

JMaster3/L
Stand-Alone Production Programmer

Brief Manual

V1.01

Nanjing WAVE Industry Co., Ltd.

-Since 1993-

www.wave-cn.cn



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JMaster3/L Programmer

Introduction

JMaster3/L supports most ISPs and is suitable for In-System programming. Coupled with an IC socket, it can also support IC offline programming.

- Supports almost all ISP protocol including I2C, SPI, UART, BDM, MW, JTAG, SWD, CAN, etc.
- Includes ultra high speed programming via FPGA device
- Operates with a PC or in stand-alone mode without a PC
- Build-in ATE interface
- Further-development supported (provide SDK resource package)
- Includes 2 complete independent modules which can be extended to 8 Programmer
- Built-in over current protection
- Capable of providing power to target boards (500mA maximum) with adjustable voltage from 1.8V to 5V
- Color LCD display screen, 3 buttons and dual digit LED display for stand-alone use, utilizes a SD card for program files
- Program counter
- Unique serial numbers for each chip
- Programmer file can set password and programmer file can not be copied.
- Can limit amount of burns per program
- Logs status and time on a PC if connected.
- Built-in RTC(automatically syncs when connected), provides the basis for unique serial numbers using date and time
- Operates in either Chinese or English depending on automatic detection of connected PC's language
- Programmer can rename or set password 可以对编程器命名、设置密码
- Can update from internet
- Can remote programmer via internet

System Installation

This section provides information on how to install the software and connect the programmer hardware properly.

To avoid complications during the installation process, you must install the software before connecting the programming hardware to your computer.

Install J.MasterIII software

Download Link: http://www.wave-cn.com/dl_jm3p.html

Start software by "Start Menu\JMasterIII Programmer\JMasterIII Programmer".

Install USB Driver

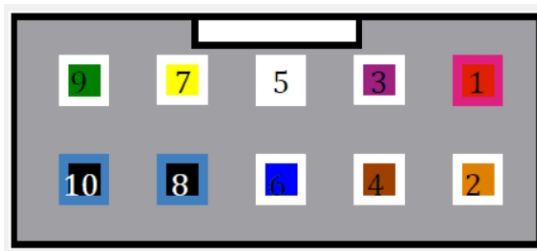
Star USB Driver setup program wizard by "Start Menu\JMasterIII Programmer\USB & KEIL Driver Setup", Press "USB Driver" in wizard windows. Follow the prompts that appear to successfully install the software then connect the programmer.

***You should connect the JMaster3/L to computer before installing the USB driver.



Programming Port

/Each individual port includes all required connections for programming. The JMaster3/L comes with 2 ports: P1 and P2. This programmer can also be extended an additional four ports: P3, P4, P5, and P6. All six ports have the same configuration as the diagram below.



Corresponding wires of UART、SWD、JTAG、IIC、SPI、BDM, etc.

| Pin | Color | Wire Cap Color | UART Signal | SWD Signal | JTAG Signal | IIC Signal | SPI Signal | BDM Signal |
|-----|--------|----------------|-------------|------------|-------------|------------|------------|------------|
| 1 | Red | Red | Power out | Power out | Power out | Power out | Power out | Power out |
| 2 | Orange | White | | | | | | |
| 3 | Purple | White | | RESET | RESET | | NSS | RESE |
| 4 | Brown | White | | | | | | |
| 5 | White | White | | | TDO | | MOSI | |
| 6 | Blue | White | | | TDI | | | |
| 7 | Yellow | White | TXD | SWDCK | TMS | SDA | MISO | |
| 8 | Black | Blue | GND | GND | GND | GND | GND | GND |
| 9 | Green | White | RXD | SWDIO | TCK | SCK | SCK | BDM |
| 10 | Black | Blue | GND | GND | GND | GND | GND | GND |

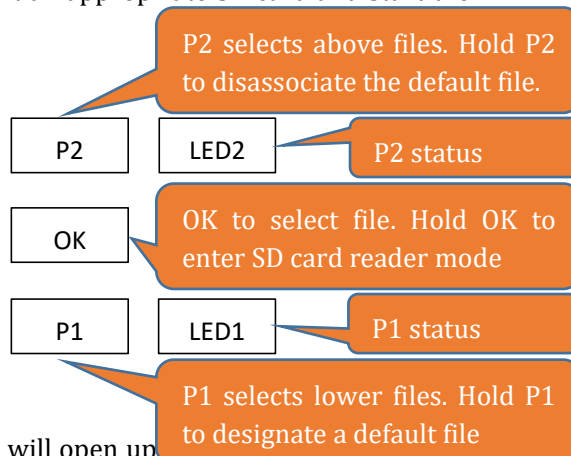
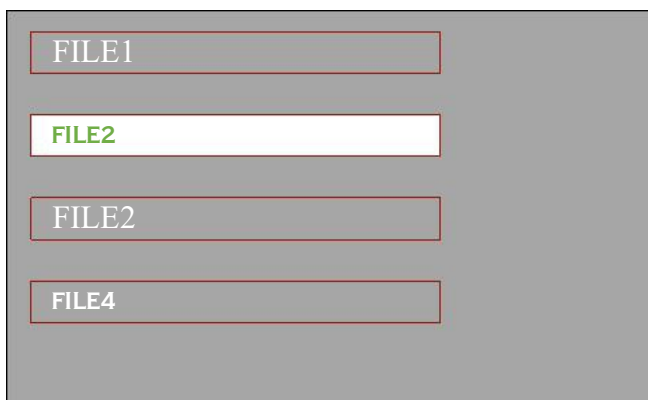
Above are the standard ISP connections for each pin. Different manufacturers may use additional connections. Refer to the following charts for ISP connections of supported chips.

