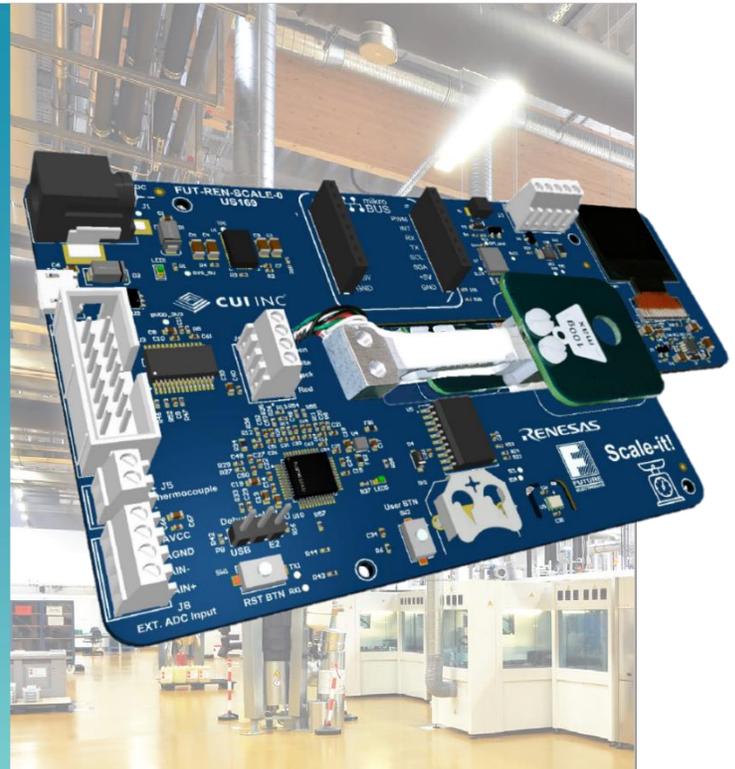


**“A New Look”**  
**Scale-It**  
for Industrial Sensing  
and Signal Processing  
FUT-REN-SCALE-0



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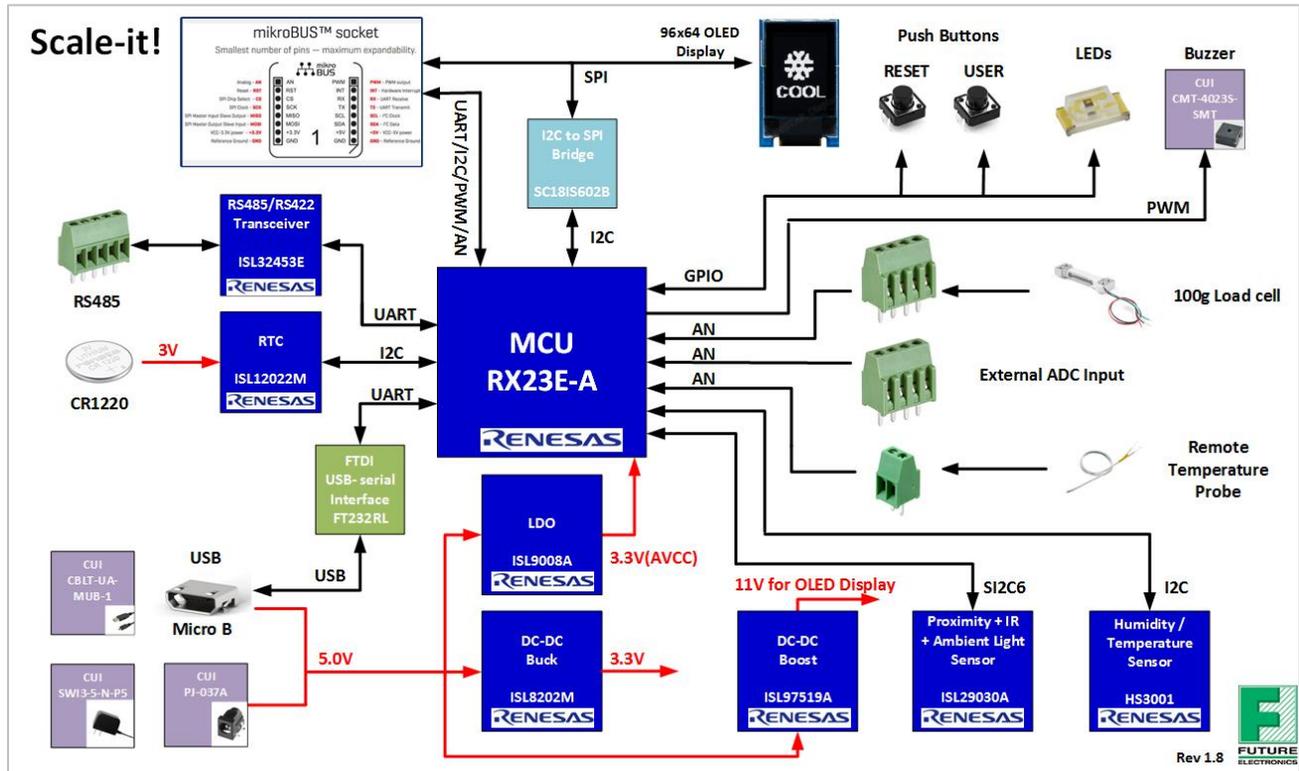
## 1. Scale-It Package Content

