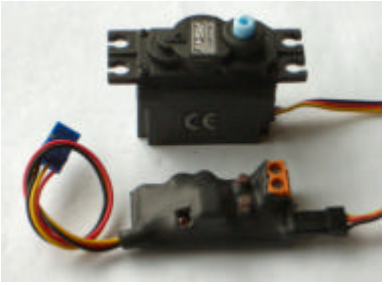
Timpdon Electronics

UltraRad Radio System
Servo Controller
Model *URC7*



For operation, the ***URC7*** requires the following additional ***UltraRad*** radio system components, supplied separately:

UltraRad **Radio Transmitter Model *UTX1, UTX2* or *UTX3***

UltraRad **Radio Receiver Model *URX1***

Features

- Connects directly to any ***UltraRad*** radio receiver.
- Can be locked to any ***UltraRad*** transmitter.
- Controlled switched motion between two servo positions, using either **Aux 1** or **Aux 2** ***UltraRad*** transmitter switches. Uses any standard RC servo.
- Fully user programmable for control switch selection, independent servo end positions, rotation speed and end of travel bounce. Programmed settings retained when power removed.
- Ideal for control of crossing gates and barriers, points and semaphore signals.
- Digital microprocessor controlled.
- Small size – 45mm x 20mm x 15mm.
- 4.8 V to 6 V d.c. supply - suitable for battery operation.

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Issue 1 – February 2011
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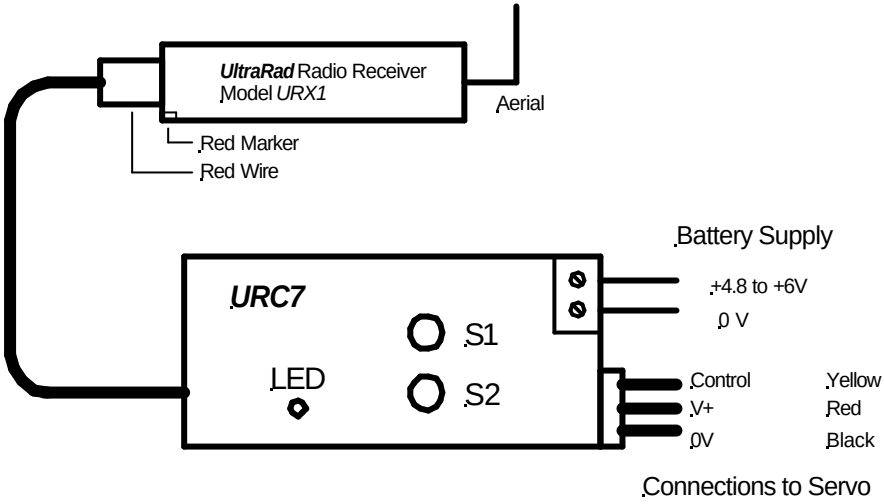
Installation and Wiring



Notes

1 Connect a d.c. supply of between 4.8 V and 6V to the screw terminals, as shown. – Please read the **Cautionary Notes** below, before selecting your power source.

Do not exceed the maximum permitted nominal supply voltage of 6 V. Although the ***URC7*** will accommodate higher voltages without blowing up, many RC servos will not.

Ensure that the power supply polarity is correct before powering up.

2 Connect the flying lead directly to the 3 pin connector on the ***URX1 UltraRad*** radio receiver.

3 Plug the servo connector on to the three pin plug connector on the opposite end of the ***URC7***. Ensure that the **black** wire on the servo is positioned towards the bottom edge of the ***URC7***, as shown.

Operation

1 Once locked to a particular ***UltraRad*** transmitter and programmed, as described below, simply select the required servo end position, **Set** or **Reset** using the appropriate **Aux1** or **Aux2** switch on your ***UltraRad*** Transmitter.

Each switch **on** position corresponds to the **set** output condition of the ***URC7***, and the switch **off** condition to **reset**.

When the selected switch is operated, the servo will move to the opposite programmed position, at the programmed rotation speed.

