aP23KWC8S

USB Writer

USER GUIDE

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Introduction

The aP23KWC8S USB Writer is designed to support Aplus aP23xxx series Voice chips. It is suitable for:

- aP23682 **(682 sec, 2 I/O chip) – SOP8**
- aP23341 **(341 sec, 2 I/O chip) – SOP8**
- aP23170 **(170 sec, 2 I/O chip) – SOP8**
- aP23085 **(085 sec, 2 I/O chip) – SOP8**

This development system serves three main functions:

Compiler – to create a dp2 file from user's Voice files
Writer – to program the dp2 file into the aP23xx chip
Copier – connect DC 5V adaptor for 1 to 1 programming

The **Compiler** is used to combine the edited voice files into the chip to form the desired Voice Group and to define the playback functions of each Voice Group by selecting different Options and Trigger Modes of each individual Voice Group.

The **Writer** is used to program the voice data into the aP23xxx devices that resulted from the Compiler Function. A Writer Board connected to the PC via USB port is required.

The **Copier** is using the compiled *.dp2 which loads to writer then disconnect the USB and connect the DC 5V for 1 pcs copying.

Installation

Hardware Installation

aP23KWC8S is a USB based writer programmer. It is intended to be used in Windows XP , Win7 , Win8, Win10 computer.

Writer Board Connection

1) Connect USB cable from the writer board to the computer. The computer will display a new hardware is found message. The installation will begin automatically.
2) If there are too many USB devices are connected to your computer at the same time, the current supply from USB may not be sufficient to support the writer board.

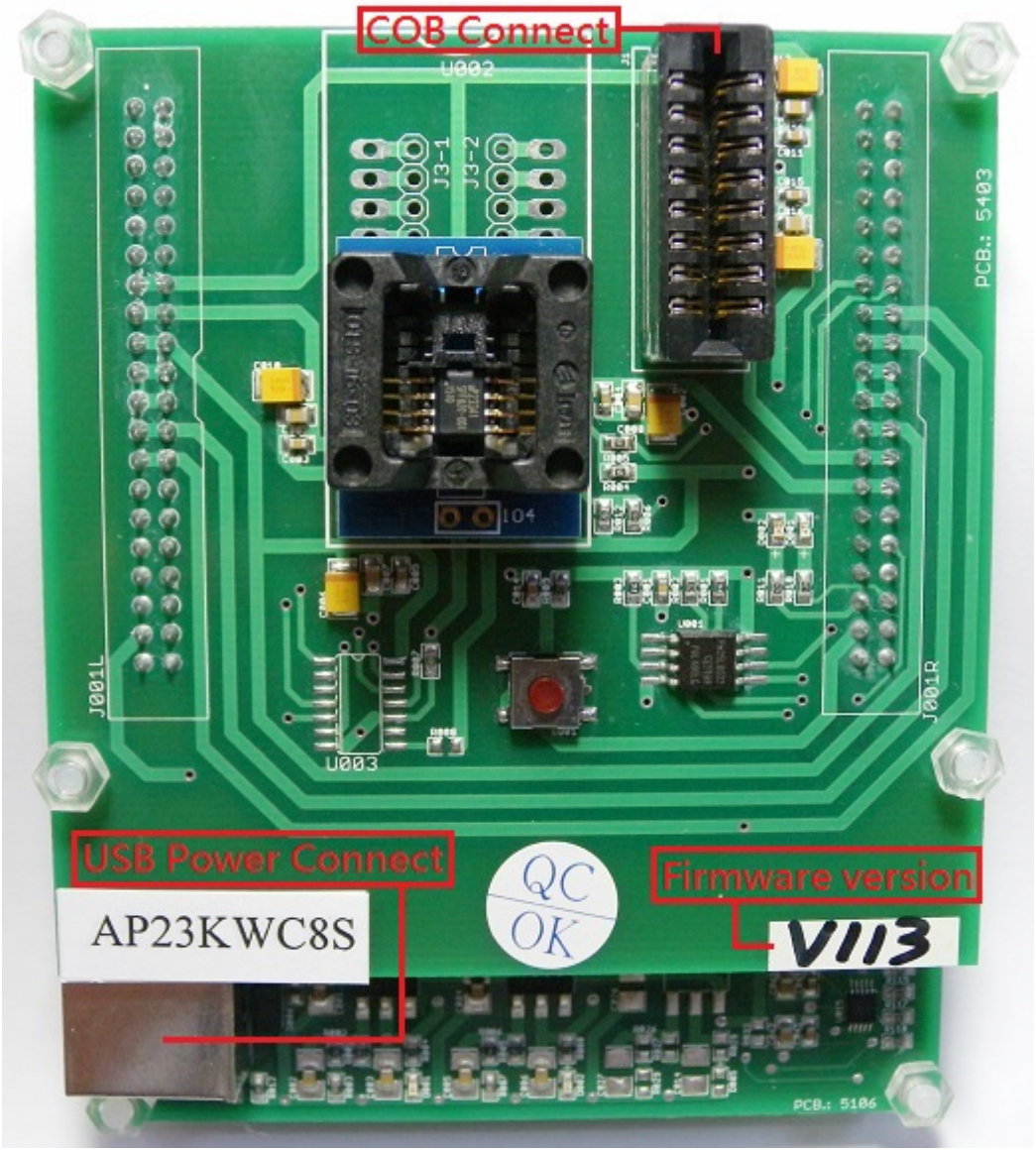
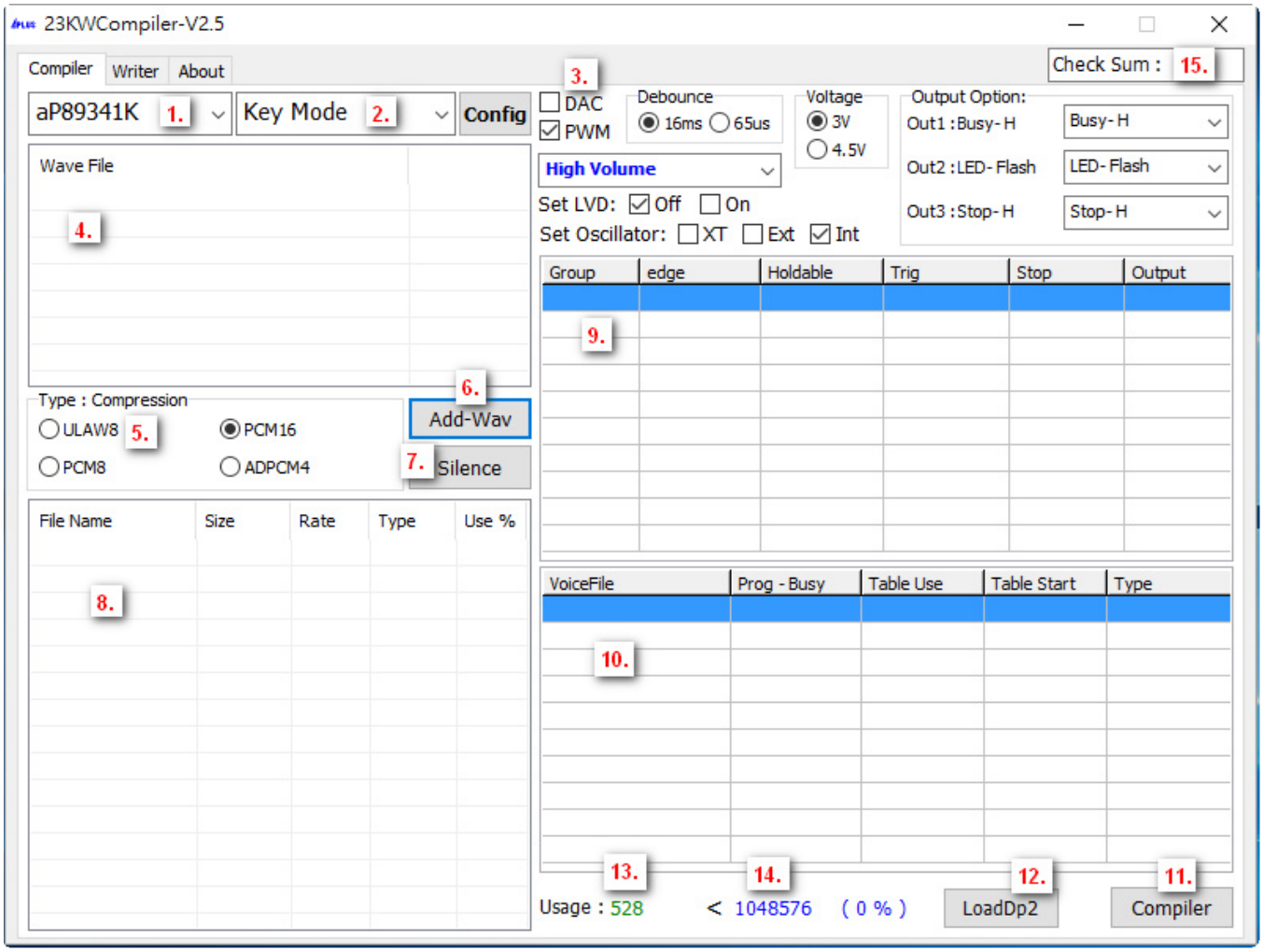


Fig. 1 The aP23KWC8S USB Writer Programmer Board

Running The Software

Double click the file **23KWComplier.exe** to launch the software.

- **COMPILER :**



COMPILER DESCRIPTION:

1. Select your required IC body.
   --- aP23682-8pin , aP23341-8pin , aP23170-8pin , aP23085-8pin.
   --- aP23682-16pin , aP23341-16pin , aP23170-16pin , aP23085-16pin.
   --- aP89682K , aP89341K , aP89170K , aP89085K.

2. Select your required trigger mode.
   --- Key mode / CPU parallel mode / MP3 mode / SPI mode / I2C mode / aP89 mode / SBT mode.

3. Select voice output mode.
   --- DAC or PWM.

4. Show all your required voice files. (Only wav files acceptable).
   --- The [xxx.wav]: 8 bits or 16 bits mono xxx.wav.

5. Select the compression mode.
   --- ADPCM4 / ULAW8 / PCM8 / PCM16.

6. Select your required voice file [xxx.wav] folder.

7. Select if adding the silence.
   --- 1ms ~ 10000ms.

8. Loading the required *.wav files.

9. Setting your required voice sections and function mode.

10. Show your final voice list.

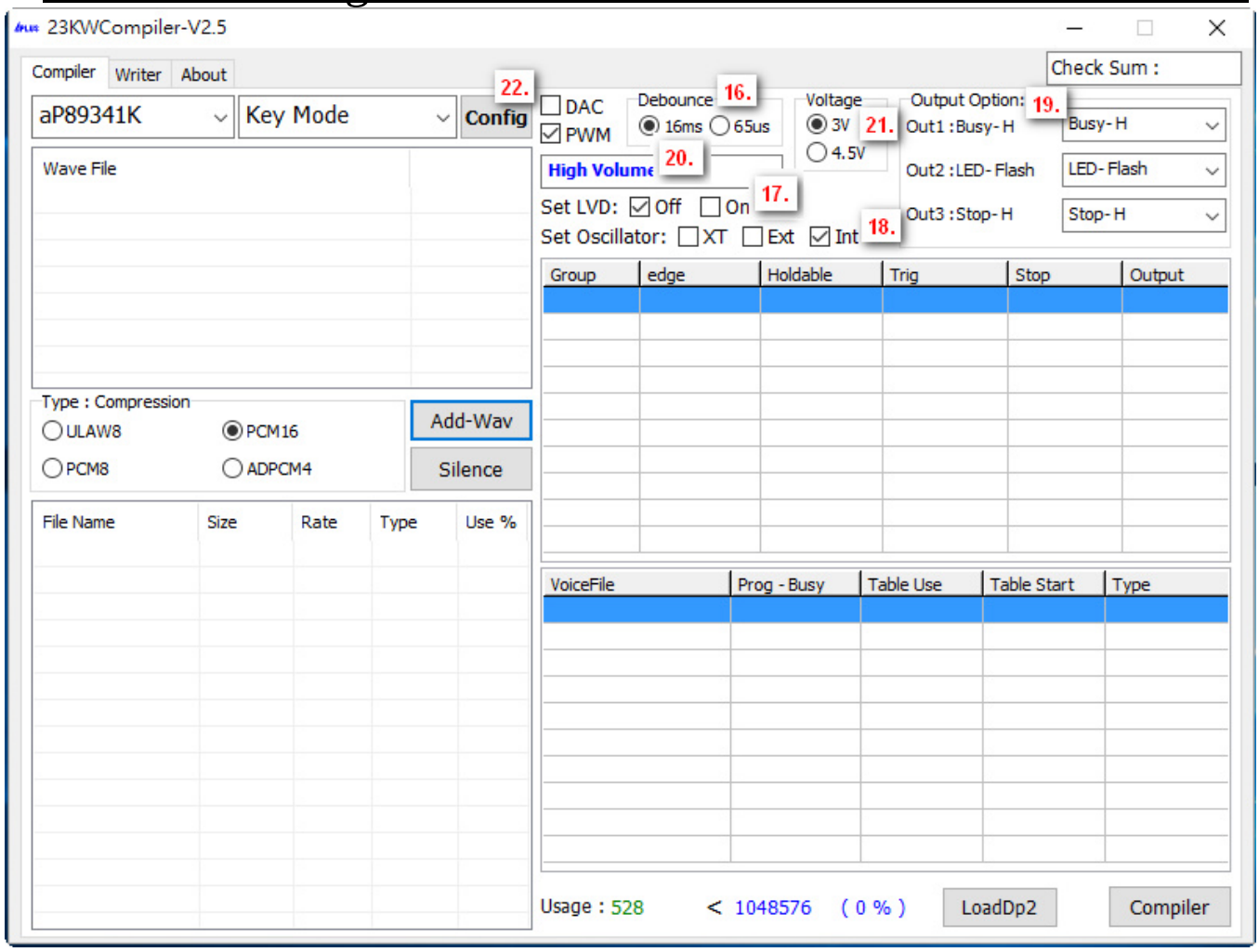
11. Compiler: After setting the voices & function, push the button to create xxx.txt & xxx.dp2 files.

