

# Avnet Visible Things Multi-PMOD Example by

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e2 Studio Version: 5.3.1.002

## Project Summary

Board:	gw002_rev1_3
Device:	R7FS7G27H2A01CBD
Toolchain:	GCC ARM Embedded
Toolchain Version:	4.9.3.20150529
SSP Version:	1.2.0

# Hardware Setup

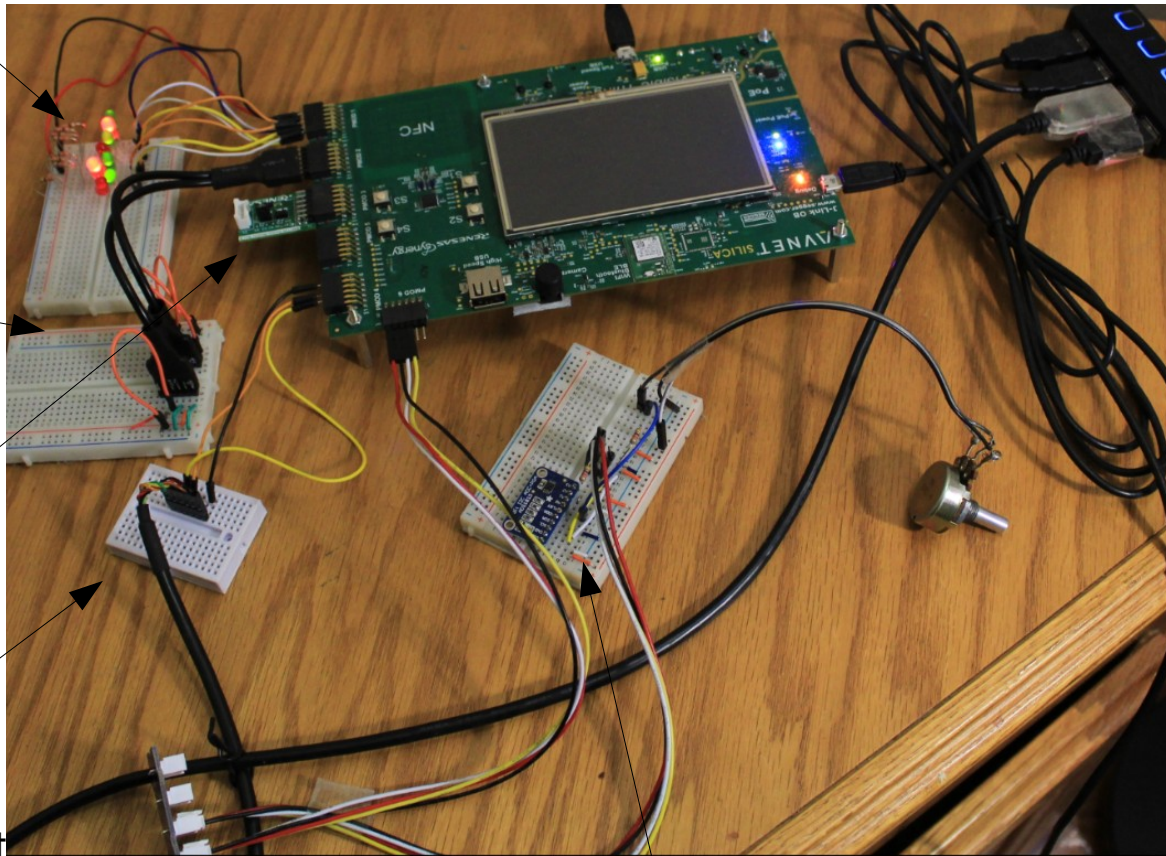
PMOD1: LED GPIO output mode

PMOD2:  
Jumper Wires  
GPIO input  
mode

PMOD3 : SPI  
BMC150  
Accelerometer  
Sensor

PMOD4 : UART port  
(Adafruit USB to UART FTDI cable)

PMOD6: I2C TI ADS1015 ADC Module



# PMOD Configuration

Description: Configuration

PMOD1 : GPIO Type 1, 12 pins (Use 8 LEDs to display PMOD 2 input pattern)

PMOD2 : GPIO type 1, 12 pins (inputs for 8 jumper wires to either VCC or GND)

