

**Minutes of TC-10 Waveform Recorder Subcommittee Meeting of
November 4, 2003 in Gaithersburg, Maryland.**

Attendance:

Steve Tilden	Texas Instruments
Tom Linnenbrink	Q-Dot
Bill Boyer	Sandia National Laboratories
Sol Max	LTX Corporation
David Bergman	NIST
Donald Larson	NIST
Jerry Blair	Bechtel Nevada
Tom Meyer	Iowa State University
Jim Mueller	LeCroy
Mike Souders	NIST
Fang Xu	Teradyne
Pasquale Daponte	University of Salerno

1. Agenda

Bill Boyer distributed an agenda by email prior to the meeting. It is attached to the minutes.

2. Introductions and Background

The attendees introduced themselves. Bill Boyer covered the background of what we are currently doing – incorporating material from the user guide and from IEEE Standard 1241 into IEEE Standard 1057. Tom Meyer was editing a copy of the draft on his computer during the meeting.

3. Review of Assignments

The material is presented here in order by the sections of the draft as opposed to the order in which it was covered in the meeting.

General

Auto Equation Numbering. Submitted material should use automatic equation numbering when possible.

Longer Subsection Titles. Subsection titles should be more descriptive, such as “Effect of Xxx on Yyy” rather than “Effect on Yyy”.

4.2.2 The first paragraph should be changed to say that the signals should be defined at the signal source output and that the signal source output should include all cables. Minor rewording was made in the second paragraph, and the comment about 1st and 3rd harmonics was removed from the third paragraph.

Sol Max suggested that these problems ought to be covered in the next section, that he and Steve Tilden are working on. This was agreed to, but I do not know which section this refers to.

4.2.3 and 4.2.4. Steve Tilden and Tom Meyer agreed to each do one of these.

4.5.6. There was some discussion of whether this section, Presentation of Sinewave Data, should be here. It needs to be lengthened to be clearer. I will write Annex I that has the examples.

4.5.7 I agreed to rewrite this to include the description, measurement and control of non-idealities of sine waves. David Bergman will continue describing the effects on some of the particular tests and the material will be included in the sections pertaining to the tests.

4.5.8. Will be deleted; it is covered in section 7 as maximum static error.

4.6

4.6.1 In the last sentence of the 1st paragraph the reference to 4.6.2 was changed to a reference to 6.1.2.

4.6.2.1 The 2nd paragraph refers to Table 1, but is actually probably referring to Figure 2.

Labels in Table 2 need to be changed from 'precision' to 'uncertainty'.

4.6.3.2 needs to be taken from 1241. A Microsoft Word version of 1241 will be put on the web site to facilitate this.

4.6.3.3. Change name to "Effect on Transition Levels of Harmonic Distortion of signal Source" or something similar.

4.6.4.1.1 Some mention should be made of the source for (27) and (28). Figure 6 needs better labeling.

4.7.7. I will supply some material for the introductory part of this section.

4.7.7.2 Mike Souders agreed to rewrite this to clarify the statement concerning the Bernouli process.

4.7.8 Change name to remove the word "equivalent"

Jim Mueller pointed out that we need to distinguish between the jitter between multiple records and the jitter between records.

There was a discussion of "jitter" vs. "aperture uncertainty" and the fact that (trigger) jitter appears in section 17.

Bill Boyer will write an introduction on time jitter and aperture uncertainty.

4.7.8.3 A sentence was added with caveats on the use of the correction formula for effect of jitter on transition duration

4.7.8.4 Include random effects of time jitter on frequency response. I will send David Bergman a paper with results on this.

6.1.1 Mike Souders volunteered to provide matrix versions of equation 61 for gain and offset.

7.8 Bill Boyer said he would search his computer for Sol Max's latest input for an alternate noncoherent test method for THD.

Section 9. Don Larson will update 9.2 to conform to the new standard 181.

Need a convention of % vs. 'percent'. Also a slight modification to figure 1 to make clear that the upper line is a continuation of the lower signal. The quantities in the figure should be identified in the text.

There was a discussion of the use of "error" in settling error; some thought it was not the right term.

Bill Boyer brought up that much in sect. 4.7 should be in section 9 and section 10. In particular 4.7.7.2 should be split between these two.

David Bergman will move the definitions of settling parameters to section 9.

Bill Boyer will incorporate the introductory material on aperture weighting function that is in 1241 into 1057.

9.2.2 Remove "sharp cutoff" from the first sentence.

Agenda for Waveform Recorder Subcommittee Meeting
November 4, 2003

1. Introductions
2. Review of status of the draft
3. Review of status of assignments per minutes of May 19, 2003 meeting:
 - Sections 4.2.2-4.2.4 Signal Sources (Dan Kien)
 - Section 4.5.7 Introduction to Aberrations in sine wave sources (Jerry Blair)
 - Section 4.5.7 Aberrations in sine wave sources continuing work (David Bergman)
 - Section 4.7.7.2, 4.7.8.3, 4.7.8.4, 9.1, 9.1.1 – 9.1.6 Minor changes per comments at meeting (David Bergman)
 - Section 4.7.7 Equivalent noise in recorder - Introduction (Bill Boyer)
 - Section 4.6.1.2 Code Transition Test Setup - Fix Bill Boyer's version (Sol Max)
 - Sections 7.7 & 8.1.3 (Steve Tilden)
 - Section 4.6.3, Ramp Histogram Testing - (Antonio Cruz Serra, Sol Max)
 - Sections 7.7 & 8.1.3 - Get Steve Tilden's work into draft - (Steve Tilden, Bill Boyer)
 - Equivalent Time Sampling errors per Tom Linnenbrink (Jerry Blair)
3. Waveform Simulation Software proposed by LeCroy
4. Other pending discussions
 - Effective Bits issues raised at previous meetings
5. Other business
6. Detailed review of draft
7. Review action items