



# THE DATASHEET OF MPC565CZP40



**Product Brief**

MPC565PB/D  
Rev. 3, 2/2003

MPC565/MPC566  
Product Brief


This document provides an overview of the MPC565/MPC566 microcontrollers, including a block diagram showing the major modular components, sections that list the major features, and differences between the MPC565/MPC566 and the MPC555. The MPC565 and MPC566 devices are members of the Motorola MPC500 RISC Microcontroller family. The parts herein will be referred to only as MPC565 unless specific parts need to be referenced.

**Table 1. MPC565/MPC566 Features**

Device	Flash	Code Compression
MPC565	1 Mbyte	Code compression not supported
MPC566	1 Mbyte	Code compression supported

# 1 Introduction

The MPC565 device offers the following features:

- PowerPC™ core with a floating point unit (FPU) and a burst buffer controller (BBC)
- Unified system integration unit (USIU), a flexible memory controller, and improved interrupt controller
- 1 Mbyte of Flash memory (UC3F)
  - Typical endurance of 100,000 write/erase cycles @ 25°C
  - Typical data retention of 100 years @ 25°C
- 36 Kbytes of static RAM (two CALRAM modules)
  - 8 Kbytes of normal access or overlay access (sixteen 512-byte regions)
  - 4 Kbytes in CALRAM A, 4 Kbytes in CALRAM B
- Three time processor units (TPU3)
  - TPU3 A and TPU3 B are connected to DPTRAM AB (6 Kbytes)
  - TPU3 C is connected to DPTRAM C (4 Kbytes)
- A 22-timer channel modular I/O system (MIOS14)
  - Same as MIOS1 plus a real-time clock sub-module (MRTCSM), 4 counter sub-modules (MCSM), and 4 PWM sub-modules (MPWMSM)
- Three TouCAN modules (TouCAN\_A, TouCAN\_B, and TouCAN\_C)
- Two enhanced queued analog to digital converters (QADC64E A, QADC64E B) with analog multiplexers (AMUX) for 40 total analog channels. These modules are configured so each module can access all 40 of the analog inputs to the part.

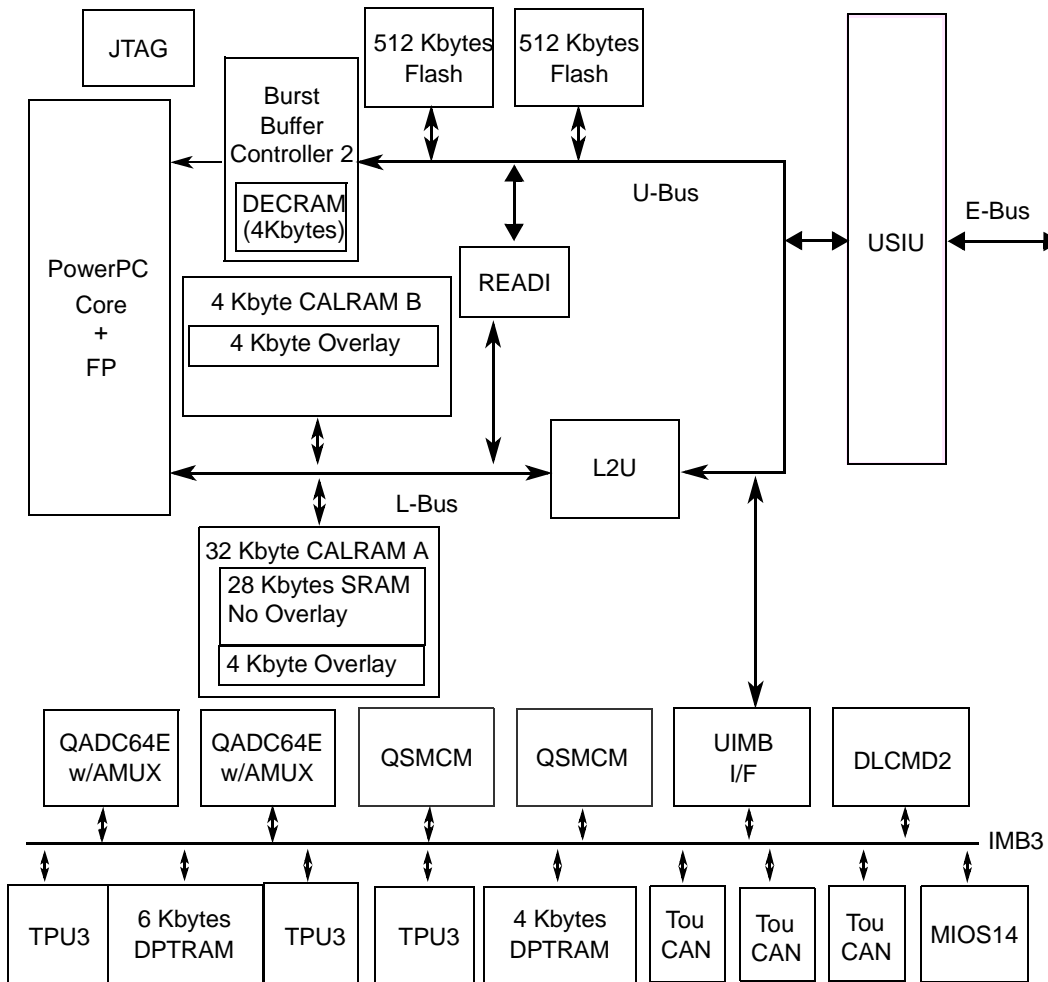
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**Block Diagram**

