UM10553

DALI getting started guide

Rev. 1 — 6 March 2012   **User manual**

NXP

Revision history

Rev	Date	Description
1	20120306	Initial version.

Contact information

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1. Introduction

This document describes how to get started with the NXP LPC111x Cortex-M0 DALI slave and LPC1343 Cortex-M3 DALI master demoboards in combination with a PC demonstration application.

The design information of the LPC111x Cortex-M0 DALI slave and theLPC1343 Cortex-M3 DALI to USB master can be found in application notes AN11174[1] and AN11175[2].

2. Required items

2.1 Required hardware

To get started the following hardware items are required:
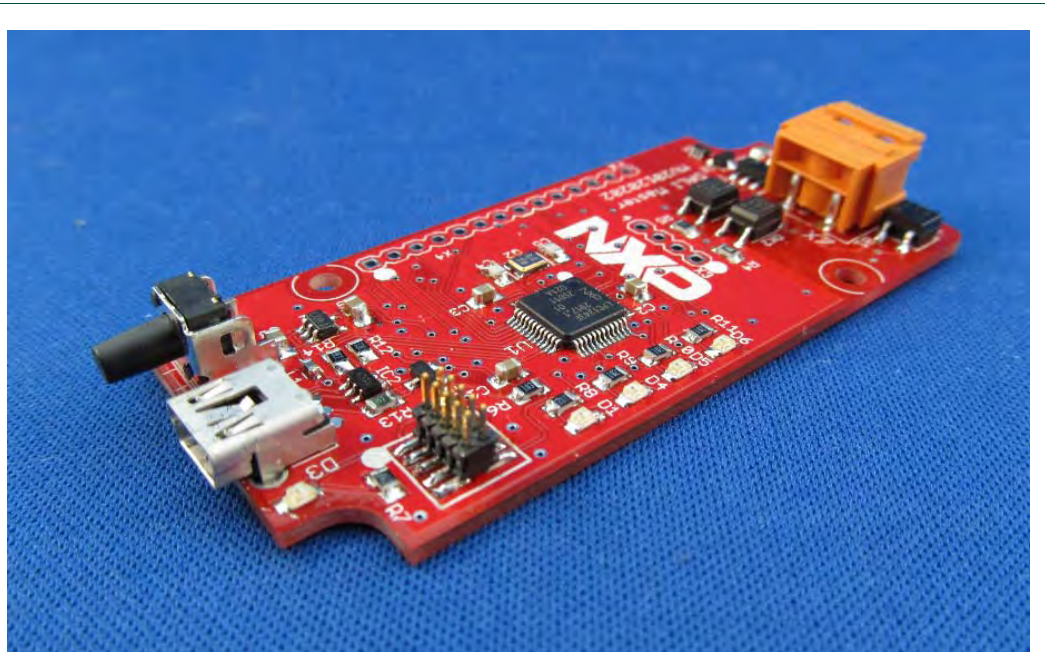
1. LPC1343 DALI to USB master as shown in Fig 1.

Fig 1.   LPC1343 DALI to USB Master demo board

2. USB cable to connect the LPC1343 DALI master to a PC

Fig 2.   USB cable for NXP DALI Master

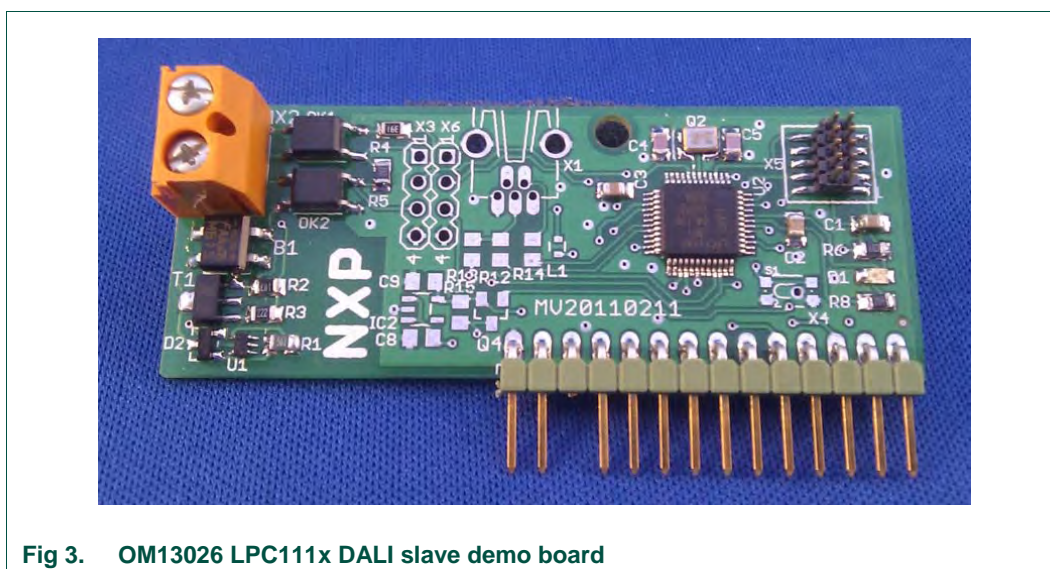3. NXP Cortex M0 LPC111x DALI Slave as shown in Fig 3.

