ANNA-LISA

User's Manual

Version 1.2

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About This Manual

How to Use This Manual

This manual guides you through the installation and operation of the device.
Use the Table of Contents at the beginning of the manual or Index Directory at the
end of the document to locate help on a particular topic. You can access more
information and latest news by visiting on the DirectOut website at
www.directout.eu.

Conventions

The following symbols are used to draw your attention to:

TIPS

indicate useful hints and shortcuts.

NOTES

are used for important points of clarification or cross references.

WARNINGS!

alert you when an action should always be observed.

CHAPTER 1: Overview

Introduction

Welcome to ANNA-LISA, DirectOut's battery powered and mobile analyser and signal generator for MADI signals. ANNA-LISA provides a coaxial MADI I/O for standard BNC cabling and a flexible SFP I/O to meet various connection standards by using SFP modules. Input signals are analysed (e.g. signal level, jitter, sample rate,...) and can be output or replaced by a generated signal (e.g. white/pink noise, sine waves,...).

Feature Summary

MADI Ports	1 x SFP (empty cage without module) 1 x coaxial BNC connectors
MADI Formats	56/64 channel, 48k/96k Frame
Sample Rates	44.1, 48, 88.2, 96, 176.4, 192 kHz +/-12.5%
Bluetooth®	v2.0+EDR support for remote control via mobile devices
USB Port	USB 2.0 (B) plug for charging.
Analysing Features	Sample Rate, MADI Format, Signal Amplitude, Jitter, Conformity with AES10 Spec, Eye Pattern

How it works

The signal of the selected input is analysed. Analysis results are displayed on the device itself via simple 'traffic light' LEDs, detailed information can be obtained with a remote software that connects Bluetooth®.

Standard MADI streams can be configured on the device itself. Three presets store detailed settings for signal sources (white/pink noise, sine waves, routing of incoming channels), gains and MADI settings.

Applications

ANNA-LISA can be used in numerous applications where MADI connections are used. Both proper signal analysis and test signal generation serve the aim of solid operating conditions in MADI environments.

Typical applications include:

- ensuring stable signal connections
- detection of cabling issues (poor signal condition)
- line check of pre-installed cabling
- inspection of compatibility issues between different MADI transceivers
- ...

CHAPTER 2: Legal issues & facts

Before Installing This Device

WARNING!

Please read and observe all of the following notes before installing this product:

- Check the hardware device for transport damage.
- Any devices showing signs of mechanical damage or damage from the spillage of liquids must not be operated.
- Do not use the device at extreme temperatures. Proper operation can only be guaranteed between temperatures of 5º C and 45º C and a maximum relative humidity of 80 %, non-condensing.
- The cabinet of the device will heat up. Do not place the device close to heating sources (e.g. heaters). Observe the environmental conditions.
- Do not dispose the device into fire, water or other liquids.

Battery - Safety Instructions

WARNING

This device contains a rechargeable lithium-ion polymer battery. Observe the following safety instructions.

- Use only approved chargers and procedures. Improperly charging a cell or battery may cause the cell or battery to flame or damage.
- The battery may be exchanged only by service staff that has been authorized by DirectOut GmbH.
- The battery must be recycled or disposed of separately from general trash.
- Contact your DirectOut representative for exchanging the battery.
- Do not expose the battery to temperatures below 0°C or higher than 45° C.
- The battery is excluded from warranty claims.

Defective Parts/Modules

WARNING!

This device contains no user-serviceable parts. Therefore do not open the device.
In the event of a hardware defect, please send the device to your DirectOut representative together with a detailed description of the fault.
We would like to remind you to please check carefully whether the failure is caused by erroneous configuration, operation or connection before sending parts for repair.

First Aid (in case of electric shock)

WARNING!

- Do not touch the person or his/her clothing before power is turned off, otherwise you risk sustaining an electric shock yourself.
- Separate the person as quickly as possible from the electric power source as follows:
  - Switch off the equipment.
  - Unplug or disconnect the mains cable.
- Move the person away from the power source by using dry insulating material (such as wood or plastic).
- If the person is unconscious:
  - Check their pulse and reanimate if their respiration is poor.
  - Lay the body down and turn it to one side. Call for a doctor immediately.
- Having sustained an electric shock, Always consult a doctor.

