

GX3 EEPROM Programming User Guide

GX3 EEPROM Programming User Guide

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1. Introduction

This user guide provides the information about how to program EZ-USB GX3 EEPROM

2. EEPROM Memory Map

2-1. EEPROM Format

The following tables show portions of GX3 EEPROM format.

The EEPROM used for GX3 based applications should be a serial EEPROM (93C56 or 93C66) with at least 128*16 bits of storage space for storing the hardware configuration data like USB Device Descriptors, Node-ID, etc. GX3 driver/software can use the “Read EEPROM” and “Write EEPROM” vendor commands to read/write the serial EEPROM in 16-bit data word.

During power on, the GX3 first checks if the EEPROM data is valid or not. If EEPROM data is invalid, GX3 will auto-load the internal memory default settings inside chip hardware to communicate with USB host controller during enumeration. The default settings inside chip facilitate users to update the EEPROM content through a Windows PC during R&D validation process or program a blank EEPROM during manufacturing process.

Please refer to Section 4 of GX3 datasheet for detailed description of the EEPROM contents.

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EEPROM OFFSET	HIGH BYTE	LOW BYTE
00h	Node ID 1	Node ID 0
01h	Node ID 3	Node ID 2
02h	Node ID 5	Node ID 4
03h	PID_HB	PID_LB
04h	VID_HB	VID_LB
05h	Flag	EEPROM Checksum
06h	Reserved	Reserved
07h	Max. Power for Self Power	Max. Power for Bus Power
08h	EndPoint1 for SS/HS	EndPoint1 for FS
09h	Language ID High Byte	Language ID Low Byte
0Ah	Length of Product String (bytes)	Offset of Product String (0Eh)
0Bh	Length of Manufacturer String (bytes)	Offset of Manufacturer String (1Ah)
0Ch	Length of Serial Number String (bytes)	Offset of Serial Number String (26h)
0Dh	Length of BOS-type Descriptor (bytes)	Offset of BOS-type Descriptor (2Dh)
19~0Eh	Product String: (Max.) 24 bytes	
25~1Ah	Manufacturer String: (Max.) 24 bytes	
2C~26h	Serial Number String: (Max.) 14 bytes	
3B~2Dh	BOS-type Descriptor: (Max.) 30 bytes	
3Ch	Reserved	Max. Burst: [7:4] for EP3, [3:0] for EP2
41~3Dh	Fixed_pattern (10 bytes)	
42h	LED_Mode_HB	LED_Mode_LB

Note: The value of EEPROM Checksum field located at EEPROM offset 05h (low byte). The correct value must be equal to (0xFF - SUM [EEPROM offset 03h ~ 04h]). If SUM [EEPROM offset 03h ~ 04h] has carry, please add '1' to its result.

Table 1. Serial EEPROM Memory Map

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2-2. Internal Memory Default Settings

The GX3 internal memory default settings are fixed by hardware and can't be modified.

Below table shows GX3's internal memory default settings being used in the case of blank EEPROM or EEPROM with wrong checksum value or 1st byte is "0xFF" on board.

Field Definition	Default Values	Description
Node ID	00 0E C6 F9 D0 00	Node ID 0 ~ 5
Product ID (PID)	10 36	PID of GX3
Vender ID (VID)	B4 04	Cypress VID
Flag - Remote Wakeup and PME setting, etc.	73	Enable the "remote wakeup" and Low Power WOL function, (Note 1)
Max Power for Bus-powered configuration	3E	496mA for USB 3.0 248mA for USB 2.0 (Note 2)
Max Power for Self-powered configuration	01	8mA for USB 3.0 4mA for USB 2.0 (Note 2)
Length of Product String	03	Product String Length (Note 3)
Length of Manufacturer String	07	Manufacturer String Length (Note 3)
Product String (Max. 12 bytes)	41 58 33 00 00 00 00 00 00 00 00 00	"GX3"
Manufacture String (Max. 10 bytes)	43 79 70 72 65 73 73 00 00 00	"Cypress"
Fixed Pattern	40 4A 40 00 40 30 0D 49 90 41	Fixed pattern to be written

Table 2. Internal Memory Default Settings Descriptions

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2-3. Recommended EEPROM Settings

Below table shows the typical EEPROM settings. For this kind of applications, the EEPROM part, 93C56 with 128*16 bits of storage space is sufficient while 93C66 is also acceptable.

Each of the address offset contains 16-bit data from left to right representing the low-byte and high-byte, respectively. For example, in offset address 0x08, the '80' is low-byte data and the '0B' is high-byte data.

Offset Address	0 8	1 9	2 A	3 B	4 C	5 D	6 E	7 F
0x00	00 00	00 00	00 01	90 17	95 0B	B7 73	00 E0	3E 01
0x08	80 0B	09 04	0E 07	1A 10	26 0E	2D 16	41 58	38 38
0x10	31 37	39 00	00 00	00 00	00 00	00 00	00 00	00 00
0x18	00 00	00 00	41 53	49 58	20 45	6C 65	63 2E	20 43
0x20	6F 72	70 2E	00 00	00 00	00 00	00 00	30 30	30 30
0x28	30 30	30 30	30 30	30 30	30 31	05 0F	16 00	02 07
0x30	10 02	02 00	00 00	0A 10	03 00	0E 00	01 01	65 00
0x38	00 00	00 00	00 00	00 00	F3 FF	40 4A	40 00	40 30
0x40	0D 49	90 41	C1 BD	FF FF	FF FF	FF FF	FF FF	FF FF
0x48	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF
0x50	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF
0x58	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF
0x60	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF
0x68	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF
0x70	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF
0x78	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF
0x80~FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF

Table 3. Recommended EEPROM Settings

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Field Definition	Address Offset	Default Values	Description
Node ID	00h ~02h	00 00 00 00 00 01	Node ID 0 ~ 5 (Note 1)
Product ID (PID)	03h	10 36	The PID of GX3 is 0x3610
Vender ID (VID)	04h	B4 04	CYPRESS's VID is 0x04B4
Checksum	05h (Low byte)	E0	0xFF - SUM [EEPROM offset 03h ~ 04h]
Flag	05h (High byte)	73	Enable the "remote wakeup" and Low Power WOL function
Max Power for Bus Power	07h (Low byte)	3E	496mA for USB 3.0 248mA for USB 2.0
Max Power for Self Power	07h (High byte)	01	8mA for USB 3.0 4mA for USB 2.0
Length of Product String	0Ah (High byte)	03	Product String Length
Length of Manufacturer String	0Bh (High byte)	07	Manufacturer String Length
Length of Serial Number String	0Ch (High byte)	0E	Serial Number String Length
Product String (Max. 24 bytes)	0Eh~19h	41 58 33 00	"GX3"
Manufacture String (Max. 24 bytes)	1Ah~25h	43 79 70 72 65 73 73 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	"Cypress."
Serial Number String (Max. 14 bytes)	26h~2Ch	30 30 30 30 30 30 30 30 30 30 30 30 30 31	"00000000000001"
LED Mode	42h	C1 BD	Refer to Note 7 in Section 2.5 for details
Software Field	43h	FF FF	Refer to Note 10 in Section 2.5 for details

Note 1: The Node ID field must be unique for each GX3 device.

Table 4. Recommended EEPROM Settings Descriptions

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2-4. EEPROM User-defined Fields Notes

Note 1: Node ID Settings

Every Ethernet device must have a unique MAC address. Users should always assign a unique MAC address in the GX3 EEPROM for every GX3 based devices. Please refer to [Section 5-2](#) for details.

For example, if MAC address = 00-23-45-67-89-AB, then Node ID 0 = 00h, Node ID 1 = 23h, Node ID 2 = 45h, Node ID 3 = 67h, Node ID 4 = 89h, and Node ID 5 = ABh.

Note that the Node ID value cannot be set to multicast MAC address (i.e. the 1st bit of MAC address is set to “1”). If the 1st byte of Node ID value of EEPROM was set to “0xFF”, the GX3 will auto-detect the programmed EEPROM as blank EEPROM

Note 2: PID/VID/EEPROM Checksum Settings

Note the EEPROM Checksum field should be changed together with the VID/PID fields. The value of EEPROM Checksum MUST be equal to (0xFF - SUM [EEPROM offset 03h ~ 04h]). If SUM [EEPROM offset 03h ~ 04h] has carry, please add ‘1’ to its result. Please refer to [Section 5-1](#) for details.

Note 3: Flag - Remote Wakeup Settings

The RWU bit of EEPROM offset 05h “Flag” field is used to configure the “bmAttributes” field of Standard Configuration Descriptor that will be reported to the USB host controller when the GET_DESCRIPTOR command with CONFIGURATION type is issued. Please refer the “Section 9.6.3 Configuration” of Universal Serial Bus 3.0 Spec for the detailed description of the “bmAttributes” field of Standard Configuration Descriptor.

The USB device power mode (bus-powered or self-powered) is decided by the SELF_PWR pin when chip powers on. This will updated to the “bmAttributes” field of Standard Configuration Descriptor.

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Note 4: Max Power Settings

The unit of EEPROM “Max. Power” fields is 8mA at super-speed mode and is 4mA at high-speed mode.

The low byte of EEPROM offset 07h (for bus-powered) field and high byte of GX3 EEPROM offset 07h (for self-powered) field are used to configure the “bMaxPower” field of Standard Configuration Descriptor that will be reported to the USB host controller when the GET_DESCRIPTOR command with CONFIGURATION type is issued. These fields are used to define the Maximum power consumption of the USB device drawn from the USB bus in this specific configuration when the device is fully operational.

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Note 5: Product/Manufacturer/Serial Number String Settings

The “Offset” fields of Product/Manufacturer/Serial Number String are fixed in GX3 EEPROM memory map. Please DON’T change the recommended values of these fields.

If you need to change the Product/Manufacturer/Serial Number strings on your GX3 EEPROM, please modify the “Length” fields of Product/Manufacturer/Serial Number String to meet the exact string length of your Product/Manufacturer/Serial Number strings.

Note 6: LED Mode Settings

It’s to define the indication setting for LED_0/1/2/3 function of MFA_0/1/2/3 pins.

Bit 7~Bit 0: LED_Mode_LB; Bit 15~Bit 8: LED_Mode_HB

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
LED1_100	LED1_10	LED1_Active	LED0_Duplex	LED0_1000	LED0_100	LED0_10	LED0_Active
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
1	LED2_Duplex	LED2_1000	LED2_100	LED2_10	LED2_Active	LED1_Duplex	LED1_1000

Note: Bit 15 must be ‘1’ to enable the LED_mode setting; otherwise, it will work at default LED mode.

The LED mode table is as below:

bit	4	3	2	1	0	Description of indication
LED_0	Full duplex	Link speed(Mbps)			Active (TX/RX)	
		1000	100	10		
	0	0	0	0	0	USB3.0 Super Speed: It keeps radiating when device operated at USB3.0 Super Speed.
	0	0	0	0	1	Active (Default)
	0	0	0	1	0	Link 10
	0	0	0	1	1	Link 10+Active
	0	0	1	0	0	Link 100
	0	0	1	0	1	Link 100+Active
	0	0	1	1	0	Link 100/10
	0	0	1	1	1	Link 100/10+Active
	0	1	0	0	0	Link 1000
	0	1	0	0	1	Link 1000+Active
	0	1	0	1	0	Link 1000/10
	0	1	0	1	1	Link 1000/10+Active
	0	1	1	0	0	Link 1000/100
	0	1	1	0	1	Link 1000/100+Active
	0	1	1	1	0	Link 1000/100/10
	0	1	1	1	1	Link 1000/100/10+Active
	1	0	0	0	0	Full duplex

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bit	9	8	7	6	5	Description of indication
LED_1	Full duplex	Link speed(Mbps)			Active (TX/RX)	
		1000	100	10		
	0	0	0	0	0	USB3.0 Super Speed: It keeps radiating when device operated at USB3.0 Super Speed.
	0	0	0	0	1	Active
	0	0	0	1	0	Link 10
	0	0	0	1	1	Link 10+Active
	0	0	1	0	0	Link 100
	0	0	1	0	1	Link 100+Active
	0	0	1	1	0	Link 100/10
	0	0	1	1	1	Link 100/10+Active
	0	1	0	0	0	Link 1000
	0	1	0	0	1	Link 1000+Active
	0	1	0	1	0	Link 1000/10
	0	1	0	1	1	Link 1000/10+Active
	0	1	1	0	0	Link 1000/100
	0	1	1	0	1	Link 1000/100+Active
	0	1	1	1	0	Link 1000/100/10 (Default)
	0	1	1	1	1	Link 1000/100/10+Active
	1	0	0	0	0	Full duplex
bit	14	13	12	11	10	Description of indication
LED_2	Full duplex	Link speed(Mbps)			Active (TX/RX)	
		1000	100	10		
	0	0	0	0	0	USB3.0 Super Speed: It keeps radiating when device operated at USB3.0 Super Speed.
	0	0	0	0	1	Active
	0	0	0	1	0	Link 10
	0	0	0	1	1	Link 10+Active
	0	0	1	0	0	Link 100
	0	0	1	0	1	Link 100+Active
	0	0	1	1	0	Link 100/10
	0	0	1	1	1	Link 100/10+Active
	0	1	0	0	0	Link 1000
	0	1	0	0	1	Link 1000+Active
	0	1	0	1	0	Link 1000/10
	0	1	0	1	1	Link 1000/10+Active
	0	1	1	0	0	Link 1000/100
	0	1	1	0	1	Link 1000/100+Active
	0	1	1	1	0	Link 1000/100/10
	0	1	1	1	1	Link 1000/100/10+Active (Default)
	1	0	0	0	0	Full duplex

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bit	4	3	2	1	0	Description of indication
	Full duplex	Link speed(Mbps)			Active (TX/RX)	
		1000	100	10		
LED_3	0	0	0	0	1	USB3.0 Super Speed: The LED_0 mode MUST be set to “Active” only when the LED_3 is used. It will radiate when device operated at USB3.0 super speed and keep flashing when device is receiving/ transmitting packets.

