CHAPTER 1

Introduction

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1.1 Product Description

Soft-ICE is a software debugging tool that provides hardware-level debugging capabilities to PCDOS and MSDOS debuggers.

Soft-ICE uses 80386 protected mode to run DOS in a virtual machine. This gives Soft-ICE complete control of the DOS environment. Soft-ICE uses 80386 protected mode features, such as paging, I/O privilege level, and break point registers, to add hardware-level break points your existing DOS debugger.

Soft-ICE was designed with three goals in mind:
   1. To utilize the 80386 virtual machine capability to debugging features that are impossible or prohibitively slow with software-only debuggers (e.g., real time hardware-level break points, memory protection, breaking out of hung programs, etc.).
   2. To work with existing debuggers. We wanted to provide a tool that worked with existing tools. We designed Soft-ICE in such a way that you don't have to learn a new debugger to get powerful hardware debugging capabilities.
   3. To be a user-friendly program with a window that pops up instantly and does not get in the way. All of the Soft-ICE commands were designed to fit in a small window so that information on the screen behind Soft-ICE could still be viewed. Dynamic on-line help assists users who only use Soft-ICE occasionally.

The Soft-ICE program features:
        * real time break points on memory reads/writes, port reads/writes, memory ranges, and interrupts

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        * back trace history ranges

* symbolic and source level debugging
* an environment that works with existing debuggers
* full EMM 4.0 support
* backfilling to raise base memory past 640K for
        monochrome systems
* a window that can pop up at any time
* the ability to break out by keystroke even if
        interrupts are disabled
* debugger code that is isolated by 80386 protected
        mode. This prevents an errant program from
        modifying or destroying Soft-ICE; even if DOS
        clobbered, Soft-ICE will still work
* the ability to configure Soft-ICE to use no memory
        in the lower 640K if the system has more than 640K
* user-friendly dynamic help
* the ability to be used as a stand-alone debugger.
        This ability is useful if you are debugging loadable
        device drivers, interrupt handlers, or boot
        sequences where traditional debuggers can't go,
        if your debugger suffers from re-entrancy problems
* a soft boot capability that allows debugging with
        non-DOS operating systems or self-booting
        programs
* a simple installation, with no DIP switches to set
        no I/O ports taken up, and no memory address
        space conflicts
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NOTE:
  Soft-ICE will work with real address mode programs
  only. It will not work with programs that use 80286 or
  80386 protected mode instructions.

1.2 Using This Manual

The Soft-ICE manual is divided into four main sections:
    Learning Soft-ICE (Section I)
    Commands (Section II)
    Support Features (Section III)
    Advanced Topics (Section IV)

Soft-ICE can be used for most debugging problems after reading Section I, "Learning Soft-ICE", and a little experimentation. Soft-ICE's user-friendly on-line help can be used to reference command descriptions and syntax.

The "Learning Soft-ICE" section contains installation instructions, a description of the user interface,

and a tutorial. The tutorial is designed to get you up and running quickly.

The "Commands" section describes all of the Soft-ICE commands. The command descriptions are organized by functional group with an alphabetic index for reference.

The "Support Features" section covers advanced loading options, symbolic and source level debugging, and EMM 4.0 capability.

The "Advanced Topics" section covers topics such as using Soft-ICE with DOS loadable drivers and using Soft-ICE with non-DOS operating systems.

Throughout the manual, especially in the tutorial and the command section, examples are given that require you to give data to Soft-ICE. When the directions specify that you

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"press" a key, such as the key, you should press the key labelled . When the directions tell you to "enter" a phrase, such as WIN, you should type in the specified letters, then press the ENTER key.

1.3 System Requirements

Soft-ICE works with the IBM Series II Model 70 and 80, Compaq 80386 and 80386SX computers, AT compatible and 80386 co-processor cards. Soft-ICE will only work with 80386 XT co-processors if they are AT compatible.

Soft-ICE works best with extended memory, but works fine with conventional memory systems.

Soft-ICE does not use DOS or ROM BIOS for its video output and keystroke input. Therefore the video must be compatible with one of the following: MDA, Hercules, CGA, EGA, or VGA. Soft-ICE also has support for a two-monitor configuration, which can be very helpful when debugging video-intensive programs.

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