

# Infineon AGBT Active Probe

V1.0

## User Manual



Enabling Safer Embedded Systems

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# Introduction

The iC5700 BlueBox On-Chip Analyzer is a hardware platform designed for debugging and testing a wide range of embedded microcontroller platforms that are based on a variety of processor architectures.

Functionality can be further extended with the addition of our IOM6 Accessories, enabling the synchronous capture of analog and digital signals in parallel to trace information. Such capability is used for advanced debugging of complex applications together with our winIDEA Integration Development Environment (IDE), as well as for thorough testing in conjunction with our testing environment testIDEA.

**Infineon AGBT Active Probe** enables the debugging, tracing and testing of Infineon's AURIX™ microcontroller family. It supports the DAP and Aurora GigaBit Trace (AGBT) interface operating at their maximum frequency. Its small and compact hardware size allows for connecting to a target microcontroller in a confined space as far as 5m away. The Active Probe supports up to 4 parallel AGBT lanes, running at a maximum bitrate of 5Gbps.

Complementing our hardware is a range of software which target three key areas of embedded development: debugging, timing-analysis and testing.

**winIDEA** – The winIDEA Integration Development Environment (IDE) delivers the visual insights required to debug your embedded application. At the simplest level, winIDEA provides all the usual functionality of an IDE, such as breakpoints, stepping and device programming. When supported by the target microcontroller, winIDEA can also visualize the timing and code coverage of the application via the trace interface, as well as combine data captured by our IOM Accessories. Various third-parties also provide software tools to perform advanced worst-time-execution analysis based upon the data winIDEA can export. When a Real-Time Operating System (RTOS) is in use, the state of the RTOS and its tasks can also be visualized.

**testIDEA** – The testIDEA environment simplifies the development of unit tests for embedded applications. By making use of the winIDEA environment, this application makes it easy to locate source code functions and generate test cases for them. Tests are then executed using the Original Binary Code (OBC) method, testing the object code running on the target microcontroller. The tests, which are stored as YAML files, can easily be added to a project, maintained in a repository, and then automatically executed together with Continuous Integration (CI) tools such as Jenkins.

**isystem.connect** – There are times where it is much more efficient to write a script to execute a task that requires many clicks within a visual development environment. This is where our Software Development Kit (SDK) isystem.connect comes in. The well documented interface provides access to Python, Java, C++ and other languages so that any action available within winIDEA and testIDEA can be scripted. Scripts can also be executed directly from within winIDEA, thereby allowing the developer to extend its functionality.

iSYSTEM's solutions run under the Microsoft® Windows® operating system or optionally within the Eclipse environment through a plug-in. All our software can be downloaded from the Downloads page at <http://www.isystem.com>.

# Important safety notice

## General safety instructions

Please read the following safety precautions carefully before putting this device to use to avoid any personal injuries, damage to the instrument, or to the target system.

Use this instrument only for its intended purpose as specified by this manual to prevent potential hazards.

## Use included power cord and power supply

The enclosed power supply has been approved for use by iSYSTEM. Please contact iSYSTEM if you need to consider an alternative power.

## Use grounding wire

Prior to applying power to either the BlueBox or the target, connect the device and the target system together with the included grounding wire. This is to avoid potential damage caused by any voltage difference between the device and the target system.

## Use proper overvoltage protection

Please ensure proper protection to avoid exposing the BlueBox device or the operator to overvoltage surges (e.g. caused by thunderstorm, mains power).

## Do not operate without cover

Do not operate the device with cover removed.

## Avoid circuit and wire exposure

Do not touch exposed components or wires when the device is powered.

## Do not operate with suspected damage

If you suspect damage may have occurred, the BlueBox device must be inspected by qualified service personnel before further operation.

## Do not operate the device outside its rated supply voltage or environmental range

Consult with iSYSTEM before using equipment outside of the parameters provided in this manual.



This symbol indicates further safety notices within this manual.

