

# MIPS base - Software Development Suite

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## System Navigator for MIPS32 and MIPS64

A product of MIPS Technologies, inc.



**Flash Technology**

2010年7月12日

# About Flash Technology

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- ◆ We are distributors of electronic development and test tools
- ◆ We are founded in Singapore more than ten years
- ◆ We have branch offices in Hong Kong and Shanghai
- ◆ We have lots of partners and customers, such as Intel ,AMD,HP, Dell,Freescale, NXP, Infineon. ...



# Agenda –Development suite

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- ◆ System Navigator EJTAG probe for MIPS32 and MIPS64
- ◆ System Navigator Console
- ◆ MIPS GDB/Insight
- ◆ System Navigator ICS (un-present)
  - Eclipse IDE for development
  - Code Sourcery g++ for MIPS



# System Navigator EJTAG probe

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The System Navigator probe host software runs on a Windows® XP or Linux PC over a USB2.0 or 10/100 Ethernet host connection. It provides a source-level debug solution with PDtrace™ (Program and Data Trace) and complex breakpoint support when used with the MIPS Navigator™ ICS product.



# EJTAG probe Features

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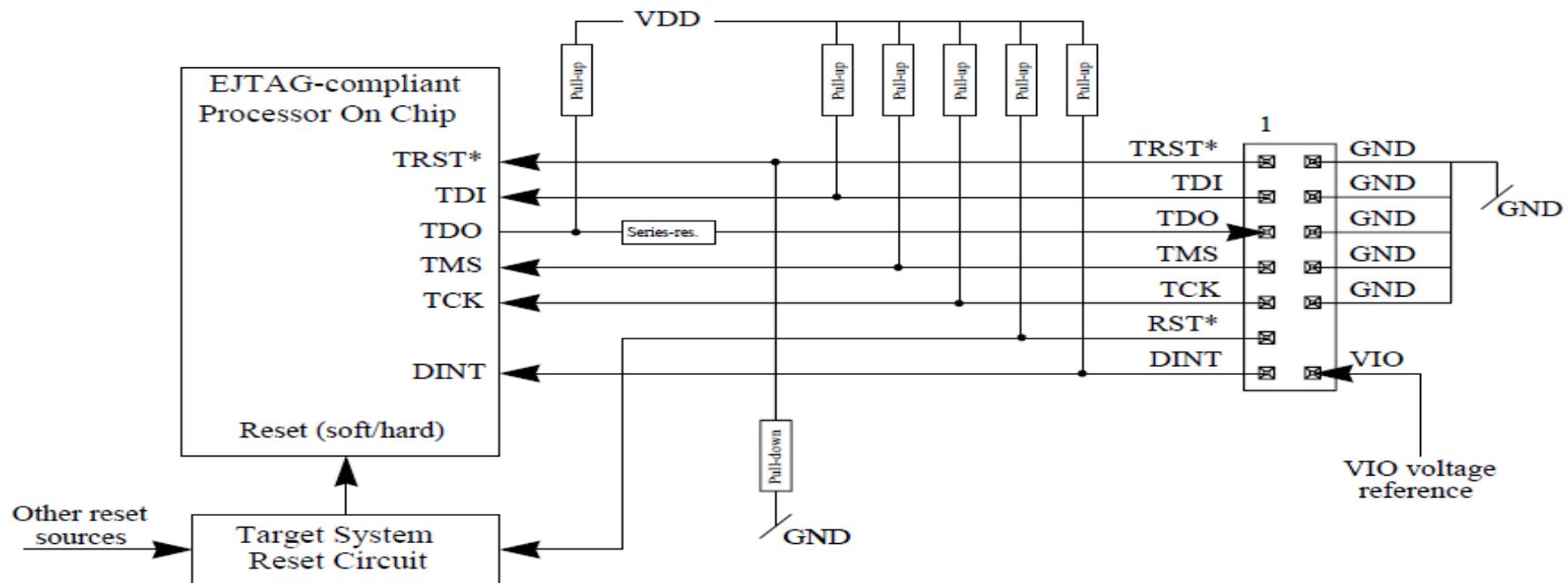
- Utilizes On-chip Instrumentation (OCI™) trace and debug extensions in the synthesizable core
- Cores supported include all MIPS32 and MIPS64 cores including: M4K®, 4K®, 5K®, 24K®, 34K™, 74K™, 1004K™ families
- Supports on-chip trace if configured in the core
- Off-chip trace version available (System Navigator Pro product)
- A USB2.0 or 10/100 Ethernet host connection
- Broadcom processors with MIPS EJTAG v2.0 or later

\*\* Extend many features explained at application topic.



