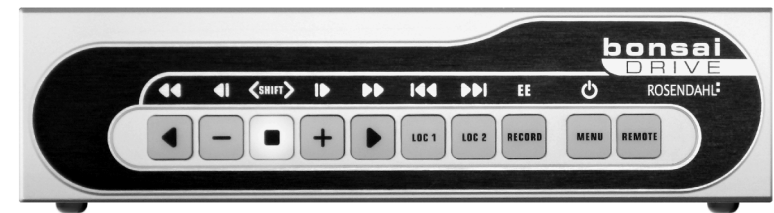


Instruction Manual

Rosendahl bonsaiDRIVE

The Rosendahl bonsaiDRIVE is a professional portable video and audio multitrack recorder.



ROSENDAHL

www.bonsaidrive.com



Declaration of Conformity

Rosendahl Studiotechnik GmbH
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herewith confirm that the product:
Type: Harddisk Video Recorder
Model: bonsaiDRIVE

meets the requirements of the council of the European communities relating to electromagnetic compatibility (Council Directive 89/336/EEC)

Technical Data: CENELEC EN 55 103-1 + 2 1997-06
CENELEC EN 61000-4 - 5 12/2001

The CE symbol is awarded to high-quality appliances which comply with the European Directive 89/336/EEC or the EMVG (law relating to electromagnetic compatibility of appliances) and which offer the following significant benefits:

- *Simultaneous and interference-free operation of adjoining appliances
- *No unpermitted interference signals
- *High resistance to electro-smog



This marking shown on the product or its literature indicates that it should not be disposed with other household wastes at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product or their local government office for details of where and how they can take this item for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial wastes for disposal.

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1. Unpacking the unit

The unit is available in two powering versions: Mains with built in 90-230 VAC switch mode power supply or with 12 volt external DC.

Mains powered units are marked on the outside of the box with "90-230 VAC", DC powered units with "10-18 VDC". The unit itself is either fitted with an IEC mains socket or a 4 pin XLR DC input wired in the standard method.

Included in the DC version package is a 90-230 VAC mains adapter with 12 Volt DC output on an XLR 4 pin female plug.

Both versions come with the following accessories:

- 1 pcs IEC mains cable
- 1 pcs 9 pin D-SUB cable, 5 meters long, 2 x male plug
- 1 pcs 9 pin D-SUB update cable, black, 1.5 meters long
- 4 pcs UNC fixing screws for harddrive
- 1 pcs PATA-SATA adapter (effective from 2009)
- 1 pcs Instruction manual, that you are now reading!

Please check that all these items are present and contact your dealer if anything is missing.

2. Mechanics

In order to reduce noise the bonsaidrive does not have a fan. It is very important that all the ventilation holes on the bottom, side and top of the unit are kept free for air to circulate. Do not place the unit on top of another unit which is hot.

Avoid mechanical shock to the unit especially when the unit is on and the harddrive is running. Switch off the unit before resiting.

The front panel of the unit is removable and can be used as a remote control in the studio (with the 5 meter cable provided).

On the left side of the unit is an 8 mm dia through hole behind which is the fixing screw for the front panel.

Turn this screw **clockwise**, i.e. screw it **in**, to release the remote panel and remove it from the main housing.

After the left side of the panel is released it can be swung open like a door and removed.

When replacing the front panel into the main housing, first insert the panel into the guide post on the right side swing the panel to close on the left side and when the fixing screw head is opposite the hole, turn the fixing-screw **anticlockwise**, i.e. screw **out**, to lock the panel.



3. Installing the hard drive

If you have received your unit with the harddrive already built in you can pass over this section of the manual. When replacing the harddrive at any time please read this section in detail before proceeding.

bonsaidrive has been tested with many different harddrive models. Please visit www.bonsaidrive.com/bonsaidisks.pdf to download a list of recommended drives.

The harddrive used on bonsaidrive must have the following specification:

Harddrive or SSD (solid state disk) with parallel (IDE) or serial (SATA) port.

To use SATA harddrives a small IDE to SATA adapter is provided (effective from 2009).

ATAPI, CD writer, DVD writer or Zip drives are not supported and "NO VALID DRIVE" is shown on the bonsaidrive display.

The present bonsaiDRIVE firmware can address up to 980 Gigabytes. Harddrives with higher capacities can also be used but the effective size will be limited to 980 Gbytes.

Attention! Bonsaidrive must be turned off and disconnected from its power supply before installing or removing a harddrive. To be certain: ALWAYS REMOVE THE POWER CABLE!

Set the address jumpers of the harddrive to MASTER or SINGLE. Harddrives set to SLAVE or CS (Cable Select) mode will not be detected!

Remove the 4 black Philips screws (not the Allen screws!) on the top of the unit.

Mount the harddrive on its caddy (sockets to the right) with the 4 UNC screws provided.

First connect the 4 pin power cable, **then** the 40 pin flat cable connector.

When **removing** the harddrive, **first** remove the 40 pin connector then the 4 pin power supply cable. In this way the harddrive is always grounded when the data cable is connected or removed. (Incidentally this procedure is standard for every computer.)

Now replace the top cover making certain when replacing the 3mm screws that they are not cross threaded or screwed in so tight that the thread is stripped!

Now switch on the recorder with a monitor connected. The bonsaidrive serial number and the current firmware will be displayed, after which the hard drive will be searched and identified. If an ATA100 or ATA133 (UDMA4 or 5) is found then the name and capacity of the drive will be displayed.

If no valid hard drive is found the following message will be displayed after 50 seconds:
"NO VALID DRIVE DETECTED"

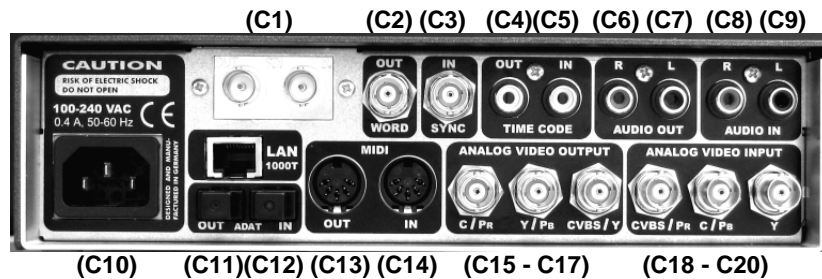
Only after having detected a valid drive the main program will be started. If no bonsai format is found on the drive the program will proceed to the "FORMAT DISC" menu.

Press down the [RECORD] button and then the [◀] button simultaneously to format 255 empty bonsai formatted clips.

Existing partitions and volumes will be overwritten by this process.

Now you can begin with the recording of a clip (see chapter 8).

4. Connections



(C1) Options Ports:

for bonsaiSDI 270 Mbit SDI option and bonsaiLAN Ethernet option.

(C2) Word Output:

1 x BNC socket, 48 KHz Wordclock out for synchronising peripheral audio units.

(C3) Sync Input:

1 x BNC socket, Genlock in for connection of a PAL or NTSC black and burst video sync. Note: Accuracy of video sync signals must be within broadcast specs.

(C4, C5) Timecode Output, Input:

2 x RCA Timecode in, Timecode out for synchronising bonsaiDRIVE with other video and audio recorders.

(C6, C7) Analog Audio Outputs:

2 x RCA socket. Variable output level per menu up to +9dBu = fullscale. Low output impedance for driving professional line inputs.

(C8, C9) Analog Audio Inputs:

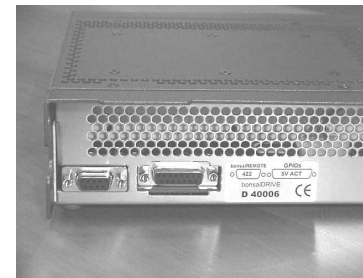
2 x RCA sockets. Variable input sensitivity per menu up to +9dBu = fullscale. Input impedance 10 k Ω .