Fig 3.   OM13026 LPC111x DALI slave demo board

4. Cable to connect DALI slave board to 3V3 supply

5. Low power LEDS or an LED driver to connect to the PWM1…4 outputs of the OM13026 board respectively.

6. DALI bus power supply to power the DALI bus

7. Windows7 or Windows-XP PC

2.2 Required software

To get started the following software items are required:

1. Windows7 or Windows-XP (Service Pack 3)

2. Microsoft .NET Framework 4 (default on Windows7)

3. NXP DaliController application. This .NET application can be downloaded from NXP website as part of the NXP DALI SDK.

Software tooling needed for software development:

4. Microsoft Visual Studio C# Express 2010

5. LPCXpresso v4.x

6. IAR Embedded Workbench for ARM v6.20

The NXP DALI Master and DALI Slave demo boards already have firmware stored in flash memory of the LPC1343 and LPC111x microcontrollers respectively.

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3. Installation and setup

3.1 Microsoft .NET Framework 4

The DALI GUI application requires a PC running Microsoft Windows7 or Windows-XP, and an installation of the Microsoft .NET Framework 4.

The first step is to download Microsoft .NET Framework 4 from the link below, if it is not already installed on the demonstration PC (Windows7 by default has support for.NET 4).

Microsoft .NET Framework 4 Client Profile:

http://www.microsoft.com/download/en/details.aspx?displaylang=en&id=17113

3.2 DALI SDK 1.0

Download and install the NXP DALI SDK 1.0 from the NXP website[3].

3.3 Running the install program

After downloading the NXP DALI SDK 1.0 run the installer. The Welcome screen is shown in Fig 4.

Fig 4.   Welcome screen of NXP DALI SDK 1.0

The next screen of the NXP DALI SDK 1.0 install program gives the user the freedom to choose the destination folder for the SDK. The default location is:

C:\nxp\lighting\DALI_SDK_v1.0\

The installation starts when the **Install button** is pressed. When the DALI SDK installation is completed the Start menu of the PC has been updated. Fig 5 shows the new menu entries.
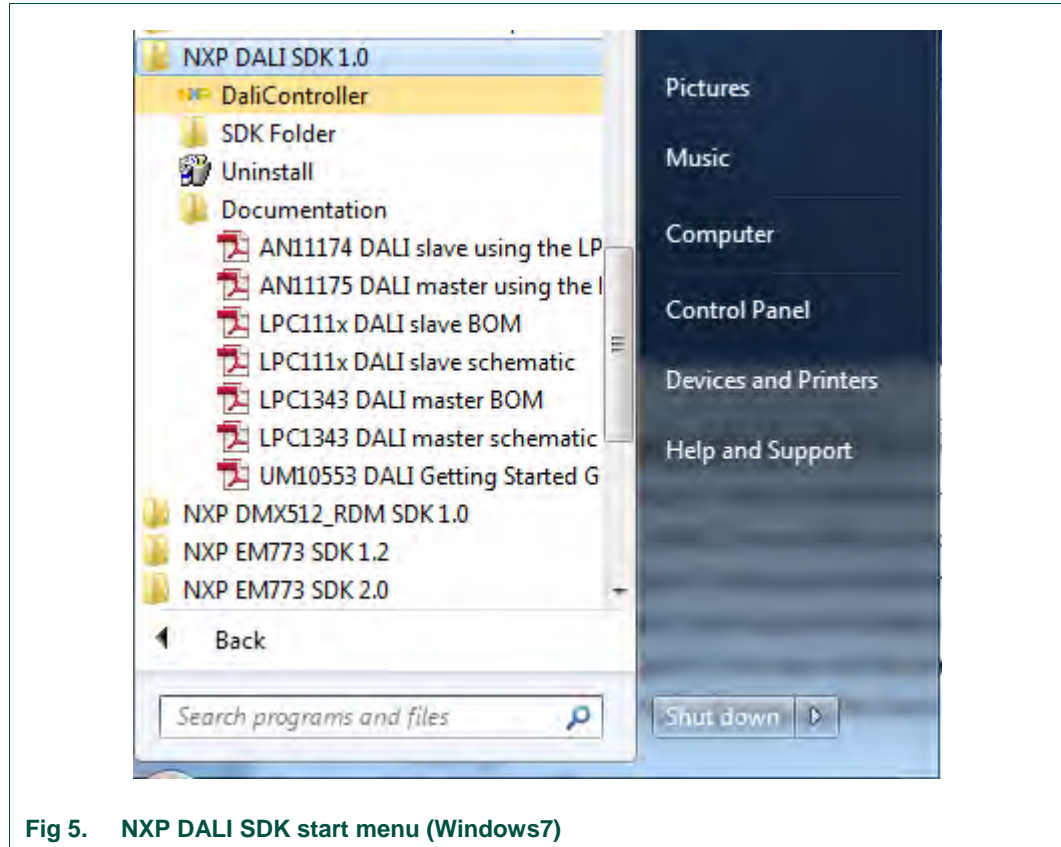

Fig 5.   **NXP DALI SDK start menu (Windows7)**

The menu items show *DALI controller* (the PC application to use with the DALI LPC1343 master), a direct link to the installed *SDK folder* that contains all software source files, hardware descriptions, and all documentation under the *Documentation* entry. The DALI SDK 1.0 can be removed by using Uninstall.

3.4 Creating a setup

To create an evaluation or demonstration setup, connect the LPC1343 DALI master to a DALI bus and connect the LPC1114 DALI slave to the same bus. Make sure the DALI bus is powered via an external DALI power supply. An overview of such a setup is given in Fig 6.

Fig 6. **Small DALI bus system setup**
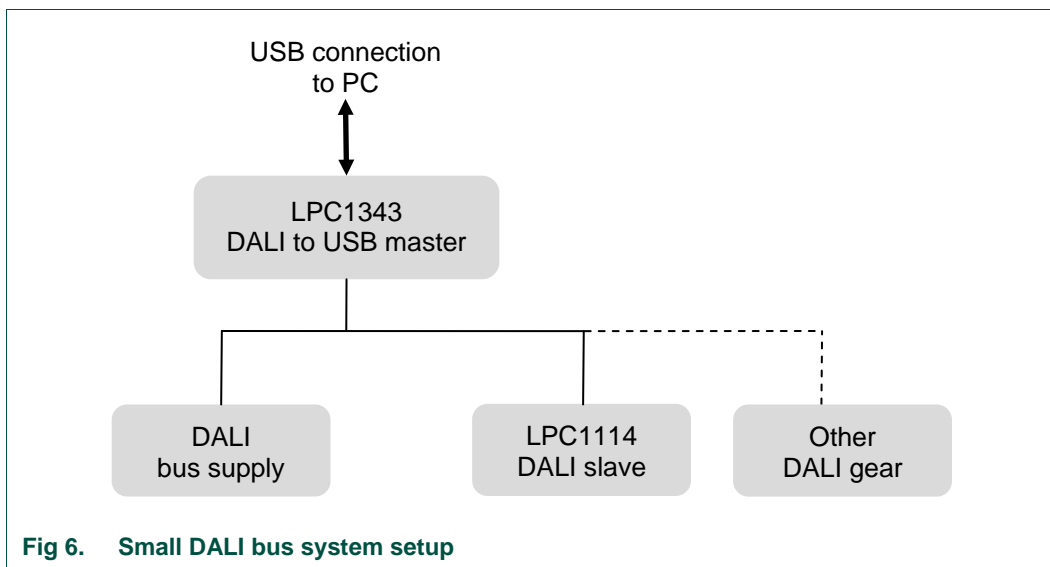
If no DALI bus supply is present, a laboratory power source with output voltage set to 16 V DC and a current limit set to 200 mA can act as replacement for the DALI bus supply unit.

