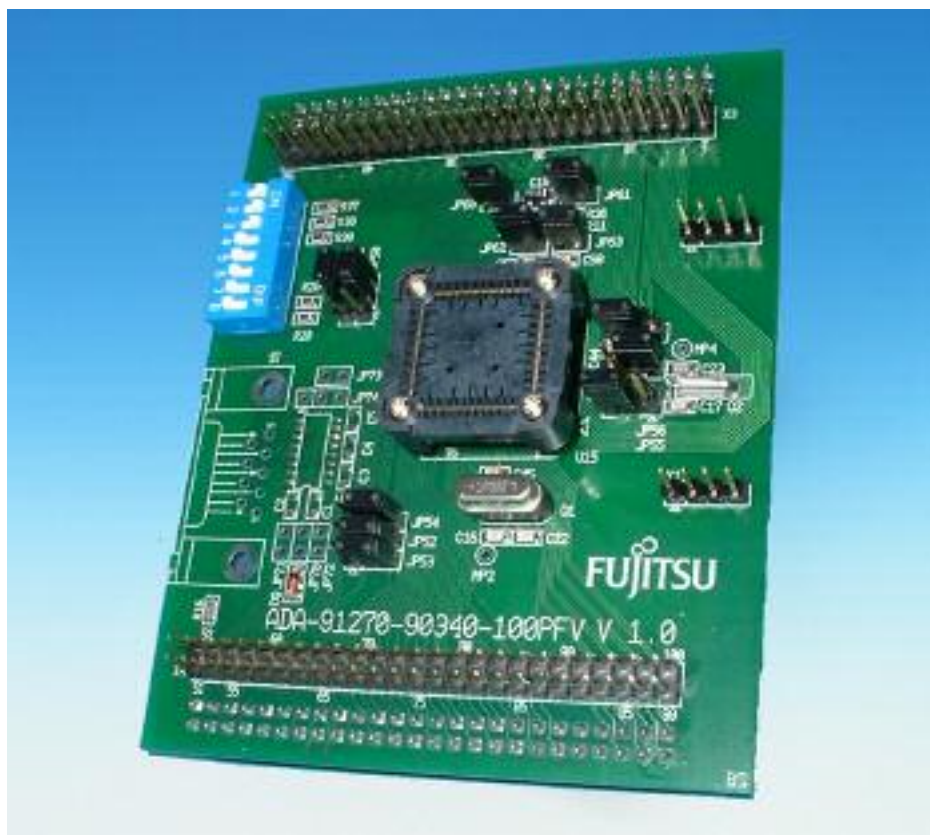


F²MC-16LX FAMILY EVALUATION BOARD ADA-91270-90340-100PFV V1.0

USER GUIDE



Revision History

Date	Issue
2005-08-04	V1.0, HW/PH, First Release
2005-08-10	V1.1, PH, typos corrected

This document contains 20 pages.

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2 Overview

2.1 Abstract

The ADA-91270-90340-100PFV is an adapter board that can be used together with the evaluation board FLASH-CAN-100P-340 or as a stand-alone system with some limitations. The ADA-91270-90340-100PFV supports devices of the 16-bit MB90340 Series and 32-bit MB91270 Series with LQFP package PFV/M05.

It can be used stand alone for software development and testing of with Flash-devices or as a target board to work with the emulator system.

The board allows the designer immediately to start with the software development before his own final target system is available.

2.2 Features of adapter board ADA-91270-90340-100PFV

- ▶ Supports the following series in FPT-100P-M05 package:
 - ▶ MB90340 Series: MB90F34x PFV
 - ▶ MB91270 Series: MB91F272x PFV
- ▶ All resources available for evaluation
- ▶ All pins routed to connectors
- ▶ 4 MHz main-crystal, 32kHz subclock-crystal (selectable by jumpers)
- ▶ Run- / Program-Mode Selector
- ▶ One UART interface (optional)

2.3 Features supported by base-board FLASH-CAN-100P-340

- ▶ 9-12V unregulated external DC power supply usable
- ▶ 5V internal power supply, Power-LED
- ▶ In-Circuit serial Flash programming
- ▶ Two UART interfaces
- ▶ Two LIN interfaces
- ▶ Two High-Speed CAN Transceivers
- ▶ 8 User LEDs, optional: alphanumeric standard LC-Display connectable instead of LEDs
- ▶ Reset-Button, Reset-LED
- ▶ Up to 5 User-buttons
- ▶ 96 pin VG connector

The adapter board will be delivered with the MB91F272WPFV (dual clock version).

This microcontroller contains a 'burn-in'-boot loader for programming the flash.

**This board must only be used for test applications
in an evaluation laboratory environment.**

3 Installation

Remove carefully the board from the shipping carton and check for any damages.

Make the correct jumper setting for the related device (MB90340 Series / MB91270 Series).

