spatz

Operation Manual

BARRACUDA

05/08

www.spatz-tech.de

1. Introduction

Thank you for purchasing the SPATZ **BARRACUDA** video processor.
We have done our best to design an innovative and easy to use unit loaded with new technologies that can only be found in our product.
We hope that the **BARRACUDA** exceeds your expectations
Please read the manual before using the unit. Firmware updates can be found on our websites
www.spatz-tech.de or www.spatz-tech.com.

2. Features

The SPATZ **BARRACUDA** video processor offers a number of features making it the ultimate video switcher and lindeoubler in one unit.
The unit was designed for the residential and commercial AV market, offering features that are necessary in both markets. It is a versatile switcher for up to 10 analog and digital video signals with an integrated Faroudja Linedoulber IC that processes the analog video signals to HDMI with integrated audio to 480p or 576p. These signals can be processed by any video display with HDMI input .
The main idea was to improve the analog video to the best level possible and integrate all signals in a way so only one wire is needed to the projector or display.

- 2 x Composite, 2 x Svideo, 2 x Component (SD and HD) or 2 SCART RGB Inputs
- 4 x HDMI 1.3 for PC or HDTV fully programmable EDID
- 4 x DVI (with adaptor cables) fully programmable EDID
- High quality analog to digital converter with 11 Bit
- Adaptive 3-D comb filter for improved composite and S-Video decoding
- 3:2 and 2:2 film pull-down recognition for jaggie free images
- Adjustments for Brightness, Contrast, Sharpness, Image Shift
- DCDI video processing for jaggie free images with sports or formula 1 footage
- Individual EDID programming for each input
- Selection of internal EDID, programmable, pass through or learned
- 6 analog stereo audio inputs that are embedded in the HDMI signal (one wire to the display)
- Optical switched audio output for the 6 analog stereo inputs
- Infrared Control with OnScreenDisplay or RS-232 control for third party control equipment
- **No Fan, No Light emissions (display may be dimmed)**

3. Function

The main task for a switcher or analog and digital video signals is the creation of a common video format so only one wire is needed to the display. The advantage of HDMI is the embedded audio, so for flat panel TVs this one wire carries video and audio.
For the fact that only very few displays will accept 480i/576i on the HDMI input, it is mandatory to convert the interlaced analog video signals to a progressive format. This function is known as “Linedoubling”. It is important to understand that the deinterlacing (linedoubling) is a critical part in every video system and usually determines 80% of the image quality. Unfortunately the deinterlacer technology in many displays has become poor mainly because of system on a chip integration and cost pressure.
We have decided to use the best deinterlacer chip ever made and put this in the **BARRACUDA.**
This chip designed by the living legend Yves Faroudja guarantees the best image quality no matter if your source material is film or video. Especially sport broadcasts benefit enormously from the DCDI algorithm that prevents jaggies from directional lines.
Our tests have shown that is not necessary any longer to incorporate a scaler in a video processor. Most displays have good scaling technology but lack good deinterlacing.
Using the displays scaler reduces cost in design and more important makes the **BARRACUDA** extremely easy to use.
However we have supplied the 4 HDMI inputs with individual programmable EDID functions.
The EDID contains information about the displays capability of video and audio formats. Attached sources read out this EDID information and automatically adjust their settings. (at least in theory they should do)
The problems of EDID handshake are numerous and with our programmable EDID we provide the tool to improve your switching time and switching reliability. The user may define a output resolution of his choice and block the automatic adjustment.
This is an unique feature and SPATZ is the first company to introduce this feature in a HDMI switcher.

ATTENTION !!! OPERATION with Displays that do not support 50Hz on the DVI inputs !!

