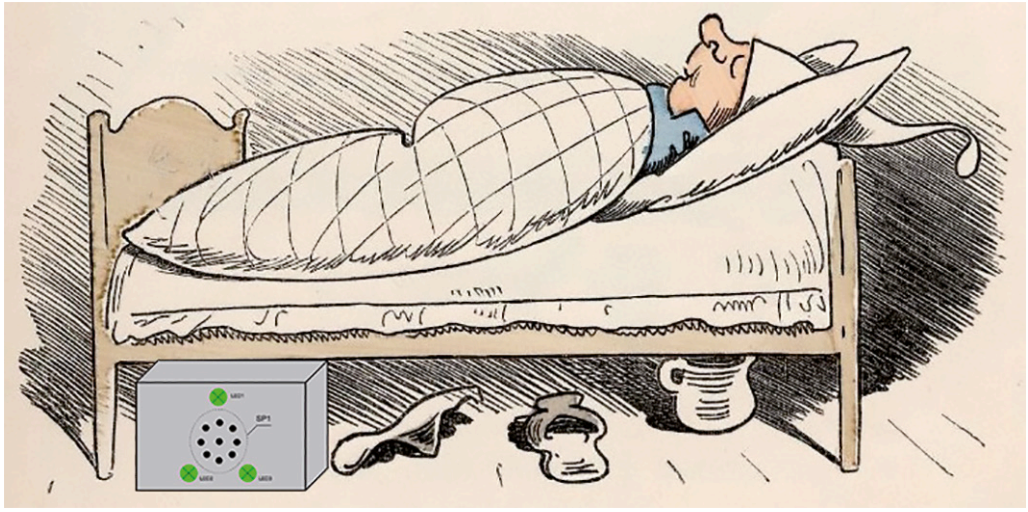
Sleep Generator

Sea sounds from a box



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After a drawing by
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It is said that the sight of flames flickering from an open fire or the sound of the ocean rhythmically breaking on a beach has a calming affect on us. Nowadays you can easily install a cozy fireside scene for use as a screen saver, but a stand-alone unit producing soothing ocean sounds? Now that's something else…

Discrete Waves

The circuit in **Figure 1** to generate the realistic ocean swell sound is made from discrete components. It consists of a white noise generator, a square wave generator, filter and summing network to produce the envelopes of white noise which are fed to the input of a low frequency amplifier and out to a loudspeaker. The waveforms in **Figure 2** show how the ocean sounds are produced.

The white noise generator (around T1) is a super-regenerative detector circuit like those used in the designs of old radios. The pot R2 is adjusted so that a strong white noise signal is output at point A. The operating frequency set by the resonant network made up of L1 and C2 is not critical and can be changed if necessary. The coil L1 is air spaced and made up of 9 turns of 0.8 mm (20 AWG) enamel coated wire wound on a 9 mm diameter former (the shank of a 9 mm drill is useful here). The finished coil is pulled out to a length of 17 mm. L2 is a 40 µH inductor. If RF break-through is apparent from a nearby radio station, the resonant frequency of L1/C2 can be adjusted to avoid the problem by pulling out or squashing together the turns of L1.

The square wave generator producing waveform B is built from a Schmitt-trigger circuit (transistors T2 and T3). The frequency and duty cycle of the waveform (controlling the speed of the ocean's inrush and outrush) is controlled by pot R5. The generator frequency can be altered by changing the value of capacitor C6.

The sound envelope of white noise is shaped with resistors (R11, R12, R13) and capacitors C7 and C9 to produce the effect that with just a little imagination sounds like the

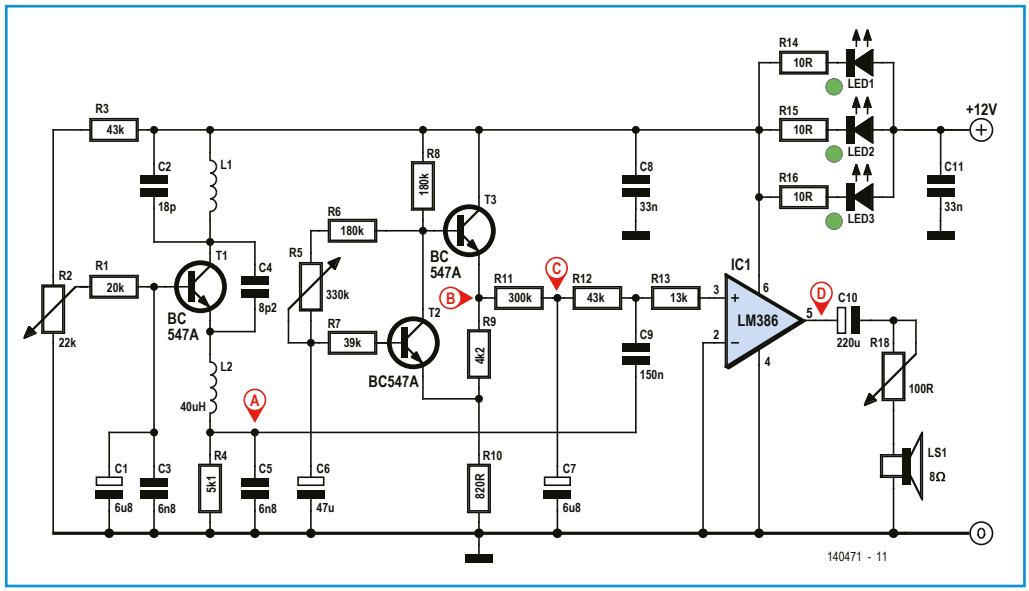

Figure 1.
The circuit can be powered by a plug-in AC adapter with a stabilized DC output or by batteries supplying 10 V to 14 V.

ocean breaking on a deserted beach. The resulting envelopes of white noise are then coupled to the input of the audio amplifier IC1. This amplifier (LM386) boosts the signal before it is sent to the loudspeaker LS1. Output volume is controlled by pot R18.
The ocean sounds are also visually accentuated. In rhythm with the ocean swell, the green or blue LEDs glow more and less brightly which promotes relaxation and can help reduce levels of stress and psycho-emotional anxiety (which may, for example be the cause of teeth grinding while asleep).
The three LEDs used here must be capable of handling a current of at least 30 mA. As an aside, it could prove interesting if resistor R6 were replaced by either a light dependant resistor (LDR) or a thermistor (of equivalent resistance to R6). This would make the generated ocean sound change as these sensors change value when you get close to them. An element of bio-feed back has now been introduced into the control of the generator. With this modification it could prove to be a useful tool in the fields of autogenic training and psychophysiological testing.

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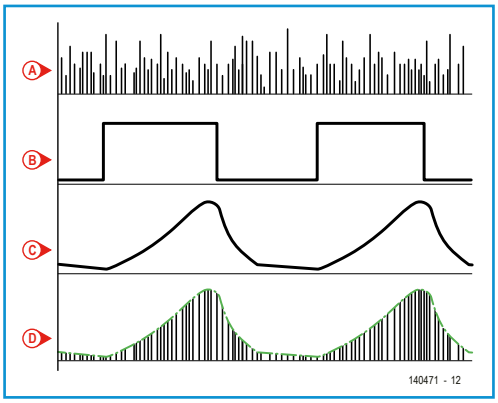

Figure 2. Waveforms to produce the white noise envelope.