Updates

DirectOut products are continually in development, and therefore the information in this manual may be superseded by new releases. To access the latest documentation, please visit the DirectOut website:

www.directout.eu.

This guide refers to firmware version 1.0.

Intended Operation

ANNA-LISA is designed for analysis and generation of MADI signals (AES10).

WARNING!

No compensation can be claimed for damages caused by operation of this unit other than for the intended use described above. Consecutive damages are also excluded explicitly. The general terms and conditions of business of DirectOut GmbH are applied.

Conditions of Warranty

This unit has been designed and examined carefully by the manufacturer and complies with actual norms and directives.

Warranty is granted by DirectOut GmbH over the period of 36 months for all components that are essential for proper and intended operation of the device. The date of purchase is applied for this period.

Consumable parts (e.g. battery) are excluded from warranty claims.

WARNING!

All claims of warranty will expire once the device has been opened or modified, or if instructions and warnings were ignored.

For warranty claims please contact the dealer where your device was acquired.

Conformity & Certificates

CE
This device complies with the basic requests of applicable EU guidelines. The appropriate procedure for approval has been carried out.

RoHS
(Restriction of the use of certain Hazardous Substances)
This device was constructed fulfilling the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC.

WEEE
(Directive on Waste Electrical and Electronic Equipment)
Due to the directive 2002/96/EC for waste disposal this device must be recycled.
For correct recycling please dispatch the device to:
DirectOut GmbH,
Hainichenerstr. 66a
09648 Mittweida
Germany
Only stamped parcels will be accepted!
WEEE-Reg.-No. DE 64879540

Radio
The installed bluetooth® antenna complies with the standards listed below:
- USA: FCC Part 15, Subpart B: 2008 Class B / FCC CRF Title 47 Part 15 Subpart C
- FCC ID: T9J-RN42
- Europe: ETSI EN 301489-1 V1.8.1 / ETSI EN 301489-17 V.2.1.1 /
    ETSI EN 301328 V1.7.1
- Canada: IC RSS-210 low power comm. device
- Certification Number: 6514A-RN42

EMC
The installed bluetooth® antenna complies with the standards listed below:
- USA: FCC CFR47 Part 15 subclass B
- Europe: EN 55022 Class B radiated / EN61000-4-2 ESD immunity /
    EN61000-4-3 radiated field / EN61000-4-6 RF immunity /
    EN61000-4-8 power magnetic immunity

Bluetooth®
The installed bluetooth® antenna complies with the standards listed below:
- BQB Listed: B014867 - SPP and DUN profiles

Contact

Sales:

DirectOut GmbH, Hainichener Str. 66a, 09648 Mittweida, Germany

Phone: +49 (0)3727 5650-00

Mail: sales@directout.eu

www.directout.eu

Manufacturer:

Leine-Weser-Labor GmbH, Brabeckstr. 121, 30539 Hannover, Germany

Contents

The contents of your ANNA-LISA package should include:

- 1 x ANNA-LISA
- 1 x USB cable
- 1 x product information

To complete the delivery please download from the
DirectOut website: www.directout.eu

- User Manual

Accessory

Two different optical SFP transceiver for MADI transmission are available from
DirectOut GmbH:
- Multimode SFP transceiver with LC connectors (No: DOICT0129)
- Singlemode SFP transceiver with LC connectors (No: DOICT0130)

Specification of the optical SFP transceivers:

SFP	Multimode	Singlemode
Wavelength TX nominal	1310 nm	1310 nm
Wavelenght RX nominal	1310 nm	1310 nm
Distance	2 km	10 km
Powerbudget (dB)	> 11 dB	> 12 dB
Protocols	Fast Ethernet OC3/STM1	Gigabit Ethernet, Gigabit Fibre Channel
Bandwidth from	100 Mbit/s	1.050 Gbit/s
Bandwidth	155 Mbit/s	1.250 Gbit/s
Laser	FP	FP
Receiver Type	PIN	PIN
Connector	LC	LC
Wavelength TX min	1260 nm	1260 nm
Wavelength TX max	1360 nm	1360 nm
Wavelength RX min	1260 nm	1260 nm
Wavelength RX max	1620 nm	1600 nm
Transmit min	- 19.00 dBm	- 9.00 dBm
Transmit max	- 14.00 dBm	- 3.00 dBm
Receive min	- 30 dBm	- 21.00 dBm
Receive max (Receiver overload)	- 5.00 dBm	- 3.00 dBm
Temperature (min)	0° Celsius	0° Celsius
Temperature (max)	70° Celsius	70° Celsius
Type of DDM/DOM	internal	internal
Extinction Ratio	8.20 dB	9 dB

The modules support all analysing features of ANNA-LISA.

