

HORST - IPR2018-01249

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.,

Petitioner,

vs.

Case IPR2018-01249

QUALCOMM INCORPORATED,

U.S. Patent No. 7,693,002

Patent Owner.

CONFIDENTIAL

DEPOSITION OF ROBERT W. HORST, PH.D.

VOLUME II

BELLEVUE, WASHINGTON

THURSDAY, AUGUST 8, 2019

Reported by:

DARCY J. BROKAW, RPR, CRR, CCR No. 3455

JOB NO. 165495

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3
4 AUGUST 8, 2019

5 8:57 A.M.
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8 Deposition of ROBERT W. HORST, PH.D., Volume II, held
9 at The Westin Bellevue, 600 Bellevue Way NE, Bellevue,
10 Washington, before Darcy J. Brokaw, a Registered
11 Professional Reporter, Certified Realtime Reporter,
12 Washington Certified Court Reporter.
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2 APPEARANCE OF COUNSEL:

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17 KENNETH HOOVER, ESQ.

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2 ROBERT W. HORST, PH.D.,

3 called as a witness, having been duly sworn,
4 was examined and testified as follows:

5 ---000---

7 EXAMINATION

8 BY MR. COCHRAN:

9 Q. Good morning.

10 A. Good morning.

11 Q. Dr. Horst, you've seen you're under oath
12 today?

13 A. Yes.

14 Q. Is there any reason you cannot testify
15 truthfully today?

16 A. No.

17 Q. Great.

18 This first deposition that we're going to
19 do today relates to your Supplemental Declaration
20 testimony in IPR2018-01249. It relates to the '002
21 patent.

22 Is that your understanding?

23 A. Yes.

24 Q. Great.

25 MR. COCHRAN: I'll hand the witness what

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2 has previously been marked as Exhibit 1013.

3 (Deposition Exhibit 1013 marked for
4 identification.)

5 BY MR. COCHRAN:

6 Q. Do you recognize this document, Dr. Horst?

7 A. Yes. This is the Declaration for the '002
8 that I submitted on July 13th.

9 Q. Can you take a look at page 22 of
10 Exhibit 1013 and tell me if that is your signature
11 on page 22.

12 A. Yes.

13 Q. Are there any errors that you're aware of
14 in this document, Exhibit 1013, Dr. Horst?

15 A. There's nothing that I know of, but there
16 could be some small typos and other things.

17 Q. Are there any opinions set forth in this
18 document, Exhibit 1013, that you would like to
19 change before we get started?

20 A. No. No, my opinions have not changed.

21 Q. Okay. Can you turn to page 3 of
22 Exhibit 1013.

23 Are you at page 3?

24 A. Yes.

25 Q. Sorry, page 2.

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2 In paragraph 3 -- I'm going to draw your
3 attention to paragraph 3 on page 2, Dr. Horst, where
4 you state:

5 "A POSITA would not have
6 considered a periodic clock signal to
7 be the broadest reasonable
8 interpretation (BRI) of 'clock signal'
9 as used in the claims of the '002
10 patent."

11 Do you see that statement, sir?

12 A. Yes.

13 Q. Is this still your opinion, Dr. Horst?

14 A. Yes, it is.

15 Q. Can you turn to page 5. And I'm going to
16 direct your attention to paragraph 7.

17 In paragraph 7, you state:

18 "Dr. Pedram states that his
19 definition is the broadest reasonable
20 interpretation based on the definition
21 of 'clock signal' from an IEEE
22 dictionary."

23 Do you see that, sir?

24 A. Yes.

25 Q. And then in paragraph 8, just below that,

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2 you say:

3 "Also, Dr. Pedram's declaration
4 omits alternate definitions for
5 'clock' in the same IEEE dictionary."
6 Do you see that?

7 A. Yes.

8 MR. COCHRAN: I'm handing the witness what
9 has previously been marked as Exhibit 1014.

10 (Deposition Exhibit No. 1014 marked for
11 identification.)

12 BY MR. COCHRAN:

13 Q. Would you please turn to page 5,
14 Dr. Horst.

15 A. Okay.

16 Q. And on page 5 of Exhibit 1014, this is an
17 excerpt from the IEEE dictionary, correct?

18 A. This is an excerpt from one edition of the
19 IEEE. I believe it's the one that I quoted. I
20 haven't checked.

21 Q. On the left-hand column, you'll see
22 there's a term "clock signal" on page 5.

23 Do you see that?

24 A. Yes.

25 Q. The IEEE dictionary includes one

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2 definition for the term "clock signal," correct?

3 MS. REICHEL: Objection to form.

4 THE WITNESS: In this version, it includes
5 the one definition, but this doesn't appear to be
6 the same one that I reviewed for my report, because
7 it has something after the reference for -- or after
8 the definition of "clock signal." And it says there
9 are synonyms for clock signal.

