Getting Started with GPCM3 Family

V1.0 – May 19, 2023

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Revision History

Revision	Date	By	Remark
1.0	2023/05/19	Kim Huang	Preliminary edition

1 INTRODUCTION

1.1 GENERAL DESCRIPTION

The GPCM3 series of industrial microcontrollers based on the ARM® Cortex®-M0 processor core and operating at a frequency of up to 122.88MHz. The GPCM3 series is mainly applicable for digital sound process and voice recognition applications.

The following table enumerates the differences between members of the GPCM3 family.

Item	GPCM3V000A (EV Chip)	GPCM300A	GPCM300A _0001	GPCM300B	GPCM300B _0001
Microprocessor	ARM Cortex-M0	ARM Cortex-M0	ARM Cortex-M0	ARM Cortex-M0	ARM Cortex-M0
System Clock	Max. 122.88MHz	Max. 122.88MHz	Max. 122.88MHz	Max. 122.88MHz	Max. 122.88MHz
Operating Voltage	2.0V - 5.5V	2.0V - 5.5V	2.0V - 5.5V	2.0V - 5.5V	2.0V - 5.5V
Regulator Out (Body Option)	3.0~3.3V, 30mA	3.0~3.3V, 30mA	3.0~3.3V, 30mA	3.0~3.3V, 30mA	3.0~3.3V, 30mA
Internal RAM Size	32KB + 8KB cache	32KB + 8KB cache	32KB + 8KB cache	16KB + 8KB cache	16KB + 8KB cache
GPIO Numbers	37+6	37+6	37+6	21+6 (Without IOA[2:1], IOA[9] , IOA[12:11] , IOA[19:14] , IOA[26], IOA[29:28] , IOD[1:0])	21+6 (Without IOA[2:1], IOA[9] , IOA[12:11] , IOA[19:14] , IOA[26], IOA[29:28] , IOD[1:0])
Voice Recognition	V	X	V	X	V
USB	V	V	V	X	X
SPU	32 Channels	32 Channels	32 Channels	X	X

2 DEVELOPMENT ENVIRONMENT

2.1 GENERAL DESCRIPTION

Generalplus offers a series of documents, software, and hardware for GPCM3 development purpose. The following list includes useful tools and documents that assist users getting started with GPCM3 development.

Table 2-1 summary of GPCM3 series development materials

Document / Software / Hardware	Version	Writing Code	Debugging	Verifying	Code Releasing
Document					
Data Sheet	V1.1	V	-	-	-
Programming Guide	V1.0	V	V	-	-
Getting Start	V1.0	V	V	-	-
GPCM SACM Library User Manual	V1.0	V	-	-	-
Confirmation Sheet	-				V
Software					
G+ IDE for ARM	V1.1.2.3	V	V	V	V
G+ Gadget	V1.1.5	V			
G+ Midiar	V3.1.0.3	V			
G+ Eventor	V2.3.1	V			
G+ Easy Writer	V1.3.2.2	V	V	V	V
Hardware					
G+ LINK PRO	-	V	V	V	-
EMU Board	V1.2	-	V	V	-
Piggyback	V1.3		V	V	

2.2 DOCUMENT

2.2.1 Datasheet

Each IC has its corresponding data sheet. Most of them need to be obtained from Generalplus. The data sheet mainly introduces IC specification, pin count, AC/DC characteristics, package-type, and reference circuit.

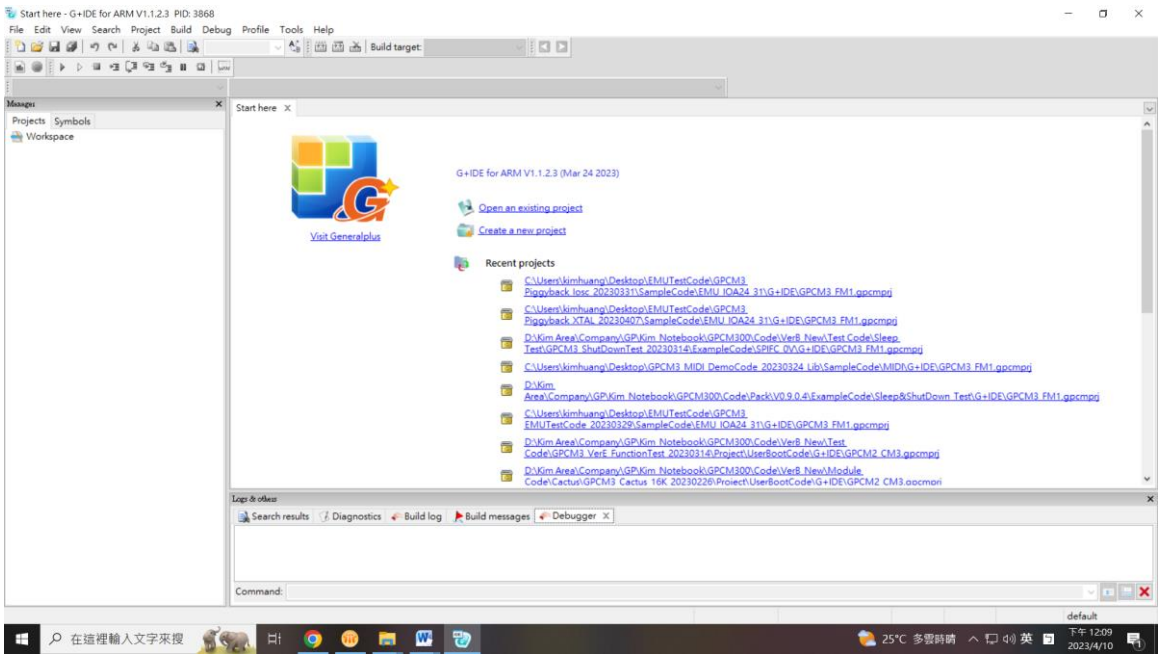
2.2.2 Programming guide

The purpose of programming guide is to guide users how to develop a program code for a specific integrated circuit. You may obtain it from Generalplus through your convenient channel.

2.3 SOFTWARE

2.3.1 G+IDE for ARM

G+ IDE for ARM, a newly integrated development environment by Generalplus, is designed to fulfill the needs of various programming environments including project management, engineering configuration, source code programming, debug tools and many others. We will introduce each of these functions in later chapters to help you get familiar with G+ IDE for ARM. We also provide a quick start guideline to help you install and utilize the IDE rapidly.



After installing G+ IDE for ARM tool, a user's manual can be found under C:\Program Files (x86)\Generalplus\G+ IDE for ARM 1.x.x\Doc.

Note 1: Keil to G+ IDE Migration Guide which will introduce how to convert a Keil project to a G+IDE for ARM Project.

Note 2: User should install a GPCM3 Device Family Pack that is a compressed file. After decompression, some GPCM3 example codes and sample codes can be found in the folder.

2.3.2 G+ Midiar

G+ Midiar is an integrated musical tool which supports both tone mode and speech mode. After a MIDI or tone-color is edited on G+ Midiar, they can be downloaded on EMU board or Piggyback, no additional program required. After G+ Midiar is installed on a PC, please press F1 or select Help from Menu to open a user's guide. The following figure is the interface. GPCM3 series supports hardware SPU and software MS02. Please select which midi to be used in the body selection field.

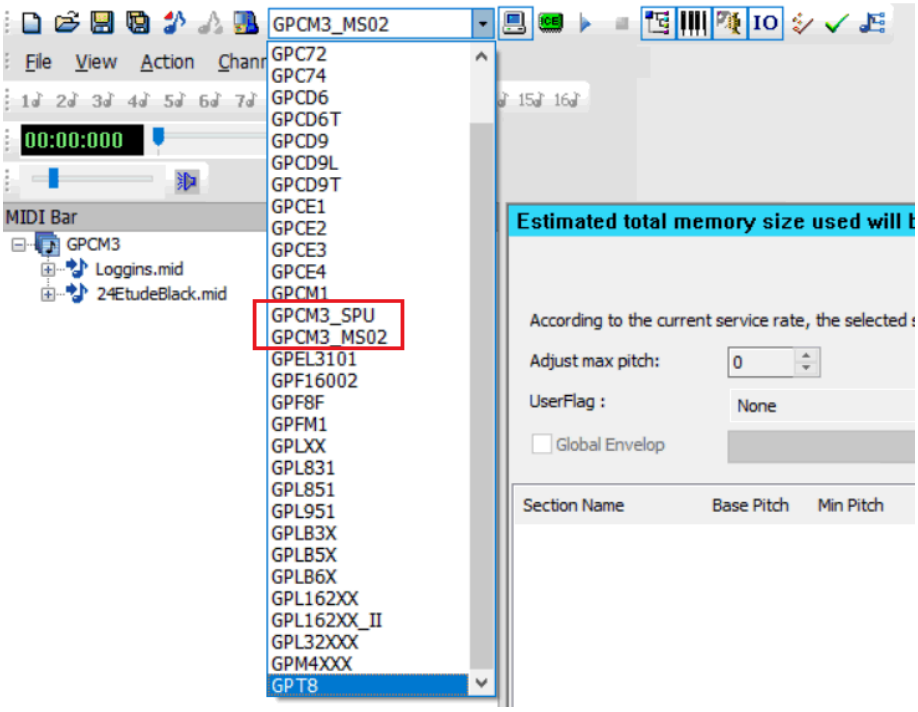
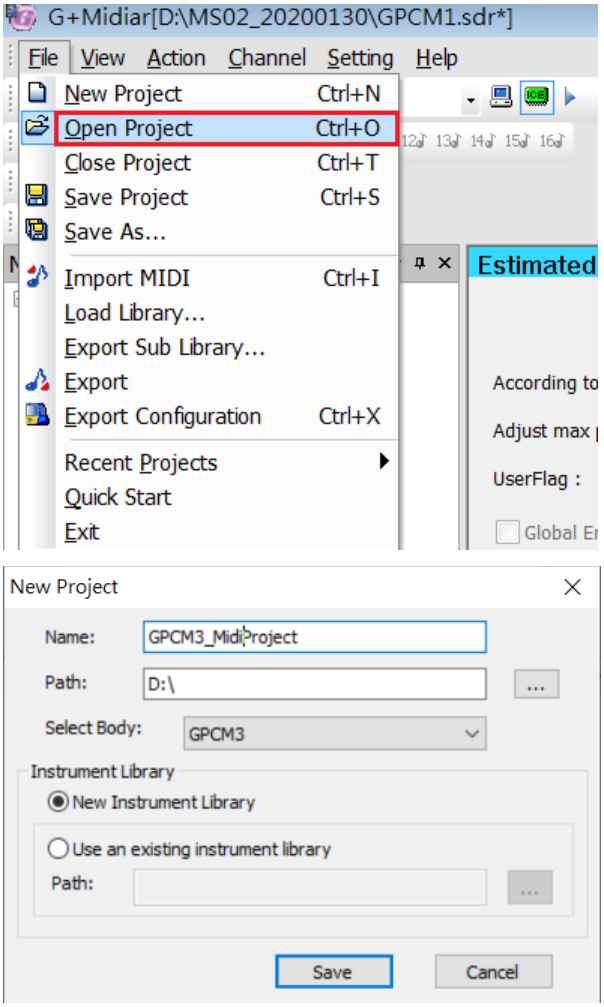


Figure 2-1 G+Midiar GUI

1. Download a file onto GPCM3 EMU or Piggyback from G+Midiar:
   (a) Open/ New a G+Midiar's project(*.sdr)



(b) Connect GPCM3 PIGGYBACK/ EMU board and G+ LINK PRO shown as follows.

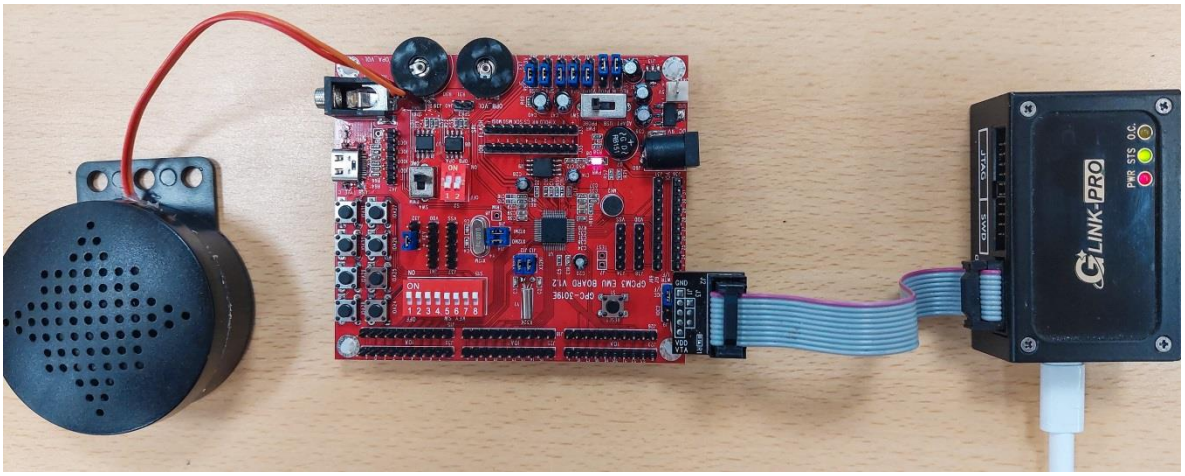


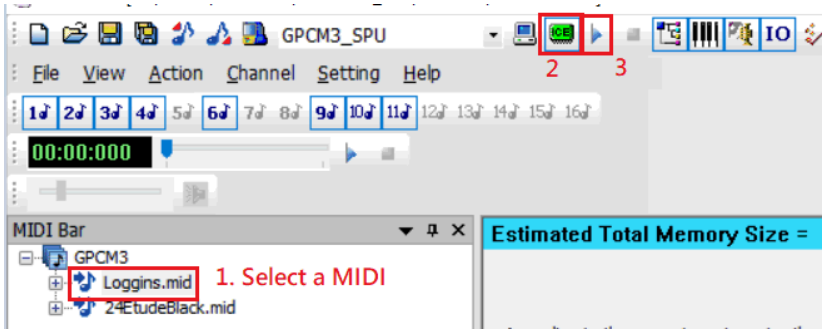
Figure 2-2 connect EMU board and G+ LINK PRO

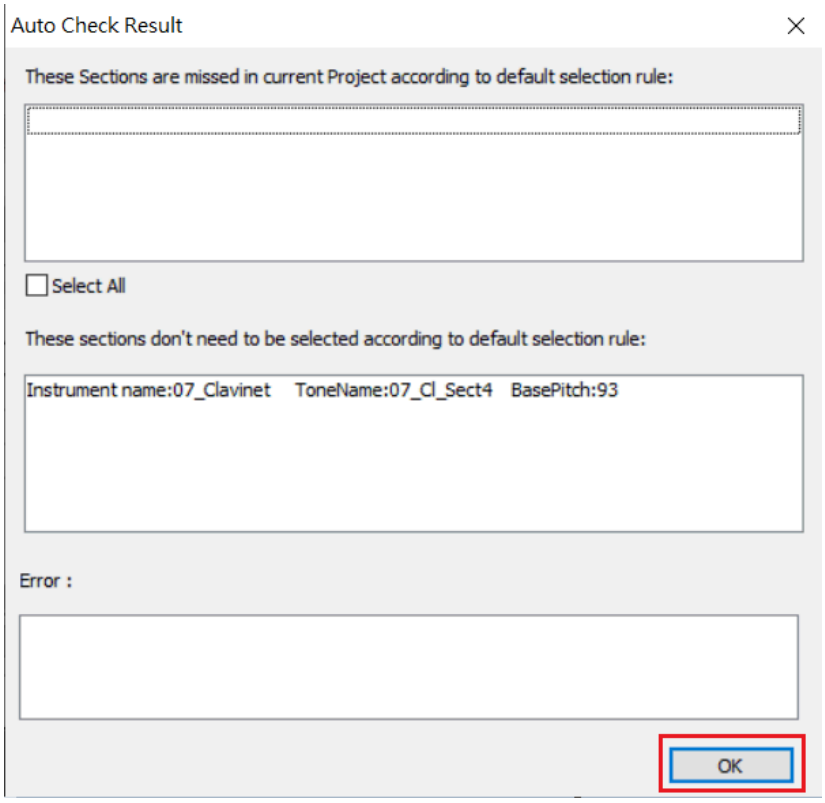
(c) Download & play:

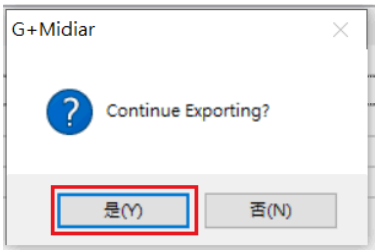
(1) Step 1: Select a MIDI.

(2) Step 2: Select ICE interface.

(3) Step.3: Click the playback icon and it will display the following message boxes.