Stand-Alone Mode

In stand-alone mode, there is no need for the JMaster3/L to be connected to a PC.

Instead, the built in buttons and LCD display screen are utilized and all program files are saved on a SD card.

Upon start up, the J Master. II will automatically detect the SD card. If there is no SD card or if it is in the wrong format (not FAT16 or FAT32), the display will show “SD Error”. If this happens, first disconnect the power source, then insert an appropriate SD card and start the programmer again.



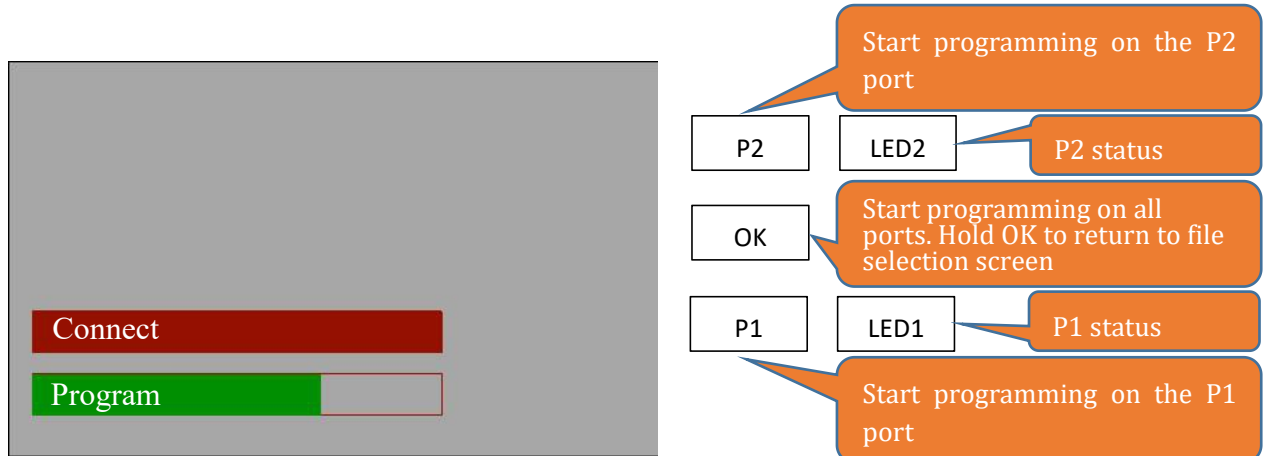


JMO format. Use the keys P2 and P1 to move between files and select the desired program file. Once the appropriate program has been selected, press OK to confirm and the JMaster3/L will check the following three items to verify the file.

1. Do the passwords match?
2. Is the programmer suitable or set as a designated programmer for the file?
3. Does it have available numbers of burns? (has not reached the limit)

If the answer is yes to all three questions, programming can begin. The display screen will show the progress of the programs.

When the corresponding port status bar is green, you can use it to start programming. The display will also show available remaining burns up to 9999 (limited by 4 digit display)



If the verification process fails, the programmer will show the reason. Press any key to return to the file select screen.

Initiating Programming

The JMaster3/L has three ways to initiate programming through the usage of its integrated buttons, PIN connection or automatic detection. This is set before actual burning occurs.

1. Integrated buttons

Once the program has been chosen and the status light shows as green (or red), use the buttons to start actual programming. The keys P1 and P2 correspond to their appropriate ports when pressed and pressing OK will start all non-active programs.

2. PIN connection initiation

Connect PIn to POut to start programming.

3. Automatic detection

As soon as the target board programmer is connected to a power source, programming will start.

While the programmer is working, the indicator light will flash yellow and the progress will be displayed on the screen. The corresponding port button will be disabled until it finishes. If the programming was successful, the port light and status bar will change to green. If the programming failed, both the port light and the status bar will change to red, with the latter showing the source of error.

Programming can start if the light is green or red. The different colors are to indicate



whether or not the previous attempt was successful (green being successful and red being failure).

Default Program File

Holding down the P1 key for a few seconds over a highlighted file will set it as the default file. If a default file has been set, the programmer will automatically run it on start up and will no longer show a file selection screen. To use a different file than the default, hold OK to access the selection screen and select the desired file. This does not remove the default start-up file and the JMaster3/L will still automatically run it on future start-ups. To dissociate the default file, hold down P2 while on the selection screen and the programmer will then open with the selection screen each time. If you wish to assign a new file as the default, hold down P1 while it is selected to replace the previous file.