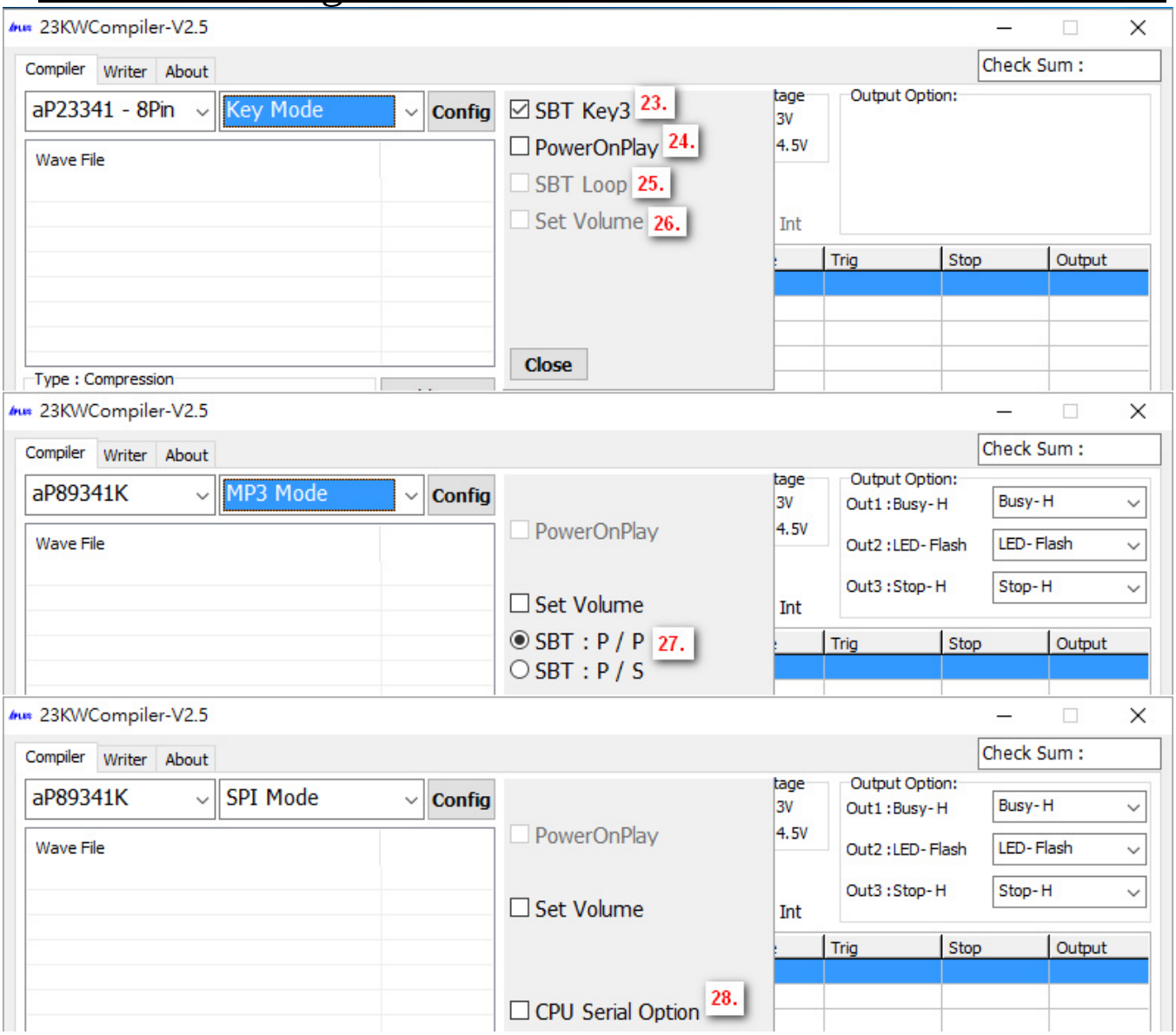
12. Re-download & Re-editing [xxx.dp2] to setting and function.

13. Show the memory of your usage.

14. Show the IC body memory size.

15. Show Check Sum.


23KWCompiler-V2.5
Compiler
Writer
About
Check Sum :
aP89341K
Key Mode
Config
22.
DAC
PWM
Debounce
16.
16ms
65us
Voltage
3V
4.5V
21.
Output Option:
19.
Out1 :Busy- H
Busy- H
Out2 :LED- Flash
LED- Flash
Out3 :Stop- H
Stop- H
High Volume
20.
Set LVD:
Off
On
17.
Set Oscillator:
XT
Ext
Int
18.
Wave File
Group
edge
Holdable
Trig
Stop
Output
Type : Compression
ULAW8
PCM16
PCM8
ADPCM4
Add-Wav
Silence
File Name
Size
Rate
Type
Use %
VoiceFile
Prog - Busy
Table Use
Table Start
Type
Usage : 528
< 1048576 (0 %)
LoadDp2
Compiler



16. Select required debounce time.
    --- 65us or 16ms.

17. Select if using low voltage detect.
    --- Select ON if the IC voltage less than 2V will be reset.

18. Select if using the oscillator.
    --- XT (X'tal=16MHz) / Rosc ext (68K ohm) / Rosc Int.

19. Select the output function for output1, output2, output3.
    --- Busy-H, Busy-L.
    --- LED Flash (LED high active) , ~LED Flash (LED low active).
    --- Stop-H, Stop-L.
    --- Prog-BusyH, Prog-BusyL.
    --- Load: For the play command [094h+D9~D0]; [D9~D0] total 10 bits indicate the voice address.
    Same the aP89341 prefetch-071h [no gap loop play].

20. Select PWM voice output volume.
    ---Select PWM high volume.

21. Select IC operating voltage at PWM (VOUT).
    --- Low Voltage: 3V, High Voltage: 4.5V.

22. IC body configures advanced function.

23. Select SBT pin swap. (for 8pin device only).
    --- Select (SBT as OUT1) or (SBT as KEY3).

    --- SBT as OUT1: Busy-H/L, Stop-H/L, LED Flash (LED high active),
    ~LED Flash (LED low active), Prog-BusyH/L, Load.

S3 (pin7)	S2 (pin6)	Group	SBT = OUT1
0	1	SW1	Busy-H/L
1	0	SW2	Stop-H/L
1	1	SW3	LED ……

    --- SBT as Key3:

SBT (pin5)	S3 (pin7)	S2 (pin6)	Group
0	0	1	SW1
0	1	0	SW2
0	1	1	SW3
1	0	0	SW4
1	0	1	SW5
1	1	0	SW6
1	1	1	SW7

24. Select power on play.
    --- Power on play [sw0] group once.

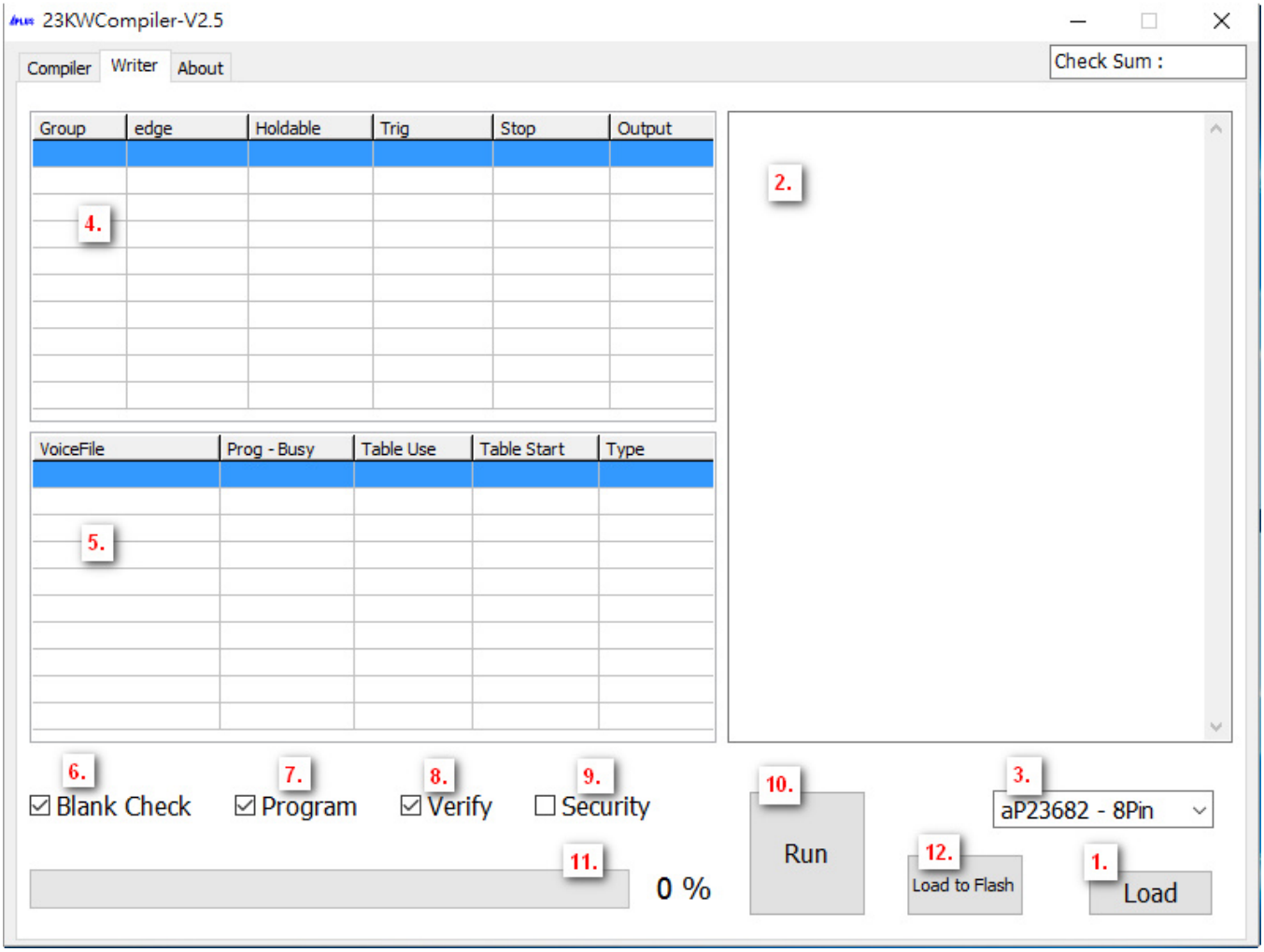
25. Select SBT loop. (At SBT mode).
    --- Enable: The SBT pin sequential trigger & loop play.
    --- Disable: The SBT pin sequential trigger & play once.
    *Note: Voice function (Trig Level) must select Level.

26. Select volume control function.
    --- Select the volume control Level x16 / x8 / x4.

27. SBT pin act play/pause or play/stop function for MP3 mode.

28. Select if using pin S4 as data output pin.
    --- The SPI mode or I2C mode of data output for 24 pin IC body and 16 pin IC body.

- **WRITER :**



WRITER DESCRIPTION:

1. Loading your programming file. (xxx.dp2)

2. Show setting and function after loading *.dp2 file.

3. Show your required IC body.

4. Show voice sections and function mode.

5. Show the content of your selected section of voice list.

6. Select to blank check IC is blank?

7. Select to execute programming.

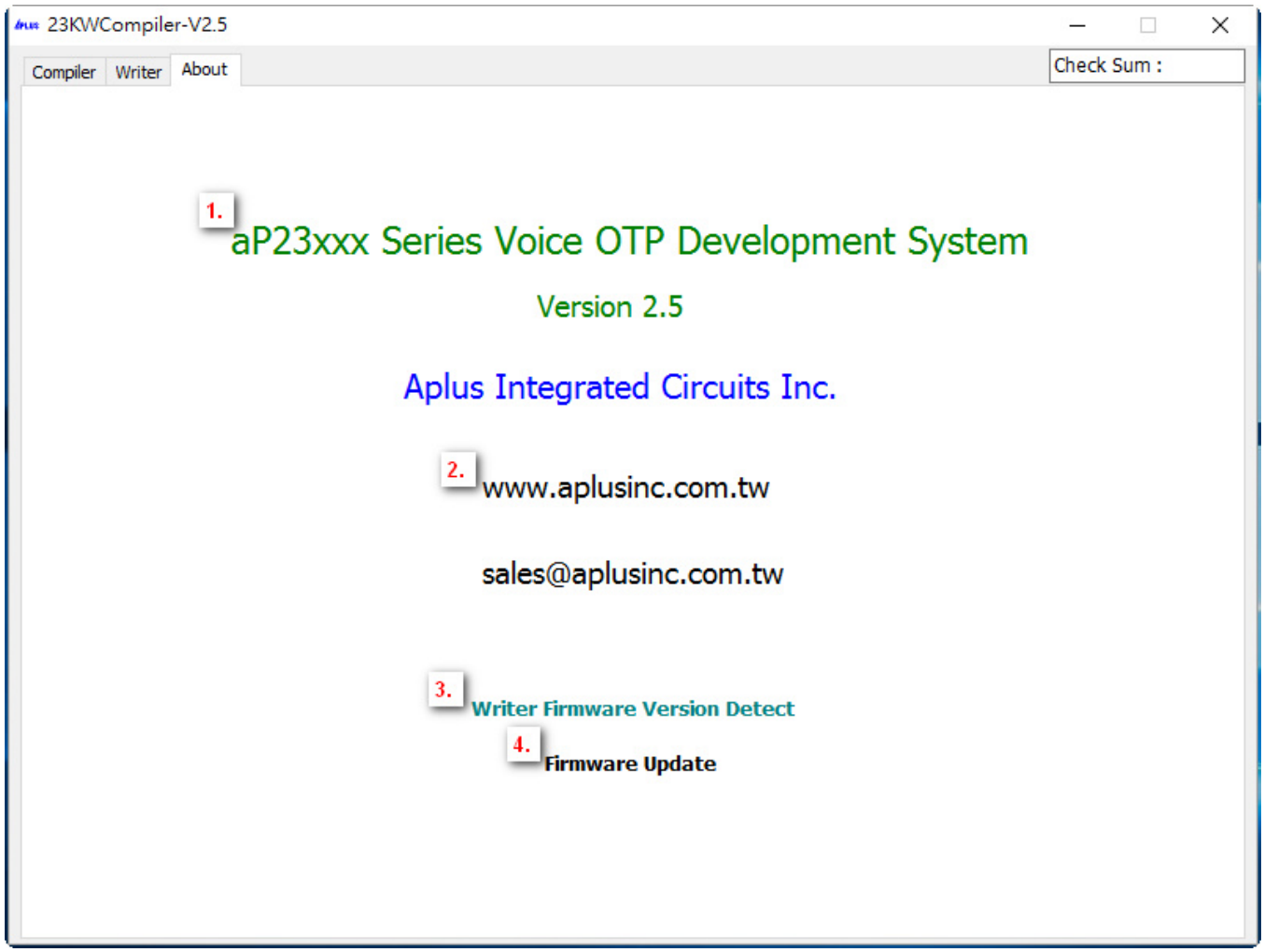
8. Select to verify the data of your programming.

9. Select if you need security mechanism.
   *** (If do this, it can't be copied; it can't be Master IC.)
10. Execute your selected (6.) (7.) (8.) (9.).

