SN34F280 Series

QUICK START

SN34F289
SN34F288
SN34F287
SN34F285
SN34F2852

SONiX 32-Bit Cortex-M4F Micro-Controller

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AMENDMENT HISTORY

Version	Date	Description
1.0	2023/10/02	1. First version.
1.1	2023/11/28	1. Update SN34F280 Starter-kit Board description.
1.2	2024/04/25	1. Add SN34F2852 2. Update 2 Setup 3. Update 3.1.7.4 Add SN_LINK_Lite description

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1 OVERVIEW

此檔案目的在於讓使用者熟悉 SONiX SN34F280 系列 MCU 之 Quick Start Development Package 及 Keil MDK-ARM 相關設定。

1.1 SN34F280 QUICK START DEVELOPMENT PACKAGE

SN342F280 系列 MCU 之 Quick Start Development Package 包含

H/W

1. SN34F280 Starter Kit Board

S/W

1. SN34F280 SDK Files
2. SN34F280 Flash Algorithm file
3. SN34F280 FW Library
4. SN34F280 Tool Installer

1.2 KEIL MDK-ARM

The MDK-ARM is a complete software development environment for Cortex™-M，Cortex-R4，ARM7™ and ARM9™ processor-based devices. MDK-ARM is specifically designed for microcontroller applications，it is easy to learn and use，yet powerful enough for the most demanding embedded applications.

- Complete support for Cortex-M，Cortex-R4，ARM7，and ARM9 devices
- Industry-leading ARM C/C++ Compilation Toolchain
- µVision4 IDE，debugger，and simulation environment
- Keil RTX deterministic，small footprint real-time operating system (with source code)
- TCP/IP Networking Suite offers multiple protocols and various applications
- USB Device and USB Host stacks are provided with standard driver classes
- Complete GUI Library for embedded systems with graphical user interfaces
- ULINK*pro* enables on-the-fly analysis of running applications and records every executed Cortex-M instruction
- Complete Code Coverage information about your program's execution
- Execution Profiler and Performance Analyzer enable program optimization
- Numerous example projects help you quickly become familiar with MDK-ARM's powerful，built-in features
- CMSIS Cortex Microcontroller Software Interface Standard compliant

MDK-ARM is available in 4 editions: MDK-Lite，MDK-Basic，MDK-Standard，and MDK-Professional.

All editions provide a complete C/C++ development environment and MDK-Professional includes extensive middleware libraries. Refer to the Product Selector for more details.

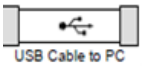
For MDK Version 5 additional software components and support for microcontroller devices is provided by Software Packs. DFP (Device Family Pack) indicates that a Software Pack contains support for microcontroller devices.

✷ Note: 1. MDK-Lite (32KB) Edition is available for download. It does not require a serial number or license key.
2. Please refer to 3.1 Build a New Project step3 to download SONiX 32-bit M4 MCU DFP from Pack Installer of Keil MDK V5.X

詳細介紹及下載請至 **http://www.keil.com/arm/mdk.asp**

2 SETUP

SONiX 32-bit MCU Starter-Kit.

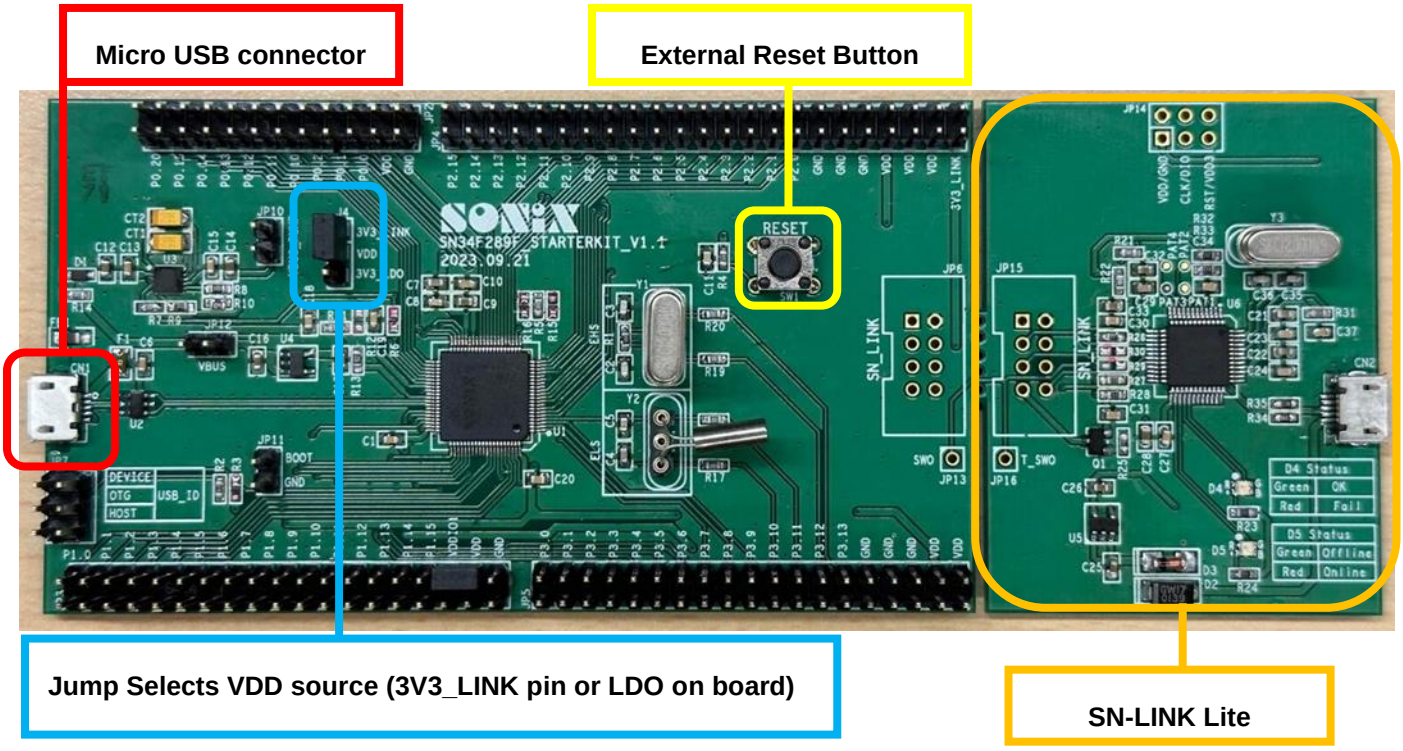


IDE/SDK

2.1 ICE

1. 請執行 SN-LINK Package 安裝 SN-LINK 相關檔案
2. 將 SN-LINK Lite 一端透過 Micro USB 線接至 PC

2.2 SN34F280 Starter-kit Board



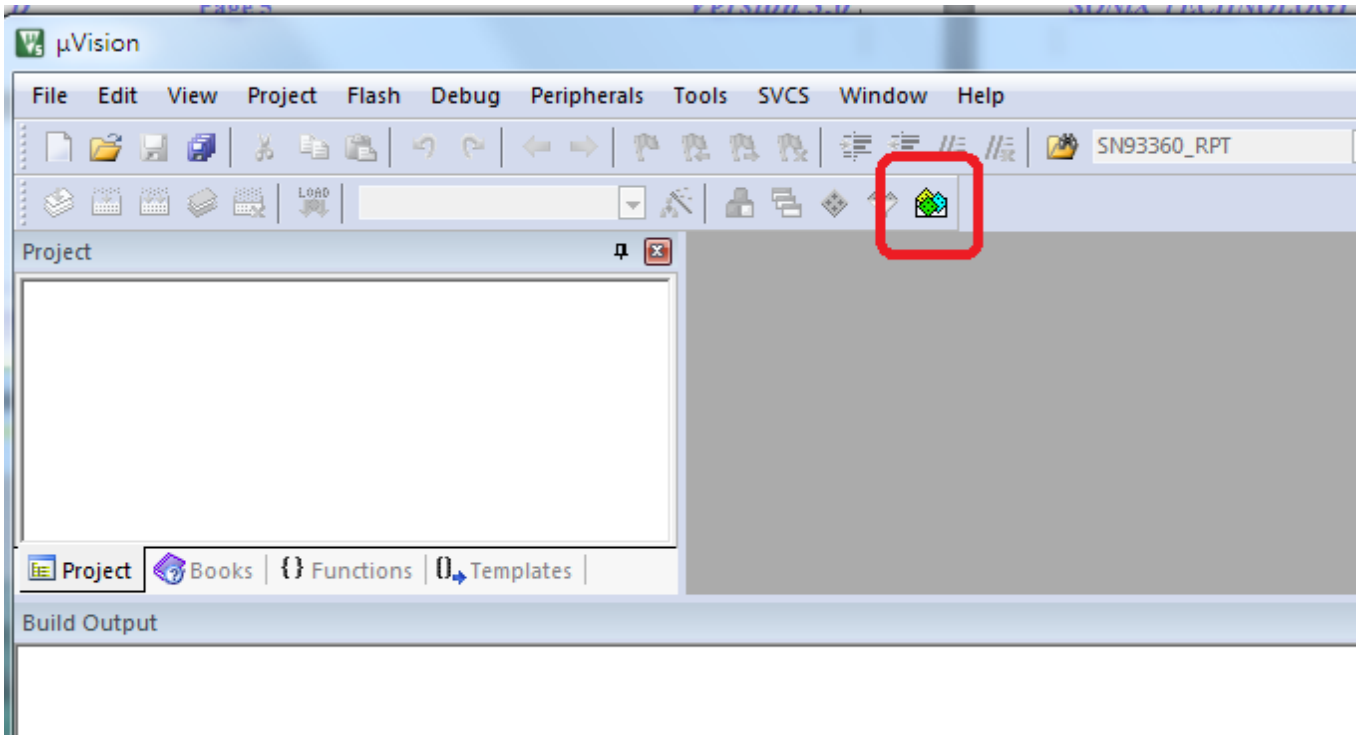
- U1 : SN34F289FG real chip
- CN1 : Micro USB connector for MCU
- CN2 : Micro USB connector for SN-LINK Lite
- JP12 : 電路板上 3.3V LDO 的電源來至 Micro USB 5V.
- JP10 : 連接 VBUS pump 來源從 3V3_LINK pin (3.3V to 5V).
- J4 : JUMP 選擇 VDD 來源 (3V3_LINK pin 或電路板上的 3.3V LDO).
- JP3 VDDIO1 : 選擇 VDDIO1 來源 (外部輸入或電路板上 VDD).
- RESET button : External reset 按鍵.
- JP6 : 外接 SN-LINK debugger 之排線
- JP11 : 如欲於 Boot Loader 進行 ISP Flow，請將其 short (P1.3 接 VSS)
- JP7 : USB 模式選擇 (Device, OTG 或 Host).
- Y1: 高速晶振接點 (10MHz ~ 25MHz)
- Y2: 低速晶振接點 (32.768KHz)
- Y3: SN-LINK Lite 的高速晶振接點 (12MHz)

2.3 KEIL MDK-ARM

1. 請至 http://www.keil.com/arm/mdk.asp 下載 MDK V5.00 以上的版本並安裝於 default 路徑（C:\Keil_v5）下

> ✷ ***Note: MDK V5 之後的版本的 CMSIS 架構可支援線上更新功能，未來 SONiX 於線上放置最新的 CMSIS 檔案後，使用者便可直接透過 Pack Installer 進行線上更新，因此強烈建議更新至 MDK V5.00 以上的版本，並將項目轉換至 V5 架構(章節 3.3 Transform Existed MDK v4 Project to v5 會說明如何轉換)。***

2. 開啟 MRK-ARM, 點擊下圖紅圈處(“Pack Installer”)