# Package content

The standard Infineon AGBT Active Probe kit (ordering code IC57164) is delivered with the following components:

Infineon AGBT Active Probe	1 m FNET Cable	User manual
Ordering code: IC57164	Ordering code: BB-FNET-100	

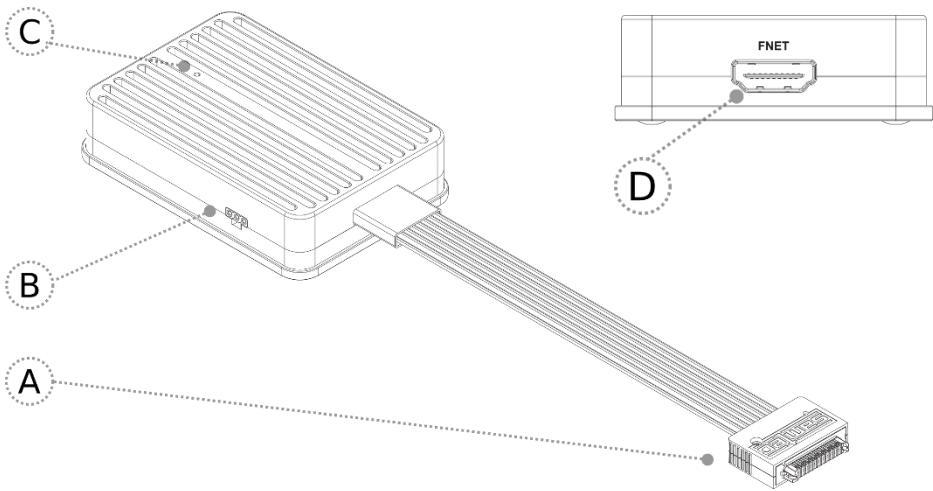


# Specifications

<b>GENERAL</b>	
Supply voltage	9.0V DC via FNET cable
Operating temperature	10°C to 40°C
Storage temperature	-10°C to 60°C
Humidity	5% to 80% RH
<b>MECHANICAL</b>	
Size	80 x 55 x 18 mm
Weight	0.125 kg
<b>OPERATION</b>	
Communication interface to BlueBox	iSYSTEM proprietary FNET
Debug signal valid input voltage range	3.3V (max. 3.6V)
Power consumption	Max. 3W (dependent on operation mode)
Number of supported AGBT lanes	Up to 4
Maximum AGBT bitrate	5Gbps
AGBT clock source options	Target or Active Probe
<b>PROTECTION</b>	
Debug signals	33 $\Omega$ series termination/protection resistors, ESD protection devices
DAP1-3	10k $\Omega$ pull-down
DAP_RESET	1k $\Omega$ pull-up, 33 $\Omega$ series termination/protection resistor
VREF	1k $\Omega$ input impedance

# Operation

## Device overview



## Device description

- **A** – Samtec 22-pin ERF8 connector, with the following pinout:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal description	Signal Direction
I	AGBT TX0_P	TX0+	1	2	VREF	Reference Voltage	I
I	AGBT TX0_N	TX0-	3	4	DAP0	DAP clock	O
	Ground	GND	5	6	DAP1	DAP data	IO
I	AGBT TX1_P*	TX1+	7	8	NC	Not Connected	O
I	AGBT TX1_N*	TX1-	9	10	DAP2	Optional 2 <sup>nd</sup> DAP data	I
	Ground	GND	11	12	DAP_EN	DAP enable	I
I	AGBT TX2_P*	TX2+	13	14	CLK+	AGBT clock	O
I	AGBT TX2_N*	TX2-	15	16	CLK-	AGBT clock	O
	Ground	GND	17	18	TGO	AGBT trigger out	
I	AGBT TX3_P*	TX3+	19	20	NC	Not Connected	
I	AGBT TX3_N*	TX3-	21	22	~PORST	Power-On Reset	IO

\* Current TriCore devices feature only one AGBT lane while the Active Probe hardware is ready for future devices which could have more AGBT lanes.

Signal direction definition:

O - output from the Active Probe to the target microcontroller

I - input to the Active Probe from the target microcontroller

- **B** – Trigger connector – provision for future functional extensions. No functionality at the moment.

- **C** – The indicator light provides the status of the Active Probe as follows:
  - Permanently green - Powered On and ready to use
  - Blinking green – Establishing connection with the BlueBox
  - Blinking blue – Reprogramming SPLASH
  - Permanently magenta – Golden image loaded and ready to use
- **D** – FNET connector, that connects the Active Probe to the iC5700 BlueBox. The FNET cable is delivered with the Active Probe.



When powering on the system, switch the iC5700 on prior to powering on the target system; when powering down the system, power off the target microcontroller before powering off the iC5700.

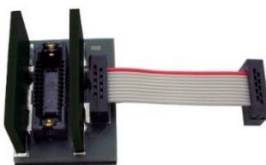
Use only original iSYSTEM accessories for powering and connecting with the iC5700. Consult with iSYSTEM before attempting to use any other accessory.

### Target connector

The target should feature a matching part, for example, Samtec part number: ASP-137969-01 (Samtec Series ERF8, Rugged High-Speed Socket).

