Lockit

Firmware Version 7.02

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1. Introduction

The Lockit (ACN-CL)

Lockit Timecode by Ambient

Since we released the very first mobile timecode and sync generator ever already in 1992 our devices became the industry standard for timecode and synchronization on set. Lockits provide frame-accurate synchronized video and audio clips for Hollywood blockbusters, TV series and independent productions.

Highly Accurate Timecode and Sync Generator

Ambient Timecode is synonymous with precision and reliability. The Lockit provides all timecode frame rates and sync (wordclock / genlock) formats and full ACN compatibility.

Zero Drift (C-Jam)

Lockits are based on a highly accurate temperature-compensated crystal oscillator. Once set, the Lockit boxes stay on time - and drift less than 1 frame apart within 24 hours. With active C-Jam (continuous jam) mode via ACN, any drift is even completely excluded.

More Options

Two push-pull connectors: ACN (outputs Timecode & Metadata) and Sync (outputs Timecode & Sync)

TX Mode

Lockits can be started in the so-called TX mode. Then they take over the timecode of an external source (LTC - longitudial timecode or MTC - midi timecode) and spread it in the ACN. This is especially relevant in playback situations like music videos.

Plug & Play

Instead of using the graphical menu of the Lockit or the LockitToolBox - feed in timecode and frame rate externally. Just plug one Lockit to the TC Out port of another device (e.g. your sound recorder) and it's automatically set and ready to sync – without any additional apps.

LED Display

No external app needed. Display menu easily operated via buttons.

ACN stands for Ambient Communication Network and is our own wireless network.

It utilizes an extremely reliable, proprietary 2.4GHz network with 16 selectable channels for communication to minimize lag and interference with other radio sources. All gathered information is buffered until it is successfully received and stored.

The ACN is used to interchange **timecode related information** including time, frame rate and user bits as well as **device metadata** between Lockits or third-party devices with built-in Lockit Module.

Learn more about the beauty of ACN here:

https://ambient.de/en/acn-technology

2. Unit Description

Front

1 ACN antenna, SMA RP 2.4GHz, keep attached to unit

2 RGB status LED

3 OLED display

4 TC & ACN connector (LEMO-compatible)

5 TC & Sync connector (LEMO-compatible)

6 Power button

7 Red button

8 Green button

9 Battery door, NP-50 Li-Ion type batteries only

10 USB-C socket (Power & Midi timecode)

3. LED Blink Code

Mode	1sec	2sec
ACN Jam (C-Jam, TX, Single)		
Jam transmitted / sent	🟩 blink	🟩 blink
Jam received	🟩 long blink	
Lockit, NanoLockit, LockitSlate Take2, Lockit+ (in standby) or LockitModule		
TC out mute; will start with preference	🔴	🟢
TC out mute; will start from fallback zero	🔴	
TC out active	🟢	🟢
TC out active; output level reduced	🟢	🟡
TC out active; low battery	🟢 🟢	🟢
Lockit+ with WiFi active		
TC out mute; will start with preference	🔴	🔵
TC out mute; will start from fallback zero		🔵
TC out active	🟢	🔵
TC out active; low battery	🟢 🟢	🔵
TX Mode Warnings		
TC out mute; no initial LTC source	🔴 blink	🔴 blink
TC out active; LTC source lost/stopped	🟡 blink	🟡 blink
Charging Mode, Unit off		
ext. Power, charging	🔴 blink	
ext. Power, fully charged	🟩 long blink	

🔘 flash   ▬▬ blink

4. Powering

Only use **certified NP-50 compatible Li-Ion batteries** and power sources in compliance with **USB BC1.2 and EN 62368-1 for external power** and charging.