1. Setting a default file

Choose the file (highlighted) on the selection screen and hold P1 (over 2 seconds)

2. Dissociating a default file

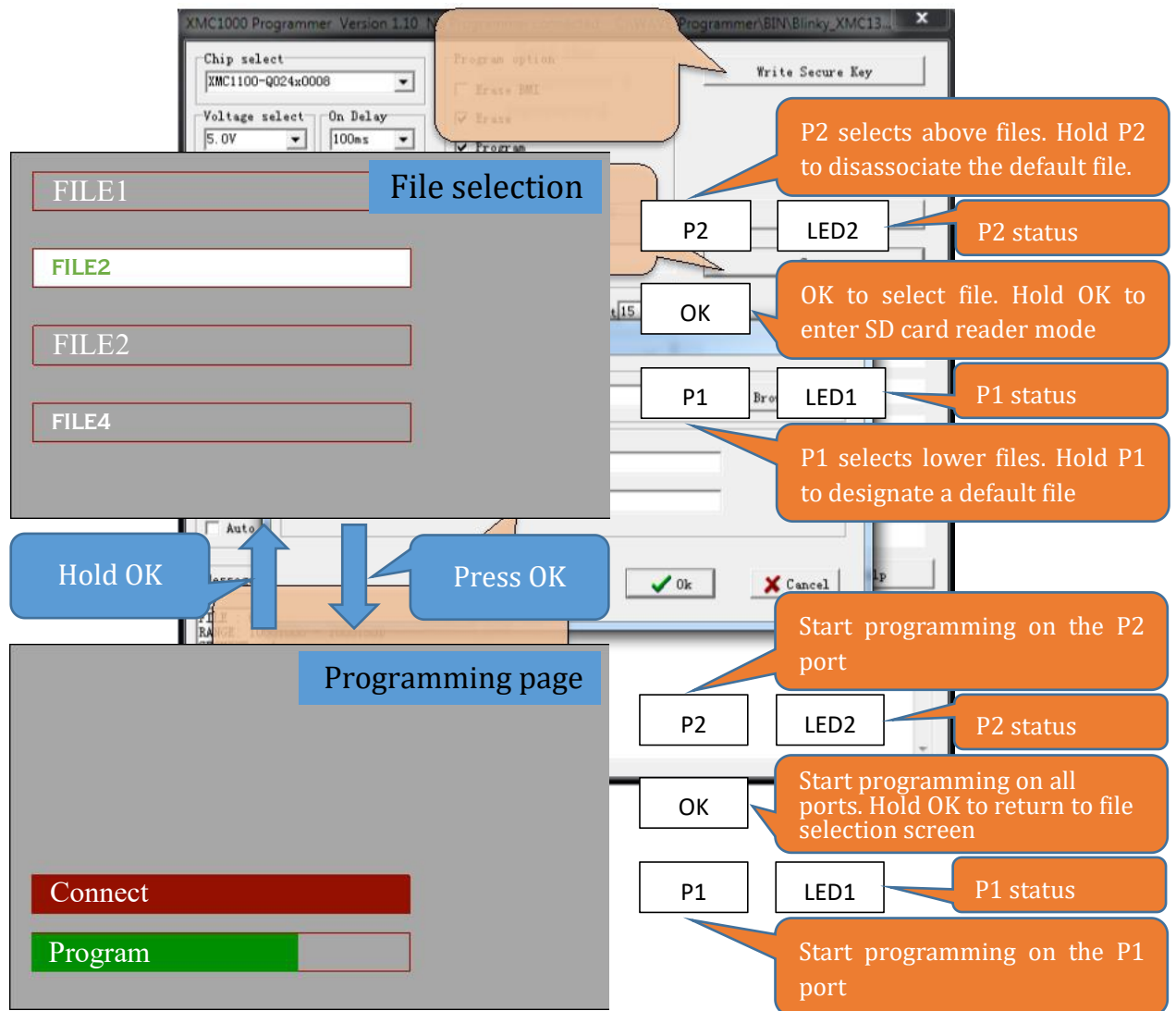
Hold P2 (over 2 seconds) while on the selection screen. Changes take effect on next start up.

Power Output

1. The JMaster3/L can directly provide power for low current target boards (normally not recommended as it is better to have its own power supply)
2. The power provided can be adjusted between 1.2V to 5.0V. This is set using the computer software. Once set, the programmer will automatically adjust the voltage of the signal lines accordingly.
3. If not using the JMaster3/L as a power supply, an appropriate voltage still needs to be selected to ensure that the port works normally.
4. If automatic detection is selected to begin programming, the programmer will not provide any power. The target board must have a power source of its own.
5. When using the programmer as a power source, there will only be power output during actually programming. Specifically, if using the integrated buttons to start programming, the J. Master will provide power as soon as programming is initiated to the instant programming is complete. For PIN connection initiation, once POut and PIn are been connected, the programmer will provide power until programming is complete.
6. When the programmer is started using manual methods (button and PIN connection), the programming signal only transmits while actually programming is happening. Once programming is complete, the signal will not drive (float with weak pull-up). In automatic detection, the programming signal is constantly on (with no power signal).

