

CLOCKIT MASTER SLATE ACD 301 / RF

Time code Slate

MK III - 2009



Ambient Recording GmbH
Schleissheimer Str.181 C, D-80797 Muenchen
Tel: +49 89 6518535 Fax: +49 89 6518558
Email: info@ambient.de
www.ambient.de

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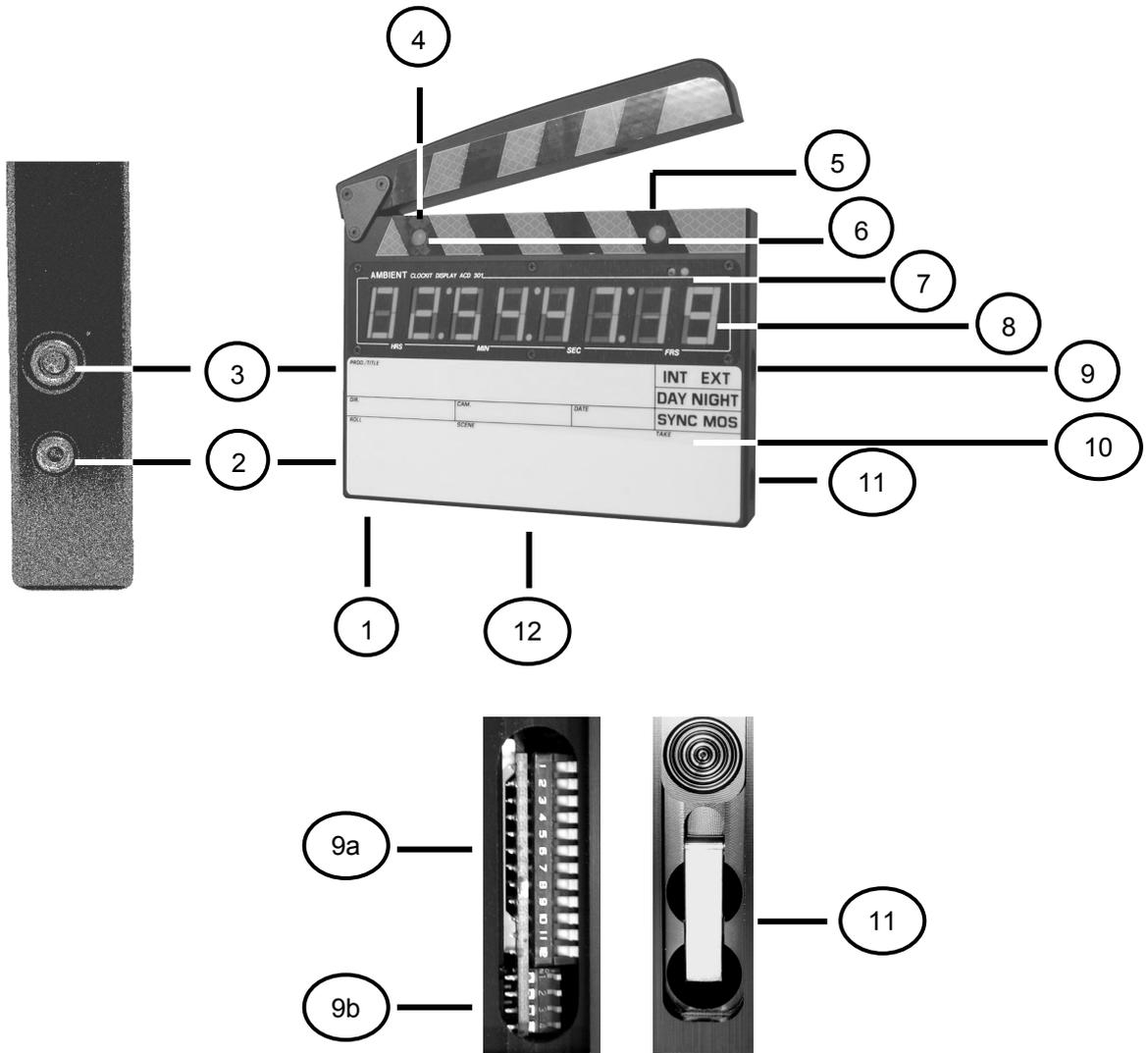
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1 User Instructions

