

# TN00016

## LPC54608 ADC to USART with DMA

Rev. 1 — 1 May 2017

Technical note

### Document information

Info	Content
<b>Keywords</b>	LPC54608, 12-bit ADC, Flexcomm interface, USART, DMA, temperature sensor
<b>Abstract</b>	This technical note gives an overview of an example that performs DMA operation from ADC to USART.



**Revision history**

Rev	Date	Description
1.0	20170501	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](mailto:salesaddresses@nxp.com)

## 1. Introduction

The LPC5460x is a family of ARM Cortex-M4 based microcontrollers for embedded applications. The LPCXpresso Development Board for LPC5460x MCUs is used in this technical note. Details of the board can be found in:

<http://www.nxp.com/products/microcontrollers-and-processors/arm-processors/lpc-cortex-m-mcus/lpc54000-series-cortex-m4-mcus/lpcxpresso-development-board-for-lpc5460x-mcus:OM13092>



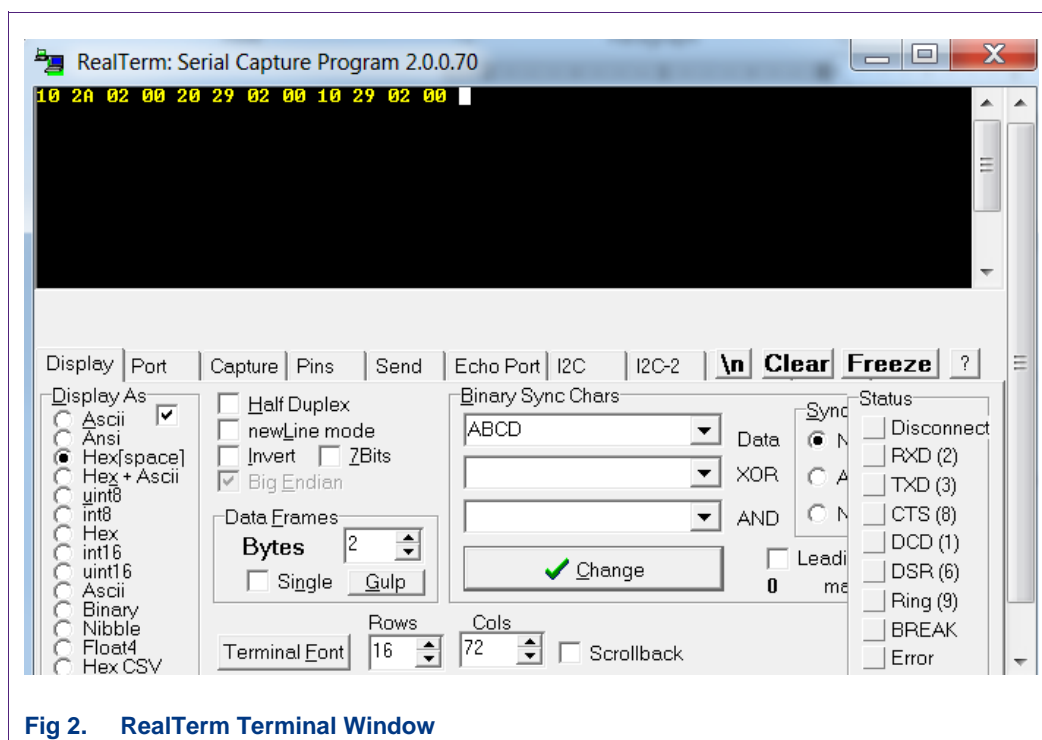
Fig 1. LPC54608 LPCXpresso Development Board

## 2. Description

The example shows peripheral to peripheral DMA transfer operation. ADC Channel0 is used, which is internally connected to the on-chip temperature sensor. On pressing any key on the keyboard, the ADC sample conversion is triggered. The results of the conversion are present in ADC DAT0 register for ADC Channel0. The contents of the ADC DAT0 register is transferred to USART TXFIFO using DMA.

The terminal program used in this example is RealTerm. The conversion data is printed on the terminal window (configured to display values in hex format) with Least Significant Byte first on every trigger (keypress on keyboard).

For example, if the result in register DAT0 (register address 0x400A0020) is 0x00022A50, the terminal window prints as 50 2A 02 00. [Fig 2](#) shows the terminal window after 3 triggers.



**Fig 2. RealTerm Terminal Window**

The example is available in three tool chains:

- MCUXpresso IDE v10.0
- Keil MDK v5.23
- IAR Workbench v8.0

The Keil and IAR examples are found in:

**lpc54608\_adc\_usart\_dma\_keil\_iar\boards\lpcxpresso54608\demo\_apps\lpc\_adc\_usart\_dma**

The MCUXpresso example can be found in the zip file:

**lpc54608\_adc\_usart\_dma\_mcux.zip**

## 3. Legal information

### 3.1 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.

### 3.2 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.

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 accepts 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.

### 3.3 Trademarks

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

4. Contents

1. Introduction .....3

2. Description.....3

3. Legal information .....5

3.1 Definitions .....5

3.2 Disclaimers.....5

3.3 Trademarks.....5

4. Contents.....6

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