COOLEY LLP
HEIDI L. KEEFE (SBN 178960) (hkeefe@cooley.com)
MARK R. WEINSTEIN (SBN 193043) (mweinstein@cooley.com)
RONALD S. LEMIEUX (SBN 120822) (rlemieux@cooley.com)
KYLE D. CHEN (SBN 239501) (kyle.chen@cooley.com)
Five Palo Alto Square, 4th Floor
3000 El Camino Real
Palo Alto, California 94306-2155
Telephone: (650) 843-5000
Facsimile: (650) 857-0663

STEPHEN R. SMITH (*pro hac vice*) (stephen.smith@cooley.com)
One Freedom Square
Reston Town Center
11951 Freedom Drive
Reston, VA 20190-5656
Telephone: (703) 456-8000
Facsimile: (703) 456-8100

Attorneys for Plaintiffs
HTC CORPORATION and
HTC AMERICA, INC.

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

HTC CORPORATION and HTC AMERICA, INC.,

Plaintiffs,

v.

TECHNOLOGY PROPERTIES LIMITED, PATRIOT SCIENTIFIC CORPORATION, and ALLIACENSE LIMITED,

Defendants.

Case No. 5:08-CV-00882 PSG

(Related to Case No. 5:08-CV-00877 PSG)

RENEWED MOTION FOR ENTRY OF JUDGMENT AS A MATTER OF LAW OF NON-INFRINGEMENT [PER FED. R. CIV. P. 50(b)]

Complaint Filed: February 8, 2008
Trial Date: September 23, 2013

Date: December 10, 2013
Time: 10:00 a.m.
Place: Courtroom 5, 4th Floor
Judge: Hon. Paul S. Grewal

NOTICE OF MOTION AND MOTION

PLEASE TAKE NOTICE that, pursuant to Federal Rule of Civil Procedure 50(b), Plaintiffs HTC Corporation and HTC America, Inc. (collectively "HTC") hereby renew their motion for judgment as a matter of law ("Motion"), for which the hearing is proposed to be held on December 10, 2013 at 10:00 a.m.

In this Motion, HTC seeks the entry of judgment as a matter of law on the ground that HTC does not infringe any of claims 6, 7, 9, 13, 14 or 15 of U.S. Patent No. 5,809,336 ("'336 patent"). This Motion is based on the Memorandum of Points and Authorities set forth below, the evidence and proceedings at trial, and such other matters as may be presented and allowed by the Court.[1]

MEMORANDUM OF POINTS AND AUTHORITIES

HTC is entitled to judgment as a matter of law because, based on the evidentiary record at trial and the Court's claim construction, no reasonable jury could have found that HTC infringes any asserted claim of the '336 patent. Prior to trial, HTC sought summary judgment that none of the accused HTC products infringe the '336 patent. In ruling on the motion, the Court found that the "entire oscillator" term excluded the use of any external clock to generate the signal used to clock the CPU. (Dkt. No. 585 at 11:1-2; Dkt. No. 616, at 2:4-7) "Nevertheless," the Court held, "there remains a factual dispute whether HTC's products contain an on-chip ring oscillator that is self-generating and does not rely on an input control to determine its frequency." (*Id.* at 11:2-4.) The Court found that the summary judgment record presented "a classic factual question that requires a trial to answer." (*Id.* at 11:6-7.)

This "classic factual question," however, evaporated at trial. The trial record, including testimony elicited from TPL's technical expert, established without question that in all accused HTC products, an "external clock" is "used to generate the signal used to clock the CPU" –

[1] Before the case was submitted to the jury, HTC brought a pre-verdict motion for judgment as a matter of law pursuant to Federal Rule of Civil Procedure 50(a) on October 1, 2013. (*See* Dkt. No. 647.) This renewed motion is timely filed pursuant to Federal Rule of Civil Procedure 50(b).

precisely what this Court found was excluded from the scope of the asserted claims. In particular, TPL conceded repeatedly at trial that all of the accused HTC products included an on-chip oscillator that relied on an input control to determine its frequency. Judgment as a matter of law, therefore, should be entered in HTC's favor.

I. LEGAL STANDARD

TPL's infringement claim against HTC at trial was based solely on literal infringement. (Declaration of Kyle D. Chen in Support of Renewed Motion for Entry of Judgment as a Matter of Law of Non-Infringement ("Chen Decl."), Ex. 1 (09/27/2013 Trial Tr. (Dkt. No. 643)) at 1012:25-1013:8.) Literal infringement could be found only if TPL established that "every limitation recited in the claim appears in the accused device, *i.e.*, when the properly construed claim reads on the accused device exactly." *DeMarini Sports, Inc. v. Worth, Inc.*, 239 F.3d 1314, 1331 (Fed. Cir. 2001) (internal quotations and citation omitted). "If any claim limitation is absent from the accused device, there is no literal infringement as a matter of law." *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000).

In deciding a motion for judgment as a matter of law under Federal Rule of Civil Procedure 50, a district court must draw all reasonable inferences in favor of the nonmoving party and refrain from making credibility determinations or weighing the evidence. *See Reeves v. Sanderson Plumbing Prods., Inc.*, 530 U.S. 133, 150 (2000). Judgment as a matter of law should be entered because, based on the undisputed evidence presented at trial, no reasonable jury could have found that HTC literally infringes any claim of the '336 patent.

The question of literal infringement in this case did not turn on resolving conflicting evidence or weighing credibility of witnesses – the relevant facts surrounding the operation of the accused products were undisputed. Infringement instead turned on applying the undisputed operation of the accused products to the claim language as construed by the Court. The Federal Circuit has made it clear that in this situation – where there is no material dispute regarding the operation of the accused products – the question of literal infringement is properly decided as a matter of law. *See, e.g., MyMail, Ltd. v. Am. Online, Inc.*, 476 F.3d 1372, 1378 (Fed. Cir. 2007) ("Because there is no dispute regarding the operation of the accused systems, that issue [of literal

infringement] reduces to a question of claim interpretation and is amenable to summary judgment."); *K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1362 (Fed. Cir. 1999) ("Because the relevant aspects of the accused device's structure and operation are undisputed in this case, the question of whether [the accused product] literally infringes the asserted claims of the [patent-in-suit] turns on the interpretation of those claims."); *see also Reeves*, 530 U.S. at 150 ("And the standard for granting summary judgment 'mirrors' the standard for judgment as a matter of law, such that 'the inquiry under each is the same.'") (quoting *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 250-51 (1986)).

II. JMOL OF NON-INFRINGEMENT SHOULD BE GRANTED TO HTC

A. No Reasonable Jury Could Find that HTC's Products Satisfy the "Entire Oscillator" Limitation

The Court found that the term "entire oscillator" is properly understood to exclude the use of any external clock to generate the signal used to clock the CPU. (*See* Dkt. Nos. 585 at 11 and 616 at 2:4-7.) Based on this construction, the Court explained that the factual dispute for trial was "whether HTC's products contain an on-chip ring oscillator that is self-generating ***and does not rely on an input control to determine its frequency***." (Dkt. No. 585 at 11:3-4 (emphasis added).) The Court's identification of the relevant issue was consistent with the intrinsic record:

- "[T]he Magar microprocessor clock is frequency controlled by a crystal which is also external to the microprocessor. … The Magar microprocessor in no way contemplates a variable speed clock as claimed." (Dkt. No. 457-13, 7/7/1997 Amendment at 3-4 (TPL853_00002427-28).)
- "The Magar teaching is well known in the art as a conventional crystal controlled oscillator. It is specifically distinguished from the instant case in that it is both fixed-frequency (being crystal based) and requires an external crystal or external frequency generator." (Dkt. No. 457-14, 2/10/1998 Amendment at 5 (TPL853_00002403).)
- "Even if the examiner is correct that the variable clock in Sheets is in the same integrated circuit as the microprocessor of system 100, that still does not give the claimed subject matter. In Sheets, a command input is required to change the clock speed." (Dkt. No. 457-17, 1/13/1997 Amendment at 4) (TPL853_00002449).)

