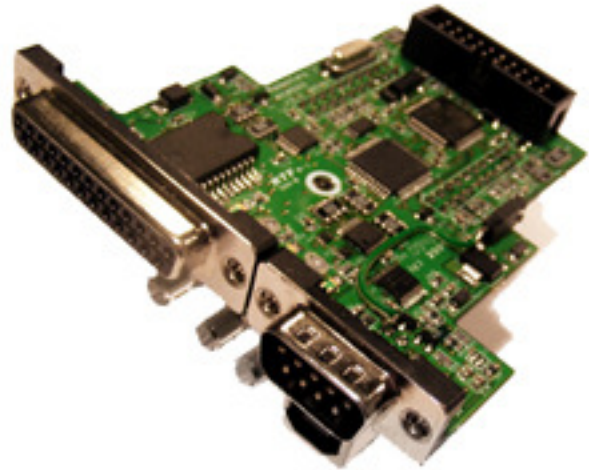




US-BOARDS RCB500 Controller



US-BOARDS High Performance Controller Board RCB500 is a data acquisition and processing board able to process analog and digital inputs and to control several digital outputs. RCB500 feature an easy to use BASIC like programming language and a powerful programming and testing environment running on almost any Microsoft Windows Operating System.

Equipped with a high performance 32 bit microprocessor the RCB500 can operate as a stand-alone programmable device, requiring no connection to a PC.

Connectivity

All the RCB500 I/O connections are done using the two DB 25 and DB 9 connectors on the front of the board. Connectivity to a PC is provided by a RS232 or USB line.

Data lines can be

DIN : 5 Volt Digital Inputs

ANA1: 0 – 5 Volt analog inputs

Pulse (RC radio) lines

DOUT: 24 Volt 1 A max Digital Outputs

Applications

The DAB-500 can be used in a wide range of applications, where sensing of several inputs, complex data processing capabilities, ease of configuration are required. It is specially suited for

- Industrial Automation
- Alarm systems
- Robotics
- Automatic Guided Vehicles
- Flight simulators
- Remote presence Systems

Features list

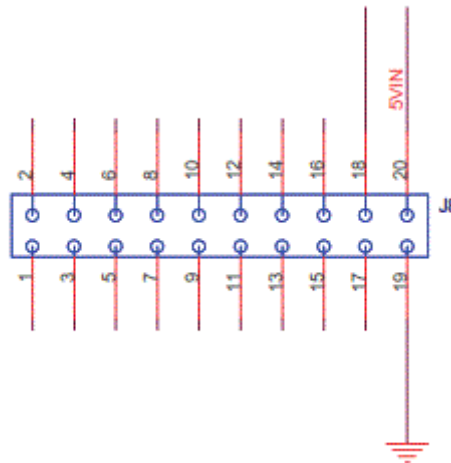
- USB, RS232, 0-5V Analog, or Pulse (RC radio) command modes.
- Easy connection to PC via USB, RS232 interface
- Auto switch between USB, RS232, Analog, or Pulse based on user-defined priority



- Custom scripting in Basic language. Execution speed 50,000+ lines per second
- Up to 11 Analog Inputs
- Up to 6 Pulse Length, Duty Cycle or Frequency Inputs for use as command and/or feedback
- Up to 21 Digital Inputs
- Dual Quadrature Encoder inputs with 32-bit counters
- 8 general purpose 24V, 1A output for accessories or relay control
- Selectable min, max, center and dead band in Pulse and Analog modes
- Selectable exponentiation factors for each command inputs
- Trigger action if Analog, Pulse or Encoder capture are outside user selectable range (soft limit switches)
- Diagnostic LED
- -40° to +85° C operating environment
- Easy configuration, tuning and monitoring using provided PC utility
- Field upgradeable software for installing latest features via the internet

Power Connection

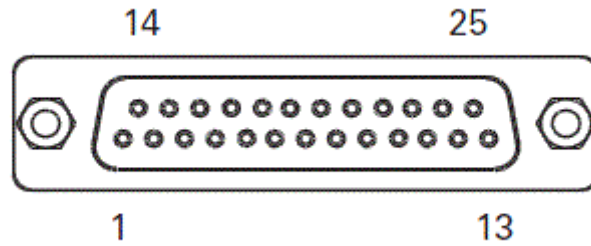
The board is powered by a 5 V external power supply. Connection is made via the provided flat ribbon connector, connected to pin 19 (GROUND) and 20 (5 Volts) of connector J8. A stabilized power supply (5V, 200 mA) must be used.



1 Power In 5 Volt connection

Data Connection

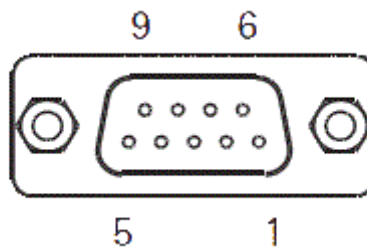
Connection to RC Radio, Joystick and other low current sensors and actuators is done via the 25 and 9 pin connectors located in front of the connector. The functions of many pins vary depending on user configuration. Pin assignment is found in the tables below (Table 1 and Table 2).



