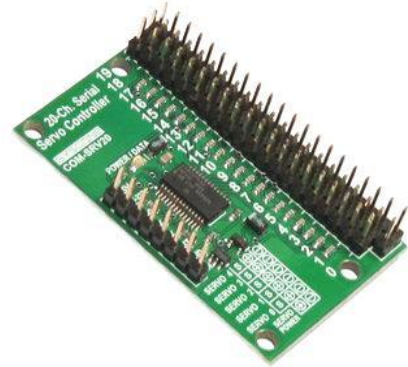


Syscone Robotics

COM-SRV20

20-Channel Serial Servo Controller



The SYSCONE **COM-SRV20** servo controller allows to control up to twenty servos from almost any robot controller or computer.

The COM-SRV20 servo controller has the following specifications:

- PCB size: 2.1" x 1.3" (55mm x 33mm)
- Controls up to 20 servos
- Serial interface (RS-232 or TTL) @ 9600b/s
- Data In voltage levels: 5V (TTL) or +/-15V (from RS-232 connector)
- Accepts 3.3V Data In from 0-3.3V (Logic) Interfaces (no 3.3V to 5V conversion needed)
- Servo type supported: Futaba, Hitec, T-pro, EXI, etc.
- Power supply: Servo powered (min. 5V) or external power (from 5V to 12V)
- Servo travel range: 0 – 180°
- PWM pulse width range: 0.5mS - 2.5mS
- Servo resolution: 1uS, .09° (200 steps / 180°)
- MiniSSC-II communication protocol [sync marker "FF"(255)] [servo#(0-19)] [position(0-200)]
- Low power consumption: 15mA
- Power / Activity indicator
- Simple, easy to use commands (MiniSSC-II)

1 Introduction

The **COM-SRV20** servo controller is a very compact solution for controlling up to 20 radio control (RC) servos from a computer or microcontroller. The controller measures just 2.1" x 1.3", it incorporates a 5V servo powered voltage regulator (no need for external power supply, it can provide up to 150mA power for an external microprocessor), and yet it is one of the most robust servo controllers available. Each servo range can be controlled independently, including any standard RC servos or the giant 1/4-scale servos.

The communication protocol used is similar (compatible) to the MiniSSC II servo controller and any software written for it. The COM-SRV20 servo controller is less than half the size and price of similar servo controllers. This means that the servo controller is an ideal solution even if you need to control few or many servos. The interface to the servo controller is a standard RS-232 serial port with +/-15V levels or TTL-levels (5V or 3.3V Logic Levels), using 9600b/s baud rate.

