GETTING STARTED

A Guide for New Users

9000A-80188

HP

G E T T I N G S T A R T E D

A Guide For New Users

9000A-80188

INTERFACE POD

FLUKE

CONTENTS

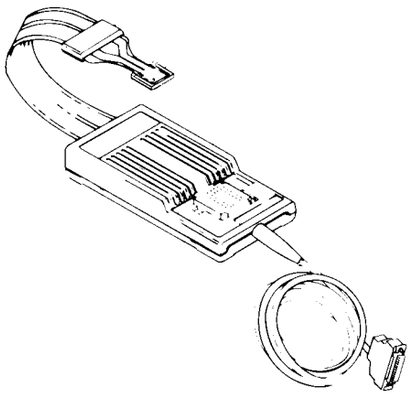
This guide introduces the Fluke 80188 Interface Pod and gives the basic setup information necessary to begin testing. The 80188 Pod is to be used in conjunction with the 9000 Series Micro-System Troubleshooter.

This guide assumes a certain familiarity with the keyboard and commands of the Troubleshooter. If you are not comfortable with the workings of the Troubleshooter, consult the 9000 Series Operator Manual for instructions.

For more complete reference information on Pod operations, consult your 9000A-80188 Pod Instruction Manual.

P/N 776005
JULY 1985

MEET THE 80188 POD



Your 9000A-80188 Pod is the test interface connection between your 9000A Series Micro-System Troubleshooter and your Unit Under Test (UUT). The 80188 Pod contains an 80188 microprocessor and provides all of the input and output signals to the UUT. The Pod is also the interface to the components on the UUT.

The performance features of your Pod include:

- Built-in tests via the Pod self-test socket.
- Single connection to the UUT via the microprocessor socket.
- Special test functions such as the Quick RAM test for fast testing.

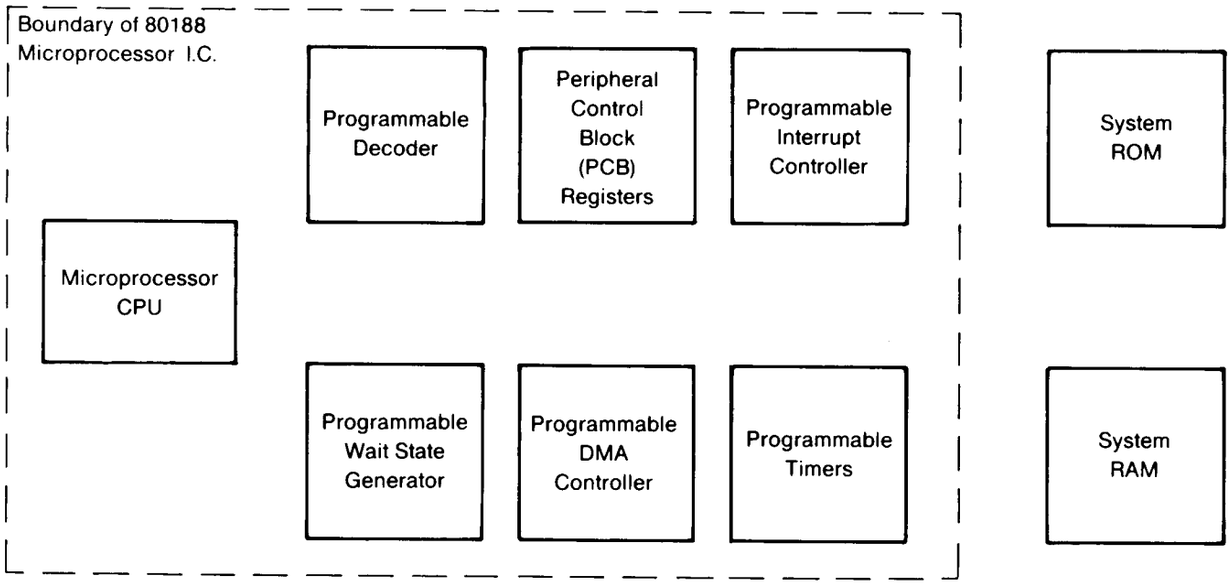
This guide will help you become familiar with the Pod and with the basic setup information necessary to begin testing your UUT.

THE 80188 MICROPROCESSOR

The 80188 microprocessor has an enhanced 8088 CPU and several of the common peripheral devices integrated into its design. These include:

- Programmable Decoder
- Programmable Wait State Generator
- Programmable Timers
- Programmable DMA (Direct Memory Access) Channels
- Programmable Interrupt Controller

All of the on-chip peripheral devices of the 80188 microprocessor are controlled by a group of registers called the Peripheral Control Block (PCB).



80188 Microprocessor System Architecture

THE CHIP SELECT GENERATOR

Before the microprocessor communicates with an external device on the bus, the device must first be selected. The Chip Select Generator in the Programmable Decoder selects that device by pulling one of several Chip Select lines (outputs of the Pod) low.

Chip Select lines are labeled by function. They are:

- Upper Chip Select Line ($\overline{UCS}$)
  In most UUTs, this line selects ROM and devices in the upper portion of the memory map.

- Lower Chip Select Line ($\overline{LCS}$)
  In most UUTs, this line selects main RAM and devices in the lower portion of the memory map.

- Mid-Range Memory Chip Select Lines ($\overline{MCS0\text{-}3}$)
  These lines select other devices external to the microprocessor.

- Peripheral Chip Select Lines ($\overline{PCS0\text{-}6}$)
  Each $\overline{PCS}$ line selects a peripheral device over a 128-byte block of addresses.