# Product codes

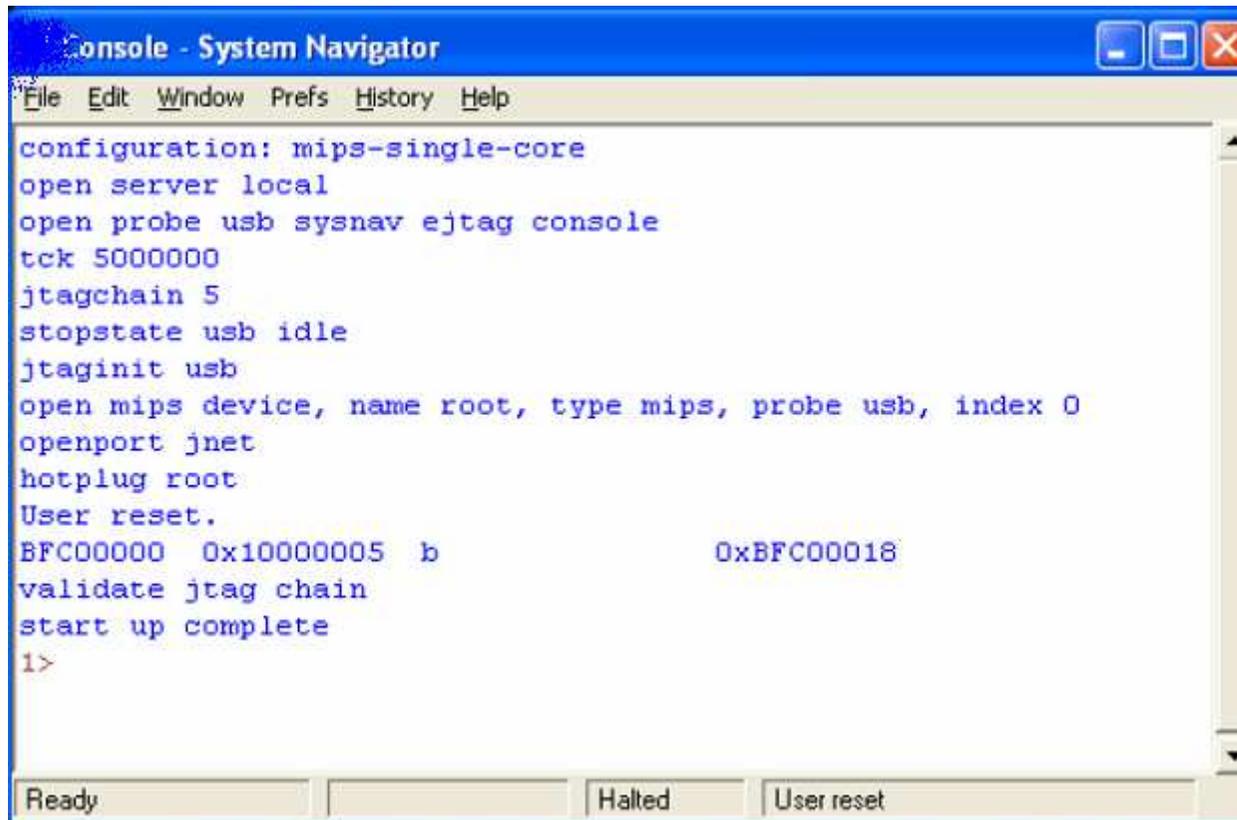
SNAV-MIPS-USB	System Navigator, USB 2.0 interface
SNAV-MIPS-ETH	System Navigator with 10/100 Ethernet and USB 2.0 interface
SNP-2048	System Navigator Pro, 2GB off-chip trace



# Using probe 1

## 1, System Navigator Console

A command-line interface (CLI) based on Tcl/Tk.



```
Console - System Navigator
File Edit Window Prefs History Help
configuration: mips-single-core
open server local
open probe usb sysnav ejtag console
tck 5000000
jtagchain 5
stopstate usb idle
jtaginit usb
open mips device, name root, type mips, probe usb, index 0
openport jnet
hotplug root
User reset.
BFC00000 0x10000005 b 0xBFC00018
validate jtag chain
start up complete
1>
```

