

Motorola Semiconductor Engineering Bulletin

EB279

Low Output Levels on Output Pins

By Charles Melear
Austin, Texas

Introduction

A problem occasionally reported is that an output level on a particular pin or small group of pins, such as address or data bus pins, will have a logic high level of about 3 volts. This problem can actually happen to any output pin. The pins with low output high levels are usually adjacent to one another.

General Information

Providing that there are no shorts or that pin loading does not exceed specifications, the problem almost always centers around a power pin that does not have power applied to it. This can result because of a cold or broken solder joint. Other causes are due to socket problems, such as misalignment of the device in the socket or weak socket pins.


Note that there are 13 V_{SS} and 13 V_{DD} pins on the MC68332. In fact, all of the M683XX and M68HC16 MCUs have a large number of power and ground pins. These pins are not always connected together within the device. Internal power buses may serve only about eight to 10 pins each.

When one V_{DD} pin is floating due to no external voltage being applied, the floating V_{DD} pin can receive power from internal circuitry (such as



internal protection diodes). However, the internal sources providing power to the floating V_{DD} pin will usually be of very limited current sourcing capability and the current path usually will have several diode drops, resulting in a low output high voltage on associated output pins.

As a side note, a problem in testing the M683XX and M68HC16 devices is created when the test drivers are not disconnected from the device before the power is switched off from V_{DD} . The MC68332 can power up from the voltage applied to an input pin. Therefore, all power and ground pins must be connected to power sources to avoid low output high voltage levels.

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution, P.O. Box 5405, Denver, Colorado 80217, 1-800-441-2447 or 1-303-675-2140. Customer Focus Center, 1-800-521-6274

JAPAN: Nippon Motorola Ltd.: SPD, Strategic Planning Office, 141, 4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan. 03-5487-8488

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd., 8B Tai Ping Industrial Park, 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

Mfax™, Motorola Fax Back System: RMFAX0@email.sps.mot.com; <http://sps.motorola.com/mfax/>;

TOUCHTONE, 1-602-244-6609; US and Canada ONLY, 1-800-774-1848

HOME PAGE: <http://motorola.com/sps/>

Mfax is a trademark of Motorola, Inc.



MOTOROLA

© Motorola, Inc., 1998

EB279/D