11. Show the progress of "blank check", "program", "verify" and "load to flash".

12. Load to Flash: download the program file (xxx.dp2) to [1 to 1 copier] writer.

- **About :**



ABOUT DESCRIPTION:

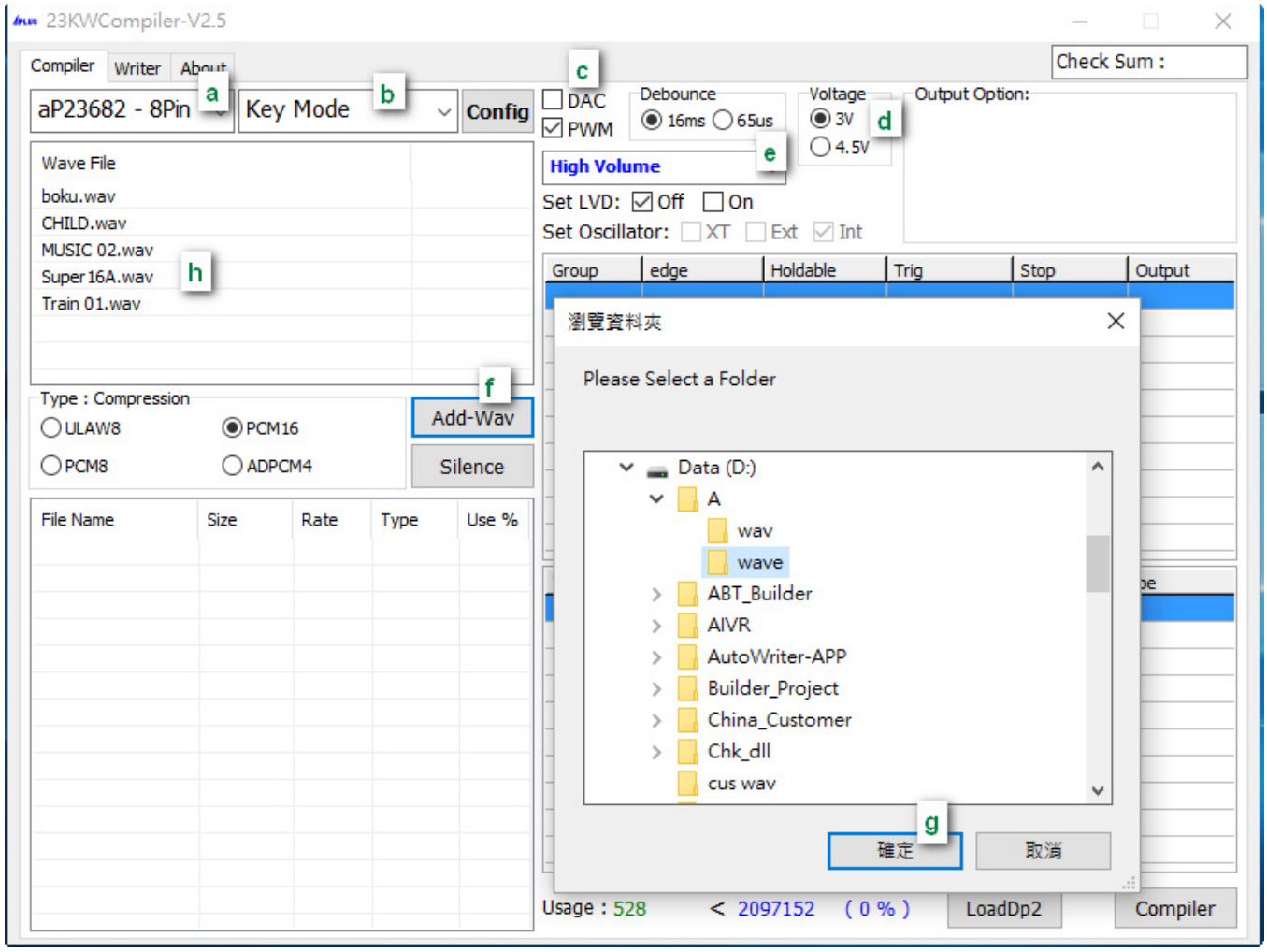
1. Show software version.

2. Show website of Aplus Integrated Circuits Inc.

3. Detect writer firmware version.

4. Update writer firmware version.

▪ Example for Compiler :



1. Select the IC body is [aP23682 - 8Pin].

2. Select [Key Mode] to be our trigger mode.

3. Select the voice output is [PWM].

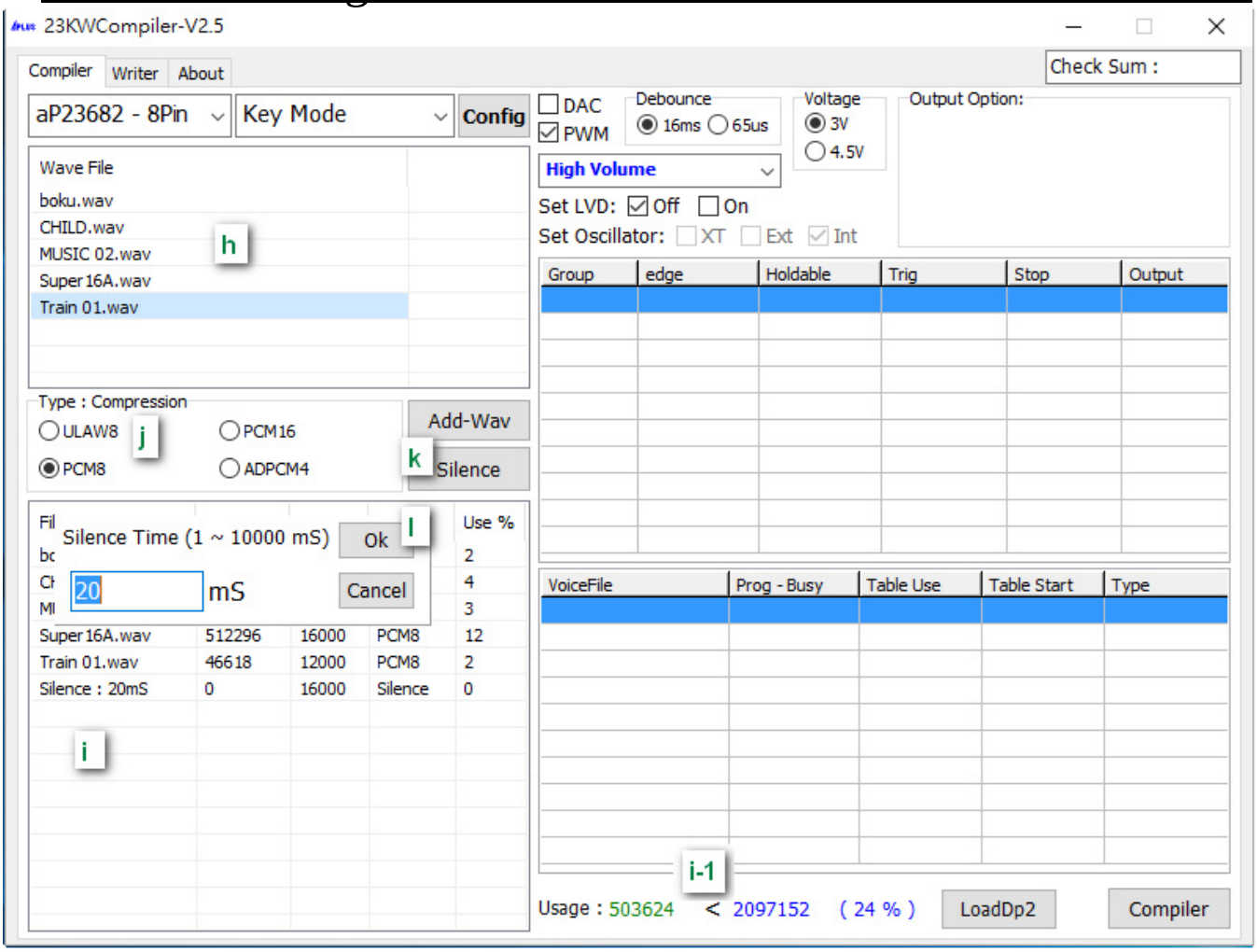
4. IC operating voltage at 3V.

5. Select PWM high volume.

6. Click Add-Wav to pick your required folder.

7. After confirming the folder, click the button.

8. All wav files in the folder will be listed here.



9. Show all your required *.wav files. Double click wav files you required in h, they will be showed in i.

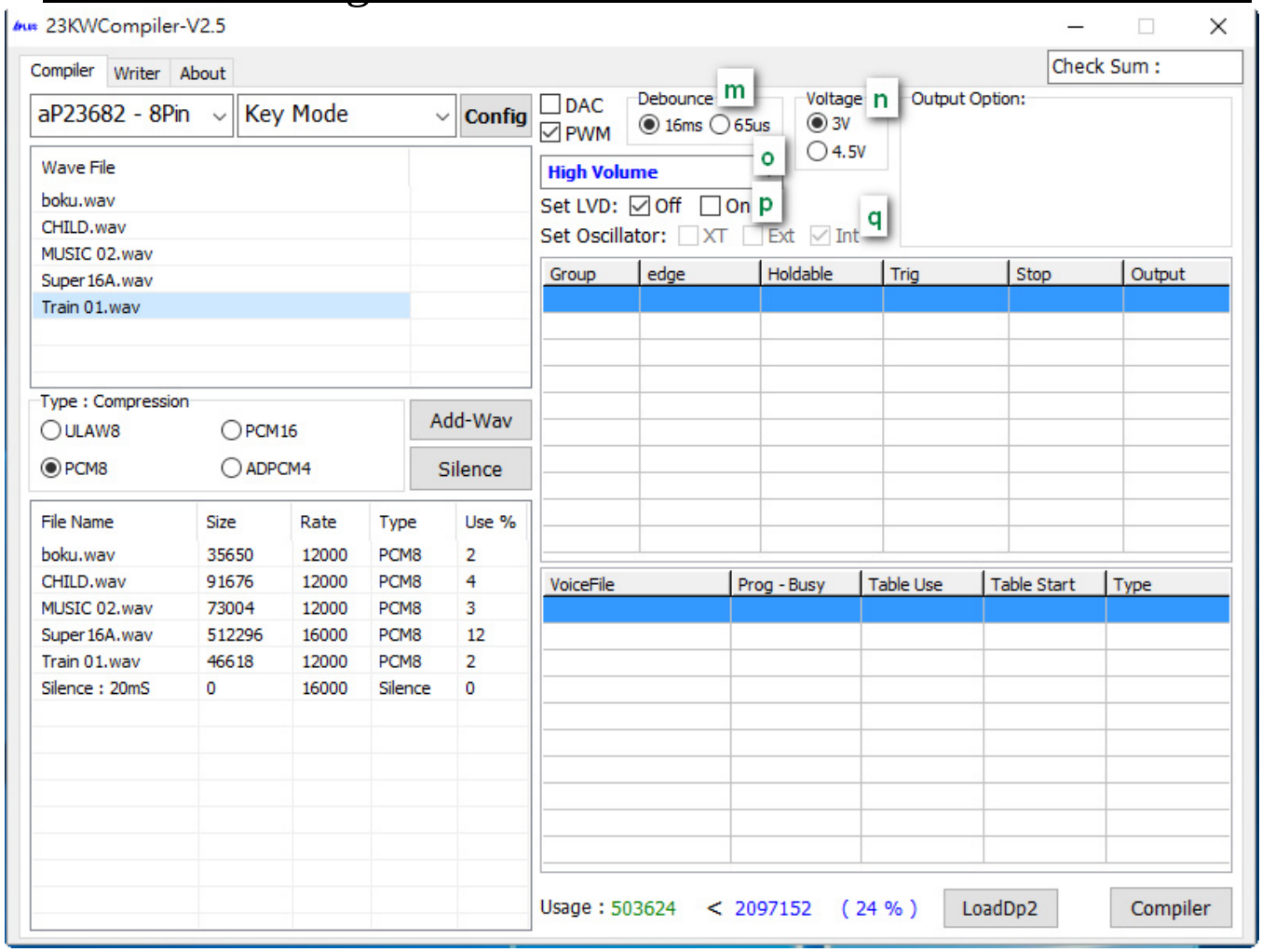
9-1.If you once required multiple wav files to be showed in i. (Mouse left button as begin item after mouse right button as end item and click Add-Multi Wav at the same time).

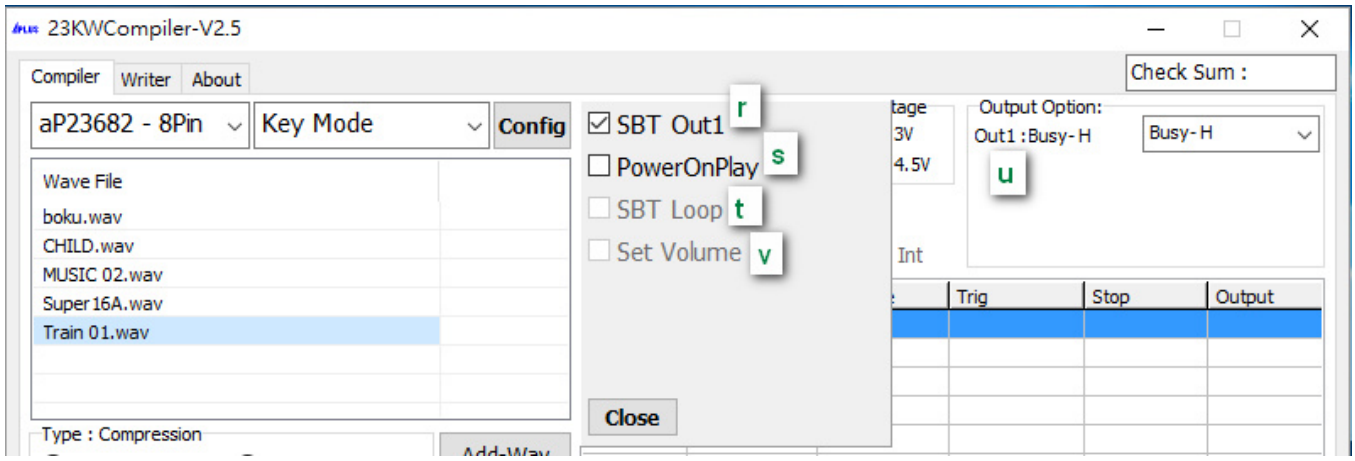
9-2.It will show the memory size you has been used.
(Please note the data size you loaded can't exceed the body's memory).
*** Please note the data size you loaded can't exceed the body's memory. If so, there are some ways to solve this problem:
1). Change it to a bigger memory size body. ex: aP23085-8Pin to aP23341-8Pin.
2). Compressed the wav files to decrease the memory size. ex: from PCM16 to PCM8.
3). Delete some required voice files.

