default settings: {Attention: all user adjustments will be deleted.}
AC2h		Power On / OFF	This item is not show in the OSD menu
486h	Setup	Act. color values	Default settings for contrast, brightness, red, green, blue and gamma are taken from the actual settings. {Hint:} Only for VGA.
487h		Def. color values	Default settings for contrast, brightness, red, green, blue and gamma are taken from the factory settings.
449h	Setup ->No signal ->Search	VGA 1	Check 1st VGA input.
44Eh		VGA 2	Check 2nd VGA input.
44Ah		COMP 1	Check 1st composite input.
44Bh		COMP 2	Check 2nd composite input.
44Ch		Y/C	Check s-video input.
59Ch		AV	Check AV input.
59Dh		SDI	Check SDI input.
44Fh		Message	
44Dh		Delay	
445h	Setup ->No signal	Blue	At {No Signal} background will be blue.
446h		Black	At {No Signal} background will be black.
447h		User	Background color at {No Signal}.
451h	Setup ->No signal ->User	Red	
452h		Green	
453h		Blue	
448h	Setup ->No signal	Text	Show message {No Signal}.
5B9h	Setup ->No signal ->DPMS	Suspend	
5BAh		Power Down	
454h	Setup ->New Signal	VGA 1	Allow automatically activation of the VGA input. {Remark:} Only possible if Video or SDI input is active.
456h		VGA 2	Allow automatically activation of the VGA input. {Remark:} Only possible if Video or SDI input is active.
455h		COMP1	Allow automatically activation of the 1st composite input. {Remark:} Only possible if VGA or SDI input is active.
457h		COMP2	Allow automatically activation of the 2nd composite input. {Remark:} Only possible if VGA or SDI input is active.
458h		Y/C	Allow automatically activation of the s-video input. {Remark:} Only possible if VGA or SDI input is active.
59Eh		AV	Allow automatically activation of the s-video input. {Remark:} Only possible if VGA or SDI input is active.
59Fh		SDI	Allow automatically activation of the SDI input.

459h		Back	After loss of signal at an automatically activated input the last active input will be selected. Otherwise {No signal} settings will be performed.
5D1h	Setup ->Temperatures	Actual	
5D2h		Lowest	
5D3h		Highest	
5D4h		Backlight Down	Driving down the Backlight if the system temperature reaches the upper limit.
5D5h		System Down	Driving down the whole system if the system temperature overrides the upper limit.
5BCh	Setup ->Aux1 Configuration	Input High ***(d)***	
5BDh		Input Low ***(d)***	
5C3h		Temperature	
5C5h	Setup ->Aux2 Configuration	No Function	
5C6h		Over/Under temp.	
5C7h		On above temp.	
5C8h		On below temp.	
5C9h		Temperature	
5CBh	Setup ->Aux3 Configuration	0V Temperature	
5CCh		5V Temperature	
D82h	Setup-Anti Sticking	Mode ***(d)***	Refer D82h : Anti Sticking->Mode for allowed values
D83h		Period ***(d)***	Refer D83h : Anti Sticking->Period for allowed values
D84h		Duration ***(d)***	Refer D83h : Anti Sticking->Period for allowed values
D87h		Off	Allows disabling of the Inverse / White view at key pressed.
D88h		Active	
D85h		Rotation ***(d)***	Refer D83h : Anti Sticking->Period for allowed values
D86h		Pixel ***(d)***	Refer D86h : Anti Sticking->Pixel for allowed values
490h	Setup -> Firmware	Baudrate ***(d)***	Adjust of the Baudrate: {Remark:} Only for Firmware Update. The Setting for all other RS232 operations is 9600.
48Ch		Download	

AII.7: Submenu Color setup items

ItemNo	Menu	Item	Description
74Eh	Pre-Offset	Offset R	
750h		Offset B	
74Fh		Offset G	
756h		Auto	
751h	Pre-Gain	Gain R	
752h		Gain G	
753h		Gain B	
757h		Auto	
76Ah	Display wp	Whitepoint y	
769h		Whitepoint x	
76Bh		Default	

AII.8: Submenu BACKLIGHT SETUP items

ItemNo	Menu	Item	Description
894h	Backlight-Setup	Min. brightness	
895h		Max. brightness	
896h		Steps	
897h		On/Off Control ***(d)***	Bit 0: 1-> Backlight on/off normal logic. Bit 1: 1-> Backlight on/off reverse logic.
898h		DPMS value	
89Bh		Defaultvalues	
89Ch		Backlight	