2 If a bounce level is programmed for the current direction of travel then, as soon as the programmed end position is reached the servo will reverse to the bounce position at the same speed, reverse again and finally return to the programmed end position at the same speed. This feature may be used to realistically simulate bounce at end of travel of semaphore signal arms or crossing gates and barriers. If you do not require bounce in either direction of travel, program the relevant bounce level to zero bounce.

3 Once the servo started has started moving towards either the **Set** or **Reset** position it can not be stopped or reversed until it has completed its programmed travel, and a further period of 1 second has elapsed.

4 The **LED** indicator will flash once each time a valid data transmission is received from the ***UltraRad*** transmitter, and will illuminate continuously while the servo is moving from one end position to the other. During this period, the ***URC7*** will not respond to any further ***UltraRad*** transmissions.

Transmitter Lock

Before the ***URC7*** can be used, it must be locked to a particular UltraRad transmitter. To perform a transmitter lock:

1 Ensure that your transmitter is on and transmitting, and that the ***URC7*** is not powered up.

2 Press and hold **both** push button switches **S1** and **S2** on the ***URC7***.

3 Whilst both switches are pressed, apply power to the ***URC7***.

4 Wait until the **LED** on the ***URC7*** first illuminates and then goes off.

5 Then release both switches **S1** and **S2**.

If the ***URC7*** has correctly locked to the transmitter, the **LED** will now flash in synchronism with the transmitter **Tx LED**. Once locked, settings are retained in non-volatile memory and retained even when power is removed from the ***URC7***.

If the ***URC7*** fails to lock on the first attempt, repeat the procedure from **Step 1**.

Transmitter Input Selection

The ***URC7*** can be set to respond to either the **Aux 1** or **Aux 2** control switch of the transmitter. This feature permits two separate ***URC7*** units to be independently controlled from one transmitter. Transmitter input selection may be performed at any time.

To change the transmitter input to which the ***URC7*** will respond:

1 Ensure that the ***URC7*** is not powered up. The transmitter may be either on or off.

2 To select the **Aux 1** input, press and hold the **S1** push button switch **only**.

To select the **Aux 2** input, press and hold the **S2** push button switch **only**.

3 Whilst the appropriate switch is pressed, apply power to the ***URC7***.

4 Wait until the **LED** on the ***URC7*** first illuminates and then goes off.

5 Then release switch **S1** or **S2**.

The ***URC7*** will save the selected input selection in non-volatile memory and, thereafter, respond only to the selected input switch on the transmitter, until changed again.

Servo Programming

Servo programming or re-programming may be performed at any time, using push button switches **S1** and **S2**, with indication provided by the **LED** indicator.

Programming is performed in **five** steps, in order – **Set Position**, **Reset Position**, **Rotation Speed, Reset Bounce Level** and **Set Bounce Level**. No new programmed settings will be saved unless **all five** programming steps are correctly completed, in sequence.

The **Set** and **Reset** positions of the servo may be anywhere within the operating range of the servo – approximately 160 degrees rotation on most servos.

Servo programming may be performed with the transmitter either on or off.

Servo Programming Procedure

With the ***URC7*** powered up, press and hold **both** push button switches **S1** and **S2** together until the **LED** illuminates continuously, after about 2 seconds. Then release both switches.

1 You are now in **Step 1 – Program Reset Position**.
The **LED** will flash with **single short** flashes.

Adjust the required **Reset** position using either **S1** to increase the servo position or **S2** to decrease it. The actual rotation direction is servo dependent.

When satisfied, press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about two seconds. Then release both switches.

2 You are now in **Step 2 – Program Set Position**.
The **LED** will flash with **double short** flashes.

Adjust the required **Set** position using either **S1** to increase the servo position or **S2** to decrease it. The actual rotation direction is servo dependent.

When satisfied, press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about two seconds. Then release both switches.

3 You are now in **Step 3 – Program Rotation Speed**.
The **LED** will flash with **single long** flashes.

In programming step 3, the servo will rotate continuously between the two end positions which have already been programmed, at the current rotation speed.