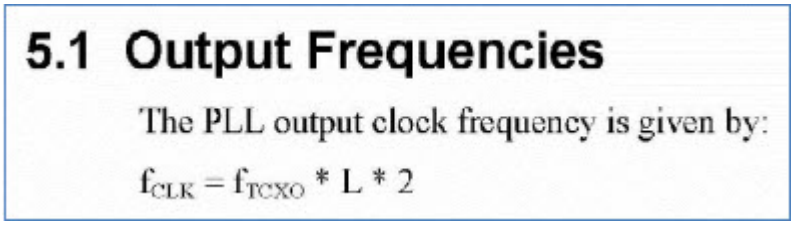
The testimony of TPL's technical expert, Dr. Vojin Oklobdzija, confirmed that in all accused HTC products, an "external clock" is "used to generate the signal used to clock the

CPU," precisely what the Court found (and the intrinsic record made clear) was excluded by the claim scope. In particular, the on-chip oscillator in the HTC products "rel[ies] on an input control to determine its frequency." (Dkt. Nos. 585 at 11:2-4 and 616 at 2:6-7.) Dr. Oklobdzija's testimony on this issue was consistent with the testimony of every other technical fact and expert witness that testified at trial.

As Dr. Oklobdzija acknowledged, although each accused HTC product includes either a Qualcomm, Texas Instruments (TI) or Samsung chip, for purposes of his infringement analysis, "they generally work the same way." (Chen Decl., Ex. 2 (09/26/2013 Trial Tr. (Dkt. No. 642)) at 734:16-18.) In particular, each chip includes a Phase Locked Loop (PLL) that receives input from an external (off-chip) reference signal which is based on a crystal. (*Id*. at 734:19-22, 735:6-19, 744:15-745:3.) This external reference signal is, according to Dr. Oklobdzija, "essential" to the PLLs in all of the accused HTC products. (*Id*. at 737:17-738:2.) The external reference produces a "stable" signal that "is **used** to adjust the frequency generated by the ring oscillator, so it has some relationship with it." (*Id*. at 738:9-17 (emphasis added).) The purpose of the PLL, in fact, is to adjust the frequency of the on-chip oscillator based on that external reference. (*Id*. at 746:11-18; *see also* Chen Decl., Ex. 3 (9/25/2013 Trial Tr. (Dkt. No. 641)) at 553:16-554:11.) The evidence at trial confirmed that all of the Qualcomm, TI and Samsung chips at issue in this case use such a PLL with an external reference signal. (*See, e.g*., Chen Decl., Ex. 4 (Trial Ex. 3084) at HTCTP0075742 (TCXO); Ex. 5 (Trial Ex. 3107) at QCHTCTPL0013601 (Fig. 12-1, TCXO), QCHTCTPL0013600; Ex. 6 (Trial Ex. 3109) at QCHTCTPL0017373; Ex. 7 (Trial Ex. 3112) at QCHTCTPL0024020; Ex. 8 (Trial Ex. 3091) at HTCTPI0002154 (CLKTCXO); Ex. 9 (Trial Ex. 3115) at TI-0001073 (CK_REF); Ex. 10 (Trial Ex. 3100) at PIC00004245-46 (XTlpll or EXTCLK.)

Dr. Oklobdzjia also acknowledged that the signal used to clock the CPU is determined by a formula contained "in every textbook" that defines the relationship between the frequency of the reference signal and the output frequency of the on-chip oscillator. (Chen Decl., Ex. 2 (09/26/2013 Trial Tr.) at 739:12-24, 749:4-6, 735:2-5.) The Qualcomm, TI and Samsung chips all use such a formula to determine the frequency of the signal used to clock the CPU. The

notation used to express this formula may differ from chip to chip, but in each case, the formula expressly relies on the external clock frequency as the input control to determine the frequency of the accused oscillator. (*See, e.g.*, Chen Decl., Ex. 11 (Trial Ex. 3101) at QCHTCTPL0007812; Ex. 7 (Trial Ex. 3112) at QCHTCTPL0024021; Ex. 9 (Trial Ex. 3115) at TI-0001076; Ex. 12 (Trial Ex. 3117) at TI-0007192; Ex. 10 (Trial Ex. 3100) at PIC00004247.) One example of such a formula (for a Qualcomm chip) was discussed during Dr. Oklobdzija's cross-examination:



5.1 Output Frequencies

The PLL output clock frequency is given by:

$f_{CLK} = f_{TCXO} * L * 2$

(Chen Decl., Ex. 13 (Trial Ex. 3027) at QTPL-0013892.)

The formula shown above states that the output frequency of the on-chip clock (f_{CLK}) equals the frequency of the external crystal clock (f_{TCXO}), multiplied by "L," multiplied by 2. (Chen Decl., Ex. 2 (09/26/2013 Trial Tr.) at 743:5-20.) The table below, from the same page of Exhibit 3027, shows that the output clock signal frequency of the PLL is based on the external reference frequency (19.2 MHz) multiplied by "L" and 2. For example, for an "L" value of 10, the output of the on-chip clock will equal 19.2 MHz * 2 * 10, which equals 384 MHz. (*Id.* at 743:21-744:17, 748:22-749:6.)

Table 5-1 PLL output clock frequencies with 19.2 MHz reference

Input frequency	L	PLL_L_VAL[5:0]	Output frequency (MHz)
19.2 MHz	10	001010	384.0
19.2 MHz	11	001011	422.4
19.2 MHz	12	001100	460.8
19.2 MHz	13	001101	499.2
19.2 MHz	14	001110	537.6

(Chen Decl., Ex. 13 (Trial Ex. 3027) at QTPL-0013892.) Dr. Oklobdzija admitted that a

manufacturer can select the "L" value depending on what it wanted to achieve in its product. (Chen Decl., Ex. 2 (09/26/2013 Trial Tr.) at 746:8-18.)

As this example illustrates, the external clock in the accused HTC products is indisputably "used to generate the signal used to clock the CPU." This is because the frequency of the on-chip oscillator (represented by the output frequency f_{clk}) is determined based on the external clock input (represented, for example, by the input frequency or TCXO above) in accordance with a precise mathematical formula. In this regard, the on-chip oscillator relies on an input control to determine its frequency. The "external clock," simply put, is "used" to generate the signal used to clock the CPU because the external clock determines the frequency of that clock signal.[2]

The trial record is undisputed that all of the PLLs in all of the HTC accused products use a formula, similar to the one above, in which the signal used to clock the CPU has a frequency determined as a function of the frequency of the external clock. This was confirmed through the undisputed trial testimony of Sina Dena, Baher Haroun and Thomas Gafford. (*E.g.*, Chen Decl., Ex. 14 (9/24/2013 Trial Tr. (Dkt. No. 640)) at 350:7-17, 364:22-366:1, 360:21-361:6; Ex. 1 (9/27/2013 Trial Tr.) at 1046:9-14.)

TPL did not dispute that all accused HTC products include an external clock that controls the frequency of the on-chip oscillator. TPL conceded as much in closing argument, asserting that the external crystal is "used to limit or regulate the speed of the clock signal that is generated by the ring oscillator." (Chen Decl., Ex. 15 (10/1/2013 Trial Tr. (Dkt. No. 666)) at 1551:16-18.) TPL's concession eliminated the "factual dispute" that the Court identified as requiring a trial when it denied HTC's motion for summary judgment. (Dkt. No. 585 at 11:2-4.)

TPL's argument at trial focused on the suggestion that, for a system to be excluded from the "entire oscillator" definition, the signal from the external clock had to ***directly*** clock the

[2] Indeed, the Office of Unfair Import Investigations for the U.S. International Trade Commission reached the same conclusion in responding to TPL's Petition for Review of the ITC's Initial Determination of no infringement by HTC of the '336 Patent. *See* Request For Judicial Notice filed herewith, Exhibit A at pp.6-15.

