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*As RUN*

JEM-X FM 1 Electrical  
Integration & Test Procedure  
(IN-TP-JEM-0012)

Date: 15 August 2001

Prepared: Alenia/DSRI Payload Team

*More power*

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## **1. SCOPE OF THE TEST**

This document has been written to verify the efficiency from the electrical point of view of the JEM-X FM 1 Instrument, in order to check all the cable connections and the signals relevant to them.

A detailed test procedure, in accordance with DSRI methodologies, is provided in this document, following the one used for the I&T test in Alenia (refer to document INT-PR-AI-0148 "JEM-X FM I&T Procedure" Issue 2).

To perform the activities described below, the Satellite Interface Simulator (SIS) will be used. The test will be performed in DSRI Copenhagen using manual oscilloscope, digital voltmeter, current probe and BOB for the measurements.

Thus, detailed requirements and methodologies for the test execution together with the test instruments configuration will be provided within this document.

## **2. TEST OBJECTIVE**

The test is performed to achieve the following purpose:

- to verify the equipment grounding;
- to verify all the equipment electrical interfaces characteristics w.r.t. all the applicable requirements.
- to verify the equipment compatibility w.r.t harness;
- to perform the harness connection;

## **3. HARDWARE CONFIGURATION**

In order to carry out the activity detailed in this procedure, the following hardware configuration is available:

- SIS PDU simulator;
- SIS RTU simulator;
- On-Board Data Handling (OBDH FEE);
- XDPE (EM);
- XDFEE;
- Detector & DAE;
- ECOE;

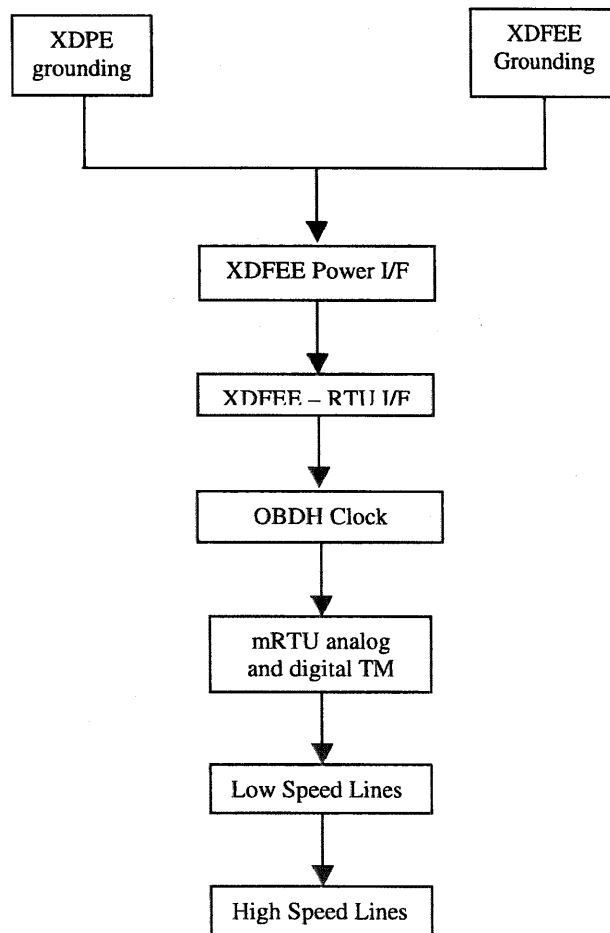
#### 4. MEASUREMENTS TOOLS

In order to carry out the activity detailed in this procedure, the following tools will be used:

- Digital Multimeter;
- Oscilloscope;
- BOB:
  - N x 26 pins BOB;
  - N x 50 pins BOB;
  - N x 116 pins BOB;

#### 4. TEST DESCRIPTION

In the following table the flow of all the foreseen tests are represented. For each test the verified connectors and interfaces are listed.





**XDFEE Grounding:** With this test the grounding of the I/F XDFEE will be verified on the XDFEE side. The involved connectors have different interfaces like LCL, SHP and ANY.

**XDFEE Power Interface:** With this test the inrush current and steady state current of the signals from the SIS-PDU to the XDFEE will be verified. The involved connectors have different interfaces like LCL.

**XDFEE RTU Interface:** With this test the SIS-RTU signals to the XDFEE will be verified. The involved connectors have different interfaces like SHP and ANY (just loaded test will be performed).

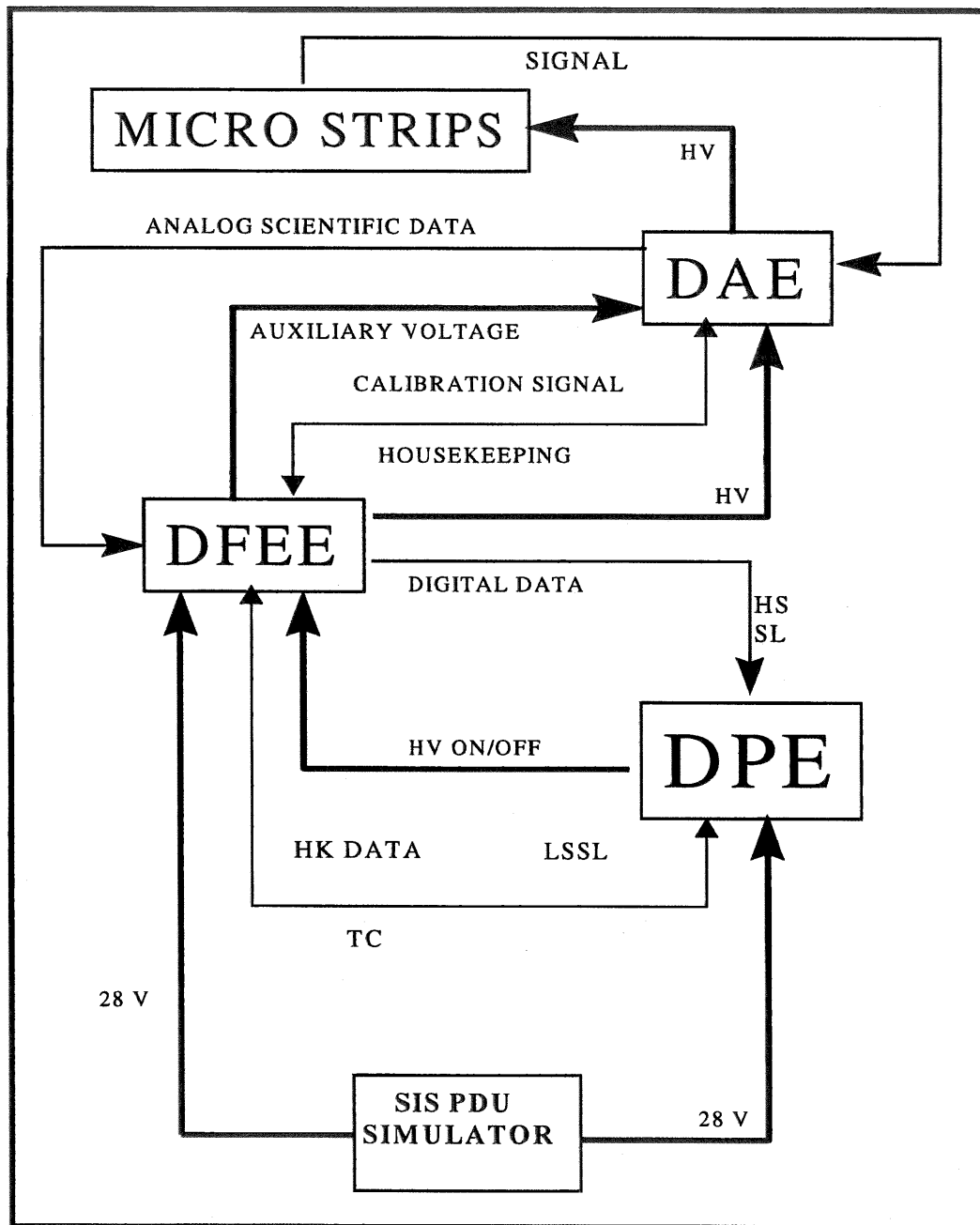
**OBDH Clock:** With this test the Litton code at the XDPE connectors and the clock provided by the XDPE will be verified.

**mRTU analog and digital Interface:** With this test the analog TM signals levels used to monitor the XDFEE LVPS will be checked. The involved connectors have different interfaces like ANY, AND, BDI and SHP.

**Low Speed Line Verification:** With this test the Low Speed Lines between the XDFEE and the XDPE will be verified.

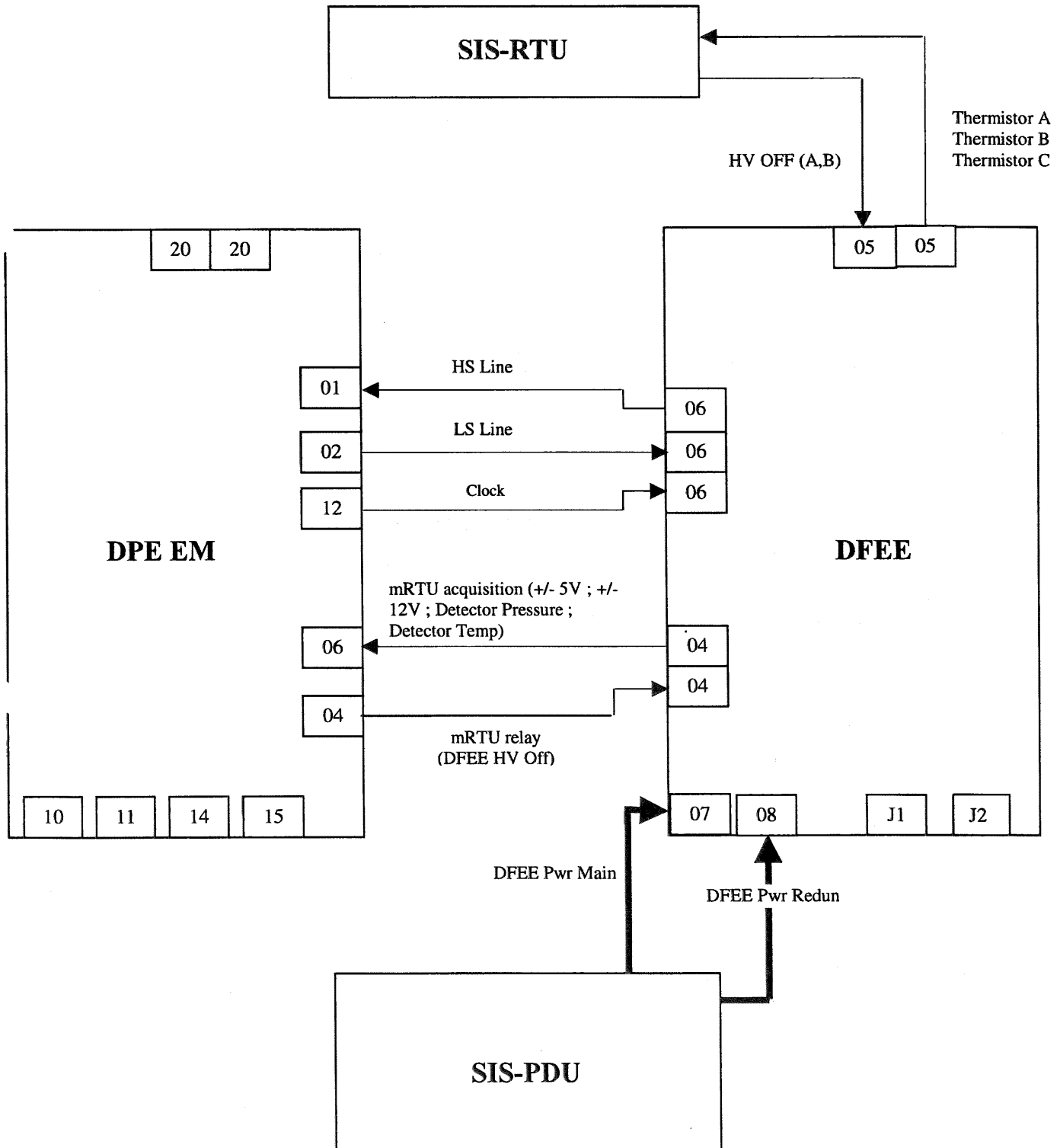
**High Speed Line Verification:** With this test the High Speed Lines between the XDFEE and the XDPE will be verified.

In order to understand the power and data distribution chain between the sub-units involved in the test, a detailed scheme is shown.



## 5. TEST SET-UP

Here below is reported the set-up that will be carried out during the activities.



The tests will be performed first unloaded and then loaded by means of a manual oscilloscope, digital voltmeter, current probe, BOBs (to put between the DFEE and the DPE to verify the signals interface) and long jumpers to detect the power consumption.

Test aid to perform the HSL test will be available.

In order to maintain trace of anomaly/problems related to hardware development, the Test team in DSRI will complete a list of Non Conformance Report.

## **6. STEP-by-STEP PROCEDURE**

In this section all the foreseen tests activity are described Step-by-step. The Step-by-Step procedure is split in the following test:

- DFEE Pin Grounding Continuity Check
- DFEE Power Interface Verification
  - SIS-PDU / DFEE Interface Connected Check
- SIS-RTU / DFEE Interface Verification
  - SIS-RTU / DFEE Interface Unconnected Check
  - SIS-RTU / DFEE Interface Connected Check
- OBDH Clock Verification
- mRTU Analog and Digital Interface Verification
  - mRTU Analog and Digital I/F Verification Unconnected Check
  - mRTU Analog and Digital I/F Verification Connected Check
- Low Speed Serial Line Verification
- High Speed Serial Line Verification





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| Paragraph: 6.1 Pin Grounding Continuity Check (JEM-X 1) - General Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                         |                |              |                |         |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|
| STEP No.                                                                                                  | Step Description                                                                                                                                                                                                                                                        | Required Value | Actual Value | Conductor Sign | Date    |
| 10                                                                                                        | General Test Conditions, Declarations and Setup                                                                                                                                                                                                                         | OK             | OK           | M <sub>4</sub> | 15/8/01 |
| 20                                                                                                        | The measurement will be performed using manual oscilloscope, digital voltmeter, current probe and BOB.                                                                                                                                                                  | OK             | OK           | M <sub>4</sub> |         |
| 30                                                                                                        | Verify that all the connectors between the XDPE1 and XDPEE1 are not connected and that the units are not damaged.<br>1. XDPE1 J01 to XDPEE1 J06<br>2. XDPE1 J02 to XDPEE1 J06<br>3. XDPE1 J04 to XDPEE1 J04<br>4. XDPE1 J06 to XDPEE1 J04<br>5. XDPE1 J12 to XDPEE1 J06 | OK             | OK           | M <sub>4</sub> |         |
| 40                                                                                                        | Verify the presence of the saver connectors.                                                                                                                                                                                                                            | OK             | OK           | M <sub>4</sub> |         |
| 50                                                                                                        | Verify that the SIS is switched OFF. If it is not, switch it off according to the SIS User Manual procedure.                                                                                                                                                            | OK             | OK           | M <sub>4</sub> |         |
| 60                                                                                                        | Verify that all the connectors coming from the SIS and OBDH are not connected to the XDPE1.<br>1. XDPE1 J10 to SIS OBDH J201<br>2. XDPE1 J11 to SIS OBDH J202<br>3. XDPE1 J14 to SIS PDU 602 LCL<br>4. XDPE1 J20 to SIS RTU simulator                                   | OK             | OK           | M <sub>4</sub> |         |



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| Paragraph: 6.1 Pin Grounding Continuity Check (JEM-X 1) - General Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                  |                           |              |                |         |         |
|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------|----------------|---------|---------|
| STEP No.                                                                                                  | Step Description                                                                                                                                                                                                                 | Required Value            | Actual Value | Conductor Sign | Date    | Remarks |
| 70                                                                                                        | Verify the presence or insert a <b>BOB #1</b> without jumpers between the following SIS/Unit connectors, saver protected (remember to don't remove the savers):<br><br>• <b>XDFEE1 J05 / SIS-RTU (Commands, Thermistors RTU)</b> | OK                        | OK           | MG             | 15/8/01 |         |
| 80                                                                                                        | Using digital voltmeter measure the ground isolation on the connector <b>XDFEE1 J 05 (XDFEE1 Side)</b> between the pins:<br><b>21 XDFEE1 Thermistor A - RTN</b><br><b>GND</b>                                                    | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN         | MG             |         |         |
| 90                                                                                                        | Using digital voltmeter measure the ground isolation on the connector <b>XDFEE1 J 05 (XDFEE1 Side)</b> between the pins:<br><b>22 XDFEE1 Thermistor B - RTN</b><br><b>GND</b>                                                    | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN         | MG             |         |         |
| 100                                                                                                       | Using digital voltmeter measure the ground isolation on the connector <b>XDFEE1 J 05 (XDFEE1 Side)</b> between the pins:<br><b>23 XDFEE1 Thermistor C - RTN</b><br><b>GND</b>                                                    | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN         | MG             |         |         |
| 110                                                                                                       | Using digital voltmeter measure the ground isolation on the connector <b>XDFEE1 J 05 (XDFEE1 Side)</b> between the pins:<br><b>19 XDFEE1 HVC OFF (A) - RTN</b><br><b>GND</b>                                                     | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN         | MG             |         |         |



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| Paragraph: 6.1 Pin Grounding Continuity Check (JEM-X 1) - General Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                        |                                       |              |                |         |             |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------|----------------|---------|-------------|
| STEP No.                                                                                                  | Step Description                                                                                                                                                                                                                                       | Required Value                        | Actual Value | Conductor Sign | Date    | Remarks     |
| 120                                                                                                       | Using digital voltmeter measure <del>the</del> ground isolation on the connector XDFEE1 J 05 (XDFEE1 Side) between the pins: 21 XDFEE1 Thermistor A - RTN GND                                                                                          | <del>Min 1.0 MΩ<br/>Max 11.0 MΩ</del> |              | Mg             | 15/8/01 | REMOVE STEP |
| 130                                                                                                       | Using digital voltmeter measure <del>the</del> ground isolation on the connector XDFEE1 J 05 (XDFEE1 Side) between the pins: 22 XDFEE1 Thermistor B - RTN GND                                                                                          | <del>Min 1.0 MΩ<br/>Max 11.0 MΩ</del> |              | Mg             |         | REMOVE STEP |
| 140                                                                                                       | Using digital voltmeter measure <del>the</del> ground isolation on the connector XDFEE1 J 05 (XDFEE1 Side) between the pins: 23 XDFEE1 Thermistor C - RTN GND                                                                                          | <del>Min 1.0 MΩ<br/>Max 11.0 MΩ</del> |              | Mg             |         | REMOVE STEP |
| 150                                                                                                       | Verify the presence or insert a BOB #2 without jumpers between the following SIS/Unit connectors, saver protected (remember to don't remove the savers):<br><ul style="list-style-type: none"><li>• XDFEE1 J07 / SIS-PDU (Power Supply Main)</li></ul> | OK                                    | OK           | Mg             |         |             |
| 160                                                                                                       | Using digital voltmeter measure the ground isolation on the connector XDFEE1 J 07 (XDFEE1 Side) between the pins: 10 PDU-P A Pwr JEM-X 1 [A] - RTN1 GND                                                                                                | Min 1.0 MΩ<br>Max 11.0 MΩ             | OPEN         | Mg             |         |             |



