AMBIENT RECORDING

CLOCKIT CONTROLLER
ACC501

Operating Manual
Rev 1.03 11 / 2006

AMBIENT CLOCKIT CONTROLLER ACC501

General.

The new Clockit Controller ACC 501 supersedes the original controller ACC101.

In addition to retaining all the functions that were available in the first device, it offers many new features, and free software updates during the products' lifetime. The hardware has been conceived so that the user can download software updates from our website and load the new program through a PC and USB connection,

The ACC 501 is half the size of the previous controller has a graphic display and keypad, 4AA internal batteries, USB or an external source can power it. The controller will run for at least 24 hrs switched on, (depends on brightness of display backlight if used) and will probably run for many days when used intermittently.

The electronics are organised on one PCB connected by a flex cable to the keypad lid. The In/Out sockets are either integrated onto the board or connected by coax or twisted pairs to the PCB.

A standby MCU monitors the power converters and the reference oscillator storing and saving the accurate timecode in an auxiliary generator when the ACC is put in Standby. This allows accurate timecode to be held for the full battery life of the Controller (one week or more).

The main MCU controls the main timecode generator, keypad, display and memory functions. There is an internal flashcard slot which can be filled with more memory by the user for logging larger data quantities (future software).

To complete the hardware configuration, separate wordclock and sync in, infrared link and midi timecode modules interface to the main MCU. A 15 pin Sub D socket contains all signals and power supplies needed to attach external modules such as a GPS smart Antenna, Timecode transceiver etc.

 The ACC 501 hardware has been designed to cater for the software features we foresee in the next years and will be able to implicate them when they become available, without need for hardware updates.

The following Ports are provided

Standard Lemo 5 pin,
Pin   1 Gnd
        2 TC in. 100 mV sensitivity
        3 Aaton ASCII protocol in/out
        4 Tune signal in.1.92 MHz
        5 TC out. TTL level

Infrared port. Range 4 Ft
For setting other Clockit devices* and data download using Aaton ASCII protocol.
There will be no need to connect the device with a Lemo cable.
* New Clockit devices such as Lanc logger available 2006.

BNC. Sync in

This input will accept sync signals such as composite video PAL, NTSC or trilevel sync and analyse/ identify them providing vertical sync and field number signals. The Controller's timecode can be synchronised with these signals and the reference oscillator can be calibrated to fit. E.g.: calibrate Controller to Sync generator from OB truck. Then recalibrate Lockit boxes   with the controller to the X-tal frequency of the OB truck. In this way the total timecode drift of a working system can be minimised (future software for video sync input).

BNC. Wordclock Out

This output is Wordclock, sync to the internal time code reference. This feature will be useful for those using the Gallery Metacorder and needing to synchronise their input interfaces.
Selectable frequencies are.

44.1 KHz with pull up and pull down
48 KHz with pull up and pull down
There is a x1, x2, and x4 multiplier for each frequency giving wordclocks up to 192Khz pull up.

USB 1

Used for downloading new software and for data transfer to a computer. EXT power in 5 volts.

USB2

This port is used for MIDI TC in and out, EXT power in 5 volts.

3.5mm Minijack TC in/out

This is a separate LTC input/output with 1 volt peak to peak and has the same TC source internally as the TC in/out on the Lemo socket except that the level has been reduced to 1.2 Volts.
Tip = LTC-OUT, Ring = LTC-IN, Sleeve = Ground.

Sub D 15 pin socket Accessory input

This socket is for general access to the controller and contains all connections including power, needed to interface to a connected device. This socket will be used to connect a GPS smart antenna, a radio link transceiver for remote logging, GPIOs or reception of Timecode, etc.

Keypad.

The keypad is organised with the *menu* and *command* cursors on the right and *general editing cursors* on the left. These keys can double as *hold/log* when logging on the fly.
There is a red *escape* key on the left which doubles as an *on/off switch* and a green *enter* key on the right. Underneath there are *0-9 number* keys in black with *secondary functions* in red and a *shift* key on the left. The 4 domed Allen screws protect the keypad surface.

Display

 The display is a 128 X 64 pixel graphic display with white LED back light. Contrast can be adjusted and the backlight can be turned off or adjusted in brightness. The display is organised with a menu bar at the top and a command bar at the bottom. Movement within these bars is done by 4 cursor keys at the right of the display, two keys for left/right scroll for the menu bar at the top and 2 keys, left/ right scroll for the command bar at the bottom. The relevant status of the controller is shown in the remaining space between these bars.
Selection of the command required is done by pressing the Key with the number shown in the command. Or by selecting command and then pressing enter. Escape returns to the command line.

