SmartFusion2 MSS

Ethernet MAC Configuration

Microsemi

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Introduction

The SmartFusion2 Microcontroller Subsystem (MSS) provides one Ethernet MAC hard peripheral.

On the MSS canvas, you must enable or disable (default) the Ethernet MAC instance based on whether it is being used in your current application. When disabled, the Ethernet MAC instance is held in reset (lowest power state).

The functional behavior of the Ethernet MAC instance must be defined at the application level using the SmartFusion2 MSS Ethernet MAC Driver provided by Microsemi.

In this document, we describe how you can configure the MSS Ethernet MAC instance and how the peripheral signals are connected.

For more details about the MSS Ethernet MAC hard peripheral, please refer to the SmartFusion2 User Guide.

1 – Configuration Options

Interface - Use this option to select between the Media Independent Interface (MII), Gigabit Media Independent Interface (GMII) and Ten-Bit Interface (TBI) Interfaces. For any of these interfaces the signals are connected the FPGA fabric. The 'Main Connection' column will display 'Fabric' and is not editable.

Line Speed - The line speed is limited to 10/100 for MII. For GMII and TBI all three speeds 10/10/100 are available. The highest speed is the default in the configurator.

Management Interface - This option is available for all three interfaces and exposes the management interface PHY interface. The management Interface is used for control and status information to be exchanged with the attached PHY (Figure 1-1).

