

Half-Duplex, Isolated RS-485 Interface

CIRCUIT FUNCTION AND BENEFITS

This circuit provides a half-duplex, isolated RS-485 interface using the [ADM2485](#) high speed, isolated RS-485 transceiver and the [ADP3330](#) high accuracy linear regulator. This circuit achieves signal and power isolation and at the same time decreases board space and power consumption.

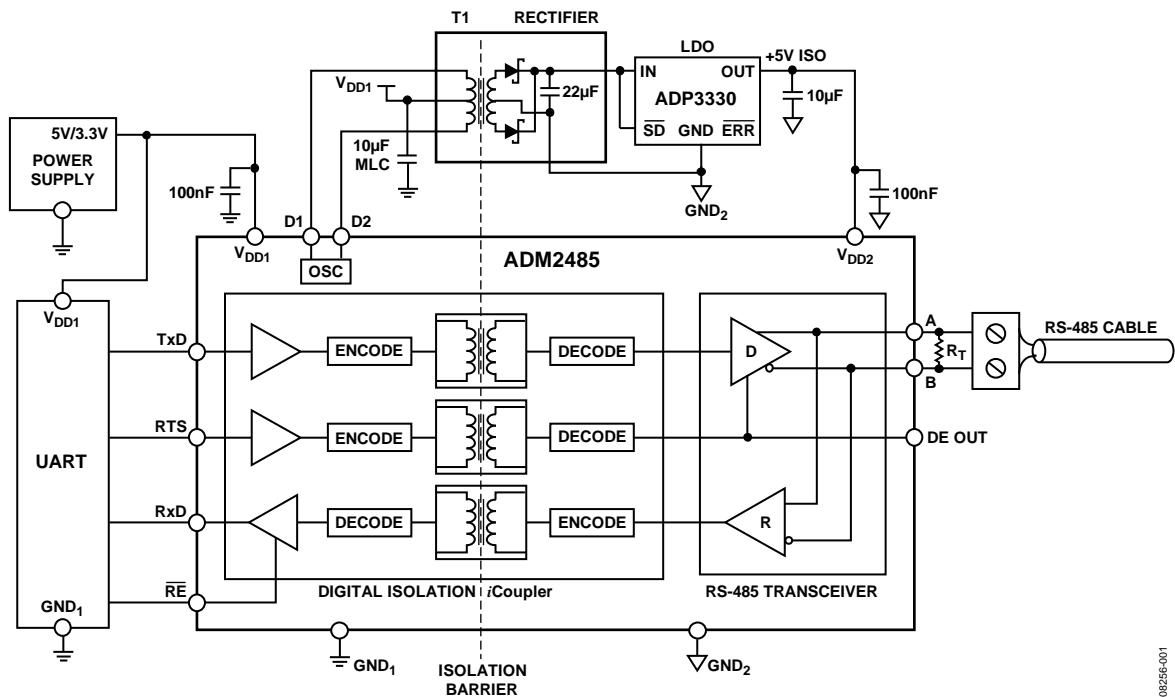


Figure 1. Half-Duplex Isolated RS-485 Interface Using [ADM2485](#) and [ADP3330](#) (Simplified Schematic)

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REVISION HISTORY

11/2017—Rev. A to Rev. B

Document Title changed from CN0031 to AN-1493	Universal
Change to Figure 1	1
Changes to Table 1.....	3

6/2009—Rev. 0 to Rev. A

Updated Format.....	Universal
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10/2008—Revision 0: Initial Version

CIRCUIT DESCRIPTION

The [ADM2485](#) is a half-duplex RS-485 transceiver that can achieve a fully isolated RS-485 PROFIBUS[®]-compliant node. The [ADM2485](#) integrates a transformer driver that, when used with an external transformer and low dropout (LDO) regulator, generates an isolated 5 V power supply to be supplied between V_{DD2} and GND₂.

The D1 and D2 oscillator outputs of the [ADM2485](#) drive the center tapped transformer, T1. A pair of Schottky diodes and a smoothing capacitor are used to create a rectified signal from the secondary winding. The [ADP3330](#) linear voltage regulator provides a regulated 5 V power supply to the [ADM2485](#) bus side circuitry (V_{DD2}), as shown in Figure 1.

COMMON VARIATIONS

When the [ADM2485](#) is powered by 3.3 V on the logic side, a 1CT:2.2CT transformer, T1, is required to step up the 3.3 V to 6 V supply voltage, thereby ensuring enough headroom for the [ADP3330](#) LDO to output a regulated 5 V output.

If the [ADM2485](#) is powered by 5 V on the logic side, a 1CT:1.5CT transformer, T1, is required to ensure enough headroom for the [ADP3330](#) LDO to output a regulated 5 V output.

The external transformer used with the [ADM2485](#) must have a center tapped winding. The turns ratio of the transformer must be set to provide the minimum required output voltage at the maximum anticipated load current with the minimum input voltage. Table 1 shows suitable transformers for the [ADM2485](#) circuit of Figure 1.

Table 1. Transformer Suppliers

Manufacturer	Primary Voltage	
	3.3 V	5 V
Coilcraft	DA2304-AL	DA2303-AL
C&D Technologies	782482/35C	782485/55C

REFERENCES

- Chen, Baoxing. 2006. *iCoupler[®] Products with isoPower[®] Technology: Signal and Power Transfer Across Isolation Barrier Using Microtransformers*. Analog Devices.
- Wayne, Scott. 2005. *iCoupler[®] Digital Isolators Protect RS-232, RS-485, and CAN Buses in Industrial, Instrumentation, and Computer Applications*. Analog Dialogue, Volume 39. Analog Devices.