



Overview:

The **VRM-CU7-RS485-X** is an isolated RS-485 Rear-I/O module, destined for CompactPCI® systems, to be used in combination with the serial interface cards VRM-CU1 and VRM-CU2. The **VRM-CU7-RS485-X** is provided with an electrically isolated TIA-485 data transceiver for EMI sensitive applications. The **VRM-CU7-RS485-1** allows for connecting various controllers in a daisy-chain fashion across a single twisted pair cable, while the **VRM-CU7-RS485-2** is suitable for direct point-to-point interconnection between two devices over a 4-wire line.

Designed for harsh environments, the **VRM-CU7-RS485-X** modules are high-reliability, rugged RS-485 interfaces, well suited for industrial and telecommunication purposes. The RS-485 bus network topology is also known as party line. Using a half duplex transmission principle, this method is requiring a single twisted pair cable only, by connecting together driver outputs and receiver inputs. The **VRM-CU7-RS485-1** allows for up to 32 networking nodes, sharing a common bus. Typically, all devices receive permanently all messages, but there is only one sender allowed to be enabled at a given time. Point-to-point interconnections however can be established as a full-duplex 4-wire line (sending and receiving data simultaneously). The **VRM-CU7-RS485-2** is therefore equipped with separated drivers and receivers. While providing data transfer rates up to 2.5Mbps, both modules are protected against ESD up to 15kV and electrically isolated up to 500V.

The **VRM-CU7-RS485-X** modules are intended for use especially with the serial interface boards VRM-CU1 and VRM-CU2. These CompactPCI® cards have their TTL level serial ports routed to J4/J5, respective J2, for rear-I/O by additional PHY (physical layer) modules. Mounted onto the CPCI backplane from behind, the additional distribution board VRM-CU9-1 for up to 16 ports, or VRM-CU9-2 for a maximum of 4 ports, is equipped with metric 2mm pin headers, matching the flat ribbon cable assemblies to the particular PHY modules.

As data rates increase, proper termination on both ends of the RS-485 bus becomes important. A popular approach is to use external termination, having the resistors located within the shell of the DB9 connectors. As an alternative, termination resistors can be stuffed directly on the VRM-CU7-RS485 board. Due to miniaturized SMD components, a properly equipped working place is highly recommended.

Typically, the termination resistor value is 120 or 130 Ohm, ideally matching the twisted pair cable impedance. When calculating, the optionally stuffed bias resistors for open-line fail-safe termination would lie in parallel. Normally this effect can be disregarded. Any party line network must be terminated at the extreme ends of its bus. Stubs in order to attach particular nodes are not allowed.

When establishing a point-to-point full-duplex interconnection, both data directions, receiver and driver lines, require termination. This means, in addition to the A/B line, the Y/Z line must also be terminated.

The RS-485 receivers used in the MAX1480/MAX1490 have an internal built-in-fail-safe feature, so that the resistors R17/R18 and R22/R23 normally should not be stuffed. If for some reason bias resistors for open line fail-safe termination are required, a nominal value of 750 or 820 Ohm is recommended.

V Rose recommends using a two pair cable, with one or both wires of the additional pair dedicated as the common ground. Connect these additional wires directly to the Shield1 and Shield2 pins of the DB9 connector for proper grounding.

A shield, that covers the two cable pairs, should be connected to the pin 1 of the connector (it is equivalent and sufficient to connect the shield with the metallic shell of the DB9 connector). This shield should be grounded at one point only (isolate the shield at the opposite cable end in order to avoid any contact with the connector hood).

Features:

- Rear I/O Module (60x31mm²)
- PHY Transceiver RS-485 (EIA/TIA-485-A)
- Maxim MAX1480EA (VRM-CU7-RS485-1) or Maxim1490EA (VRM-CU7-RS485-2), electrically isolated
- 2-Wire line TxD/RxD, driver and receiver connected, operation mode half-duplex, the transmitter (driver) is enabled by signal RTS, receiver has a fail-safe feature if the input is open circuit, external connector D-Sub 9-pos. Male (VRM-CU7-RS485-1)
- 4-Wire line TxD,RxD, driver and receiver not connected, operation mode full-duplex, the transmitter (driver) is permanently enabled, receiver has a fail-safe feature if the input is open circuit, external connector D-Sub 9-pos. Male (VRM-CU7-RS485-2)
- 2.5Mbps max. (VRM-CU7-RS485-1), 2 x 2.5Mbps max. (VRM-CU7-RS485-2)
- ±15kV (Human Body Model) ESD Protection
- ±500V DC max. Isolation Voltage
- Short circuit current limited, protected against excessive power by thermal shutdown
- +5V 0.3A max.
- Operating temperature: 0-70°C (extended temperature range available upon request)
- Relative humidity 5-90% non-condensing



Ordering Options:

VRM-CU7-RS485-1: RS-485/RS-422 Rear I/O PHY interface module, 1 port, 2.5Mbps two wire transmission line (half-duplex party line), electrically isolated

VRM-CU7-RS485-2: RS-485/RS-422 Rear I/O PHY interface module, 1 port, 2.5Mbps 4-wire transmission line (full-duplex point-to-point), electrically isolated.