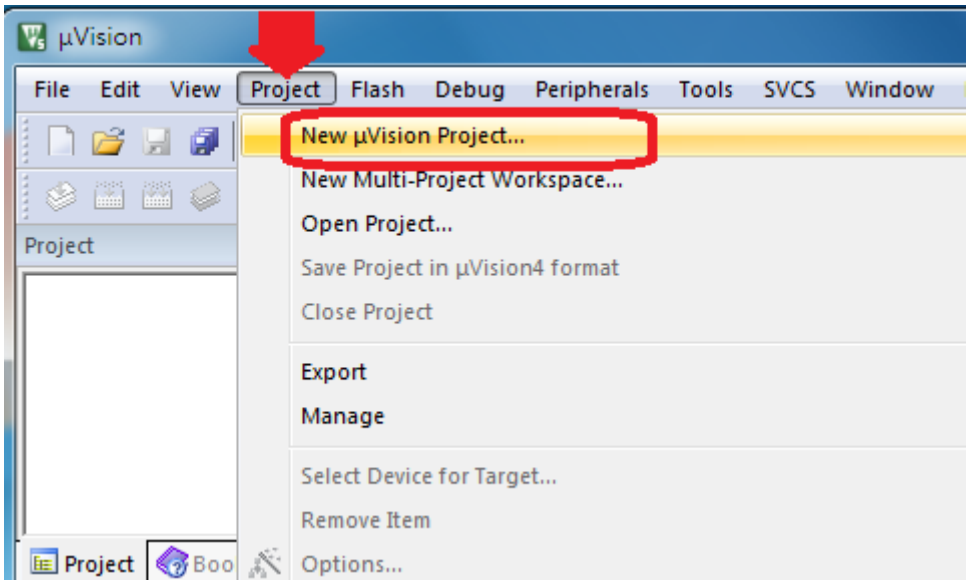
3. 請安裝 SN34F280 的 SDK 相關檔案。

4. 請雙點 SN34F280_Startkit_Package_VX.X\Tools\Hex2Bin 中的 Hex2Bin_Vxx.exe 安裝 HexConverter，此工具會自動安裝到 Keil 的安裝路徑下，第 3 章中會說明如何透過設定調用此工具，幫助您產生 Bin 檔和計算 Checksum。

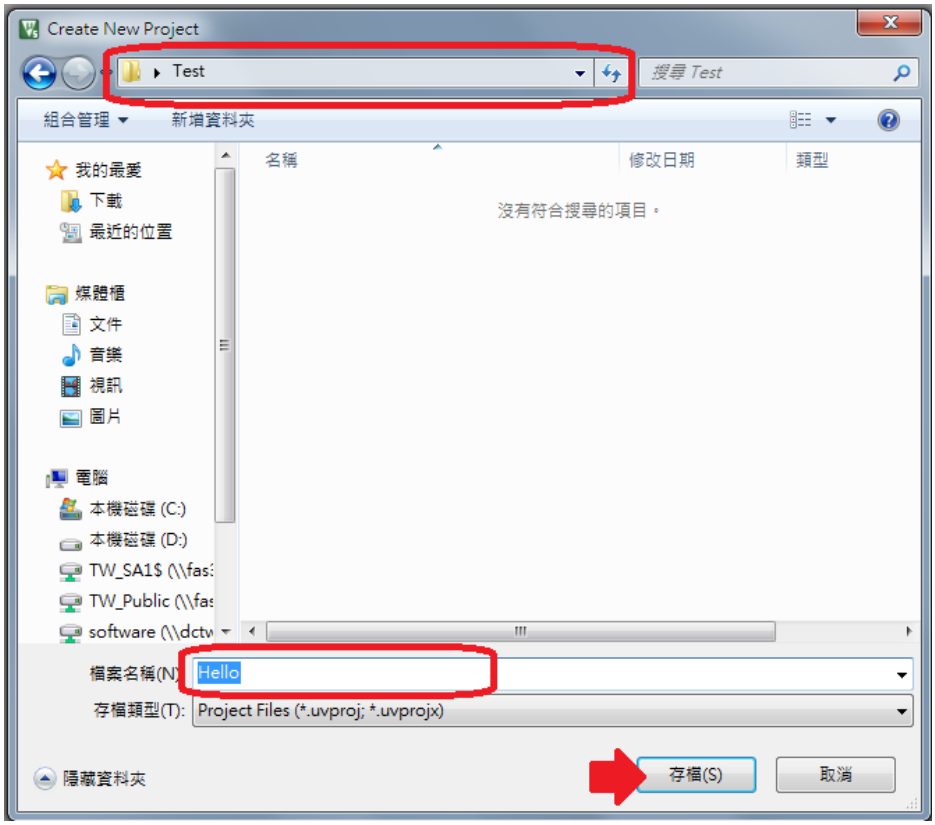
3 DEVELOP

3.1 Build a New Project

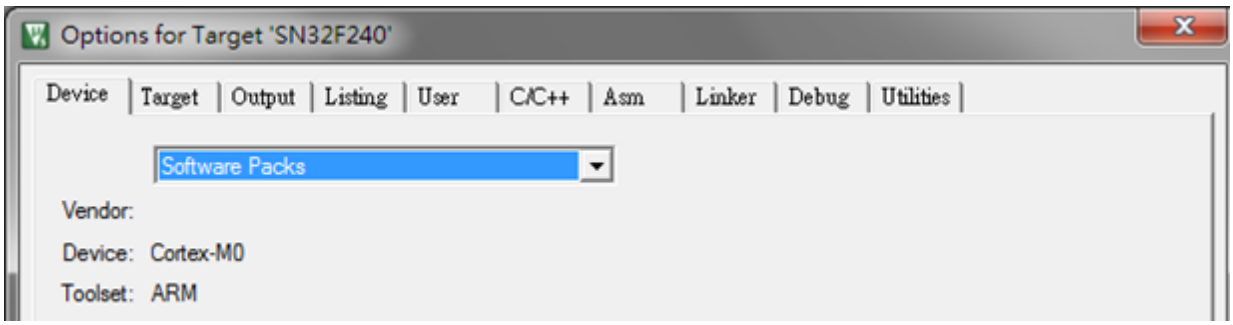
1. 點擊”Project”標籤後，點選”New uVision Project”。



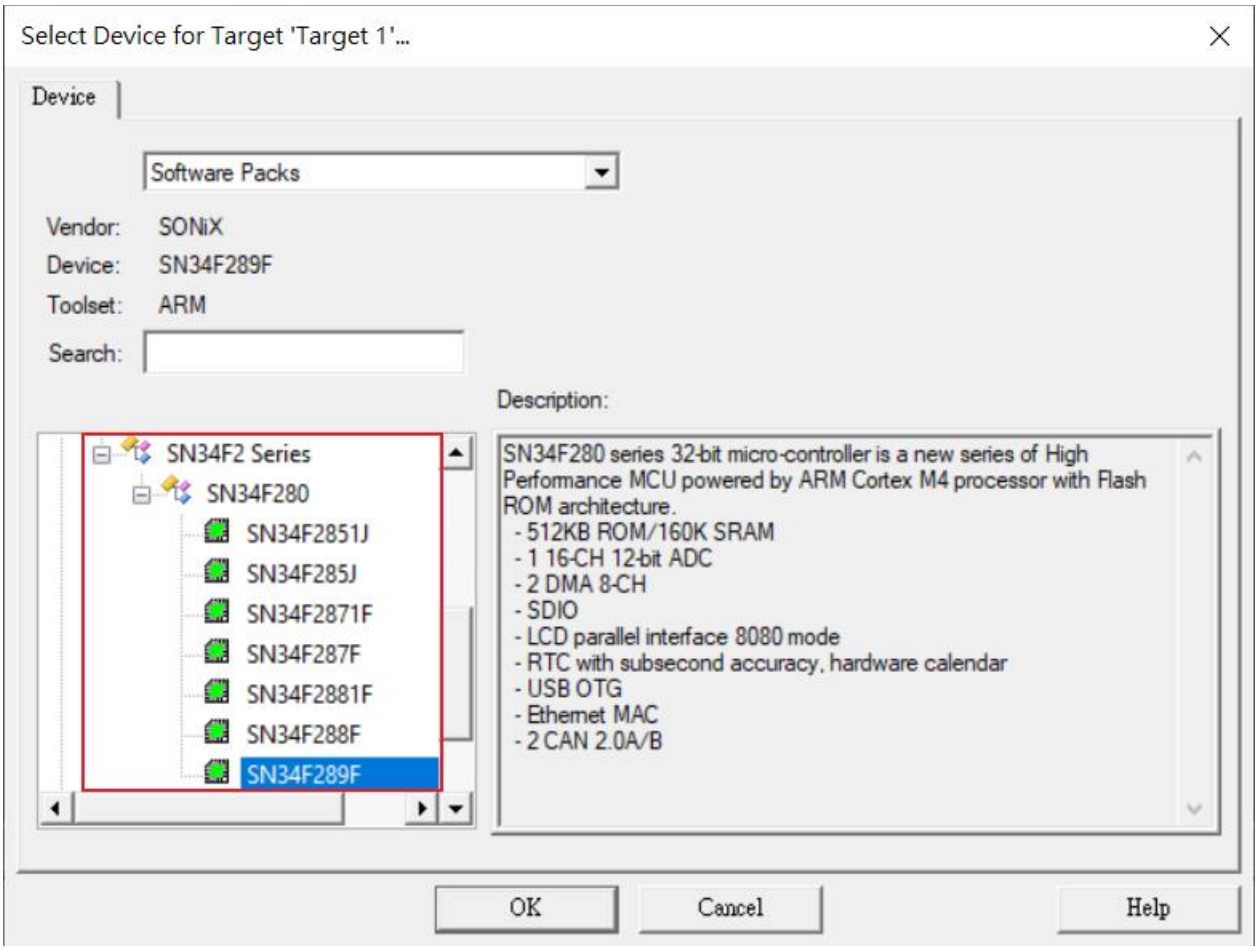
2. 請自行選取要建立專案的資料夾，填入專案名稱，點擊”存檔(S)”。



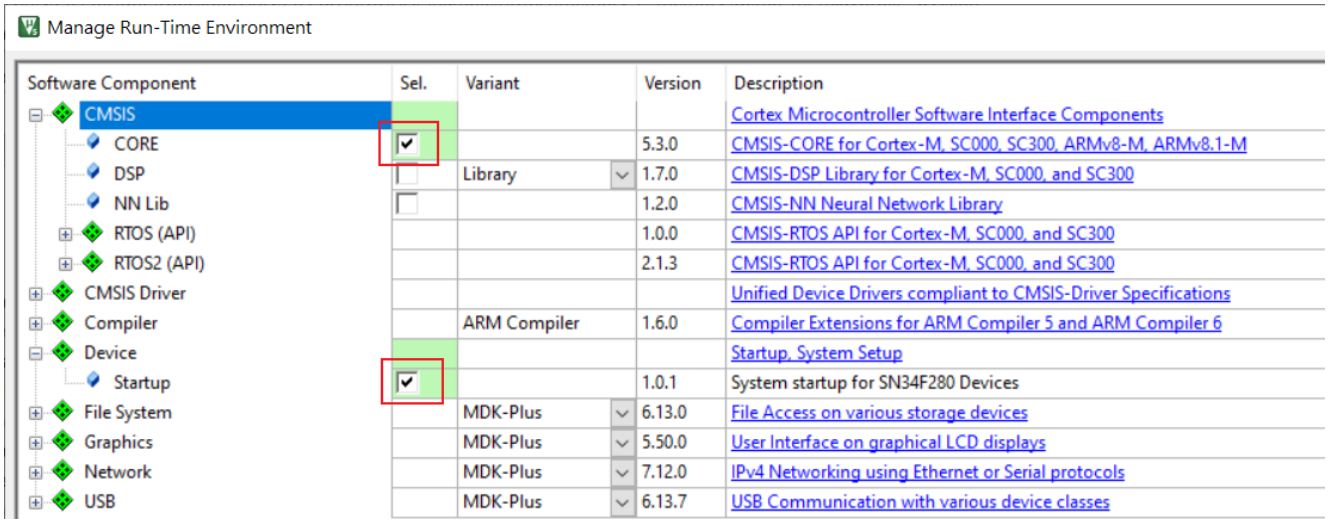
3. 請依照 Keil MDK 顯示之視窗選取 “Software Packs”