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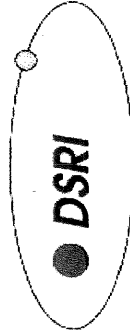
**Paragraph: 6.1 Pin Grounding Continuity Check (JEM-X 1) - General Test Conditions, Declarations and Setup**

| STEP No. | Step Description                                                                                                                                                                             | Required Value            | Actual Value | Conductor Sign | Date    | Remarks     |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------|----------------|---------|-------------|
| 170      | Using digital voltmeter measure the ground isolation on the connector XDFEE1 J 07 (XDFEE1 Side) between the pins:<br>11 PDU-P A Pwr JEM-X 1 [A] - RTN2<br>GND                                | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN         | M <sub>4</sub> | 15/8/01 |             |
| 180      | Using digital voltmeter measure the ground isolation on the connector XDFEE1 J 07 (XDFEE1 Side) between the pins:<br>1 CHASSIS GROUND<br>GND                                                 | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN         | M <sub>4</sub> |         |             |
| 190      | Using digital voltmeter measure the ground resistance on the connector XDFEE1 J 07 (XDFEE1 Side) between the pins:<br>2 PDU-P A Pwr JEM-X 1 [A] - SUP1<br>3 PDU-P A Pwr JEM-X 1 [A] - SUP2   | Min 0.0 Ω<br>Max 2.0 Ω    | 0.02         | M <sub>4</sub> |         |             |
| 200      | Using digital voltmeter measure the ground resistance on the connector XDFEE1 J 07 (XDFEE1 Side) between the pins:<br>10 PDU-P A Pwr JEM-X 1 [A] - RTN1<br>11 PDU-P A Pwr JEM-X 1 [A] - RTN2 | Min 0.0 Ω<br>Max 2.0 Ω    | 0.16         | M <sub>4</sub> |         |             |
| 210      | Using digital voltmeter measure the ground isolation on the connector XDFEE1 J 07 (XDFEE1 Side) between the pins:<br>10 PDU-P A Pwr JEM-X 1 [A] - RTN1<br>GND                                | Min 1.0 MΩ<br>Max 11.0 MΩ |              | M <sub>4</sub> |         | REMOVE STEP |



Paragraph: 6.1 Pin Grounding Continuity Check (JEM-X 1) - General Test Conditions, Declarations and Setup

| STEP No. | Step Description                                                                                                                                                                                                                                          | Required Value                        | Actual Value | Conductor Sign | Date    | Remarks        |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------|----------------|---------|----------------|
| 220      | Using digital voltmeter measure the ground isolation on the connector XDFEE1 J 07 (XDFEE1 Side) between the pins:<br>11 PDU-P A Pwr JEM-X 1 [A] - RTN2<br>GND                                                                                             | <del>Min 1.0 MΩ<br/>Max 11.0 MΩ</del> |              | M <sub>4</sub> | 15/8/01 | REVIEW<br>STEP |
| 230      | Verify the presence or insert a BOB #3 without jumpers between the following SIS/Unit connectors, saver protected (remember to don't remove the savers):<br><ul style="list-style-type: none"><li>XDFEE1 J08 / SIS-PDU (Power Supply Redundant)</li></ul> | OK                                    | OK           | M <sub>4</sub> |         |                |
| 240      | Using digital voltmeter measure the ground isolation on the connector XDFEE1 J 08 (XDFEE1 Side) between the pins:<br>10 PDU-P B Pwr JEM-X 1 [B] - RTN1<br>GND                                                                                             | Min 1.0 MΩ<br>Max 11.0 MΩ             | OPEN         | M <sub>4</sub> |         |                |
| 250      | Using digital voltmeter measure the ground isolation on the connector XDFEE1 J 08 (XDFEE1 Side) between the pins:<br>11 PDU-P B Pwr JEM-X 1 [B] - RTN2<br>GND                                                                                             | Min 1.0 MΩ<br>Max 11.0 MΩ             | OPEN         | M <sub>4</sub> |         |                |
| 260      | Using digital voltmeter measure the ground isolation on the connector XDFEE1 J 08 (XDFEE1 Side) between the pins:<br>1 CHASSIS GROUND<br>GND                                                                                                              | Min 1.0 MΩ<br>Max 11.0 MΩ             | OPEN         | M <sub>4</sub> |         |                |



Paragraph: 6.1 Pin Grounding Continuity Check (JEM-X 1) - General Test Conditions, Declarations and Setup

| STEP No. | Step Description                                                                                                                                                                                                                                                  | Required Value                                                 | Actual Value | Conductor Sign | Date    | Remarks     |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------|----------------|---------|-------------|
| 270      | Using digital voltmeter measure the ground resistance on the connector<br>XDFEE1 J 08 (XDFEE1 Side) between the pins:<br>2 PDU-P B Pwr JEM-X 1 [B] - SUP1<br>3 PDU-P B Pwr JEM-X 1 [B] - SUP2                                                                     | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$                           | 0.36         | M4             | 15/8/01 |             |
| 280      | Using digital voltmeter measure the ground resistance on the connector<br>XDFEE1 J 08 (XDFEE1 Side) between the pins:<br>10 PDU-P B Pwr JEM-X 1 [B] - RTN1<br>11 PDU-P B Pwr JEM-X 1 [B] - RTN2                                                                   | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$                           | 0.25         | M4             |         |             |
| 290      | Using digital voltmeter measure the ground isolation on the connector<br>XDFEE1 J 08 (XDFEE1 Side) between the pins:<br>10 PDU-P B Pwr JEM-X 1 [B] - RTN1<br>GND                                                                                                  | Min 1.0 M $\Omega$<br>Max <del>11.0 M<math>\Omega</math></del> |              | M4             |         | REMOVE STEP |
| 300      | Using digital voltmeter measure the ground isolation on the connector<br>XDFEE1 J 08 (XDFEE1 Side) between the pins:<br>11 PDU-P B Pwr JEM-X 1 [B] - RTN2<br>GND                                                                                                  | Min 1.0 M $\Omega$<br>Max <del>11.0 M<math>\Omega</math></del> |              | M4             |         | REMOVE STEP |
| 310      | Verify the presence or insert a <b>BOB #4</b> without jumpers between the following Unit connectors, saver protected (remember to don't remove the savers):<br><ul style="list-style-type: none"><li>• XDPE1 J06 / XDFEE1 J04 (mRTU Analog Acquisition)</li></ul> | OK                                                             | OK           | M4             |         |             |

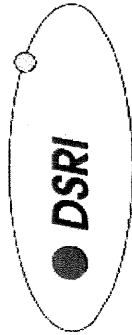


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| STEP<br>No. | Step Description                                                                                                                                           | Required<br>Value         | Actual<br>Value | Conductor<br>Sign | Date    | Remarks |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------|-------------------|---------|---------|
| 320<br>44   | Using digital voltmeter measure the ground isolation on the connector<br>XDPE1 J 06 (XDFEE1 Side) between the pins:<br>35 Thermistor 0 XDFEE1 - RTN<br>GND | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN            | Mg                | 15/8/01 |         |
| 330<br>31   | Using digital voltmeter measure the ground isolation on the connector<br>XDPE1 J 06 (XDFEE1 Side) between the pins:<br>37 Thermistor 1 XDFEE1 - RTN<br>GND | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN            | Mg                |         |         |
| 340<br>43   | Using digital voltmeter measure the ground isolation on the connector<br>XDPE1 J 06 (XDFEE1 Side) between the pins:<br>39 Thermistor 2 XDFEE1 - RTN<br>GND | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN            | Mg                |         |         |
| 350<br>46   | Using digital voltmeter measure the ground isolation on the connector<br>XDPE1 J 06 (XDFEE1 Side) between the pins:<br>41 Thermistor 3 XDFEE1 - RTN<br>GND | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN            | Mg                |         |         |
| 360<br>45   | Using digital voltmeter measure the ground isolation on the connector<br>XDPE1 J 06 (XDFEE1 Side) between the pins:<br>43 Thermistor 4 XDFEE1 - RTN<br>GND | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN            | Mg                |         |         |



Paragraph: 6.1 Pin Grounding Continuity Check (JEM-X 1) - General Test Conditions, Declarations and Setup

| STEP No. | Step Description                                                                                                                                                | Required Value            | Actual Value | Conductor Sign | Date    | Remarks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------|----------------|---------|---------|
| 370      | Using digital voltmeter measure the ground isolation on the connector XDPE1 J 06 (XDPEE1 Side) between the pins:<br>45 Thermistor 5 XDPEE1 - RTN<br>GND         | Min 1.0 MΩ<br>Max 11.0 MΩ | OPEN         | MG             | 15/8/01 |         |
| 380      | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPEE1 Side) between the pins:<br>18 +5V Digital Monitor (AN 0) - RTN<br>GND | Min 0.0 Ω<br>Max 2.0 Ω    | 0.58         | MG             |         |         |
| 390      | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPEE1 Side) between the pins:<br>19 +5V Current Monitor (AN 1) - RTN<br>GND | Min 0.0 Ω<br>Max 2.0 Ω    | 0.59         | MG             |         |         |
| 400      | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPEE1 Side) between the pins:<br>20 +5V Analog Monitor (AN 2) - RTN<br>GND  | Min 0.0 Ω<br>Max 2.0 Ω    | 0.57         | MG             |         |         |
| 410      | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPEE1 Side) between the pins:<br>21 -5V Analog Monitor (AN 3) - RTN<br>GND  | Min 0.0 Ω<br>Max 2.0 Ω    | 0.58         | MG             |         |         |





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| STEP No. | Step Description                                                                                                                                                             | Required Value                       | Actual Value | Conductor Sign | Date    | Remarks |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------|----------------|---------|---------|
| 420      | Using digital voltmeter measure the ground resistance on the connector<br><b>XDPE1 J 06 (XDFEE1 Side) between the pins:<br/>22 +12V Analog Monitor (AN 4) - RTN<br/>GND</b>  | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$ | 0.58         | M4             | 15/8/01 |         |
| 430      | Using digital voltmeter measure the ground resistance on the connector<br><b>XDPE1 J 06 (XDFEE1 Side) between the pins:<br/>23 +12V Current Monitor (AN 5) - RTN<br/>GND</b> | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$ | 0.59         | M4             |         |         |
| 440      | Using digital voltmeter measure the ground resistance on the connector<br><b>XDPE1 J 06 (XDFEE1 Side) between the pins:<br/>24 -12V Analog Monitor (AN 6) - RTN<br/>GND</b>  | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$ | 0.60         | M4             |         |         |
| 450      | Using digital voltmeter measure the ground resistance on the connector<br><b>XDPE1 J 06 (XDFEE1 Side) between the pins:<br/>25 -12V Current Monitor (AN 7) - RTN<br/>GND</b> | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$ | 0.57         | M4             |         |         |
| 460      | Using digital voltmeter measure the ground resistance on the connector<br><b>XDPE1 J 06 (XDFEE1 Side) between the pins:<br/>26 Pressure Monitor 1 (AN 8) - RTN<br/>GND</b>   | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$ | 0.58         | M4             |         |         |



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| STEP No.  | Step Description                                                                                                                                                    | Required Value                       | Actual Value | Conductor Sign | Date    | Remarks |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------|----------------|---------|---------|
| 470       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDFEE1 Side) between the pins:<br>27 Pressure Monitor 2 (AN 9) - RTN<br>GND      | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$ | 0.58         | M <sub>4</sub> | 15/8/01 |         |
| 480       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDFEE1 Side) between the pins:<br>28 Detector Temperature 1 (AN 10) - RTN<br>GND | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$ | 0.59         | M <sub>4</sub> |         |         |
| 490       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDFEE1 Side) between the pins:<br>29 Detector Temperature 2 (AN 11) - RTN<br>GND | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$ | 0.58         | M <sub>4</sub> |         |         |
| 500<br>35 | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDFEE1 Side) between the pins:<br><del>30</del> HF FIFO Flag XDFEE1 - RTN<br>GND | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$ | 0.58         | M <sub>4</sub> |         |         |
| 510<br>37 | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDFEE1 Side) between the pins:<br><del>31</del> ANA 13- / ANALOG 13 - RTN<br>GND | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$ | 0.58         | M <sub>4</sub> |         |         |



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Paragraph: 6.1 Pin Grounding Continuity Check (JEM-X 1) - General Test Conditions, Declarations and Setup

| STEP No.  | Step Description                                                                                                                                                    | Required Value                                             | Actual Value | Conductor Sign | Date    | Remarks         |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------|----------------|---------|-----------------|
| 520<br>38 | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPEE1 Side) between the pins:<br><del>32</del> ANA 14- / ANALOG 14 - RTN<br>GND | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$                       | 0.55         | Mg             | 15/8/01 |                 |
| 530<br>41 | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPEE1 Side) between the pins:<br><del>35</del> ANA 15- / ANALOG 15 - RTN<br>GND | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$                       | 0.58         | Mg             |         |                 |
| 540       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPEE1 Side) between the pins:<br><del>1</del> CHASSIS GROUND<br>GND             | Min 0.0 $\Omega$<br><del>Max 2.0 <math>\Omega</math></del> |              | Mg             |         | RETROVE<br>STEP |
| 550       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPEE1 Side) between the pins:<br><del>50</del> CHASSIS GROUND<br>GND            | Min 0.0 $\Omega$<br><del>Max 2.0 <math>\Omega</math></del> |              | Mg             |         | RETROVE<br>STEP |
| 560       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPEE1 Side) between the pins:<br>35 Thermistor 0 XDPEE1 - RTN<br>GND            | Min 0.0 $\Omega$<br>Max 2.0 $\Omega$                       | 0.55         | Mg             |         |                 |



| Paragraph: 6.1 Pin Grounding Continuity Check (JEM-X 1) - General Test Conditions, Declarations and Setup |                                                                                                                                                         |                        |              |                |         |         |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|----------------|---------|---------|
| STEP No.                                                                                                  | Step Description                                                                                                                                        | Required Value         | Actual Value | Conductor Sign | Date    | Remarks |
| 570                                                                                                       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPE1 Side) between the pins:<br>37 Thermistor 1 XDFEE1 – RTN<br>GND | Min 0.0 Ω<br>Max 2.0 Ω | 0.57         | M4             | 15/8/01 |         |
| 580                                                                                                       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPE1 Side) between the pins:<br>39 Thermistor 2 XDFEE1 – RTN<br>GND | Min 0.0 Ω<br>Max 2.0 Ω | 0.57         | M4             |         |         |
| 590                                                                                                       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPE1 Side) between the pins:<br>41 Thermistor 3 XDFEE1 – RTN<br>GND | Min 0.0 Ω<br>Max 2.0 Ω | 0.56         | M4             |         |         |
| 600                                                                                                       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPE1 Side) between the pins:<br>43 Thermistor 4 XDFEE1 – RTN<br>GND | Min 0.0 Ω<br>Max 2.0 Ω | 1.03         | M4             |         |         |
| 610                                                                                                       | Using digital voltmeter measure the ground resistance on the connector XDPE1 J 06 (XDPE1 Side) between the pins:<br>45 Thermistor 5 XDFEE1 – RTN<br>GND | Min 0.0 Ω<br>Max 2.0 Ω | 1.08         | M4             |         |         |
| 620                                                                                                       | Remove all the remained <b>BOB</b> previously installed.                                                                                                | OK                     | 0M           | M4             |         |         |



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| Paragraph: 6.2 XDFEE1 Power Interface Verification - General Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                                                                                                         |                |              |                |         |         |
|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|---------|
| STEP No.                                                                                             | Step Description                                                                                                                                                                                                                                                                                                                                        | Required Value | Actual Value | Conductor Sign | Date    | Remarks |
| 10                                                                                                   | SIS-PDU/XDFEE1 I/F Verification                                                                                                                                                                                                                                                                                                                         | OK             | OK           | NG             | 15/8/01 |         |
| 20                                                                                                   | General Test Conditions, Declarations and Setup                                                                                                                                                                                                                                                                                                         | OK             | OK           | NG             |         |         |
| 30                                                                                                   | The measurement will be performed using manual oscilloscope, digital voltmeter, current probe and BOB.                                                                                                                                                                                                                                                  | OK             | OK           | NG             |         |         |
| 40                                                                                                   | Verify that the SIS is switched OFF. If it is not, switch it off according to the SIS User Manual procedure.                                                                                                                                                                                                                                            | OK             | OK           | NG             |         |         |
| 50                                                                                                   | Verify that all the power connectors coming from the SIS-PDU are not connected to the XDFEE1.                                                                                                                                                                                                                                                           | OK             | OK           | NG             |         |         |
| 60                                                                                                   | Verify the presence or insert the BOB #1 and #2 without jumpers between the following SIS-PDU/Unit connectors, saver protected (remember to don't remove the savers): <ul style="list-style-type: none"> <li>• XDFEE1 J 07 / SIS-PDU (Power Main) &gt;&gt;&gt; BOB #1</li> <li>• XDFEE1 J 08 / SIS-PDU (Power Redundant) &gt;&gt;&gt; BOB #2</li> </ul> | OK             | OK           | NG             |         |         |



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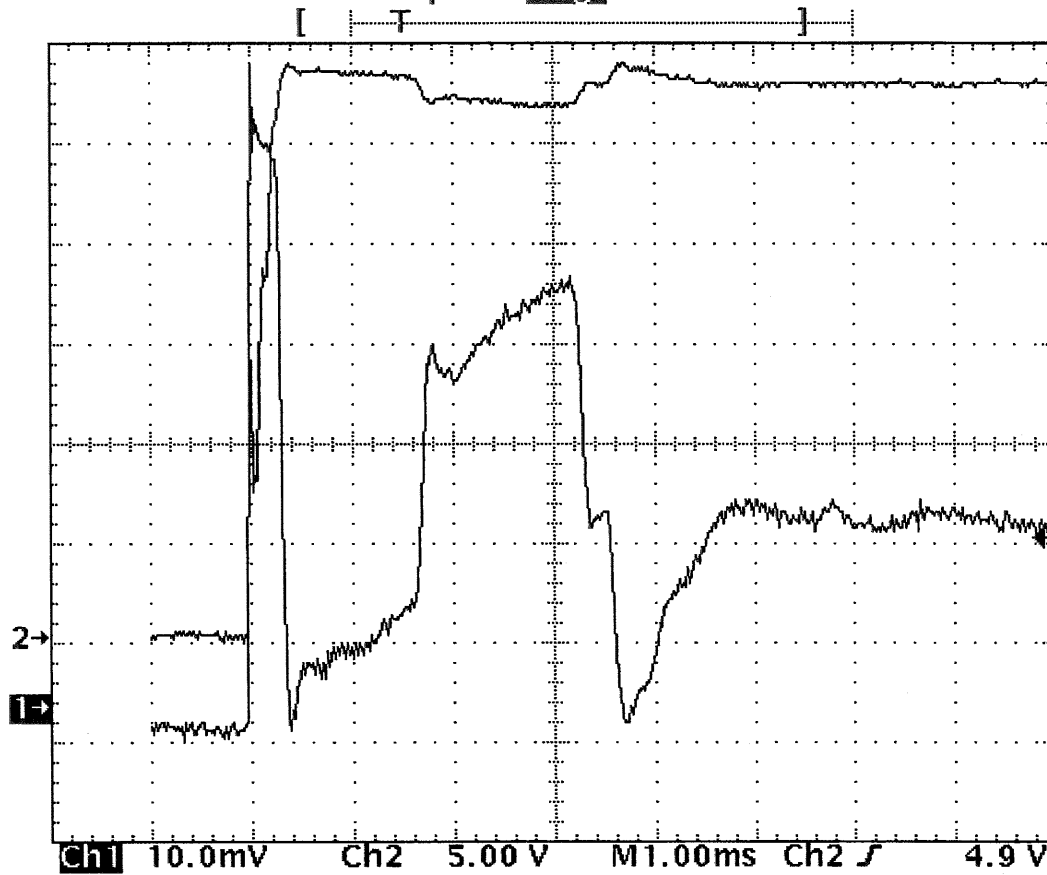
| Paragraph: 6.2.1 SIS-PDU/XDFEE1 I/F Connected check - General Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                                                                                               |                |              |                |         |         |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|---------|
| STEP No.                                                                                              | Step Description                                                                                                                                                                                                                                                                                                                              | Required Value | Actual Value | Conductor Sign | Date    | Remarks |
| 10                                                                                                    | SIS-PDU/XDFEE1 I/F - Connected Harness Measurements                                                                                                                                                                                                                                                                                           | OK             | OK           | NG             | 15/8/01 |         |
| 20                                                                                                    | Test Conditions, Declarations and Setup                                                                                                                                                                                                                                                                                                       | OK             | OK           | NG             |         |         |
| 30                                                                                                    | Insert long jumpers into the BOB #1 between the XDFEE1 J 07 / SIS-PDU connection on pins:<br><br>2 PDU-P A PWR JEM-X 1 [A] SUP1<br>10 PDU-P A PWR JEM-X 1 [A] RTN1<br>3 PDU-P A PWR JEM-X 1 [A] SUP2<br>11 PDU-P A PWR JEM-X 1 [A] RTN2                                                                                                       | OK             | OK           | NG             |         |         |
| 40                                                                                                    | Clamp the current probe on the BOB #1 on XDFEE1 J 07 around pin 2 and 3 (current direction toward XDFEE1).                                                                                                                                                                                                                                    | OK             | OK           | NG             |         |         |
| 50                                                                                                    | Inrush Current Measurement:                                                                                                                                                                                                                                                                                                                   | OK             | OK           |                |         |         |
| 60                                                                                                    | Set the oscilloscope (Current max 5 Amp - Trigger level 0.5 Amp - Positive Slope) in order to record the inrush current waveform on the following pin:<br>2 PDU-P A PWR JEM-X 1 [A] SUP1<br>3 PDU-P A PWR JEM-X 1 [A] SUP2<br><br>and the Voltage on the following pins:<br>2 PDU-P A PWR JEM-X 1 [A] SUP1<br>10 PDU-P A PWR JEM-X 1 [A] RTN1 | OK             | OK           | NG             |         |         |
| 70                                                                                                    | Activate the XDFEE1 power supply lines 'A', using the SIS.                                                                                                                                                                                                                                                                                    | OK             | OK           | NG             |         |         |