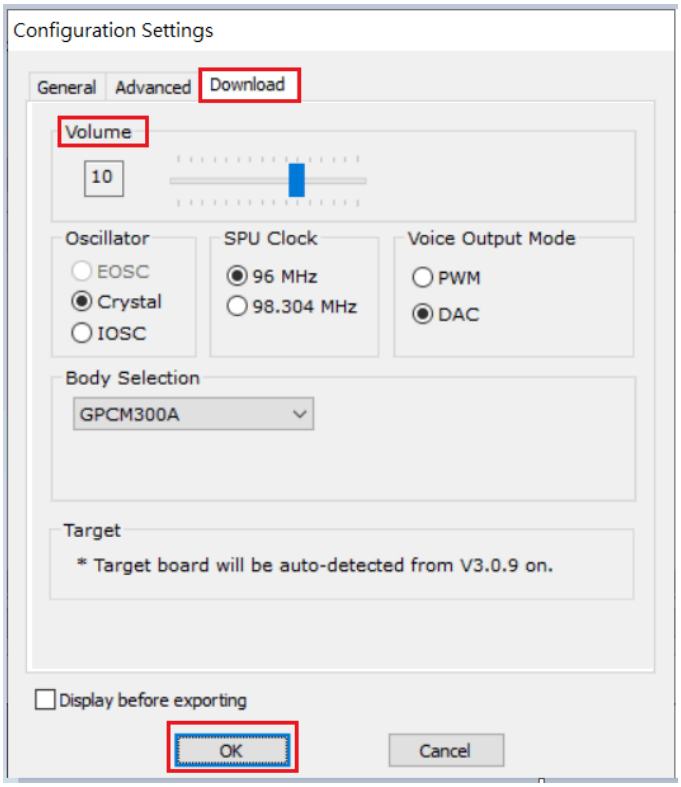




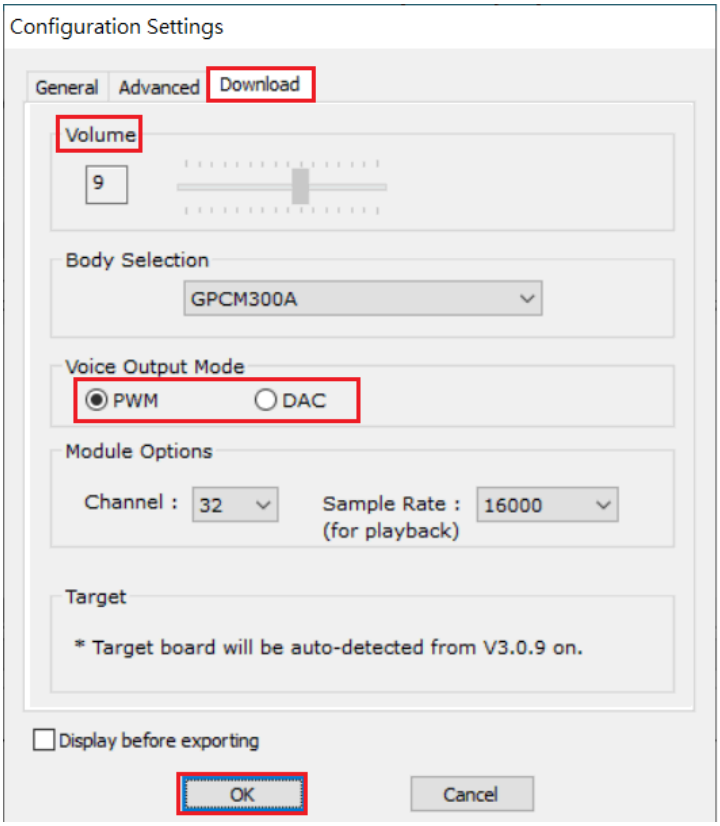


(4) You may adjust the volume before download.

(5) Click OK and start downloading files.



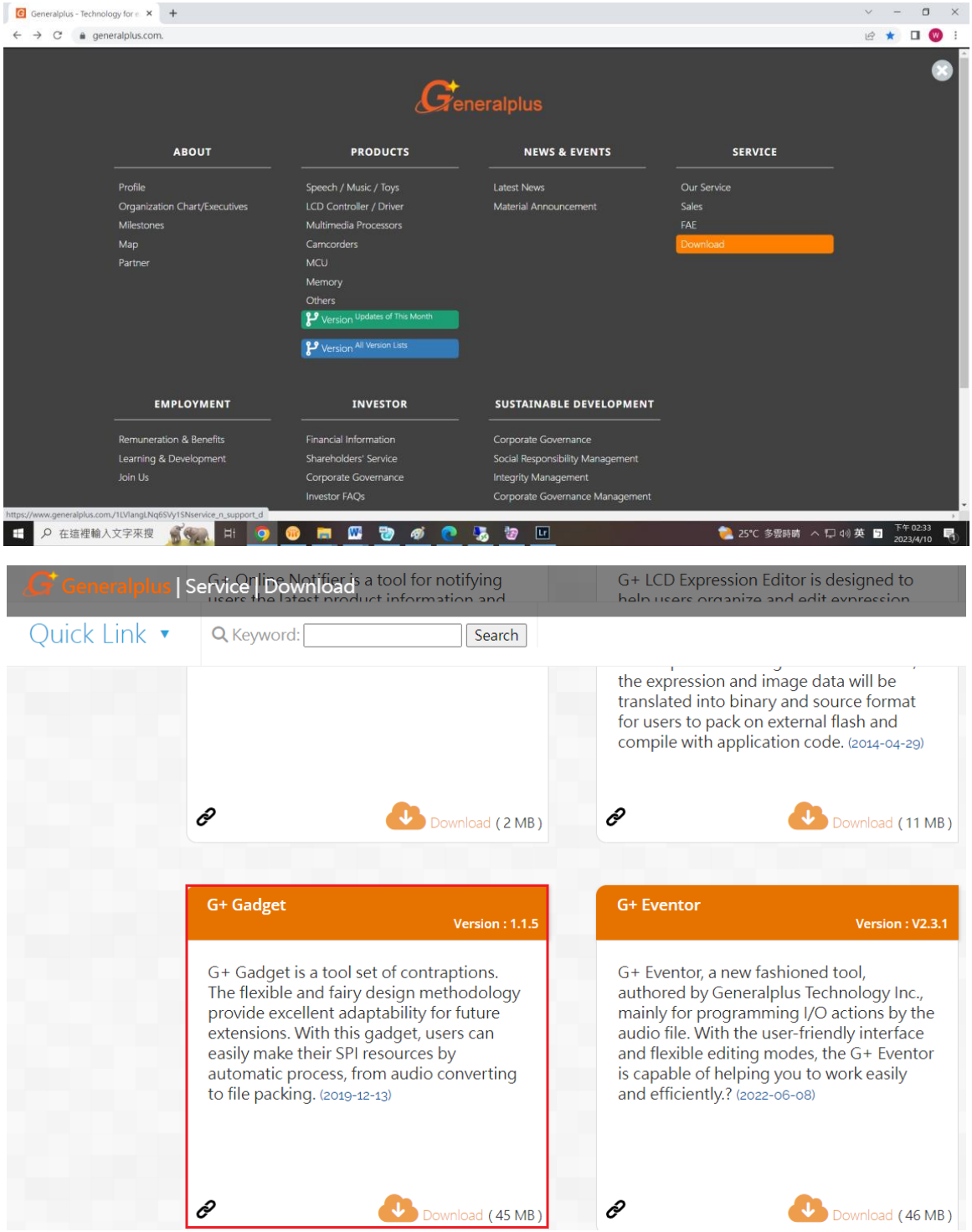
UI for GPCM3_SPU



UI for GPCM3_MS02

2.3.3 G+ Gadget

G+ Gadget is a tool set of contraptions. The flexible design methodology provides excellent adaptability for future extensions. With this gadget, users can easily make their SPI resources by automatic process, from audio converting to file packing.



G+Gadget has three major tools, including Audio Batch Converter, File Merger, and SPI FLASH Writer. You may download it from Generalplus's web site at www.generalplus.com. We will introduce these three tools in the following sections.

2.3.3.1 Audio Batch Converter

Audio Batch Converter is a tool to convert wave file (*.wav). It can convert a wave file to all SACM's speech formats supported by GPCM3 Series. It also allows user to download speech/music onto GPCM3 emulation board or Piggyback directly. (additional SPI FLASH is required connecting with SPIFC Interface) The following picture is the Audio Batch Converter Interface. User can start using this tool by running the Audio Batch Converter.exe from AudioBatchConverter Vx.x.x folder.

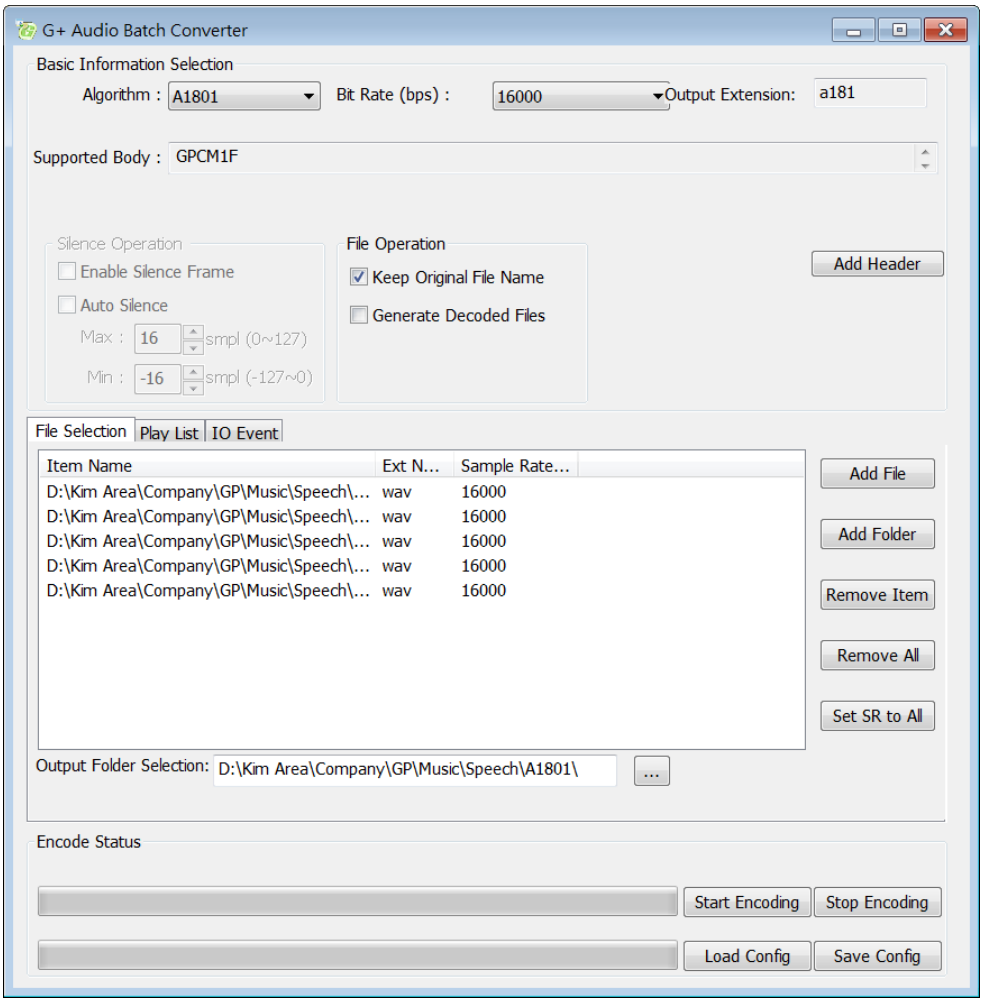


Figure 2-3 G+Audio Batch Converter GUI

2.3.3.2 File Merger

File Merger is capable of integrating multiple files into one single file. In general, before storing and downloading multiple songs into SPI FLASH, we will integrate and order those songs into *.o, *.inc and *.h files using File Merger.

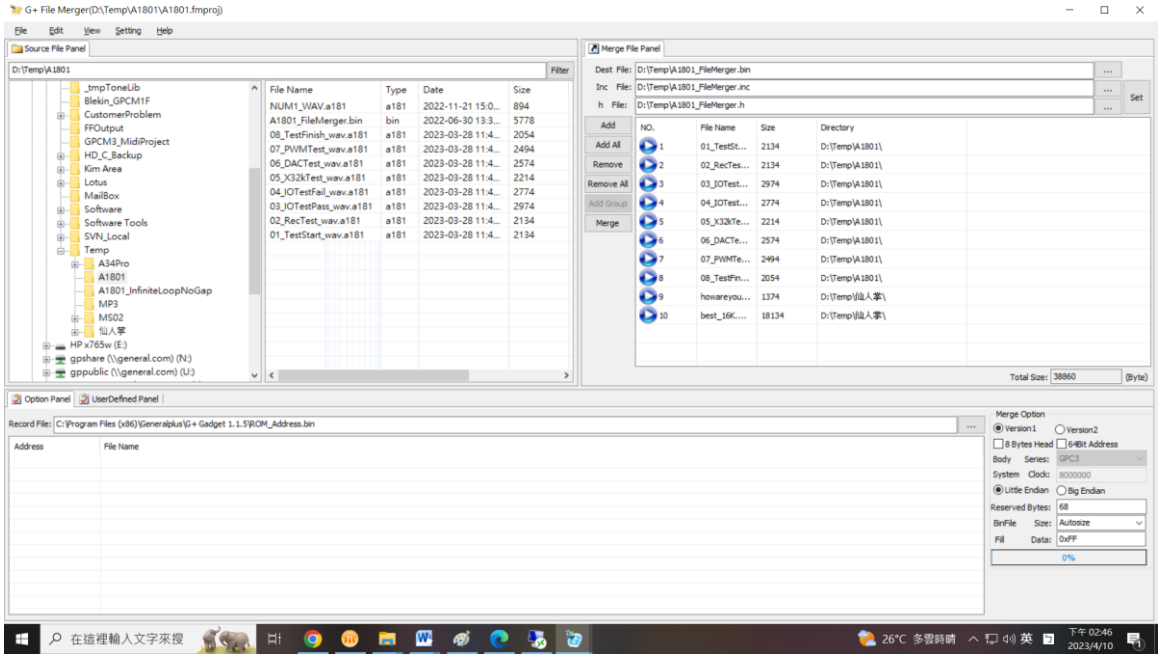
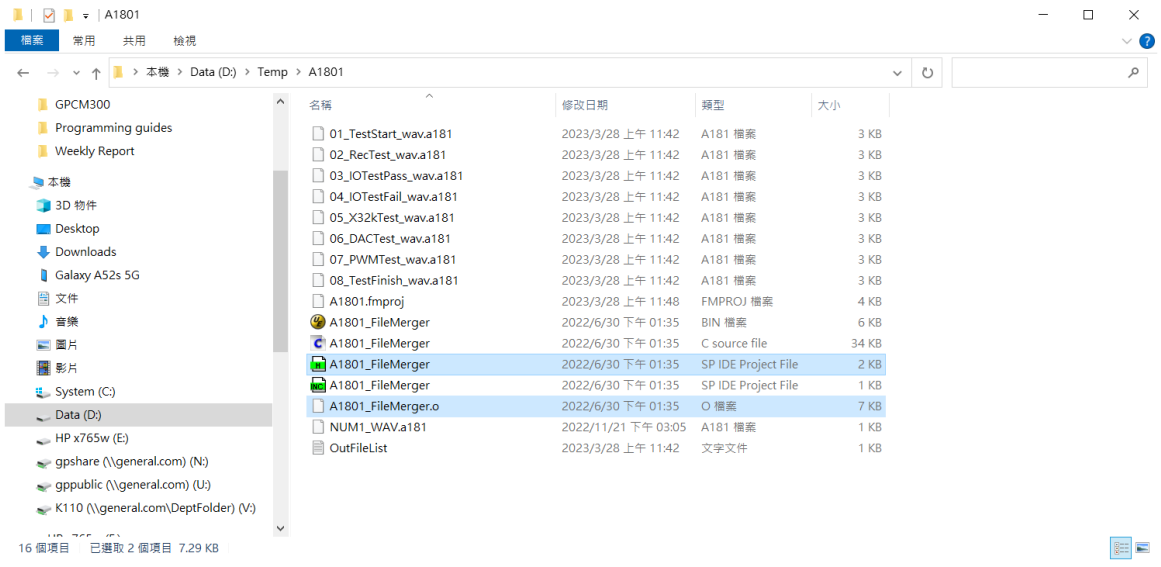
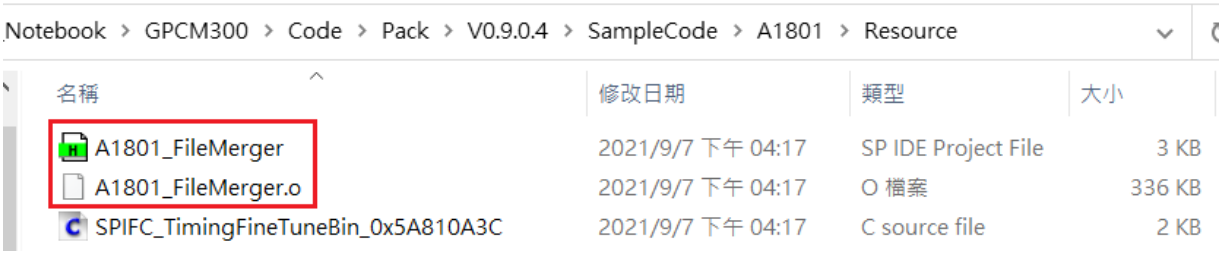


