FR60 FAMILY

SOCKET ADAPTER BOARD

EMA-MB91F467B-LS144M08B

USER GUIDE

FUJITSU
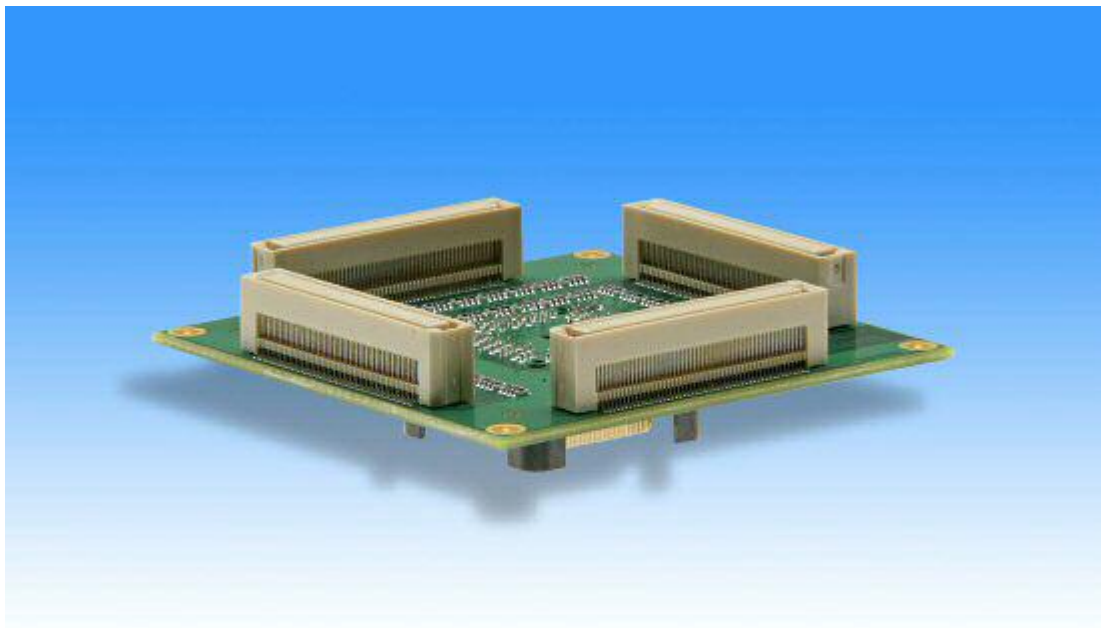
Revision History

Date	Issue
09.07.2007	V1.00, RH/AW/MB, First Release, based on UG-910035-10-EMA-MB91F467B-LS144M08 WR1# signal added
11.07.2007	V1.1, MB, Corrections from UG-910059-10-EMA-MB91F467B-LS144M08B-corr-x1-00.pdf added
09.04.2008	V1.2, China RoHS note added, CPLD code updated, SDRAM removed
16.09.2008	V1.2, MSc, China-RoHS regulation added
31.10.2008	V1.3, CEy Please note the version conflict of V1.2. Merged both versions Restored missing pictures
16.01.2009	V1.4, CEy Description for EMA-MB91FV460B-001 added

Latest product revision: 1.1

Schematic version: 1.1

PCB version: 1.0

CPLD version :   BB11

This document contains 22 pages.

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To the maximum extent permitted by applicable law, Fujitsu Microelectronics Europe GmbH restricts its warranties and its liability for **the EMA-MB91F467B-LS144M08B Board and all its deliverables** (e.g. software include or header files, application examples, target boards, evaluation boards, engineering samples of IC's etc.), its performance and any consequential damages, on the use of the Product in accordance with (i) the terms of the License Agreement and the Sale and Purchase Agreement under which agreements the Product has been delivered, (ii) the technical descriptions and (iii) all accompanying written materials. In addition, to the maximum extent permitted by applicable law, Fujitsu Microelectronics Europe GmbH disclaims all warranties and liabilities for the performance of the Product and any consequential damages in cases of unauthorised decompiling and/or reverse engineering and/or disassembling. **Note, the EMA-MB91F467B-LS144M08B Board and all its deliverables are intended and must only be used in an evaluation laboratory environment**.

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Should one of the above stipulations be or become invalid and/or unenforceable, the remaining stipulations shall stay in full effect

FMEMCU-UG-910059-14

0 Contents

1 Overview

1.1 Abstract

The EMA-MB91F467B-LS144M08B in combination with the EMA-MB91V460A-002B/-80/003 or EMA-MB91FV460B-001 is a development system for the Fujitsu FR60 MB91V460 Flash microcontroller.

The EMA-MB91F467B-LS144M08B is an adapter board with level shifters to support the MB91V460A external bus interface at 3.3V levels.

The development system allows the designer immediately to start with the software development before MB91V460 based silicon samples are available.

