

ARM[®] Cortex[®]-M
32-bit Microcontroller

NuMicro[™] Family
NU-DIP-MINI
User Manual

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Table of Contents

1	OVERVIEW	3
2	NU-DIP-MINI介绍	4
2.1	MINI58FDE Microcontroller	4
2.1.1	USB Power	4
2.1.2	SWD ICE I/F	4
2.1.3	LEDs	5
2.1.4	Reset Button	5
2.1.5	Extension Header	5
3	设定开发环境.....	7
3.1	安装Keil μ Vision® IDE	7
3.2	安装Nu-Link驱动程序.....	7
3.3	安装MINI58 BSP	8
3.4	使用ISP刻录	8
3.4.1	硬件连接.....	8
3.4.2	NuMicro ISP Programming Tool.....	9
4	执行范例程序.....	10
4.1	硬件连接.....	10
4.2	执行项目	11
5	NU-DIP-MINI线路图	12
6	REVISION HISTORY	13

1 OVERVIEW

Nu-DIP-Mini是一款低成本、易用、轻巧的核心转接板，尺寸仅有2.6cm X 1.7cm，完整提供开发所需要的组件，包含两颗LED与USB电源，与标准DIP 8051脚位兼容，可轻易地将系统由8位升级为32位，搭配新唐所提供的BSP包，让使用者能快速进行应用开发。

- MINI58FDE cortex-M0 处理器，主频频率 50MHZ，32KB Flash，4KB SRAM
- 尺寸 2.6cm X 1.7cm，大小与脚位间距与 DIP 包装的 8051 完全相同，可直接替换现有 DIP 8051，将系统由 8 位升级为 32 位
- 直接使用 USB 供电
- 内建两颗使用者自定义的 LED 及一个重置按钮
- 双列排针引出所有 I/O 脚位
- 包含 ICE 接口可连接 Nu-Link 进行刻录及除错
- 内建 ISP，仅需透过 UART 即可升级程序



Figure 1-1 Nu-DIP-Mini

2 NU-DIP-MINI介绍

Figure 2-1 为 NU-DIP-MINI硬件组成，所有组件皆环绕着MINI58FDE设计，可直接使用USB供电，包含最低系统执行所需的组件，减少开发者周边电路的连接。

