Fig.2: the circuit is based on the PIC16F84 microcontroller. This processes timing information from the car's distributor (points, Hall effect, etc) and varies the ignition timing accordingly.

PROGRAMMABLE IGNITION TIMING MODULE

a delayed pulse to the HEI system to fire the ignition coil.

Why are the ignition pulses delayed? In cars without engine management, the ignition timing (ie, the ignition advance curve) is controlled by centrifugal weights in the distributor.

These cause the ignition timing to advance as the engine RPM increases. In addition, a vacuum diaphragm actuator mechanically increases the advance as manifold vacuum rises.

When the PIT and HEI systems are employed together, the car's centrifugal advance mechanism is clamped in the fully advanced position.

To do this, the advance weight return springs are removed and the weights themselves are wired so they are held in the fully out position. In addition, the moveable vacuum advance plate must be clamped so that it can't move when the vacuum actuator is removed.

Since the distributor is locked in the fully advanced position, the PIT module must provide a variable time delay in order to allow the engine to start and run.

In practice, it provides quite a lot of delay when the engine revs are low and less delay when the engine revs are high. It also modifies the delay depending on whether the vacuum switch is open or closed.

How it works

Fig.2 shows the circuit of the PIT module. The heart of the circuit is the PIC 16F84 microcontroller. It calculates the delay period for each ignition pulse, according to stored data which has been previously entered via the numeric keypad.

The keypad has four rows and three columns (for 12 keys) and these are connected to seven inputs on the PIC, RB0-RB6; the columns to RB0-RB2 and the rows to RB3-RB6.

When operating, the PIC alternately takes its RB3-RB6 outputs high and low. When any key is pressed, this low is then sensed by one of the RB0-RB2 inputs and the PIC takes the appropriate action.

For example, if key "0" is pressed, then when RB6 is pulled high, it is connected through the key to RB2, which is normally held low by resistor R5.

RA4 (pin 3) is the vacuum advance input and S1 is a microswitch that is