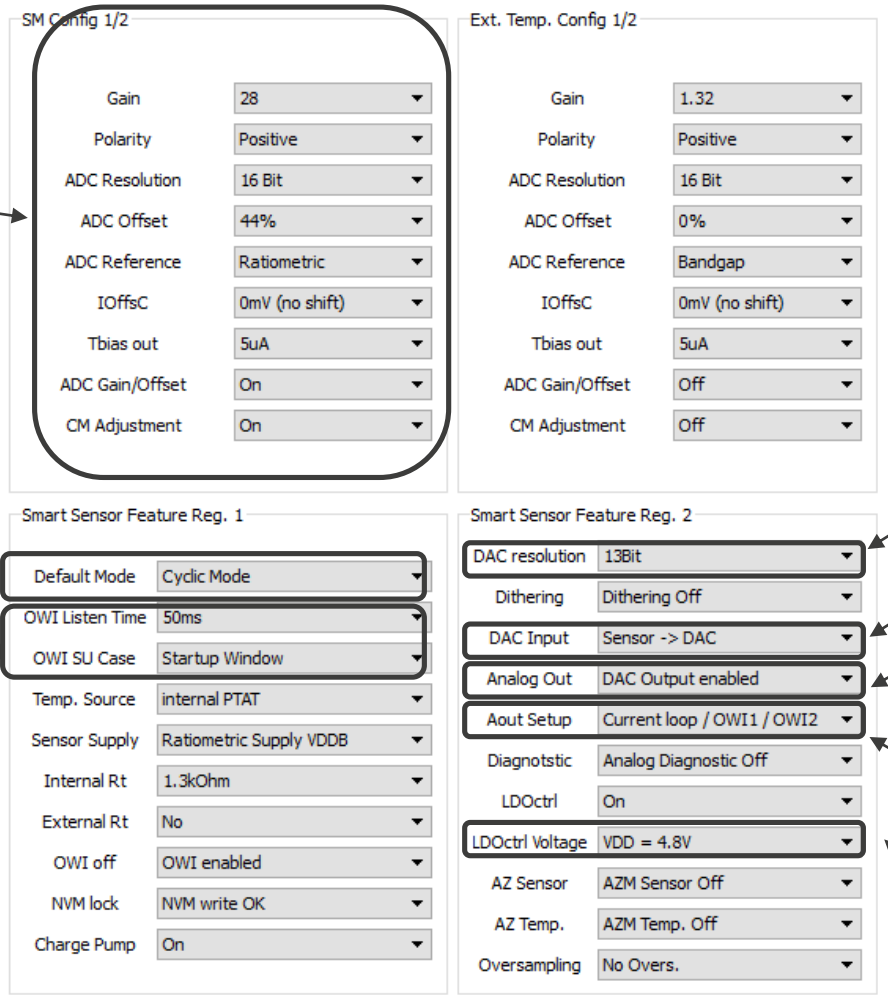
ZSSC3240 CURRENT LOOP / OWI

ZSSC3240 Configuration

Recommended AFE configuration for test application using the Sensor Replacement Board

Default mode is the Cyclic Mode. After IC-reset the ZSSC3240 starts autonomously the measurements.

OWI interface is activated for 50ms after IC-reset.
If in this period the command 0xD9 (START_UP_OWI) is received, the ZSSC240 stays in OWI communication mode. Otherwise it provides the measurement results after 50ms at AOUT.



Desired DAC resolution

Sensor choice for analog output

DAC functionality has to be enabled

Necessary configuration for Current Loop application in combination with OWI.

Desired regulated VDD voltage

ZSSC3240 CURRENT LOOP / OWI HW SETUP

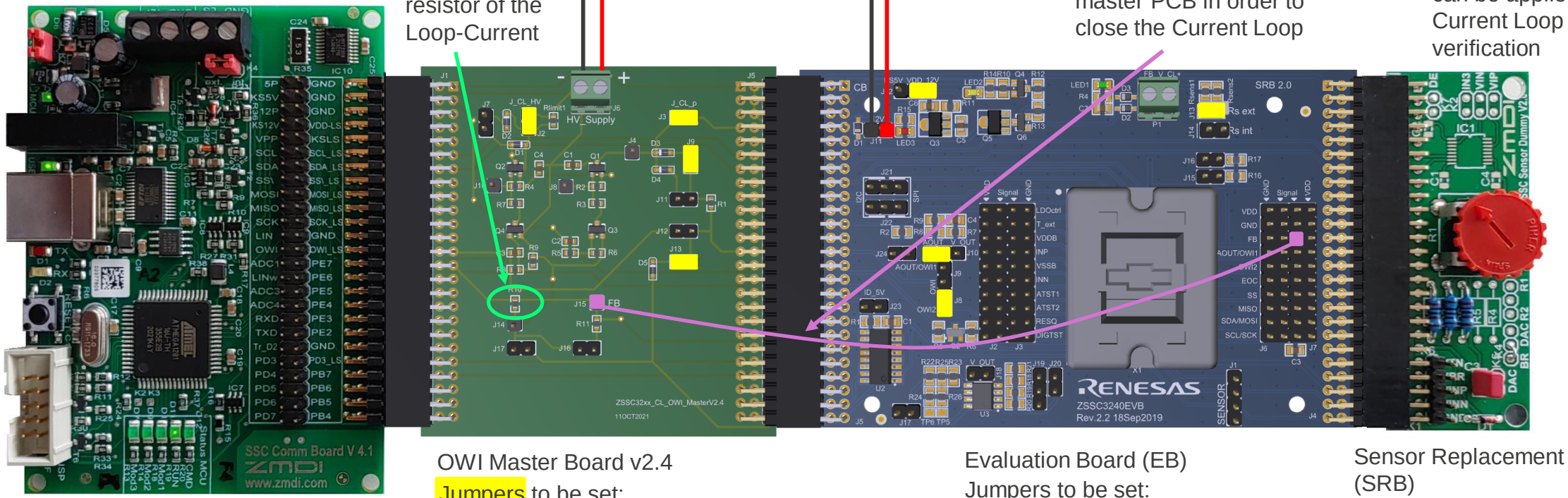
HV supply voltage = 26V (recommended current limitation: 40mA)