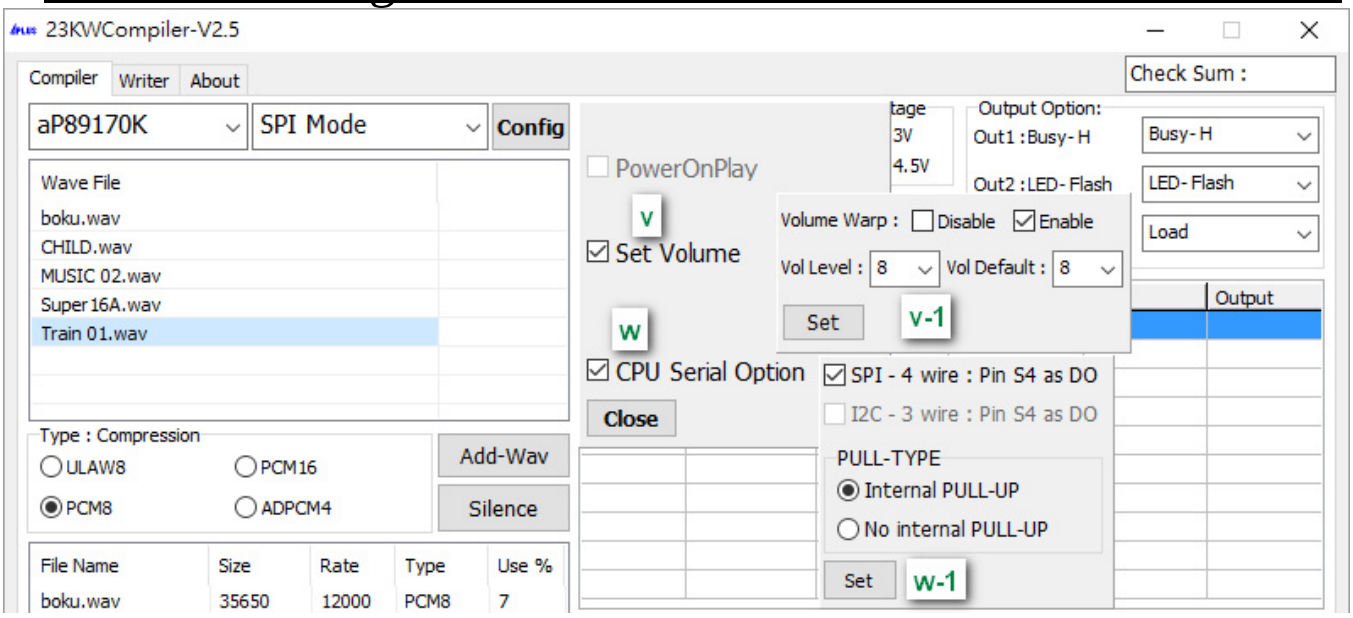
10. If wav file is too big, we can choose compressing files to decrease their sizes.
(UALW8 compress wav file to 8bits, PCM8 compress wav file to 8bits, ADPCM compress wav file to 4bits).
*** Please note if your original voice is 16bits wav file which need to be compressed to 8 bits, We suggest you choose ULAW would be better.

11. If you want to add mute voice, click Silence button to set the silence time.

12. If need silence 20ms. Key in 20 (unit ms) then click OK button.


23KWCompiler-V2.5
Compiler
Writer
About
Check Sum :
aP23682 - 8Pin
Key Mode
Config
DAC
PWM
Debounce
16ms
65us
m
Voltage
3V
4.5V
n
Output Option:
High Volume
o
Set LVD:
Off
On
p
Set Oscillator:
XT
Ext
Int
q
Wave File
boku.wav
CHILD.wav
MUSIC 02.wav
Super 16A.wav
Train 01.wav
Type : Compression
ULAW8
PCM16
PCM8
ADPCM4
Add-Wav
Silence
File Name
Size
Rate
Type
Use %
boku.wav 35650 12000 PCM8 2
CHILD.wav 91676 12000 PCM8 4
MUSIC 02.wav 73004 12000 PCM8 3
Super 16A.wav 512296 16000 PCM8 12
Train 01.wav 46618 12000 PCM8 2
Silence : 20mS 0 16000 Silence 0
Group
edge
Holdable
Trig
Stop
Output
VoiceFile
Prog - Busy
Table Use
Table Start
Type
Usage : 503624 < 2097152 (24 %)
LoadDp2
Compiler


23KWCompiler-V2.5
Compiler
Writer
About
Check Sum :
aP23682 - 8Pin
Key Mode
Config
SBT Out1
r
PowerOnPlay
s
SBT Loop
t
Set Volume
v
Output Option:
Out1 :Busy- H
Busy- H
u
3V
4.5V
Int
Wave File
boku.wav
CHILD.wav
MUSIC 02.wav
Super 16A.wav
Train 01.wav
Trig
Stop
Output
Close
Type : Compression



13. Select the signal timing. (16ms or 65us).

14. IC operating voltage at 3V.

15. Select PWM high volume.

16. Select set Low Voltage Detect when voltage less than 2V IC will be reset.

17. Select set Oscillator from Crystal mode(X'tal=16MHz), External Rosc mode(68K), Internal Rosc mode. (if selecting Crystal mode, It must set at pin M0 & pin M1).

18. SBT pin swap other I/O pin function.
    ex : SBT pin swap to OUT1 as output use.

19. Disable the power on play function. It does not immediately play [SW0] once.

20. When trigger in "SBT mode".
    If enable the [SBT Loop]: It will one key sequential trigger and keep loop play in every group.
    If disable the [SBT Loop]: It will one key sequential trigger and play one time in every group.
    (*** Note: Trig Level must select Level).

21. Output Option: Setup the out1, out2, out3.
    Can select the Busy-H, Busy-L, Stop-H, Stop-L,
    LED Flash (LED high active), ~LED Flash(LED low active),
    Prog- BusyH, Prog-BusyL, Load.

22. [Set volume] control function.
    ---Select the volume control Level x16 / x8 / x4.
    ---The volume control key by the [M1] and [M0] key.
    Volume Warp: Volume level increase to the max then begin from the level 1.
    Select disable:
    Pin M0: volume Level [+ 1].
    ex: Level x8, 1→2→3→4→5→6→7→8→8→8→ ….

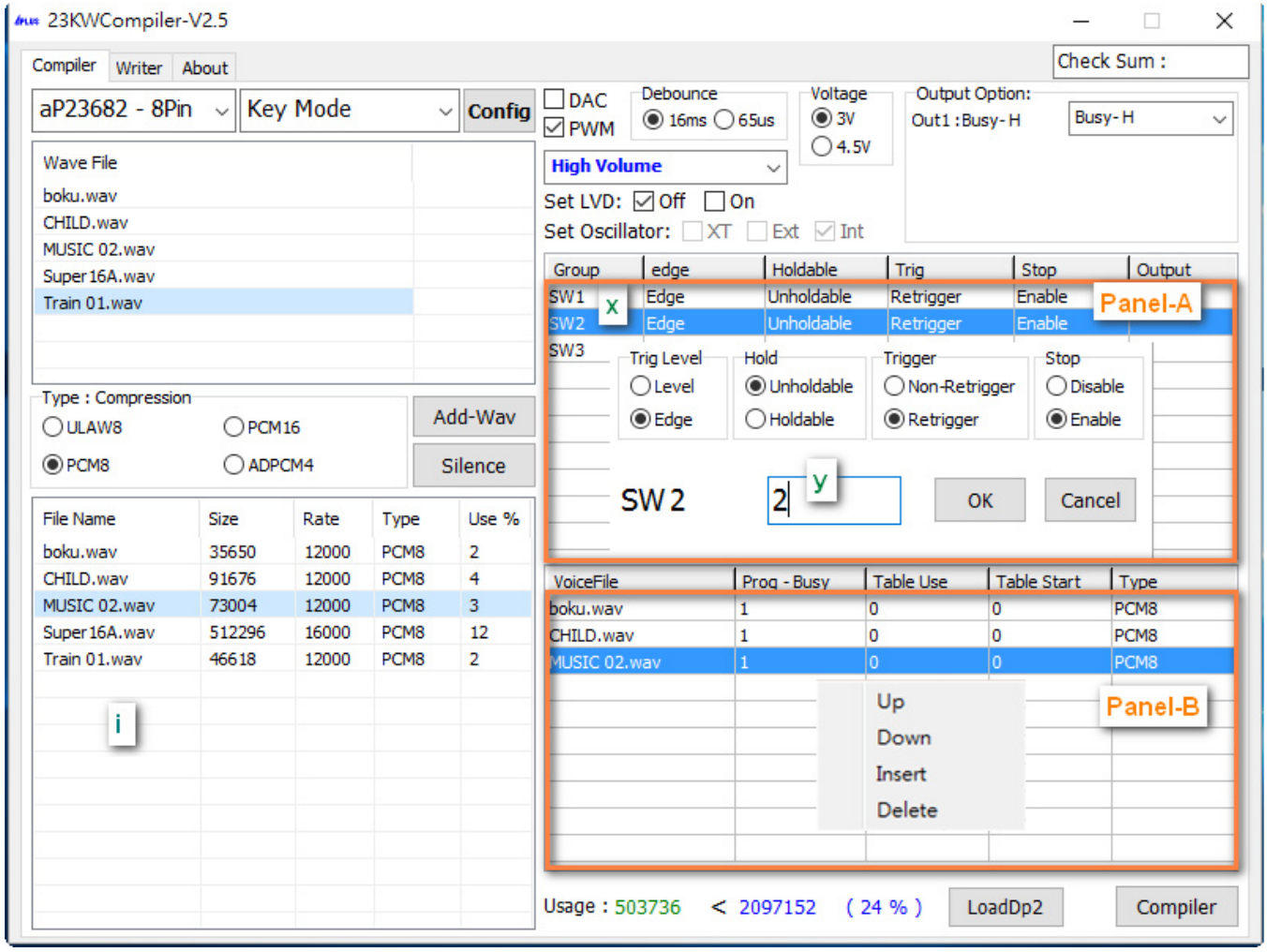
Pin M1: volume Level [- 1].
ex: Level x8, 8→7→6→5→4→3→2→1→1→1→ ….

Select enable:

Pin M0: volume Level [+ 1].
ex: Level x8, 1→2→3→4→5→6→7→8→1→2→3→ 4→….

Pin M1: volume Level [- 1].
ex: Level x8, 8→7→6→5→4→3→2→1→8→7→6→5→ ….

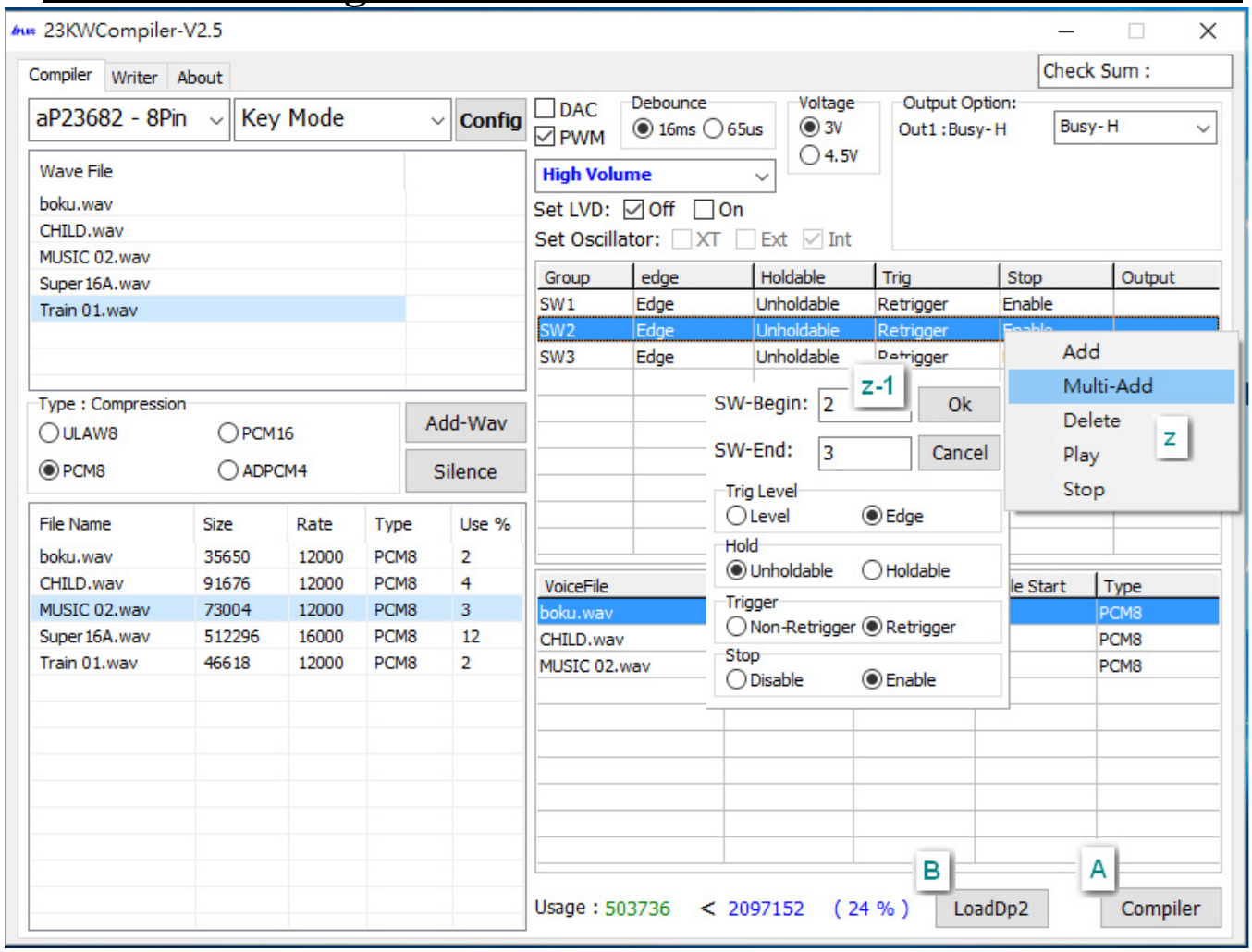
23. When set SPI Mode or I2C Mode, the pin S4 is for data output (DO) using.



24. Double click Panel-A for your setting the function of each Group.

25. Key in group number.

26. SW means group. ex : Select the second group and double click the wav files you required in (i) then Panel-B will show them.
The mouse moves to Panel-B then enter right key for your adjusting the order of the wav files or insert or delete them.



