

**Kestrel TTL to RS-232 Converter**

**FEATURES**

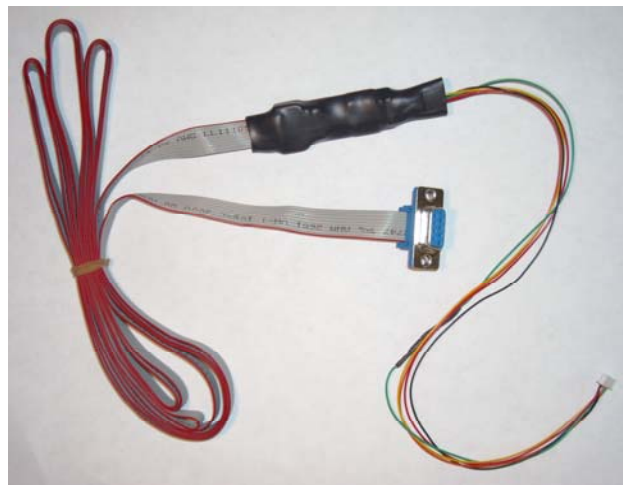
- Light weight: 59 grams
- Small Size: 0.563" x 1.5" x 0.25"

**APPLICATION**

- Updating Kestrel Autopilot Firmware
- Direct Communications with Kestrel through Virtual Cockpit
- Interface a supported RS-232 serial protocol device with the TTL level Kestrel Autopilot

**DESCRIPTION**

The Rabbit TTL to RS-232 Converter allows RS-232 sensors and other devices to communicate with the Kestrel autopilot at TTL level serial communications. The Converter contains an active circuit board that converts RS-232 voltage levels used by the PC serial port to CMOS voltage levels used by the Rabbit.



The main uses of the Kestrel TTL to RS-232 Converter include updating the Kestrel Autopilot Firmware, Direct communications with the Kestrel Autopilot through the Virtual Cockpit, and interfacing RS-232 devices with the Kestrel Autopilot through one of its TTL level serial ports.

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**ABSOLUTE MAXIMUM RATINGS**

Input Supply Voltage ..... 5.5V  
 Operating Temperature Range ..... -40°C to 85°C  
 Storage Temperature Range ..... -40°C to 125°C  
 Humidity ..... 5% to 95%, no condensing

Stresses above those listed under the Absolute Maximum Ratings may cause permanent damage to this device. This is a stress rating only; functional operation of this device at these or any other conditions above those indicated in the operational section of this specification are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability

**ELECTRICAL CHARACTERISTICS**

Parameter	Conditions	Min	Typ	Max	Units
Supply Input Voltage (Vcc)		3.0	3.3 and 5.0	5.5	V
Logic Output Voltage					
Low				0.6	V
High		Vcc-0.7		Vcc	V
Logic Input Voltage					
Low				0.8	V
High		2.0		Vcc	V

## PHYSICAL CHARACTERISTICS

Parameter	Conditions	Typ	Units
Dimensions		0.563" x 1.5" x 0.25"	Inches
Weight		59	Grams

## RELATED PARTS

The following table contains parts that may be used with the Servo Expansion Board. These parts can be purchased from Procerus Technologies or distributors like Digikey or Mouser.

Part Number	Manufacturer	Description	Comments
MOLEX5POS-L12	Procerus Technologies	5 PIN 1.25MM 12" WIRE PIGTAIL CONNECTOR	5 pin pigtails for Kestrel autopilot serial (Port E)
50058-8000	Molex/Walden	CONN TERM FEMALE 28-32AWG TIN	Crimp Terminal (Used For Hand Crimping)
51021-0500	Molex/Walden	CONN HOUSING 5POS 1.25MM	5 Pin Connector Housing (Used For Hand Crimping)

## TYPICAL APPLICATION

### Kestrel Firmware Updates

The Converter can be used to update Kestrel firmware by plugging the 5-pin Kestrel connector into port A of the Kestrel Autopilot. This results in pulling the Rabbit 2000 SMODE lines high, and causes the Rabbit to enter cold boot mode after a reset. The reset occurs when the RFU opens the serial port of the PC with the DTR line high, and then changes it to low. This pulses the reset line on the RabbitLink. In cold boot mode the processor runs a small program contained in an internal ROM. This program receives triplets sent by the PC. It is through this mechanism that the RFU sends firmware to the RabbitLink.

