

Test Technology Standards Committee (IEEE-SA Sponsor C/TT)

Meeting Minutes

January 8, 2020

1. Name of group

The Test Technology Standards Committee (IEEE-SA Sponsor C/TT) met.

2. Date and location of meeting

On Wednesday, January 8, 2020 via IEEE Meetings WebEx (teleconference).

3. Officer presiding, including the name of the secretary who wrote the minutes

The presiding officer was Adam Cron, TTSC Sponsor Chair. The secondary presiding officer was Neil Jacobson, TTSC Sponsor Vice Chair. The recording secretary was Adam Ley.

4. Attendance, including affiliation

The roll was called. The following persons were present:

Name	Employer	Affiliation (if different from employer)	Role
Adam Cron	Synopsys		Chair
Neil Jacobson	Formidable Engineering Consultants		Vice Chair
Adam Ley	ASSET InterTech		Secretary
Alfred Crouch	Amida Technology Solutions		Voting member
Ian McIntosh	Leonardo		Voting member
Jim O'Reilly	Intel		Voting member
Jason Peck	Texas Instruments		Voting member
John Potter	(self)		Voting member
Rajesh Raina	NXP Semiconductors		Voting member
Jeff Rearick	AMD		Voting member
Mike Ricchetti	Synopsys		Voting member
Saghir Shaikh	Broadcom		Voting member
Steve Sunter	Mentor		Voting member
Bradford Van Treuren	VT Enterprises Consulting Services		Voting member
Michael Wahl	University of Siegen		Voting member
Mark LaVine	Arm		Observer
Sankaran Menon	Intel		Observer*
Spencer Millican	Auburn University		Observer
Soo Kim	IEEE		Staff

* having expressed interest, completion of attendance to this meeting satisfies the requirements to be a voting member

5. Call to order, Chair's remarks

The meeting was called to order at: (EST) 11:05 AM, Wednesday, January 8, 2020.

The presiding officer shared the patents slide set ([🔒](#)) and provided opportunity for those present to fulfill their duty to inform:

None present identified any potentially essential patent claim(s)/patent application claim(s).

6. Approval of minutes of previous meeting

The sponsor secretary reported that two issues of minutes for previous meetings had been submitted and were pending approval. These were made available to TTSC members and read to the meeting participants as follows:

- [TTSC meeting minutes 2019 11 12 as submitted 2020 01 08.pdf](#)
- [TTSC meeting minutes 2019 12 03 \(SM\) \(concluded 2019 12 20\) as submitted 2020 01 08.pdf](#)

The sponsor secretary noted that these were thought to be complete and correct.

A motion for approval of the minutes of previous meeting 2019 11 12 was made, as follows:

MOTION	Approve the minutes of the meeting 2019 11 12, as submitted 2020 01 08.
Mover	Steve Sunter
Second	Alfred Crouch
Votes	The vote was not conducted on a roll call basis. No objections were raised.
Decision	Approved

A motion for approval of the minutes of previous meeting 2019 12 03 (SM) (concluded 2019 12 20) was made, as follows:

MOTION	Approve the minutes of the meeting 2019 12 03 (SM) (concluded 2019 12 20), as submitted 2020 01 08.
Mover	Neil Jacobson
Second	Jeff Rearick
Votes	The vote was not conducted on a roll call basis. No objections were raised.
Decision	Approved

Accordingly, the minutes of these previous meetings, as approved, are finally recorded as follows:

- [TTSC meeting minutes 2019 11 12 as approved 2020 01 08.pdf](#)
- [TTSC meeting minutes 2019 12 03 \(SM\) \(concluded 2019 12 20\) as approved 2020 01 08.pdf](#)

Action items review

Action	Who	When
Facilitate the formation of the study group for Scan and Array Extraction (Dump) Debug Capability, including holding of a kickoff/ coordination meeting with the principals.	Adam Cron	Forthwith
Address all TTSC members, WG chairs and WG members to issue a call for additional participation in the study group for Scan and Array Extraction (Dump) Debug Capability.	Adam Cron	Forthwith
Work toward draft proposed common P&P for all TTSC working groups (Soo Kim to establish the correct baseline and template).	Adam Cron	Forthwith
Work toward draft proposed common form letter for all calls for standard maintenance.	Adam Cron	Forthwith
Effect the approval of revision PAR for P1450.6.2.	Adam Cron	Forthwith

It was noted that the action items pertaining to Scan and Array Extraction (Dump) Debug Capability (2) and to the revision PAR for P1450.6.2 would be subject to the proposed agenda, if approved.

It was further noted that the other action items, for proposed common P&P and for proposed common call for standard maintenance remained pending.

