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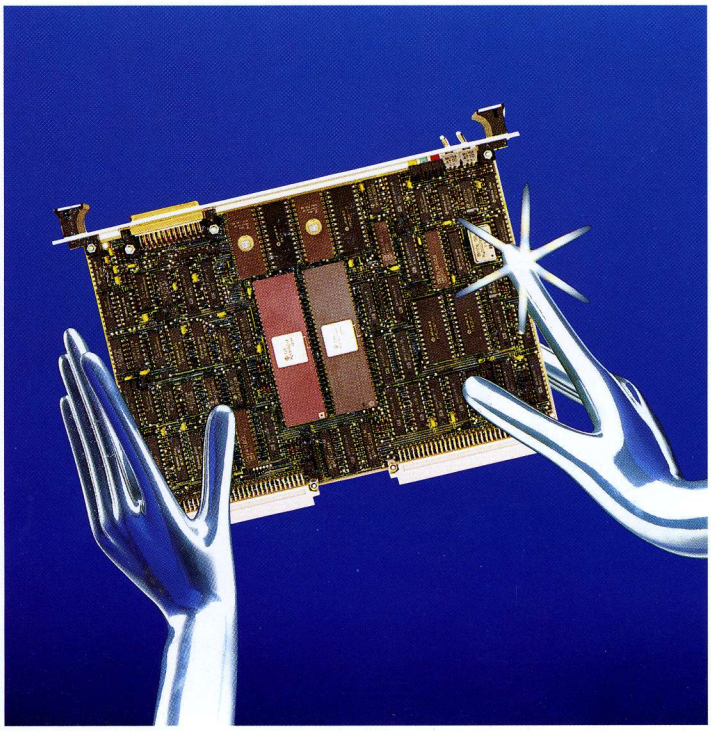
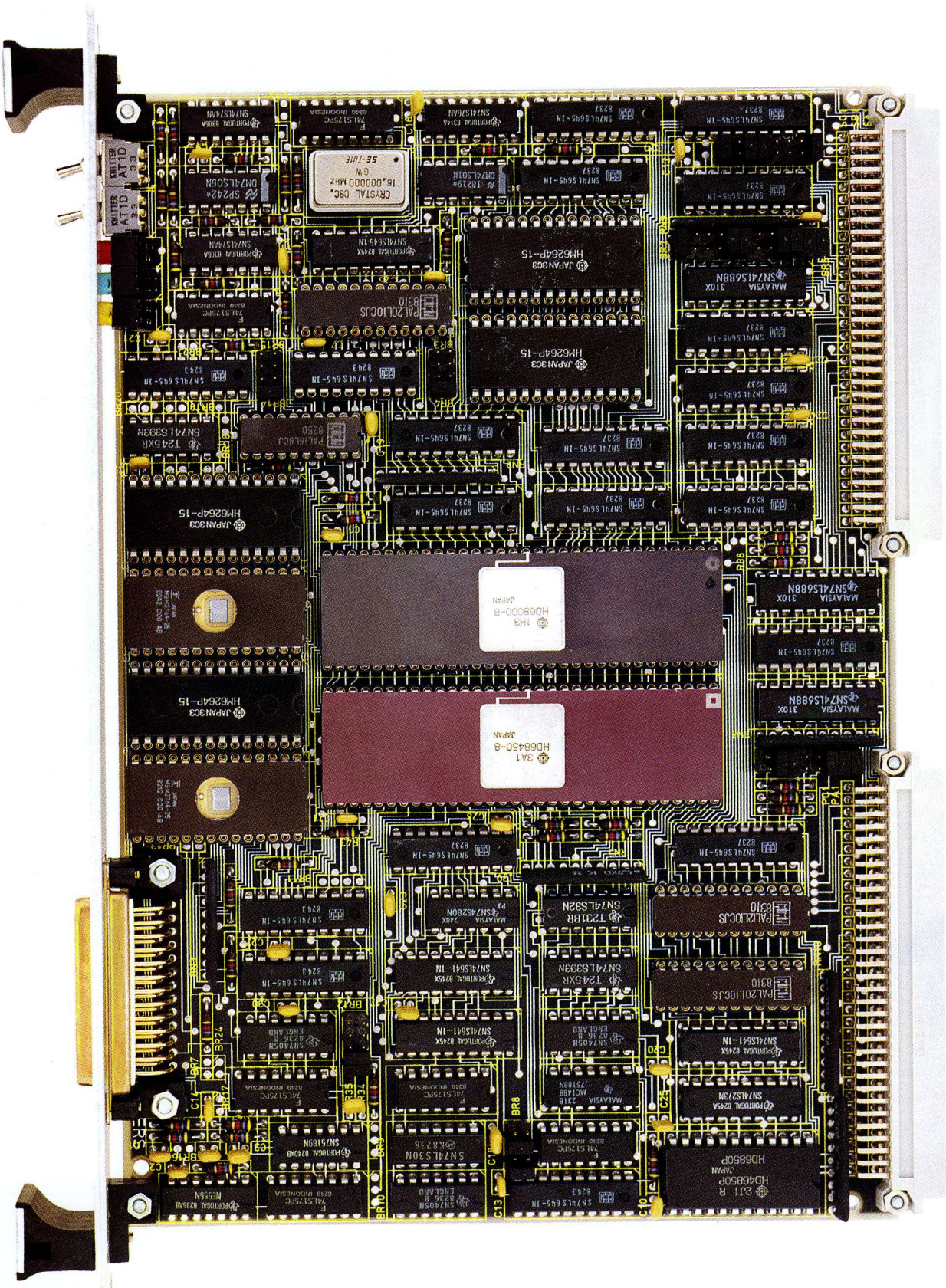


