E-PGM+ / E-GANG4/6 / E-PGM Serial Programmer

User's Manual

Version 1.0.6

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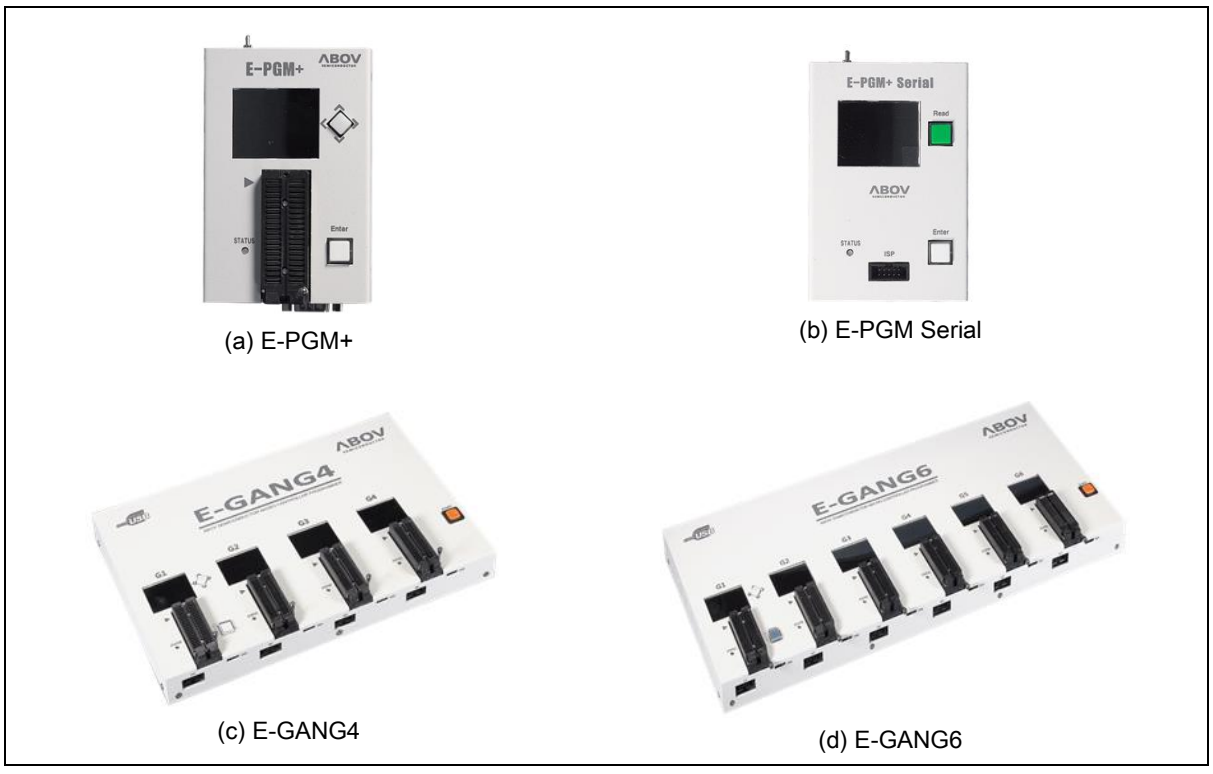
1 Introduction

E-PGM+, E-GANG4/6 and E-PGM Serial series are the universal programming equipment for the ABOV Semiconductor's MCU series, delivering superior performance and reliability.

This product line-up has the following features:

- Fast programming speed for mass manufacturing
- Standalone programming and automated programming
- Supports USB (2.0 Full-Speed) interface with Microsoft Windows.
- Built-in protection circuit for the Programmer and programmed device
- Data port inputs are protected against ESD up to 15kV.
- Supports single chip programmer mode using socket for a device (Except for E-PGM Serial).
- Supports Gang programmer mode using four or six socket devices.
- Supports On-board Programmer using In-System Programming (ISP) mode.
- Up to 1Mbit internal Flash memory for target binary or hex format data
- Programming supports the main code area and the option area as well.



(a) E-PGM+ (b) E-PGM Serial

(c) E-GANG4 (d) E-GANG6

Figure 1. Programmer

2 Hardware

2.1 Specifications

The E-PGM+ and E-GANG4/GANG6 have similar features, but the E-PGM Serial has different features. The E-PGM Serial was designed only for On-board Programming purpose and features Noise Robust for the mass production environment.

Specifications of each Programmer equipment are compared in Table 1.

Table 1. Programmer Specifications

	E-PGM+	E-PGM Serial	E-GANG4	E-GANG6
Type	Standalone Type Universal Programmer			
Dimension [Cm]	8.3 X 14.5 X 3.3	8.3 X 14.5 X 3.3	33.5 X 23 X 4.3	48.2 X 23 X 4.3
Weight [g]	350	330	2,000	2,800
Power Source	External DC 15V Power Supply			
Input Voltage	15V/1A	15V/1A	15V/2A	15V/2A
Power Consumption	15W	15W	30W	30W
Operating Temp.	-10℃ ~ 40℃			
Storage Temp.	-30℃ ~ 80℃			

Functions of each Programmer equipment are compared in Table 2.

Table 2. Programmer Functions

	E-PGM+	E-PGM Serial	E-GANG4/6
40-DIP Socket	O	X	O
ISP Port	O	O	O
ISP Port ESD/ EOS/ Surge Protection	O	◎ Level shifter added VDD Protection Diode added	O
Supported Devices	All Devices	94/95/96/97XXXX series (except for 97F1104S/1204S/1316S) All 32-bit MCU	All Devices
Buffer Size	1MB	8MB	1MB
Read Button	Joystick Button	Push Button	Joystick Button
Support Barcode Reader (RS-232C)	O	X	X
Handler Interface	O	O	O
Operating S/W	E-PGM+.exe	E-PGM+.exe	E-PGM+.exe

2.2 Functions

The E-PGM+, E-GANG4/6 and E-PGM Serial are designed as a compact system for every workspace. They are easy to use with simple and convenient features.

Consumable parts such as a 40-pin DIP socket, ENTER button, and joystick buttons are individually replaceable, ensuring a long service life. Functions of the E-PGM+, E-GANG4/6 and E-PGM Serial are described in the following sections:

2.2.1 E-PGM+ Programmer

The E-PGM+ is a standalone type universal Programmer, which is capable of programming any series of ABOV's microcontrollers. The E-PGM+ consists of main Programmer equipment and the target device socket and socket adaptor parts.

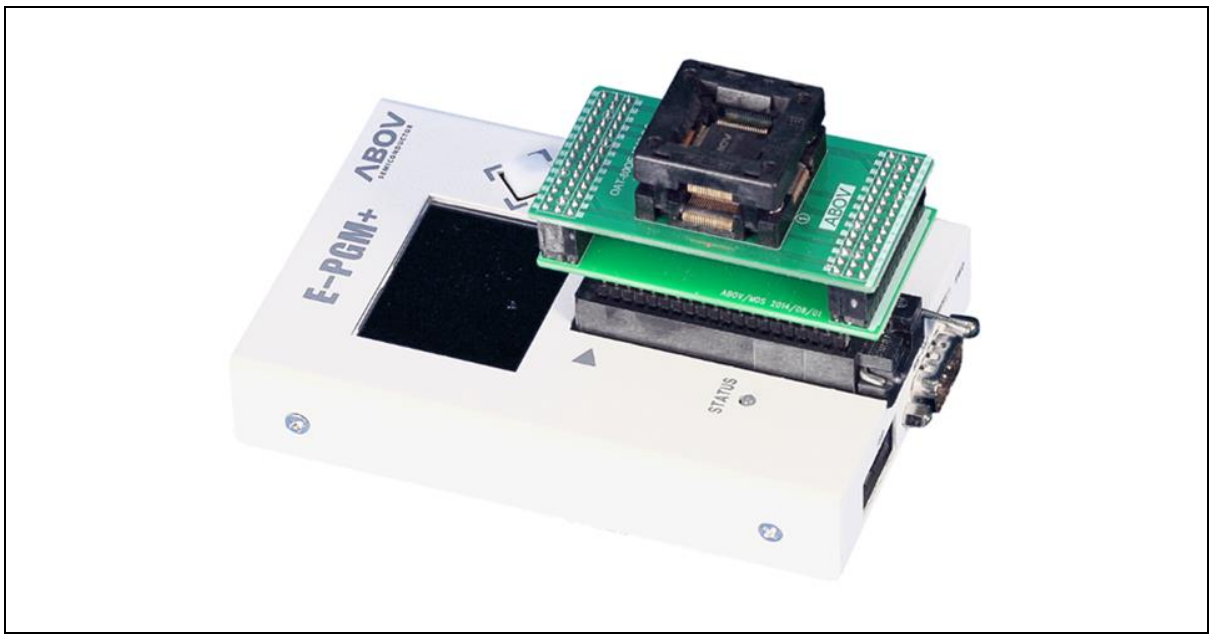


Figure 2. E-PGM+ with Target Socket Module

Figure 3 and the following list describe external features of the E-PGM+:

Figure 3. E-PGM+ Top and Side Views for Function Description

① 10-pin IDC connector for In-System Programming (ISP)

② RS-232C serial communication port (External bar code reader interface port)

③ SWD port for firmware update and development purpose (Do not use, it is not for customers.)

④ A button for programming the target device

⑤ A button for reading the target device

⑥ LCD Screen for Information Display:

- Device name, checksum data and options.
- PASS/FAIL is shown as a result of programming, accompanied by error information in the case of failure.

⑦ 40-pin DIP TEXTOOL Socket for single chip programming mode.

⑧ LED Indicator with red/green illumination shows the current status when writing is complete:

- Red for FAIL
- Green for PASS

⑨ 5-pin Molex 5264 connector for the interface with a Handler equipment

⑩ USB mini-B connector to a PC

⑪ Power Adaptor Connector for the 15V/1A external power

⑫ System Power Switch

2.2.2 E-PGM Serial Programmer

The E-PGM Serial is the standalone ISP type universal Programmer, which is capable of programming any series of ABOV's Flash microcontrollers: 94/95/96/97XXXX series (except for 97F1104S/1204S/1316S) and all 32 bit MCUs.

The E-PGM Serial is used for On-board manufacturing purpose because the E-PGM Serial does not have TEXTOOL Socket.

Figure 4. E-PGM Serial Programmer

Figure 5 and the following list describe external features of the E-PGM Serial.

Figure 5. E-PGM Serial Top and Side Views for Function Description

① 10-pin IDC connector for In-System Programming (ISP)

② SWD port for firmware update and development purpose (Do not use, it is not for customers.)

③ A button for programming the target device

④ A button for reading the target device

⑤ LCD Screen for Information Display:

- Device name, checksum data and options.
- PASS/FAIL is shown as a result of programming, accompanied by error information in the case of failure.

⑥ LED Indicator with red/green illumination shows the current status when writing is complete:

- Red for FAIL
- Green for PASS

⑦ 5-pin Molex 5264 connector for the interface with a Handler equipment

⑧ USB mini-B connector to a PC

⑨ Power Adaptor Connector for the 15V/1A external power

⑩ System Power Switch

2.2.3 E-GANG4/E-GANG6 Programmer

The E-GANG4 and E-GANG6 are standalone type universal gang Programmers, which are capable of programming any series of ABOV's microcontrollers with a gang mode that allows multiple devices to be programmed simultaneously.

The E-GANG4 and E-GANG6 consist of four or six E-PGM+s, respectively. In addition, it includes a power control board and USB-HUB.

Figure 6. E-GANG4 Programmer

Figure 7. E-GANG6 Programmer

Figure 8 and the following list describe external features of the E-PGM+.

Figure 8. E-GANG6 Top and Side Views for Function Description

① 10-pin IDC connector for In-System Programming (ISP)

② SWD port for firmware update and development purpose (Not for use)

③ A button for programming the target device 'G1' (only)

④ A button for reading the target device

⑤ LCD Screen for Information Display:

- Device name, checksum data and options
- PASS/FAIL is shown as a result of programming, accompanied by error information in the case of failure.

⑥ 40-pin DIP TEXTOOL Socket for gang programming mode:

- Gang4 has four separate sockets.
- Gang6 has six separate sockets.

⑦ LED Indicator with red/green illumination shows the current status when writing is complete.

- Red for FAIL
- Green for PASS

⑧ A button for the simultaneous programming for all the four or six gangs

⑨ System Power Switch of E-GANG4/6

⑩ This connector is for the 15V/2A power adapter used to power E-GANG4/6.

⑪ 12-pin Molex 5264 connector for the interface with a Handler equipment

⑫ USB mini-B connector to a PC

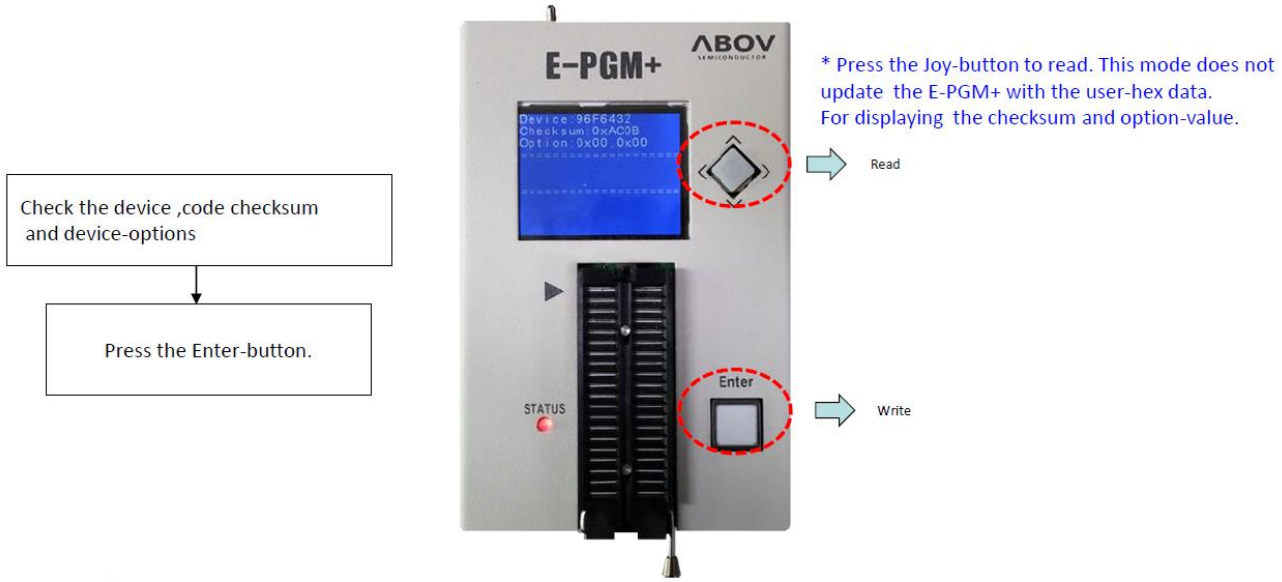
2.3 Programming a microcontroller

E-PGM+ supplies 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.