(C10) Mains socket:

Use the IEC mains cable supplied for connecting to an earthed mains socket 90-230 VAC, 50-60 Hz.

(C11, C12) Digital Audio Output, Input:

2 x Optical Toslink sockets. Digital audio interface for simultaneous record and playback of 8 audio tracks with 48KHz/ 24 Bit in the Alesis-ADAT $\text{\textcircled{C}}$ Format.



(C21) (C22)



(C23) (C24)

(C13/ C14) MIDI Output, Input:

2 x DIN sockets for the transmission of MIDI signals for MTC synchronisation and MMC control. Also used for bonsaiDRIVE firmware updates using MIDI SYSEX.

(C15 - C17) Video Outputs:

3 x BNC sockets. Can be configured as composite video on C17 and as Y/C (S-Video) on C16, C15 or as a component signal (Y,Pb,Pr) on C17, C16, C15.

(C18 - C20) Video Inputs:

3 x BNC sockets can be configured for composite video input on C18, Y/C (S-Video) input on C20, C19 or a component signal (Y, Pb, Pr) on C20, C19, C18.

All inputs are internally terminated with 75 Ω .

(C21) bonsaiREMOTE Port:

9 Pin Sub D for connection of the bonsai remote control.

(C22) GPIOs Port:

15 pin Sub D connector for switching signals. 4 Inputs, 4 Outputs.

(C23) bonsaiDRIVE Port:

9 Pin Sub D for connection of the bonsaiDRIVE to the remote panel.

(C24) Remote Port:

9 Pin sub D, RS422 for remote controlling the bonsaidrive with the Sony $\text{\textcircled{C}}$ P2 Protocol.

5. Connecting a monitor

Professional monitors are expensive. For this reason people like to use consumer TVs with an AV input.

Attention! Consumer TV equipment is generally safety class II, i.e. without earth connection. This is easily confirmed by looking at the 2 pole mains plug.

Earth potential differences up to 100 volts can occur and ground currents will flow when such TV equipment, when switched on, is connected to your earthed studio environment. For example when you connect the consumer TV to the studio equipment via a BNC connector it is not guaranteed that the shield makes contact first. In this case the signal input on the middle pin can be subjected to several hundred volts which no input will survive, the result being that expensive studio equipment and computer hardware can be destroyed!

If you still intend using a consumer TV as a monitor it is imperative that the AV ground is permanently connected to the studio ground at all times.

This connection can be made using the ground of an audio input to the TV set (cinch socket shield connection) which can be permanently connected to the mains earth/ studio ground.

Switch off the TV set. Remove mains plug. Connect the permanent earth then the AV connection to the studio system. Then reconnect the TV to the mains and switch on.

The video outputs of the bonsaidrive have 75 Ω source impedance and must be connected using 75 Ω coax cable and be connected to single 75 Ω terminated inputs. With connection to 2 inputs in parallel (2x75 Ω) the video picture will be 6 dB darker and with a single input without 75 Ω termination the picture will be 6 dB brighter.

bonsaidrive supports 4 different analog video formats:

(1) Composite Video (CVBS, German FBAS), a “normal” video signal. All picture and sync information is transmitted over a single 75 Ω cable. Connection over C17 (CVBS).

(2) Y/C Video (German S-Video) is normally outputted by a small mini DIN socket and is a 2 signal 75 Ω analog video standard, a brightness signal (Y) and a colour signal (C). Connections over C16 (Y) and C15 (C)

(3) Component Video (German Komponentensignal) is formed out of 3 component signals (Y, Pb, Pr). Y is brightness, Pb and Pr are two colour difference signals (Y-blue, Y-red). Connection over C17 (Y), C16 (Pb), C15 (Pr).

Note: This analog video transmission standard offers the highest picture quality and should always be used when the monitor has an component video input.

(4) RGB Video is also a three signal 75 Ω video transmission standard and offers the same advantages as Component Video. R is red, G is green with sync signals, B is blue.

Note: Not to be confused with a computer VGA connection!

RGB video is often used in the SCART connection in consumer TV equipment and can be connected to the bonsaidrive using a SCART to BNC adapter cable.

Connections are: C17 (G), C16 (B), C15 (R).

Now connect the monitor to the bonsaidrive with 75 Ω cables and switch on. If no stable picture is shown, select the required output format in the “ANALOG OUTPUT FORMAT” menu i.e. COMPOSITE and Y/C, COMPONENT or RGB.

Note: In order to guarantee at least a black and white picture use the CVBS/Y output C17 connected to a Y or CVBS input of the monitor.

6. Connecting the remote control panel

The removable remote control panel communicates with the recorder over an RS422 9-pin Sub D connection and uses the same pinout as Sony® P2, also known as Sony 9-pin protocol.

In this communication standard pin 5 is not used, but is used by bonsaiDRIVE for the 5 volt supply to the remote control panel. This pin 5 on output C21 (bonsaiREMOTE) of the recorder is protected by a PTC temperature element in the event of a short circuit.

Use the 5 meter long 9-pin Sub D cable supplied or any other 1:1 wired 9 Pin Sub D cable to connect the remote control panel to the recorder.

RS 422 works with cable lengths up to 100 meters. If you already have a 9 pin cable system installed or use 9 pin patch fields the bonsaidrive control panel can be integrated and locally powered with 5 Volts on pin 5.

Attention! The DC input on pin 5 is not protected against reverse polarity or overvoltage. Be certain that the auxiliary power supply used is a 5 Volts regulated and can deliver at least 100 mA.

The remote panel can be connected or removed at any time from the bonsaiDRIVE (also during record) without affecting the function of the recorder.

At every reconnection the panel does a LED test in which the LEDS light up consecutively from left to right, after which communication with the recorder starts.

The remote panel can not be used as a stand alone Sony 9 pin controller to control other manufacturers' equipment.

7. Basic Functions

With the REMOTE button the serial communication to the recorder can be switched over to an external Sony P2 controller connected to C24.

When the REMOTE switch is on (LED lit), the recorder is connected to the external controller on C24 and all functions of the bonsaidrive remote panel are deactivated.

When the REMOTE switch is off (LED unlit), the remote panel of the bonsaidrive is activated and the external controller on C24 is ignored.

The MENU button switches the on-screen menu on and off. The button is lit with the menu on.

When the MENU is off (LED notlit), the eight buttons on the left are used for controlling the deck.

Direct Button Functions:

[▶]	Playback forwards 100% nominal speed
[■]	Stop
[◀]	Playback backwards 100% nominal speed
[LOC 1]	Recorder stops and goes to locate position 1
[LOC 2]	Recorder stops and goes to locate position 2
[+]	In stopframe mode: 1 frame forwards or clip number ++ (see also menu 075 [+]/[-] keys function) In playback mode: increase playback speed
[-]	In stopframe mode: 1 frame back or clip number -- (see also menu 075 [+]/[-] keys function) In playback mode: decrease playback speed
[RECORD]	no function as direct button

Locate 1 and Locate 2 are storable (timecode) positions that serve to fast return to or loop to a particular position in a recording.

Additional button functions are activated by using the stop button [■] as a shift button. Hold down the stop button and press the second button as required.

Stop Shift Functions:

[■] + [▶]	Fast forward (64x speed)
[■] + [◀]	Fast rewind (64x speed)
[■] + [+]	Slow motion forwards
[■] + [-]	Slow motion reverse
[■] + [LOC 1]	Go to clip start, end of previous clip...
[■] + [LOC 2]	Go to clip end, start of next clip...
[■] + [MENU]	Switch off unit (Standby)

Instead of a power on/off switch the bonsaidrive has a power down mode in which the harddrive is put into sleep mode and all AD/DA converters are switched off. The machine is "woken up" by pressing any button on the control panel.