1.1 Controls & Control elements



Bottom edge

① **ON/OFF switch**

⑫ **Antenna**

Left side

② **1/8" jack time code In/Out socket**

③ **5 PIN LEMO interface socket**

Between clapstick and body

④ **Push button left. (RED)**

⑤ **Push button right. (BLUE)**

All internal setting functions are carried out using these two buttons in combination with the DIP-switches.

Front

- 6 2 RED flash-LED's
- 7 RED and GREEN single LED
- 8 LED display with Anti-glare mask and polarizing red filter
- 10 Writing surface for boardmarker

Right side

Two sliders are on this side of the slate.

- 9 The top slider exposes the **DIP-switches**.
 - 9a Switch with 12 switches
 - 9b Switch with 4 switches
- 11 The Bottom slider locks the battery contact strip and allows the exchange of batteries.

Back cover

Has a short form instruction manual laser engraved, it describes the main functions of the slate.

1.1.1 The DIP-switches

There are two switch field's inside. One with 12 DIP-switches and one with 4 DIP-switches. Their functions are outlined in this chapter. It is important to note that changes made to the DIP-switches (12 switch-field) 1, 2 and 3 are activated only after a power-down, power-up cycle. Switches 4 through 12 take effect at once.

DIP-switch with 12 switches:

													OFF
													ON
1	2	3	4	5	6	7	8	9	10	11	12		

Frame rate

SW	24 Frs	25 Frs	30 Frs	29.97 Frs
----	--------	--------	--------	-----------

1	ON	OFF	OFF	ON
2	OFF	OFF	ON	ON

3 ON **Drop Frame with 29.97 and 30 frames**
Note. Drop Frame with 24 is slow 24 (23.98frs!)
Drop Frame with 25 in Reader mode is Enhanced reader (see section 3.4)

Operating modes

SW	Gen	Gen/ RTC	Read/Gen	Read
4	OFF	OFF	ON	ON
5	OFF	ON	OFF	ON

Display modes

6 ON **Time code only displayed.**
 No transition to userbits when slate closed.
 Display userbits with RED button.

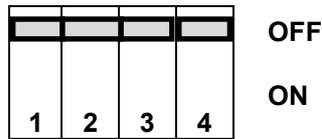
OFF **Normal slate function.**
Slate open Time code display.
Slate closed Display userbits for 2 secs,
 or userbits with RED button.

7 ON **Clapped time shown for 2 minutes.**
 OFF **No clapped time displayed.**
Note: With SW 7 down LED display shuts off after 3 minutes.

8 ON **Advance display** frames as selected by switches 9. 10. 11.
 OFF **Retard display** frames as selected by switches 9.10.11.

	Frs	0	1	2	3	4	5	6	7
9	1's	0	1	0	1	0	1	0	1
10	2's	0	0	1	1	0	0	1	1
11	4's	0	0	0	0	1	1	1	1
12	OFF	Running time code shown when clapstick lifted.							
	ON	Userbits shown for one second.							

DIP-switch with 4 switches:



- 1 TRX OFF / ON** Transceiver is transmitter when slate is in GEN mode, receiver when in READ or READ/GEN mode.
Make sure TRX is switched off when not in use, reading or jamming TC from LEMO or 1/8" jack is not possible if TRX is left on.
- 2 TX continuous / burst:** when in GEN mode, TC is transmitted continuously or as a 5 seconds burst when slate is clapped.
- 3 Flash-LED ON / OFF:** LEDs flash at second's start (5 frames) when up. This aids syncing up if the frames are not readable on the display.
- 4 Read TC is inserted in userbits when in RD/GEN mode**

1.1.2 Brightness control

Open the clapstick and hold down one button while incrementing or decrementing the brightness with the other.