Transitioning between the 2 display screens

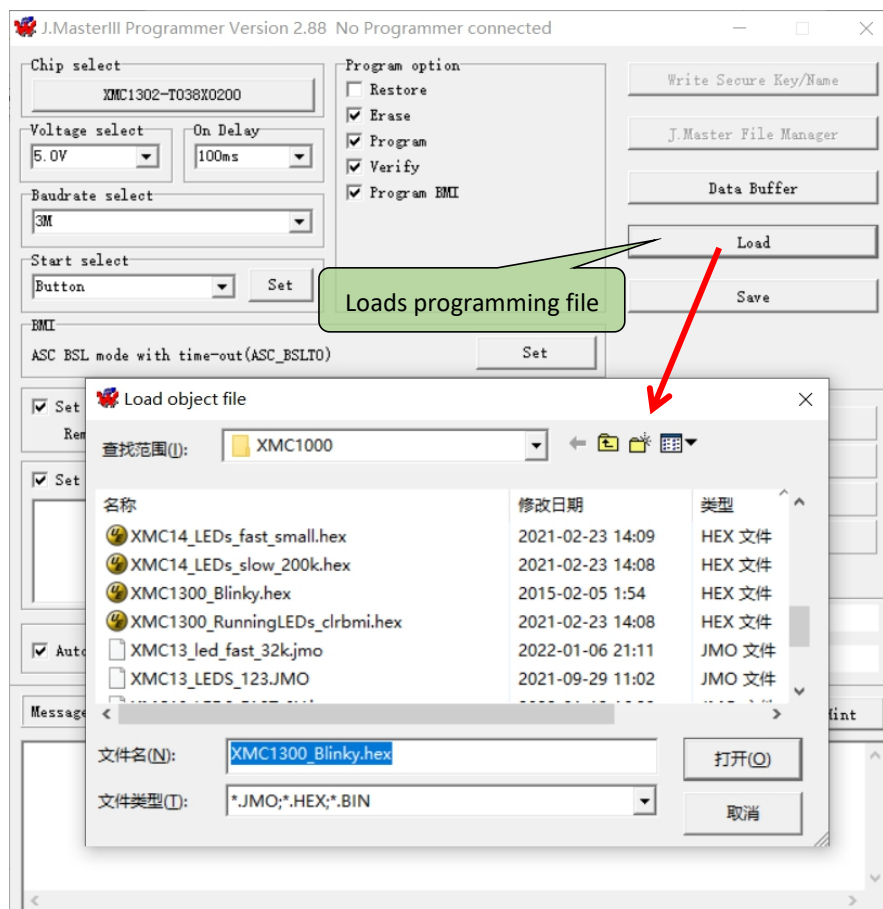
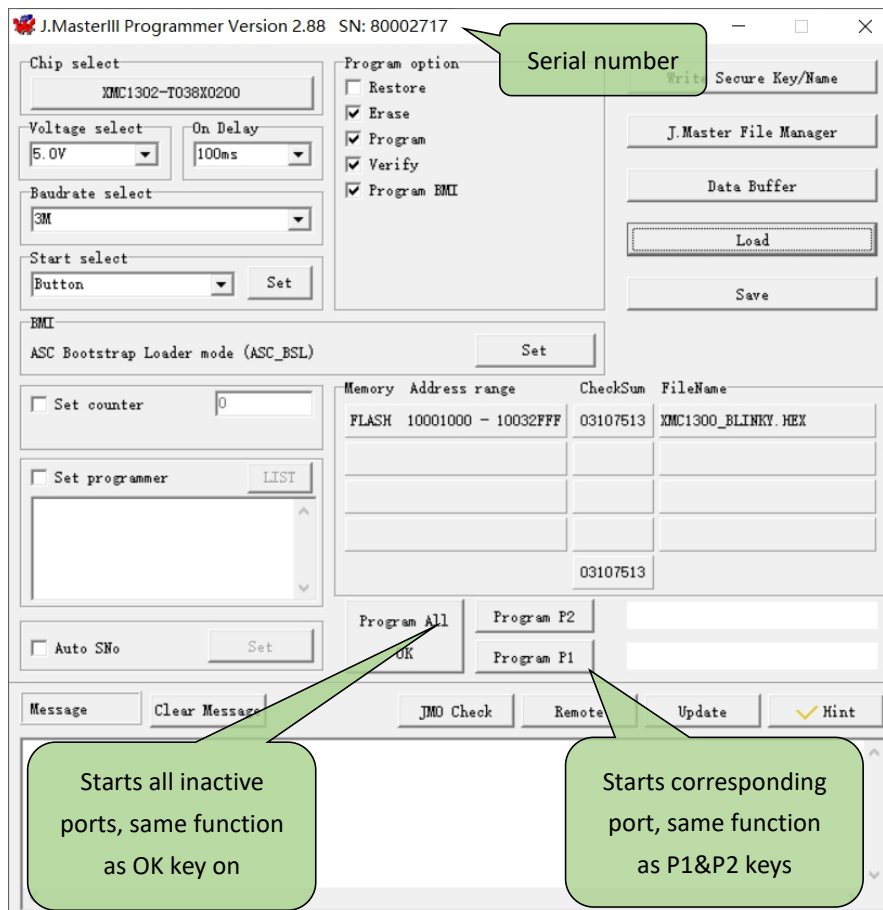
1. If starting up the JMaster3/L normally, it will automatically go to the file selection screen. Use the P1 and P2 buttons to choose the appropriate document and press OK to begin verifying the program. If there are no errors, it will go to the programming page.
2. If a default start up file has been set, starting up the programmer will go directly to the programming page. To return to file selection, hold OK.