5. Display
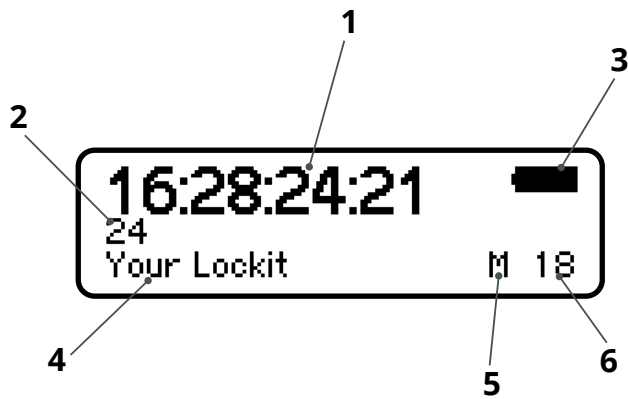
1 Timecode

2 Project Rate (FPS)

3 Battery Status / Ext. Power

4 Unit ID* / Unit Name

5 ACN Mode

6 ACN Channel

* Note: Unit ID can be set via the ACN Radar of the Lockit+

6. Basic Button Operations
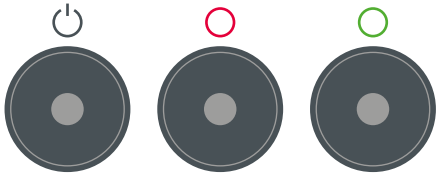
Turn On: Press and hold ⏻ *Power* until LED lights green to start unit.

Turn Off: Press and hold ⏻ *Power* for 5 seconds until power off menu appears. Confim shutdown with ⏻ *Power*.

Access Menu: While the unit is running you can access the menu by pressing ◯ *Red* & ◯ *Green* simultaneously.
There you can easily set:

- *Project Rate:*
  23.98 / 24 / 25 / 29.97 / 29.97 DROP / 30 / 47.95 / 48 / 50 / 59.94 / 59.94 DROP / 60 FPS

- *Sync Output:*
  off / P / PsF / i / 48 kHz / 96 kHz / 192 kHz

- *ACN Channel:*
  11 – 26 / off

- *TC Start Preference:*   *Note: RTC-12 automatically sets Start TC to*
  RTC / RTC-12 / zero / one / manual   *RTC in the mornings or RTC-12 after 1pm.*

- *LED Brightness:*
  1 – 10

- *TC Out Level:*
  -68 / -58 / -50 / -6 / 0 / +6 dB

- *Auto Power*

Tap ◯ *Red* to decrease or ◯ *Green* to increase a parameter value.
Tap ◯ *Red* & ◯ *Green* simultaneously to confirm and proceed.
Tap ⏻ *Power* to cancel or to leave the menu.

Applied settings will be persistent over a reboot until reset or changed.

Reset: When switched off, press and hold ◯ *Red* & ◯ *Green* simultaneously to perform a factory reset of the Lockit Module.

7. Operation Modes

Within the ACN there is always one Lockit device acting as timecode transmitter, broadcasting timecode and frame rate to the Receivers. You can choose between C-Jam, TX and Single Jam Mode.

7.1 C-Jam Mode (Continuous Jam)

In C-Jam Mode we utilize our ACN network to completely prevent any drift. In this mode one Lockit device acts as a C-Jam Master. It sends a pulse through the ACN every six seconds to constantly align with all other Lockit boxes.

To start the unit as C-Jam Master press and hold ⬤ **Green**, then tap ⏻ **Power**.

```
--:--:--:--        ▬
24
Your Lockit       (M) 18
```
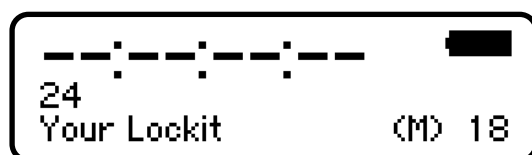
On the display you will see an (M) appear, indicating that the device is ready to go.

Press and hold ⬤ **Green** to confirm the timecode and start the C-Jam.

The icon on the display will switch to **M**.

All other Lockits (that are on the same ACN channel) will now automatically follow the C-Jam Master and display an **ACN icon** at the lower right of the display.

```
16:28:24:21        ▬
24
Your Lockit        M 18
```

```
16:28:24:21        ▬
24
Lockit            ◎ 18
```
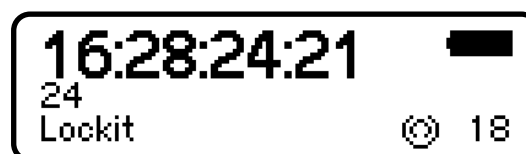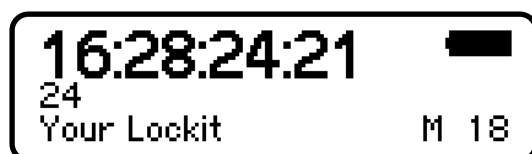
Since even in C-Jam Mode every unit still uses its own VCO (voltage-controlled oscillator) to generate timecode (and sync), they don't necessarily have to be in range of the C-Jam master constantly to be accurate.

