Introduction

The 80/DS™ Experts–PL/M™ Development System is an integrated tool set for developing Intel 8080/8085 and Zilog Z80™ software in both PL/M and assembly languages. It operates on many different machines and operating systems including the VAX™ under VMS™ and Ultrix™, the Tektronix 8560 under TNIX™, most other UNIX™ systems, and the IBM PC under PC-DOS.

The components of the 80/DS Development System are:

- the 80/PC™ Compiler which supports the 80/PL™ language (an upward compatible extension to the PL/M language);
- the 80/AS™ Assembler which is generally compatible with the Intel 8080/8085 Assembly Language; and
- the 80/RL™ Relocation and Linking Tools which combine relocatable object modules into absolute object modules for down-loading to the target machine or to an emulator.

THE 80/PC COMPILER

The 80/PC compiler compiles source modules written in the 80/PL language (an extension of the PL/M-86 language) into object modules for execution on the Intel 8080 and 8085 and the Zilog Z80 microprocessors. Object modules are produced in the Intel MCS-80/85™ Relocatable Object Module Format or, with some versions of 80/DS, the Tektronix LAS Object Module Format.

General Features and Capabilities

The 80/PL language is a superset of the PL/M-86 language and most PL/M-80 and PL/M-86 source modules should compile and execute without modification.

Among PL/M-86 features which are not available in PL/M-80, 80/PL includes support for the WORD, INTEGER, and POINTER data types and the full set of PL/M-86 string handling functions. The only PL/M-86 features not supported in 80/PL are the REAL data type and those, such as the LOCKSET function, which depend upon being executed on an 8086 microprocessor.

The 80/PC compiler supports the SET, RESET, and conditional compilation controls of the PL/M-86 compiler. The INCLUDE compiler control is also supported, except that the path name of a file to be included must correspond to the syntax of a host path name. The other PL/M-86 compiler controls are not supported.

The 80/PL language contains a number of extensions to PL/M-86, including:

- Relaxation of restrictions on the ordering and factoring of items in DECLARE statements;
- Introduction of structures within structures;
- Introduction of explicitly based references;
- Use of the HIGH and LOW builtins as assignment targets;
- Introduction of a fully-delimited IF block construct;
- Introduction of an UNDO statement for premature loop exits; and
- Introduction of a new scope for external data and procedures so that external items declared in an included file may be redeclared within a module.

Compiler Output

Output of the 80/PC compiler consists of a relocatable object module in the Intel MCS-80/85 Relocatable Object Module Format. Some versions of 80/DS can optionally produce output in the Tektronix LAS Object Module Format. Both source listings and symbol table listings are produced by the compiler.

Run-Time Support Library

Object modules produced by the compiler may call out-of-line routines to perform word and string operations. These routines reside in a library which is distributed with the 80/PC compiler.

THE 80/AS ASSEMBLER

The 80/AS assembler assembles source modules written in the 80/AS language (generally compatible with that of the Intel 8080/8085 Assembly Language) into object modules for execution on the Intel 8080 and 8085 and the Zilog Z80 microprocessors. Object modules are produced in the Intel MCS-80/85 Relocatable Object Module Format.

General Features and Capabilities

The 80/AS language is sufficiently similar to Intel's 8080/8085 Assembly Language that most programs written for that assembler should assemble correctly under 80/AS with little or no modification to the source.

The most significant area of change is in the handling of assembler controls. Instead of using special control lines beginning with a '$', 80/AS uses assembler directives that appear in the operation field of statements.

The 80/AS extensions include:

- Optional use of names up to 31 characters in length;
- Support of both blank and named COMMON segments;
- Support of symbols with limited scope (local symbols); and

- Recognition of a limited set of Z80 instructions.

Assembler Output

The output of an 80/AS assembly consists of:

- Possible error messages;
- A relocatable object module in the Intel MCS-80/85 Relocatable Object Module Format;
- An optional assembly listing; and
- An optional symbol table and cross-reference listing.

THE 80/RL RELOCATION AND LINKING TOOLS

The 80/RL relocation and linking tools provide an integrated set of utilities for combining and manipulating relocatable object modules to produce absolute object modules suitable for loading and running on Intel 8080/8085 and Zilog Z80 microprocessors.

General Features and Capabilities

The 80/RL tools are:

80/LINK	Combines multiple object modules and libraries into a single relocatable object module.
80/LOC	Converts a single relocatable object module into an absolute object module.
80/MAP	Produces an address map of one or more object modules.
80/STRIP	Deletes public and debugging dictionary information from one or more object modules.
80/HEX	Converts an object module from Intel MCS-80/85 Relocatable Object Module Format to Intel absolute hexadecimal form.
80/THEX	Converts an object module from relocatable Intel Object Module Format to the Tektronix absolute hexadecimal form and assigns absolute address. This program may not be available with all versions of 80/DS.
80/DSOBJ	Converts an object module from Intel MCS-80/85 Relocatable Object Module Format to a convenient, human-readable form.
80/CROBJ	Converts the display form of an object module, as produced by 80/DSOBJ, to Intel MCS-80/85 Relocatable Object Module Format.
80/LIBCR	Creates a library of object modules in a form to be searched by 80/LINK.
80/LIBLS	Provides a listing of information about a library created by 80/LIBCR.

ORGANIZATION OF THIS MANUAL

The remainder of this manual is divided into four parts:

Part One	A reference guide for the 80/PL language and the 80/PC compiler.
Part Two	A reference guide to the 80/AS language and assembler.
Part Three	A reference guide to the 80/RL relocation and linking tools.
Part Four	A guide to installing and tailoring the 80/DS Development System on the most commonly used machines and operating systems.