DEMO CIRCUIT 1503
QUICK START GUIDE

LTM2881
Isolated RS485/RS422 µModule Transceiver + Power

DESCRIPTION

Demonstration circuit 1503 is an Isolated RS485/RS422 µModule® Transceiver + Power featuring the LTM®2881. The demo circuit is a 2500V_{RMS} galvanically isolated RS485/RS422 transceiver interface. All components are integrated into the µModule Transceiver. The demo circuit operates from a supply on VCC and a logic supply on VL. The part generates the output Voltage VCC2 and communicates all necessary signaling across the isolation barrier through an isolation µModule technology.

Design files for this circuit board are available. Call the LTC factory.

PERFORMANCE SUMMARY

Specifications are at TA = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{CC}	Input Supply Range	LTM2881-5	4.5	5	5.5	V
		LTM2881-3	3.0	3	3.6	V
V_L	Logic Signal Supply Range		1.62		5.5	V
V_{CC2}	Output Voltage	I_{LOAD} = 90mA		5		V
f_{MAX}	Maximum Data rate	/SLO = V_{CC2}	20			Mbps
V_{IORM}	Maximum Working Insulation Voltage	GND to GND2	560			V
	Common Mode Transient Immunity		30			kV/µs

OPERATING PRINCIPLES

The LTM2881 contains an isolated DC-DC converter delivering power to VCC2 at 5V from the input supply VCC. Isolation is maintained by the separation of GND and GND2 where significant operating voltages and transients can exist without affecting the operation of the LTM2881. The logic side ON pin enables or shuts down the LTM2881. RS485/RS422 signaling is controlled by the logic inputs DE, DI, TE, and $\overline{RE}$. Connection to the transceiver pins (A, B, Y, and Z) allows full or half duplex operation on the isolated side of the demo circuit. A full / half duplex switch is included on the demo circuit to ease setting the system configuration. A driver termination resistor is included on the demo circuit to allow master termination in full duplex configurations. Additional logic signaling from the isolated side to the logic side is available with the DIN to DOUT pins. The $\overline{SLO}$ pin configures the slew rate of the driver output pins Y and Z.

Data is transmitted out the driver pins Y and Z from the input DI with the input DE set high. Data is received through the difference in A and B to the output RO with the input $\overline{RE}$ set low.

QUICK START PROCEDURE

Demonstration circuit 1503 is easy to set up to evaluate the performance of the LTM2881. Refer to Figure 2 for proper measurement equipment setup and follow the procedure below:

NOTE. When measuring the input or output voltage ripple or high speed signals, care must be taken to avoid a long ground lead on the oscilloscope probe.

1. Place jumpers in the following positions: (all are default except JP1, JP2, JP6, and JP8)

   JP1 ON

   JP2 VCC (note: logic signals referenced to VCC)

   JP3 ON

   JP4 OUT

   JP5 ON

   JP6 EXT

   JP7 ON

   JP8 ON

   JP9 ON

   JP10 FAST

   JP11 HI

   SW1 HALF DUPLEX

2. With power off, connect the input power supply to VCC and GND.

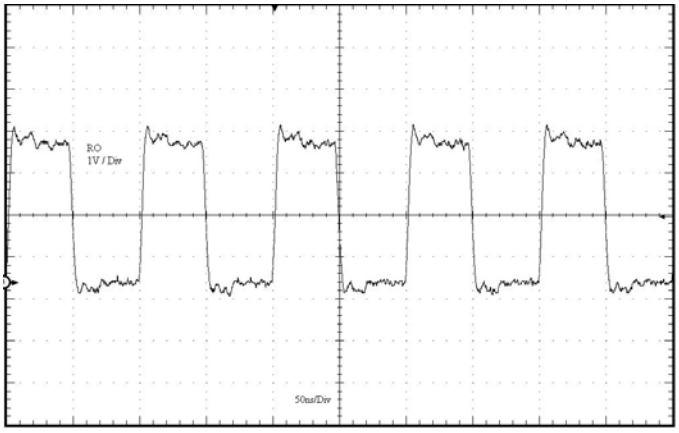
3. Turn on the power at the input.

   NOTE. Make sure that the input voltage does not exceed 6V.

4. Check for the proper output voltages. VCC2 = 5V, LED D1 is ON, LED D2 is ON.

5. Once the proper output voltages are established, Connect a function generator to terminal DI and set to square wave with a low of 0V, high = VCC, termination is High-Z. Set Frequency to 10MHz (20Mbps). Enable output of function generator.

6. Connect oscilloscope to terminal RO and observe waveform at 10MHz. This demonstration shows data that is transmit from DI, loops back through the half-duplex configuration, and out of RO.