Table 5. LED Mode Setting Table

Note 7: BOS-type Descriptor Settings

(1) EEPROM BOS-type Descriptor Settings (Offset address 2D~3Bh)

Please write these 30 bytes of EEPROM BOS-type Descriptor with hexadecimal (from low bytes to high bytes) = “05 0F 16 00 02 07 10 02 02 00 00 00 0A 10 03 00 0E 00 01 01 65 00 00 00 00 00 00 00 00”.

Note 8: Fixed_pattern (EEPROM: 3D~41h)

Please write these 10 bytes of fixed_pattern with hexadecimal (from low bytes to high bytes) = “40 4A 40 00 40 30 0D 49 90 41”.

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Note 9: Software Field (EEPROM: 43h)

The EEPROM Software Field (EEPROM offset 43h) is used for GX3 drivers to identify different specific applications for different driver configurations and maintained by Cypress directly. The default value of the Software Field is 0xFFFF that is suitable for most of GX3 applications.

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3. GX3 EEPROM Programming Tool

Cypress provides a GX3 EEPROM Programming tool for users to easily program the Serial EEPROM for GX3 applications. This Windows EEPROM Programming Tool supports to customize the MAC address, Serial Number, Vendor ID and Product ID, etc. for GX3 based application systems in mass production.

3-1. Files Description

File Name	Description
GX3 EEPROM Programming Tool.exe	GX3 EEPROM Programming Tool
EEPROM.dat	GX3 EEPROM Programming Tool Configuration Setting Data File This file will be auto-created after running the tool.
SROM.dat	EEPROM Content Data File This file will be auto-created after running the tool.
CYUSB3610Test.sys	GX3 Windows test driver
CYUSB3610Test.inf	GX3 Windows test driver INF file
Serial-MAC.log	GX3 EEPROM Programming Log file

Table 6. GX3 EEPROM Programming Tool Files Description

Note:

1. Please uninstall the standard GX3 Windows driver first if it had been installed before.
2. Please install CYUSB3610 Windows test driver before running the GX3 EEPROM Programming Tool.
3. The GX3_EEPROM_Programming_Tool.EXE tool will auto-load the SROM data from the EEPROM.DAT and SROM.DAT files. If the EEPROM.DAT and SROM.DAT files do not exist, the tool will create these data files with the default values based on the selected device.
4. Please delete the EEPROM.DAT and SROM.DAT files before running the tool if you want to restore the default EEPROM.DAT and SROM.DAT files.

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3-2. How to Run the EEPROM Programming Tool on Windows 7/8 or Vista platform

While executing the GX3 EEPROM Programming Tool on Windows 8/7 or Vista platform, users need to run with “**Administrator**” authority.

Right-click on the GX3 EEPROM Programming tool and select “**Run as administrator**”. After that, a User Account Control pop-up window will show on screen to tell you an unidentified program wants access to your computer. Click **Yes** button to allow launching the EEPROM Programming Tool.

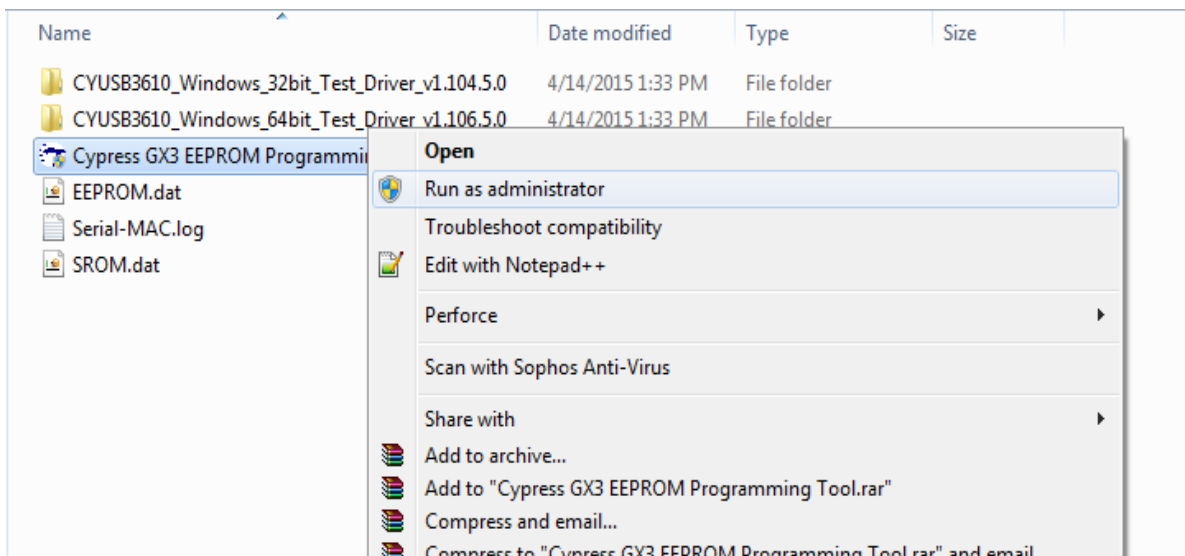


Figure 1. Run as administrator for GX3 EEPROM Programming Tool

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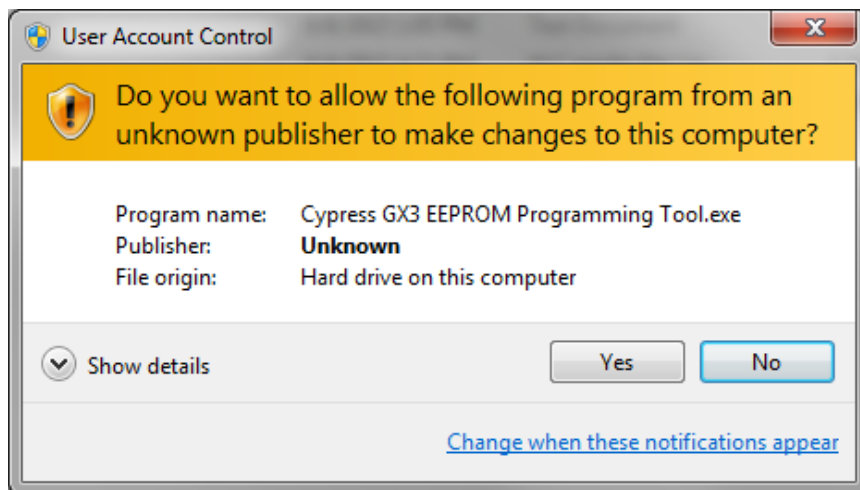


Figure 2. Allow User Account Control (UAC) for EEPROM Programming Tool

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3-3. GX3 EEPROM Programming

3-3-1. Function Description

The GX3 EEPROM Programming Tool GUI is shown below.

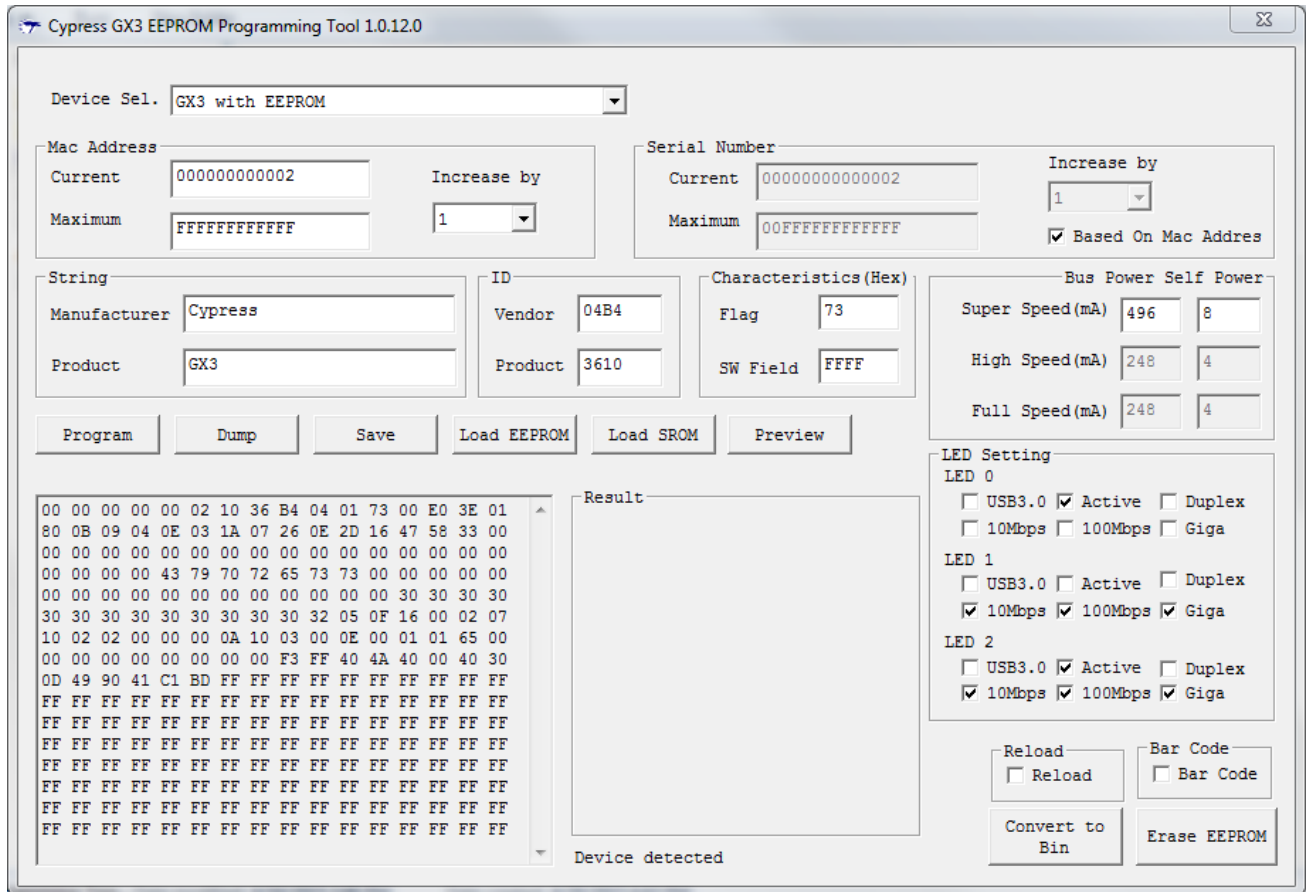


Figure 3. GX3 Programming Tool EEPROM Programming User Interface

Button #	Button Name	Description
1	Program	Start programming the EEPROM.
2	Dump	Dump the EEPROM content to the message window and save into the SROM.DAT file.
3	Save	Save the EEPROM content and the SROM tool configuration setting into the SROM.DAT and EEPROM.DAT files respectively.
4	Load EEPROM	Load the SROM tool configuration setting from the EEPROM.DAT file.
5	Load SROM	Load the EEPROM content from the selected SROM data file (e.g. SROM.DAT).
6	Preview	Preview the coming programmed EEPROM content.
7	Convert to Bin	Convert the SROM data file (SROM.DAT) to binary file (SROM.BIN) for universal programmer
8	Erase EEPROM	Erase all the EEPROM contents

Table 7. GX3 Programming Tool EEPROM Programming Buttons

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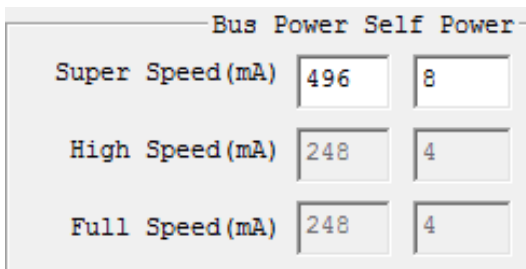
Field #	Field Name	Description
1	Disable Setting	Disable all input fields except Program to prevent error operation during mass production.
2	Mac Address	Set Current/Maximum MAC Address and Incremental value of MAC Address: The Current MAC Address should be smaller than the Max MAC Address. The incremental value is 0 ~ 9. "0" means non-incremental MAC address after programming.
3	Serial Number	Set Current/Maximum Serial Number and Incremental value of Serial Number: The Current Serial Number should be smaller than the Max Serial Number. The incremental value is 0 ~ 9. "0" means non-increased Serial Number after programming. The " Based on Mac Address " check box in the Serial Number field is used to assign the Serial Number field based on the MAC Address field value.
4	String	Set Manufacturer String and Product String in ASCII text: The max length of Manufacture String is 24 characters. The max length of Product String is 24 characters.
5	ID	Set Vendor ID and Product ID: Cypress's default Vendor ID is 04B4h. GX3's default Product ID is 3610h.
6	Bus Powered Self Powered	Set Max Power of Super Speed/High Speed/Full Speed modes: The following are the default Max Power at GX3 USB Super/High/Full Speed mode. <div style="text-align: center;">  </div>
7	Characteristics	Set the Flag field of EEPROM: Please refer to Section 4 of GX3 datasheet for details.
8	LED Setting	Set LED0/LED1/LED2 functionalities: Please refer to " Note 7: LED Mode Settings " in Section 4 for details.
9	Reload	Reload EEPROM after programming EEPROM: Imitate the scenario of detaching/re-attaching demo board after programming EEPROM. The MAC Address will be updated immediately in Windows System without un-plugging/re-plugging the demo board if Reload EEPROM box is checked.
10	Bar Code	Read MAC address from Bar Code scanner: If Bar Code box is checked, the GX3 EEPROM Programming tool will fill the Bar-code's MAC Address into the Current MAC address field and then program the EEPROM automatically while using the Bar Code Scanner to scan the bar code that contains the Ethernet MAC Address.

Table 8. GX3 Programming Tool EEPROM Programming Configuration Fields

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3-3-2. Tool Usage Procedures

The following are the test procedures of Windows GX3 EEPROM Programming Tool.