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

Before using the EMA-MB91F467B-LS144M08B adapter board, make sure that the following packed components have been delivered:

- o 1 pcs. EMA-MB91F467B-LS144M08B socket adapter board
- o 1 pcs. YQPACK144SD
- o 5 pcs. Screw M2x12
- o 5 pcs. Washer M2, Nylon
- o 1 pcs. User Guide

1.2 General Description

The EMA-MB91F467B-LS144M08B in combination with the EMA-MB91V460A-002B/-80/003 or EMA-MB91FV460B-001 replaces a MB91F467B microcontroller. For further details of the EMA-MB91V460A-002B/-80/003 or EMA-MB91FV460B-001 board please refer to the User Guide of the EMA-MB91V460A-002B/-80/003 or EMA-MB91FV460B-001.

Extension board (optional)

EMA-MB91V460A-002B/-80/003

YQSOCKET adapter board
EMA-MB91F467B-LS144M08B

YQSOCKET144SDN

YQ-Guide

YQPACK144SD
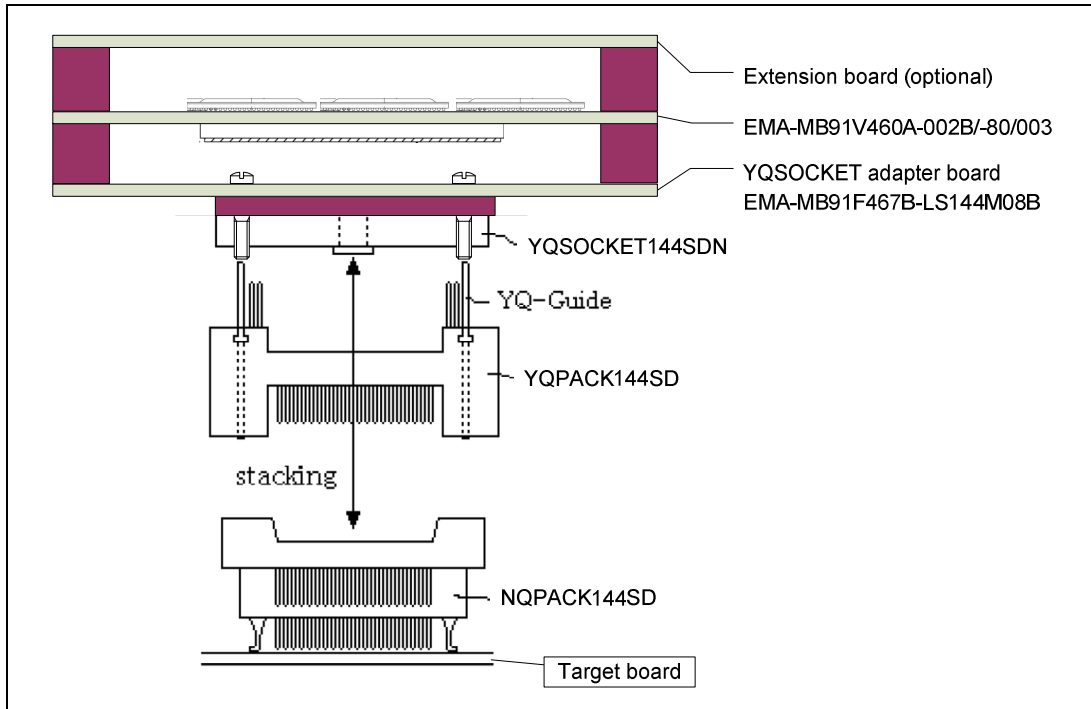
stacking

NQPACK144SD

Target board

Figure 1-1: System overview

1.3 Functional Restrictions

1.3.1 Valid for EMA-MB91V460A-002B/-80/003 and EMA-MB91FV460B-001

This probe cable can only be used for the following Microcontroller configuration:

1. VDD5 = 5V, VDD35 = 3.3V, MD3 = 1

The following Microcontroller configurations (2 & 3) are applicable with this probe cable, but it is recommended to use the appropriate MCU "NLS" probe cable!

2. VDD5 = 5V, VDD35 = 5V, MD3 = 1

3. VDD5 = 3.3V, VDD35 = 3.3V, MD3 = 1

While using this probe cable, the GPIO functionality on the external bus interface (VDD35 voltage domain) is restricted!

Unused external bus function pins (e.g. address lines) cannot be configured as general purpose in- or output randomly!

The following ports can be configured as permanent general purpose input OR output.

1. P07[0..7]

2. P06[0..7]

3. P05[0..7]

It is only possible to configure the whole port as input OR output!

Configuring each pin of these ports separately as input or output is not applicable!

For details on how to configure the port input and output direction please see chapter 3.4 Level-shifter direction control jumper!

2 Installation

Remove carefully the EMA-MB91F467B-LS144M08B board from the shipping carton and check if there are any damages.