Unfortunately Europe is using 50Hz refresh rate that is not very compatible with the 60 Hz used with PC graphics. Computer monitors with DVI inputs do usually not support 50Hz which is mandatory when you want to use the **BARRACUDAs** analog video inputs with PAL sources. The resulting output signal would be 576p@50Hz which is only accepted by HDMI inputs or DVI inputs that are “***HD READY***”.
So be careful to check the manual of your display !!
If you want to use the **BARRACUDA** only as a HDMI switcher with a display that is only compatible with 60Hz signals you need to reset the unit and forcing it to generate 480p@60Hz for the analog video section. This is necessary to see the OSD, otherwise you cannot edit the EDID paramerters for the 4 HDMI/DVI inputs.

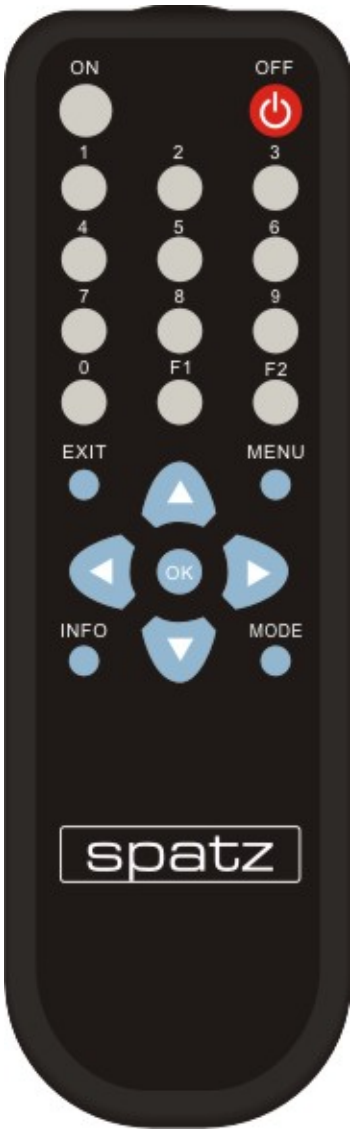
For a full RESET hold the INPUT button until you can see  in the display.

4. Operation

IR Remote

The Input LED signalizes the active input and the blinking dots show that IR signals are received. The brightness of the display can be changed in the OSD Menu.
During installation or tests, the inputs may be cycled using the front push button. The remote is infrared based and requires a visual path from remote to unit to work. However the usuable angle is very wide and the range is at least 5m or 15ft. The commands may be learned by any universal remote.

Commands



Power

The unit is powered with the **ON** button**.** Use the **OFF** command to power it down. The standby power is very low less than 1 Watt.

Input selection

Each of the 10 inputs has a corresponding button on the remote and the physical inputs are numbered on the back of the unit. Input 9 and 10 may be programmed to be HD or SD inputs using the OSD.

MEMORY Managment

All settings are saved with the OK button..

MENU

The MENU button brings you the settings and adjustments of the unit.
If the active input is 1-4 the unit automatically switches to input 5 displaying the OSD.

MODE

The MODE button flips between the 2 basic deinterlacing modes of the Faroudja chip. VIDEO is the default setting and delivers perfect deinterlacing for typical TV footage.
The FILM setting should be used for watching movies. FILM also represents the automatic mode, but can show deinterlacing errors with video footage with specific imagery (Bloomberg TV)

EXIT

EXIT closes the OSD, be sure to PRESS OK to save changes.

INFO

This button brings up a quick overview on the screen that shows the software version in the unit, the current EDID settings of all 4 digital inputs and the selected EDID color space.

F1/F2

F1 creates HOTPLUG Signal to resynchronize the digital inputs. F2 should be used with care, it resets your EDID parameters to PASS THROUGH and generates a HOTPLUG. This is a sort of recovery mode, if you have adjusted EDID settings that are not working with your sources. F2 only works if one of inputs 1-4 is active.

4.1 Operation using the OnScreenDisplay

The usage of the OSD is pretty straight forward. You will find a [BASIC] and an [Expert] Mode.
MENU brings up the OSD that may be navigated using the arrow keys. The BASIC mode allows image adjustments for the analog inputs and volume control. The EXPERT mode is restricted for advanced user and installers and allows changing of EDID settings and system functions.