10 BY MR. COCHRAN:

11 Q. Does this not appear to be the version of
12 the IEEE dictionary that you used in your creating
13 of your Supplemental Declaration, Dr. Horst?

14 A. On page 5 of my report, in paragraph 7,
15 after the part you quoted, my report says:

16 "The portion of the IEEE
17 dictionary cited in Dr. Pedram's
18 declaration defines 'clock signal' as
19 '[a] periodic signal used for
20 synchronizing events,' but this
21 partial quotation omits the part of
22 the definition that says part of the
23 definition that says 'Synonyms: clock
24 pulse; timing pulse.'

25 The version that I reviewed had this part

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2 of the definition, but it appears to be different
3 than the one you handed me.

4 Q. In Exhibit 1014, the definition of "clock
5 signal" includes one definition, correct?

6 MS. REICHEL: Objection to form. The
7 document speaks for itself.

8 THE WITNESS: As I just said, the
9 definition on the one you handed me is slightly
10 different than the one that I quoted in my report.

11 BY MR. COCHRAN:

12 Q. You mentioned that the definition of
13 "clock signal" in Exhibit 1014 includes two
14 synonyms, correct?

15 A. Yes.

16 Q. One of those is "clock pulse," correct?

17 A. Yes.

18 Q. And the other is "timing pulse," correct?

19 A. Yes.

20 Q. If you look at Exhibit 1014, a few
21 references above, entries above "clock signal,"
22 you'll see the IEEE definition of "clock pulse."

23 Do you see that?

24 A. Yes.

25 Q. And what is the definition of "clock

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2 pulse"? What's the synonym?

3 A. Here, it says: "'Clock pulse' See: clock
4 signal."

5 Q. So you'd agree that, according to the IEEE
6 dictionary, "clock pulse" has the same definition as
7 "clock signal," correct?

8 MS. REICHEL: Objection. Form.

9 THE WITNESS: It says "See: clock signal."
10 So it says that they are related. It doesn't
11 explicitly say that they are identical.

12 BY MR. COCHRAN:

13 Q. Could you take a look back at page 4 of
14 your -- sorry. Take a look at page 4 of the
15 Exhibit 1014, the dictionary.

16 A. Yes.

17 Q. And as you noted in your Supplemental
18 Declaration, the IEEE dictionary has multiple
19 definitions for the term "clock," correct?

20 A. Correct.

21 Q. In fact, if you count the subparts, there
22 are at least -- I count seven different definitions
23 set forth in the IEEE dictionary for the term
24 "clock," correct?

25 A. Depending on how you count them, there are

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2 several different major definitions and then
3 subdefinitions within those.

4 Q. Doesn't the fact that there are multiple
5 definitions for the term "clock" in the IEEE
6 dictionary but only one definition for the term
7 "clock signal" tell you that the term "clock" is a
8 broader term than the term "clock signal"?

9 MS. REICHEL: Objection to form.

10 THE WITNESS: The term "clock," when it's
11 being used to describe a signal on a printed circuit
12 board, is the same as calling it a clock signal.

13 So I see "clock signal" as a way of
14 identifying that you're talking about a signal as
15 opposed to, say, an oscillator or a real-time clock.

16 There's other uses for the term "clock"
17 which have nothing to do with signals.

18 BY MR. COCHRAN:

19 Q. Okay. So "clock" is a broader term than
20 "clock signal," according to the IEEE dictionary,
21 correct?

22 MS. REICHEL: Objection to form.

23 THE WITNESS: There can be some other uses
24 of the term "clock" which are not applicable to
25 signals on printed circuit boards. So when used in

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2 those contexts, it's a different set of definitions.

3 BY MR. COCHRAN:

4 Q. But the reason the IEEE dictionary has
5 multiple definitions of the term "clock" but only
6 one definition of the term "clock signal" is because
7 "clock" is a broader term than "clock signal"; isn't
8 that right?

9 MS. REICHEL: Objection to form.

10 THE WITNESS: When clock is used in the
11 context of a signal on a printed circuit board, I
12 can call it, this is the clock, or I can say, this
13 is the clock signal; and in that usage, "clock" is
14 no less or more broad than "clock signal".

15 BY MR. COCHRAN:

16 Q. Just in terms of the Exhibit 1014, just
17 focusing on 1014, the reason that the dictionary has
18 multiple definitions of "clock" is because it's a
19 broader term than "clock signal," correct?

20 MS. REICHEL: Objection to form.

21 Foundation.

22 THE WITNESS: I wouldn't use the term
23 "broader". I would say it's used for different
24 types of clocks. So it's -- it doesn't mean that
25 one is broader than the other.

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2 BY MR. COCHRAN:

3 Q. Well, why does the IEEE dictionary have
4 multiple definitions of the term "clock" but only
5 one definition of the term "clock signal"?