CPU. In closing argument, for example, TPL argued that that the on-chip oscillator could be analogized to a sports car following an RV on the road – both vehicles having their own separate engines. TPL's counsel asked the rhetorical question: "But is the RV and the engine in that motor home, is that used to generate the clock signal, or the engine power for the sports car?" (10/1/2013 Trial Tr. at 1552:18-20.) His response: "No way. No way. The sports car has its own engine, generates its own power." (*Id.* at 1552:20-21.)

But the language of the Court's construction, as well as the Court's reasoning, did not support counsel's inapposite analogy. The signal used to clock the CPU in each of the accused HTC products is undisputedly output by a PLL. That PLL output signal in every accused HTC product is defined by a precise formula that always includes the frequency of the signal generated by the external crystal clock. The Court's claim construction of the "entire oscillator" term makes it clear that no external clock can be **used** in any way "to generate the signal used to clock the CPU." The exclusion adopted by the Court does not require the external clock itself to directly generate the signal that actually clocks the CPU – all that is needed is for the external clock to be **used**. The "entire oscillator" limitation cannot be satisfied if an external clock is **used** in any way to generate the signal used to clock the CPU – which is indisputably the situation for all accused HTC products.

This case confirms the Federal Circuit's observation that in cases involving alleged literal infringement, such as this one, the literal infringement question ultimately reduces to a legal question of claim interpretation when the operation of the accused products is undisputed. *See MyMail*, *supra*, 476 F.3d at 1378. The only "disputes" resolved by the jury involved the meaning of the Court's exclusionary language and what it meant to "generate" a clock signal. The jury obviously struggled with these legal issues as evidenced by the two notes it sent out during its deliberations. (*See* Dkt. 656, at 15 (jury question asking for "court's definition of 'generate'"); *id.* at 16 (jury question asking for definition of "other parts" in Court's instruction regarding legal affect of "comprising").) While it is unclear how the jury ultimately came to its finding of literal infringement, the lack of any material dispute in the trial record makes it clear that it did not do so by resolving evidentiary conflicts or making credibility determinations.

Because the operation of the accused HTC products was undisputed, and that operation cannot as a matter of law meet the "entire oscillator" limitation required by all asserted claims, HTC is entitled to judgment as a matter of law of non-infringement.

B. No Reasonable Jury Could Have Found that the Processing Frequency of the CPU and the "Entire Oscillator" Vary as a Function of the Fabrication or Operational Parameter Variation as Required by the Claims

Based on the undisputed evidence presented at trial, no reasonable jury could have found that the accused HTC products meet the element of "varying the processing frequency of said first plurality of electronic devices [for the CPU] and the clock rate of said second plurality of electronic devices [for the "entire oscillator"] in the same way as a function of parameter variation in one or more fabrication or operational parameters associated with said integrated circuit substrate." The evidence at trial established that the accused HTC products use fixed speed clocks that do not vary as a function of the variation in any of the fabrication or operational parameters. As Mr. Dena testified, for example, "[r]egarding PLL's, I can tell you that PLL's are designed to maintain the target frequency across PVT variations." (*See* Chen Decl., Ex. 1 (9/27/2013 Trial Tr.) at 1062:2-3; *see also* Ex. 14 (9/24/2013 Trial Tr.) at 359:2-8 (Haroun).) Using a fixed speed clock to clock the CPU was important to enable the HTC phones to operate consistently across all conditions. (Chen Decl., Ex. 1 (09/27/2013 Trial Tr.) at 1031:9-1032:9.)

As explained in the previous section, based on the formulae that establish the PLL's output signal frequency, the processing frequency of the CPU and the on-chip clock are a function of the fixed external reference signal and other factors relating to the PLL circuitry. None of the formulae for any Qualcomm, TI or Samsung chip recites any fabrication or operational parameter variation as playing any role in the determination of the PLL output frequency. The accused HTC products, therefore, do not meet the "varying" limitations as a matter of law.

III. CONCLUSION

For the foregoing reasons, HTC respectfully requests that the Court enter judgment as a matter of law under Rule 50(b) in favor of HTC.

Dated: October 31, 2013

Respectfully submitted,

COOLEY LLP
HEIDI L. KEEFE
MARK R. WEINSTEIN
RONALD S. LEMIEUX
STEPHEN R. SMITH
KYLE D. CHEN

By: */s/ Kyle D. Chen*

Attorneys for HTC CORPORATION and HTC AMERICA, INC.

1184434/HN

COOLEY LLP
HEIDI L. KEEFE (SBN 178960) (hkeefe@cooley.com)
MARK R. WEINSTEIN (SBN 193043) (mweinstein@cooley.com)
RONALD S. LEMIEUX (SBN 120822) (rlemieux@cooley.com)
KYLE D. CHEN (SBN 239501) (kyle.chen@cooley.com)
Five Palo Alto Square, 4th Floor
3000 El Camino Real
Palo Alto, California 94306-2155
Telephone: (650) 843-5000
Facsimile: (650) 857-0663

STEPHEN R. SMITH (*pro hac vice*) (stephen.smith@cooley.com)
One Freedom Square
Reston Town Center
11951 Freedom Drive
Reston, VA 20190-5656
Telephone: (703) 456-8000
Facsimile: (703) 456-8100

Attorneys for Plaintiffs
HTC CORPORATION and
HTC AMERICA, INC.

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

HTC CORPORATION and HTC AMERICA, INC.,

Plaintiffs,

v.

TECHNOLOGY PROPERTIES LIMITED, PATRIOT SCIENTIFIC CORPORATION, and ALLIACENSE LIMITED,

Defendants.

Case No. 5:08-CV-00882 PSG

(Related to Case No. 5:08-CV-00877 PSG)

CHEN DECLARATION IN SUPPORT OF RENEWED MOTION FOR ENTRY OF JUDGMENT AS A MATTER OF LAW OF NON-INFRINGEMENT [PER FED. R. CIV. P. 50(b)]

Complaint Filed: February 8, 2008
Trial Date: September 23, 2013

Date: December 10, 2013
Time: 10:00 a.m.
Place: Courtroom 5, 4th Floor
Judge: Hon. Paul S. Grewal

I, Kyle D. Chen, declare:

1. I am an attorney at the law firm of Cooley LLP, counsel in this action for Plaintiffs HTC Corporation and HTC America, Inc. (collectively "HTC"). I make this declaration in support of Plaintiffs' Renewed Motion for Entry of Judgment as a Matter of Law on Non-Infringement (Per Fed. R. Civ. P. 50(b)) ("Motion"). I have personal knowledge based on information provided to me of the facts contained within this declaration, and if called as a witness, could testify competently to the matters contained herein.

2. Attached hereto as **Exhibit 1** are true and correct copies of excerpts from the transcript of the trial proceedings in this case on September 27, 2013.

3. Attached hereto as **Exhibit 2** are true and correct copies of excerpts from the transcript of the trial proceedings in this case on September 26, 2013.

4. Attached hereto as **Exhibit 3** are true and correct copies of excerpts from the transcript of the trial proceedings in this case on September 25, 2013.

5. Attached hereto as **Exhibit 4** is a true and correct copy of an excerpt from Trial Exhibit 3084, admitted into evidence in this case on September 26, 2013.

6. Attached hereto as **Exhibit 5** is a true and correct copy of an excerpt from Trial Exhibit 3107, admitted into evidence in this case on September 26, 2013.

7. Attached hereto as **Exhibit 6** is a true and correct copy of an excerpt from Trial Exhibit 3109, admitted into evidence in this case on October 1, 2013.

8. Attached hereto as **Exhibit 7** is a true and correct copy of an excerpt from Trial Exhibit 3112, admitted into evidence in this case on October 1, 2013.

9. Attached hereto as **Exhibit 8** is a true and correct copy of an excerpt from Trial Exhibit 3091, admitted into evidence in this case on September 26, 2013.

10. Attached hereto as **Exhibit 9** is a true and correct copy of an excerpt from Trial Exhibit 3115, admitted into evidence in this case on September 30, 2013.

11. Attached hereto as **Exhibit 10** is a true and correct copy of an excerpt from Trial Exhibit 3100, admitted into evidence in this case on October 1, 2013.

12. Attached hereto as **Exhibit 11** is a true and correct copy of an excerpt from Trial Exhibit 3101, admitted into evidence in this case on October 1, 2013.

