ARM® Cortex®-M
32-bit Microcontroller

NuMicro® Family
NT-NM1530
User Manual

For additional information or questions, please contact: Nuvoton Technology Corporation.

www.nuvoton.com

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1 OVERVIEW

NuTiny-EVB-NM1530(NT-NM1530) is the specific development tool for NuMicro® NM1530 series. Users can use NuTiny-EVB-NM1530 to develop and verify the application program easily.

The ARM® Cortex®-M0 core within NuMicro® NM1530 series can run up to 50 MHz and supports a variety of industrial control and applications which need high CPU performance. The NuMicro® NM1530 Series provides 128K/64K/32 bytes embedded flash, 4 Kbytes data flash, 8 Kbytes flash for the ISP, and 16K/8K/4K bytes embedded SRAM. This MCU includes advanced PWM function, MDU (Motor Drive Unit), QEI (Quadrature Encoder Interface) and ECAP (Enhance Input Capture Timer) which are specially designed for motor driving application. It is also equipped with plenty of peripheral devices, such as Timers, Watchdog Timer, UART, SPI, I2C, PWM Timer, GPIO, 12-bit ADC, Low Voltage Detector and Brown-out detector. These useful functions make the NuMicro® NM1530 Series powerful for a wide range of applications.

In addition, the NuMicro® NM1530 Series is equipped with ISP (In-System Programming), ICP (In-Circuit Programming) functions and IAP (In-Application Programming) which allow user to update the program memory without removing the chip from the actual end product.

2 NUTINY-EVB-NM1530 INTRODUCTION

NuTiny-EVB-NM1530 uses the NM1530 as the target microcontroller. Figure 2-1 is NuTiny-EVB-NM1530 for NM1530 series, the left portion is called NuTiny-EVB-NM1530 and the right portion is Debug Adaptor called Nu-Link-Me.

NuTiny-EVB-NM1530 is similar to other development boards. Users can use it to develop and verify applications to emulate the real behavior. The on board chip covers NM1530 series features. The NuTiny-EVB-NM1530 can be a real system controller to design users' target systems.

Nu-Link-Me is a Debug Adaptor. The Nu-Link-Me Debug Adaptor connects your PC's USB port to your target system (via Serial Wired Debug Port) and allows you to program and debug embedded programs on the target hardware. To use Nu-Link-Me Debug adaptor with IAR or Keil, please refer to "Nuvoton NuMicro® IAR ICE driver user manual "or Nuvoton NuMicro® Keil ICE driver user manual" in detail. These two documents will be stored in the local hard disk when the user installs each driver.

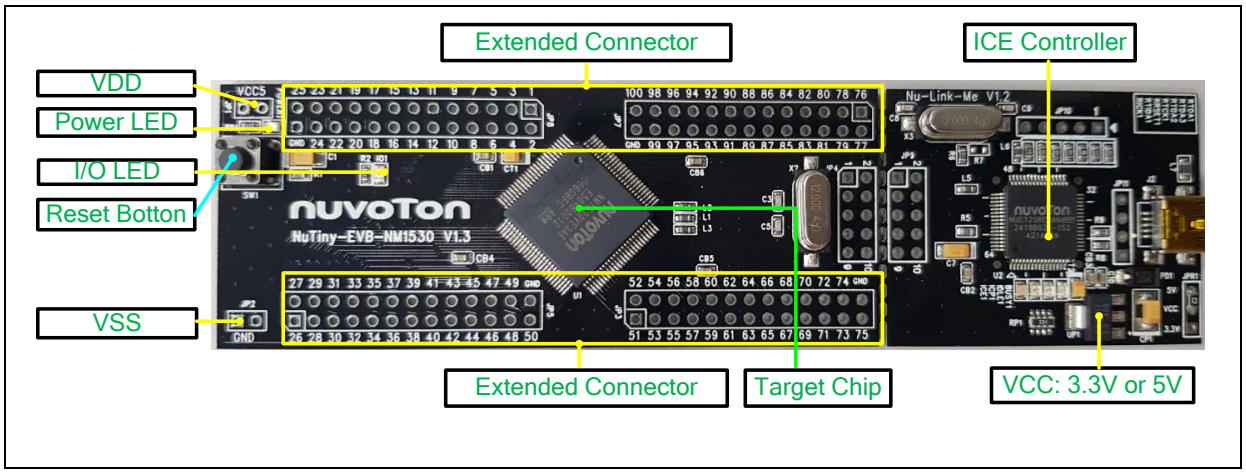


Figure 2-1 NuTiny-EVB-NM1530 (PCB Board)