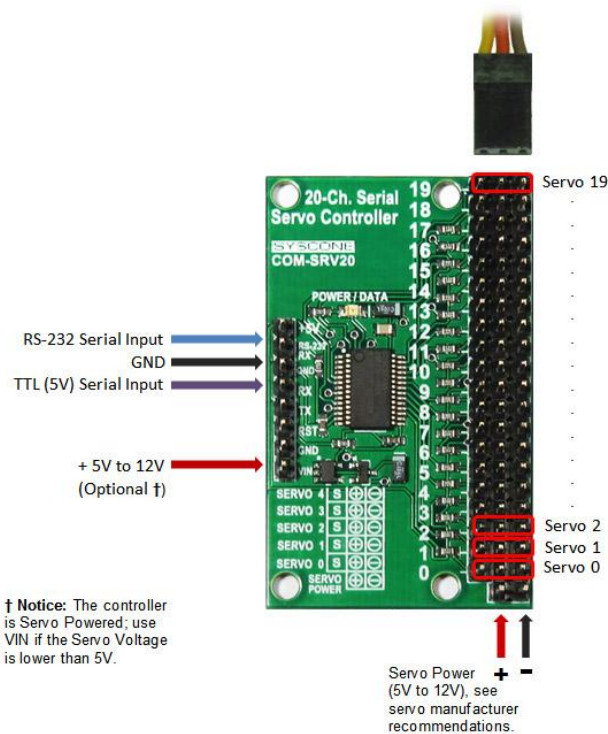


Figure 1.1 COM-SRV20 Servo controller

2 Connecting the Servo Controller

- ✓ Connect the **power supply** for the servos, making sure to observe the '+' and '-' markings on the board. The servo supply should typically range from 5.0-6.0 volts. If a large number of servos will be straining simultaneously, the total current can be close to 10 amps. In such applications, solder the power supply wires directly on the board.
- ✓ Connect the **RC servos** as shown in the picture; the black/brown wire should be closest to the edge of the board. Make sure to connect the servos correctly or they may be destroyed.
- ✓ Connect the **serial input data** to the "RS-232 RX" in case of using a RS-232 connector(+/- 15V), or to the RX input in case of using a TTL signal(0- 5V levels, 0-3.3V levels will be also accepted)

- ✓ In case of using less than 5V Power Supply for Servos, the controller will need an additional power supply (+5 to +12V) to work correctly, connected to "VIN" pin.
- ✓ The servo controller board can provide the +5V to an external microprocessor (up to 150mA) at "+5V" pin.

The **COM-SRV20** servo controller uses a very simple protocol (like the Mini SSC II):

Byte 1	Byte 2	Byte 3
[sync marker "FF" (255)]	[servo # (0-19)]	[position (0-200)]

To command a servo to a new position requires sending three bytes at the serial rate of 9600b/s baud, no parity check, and 1 stop bit (known as 9600N1).

These must be sent as individual byte values, not as text representations of numbers as you might type at a keyboard.

The Power/Activity LED on the COM-SRV20 board it lights steadily when power is applied to the board and stays on until data is received, when the data is received the LED will start blinking.

Example (serial port set to 9600b/s, no parity, 1 stop bit):

255 1 129	255 4 23	255 19 33
(servo #1 to pos. 129 , servo #4 to pos. 23 , servo #19 to pos. 33)		
255(FF Hex)	19	33 (decimal)
1111 1111	00010011	00100001 (binary)

In case of using **180° servos** (-90° to +90°) the position range will be from **0 to 200** (0.5ms to 2.5ms pulse).
 In case of using **90° servos** (-45° to +45°) the position range will be from **50 to 150** (1ms to 2ms pulse, see servo manufacture recommendations).

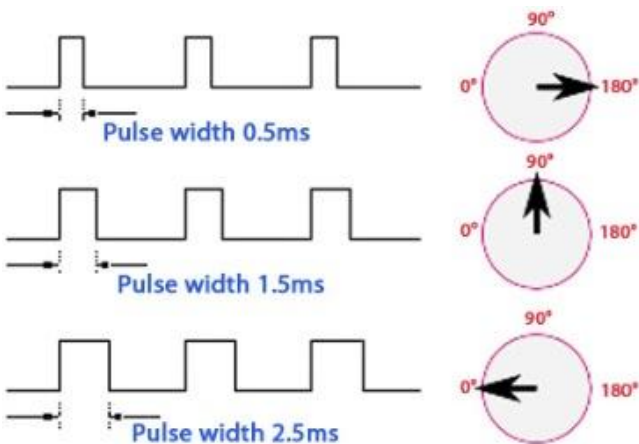


Figure 2.1 COM-SRV20 Servo positions (see manufacture specifications)