Please refer to the attached document "NQPACK/ YQPACK/ HQPACK Technical Information" for installation the socket adapter.
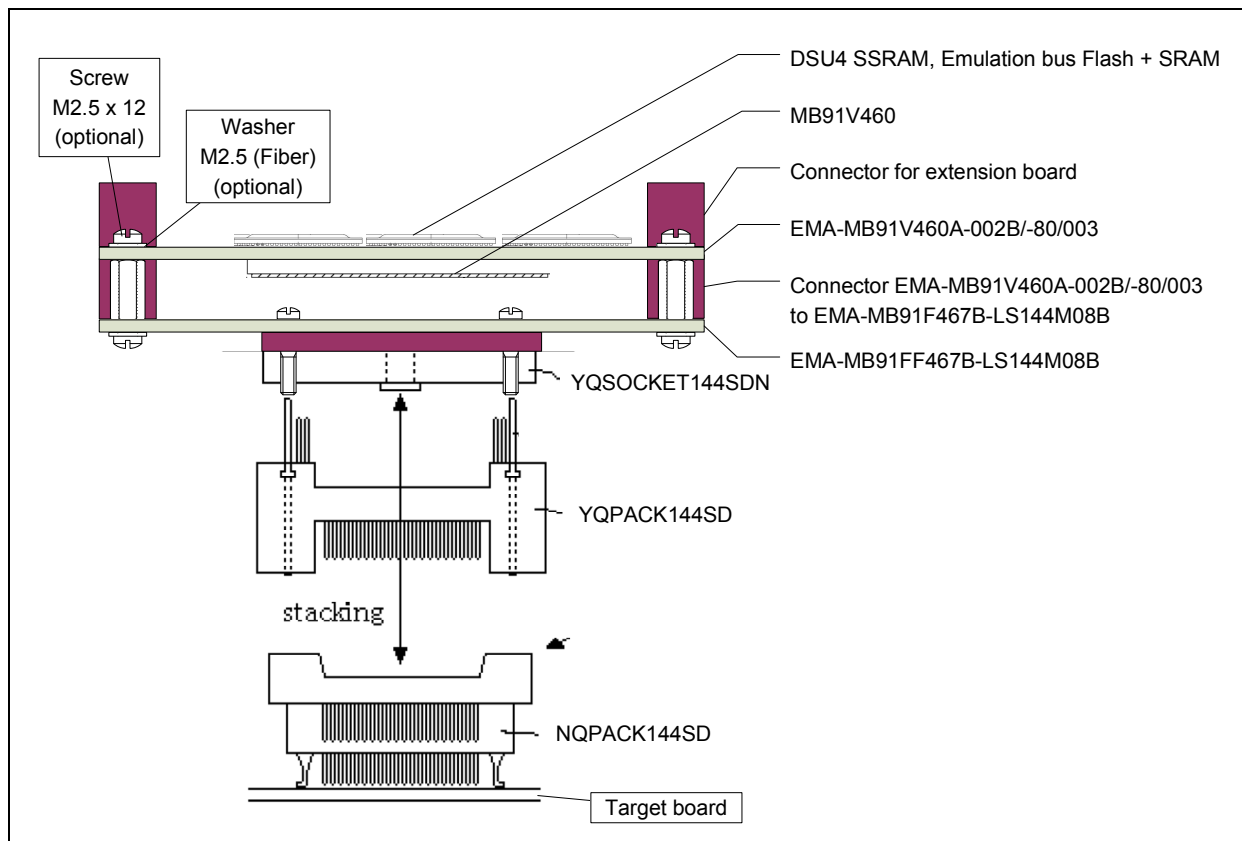

Figure 2-1: Installation

3   Switches and Jumpers

This chapter describes all switches and jumpers that can be modified or accessed on the EMA-MB91F467B-LS144M08B board. The default setting is shown with a grey shaded area.

3.1   Switches and Jumpers overview

Jumper	Description/ Function	Type	Default
S400-1	DIR_U406	DIP-Switch	OFF
S400-2	DIR_U407	DIP-Switch	OFF
S400-3	DIR_U408	DIP-Switch	OFF
S400-4	P08_1 ⇦ WR1#	DIP-Switch	OFF
S400-5	P09_0 ⇦ CS0#	DIP-Switch	OFF
S400-6	P09_1 ⇦ CS1#	DIP-Switch	OFF
S400-7	P10_0 ⇦ SYSCLK	DIP-Switch	OFF
S400-8	P08_0 ⇦ WR0#	DIP-Switch	OFF
S400-9	P08_4 ⇦ RD#	DIP-Switch	OFF
S400-10	P08_7 ⇨ RDY	DIP-Switch	OFF
S401-1	CS select	DIP-Switch	OFF
S401-2		DIP-Switch	ON
S401-10	MONCLK	DIP-Switch	OFF
R416	P09_0 ⇨ CS0#	0603	Closed
R417	P09_1 ⇨ CS1#	0603	Closed
R423	P08_7 ⇦ RDY	0603	Closed
R447	P10_0 ⇨ SYSCLK	0603	Closed
R448	P08_0 ⇨ WR0#	0603	Closed
R450	P08_1 ⇨ WR1#	0603	Closed
R449	P08_4 ⇨ RD#	0603	Closed