- Two queued serial multi-channel modules (QSMCM A, QSMCM B), each of which contains a queued serial peripheral interface (QSPI) and two serial controller interfaces (SCI/UART)
- -40°C – 125°C ambient temperature, -40°C – 85°C for suffix C devices, -55°C– 125°C for suffix A devices
- Debug features:
  - A J1850 (DLCMD2) communications module
  - A Nexus debug port (class 3) – IEEE-ISTO 5001-1999
  - JTAG and background debug mode (BDM)
- Packaging and Electrical

## 1.1 Block Diagram

Figure 1 is a block diagram of the MPC565.



**Figure 1. MPC565 Block Diagram**

## 1.2 Detailed Feature List

The MPC565 key features are explained in the following sections.

### 1.2.1 High Performance CPU System

- Fully static design
- Four major power saving modes
  - On, doze, sleep, deep-sleep and power-down

### 1.2.2 RISC MCU Central Processing Unit (RCPU)

- High-performance core
  - PowerPC single issue integer core
  - Precise exception model
  - Floating point
  - Code compression (MPC566 only)
    - Compression reduces usage of internal or external Flash memory
    - Compression optimized for automotive (non-cached) applications
    - New compression scheme decreases code size to 40% –50% of source

### 1.2.3 MPC500 System Interface (USIU)

- MPC500 system interface (USIU, BBC, L2U)
- Periodic interrupt timer, bus monitor, clocks, decremter and time base
- Clock synthesizer, power management, reset controller
- External bus tolerates 5-V inputs, provides 2.6-V outputs
- Enhanced interrupt controller supports a separate interrupt vector for up to eight external and 40 internal interrupts
- IEEE 1149.1 JTAG test access port
- Bus supports multiple master designs
- USIU supports dual-mapping of Flash to move part of internal Flash memory to external bus for development
- External bus, supporting non-wraparound burst for instruction fetches, with up to 8 instructions per memory cycle

### 1.2.4 Burst Buffer Controller (BBC) Module

- Exception vector table relocation features allow exception table to be relocated to following locations:
  - 0x0000 0000 - 0x0000 1FFF (normal MPC500 exception table location)
  - 0x0001 0000 - 0x0001 1FFF (0 + 64 Kbytes; second page of internal Flash)
  - Second internal Flash module
  - Internal SRAM
  - 0x0FFF\_0100 (external memory space; normal MPC500 exception table location)

## 1.2.5 Flexible Memory Protection Unit

- Flexible memory protection units in BBC (IMPU) and L2U (DMPU)
- Default attributes available in one global entry
- Attribute support for speculative accesses

## 1.2.6 Memory Controller

- Flexible chip selects via memory controller
- 24-bit address and 32-bit data buses
- 4- to 16-Mbyte (data) or 4-Gbyte (instruction) region size support
- Four-beat transfer bursts, two-clock minimum bus transactions
- Use with SRAM, EPROM, Flash and other peripherals
- Byte selects or write enables
- 32-bit address decodes with bit masks
- Four instruction regions
- Four data regions

## 1.2.7 1 Mbyte of CDR3 Flash EEPROM Memory (UC3F)

- 1 Mbyte Flash
  - Two UC3F modules, 512 Kbytes each
- Page mode read
- Block (64-Kbyte) erasable
- External 4.75- to 5.25-V VPP program and erase power supply
- Typical endurance of 100,000 write/erase cycles @ 25°C
- Typical data retention of 100 years @ 25°C

