

In-Circuit Emulator for Intel 196 Family

USP-96 KEY FEATURES

- ⇒ Memory display and edit while executing
- ⇒ Trace view during execution
- ⇒ Interrupts executed during breakpoints (Foreground Monitor option)
- ⇒ HLL source debugger for C-96 and PL/M-96
- ⇒ Pass-points to monitor internal RAM and registers while executing
- ⇒ Real-time transparent emulation up to 20 MHz
- ⇒ 32K of execution Trace Buffer with filtering
- ⇒ Real-time stamp in trace
- ⇒ 256K of emulation memory mappable in 256-byte blocks
- ⇒ Unlimited number of hardware breakpoints
- ⇒ Complex Events for breakpoints and trace filtering
- ⇒ Two 16-bit Pass Counters with Stop/Reload
- ⇒ 8-level hardware event sequencer
- ⇒ 8-channel user logic state analyzer
- ⇒ External trigger input and outputs
- ⇒ Wide range of μ P pods to emulate most MCS-96 family members
- ⇒ MS-Windows Chameleon Debugger
- ⇒ Serial or parallel interface to the host PC

USER INTERFACE

Chameleon Debugger works on Windows 95/98/NT and includes the latest debugging features like:

- ⇒ Multiple windows for source, memory, watch, locals, commands, stack, mapper, etc.
- ⇒ User defined watch and SFR windows
- ⇒ Fly-over variable pop-ups in source window
- ⇒ Drag and drop variables and addresses
- ⇒ C and ASM level debugging with trace synchronization
- ⇒ Macros for automatic testing and verification

DUAL -PORTED MEMORY

Using dual-ported memory allows instant viewing and modification of emulation memory without stopping or slowing down the running target.

BREAKPOINTS

Breakpoints are used to stop user program execution preserving the current program status. Breakpoints can be triggered from a combination of:

- | | |
|------------------------------|-----------------------------|
| Addresses and Address Ranges | Complex Events |
| External Input | Pass Counters |
| Sequencer | Trace Buffer Full Condition |



COMPLEX EVENTS

A complex Event is a set of conditions that qualify emulation Breakpoints, Event Sequencer, or trace filtering in real-time.

There are 3 complex events that may be qualified with:

- ⇒ Up to 256K address breakpoints or ranges
- ⇒ 16-bit Data pattern with less than, greater than, equal, not equal, and don't care combinations
- ⇒ RD, WR, INT, instruction fetch, operand read
- ⇒ External input with programmable trigger polarity

All events may be counted or delayed by the use of two 16-bit Pass Counters. An eight level hardware sequencer is available to sequentially trigger from any Event or Pass Counter.

TRACE BUFFER

Trace buffer is a high speed RAM used to capture in real time all activity on the microprocessor internal bus and pins. A dedicated start/stop logic allows for filtering unwanted information from the trace buffer while executing. Trace will store up to 32K samples comprised of the following:

Address Bus	Data Bus
Control Signals	I/O Pins
Real-Time Clock Stamp	8-ch. User Logic State Analyzer

The trace may be filtered before the information is stored with the use of complex events. After capture it may be post-filtered using a variety of options from the filter menu.

The trace is equipped with an internal counter to allow tracing to stop after a specified number of frames have been captured. This feature allows the trace to capture as much as 32K of small program fragments no matter how distant in time.

The trace contents may be viewed during program execution without stopping or slowing down the microcontroller.

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In-Circuit Emulator for Intel 196 Family

Microcontrollers emulated:	8095BH, 8096BH, 8097BH 8xC196KB, 8xC196KB-16, 8xC198, 8xC194 8xC196KC, 8xC196KC-20, 8xC196KD, 8xC196KD-20 8xC196KR, 8xC196JR, 8xC196KQ, 8xC196JQ, 8xC196KT
Maximum emulation speed	Up to 20 MHz
Size	260 mm wide, 260 mm deep, 64 mm high
Max. Emulation Program Memory	256 KB
Memory Mapping Resolution	256 byte boundary
Pass Counters	two, 16-bit each
Trace buffer	32K deep x 80-bits wide pre- and post-filtering
Real-Time Stamp	40-bits, 100ns resolution with Absolute, Relative and Delta modes
Sequencer	hardware, 8 levels
User probe	8 channel logic input 1 trigger input with gate 6 trigger outputs (Events, Pass Counters, Sequencer)
Host interface	Serial (COM1-COM4) or Parallel (LPT1-LPT2)
File upload/download format	Intel HEX/AOMF, Archimedes, IAR, BSO/Tasking, 2500AD Software

SAMPLE SCREEN FOR THE USP-96

The screenshot displays the Signum Systems WEMU96 software interface. The main window is titled "Sources 1 - MAIN.C" and shows C code for a program. The code includes a function `int4_vec` and a `main` function. The `main` function calls `int4_vec` and then `proc1`. The `int4_vec` function is currently selected, and its execution is being traced. The `Trace 1` window shows the execution flow, including the `int4_vec` function call. The `Locals 1` window shows the local variables for the `int4_vec` function, including `auto_k`, `auto_m`, `pp`, `st`, `i`, `l`, `procop`, `procpp`, `funp_tbl`, `coords`, `coords[1]`, `coords[2]`, `coords[3]`, `coords[5]`, `house_var`, `event`, `op`, `noapp`, `x`, and `y`. The `Status 1` window shows the current state of the program, including the `State` (STOP), `PC` (FF72F), `SP` (6034), `PSR` (00), `PSW` (ZNVTCPI5), `IM` (76543210), `INI` (76543210), `Clock` (Int), `Power` (Int), `Trace` (Empty), `Event` (), `Counter` (12), `Sequencer` (Off), `CCB0` (CF), `CCB1` (DF), `CCB2` (FD), and `RunPC` (F0080). The `Watch 1 - JACEK.WCH` window shows the value of the `colors` variable (E_GREEN (2)) and the `?FRAME01` variable (0x2000). The `SFR 1 - SFR.WCH` window shows the values of the Special Function Registers (SFRs), including `P0` through `P6` and `IRAM_REG`. The `Command 1` window shows the command `Mem=Program`. The `Trace Window` shows the execution flow, including the `int4_vec` function call. The `Watch Window` shows the value of the `colors` variable. The `SFR Window` shows the values of the SFRs. The `Locals Window` shows the local variables for the `int4_vec` function. The `Status Window` shows the current state of the program. The `Command Window` shows the command `Mem=Program`.

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