2.1 NuTiny -EVB-NM1530 Jumper Description

2.1.1 Power Setting

- J3: USB port in Nu-Link-Me
- JP15: VDD Voltage connecter in NuTiny-EVB-NM1530

Model	JPR2	J3 USB port	JP15 VDD	MCU Voltage
Model 1	Select VCC33 (default)	Connect to PC	DC 3.3V output	DC 3.3V
Model 2	X	X	DC 2.5 V ~ 5.5 V Input	Voltage by J2 input

X: Unused.

2.1.2 Debug Connector

- JP6: Connector in target board (NuTiny-EVB-NM1530) for connecting with Nuvoton ICE adaptor (Nu-Link-Me V1.2)
- JP13: Connector in ICE adaptor (Nu-Link-Me V1.2) for connecting with a target board (for example NuTiny-EVB-NM1530)

2.1.3 USB Connector

- J1: Mini USB Connector in Nu-Link-Me V1.2 connected to a PC USB port

2.1.4 Extended Connector

- JP17, JP18,JP19,JP20: Show all chip pins in NuTiny-EVB-NM1530

2.1.5 Reset Button

- SW2: Reset button in NuTiny-EVB-NM1530

2.1.6 Power Connector

- JP15: VDD connector in NuTiny-EVB-NM1530
- JP16: VSS connector in NuTiny-EVB-NM1530

2.2 Pin Assignment for Extended Connector

NuTiny-EVB-NM1530 provides NM1234D on board and the extended connector for (**JP17, JP18,JP19,JP20**) for LQFP100-pin. Table 2-1 is the pin assignment for NM1530.

Pin No	Pin Name
01	PVSS
02	P9.7/SS1
03	P3.7/CANTX
04	P3.6/CANRX
05	P3.5/T1/I2CSCL
06	P3.4/T0/I2CSDA
07	P3.2/INT0
08	P1.7/BKP10
09	LDO_CAP
10	VDD
11	VSS
12	PA.1/RX1/I2CSCL
13	PA.0/TX1/I2CSDA
14	P5.7/PWM21
15	P5.6/PWM20
16	P1.6/BKP00
17	P1.5/PWM15
18	P1.4/PWM14
19	P1.3/PWM13
20	P1.2/PWM12
21	P4.4/QEIA1
22	P4.5/QEIB1
23	P4.0/IC10
24	P4.1/IC11
25	P4.2/IC12
26	P4.3
27	P3.3/INT1
28	P4.6/T2/IDX1
29	P1.1/PWM11
30	P1.0/PWM10

31	P3.0/RX0/CLKO
32	P3.1/TX0/CPO0
33	P4.7/T3
34	VDD
35	VSS
36	P5.0/MOSI0/RTS0/I2CSCL
37	P5.1/MISO0/CTS0/I2CSDA
38	P2.7/SPI_CLK0/RTS1
39	P2.6/IDX0/SS0/CTS1
40	P2.5/QEIB0/CANTX
41	P2.4/QEIA0/CANRX
42	P0.7/STADC
43	P0.6/BKP01
44	P0.5/PWM05
45	P0.4/PWM04
46	P2.3/IC00
47	P2.2/IC01
48	P2.1/IC02
49	P2.0/MOSI2/CPO2
50	P5.2/MISO2/CPO1
51	P5.3/SPI_CLK2
52	P5.4/SS2
53	P5.5/CLKO
54	P0.3/PWM03/STADC
55	P0.2/PWM02/IC12
56	P0.1/PWM01/IC11
57	P0.0/PWM00/IC10
58	P8.7/CPO0
59	P8.6
60	VSS
61	VDD
62	P6.7/AINA7
63	P6.6/AINA6
64	P6.5/AINA5/CPP1

65	P6.4/AINA4/CPN1
66	P6.3/AINA3
67	P6.2/AINA2
68	P6.1/AINA1
69	P6.0/AINA0
70	P8.2/OPO0
71	P8.1/OPN0
72	P8.0/OPP0
73	AVSS
74	AVDD
75	VREF
76	P7.7/AINB7
77	P7.6/AINB6
78	P7.5/AINB5/CPP2
79	P7.4/AINB4/CPN2
80	P7.3/AINB3
81	P7.2/AINB2
82	P7.1/AINB1
83	P7.0/AINB0
84	P8.4/CPP0
85	P8.3/CPN0
86	P9.0/OPO1
87	P9.1/OPN1
88	P9.2/OPP1
89	VDD
90	VSS
91	P8.5
92	P9.3/BKP11
93	/RESET
94	XT1_Out
95	XT1_In
96	ICE_DAT
97	ICE_CLK
98	P9.4/SPI_CLK1