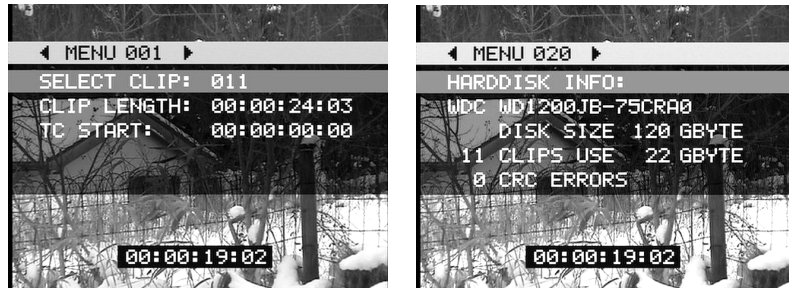
Note: the REMOTE button must be off (LED off).

By using the record [RECORD] button as shift, the following functions can be activated. Press record then the second button as indicated below:

Record Shift Functions:

[RECORD] + [■]	Electronic entry (EE)
[RECORD] + [LOC 1]	Sets locate position 1
[RECORD] + [LOC 2]	Sets locate position 2
[RECORD] + [▶]	Start crash or insert recording (to enter insert recording the transport must be in locked playback condition)

With the menu function activated [MENU] the menu is inserted into the video picture. See below:



The first green line "◀ MENU 001 ▶" tells you in which part of the menu you are at present. With the cursor buttons [◀] and [▶] you can move from one menu heading to the next. [LOC 1] and [LOC 2] keys increase/ decrease the menu position to the next menu group (+10/ -10).

When leaving the menus, the menu position will be stored and reappear at the same position when the menu is called up again.

The list of parameters that can be altered in each menu are highlighted grey and appear under the menu header. The parameters can be changed by using the [+] and [-] buttons.

The menu in the left picture shows Menu 001 "SELECT CLIP" . Change the clip number with [+] and [-], and use the [▶] button to go to the next menu title.

The information under the menu header are white against a transparent background and show details about the selected menu parameter. E.g. MENU 020 "HARDDISK INFO".

The time code burned in at the bottom of the pictures can be altered in the menu "TC INSERTER" to "LEFT", "CENTER", "RIGHT" or "OFF".

In general the buttons are used to navigate the menu in the following way:

- [▶] Select menu increment +1
- [◀] Select menu decrement -1
- [LOC 1] Fast menu navigation tab ++
- [LOC 2] Fast menu navigation tab --
- [+] Activate selected parameter +1
- [-] Deactivate selected parameter -1
- [■] Confirm selection
- [◀] + [RECORD] Confirm erase and format commands

Please consult the detailed menu descriptions in the second, "firmware" part of the manual.

8. Recording clips

Before beginning a new recording, check the following menu settings:

(1) "VIDEO INPUT"

Turn on the menu by pressing the menu button **[MENU]**. Use the replay buttons **[◀][▶]** to reach the menu position "VIDEO INPUT". You will find a numerically sorted list of the various menus and their description in the second "firmware" part of this manual. With the **[+]** button you can now select the video input.

"CVBS" (German: FBAS) configures the input to Composite Video on C18.

"Y/C" configures the input to S-Video on C20 (Y) and C19 (C).

"COMPONENT" configures the input to Component Video on C20 (Y), C19 (Pb) und C18 (Pb).

(2) "RECORD SYNC REFERENCE"

If your input video signal comes from a source which is not synchronised to your system, e.g. DVD player or consumer VTR, select "VIDEO INPUT" as sync reference (default setting).

If your input video signal comes from a synchronised video player and your bonsaidrive is synchronised to the same reference as the player at the "SYNC INPUT" (C3) select "SYNC INPUT" for the RECORD SYNC REFERENCE.

(3) "RECORD MODE"

To record a new clip set the RECORD MODE to "CRASH".

The recorder will record video and 10 channels of audio (2TRK + 8TRK). See part II of this manual for more informations respecting the other RECORD MODEs ASSEMBLE and INSERT.

(4) "VIDEO STANDARD"

If you wish to record video in NTSC set the VIDEO STANDARD to "NTSC 29.97ND". In this case the video monitor which is connected to the bonsaidrive must be capable of showing the NTSC video.

Go to menu 001 "SELECT CLIP" and select a clip number (1-255) with the **[+][−]** buttons. You can note whether a clip is empty, as opposed to a previous recording by noting "CLIP LENGTH: 00:00:00:00" and a black background instead of a video picture.

If all 255 clips are occupied (have recordings) go to the menu "DELETE CLIP" to erase a clip to free it for recording.

To leave the menu press the **[MENU]** button again.

To test the video, audio and timecode signals which are connected to the bonsaidrive inputs, put the machine into electronic entry "EE" mode by pressing **[RECORD]** and **[■]** simultaneously. (Similar to Bypass, Loop through in audio equipment.)

In EE mode the bypass video signal is delayed 1 frame (40 ms with PAL). In contrast all audio signals have only a few samples delay. This leads to a + 1 frame advance in the sound signal.

To start recording on the harddrive when in the EE mode just press the play **[▶]** button. If you are not in the EE mode hold down the record button **[RECORD]** and then press the play **[▶]** button.

Stop the recording by pressing the stop button **[■]**.

If there is valid timecode on the selected TC input (LTC or MTC according menu 031), then this time will be taken as the start timecode of the new clip. If no valid timecode is present then the clip will start with the default value 00:00:00:00.

When the recording has been stopped the playback position will remain at the end of the clip. To return to the beginning of the clip hold down the stop **[■]** button and press the locate 1 button **[LOC1]**.

If you simultaneously record audio using the optical input C12 then you must be certain that it is synchronised to the video source being recorded, to wordclock output C2 or to the optical audio output of the bonsaiDRIVE.

In other words the audio equipment which is feeding the bonsaidrive must be sync to either the wordclock or the optical output of the bonsaidrive or to the audio house sync (48 Khz sync to house video sync); which of course is also synchronising the video source being recorded by bonsaidrive.

With a sound card without wordclock input, set the sync reference of the sound card to ADAT audio input and connect the ADAT input of the card to ADAT output C11 of the bonsaidrive.

If asynchronous digital audio is connected to bonsaidrive there will be periodic audible clicks depending on the variation of reference frequency between bonsaidrive and the asynchronous source!

Note: This phenomenon is not limited to bonsaidrive and will occur with all digital audio equipment which is not synchronised together.

9. Playing back recorded clips

The playback sync reference can be selected in menu "PLAYBACK SYNC REFERENCE" and can be set to "INTERNAL" or "SYNC INPUT". If your studio system is not synced to a central video and audio reference (house sync) set the sync reference to "INTERNAL" and use the wordclock output C2 as sync reference for your digital audio equipment.

Note: The specification of the wordclock output from bonsaidrive is very high (clock jitter less than 1ns RMS) and can be used to sync the most demanding digital audio equipment without loss of audio quality.

Select the clip you wish to playback in Menu 1 "SELECT CLIP" with the [+]/[-] buttons.

Use the direct buttons and stop shift functions as described on page 15. The two locate points will help you to store positions and playback from required positions quickly and easily.

The timecode value required can be set at any position required by using the menu "SET CURRENT TC POSITION". For example you can set the timecode value 01:00:00:00 exactly over the start of the picture cross on the video.

This will save the annoying offset calculations needed when using other recorders where only one absolute offset is possible.

Using the menu "RESET RECORDED TC" you can reset the timecode to the originally recorded clip timecode at any time.

