C868

QuickstartC868

This document describes how to get started with **C868 BA-step**. It gives information about using the new C868 StarterKit (MiniC868), how to download a HEX-File into the C868's SRAM and execute it. This is done by hands of a PC-tool "MiniDebugger" which communicates with the C868 over serial line.

Two different tools are offered for this MiniDebugger: one DOS version and another Windows based version.

For testing one can use a simple assembly program togglep3.hex which just toggles Port 3 or alternatively a complete C-project based on the freeware of Keil C-Compiler evaluation version ek51v701. This project uses interrupts, the ADC module, the T2 and the CAPCOM6E module.

Following parts are delivered with this information:

- MiniDebugV106.ZIP -- installation file for MiniDebugger Windows version
- MiniDebug CmdL V102.ZIP installation file for MiniDebugger DOS version
- Getstarted.ZIP -- Software exmaples and 8051 Disassembler

By hands of QuickstartC868 it should be possible to run a user program within one hour starting from the scratch.

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Microcontrollers

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Revision History:	**2002-07**	**V 2.0**
Previous Version:	-	V 1.1
Page	Subjects (major changes since last revision)	
	Adapted to C868 BA-step	
	Using C868_gui_V106.zip, C868_cmd_V102.zip	

1.1 Using this QuickstartC868

This document describes two different tools for downloading and executing code out of the C868.

The ***MiniDebugger Command Line Interface*** is a batchable tool running under the DOS prompt and can be used very easily. For quickest start with C868 just use the MiniDebugger Command Line Interface together with the simple assembly program ***togglep3.a51*** resp. ***togglep3.hex***. The use of this tool is described in ***chapter 1.5.5***. Especially in combination with the ***ADIS51*** disassembler this is a comfortable and easy tool for assembler programmers.

- The ***MiniDebugger GUI*** version is a Windows based tool and offers more features like debugging commands. For demonstrating this tool one can use the complete C-project ***getstart.uv2*** or simply the ***togglep3.hex***.

1.2 Memory Concept of C868

The C868 is a low cost 8bit microcontroller with a standard 8051 core. It's memory system consists of BootROM and an 8kbyte SRAM/ROM plus 256byte IRAM plus 256byte XRAM. The memory concept allows to download via a serial link the user's code into the onchip SRAM. This is supported by an onchip bootstrap- loader which invokes either an UART-module to communicate with a PC or it emulates a SPI interface to download from an external EEPROM. This concept is very flexible and it allows easy getting started and fast development.

1.3 MiniDebugger Functions

The PC-host software MiniDebugger communicates with the bootstraploader (with autobaudrate detection) and supports some standard monitor commands like:

- Download HEX-file to XRAM/SRAM
- Jump to XRAM 0xFF00
- Jump to SRAM address 0x0000
- Read and write memory (IRAM, XRAM, SRAM, SFR)
- Go from Startaddress to Breakaddress (one breakpoint)
- Script functionality for comfortable use of often needed functions

