Microcontroller Development System

E-PGM+ / E-PGM Serial / E-GANG Manual

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ABOV Semiconductor MDS Team

ABOV SEMICONDUCTOR MDS

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1-1. E-PGM+ / E-PGM Serial specification

- Product name : **E-PGM+ / E-PGM Serial**
- Standalone programmer
  - No need to connect PC
  - VDD is supplied to devices
- Programming Power Output
  - VDD : 2.5V ~ 5.5V, 200mA
  - VPP : 2.5V ~ 13V, 50mA
- Dimension(x , y, h) : 8.4 x 13.5 x 33cm
- Weight : 0.35kg
- Input Voltage : DC Adaptor 15V/1A
- Power Consumption : 15W
- Operating Temp : -10 ~ 40℃
- Storage Temp : -30 ~ 80℃

1-2. E-GANG4 / E-GANG6 specification

- E-PGM+ S/W support E-GANG(4/6).
- Four or Six pieces of E-PGM+ included
- Power control board is included. USB hub is included.
- When main power is on, each E-PGM+ is sequentially power on.

- Product name : **E-GANG4**
- Programming Power Output
  - VDD : 2.5V ~ 5.5V, 200mA
  - VPP : 2.5V ~ 13V, 50mA
- Dimension(x , y, h) : 33.5 x 22.5 x 35cm
- Weight : 2.0kg
- Input Voltage : DC Adaptor 15V/2A
- Power Consumption : 15W
- Operating Temp : -10 ~ 40℃
- Storage Temp : -30 ~ 80℃

- Product name : **E-GANG6**
- Programming Power Output
  - VDD : 2.5V ~ 5.5V, 200mA
  - VPP : 2.5V ~ 13V, 50mA
- Dimension(x , y, h) : 48.2 x 22.5 x 35cm
- Weight : 2.8kg
- Input Voltage : DC Adaptor 15V/2A
- Power Consumption : 30W
- Operating Temp : -10 ~ 40℃
- Storage Temp : -30 ~ 80℃

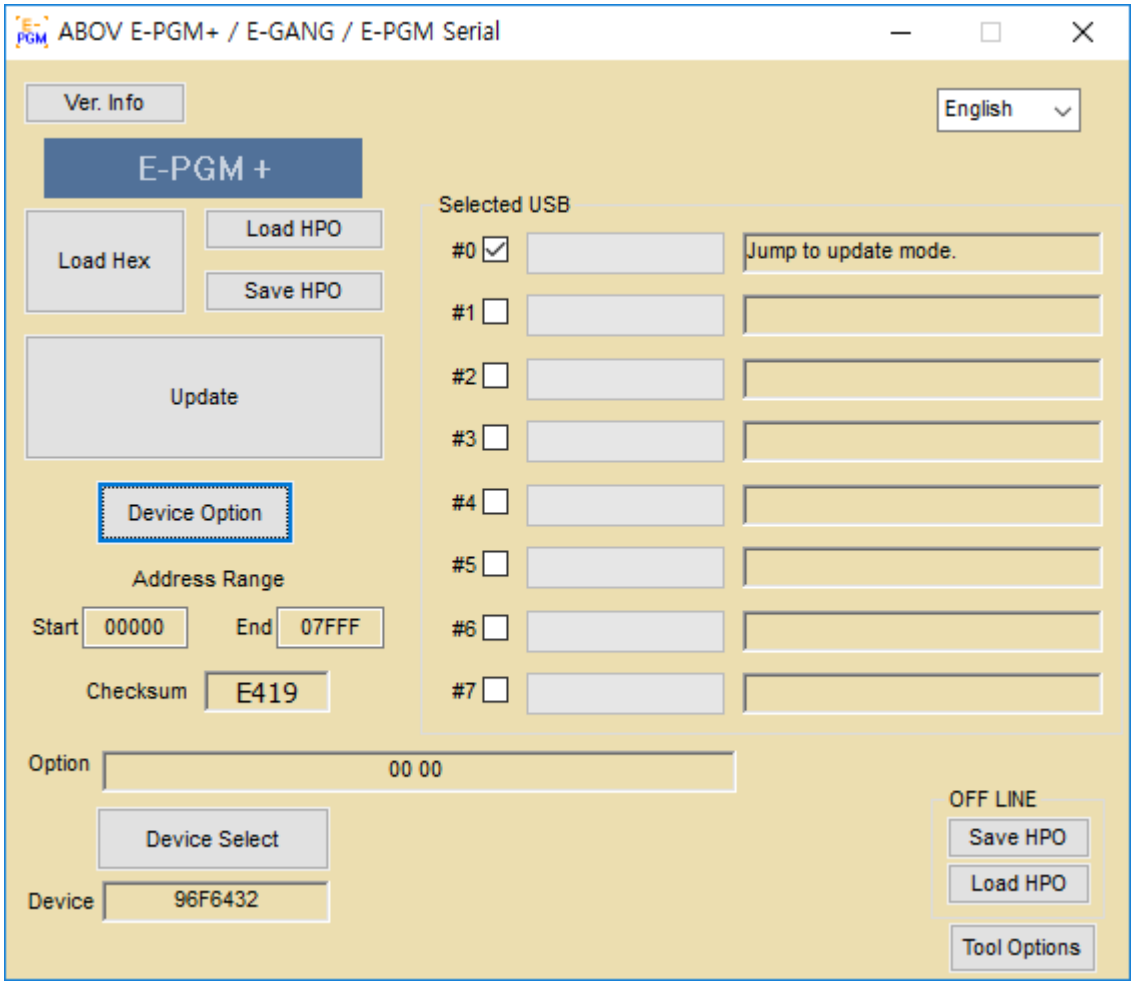
2. How to update E-PGM+ / E-PGM Serial / E-GANG

- The PC(personal computer) is not needed any more after completing the update.
- Please check the USB device driver installed.
- The USB device driver is located at ABOV homepage.

Programmer : E-PGM+, E-GANG4, E-GANG6, E-PGM Serial

1. Connect the USB cable and Power-On.
2. Press the Device Select button and select the target device.
3. Press the Load File button and select the user-hex-file.
4. Press the Option Sel. button and select device-options.
5. Press the FW-CODE Write button to download the user-hex-file and device-options.

Select Device	Select a target MCU. On selecting the target MCU, the device firmware is loaded automatically.
Load File	Load a user-hex-code.
FW-CODE Write	This button enables you to write the firmware , user hex-code, device-options for the E-PGM+.
Option Sel.	Configure options of the target device.
Load HPO	Load a HPO-file(device + code + option) No need to select device, code and option
Save HPO	Make a HPO-file(device + code + option)



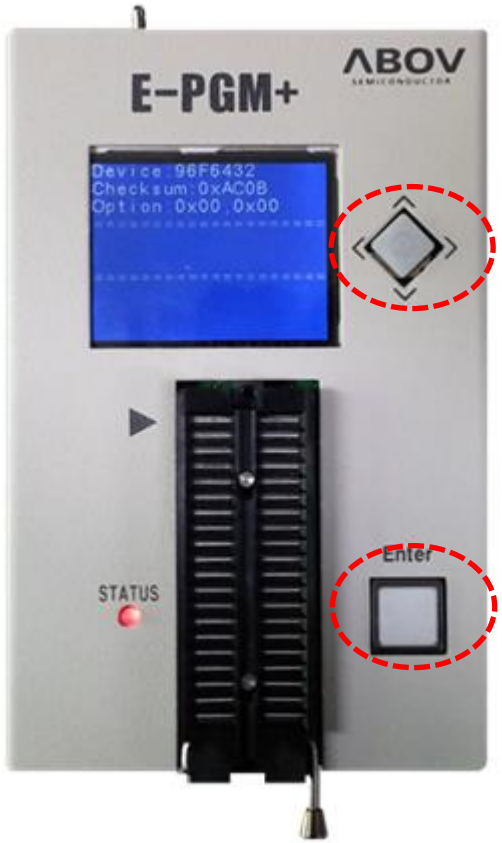
3. Programming a microcontroller

The PC(personal computer) is not needed any more after completing the update.

Check the device ,code checksum and device-options

↓

Press the Enter-button.



* Press the Joy-button to read. This mode does not update the E-PGM+ with the user-hex data.
For displaying the checksum and option-value.

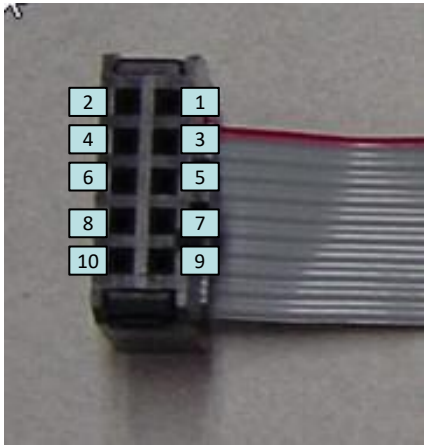
⇨ Read

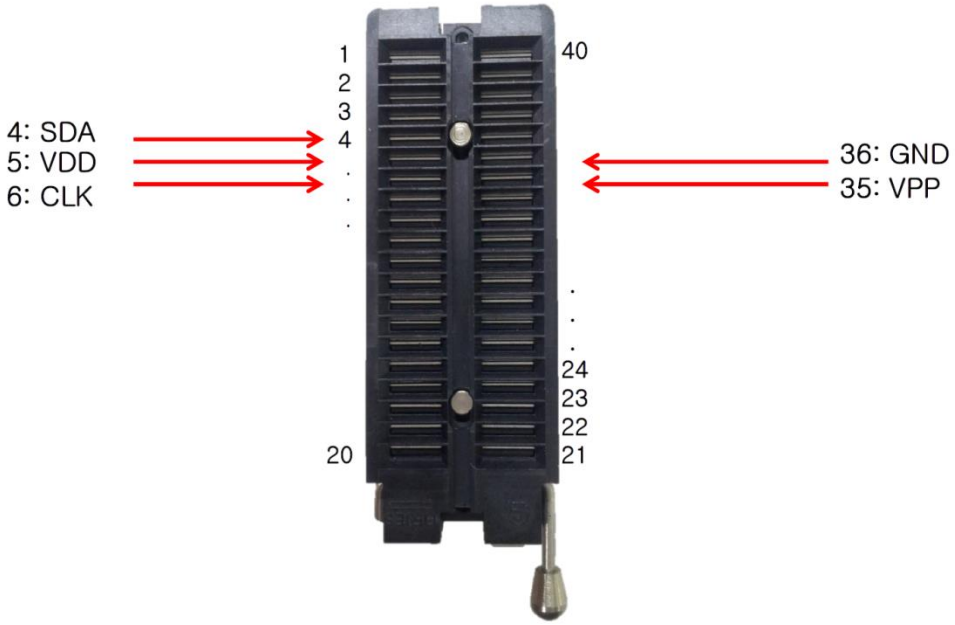
⇨ Write

Warning
Programmers supplie VDD with the target board.
* Do not turn on a user target board.
* Programmers can be damaged when the power of the target B/D is on.

4. Pin name of Socket and ISP connector

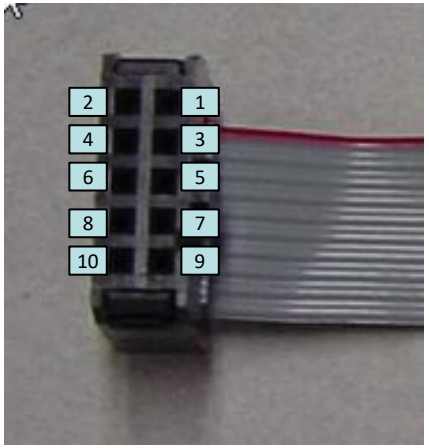
Signal	Socket	ISP connector
VDD	5	2
GND	36	4
CLOCK	6	6
DATA	4	8
VPP	35	10
Run Flag	7	5





1. MCU UART-RX
2. VDD
3. MCU UART-TX
4. GND
5. Run Flag or Boot Pin or ACK
6. Serial Clock
7. GND
8. Serial Data
9. N/A
10. VPP or Reset Pin

UART

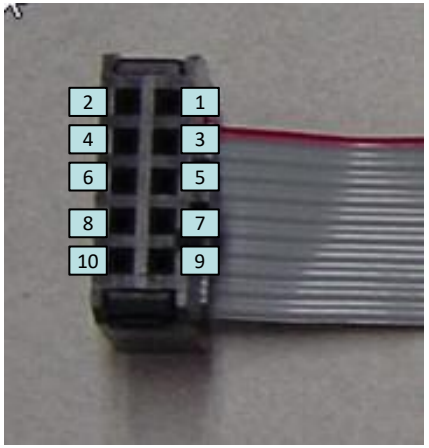


Warning
The E-PGM+ supplies VDD with the target board.
* Do not turn on a user target board.
* The E-PGM+ can be damaged when the power of the target B/D is on.

1. MCU RX : connect to the uart rx0 pin of the device.
2. VDD
3. MCU TX : : connect to the uart tx0 pin of the device.
4. GND
5. Boot Pin
6. N/A
7. N/A
8. N/A
9. N/A
10. Reset

5-2. Device connections – MC80F7708 UART ISP

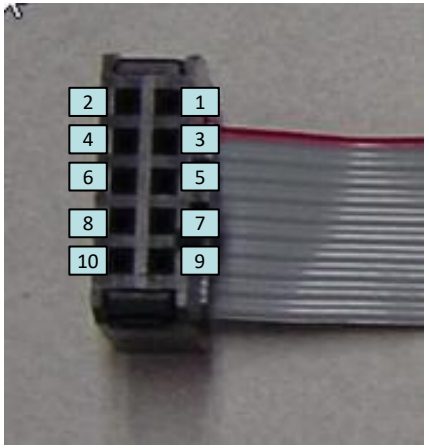
UART



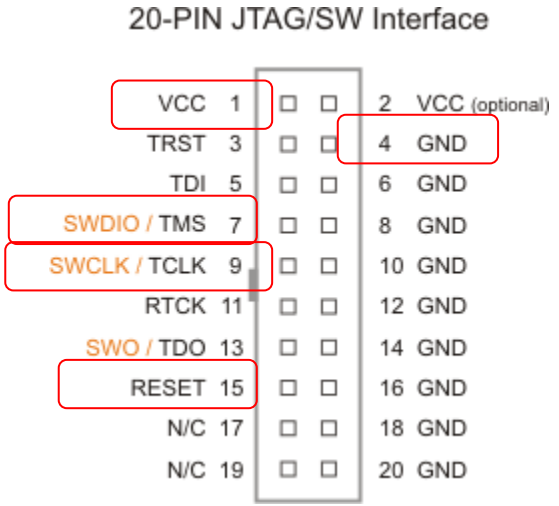
Warning
The E-PGM+ supplies VDD with the target board.
* Do not turn on a user target board.
* The E-PGM+ can be damaged when the power of the target B/D is on.