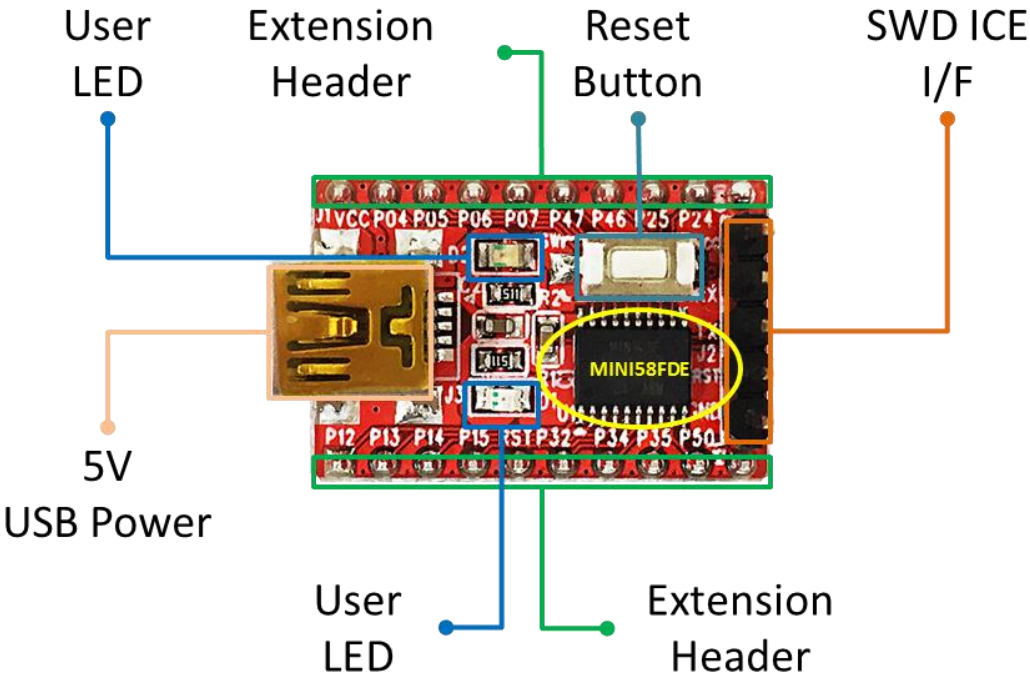


Figure 2-1 Nu-DIP-Mini硬件组成

2.1 MINI58FDE Microcontroller

NU-DIP-MINI核心转接板使用MINI58FDE芯片，系统频率可达50MHz，带有32K Flash及4KB RAM，周边包含4个ADC通道、1组SPI、2组UART及2组I2C，具有工业规格的操作温度-40℃~ + 105℃与宽电压2.5V~5.5V等优越性能，更多信息请参考MINI58FDE数据手册。

2.1.1 USB Power

- J3: Nu-DIP-Mini 的 mini USB 接口，使用 USB 提供系统所需的 5V 电源。

2.1.2 SWD ICE I/F

- J2: ICE 接口，用来连接 Nu-Link 进行烧录或除错，脚位定义见 Table 2-1。

J2	
Pin Number	Pin Name
1	VCC
2	ICEDAT

3	ICECLK
4	RESET#
5	GND

Table 2-1 SWD ICE I/F

2.1.3 LEDs

- D1: 黄色 LED 预留给使用者定义, 连接至 P4.6。
- D2: 绿色 LED 预留给使用者定义, 连接至 P4.7。

2.1.4 Reset Button

- SW: Nu-DIP-Mini 重置按钮

2.1.5 Extension Header

- DIP-20: 引出所有 MINI58FDE 脚位, 详细请 Table 3, 各脚位其他功能请见 Figure 2-2。

DIP-20			
Pin Number	Pin Name	Pin Number	Pin Name
1	P1.2	11	VCC
2	P1.3	12	P0.4
3	P1.4	13	P0.5
4	P1.5	14	P0.6
5	RST	15	P0.7
6	P3.2	16	P4.7
7	P3.4	17	P4.6
8	P3.5	18	P2.5
9	P5.1	19	P2.4
10	P5.0	20	GND

