

Microtek PowerPack™ Interface for Platform Builder 3.0

The Platform Builder 3.0 option for Microtek PowerPack emulators provides an integrated debug solution for designers of Windows CE products. It combines the powerful features of Platform Builder 3.0 with the superior run time features of PowerPack in-target probes and emulators. You can seamlessly develop your application using the compilers and linking tools provided by Microsoft, then download the Windows CE operating system and application program into the target and use the debug features of the PowerPack tool.

Why Use an Emulator?

An emulator is a debug tool used to develop embedded systems. It has two functional groups of features. The first group of features implements run control, which enables the user to control the operation of the processor. Run control features include GO, HALT, STEP, and Set Breakpoints at given memory locations.

The second group of features is used to capture and record processor activity as it is shown on the processor bus. The triggering system allows the user to specify conditions to control capturing of bus trace information. The trace system of an emulator records the processor bus activity in high-speed RAM. Together, the functions of run control and bus activity recording provide a powerful debugging tool.

Why is an Emulator Better than a Software Debugger?

An emulator can do things a software debugger cannot. Emulator hardware can send electrical signals to a processor through its JTAG interface. These signals allow the emulator to access portions of the processor that a software debugger cannot. In particular, you can view and modify registers that are unavailable to a software debugger. The hardware signal provides better run-time control .

An emulator can record real-time processor activity. This ability is equivalent to the function of an airplane flight recorder. When a problem occurs, you have a history of previous activity to review.

When a system needs to be debugged during the boot process, a software debugger cannot help. The software debugger relies on the target's operating system to provide access to the system and the communication port, making it useless during the boot process. The emulator provides its own communication port and can access any part of the system, just like the processor. Only an emulator can provide the information you need during this critical stage of debug.

To enhance the functionality of our debug solution Microtek has added a special window that allows the user to view startup code using a 16-bit disassembler.

A second enhancement is the addition of a binary loader. This loader allows the user to load new flash images into his target. So the startup-up code and BIOS code can be debugged and new images loaded prior to the Windows CE operating system being available. These features extend functionality to the point where all embedded tasks that need to be performed are supported.

After the target system crashes, the operating system usually suspends operation, and the software debugger is inoperative. An emulator is not affected by the system crash and will preserve the trace information and the processor state information, including the register values. These pieces of information can be invaluable in re-creating the situation that caused the problem.

Overview of PowerPack Family of Emulators

Microtek has standardized its product line. As a result, the PowerPack family of emulators can support each processor at three different performance levels. Each level is targeted at a particular group in the engineering development team.

In-Target-Probe

The in-target-probe, or ITP, provides run-time support for Intel processors. It can control the processor and allow it to GO, STOP, Step, and read registers and memory, and set breakpoints. It can read processor specific registers, and special control registers used by the x86 architecture. The ITP does not have trace and trigger functionality. However, the availability of trace and trigger is not always necessary. For many development tasks you rely on run-time control to spot problems, primarily by setting breakpoints at the beginning of the code you are working on, and checking variable values and the code resulting from compiles. When a difficult timing-dependent issue occurs, you might need to move up to a more full-featured emulator. One feature that the ITP brings to the Platform Builder development environment is the ability to halt the processor in an interrupt routine and check the value of variables used to control the interrupt.

PowerPack SW Plus

The PowerPack SW Plus provides run-time support as well as trace and trigger. It contains the run-time functionality of the ITP, which includes the ability to control the processor and view the registers. In addition, the SW Plus provides a full-featured trace and trigger system. With the trigger system you can capture eight independent "events" from the bus. Each event is independent. Within each event, you can specify an address, a range of addresses, a data value, or a range of data values. You can use any combination of bus signals to store in the event definition, and have the option to negate an event. The resulting events are very powerful in tracking down bus problems. These trigger events are incorporated into a triggering system that allows you to specify which of three levels

where the event will be active. When one event occurs, it triggers the system, which can be set to start the trace, then increment to the next level. When an event described on the next level occurs, the trigger can be set to halt trace, then halt, return to the original level, and start a bus cycle counter. This level of control makes tracking down real-time errors much easier than simple run-time control.

PowerPack EA

The PowerPack EA incorporates all the features of the ITP and SW Plus, with a more exact trace system. Where the SW Plus provides bus cycle resolution in its trace, the EA provides clock cycle resolution. This distinction is important; with the EA emulator you capture a snapshot of the bus at each point it is available for sampling. The signals are shown, and can be checked to insure they are at the proper levels. The EA operates much like a logic analyzer, with the resolution of the system under test. You can spot problems associated with signals not reaching valid levels by viewing the value during a particular clock cycle. This level of detail combined with the other run-time control and triggering features make the PowerPack EA the most powerful emulator for x86 development.