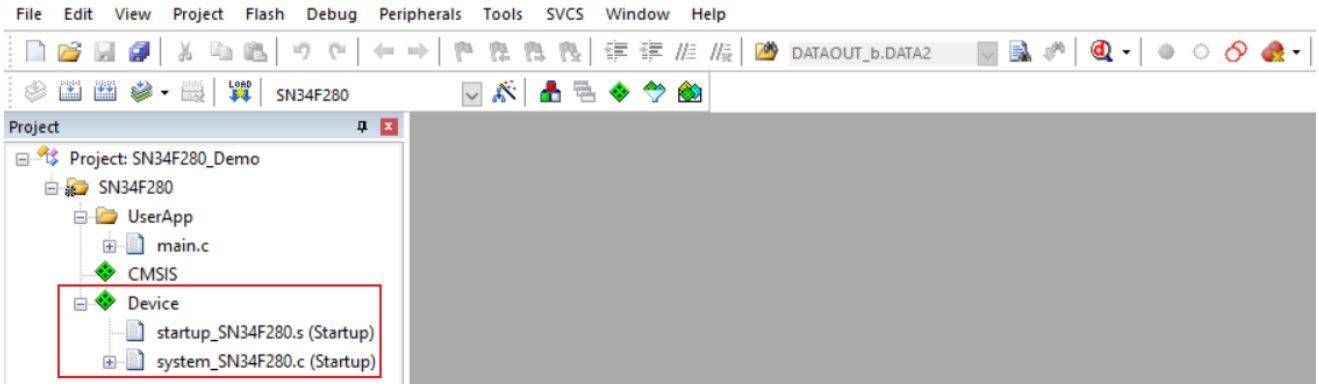
4. 搜尋列中填入”SONiX”，以 SN34F280 系列 MCU 專案為例，在列出的 MCU 型號中選擇”SN34F2 Series” → “SN34F280” → 選擇任一型號均可(例如“SN34F289F”) ，然後按下 OK。



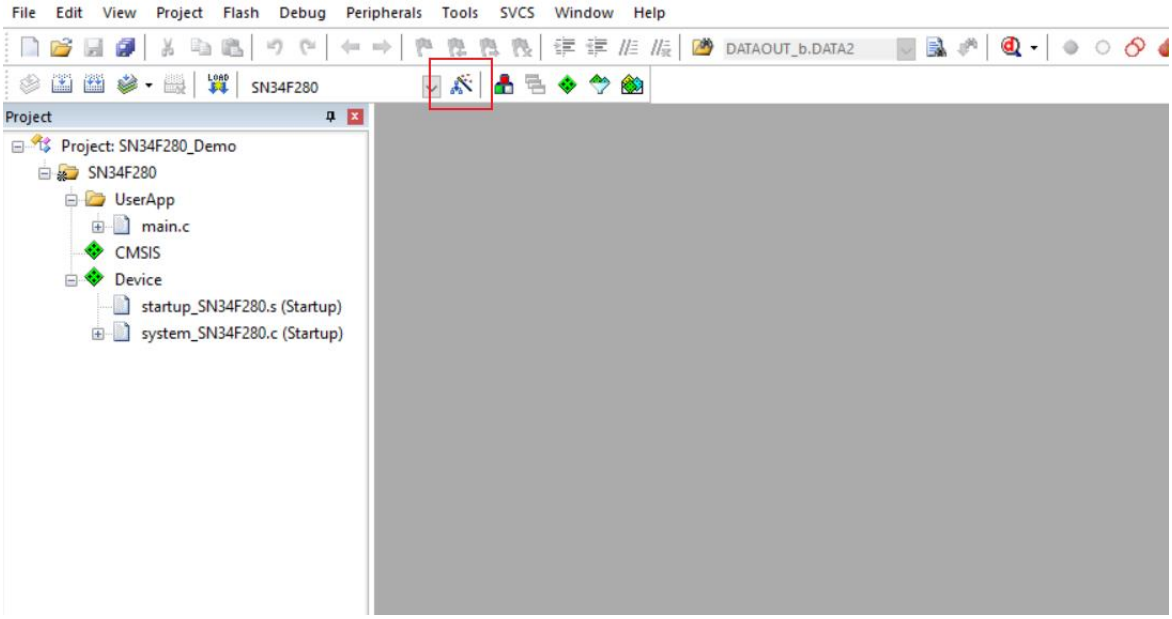
5. 請如下圖勾選"CMSIS"下的"CORE"和"Device"下的"Startup"，然後按下 OK。



6. 完成後可以在 KEIL MDK 看到以下畫面，表示需要的 CMSIS 檔案均已經載入專案中

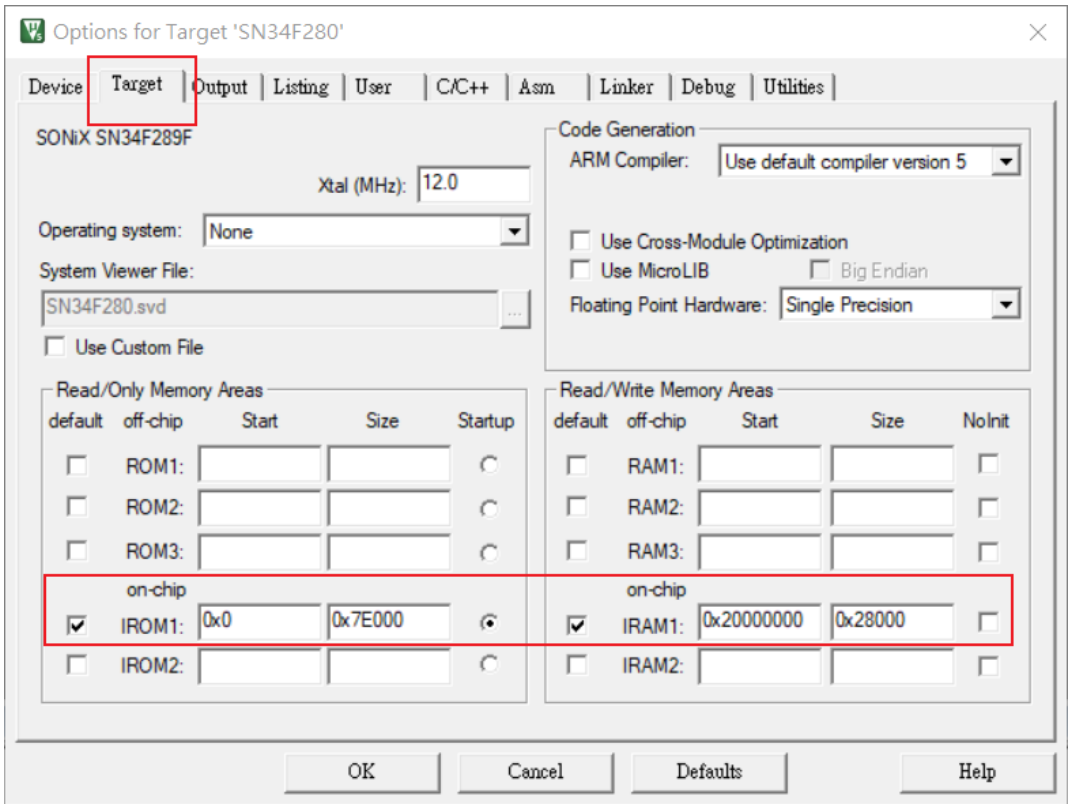


7. 點擊下圖紅圈處(“Target Options”)。

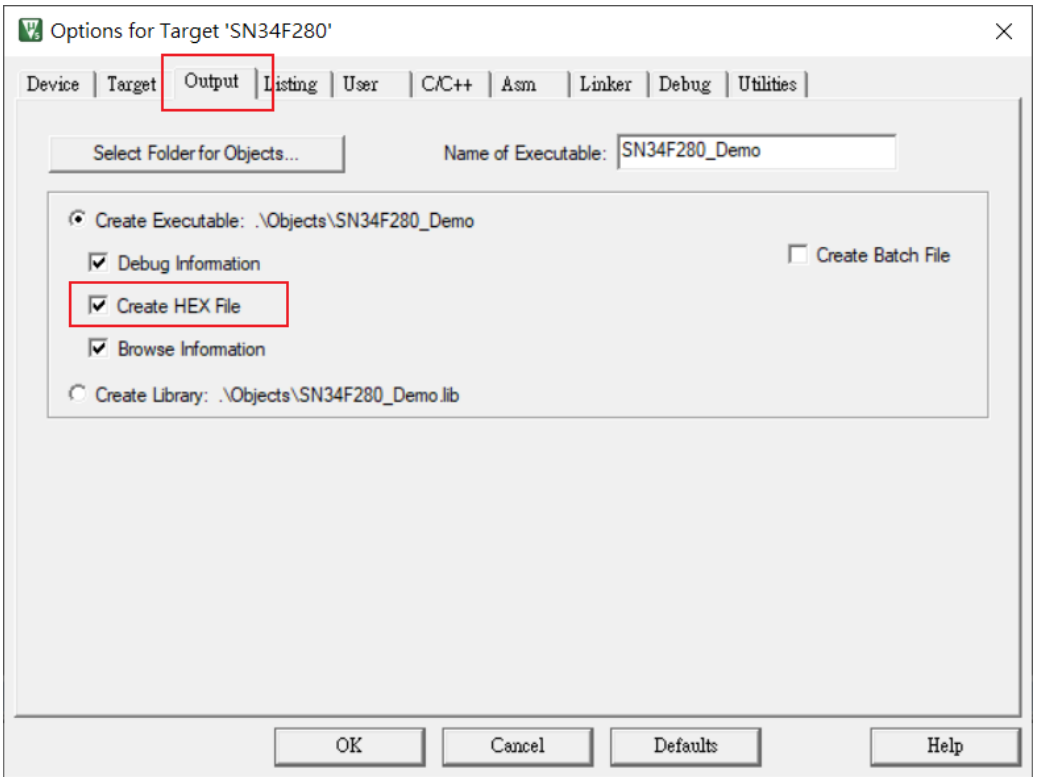


7.1 點選"Target"，依據專案使用之不同 MCU 型號正確設定其 ROM 和 RAM 大小。

A. SN34F280 (ROM 504KB, RAM 160KB)

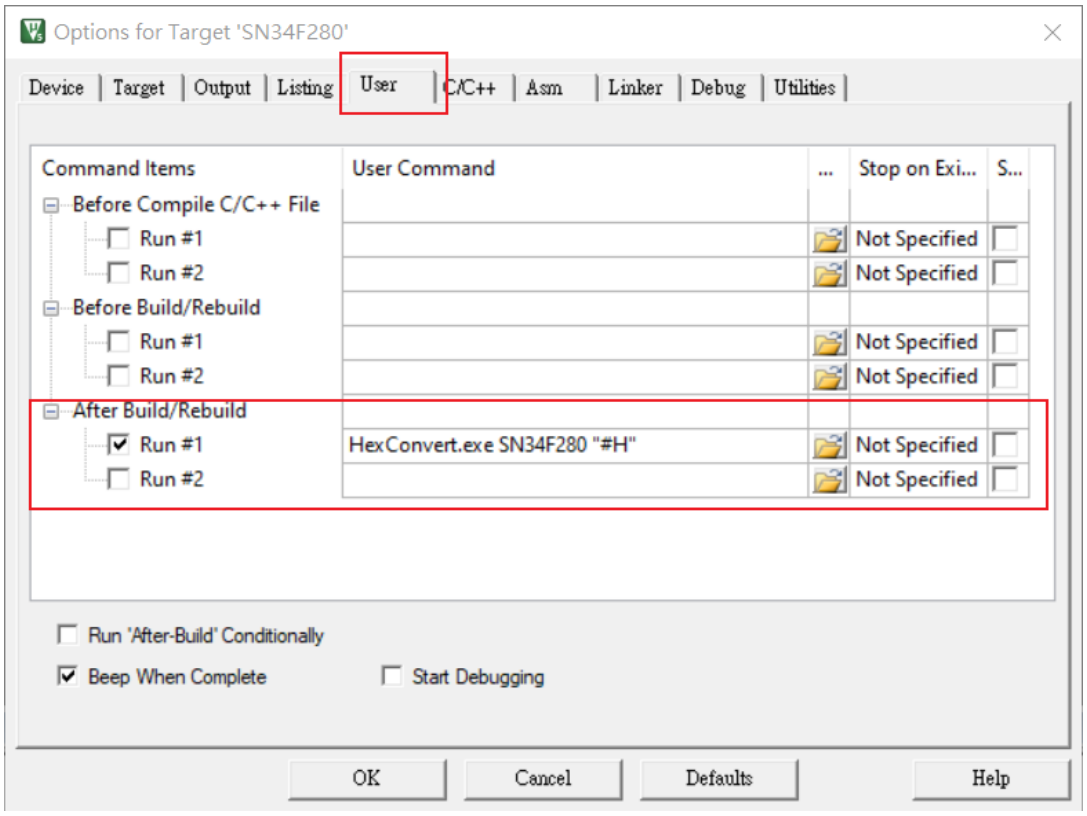


7.2 點選"Output"，勾選"Create HEX File"



