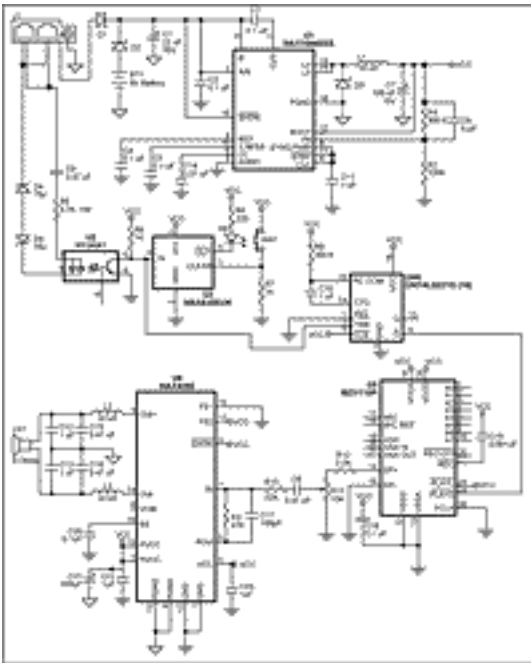


APPLICATION NOTE 1187

Chip Recorder Customizes Phone Ringer

Companies usually purchase one type of telephone for all employees. But this means that every ringer has the same sound and when one phone rings, a dozen people pause and look at their telephones. Equally annoying is the absence of a visual message indicator, so anyone who suspects they may have a message must lift the handset and listen for a special message tone.

By placing a circuit in series with the telephone (**Figure 1**), you can customize a phone ringer without modifying the phone. The heart of the ringer is a chip-recorder IC (U5) capable of playing up to 10 seconds of telephone-quality recorded sound. A high-efficiency step-down converter (U1) allows the circuitry to operate from a supply voltage of 5V to 14V.



[For larger image](#)

Figure 1. This circuit plays up to 10 seconds of recorded sound in place of the ring from a telephone. It also indicates when someone has called.

An opto-coupler and associated front-end circuitry monitor the line, sensing when the line receives a high-voltage ringer signal (**Figure 2**). Zener diodes D4 and D5 prevent the on-hook voltage from activating the opto-coupler. Comparator U3 latches LED D6 "on" when a call is received, and a pushbutton switch (SW1) clears the comparator.