CHAPTER 3: Installation

Installing the Device

1. Open the packaging and check that the contents have been delivered complete and undamaged.

WARNING!

Avoid damage from condensation by waiting for the device to adapt to the environmental temperature. Proper operation can only be guaranteed between temperatures of 5º C and 45º C and a maximum relative humidity of 80%, non-condensing. Ensure that the unit has sufficient air circulation for cooling.

2. Connect signal cable(s) for the MADI signals.

3. Turn on the power switch.

TIP!

Keep any packaging in order to protect the device should it need to be dispatched for service.

Charging the battery

The battery 'LEVEL' led should be green. A yellow or red led indicates low level and requires charging the battery.

To charge the battery switch off the device and and connect it to an external USB power supply or USB computer port.

NOTE

If the battery is empty the device can be operated with an external USB power supply. The battery can only be charged when the device is switched off.

CHAPTER 4: Operation

Introduction

This chapter describes the basic operation of the device.

Note that throughout this manual, the abbreviation FS refers to sample rate or sample frequency. So, when dealing with scaling factors, the following sample rates can be written as:

- 44.1 kHz or   48 kHz = 1 FS
- 88.2 kHz or   96 kHz = 2 FS
- 176.4 kHz or 192 kHz = 4 FS

Global Control

The power switch is on the side panel. LEDs on the top panel inform about battery level or charge state.

Power	1 Switch
	Move slider to switch device ON or OFF.
USB	USB 2.0 socket (Type B)
	Connect here for charging the battery.

Signal Connections

ANNA-LISA provides two MADI I/Os:

- coaxial BNC port
- SFP cage to connect other media carrying MADI signals, e.g. fibre (single mode/multi mode), different wavelengths etc.

1 BNC OUT / IN	2 x BNC socket (coaxial)
	OUT: MADI output (64 ch), connect for MADI output signal here.
	IN: MADI input (64 ch), connect MADI input signal here.
2 SFP	1 x SFP cage*
	Insert SFP module here and connect MADI input/output

* empty cage, module not included in delivery - see „Accessory" on page 13.

Battery

The device can operate continously up to two hours with a fully charged battery.
The battery level is indicated by the 'LEVEL' led.

Battery - Charge	**LED (green) - indicating charge status**
	ON = charging battery
	OFF = no charge
	blinking = error
Battery - Level	**LED (green / yellow / red) - indicating battery level while operation**
	green = charged (> 3.5 V)
	yellow = needs charging soon (> 3,3 V)
	red = immediate charging required (< 3.3 V)

NOTE

The operating time of the battery depends on the environmental conditions (temperature, type of installed SFP module).

NOTE

See „Charging the battery" on page 15.

State

'µC' stands for micro controller- it controls the device.

STATE	**LED (red) - monitoring device state**
	OFF = normal operation or device switched off
	blinking = during firmware update or to indicate an error

Bluetooth®

The device is equipped with a bluetooth® antenna for remote control via mobile devices.

Bluetooth®	**LED (blue) - indicating connection state with remote software**
	OFF = no remote connection active
	ON = remote software is connected

NOTE

Ensure to enable access rights 'Nearby Devices via Bluetooth' in the Android system settings.

Operating Principles

The device is operated locally by using a simple menu and two push buttons ‚SELECT' and ‚SET'.