GETTING STARTED

 Take the Controller out of its pouch and open the sliding door on the left side. Insert 4 X AA cells observing polarity, then close the contact hinge and slide the door shut.

SWITCH ON

Press the **Escape**/**On**/**Off** key (with red lightning flash) until display comes to life. The intro display containing Serial No. and Software Version No. is flashed for a few seconds then changes to default display which is the Timecode generator display, **GEN**.

 The delay on this switch is to avoid inadvertent On/Off switching. When switching Off It will ask if you want to go into standby (Hold accurate timecode) or not. Follow the instructions on the display.

SWITCH OFF

Either switch off or standby can be selected. In Standby mode the timecode is held in the auxiliary TC generator AUXGEN that runs from the accurate Internal reference.

Press ESC

After a short delay the standby select menu will appear.

```
Enter standby mode,
holding timecode (aux)?

Press ESC again to switch off,
or press ENTER for standby!
```
```
Enter standby mode,
holding timecode (aux)!
```

Press Enter
Enter Standby, Auxgen holds TC

Press ESC again
Switch off

MENUS

GEN (menu)

In this menu the timecode generator parameters can be set. The generator starts from 00:00:00:00 and can be set from the following sources.

Commands

Press 1 Preset, Set generator from different sources

Select 1 RTC sets generator to internal realtimeclock
Set: time, user (date and or userbits), both
Select 2 RESET sets selected bits to zero and generator starts counting
Set: time, user, both.
Select 3 AUX sets timecode from standby Timecode generator
Set: time, user, both

Press 8 Edit, Manually edit the time, userbits and frame rate
Select 1 Time
Select 2 Userbits
Select 3 Frames

Press 9, Log, Future logging software

Press 0 Lock, locks out keypad nothing can be changed.
Free with shift + lock

LTC (menu)

In this menu the internal and the external **LTC** are shown including **frame rate**, **userbits** and **timecode offset in 1/100 frames**. The menus allow various actions to be taken using the internal **LTC generator** and the **external LTC**. The **EXT LTC** can be present on the Lemo input, the 3.5mm Minijack **or the Accessory socket.** (Later MIDI TC-in on USB).
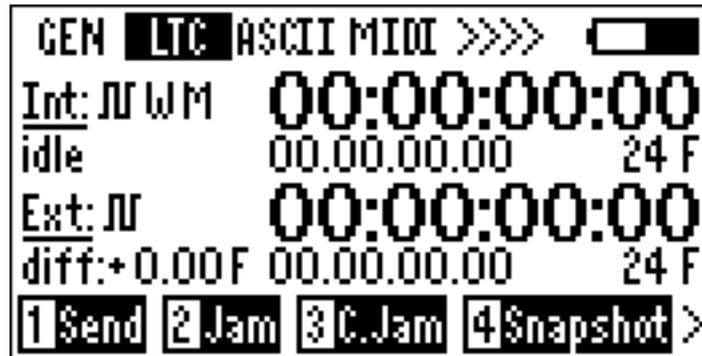
Commands

Press 1. Send, Connects LTC to all TC out pins,
A square wave icon appears next to Int. Pres again to disconnect
 Note: When the LTC out is on, can be locked "on" using the lock button.

Press 2. Jam, Jams the internal generator once to the external LTC
Set bits: time, user, both.

Note the frame rate is not changed. This allows time, userbit transfer from one frame rate to the other. Note. No time error when jamming between integer frame rates or between pull down frame rate. Incremental errors will occur if say 24 Fps external is used to jam 23.976 or 29.97 internal. When drop frame rates are jammed to non-drop rates timecode offsets will occur.
Use non-drop timecode for location recording.

Press 3. C.Jam, Continuous jam, Future software.

Will continuously jam (lock) generator to internal LTC. Frame rate independency will allow " Timecode gearbox" and "fly wheeling" if external TC is removed. Reference oscillator will be shifted to fit external TC and improve flywheel accuracy**.**

Press 4 Snapshot, Freezes Display.

Use when one needs to note TC values. Press again to release. Notre: all functions carry on. Only the display is frozen.