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



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.

2.4 Pin Configuration

2.4.1 40-pin DIP TEXTOOL Socket

The E-PGM+ and E-GANG4/6 (except for E-PGM Serial) use specific sockets to program a device or a gang of devices. Users should place the appropriate socket and adapter on the 40-pin DIP TEXTOOL socket of the E-PGM+ or E-GANG4/6 before conducting programming. We provide all sockets and adaptors which are supported by the E-PGM+ and E-GANG4/6. Please refer to the Socket and Adaptor Selection Guide for the device to be programmed.

Figure 9 and Table 3 show signal assignments of the 40-pin DIP TEXTOOL Socket.

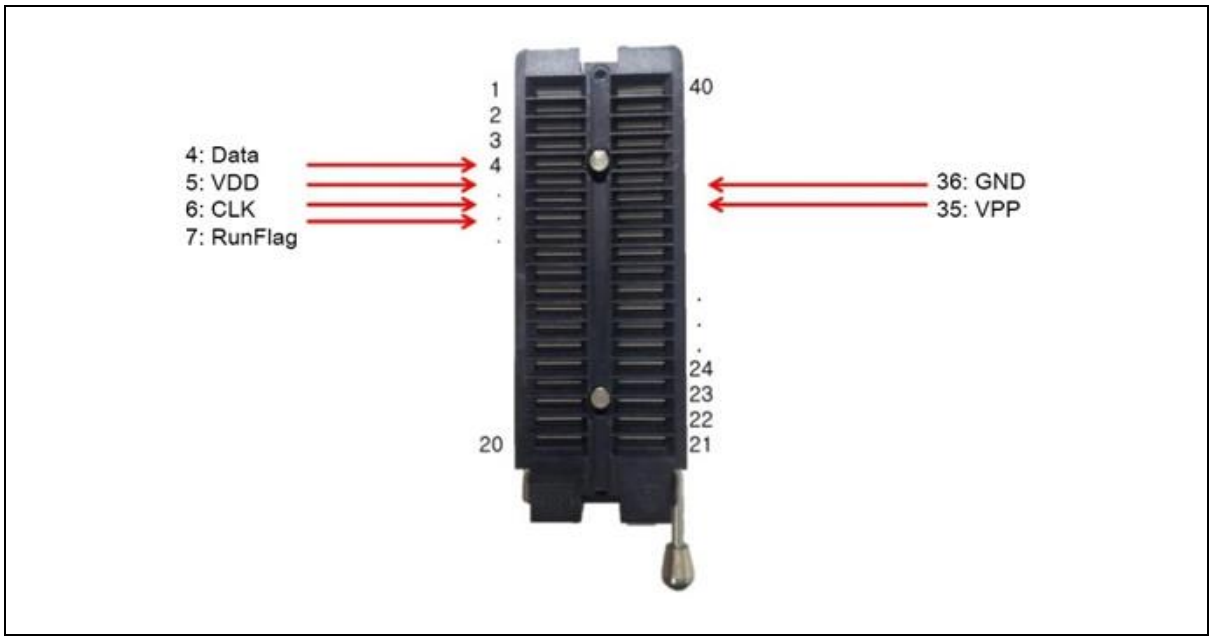


Figure 9. Programming Pin Assignment for 40-pin DIP TEXTOOL

Table 3. Pin Assignment for 40-pin TEXTOOL Socket

Pin No.	Pin Name
4	DATA
5	VDD
6	CLK (Clock)
7	Rung Flag/Boot
35	VPP/Reset
36	GND

2.4.2 10-pin Connector

A 10-pin IDC type connector is required for On-board programming with E-PGM+, E-GANG4/6 and E-PGM Serial. The target board and 10-pin connector must be connected correctly for programming. If the connection is incorrect, the "Device–ID Fail." message is displayed on the LCD screen.

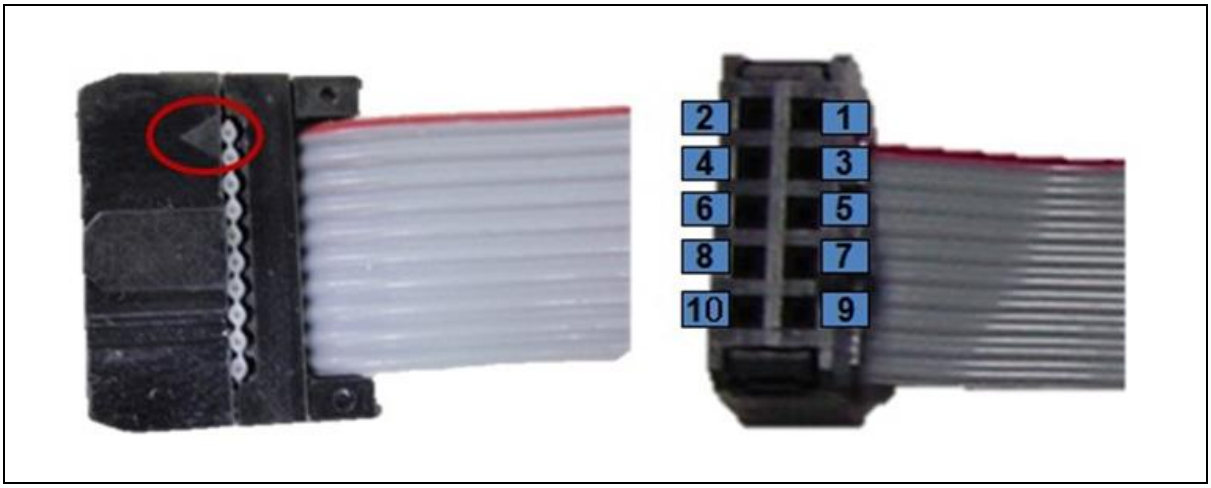


Figure 10. Programming Pin Assignment for 10-pin Connector

Table 4. Connection Table for 10-pin IDC Connector

Pin No.	Supported Signals	AC33M6128/8128, AC33M3064/4064	MC80F7708 UART ISP	32-bit SWD
1	MCU UART-RX	MCU UART-RX	MCU UART-RX	N/A
2	VDD	VDD	VDD	VDD
3	MCU UART-TX	MCU UART-TX	MCU UART-TX	N/A
4	GND	GND	GND	GND
5	Run Flag or Boot Pin or ACK	Boot Pin	ACK	N/A
6	DSCL, CLK (Clock)	N/A	N/A	SWD-CLK
7	GND	N/A	N/A	N/A
8	DSDA, Data	N/A	N/A	SWD-DATA
9	N/A	N/A	N/A	N/A
10	VPP or Reset Pin	RESET	VPP	RESET

Table 5. Device Series Pin number for Program (1)

Pin No.	A94Bx, A94Ex, A94Fx, A94Qx, A96Ax, A96G1x, A96Lx, A96Rx, A96Sx, A96Tx, MC95FGx, MC96Fx, MC96FRx
2	VDD
4	GND
6	DSCL
8	DSDA

*Note: Do not connect any other pins.

Table 6. Device Series Pin number for Program (2)

Pin No.	MC97F2664/2664A/2664AS, MC97F68128/60128
2	VDD
4	GND
5	RunFlag
6	DSCL
8	DSDA

*Note: Do not connect any other pins.

Table 7. Device Series Pin number for Program (3)

Pin No.	MC81Fx, MC40P5x, ADAMxxxx,
2	VDD
4	GND
6	SCL
8	SDA
10	VPP

*Note: Do not connect any other pins.

Table 8. Device Series Pin number for Program (4)

Pin No.	MC80Fxxxx UART ISP
1	MCU UART-RX
2	VDD
3	MCU UART-TX
4	GND
10	VPP

*Note: Do not connect any other pins.

Table 9. Device Series Pin number for Program (5)

Pin No.	AC33Mx, AC33GAx, AC30Mx, A34Mx, A33Mx, A33Gx, A31Tx, A31Rx, A31Lx, A31Gx, A31Ex
2	VDD
4	GND
6	SWCLK
8	SWDIO
10	RESET

*Note: Do not connect any other pins.

3 Software

3.1 Software Release

Software and firmware of the E-PGM+, E-GANG4/6 and E-PGM Serial can be downloaded from the ABOV Semiconductor's website. The firmware for individual devices has been developed and fully tested by us, and the certified version of program is uploaded to our website.

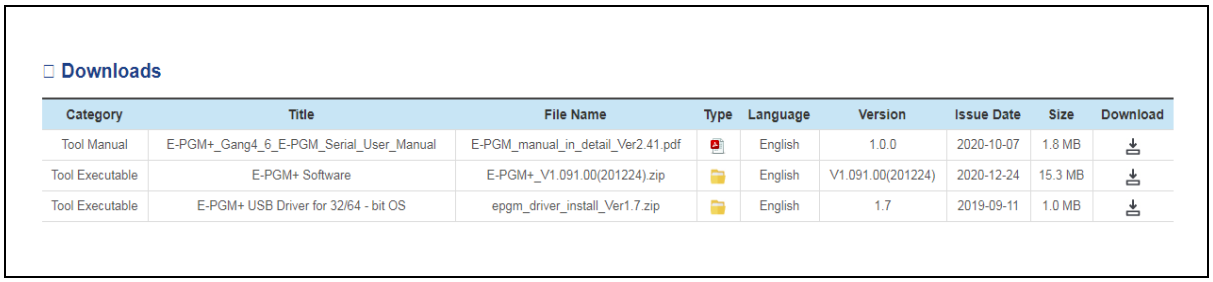
Additional software updates are provided through the special version development process upon requests by customers. For more information about the special version development, please contact our sales office.

The E-PGM+, E-GANG4/GANG6 and E-PGM Serial share a software program. When an equipment is connected, the software program identifies the equipment and enumerates how much equipment can be updated.

3.2 Software Installation

To install the software, follow the steps below:

1. At the ABOV Semiconductor's website www.abovsemi.com, go to the "Development Tools > Programmer > E-PGM+ / E-Gang4/6 / E-PGM Serial" menu.
2. Download the E-PGM+ / E-GANG4/6 USB Driver for 32/64 bit OS and the E- PGM+ / E-Gang Software shown in Figure 11.



Downloads

Category	Title	File Name	Type	Language	Version	Issue Date	Size	Download
Tool Manual	E-PGM+_Gang4_6_E-PGM_Serial_User_Manual	E-PGM_manual_in_detail_Ver2.41.pdf		English	1.0.0	2020-10-07	1.8 MB	
Tool Executable	E-PGM+ Software	E-PGM+_V1.091.00(201224).zip		English	V1.091.00(201224)	2020-12-24	15.3 MB	
Tool Executable	E-PGM+ USB Driver for 32/64 - bit OS	epgm_driver_install_Ver1.7.zip		English	1.7	2019-09-11	1.0 MB	

Figure 11. Software Download

3. Proceed without connecting the E-PGM+ to a PC.
4. Unzip the 'Epgm_driver_install_Ver_x.x.zip', and open the created folder.
5. Run the 'USB_driver_install.exe'.

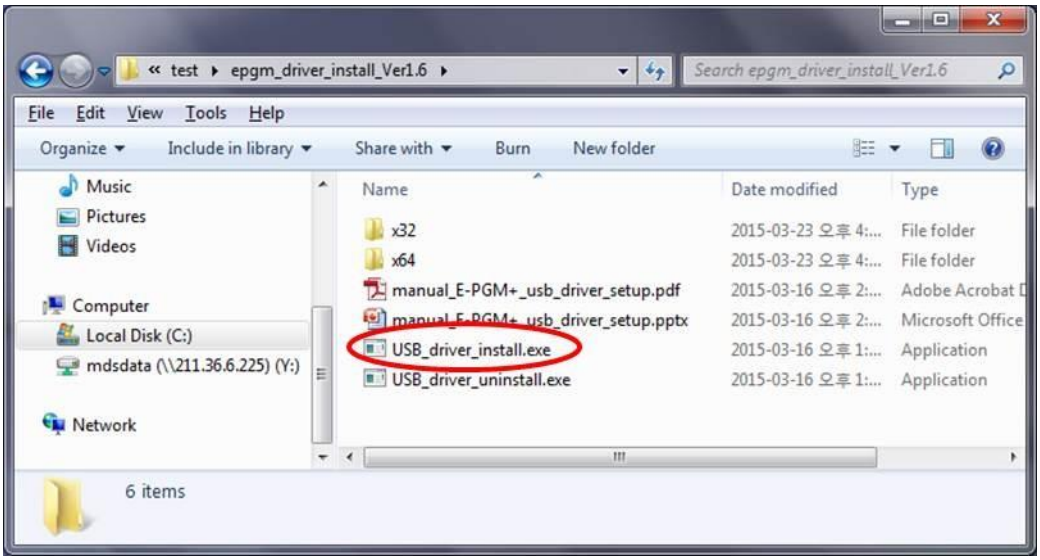


Figure 12. USB_driver_install.exe

6. Click the 'Install' button if the dialog box pops up as shown in Figure 13:

Figure 13. Windows security

7. After executing the 'exe' file, the window shown in Figure 14 appears if the installation is successful. The installation takes one to three minutes depending on the PC environment.