1.4 Ressources of MiniDebugger

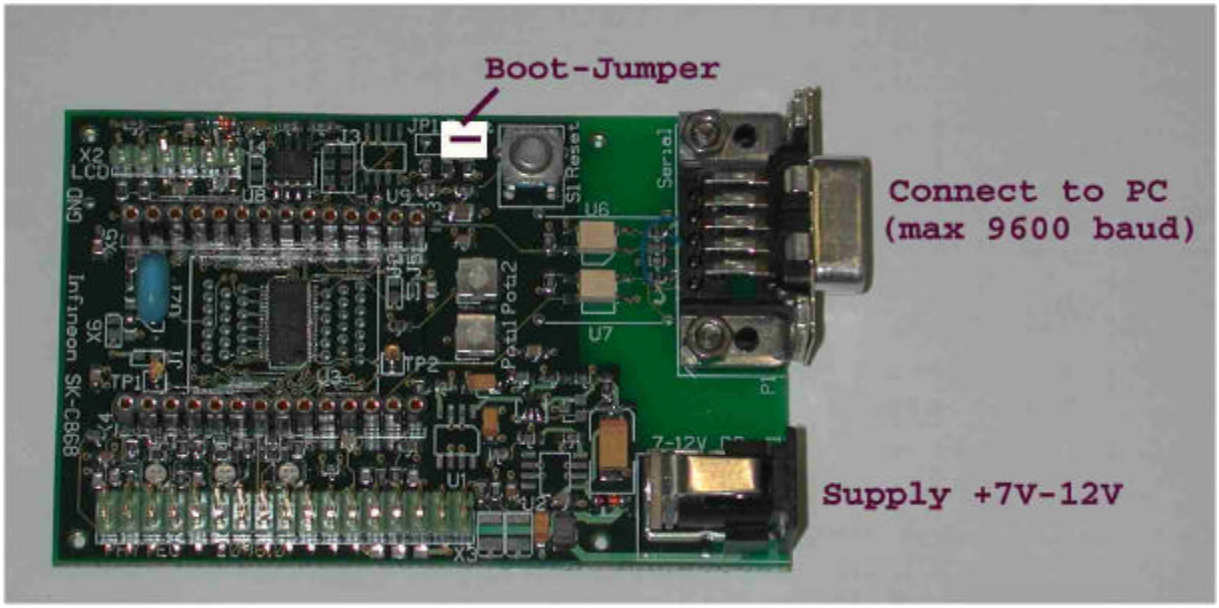
The Debugger is using the serial interface (UART) and it's baudrate generator. Default it is using the T1 to generate the baudrate clock. Furthermore it uses some bytes of the XRAM (0xFFD8-0xFFFF as shadow area for program and data memory), some bytes of indirect data memory (0x80 - 0x87) as command buffer and some bytes of SRAM (0x1FF0 - 0x1FFF). For indirect addressing of the different memories; accu and datapointer are used and restored from the stack before executing the user program. For debugging all chipmodes (normal, BSL and XRAM mode) are used.

1.5 Installing the Tools for C868

1.5.1 Preparing the Hardware

Connect a standard *"1-to-1 RS232 serial cable"* to the D-SUB9 connector of the starterkit and to your PC. Take care that the *Bootjumper* is set and supply the power connector with a *+7-12V* DC power supply. The green power LED must turn on. See figures below.

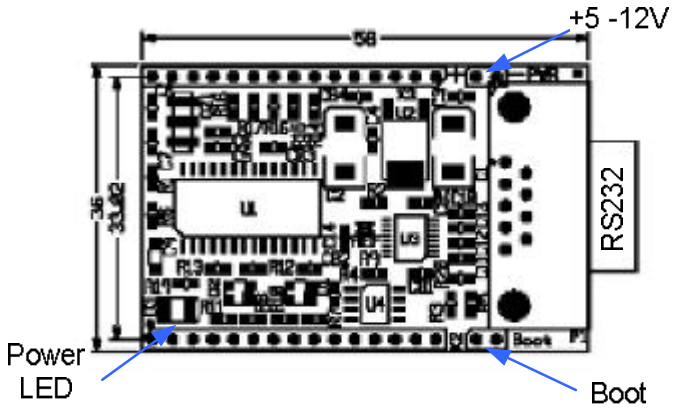
1.5.1.1 StarterKit C868



1.5.1.2 StarterKit MiniC868

The new starterkit MiniC868 is a cost optimized version with following features

- Real RS232 interface
- Power Supply LED
- Tricolour LEDs on P3
- DTR-signal from PC can control the RESET#



1.5.2 Installing the C868 Command Line Interface

The Command Line Interface is a simple tool for downloading a HEX-file to the memory of the C868. It just runs under the DOS prompt and is batchable. Therefore it can be easily integrated into a C-Compiler's *"After Make"* option. For installation of this tool please unzip the file *C868_cmd_V102.ZIP* to a temporary directory and follow the installation process. The resolving file *C868.EXE* can be copied to any user directory and can be executed from there.