## 1.2.8 36-Kbyte Static RAM (CALRAM)

- 36-Kbyte static calibration RAM
  - Composed of 4-Kbyte and 32-Kbyte CALRAM modules
- Fast access: one clock
- Keep-alive power
- Soft defect detection (SDD)
- 4 Kbyte calibration (overlay) RAM per module (8 Kbytes total)
- Eight 512-byte overlay regions per module (16 regions total)

## 1.2.9 General Purpose I/O Support (GPIO)

- General-purpose I/O support
- Address (24) and data (32) pins can be used as GPIO in single-chip mode
- 16 GPIO in MIOS14
- Many peripheral pins can be used as GPIO when not used as primary functions
- 5-V outputs with slew rate control

## 1.2.10 Debug Features

- Extensive system debug support
- On-chip watchpoints and breakpoints
- Program flow tracking
- Background debug mode (BDM)

### 1.2.10.1 Nexus Debug Port (Class 3)

- Nexus/IEEE – ISTO 5001-1999 debug port (Class 3)
- Nine- or 16-pin interface

### 1.2.10.2 Message Data Link Controller (DLCMD2) Module

- Two pins muxed with QSMCMB pins. Muxing controlled by QSMCMB PCS3 pin assignment register
- SAE J1850 Class B data communications network interface compatible and ISO compatible for low-speed (<125 Kbps) serial data communications in automotive applications
- 10.4 Kbps variable pulse width (VPW) bit format
- Digital noise filter, collision detection
- Hardware cyclical redundancy check (CRC) generation and checking
- Block mode receive and transmit supported
- 4x receive mode supported (41.6 Kbps)
- Digital loopback mode
- In-frame response (IFR) types 0, 1, 2, and 3 supported
- Dedicated register for symbol timing adjustments
- Inter-module bus 3 (IMB3) slave interface
- Power-saving IMB3 stop mode with automatic wakeup on network activity
- Power-saving IMB3 CLOCKDIS mode
- Debug mode available through IMB3 FREEZE signal or user controllable SOFT\_FRZ bit
- Polling and IMB3 interrupt generation with vector lookup available

## 1.2.11 Integrated I/O System

- True 5-V I/O

### 1.2.11.1 Time Processor Units (TPU3)

- Three time processing units (TPU3)
  - 16 channels each
- Each TPU3 is a microcoded timer subsystem
- One 6-Kbyte and one 4-Kbyte dual-port TPU RAM (DPTRAM), one (6-Kbyte) shared by two TPU3 modules for TPU microcode and the 4-Kbyte dedicated to the third TPU3 for microcode.

### 1.2.11.2 22-Channel Modular I/O System (MIOS14)

- 22-channel MIOS timer (MIOS14)
- Six modulus counter submodules (MCSM)
  - Four additional MCSM submodules compared to MIOS1
- 10 double action submodules (DASM).
- 12 dedicated PWM submodules (PWMSM)
  - Four additional PWM submodules compared to MIOS1 (shared with MIOS GPIO pins)
- MIOS real-time clock submodule (MRTCSM) provides low power clock/counter
  - Requires external 32-KHz crystal
  - Uses four pins: two for 32-KHz crystal, two for power/ground.

### 1.2.12 Two Enhanced Queued Analog-to-Digital Converter Modules (QADC64E)

- Two enhanced queued analog to digital converters (QADC64E A, QADC64E B) with AMUXes for 40 total analog channels.
- 10 bit A/D converter with internal sample/hold
  - Typical conversion time is 4  $\mu$ s (250-Kbyte samples/sec)
  - Two conversion command queues of variable length
- Automated queue modes initiated by:
  - External edge trigger/level gate
  - Software command
  - Periodic/interval timer, assignable to both queue 1 and 2
- 64 result registers in each QADC64E module
  - Output data is right or left justified, signed or unsigned
- Synchronized clock mode allows both QADC64Es to see the same conversion clock. This allows the two modules to look like one large QADC with four queues.
- Conversions alternate reference (ALTREF) pin. This pin can be connected to a different reference voltage

### 1.2.13 Three CAN 2.0B Controller (TouCAN) Modules

- Three TouCAN modules (TouCAN\_A, TouCAN\_B, and TouCAN\_C)
- 16 message buffers each, programmable I/O modes
- Maskable interrupts
- Programmable loopback for self-test operation
- Independent of the transmission medium (external transceiver is assumed)
- Open network architecture, multimaster concept
- High immunity to EMI
- Short latency time for high-priority messages
- Low power sleep mode, with programmable wake up on bus activity
- TouCAN\_C pins shared with MIOS14 GPIO pins