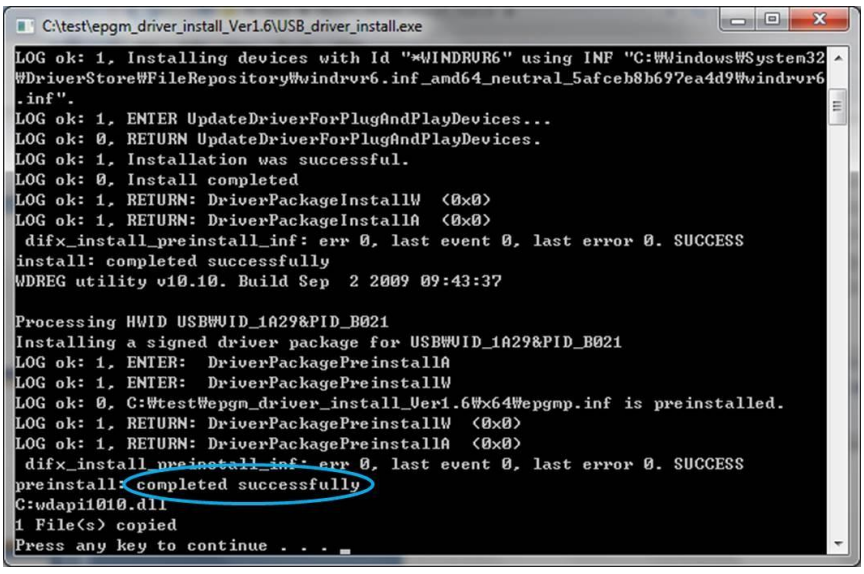


Figure 14. Driver Installation

The driver installation is complete when the "completed successfully" appears at the bottom of the CMD window as shown in a blue circle in the figure above.

8. Connect the E-PGM+ or E-GANG4/6 to the PC, and turn it on. The E-PGM+ or E-GANG4/6 should be automatically recognized and displayed in Device Manager as shown in Figure 15.

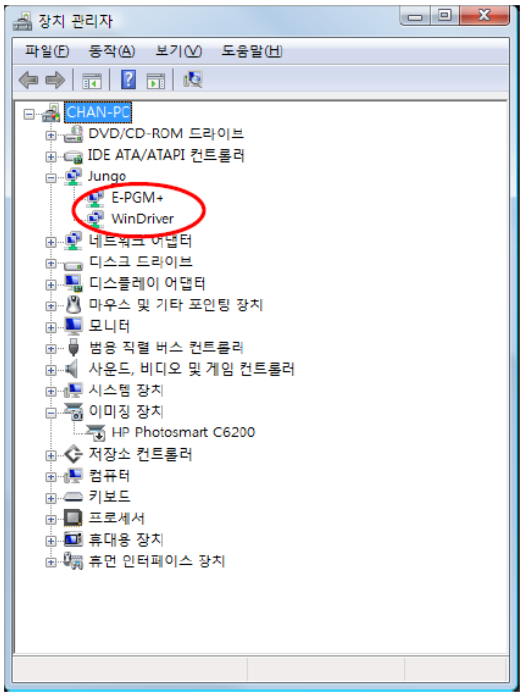


Figure 15. Device Manager

9. Unzip the E-PGM+ / E-GANG4/6 / E-PGM Serial Software that was downloaded in Step 2. In the created folder, double-click the executable (E-PGM+.exe) to run the program.

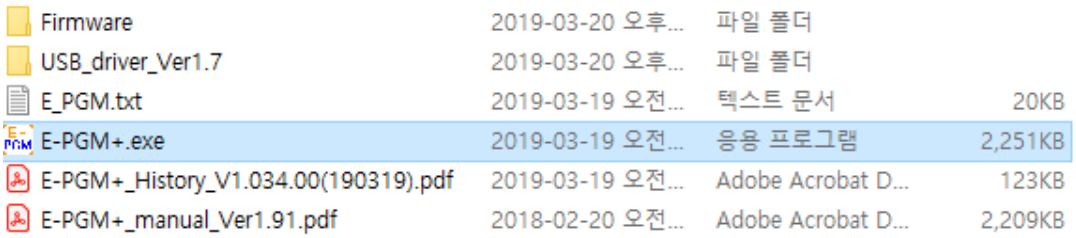


Figure 16. E-PGM+.exe

10. If the executable cannot be executed with a pop-up shown in Figure 17, right-click on the file for the context menu.

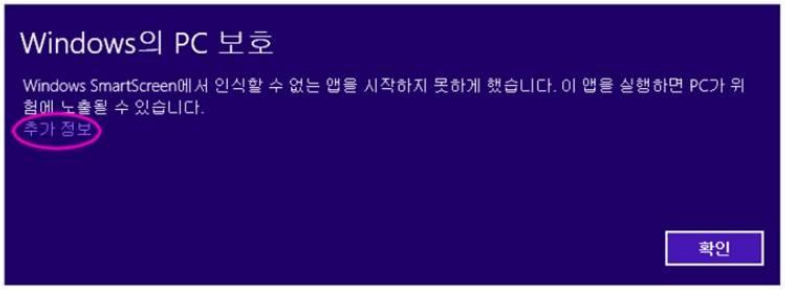


Figure 17. Windows' Warning Message

11. . Select the Properties and click the Unblock under Security. Then, double-click the executable (E-PGM+.exe) to run the program again.

Figure 18. Unblock under Security in Properties Menu

3.3 Software UI Descriptions

In this section, software functions are introduced.

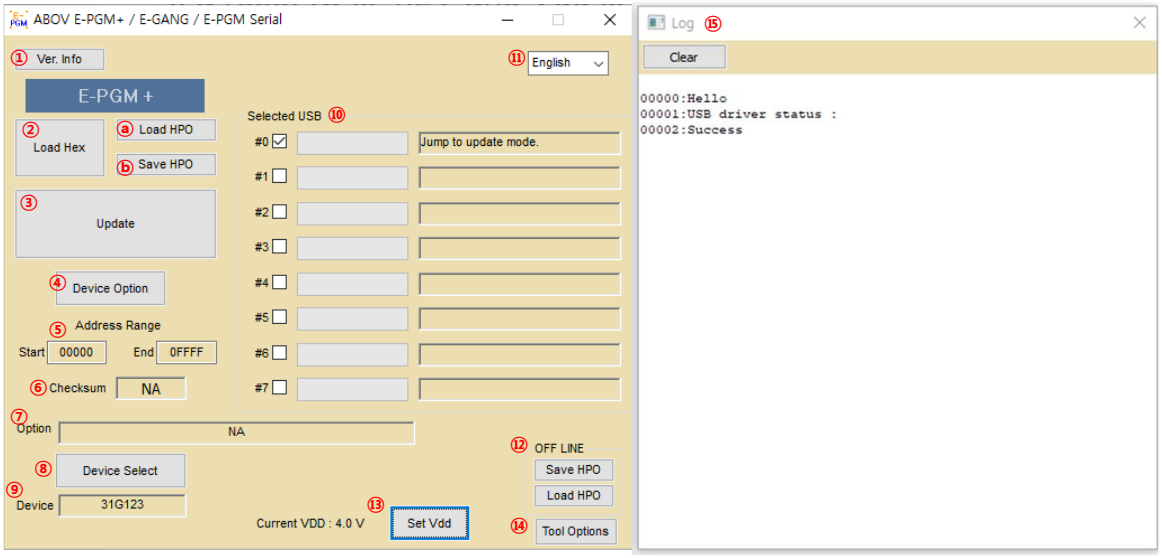


Figure 19. E-PGM+ PC Program

① The 'Ver. Info' button displays the software version. If the Ver. Info button is pressed, a dialog box pops up to show the software version, date of finalization, and developer's e-mail address.

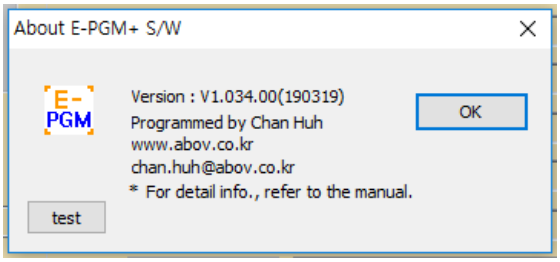


Figure 20. Software Version Information

② The 'Load Hex' button selects a hex file to write to the device. Before selecting a hex file, it is desirable to check the checksum of the file. Please make sure that it matches the checksum value displayed in the GUI after the file is loaded.

This Load button is activated only after selecting a device. When this button is pressed, the Select Hex File Type option dialog is displayed as shown in Figure 21. By default, the software displays the hex format suited for the device. Make sure everything is correct, then click OK to proceed.

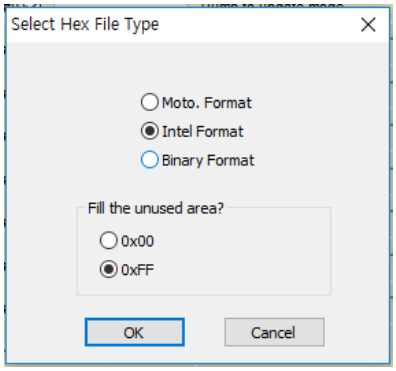


Figure 21. Select Hex File Type

a. The 'Load HPO' button is used to load an already existing HPO file. The HPO file is an improved version of a hex file that includes information on option values. Once an HPO file is created, a name of the device is stored together with option values. As such, there is no need to select a device when loading an HPO file.

b. The 'Save HPO' button stores the device name, configuration, hex file, and option values in the form of an HPO file. Users can automatically load their own settings without having to select a device-name, a hex file, options, and device under the 'Load HPO'.

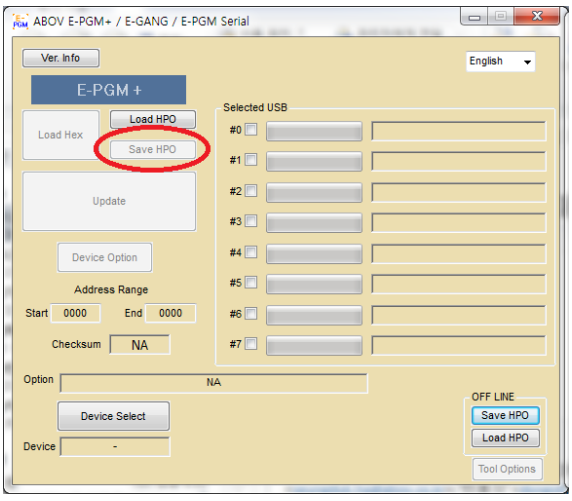
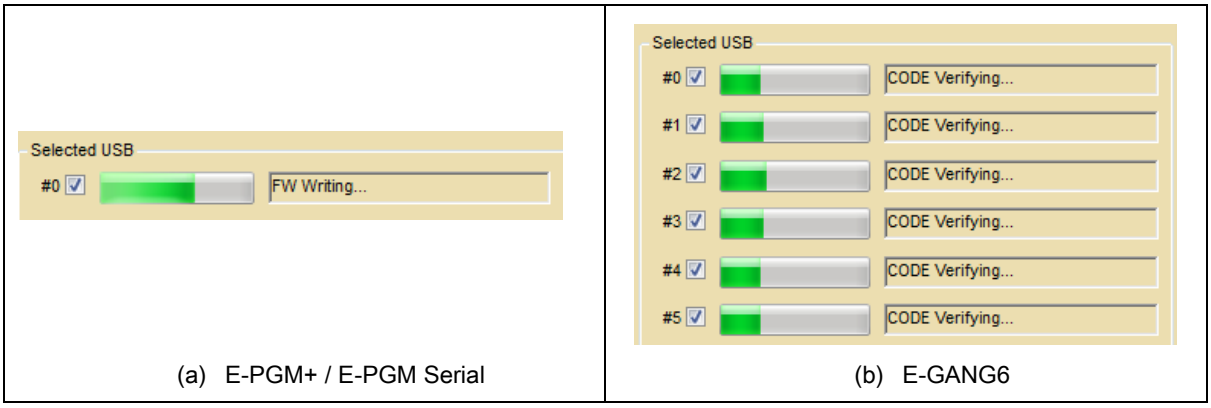


Figure 22. Save HPO

③ The 'Update' button is used to update the tool with the finalized settings. Pressing this button updates the tool with the hex file and option values. The progress bar displays the progress of the update as show in Figure 23. The status is displayed next to the progress bar as OK or Fail upon completion.



(a) E-PGM+ / E-PGM Serial (b) E-GANG6

Figure 23. Displayed Progress Bar

④ The 'Device Option' button is used to check or modify option values of the device. When this button is pressed, the option dialog box of the device pops up. In the option dialog box, users can enter new option values or modify existing option values.

As shown in Figure 24, devices A96G166 and A96T418 support device password.

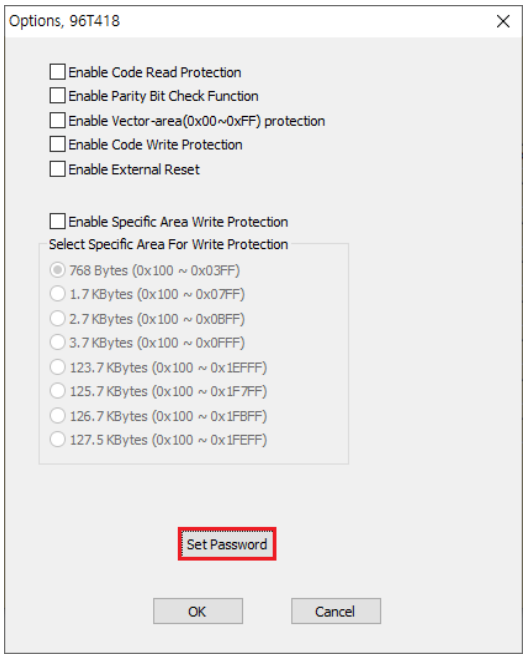


Figure 24. Example: Options of A96T418

Lock password

a. After writing hex code write, password lock is enabled.

b. The 12-byte hex-value for password is programmed.