13. Attached hereto as **Exhibit 12** is a true and correct copy of an excerpt from Trial Exhibit 3117, admitted into evidence in this case on October 1, 2013.

14. Attached hereto as **Exhibit 13** is a true and correct copy of an excerpt from Trial Exhibit 3027, admitted into evidence in this case on September 26, 2013.

15. Attached hereto as **Exhibit 14** are true and correct copies of excerpts from the transcript of the trial proceedings in this case on September 24, 2013.

16. Attached hereto as **Exhibit 15** are true and correct copies of excerpts from the transcript of the trial proceedings in this case on October 1, 2013.

I declare under penalty of perjury that to the best of my knowledge the foregoing is true and correct. Executed on October 31, 2013 in Palo Alto, California.

/s/ Kyle D. Chen
Kyle D. Chen

1188063

EXHIBIT 1

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

HTC CORPORATION AND HTC AMERICA, INC., PLAINTIFF, VS. TECHNOLOGY PROPERTIES LIMITED, PATRIOT SCIENTIFIC CORPORATION AND ALLIACENSE LIMITED, DEFENDANT.	C-08-00882 PSG SAN JOSE, CALIFORNIA SEPTEMBER 27, 2013 VOLUME 5 PAGES 901-1153

TRANSCRIPT OF PROCEEDINGS
BEFORE THE HONORABLE PAUL S. GREWAL
UNITED STATES MAGISTRATE JUDGE

A P P E A R A N C E S:

FOR THE PLAINTIFF: COOLEY LLP
BY: HEIDI KEEFE
RON LEMIEUX
3175 HANOVER STREET
PALO ALTO, CALIFORNIA 94304

APPEARANCES CONTINUED ON NEXT PAGE

OFFICIAL COURT REPORTER: LEE-ANNE SHORTRIDGE, CSR, CRR
CERTIFICATE NUMBER 9595

PROCEEDINGS RECORDED BY MECHANICAL STENOGRAPHY
TRANSCRIPT PRODUCED WITH COMPUTER

APPEARANCES (CONTINUED)

FOR THE PLAINTIFF: COOLEY LLP
BY: STEPHEN R. SMITH
1299 PENNSYLVANIA AVENUE, NW
SUITE 700
WASHINGTON, D.C. 20004

BY: MATTHEW J. LEARY
380 INTERLOCKEN CRESCENT, SUITE 900
BROOMFIELD, COLORADO 80021

ALSO PRESENT: VINCENT LAM

FOR DEFENDANTS TPL AND ALLIACENSE: AGILITY IP LAW
BY: JAMES C. OTTESON
IRVIN E. TYAN
THOMAS T. CARMACK
VINCENT K. YEE
DAVID LANSKY
149 COMMONWEALTH DRIVE
MENLO PARK, CALIFORNIA 94025

FOR DEFENDANT PATRIOT: KIRBY, NOONAN, LANCE & HOGE
CHARLES T. HOGE
35 TENTH AVENUE
SAN DIEGO, CALIFORNIA 92101

ALSO PRESENT: CHARLES MOORE
CLIFFORD FLOWERS
DAN LECKRONE
MACK LECKRONE

INDEX OF WITNESSES

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SAN JOSE, CALIFORNIA SEPTEMBER 27, 2013

P R O C E E D I N G S

(JURY OUT AT 9:07 A.M.)

08:59AM THE COURT: MR. RIVERA, WOULD YOU PLEASE CALL THE MATTER THAT'S BEEN SET FOR TRIAL.

08:59AM THE CLERK: YES, YOUR HONOR. CALLING HTC CORPORATION, ET AL VERSUS TECHNOLOGIES PROPERTIES LIMITED, ET AL, CASE NUMBER CV-08-00882 PSG, MATTER ON FOR TRIAL.

09:07AM COUNSEL, PLEASE STATE YOUR APPEARANCES.

09:07AM MR. OTTESON: GOOD MORNING. YOUR HONOR. JIM OTTESON FROM AGILITY IP LAW.

09:07AM I NOTE THAT THE 49ER'S WON LAST NIGHT, SO I'M TRYING NOT TO DO ANYTHING TO SPOIL THE MOOD TODAY.

09:07AM THE COURT: I APPRECIATE THAT, MR. OTTESON. GOOD MORNING.

09:08AM MR. HOGE: GOOD MORNING, YOUR HONOR. CHARLIE HOGE FOR PATRIOT SCIENTIFIC.

09:08AM THE COURT: GOOD MORNING TO YOU AS WELL, SIR.

09:08AM MS. KEEFE: GOOD MORNING, YOUR HONOR. HEIDI KEEFE FROM COOLEY FRO HTC.

09:08AM THE COURT: GOOD MORNING TO YOU AS WELL, MS. KEEFE.

09:08AM I HAVE BEFORE ME A MOTION FOR A, OR A REQUEST FOR A CURATIVE INSTRUCTION, SO I BELIEVE WE NEED TO ADDRESS THAT ISSUE.

09:08AM ARE THERE ALSO EVIDENTIARY OBJECTIONS AND OTHER MATTERS WE

12:37PM GENERATE THE SIGNAL USED TO CLOCK THE CPU.
THE TESTIMONY HAS SHOWN THAT NONE OF THE HTC PRODUCTS HAS AN ENTIRE OSCILLATOR AS CONSTRUED BY THE COURT, NOR DO HTC'S PRODUCTS PRACTICE THE ELEMENT OF, QUOTE, "VARYING THE PROCESSING FREQUENCY OF SAID FIRST PLURALITY OF ELECTRONIC DEVICES, AND THE CLOCK RATE OF SAID SECOND PLURALITY OF ELECTRONIC DEVICES, IN THE SAME WAY AS A FUNCTION OF PARAMETER VARIATION IN ONE OR MORE FABRICATION OR OPERATIONAL PARAMETERS ASSOCIATED WITH SAID INTEGRATED CIRCUIT SUBSTRATE, THEREBY ENABLING SAID PROCESSING FREQUENCY TO TRACK SAID CLOCK RATE IN RESPONSE TO SAID PARAMETER VARIATION," END QUOTE, AS CONSTRUED BY THE COURT.
THE TRIAL EVIDENCE HAS NOT SHOWN THAT THE ACCUSED PRODUCTS VARY BASED ON ANY OF THESE PARAMETERS.
WE MAKE THIS MOTION ON THE BASIS THAT THE PATENTEES DID NOT SHOW INFRINGEMENT, EITHER LITERALLY OR UNDER THE DOCTRINE OF EQUIVALENTS, WITH RESPECT TO ANY ASSERTED CLAIM.
DEFENDANTS HAVE ALSO FAILED TO PRESENT A LEGALLY SUFFICIENT EVIDENTIARY BASIS THAT ANY ALLEGED INFRINGEMENT BY HTC WAS WILLFUL.
THE EVIDENCE AT TRIAL HAS ESTABLISHED AN ABSENCE OF ANY EVIDENCE FOR EITHER THE OBJECTIVE OR SUBJECTIVE PRONG OF THE WILLFUL INFRINGEMENT TEST.
ON THE OBJECTIVE PRONG, AS WE EXPLAINED IN OUR SUMMARY JUDGMENT MOTION, THE OBJECTIVE PRONG IS A LEGAL DETERMINATION

