NanoLockit

Timecode + Logging

Firmware Version 8.04

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1. Introduction

The NanoLockit (ACN-NL-L)

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 Generator

Ambient Timecode is synonymous with precision and reliability. The NanoLockit provides all timecode frame rates and full ACN compatibility. All Lockit devices are based on a highly accurate temperature-compensated crystal oscillator. Once set, the NanoLockit stays on time - and drifts less than 1 frame apart within 24 hours.

One Button Syncing

Long-press the green button to send a “Single Jam” into the ACN and all Lockit devices in the same ACN channel will follow.

Logging Feature

NanoLockits can be both used as Timecode Generators AND as Loggers. By pressing the green or red button you can mark good and bad takes on set and display those markers in the editing software.

Plug & Play

Instead of using the LockitToolBox - feed in timecode and framerate externally. Just plug one NanoLockit 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.

TX Mode

Lockits can be started in the so-called TX mode to become a timecode bridge. The TX Master will automatically adapt its speed to the external timecode source and broadcast TC start and stop via ACN to all other Lockits. This is especially relevant if you want your audio recorder to be the master clock on set, in playback situations or in virtual production setups.

Midi Timecode

Connect your NanoLockit via USB to your PC/Mac. The NanoLockit will show up as midi timecode Interface - ready for use in any digital audio workstation (DAW). This way you can broadcast playback timecode through ACN to other Lockits.

Sleek Design

NanoLockits are the smallest Timecode boxes of the Lockit Family.
That makes them the go-to solution for DSLR cameras or gimbal rigs.
A NanoLockit fits every camera build.

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 meta-data** 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 2.4GHz ACN antenna, fixed

2 RGB status LED

3 TC & ACN connector (LEMO-compatible)

4 ◯ ***Green*** button
long press: Send Single Jam
short press: Good Take

5 ◯ ***Red*** button
short press: Bad Take

6 ⏻ ***Power*** button

7 Micro-USB socket (Power & Midi timecode)

3. Timecode & Device Settings

All options are adjustable via LockitToolBox.

- Project Rate:
  23.98 / 24 / 25 / 29.97 / 29.97 DROP / 30 / 47.95 / 48 / 50 / 59.94 / 59.94 DROP / 60 FPS
- ACN Channel:
  11 – 26 / off
- LED Brightness:
  1 – 10
- TC Out Level:
  -68 / -58 / -50 / -6 / 0 / +6 dB
- Keychange Mode
  LED brightness / TC Out Level
- Auto Power
- Set RTC
- Download Logs/Markers

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

Good to Know: Plug and Play Timecode

Instead of using the LockitToolbox feed in timecode and frame rate externally. Just plug one NanoLockit 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.

Timecode compare mode for Lockit devices with an OLED

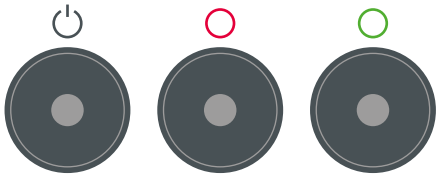
If the device is already jammed and you attach an external time- code source, you can enter the “Compare Screen”. This displays a potential timecode drift between external source and your Lockit.

4. LED Blink Code

Mode	1sec	2sec
ACN Jam (C-Jam, TX, Single)		
Jam transmitted / sent	▬	▬
Jam received	▬	▬
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	● ●	●
TC out mute; 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	● ●	●
TC out mute; low battery	● ●	●
TX Mode Warnings		
TC out mute; no initial LTC source	▬	▬
TC out active; LTC source lost/stopped	▬	▬
Charging Mode, Unit off		
ext. Power, charging	▬	
ext. Power, fully charged	▬	

● flash ▬ blink

5. 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.

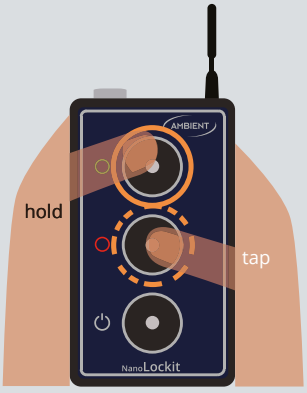
Reset: When switched off, press and hold ◯ ***Red*** & ◯ ***Green*** simultaneously for 10 seconds to perform a factory reset of the Lockit Module.