Infineon TriCore target can also feature a standard 10-pin 1.27mm DAP target debug connector exposing only the debug interface without the AGBT interface. The Active Probe can be used to connect to such targets through a small adapter connecting at the end of Samtec 22-pin ERF8 connector.

### 10-pin 1.27 mm DAP Adapter



IASAM22TRICOREPIN10

The 10-pin adapter (ordering code IASAM22TRICOREPIN10)) must be ordered separately in order to connect to the target featuring 10-pin 1.27mm pitch DAP target debug connector.

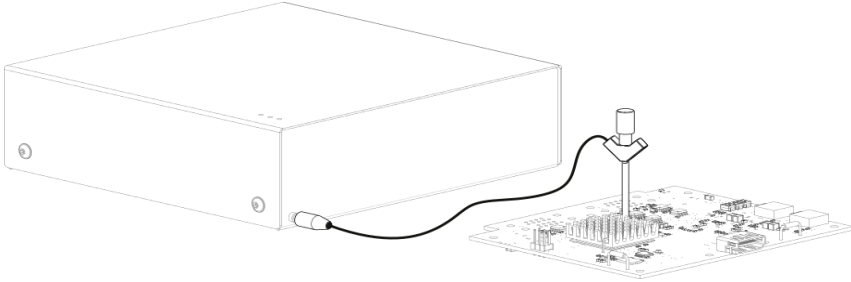
The following pinout is valid on the target side:

Signal direction	Signal	Pin	Pin	Signal	Signal direction
I	VREF	1	2	DAP1	O / IO
Ground	GND	3	4	DAP0	O / O
Ground	GND	5	6	DAP2	I
	Not Connected	7	8	DAP_EN/DAP3	O
Ground	GND	9	10	~PORST	IO

10-pin 1.27mm TriCore DAP pinout

## Active Probe and the iC5700 Connecting Guidelines

- Always start by connecting the iC5700 GND and the target GND using the grounding wire delivered with the iC5700.



If the grounding wire is not connected, the ground potential difference between the BlueBox hardware and the target can exceed well over 1000V even before any of the devices are powered up. This voltage difference is discharged over the BlueBox hardware and the target system, leading to the possible destruction of electronic components within the BlueBox hardware, the target or both.

- Connect the iC5700 Power Supply to the mains outlet and the iC5700.
- Connect the iC5700 to the PC via the supplied Ethernet or the USB 3.0 cable.
- Connect the Active Probe to the iC5700 FNET Port through the supplied FNET Cable. If a cable longer than 1.0m is required (for example when debugging an ECU in a vehicle or a confined space), optional 3m and 5m FNET cables are available from iSYSTEM.



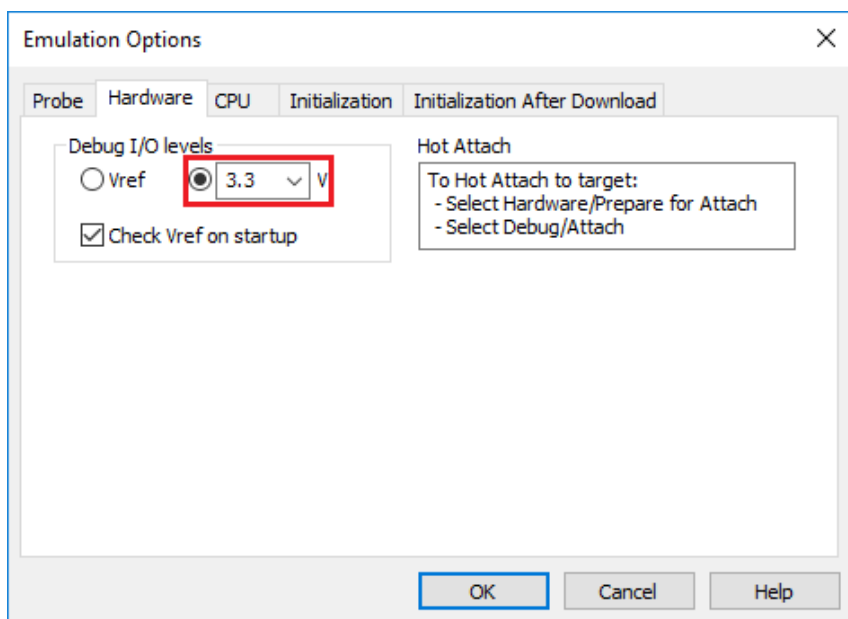
Although it looks similar to the HDMI interface, the FNET Port is **not compatible** with HDMI or any HDMI accessories.

Connecting iSYSTEM hardware to HDMI accessories will damage the hardware and will render the iSYSTEM hardware warranty void.