AII.9: Items with predefined values

Menuitem	Option	Value
3ABh : Picture->Gamma	Off	0 / 0h
	1.8	1 / 1h
	2.2	2 / 2h
3CDh : Video options->Norm	PAL	0 / 0h
	NTSC M	1 / 1h
	SECAM	2 / 2h
	NTSC 44	3 / 3h
	PAL M	4 / 4h
	PAL N	5 / 5h
	PAL 60	6 / 6h
	NTSC	7 / 7h
	Mono 50Hz	10 / Ah
	Mono 60Hz	15 / Fh
490h : Firmware->Baudrate	9600	0 / 0h
	19200	1 / 1h
	38400	2 / 2h
	115.2K	3 / 3h
4A8h : Video options->AV	Standard	3 / 3h
	RGB	2 / 2h
	YUV	1 / 1h
4B0h : Video options->Source	SAT	0 / 0h
	TV	1 / 1h
	VCR	2 / 2h
	CAM	3 / 3h
4B4h : SDI options->Format	625 - 50Hz	0 / 0h
	525 - 60Hz	1 / 1h
4BEh : Signal management->Power On	Last	15 / Fh
	VGA 1	0 / 0h
	VGA 2	1 / 1h
	FBAS 1	2 / 2h
	FBAS 2	3 / 3h
	Y C	4 / 4h
	A V	5 / 5h
	SDI	6 / 6h
4C4h : Colors->Edges	Min	0 / 0h
	Medium	1 / 1h
	Max	2 / 2h
58Dh : ->View Angle	Up side	1 / 1h
	Down side	0 / 0h
5A0h : Picture->Colortemp.	User	0 / 0h
	3200	1 / 1h
	5500	2 / 2h
	6500	3 / 3h
	7100	5 / 5h
	9300	4 / 4h
5B1h : ->S	H- V-	72 / 48h

	H- V+	74 / 4Ah
	H+ V-	88 / 58h
	H+ V+	90 / 5Ah
	H-Comp-	70 / 46h
	H-Comp+	86 / 56h
	on Green	38 / 26h
5B5h : ->S	H- V-	72 / 48h
	H- V+	74 / 4Ah
	H+ V-	88 / 58h
	H+ V+	90 / 5Ah
	H-Comp-	70 / 46h
	H-Comp+	86 / 56h
	on Green	38 / 26h
5B9h : DPMS->Suspend	Off	0 / 0h
	5 Sec	1 / 1h
	30 Sec	2 / 2h
	60 Sec	3 / 3h
5BAh : DPMS->Power Down	Off	0 / 0h
	15 Sec	1 / 1h
	60 Sec	2 / 2h
	Immidiate	3 / 3h
5BCh : Aux1 Configuration->Input High	VGA 1	0 / 0h
	VGA 2	1 / 1h
	COMP 1	2 / 2h
	COMP 2	3 / 3h
	Y/C	4 / 4h
	AV	5 / 5h
	SDI	6 / 6h
	SDI 2	7 / 7h
	SDI 3	8 / 8h
	SDI 4	9 / 9h
	DVI	10 / Ah
	Above	13 / Dh
	Below	14 / Eh
	unused	15 / Fh
5BDh : Aux1 Configuration->Input Low	VGA 1	0 / 0h
	VGA 2	1 / 1h
	COMP 1	2 / 2h
	COMP 2	3 / 3h
	Y/C	4 / 4h
	AV	5 / 5h
	SDI	6 / 6h
	SDI 2	7 / 7h
	SDI 3	8 / 8h
	SDI 4	9 / 9h
	DVI	10 / Ah
5F3h : OSD Setup->OSD timeout	Never	0 / 0h
	10	1 / 1h
	20	2 / 2h
	30	3 / 3h

