



Convert A Two Channel Full Duplex Data System from RS-232 to RS-485

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Part Numbers: SP3220EB/EU and SP3071E/7E (VCC=3.3V systems)
SP3220EB/EU and SP3081E/7E (VCC=5.0V systems)

Application Description: Converts a full duplex serial data communications bus from RS-232 protocol to RS-485 protocol at data rates of 250kbps and 1Mbps.

Electrical Requirements:

Input Voltage	3.0V – 3.6V or 4.5V - 5.5V
Input Current	20mA fully loaded and switching
ESD Protection	+/-15kV Airgap Discharge Method

Circuit Description:

This RS-232 to RS-485 protocol converter uses two products for a complete operational system. The circuit will comply with all EIA and ITU specifications for RS-232 to RS-485/RS422 conversion. This is a rugged design that will handle +/-15kV ESD levels on the bus pins. The design is compatible with 3.3V or 5V systems requiring only one pin compatible device change. Only six external capacitors are required, giving the design a small footprint. The SP3220 has receiver enable control (/EN) and driver shutdown control (/SHUTDOWN) if power saving is required. (Schematic figure 1)

The SP3070/6 (14 pin package) can be substituted for the SP3071/7 to also shutdown the RS-485 transceiver. This provides power savings and extended battery life for low power systems. (Schematic figure 2) /SHUTDOWN=low and /EN=high

Part Numbers: SP3220EB/EU and SP3070E/6E (VCC=3.3V systems)
SP3220EB/EU and SP3080E/6E (VCC=5.0V systems)

Table 1- Truth Table

SP3220				SP3070				System
/SHDN	/EN	TXout	RXout	DE	/RE	TXout	RXout	Mode
0	0	Tri-state	Active	0	0	Tri-state	Active	Sleep
0	1	Tri-state	Tri-state	0	1	Tri-state	Tri-state	Shutdown
1	0	Active	Active	1	0	Active	Active	Active - Full Duplex
1	1	Active	Tri-state	1	1	Active	Tri-state	Forbidden