All timecode and locate values will be overwritten by those stored when moving to another clip or when the machine is restarted.

In the menu "SAVE CLIP INFO TO DISK" it is possible to store the two locate points and the timecode offset in each clip.

The recorder can also synchronise itself to an external LTC timecode source. Select the mode required from the "TIME CODE CHASE MODE" menu. Please read the detailed instructions for this menu.

10 . Firmware Update

The firmware version installed in your bonsaidrive is displayed every time the unit is switched on and has the format "BFXX.XX".

To update the firmware you need a computer with either a MIDI or serial (COM port or MAC-serial) interface, and the respective cables.

Visit www.bonsaidrive.com and download the newest bonsaidrive firmware file (BFXXXX.DAT) together with a software upload module (Windows, MAC OSX) called bonsaiLOADER.

Make a serial or Midi connection from your computer to the bonsaidrive in the following way:

Connection to a Serial port:

Remove the remote panel from the bonsaidrive, exposing the 9 Pin Sub D connector C24, and connect this socket with the serial port of your computer using the cable included in the bonsaidrive package.

This 9 pin sub D cable with male and female connectors allows unidirectional transmission of data from a PC-COM port (RS232) to the Sony 9 pin (RS 422) and can only be used for firmware updates. Machine control software cannot function with this unidirectional connection!

Now connect the remote panel C23 to the recorder, C21 with 9 pin 1:1 cable, also provided in the package.

Connection to a Midi interface:

Connect the MIDI output of your computer with the MIDI input of the bonsaidrive.

The three buttons [◀] [▶] [REMOTE] will light up when the bonsaidrive is ready to accept a firmware update. There are two ways to put the recorder into this mode:

Method (1): Select menu "FIRMWARE UPDATE" and select as indicated using the [RECORD] and [▶] buttons.

Method (2): Disconnect the recorder from the power supply, mains or DC. Now holding down the [▶] and the [▶] button, reconnect the unit to the power supply that was disconnected. After about 2 seconds the [▶],[▶] and [REMOTE] LEDs will light up showing that the unit is ready for firmware update.

Now start the software "bonsaiLOADER" and select serial or Midi-port as just connected in process (1).

Under process (2) load the firmware file from BFXXXX.DAT. The program indicates the date and the version of the firmware.

After completing process (1) and (2), process (3) becomes active. Start the upload process which is indicated on the [▶], [▶], [RECORD], [REMOTE] LEDs which light up consecutively.

This process takes a few minutes and is indicated by a progress bargraph in the software display.

A premature termination of the software update process leads to the complete loss of the firmware but does not erase the bonsaidrive BIOS.

To repeat the upload process you must use method 2. Remove the power supply (if not already removed), hold down the [▶] and [▶] buttons while you reconnect the power supply.

If a CRC error occurs, the software update process is stopped and indicated by the red [RECORD] LED, without the [◀] and [▶] LEDs.

After a successful firmware update the recorder starts and shows the new firmware version and the serial number.
The previous menu settings are saved but should be verified, as the new firmware possibly contains new features and settings.

After a prematurely terminated update process all menu settings are lost and return to the default values.

The upload of firmware versions 00.50 and higher consists of two parts where the first flashes the bonsaidrive itself and the second the optional bonsaiLAN module.

bonsaidrives without bonsaiLAN module installed will boot up already after the first part of the firmware update.

This manual contains two parts:

(I) the General Information part and

(II) a software descriptive part related to the firmware installed in which the menu details are described.

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Part II

This part of the manual is a description of software functions and will depend on the firmware version it describes.

Overview of the menu list

The following part describes the implications of firmware version BF 00.52 from 12th of December 2008. The order and selection possibilities of the menus described underneath can vary in older or newer firmware versions. The following menu points are implemented:

001	SELECT CLIP	Page 28
002	DELETE CLIP	Page 28
003	SET CURRENT TC POSITION	Page 28
004-7	SET TC HOURS, MINUTES, SECONDS, FRAMES	Page 28
008	RESET RECORDED TC	Page 29
009	SAVE CLIP INFO TO DISK	Page 29
010	DELETE END OF CLIP	Page 30
011	COPY REGION	Page 30
012	PASTE REGION	Page 31
017	MAXIMUM RECORDING TIME	Page 32
018	VIDEO RECORD FORMAT	Page 32
019	RECORD MODE	Page 33
020	INSERT TRACK ARMING	Page 35
021	VIDEO INPUT	Page 35
022	ANALOG OUTPUT FORMAT	Page 36
023	SDI OUTPUT	Page 36
024	8TRK AUDIO INPUT	Page 36
025	8TRK CH1/2 3/4 MODES	Page 37
026	SDI AUDIO OUTPUT	Page 37
027	2TRK AUDIO OUTPUT	Page 37
028	2TRK INPUT SENSITIVITY	Page 38
029	2TRK OUTPUT LEVEL	Page 38
030	TIME CODE CHASE MODE	Page 38
031	TIME CODE INPUT	Page 41
032	AUTO PLAY MODE	Page 41

040... Please see bonsaiLAN user manual for detailed menu descriptions.

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061	BATTERY MONITOR	Page 42
062	PEAKMETER INSERTER	Page 42
063	PEAKMETER COLOR RED	Page 43
064	PEAKMETER COLOR YELLOW	Page 43
070	VIDEO STANDARD	Page 43
071	NTSC STANDARD	Page 43
072	STILL & SLOMO PICTURE	Page 44
073	9-PIN MACHINE ID	Page 44
074	GPIO FUNCTION	Page 45
075	[+] / [-] KEYS FUNCTION	Page 46
080	RECORD SYNC REFERENCE	Page 46
081	PLAYBACK SYNC REFERENCE	Page 47
082	SYNC LOCK MODE	Page 48
083	SC-H ADJUST	Page 48
084	CALIBRATE INTERNAL	Page 49
085	COLOR BAR	Page 50
086	DYNAMIC VIDEO OFFSET	Page 50
090	FORMAT DISK	Page 51
091	FIRMWARE	Page 52
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The menu appearing on screen can be activated by pressing the [MENU] key. The menus can be navigated by using the [▶] and [◀] buttons and parameters changed by using the [+] and [-] buttons. In some menus the stop [■] key is used to validate an entry and the [◀] + [RECORD] buttons are used to confirm erase and format commands. Use [LOC 1] and [LOC 2] keys for menu navigation.

MENU 001 SELECT CLIP

Press the [+] and [-] keys to select the clips from 001 to 255. The machine goes to the selected clip and shows the length of the clip, TC start value, TC standard and the record format. Hold down the [+] or [-] key to get to the automatic decrement [-]/increment [+] mode. This mode counts the clips slowly up or down depending on which key is pressed and changes to a fast count after holding down the respective key for more than 5 seconds.

MENU 002 DELETE CLIP

To erase a clip use the [+] and [-] keys to select the appropriate clip as in menu SELECT CLIP. The size of the clip will be shown (SIZE XX GBYTE). Hold down the [RECORD] key and then press the [◀] key to delete the selected clip. An erased clip will be shown on a black background and size "0 GBYTE" indicated. If menu 019 RECORD MODE is set to WRITE PROTECTED DISK it is not possible to erase or modify clips.

MENU 003 SET CURRENT TC POSITION MENU 004-7 SET TC HOURS, MINUTES, SEC, FRM

Time code in harddrive is not recorded on a separate track, but is regenerated from a fixed offset. At the beginning of a recording the time code of the first frame is stored as offset. During playback time code is generated depending on the clip position and the recorded offset.

In the menu SET CURRENT TC POSITION it is possible to redefine the offset in a freely selected position. For example a clip can be positioned on the start mark of a film and the time code offset at this

position changed to 01:00:00:00. The offset of the first frame of the selected clip is then automatically calculated.