Unlock password

a. Check device-id if password is enabled.

b. Then the 12-byte hex-value for password are compared.

c. If password is matched, password-lock is disabled.

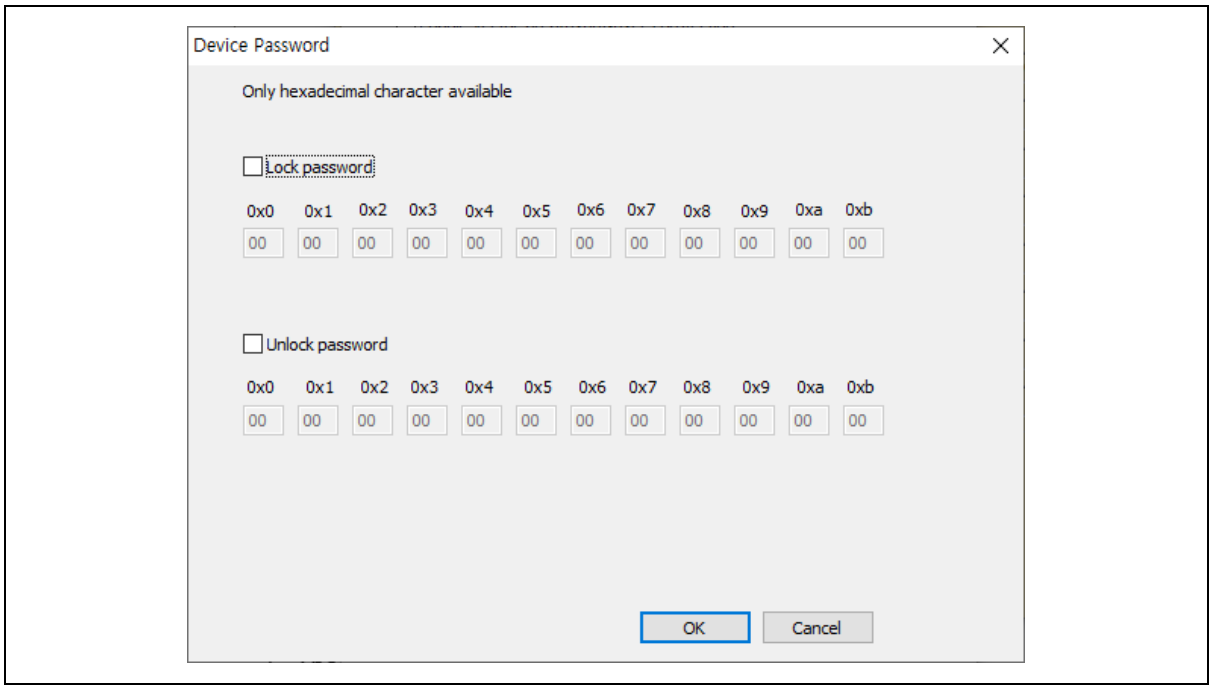


Figure 25. Device Password

⑤ The 'Address Range' shows the start and end addresses of ROM when a device is selected. These values are fixed, and cannot be modified by users.

⑥ This area displays the checksum. When a hex file is loaded using the 'Load Hex' button, checksum is calculated for data in the hex file to check for errors that may have occurred in the loading process. Checksum is an important element that must be checked in the programming process.

⑦ The 'Option' section shows the hexadecimal value of a selected option. Option values must also be checked in the programming process.

⑧ The 'Device Select' button is the first button to press after starting programming. When this button is pressed, the list of device categories is displayed as shown in Figure 26. Click + or - to see the specific devices under each category, and select the desired device.

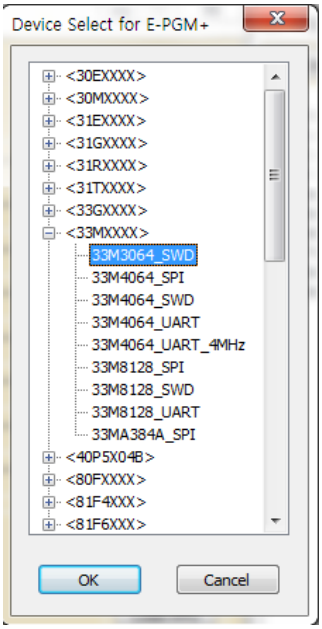


Figure 26. Device Select

⑨ When a device is successfully selected in the previous step using the 'Device Select' button, the device name is displayed in text form.

⑩ When the E-PGM+, E-PGM Serial, or E-GANG4/6 is connected, the #0 checkbox in the 'Selected USB' area is automatically ticked; For E-Gang4, the #0, #1, #2, and #3 checkboxes are ticked; For E-Gang6, #0, #1, #2, #3, #4, and #5 checkboxes are ticked. The progress bar next to each activated checkbox displays the progress status.

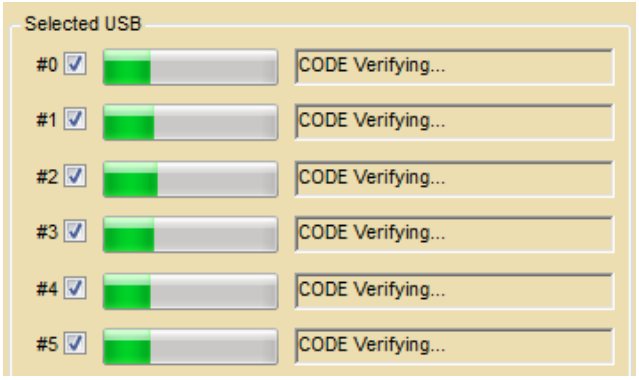


Figure 27. Displayed Progress Bar

⑪ This button allows users to select a language. The supported languages in E-PGM+ and E-GANG4/6 are English and Chinese. Choose the desired language.

⑫ The 'OFF LINE' area supports saving and loading of HPO by running the software without the E- PGM+ and E-GANG4/6 connections. If the 'Save HPO' button is clicked, two options such as E-PGM+ and E-PGM Serial are available.

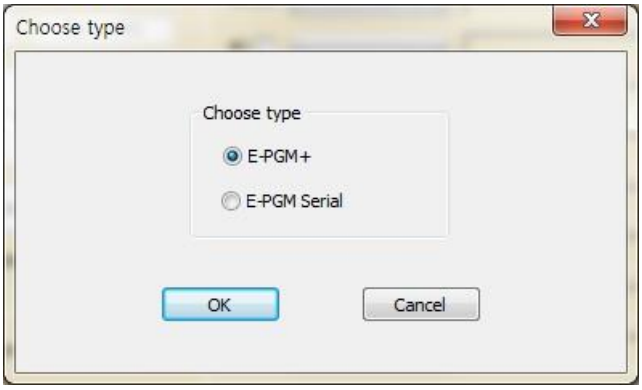


Figure 28. Choose Type

After selecting the current programmer system, proceed the following procedure:

a. Click the 'Load Hex' button and choose the option.

b. Click the 'Save HPO' button that is circled in Figure 29. In offline mode, the 'Save HPO' button is disabled.

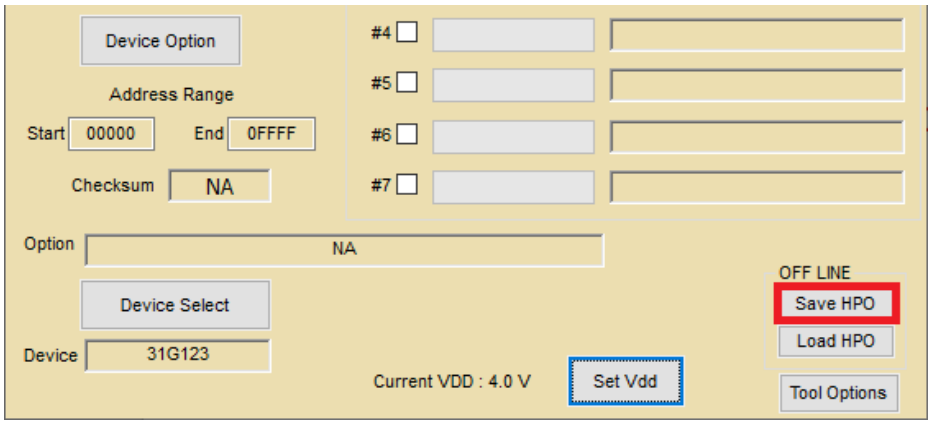


Figure 29. Save HOP (OFF LINE)/Get Code Checksum

To get a checksum without a PC connection,

a. Press the 'Save HPO' button.

b. Select a tool-type.

- E-PGM +: E-PGM+, E-GANG4/6
- E-PGM Serial: E-PGM Serial

c. Select a device.

d. Load a hex-file.

e. Check checksum.

⑬ The 'Set VDD' button allows users to change VDD value for the following reasons:

— On In-System Programming (ISP), the detect voltage of RESET IC on board must be lower than VDD of E-PGM

Example) 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 voltage selected by the 'Set VDD' button. The voltage selected by the "Set VDD'" button is up to 4.7V. Therefore, it is recommended to select a value less than 4.25V for LVR of the device.

— Do not set the VDD to greater than the operating voltage of the device. Some devices are forbidden to change the VDD (range: 3.0V to 4.7V).

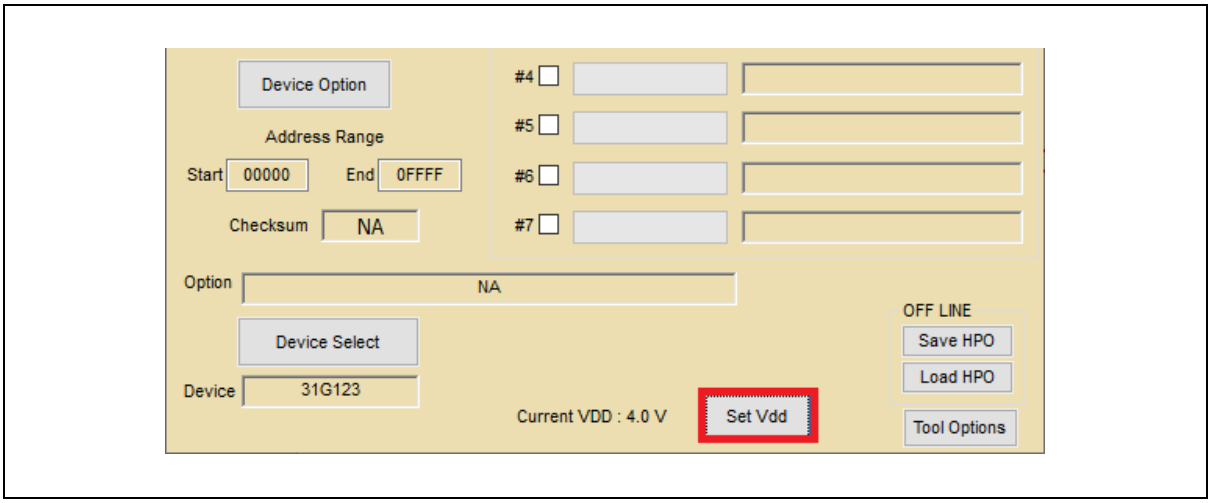


Figure 30. Set VDD

⑭ The 'Tool Options' button erases Data Flash. If users select the 'Erase Data Flash' in Figure 31, the Data Flash is erased during write-sequence. Supported devices are A33G527 and A33G526.

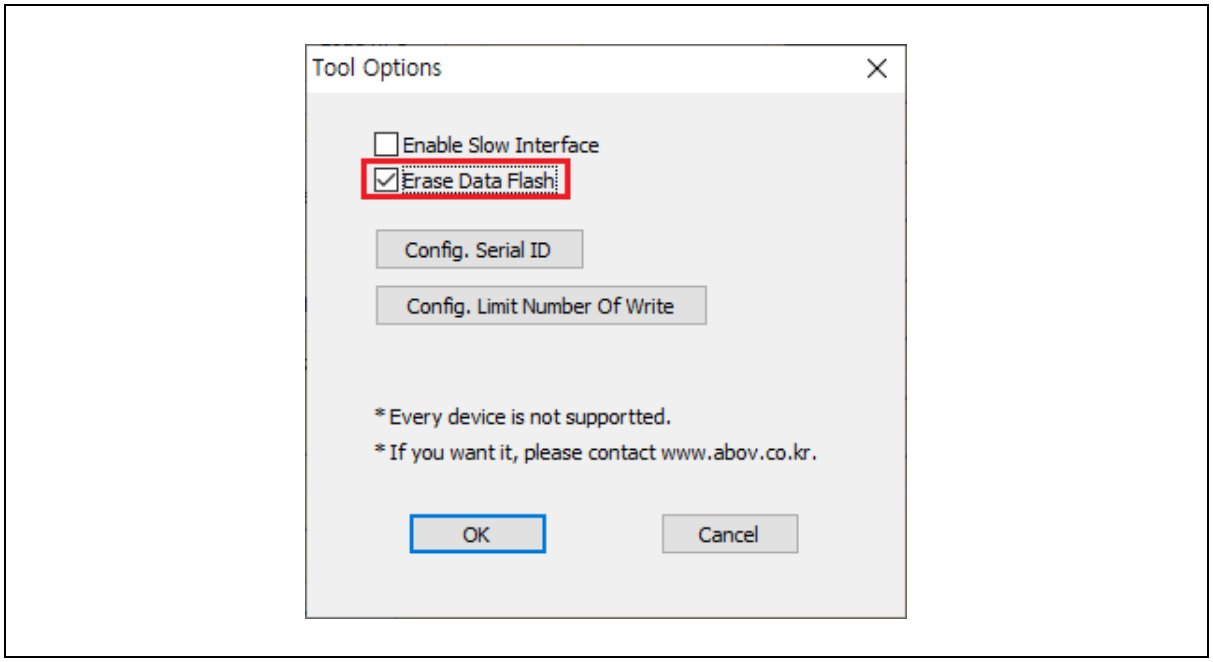


Figure 31. Tool Options: Erase Data Flash

The 'Tool Options' button also enables the 'Config. Serial ID.'

