Order this document
by EB259/D

Motorola Semiconductor Engineering Bulletin

EB259

Why MC68300 and MC68HC16 MCUs May Halt after the Release of Reset

By Charles Melear
Austin, Texas

General Information

A problem can occur that exhibits these symptoms:

- The reset line periodically asserts due the to watchdog timer timing out. (For the MC68332 using the VCO and a 32.768-kHz crystal, the periodic rate is 15.6 ms.)
- There are eight pulses (8-bit bus mode) or four pulses (16-bit bus mode) on the CSBOOT line, then all bus activity stops.
- The HALT line is not asserted.

NOTE: *HALT is not present on all M683XX and M68HC16 derivatives.*

- Address strobe, AS, and data strobe, DS, are not asserted.
- The FREEZE pin is asserted with a logic 1.

Background Debug Mode

Many people forget to check the FREEZE pin because they never consider the possibility that the background mode has inadvertently been entered. This condition almost invariably indicates that the device has entered the background debug mode. The background debug mode can be entered by executing a background mode (BGND) instruction or by holding the breakpoint (BKPT) line low at the release of RESET. When the M683XX or M68HC16 is released from reset, an internal state machine causes the device to fetch the first four words in memory and prefetch the first instruction. This accounts for the occurrence of five or nine pulses after RESET is released. If the device accidentally enters the background debug mode, due to a noise spike on BKPT, no instructions will be executed.

Relying on the BKPT pin to float high is not a safe assumption. BKPT must be pulled high with an external device.

The BKPT pin seems more susceptible to noise than do some of the other pins that can configure the internal attributes of the device. As a practical matter, the BKPT pin must be pulled up externally with a 5-kΩ resistor. Some designers have reported this problem even when using pullup resistors with a value greater than 15 kΩ.

Using a stronger pullup has always provided the necessary solution to keep from entering the background debug mode unexpectedly due to noise on the BKPT pin.

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: Motorola Japan 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., Silicon Harbour Centre, 2 Dai King Street, Tai Po Industrial Estate, Tai Po, New Territories, 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/