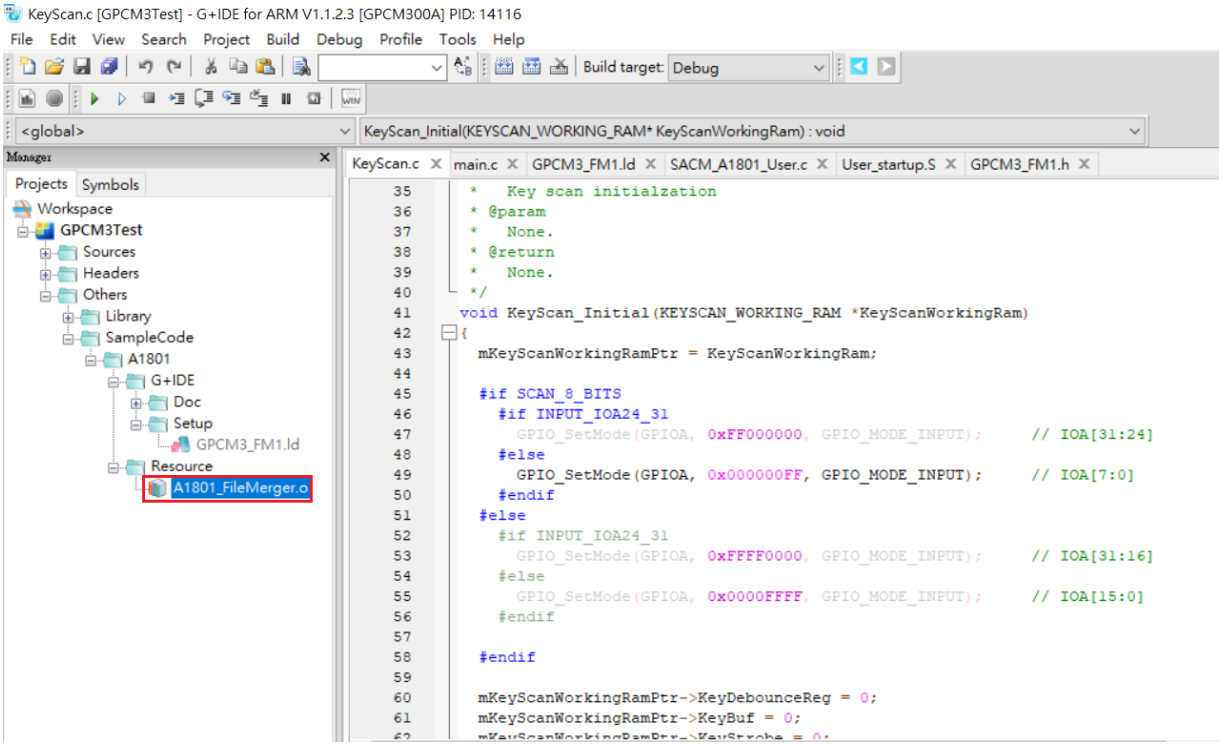
Figure 2-4 G+File Merger GUI



1. Add *.o & *.h files into G+IDE for ARM SACM project: (using the A1801 demo code as an example)
   (a) Rename *.h and *.o files (generated by File Merger) to A1801_FileMerger.h and A1801_FileMerger.o.
   (b) Copy A1801_FileMerger.h and A1801_FileMerger.o files into G+IDE for ARM SACM project and overwrite the original contents and rebuild to replace song(s).



(c) Add A1801_FileMerger.o file into G+IDE for ARM SACM project.



2.3.3.3 SPI FLASH Writer

SPI FLASH Writer allows user to download a binary file into SPI FLASH; a SPI FLASH Writer Board is required.

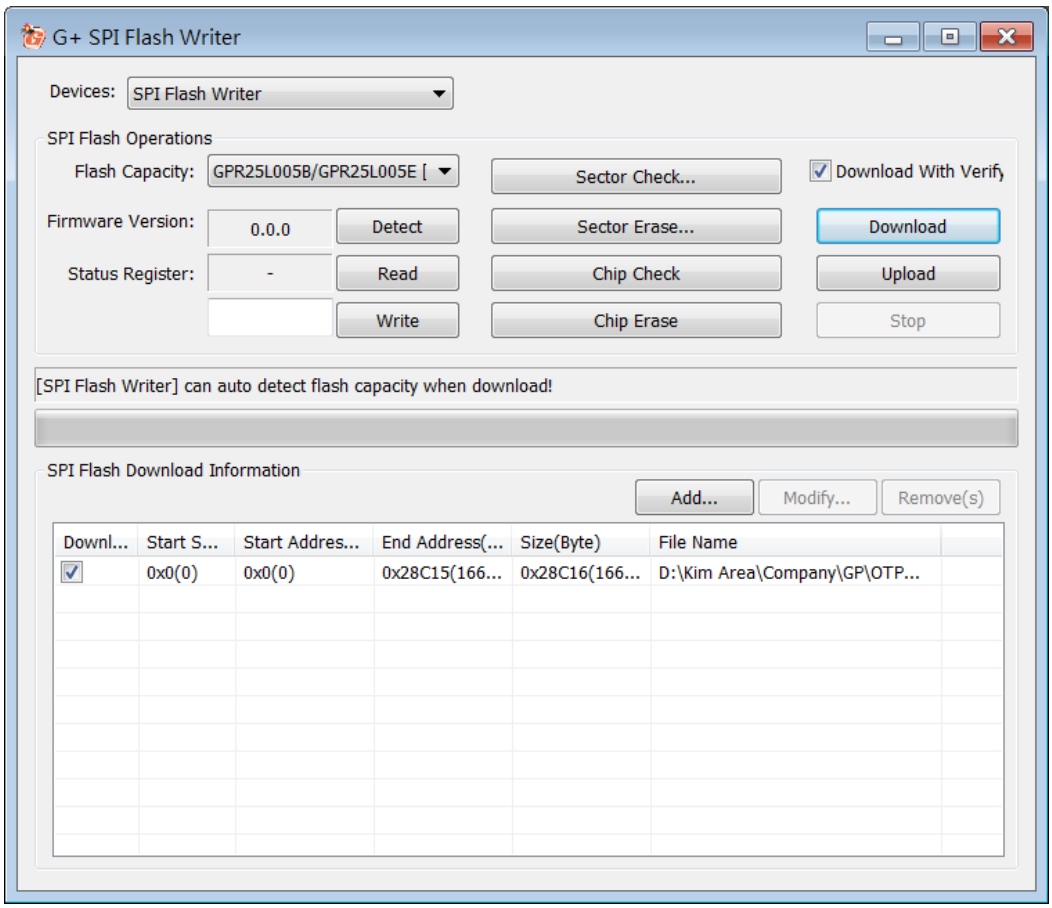
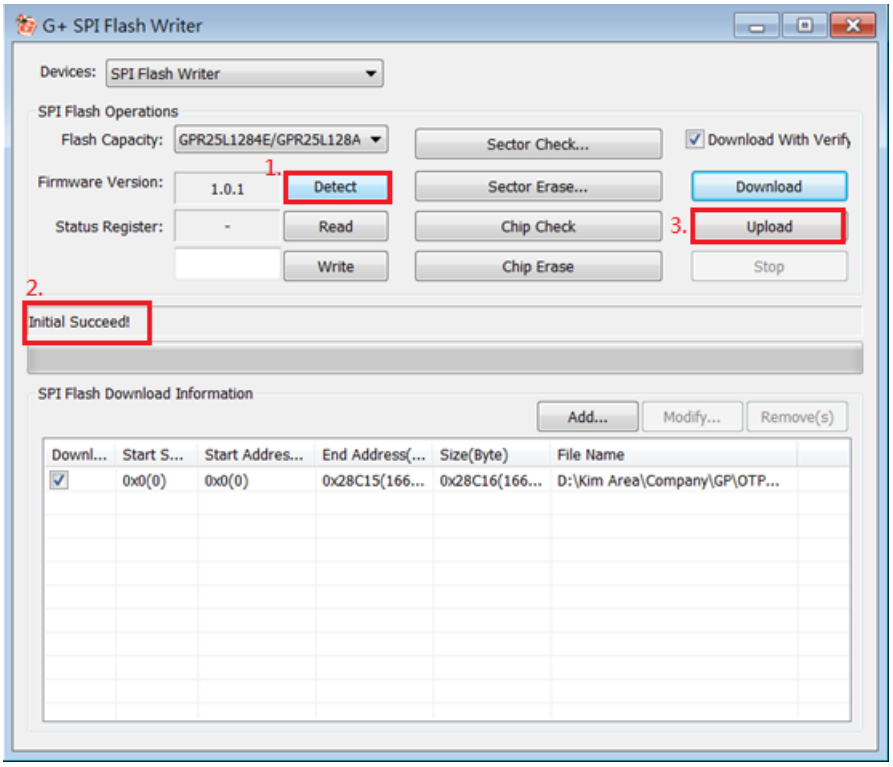


Figure 2-5 G+SPI FLASH Writer GUI

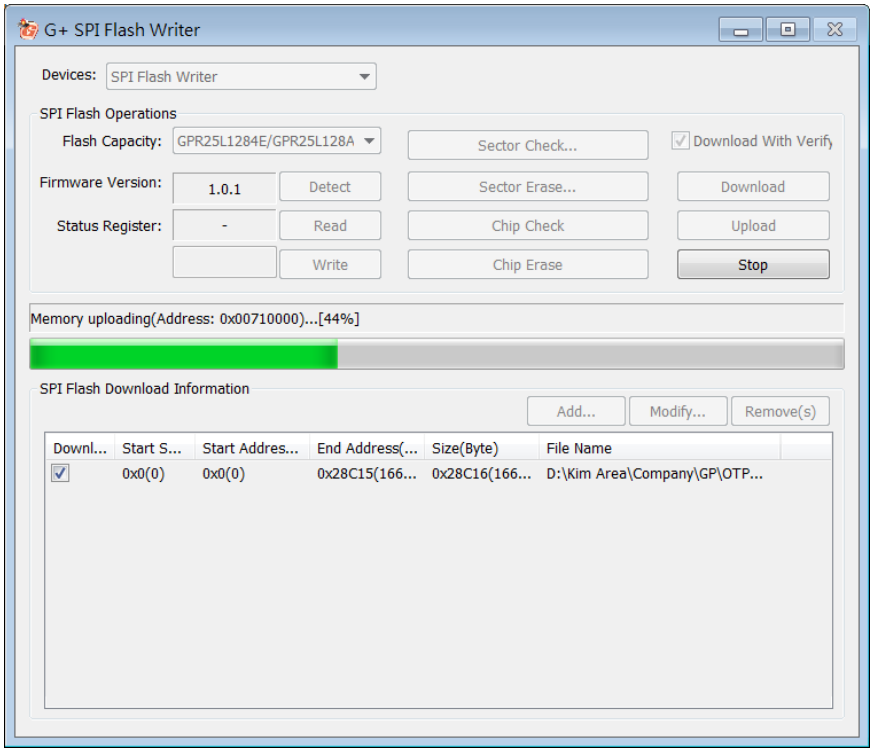
(a) Associating with G+Gadget's SPI FLASH Writer tool

(1) Press Detect button, make sure SPI FLASH is initialized successfully.

(2) If shows "Initial Succeed!", SPI FLASH is connected successfully.



(3) Press Upload button to read data from SPI FLASH or press Download button to download data onto SPI FLASH.



2.3.4 G+ Easy Writer

G+Easy Writer downloads SPI FLASH *bin file onto external SPI FLASH. You can also obtain this writer from Generalplus via your convenient channel. For more details, please refer to G+ Easy Writer User's Guide.

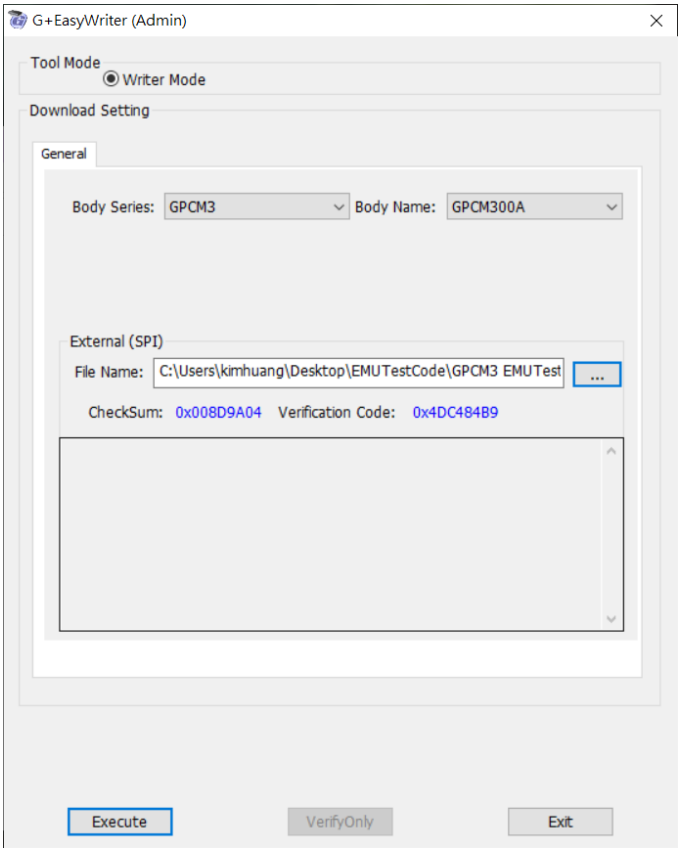


Figure 2-6 Easy Writer main user interface

2.4 HARDWARE

2.4.1 G+ LINK PRO

G+ LINK PRO is an ICE Tool with USB port supported. It is used to debug and download program. Please obtain it from Generalplus thorough your convenient channel.

Figure 2-7 New G+ Link Pro

2.4.2 Emulation Board (EMU) & Piggyback

Generalplus provides developer two hardware boards, EMU board and Piggyback. The EMU board provides more application circuits than Piggyback does, e.g. DAC application circuit. On the other side, Piggyback is target for demonstration purpose, meaning the size of board is rather small with availability of all pin outs and functions. These two boards are able to emulate GPCM3 development environment. You can also obtain these boards from Generalplus via your convenient channel.

2.4.2.1 Function Description for GPCM3 Piggyback

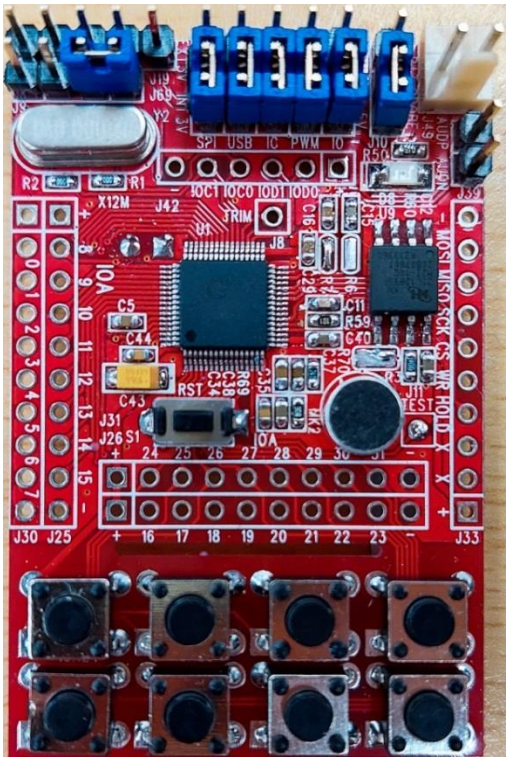


Figure 2-8 GPCM3 Piggyback

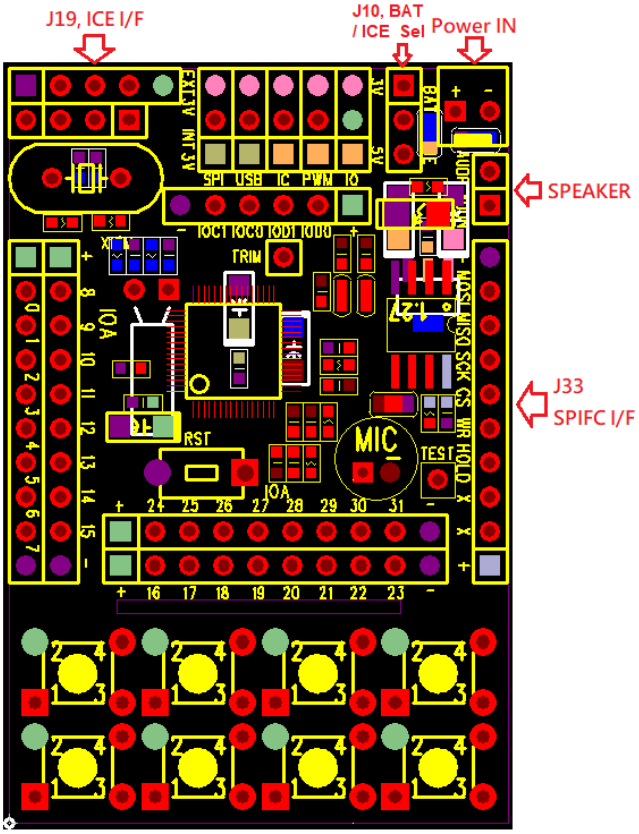


Figure 2-9 GPCM3 Piggyback function description

1. Jumper function:
   (a) J10: Battery/ ICE Power Selection:
   (b) J19: ICE I/F
   (c) J25: IOA[15:8]
   (d) J26: IOA[23:16]
   (e) J30: IOA[7:0]
   (f) J31: IOA[31:24]
   (g) J33: SPIFC I/F
   (h) J35: IOB[5:0]
   (i) J39: Speaker Output
   (j) J42:IOC[1:0] & IOD[1:0]
   (k) J49: DC5V Power Input
   (l) J66: PVDD/DAC Power Selection Pins:
      (1) 1-2: DC 5V
      (2) 2-3: DC 3V
   (m) J67: VDD_REGIN Power Selection Pins:
      (1) 1-2: DC 5V
      (2) 2-3: DC 3V
   (n) J68: USB Power Selection Pins:
      (1) 1-2: Internal Regulator 3V
      (2) 2-3: External Regulator 3V
   (o) J69: IOC2 Pin Function Selection:
      (1) 1-2: ICE I/F
      (2) 2-3: General IO (IOC2)
   (p) J70: VDDIO Power Selection Pins:
      (1) 1-2: DC 5V
      (2) 2-3: DC 3V
   (q) J71: SPIFC Power Selection Pins:
      (1) 1-2: Internal Regulator 3V
      (2) 2-3: External Regulator 3V
   (r) S1: Reset Pin