Measurement of the Loop-Current

Sensing resistor of the Loop-Current

Feedback (FB) pin has to be connected to J15 on the master PCB in order to close the Current Loop

The Sensor Replacement Board can be applied for Current Loop verification



Communication Board (EB)
(FW has to be v4.20)

OWI Master Board v2.4

Jumpers to be set:
J_CL_HV (J2)
J_CL_p (J3)
J9
J13

Evaluation Board (EB)

Jumpers to be set:
J8
J10 (pins 2-3)
J12 (pins 2-3)
J13

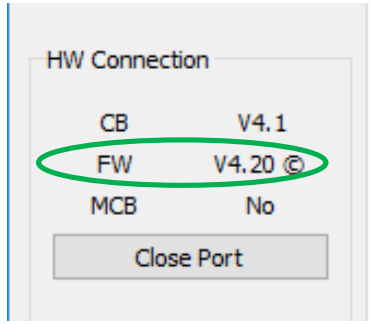
Sensor Replacement Board (SRB)

CB FW UPDATE FOR OWI IN CURRENT LOOP

For the ability of the CB to decode OWI communication, in combination with Current Loop, the firmware (FW) of the CB has to be updated to revision V4.20.

The recent FW revision, Bootloader and the documentation for the updating process are available at the Renesas site:
https://www.renesas.com/us/en/products/sensor-products/sensor-signal-conditioners-ssc-afe/ssc-cb-ssc-communication-board

Follow the instructions in the *Communication Board Firmware Update* Application Note for flashing the FW version 4.20 to the CB controller.
After a successful flashing process, the HW information in the ZSSC3240 GUI displays the FW version:



ZSSC3240 CURRENT LOOP - POWER UP

After ZSSC3240 configuration, HW connection, and FW flashing:

1. Connect the Communication Board via USB to a host PC and turn on HV supply (26V)

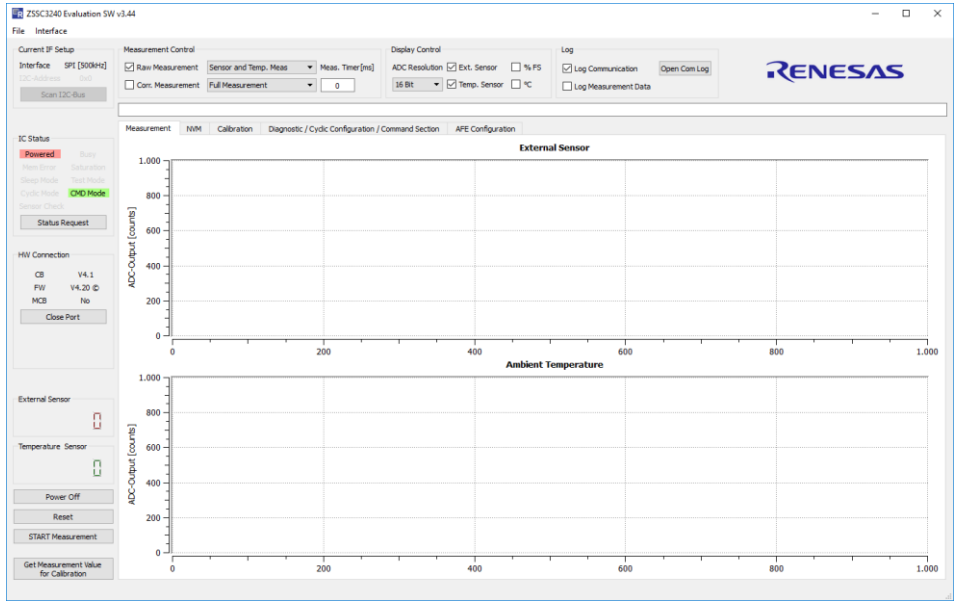
⇒ No current should be flowing in the Loop