6 MS. REICHEL: Objection to form.
7 Foundation.

8 THE WITNESS: Because "clock" sometimes
9 refers to things other than signals; and when it's
10 being -- referring to other things, it needs
11 different definitions. But when it's referring to
12 signals, they have -- one is not broader than the
13 other.

14 BY MR. COCHRAN:

15 Q. Could you take a look at Exhibit 1014,
16 definition (2) under "clock."

17 Do you see that?

18 A. Yes.

19 Q. Definition (2) says:

20 "A signal, the transitions of
21 which (between the low and high logic
22 level [or vice versa] are used to
23 indicate when a stored-state device,
24 such as a flip-flop or latch, may
25 perform an operation."

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2 Is that right?

3 A. Yes.

4 Q. And then after the definition (2) of
5 "clock," the dictionary identifies the relevant
6 categories as "(C/TT)".

7 Do you see that?

8 A. Yes.

9 Q. Do you know what that means?

10 A. I'm not sure what that means.

11 Q. Could you take a look at definition (1)(A)
12 on page 4.

13 Do you see that?

14 A. Yes.

15 Q. Definition (1)(A) says:

16 "A device that generates periodic
17 signals used for synchronization."

18 Do you see that?

19 A. Yes.

20 Q. Is that the same definition as the
21 definition of "clock signal"?

22 A. The definition here is not identical to
23 the one that the IEEE definition gives for "clock
24 signal." It has some differences.

25 Q. Is it mostly the same?

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2 MS. REICHEL: Objection to form.

3 THE WITNESS: I don't know what you mean
4 by "mostly."

5 BY MR. COCHRAN:

6 Q. Well, what's the difference?

7 A. The words in the definitions are those
8 words. You can read them and go word by word if you
9 want to point out the differences.

10 Q. Do you think definition (1)(A) is saying
11 that a clock is a device that generates a clock
12 signal?

13 A. (1)(A) says:

14 "A device that generates periodic
15 signals used for synchronization."

16 And I would understand that to be clock
17 signals that it's describing.

18 Q. Can you turn back to your Declaration,
19 Supplemental Declaration, Exhibit 1013, page 6,
20 please. Paragraph 10, in particular. Why don't you
21 take a look at that, please.

22 In paragraph 10 of your Supplemental
23 Declaration, you refer to a definition for the term
24 "clock" from the Modern Dictionary of Electronics,
25 correct?

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2 A. Yes.

3 MR. COCHRAN: I'm going to hand the
4 witness what has been previously marked as
5 Exhibit 1015.

6 (Deposition Exhibit No. 1015 marked for
7 identification.)

8 BY MR. COCHRAN:

9 Q. Do you recognize this document, Dr. Horst?

10 A. Yes. This is the reference that I'm
11 referring to in paragraph 10.

12 Q. Do you know who publishes this dictionary?

13 A. On the second page, it says "Newnes,"
14 N-e-w-n-e-s, is the publisher, a member of the Reed
15 Elsevier Group.

16 Q. Is that a standard-setting organization?

17 A. As far as I know, I do not know whether or
18 not Newnes is involved in standard setting or not.

19 Q. Can you turn to page 3 of Exhibit 1015,
20 please.

21 The definition for "clock" that you refer
22 to in your Supplemental Declaration begins on
23 page 3, on the right-hand column, at the very bottom
24 of the page.

25 Do you see that?

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2 A. Are you referring to the reference or to
3 my --

4 Q. I'm referring to the reference.
5 Exhibit 1015. You're in the right spot.

6 In the right-hand column, the bottom is
7 where the definition of "clock" begins. Do you see
8 that? And it goes on to the next page.

9 A. Yes, I see that.

10 Q. The definition of "clock" in this
11 dictionary, Exhibit 1015, includes five different
12 definitions, correct?

13 A. Yes.

14 Q. In your Supplemental Declaration, you
15 specifically refer only to definitions 1 and 4,
16 correct?

17 A. In this paragraph, I only show those two,
18 that's correct.

19 Q. Definition 1 for "clock" states:

20 "A pulse generator or signal
21 waveform used to achieve
22 synchronization of the timing of
23 switching circuits and the memory in a
24 digital computer system."

25 Correct?

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2 A. Yes.

3 Q. Definition 4 states:

4 "A strobe signal that activates a
5 certain sequence of operations."

6 Correct?

7 A. Correct.

8 Q. Neither of these definitions for "clock"
9 specify one way or the other whether a clock signal
10 is periodic, correct?

11 A. That's correct. They don't say whether
12 it's periodic. And so I would understand this to
13 cover both periodic and unperiodic signals.

14 Q. Neither of these definitions for "clock"
15 include the term "clock signal," correct?

16 A. They don't include the words "clock
17 signal," but they refer to signals that I would
18 understand as clock signals.

19 Q. The Modern Dictionary of Electronics,
20 Exhibit 1015, does not include the definition of the
21 term "clock signal", correct?

