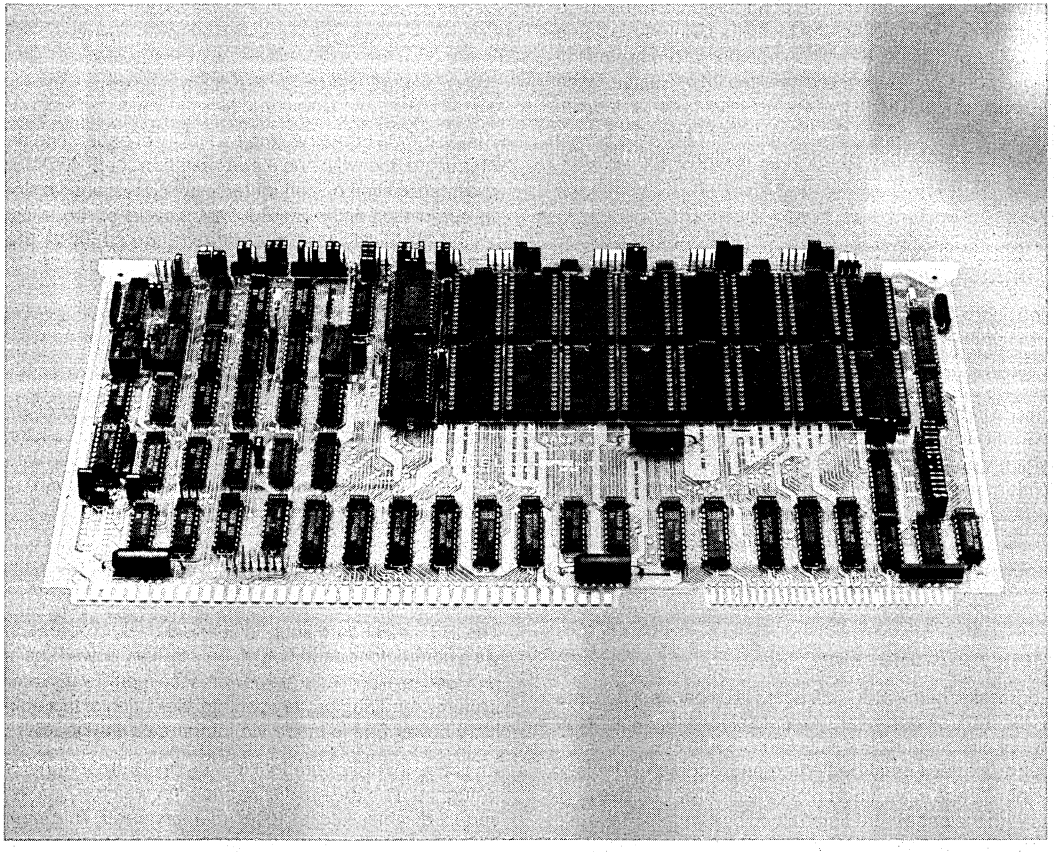
PRELIMINARY

iSBC® 428 UNIVERSAL SITE MEMORY EXPANSION BOARD

- **Supports EPROM, ROM, E²PROM, SRAM, IRAM and NVRAM**
- **iLBX™ BUS or MULTIBUS® Selectable**
- **Provides support for Battery Backup/ Memory Protect**
- **Sixteen 28 pin Universal sites**
- **Assignable anywhere within a 16 megabyte address space on 256K byte boundaries**
- **Jumper selectable base address on 4K byte boundaries**

The iSBC® 428 Universal Site Board is a member of Intel's complete line of Memory and I/O Expansion boards. The iSBC 428 Universal Site Memory Expansion Board interfaces directly to the iSBC 80, iSBC 88, or iSBC 86 Single Board Computers via the MULTIBUS® System Bus to expand system memory requirements, while system memory expansion requirements for iSBC 286 Single Board Computer can interface via either the MULTIBUS or the high speed iLBX™ Bus.