1. MCU RX : connect to the uart rx0 pin of the device.
2. VDD
3. MCU TX : connect to the uart tx0 pin of the device.
4. GND
5. ACK
6. N/A
7. N/A
8. N/A
9. N/A
10. Vpp

SWD(Serial Wire Debug)



Warning
The E-PGM+ supplies VDD with the target board.
* Do not turn on a user target board.
* The E-PGM+ can be damaged when the power of the target B/D is on.



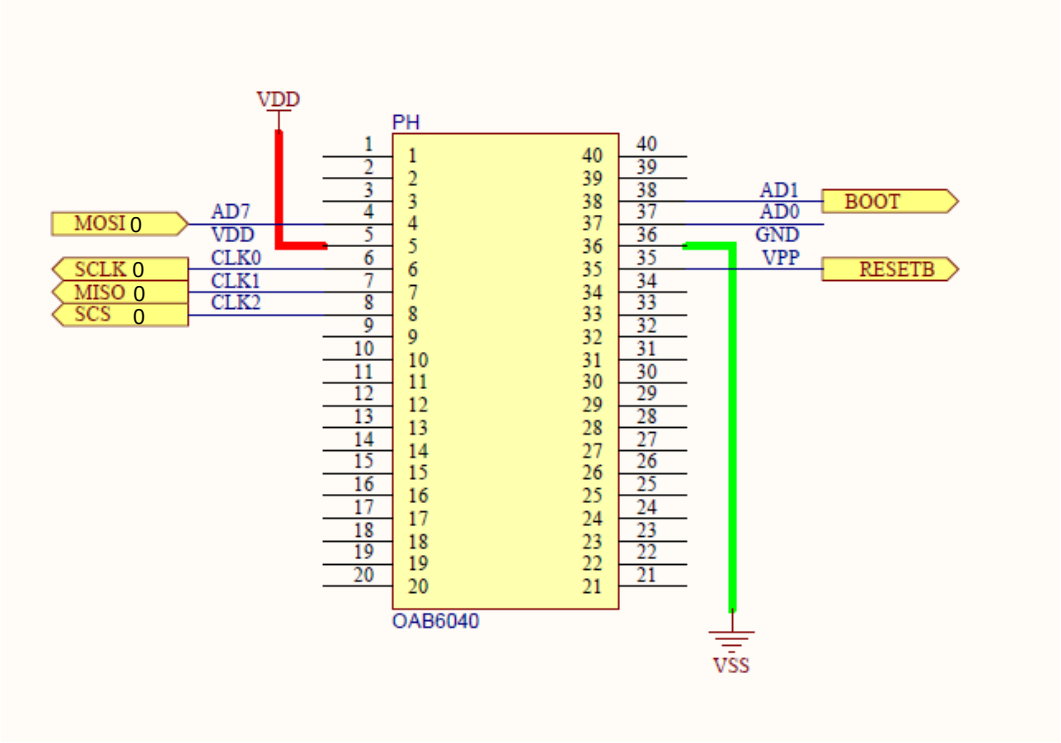
1. N/A
2. VDD
3. N/A
4. GND
5. N/A
6. SWCLK
7. N/A
8. SWDIO
9. N/A
10. Reset

*** Reset : If the debug pins are disabled by a firmware, swd-connection is failed. To solve it, reset pin should be connected.**

5-4. Device connections - AC33M6128/8128-SPI, AC33M3064/4064-SPI

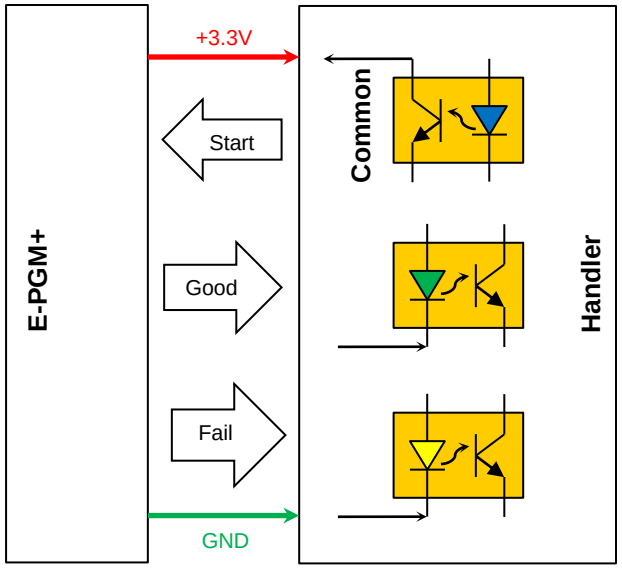
SPI

Warning
The E-PGM+ supplies VDD with the target board.
* Do not turn on a user target board.
* The E-PGM+ can be damaged when the power of the target B/D is on.

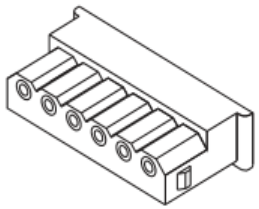
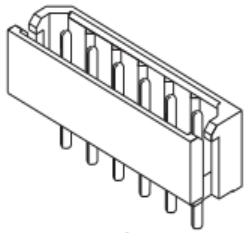
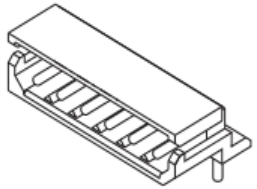


6-1. E-PGM+ / E-PGM Serial handler connection

- 3.3V Power output
- Output → Good, Fail indicate signal (active “L”)
- Input → Start Key (active “L”)

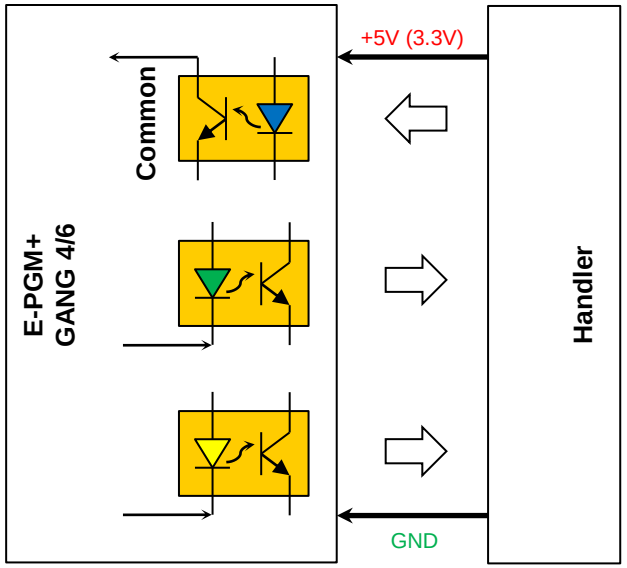


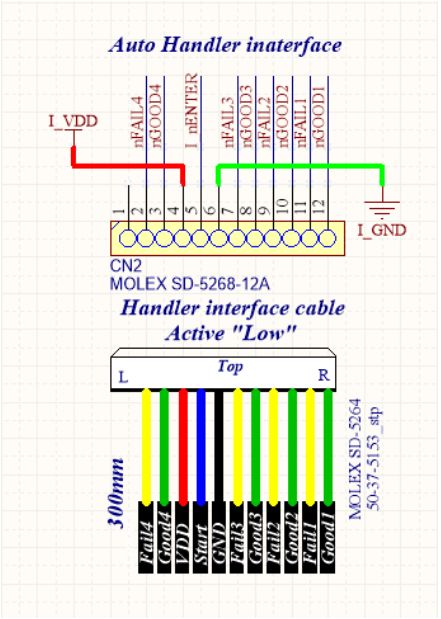
Handler Cable connector
MOLEX Part Number: 50-37-5023 (SD-5264-05**)**
2.50mm Pitch SPOX™ Wire-to-Board Crimp Housing, Friction Lock, 2 Circuits

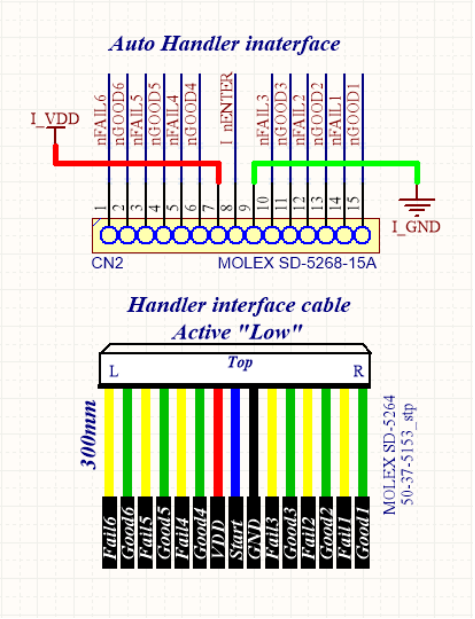
Housing	Header	
	Vertical	Right Angle
 5264	 5267/35301	 5268/35302

6-2. E-GANG4 / E-GANG6 handler connection

- Internal isolator
- Used the Handler 5V(3.3V) Power
- Output → Good, Fail indicate signal (active “L”)
- Input → Start Key (active “L”)

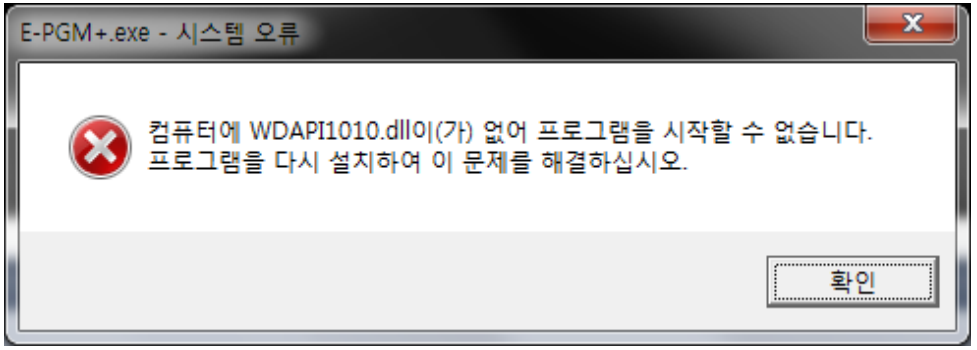




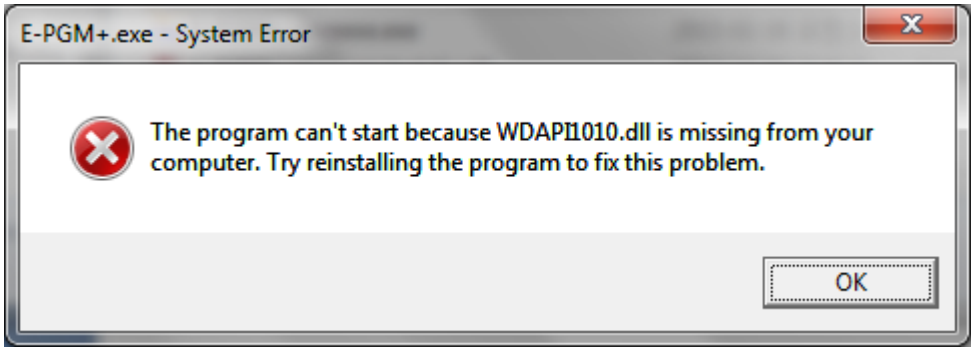


7-1. Trouble shooting

When executing E-PGM+.exe, following error message is occurred.
The error reason: WDAPI1010.DLL is not at C\windows folder.
If you setup device driver, it can copy at C\windows folder.



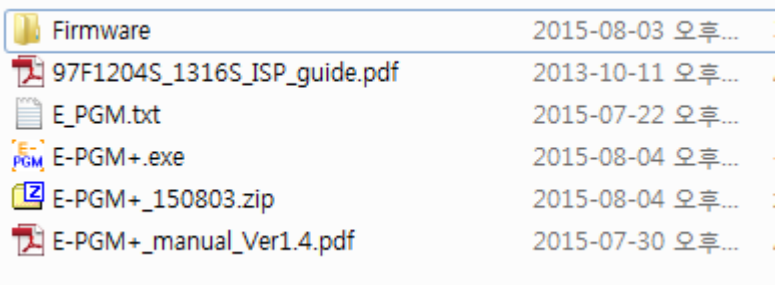
Korean

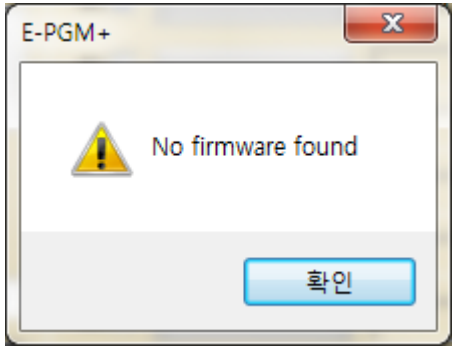


English

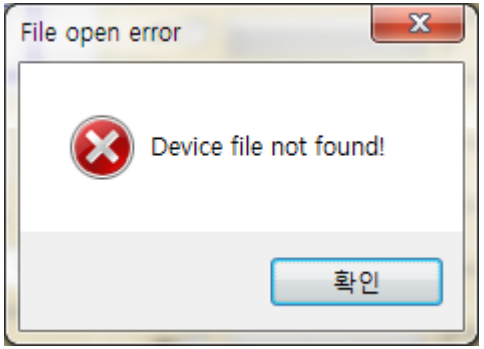
7-2. Trouble shooting

When executing E-PGM+.exe, the firmware folder and E-PGM.txt file are located at same folder.
If you want to execute at desktop, you need to use “ desktop shortcut”.



