P1687.1

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Type of Project: New IEEE Standard
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Status: PAR for a New IEEE Standard

1.1 Project Number: P1687.1
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Title: Standard for the Application of Interfaces and Controllers to Access 1687 IJTAG Networks Embedded Within Semiconductor Devices

3.1 Working Group: Interfaces and Controllers for Accessing 1687 Networks Working Group (C/TT/IJTAG-NAPI)
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3.2 Sponsoring Society and Committee: IEEE Computer Society/Test Technology (C/TT)
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None

4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 12/2019
4.3 Projected Completion Date for Submittal to RevCom
Note: Usual minimum time between initial sponsor ballot and submission to Revcom is 6 months.: 05/2020

5.1 Approximate number of people expected to be actively involved in the development of this project: 20
5.2 Scope: This standard extends or expands the application of the IEEE 1687-2014 standard to allow the use of, and description of, a broad range of device interfaces and their associated controllers to access IEEE 1687 networks embedded within semiconductor devices. For example, these interfaces may include one or more of I2C, SPI, SWD, IEEE 1149.7 and/or other similar source synchronous clock interfaces.

5.3 Is the completion of this standard dependent upon the completion of another standard: No
5.4 Purpose: This standard enables users of the IEEE 1687-2014 Internal-JTAG "Standard for Access and Control of Instrumentation Embedded within a Semiconductor Device" to extend the use of, and description of, a broad range of interfaces and their associated controllers to access IEEE 1687 networks embedded within semiconductor devices. For example, these interfaces may include one or more of Inter-Integrated Circuit bus (I2C), Serial Peripheral Interface (SPI), IEEE 1149.7 Compact-JTAG, IEEE 1149.1 Test Access Port (TAP), and/or other current or future source synchronous interfaces.

5.5 Need for the Project: There are many ICs in the market today that contain embedded instruments, such as test logic, debug logic, monitors, configuration control, tuning, and other items that are normally accessed by a test or debug port. IEEE 1687 currently teaches in detail how to utilize the IEEE 1149.1 TAP interface and controller, but has only a generic "AccessLink" statement to enable alternate interfaces/controllers to access a 1687 network. For ICs that contain embedded instruments but do not include an 1149.1 TAP, it would be highly beneficial to standardize a well-specified description of how to use the interface/controller that is present to access the instrument network. This would allow a larger number of devices, including many already in existence, to make use of the advantages of 1687 -- portability of instruments, retargeting of embedded vectors, engineering tradeoffs in instrument access network design, and operation tradeoffs

in instrument operation and scheduling. This proposed standard will create a new retargeting interface and protocol-generation unit to be appended in front of compliant 1687 networks to extend its "usage space" (where 1687 networks can be used) - for example, allowing 1687 networks to be used within Big-A, Little-D (Analog) devices such as DACs and ADCs. This will be done in much the same way as 1149.6 and 1149.7 are new standards that extend the applicability of 1149.1 -- but are unique standards in their own right.

5.6 Stakeholders for the Standard: The stakeholders of this standard are any semiconductor markets that use ICs that support functional, test and debug interfaces as an alternative to the IEEE 1149.1 TAP to access embedded instrumentation. For example, Analog-Mixed-Signal IC's tend to use SPI or I2C and may contain Built-In Self-Test (BIST) functions and configuration functions. Accessing embedded instrumentation within semiconductor devices in a mixed environment that uses both the 1149.1 TAP and alternate interfaces in conjunction or coordination with each other enhances board development, board test, board debug, and background operation in end-user systems. Markets that typically have such mixed-interface environments are transportation-automotive, medical, telecom, computing-networking, and government-military electronics.

Intellectual Property
6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No
6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

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7.1 Are there other standards or projects with a similar scope?: No
7.2 Joint Development
Is it the intent to develop this document jointly with another organization?: No

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8.1 Additional Explanatory Notes: 7.1 There are several projects/standards that address the use of alternate interfaces in front of the IEEE 1149.1 TAP - 1149.7 and P1149.10. However, these are definitions of how to access and use the 1149.1 TAP and TAP Controller via other interface definitions to enhance bandwidth and test data volume - this is not the same as the 1687.1 proposal. The 1687.1 proposal expects to provide a method to describe and to enable the use of existing IC interfaces that are prevalent in the industry, such as SPI, I2C and others - and interfaces and controllers not yet adopted or invented - to access embedded IEEE 1687-2014 compliant networks of embedded instruments and to describe them with 1687 Instrument Connectivity Language (ICL) and Procedure Description Language (PDL). This means that IEEE 1687-2014 advantages to ICs, such as making embedded instruments portable by allowing description and vectors and vector retargeting to exist, will be applicable to ICs that currently deal with embedded functions in an ad hoc manner. For example there is automation for the insertion, verification and vector generation of IEEE 1149.1 - but such standard based automation does not exist for SPI or I2C networks. The use of 1687.1 will bring this same measure of standards-based automation to ICs that, for example, support a SPI interface and controller to access embedded instrumentation.