Lockit devices that are powered up at a later point in time will automatically follow the C-Jam Master and set their timecode and frame rate accordingly.

Note: *Just one unit is allowed to be the C-Jam Master within an ACN channel. A second master will be blocked and will also automatically follow the C-Jam Master and display an ACN icon at the lower right of the display.*

7.2 TX Mode (Transceiver Mode)

The TX Mode basically works like the C-Jam Mode, with the difference that the TX Master receives start/stop timecode and frame rate from an external source via LTC or Midi. Main use cases are playback situations (e.g. music video shootings) or rec run setups (e.g. start/stop recording triggered by running timecode).

To start the unit as TX Master press and hold ◯ *Red*, then tap ⏻ *Power*.

On the display you will see TX appear.

The TX Master will broadcast the external source's TC start and stop via ACN to all other Lockits. They will display an ACN icon at the lower right of the display.
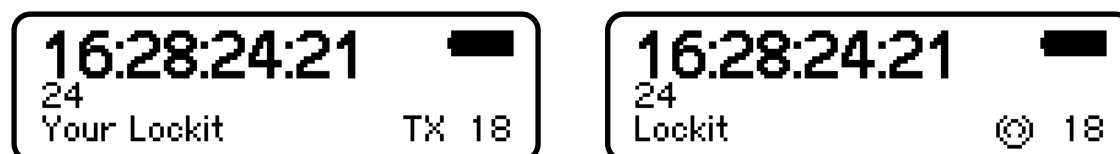
As soon as the external source stops sending timecode to the TX Master, the timecode on all Lockits will freeze, and they will start flashing yellow. As soon as the timecode starts running again, they'll flash green again.

To make the TX Mode work, all Lockit Devices must run on the latest firmware (7.xx) which is available for Lockit, NanoLockit, LockitSlate Take2 and Lockit+.

Note: *However, if you want to use this workflow with deprecated Lockit models, the predecessor TRX mode is still available. It is important that all Lockit devices are running on firmware 6.3X to make it work. The last 6.3X firmware version is still (and will be in the future) available via the LockitToolBox.*

7.3 ACN Receiving Mode

All Lockit devices that are jammed via a C-Jam or TX Master automatically switch to ACN Receiver Mode, indicated by the ACN logo in the lower right of the display.

```
┌─────────────────────────────┐
│ 16:28:24:21      �▌      │
│ 24                          │
│ Your Lockit        ◎ 18     │
└─────────────────────────────┘
```
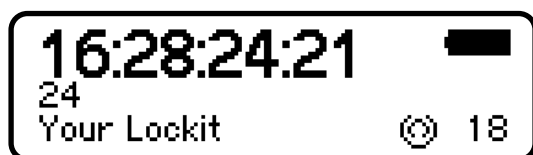
Lockit devices in ACN Receiving Mode constantly follow the current C-Jam or TX Master.

To power up just long-press ⏻ **Power**.

Lockit devices that are powered up at a later point of time will automatically switch to ACN Receiver Mode after having received a jam via ACN. Their timecode and frame rate will be set accordingly.

7.4 Single Jam Mode

In Single-Jam Mode you can send a one-time pulse through the ACN to sync all Lockit devices. From then on, each Lockit continues to run autonomously.

This is perfectly fine for most occasions, as our Lockit devices are highly accurate and drift less than a frame within 24 hours.

To power up just long-press ⏻ **Power**.

All Lockit devices in this mode can send and receive a Single Jam. Choose one of your Lockits and press ◯ **Green** for 3 seconds until the green LED lights up twice.

This way timecode and frame rate gets broadcasted to the other Lockit boxes in the same ACN channel.

Note: Once a Lockit device is turned off the timecode generator stops. After turning on again you must perform the Single Jam again.

That's why we recommend C-Jam Mode over Single Jam Mode, as it completely eliminates drift and is more convenient to use.

Good to Know: Plug and Play Timecode

Instead of using the graphical menu of the Lockit (pressing ○ *Red* & ○ *Green* simultaneously) – feed in timecode and frame rate externally. Just plug one Lockit to the TC Out port of another device (e.g. your sound recorder) and it's automatically set and ready to sync – without any additional apps.

