AN14025 How to Set Up LPC860 Switch Matrix Demo Rev. 1.0 — 13 October 2023

Application note

Document information

Information	Content
Keywords	AN14025, LPC860, switch matrix, UART
Abstract	This application note introduces LPC860 switch matrix demo functions. The switch matrix is a feature, which assigns the internal signals to external pins in the LPC860 microcontroller.



How to Set Up LPC860 Switch Matrix Demo

1 Introduction

The switch matrix is a feature, which assigns the internal signals to external pins in the LPC860 microcontroller. <u>Figure 1</u> shows the block diagram for the switch matrix. The switch matrix demo is used to show its features. In this demo, a single UART signal can be switched to a different external port.



2 Switch matrix demo setup

This section includes the hardware and software setup for the switch matrix demo.

2.1 Hardware setup

The switch matrix demo is implemented in the LPCXpresso860-MAX EVK board.

To set up this demo, one USB to TTL module is required. Figure 2 shows the following connections:

- Connect the J2 pin2 to the USB to the TTL RX pin.
- Connect the J2 pin4 to the USB to the TTL TX pin.

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2.2 Software setup

The switch matrix demo development environment is MCUXpresso IDE.

Figure 3 shows the demo project.

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6 10 Y 6 V 10 -	272 /* PIOI PINAS (coords: 36) is configured as USARTO, RXD. */	fsl_common.h
EPC865_PC_accessory_host	273 IOCW_TIMUXSE(IOCW, IOCU_TUEX_TUE_24, DEBUG_DWK(_0X);	fsl_gpio.h
LPC8b5_PC_accessory_larget	275 const uint32 t DEBUG UART TX = (/* Selects pull-up function */	fsl_iocon.h
 IB LPCB65_SwitchMatrix_demo <debug></debug> 	276 IOCON_PIO_MODE_PULLUP	fsl_swm.h
D Project Settings	277 /* Enable hysteresis */	pin_musch
> 6° Binaries	278 TOCON PTO MYS EN	 BOARD_InitBootPins(void) : void
) 🖉 Includes	2/9 /* Input not Invent */	 BOARD_InitPins(void) : void
> CMSIS	281 /* Disables Open-drain function */	 BOARD_InitLEDsPins(void) : void
 Ø board 	282 IOC0N_PI0_00_DI	 BOARD_InitDEBUG_UARTOPins_Config1(void)
> @ board.c	283 /* Bypass input filter */	 BOARD_InitDEBUG_UART0Pins_Config2(void)
> 🗟 board.h	214 IOCON_PTO_SHOPE_BYPASS	 BOARD_InitSWD_DEBUGPins(void) : void
> @ clock_config.c	205 /* 1000kCh0100 */	 BOARD_InitBUTTONsPins(void) : void
B clock_config.h	/* PIO1 PID17 (coords: 37) is configured as USARTO, TXD. */	
> iii peripherals.c	288 IOCON_PInMuxSet(IOCON, IOCON_INDEX_PIOP_25, DEBUG_UART_TX);	
> @ peripherals.h	289	
> @ pin_muse	290 /* USARTB_TXD connect to P0_24 */	
> @ pin_much	201 SMM_SetHovablePinSelect(SMM0, #SMM_USART0_TXD, #SMM_POrtPin_P0_24); 201	
> @ component	293 /* USARTE RXD connect to PE 25 */	
> 🖉 device	294 SMM_SetMovablePinSelect(SMM0, kSMM_USART0_RXD, kSMM_PortPin_P0_25);	
III drivers	295	
Y 🕮 source	296 /* Disable clock for switch matrix. */	
> @ LPC865_SwitchMatrix_demo.c	297 CLOCK_DIsableClock(ACLOCK_Sum); 200 3	
> @ mtb.c	279 J 299	
> @ semihost_hardfault.c	300 /* clang-format off */	
 startup 	301+/*	
> in startup_lpc865.c	102 * TEXT BELOW IS USED AS SETTING FOR TOOLS	
> 😆 utilities	Set BOARD Initian DeBudying	
> 📴 Debug	305 - opiionsi (tairrominitooti Taise, coreio) core, eneolecioti true y 305 - opiisti	
LPC865_SwitchMatrix_demo LinkServer DebugJaur	d 306 - (pin_num: '12', peripheral: SND, signal: SWCLK, pin_signal: SWCLK/PIC0_3, mode: pullUp, invert: disabled, hysteresis: enabled, opendrain: disabled, smode: bypass,	
Id lpcspresso860max ftm input capture	307 clkdly: div0}	
> # lpopresso@i0max ftm simple pwm	308 - {pin_num: '14', peripheral: SND, signal: SNDIO, pin_signal: SNDIO/PIO8_2, mode: pullUp, invert: disabled, hysteresis: enabled, opendrain: disabled, smode: bypass,	
> # lpospresso860max hello world	Star (Likely: dive)	
> 15 locepresso@60max usart polling example	310 - (pin_mmi: 5, peripheral: Sistem, Signal: RESEN, pin_Signal: RESEN/Fide_5, mode: pullop, invert: disabled, nysteresis: enabled, openwain: disabled, second openwain: disabled,	Memory ** Heap and Energy M × ** 0
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	313 */	Plot Config Statistics
	314 /* clang-format on */	Please select a compatible probe or link the
	315 516 / Elan/TTON	view to the currently selected debug context by
	217 *	using the toolbar actions.
	318 * Function Name : BOARD InitSkD_DEBUGPins	私名名会会 開始 ちか 開たたた部
	319 * Description : Configures pin routing and optionally pin electrical features.	
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	No consoles to display at this time.	
MCUXpresso IDE - Quickstart Panel		
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16 (LPCE05 SwitchMatrix demo/board/pin mus.c		W NVD IDPOCCE & DPOCC CubickAdded classed

Figure 3. Switch matrix demo project

In this switch matrix demo, perform the following steps:

- Attach the UART0 to different external ports by the switch matrix.
- Use PIO1_16/PIO0_25 as RX signal and PIO1_17/PIO0_24 as TX signal separately.
- Switch the attach selection by the UART terminal.

COM7 represents the UART0 attached to PIO1_16/PIO1_17 and COM6 represents the UART0 attached to PIO0_24/PIO0_25, as shown in Figure 4.

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Figure 4. Tera Term communication

The Tera Term generates the following outputs:

• When "y" is printed in Tera Term COM7, the UART0 switches to PIO0_24/PIO0_25. Tera Term COM6 prints "UART switch successfully", as shown in Figure 5.



Figure 5. Tera Term communication

• When "y" is printed in Tera Term COM6, the UART0 switches back to PIO1_16/PIO1_17, as shown in Figure 6.

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Figure 6. Tera Term communication

• When "n" is printed in Tera Term COM7/COM6, the UART port does not switch and prints "DO NOT SWITCH UART", as shown in Figure 7.



Figure 7. Tera Term communication

3 Revision history

Table 1 summarizes revisions to this document.

Table 1. Revision history

Revision history	Release date	Description
1	13 October 2023	Initial public release

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Date of release: 13 October 2023 Document identifier: AN14015