	40	4 / 4h
	50	5 / 5h
	60	6 / 6h
759h : Configuration->Function	Key: Down	20 / 14h
	Key: Left	12 / Ch
	Key: Right	21 / 15h
	Search	19 / 13h
	Supervise	14 / Eh
891h : Interlaced->Auto phase	Off	0 / 0h
	1 sec	1 / 1h
	16 sec	2 / 2h
	4 min	3 / 3h
897h : Backlight-Setup->On/Off Control	n/a	0 / 0h
	Pos	1 / 1h
	Neg	2 / 2h
8CCh : ->S	H- V-	72 / 48h
	H- V+	74 / 4Ah
	H+ V-	88 / 58h
	H+ V+	90 / 5Ah
	H-Comp-	70 / 46h
	H-Comp+	86 / 56h
	on Green	38 / 26h
8D3h : Details->Edge 8D3h :	1st	1 / 1h
	2nd	0 / 0h
8D4h : Details->C-Sync Filter	Off	1 / 1h
	LF	2 / 2h
	HF	3 / 3h
8E4h : Info->Interfaceboard	MMIB1Ev1	1 / 1h
	MMIB1Ev2	2 / 2h
	MMIB2B	3 / 3h
	ADVIIB2A	4 / 4h
A72h : Anti Sticking->Checkerboard	Off	255 / FFh
	4 sec	1 / 1h
	16 sec	7 / 7h
	32 sec	15 / Fh
	1 min	31 / 1Fh
	4 min	127 / 7Fh
AA4h : Signal management->Power On	Last	15 / Fh
	VGA 1	0 / 0h
	VGA 2	1 / 1h
	FBAS 1	2 / 2h
	FBAS 2	3 / 3h
	Y C	4 / 4h
	A V	5 / 5h
	SDI	6 / 6h
AB0h : Details->Edge	1st	1 / 1h
	2nd	0 / 0h
AB1h : Details->C-Sync Filter	Off	1 / 1h
	LF	2 / 2h
	HF	3 / 3h

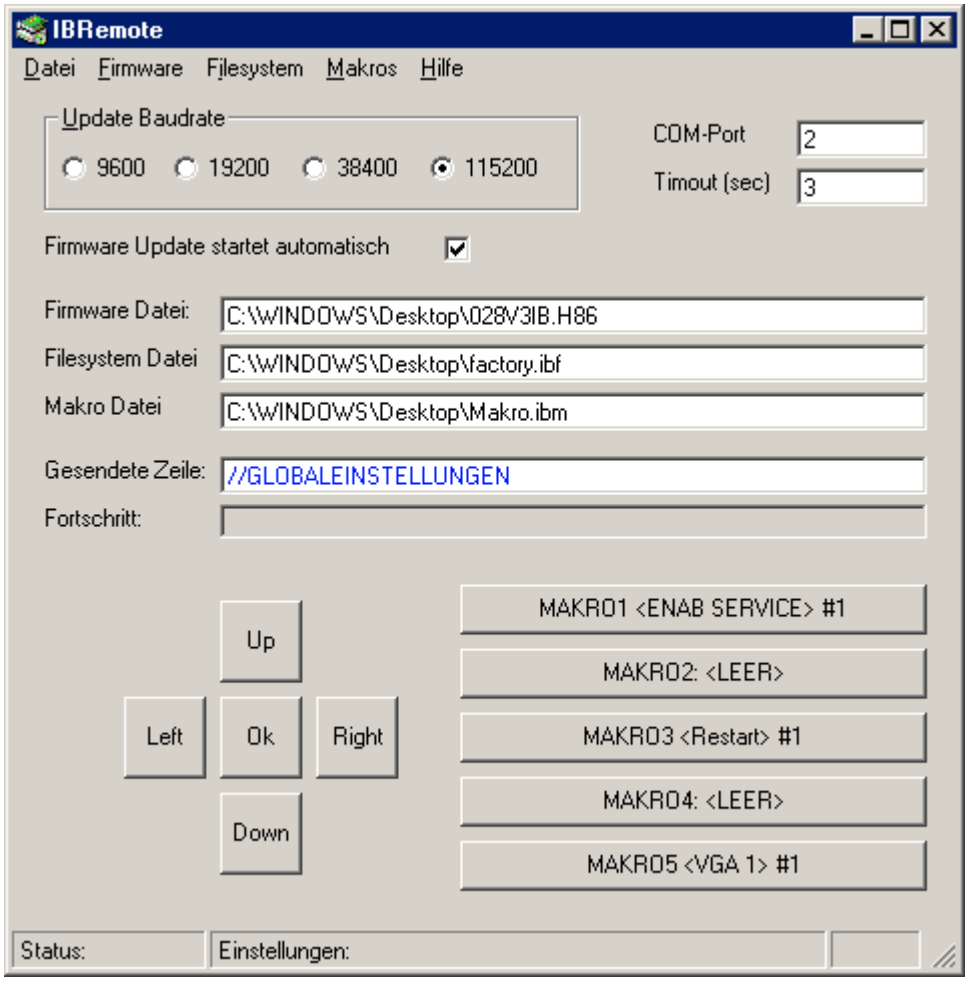
AB2h : Setup->Aux1 In	VGA	0 / 0h
	DVI	10 / Ah
	unused	15 / Fh
ABFh : Display->Format	Original	7 / 7h
	4:3	0 / 0h
	16:9	1 / 1h
AC0h : Display	Original	7 / 7h
	4:3	0 / 0h
	16:9	1 / 1h
AC3h : Colors->Output	TrueColor	7 / 7h
	64 Colors	6 / 6h
	8 Colors	5 / 5h
	Blue Only	4 / 4h
	Green Only	3 / 3h
D82h : Anti Sticking->Mode	Invers	0 / 0h
	White	1 / 1h
D83h : Anti Sticking->Period	Off	0 / 0h
	5 sec	8 / 8h
	5 min	1 / 1h
	10 min	2 / 2h
	30 min	3 / 3h
	1h	4 / 4h
	8h	5 / 5h
	12h	6 / 6h
	On	7 / 7h
D86h : Anti Sticking->Pixel	2	0 / 0h
	4	1 / 1h
	6	2 / 2h
	8	3 / 3h

