



ROV Ground Fault Detection system

Version 1.00

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This document provides the hardware description for the ROV Ground Fault Detection system electronics. It provides enough detail to give the reader an understanding of the components on the card and their functions.

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1.Scope of this document

This document describes the electronics for the ROV Ground Fault Detection system. It does not go into depth regarding individual components— links are supplied to various manufacturer's data sheets.

2. References

The key components can be found on the manufacturer's WWWs. The most important are:

a. Isolation opamp

Burr-Brown type ISO122U

<http://www.burr-brown.com/download/DataSheets/ISO122.pdf>

2.1. Schematic diagram for the ROV Ground Fault Detection

This document shows exactly how the card is designed electronically, and should be referred to whenever there is any doubt as to how components are connected. See Appendix 1.

3. General description of the ROV Ground Fault Detection system

The principle of the Ground Fault Detection system consists of superimposing a DC voltage (60V) between the power supplies and earth (or ground) through a high-ohmic resistor. If no ground fault occurs, the output voltage is largest (+10V or –10V, depending on the polarity of the 60V supply) and will become smaller if the ground fault becomes larger (larger current). The outputs are galvanically isolated from the inputs.

In total 8 channels are available on the card. In the prototypes for Hitec only 2 channels are mounted with components.

Each channel must be calibrated. No ground fault should give out 10V, a short approximately 3.4V. The transfer function is NOT linear, so a double fault current does not give a half output voltage.

A test function is available, when used a known ground fault is introduced to all channels. The output from all channels should be the same (approx. 4.5V). Mind that the order of potentiometers and channels is NOT natural, check carefully before adjusting. See table 1.

There is a labelling error in the PCB revision 1.10 (no. 13057110): Input channels 1 to 4 correspond to output channels 4 to 1 and input channels 5 to 8 correspond to output channels 8 to 5. See also table 1.

Input channel (reference to pin 28C)	Connector pin #	Adjustment potmeter	Output channel (reference to pin 18A or 26C)	Connector pin #
In 1 (+ and -)	2A and 2C	R123	Out 4	22A
In 2 (+ and -)	4A and 4C	R119	Out 3	20C
In 3 (+ and -)	6A and 6C	R116	Out 2	20A
In 4 (+ and -)	8A and 8C	R113	Out 1	18C
In 5 (+ and -)	10A and 10C	R133	Out 8	26A
In 6 (+ and -)	12A and 12C	R136	Out 7	24C
In 7 (+ and -)	14A and 14C	R139	Out 6	24A
In 8 (+ and -)	16A and 16C	R143	Out 5	22C

The system uses a 24V supply. Total power consumption is approx. 300mA when all isolation opamps are mounted, 150mA for the prototypes with 2 channels.

