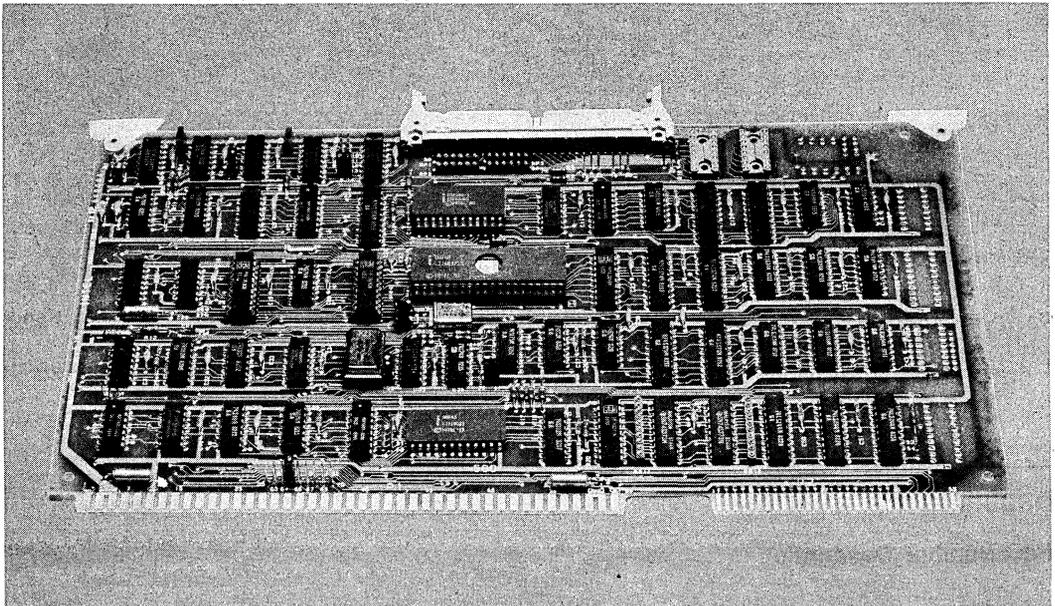




iSBC[®] 580 MULTICHANNEL[™] BUS TO iLBX[™] BUS INTERFACE

- MULTICHANNEL[™] I/O bus 16-bit Talker/Listener interface
- Data rates up to 5.3 megabytes per second
- iLBX[™] bus master interface (primary or secondary)
- Addresses up to 16 megabytes of iLBX[™] bus memory
- Supports MULTIBUS[®] interrupts
- MULTIBUS[®] form factor

The iSBC[®] 580 Interface Board is a member of Intel's complete line of MULTIBUS[®] microcomputers which maximize system performance by using separate optimized buses for intra-system communication (MULTIBUS system bus), high speed I/O (MULTICHANNEL[™] DMA I/O bus), expansion I/O (iSBX[™] I/O expansion bus) and high-speed memory expansion (iLBX[™] execution bus). The iSBC 580 board provides a key element in the enhanced MULTIBUS system architecture by implementing a MULTICHANNEL I/O bus to iLBX bus interface on a single 6.75 x 12.00 inch printed circuit board. Using an LSI state machine with standard on-chip firmware to maximize throughput, the on-board Intel[®] 8048 Single Component Microcomputer transfers data between a MULTICHANNEL Controller, device and up to 16 megabytes of iLBX bus resident memory at rates up to 5.3 megabytes per second. Acting as a MULTICHANNEL Talker/Listener, the iSBC 580 board increases the system's overall performance by transferring data between the MULTICHANNEL I/O bus and system memory without using the MULTIBUS system bus. As shown in Figure 1, this allows other system tasks to utilize MULTIBUS resources while high-speed I/O block transfers are occurring simultaneously. The board's high throughput and independence from MULTIBUS activities make it an ideal solution for applications that must transfer large amounts of data in and out of a MULTIBUS system, such as MULTIBUS to host computer links and mass storage, graphics display and high-speed data acquisition subsystem interfaces.



FUNCTIONAL DESCRIPTION

MULTICHANNEL™ Interface Capabilities

The MULTICHANNEL I/O bus is designed to provide a general purpose, high-speed data path between a microcomputer system and up to 15 block transfer devices. Using a 16-bit wide data bus and a simple asynchronous handshaking scheme, the MULTICHANNEL bus can operate over distances up to 15 meters (50 feet) with a maximum burst throughput of 8 megabytes/second. The bus consists of 16 address/data lines, 6 control lines, 2 interrupt lines, parity lines and reset. Via these signals, a MULTICHANNEL Supervisor or Controller may configure and then initiate a block data transfer with any other device on the bus.