- A. Anti-static bag
  - a. 1x Scale-It PCB assembly.....Part# FEN-562805-PCB-R1
- B. Plastic zip bag
  - a. Coin cell battery .....(BT1): Part# CR1220
- C. Plastic zip bag
  - a. 1x Load Plate PCB ..... Part# FEN-562805A-PCB-R1
  - b. 1x Load Cell ..... (LC1): Part#: SEN-14727
  - c. 2x Plastic Screws ..... (Screw3-4): Part#: 29344
  - d. 2x Plastic nuts .....(Nut1-2): Part#: 4688
  - e. 2x Metal screws ..... (Screw1-2): Part#: 29311
  - f. 1x jumper-shunt .....(JP1): Part#: SSC02SYAN
  - g. 4x rubber pads .....(Bumper1-4): Part#: SJ6512
- D. 1x Thermocouple sensor, K Type ..... (THC1): Part#: XS-18 or COM1705
- E. 1x Power Supply: Part# SWI3-5-N-P5 ..... (PS1): Part#: SWI3-5-N-P5
- F. 1x USB cable A-to-MicroB .....(CBL1): Part#: CBLT-UA-MUB-1

**Optional part (not included): Renesas E1/E2/E2Lite Programmer Debugger**

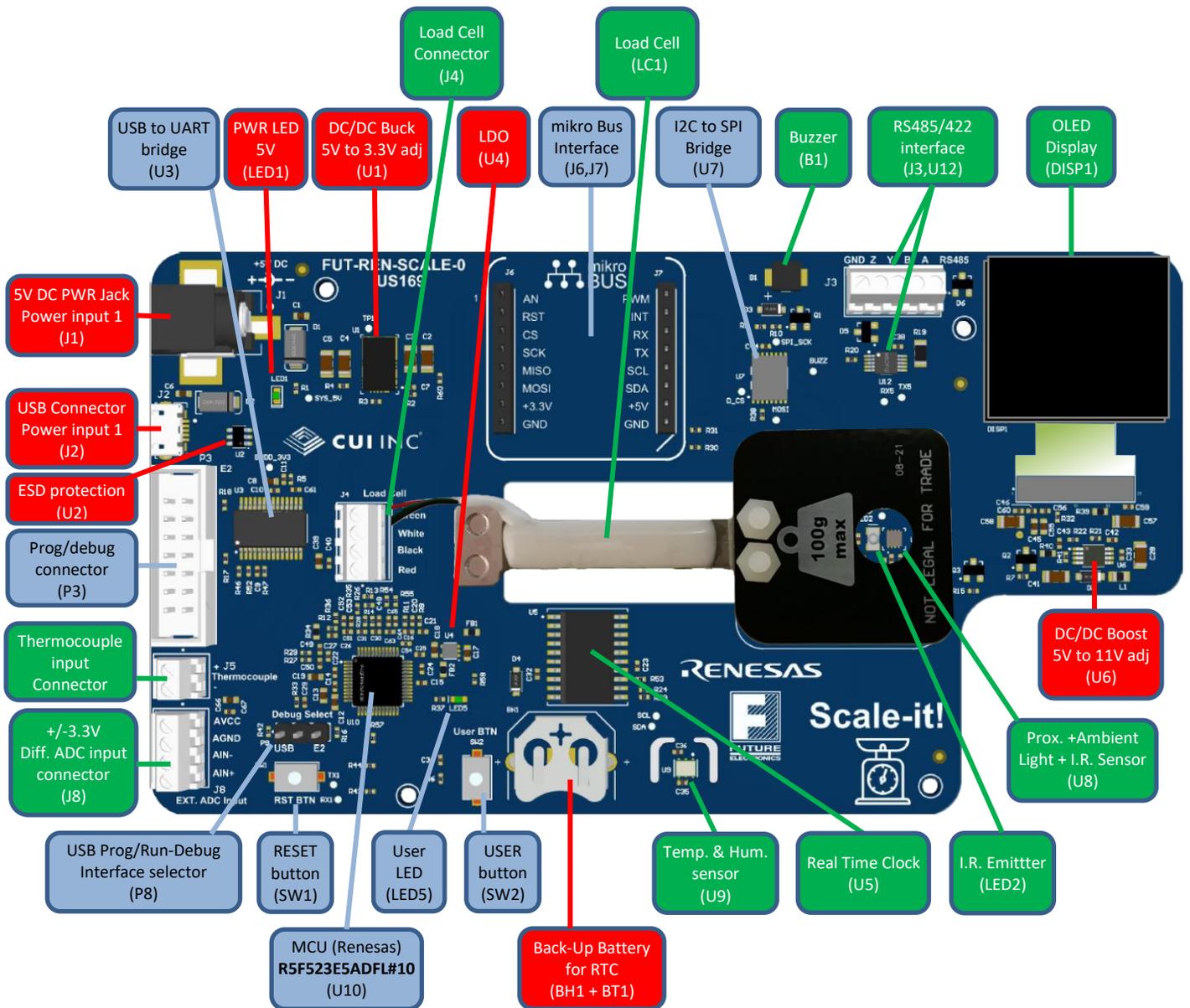
# Scale-It for Industrial Sensing and Signal Processing

## 2. Scale-It Block Diagram



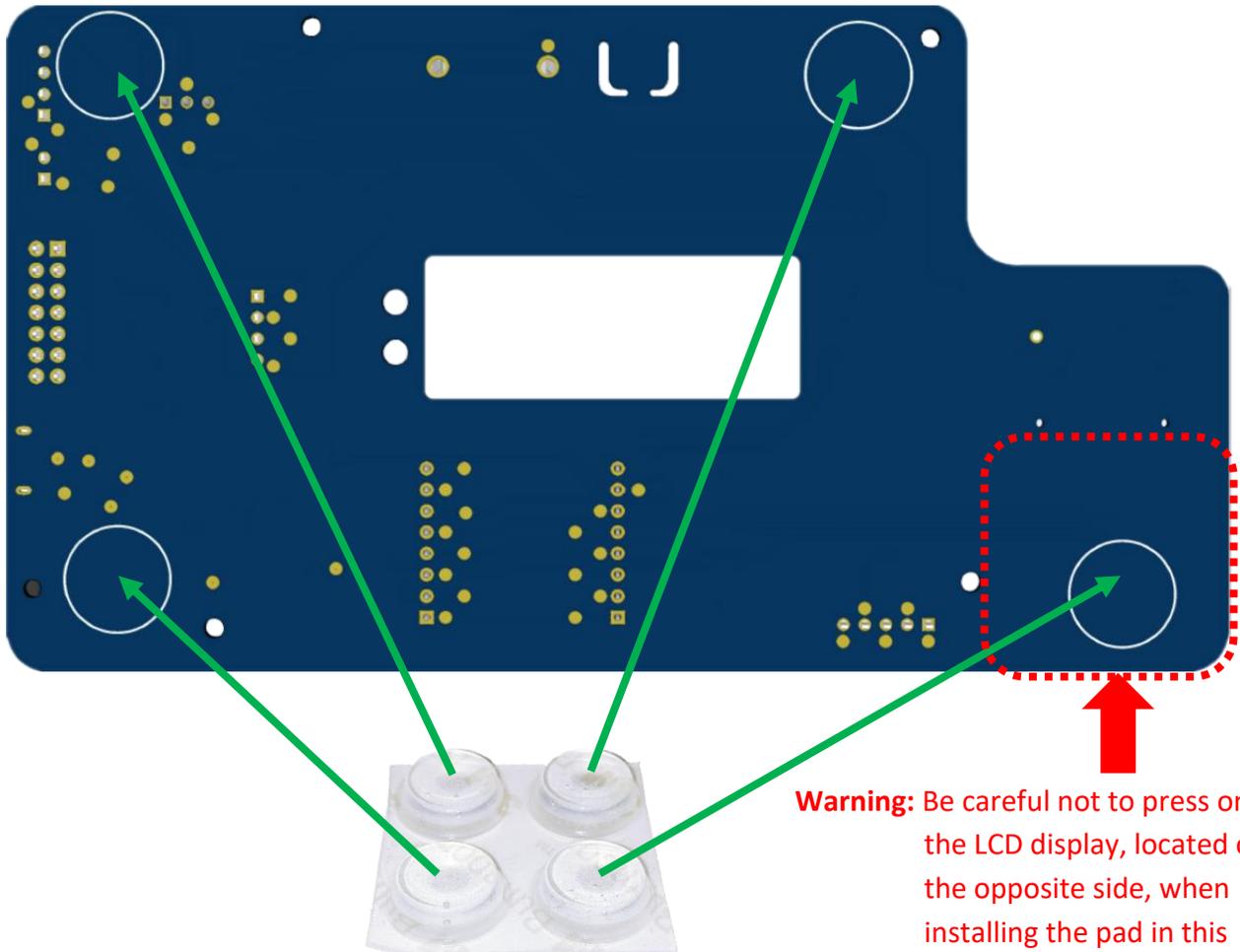
# Scale-It for Industrial Sensing and Signal Processing

