

aP23KWC8D

USB Writer **USER GUIDE**

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Introduction

The aP23KWC8D USB Writer is designed to support Aplus aP23xxx series Voice chips. It is suitable for:

- aP23682 (682 sec, 2 I/O chip) DIP8
- aP23341 (**341 sec, 2 I/O chip**) **DIP8**
- aP23170 (170 sec, 2 I/O chip) DIP8
- aP23085 (085 sec, 2 I/O chip) DIP8

This development system serves three main functions:

Compiler – to created 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 aP23xx 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 1pc. copying.



Hardware Installation

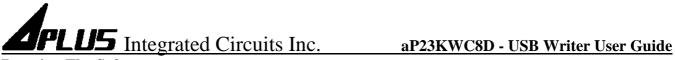
aP23KWC8D is a USB based writer programmer. It is intended to be used in WindowsXP, Win7, Win8 computer.

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 aP23KWC8D USB Writer Programmer Board



Running The Software

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

COMPILER:

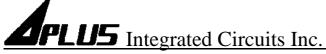
aux 23KWCompiler-	V2.2			1.00		1				X
Compiler Writer / aP89341K Wave File 5	About 1 • Key	Mode	2	3 ▼PWM □DAC	Debounce I 6ms Output Op Out1 : Busy Out2 : LED	650 ^s S tion: - H 16 B	11 PowerOnPla et Oscillator usy- H ED- Flash		me SBT Lo	Rosc Int
Type : Compression ULAW8 DPCM8 File Name	PCM1 ADPC Size			dd-Wav jilence Use %	Group	edge	Holdable	Trig	Stop	Output
					VoiceFile	<u>&</u> <	Prog - Busy 1048576 (Table Use	Table Start	Type

4ue 23KWCompiler-V2.2		
Compiler Writer About		Check Sum :
Compiler Writer About AP23341 - 8Pin Key Mode	PWM Debounce DAC O 16ms 65us	PowerOnPlay Set Volume SBT Loop SBT Swap Set Oscillator : XT Rosc Ext Rosc Int

The steps of compiler :

Select your required IC body.

- --- aP23682-8pin, aP23341-8pin, aP23170-8pin, aP23085-8pin
- --- aP23682-16pin , aP23341-16pin , aP23170-16pin , aP23085-16pin
- ---- aP89682K , aP23341K , aP89170K , aP89085K
- 1. Select your required trigger mode. --- Key mode / CPU parallel mode / MP3 mode / SPI mode / I2C mode
- 2. Select voice output mode. --- DAC or PWM
- 3. Select your required voice file [xxx.wav] folder.
- 4. Show all your required voice files. (Only wav files acceptable)



- --- the [xxx.wav] : 8 bit or 16 bit mono xxx,wav
- 5. Select the compression mode. --- ADPCM4 / ULAW8 / PCM8 / PCM16
- 7. Loading the required .wav files.
- 8. Show the memory of your usage.
- 9. Select if adding the silence.
 - --- 1ms ~ 1048ms
- 10. Select required debounce time. --- 65us or 16ms
- 11. Select power on play. --- power on play [sw0] group
- 12. Volume control setting.
 - --- volume level x16 / x8 / x4
- 13. Select SBT loop. (only for Key mode)
 - --- enable : the SBT pin sequential trigger & loop play
 - --- disable : the SBT pin sequential trigger & play one times
- 14. Select SBT pin swap. (for 8pin device only)
- --- select (SBT as OUT1) or (SBT as KEY3)
 - [ps : enable the SBT Swap, the SBT loop auto disable]
 - --- SBT as OUT1 : busy-H/L,stop-H/L,LED flash(LED high active),

~LED flash(LED low active),prog busyH/L

S3 (pin7)	S2 (pin6)	Group	SBT = OUT1
0	1	SW2	Busy-H/L
1	0	SW3	Stop-H/L
1	1	SW10	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