7. Approval of agenda

The presiding officer offered the following agenda:

- **Call to order, Chair's remarks**
(to include, in every session, patents slideset)
- **Approval of agenda**
- **Approval of minutes of previous meeting**
 - **Action items review**
- **Technical topics**
 - **Elections review**
please expect to review election need/ status for
 - **TTSC (Rearick)**
 - **P1149.7/P1500 (Ley)**
 - **P2427/P1687.2 (Ehrenberg)**
 - **Status of Projects in Active Development**
 - **P1149.7 (Peck)**
requests approval of their P&P
 - **P1500 (Ricchetti)**
requests approval of their P&P
 - **Status of Active Study Groups**
 - **SG Debug Scan/Array Dump (Menon)**
 - **Proposals for New Activities**
 - **P1450.6.2 (Adham)**
on NesCom Agenda 22-Jan-2020
 - **Maintenance review**
note: without Sponsor action, the following standards will expire at the end of 2020
 - **1149.4 2010 C/TT/1149.4WG**
IEEE Standard for a Mixed-Signal Test Bus
note: without Sponsor action, the following standards will expire at the end of 2021
 - **1450 1999 C/TT/STIL_WG**
IEEE Standard Test Interface Language (STIL) for Digital Test Vector Data
 - **1450.1 2005 C/TT**
IEEE Standard for Extensions to Standard Test Interface

Language (STIL) (IEEE Std 1450-1999) for Semiconductor Design Environments

- **1450.6 2005 C/TT/1450.6WG**
IEEE Standard Test Interface Language (STIL) for Digital Test Vector Data-Core Test Language (CTL)
 - ~~1500 2005 C/TT~~
~~IEEE Standard Testability Method for Embedded Core-based Integrated Circuits~~
per above, P1500 is in active development
 - **1581 2011 C/TT/SCIT1581**
IEEE Standard for Static Component Interconnection Test Protocol and Architecture
- **New business**
 - **Action items**
 - **(Subcommittee reports)**
 - **(Items reported out of executive session)**
 - **Next meeting – date and location**
 - **Proposed ~ January 8th, 2020, 11:00am EST,**
by IEEE meetings WebEx

A motion to approve the agenda was heard and seconded. Agenda approved.

8. Technical topics**■ Elections review**

please expect to review election need/ status for

- **TTSC (Rearick)**

Elections Officer Jeff Rearick reported that he believes that he is ready to resume the election, which had been sidelined due to difficulties in email communications required for acceptance/ rejection of nominations.

- **P1149.7/P1500 (Ley)**

Elections Officer Adam Ley reported that elections are underway for both working groups.

In the case of P1149.7, the nominations period had been completed and the nominations accept/ reject phase is nearing close.

In the case of P1500, the call for nominations are underway.

- **P2427/P1687.2 (Ehrenberg)**

Elections Officer Heiko Ehrenberg indicated that he was working on starting up elections for both working groups, P2427 and P1687.2. He said that he plans to start by reviewing elections process/ procedures in the coming meetings for each.

- **Status of Projects in Active Development ([ref](#))**

- **P1149.7 (Peck)**

requests approval of their P&P

WG Chair Jason Peck reported that the working group has been meeting bi-weekly and is in a first draft review, anticipating a vote to advance ballot draft in Jan 2020.

The WG has prepared its policies and procedures and has offered them for sponsor approval:



[WGP1149.7-PnP-v02.pdf](#)

16-Dec-2019 20:11 562K

In the interest of time, Adam Cron requested, without objection, that the P&P approval be managed by email vote.

A required action in these regards was recorded as follows:

ACTION	Organize email vote for approval of P1149.7 P&P.
Who	Jason Peck/ Adam Cron
When	Forthwith

- **P1500 (Ricchetti)**

requests approval of their P&P

WG Chair Mike Ricchetti reported that the WG makes good progress, with priorities identified and champions assigned.

The WG has prepared its policies and procedures and has offered them for sponsor approval:

[WGP1500-PnP-v01.pdf](#)

16-Dec-2019 20:07 290K

In the interest of time, Adam Cron requested, without objection, that the P&P approval be managed by email vote.

A required action in these regards was recorded as follows:

ACTION	Organize email vote for approval of P1500 P&P.
Who	Mike Ricchetti/ Adam Cron
When	Forthwith

■ Status of Active Study Groups

- **SG Debug Scan/Array Dump (Menon)**

(temporal note: this topic was addressed first amongst the Technical Topics to allow Sankaran Menon, calling from a hospital bed(!), to exit the call to the benefit of his health)

SG Chair Sankaran Menon, reported on the progress to date:

[20190107_SVDTC_Debug_Pres_TTSC_Rev2.pdf](#) 09-Jan-2020 15:03 513K

The whitepaper that had been initiated under CEDA, SVDTC ScanArrayExtractionDebug was released Dec 2019.




The SG has organized, chair, vice chair and secretary have been chosen and meetings have begun. Next steps underway are expected to lead to a PAR within 6 months.