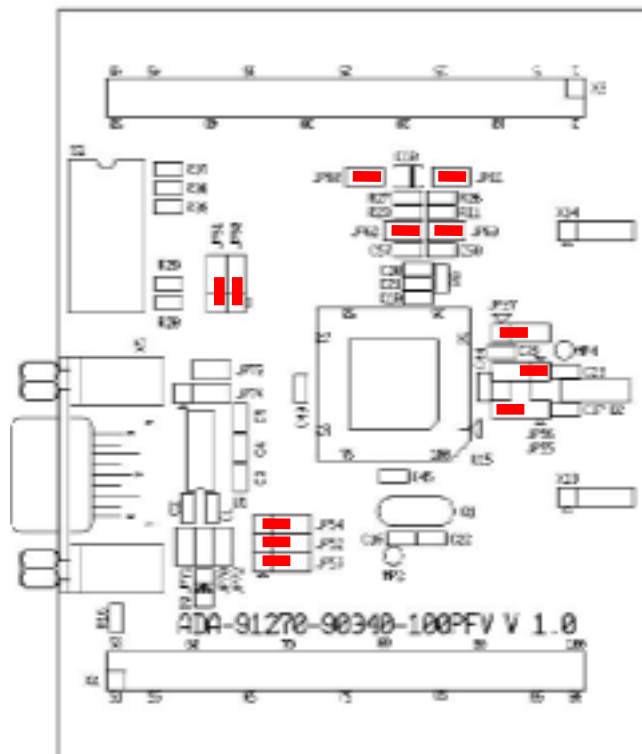
The adapter board will be delivered with the MB91F272PFV microcontroller.

Before mounting the adapter on the FLASH-CAN-100P-340 remove the microcontroller and check the correct jumper setting of the evaluation board. For details about the FLASH-CAN-100P-340 evaluation board please see the user guide ug-900003.

3.1 MB90340 Series

The following default jumper setting of ADA-91270-90340-100PFV reflects a dual-clock device of MB90340 Series. For details please refer to chapter 4.

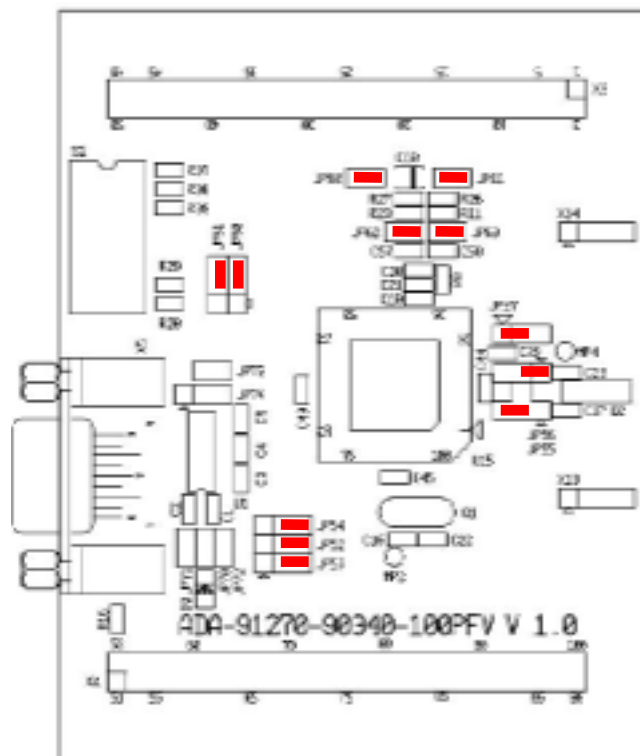
Jumper	Description / Function	Type	Default MB90340
JP50	P00/P10	Jumper 3 pol	1-2
JP51	P01/P11	Jumper 3 pol	1-2
JP52	SOT0/SOT1	Jumper 2 pol	1-2
JP53	SIN0/SIN1	Jumper 2 pol	1-2
JP54	SCK0/SCK1	Jumper 2 pol	1-2
JP55	Subclock (X0A)	Jumper 4 pol	SUB
JP56	Subclock (X1A)	Jumper 3 pol	1-2
JP57	C-Pin	Jumper 3 pol	1-2
JP60	AVSS	Jumper 2 pol	Closed
JP61	AVCC	Jumper 2 pol	Closed
JP62	AVRL	Jumper 2 pol	Closed
JP63	AVRH	Jumper 2 pol	Closed
JP70	Optional: UTXD	Jumper 2 pol	Open
JP71	Optional: URXD	Jumper 2 pol	Open
JP72	Optional: URST	Jumper 2 pol	Open
JP73	Optional: RTS-CTS	Jumper 2 pol	Open
JP74	Optional: URST	Jumper 3 pol	Open



3.2 MB91270 Series

The following default jumper setting of ADA-91270-90340-100PFV reflects a dual-clock device of MB91270 Series. For details please refer to chapter 4.