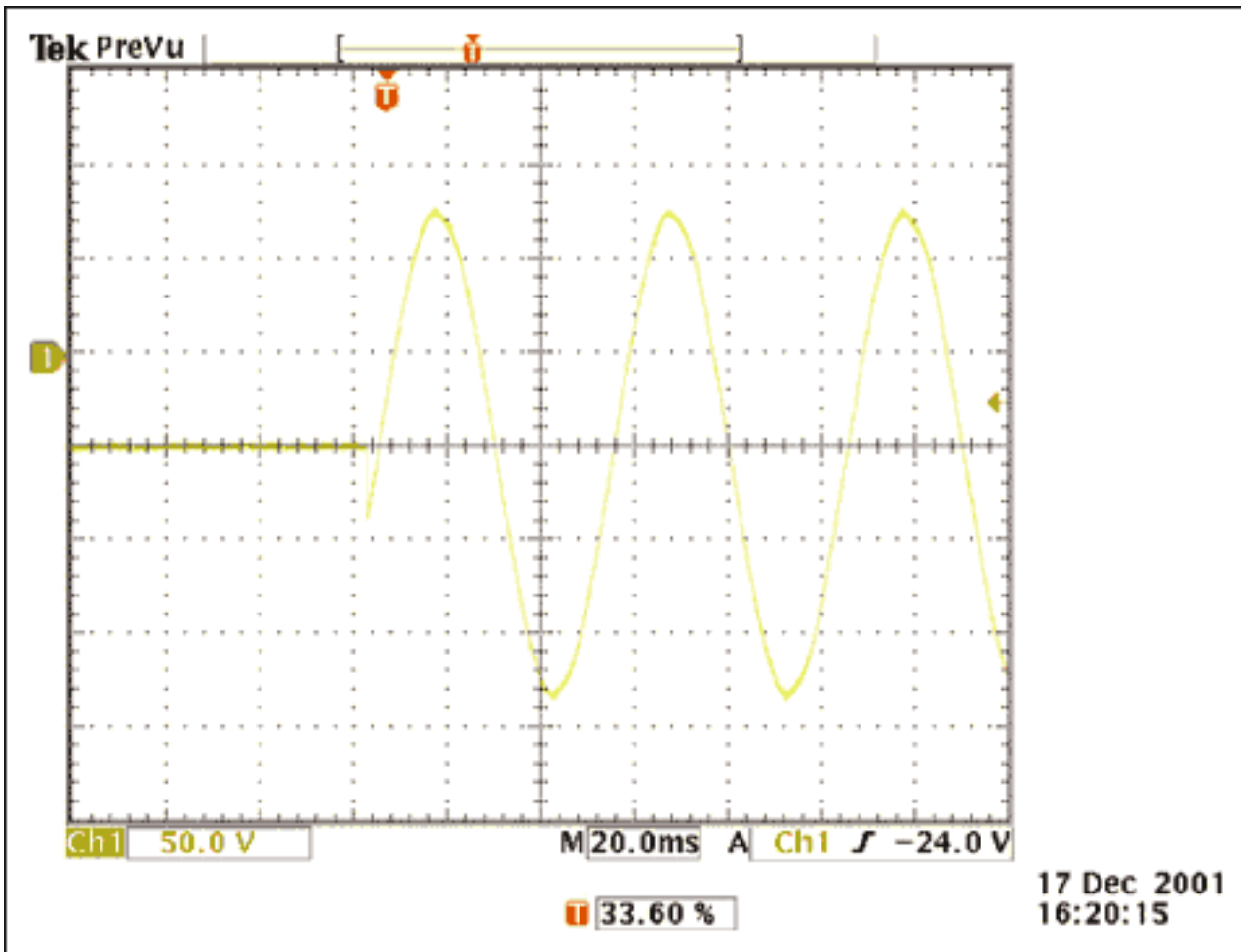


Figure 2. The ringer signal of a typical telephone exceeds 200V_{p-p} (vertical scale is 50V/div).

The circuit shown in **Figure 3** records up to 10 seconds of sound in the chip recorder's proprietary multi-level EEPROM. A switch-mode, Class-D audio amplifier (U6) maintains high efficiency while delivering adequate power to an 8Ω speaker (even a PC speaker will work).

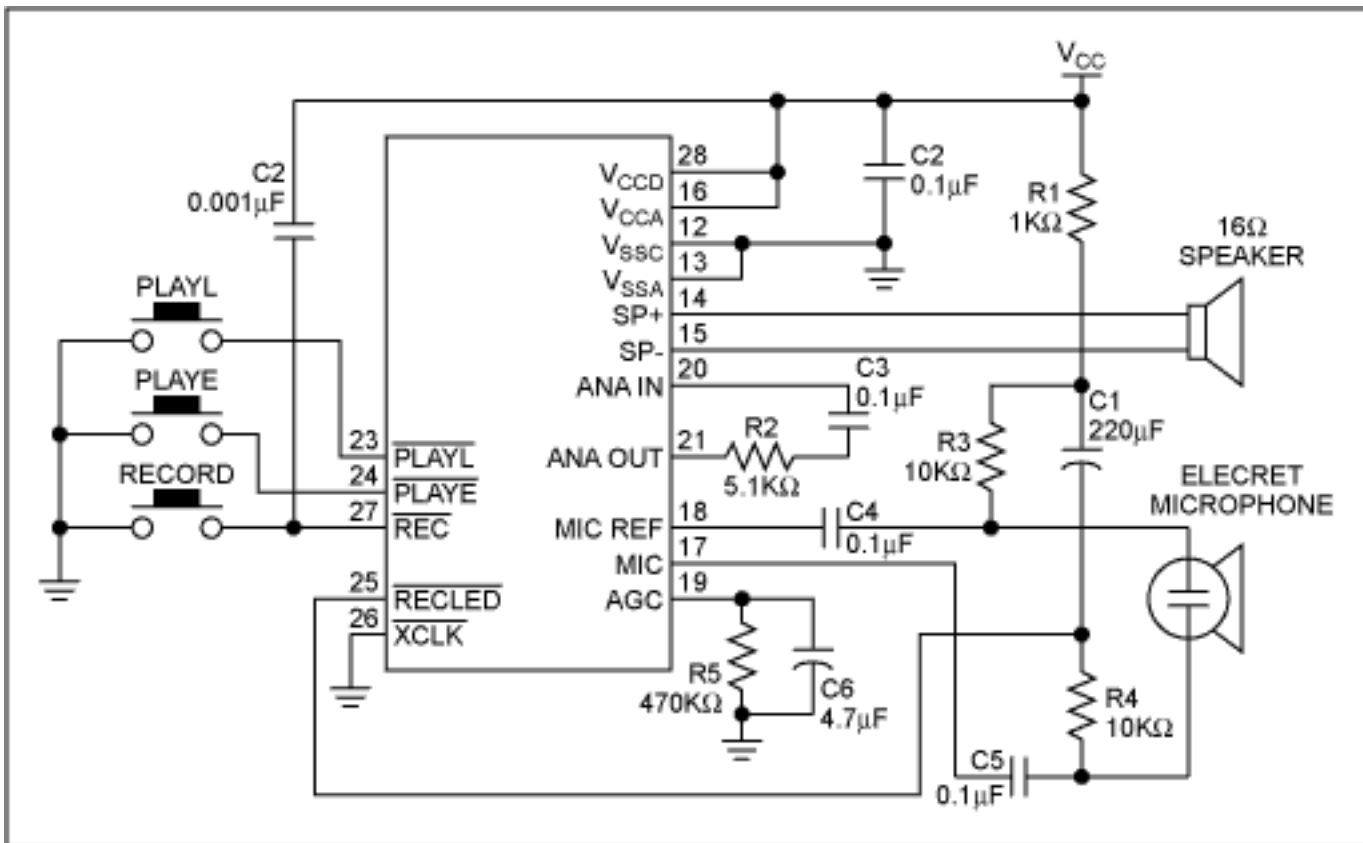


Figure 3. Using the EEPROM internal to U5 in Figure 1, this circuit records up to 10 seconds of sound.

A similar version of this article appeared in the July 25, 2002 issue of *EDN* magazine.

Application Note 1187: <http://www.maxim-ic.com/an1187>

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AN1187, AN 1187, APP1187, Appnote1187, Appnote 1187

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