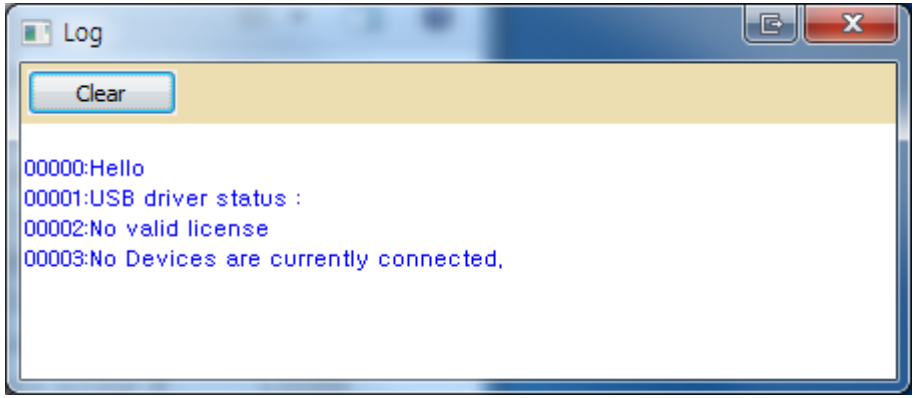


No Firmware folder

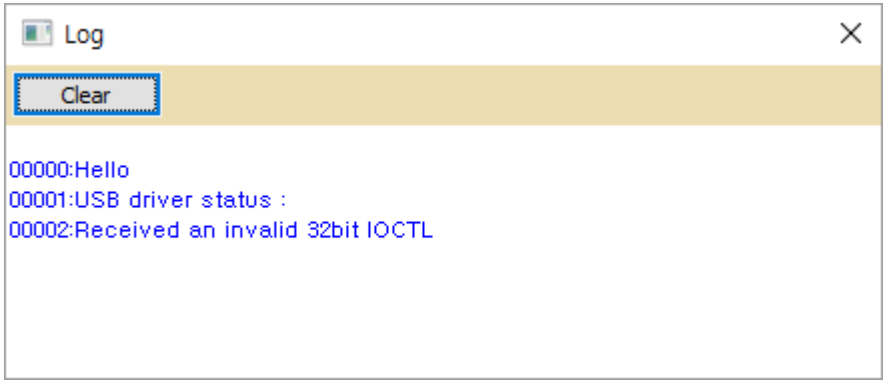


E_PGM.txt is not found.

7-3. Trouble shooting : USB driver



Or



1. Close E-PGM+ S/W

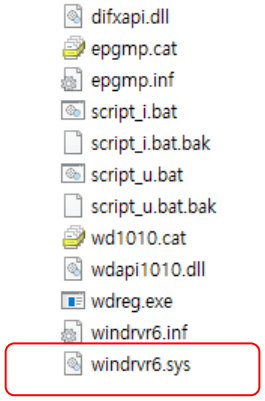
2. Disconnect USB line

3. Run USB_driver_unistall.exe (Version 1.7)

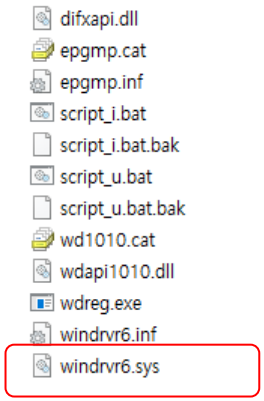
4. Delete C:\Windows\System32\drivers\windrvr6.sys

5. Copy windrvr6.sys which is in the driver install files
64 bit : Copy x64\windrvr6.sys to C:\Windows\System32\drivers
32 bit : Copy x32\windrvr6.sys to C:\Windows\System32\drivers

x32



x64



6. Run USB_driver_install.exe(Version 1.7)

7. Connect USB line

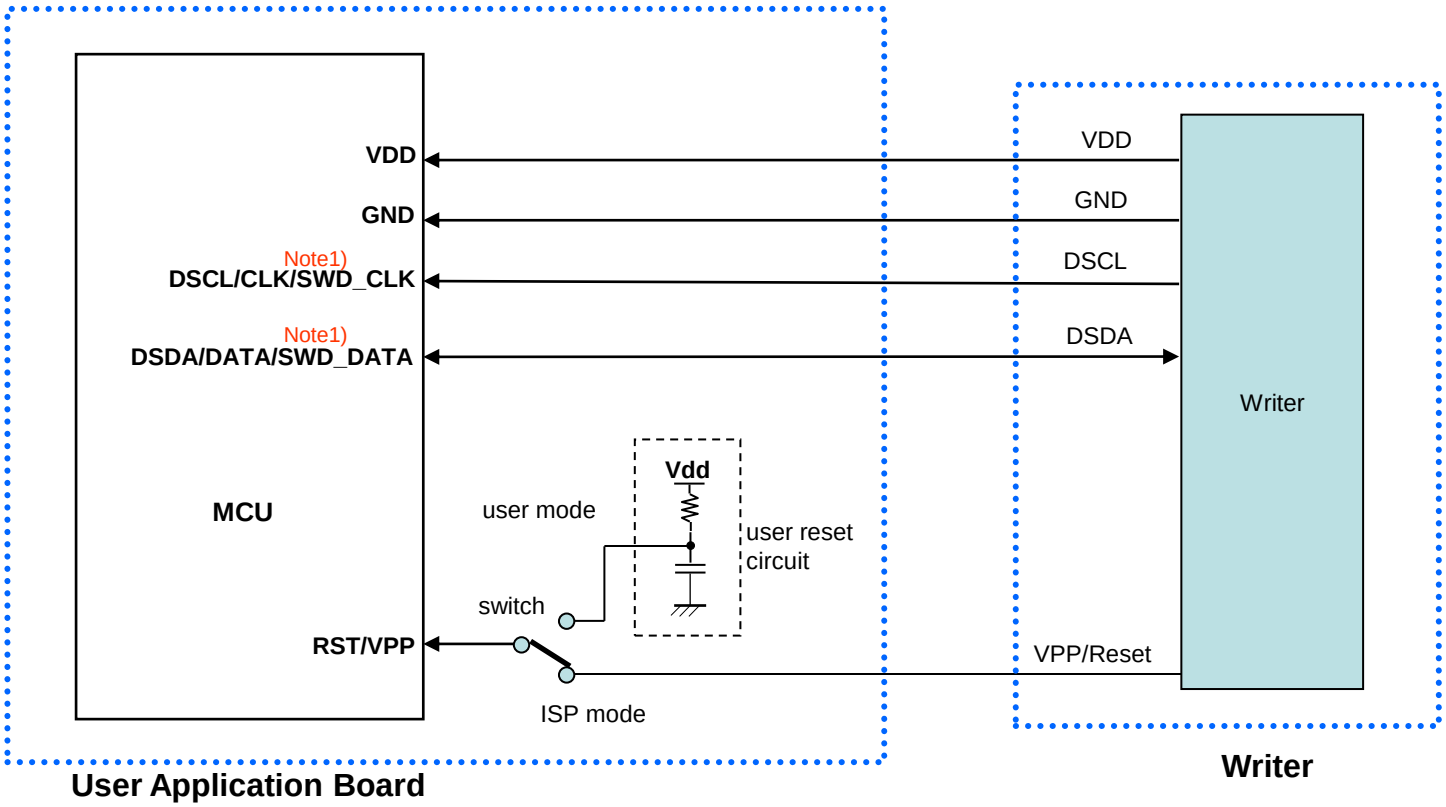
7-4-1. Trouble shooting : Error message at writing

Error message	Error and reason
No DPID	Related with ARM devices VDD/GND/SWDCLK/SWDATA are not connected.
No device-ID Read-ID = 0xxxxx	Vdd/Gnd and signals are not connected. Wrong device is selected.
Power Check Vdd : xx or Vpp : xx	- Supplied VDD/Vpp voltage not correct - On board writing, target B/D spend lots of current and drop voltage - On board writing, target B/D is short between Vdd and GND
Trim Chk. failed	- No device-special-data is found. - On board writing, device is reset. The reset ic in the board is in reset state. If tool-Vdd is lower than the Vdd of reset IC. Ex) Tool Vdd : 3.3V, Reset IC : 4.2V As the default voltage is 3.3V, need to change Vdd from 3.3V to 4.5V. Refer to “Set VDD” page to change VDD.
Erase failed	Erase fail
Verify Fail Addr : xxxx Data : xx => xx	Verify fail For example, Addr : 1234 Data : 12 => 32 Failed address is 1234 Normal case: read value is 12 Fail case: read value is 32
Fail:Ext. Power On Remove Ext. Power	On board Writing, target-board is received from external power. Remove the external power.

7-4-2. Trouble shooting : Error message at writing

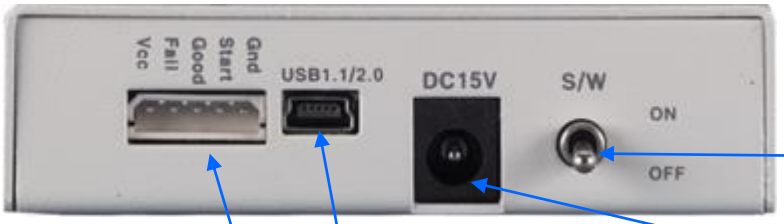
Error message	Error and reason
Debug Power Request Fail	The reset ic in the board is in reset state. If tool-VDD is lower than the VDD of reset IC. Ex) Tool VDD : 3.3V, Reset IC : 4.2V As the default voltage is 3.3V, need to change VDD from 3.3V to 4.5V. Refer to “Set VDD” page to change VDD.
CPU Reset Halt target	Device is in reset state. Check LVD of user option, especially A31G112/123. Set VDD as higher than LVD level.
No APID APID : xxxxxx	Debug mode connection is established, but ID of AP is not found. AP : Memory Access Port in ARM device. Check the range of VDD Check the reset state

8-1. Info. : ISP Connections



Note1) If other signals affect the communication in ISP mode, disconnect them with pins by using jumper or switch.

8-2. Info. : Connectors



Power switch

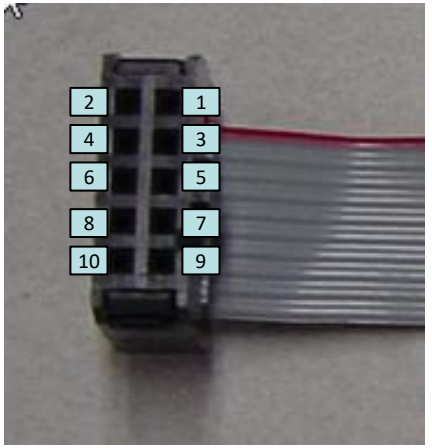
Connect USB mini type cable.

Power DC 15V

Enter Key Connector.
To connect with the auto-handler

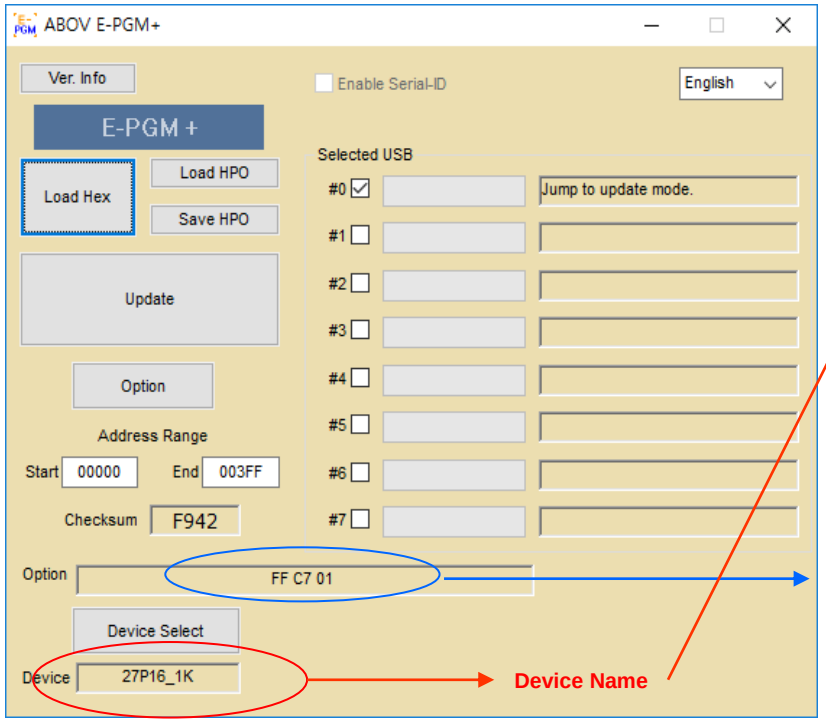
For ISP(In-System-Programming)

For Barcode reader(E-PGM+ only)



1. MCU RX
2. VDD
3. MCU TX
4. GND
5. Run Flag or Boot Pin
6. Serial Clock
7. GND
8. Serial Data
9. N/A
10. VPP or Reset Pin

8-3. Info. : Structure of a HPO file



Option Info.

A HPO file opened by a text editor

Structure of a HPO file

- Device Name : @DeviceName
- Option : Ooption info
- Tool VDD : VDD X.X
- Hex code

8-4. Info. : Run E-PGM+ with loading a HPO file

E-PGM+.exe –hpo filename.HPO

example => C:\E-PGM+.exe -hpo test.HPO

8-5. Info. : PC mode S/W (E-PGM+ only) For A31R118 only

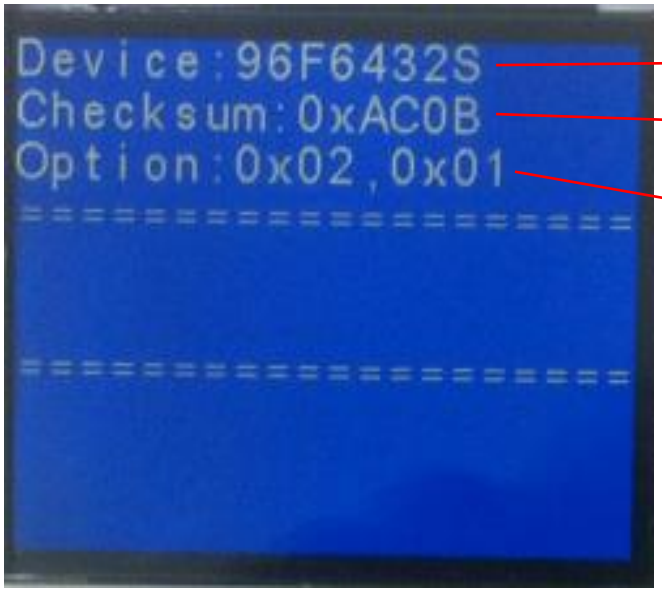
E-PGM+ update S/W should be closed before running PC mode S/W.

Set Gang ID
Open the case and locate the switch.
ID is start from 0.

1. Connect PC with tool
2. Set Serial ID info, generate 1,000,000 id, enable Program with serial id button
3. Program Code & ID

8-6. Info. : Important displayed information

After updating firmware and user-hex code, it is required to check following items.



