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Regulator IC's

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MENTION VOLTAGE REGULATORS WHEN talking to a group of knowledgeable electronics buffs and you're sure to be met with "So what," "What's new?" or some other similar remark indicating uninterest. After all, most electronics technicians and experimenters consider the voltage regulator to be a simple 3-terminal device that outputs a specified voltage that's lower than its supply voltage. Your "know-it-all" friends wouldn't be so smug had they read Motorola's data sheet on the TL431 adjustable-shunt regulator (introduced by Texas Instruments and now second-sourced by Motorola).

The TL431 is a precision adjustable-

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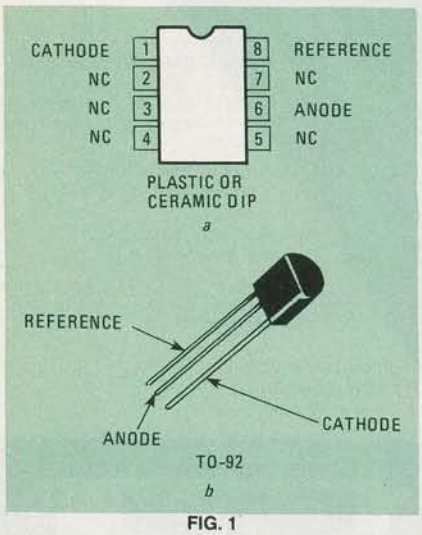