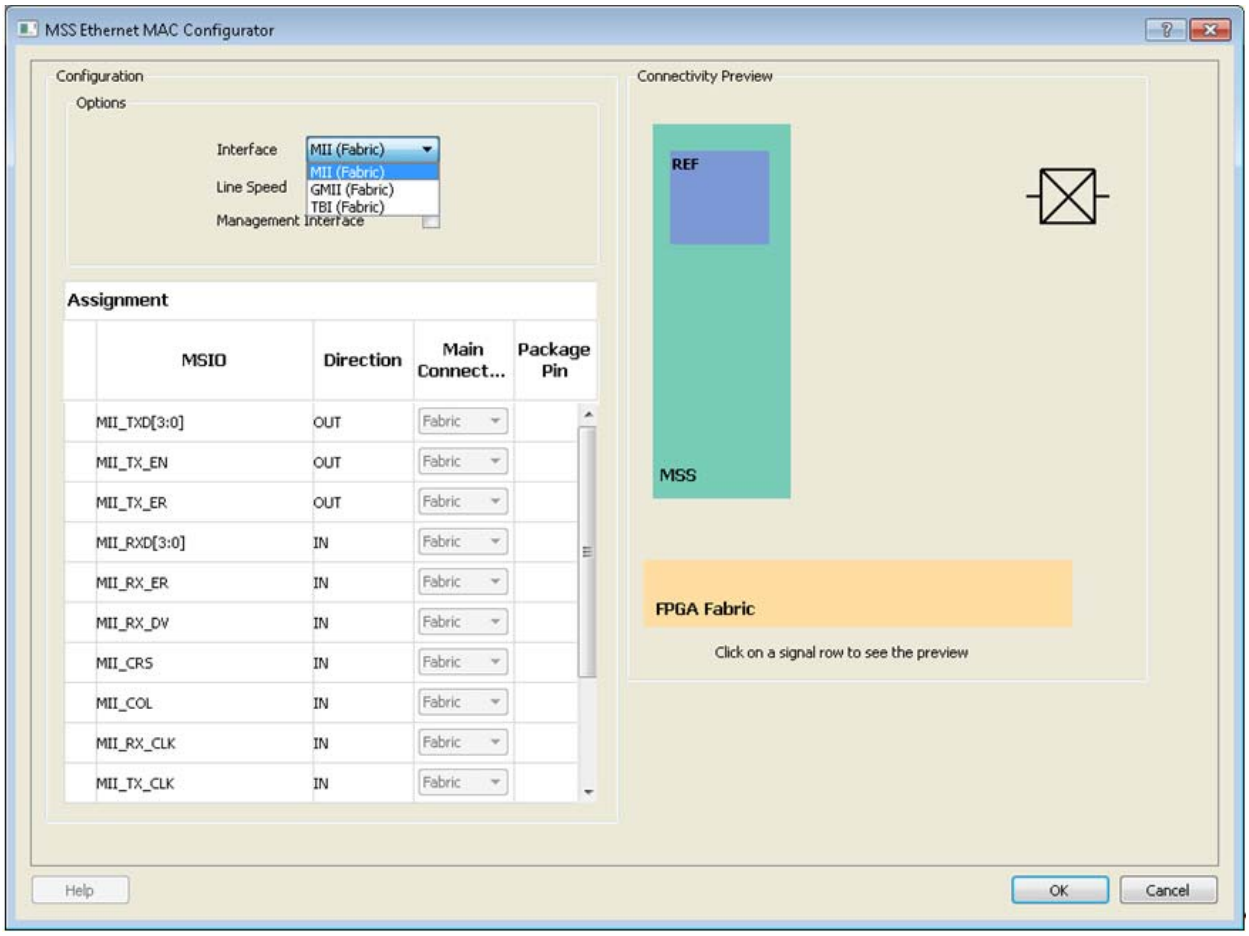

Figure 1-1 **• Ethernet MAC Configurator Options**

Peripheral Signals Assignment Table

For the Ethernet MAC, all interfaces use dedicated connections to the FPGA fabric. The Signal Assignment Table shows, for each selected interface, the list of ports for that interface. This assignment table has the following columns:

MSIO - Identifies the peripheral signal name configured in a given row.

Main Connection - Always displays Fabric as all interface options are going through the FPGA fabric.

Direction- Indicates if the signal direction is IN, OUT or INOUT.

Package Pin - May be ignored as none of the interface ports are routed through MSIO directly.

Connectivity Preview

The Connectivity Preview panel shows a graphical view of the current connections for the highlighted signal row, as in Figure 1-2.