## 3. PCB Assembly Details



## 4. Assembly Instruction

- **Install Rubber Pads (C.g):** peel and stick the rubber pads to the bottom side of the Scale-It PCB Assembly (A.a). The positions are marked with white circle as shown in picture below:



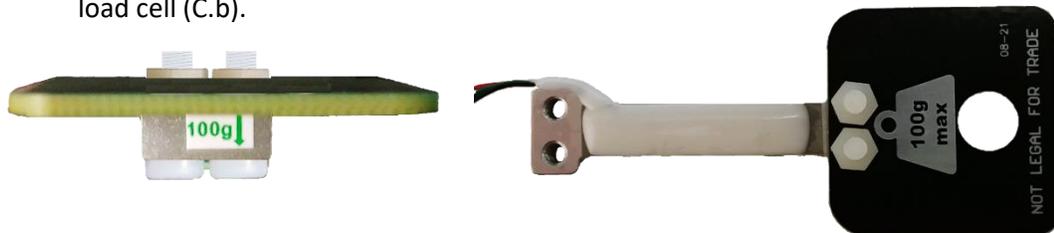
**Warning:** Be careful not to press on the LCD display, located on the opposite side, when installing the pad in this location.

# Scale-It for Industrial Sensing and Signal Processing

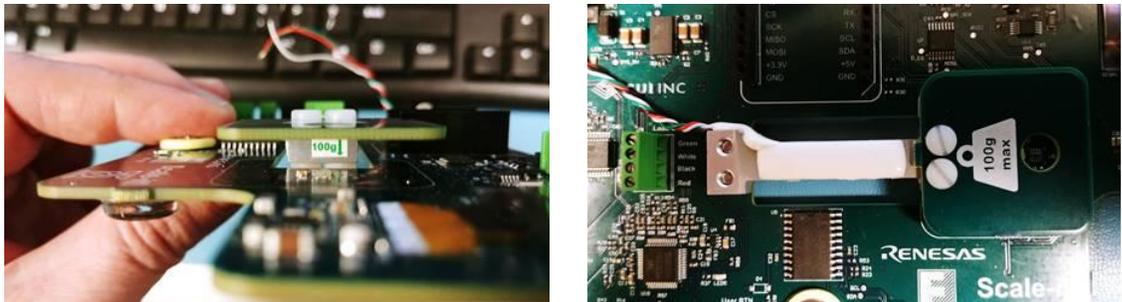
- **Installing Load Cell and Load Plate:**

In order to protect load cell from being damaged or over strained during shipping, the load cell is shipped unassembled, and will need to be installed to the Scale-it PCB assembly (A.a).

