

F²MC-16LX FAMILY
16-BIT MICROCONTROLLER
MB903XX/4XX/5XX

NOTES ON USING RESET

APPLICATION NOTE

Revision History

Date	Issue
2002-10-31	Version: 1.0, MSt Initial version
2005-11-25	Hard wired reset vector chapter added; MWi

This document contains 12 pages.

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Contents

REVISION HISTORY	2
WARRANTY AND DISCLAIMER	3
CONTENTS	4
0 INTRODUCTION	5
1 16-LX SERIES INCLUDING BOTH RESETS.....	6
1.1 RST Reset.....	6
1.2 HST Reset.....	7
1.3 Conclusion	8
1.3.1 Voltage drop down.....	8
1.4 Operation Transition by Reset Input	9
2 16LX SERIES INCLUDING RST ONLY	10
2.1 RST Reset.....	10
3 APPENDIX.....	11
3.1 16LX series Reset overview	11
3.2 Hard wired reset vectors addresses	12

0 Introduction

In 16LX series there are several devices including two Reset Pins - HST and RST.

Chapter 1 explains the behaviour and restrictions of RST and HST.

There are several devices including RST only.

Chapter 2 explains the behaviour of RST on chips without HST.

1 16-LX Series including both Resets

1.1 RST Reset

When using RST (HST=1), bits of the CKSR and LPMR Register are not reset.

That means, the clock selection and PLL selection is not changed to default values.

After asserting RST the program is executed with same internal frequency and same operation mode (e.g. sub clock mode) as before. The start-up of the mcu can be done faster.

(No oscillation stabilisation time must be waited)

Table 1: Registers not initialised by RST

Reset	CKSCR					WTC	LPMCR	
	WS1	WS0	MCS	CS1	CS0	WDCS	CG1	CG0
RST	N	N	N	N	N	N	N	N

[N]: Not initialised

[Y]: Initialised

Note:

If a crashed program changes CKSCR, it can happen that MCU does not restart correctly, although RST is asserted. Depending on external crystal, the internal frequency may become outside the valid operating range due to wrong CKSCR setting.

When using external Bus Interface, the addresses generated by mcu are undefined during Reset. The signals including /RD and /WR become inactive.

1.2 HST Reset

When using HST (Hardware stand-by) (RST=1) the clock settings are set to default values.

The internal Oscillator is turned off during HST active.

After release of HST the oscillation stabilisation time of internal Oscillator must be waited (2^{17} clock cycles). After the stabilisation time the CPU is running with $\frac{1}{2}$ external clock. During start-up phase of the device, the PLL must be switched on again (if necessary).

Table 2: Registers not initialised by HST

Reset		CKSCR					WTC	LPMCR	
		WS1	WS0	MCS	CS1	CS0	WDCS	CG1	CG0
HST	Main mode	N	N	Y	N	N	N	Y	Y
	Sub mode *1	Y	Y	Y	Y	Y	Y	Y	Y

[N]: Not initialised

[Y]: Initialised

*1: devices including subclock

1.3 Conclusion

We recommend the use of RST and HST together.

CPU can be restarted correctly after a voltage drop on Vcc.

Table 3: Registers not initialised using RST + HST

Reset		CKSCR					WTC	LPMCR	
		WS1	WS0	MCS	CS1	CS0	WDCS	CG1	CG0
HST	Main mode	N	N	N	N	N	N	Y	Y
	Sub mode *1 *2	Y	Y	Y	Y	Y	Y	Y	Y