1. Please uninstall the standard GX3 Windows driver first if it had been installed before.
2. Check if GX3 Windows test driver was installed properly.

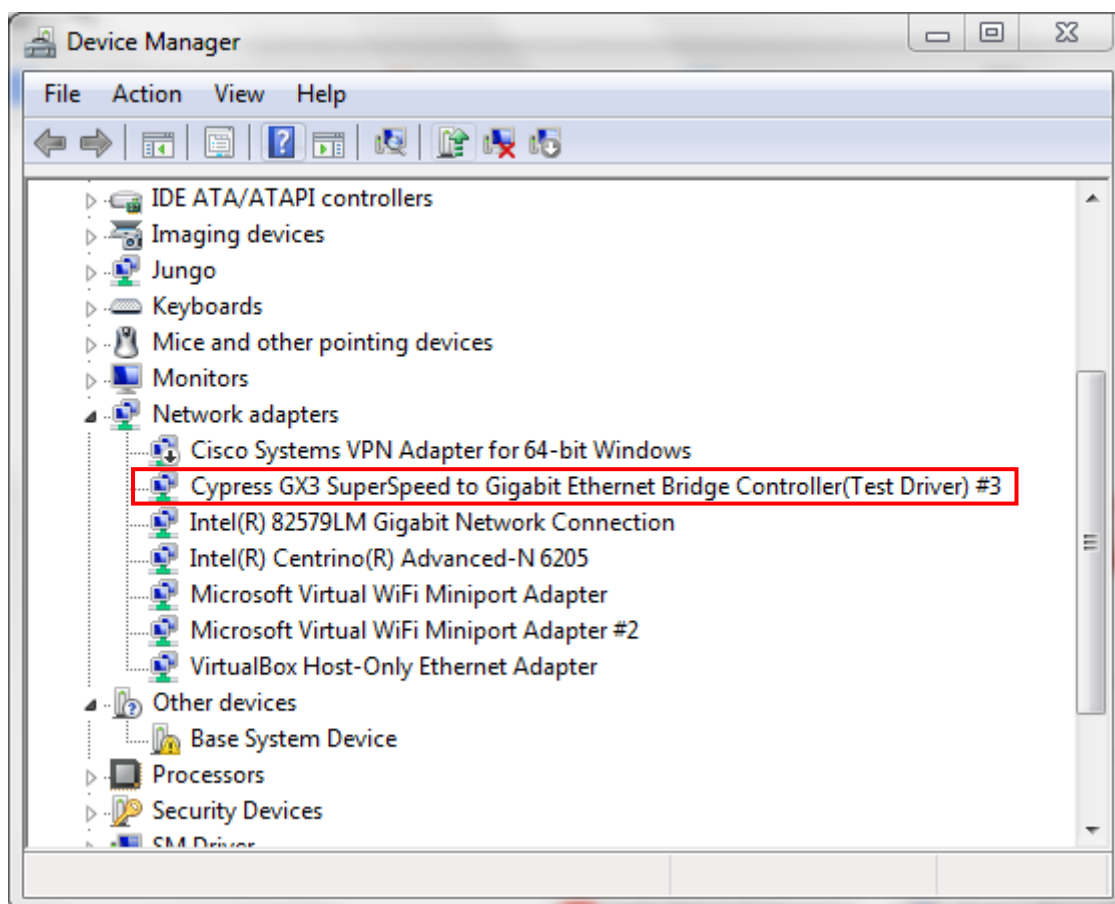


Figure 4. Windows Test Driver in Windows Device Manager

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3. Double-click the GX3 EEPROM Programming tool.

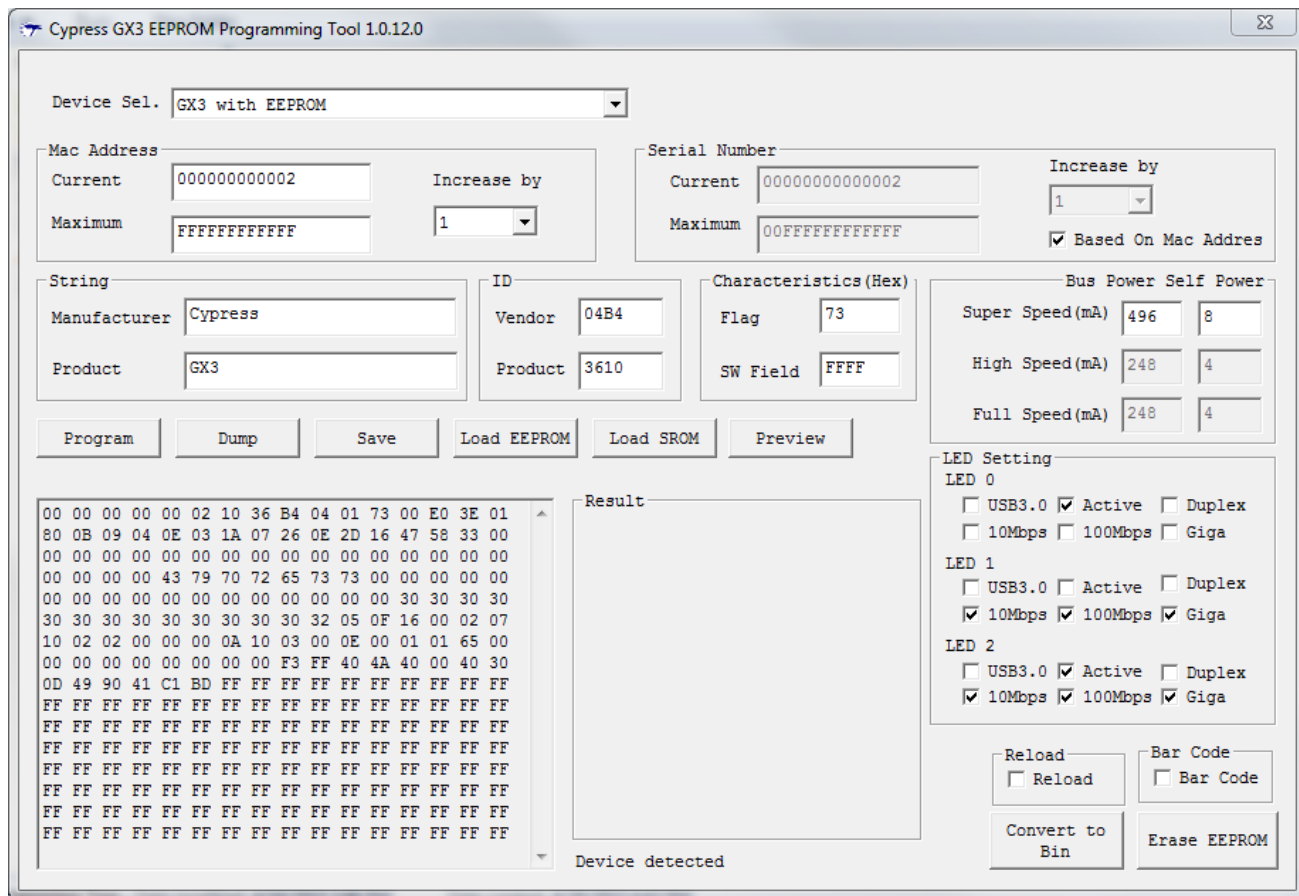
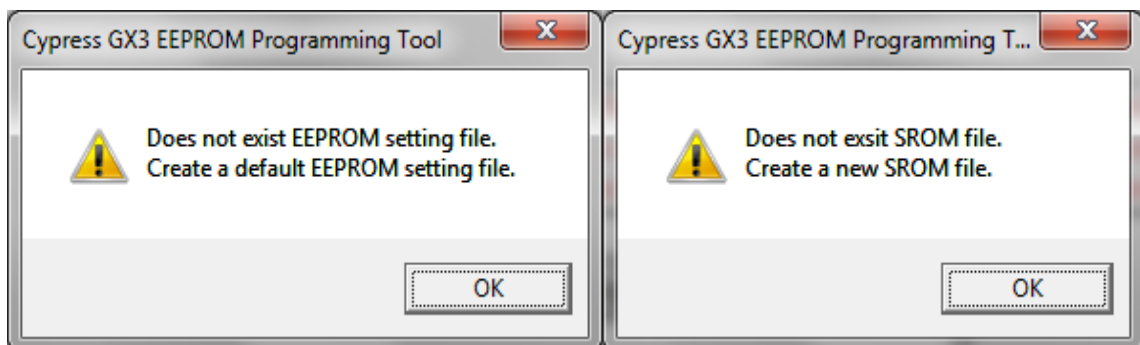


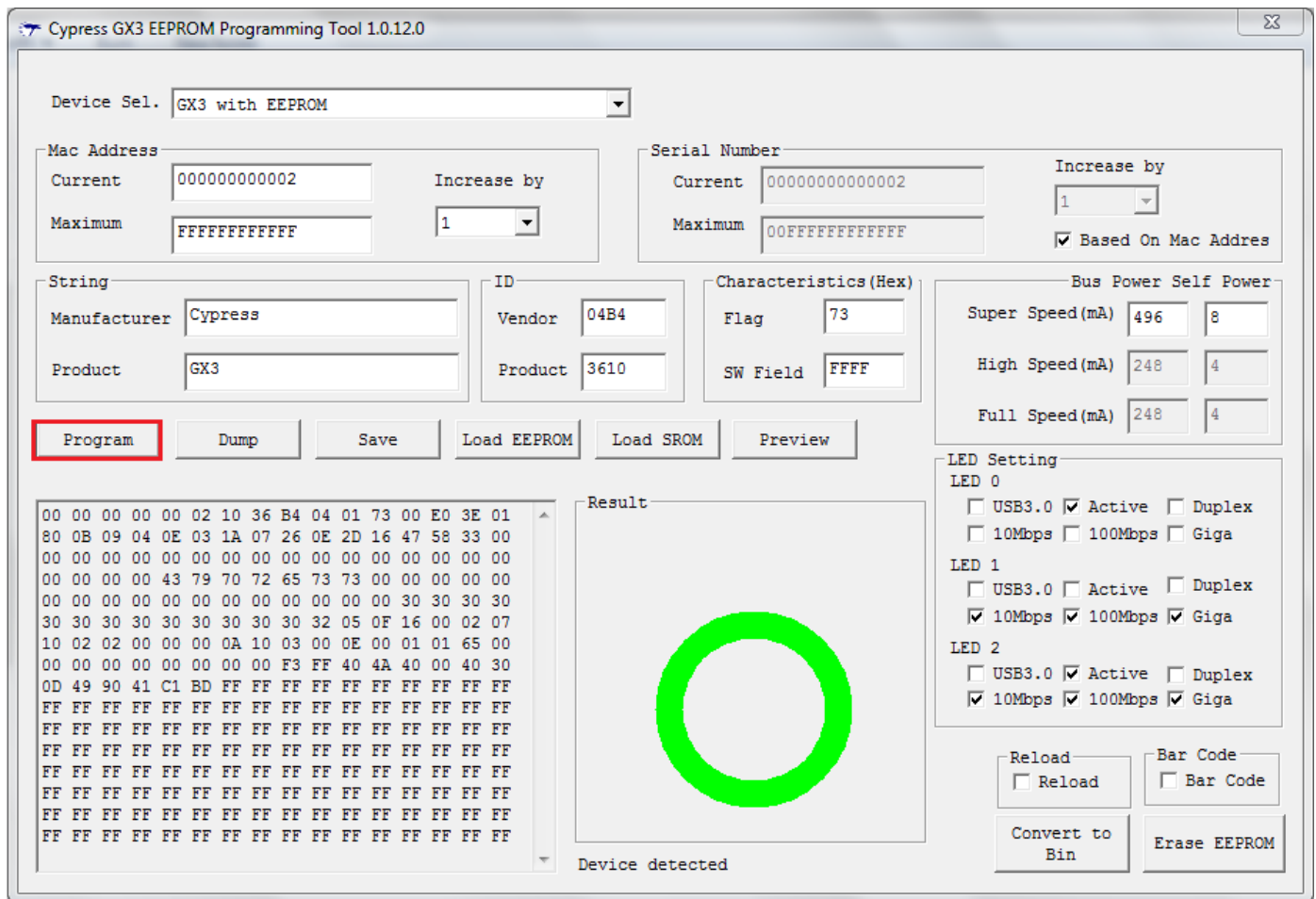
Figure 5. GX3 EEPROM Programming Tool Main Page

Note: If the EEPROM.DAT and SROM.DAT files are not existent in the same subdirectory of the .exe file, users will see the following warning dialog while running the tool. The tool will auto-create these two data files, and users can just ignore this warning message.



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4. Configure proper settings on all fields of GX3 EEPROM Programming Tool. Re-confirm all settings that match your GX3 application's configuration; for example, VID/PID, MAC Address, Serial Number, Manufacture/Product String, LED Setting, etc.
5. Press "Program" button to start programming GX3 SROM data into EEPROM. The test results will be displayed in the "Result" window after programming EEPROM completely. A big green "O" shown on Result's pane means successful and a big red "X" shown on Result's pane means failure.



