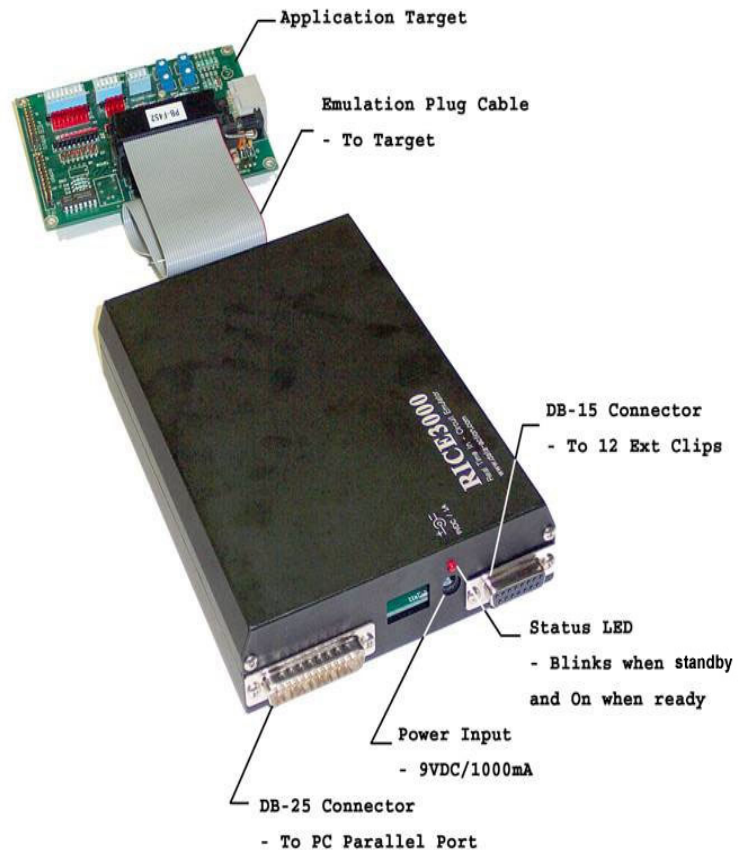


# RICE3000 Emulator

RICE3000 is a full-featured in-circuit emulator supporting Microchip 12/16/18 family microcontrollers. It comprises an emulator base and different emulation modules that support various members of the Microchip family as well as other processors in the future. The emulator offers versatile and powerful features that allow you to quickly debug your firmware code. RICE3000 runs under Windows 98/ME/2000/XP on Pentium or compatibles PC, including notebook and desktop computers.

## The RICE3000 Hardware Feature Highlights

- Real-time and full-speed emulation (Up to 40MHz)
- 2.7 volt to 5 volt emulation range
- Flash-based firmware for easy product updates
- Fast downloading and data retrieval during stepping via parallel port
- Standard 64K word installed program memory, expandable to 1M word (2 M Byte)
- 32K by 64-bit real-time trace memory
- Built-in frequency synthesizer from 48.8KHz to 50MHz
- Selectable internal oscillator and external oscillator support
- 12-clip external probe including an edge-triggered external break input, a break output, a trigger output, ground and 8 trace inputs
- Source level and symbolic debugging in assembly and high level languages
- Unlimited number of internal breakpoints within program memory
- Trigger output on any address range within program memory
- Versatile emulator controls including Go From Reset, Go, To Cursor, Single step, ASM instruction step, Step over Call, Return to Caller and Animation
- Supports watching floating points and complex variables such as structures and arrays on selective compilers
- 20-bit time stamp function with 4-bit prescaler resolution ( 0.125us ~ 2us)
- Interrupts function will be supported in single step mode and run mode
- Flash program memory and EEDATA erase/write function will be supported at full speed
- Support all common PIC C and Basic compilers, assemblers (Byte Craft, CCS, HI-TECH, IAR, Microchip, microEngineering ....)



## Emulation Modules

Different emulation probes can be installed inside RICE3000 to support various Microchip or other future processors. These devices specific emulation probes contain the actual chips or special bondout devices to provide accurate, real-time and full speed emulation. Series protective resistors are present on all I/O lines to prevent damage to the emulation chipset.

Available emulation probes: PB-5XB; PB-F87XA; PB-F452; \*PB-F62XA; \*PB-F8720 (\* under development)

## Emulation Voltage

RICE3000 is designed to fully support the emulated processors' capability to run at the 3V level. Users can select from five different voltage settings, between 2.7V and 5V, to run the processor.

## Different Oscillator Sources

RICE3000 provides several options for the oscillator to run the processor:

- Divided from the internal onboard crystal that provides frequencies at 16mHz, 8mHz, ..., etc.
- From the frequency synthesizer which provides frequencies from 48.8KHz to 50MHz.
- From external clock source in the target application.