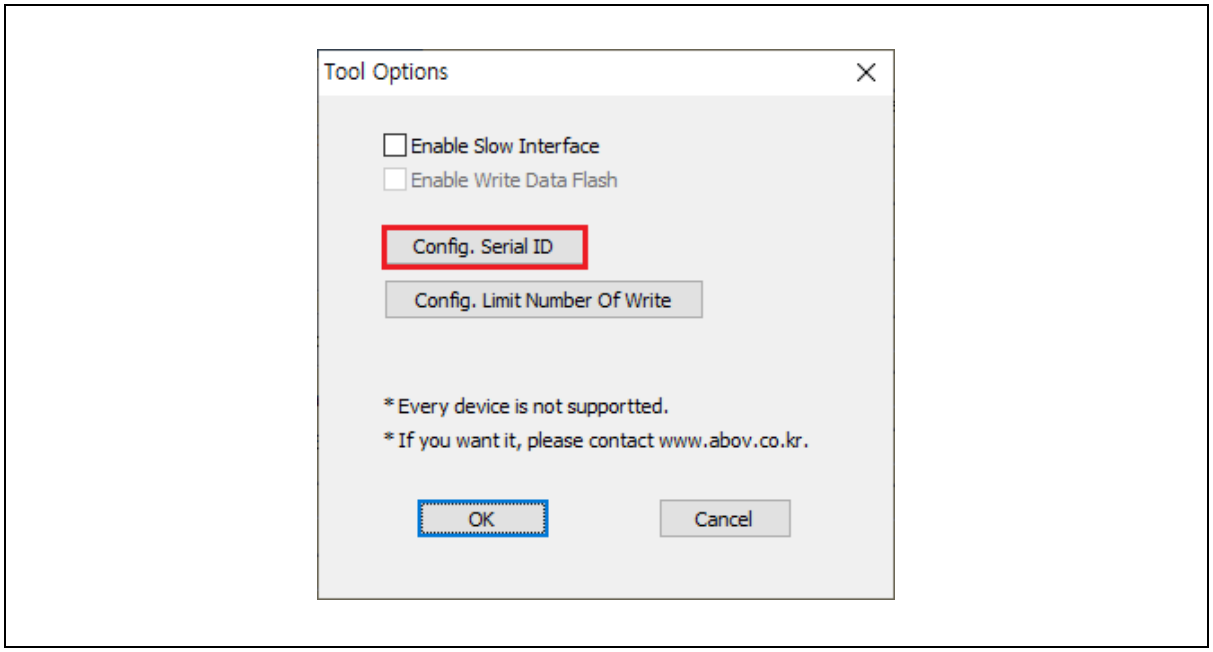


Figure 32. Tool Options: Config. Serial ID

As shown in Figure 33, users can set the options of the 'Config. Serial ID'.

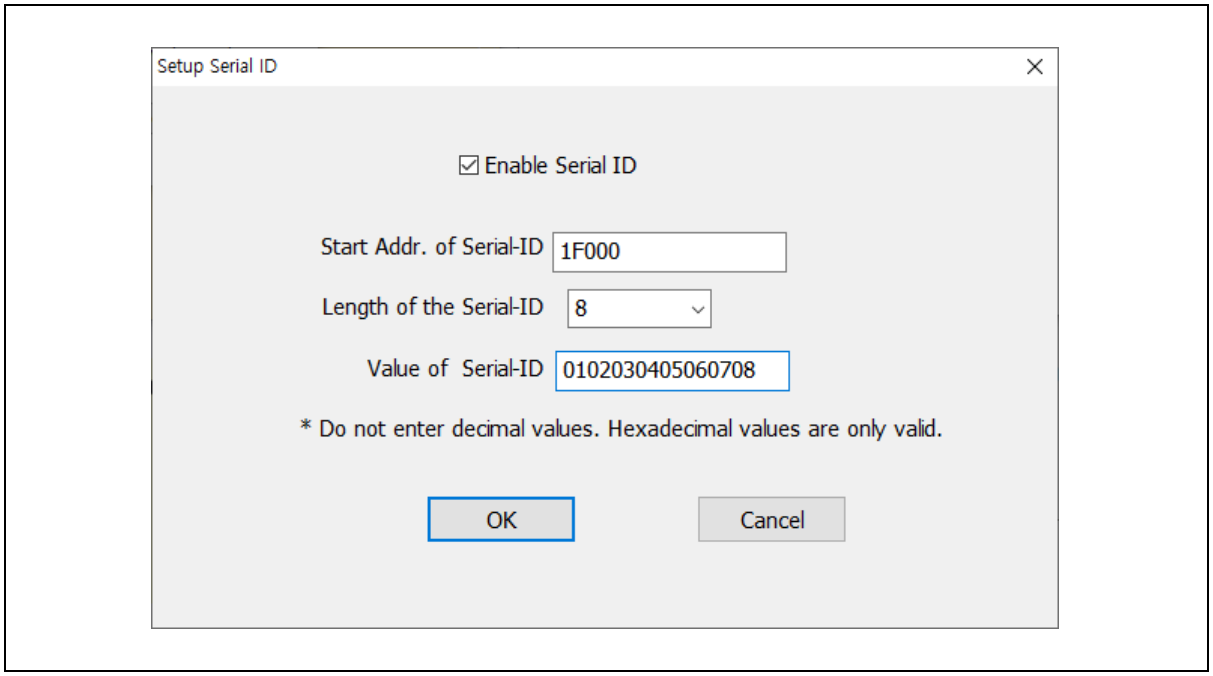


Figure 33. Options of Config. Serial ID

a. Start addr: Start address of serial-ID

b. Length: Length of serial-id, 4-byte or 8-byte

c. Value: ID value

d. Little endian type

e. 0x1F000 : 08 07 06 05 04 03 02 01

f. ID is auto-incremented after writing.

The 'Tool Options' button also enables the 'Set Limit Number of Write.'

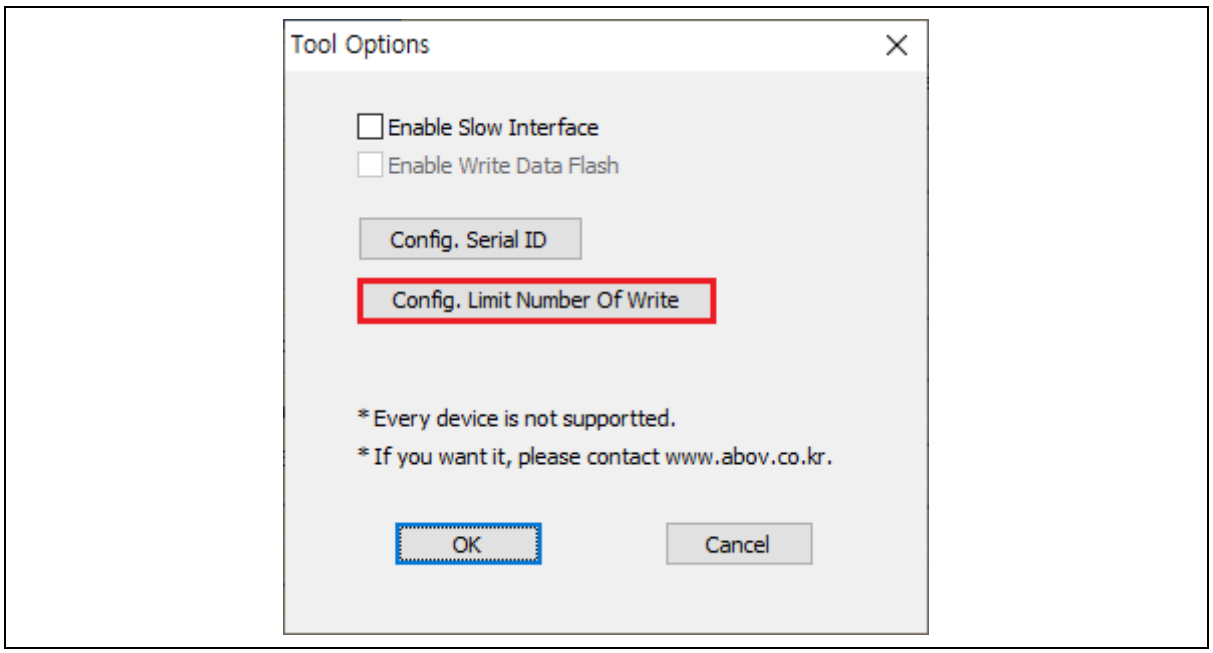


Figure 34. Tool Options: Config. Limit Number of Write

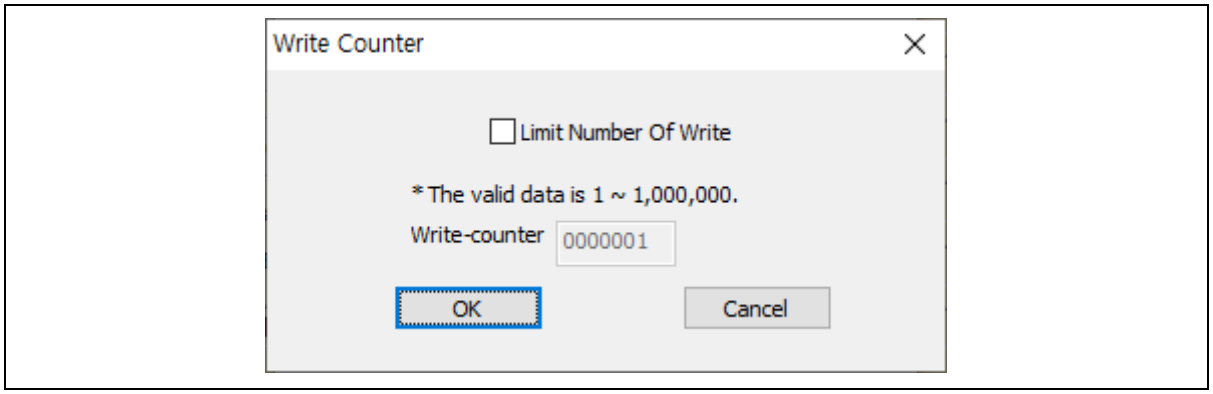


Figure 35. Write Counter

a. Enable the 'Limit Number of Write'.

b. Enter the available write-counter (1 to 1,000,000).

c. Limit number is decreased per write.

⑮ The Log dialog shows the progress and results in real time. Users can check the problems and solutions that occurred before progress recording.

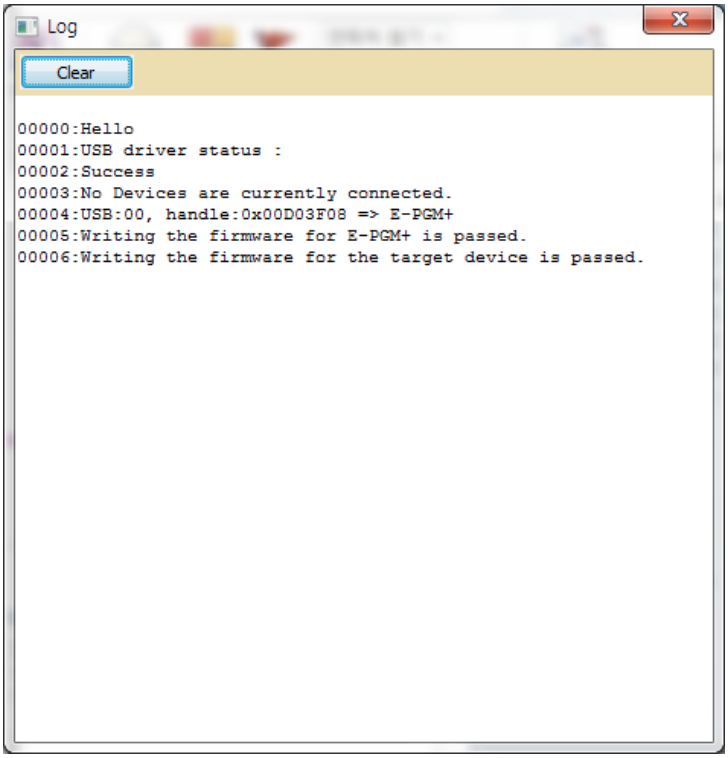


Figure 36. Log Dialog

3.4 Device Selection

The E-PGM+ PC program is used jointly by E-Gang4 and E-Gang 6. The number of ports is displayed in the GUI when any of the products is connected: 1 port for E-PGM+ and E-PGM Serial; 4 ports for E-GANG4; 6 ports for E-GANG6.