2.4.2.2 Function Description for GPCM3 EMU board

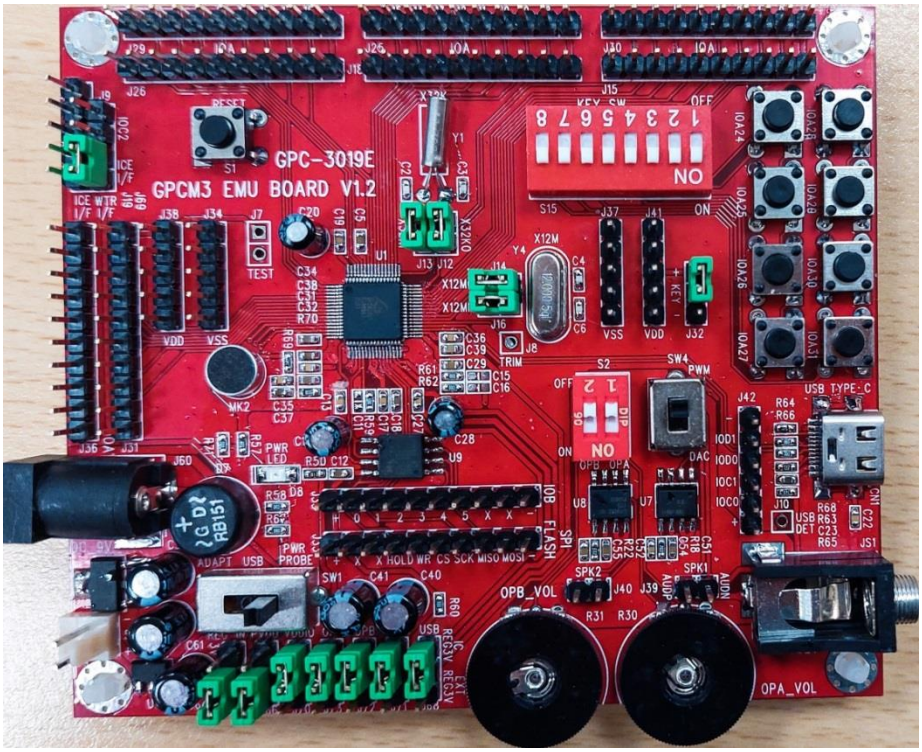


Figure 2-10 GPCM3 EMU board

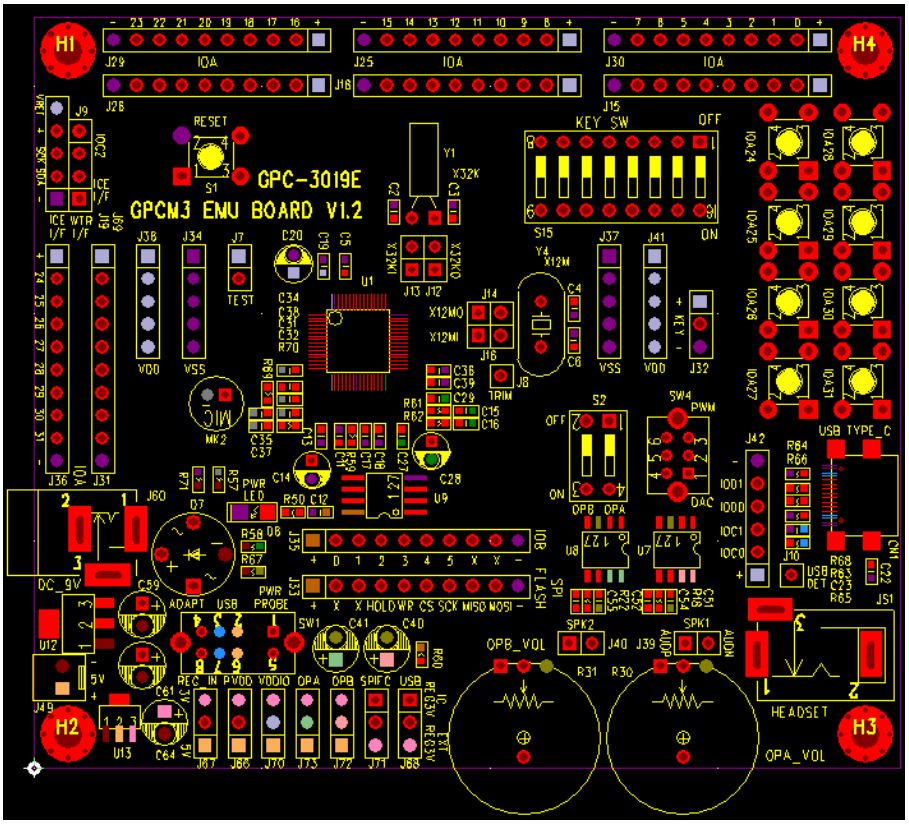


Figure 2-11 GPCM3 EMU board function description

1. Jumper Function:
   (a) J12 & J13: X'TAL 32KHz Input Selection Pins
   (b) J14 & J16: X'TAL 12MHz Input Selection Pins
   (c) J19: ICE I/F
   (d) J33: SPIFC I/F
   (e) J15 & J30: IOA[7:0]
   (f) J18 & J25: IOA[15:8]
   (g) J26 & J29: IOA[23:16]
   (h) J31 & J36: IOA[31:24]
   (i) J35: IOB[5:0]
   (j) J42:IOC[1:0] & IOD[1:0]
   (k) J39: Speaker Output 1 (PWM or OPA_DAC Out)
   (l) J40: Speaker Output 2 (OPB_DAC Out)
   (m) J49: DC 5V Power Input
   (n) J60: DC 9V Jack
   (o) J66: PVDD/DAC Power Selection Pins:
      (1) 1-2: DC 5V
      (2) 2-3: DC 3V
   (p) J67: VDD_REGIN Power Selection Pins:
      (1) 1-2: DC 5V
      (2) 2-3: DC 3V
   (q) J68: USB Power Selection Pins:
      (1) 1-2: Internal Regulator 3V
      (2) 2-3: External Regulator 3V
   (r) J69: IOC2 Pin Function Selection:
      (1) 1-2: ICE I/F
      (2) 2-3: General IO (IOC2)
   (s) J70: VDDIO Power Selection Pins:
      (1) 1-2: DC 5V
      (2) 2-3: DC 3V
   (t) J71: SPIFC Power Selection Pins:
      (1) 1-2: Internal Regulator 3V
      (2) 2-3: External Regulator 3V
   (u) J72: GPY0030C OPA Power Selection Pins:
      (1) 1-2: DC 5V
      (2) 2-3: DC 3V
   (v) J73: GPY0030C OPB Power Selection Pins:
      (1) 1-2: DC 5V
      (2) 2-3: DC 3V

2. Switch Function:
   (a) S1: Reset Pin
   (b) S2: DAC OPA & OPB ON/OFF Selection
      (1) 1: OPA ON/OFF
      (2) 2: OPB ON/OFF
   (c) S15: IOA[7:0] Key Switch Enabling/Disabling Selection
   (d) SW1: Power Source Selection
      (1) 1-5 (Right): G+Link Pro Power
      (2) 3-7 (Middle): USB Power
      (3) 4-8 (Left): Adapter DC 9V=> 5V Power
   (e) SW4: Speaker Output 1 Source Selection:
      (1) PWM Out
      (2) DAC Out

3. CONN & Others:
   (a) CN1: USB TYPE-C Socket
   (b) R30: OPA_DAC Volume Adjustment Resistor
   (c) R31: OPB_DAC Volume Adjustment Resistor
   (d) RS1: Headset Jack

3 HOW TO USE DEBUG TOOL

3.1 GENERAL DESCRIPTION

This chapter introduces how to use debug tool, including software settings, such as G+ IDE for ARM setup, and hardware setup.

3.1.1 Hardware Connection

Connect GPCM3 PIGGYBACK and your computer as follows:

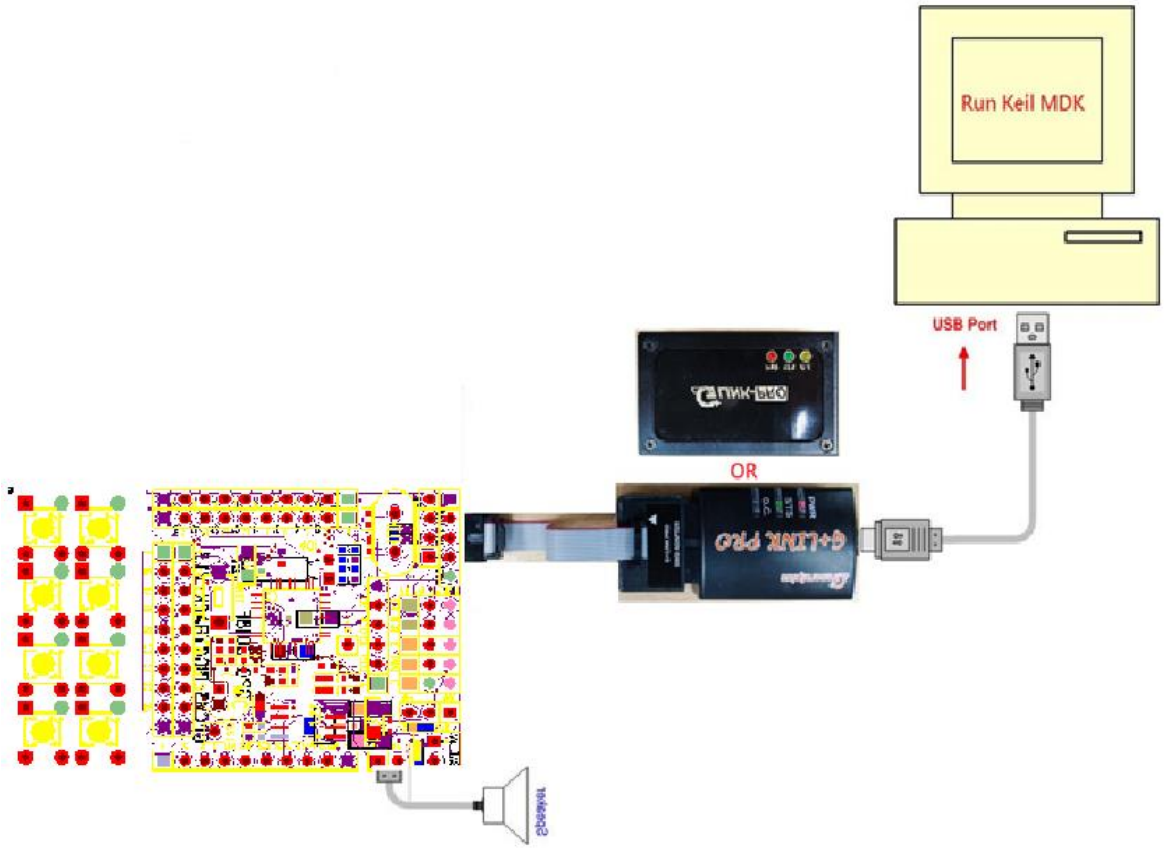


Figure 3-1 connect PC and Piggyback using new or older G+Link pro

1. Connect GPCM3 PIGGYBACK and G+ LINK PRO shown as follows.

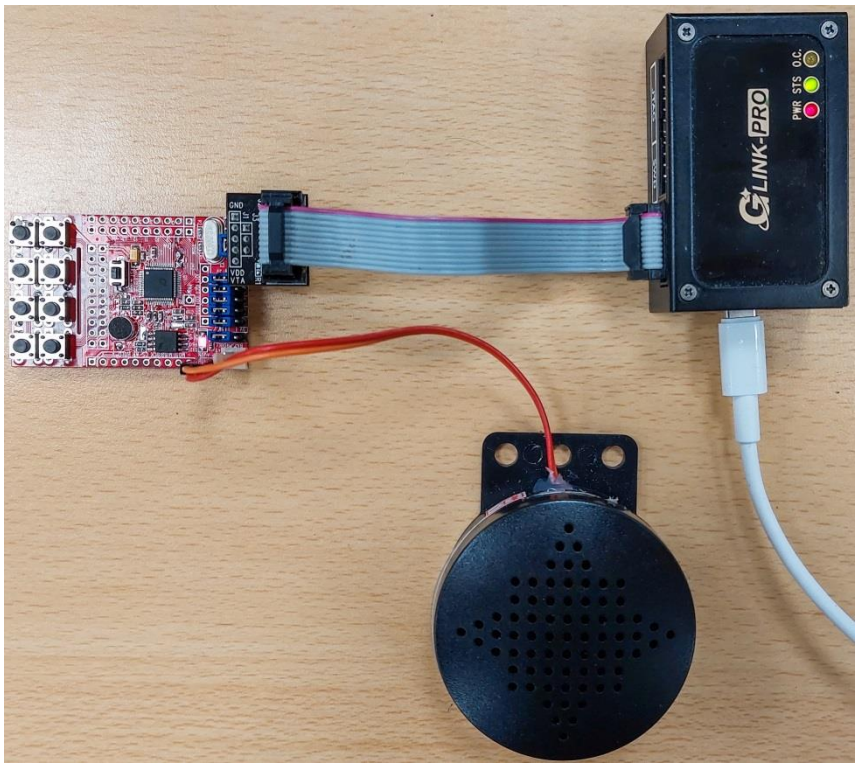


Figure 3-2 connect GPCM3 Piggyback and G+ LINK PRO

2. Connect GPCM3 EMU BOARD and G+ LINK PRO shown as follows.

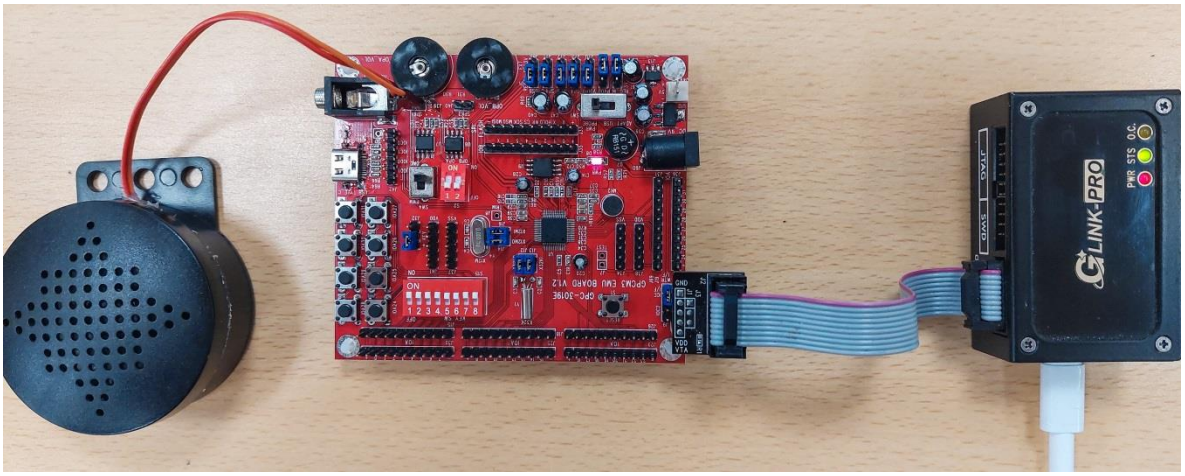
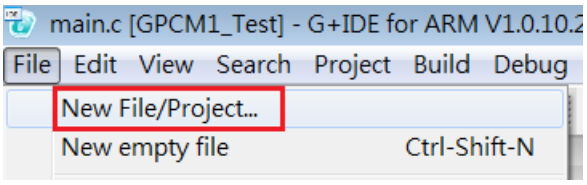