## 1.2.14 Queued Serial Multi-Channel Modules (QSMCM)

- Two queued serial modules with one queued-SPI and two SCI each (QSMCM\_A, QSMCM\_B)
  - QSMCM\_A matches full MPC555 QSMCM functionality
  - QSMCM\_B has pins muxed with DLCMD2 module
    - Two pins are muxed with DLCMD2 (J1850) transmit and receive pins (B\_PCS3\_J1850\_TX and B\_RXD2\_J1850\_RX)
    - QSMCM B vs J1850 mux control provided by QPAPCS3 bit in QSMCM pin assignment register (PQSPAR)
- Queued-SPI
  - Provides full-duplex communication port for peripheral expansion or interprocessor communication
  - Up to 32 preprogrammed transfers, reducing overhead
  - Synchronous serial interface with baud rate of up to system clock / 4
  - Four programmable peripheral-select pins support up to 16 devices
  - Special wrap-around mode allows continuous sampling of a serial peripheral for efficient interfacing to serial analog-to-digital (A/D) converters
- SCI
  - UART mode provides NRZ format and half- or full-duplex interface
  - 16 register receive buffer and 16 register transmit buffer on one SCI
  - Advanced error detection, and optional parity generation and detection
  - Word length programmable as 8 or 9 bits
  - Separate transmitter and receiver enable bits, and double buffering of data
  - Wake-up functions allow the CPU to run uninterrupted until either a true idle line is detected, or a new address byte is received

## 1.2.15 Electrical Specifications and Packaging

- 40 MHz operation (56 MHz operation is optional for the MPC566)
- -40°C – 125°C ambient temperature, -40°C – 85°C for suffix C device, -55°C– 125°C for suffix A devices
- 2.6 V  $\pm$  0.1 V external bus
  - External bus is compatible with external memory devices operating from 2.5 V to 3.4 V.
  - Extended voltage range (2.7 – 3.4 V) degrades data drive timing by 1.1 ns on data writes.
- 2.6  $\pm$  0.1 V internal logic
- 5-V I/O (5.0  $\pm$  0.25 V)
- Available in package or bumped die
- Plastic ball grid array (PBGA) packaging
  - 388 ball PBGA
  - 27 mm x 27 mm body size
- 1.0 mm ball pitch

## 1.3 MPC565 Optional Features

The following features of the MPC565 are optional features and may not appear in certain configurations:

- 56-MHz operation (40-MHz is default)
- MPC566 supports code compression

## 2 Differences between the MPC565 and the MPC555

The MPC565 is an enhanced version of the MPC555. Most functional features of the MPC555 are unchanged on the MPC565. Table 2 shows the high level differences.

**Table 2. Differences Between Modules of the MPC555 and the MPC565**

Module	MPC555	MPC565
CPU Core	No Change	
BBC	BBC	BBC with improved code compression <sup>1</sup>
L2U	No Change	
SRAM	26-Kbytes	36-Kbyte CALRAM with overlay features
Flash	448-Kbyte CMF	1-Mbyte UC3F (new programming, etc.)
USIU	USIU	USIU with enhanced interrupt controller
JTAG	No Change	
READI	None	New Module
UIMB	No Change	
QADC64	2 QADC64 (16 channels on each QADC for 32 total channels)	2 QADC64E w/AMUXes (40 channels accessible from either QADC64E)
QSMCM	(1) No Change (2)	
DLCMD2 (J1850)	None	1
MIOS	MIOS1	MIOS14: MIOS1 with real-time clock (MRTCSM), 4 more PWMSMs and 4 more MCSMs
TouCAN	(2) No Change (3)	
TPU3	(2) No Change (3)	
DPTRAM	(6-Kbytes) No Change (6-Kbytes, 4-Kbytes)	
Power Supplies		
—	40 MHz with two power supplies: nominal 3.3-V to 5.0-V power supplies	56 MHz with two power supplies: 5.0-V I/O, 2.6-V internal logic

<sup>1</sup> Available on some options.

## 2.1 Additional MPC565 Differences

The following are additional differences between the MPC555 and the MPC565.

