RG3MxxB12B1

I3C Intelligent Switch Device

Description

The RG3MxxB12B1 is a family of I2C/I3C Multiple Port Hub devices featuring two I2C/I3C Controller Side Ports and up to eight I2C/IC Target Side Ports. An RG3MxxB12B1 device provides connectivity to up to two controllers, and up to eight targets. By cascading and duplicating the RG3MxxB12B1, the user builds a RG3MxxB12B1 Hub Network to provide connectivity to a number of device, with extended reach distance, and running with different level of I2C, I3C, and SMBus protocols.

In an RG3MxxB12B1 device, each of **Controller Side Port** is associated with an on-chip I2C/I3C target interface. Each I2C/I3C interface accesses on-chip registers. Controller-Controller communication is achieved with shared registers and intra-port IBI channels.

One of the two Controller Side Ports is selected to connect to a 1:N **Hub network**, which allows the selected controller to get access to the enabled Target Side Ports in the Hub network. The controller selection multiplexer allows the two controllers to share the downstream I2C/I3C network.

The 1:N I2C/I3C Hub network allows the management of the I2C/I3C hierarchy with expansion to up to eight **Target Side Ports**. The expanded ports allow the system to reduce the load that the selected controller sees at any moment. The Hub network maintains software level transparently. All devices connected to the Hub Target Side Ports are accessed the same way as if all ports directly connected as if the Hub network does not exist. The Hub network also allows physical segmentation of the I2C/I3C hierarchy employing on the fly connecting and disconnecting to any of the expanded ports.

Each Target Side Port is associated with a **Bus Agent**. This Agent independently receives or transmits legacy SMBus transactions and allows SCL Stretching within the SMBus segment behind the Target Side Port. When the SMBus Agent is active, the Agent is engaged directly with the Target Side Port and the Hub Network to the port is disconnected.

Features

- Two Controller Side (upstream/management) ports
- Up to eight Target Side (downstream/subordinate) ports
- On-Chip I2C/I3C Target (target) Interface
- Controller Side Port multiplexer
- Controller switching via in-band I2C/I3C commands or pin selection
- Controller-Controller communication and messaging support
- Hot Join support
- Support both I2C and I3C Basic 1.0 Protocol
- All ports support 1.0 to 1.8V I2C/I3C compatible operation
- All ports support I2C Open-Drain only operation up to 3.3V
- JEDEC SPD/Module Management Bus Context support
- Controller to Target analog switch mode support
- Hybrid analog switch and re-driving support (Patent pending)
- Mixed I2C/I3C Bus support
- In-Band Interrupt (IBI) and IBI Optimization support
- Single 3.3V power supply
- Controller-Target Level shifting support
- On-Chip Voltage Regulators or direct platform connection of IO supplies
- SMBus transaction agent for SMBus compatibility
- SMBus SCL stretching support
- SMBus SCL stretching support in Open-Drain Only Operation
- Network partition support
- Mixed transparent and non-transparent bridging (patent pending)

Applications

- DIMM I3C fan-out
- I3C/I2C/SMBus compatibility
- I3C Port Expansion and Level adaptation
- I3C Topology Management
- I3C Signal Integrity Management