FUNCTIONAL DESCRIPTION

General

The iSBC 428 board contains sixteen 28 pin sockets. The actual capacity of the board is determined by the type and quantity of components installed by the user. The iSBC 428 board is compatible with five different types and densities of devices: the 2K by 8 thru 64K by 8 EPROM/ROM devices, 2K by 8 thru 8K by 8 "Five Volt Only, Enhanced" E²PROM devices, 512 by 8 thru 16K by 8 NVRAM (Non-Volatile RAM) devices, 2K by 8 thru 32K by 8 SRAM devices, and 8K by 8 IRAM (Integrated RAM) devices. In addition the board can be accessed by either the MULTIBUS System Bus or Intel's new high speed iLBX Bus.

iLBX™ Bus

The iSBC 428 board can be configured via jumpers to communicate with either the MULTIBUS interface or the iLBX Bus interface. Significant memory access time improvements can be realized over the iLBX Bus interface (versus the MULTIBUS interface) due to its dedicated, unarbitrated architecture. Additional information on the iLBX Bus is available in the iLBX Specification #144456-003.

Memory Banks

The sixteen sites on the iSBC 428 board are partitioned into two banks of 8 sites each. Within each bank the 8 sites are further partitioned into 2 groups of 4 sites each. Each group of 4 sites is configurable to each of the six device types described above via a "Configurator". The "Configurator" is an arrangement of push-on jumpers which configures each of the four groups of 4 sites. Within each bank devices of the same density must reside and within each group devices of the same type must reside (i.e. SRAM or EPROM).

Memory Addressing

Addressing of the iSBC 428 board is by pages. There are 64-256K pages which are jumper selectable. Each of the two banks are independently addressable and can reside in any page. Actual beginning and ending addresses within a page are a function of the actual device size and, as with the pages, are determined by jumpers. Because of the paging based memory addressing architecture more than one iSBC 428 board can be placed in a system.

Mode of Operation

The iSBC 428 board can operate in one of two modes: the 8 bit only mode or the 8/16 bit mode. The 8 bit mode provides the most efficient memory configuration for systems handling 8 bit data only. The 8/16 bit mode allows the iSBC 428 board to be compatible with systems employing 8 bit and 16 bit masters. The mode of operation is selected by on board jumpers and is available for both MULTIBUS and iLBX Bus configurations.

Memory Access

The iSBC 428 board has jumper selectable access times which allows the board to be tailored to the performance of the particular devices which are installed in the iSBC 428 board. The board can be configured via jumpers to accept devices with an access time range of 50 ns to 500 ns with a granularity of 50 ns and results in a board access time from 225 ns to 775 ns.

Interrupt

The iSBC 428 board has the capability of generating an interrupt for the write and erase operations of E²PROMS. The interrupt can be configured in two ways: one, to signal completion of the E²PROM write cycle, or two, allow polling by the system to determine the status of the E²PROM during the write programming time.

Inhibits

Inhibits are provided on the iSBC 428 board to allow ROM to overlay RAM for bootstrapping or diagnostic operations. Each bank of the iSBC 428 board can be overlayed with the system RAM by jumpers provided on the board.

Battery Backup

The iSBC 428 board supports battery backup operation via a connector on the board. An auxiliary power bus is provided to allow separate power to the memory array for systems requiring battery backup. Selection of this auxiliary power bus is made via jumpers on the board.