### Direct Kestrel-Virtual Cockpit Communications

The Converter can be used to facilitate direct communications, between a Kestrel Autopilot and the Virtual Cockpit software, thus bypassing wireless modem communications. This is achieved by plugging the 5-pin Kestrel connector into the Modem port of the Autopilot, and connecting the DB9 connector into the serial port of your computer or into a USB to RS-232 adapter connected to a PC. Next, power-up the Kestrel Autopilot and the run the Virtual Cockpit application. Then from the Virtual Cockpit, select the correct Com port and open the connection. Commands can then be sent to Autopilot directly through the Kestrel TTL to RS-232 Converter cable.

### Interface RS-232 Serial Device with Kestrel TTL Serial Ports

The Converter can be used to connect supported devices to the Kestrel Autopilot that communicate using RS-232 serial communications to a Kestrel Autopilot TTL level serial port.

## PORT DESCRIPTIONS

This section describes ports or pin out on the Kestrel TTL to RS-232 Converter. The pinout for DB9 Connector associated with the RS-232 side of the Converter Board is shown in Figure 1. The pinout for the Kestrel autopilot connector is shown in Figure 2 and the pinout for the converter board is shown in Figure 3.

**Ground:** Power common ground. This pin connects to all grounds on this device.

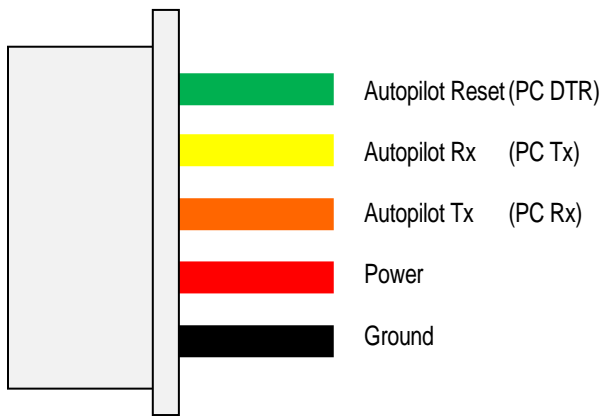


Figure 2 Kestrel 5-pin Connector Pinout

**VIN:** Converter power. Connect this pin to +5 or +3.3 Volts from autopilot. This pin powers the onboard IC.

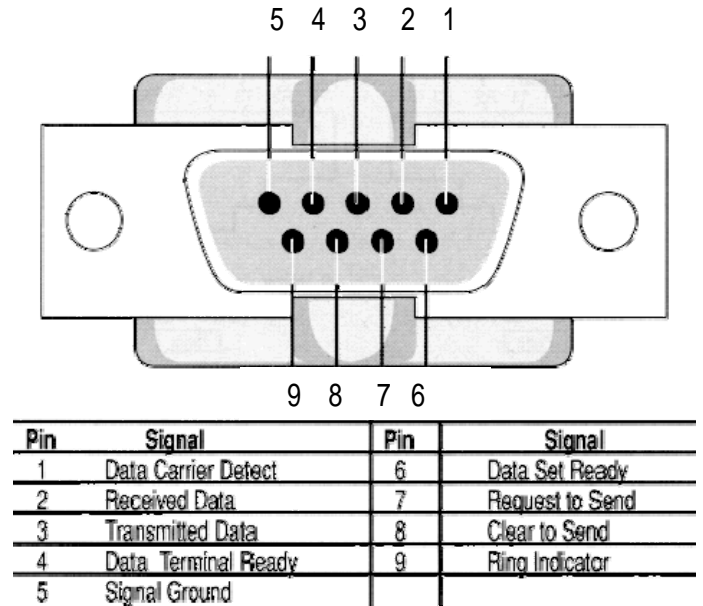
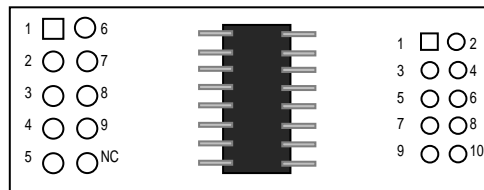


Figure 1 RS-232 DB9 Connector Pinout

Figure 3 Converter Board Pinout



### TTL (Autopilot)

1. Autopilot Rx
2. Ground
3. Clock
4. VIN (3V-5V)
5. Autopilot Reset
6. Autopilot Tx
7. Not Connected
8. Status
9. SMode 0
10. SMode 1