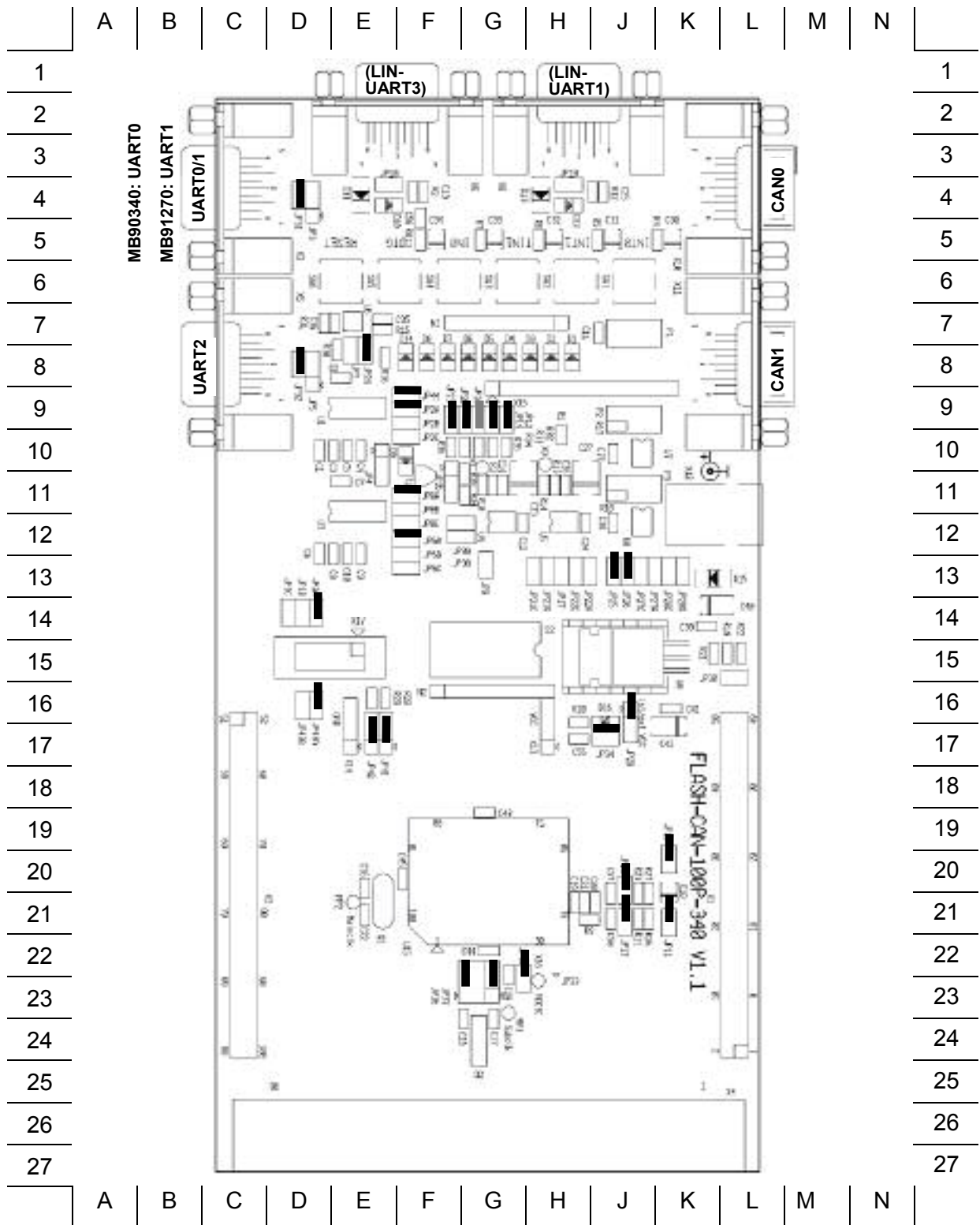
Jumper	Description / Function	Type	Default MB91270
JP50	P00/P10	Jumper 3 pol	2-3
JP51	P01/P11	Jumper 3 pol	2-3
JP52	SOT0/SOT1	Jumper 2 pol	2-3
JP53	SIN0/SIN1	Jumper 2 pol	2-3
JP54	SCK0/SCK1	Jumper 2 pol	2-3
JP55	Subclock (X0A)	Jumper 4 pol	SUB
JP56	Subclock (X1A)	Jumper 3 pol	1-2
JP57	C-Pin	Jumper 3 pol	1-2
JP60	AVSS	Jumper 2 pol	Closed
JP61	AVCC	Jumper 2 pol	Closed
JP62	AVRL	Jumper 2 pol	Closed
JP63	AVRH	Jumper 2 pol	Closed
JP70	Optional: UTXD	Jumper 2 pol	Open
JP71	Optional: URXD	Jumper 2 pol	Open
JP72	Optional: URST	Jumper 2 pol	Open
JP73	Optional: RTS-CTS	Jumper 2 pol	Open
JP74	Optional: URST	Jumper 3 pol	Open



3.3 Jumper settings of FLASH-CAN-100P-340

The following jumper setting should be chosen if the FLASH-CAN-100P-340 V1.1 board is used together with ADA-91270-90340-100PFV:

Jumper	Description / Function	Type	Default ADA-91270- 90340-100PFV	Coordinates
JP1a	UART A (TXD) / UART0(MB90340)	Jumper 2 pol	Closed	D14
JP1b	UART A (TXD) / UART0(MB90800) / SIO4(MB90945)	Jumper 2 pol	Open	D14
JP1c	UART A (TXD) / UART0(MB90945)	Jumper 2 pol	Open	D14
JP2a	UART A (RXD) / UART0(MB90340)	Jumper 2 pol	Closed	EF9
JP2b	UART A (RXD) / UART0(MB90800) / SIO4(MB90945)	Jumper 2 pol	Open	EF9
JP2c	UART A (RXD) / UART0(MB90945)	Jumper 2 pol	Open	EF10
JP3	DTR/RTS A	Jumper 3 pol	Open	D4
JP4	RESET UART A/B	Jumper 3 pol	Open	E10
JP5	DTR/RTS B	Jumper 3 pol	Open	D8
JP6a	UART B (RXD) / UART2(MB90340)	Jumper 2 pol	Closed	EF12
JP6b	UART B (RXD) / UART1(MB90800)	Jumper 2 pol	Open	EF12
JP6c	UART B (RXD) / UART3(MB90945)	Jumper 2 pol	Open	EF13
JP8a	UART B (TXD) / UART2(MB90340)	Jumper 2 pol	Closed	EF11
JP8b	UART B (TXD) / UART1(MB90800)	Jumper 2 pol	Open	EF11
JP8c	UART B (TXD) / UART3(MB90945)	Jumper 2 pol	Open	EF12
JP7	Reset 3V3	Jumper 2 pol	Open	E8
JP9	LIN B enable	Jumper 2 pol	Open	G13
JP10	LIN B Master-Mode	Jumper 2 pol	Open	E3
JP11	AVcc	Jumper 2 pol	Closed	K21
JP12	SW1	Jumper 2 pol	Closed	G9
JP13	AVcc=AVRH	Jumper 2 pol	Closed	J21
JP14	SW2	Jumper 2 pol	Closed	G9
JP15	AVss	Jumper 2 pol	Closed	K19
JP16	SW3	Jumper 2 pol	90340: Closed 91270: Open	G9
JP17	LIN A enable	Jumper 2 pol	Open	H13
JP18	LIN A Master-Mode	Jumper 2 pol	Open	H3
JP19	AVss=AVRL	Jumper 2 pol	Closed	J20
JP20	SW4	Jumper 2 pol	Closed	F9
JP21a	LIN A (RXD) / LINUART1(90340)	Jumper 2 pol	Open	H13
JP21c	LIN A (RXD) / LINUART3(90945)	Jumper 2 pol	Open	H13
JP22a	LIN A (TXD) / LINUART1(90340)	Jumper 2 pol	Open	H13
JP22c	LIN A (TXD) / LINUART3(90945)	Jumper 2 pol	Open	H13
JP23	SW5	Jumper 2 pol	Closed	F9
JP24	RESET	Jumper 2 pol	Closed	E8
JP25	CAN A (TXD) / CAN0(MB90340)	Jumper 2 pol	Closed	J13
JP26	CAN A (RXD) / CAN0(MB90340)	Jumper 2 pol	Closed	J13
JP27a	CAN B (TXD) / CAN1(MB90340)	Jumper 2 pol	Open	J13
JP27c	CAN B (TXD) / CAN1(MB90945)	Jumper 2 pol	Open	J13
JP28a	CAN B (TXD) / CAN1(MB90340)	Jumper 2 pol	Open	K13
JP28c	CAN B (RXD) / CAN1(MB90945)	Jumper 2 pol	Open	K13
JP29	int/ext VCC	Jumper 3 pol	1-2	J17
JP30	5V/3V3	Jumper 2 pol	Open	L15
JP31	RTS-CTS A	Jumper 2 pol	Closed	D4
JP32	RTS-CTS B	Jumper 2 pol	Closed	D8
JP33	C-Pin to MCU VCC	sold-Jumper	Open	H22
JP34	MCU VCC	Jumper 2pol	Closed	J17
JP35	DTR / DTRx	Jumper 3 pol	Open	F11
JP36	X0A select	Jumper 4 pol	1-4	G22
JP37	X1A select	Jumper 3 pol	1-2	G22
JP38	LIN B (RXD) / LINUART3(90340)	Jumper 2 pol	Open	F12
JP39	LIN B (TXD) / LINUART3(90340)	Jumper 2 pol	Open	F12
JP40	C-Pin	Jumper 2 pol	Closed	GH22
JP41	P00/P65	Jumper 3 pol	1-2	E17
JP42	P01/P66	Jumper 3 pol	1-2	E17
JP43a	SCK0(MB90340)	Jumper 2 pol	Closed	D16
JP43b	SCK0(MB90800) / SCK4(MB90945)	Jumper 2 pol	Open	D16
JP44	SIN A	Jumper 2 pol	Closed	EF9



Please see the user guide ug-900003 for a detailed description of the FLASH-CAN100P-340 evaluation board.

4 Jumpers and Switches

This chapter describes all jumpers and switches that can be modified on the adapter board. The default setting (MB91270 Series) is shown with a grey shaded area. All jumpers and switches are named directly on the board, so it is very easy to set the jumpers according to the features.

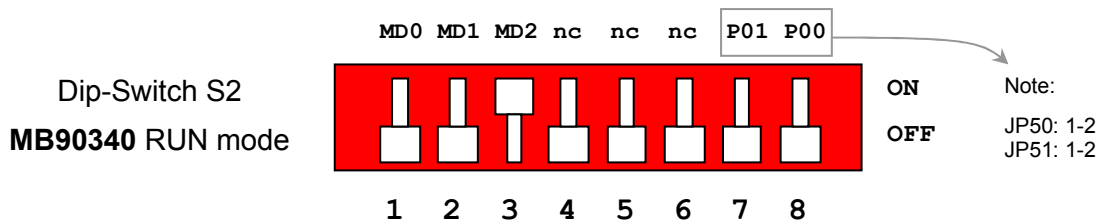
4.1 Operating-Mode (S2)

The DIP-switch S2 is used to set the operating mode of the μ C. Ensure that the mode pin settings correspond to the operation-mode of the application. For more detailed information please check the Hardware-Manual of the microcontroller.

