# CoLinkEx\_LPC11C14 EVB Kit User Guide

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- Website: http://www.coocox.org
- Forum: <u>http://www.coocox.org/Forum/forum.php?id=1</u>
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# Revision history

Rev	Date	Description
1.0	2012-05-07	Initial version

# CooCox CoLinkEx\_LPC11C14 EVB Kit

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# 1. CoLinkEx\_LPC11C14 EVB Kit Overview

# **1.1 The Microcontroller Introduction**

CoLinkEx\_LPC11C14 EVB Kit uses the LPC11C14x301FBD48 for NXP. The LPC11Cxx are ARM Cortex-M0 based microcontrollers for embedded applications featuring a high level of integration and low power consumption.

The LPC11xx operate at CPU frequencies of up to 50 MHz, the peripheral complement of the LPC11xx series includes up to 32KB of flash memory, up to 8 KB of data memory, one Fast-mode Plus I2C-bus interface, one RS-485/EIA-485 UART, up to two SPI interfaces with SSP features, four general purpose timers, a 10-bit ADC, and up to 42 general purpose I/O pins. It integrated ARM Cortex-M0 built-in Nested Vectored Interrupt Controller (NVIC), integrated PMU (Power Management Unit) to minimize power consumption during Sleep, Deep-sleep, and Deep power-down modes.

The LPC11Cxx operates in the -40 to +85 °C temperature range, from a 1.8 to 3.6 V power supply. A comprehensive set of power-saving mode allows the design of low-power applications. It includes:

- Emetering
- Lighting
- Industrial networking
- Alarm systems
- White goods

# **1.2 Evaluation Boards Introduction**

CooCox's CoLinkEx\_LPC11C14 EVB Kit is a brand new, cost-effective but high-performance evaluation tool of the ARM Cortex-M0 based LPC11xx controller family from NXP, allowing you to create and test working programs for this advanced architecture. The board has UART Interface which support RS-485 and EIA-485 modes, 8 channel 10 bit ADC Converter, 2 16bit timer and 2 32bit timer, includes a wide range of interfaces such as SPI, I2C, integrates PMU(Power Manage Unit). It supports IO extensions, which is compatible with LPCXpresso Base Board, making it a great starting point for your next Cortex-M0 project. The onboard adapter: CoLinkEx support MDK and IAR, help you execute download and debug the project.

You can use the CoLinkEx\_LPC11C14 EVB Kit to generate and test application programs for the NXP LPC11xx microcontroller family. The example and source in the CD will help you quickly start project development and personal learning.

# **1.3 Hardware resources list**

### CoLinkEx\_LPC11C14 EVB Kit contains CoLinkEx and LPC11C14 board:



On board CoLinkEx	LPC11C14_Dev_Board
A mini-type USB socket, power supply	CAN Interface
and communicate with PC	
2mm*10pin Debug Interface, can debug	An Serial connection socket ( support RS-485
other devices	/ EIA-485)
a power supply LED	1 LED(P2.9)
3 CoLinkEx Status LED: D1~D3	Full function IO extension, support I2C, SPI,
	ADC

The suite contains the CoLinkEx\_LPC11C14 EVB Kit and the following issues:

#### MiniUSB Line

2mm\*10pin to DB9 serial line

Two 2.54mm Jumper cap

A CD and Publicity Color Pages

# **1.4 Software resources list**

Example Name	Function Description
Default factory program	LED4 Blink, UART Send data, I2C Read Temperature
	sensor
<u>Blinky</u>	LED4 Blink
UART_Print	UART Send data
Master_Transfer	Read data though I2C (Need to connect EEPROM)
WDT_Reset	Watchdog application example.