Use the normal transport functions to locate the clip at the required position.

Press the menu key and go to menu SET CURRENT TC POSITION. Press the stop key [■] to go to menu SET TC HOURS. Using the [+] and [-] keys set the hours. Using the play key [▶] go to the menus SET TC MINUTES, SECONDS, FRAMES in order to set minutes, seconds and frames.

Press the [▶] key again to reach the menu SAVE CLIP INFO TO DISK to store the values entered on the hard disk.

Note: If the values are not saved then they will only be retained until the clip is changed.

It is also possible during active CHASE TC mode to trim the offset "on the fly" in order to sync picture and sound empirically.

MENU 008 RESET RECORDED TC

As already described under SET CURRENT TC POSITION, at the start of recording the time code value of the first frame is stored as offset. The original offset value can be restored at any time by going to menu RESET RECORDED TC and pressing the stop [■] key.

To store this value as present offset on the harddrive use the menu SAVE CLIP INFO TO DISK. Otherwise the original offset will only remain till the next time the clip is changed.

MENU 009 SAVE CLIP INFO TO DISK

For every clip on the harddrive there is a so called clip info sector. In this section such data as clip length, TC offset and format, original record offset, locator points, clipname and metadata are stored.

When selecting a new clip this data is read into the system and for this reason the changed working data such as offset or locator points must be stored before changing to another clip.

Go to menu SAVE CLIP INFO TO DISK and press the stop [■] key to store the (new) clipdata to the harddrive.

MENU 010 DELETE END OF CLIP

This function deletes the section of a recorded clip from the current transport position until the end of the clip. This command is useful when a recording became too long because it was not stopped in time.

Switch the menu off and use the transport keys to locate the desired new end of the current clip. Select MENU 010 by pressing the [MENU] key. Hold down the [RECORD] key and then press the [◀] key to delete the marked end of the selected clip.

Note: Previously locator positions which are not anymore inside the clip range are automatically set to the new created end of clip.

The erased disk space is available for new recordings.

MENU 011 COPY REGION

Menu 011 COPY REGION and MENU 012 PASTE REGION allow you to copy a section of a clip and paste it to the end of an other or empty clip.

LOC1 and LOC2 markers define the start and endpoints of the region. Switch off the MENU and use the transport keys to locate the beginning of the region you want to copy.

Hold down the [RECORD] key and then press the [LOC1] key to set the start point of the region (IN).

Use the transport keys to locate the end of the section you want to copy.

Hold down the [RECORD] key and then press the [LOC2] key to set the end point of the region (OUT).

Select MENU 011 COPY REGION and press the stop [■] key to copy the selected region to the bonsaidrive clipboard.

The display indicates "BUSY..." during the copy process and "DONE" when the copy procedure is finished.

If the marked endpoint (LOC1) is set before the startpoint (LOC2) a error message will occur: "ERROR: OUT BEFORE IN".

The length of a region is called DURATION and displayed in this menu in time code format (hours:minutes:seconds:frames).

The bonsaidrive clipboard is limited to 311.296 frames (about 2.88 hours at 30 fps).

Use the [+] and [-] keys to navigate in-between different clips.

MENU 012 PASTE REGION

This command adds a region you have copied before using the COPY REGION command to the end of the currently selected clip.

Use the [+] and [-] keys to navigate to the clip where you want to add the region. The DURATION of the clipboard is shown in this menu as well.

Press stop [■] key to paste the clipboard contents to the end of the selected clip.

The display indicates "BUSY..." during the paste process and "DONE" when the paste procedure is completed.

A so called crossfade is processed for all 10 audio channels at the edit point to avoid the typical "pop" noise which is generated when audio signals are hard edited.

The copy & paste procedure does not duplicate the video and audio material data on the harddrive. Therefore no additional hard drive space is used and the whole process takes just a few seconds.

On the bonsaidrive harddisk each frame is stored individually and can be used independent by each of the 255 clips. As long as one of the clips uses a specific frame this frame and its disk space are write protected.

Example: You have copied a region from clip 001 and pasted to clip 002. Now you DELETE clip 001. The copied frames are still reserved by clip 002 and will not be overwritten by new recordings.

MENU 017 MAXIMUM RECORDING TIME

bonsaiDRIVE recordings are organised in several CLIPS. The maximum recording time can be set to SINGLE or MULTIPLE CLIPS with a duration of 240, 120, 60 or 30 minutes.

When set to SINGLE CLIP 60 MINUTES for example the machine stops automatically a recording after 1 hour. Of course you can also stop a recording at any time manually by pressing the stop key.

When set to MULTIPLE AT 30 MINUTES the machine stops recording the first clip after 30 minutes and starts to record a following clip with increased clip number automatically.

MENU 018 VIDEO RECORD FORMAT

From firmware version 00.40 there are two different video codecs implemented:

(1) bonsaidrive LOSSLESS

This is our proprietary Huffman codec used in all earlier firmware versions.

This codec consumes about 40-60 Gbyte/ hour and does not modify the video data. Data reduction is achieved by Huffman coding and the coded and decoded data is identical.

(2) bonsaidrive LOW RES

For some applications the high uncompressed video quality is not required and instead less disk space consumption desired. The new bonsaidrive LOW RES codec consumes about 15-25 Gbyte/ hour and allows you to record up to 40 hour on a single 750 Gbyte disk. Only new clip recordings (RECORD MODE = CRASH) will take over the video record format selected in this menu. ASSEMBLE or

INSERT recordings are automatically executed in the format of the existing clip.

In MENU 001 "SELECT CLIP" the format of each recording is displayed: LOSSLESS or LOW RES together with the video standard PAL / NTSC DROP or NTSC NON DROP.

MENU 019 RECORD MODE

In this menu the record mode can be selected with the [+] and [-] keys. From firmware BF 00.30 the following modes are available:

WRITE PROTECTED DISK
CRASH
ASSEMBLE
INSERT PREVIEW
INSERT RECORD

WRITE PROTECTED DISK means that all harddrive write functions are disabled, including SAVE CLIP INFO TO DISK, DELETE CLIP and FORMAT DISK.

This allows additional protection against accidental recording over or deleting of files in certain applications.

The selection of CRASH puts the video channel and all 10 audio channels in a record ready mode. A CRASH recording automatically assigns the next free clip number from current clip number position. CRASH recordings are stopped using the stop [■] key.

Selecting ASSEMBLE record mode sets the TRACK ARMING in MENU 020 automatically to 8TRK + 2TRK + VIDEO. To enter an ASSEMBLE recording the unit must be in the locked play forward condition. Therefore press the play key [▶] to start a locked playback forward. After one or two seconds when the units is locked hold the [RECORD] key down and press the play key [▶] to start an assemble recording. Press the stop [■] key to finish and exit the assemble editing.

ASSEMBLE recordings perform a so called "clean in", which means a seamless picture editing at the IN point together with a smooth

audio crossfade. The endpoint of the recording will become the new end of clip and all later material of the clip recorded previously will be deleted ("dirty out").

Advise: Make a copy of the complete clip using the COPY and PASTE functions before executing ASSEMBLE edits.

Using record mode INSERT it is possible to overlay only selected audio tracks with smooth audio crossfades at the record IN and OUT points. The PREVIEW mode emulates the edit without writing to the harddisk. INSERT RECORD writes new audio data to the disk.

Note: audio insert recordings affect also all copies of the material when used in other clips (created with COPY and PASTE functions).

This means you can not backup the material with the copy and paste functions because audio insert recordings will also change the copy.

All editing features including track arming and auto edit can be remote controlled via Sony P2 protocol.
See PDF document bonsaidrive 9-pin implementation for further information.

