Using National's NMC87C257 256K EPROM with On-Chip Latches

National Semiconductor
Application Note 731
Sean Pitonak
April 1992

INTRODUCTION

The standard EPROM available from most manufacturers limits the on-chip circuitry to just the minimum needed to operate the EPROM and the minimum of user interface handles. Users of standard EPROMs are forced to include latches in their design to interface with most microcontrollers and microprocessors.

Probably one of the most desirable user-interface features is the ability to directly interface the EPROM to a host device that has a multiplexed address and data port. This type of interface is present on many microcontrollers and microprocessors such as the HPC, 80C51 and many of the Intel and Motorola microcontrollers. National is now manufacturing an EPROM that can directly interface with a host device—the NMC87C257.

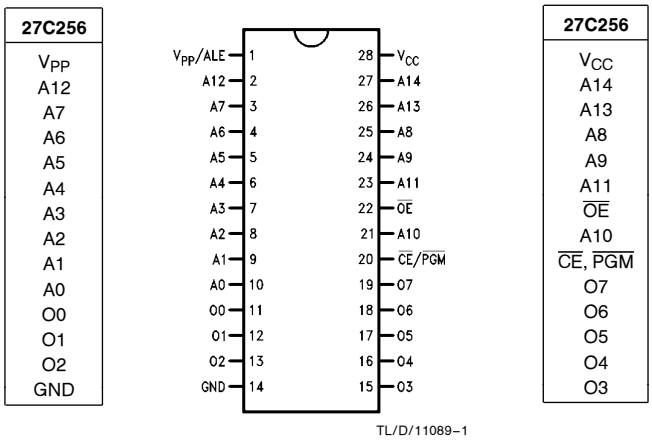
NATIONAL'S NMC87C257 SOLUTION

The NMC87C257 is pin-compatible with the standard 27C256 (1 Megabit EPROM, organized as 128K x 8 bits), shown in *Figure 1*. In fact, the NMC87C257 can be directly substituted into the many existing 27C256 sockets when used in the unlatched mode. The internal latches are transparent and the Address Latch Enable (ALE) is on a shared pin with V_{PP}. By tying V_{PP} to V_{CC}, the NMC87C257 behaves exactly like the 27C256. The NMC87C257 is available in both quartz-windowed Ceramic DIP and Plastic LCC packages as is the 27C256.

National's latched EPROM is useful because the same ALE used for the 74F373 latch can be tied to the ALE of the NMC87C257, eliminating the need for the 74F373 latch. As shown in *Figure 2*, it is as simple as removing the two octal latches and routing the appropriate bus and control line to the EPROM.

SUMMARY

The NMC87C257 allows the user the combination of familiar functionality, pinout and programmability (due to its compatibility with existing 27C256 EPROMs) and the advantages of saved board space, cost of the octal latches and their insertion and system power consumption. The NMC87C257 gives the system designer the needed flexibility of interfacing directly with microcontrollers and microprocessors that have multiplexed address and data ports.



TL/D/11089–1

FIGURE 1. Socket Compatible 27C256 EPROM Pin Configuration is Shown in the Block Adjacent to the NMC87C257 Pins.

  RRD-B30M75/Printed in U. S. A.

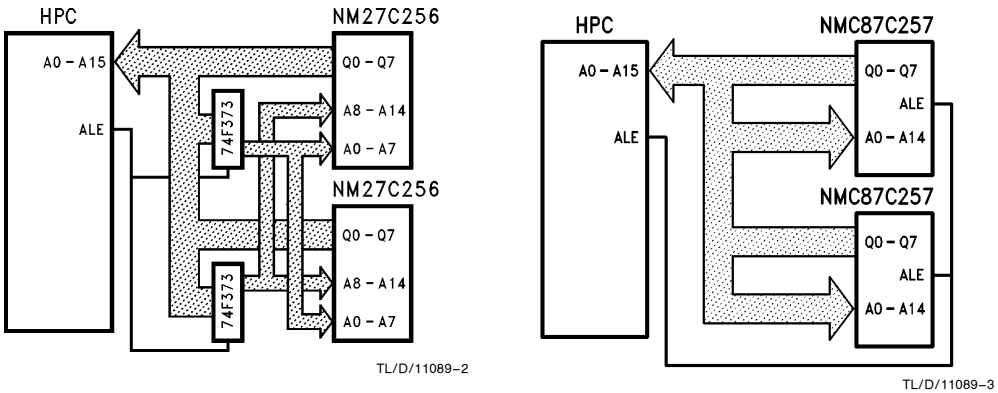


FIGURE 2. A common HPC Microcontroller application using two NM27C256 EPROMs and two 74F373 external latches (left) and the same application using only two NMC87C257 EPROMs with on-chip latches (right).

National Semiconductor Corporation
2900 Semiconductor Drive
P.O. Box 58090
Santa Clara, CA 95052-8090
Tel: 1(800) 272-9959
TWX: (910) 339-9240

National Semiconductor GmbH
Livry-Gargan-Str. 10
D-82256 Fürstenfeldbruck
Germany
Tel: (81-41) 35-0
Telex: 527649
Fax: (81-41) 35-1

National Semiconductor Japan Ltd.
Sumitomo Chemical
Engineering Center
Bldg. 7F
1-7-1, Nakase, Mihama-Ku
Chiba-City,
Ciba Prefecture 261
Tel: (043) 299-2300
Fax: (043) 299-2500

National Semiconductor Hong Kong Ltd.
13th Floor, Straight Block,
Ocean Centre, 5 Canton Rd.
Tsimshatsui, Kowloon
Hong Kong
Tel: (852) 2737-1600
Fax: (852) 2736-9960

National Semiconductores Do Brazil Ltda.
Rue Deputado Lacorda Franco
120-3A
Sao Paulo-SP
Brazil 05418-000
Tel: (55-11) 212-5066
Telex: 391-1131931 NSBR BR
Fax: (55-11) 212-1181

National Semiconductor (Australia) Pty, Ltd.
Building 16
Business Park Drive
Monash Business Park
Nottinghill, Melbourne
Victoria 3168 Australia
Tel: (3) 558-9999
Fax: (3) 558-9998