22 A. The first definition says "a pulse
23 generator or signal" . . .

24 So the definition of "clock" which is
25 referring to signals, I would understand to be a

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2 clock signal.

3 And then definition 4, it says "a strobe
4 signal." So if the definition of a clock is a
5 strobe signal, I would understand that to be a clock
6 signal.

7 Q. Does the Modern Dictionary of Electronics,
8 Exhibit 1015, have a separate entry for the term
9 "clock signal"?

10 MS. REICHEL: Objection. Form.

11 THE WITNESS: It doesn't separately define
12 clock signals, but it includes definitions that
13 would apply to clock signals within these
14 definitions of "clock."

15 BY MR. COCHRAN:

16 Q. You did not refer to definition 2 in your
17 Supplemental Declaration, correct?

18 A. Correct.

19 Q. How come?

20 A. Definition 2 is:

21 "a timing device in a system;
22 usually it provides a continuous
23 series of timing pulses."

24 But this is referring to a "device," not a
25 signal; so it doesn't apply to signals. It is not

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2 trying to define a signal; it's defining a device
3 instead.

4 Q. What about definition 3? You didn't refer
5 to definition 3 in your Supplemental Declaration
6 either. Why not?

7 A. Definition 3 says:

8 "an electronic circuit that
9 generates timing pulses to synchronize
10 the operation of a computer as well as
11 keep time."

12 So this is a definition for what's usually
13 called a real-time clock in a system, which is a
14 device that keeps the time of day. So this is a
15 definition that has nothing to do with the
16 definition of "clock signal" as used in the patent.

17 Q. Like the IEEE dictionary, Exhibit 1014,
18 the Modern Dictionary of Electronics has multiple
19 definitions of the term "clock", correct?

20 A. Both of these references have multiple
21 definitions of "clock," for the way it's used in
22 different contexts.

23 Q. Okay. What are the different contexts in
24 which the term "clock" is used, in your experience?

25 A. You can use "clock" to refer to a device

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2 like a clock oscillator; and you can use "clock" to
3 refer to a signal on a board; and you can use
4 "clock" to refer to a real-time clock, which can be
5 a device or it can be a whole instrument.

6 So the word "clock" can be used in
7 different contexts like that.

8 Q. Turn back to your Supplemental Declaration
9 on page 3, paragraph 5. Turn to paragraph 5.

10 In paragraph 5 of your Supplemental
11 Declaration, you state:

12 "Dr. Pedram's definition appears
13 to be based on his assumption that the
14 '002 patent is directed only to
15 synchronous memory systems."

16 Correct?

17 A. That's what the first sentence says, yes.

18 Q. If you turn to paragraph 6 at the bottom
19 of page 4, you state:

20 "In the embodiment in Figure 1 of
21 the '002 patent, the clock input could
22 be supplied with any type of clock
23 signal -- e.g., a periodic clock
24 signal, a non-periodic gated clock
25 signal, a non-periodic clock signal

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2 derived from a periodic clock (e.g.,
3 RS1 as shown in Itoh's synchronous
4 clock system) or another type of
5 non-periodic clock signal -- without
6 adversely affecting its row decoding
7 functionality."

8 Correct?

9 A. Yes, that's what it says.

10 Q. So Figure 1 of the '002 patent could be
11 supplied with a non-periodic clock signal and still
12 function, according to you, correct?

13 A. That's right.

14 Q. But you don't cite to any portion of the
15 '002 patent in support of that conclusion, do you?

16 MS. REICHEL: Objection to form.

17 THE WITNESS: I base that on my analysis
18 of the circuit and noting that there's nothing in
19 the circuit that depends on the periodic clock.

20 BY MR. COCHRAN:

21 Q. Well, the '002 patent does not state that
22 the clock input in Figure 1 may be non-periodic,
23 correct?

24 A. It doesn't state either way as to what
25 that -- the requirements are of that clock.

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2 Q. Can you turn to page 17 of your
3 Supplemental Declaration, Dr. Horst. Specifically
4 I'm going to point you to paragraph 31.

5 Are you there?

6 A. Yes.

7 Q. In paragraph 31 of your Supplemental
8 Declaration, you state:

9 "As my previous analysis shows,
10 the 'clock signal' limitation should
11 not be restricted to periodic signals.
12 However, even if such a limited
13 construction were adopted, the timing
14 signal øce of Sato would still satisfy
15 the limitation for 'clock signal'
16 because the Sato row decoder circuit
17 would still function with periodic
18 external signals."

19 Correct?

20 A. Yes, that's what it says.

21 Q. Are you suggesting here in this paragraph
22 that the timing signal øce of Sato could be a
23 periodic signal?

24 A. Sato also doesn't state how the øce signal
25 is input. And my analysis of a circuit shows that

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2 it would work with either a periodic or a
3 non-periodic øce signal.

