F²MC-8FX FAMILY
8-BIT MICROCONTROLLER
MB95200H/210H SERIES

LOW-VOLTAGE DETECTION
RESET CIRCUIT
APPLICATION NOTE
Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Author</th>
<th>Change of Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-03-20</td>
<td>Benjamin. Yang</td>
<td>V1.0, First draft</td>
</tr>
<tr>
<td>2008-07-15</td>
<td>Benjamin. Yang</td>
<td>V1.1, Modification</td>
</tr>
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</table>

This manual contains 11 pages.

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1 Introduction

The Application Note describes the function and operation of low-voltage detection reset

circuit. The configuration, pins, and operation of low-voltage detection reset circuit are

introduced in this manual.
2 Feature

This chapter explains the electrical characteristics and block diagram.

This circuit monitors power supply voltage and generates reset signal if the voltage drops below the detection voltage level.

The functions of low-voltage detection reset circuit are as follow:

- Avoids the Power Down;
- Detects low voltage;
- Reset the MCU;
- Outputs reset signal to external pin.

So we don’t need to apply a voltage monitoring IC to the external circuits.

2.1 Electrical Characteristics

The electrical characteristics related to low-voltage detection are as follows.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min</td>
<td>Typ</td>
<td>Max</td>
</tr>
<tr>
<td>Release voltage</td>
<td>( V_{CL} )</td>
<td>2.52</td>
<td>2.7</td>
<td>2.88 V</td>
</tr>
<tr>
<td>Detection voltage</td>
<td>( V_{CL-V} )</td>
<td>2.42</td>
<td>2.6</td>
<td>2.78 V</td>
</tr>
<tr>
<td>Hysteresis width</td>
<td>( V_{HY} )</td>
<td>70</td>
<td>100</td>
<td>—</td>
</tr>
<tr>
<td>Power supply start voltage</td>
<td>( V_{SR} )</td>
<td>—</td>
<td>—</td>
<td>2.3 V</td>
</tr>
<tr>
<td>Power supply end voltage</td>
<td>( V_{on} )</td>
<td>4.9</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Power supply voltage change time</td>
<td>( t_{rr} )</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>(at power supply rise)</td>
<td></td>
<td>—</td>
<td>3000</td>
<td>—</td>
</tr>
<tr>
<td>Power supply voltage change time</td>
<td>( t_{rr} )</td>
<td>300</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>(at power supply fall)</td>
<td></td>
<td>—</td>
<td>300</td>
<td>—</td>
</tr>
<tr>
<td>Reset release delay time</td>
<td>( t_{rr} )</td>
<td>—</td>
<td>—</td>
<td>300 ( \mu s )</td>
</tr>
<tr>
<td>Reset detection delay time</td>
<td>( t_{dd} )</td>
<td>—</td>
<td>—</td>
<td>20 ( \mu s )</td>
</tr>
</tbody>
</table>

Table 2-1: Electrical Characteristics related to Low-voltage Detection
2.2 Block Diagram

Figure 2-1 shows block diagram of low-voltage detection reset circuit.

Figure 2-1: Block Diagram of Low-voltage Detection Reset Circuit
This chapter explains the pins of low-voltage detection reset circuit.

### Pins Related to Low-voltage Detection Reset Circuit

- **Vcc pin**: Low-voltage detection reset circuit monitors the voltage applied to Vcc pin.
- **Vss pin**: Vss pin is a GND pin serving as the reference for voltage detection.
- **RST pin**: The low-voltage detection reset signal is output to RST pin inside the microcontroller.
4 Operation of Low-voltage Detection Reset Circuit

The low-voltage detection reset circuit generates reset signal if the power supply voltage falls below the detection voltage level.

**Operation of Low-voltage Detection Reset Circuit**

Low-voltage detection reset circuit generates reset signal if the power supply voltage falls below the detection voltage level. If the voltage is subsequently detected to have been recovered, the circuit outputs reset signal during oscillation stabilization wait time to cancel the reset.

For details on the electrical characteristics, refer to Data Sheet.

![Figure 4-1: Operation of Low-voltage Detection Reset Circuit](image)

A: Delay  
B: Oscillation stabilization wait time
5 Notes on Low-voltage Detection Reset Circuit

This chapter shows the notes on Low-voltage detection reset circuit.

The MB5200H/210H series of 8FX-Family has low-voltage detection function, so users should pay attention to following notes.

- The low-voltage detection reset circuit remains operating even in standby modes (stop, sleep, sub-clock and watch modes).
- Low-voltage detection is compulsorily set to “ON” debug mode, it is higher priority than user option.
- There isn’t any external mode pin control, so initialize the low-voltage detection state by power-on reset and external reset.
6 Additional Information

For more information on FUJITSU MICROELECTRONICS products, please visit the following website:


7 Appendix

7.1 Index of Tables
Table 2-1: Electrical Characteristics related to Low-voltage Detection ..................................... 5

7.2 Index of Figure
Figure 2-1: Block Diagram of Low-voltage Detection Reset Circuit........................................ 6
Figure 4-1: Operation of Low-voltage Detection Reset Circuit................................................ 8