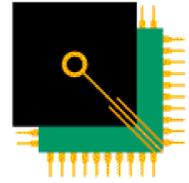


Flash Magic Application Note 4

What to do if ISP Does Not Work

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1. Introduction

This application note describes steps to take and items to check when In-System Programming does not appear to be working. The information contained in this application note has been drawn on several years of supporting Flash Magic and includes the common problems.

2. First Steps

Ensure the crystal frequency entered is accurate. For example, if you are using 11.0592MHz, then enter "11.0592", not "11.0000" or "11".

If you are using high-speed communications mode with the correct frequency entered, then try connecting with the feature turned off. Make sure the device is reset again into ISP mode if needed before attempting to connect.

If you have the half-duplex communications feature turned on and you do not need it, then turn it off. It only slows down the serial communications.

If you are using a baud rate higher than 9600, lower it to 9600, reset the device into ISP mode (if applicable) and try again. The baud rate at which you are able to successfully connect to the device depends on which device you are using, the crystal frequency you are using and how many clocks per cycle the device is configured for.

If you are already using 9600 baud, or lowering to 9600 baud does not work, then try 4800 baud. If your crystal frequency is 6MHz or below, try the baud rates below 4800 baud.

Ensure you have the correct device selected in Flash Magic. Some of the devices have very similar names. If you change the device then ensure you reset the device into ISP mode if applicable before trying again.

Ensure the COM Port selected in Flash Magic is the correct one you are using.

Check the datasheet and Philips Application Note AN461 for details of the requirements to place the device into ISP mode using hardware methods. **Ensure the voltages on the necessary pins are at the expected levels.**

Ensure the power supply to the device is stable, within the allowed range, and free from glitches.

Ensure your ground is stable and it is not floating. A floating ground will cause devices to behave erratically or incorrectly.

3. Device Specifics

3.1 89C51Rx2+, 89C51Rx2Hxx, 89C51Rx2xx, 89C5166x

Philips presently produces two versions of the Rx2 family:

- 89C51Rx2Hxx - second generation

- 89C51Rx2xx - third generation

Note that they are differentiated by the presence or lack of a 'H' after the '2'. These devices are very similar but it is important that the correct one you are using is selected in Flash Magic, as they are not identical. Check the part number printed on the device itself to see if the 'H' is present or not.

All these devices except the 89C51Rx2xx must have both **P2.6 AND P2.7** pulled high during reset when attempting to enter ISP mode. Failure to do this results in anything from partial functioning of the bootloader to complete non-functioning of the bootloader.

3.2 89LPC932

If the Keil MCB900 board is being used, then ensure the power is removed and reapplied after changing the jumpers. Failure to do this could cause the device to enter an unknown state.

Read Flash Magic Application Note 3 regarding ISP entry when using the 89LPC932.

4. Additional Steps

4.1 Terminal Test

This is a simple and very useful test, which attempts to narrow down where the problem lies.

Try connecting to the device using Hyperterminal or any other terminal program, such as Tera Term Pro.

Hyperterminal comes with most versions of Windows and is usually available from the Start Menu, under Start | Programs | Accessories | Communications.

If it does not appear on the Start Menu, then you may need to install it. The method to do this varies between different versions of Windows, but in general:

- Click on Start | Settings | Control Panel
- Choose Add/Remove Programs
- Click on Windows Components or similar
- Search for the checkbox for Hyerterminal and check it. You may need to keep selecting categories and clicking on the Details button to view more choices.

Once you have a terminal program running, select the COM Port you are using and create a connection with the following configuration:

- 8 bits
- No parity
- One stop bit
- No handshaking or flow control
- 9600 baud or 4800 baud
- No local echo (if available)

If you are using the Start BootROM feature, then send the Start BootROM command your device expects. If the command and/or the full stop response are not echoed back, then the problem potentially lies in your application code.

Next:

- Reset the device into ISP mode if applicable.

- Send a single uppercase 'U'.

If the device fails to echo the uppercase 'U' back to the terminal program then there is a COM Port, serial cable or device problem.