1. Install the Load Plate (C.a) to the Load Cell (C.b) using the Plastic Screws (C.c) and nuts (C.d)
  - ⇒ Insert the screws from the bottom so the plastic nuts are on the top of the load plate, as shown below (so the screws won't touch the table when weighing objects).
  - ⇒ Make sure the arrow on the Load Cell label is pointing away from the load plate, as shown in the picture on the left. This indicate the proper direction of the flex for the load cell (C.b).

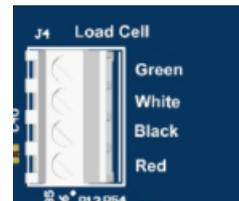


2. Install the Load Cell (C.b) to the Scale-It PCB Assembly (A.a) using the metal screws (C.e). The 2 screws will come in from the bottom side of the PCB and into the load cell's threaded mounting holes.



3. Connect the 4 wires from the Load Cell (C.b) to connector (J4) on the Scale-It PCB Assembly (A.a).

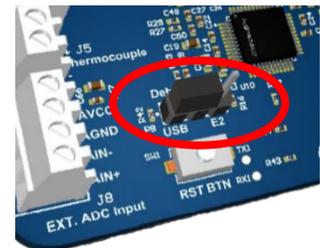
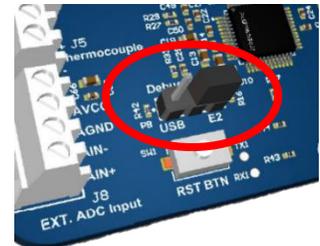
- ⇒ Make sure the wire color is matching the color position marked on the PCB beside (J4)
- ⇒ The wires can be cut to desired length.
- ⇒ To ensure proper electrical contact, make sure the wires' insulation are not pinched inside the Terminal block socket.



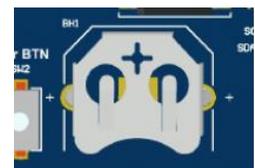
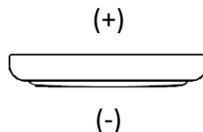
# Scale-It for Industrial Sensing and Signal Processing

- **(P8) Jumper Installation:** Install the jumper shunt (C.f) to the **Debug Select header (P8)** of the Scale-It PCB Assembly (A.a) for the desired operation, as described here:

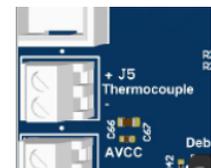
- **Option 1: (Default) Run mode and Debugger mode**
  - Install jumper over **pins 2 and 3** of (P8)
  - ex: to run the OOB demo firmware already programmed or to use a Renesas E1/E2 Programmer-debugger connected in P3, use option 1.
- **Option 2: MCU USB port into bootloader mode**
  - Install jumper over **pins 1 and 2** to set the MCU into bootloader mode from USB port, for programming firmware image file via the USB connection. **Once programmed**, in order to run the firmware, move the jumper to **position 2-3** then power cycle the unit. Programming requires **Renesas Flash Programming software**.



- **Install 3V Coin Cell battery (BT1) (Optional, for Real-Time Clock battery back-up only):** The battery is not required for operation. Use it if maintaining the RTC operation and settings are required after powering off the board. Insert coin cell battery (B.a), into the battery holder (BH1) on the Scale-It PCB Assembly (A.a), **with positive side (+) on top** (wider surface).



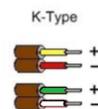
- **Install Thermocouple (THC1) (Optional, for Thermocouple measurements):**
  - Connect the long wire of the thermocouple to the Therm+ (pin1 of J5).
  - Connect short wire of the thermocouple to Therm- (pin2 of J5).



Notes: It is important to respect the polarity for proper measurements.

