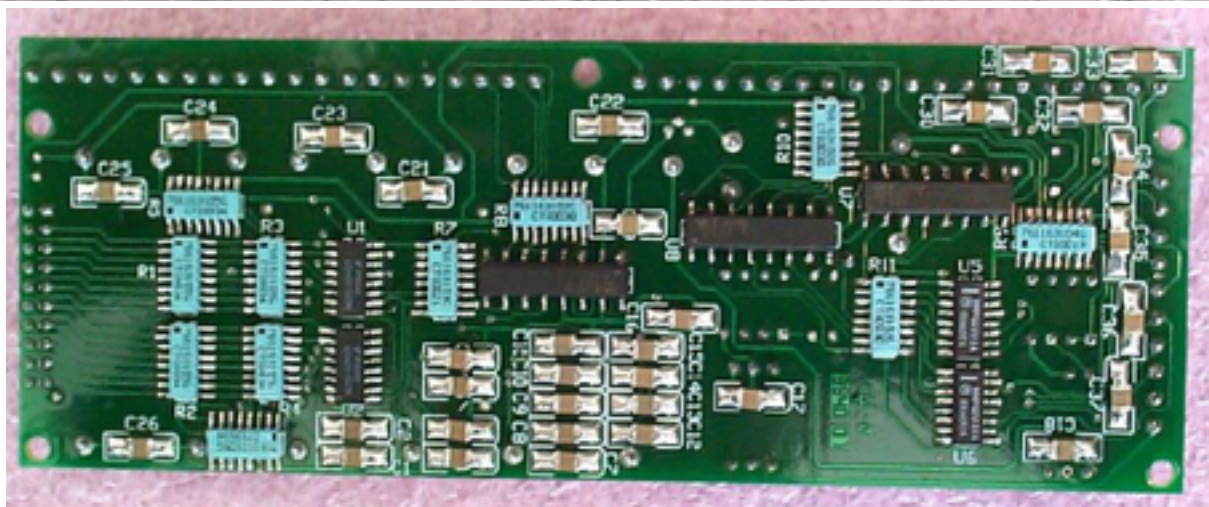


GFIWATER Ground Fault Monitor & Water Alarm Circuit Board

- 16 Separate Channels from 5 to 200VDC, or 24 to 1000VAC.
- 1 Switched Analog Channel. Able to read any of the 8 Ground fault channels
- Electrical:
 - 15VDC input at 230mA
 - Ground Fault Monitor 26.5VDC high impedance >3M Ohm
 - Analog Channel selected BCD 4 wire, 0-15VDC
 - Analog Output 0-5VDC 25mA max.
 - 8 Optically Isolated and Amplified Water Alarm Sensor Channels
- Mechanical:
 - 6" x 2" x .375"
- Optical isolation between sensed circuits and power supply.
- Stock item, US\$830.00 each
- Higher Voltages > 120VAC require sense blocks

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Circuit Description:

The DTEC Ltd. GFIWAT ground fault monitoring board places a high impedance (~2M2 ohms) voltage source of +25.6 VDC, with respect to chassis ground, onto sixteen channels. It then measures the drop across sensing resistors. These (1M2 single phase 1M8 3 phase) sensing resistors are installed in an epoxied block close to the high voltage source. If a ground fault condition develops this +25.6 vdc level decreases. If +25.6 VDC is measured with respect to chassis ground on the monitored channel there is no ground fault. As this voltage drops, a corresponding decrease in the ground fault resistance level is sensed and an increasing analog output voltage for that channel is produced.

There are 3 sections to the circuit board:

Power Supply

The 2 - DC-DC converters receive a logic +15 vdc and output +/- 15 vdc. These work in series to create a +60 vdc circuit and a single +15 vdc with respect to chassis ground. Minimum current required by the board is 1 amps to startup and nominally 370ma running. Typical load in a no ground fault condition is 170mA (normal operation). There is also an additional DC-DC converter to allow the board to be run from a 12 Volt DC power supply.

Analog Output/Isolator

Provides isolation and amplification/conditioning of the analog signal. The output is with reference to power supply ground and should range from +0.00 to +5.00 vdc.

Bit Select Input

This is the section which selects the channel that will be routed through the analog isolator. The following is a table for the bit select levels and the corresponding channel to be routed to the analog output.

For download of Schematic and General Arrangement in DXF format go to download files.

Channel #	Bit A (lsb)	Bit B	Bit C	Bit D (msb)
1	1	1	1	1
2	0	1	1	1
3	1	0	1	1
4	0	0	1	1
5	1	1	0	1
6	0	1	0	1
7	1	0	0	1
8	0	0	0	1
9	1	1	1	0
10	0	1	1	0
11	1	0	1	0
12	0	0	1	0
13	1	1	0	0
14	0	1	0	0
15	1	0	0	0
16	0	0	0	0

Note :
lsb : Least Significant Bit
msb : Most Significant Bit
0 : Logic Ground
1 : Logic +15 vdc

Board Setup

Test points used on the board

Setup

Place a full ground fault (two 1M2 resistors in parrallel from chassis ground and the input) on channel #1. Tune Pot 1 so that the analog output is 5.00 VDC. Replace the short (ground fault) with a 5 Meg Ohm resistor. Tune P2 so that the analog output is 0.62 Volts. Retune Pot 1 with a short on the ground fault/5.00 Volts output and retune P2 with a 5 Meg Ohm resistor/0.62 Volts output until no further adjustments are needed.

Water Alarm Section

The water alarm section uses a transistor amplifier and opto-isolator to sense the current flow through two preferably gold contacts placed at the bottom of subsea housings. As the water touches the contacts the current flow turns on the transistor which turns on the diode in the opto-isolator. The isolator provides protection to the telemetry digital inputs ensuring that any noise or voltage transients present at the gold contacts (which are usually placed in high voltage environments) cannot reach the digital inputs. The isolation is 1500VAC. There is a 12 Volt DC-DC converter on the board providing isolated power for the transistors/gold contacts. The water alarm outputs are normally tied high and when there is a water alarm condition the output goes low (logic ground)