Just plug the **Lockit** to the TC Out port of another device (e.g. your Sound Recorder) and it will automatically take over time-code and frame rate.

This only works if no Single Jam has been sent - or a C-Jam / TX Master is active in the *ACN channel*. Indicated by the LED flashing red and green alternately.

If the device is already jammed and you attach an external time-code source, you can enter the "Compare Screen". This displays a potential timecode drift between external source and your Lockit.

8. LockitToolbox
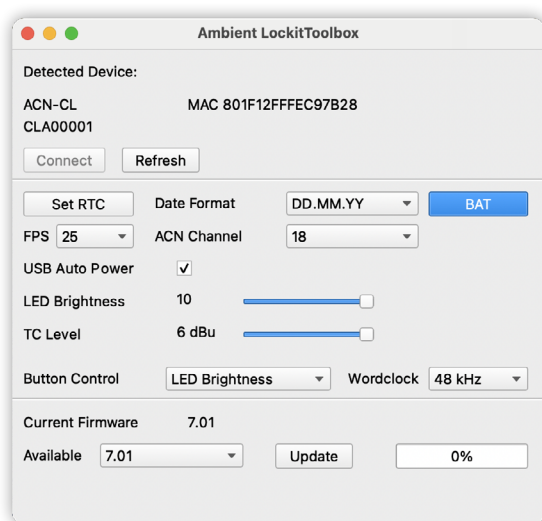
Please check
ambient.de/en/downloads
for new firmware updates.

Firmware Updates are distributed via the LockitToolbox, available for Windows or Mac OS.

With the LockitToolbox you can update your Lockit, set your RTC or define basic settings for your Device.

9. Useful Links

- Timecode Cable Guide
  https://faq.ambient.de/
  hc/en-001/articles/4415083061650-Timecode-Cable-Guide

- ACN Technology
  https://ambient.de/en/acn-technology

- Ambient FAQs
  https://faq.ambient.de/hc/en-001

- LockitToolbox and Firmware Updates
  https://ambient.de/en/downloads

10. Appendix

10.1 ACN Channel Frequencies

The ACN is designed to allow for friendly coexistence of different systems on the same channel. Still, equivalent ARRI remote focus equivalents listed to further help avoiding interferences. The default ACN Channel is 18.

ACN		ARRI EMIP WRS
Channel	**Center Frequency (MHz)**	**Channel**
11	2405	
12	2410	0
13	2415	1
14	2420	
15	2425	
16	2430	2
17	2435	3
18	2440	
19	2445	
20	2450	4
21	2455	5
22	2460	
23	2465	
24	2470	6
25	2475	7
26	2480	

Learn more on https://ambient.de/en/acn-technology

10.2 Connector Pinouts

Blue ACN Connector and Yellow Sync Connector
Accept LEMO FGG.0B.305 and compatible push-pull plugs

Connectors carry TC in and out as per industry standard,
plus sync on one and ACN metadata on the other.

	ACN	**SYNC** (yellow cable)
1	GND	GND
2	TC in	TC in
3	ACN TX	PPF out
4	ACN RX	Sync out
5	TC out	TC out
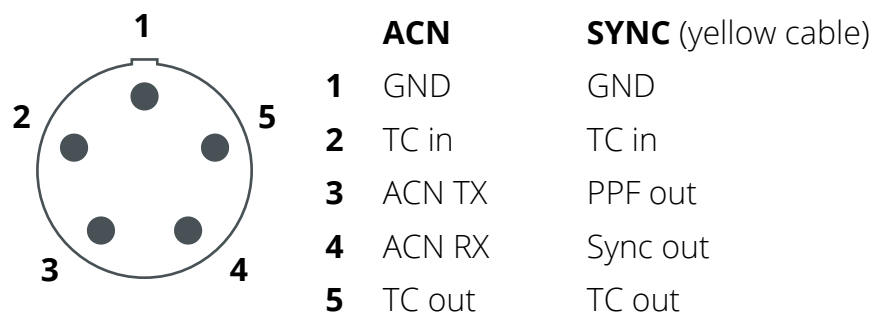
Trilevel Sync Out Impedance 75Ω / Dual Load: 38Ω
LTC Out Impedance 1kΩ
LTC In Impedance 15kΩ

10.3 Internal Buffer Battery

Your Lockit has an **internal buffer battery for the RTC (Real Time Clock)**. It will only deplete when the unit is off with no NP-50 loaded and last you a long time.