Table 2-2 DIP-20

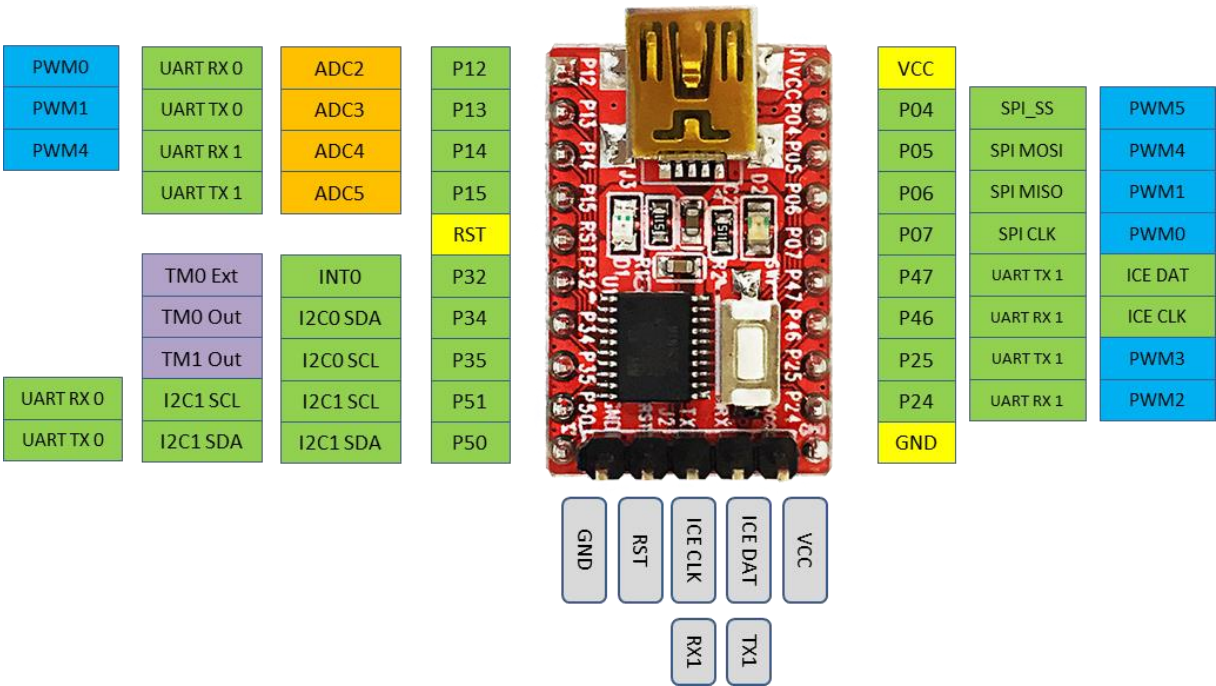


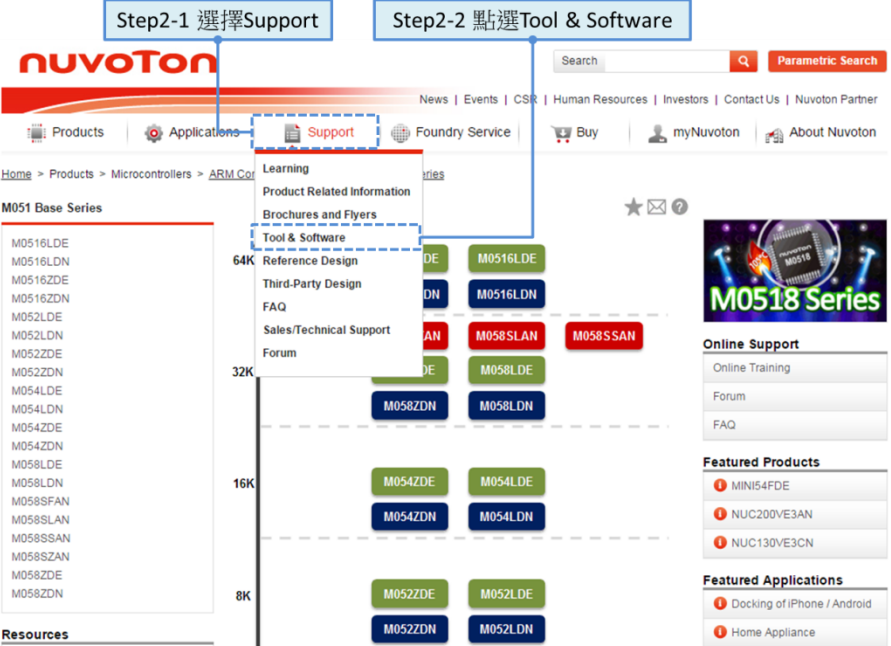
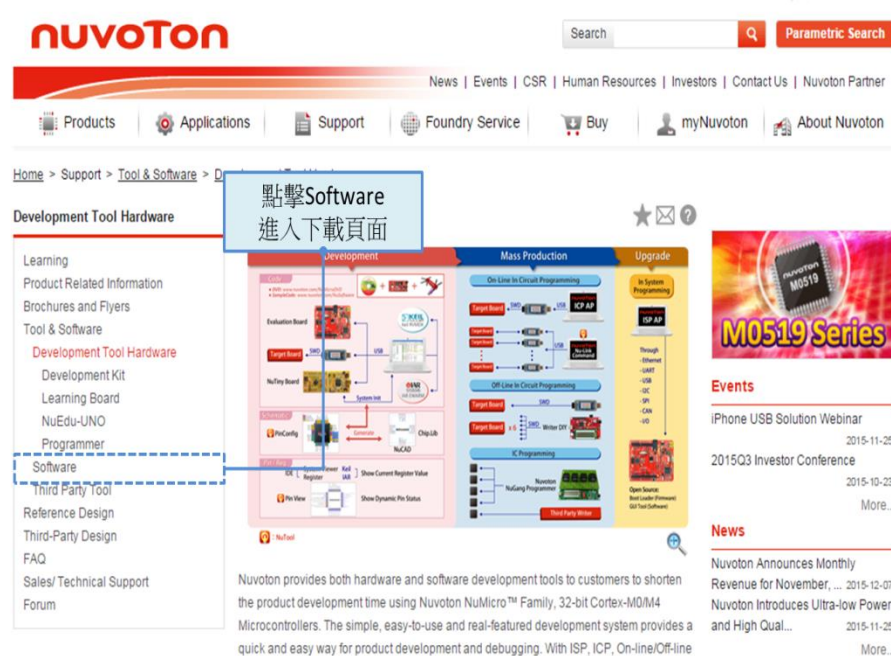
Figure 2-2 Nu-DIP-Mini 各功能脚位

