

IBM 486 DX4 Microprocessor



Application Note

Author: John Young, Scott Pheasant

| |
|---|
| Revision Summary: This is the initial release of this Application Note. |
|---|

Introduction

This paper describes features of the IBM 486 DX4 microprocessor that motherboard designers should be aware of.

PGA and QFP Pinout Offerings

The IBM 486 DX4 processor is being offered in three packages:

1. 208-pin CQFP (Ceramic Quad Flat Pak) package.
2. 168-pin PGA (Pin Grid Array) package pinout. **IBM 486 DX2 pinout.**
3. 168-pin PGA (Pin Grid Array) package pinout. **Intel® 486DX4-like pinout.**

Please reference the Application Note entitled **PGA and QFP Pinout Offerings for the 486 DX4 Microprocessor** for more details.

CLKMUL Pin

Clock Multiplier (CLKMUL) is an input pin that allows selection of clock-doubled (2x) mode or clock-tripled (3x) mode. If CLKMUL = 0 then 2x mode is selected. If CLKMUL = 1 or is not connected then 3x mode is selected. CLKMUL is connected to an internal 20-K ohm pull-up resistor.

The IBM 486 DX4 PGA with IBM DX2 pinout has CLKMUL internally tied to Vcc (1). No CLKMUL pin is available at the module level. This indicates 486 DX4 clock tripled (3x) operation.

The IBM 486 DX4 PGA with Intel DX4-like pinout has CLKMUL pin and adheres to the values above to select 2x or 3x operation.

The IBM 486 DX4 QFP has CLKMUL pin and adheres to the values above to select 2x or 3x operation.

Processor Identification

The IBM 486 DX4 has a new identification to distinguish it from the IBM 486 DX2. The identification is in the Device Identification Register 0 (DIR0). DIR0 is set to values determined by the CLKMUL pin. The device type is shown in table 1.

Each revision of the 486 DX2 and 486 DX4 processors also has a unique device ID that identifies the hardware revision. This ID can be found in the Device Identification Register 1 (DIR1). Table 2 shows the various hardware revisions and their corresponding ID values.

Table 1. DIR0 Register Contents

| DEVICE TYPE | CLKMUL Input Pin | DIR0 CONTENTS | Processor Internal Clock |
|-------------|------------------|---------------|--------------------------|
| IBM 486 DX2 | - | 1Bh | 2x Mode |
| IBM 486 DX4 | 0 | 1Bh | 2x Mode |
| IBM 486 DX4 | 1 or floating | 1Fh | 3x Mode |

Table 2. DIR1 Register Contents

| | Processor Revision | DIR1 Contents |
|---------|--------------------|---------------|
| 486 DX2 | 4.0 | 30h |
| | 4.1 | 31h |
| | 4.2 | 32h |
| | 4.4 | 34h |
| 486 DX4 | 4.6 | 36h |

BIOS changes may be required to detect the new processor identification for the IBM 486 DX4.

IBM Corporation 1995. All rights reserved.

IBM and the IBM logo are registered trademarks of International Business Machines Corporation. IBM Microelectronics is a trademark of the IBM Corp.

All other product and company names are trademarks/registered trademarks of their respective holders. 1995 IBM Corp.

This document may contain preliminary information and is subject to change by IBM without notice. IBM makes no representations or warranties the use of the information or applications shall be free of third party intellectual property claims and assumes no responsibility or liability for any use of the information contained herein. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of IBM or third parties.

The products described in this document are not intended for use in implantation or other direct life support applications where malfunction may result in physical harm or injury to persons.

NO WARRANTIES OF ANY KIND, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE OFFERED IN THIS DOCUMENT.