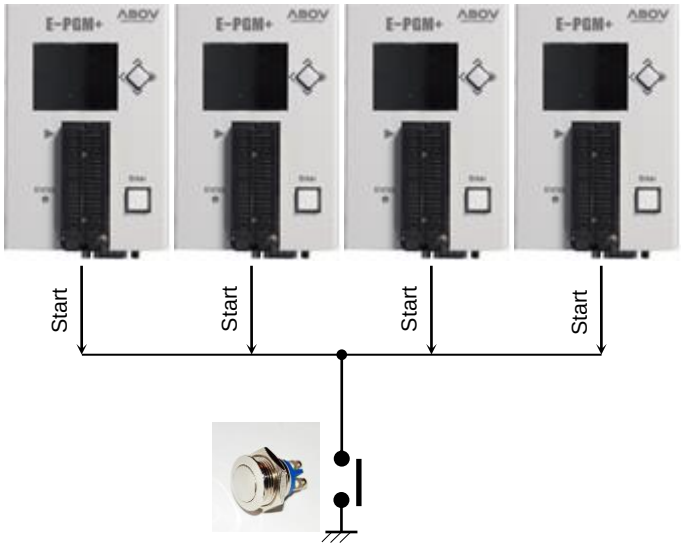
Device Name

User hex-code checksum

Device Option values

8-7. Info. : E-PGM+ / E-PGM Serial : multiple operation(Gang mode)

- Short Gnd and start signals.
- Multiple writing at pressing a write button.



9-1 : For MC97F1104S/1204S/1316S (1/3)

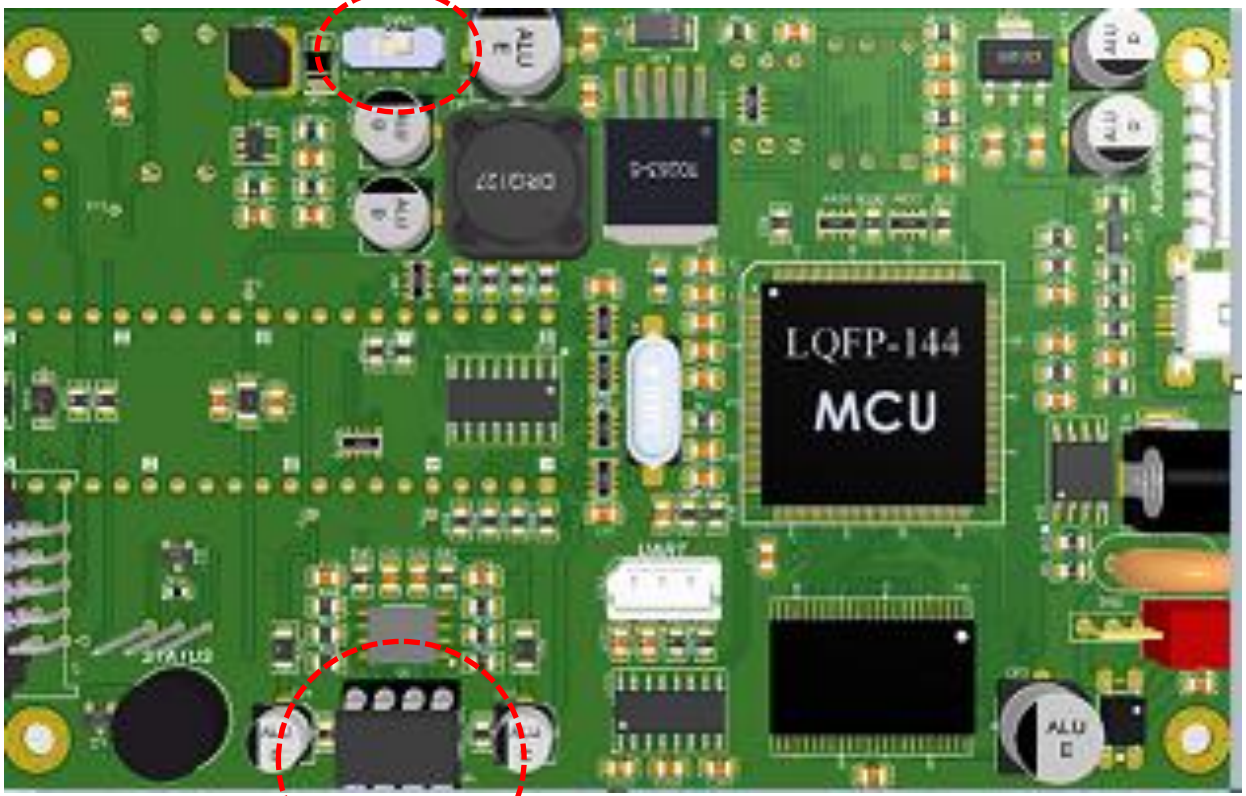
Only for E-PGM+

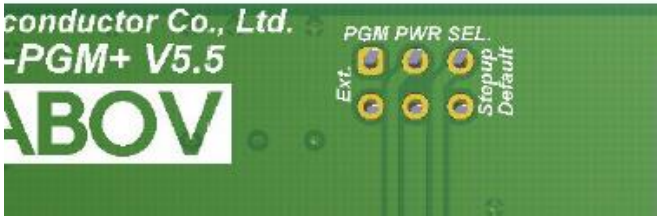
For MC97F1204S, MC97F1104S, MC97F1316S, and PCB Version V5.5.
The level of Vpp is 17V. The SW3 switch is for Vpp level.
If Step-up is selected, the max. Vpp level is 19.0V.
If Ext. is selected, the max. Vpp level is 15.0V.
If you use above chips, the SW3 switch is set as Step-up.

If you use other devices, please set SW3 as Ext.
If SW3 is set as Step-up, the OPAMP can be damaged when Vdd and ground are short at on-board-writing.

Step-up ⇦ ⇨ Ext.

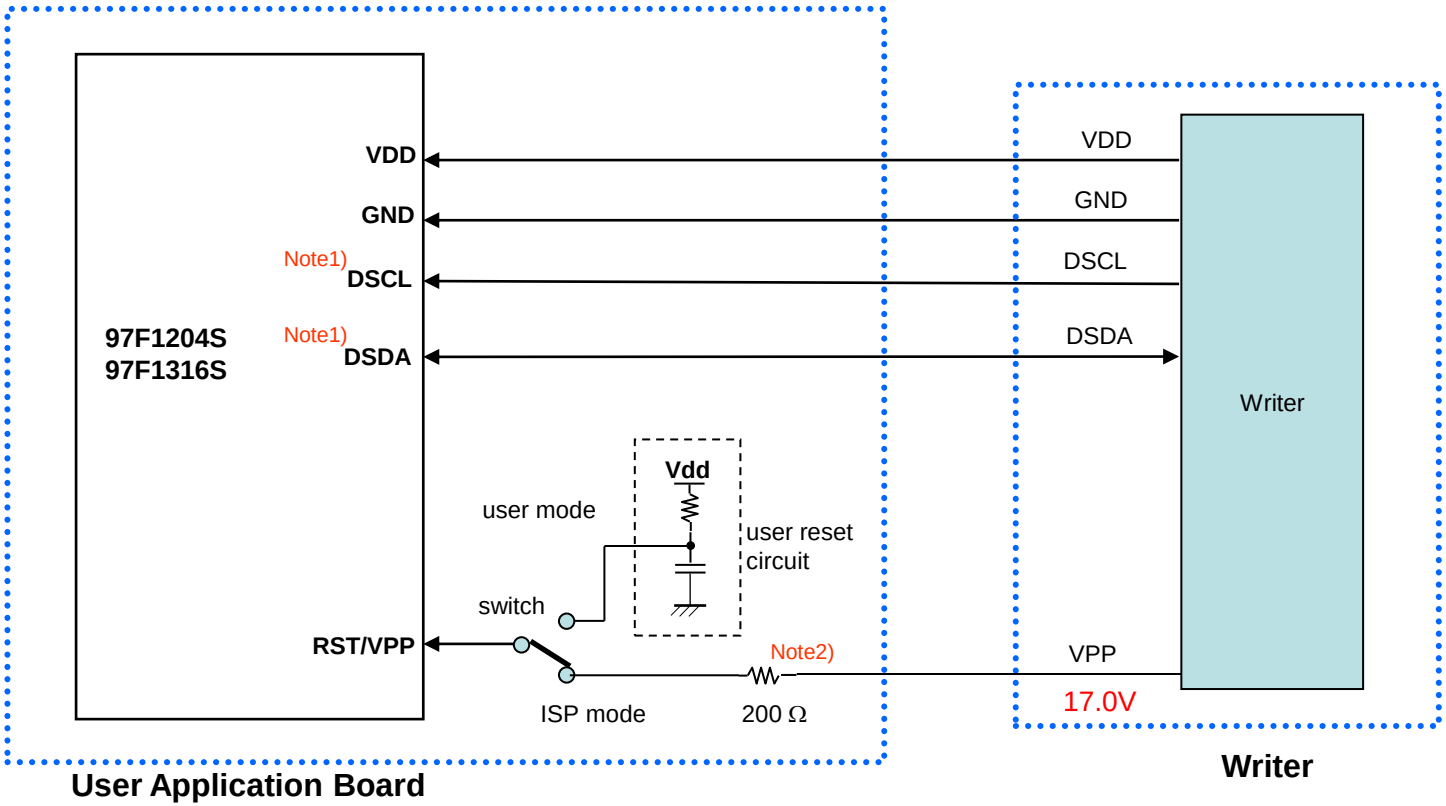
Ext. means the Vdd of OPAMP is connected with External Power adapter(15V)
Step-up means the Vdd of OPAMP is connected with DC/DC step-up output(19V).





9-2 : For MC97F1104S/1204S/1316S (2/3)

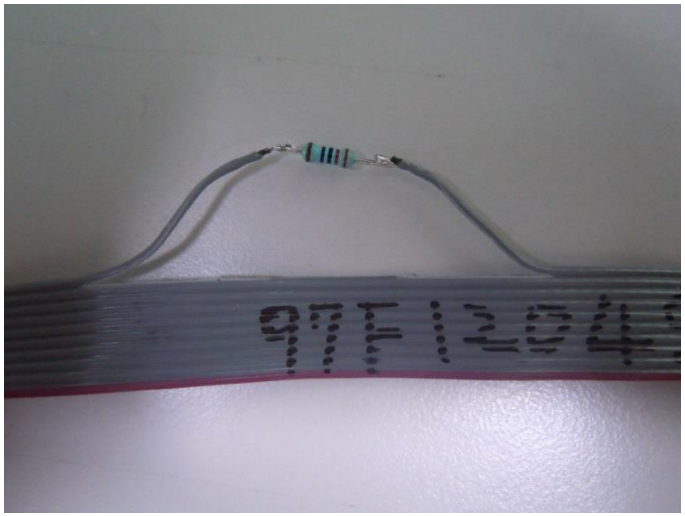
Only for E-PGM+



Note1) If other signals affect the communication in ISP mode, disconnect them with pins(DSDA/DSCL) by using jumper or switch.

Note2) The 200 Ω resister must be located in a target B/D. Without it, the MCU could be damaged by high-voltage(17.0V). If you want to remove it, you need to insert it in the ISP cable. Please refer to the next page.

To remove the 200 Ohm resistor in the board,
Please insert the resistor in the Vpp line.



10. Comparison : E-PGM+ vs E-PGM Serial

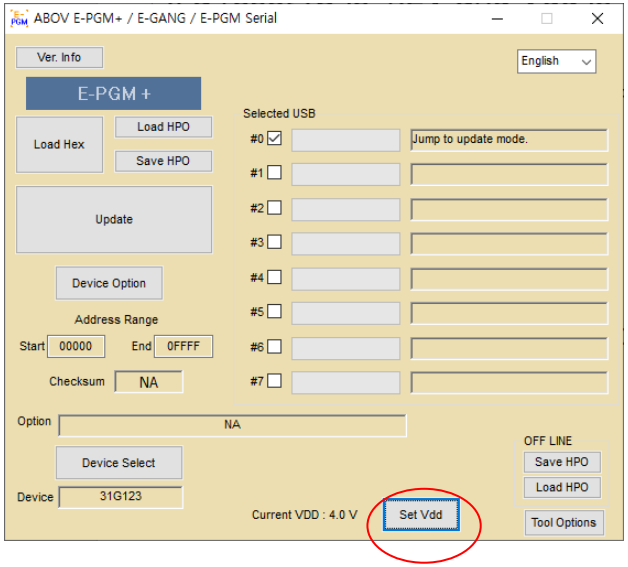
	E-PGM+	E-PGM Serial
Socket writing	O	X No 40pin Dip socket
Supported Devices	All devices	94/95/96/97XXXX series (Not support 97F1104S/1204S/1316S) All 32 bit MCU
Buffer Size	1MByte	8MByte
Read Button	Joystick button	Simple push button
Support UART Barcode reader	O	X
Built-in protection circuits eliminate **damage** of **programmer**	Poor	Good
S/W	E-PGM+ S/W	

11. Set VDD

You can change VDD value for following reasons.

◆ On ISP(In System Programming), the detect voltage of RESET IC on board must be lower than VDD of E-PGM.
- If the reset voltage is 4.2V and “Set VDD” is 3.3V, Programming may be failed because the device of board is on reset.

◆ The LVR voltage of A31G112/123 should be lower than the selected voltage by “Set VDD” button.
- The voltage by “Set VDD” button is up to 4.7V. So, You had better select under 4.25V for LVR of the devices.