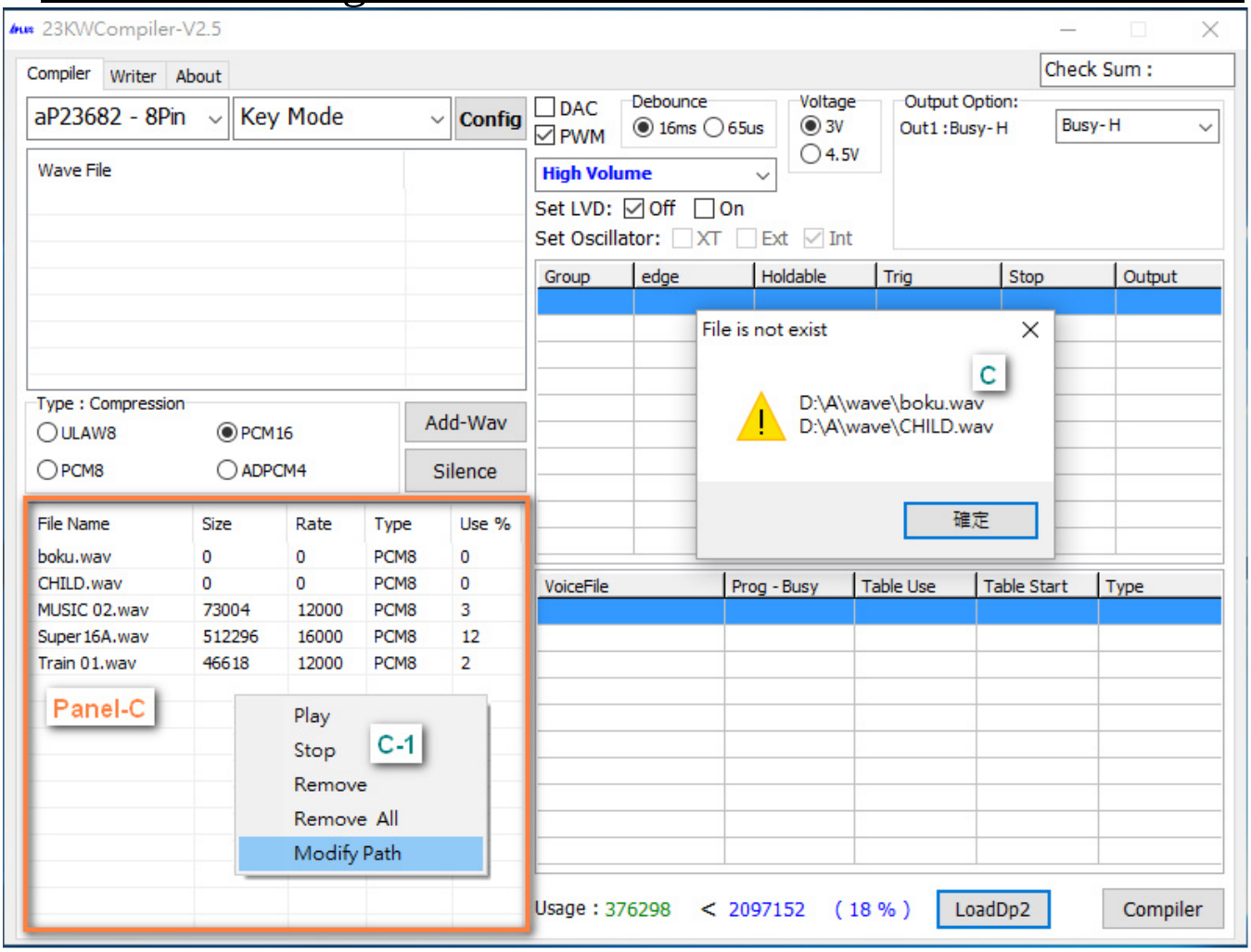
27. If the mouse move to Panel-A and enter right key, it will show there are additional function for add, multi-add, delete, play and stop.

    Add: add single group.
    Multi-Add: add multi-groups at one time (z-1).
    Delete: delete the group.
    Play: play all voices of the group.
    Stop: stop the voice playback.

28. Finish compiling, click compiler button.

29. Generate Check Sum number.

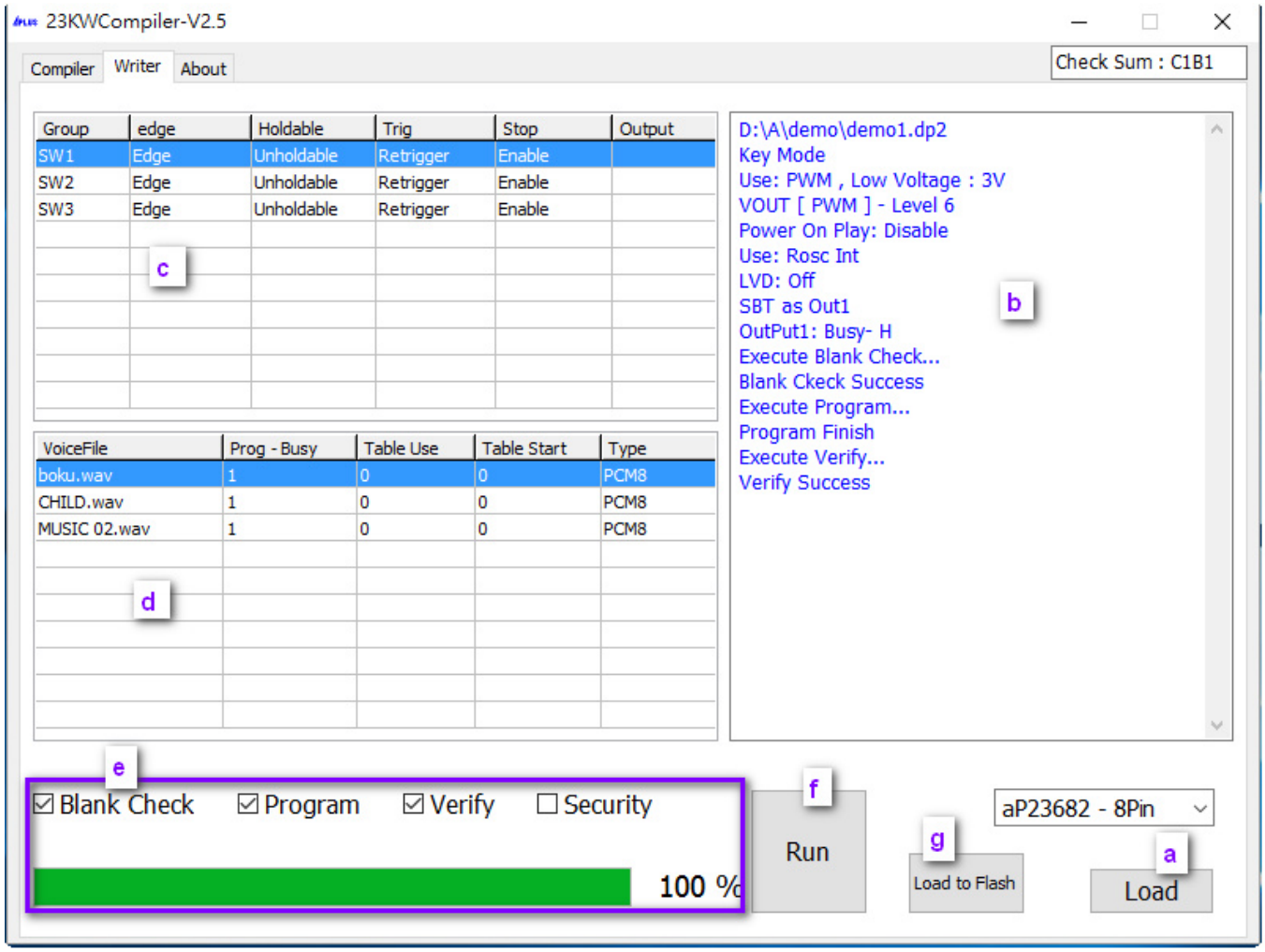
30. Loading finished compiled .dp2 file.



31. Reloading .dp2 file if the voice file (*.wav) is not exist.

32. The mouse moves to Panel-C then enter right key for your modifying the path of the wav files.

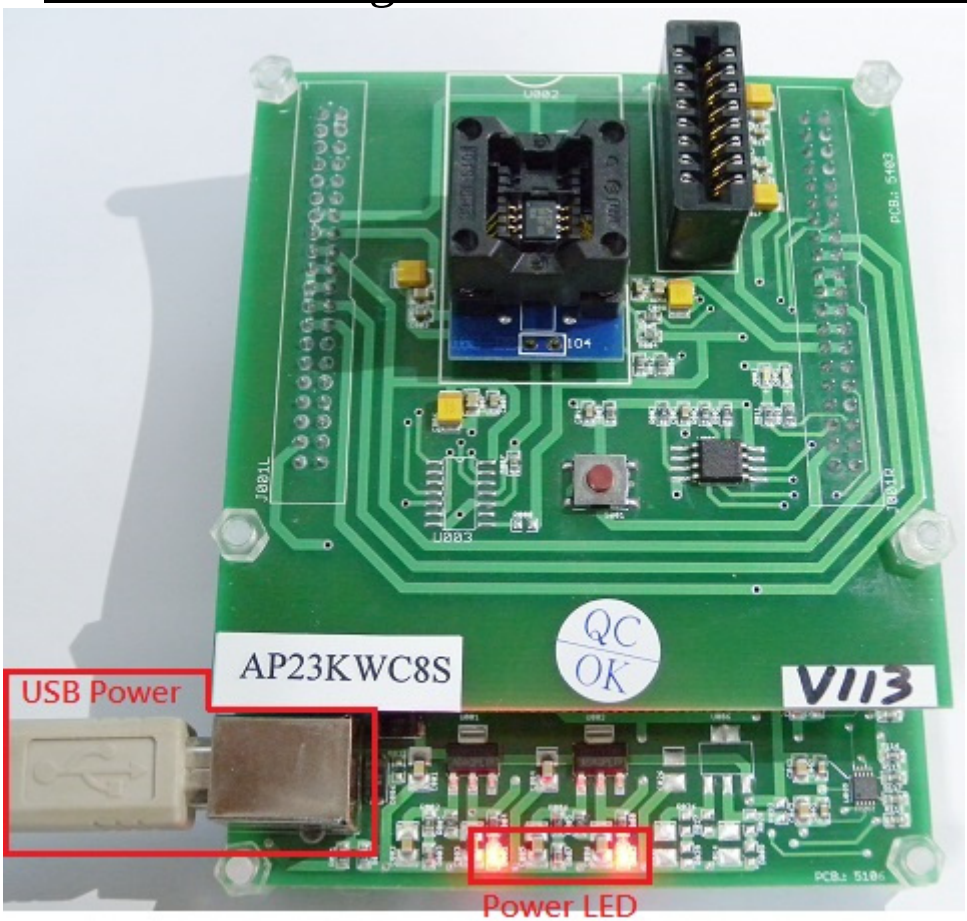
- **How to write the program file [xxx.dp2] to IC :**



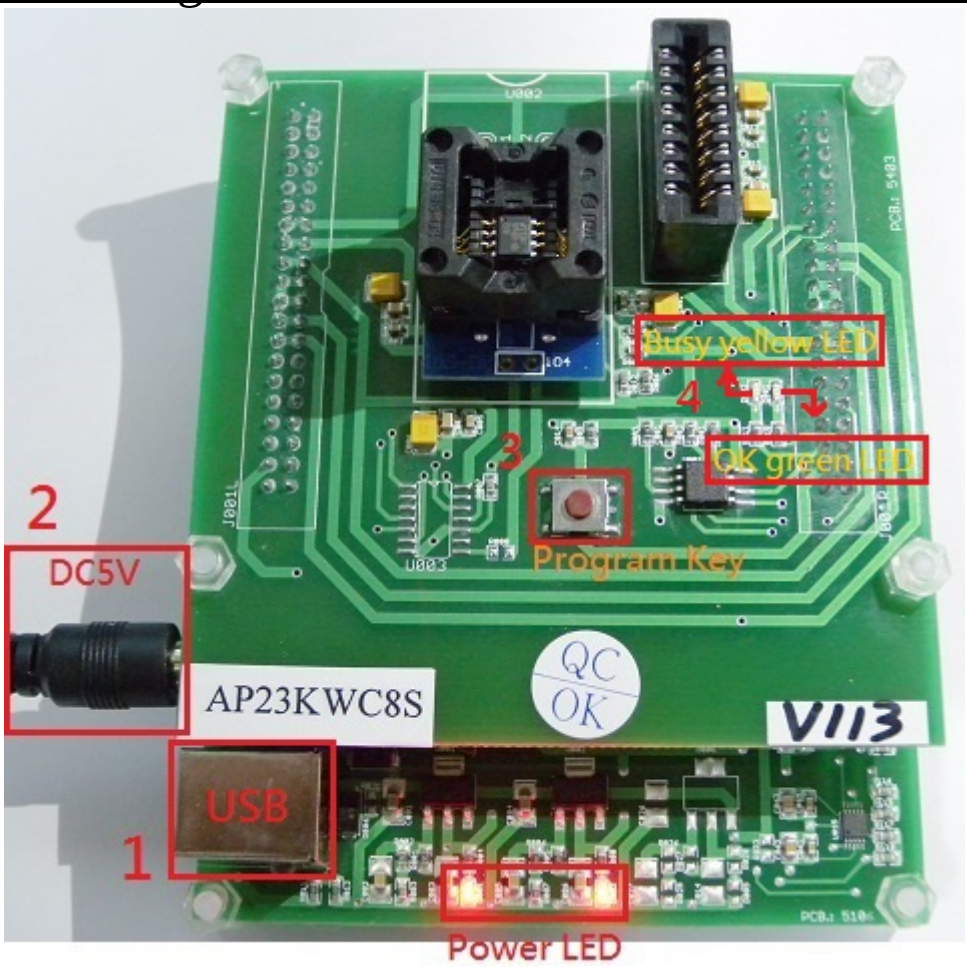
a. Click [Load] button to load the program file [xxx.dp2] file.
After loading, it will show Check Sum 、b、c、d message.

e. Select Blank Check to check if this IC is blank.
Select Program to execute programming.
Select Verify to execute verification.
Select Security to execute IC security mechanism.
***(To avoid the data to be copied and it can't be a master IC).

f. Click Run button to execute all your selected items in e column.
(It'll show (e.) progress & (b) message).



g. Click [Load to Flash] button to download .dp2 file to Writer.



When writer is able to be a 1 to 1 copier. *** (You must do g. step at first)

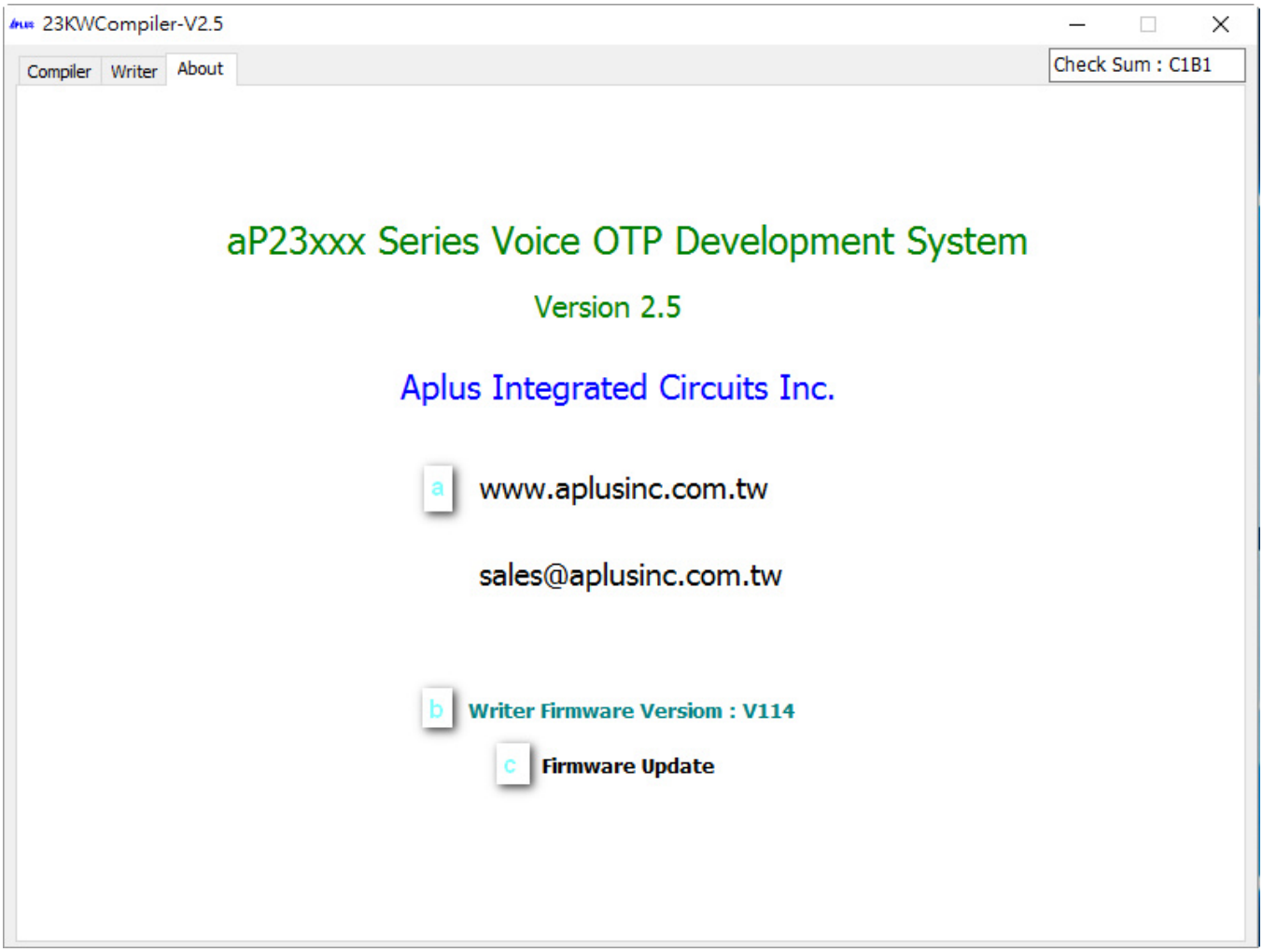
1. Disconnect USB.