PMOD3 : SPI Type 2 6 pins (read xyz, and device ID) SCI1 Simple SPI mode

PMOD4 : UART Type 4, 6 pins (Print the PMOD2 input pattern on PC serial term)  
SCI5 Asy UART mode

PMOD6 : I2C 4 pins (read the voltage level from the potentiometer) IIC1 framework driver

# PMOD Configuration for this example

Avnet Visible Things Platform

User's Manual

Gateway PMOD	I2C	Type 1 GPIO	Type 2 SPI	Type 2A Expanded SPI	Type 3 UART	Type 4 UART	Type 4A Expanded UART	Type 5 H-Bridge	Type 6 Dual H-Bridge
1	Y	Y	Y	Y	Y	Y	Y	N	N
2	Y	Y	Y	Y	Y	Y	Y	N	N
3	Y	Y	Y	Y	Y	Y	Y	N	N
4	Y	Y	Y	Y	Y	Y	Y	N	N
5	N	Y	Y	Y	N	Y	Y	Y	Y
6	Y	Y	N	N	N	N	N	N	N

Table 3 – Pmod Compatibility Chart

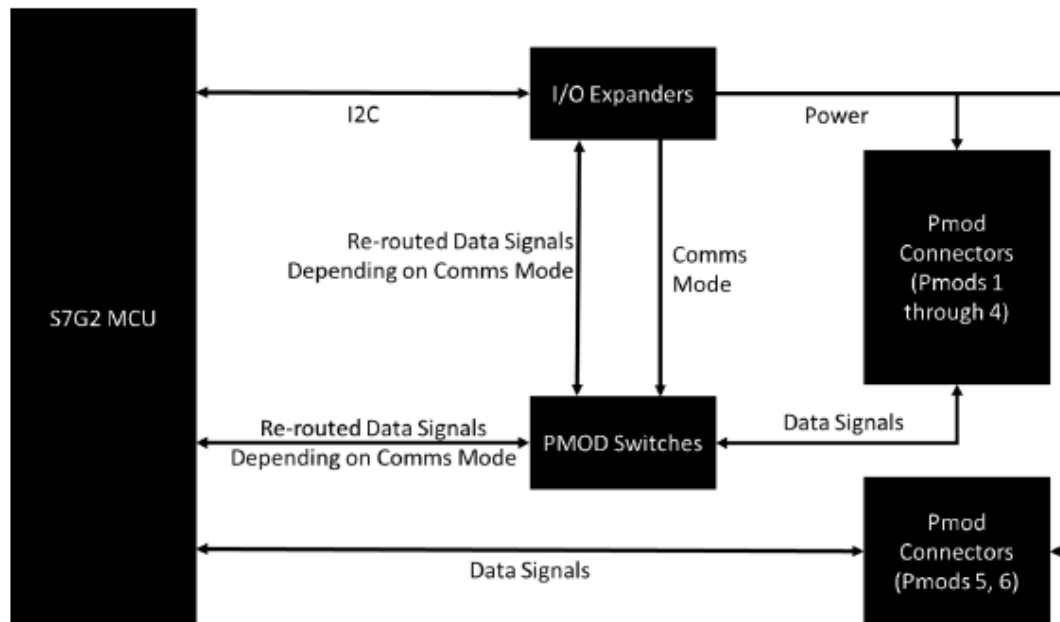


Figure 30 – Pmod, I/O Expander Interconnections Diagram

# Project Summary

The screenshot shows the Renesas Synergy IDE interface. At the top, there's a header with the Renesas logo, a search bar, and navigation links like 'Solutions', 'Products', 'Platforms', 'Design & Support', 'About', 'Special Offers', 'Parametric search', and 'History'. Below this is a banner with the text 'START AHEAD' and a woman's face. The main content area is titled 'Project Summary' and contains the following information:

- Board: gw002\_rev1\_3
- Device: R7FSTG27H2A01CBD
- Toolchain: GCC ARM Embedded
- Toolchain Version: 4.9.3.20150529
- SSP Version: 1.2.0

Below this, it says 'Selected software components:' followed by a version number 'v1.2.0'. At the bottom, there's a footer with 'YouTube' and 'Renesas Synergy Gallery' logos, and a navigation bar with 'Summary', 'BSP', 'Clocks', 'Pins', 'Threads', 'Messaging', 'ICU', and 'Components'. The bottom status bar shows 'Problems', 'Tasks', 'Console', 'Properties', 'Memory Usage', and 'Smart Browser'.