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4. The DaliController program

4.1 Startup

The DaliController program can be started via the PC Start menu (see Fig 7). When started, the "Dali" tab shows a picture of the LPC1343 DALI master board.
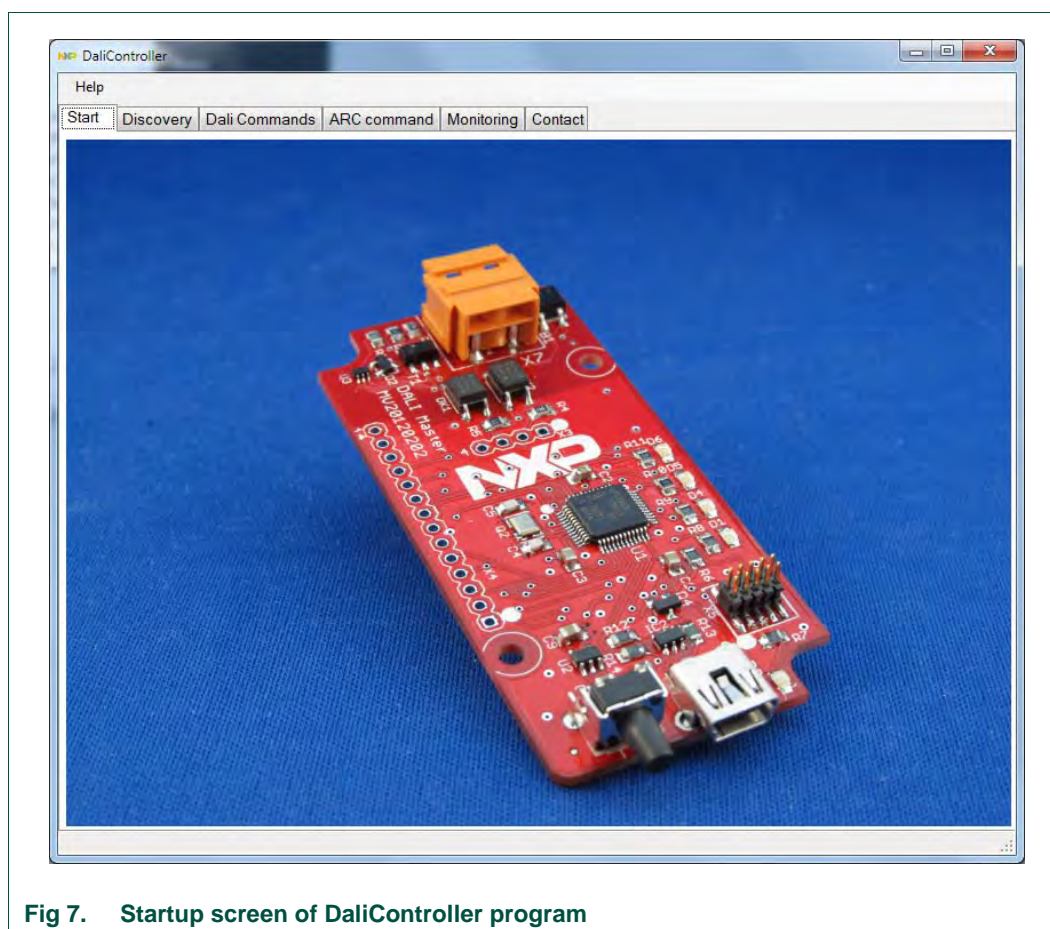

Fig 7. **Startup screen of DaliController program**

The NXP DALI Master uses the USB Human Interface Device (HID) class for communication between the PC and the master board. This has the advantage that no dedicated software driver needs to be installed to enable communication.