# 

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Simple_ADC	ADC Convert application example.
Capture	32-bits timer capture example
Printchar for NXP	Retarget printf to Serial output in CoIDE
<u>Semihosting</u>	Retarget printf to Semi hosting in CoIDE(Debug only)
CoOS_App_Framework	CoOS simple example for how to create task

# 2. CoLinkEx\_LPC11C14 EVB Kit Introduction

# 2.1 Board Interface Overview



ID	Description	ID	Description
BP1	CoLinkEx Reset Button	J6	GPIO IO Extension Interface
BP2	LPC11C14 Board Reset Button	J8	UART232 Serial Socket
D1	Red LED, CoLinkEx Error status	J9	CAN Interface
D2	Yellow LED, CoLinkEx Connection	JP1	CoLinkEx Update Pin
D3	Blue LED, CoLinkEx Busy status	JP2	LPC11C14board ISP Pin
D4	LPC11C14 Board LED	U6	LPC11C14x301FBD48
J1	CoLinkEx Micro-USB Interface	U7	RS232 Transceiver
J2	CoLinkEx SWD Interface	U8	Temperature Sensor (Though I2C)
J4	CoLinkEx Debug Interface, connect with LPC11C14	U9	CAN Controller

# 2.2 Jumpers settings

ID	Name	Default Settings	Note	
JP1	UPDATE	Open	Allow user to update the firmware of CoLinkEx	
			when this jumper is closed.	
JP2	ISP	Open	Allow user to download the code using ISP	
			software when this jumper is closed.	

# 2.3 SW/JTAG Debug Interface

CoLinkEx\_LPC11C14 EVB Kit use ARM standard 2mm\*10 pin SW/JTAG Interface. You can use this interface to debug other devices. See: <u>How to use CoLinkEx to debug</u> <u>other devices</u>. You can also use other adapter to debug the LPC11C14board, such as ULink2, J-Link.

# 2.4 UART

The Universal Asynchronous Receiver Transmitter features a 9-pin UART that can be used for communication and trace purposes. It offers an ideal channel for ISP downloading. Use the following line to connect the board and PC.



### 2.5 CAN

CAN Interface, use TJA1040 Controller, can connect through J9. It offers an ideal channel for ISP downloading, too.

# 2.6 Mini USB Port

A Mini USB AB interface supplies 5V voltage to the Board. CoLinkEx communicate with the PC through this port.

# 2.7 LM75 Temperature Sensor

A LM75 Temperature Sensor is connected to the I2C bus in CoLinkEx\_LPC11C14 EVB Kit.

# 2.8 LED

CoLinkEx+LPC11C14\_Dev Board provide LEDs D4, it respectively connect with PIO2.9 IO pins, and can be used for user output.

# 3. Getting Started

# **3.1 Version Information**

- Firmware: 0.4
- Driver: 1.2.0 (or 1.2.1)
- Software:
  - CoIDE 1.4.0 or higher
  - CoFlash 1.4.0 or higher
  - MDK 4.03(or higher) plus CoMDKPlugin1.4.0 or higher

# 3.2 Hardware Source Requirement

When you use CoLinkEx\_LPC11C14 EVB Kit, The PC is required to use the following sources:

- ✓ CPU: 2.0GHz (at least)
- ✓ Memory: 512M (at least)
- ✓ USB Interface: 1 (at least)
- ✓ Serial Line interface use COM1
- ✓ Operation System: Windows XP/Windows Vista/Win 7
- ✓ Software need: CoIDE, MDK, IAR(with <u>CoMDKPlugin</u>, CoIARPlugin)

# **3.3 Preparation**

- Install CoIDE or the corresponding Plugin
- Update the firmware and install the driver, <u>Refer to: CoLinkEx Installation and</u> <u>Use</u>
- Jumpers' setting: JP1, JP2 both OFF.
- USB Connection: Using USB cable, one end plugged into the Mini USB port on the board CoLinkEx (J1), the other end connected to PC.
- If serial communication is needed:

Serial Connection: Connect com of board and the COM of PC through serial port cable.