4.2 EDID [LEARNED MODE]

The **BARRACUDA** can learn the EDID information of the attached display and store it into the Memory of the active input. For learning move the OSD's blue bar to [Trigger] and confirm with OK. The attached source now reads the EDID like if it would be attached to the display directly.
If you want more control of what resolution the source is using please refer to 8.1.

4.3 RESET

BARRACUDA is a complex unit, and it might be happen that a command or function selection can cause the unit to hang up. If that happened, please switch the unit ON/OFF with the remote. If that has no effect unplug the unit from the power, wait 10s then replug it. IF the device continues to behave unnormal then you need to RESET the unit to factory defaults. Power the unit and press the INPUT button until the display shows  .
RESET sets all image,volume and EDID settings to FACTORY.

4.4 Firmware Update

The INFO button of the remote will display the current software that is installed in the unit.
The **BARRACUDA** may be updated with new firmware using a PC and our firmware file.
This can be found on www.spatz-tech.de or www.spatz-tech.com.
The file is a .txt format, that you may upload with the Windows Hyperterminal.
Hyperterminal is a small communications software, that is part of WINDOWS since WIN98 and may be found in the ACCESSORIES of any Windows operation system (*unless your admin deinstalled it*).
The *.ht file is a preconfiguration for the HYPERTERMINAL and once you double clicked it, the programm should start and all your settings should be loaded to work with COM1.
You will need a serial cable standard configuration to load the file in the unit.
To verify communication just connect the serial cable , run the *.ht file and repower the **BARRACUDA**. If everything is ok, you will see some status commands on your PC screen that are sended by the unit.
Now remove the power again and hold the INPUT button of the unit until you see following message on the PC screen "SOFTWARE DOWNLOAD READY" . The display should show  .
Now you can transfer the file using the option „SEND TEXT FILE".
NEVER REMOVE the POWER or the serial cable during the update process.
If this has happened the operation system will fall back to a basic loader programm that will allow you to load the firmware again.

5. Installation

Installation

Please store the original packing after opening the unit. Install the batteries in the remote and connect the wall mount adaptor.

What is in the box:

BARRACUDA Video Processor
Infrared remote with 2 AAA batteries
Universal Wall mount adaptor
This manual

FRONT

The **BARRACUDA** offers a quick feedback which input is selected showing the active input on ist 7-Segment display. You may cycle the inputs using the front push button.
The display is dimmable to avoid undesired light pollution in home theater use.

BACK

All connections of the **BARRACUDA** are located at the back

- POWER: + on inner Pin 5 VDC min. 2A
- VIDEO (Input 5+6): Composite Video
- SVIDEO (Input 7+8)
- YP_BP_R (Input 9+10): SD or HDTV Input, 480i – 1080i
- RGBS (Input 9+10): European SCART RGB found on digital Set Top Boxes, or DVD Players Special SCART to 4 RCA cable available on request
- RS-232 port for serial control or firmware updates
- HDMI/DVI 1-4 up to 2,25 Gbit/s HDMI 1.3a compatible
- STEREO AUDIO INPUTS 5-10, assigned to corresponding video inputs
- HDMI OUT, connect with display
- AUDIO OUT, switched analog audio inputs 5-10 converted to optical digital audio

Attention for SCART RGB:
Most of the DVD-Players and digital satellite have to be programmed to output RGBs on the SCART connector !!

6. Connection Digital Satellite Receiver or cable boxes

SD-Sources (native resolution 576i)

If you are using standard definition sources that have a HDMI output it might be worth to check how well the internal video processor is performing. For this connect the component output or SCART RGBs to the analog inputs of the **BARRACUDA** and simultanously use the HDMI input for a direct comparison by switching back and forth between the 2 inputs.
The chance that the Faroujda chip delivers better images than the internal upscaling is 95% according to our tests. Even DVD players that have the Faroujda chip built in sometimes do not perform at optimum because the implementation is poor.

