Module runs Linux on new octa-core RZ/G1H SoC, has nano-ITX carrier

Apr 17, 2017 — by Eric Brown — 771 views

iWave's rugged "iW-RainboW-G21M-Q7" COM debuts the octa-core Renesas RZ/G1H, and adds 2GB DDR3, 4GB eMMC, and support for GbE, SATA 3.1, USB 3.0, and PCIe.

iWave's Qseven 2.0 form-factor iW-RainboW-G21M-Q7 computer-on-module, also referred to as the "RZ/G1H SOM," appears to be the first embedded board showcasing the recently announced, octa-core RZ/G1H SoC from Renesas. The Japanese chipmaker collaborated with India-based iWave on the project, which demonstrates the latest and most powerful member of the Renesas RZ/G series of ARM SoCs. In December, iWave unveiled a iW-RainboW-G20M-Qseven COM that tapped the dual-core, Cortex-A15 Renesas RZ/G1M and RZ/G1N variants. There's also a dual-core Cortex-A7-based Renesas RZ/G1E SoC.
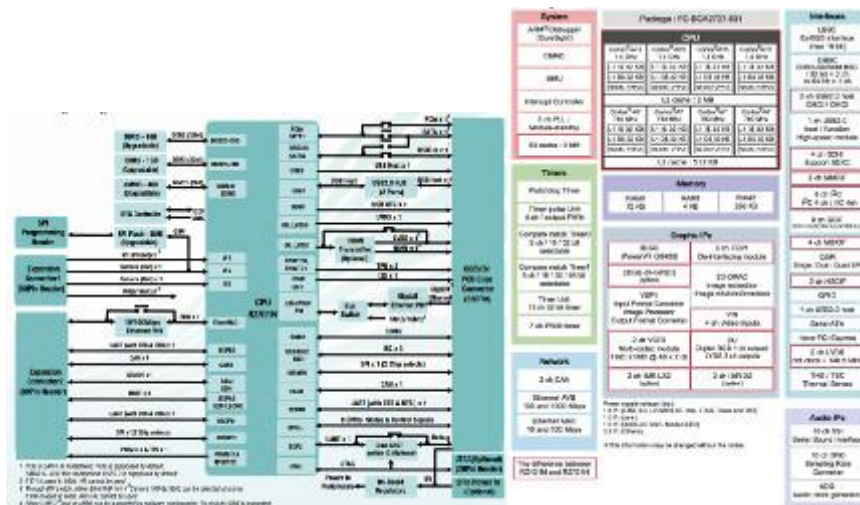

iW-RainboW-G21M-Q7, front and back
(click images to enlarge)

The RZ/G1H SoC comprises 4x Cortex-A15 cores clocked to 1.4GHz and 4x Cortex-A7 cores at 780MHz. There's also an Imagination Technologies PowerVR G6400 GPU at 520MHz, which was also found on the Renesas R-Car H2 automotive SoC. It features simultaneous HD video encode and decode, with support for four-channel video input and three-channel video display outputs.

The iW-RainboW-G21M-Q7 module is aimed at multimedia applications such as vision, video analytics, entertainment, digital signage, real-time image recognition, video surveillance, network camera, advanced HMI, office equipment, and smart terminals. Like the iW-RainboW-G20M-Qseven, it supports -40 to 85°C temperatures, and offers a Linux 3.10.31 BSP and an optional hardware development kit (see farther below).

The 70 x 70mm module is available with 2GB DDR3-1600 RAM and 4GB eMMC flash, both of which are said to be expandable with special orders. There's also a microSD slot and 2MB SPI NOR flash for boot code.

iW-RainboW-G21M-Q7 block diagram (left) and Renesas RZ/G1H block diagram
(click images to enlarge)

Like the iW-RainboW-G20M-Qseven, the iW-RainboW-G21M-Q7 departs from traditional Qseven COM designs by splitting I/O between the 230-finger Qseven MXM edge connector and a pair of high density, 80-line connectors on the back side of the module. The resulting, wider-than-normal range of interfaces includes LVDS, RGB, SATA, CAN, USB 3.0 and 2.0, and a variety of serial and camera interfaces.

Unlike the earlier module, the iW-RainboW-G21M-Q7 integrates a 10/100Mbps, as well as 10/100/1000Mbps, Ethernet PHY, and there's an HDMI interface in addition to LVDS. A wireless HDMI transmitter is optional.