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Cypress GX3 EEPROM Programming Tool 1.0.12.0

Device Sel. GX3 with EEPROM

Mac Address
 Current 000000000002 Increase by 1
 Maximum FFFFFFFFFFFF

Serial Number
 Current 00000000000002 Increase by 1
 Maximum 00FFFFFFFFFFFF ☒ Based On Mac Address

String
 Manufacturer Cypress
 Product GX3

ID
 Vendor 04B4
 Product 3610

Characteristics (Hex)
 Flag 73
 SW Field FFFF

Bus Power Self Power
 Super Speed (mA) 496 8
 High Speed (mA) 248 4
 Full Speed (mA) 248 4

LED Setting
 LED 0
☐ USB3.0 ☒ Active ☐ Duplex
☐ 10Mbps ☐ 100Mbps ☐ Giga
 LED 1
☐ USB3.0 ☐ Active ☐ Duplex
☒ 10Mbps ☒ 100Mbps ☒ Giga
 LED 2
☐ USB3.0 ☒ Active ☐ Duplex
☒ 10Mbps ☒ 100Mbps ☒ Giga

Program Dump Save Load EEPROM Load SROM Preview

00 00 00 00 00 02 10 36 B4 04 01 73 00 E0 3E 01
 80 0B 09 04 0E 03 1A 07 26 0E 2D 16 47 58 33 00
 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00 00 00 00 43 79 70 72 65 73 73 00 00 00 00
 00 00 00 00 00 00 00 00 00 00 00 00 30 30 30
 30 30 30 30 30 30 30 30 30 32 05 0F 16 00 02 07
 10 02 02 00 00 00 0A 10 03 00 0E 00 01 01 65 00
 00 00 00 00 00 00 00 00 00 F3 FF 40 4A 40 00 40 30
 0D 49 90 41 C1 BD FF FF FF FF FF FF FF FF FF
 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Result

Device Unplugged

Reload ☐ Reload Bar Code ☐ Bar Code
 Convert to Bin Erase EEPROM

Figure 6. GX3 EEPROM Tool Programming Result

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3-3-3. How to Load Recommended SROM Data File

For some special GX3 applications, Cypress will provide you a recommended SROM data file (SROM.DAT) to fulfill the requirements of your GX3 applications. In this case, please contact Cypress Technical Support (www.cypress.com/support) to get the recommended SROM.DAT file and then follow below procedures to program the recommended SROM data into the EEPROM on your GX3 applications.

1. Uninstall the standard GX3 Windows driver first if it had been installed before.
2. Install the GX3 Windows test driver and ensure it is indeed a Windows Test Driver shown in Windows Device Manager; ex., “Cypress GX3 SuperSpeed to Gigabit Ethernet Adapter (Test Driver)”.
3. Delete the previous EEPROM.DAT and SROM.DAT files located in the same folder before running the tool.
4. Run the GX3_EEPROM_Programming.exe Windows tool.
5. Select “GX3 with EEPROM” from the “Device Sel.” drop-down menu.
6. Copy the recommended SROM data file (SROM.DAT) into the folder that the GX3_SROM.exe tool was located and overwrite the original SROM.DAT file.
7. Click “Load SROM” button to load the specific SROM data file as the figure below.

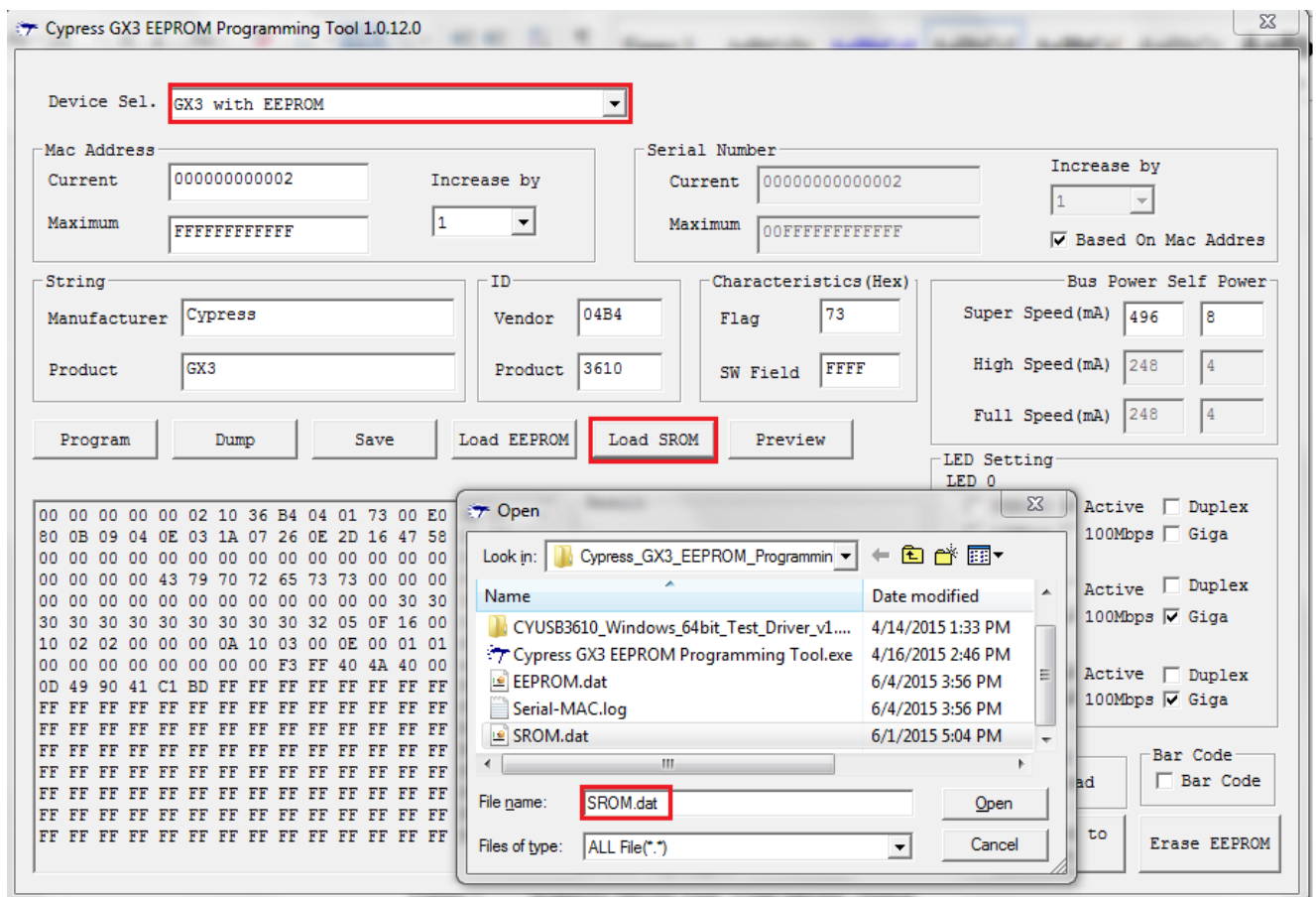


Figure 7. GX3 EEPROM Tool “Load SROM” Dialog

GX3 EEPROM Programming User Guide

8. Configure proper EEPROM setting such as VID/PID, MAC address, Serial Number, etc.

Cypress GX3 EEPROM Programming Tool 1.0.12.0

Device Sel. GX3 with EEPROM

Mac Address
Current 000000000001 Increase by 1
Maximum FFFFFFFF

Serial Number
Current 00000000000001 Increase by 1
Maximum 00FFFFFFFF ☐ Based On Mac Address

String
Manufacturer Cypress
Product GX3

ID
Vendor 04B4
Product 3610

Characteristics (Hex)
Flag 73
SW Field FFFF

Bus Power Self Power
Super Speed (mA) 496 8
High Speed (mA) 248 4
Full Speed (mA) 248 4

Program Dump Save Load EEPROM Load SROM Preview

00 00 00 00 00 01 10 36 B4 04 01 73 00 E0 3E 01
80 0B 09 04 0E 03 1A 07 26 0E 2D 16 47 58 33 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 43 79 70 72 65 73 73 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 30 30 30 30
30 30 30 30 30 30 30 30 30 31 05 0F 16 00 02 07
10 02 02 00 00 00 0A 10 03 00 0E 00 01 01 65 00
00 00 00 00 00 00 00 00 F3 FF 40 4A 40 00 40 30
0D 49 90 41 C1 BD FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Result

Device detected

LED Setting
LED 0
☐ USB3.0 ☒ Active ☐ Duplex
☐ 10Mbps ☐ 100Mbps ☐ Giga
LED 1
☐ USB3.0 ☐ Active ☐ Duplex
☒ 10Mbps ☒ 100Mbps ☒ Giga
LED 2
☐ USB3.0 ☒ Active ☐ Duplex
☒ 10Mbps ☒ 100Mbps ☒ Giga

Reload Bar Code
☐ Reload ☐ Bar Code

Convert to Bin Erase EEPROM

Figure 8. GX3 Tool EEPROM Setting

9. Press the “Program” button to start programming the EEPROM.

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10. After programming, you can verify the programmed SROM data with the recommended SROM data to prevent operating error from mass production.

Please follow the following procedures to compare the programmed SROM data with the recommended SROM data to check if you had programmed the EEPROM as expected.

- a) Press the “Dump” button to dump the programmed EEPROM content into the SROM.DAT file in the folder that the GX3 Programming tool was located.

