

**TOSHIBA Microcontrollers**  
**870 Family**  
**(TMP86FM48)**

October 2004

## Datasheet Modifications: I<sup>2</sup>C Bus Control

The following modifications (shown in red) will be made to the technical datasheets in the next revision.

### Section: "I<sup>2</sup>C Bus Control"

▪ **In the explanation of the Serial Bus Interface Control Register A**

1. Delete the setting examples where the serial clock frequency exceeds 100 kHz.
2. Modify the note as shown below.

SCK	Serial clock (fsc) selection (Output on SCL pin) [fsc = 1/(2 <sup>n+1</sup> /fc + 8/fc)]	SCK	n	At fc = 16 MHz	At fc = 8 MHz	At fc = 4 MHz	Write only
		000:	4	Reserved (Note)	Reserved (Note)	100.0 kHz	
001:	5	Reserved (Note)	Reserved (Note)	55.6 kHz			
010:	6	Reserved (Note)	58.8 kHz	29.4 kHz			
011:	7	60.6 kHz	30.3 kHz	15.2 kHz			
100:	8	30.8 kHz	15.4 kHz	7.7 kHz			
101:	9	15.5 kHz	7.8 kHz	3.9 kHz			
110:	10	7.8 kHz	3.9 kHz	1.9 kHz			
111:				Reserved			

**Note:** Do not set SCK as the frequency that is over 100 kHz.



**Note:** This I<sup>2</sup>C bus circuit does not support the Fast mode. It supports the Standard mode only. Although the I<sup>2</sup>C bus circuit itself allows the setting of a baud rate over 100 kbps, the compliance with the I<sup>2</sup>C specification is not guaranteed in that case.

▪ **In "(3) Serial clock"**

1. Add the following sentence about the communication baud rate.
  - a. Clock source

The SCK (Bits 2 to 0 in SBICRA) is used to select a maximum transfer frequency output from the SCL pin in the master mode. **Set a communication baud rate that meets the I<sup>2</sup>C bus specification, such as the shortest pulse width of t<sub>LOW</sub>, based on the equations shown below.**

Four or more machine cycles are required for both high and low levels of pulse width in the external clock which is input from SCL pin.

Note: Since the I<sup>2</sup>C of TMP86FM48 cannot be used as the fast mode and the high-speed mode, do not set SCK as the frequency that is over 100 kHz.

$$t_{LOW} = 2^n / f_c$$

$$t_{HIGH} = 2^n / f_c + 8 / f_c$$

$$f_{sc} = 1 / (t_{LOW} + t_{HIGH})$$