2. Start the ZSSC3240 Evaluation SW

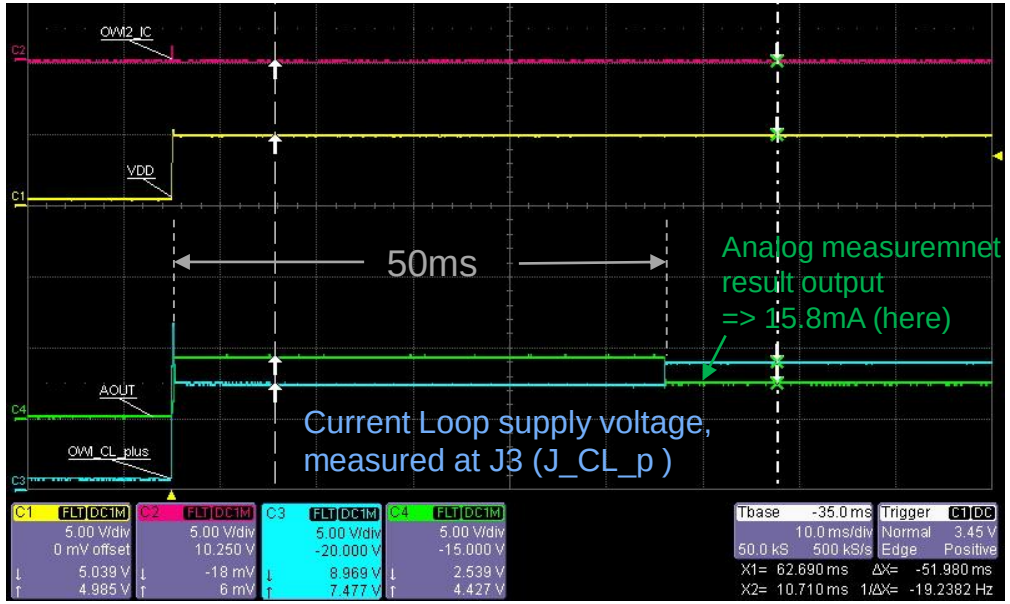
⇒ KS5V is set to 5V when the GUI is loaded, it enables the HV supply to EB. The Current Loop is supplied.

⇒ ZSSC3240 is in Cyclic Mode, providing the measurement result at AOUT pin. The AOUT voltage is driving the CL current.