2. Connect 5V adapter.

3. Push program key to execute programming.

4. When programming, yellow LED flash.
   When programming finished, green LED light.
   When programming failed , no LED light.

- **Example for About :**



a. Double click the www.aplusinc.com.tw will connect website Aplus Integrate Circuits Inc.

b. Double click the Writer Firmware Version will show writer firmware version.

c. Double click the Firmware Update will load firmware file.

***Note:

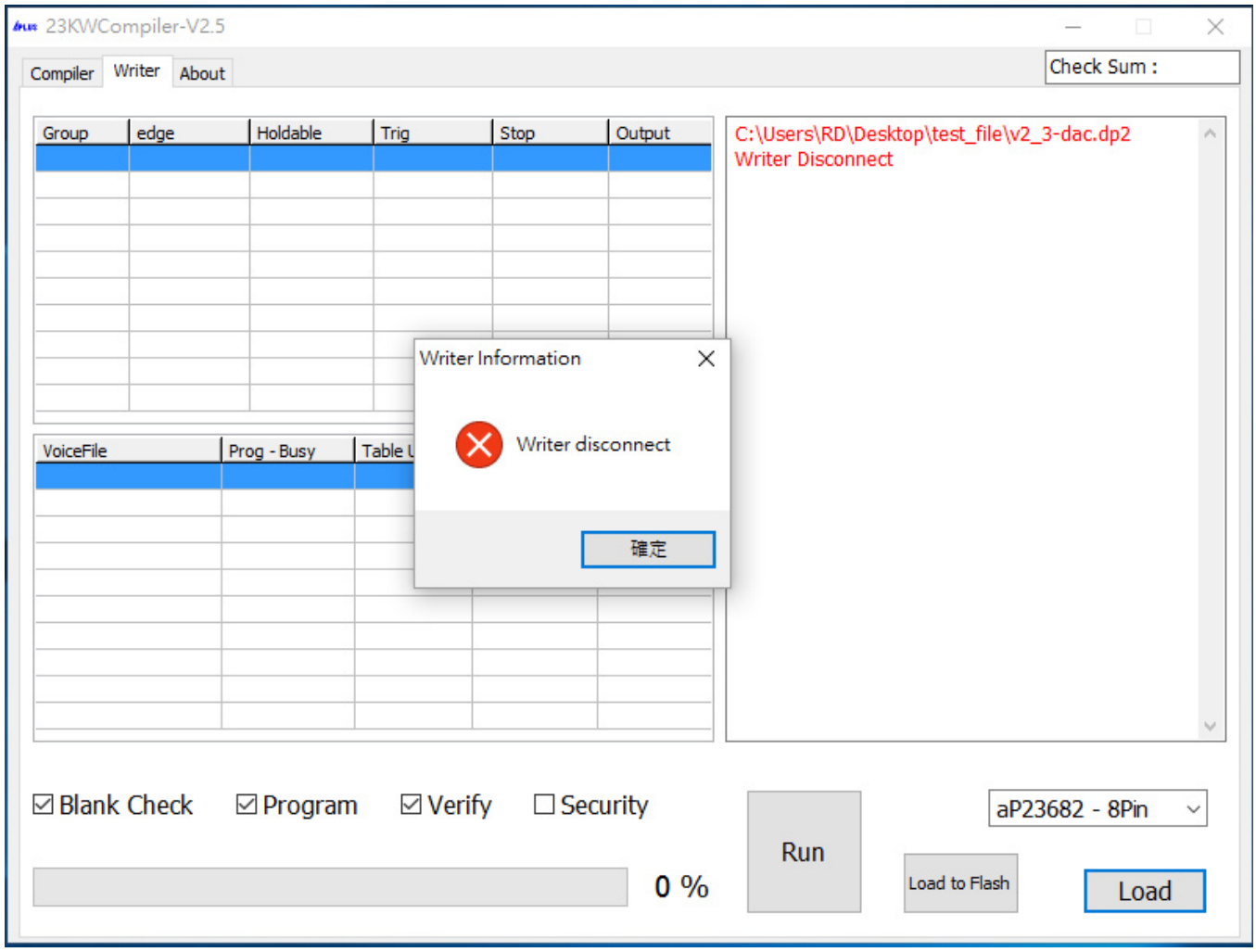
Writer and Copier only support the (*.dp2) file from 23KWCompiler version V2.4 or up.

Q1: How to update the latest firmware version.

Q2: How to convert (*.dat) format to (*.dp2) format.

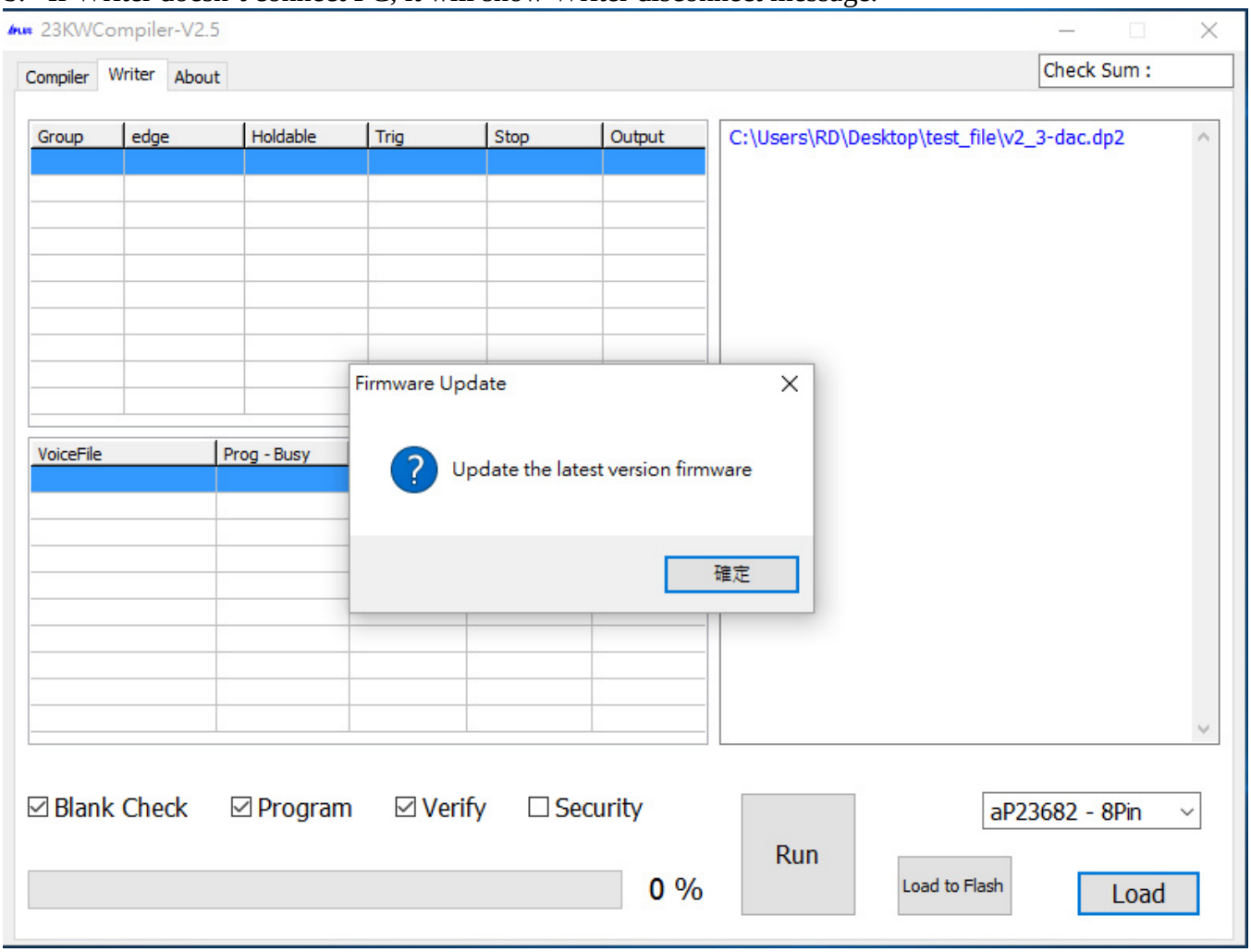
Q3: How to convert V2.1 & V2.2 & V2.3 (*.dp2) to V2.4 or up (*.dp2) format.

Ans1:



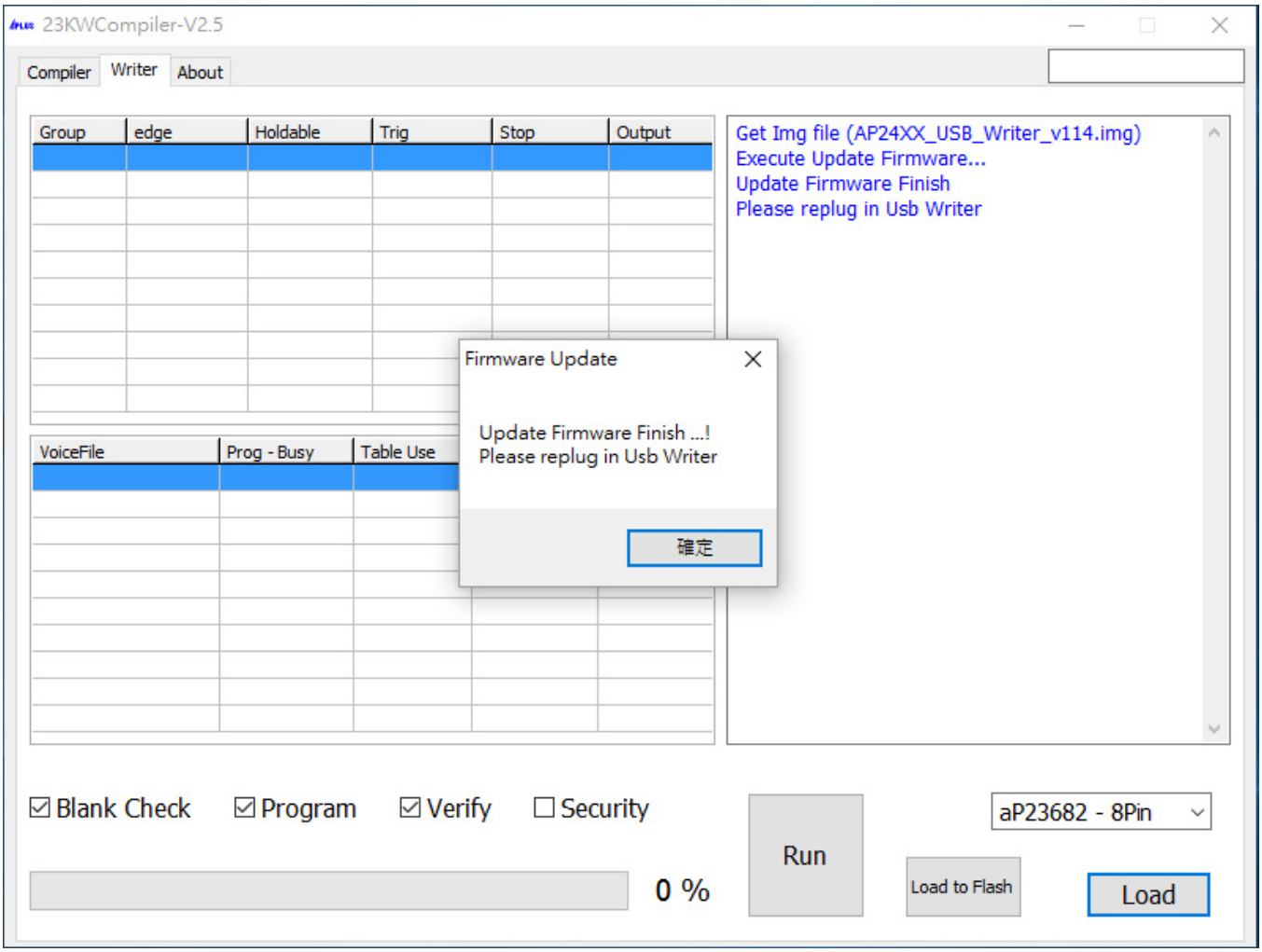
a. Writer must be connected PC after load (*.dp2) file.

b. If Writer doesn't connect PC, it will show Writer disconnect message.



c. If Writer connects PC,it will show Update the latest version firmware message.