- SPI (MISO, MOSI, and SCK) pin drive.
  - MPC565 provides 21-ns rise/fall with 200-pf load using CMOS (20%/70%) levels
- GPIO on MODCK1 pin outputs only 2.6 V
  - MODCK1 pin is in keep-alive power section with no 5-V rail available
  - 5.0-V compatibility modes
    - Input is 5-V friendly
    - 2.6-V output has less slew rate control
    - 2.6-V:  $V_{OH} = 2.3\text{ V}$
- Power supplies for external bus pins
  - QVDDL is quiet supply to hold non-switching outputs quiet even when noisy supply (NVDDL) sags
  - QVDDL supplies pre-drive and other pad logic
  - NVDDL only supplies final PMOS driver stage
  - QVDDL and NVDDL shorted on customer board after filtering
- Pull-up and pull-down changes during PORESET and HRESET
  - All 2.6-V/5-V pads (external bus: address/data/control) pull down at reset
  - All 5-V pads pull up at reset
  - Additional control granularity in the PDMCR register
- No pull-ups on QSMCM SCI receive pads
- A\_RXD1\_QGPI1, A\_RXD2\_QGPI2, B\_RXD1\_QGPI1 pins do not have weak pull-up during reset or any other time
- CLKOUT has 3 drive strength options
  - Better matches drive to requirements to reduce EMI
  - 25, 50, 100 pf instead of 45 and 90 pf
- Change reset value of ENGCLK to maximum divide (crystal/128)
  - For a 4-MHz crystal, this is 31.25 KHz
    - ENGCLK is selectable between 2.6 V and 5 V
- A daisy chain between UC3F modules allows either module to provide the reset configuration word (RCW)
- Censorship operation
  - A RCW bit controls whether or not the entire UC3F can be erased while censorship is violated
- BBC SPRs (PPC regs) access in two clocks instead of one clock
- CALRAM internal protection block size is 8 Kbytes
  - Instead of 4 Kbytes on MPC555 LRAM
- CALRAM causes machine check exception instead of data storage interrupt (DSI) exception in certain cases
  - For non-overlay CPU core accesses, a DSI exception is taken
  - For overlay accesses and any non-core access (slave mode), a machine check exception is taken

- CALRAM causes DSI exception only if the data relocation (DR) bit in the core machine state register, MSR[DR], is set.
  - L2U on MPC555 already followed this protocol, but the LRAM did not. Now all L-bus peripherals follow this protocol.
  - The MSR[DR] bit is described in the reference manual for more information.
- Four additional PRDS control bits were added to the USIU to allow more granularity of PRDS control on a part
- BBC includes a 4-Kbyte DECRAM that can be used if compression is not used or is not available.

### 3 SRAM Keep-Alive Power Behavior

The SRAM has three keep-alive power pins (VDDSRAM1, VDDSRAM2, and VDDSRAM3). These pins provide keep-alive power to the SRAM arrays in the CALRAM modules and the DPTRAM modules.

The VDDSRAM1 pin powers the 32-Kbyte CALRAM A during keep-alive while power is off to the MPC565 (except for the keep-alive power supplies). CALRAM A keeps all of its 32 Kbytes powered during power down.

The VDDSRAM2 pin powers the 4-Kbyte CALRAM B module. The VDDSRAM3 pin powers the DPTRAM modules during keep-alive as well as during normal operation. The CALRAM modules only power their arrays from the VDDSRAM pins during keep-alive. During normal operation, they are powered by the normal internal VDD of the part.

The DPTRAM modules (6 Kbytes and 4 Kbytes) and the 4-Kbyte DECRAM in the BBC module power their arrays via the VDDSRAM3 pin during keep-alive and are supplied by VDD during normal operation.