4. Interconnections

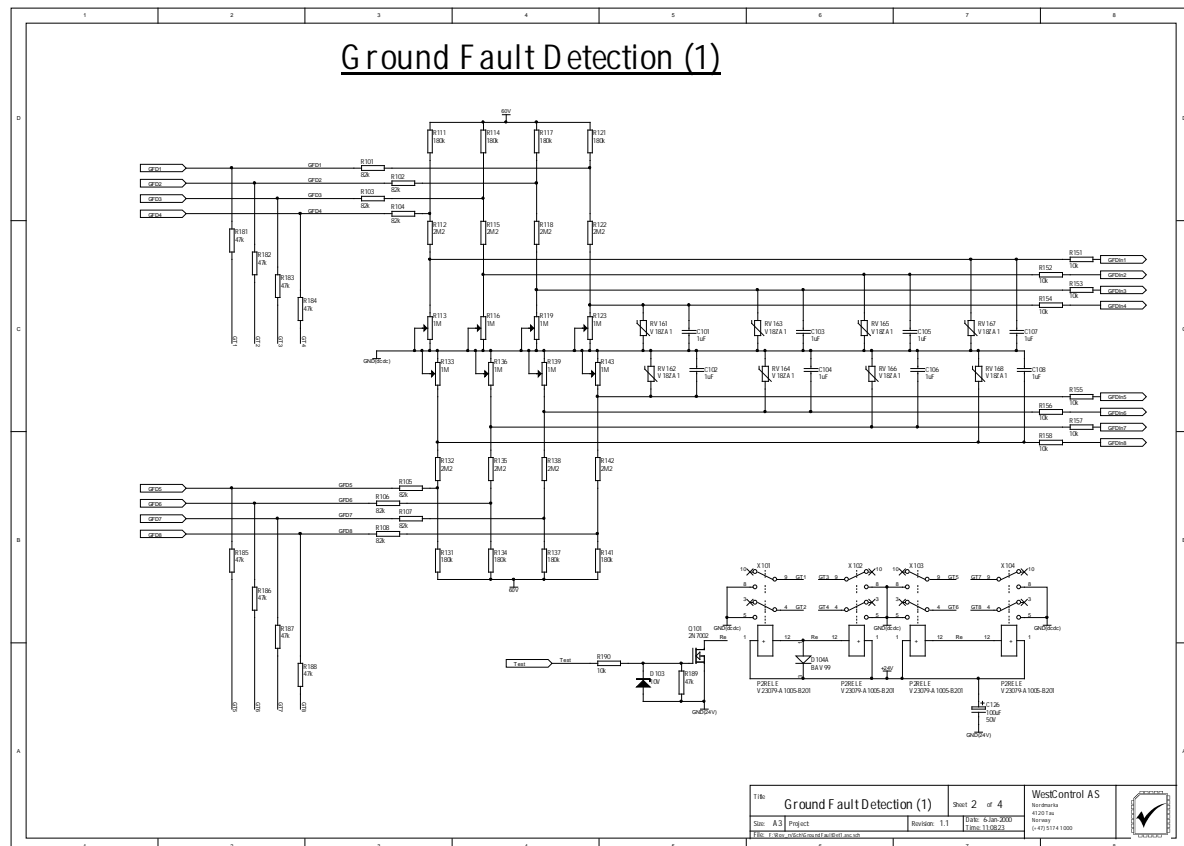
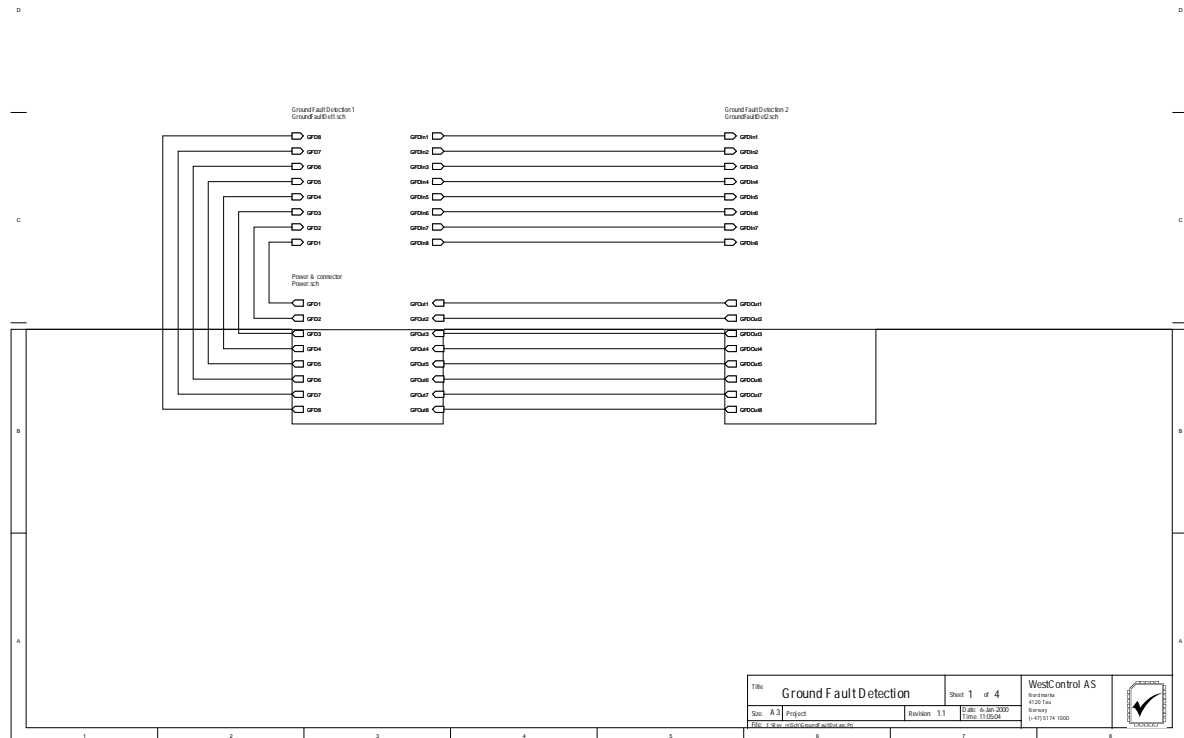
There is 1 interconnection to a backplane. See the schematic diagram (Appendix 1).