The iSBC 580 board acts as a 16-bit only Talker/Listener device on the MULTICHANNEL I/O bus. As a Talker/Listener, the board will respond to Register Read or Write and DMA requests issued by the MULTICHANNEL Supervisor (typically an iSBC 589 board) or by a MULTICHANNEL Controller device.

The iSBC 580 board implements 32 MULTICHANNEL Device Registers. The first three registers are the standard STO Status, SRQ Status and SRQ Mask Registers, as defined by the MULTICHANNEL Bus Specification. The remaining registers are used to communicate with the on-board firmware and for user data storage. The firmware operations which may be initiated by writing to the Command Register are listed in Table 1. The iSBC 580 board always sends and receives a 16-bit word on the MULTICHANNEL interface but, the iSBC®

580 device registers (see Table 2) are 8-bit only. Register Write operations use only the low order 8-bits (AD0-AD7). Register Read operations place the data on the low order data lines of the MULTICHANNEL I/O bus and set the high order data lines to FFH.

Command Code (Hex)	Operation
0	No Operation
1	Go off line forever
2	STO poll (diagnostic)
3	SRQ poll (diagnostic)
4	Set on-board timer
5	Read on-board timer
6	Start on-board timer
7	Stop on-board timer
8	Generate Task Complete interrupt
9	Perform checksum on firmware (diagnostic)
A	Turn on-board LED on
B	Turn on-board LED off
C	Reset
D, E	Reserved
F	Set interrupt mask
10	Read interrupt mask
11-1F	Reserved

Table 1. iSBC® 580 Firmware Commands

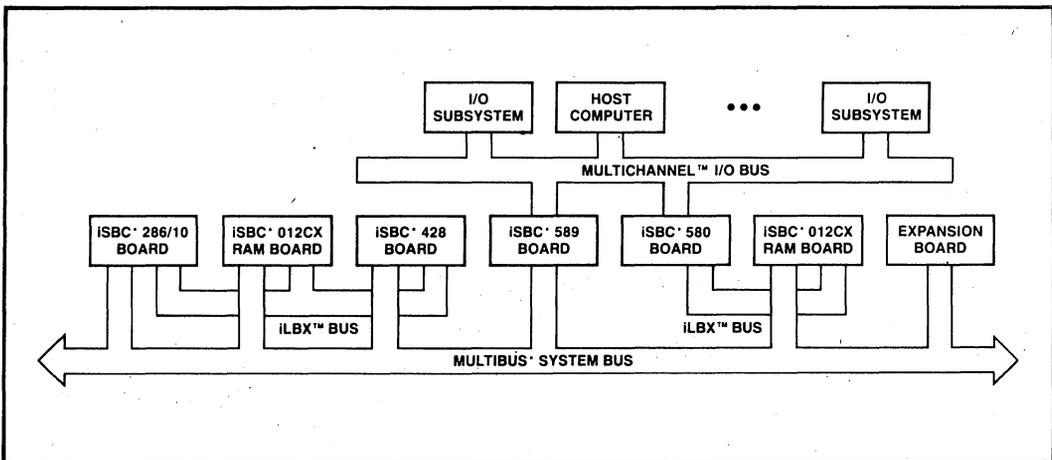


Figure 1. iSBC® 580 board, configured as an iLBX™ Bus Primary Master, transfers data between iLBX™ memory and MULTICHANNEL™ devices without using the system bus. The iSBC® 589 board acts as the MULTICHANNEL™ Supervisor and performs data transfers between MULTIBUS® memory and MULTICHANNEL™ devices.

The iSBC 580 board can generate maskable MULTICHANNEL STO interrupts when the board detects a parity error in incoming MULTICHANNEL data, when the board attempts to address non-existent iLBX memory or when the board detects a MULTIBUS interrupt from the system in which it resides. The last type of interrupt allows a single board computer to send an interrupt via the iSBC 580 board to the MULTICHANNEL Supervisor located in another MULTIBUS system. The board can also generate a number of SRQ interrupts on the MULTICHANNEL bus as shown in Figure 2.