3 Examples

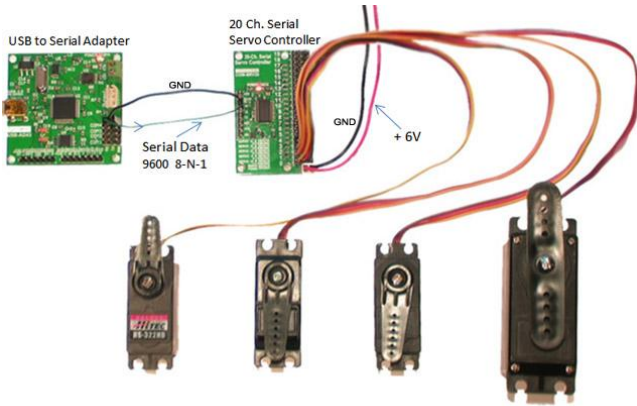


Figure 3.1 COM-SRV20 Example – Driving 4 servos

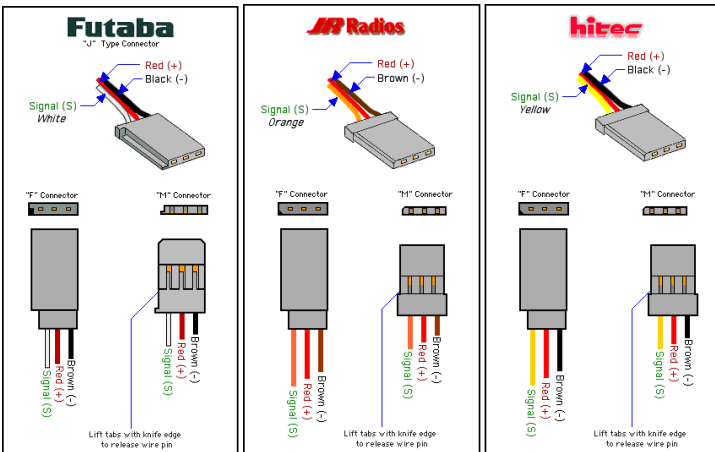
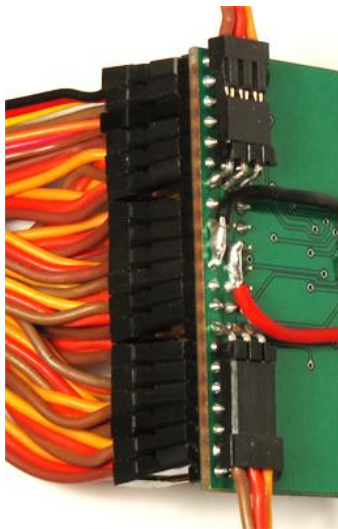


Figure 3.2 Servo connectors



- If the total current required to power the servos exceeds 2A, we recommend soldering the power supply wires directly on the board like in Figure 3.3.
- Some servo connectors are bigger than others (every manufacturer has his own type of connector), see Figure 3.2, in this case connect groups of 6 servos, on the top of the board, the two remaining servos (#6 and #13) will be solder on the bottom of the board, see Figure 3.3 (the two 90° headers to be soldered are provided with the board).
- **MAKE SURE YOU CONNECT CORRECTLY THE POWER SUPPLY, AND THE SERVOS (BROWN/BLACK WIRE ON THE EDGE OF THE BOARD).**

Figure 3.3 Power supply / Servo connections

4 Servo controller - PC Utility

The utility provided for the **COM-SRV20** servo controller can be downloaded from the support page:

<http://www.syscone.com/support/com-srv20>

Before starting the Utility, insert the serial port adapter and then choose the corresponding COM port from the list.

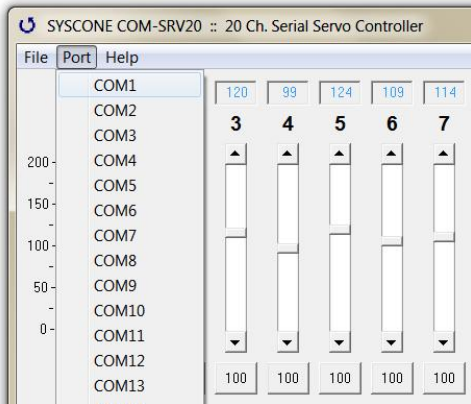


Figure 4.1 Servo controller Utility – serial port selection

If you receive a “COM port already in use” or “Operation is valid only when the port is open” error Unplug and Plug back the serial port adapter (or use Enable/Disable in Device Manager).

In case the desired COM port is not on the list, change the COM Port Number to a lower number:

1. Go to **Control Panel**, and then double-click **System**.
2. On the **Hardware** tab, click **Device Manager**.
3. Double-click **Ports (COM & LPT)**.
4. Double-click the appropriate COM port.
5. On the **Port Settings** tab, click **Advanced**.
6. In the **COM Port Number** box, click the appropriate number (from 1 to 256).
7. Click **OK**.