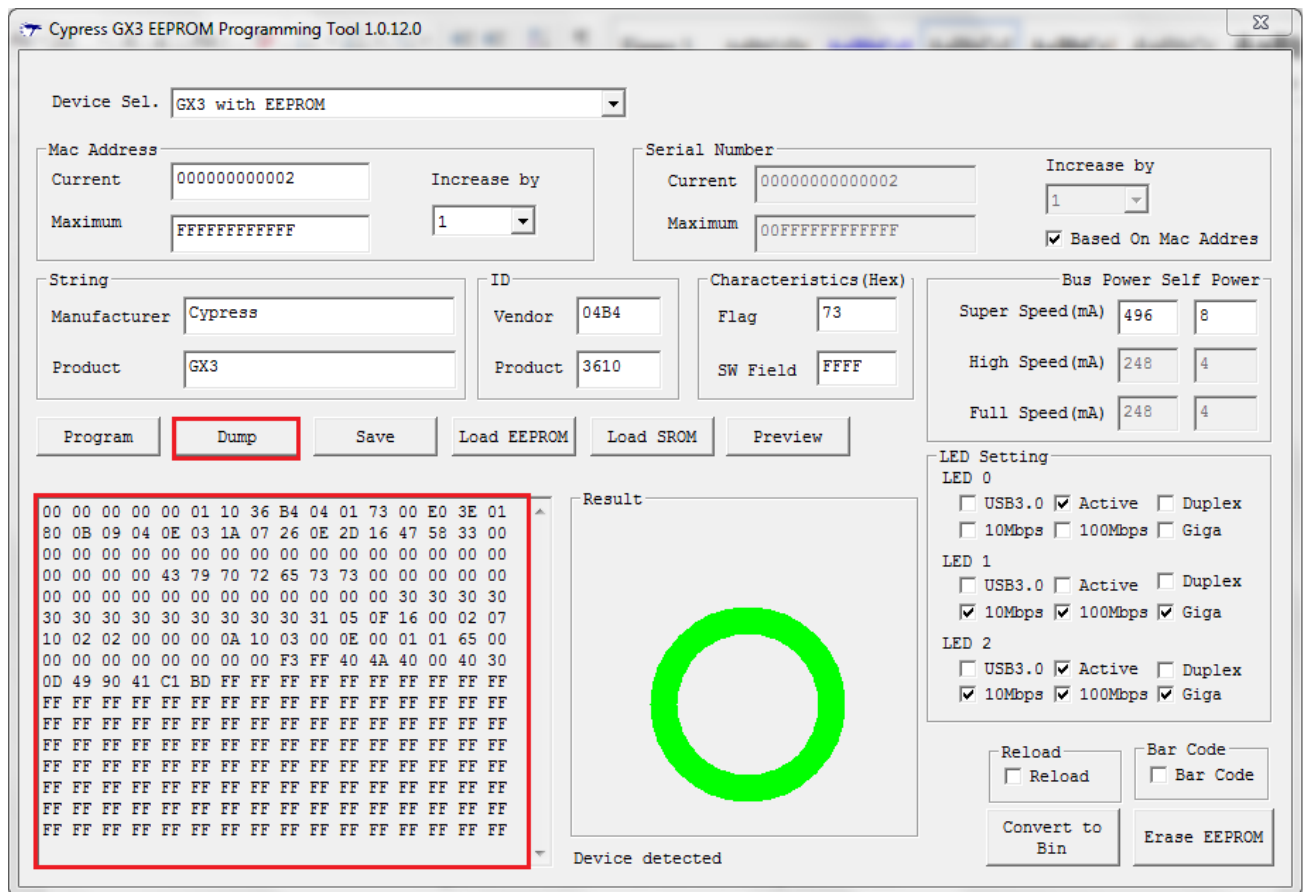


Figure 9. GX3 EEPROM Tool Dump SROM Data

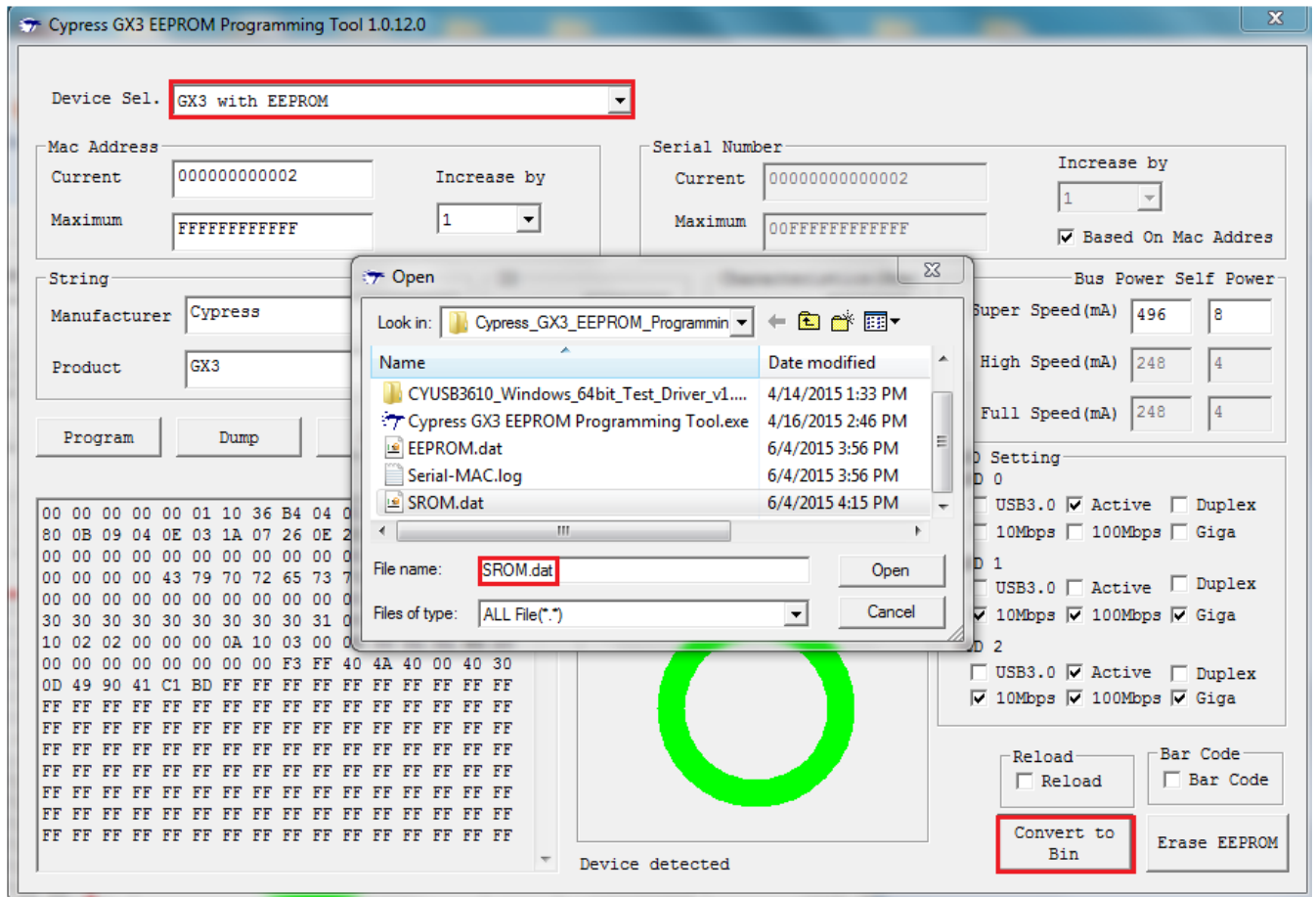
- b) Compare the dump programmed SROM.DAT file with the original recommended SROM.DAT file to confirm all EEPROM contents were programmed as you expected.

GX3 EEPROM Programming User Guide

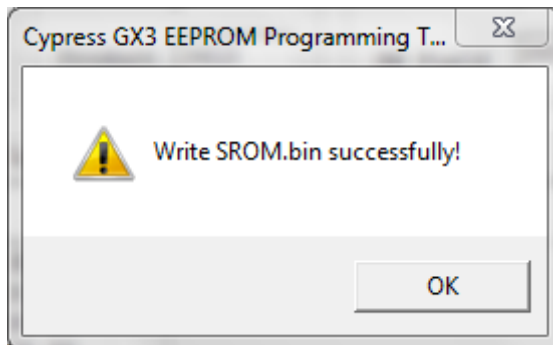
3-3-4. How to Convert SROM Data File to Binary File

The Windows SROM tool supports the “Convert to Bin” function to convert the SROM data file (SROM.DAT) to a binary file (SROM.BIN) for universal programmer.

1. Press the “Convert to Bin” button to select a proper SROM.DAT file and then click “Open” button to start converting the SROM.DAT file into the binary file.



2. After converting the SROM.DAT file into the binary file (SROM.BIN) successfully, you will see the following dialog and then click “OK” button to continue.



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3. Now, you can find the SROM binary file (SROM.BIN) in the same folder of the SROM.DAT file for universal programmer.

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4. Windows Production Test Tool

Cypress provides a Windows Production Test tool for users to run some basic network function tests and program the EEPROM of their GX3 based application systems during production. This tool is used for testing GX3 USB 3.0 to Gigabit products.

This tool supports to send/receive packets in different Ethernet speed modes, and program EEPROM. This tool must be run on a Windows PC, which installs the GX3 Windows test driver. This tool also needs a separate server PC to run the test server tool. The test server tool on server PC can receive packets from the “device under test” product, and then reply back.

The test environment is as below:

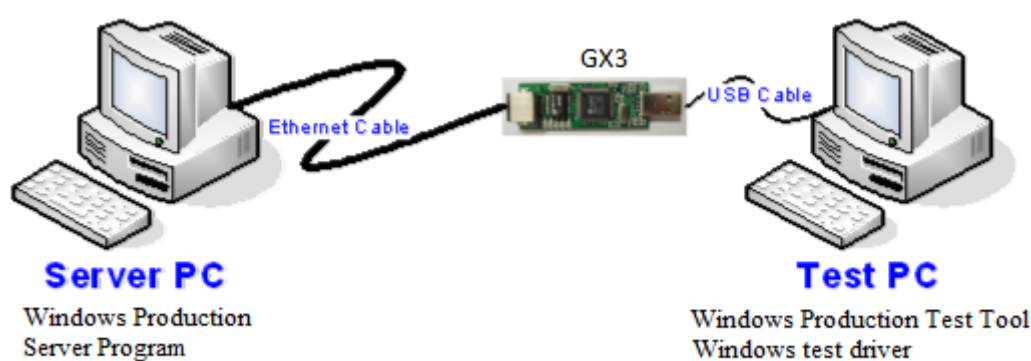


Figure 10. Windows Production Test Tool Test Environment

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4-1. Files Description

File Name	Description
ProductionTest.exe	Windows Production Test program. This program should be run on the Test PC.
TestServer.exe	Windows Production Server program. This program should be run on the Server PC.
SETTING.INI	Windows Production Test configuration data file. This file will be auto-created after running ProductionTest.exe.
TEST.LOG	Windows Production Test log file. This file will be auto-created after running ProductionTest.exe.
SROM.DAT	The GX3 SROM data file. Users can create this SROM data file by GX3 EEPROM Programming Tool.
CYUSB3610Test.SYS	GX3 Windows test driver
CYUSB3610Test.INF	GX3 Windows test driver INF file

Table 9. Windows Production Test Tool Files Description

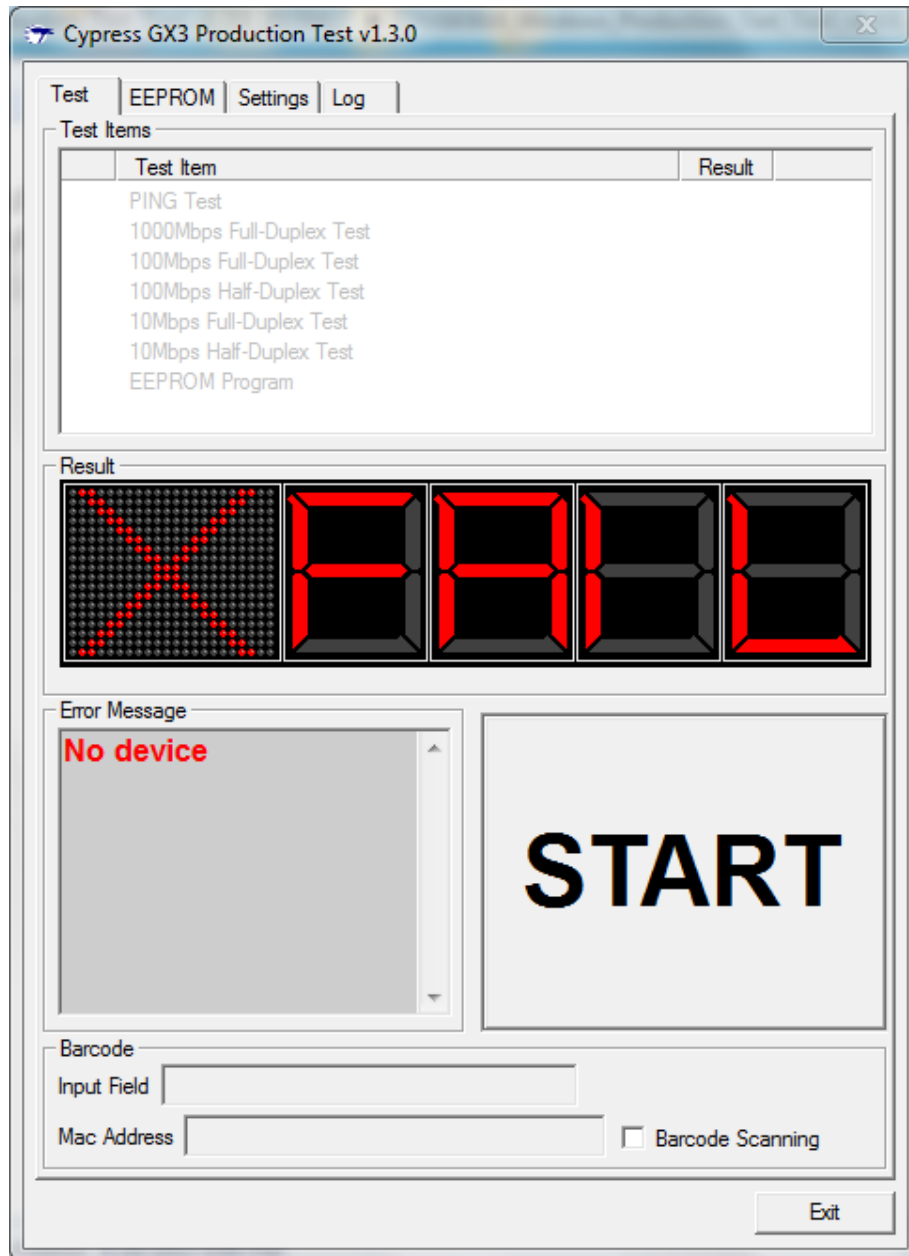
Note:

1. Please uninstall the standard GX3 Windows driver first if it had been installed before.
2. If your GX3 board has your own VID/PID, please refer to [Section 4-5](#) for more details.
3. If you had programmed the EEPROM content on your GX3 device, please refer to [Section 4-6](#) for more details.
4. Please install GX3 Windows test driver before running the Windows Production Test Tool.
5. The 'ProductionTest.exe' tool will auto-load the configuration setting from the SETTING.INI file. If the SETTING.INI file does not exist, the ProductionTest.exe tool will create this file with default values.
6. Please make sure the SROM.DAT file is exist before running the Windows Production Test Tool. If you don't have the SROM.DAT file, you can create a proper GX3 SROM data file (SROM.DAT) by Windows GX3 EEPROM Programming Tool.

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4-2. How to Run Windows Production Test Tool on Windows 7/8 or Vista platforms

When execute the Windows Production Test Tool on Windows 8/7/Vista, users need to run with “**Administrator**” authority; otherwise, you might see below error messages after pressing the “START” button.



Note: You might also see this error message if you don't install GX3 Windows test driver properly. Please refer to [Figure 4](#) to check if the Windows test driver was installed properly or not.

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To solve this issue, right-click on the **ProductionTest.exe** file and select “**Run as administrator**”. After that, a User Account Control pop-up window will be displayed on screen to tell you an unidentified program wants access to your computer. Click **Yes** button to allow launching the **ProductionTest.exe** program.

4-3. Function Description

The following is the user interface of Windows Production Test program.

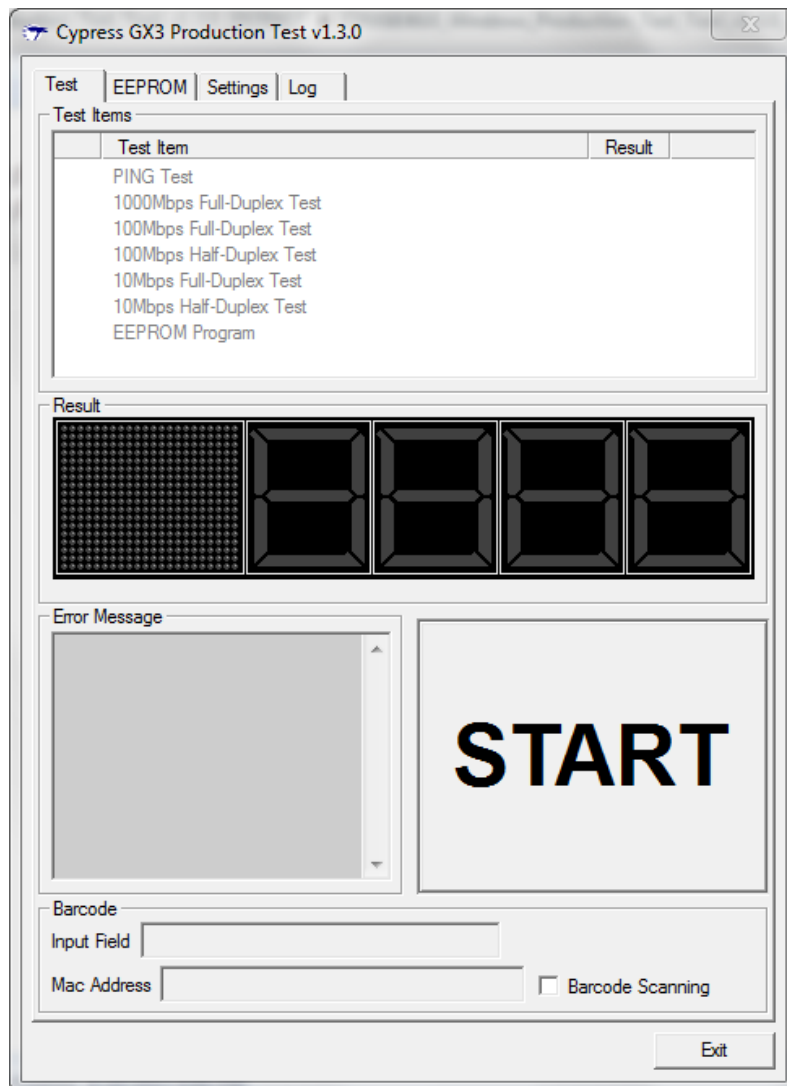


Figure 11. Windows Production Test Tool User Interface

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The Windows Production Test program supports 6 test items.

