SYSTEM TESTING PROCEDURE STEP BY STEP

Contents

1 Introduction 2
2 Step Description 3
2.1 Visual Inspection 3
2.2 Modules Connection 4
2.3 Back Side Connections 5
2.4 Front Side Connections 5
2.5 Configuration File Download 6
2.6 USI 3 to 6/10 Module Connection and Tripline/Interlock Check 6
2.7 SCU Behavior 7
2.8 DCCT 7
2.9 FAIR Backplane USI Tripline Enabling 9
2.10 HexSchalter setting: 10
2.11 Read QR Codes: 11
2.12 Test Log File Generation 12

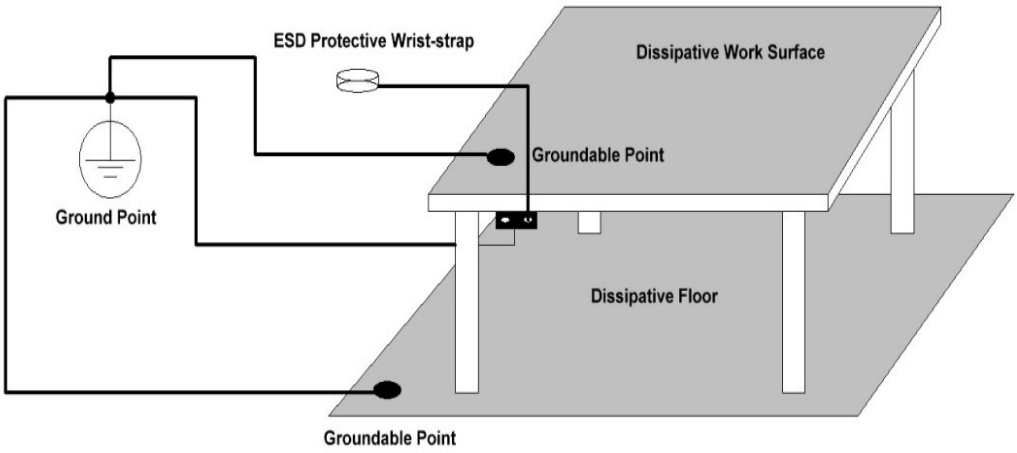
1 Introduction

This document describes step by step the testing procedure for the ACU frame.
The goal is to execute, in the proper way, each item reported in the testLogSystem_xxx.pdf file table and this document gives the instruction to do it.
There are two ways to follow the steps below, both of them valid. It is up to the tester, considering the available power converter test bench, to choose one of them.
The first method consists to test the ACU frame directly including the shelf in the power converter rack.
When this is not so easy to perform (it could be necessary to screw and unscrew several times many screws), it is possible to adopt the second method: the stand alone test. In this case it will be necessary to have, in addition to the power converter test bench, an extra slave module (for example another ICM module) and an extra DCCT head connected in series with the one used in the power converter test bench.
Once again, the methods above mentioned are complementary each other and with both of them it is possible to test the ACU frame in the proper way.

NOTE!!: Before starting the test, please pay attention to the Electrostatic Discharge Protection (ESD) equipment.

- Be sure that your Device Under Test (DUT) lays always over a dissipative work surface.
- Don't forget to connect yourself to ground through the Wrist Strap device.

