

Z80TM-PDS

Program Development Station



Product Specification

The Zilog Z80-PDS System is designed as a low cost software development and debugging tool. This system will provide total support in every step of developing and debugging Z80 programs. The Z80-PDS is compact in physical size, light-weight and very portable. This system includes a floppy disk drive with up to 300K bytes of on-line data storage and internal memory of 16K bytes. The Z80-PDS connects directly into any RS232 or current loop terminal — CRT or hard copy — or may connect directly into an optional Zilog keyboard and TV monitor with the Z80-VDB (Video Display Board).

The Z80-PDS offers low cost software development capability and is available with a number of options that can expand the system with additional I/O or terminal capability. It can also be used as a low cost general purpose computer.



System Features

- Z80-CPU — highest performance microprocessor available.
- Main memory capacity of up to 64K bytes. The standard system contains 3K bytes of PROM and 16K bytes of RAM.
- Floppy disk drive provides storage capacity of up to 300,000 bytes on an inexpensive, removable diskette.
- Serial I/O with RS232 or strapable current loop interface allows the use of any standard CRT or hard copy terminal at rates from 110 BAUD to 19.2K BAUD.
- Small units for desk-top use:
 - Chassis measures 17" X 10" X 4".
 - Disk module measures 16" X 5" X 9".
- Light weight for portability
 - Chassis weighs 10 lbs.
 - Disk module weighs 15 lbs.
- Powerful Software Standard from Zilog
 - PROM resident I/O drivers, debug package and bootstrap loaders.
- Disk Resident
 - Operating System
 - Assembler
 - Editor
 - File Utilities
 - Complete documentation and support
- 2 spare card slots available for user options.
- Optional items include:
 - PROM programmer permits the Z80 Programming Station to handle the full job — from original program entry right through to PROM production.
 - Two Standard parallel I/O ports can be optionally wired for interface to a printer or other I/O device.
 - Optional video interface permits the use of a low cost video monitor and keyboard for programmer's terminal.



System Description

The Z80-PDS is a modular system including a compact enclosure and a floppy disk drive. Based on the Z80-CPU — the industry's most advanced microprocessor — this system provides an ideal environment for developing and debugging Z80 programs. The Z80-PDS provides a stand alone computer capability which is compact enough and inexpensive enough to be used as a programming station by every person contributing to the implementation of Z80 based software.

The basic system includes a system enclosure, a disk drive and the capability of interfacing to any CRT or hard copy terminal via its standard RS232 or current loop interface. The communication frequency is switch selectable in the range 110 BAUD to 19.2K BAUD. All internal connections are made on a single printed circuit board backplane for high reliability. External connections are all made through standard 25 pin connectors with flat ribbon cables.

The Z80-PDS has a standard capacity of 4 card slots. The basic system is delivered with a Microcomputer Board (Z80-MCB) and the Memory Disk Controller Board (Z80-MDC) that occupy two card slots. In this configuration, the chassis provides 16K bytes of internal RAM memory, 3K bytes of executive PROM firmware, control of the disk drive module and interface to any standard RS232 terminal. The Board may be strapped to provide a 20 mA current loop interface. With the addition of an optional Video Display Board, the chassis can also control a video monitor and keyboard to provide a low cost programming station. System controls include a system reset button as well as an execution interrupt button.

The floppy disk module provides a single drive giving the system a bulk storage capacity of 300,000 bytes. This drive connects to the card chassis via a single cable with standard 37 pin connectors at either end for simple setup, storage and moving.

The optional video monitor is modified by Zilog for direct plug connection to the Programming Station's card chassis and control via the optional Video Display Board. The screen provides a full 80 X 24 character display when acting as the system terminal.

The optional keyboard module is a standard keyboard offered by Zilog for direct connection to the PDS. Its control logic is also provided on the optional Video Display Board. It provides a standard typewriter keyboard, a ten key numeric pad and a variety of special function keys. Full n-key rollover logic and repeated character generation when keys are held down make this one of the smoothest operating keyboards available.

Through the use of the optional fourth card slot, the PDS can interface to a variety of add-on boards. A PROM programming board is available to program and check bipolar and EPROM's. This board is delivered with full disk software to burn PROMs, verify their contents, or record their contents on disk. Add-on memory and I/O boards are also available and may be used to interface a variety of peripheral devices during tests of I/O driver software. The fourth connector which supports both the PROM programmer or the add-on I/O boards is mounted at the top of the chassis to provide easy access to a wire wrap or other stand-alone board for test probing and also easy access for PROM-insertion.



System Stability and Compatibility

As the most recent addition to Zilog's microcomputer system family, the Z80-PDS shares in the tradition of excellence which has now been established. The circuit boards used in the Z80-PDS are from Zilog's Standard Microcomputer Board family. These boards are now in a wide range of use in customer applications. The software in the Z80-PDS has served already in both the Z80 Development System and the Z80 Microcomputer series and has acquired a long history of stability and performance in these environments. With the introduction of the Z80-PDS, Zilog now brings its proven hardware and software into the lowest cost work station available.

Diskettes used on the Z80-PDS are directly compatible with those of Zilog's larger Development System and Microcomputer system. These may be readily interchanged to transfer programs or utilize the facilities available in the larger systems. This makes the Z80-PDS the ideal work station for adding program development power to design teams which are already using other Z80 systems.