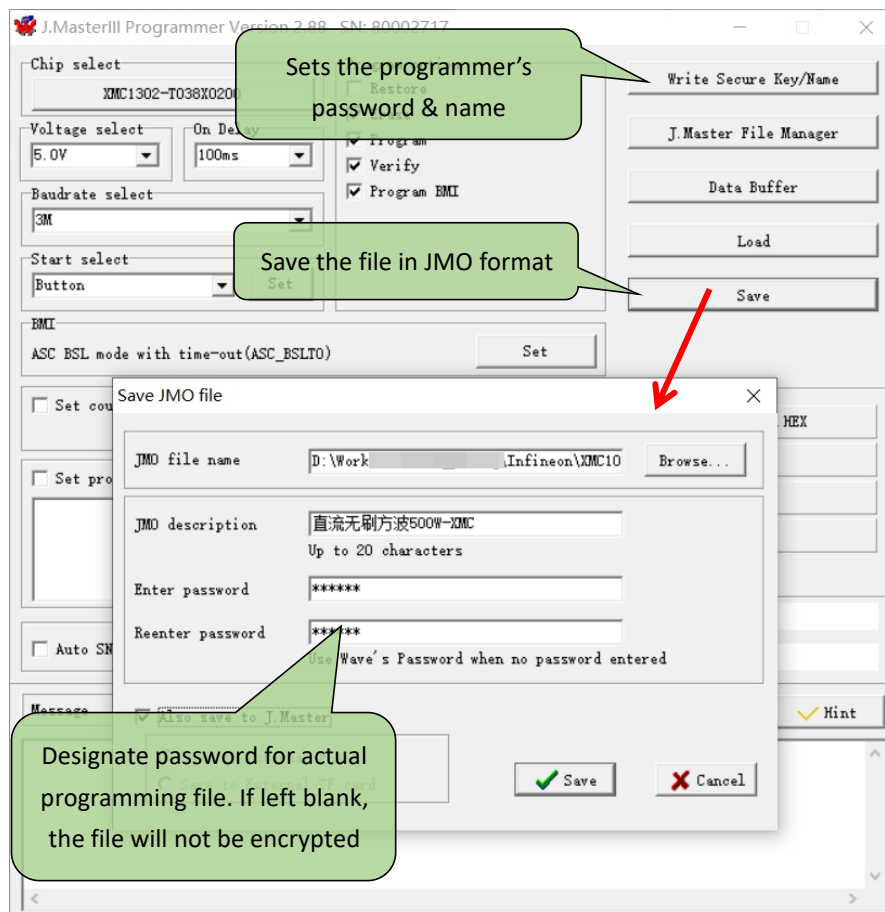


Software Usage

To add a programming file to the SD card, you must convert it to programmable format (JMO) using the software provided with the JMaster3/L. The JMO file will include the original program, BMI, chip serial number, voltage, baud rate, method of initiating programming, counter and other related information.

The software can also be used to control the programmer from the computer.





Loading object file

Load the original file (in binary or Intel HEX format) or a JMO file with programming information included. JMO files are only for programming and cannot be changed once converted to this format. For an original file, select the appropriate chip, voltage, baud rate, BMI, and counter. Once all fields have been set, you can begin programming directly, or save the file with all the settings into a JMO file for easier access or stand-alone usage.

Saving JMO files

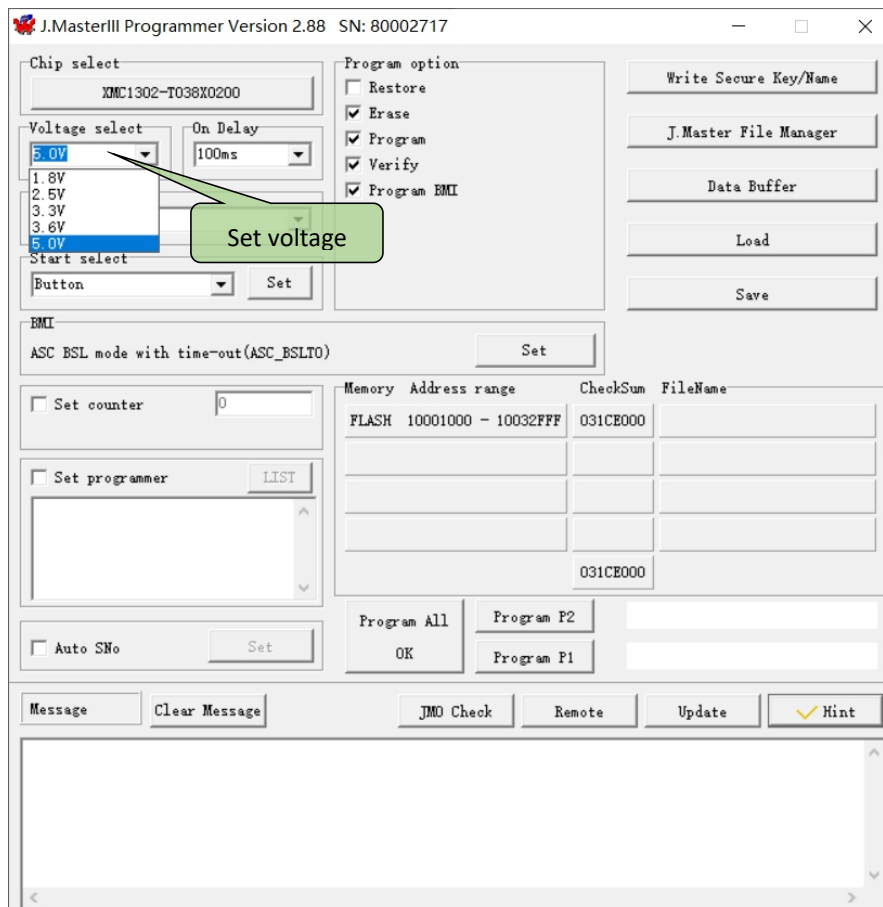
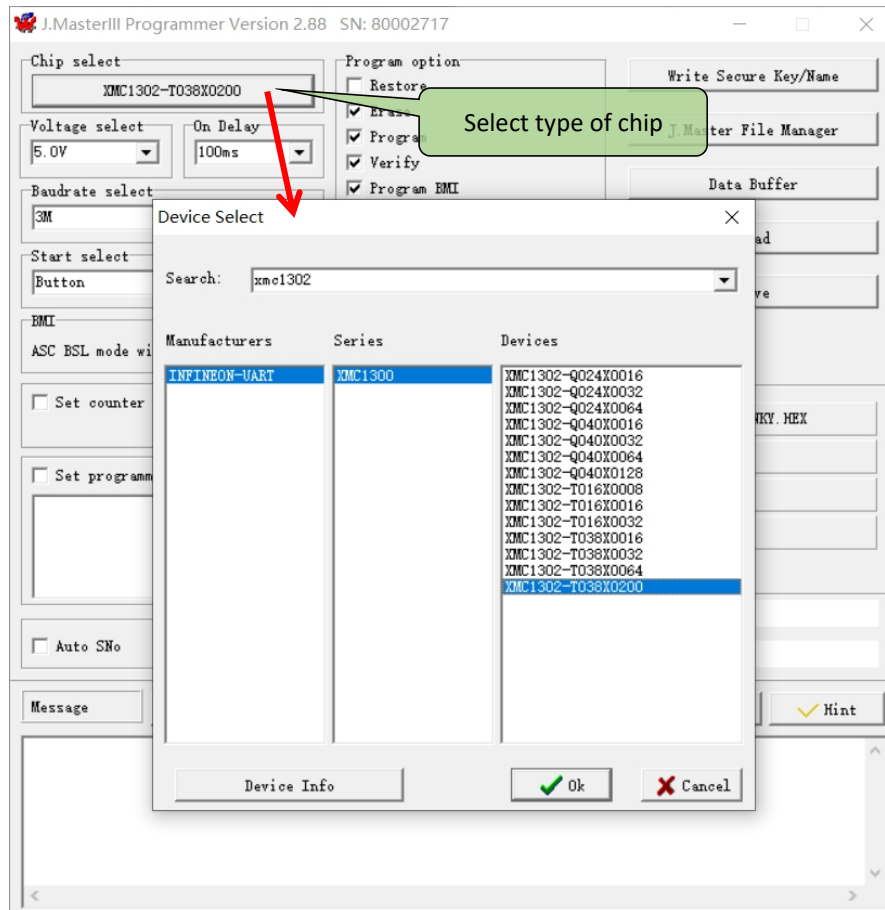
JMO files include the original file, all settings and can include a password for increased AES 128 bit security. When saving, the software will ask whether or not you wish to designate a password. If left empty, it will not encrypt the chip. If you do include a password, the file can only be used for programming if the password matches the one in the programmer (can be set using the software). We recommend setting a password for the programmer then using the same password for all ensuing programs. Should you wish to change the password, it is easily done using the JMaster3/L software.