3.2 Default Jumper Setting
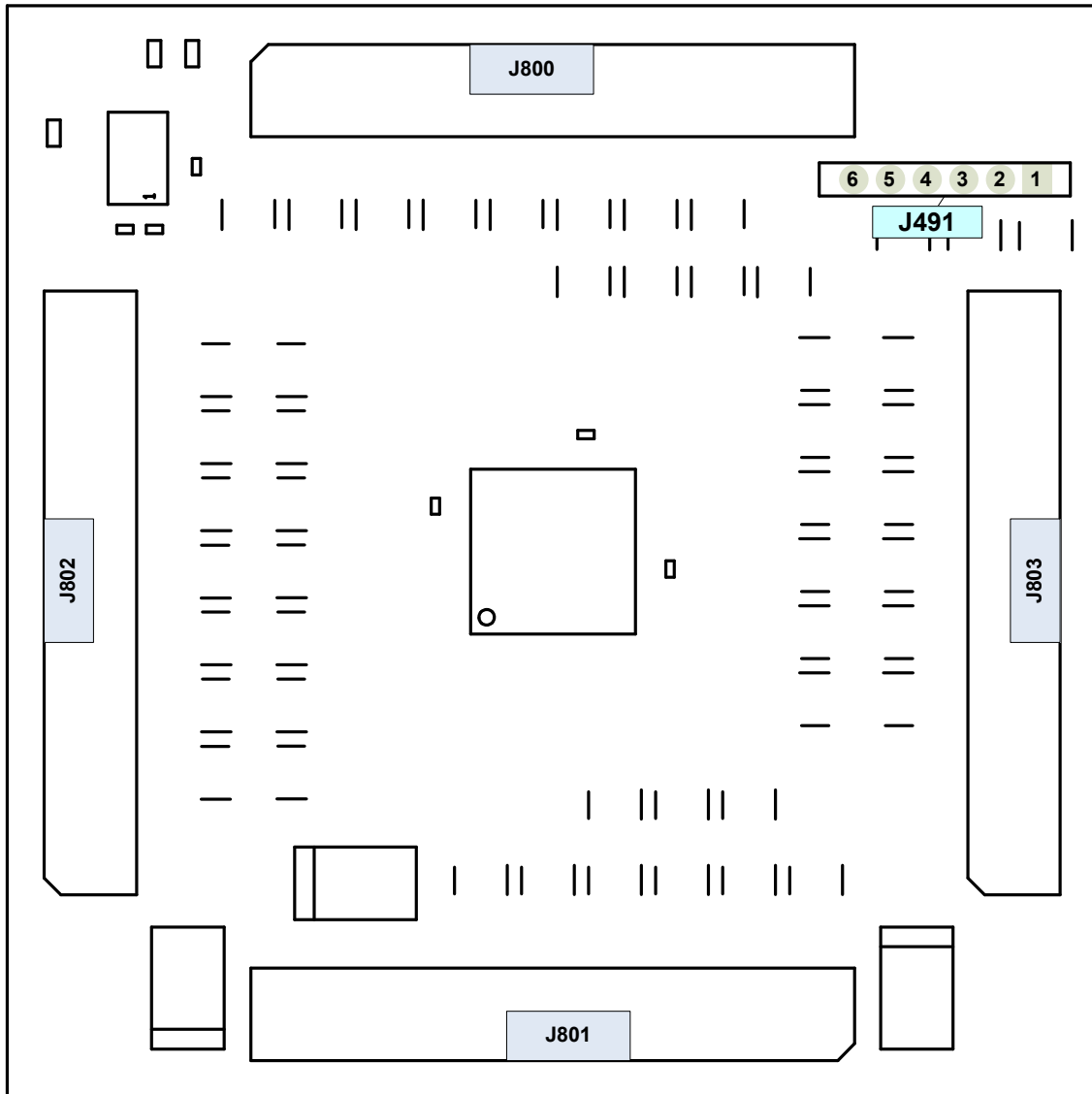
The following jumper setting is the default setting.
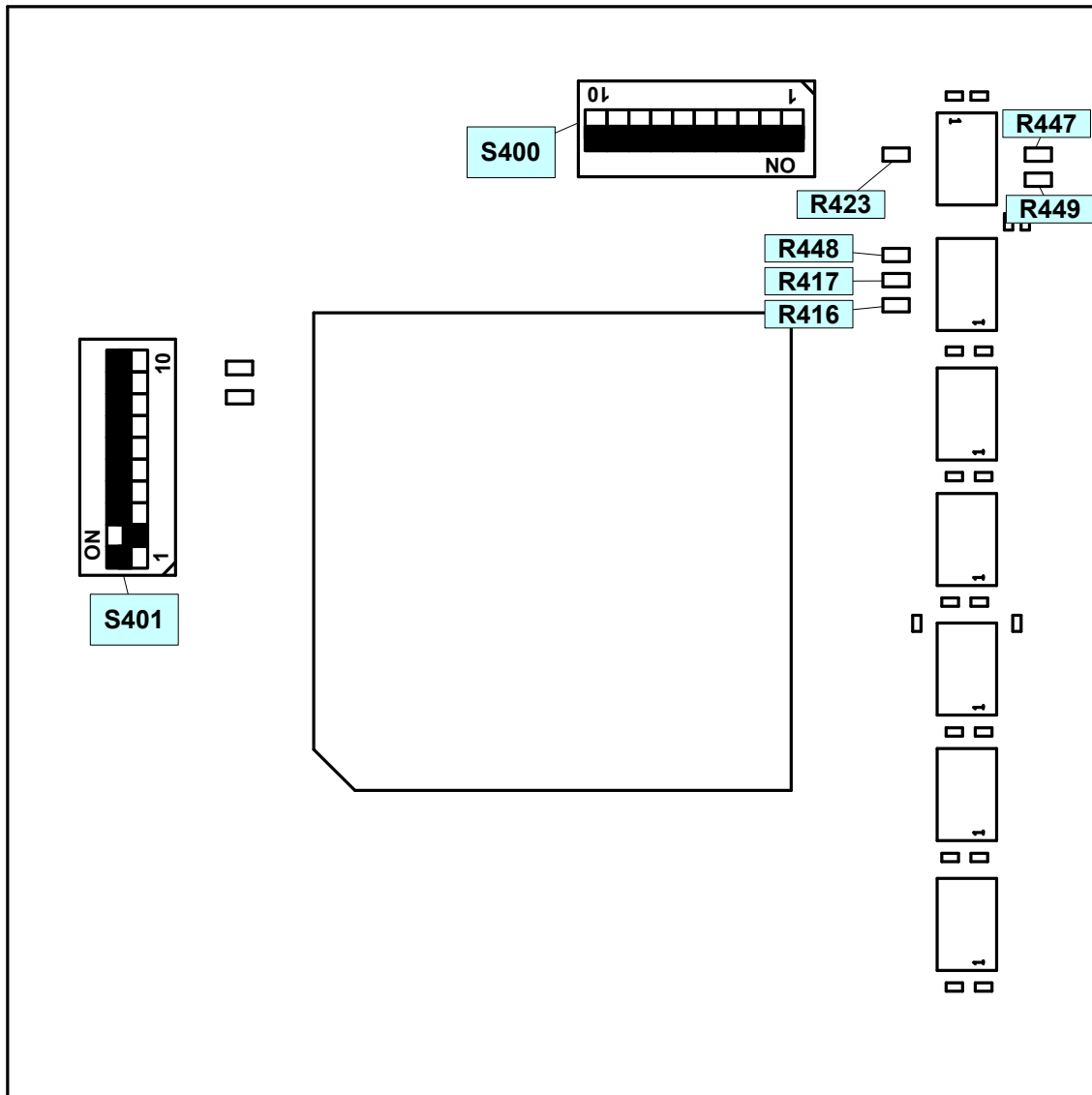