To enter a INSERT recording manually please first press the play key [▶] to start a locked playback forward. After one or two seconds when the units is locked hold the [RECORD] key down and press the play key [▶] to start the insert recording. Press the play key [▶] again to leave the insert recording mode.

Do not use the stop [■] key instead, because this produces a "dirty out" without audio crossfade processing at the out point.

MENU 020 INSERT TRACK ARMING

The bonsaidrive records 10 audio channels organised in one 8 track and a 2 track section (2TRK, 8TRK). The 2TRK section is internally mapped as channels 9-10. The track arming is restricted to a fragmentation of one side records where the other side is in playback mode. Therefore the following combinations can be armed:

OFF	
8TRK 1-2	2TRK
8TRK 1-4	2TRK + 8TRK 7-8
8TRK 1-6	2TRK + 8TRK 5-8
8TRK 1-8	2TRK + 8TRK 3-8
8TRK 1-8 + 2TRK	2TRK + 8TRK + VIDEO

Only video inserts are for technical reasons not possible (variable length of the video codec).

Note: Selecting the record mode MENU 019 to ASSEMBLE arms all audio channels + video automatically. Check MENU 020 before you start a INSERT RECORDING to avoid unwanted overwriting of your material.

The audio level inserter indicates armed track pairs with red markers.

MENU 021 VIDEO INPUT

Select the video input used with the [+] and [-] keys. The following selections are possible: CVBS (Composite or also called FBAS), Y/C (S-video), COMPONENT (Component signal) and GBR (RGB-video signal, G on C20, B on C19 and R on C18).

With installed SDI board also appears menu item SDI.

An additional information on input formats is available in chapter 8 "Recording clips" (I, page 18).

MENU 022 ANALOG OUTPUT FORMAT

Use the [+] and [-] keys to select the analog output format. When CVBS & Y/C is selected the following signals are output: Composite (FBAS) video signal on C17 and a Y/C (S-video) signal on C16 and C15. With COMPONENT selected an analog component signal on C17-C15 is output. Select GBR to output an analog RGB video signal (G on C17, B on C16 and R on C15).

You will find a detailed description of these formats in chapter 5 "Connecting a monitor" (I, page 10).

MENU 023 SDI OUTPUT

With you have installed the optional SDI board you can select between two different SDI video output modes.

Setting PROGRAM ONLY outputs the video signal without any graphic insertions. PROGRAM & INSERTS routes the onscreen inserts and the menu to the SDI output.

The analog outputs do always send program and inserts independent of this setting.

MENU 024 8TRK AUDIO INPUT

Choose from OPTICAL ADAT or SDI EMBEDDED AUDIO as source of the 8 track audio section. SDI signals with only four embedded audio tracks will be recorded on channels 1 to 4.

MENU 025 8TRK CH1/2 CH3/4 MODE

Dolby E is a technology to transmit compressed multi channel audio over a single uncompressed AES/EBU audio channel. In the AES/EBU status bits exists a "non audio" flag to indicate that the data stream is used for other datatypes than pcm audio. Embedded SDI audio also transmits these AES/EBU status bits.

This setting allows you to set pair 1-2 and/ or pair 3-4 to 20 BIT DATA mode for Dolby E recordings.

Set both pairs to PCM audio for standard audio use.

Selecting 20 BIT DATA also disables the audio crossfade processing on the respective channels (INSERT RECORD, PASTE REGION).

MENU 026 SDI AUDIO OUTPUT

If you have installed the optional SDI board menu 026 configures the SDI embedded audio signals:

DISABLED	no SDI embedded audio is output (blank h-sync)
8TRK 1-8	outputs channel 1-8 of bonsai 8TRK (2 groups)
8TRK 1-4	outputs channel 1-4 of bonsai 8TRK (1 group)
2TRK	outputs bonsai 2TRK audio (1 group)

MENU 027 2TRK AUDIO OUTPUT

The analog 2TRK outputs can also be used for monitoring the 8TRK audio section in all operation modes (playback, record, insert):

Setting 2TRK (default) outputs the analog stereo signal whereas 8TRK CH 1-2, CH 3-4, CH 5-6, CH 7-8 routes the respective pair of the 8TRK audio section to the analog outputs.

Note: This routing has no effect to the onscreen peakmeters which will always display the 2TRK audio section.

MENU 028 2TRK INPUT SENSITIVITY

The sensitivity of the analog 2 track inputs can be adjusted in 3 dB steps from -6 dBU up to +9 dBU as digital full scale level.

MENU 029 2TRK OUTPUT LEVEL

The full scale level of the analog 2 track outputs can be set in 3 dB steps from -6 dBU up to + 9 dBU.

MENU 030 TIME CODE CHASE MODE

The time code chase mode is a function that synchronises the bonsaidrive to an external time code. The machine chases (runs after) and locks to the external time code. The bonsaidrive requires a time code signal in the correct time code format, i.e. 25 FPS for PAL or 29.97 FPS DF/ND for NTSC video formats (see menu 070 VIDEO STANDARD).

The time code can either be LTC (sometimes describes as SMPTE) or MTC, Midi Time Code format, and can be selected with menu 031 TIME CODE INPUT.

There are 6 different chase settings:

(1) DISABLE

No synchronisation to external time code.

(2) VARISPEED

In this setting the audio and video follows the speed of the input time code. The nearest video frame to the current time code position is shown and the audio channels are output in varispeed with so called linear interpolation (14 bit). The audio quality is not as good as in the normal play function which has sample synchronous audio playback.

The frequency of the word clock signal at output C2 and the digital Audio output C11 do not follow the chase time code exactly and may not be synchronous with it.

The picture and audio signals however are output synchronous to the chase time code.

The state of the varispeed is shown by the lighting up of either the [+] or [-] keys. [+] means that the play speed is over the nominal value and [-] under the nominal value.

The varispeed chase mode should be used if it is not possible to synchronise the master and slave machines to a common house sync, or if using the bonsaidrive just as a picture player without audio.

(3) GENLOCKED

If the feed time code is locked to the video output of the bonsaidrive or to a house sync one should use the setting GENLOCKED.

In this mode at the start of play, the first video frames are synchronised as in VARISPEED above, but after the correct frame position and video phase have been reached the play speed switches over automatically to nominal and is not regulated any more. This status is easily recognised as only the play key lights up in forward mode.

When using a synchronous time code source, sync is guaranteed by the fact that both time code and the bonsaidrive are synchronised by the same sync source.

In normal playback mode the audio signals are not interpolated and are played back with full 24 bit resolution.

Should the time code and picture not be exactly synchronised, then - when the error reaches 1 frame - a correction is made as in varispeed until the error is cancelled. Then genlock mode is switched in again.

Genlocked chase mode is mostly used in the synchronisation of professional video machines or when using several bonsaidrives coupled together.

(4) TRIGGER

Midi time code is often output from PC audio workstations. Depending on the system used there is often too much latency and jitter in the MTC making it unsuitable for a continuous synchronisation. To get round this problem, one can use a so called TRIGGER setting.

In this mode the input time code is only used as a start mark that triggers the synchronisation. From this point onwards both player and synchronised machine run in nominal speed and through the use of an external sync for all machines, sync is guaranteed over long play times.

Note: One can use the word clock output of the bonsaidrive as 48 kHz word clock reference for the audio workstation.

Similar to GENLOCK mode the input time code and the internal time code are compared, and when an error of over 1 frame has accumulated a resync is done to remove the error.

In trigger mode the audio data are not interpolated and are given out in full 24 bit resolution.

Note: It is advisable to use the chase mode TRIGGER when synchronising to a MTC source.

