STANDARD THIN FILM RESISTOR NETWORKS
FOR HIGH ACCURACY DESIGNS WITH OP AMPS AND SWITCHES

It is a truism that even modest operational amplifiers have behavior so closely approaching the ideal that gain accuracy of op amp circuits is largely limited by the associated circuit elements. Since gains are usually controlled by resistance ratios, a portion of the circuit-design effort involves the choice of resistors. Recently, thin-film resistor networks in standard IC packages (or in chip form) have become available at low cost in arrays that will suit a substantial variety of analog circuits.

The circuits shown here* are representative examples chosen from among the numerous high-precision nichrome thin-film resistor networks manufactured by the Resistor Products Division of Analog Devices, which already has a history of solid achievement in the manufacture of the more-complicated networks for converters,† custom circuitry,§ "precircuits", hybrids, as well as the all-important substrates themselves,‡ including a large number of units purchased to MIL-STD-883.

WHY THIN-FILM NETWORKS?
In addition to excellent resistance-matching (to better than 0.01%), temperature tracking (to better than 2ppm/°C), and uniform behavior, which are usually more important than absolute resistance value alone, the small size of monolithic (single-substrate) devices tends to maintain all resistors at the same ambient temperature, despite external gradients.

Thin-film networks are convenient: the entire network can be specified, purchased, and used as a single component (like an IC), simplifying the process of buying, testing, keeping-track-of, and assembling matched elements. Their initial moderate cost, plus the savings in purchasing, inventory, assembly, and test, make these thin-film networks highly competitive with

do-it-yourself resistor assemblies, even in some lower-performance applications.

AD1830: 7 EQUAL INDEPENDENT RESISTORS in 14-pin DIP or Flatpak. Choice of 13 standard values from 50Ω to 500kΩ, absolute accuracies within ±1% to ±0.01%. Prices start at $3.00 (100's).

AD1805: DUAL DIVIDER—4 EQUAL INDEPENDENT RESISTORS ratio-matched in pairs in TO–99 can. Choice of 7 standard values from 2kΩ to 200kΩ, ±1% to ±0.01% ratio match, ±1% absolute for reference. Prices start at $1.90 (100's).
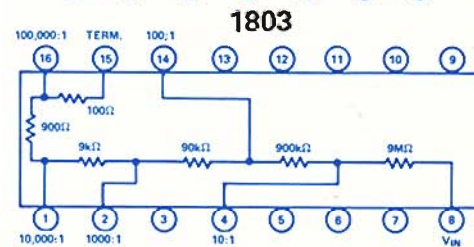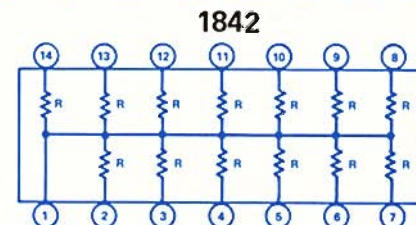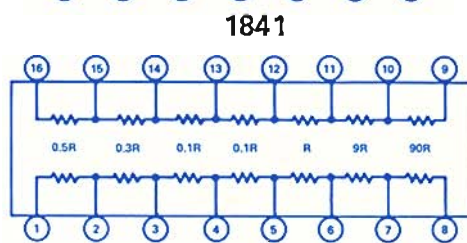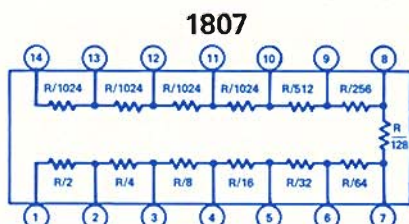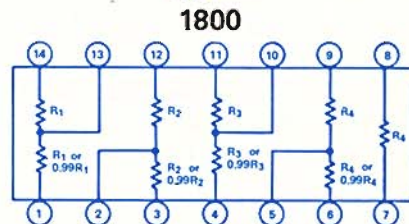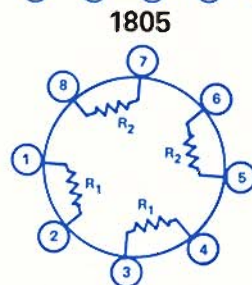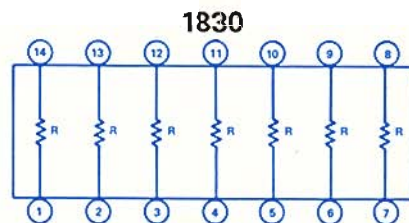
AD1800: QUAD DIVIDER—4 RATIO-MATCHED RESISTOR PAIRS with choice of equal values or 0.99 ratio (to permit external trimming to compensate for switch or source resistance) in 14-pin DIP. Choice of 7 standard values from 2kΩ to 200kΩ, ratio match ±0.01% to ±1%, absolute ±1%. Prices start at $3 (100's).

AD1807: BINARY RATIO NETWORK—Arbitrary gains or attenuations programmable by external shunts in 10-bit (1/1024) steps. Choice of 7 standard resistance levels from 10kΩ to 1MΩ. Prices start at $5.20 (100's).

AD1841: MATCHED DUAL NETWORK—2 IDENTICAL SETS OF 7 RESISTORS WITH 900:1 MAX RATIO in 16-pin DIP. Choice of 4 standard resistance levels for reference, from 1kΩ to 10kΩ. Prices from $4.40 (100's).

AD1842: SUMMING NETWORK WITH 13 IDENTICAL RESISTORS in 14-pin DIP or Flatpak. Choice of 12 standard resistance levels, from 50Ω to 250kΩ. Prices from $4.30 (100's).

AD1803: DECADE DIVIDER NETWORK WITH 10^5 MAXIMUM RATIO (1MΩ to 100Ω) in 16-pin 0.9 x 0.5 x 0.15″ (23 x 13 x 4mm) dual in-line package. Ratio accuracies from ±0.01% to ±1%, tracking TCR 5ppm/°C *max*. Prices start at $5.75 (100's). ▶▶▶