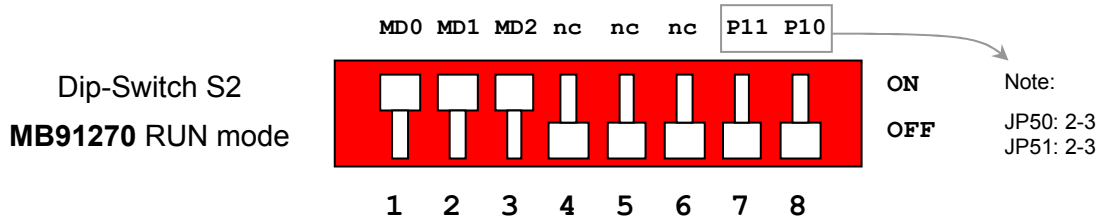
DIP switch	Setting	Logical value
S2/1 (MD0)	ON (closed)	0 (low)
	OFF (open)	1 (high)
S2/2 (MD1)	ON (closed)	0 (low)
	OFF (open)	1 (high)
S2/3 (MD2)	ON (closed)	0 (low)
	OFF (open)	1 (high)
S2/4-6	not connected (OFF)	
S2/7 (P01/P11*)	ON (closed)	1 (high)
	OFF (open)	0 (low) ^{*1}
S2/8 (P00/P11*)	ON (closed)	1 (high)
	OFF (open)	0 (low) ^{*1}

^{*1}Note: The low-level for serial programming is reached by the pull-down resistors R28 and R29 that are enabled by the jumpers JP50 and JP51. Please refer to chapter 5 (Programming the internal Flash) for more details about the operation mode.

4.1.1 MB90340 Series



4.1.2 MB91270 Series



4.2 Analogue Power Supply Voltage (JP: 60, 61, 62, 63)

The power supply as well as the positive reference voltage for the A/D-converter can be provided internally or externally.

JP60, JP61 connect power supply voltages (AVcc and AVss)

JP62, JP63 connect reference voltages (AVRH to AVcc, ARRL to AVss)

Jumper	Setting	Description
JP60 (AVss)	ON (closed)	AVss is connected to GND
	OFF (open)	AVss is disconnected from GND
JP61 (AVcc)	ON (closed)	AVcc is connected to Vcc
	OFF (open)	AVcc is disconnected from Vcc
JP62 (AVRL)	ON (closed)	AVRL is connected to AVss
	OFF (open)	AVRL defined by resistor network ^{*1}
JP63 (AVRH)	ON (closed)	AVRH is connected to AVcc
	OFF (open)	AVRH defined by resistor network ^{*1}

^{*1}By default the resistor network (R11, R23 and R26, R27) is not mounted on the board

Default: JP60, JP61, JP62 and JP63 are closed

By default, the A/D-converter supply and reference voltage is same as the microcontroller supply voltage.

Note:

If JP60 and J61 are open, the user has to supply an adequate analogue voltage supply (AVcc and AVss) to the A/D-converter.

If JP63 is open, the resistors R11 and R23 define AVRH.

If JP62 is open, the resistors R26 and R27 define AVRL.

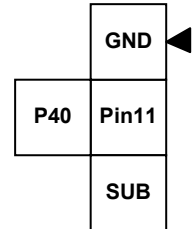
By default the resistor network (R11, R23 and R26, R27) is not mounted on the board.

4.3 Subclock (JP: 55,56)

Some devices support a 32 kHz subclock (X0A, X1A), other devices do not support a subclock but will offer additional port-pins (e.g. P40, P41) instead.

Please check the related datasheet.

Pin-out JP55:



JP55: defines usage of microcontroller pin 11 (X0A/P40)

JP56: defines usage of microcontroller pin 12 (X1A/P41)

Jumper	Setting	Description
JP55 (X0A/P40)	SUB - Pin11	Pin 11 is connected to the 32 kHz Subclock (X0A)
	P40 - Pin11	Pin 11 is used as P40 and is connected to X3-11
	GND - Pin11	Pin 11 is connected to GND (in case that subclock-device is used, but no 32kHz crystal is connected)
JP56 (X1A/P41)	1-2	Pin 12 is connected to the 32kHz Subclock (X1A)
	2-3	Pin 12 is used as P41 and is connected to X3-12

Default: JP55: 1-4, JP56: 1-2

By default, the 32kHz-subclock-crystal is connected to the microcontroller.

4.4 UART"A" (JP: 52, 53, 54)

Because MB90340 and MB91270 Series uses different UARTs for the burn-in bootloader the right UART can be connected to UART "A" and the programming socket X17 for synchronous programming of the FLASH-CAN-100P-340 evaluation board:

MB90340 Series uses UART0 for in circuit programming.

MB91270 Series uses UART1 for in circuit programming.

JP52 connects SOT0 or SOT1 to UART "A" and to X17 (FlashKit)

JP53 connects SIN0 or SIN1 to UART "A" and to X17 (FlashKit)

JP54 connects SCK0 or SCK1 to UART "A" and to X17 (FlashKit)

Jumper	Setting	Description
JP52 (SOTx)	1-2	SOT0 (MB90340 bootloader UART) is connected to UART 'A'
	2-3 ^{*1}	SOT1 (MB91270 bootloader UART) is connected to UART 'A'
JP53 (SINx)	1-2	SIN0 (MB90340 bootloader UART) is connected to UART 'A'
	2-3 ^{*1}	SIN1 (MB91270 bootloader UART) is connected to UART 'A'
JP54 (SCKx)	1-2	SCK0 (MB90340 bootloader UART) is connected to UART 'A'
	2-3 ^{*1}	SCK1 (MB91270 bootloader UART) is connected to UART 'A'

Default: JP52=2-3, JP53=2-3, JP54=2-3

By default, UART1 is used as UART"A".