1.5.3 Installing the C-Compiler

At the first step an 8051-C-Compiler is required. This example is based on the free evaluation version of Keil C-Compiler ek51v701 which can be downloaded from CD or internet under http://www.keil.com/demo/.

Please download this C-Compiler if you want to run the software example given in this document. This evaluation version has some restrictions in code size (2kbyte) but supports the standard features).

Second step is to unzip the demo project getstart.zip to a userspecific directory.

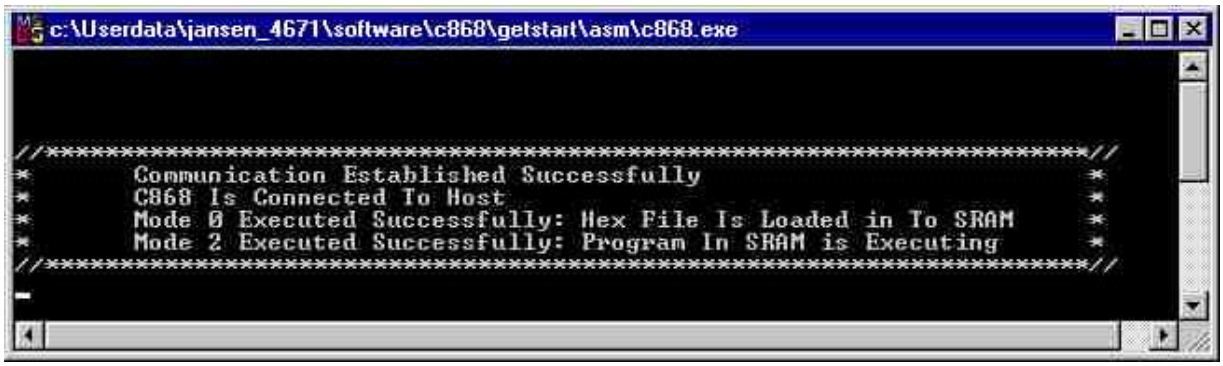
1.5.4 Installing the MiniDebugger

The MiniDebugger is a PC-based development tool and runs under Windows NT/95/98/2000/XP. It can be installed by unzipping the C868_gui_V106.ZIP and running setup.exe. Unfortunately the link to the START/Program-Files fails and this has to be done manually. For execution just start *MiniDebug.exe* in the \bin directory or put a link to your desktop. Using the Command Line Interface
If one just wants to download and execute some code to the C868 memory without using other MiniDebugger commands the Command Line Interface gives a fast solution.

The given example ***togglep3.hex*** will toggle the LEDs on Port 3.

Just call following command from the DOS prompt:
C868 filename.hex
With *C868 help command* you will get some help.
With *C868 -br4800 -DTR1 -COM2 filename.hex* one can influence the baudrate and the comport as well as the DTR-signal (when using the C868 starterkit DTR has to be enabled).