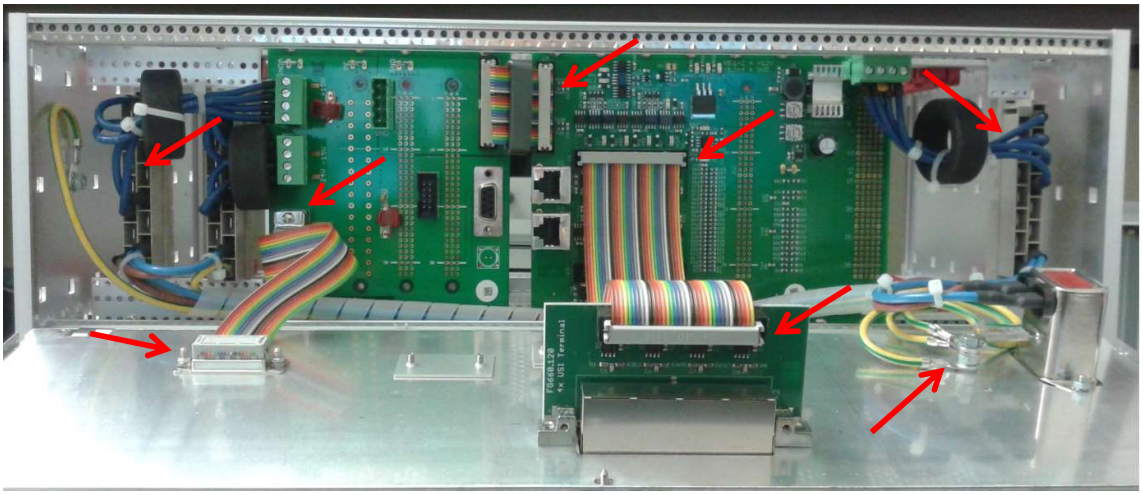
Your testing area should look like the picture below.



2 Step Description

2.1 Visual Inspection

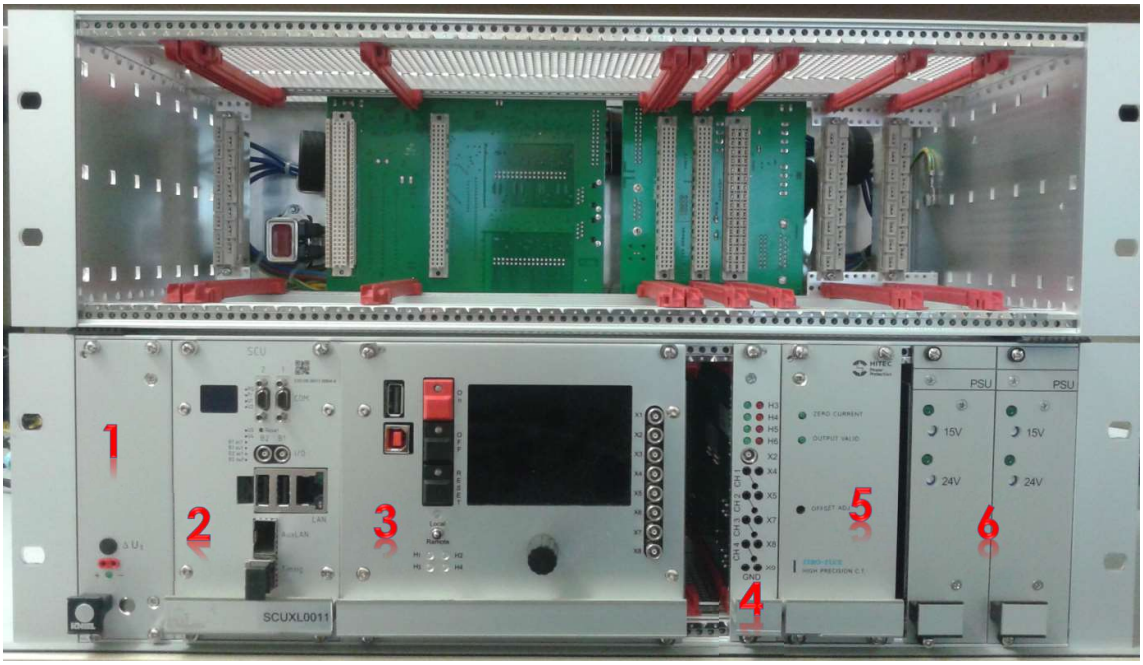
The first step consists of a visual inspection of the connection performed inside the ACU frame. Please take some time to perform this important test step, checking if all the modules are properly connected, if some connection is missing, etc. The problematic points are in red below highlighted.