12:39PM MADE BY THE COURT, SO NOW THAT THE COURT HAS ALLOWED TPL TO BE HEARD ENTIRELY ON THIS ISSUE, IT SHOULD REMOVE THE ISSUE FROM THE JURY'S CONSIDERATION.
TPL HAS ALSO FAILED TO SHOW THE REQUISITE OBJECTIVE LEVEL OF RECKLESSNESS WITH RESPECT TO THE ALLEGED INFRINGEMENT.
DEFENDANTS HAVE ALSO FAILED TO PRESENT A LEGALLY SUFFICIENT EVIDENTIARY BASIS FOR ANY ALLEGED INDIRECT INFRINGEMENT. IT IS NOT CLEAR IF TPL IS EVEN PURSUING INDIRECT INFRINGEMENT AT THIS TIME GIVEN THE REDUCTION IN NUMBER OF ASSERTED CLAIMS, BUT IN ANY CASE, THERE HAS NOT BEEN A LEGALLY SUFFICIENT EVIDENTIARY BASIS THAT HTC POSSESSED THE REQUISITE SPECIFIC INTENT FOR ANY FORM OF INDIRECT INFRINGEMENT, INCLUDING INDUCEMENT OR CONTRIBUTORY INFRINGEMENT.
DEFENDANTS HAVE ALSO FAILED TO PRESENT A LEGALLY SUFFICIENT EVIDENTIARY BASIS TO SHOW THAT THEY ARE ENTITLED TO DAMAGES FOR ANY ALLEGED INFRINGEMENT BY HTC.
12:40PM THE TRIAL EVIDENCE HAS SHOWN THAT TPL RELIED ON FULL PORTFOLIO LICENSES THAT ARE NOT COMPARABLE TO THE HYPOTHETICAL '336 ONLY LICENSE AT ISSUE IN THIS CASE AND RELIED ON A DAMAGES THEORY THAT IS NOT TIED TO THE FACTS AND CIRCUMSTANCES OF THE CASE.
TPL HAS ALSO FAILED TO PRESENT EVIDENCE REGARDING THE ALLEGED IMPORTANCE OF THE '336 PATENT AND, THUS, HAS NOT PROVIDED A LEGALLY SUFFICIENT EVIDENTIARY BASIS FOR ITS REASONABLE ROYALTY DEMAND.

12:40PM WE THANK THE COURT FOR ITS AND WE PLAN ON SUBMITTING FULL WRITTEN BRIEFING LATER, BUT THIS PRESERVES OUR RECORD AND WE WOULD APPRECIATE THE COURT'S RULING.
THE COURT: THANK YOU, MS. KEEFE.
MR. OTTESON, DO YOU WANT TO RESPOND? OR MR. HOGE?
MR. OTTESON: THANK YOU, YOUR HONOR.
DEFENDANTS OPPOSE HTC'S RULE 50(A) MOTION FOR JUDGMENT AS A MATTER OF LAW ON ALL OF THE ISSUES FOR WHICH THEY MOVE.
12:41PM WE BELIEVE THAT WE HAVE SHOWN AN EVIDENTIARY BASIS FOR INFRINGEMENT OF THE '336 PATENT, THAT WE HAVE PROVIDED EVIDENCE THAT THE ACCUSED HTC PRODUCTS INCLUDE THE ENTIRE OSCILLATOR, AS WELL AS SATISFYING THE VARIED IN THE SAME WAY LIMITATIONS THAT HAVE BEEN DISCUSSED BY MS. KEEFE.
WE ALSO BELIEVE THAT THERE IS MORE THAN A SUFFICIENT BASIS FOR A FINDING OF INDIRECT INFRINGEMENT WITH RESPECT TO INDUCEMENT. LITERATURE IS PROVIDED BY HTC TO ITS CUSTOMERS INSTRUCTING THEM TO USE A USB CABLE IN AN INFRINGING MANNER, IN OTHER WORDS, TO BASICALLY PROVIDE A SECOND CLOCK SIGNAL AS REQUIRED BY THE CLAIMS.
SO WE BELIEVE THAT THERE IS PLENTY OF EVIDENCE THERE, AS WELL AS HTC'S KNOWLEDGE OF NOT ONLY THE PATENT ITSELF, BUT THAT SPECIFIC ARGUMENT, BECAUSE THAT ARGUMENT WAS ACTUALLY MADE TO THEM IN BRIEFINGS BY ALLIACENSE.
12:42PM SO WE BELIEVE WE DEFINITELY SATISFY THAT, WHICH ALSO LEADS INTO THE ISSUE OF WILLFULNESS.

12:42PM WE ALSO BELIEVE THAT WE HAVE SUBMITTED AN EVIDENTIARY BASIS TO SUPPORT BOTH SUBJECTIVE AND OBJECTIVE WILLFULNESS BASED ON THE EVIDENCE, THE TESTIMONY FROM MAC LECKRONE, THE DOCUMENTS THAT WERE PROVIDED, THE COMMUNICATIONS THAT WERE EXCHANGED BETWEEN THE PARTIES.
AND IN TERMS OF DAMAGES, I BELIEVE THAT WITH RESPECT TO THIS PORTFOLIO AND HOW THE LICENSING PROGRAM WAS DONE UNDER THIS PORTFOLIO, WHICH INCLUDES THE '336 PATENT AS THE COURT HAS ALREADY RECOGNIZED IN DENYING THEIR MOTION FOR SUMMARY JUDGMENT.
WE HAVE SUBMITTED MORE THAN A SUFFICIENT EVIDENTIARY BASIS FOR THE MEASURE OF DAMAGES THAT HAVE BEEN TESTIFIED TO BY DR. PROWSE.
AND SO WE WOULD ASK THAT THE COURT DENY THEIR MOTION IN ITS ENTIRETY.
THE COURT: MR. OTTESON, CAN YOU ASK JUST A COUPLE QUESTIONS? IT SEEMS THAT THE PARTIES AGREE THERE IS NO CONTRIBUTORY INFRINGEMENT CLAIM IN THIS CASE. IS THAT CORRECT?
MR. OTTESON: YES, THAT IS CORRECT.
THE COURT: OKAY. ON THAT BASIS, TO THE EXTENT THAT THERE EVEN IS ONE, I'LL GRANT THE RULE 50(A) MOTION ON THAT ISSUE.
MS. KEEFE: I'LL TAKE THAT AS A VICTORY, YOUR HONOR. THANK YOU.
12:43PM THE COURT: LET ME SEE ABOUT ANOTHER POSSIBILITY,

MS. KEEFE.

ON EQUIVALENTS, D.O.E., I DIDN'T HEAR ANYTHING COMING OUT OF DR. OKLOBDZIJA OR ANY OF THE OTHER WITNESSES AS TO D.O.E.

CAN WE AGREE THAT D.O.E. IS OUT?

MR. OTTESON: YES, YOUR HONOR.

THE COURT: ON THAT BASIS I'LL GRANT THE SECOND VICTORY, AS IT WERE, AND GRANT THE 50(A) MOTION ON THE D.O.E. CLAIM ALONE.

MS. KEEFE: THANK YOU, YOUR HONOR.

THE COURT: WITH RESPECT TO LITERAL INFRINGEMENT, WILLFULNESS, INDUCEMENT, AND DAMAGES, THE MOTION IS DENIED. ISSUES ARE PRESERVED AND OF COURSE, DEPENDING ON THE OUTCOME, YOU CAN RENEW THOSE MOTIONS POST-TRIAL.

MS. KEEFE: APPRECIATE IT. THANK YOU, YOUR HONOR.

MR. OTTESON: THANK YOU, YOUR HONOR.

THE COURT: ALL RIGHT. ANY OTHER ISSUES BEFORE WE GET BACK TO THE JURY? IF NOT, LET'S STAND.

MR. RIVERA.

(PAUSE IN PROCEEDINGS.)

(JURY IN AT 12:46 P.M.)

THE COURT: MEMBERS OF THE JURY, WELCOME BACK. I HOPE YOU HAD A GOOD LUNCH. YOU WILL RECALL THAT JUST BEFORE WE BROKE, TPL HAD RESTED IN ITS CASE.

WE WILL NOW HEAR FROM HTC IN ITS CASE.

MS. KEEFE, YOU MAY CALL YOUR FIRST WITNESS.

MS. KEEFE: THANK YOU, YOUR HONOR.

YOUR HONOR, HTC CALLS MARTIN FICHTER TO THE STAND, PLEASE.

THE COURT: MR. FICHTER, GOOD AFTERNOON, SIR. WELCOME.

THE WITNESS: GOOD AFTERNOON. WHERE DO I GO?

THE COURT: IF YOU COULD APPROACH THE WITNESS STAND, I WOULD APPRECIATE IT. YOU WILL NEED TO BE SWORN BEFORE YOU TAKE YOUR SEAT, SIR.