| Paragraph: 6.2.1 SIS-PDU/XDFEE1 I/F Connected check - General Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                     |                            |              |                |         |
|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------|----------------|---------|
| STEP No.                                                                                              | Step Description                                                                                                                                                                                                                    | Required Value             | Actual Value | Conductor Sign | Date    |
| 80                                                                                                    | Verify in the above plot that the LCL not enter in its current limiting mode or verify, in this case, that the limitation time is < 5 mSec                                                                                          | OK                         | OK           | MG             | 15/8/01 |
| 90                                                                                                    | Measure the Steady State Current recording the current acquired with the scope:<br>2 PDU-P A PWR JEM-X 1 [A] SUP1                                                                                                                   | Min 500 mA<br>Max 1.1 A    | 1.1 A        | MG             |         |
| 100                                                                                                   | Using digital voltmeter measure the Voltage on the connector XDFEE1 J 07 between the pins:<br>2 PDU-P A PWR JEM-X 1 [A] SUP1<br>10 PDU-P A PWR JEM-X 1 [A] RTN1                                                                     | Min 26.75 V<br>Max 28.28 V | 27.44        | MG             |         |
| 110                                                                                                   | Deactivate the XDFEE1 power supply lines 'A', using the SIS.                                                                                                                                                                        | OK                         | OK           | MG             |         |
| 120                                                                                                   | Using digital voltmeter measure the Voltage on the connector XDFEE1 J 07 between the pins:<br>2 PDU-P A PWR JEM-X 1 [A] SUP1<br>10 PDU-P A PWR JEM-X 1 [A] RTN1                                                                     | 0.0 V                      | 0 V          | MG             |         |
| 130                                                                                                   | Insert long jumpers into the BOB #2 between the XDFEE1 J 08 / SIS-PDU connection on pins:<br>2 PDU-P B PWR JEM-X 1 [B] SUP1<br>10 PDU-P B PWR JEM-X 1 [B] RTN1<br>3 PDU-P B PWR JEM-X 1 [B] SUP2<br>11 PDU-P B PWR JEM-X 1 [B] RTN2 | OK                         | OK           | MG             |         |

TEK 000  
20: 48: 40

Tek Run: 50.0kS/s Sample 11192



Ch1 High  
41.4mV  
Unstable  
histogram

Ch1 Low  
18.6mV

15 Aug 2001  
20:48:40



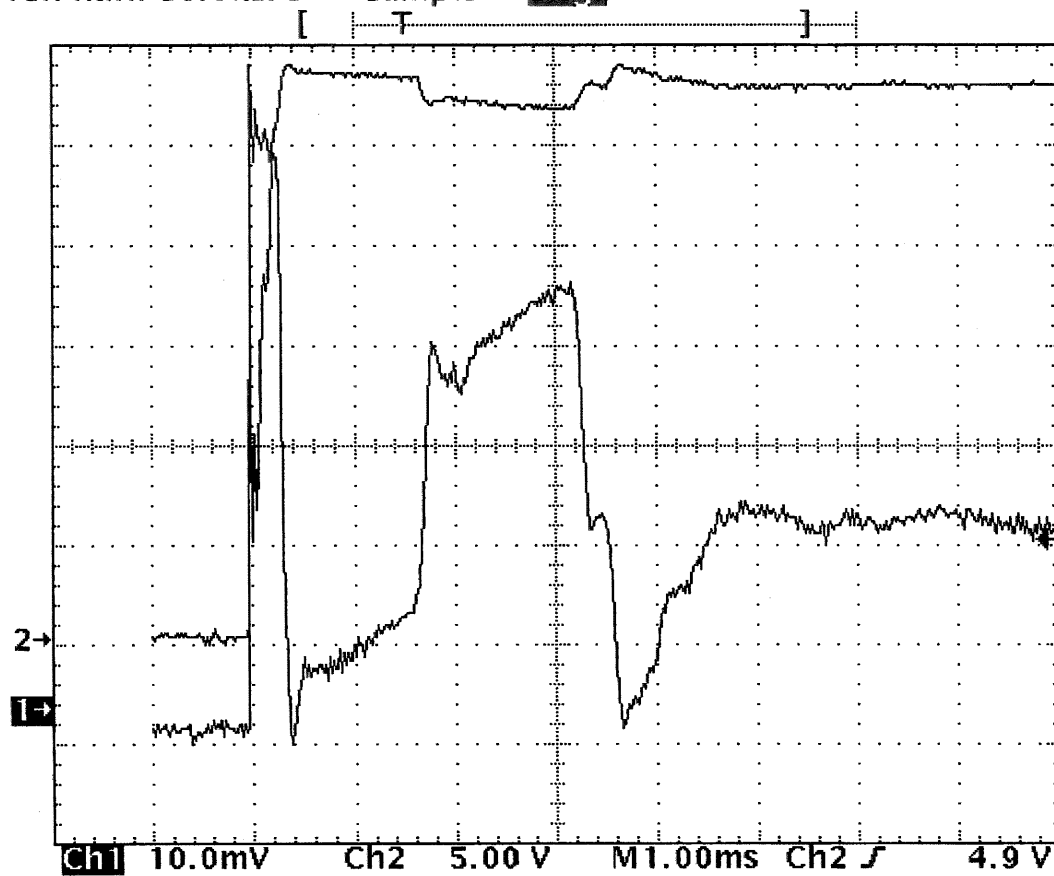


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| Paragraph: 6.2.1 SIS-PDU/XDFEE1 I/F Connected check - General Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                                                                                                                            |                         |              |                |         |                     |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------|----------------|---------|---------------------|
| STEP No.                                                                                              | Step Description                                                                                                                                                                                                                                                                                                                                                           | Required Value          | Actual Value | Conductor Sign | Date    | Remarks             |
| 140                                                                                                   | Clamp the current probe on the BOB #2 on XDFEE1 J 08 around pin 2 and 3 (current direction toward XDFEE1).                                                                                                                                                                                                                                                                 | OK                      | OK           | MH             | 15/8/01 |                     |
| 150                                                                                                   | Inrush Current Measurement:                                                                                                                                                                                                                                                                                                                                                | OK                      | OK           | MH             |         |                     |
| 160                                                                                                   | Set the oscilloscope (Current max 5 Amp – Trigger level 0.5 Amp – Positive Slope) in order to record the inrush current waveform on the XDFEE1 J 08 connector on the following pin:<br>2 PDU-P B PWR JEM-X 1 [B] SUP1<br>3 PDU-P B PWR JEM-X 1 [B] SUP2<br><br>and the Voltage on the following pins:<br>2 PDU-P B PWR JEM-X 1 [B] SUP1<br>10 PDU-P B PWR JEM-X 1 [B] RTN1 | OK                      | OK           | MH             |         |                     |
| 170                                                                                                   | Activate the XDFEE1 power supply lines 'B', using the SIS.                                                                                                                                                                                                                                                                                                                 | OK                      | OK           | MH             |         |                     |
| 180                                                                                                   | Verify in the above plot that the LCL not enter in its current limiting mode or verify, in this case, that the limitation time is < 5 mSec                                                                                                                                                                                                                                 | OK                      | OK           | MH             |         | TEK 001<br>20:53:14 |
| 190                                                                                                   | Measure the Steady State Current recording the current acquired with the scope:<br>2 PDU-P B PWR JEM-X 1 [B] SUP1                                                                                                                                                                                                                                                          | Min 500 mA<br>Max 1.3 A | 1.1 A        | MH             |         |                     |

Tek Run: 50.0kS/s Sample Trig



Ch1 High  
41.4mV  
Unstable  
histogram

Ch1 Low  
19.0mV

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20:53:14



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Paragraph: 6.2.1 SIS-PDU/XDFEE1 I/F Connected check - General Test Conditions, Declarations and Setup

| STEP No. | Step Description                                                                                                                                                                                                                                          | Required Value             | Actual Value | Conductor Sign | Date    | Remarks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------|----------------|---------|---------|
| 200      | Using digital voltmeter measure the Voltage on the connector XDFEE1 J 08 between the pins:<br>2 PDU-P B PWR JEM-X 1 [B] SUP1<br>10 PDU-P B PWR JEM-X 1 [B] RTN1                                                                                           | Min 26.75 V<br>Max 28.28 V | 27.43v       | M4             | 15/8/01 |         |
| 210      | Deactivate the XDFEE1 power supply lines 'B', using the SIS.                                                                                                                                                                                              | OK                         | OK           | M4             |         |         |
| 220      | Using digital voltmeter measure the Voltage on the connector XDFEE1 J 08 between the pins:<br>2 PDU-P B PWR JEM-X 1 [B] SUP1<br>10 PDU-P B PWR JEM-X 1 [B] RTN1                                                                                           | 0.0 V                      | 0 V          | M4             |         |         |
| 230      | Disconnect the BOB #1 and #2 between the following SIS-PDU/Unit connectors, saver protected, and mate them together (don't remove the savers):<br>• XDFEE1 J 07 / SIS-PDU (Power Main) >>> BOB #1<br>• XDFEE1 J 08 / SIS-PDU (Power Redundant) >>> BOB #2 | OK                         | OK           | M4             |         |         |



Paragraph: 6.3 SIS-RTU/XDFEE1 Interface verification - General Test Conditions, Declarations and Setup

| STEP<br>No. | Step Description                                                                                                                                                                                                                                               | Required<br>Value | Actual<br>Value | Conductor<br>Sign | Date | Remarks |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------|-------------------|------|---------|
| 10          | SIS-RTU/XDFEE1 I/F Verification                                                                                                                                                                                                                                | OK                |                 |                   |      | N/A     |
| 20          | General Test Conditions, Declarations and Setup                                                                                                                                                                                                                | OK                |                 |                   |      | N/A     |
| 30          | The measurement will be performed using manual oscilloscope, digital voltmeter, current probe and BOB.                                                                                                                                                         | OK                |                 |                   |      | N/A     |
| 40          | Make sure that the following XDFEE1 SIS-PDU/unit connectors, savers protected, have been integrated and mated together: <ul style="list-style-type: none"><li>• XDFEE1 J 07 / SIS-PDU (Power Main)</li><li>• XDFEE1 J 08 / SIS-PDU (Power Redundant)</li></ul> | OK                |                 |                   |      | N/A     |
| 50          | Make sure that a <b>BOB #1</b> is inserted between the following SIS-RTU / Unit connectors, savers protected, with no jumper mounted: <ul style="list-style-type: none"><li>• XDFEE1 J 05 / SIS-RTU (Commands, Thermistors RTU)</li></ul>                      | OK                |                 |                   |      | N/A     |
| 60          | If the above <b>BOB #1</b> is not inserted then verify or perform the switching off of the SIS according to the SIS User Manual procedure.                                                                                                                     | OK                |                 |                   |      | N/A     |
| 70          | Insert the above <b>BOB #1</b> , if not already inserted, without removing the savers.                                                                                                                                                                         | OK                |                 |                   |      | N/A     |



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| Paragraph: 6.3.1 SIS-RTU/XDFEE1 I/F Unconnected check - General Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                 |                        |              |                |      |         |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|----------------|------|---------|
| STEP No.                                                                                                | Step Description                                                                                                                                                                                                                                | Required Value         | Actual Value | Conductor Sign | Date | Remarks |
| 10                                                                                                      | Thermistors (ANY) and High Voltage command off (SHP)                                                                                                                                                                                            | OK                     |              |                |      | N/A     |
| 20                                                                                                      | Activate the SIS-RTU following the SIS User Manual procedure.                                                                                                                                                                                   | OK                     |              |                |      | N/A     |
| 30                                                                                                      | Using digital voltmeter measure the voltage on the connector <b>XDFEE1 J 05</b> (SIS side) between the pins:<br><b>08 XDFEE1 THERMISTOR A SIG</b><br><b>21 XDFEE1 THERMISTOR A RTN</b>                                                          | Min 5.0 V<br>Max 11 V  |              |                |      | N/A     |
| 40                                                                                                      | Using digital voltmeter measure the voltage on the connector <b>XDFEE1 J 05</b> (SIS side) between the pins:<br><b>09 XDFEE1 THERMISTOR B SIG</b><br><b>22 XDFEE1 THERMISTOR B RTN</b>                                                          | Min 4.0 V<br>Max 7.0 V |              |                |      | N/A     |
| 50                                                                                                      | Using digital voltmeter measure the voltage on the connector <b>XDFEE1 J 05</b> (SIS side) between the pins:<br><b>10 XDFEE1 THERMISTOR C SIG</b><br><b>23 XDFEE1 THERMISTOR C RTN</b>                                                          | Min 4.0 V<br>Max 7.0 V |              |                |      | N/A     |
| 60                                                                                                      | Set the oscilloscope (Trigger level 6 Volt – Positive Slope) in order to record the CMD-pulse waveform on the connector <b>XDFEE1 J 05</b> (SIS side) between the pins:<br><b>06 XDFEE1 HVC OFF (A) SIG</b><br><b>19 XDFEE1 HVC OFF (A) RTN</b> | OK                     |              |                |      | N/A     |
| 70                                                                                                      | Send CMD (XDFEE1 HVC OFF A):<br>1881 C230 0003 0021 4320                                                                                                                                                                                        | OK                     |              |                |      | N/A     |



| Paragraph: 6.3.1 SIS-RTU/XDFEE1 I/F Unconnected check - General Test Conditions, Declarations and Setup |                                                                                                                                             |                                                                        |              |                |      |         |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------|----------------|------|---------|
| STEP No.                                                                                                | Step Description                                                                                                                            | Required Value                                                         | Actual Value | Conductor Sign | Date | Remarks |
| 80                                                                                                      | Measure the CMD-pulse analysing the above plot acquired:<br><br>Pulse Duration:<br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time: | 11 to 15 mS<br>12 to 14 V<br>-0.5 to 0.5 V<br><500microS<br><500microS |              |                |      | N/A     |
| 90                                                                                                      | Deactivate the SIS-RTU following the SISUser Manual procedure.                                                                              | OK                                                                     |              |                |      | N/A     |



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| Paragraph: 6.3.2 SIS-RTU/XDFEE1 I/F Connected check - General Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                                                                                            |                |              |                |      |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|------|
| STEP No.                                                                                              | Step Description                                                                                                                                                                                                                                                                                                                           | Required Value | Actual Value | Conductor Sign | Date |
| 10                                                                                                    | SIS-RTU/XDFEE1 I/F - Connected Harness Measurements                                                                                                                                                                                                                                                                                        | OK             |              |                | N/A  |
| 20                                                                                                    | Test Conditions, Declarations and Setup                                                                                                                                                                                                                                                                                                    | OK             |              |                | N/A  |
| 30                                                                                                    | If the SIS-RTU is ON, deactivate it according to the SIS User Manual procedure.                                                                                                                                                                                                                                                            | OK             |              |                | N/A  |
| 40                                                                                                    | Insert the jumpers into the BOB #1 between the XDFEE1 J 05 / SIS-RTU connection on pins:<br><br>06 XDFEE1 HVC OFF (A) SIG<br>19 XDFEE1 HVC OFF (A) RTN<br>08 XDFEE1 THERMISTOR A SIG<br>21 XDFEE1 THERMISTOR A RTN<br>09 XDFEE1 THERMISTOR B SIG<br>22 XDFEE1 THERMISTOR B RTN<br>10 XDFEE1 THERMISTOR C SIG<br>23 XDFEE1 THERMISTOR C RTN | OK             |              |                | N/A  |
| 50                                                                                                    | Activate the SIS-RTU following the SIS User Manual procedure.                                                                                                                                                                                                                                                                              | OK             |              |                | N/A  |
| 60                                                                                                    | Activate the XDFEE1 main power lines 'A', using the SIS.                                                                                                                                                                                                                                                                                   | OK             |              |                | N/A  |
| 70                                                                                                    | Thermistors (ANY) and High Voltage command off (SHP)                                                                                                                                                                                                                                                                                       | OK             |              |                | N/A  |



| Paragraph: 6.3.2 SIS-RTU/XDFEE1 I/F Connected check - General Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                 |                          |              |                |      |                                                                                        |
|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------|----------------|------|----------------------------------------------------------------------------------------|
| STEP No.                                                                                              | Step Description                                                                                                                                                                                                                                | Required Value           | Actual Value | Conductor Sign | Date | Remarks                                                                                |
| 80                                                                                                    | Using digital voltmeter measure the voltage on the connector <b>XDFEE1 J 05</b> (SIS-side) between the pins:<br><b>08 XDFEE1 THERMISTOR A SIG</b><br><b>21 XDFEE1 THERMISTOR A RTN</b>                                                          | Min 0.75 V<br>Max 1.75 V |              |                |      | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 90                                                                                                    | Using digital voltmeter measure the voltage on the connector <b>XDFEE1 J 05</b> (SIS-side) between the pins:<br><b>09 XDFEE1 THERMISTOR B SIG</b><br><b>22 XDFEE1 THERMISTOR B RTN</b>                                                          | Min 0.75 V<br>Max 1.75 V |              |                |      | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 100                                                                                                   | Using digital voltmeter measure the voltage on the connector <b>XDFEE1 J 05</b> (SIS-side) between the pins:<br><b>10 XDFEE1 THERMISTOR C SIG</b><br><b>23 XDFEE1 THERMISTOR C RTN</b>                                                          | Min 0.75 V<br>Max 1.75 V |              |                |      | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 110                                                                                                   | Set the oscilloscope (Trigger level 6 Volt – Positive Slope) in order to record the CMD-pulse waveform on the connector <b>XDFEE1 J 05</b> (SIS-side) between the pins:<br><b>06 XDFEE1 HVC OFF (A) SIG</b><br><b>19 XDFEE1 HVC OFF (A) RTN</b> | OK                       |              |                |      | N/A                                                                                    |
| 120                                                                                                   | Send CMD (XDFEE1 HVC OFF A):<br>1881 C230 0003 0021 4320                                                                                                                                                                                        | OK                       |              |                |      | N/A                                                                                    |