Serial Port Receive Settings: In the PC, run HyperTerminal serial communication program, select the serial port used and set the following parameters (to set status: Baud rate (115200), data bits (8 bits), stop bits (1 bit), parity bit (no ), data flow control (no)).

• If CAN Communication is needed:

Connect J9 (CAN Interface) with PC or other devices.

# 3.4 Use the default factory program

The board has load the following program by default. You can use it to test the hardware. You can also get the code through CooCox CoFlash.

- 1. Test Objective: The onboard hardware: Adapter, LPC11C14 chip, LED, UART and Temperature sensor can work normally.
- Test Hardware Resources: MiniUSB Line, 2mm\*10 pin to COM serial line, CoLinkEx\_LPC11C14 EVB (all included in the CoLinkEx\_LPC11C14 EVB Kit )
- 3. Test Prepareation: Connect the lines and set the HyperTerminal, you can refer to 3.3
- 4. procedure:
  - 1) Power on the board and press the Reset button.
  - 2) HyperTerminal will display "Welcome to use CooCox!" the tests begin.
  - 3) LED Blink Test: The board execute blinky test, D4 will light 5 times, means test OK. When the execute end, HyperTerminal will display "LED Blink Test OK!"
  - 4) UART Test: HyperTerminal will display "UART Print Test OK!"
  - 5) Temperature sensor and I2C Test: HyperTerminal will display the temperature value, and "I2C Temperature Sensor Test OK!" when the test ends.
  - 6) When the entire test ends, you will see "All test ended!" on the screen. If your board works normally, you will see the following lines on the HyperTerminal.



 If you need to reload the default factory program to the board, you can use CoFlash. <u>Refer to: How to use CoLinkEx in CoFlash</u>. Just load the "LPC11CxxTest.bin" to your board.

# 4. CoLinkEx Installation and Use

# 4.1 Installation

To install CoLinkEx, you need to do the following:

Update the firmware

Install the Driver of CoLinkEx

Connect CoLinkEx to PC

# 4.1.1 Update the firmware

If you are using CoMDKPlugin V1.4.0, CoIDE V1.4.0, or CoFlash V1.4.0, you need to update CoLinkEx driver and firmware before using CooCox CoLinkEx.

The firmware can be found in the disk: Tools\ColinkEx\_Driver\ColinkEx\_firmware\_v0.4.bin

How to update the firmware:

- 1) Short-circuit JP1.
- 2) Connect CoLinkEx to the PC.

Wait for the PC enumerates the removable disk whose label is "CRP2 ENABLD" or "CRP DISABLD". If it does not, you could press the reset button (BP1) for several times or power on again.



Delete the firmware.bin file in removable disk.



3) Copy the downloaded firmware: ColinkEx\_firmware\_v0.4.bin into the removable disk.



4) Disconnect JP1, power on again, then CoLinkEx will work normally.

# 

### 4.1.2 Install the Driver of CoLinkEx

You need to select the version of CoLinkExUSBDriver according to your Windows OS first.

1) If you're using the 32 bit windows system, for example:

Windows XP/Windows Vista 32bit/Windows 7 32bit.

Installation file: Tools\ColinkEx\_Driver\CoLinkExUsbDriver-1.1.0.exe

Do the operations shown in the following picture.



# 

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Setup - CooCox ColinkEx USB Driver		
Select Destination Location Where should CooCox ColinkEx USB Driver b	e installed?	
Setup will install CooCox ColinkEx U	SB Driver into the foll	owing folder.
To continue, click Next. If you would like to s	elect a different folde	er, dick Browse.
C:\Program Files\CooCox\CooCox ColinkEx U	JSB Driver	Browse
At least 18.8 MB of free disk space is require	d.	
	< Back	ext > N Cancel
		<u> </u>

etup - CooCox ColinkEx USB Drive	r	_
Ready to Install Setup is now ready to begin installing computer.	g CooCox ColinkEx USB Driver on your	6
Click Install to continue with the insta change any settings.	allation, or click Back if you want to review	v or
Destination location: C:\Program Files\CooCox\CooC	ox ColinkEx USB Driver	×
I.		<b>V</b>
	< Back [ Instal ]	Cance
	2 Pack Listall	Carice

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2) If you are using Windows Vista 64bit or Windows 7 64bit.