Specifications listed for the iW-RainboW-G21M-Q7 include:

- Processor — Renesas RZ/G1H (4x Cortex-A15 cores @ 1.4GHz, 4x Cortex-A7 cores @ 780MHz; PowerVR G6400 GPU @ 520MHz; HD video codecs

- Memory:
    - 2GB DDR3-1600 (expandable)
    - 4GB eMMC flash (expandable)
    - 2MB SPI NOR flash (for boot)
    - MicroSD slot
- Networking — Gigabit Ethernet PHY (via 230-pin Q7 connector); Fast Ethernet (or RMII) PHY (via 80-pin connector)
- I/O via 230-pin Qseven edge connector:
    - PCIe (can't be used with active SATA)
    - SATA (can't be used with active PCIe)
    - SDHC
    - USB 3.0 host
    - 3x USB 2.0 host
    - USB 2.0 device
    - 2x LVDS (second port not available when HDMI is active)
    - HDMI
    - Optional HDMI transmitter
    - I2S audio
    - 3x I2C
    - 2x PWM
    - SPI, CAN, UART
    - UART or optional JTAG console
    - 8x GPIO
- I/O via 2x 80-line expansion connectors:
    - 4x 8-bit CSI or 2x 16-bit CSI
    - 2x UART
    - SSI/I2S audio
    - SPI, CAN, PWM
    - GPIOs
- Other features — Optional dev kit and camera kit
- Power — 5V @2.5A via Q7 connector; optional 2-pin power input
- Operating temperature — -40 to 85°C
- Dimensions — 70 x 70mm; Qseven 2.0
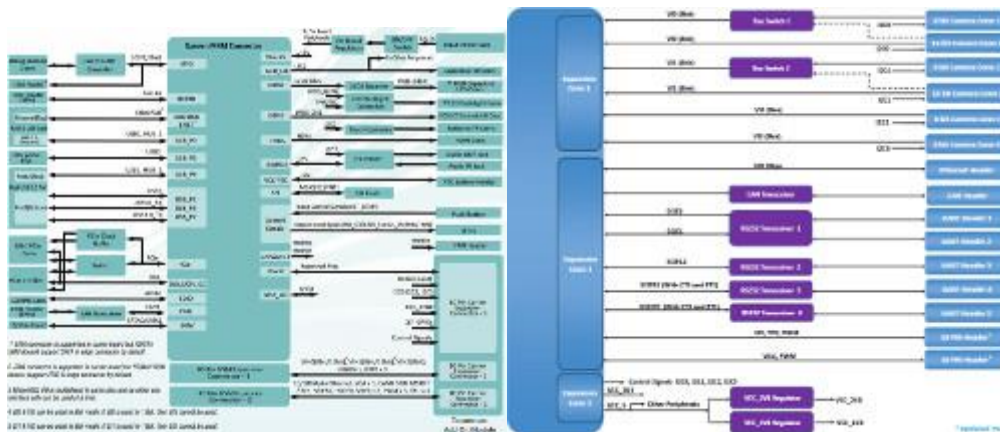- Operating system — Linux 3.10.31 BSP

RZ/G1H development kit

iWave's RZ/G1H development kit is built around a 120 x 120mm Nano-ITX development board that interfaces with the iW-RainboW-G21M-Q7 COM via its two non-standard 80-pin expansion connectors. There's also an optional 7-inch capacitive display and optional camera daughter board.

RZ/G1H dev kit carrier board (left) and full kit with 7-inch display and camera daughter board
(click images to enlarge)

The carrier board extends many of the module's features with real-world ports including GbE, HDMI, USB 3.0, micro-USB OTG, and SATA. An SD slot is available along with audio and 12V power jacks. Other interfaces include LVDS, PCIe, serial, CAN, and I/O expansion connectors. The board supports 0 to 60°C temperatures.

RZ/G1H dev kit block diagram (left) and camera daughter card block diagram
(click images to enlarge)

The optional camera daughter board provides 4x 8-bit camera or optionally 2x 16-bit camera ports. The camera board also supplies a second CAN port and 4x optional RS232 ports.

Further information

No shipping information was provided for the iW-RainboW-G21M-Q7 COM and RZ/G1H development kit. More information may be found on iWave's iW-RainboW-G21M-Q7 and RZ/G1H dev kit product pages.