Ready | Halted | User reset



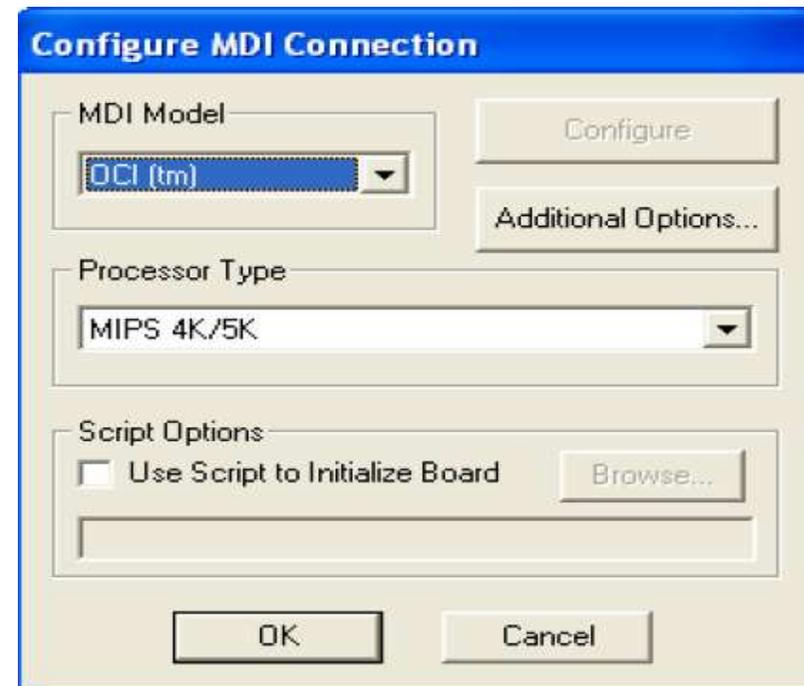
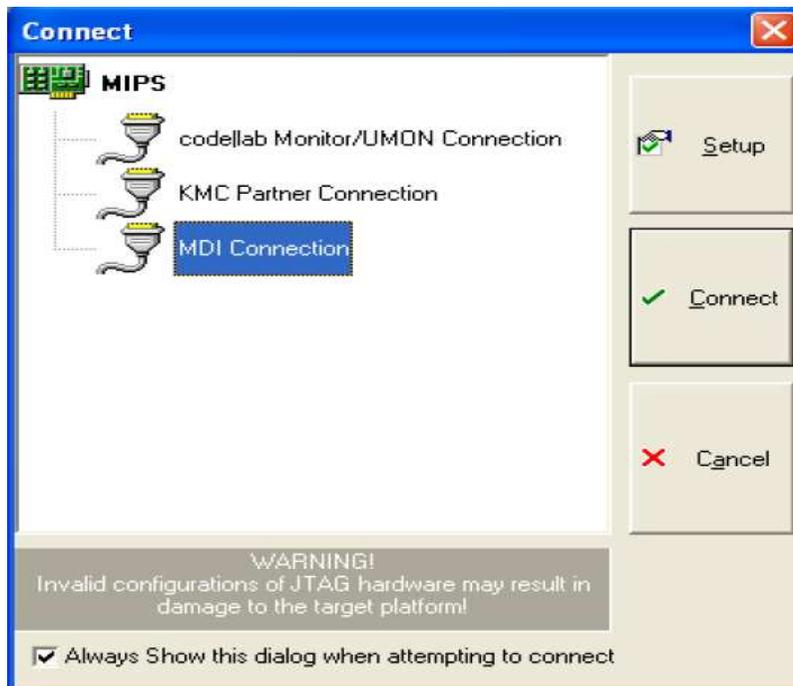
# Using probe 2

2, Third-party source-level debugger applications.

