

UM10553

DALI getting started guide

Rev. 1 — 6 March 2012

User manual

Document information

Info	Content
Keywords	LPC111x, LPC1343, ARM, Cortex M0/M3, DALI, USB, lighting control, USB to DALI interface.
Abstract	This user manual explains how to get started with the LPC1343 DALI to USB Master demo board and the LPC111x DALI Slave demo board using a DALI control application from NXP Semiconductors for Windows.



Revision history

Rev	Date	Description
1	20120306	Initial version.

Contact information

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

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 the LPC1343 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](#).

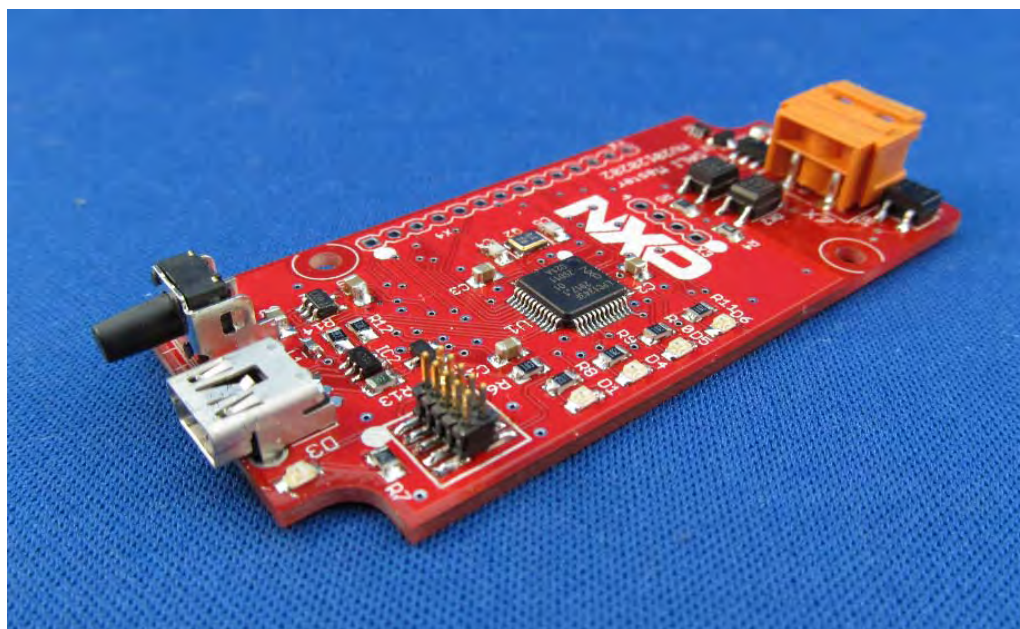


Fig 1. LPC1343 DALI to USB Master demo board

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](#).

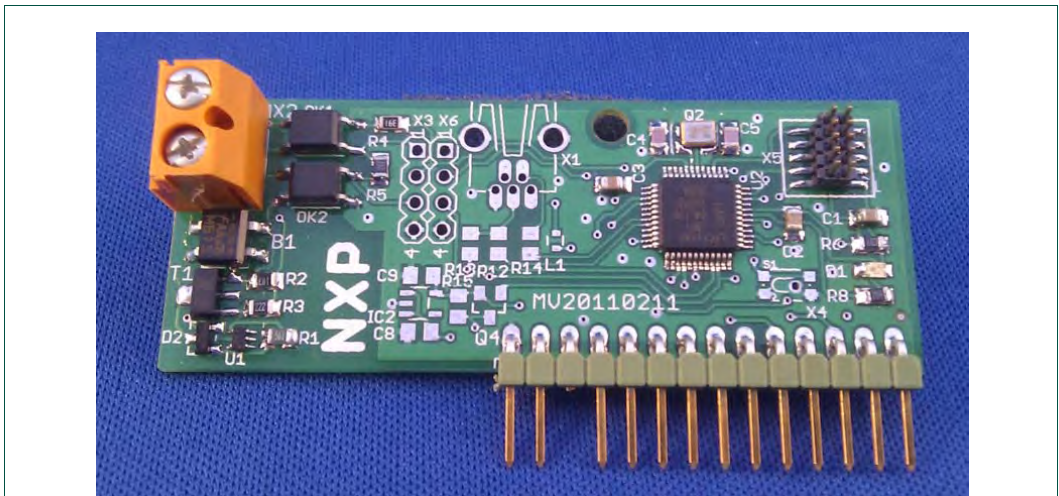


Fig 3. OM13026 LPC111x DALI slave demo board

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.