3 设定开发环境

3.1 安装Keil μ Vision® IDE

请至Keil官方网站(<http://www.keil.com>)下载Keil μ Vision® IDE并安装。

3.2 安装Nu-Link驱动程序

Step1	开启新唐网站(http://www.nuvoton.com)
Step2	 <p>Step2-1 選擇Support</p> <p>Step2-2 點選Tool & Software</p>
Step3	 <p>點擊Software 進入下載頁面</p>

Programmer Software Tools Package

File name	Description	Version	Date
ICP Programming Tool V1.30.6491.zip Revision History	NuMicro ICP tool & user manual	V1.30.6491	2015-8-24
ISP Programming Tool V1.47.zip Revision History	NuMicro ISP Programming Tool & user manual	V1.47	2015-7-28
NuGang Programmer V7.02.zip Revision History	NuGang Programmer software & user manual	V7.02	2015-11-27

Nu-Link Driver

點選開始下載檔案

File name	Description	Version	Date
Nu-Link Driver for Keil RVMDK V1.30.6491.zip Revision History	This driver is to support Nu-Link to work under Keil RVMDK Development Environment for all NuMicro Family Devices.	V1.30.6491	2015-8-10
Nu-Link Driver for IAR EWARM V1.30.6491.zip Revision History	This driver is to support Nu-Link to work under IAR EWARM Development Environment for all NuMicro Family Devices.	V1.30.6491	2015-8-10

NuTool

File name	Description	Version	Date
NuTool-PinConfig_Rev.1.05	PinConfigure is used to configure GPIO multi-functions of Nuvoton MCU families.	V1.05	2015-7-30

Step4

Step5

下载“Nu-Link Driver for Keil RVMDK”档案，下载完成后，解压缩文件案并执行“Nu-Link_Keil_Driver.exe”，依指示安装Nu-Link驱动程序。

3.3 安裝MINI58 BSP

請至新唐官方網站(<http://www.nuvoton.com>)，下載MINI58 BSP並安裝。

3.4 使用ISP刻錄

以下章節示范如何使用UART ISP對Nu-DIP-MINI進行刻錄。

3.4.1 硬件連接

如Figure 3-1 連接Nu-DIP-Mini VCC(5V)、TX、RX、GND到計算機UART。

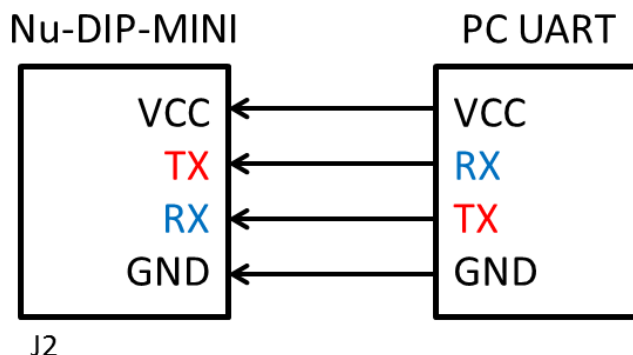


Figure 3-1 ISP连接示意图

3.4.2 NuMicro ISP Programming Tool

- 启动 NuMicro ISP Programming Tool
- 选择 Connection type 为 COM 后选择 COM port 号码, 如 Figure 3-2 ISP 刻录步骤方框 2。
- 点选 connect, 如 Figure 3-2 方框 3。
- 按下 Nu-DIP-MINI 上的重置按钮
- 确定连接后, 选择要更新的 APROM FW 档案, 如 Figure 3-2 方框 4。
- 选择 Program 的区域为 APROM, 如 Figure 3-2 方框 5。
- 点选 Start, 如 Figure 3-2 方框 6。