4 Q. So the timing signal øce of Sato could be
5 a periodic signal, correct, according to you?

6 A. øce could be periodic. It could be -- a
7 circuit could be used in such a way that the øce
8 signal is a periodic signal.

9 Q. In the first Declaration that you
10 submitted in this matter along with the petition,
11 you did not suggest that øce in Sato could be a
12 periodic signal, correct?

13 MS. REICHEL: Objection to form.

14 Feel free to request the Declaration if
15 you'd like to see it.

16 THE WITNESS: I would like to see that, or
17 a copy of that, if you want to ask questions about
18 that Declaration.

19 BY MR. COCHRAN:

20 Q. Do you recall?

21 MS. REICHEL: Objection to form.

22 THE WITNESS: I do not recall if I
23 discussed that or not in the original Declaration.

24 MR. COCHRAN: I'm going to hand the
25 witness what was previously marked as Exhibit Apple

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2 1005.

3 (Deposition Exhibit No. 1005 marked for
4 identification.)

5 BY MR. COCHRAN:

6 Q. You recognize this as the Sato patent,
7 correct?

8 A. Yes, this is the Sato patent.

9 Q. Could you refer to page 3, Figure 3, of
10 Sato.

11 Dr. Horst, would the circuits shown in
12 Figure 3 of Sato operate properly if the signal øce
13 were replaced with a periodic timing signal?

14 A. The row decoder circuit, which is depicted
15 in Figure 3, would work with a periodic timing
16 signal, yes.

17 Q. In your Supplemental Declaration, you did
18 not provide any evidence that Sato would operate
19 with a periodic timing signal, correct?

20 MS. REICHEL: Objection to form.

21 THE WITNESS: In my Declaration, I discuss
22 the periodic timing signal on pages 19 and 20. So I
23 have a full discussion about it in my supplement-
24 supplementary Declaration.

25 BY MR. COCHRAN:

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2 Q. You didn't simulate Sato's circuit using a
3 periodic timing signal, correct?

4 A. No, I didn't simulate the circuit.

5 Q. So how do you know it would work?

6 A. On page 15 of my report, I developed this
7 table of all the different states that the circuit
8 can be in, and I showed that the circuit functions
9 correctly in all these different states.

10 And whether it sequences through these
11 states periodically or not periodically doesn't
12 affect its operation. So it would work correctly in
13 either case.

14 Q. Well, wouldn't you have to know the
15 characteristics of the transistors shown in Figure 3
16 in order to determine whether or not the Sato row
17 decoder would operate properly with a periodic
18 timing signal, Dr. Horst?

19 A. The characteristics of the transistors,
20 assuming that they are fast enough for the clock
21 that's being applied, would not be an issue. That
22 wouldn't affect the circuit operation with respect
23 to periodic clocks.

24 Q. Well, what if they're not fast enough?
25 Then would it work?

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2 MS. REICHEL: Objection to form.

3 THE WITNESS: If the transistors weren't
4 fast enough and you gave it a clock that was too
5 fast, it wouldn't function.

6 And also if you gave it a nonperiodic
7 clock that was too fast, it wouldn't function.

8 So in both cases, you have to make sure
9 that the circuit is fast enough for the clock pulses
10 that it's given.

11 BY MR. COCHRAN:

12 Q. Could you turn to page 4 of Exhibit 1005,
13 please.

14 Referring to Figure 4, the timing signal
15 øce is generated by the block labeled "TC," correct?

16 A. Yes, it shows it coming from block TC,
17 although there are not details on what's inside
18 clock -- or the block TC.

19 Q. Okay. "TC" stands for timing control,
20 correct?

21 A. I believe that's right.

22 Q. The timing control block generates the
23 timing signal øce based on the states of a chip
24 enable signal, a rate enable signal, and an output
25 enable signal, correct?

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2 A. That's what this figure shows, yes.

3 Q. If you turn back to Figure 3, page 3 of
4 the patent, the timing of the predecoder, "PDCR," is
5 controlled by the timing signal ϕ_{ce} , correct?

6 A. The timing of the outputs of the
7 predecoder are determined by the clock ϕ_{ce} , that's
8 right.

9 Q. So the decoding operations of the
10 predecoder, PDCR, are triggered by some combination
11 of the chip enable, write enable, and output enable
12 signals, correct?

13 A. I wouldn't use the term "triggered," but
14 the clocks are gated by the -- the decoding function
15 and the clock are ANDed together to produce outputs
16 that are synchronized by the clock.

17 Q. Still referring to Figure 3, in your
18 periodic version of the circuit, would the periodic
19 clock signal be received by both the predecoder,
20 PDCR, and the NAND gate circuit, NAG0?

21 A. Yes. If clock ϕ_{ce} is periodic, it would
22 go to both the decoder NAG0 and all the other NAG
23 decoders, as well as the predecoders.