MR. RIVERA, PLEASE SWEAR THE WITNESS.

THE CLERK: RAISE YOUR RIGHT HAND.

(MARTIN FICHTER, PLAINTIFF'S WITNESS, WAS SWORN.)

THE WITNESS: I DO.

THE CLERK: THANK YOU. PLEASE BE SEATED.

THE WITNESS: THANK YOU.

THE COURT: PLEASE STATE YOUR FULL NAME AND SPELL YOUR LAST NAME FOR THE RECORD.

THE WITNESS: MY NAME IS MARTIN FICHTER, F-I-C-H-T-E-R.

DIRECT EXAMINATION

BY MS. KEEFE:

Q. GOOD AFTERNOON, MR. FICHTER.

A. GOOD AFTERNOON.

Q. MR. FICHTER, WHERE DO YOU WORK?

A. I WORK AT HTC AMERICA.

Q. AND WHAT IS YOUR TITLE AT HTC?

A. I'M THE VICE-PRESIDENT OF PRODUCT AND OPERATIONS FOR HTC AMERICA.

Q. BEFORE WE GET INTO EXACTLY WHAT DO YOU AT HTC, BECAUSE WE'RE GOING TO GO PRETTY DEEP INTO THAT, I'D LIKE TO ASK A FEW MORE QUESTIONS ABOUT YOUR BACKGROUND SO THE JURY CAN GET TO KNOW YOU JUST A LITTLE BIT.

A. SURE. NO PROBLEM.

Q. MR. FICHTER, WHERE DO YOU CURRENTLY LIVE?

A. I LIVE IN ISSAQUAH. THAT'S A SMALL CITY JUST EAST OF SETTLE, WASHINGTON STATE.

Q. I HEAR A LITTLE BIT OF AN ACCENT. WHERE DID YOU GROW UP?

A. THANK YOU FOR CALLING IT A LITTLE. I'M GERMAN. I GREW UP IN BERLIN, IN GERMANY.

Q. HOW LONG HAVE YOU LIVED IN THE UNITED STATES?

A. WELL, MY WIFE AND MY DAUGHTERS, WE CAME OVER IN 2000S, EARLY 2000S, SO ABOUT 13, 14 YEARS.

Q. HAVE YOU SPENT ALL OF YOUR TIME IN WASHINGTON SINCE YOU CAME TO THE UNITED STATES?

A. WE MOVED TO SAN DIEGO FIRST, SPENT TEN YEARS IN CALIFORNIA BEFORE WE MOVED TO SEATTLE.

Q. YOU AND I WERE TEASING YESTERDAY. YOU PREFER CALIFORNIA; RIGHT?

A. LOOKING OUT THERE, THE SUN, I LIKE IT BETTER THAN THE RAIN.

Q. DO YOU HAVE ANY FAMILY, MR. FICHTER?

A. YEAH. MY WIFE AND MY TWO DAUGHTERS. MY OLDER ONE, SHE'S IN HER YEAR NUMBER THREE AT REED COLLEGE IN PORTLAND. SHE'S GOING TO MAJOR IN LINGUISTICS. I GUESS IT'S ALL THESE DIFFERENT LANGUAGES THAT LED HER THERE.

MY YOUNGER ONE, SHE'S A FRESHMAN AT VASSAR IN POUGHKEEPSIE, NEW YORK. SHE'S LOOKING MORE LIKE INTERNATIONAL MANAGEMENT STUDY.

Q. WHAT DOES YOUR -- I'M SORRY.

A. MY WIFE, SHE'S SPENDING A LOT OF TIME AT THE YWCA. SHE'S VERY ENGAGED IN WOMEN'S ISSUES AND THERE'S A LOT OF WORK IN OUR AREA WITH DIVERSITY.

Q. SO YOUR JOB AT HTC, COULD YOU REPEAT THE TITLE FOR ME AGAIN, PLEASE?

A. VICE-PRESIDENT OF PRODUCT AND OPERATIONS.

Q. WHAT DOES THAT MEAN?

A. I KNOW. IT'S A FANCY TITLE.

SO FOR ME IT'S TWO MAJOR BUCKETS. THE PRODUCT BUCKET DEALS MORE WITH UNDERSTANDING ALL THE REQUIREMENTS THAT LEAD TO THE DEVELOPMENT OF A PHONE, THE REQUIREMENTS FOR THE FEATURES FOR WHAT THE CUSTOMERS WANT, FOR WHAT THE WIRELESS OPERATORS LIKE AT&T AND VERIZON WANT, WHAT THE REGULATORS WANT, LIKE THE S.E.C., AND MAKING SURE THAT THE PHONE WILL BE DEVELOPED ACCORDING TO THESE STANDARDS AND REQUIREMENTS, TEST THE PHONES, BRING THEM TO THE LABORATORIES, GET THEM TESTED, GET THEM

01:07PM WHICH MEANS I HAVE TO MAKE TRADEOFFS IN ORDER TO, TO GET TO A
01:07PM POINT WHERE EVERYTHING IS WORKING UNDER WORSE CASE CONDITIONS.
01:07PM **Q.** AND WHAT ARE SOME OF THE TRADEOFFS THAT YOU HAVE TO MAKE
01:07PM IN ORDER TO ENSURE THAT THE PHONE WORKS IN THAT WORST CASE
01:07PM SCENARIO?
01:07PM **A. WELL, YOU COULD POTENTIALLY GET HIGHER PERFORMANCE OUT OF**
01:08PM **SOME OF THE COMPONENTS, BUT YOU WOULD LOSE RELIABILITY.**
01:08PM **Q.** WHAT DO YOU MEAN BY THAT?
01:08PM **A. IF YOU COULD -- IF YOU CAN RUN THE SYSTEM FASTER, YOU**
01:08PM **MIGHT RUN INTO A SITUATION WHERE SOME COMPONENTS FALL OUT OF**
01:08PM **SYNCH OR YOU FALL OUT OF A SYNCH WITH A NETWORK, WHICH WOULD**
01:08PM **OBVIOUSLY BE BAD BECAUSE YOU MIGHT DROP A CALL, AND IT'S MORE**
01:08PM **IMPORTANT TO KEEP THAT CALL THAN TO BE THAT LITTLE BIT FASTER.**
01:08PM **Q.** AND SO HOW DOES HTC GO ABOUT MAKING SURE THAT IT HAS THAT
01:08PM RELIABILITY THAT YOU TALKED ABOUT?
01:08PM **A. HOW DO WE MAKE -- AGAIN, WE'RE DESIGNING FOR ABSOLUTE**
01:08PM **WORST CASE, WHICH MEANS WE ARE LOOKING AT THE, THE RANGES OF**
01:08PM **HOW MUCH DUST CAN THERE BE IN THE AIR, HOW HOT, HOW COLD CAN IT**
01:08PM **BE, AND WE LOOK FOR THE WORST CASE AND MAKE SURE THAT THE PHONE**
01:08PM **WILL WORK IN THE WORST CASE, AND THEN WE TIGHTEN EVERYTHING**
01:08PM **DOWN.**
01:09PM **Q.** AND AS HEAD OF PRODUCT AND DEVELOPMENT, DO YOU HAVE A ROLE
01:09PM IN HELPING TO FIGURE OUT WHAT COMPONENTS GO INTO THE PHONE TO
01:09PM ACHIEVE THOSE RESULTS?
01:09PM **A. I DON'T PICK COMPONENTS MYSELF, BUT I WORK VERY CLOSELY**

