

THE COLOUR LOCKIT BOX

**Timecode / Videosyncs, Wordclock
generator
ACL202**

**Description and instructions for use.
August 2000**

THE NEW COLOUR LOCKIT SYNCHRONISER ACL202

The Lockit box is a small, highly accurate portable time code and black and burst video sync and wordclock generator. Audio and video machines such as DAT Recorders and Betacams can be locked to the Lockit box thus giving very low drift between machines. Typically, the drift will be less than one frame a day allowing multicamera shoots to be carried out, without experiencing timecode drift between recording units, and without connecting cables.

The Lockit can be jam synced with external timecode or set with an Aaton ASCII code.

The Lockit box can be used to "pull up"* DAT recorders using the external video sync. The recorder is set to 29.97 Fps with external sync and an external timecode and Videosync running at 30 Fps is connected.

*In NTSC Countries where film is being shot at 24 Fps and video transfer is required, the sound can be recorded at a sample frequency slightly above the standard rate in the relationship 30/29.97. On transfer to video running at 29.97 Fps the film is transferred at 23.98 Fps and the DAT playback is "pulled down" to the standard sample frequency giving exact sync between sound and picture.

Special Features.

Clockit Crystal less than 1 Frame a Day timecode Drift between Lockit boxes connected to different machines.

Clockit crystal can be tuned at regular intervals in the field using Ambient ACC 101 Clockit Controller, thus minimising long term drift.

Extensive unit monitoring through 2 Leds

DC/DC converter for Long life over 18 hours (worst case PAL colour) with 2 penlite cells and 75 Ohm colour video output connected. Without video running time is over one week

Previous versions of the Lockit provided either a PAL or NTSC black and white video signal sync to timecode

The Colour Lockit box now provides colour video signal output, crystal generated colour burst Field locked to timecode.

- PAL 25 fps Black and burst video in 8 field sequence to timecode
- NTSC 29.97 fps Black and burst video in 4 field sequence to timecode
- NTSC 30Ffps Black and white video in 2 field sequence to timecode
- 48 Khz Wordclock at TTL level
- Option Zero level AES EBU Audio signal 48Khz Wordclock

1.2 LEMO SOCKET

1	Ground
2	LTC in
3	ASCII in/out
4	6-16 volt external powering. Tune reference out 1.92 MHz
5	LTC out

1.3 LED INDICATORS

The red and the green Led show the state of the Lockit unit

Red led shows that Lockit has not been set form an external source or has lost timecode.

Green led shows Lockit has been jammed correctly to an external source. Note. If a Lockit which has been running green changes to red the time value has been lost. Rejam.

1.5 LED Indicators

blink secs.	1s		2s		3s		4s Normal	X
		X		X		X		
Batt. Low	X	X			X	X		
Video not sync to TC*	X		X	X	X		X	
Vid/TC not sync	X	X	X	X	X	X		
Battery Low								

==== 5 Frames
 =====10 Frames
 =====1 Second

*When the Lockit is set it takes the video sync up to 30 seconds to sync up with the timecode. During this time the Lockit may show out of sync
 The resonator frequency is being shifted till the TC and Video first half frame line up.

1.5 BATTERIES POWERING

The Lockit is powered by 2 Mignon (AA) cells, 3 volts, which feed a DC/DC to 5 volts converter. It is recommended to use alkaline cells. The external power is connected directly to a linear regulator and can have a voltage from 6-16 volts. If the lockit is being powered externally, the internal batteries can be fitted and act as a backup if external power is removed. With external power and batteries fitted and switched on the led will blink normal 1 sec. intervals if batteries are good, doubleblink if batteries are bad or not fitted. Always fit batteries when running external power. Ther will be intantaneous backup if the cable fails
 Note. The batteries will run for at least 18Hrs with Video out (75 Ohm) connected. with timecode alone and wordclock switch on about one week!

1.7 Setting the Lockit TC generator from an external source.

A External LTC Timecode

Normally on switch on the Lockit will start counting from zero, but it can be jammed to another timevalue from external code. The jamming process is automatic and is signalled by the Leds.

Note. In LTC jam as in ASCCII jam only the time is transferred. The framerate is as selected by the dip switches. This allows "X jamming" say a Lockit running at 25Fps with a film camera running at 24 Fps.

Connect the external LTC using the Lemo socket. the Red led will light followed by the green, which will then blink in the same way as the red led. Remove the external TC on the green phase, the Lockit has been jammed to external code. If the external TC is left connected the jamming process will repeat every 5 seconds. Always remove on the green phase.

Note. On setting the leds may blink irregularly for a few seconds, It is the video resyncing.

B Setting with Aaton Origen C or Ambient controller**

The Lockit and all clockit units are Aaton compatible. The Lockit is connected to the Origen C or our controller with an Ascii cable and setting and comparisons can be carried out using the Aaton instructions. After setting the led goes green. Remove the ASCII cable

** The Ascii Protocol does not transfer framerate only time and Userbit values. Note the userbits must follow the Aaton format or Ascii setting method will not work!

Userbits

DD MM YY PP

D, day. M, month. Y, year. P, production number.

1.8 Dimensions

size 100X 74X 26mm

Weight 250 grams without batteries

TC input under .1 to 5 Volts pp

TC output 3 volts TTL at Lemos socket 1.2 Volt pp at BNC

Video out 0.3 Volts on 75 ohm

NOTES.

When running film at 24 or 30 Fps there is a sound sync problem when transferring to video and running the film at reduced speed to be in sync with the video. This feature was easily implemented in analog timecode recorders, as the timecode itself was used for resolving. Syncing a recorded 30Frs timecode to 29.97 Fps gave the required reduction in play speed.

In digital recorders things are different and the wordclock defines the sound playback speed. In normal record mode the word clock runs sync to 30 or 29.97 Fps at its standard frequency of 44.1 or 48 kHz. When this sound is transferred to fit the rushes which are played back at 23.98 or 29.97 to fit the video, the house sync or word clock will play back the sound at the standard rate which will not slow down the sound as required to fit picture which is being played back slower.

The solution is to run the word clock at a slightly higher frequency in the recording process, to fit the 24 or 30 frame filmspeed. This feature is not always available in DAT machines. This is managed by setting the Dat or digital recorder to 29.97 Fps external timecode and external sync. The recorder is then fed with 30 Fps timecode and a 30 Fps NTSC videosync locked to this time code. The digital recorder locks to this external sync thinking it is 29.97 fps and is now speeded up in the required amount and is running sync to the filmcamera. On transfer the digital player is locked to house sync running at the normal sample frequency sync to 29.97 Fps. the digital recording locks to the normal sample rate and thus is slowed down by the amount required for it to be in sync with the telecine speed. Using the Lockit box as an external sync source not only gives the above capability but gives under one frame a day timecode drift which is more accurate and stable than most DAT recorder timecode generators.

Note. The HHB Portadat doesn't have the 30Fps drop frame. Select 29.97 dropframe and feed external 30 fps dropframe as above. The word clock shift required is 1/1000th which is within the lock capabilities of the Portadat word clock PLL which will lock into signals of +/- 0.5 %.

The Lockit box a self contained timecode and video sync generator for all combinations which also provides these 30 Fps TC locked to 30 Frame Video and that at extreme accuracy. The Unit is Aaton compatible and has a less than one frame a day drift compared to the Ambient Master slate and most film cameras. The unit can also be tuned to calibrate the Xtal at regular intervals. The videosync oscillator has low jitter and stable output.

This product is already well known in Europe where it is used to slave Betacams in multicamera shoots.

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