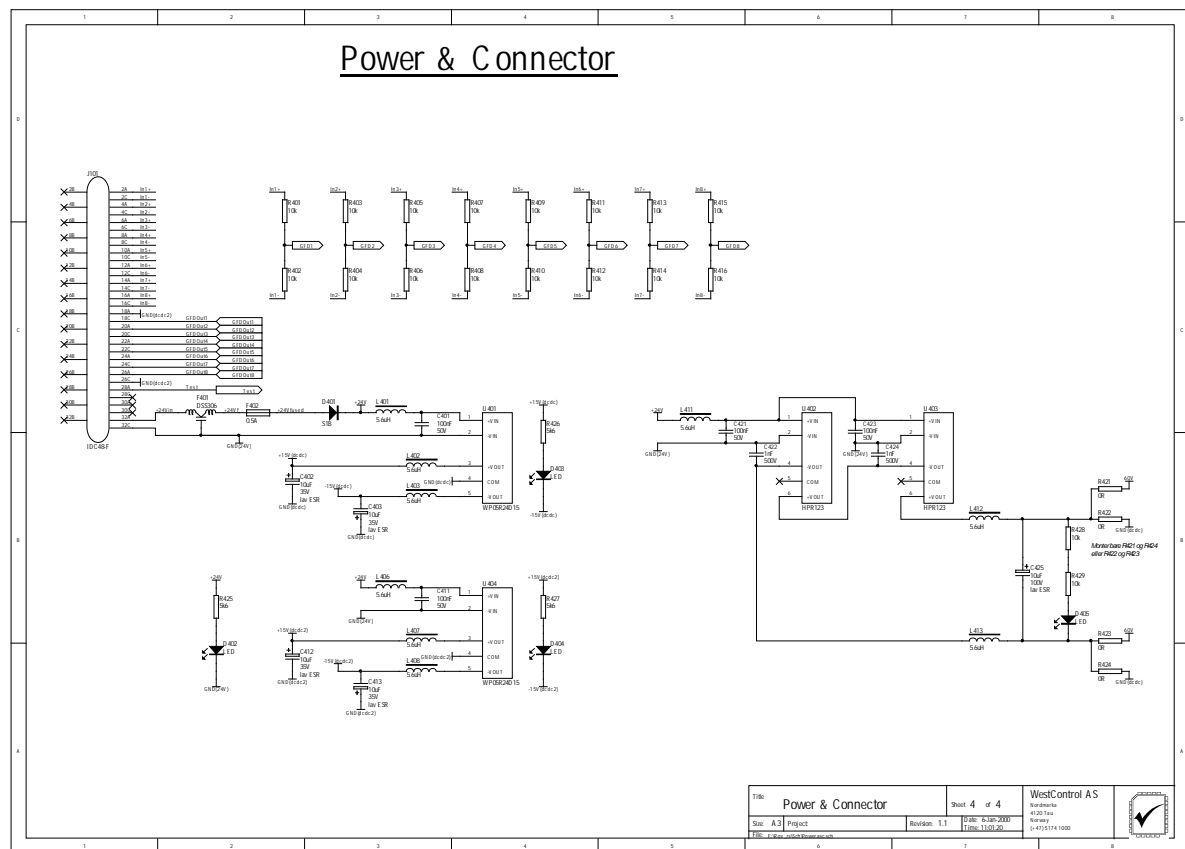
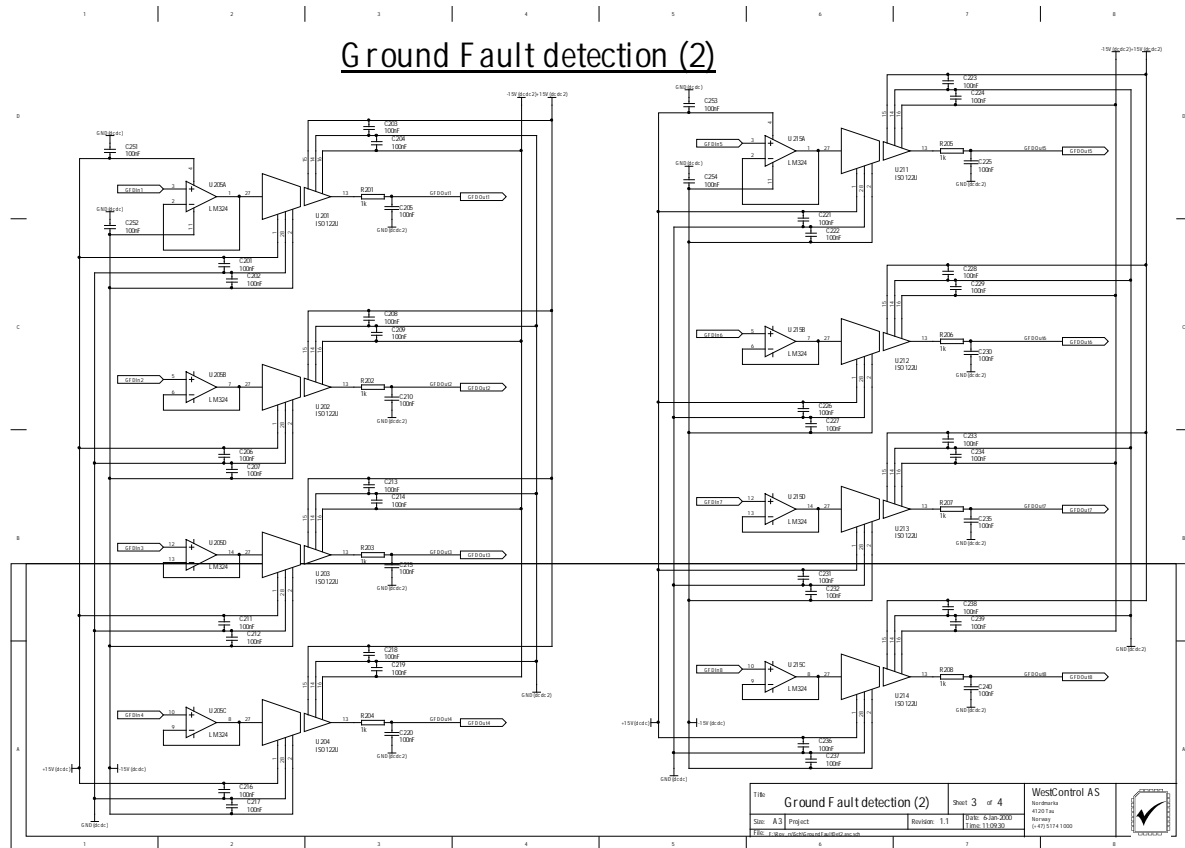
5. Main circuit board overview

The circuit board image (Appendix 2) gives an indication of the major components and connectors on the card. The labels on the diagram are the component numbers.

Appendix 1. Schematics of Ground Fault Detection system

Ground Fault Detection





Appendix 2. PCB overview