Figure 3-3 connect EMU Board and G+ LINK PRO

3.2 PROJECT IN G+IDE for ARM

3.2.1 Create a New Project

1. Click **File,** and then **New File/Project**



2. Select Embedded Application and click **Go** to continue.

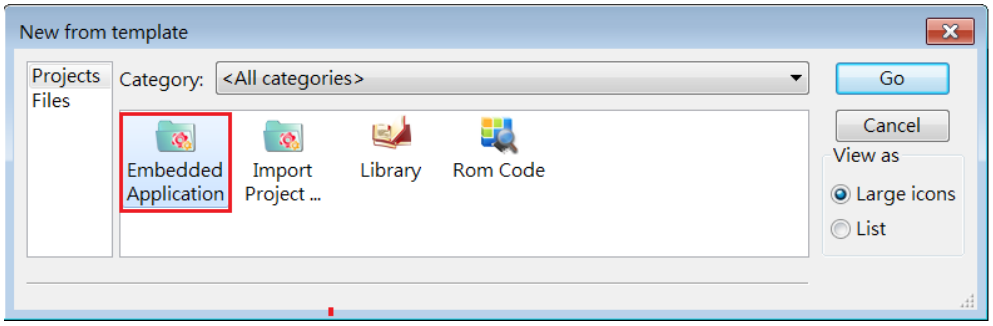


Figure 3-4 create the Embedded Application project

3. Name a project and assign it a path. Click **Next** to continue.

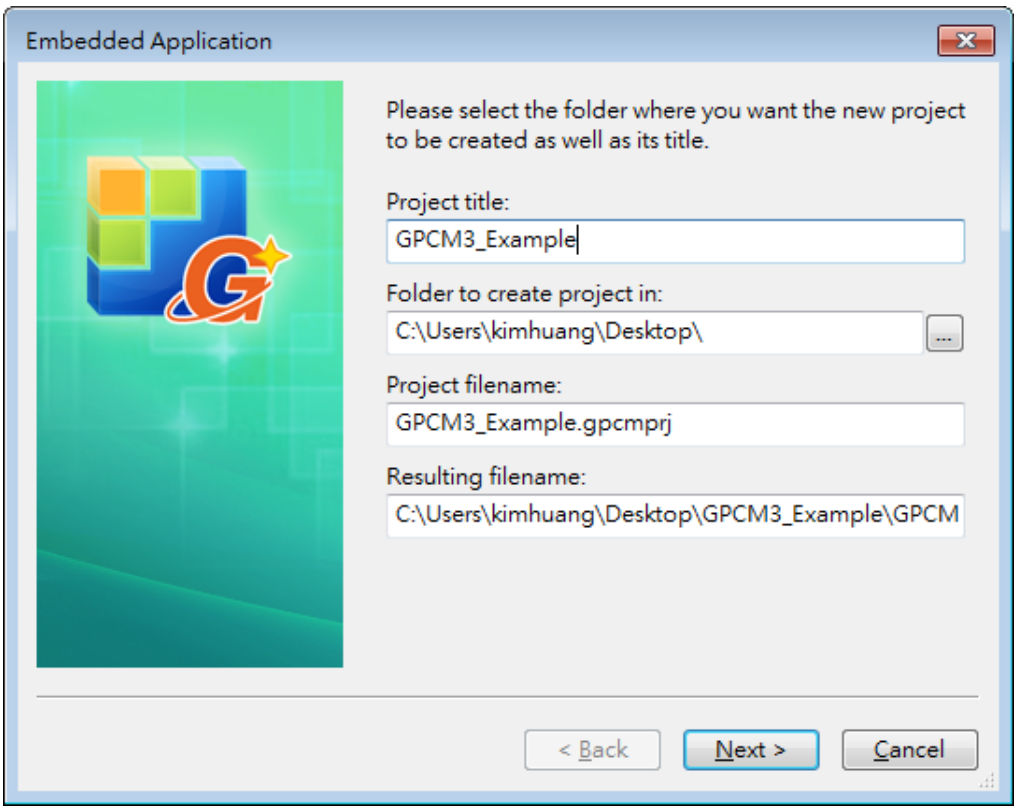


Figure 3-5 create a project name

4. Select a GPCM3 body for a new project, e.g. GPCM300A and click **Next** to continue.

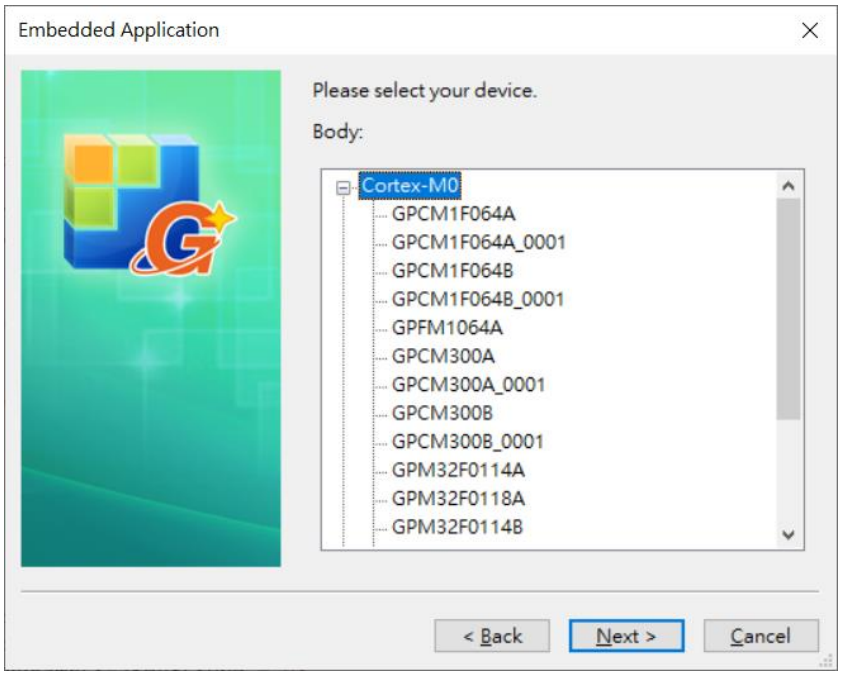
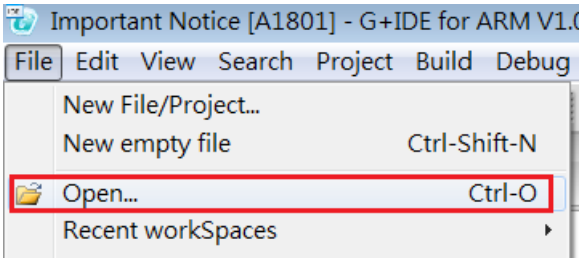


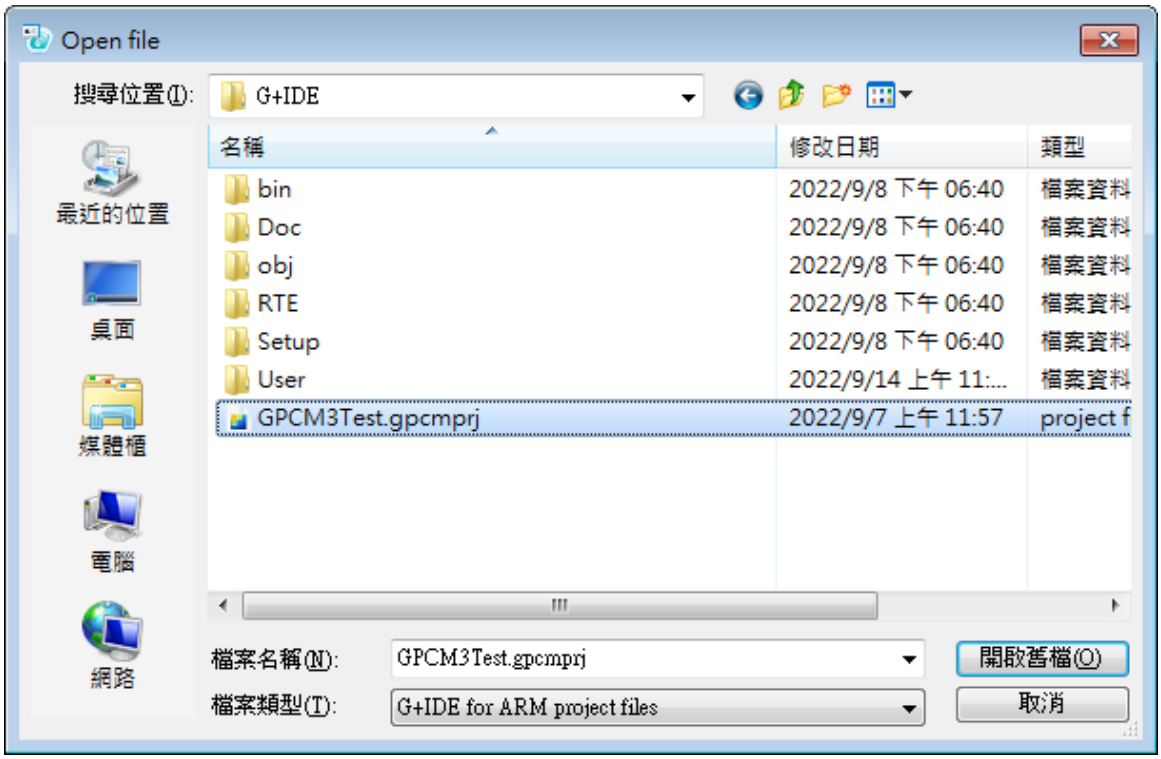
Figure 3-6 Select a GPCM3 body for a new project

3.2.2 Open an existing Project/ demo code

1. Click **File**; choose "**Open**"

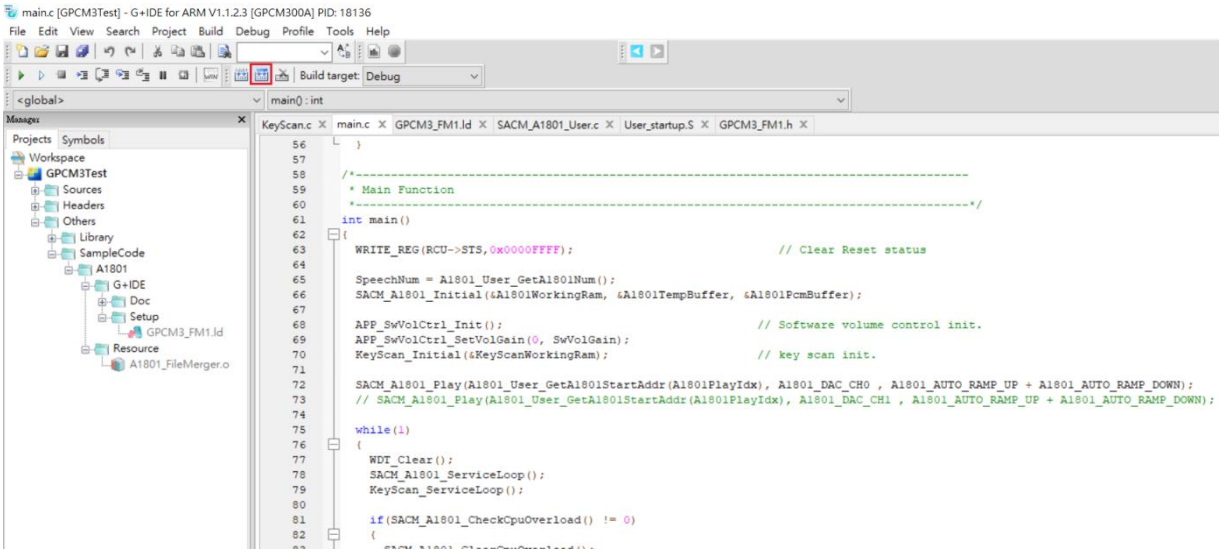


2. For example, you can open an A1801 project using "A1801.gpcmprj"

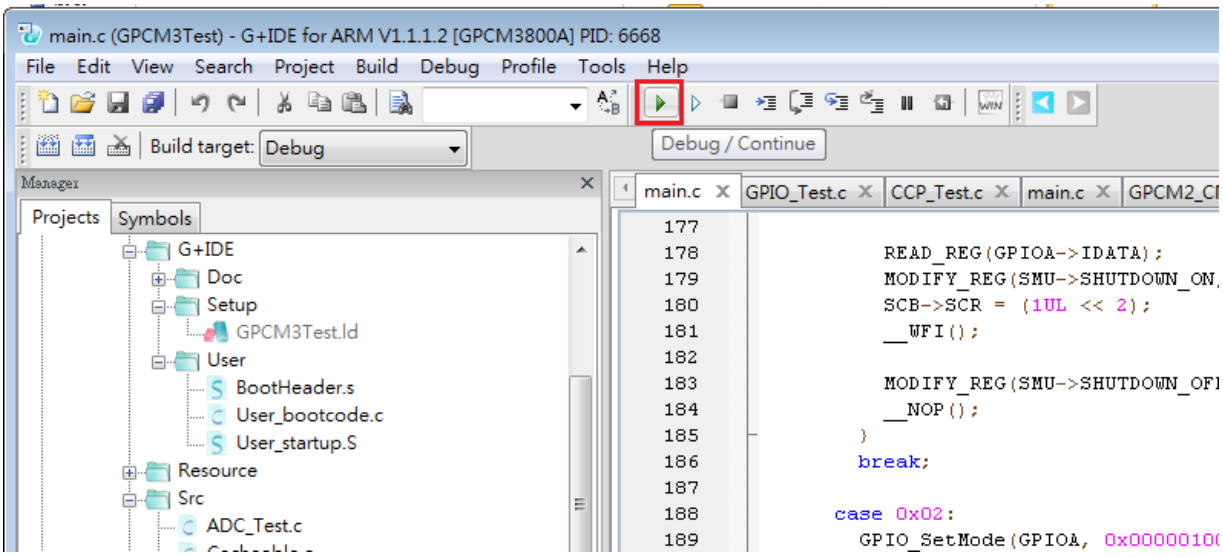


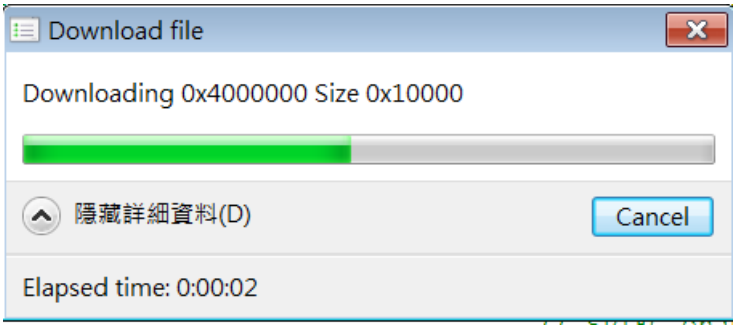
3. Rebuild & run:

(a) Step.1: Press "  " button to rebuild the project.



(b) Step2: Press "  " button to download project.





(c) Step3: Run code in debug mode.

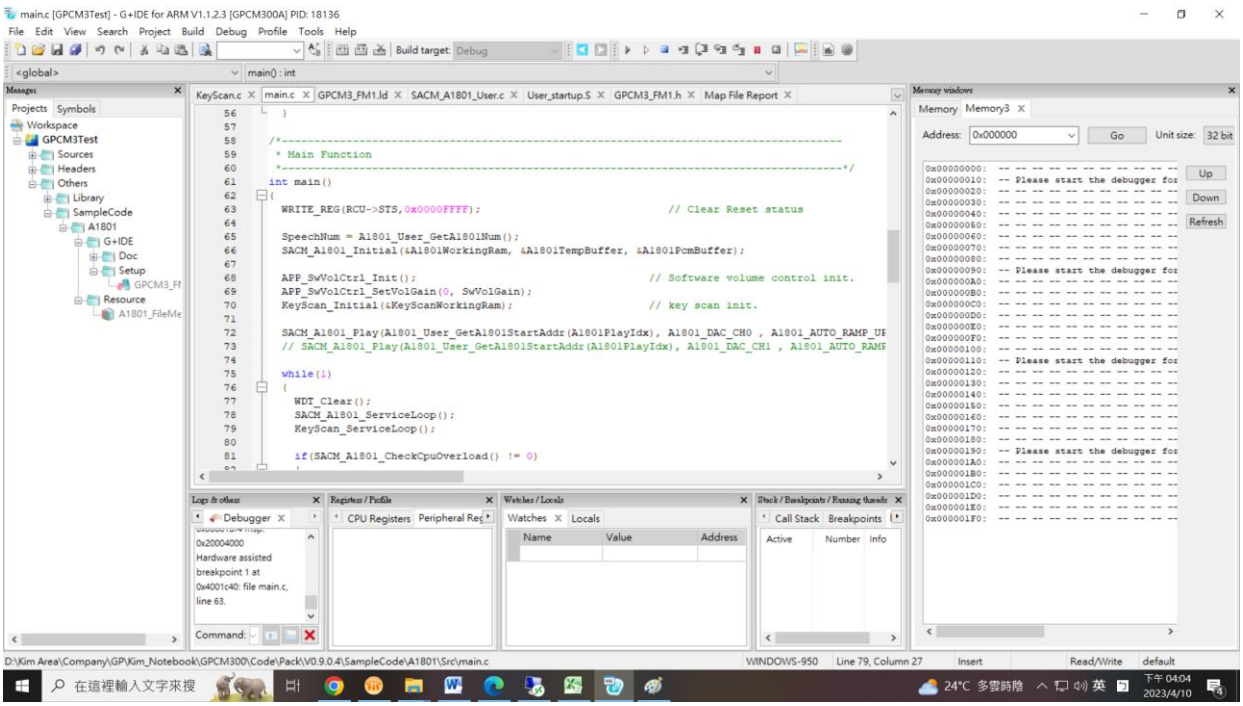


Figure 3-7 Project in debug mode

Output Window

4. The G+IDE for ARM user interface is shown in the following figure.

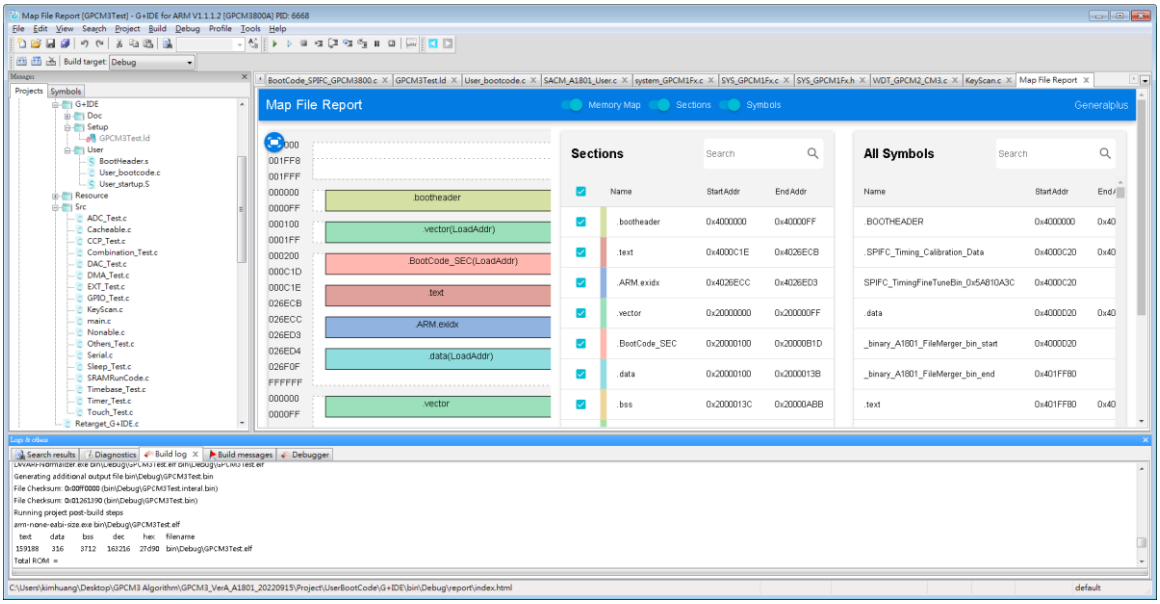


Figure 3-8 G+IDE for ARM user interface

5. Checksum value display

After building the target, file checksum value will be displayed in Build Output Window as well as the current status of RAM and ROM usage.