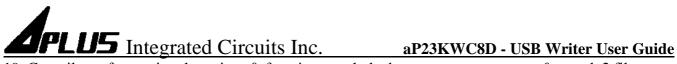
- 15. Select if using the oscillator.
 - --- XT (X'tal=16MHz) / Rosc ext (68K ohm) / Rosc Int
- 16. Select the output function for output1, output2, output3.
 - --- busy-H , busy-L
 - --- LED flash (LED high active) , ~LED flash (LED low active)
 - --- stop-H , stop-L
 - --- Loadbit : for the play command [094h+A9~A0] = [1001-01A98-7654-3210]

Same the aP89341 prefetch-071h [no gap loop play]

--- prog busy-H , prog busy-L can setup the each section of group

17. Setting your required voice sections and function mode.

18. Show your final voice list.



19. Compiler : after setting the voices & function, push the button to create xxx.txt & xxx.dp2 files. 20. re-download & re-editing [xxx.dp2] to setting and function

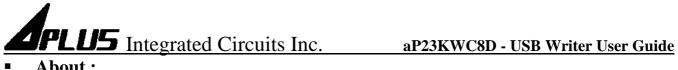
21. Show Check Sum.

WRITER: .

23KWCon	npiler-V2.	2	1000	.		1.5	
Compiler W	riter Abou	ut					Check Sum :
Group	edge	Holdable	Trig	Stop	Output		*
						2.	
4.							
0							
VoiceFile	·	Busy-H	Table Use	Table Start	Туре		
					17,5-2		
5.							
							•
6. ☑Blank	Check	7.)	n <mark>8.</mark> n ⊻Ve	rify 🗆 S	9. ecurity		aP23682 - 8Pin 🛐
		2			11.	Run	aP23682 - 8Pin 3.
				Į	0 %		Load to Flash

The steps of writer :

- 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 not be verified and 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 :

aue 23KWCompiler-V2.2	
Compiler Writer About	Check Sum :
1.aP23xxx Series Voice OTP Development System	
Version 2.2	
Aplus Integrated Circuits Inc.	
2. www.aplusinc.com.tw	
sales@aplusinc.com.tw	
3. Writer Firmware Version Detect	
4. Firmware Update	

The steps of About :

- 1. Show software version.
- 2. Show website of Aplus Integrated Circuits Inc.
- 3. Detect writer firmware version.
- 4. Update writer firmware version.



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• Example for Compiler :

au 23KWCompiler	-V2.2	1.1	
Compiler Writer	About	С	Check Sum :
aP23341 - 8P	n av Key Mode	b VPWI	
Wave File		-	· · · · · · · · · · · · · · · · · · ·
0.wav 1.wav f 2.wav 3.wav		E	Please Select a Folder
5.wav boku.wav CHILD.wav laugh 0.1.wav Type : Compressio O ULAW8	on	d Add-Wav Silence	↓ number_12KHz ↓ sdCcode ↓ uLaw ↓ wav ↓ Wave ↓ A3Copier-APP_分版本G-GA=OK
File Name	Size Rate	Type Use %	 ▲ aIVR_Dev_V111 ▲ aIVR_Project ▲ AndroidJava ▲ aPR2SWBoot-App ▲ aPR2SWBoot-App ▲ aPR2SWBoot-App ▲ aPR2SWBoot-App ▲ aPR2SWBoot-App ▲ art Type
			Usage : 6288 < 1048576 (1%) LoadDp2 Compiler

- 1. Select the IC body is [aP23341 8Pin.]
- 2. Select [Key Mode] to be our trigger mode.
- 3. Select the voice output is [PWM].
- 4. Click Add-Wav to pick your required folder.
- 5. After confirming the folder, click the button.
- 6. All way files in the folder will be listed here.

