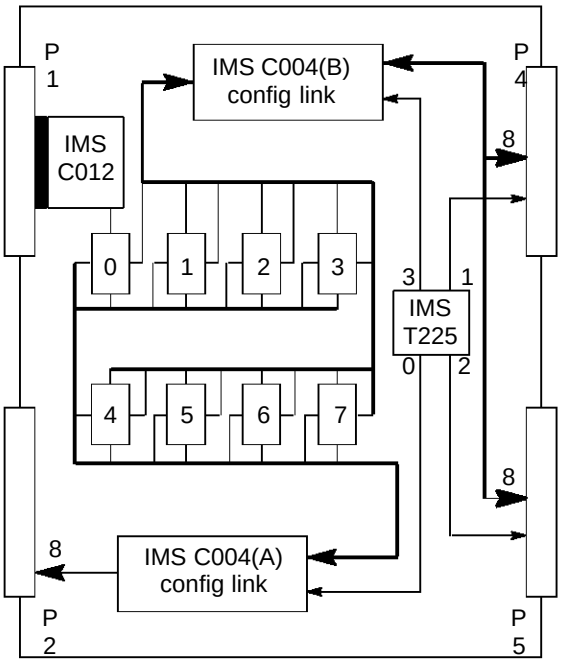
SGS-THOMSON MICROELECTRONICS

IMS B014

VMEbus Slave Card



FEATURES

- Compatible with VMEbus Specification Rev. C.1
- Accommodates 8 standard transputer modules (TRAMs)
- Static or dynamic link configuration using two IMS C004 link switches
- VMEbus interface designed around an IMS C012 link adaptor
- Expandable to form arbitarily large systems
- Suitable for use as VMEbus–transputer interface with a SUN based development system and IMS CA12 card frame

DESCRIPTION

The IMS B014 module motherboard is compatible with VMEbus Specification Rev. C.1. It is a standard depth (160mm), double height (6U) card, containing 8 TRAM slots with associated configuration circuitry and a VMEbus slave interface. Two IMS C004 crossbar link switches are provided to allow the user to configure the transputer link connections. This architecture allows any topology to be established on the board. Additionally, 24 links are brought to the edge connectors (8 on the P2 back connector, and 16 split between two front connectors) so that larger networks, using multiple boards, may be constructed.

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1.1 Description

1.1.1 VMEbus Interface

The IMS B014 has a slave interrupting interface to the VMEbus. This interface provides access to a single, bi-directional INMOS link and a system service port. The interface appears as a number of registers located in the A16 (short) address space on the VMEbus, which may be accessed by any VMEbus master such as the IMS B016. These registers are used to program and interact with the IMS B014.

The TRAMS on the IMS B014 can be reset or analysed via the VMEbus interface, or can be bootstrapped through it. Data can be exchanged between TRAMs on the IMS B014 and any bus-master on the VMEbus. All bus communication is achieved using D08(O) data transfers.

1.1.2 Interrupts

The IMS B014 is capable of generating a single VMEbus interrupt that may be assigned to any of the seven VMEbus priority interrupt levels. Interrupts can be triggered by any one of three events:

- data byte received on VMEbus link;
- VMEbus link free to send a data byte;
- an error has occurred in the transputer system;

All interrupts may be individually masked.

1.1.3 IMS C004 Control

The IMS B014 uses the same method of controlling the IMS C004 as other INMOS module motherboards. This allows all IMS C004s to be programmed from a single master configuration link. Each module motherboard has a **ConfigUp** link and a **ConfigDown** link. Thus, motherboards may be cascaded to build multi-board systems, by connecting these links in a pipeline.

On the IMS B014, the **ConfigUp** and **ConfigDown** links can be switched to either the P2 back connector or to the front connectors (P4, P5). Jumpers are also provided that allow either the VMEbus link or slot 0, link 1 to be the master configuration link (figure 1.1).