HD-Sources (native resolution 576i for SD and 720p or 1080i for HD)

If you have a HD satellite receiver or any other HDMI output SDTV source, we recommend to try following connections.
Most HD capable satellite receivers on the market have an integrated upconverter or deinterlacer for SD reception. As you can imagine not all perform equal therefore we recommend again to connect the SD analog output parallel to the HDMI connection and determine if **BARRACUDA** does the better job on your SD reception. It is really worth trying this, as of now, most of the broadcasts are still in SD and you should really get the best picture for what you are watching most.
For US customers that usually have an analog output HD satellite receiver or cable box, we can offer 2 inputs that will take all HD signals 480p,720p and 1080i. In the OSD menu change the setting from SD to HD and save the change. If the **BARRACUDA** detects loss of HD signal it defaults back into SD mode. Unless you change the setting back to SD it will search for HD signals any time you switch back to any of the component inputs.

7. INPUTS

We have implemented one of the best video decoders in **BARRACUDA** that is available on the market. You will hardly find this kind of quality in your TV with 11 Bit AD converter and a 3D comb filter that will make your old composite and S-Video sources look better than ever before.
The components inputs are multistandard and accept european SCART RGBs and SD and HD component signals.
The unit can automatically detect between SD component and RGBs. If you want to use HD component it is necessary to switch from SD to HD using the OSD menu and store it.

7.1 Audio Inputs

The audio inputs have independent level control (+/- 12db) using the UP and DOWN button of the remote for the active input, mainly to adjust for different output levels of your sources. They may be adjusted using the OSD.
The assignement is according the numbers on the back of the unit. You may use the audio input without an active video source, so you can use your TV speakers for music playback.
The other option is assigning the stereo audio inputs to a HDMI input, including level control with automatic saving and outputting the adjusted level at the optical audio output.
If you need a stereo analog output signal then you may use the SPATZ OPTORCA converter.

7.2 HDMI operation

The HDMI inputs of **BARRACUDA** has unique features that cannot be found in competitors products. Using our unique EDID mangement we offer full control of the source settings and decrease switching time drastically. Each HDMI input has its independent adjustable EDID manager described in the following paragraphs.
All EDID settings may be selected using the IR remote and OSD menu.

8. EXPERT adjustments

Only for experts:

The EDID that is stored in every DVI or HDMI display and forces the source according to its contents to automatically set video and audio parameters. This negotiations are part of the reason why HDMI is working so unreliable and unpredictable. The protocol is very complicated and there is no real common standard how to use the EDID information. Some sources follow the EDID strictly, others ignore it completely, a real mess.
We have taken care of this problem and implemented a fully programmable EDID manger for every HDMI/DVI input that lets you adjust all parameter that are part of the HDMI/DVI protocol.
In addition the individual EDID per input increases switching reliability and time drastically.
Our EDID manager is blocking the automatic adjustments and offers several options how to deal with EDID.
With **BARRACUDA** a nd a HDDVD player we could reduce switching time from 7s (pass through) to 2s (internal EDID). An average AV receiver can take as long 20s before you get back your image !!!

8.1 EDID HANDLING

BARRACUDA offering several modes for the EDID handling. You may learn the display's data and save it into the learned EDID memory. Execute the [LEARNED] Mode using the OSD and confirm with OK .
After having stored the displays EDID the unit will forward this EDID to the source. This avoids the hotplug generation of the [Through] mode with faster switching times but still using the original display's EDID data.
In the [THROUGH] mode **BARRACUDA** forwards the EDID data to the source, like if you were using a simple HDMI switcher. This mode usually has the longest switching time and should be avoided in regular operation mode. If you do not want to make further settings for the EDID you may use the [DEFAULT] mode (factory reset default).
The [DEFAULT] settings includes the most common DVI and HDMI resolutions with 2 channel audio.
The [THROUGH] mode releases a HOTPLUG signal any time you make a switch at all HDMI inputs and should be used for testing only.
The [ASSEMBLED] mode however is the most powerful tool of the **BARRACUDA**. This mode allows you to create your own EDID data according to what you want the source to be adjusted.
The following tables show you the available selections for video and audio settings.
It is important to note that not all sources are fully controllable by the displays EDID. It is known to us that some sources are following strictly the EDID data whereas others only make use of parts of the EDID data.