ZSSC3240 GUI after launching



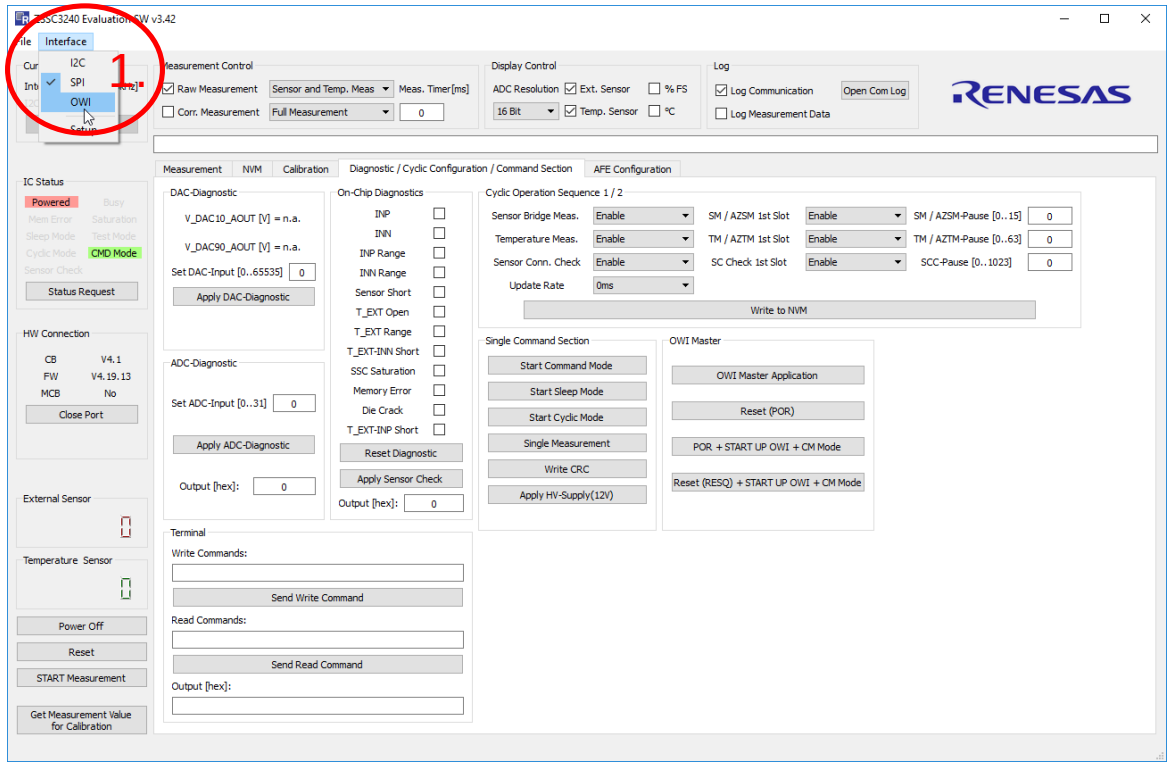
Scoping the signals after GUI start

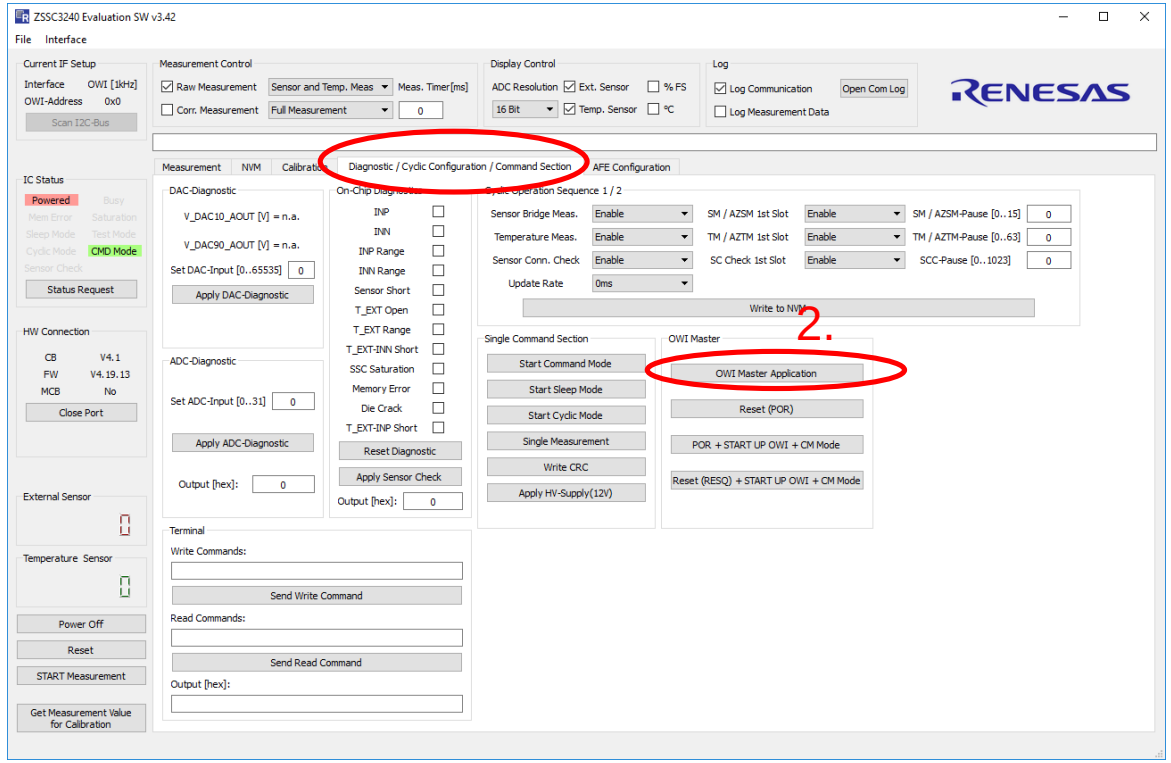


SW CONFIGURATION FOR OWI COMMUNICATION

1. Switch to OWI interface:
   Menu -> Interface -> OWI

2. CB configuration to decode the ZSSC3240 OWI output (modulated on the Loop-Current):
   Diagnostic / Cyclic… / Command Section tab -> OWI Master -> OWI Master Application





SWITCH FROM CYCLIC MODE TO COMMAND MODE

POR (Power-On Reset)

Diagnostic / Cyclic… / Command Section tab -> OWI Master -> POR START_UP_OWI_CM_Mode

Communication Log:

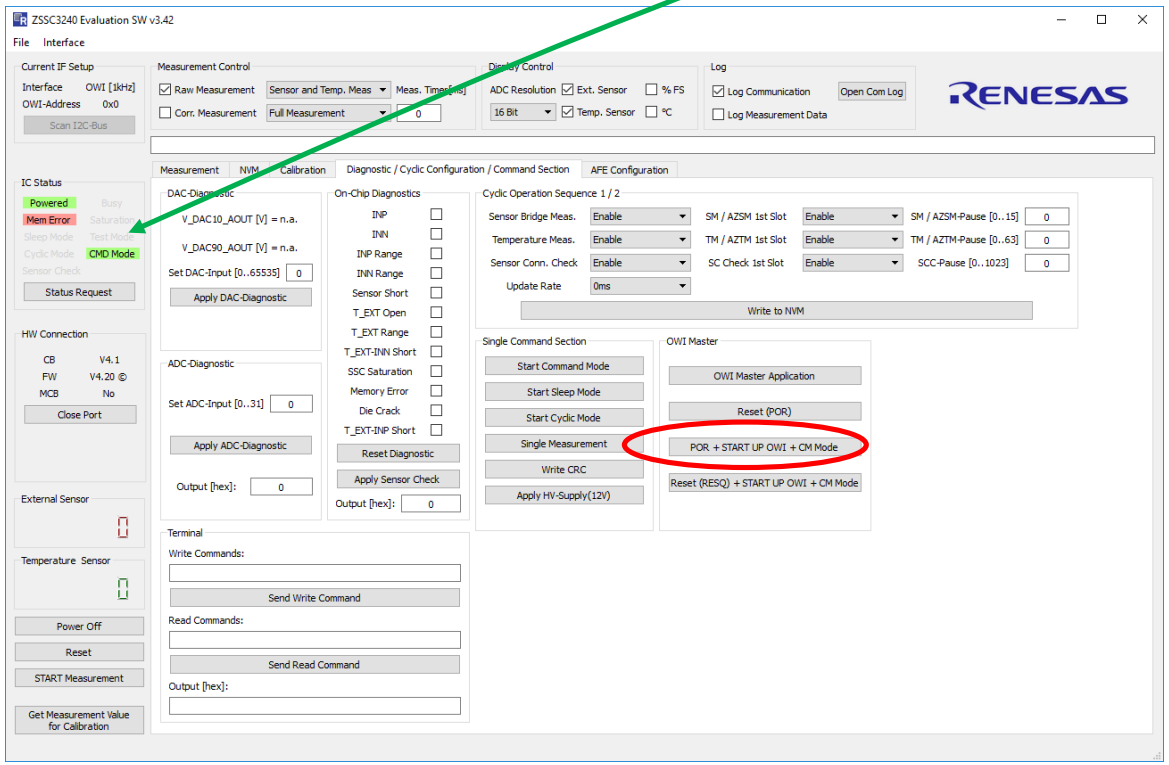
…

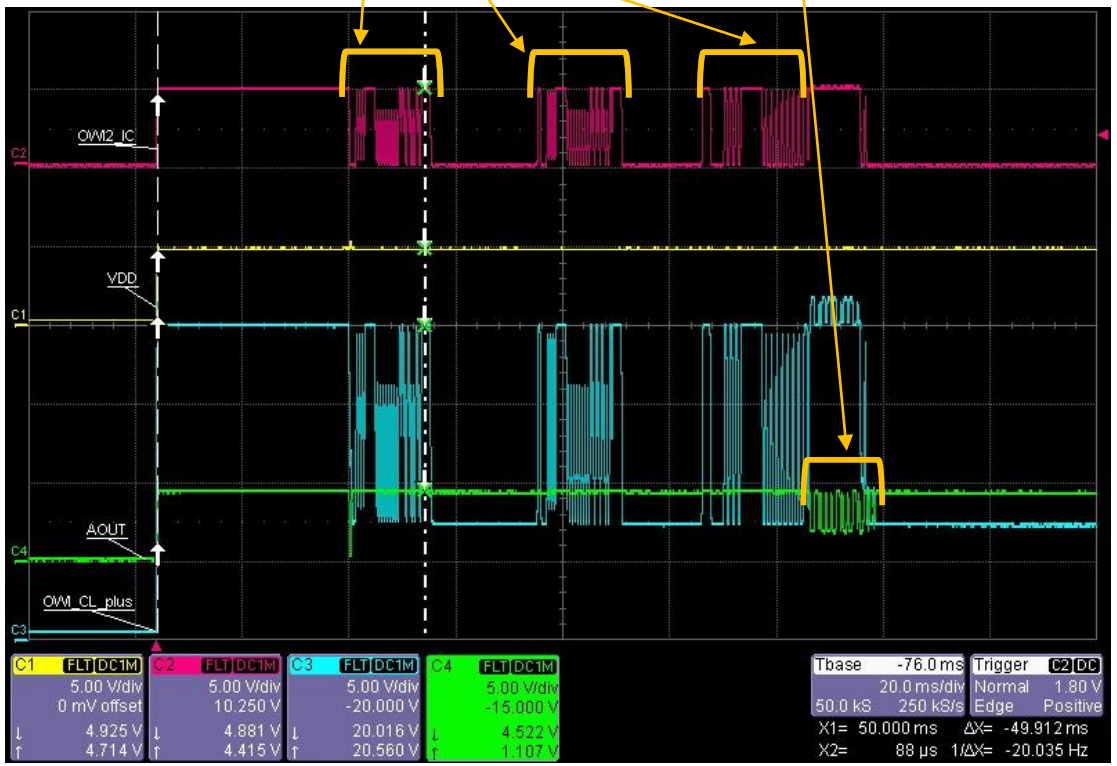
send_cmd: 'OWT00001D2' response: 'ACK', (STARTUP OWI)

send_cmd: 'OW_00001A9' response: 'ACK', (ENTER COMMAND MODE)

receive_owi: 'OR_00001' response: 'ACK', '44', (READ 1 byte -> IC-status)