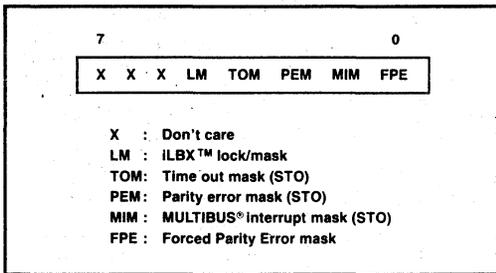


Figure 2. iSBC® 580 Interrupt Mask Register (14H)

iLBX™ Bus Interface Capabilities

Used in conjunction with the MULTIBUS interface, the iLBX bus is designed to provide off-board memory and I/O expansion for single board computers while maintaining on-board performance. The iLBX bus provides high-speed access to compatible expansion boards by granting privileged use of the bus to a single Primary Master. The bus also provides limited access to iLBX bus expansion boards for, at most, one Secondary Mas-

ter that requires only occasional or non-concurrent access to iLBX resources. The iLBX bus, with 16 data lines, 24 address lines plus control, parity and interrupt signals, utilizes all the pins on the P2 connector except the four pins dedicated to the high-order address lines of the MULTIBUS interface. The non-multiplexed address and data lines provide access to up to 16 megabytes of iLBX bus resident memory, on up to 4 separate expansion boards, at speeds comparable to that of a single board computer's on-board resources.

The iSBC 580 board is configurable as either a Primary or a Secondary Master on the iLBX bus. Figure 1 shows a typical system configuration, with an iSBC 580 board acting as a Primary Master. The board can access up to 16 megabytes of iLBX memory. Supporting 16-bit transfers on the MULTICHANNEL bus, the board accesses memory as 16-bit words on even byte iLBX address boundaries. To increase the performance of iLBX memory read operations, the iSBC 580 board prefetches data from memory while the current data word is being transferred over the MULTICHANNEL I/O bus.

Register	Address
STO Status	00H
SRQ Status	01H
SRQ Mask	02H
RESERVED	03H-0FH
General Purpose Registers	10H*-1FH

* NOTE: 10H used as Command Register.

Table 2. iSBC® 580 MULTICHANNEL™ Device Register Set

SPECIFICATIONS

MULTICHANNEL™ Bus

Interface — Basic Talker/Listener

Transfer Mode — 16-bit

Device Address — Jumper selectable between 00H and 0EH

Registers — STO status, SRQ status, SRQ mask plus device specific registers

Signal Level — TTL compatible

iLBX™ Bus

Interface — Primary or Secondary (default) Master

Transfer Mode — 16-bit

Addressing — 16 megabytes on even byte boundaries only

Signal Level — TTL compatible

MULTIBUS® Interface

Data — None

Addressing — None

Interrupts — Jumper configurable to use any 1 of the 8 MULTIBUS interrupt lines. Interrupts are edge triggered.

Signal Level — TTL compatible

Throughput

5.3 megabytes/sec (2.65 megatransfers) max.

Connectors

iLBX™ BUS INTERFACE

Double-Sided Pins — 60

Centers — 0.100 in.

Mating Connectors* — Kelam RF30-2803-5
T&B Ansley A3020
(609-6025 modified)

MULTICHANNEL™ BUS INTERFACE

Pins — 60

Centers — 0.100 in.

Mating Connectors* — 3M 3334-6000
Berg 65949-960

* Connectors compatible with those listed may also be used.

Physical Characteristics

Width — 12.00 inches (30.5 cm)

Height — 6.75 inches (17.1 cm)

Depth — 0.60 inches (1.5 cm)

Weight — 12 ounces (340 gm)

Environmental Characteristics

Operating Temperature — 0° to 55°C

Relative Humidity — to 90% (without condensation)

DC Power Requirements

Voltage — +5 volt only $\pm 5\%$

Current — 2.5 amps (typical)

Reference Manuals

144457-001 — iSBC 580 MULTICHANNEL to iLBX Bus Interface Board Hardware Reference Manual (NOT SUPPLIED)

143269-001 — Intel MULTICHANNEL Bus Specification (NOT SUPPLIED)

144456-001 — Intel iLBX Bus Specification (NOT SUPPLIED)

142996-001 — iSBC 589 Intelligent DMA Controller Board Hardware Reference Manual (NOT SUPPLIED)

Manuals may be ordered from any Intel sales representative, distributor office or from Intel Literature Department, 3065 Bowers Avenue, Santa Clara, CA 95051

ORDERING INFORMATION

Part Number Description

SBC 580	MULTICHANNEL to iLBX Bus Interface Board
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