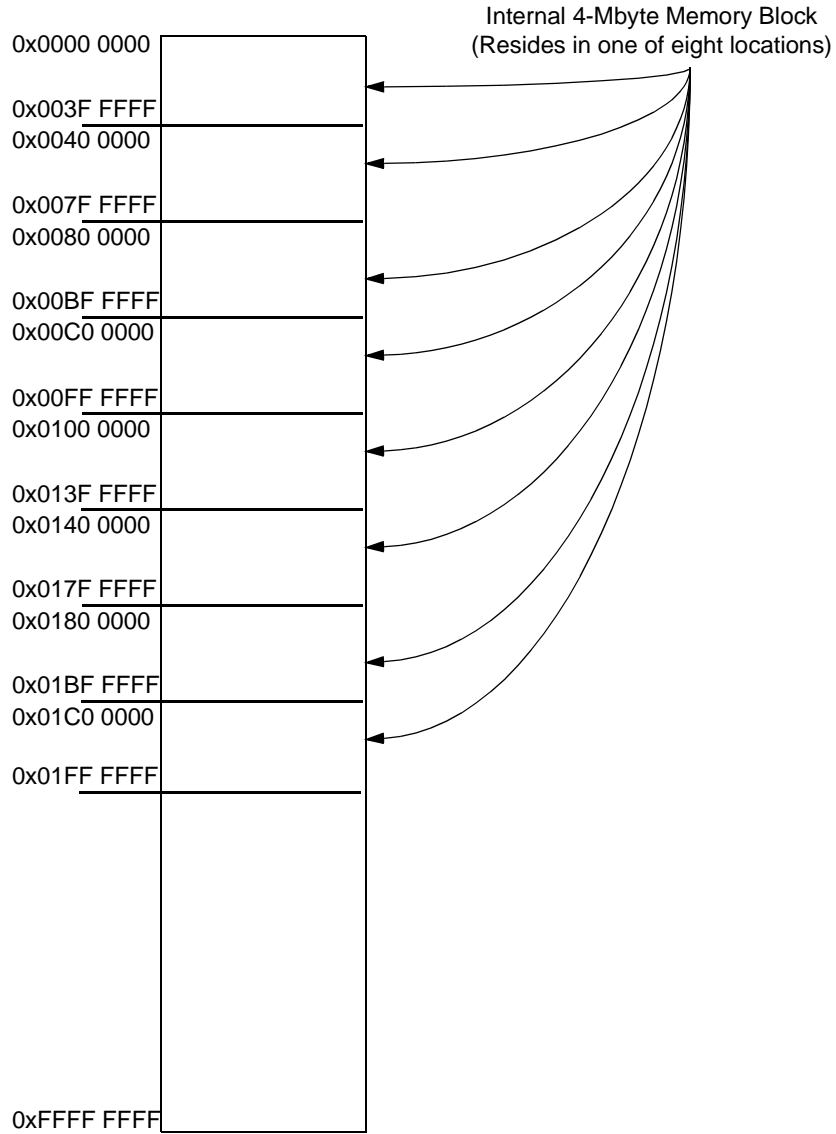
### 4 MPC565 Memory Map

The internal memory map is organized as a single 4-Mbyte block. This is shown in Figure 3. This block can be moved to one of eight different locations. The internal memory space is divided into the following sections:

- Flash memory (1 Mbyte) — U-bus memory
- Static RAM memory (36 Kbytes CALRAM) — L-bus memory
- Control registers and IMB3 modules (64 Kbytes), partitioned as
  - USIU and flash control registers
  - UIMB interface and IMB3 modules
  - CALRAM and READI control registers (L-bus control register space)

The internal memory block can reside in one of eight possible 4-Mbyte memory spaces. These eight locations are the first eight 4-Mbyte memory blocks starting with address 0x0000 0000, as shown in Figure 2. There is a user programmable register in the USIU to configure the internal memory map to one of the eight possible locations. Programmability of internal memory map location allows multiple chip system.

The IMB3 address space block in Figure 3 shows memory allocation for IMB3 modules. It does not show the actual memory space required for individual modules. All modules are mapped to the low address, numerically, of the memory allocated for that module in the IMB3 address space.



**Figure 2. Memory Map**

0x00 0000	UC3F_A Flash 512 Kbytes	USIU Control Registers	0x2F C000
0x07 FFFF		UC3F_A Control (64 bytes)	0x2F C800
0x08 0000	UC3F_B Flash 512 Kbytes	UC3F_B Control (64 bytes)	0x2F C840
0x0F FFFF			0x2F C87F
0x10 0000	Reserved for Flash (2,016 Kbytes)		
0x2F 7FFF		DPTRAM_AB Registers (64 bytes)	0x30 0000
0x2F 8000	DECRAM 4 Kbytes	DPTRAM_C Registers (64 bytes)	0x30 0040
0x2F 8FFF		DLCMD2 (16 bytes)	0x30 0080
0x2F 9000	Reserved	Reserved (3952 bytes)	0x30 0090
0x2F 9FFF			
0x2F A000	BBC Control Registers 8 Kbytes	DPTRAM_C (4 Kbytes)	0x30 1000
0x2F BFFF		DPTRAM_AB (6 Kbytes)	0x30 2000
0x2F C000	USIU & Flash Control 16 Kbytes	Reserved (2 Kbytes)	0x30 3800
0x2F FFFF		TPU3_A (1 Kbytes)	0x30 4000
0x30 0000	UIMB I/F & IMB Modules 32 Kbytes	TPU3_B (1 Kbytes)	0x30 4400
0x30 7FFF		QADC64_A (1 Kbytes)	0x30 4800
0x30 8000	Reserved for IMB 480 Kbytes	QADC64_B (1 Kbytes)	0x30 4C00
0x37 FFFF		QSMCM_A (1 Kbytes)	0x30 5000
0x38 0000	CALRAM/ Readi Control 256 bytes	QSMCM_B (1 Kbytes)	0x30 5400
0x38 00FF		Reserved (1 Kbytes)	0x30 5800
0x38 0100	Reserved (L-bus Control) ~32 Kbytes	TPU3_C (1 Kbytes)	0x30 5C00
0x38 3FFF		MIOS14 (4 Kbytes)	0x30 6000
0x38 4000	Reserved (L-bus Mem) 444 Kbytes	TOUCAN_A (1 Kbytes)	0x30 7000
0x3F 6FFF		TOUCAN_B (1 Kbytes)	0x30 7400
0x3F 7000	All 4-Kbytes can be Overlay Section	TOUCAN_C (1 Kbytes)	0x30 7800
0x3F 7FFF	CALRAM_B (4 Kbyte)	Reserved (896 bytes)	0x30 7900
0x3F 8000		UIMB Control Registers (128 bytes)	0x30 7F80
	CALRAM_A (32 Kbyte)		0x30 7FFF
0x3F FFFF	4-Kbyte Overlay Section		