01:09PM **WITH THE PEOPLE WHO DO.**
01:09PM **Q.** AND WHAT DO YOU DO IN YOUR, IN YOUR ROLE WITH THEM? HOW
01:09PM DO YOU WORK WITH THEM?
01:09PM **A. WELL, I WILL TELL THEM, LOOK, I NEED A PHONE THAT HAS ALL**
01:09PM **THESE FEATURES, THAT HAS ALL THESE SPECIFICATIONS, AND THEN**
01:09PM **USUALLY I'M BEING PRESENTED WITH DIFFERENT OPPORTUNITIES AND WE**
01:09PM **LOOK AT, OKAY, HERE'S A CHIP WE COULD USE AND HERE'S THE PRICE**
01:09PM **FOR THE SYSTEM IF WE USE THIS CHIP. HERE'S A DIFFERENT CHIP WE**
01:09PM **CAN USE AND HERE'S THE PRICE IF WE USE THAT CHIP.**
01:09PM **SO WE GO THROUGH ALL THESE TRADEOFFS AND MAKE A DECISION**
01:09PM **TOGETHER.**
01:09PM **Q.** AND WHAT CHIPS DO YOU TYPICALLY USE IN MOST OF YOUR
01:09PM PHONES?
01:09PM **A. WELL, A LARGE MAJORITY OF OUR PHONES ARE POWERED BY**
01:09PM **QUALCOMM CHIPS.**
01:09PM **Q.** AND WHY DID YOU CHOOSE THOSE QUALCOMM CHIPS?
01:09PM **A. QUALCOMM IS THE MARKET LEADER IN WIRELESS CHIPSETS, AND**
01:10PM **THEY'RE THE MARKET LEADER BECAUSE THEY ARE VERY INNOVATIVE. WE**
01:10PM **HAVE A JOINT HISTORY, QUALCOMM AND US. WE ARE VERY COMPATIBLE**
01:10PM **WHEN IT COMES TO -- WE'RE COMPATIBLE WHEN IT COMES TO**
01:10PM **INNOVATION, WHEN IT COMES TO OUR SENSE OF QUALITY AND**
01:10PM **RELIABILITY.**
01:10PM **SO** AND WE HAVE WORKED TOGETHER VERY CLOSELY. IN THE PAST
01:10PM YEARS, I DON'T KNOW AN EXACT WHAT THE NUMBER IS, BUT MOST OF
01:10PM THE QUALCOMM CHIPS THAT ARE OUT THERE IN THE MARKET TODAY HAVE

01:10PM BEEN BROUGHT UP FIRST IN HTC PHONES. SO WE HAVE PEOPLE IN
01:10PM SAN DIEGO WORKING AT QUALCOMM, AND QUALCOMM HAS ALWAYS PEOPLE
01:10PM IN TAIWAN WORKING IN OUR OFFICES TO MAKE SURE THAT WE ARE
01:10PM CLOSELY INTERRELATED.
01:10PM **Q.** AND WHAT TYPES OF CHIPS DO YOU BUY FROM QUALCOMM? WHAT
01:10PM TYPES OF -- IN TERMS OF HELPING NARROW IT DOWN FOR WHAT MATTERS
01:10PM FOR THIS CASE --
01:10PM **A. YES.**
01:10PM **Q.** -- WHAT TYPES OF CLOCKS ARE ON THE CHIPS THAT YOU BUY FROM
01:11PM QUALCOMM?
01:11PM **A. WELL, THE SYSTEMS THAT WE ARE RUNNING ALL RUN A FIXED**
01:11PM **CLOCK.**
01:11PM **Q.** AND WHY IS THAT?
01:11PM **A. THAT'S THE ONLY WAY TO MAKE SURE THAT THE PHONE WORKS**
01:11PM **UNDER ALL, ALL CIRCUMSTANCES.**
01:11PM **Q.** HAVE YOU EVER CONSIDERED USING A VARIABLE CLOCK IN YOUR
01:11PM PHONES?
01:11PM **A. I HAVE NOT CONSIDERED AND I DON'T SEE WHAT THE BENEFIT**
01:11PM **WOULD BE.**
01:11PM **Q.** WHY NOT?
01:11PM **A. WELL, THE KEY THING FOR THE PHONE IS TO RUN UNDER ALL**
01:11PM **CIRCUMSTANCES AND BE FULLY RELIABLE.**
01:11PM **SO** THE SECOND CONSIDERATION THAT I WOULD HAVE IS THE MOST
01:11PM IMPORTANT THING THAT THE PHONE DOES IS CONNECT TO THE NETWORK,
01:11PM AND THE NETWORK DETERMINES HOW FAST THAT EXPERIENCE IS.

01:11PM **SO** EVEN IF I WOULD CHANGE THE PERFORMANCE OF THE PHONE
01:11PM ITSELF AND CLOCK IT FASTER OR SLOWER, IT WOULDN'T CHANGE THE
01:11PM PERFORMANCE OF THE NETWORK AND SO I WOULDN'T GET ANY BENEFIT.
01:11PM I WOULDN'T DOWNLOAD SOMETHING FASTER OR WOULDN'T BE ABLE TO
01:11PM FINISH A PHONE CALL FASTER. IT'S JUST THE WAY IT IS.
01:12PM **SO** AND, AGAIN, THE PROBLEM THAT YOU MIGHT RUN INTO IS IF SOME
01:12PM OF YOUR COMPONENTS GET OUT OF SYNCH OR YOU GET OUT OF SYNCH
01:12PM WITH THE NETWORK, YOU DROP THAT CALL AND THAT WOULD BE BAD,
01:12PM ESPECIALLY IF IT'S A 911 CALL, YOU DON'T WANT TO DROP THAT.
01:12PM **Q.** SO YOU MENTIONED THAT YOU WORK WITH QUALCOMM QUITE A BIT
01:12PM AND YOU USE THEIR FIXED CLOCK CHIPS.
01:12PM DO YOU WORK WITH OTHER COMPANIES AS WELL WITH THEIR CHIPS?
01:12PM **A. I KNOW FOR A FACT ABOUT A FEW THINGS THAT WE DID WITH**
01:12PM **OTHERS. WE HAD TI-BASED DESIGNS. I KNOW WE HAD AN**
01:12PM **NVIDIA-BASED DESIGN. I KNOW WE HAD A FEW INTEL-BASED SIGNS.**
01:12PM **THERE MIGHT BE OTHERS, BUT THOSE ARE THE OTHERS I KNOW.**
01:12PM **Q.** DO YOU KNOW WHETHER OR NOT YOU HAVE ANY SAMSUNG CHIPS IN
01:12PM YOUR PHONES?
01:12PM **A. I DON'T KNOW.**
01:12PM **Q.** AND AS FAR AS THE NVIDIA AND INTEL CHIPS --
01:12PM **A. UM-HUM.**
01:12PM **Q.** -- YOU SAID YOU HAD PHONES THAT USE THOSE CHIPS; IS THAT
01:12PM RIGHT?
01:12PM **A. YES, CORRECT.**
01:12PM **Q.** COULD YOU HAVE -- COULD YOU DESIGN FUTURE PHONES TO

01:27PM BY MR. SMITH:

01:27PM **Q.** AND IF YOU DON'T MIND SKETCHING OUT FOR US, AT A HIGH

01:27PM LEVEL -- I UNDERSTAND IT'S A LITTLE BIT MORE COMPLICATED -- BUT

01:27PM AT A HIGH LEVEL WHAT YOU'VE JUST TALKED ABOUT.

01:27PM **A. SO THERE'S THE, THE VERY FIRST ELEMENT IS A FIXED INPUT**

01:27PM **CLOCK FREQUENCY (INDICATING).**

01:27PM **Q.** WHAT IS THAT?

01:27PM **A. IT'S COMING FROM AN EXTERNAL CHIP CRYSTAL, WE CALL IT**

01:27PM **TCXO. IT STANDS FOR TEMPERATURE COMPENSATED CRYSTAL**

01:27PM **OSCILLATOR.**

01:27PM **Q.** OKAY.

01:27PM **A. THE BOX I'M DRAWING IS BASICALLY THE PLL SYSTEM ITSELF**

01:27PM **(INDICATING).**

01:27PM **Q.** SO MR. DENA, IS THE TCXO PART OF THE CHIP?

01:27PM **A. NO. THE CRYSTAL RESIDES OUTSIDE THE CHIP.**

01:27PM **Q.** OKAY. PLEASE CONTINUE.