80188 POD WAIT STATES

Default Values

A Wait state is an extra period of time that an external device has to respond to the microprocessor after is has been selected. A Wait state is inserted into the bus cyle by the Wait State Generator portion of the Programmable Decoder. The Wait State Generator is programmed with the Chip Select Generator such that 0 to 3 Wait states are inserted into the bus cycle when a Certain Chip Select line is addressed.

When you first power up your 80188 Pod, the Pod configures the Chip Select Generator and the Wait State Generator to the default values. The default values will allow you to read from and write to devices on your UUT.

Example

WRITING TO RAM USING THE LOWER CHIP SELECT LINE

The default setup of the Pod causes the $\overline{\text{LCS}}$ line to go low at addresses 0 through 3FFFF. You can try writing to RAM on your UUT by doing the following:

1. Connect your Pod to the 9000 Series Troubleshooter and to your UUT.
2. On the 9000 Series Troubleshooter, execute a WRITE @ 0 = AA
3. Execute a READ @ 0

The 9000 Series Troubleshooter should display READ @ 0 = AA

4. This confirms that the Pod is able to communicate with the UUT.

80188 POD WAIT STATES

Now try using a Chip Select line on your own. (Refer to the following table for information.)

Example

1. Identify a RAM-like device connected to one of the Chip Select lines on your UUT.

2. Execute a WRITE @ to a valid address for that Chip Select line. (See the following table.)

3. Execute a READ @ that address. The data read should be the same value that you wrote in step 2.

The default setup of the Pod causes three Wait states to occur for each Chip Select line.

Having three Wait states in every UUT access cycle may give a bad RAM chip enough time to respond such that no error appears to exist. For example, the default number of Wait states for the 80188 Pod's Lower Chip Select line ($\overline{LCS}$) is 3. The RAM on your UUT may only require 1. This is why it is sometimes necessary to change the default value.

80188 POD WAIT STATES

80188 Pod Default Chip Select Configuration

CHIP SELECT LINE	ADDRESS RANGE (HEX)	HOW MANY BYTES	WAIT STATES
$\overline{\text{LCS}}$	0 through 3FFFF	256K	3
$\overline{\text{PCS1}}$	40000 through 4007F	128	3
$\overline{\text{PCS1}}$	40080 through 400FF	128	3
$\overline{\text{PCS2}}$	40100 through 4017F	128	3
$\overline{\text{PCS3}}$	40180 through 401FF	128	3
$\overline{\text{PCS4}}$	40200 through 4027F	128	3
$\overline{\text{PCS5}}$/A1	40280 through 402FF	128	3
$\overline{\text{PCS6}}$/A2	40300 through 4037F	128	3
$\overline{\text{MCS0}}$	80000 through 8FFFF	64K	3
$\overline{\text{MCS1}}$	90000 through 9FFFF	64K	3
$\overline{\text{MCS2}}$	A0000 through AFFFF	64K	3
$\overline{\text{MCS3}}$	B0000 through BFFFF	64K	3
$\overline{\text{UCS}}$	C0000 through FFFFF	256K	3

HOW TO CONFIGURE THE CHIP SELECT LINES

PCB Recovery

The 80188 Pod can be configured in two ways so that its Chip Select lines behave correctly for your UUT. You can:

1. Use the PCB Recovery Tape provided with this guide to learn how your UUT's software sets up the registers in the PCB. This will include the Chip Select register setups.

2. Program the Chip Select registers of the Pod's PCB individually. To do this you must have knowledge of the UUT's requirements.

   This procedure is not covered in this guide. Consult the 80188 Pod Instruction Manual for this information.

USING THE PERIPHERAL CONTROL BLOCK (PCB) RECOVERY TAPE

The program on the tape recovers the values of the PCB from a good UUT by executing a RUNUUT, and uses the values initialized by the UUT's software. Once you've used the program to recover these registers, you can create your own program to load the recovered values into the Pod's PCB.

To use the PCB Recovery Tape, follow these steps:

1. With the 80188 Pod already connected to the Troubleshooter, find a known-good UUT, and plug the 80188 Pod into it.

2. Load the cassette into the Troubleshooter with side A up.

3. Press the READ TAPE key.

4. When you are prompted with the message

   READ TAPE - ARE YOU SURE?

   Press the YES/ENTER key of the Troubleshooter.

   You should now see the following message on the Troubleshooter display:

   READ TAPE OK

5. To execute the program,

   Press the keys EXEC, 0, and ENTER on the Troubleshooter.

   You should see the following message on the Troubleshooter display:

   80188 POD PCB RECOVERY PROGRAM

   You'll then be prompted with the question,

   READY TO RECOVER PCB REGS?

At this point, the program has put the 80188 Pod into a special RUNUUT mode. The Pod is now executing the UUT's software as if the Pod were the UUT's microprocessor. You may notice that your UUT is going through an initialization routine (if the UUT has a display to show this).

You should not respond to the READY TO RECOVER PCB REGS? prompt until you are sure that the UUT software has completed its initialization routines. You should also make sure that the UUT is in a "waiting for input" state. In other words, don't press any keys or buttons on the UUT. Now, continue as follows:

6. Press the YES/ENTER key on the Troubleshooter. (Pressing the NO key will cause no action by the program.)

If you see the message

RECOVERY SUCCESSFUL

followed by the prompt

SET POD TO RECOVERED VALUES?

the 80188 Pod has successfully recovered the PCB configuration from your UUT. The Pod has put this information in a "holding tank" of registers. (The Pod's PCB has NOT been configured to the recovered values yet.) Continue as follows:

7. Press the YES/ENTER key on the Troubleshooter, and the program will configure the Pod. Now the Pod's Chip Select lines will be set up for accurate testing on your UUT.

8. Execute a

   READ @ F001A2 (low byte)
   READ @ F001A3 (high byte)

   The data read is the value of the $\overline{\text{LCS}}$ register as programmed by the UUT's software.