7.3 點選"User"，勾選"Run #1:"，並依據選擇的 MCU 型號填入以下對應的指令

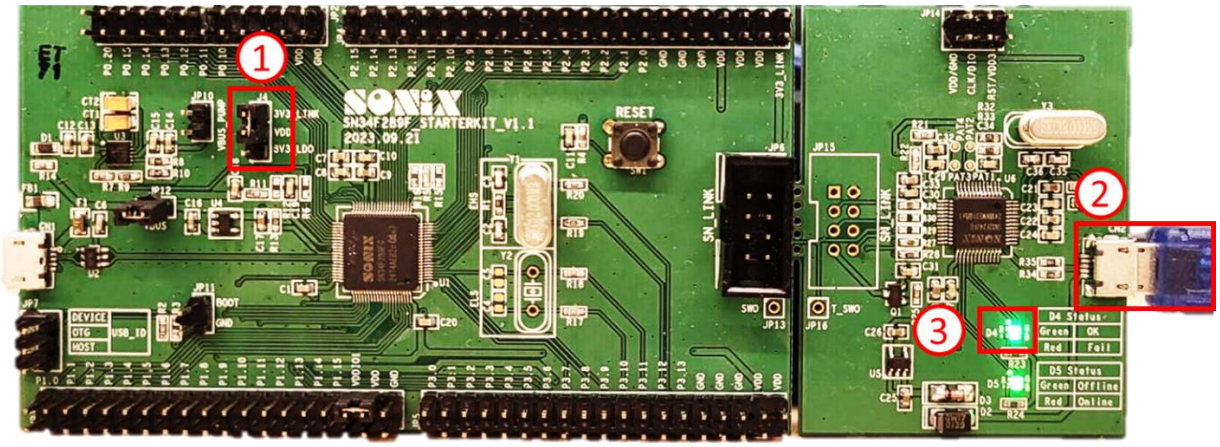
SN34F280 → HexConvert.exe SN34F280 "#H"

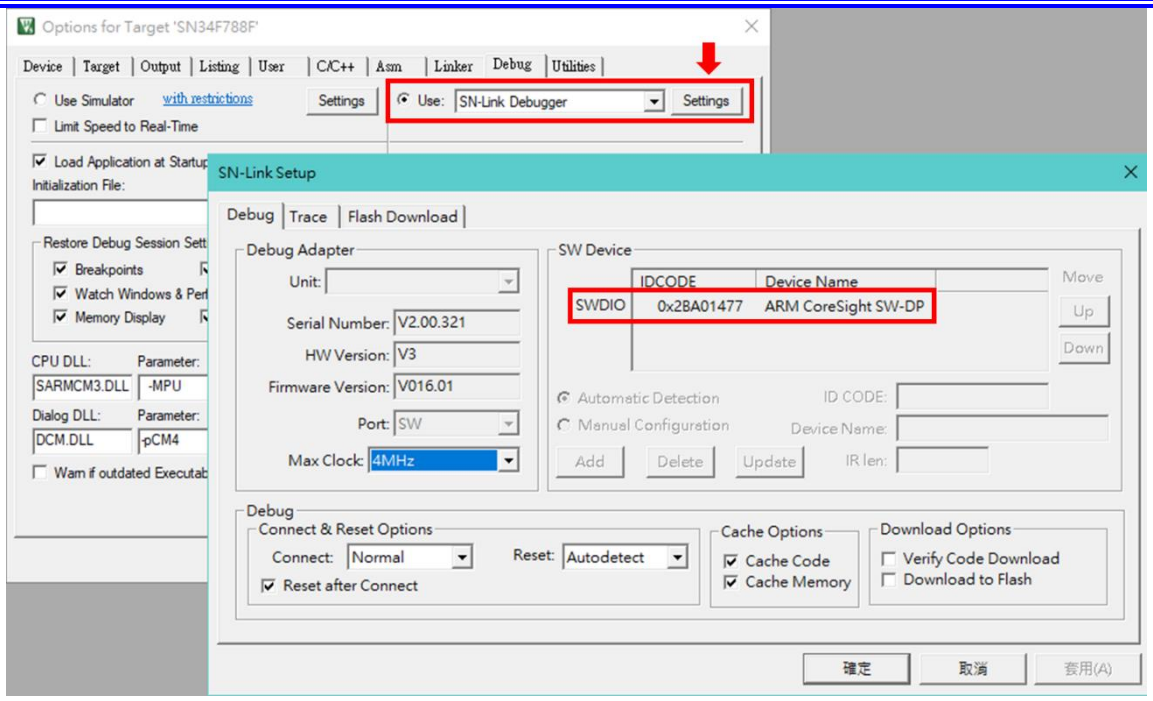


7.4 點選"Debug"，請選取使用的 ICE 然後按下"Settings"進行後續設定，設定完成後如果和已經上電的開發板連接正常，應可順利透過 ICE 取得並如下圖顯示 SW Device 相關資訊。

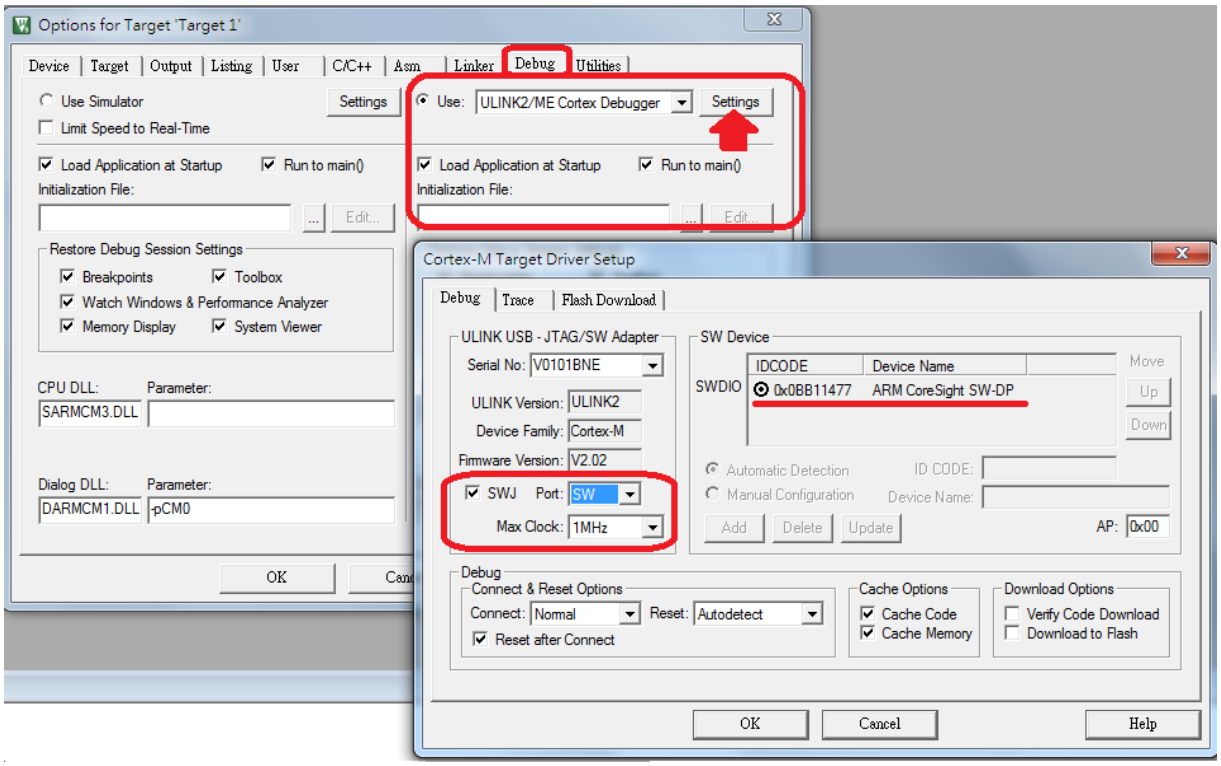
A. 使用 SN_LINK_Lite，可自行設定 ICE 傳送速率(Max Clock)