On the following pages each parameter and its corresponding values are described. The „Menu Structure" on page 21 provides a basic overview.
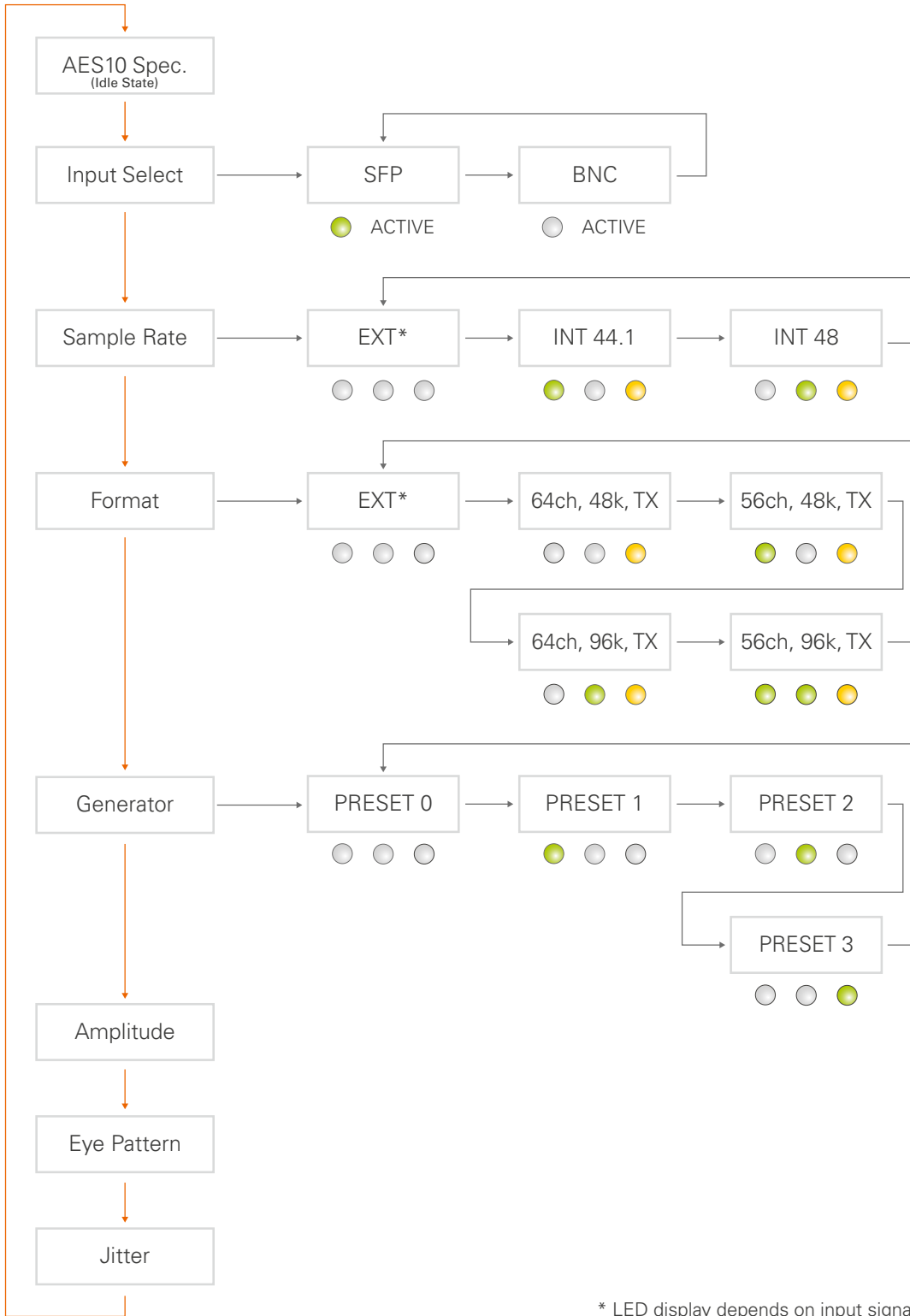

Parameters

Values

The LEDs in the collumn indicate the **parameters**.

The three LEDs in the row monitor the **values** of the selected parameter (except the SFP ACTIVE parameter). The values are expressed by using different colors and combinations of the three LEDs.

Menu Structure

Press ‚SELECT' ──▶ to navigate the menu and to exit a parameter setting.

Press ‚SET' ──▶ to adjust selected parameter.

AES10 Spec. (Idle State)		
Input Select →	SFP →	BNC
	⬤ ACTIVE	⚪ ACTIVE
Sample Rate →	EXT*	INT 44.1	INT 48
	⚪ ⚪ ⚪	🟢 ⚪ 🟡	⚪ 🟢 🟡
Format →	EXT*	64ch, 48k, TX	56ch, 48k, TX
	⚪ ⚪ ⚪	⚪ ⚪ 🟡	🟢 ⚪ 🟡
		64ch, 96k, TX	56ch, 96k, TX
		⚪ 🟢 🟡	🟢 🟢 🟡
Generator →	PRESET 0	PRESET 1	PRESET 2
	⚪ ⚪ ⚪	🟢 ⚪ ⚪	⚪ 🟢 ⚪
			PRESET 3
			⚪ ⚪ 🟢
Amplitude		
Eye Pattern		
Jitter		

* LED display depends on input signal

AES10 Spec Conformity

This is the default view (Idle State), no led in the parameter section is lit.
This view sums up all measurements of the MADI media stream and the properties of the MADI data.