The status bar at the bottom of the Dali Controller program shows if a LPC1343 DALI master is present. After connecting an LPC1343 DALI Master to the PC, the DALI Master is detected by pressing the "Find Device" button in the Monitoring tab. The status bar shows "DALI Master: detected" (see Fig 8).
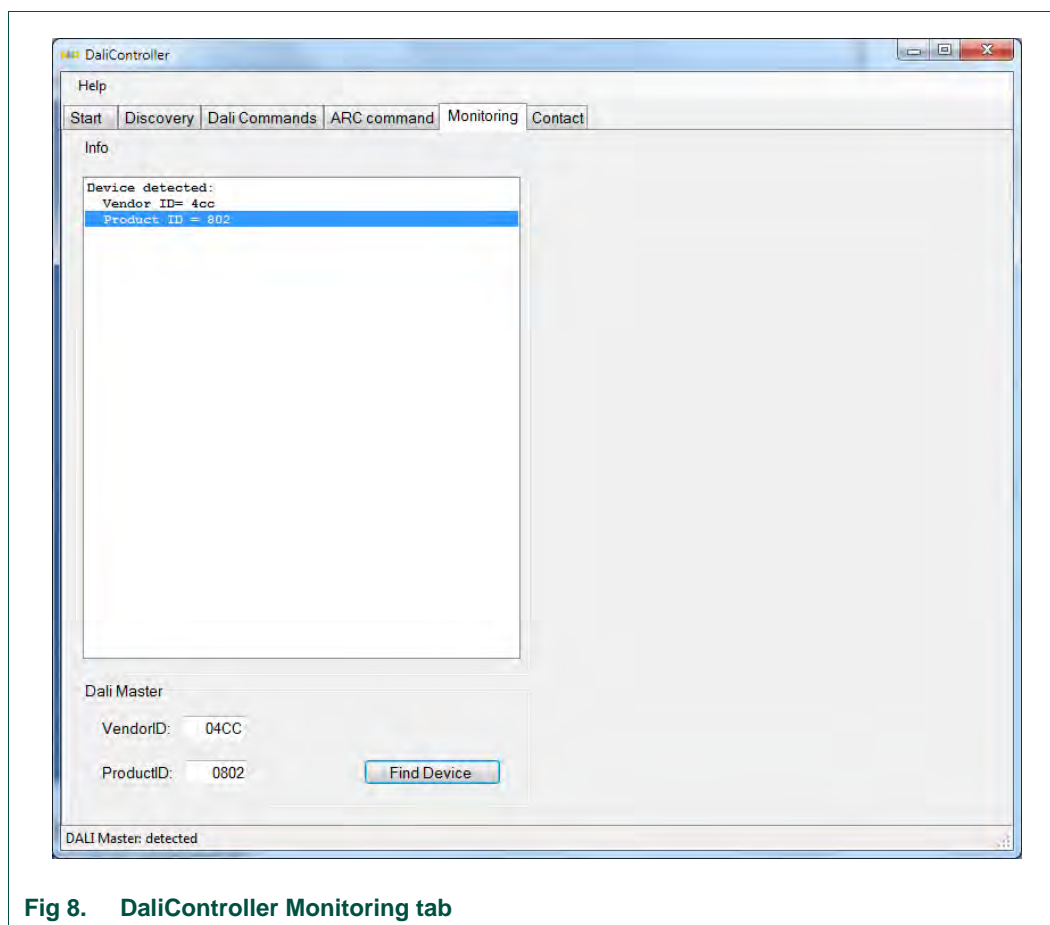
Fig 8.   DaliController Monitoring tab