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aP23341 - 8P	in 🖌 Ker									:k Sum :
Wave File		y Mode	5	PWM	Debounce I6ms	65us			ume 🔲 SBT Lo Rosc Ext 📝	op 🔲 SBT Swa Rosc Int
				*	Output O	ption:				NODE IN
0.wav f										
1.wav				=						
2.wav						1 .	1	1	1	
3.wav					Group	edge	Holdable	Trig	Stop	Output
boku.wav										
CHILD.wav										
laugh 01.wav				-	-					
Type : Compressio	n				-					
O ULAW8	O PCM	116	Ad	d-Wav						
Č										
PCM8 h	ADP	CM4	1 S	ilence						
Fil Silence Tim	e (1 ~ 104	8 mS)	Ok	Use %						
0.		J		1			10	1-11-11	1-11-0	1-
1. 2.	mS	C	ancel	1	VoiceFile		Prog - Busy	Table Use	Table Start	Туре
3.wav	7472	8000	PCM16	1						
boku.wav	35650	12000	PCM8	3						
CHILD.wav	91676	12000	PCM8	9						
laugh 01.wav	22877	12000	PCM8	2						
Silence : 20mS	0	16000	Silence	0						
g										
					-					
					g-1 Usage:1	92010	< 1048576	(17%)	LoadDp2	Compiler

7. Show all your required .wav files. Double click .wav files you required in f, they will be showed in g.

7a. 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: aP23341-8Pin to aP23682-8Pin

2).Compressed the wav files to decrease the memory size. ex: from PCM16 to PCM8.

3).Delete some required voice files.

8. If way file is too big, we can choose compressing files to decrease their sizes.

(UALW compress wav file to 8bits, PCM8 compress wav file to 8bits,

ADPCM compress wav file to 4bits)

*** Please note if your original voice is 16bit wav file which need to be compressed to 8 bit, We suggest you choose ULAW would be better.

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

10. If need silence 20ms. ,key in 20 (unit ms) then click OK button.

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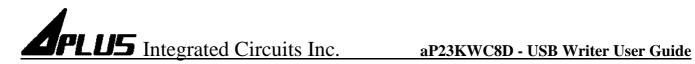
ompiler Writer / aP23341 - 8Pir	About n + Key	y Mode		▼ PWM DAC		65us	PowerOnPla Set Oscillator		me SBT Loo	op 📝 SBT Out1 Rosc Int
Wave File				*	Output O					
0.wav					Out1:Bus	y-H q	Busy-H	•		
1.wav				=						
2.wav									1	
3.wav					Group	edge	Holdable	Trig	Stop	Output
boku.wav						3				
CHILD.wav										
laugh 01.wav				-						
Type : Compression										
			A	dd-Wav						
O ULAW8	O PCM	116								
PCM8	ADP	CM4		Silence						
File Name	Size	Rate	Туре	Use %						
0.wav	6732	8000	PCM16	1						
1.wav	6412	8000	PCM16	1	VoiceFile		Prog - Busy	Table Use	Table Start	Type
2.wav	5912	8000	PCM16	1						
3.wav	7472	8000	PCM16	1						
boku.wav	35650	12000	PCM8	3						
CHILD.wav	91676	12000	PCM8	9						
laugh 01.wav	22877	12000	PCM8	2						
Silence : 20mS	0	16000	Silence	0						
					21					

Debounce 16ms 65us	PowerOnPlay V Set Volume SBT Loop Set Oscill _{Volume} Warp : V Disable Enable	Int
Output Option: Out1 :Busy- H	Busy-H Vol Level : 8 Vol Default : 8 V	
	Set	

- 11. Select the signal timing. (16ms or 65us)
- 12. enable the power on play function, immediately play [SW0] one time.
- 13. [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 : M0(pin-12) : volume Level [+ 1]

```
ex: Level x8, 1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5 \rightarrow 6 \rightarrow 7 \rightarrow 8 \rightarrow 8 \rightarrow 8 \rightarrow \dots
```

```
M1(pin-11) : volume Level [ - 1 ]
ex: Level x8, 8 \rightarrow 7 \rightarrow 6 \rightarrow 5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 1 \rightarrow 1 \rightarrow 1 \rightarrow \dots
```



Select enable :

M0(pin-12) : volume Level [+1] ex: Level x8, $1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5 \rightarrow 6 \rightarrow 7 \rightarrow 8 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow \dots$

M1(pin-11) : volume Level [- 1] ex: Level x8, $8 \rightarrow 7 \rightarrow 6 \rightarrow 5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 1 \rightarrow 8 \rightarrow 7 \rightarrow 6 \rightarrow 5 \rightarrow \dots$

14. When trigger in "Key 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)

Debounce 16ms 65us	PowerOnPlay Set V Set Oscillator : XT	0-1
Output Option: Out1 :Busy-H	Busy- H 👻	SBT as KEY3
		 Set

15. SBT pin swap other I/O pin function.

ex : SBT pin swap to OUT1 as output use.