Parameter: AES10 SPEC.

Values: FAIL / CHECK / OK

Code	Meaning	LED Code
🔴 ⚪ ⚪	Signal violates one or more features AES10 requires, or cannot be recognized at all.	FAIL ON red CHECK OFF OK OFF
⚪ 🟡 ⚪	MADI stream has questionable properties that might cause problems.	FAIL OFF CHECK ON yellow OK OFF
⚪ ⚪ 🟢	All measured properties are within normal parameters.	FAIL OFF CHECK OFF OK ON green

Input Selection

Select between SFP I/O or coaxial BNC I/O by using the menu.

Parameter: ACTIVE

ACTIVE	**LED (green) - indicating active input**
	OFF = BNC I/O active
	ON = SFP I/O active
	blinking slowly = SFP module present
	blinking fast (5 Hz) = no SFP module present

Sync

The device can be clocked internally or by the active input signal.

INPUT SYNC	**LED (green) - indicating input lock/sync state**
	OFF = no signal detected
	ON = locked and input signal is in sync with clock reference
	blinking = locked on input signal

Sample Rate

If an input signal is present on the selected input ('INPUT SYNC' is blinking/ON) and its sample rate is within a 5 Hz range around 44.1/48 kHz, the corresponding led is lit green for 1 FS sample rates, and yellow for any higher sample rate factor. Pressing 'SET' lets you configure the clock reference that is used for both the sync check of the incoming signal and generating the outgoing signal. The 'SAMPLE RATE' led will now blink, and every push of 'SET' cycles you through the settings.

Parameter: SAMPLE RATE

Values: 44.1 / 48 / INT
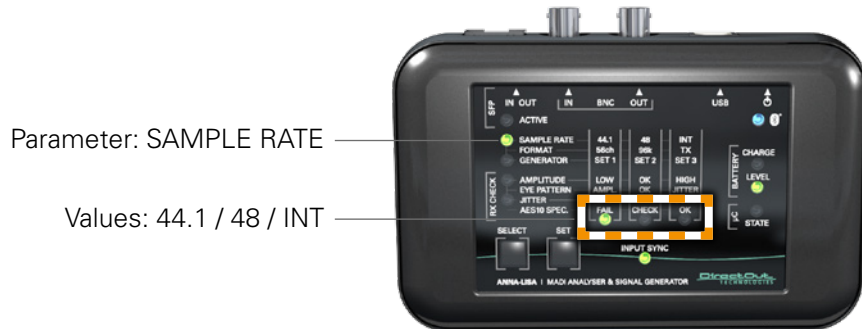
Code	Meaning	LED Code
○ ○ ○	external clock of the selected input, display depends on input signal	--
● ○ ●	internal clock, 44.1 kHz, 1 FS	44.1 ON green 48 OFF INT ON yellow
○ ● ●	internal clock, 48 kHz, 1 FS	44.1 OFF 48 ON green INT ON yellow
● ○ ●	internal clock, 44.1 kHz, > 1 FS	44.1 ON yellow 48 OFF INT ON yellow
○ ● ●	internal clock, 48 kHz, > 1 FS	44.1 OFF 48 ON yellow INT ON yellow

Pressing 'SELECT' exits the sample rate submenu.

Format

If an input signal is present on the selected input and it has 56 channels, the '56ch' led is lit. If the incoming signal is using the 96k frame format, the '96k' led is lit. No led lit means 64ch MADI with 48kFrame.

Pressing 'SET' lets you configure the number of channels and frame format for the output signal.