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.



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.

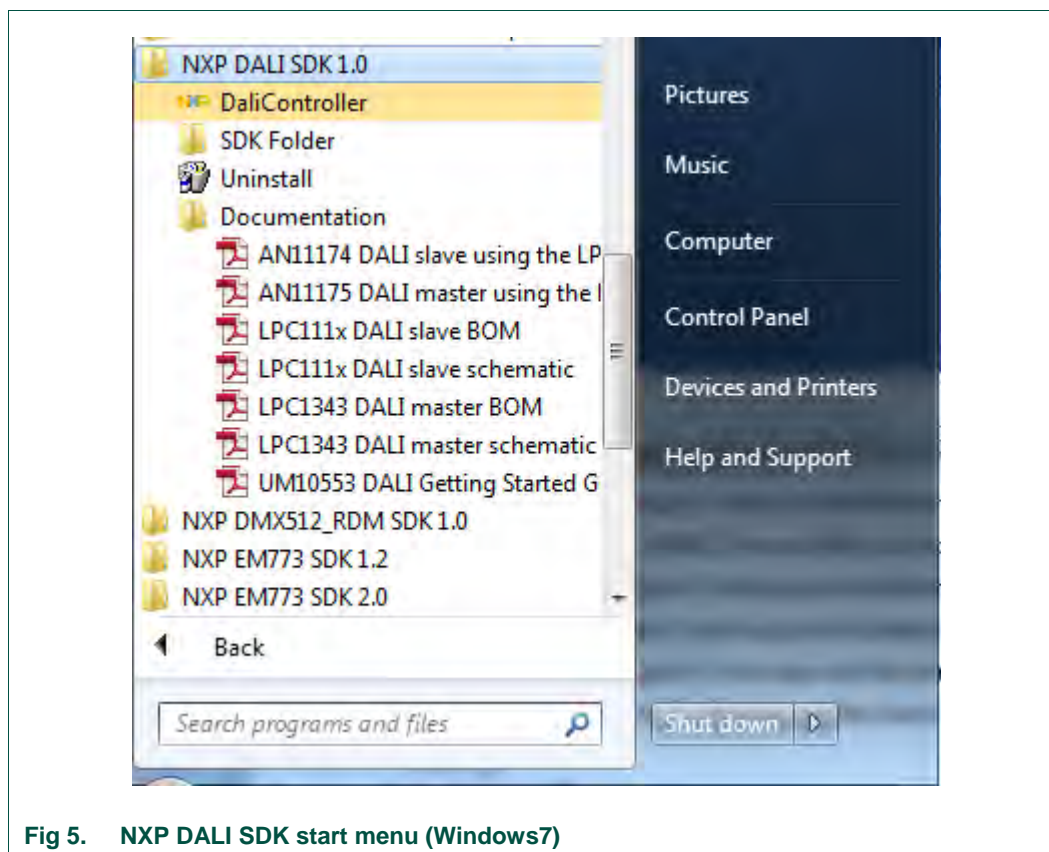
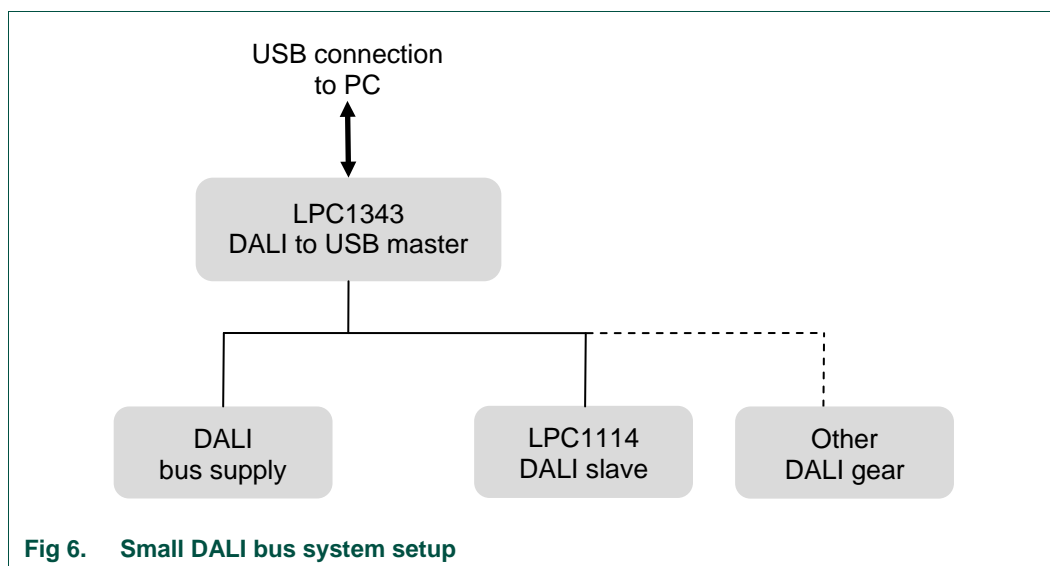