8.2 Programming your own EDID – only for experts

Programming the EDID is quite simple. The OSD menu will guide you through the available choices.
To store the new setting permanently press OK after making the adjustments.
You may need to repower the sources to synchronize on the new settings, or you may try pressing F1 on the remote that will generate a HOTPLUG signal that should according to HDMI protocol start a new sync routine. If not repowering the source is the next logical step.
If you have generated an EDID that is not compatible with your display and you have no picture you may press F2 on the remote and load the [DEFAULT] settings and generate the HOTPLUG.
This should bring back the picture, if not you probably have to perform a full RESET by holding the INPUT button until you can read  in the display.

8.3 Preprogrammed Video Standards

640x480/60	1280x1024/50	1280x720p/50
640x480/75	1280x1024/60	1280x720p/60
848x480/60	1280x1024/75	1920x1080i/50
800x600/50	1366x1024/60	1920x1080i/50
800x600/60	1400x1050/50	1920x1080i/60
800x600/75	1400x1050/60	1920x1080p/24
1024x768/50	1400x1050/75	1920x1080p/25
1024x768/60	1680x1050/60	1920x1080p/30
1024x768/75	1600x1200/50	1920x1080p/50
1152x864/75	1600x1200/60	1920x1080p/50
1280x768/50	1920x1200/50	1920x1080p/60
1280x768/60	1920x1200/60	2048x1080p/50
1280x768/75	480i/59,94	2048x1080p/50
1360x768/60	640x480p/59,9	2048x1080p/60
1364x768/50	720x480p/59,9	640x480/60
1364x768/60	576i/50	
1364x768/75	720x576p/50	

8.4 Preprogrammed Color Space (Farbraum)

RGB
YPrPB /Component 4 : 2 : 2
YPrPb/Component 4 : 4 : 4

8.5. Preprogrammed Audio Standards

01) LPCM 2.0 48kHz 24bit	speaker=FL/FR
02) DolbyDigital (AC-3) 5.1 48kHz 640kbps max.	speaker=FL/FR,LFE,FC,RL/RR
03) MPEG-1 2.0 48kHz 192kbps max	speaker=FL/FR
04) MP3 2.0 48kHz 192kbps max.	speaker=FL/FR
05) MPEG-2 (multichannel) 5.1 48kHz 528kbps max.	speaker=FL/FR,LFE,FC,RL/RR
06) AAC5.1 48kHz 512kbps max.	speaker=FL/FR,LFE,FC,RL/RR
07) DTS 5.1 48kHz 1536kbps max.	speaker=FL/FR,LFE,FC,RL/RR
08) ATRAC 2.0 48kHz 292kbps max.	speaker=FL/FR
09) <AStd 09> 5.1 44.1kHz (unspecified)kbps max.	speaker=FL/FR,LFE,FC,RL/RR
10) <AStd 10> 7.1 48kHz (max.)kbps max.	speaker=FL/FR,LFE,FC,RL/RR,RLC/RRC
11) <AStd 11> 7.1 96kHz (min.)kbps max.	speaker=FL/FR,LFE,FC,RL/RR,RLC/RRC
12) <AStd 12> 7.1 96kHz (unspecified)kbps max.	speaker=FL/FR,LFE,FC,RL/RR,RLC/RRC
13) <AStd 13> (reserved) 5.1 96kHz (max.)kbps max	speaker=FL/FR,LFE,FC,RL/RR,RLC/RRC
14) <AStd 14> (reserved) 5.1 96kHz (max.)kbps max.	speaker=FL/FR,LFE,FC,RL/RR,RLC/RRC
15) <AStd 15> (reserved) 5.1 96kHz (max.)kbps max.	speaker=FL/FR,LFE,FC,RL/RR,RLC/RRC

