DI Errata

- **ATAM893S**
- **ATAM894P**
- **ATAR092P**
- **ATAR892P**
- **ATAR090H**
- **ATAR890H**
- **ATAR080F**
- **ATA6020N**
- **ATAR510F**
- **ATAR862N3/N4/N8**

The latest product enhancement (PCN HC030703 DI enhancement) introduced to all MARC4 products during 2003, leads, under some conditions, to an unforeseen and unwanted behavior. The circuit may not process interrupts correctly. All above mentioned MARC4 products are affected.

Description

If a DI command is immediately followed by a CALL or SCALL command and an interrupt meets this DI command, this interrupt is kept in the interrupt active register permanently despite a correct RTI execution. Even if the EI command in the interrupted program has been executed, this bit in the interrupt active register stays set and disables the execution of any interrupt of the same or lower priority. Only an interrupt with a higher priority or a reset is able to solve this blocking status.

If the command following the DI is a NOP, the interrupt active register usually is cleared correctly after an RTI and executing interrupts then continues normally.

MARC4 4-bit Microcontrollers

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Errata Sheet

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Workaround

MTP Parts

a) Experienced customers using Atmel MTP parts (ATAM893S, ATAM894P) can modify the HEX-file directly. Within each interrupt service routine, replace the HEX-code for CCR! in front of the RTI with a SCALL to a free address. Introduce the HEX-codes for the commands LIT_1, OR, CCR! and EXIT at this address. Now, with each RTI, the interrupt enable flag is set. This software modification overrides the last hardware modification, i.e., the parts behave as if not having received DI-enhancement, and the interrupt active register will be cleared correctly.

b1) An equivalent modification can be done in the source code, but the modification depends on the content the compiler saved at the beginning of an interrupt service routine:

```
0080   : INT1
0080 0D     CCR@     \$SAVEREG
0081 73     Y@
0082 72     X@
```

In this case, CCR, X and Y registers were saved, therefore, the modification should look as follows:

```
2>R 2>R 1 or 2R> 2R>
```

either at the beginning or at the end of the interrupt service routine.

b2) If only CCR and one of the registers were saved:

```
01E0   :INT7
01E0 0D     CCR@     \$SAVEREG
01E1 73     Y@
```

The modification looks as follows:

```
ROT 1 or <ROT
```

c) Customers using MTP parts may switch their order to the predecessor version.

ROM Parts

Customers using ROM parts may switch their order to the predecessor version.

Up to now it has not occurred, that parts working correctly under all conditions might fail in the future or under different environmental conditions.

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