Fig 5. NXP DALI SDK start menu (Windows7)

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](#).



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.

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.

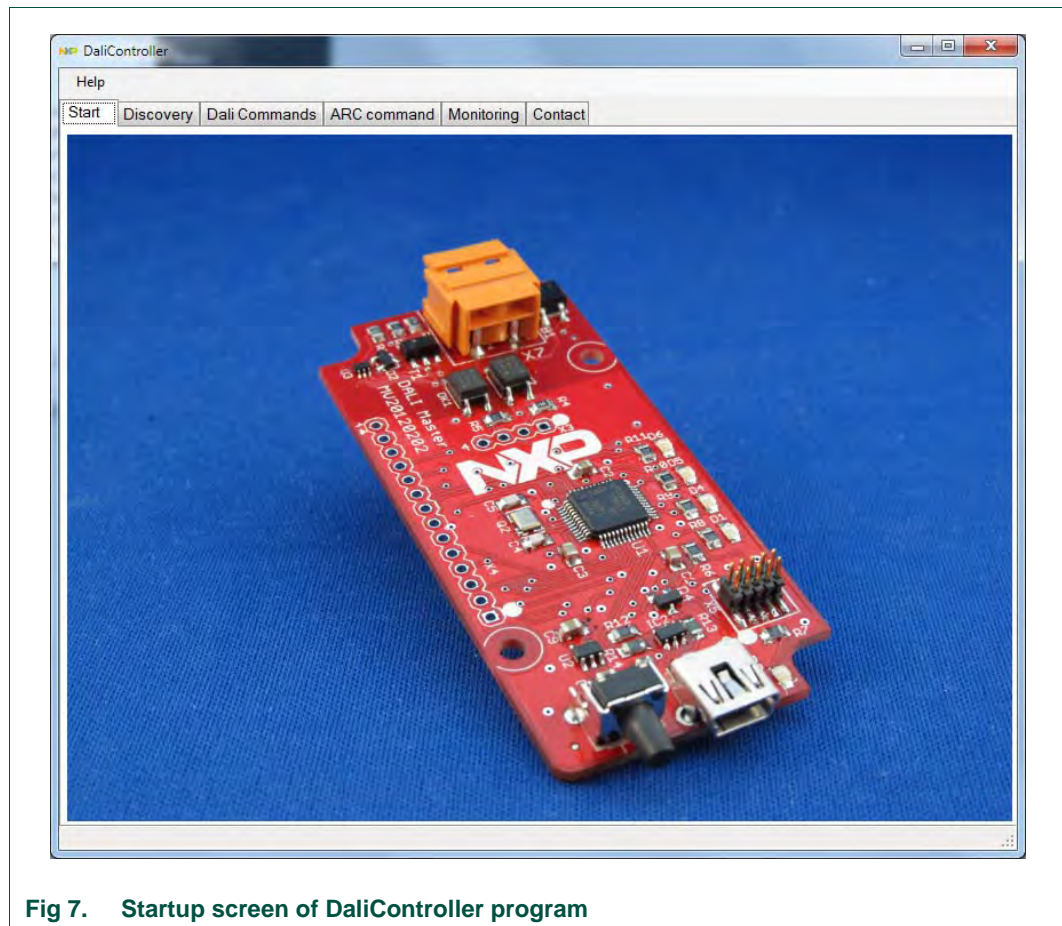


Fig 7. Startup screen of DaliController program

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](#)).