Parameter: FORMAT

Values: 56ch / 96k / TX
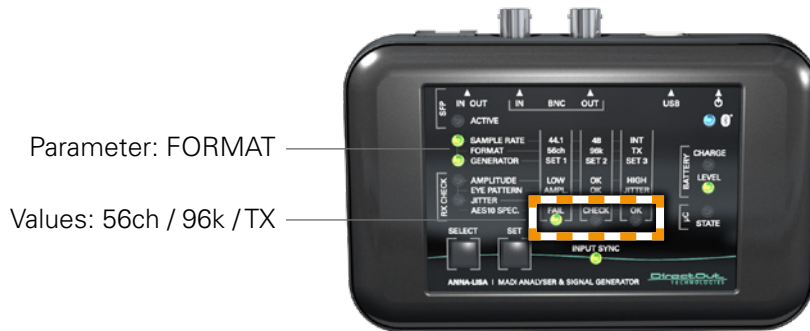
Code	Meaning	LED Code
○ ○ ○	same as input signal, display depends on input signal	--
○ ○ ●	64ch, 48k Frame	56ch OFF 96k OFF TX ON yellow
● ○ ●	56ch, 48k Frame	56ch ON green 96k OFF TX ON yellow
○ ● ●	64ch, 96k Frame	56ch OFF 96k ON green TX ON yellow
● ● ●	56ch, 96k Frame	56ch ON green 96k ON green TX ON yellow

Pressing 'SELECT' exits the format submenu.

Generator

If one of the generator presets is active, the corresponding led is lit.
Pressing 'SET 'lets you load and activate one of the three stored configuration presets. The 'GENERATOR' led will now blink and every push of 'SET' jumps to the next preset, which is activated immediately.

Parameter: GENERATOR

Values: SET 1 / SET 2 / SET 3

Code	Meaning	LED Code
○ ○ ○	Preset 0 Active input is fed to both outputs.	SET 1 OFF SET 2 OFF SET 3 OFF
● ○ ○	Preset 1 1 kHz test tone with decreasing level per channel (-1 dBFS ..-64 dBFS)	SET 1 ON green SET 2 OFF SET 3 OFF
○ ● ○	Preset 2 musical test tones at-20 dBFS (good for debugging 2FS /4FS setups with s/mux)	SET 1 OFF SET 2 ON green SET 3 OFF
○ ○ ●	Preset 3 uncorrelated pink noise on all channels	SET 1 OFF SET 2 OFF SET 3 ON green

Pressing 'SELECT' exits the generator submenu.

Amplitude

If the BNC input is active, the voltage of the MADI carrier is measured. The AES10 spec requires it to be between 300..600mV.

Parameter: AMPLITUDE

Values: LOW / OK / HIGH
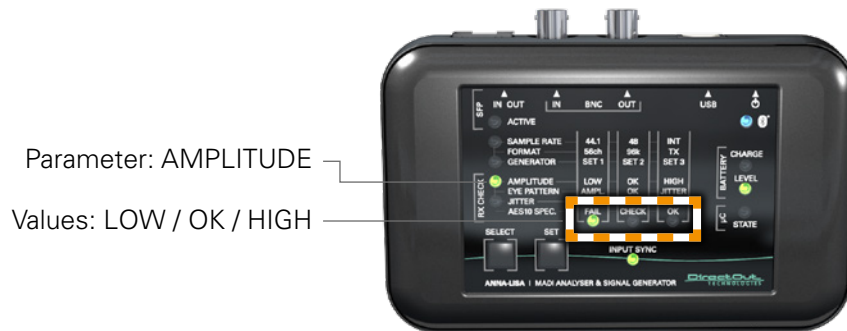
Code	Measured Voltage	LED Code
	< 250 mV	LOW blinking red OK OFF HIGH OFF
	250 .. 350 mV	LOW ON yellow OK OFF HIGH OFF
	350 .. 550 mV	LOW OFF OK ON green HIGH OFF
	550 .. 650 mV	LOW OFF OK OFF HIGH ON yellow
	> 650 mV	LOW OFF OK OFF HIGH blinking red

For the SFP input, the RX power measurement of the SFP module is read out and displayed in the same fashion as for the BNC input. If the SFP module has no DDM capabilities, the 'AMPLITUDE' led blinks to indicate that this parameter cannot be measured.

Eye Pattern

Analyses the Eye Pattern of the selected MADI carrier. If both signal level and jitter are within acceptable limits, the green 'OK' led is lit. If signal level and/or jitter are off, the corresponding LEDs are lit yellow or blinking red.

