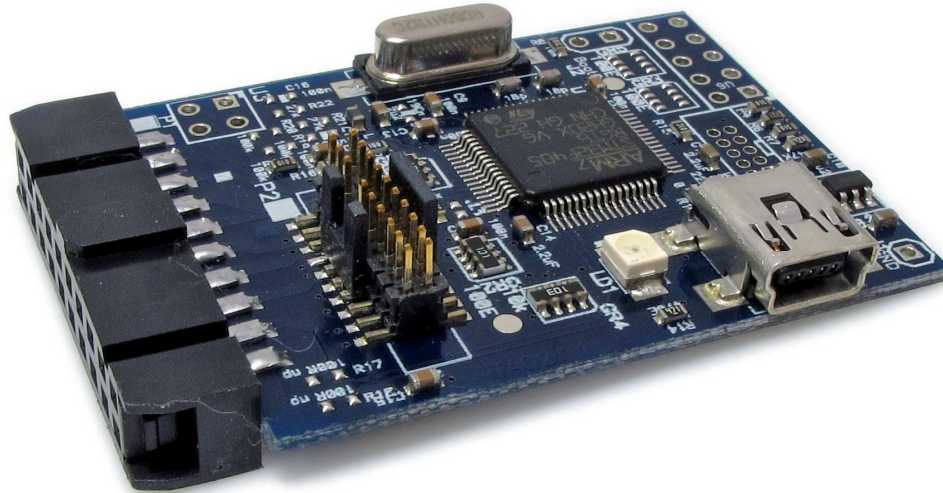Hardware Reference

iTAG.Fifty

iSYSTEM iTAG.Fifty is an entry level ARM development system for Cortex-M, ARM7 and ARM9 based targets. It combines a HW debugger connecting to the target microcontroller through the debug interface and winIDEA^{TM} / testIDEA^{TM}, iSYSTEMs integrated development and real-time (unit) test environment.

Supported Architectures	Supported Cores	Supported microcontroller families
Cortex-M	Cortex-M0 Cortex-M1 Cortex-M3 Cortex-M4	NXP LPC1xxx ST STM32 Freescale Kinetis Fujitsu FM3 Infineon XMC4000 Texas Instruments Stellaris Energy Micro EFM32 …
ARM7	ARM7 ARM720T ARM7DI ARM7TDMI	NXP LPC2xxx ST STR7 Atmel AT91, SAM7 Cirrus Logic EP73xx …
ARM9	ARM9 ARM9E ARM9TDMI ARM920T/922T/925 ARM940T/946ES ARM966ES	NXP LPC3xxx ST STR9 Atmel AT91, SAM9 Freescale i.MX2x Cirrus Logic EP79xx …

Package content:

- iTAG-Fifty with 20-pin 2.54mm ARM JTAG pinout

- Cortex debug cable with 10-pin 1.27mm Cortex Debug and 20-pin 1.27mm Cortex Debug+ETM pinout

- Link to iTAG.Fifty user information

iTAG.Fifty features:

- Pocket size 56 mm x 30 mm

- USB 2.0 connection to PC

- USB powered

- ARM Cortex-M0/M1/M3/M4

- ARM ARM7/ARM9

- SWD and JTAG debug interface

- 3.3V debug levels

- 20-pin 2.54 mm IDC JTAG Connector

- 20-pin 1.27 mm Cortex Debug+ETM Connector Cable

- 10-pin 1.27 mm Cortex Debug Connector Cable

- iTAG winIDEA™ IDE*

* iTAG.fifty is fully operational with iTAG winIDEA™ version. This version supports GCC compiler only and no technical support is provided. In all other aspects it has full functionality of a regular winIDEA™ version. If a new or a different microcontroller, or a compiler other than GCC, or a technical support is required, you can upgrade iTAG.Fifty to iTAG.1K by buying a full winIDEA software license.

If the target microcontroller is not listed in winIDEA, it can be still debugged by selecting the target core architecture (e.g. Cortex-M3) on which the target microcontroller is built on.

iTAG.1K adds on comparing to iTAG.Fifty:

- Regular and full winIDEA™ versions support newly introduced microcontrollers and provide new functionalities

- All compilers for ARM/Cortex supported

- Technical support included

Overall winIDEA™ software features (no time or code size limitations):

- GCC 4.7.0 ARM compiler

- Editor & build manager

- Flash programming

- HW and SW breakpoints

- Low and high-level debugging

- device register view (SFRs)

- Python scripting

- isystem.connect interface/API allowing 3rd party tools accessing all winIDEA™ functionalities

- Realtime (unit) testing with testIDEA™

- OS awareness (FreeRTOS, RTX, rcX, CMX, µC/OS-II,...)

- Compilable GCC sample projects (NXP LPC1xxx, ST STM32, Fujitsu FM3, Ti Stellaris LM3, Infineon XMC4500, Freescale Kinetis,...)

Target debug connectors

Three target debug connectors are supported. Note that only one connector must be used at once!