# Threads : Driver & Thread Configuration

The screenshot displays the Renesas Synergy IDE interface for configuring threads in a project named `gw002_example_gpio_i2c_spi_uart_v1h`. The **Project Explorer** on the left shows the project structure, including source files like `pm0d4_run_thread_entry.c` and `pm0d6_run_thread_entry.c`.

The main window is divided into several panes:

- Threads**: A list of threads configured for the project, including:
  - PMOD Configure Thread (containing `g_sf_i2c_io_exp_u18 I2C Framework Device`, `g_sf_i2c_io_exp_u19 I2C Framework Device`, and `g_config_done_flags Event Flags`)
  - PMOD1 Output LED Run Thread
  - PMOD 2 Input Run Thread
  - PMOD4 UART Run Thread (containing `g_sf_comms0 Communications Framework`)
  - PMOD6 I2C ADS1015 Thread (containing `g_ads1015 I2C Framework Device on sf_i2c`)
- PMOD Configure Thread Stacks**: A diagram showing the stack configuration for the threads. It includes components like `g_sf_i2c_io_exp_u18 I2C Framework Device on sf_i2c`, `g_sf_i2c_io_exp_u19 I2C Framework Device on sf_i2c`, `g_i2c0 I2C Master Driver on r_sci_i2c`, `g_sf_i2c_bus0 I2C Framework Shared Bus on sf_i2c`, and `g_i2c1 I2C Master Driver on r_sci_i2c`. Below the diagram are checkboxes for adding DTC drivers for transmission and reception, all marked as optional.
- PMOD Configure Thread Objects**: A list of objects configured for the threads, including `g_config_done_flags Event Flags` and `g_gpio_lock_mutex Mutex`.

The bottom status bar indicates the GDB server version: `GDBServer for Renesas targets. Version 5.3.0.023 (Jan 3 2017 15:08:05)`.

# Successful Build

The screenshot displays an IDE window with the following components:

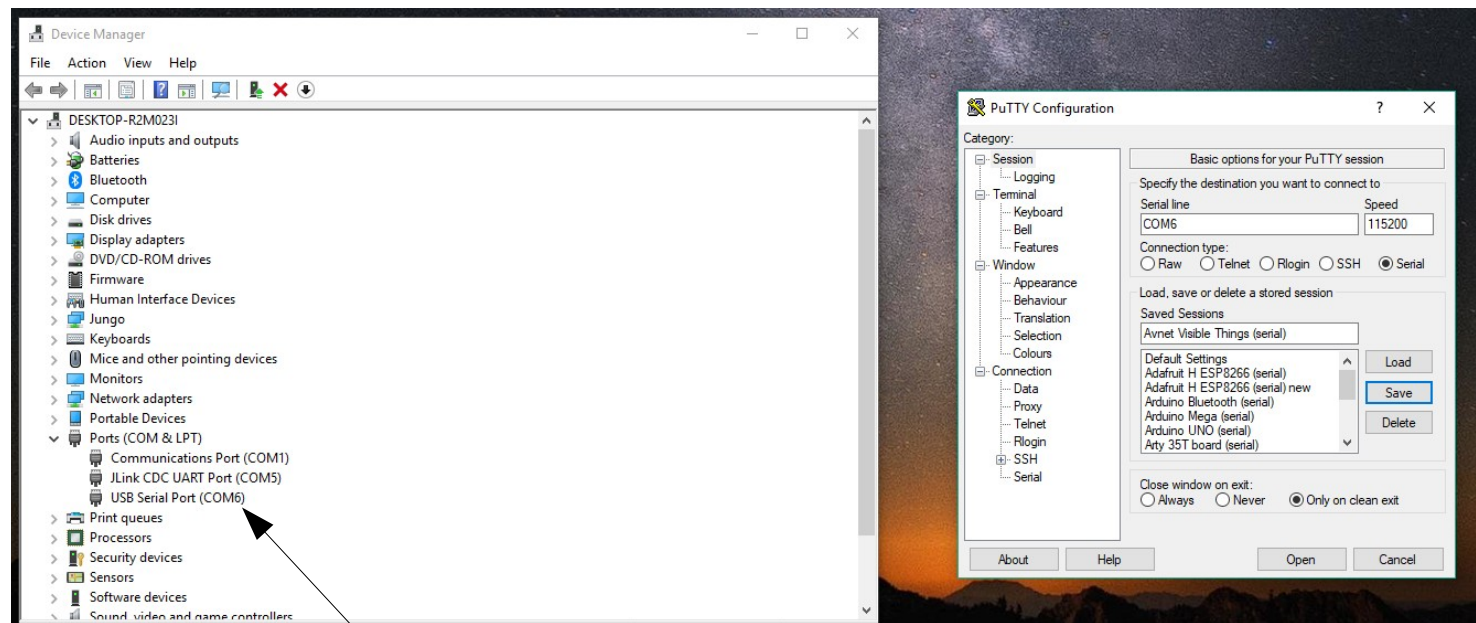
- Project Explorer:** Shows a project structure with files like `gw002_example_gpio_12pin_rtos_v1b`, `gw002_example_gpio_6pin_rtos_v1a`, `gw002_example_gpio_i2c_spi_uart_v1h [Debug]`, `gw002_example_i2c_rtos_v1e`, `gw002_example_spi_rtos_v1a`, and `gw002_example_uart_rtos_v1d`.
- Source Editor:** Displays the file `pm0d1_run_thread_entry.c` with the following code:

```
1  #include "pm0d1_run_thread.h"
2  #include "pm0d_configure_thread_entry.h" // event flag
3  #include <pca9535/pca9535.h>
4
5  extern PMOD_BUS_TYPE_t      pmod_bus_type_cfg[PMOD_PORT_NUM];
6
7  #define refresheddelay 10    // 10x10 msec delay time.
8
9  extern uint8_t g_pmod2_port_data;
10
11 /* PMOD1 Run Thread entry function */
12 void pm0d1_run_thread_entry(void)
13 {
14     ULONG event_flags;
15     //uint8_t writedata[8] = {0xAA, 0x00, 0x55, 0x00, 0x55, 0x00, 0xAA, 0x00}; // write data
16     uint8_t writedata[8] = {0x01, 0x02, 0x04, 0x08, 0x10, 0x20, 0x40, 0x80}; // write data
17
18     tx_event_flags_get(&g_config_done_flags, IOEXP_DONE_EVENT_FLAG, TX_AND, &event_flags, TX_WAIT_FOREVER);
19
20
21     while (true)
22     {
23         for (int i=0; i<8; i++) {
24             tx_mutex_get(&g_gpio_lock_mutex, TX_WAIT_FOREVER);
25             write_pmod_gpio_type1_byte_port(1, ~g_pmod2_port_data, pmod_bus_type_cfg[PMOD1_PORT]);
26             tx_mutex_put(&g_gpio_lock_mutex);
27             tx_thread_sleep(refresheddelay);
28         }
29     }
30 }
31
32
33
34
```
- Outline:** Lists the project's header and source files, including `pm0d1_run_thread.h`, `pm0d_configure_thread_entry.h`, `pca9535/pca9535.h`, `pm0d_bus_type_cfg: PMOD_BUS_TYPE_t[]`, `# refresheddelay`, `g_pmod2_port_data: uint8_t`, and `pm0d1_run_thread_entry(void): void`.
- Console:** Shows the build output for the target `gw002_example_gpio_i2c_spi_uart_v1h`. The output includes commands for building the target, invoking the ARM GNU Create Flash Image, and invoking the ARM GNU Print Size. The final output is: `13:56:31 Build Finished. 0 errors, 27 warnings. (took 1m:8s.422ms)`.

At the bottom of the IDE, a status bar indicates: `conversion to 'uint8_t' from 'int' may alter its value [-Wconversion]`.



# Check for the COM port.



This COM port is the USB to UART adaptor.



Run in debug mode. Set a breakpoint in PMOD4 run thread.

Output data from sensors.