16. 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)

17. 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 busy-H, prog busy-L Loadbit

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ompiler Writer Al	bout								Che	ck Sum :
aP23341 - 8Pin	- Key	/ Mode		PWM		e 🔘 65us	PowerOnPla Set Oscillator :	Section and the section of the secti	me 🔲 SBT Lo	oop 🔽 SBT Out1
Wave File				*	Output 0		2			
0.wav					Out1:Bu	sy-H	Busy-H	•		
1.wav				=						
2.wav						1.	1	1	1	1
3.wav					Group	edae	Holdable	Tria	Stop	Output
boku.wav					SW0	Level	Unholdable	Retrigger	Enable	Panel-A
CHILD.wav					SW1 r	Level	Unholdable	Retrigger	Enable	
laugh 01.wav				-	SW2	Trig Level	Hold	Trigger	Stop	
Type : Compression	8		_			Level	Output	Non-Ret	rigger 💿 Dis	able
ULAW8	O PCM	16	A	dd-Wav		C Edge	Holdable	Retrigge	er 💿 En	able
-	0.1				í — ')[
PCM8	ADP	CM4	S	Silence	J					
File Name	Size	Rate	Туре	Use %		SW 2	2 s		OK Car	ncel
0.wav	6732	8000	PCM16	1						
1.wav	6412	8000	PCM16	1	VoiceFile		Prog - Busy	Table Use	Table Start	Type
2.wav	5912	8000	PCM16	1	boku.way	·	1	0	0	PCM8
3.wav	7472	8000	PCM16	1	laugh 01.		1	0	0	PCM8
boku.wav	35650	12000	PCM8	3	idogri o 1.	1101				
CHILD.wav	91676	12000	PCM8	9					<u> </u>	Panel-B
laugh 01.wav	22877	12000	PCM8	2				Up		
Silence : 20mS	0	16000	Silence	0				Down		
								Insert		
								Delete		
					Usage : 1	83115 •	< 1048576 (17 %)	LoadDp2	Compiler

- 18. Double click Panel A for your setting the function of each Group.
- 19. Key in group number.
- 20. SW means group. ex : Select the second group and double click the wav files you required in (t.) 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.

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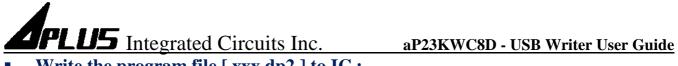
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Compiler Writer	About										ck Sum : 86C2
aP23341 - 8Pi	in 👻 Key	/ Mode		PWM		0.00	PowerO Set Oscillat			osc Ext 🔽	op 📝 SBT Out: Rosc Int
Wave File				*	Output Op						
3.wav					Out1:Busy	/-н	Busy-H	•			
boku.wav											
CHILD.wav						1.	1			1	1
laugh 01.wav				E	Group	edge	Holdat		Frig	Stop	Output
MUSIC 02.wav					SW0	Level	Unhold		.etrigger	Enable	Panel-A
Sound 2-1.wav					SW1	Level	Unhold		.etrigger	Enable	I allCI-A
Super 16A.wav				-	SW2	Level	Unhold	lable R	etrigger	Enable	
Type : Compressio	n					Ad	dd n				
ULAW8 PCM16			A	dd-Wav			ulti-Add		- n-1		
PCM8 O ADPCM4			S	Silence]	Delete		-	SW-Beg	Ok	
File Name	Size	Rate	Туре	Use %			ay op		SW-End	i: 4	Cancel
0.wav	6732	8000	PCM16	1		SL	op		Trig Lev	/el	
1.wav	6412	8000	PCM16	1	VoiceFile		Prog - Bus	sy Tab	le I 💿 Leve		Edge
2.wav	5912	8000	PCM16	1	boku.wav		1	0	Hold		
3.wav	7472	8000	PCM16	1	laugh 01.w	av	1	0	🔘 Unh	oldable 💿	Holdable
boku.wav	35650	12000	PCM8	3					Trigger		
CHILD.wav	91676	12000	PCM8	9					Non	-Retrigger 🎯	Retrigger
laugh 01.wav	22877	12000	PCM8	2					Stop		
Silence : 20mS	0	16000	Silence	0					Disa	ble 💿	Enable
										W	V
					Usage : 18	3131 <	1048576	(17 %	6) 103	dDp2	Compiler