Working with Audio Timecode.

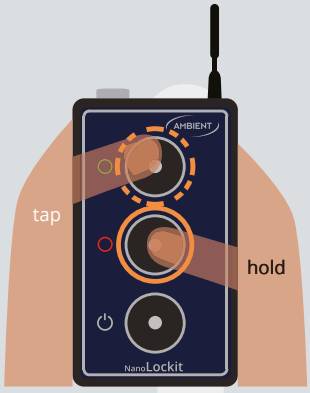
Quicktipp: If your camera does not support native timecode input you may record timecode on a audio track.

Please assure to use line input as the timecode output of the NanoLockit is amplified on default.

If you need to use a microphone input you can decrease the level of the timecode output via following button interaction:



Hold ◯ ***Green*** and repeatedly press ◯ ***Red*** to reduce level.



Hold ◯ ***Red*** and repeatedly press ◯ ***Green*** to increase level.

6. 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.

The NanoLockit can act as Single Jam or TX transmitter - and it can recieve a C-Jam (Continuous Jam) signal by a C-Jam Transmitter (Lockit, LockitSlate or Lockit+).

6.1 Single Jam Mode

On sets where there are only NanoLockit available you can use the Single Jam Mode for sending a jam to all other NanoLockits on the same ACN Channel.

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.

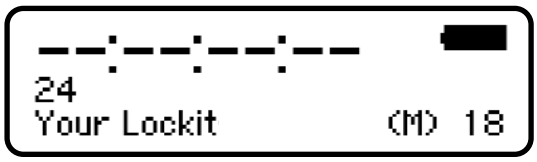
That's why we recommend C-Jam Mode over Single Jam Mode, as it completely eliminates drift and is more convenient to use.

6.2 C-Jam Mode (Continuous Jam)

The C-Jam Transmitter can either be a Lockit, LockitSlate or Lockit+.

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***.

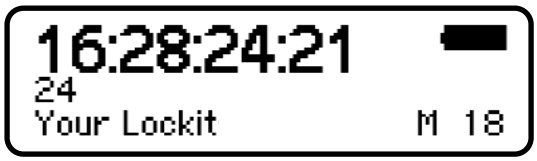


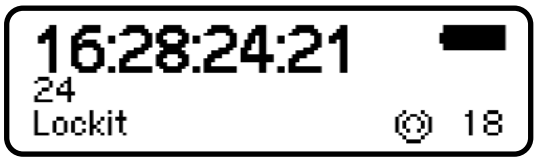
*On the display you will see an **(M)** appear, indicating that the device is ready to go.*

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.





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.*

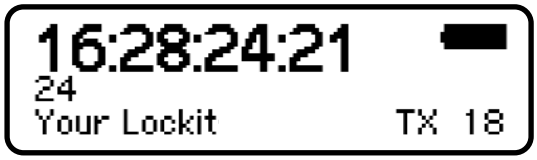
6.3 TX Mode (Transceiver Mode)

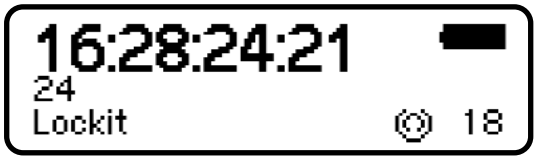
The TX Mode basically works like the C-Jam Mode, with the difference that the TX Master receives start/stop timecode and frame rate from an external source via LTC or Midi. Main use cases are playback situations (e.g. music video shootings), rec run setups (e.g. start/stop recording triggered by running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

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

On the display you will see TX appear.

