

AP1628

Scanning
for Problem CPU.21
in C166 Family
Microcontrollers

Microcontrollers



Never stop thinking.

Scanning for Problem CPU.21

Revision History: **2001-05**

V 1.3

Previous Version: 2001-04 V1.2

Page	Subjects (major changes since last revision)
4	reference to ap162804.exe and aiScan21 V2.3 (including disassembler V1.3 with extended buffer for hex files with maximum line length)

Controller Area Network (CAN): License of Robert Bosch GmbH

We Listen to Your Comments

Any information within this document that you feel is wrong, unclear or missing at all?
Your feedback will help us to continuously improve the quality of this document.

Please send your proposal (including a reference to this document) to:

mcdocu.comments@infineon.com



1. Introduction

This application note briefly summarizes different methods to handle problem CPU.21 (BFLDL/BFLDH Instructions after Write Operation to Internal IRAM), a problem which affects specific devices and steps of the Infineon C166 microcontroller family. This application note concentrates in particular on aiScan21, a scan tool which was developed with the focus on analysis of software which is already in practical operation in the field.

The scan tool aiScan21 is included in the self-extracting file ap162801.exe

2. Affected/Non-affected Devices and Steps

Based on the status of January 2001, the devices and steps which are affected/not affected by problem CPU.21 are listed in the 'Early Problem Notification' (see file EPN_CPU21_V14.pdf). For future devices and steps, see the Errata Sheet of the respective device.

3. Handling of Problem CPU.21

Depending on the status of a project, there are several possibilities to handle problem CPU.21

3.1 Software already in Practical Use

In order to analyze software which is already in practical use in the field, or which was transferred (without modifications) from a previous design step which was not affected by problem CPU.21, the scan program aiScan21 was developed. This tool operates on files in (Intel) hex format in combination with information supplied by the locator map file and/or a user specified configuration file.

The advantage of aiScan21 is that it can include the absolute operand address information, which is only available in the final (absolutely located) hex file, into its decision process. Furthermore, it can consider PEC destination, stack, and register bank areas. This in most cases helps to definitely classify a given BFLDx instruction as critical or uncritical. In situations where this is not possible, aiScan21 outputs diagnostic information (e.g. calculation of range of critical values, etc.) that further helps the programmer in the analysis process.

Conversion from other file formats into Intel hex format may be performed with converter programs (from tool suppliers, or from the Internet).

3.2 Software currently in Development

If possible, it is recommended to use a version of the tool chain which already includes support for problem CPU.21. Both Keil and Tasking have updates of their compilers available which either avoid generation of BFLDx instructions or protect BFLDx instructions (by inserting an ATOMIC instruction).

Tasking in addition provides an assembler version with check option for problem CPU.21. This assembler may be used for checking purposes also for code generated with previous versions of the tool chain.

When BFLDx instructions (in a critical context) are detected, one of the workarounds described in the Early Problem Notification or in the Errata Sheet text module for problem CPU.21 should be used. Since in some situations the definite classification of a given BFLDx instruction as critical or uncritical may be relatively complex, a trade-off may be made between the depth of the analysis and the (usually relatively small) overhead of a workaround.

As an alternative (or in addition), the scan tool aiScan21 may be used. However, a new run of aiScan21 is required each time the program or the locating of the operands is modified.

4. Contents of ap162804.exe

The self-extracting file ap162804.exe contains the following elements:

- Scan tool aiScan21:

README.txt:	hints for installation and starting of aiscan21
aiscan21.exe:	scan tool aiscan21 V2.3
aiscan21.pdf:	documentation for aiscan21
C16XDisasm.exe:	pls disassembler V1.3, invoked by aiscan21
example.cfg:	exemplary configuration file for aiscan21
FAQ.txt:	frequently asked questions (and answers) V2.3 about aiscan21
releaseNote.txt:	changes to earlier releases of aiscan21

- Documentation to problem CPU.21:

CPU21_EPN_V14.pdf:	Early Problem Notification (EPN) for problem CPU.21
CPU21_EPN_Proc_V04.pdf:	Comments to Problem CPU.21

5. Links

For questions about handling problem CPU.21 on Infineon microcontrollers, you may contact your nearest Infineon FAE or distributor's FAE. You may also use the 'CONTACT' button on the Infineon Microcontroller webpage

http://www.infineon.com/cgi/ecrm.dll/ecrm/scripts/prod_cat.jsp?oid=-8137

In case there will be updates of aiScan21, you will find them on this website. In this case, the 2 least significant digits xx of ap1628xx will be incremented.

For further information about the software tools, please contact our partners at

<http://www.absint.com/>

<http://www.keil.com/>

<http://www.tasking.com/>

Infineon goes for Business Excellence

“Business excellence means intelligent approaches and clearly defined processes, which are both constantly under review and ultimately lead to good operating results.

Better operating results and business excellence mean less idleness and wastefulness for all of us, more professional success, more accurate information, a better overview and, thereby, less frustration and more satisfaction.”

Dr. Ulrich Schumacher

<http://www.infineon.com>

Published by Infineon Technologies AG