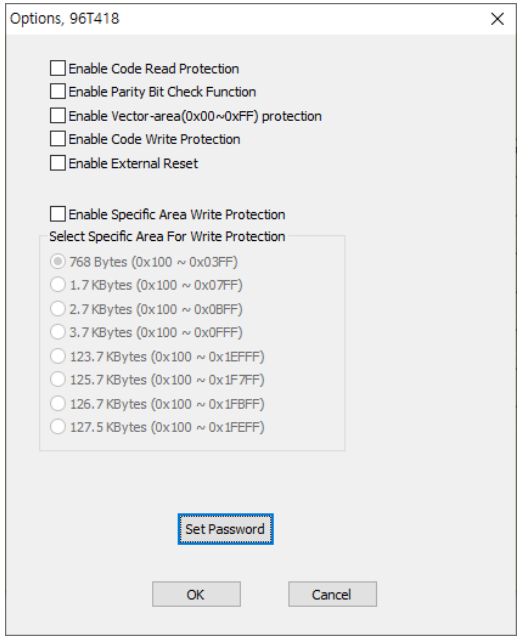


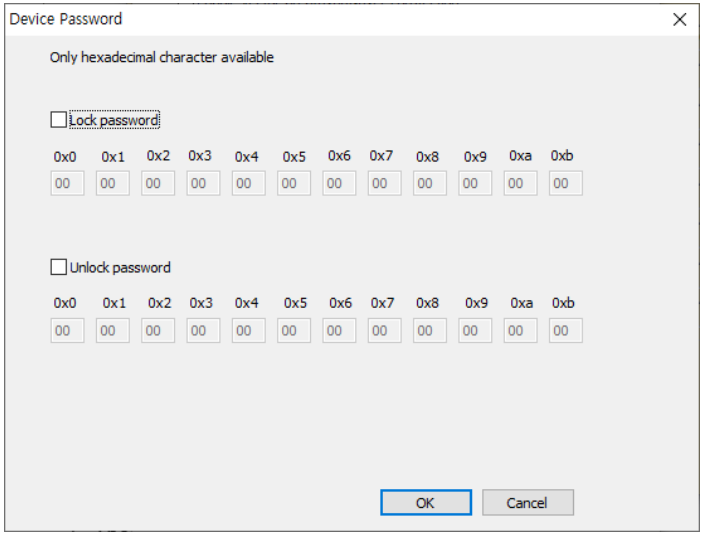
Do not set the VDD beyond operation-voltage of device.

Some devices are forbidden to change VDD.
Range : 3.0V ~ 4.7V

12. Device Password

Device : A96G166, A96T418

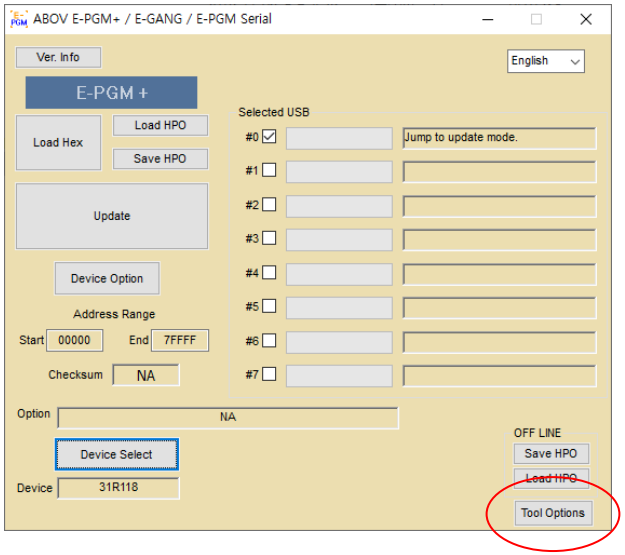


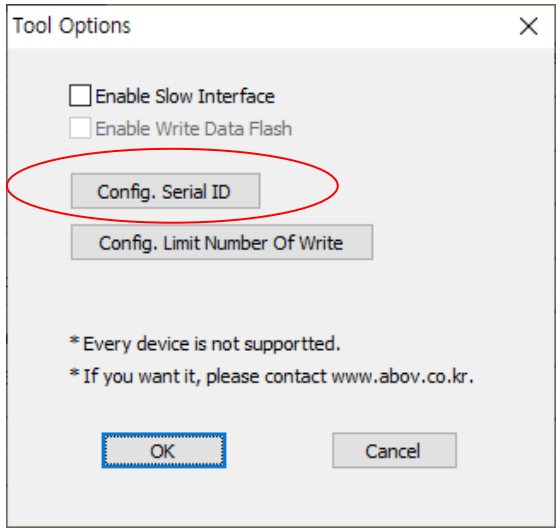


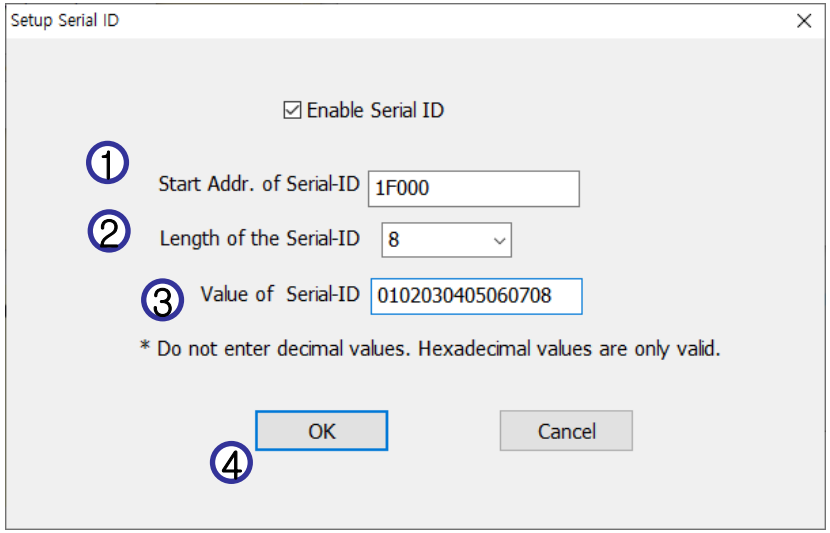
Lock password
⇒ After writing hex code write, password lock is enabled.
⇒ The 12 byte hex-value for password are programmed.

Unlock password
⇒ After checking device-id, if password is enabled,
⇒ The 12 byte hex-value for password are compared.
⇒ If password is matched, password-lock is disabled.

13. Set Serial ID

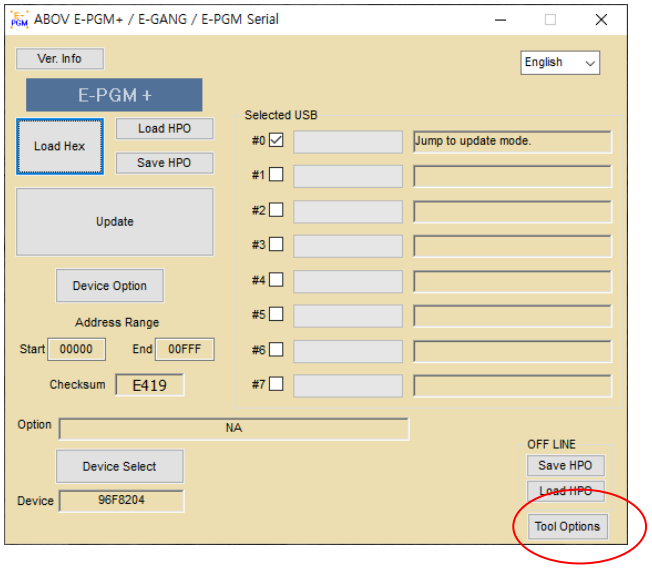


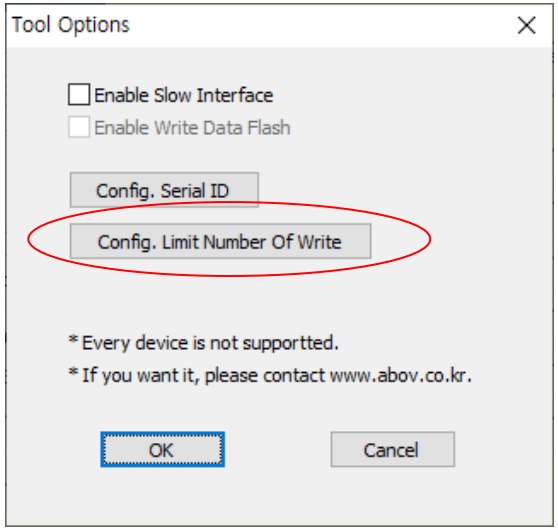


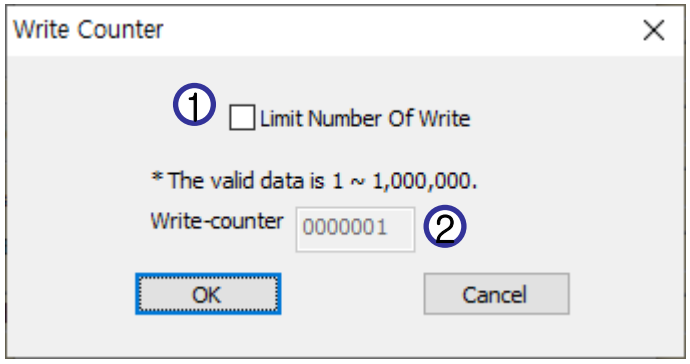


1. Start addr : Start address of serial –ID
2. Length : Length of serial-id, 4 byte or 8 byte
3. Value : ID value
   - Little endian type
   - 0x1F000 : 08 07 06 05 04 03 02 01
4. ID is auto-incremented after writing

14. Set limit Number of Write



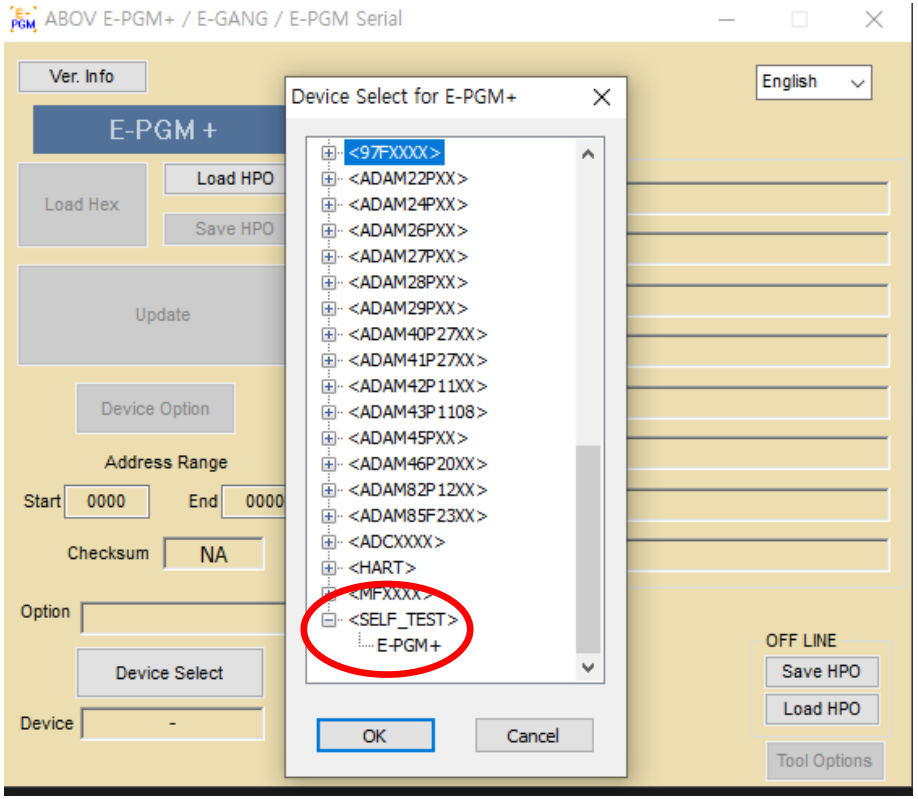




1. Enable Limit Number of Write
2. Available limit number : 1 ~ 1,000,000
3. Limit number is decreased per write.

14. E-PGM Tool Self Check

1. Remove a device in a tool.(툴에 연결된 디바이스를 제거함)
2. Run E-PGM+.exe. (E-PGM+.exe 실행)
3. Device select, <SELF_TEST>E-PGM+
4. Press update-button. (Update 실행)
5. Run test after update. (업데이트 완료 후 TEST 실행)
   - E-PGM+ : Press ENTER button.(E-PGM+는 “ENTER” button 누름)
   - E-GANG : Press START button.(E-GANG은 “START” button 누름)



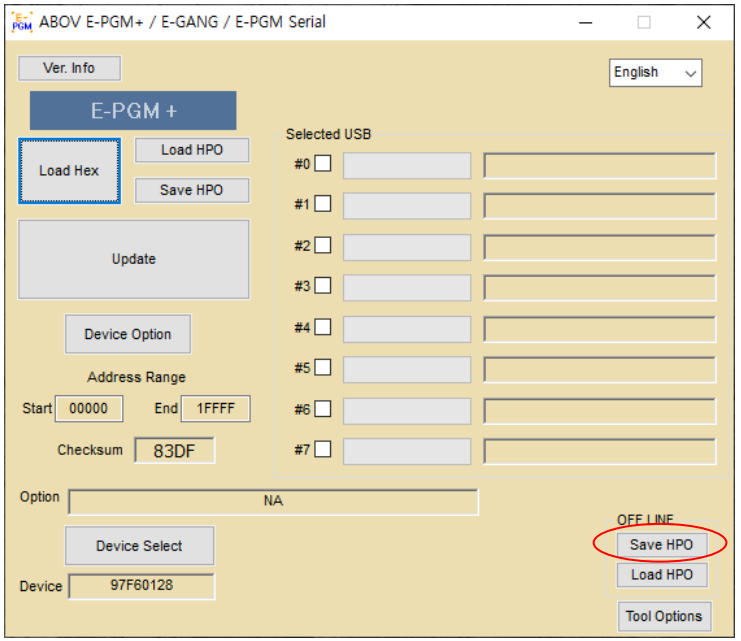
Pass

Fail

15. OFF LINE : Get code-checksum

To get a checksum without connection with PC.

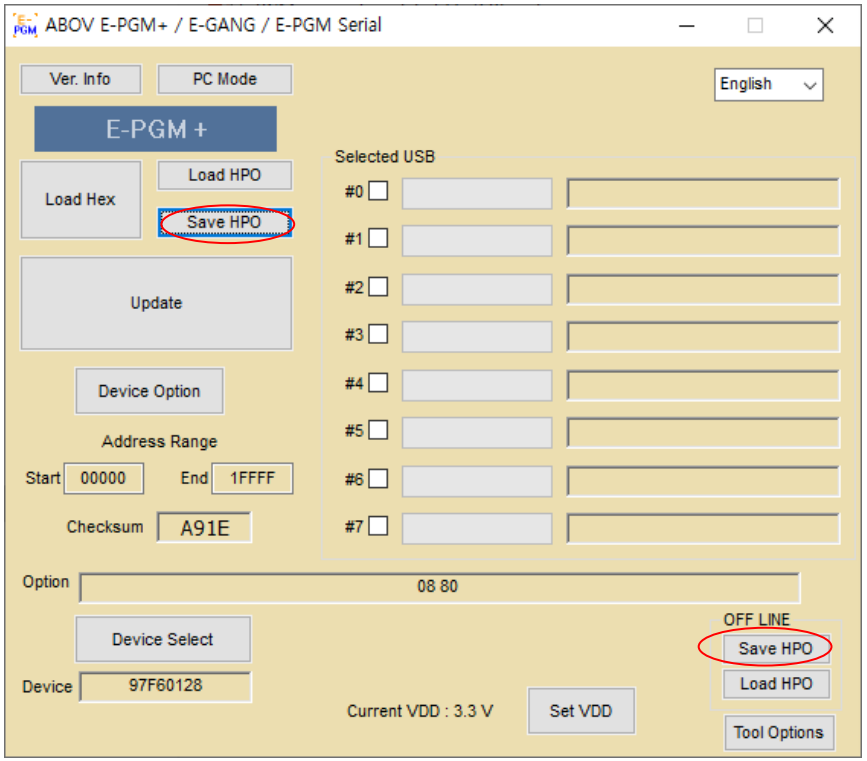
1. Press Save HPO
2. Select tool-type
   =>E-PGM + : E-PGM+, E-GANG4/6
   =>E-PGM Serial : E-PGM Serial
3. Device select
4. Load a hex-file
5. Check checksum



15. OFF LINE : Making a HPO file

To make a HPO file without connection with PC.