RO output

Figure 1.

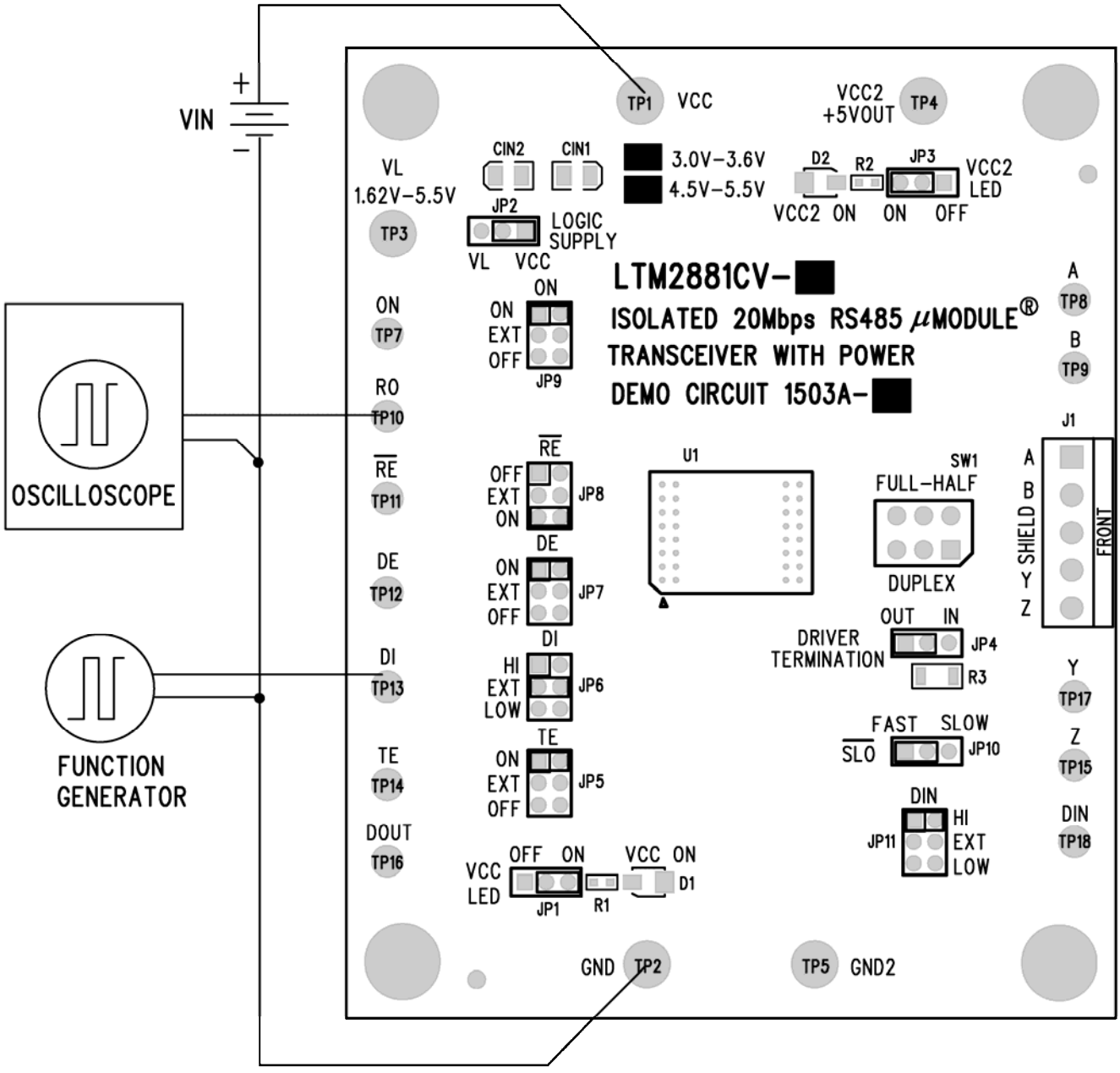
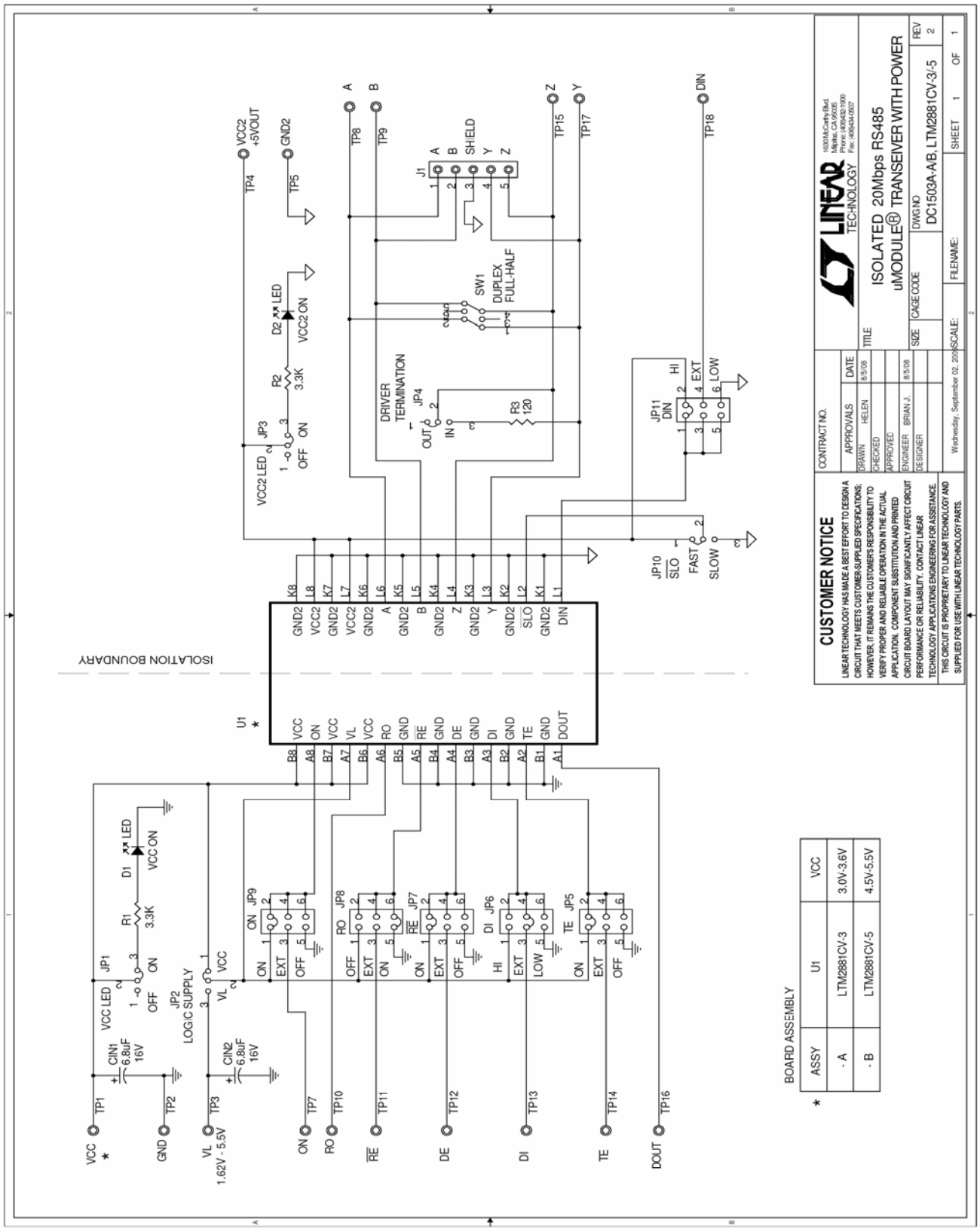


