Errata Sheet

V 1.1, 2003-12

Device	**C515C-8E**
Marking/Step	**Step BC**
Package	**P-MQFP-80**

This Errata Sheet describes the deviations from the current user documentation.

The module oriented classification and numbering system uses an ascending sequence over several derivatives, including already solved deviations. So gaps inside this enumeration can occur.

Current Documentation

- C515C User's Manual 11.97
- C515C Data Sheet Feb. 2003
- Instruction Set Manual 07.2000

Note: Devices marked with EES- or ES are engineering samples which may not be completely tested in all functional and electrical characteristics, therefore they should be used for evaluation only.

The specific test conditions for EES and ES are documented in a separate Status Sheet.

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1 History List/Change Summary

(since last CPU Step BB, previous Errata Sheet V1.0)

Table 1 Functional Deviations

Functional Deviation	Short Description	Fixed in Step	Change
CAN.2	Unexpected Remote Frame Transmission		
CAN.3	Description in User's Manual regarding the reception of remote frames and the data length code (DLC) field is incorrect		
CAN.4	Flowchart sequence in figure in User's Manual regarding Micro-controller handling of the Last Message Object is partly incorrect		
CAN.5	Description in User's Manual section 6.5.5 regarding the Configuration of the Bit Timing is partly incorrect		
WDT.1	Watchdog Timer is not halted in Idle Mode		
OTP.1	ROM Verification Mode 2 and verification error signaling at Port 3.5		
OTP.2	OTP module may fail under special conditions, leading to undefined operation	BC	

Table 2 AC/DC Deviations

AC/DC Deviation	Short Description	Fixed in Step	Change
DC.3	V_{IH} minimum on EA pin does not meet the specification values		
DC.4	V_{DD} is valid for a smaller range than specified on documents		
DC.5	Minimum value of -3 µA for the logic 0 input current (Ports 1, 2, 3, 4, 5, 7)		New
DC.6	Maximum limit values of the power supply current (I_{DD})for Active Mode and Idle Mode		New

Table 3 Application Hints

Application Hint	Short Description	Fixed in Step	Change
None.			

2 Functional Deviations

CAN.2: Unexpected Remote Frame Transmission

The on-chip CAN module may send an unexpected remote frame with the identifier=0, when a pending transmit request of a message object is disabled by software.

There are three possibilities to disable a pending transmit request of a message object (n=1..14):

- Set CPUUPDn element
- Reset TXRQn element
- Reset MSGVALn element

Either of these actions will prevent further transmissions of message object n.

The symptom described above occurs when the CPU accesses CPUUPD, TXRQ or MSGVAL, while the pending transmit request of the corresponding message object is transferred to the CAN state machine (just before start of frame transmission). At this particular time the transmit request is transferred to the CAN state machine before the CPU prevents transmission. In this case the transmit request is still accepted from the CAN state machine. However the transfer of the identifier, the data length code and the data of the corresponding message object is prevented. Then the pre-charge values of the internal “hidden buffer” are transmitted instead, this causes to a remote frame transmission with identifier=0 (11 bit) and data length code=0.

This behavior occurs only when the transmit request of message object n is pending and the transmit requests of other message objects are **not** active (single transmit request). If this remote frame loses arbitration (to a data frame with identifier=0) or if it is disturbed by an error frame, it is **not** retransmitted.

Effects to other CAN nodes in the network

The effect leads to delays of other pending messages in the CAN network due to the high priority of the Remote Frame. Furthermore the unexpected remote frame can trigger other data frames depending on the CAN node's configuration.

Workaround:

1. The behavior can be avoided if a message object is not updated by software when a transmission of the corresponding message object is pending (TXRQ element is set) **and** the CAN module is active (INIT = 0). If a re-transmission of a message (e.g. after lost arbitration or after the occurrence of an error frame) needs to be cancelled, the

TXRQ element should be cleared by software as soon as NEWDAT is reset from the CAN module.

2. The nodes in the CAN system ignore the remote frame with the identifier=0 and no data frame is triggered by this remote frame.

CAN.3: Description in User's Manual regarding the reception of remote frames and the data length code (DLC) field is incorrect

It is inaccurately described in the User's Manual on page 6-94 under *'Arbitration Registers'* that *'When the CAN controller stores a remote frame, only the data length code is stored into the corresponding message object'*. The correct should be that the DLC field remains unchanged in the receiving message object, and that the CPU has the responsibility to define the DLC of the answering data frame.

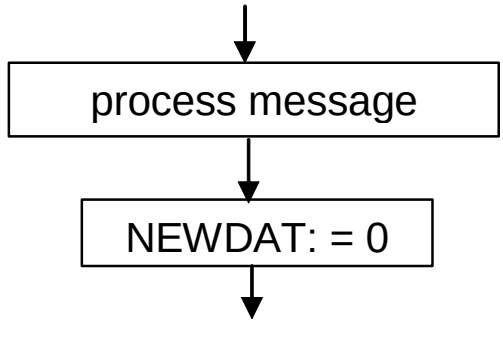
This correction will be updated to the future versions of the User's Manuals.