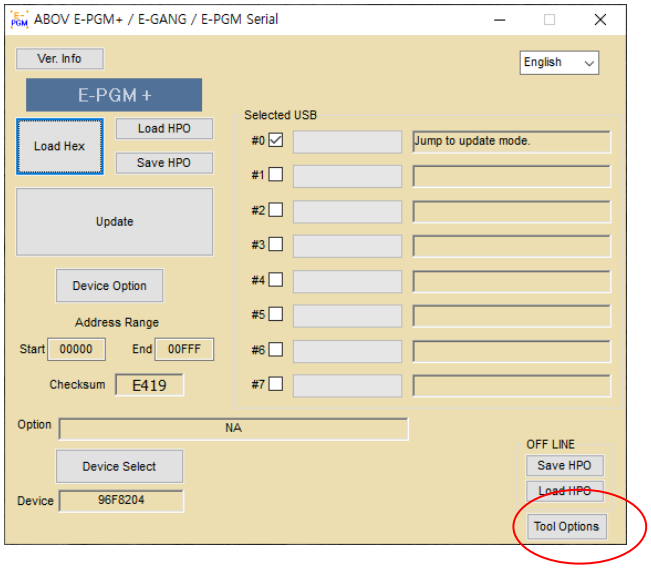
1. Press Save HPO in OFF LINE
2. Select tool-type
   =>E-PGM + : E-PGM+, E-GANG4/6
   =>E-PGM Serial : E-PGM Serial
3. Device select
4. Load a hex-file and check checksum
5. Configure options of device
6. Press Save HPO

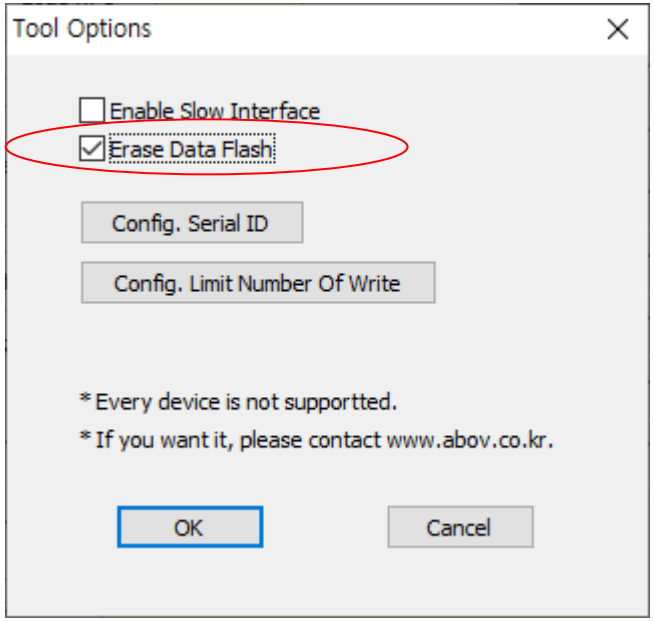


16. Tool Option : Erase Data Flash

If you select the Erase Data Flash,
Data Flash is erased during write-sequence.

Supported devices : A33G527, A33G526,
A96L416/414, A96L533/623





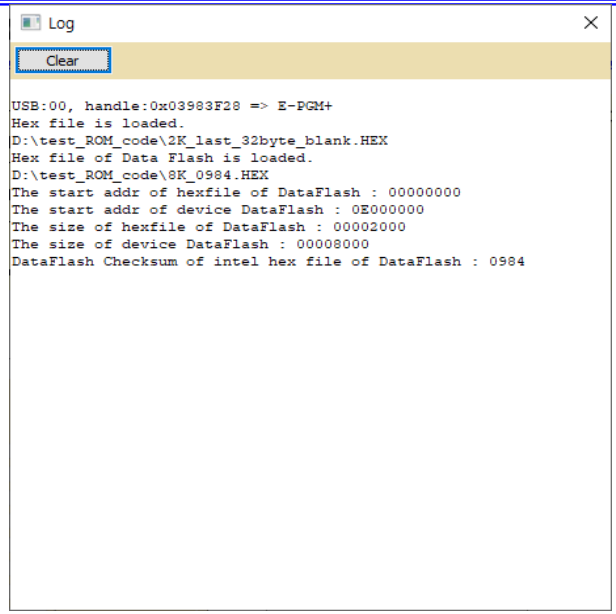
16-1. Tool Option : Write Data Flash

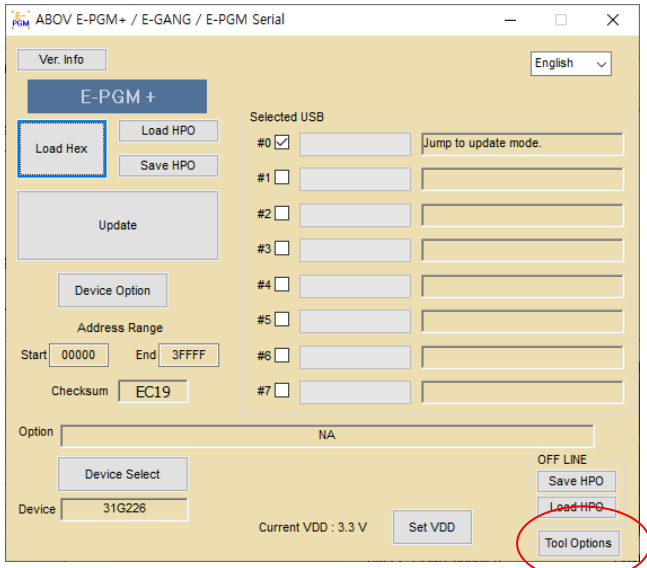
If you press Write Data Flash- button, you can load a intel hex file(.hex) for data flash.
After hex file loaded, followings are displayed in log-windows.

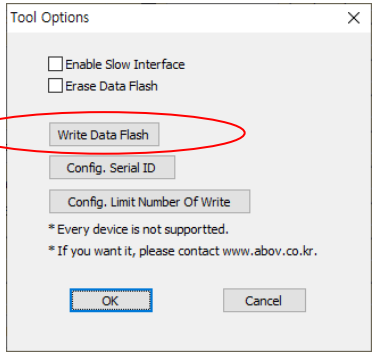
D:\test_ROM_code\2K_last_32byte_blank.HEX
The start addr of hexfile of DataFlash : 00000000
The start addr of device DataFlash : 0E000000
The size of hexfile of DataFlash : 00002000
The size of device DataFlash : 00008000
DataFlash Checksum of intel hex file of DataFlash : 0984
* Checksum is calculated adding data from start address of hex file for size-wide.
* Checksum info. is also displayed in the TFT-LCD of E-PGM+ after updated.

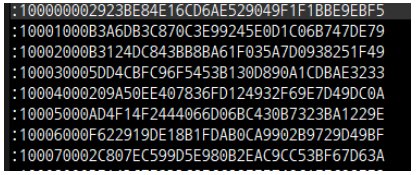
Data Flash is programmed from the start address of hex file for the size of hex file.
The whole sequences are as followings,
ID check -> Code Bulk Erase -> Data Flash Bulk Erase -> Data Flash PGM. -> Code Flash PGM
- Refer to the data sheet for the address map for data flash.

If you pressed the read-button of E-PGM+, code and data flash checksums are displayed.

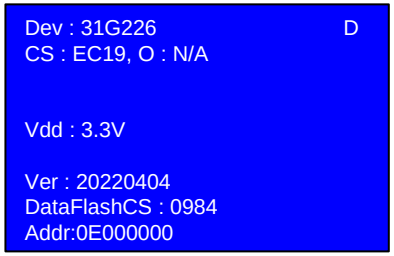




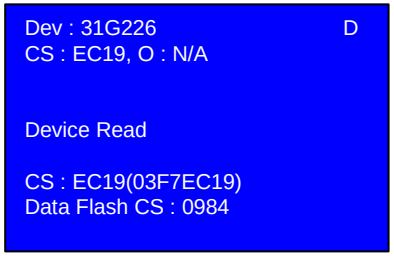




Intel Hex File



After E-PGM+ updated,
data flash checksum is displayed.
The checksum must be same
with the hex-file.



After E-PGM+ read button pressed,
code and data flash checksum are displayed.

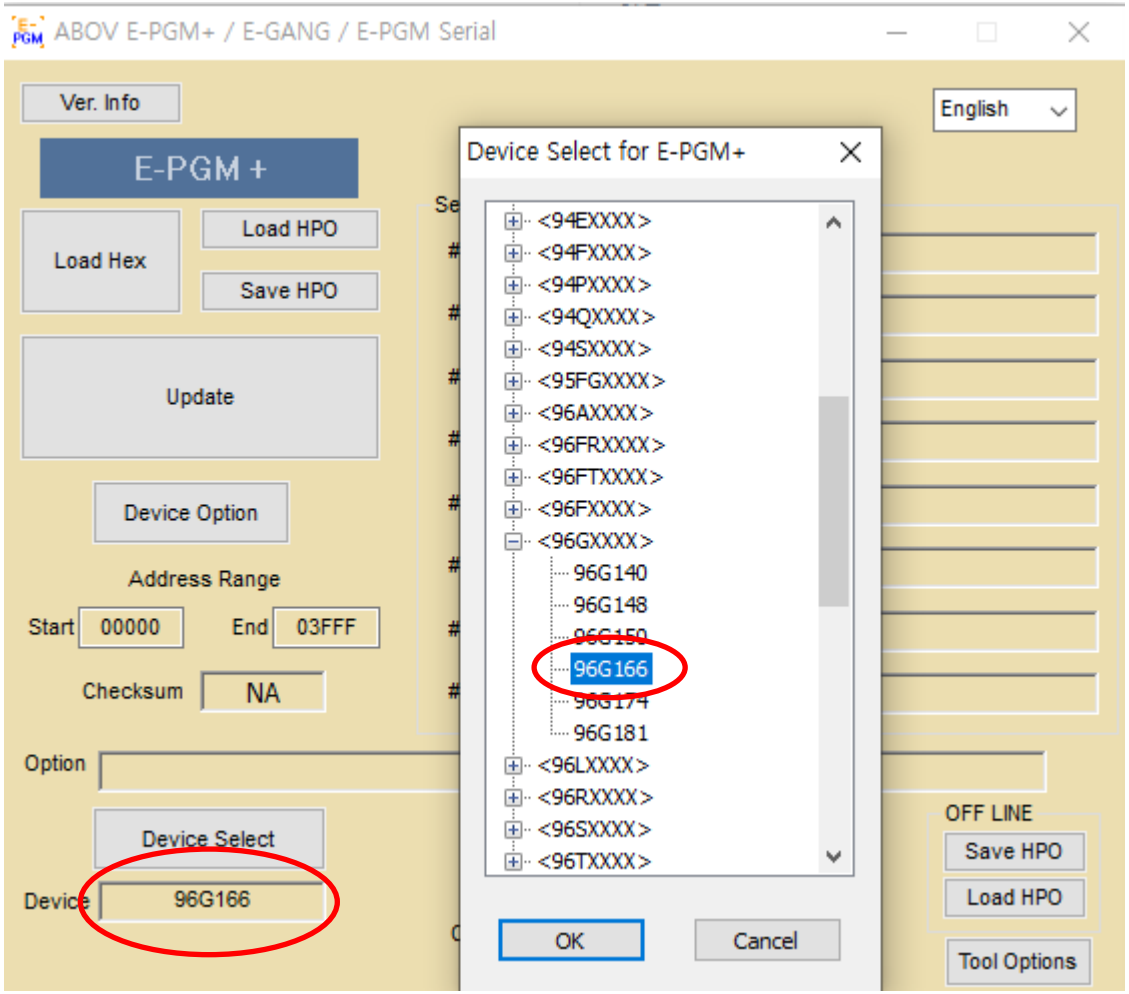
For 32bit-MCU, the address of data flash memory is 32bit.
When loaded a intel hex file, the upper 16bit address is discarded.
So, when you make a hex file you do not need to define upper 16bit address.