(1)請先將 J4 3V3_LINK 與 VDD 短接，(2)接上 SN_LINK_Lite Micro USB，(3)D4 亮綠燈代表連線成功

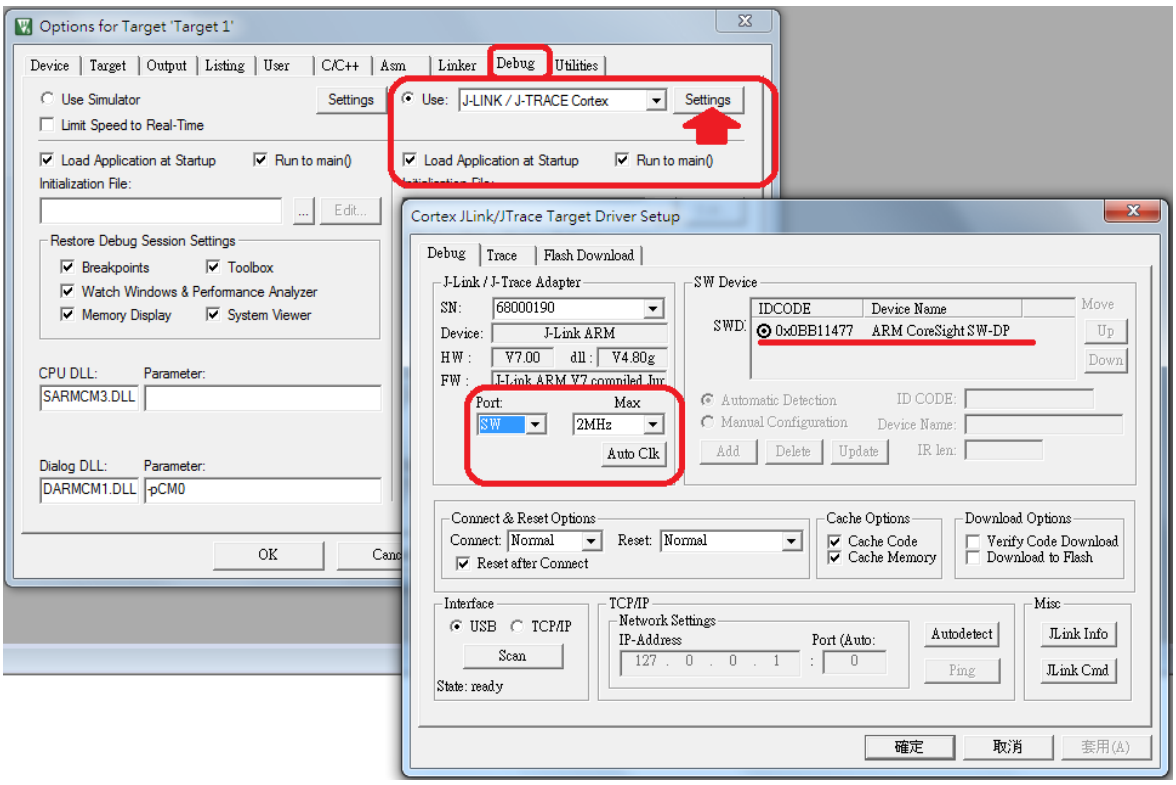




C. 使用 ULINK2，請勾選”SWJ”並將 Port 切換成”SW”，可自行設定 ICE 傳送速率(Max Clock)

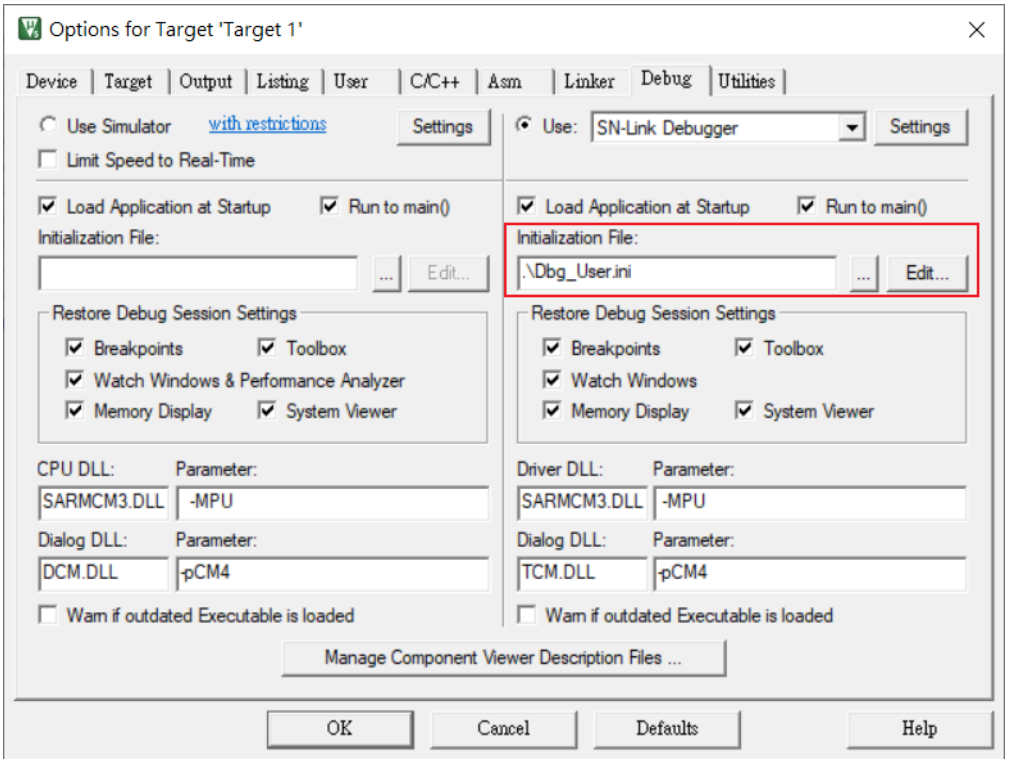


D. 使用 J-LINK，請將 Port 切換成"SW"，可自行設定 ICE 傳送速率(Max)

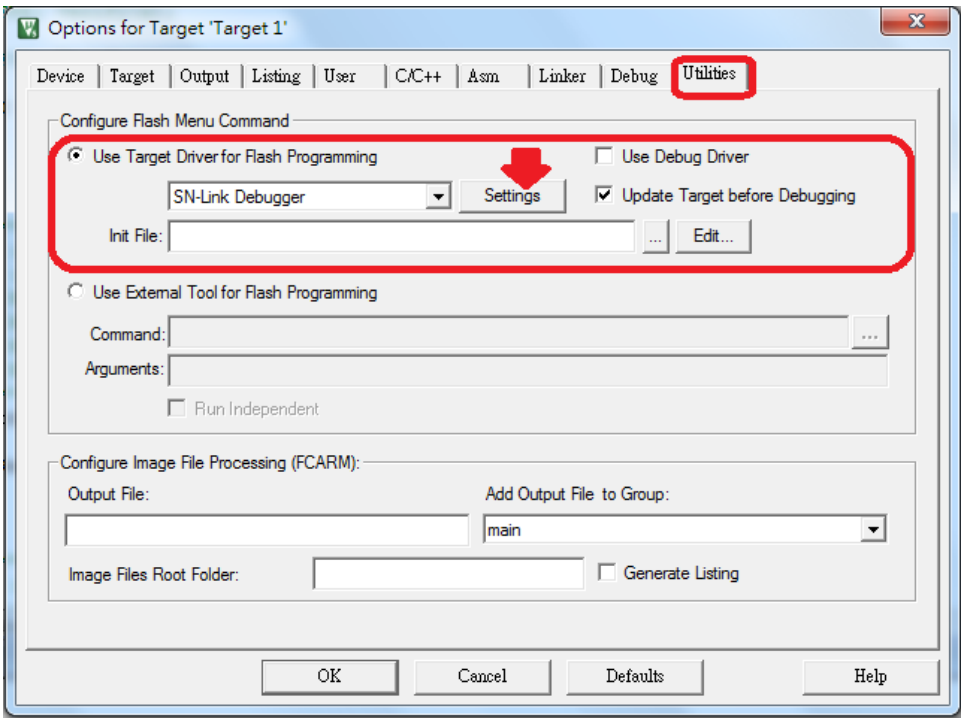


E. 使用其他 ICE，請自行參考該 ICE 之使用說明。

7.5 點選"Debug"，然後按一下"編輯..."載入初始化檔案"Dbg_User.ini"。 Keil 可以使用該檔案將 shadow memory 重新映射到 User ROM 區域，以避免 CPU 運行在 Boot ROM 時進行 Debug 發生錯誤。

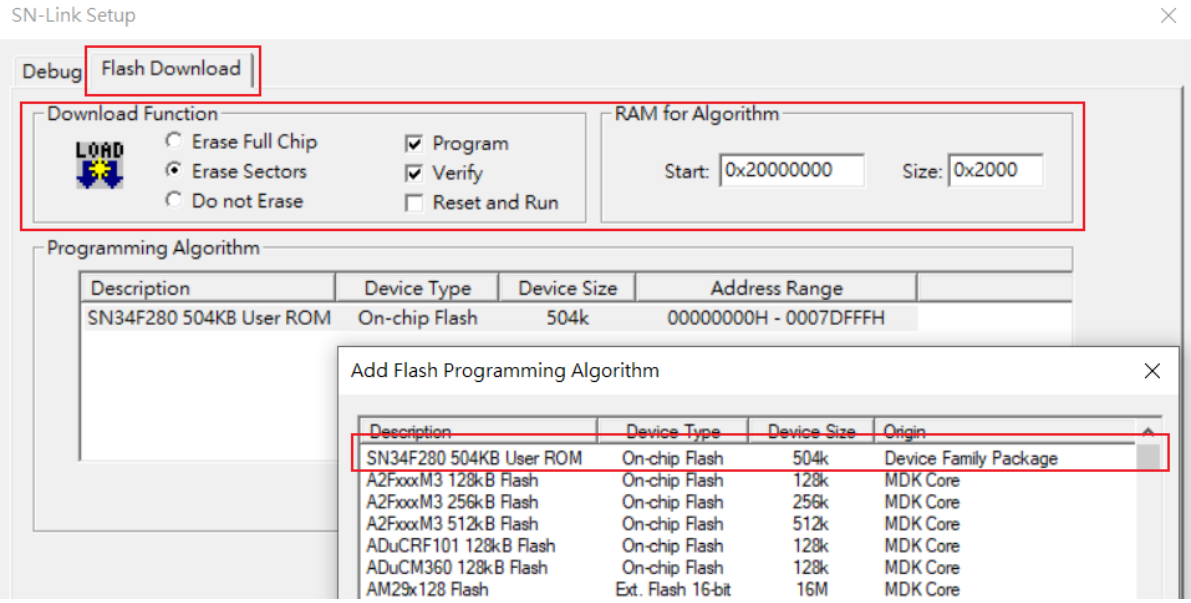


7.6 點選"Utility"，並如下選取自行使用的 ICE，然後按下"Settings"



✷ ***Note: 請勿勾選 "Use Debug Driver"。***

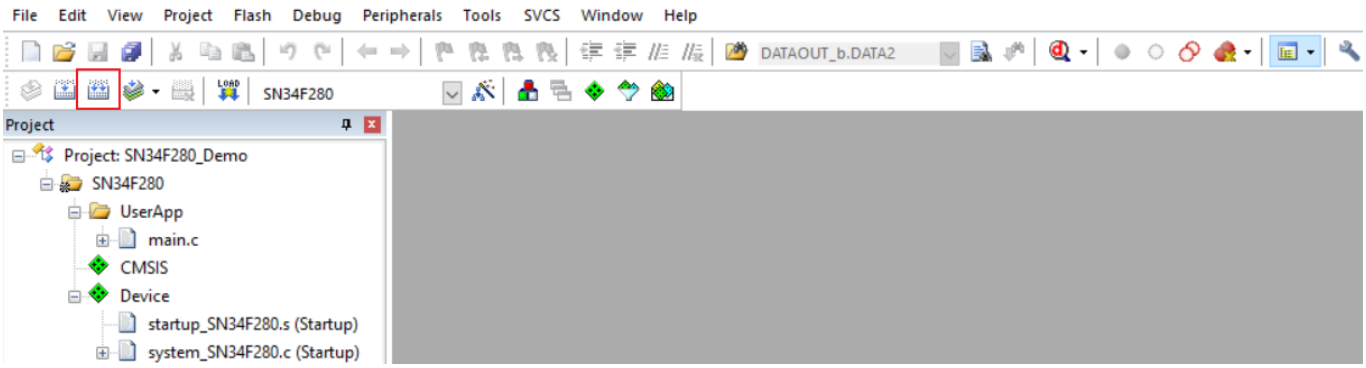
7.7 接著依據各型號可見下圖各設定。



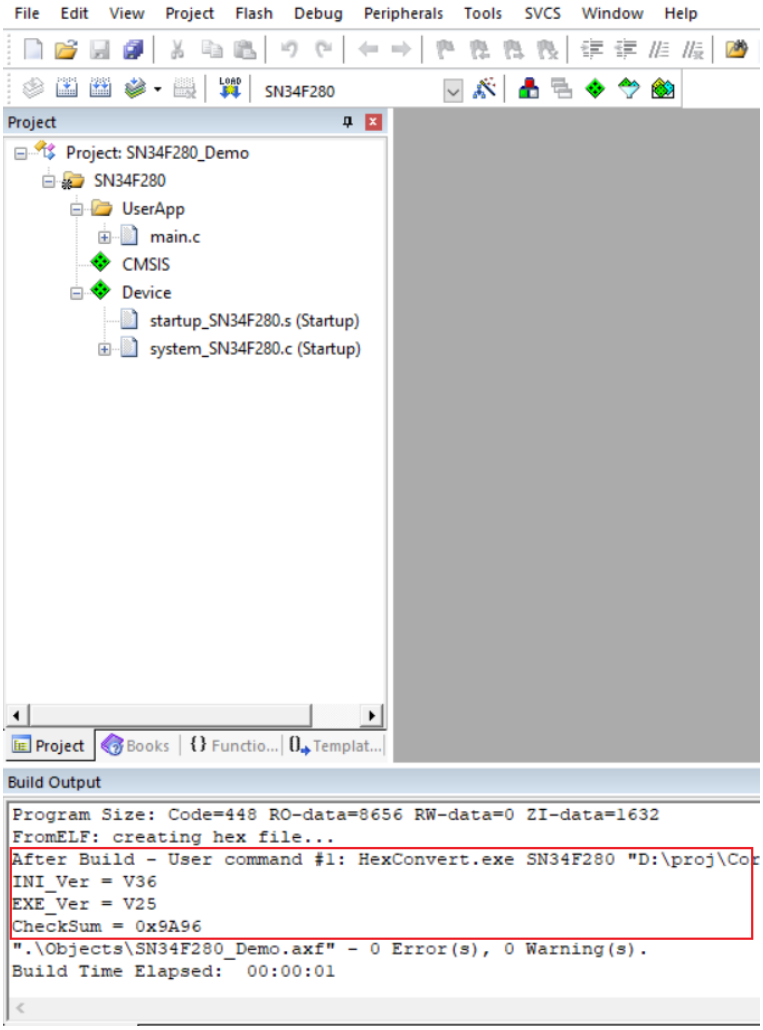
✷ ***Note: 點選"Add"→ 於彈出之窗口中可見"SN34F280 504KB User ROM"，如窗口中無法找到 "SN34F280 504KB User ROM"，請確認 3.1 Build a New Project 步驟 3 已經完成。***