99	P9.5/MISO1
100	P9.6/MOSI1

Table 2-1 Pin Assignment for NM1530

3 HOW TO START NUTINY-EVB-NM1530 ON THE KEIL MVISION® IDE

3.1 Keil uVision® IDE Software Download and Install

Please visit the Keil company website (http://www.keil.com) to download the Keil µVision® IDE and install the RVMDK

3.2 Nuvoton Nu-Link Driver Download and Install

Please visit the Nuvoton company NuMicro® website (http://www.nuvoton.com/NuMicro) to download "NuMicro® Keil µVision® IDE driver" file. When the Nu-Link driver has been well downloaded, please unzip the file and execute the "Nu-Link_Keil_Driver.exe" to install the driver.

3.3 Hardware Setup

The hardware setup is shown as Figure 3-1.

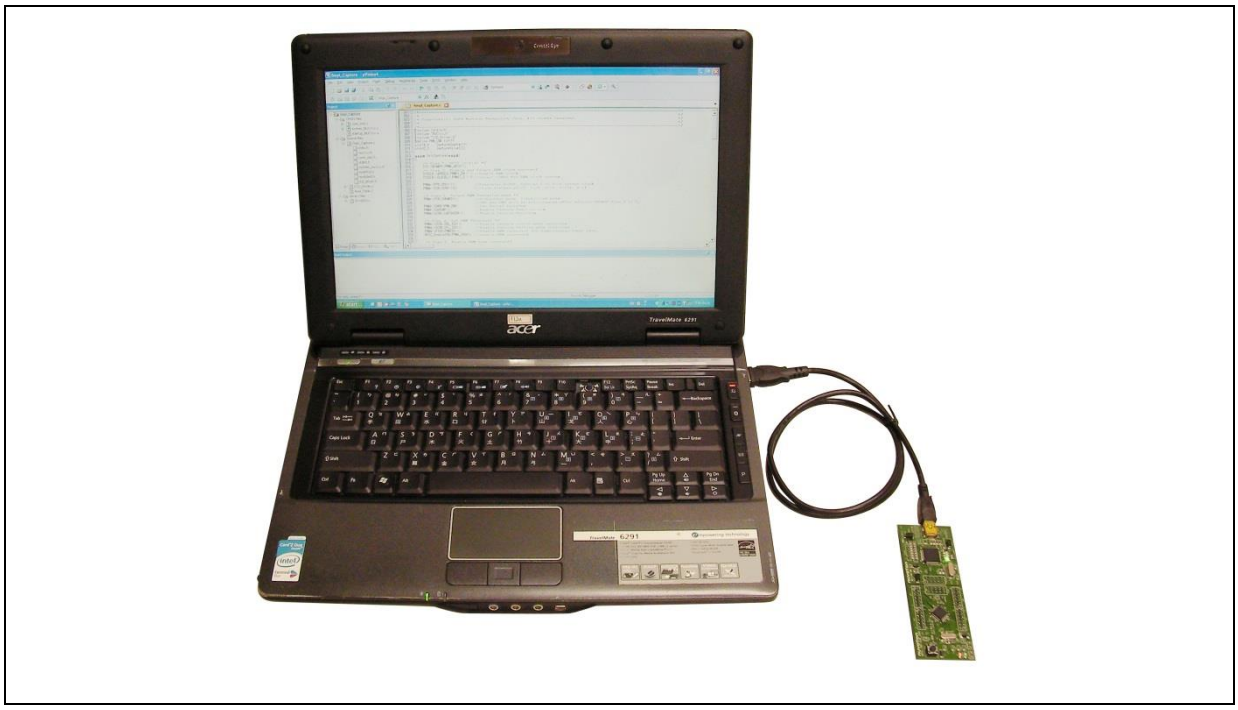


Figure 3-1 NuTiny-EVB-NM1530 Hardware Setup

3.4 Example Program

This example demonstrates the ease of downloading and debugging an application on a NuTiny-EVB-NM1530 board. It can be found on Figure 3-2 list directory and downloaded from Nuvoton NuMicro® website.