The brightness of the slate can be altered in 9 steps with the blue and red pushbuttons. This optimises film exposure of the display and helps save batteries. Additionally, when the brightness is at maximum there is an automatic control which reduces the brightness in 10 second cycles. When the slate is closed the internal counter counts back to 0 seconds. The display will show maximum brightness on opening again.

Due to the increased brightness of the slate, it is necessary to save batteries. In the clap mode the slate is opened and clapped usually within 10 seconds, so that this feature does not impair the maximum brightness at slating time.

Note a: When the batteries get low and don't recuperate in the time the display is off, the processor reduces the maximum brightness until batteries are changed. If you can't get 9 brightness levels it is time to change the batteries. (See chapter 1.1.4 and 1.1.5)

Note b: No external time code should be connected in the generator mode when changing brightness otherwise the generator could be jammed if the red button is pressed while holding down the blue. In reader mode changing the brightness will not influence the generator.

1.1.3 The "Red" and "Green" LED

On the top right hand corner of the display are a Green and a Red LED which indicate the status of the generator and reader.

RED LED flashes at one second intervals. Gen ON and running but hasn't been set from an external or RTC source.

GREEN LED flashes at one second intervals. Gen ON and has been set from external source or RTC on start up.

Note. If the generator loses time due to unsuccessful ext. Jam or other problem, the Red LED will flash instead of the Green.

When the generator is set from an external source while it is running the Red LED will go on shortly and then the Green LED will flash at 1 sec. intervals. A full on LED indicates latchup or time code/noise present at the input. Repeat jamming process, or turn OFF then ON to reset.

Generator mode When the slate is turned ON, the Red LED will flash at one second intervals indicating that the generator is running but not set.

Generator RTC mode When the slate is turned ON the Green LED will flash indicating that the generator has been set from the internal RTC.

Reader/Generator mode When the slate is opened and the reader mode is active the Red LED will be ON if no ext TC is present. The Green LED will be ON indicating that an external TC is being read successfully. When the slate switches over to generator on closing the slate the Green or Red LED will flash as described in the generator mode.

Reader Mode The Red LED is full ON when no Ext TC is present or there are reading problems. The Green LED will be full ON when an external code is being read correctly.

1.1.4 Voltage readout, low battery warning

Pressing the right / blue button shows the battery voltage for 5 seconds before going into the camera speed check (only in GEN mode with no TC signal at the input or in READ mode).

When the batteries have gone below 6.9 Volts or the batteries are being changed the Red or Green LED will double flash.

If using good alkaline, this threshold gives you about one hour to replace the batteries (with lit LED display at a medium brightness level).

If using Ni-MH or Li-Ion batteries, that time may be shorter due to the different discharge curve of those.

For rechargeable or Lithium batteries, we recommend monitoring the voltage indication and double flash behaviour to gather an empirical value about how long those will last when they are close to being empty.

1.1.5 Changing the batteries

The ACD301 accepts 6 pcs. AA 1,5 Volt batteries.

Make sure to observe polarity, reversed batteries will leak!

Alkaline, Lithium or rechargeable Ni-MH are possible.

Due to the high current draw with display at higher brightness levels, Lithium batteries will last longer when operating with permanently opened slate.

The slate's internal Ni-MH accumulator will keep the generator running for 5 minutes when the batteries have been removed. The LED display is shut off while running on the backup battery. The internal data are not lost during battery change. After new batteries are inserted, double flashing will go on for about a minute.

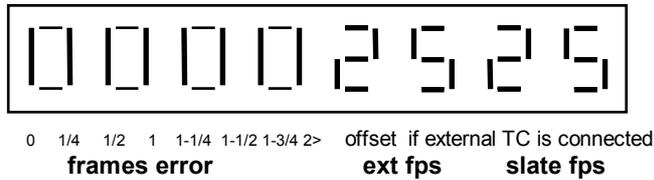
1.1.6 Tuning the slate

The generator Xtal of all Clockit units can be "tuned" using the Clockit Controller (ACC 101 - 501) to within +/- 0.1 ppm to it's reference Xtal, which in

turn is “tuned” to GPS (factory setting) or to a fixed offset to match another machine by the user. Full details of this process will be found in the Clockit Controller manual.