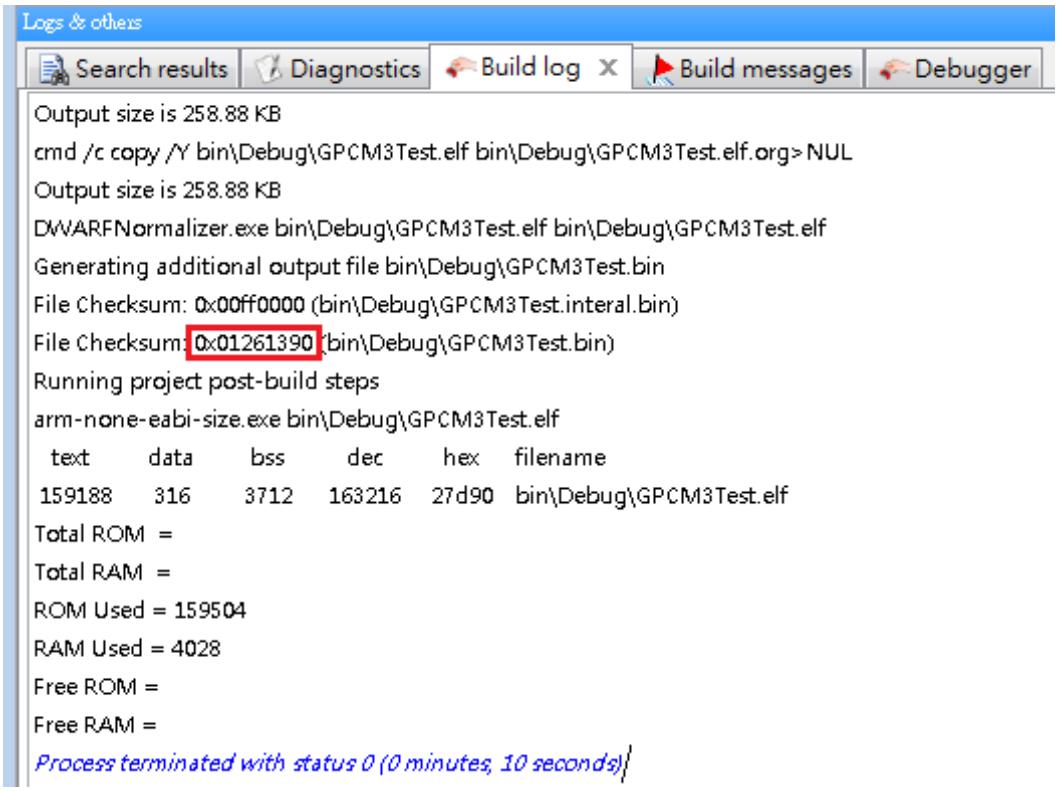
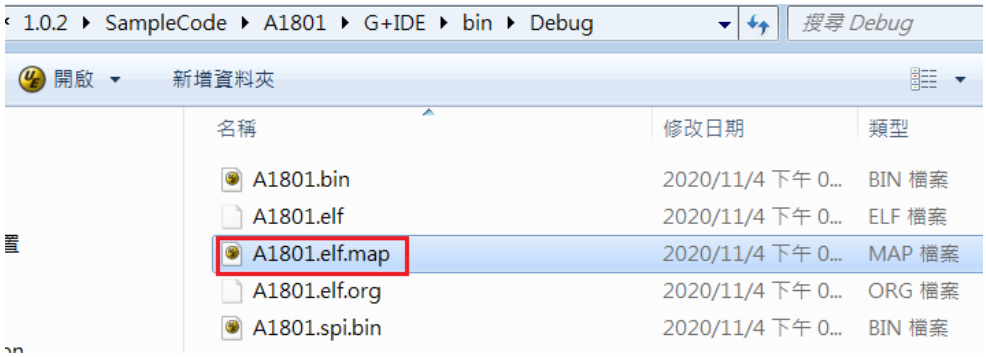


Figure 3-9 G+IDE for ARM output window

Note: For more information about the allocation of RAM and external SPI FLASH memory, refer to the *.map file under GPCM3 Project \G+IDE\bin\Debug.

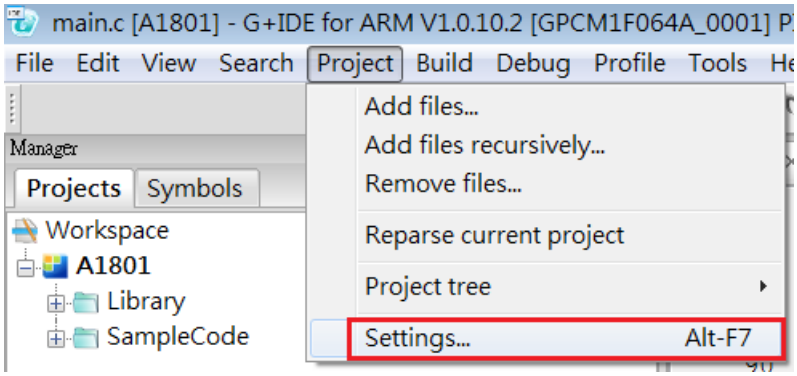


A1801.elf.map

```
                0x00006524                int_region_standard_deviation_table
 .rodata.vector_dimension_dec
                0x000065a4        0x8 ..\..\..\Library\Lib\A1801_V1.0.1.lib(tables_1.o)
                0x000065a4                vector_dimension_dec
 .rodata.number_of_vectors_dec
                0x000065ac        0x8 ..\..\..\Library\Lib\A1801_V1.0.1.lib(tables_1.o)
                0x000065ac                number_of_vectors_dec
 .rodata.max_bin_dec
                0x000065b4        0x8 ..\..\..\Library\Lib\A1801_V1.0.1.lib(tables_1.o)
                0x000065b4                max_bin_dec
 .rodata.max_bin_plus_one_inverse
                0x000065bc       0x10 ..\..\..\Library\Lib\A1801_V1.0.1.lib(tables_1.o)
                0x000065bc                max_bin_plus_one_inverse
 .rodata.rmlt_to_samples_window
                0x000065cc      0x500 ..\..\..\Library\Lib\A1801_V1.0.1.lib(tables_1.o)
                0x000065cc                rmlt_to_samples_window
 *(.libtag*)
 *(*GP_LIBRARY_TAG_SECTION*)
 GP_LIBRARY_TAG_SECTION
                0x00006acc       0x10 ..\..\..\Library\Lib\A1801_V1.0.1.lib(a1801_libtag_no_located_on_spiflash.o)
                0x00006acc                T_GPLibTag_01001605
 *(.eh_frame*)
 .eh_frame      0x00006adc        0x0 c:/program files (x86)/generalplus/g+ ide for arm 1.0.10.2/toolchain/bin/../lib/gcc/ar
 .eh_frame      0x00006adc        0x4 c:/program files (x86)/generalplus/g+ ide for arm 1.0.10.2/toolchain/bin/../lib/gcc/ar

.vfp11_veneer   0x00006ae0        0x0
 .vfp11_veneer  0x00000000        0x0 linker stubs

.v4_bx          0x00006ae0        0x0
 .v4_bx         0x00000000        0x0 linker stubs

.iplt           0x00006ae0        0x0
 .iplt          0x00000000        0x0 c:/program files (x86)/generalplus/g+ ide for arm 1.0.10.2/toolchain/bin/../lib/gcc/ar

.ARM.extab
 *(.ARM.extab* .gnu.linkonce.armextab.*)
                0x00006ae0                __exidx_start = .

.ARM.exidx      0x00006ae0        0x8
 *(.ARM.exidx* .gnu.linkonce.armexidx.*)
 .ARM.exidx     0x00006ae0        0x8 ..\..\..\Library\Lib\A1801_V1.0.1.lib(a1800dec.o)
                                 0x50 (size before relaxing)
 .ARM.exidx     0x00006ae8        0x0 ..\..\..\Library\Lib\A1801_V1.0.1.lib(coef2sam.o)
```

3.2.3 Project Options for Target

Click **Project**; then choose "**Settings"**



1. **General**:

   (a) Output: Selecting Executable project and checking Generate bin file.

   (b) IC Body: Allowing users to select various GPCM3 body.

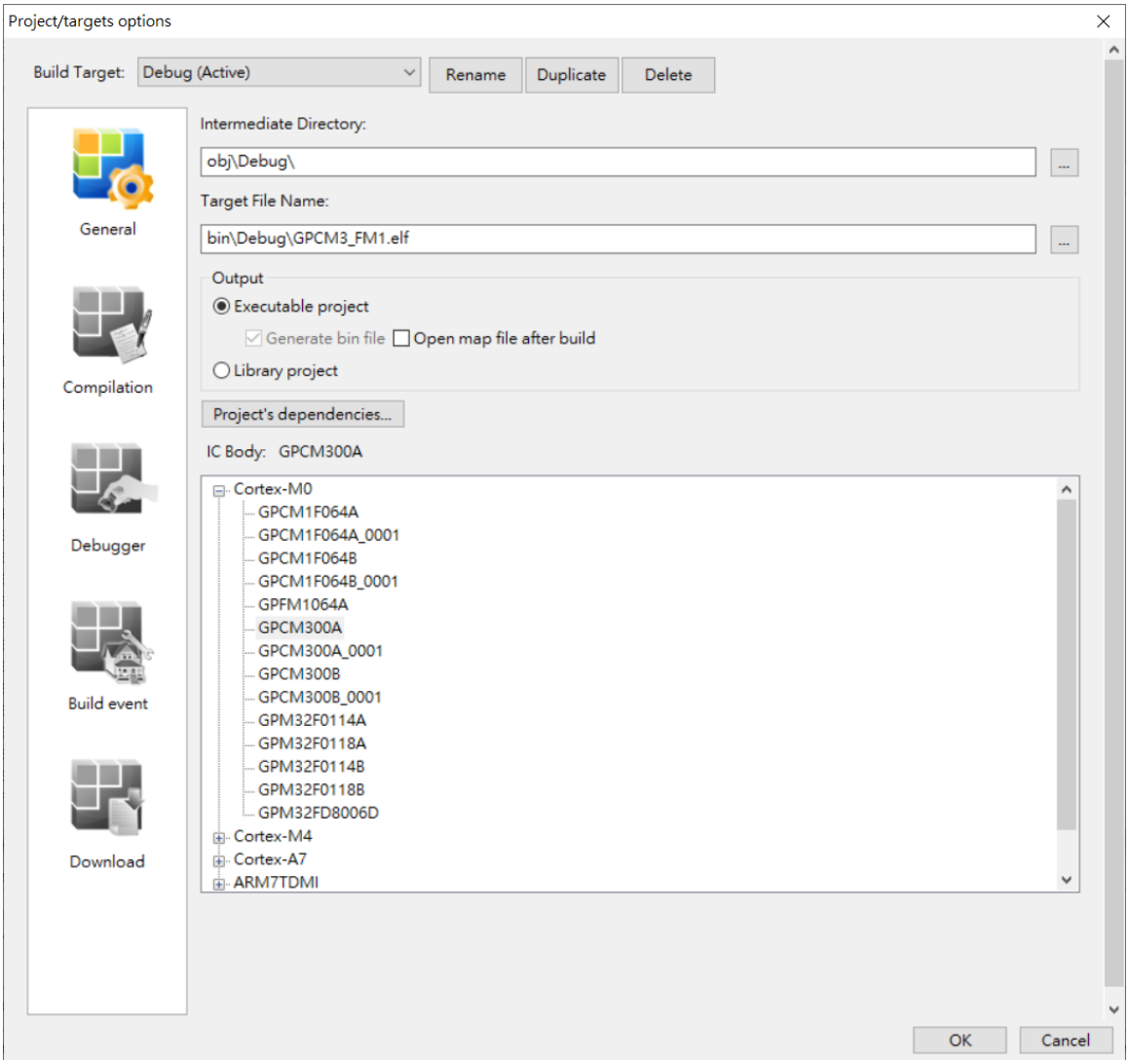


Figure 3-10 General Options

2. **Compilation_Config file:** Setup Body Option

(a) **Unlock Security Setting:**

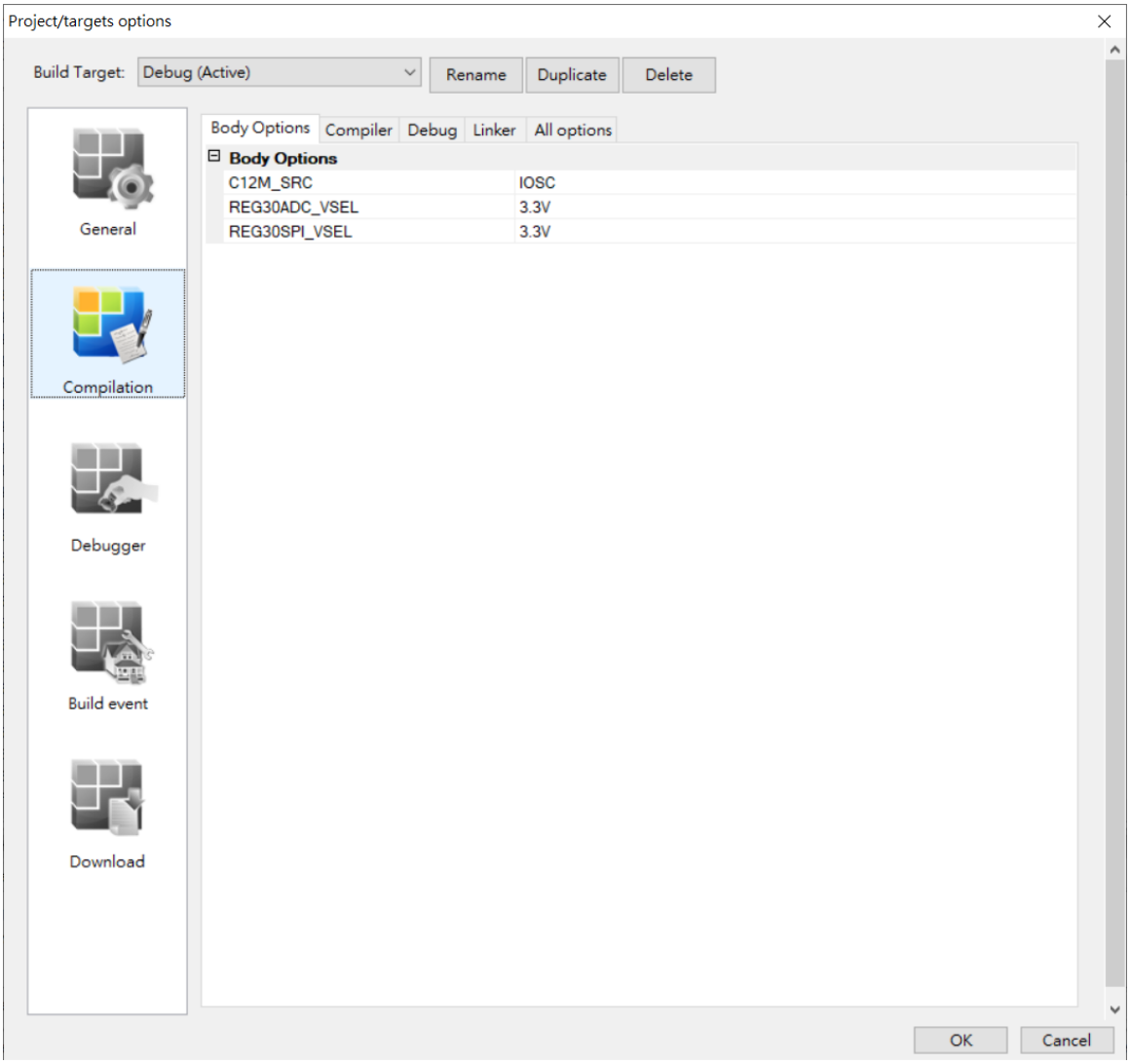
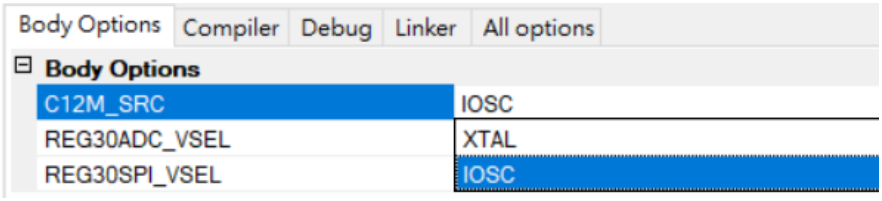


Figure 3-11 Body option setting screen

(1) This option is void in EV Chip because GPCM3 Piggyback and EMU board all use EV chip. Thus, the function cannot be verified on Piggyback & EMU board. It must be tested on a real chip.