2.2 Modules Connection

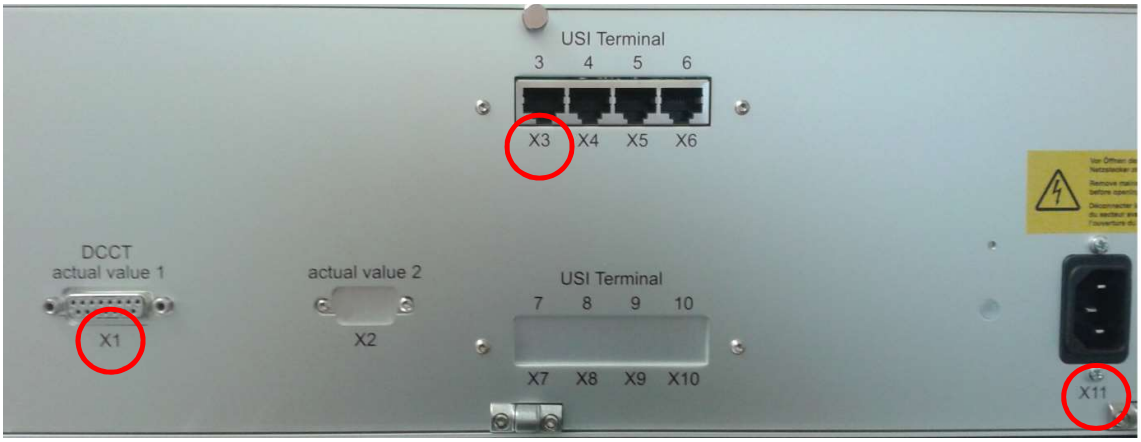
The second step is to connect the following modules to the ACU frame:

1. FAIR Back Plane Power Supply (12V)
2. SCU System
3. MFU Module
4. ADC Module
5. DCCT Electronic Module
6. DCCT Back Plane power supplies (2 modules ±15V; ±24V)



2.3 Back Side Connections

Connect the DCCT head to the 15 pins DCCT port (X1), one slave module to the USI terminal 3 (X3) and the power supply (X11).



NOTE!!: The power supply connector can be also three phases.

2.4 Front Side Connections

There are two connections on the front side:

1. GSI FAIR network cable: it allows to include the ACU frame in the GSI/FAIR LAN network.

2. USB Cable from PC to MFU: it is necessary to perform the next step (2.4). **NOTE!!:** after the execution of the step 2.4, this cable has to be immediately removed

2.5 Configuration File Download

Download the test configuration file via Power Config Advance. It has to be compliant with your test bench environment (it has to contain all the configurable modules connected to the ACU frame).

2.6 USI 3 to 6/10 Module Connection and Tripline/Interlock Check

On the ACU frame back side there are up to 8 USI terminals available. In the standard frames, only 4 are visible from outside. For each of them, the procedure below has to be followed:

1. Perform an USI Rescan action and check if the slave module is detected on the expected USI number:

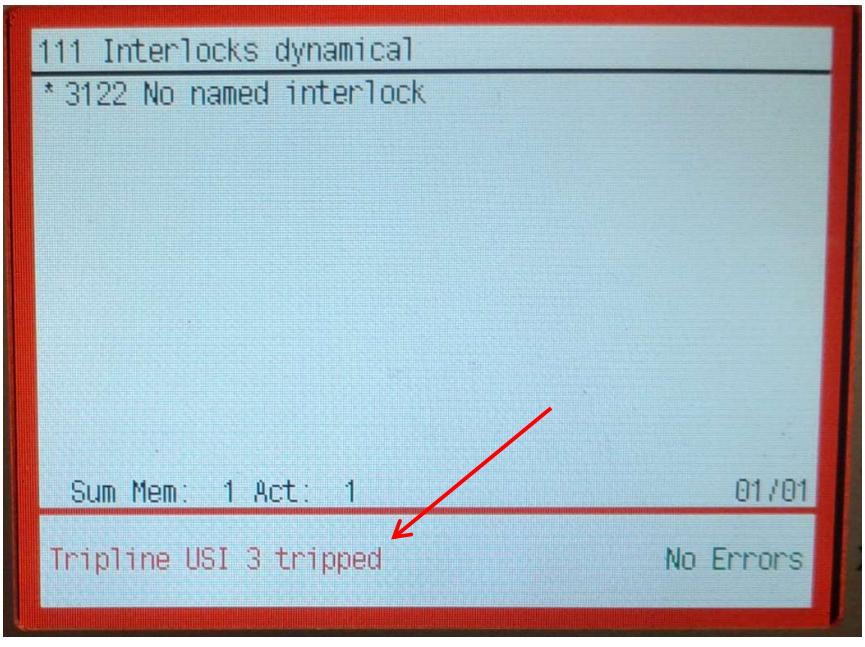
    a. Press briefly the incremental Encoder and select ***2 USI***

    b. select ***23 USI Rescan***

    If it was not possible to see live during the rescan action the detected module, is it possible to see it in a static way selecting ***2 USI*** and then ***21 Module Quick Overview.***

2. Trigger and remove an interlock from the slave module connected on the USI terminal under test and check it on the TFT display (**1 System – Overview - 11 Interlocks - 111 Interlocks dynamical**).

3. If the USI terminal under test is the number 3, check while the interlock is active if the tripline is pulled on the TFT Display.



4. Disconnect the USI cable on the ACU frame back side and connect it to the next terminal to test.

2.7 SCU Behavior

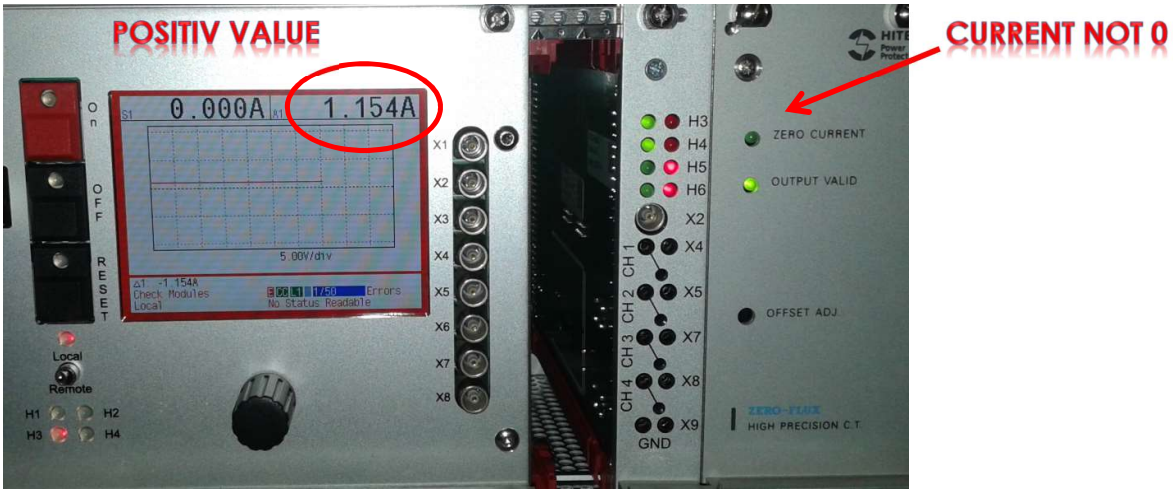
The purpose of this test is to verify if the SCU back plane connections are properly working. It is simply sufficient to read the content of one FSP (usually the number 0) for each ACU modules connected to the frame. To do that, it is necessary to work with a Linux machine and use one dedicated software to communicate with the SCU. One of this software is RdWrFSP_2_0 written by Davide Rodomonti. Please ask him if you want to use that tool (See at the end of the document).