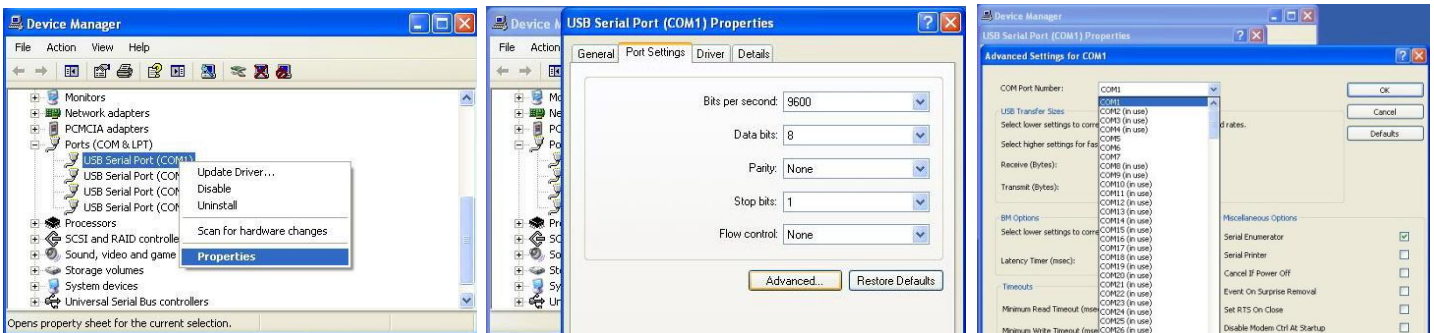


Figure 4.2 Changing the Serial Port Number

For sending a complex command, use the Space key between bits / commands like in Figure 4.3.
Use the **WAIT** command, followed by the number of seconds you want to delay the next servo command.

Usage:

- FF 1 24** (servo #1 to pos. 24)
- WAIT 0.3** (wait for 0.3 seconds)
- FF 19 200** (servo #19 to pos. 200)

Enable the **“LOOP”** function in case you want to repeat the sequence. To stop the sequence Uncheck the **“LOOP”** box.
FF = 255 (use FF or 255 for sync byte)
Instead of **“WAIT”** you can use: **“DELAY”** or **“HOLD”** or **“SLEEP”** followed by Space key and the number of seconds.

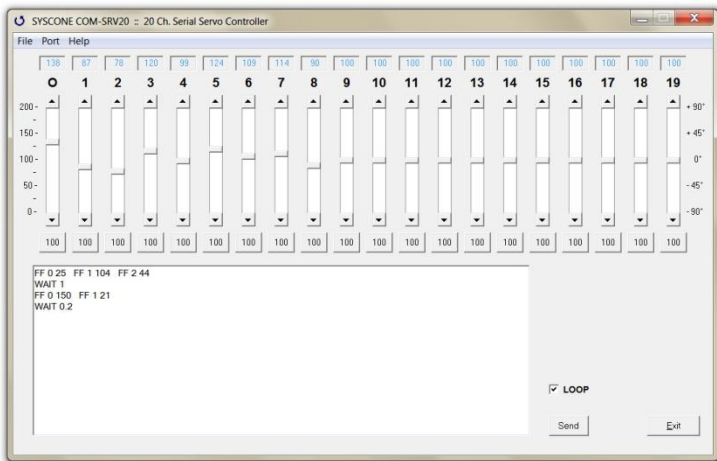


Figure 4.3 Servo controller Utility (installed)

5 Mechanical Details

- PCB size: 2.1" x 1.3" (55mm x 33mm)
- Mounting holes Ø: 0.12" (3.1mm)
- Weight: 0.38oz (11g)
- Distance between the mounting holes: 1.9" (50mm) / 0.7" (20mm).

6 Contact Information

For more information please visit COM-SRV20 support page:
<http://www.syscone.com/support/com-srv20>

Technical support may be obtained by email:
<http://www.syscone.com/contact>