

AP1679

Scanning
for Problem CPU.22
in C166 Family
Microcontrollers

Microcontrollers



Never stop thinking.

Scanning for Problem CPU.22

Revision History: **2002-05**

V1.1

Previous Version: V1.0

Page	Subjects (major changes since last revision)
5	reference to ap167902.exe, including software update aiscan22 V1.5

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1 Introduction

This application note briefly summarizes different methods to handle problem CPU.22 (Z flag may erroneously be set after PUSH or PCALL instructions), a problem which affects specific devices and steps of the Infineon C166 microcontroller family. This application note concentrates in particular on aiScan22, 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 aiScan22 is included in the self-extracting file ap167901.exe.

2 Affected/Non-affected Devices and Steps

Based on the status of March 2002, the devices and steps which are affected/not affected by problem CPU.22 are listed in the 'Early Problem Notification' (see file EPN_CPU22_V13.pdf). For future devices and steps, see the Errata Sheet of the respective device.

3 Handling of Problem CPU.22

In general, problem CPU.22 will **not** occur for software which was generated by the Hightec C166 compiler, the Keil C166 compiler (versions 3.xx and higher), or the Altium/Tasking C166 compiler (version 3.x and higher). Therefore, analysis can be restricted to program parts written in assembler (including inline assembly). Depending on the status of a project, there are several possibilities to handle problem CPU.22:

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.22, the scan program aiScan22 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 aiScan22 is that it can include the absolute address information, which is only available in the final (absolutely located) hex file, into its decision process. This in most cases helps to definitely classify a given PUSH or PCALL instruction as critical or uncritical. In situations where this is not possible, aiScan22 outputs diagnostic information that further helps the programmer in the analysis process. In addition, switches are provided to suppress warnings for special cases (e.g. no indirect PSW access, no PUSH-RET warnings, etc.).

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

Since (at least for the latest compiler versions) problem CPU.22 is not generated by the C compilers from Hightec, Keil, or Altium/Tasking, analysis can be restricted to program parts written in assembler, or instructions inserted via inline assembly.

When PUSH or PCALL instructions (in a critical context) are detected, the workaround described in the Early Problem Notification or in the Errata Sheet text module for problem CPU.22 should be used.

In addition, the hex file scan tool aiScan22 may be used. However, a new run of aiScan22 is required each time the program is modified.

4 Contents of ap167902.exe

The self-extracting file ap167902.exe contains the following elements:

- Scan tool aiScan22:

README.txt: hints for installation and starting of aiscan22
aiscan22.exe: scan tool aiscan22 V1.5
aiscan22.pdf: documentation for aiscan22
C16XDisasm.exe: pls disassembler V1.3, invoked by aiscan22
example.cfg: exemplary configuration file for aiscan22
releaseNote.txt: changes to earlier releases of aiscan22

- Documentation to problem CPU.22:

CPU22_EPN_V13.pdf: Early Problem Notification (EPN) for problem CPU.22

5 Links

For questions about handling problem CPU.22 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 aiScan22, you will find them on this website. In this case, the 2 least significant digits xx of ap1679xx 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/>

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Dr. Ulrich Schumacher

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