

September 2008

Dear Customer

## **Important Notices**

Thank you for your continued patronage of Toshiba microcontrollers.

This page gives you important information on using Toshiba microcontrollers. Please be sure to check each item for proper use of our products.

### **▶ Caution in Setting the UART Noise Rejection Time** (September 2008)

- \* If your datasheet is dated 1 July 2008 or earlier, please download the latest datasheet or request it from your local Toshiba office.

## TOSHIBA Microcontrollers TLCS-870 Family

### TLCS-870/X Series

|           |            |            |           |            |           |           |
|-----------|------------|------------|-----------|------------|-----------|-----------|
| TMP88CH40 | TMP88CH40I | TMP88PH40  | TMP88CH41 | TMP88PH41  | TMP88FH41 | TMP88CS42 |
| TMP88PS42 | TMP88CS43  | TMP88FW44  | TMP88FW45 | TMP88FW45A | TMP88F846 | TMP88CH47 |
| TMP88CK48 | TMP88CM48  | TMP88CS48A | TMP88CK49 | TMP88CM49  | TMP88C060 |           |

### TLCS-870/C Series

|            |             |            |            |            |            |            |
|------------|-------------|------------|------------|------------|------------|------------|
| TMP86P202  | TMP86P203   | TMP86CH06  | TMP86CH06A | TMP86PH06  | TMP86C906  | TMP86C407  |
| TMP86C407I | TMP86C407S  | TMP86C807  | TMP86C807I | TMP86C807S | TMP86F807  | TMP86P807  |
| TMP86C408  | TMP86C408I  | TMP86C408S | TMP86C808  | TMP86C808I | TMP86C808S | TMP86F808  |
| TMP86P808  | TMP86C908   | TMP86C809  | TMP86CH09  | TMP86F409  | TMP86F809  | TMP86FH09  |
| TMP86FH09A | TMP86C909   | TMP86C912  | TMP86CH12  | TMP86FH12  | TMP86C420  | TMP86C820  |
| TMP86P820  | TMP86CH21   | TMP86CH21A | TMP86C822  | TMP86CH22  | TMP86PH22  | TMP86CP23  |
| TMP86CP23A | TMP86CM23   | TMP86CM23A | TMP86FS23  | TMP86PM23  | TMP86PS23  | TMP86C923  |
| TMP86FP24  | TMP86CM25   | TMP86CM25A | TMP86CS25  | TMP86CS25A | TMP86FM25  | TMP86PS25  |
| TMP86C925  | TMP86FM26   | TMP86CM27  | TMP86CP27A | TMP86FS27  | TMP86PS27  | TMP86C927  |
| TMP86CS28  | TMP86FS28   | TMP86C829  | TMP86C829A | TMP86C829B | TMP86CH29  | TMP86CH29A |
| TMP86CH29B | TMP86CM29   | TMP86CM29A | TMP86CM29B | TMP86CM29L | TMP86FM29  | TMP86PM29  |
| TMP86PM29A | TMP86PM29B  | TMP86C929A | TMP86CS41  | TMP86CS43  | TMP86CS44  | TMP86PS44  |
| TMP86C944  | TMP86C845   | TMP86C846  | TMP86CH46A | TMP86CM46A | TMP86FH46  | TMP86FH46A |
| TMP86PH46  | TMP86PM46   | TMP86C847  | TMP86C847I | TMP86C847S | TMP86CH47A | TMP86CH47I |
| TMP86CH47S | TMP86CM47A  | TMP86FH47  | TMP86FH47A | TMP86PH47  | TMP86PM47  | TMP86PM47A |
| TMP86C947  | TMP86FM48   | TMP86C948  | TMP86CH49  | TMP86CM49  | TMP86CS49  | TMP86FS49  |
| TMP86FS49  | TMP86FS49AI | TMP86FS49B | TMP86PM49  | TMP86C949  | TMP86CS64  | TMP86CS64A |
| TMP86FS64  | TMP86PS64   | TMP86C964  | TMP86CH72  | TMP86CM72  | TMP86PM72  | TMP86C972  |
| TMP86CK74A | TMP86CM74A  | TMP86PM74A | TMP86C974  | TMP86CH87R | TMP86PM87R | TMP86PM87R |
| TMP86C987  | TMP86C989   | TMP86CH92I | TMP86CH92S | TMP86FH92  | TMP86FH92I | TMP86FH93  |
| TMP86C993  |             |            |            |            |            |            |

### TLCS-870 Series

|           |           |           |           |           |            |           |
|-----------|-----------|-----------|-----------|-----------|------------|-----------|
| TMP87CH29 | TMP87CK29 | TMP87CM29 | TMP87PM29 | TMP87CH48 | TMP87CH48I | TMP87CM48 |
| TMP87PH48 | TMP87PM48 | TMP87CM53 | TMP87PM53 | TMP87CS68 | TMP87PS68  |           |

\*Applicable products include all TLCS-870 Family microcontrollers with the UART function including custom products and products supplied as bare chips that are not listed above. If you have any questions, please contact your local Toshiba sales representative.

September 2008

## Caution in Setting the UART Noise Rejection Time

With regard to the TLCS-870, TLCS-870/X and TLCS-870/C Series of Toshiba's 8-bit microcontrollers listed above, please be informed that certain combinations of transfer clock frequency and noise rejection time should not be used in the UART (asynchronous serial interface) as explained below. If you need further information, please contact your local Toshiba sales representative.

### [Applicable Usage Conditions]

This caution applies when the timer/counter interrupt is selected as a transfer clock of the UART and the transfer clock frequency (fc) and the RXD input noise rejection time are set to one of the combinations shown in the table below. Under any other conditions, the noise rejection can be used without any problem.

| Communication mode setting | Transfer clock select             | Transfer clock frequency [Hz] (Note) | RXD input noise rejection time setting                | fc frequency [MHz] | Communication speed [bps] |
|----------------------------|-----------------------------------|--------------------------------------|---|--------------------|---------------------------|
| Receive operation (RXE=1)  | Timer/counter interrupt (BRG=110) | fc/8                                 | Reject pulses shorter than 31/fc as noise (RXDNC=01)  | 1.229              | 9600                      |
|                            |                                   |                                      |   | 2.458              | 19200                     |
|                            |                                   |                                      |   | 4.915              | 38400                     |
|                            |                                   |                                      |   | 9.830              | 76800                     |
|                            |                                   | fc/16                                | Reject pulses shorter than 63/fc as noise (RXDNC=10)  | 1.229              | 4800                      |
|                            |                                   |                                      |   | 2.458              | 9600                      |
|                            |                                   |                                      |   | 4.915              | 19200                     |
|                            |                                   |                                      |   | 9.830              | 38400                     |
|                            |                                   |                                      |   | 19.661             | 76800                     |
|                            |                                   | fc/32                                | Reject pulses shorter than 127/fc as noise (RXDNC=11) | 1.229              | 2400                      |
|                            |                                   |                                      |   | 2.458              | 4800                      |
|                            |                                   |                                      |   | 4.915              | 9600                      |
|                            |                                   |                                      |   | 9.830              | 19200                     |
|                            |                                   |                                      |   | 19.661             | 38400                     |

Note: The transfer clock is calculated by the following equation:

$$\text{Transfer clock [Hz]} = \text{Timer/counter source clock [Hz]} \div \text{TREG set value}$$

**[Problem]** In receive operation (RXE=1), input data on the RXD pin may not be received properly.

**[Workaround]** If you are using the UART with one of the above noise rejection time settings, disable the noise rejection or change the noise rejection time to a shorter period.