System 68000 VME

SYS68K/SASI-1

Intelligent SASI Interface Controller



General Description

The SYS68K/SASI-1 Board is a high performance low cost controller board based on the 68000 CPU and the VME bus. It contains 16k bytes of static RAM, 16k bytes of ROM resident firmware and a 16k byte dual ported RAM (DPR).

The firmware contained in the system EPROM area provides the handling of the SASI bus and the DMA (Direct Memory Access). The implemented DMA Controller provides high speed data transfers between devices on the VME bus.

The SASI interface allows the connection to the SASI bus and therefore the handling of Floppy, Winchester drives, and Tapes via a SASI Controller.

The implemented VME bus may be used for an easy system configuration with extended RAM, ROM, I/O, and additional DMA cards.

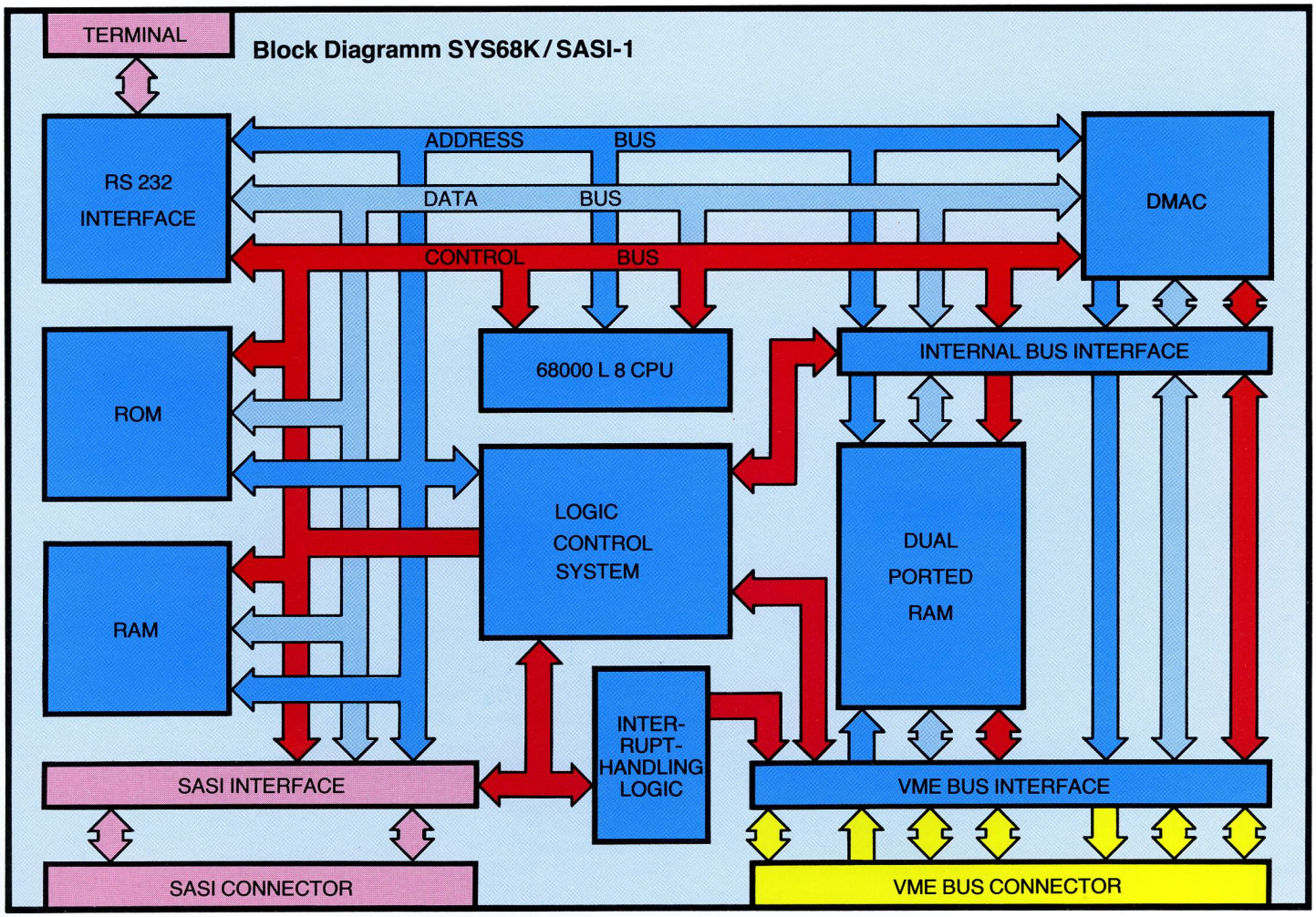
SYS68K/SASI Features:

- SASI Interface
- Full VME Bus compatible
- 68000 CPU (8 MHz), local as control unit
- Firmware in EPROM's
- Four free programmable DMA channels including address modifiers
- 16k bytes dual ported RAM (Macro Command and Data Buffer Register)
- Free programmable interrupts (jumper selectable to all levels)
- Slave bus arbitration capability
- Serial Communication Port (RS232C compatible)
- RESET and LOCAL function switches
- LED function indicators: RUN, LOCAL, and FAIL

Functional Description

Memory, I/O devices and the DMA Controller communicate with the CPU via their common local bus. The various functional areas are described briefly in the following paragraphs.

1. 68000 CPU (8 MHz)
The 6800 CPU has a 16 bit data bus and a 23 bit address bus. The processor has eight 32 bit data registers, seven 32 bit address registers, two 32 bit stackpointers, a 32 bit program counter and a 16 bit status register. The processor