^{*1} Note for MB91270 Series:

Make sure that jumper JP21a and JP22a (LIN transceiver) on the FLASH-CAN-100P-340 are open, while the UART1 of MB91270 Series is used.

5 Programming the internal Flash

All Flash devices have an internal bootloader for asynchronous- as well as synchronous-Flash-programming:

- ▶ asynchronous-serial Flash-programming via X3 (UART "A") of FLASH-CAN-100P-340
- ▶ synchronous-serial Flash-programming via X17 ("FlashKit") of FLASH-CAN-100P-340

5.1 Asynchronous Mode

The Flash-microcontroller of MB90340 and MB91270 Series can be programmed in circuit by using the freeware "Fujitsu Flash MCU Programmer" that is available on the Fujitsu Micros CD-ROM or Web Site (<http://www.fme.gsdc.de/gsd.htm>: select ▶ Software ▶ Utilities)

MB90340 Series uses UART0 for in circuit programming.

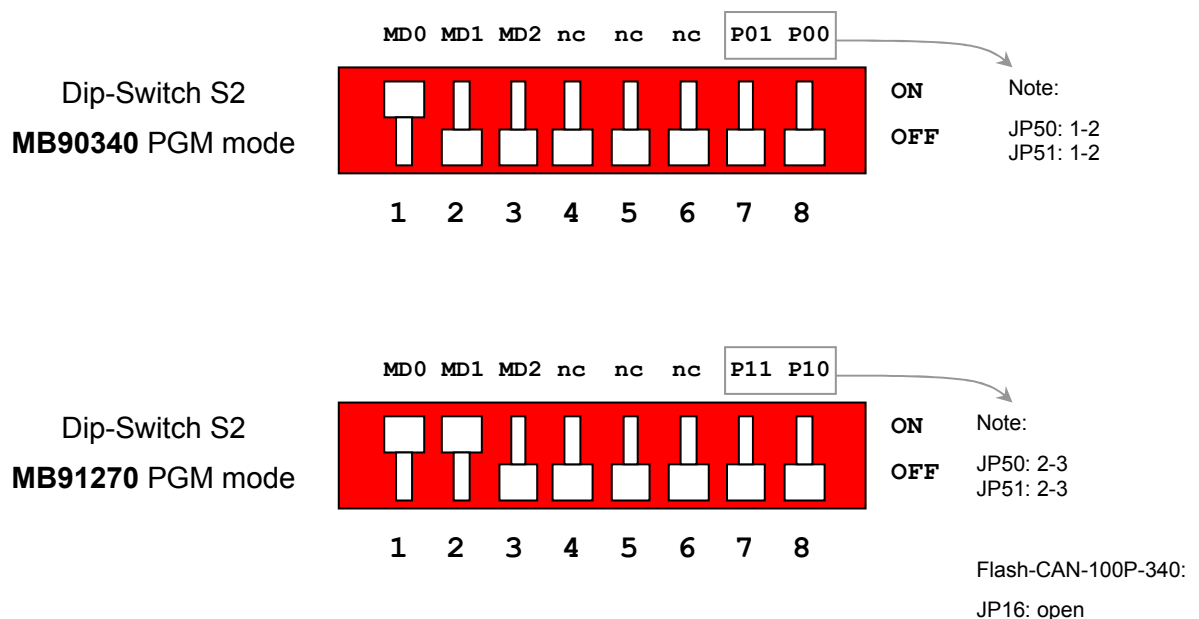
MB91270 Series uses UART1 for in circuit programming.

Note: Open jumper JP16 of FLASH-CAN-100P-340 because P10 is used for mode selection.

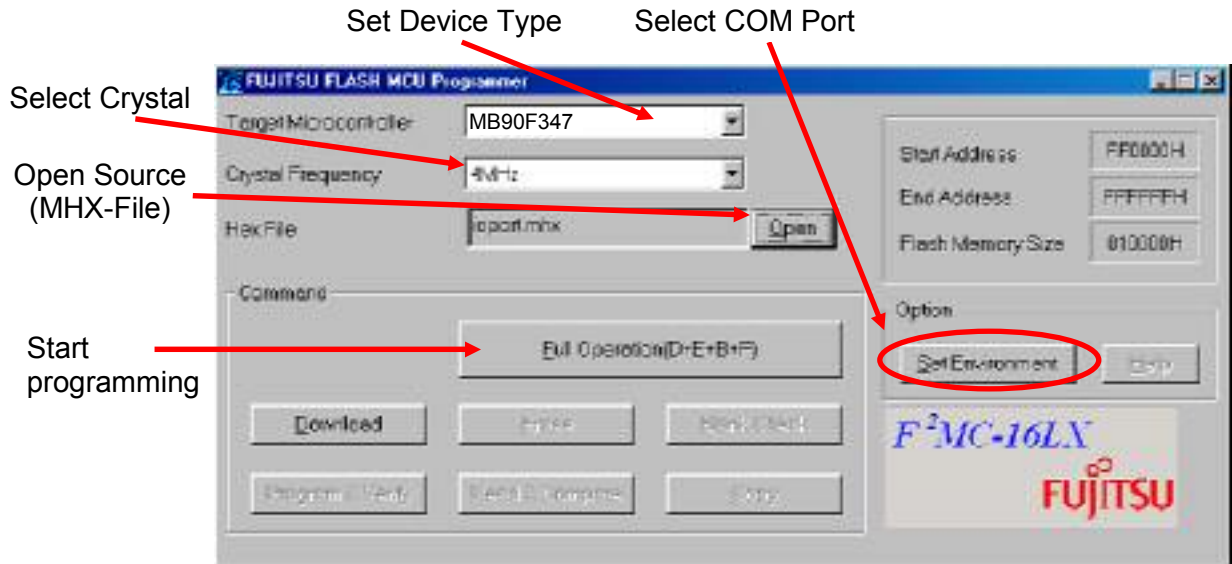
Please check the correct UART selection in chapter 4.4.