1. PING Test

This test will run the Ping Test with Server PC.

2. 1000Mbps Full-Duplex Test

This test will let network auto-negotiates at 1000Mbps Full-Duplex, and then starts sending packets to test server. Every packet received from test server will be compared.

3. 100Mbps Full-Duplex Test

This test will let network auto-negotiates at 100Mbps Full-Duplex, and then starts sending packets to test server. Every packet received from test server will be compared.

4. 100Mbps Half-Duplex Test

This test will let network auto-negotiates at 100Mbps Half-Duplex, and then starts sending packets to test server. Every packet received from test server will be compared.

5. 10Mbps Full-Duplex Test

This test will let network auto-negotiates at 10Mbps Full-Duplex, and then starts sending packets to test server. Every packet received from test server will be compared.

6. 10Mbps Half-Duplex Test

This test will let network auto-negotiates at 10Mbps Half-Duplex, and then starts sending packets to test server. Every packet received from test server will be compared.

7. EEPROM Program

This test will program EEPROM content, and then read EEPROM to verify.

After starting each of above test items, if the result of current test item is failed, the test will be stopped.

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The Windows Production Test program has four tabs, namely: Test, EEPROM, Setting and Log.

4-3-1. Test Tab

The following is the user interface of “Test” tab of the Windows Production Test program.

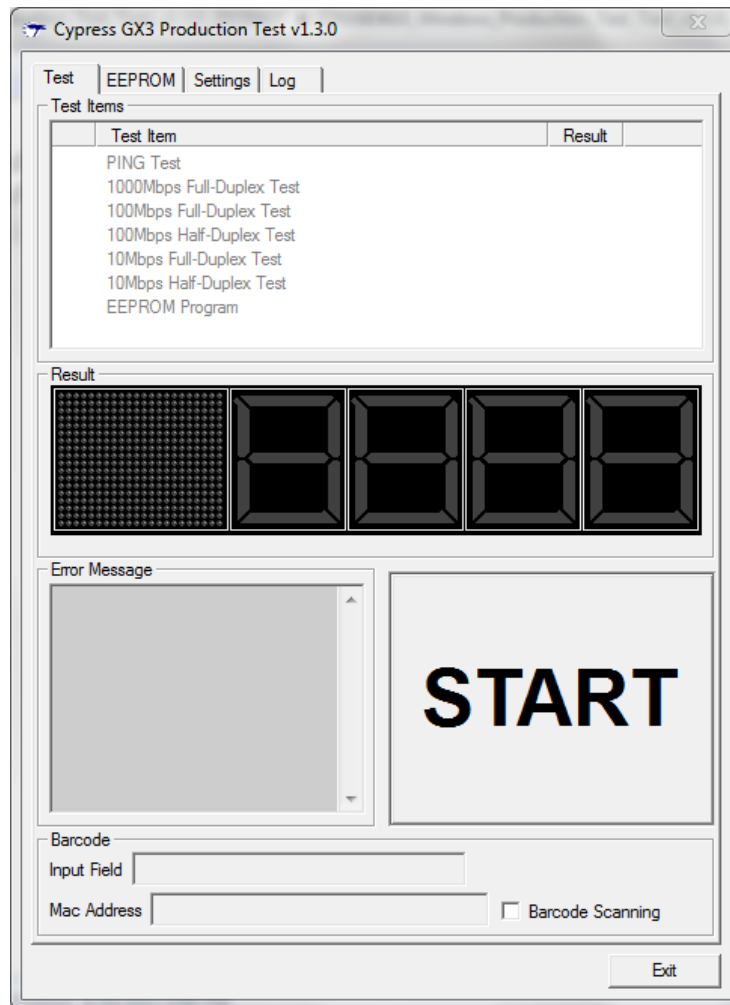


Figure 12. Windows Production Test Tool User Interface

Field #	Field Name	Description
1	Test Items	Displays all test items and test results.
2	Result	Displays final test result. “ O PASS ” means SUCCESS and “ X FAIL ” means FAIL. The error message will be displayed in the Error Message window if the test is failure.
3	Error Message	Displays the error messages when the test result is failure.
4	“START” button	Starts running all Production Test items.
5	“Exit” button	Quit this program.

Table 10. Windows Production Test Tool “Test” tab

Note: Please double check following items before starting the Production Test.

1. The IP address (e.g. 192.168.0.100) of GX3 Windows test driver of Test PC should be configured to the same subnet as the IP address (e.g. 192.168.0.1) of Server PC.

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2. The Server IP address, TCP/UDP packet type and port number settings of Windows Production Test Server should be the same as that in the Windows Production Test program.

4-3-2. EEPROM Tab

The following is the user interface of “EEPROM” tab of the Windows Production Test program.

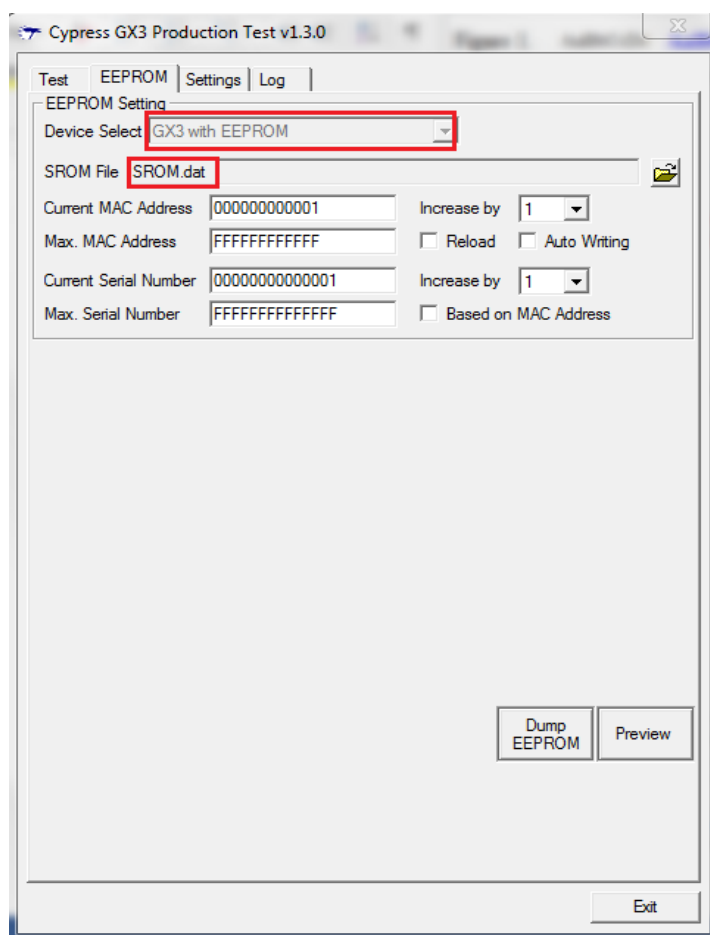
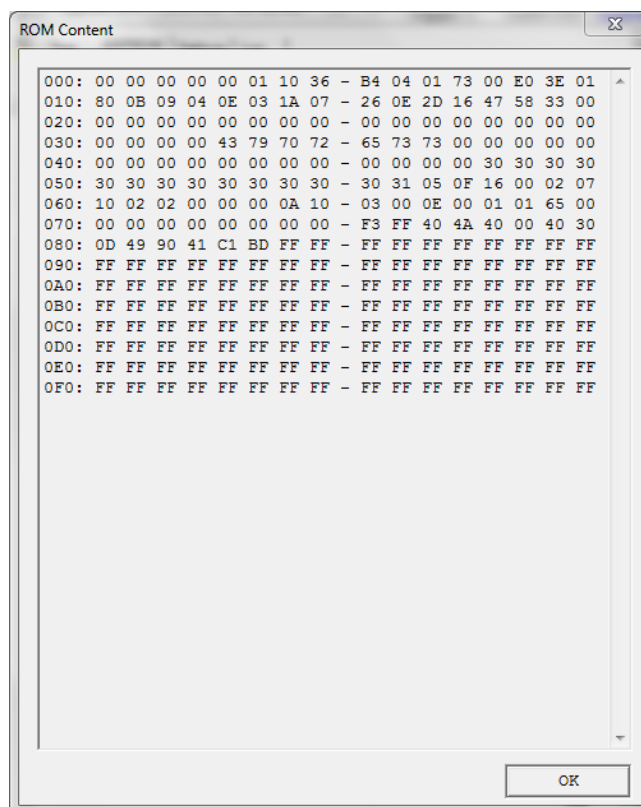


Figure 13. Windows Production Test Tool EEPROM Tab

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Field #	Field Name	Description
1	Device Select	Select product: GX3 with EEPROM
2	ROM File	Select GX3 SROM data file.
3	Current/Max/Increase by MAC Address	Set Current/Maximum MAC Address and Incremental value of MAC Address: The Current MAC Address should be smaller than the Max MAC Address. The incremental value is 0 ~ 9. “0” means non-increased MAC address after programming.
4	Current/Max/Increase by Serial Number	Set Current/Maximum Serial Number and Increment of Serial Number: The Current Serial Number should be smaller than the Max Serial Number. The incremental value is 0 ~ 9. “0” means non-increased Serial Number after programming.
5	Reload	Check “Reload” box to auto-reload EEPROM after programming EEPROM.
6	Auto Writing	Check “Auto Writing” box to auto-program EEPROM after unplugging/re-plugging GX3 dongles. Note that the other test items will be auto-disabled when the “Auto Writing” function is enabled.
7	“Dump EEPROM” button	Dump the EEPROM data from GX3 EEPROM to a pop-up window.
8	“Preview” button	Preview the EEPROM content that is going to be programmed.
9	“Exit” button	Quit this program.

Table 11. Windows Production Test Tool “EEPROM” tab



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Figure 14. Windows Production Test Tool Dump/Preview SROM Data

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4-3-3. Settings Tab

The following is the user interface of “Setting” tab of Windows Production Test program.

Note:

1. The IP address (e.g. 192.168.0.100) of GX3 Windows test driver of Test PC should be configured to the same subnet as the IP address (e.g. 192.168.0.1) of Server PC.
2. The Server IP address, TCP/UDP packet type and port number settings of Windows Production Test Server should be the same as that in Windows Production Test program.

