This DC-to-DC converter delivers a maximum power of about 36 watts at an efficiency of 90%. Apart from a modern FET and a Schottky diode, this circuit is comprised entirely of familiar and inexpensive parts. In spite of this, the specifications are excellent:

- Efficiency: approx 90%
- Ripple voltage: max. 10 mV
- Output current: max. 1.5 A
- Switching frequency: 40 kHz
- Input voltage: 12 V
- Output voltage: 24 V regulated

The switching element is a fast power FET (T8). This FET has a relatively high input capacitance and is switched on and off by a push/pull stage consisting of two RF transistors (T5/T6). Schottky-diode D2 increases turn-off speed even further, which is crucial here because we are aiming to obtain the highest possible efficiency.

The switching signal is provided by a simple multivibrator, which is also made from two RF-transistors (T1/T2). Difference amplifier T3/T4 has been added to obtain a regul-
lated output voltage of 24 V.

L2 is an off the shelf 5 A suppressor choke with a self-inductance of 65 µH. L1 is part of the output filter, the purpose of which is to eliminate RF noise. This is an air-cored coil, which you can easily make yourself by winding 25 turns of 0.5 mm dia. enamelled copper wire around a 10 mm diameter drill. Because of the high efficiency, the dissipation of T8 remains smaller than about 3.6 W so a modest heatsink of about 10 K/W will suffice. It is advisable that the 12 V input supply includes a fast fuse, rated about 3.5 A.

Considering that the duty cycle has a substantial effect on the efficiency, a second capacitor (C3) has been added in parallel with C2. The optimum setting can be determined by varying this additional capacitor.

The remaining components are not at all critical. Any 5 A suppressor choke will work for L2, any 5 A Schottky-diode for D3 and just about any power MOSFET for T8 (BUZ10, BUZ20, BUZ100).

Active PC Loudspeaker

P. Lay

With the well-known TDA2030V integrated power amplifier in the Pentawatt package, it is easy to ‘activate’ a PC loudspeaker or upgrade the quality of an inexpensive active loudspeaker. The TDA2030 combines ease of use with low levels of harmonic and crossover distortion, and it is also incorporates short circuit and thermal overload protection.

No creative brilliance is needed to arrive at the circuit shown in Figure 1, which is practically the same as the standard application circuit for single-supply operation as shown in the device data sheet from its manufacturer, ST Microelectronics:


The two resistors R1 and R3 set the operating point of the amplifier, and the non-inverting input is biased via R2. The audio signal reaches the power opamp via C1. The gain is determined by the ratio of R5 to R4. Capacitor C5, like C1, affects the lower roll-off frequency. The two diodes protect the IC against positive and negative spikes in the output signal. The RC network C6/R6 ensures stable operation of the amplifier in the high frequency range. The load is connected via the output electrolytic capacitor C7. In the data sheet, you can see which parameters change if you ‘play around’ with the values of the resistors and capacitors.

Any individual speaker with an impedance of 4 to 8 Ω or a multi-way loudspeaker can be connected to the output. The maximum achievable power is 6 to 12 W, so a heat sink with a thermal resistance of 8.3 K/W to 4.2 K/W is mandatory.