

Development Kit DIPmodul-F40

Quickstart Instructions

Edition May 2011

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1 Introduction to the Development Kit

This Quickstart provides:

- general information on the SYS TEC DIPmodul-F40 Single Board Computer (SBC)
- instructions on how to run example programs on the DIPmodul-F40, mounted on the SYS TEC DIPmodul Developmentboard

Please refer to the DIPmodul-F40 Hardware Manual for specific information on such board-level features as jumper configuration, memory mapping and pin layout.

1.1 Development Kit Documentation

The “Development Kit” includes the following electronic documentation on the enclosed SYS TEC Products CD-ROM:

- the SYS TEC DIPmodul-F40 Hardware Manual and DIPmodul Development Board Hardware Manual
 - controller User's Manual and Data Sheets
- this Quickstart Instruction with general “Development Kit” description, software installation hints and two example programs enabling quick out-of-the box start-up of the DIPmodul-F40 in conjunction with the FUJITSU Workbench Softune software development tools.

1.2 Overview of this Quickstart Instruction

This Quickstart Instruction gives a general “Development Kit” description, as well as software installation hints and two example programs enabling quick out-of-the box start-up of the DIPmodul-F40 in conjunction with the FUJITSU Workbench Softune software development tools. It is structured as follows:

- 1) The *"Getting Started"* section uses one example programs, to demonstrate the download of user code to the Flash device using FUJITSU MCU Programmer for Windows.

In addition to dedicated data for this Development Kit, this CD-ROM contains supplemental application notes on embedded microcontroller design and development.

1.3 System Requirements

Use of this “Development Kit” requires:

- the SYS TEC DIPmodul-F40,
- the SYS TEC DIPmodul Development Board with included DB-9 serial cable and AC adapter supplying 8-13 VDC / min. 300 mA,
- the SYS TEC Products CD-ROM,
- an IBM-compatible host-PC (486 or higher running at least Windows 9x/NT)

For more information and example updates, please refer to the following sources:



<http://www.systemec-electronic.com>
support@systemec-electronic.com

1.4 The SYS TEC DIPmodul-F40

The DIPmodul-F40 represents an affordable, yet highly functional Single Board Computer (SBC) solution in DIP-40 dimensions (24 mm x 56 mm). The standard board is populated with an FUJITSU MB90350 serie controller in MQFP-64 packaging, featuring an 8-channel on-chip A/D-converter with 10-bit resolution and an integrated 2.0B CAN controller.

All applicable signals extend from the underlying logic devices to two standard-width (2.54 mm /0.10 in.) single row SMD pin header connectors. This enables the DIPmodul-F40 to be plugged like a “big chip” into target hardware.

The module communicates by means of a serial communication channel and operates within a standard industrial range of 0 to +70 degrees C. It requires only a 80 mA power source.

FUJITSU MCU Programmer enables easy on-board download of user programs.

DIPmodul-F40 Technical Highlights

- SBC in DIP-40 dimensions (24 mm x 56 mm) achieved through state-of-the-art SMD technology
- populated with an MQFP-64 packaged FUJITSU MB90350 serie featuring 2.0B on-chip CAN
- 24 MHz CPU frequency
- improved interference safety achieved through multilayer technology
- 2 kByte (up to 128 kByte) serial EEPROM
- serial interface (TTL level)
- 2.0B CAN bus interface supporting 11-bit and 29-bit message identifiers with on-board CAN transceiver
- on-chip Bootstrap loader

- various port lines are available on the pin header connector (DIPmodul-connector)
- 2 on-board led's
- can be plugged into the application like a “big chip” requires only a +5 VDC / 80 mA (max.) power source

The SYS TEC DIPmodul Developmentboard, in EURO-card dimensions (160 x 100 mm), is fully equipped with all mechanical and electrical components necessary for the speedy and secure insertion, and subsequent programming, of SYS TEC DIPmodul series Single Board Computers with standard width DIP-40 (2.54 mm/ 0.10 in.) pin header connectors. Simple jumper configuration readies the Development Board's connection to any DIPmodul, which plug pins-down into the contact strips mounted on the DIPmodul Development Board.