Figure 2. Proper Measurement Equipment Setup


ISOLATION BOUNDARY
U1
JP1
JP2
LOGIC SUPPLY
JP3
JP4
DRIVER TERMINATION
SW1
DUPLEX FULL-HALF
JP10
JP11
J1
R1 3.3K
R2 3.3K
R3 120
D1 LED
D2 LED
VCC ON
VCC2 ON
VCC LED
VCC2 LED
CIN1 6.8uF 16V
CIN2 6.8uF 16V
VCC +5VOUT
GND2
SHIELD
DIN
FAST
SLOW
HI
LOW
EXT
CUSTOMER NOTICE
LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.
CONTRACT NO.
APPROVALS
DRAWN HELEN 8/5/08
CHECKED
APPROVED
ENGINEER BRIAN J. 8/5/08
DESIGNER
Wednesday, September 02, 2009
SCALE:
FILENAME:
SHEET 1 OF 1
TITLE
ISOLATED 20Mbps RS485 uMODULE® TRANSCEIVER WITH POWER
SIZE
CAGE CODE
DWG NO
DC1503A-A/B, LTM2881CV-3/-5
REV 2
LINEAR TECHNOLOGY
1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408)432-1900
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BOARD ASSEMBLY
* ASSY U1 VCC
- A LTM2881CV-3 3.0V-3.6V
- B LTM2881CV-5 4.5V-5.5V