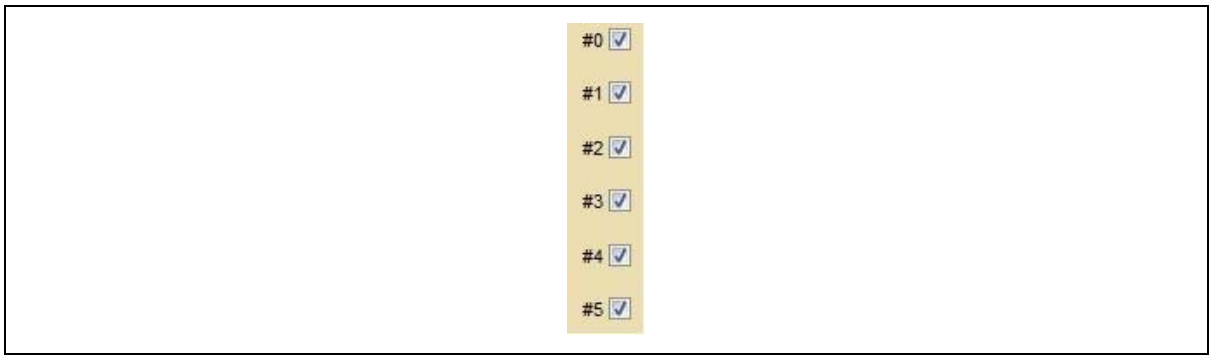


Figure 37. Port Selection

To prepare for programming, users can select a device by following the procedure below:

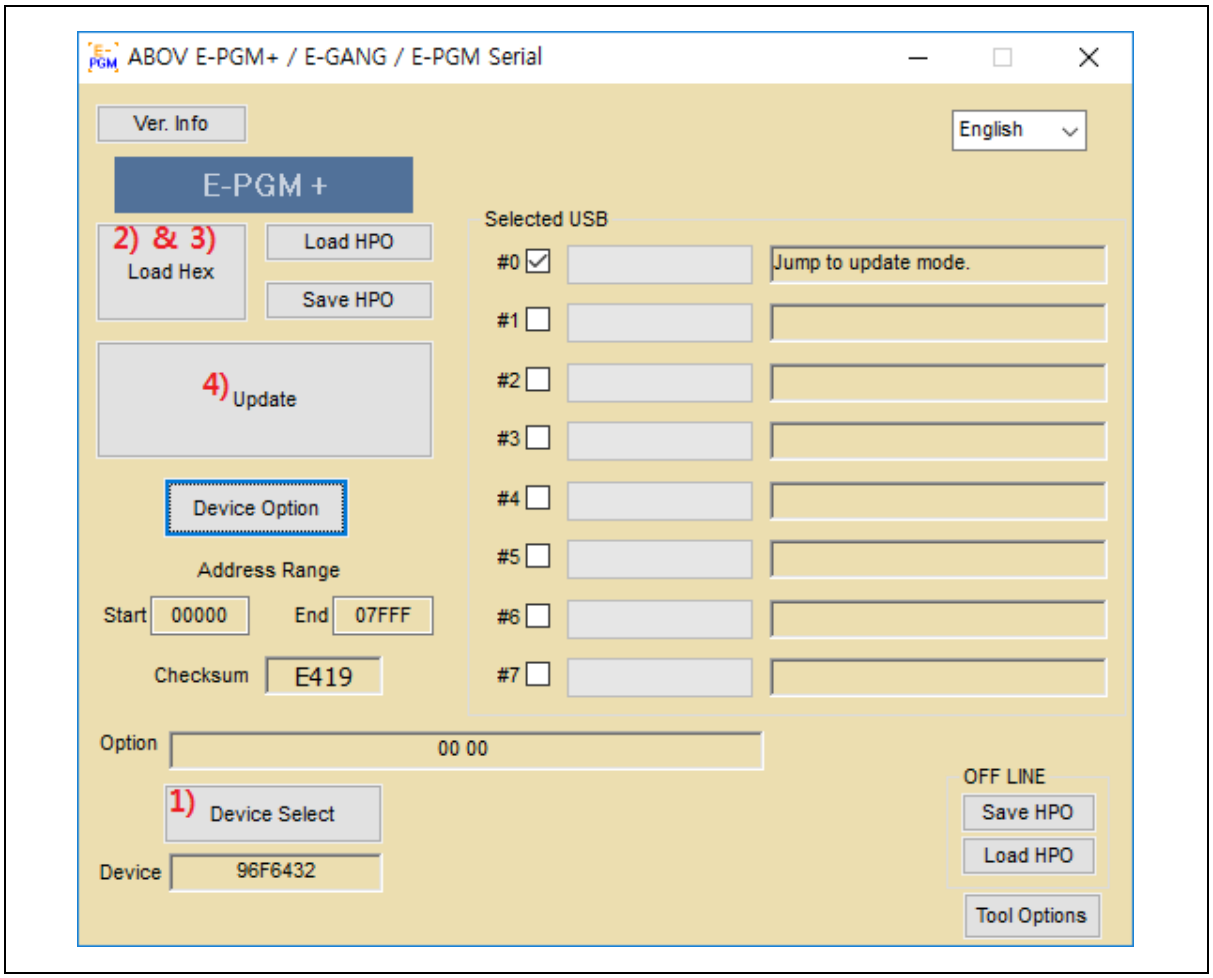


Figure 38. Device Selection, Load Hex, and Update

① Click the 'Device Select' button to select a device.

② Click the 'Load Hex' button to select a hex file for IC programming.

③ Selecting a hex file pops up the option dialog box. Refer to the device's manual, and select the appropriate options according to application characteristics.

④ Click the 'Update' button to update the E-PGM+ or E-GANG4/6 with the hex file and option values. This updates a controller and buffer in the tool (E-PGM series) only.

⑤ Writing to the device does not begin until users press the 'Enter' button of the E-PGM+ or E-GANG4/6.

3.5 Programmer Self Check

The Programmer supports a function of Self Check. For this, users need to follow the procedure below:

1. Remove a device in a tool.
2. Run the 'E-PGM+.exe' file.
3. Device select <SELF_TEST>E-PGM+
4. Press the 'Update' button.
5. Run TEST after the update is complete.
    a. E-PGM+: Press the 'ENTER' button.
    b. E-GANG: Press the 'START' button.

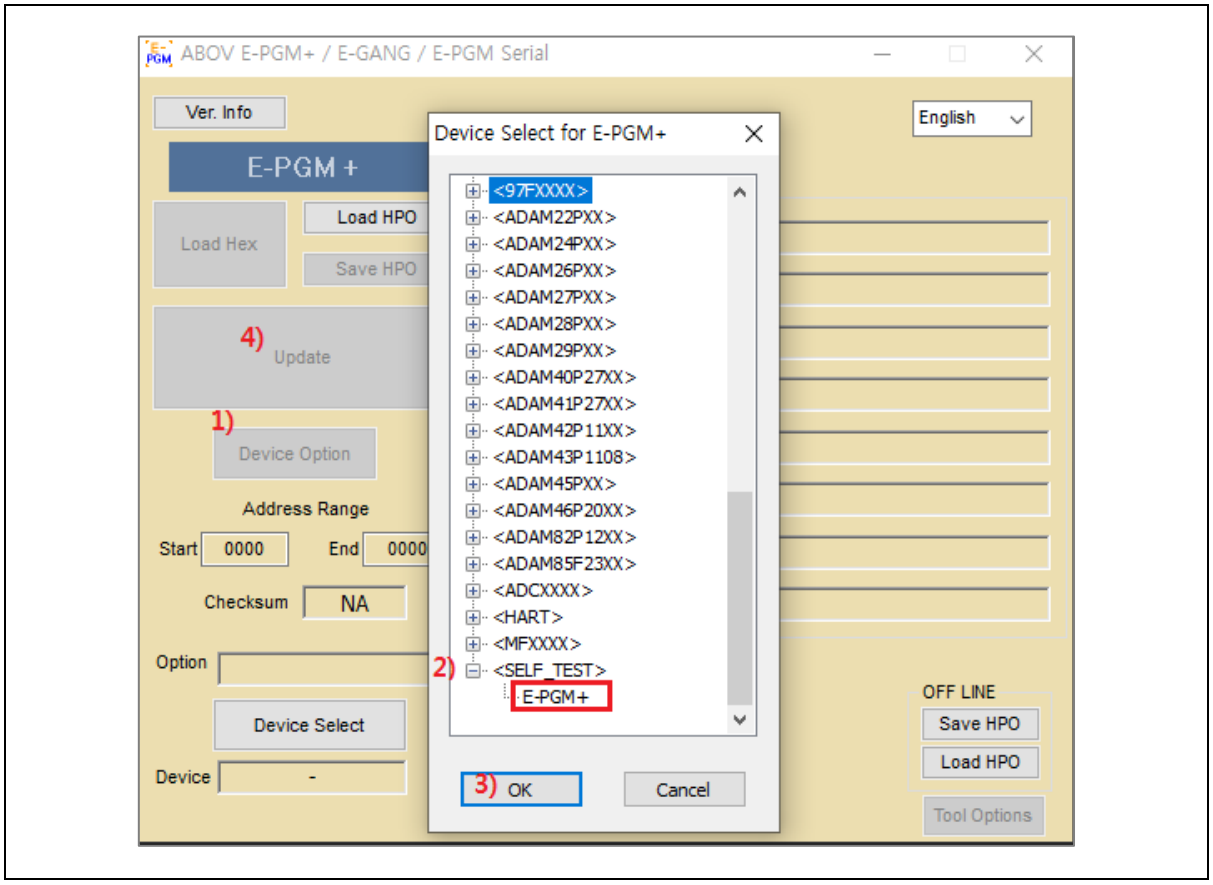


Figure 39. E-PGM+ Software Settings for Self Check

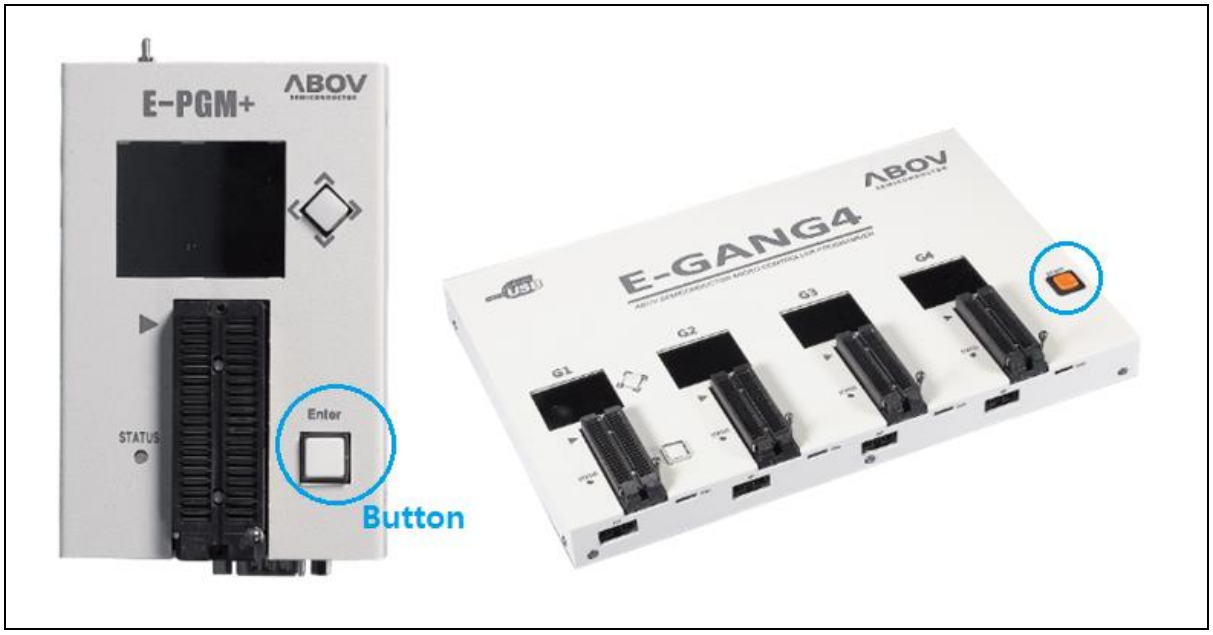


Figure 40. Button of Programmers

The Self Check results are displayed on the Programmer's LCD screen. Figure 41 shows example results on the LCD screen.

(a) Pass (c) Fail

Figure 41. Self Check Results

3.6 Programming Error Messages

Errors may occur during programming. Causes of the errors are not displayed in detail due to the limited space of the LCD screen. Instead, a brief error message is displayed and the details of each error are given in Table 10.

Table 10. Error Messages and Causes

Error Messages	Error Details and Causes
No device-ID Read-ID = 0xxxxx	VDD/GND and signals are not connected. Wrong device is selected.
No DPID	Related with ARM devices VDD/GND/SWDCLK/SWDATA are not connected.
Power Check VDD: xx or VPP: xx	Incorrect VDD/VPP voltage supply; During on-board programming, the target board spends a lot of current and causes a voltage drop; or during on-board programming, the target board is short between VDD and GND.
Trim Chk. Failed	No device-specific data is found; or during on-board programming, the device is reset.
Erase Failed	Erase failed.
Verify Fail Addr: xxxxxx Data: xx => xx	Verification failed. 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 Remove Ext. Power	During on-board programming, the target board is supplied with external power. Remove the external power.
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. For example) 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.
CPU Reset Halt target	Device is in reset state. Check LVD of user option, especially A31G112/123. Set VDD as higher than LVD level.

3.7 Troubleshooting

3.7.1 Error Message: 'The program can't start because WDAPI1010.dll is missing.'

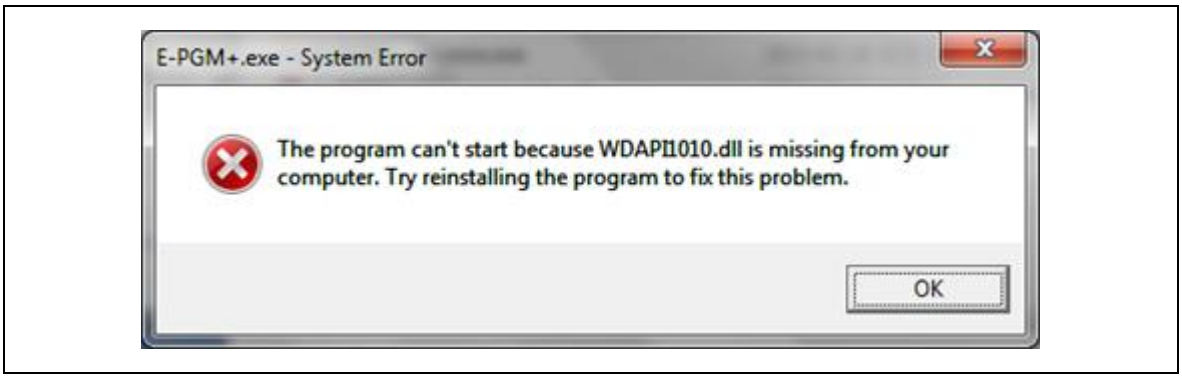


Figure 42. Error Message of WDAPI1010.DLL

Cause)

WDAPI1010.DLL is not found in the 'C:\Windows' folder.