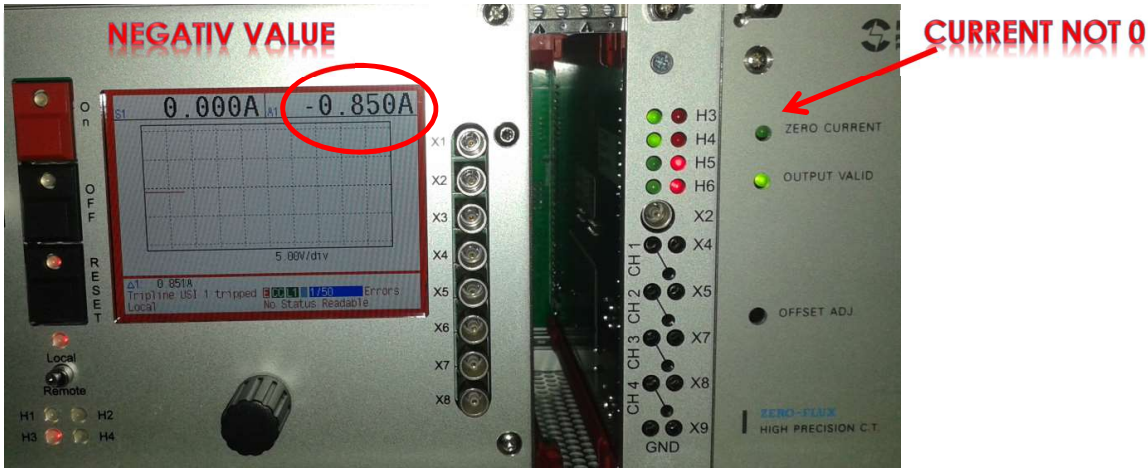
2.8 DCCT

This test checks the connection between the DCCT head (X1), the DCCT back Plane and the DCCT electronic. It consists of 3 points:

1. Turn on the power converter test bench and check if the two LEDs on the DCCT electronic module are on. The first (Zero Current) indicates that there is no current flowing in the power converter, the second (output valid) that there is a DCCT head connected to X1 on the ACU frame back side.

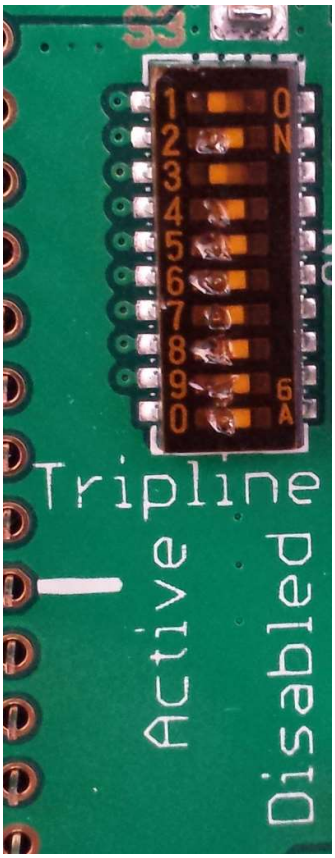
2. Apply first a positive and then a negative Set Value rotating the incremental encoder on the MFU and check if the Actual Value displayed on the TFT display follows more or less the Set Value.
NOTE!!: It is not important, for the purpose of this test, that the Actual Value is exactly the same value of the Set Value.