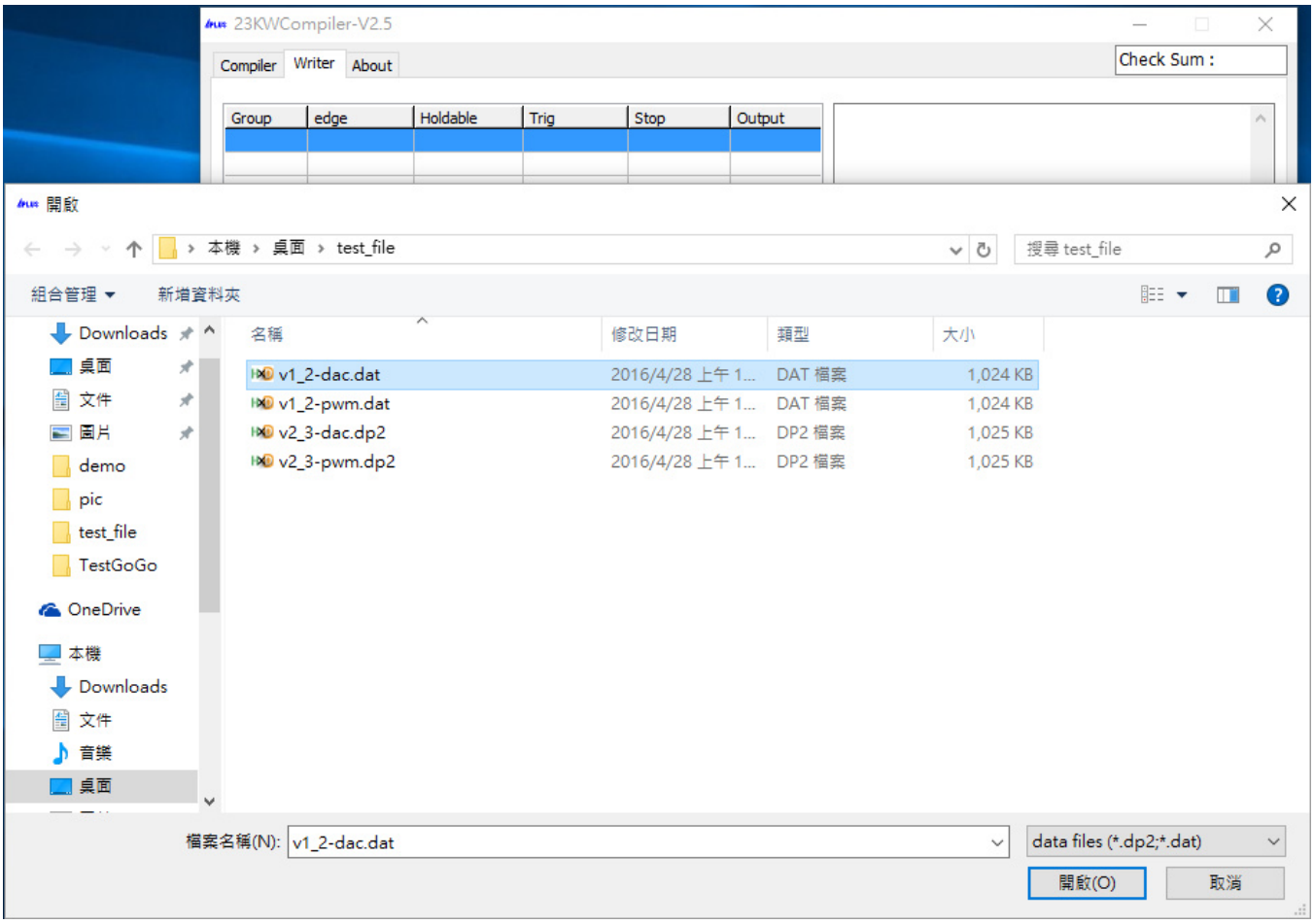
d. Please click OK button.



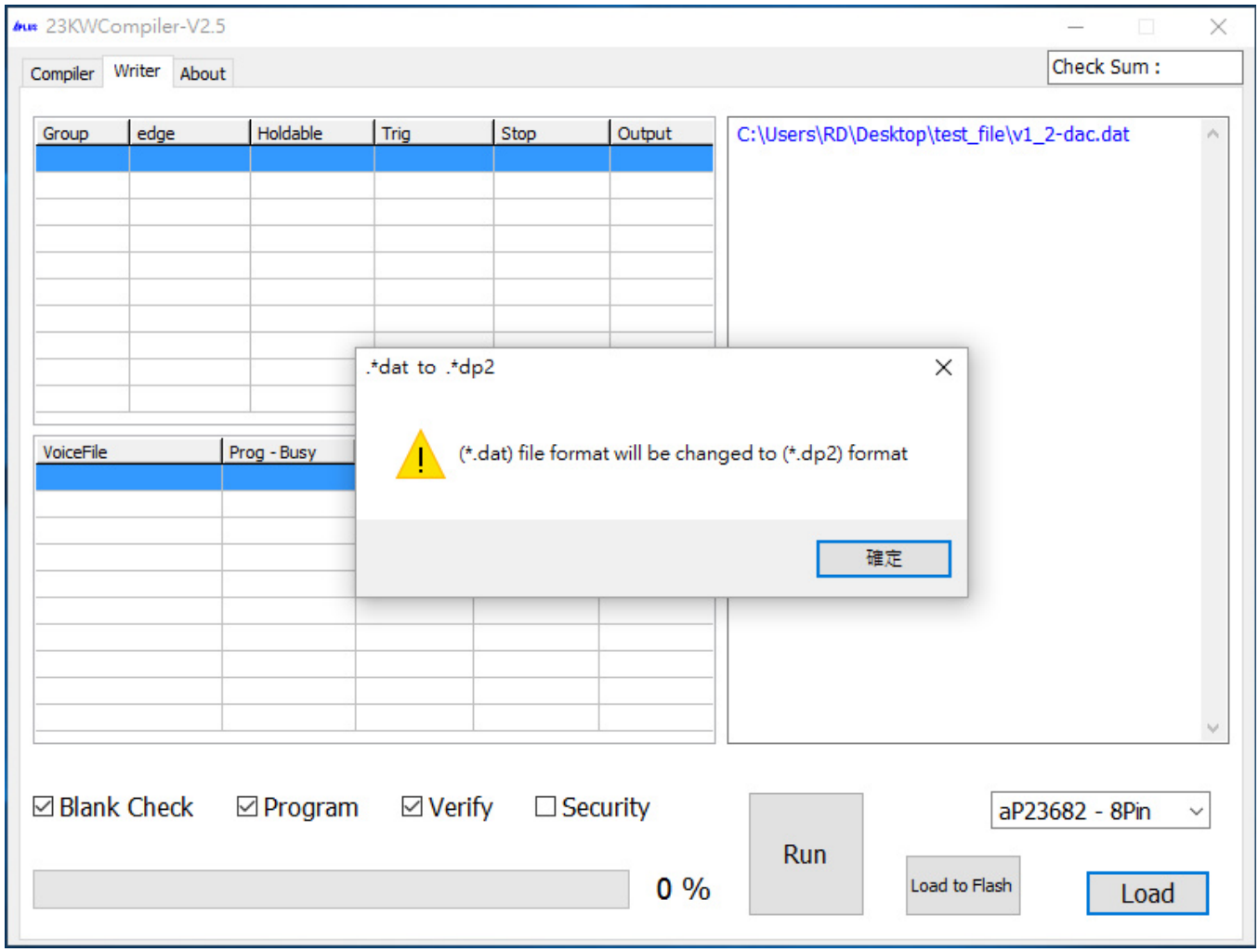
e. After finishing firmware update, click OK button and replug in Usb Writer.

f. You can see About page to check Writer Firmware Version.

Ans2:

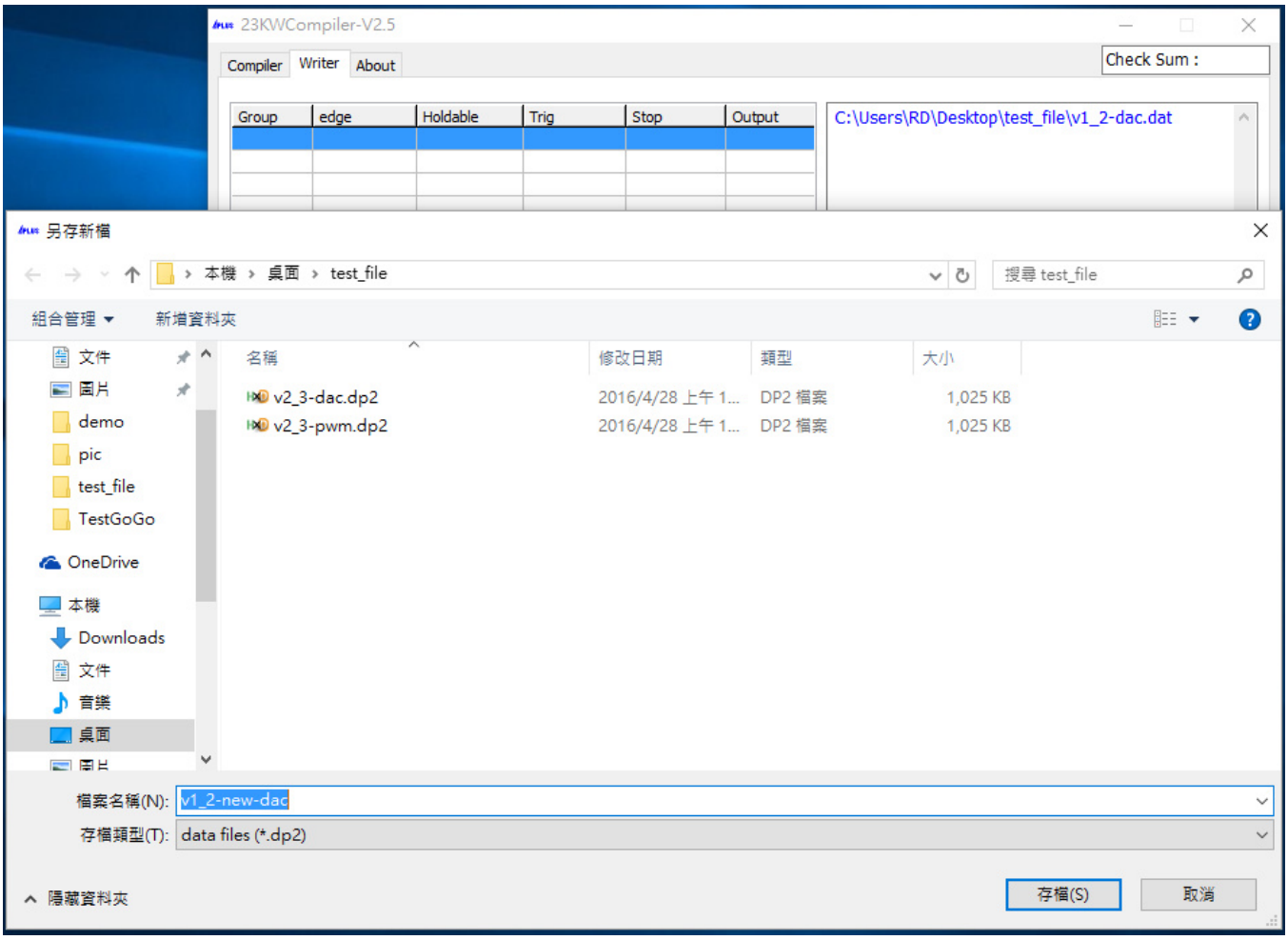


a. At Writer page click Load button and select (*.dat) file.



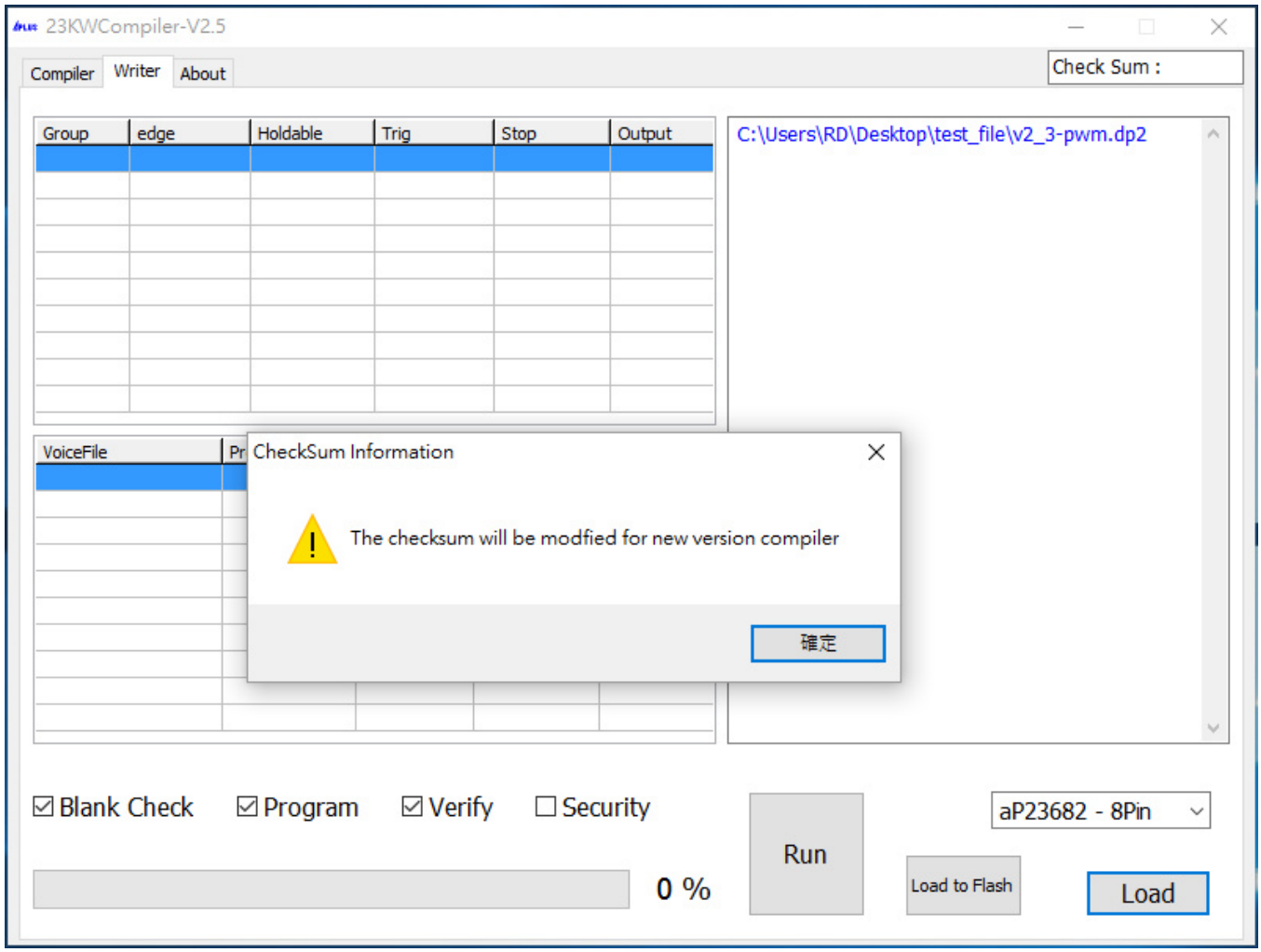
b. It will show (*.dat) file format will be changed to (*.dp2) format message.

c. Click OK button.