- 20-pin IDC 2.54 mm edge connector features ARM7/ARM9 JTAG target debug pinout, which is used to connect to ARM7 and ARM9 based targets.
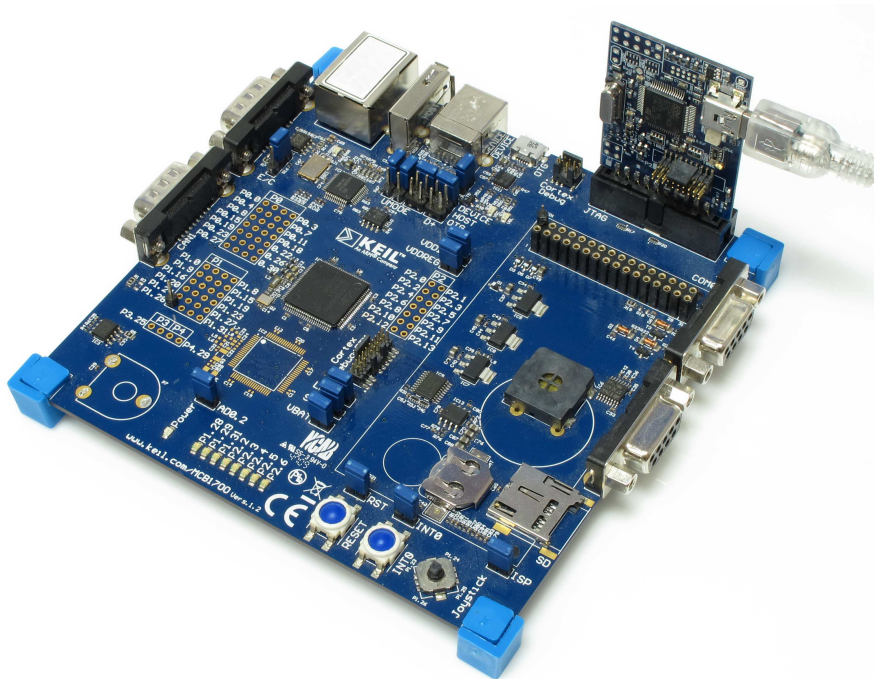
iTAG.Fifty connecting to the target via a 20-pin IDC 2.54 mm ARM JTAG connector
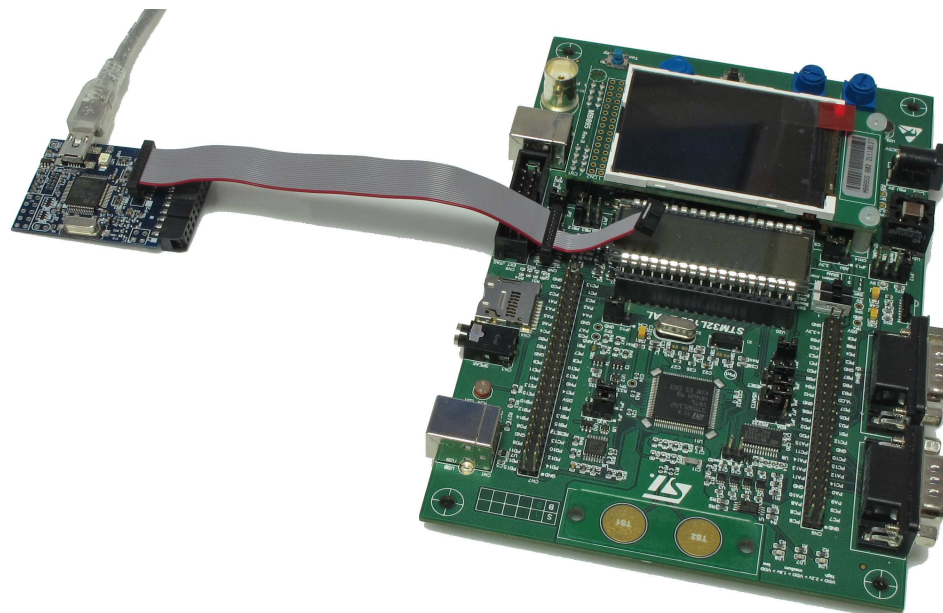
The following pinout is valid on the target side:

Signal direction	Signal description	Signal	Pin	Pin	Signal	Signal description	Signal direction
I	Reference voltage	VTref	1	2	NC	Not Connected	
O	Debug JTAG	nTRST	3	4	GND	Ground	
O	Debug JTAG	TDI	5	6	GND	Ground	
O	Debug JTAG	TMS	7	8	GND	Ground	
O	Debug JTAG	TCK	9	10	GND	Ground	
	Not Connected	NC	11	12	GND	Ground	
I	Debug JTAG	TDO	13	14	GND	Ground	
I/O	System Reset	RESET	15	16	GND	Ground	
	Not Connected	NC	17	18	GND	Ground	
	Not Connected	NC	19	20	GND	Ground	