Once the Lockit doesn't hold time it's time to replace. The RTC allows you to set the timecode to time of day.

First, get a **CR2016 type battery**. Remove NP-50 battery, slightly losen the nut of the antenna socket by a half turn, and remove the 4 Torx 6 screws on the back. Take off back cover, and slide out the covering lid as per print. Replace battery and reassemble in reverse order.

Safety Instructions

For your own safety and trouble-free use, please carefully read through the instructions below. Always keep a copy of these instructions and hand them out with the unit to other users.

This unit is exclusively intended for indoor use. Keep it safe and away from water, rain and humidity and dry under all conditions, even when powered off. Clean gently with a slightly moistened cloth and never let water, detergents or liquids of any kind get into the unit as this will imply the risk of short circuits and electrical hazard.

Keep distant from sources of heat and never expose to direct sunlight. Admissible ambience temperature for operation and storage is from +5° to +50° Celsius. Power down before storing or shipping, detach external power sources, and, if applicable remove batteries.

Do not throw or expose to mechanical impact and keep it safe from hard vibrations.

Only use genuine accessories such as cables antennae etc. which have been included with the unit or supplied by an authorized dealer. Always observe integrity and the pertinent compatibility with all units connected to.

Powering from external sources is exclusively limited to the use of LPS sources in compliance to part 2.5 of EN 60950-1 with correct polarity, voltage range, and current rating. Disregarding recommended power requirements may damage the product or even risk explosion of the internal backup cell or inserted batteries.

Do not perform software updates in situations in which the integrity of mains supply cannot be granted such as thunderstorms and remove connections from and to all devices directly or in directly connected to mains.

When using the wireless connection, place it centrally and keep it distant from sources of possible interference such as microwaves or electrical devices with large metal surfaces. Only use the original external antenna directly and firmly attached to the socket. Extension or use of 3rd party accessories is not permissible.

Never open the unit. Inappropriate and unauthorized access will void the warranty and imply possible risk of harm to the user.

When disposing the unit, follow the legal requirements for recycling electronic equipment.

Warranty

Ambient Recording GmbH warrants this product against defects in materials and workmanship for a period of ONE (1) year from date of original retail purchase. This is a non-transferable limited warranty that extends only to the original purchaser. Ambient Recording GmbH will repair or replace the product at its discretion after evaluation at no charge. Warranty claims due to severe service conditions will be addressed on an individual basis.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE. AMBIENT RECORDING GMBH DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. AMBIENT RECORDING GMBH IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING FROM ANY BREACH OF WARRANTY OR UNDER ANY OTHER LEGAL THEORY.

Because some jurisdictions do not permit the exclusion or limitations set forth above, they may not apply in all cases.

For all service, including warranty repair, please send the prodcut, along with proof of purchase date to your retailer, or, if not applicable, to:

Ambient Recording GmbH
Schleissheimer Str. 181 C
DE – 80797 Muenchen, Germany

Please obtain a return authorization through the contact form on our website before sending in a unit.

https://ambient.de/en/service

Approvals

CE Conformity Statement:
Declaration of Conformity According to ISO/IEC Guide 22

Manufacturer's Name:
Ambient Recording GmbH

Manufacturer's Address:
Schleissheimer Str. 181 C, DE – 80797 Muenchen, Germany

declares that this product is in conformity with:
- EN 62368-1
- EN 300 328 V2.1.1
- EN 301 489-1 V1.9.2
- EN 301 489-3 V1.4.10

which is indicated and affirmed by the applied CE marking.

FCC Statement

The FCC requires that the following statements be
included in this manual:

FCC § 15.19
This device complies with Part 15 of the FCC rules. Operation is subject to the
following two conditions: (1) This device may not cause harmful interference,
and (2) this device must accept any interference received, including interfer-
ence that may cause undesired operation.

Canada CNR-Gen Section 7.1.3
This device complies with Industry Canada licence-exempt RSS standard(s).
Operation is subject to the following two conditions:(1) this device may not
cause interference, and (2) this device must accept any interference, including
interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux
appareils radio exempts de licence. L'exploitation est autorisée aux deux con-
ditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utili-
sateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si

le brouillage est susceptible d'en compromettre le fonctionnement.

FCC § 15.21
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC § 15.105
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

ICES-003
This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.