LTC1535
Full Duplex, Isolated RS485
Transceiver with Slew Limiting

DESCRIPTION

Demonstration circuit 241C showcases the LTC®1535 isolated RS485 transceiver. The LTC1535 features 2,500V isolation; the "left-half" of the chip contains familiar RS485 logic functions and an isolated switching converter, and the "right-half" contains the RS485 transceiver. Both sides include a communications section to send data back and forth across the internal capacitive isolation barrier.

The LTC1535 allows the user to break ground loops that cause problems in large systems, and it can also handle high common mode swings relative to ground without loss of data.

Isolation Considerations

The board, as constructed, is designed for 500V isolation, limited by the CTX02-14659 transformer. A full 3750V UL approvable transformer is also available from Coiltronics as CTX02-14608. Note that the LTC1535 meets only a 2,500V test. See the LTC1535 data sheet for additional information an other transformer options.

Logic Interface

The left-half of DC241C contains the logic interface sections. Large terminals are provided for +5V and logic ground (V_{CC1} and GND1). The input current is approximately 94mA. The smaller terminals connect to RO (receiver output), $\overline{RE}$ (receiver enable), DE (driver enable), and DI (driver input). The terminals are arranged to match the LTC485 industry-standard pinout.

RS485 Interface

The right-hand side contains the isolated RS485 section. The chip is designed for full duplex operation. So the receiver input A-B and driver output Y-Z are brought out to small terminals. The receiver also has a local output RO2. Larger terminals V_{CC2} and GND2 are powered from the transformer, and require no external power. They are included for the purpose of monitoring the isolated converter output.

Other DC241C Features

Both sides have green LEDs (D1, D3) for monitoring the presence of power. A 3.3k series resistor makes for dim viewing, but conserves current. For accurate power supply current measurement disable the LEDs with JP1 and JP3.

120Ω, 1/4W terminations are included. They are selected with jumpers JP4 (receiver) and JP5 (driver).

Half-duplex operation is simplified by S1, which simply shorts A to Y and B to Z. Half to the left, full to the right.

The driver slew rate is controlled by JP2; slow left and fast right.

Terminal block J1 is the fastest way to graft DC241C into a system. J1 requires a 2mm screw driver (Xcelite® P3321 recommended). Xcelite R181 won't fit no matter how hard you push.

Design files for this circuit board are available.

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ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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UG-1405 Rev. A

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UG17102-0-01/19(A)
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