Figure 3-1: Jumper default setting, top

Figure 3-2: Jumper location, bottom

3.3 MONCLK select (S400-10)

Swicth	Setting	Description
S400-10 (MONCLK)	OFF	No connection
	ON	MONCLK signal connected to the socket

Default: OFF

3.4 Level-shifter direction control jumper

Jumper	Setting	Description
S400-1 (Direction U406)	ON	Target board A[0..7] $\Rightarrow$ MB91V460 A[0..7]
	OFF	Target board A[0..7] $\Leftarrow$ MB91V460 A[0..7]
S400-2 (Direction U407)	ON	Target board A[8..15] $\Rightarrow$ MB91V460 A[8..15]
	OFF	Target board A[8..15] $\Leftarrow$ MB91V460 A[8..15]
S400-3 (Direction U408)	ON	Target board A[16..23] $\Rightarrow$ MB91V460 A[16..23]
	OFF	Target board A[16..23] $\Leftarrow$ MB91V460 A[16..23]

Default: S400-1, S400-2, S400-3: OFF

3.5 Bus control jumpers

3.5.1 WR1# (P08_1)

R450	S400-8	Description
Closed	OFF	P08_1 $\Rightarrow$ WR1#
Open	ON	P08_1 $\Leftarrow$ WR1#
Closed	ON	Prohibited