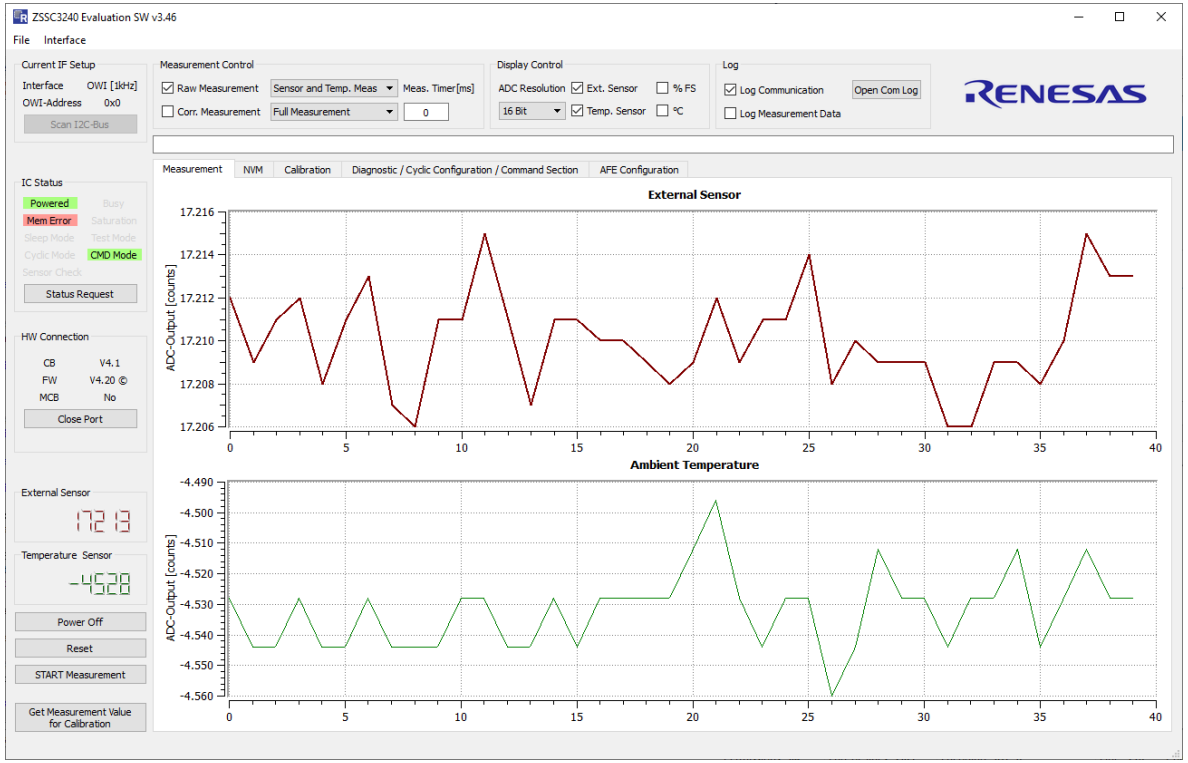
…





⇒ In Command Mode any digital interaction via OWI is applicable: NVM Reading / NVM Writing / Measuring

MEASUREMENT VIA OWI



Commnication Log:

…

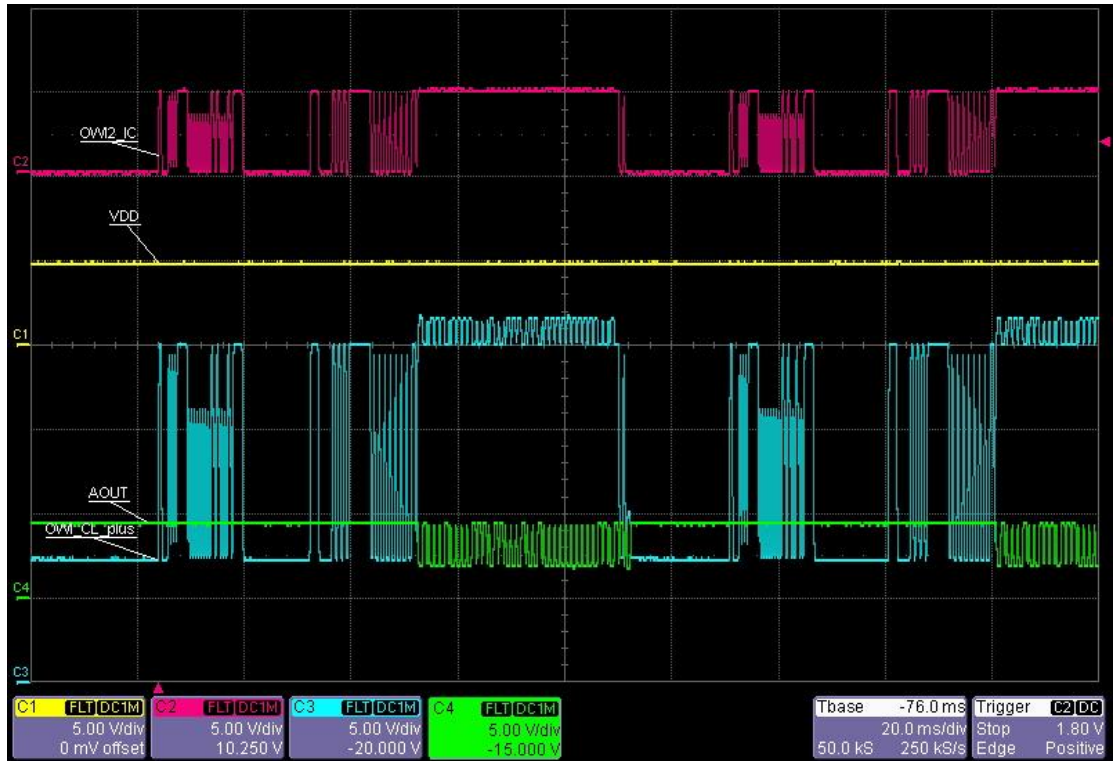
send_owi: 'OW_00001A2' response: 'ACK', ''