8.6 Preprogrammed nubmer of audio channels

Select the number of channels:
2.0, 5.1, 6.1, 7.1, 3CH, 4 CH, 5CH,6 CH, 7CH, 8CH

8.7 Preprogrammed AUDIO Sampling frequencies

F1) 32kHz	F2) 44.1kHz
F3) 48kHz	F4) 88.2kHz
F5) 96kHz	F6) 176kHz
F7) 192kHz	

8.8 Preprogrammed AUDIO Sampling frequencies

Bitdepth of PCM audio channels, only possible with PCM formats
16,20 or 24 BIT

9. Pin Out

Pin out S-VHS

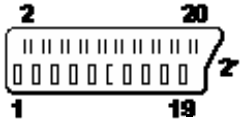
Y/C (S-VHS) Eingang 2

pin 1 - C-Ground
pin 2 - Y-Ground
pin 3 - C-Chroma
pin 4 - Y-Luma

SCART

Pinout VGA

Pinout SCART-plug
Male



pin 15----------Red
pin 11----------Green
pin 7 ----------Blue
pin 13----------R-Ground
pin 9 ----------G-Ground
pin 5 ----------B-Ground
pin 17----------Ground
pin 19----------Composite Sync

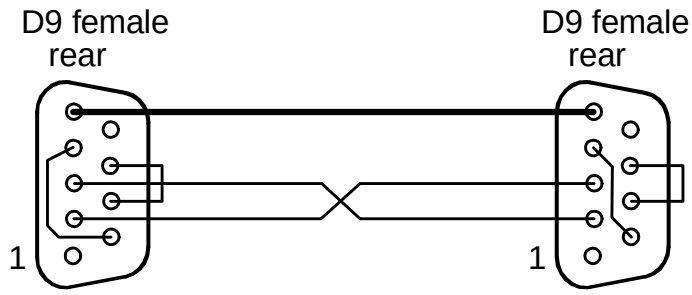
10. Technical data

Dimensions	430 mm x 48 mm x 210 mm, 19 Zoll Befestigung im Lieferumfang	
Weight	approx. 2 kg	
Colour	black	
Power Supply	universal wall mount adaptor 100-250V 5VDC, 2,6 A, +TIP	
Video-Inputs	**5,6**	2 x composite, RCA, Recognized Standards PAL B,G, PAL M, PAL N, NTSC M, NTSC 4,43 MHZ, SECAM
	7,8	2 x Y/C, Mini Din
	9,10	2 x YPrPb, 3 RCA oder 2 x SCART RGBs 4 x RCA
	1-4	HDMI or DVI (with adpator) up to 2,25 Gbit/s
Video-Output	HDMI oder DVI (mit Adapter)	
Remote Control	Infrared, RS-232, baudrate 57600, 8N1	

11. RS-232 Protocol

Pin out for RS-232 cable

this is usually referred as a standard connection cable with crossed TX/RX wires



BARRACUDA offers following RS-232 commands for serial control.
You may use a PC or an AMX/CRESTRON System to control the unit remotely.
The necessary adjustments are 57600 BAUD, 8 data Bits, no parity 1 stop bit.
No Hardware or Software Handshaking.

11.1 RS-232 commands

in1+ [CR]	Schaltet auf Eingang 1
in2+ [CR]	Schaltet auf Eingang 2
in3 +[CR]	Schaltet auf Eingang 3
in4 +[CR]	Schaltet auf Eingang 4
in5 +[CR]	Schaltet auf Eingang 5
in6 +[CR]	Schaltet auf Eingang 6
in7 +[CR]	Schaltet auf Eingang 7
in8 +[CR]	Schaltet auf Eingang 8
in9 +[CR]	Schaltet auf Eingang 9
in0 +[CR]	Schaltet auf Eingang 0
eon+ [CR]	Rückmeldung an
eof + [CR]	Rückmeldung aus
HPB + [CR]	Hot Plug Release
PON + [CR]	Power On
POF + [CR]	Power Off
VUP + [CR]	VOLUME UP (1,5db)
VDN + [CR]	VOLUME DOWN (1,5db)
V00-V16 + [CR]	Volume direct V00 (-12dB) - V16 (+12db)