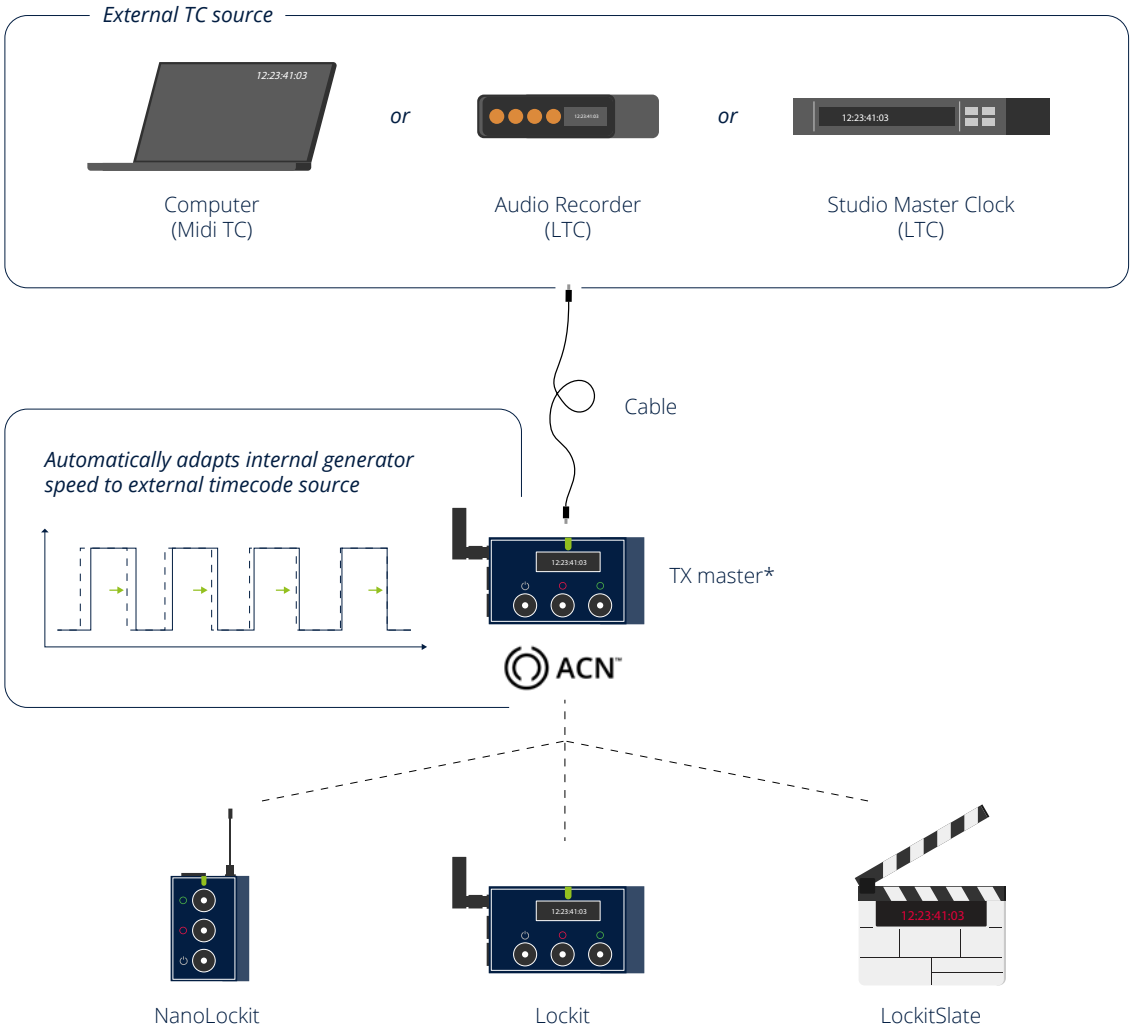
The TX master will automatically adapt its speed to the LTC-in timecode source and broadcast the external source's TC start and stop via ACN to all other Lockits. They will display an ACN icon at the lower right of the display.





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+.



* *Can be any Lockit device started up with* ◯ ***Red*** + ⏻ ***Power***.
We broadcast Start, Stop and Freeze Frame through ACN.