DIPmodul Development Board Technical Highlights

- Reset signal controlled by push button
- Boot signal controlled by push button
- a low voltage socket and voltage regulator accepting an unregulated input voltage in a range from 8 to 13 VDC
- one DB-9 socket configured as RS-232 interface
- one DB-9 plug configured as a CAN interface
- simple jumper configuration allowing use of the DIPmodul Developmentboard with various SYS TEC DIPmodul SBCs
- peripheral devices (4 push buttons, 4 LEDs, 2 potentiometers, 1 temperature sensor) for quick testing of user software
- a wire wrap field (75 mm x 60 mm) supporting development of user-designed peripheral hardware

1.5 The FUJITSU Workbench Softune Development Toolchain

The FUJITSU Workbench Softune software evaluation development tool chain fully supports the entire Fujitsu microcontroller family. This includes a C compiler, assembler, linker/lokator and the simulator.

The FUJITSU Workbench Softune tool chain consists of the following executables:

- **C Compiler** fcc907s.exe
- **Assembler** fasm907s.exe
- **Linker** flnk907s.exe
- **Converter** fscv907s.exe
- **Softune** fs907s.exe

Once installed, the default destination location for the DOS-based files is the *C:\Softune\Bin* directory. Access to these programs from Windows is accomplished within Softune. The entire tool set can be run from Softune.

FUJITSU Workbench Softune

Softune is a Windows-based Graphical User Interface for the C compiler and assembler. All compiler, assembler and linker options are set with simple mouse clicks. Softune runs under Windows 95/98/ME/NT and 2000. This Integrated Development Environment (IDE) has been expressly designed with the user in mind and includes a fully functional editor.

All IDE commands and functions are accessible via intuitive pull-down menus with prompted selections. An extensive Help utility is included.

C Compiler

The ANSI C compiler and assembler are desined specially for the 16Bit Fujitsu derivates. Extensions provide access to onchip peripherals. The C compiler provides the fastest and smallest code using industry benchmarks.

2 Getting Started

What you will learn with this Getting Started example:

- installing Development Kit software
- starting FUJITSU MCU Programmer for Windows download utility
- interfacing the DIPmodul-F40, mounted on the DIPmodul Development Board, to a host-PC
- downloading example user code in hexfile format from a host-PC to the external Flash memory using MCU Programmer

2.1 Installing Development Kit Software

The automatic installation of all required software components as well as electronic documentation for the DIPmodul-F40 Development Kit is not yet finished. This will be available soon.

Follow the steps described below to install all components on your machine:

- Insert the FUJITSU Microcontrollers DVD with the corresponding Softune Workbench for the F2MC-16LX family. Browse to the setup, start the installation and follow the instructions during installation. Before you may use the software, you must register your Software Development Environment at FUJITSU. European customers can proceed with the registration directly via the following online form.

https://mcu.emea.fujitsu.com/cusreg/htm/cusreg_form.htm

If your location is outside Europe (EMEA), please contact your local sales office.

The applicable Softune must be installed to ensure successful completion of this Quickstart Instruction. Failure to install the proper software could lead to possible version conflicts, resulting in functional problems.

- After the Softune is installed, please start the compiler update in the same folder (fcc907s-v30113r01.exe).
- Now install FUJITSU MCU Programmer for Windows.
- Browse to the setup program located in the */Software/FUJITSU MCU Programmer* folder on your SYS TEC Products CD-ROM and run the *flashprog16lx-v01111.exe*.

Follow the setup installation steps. Once installed you can start Programmer by selecting *FMCI6LX* from within the *Programs\FUJITSU MCU Programmer* program group.

- Now copy all the demo programs for the DIPmodul-F40 Development Kit to your hard-drive.

2.2 Interfacing the DIPmodul-F40 to a Host-PC

Connecting the DIPmodul-F40, mounted on the DIPmodul Development Board, to your computer is simple:

- As shown in the figure below, if the DIPmodul-F40 is not already pre-installed, mount it pins down onto the Development Board receptacle footprint (X101, referred to as DIPmodul-F40 in the figure below).
- Ensure that pin 1 of module (denoted by the hash stencil mark on the PCB) matches pin 1 of the receptacle on the Development Board.
- Ensure that there is a solid connection between the module pins and the Development Board DIPmodul MM-993 receptacle.