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J.MasterIII Programmer Version 2.88 SN: 80002717

Chip select: XMC1302-T038X0200

Voltage select: 5.0V On Delay: 100ms

Baudrate select: 3M

Program option:
☐ Restore
☒ Erase
☒ Program
☒ Verify
☒ Program EMI

Write Secure Key/Name
J.Master File Manager
Data Buffer
Load
Save

Set baud rate

Set counter: 0

Set programmer: LIST

Auto SNo: Set

| Memory | Address range | Checksum | FileName |
|--------|---------------------|----------|----------|
| FLASH | 10001000 - 10032FFF | 031CE000 | |
| | | | |
| | | | |
| | | | |
| | | 031CE000 | |

Program All OK Program P2 Program P1

Message Clear Message JMO Check Remote Update Hint

J.MasterIII Programmer Version 2.88 SN: 80002717

Chip select: XMC1302-T038X0200

Voltage select: 5.0V On Delay: 100ms

Baudrate select: 3M

Start select: Button

Auto detect: ATE

NSC BSL mode with time-out(ASC_BSLTO)

Program option:
☐ Restore
☒ Erase
☒ Program
☒ Verify
☒ Program EMI

Write Secure Key/Name
J.Master File Manager
Data Buffer
Load
Save

Select Start method

Set counter: 0

Set programmer: LIST

Auto SNo: Set

| Memory | Address range | Checksum | FileName |
|--------|---------------------|----------|----------|
| FLASH | 10001000 - 10032FFF | 031CE000 | |
| | | | |
| | | | |
| | | | |
| | | 031CE000 | |