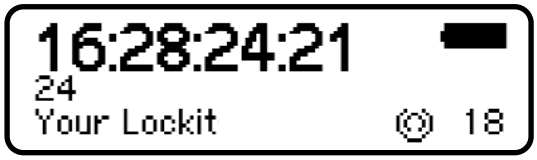
Pro tip for VFX, Volume, 3D setup and projects with high demand of genlock accuracy:

We recommended to project tune the ACN devices once. The Project Tune feature is available within the ACN Radar of the Lockit+.

Find more information here:
https://manuals.ambient.de/lockitplus

6.4 ACN Receiving Mode

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

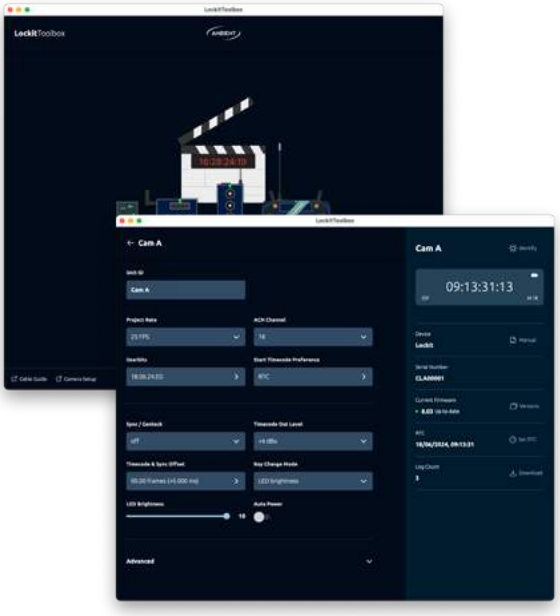


Lockit devices in ACN Receiving Mode constantly follow the current C-Jam or TX Master.

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 time-code and frame rate will be set accordingly.

7. LockitToolbox



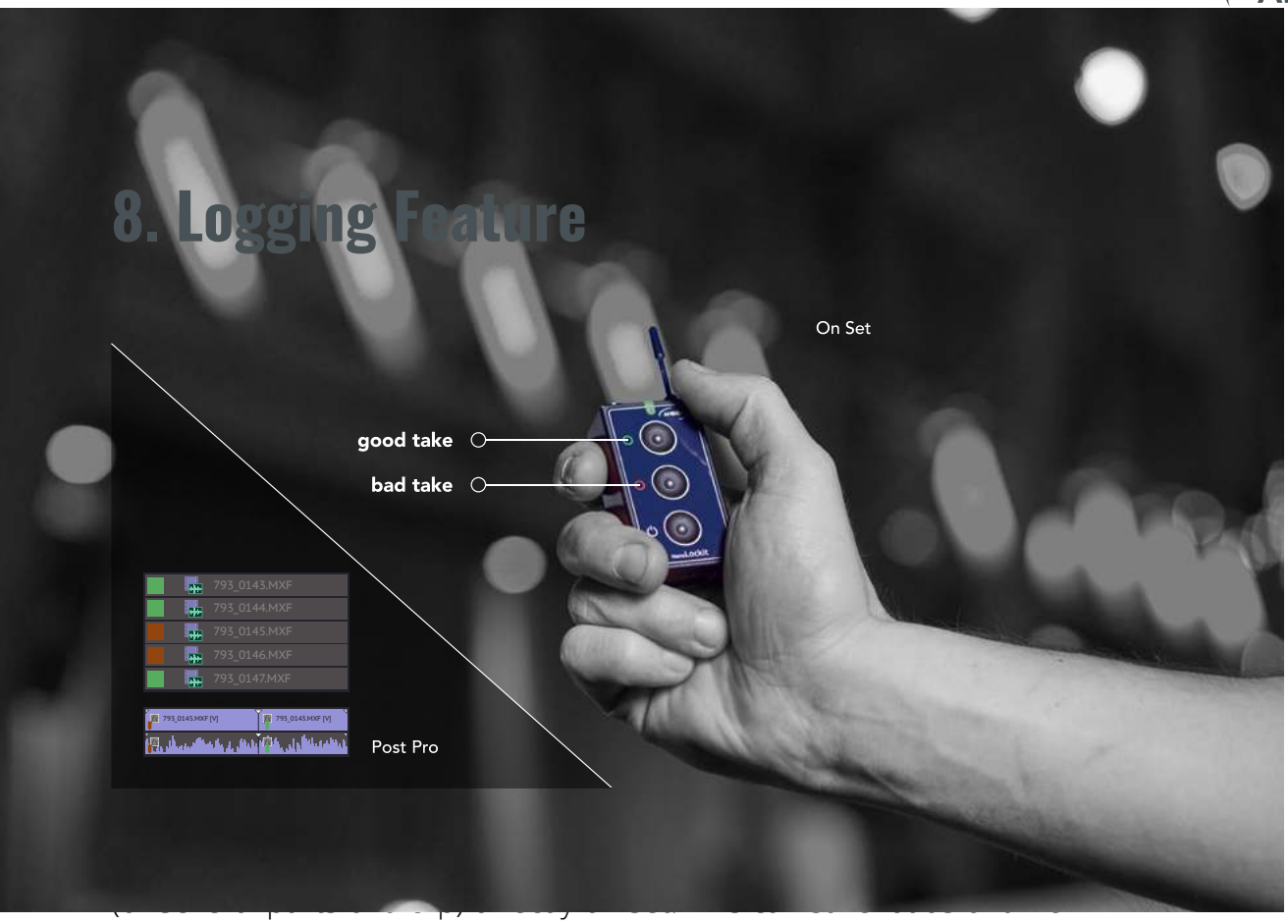
With the LockitToolbox you can define basic settings for your NanoLockit.