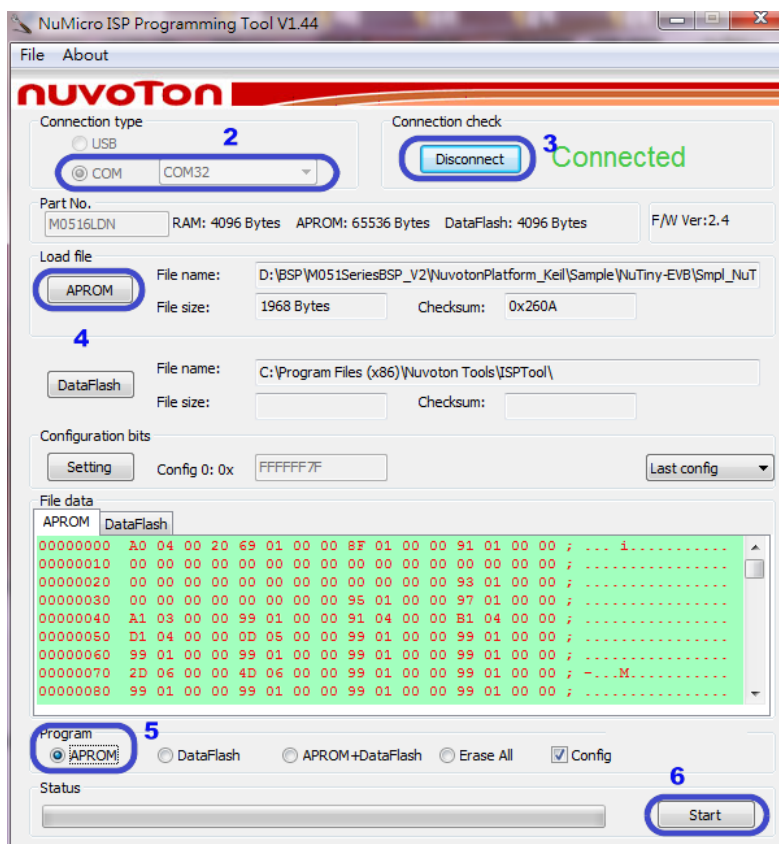


Figure 3-2 ISP刻录步骤

4 执行范例程序

此章节以NU-DIP-MINI BSP中的DancingLED为例，示范如何使用Keil μ Vision® IDE来执行范例程序。※范例程序路径Nuvoton_NU_DIP_MINI_BSP\SampleCode\NU-DIP-MINI。

4.1 硬件连接

依Figure 4-1 DancingLED硬件接线示意图，将Nu-DIP-MINI的P0.4-P0.7连接至面包版上的LED，并将NU-DIP-MINI J2与Nu-Link连接，如Figure 4-2 Nu-Link连接示意图所示。