[N]: Not initialised

[Y]: Initialised

*1: devices including subclock

*2: including the sub mode transition period

1.3.1 Voltage drop down

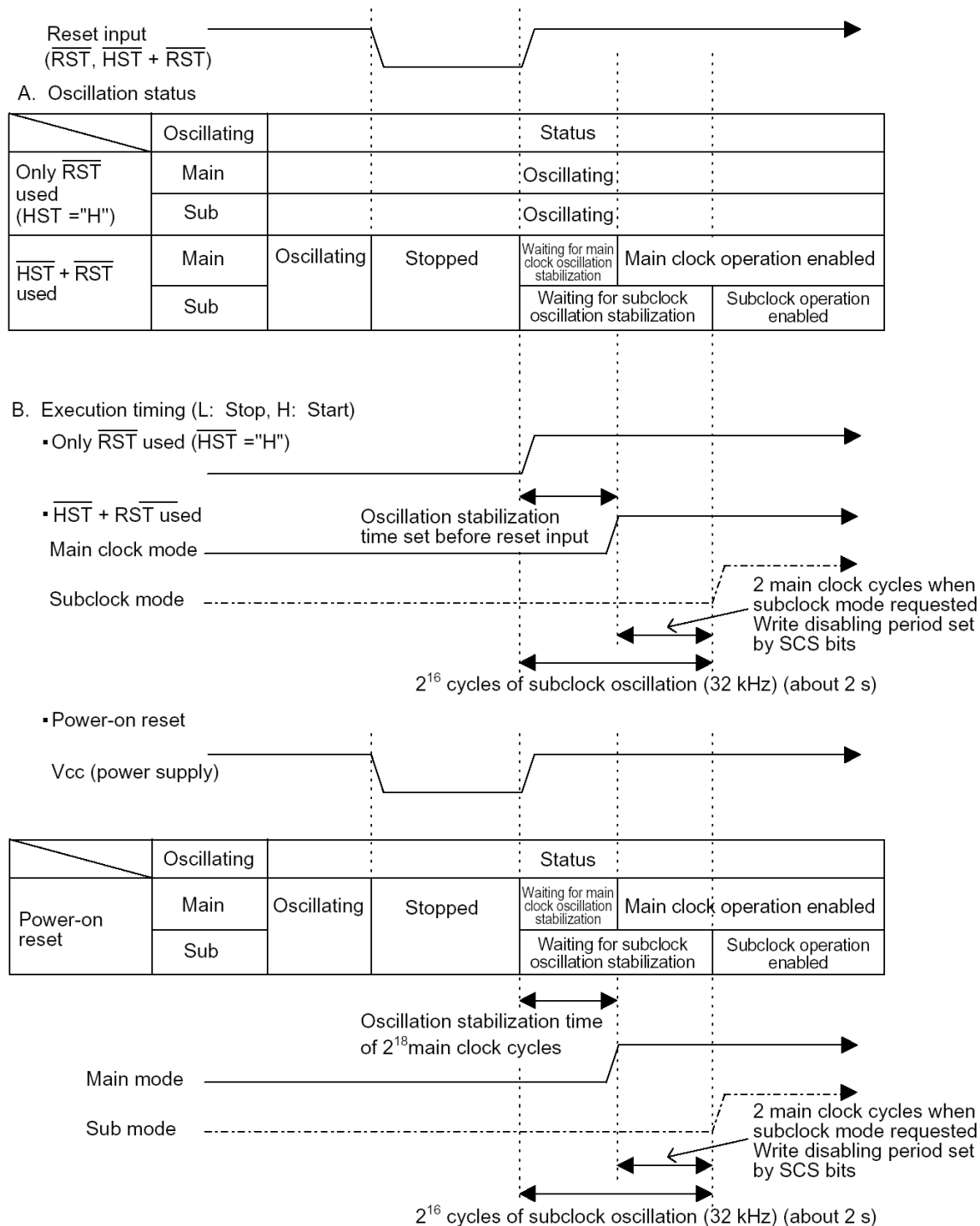
Condition: Voltage drop on Vcc

If a voltage drop on Vcc occurs, there is no power-on reset executed, if the voltage Vcc does not drop below under 0.2V for a certain time (t_{off}), which is specified in the DS. See details on Vcc in the corresponding Datasheet. If HST & RST is asserted afterwards, the MCU would restart correctly.

See also the Errata sheet of the series.

1.4 Operation Transition by Reset Input

Figure 1: Reset Timing



2 16LX series including RST only

2.1 RST Reset

When using RST Reset all bits in CKSR and LPMR Register are reset. The internal oscillation unit is not stopped. Therefore no oscillation stabilisation time must be waited after the release of RST. The mcu is operating in MAIN clock mode (PLL off).

If the reset cause is generated during a write operation (during the execution of a transfer instruction such as MOV), the CPU waits for the reset to be cleared after completion of the instruction only for reset requests via the RSTX pin. Therefore, the normal write operation is completed even though a reset is input concurrently.

Table 4: Registers not initialised by RST

Reset	CKSCR					WTC	LPMCR	
	WS1	WS0	MCS	CS1	CS0	WDCS	CG1	CG0
RST	Y	Y	Y	Y	Y	Y	Y	Y

[N]: Not initialised

[Y]: Initialised

3 Appendix

3.1 16LX series Reset overview

Table 5: 16LX series, reset overview

Series	RST	HST
MB90340	X	--
MB90385	X	--
MB90390	X	--
MB90420/425	X	--
MB90435	X	X
MB90440	X	--
MB90455	X	--
MB90460	X	--
MB90470	X	--
MB90495	X	--
MB90520	X	X
MB90540/545	X	X
MB90550	X	X
MB90560	X	--
MB90565	X	--
MB90570	X	X
MB90580	X	X
MB90590	X	X
MB90595	X	X

[X]: included

[--]: not available

3.2 Hard wired reset vectors addresses

The following MCUs have hard wired reset vectors. Please note, that new MCUs may not be listed here.

Table 6: Hard wired reset vector addresses

MCU Series	Address
MB90335	FFE000 _H
MB90350A	FFE000 _H
MB90355A	FFE000 _H
MB90390	FFA000 _H
MB90590	FFA000 _H
MB90595	FFA000 _H
MB90895	FFE000 _H
MB90845	FFA000 _H