20-pin ARM7/ARM9 pinout

- 10-pin 1.27mm Cortex Debug and 20-pin 1.27mm Cortex Debug+ETM connector

Connection to iTAG.Fifty

Connection to 20-pin 1.27 Cortex target debug connector

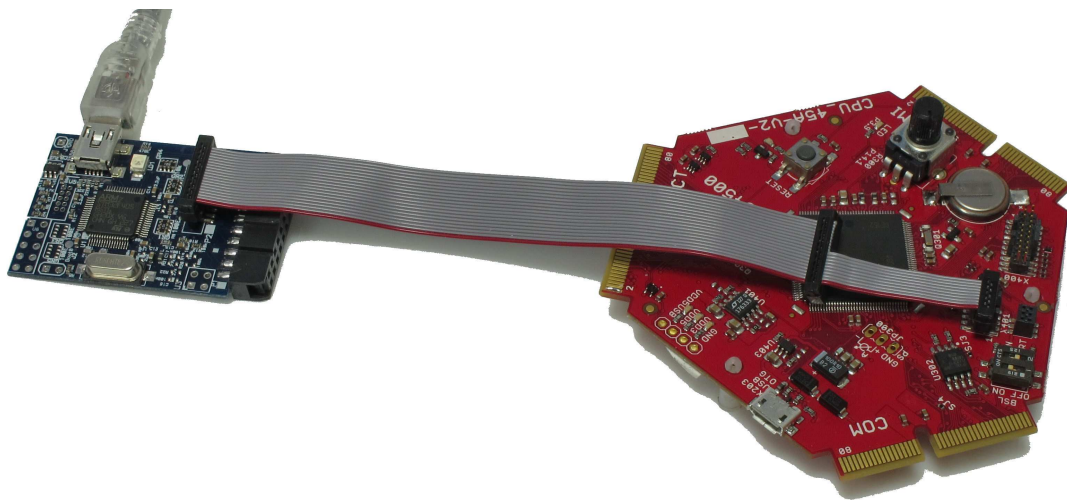Connection to 10-pin 1.27 Cortex target debug connector

Cortex debug cable

iTAG.Fifty connecting to the target via a 20-pin 2.54 mm Cortex Debug+ETM connector

Signal direction	Signal description	Signal	Pin	Pin	Signal	Signal description	Signal direction
I	Reference voltage	VTref	1	2	SWDIO/TMS	SWD/JTAG	I/O
	Ground	GND	3	4	SWCLK/TCK	SWD/JTAG	O
	Ground	GND	5	6	SWO/TDO	SWD/JTAG	I
	Ground	GND	7	8	EXTB/TDI	SWD/JTAG	O
	Ground	GND	9	10	RESET	System Reset	I/O
	Ground	GND	11	12	NC	Not Connected	I
	Ground	GND	13	14	NC	Not Connected	I
	Ground	GND	15	16	NC	Not Connected	I
	Ground	GND	17	18	NC	Not Connected	I
	Ground	GND	19	20	NC	Not Connected	I

20-pin 1.27mm Cortex Debug+ETM pinout

iTAG.Fifty connecting to the target via a 10-pin 2.54 mm Cortex Debug connector

Signal direction	Signal description	Signal	Pin	Pin	Signal	Signal description	Signal direction
I	3V3 voltage	3V3	1	2	TMS	Debug JTAG	I/O
	Ground	GND	3	4	TCK	Debug JTAG	O
	Ground	GND	5	6	TDO	Debug JTAG	I
	Ground	GND	7	8	TDI	Debug JTAG	O
	Ground	GND	9	10	RESET	System Reset	I/O

10-pin 1.27mm Cortex Debug pinout

Power Supply

iTAG-Fifty is a self USB powered device, which requires no external power supply and is compliant with the USB 2.0 standard. A normal power consumption of iTAG-Fifty is less than 100mA.

Debug I/O Levels

iTAG-Fifty drives debug JTAG signals at 3.3V while debug inputs are 5V tolerant.

winIDEA^{TM} IDE

iTAG-Fifty runs under iTAG winIDEA^{TM}, iSYSTEM development environment, which can be downloaded from www.isystem.com/itag.

Getting Started

1) Install iTAG winIDEA^{TM}, which can be downloaded from www.isystem.com/itag and start the application.

2) Make sure that the embedded target is not powered and that iTAG.Fifty is not connected to the PC via the USB yet.

3) Identify, which iTAG debug connector is valid for your embedded target.

4) Connect iTAG.Fifty to the embedded target.

5) Connect iTAG.Fifty to the PC running iTAG winIDEA^{TM} via a mini USB cable.

6) Power the embedded target.

7) Open one of the included sample projects, which is close to your target microcontroller and adjust the CPU selection in the Hardware/Emulation Options to match the target microcontroller. Basically, with this setting the debugger should be already able to connect to the target microcontroller. Perform Debug/Run Control -> CPU Reset and green STOP status should occur in the right bottom corner.

8) In case of problems, go to winIDEA Help menu, where you find the Emulation Technical Notes item at the bottom, which opens a belonging technical notes document for your particular architecture. It should help you with troubleshooting.