Solution)

If the device driver has been set up, the missing file can be copied into the 'C:\Windows' folder.

3.7.2 Error Message: 'No firmware found' or 'Device file not found!'

Figure 43. Error Message of Firmware or Device File

Cause)

The firmware folder and 'E-PGM.txt' file are not located in the same folder.

Solution)

To execute this on the desktop, a user needs to use a desktop shortcut.

3.7.3 Error Message: 'No valid license' or 'Received an invalid 32-bit LOCTL'

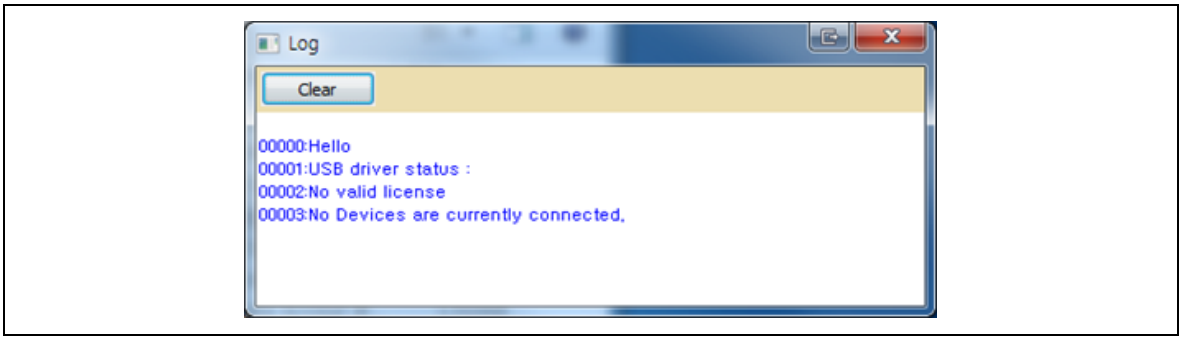


Figure 44. Error Message of Validity

Cause)

The existing 'windrvr6.sys' file is invalid.

Solution)

1. Close the E-PGM+ S/W.
2. Disconnect the USB line.
3. Run the 'USB_driver_unistall.exe' file (version 1.7).
4. Delete the 'windrvr6.sys' file that is located in the directory 'C:\Windows\System32\drivers\'.
5. Copy the 'windrvr6.sys' file from the driver installation files to the following path:
   - 64-bit OS: Copy the 'x64\windrvr6.sys' to 'C:\Windows\System32\drivers\'.
   - 32-bit OS: Copy the 'x32\windrvr6.sys' to 'C:\Windows\System32\drivers\'.
6. Run the 'USB_driver_install.exe' (version 1.7).
7. Connect the USB line.

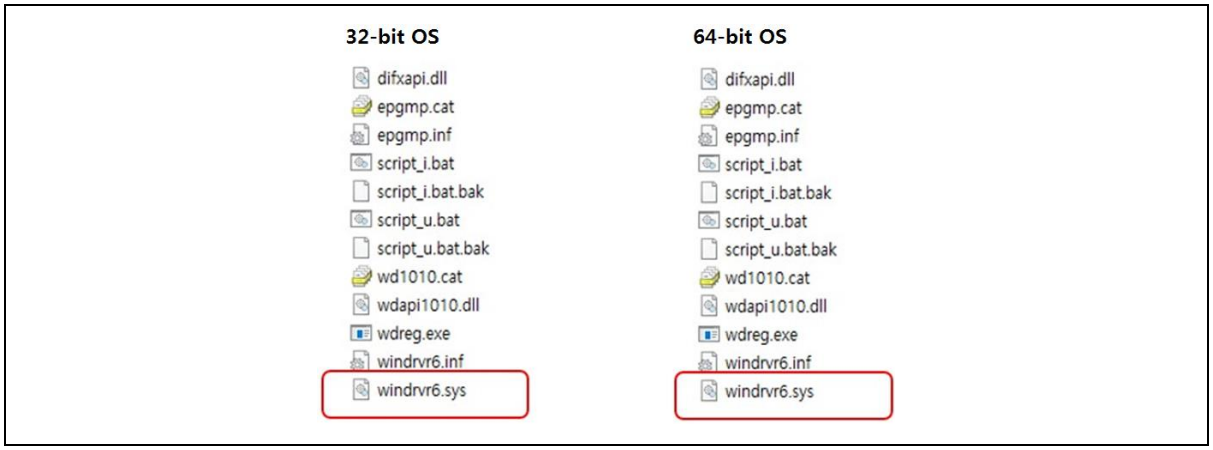


Figure 45. windrvr6.ssys

4 Connection of Handler

The E-PGM+ / E-GANG4/6 / E-PGAM Serial are designed to maximize the efficiency of device programming when they are connected with handlers - an automated mass-production machine.

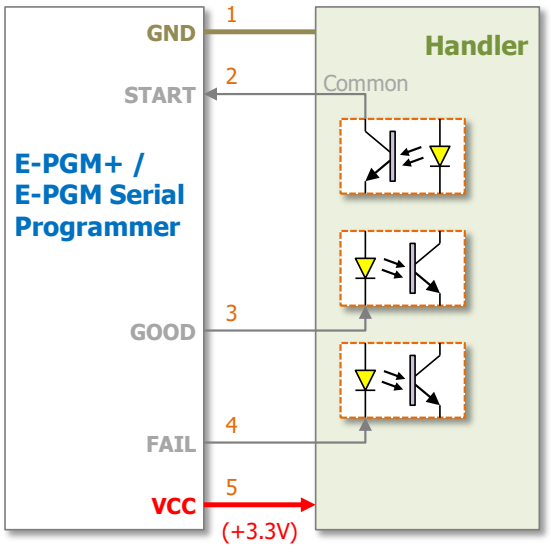
The connected handler receives the Enter button signal and communication signals (DSDA, DSCL) required for device programming from the E-PGM+ / E-GANG4/6 / E-PGAM Serial. This ensures that signals from a single unit of the E-PGM+ / E-GANG4/6 / E-PGAM Serial are delivered to multiple devices configured in parallel on the handler and thus all those devices are programmed simultaneously.

The hardware description for the handler connection is provided in the following sections.

4.1 E-PGM+ / E-PGM Serial Handler Connections

The software and firmware for the E-PGM+, E-GANG4/6, and E-PGM Serial are available for download from ABOV's website (www.abovsemi.com).

- VCC: 3.3V power output from the E-PGM+ / E-PGM Serial Programmer
- START: Input pin, active low
- GOOD/FAIL: Output pin, active low, indicate signals



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

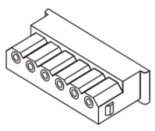
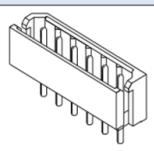
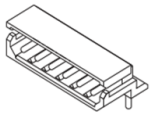
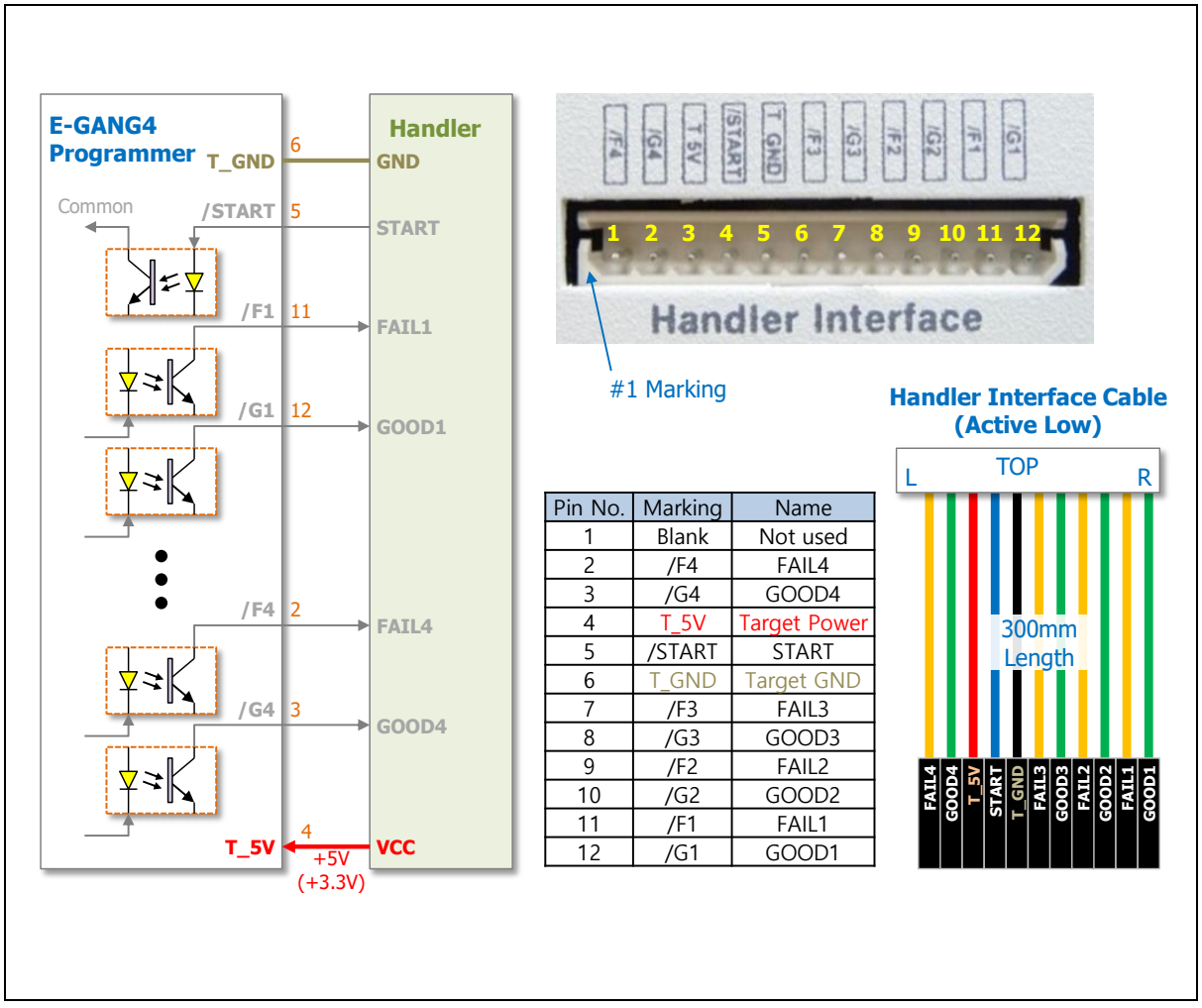
Housing	Header	
	Vertical	Right Angle
		
5264	5267/35301	5268/35302

Figure 46. E-PGM+ Handler Connections

4.2 E-GANG4 Handler Connections

The software and firmware for the E-PGM+, E-GANG4/6 and E-PGM Serial are available for download from ABOV's website (www.abovsemi.com).

- Built-in internal isolator circuit
- Used the handler power +5V or +3.3V (Used target power)
- START: Input pin, active low
- GOOD/FAIL: Output pin, active low, indicate signals



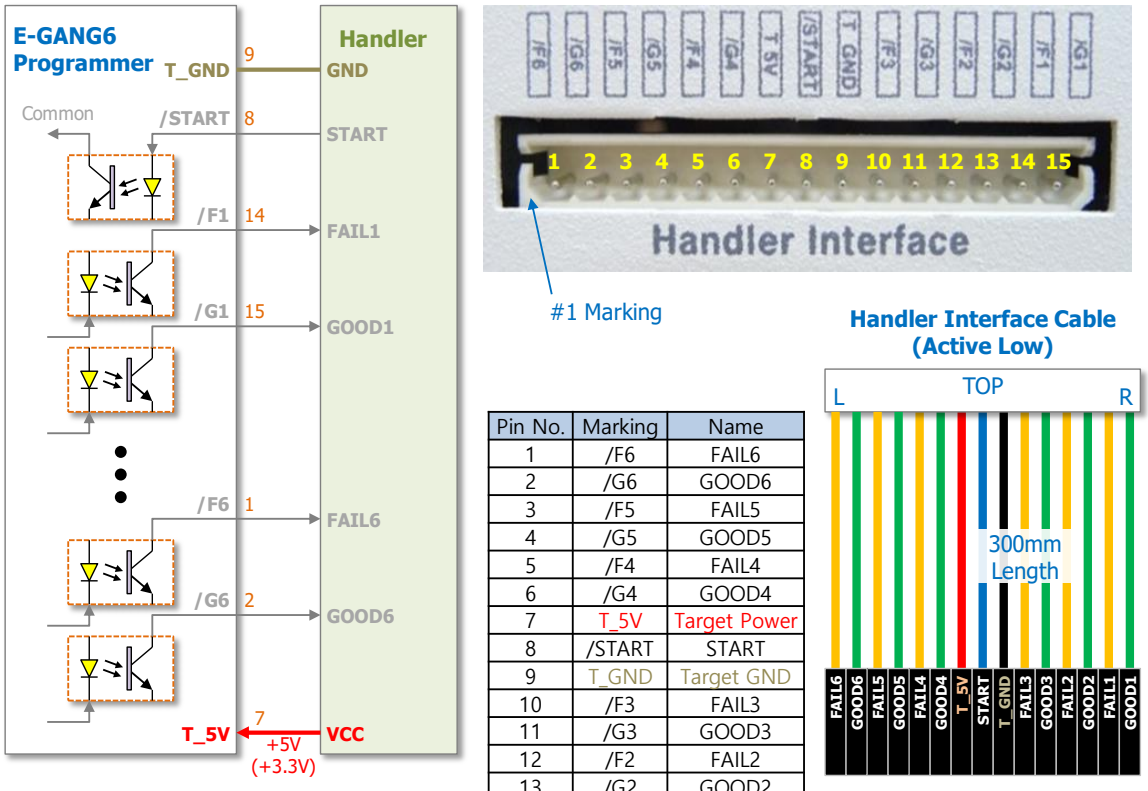
Pin No.	Marking	Name
1	Blank	Not used
2	/F4	FAIL4
3	/G4	GOOD4
4	T_5V	Target Power
5	/START	START
6	T_GND	Target GND
7	/F3	FAIL3
8	/G3	GOOD3
9	/F2	FAIL2
10	/G2	GOOD2
11	/F1	FAIL1
12	/G1	GOOD1

Figure 47. E-GANG4 Handler Connections

4.3 E-GANG6 Handler Connections

The software and firmware for the E-PGM+, E-GANG4/6 and E-PGM Serial are available for download from ABOV's website (www.abovsemi.com).