There are sixteen steps of rotation speed, varying from about 0.25 s to 20 s for 90 degree rotation. Press and release **S1** to increase the speed by one step, or press and release **S2** to decrease it by one step.

Please read the **Cautionary Notes** below before attempting to use very high rotation speeds.

After the last step, the rotation speed will revert to the other end of the speed scale.

When satisfied, press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about two seconds. Then release both switches.

4 You are now in **Step 4 – Program Reset Bounce Level**.
The **LED** will flash with **single long** followed by **single short** flashes.

In programming step 4, the servo will rotate continuously between the programmed **Reset** position and the position represented by current Reset Bounce level, at the programmed rotation speed.

There are sixteen steps of bounce level, varying from zero to approximately 20% of the programmed servo range between **Set** and **Reset**. Press and release **S1** to increase the bounce level by one step, or press and release **S2** to decrease it.

After the last step, the bounce level will revert to the other end of the setting range. To disable bounce, set the bounce level to zero.

When satisfied, press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about two seconds. Then release both switches.

5 You are now in **Step 5 – Program Set Bounce Level**.
The **LED** will flash with **single long** followed by **double short** flashes.

In programming step 5, the servo will rotate continuously between the programmed **Set** position and the position represented by current Set Bounce level, at the programmed rotation speed.

There are sixteen steps of bounce level, varying from zero to approximately 20% of the programmed servo range between **Set** and **Reset**. Press and release **S1** to increase the bounce level by one step, or press and release **S2** to decrease it.

After the last step, the bounce level will revert to the other end of the setting range. To disable bounce, set the bounce level to zero.

When satisfied, press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about two seconds. Then release both switches.

6 At this point **only**, programming is complete. All new settings will now be saved in non-volatile memory, and applied to ***URC7*** operation. The unit will then automatically exit programming mode, the **LED** will extinguish and the ***URC7*** is ready for normal operation.

Cautionary Notes

1 The current consumption of a servo, when in motion, increases with the rotation speed. At high rotation speeds, the current on a single standard servo can reach as much as 500 mA.

Most small batteries [eg AA cells] used by many modellers to power servos can not supply this level of current without a significant voltage drop, in the order of one or two volts, at the battery terminals. With

4.8V supplies, or with partially discharged batteries, this may well result in erratic servo operation if the battery terminal voltage falls below the minimum specified servo operating voltage.

If you experience such erratic operation, either reduce the servo rotation speed or improve your power supply arrangements before assuming that the ***URC7*** is faulty and returning it for repair.

2 Although the rotation speed of the ***URC7*** can be programmed to a maximum speed of 0.25 seconds for 90 degree rotation, many servos can not achieve this speed.

If you program a rotation speed higher than the servo can actually achieve the servo will not be able to keep up with the programmed output of the ***URC7*** when moving between **Set** and **Reset**, and vice versa.

If this occurs, and you have bounce levels programmed, the actual bounce levels achieved in normal operation may vary considerably from those programmed, or even be lost completely. This problem is likely to be more apparent if you have programmed a large angle of rotation between **Set** and **Reset**.

If this happens, reduce the programmed rotation speed until the effect is corrected, or change the servo for one with a higher maximum rotation speed.

For the ***ACOMS AS17*** servo, supplied by ***Timpdon Electronics***, the maximum specified rotation speed is approximately 0.35 s for 90 degree rotation at 5V.

Using Two URC7 Controllers with a single URX1 Receiver

For installations where two ***URC7*** controllers are required, operated by both **Aux 1** and **Aux 2** controls on your transmitter, they may both be operated from a single ***URX1 UltraRad*** radio receiver.

Connect the receiver to both ***URC7*** controllers using, for example, a standard servo '**Y**' connector lead, but make sure that the ***URX1*** is powered from only one of the controllers by cutting out the +5 V supply lead from one ***URC7***.

This is the **red** wire on the ***URC7*** flying lead, but may be coloured differently on the servo '**Y**' lead used to make the interconnection.