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**Paragraph: 6.3.2 SIS-RTU/XDFEE1 I/F Connected check - General Test Conditions, Declarations and Setup**

| STEP No. | Step Description                                                                                                                                                                                          | Required Value                                                         | Actual Value | Conductor Sign | Date | Remarks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------|----------------|------|---------|
| 130      | Measure the CMD-pulse analysing the above plot acquired:<br><br>Pulse Duration:<br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time:                                                               | 11 to 15 mS<br>12 to 14 V<br>-0.5 to 0.5 V<br><500microS<br><500microS |              |                |      | N/A     |
| 140      | Deactivate the XDFEE1 main power lines 'A', using the SIS.                                                                                                                                                | OK                                                                     |              |                |      | N/A     |
| 150      | Deactivate the SIS-RTU following the SIS User Manual procedure.                                                                                                                                           | OK                                                                     |              |                |      | N/A     |
| 160      | Disconnect the <b>BOB #1</b> between the following SIS-RTU/Unit connectors, saver protected, and mate them together (don't remove the savers):<br><br>• XDFEE1 J 05 / SIS-RTU (Commands, Thermistors RTU) | OK                                                                     |              |                |      | N/A     |
| 170      | Activate the SIS-RTU following the SIS User Manual procedure.                                                                                                                                             | OK                                                                     |              |                |      | N/A     |
| 180      | Activate the XDFEE1 main power lines 'A', using the SIS.                                                                                                                                                  | OK                                                                     |              |                |      | N/A     |



**Paragraph: 6.4 OBDH Clock verification**

| STEP No. | Step Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Required Value | Actual Value | Conductor Sign | Date    | Remarks |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|---------|
| 10       | <b>XDPE1/XDFEE1 OBDH Clock Verification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | OK             | OK           | MG             | 15/8/01 |         |
| 20       | <b>Test Conditions, Declarations and Setup</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | OK             | OK           | MG             |         |         |
| 30       | The measurement will be performed using manual oscilloscope, digital voltmeter, current probe and BOB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | OK             | OK           | MG             |         |         |
| 40       | <p>Make sure that the following XDFEE1 SIS-PDU/SIS-RTU/OBDH-FEE/units connectors, savers protected, have been integrated and mated together:</p> <ul style="list-style-type: none"> <li>• XDPE1 J 14 / SIS-PDU (Power Main)</li> <li>• XDPE1 J 15 / SIS-PDU (Power Redundant)</li> <li>• XDPE1 J 20 / SIS-RTU (DC/DC Sec. Control)</li> <li>• XDPE1 J 10 / OBDH-FEE (OBDH Main Bus)</li> <li>• XDPE1 J 11 / OBDH-FEE (OBDH Redundant Bus)</li> <li>• XDFEE1 J 07 / SIS-PDU (Power Main)</li> <li>• XDFEE1 J 08 / SIS-PDU (Power Redundant)</li> <li>• XDFEE1 J 05 / SIS-RTU (Commands, Thermistors RTU)</li> </ul> | OK             | OK           | MG             |         |         |
| 50       | <p>Verify the presence or insert a BOB #1 without jumpers between the following Units connectors, saver protected (remember to don't remove the savers):</p> <ul style="list-style-type: none"> <li>• XDFEE1 J 06 / XDPE1 J 12 (Serial Communication)</li> </ul>                                                                                                                                                                                                                                                                                                                                                   | OK             | OK           | MG             |         |         |
| 60       | Make sure that the XDPE1 J 12 unit connectors, savers protected, have been mated together.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | OK             | OK           | MG             |         |         |



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Paragraph: 6.4 OBDH Clock verification

| STEP<br>No. | Step Description                                                                                                                                                                                                                                                                                                                                                                                                  | Required<br>Value | Actual<br>Value | Conductor<br>Sign | Date    | Remarks |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------|-------------------|---------|---------|
| 70          | Verify the presence or insert jumpers into the <b>BOB #1</b> between the <b>XDFEE1 J 06 / XDPE1 J12</b> connection on pins:<br><br>13 4 MHz Timing XDFEE1 TRUE<br>46 4 MHz Timing XDFEE1 COMP<br>14 1 Hz Timing (BCP2) XDFEE1 TRUE<br>47 1 Hz Timing (BCP2) XDFEE1 COMP<br>15 8 Hz Timing XDFEE1 TRUE<br>48 8 Hz Timing XDFEE1 COMP<br>16 1/8 Hz Timing (BCP1) XDFEE1 TRUE<br>49 1/8 Hz Timing (BCP1) XDFEE1 COMP | OK                | OK              | MS                | 15/8/01 |         |
| 80          | Activate the XDPE1 power supply lines 'A', using the SIS.                                                                                                                                                                                                                                                                                                                                                         | OK                | OK              | MS                |         |         |
| 90          | Activate the XDFEE1 power supply lines 'A', using the SIS.                                                                                                                                                                                                                                                                                                                                                        | OK                | OK              | MS                |         |         |
| 100         | Set the oscilloscope (Trigger level 2 Volts – Positive Slope) in order to record the pulse waveform on the connector <b>XDFEE1 J 06</b> (XDPE1 side) between the pins:<br><br>13 4 MHz Timing XDFEE1 TRUE<br>46 4 MHz Timing XDFEE1 COMP                                                                                                                                                                          | OK                | OK              | MS                |         |         |

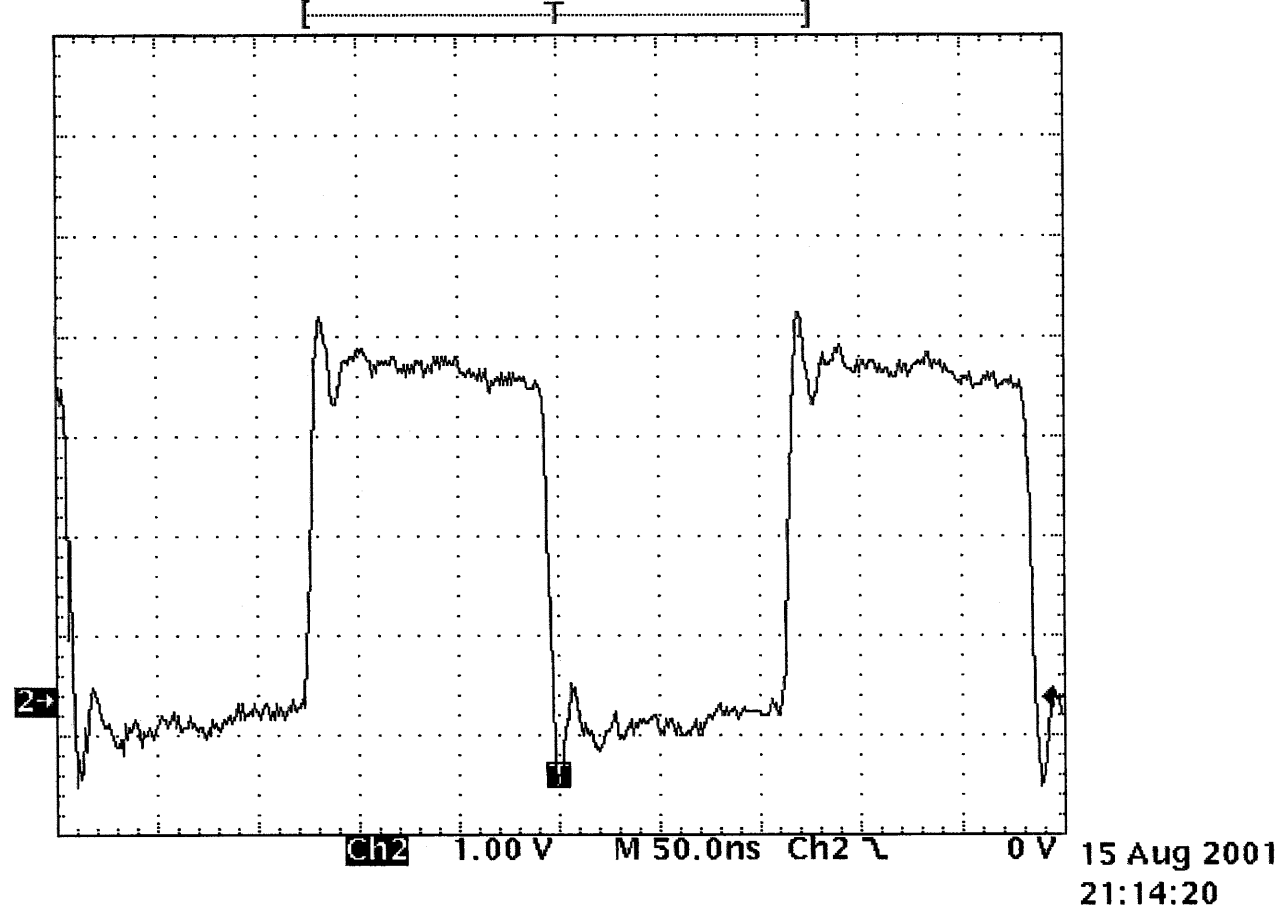


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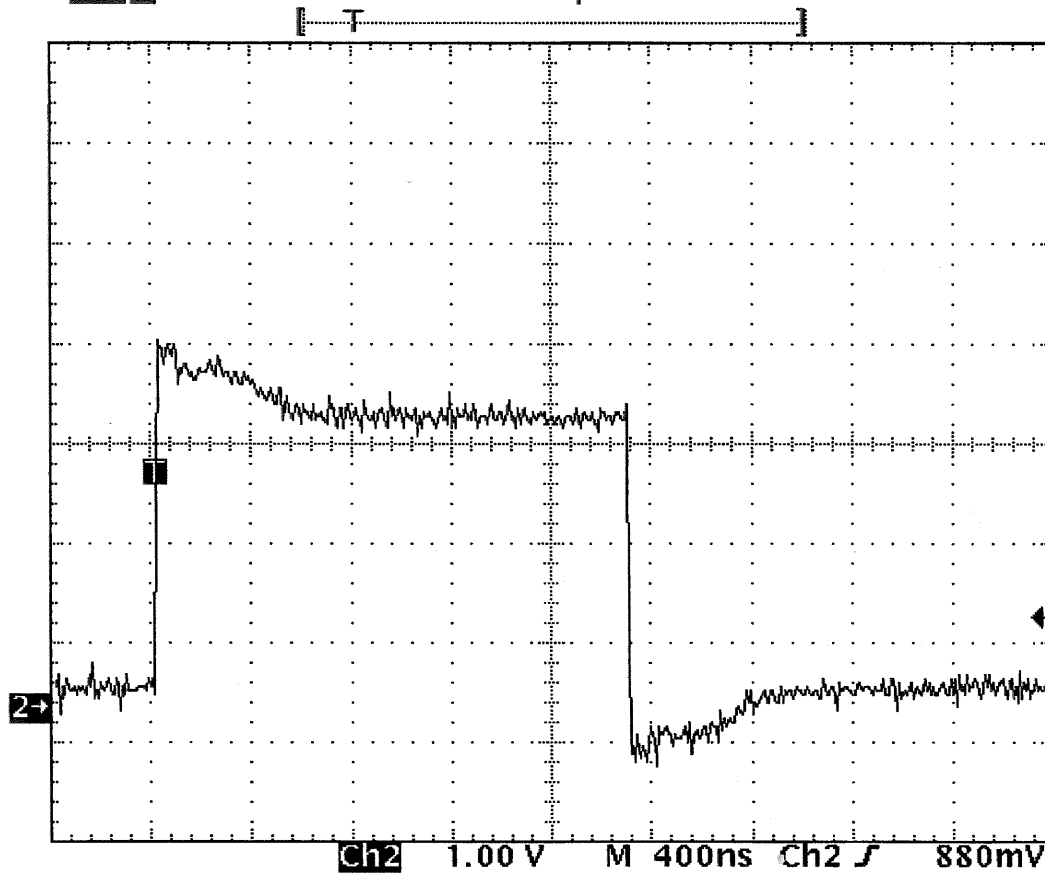
**Paragraph: 6.4 OBDH Clock verification**

| STEP No. | Step Description                                                                                                                                                                                                                              | Required Value                                                               | Actual Value                                                | Conductor Sign | Date    | Remarks             |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------|----------------|---------|---------------------|
| 110      | Measure the pulse analysing the above plot acquired verifying the 4 MHz pulse:<br><br>Pulse Duration:<br>Pulse Period:<br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time:                                                            | 115 to 123 nS<br>230 to 245 nS<br>2 to 6 V<br>-6 to -2 V<br><20 nS<br><20 nS | 120 nSec<br>241 nSec<br>3.6 V<br>-3.6 V<br>7 nSec<br>7 nSec | M              | 15/8/01 | TEH 003<br>21:14:20 |
| 120      | Set the oscilloscope (Trigger level 2 Volts – Positive Slope) in order to record the pulse waveform on the connector XDFEE1 J 06 (XDPE1 side) between the pins:<br><br>14 1 Hz Timing (BCP2) XDFEE1 TRUE<br>47 1 Hz Timing (BCP2) XDFEE1 COMP | OK                                                                           | OK                                                          | M              |         |                     |
| 130      | Measure the pulse analysing the above plot acquired verifying the 1 Hz pulse:<br><br>Pulse Duration:<br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time:                                                                              | 1.50 to 2.50 $\mu$ S<br>2 to 6 V<br>-6 to -2 V<br><20 nS<br><20 nS           | 1.82 $\mu$ Sec<br>3 V<br>-3 V<br>5 nSec<br>5 nSec           | M              |         | TEH 004<br>21:24:03 |



Tek Stop: 125MS/s

9 Acqs



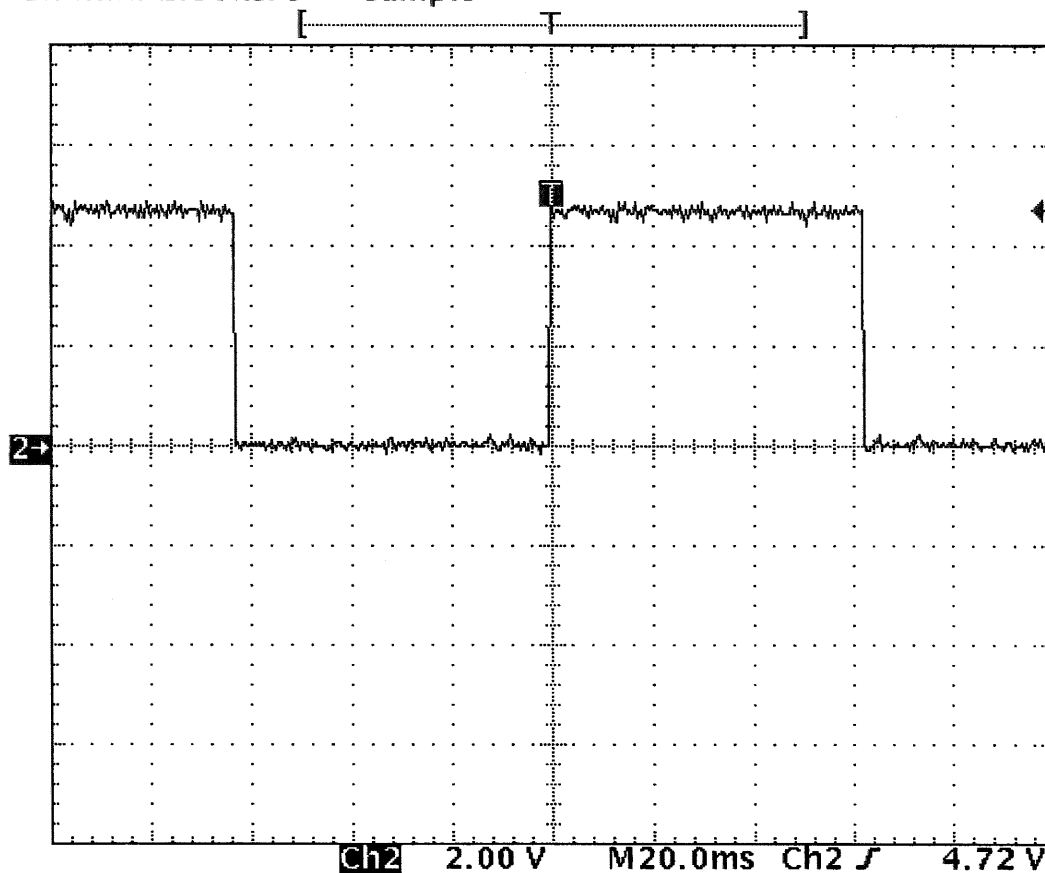
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21:24:03



Paragraph: 6.4 OBDH Clock verification

| STEP No. | Step Description                                                                                                                                                                                                                              | Required Value                                            | Actual Value                                     | Conductor Sign | Date    | Remarks             |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------|----------------|---------|---------------------|
| 140      | Set the oscilloscope (Trigger level 2 Volts – Positive Slope) in order to record the pulse waveform on the connector XDFEE1 J 06 (XDPE1 side) between the pins:<br>15 8 Hz Timing XDFEE1 TRUE<br>48 8 Hz Timing XDFEE1 COMP                   | OK                                                        | OK                                               | MS             | 15/8/01 |                     |
| 150      | Measure the pulse analysing the above plot acquired verifying the 8 Hz pulse:<br>Pulse Duration:<br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time:                                                                                  | 60 to 65 mS<br>2 to 6 V<br>-6 to -2 V<br><20 nS<br><20 nS | 62 msec<br>4.7 V<br>-4.7 V<br>13 nsec<br>13 nsec | MS             |         | TEK 005<br>21:36:24 |
| 160      | Set the oscilloscope (Trigger level 2 Volts – Positive Slope) in order to record the pulse waveform on the connector XDFEE1 J 06 (XDPE1 side) between the pins:<br>16 1/8 Hz Timing (BCP1) XDFEE1 TRUE<br>49 1/8 Hz Timing (BCP1) XDFEE1 COMP | OK                                                        | OK                                               | MS             |         |                     |

Tek Run: 2.50kS/s Sample



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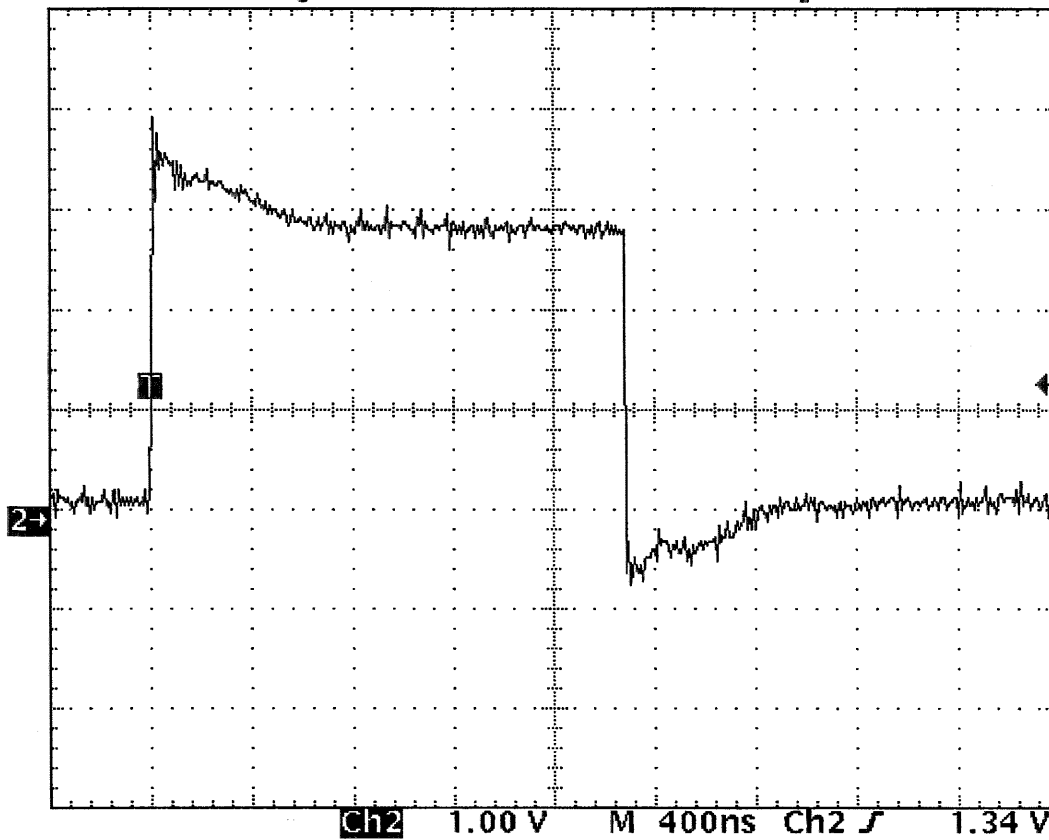
Paragraph: 6.4 OBDH Clock verification

| STEP No. | Step Description                                                                                                                                                   | Required Value                                                     | Actual Value                                          | Conductor Sign | Date    | Remarks            |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------|----------------|---------|--------------------|
| 170      | Measure the pulse analysing the above plot acquired verifying the 1/8 Hz pulse:<br><br>Pulse Duration:<br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time: | 1.50 to 2.50 $\mu$ S<br>2 to 6 V<br>-6 to -2 V<br><20 nS<br><20 nS | 1.92 $\mu$ sec<br>3.0 V<br>-3.0 V<br>6 nsec<br>6 nsec | Mg             | 15/8/01 | TEH006<br>21:45:09 |
| 180      | Deactivate the XDPE1 power supply lines 'A', using the SIS.                                                                                                        | OK                                                                 | OK                                                    | Mg             |         |                    |
| 190      | Deactivate the XDFEE1 power supply lines 'A', using the SIS.                                                                                                       | OK                                                                 | OK                                                    | Mg             |         |                    |