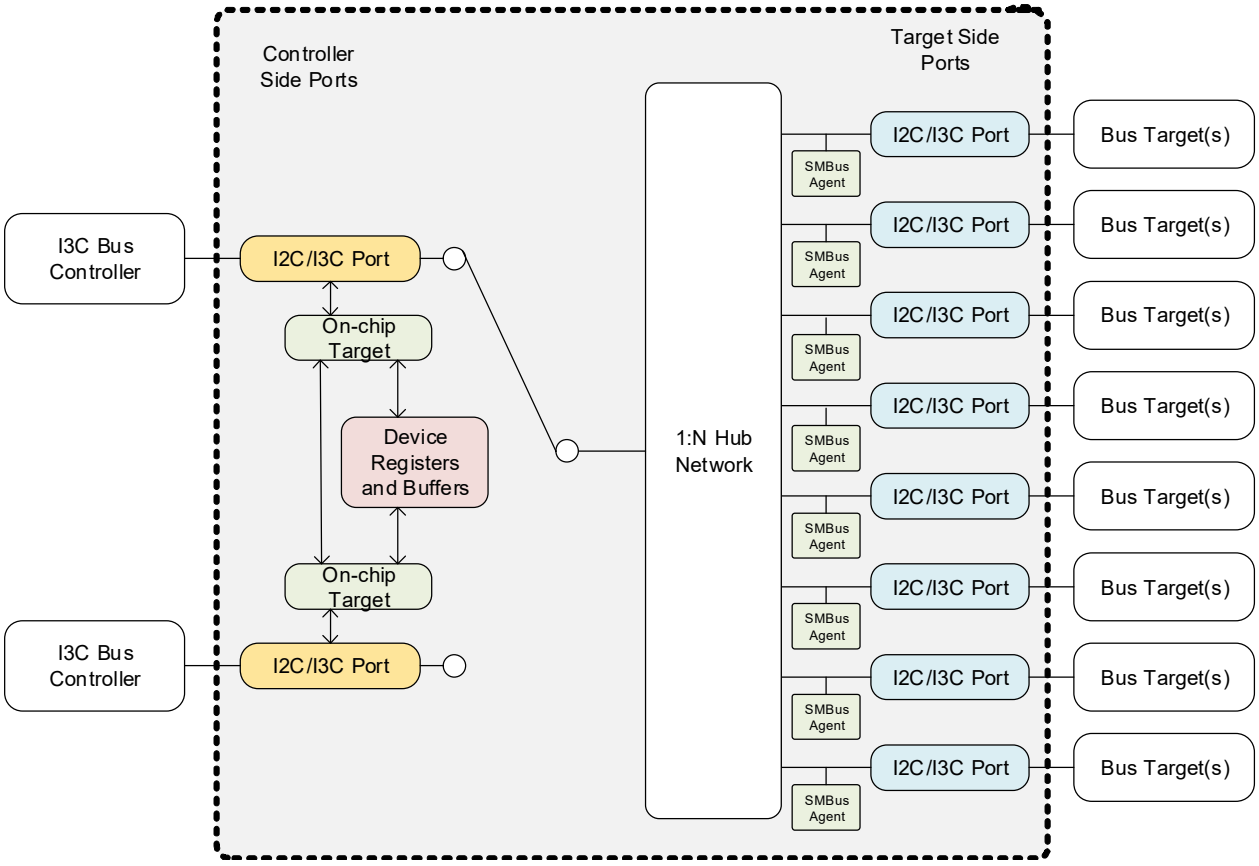

Figure 1. Block Diagram

Part Numbers

Part Number	Part Description
RG3M87B12B1	2:8 Hub with down stream ports power up disabled. User configures the device and the ports per the application needs.
RG3M47B12B1	2:4 Hub with down stream ports power up disabled. User configures the device and the ports per the application needs.
RG3M88B12B1	2:8 Hub with down stream ports power up enabled and connected in a pre-configured I3C transparent operation. The Hub device allows the I3C traffic passing through the device without a configuration.
RG3M48B12B1	2:4 Hub with down stream ports power up enabled and connected in a pre-configured I3C transparent operation. The Hub device allows the I3C traffic passing through the device without a configuration.
RG3M89B12B1	2:8 Hub with down stream ports power up disabled and the VIOM and VIOS LDOs enabled. User does not need to power the VIOM/VIOS of the Hub device. User configures the device and the ports per application needs.
RG3M49B12B1	2:4 Hub with down stream ports power up disabled and the VIOM and VIOS LDOs enabled. User does not need to power the VIOM/VIOS of the Hub device. User configures the device and the ports per application needs.

IMPORTANT NOTICE AND DISCLAIMER

RENESAS ELECTRONICS CORPORATION AND ITS SUBSIDIARIES (“RENESAS”) PROVIDES TECHNICAL SPECIFICATIONS AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD-PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for developers who are designing with Renesas products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. Renesas grants you permission to use these resources only to develop an application that uses Renesas products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Renesas intellectual property or to any third-party intellectual property. Renesas disclaims responsibility for, and you will fully indemnify Renesas and its representatives against, any claims, damages, costs, losses, or liabilities arising from your use of these resources. Renesas' products are provided only subject to Renesas' Terms and Conditions of Sale or other applicable terms agreed to in writing. No use of any Renesas resources expands or otherwise alters any applicable warranties or warranty disclaimers for these products.

(Disclaimer Rev.1.01 Jan 2024)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit www.renesas.com/contact-us/.

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.