Press 5 Run/Stop, Stops and runs the timecode generator.

 This is a test mode and will stop the generator and restart it. To avoid inadvertent stopping of the generator Enter must be pressed two times. This feature can be used to test other timecode equipment. When restarting the generator after stopping, **Idle** will be show, to indicate that the generator is not jammed to any source.
Note: time will be lost if **Run, Stop** is pressed. To retrieve timecode reset generator from the aux generator in the **GEN** menu.

Press 9 Log mode, Future software

Press 0 Lock, Locks out keypad.

Nothing can be changed. Used to prevent settings being changed.
Free with shift + lock

ASCII (menu)

In this menu timecode can be sent, received and compared using the Aaton ASCII protocol. This protocol sends and receives ASCII messages about timecode and is not a continuous data transfer. The Ambient IR interface will also use this protocol to communicate with external Timecode equipment without cables,

Commands

Press 1 ENQ & Cmp

Sends and receives message to enquire and compare status of the connected device and returns status to the display.

Press 2 Send & Cmp
Sends and receives message from connected device and compares to check if
correct time has been set

Press 3 Load
Sends and receives message from selected device and loads value into generator,
Select: 1,Time. 2, User. 3, Both.
Note: this process has the same effect as jamming the generator form an external
source with LTC, but the load process is different. Only time and/or userbits are
transferred. It is a single action. There can be no continuous jam using the Aaton
ASCII protocol.

Press 9 Log mode
Future software

Press 0 Lock
Locks out keypad. Nothing can be changed. Used to prevent settings being changed.
 Free with shift + lock

MIDI (menu)

Changes the status of the midi timecode (MTC) generator. In this first software
version the MTC generator is locked to the main timecode generator at all times. In
future software the MTC in will be activated as well as the possibility to run the MTC
generator at a different frame rate from the main LTC generator allowing a gearbox
function.

Commands

Press 1 On/Off
Turns the MTC output on or off.
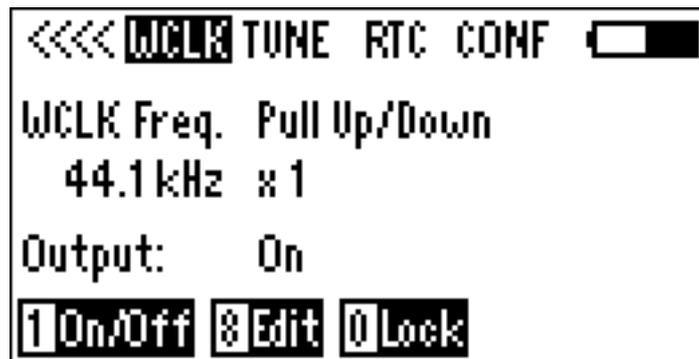**Note: When the MIDI generator is "on" an M will appear in the Gen TC line of the LTC menu.**

Press 9 Log mode
Future software

Press 0 Lock
Locks out keypad. Nothing can be changed
Used to prevent settings being changed. Free with shift + lock.

WCLK (menu)

```
<<<<  WCLK  TUNE  RTC  CONF   [===▮]

WCLK Freq.  Pull Up/Down
  44.1kHz   x1

Output:     On
[1]On/Off [8]Edit [0]Lock
```

The wordclock menu controls the parameters of the wordclock and turns the wordclock generator on or off. 48 KHz and 44.1 KHz x1, x2, x4, with pull up and pull down are provided giving a maximum frequency of 192Khz pull up.
All wordclocks are generated by integer division from a resonator oscillator in fundamental mode and have subnanosecond jitter.

Commands

Press 1 On/Off
Turns the wordclock generator on and off and shuts down the oscillator and counters saving Power.
Note: When the wordclock generator is "on" a W will appear in the Gen TC line of the LTC menu.

Press 8 Edit
Changes the wordclock settings

Press 0 lock
Locks keyboard

TUNE (menu)

```
<<<<  WCLK  TUNE  RTC  CONF   [===▮]

Int:     src:man  date: 01.01.2006
diff: +0.0ppm  new:107  dac:107
Ext:

                        dac: ---
[1]Tune extern [2]Tune intern [0]Lock
```

This menu is used to tune (calibrate) other Clockit devices or for the Controller to calibrate its reference oscillator to an external source. The internal reference can be tuned to + - 10ppm with a resolution of 0.15 ppm per digit. The tuning number DAC is shown on the display as well as recent tuning history. The tuning protocol uses an ASCII format connected as cable or through infrared. The tuning process may have

to be carried out several times if the tuning error is large (over 4ppm). The tune values are estimated and the final value approached and met after up to 5 tune processes.