■ Proposals for New Activities

- **P1450.6.2 (Adham)**
on NesCom Agenda 22-Jan-2020

SG Chair Saman Adham presented the case that had been made for the approval of revision PAR for P1450.6.2 (per email vote concluded

12/20/2019), including reprising the draft PAR and offering supporting materials, as follows:

	PIEEE1450.6.2 PAR (Draft v0.1).docx	04-Dec-2019 12:33	18K
	IEEE 1450 open Items - 10222019.pdf	04-Dec-2019 12:33	638K
	Std Memory CTL Repair issues 2019-1119a.pptx	04-Dec-2019 12:33	1.0M

■ **Maintenance review ([ref](#))**

note: without Sponsor action, the following standards will expire at the end of 2020

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note: without Sponsor action, the following standards will expire at the end of 2021
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- **1450.6 2005 C/TT/1450.6WG**
IEEE Standard Test Interface Language (STIL) for Digital Test Vector Data-Core Test Language (CTL)
- ~~**1500 2005 C/TT**~~
~~**IEEE Standard Testability Method for Embedded Core-based Integrated Circuits**~~
per above, P1500 is in active development
- **1581 2011 C/TT/SCIT1581**
IEEE Standard for Static Component Interconnection Test Protocol and Architecture

It was observed that all above standards due for maintenance would seem to have at least some use and thus may merit revision.

For Std 1149.4, it was considered that there had been some interest heard toward “keeping it going” ... Adam Cron was a past chair (though not the immediate past chair).

Concerning champion(s) for Std 1450 and 1450.1, it was suggested to look to Greg Maston, due to his past efforts for STIL (including a well-received presentation at ITC 2019).

Mike Ricchetti considered that Std 1450.6 needs to be kept alive and would be expected to need to coordinate changes with p1500. Champion TBA.

With respect to Std 1581, it was noted that though JEDEC DDR4 uses a method based on teachings of 1581, it does not claim conformance. Why? It was supposed that Heiko Ehrenberg might champion 1581 revision as he was its past chair.

It was agreed that the sort of call to action required to get such efforts off the ground seems to need the “form letter” action that has been pending ... A tiger team approach was suggested; Sunter and Shaikh volunteered to participate; Cron to organize.

A required action in these regards was recorded as follows:

ACTION	Organize a tiger team to work toward draft proposed common form letter for all calls for standard maintenance.
Who	Adam Cron
When	Forthwith

■ New business

The presiding officer made a call for new business. Several topics were addressed (though none requiring immediate action).

- **P2654**

WG Chair Ian McIntosh reported that progress is made with regular meetings, weekly. The WG has presently begun work to outline the first draft.

- **P2427/P1687.2**

WG Chair Steve Sunter reported that the work in both groups is progressing, but not at the pace that had been hoped ... they are now not expected to ballot in 2020, but 2021. For P2427, they have had some issues reining in complexities. For P1687.2, they have found that validating against examples has exposed oversights.

- **P1687.1**

WG Chair Al Crouch reported that they have been continuing to work examples and to seek input; meeting biweekly. Concepts of callbacks, transfer functions, transformations, and conversions have been documented/presented, but are yet to get into a formal draft. Concerning the last point, it was noted that the editor has been sidelined by health issues ...

In the meantime, they have been staying aligned with p2654 (STAM). It was supposed that there might be consideration of a new PAR for common communications elements, which begged the question of possible overlap? While it was acknowledged that there are common elements, the former is scoped to managing non-TAP access to end points (where some specifications for hardware are in the mix) while the latter is scoped from system top level through to end points (expect to manifest as specifications for software).

- **Std 1687**

It was noted that Std 1687 was approaching its own need of maintenance/revision. Jeff Rearick expects to bring that up to the sponsor soon.

9. Action items

New actions items, as mentioned above, and one carry over, are recorded in the action summary table appended at the end of these minutes.

Subcommittee reports

Other than as given above, under various subheadings, no further subcommittee reports were given.

10. Items reported out of executive session

There was no executive session and, as such, no items were reported out of executive session.

11. Recesses and time of final adjournment

A motion for adjournment was heard and seconded. Adjournment approved.

Meeting adjourned at: (EST) 11:48 AM, Wednesday, January 8, 2020.

12. Next meeting--date and location

As approved, the next meeting is to be arranged as follows:

NEXT MEETING	
Location	Via IEEE Meetings WebEx
When	(EDT) 11:00 AM, Wednesday, April 8, 2020

Action Summary Table

Action	Who	When
Organize email vote for approval of P1149.7 P&P.	Jason Peck/ Adam Cron	Forthwith
Organize email vote for approval of P1500 P&P.	Mike Ricchetti/ Adam Cron	Forthwith
Organize a tiger team to work toward draft proposed common form letter for all calls for standard maintenance.	Adam Cron	Forthwith
(carry over) Work toward draft proposed common P&P for all TTSC working groups on a staff-provided baseline and template.	Adam Cron/ Soo Kim	Forthwith

History of these minutes

Meeting notes recorded by: Adam Ley.

Minutes submitted by: Adam Ley, TTSC Sponsor Secretary; April 28, 2020.

Minutes approved by: motion of TTSC Sponsor; April 29, 2020.