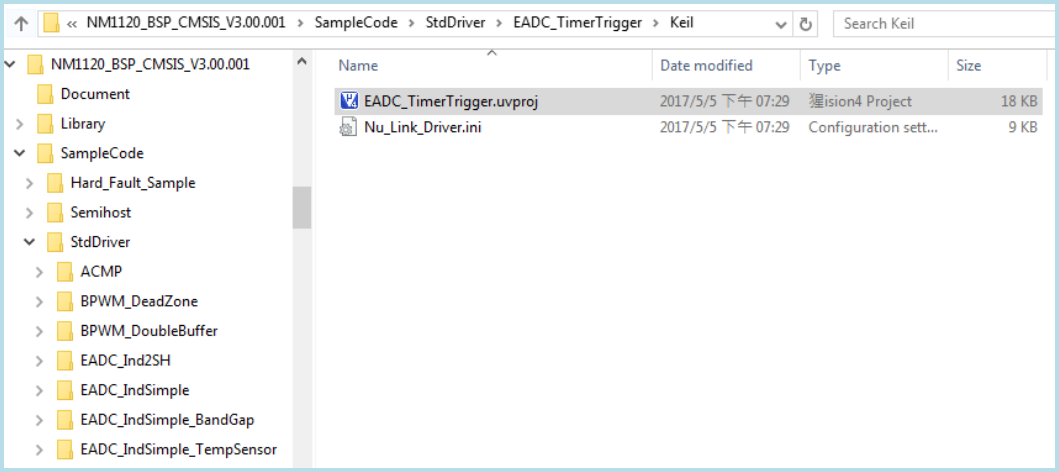
Directory	C:\ Nuvoton\BSP Library\NM1530BSP\SampleCode \StdDriver\SYS\KEIL
Project File	

Figure 3-2 Example Directory

This sample code will show some functions about system manager controller and clock controller.

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

4 HOW TO START NUTINY -EVB-NM1530 ON THE IAR EMBEDDED WORKBENCH

4.1 IAR Embedded Workbench Software Download and Install

Please connect to IAR company website (http://www.iar.com) to download the IAR Embedded Workbench and install the EWARM.

4.2 Nuvoton Nu-Link Driver Download and Install

Please visit the Nuvoton company NuMicro® website (http://www.nuvoton.com/NuMicro) to download the "NuMicro® IAR EWARM Driver" file. When the Nu-Link driver has been well downloaded, please unzip the file and execute the "Nu-Link_Keil_Driver.exe" to install the driver.

4.3 Hardware Setup

The hardware setup is shown as Figure 4-1.

Figure 4-1 NuTiny-EVB-NM1530 Hardware Setup

4.4 Example Program

This example demonstrates the ease of downloading and debugging an application on a NuTiny-EVB-NM1530 board. It can be found on Figure 4-2 list directory and downloaded from Nuvoton NuMicro® website.

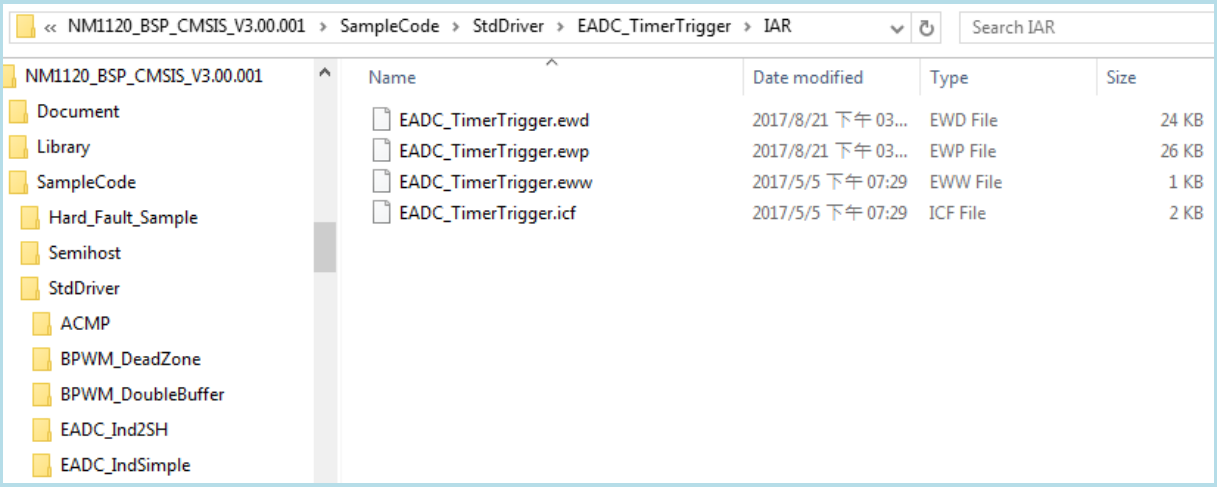
Directory	C:\ Nuvoton\BSP Library\NM1530BSP\SampleCode \StdDriver\SYS\IAR
Project File	