(b) **System clock source setting**

(1) GPCM3 may choose Iosc12M or XTAL12M for the system clock source.



(c) **VDD33_DSADC Voltage Setting**

(1) Function: Internal Regulator output voltage adjustment for DSADC(Mic ADC), from 3.0V ~ 3.3V.

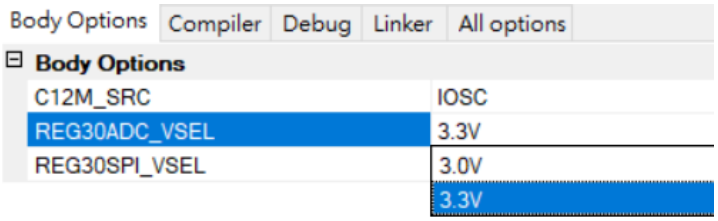


Figure 3-12 VDD33_DSADC Voltage Setting screen

(d) **VDD33_SPI Voltage Setting**

(1) Function: Internal Regulator output voltage adjustment, from 3.0V ~ 3.3V. This regulator is for IOB Port power. The Regulator power is 30mA, which can be supplied to an external high-speed SPIFC FLASH Power

(2) IOB[5:0]'s internal power is connected to internal Regulator out so that when IOB is in output mode, it only outputs 3.0 ~ 3.3V.

(3) H/W Touch also uses this regulator.

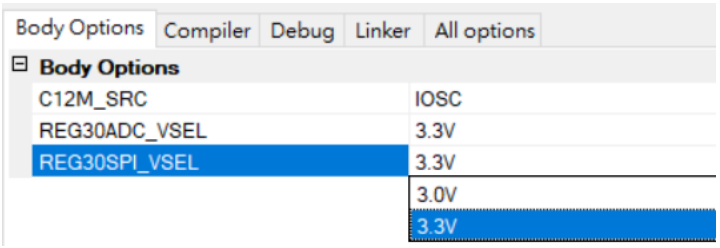


Figure 3-13 Regulator output voltage setting screen

3. Compilation_Compiler: Additional include path

Setting up the included paths are decribed as follows. This step is mandatory for including all required files.

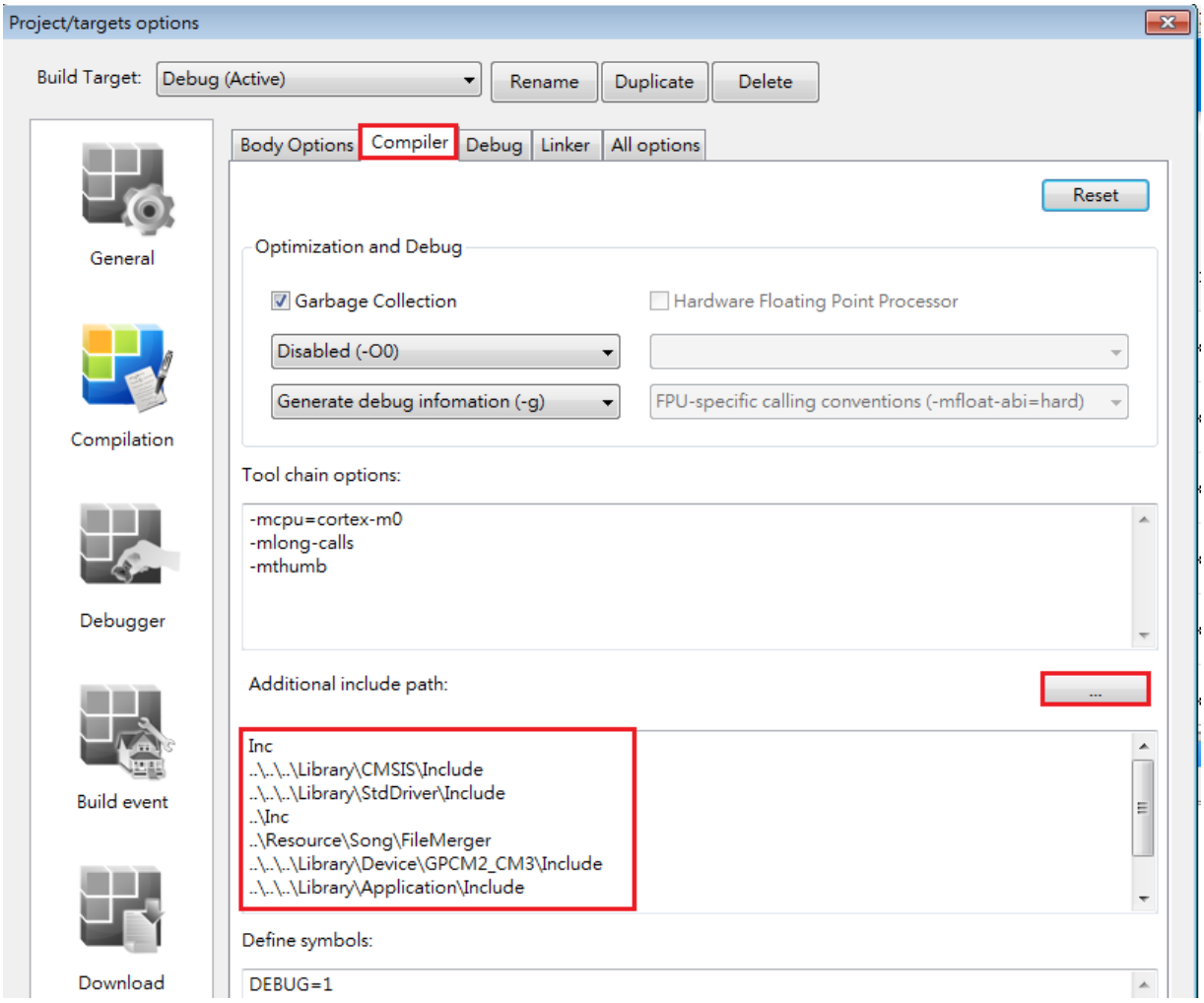


Figure 3-14 Additional include path

When adding included files to a non-existing path of a project, select ... from the compiler window to add a path first and click OK.

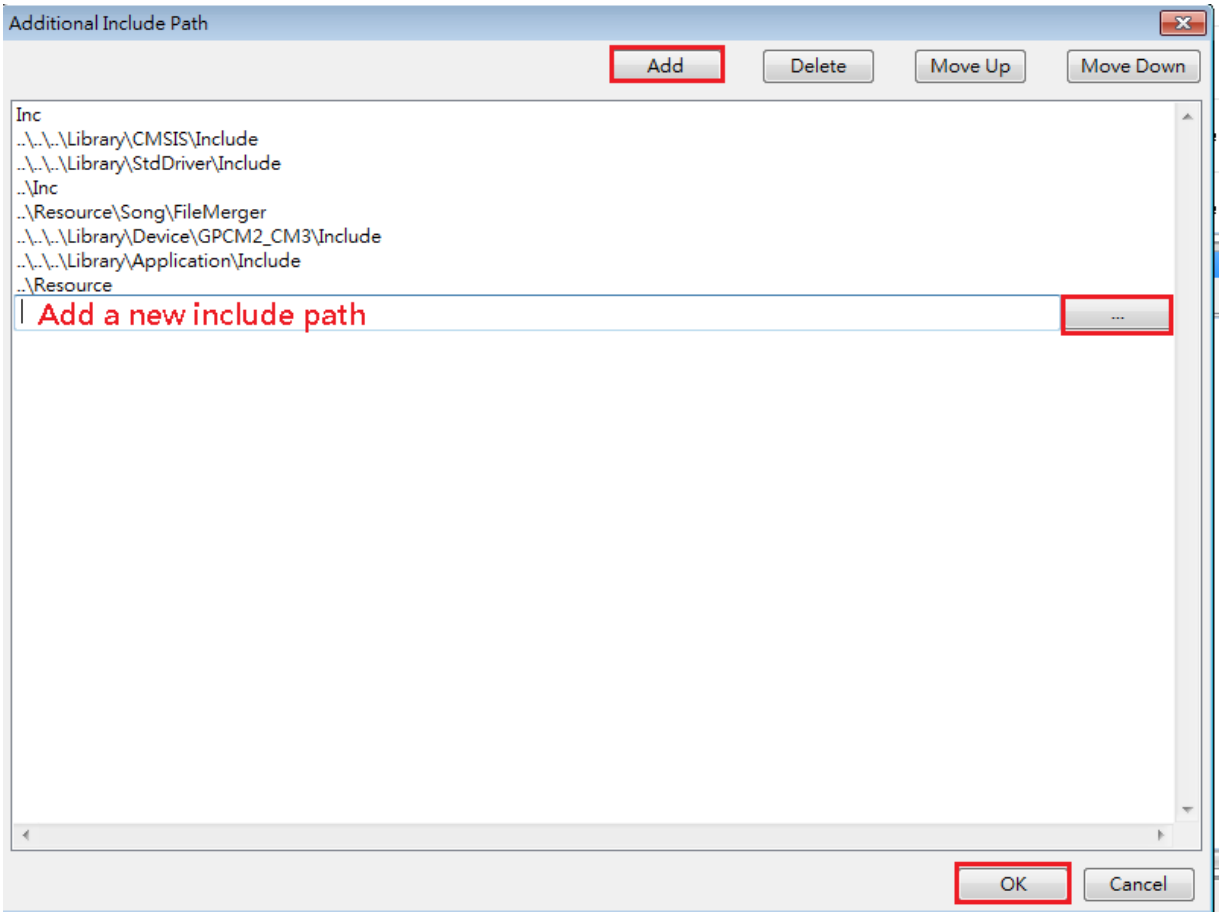
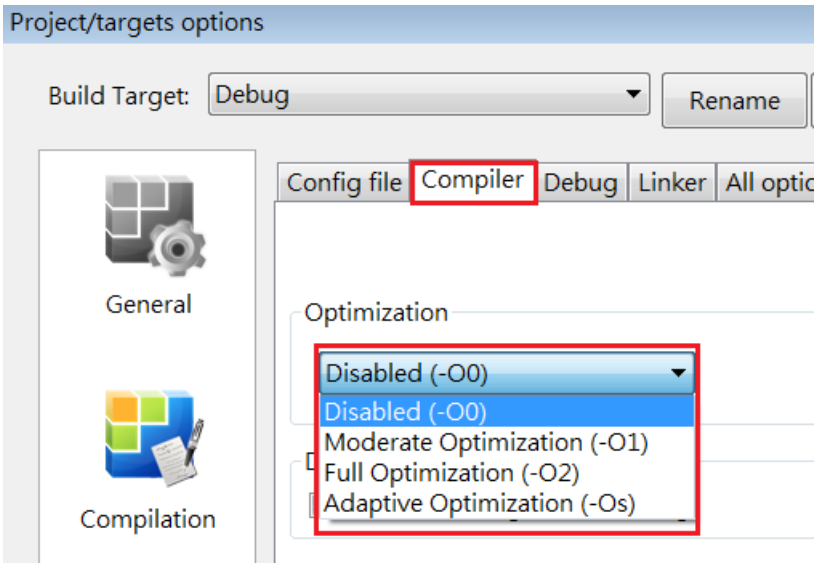


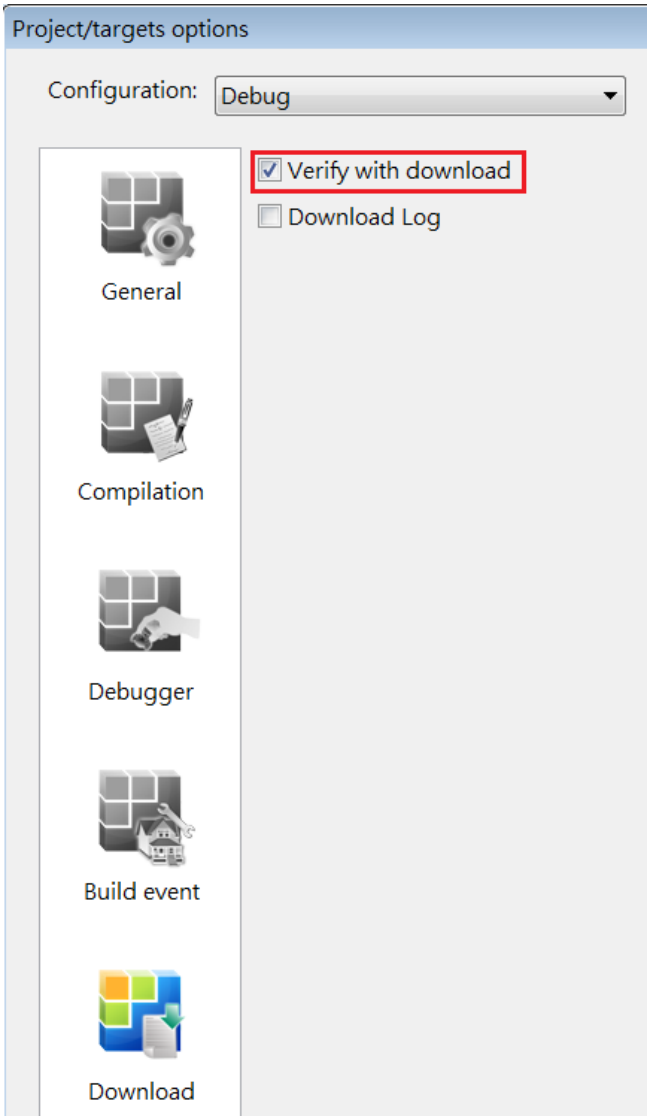
Figure 3-15 Include path folder setup

(a) Whether compiler performs optimization will influence program efficiency significantly. Configure the optimization option from "Compiler => Optimization", where the Full Optimization (-O2) is recommended for the best result in optimization.



4. Download

(a) Make sure to check "**Verify with download"** option in order to assure the correctness while downloading data to internal FLASH and external SPI FLASH.



3.2.4 Locating Code and Resource files at the external SPI FLASH memory

1. Locating the resource files at the external SPI FLASH memory:

(a) Add resource files into the Resource folder located at the left window of G+IDE for ARM tool, e.g. adding A1801_FileMerger.o resource files.