**MIPS GDB/insight**

Mentor API code|lab

Green Hill MULTI

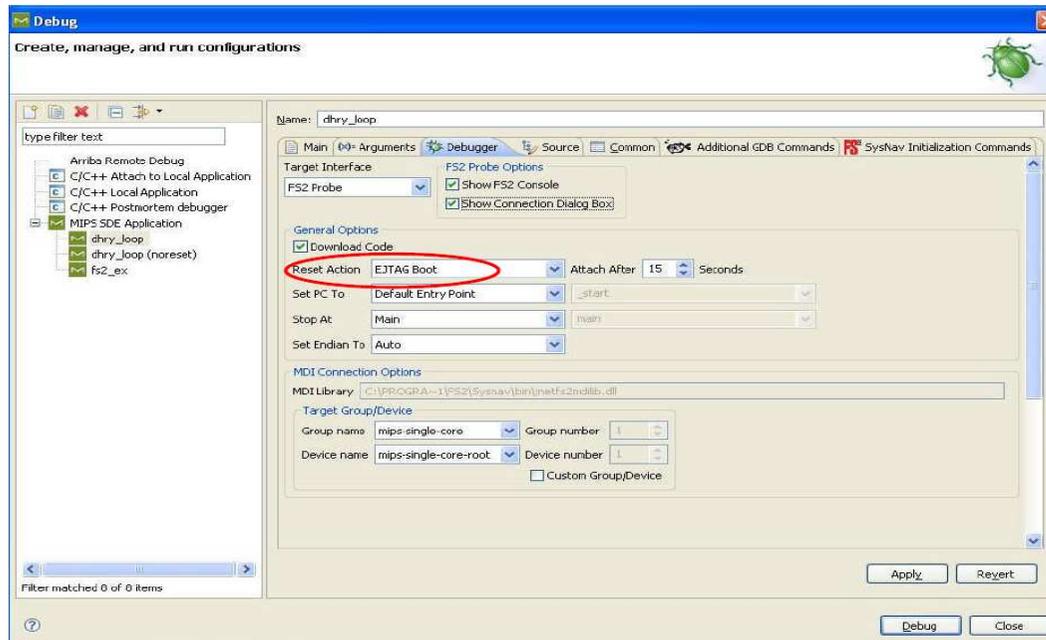


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# Using probe 3

## 3, System Navigator ICS



4, System Navigator Probe provided an interface called **MDI** (microprocessor debug interface), This interface is used by third party application .



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# System Navigator console

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- ◆ Based on Tcl/Tk

<http://www.tcl.tk>

A number of command primitives and Tcl procedures have been added to customize Tcl for this application. Commands are included for system configuration, emulation control, memory access including an assembler and disassembler, register access, trace and trigger access, file download, and status indication. The commands are detailed in the *MIPS Console Command Reference*.

- ◆ Debugger and program flash



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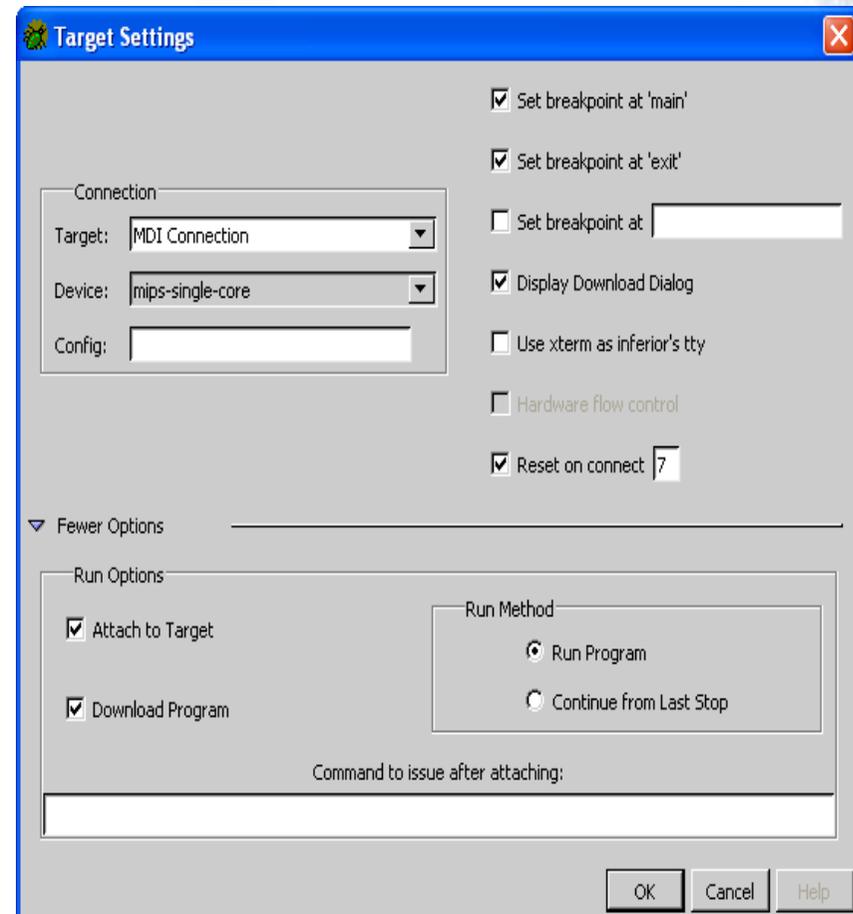


# MIPS GDB/Insight 1

The MIPS SDE toolchain is available as a fully supported software kit or as a free, unsupported SDE Lite.

