

THE COLOUR LOCKIT BOX

**Timecode / Videosyncs, Wordclock
generator
ACL202**

**Description and instructions for use.
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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

1.7 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 ASCII 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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LOCKIT USER TIPS

Betacam Shoot

In order to program the right time of day userbits etc into the Lockit you do not need a master clock.

- Make one Betacam the master
- Set to free run
- Set up timecode time of day/ userbits in this Betacam
- Switch on all Lockits they will blink red (not set)
- Connect the setting cable to the timecode out of the master Betacam
Setting cable is BNC to Lemo 5 pin Timecode goes into the BNC and out of the Lemo
- Jam one Lockit after another to the Master camera using the **setting cable** removing each Lockit when it blinks green.
- Now all Lockits are running sync to the master camera.
- Now connect up a Lockit to the master camera and all other cameras and audio. Set to external timecode. All units are now sync.

(If all lockits are jammed within 2 minutes from the same master camera they will all be in sync with not more than 1/100 Fr difference.) The master camera will not drift more than 1/100 frame in 2 minutes.

You can use the **Clockit controller** as a master timecode source but its main use would be to check drift and Tune the Xtals of the Lockits before a long shoot or a severe climate change or after several months / year, (aging). The Lockit has a temperature compensated oscillator but using the tune function you can really be certain that the xtals are optimised.

Timecode Outputs. The BNC timecode output is about 1 .2 Volts pp for a 5 K ohm input impedance. We have had some trouble with Ikegami cameras as they have terminated the timecode input with 75Ohms (videoseal impedance not timecode). The BNC timecode output levels then too low and error is shown. There is a TTL level out from the Lockit at the Lemo socket pin 5 and with a special cable Lemo to BNC (**not the setting cable** as this cable is the other way round) a sufficient timecode level can be fed to the Ikegami.

Genlocking.

The Lockit black and burst video out is used to genlock the camera and is connected to the genlock in of the camera. The reason for this is as follows. The timecode word has an exact timing relationship to the video frame so that in editing the timecode value is assigned to the correct video frame . If one only uses the timecode in then the video frame will drift relative to the timecode and eventually there may be a video glitch as the camera readjusts the video to timecode. The camera reads the timecode input and puts the nearest frame value onto the picture. It also adjusts the video frame sequence to follow the 4 field NTSC and the 8 field PAL sequence. If the camera runs for a long time the timecode seen at the input may be seen as incorrect and the camera will correct. causing a sync glitch. If the Lockits video out is connected to genlock in the camera's video generator and tape mechanism etc is all synchronised to the lockit box so there will be no drift and the field sequence will always be correct.

The lockit box can be seen as a virtual camera.

In normal practice stationary cameras can be timecode and genlocked together using cables The Lockit box provides the same solution without cables.

Note: If there are any problems with the camera not syncing to genlock, then the genlock can be removed and the Lockit timecode can remain connected. In this mode with shots of short duration the timecode will be correct, but there is a danger of frame offsets due to the camera reframing on long takes.

Battery Life

- One should always give the Lockit new AA alkaline cells before a shoot begins.
- The Lockit will run about 16 hours on a set of batteries.
- When the Lockit double blinks one should change batteries there is a danger that the video will become unstable when the batteries are very low.
- For very long shoots there is an alternative method of powering .
- The Lockit can be externally powered over the Lemo socket. Using the Hirose DC out from the Betacam and a Hirose/ Lemo external power cable. In this method the batteries act as backup. When the external power is disconnected, (Camera battery change) the internal lockit batteries take over seamlessly. There is now timecode or videosync loss. In this way a Lockit can easily go a whole day (weekss) on one set of batteries.

Wordclock

The Lockit has switchable 48Khz wordclock output (Note. without pull up or pull down). This wordclock can be used to advantage when syncing portable audio recorders.

For example The HHB Portadat syncs better to wordclock as the sync signal is at a higher frequency. Using videosync the field rate 50/60 Hz is extracted from the video signal. As this is a low frequency the PLL correcting period is longer leading to more jitter.

Tascam DA88

The Tascam DA88 is being used often for field recordings. The lockit can be connected to the Tascam using the wordclock sync signal (or video , but wordclock is best) and timecode. If more than one Tascam is being used in parallel the wordclock out from the first machine can be looped out to the other units. The timecode should also be looped through but be careful that only loop is used otherwise a tape timecode on one machine could lead to offsets and problems on the other machines.

PLEASE READ THE MANUAL FOR OTHER TECHNICAL DETAILS.

DIPSWICH SETTINGS ON THE LABEL AS WELL. PICTURE AS SEEN WITH OPENED SLIDER

ALWAYS CHANGE SETTINGS BEFORE SWITCHING ON.

NO SETTINGS CHANGED WHILE LOCKIT IS RUNNING ARE VALID.

SETTINGS ARE LOADED DURING POWER UP

Please feel free to call us at Ambient for help at any time. We would also be very happy to receive any pictures or user reports good or otherwise. It helps us to improve things if needed and success stories give a great boost!!

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