Figure 4-2 Example Directory

This sample code will show some functions about system manager controller and clock controller.

- Start IAR Embedded Workbench
- File-Open-Workspace
  Open the SYS.eww workspace file
- Project - Make
  Compile and link the SYS application
- Project – Download and Debug
  Program the application code into on-chip Flash ROM
  - Single step through code
  - Reset the device
  - Run the application

5 NUTINY-EVB-NM1530 SCHEMATIC

5.1 NuTiny-EVB-NM1530 PCB Placemen (TOP)

Users can refer to Figure 5-1 for the NuTiny-EVB-NM1530 PCB placements.

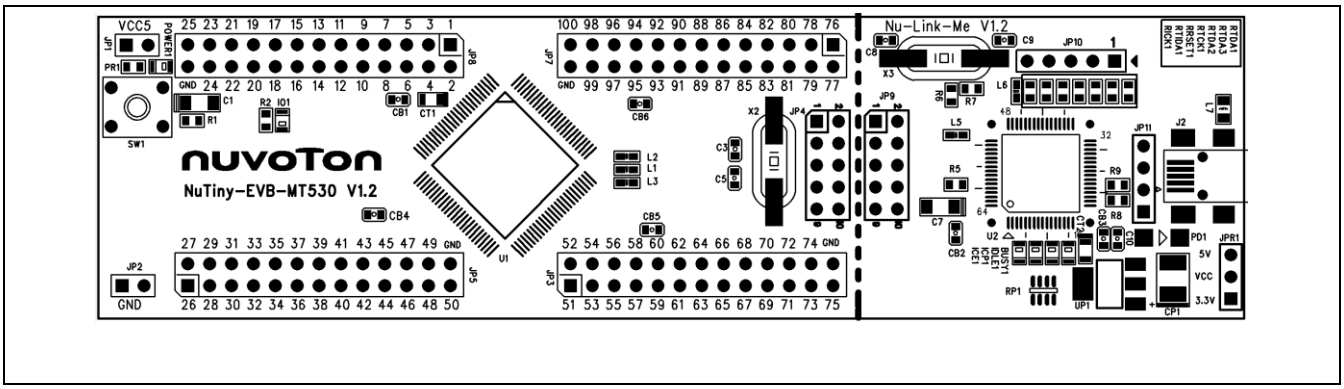


Figure 5-1 NuTiny-EVB-NM1530 PCB Placement

5.2 NuTiny-EVB-NM1530 PCB Placemen (Bottom)

Users can refer to Figure 5-1 for the NuTiny-EVB-NM1530 PCB placements.