2 Main Connector pin locations

Table 1

Connector Pin	Power	Dout	Com	Pulse	Ana	Dinput	Enc	Default Config
1	GND							
14	5Vout							
2			TxData					Rs232Tx
15				RC1	ANA1	DIN1		RcRadio1
3			RxData					Rs232Rx
16				RC2	ANA2	DIN2		RcRadio2
4				RC3	ANA3	DIN3		AnaCmd1
17				RC4	ANA4	DIN4		AnaCmd2
5	GND							
18		DOUT1				DIN12		Unused
6		DOUT2				DIN13		Unused
19		DOUT3				DIN14		Unused
7		DOUT4				DIN15		Unused
20		DOUT5				DIN16		Unused
8		DOUT6				DIN17		Status Led
21				RC5	ANA5	DIN5		Unused
9	GND							
22				RC6	ANA6	DIN6		Unused
10					ANA7	DIN7		Unused
23					ANA8	DIN8	ENC2B	Unused
11					ANA9	DIN9	ENC2A	Unused
24					ANA10	DIN10	ENC1B	Unused
12					ANA11	DIN11	ENC1A	Unused
25	5Vout							
13	GND							



3 Secondary connector pin locations

Table 2



Connector Pin	Power	Dout	Com	Pulse	Ana	Dinput	Enc	Default Config
5		DOUT7				DIN18		Unused
9	5Vout							
4			SCLI					Reserved
8			SDAI					Reserved
3	GND							
7			CANH					Reserved
2			CANL					Reserved
6	GND							
1		DOUT8				DIN19		Unused

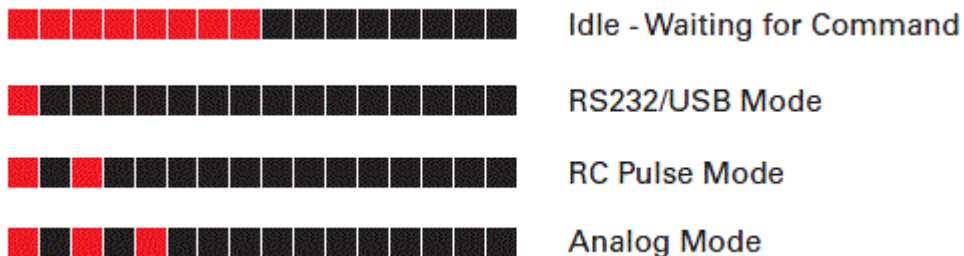
Default I/O Configuration

While the controller can be configured so that practically any Digital, Analog and RC pin can be used for any purpose, the controller’s factory default configuration provides an assignment that is suitable for most applications.

The figure below shows how to wire the controller to two analog potentiometers, an RC radio, and the RS232 port. It also shows how to connect two outputs to motor brake solenoids and another output to an external status LED. You may omit any connection that is not required in your application. The controller automatically arbitrates the command priorities depending on the presence of a valid command signal in the following order: 1-RS232, 2-RC Pulse, 3-Analog. If needed, use the Roborun+ PC Utility to change the pin assignments and the command priority

Status LED Flashing Patterns

After the controller is powered on, the Power LED will turn on, indicating that the controller is On. The Status LED will be flashing at a 2 seconds interval. The flashing pattern provides operating or exception status information.



4 Normal operations flashing pattern

Additional status information may be obtained by monitoring the controller with the PC utility.

Electrical Specifications

Absolute Maximum Values

The values in the table below should never be exceeded, Permanent damage to the controller may result.



Table 3

Parameter	Measure Point	Min	Typ	Max	Units
Analog and Digital Input Voltage	Ground to any signal pin on 25 & 9 pin connectors			15	Volts
RS232 I/O Pins Voltage	External Voltage applied to Rx/Tx Pins			15	Volts
Digital Output Voltage	Ground to Output Pins			30	Volts
Max Power Voltage	Ground to Power Supply Pin		5	5.5	Volts

Command, I/O and Sensor Signals Specifications

Table 4

Parameter	Measure Point	Min	Typ	Max	Units
Digital Output Voltage	Ground to Output Pins			30	Volts
Digital Output Current	Output pins, sink current			1 (2)	Amps
Output On resistance	Output pin to ground		0.75	1.5	Ohm
Input Impedances (except DIN12-19)	AIN/DIN Input to Ground		53		KOhm
Input Impedance (DIN12-19)	Input to 5V		50		kOhm
Digital Input 0 Level	Ground to Input pins	-1		1	Volts
Digital Input 1 Level	Ground to Input pins	3		15	Volts
Analog Input Range	Ground to Input pins	0		5.1	Volts
Analog Input Precision	Ground to Input pins		0.5		%
Analog Input Resolution	Ground to Input pins		2.5		mV
Pulse durations	Pulse inputs	20000		10	us
Pulse repeat rate	Pulse inputs	50		250	Hz
Pulse Capture Resolution	Pulse inputs		1		us
Frequency Capture	Pulse inputs	100		10000	Hz

1: sum of all 5 Vout outputs

2: Total average current on all outputs not to exceed 4.5 A

Operating & Timing Specifications

Table 5

Parameter	Measure Point	Min	Typ	Max	Units
Command Latency	Command to output change		0.5	1	ms
USB Rate	USB pins			12	Mbit/s
RS232 baud rate	Rx & Tx pins		115200(1)		bps

1: 115200, 8-bit, no parity, 1 stop bit, no flow control

Scripting

Parameter	Measure Point	Min	Typ	Max	Units
Scripting Flash Memory	Internal		8192		Bytes
Max Basic Language programs	Internal	1000		1500	Lines
Integer Variables	Internal		1024		Words(1)
Boolean Variables	Internal		1024		Symbols
Execution Speed	Internal	50000	100000		Lines/s

1: 32 – bit words