Figure 3. Internal Memory Block

### 5 MPC565 Pinout Diagram

Figure 4 shows the pinout for the MPC565.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A	VDD ANA_B_PCB0	VBI ANA_AV_A_PCB1	VRE ALTRFE	AMB4 AMB5	AMB6 AMB7	AMB8 ANA_AV_A_PCB2	AMB9 ANA_AV_A_PCB3	AMB10 ANA_AV_A_PCB4	AMB11 ANA_AV_A_PCB5	AMB12 ANA_AV_A_PCB6	AMB13 ANA_AV_A_PCB7	AMB14 ANA_AV_A_PCB8	AMB15 ANA_AV_A_PCB9	AMB16 ANA_AV_A_PCB10	AMB17 ANA_AV_A_PCB11	AMB18 ANA_AV_A_PCB12	AMB19 ANA_AV_A_PCB13	AMB20 ANA_AV_A_PCB14	AMB21 ANA_AV_A_PCB15	AMB22 ANA_AV_A_PCB16	AMB23 ANA_AV_A_PCB17	AMB24 ANA_AV_A_PCB18	AMB25 ANA_AV_A_PCB19	AMB26 ANA_AV_A_PCB20	AMB27 ANA_AV_A_PCB21
B	VSS	VDD VDS5V0	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS
C	VDDRTC	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD
D	EXTAL32	VDS5V0	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS
E	XITAL32	B_CNTRX	VDS5V0	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD	VSS	VDD
F	VSSRTC	C_TRU008	C_TRU009	MD01	MD02	MD03	MD04	MD05	MD06	MD07	MD08	MD09	MD10	MD11	MD12	MD13	MD14	MD15	MD16	MD17	MD18	MD19	MD20	MD21	
G	C_TRU010	C_TRU011	C_TRU012	VDS5V0	C_TRU013	C_TRU014	C_TRU015	C_TRU016	C_TRU017	C_TRU018	C_TRU019	C_TRU020	C_TRU021	C_TRU022	C_TRU023	C_TRU024	C_TRU025	C_TRU026	C_TRU027	C_TRU028	C_TRU029	C_TRU030	C_TRU031	C_TRU032	
H	C_TRU033	C_TRU034	C_TRU035	C_TRU036	C_TRU037	C_TRU038	C_TRU039	C_TRU040	C_TRU041	C_TRU042	C_TRU043	C_TRU044	C_TRU045	C_TRU046	C_TRU047	C_TRU048	C_TRU049	C_TRU050	C_TRU051	C_TRU052	C_TRU053	C_TRU054	C_TRU055	C_TRU056	
J	C_TRU057	C_TRU058	C_TRU059	C_TRU060	C_TRU061	C_TRU062	C_TRU063	C_TRU064	C_TRU065	C_TRU066	C_TRU067	C_TRU068	C_TRU069	C_TRU070	C_TRU071	C_TRU072	C_TRU073	C_TRU074	C_TRU075	C_TRU076	C_TRU077	C_TRU078	C_TRU079	C_TRU080	
K	C_TRU081	C_TRU082	C_TRU083	C_TRU084	C_TRU085	C_TRU086	C_TRU087	C_TRU088	C_TRU089	C_TRU090	C_TRU091	C_TRU092	C_TRU093	C_TRU094	C_TRU095	C_TRU096	C_TRU097	C_TRU098	C_TRU099	C_TRU100	C_TRU101	C_TRU102	C_TRU103	C_TRU104	
L	MDL0	TCK_DSEK	MDL1	MCKI	MDL2	MDL3	MDL4	MDL5	MDL6	MDL7	MDL8	MDL9	MDL10	MDL11	MDL12	MDL13	MDL14	MDL15	MDL16	MDL17	MDL18	MDL19	MDL20	MDL21	
M	MDL22	MDL23	MDL24	MDL25	MDL26	MDL27	MDL28	MDL29	MDL30	MDL31	MDL32	MDL33	MDL34	MDL35	MDL36	MDL37	MDL38	MDL39	MDL40	MDL41	MDL42	MDL43	MDL44	MDL45	