Installation file: Tools\ColinkEx\_Driver \ColinkExUsbDriver-1.1.1.exe

Please connect CoLinkEx to the computer before you start installing this driver.

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# 4.1.3 Connect CoLinkEx to PC

When you connect CoLinkEx to PC, it will ask you to install the driver to system for the new detected devices. Then you may need to specify the path for CoLinkEx Driver:



硬件更新向导
请选择您的搜索和安装选項。
<ul> <li>在这些位置上搜索最佳驱动程序(S)。</li> <li>使用下列的复选框限制或扩展默认搜索,包括本机路径和可移动媒体。会安装找 到的最佳驱动程序。</li> </ul>
<ul> <li>         「 搜索可移动媒体(软盘、CD-ROM)(M)              ✓ 在搜索中包括这个位置(0):</li></ul>
○ 不要搜索。我要自己选择要安装的驱动程序 (D)。 选择这个选项以便从列表中选择设备驱动程序。Windows 不能保证您所选择的驱动程序与您的硬件最匹配。

When you install the driver, in device manager, you will found CooCox(COM x) under Port and CooCox CoLinkEx Debug Interface under USB Controller.

If there "?" in front of the two devices, it means that the driver have not been installed to the system or install failed; if there isn't CooCox Port, it means that your CoLinkEx firmware and driver is old version.



# 4.2 Use CoLinkEx

Now CoLinkEx support CoIDE, CoFlash CoMDKPlugin. The following is the configuration to use CoLinkEx in this software.



#### 4.2.1 How to use CoLinkEx in CoIDE

1) After create CoIDE Project, click Debug Configuration button:



2) In "debug configuration" page, select CoLinkEx, and set other parameters.

🚺 Debug Configurations		<u>×</u>
Create, manage, and ru	n configurations	- A
type filter text C Cortex-M Applica C Test. configur Launch Group	Debugger     DownLoad      Hardware      Adapter     Nu-Link     ColinkEx     Nu-Link     NGX-USB-JTAG     Reset Mod picoJTAG     ST-Link     TargetIntAmontec-JTAGkey     Host Name-rocanost	▼ Port SWD ▼ ▼ CacheRomEnable Port Number: 2009
Filter matched 3 of 3 it	<b> </b>	Apply Reyert Close

3) In Download page, configure the flash algorithm.

🚺 Debug Configurations		×
Create, manage, and run o	configurations	Ť.
Eype filter text		
Filter matched 3 of 3 items		
		Close

4) After compile the project, click the download button to Download code to Flash

🚺 CooCox CoIDE					
File Edit View Project F	lash <u>D</u> ebug Se <u>a</u>	rch <u>H</u> elp			
] 📫 🗎 🔛 ] 🛗 📇   🕸	88 👱 🖉 🗍	▦ ᆝᄵᆞᆞᆝᅆ॒	• 😽 • 🏷	⇔ + +	
Device [ LPC11C14x301 ]	H Repository	.c main. c 🔀			- 8
ommon MO Cmsis Core oot Cmsis Boot eripheral. NXP CLPC11xx.h Csystem_LPC11 Csystem_LPC11 Extended for the system of the	1 wd Download 2 3 int main( 4 { 5 6 //aut 7 Blink 8 9 while 10 { 11 } 12 }	<pre>Code To Flash void) omatically added Exp(); (1)</pre>	l by CoIDE		×
📮 Console 🔀				🛃 🖻 • 📑 • 🗞	
Build					
BUILD SUCCESSFUL Total time: 1 second					•
]	Writable	Smart Insert	1 : 1	] 🔒 Sign in t	o CooCox



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5) Click Debug button to debug the program.