Parameter: EYE PATTERN

Values: AMPL. / OK / JITTER

Code	Meaning	LED Code
⚪ 🟢 ⚪	signal level and jitter are ok	AMPL. OFF OK ON green JITTER OFF
🟡 ⚪ ⚪	check AMPLITUDE	AMPL. ON yellow OK OFF JITTER OFF
🔴 ⚪ ⚪	check AMPLITUDE	AMPL. ON blinking red OK OFF JITTER OFF
⚪ ⚪ 🟡	check JITTER	AMPL. OFF OK OFF JITTER ON yellow
⚪ ⚪ 🔴	check JITTER	AMPL. OFF OK OFF JITTER ON blinking red
🔴 ⚪ 🟡	check AMPLITUDE & JITTER *	AMPL. blinking red OK OFF JITTER ON yellow

If the SFP input is selected, a module with DDM is required for the signal level analysis (see „Amplitude" on page 27).

* exemplary code- more combinations possible.

Jitter

The jitter of the incoming MADI carrier is analysed and displayed.

Parameter: JITTER

Values: BAD / FAIR / GOOD

Code	Measured Jitter	LED Code
○ ○ ●	<= 1 ns	BAD OFF FAIR OFF GOOD ON green
○ ● ●	1 .. 2 ns	BAD OFF FAIR ON green GOOD on green
○ ● ○	2 .. 3 ns	BAD OFF FAIR ON yellow GOOD OFF
● ● ○	3 .. 4 ns	BAD ON red FAIR ON yellow GOOD OFF
☀ ○ ○	> 4 ns	BAD blinking red FAIR OFF GOOD OFF

For the SFP input, the RX power measurement of the SFP module is read out and displayed in the same fashion as for the BNC input. If the SFP module has no DDM capabilities, the 'AMPLITUDE' led blinks to indicate that this parameter cannot be measured.

CHAPTER 5: Troubleshooting and Maintenance

Troubleshooting

To identify a possible defect with the device please consult the following table.
If the fault cannot be resolved using these instructions, please contact your local
DirectOut representative or visit support.directout.eu.

Issue	Possible reason	Solution
Device doesn't work.	Battery discharged.	Check that the power supply switch is off and plug the device to a matching charging device using the USB connection. Check led 'BATTERY-CHARGE'.
Rare blinking led codes after switch on.	Low power- battery discharged.	Check that the power supply switch is off and plug the device to a matching charging device using the USB connection. Check led 'BATTERY-CHARGE'.
Optional SFP Module: Optical port does not work.	Optic is dirty.	Use an air supply to carefully remove any dust. Never use objects for cleaning.
Optional SFP Module: Analysis of Amplitude does not work	SFP Module does not support this feature.	Use appropriate SFP module. See „Accessory" on page 13.
No signal at the output port.	Signal cable defective.	Exchange the signal cable.
No signal at the output port.	Connections (input / output) are mixed up.	Check the connections and change the cables if necessary.
Clicks in the audiosignal.	Input source is not in sync with clock master of the device.	Check the status of led 'INPUT SYNC' and check clock setting of the connected device.

Maintenance

To clean the device, use a soft, dry cloth. To protect the surface, avoid using cleaning agents.
The device should be switched off during the cleaning process.

CHAPTER 6: Technical Data

Dimensions
- Width: 120 mm
- Height: 90 mm
- Depth: 28 mm
- Weight: about 200 g

Battery
- Nominal Capacity: 1100 mAh (typical)
- Nominal Voltage: 3.7 V
- Charging via USB connection (max. 5 V)
- Charging Current max. 500 mA

Environmental Conditions
- Operating temperature +5°C up to +45°C
- Relative humidity: 10% - 80%, non condensing

MADI Port BNC coaxial
- 2 x BNC socket (input / output)
- Impedance: 75 Ω
- 0.3 V up to 0.6 V (peak to peak)

MADI Port SFP
- 1 x SFP (empty cage without module)
- optional SFP Modules: see „Accessory" on page 13

Sample Rate
- 30- 50 kHz @1 FS
- 60- 100 kHz @2 FS
- 120- 200 kHz @4 FS

MADI Format (I/O)
- 48k Frame, 96k Frame
- 56 channel, 64 channel

USB
- 1 x USB socket (Type B)
- for charging

Bluetooth®
- Bluetooth 2.1/2.0/1.2/1.1 (fully qualified)
- v2.0+EDR support

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