Tek **Stop:** 125MS/s

1 Acqs

[-----]



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21:45:09



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| Paragraph: 6.5 mRTU Analog and Digital Interface verification (JEM-X 1) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |              |                |         |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|
| STEP No.                                                                | Step Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Required Value | Actual Value | Conductor Sign | Date    |
| 10                                                                      | XDPE1/XDFEE1 mRTU analog and digital I/F verification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OK             | OK           | MH             | 15/8/01 |
| 20                                                                      | Test Conditions, Declarations and Setup                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | OK             | OK           | MH             |         |
| 30                                                                      | The measurement will be performed using manual oscilloscope, digital voltmeter, current probe and BOB.                                                                                                                                                                                                                                                                                                                                                                                                                                              | OK             | OK           | MH             |         |
| 40                                                                      | Make sure that the following XDPE1 SIS-PDU/SIS-RTU/OBDH-FEE/unit connectors, savers protected, have been integrated and mated together: <ul style="list-style-type: none"> <li>• XDPE1 J 14 / SIS-PDU (Power Main)</li> <li>• XDPE1 J 15 / SIS-PUD (Power Redundant)</li> <li>• XDPE1 J 20 / SIS-RTU (DC/DC Sec. Control)</li> <li>• XDPE1 J 10 / OBDH-FEE (OBDH Main Bus)</li> <li>• XDPE1 J 11 / OBDH-FEE (OBDH Redundant Bus)</li> <li>• XDPE1 J 12 / XDFEE1 J 06 (OBDH Clock)</li> <li>• XDPE1 04 / XDFEE1 J 04 (mRTU Relay Control)</li> </ul> | OK             | OK           | MH             |         |
| 50                                                                      | Make sure that the following XDFEE1 SIS-PDU/SIS-RTU/unit connectors, savers protected, have been integrated and mated together: <ul style="list-style-type: none"> <li>• XDFEE1 J 07 / SIS-PDU (Power Main)</li> <li>• XDFEE1 J 08 / SIS-PDU (Power Redundant)</li> <li>• XDFEE1 J 05 / SIS-RTU (Commands, Thermistors RTU)</li> </ul>                                                                                                                                                                                                              | OK             | OK           | MH             |         |

Remarks





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Paragraph: 6.5 mRTU Analog and Digital Interface verification (JEM-X 1)

| STEP<br>No. | Step Description                                                                                                                                                                                                                                                         | Required<br>Value | Actual<br>Value | Conductor<br>Sign | Date    | Remarks |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------|-------------------|---------|---------|
| 60          | Verify the presence or insert a <b>BOB #2</b> without jumpers between the following Units connectors, saver protected (remember to don't remove the savers): <ul style="list-style-type: none"><li>• <b>XDPE1 J 06 / XDPEE1 J 04 (mRTU Analog Acquisition)</b></li></ul> | OK                | OK              | Mh                | 15/8/01 |         |
| 70          | Verify the presence or insert a <b>BOB #3</b> without jumpers between the following Units connectors, saver protected (remember to don't remove the savers): <ul style="list-style-type: none"><li>• <b>XDPEE1 J 04 / XDPE1 J 06 (Housekeeping XDPE1)</b></li></ul>      | OK                | OK              | Mh                | 15/8/01 |         |

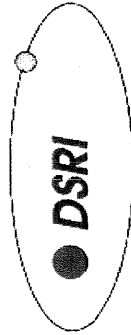


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Paragraph: 6.5.1 mRTU Analog and Digital Interface verification – Unconnected check

| STEP No. | Step Description                                                                                                                                                                                                                                                                                                                                                                                                                                              | Required Value | Actual Value | Conductor Sign | Date    | Remarks |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|---------|
| 10       | XDPE1/XDFEE1 mRTU analog and digital I/F verification – XDPE1 side                                                                                                                                                                                                                                                                                                                                                                                            | OK             | OK           | Mh             | 15/8/01 |         |
| 20       | Test Conditions, Declarations and Setup                                                                                                                                                                                                                                                                                                                                                                                                                       | OK             | OK           | Mh             |         |         |
| 30       | The measurement will be performed using manual oscilloscope, digital voltmeter, current probe and BOB.                                                                                                                                                                                                                                                                                                                                                        | OK             | OK           | Mh             |         |         |
| 40       | Verify the presence or insert jumpers into the BOB #2 on XDPE1 J 06 side on pins:<br><br>34 Thermistor 0 XDFEE1 SIG<br>35 Thermistor 0 XDFEE1 RTN<br>36 Thermistor 1 XDFEE1 SIG<br>37 Thermistor 1 XDFEE1 RTN<br>38 Thermistor 2 XDFEE1 SIG<br>39 Thermistor 2 XDFEE1 RTN<br>40 Thermistor 3 XDFEE1 SIG<br>41 Thermistor 3 XDFEE1 RTN<br>42 Thermistor 4 XDFEE1 SIG<br>43 Thermistor 4 XDFEE1 RTN<br>44 Thermistor 5 XDFEE1 SIG<br>45 Thermistor 5 XDFEE1 RTN | OK             | OK           | Mh             |         |         |
| 50       | Activate the XDPE1 power supply lines 'A', using the SIS.                                                                                                                                                                                                                                                                                                                                                                                                     | OK             | OK           | Mh             |         |         |
| 60       | Activate the XDFEE1 power supply lines 'A' using the SIS.                                                                                                                                                                                                                                                                                                                                                                                                     | OK             | OK           | Mh             |         |         |

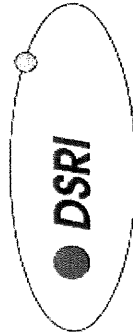


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Paragraph: 6.5.1 mRTU Analog and Digital Interface verification – Unconnected check

| STEP No. | Step Description                                                                                                                                                    | Required Value          | Actual Value | Conductor Sign | Date    | Remarks |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------|----------------|---------|---------|
| 70       | Using digital voltmeter measure the Voltage on the connector XDFEE1 J 04 (XDPE1 side) between the pins:<br>13 Thermistor 0 XDFEE1 SIG<br>14 Thermistor 0 XDFEE1 RTN | Min 9.9 V<br>Max 10.1 V | 9.98 V       | MS             | 15/8/01 |         |
| 80       | Using digital voltmeter measure the Voltage on the connector XDFEE1 J 04 (XDPE1 side) between the pins:<br>30 Thermistor 1 XDFEE1 SIG<br>31 Thermistor 1 XDFEE1 RTN | Min 9.9 V<br>Max 10.1 V | 9.99 V       | MS             |         |         |
| 90       | Using digital voltmeter measure the Voltage on the connector XDFEE1 J 04 (XDPE1 side) between the pins:<br>42 Thermistor 2 XDFEE1 SIG<br>43 Thermistor 2 XDFEE1 RTN | Min 9.9 V<br>Max 10.1 V | 9.99 V       | MS             |         |         |
| 100      | Using digital voltmeter measure the Voltage on the connector XDFEE1 J 04 (XDPE1 side) between the pins:<br>15 Thermistor 3 XDFEE1 SIG<br>16 Thermistor 3 XDFEE1 RTN | Min 9.9 V<br>Max 10.1 V | 9.99 V       | MS             |         |         |
| 110      | Using digital voltmeter measure the Voltage on the connector XDFEE1 J 04 (XDPE1 side) between the pins:<br>44 Thermistor 4 XDFEE1 SIG<br>45 Thermistor 4 XDFEE1 RTN | Min 9.9 V<br>Max 10.1 V | 9.99 V       | MS             |         |         |



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**Paragraph: 6.5.1 mRTU Analog and Digital Interface verification – Unconnected check**

| STEP No. | Step Description                                                                                                                                                                                                                        | Required Value          | Actual Value | Conductor Sign | Date    | Remarks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------|----------------|---------|---------|
| 120      | Using digital voltmeter measure the Voltage on the connector <b>XDFEE1 J 04</b> (XDPE1 side) between the pins:<br>46 Thermistor 5 XDFEE1 SIG<br>47 Thermistor 5 XDFEE1 RTN                                                              | Min 9.9 V<br>Max 10.1 V | 9.98 V       | MH             | 15/8/01 |         |
| 130      | Set the oscilloscope (Trigger level 6 Volt – Positive Slope) in order to record the CMD-pulse waveform on the connector <b>XDFEE1 J 04</b> (XDPE1 side) between the pins:<br>48 XDPE1 HVC OFF XDFEE1 SIG<br>49 XDPE1 HVC OFF XDFEE1 RTN | OK                      | OK           | MH             |         |         |
| 140      | Deactivate the XDPE1 power supply lines 'A', using the SIS.                                                                                                                                                                             | OK                      | OK           | MH             |         |         |
| 150      | Deactivate the XDFEE1 power supply lines 'A', using the SIS.                                                                                                                                                                            | OK                      | OK           | MH             |         |         |





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Paragraph: 6.5.2 mRTU Analog and Digital Interface verification - Connected check

| STEP No. | Step Description                                                                                                                                                                                                                                                                                                                | Required Value | Actual Value | Conductor Sign | Date    | Remarks |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|---------|
| 10       | XDPE1/XDFEE1 mRTU analog and digital I/F verif. - XDFEE1 side                                                                                                                                                                                                                                                                   | OK             | OK           | MH             | 15/9/01 |         |
| 20       | Test Conditions, Declarations and Setup                                                                                                                                                                                                                                                                                         | OK             | OK           | MH             |         |         |
| 30       | The measurement will be performed using manual oscilloscope, digital voltmeter, current probe and BOB.                                                                                                                                                                                                                          | OK             | OK           | MH             |         |         |
| 40       | Make sure that a BOB #2 and #3 is inserted between the following Units connectors, savers protected, with no jumper mounted: <ul style="list-style-type: none"> <li>• XDPE1 J 06 / XDFEE1 J 04 (mRTU An. Acquisit.) &gt;&gt;&gt; BOB #2</li> <li>• XDFEE1 J 04 / XDPE1 J 06 (Housekeeping XDPE1) &gt;&gt;&gt; BOB #3</li> </ul> | OK             | OK           | MH             |         |         |



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| Paragraph: 6.5.2 mRTU Analog and Digital Interface verification – Connected check |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |              |                |         |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|
| STEP No.                                                                          | Step Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Required Value | Actual Value | Conductor Sign | Date    |
| 50                                                                                | Verify the presence or insert jumpers into the BOB #2 on XDPE1 J 06 side on pins:<br><br>02 +5 V Digital Monitor (AN0) SIG<br>18 +5 V Digital Monitor (AN0) RTN<br>03 +5 V Current Monitor (AN1) SIG<br>19 +5 V Current Monitor (AN1) RTN<br>04 +5 V Analog Monitor (AN2) SIG<br>20 +5 V Analog Monitor (AN2) RTN<br>05 -5 V Analog Monitor (AN3) SIG<br>21 -5 V Analog Monitor (AN3) RTN<br>06 +12 V Analog Monitor (AN4) SIG<br>22 +12 V Analog Monitor (AN4) RTN<br>07 +12 V Current Monitor (AN5) SIG<br>23 +12 V Current Monitor (AN5) RTN<br>08 -12 V Analog Monitor (AN6) SIG<br>24 -12 V Analog Monitor (AN6) RTN<br>09 -12 V Current Monitor (AN7) SIG<br>25 -12 V Current Monitor (AN7) RTN<br>10 Pressure Monitor 1 (AN8) SIG<br>26 Pressure Monitor 1 (AN8) RTN<br>11 Pressure Monitor 2 (AN9) SIG<br>27 Pressure Monitor 2 (AN9) RTN<br>12 Detector Temp. 1 (AN10) SIG<br>28 Detector Temp. 1 (AN10) RTN | OK             | OK           | Mh             | 15/8/01 |
|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |              |                |         |



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| Paragraph: 6.5.2 mRTU Analog and Digital Interface verification – Connected check |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |              |                |         |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|
| STEP No.                                                                          | Step Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Required Value | Actual Value | Conductor Sign | Date    |
| 60                                                                                | 13 Detector Temp. 2 (AN11) SIG<br>29 Detector Temp. 2 (AN11) RTN<br>14 HF FIFO FLAG XDFFEE1 SIG<br>30 HF FIFO FLAG XDFFEE1 RTN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | OK             | OK           | nh             | 15/8/01 |
| 70                                                                                | Verify the presence or insert jumpers into the BOB #3 on XDFFEE1 J 04 side on pins:<br><br>01 +5 V Digital Monitor (AN0) SIG<br>18 +5 V Digital Monitor (AN0) RTN<br>02 +5 V Current Monitor (AN1) SIG<br>19 +5 V Current Monitor (AN1) RTN<br>03 +5 V Analog Monitor (AN2) SIG<br>20 +5 V Analog Monitor (AN2) RTN<br>04 -5 V Analog Monitor (AN3) SIG<br>21 -5 V Analog Monitor (AN3) RTN<br>05 +12 V Analog Monitor (AN4) SIG<br>22 +12 V Analog Monitor (AN4) RTN<br>06 +12 V Current Monitor (AN5) SIG<br>23 +12 V Current Monitor (AN5) RTN<br>07 -12 V Analog Monitor (AN6) SIG<br>24 -12 V Analog Monitor (AN6) RTN<br>08 -12 V Current Monitor (AN7) SIG<br>25 -12 V Current Monitor (AN7) RTN | OK             | OK           | nh             |         |



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| Paragraph: 6.5.2 mRTU Analog and Digital Interface verification - Connected check |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |              |                |         |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|
| STEP No.                                                                          | Step Description                                                                                                                                                                                                                                                                                                                                                                                                                                               | Required Value | Actual Value | Conductor Sign | Date    |
| 80                                                                                | 09 Pressure Monitor 1 (AN8) SIG<br>26 Pressure Monitor 1 (AN8) RTN<br>10 Pressure Monitor 2 (AN9) SIG<br>27 Pressure Monitor 2 (AN9) RTN<br>11 Detector Temp. 1 (AN10) SIG<br>28 Detector Temp. 1 (AN10) RTN<br>12 Detector Temp. 2 (AN11) SIG<br>29 Detector Temp. 2 (AN11) RTN<br>34 HF FIFO FLAG XDFEE1 SIG<br>35 HF FIFO FLAG XDFEE1 RTN                                                                                                                   | OK             | OK           | Mh             | 15/8/01 |
| 90                                                                                | Verify the presence or insert jumpers into the BOB #3 on XDFEE1 J 04 side on pins:<br><br>13 Thermistor 0 XDFEE1 SIG<br>14 Thermistor 0 XDFEE1 RTN<br>30 Thermistor 1 XDFEE1 SIG<br>31 Thermistor 1 XDFEE1 RTN<br>42 Thermistor 2 XDFEE1 SIG<br>43 Thermistor 2 XDFEE1 RTN<br>15 Thermistor 3 XDFEE1 SIG<br>16 Thermistor 3 XDFEE1 RTN<br>44 Thermistor 4 XDFEE1 SIG<br>45 Thermistor 4 XDFEE1 RTN<br>46 Thermistor 5 XDFEE1 SIG<br>47 Thermistor 5 XDFEE1 RTN | OK             | OK           | Mh             |         |



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| Paragraph: 6.5.2 mRTU Analog and Digital Interface verification – Connected check |                                                                                                                                                                                                           |                      |              |                |          |                                                                                        |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------|----------------|----------|----------------------------------------------------------------------------------------|
| STEP No.                                                                          | Step Description                                                                                                                                                                                          | Required Value       | Actual Value | Conductor Sign | Date     | Remarks                                                                                |
| 100                                                                               | If any of the previous <b>BOB #1, #2 and #3</b> are not inserted then verify or perform the switching off of the <b>XDPE1</b> and <b>XDFEE1</b> by means of the <b>SIS User Manual</b> procedure.         | OK                   | OK           | MS             | 18/08/21 |                                                                                        |
| 110                                                                               | Insert the above <b>BOB #1, #2 and #3</b> , if not already inserted, without removing the savers.                                                                                                         | OK                   | OK           | MS             |          |                                                                                        |
| 120                                                                               | Verify or perform the switching on of the <b>XDPE1</b> and <b>XDFEE1</b> following the <b>SIS User Manual</b> procedure.                                                                                  | OK                   | OK           | MS             |          |                                                                                        |
| 130                                                                               | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>02</b> +5 V Digital Monitor (AN0) SIG<br><b>18</b> +5 V Digital Monitor (AN0) RTN | Min 0 V<br>Max 5.1 V | 3.97 V       | MS             |          | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 140                                                                               | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>03</b> +5 V Current Monitor (AN1) SIG<br><b>19</b> +5 V Current Monitor (AN1) RTN | Min 0 V<br>Max 5.1 V | 1.29 V       | MS             |          | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 150                                                                               | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>04</b> +5 V Analog Monitor (AN2) SIG<br><b>20</b> +5 V Analog Monitor (AN2) RTN   | Min 0 V<br>Max 5.1 V | 3.85 V       | MS             |          | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |



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| Paragraph: 6.5.2 mRTU Analog and Digital Interface verification – Connected check |                  |                |              |                |      |         |
|-----------------------------------------------------------------------------------|------------------|----------------|--------------|----------------|------|---------|
| STEP No.                                                                          | Step Description | Required Value | Actual Value | Conductor Sign | Date | Remarks |

|     |                                                                                                                                                                                                             |                      |        |    |         |                                                                                        |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------|----|---------|----------------------------------------------------------------------------------------|
| 160 | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>05</b> -5 V Analog Monitor (AN3) SIG<br><b>21</b> -5 V Analog Monitor (AN3) RTN     | Min 0 V<br>Max 5.1 V | 4.16 V | mg | 15/8/21 | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 170 | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>06</b> +12 V Analog Monitor (AN4) SIG<br><b>22</b> +12 V Analog Monitor (AN4) RTN   | Min 0 V<br>Max 5.1 V | 3.91 V | mg |         | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 180 | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>07</b> +12 V Current Monitor (AN5) SIG<br><b>23</b> +12 V Current Monitor (AN5) RTN | Min 0 V<br>Max 5.1 V | 2.90 V | mg |         | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 190 | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>08</b> -12 V Analog Monitor (AN6) SIG<br><b>24</b> -12 V Analog Monitor (AN6) RTN   | Min 0 V<br>Max 5.1 V | 3.95 V | mg |         | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 200 | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>09</b> -12 V Current Monitor (AN7) SIG<br><b>25</b> -12 V Current Monitor (AN7) RTN | Min 0 V<br>Max 5.1 V | 2.83 V | mg |         | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |



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**Paragraph: 6.5.2 mRTU Analog and Digital Interface verification - Connected check**

| STEP No. | Step Description                                                                                                                                                                                      | Required Value       | Actual Value | Conductor Sign | Date    | Remarks                                                                                |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------|----------------|---------|----------------------------------------------------------------------------------------|
| 210      | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>10</b> Pressure Monitor 1 (AN8) SIG<br><b>26</b> Pressure Monitor 1 (AN8) RTN | Min 0 V<br>Max 5.1 V | 0.485V       | MH             | 15/8/01 | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 220      | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>11</b> Pressure Monitor 2 (AN9) SIG<br><b>27</b> Pressure Monitor 2 (AN9) RTN | Min 0 V<br>Max 5.1 V | 0.350V       | MH             |         | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 230      | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>12</b> Detector Temp. 1 (AN10) SIG<br><b>28</b> Detector Temp. 1 (AN10) RTN   | Min 0 V<br>Max 5.1 V | 2.66 V       | MH             |         | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 240      | Using digital voltmeter measure the voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>13</b> Detector Temp. 2 (AN11) SIG<br><b>29</b> Detector Temp. 2 (AN11) RTN   | Min 0 V<br>Max 5.1 V | 2.66 V       | MH             |         | Verify that the raw format read on the OBDH FEE, represents the voltage value measured |
| 250      | Using digital voltmeter measure the Voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br><b>14</b> HF FIFO FLAG XDFFEE1 SIG<br><b>30</b> HF FIFO FLAG XDFFEE1 RTN         | Min 0 V<br>Max 5.5 V | 2.4 V        | MH             |         |                                                                                        |



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Paragraph: 6.5.2 mRTU Analog and Digital Interface verification – Connected check

| STEP No. | Step Description                                                                                                                                                | Required Value         | Actual Value | Conductor Sign | Date    | Remarks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|----------------|---------|---------|
| 260      | Using digital voltmeter measure the Voltage on the BOB #2 on connector XDPE1 J 06 between the pins:<br>34 Thermistor 0 XDFEE1 SIG<br>35 Thermistor 0 XDFEE1 RTN | Min 75 mV<br>Max 4.5 V | 2.91 V       | M4             | 15/8/01 |         |
| 270      | Using digital voltmeter measure the Voltage on the BOB #2 on connector XDPE1 J 06 between the pins:<br>36 Thermistor 1 XDFEE1 SIG<br>37 Thermistor 1 XDFEE1 RTN | Min 75 mV<br>Max 4.5 V | 2.65 V       | M4             |         |         |
| 280      | Using digital voltmeter measure the Voltage on the BOB #2 on connector XDPE1 J 06 between the pins:<br>38 Thermistor 2 XDFEE1 SIG<br>39 Thermistor 2 XDFEE1 RTN | Min 75 mV<br>Max 4.5 V | 2.66 V       | M4             |         |         |
| 290      | Using digital voltmeter measure the Voltage on the BOB #2 on connector XDPE1 J 06 between the pins:<br>40 Thermistor 3 XDFEE1 SIG<br>41 Thermistor 3 XDFEE1 RTN | Min 75 mV<br>Max 4.5 V | 2.51 V       | M4             |         |         |
| 300      | Using digital voltmeter measure the Voltage on the BOB #2 on connector XDPE1 J 06 between the pins:<br>42 Thermistor 4 XDFEE1 SIG<br>43 Thermistor 4 XDFEE1 RTN | Min 75 mV<br>Max 4.5 V | 2.78 V       | M4             |         |         |





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**Paragraph: 6.5.2 mRTU Analog and Digital Interface verification – Connected check**

| STEP No. | Step Description                                                                                                                                                                                                                                                                                                                                                  | Required Value         | Actual Value | Conductor Sign | Date    | Remarks |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|----------------|---------|---------|
| 310      | Using digital voltmeter measure the Voltage on the <b>BOB #2</b> on connector <b>XDPE1 J 06</b> between the pins:<br>44 Thermistor 5 XDFFEE1 SIG<br>45 Thermistor 5 XDFFEE1 RTN                                                                                                                                                                                   | Min 75 mV<br>Max 4.5 V | 2.82 v       | M4             | 15/8/01 |         |
| 320      | Deactivate the XDPE1 power supply lines 'A', using the SIS.                                                                                                                                                                                                                                                                                                       | OK                     | OK           | M4             |         |         |
| 330      | Deactivate the XDFFEE1 power supply lines 'A', using the SIS.                                                                                                                                                                                                                                                                                                     | OK                     | OK           | M4             |         |         |
| 340      | Disconnect the <b>BOB #2</b> and <b>#3</b> between the following Units connectors, saver protected, and mate them together (don't remove the savers):<br><ul style="list-style-type: none"> <li>• XDPE1 J 06 / XDFFEE1 J 04(mRTU Analog Acquisition) &gt;&gt;&gt; BOB #2</li> <li>• XDFFEE1 J 04 / XDPE1 J 06 (Housekeeping XDPE1) &gt;&gt;&gt; BOB #3</li> </ul> | OK                     | OK           | M4             |         |         |



Paragraph: 6.6 Low Speed Serial Line Verification (JEM-X 1) – Test Conditions, Declarations and Setup

| STEP No. | Step Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Required Value | Actual Value | Conductor Sign | Date    | Remarks |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|---------|
| 10       | XDPE1/XDFEE1 I/F - Low Speed Serial Line                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | OK             | OK           | MS             | 15/8/01 |         |
| 20       | Test Conditions, Declarations and Setup                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | OK             | OK           | MS             |         |         |
| 30       | The measurement will be performed using manual oscilloscope, digital voltmeter, current probe and BOB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | OK             | OK           | MS             |         |         |
| 40       | Make sure that the following XDPE1 SIS-PDU/SIS-RTU/OBDH-FEE/unit connectors, savers protected, have been integrated and mated together: <ul style="list-style-type: none"> <li>• XDPE1 J 14 / SIS-PDU (Power Main)</li> <li>• XDPE1 J 15 / SIS-PDU (Power Redundant)</li> <li>• XDPE1 J 20 / SIS-RTU (DC/DC Sec. Control)</li> <li>• XDPE1 J 10 / OBDH-FEE (OBDH Main Bus)</li> <li>• XDPE1 J 11 / OBDH-FEE (OBDH Redundant Bus)</li> <li>• XDPE1 J 12 / XDFEE1 J 06 (OBDH Clock)</li> <li>• XDPE1 J 04 / XDFEE1 J 04 (mRTU Relay Control)</li> <li>• XDPE1 J 06 / XDFEE1 J 04 (mRTU Analog Acquisition)</li> </ul> | OK             | OK           | MS             |         |         |
| 50       | Make sure that the following XDFEE1 SIS-PDU/SIS-RTU/unit connectors, savers protected, have been integrated and mated together: <ul style="list-style-type: none"> <li>• XDFEE1 J 07 / SIS-PDU (Power Main)</li> <li>• XDFEE1 J 08 / SIS-PDU (Power Redundant)</li> <li>• XDFEE1 J 05 SIS-RTU (Commands, Thermistors RTU)</li> <li>• XDFEE1 J 04 / XDPE1 J 06 (Housekeeping XDPE1)</li> </ul>                                                                                                                                                                                                                       | OK             | OK           | MS             |         |         |



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| Paragraph: 6.6 Low Speed Serial Line Verification (JEM-X 1) – Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                                         |                |              |                |         |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|
| STEP No.                                                                                              | Step Description                                                                                                                                                                                                                                                                        | Required Value | Actual Value | Conductor Sign | Date    |
| 60                                                                                                    | Verify the presence or insert a <b>BOB #1</b> without jumpers between the following Units connectors, saver protected (remember to don't remove the savers):<br><ul style="list-style-type: none"><li>• XDPE1 J 02 / XDFEE1 J 06 (Low Speed Line) &gt;&gt;&gt; BOB #1</li></ul>         | OK             | OK           | MH             | 15/8/01 |
| 70                                                                                                    | Make sure that the following jumpers are inserted into the <b>BOB #1</b> on <b>XDPE1 J 02</b> side on pins:<br><br>05 LS CLK XDFEE1 (CLK0+)<br>38 LS CLK XDFEE1 (CLK0-)<br>01 LS FWD XDFEE1 (DTF0+)<br>18 LS FWD XDFEE1 (DTF0-)<br>02 LS RTN XDFEE1 (DTR0+)<br>19 LS RTN XDFEE1 (DTR0-) | OK             | OK           | MH             |         |
| 80                                                                                                    | If any of the previous <b>BOB #1</b> are not inserted then verify or perform the switching off of the XDPE1 and XDFEE1 by means of the SIS User Manual procedure.                                                                                                                       | OK             | OK           | MH             |         |
| 90                                                                                                    | Insert the above BOB #1, if not already inserted, without removing the savers                                                                                                                                                                                                           | OK             | OK           | MH             |         |
| 100                                                                                                   | Verify or perform the switching on of the XDPE1 and XDFEE1 following the SIS User Manual procedure.                                                                                                                                                                                     | OK             | OK           | MH             |         |
| 110                                                                                                   | <b>Low Speed Serial Line: Measurements (DTF, CKL)</b>                                                                                                                                                                                                                                   | OK             | OK           | MH             |         |

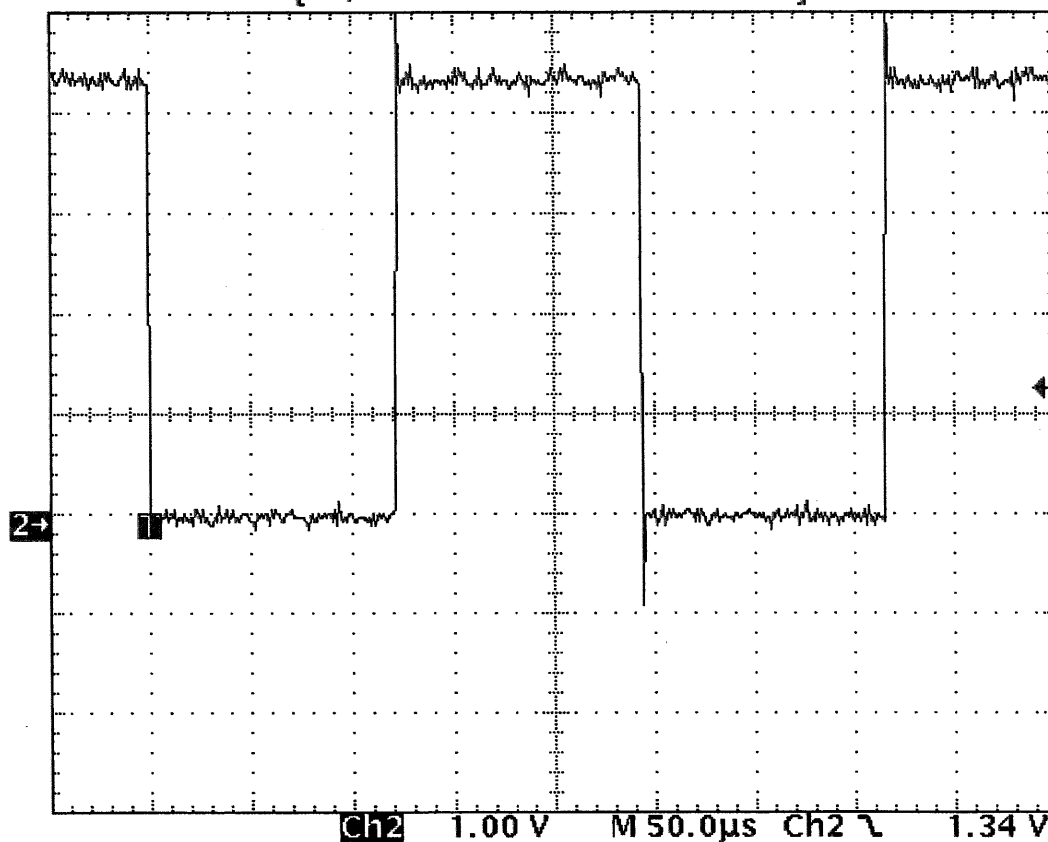


| Paragraph: 6.6 Low Speed Serial Line Verification (JEM-X 1) – Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                      |                                                                                                |                                                                         |                |                     |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------|---------------------|
| STEP No.                                                                                              | Step Description                                                                                                                                                                                                                     | Required Value                                                                                 | Actual Value                                                            | Conductor Sign | Date                |
| 120                                                                                                   | Set the oscilloscope in order to record the waveform on the Clock Channel:<br>Connect the probe on <del>XDPE1 J02</del> on the following pins:<br><del>XDPE1 J06</del><br>10 05 LS CLK XDFEE1 (CLK0+)<br>43 38 LS CLK XDFEE1 (CLK0-) | OK                                                                                             | OK                                                                      | M4             | 15/8/01             |
| 130                                                                                                   | Measure the Clock Waveform analysing the above plot acquired:<br><br>Pulse Duration:<br>Pulse Period:<br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time:                                                                    | 100 to 200 $\mu$ S<br>200 to 400 $\mu$ S<br>2 to 6 V<br>-6 to -2 V<br><2 $\mu$ S<br><2 $\mu$ S | 120 $\mu$ sec<br>241 $\mu$ sec<br>4.4 V<br>-4.4 V<br>20 nsec<br>20 nsec | M4             | TEK 007<br>21:50:56 |
| 140                                                                                                   | Set the oscilloscope in order to record the waveform on the DTF Channel:<br>Connect the probe on <del>XDPE1 J02</del> on the following pins:<br><del>XDPE1 J06</del><br>8 01 LS FWD XDFEE1 (DTF0+)<br>41 18 LS FWD XDFEE1 (DTF0-)    | OK                                                                                             | OK                                                                      | M4             |                     |
| 150                                                                                                   | Measure the DTF Waveform analysing the above plot acquired:<br><br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time:                                                                                                          | 2 to 6 V<br>-6 to -2 V<br><2 $\mu$ S<br><2 $\mu$ S                                             | 4.4 V<br>-4.4 V<br>20 nsec<br>20 nsec                                   | M4             | TEK 008<br>22:00:33 |

Tek Stop: 1.00MS/s

184 Acqs

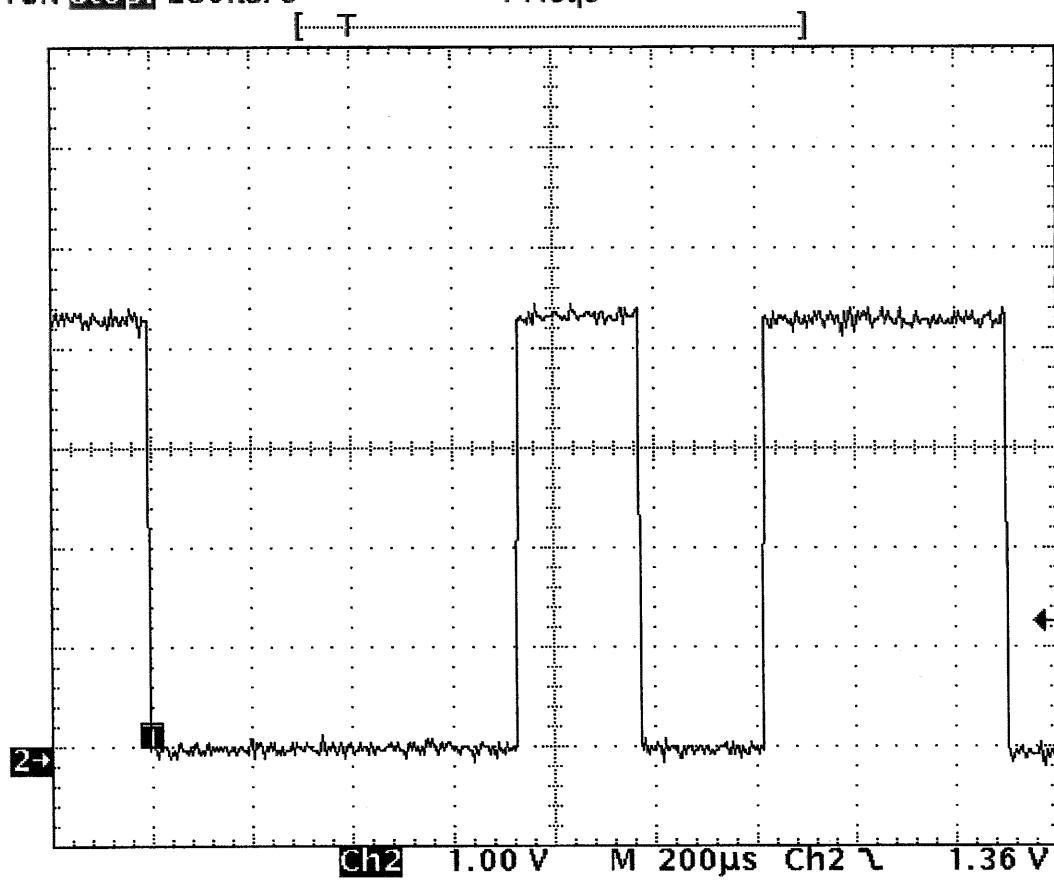
[ T ]



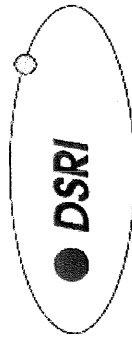
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21:50:56

Tek **Stop** 250kS/s

4 Acqs



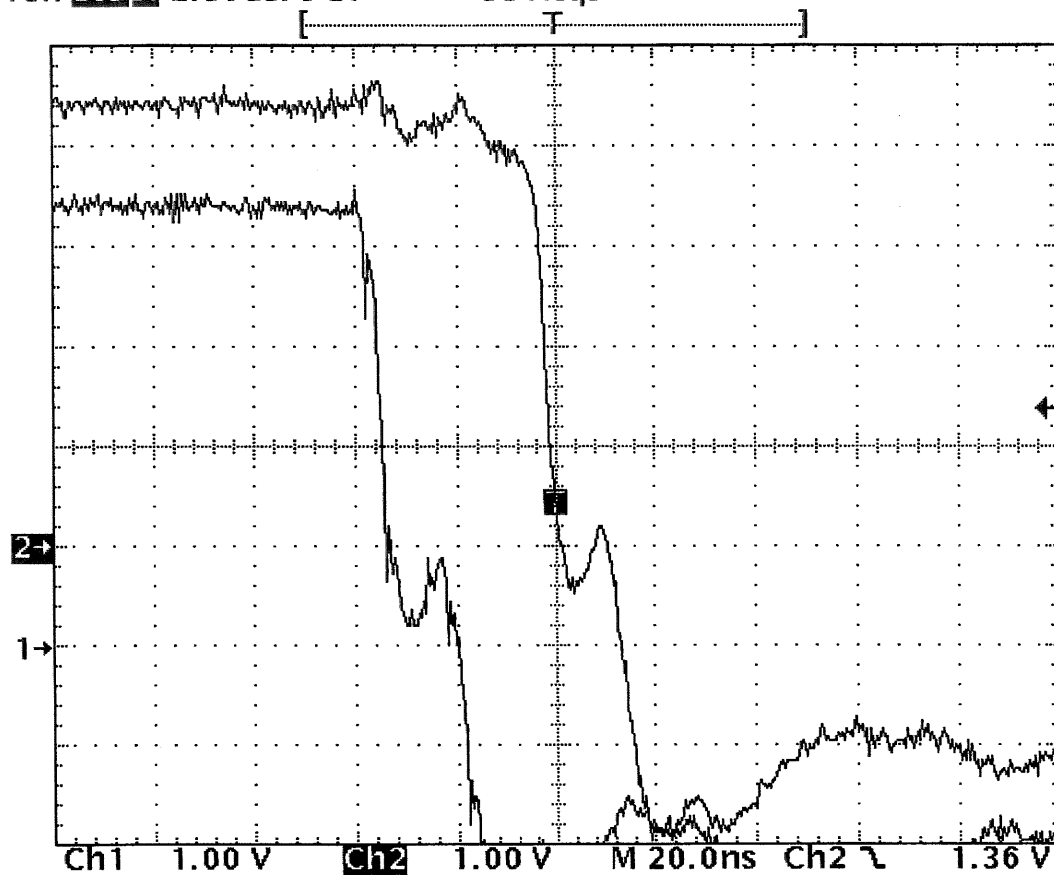
15 Aug 2001  
22:00:33



| Paragraph: 6.6 Low Speed Serial Line Verification (JEM-X 1) – Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |                                     |                |                     |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|----------------|---------------------|
| STEP No.                                                                                              | Step Description                                                                                                                                                                                                                                                                                                                                                                                                                         | Required Value                                     | Actual Value                        | Conductor Sign | Date                |
| 160                                                                                                   | Set the oscilloscope in order to record the time relation between the following lines (DTF / CLKL): <del>0554 J06</del><br>Connect the probe1 on <del>XDPE1 J02</del> on the following pins:<br>8 <del>01</del> LS FWD XDFEE1 (DTF0+)<br>41 <del>18</del> LS FWD XDFEE1 (DTF0-)<br>Connect the probe2 on <del>XDPE1 J02</del> on the following pins:<br>10 <del>05</del> LS CLK XDFEE1 (CLK0+)<br>43 <del>38</del> LS CLK XDFEE1 (CLK0-) | OK                                                 | OK                                  | M4             | 15/8/01             |
| 170                                                                                                   | Measure the timing relation between DTF and CLK analysing the above plot acquired.                                                                                                                                                                                                                                                                                                                                                       | < 2 $\mu$ S                                        | 40 nsec                             | M4             | TEK 009<br>22:10:06 |
| 180                                                                                                   | Set the oscilloscope in order to record the waveform on the DTR Channel:<br>Connect the probe on <del>XDPE1 J02</del> on the following pins:<br><del>XDPE1 J06</del><br>7 <del>02</del> LS RTN XDFEE1 (DTR0+)<br>10 <del>19</del> LS RTN XDFEE1 (DTR0-)                                                                                                                                                                                  | OK                                                 | OK                                  | M4             | TEK 009<br>22:08:27 |
| 190                                                                                                   | Measure the DTR Waveform analysing the above plot acquired:<br><br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time:                                                                                                                                                                                                                                                                                                              | 2 to 6 V<br>-6 to -2 V<br><2 $\mu$ S<br><2 $\mu$ S | 4.5 V<br>-4.4 V<br>6 nsec<br>6 nsec | M4             | TEK 011<br>22:14:53 |