1.2.3 External TC frame rate identification

Press BLUE button to display the Generator frame rate and next to it the external TC frame rate. A single bar to left of the frame rate indicates the eventual error in the following ways:



1.2.4 EXT TC error check

Bar full left indicates an error of 0 frames or less the 1/4 frames.
4 bars from left 1 fps error.
Full right indicates 2 or more frames error.

1.2.5 Frame rate identification

The ACD slate display shows the various frame rates in the following way:

Display	24	25	23	29	2d	30	3d
Frame rate	24	25	23.98	29.97	29.97 Drop Frame	30	30 Drop Frame

1.3 The Manual Set Mode

To enter the SET MODE press both (RED and BLUE) buttons simultaneously for appr. 3 seconds until the userbits show (one spacer dot). The left most digit will flash. You can then release both buttons. The digits can be changed with the following cursor movements:

1.3.1 Moving the Cursor

To move Right Press the BLUE button.
To move Left Hold the BLUE button down and press the RED button.

1.3.2 Changing the digit values

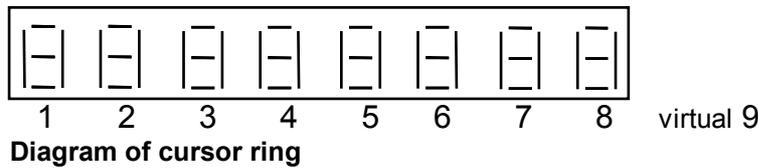
Increment value Push RED button.
Decrement value Hold down RED button and decrement with BLUE.

1.3.3 Cancelling changes

Closing the slate stick at any time during the set mode immediately cancels all the current changes and reverts the slate to the state prior to the set mode.

Note: The generator still counts during set mode so no time is lost by entering and leaving set mode in the above manner.

1.3.4 The cursor ring



The cursor moves in ring in the following way:

First 8 user digits (single spacedots) then a position one digit to the right of the 8 userbits (pos 9) where the single spacedots flash and the old and new userbits can be toggled to select. Then on moving the cursor one more step to the right the time display is entered (double spacedots). Moving the cursor to the right leaves the time display through the Toggle position (pos 18) and reenters the userbit field from the left. The cursor can move in both directions to reach its required position though the left to right movement is easier to implement with the push buttons and considering one changes userbits more often than the time.

Note: The position of the cursor decides which new Data is entered into the generator.

With the cursor in the userbit or toggle userbit position, only userbits will be entered into the generator. The time which still runs in the set mode, will not have been changed.

With the cursor in the Time or toggle time position the selected time and userbits will be entered into the generator.

Loading the selected values into the generator is implemented by holding down both buttons simultaneously till the display runs.

1.3.5 Notes on selecting digits

Userbit Field

The userbits have 8 digits all of which can be set to numerals 0 to 9 and various letters. Generally there is no restriction to what one selects but userbits have been traditionally used to indicate the date and/or production number, camera number etc.

In addition time code film cameras expect to find the date in a particular configuration and may reject a time code if the date is not written correctly. A specific configuration is necessary so that a number is recognised for what it is, for example 'day of the month'. Obviously if the year was entered into this slot the reader would reject a day of the month with a value of 96 (the year).

We recommend the following formats for the order of the digits as seen in the display.

D=Day. M=Month. Y=Year. X=Prod Number. U=Unit (Camera). R= Roll Nr.

1.3.6 The Aaton configuration

DD MM YY XX

When working with an Aaton or Aaton system cameras, or setting the Internal RTC this format must be used.

1.3.7 The AMPS configuration

DD MM UR RR

Use this format when more identification numbers are required.

1.3.8 The Time Field

The time field has the following **fixed** configuration:

H= Hours M= Minutes S= Seconds F= Frames

HH MM SS FF

When the display is running the frame field is changing at the frame rate. In the set mode the FF position can contain the following digits and letters which indicate the frame rate selected by the DIP-switches or modes for setting the RTC.