#### 4.2.1 How to use CoLinkEx in CoFlash

1) Open CoFlash, select LPC11C14x301 from NXP, CoLinkEx, and modify the related parameter if you need. You can refer to the following picture.

F CooCox Cortex Flash Programmer				
Config Command				
<ul> <li>NXP</li> <li>LPC1111x101</li> <li>LPC1111x201</li> <li>LPC1112x101</li> <li>LPC1112x201</li> <li>LPC1113x201</li> <li>LPC1113x301</li> <li>LPC1114x201</li> <li>LPC1114x301</li> <li>LPC11C12x301</li> <li>LPC1224x101</li> <li>LPC1225x301</li> <li>LPC1225x301</li> <li>LPC1225x301</li> <li>LPC1225x301</li> <li>LPC1227x301</li> <li>LPC1311</li> <li>LPC1312</li> </ul>	USB Adapter Setup Adapter: ColinkEx Port: SWD Microcontroller Info Vendor: NXP Device: LPC11C14x301 Flash Driver Description LPC11xx/122x/13xx IA	Ma R R Size 32K	ax Clock: 1MHz Reset: SYSRESETREQ AM Start: 0x10000000 Address Range 00000000H - 00008000H	
			Clos	•

2) Switch to Download page to execute Download, Erase, Verify, Blank Check, etc.

✓         Sector         Start Address         Size         C:\Program Files\CooCox\CoIDE\workspace           ✓         0         0x0000000         0x1000         Program With:         ✓         Auto Erase           ✓         1         0x00002000         0x1000         ✓         Auto Verify           ✓         2         0x00002000         0x1000         ✓         Auto Verify           ✓         2         0x00002000         0x1000         ✓         Auto Verify	,Te 🔁
☑         0         0x00000000         0x1000         Program With:         ☑ Auto Erase           ☑         1         0x00001000         0x1000         ✓         Auto Verify           ☑         2         0x00002000         0x1000         ✓           ☑         2         0x00002000         0x1000         ✓	
I         0×00001000         0×1000         Program With:         ✓ Auto Verify           Image: 2         0×00002000         0×1000         Image: 2         Image: 2 <t< td=""><td></td></t<>	
☑         2         0x00002000         0x1000         Image: Run After Program           ☑         2         0x00022000         0x1000         Image: Run After Program	
Sactor Official	
☑ 4 0x00004000 0x1000	
☑ 5 0x00005000 0x1000	
☑ 6 0x00006000 0x1000 Coperate	
▼ 7 0×00007000 0×1000	
Erase	
	eck
Verify Blank Ch	

.PC	11xx IAP (	32KB Flash		Data File
V	Sector	Start Address	Size	— C:\Program Files\CooCox\CoIDE\workspace\Te
2	0	0×00000000	0x1000	Auto Erase
$\checkmark$	1	0x00001000	0×1000	Program With: 🔽 Auto Verify
2	2	0x00002000	0×1000	Run After Program
$\checkmark$	3	0x00003000	0×1000	Sector Officet: Jour
$\checkmark$	4	0x00004000	0×1000	Sector on set. 10x0
2	5	0x00005000	0×1000	
$\checkmark$	6	0×00006000	0×1000	Coperate
$\checkmark$	7	0x00007000	0×1000	
				Program Erase  Verify Blank Check

LPC	11xx IAP 3	32KB Flash				
V	Sector	Start Address	Size	C:\Program Files(CooCox)CoDE(workspace) [e]		
$\mathbf{\nabla}$	0	0x00000000	0x1000	🔽 Auto Erase		
$\checkmark$	1	0×00001000	0×1000	Program With: 🔽 Auto Verify		
$\checkmark$	2	0x00002000	0x1000	Run After Program		
$\mathbf{\nabla}$	3	0x00003000	0x1000	Sector Officet: D.D		
$\square$	4	0x00004000	0x1000	Dector Onset. Juxu		
$\mathbf{\nabla}$	5	0x00005000	0x1000			
$\checkmark$	6	0x00006000	0x1000	_ Operate		
$\square$	7	0x00007000	0x1000			
				Program Frase Verify Blank Check		