Tek **Stop:** 2.50GS/s ET

33 Acqs

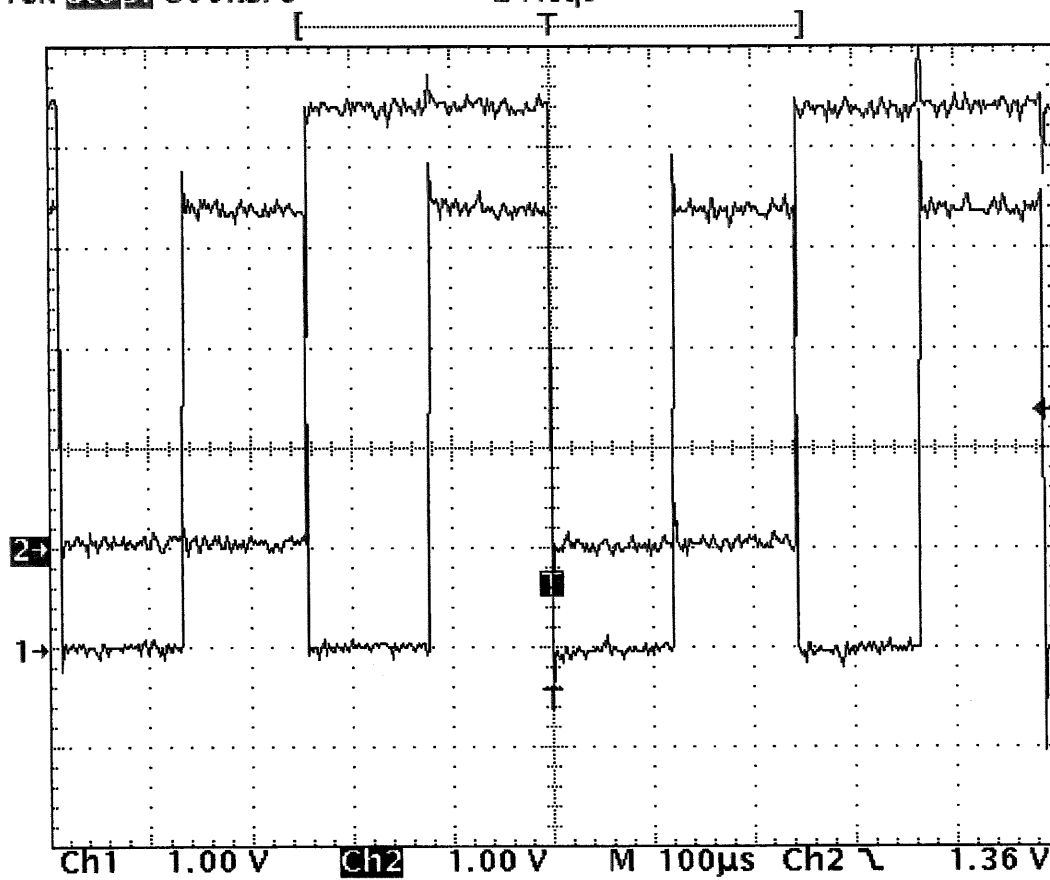


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22:08:27



Tek Stop: 500ks/s

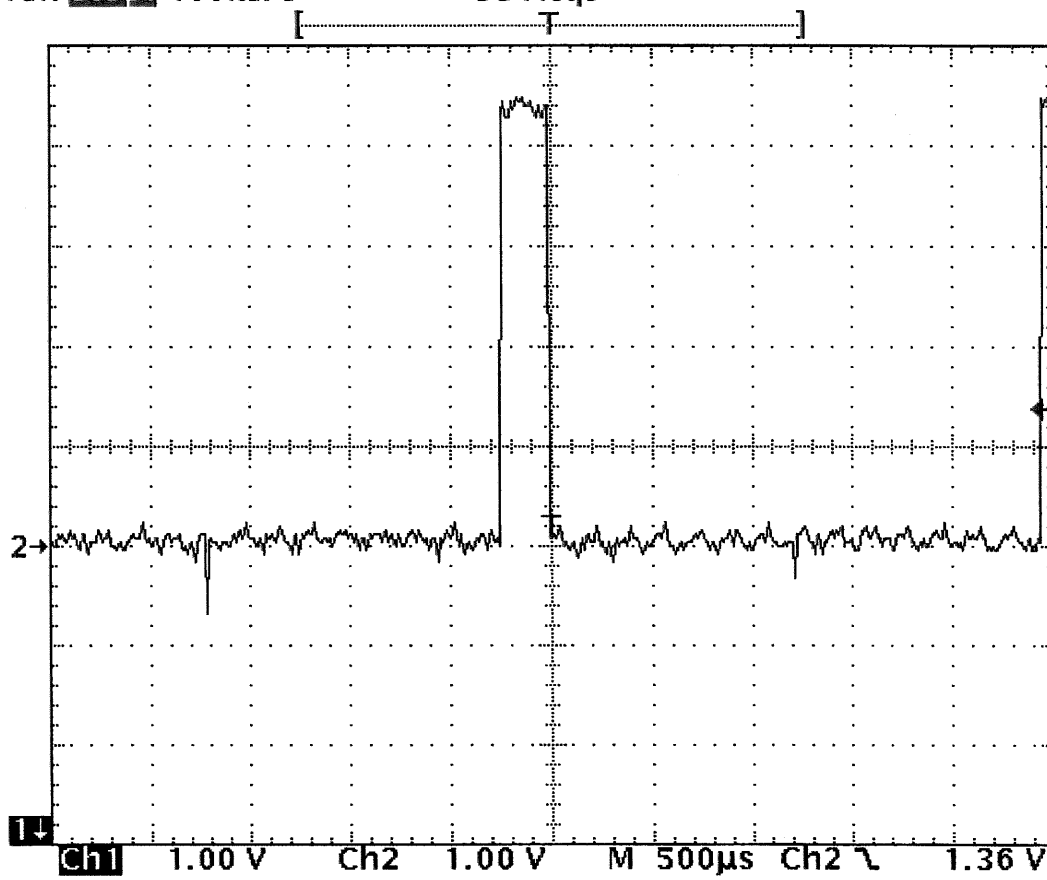
2 Acqs



15 Aug 2001  
22:10:06

Tek **Stop:** 100kS/s

33 Acqs



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22:14:53



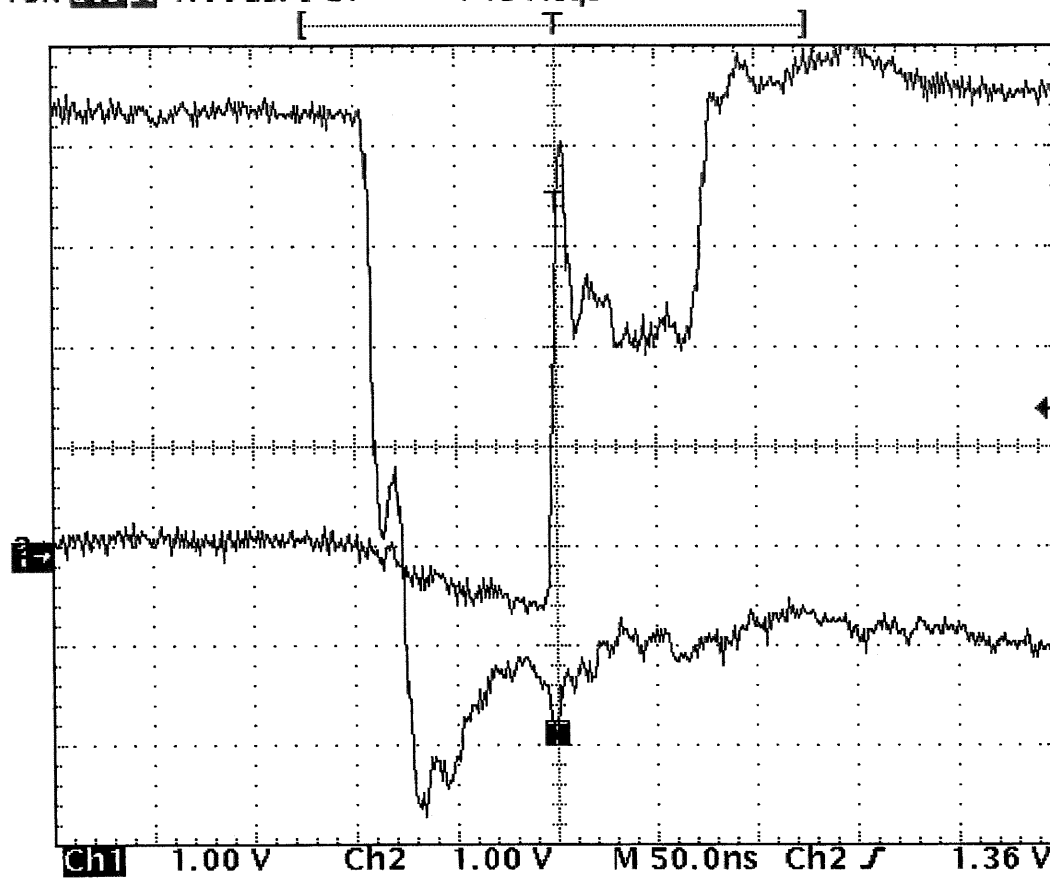
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Paragraph: 6.6 Low Speed Serial Line Verification (JEM-X 1) – Test Conditions, Declarations and Setup

| STEP No. | Step Description                                                                                                                                                                                                                                                                                                                                                                                                                         | Required Value | Actual Value | Conductor Sign | Date    | Remarks             |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|---------------------|
| 200      | Set the oscilloscope in order to record the time relation between the following lines (DTR / CLK): <del>DFEE1 J06</del><br>Connect the probe1 on <del>XDPE1 J02</del> on the following pins:<br><del>7 02</del> LS RTN XDFEE1 (DTR0+)<br><del>10 10</del> LS RTN XDFEE1 (DTR0-)<br>Connect the probe2 on <del>XDPE1 J02</del> on the following pins:<br><del>10 05</del> LS CLK XDFEE1 (CLK0+)<br><del>13 38</del> LS CLK XDFEE1 (CLK0-) | OK             | OK           | MG             | 15/8/01 | TEK 012<br>22:19:22 |
| 210      | Measure the timing relation between DTR and CLK analysing the above plot acquired.                                                                                                                                                                                                                                                                                                                                                       | < 2 $\mu$ S    | 80 nsec      | MG             |         |                     |
| 220      | Deactivate the XDPE1 power supply lines 'A', using the SIS.                                                                                                                                                                                                                                                                                                                                                                              | OK             | OK           | MG             |         |                     |
| 230      | Deactivate the XDFEE1 power supply lines 'A', using the SIS.                                                                                                                                                                                                                                                                                                                                                                             | OK             | OK           | MG             |         |                     |
| 240      | Disconnect the BOB #1 between the following Units connectors, saver protected, and mate them together (don't remove the savers):<br><br>• XDPE1 J 02 / XDFEE1 J 06 (Low Speed Lines)                                                                                                                                                                                                                                                     | OK             | OK           | MG             |         |                     |

Tek Stop: 1.00GS/s ET 743 Acqs



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22:19:27



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| Paragraph: 6.7 High Speed Serial Line verification (JEM-X 2) – Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |              |                |         |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|
| STEP No.                                                                                               | Step Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Required Value | Actual Value | Conductor Sign | Date    |
| 10                                                                                                     | XDPE1/XDFEE1 I/F - High Speed Serial Line                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | OK             | OK           | MS             | 15/8/01 |
| 20                                                                                                     | Test Conditions, Declarations and Setup                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | OK             | OK           | MS             |         |
| 30                                                                                                     | The measurement will be performed using manual oscilloscope, digital voltmeter, current probe and special adapter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | OK             | OK           | MS             |         |
| 40                                                                                                     | Make sure that the following XDPE1 SIS-PDU/SIS-RTU/OBDH-FEE/unit connectors, savers protected, have been integrated and mated together: <ul style="list-style-type: none"><li>• XDPE1 J 14 / SIS-PDU (Power Main)</li><li>• XDPE1 J 15 / SIS-PDU (Power Redundant)</li><li>• XDPE1 J 20 / SIS-RTU (DC/DC Sec. Control)</li><li>• XDPE1 J 10 / OBDH-FEE (OBDH Main Bus)</li><li>• XDPE1 J 11 / OBDH-FEE (OBDH Redundant Bus)</li><li>• XDPE1 J 12 / XDFEE1 J 06 (OBDH Clock)</li><li>• XDPE1 J 04 / XDFEE1 J 04 (mRTU Relay Control)</li><li>• XDPE1 J 06 / XDFEE1 J 04 (mRTU Analog Acquisition)</li><li>• XDPE1 J 02 / XDFEE1 J 06 (Low Speed Lines)</li></ul> | OK             | OK           | MS             |         |

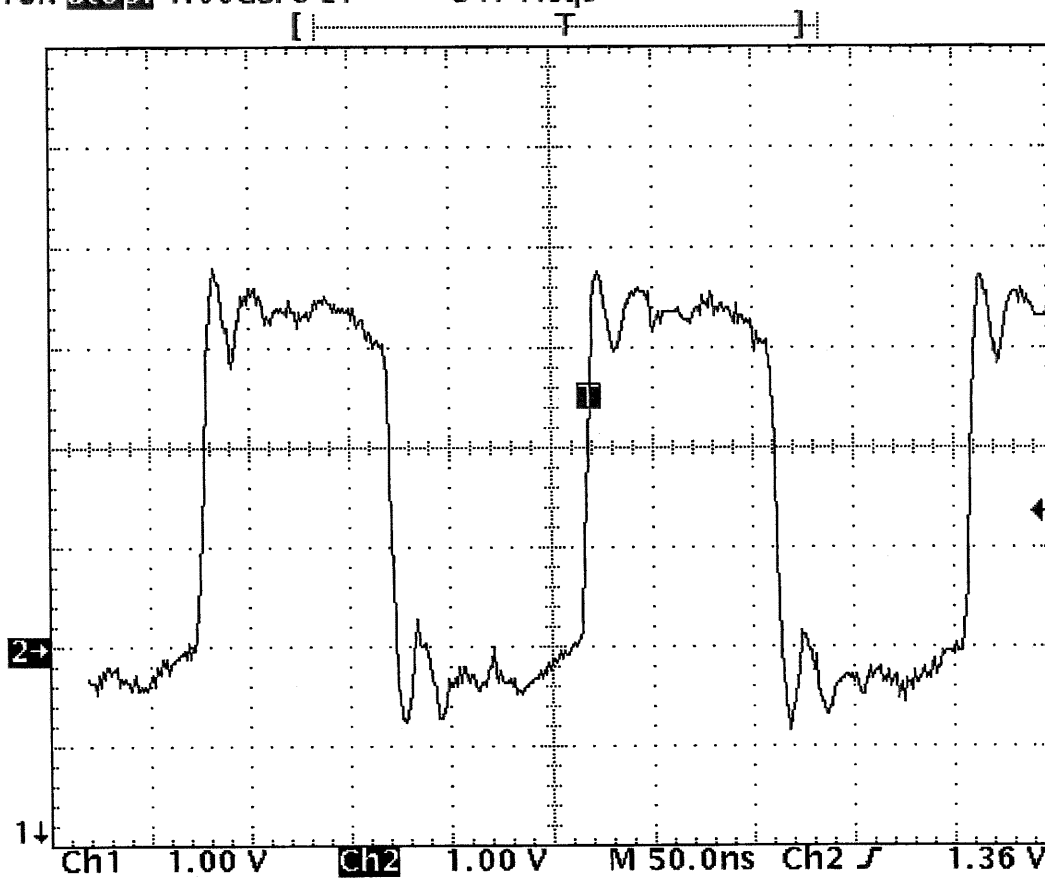


| Paragraph: 6.7 High Speed Serial Line verification (JEM-X 2) – Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                                                                                                                                            |                |              |                |         |         |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|---------|
| STEP No.                                                                                               | Step Description                                                                                                                                                                                                                                                                                                                                                                           | Required Value | Actual Value | Conductor Sign | Date    | Remarks |
| 50                                                                                                     | Make sure that the following XDFEE1 SIS-PDU/SIS-RTU/unit connectors, savers protected, have been integrated and mated together: <ul style="list-style-type: none"><li>• XDFEE1 J 07 / SIS-PDU (Power Main)</li><li>• XDFEE1 J 08 / SIS-PDU (Power Redundant)</li><li>• XDFEE1 J 05 / SIS-RTU (Commands, Thermistors RTU)</li><li>• XDFEE1 J 04 / XDPE1 J 06 (Housekeeping XDPE1)</li></ul> | OK             | OK           | Mh             | 15/8/01 |         |
| 60                                                                                                     | Verify the presence or insert a <b>special adapter</b> without jumpers between the following Units connectors, saver protected (remember to don't remove the savers): <ul style="list-style-type: none"><li>• XDPE1 J 01 / XDFEE1 J 06 (High Speed Line) &gt;&gt;&gt; <b>adapter</b></li></ul>                                                                                             | OK             | OK           | Mh             |         |         |
| 70                                                                                                     | If the previous <b>special adapter</b> for High-speed line is not inserted then verify or perform the switching off of the XDPE1 and XDFEE1 by means of the SIS User Manual procedure.                                                                                                                                                                                                     | OK             | OK           | Mh             |         |         |
| 80                                                                                                     | Insert the above <b>special adapter</b> for High-speed line, if not already inserted, without removing the savers.                                                                                                                                                                                                                                                                         | OK             | OK           | Mh             |         |         |
| 90                                                                                                     | Verify or perform the switching on of the XDPE1 and XDFEE1 following the SIS User Manual procedure.                                                                                                                                                                                                                                                                                        | OK             | OK           | Mh             |         |         |
| 100                                                                                                    | <b>HSL Measurements (CKH, DTH, ENH)</b>                                                                                                                                                                                                                                                                                                                                                    | OK             | OK           | Mh             |         |         |



| Paragraph: 6.7 High Speed Serial Line verification (JEM-X 2) – Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                 |                                                                             |                                                            |                |                    |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------|----------------|--------------------|
| STEP No.                                                                                               | Step Description                                                                                                                                                                                                                                                | Required Value                                                              | Actual Value                                               | Conductor Sign | Date               |
| 110                                                                                                    | Perform the transition to "Data Taking Mode" running the sequence set on the OBDH_FEE.                                                                                                                                                                          | OK                                                                          | OK                                                         | Mh             | 15/8/01            |
| 120                                                                                                    | Set the oscilloscope in order to record the waveform on the Clock Channel:<br>Connect the probe on <del>XDPE1 J01</del> on the following pins:<br>S <del>02</del> CLOCK HS LINK XDFEE1 TRUE <del>XDFEE1 J06</del><br>38 <del>03</del> CLOCK HS LINK XDFEE1 COMP | OK                                                                          | OK                                                         | Mh             |                    |
| 130                                                                                                    | Measure the Clock Waveform analysing the above plot acquired:<br>Pulse Duration:<br>Pulse Period:<br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time:                                                                                                   | 90 to 100 nS<br>180 to 200 nS<br>2 ÷ 6 V<br>-6 ÷ -2 V<br>< 15 nS<br>< 15 nS | 92 nsec<br>190 nsec<br>3.5 V<br>-3.5 V<br>5 nsec<br>7 nsec | Mh             | TEK013<br>22:25:26 |
| 140                                                                                                    | Set the oscilloscope in order to record the waveform on the Data Channel:<br>Connect the probe on <del>XDPE1 J01</del> on the following pins:<br>2 <del>04</del> DATA HS LINK XDFEE1 TRUE <del>XDFEE1 J06</del><br>35 <del>05</del> DATA HS LINK XDFEE1 COMP    | OK                                                                          | OK                                                         | Mh             |                    |
| 150                                                                                                    | Measure the Data Waveform analysing the above plot acquired:<br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time:                                                                                                                                        | 2 ÷ 6 V<br>-6 ÷ -2 V<br>< 15 nS<br>< 15 nS                                  | 3 V<br>-3 V<br>5 nsec<br>6 nsec                            | Mh             | TEK014<br>22:42:41 |