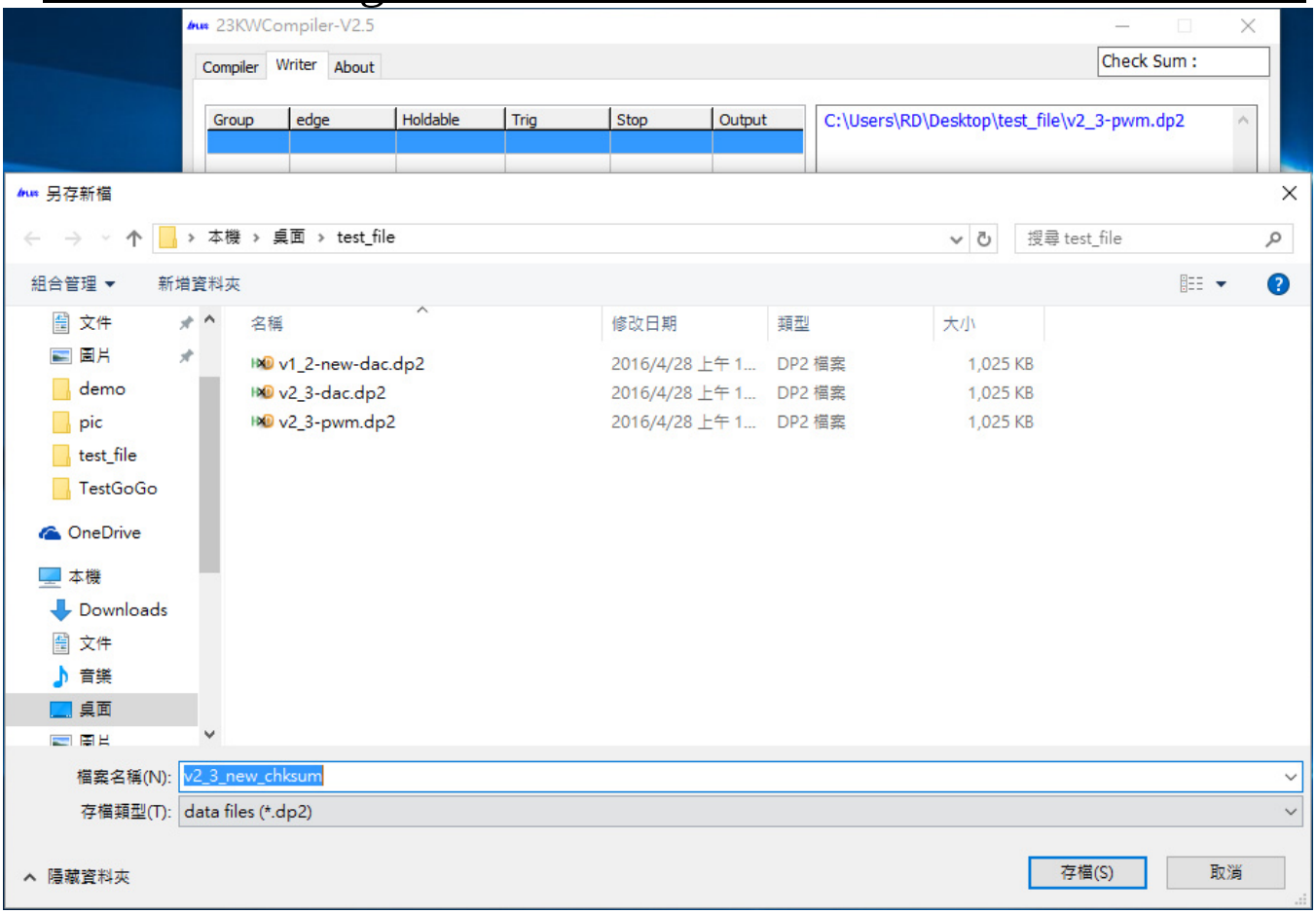
d. Now save (*.dat) file as (*.dp2) file. The (*.dp2) can be used as the data for program and verify only. The (*.dp2) file don't include sufficient information for re-load to the compiler.

Ans3:



a. At Writer page click Load button.

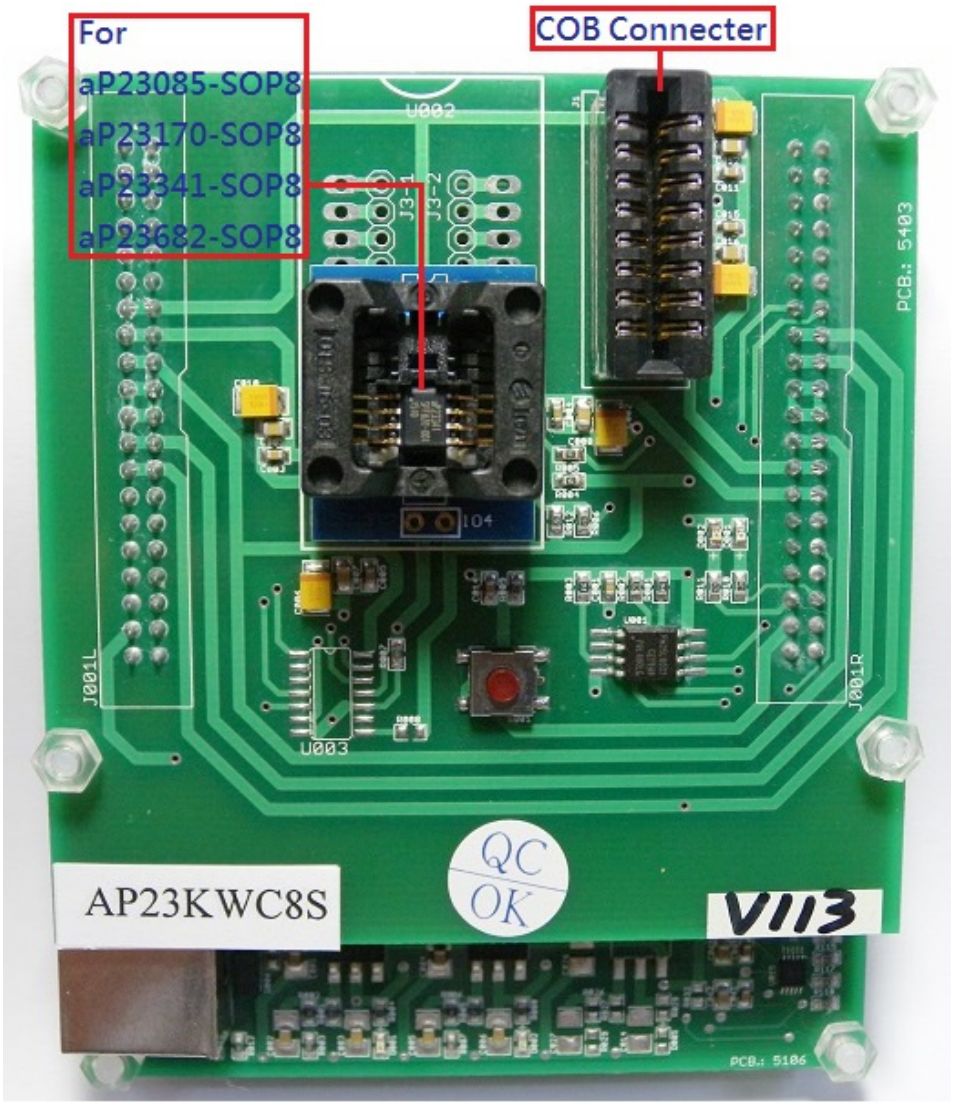
b. Because the check sum rule has been modified after version V2.4,the check sum maybe different from the original one.



c. Now save (*.dp2) file as version V2.5 (*.dp2) file. The (*.dp2) include sufficient information for re-load to the compiler.

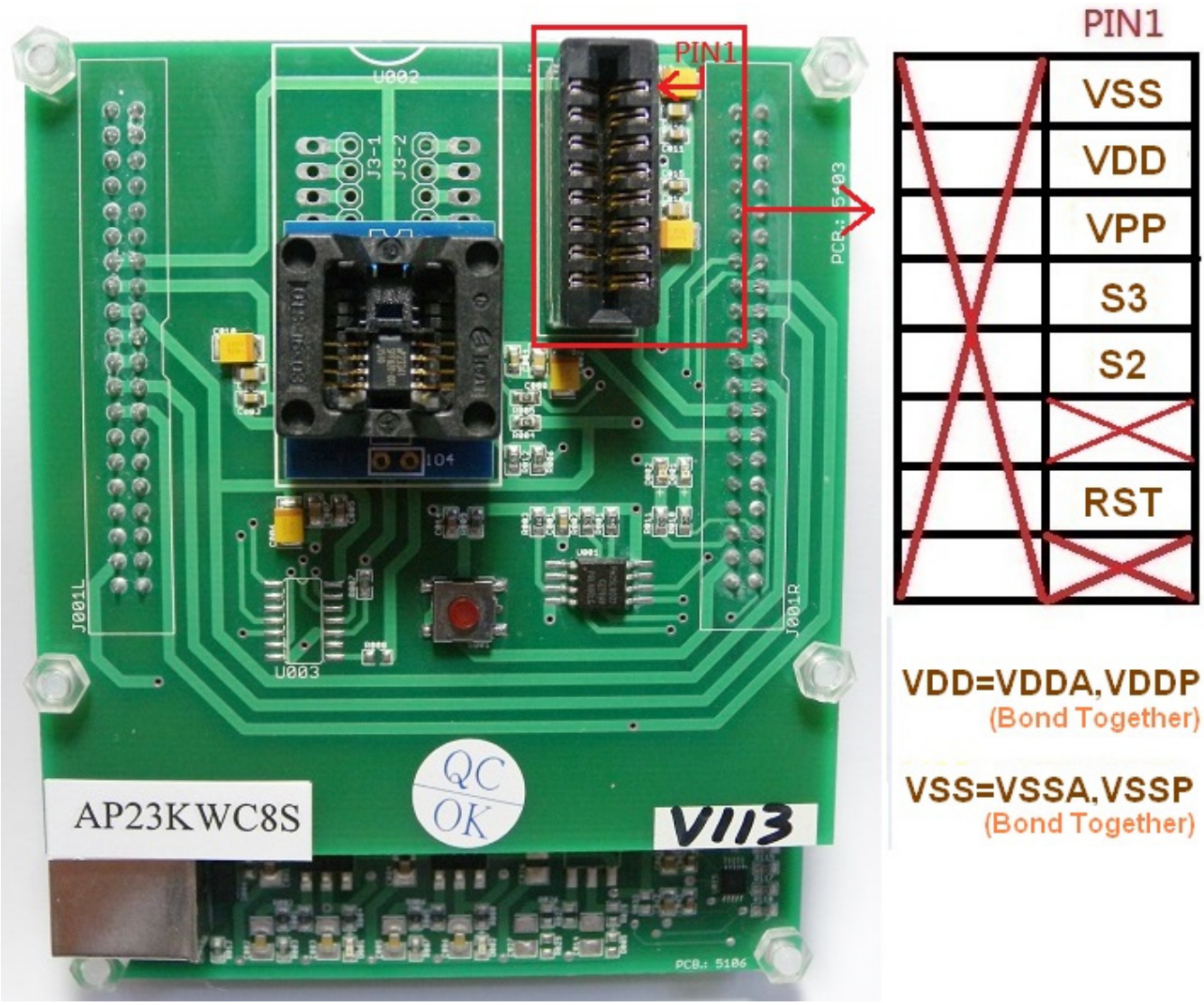
Inserting Devices into the Programmer

- DIP package devices
- Device should be inserted align to the bottom of the 8-pin textool socket.
- If you want to program COB, insert it to the COB Connecter

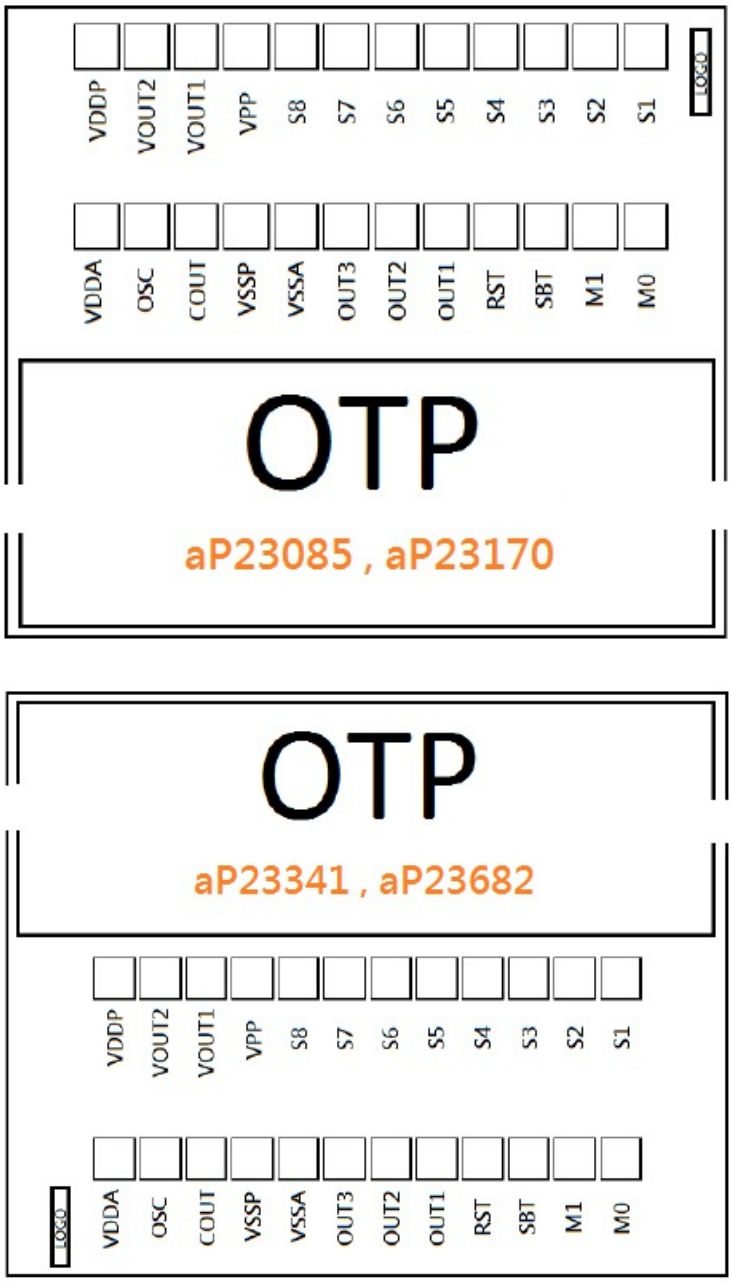


COB Information

AP23xxx_Writer Programmable I/O pin



DIE DIAGRAM：



Programmable pin：

VDD(VDDP、VDDA)、VSS(VSSA、VSSP)、VPP、S2、S3、RST

Notes:

1. Between VPP and GND should add 10KΩ resistor.
2. VDDA and VDDP should be connected to the Positive Power Supply.
3. VSSA and VSSP should be connected to the ground.
4. Substrate should be connected to the ground.

*PCB dimension for Slot：2.28cm x 0.15cm

COB pad pitch：2.54mm

HISTORY

2015/04/10
aP23KWC8S User Guide.

2015/05/20
Dat file become dp2 file.

2015/07/17
Add→Device map & Check Sum

2015/09/18
Add→Low voltage reset & CPU serial option.
Modify→Trigger mode & Silence time & Usage memory size & Execute Run component control.

2016/02/01
Add→ Auto detect writer firmware version.
Add→ MP3 mode Play/Pause & Play/Stop option.

2016/02/24
Add→Q&A.

2016/05/06
Add→ Select IC operating voltage.
Add→ PWM voice output volume option.
Modify→ Change LVR to LVD.