receive_owi: 'OR_00004' response: 'ACK', '44433D00'

send_owi: 'OW_00001A4' response: 'ACK', ''

receive_owi: 'OR_00004' response: 'ACK', '44EE5000'

…



Consistency check, digital vs. analog output:

Measured Loop-Current at given SRB positistion: **15.8mA**

17213 LSBs + 32768 LSBS = 49981 LSBs

49959 LSBs ÷ 65536 LSBs = 0.763 % FSO

0.763 %FSO × 20mA = **15.3mA** ⇒ OK, small offset due to DAC deviation

ENTERING CYCLIC MODE FROM COMMAND MODE

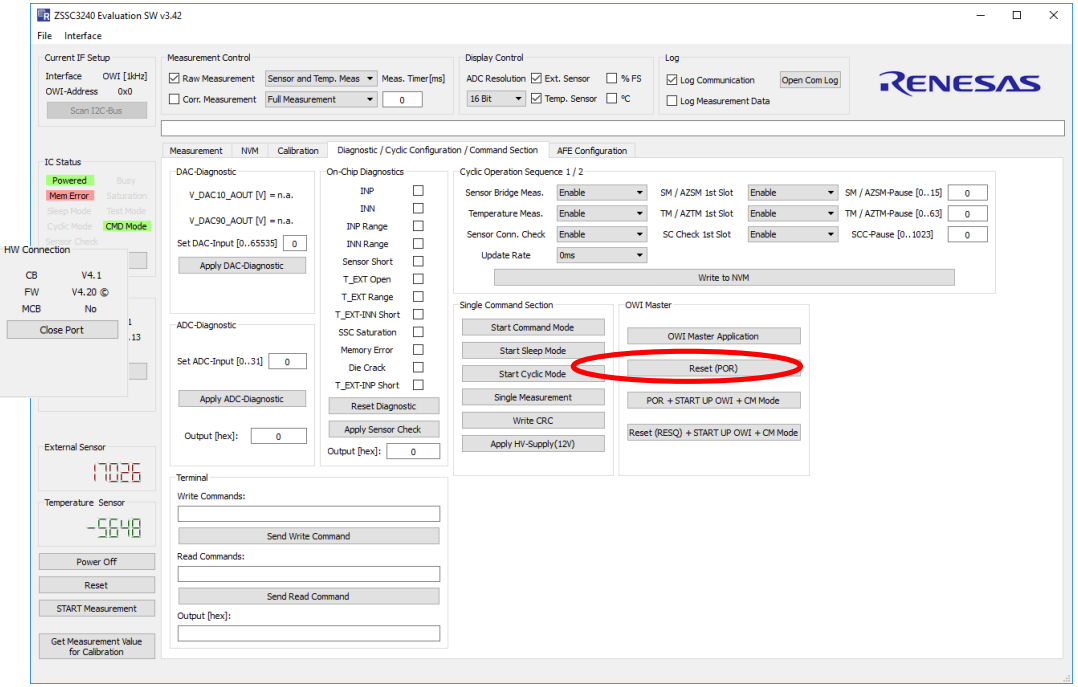
HV power supply is controlled by the KS5V signal on the CB. Toggling it causes a POR (power-on reset).