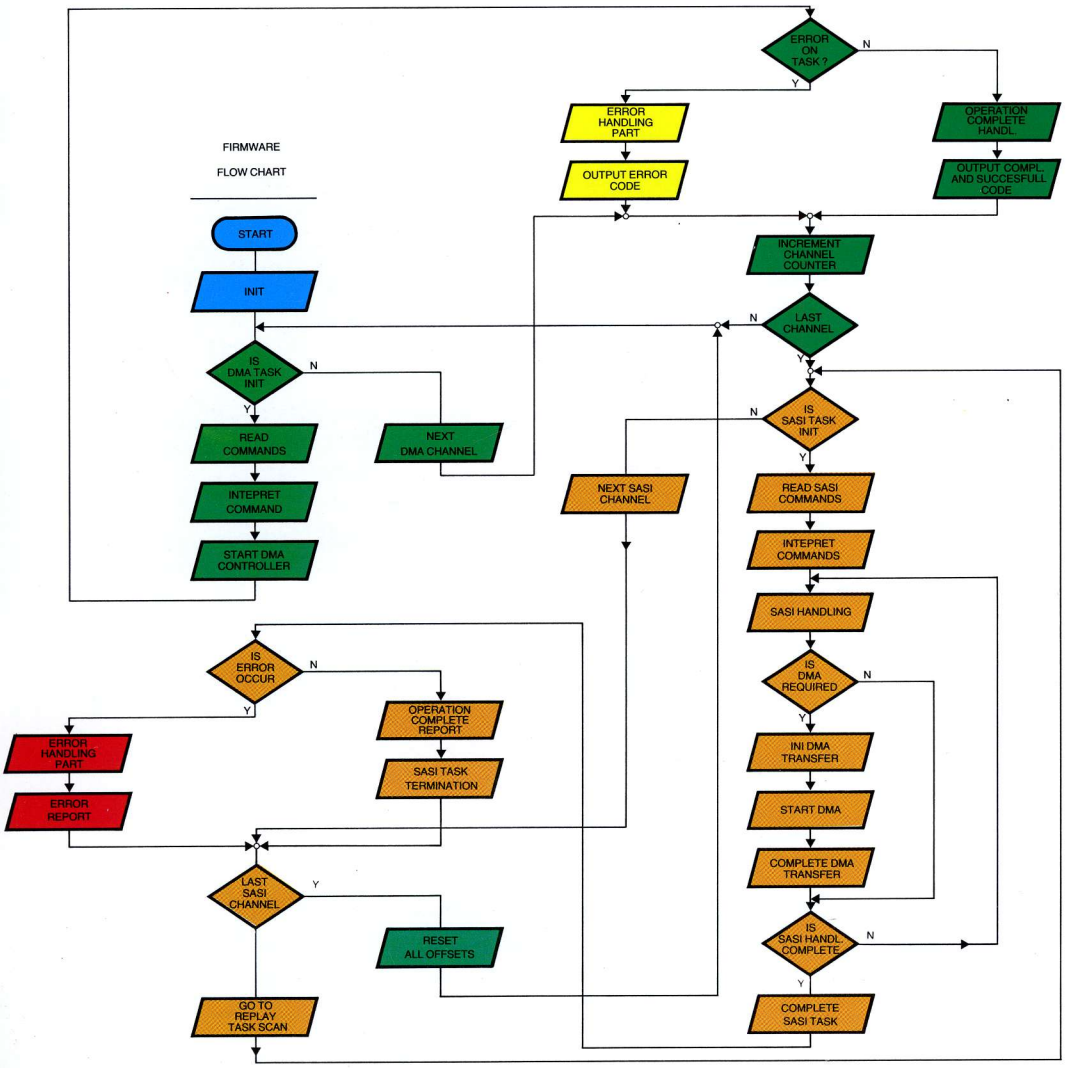
clock frequency is 8 MHz. The CPU, working only on the local bus, is used to control the SASI bus interface and the four channels of the DMA Controller.
Communication to the VME bus is provided via the Dual Ported RAM (16k bytes).

2. Local System Memory
Local system memory consists of 16k bytes of static RAM and 16k bytes of firmware. RAM is used as scratchpad space of the firmware. System firmware resides in two 8k bytes Read Only Memory devices (2764 EPROM's).

3. Direct Memory Access Controller
The address bus of the DMA Controller provides a direct memory addressing range of 16M bytes. The DMA Controller has four largely independent DMA channels. Each channel has its own set of channel registers. These registers define and control the activity of the DMA Controller in processing a channel operation. The operation of each channel is independent of the other channels. The controller supports dual address transfers as well as unchained, array chained or link chained operations.
The DMA Controller is able to transfer a series of operands between memory and device in byte, word, or lang word mode.
The DMA Controller is 68000 bus compatible and all DMA channels are programmable in their priority. The transfer rate goes up to 4M bytes/second.