8. 回到專案主畫面，開始撰寫程式。

9. 專案程式撰寫完成後，點擊下圖紅圈處”Rebuild”，Keil MDK 會開始進行編譯。

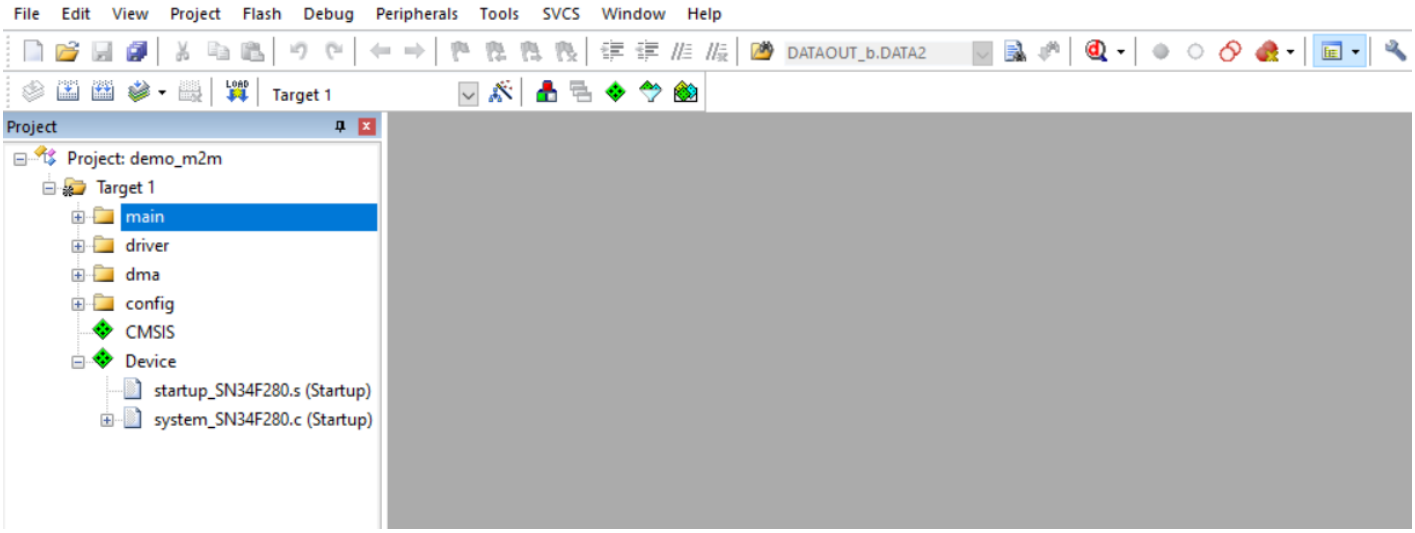


10. 編譯成功後，在下方訊息欄會秀出 HexConverter 的版本號以及計算出的 Checksum 值。

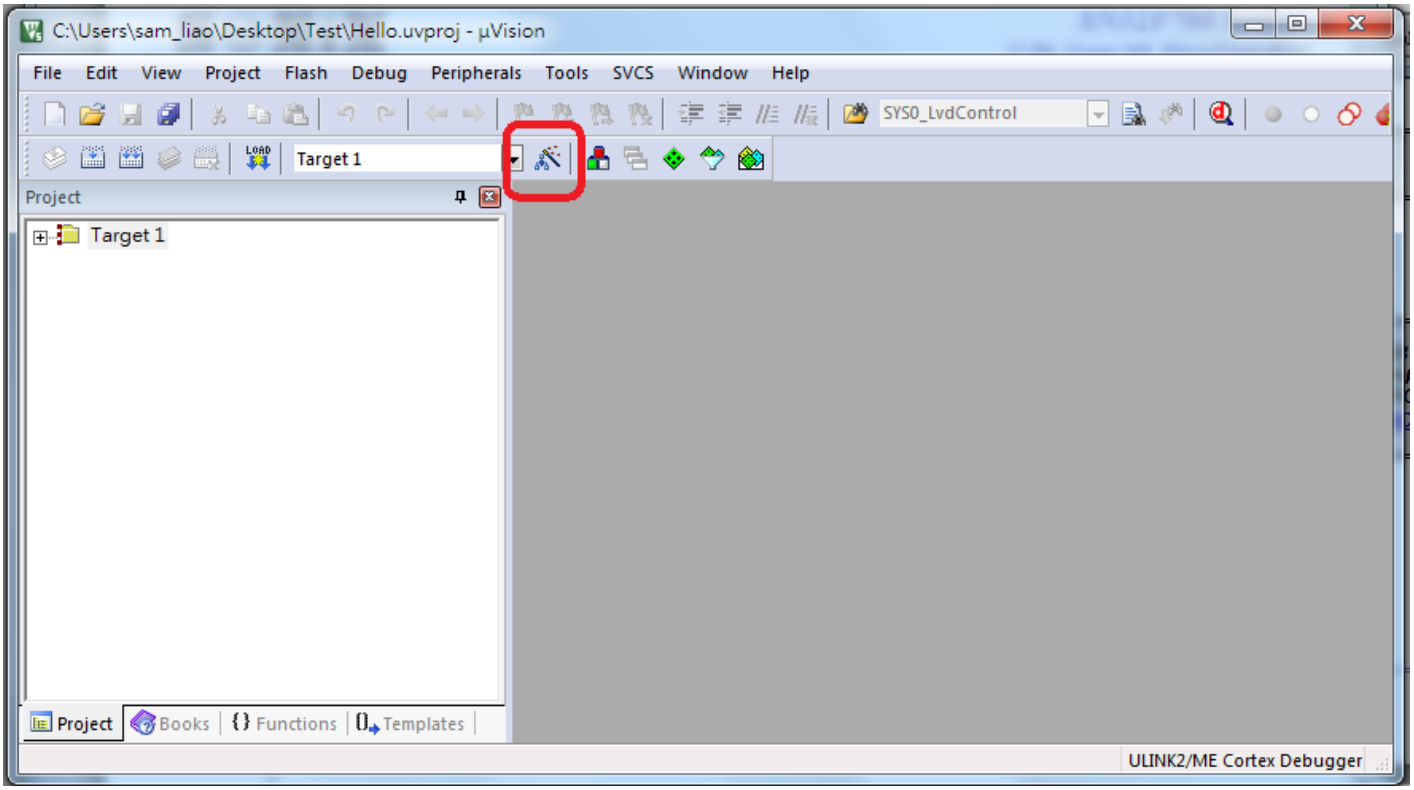


3.2 Use SONiX Sample Code

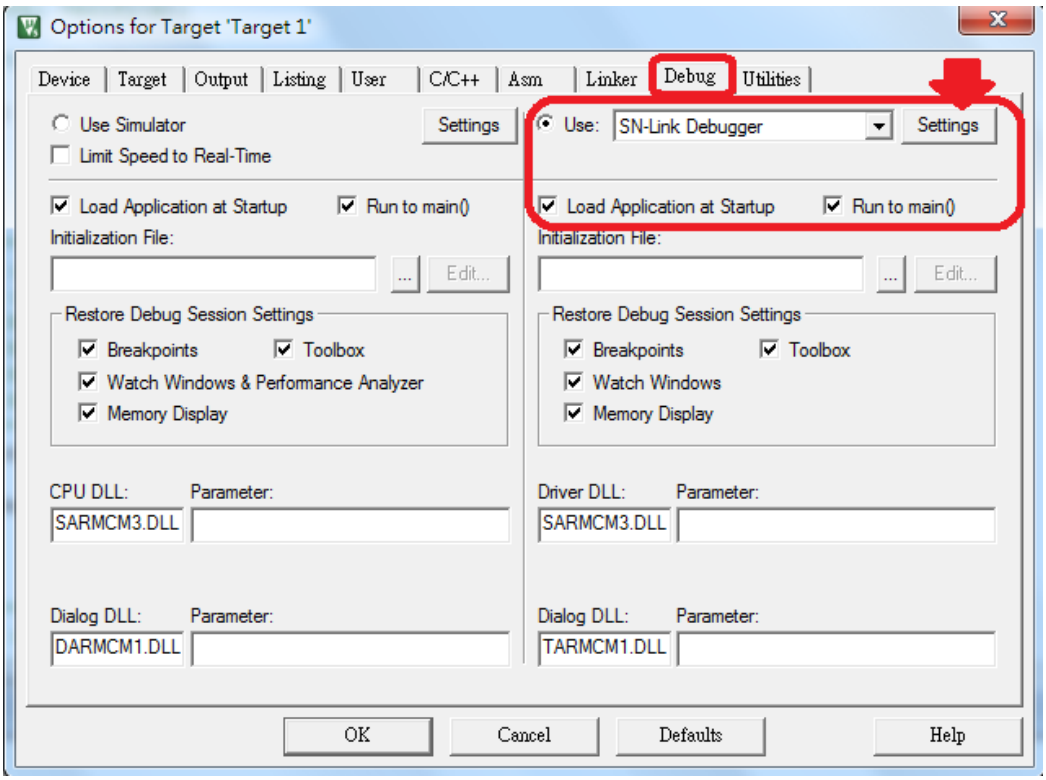
1. 從 SN34F280 Firmware Library 中開啟任一 project，並依需求選擇使用之 MCU 型號。



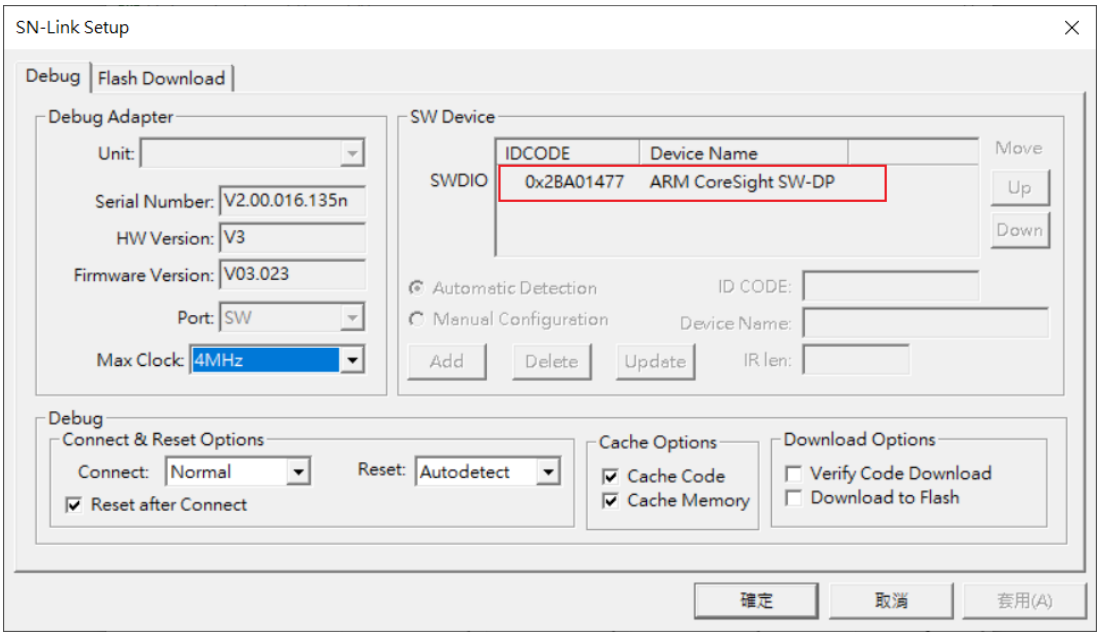
2. 點擊下圖紅圈處(“Target Options”)。



3. 進入“Target Options”後點選”Debug”，並請依下圖進行設定. 接著請按下”Settings”.