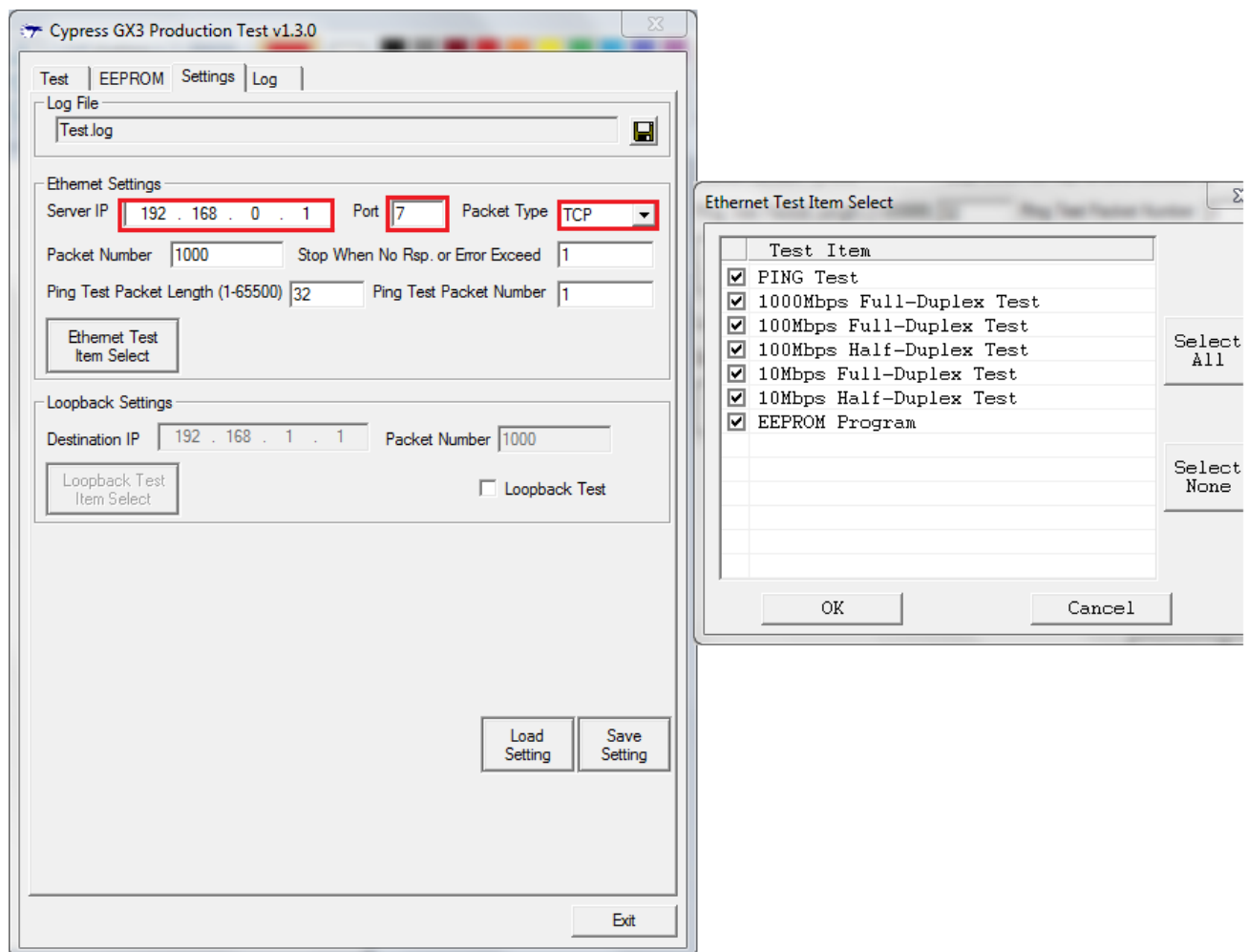


Figure 15. Windows Production Test Tool Setting Tab – Ethernet Setting

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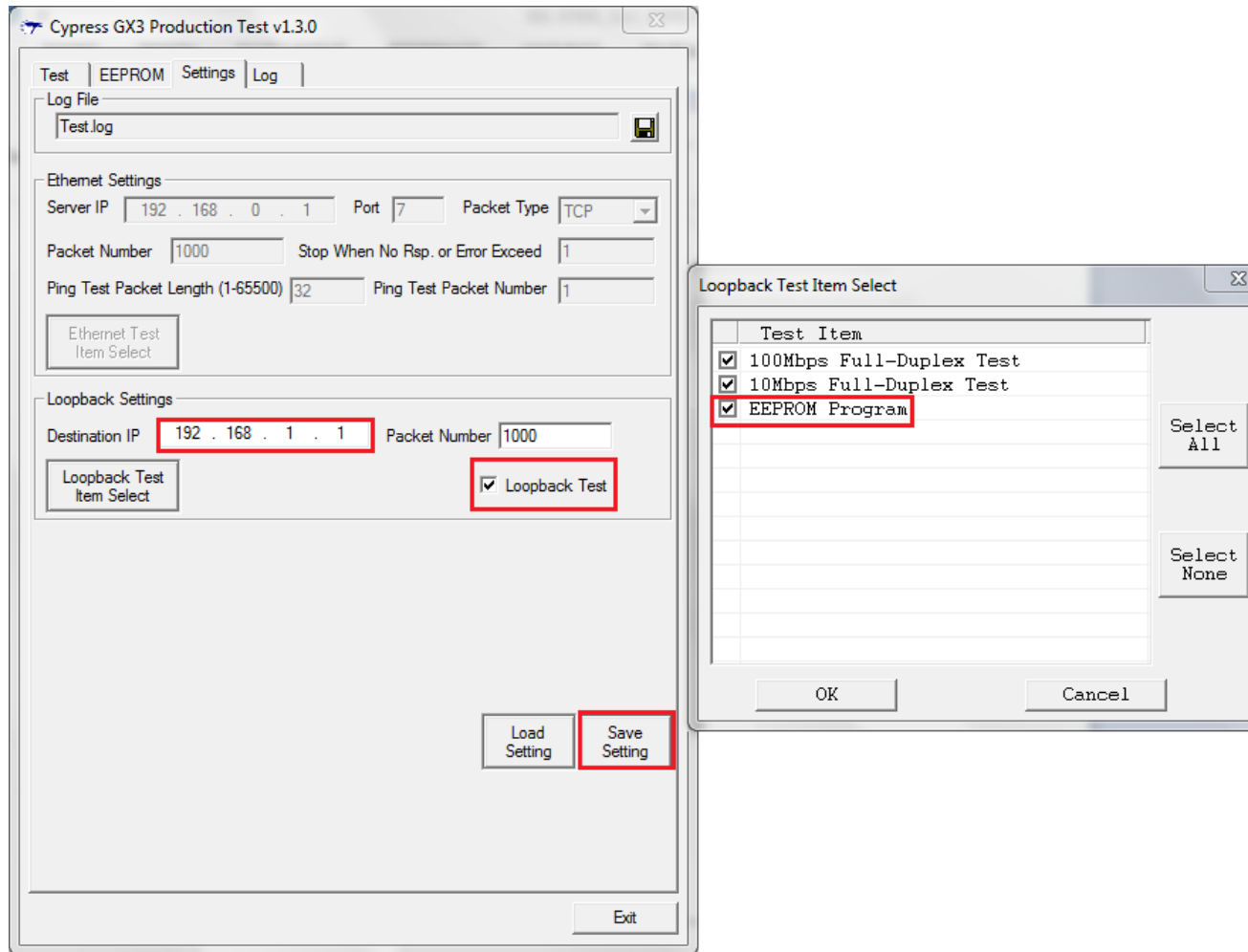


Figure 16. Windows Production Test Tool Setting Tab – Loopback Setting

Field Name		Description
Log File		Select a log file
Ethernet Setting	Server IP	Enter the IP address of Server PC
	Port	Enter the port number of TCP or UDP packets
	Packet Type	Select a TCP or UDP packet type
	Packet Number	Enter the packet number for Production Test
	Stop When No Rsp. or Error Exceed	Enter the allowed no response or error packet count
	Ping Test Packet Length	Enter the data length (1 ~ 65500 bytes) of ping command
	Ping Test Packet Number	Enter the packet number for ping test
	“Ethernet Test Item Select” button	Select Production Test items.
Loopback Setting	Destination IP	Enter a different IP address from the IP address of GX3 Windows test driver but at the same subnet.
	Packet Number	Enter the packet number for Production Test
	“Loopback Test Item Select” button	Select Production Test items. Note that the loopback test items only support 100M/10M Full-duplex modes. Please connect a loopback RJ-45 connector to GX3 for loopback test.
“Load Setting” button		Load the default setting of “EEPROM” and “Setting” tabs from

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	the SETTING.INI file.
“Save Setting” button	Save the new setting of “EEPROM” and “Setting” tabs into the SETTING.INI file.
“Exit” button	Quit this program.

Table 12. Windows Production Test Tool “Setting” tab

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4-3-4. Log Tab

The following is the user interface of “Log” tab of Windows Production Test program.

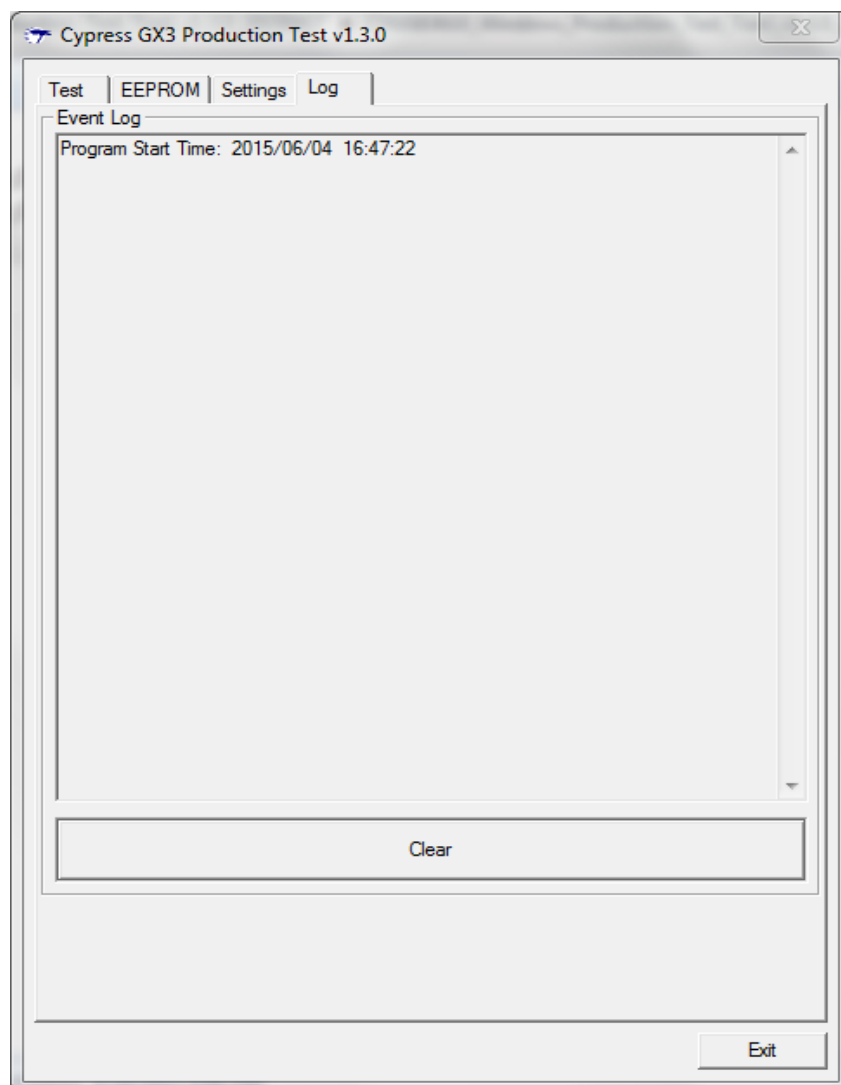


Figure 17. Windows Production Test Tool Log Tab

Field #	Field Name	Description
1	Event Log	Display test log.
2	“Clear” button	Clear the test log strings in the “Event Log” window.
3	“Exit” button	Quit this program.

Table 13. Windows Production Test Tool “Log” tab

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4-4. Tool Usage Procedures

The following are the test procedures of Windows Production Test tool.

4-4-1. Windows Production Server Program Setting

The Windows Production Test Server program is an echo server program. It will reply all packets it received. The sent packet payload is the same as received packet payload. The following is user interface of Windows Production Test Server program.

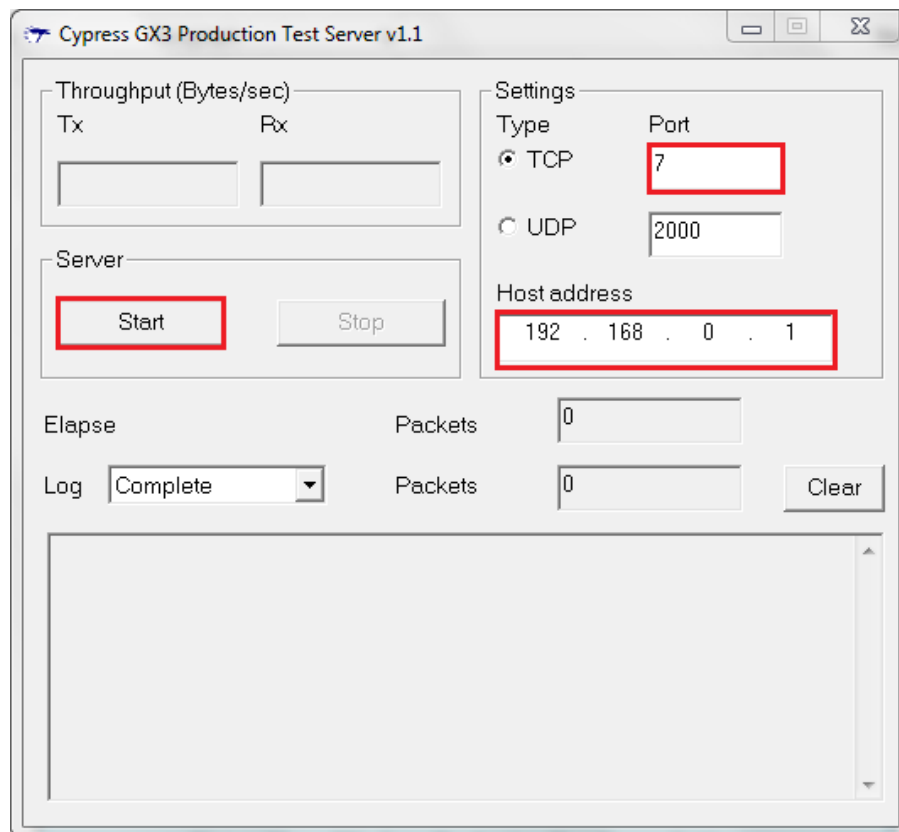


Figure 18. Windows Production Test Server Setting

The Windows Production Test Server setup procedures:

1. Configure a proper IP address (e.g. 192.168.0.1) for Server PC's NIC card.
2. Set a correct IP address (e.g. 192.168.0.1) of Server PC in the "Host Address" field.
3. Select TCP or UDP packet type in the "Setting" field and set a correct port number of TCP or UDP packets.
4. Press "Start" button to start Windows Production Test Server.

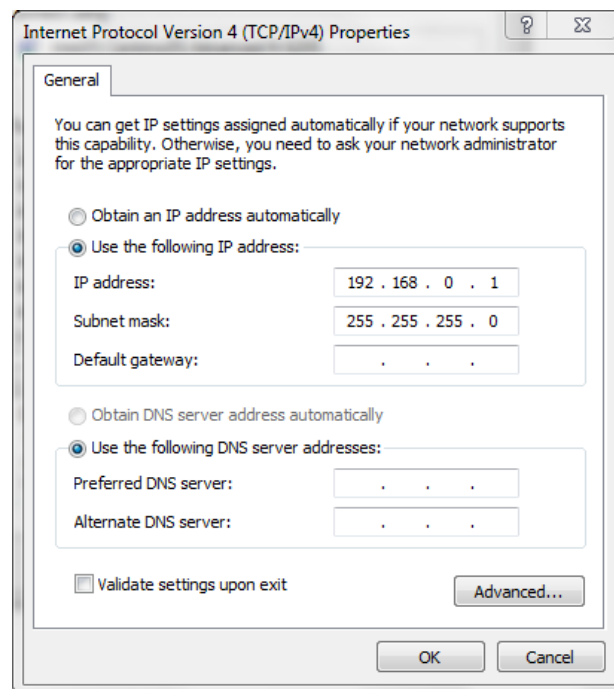
Note: The Server IP address, the TCP/UDP packet type and port number settings of Windows Production Test Server should be the same as that in Windows Production Test program.

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4-4-2. Windows Production Test Program Setting

1. Run Windows Production Test Server Program on Server PC.
(Refer to Section [4-4-1](#) for details.)
2. Check if the GX3 Windows test driver (GX3_TEST.SYS) was installed properly on Test PC. Please refer to [Figure 4](#) for details.
3. Configure a proper IP address for GX3 Windows test driver on Test PC.


Note: The IP address (e.g. 192.168.0.100) of GX3 Windows test driver should be configured to the same subnet as the IP address (e.g. 192.168.0.1) of Server PC.

