

# A Base Station for the Lovell Earth Return Telephone

*Chris Ross describes a development of the Lovell single-wire telephone, adding a call button and loudspeaker to form a base station.*

It is nearly 30 years since Nigel Lovell published his design for an earth return telephone (Lovell, 1993). This single-wire design has stood the test of time and is still commonly used. Whilst simple and effective, it lacks a call button to alert the other party of an incoming call. It also lacks a loudspeaker, requiring the device to be held to the ear.

This brief article describes modifications to add a call button and loudspeaker to the original design, which is intended to be used as the base station.

## Amplified Loudspeaker

The design is based around the very simple TDA7052 amplifier module, which produces good volume. The schematic below shows the modifications needed to add this amplifier. Whilst currently in plentiful supply, the TDA7052 is going out of production. The schematic also shows the option of substituting an LM386 as an alternative.

## Call Button

The call button modification has been described previously (Ross, 2012). Call button S3 introduces positive feedback

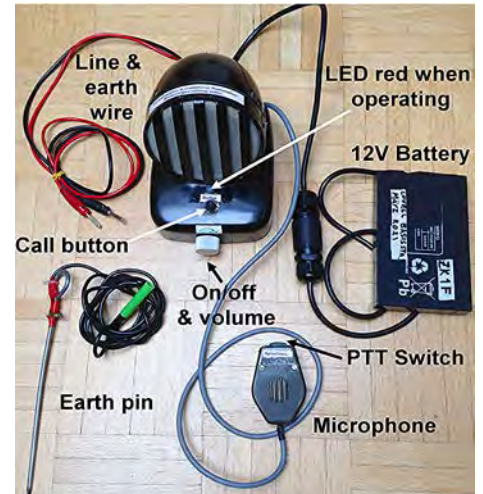
around the transmit amplifier, IC1(a). The frequency of the tone is determined in part by the 33 nF feedback capacitor. Whilst the received tone audio level is still limited by the speaker/ microphone of the original Lovell design, it is significantly louder than speech and less likely to go unnoticed.

## Power

Power consumption is greater than with the original design. The internal battery has been replaced with an external 12V lead-acid battery. A low-current LED is used as a continuous power indicator in place of the momentary red/green LED of the original design. Standby current is around 11 mA and normal operation with moderate volume is about 30 mA. Momentary consumption during calling is approximately 220 mA.

## Summary

This modification to the Lovell design greatly improves the usability, but at some sacrifice of the simple self-contained, low power consumption nature of the original. We envisage the use of this as the base station communicating with a telephone of the original design; however, there is no

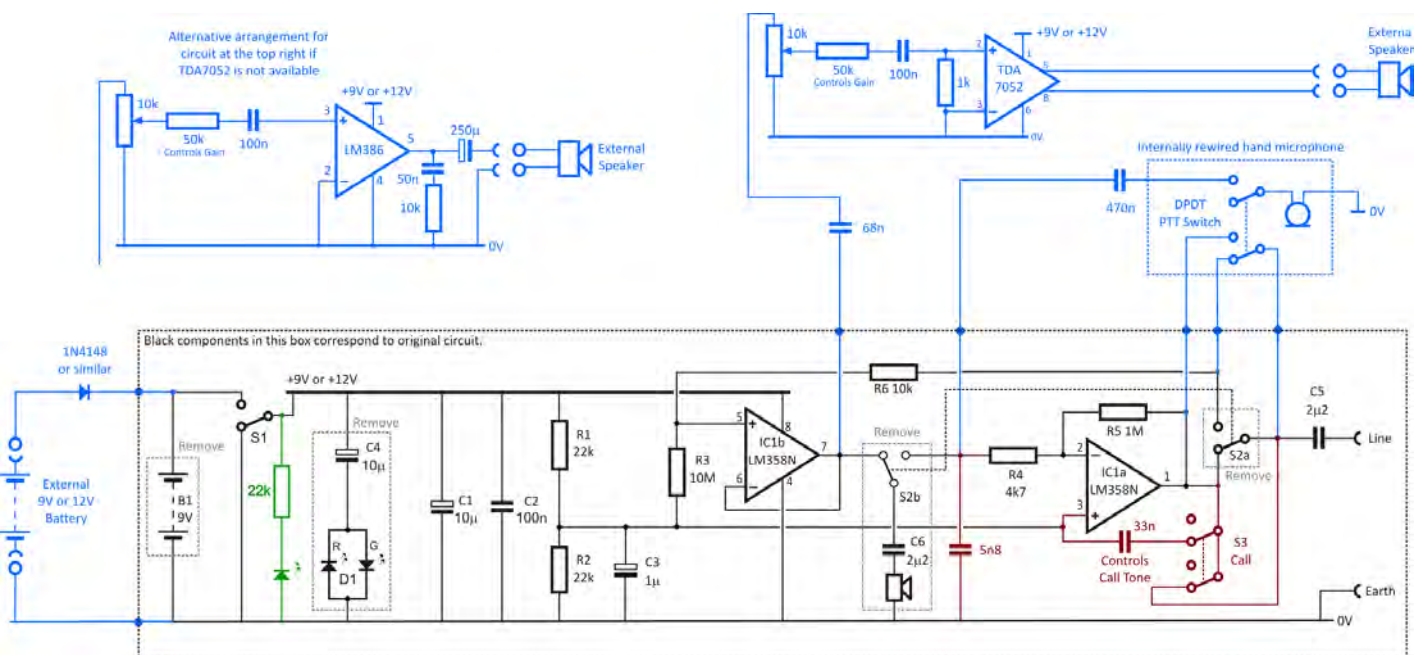


Components of the base station

Circuitry is contained within the loudspeaker housing reason that it cannot operate with another similar base station.

## References

- Lovell, Nigel (1993a) *Practical Earth Return Telephone Design - Part 1*, CREGJ 13, pp 9-12
- Lovell, Nigel (1993b) *Practical Earth Return Telephone Design - Part 2*, CREGJ 14, pp 3-6
- Ross, Chris (2012) *A Call Button for the Lovell Earth Return Phone*, CREGJ 78, p5



The Earth Return Telephone Base Station

Based on the original schematic by Nigel Lovell in CREGJ14, the blue section shows additional components, the green section shows a low-current red LED in place of the original two-colour LED, and the red section is the call button modification.