The following procedure must be followed to enable Flash Programming:

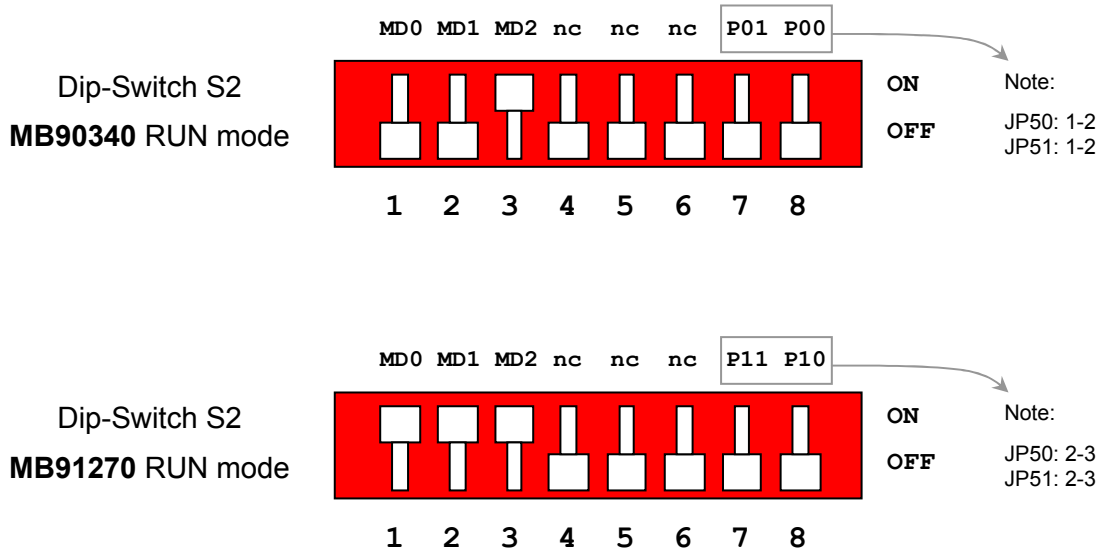
1. Power off the system
2. Connect the Evaluation Board UART"A" to your serial PC communication port. A straight cable connection (1:1) has to be used.
3. Check the Jumper-settings according to the UART as described in chapter 4.4.
4. Configure the mode related to your microcontroller



5. Power on the board
6. Check that the Reset LED is off. Otherwise change the DTR polarity (JP35) and check the power supply voltage.
7. Start the tool “Fujitsu Flash MCU Programmer” software and follow the instructions:
Note: The screenshot may differ regarding the used release version of the tool



8. After programming the Flash-ROM, switch off the power supply and set back the mode according to the usage of the application, e.g.:



9. Power on the board. The user application is started directly.

6 Connectors

6.1 Edge connector (X3, X4)

Nearly^{*1} all pins of the microcontroller are directly connected to X3 and X4 as follows:

Connector ^{*1}	MCU Pins ^{*1}
X3 (1 – 50)	1 – 50
X4 (51 – 100)	51 – 100

The odd pin numbers are located on the one side and the even pin numbers are located on the other side of the connector.