24 Q. So in the periodic version of Sato's
25 Figure 3, the predecoder in all of the multiple NAND

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2 gate circuits would be coupled to the same clock
3 signal, correct?

4 A. I don't agree with the premise of the
5 question, which is that there is a separate periodic
6 and nonperiodic version of Figure 3.

7 It's the same circuit in either case. It
8 is just -- the only difference is the timing on the
9 input signal to that circuit.

10 Q. Well, if Sato's system was provided with a
11 periodic clock signal, that signal would be provided
12 to the predecoder PDCR and all of the multiple NAND
13 gate circuits, correct?

14 A. It would be provided to the NAND gate
15 circuits as well as the predecoder circuits.

16 Q. Still on Figure 3. And specifically the
17 NAND gates, the NAND gates NAG0 through NAGk, which
18 is shown in Figure 1, the NAND gate circuits operate
19 in two states, an evaluation state and a precharge
20 state, correct?

21 A. This decoder uses that clock for both
22 evaluation and precharging, yes.

23 Q. And the NAND gates, NAG0 to NAGk, each
24 receive the selection control signal ϕ_{ce} , correct?

25 A. They receive this ϕ_{ce} signal, the -- the

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2 clock, which is sometimes called a selection signal.

3 Q. When the selection control signal ϕ_{ce} is
4 high, the NAND gates are in the evaluation state,
5 correct?

6 A. When ϕ_{ce} is high, the end-channel
7 transistors are active and the P-Channel is cut off;
8 so it's in the evaluation state.

9 Q. In the evaluation state, the selection
10 control signal ϕ_{ce} discharges the output of one of
11 -- one selected NAND gate to a low level, correct?

12 A. One of the NAG decoders will get pulled
13 down, and the other ones will not.

14 Q. Discharging the output of the selected
15 NAND gate takes some amount of time, correct?

16 A. It takes some amount, small amount of
17 time, yes.

18 Q. What determines how much time it takes?

19 A. The -- like the rest of the circuit, it
20 depends on the strength of the transistors, the
21 amount of capacitance, and the layout and so on.

22 Q. Anything else?

23 A. The determination on how fast the circuit
24 is depends on a lot of different factors. And if
25 one is trying to run at the maximum possible

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2 frequency, there are a lot of things to consider;
3 but if you are not trying to push the limits, then
4 it functions without considering those other
5 factors.

6 Q. What about the characteristics of the
7 selection control signal ϕ_{ce} ? Would that be about
8 the timing that it takes to discharge the NAND
9 circuit?

10 A. The timing depends on when it reaches a
11 valid level at all the decoder circuits. So the
12 driving of that ϕ_{ce} signal affects how fast the
13 circuit would operate.

14 Q. When the selection control signal ϕ_{ce} is
15 low, the NAND gates are in the precharge state,
16 correct?

17 A. Yes, that's correct.

18 Q. And in the precharge state, the selection
19 control signal ϕ_{ce} precharges the NAND gate outputs
20 to a high level, correct?

21 A. I don't know if I would say that it's the
22 ϕ_{ce} signal that's doing that. It's really the Qg1
23 transistor and the Q19 transistors that are doing
24 that.

25 Q. Precharging the NAND gate outputs to the

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2 high level takes some amount of time, correct?

3 A. Yes. All transitions in a circuit takes
4 some amount of time.

5 Q. And the amount of time required to
6 precharge the NAND gate outputs is controlled by the
7 pMOSFETS, like Qg1, correct?

8 A. That's one of the factors.

9 Q. What are the other factors?

10 A. The Q19 transistor, in particular, and the
11 capacitance of the various lines, so on.

12 Q. How does the Q19 transistor affect the
13 precharge rate?

14 A. During precharge, when that S0 node --
15 (Reporter inquires.)

16 THE WITNESS: When the S0 bar node is
17 high, the body diode of Q19 is pulling the output
18 node high. So the precharge is partially determined
19 by that Q19 transistor body diode drop.

20 BY MR. COCHRAN:

21 Q. If the selection control signal øce
22 transitions from high to low too quickly, the NAND
23 gate outputs may not be discharged completely before
24 charging again, correct?

25 MS. REICHEL: Objection to form.

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2 THE WITNESS: As in all circuits, the
3 clock has to be run at a frequency or a pulse
4 with -- to match the circuits that it's driving.

5 So there's some range of frequencies or
6 pulse spacing that it will work for; and if you
7 exceed that, it would not work.

8 BY MR. COCHRAN:

9 Q. Could you turn back to your Declaration,
10 Dr. Horst. Page 17 of your Supplemental
11 Declaration.

12 In particular, I want to point you to
13 paragraph 33, which continues onto page 18.

14 In paragraph 33 of your second
15 Declaration, you include a quotation from
16 Dr. Pedram's Declaration in this matter, correct?