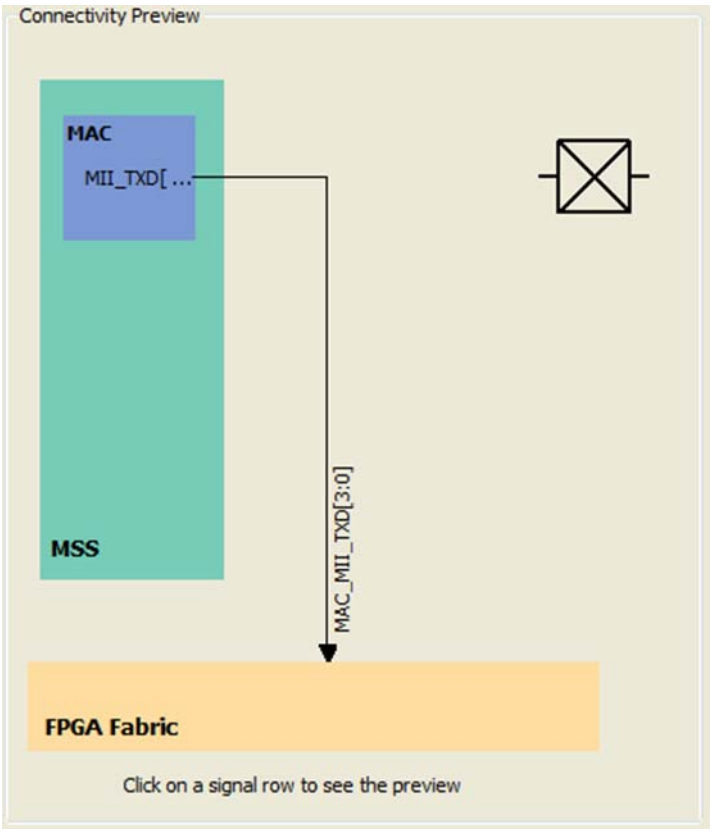

***Figure 1-2* • Connectivity Preview**

2 – Port Description

Table 2-1 **• MII Ports**

Port Name	Port Group	Direction	Description
MII_TXD[3:0]	MAC_MII_FABRIC	Out	Indicates MII transmit data.
MII_TX_EN	MAC_MII_FABRIC	Out	Indicates MII transmit data enable.
MII_TX_ER	MAC_MII_FABRIC	Out	Indicates MII transmit data error.
MII_RXD[3:0]	MAC_MII_FABRIC	In	Indicates MII receive data.
MII_RX_ER	MAC_MII_FABRIC	In	Indicates MII receive data error.
MII_RX_DV	MAC_MII_FABRIC	In	Indicates MII receive data valid.
MII_CRS	MAC_MII_FABRIC	In	Asynchronous carrier sense signal. Indicates at least one physical device transmits on the medium.
MII_COL	MAC_MII_FABRIC	In	Asynchronous collision signal. Indicates more than one physical device transmits simultaneously on the medium.
MII_RX_CLK	MAC_MII_FABRIC	In	Indicates MII receive clock. 25 MHz for 100-Mbit/s mode and 2.5 MHz for 10-Mbit/s mode.
MII_TX_CLK	MAC_MII_FABRIC	In	Indicates MII transmit clock. 25MHz for 100-Mbit/s mode and 2.5MHz for 10-Mbit/s mode. MIII_TXD, MII_TX_EN, MII_TX_ER signals are synchronized to MII_TX_CLK.
MII_MDC		Out	Indicates MII Management data clock.
MII_MDO_EN		Out	Indicates MII Management data output enable.
MII_MDO		Out	Indicates MII Management data out.
MII_MDI		In	Indicates MII Management data Input.

***Table 2-2* • GMII Ports**

Port Name	Port Group	Direction	Description
GMII_TXD[7:0]	MAC_GMII_FABRIC	Out	Indicates MII transmit data.
GMII_TX_EN	MAC_GMII_FABRIC	In	Indicates MII transmit data enable.
GMII_TX_ER	MAC_GMII_FABRIC	Out	Indicates MII transmit data error.
GMII_RXD[7:0]	MAC_GMII_FABRIC	Out	Indicates MII receive data.
GMII_RX_ER	MAC_GMII_FABRIC	In	Indicates MII receive data error.
GMII_RX_DV	MAC_GMII_FABRIC	In	Indicates MII receive data valid.
GMII_CRS	MAC_GMII_FABRIC	In	Asynchronous carrier sense signal. Indicates at least one physical device transmits on the medium.
GMII_COL	MAC_GMII_FABRIC	In	Asynchronous collision signal. Indicates more than one physical device transmits simultaneously on the medium.
GMII_RX_CLK	MAC_GMII_FABRIC	In	Indicates GMII receive clock. 125 MHz for 1000-Mbit/s, 25 MHz for 100-Mbit/s mode and 2.5 MHz 10 Mbit/s mode.
GMII_TX_CLK	MAC_GMII_FABRIC	In	Indicates GMII transmit clock. 25 MHz for 100-Mbit/s mode and 2.5 MHz10-Mbit/s mode. GMII_TXD, GMII_TX_EN, GMII_TX_ER signals are synchronized to GMII_TX_CLK.
GMII_GTX_CLK	MAC_GMII_FABRIC	In	Indicates gigabit 125-MHz transmit clock input for 1000-Mbit/s mode. GMII_TXD, GMII_TX_EN, GMII_TX_ER signals are synchronized to GMII_GTX_CLK
GMII_MDC		Out	Indicates GMII Management data clock.
GMII_MDO_EN		Out	Indicates GMII Management data output enable.
GMII_MDO		Out	Indicates GMII Management data out.
GMII_MDI		In	Indicates GMII Management data Input.