N	MDL46	MDL47	MDL48	MDL49	MDL50	MDL51	MDL52	MDL53	MDL54	MDL55	MDL56	MDL57	MDL58	MDL59	MDL60	MDL61	MDL62	MDL63	MDL64	MDL65	MDL66	MDL67	MDL68	MDL69	
P	MDL70	JCOMP	MCKO	MDL0	MDL1	MDL2	MDL3	MDL4	MDL5	MDL6	MDL7	MDL8	MDL9	MDL10	MDL11	MDL12	MDL13	MDL14	MDL15	MDL16	MDL17	MDL18	MDL19	MDL20	
R	MDL21	TRD_DSEK	MDL22	MDL23	MDL24	MDL25	MDL26	MDL27	MDL28	MDL29	MDL30	MDL31	MDL32	MDL33	MDL34	MDL35	MDL36	MDL37	MDL38	MDL39	MDL40	MDL41	MDL42	MDL43	
T	MDL44	MISO_B	MISO_C	MISO_D	MISO_E	MISO_F	MISO_G	MISO_H	MISO_I	MISO_J	MISO_K	MISO_L	MISO_M	MISO_N	MISO_O	MISO_P	MISO_Q	MISO_R	MISO_S	MISO_T	MISO_U	MISO_V	MISO_W	MISO_X	
U	SEPC016	SEPC017	SEPC018	SEPC019	SEPC020	SEPC021	SEPC022	SEPC023	SEPC024	SEPC025	SEPC026	SEPC027	SEPC028	SEPC029	SEPC030	SEPC031	SEPC032	SEPC033	SEPC034	SEPC035	SEPC036	SEPC037	SEPC038	SEPC039	
V	SEPC040	SEPC041	SEPC042	SEPC043	SEPC044	SEPC045	SEPC046	SEPC047	SEPC048	SEPC049	SEPC050	SEPC051	SEPC052	SEPC053	SEPC054	SEPC055	SEPC056	SEPC057	SEPC058	SEPC059	SEPC060	SEPC061	SEPC062	SEPC063	
W	SEPC064	SEPC065	SEPC066	SEPC067	SEPC068	SEPC069	SEPC070	SEPC071	SEPC072	SEPC073	SEPC074	SEPC075	SEPC076	SEPC077	SEPC078	SEPC079	SEPC080	SEPC081	SEPC082	SEPC083	SEPC084	SEPC085	SEPC086	SEPC087	
Y	SEPC088	SEPC089	SEPC090	SEPC091	SEPC092	SEPC093	SEPC094	SEPC095	SEPC096	SEPC097	SEPC098	SEPC099	SEPC100	SEPC101	SEPC102	SEPC103	SEPC104	SEPC105	SEPC106	SEPC107	SEPC108	SEPC109	SEPC110	SEPC111	
AA	SEPC112	SEPC113	SEPC114	SEPC115	SEPC116	SEPC117	SEPC118	SEPC119	SEPC120	SEPC121	SEPC122	SEPC123	SEPC124	SEPC125	SEPC126	SEPC127	SEPC128	SEPC129	SEPC130	SEPC131	SEPC132	SEPC133	SEPC134	SEPC135	
AB	SEPC136	SEPC137	SEPC138	SEPC139	SEPC140	SEPC141	SEPC142	SEPC143	SEPC144	SEPC145	SEPC146	SEPC147	SEPC148	SEPC149	SEPC150	SEPC151	SEPC152	SEPC153	SEPC154	SEPC155	SEPC156	SEPC157	SEPC158	SEPC159	
AC	SEPC160	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
AD	SEPC161	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
AE	SEPC162	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
AF	SEPC163	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	

NOTE: This is a top down view of the balls.

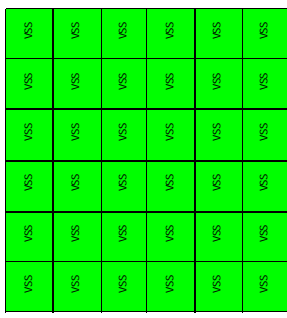


Figure 4. MPC565 Pinout Diagram



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