			Data File
PCTTXXTAP	32KB Flash		
Sector	Start Address	Size	C:\Program Files\CooCox\CoIDE\workspace\Te
<b>I</b> 0	0×00000000	0×1000	Auto Erase
<b>7</b> 1	0×00001000	0×1000	Program With: 🔽 Auto Verify
<b>7</b> 2	0x00002000	0×1000	Run After Program
<b>7</b> 3	0x00003000	0×1000	Sector Offcety
<b>7</b> 4	0x00004000	0×1000	Dector Onset. [0x0
<b>7</b> 5	0×00005000	0x1000	
<b>7</b> 6	0x00006000	0×1000	_ Operate
7 7	0×00007000	0×1000	
			Program Erase
			Verify Blank Check



#### 4.2.2 How to use CoLinkEx in MDK

1) Open MDK Project, Click Target options 🔊 to configure the project:



2) "Debug -> Use", open the configuration dialog and selects "CooCox Debugger".

ence   meer   output   matting   o	an loton li		Terrer Indiades	
Use <u>S</u> imulator	Settings	🖲 Use: Cool	Cox Debugger	<ul> <li>Settings</li> </ul>
Limit Speed to Real-Time		Signi	um Systems JTAGjet ex-M/R J-LINK/J-Trace	
✓ Load Application at Startup  ✓ F Initialization File:	Run to main()	Load, ST-L ULIN Initializatic NUL	ink Debugger IK Pro Cortex Debugger ink Debugger oton Nu-Link M0 Debugge ox Debugger	o main() er
<ul> <li>Restore Debug Session Settings</li> <li>✓ Breakpoints</li> <li>✓ Toolbox</li> <li>✓ Watch Windows &amp; Performance Ar</li> <li>✓ Memory Display</li> </ul>	nalyzer	Restore ST-L SiLal Br, ST-L Holte Watch V	ink (Deprecated Versidn) os UDA Debugger ink Debugger sk e-Link32 Debugger windows Display	<b>_</b>
CPU DLL: Parameter:		Driver DLL:	Parameter:	
SARMCM3.DLL		SARMCM3.DL	L	
		Dialog DLL:	Parameter:	
Dialog DLL: Parameter:		the second se		

C	
COOLOX	CoLinkEx_LPC11C14 EVB Kit

3) Click "Settings", and then select the "CoLinkEx" as the adapter. You can also modify the Port, Max Clock for the adapter, Reset, Cache, Trace or Semihosting Options, etc.

5B Adapter			Reset Options Cache Options
Adapter:	ColinkEx	-	Reset: SYSRESETREQ  Cache Code
Port: Max Clock:	ColinkEx Colink Stellaris-ICDI JTAGkey	43	Trace Option Enable Trace Core Clock: 72,000000 MHz
	NGX-USB-JTAG Olimex openJTAG picoJTAG		Semihosting

4) Switch to Flash Download to set the flash options and the flash algorithm.

© Erase Full Chip	e Affected 🛛 🔿 Do not Era	se	Additional Option Run after Download Second Verify Download
ogramming Algorithm	Device Type	Device Size	Address Range



5) Then, if you debug your program in flash, you also have to configure "Utilities" by selecting "CooCox Debugger" for Flash Programming.

lmit Film	CooCox Debugger Signum Systems JTAGjet		Settings	Update ·	Target before Debuggin ธ.ส. 1	.g
init rile:	Cortex-M/R J-LINK/J-Trace ST-Link Debugger					
C Use Exter	ULINK Pro Cortex Debugger NULink Debugger					
Command	CooCox Debugger					
Arguments:	SiLabs UDA Debugger					
	Holtek e-Link32 Debugger	-				