## SDE Lite:

[http://www.mips.com/products/softwaretools/software\\_tools/MIPS\\_SDE\\_Lite.php](http://www.mips.com/products/softwaretools/software_tools/MIPS_SDE_Lite.php) SDE tool



# MIPS GDB/Insight 2

```
fs2_ex.c - Source Window
File Run View Control Preferences Help
Find:
fs2_ex.c main SOURCE
43 /* main program */
44 /******
45
46 //-----
47 // main uses 3 local variables a, b, and c
48 // to hold the return values from func1, 2, 3
49 //-----
50 unsigned long loopx = 0; // make global to get symbol name
51 int main (void) {
52     volatile static unsigned char a, b, c;
53     static unsigned char d;
54
55     global x = 0x11;
56     global y = 0x22;
57     global z = 0x33;
58
59     while ( 1 ) {
60         a = func1(loopx);
61         b = func2(loopx);
62         c = func3(loopx);
63         d = a + b + c;
64         loopx++;
65         if (0 == (loopx & 0x00007FFF)) {
66             OutputMessage(sizeof(ESC_message));
67         }
68     }
69     return 0;
70 } // end main()
71
72
73 //*****
Program stopped at line 55 80100dc0 55
```

```
HW Trace - System Navigator for MIPS Processor Cores
File View Symbols Utility Window Help
Find: (no event) Cancel Source
1020.56: 00:80100DA4 0x27BD0008 addiu $sp,$sp,0x0008
1020.60: 00:80100DA8 0x03E00008 jr $ra
1021.04: 00:80100DAC 0x00000000 nop
1021.08: 00:80100E1C 0xA3828076 sb $v0,0xFFFF8076($gp)
fs2_ex.c:63: d = a + b + c;
1021.50: 00:80100E20 0x93838074 lbu $v1,0xFFFF8074($gp)
1021.54: 00:80100E24 0x93828075 lbu $v0,0xFFFF8075($gp)
1021.58: 00:80100E28 0x00621021 addu $v0,$v1,$v0
1021.62: 00:80100E2C 0x00401821 addu $v1,$v0,$0
1022.08: 00:80100E30 0x93828076 lbu $v0,0xFFFF8076($gp)
1022.12: 00:80100E34 0x00621021 addu $v0,$v1,$v0
1022.16: 00:80100E38 0xA3828077 sb $v0,0xFFFF8077($gp)
fs2_ex.c:64: loopx++;
1022.20: 00:80100E3C 0x8F828070 lw $v0,0xFFFF8070($gp)
1022.24: 00:80100E40 0x24420001 addiu $v0,$v0,0x0001
1022.28: 00:80100E44 0xAF828070 sw $v0,0xFFFF8070($gp)
fs2_ex.c:65: if (0 == (loopx & 0x00007FFF)) {
1022.32: 00:80100E48 0x8F828070 lw $v0,0xFFFF8070($gp)
1022.36: 00:80100E4C 0x30427FFF andi $v0,$v0,0x7FFF
1022.40: 00:80100E50 0x1440FFE1 bne $v0,$0,0x80100DD8
1022.44: 00:80100E54 0x00000000 nop
1022.48: mode debug, isa=MIPS32, asid=0x00
1022.48: idle cycles 1
Ready. 1024 frames
```



# Conclusion

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**Any question, do not hesitate to ask us.**

- ◆ Flash Technology Trading (Shanghai) Limited  
中国上海长宁区天山路600弄1号405室同达创业大厦  
邮编: 200051  
Tel: (86-21) 6145-7130 Fax: (86-21) 6145-7131
- ◆ Email : sales@flashtech.com.cn (sales)  
support@flashtech.com.cn (support)
- ◆ Flash Technology (HK) Limited  
香港九龙长沙湾永康街七号西港都会中心13楼D室  
Tel : 852-23109662 Fax: 852-28157209  
Email: sales@flashtech.com.cn (sales)  
support@flashtech.com.cn (support)



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# Thank you



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