Workaround:

Not applicable.

CAN.4: Flowchart sequence in figure in User's Manual regarding Micro-controller handling of the Last Message Object is partly incorrect

For the software flowchart figure 6-48 in User's Manual 11.97, the correct would be to first 'process message contents' and then to 'clear bit NEWDAT'.



This correction will be updated to the future versions of the User's Manuals.

Workaround:

Not applicable.

CAN.5: Description in User's Manual section 6.5.5 regarding the Configuration of the Bit Timing is partly incorrect

As described for the CAN Bit Timing Register High BTR1, the minimum total time requirement for segment 1 and segment 2 is as follows:

$$t_{TSeg1} \geq 3 \times t_q$$
$$t_{TSeg2} \geq 2 \times t_q$$

The total bit time remains at ($t_{TSeg1} + t_{TSeg2} \geq 7 \times t_q$).

This correction will be updated to the future versions of the User's Manuals.

Workaround:

Not applicable.

WDT.1: Watchdog Timer is not halted in Idle Mode

The Watchdog Timer (WDT) is not halted in the Idle Mode as defined. However, during the Idle Mode, an overflow condition of the WDT does not initiate an internal reset. In such a case, the WDT starts a new count sequence.

Workaround:

1. Do not use the Watchdog Timer function in combination with the Idle Mode
2. In case of WDT is running before entry into idle mode, to avoid a WDT initiated reset upon exit of the Idle Mode, the following methods can be used.

   a) The WDT is refreshed immediately upon exit from Idle Mode.
   b) A timed interrupt can be used to exit the Idle Mode before the WDT reaches the counter state 7FFCh. This can be achieved by using Timer 0, 1 or 2. This timer can be programmed to generate an interrupt at a WDT counter state prior to overflow, for e.g., at 7F00h. Prior to entering Idle Mode, the WDT can be refreshed and Timer 0, 1or 2 can be started immediately to synchronize the WDT. In the interrupt service routine of Timer 0, 1 or 2, the WDT must be refreshed. If required, Idle Mode could be entered again.

OTP.1: ROM Verification Mode 2 and verification error signaling at Port 3.5

P3.5 does not remain at “0” permanently after detecting a verify error. It will return to “1” when a block of 16 bytes is equal to the internal memory contents, i.e. the verify procedure for these 16 bytes is passed.

Also, the last block of 16 bytes will always return verification error in the ROM Verification Mode 2.

Workaround:

None.

3 Deviations from Electrical- and Timing Specification

DC.3: V_{IH} minimum on $\overline{EA}$ pin does not meet the specification values

The V_{IH} min. voltage on pin $\overline{EA}$ does not meet the specified values:

V_{IH} min. for $\overline{EA}$ pin is (0.6 • V_{DD}) V, instead of (0.2 • V_{DD} + 0.9) V.

The new value will be worked into future documentation.

Workaround:

None.

DC.4: V_{DD} is valid for a smaller range than specified on documents

V_{DD} is valid in the range from 4.5 V to 5.5 V at all specified temperatures, instead of 4.25 V to 5.5 V as specified on the documents. This smaller range is effective on devices with date code *0115*.

Workaround:

None.

DC.5: Minimum value of - 3 µA for the logic 0 input current (Ports 1, 2, 3, 4, 5, 7)

The minimum value of the logic 0 input current for ports 1, 2, 3, 4, 5, and 7 is lower than the specified value:

I_{IL} min. = - 3 µA (instead of - 10 µA)

Workaround:

None.

DC.6: Maximum limit values of the power supply current (I_{DD}) for Active Mode and Idle Mode

The maximum limit values of the power supply current (I_{DD}) for Active Mode and Idle Mode are shown in the table below, instead of the specified values stated in the Data Sheet.

Power Supply Current

Parameter			Symbol	Maximum Limit Values	Unit
Active Mode	C515C-8E	6 MHz	I_{DD}	15.76	mA
		10 MHz	I_{DD}	24.16	mA
Idle Mode	C515C-8E	6 MHz	I_{DD}	9.85	mA
		10 MHz	I_{DD}	14.45	mA
Active Mode with Slow-Down enabled	C515C-8E	6 MHz	I_{DD}	5.66	mA
		10 MHz	I_{DD}	6.60	mA
Idle Mode with Slow-Down enabled	C515C-8E	6 MHz	I_{DD}	5.02	mA
		10 MHz	I_{DD}	5.60	mA

Workaround:

None.

4 Application Hints

No application hints for this step.

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