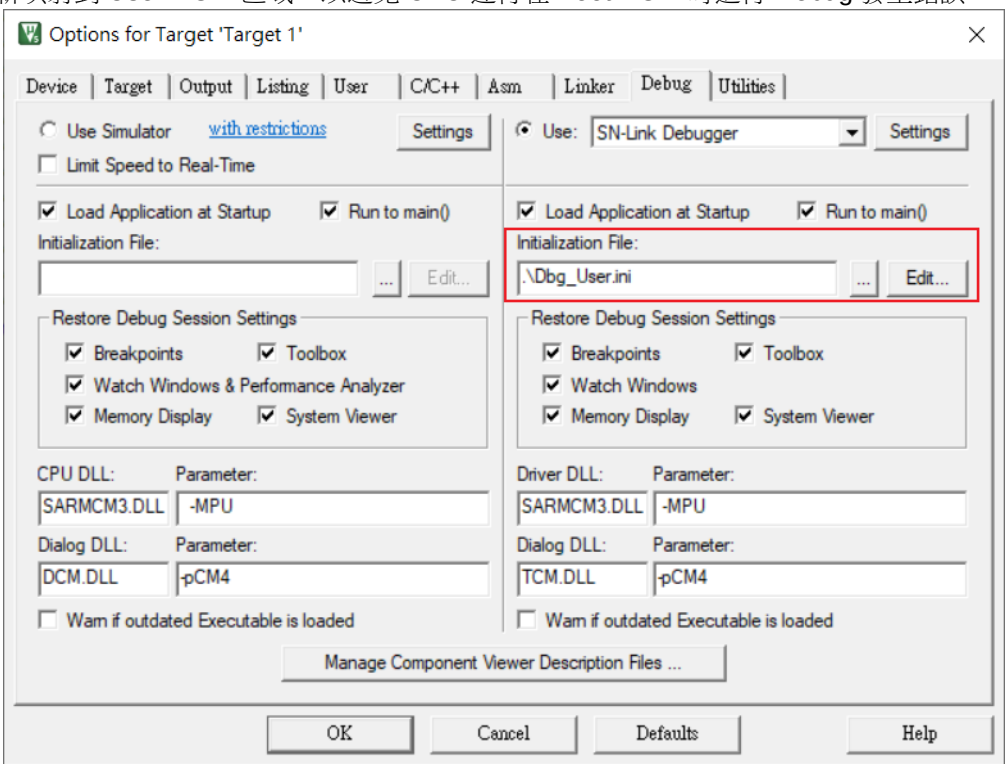


4. 進入設定畫面後，如 SN-LINK 連接正常，KEIL 應可順利透過 ICE 取得並如下圖顯示 SW Device 相關資訊，代表 ICE 連接沒有問題，可點選 OK 離開此設定畫面。

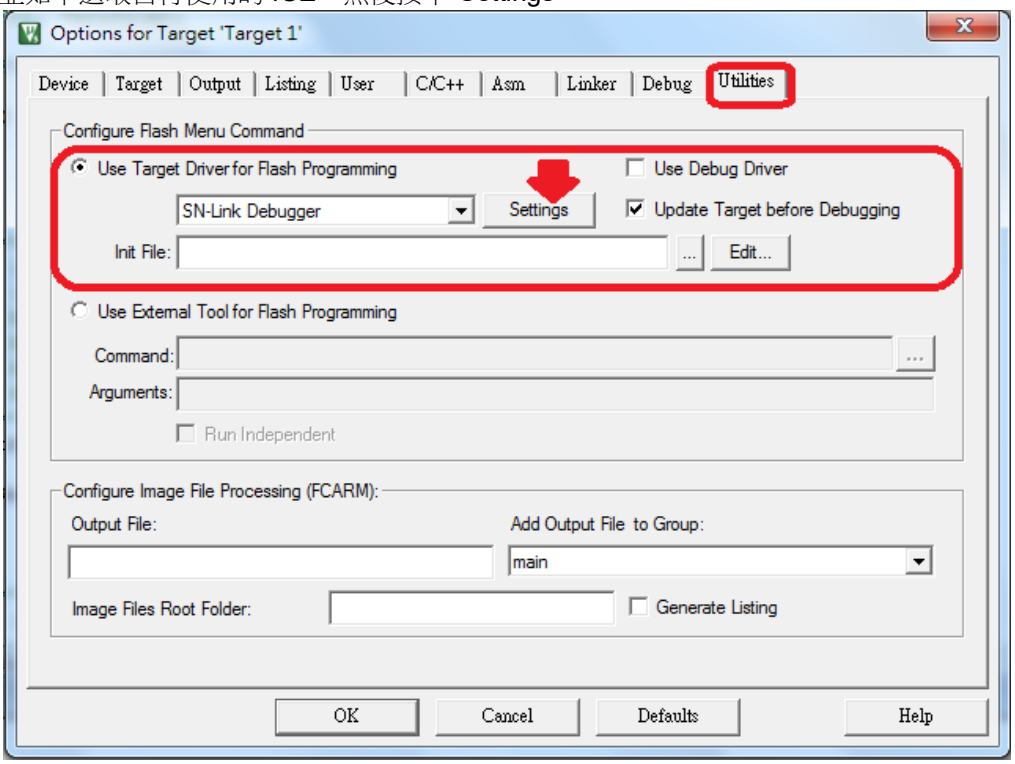


✷ ***Note:** 如使用 ICE 非 SN-LINK，請參考 [3.1 Build a New Project](#) 步驟 7.4 進行相關設定。*

5. 點選”Debug”，然後按一下“編輯...”載入初始化檔案“Dbg_User.ini”。 Keil 可以使用該檔案將 shadow memory 重新映射到 User ROM 區域，以避免 CPU 運行在 Boot ROM 時進行 Debug 發生錯誤。

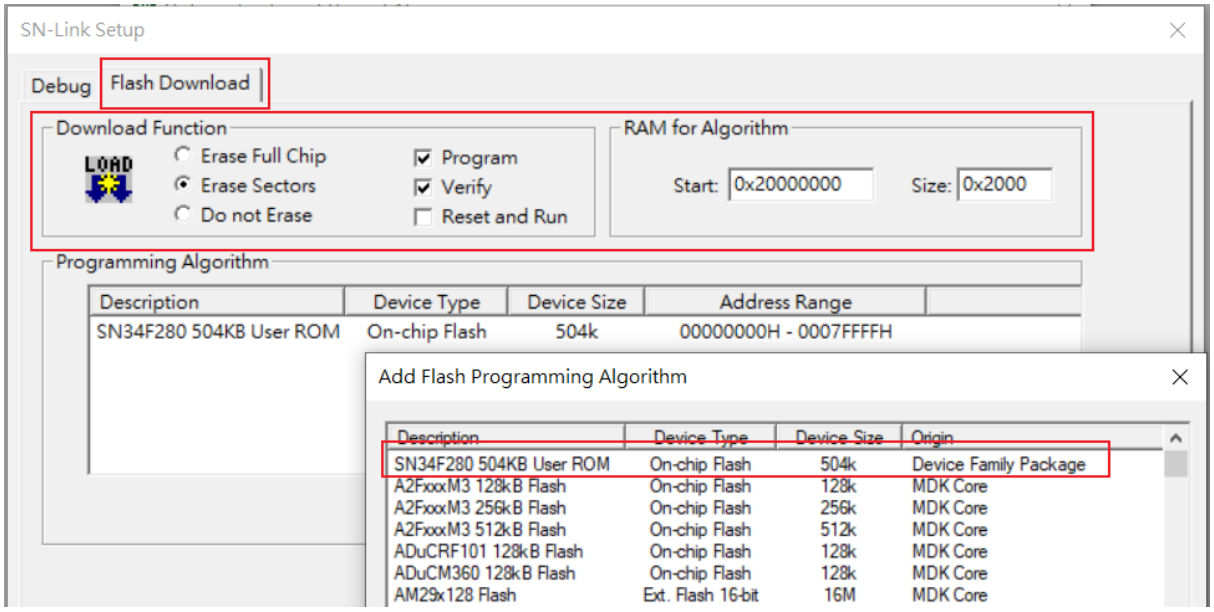


6. 點選”Utility”，並如下選取自行使用的 ICE，然後按下”Settings”。



✷ ***Note: 請勿勾選 ”Use Debug Driver”。***

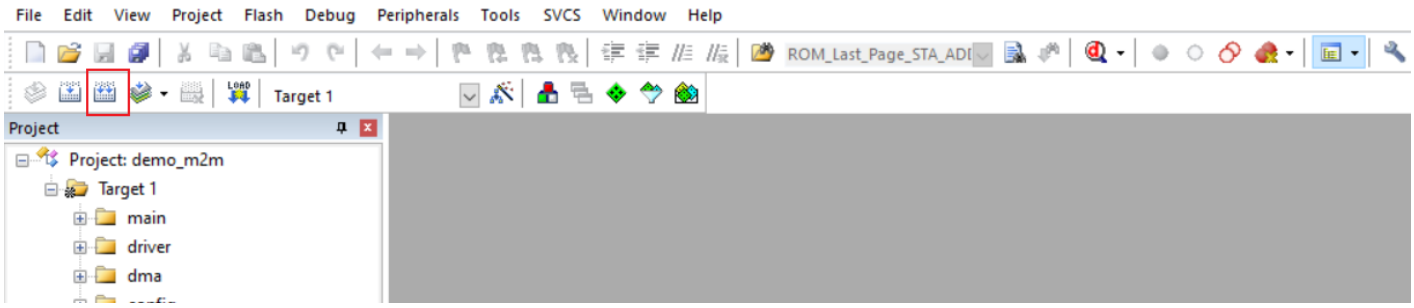
7. 依據各 MCU 型號可見下圖各設定，依據使用之 MCU 型號選取。



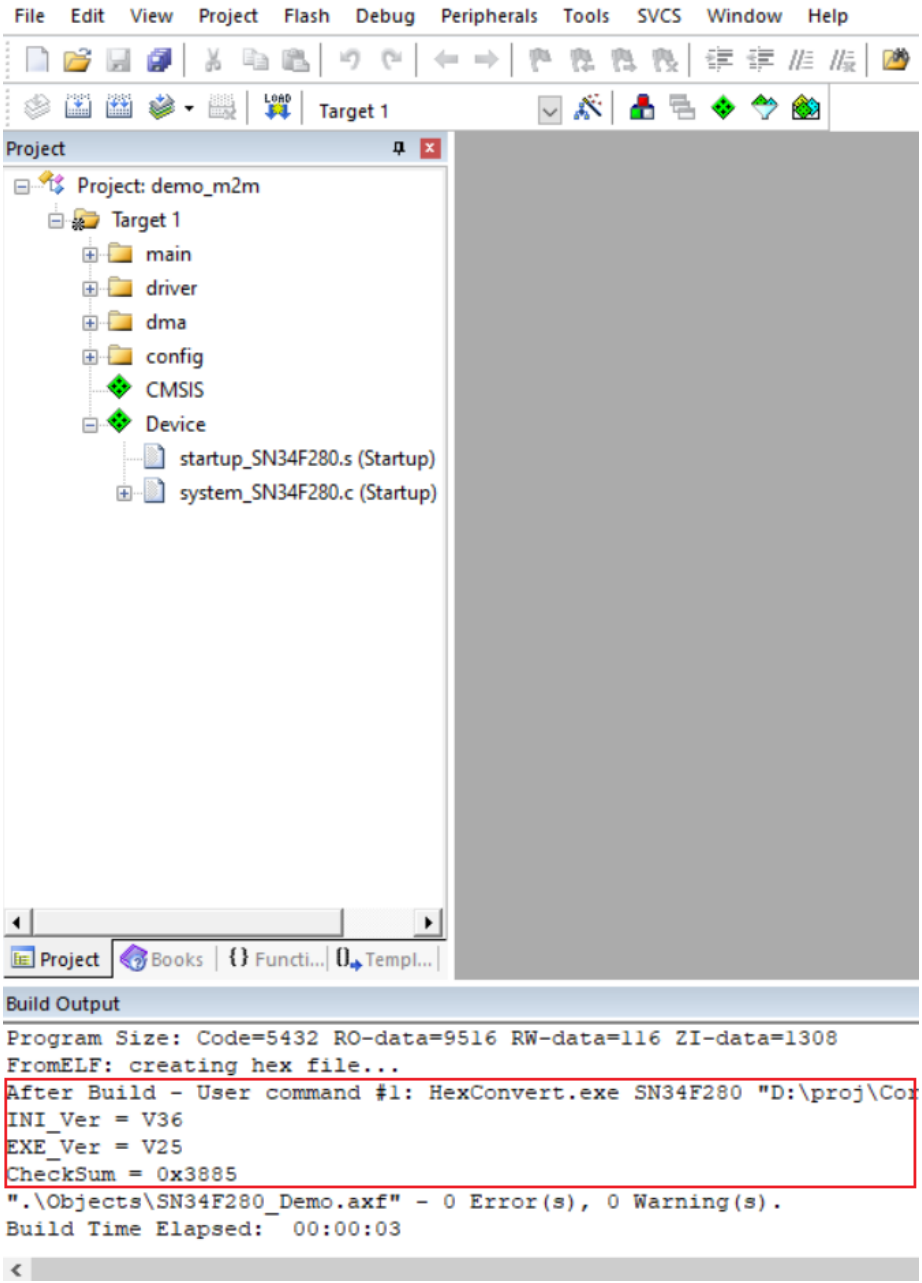
> ✷ ***Note:** 點選"Add"→ 於彈出之窗口中可見"SN34F280 504KB User ROM"，如窗口中無法找到 "SN34F280 504KB User ROM"，請確認 [3.1 Build a New Project](#) 步驟 3 已經完成。*
>
> ✷ ***Note:** 如使用 ICE 非 SN-LINK，請參考 [3.1 Build a New Project](#) 步驟 7.4 進行相關設定。*

