

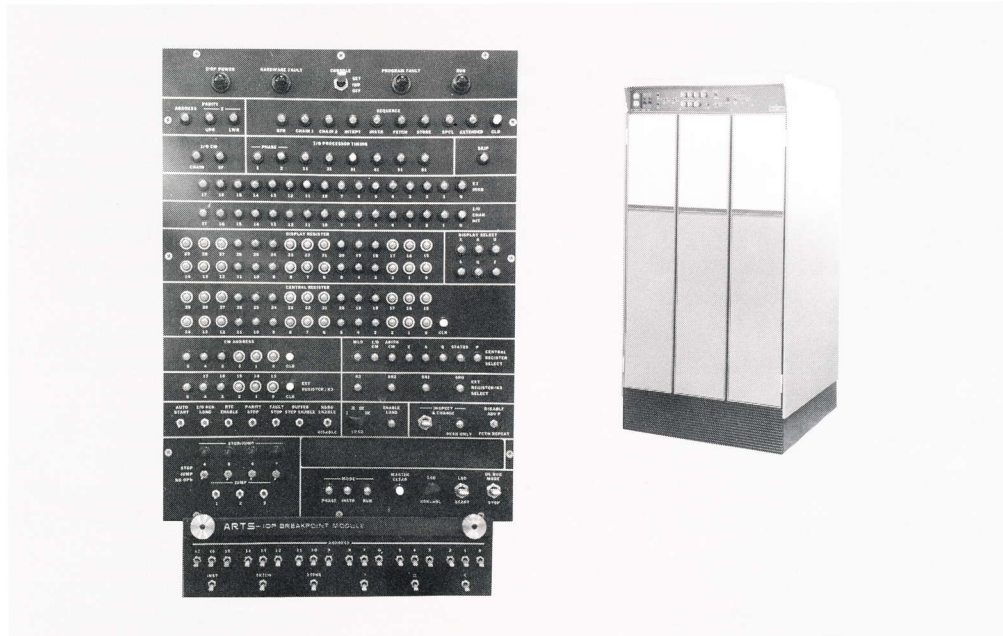
Input Output Processor-B (IOP-B)

FA-8303

Breakpoint Module (BPM)

FA-8313

UNISYS



- Designed for use as a multiprocessor or a stand-alone processor
- General purpose 30-bit processor
- Up to 16 input/output (I/O) channels
- Relative addressing and memory protect circuitry
- Addressing to 262,144 words of memory (30-bit words)
- Parity on all data transfer to memory or I/O
- I/O chaining and automatic buffer capability
- Externally Specified Index (ESI) I/O channel capability
- Allows stopping the Input/Output Processor (IOP) on a selected condition or at a specific address
- Valuable maintenance and debug aid which can facilitate checkout of software or aid in solving difficult hardware problems
- Address selection and conditions set by manual switches

Features

General Characteristics (IOP-B)

- Real-time 30-bit multiprocessor
- Single address instructions:
 - 74 processor instructions
 - 7 I/O chain instructions
- Arithmetic section:
 - One's complement integer binary
 - 30-bit subtractor type adder
 - Fixed point
- Memory addressing to 262,144 memory locations
- Relative addressing and memory protection hardware registers (2048 word segments)
- Control memory provides fast access for:
 - Seven index registers for address modification
 - Program control storage
 - Clock storage
 - I/O chain addresses
 - Buffer control words
- Multilevel interrupt processing
- Basic instruction execution times:
 - Enter — .750 usec
 - Store — 1.47 usec
 - Add — 1.47 usec
 - Subtract — 1.47 usec
 - Multiply — 5.82 - 13.02 usec
 - Divide — 13.02 usec
- Up to 16 parallel I/O channels
- Special processor interfaces
- Parity on all data transfers between memory and I/O
- Real-time clock:
 - 30-bit incremental
 - Internal: 1024 Hz, $\pm 0.02\%$
 - External: 1024 Hz, clock from WWV time synchronization subsystem
- Monitor clock:
 - 30-bit decremental
 - Same frequency source as real-time clock