Caution:

Take precautions not to bend the pins when the DIPmodul-F40 is removed from and inserted onto the DIPmodul Development Board.

Also make sure **not** to insert the DIPmodul-F40 into the second pair of contact strips for the CANOpen-Chip 505!

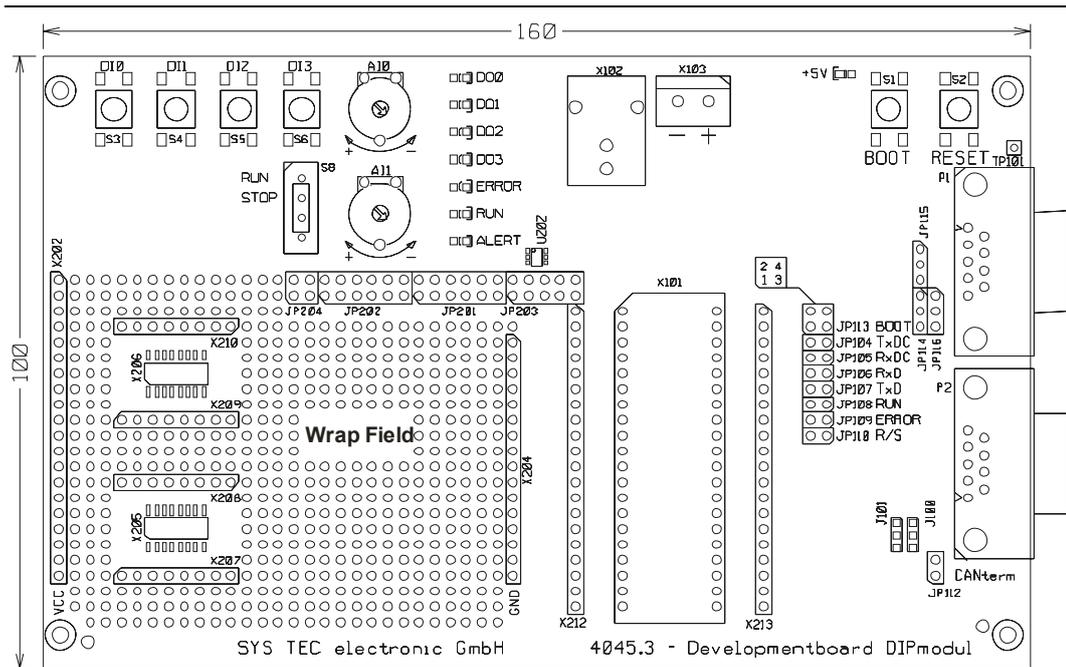


Figure 1: Development Board Overview

- Configure the jumpers on the DIPmodul Developmentboard as indicated below. This correctly routes the RS-232 signals to the DB-9 connector (P1) and connects the Developmentboard's peripheral devices to the DIPmodul-F40.

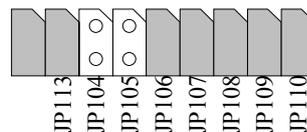
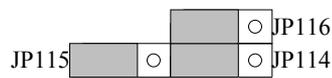


Figure 2: Suitable Development Board Jumper Settings

- Connect the RS-232 interface of your computer to the DB-9 RS-232 interface on the Developmentboard (P1) using the included serial cable.

- Using the included power adapter, connect the power socket on the board (X102) to a power supply (*refer to Figure 3 for the right polarity*).

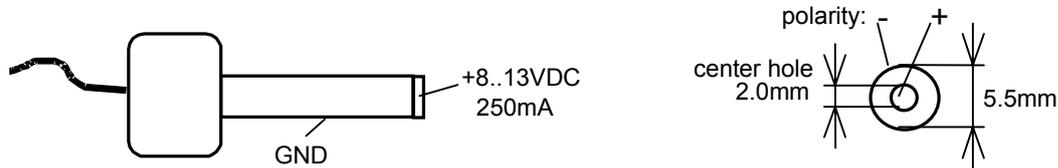


Figure 3: Power Connector

- Simultaneously press the Reset (S2) and Boot (S1) buttons on the DIPmodul Development Board, first releasing the Reset and then, two to three seconds later, release the Boot button.