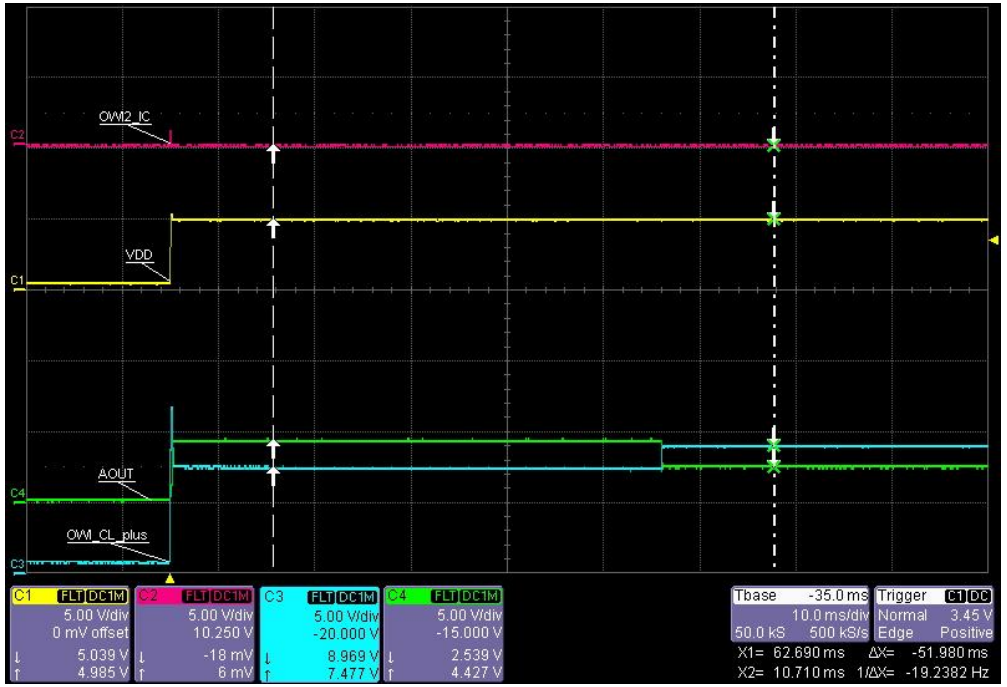
⇒ After the POR, the ZSSC3240 is restarting in the programmed default mode (here: Cycling Mode).

⇒ Sensor measurement results are provided at AOUT pin such that the Current Loop is driven by the sensor output

Communication Log (POR):

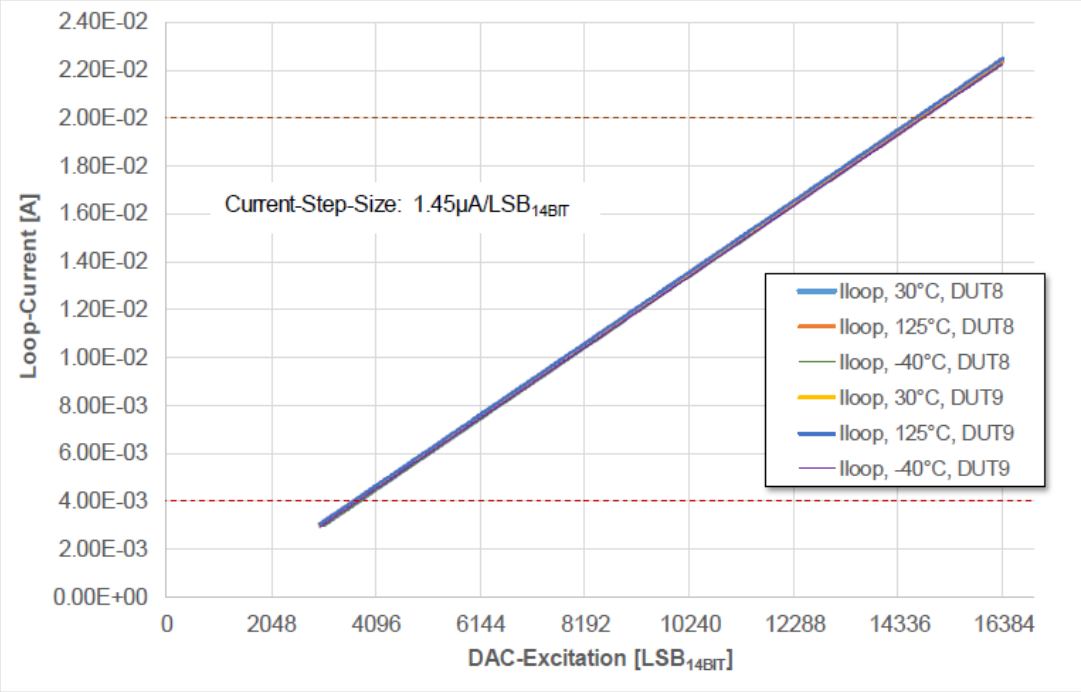
…
send_cmd: 'PS_A50' response: 'ACK', ''
send_cmd: 'TWAIT100' response: 'ACK', ''
send_cmd: 'PS_A51' response: 'ACK', ''
…





ZSSC3240 CURRENT LOOP CHARACTERISTIC

DAC Current-Loop Output



Corresponding Voltage at AOUT-pin