6) You can use the example for CoLinkEx\_LPC11C14 EVB Kit directly. The project is included in the CoMDKPlugin. You can find it under the path: Keil\ARM\Boards\CooCox\LPC11xx\_Blinky+semihosting

Reil\ARM\Boards\CooCox\LPC11xx_Blinky+semihosting\LPC11xx_Blinky.uvproj - µVision4	_ 🗆 🗵
<u>File Edit View Project Flash Debug Peripherals Icols SVCS Window H</u> elp	
🗋 😂 🛃 🔌 🖎 🗢 🔛 🖛 🔶 🕸 務 務   導 導 推 版 🖄 💌 💌 🕵 🥙	• ර
\$# I ③ ③ P P P *	
Registers A X Disassembly	џ×
Register SH_DoCommand:	
Cate Cate Cox 0000000 C BEAB BKPT OX AB	
RO 0x000000FE E001 B 0x00000104	
1 - <u>R1</u> - <u>Dx00000100 2000</u> MOVS το.#0x00	
	▼ ×
R5 10 //automatically added by CoBuilder	
$\mathbf{R}_{6}$	
R9 13 while(1)	
	-
E Project Regi	
Command I UART #1	ąΧ
Load "D:\\Keil\\ARM\\Boards\\CooCox\\LPC11xx_BJ_ this msg from Semihosting	_
input a integer (ENTENR-trim) :	
	<b>_</b>
× I	Þ
ASSIGN BreakDisable BreakEnable BreakKill 🖟 Call Stack + Locals 🕎 UART #1 🔳 Memory 1	
CooCox Debugger ti	: 0.000

# 5. How to use CoLinkEx to debug other devices

If you want to use CoLinkEx to program/debug other devices, you can break off the kit and use CoLinkEx alone. It is recommended to do that to avoid the disturbance come from the LPC1114 part. Then you can use the J2 or J4 to connect other devices.

# 5.1 CoLinkEx Debug Pin Description:



J2 is compatible with the standard ARM 10 PIN SW/JTAG Interface. So if you have the 10pin(2mm) to 20pin(2.54mm) connector, you can use it to connect J2 to ARM 20-PIN Interface directly.

### 5.2 Standard 20-PIN SW/JTAG Interface:



### 5.3 Connection method used in SW Debug:

Pin Function	CoLinkEx J2	CoLinkEx J4	ARM 20-PIN SW Interface
VCC (Optional)	1	1	1
SWDIO	2	2	7
SWCLK	4	3	9
SWO (Optional)	6	4	13

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RESET	10	6	15
GND	3,5,9	8	4,6,20

Note:

- 1) If you don't use ColinkEx to supply voltage to target board, VCC can be not connected.
- 2) If you don't need to use SW Trace function, SWO can be not connected.

# **5.4 Connection method used in JTAG Debug:**

Pin Function	CoLinkEx J2	CoLinkEx J4	ARM 20-PIN JTAG Interface
VCC(Optional)	1	1	1
TMS	2	2	7
TCLK	4	3	9
TDO	6	4	13
TDI	8	5	5
RESET	10	6	15
GND	3,5,9	8	4,6,20

Note:

1) If you don't use CoLinkEx to supply voltage to target board, VCC can be not connected.