Multi Media Interfaceboard MMIB2B MMIB

Appendix III: IB-Remote description

The PC program IB-Remote implements nearly all functionality descripte in Capter 7.

- Firmware Update
- Load and Save the Filesystem (settings)
- Configurable command buttons (makros)



Menu Firmware	
Datei...	Select Firmware (*.h86) File. Filename and path is shown under “Firmware Datei”
Zeige Datei...	Open default editor with the selected file
Update	Start Firmware download to the MMIB. If the check box “Firmware Update startet automatisch” is enabled. Otherwise updated has also to be started by OSD System->Firmware->Download.

Menu Filesystem	
Datei...	Select Filesystem (*.ibf) File. Filename and path is shown under “Filesystem Datei ”
Zeige Datei...	Open default editor with the selected file
Schreibsch.	“Schreibschutz aktiviert”: Allows to set the read only flag. Helpfull to prevent unintentional overwriting of the filesystem file.
Upload	Upload all filesystem entrys (blocks) from the MMIB to the PC.
Download	Download all filesystem entrys (blocks) found in the given filesystem file from PC to the MMIB. An existing block is erased in the MMIB before the new one is downloaded
Erase	Erase the entire filesystem

For further explanation see following example (Factory.ibf):

```
//INTERNAL DATA
:FFA1 0041 0500 0258 010D 0004 3802 0002 3782 0002 BB64 0000 0900 2807 0343 0343 0343
0274 001C 001C 0002 0002 0008 0020 0030 02B0 0030 0005 03FF FFFF FFFF FFFF

//(VGA 1/2) MODUS DATEN 1024x768   48.296 kHz  59.9205955334988 Hz
:00AE 0326 2F2A 0090 0400 0300 FFD7 FFF7 0540 7FFF 7FFF 0000 0000 0000 0000 0000 0000
0080 0080 0014 0020 0028 0001 FFFF FFFF FFFF 0010 0000 0000 0000 0000 000F

//GLOBALEINSTELLUNGEN
:FFAD 0000 0000 0C1C 0816 0000 0000 0000 0000 000A 0030 004B 003C 0F03 4A0F 0F03 0080
00FF 0000 0000 0F03 0F03 0F03 31F5 3C3C 3CFB 3CFB 0000 FFFF FFFF FFFF FFFF
```

The first word (FFA1, 00AE , FFAD) is the Block identifier (FlashID+ExtFlashID).

- To generate your own factory settings change the FlashID to 0xBX (result: FFB1, 00BE, FFBD). Download the Filesystem file to the MMIB.
- Deleting unwanted blocks coping some blocks from various filesystem files etc... is allowed.

Menu Makro	
Datei...	Select Makro (*.ibm) File. Filename and path is shown under “Makro Datei ”
Zeige Datei...	Open default editor with the selected file

The Makro file configures the five Makro buttons:
For further explanation see following example (Makro.ibm):

```
MAKRO1 <ENAB SERVICE>
:0x01 0x9021 0x0018
MAKRO1 <ENAB COLORSETUP>
:0x01 0x9021 0x0028
MAKRO1 <ENAB BACKLIGHT>
:0x01 0x9021 0x0038
MAKRO1 <DISABLE>
:0x01 0x9021 0x0008

MAKRO3 <Restart>
:01 0x6009

MAKRO5 <VGA 1>
:01 0x138D 0x0001
MAKRO5 <VGA 2>
:01 0x149a 0x0001
MAKRO5 <FBAS 1>
:01 0x14b9 0x0001
MAKRO5 <FBAS 2>
:01 0x14ba 0x0001
MAKRO5 <YC + Restart>
:01 0x14bb 0x0001
:01 0x6009
:01 0x6009
```

The Buttons 2 and 4 are not used in this example. The basic idea is to send the MMIBNo, CMD+ITEM and VALUE Parts of the 10byte RS232 protocol packed.
After pressing the button the next command is shown. It is also possible to process more then one packet.