(5) LOCK & RELEASE

Once the bonsaidrive has locked to a nominal time code source it remains in this locked play status independent of the incoming time code. Only a valid stop command from the bonsairemote or received via 9-pin or MMC will cancel the locked playback. This mode can be used to synchronise the machine to so called time code burst recordings or to lock to fragmentary or faulty time code tracks.

(6) AUTO CRASH RECORD

To enable this time code chase mode you must also set the RECORD MODE in menu 019 to CRASH.

When a valid nominal time code source is detected the unit starts a new crash recording with the captured time code. When this time code source stops or becomes not valid the recording will be stopped automatically.

Each new detected offset in the time code source causes a new separate crash recording with an increased clip number. This chase mode serves for location recordings where each take with new running time code values from a camera automatically starts a new crash recording with increasing clip numbers.

MENU 031 TIME CODE INPUT

Select the time code input used for the TC chase mode and for the TC record mode using the [+] and [-] keys. Firmware BF 00.52 supports LTC and MTC time code sources.

Note: detected 29.97 drop frame time code format is indicated by the time code inserter with a semikolon ";" in-between the minutes and seconds digit.

MENU 032 AUTO PLAY MODE

Select one of the AUTO PLAY MODES, "LOOP LOC1... LOC2", START LOC1, STOP LOC2 or PLAY ALL CLIPS".

LOOP LOC1... LOC2 plays a continuous loop of which the start and end points are defined by the two locator points.

START LOC1, STOP LOC2 is an automatic play function that begins with locator point 1, plays to locator point 2 and stops.

In this way in connection with the GPIO's (General Purpose Inputs/Outputs) a particular scene can be played back at the press of a button.

PLAY ALL CLIPS plays all 255 clips successively with "jumping" time code values on each clip crossing.

When an autoplay function is selected play and shuttle functions work automatically, moving from the right Locator LOC 2 back to the left locator point LOC 1.

In order to set a new locator point and move to another play loop press [LOC 2] to go to the end of the play loop and then press the [+] key twice (STEP FORWARD).

Now you can move about outside the end point with normal play or shuttle functions to set a new end point. Start and end points are set like normal locator points with [REC] + [LOC1] or [REC] + [LOC2].

MENU 060 INSERTER

To insert the time code and clip number into the picture the following positions are available: TC LEFT BOTTOM, TC CENTER BOTTOM, TC RIGHT BOTTOM, TC & CLIP BOTTOM and the respective on the TOP of the screen (TC LEFT TOP....).

TC & CLIP shows the time code and the current clip number.

OFF switches the inserter function off.

Semikolons ";" in-between the digits indicate the following:

Hours ; minutes: Dynamic video offset applied

minutes ; seconds: NTSC drop frame format on TC input

Seconds ; frames: NTSC drop frame format selected in menu 070

MENU 061 BATTERY MONITOR AUTO POWER DOWN

Set BATTERY MONITOR: ON to insert a battery monitor symbol in the picture when you are using a battery powered DC version powered by an external battery.

The AUTO POWER DOWN function switches the unit off automatically when the feed DC supply voltage drops below 10.5 Volts.

MENU 062 PEAKMETER INSERTER

The audio levels can be monitored with onscreen peakmeter inserts. You can select 2TRK, 8TRK, 2TRK & 8TRK or OFF to display the respective 2, 8 or 10 audio channels simultaneously.

Levels from 0 dB to -30 dB are shown linear in one dB steps, from -30 dB to -60 dB using a logarithmic scale.

0, -10, -20, -30, -40, -50, -60 dB positions are marked by white spots. When an audio insert record mode is selected the armed channel pairs become marked by red spots.

MENU 063 PEAKMETER COLOR RED

The Peakmeter display is divided into three level ranges which show the colors green, yellow and red.

The upper red area can be adjusted in 1 dB steps from -30 dB up to 0 dB.

MENU 064 PEAKMETER COLOR YELLOW

The start level of the peakmeters yellow, center area can also be adjusted in 1 dB steps from -30 dB up to 0 dB.

MENU 070 VIDEO STANDARD

Select the required video standard with the [+] and [-] keys. The following selection is available.

PAL 25 FPS

NTSC 29.97 ND (non drop TC format)

NTSC 29.97 DF (drop frame TC format)

NTSC clips can be played back with non drop or drop frame time code independently to the time code format used in recording.

The time code inserter indicates DF format showing a semikolon ";" in-between the seconds and frames digits.

See also MENU 009 how to save the selected TC format individually to each clip.

MENU 071 NTSC PEDESTAL

Select the black level for analog NTSC video signals according to the standard used in your country.

7.5 IRE (USA) or 0 IRE (JAPAN)

MENU 072 STILL & SLOMO PICTURE

PAL and NTSC video standards consist of two sequential, interlaced half frames (called first and second fields). There are video sources where both fields are scanned simultaneously (called frame scan), and also systems that do individual scans for each field (field scan).

The playback of a complete frame (two fields) in a still picture can lead to a flicker effect as both fields are alternate played back. Using the menu STILL & SLOMO PICTURE the playback mode for still and slow motion frames can be changed:

FIELD shows only the first half frame which reduces the vertical resolution but removes field flicker from field scanned video. FRAME shows both half frames with full vertical resolution.

MENU 073 9-PIN MACHINE ID

To remote control the bonsaidrive through the Sony 9 pin protocol connect the external controller being used to the remote port C24. Using the [REMOTE] key, switch over the communication from the bonsai remote to the external controller. For menu settings or normal transport commands the communication must be switched to the bonsai remote panel. That means [REMOTE] must be deactivated.

When connecting the external controller take care that the bonsaidrive is the Sony 9-pin "CONTROLLED DEVICE" on C24. The pinning and signal levels must comply. Note: The pinning and levels are not compatible to PC COM ports and should be adapted using the converters which are available to buy. Sony 9 pin communication usually starts with a "device request" command. The machine being controlled answers with its identification (ID). In menu 25 "9-PIN MACHINE ID" one can select either B1 00 PAL/ B000 NTSC for a Sony A500 or the bonsaidrive Identification 31 E0 PAL/ 30 E0 NTSC.

MENU 074 GPIO FUNCTION

The GPIO (General Purpose Input/ Output) Port C22 has the following pinning.

- | | |
|------------|-----------|
| (1) GPO_1 | (5) GPI_1 |
| (2) GPO_2 | (6) GPI_2 |
| (3) GPO_3 | (7) GPI_3 |
| (4) GPO_4 | (8) GPI_4 |
| (9-15) GND | |

The inputs (GPIs) are switched to ground (GND) for example with a press button switch. The input signals are debounced in bonsaidrive and the selected GPI command is carried out when the contact closes.

The outputs (GPOs) are 0 V inactive, and 5 V active drivers with a 100 ohm output impedance. The output current is limited to 50 mA. When connecting a LED one should add a series resistance of 330 ohms to limit the diode current to about 7 mA. When connecting reed or coil relays it is recommended to use a protection diode. Electronic solid state relays (SSR) do not need a protection diode and can be directly connected without additional components.

Take care that all GPIO connections are isolated and that there are no ground or current loops to other grounds or potentials.

With the DISABLE setting all GPI inputs have no function. The GPO outputs are switched momentarily to inactive = 0 V at reset (shortly after start).

With the SELECT CLIP 1,2,3,4 function the GPIs 1...4 are switched to select clip number 1...4 respectively. When the auto play mode is activated, (menu 014) the selected clip is played once from locator 1 to locator 2 or repeats in an endless loop depending on the menu selection.

In this way it is easy to realise a media player for presentations and exhibitions, which can be activated by the public through the GPI buttons. Even after a power cut or switching the machine off and on settings are stored and the machine will resume its function.

The respective GPOs indicate the selection of clip 1, 2, 3 or 4.