1.3.9 The Frame (FF) Digits

Display	24	25	23	29	2d	30	3d	ct	cd
Fps	24	25	23.98	29.97	29.97 Drop Frame	30	30 Drop Frame	set RTC Gen. TC	set RTC from Manual Displ

Note: The frame rate displayed is an indication of the DIP-switch setting and cannot be changed by the cursor.

1.3.10 The CD and CT functions

The **ct** or **cd** function can be selected in the FF position. The slate must also be in the generator /RTC mode.

Select ct

When Load is implemented the **RTC** is set **from the generator** time and date.

Select cd

When Load is implemented the **RTC** is loaded **from the current display** time and date. (Set manually)

Select Fps (DIP-switch value shown)

When Load is implemented only the **generator is loaded** with the selected data.

1.3.11 Setting the generator

There are three settings of the DIP-switches in which the generator is active.

- A Generator Mode**
- B Generator/ RTC Mode**
- C Reader/ Generator Mode**

In Generator Mode

On power-up the generator starts counting from 00.00.00.00 .and the userbits are 00.00.00.00. The Red LED flashes.

Go to set mode. (See 2.3)

Set user bits as above and move cursor to time frame.

Set time value and verify frame rate in last 2 digit positions.

To LOAD press both buttons simultaneously till display runs.

Userbits can be loaded without changing time by selecting the userbits and loading with the cursor in the userbit display.

In Generator / RTC Mode

On power-up the generator is loaded with the RTC time and date values. The Green LED flashes.

The frame rate is as selected by the DIP-switches.

The values entered by the RTC will be overridden by a manual set as above or by jamming from Ext TC.

In Reader / Generator Mode

The generator cannot be loaded in the Reader/Generator mode.

Select Generator Mode, then load the generator and change the DIP-switches back to Reader/Generator Mode. (DIP-switch pos 4.5. goes from Off. Off to On. Off)

When re-jamming generator change DIP-switches to generator mode, re-jam and change DIP-switches back to Reader/Generator.

Note: We recommend that the slate is used as master in this mode. It is easier to re-jam the camera and recorder than changing the slate's DIP-switches each time.

1.3.12 Setting the Real Time Clock (RTC)

The RTC can only be set with the slate in generator RTC mode

To enter values from running generator,

Go manual set mode.
Check that userbits have DD.MM.YY.XX format
move cursor to FF position without changing the display.
Select ct.
Load by pressing both buttons till display runs.

To enter values from selected display

Go manual set mode
Enter date
DD. MM. YY.XX XX don't care
Enter time
Move cursor to pos FF select cd
Load by pressing both buttons till display runs

Note. If frame rate is selected in the FF pos then only the generator will be loaded.

1.4 Jamming the generator from external TC

The slate must be in the Generator or Generator/RTC mode.

Connect external TC.
Verify frame rate and error with the blue button as in 2.2.2 and 2.2.3.
While holding down Blue button tip Red button ON shortly.
Red LED goes on then the Green LED flashes.
Check frame error with Blue button again.
The error bar should be on the far left.

Note1. The generator always runs with the frame rate selected by the DIP-switches.
Thus X jamming of frame rates is possible. In other words a camera running at 24 fps can jam a 30 fps slate.

Note 2. The X jamming and the error check takes place at the 00 Frame transition.
Thus the error check works correctly between time codes of different frame rates. A 24 fps time code running with a 30 fps time code will show no error if the 00 frame points are coincident in time.

1.5. Setting the generator from an ASCII source (Aaton protocol)

The Master slate is fully Aaton compatible and can be set by the **Aaton Origin C** or by the **Ambient Controller ACC 101 / 501** using the ASCII protocol.

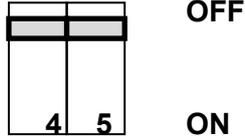
The ASCII protocol enquires the time and userbit values from the slate, it checks the error and reloads the external time value at the 00 frame transition point on initialisation.

Connect the ASCII Device
Check error
Initiate reload

Red LED goes ON, then the Green LED flashes.