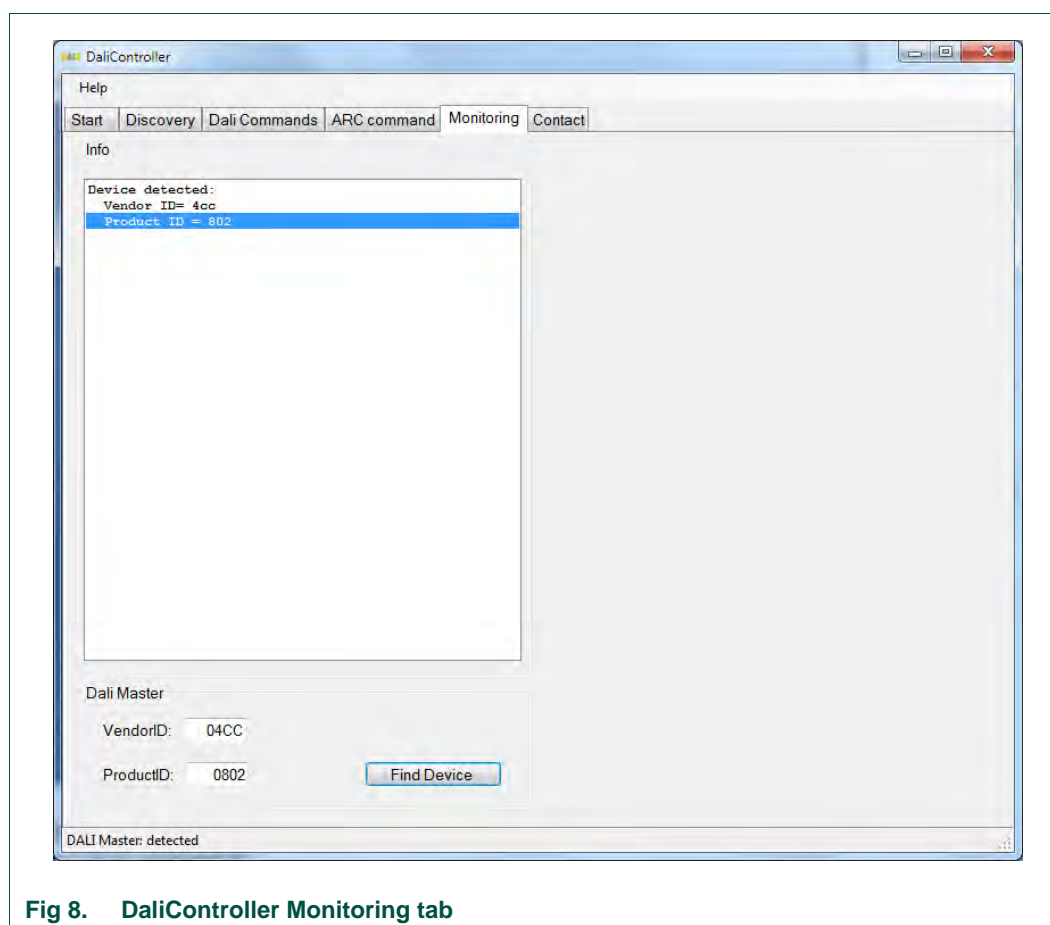


Fig 8. DaliController Monitoring tab

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](#)).