4.2 Controlling DALI devices

In the "DALI Commands" tab, a more convenient method is used: the addressing mode and command can be set. When the send button is pressed, the PC application sends the DALI command to the DALI Master, which transmits the command on the DALI bus. If a response is expected, the DALI Master sends this back to the PC and the response is displayed in the "Response" field (see Fig 9).
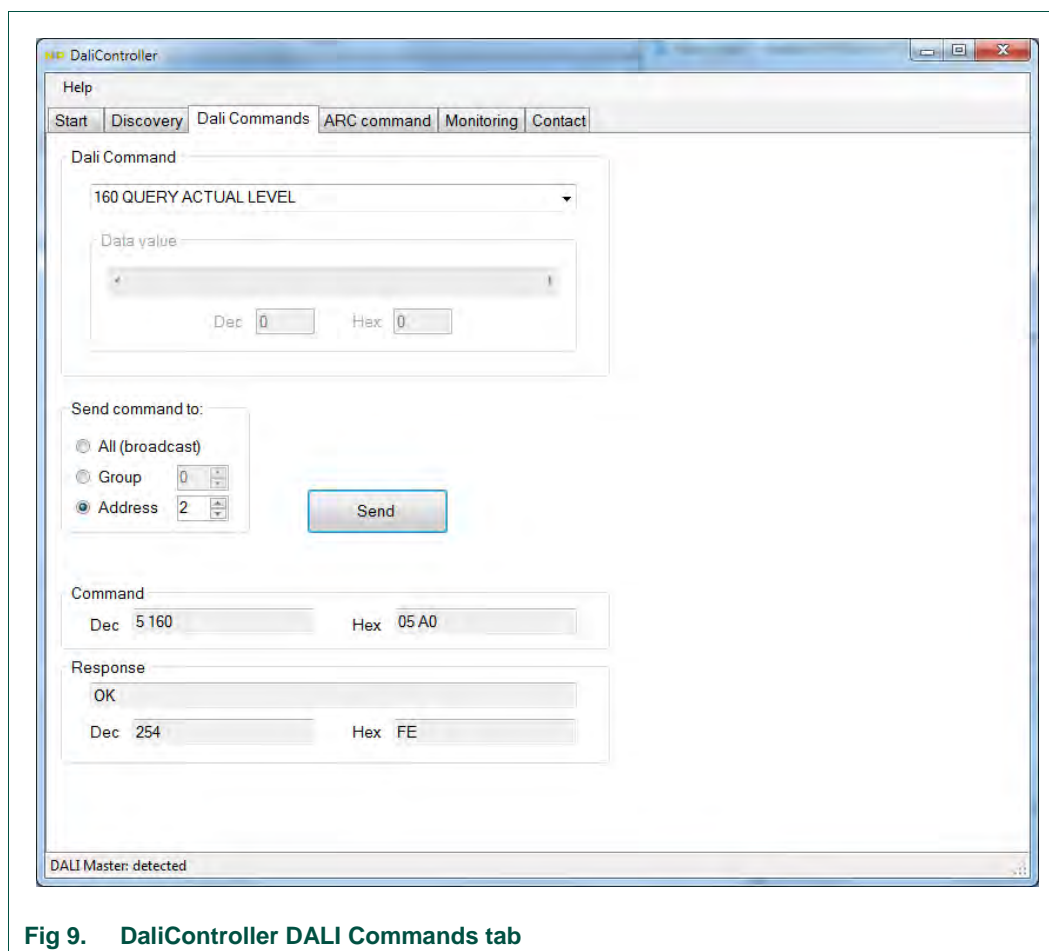
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Fig 9. DaliController DALI Commands tab

The "ARC command" tab as shown in Fig 11 allows sending Direct ARC Power Control commands using sliders. The address selection below each slider allows commands to transmit as broadcast, to individual addresses, or to a group address.

The Color Demo mode sends direct arc power control commands to the three addresses defined under the Red, Green and Blue labeled sliders. For this demo, the LPC1114 slave PWM outputs PWM1, PWM2 and PWM3 should be connected to Red, Green and Blue LEDs.

In the Color demo mode, the application steps through the Hue circle from 0…360 degrees in step sizes that are defined with the Step slider. Furthermore, Saturation and Value can be set using sliders. This results in a color demo showing all available colors as depicted in Fig 10.

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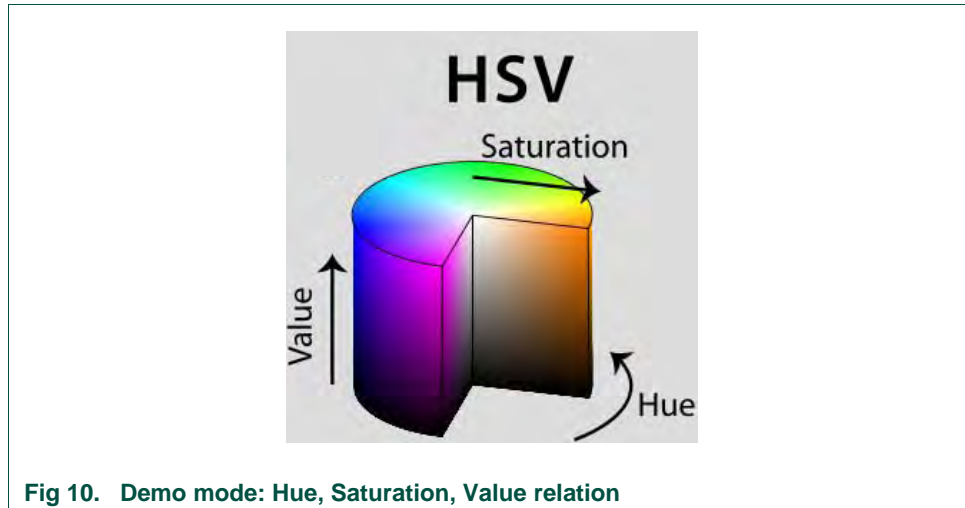**User manual** **Rev. 1 — 6 March 2012** **11 of 17**