Commands

Press 1 Tune extern
The device connected can be tuned to the Controller

Press 1 ref
The tuning reference is the internal reference of the Controller. This is the most used mode as the controller is master in most cases. Controller selects tune value to reduce tuning error.
After scanning the value you will be asked to "confirm or edit new tune value". To confirm, press "Enter". To change values, use the "Up" or "Down" Keys. Repeat tuning until difference is not more than 0,1 ppm.

Press 2 man.
The tune steps can be entered manually. (1 digit = 0.15ppm)

Press 2 Tune intern
Using this menu the controller's internal reference oscillator can be calibrated to an external source.

Press1 Ref
Calibrates the controller's internal reference oscillator to another Clockit unit such as a Lockit box or another controller.
After scanning the value you will be asked to "confirm or edit new tune value". To confirm, press "Enter". To change values, use the "Up" or "Down" Keys. Repeat tuning until difference is not more than 0,1 ppm.

Press 2 Man
Manually shifts the Controller's internal reference oscillator in 0.15ppm steps.

Press 3 GPS
Calibrates the Controller's internal reference oscillator to a GPS source having the 1 µS timing pulse. Note GPS time can also be downloaded.

Press 4 LTC
Calibrates the Controller's internal reference oscillator to and external LTC. The Controller observes the LTC till enough error has accumulated to make a calculation to retune the internal reference.

Press 0 Lock
 Locks keyboard

RTC (menu)

```
<<<< WCLK TUNE  RTC  CONF  ▭
RTC          YYYY-MM-DD   hh:mm:ss
current:     2000-00-00   00:00:00



8 Edit  0 Lock
```

This menu sets the Real Time Clock. The RTC runs from its own battery and X-tal oscillator and contains all calendar data such as days in the month, leap year etc. It is an independent on board clock with its own battery and crystal. Note. **The RTC does not run from the tuned internal reference and is not as accurate.** It is used only to retrieve the actual time of day and the date when starting the time code generator and for logging purposes.
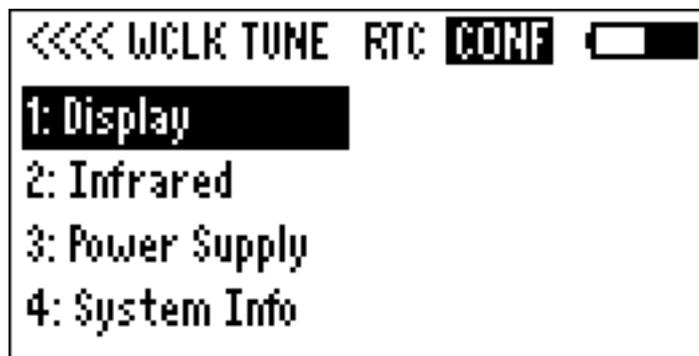
Press 8 Edit
The RTC parameters can be changed or corrected,

Press 0 Lock
Locks keypad; *……………………… should only lock settings*

CONF (menu)

```
<<<< WCLK TUNE  RTC  CONF  ▭
1: Display
2: Infrared
3: Power Supply
4: System Info
```

This is a general menu for the controller status and control and monitoring of peripherals.

Command
Select by pressing numbers.

1: Display
 Change contrast and display default brightness.

2: Infrared
  Pending activation.

3: Power supply
   Shows voltages at power inputs.

4: System Info
   Shows the serial number of the unit and the various software versions currently loaded.

5: USB Port Settings
   USB Port 1 can be set to:
   1.   standard mode (Ambient XDOP):
   used for programming and computer connection
   2.   Sony P2:
   on the virtual COM Port that appears in your hardware settings when the ACC501 is connected, a Sony P2 protocol is being emulated. Thus the ACC501 can be recognized by editing programs (AVID express, Media Log) as a virtual machine and the time code be used for logging etc.

Battery symbol

Shows only the level of the internal 4xAA batteries, not the external source, for this see Power Supply in the Config menu.

We welcome any comments or software ideas for this new controller. Please get in touch with us for your suggestions.

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