17. E-PGM+ save Hexfile

- **Device Select**

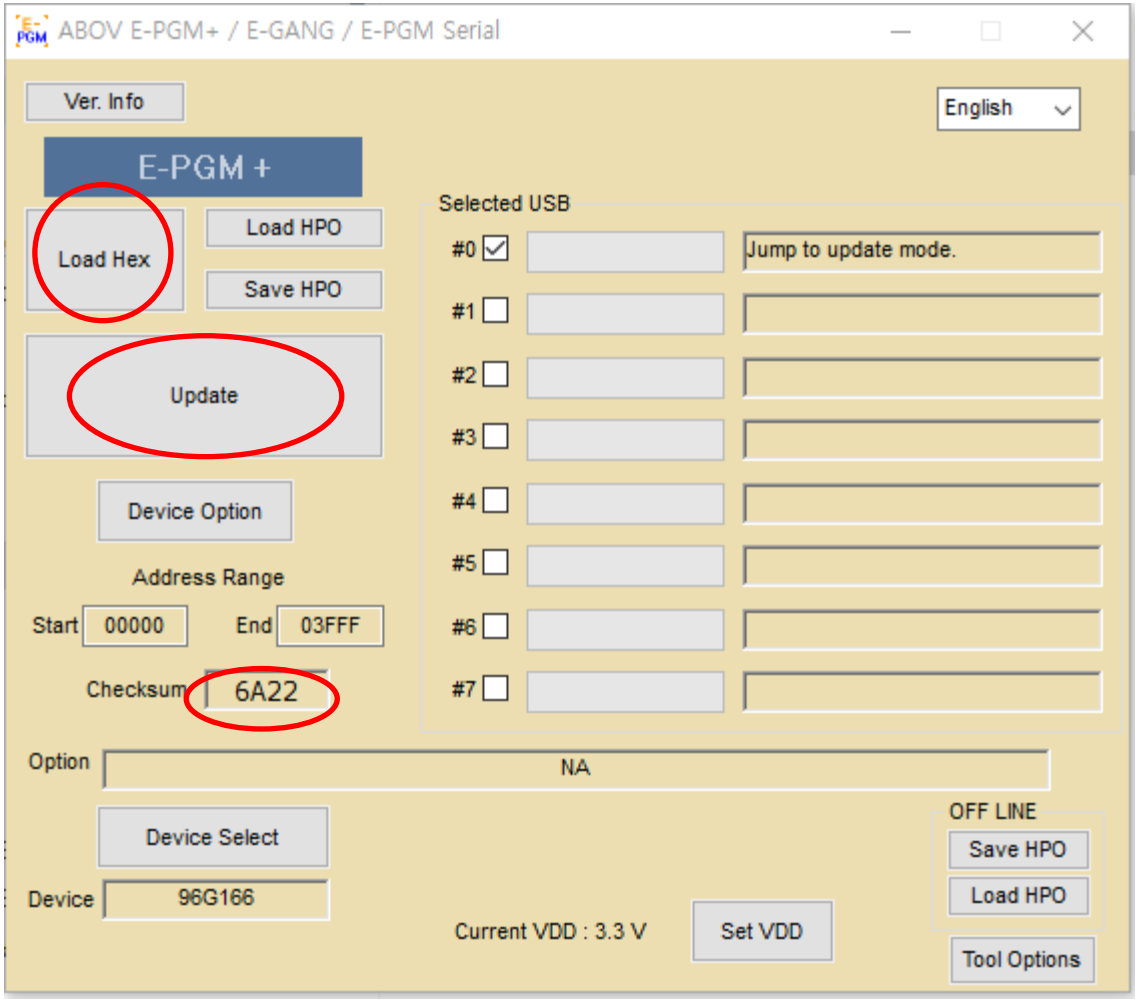
  1. **First, please “Device Select” Button on E-PGM+ software**

     - **Select Device**



17-1. E-PGM+ save Hexfile

- **E-PGM+ Upadate**
  2. **Push “Load Hex” button and select user Hex File.**
  3. **Push “Update” button and Update user E-PGM+**