POSITIV VALUE
CURRENT NOT 0
0.000A
1.154A
ZERO CURRENT
OUTPUT VALID
OFFSET ADJ
HIGH PRECISION C.T.
Local
Remote
GND


NEGATIV VALUE
CURRENT NOT 0
0.000A
-0.850A
ZERO CURRENT
OUTPUT VALID
OFFSET ADJ
HIGH PRECISION C.T.
Local
Remote
GND

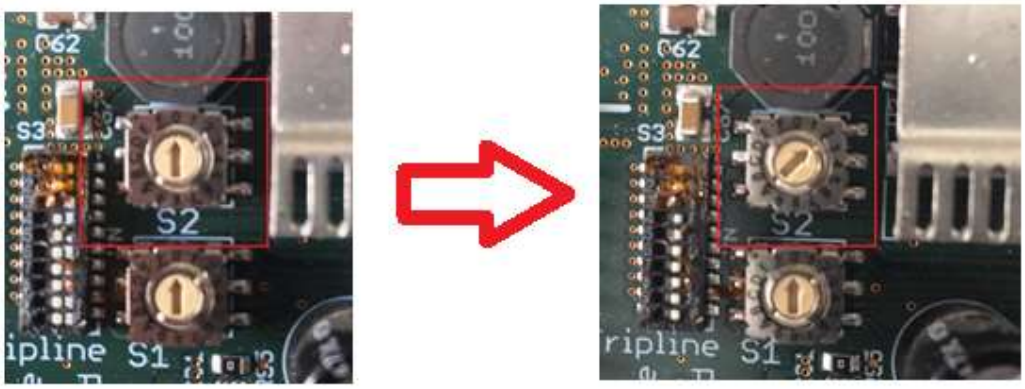
2.9 FAIR Backplane USI Tripline Enabling

This is not really a test case, but more a board configuration; nevertheless it could be used also for testing purposes. It is frame type dependent because it has to be performed only for all the frames where the latest version of the FAIR Backplane card is mounted (FG660_039_FAIR_BUS_Backplane).
The test consists to disable all the USI Terminal tripline excluded the number 1 and 3. It is simply necessary to change the switches position of the S3 device, leaving the number one and three as they are by default (see the pictures below).



2.10 HexSchalter setting:

On the FAIR bus backplane (FG660_03x_FAIR_BUS_Backplane) there are two HexSchalter (S1 and S2).
Set the S2 in position 2 like shown in the picture below:



2.11 Read QR Codes:

This step is necessary to track the ACU modules mounted in the several frames. In a dedicated excel file (i.e. ACU_GSI_ChipID.xlsx) the following info have to be reported:

1. FRAME
    i. GSI Number { 241}
    ii. Vendor Number (Schroff-Nr) { 24397350432781921201601930AA}

2. MFU
    i. Type {MFU_SE}
    ii. FG660.xxx { FG660.018}
    iii. MFU S/N Nummer { 000019861AF8}
    iv. FW {7.0}

3. TFT
    i. Type { TFT-Display}
    ii. FG660.xxx { FG660.026}
    iii. TFT S/N Nummer { 000019875EE5}
    iv. FW {7.0}

4. ADC
    i. Type { ADC-Karte}
    ii. FG660.xxx { FG660.046}
    iii. ADC S/N Nummer { 00000E56D97A}
    iv. FW {7.0}

5. Fairbus Backplane
    i. FG660.xxx { FG660.038}
    ii. SN { GSI A096038 SN:100168 12/2016 RoHS}

6. DCCT Backplane
    i. FG660.xxx { FG660.074}
    ii. SN { GSI A506074 SN:100041 10/2016 RoHS}

7. USI Teminal
    i. FG660.xxx { FG660.120}

8. DCCT-Netzteil
    i. DCCT-Netzteil(R+) { EPLAX/PK45}
    ii. (R+)SN { 1288135}
9. DCCT-Netzteil
    i. DCCT-Netzteil(L-) { EPLAX/PK45}
    ii. (L-)SN { 1288195}

10. SCU-Netzteil
    i. Type { EPLAX VP82-1-12V LN}
    ii. SN { 1329369}

2.12 Test Log File Generation

Generate the testLogSystem_xxx.docx file and save it in pdf format in the dedicated eet-common folder (Arbeitsordner ACU\ACU - outgoing).

FOR ANY DOUBT, EVEN THE SMALLEST ONE, PLEASE CONTACT YOUR SUPERVISOR!