This sequence of pressing and releasing the Reset and Boot buttons renders the DIPmodul-F40 into programming mode. Use of MCU Programmer always requires the DIPmodul-F40 to be in programming mode. See *section 2.4* for more details.

The DIPmodul-F40 should now be properly connected via the Development Board to a host-PC and power supply. After executing a Reset and rendering the board in Bootstrap mode, you are now ready to program the DIPmodul-F40. This DIPmodul-F40/Development Board combination is also referred to as “target hardware”.

2.3 Starting FUJITSU MCU Programmer for Windows

MCU Programmer should have been installed during the initial setup procedure as described in section 2.1.

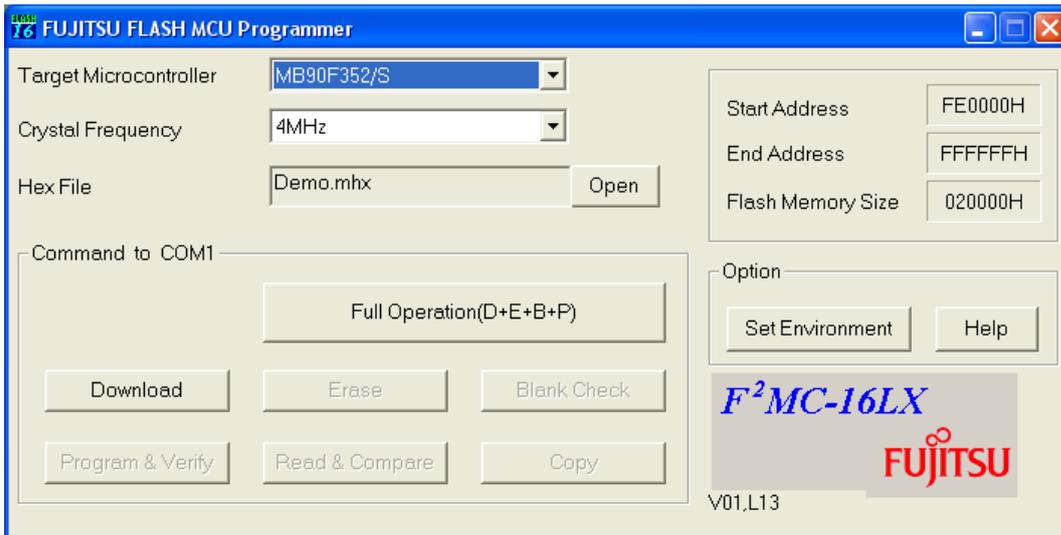
MCU Programmer for Windows is an utility program that allows download of user code in **.mhx* file format from a host-PC to a SYS TEC/PHYTEC Single Board Computer via an RS-232 connection. Proper connection of the DIPmodul-F40 to a host-PC enables the software portion of MCU Programmer to recognize and communicate to the firmware portion.

- You can start the MCU Programmer by selecting it from the *Programs* menu using the Windows *Start* button.

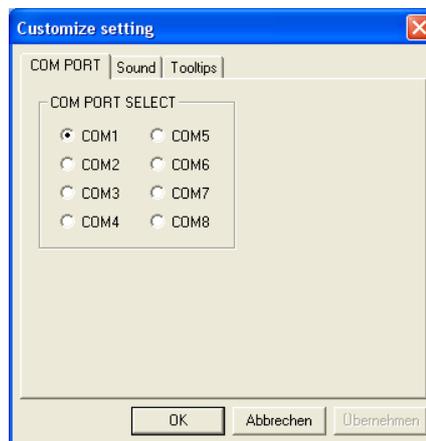
It is recommended that you drag the MCU Programmer icon onto the desktop of your PC. This enables easy start of MCU Programmer by double-clicking on the icon.