2 Operating modes

2.1 Generator Mode



The Clockit master slate contains a very accurate time code generator which drives the display. When the slate is synchronised to a film camera or Nagra recorder, the time code will not drift off more than 1 frame in 10 hours*. Other time code machines which do not have such accurate Time code generators such as DATs and video recorders may have to be synchronised every hour. We recommend the Lockit box as an accurate time code and video sync source for audio or video recorders.

***Note:**

Clockit units running together do not drift apart more than **1 frame in 24 Hours**. When Clockit units are used in combination with other time code equipment calibration errors can lead to increased TC-drift necessitating re-jamming more frequently.

The Clapping sequence is as follows

Open slate - The Time code is displayed

Close slate - The Time code is frozen for 3 frames, then the userbits are displayed for 3 seconds.

When switch 7 is ON the clapped time is displayed for 2 minutes at reduced brightness after the userbits are shown. This value can be logged by the Continuity/Script person.

Traditionally the time code in the master slate display is used to represent the time code in the audio machine for syncing purposes. It may or may not have the same frame rate as the film camera. The frame rate should be chosen so that the 00 frame point in Recorder and camera is identical, assuming no time code error. See the following table:

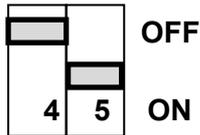
Film Camera	fps	24	25	23.98	30	
Video Camera	fps		25			29.97
Master Slate						
NTSC Video	fps	30*		29.97	30*	29.97
PAL Video	fps	25	25		25	

* Dat recorders MUST be "pulled up", in other words run at 30 fps instead of 29.97 fps. The word clock will run faster in the recording process and be pulled down to 29.97 fps to run in sync with the Telecine which transfers the film, which was shot at 24 fps at 23.98 fps to be in sync with NTSC colour video at 29.97 fps.

Note 1: The use of drop frame codes in the recording process is not recommended.

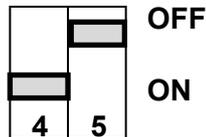
Note 2: Some filmcameras have a 23.98 fps frame rate. Audio recorders can then use 29.98 fps TC. Recordings can then be synchronized with the Film (shot at 23.98 fps) without the need to pull down during the TeleCine process.

2.2 Generator RTC Mode



This mode has the same function as the generator-only mode with the difference that on power-up of the master slate the RTC time and date is loaded into the Generator.

2.3 Reader / Generator Mode



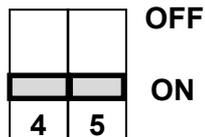
In many film situations there is a requirement for 2 time codes to be displayed. In the classical situation a playback with time code is being played in a scene where at the same time sound is being recorded.

The master slate when opened, displays the Playback time code (ext TC) connected by cable or transmitted by radio, thus facilitating syncing playback to picture. When the slate is closed the generator time is displayed thus giving a time code value corresponding to the time on the recorded tape.

Note. When switch 7 is ON the playback time value at the moment of closure of the slate is displayed for 2 minutes after the userbits. This value can be logged by the Continuity/Script person.

Feature: With DIP-switch 12 ON the TC out signal (pin 5 LEMO) contains the generator time and the reader time in the generator userbit slot. This TC could be transmitted for logging purposes.

2.4 Reader Mode



In this mode the slate is a reader only and can be used in conjunction with a radio link or cable to display Playback time code in a videoclip or multicamera shooting situation.

When the slate is opened the time code is displayed.

When the slate is closed the userbits of the Ext TC are displayed.

This function is like the generator mode only the time code is coming from an external source.

Note. The DIP- switches 1,2 & 3 should be set to OFF, OFF and ON giving a meaningless setup of 25 fps Dropframe. This setting only has meaning in the reader mode where the reader will then read forwards, backwards and up to several times normal speed.

3 New features in ACD301RF MKIII

3.1 CLOCKIT Radio Slate

The CLOCKIT Radio Slate is a combination of a small UHF telemetry transceiver powered by 2 AA batteries and a receiver built into the master slate. This makes the unit more compact than external receivers and easier to use. The range can be up to 200 meters but in difficult conditions it is typically 50 meters.