8. 完成後請按 OK 離開"Target Options"

9. 點擊下圖紅圈處"Rebuild"，Keil MDK 會開始進行編譯。

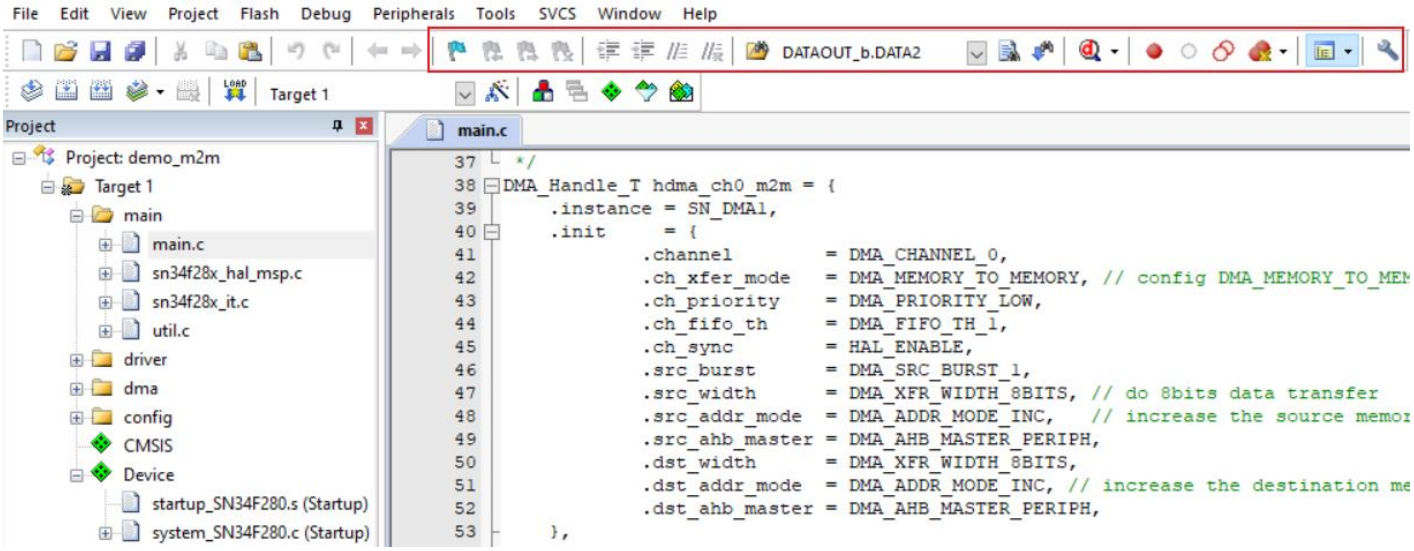


10. 編譯成功後，在下方訊息欄會秀出 HexConverter 的版本號以及計算出的 Checksum 值。

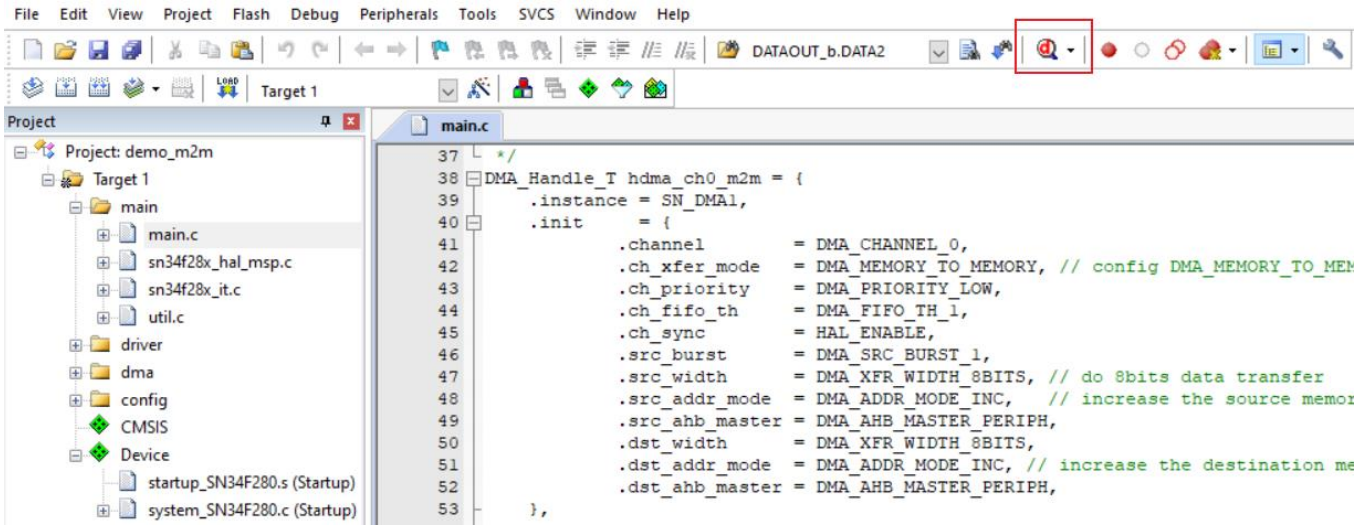


3.3 Debug

完成以上設定後即可使用 MDK-ARM 進行開發及模擬。



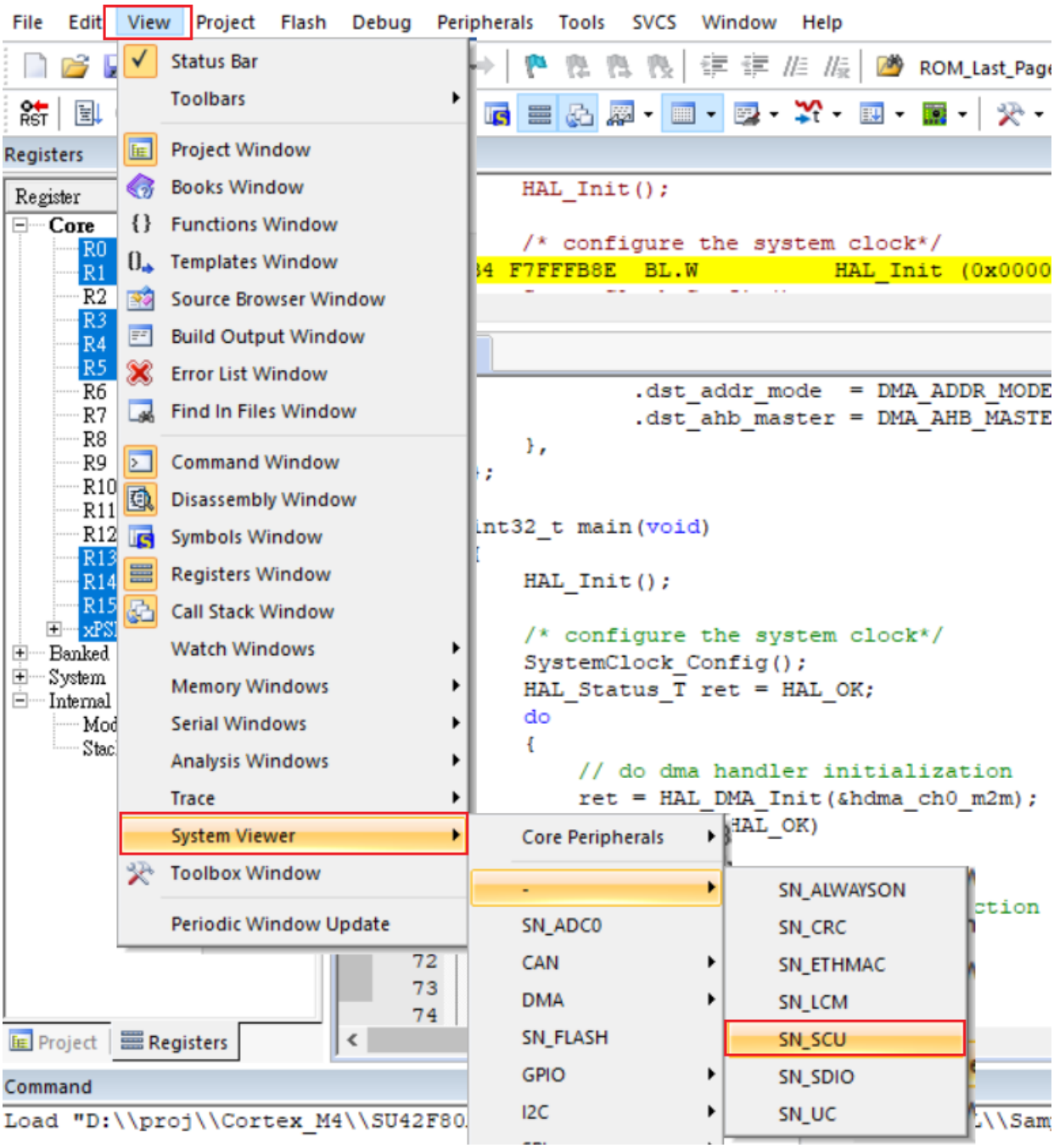
點擊下圖紅圈處(“Start/Stop Debug Session”) 開始模擬。



3.3.1 CMSIS-SVD (System View Debug)

SVD 是 CMSIS 中制訂的 debug 標準，依其標準制訂相關的檔案後，在 KEIL 中可以直覺地觀看 MCU 每個 register 甚至每個 bit 目前的狀態和代表的意義，是模擬時很好用的工具。

1. 進入 debug 畫面前，可以點擊下圖紅圈處(“View”) ，從彈出的選單中點選”System Viewer”並選取要觀察的 register



2. 以選取 SN_SCU 為例，即可在 KEIL debug 視窗中看見以下資訊

SN_SCU

Property	Value
BTUP_STS	0x00008000
GPIO_HOLD	0: Release = GPIO was controlled by
EXTRSTF	0: No = No External reset occurred
WDTRSTF	0: No = No Watchdog reset occurre
DPDWKF	0: No = No wakeup from DPD mode
LVDRSTF	0: No = No LVD reset occurred
SWRSTF	1: Occurred = Software reset occurre
RTCWKF	0: 0x0 = No wakeup by RTC alarm
P0WKF	0: 0x0 = No wakeup by GPIO0 interru
P1WKF	0: 0x0 = No wakeup by GPIO1 interru
P2WKF	0: 0x0 = No wakeup by GPIO2 interru
P3WKF	0: 0x0 = No wakeup by GPIO3 interru
USBDWKF	0: 0x0 = No wakeup by USB Device r
ETHWKF	0: 0x0 = No wakeup by Ethernet wak
USBHWKF	0: 0x0 = No wakeup by USB Host rec
BTUP_CTRL	0x01FE0000
CHIPID	0x00004280
VERSION	0x00030100
PWRMODE	0x01000000
RIS	0x00000800
IE	0
PERRSTCTL	0x0000000F
PLLCTRL	0x40000300
PLLEN	0: Disable = Disable PLL
PLLSTABLE	0: Not stable = PLL is not stable

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