Program All OK Program P2 Program P1

Message Clear Message JMO Check Remote Update Hint



Initiating Programming

1. Integrated buttons

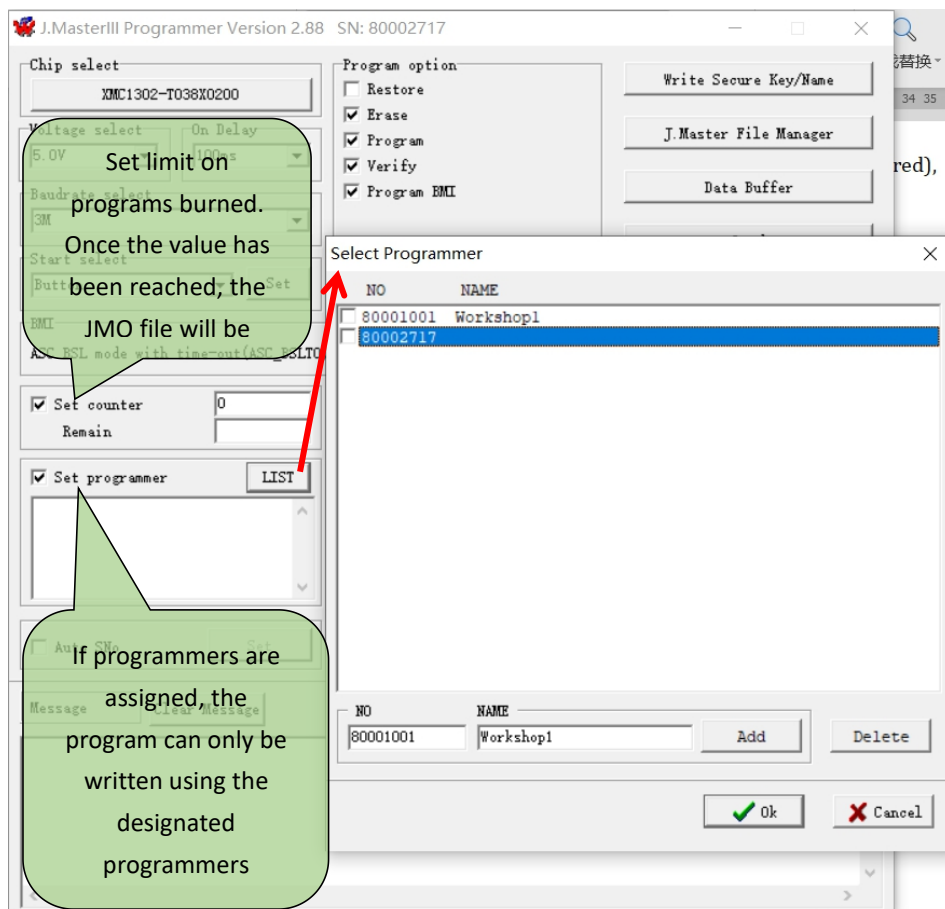
Once the program has been chosen and the status light shows as green (or red), use the buttons to start burning. The keys P1 and P2 correspond to their appropriate ports when pressed and pressing OK will start all non-active programs.

2. PIN connection initiation

Connect PIn to POut to start programming.

3. Automatic detection

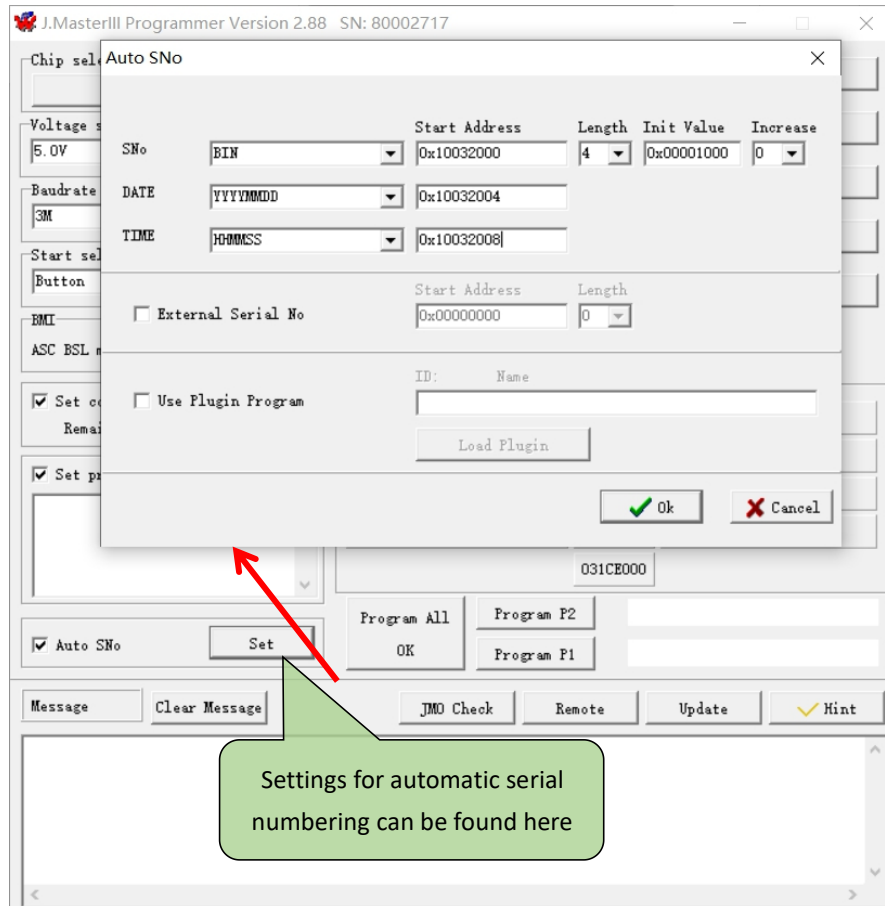
As soon as the programmer is connected to a power source, programming will start.





Automatic Serial Numbering

If automatic numbering is enabled, the programmer will add a serial number as well as date and time information to the chip. The format can be selected using the drop down menu in Automatic SNo settings. In the settings window, designate the address for the serial number (Note: Make sure the address is not in an already used space otherwise it will cause program errors) as well as the initial serial number and its increments.





Port Definition of Infineon XMC100/XMC4000 Series

| Pin | Color | Wire Cap Color | XMC1000 (ASC) | XMC4000 (UART) |
|-----|--------|----------------|---------------|----------------|
| 1 | Red | Red | Power out | Power out |
| 2 | Orange | White | | |
| 3 | Purple | White | | TMS |
| 4 | Brown | White | | |
| 5 | White | White | | TCK |
| 6 | Blue | White | | RESET |
| 7 | Yellow | White | TXD | TXD |
| 8 | Black | Blue | GND | GND |
| 9 | Green | White | RXD | RXD |
| 10 | Black | Blue | GND | GND |

Note: XMC4000's UCB part can only be adjusted 4 times. If programming a blank chip, you must program the UCB to secure the chip. If the chip's UCB has already been programmed, avoid erasing it unless you need to change the settings. Erasing or reprogramming the actual chip itself does not affect the UCB's content.