Default: R450: Closed, S400-4: OFF

3.5.2 CS0# (P09_0)

R416	S400-5	Description
Closed	OFF	P09_0 $\Rightarrow$ CS0#
Open	ON	P09_0 $\Leftarrow$ CS0#
Closed	ON	Prohibited

Default: R416: Closed, S400-5: OFF

3.5.3 CS1# (P09_1)

R417	S400-6	Description
Closed	OFF	P09_1 ⇨ CS1#
Open	ON	P09_1 ⇦ CS1#
Closed	ON	Prohibited

Default: R417: Closed, S400-6: OFF

3.5.4 SYSCLK (P10_0)

R447	S400-7	Description
Closed	OFF	P10_0 ⇨ SYSCLK
Open	ON	P10_0 ⇦ SYSCLK
Closed	ON	Prohibited

Default: R447: Closed, S400-7: OFF

3.5.5 WR0# (P08_0)

R448	S400-8	Description
Closed	OFF	P08_0 ⇨ WR0#
Open	ON	P08_0 ⇦ WR0#
Closed	ON	Prohibited

Default: R448: Closed, S400-8: OFF

3.5.6 RD# (P08_4)

R449	S400-9	Description
Closed	OFF	P08_4 ⇨ RD#
Open	ON	P08_4 ⇦ RD#
Closed	ON	Prohibited

Default: R449: Closed, S400-9: OFF

3.5.7 RDY (P08_7)

R423	S400-10	Description
Closed	OFF	P08_7 ⇦ RDY
Open	ON	P08_7 ⇨ RDY
Closed	ON	Prohibited

Default: R423: Closed, S400-10: OFF

4   CPLD

The CPLD Xilinx XC9536XL-5VQL44C controls the direction of the data bus.

4.1   CPLD Verilog Code

```
`timescale 1ns / 1ps
//////////////////////////////////////////////////////////////////////////////
// Company: Accemic GmbH & Co. KG
// Engineer: RH / AW
//
// Create Date: 26/07/2007
// Design Name: EMA-MB91F467B-LS144M08B
// Module Name: F467BB
// Project Name:
// Target Devices: XC9536XL-5VQ44
// Tool versions: ISE 9.2
// Description:
//
// Dependencies:
//
// Revision:
// Revision 1.1
// Additional Comments:
//
// USERCODE: BB11
//           ||||____  Subversion
//           |||_____  Version
//           ||_____  Target 467BB
//                          **
//
//////////////////////////////////////////////////////////////////////////////
module EMA_MB91F467B_LS_144M08B_V10_cpld_BB11(
ECSx,
CSx,              // P09_7..P09_0
WRx,              // P08_3..P08_0
RDx,              // P08_4
ASx,              // P10_1
BAAx,             // P10_2
WEx,              // P10_3
IORDx,            // P11_0
IOWRx,            // P11_1
S401,
DIR_U400,
DIR_U401,
DIR_U404,
DIR_U405,
OEx_U400_U401,
OEx_U404_U405);
```

```verilog
input ECSx;
input[7:0] CSx;
input[3:0] WRx;
input RDx;
input ASx;
input BAAx;
input WEx;
input IORDx;
input IOWRx;
input[7:1] S401;
output DIR_U400;
output DIR_U401;
output DIR_U404;
output DIR_U405;
output OEx_U400_U401;
output OEx_U404_U405;

reg OEx_U400_U401, OEx_U404_U405;
reg DIR_U400, DIR_U401, DIR_U404, DIR_U405;

always @*
begin
     case (S401[2:1])  // CS_MASK;
          2'b11:       // CS0
                       OEx_U404_U405 =  !ECSx | CSx[1];
          2'b10:       // CS1
                       OEx_U404_U405 =  !ECSx | CSx[0];
          default:     // none masked
                       OEx_U404_U405 =  !ECSx | (CSx[0] & CSx[1]);
     endcase

     OEx_U400_U401 = 1;

     // check schematic for DIR level (different on LS boards)
     DIR_U400 = 1;
     DIR_U401 = 1;
     DIR_U404 = RDx;
     DIR_U405 = RDx;

end

endmodule
```