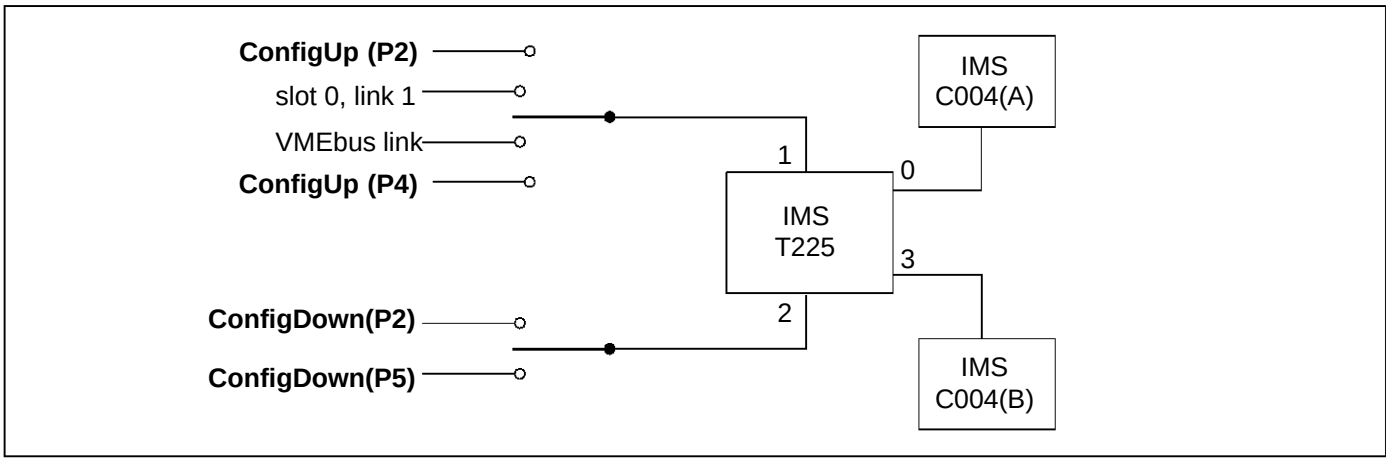

Figure 1.1 Configuration Control

1.1.4 System Services Organisation

On all INMOS board products, the term ''system services'' refers to the collection of the **reset, analyse** and **error** signals. **ResetUp** and **ResetDown** ports are used to carry these signals between boards. **Error** signals ''flow'' in the reverse direction to the **reset** and **analyse** signals.

The IMS B014 allows system service signals to be generated by bus-masters on the VMEbus. A bus-master can reset or analyse the transputer system by writing to the appropriate registers in the interface. Transputer error signals are propagated back to a register in the interface where they may be monitored by the bus-master.

TRAM slot 0 can be reset independently of the other TRAM slots on the board. This allows slot 0 to be used as a ''transputer master'', controlling other transputers in the system. Thus, it is possible to establish a control hierachy; a principle that can be extended to multi-level systems using multiple motherboards.

1.2 Specification

Mechanical details

The IMS B014 is designed to accord with DIN 41494 and IEC 297 standards. The board is nominally 160mm by 233.35mm. Nominal board thickness is 1.6mm. The supplied front panel width is 4HP (approx 20mm). This is compatible with a board-to-board pitch in a card cage of 0.8''. M2.5 fastening bolts are provided on the front panel, these mate with tapped holes in the card cage and fix the board securely. Front panel handles allow the board to be removed from the card cage (by un-screwing the retaining bolts and pulling hard on the handles). Note that the front panel is *required* when operating the IMS B014 in a card cage, both for mechanical rigidity and to give correct cooling air flow.

Thermal details

Adequate cooling air flow must be provided to maintain the components on the board within their operating temperature. Air flow should run parallel to the board surface and parallel to the front panel. The amount of heat dissipated by the board depends upon the TRAMs fitted. With no TRAMs the IMS B014 dissipates no more than 5W. With TRAMs fitted, the maximum dissipation allowed (from 5v supply) is 18.75W when only using a J1 backplane and 37.5W when using a J1/J2 backplane[1]. It is essential that the user ensures that the maximum power dissipation is not exceeded. The cooling air flow required for a particular application will probably need to be determined empirically.

A single board operating in static air at room temperature (and not in a card-cage) will usually not need forced air cooling. This kind of set-up should only be used for lab and development work. High reliability is not to be expected from boards which are not provided with adequate cooling.

Operating and Storage Environments

	Operating	Storage
Temperature	0 to +50°C ambient air	–55 to +85°C
Relative Humidity	95% non condensing	95% non condensing
Thermal Shock	<0.08°C/s	<0.15°C/s
Altitude	–300 to +3000 m	–300 to +16000 m

Table 1.1 Environmental details

Electrical details

The IMS B014 requires power supply voltages in accordance with the VMEbus specification. That is, the +5V dc supply must be between 4.75V and 5.25V and have less than 50mV pk-pk noise and ripple between dc and 10MHz. The IMS B014 does not incorporate protection against incorrect power supplies. Major damage can result from operating the board outside its power supply range.

The maximum power consumption of the IMS B014 without any TRAMs fitted is 10W.

1. J1 is the minimum VMEbus backplane and mates with P1 connectors on VMEbus boards. J2 mates with P2 connectors and is sometimes called a 32-bit backplane because it is needed for 32-bit VMEbus operations. Combined J1/J2 backplanes mate with both P1 and P2 and are needed for reliable operation of fast 32-bit VMEbus transfers

VMEbus capability

For easy description of VMEbus boards, the VMEbus specification defines a number of ‘‘capability’’ abbreviations. The relevant capabilities for the IMS B014 are listed here—

1 A16:D08(O) SLAVE

2 INT(1–7):D08(O) INTERRUPTER

3 6U high—double height board

VMEbus access time will be no longer than 170ns from DSA* to DTACK*.

The time to propagate a non-participating interrupt acknowledge cycle is no longer than 100ns from IACKIN* to IACKOUT*. The time to respond to a participating interrupt acknowledge cycle will be no longer than 170ns from IACKIN* to DTACK*.

The IMS B014 propagates the BUSREQ* daisy-chain signals on the board, thus there is no need for jumpers on the backplane at the slot which the IMS B014 is plugged into.

1.3 Ordering Information

Description	Order Number
VMEbus Module Motherboard with IMS T225	IMS B014–1
Associated products	
Device driver software	IMS S514

Table 1.2 Ordering Information