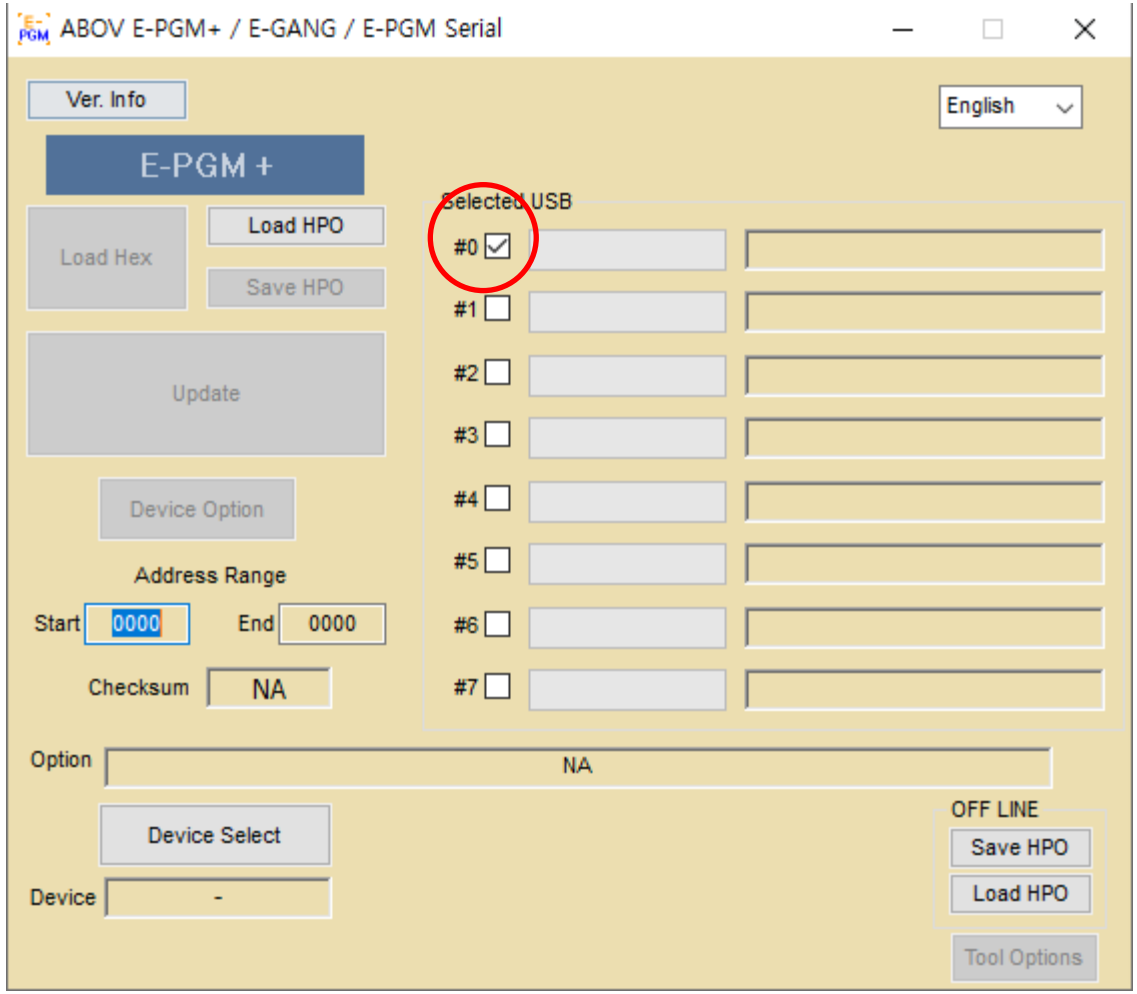


17-2. E-PGM+ save Hexfile

- **PC Mode**

4. Please Check #0 Selected USB

➢ **If checkbox is not checked, disattach and attach E-PGM+ usb cable.**

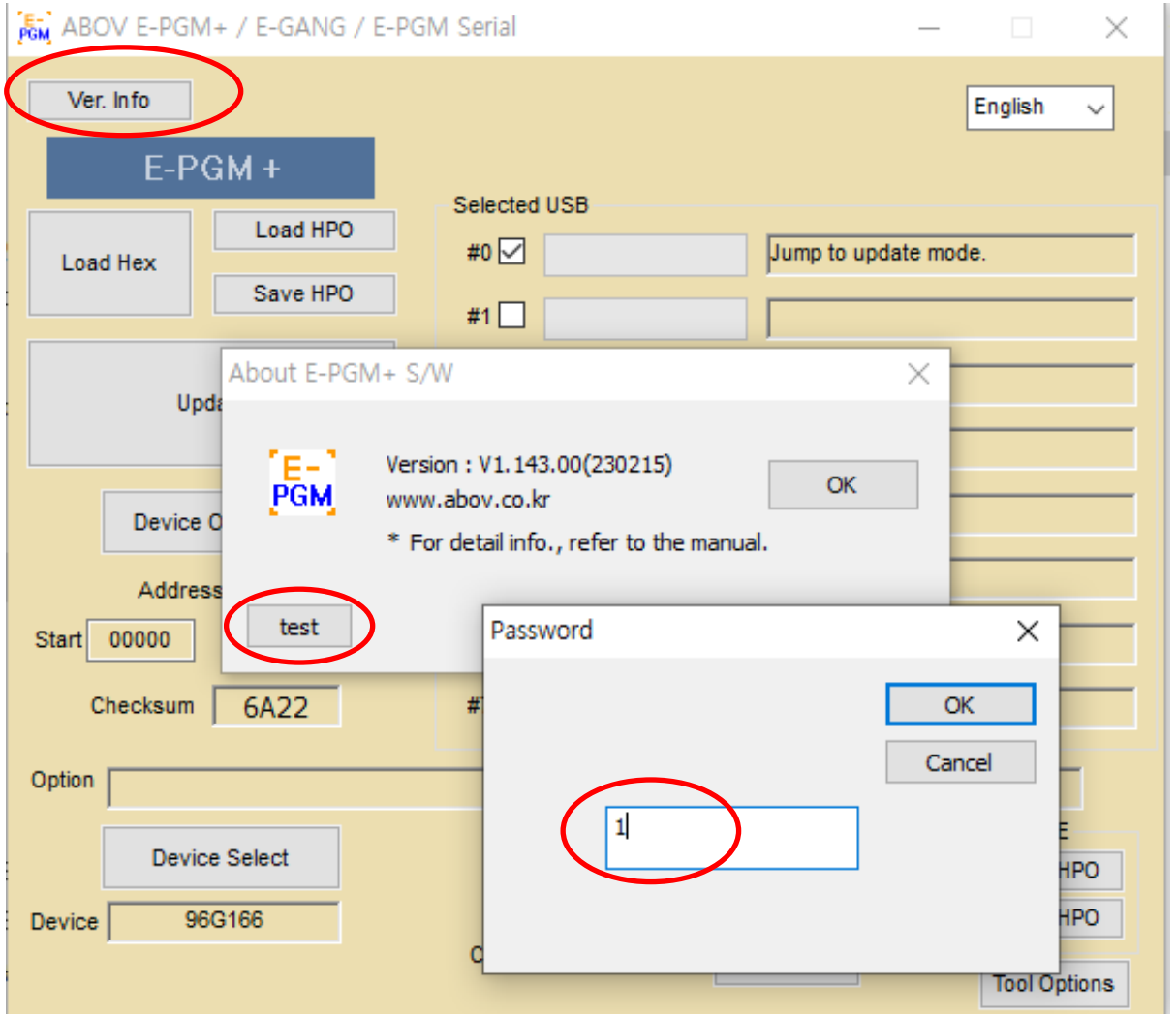


17-3. E-PGM+ save Hexfile

- **Password**

  5. Please Push Button “Ver. Info”

  - **Push Button “test”**
    - ✓ **Enter password “1”**



17-4. E-PGM+ save Hexfile

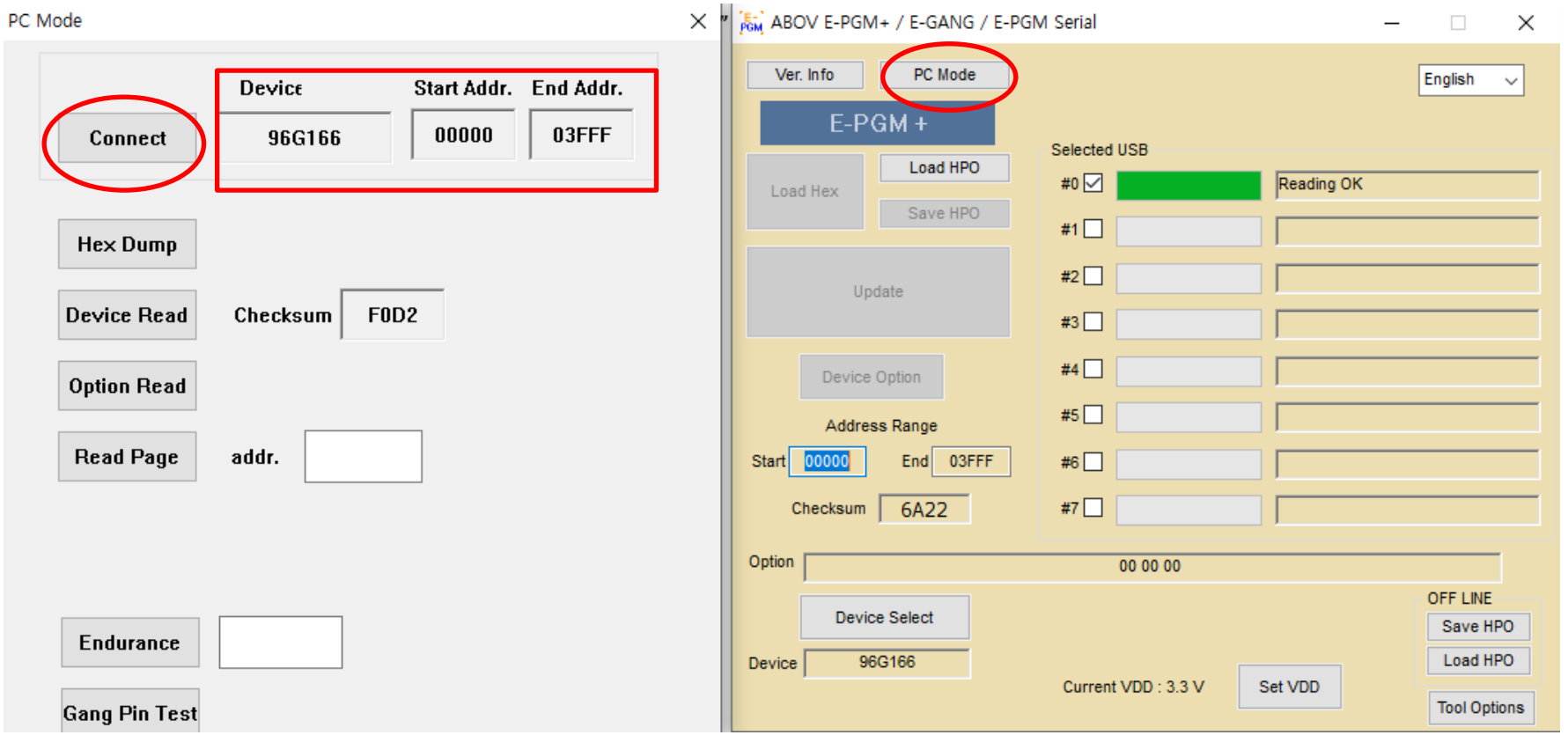
- **PC Mode**

6. Please Push Button “PC Mode”

- You can see PC Mode new dialog

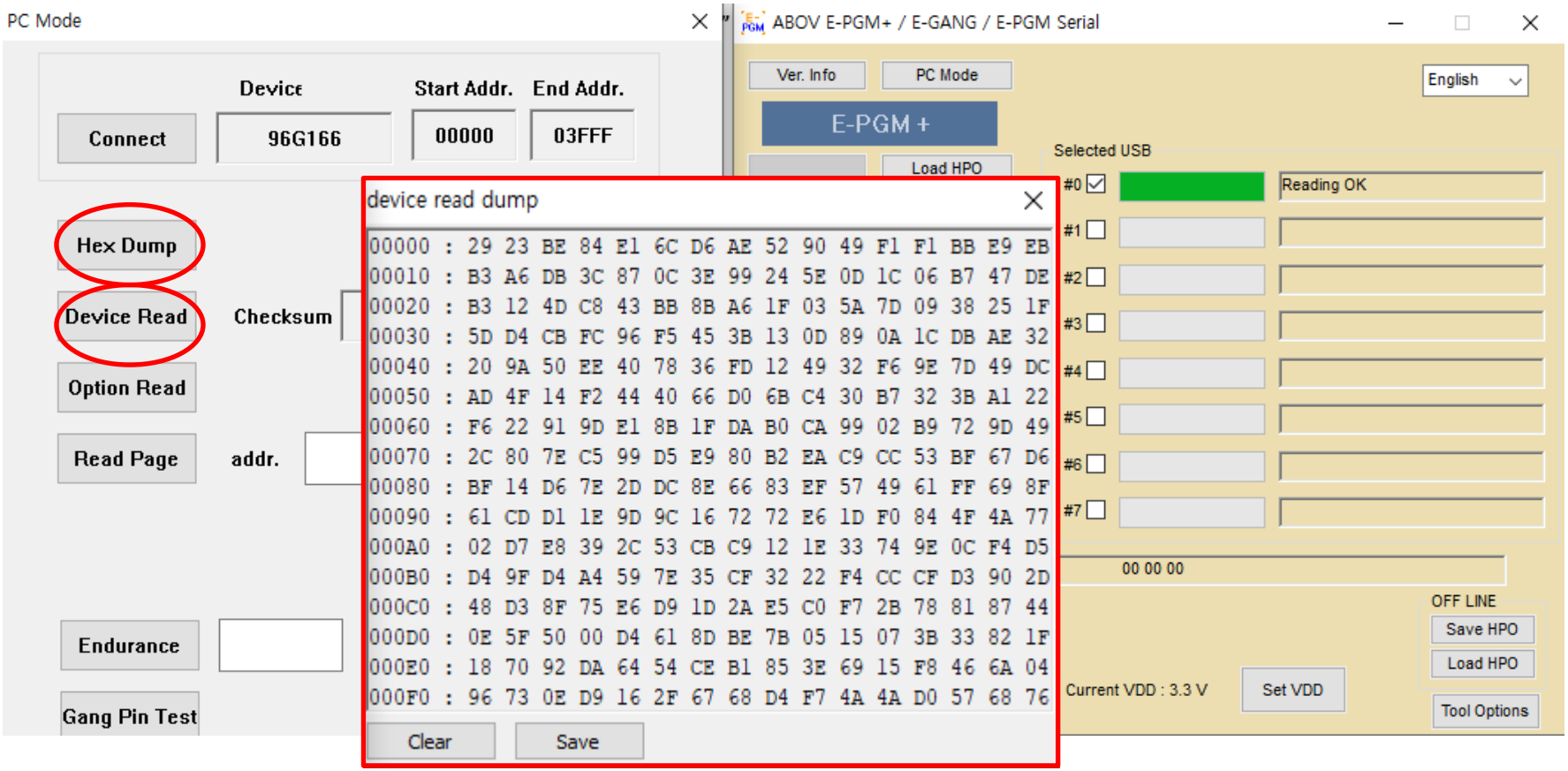
7. Please Push Button “Connect”

- E-PGM+ has to be connected user Board
- Device info is updated.



17-5. E-PGM+ save Hexfile

- **PC Mode**
  - **8. Please Push Button “Device Read”**
    - ➢ **Please connect User Board to E-PGM+**
  - **9. Please Push Button “Hex Dump”**
    - ➢ **You can see new dialog “Dump”**

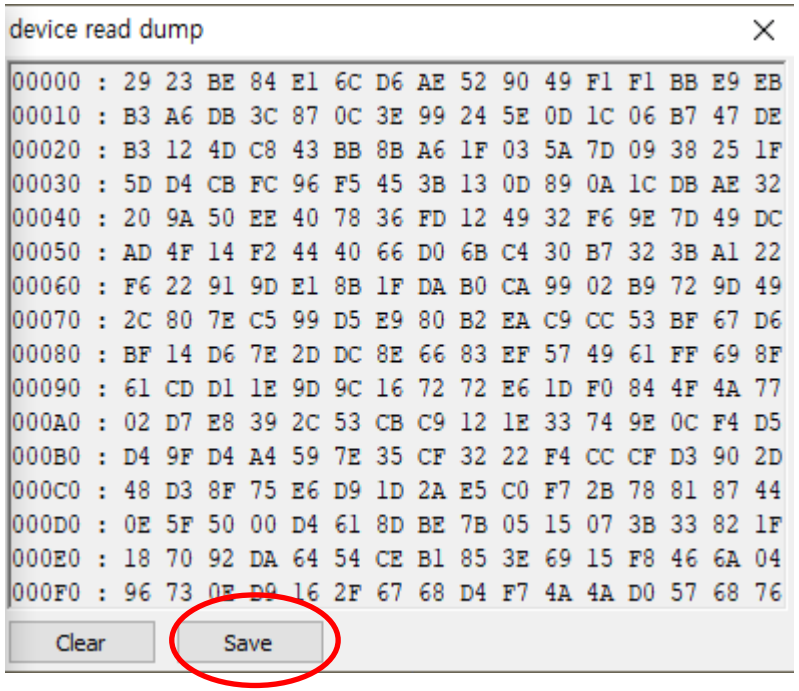


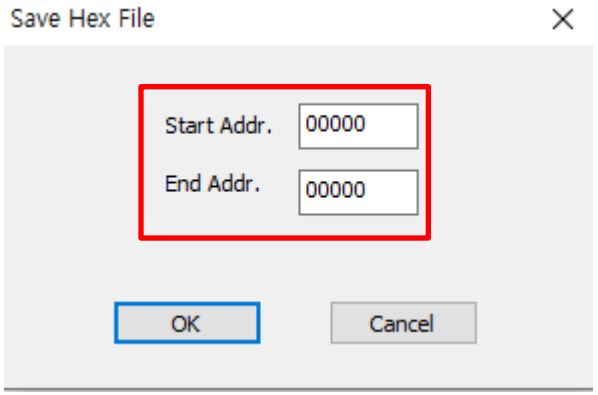
17-6. E-PGM+ save Hexfile

- **PC Mode**

10. Please Push Button “Save”

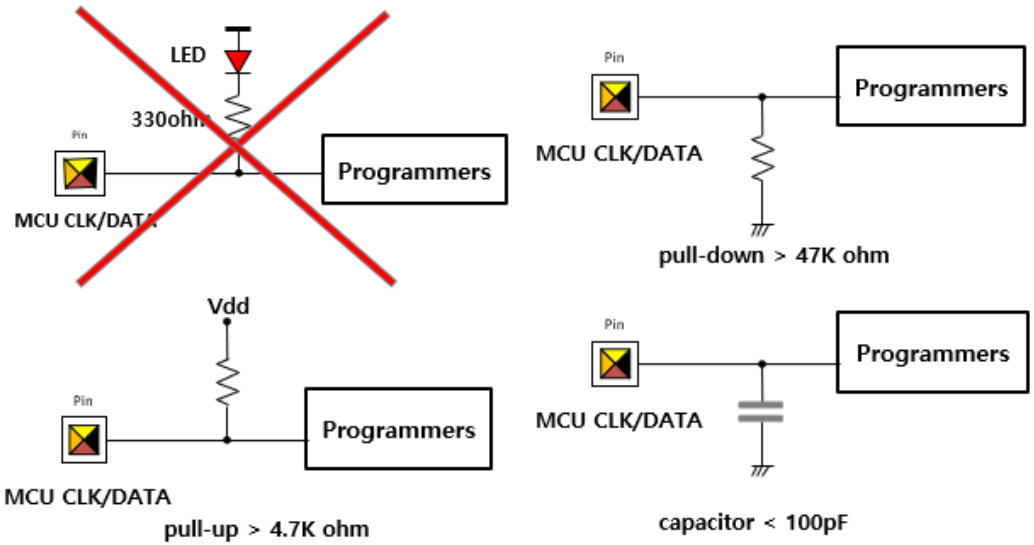
- ➢ **Enter Device’s Sart & End Address**
- ➢ **You can select address where you want area.**





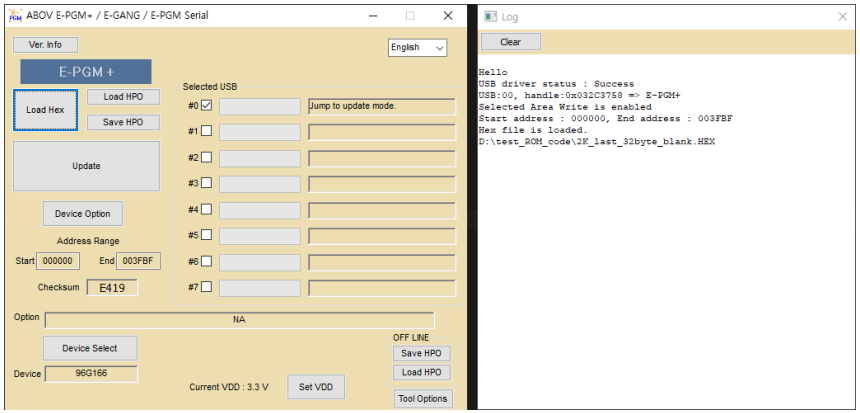
18. Precautions when connecting circuit to the signals (CLK/DATA)

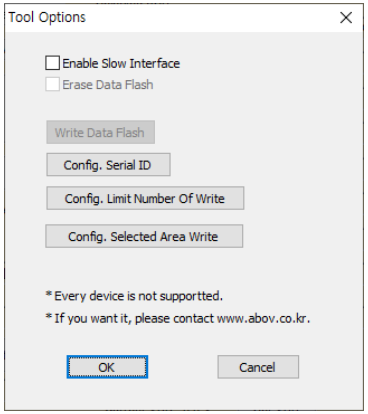
- Recommend : regsistor and capacitor should not be connected to the signal
- Should not be used as an LED driver
- When using Pull-up resistance
  - If it must be used, user higher than 4.7k ohm
- When using Pull-down resistance
  - Do not use pull-down if possible. If it must be used, use one higher than 47k ohm
- When using capacitors
  - Do not use capacitors if possible. If it must be used, use one smaller than 100pF

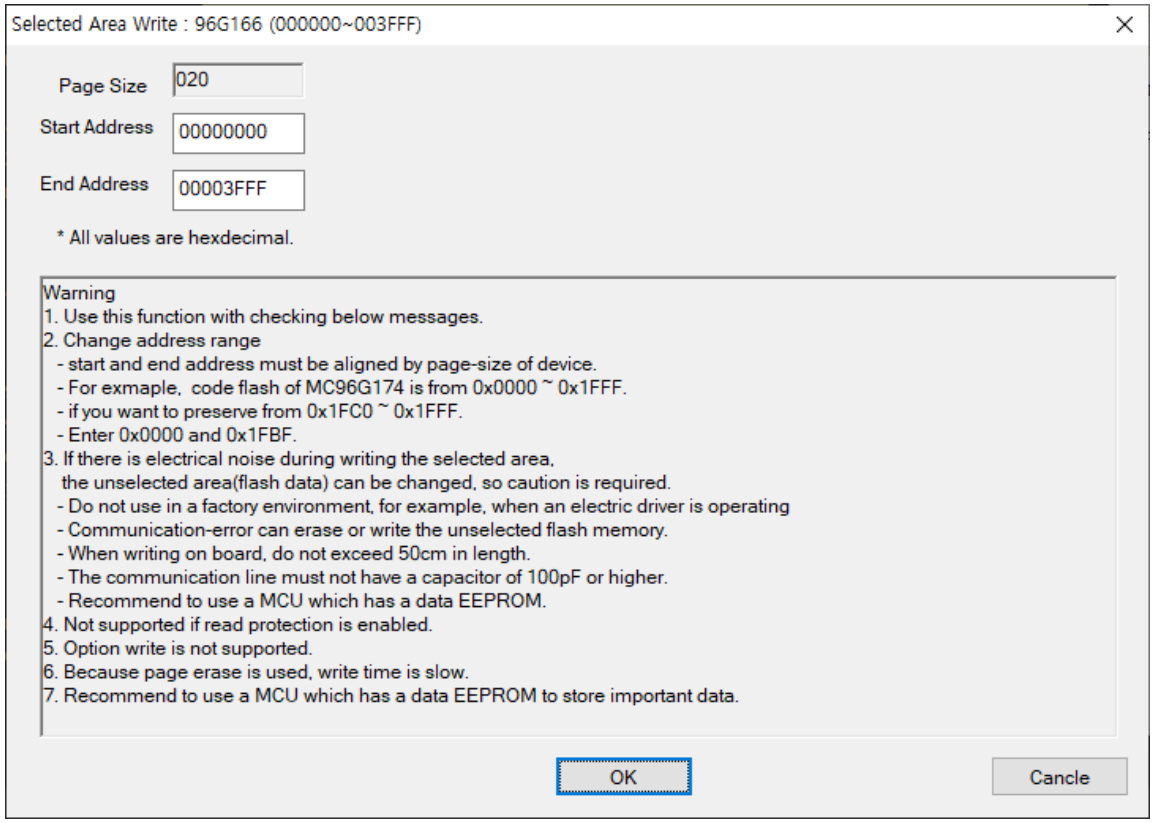


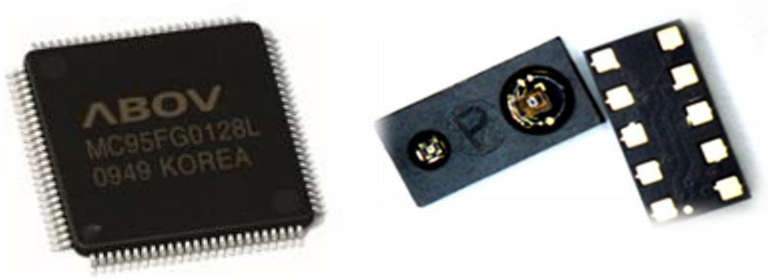
18. Selected Area Writing

1. Press the Device Select Button
2. Press the Tool Options
3. Press Config. Selected Area Write
4. Change Start Address and End Address
5. Press the Load Hex button
6. Press the Update button







ABOV SEMICONDUCTOR

ABOV Semiconductor, more than meets the eye!