4.2 CPLD Constraints

```
NET "ASx"  LOC = "P13"  ;
NET "BAAx"  LOC = "P14"  ;
NET "CSx<0>"  LOC = "P2"  ;
NET "CSx<1>"  LOC = "P1"  ;
NET "CSx<2>"  LOC = "P3"  ;
NET "CSx<3>"  LOC = "P5"  ;
NET "CSx<4>"  LOC = "P6"  ;
NET "CSx<5>"  LOC = "P7"  ;
NET "CSx<6>"  LOC = "P8"  ;
NET "CSx<7>"  LOC = "P12"  ;
NET "DIR_U400"  LOC = "P39" | SLEW = FAST ;
NET "DIR_U401"  LOC = "P38" | SLEW = FAST ;
NET "DIR_U404"  LOC = "P36" | SLEW = FAST ;
NET "DIR_U405"  LOC = "P37" | SLEW = FAST ;
NET "ECSx"  LOC = "P32"  ;
NET "IORDx"  LOC = "P18"  ;
NET "IOWRx"  LOC = "P19"  ;
NET "OEx_U400_U401"  LOC = "P34" | SLEW = FAST ;
NET "OEx_U404_U405"  LOC = "P33" | SLEW = FAST ;
NET "RDx"  LOC = "P44"  ;
NET "S401<1>"  LOC = "P31"  ;
NET "S401<2>"  LOC = "P30"  ;
NET "S401<3>"  LOC = "P29"  ;
NET "S401<4>"  LOC = "P28"  ;
NET "S401<5>"  LOC = "P27"  ;
NET "S401<6>"  LOC = "P23"  ;
NET "S401<7>"  LOC = "P22"  ;
NET "WEx"  LOC = "P16"  ;
NET "WRx<0>"  LOC = "P40"  ;
NET "WRx<1>"  LOC = "P41"  ;
NET "WRx<2>"  LOC = "P43"  ;
NET "WRx<3>"  LOC = "P42"  ;
```

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4.3 CS# select (CPLD revision BB11)

Chip select signals, selected by S401-2..1, will not be routed towards the target hardware! For applications with extension board EMA-MB91V460A-300 or equivalent extension boards, please select and set the corresponding chip select signal (CSx) used for the extension board! Please also refer to the user guide of the extension board and to the settings on the extension board itself.

E.g. if the EMA-MB91V460A-300 is configured to use chip select CS1, please set S401-2..1 on EMA-MB91F467B-LS144M08B to CS1 (OFF, ON)!

In default setting all chip select signals are routed to the target hardware.

S401-2	S401-1	Description
OFF	OFF	CS0# is selected
OFF	ON	CS1# is selected
ON	Don't care	None selected

Default: S401-2: ON

4.4 CPLD programming jumper (J491)

The CPLD is re-configurable by programming via J491. Please refer to www.xilinx.com for details and tools for Xilinx CPLD configuration.

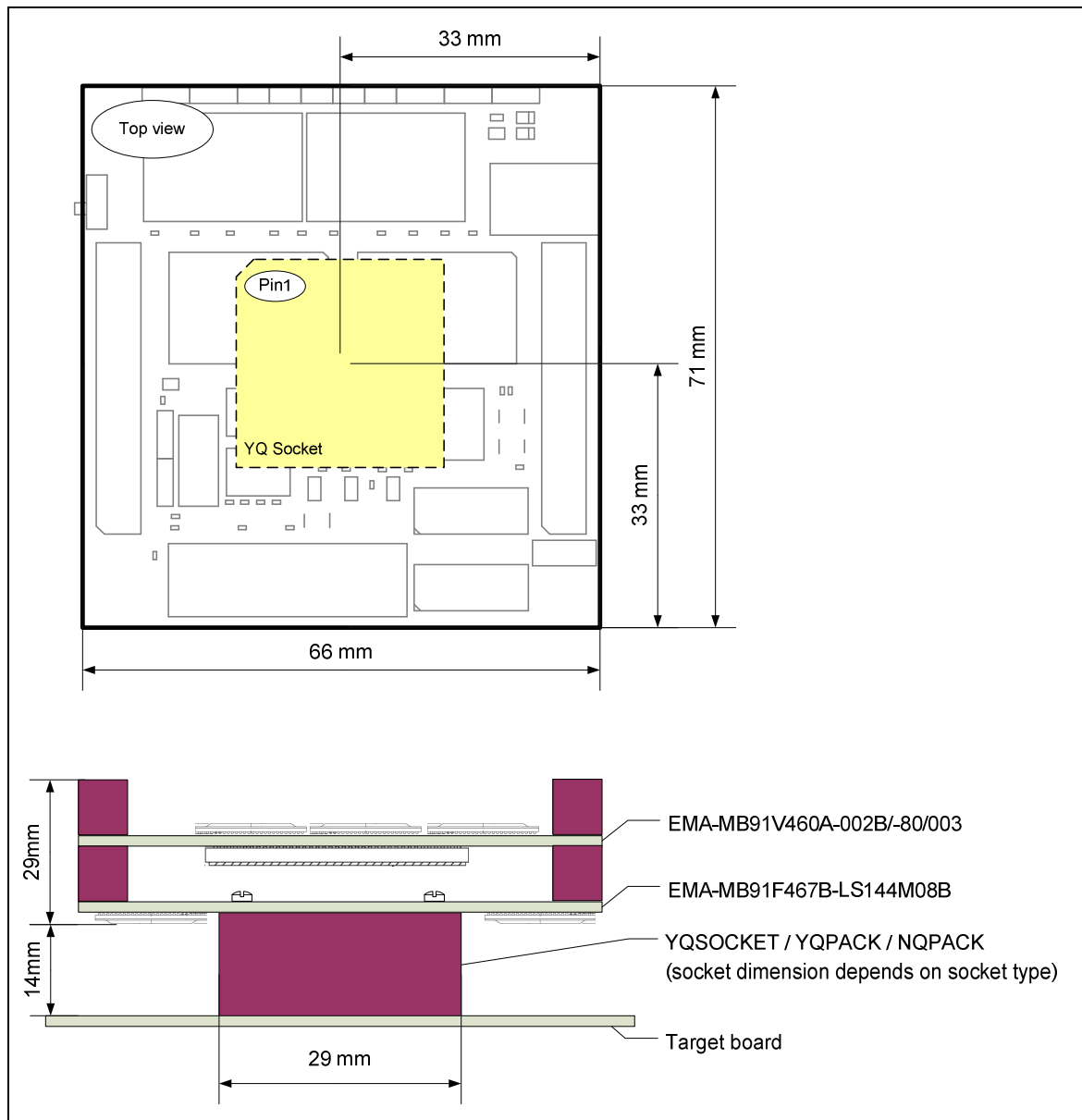| J491 pin	Name
1	GND
2	TDO
3	TCK
4	TMS
5	TDI
6	VREF