Next check using an oscilloscope:

- If the 'U' is not arriving at the RxD pin of the device then it is a COM Port or serial cable problem.
- If the 'U' is arriving, but no 'U' is leaving the TxD pin in response, then the device is not executing the bootloader for some reason. Check how you are placing the device into ISP mode.
- If the 'U' is leaving the TxD pin of the device but not arriving at the terminal program, then it is a COM port or serial cable problem.
- If the baud rate of the 'U' is not the baud rate selected in the terminal program, then either the PC COM port is faulty, or there is something like opto-isolators affecting the baud rate.

If the device echoes back the 'U' to the terminal program then try sending some ISP commands to the device and seeing if they are echoed back. If any response from the device takes longer than about 10 seconds, then perform the Last Resort steps below.

If the device echoes back the 'U' and all ISP commands and responses then the problem likely lies in Flash Magic somewhere. Perform the Last Resort steps below.

4.2 Switching Hardware

If the above steps do not give an indication where the problem lies, try using a different device, different COM Port or different PC, with a different version of Windows.

4.3 Hardware ISP Entry using DTR and RTS

If you are using the COM Port control signals DTR and RTS to place the device into ISP mode, look at the signals on an oscilloscope and compare them with the waveforms shown in Flash Magic Application Note 1. If there are differences, check your circuit.

Ensure the timing for T1 is at least 50ms and T2 is at least 100ms. Try increasing both values to 200ms and 300ms respectively.

Try temporarily using switches or jumpers to place the device into ISP mode, rather than using DTR and RTS. Turn off the option in Flash Magic to use DTR and RTS.

4.4 Timeouts

Another cause of problems could be that your device is taking a little longer to respond than Flash Magic allows. This problem has been most frequently observed during device erasing or when using some types of USB to RS232 converters or cables.

To increase the timeouts in Flash Magic go to the Options menu, choose Advanced Options and click on the Timeouts tab. Check "Use my timeouts for ISP operations" and increase the values displayed in the boxes. Keep increasing the timeouts one or two seconds at a time and retesting.

Note that increasing the timeouts has the downside that if something should go wrong during an ISP operation, or if you start Flash Magic with no device connected, then you will have a longer wait before Flash Magic gives up trying.

The command line also supports the TIMEOUTS directive to allow the timeouts to be increased. See the manual for details of how to use the directive.

5. Last Resort

If all of the suggestions in this application note have failed to work, then the last resort is to generate a debug file and send it along with some additional information to Embedded Systems Academy. The following steps describe how to generate a debug file for both the Command Line and Windows versions of Flash Magic.

Windows:

- Start Flash Magic
- When the splash screen appears press F1 to turn the debug mode on. There will be no indication at this point that anything has changed.
- When the Flash Magic window appears it will say “[Debug]” at the top indicating the debug mode is turned on.
- Perform the necessary steps to generate an error message in Flash Magic. If you cannot seem to get anything to work, then simply choose Read Security Bits... from the ISP menu
- Press F2 to turn off the debug mode.
- Debug mode can be turned on at any time by pressing F1 again. The debug file is always appended.

Command line:

Use the following directive. It can only be used once on the command line or in a command file. There are no parameters.

- DEBUG

The debug file generated can be found at

- C:\flashmagic.fmd

Email this file to support@esacademy.com along with the following information:

- Exact text of any error message in Flash Magic
- Exact name of the device being used
- Exact crystal frequency
- The baud rate being used
- The number of clocks per cycle for devices where it can be changed
- The details of all tests performed and the results
- Any additional information that you feel might be helpful

Delete the debug file.

It is important that all the information listed above is included for the fastest possible resolution to the problem.

Note that the debug file may contain an encoded version of your entire hex file or part of it, if you generated it while attempting to program the device. If sending your entire hex file or part of it is a concern then you can either:

- Use a different hex file and repeat the debug file generation steps

- Contact us regarding signing an NDA – our only concern is solving any problems with Flash Magic