- Power failure detection and automatic restart
- Read Only Memory (ROM):
 - Initial load
 - Failsafe/soft recovery system
 - 1024 words, furnished in standard configuration
 - *4096 words

General Characteristics (BPM)

- Breakpoint Module (BPM) contains 18 breakpoint data switches and 6 condition switches (3 compare and 3 sequence) to select the breakpoint desired
- Breakpoint data switches are compared with the lower 18 bits of the IOP Display Register selected in the IOP Display Select
- Compare switch settings
 - Less than
 - Equals
 - Greater than
- Any one or combination of compare switches may be used
- Sequence switch settings
 - Instruction
 - Fetch
 - Store
- Any one or combination of sequence switches may be used
- Plug-in interface to IOP
- Mounted in a processor cabinet below the IOP maintenance panel
- Temperature and Humidity requirements are compatible with the IOP

Special Multiprocessing Features

- Relative addressing and memory protection
- Relative interrupt steering
- Table access control
- Processor sensitive load and store instructions

Processor Interface Channels

- Memory interface through either:
 - Memory modules (FA-8304 and FA-8304B)
 - Central Memory Access (CMA) (FA-8311)
 - Allows access up to 262,144 words of memory
- *Interprocessing signal interface for multiprocessor communication for itself and up to 7 other processors
- *External oscillator interface for accepting oscillator signals from eight sources (i.e., itself RTC or other processors)
- *Reconfiguration and Fault Detection Unit (RFDU) (FA-8309)
- *Minimum Safe Altitude Warning interface provides interface to four (expandable to six) MSAW alarms (FA-9481A)
- *Remote Scatter Recovery Alarm (RALM) (FA-8314) interface provides an interface to an aural alarm control which controls remote scatter recovery alarm

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*Options

Input/Output

- Maximum of 16 I/O channels (up to 4 Type B (logic level) and 12 Type A (long cable))
- Maximum I/O rate — 1.3 million 30 bits word/sec
- I/O channel interfaces available:
 - Type A, -3V 1108 30-bit parallel (Unisys SB 10205)
 - *Type A, -3V NTDS 30-bit parallel (DS-4772)
 - Type B, logic level (Unisys SB 10205)

Power

- Voltage
 - 120 VAC single phase
- Frequency
 - 60 Hz
- IOP-B Power
 - 960 watts
- Cabinet Power
 - 440 watts

Physical

- Up to 2 IOPB's may be mounted in a single processor cabinet (FAA type FA-8301)
- Operating temperature
 - +50° F to 90° F
- Operating humidity
 - 20% to 80%
- Atmospheric pressure
 - sea level to 7000 feet above sea level
- Cabinet size (inches):
 - Height - 70.4"
 - Width - 37.3" (with side skins)
 - Depth - 25.5"
 - Service Area - 37.3"W x 72.5"D
- IOP-B cabinet area contains:
 - Logic chassis
 - Maintenance panel
 - AC-DC converters
 - DC-DC converters
 - I/O connector assembly

Software

- Standard 30-bit support software:
 - Librarian
 - Macro Assembler
 - Linking Loader
 - Debug aids
 - Utility routine
 - Jovial compiler
- Assembler, simulator, builder and JOVIAL compiler operating on Unisys 1100 series systems
- Multiprocess Executive:
 - Scheduling and dispatching
 - Executive service
 - Debug aids
- Air Traffic Control functions include:
 - Radar and beacon tracking
 - MSAW
 - Collision avoidance
 - Continuous recording
 - Display function
- Failure recovery programs

Applications (IOP-B)

- Terminal Air Traffic Control
- Enroute Air Traffic Control
- Beacon and Radar Training
- General Purpose Commercial Applications
- Military Applications Not Requiring Ruggedized Hardware

Applications (BPM)

- Debug and maintenance aid for IOP

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