- Connect the Active Probe Samtec 22-pin ERF8 connector to the target.

## Setting Debug Interface Voltage Levels

The voltage levels for the debug interface are configured within winIDEA via the menu option “Hardware -> Emulation Options”, selecting the “Hardware” tab in the “Emulations Options” dialog window, as shown below.



When the VREF signal (pin 1) is 3.3V or less, the debug interface logic should be supplied by the Active Probe (right radio-button selected as shown above), with an appropriate voltage selected from the drop-down list options.

When the microcontroller target supplies 5.0V to the VREF signal (pin 1), use the radio-button selection to choose the ‘Vref’ option instead.

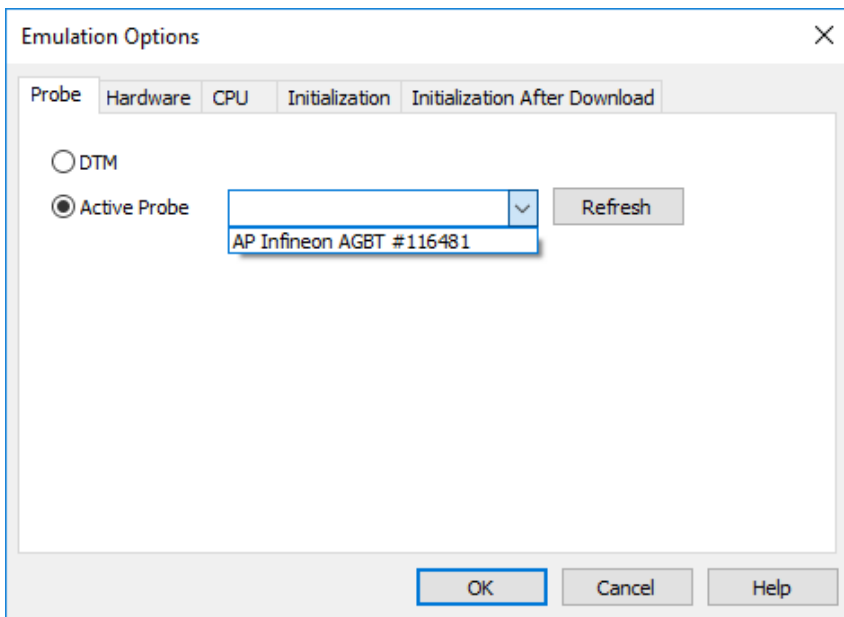
## Further Active Probe Settings

This section describes winIDEA settings distinct to the Infineon AGBT Probe.

The iC5700 can connect to AURIX™ target devices through:

- its installed DTM module and an appropriate DAP cable adapter (e.g. IC50163-2).  
This debug system has limited maximum DAP frequency and does not support the DAPE debug interface nor the AGBT interface. Alternatively, JTAG debug interface support is also available through a dedicated JTAG cable adapter (e.g. IC50160).
- or the Infineon DAP Active Probe supporting the DAP and DAPE debug interface.
- or the Infineon AGBT Active Probe

In order to switch from the default DTM interface use to the Active Probe use, the “Emulation Options” dialog needs to be opened from the menu option “Hardware -> Emulation Options”. By switching to the tab “Probe”, the ‘Active Probe’ option can be selected.



Other, more general TriCore related settings are described within [winIDEA on-line help](#).

# Accessories

## IOM6 product line

Expand the iC5700 operation with modules from the IOM6 product line to enable parallel debugging and testing of multiple different target systems, monitoring of network traffic (e.g. LIN/CAN/CAN FD) and manipulation of analog and digital signals.

Ordering Code	Description
IC57031	IOM6-HUB with three extra FNET ports and an FBridge port
IC57040	CAN/LIN Add-On Module
IC57041	Analog/Digital Input/Output Add-On Module
IC57125	ARM HSSTP Active Probe
IC57163	Infineon DAP Active Probe
IC57164	Infineon AGBT Active Probe

## Infineon AGBT Active Probe Accessories

Ordering Code	Description
IASAM22TRICOREPIN10	10-pin 1.27 mm DAP Adapter
BB-FNET-100	1.0m FNET Cable
BB-FNET-300	3.0m FNET Cable
BB-FNET-500	5.0m FNET Cable

Please refer to the iC5700 User Manual for all current iC5700 accessories.



Find more information on [www.isystem.com](http://www.isystem.com) or contact [sales@isystem.com](mailto:sales@isystem.com)



## Technical support

To reach for technical support please visit [www.isystem.com/support](http://www.isystem.com/support).

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