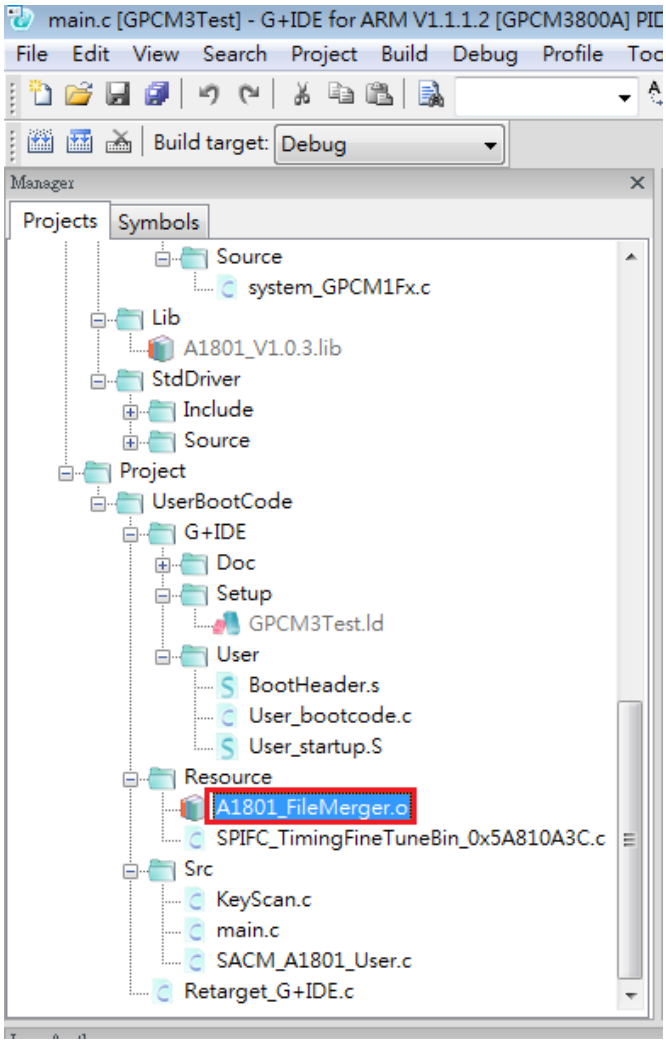


Figure 3-16 Add resource files

(b) Configure *.ld:

GPCM2_CM3.h | BootCode_SPIFC_GPCM3800.c | GPCM3Test.ld | User_bootcode.c | SACI

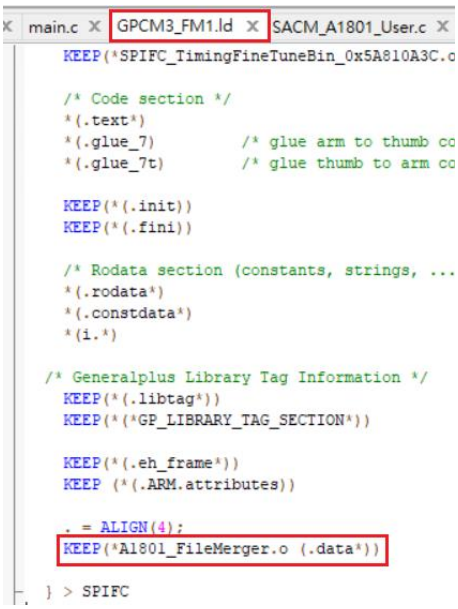
```
/* ------------------------------------------------------------------
/* memory layout and stack/heap size value                          */
/* ------------------------------------------------------------------
MEMORY
{
  FLASH (rx)         : ORIGIN = 0x00000000, LENGTH = 0x00002000
  CODEVER (rx)       : ORIGIN = 0x00001FF8, LENGTH = 0x00000008
  BOOTHEADER (rx)    : ORIGIN = 0x04000000, LENGTH = 0x00000100
  VECTOR(rx)         : ORIGIN = 0x04000100, LENGTH = 0x00000100
  SPIFC (rx)         : ORIGIN = 0x04000200, LENGTH = 0x04000000 - 0x200
  RAM   (xrw)        : ORIGIN = 0x20000000, LENGTH = 0x00008000

}
_Min_Heap_Size  = 0x100;  /* required amount of heap  */
_Min_Stack_Size = 0x400;  /* required amount of stack */
```

(1) FLASH (rx) means Internal Flash;

(2) SPIFC (rx):

- Because SPIFC will enable Auto Mode, 0x400, 0000 is the address where Auto mode corresponds to the starting address of Address 0x0 at SPI FLASH memory.
- Note: If a program code is located in the external SPI FLASH memory, cache only supports the first 1MB(0x100,000). Whether having cache support will influence program efficiency significantly. Usually, we deploy the code first and followed by data.

(3) Find the data section in *.ld. In text section, add *A1801_FileMerger.o, which is intended to store in SPI FLASH.



4 HOW TO USE DOWNLOAD TOOL

4.1 General Description

This chapter introduces the download process. Generalplus supports G+ Power Writer download tool.

4.2 How to Generate a Bin File

Before using download tool, user requires to make a binary file. After successfully building a project using G+IDE for ARM, a *.bin fine can be found under xxx\G+IDE\bin\Debug path.

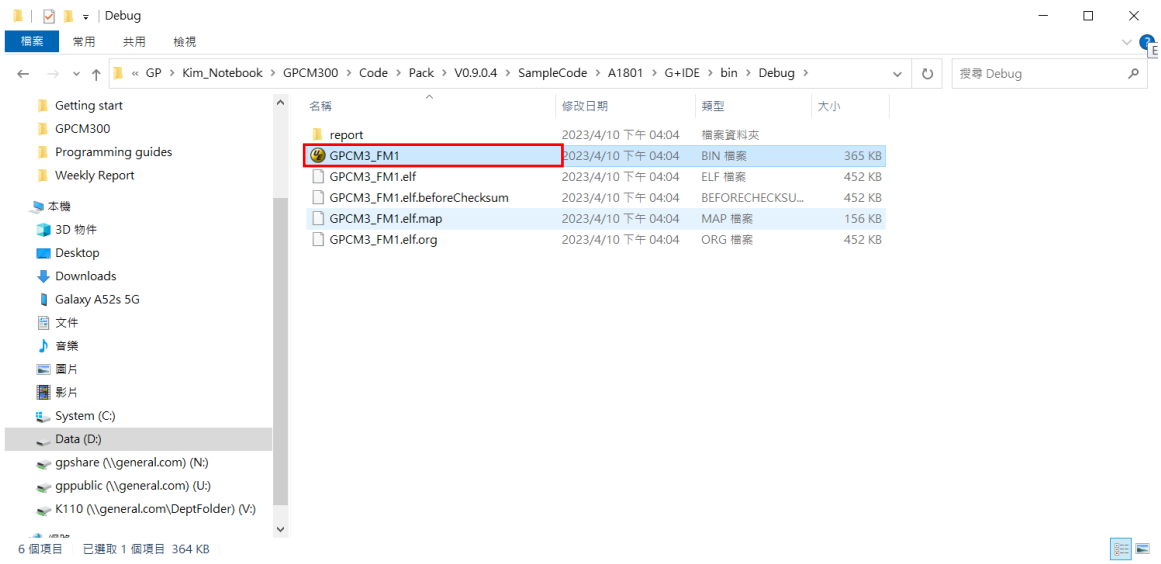


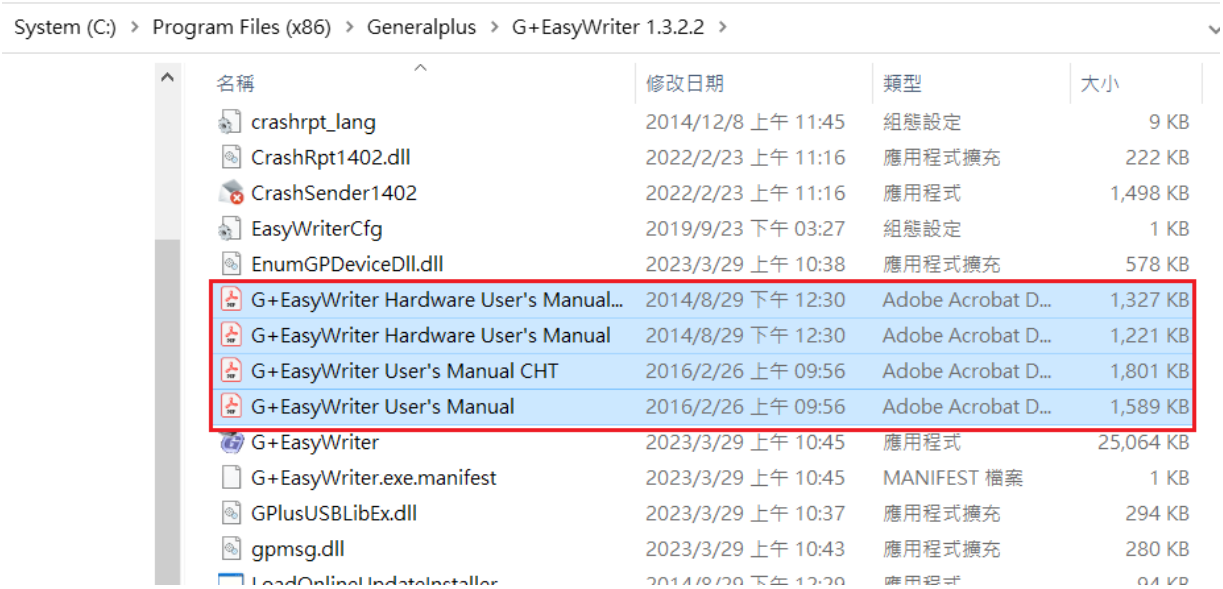
Figure 4-1 the location of axf and bin file

4.3 How to Use G+ Easy Writer

G+Easy Writer downloads SPI FLASH *bin file to external SPI FLASH. You can also obtain this writer from Generalplus via you convenient channel.

4.3.1 User's Manual

You may refer to the G+EasyWriter User's Manual in the root directory.



Generalplus

G+ Easy Writer User's Manual

V1.0.8 – Feb. 25, 2016

Figure 4-2 G+EasyWriter User's Manual

4.3.2 Hardware Connection

G+Easy Writer tool to download GPCM3 bin file should work with G+Link Pro. The connection setup is the same as the G+IDE for ARM download.

Connect GPCM3 EMU board and G+ LINK PRO as follows.

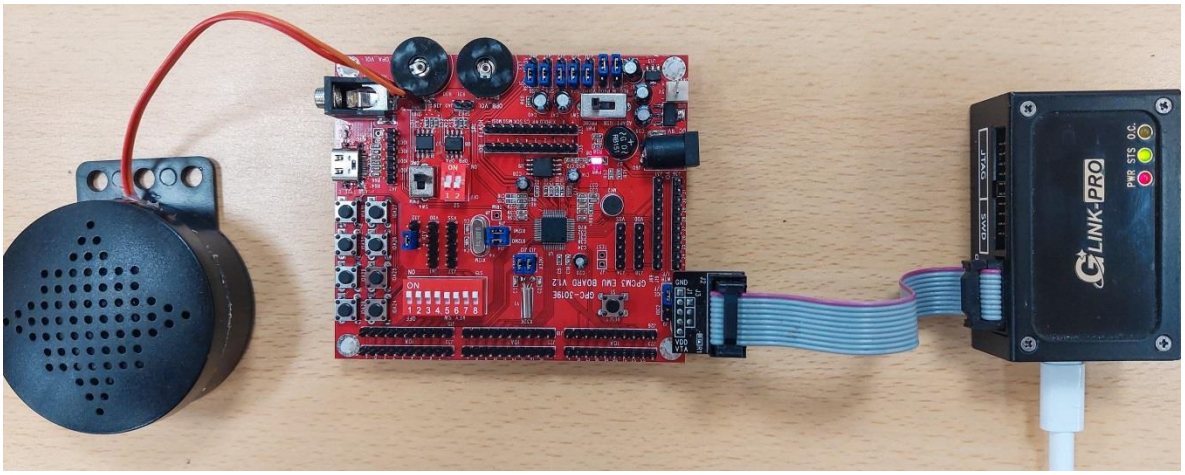


Figure 4-3 connect EMU board and G+ LINK PRO

4.3.3 Software Tool

1. **Select Body**：Select target body series and body name, for example, "GPCM3" & "GPCM300A".

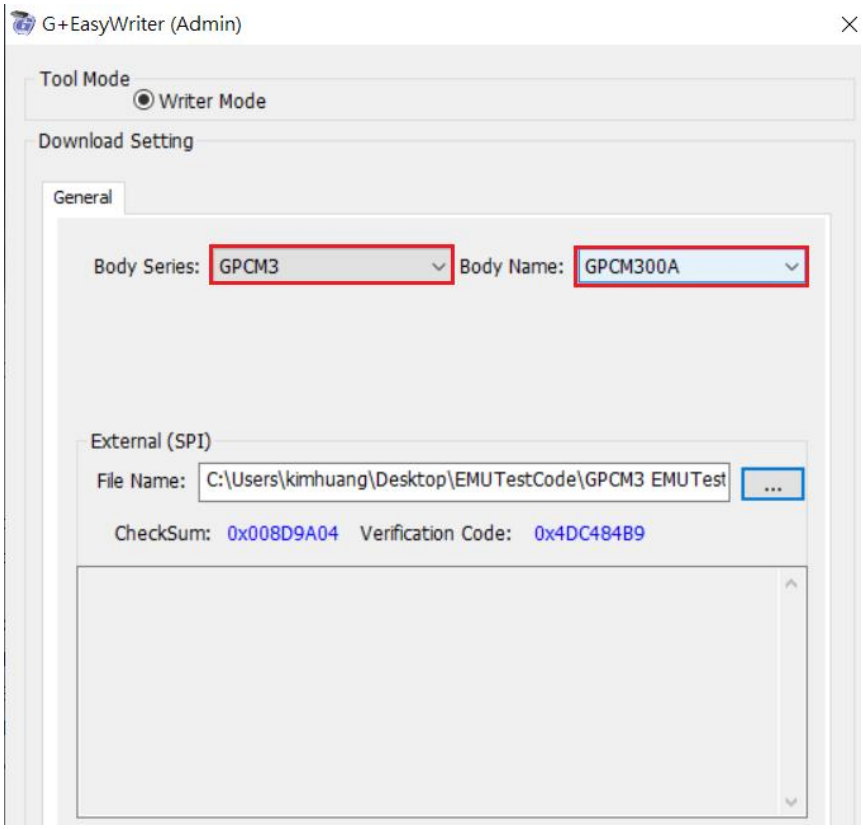


Figure 4-4 G+ Easy Writer: Select Body Series and Body Name

2. **Load File:** Select a bin file to be downloaded to external SPI FLASH through the G+ Easy Writer tool.

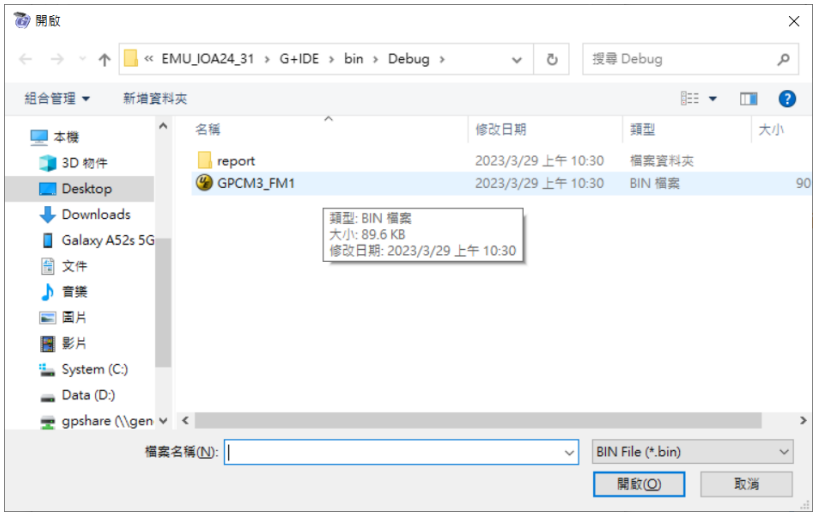


Figure 4-5 Select an embedded FLASH's bin file

3. **Download:**

(a) Press "Execute" button to start downloading to external SPI FLASH process.

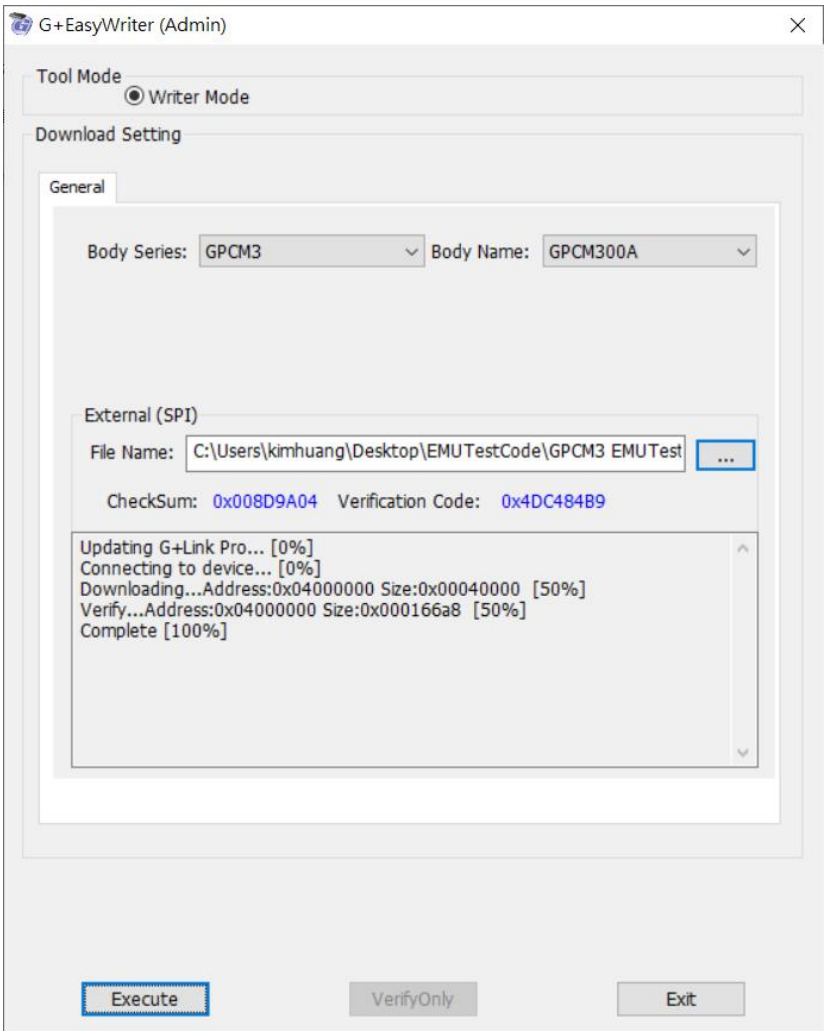


Figure 4-6 Download to external SPI FLASH

(b) When download succeeds, a completion message is displayed.

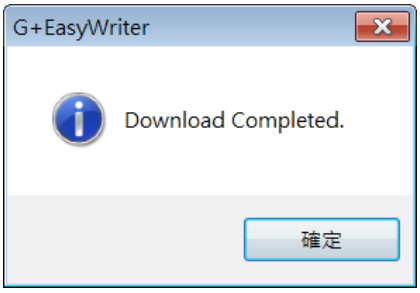


Figure 4-7 Download completed message.