If the wires have an individual colored insulation

- As per **ANSI/ASTN E230**: the negative wire is always the red wire ==>
- As per **IEC 60584**, the negative wire is always white =====>



T/C type	North America ASTM E230		International IEC 60584	BS 1843 (UK)	DIN 43710 (Germany)	JIS C1610 (Japan)	NFC 42-324 (France)
	Thermocouple Grade	Extension Grade					
K	Negative Conductor	Red	White	Blue	Green	White	Purple
	Positive Conductor	Yellow	Green	Brown	Red	Red	Yellow
	Sheath	Brown	Green	Red	Green	Blue	Yellow

## 5. Operation Instructions

- **Power up options:**
  - **Option 1:** (Typical) Power through USB port (J2) using USB Cable (F) connected to a PC.
  - **Option 2:** (Optional) If more power is required, power through the connector (J1) with the included plug-in power supply (E).
- **Out-Of-The-Box Demo Operation:**
  - **Make sure Jumper on (P8) is set to short pin 2 and 3** for the unit to be in Run mode.
  - **Remove any object from the weight scale load plate**
  - **Connect the provided USB cable between a PC and connector (J2)**
  - **Upon power up, the Scale-It will**
    - Enter the Object Detection mode . Object detection is based on light sensing, so may jump immediately to the weight measurement mode if not enough light reached the sensor through the hole in the load plate. Note: The object detection mode is only active while the Scale icon is displayed.
    - Zero-out the weight scale including the load plate after approximately 2 seconds.
  - **User BTN (SW2)** is used to select the following modes in circular sequence with each click as follow: Object Detection mode, Weight Measurements, Thermocouple, Differential ADC, Temperature / Humidity and Real Time Clock. Related icon shown in picture below will be displayed on the OLED display:

Modes:



Object Detection



Weight  
Measuremen



Thermocouple



Differential ADC



Temperature  
& Humidity



Real-Time Clock

- **Object Detection mode:** Detects when an object is placed over the load plate's aperture and automatically switches to the Weight Measurements mode. There are 3 possible methods of object detection with the Renesas ISL29030AIROZ-T7 sensor: Ambient light, IR passive sensing and IR Proximity active sensing with on-board IR LED. The OOB demo only uses the ambient light sensing method but all sensing values can be read through the USB port connection using a simple Terminal Emulation software.
- **Weight Measurements mode:** The weight measurement of the object will be displayed on the OLED display. The measurement range of the load cell is 0g – 100g. If the weight exceeds this range, a buzzer will sound. For precise measurements, calibration for the specific load cell is required. Please refer to Programming Guide for details.

- **Thermocouple measurements mode:** The temperature value in degree Celsius and Fahrenheit, measured using the external thermocouple probe connected to connector (J5), will be displayed on the OLED display.
- **Differential ADC mode** [+/-3.3V]: Differential voltage measurement of the signal applied at connector (J8) between pin 4(AIN+) and pin 3(AIN-), will be displayed on the OLED display [Diff. input voltage range = +/-3.3V].
- **Temperature / Humidity mode:** humidity and temperature values measured by the on board (U9) Humidity & Temperature sensor (HS3001) will be displayed on the OLED display
- **Real Time Clock mode:** Time and date will be displayed on the OLED display. Use a Terminal emulation software to set the time and date. RTC back-up battery operation (Optional): to maintain the time and date when power is removed, make sure to install the provided CR1220 coin cell battery as described previously.
- **USB - Terminal Interface:** The USB port provides an easy interface via a simple terminal emulation software. There are several commands to get the various sensors data, and to configure some settings. Type 'Help' in the terminal window to see a list of commands. See Programming Guide for more details.
- **RS-485 Communication port:** The Scale-It also offers a RS-485 communication port at connector (J3) for development purposes. The OOB demo provides the basic drivers as well as a simple external loopback test through the USB Terminal interface with the external loopback wiring connections at connector (J3) as follow:
  - Y (TX+) to A (RX+)
  - Z (TX- ) to B (RX- )
- **mikroBUS interface:** The Scale-It also offers a standard mikroBUS interface for development purposes with standard mikroBUS devices, at connector (J6) and (J7). The OOB demo firmware does not currently support it. User code development is required. Different basic drivers are provided in the OOB demo project (refer to Programming Guide). The OOB demo also provides a command to read the analog voltage from the AN pin of the mikroBUS interface, through the USB Terminal interface.