XMC1000 Series Usage

Port connections

- a) **Signal line:** Connect the RXD (PIN9) to the P1.3 or P0.14 pin on the target board
- b) **GND:** Connect GND (PIN8 or PIN10) to the target board's grounding wire
- c) **Power :** If the target board has it's own power supply, there is no need to connect the power line. Should the target board require a power source, please connect the power line (PIN1) to the target board Chip

BMI requirements

The JMaster3/L can only perform programming on chips that are designated as ASC_BSL (by default) or ASC_BSLTO

If your chip's BMI is set to another mode, the JMaster3/L programmer cannot work as intended. Follow the instructions below to revert the BMI to the default mode (ASC_BSL).

a) BMI in debugging mode

Add the following lines to the program and run it as usual.

```
#define ROM_FUNCTION_TABLE_START (0x00000100)
#define _BmiInstallationReq (ROM_FUNCTION_TABLE_START + 0x08)
// Pointer to Request BMI installation routine
#define XMC1000_BmiInstallationReq (*((unsigned long (**)) (unsigned short)) _BmiInstallationReq))
// Call the BMI_installation routine to set BMI = ASC_BSL
XMC1000_BmiInstallationReq(0xFFC0);
```

After running the program, the chip will revert to default settings and can no longer be debugged. If debugging is required, use the JMaster3/L programmer to set the BMI to debug mode

b) BMI in production mode

When the chip is in production mode, it can no longer be reprogrammed.



We provides the option to reprogram the chip in production mode by adding a small program to the user's start up file (startup_XMC1xxx.s). Upon each reset, the chip will run the program to do the following two things:

1. Determine whether or not the target board is connected to the JMaster3/L programmer. If it is not connected, the target board will run normally. If it is connected, it will execute 2.
2. Compare the 32-digit password with the preset in the JMaster3/L. If the passwords match, the entire chip will be erased and reverted to factory mode. If the passwords do not match, the program will run normally.

The following programs (KEIL or DAVE) can be found in the BMI folder of setup directory.

Using KEIL:

Locate Reset_Handler in startup_XMC1xxx.s

Add the recovery mode program before the first executable line of code

```
;* Reset Handler  
Reset_Handler PROC  
EXPORT Reset_Handler [WEAK]  
IMPORT __main  
IMPORT SystemInit
```

Insert program KEIL_BMI_P1_3.S (when using P1.3 programming) or KEIL_BMI_P0_14.S (when using P0.14 programming) here.

The following is the first executable line of code

```
;* C routines are likely to be called. Setup the stack now  
LDR R0, =_initial_sp  
MOV SP, R0
```

Using DAVE:

Locate __Xmc1xxx_reset_cortex_m: in startup_XMC1xx.s

Add the recovery mode program before the first executable line of code

```
__Xmc1xxx_reset_cortex_m:  
.fnstart
```

Insert program DAVE_BMI_P1_3.S (when using P1.3 programming) or DAVE_BMI_P0_14.S (when using P0.14 programming)

The following is the first executable line of code

```
/* C routines are likely to be called. Setup the stack now */  
/* This is already setup by BootROM,hence this step is optional */  
LDR R0,=__Xmc1100_stack  
MOV SP,R0
```

Setting a Password for Recovery Mode

In erasing the BMI's settings, the passwords from the user program and the JMaster3/L are compared. The chip will be erased only if the passwords match exactly.

The password for erasing has nothing to do with the chip's internal security. Should you choose to add in a recovery mode to the program, its only function is to erase the chip. It has no access to read the program files.

The password is set at the beginning of the program, with the default password being



0x12345678.

If you need to change the password, alter 0x12, 0x34, 0x56, 0x78 to your desired password.

a) Verifying whether or not the program is correct

Since XMC1000 cannot be debugged after being written in production mode, we advise adding the recovery mode option provided by us. In the start up file so the BMI can be reset no matter what BMI mode it is in.

During verifying, we recommend the BMI be set to ASC_BSLTO with a delay of 2 (approximately 1 second). During this time the chip is not encrypted, and if no program commands are received during this time frame the program will run as normal.

Note: When using ASC_BSLTO, do NOT set the delay to 0. Setting it to 0 is in essence, setting the chip as production mode.

XMC4000 Series Usage

Port connections

- a) Signal line: Connect lines RXD (PIN9) and TXD (PIN7) to target board pins P1.4 and P1.5
- b) Ground line: Connect GND (PIN8 or PIN10) to the target board's grounding wire
- c) Power line: If the target board has its own power supply, there is no need to connect the power line. Should the target board require a power source, please connect the power line (PIN1) to the target board
- d) Control line: If the board has TMS, TSK jumpers, set them as BSL download mode. There is no need to connect TMS (PIN3), TCK (PIN5). If the target board does not have TMS and TCK jumpers, connect TSM (PIN3), TCK (PIN5) to the target board's TMS, TCK. TMS (PIN3), TCK (PIN5) output 0 during programming.
- e) Reset: If the target board does not have a reset circuit, please connect RESET (PIN6) to the board's reset pin. During programming, this line will sent a reset signal. If the target board has a built in reset circuit, there is no need to connect this line.