17 A. Yes.

18 Q. And if you look at the quotation, down at
19 the bottom, it reads:

20 "In fact, there is a return to
21 non-selected state requirement after a
22 row address is correctly decoded and
23 before a new row address comes in, and
24 the dynamic NAND gates NAG0-NAGk would
25 fail if one was to evaluate them

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2 multiple times without precharging

3 them in between evaluations."

4 Do you see that?

5 A. Yes.

6 Q. Do you agree with that?

7 A. I have a -- that isn't exactly the way I
8 stated it, but I have something in my Declaration
9 which is similar that shows that you need to have a
10 once signal that changes on each address change.

11 Q. Could you turn to page 20 of your
12 Declaration. Specifically paragraph 36.

13 Here, you state:

14 "Furthermore, Sato states that
15 his address decoder could be modified
16 (if necessary) for use in clocked
17 synchronous systems."

18 Do you see that?

19 A. Yes.

20 Q. In paragraph 36, you don't provide any
21 citation to Sato to support that statement, correct?

22 A. I don't have that reference here. It may
23 be in my original report.

24 MR. COCHRAN: I'm handing the witness what
25 has been previously marked as Apple 1001.

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2 (Deposition Exhibit No. 1001 marked for
3 identification.)

4 BY MR. COCHRAN:

5 Q. You'll recognize this as the '002 patent
6 that's at issue in this case, correct?

7 A. Yes.

8 Q. Can you turn to page 2, please, Dr. Horst.
9 Figure 1.

10 Figure 1 shows a conditional clock
11 generator, labeled with reference No. 110, correct?

12 A. Yes.

13 Q. And you're familiar with the operation of
14 the conditional clock generator shown in Figure 1,
15 correct?

16 A. Yes.

17 Q. The conditional clock generator 110
18 receives a clock signal 118 as an input, right?

19 A. Can you repeat that? I didn't quite
20 understand.

21 Q. The conditional clock generator 110
22 receives a clock signal labeled 118 as an input,
23 correct?

24 A. Yes.

25 Q. And the conditional clock generator also

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2 receives the output of 2 to 4 Decoder 112 as another
3 input, correct?

4 A. Yes.

5 Q. Based on the output of the 2 to 4 Decoder,
6 the conditional clock generator selectively applies
7 the clock signal 118 to one of its four outputs,
8 labeled 124, 126, 128 and 130, correct?

9 A. Yes. It applies it to those clock
10 outputs, which are also called clock signals, as
11 were in the '002.

12 Q. Focus on the output 124, for example.

13 A. Okay.

14 Q. When output 124 is selected for the output
15 of the 2 to 4 Decoder, the conditional clock
16 generator applies the clock signal 118 to the output
17 124, correct?

18 A. I don't know if that is the exact way that
19 I would state it, but it -- the clock is effectively
20 ANDed by the conditional clock generator to produce
21 outputs that are the AND of the clock and those
22 selection signals.

23 Q. When the output 124 is not selected, the
24 clock signal 118 is not applied to the output 124,
25 correct?

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2 A. When the clock signal is low, all of those
3 outputs are low.

4 Q. But when the output 124 is not selected by
5 the 2 to 4 Decoder, the clock signal 118 is not
6 applied on the output 124, correct?

7 A. That's right. When -- the nonselected
8 outputs are always low.

9 Q. The state of output 124 of the conditional
10 clock generator is conditional on whether it has
11 been selected to apply the clock signal 118,
12 correct?

13 A. All of the disclosure and the patent
14 indicates that this block called "conditional clock
15 generator" is just a set of AND gates. So the -- a
16 clock is high, a clock output is high when the clock
17 input is high and that output is selected.
18 Otherwise, the output is low.

19 Q. And that's why the outputs of the
20 conditional clock generator are referred to as
21 conditional clocks, correct?

22 MS. REICHEL: Objection to form.

23 THE WITNESS: When one of the outputs is
24 selected by the decoder, like 124, its waveform will
25 follow the waveform of the clock 118.

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2 So that's what it means by applying the
3 clock to that signal.

4 BY MR. COCHRAN:

5 Q. And would you call that a conditional
6 clock?

7 A. I'd have to look at all the different
8 terms that it calls those signals, but they're
9 called clock signals 124 through 130.

10 MR. COCHRAN: Okay. That's all on this
11 one.

12 MS. REICHEL: I do have a couple of
13 questions.

14

15 EXAMINATION

16 BY MS. REICHEL:

17 Q. Dr. Horst, can you please find
18 Exhibit 1014. That's the IEEE Standard Dictionary.

19 A. Yes.

20 Q. Please turn to page 5.

21 And please find the term or the entry for
22 "clock signal."

23 A. Yes, I have it.

24 Q. Do you see it says:

25 "a periodic signal used for

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2 synchronizing events"?