Specifications and Options

MEMORY STORAGE:	Expandable to 64K bytes of main storage. Standard capacity is 3K bytes of PROM Monitor plus 16K bytes of RAM.
WORD SIZE:	8 Bits (1 byte)
DISK STORAGE:	300,000 bytes
SYSTEM DIMENSIONS:	Card Enclosure 17" X 10" X 4" Disk Unit 26" X 5" X 9"
SYSTEM WEIGHT:	Card Enclosure 10 lbs. Disk Unit 15 lbs.
USER PANEL:	One system reset switch that also indicates system power is on. One interrupt switch to halt execution of a program under test while preserving system's state.
COOLING:	System contains its own cooling fan.
CONNECTORS:	Four connectors on card enclosure for RS232 terminal, disk units, keyboard and monitor.
ON/OFF:	Illuminated on/off switch is located at the rear of the unit.
ENVIRONMENT:	0°C — 40°C operating temperature range.
I/O CHANNELS:	Serial I/O port with RS232 interface (can be strapped to support 20 mA current loop). Two 8 bit parallel ports can be wired to interface other peripherals such as a high speed printer.
POWER:	115V or 220V, 50 or 60 Hz. 1.5 amps available for each option card.

Optional System Modules

Z80-PPB	PROM Programmer Board allows the user to program PROMs or EPROMs electrically. This PROM Programmer is designed for use with 2704 or 2708 EPROMs and also 7620, 7621, 7640 or 7641 fuseable bipolar PROMs.
Z80-IOB	Input/Output Board provides I/O interface with 64 programmable data lines and 16 controls.
Z80-SIB	Serial I/O Board provides four (4) serial full duplex channels.
Z80-VDB	Video Display Board provides interface to video monitor and keyboard.
Z80-MON	Video Monitor for use with Z80-VDB.
Z80-KBD	Keyboard module for use with Z80-VDB.
Z80-CEN	Zilog Printer Interface Logic.
Z80-EXT	Extender Board.
Z80-WWB	Wire Wrap Board.

Powerful Software

The Z80 Programming Station brings to its operator some of the most advanced microcomputer software available. The operating system, editor, assembler, debugger and file utilities support every phase of microcomputer programming with the fast interactive response that only a full disk system can give. The software packages include the following:

■ PROM Based Monitor

This package includes all terminal and disk drivers required for system I/O. The PROM's bootstrap routines make power-on a simple pushbutton operation. The resident debug package provides powerful checkout stored in non-volatile media to assure its own integrity. Monitor commands include:

- Breakpoint setting — on the first or nth execution of an instruction.
- Single and multiple step — with full register trace line printed after each instruction.
- Set and display registers or memory — either in large blocks or one location at a time interactively.
- Jump to specific address or continue execution from current location.
- Load programs from disk.
- Save memory contents back to disk.

■ Disk Based Assembler

Zilog's resident assembler is the most powerful available in any microcomputer environment. As a totally disk oriented product, it offers the following features:

- Source is read from one or more disk files. Object code is written to disk file. Even the listing is recorded on disk. All diagnostics are directed to the terminal. No time is ever wasted waiting for a printout of a listing with an assembly error.
- Fast operation — The Z80 Disk Based Assembler will generate object code and listings from source at the rate of 400–600 lines per minute. With the NOLIST and NOOBJECT options invoked, a fast error scan can be executed at the rate of more than 1000 lines per minute.
- No symbol table limit — when the Z80 assembler runs out of symbol table space in memory, it allocates space on disk and pages the symbol table. Thus the Z80-PDS is not limited in the size of a program which can be assembled by anything other than available disk space.

- Optional Cross Reference — In an optional third pass, the assembler can produce a complete line number cross reference for all symbols used. The cross reference eases updating or maintaining programs over a long period of time by providing documentation of all references to all routines and variables.

Fast interactive assemblies with object and listing produced on disk permit more frequent use of the assembler and reduce the amount of machine language "patching" done during checkout. At the same time, all files are readily accessible for changes yet easily archived.

■ Disk Based Editor

The Z80 Editor is a line oriented editor which can deal with very large files regardless of the size of the system memory available. It provides the ability to enter programs, quickly modify programs, and save multiple copies for purposes of back-up. Its features include:

- Direct control of internal line pointer. Go directly to any statement in a program. Statement numbers are identical to those produced in the Assembler's listing.
- Text directed searches. Search forward or backward within the file being edited for specific substrings of a program line. Special statement label search is available. Go directly to the label definitions for quick location of any routine in the program.
- Text directed changes. Any substring of a line can be replaced in a simple "change" command without trying to position a character pointer. Multiple substitution and global substitution are also available for changing variable names or register allocations.
- Edit command macros and an "Again" command permit simple implementation of complex or repetitive edit operations.
- "Get" and "Put" commands provide full communication between the edit work area and all disk files.

■ File Handling Utilities

In addition to the major software systems for preparing and checking programs, Zilog also supplies a variety of utilities for maintaining files on disk. These include:

- Catalog listings — whole or partial
- Combine or Append files.
- Print in ASCII or DUMP in hexadecimal.
- Rename or delete files.

System Documentation

Z80-PDS Hardware User's Manual

Contains information required to explain the basic operating characteristics of the PDS.

Z80-PDS Software User's Manual

Contains information required to properly use the system and its included software.

Programming Manual

Gives complete details on each instruction in the Z80 set.

Z80-CPU Manual

Gives specific details on the Z80-CPU Processor Device that is used as the heart of the MCS Microprocessor System.

Z80 Programmer's Reference Card

Details of the Z80 instruction set and other valuable information in a pocket size form.

Zilog

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