- Built-in internal isolator circuit
- Used the handler power +5V or +3.3V (Used target power)
- START: Input pin, active low
- GOOD/FAIL: Output pin, active low, indicate signals



Pin No.	Marking	Name
1	/F6	FAIL6
2	/G6	GOOD6
3	/F5	FAIL5
4	/G5	GOOD5
5	/F4	FAIL4
6	/G4	GOOD4
7	T_5V	Target Power
8	/START	START
9	T_GND	Target GND
10	/F3	FAIL3
11	/G3	GOOD3
12	/F2	FAIL2
13	/G2	GOOD2
14	/F1	FAIL1
15	/G1	GOOD1

Figure 48. E-GANG6 Handler Connections

5 Connecting Multiple E-PGM+ Units

As an alternative to the handler, users can connect multiple E-PGM+ units between Start and GND pins, respectively, as shown in Figure 49. With this configuration, the button inputs on any single Programmer are delivered to all the connected units. Thus, “multi-write” is supported without a handler.

This function is available in the E-PGM Serial too.

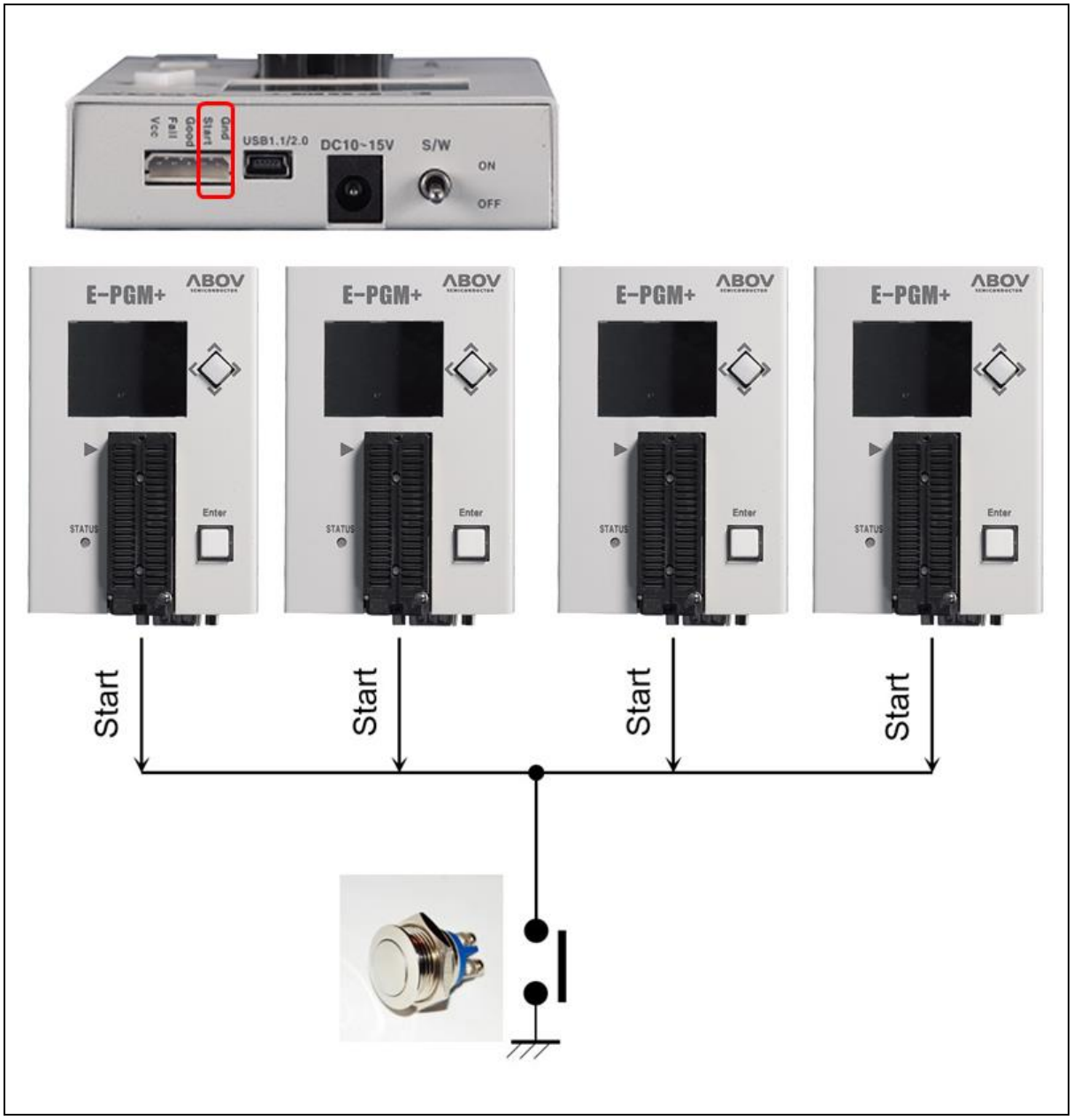


Figure 49. Example of Multiple Connections of E-PGM+

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6 PCB V5.5 SW3 Settings

MC97F1104S, MC97F1204S, and MC97F1316S require a higher VPP of 17V when programmed, and therefore users need to set the SW3 switch in the Step-up position to ensure a maximum VPP level of 19V.

When programming any other devices, on the other hand, users must set the switch to be in the Ext position to limit the maximum VPP level to 15V. If the switch SW3 is set in the Step-up position, the OP-AMP can be damaged when the VDD and ground are shorted during on-board programming.

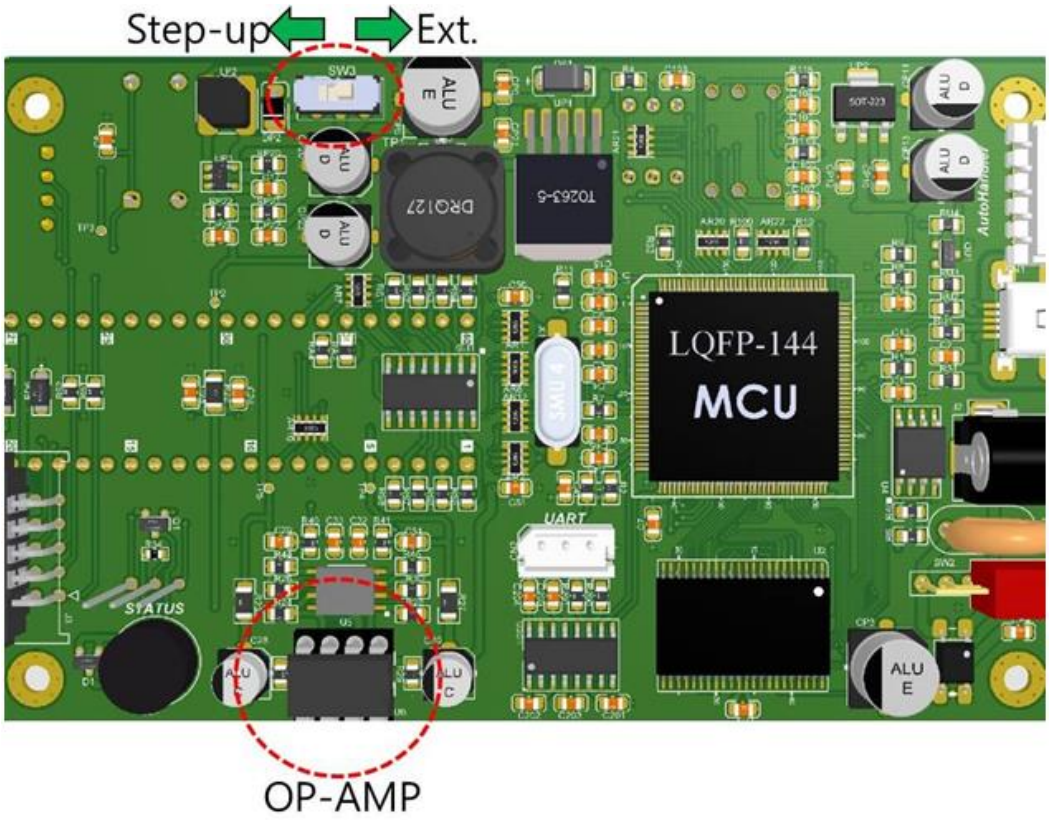


Figure 50. Internal Step-up Power Selection

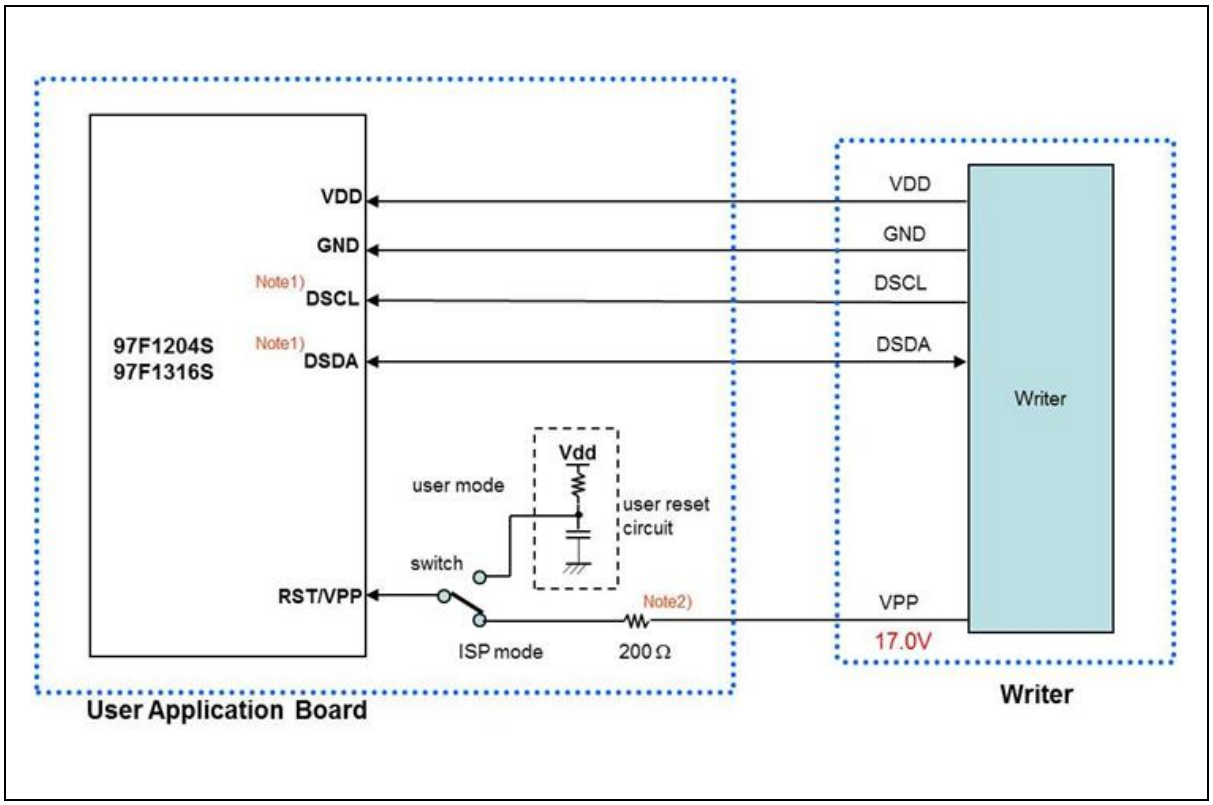
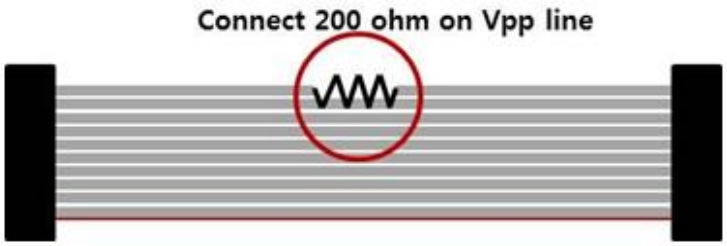


Figure 51. Insertion of 200 Ohms in VPP Line

NOTES:

1. If other signals affect communication in ISP mode, disconnect them from the pins (DSDA/DSCL) using a jumper or switch.
2. A 200Ω resistor must be installed at the target board. Without it, an MCU can be damaged because of a high voltage (17.0V). To remove it, users need to insert it in the Vpp line of the ISP cable as illustrated below:



Revision History

Version	Date	Description
1.0.3	Mar. 12, 2021	First released.
1.0.6	Jan.8, 2024	Programming a microcontroller added. Warning message added.

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