***Table 2-3* • TBI Ports**

Port Name	Port Group	Direction	Description
TBI_RCGF[9:0]	MAC_TBI_FABRIC	In	MAC_RCGF is the 10-bit parallel receive data. The receive data byte 0 containing the comma character is byte aligned to 53,125 MHz receive byte clock used to latch the bytes 0 and 2 of the receive data word.
TBI_TCGF[9:0]	MAC_TBI_FABRIC	Out	MAC_TCGF is the 10-bit parallel transmit data presented in the Physical layer for serialization and transmission. The order of transmission is MAC_TCGF[0] first, followed by MAC_TCGF[1] through MAC_TCGF[9].
TBI_RX_CLKP0	MAC_TBI_FABRIC	In	TBI_RX_CLKP0 and TBI_RX_CLK1 are fed in from the fabric as two 62.5MHz clocks, which are 180° out of phase with one another.
TBI_RX_CLKP1	MAC_TBI_FABRIC	In	TBI_RX_CLKP0 and TBI_RX_CLK1 are fed in from the fabric as two 62.5-MHz clocks, which are 180° out of phase with one another.
TBI_GTX_CLK	MAC_TBI_FABRIC	In	Indicates 125-MHz transmit clock from the fabric for 1000Mbps mode.
TBI_MDI		In	Indicates TBI Management data clock.
TBI_MDO		Out	Indicates TBI Management data output enable.
TBI_MDO_EN		Out	Indicates TBI Management data out.
TBI_MDC		Out	Indicates TBI Management data Input.

Note: Port names have the name of the MAC instance as a prefix, e.g. MAC_GMII_TXD.

A – Product Support

Microsemi SoC Products Group backs its products with various support services, including Customer Service, Customer Technical Support Center, a website, electronic mail, and worldwide sales offices. This appendix contains information about contacting Microsemi SoC Products Group and using these support services.

Customer Service

Contact Customer Service for non-technical product support, such as product pricing, product upgrades, update information, order status, and authorization.

From North America, call 800.262.1060
From the rest of the world, call 650.318.4460
Fax, from anywhere in the world, 408.643.6913

Customer Technical Support Center

Microsemi SoC Products Group staffs its Customer Technical Support Center with highly skilled engineers who can help answer your hardware, software, and design questions about Microsemi SoC Products. The Customer Technical Support Center spends a great deal of time creating application notes, answers to common design cycle questions, documentation of known issues, and various FAQs. So, before you contact us, please visit our online resources. It is very likely we have already answered your questions.

Technical Support

Visit the Customer Support website (www.microsemi.com/soc/support/search/default.aspx) for more information and support. Many answers available on the searchable web resource include diagrams, illustrations, and links to other resources on the website.

Website

You can browse a variety of technical and non-technical information on the SoC home page, at www.microsemi.com/soc.

Contacting the Customer Technical Support Center

Highly skilled engineers staff the Technical Support Center. The Technical Support Center can be contacted by email or through the Microsemi SoC Products Group website.

Email

You can communicate your technical questions to our email address and receive answers back by email, fax, or phone. Also, if you have design problems, you can email your design files to receive assistance. We constantly monitor the email account throughout the day. When sending your request to us, please be sure to include your full name, company name, and your contact information for efficient processing of your request.

The technical support email address is soc_tech@microsemi.com.

My Cases

Microsemi SoC Products Group customers may submit and track technical cases online by going to My Cases.

Outside the U.S.

Customers needing assistance outside the US time zones can either contact technical support via email (soc_tech@microsemi.com) or contact a local sales office. Sales office listings can be found at www.microsemi.com/soc/company/contact/default.aspx.

ITAR Technical Support

For technical support on RH and RT FPGAs that are regulated by International Traffic in Arms Regulations (ITAR), contact us via soc_tech_itar@microsemi.com. Alternatively, within My Cases, select **Yes** in the ITAR drop-down list. For a complete list of ITAR-regulated Microsemi FPGAs, visit the ITAR web page.

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