# 6. Examples

#### 6.1 Use CoIDE to develop a project



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			IOCON		LPC11xx I\C	) Configuration	Dr		configured as input or output		
			UART		LPC11xx Uni	iversal Asynchr	on		and can serve as an edge-		
			I2C		LPC11xx I20	] Driver			or level- sensitive interrupt request. It is able to set GPIO		
			SSP		LPC11xx Syr	nchronous Seria	al F		bits without affecting any		
			WDT		LPC11xx Wa	atchDog Timer D	Driv		other pins in a single write operation.		
			ADC		LPC11xx An	alog-to-Digital (	:o		llsage		
			TIMER		LPC11xx 16	-bit\32-bit Cour	ite 🗸		ISH - ODIO Markalarik		
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You can also go to our website for more information:

CoIDE Quick Start Guide: http://www.coocox.org/CoIDE/CoIDE\_QuickStart.htm

CoIDE Guide: http://www.coocox.org/CooCox\_CoIDE.htm

# 6.2 CoIDE Example Description

### 6.2.1 Blinky

The example shows how to use the LPC111x PIO API to drive a LED.

This example mainly uses the SYSCON and GPIO components. It enable GPIO block clock and set PIO2\_9 to be output and blinking. You can see the D4 Blinking when you load the project to board.

### 6.2.2 UART\_Print

A simple example shows how to use the UART to print a string.

It sends a "Hello, World!" to UART Interface. After using the Serial line to connect J8 to the DB9 COM on the computer, you can see the result in HyperTerminal.

The HyperTerminal's configuration must be:

Baud rate: 115200

Parity: NONE

Data bits: 8 bits

Stop bits: 1 bit

You can see "Hello, World!" in the HyperTerminal screen after you press the reset button BP2.

### 6.2.3 Master\_Transfer

This example describes how to configure I2C working in master mode, and Read/Write EEPROM using I2C bus. The example sends some data to EEPROM and then read back.

To use this example, you need to connect LPC11C14 board with an EEPROM: M24C64. Here is the recommended connection:

![](_page_34_Figure_2.jpeg)

### 6.2.4 WDT\_Reset

A simple WDT reset example, if TIM\_MatchConfigStruct. MatchValue is greater than 8, Watchdog reset will occur. (Component TMR should be checked). It has no phenomenon on board.

# 6.2.5 Simple\_ADC

A simple ADC example.

It use ADC Channel 5 to get data, users can select to printf the data through UART printf. (Need to set UART and retarget printf.)

### 6.2.6 Capture

A simple example to use TIMER capture function

Use PIO1\_5 as the TMR32B0 Capture pin, capture on CAPn.0 rising edge and falling edge, Generate capture interrupt. You can use printf to get the capture value in the interrupt function. (Need to set UART and retarget printf.)

# 6.2.7 Printchar for NXP

Retarget printf to UART of the LPC1100 and LPC11C00 series. If you want to use printf function in your code, you need to select the "Retarget Printf" component. And use the Printchar function to replace the one in Printf.c.

### 6.2.8 Semihosting

This example is a little different from others. If you want to use Semihosting function, you need to use the example. Then in your application, you can use printf function to print the code to Semihosting IP. You should enable the Semihosting function in debug configuration. Then in debug mode, Semihosting will work. It works only in Debug mode.

This example shows how to retarget printf to Semihosting output. It cannot be add directly. You need to copy the content of PrintChar to the PrintChar function in printf.c

It means that you need to use the following code in the example:

```
#include "semihosting.h"
```

### void PrintChar(char c)

{

- /\* Send a char like:
  - While (Transfer not completed);
  - Transmit a char;
- \*/
- SH\_SendChar(c);

}

To replace the following in printf.c:

```
void PrintChar(char c)
```

{

```
/* Send a char like:
```

While (Transfer not completed);

```
Transmit a char;
```

```
*/
```

}

### 6.2.9 CoOS\_App\_Framework

A simple example shows how to create task, init and start CoOS. This example cannot be automatically added to the application code.

To use this example, you must note the following issues:

CoOS is just an OS, to make it work on LPC11C14, you need to add CMSIS Boot code at least.

The example contains a main function, so you may need to delete the main.c or move the main function to that file.

The example is a simple example tells you how to create task, init and start CoOS. It shows no phenomenon on board. To get more CoOS Applications for that board, you can go to: <u>http://www.coocox.org/CoOS.htm</u>

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