3 And then on the following line, it says:

4 "Synonyms: clock pulse; timing
5 pulse"?

6 A. Yes, I see that.

7 Q. Does that impact your understanding of
8 whether this is the same exhibit that you relied
9 upon in forming your opinions in your reply
10 Declaration?

11 A. Yes. When I was reading this earlier, I
12 didn't see that small text below it. So this does
13 appear to be the same reference that I used in my
14 report.

15 Q. How does the presence of those synonyms,
16 "clock pulse and timing pulse," in the IEEE
17 definition of "clock signal" impact your opinion
18 about whether the IEEE dictionary limits the term
19 "clock signal" to a periodic signal only?

20 MR. COCHRAN: Objection to form. Leading.

21 THE WITNESS: A synonym like "timing
22 pulse" says that -- a timing pulse is a general term
23 for timing signals that may or may not be periodic.

24 So given that "clock signal" is a synonym
25 for "timing pulse" and for "clock pulse," that says

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2 to me that "clock signal" shouldn't be restricted to
3 just periodic signals.

4 MS. REICHEL: Thank you. I have nothing
5 further.

6 MR. COCHRAN: I'm going to call this Horst
7 Exhibit 1 since it hasn't been previously marked.

8 MS. REICHEL: Before you begin your
9 recross, I will lodge an objection.

10 My redirect was specific to a dictionary
11 that you had previously introduced at this
12 deposition, and I did not go afield or outside the
13 scope of that previously marked exhibit.

14 So you are now attempting to recross by
15 adding a new exhibit to the record, and I believe
16 that is outside the scope of what I redirected
17 Dr. Horst on.

18 (Deposition Exhibit No. 1 marked for
19 identification.)
20

21 FURTHER EXAMINATION

22 BY MR. COCHRAN:

23 Q. Dr. Horst, what we've marked as Horst 1 is
24 another page from the IEEE dictionary. And if you
25 look at the left-hand side -- it says page 1187 of

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2 the dictionary -- you will see the phrase "timing
3 pulse."

4 Do you see that?

5 MS. REICHEL: I'm going to object.

6 I'll also just note for the record, as far
7 as foundation goes, you're making representations
8 about the source of this document, but there is
9 nothing on Horst Exhibit 1, that I can see, that
10 indicates its source and whether or not it is part
11 of a previous exhibit.

12 So I'll further object to the use of this
13 exhibit without those foundational materials.

14 BY MR. COCHRAN:

15 Q. Do you see the definition of "timing
16 pulse," Dr. Horst? It's on the left-hand side.

17 A. Yes, I see the definition of "timing
18 pulse."

19 Q. And what does it say?

20 A. It says "See: clock signal."

21 MR. COCHRAN: Thank you. Nothing further.

22 (Deposition concluded at 10:04 a.m.)
23
24
25

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REPORTER'S CERTIFICATION

I, Darcy J. Brokaw, Certified Court Reporter,
in and for the State of Washington, do hereby
certify:

That the foregoing witness was by me duly
sworn; that the deposition was then taken before me
at the time and place herein set forth; that the
testimony and proceedings were reported
stenographically by me and later transcribed into
typewriting under my direction; that the foregoing
is a true record of the testimony and proceedings
taken at that time.

I further certify that pursuant to FRCP
Rule 30(e)(1), before completion of the deposition,
review of the transcript [] was [X] was not
requested.

I further certify I am neither financially
interested in the action nor a relative or employee
of any attorney or party to this action.

IN WITNESS WHEREOF, I have subscribed my name
on this 12th day of August, 2019.



Darcy J. Brokaw

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2 RPR, CRR, CCR No. 3455

3 INDEX

4 WITNESS: ROBERT W. HORST, Ph.D., VOLUME II

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6
7 EXAMINATION

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8 BY MR. COCHRAN

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9 BY MS. REICHEL

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10
11
12 EXHIBITS

DESCRIPTION

PAGE

13 Exhibit 1 Page 1187 from the IEEE Standard
14 Dictionary of Electrical and
15 Electronics Terms

101

16 Exhibit 1001 U.S. Patent No. 8,063,674 B2

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17 Exhibit 1005 U.S. Patent No. 4,951,259;
co-inventor, Yoichi Sato

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18 Exhibit 1013 Declaration of Robert W. Horst,
19 Ph.D., in re U.S. Patent 7,693,002

66

20 Exhibit 1014 Sixth Edition of the IEEE Standard
21 Dictionary of Electrical and
22 Electronics Terms

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23 Exhibit 1015 Modern Dictionary of Electronics,
24 Seventh Edition, Revised and
25 Updated

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Pg.	No.	Now Reads	Should Read	Reason
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Signature of Deponent

SUBSCRIBED AND SWORN BEFORE ME

THIS _____ DAY OF _____, 2019.

(Notary Public) MY COMMISSION EXPIRES:_____