Fig 10.   Demo mode: Hue, Saturation, Value relation

When not using the demo mode, the color can be chosen using the Color Button. This shows a pop up to select a color. After choosing a color and confirming the selection with 'Ok' the color sliders adapt accordingly and the command is sent on the DALI bus.
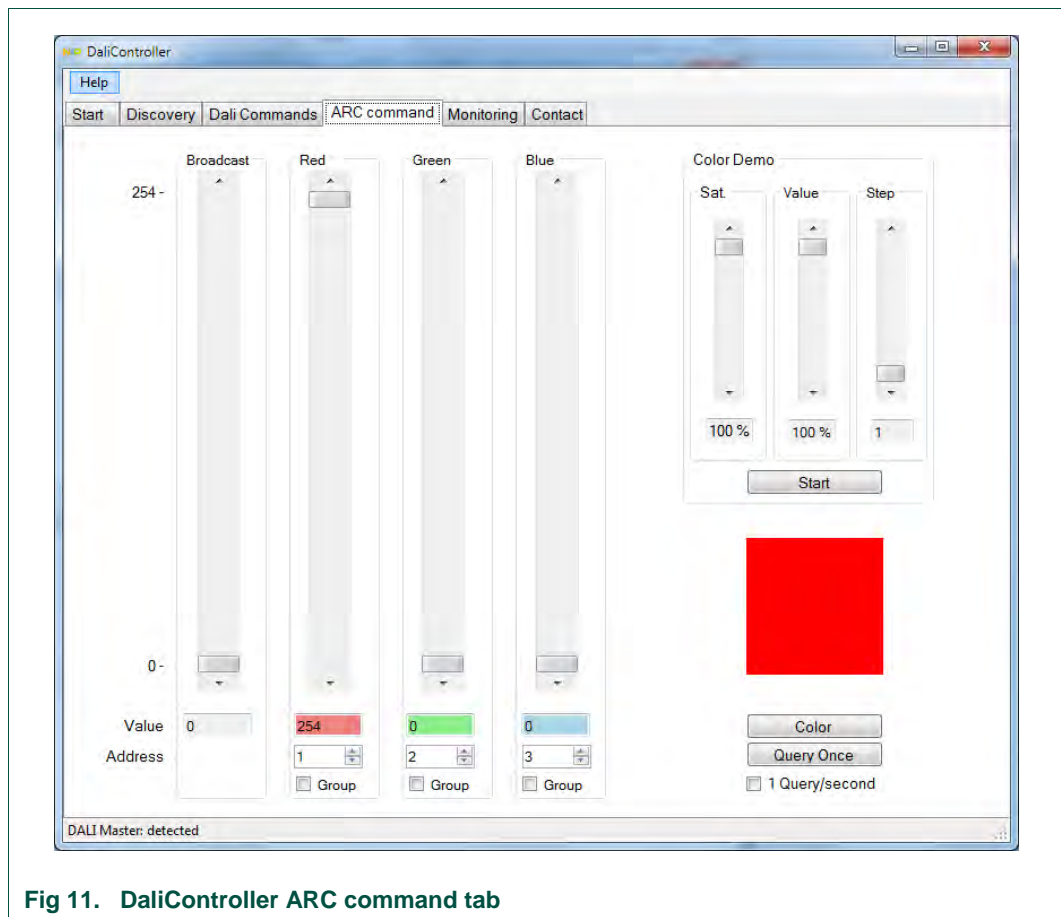

Fig 11.   DaliController ARC command tab

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5. Document management

5.1 Referenced documents

Table 1.   Referenced documents

Title		Version	Author	Issue Date
[1]	AN11174 DALI slave using the LPC111x	1.0	NXP	2012
[2]	AN11175 DALI master using the LPC134x	1.0	NXP	2012
[3]	DALI Development Kit http://www.nxp.com	1.0	NXP	2012

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