Choose your projectrate for your next shooting and assure all your NanoLockits are running on the same ACN Channel.

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

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

8. Logging Feature



post-production.

Logging basically works by pressing the green or the red button, meaning “good” and “bad”. The Markers are locally stored on the NanoLockit as a *.markers* file that can be downloaded via a USB connection to your computer.

The NanoLockit Logger Software for Windows or Mac OS enables you to download your logs from the NanoLockit.

Please check ambient.de/en/downloads for the latest version.

Learn more about the logging workflow in postproduction following this link: https://faq.ambient.de/hc/en-001/articles/4415296890642-Logging-in-Post-Production

To learn how to use the NanoLockit as a Logger on Set please read this FAQ article: https://faq.ambient.de/hc/en-001/articles/4415296799634-Logging-on-Set

9. Powering

Your NanoLockit has an internal battery.
It will last up to 24h while shooting.

A small percentage of the battery is preserved to maintain the RTC (Real Time Clock) while the NanoLockit is powered off.

RTC is used to start und set the internal generator timecode.

10. Useful Links

- Timecode Cable Guide
  https://faq.ambient.de/hc/en-001/articles/4415083061650-Timecode-Cable-Guide
- How to Sync Your Gear
  https://faq.ambient.de/hc/en-001/categories/18617816008978--How-to-sync-your-gear
- ACN Technology
  https://ambient.de/en/acn-technology
- Ambient FAQs
  https://faq.ambient.de/hc/en-001
- LockitToolbox with Firmware Updates and Logger Software
  https://ambient.de/en/downloads
- Lockit Family Data Sheet - Compare Lockit Devices
  https://manuals.ambient.de/lockitfamily

11. Appendix

11.1 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	

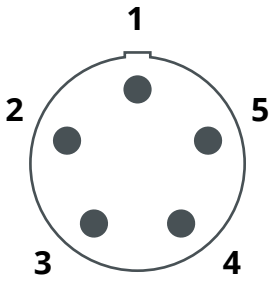
Learn more on https://ambient.de/en/acn-technology

11.2 Connector Pinouts

Blue ACN Connector

Accept LEMO FGG.0B.305 and compatible push-pull plugs.

Connectors carry TC in and out as per industry standard and ACN metadata.



	ACN
1	GND
2	TC in
3	ACN TX
4	ACN RX
5	TC out

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 interference 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 conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur 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.