21. 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 (u-1). Delete: delete the group. Play : play all voices of the group. Stop : stop the voice playback.

- 22. Finish compiling ,click compiler button.
- 23. Generate Check Sum number.
- 24. Loading finished compiled .dp2 file.



Write the program file [xxx.dp2] to IC :

Group	edge	Holdable	Trig	Stop	Output	C:\Users\Jimmy\Desktop\demo.dp2
WO	Level	Unholdable	Retrigger	Enable	Cathor	Key Mode
W1	Level	Unholdable	Retrigger	Enable		Use: PWM
W2	Level	Unholdable	Retrigger	Enable		Power On Play: Enable
C						Use: Rosc Int b SBT as Out1 OutPut1: Busy- H Execute Blank Check Device ID Correct Blank Ckeck Success Execute Program Device ID Correct
VoiceFile CHILD.wav	Î.	Busy-H	Table Use	Table Start 0	Type PCM8	Program Finish Execute Verify Device ID Correct
d						Verify Success Execute Security Device ID Correct Security Finish
Ø Blank c	Check	🗷 Progran	n 🗵 Ver	rify 🛛 Se	curity	f aP23682 - 8Pin ▼ Run g a Load to Flash Load

- a. Click [Load] button to load the program file [xxx.dp2] file. After loading, it will show Check Sum $\cdot b \cdot c \cdot d$ 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) PS : After the IC selecting Security, this IC can't execute Verify.
- f. Click Run button to execute all your selected items in e column. (It'll show (e.) progress & (b)message)

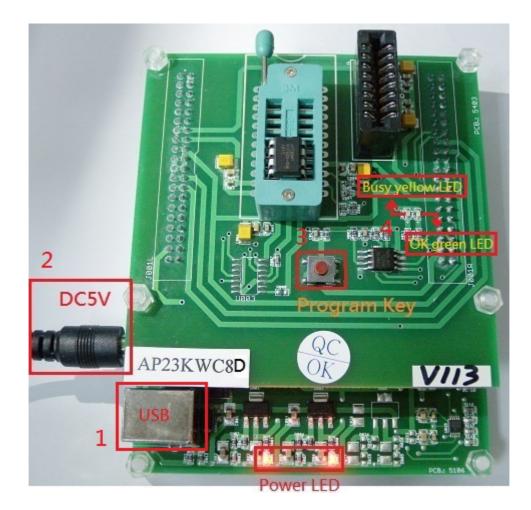






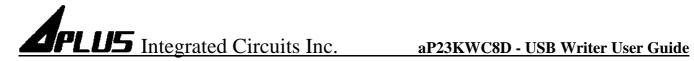
g. Click Load to Flash button to download .dp2 file to Writer.





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

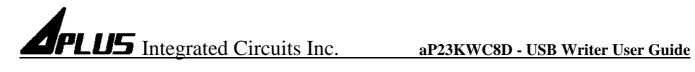
- 1. Disconnect USB.
- 2. Connect 5V adapter.
- 3. Push program key to execute programming.
- 4. When programming, yellow LED flash. When programming finished, green LED light. When programming failed , no LED light.