FIG. 1

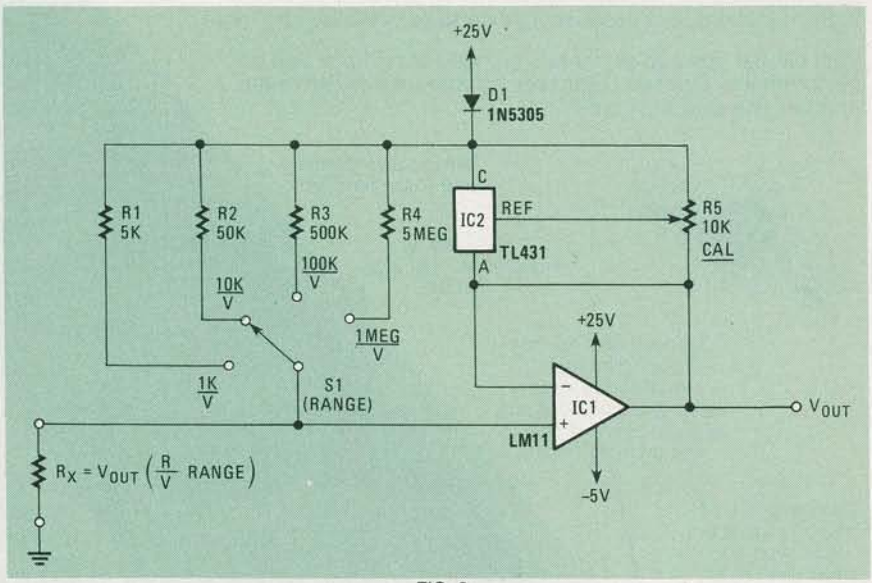

FIG. 3

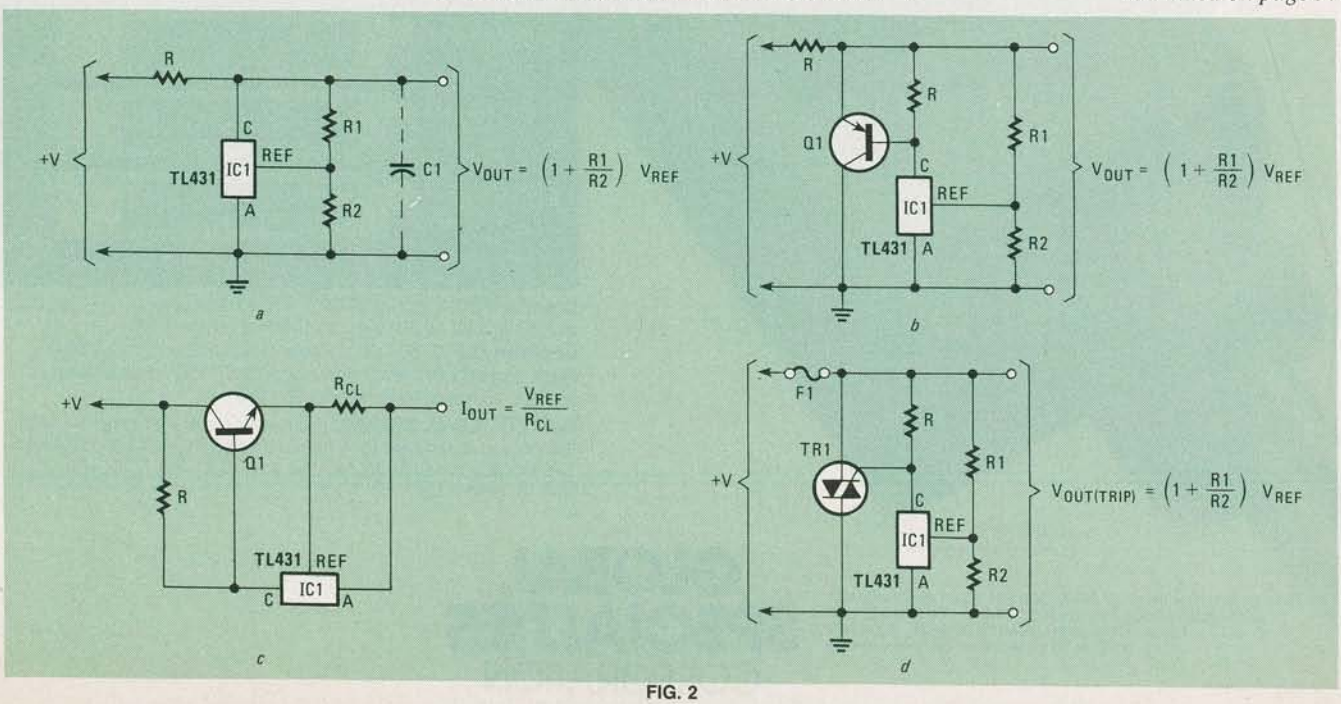

FIG. 2

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shunt regulator, whose output is programmable from 2.5 to 36 volts, using only two external resistors. The current range of that device is from 1 mA to 100 mA, with a low dynamic-impedance of typically 0.22 ohms. Its internal temperature compensation ensures stable operation with a temperature coefficient of 55 ppm/°C. The TL431 is available in three temperature ranges: −55 to +125°C, −40 to +85°C, and 0 to 70°C. Two case styles are available: an 8-pin plastic or ceramic DIP, or the TO-92 case (see in Fig. 1).

Some typical applications for the TL431 are shown in Fig. 2: Figure 2-a shows a shunt regulator; 2-b is a high-current shunt regulator; 2-c shows a constant-current source, and 2-d shows a triac crowbar circuit. Figures 3 and 4 show two of the more unusual applications for this regulator IC. In Fig. 3, the TL431 is teamed up with an LM11 (precision low-drift op-amp) to form a linear ohmmeter. The schematic in Fig. 4 shows an unusual phono amplifier using the TL431. The circuit shown there resembles a vacuum-tube cathode follower or a solid-state emitter follower with the unit's reference electrode corresponding to the grid or base in triode devices. The output of the crystal phono-cartridge (typically 2 volts) modulates the reference voltage. That, in turn, modulates the TL431 cathode-to-anode voltage (V_{CA}) and the audio output is then coupled to the speaker through an output transformer. Prices for the TL431 start at $0.52 and can range up to $3.42 depending on the temperature range and case style. Complete specifications for the IC, along with numerous application diagrams, are available from **Motorola Semiconductor Products**, PO Box 20912, Phoenix, AZ 85036.

Designers' guide

Designer's Guide—Small-Signal, Low-Noise Transistors is a 126-page data and applications manual covering the TRW line of transistors for receiver and RF circuitry. The manual includes a cross-reference listing nearly 100 competitive transistors and 22 TRW substitutes or equivalents. Also included in the manual are packaged outline drawings with dimensions, complete technical data on the 22 TRW transistors, and application notes including schematics and PC-board patterns. The manual is available from the Semiconductor Division, **TRW Electronics Components Group,** 14520 Aviation Blvd., Lawndale, CA 90260.

New semiconductor databook

The new 588-page RCA *CMOS-LSI Databook*, No. SSD-260A, provides technical information on the company's line of CMOS-LSI products. That databook includes information on such devices as the 1800-series and 6805-series of microprocessor products, a series of general-purpose CMOS memories. Also included are RCA alternate-source types for the industry.

The introduction is the "General Guide" to RCA CMOS-LSI products. It points out currently available package options and summarizes the basic features in each product category. In addition, the various IC's are classified according to product type and function.

Five separate data sections provide ratings, electrical characteristics, significant features, and user information for: 1800-series microprocessors and microcomputers, 1800-series memories, 1800-series peripherals, general-purpose memories, and 6505-series LSI products. The *CMOS-LSI Databook* is available from RCA distributors or **RCA** (Solid State Division, Box 3200, Somerville, NJ 08876) priced at $7.00. **R-E**

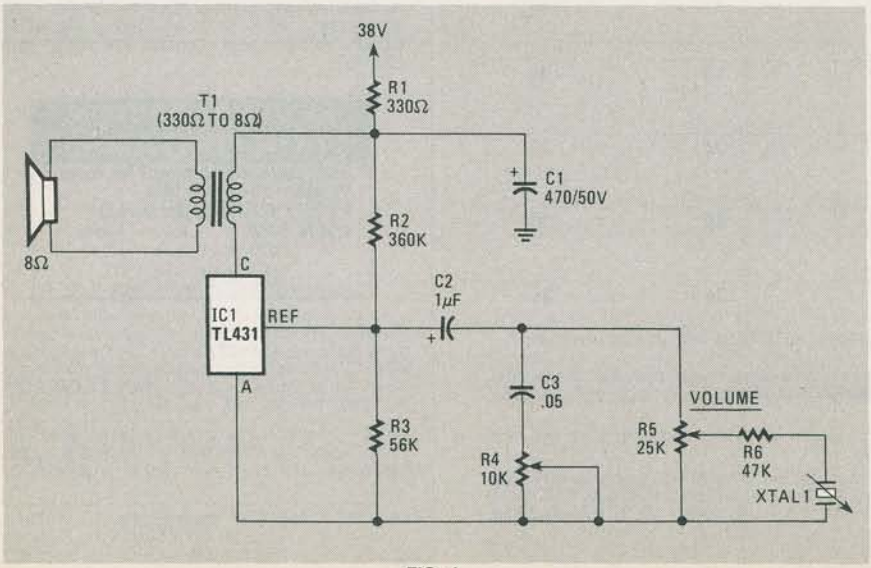

FIG. 4