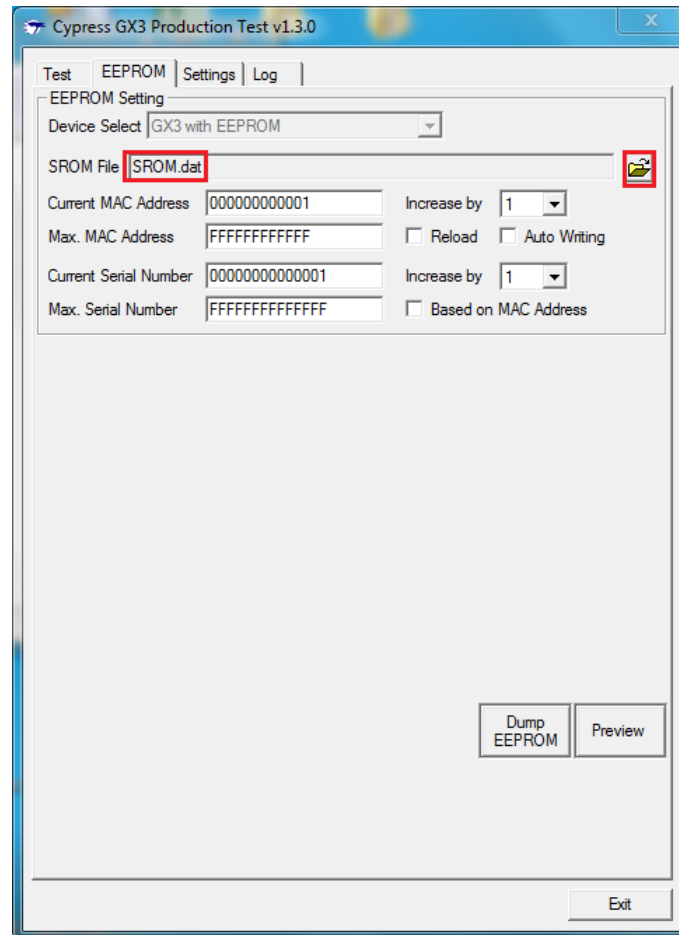


4. Configure proper Server IP address (e.g. 192.168.0.1), TCP/UDP packet type and port number in the “Setting” tab of Windows Production Test program on Test PC.

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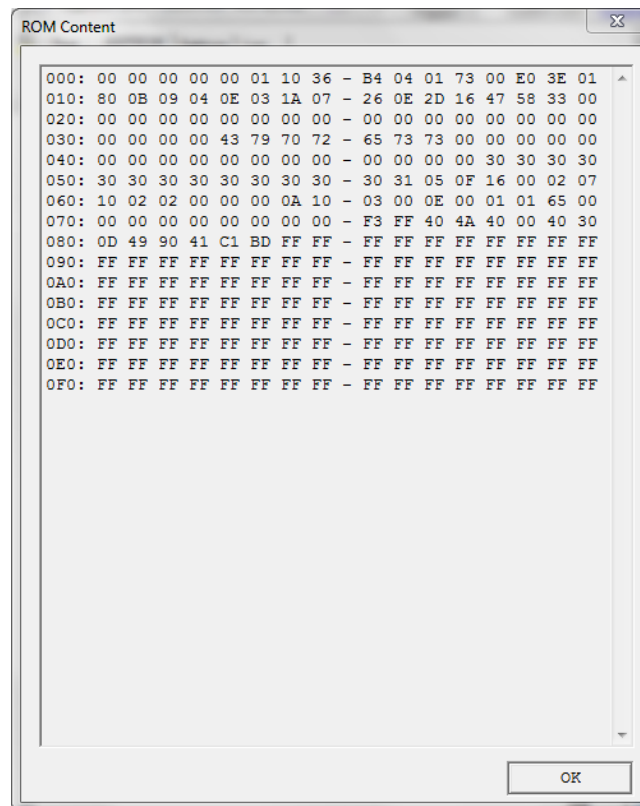
5. If the “EEPROM Program” test item was selected, set the EEPROM configuration in the “EEPROM” tab of Windows Production Test program on Test PC.

(1) Press  button to select a correct SROM.DAT file.



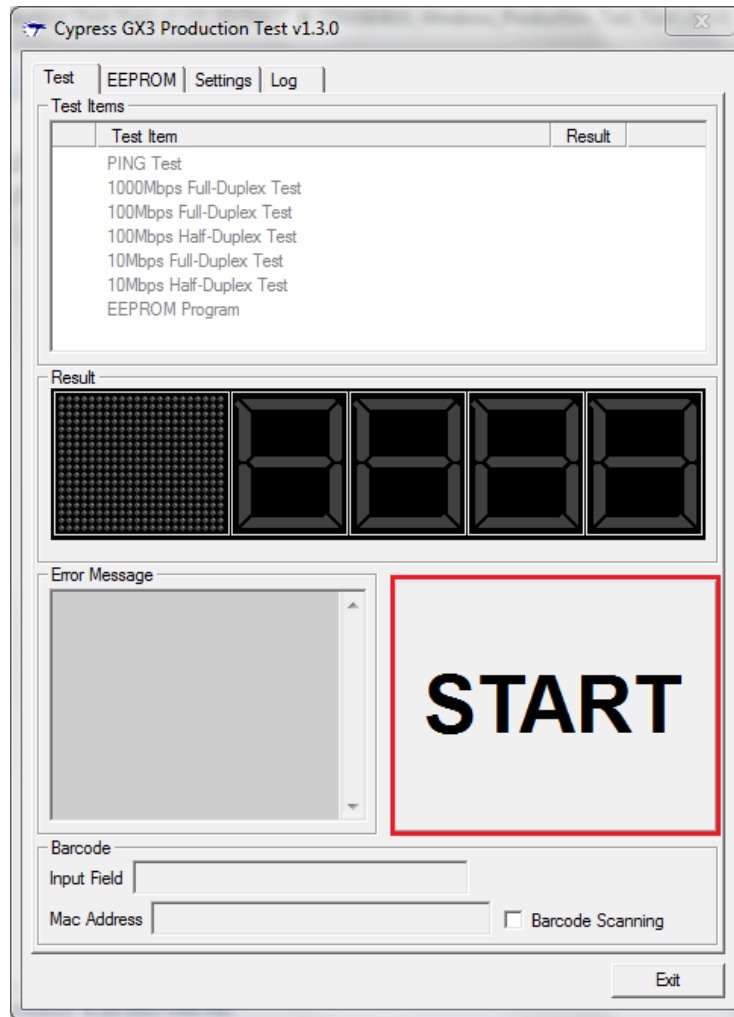
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- (2) Press “Preview” button in EEPROM tab to double check the EEPROM content that is going to be programmed.



6. Press “START” button to start running Windows Production Test on Test PC.

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4-5. How to Run Windows Production Test Tool If I Have My Own VID/PID?

If you have your own VID/PID after programming SROM data using the GX3 EEPROM Programming Tool, the GX3 Windows test drivers may not recognize your device due to the GX3 Windows test drivers can only acknowledge Cypress's GX3 default VID/PID. Under this circumstance, you can modify the GX3_TEST.inf file of GX3 Windows test drivers to support your own VID/PID and then install the revised Windows test driver again.

Below is an example of GX3 to add a specific VID/PID in the GX3_TEST.inf. It is supposed the VID is 1234h and PID is 5678h.

```
.*****  
; Cypress GX3 USB 3.0/2.0 to Gigabit Ethernet Adapter (Test Driver)  
;  
; Copyright 2014-2015, Cypress Semiconductor Corporation  
;  
; Version: 1.104.5.0      for Windows 32 bit  
*****  
[Version]  
Signature = "$Windows NT$"  
CatalogFile = CYUSB3610Test.cat  
Class     = Net  
ClassGUID = {4d36e972-e325-11ce-bfc1-08002be10318}  
Provider  = %Cypress%  
DriverVer = 03/17/2015, 1.104.5.0  
  
[Manufacturer]  
%CYPRESS% = USB  
  
[ControlFlags]  
ExcludeFromSelect = USB\VID_04B4&PID_3610, USB\VID_04B4&PID_3610, USB\VID_1234&PID_5678  
  
[USB]  
%GX3.DeviceDesc% = GX3.Ndi,USB\VID_04B4&PID_3610, USB\VID_1234&PID_5678
```

Note: After you modified the INF file, the Windows test driver will not be a WHQL certified driver any more so the revised Windows test driver will not be installed properly on Windows 8 64-bit system. You can try to find another Windows system to re-program your GX3 EEPROM in this case.

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4-6. Skip to Program EEPROM again on Windows Production Test Tool

You may program the SROM data into your device's EEPROM by using Windows GX3 EEPROM Programming Tool or universal I/O Programmer before using the Windows Production Tool. Under this circumstance, to prevent programming EEPROM twice and save time, click Test Item Select and un-check EEPROM Program as the figure below. It will reduce the procedures of Windows Production Test.

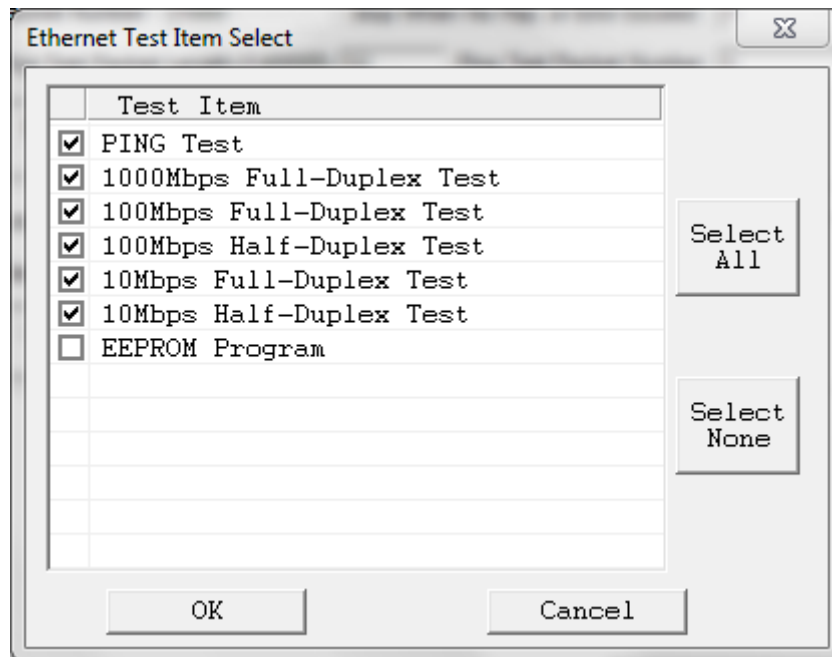


Figure 19. Uncheck EEPROM Program in Windows Production Test Tool

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5. GX3 EEPROM FAQs

5-1. The Vendor ID (VID) and Product ID (PID)

5-1-1. Do we need to register our own VID/PID for our GX3 based application systems or can we use the Cypress VID/PID?

The answer to the above question really depends on user's product applications and target market, which can be different on individual cases. Below gives customers some general guidelines about whether one can use Cypress's VID/PID or one should better register its own one with USB-IF.

1. Cases where it is OK to use Cypress's VID (04B4h) and PID (3610h)

You may be able to use Cypress's VID and PID when your GX3 based application system can simply work with GX3 standard drivers provided by Cypress without any modification and you don't have any concern from business and product marketing perspective to use the same VID and PID on your products as Cypress's other customers who are also using Cypress's VID and PID. Cypress would like to request customers to inform Cypress sales staffs by sending us email at sales@cypress.com beforehand if you would like to use Cypress VID and PID for your products.

In other words, if your GX3 based application system requires you to modify GX3 driver on your own or by Cypress support team, you might have to register your own VID and PID. This can avoid your end customers from going to Cypress web site to download the GX3 standard driver which may not be suitable to work with the specific GX3 based application system.

2. Cases requiring you to use your own VID and PID

- (1) Your GX3 based application systems can't work directly with GX3 standard drivers which Cypress releases on its web site and your target application system (such as USB dongle or docking station) may allow your end customers to update the standalone GX3 driver by themselves after sales. In that case, you MUST assign your own unique VID and PID for your GX3 based devices.
- (2) For brand name products, you probably don't want your GX3 based devices to become compatible with other company's GX3 based devices. In this case, you should consider assigning your own unique VID and PID for your GX3 based devices.

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You can refer to Section 5-1-2 to register your own VID from USB Implementers Forum, Inc. and define the PID based on your company rules by yourselves. If you have any problem, please contact Cypress's support (support@cypress.com) for further support.

5-1-2. How to register a Vendor ID from USB-IF?

If you are a new USB product developer looking to get a Vendor ID for your company, you can register a Vendor ID from USB Implementers Forum, Inc. Please visit the USB-IF web site (<http://www.usb.org/developers/vendor/>) for details.

5-2. The MAC address

5-2-1. Do I have to assign a unique MAC address to every GX3 based devices?

Yes, every Ethernet device must have a unique MAC address. Users should always assign a unique MAC address in the GX3 EEPROM for every GX3 based devices.

You should refer to Section 5-2-2 to register a block of MAC addresses for your company.

5-2-2. How to register a MAC/Ethernet address from IEEE-SA?

You must first have an OUI or an IAB, to which you then append 24 or 12 bits respectively, in a way that makes the resulting 48-bit number unique, i.e., your 24 or 12 bits must be unique within your organization, which will require coordination among all the users of your organization's OUI or IAB. Please visit the IEEE-SA web site (http://standards.ieee.org/regauth/registry_OUI.html) for details.

5-3. The Serial Number

5-3-1. Do I have to assign a unique serial number to every GX3 based devices?

No, it depends on the real requirement of your GX3 target application. If users need to install more than one GX3 based devices on your target application, you should assign a different serial number in the EEPROM for every GX3 device.

If your target application always uses one GX3 device, you can consider assigning the same serial number in the EEPROM for every GX3 device for easy maintenance in mass production, especially if you plan to use a Windows PC to test GX3 based devices repeatedly during mass production test.