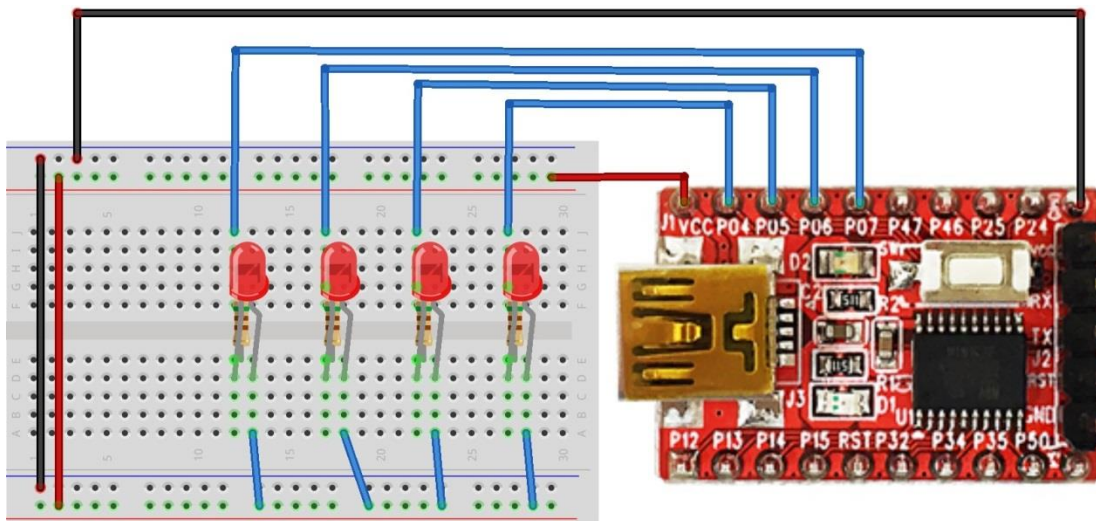


Figure 4-1 DancingLED硬件接线示意图

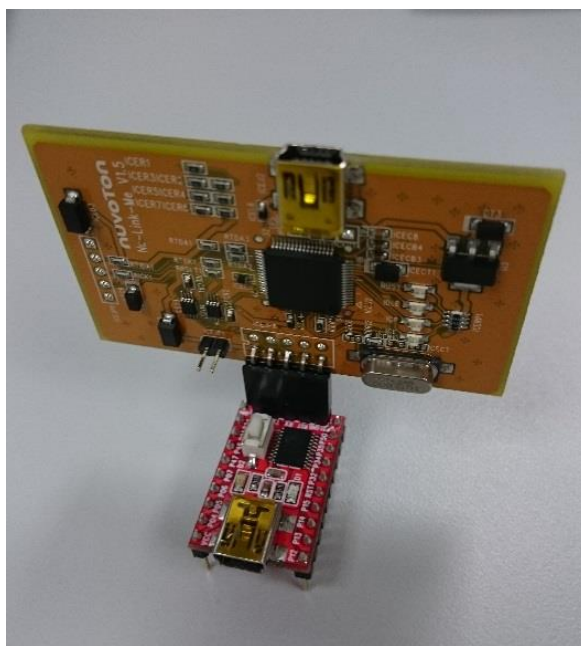


Figure 4-2 Nu-Link连接示意图

4.2 执行项目

开启DancingLED项目，项目路径如Figure 4-3所示。执行DancingLED范例后，可以看到面包版上的LED不停由右到左并由右至左不停的变动。

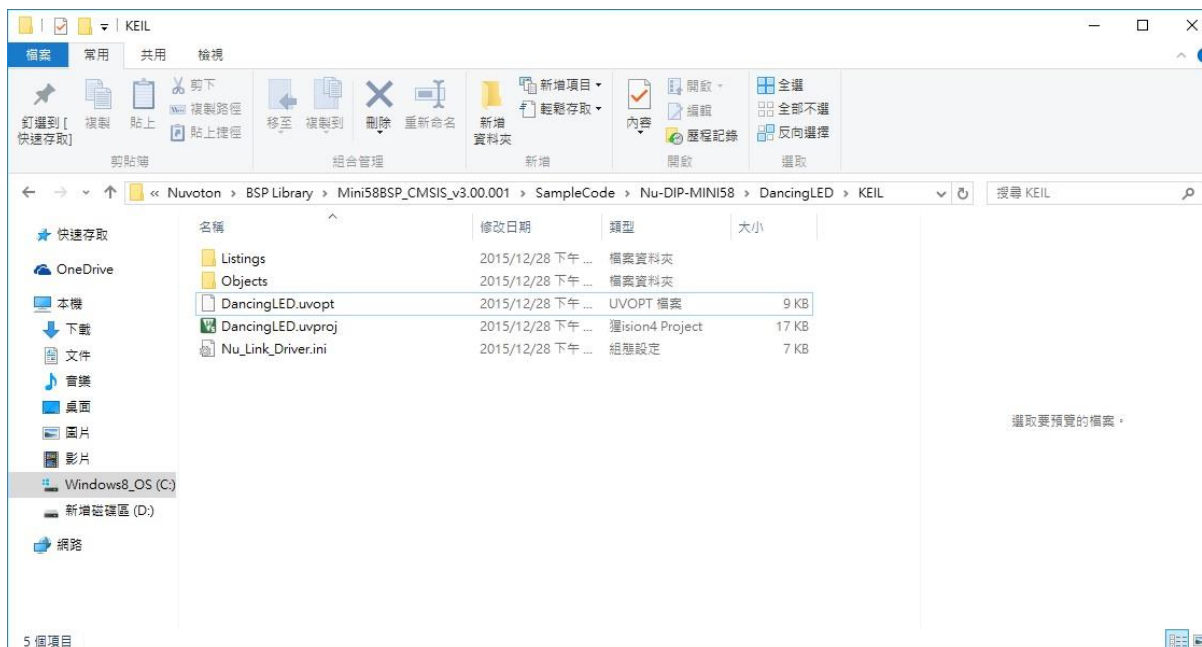








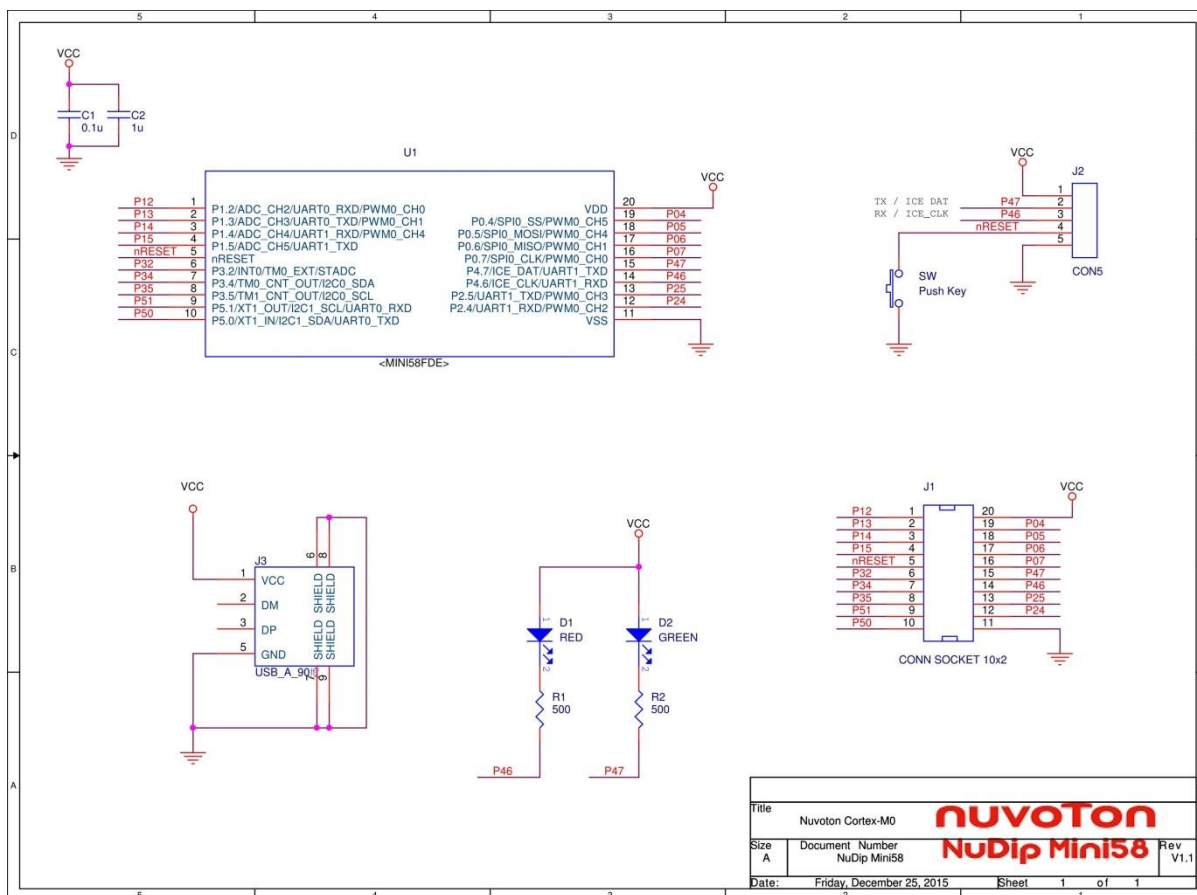


Figure 4-3 范例DancingLED路径

-  **Start µVision®**
- **Project-Open**
Open the DancingLED.uvproj project file
-  **Project - Build**
Compile and link the DancingLED application
-  **Flash – Download**
Program the application code into on-chip Flash ROM
-  **Start debug mode**
Using the debugger commands, you may:
 - ◆  Review variables in the watch window
 - ◆  Single step through code
 - ◆  Reset the device
 - ◆  Run the application

5 NU-DIP-MINI线路图



6 REVISION HISTORY

Date	Revision	Description
2015.12.28	1.00	1. Initially issued.

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