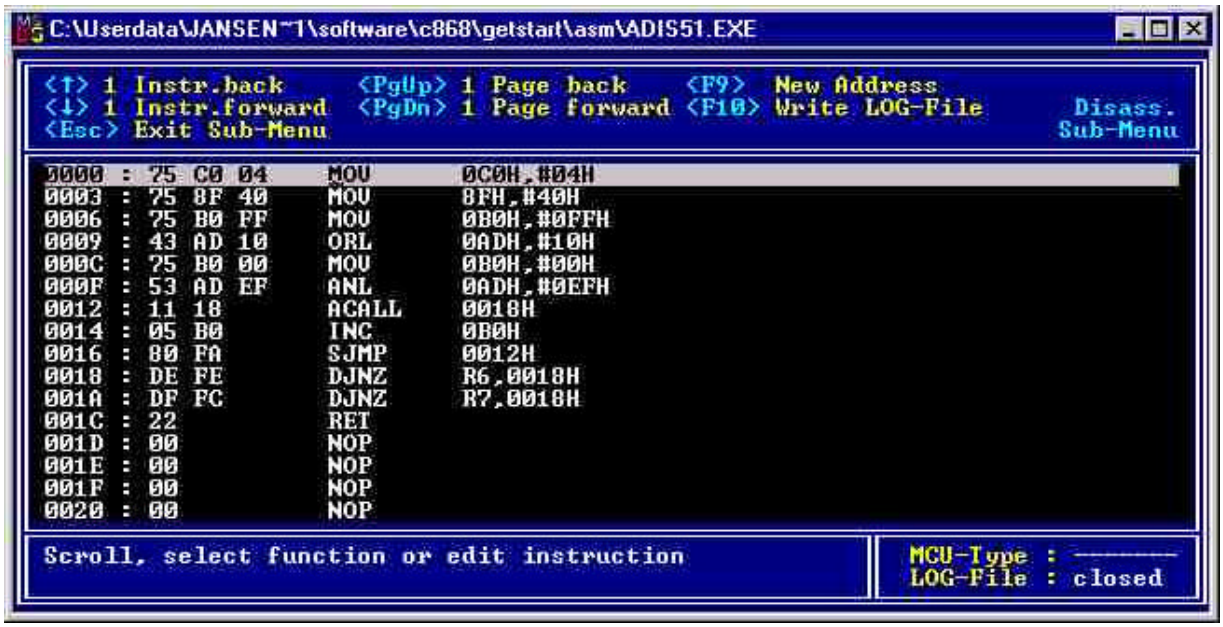
After successfull execution following message will appear:



1.5.5 Using the Disassembler ADIS51

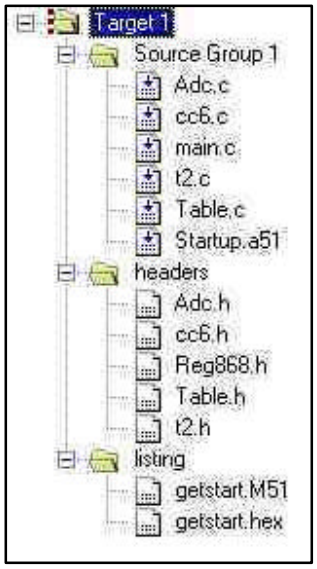
ADIS51 is a freeware 8051 disassembler and can be invoked from the DOS prompt. It offers features like:

- HEX-dump
- Disassembly
- Write HEX-file



1.5.6 Using the C-Compiler

After starting the C-Compiler with *uv2.exe* we have to open the project getstart.uv2 and we can see the different modules in the *"Project Window"*:



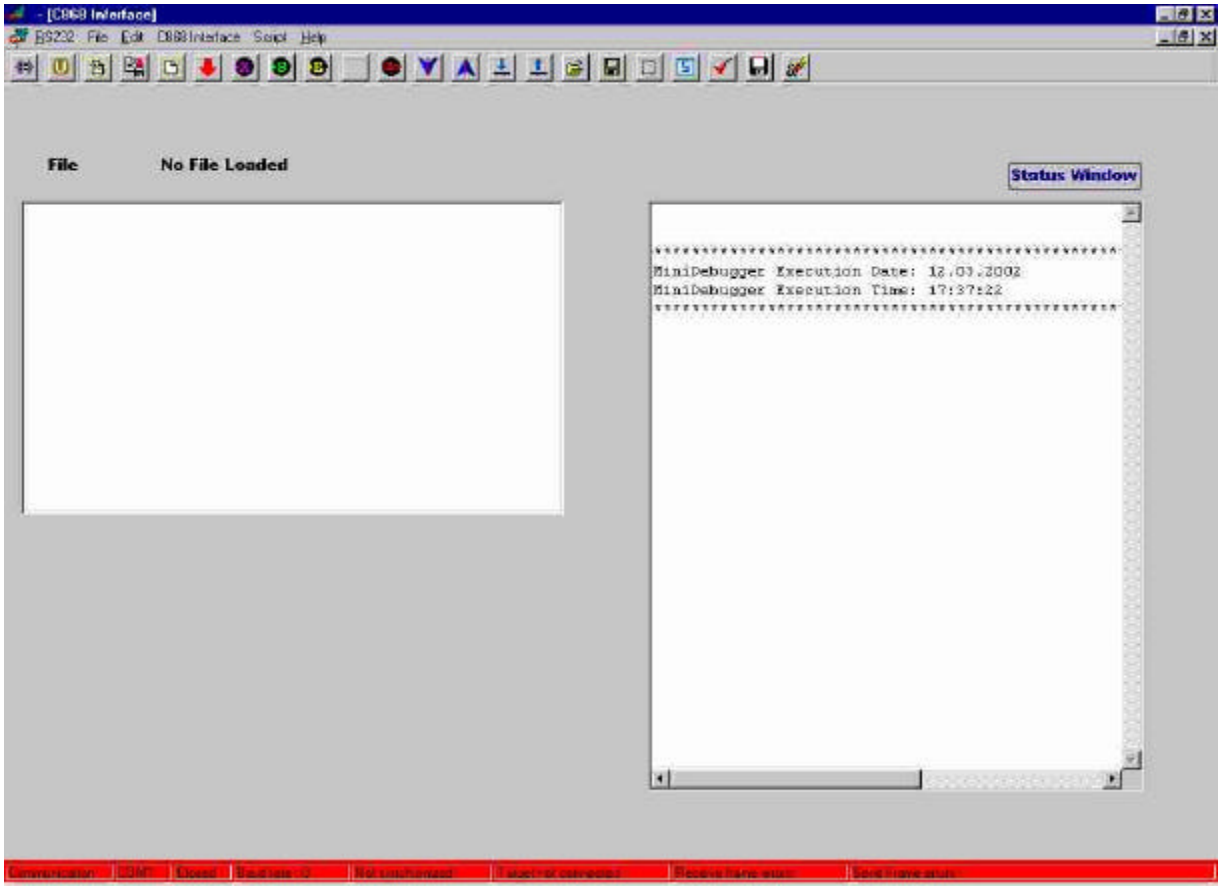
After Compiling we should have no errors and the HEX-file should be generated. Following Message appears in the *"Output Window"*.

```
assembling Startup.a51...
linking...
creating hex file from "getstart"...
"getstart" - 0 Error(s), 0 Warning(s).
```

Now everything is prepared for downloading the *GETSTART.HEX* into the C868.

1.5.7 Using the MiniDebugger

After invoking *MiniDebug.exe* the following menu appears:



If the C868 StarterKit is connected to the PC we have to initialize and synchronize the serial interfaces of the PC and the C868. This can be done by clicking on the first left button and the red status bar will turn into a blue one with the following message:



Now the C868's bootstraploader is waiting on monitor commands from the MiniDebugger and we can e.g. download a HEX-file to the C868 memory locations. For this purpose the HEX file has to be opened and loaded to the PC's memory first. This is done by clicking on the third left button and the HEX-file will appear in the MiniDebugger's memory window.

Next step is to download the HEX-file to the C868. The red arrow will do this and we will see the message

Data Transfer Is Successful

in the *Status Window*. The bootstraploader itself will recognize if the file is to be loaded to the 8k SRAM or to the 256byte XRAM by hands of the given addresses in the HEX-file.

Now we can jump to the SRAM address 0x0000 or to XRAM 0xFF00. This is done by the pink *>X-Button* (for jump to XRAM) or by the green *>S-Button* (for jump to SRAM). After clicking the Jump-to-SRAM button the example program is executed and the LEDs will change their colours.

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