5 Mechanical dimensions

Figure 5-1: Mechanical dimensions

6   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://mcu.emea.fujitsu.com/mcu_portal.htm

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

http://www.fujitsu.com/emea/services/microelectronics

Media Products: SAW filters, acoustic resonators and VCOs

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

For more information about FUJITUS MICROELECTRONICS

http://www.fujitsu.com/emea/services/microelectronics

7 China-RoHS regulation

Evaluation Board 评估板

Emulation Board 仿真板

根据SJ/T11364-

2006《电子信息产品污染控制标识要求》特提供如下有关污染控制方面的信息。

The following product pollution control information is provided according to SJ/T11364-2006 *Marking for Control of Pollution caused by Electronic Information Products*.

1．电子信息产品污染控制标志说明 Explanation of Pollution Control Label

该标志表明本产品含有超过中国标准SJ/T11363-

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为保证所申明的环保使用期限，应按产品手册中所规定的环境条件和方法进行正常使用，并严格遵守产品维修手册中规定的定期维修和保养要求。

产品中的消耗件和某些零部件可能有其单独的环保使用期限标志，并且其环保使用期限有可能比整个产品本身的环保使用期限短。应到期按产品维修程序更换那些消耗件和零部件，以保证所申明的整个产品的环保使用期限。

本产品在使用寿命结束时不可作为普通生活垃圾处理，应被单独收集妥善处理。

请注意：环保使用期限50年的指定不是与产品的耐久力，使用期限或任何担保要求等同的。

This symbol to be added to all EIO sold to China, indicates the product contains hazardous materials in excess of the limits established by the Chinese standard SJ/T11363-2006 *Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products*. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period, starting from the manufacturing date, during which the toxic or hazardous substances or elements contained in electronic information products will not leak or mutate under normal operating conditions so that the use of such electronic information products will not result in any severe environmental pollution, any bodily injury or damage to any assets, the unit of the period is "Year".

In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly.

Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures.

This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.

Please note: The designation of 10 years EFUP is <u>not</u> to be equated with the <u>durability</u>, <u>use-duration</u> or any <u>warranty-claims</u> of the product.

产品中有毒有害物质或元素的名称及含量

Table of hazardous substances name and concentration

部件名称 EMA-MB91F467B- LS144M08B	有毒有害物质或元素 Hazardous substances name					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
	x	o	o	o	o	o

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求

- 此表所列数据为发布时所能获得的最佳信息

- 由于缺少经济上或技术上合理可行的替代物质或方案，此医疗设备运用以上一些有毒有害物质来实现设备的预期临床功能，或给人员或环境提供更好的保护效果。

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

- Data listed in the table represents best information available at the time of publication

8 Recycling

Gültig für EU-Länder:

Gemäß der Europäischen WEEE-Richtlinie und deren Umsetzung in landesspezifische Gesetze nehmen wir dieses Gerät wieder zurück.

Zur Entsorgung schicken Sie das Gerät bitte an die folgende Adresse:

Fujitsu Microelectronics Europe GmbH

Warehouse

Monzastraße 4a

63225 Langen

Valid for European Union Countries:

According to the European WEEE-Directive and its implementation into national laws we take this device back.

For disposal please send the device to the following address:

Fujitsu Microelectronics Europe GmbH

Warehouse

Monzastraße 4a

63225 Langen