Example for About :

au 23KWCompiler-V2.2	
Compiler Writer About	Check Sum :
aP23xxx Series Voice OTP Development System	
Version 2.2	
Aplus Integrated Circuits Inc.	
a . www.aplusinc.com.tw	
sales@aplusinc.com.tw	
b. Writer Firmware Versiom : V113	
C . Firmware Update	

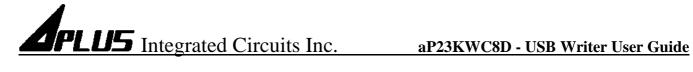
- a. Double click the <u>www.aplusinc.com.tw</u> will connect website Aplus Integrate Circuits Inc..
- b. Double click the Writer Firmware Version will show writer firmware version.
- c. Double click the Firmware Update will load firmware file.



Inserting Devices into the Programmer

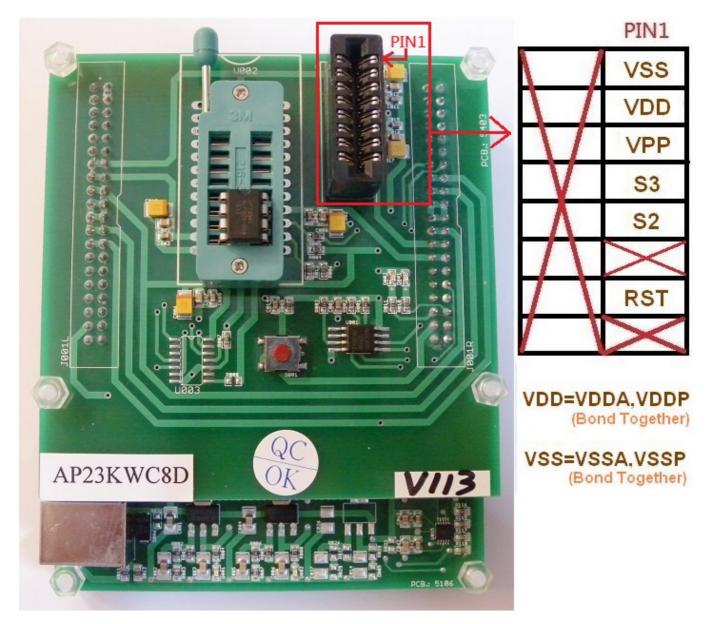
- DIP package devices
- Device should be inserted align to the bottom of the 8-pin textool socket.
- If you want to program COB, insert it to the COB Connecter





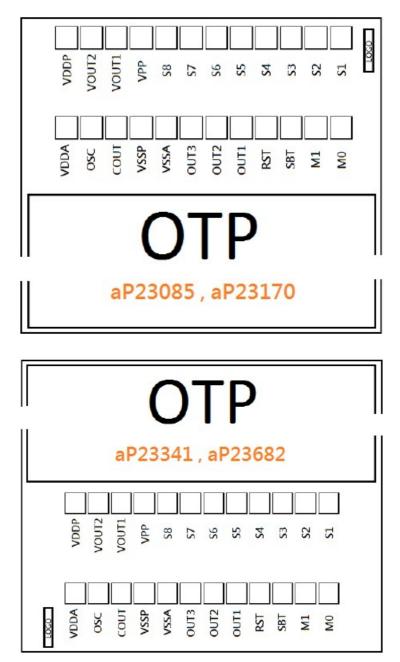
COB Information

AP23xxx_Writer Programmable I/O pin





DIE DIAGRAM:



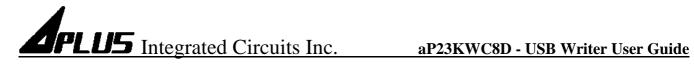
Programmable pin : VDD(VDDP \vdot VDDA) \vdot VSS(VSSA \vdot VSSP) \vdot VPP \vdot S2 \vdot S3 \vdot RST

Notes:

- 1. Between VPP and GND should add $10K\Omega$.
- 2. VDDA and VDDP should be connected to the Positive Power Supply.
- 3. VSSA and VSSP should be connected to the Power GND.
- 4. Substrate should be connected to the Power GND.

*PCB dimension for Slot : 2.28cm x 0.15cm COB pad pitch : 2.54mm

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HISTORY

2015/04/10

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2015/05/20

Dat file become dp2 file.

2015/07/17

Add→Device map & Check Sum