Fusible-link p.r.o.m. programmer

Fusible-link p.r.o.ms such as the SN74S288 and SN74S188 can be programmed directly and, by adding up to three more address lines from the counter and using a larger socket, the following devices can also be programmed.

74S287, 74S387	8 inputs 4 outputs
74S470, 74S471	8 inputs 8 outputs
74S472, 74S473	9 inputs 8 outputs

Als5o, data can be easily verified before or after programming. These small low-cost p.r.o.ms can be used to replace logic elements by programming the desired truth table into the device. Although they are not low-power memories, they can reduce system power by replacing several packages.

Without +12V, the circuit reads a p.r.o.m. powered through D_1, and eight l.e.ds monitor the data outputs via inverters. The device is addressed by a 4040 binary counter which is incremented by a push button. The address is monitored by a further five l.e.ds and inverters and, in a 5-bit address range, a reset button is not necessary. For larger p.r.o.ms, a reset button can be added across C_4. Switch S_3 should be set to 0 or 9 during the reading.

To program a device, the address must be set and the bit to be programmed high (the 74S288 is supplied with all locations low) is selected by S_2. This saturates one of the eight transistors and clamps the data outputs low. S_2 is then pressed to trigger a flip-flop which then feeds clock pulses to the 4017 counter. The counter outputs sequentially set and reset two flip-flops to give outputs Q_1, Q_2 as shown in the timing diagram. Chip select on the p.r.o.m. is taken high, a +10.5V program pulse is applied to V_{cc} for 4 clock cycles, and for the second and third clock cycles $\overline{CS}$ is taken low to program the bit.

Flip-flop 3 is reset on the ninth clock cycle and stops the program cycle. Capacitor C_4 and R_1 set the counters and flip-flops to the correct initial states, and the 3k9 resistors apply the correct loads to the unprogrammed outputs during the programming cycle. Diode D_1 disconnects the +5V supply to the p.r.o.m. during programming.

The +12V supply should be rated at 1A, and the only important constructional note is to ensure that a low resistance path exists between the emitters of the eight transistors, 0V on the p.r.o.m., and the +12V ground, so that the programmed bit is held low and a 750mA current pulse flows through it.

S. Kirby
Heslington
N. Yorkshire