# Robo Voice Effects - – Talking Robots

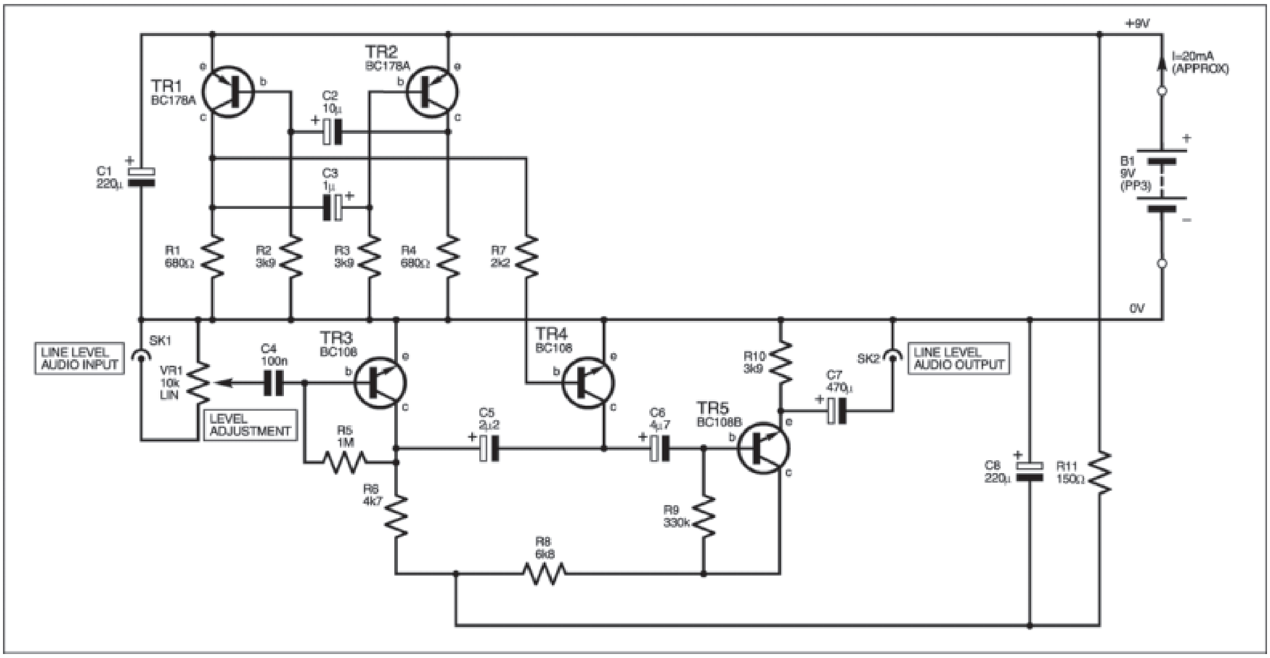

*Fig.2. Complete circuit diagram for the Robot Voice Effects.*

The fact that time division multiplex telephone systems are now used proves that you can have intelligible results with an audio channel that is open for only some of the time. This is used in our project but by interrupting the audio channel at a much lower rate (67Hz) we achieved an effect rather like a science fiction robot voice, being quite metallic and artificial sounding.

The circuit diagram shown in Fig.2. will produce novel Robot Voice Effects from, for example, a Line level input signal from a microphone preamplifier and give a Line level "voice" processed output.

The circuit is quite straightforward with transistor TR3 acting as a voltage amplifier to raise the level of the incoming audio signal, which is routed through a muting circuit based on transistor TR4. The output from TR4 is then buffered by an emitter follower using transistor TR5.

The muting circuit is driven by a rectangular waveform obtained from an astable multivibrator based on transistors TR1 and TR2. This 67Hz drive has a mark-to-space ratio of 1:2.

If the final Line output signal of this circuit is fed to a piece of equipment which also incorporates a graphic equaliser, and a little trial and error, the results can be even more effective.

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# Visual Capacitance Gauge – A Measured View

A multimeter frequently has no capacitance meter, and a capacitor frequently has no markings. These two facts together make a capacitance meter a useful device to have at hand. However, such devices tend to be relatively costly.

The simple capacitance gauge circuit diagram shown in Fig.3 will measure capacitance between 100pF and 1µF – determining this with the aid of a front panel control knob pointer above a calibrated scale. It is a Visual Capacitance Gauge, which *extinguishes* l.e.d. D1 at the precise point on the scale which matches the value of the capacitor. This has advantages over the usual audio capacitance bridge, which either requires an earpiece (with a cable to get tangled), or might disturb with its sound.

A standard op.amp relaxation osc–illator, IC1a, produces a square wave at output pin 1. Its frequency may be approximately calculated by the formula $f = 0{\cdot}72 / (R3 \times C1)$. In Fig.3, this represents about 7kHz. This feeds a standard capacitance bridge, which comprises potentiometer VR1, resistor R5, capacitor C2, and the "capacitor under test" (C-TEST). When the bridge is balanced, no signal voltage is present across resistor R6. With IC1b being wired as a comparator, l.e.d. D1 therefore fails to illuminate. At all other times (when the bridge is not balanced), l.e.d. D1 remains illuminated.

The range of the gauge is defined by the value of capacitor C2 – although in practice this will not be exact, so that the scale is best calibrated through trial and error. So, for instance, to obtain a range of 0 to 100nF, C2 would be a 100nF capacitor. Needless to say, the accuracy of the gauge is dependent on the accuracy of the capacitors "under test" when the scale is calibrated, and ideally C2 will also be a perfect value. In fact, this applies to all the components of the bridge.

If the pointer of VR1's knob is turned, and l.e.d. D1 fails to extinguish, then the wrong range has been selected, with the value of C-TEST likely being higher than the value of capacitor C2. A selector switch may be used to access several ranges, and crocodile clips may be used to attach the capacitor under test to the circuit.

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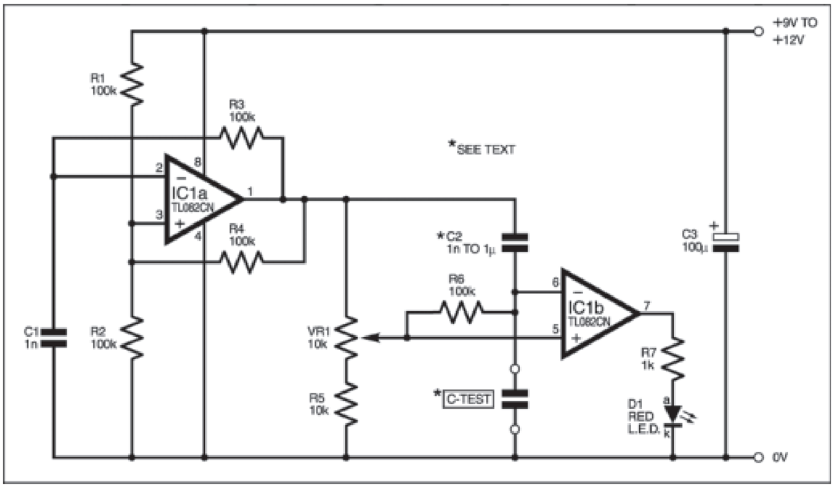

*Fig.3. Visual Capacitance Gauge circuit diagram.*