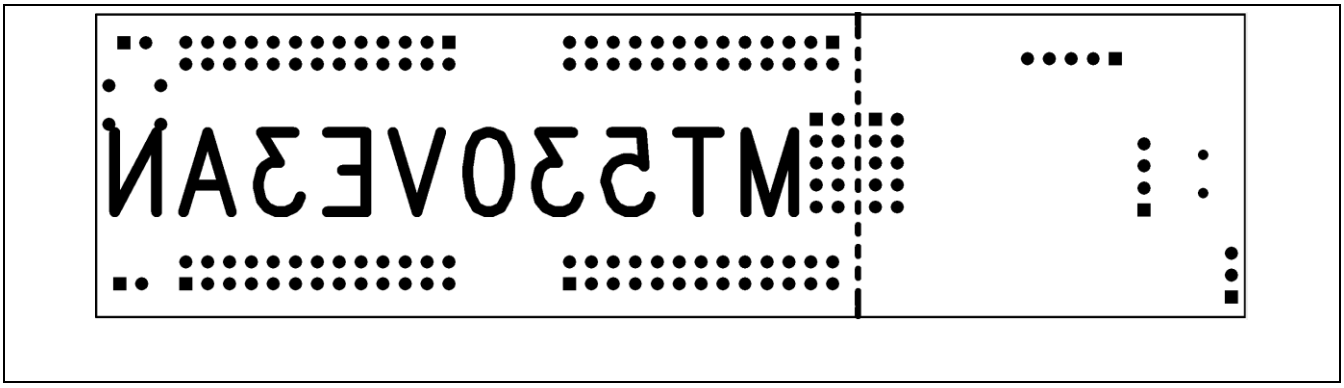
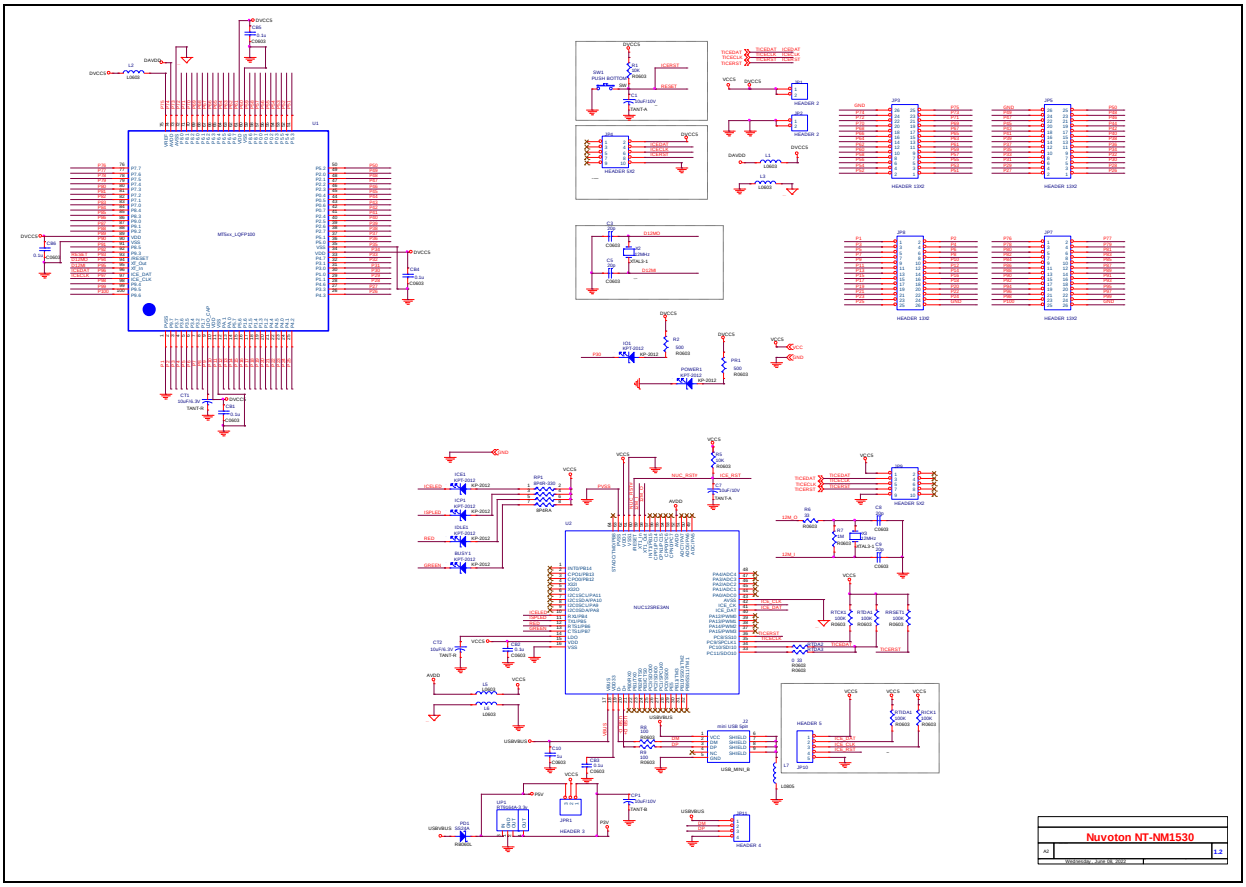


Figure 5-2 NuTiny-EVB-NM1530 PCB Placement

5.3 NuTiny-EVB-NM1530 Schematic



6 REVISION HISTORY

Date	Revision	Description
2022.05.26	1.00	1. Initially issued.

Important Notice

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