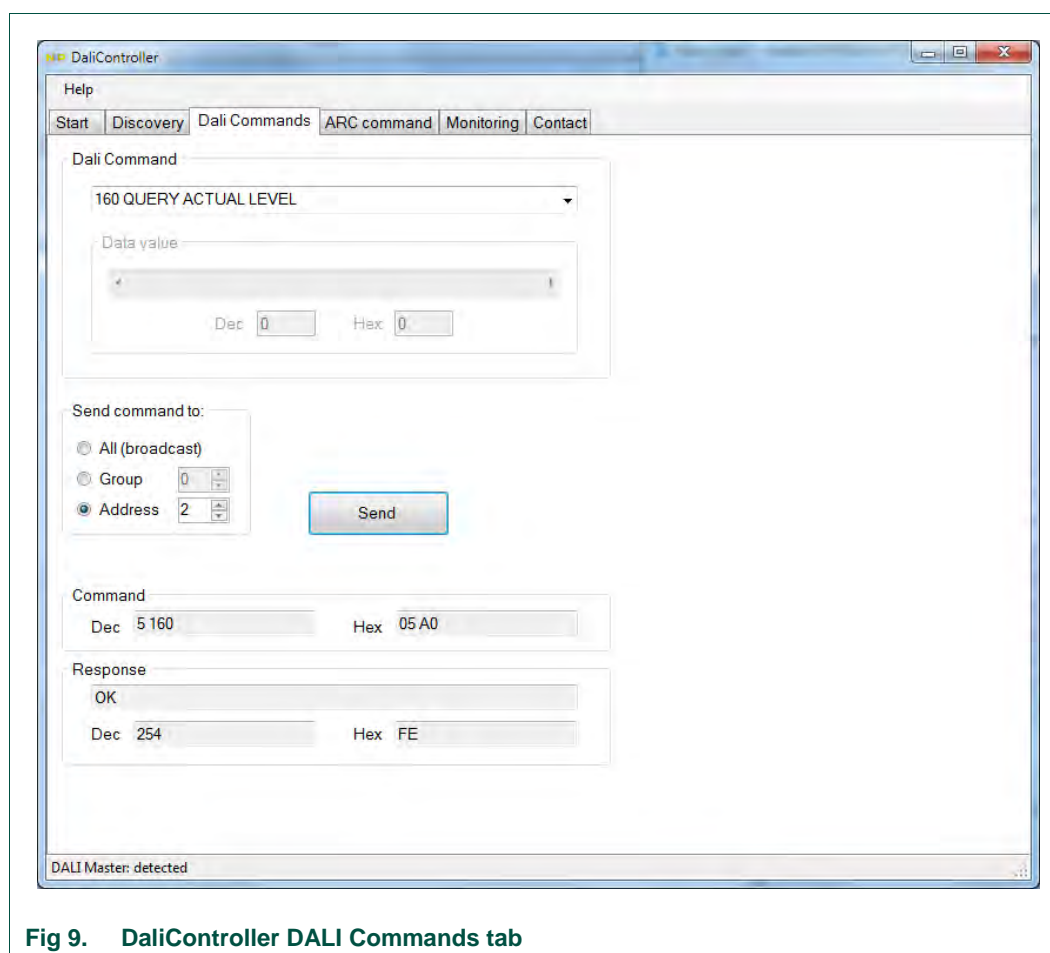


Fig 9. DaliController DALI Commands tab

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](#).

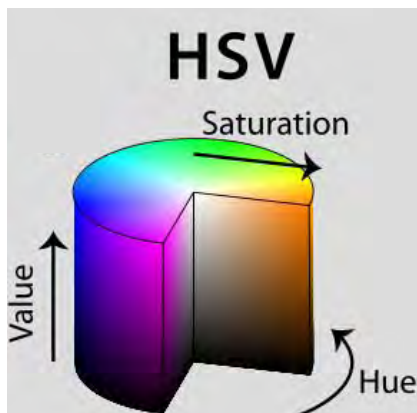


Fig 10. Demo mode: Hue, Saturation, Value relation

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.