Tek **Stop:** 1.00GS/s ET 347 Acqs

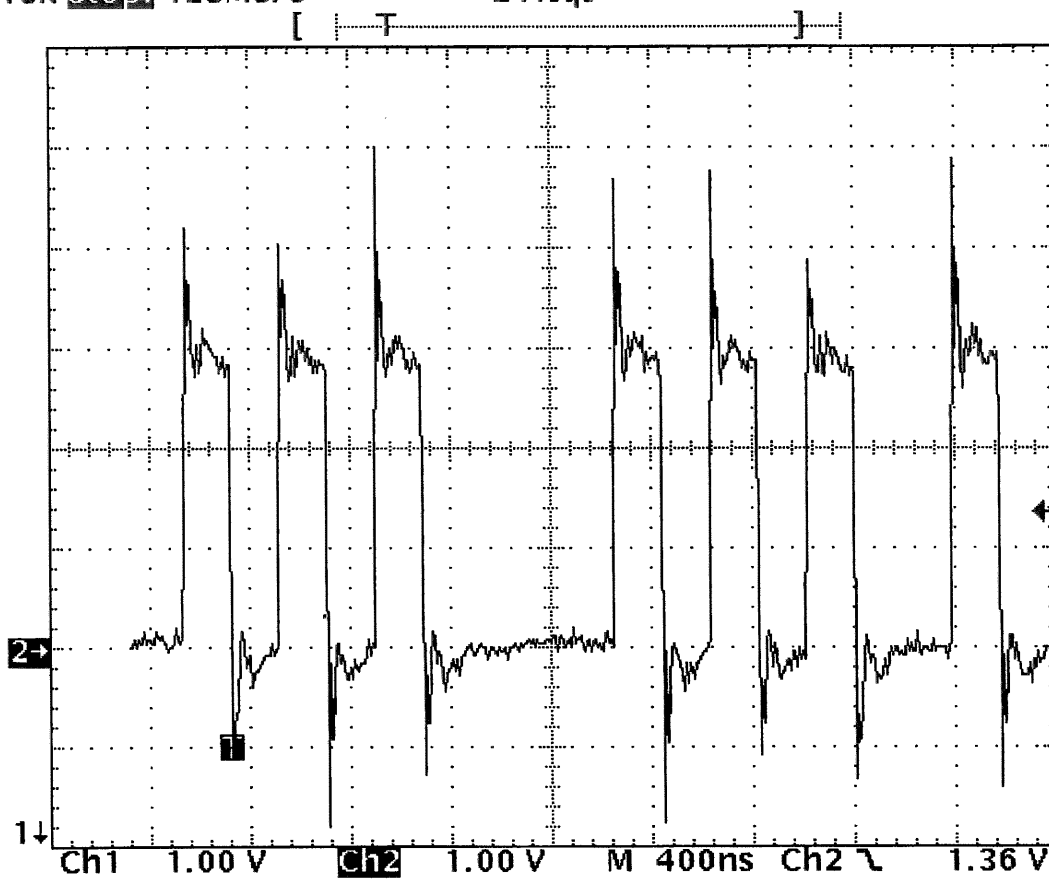


15 Aug 2001  
22:25:26



Tek Stop: 125MS/s

2 Acqs



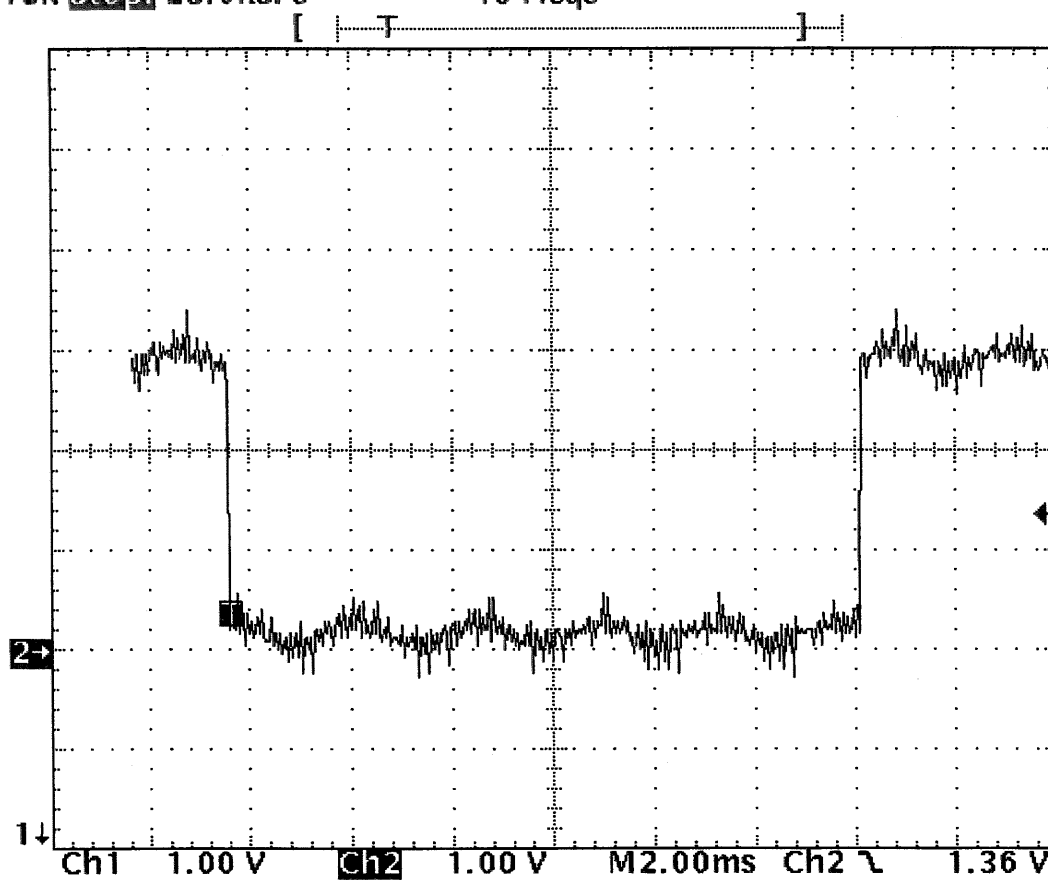
15 Aug 2001  
22:42:41



| Paragraph: 6.7 High Speed Serial Line verification (JEM-X 2) – Test Conditions, Declarations and Setup |                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |                                     |                |                      |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------|----------------|----------------------|
| STEP No.                                                                                               | Step Description                                                                                                                                                                                                                                                                                                                                                                                     | Required Value                             | Actual Value                        | Conductor Sign | Date                 |
| 160                                                                                                    | Set the oscilloscope in order to record the waveform on the <b>Enable Channel</b> :<br>Connect the probe on <del>XDPE1 J01</del> on the following pins:<br>3 06 ENABLE HS LINK XDFEE1 TRUE <del>XDPE1 J01</del><br>36 07 ENABLE HS LINK XDFEE1 COMP                                                                                                                                                  | OK                                         | OK                                  | Mg             | 15/8/01              |
| 170                                                                                                    | Measure the <b>Enable Waveform</b> analysing the above plot acquired:<br>Upper Level:<br>Lower Level:<br>Rise Time:<br>Fall Time:                                                                                                                                                                                                                                                                    | 2 ÷ 6 V<br>-6 ÷ -2 V<br>< 15 nS<br>< 15 nS | 3.6 V<br>-3.6 V<br>8 nsec<br>8 nsec | Mg             | TEK OAS<br>22: 48:08 |
| 180                                                                                                    | Set the oscilloscope in order to record the time relation between the following lines ( <b>Clock/Enable</b> ):<br>Connect the probe1 on <del>XDPE1 J01</del> on the following pins:<br>5 02 CLOCK HS LINK XDFEE1 TRUE<br>38 03 CLOCK HS LINK XDFEE1 COMP<br>Connect the probe2 on <del>XDPE1 J01</del> on the following pins:<br>3 06 ENABLE HS LINK XDFEE1 TRUE<br>36 07 ENABLE HS LINK XDFEE1 COMP | OK                                         | OK                                  | Mg             |                      |
| 190                                                                                                    | Measure the time t1 between <b>Clock</b> and <b>Enable</b> signals                                                                                                                                                                                                                                                                                                                                   | Max: 60 nSec                               | 25 nsec                             | Mg             | TEK OAS<br>22: 48:49 |

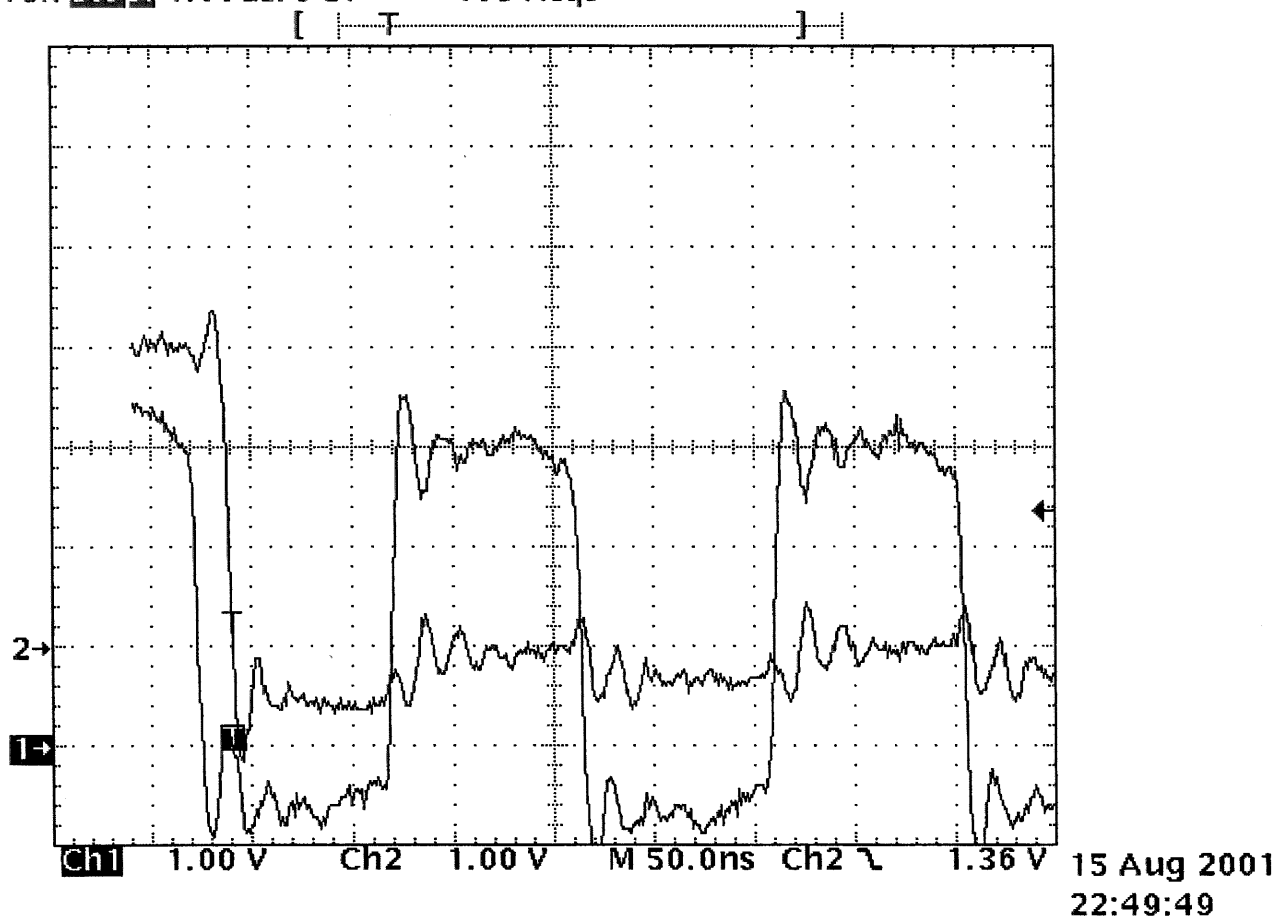
Tek **Stop:** 25.0kS/s

19 Acqs



15 Aug 2001  
22:48:08

Tek Stop: 1.00GS/s ET 168 Acqs





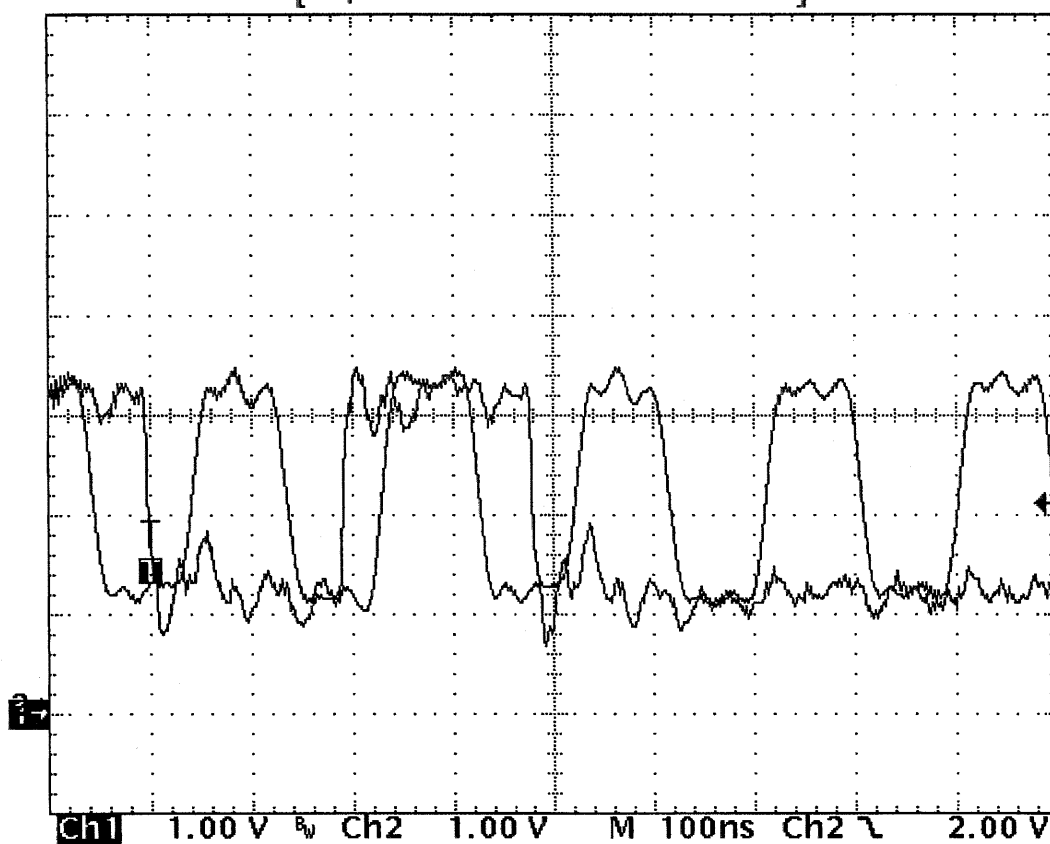
Paragraph: 6.7 High Speed Serial Line verification (JEM-X 2) – Test Conditions, Declarations and Setup

| STEP No. | Step Description                                                                                                                                                                                                                                                                                                                                                                   | Required Value | Actual Value | Conductor Sign | Date    | Remarks             |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---------|---------------------|
| 200      | Set the oscilloscope in order to record the time relation between the following lines (Data/Clock): XDFEE1 J 06 J 06<br>Connect the probe1 on XDPE1 J 01 on the following pins:<br>2 04 DATA HS LINK XDFEE1 TRUE<br>35 05 DATA HS LINK XDFEE1 COMP<br>Connect the probe2 on XDPE1 J 01 on the following pins:<br>5 02 CLOCK HS LINK XDFEE1 TRUE<br>38 03 CLOCK HS LINK XDFEE1 COMP | OK             | OK           | MS             | 16/8/01 |                     |
| 210      | Measure the time t2 between Data and Clock signals.                                                                                                                                                                                                                                                                                                                                | Max: 120 nSec  | 50 nsec      | MS             |         | TEK 047<br>10:11:18 |
| 220      | In order to send the instrument in Safe Mode send the following TC from the OBDH-FEE by means of the set sequence:<br>• I55-5 - JEM-X 1 to Setup Mode<br>• I55_1 - JEM-X 1 to Safe Mode                                                                                                                                                                                            | OK             | OK           | MS             |         |                     |
| 230      | Verify or perform the JEM-X 1 "Safe" Mode configuration.                                                                                                                                                                                                                                                                                                                           | OK             | OK           | MS             |         |                     |
| 240      | Deactivate the XDPE1 power supply lines 'A', using the SIS.                                                                                                                                                                                                                                                                                                                        | OK             | OK           | MS             |         |                     |
| 250      | Deactivate the XDFEE1 power supply lines 'A', using the SIS.                                                                                                                                                                                                                                                                                                                       | OK             | OK           | MS             |         |                     |
| 260      | Remove the special adapter for High-speed line between the following Harness/Unit connectors and mate them together (don't remove the savers):<br>• XDPE1 J 01 / XDFEE1 J 06 (High Speed Line)                                                                                                                                                                                     | OK             | OK           | MS             |         |                     |

Tek **Stop:** 500MS/s ET

70 Acqs

[ T ]



16 Aug 2001  
10:11:18