**The RICE3000 Hardware Physical Dimension:** 6.4 x 5.2 x 1.3 (inch)

# The RICE3000 software

RICE3000 comes with an Integrated Development Environment (IDE) which runs under Windows 98/ME/2000/XP. The IDE user interface is so intuitive that there is no learning curve to the system. Users can be up and running within minutes. All information regarding the processor and the application is available right on the screen. It provides separate windows to examine source codes, program memory and data memory, special file registers, watch variables, program stack and trace memory.

Number	Addr	Opcode	Time-stamp (us)	Data
32735	00100	2E22	3565.375	0A
32736	00102	EF7F	3565.500	06
32737	00104	F000	3565.750	7F
*32738	000FE	0004	3566.125	0A
32739	00100	2E22	3566.250	0A
32740	00102	EF7F	3566.500	05
32741	00104	F000	3566.875	7F
32742	000FE	0004	3567.000	0A
32743	00100	2E22	3567.250	0A
*32744	00102	EF7F	3567.625	04
32745	00104	F000	3567.750	7F
32746	000FE	0004	3568.000	0A
32747	00100	2E22	3568.375	0A
32748	00102	EF7F	3568.500	03
32749	00104	F000	3568.750	7F

**Time-Stamp**

Begin Time = 3566.125 us  
 Time Base = 1000 ns  
 Program Counter Number = 32738

End Time = 3567.625 us  
 Program Counter Number = 32738

Difference in time = 1.500 us.

OK

**Device Configuration**

PIC processor: PIC18F452  
 Probe Card: PB-F452  
 Emulator Chip: 18C02-ME  
 Bondout Chip: 18F452-ME  
 Installed Program Memory in Emulator: 64K Words  
 Oscillator: RC/RA6  
 Watchdog Timer: Disable  
 Stack Overflow Enable Bit: Disable  
 Off-Chip Memory: 0x10000  
 Watchdog Timer Postscale Bits: 1:128  
 CCP2 Mux Bit: Multiplexed with RC1  
 Low Power System Clock Enable Bit: Disabled

Enable External Oscillator  
 Enable Internal Oscillator Frequency: 8 MHz  
 Enable Customized Synthesizer: (48.8 KHz - 50 MHz) with 0.1% accuracy  
 Synthesizer Frequency: 20 MHz

OK Cancel

**Rice3000 PIC Emulator IDE**

File Edit View Run Debug Tools Config Window Help

C:\HTSOFT\HI-TIDE\samples\demo18.c

```

MessageFunc(void)
000E8- {
    static unsigned char
    static unsigned char
    static const unsigned char
    unsigned char

000EC-     if (lmsg_buf[0])
    {

000FA-         for (count=0; count < L
000FC-             msg_buf[count] =

00122-     if (CHK_STATUS(SCROLL MESSAGE))
    {

00162-         for (
    
```

Stack	Value
1	0x000C2
2	0x00000
3	0x00000
4	0x00000
5	0x00000
6	0x00000
7	0x00000
8	0x00000
9	0x00000
10	0x00000

Name	Hex
<FE8>WREG	C1
<FFF>TOSU	00
<FFE>TOSH	00
<FFD>TOSL	C2
<FFC>STKPTR	01
<FFB>PCLATU	00
<FFA>PCLATH	00
<FF9>PCL	00
<FF8>TBLPTRU	00
<FF7>TBLPTRH	00
<FF6>TBLPTRL	00
<FF5>TABLAT	00
<FF4>PRODH	00
<FF3>PRODL	00
<FF2>INTCON	01
<FF1>INTCON2	F5
<FF0>INTCON3	C0
<FEA>FSR0H	00
<FE9>FSR0L	FF
<FE2>FSR1H	00
<FE1>FSR1L	FF
<FE0>BSR	00
<FDA>FSR2H	00
<FD9>FSR2L	FF
<FD8>STATUS	0B

**Data Capture Conditional Break**

Enable Data Capture Conditional Break

Data Capture Address: 0x0C0

Bit Mask Value (0-0xFF): 0xFF

Compare Value (0-0xFF): 0x9B

Pass Count (0-1023): 0x01

OK Cancel

**Watch**

Symbol	Addr	Hex
Message	600 (6)	FF

Modify

**Data Memory**

Addr	Hex
0000	C2
0010	08 08 E0 EF 32 0B 5E B7 14
0020	A9 B3 FD B7 28 09 BE DB 60
0030	80 20 DD 8F 04 2A B9 DE 01
0040	30 07 8E 7F 07 2C D0 E1 80
0050	82 0B D2 7F 84 38 1C 6C 30
0060	C4 52 C9 9A 04 C0 B3 BF 80 5A 5
0070	41 28 CE FC C2 9A DF 3E B0 74 F
0080	09 4C D5 FC F2 09 F0 9F 84 2A F
0090	40 04 FF FF A5 4D 7A E8 9C 02 3

Set data capture conditional break      Ln 1,Col 1      Halt    PC:0x00000    Int Osc    PIC18F452