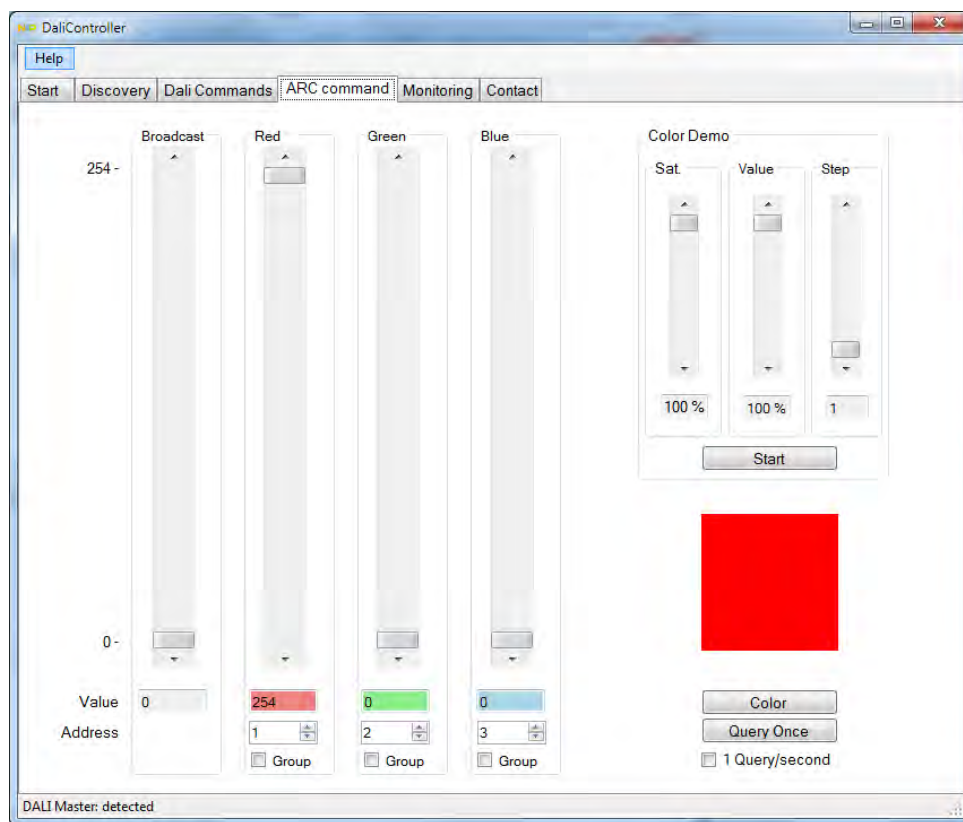


Fig 11. DaliController ARC command tab

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

6. Legal information

6.1 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

6.2 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. NXP Semiconductors takes no responsibility for the content in this document if provided by an information source outside of NXP Semiconductors.

In no event shall NXP Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, NXP Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of NXP Semiconductors.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors and its suppliers accept no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using NXP Semiconductors products, and NXP

Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using NXP Semiconductors products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). NXP does not accept any liability in this respect.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Evaluation products — This product is provided on an "as is" and "with all faults" basis for evaluation purposes only. NXP Semiconductors, its affiliates and their suppliers expressly disclaim all warranties, whether express, implied or statutory, including but not limited to the implied warranties of non-infringement, merchantability and fitness for a particular purpose. The entire risk as to the quality, or arising out of the use or performance, of this product remains with customer.

In no event shall NXP Semiconductors, its affiliates or their suppliers be liable to customer for any special, indirect, consequential, punitive or incidental damages (including without limitation damages for loss of business, business interruption, loss of use, loss of data or information, and the like) arising out of the use of or inability to use the product, whether or not based on tort (including negligence), strict liability, breach of contract, breach of warranty or any other theory, even if advised of the possibility of such damages.

Notwithstanding any damages that customer might incur for any reason whatsoever (including without limitation, all damages referenced above and all direct or general damages), the entire liability of NXP Semiconductors, its affiliates and their suppliers and customer's exclusive remedy for all of the foregoing shall be limited to actual damages incurred by customer based on reasonable reliance up to the greater of the amount actually paid by customer for the product or five dollars (US\$5.00). The foregoing limitations, exclusions and disclaimers shall apply to the maximum extent permitted by applicable law, even if any remedy fails of its essential purpose.

6.3 Trademarks

Notice: All referenced brands, product names, service names and trademarks are property of their respective owners.

7. List of figures

Fig 1. LPC1343 DALI to USB Master demo board.....3

Fig 2. USB cable for NXP DALI Master.....4

Fig 3. OM13026 LPC111x DALI slave demo board4

Fig 4. Welcome screen of NXP DALI SDK 1.0.....6

Fig 5. NXP DALI SDK start menu (Windows7)7

Fig 6. Small DALI bus system setup8

Fig 7. Startup screen of DaliController program.....9

Fig 8. DaliController Monitoring tab..... 10

Fig 9. DaliController DALI Commands tab 11

Fig 10. Demo mode: Hue, Saturation, Value relation.. 12

Fig 11. DaliController ARC command tab 12

8. List of tables

Table 1. Referenced documents..... 13

9. Contents

1. Introduction3

2. Required items3

2.1 Required hardware.....3

2.2 Required software5

3. Installation and setup6

3.1 Microsoft .NET Framework 4.....6

3.2 DALI SDK 1.0.....6

3.3 Running the install program6

3.4 Creating a setup.....7

4. The DaliController program.....9

4.1 Startup9

4.2 Controlling DALI devices10

5. Document management.....13

5.1 Referenced documents13

6. Legal information14

6.1 Definitions14

6.2 Disclaimers.....14

6.3 Trademarks14

7. List of figures.....15

8. List of tables16

9. Contents.....17

Please be aware that important notices concerning this document and the product(s) described herein, have been included in the section 'Legal information'.



**Стандарт
Электрон
Связь**

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331