Setting PLAY, STOP, CLIP-, CLIP+ defines the GPIs as follows:

GPI_1: PLAY puts the machine into play
GPI_2: STOP stops the transport
GPI_3: CLIP- decreases current clip number
GPI_4: CLIP+ increases current clip number

MENU 075 [+]/[-] KEYS FUNCTION

In this menu the function of the [+] and [-] keys during stop mode can be defined.

"During stop mode" means the machine shows a still picture and the menu is switched off.

Selection STEP FWD/REVERSE allows you to step one frame ahead and reverse respectively.

The function INC/DEC CLIP NUMBER changes the current clip number without using a menu.

MENU 080 RECORD SYNC REFERENCE

The reference sync for the bonsaidrive can be separately selected for playback and record mode.

Select the sync reference for record mode in menu RECORD SYNC REFERENCE.

The setting VIDEO INPUT uses the video input signal as sync reference. A digital PLL guarantees a stable lock even from very unstable or inaccurate video sources e.g. from a VHS-video tape recorder.

The colour subcarrier frequency of the composite video output is asynchronously controlled for errors larger than +/- 5 ppm. In this way errors of up to 150 ppm in the video source can be compensated.

The audio section of the recorder is synced to the video input and so the word clock output on C2 can be used to synchronise other audio equipment.

When synchronising from the video input, only the video frequency is used. Field and line phase are not synchronised at the output.

The setting SYNC INPUT uses external house sync on input C3 (Sync Input) to synchronise the recorder in record mode. When using this setting the input video must be synchronised to the same house sync as well.

DIRECT VIDEO I/O MODE passes the video input signal data direct to the video outputs. This mode is saving system memory throughput and should be used for the "CAPTURE WHILE RECORD" functions with bonsaiLAN networking option.

When entering EE or record in this mode the picture contents are moving some seconds from a left or right offset into the centre. This appears only on the monitoring output and does not affect the recording on the harddisk.

MENU 081 PLAYBACK SYNC REFERENCE

In play mode the recorder can be synced internally or to an external house sync (video black and burst signal).

The setting INTERNAL synchronises the internal audio clocks and video to a very stable VCXO.

The word clock output has absolute reference quality and can be used to synchronise all professional audio equipment.

The internal Xtal oscillator can be calibrated to the external reference signal in menu 22 CALIBRATE INTERNAL.
Resolution is 0,02 ppm.

If the machine is to be synchronised to house sync in play mode, set the PLAYBACK SYNC REFERENCE to SYNC INPUT and connect the house sync reference signal to input C3 (SYNC INPUT).

When no reference signal is present the status LEDs blink on the remote panel.

Synchronising to an external house sync takes about 2 seconds in 2-field and 8 seconds in 8-field mode, depending on the SYNC LOCK MODE used.

The external synchronising video signal (house sync) should comply with the broadcast specification (+/- 1 ppm, black & burst, line jitter < 10 ns).

MENU 082 SYNC LOCK MODE

MENU 083 SC-H ADJUST

In a PAL composite video signal (FBAS) the phase between the colour subcarrier (SC) and horizontal sync (H) repeats phase coherence every 8 fields (SC-H phase).

If one sets the SYNC LOCK MODE to 8 FIELD the composite outputs are phase correct to the house sync (and other equipment synchronised with the house sync).

A phase adjustment in 1.8 degree steps can be carried out in menu 21, SC-H ADJUST.

If composite video signals are to be mixed it is necessary to sync to the 8 field sequence. For all other uses one should set SYNC LOCK MODE to 2 FIELD sequence.

MENU 084 CALIBRATE INTERNAL

A composite video signal needs a very precise colour subcarrier frequency. The tolerance lies in the under 10 ppm range.

With this menu it is possible to recalibrate the internal Xtal oscillator for the PLAYBACK SYNC REFERENCE = INTERNAL mode.

For this one needs a very precise studio reference generator or a clean video signal received from a public broadcaster (cable or antenna).

(1) connect the reference signal to SYNC INPUT (C3).

(2) Set the PLAYBACK SYNC REFERENCE to SYNC INPUT.
Make certain that the recorder is in stable lock.

I.e. the key led stops blinking and is lit. A clean picture without colour errors must now be visible on the composite output.

(3) Hold down the record key [REC] and then press [◀]. In the display the message "DONE" appears. The calibration used to synchronise to the external sync signal is stored and used for the PLAYBACK SYNC REFERENCE = INTERNAL mode.

Set the PLAYBACK SYNC REFERENCE back to INTERNAL and check the composite output signal.

Do the above calibration only if colour is missing or colour errors are seen on the composite video output in the PLAYBACK SYNC REFERENCE = INTERNAL mode.

The external calibration has no effect on the record sync function or other functions using external sync sources (SYNC INPUT).

Menu 099 SAVE AND POWER DOWN must be carried out to store the new tuning non volatile to flash memory.

MENU 085 COLOR BAR

For test purposes you can activate the internal 75% color bar generator by pressing the [+] key. Press the [■] or [-] key to return to the menu.

The color bar generator is only output on the analog video outputs.

MENU 086 DYNAMIC VIDEO OFFSET

Digital TFT video displays and projectors produce frame delays caused by the internal scaling / framing processes.

To compensate these effects it is possible to apply a video offset of maximal +/- 8 frames against the bonsaidrive's internal time code and audio engine. This offset is dynamic, which means only effective during forward play operation. Fixed images when the transport is stopped or playing reverse are unchanged to ensure correct spotting and editing.

Note: Set to +0 frames for standard use with a tube monitor!

A value different than +0 is indicated in the time code inserter showing a semikolon ";" in-between the hours and minutes.

MENU 090 FORMAT DISK

The hard drive is used with a proprietary bonsaidrive format which divides the hard disk into blocks (clusters) of 512 Mbyte. Such a block can store about half a minute of lossless (Huffman code) video together with 10 channels of audio.

Every recording - no matter how small - uses at least one of these blocks. Erasing a clip frees these blocks for rerecording. The fragmentation of the whole hard disk is thus limited to (2 x disk capacity/GB) units.

Parts of the hard disk which show errors are automatically avoided by the recording.

The so called metadata, which have the LBA addresses and other data management informations, are stored in the lower parts of the hard disk. When the machine starts it checks whether valid metadata exists for 255 clips.

If no clips are present or some have errors, the machine goes to the menu FORMAT DISK.

When carrying out the format disk command new metadata for 255 clips is written. All clips which are on hard disk are deleted.

The complete action takes less than one second.

Hold down the [RECORD] key and press the [◀] key to format the hard drive.

MENU 091 FIRMWARE

In menu 091 you can see the actual firmware version installed. BF 00.52 is the firmware being described in this section. To make a firmware update, hold down the [RECORD] key and press the [◀] key. See details in chapter 10 "Firmware update" in the main part of this manual (I, page 22).

Each time the bonsaidrive is powered up a checksum of all flash memory cells will be calculated. Thus flash memory errors will be detected and reported as bonsaidrive errors 030 and 031.

MENU 092 HARDDISK INFO

The menu 092 gives information about the hard drive.

In the top line is shown the name and number of the hard drive. In the second line the total capacity in GBYTE is shown. (GBYTE = Gigabyte)
Underneath is shown how many clips have been recorded and how much storage space has been used.
The difference between the disk capacity and the storage space used is the storage capacity remaining for recording.
One hour uses about 50 Gbyte storage dependant of the video material.
The number of disk errors that have occurred since the last time the machine was switched on is shown in the bottom line. This value should always be zero.

MENU 099 SAVE AND POWER DOWN

Press the [■] key to save all menu settings and put the bonsaidrive in power down mode.

Use menu 009 SAVE CLIP INFO TO DISK to store modified locator points, time code offsets and time code format in the clip info area on the hard drive before powering down.