

# *nanoScope developer*

## User Guide

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## Overview

nanoScope developer is a battery-powered RDM analyser and DMX512 mimic. The only user control is a three-way switch on the rear face of the product. In the centre position, nanoScope developer is switched off and the internal batteries are disconnected. Switching to the left selects Pixel mode, while switching to the right selects RDM mode.

### Connections

nanoScope developer connects via an in-built 5-pin XLR. Pins 4 & 5 are not connected. The product has an internal terminator so should be connected in place of an existing terminator during testing.

### Power

nanoScope developer is powered by two AAA batteries. Access to the battery chamber is gained by removing the two screws and gently slipping the module out of the case. Continuous operation of around 48 hours is achieved using good quality batteries. nanoScope developer implements an advanced power saving system whereby it sleeps in the absence of a DMX512 signal for more than 1 second and immediately wakes when it is plugged into a DMX signal. Sleep mode does consume battery power so owners are advised to switch off the product between uses. It is advisable to remove the batteries if the product is not being used for a long period. If the product strobos when switched on, this means that the batteries are depleted and need changing.

## Pixel Mode

At power on, nanoScope developer indicates Pixel mode is selected with a half-second red flash.

In Pixel mode, nanoScope samples the first three data slots of the zero start code data and displays it as a colour mix as follows:

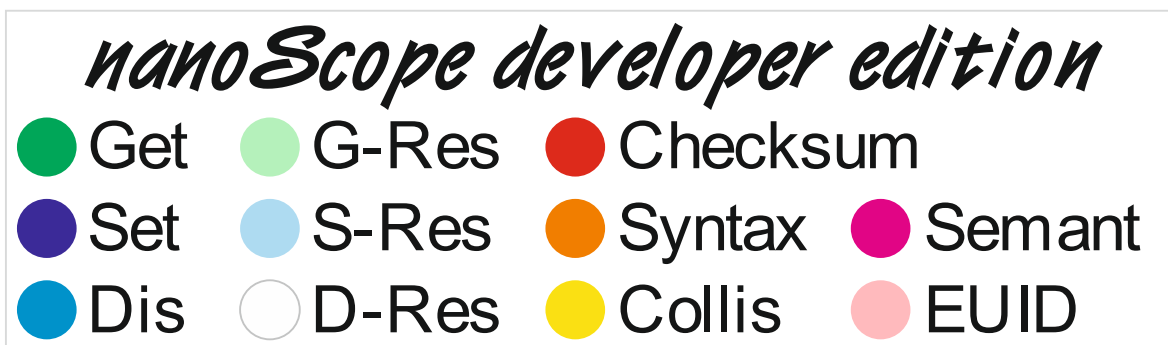
- Data Slot 1    Red
- Data Slot 2    Green
- Data Slot 3    Blue

## RDM Mode

At power on, nanoScope indicates RDM mode is selected with a half-second green flash.

In RDM mode, nanoScope developer analyses the RDM data and displays the results in a near real time mimic. This provides an invaluable visualisation of RDM data flow during development, debugging and fail-finding RDM equipment.

nanoScope developer displays specific types of RDM data and error information using coloured pulses of light. The product label shows the summary:



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## Command Class

Slot 20 of the RDM packet, called command class, defines the headline purpose of the RDM packet. There are six valid settings of command class, which are all identified with short pulses of colour:

### Green: GET

A command class value of 32 indicates that the packet is a GET command. This means the controller is requesting information from a responder. This is displayed as a short green pulse.

### Mint: GET RESPONSE

A command class value of 33 indicates that the packet is a GET RESPONSE. This means a responder is replying to the controller's GET command. This is displayed as a short mint pulse.

### Blue: SET

A command class value of 48 indicates that the packet is a SET command. This means the controller is setting a parameter in a responder or multiple responders. This is displayed as a short blue pulse.

### Ice blue: SET RESPONSE

A command class value of 49 indicates that the packet is a SET RESPONSE. This means a responder is acknowledging the controller's SET command. This is displayed as a short ice blue pulse.

### Cyan: DISCOVERY

A command class value of 16 indicates that the packet is a DISCOVERY command. This means the controller is managing the discovery of responders. This is displayed as a short cyan pulse. Note that this includes all three DISCOVERY commands:

- DISC\_MUTE
- DISC\_UN\_MUTE
- DISC\_UNIQUE\_BRANCH

### Warm white: DISCOVERY RESPONSE

A command class value of 17 indicates that the packet is a DISCOVERY RESPONSE. This means a responder is replying to a DISC\_MUTE or DISC\_UN\_MUTE command. This is displayed as a short warm white pulse.

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## Discovery

The RDM discovery process is initiated by the controller. The controller uses the DISC\_UNIQUE\_BRANCH command (PID) to probe the network. Any responders that are not muted and have a UID within the range defined by the command will respond with a packet called the EUID or Encoded-UID. This is an unusual packet in that it does not start with a Break – MaB – Start Code sequence.

If multiple responders reply with their EUID then a collision will occur. Both these scenarios are an integral part of the discovery process and nanoScope developer can detect both.

### Yellow: Collision

During discovery, multiple responders replying will usually cause a collision. This generates errors such as framing errors. nanoScope developer displays this as a short yellow pulse.

Note that both framing errors and corrupted EUIDs are shown in this way.

## Pink: EUID

During discovery, the controller reaches the end of a branch in its binary tree algorithm. At this point a single responder will reply with an error free EUID. nanoScope developer displays this as a short pink pulse.

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## Errors

Numerous types of error can be introduced into RDM data, particularly in the development phase of product software.

nanoScope developer groups errors into three categories for display:

### Red: Checksum error

All RDM packets contain a checksum. If the checksum is incorrect a long red pulse is displayed. Note that EUIDs with a checksum error are excluded as this is included in the Collision category above.

### Orange: Syntax errors

Syntax errors encapsulate basic packet formatting errors:

- RDM Slot 1 Sub-Start Code !=1
- RDM Slot 2 Message Length field < 24
- RDM PDL (Slot 23) is != (Slot 2) Message Length – 24

### Magenta: Semantic errors

Semantic errors encapsulate errors which mean the packet cannot be unambiguously understood:

- RDM command class (Slot 20) contains an incorrect value.
- Destination UID is broadcast and is not allowed for this command class



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#### CE Compliance

nanoScope developer is CE compliant

All products are covered from date of purchase by a two-year return to base warranty.

By return to base, we mean that the customer is responsible for all costs of transport to and from Artistic Licence.

Returns will not be accepted without prior authorisation.

All Products manufactured or sold by Artistic Licence Engineering Ltd are fully compliant with the appropriate CE, FCC, and RoHS regulations. Product specific information is available on request.

Artistic Licence is a member of a WEEE compliance scheme and will happily recycle any of our products that you, at your expense, return to us.