CPU and POWER SUPPLY BOARD

The CPU board contains the microprocessor system. All display, front panel, disk, and computer interfaces are on this board.

MICROPROCESSOR SYSTEM

The microprocessor, U101, is an 80C186 microcontroller which integrates a fast 16 bit processor, counter-timers, interrupt controller, DMA controller, and I/O decoding into a single component.

The 80C186 uses a 24.00 MHz crystal, X101, as its oscillator. The instruction clock cycle is 2 oscillator cycles or 12.0 MHz. The data and lower 16 bits of address are multiplexed on AD0-AD15. U201, U202, U203 latch the address A0-A19 at the beginning of each memory or I/O cycle. U204 and U205 are bidirectional data bus drivers which are active during the data read/write portion of each memory or I/O cycle.

The 80C186 can address 1 Mbyte of memory and 64k of I/O space. The memory is mapped into 2 256kbyte blocks. Each block has 2 sockets, one for the low byte and one for the high byte of data.

U303 and U304 are 128kbyte EPROMS holding the program boot firmware. This memory is mapped at C0000H to FFFFFH (256k).

U401 and U402 are 128kbyte CMOS static RAMs mapped at 00000H to 3FFFFH (256k). U401 and U402 are backed up by the battery. Q401 provides power down RAM protection. This memory is system memory.

3 of the 7 80C186's peripheral chip select strobes are used by peripherals on the CPU board. -PCS0 is decoded into 16 I/O strobes which access the displays, keypad and knob, etc. -PCS1 decodes the the GPIB controller. -PCS2 selects the UART.

FRONT PANEL INTERFACE

U614 and U615 buffer the front panel connector cable. The Display Board holds the front panel logic.

SPIN KNOB

The knob is an optical encoder buffered by U612. Each transition of its outputs is clocked into U610 or U611 and generates an interrupt at the output of U602A. The processor keeps track of the knob's position continuously.

SPEAKER

The speaker is driven by a timer on the 80C186. The timer outputs a square wave which is enabled by U602B and drives the speaker through Q705.

GPIB INTERFACE

The GPIB (IEEE-488) interface is provided by U902, a TMS9914A controller. U903 and U904 buffer data I/O to the GPIB connector. U902 is programmed to provide an interrupt to the processor whenever there is bus activity addressed to the unit.

RS232 INTERFACE

The SCN2641 UART, U905, provides all of the UART functions as well as baud rate generation. Standard baud rates up to 19.2k can be generated from the 3.6864 MHz clock. U906 buffers the outgoing data and control signals. Incoming signals are received by U705A and U705B. If the host computer asserts DTR, RS232 data output from the unit will cease.

The RS232 port is a DCE and may be connected to a PC using a standard serial cable (not a "null modem" cable).

EXPANSION CONNECTOR

All control of the data acquisition hardware is through the signals on the 30 pin expansion connector.