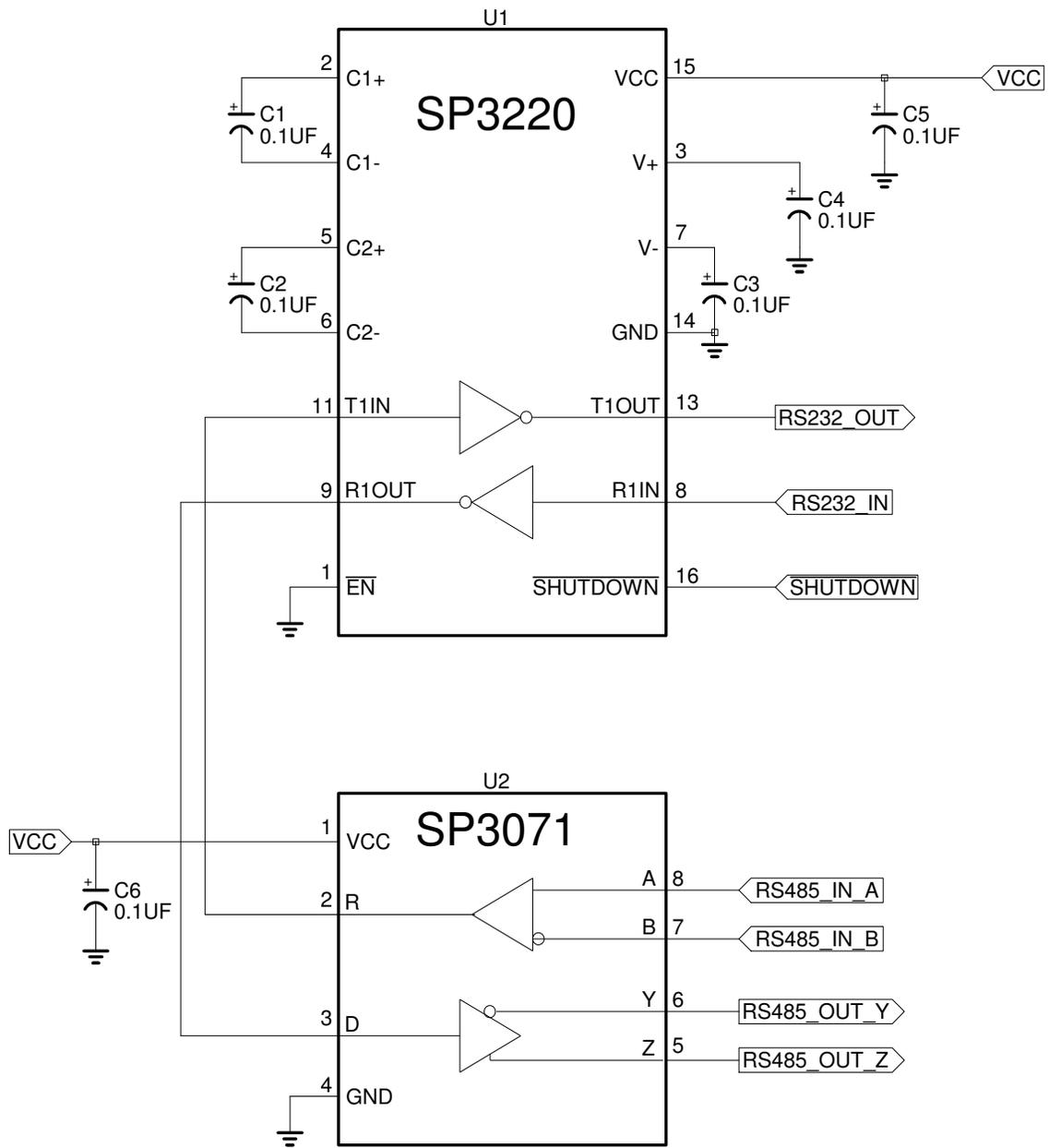


Figure 3 - Application Schematic

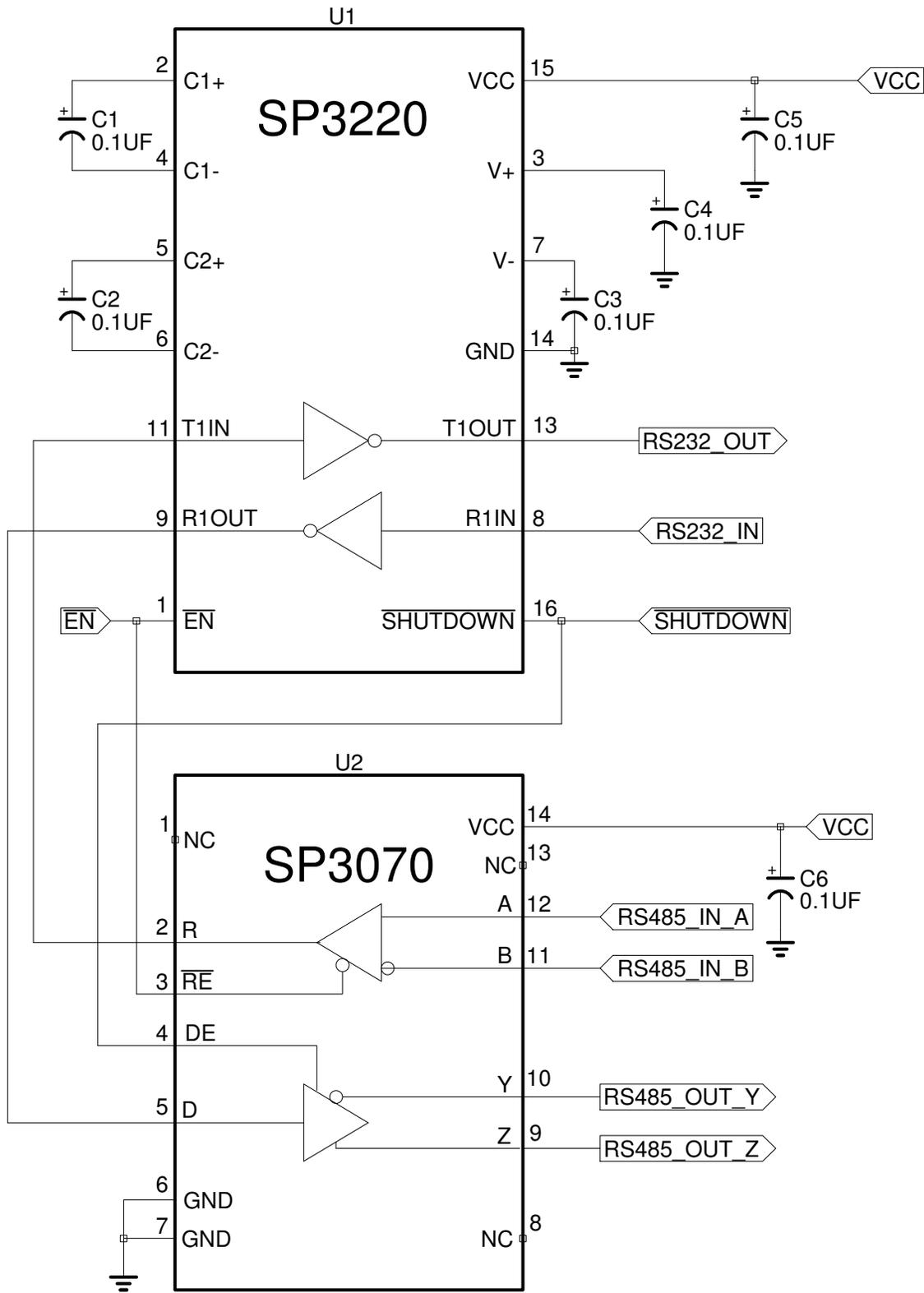


Figure 4 - Application Schematic for complete system shutdown capability