4. Dual Ported RAM (Command RAM)
The dual ported RAM (DPR) is located

SYS68K/SASI-1 Firmware Flowchart



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between the local bus and the global bus (VME bus) consisting of 16k bytes of high speed static RAM.
The DPR is used as a macro command RAM, Data Buffer and/or global RAM and the DPR is divided into several display register arrays for the following on-board devices:

- Four register arrays for the DMA Controller channels representing all control and status registers of the DMA Controller channel.
- Four register arrays for the SASI bus interface representing data, SASI commands, control and status information of the different tasks.

All these register arrays are completely firmware controlled.
The DPR decoding logic includes the Address Modifier. The Base Address and the Address Modifier of the DPR are free selectable. Each AM Signal can be set and disabled separately.

5. SASI Interface (Shugart Associated Standard Interface)
The board contains an interface to the SASI bus which allows the connection to the SASI controller. This controller can control Floppy, Winchester Drives, and Tapes.
This interface contains status register, command register, and data register. All these registers are controlled by the on-board CPU.
This interface contains 9 data signals (D0-D7 and parity) and 9 control signals which are terminated on the SASI port (single ended mode).

6. Serial Communication Port
The asynchronous serial communication port designated for a terminal is provided on the board. The port is RS232C compatible. The terminal may act as an interface for service and special debug purposes. The serial communication port has a hardware selectable baud rate (from 1200 to 9600 baud).

7. VME Bus
The VME bus interface drives/receives 23 address signals, 6 address modifier signals, 16 data signals, and special control signals. The asynchronous structure of the VME bus allows data transfers at various speeds. The BR (Bus Request) level of the board may be jumpered from level 0 to 3 (highest priority) within a prioritized bus master arbitration scheme.
The AM signals are free programmable for Read and Write transfers separately.

8. Interrupt Mode
The board is able to drive an interrupt to the VME-bus (level 1–7).
A free programmable Interrupt auto vector register (fully under Software control) allows the usage of this board in a fully asynchronus environment.
The firmware offers a special mode in which the board may generate an interrupt after the operation is complete or after detecting an error.

Software Capabilities

The SYS68K/SASI-1 board operates under full control of the SYS68K/SASI-1 firmware (handling software). This software package reads, interprets and executes all commands which are placed into the DPR and forwards error or control messages to the error or control registers (see flowchart).
The software controls the DMA Controller and the SASI interface in conjunction with the commands within the DPR.

ARRAYS OF THE DUAL PORTED RAM

DPR BASE ADDRESS	DMA Controller Register for Channel 0
BASE + $ 40	DMA Controller Register for Channel 1
BASE + $ 80	DMA Controller Register for Channel 2
BASE + $ C0	DMA Controller Register for Channel 3
BASE + $ 100	SASI Command, Control and Data Array for Channel 0 (for example drive 0)
BASE + $ E00	SASI Command, Control and Data Array for Channel 1 (Drive 1)
BASE + $ 1B00	SASI Command, Control and Data Array for Channel 2 (Drive 2)
BASE + $ 2800	SASI Command, Control and Data Array for Channel 3 (Drive 3)

Specifications

Microprozessor	68000 / 8 MHz
DMAC (Direct Memory Access Controller)	68450 / 8 MHz / 4 channels
Interface	SASI interface for SASI bus
Serial I/O	1 RS 232C with selectable baud rate from 1200 to 9600
Bus	VME bus implemented
Memory	16k bytes local RAM 16k bytes dual ported RAM 16k bytes of EPROM area
Firmware	Operating firmware EPROM resident
Power Requirements	+5V/2,1A, +12V/100mA, –12V/100mA
Operating Temperature	0 to +50 degrees C
Storage Temperature	–50 to +85 degrees C
Relative Humidity	0–95% (non-condensing)
Board Dimensions	Double Eurocard 234 x 160 mm (9.2 x 6.3 inch)

Ordering Information:

SYS68K/SASI-1 Part No. 300000	Interface Controller Board including HUM, FIM
SYS68K/SASI-1/HUM Part No. 800007	Hardware User Manual
SYS68K/SASI-1/FIM Part No. 800019	Firmware Interface Manual

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