2.4 Downloading Example Code with MCU Programmer

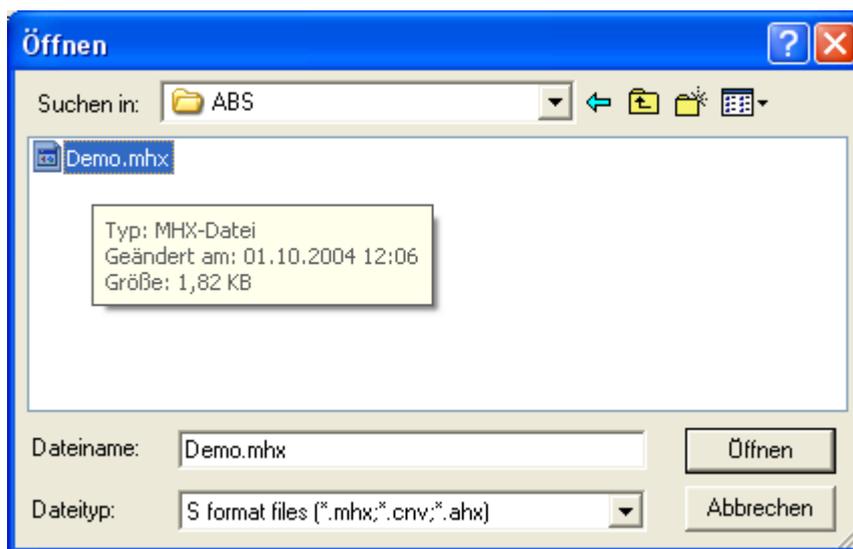
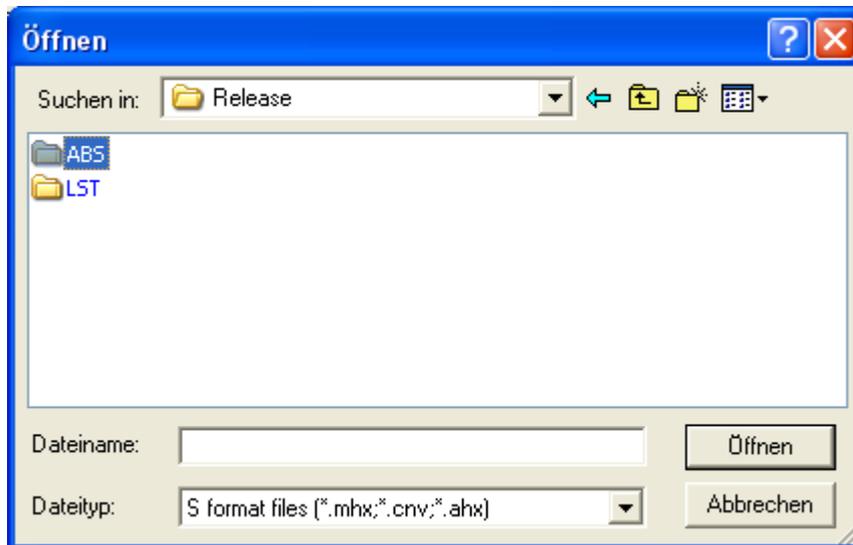
- Start MCU Programmer for Windows by double-clicking on the MCU Programmer icon or by selecting *MCU Programmer* from within the *Programs\FUJITSU MCU Programmer* program group.
- The main tab of the MCU Programmer tabsheet window will now appear. Here you can select the target hardware.



- Select the MB90F352/C/S/CS target microcontroller from the list.
- Press the *Set Environment* button and the following window will now appear. Here you can specify connection properties to the DIPmodul-F40.



- Select the correct serial port for your host-PC and press the *OK* button.
- Press the *Open* button to select the mhx file.



- Click on the *Open* button to load the select file.

- Press the *Full operation* button to start the programming of the DIPmodul-F40 and the following popup message arrive



Note:

Always ensure that the DIPmodul-F40 is in Programming mode before pressing the *OK* button.

- After the data transfer you will see MCU Programmer for Windows tabsheet window with the following tabs:



After a press on the Reset button on the Development Board, the downloaded programm will started.

2.4.1 "Demo"

The "Demo" example has three main function:

- 1) check the RUN/STOP switch;
- 2) press one of the four keys and one of the four LED's go on or off;
and
- 3) turn the poti AI0 to manipulate the switching frequency of the
RUUN and ERROR LED

The Programms start the main routine only if the RUN/STOP switch is RUN. In STOP nothing happened and the red LED on the DIPmodul-F40 in on. Change the switch to RUN the green LED on the SBC goes on and the red is cleared.

The RUN and ERROR LED of the Development Board flashes by turn. The switching frequency is changed by moving the poti AI0.

By pressing one of the keys DI0....DI3 one of the LED DO0...DO3 goes on e.g. off.

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