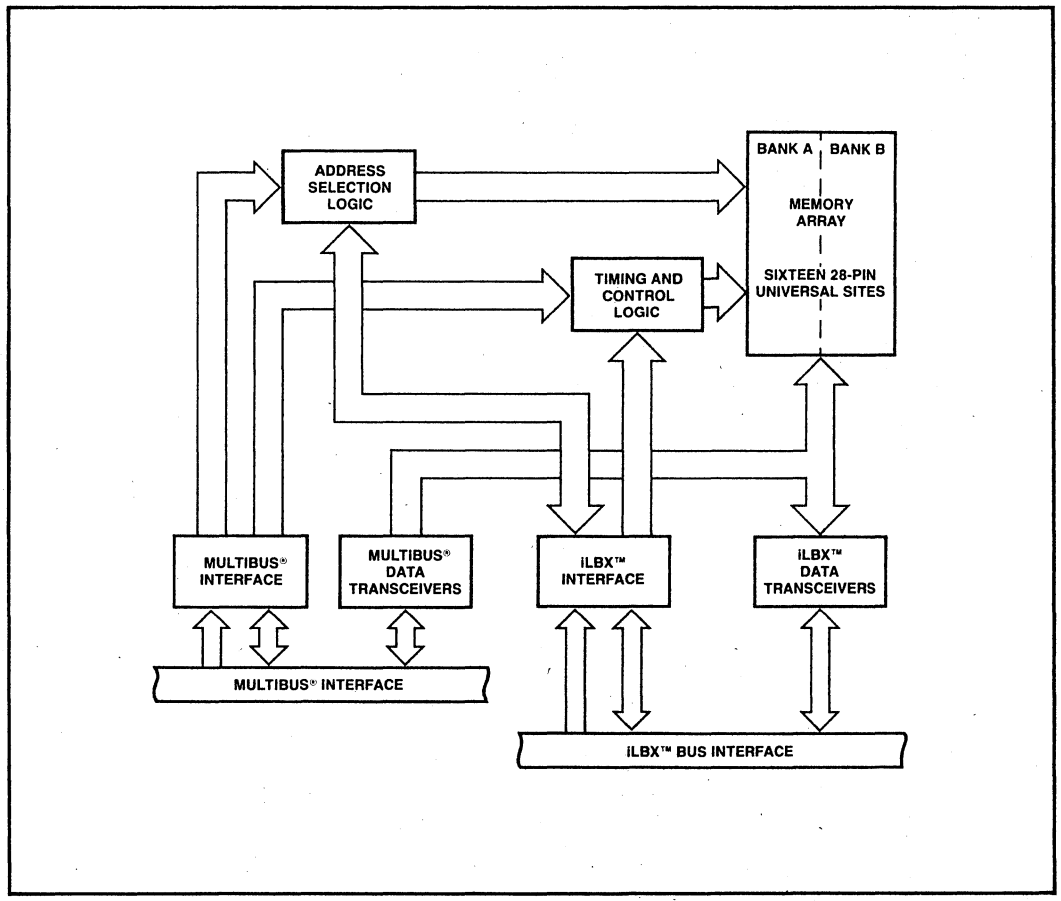
An active-low TTL compatible Memory Protect signal is brought out on the auxiliary connector which, when asserted, disables access to the memory array. This input is provided for the protection of Memory contents during system power-down sequences.

Devices Supported

Listed below are the current and future devices supported by the iSBC 428 board.

	Size							
Type	**512 x 8**	**2K x 8**	**4K x 8**	**8K x 8**	**16K x 8**	**32K x 8**	**64K x 8**	**Comments**
EPROM	—	2716	2732A	2764	27128	27256	27512	—
ROM	—	X	X	X	X	X	X	—
EEPROM	—	2817A	X	X	X	X	—	5V, Enhanced
SRAM	—	X	X	X	X	X	—	NMOS & CMOS
NVRAM	—	X	X	X	—	—	—	—
IRAM	—	—	—	2186	—	X	—	—

X-Denotes that the iSBC 428 board will support the device indicated but that it is not currently available from Intel.



iSBC® 428 Block Diagram

SPECIFICATIONS

Word Size

8 or 8/16 bits

Memory Size

Sockets are provided for up-to sixteen 28 pin devices which can provide up to 512K bytes of EPROM/ROM/SRAM.

Access Time

Jumperable from 225 to 775 ns with a granularity of 50 ns and is equivalent for both MULTIBUS and the iLBX Bus.

Power Requirements

$V_{CC} = 5$ volts $\pm 5\%$

$I_{CC} = 2.0$ amps, maximum, without any memory devices in the board.

Physical Characteristics

Length — 30.48 cm (12 inches)

Width — 17.15 cm (7.05 inches)

Depth — 1.27 cm (0.5 inches)

Environment

Operating Temperature — 0°C to +55°C

Relative Humidity — 90% non-condensing

Reference Manual

145696-001 — iSBC 428 Hardware Reference Manual (NOT SUPPLIED)

Additional Literature

9800683-04 — MULTIBUS Specification

144456-001 — The iLBX Specification

ORDERING INFORMATION

Part Number	Description
SBC 428	Universal Site Memory Expansion Board