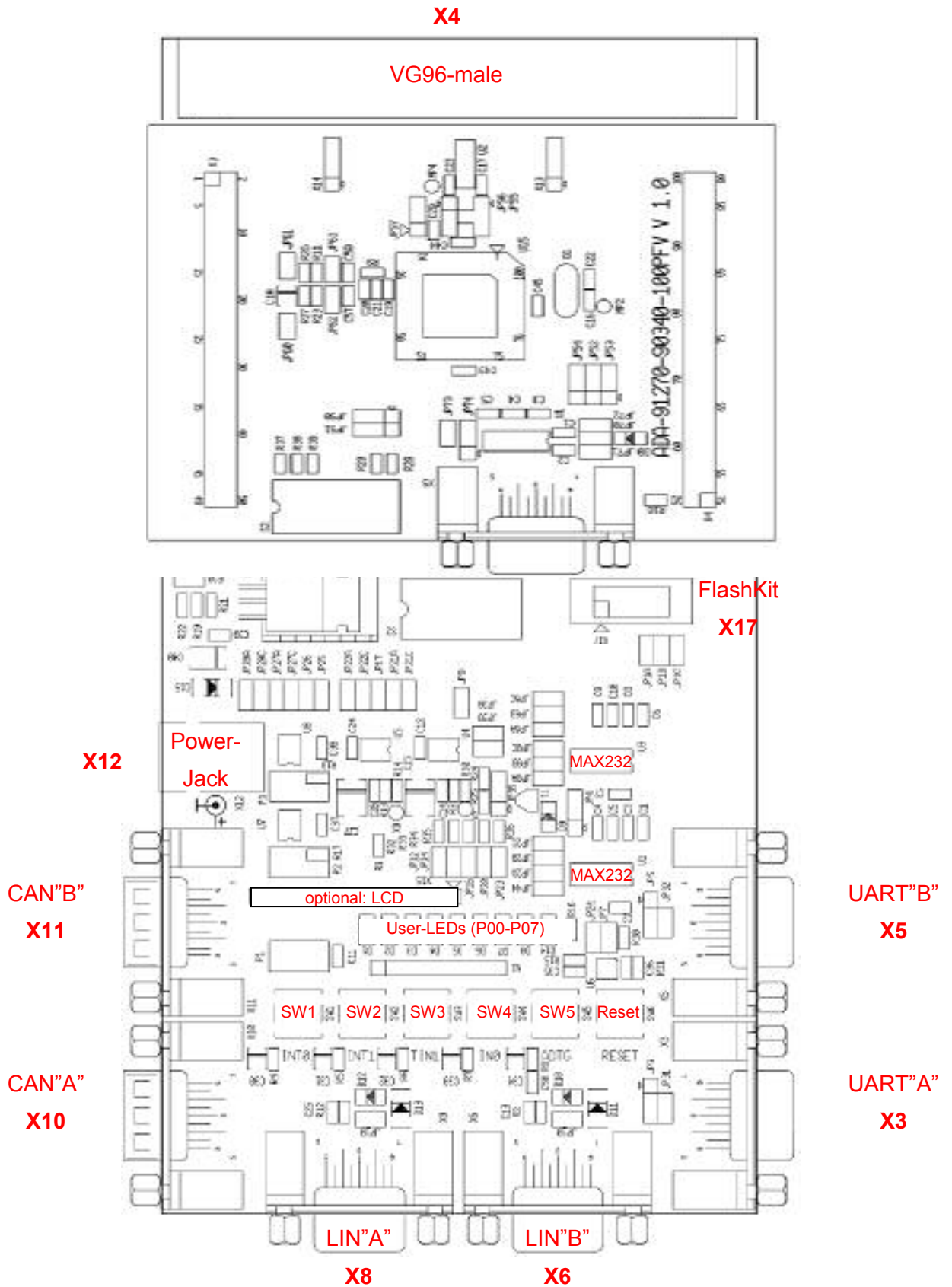
On the PCB, the corresponding pin numbers of the μ C are written next to the connector pins.

***1Note:**

The following pins are not routed to the connector (X3, X4):

Pin 13 (VCC)	Pin 14 (GND)	Pin 42 (GND)	Pin 63 (VCC)
Pin 64 (GND)	Pin 88 (VCC)	Pin 89 (GND)	Pin 90 (X1)
Pin 91 (X0)			

7 Silk-Plot of the Board



8 PCB History

8.1 ADA-91270-90340-100PFV V1.0

Part	Problem	Fixed
JP55	Pin11 and GND are swapped in the layout	Patched
S2	Dip-Switch pins may be shorted by heat-sink of U9 (FLASH-CAN-100P-340)	-

9 Related Products

- ▶ FLASH-CAN-100P-340 Evaluation board for MB90340, MB90800, MB90860, MB90945 Series with FPT-100P-M06 package
- ▶ ADA-91270-90340-100PFV Adapterboard for M05 (PFV) Package of MB90340 and MB91270 Series
- ▶ NQPack100SD Socket for package FPT-100P-M05 (Tokyo Eletech Corp. www.tetc.co.jp/e_tet.htm)
- ▶ HQPack100SD Header for NQPack100SD

- ▶ MB90340 Series
 - ▶ MB90F34xS_PFV Flash-MCU (M05 package), single-clock
 - ▶ MB90F34x_PFV Flash-MCU (M05 package), dual-clock
 - ▶ MB2147-01 Emulator debugger main unit
 - ▶ MB2147-20 Emulation adapter
 - ▶ MB90V340A-101 Evaluation chip for MB90340 Series, single-clock
 - ▶ MB90V340A-102 Evaluation chip for MB90340 Series, dual-clock
 - ▶ MB90V340A-103 Eval.-chip for MB90340 Series, single-clock, incl. RC-osc
 - ▶ MB90V340A-104 Eval.-chip for MB90340 Series, dual-clock, incl. RC-osc
 - ▶ MB2147-581 Emulator probe cable for MB90340/M05 Package

- ▶ MB91270 Series
 - ▶ MB91F27xS_PFV Flash-MCU (M05 package), single-clock
 - ▶ MB91F27x_PFV Flash-MCU (M05 package), dual-clock
 - ▶ MB2198-01 Emulator debugger main unit
 - ▶ MB2198-10 Emulator DSU cable
 - ▶ MB2198-130 Emulation POD
 - ▶ MB91V280CR-ES Evaluation chip for MB91270 Series, single-clock
 - ▶ MB2198-129 Emulator probe cable for MB91270/M05 Package

10 Information in the WWW

Information about FUJITSU MICROELECTRONICS Products can be found on the following Internet pages:

Microcontrollers (8-, 16- and 32bit), Graphics Controllers
Datasheets and Hardware Manuals, Support Tools (Hard- and Software)

<http://www.fme.gsdc.de/gsdc.htm>

Linear Products: Power Management, A/D and D/A Converters

<http://www.fujitsu.com/emea/services/microelectronics/linears/>

Media Products: SAW filters, acoustic resonators and VCOs

<http://www.fujitsu.com/emea/services/microelectronics/saw/>

For more information about FUJITSU MICROELECTRONICS

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