3.1.1 Transceiver unit TC-TRX

The transceiver unit shipped with the ACD301RF can be configured to transmitter or receiver by sliding switch inside the battery compartment. A dual color LED indicates transmit (green) or receive (red). When shipped, it is set to transmitter.

The transceiver has a LEMO 5-pin connector:
pin 1 = ground,
pin 2 = tc-in,
pin 5 = tc out.

Mating connector is LEMO part no. FGG.0B.305.CLADxxZN or the shorter version JGG.0B.305.CLADxxZN.

Also on the top is the on/off switch and the antenna. The transceiver is shipped with our TC-IN cable XLR-3F to LEMO-5pin to feed time code into the transceiver. This cable can also be used to feed time code into the slate by wire.

The TC-TRX is available in 315 MHz (green marked antenna), 418 MHz (blue marked antenna) and 433 MHz (red marked antenna).

Note: the TC-TRX uses “amplitude manipulation” and is not compatible with older slates or the TC-TX / TC-RX, a.k.a. “Black Box”.

3.1.2 Built-in TC-TRX

A transceiver is built into the slate and can be turned on and off with the 4-DIP-switch → switch 1
up = off, down = on

When the slate is in GEN mode, the TRX is set to transmitter. With 4-DIP-switch → switch 2 user can select if time code is transmitted continuously or as a five seconds burst after clapping the slate.

up = cont., down = burst

When the slate is in READ or READ/GEN mode, the TRX is set to receiver.

Always set the TC-TRX to the right mode.

Note: With the receiver on and the transmitter off there will be noise in the time code input line making the led glow red (see 1.1.3). **Always switch off the transceiver when not in use.**

Note: Some Steadycam and camera focus remotes use the same frequency as our transceiver module, leading to poor reception and low range (interference).

3.2 Operating Note

The slate can be used to show the camera the userbits before rolling over. This is done by pressing the RED button under the clapstick. This will become useful in the near future to display the **Event number** which is a unique number for each audio recording in the userbits. This number can be slated to the camera in advance thus showing the event number on film like the take number written on the slate.

Alternatively, the slate will show UB automatically when opened if DIP-switch 12 is down.

3.3 Large Writing Sleeve

Due to users requests we offer a larger writing sleeve for the ACD master slate. The width is a standard 11 inches „Fits in a front box“ and the surface is covered with a non reflective laser engraved label. Standard boxes are etched in the surface.

Note: The writing surface is similar to Formica and can be dry wiped clean. If the surface gets grey after frequent use it can be cleaned occasionally with spirits or acetone.

Note: Too much cleaning with acetone or aggressive solvents may damage the writing surface!!

4 TECHNICAL DATA:

4.1 Mechanical Specification

Dimensions	250 x 160 x 26 mm
Weight	960 g (no batteries)

4.2 Electric specification

Batteries	6 pcs. AA 1.5 Volt
Current consumption	
Display OFF	30 mA
Display level 9	500 mA

4.3 SIGNAL description:

The ACD 301 Generates all Time codes according to SMPTE / EBU standards.

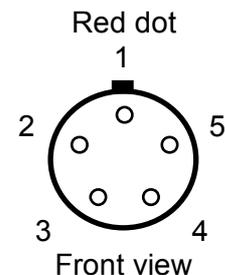
TC - IN	0.1 to 5 Volt pp
TC - OUT	1 Volt pp
AATON (ASCII)	TTL Level
TUNE OUT	TTL Level

4.4 Plug description:

LEMO 5 PIN

Pin	SIGNAL
1	GND
2	TC- IN
3	ASCII I/O
4	TUNE OUT *
5	TC- OUT

Note: No external DC input as indicated on slate back panel



1/8" JACK SOCKET

Pin	SIGNAL
TIP	TC - OUT
RING	TC - IN
SHAFT	GND (SHIELD)

We wish you successful shooting and in case you have any questions please don't hesitate to get in touch with us.

April 2009