01:27PM **A. THERE ARE WHAT WE CALL REGISTERS THAT ARE 32 BIT WIDE, AND**

01:28PM **THEY'RE BASICALLY REPRESENTING THE BINARY VALUE OF THE NUMBER.**

01:28PM **SO FOR COURT PURPOSES, WE CAN IMAGINE THESE ARE JUST L, M, AND**

01:28PM **N, OR A SERIES OF NUMBERS (INDICATING).**

01:28PM **Q.** HOLD ON, MR. DENA. LET ME SEE IF WE CAN GET A BETTER VIEW

01:28PM HERE.

01:28PM EXCUSE ME. THANK YOU.

01:28PM **A. AND THEN BASICALLY OF THE PLL OUTPUT, WHICH ESSENTIALLY IS**

01:28PM **THE CLOCK THAT WE USE FOR THE REST OF THE CHIP (INDICATING).**

01:28PM **SO THIS SYSTEM THAT I'VE SHOWN IS THE SOURCE OF ALL CLOCKS**

01:28PM **ON THE CHIPS, AND WE HAVE MULTIPLE OF THESE DEPENDING ON THE**

01:28PM **CHIP, AND IN SOME CHIPS YOU HAVE FOUR, SOME CHIPS YOU HAVE**

01:28PM **FIVE, SEVEN, SIX, DEPENDING ON THE CHIP APPLICATION.**

01:29PM NOW, IN THIS PARTICULAR CASE -- SO ON THE REFERENCE INPUT

01:29PM FREQUENCY, THE REFERENCE INPUT HAS A FREQUENCY ASSOCIATED WITH

01:29PM IT (INDICATING), AND THEN YOU HAVE THE CLOCK OUTPUT THAT HAS A

01:29PM FREQUENCY ASSOCIATED WITH IT (INDICATING).

01:29PM IN A NUTSHELL, PLL USE THAT FORMULA TO CREATE A FREQUENCY

01:29PM A LOT LARGER IN MAGNITUDE THAN THE INPUT FREQUENCY THAT IT

01:29PM RECEIVES, AND THAT FORMULA BASICALLY IS DICTATED IN THIS -- IN

01:29PM THIS PARTICULAR CASE I'M SHOWING THE CLOCK FREQUENCY, WHICH

01:29PM MEANS THE OUTPUT FREQUENCY, L PLUS M OVER N MULTIPLIED BY THE

01:29PM INPUT FREQUENCY (INDICATING).

01:29PM SO YOU CAN IMAGINE IF YOU WANTED TO MULTIPLY THE FREQUENCY

01:29PM OF THE PLL TO BE TEN TIMES, 10.25 TIMES THE INPUT FREQUENCY,

01:30PM YOU PUT 10 FOR L AND YOU PUT 1 OVER 4 FOR M AND N, AND THAT

01:30PM BASICALLY DOES THE JOB (INDICATING).

01:30PM OF COURSE YOU HAVE TO GO THROUGH THE PERIOD OF WAITING FOR

01:30PM THE PLL TO LOCK UNTIL THE STEADY OUTPUT IS ACHIEVED, AND THEN

01:30PM FROM THEN ON, THE TARGET, THE OUTPUT FREQUENCY IS ALWAYS

01:30PM CONSTANT.

01:30PM **Q.** IS THERE ANY SIGNIFICANCE FOR THE OUTPUT SIGNAL TO BE

01:30PM CONSTANT?

01:30PM **A. IT'S CRITICAL FOR THE CHIP PERFORMANCE.**

01:30PM **Q.** WHY IS IT CRITICAL?

01:30PM **A. IT NEEDS -- IT HAS TO DO WITH THE STABILITY TO BEGIN WITH,**

01:30PM **SO, YOU KNOW, IF YOU'RE EXPERIENCING A CALL DROP, FOR INSTANCE,**

01:30PM **IF THE FREQUENCY IS VARYING OUT CONTROL, YOU KNOW, YOU WOULD**

01:30PM **LOSE THE CALL. YOU WOULD LOSE YOUR WIRELESS. YOU WOULD LOSE**

01:30PM **YOUR BLUETOOTH. BASICALLY THE CHIP STARTS TO MALFUNCTION IF**

01:30PM **THE FREQUENCY IS NOT FIXED.**

01:30PM YOU ARE NOT SUPPLYING ONLY TO ONE COMPONENT OF THE CHIP.

01:31PM AS I MENTIONED, THERE ARE MULTITUDES OF PLL'S AND THEY ARE

01:31PM SUPPLYING TO A SYMPHONY ORCHESTRA, TO GROUPS OF COMPONENTS OF

01:31PM THE CHIP AND THEY ALL HAVE TO WORK IN UNISON.

01:31PM IN OTHER WORDS, YOU CAN IMAGINE IF YOU RUSH TOO MUCH, TOO

01:31PM MANY CARS INTO A HIGHWAY THAT DOESN'T HAVE THE BANDWIDTH TO

01:31PM CARRY THAT TRAFFIC, YOU'RE GOING TO HAVE A BACKUP OF THE

01:31PM TRAFFIC.

01:31PM **Q.** NOW, IS THIS HIGH LEVEL DESIGN IN ALL OF THE QUALCOMM

01:31PM CHIPS AT ISSUE IN THIS CASE?

01:31PM **A. THAT'S CORRECT.**

01:31PM NOW, WE HAVE CERTAIN PLL'S THAT MIGHT, INSTEAD OF L AND M

01:31PM AND N, USE ONLY L. BUT PRETTY MUCH THIS IS IT (INDICATING).

01:31PM **Q.** HOW DOES THAT LOOK IN A FORMULA WITH JUST L?

01:31PM **A. WITH JUST L, WE HAVE ONE VERSION THAT IS BASICALLY L TIMES**

01:31PM **TCXO FREQUENCY TIMES TWO (INDICATING). THERE WAS A VERSION OF**

01:31PM **THE PLL LIKE THAT.**

01:31PM **Q.** AND ALL THE PLL'S USED IN THE QUALCOMM CHIPS AT ISSUE IN

01:32PM THIS CASE, IS THERE A FORMULA THAT GOVERNS THE OUTPUT?

01:32PM **A. ALWAYS.**

01:32PM **Q.** HAVE YOU SEEN ANY INSTANCES WHERE THERE'S NOT A FORMULA?

01:32PM **A. NO. THAT BASICALLY DEFEATS THE USAGE OF THE PLL.**

01:32PM **Q.** WHAT DO YOU MEAN IT DEFEATS THE PURPOSE, OR THE USAGE OF

01:32PM THE PLL?

01:32PM **A. SO THE PURPOSE OF THE PLL IS TO PROVIDE A PREDETERMINED --**

01:32PM **WHAT WE ARE ASKING IT TO DO IN TERMS OF FREQUENCY AND MAINTAIN**

01:32PM **IT AT A CONSTANT LEVEL AT ALL TIMES.**

01:32PM **Q.** OKAY. NOW, ONE MORE LAST QUESTION ABOUT THIS. THIS TCXO

01:32PM RIGHT HERE, IS THAT A -- WHAT TYPE OF SIGNAL IS THAT

01:32PM (INDICATING)?

01:32PM **A. IT'S WHAT YOU CALL A REFERENCE CLOCK SIGNAL FIXED AT 19.2,**

01:32PM **AND IT'S EXTREMELY IMPORTANT FOR PLL OPERATION FOR THIS SIGNAL**

01:32PM **TO BE FIXED ACROSS VARIATION AND TEMPERATURES (INDICATING).**

01:32PM **Q.** OKAY. YOU CAN TAKE YOUR SEAT, SIR. THANK YOU.

01:33PM NOW, WHAT WOULD HAPPEN IN ANY OF THE PLL'S THAT ARE IN THE

01:33PM QUALCOMM CHIPS IN THIS CASE IF THERE WAS NO TCXO?

01:33PM **A. YOU WOULD LOSE THE CLOCK OUTPUT.**

01:33PM **Q.** ARE YOU SURE?

01:33PM **A. POSITIVE.**

01:33PM **Q.** HOW ARE YOU SURE?

01:33PM **A. I'VE HAD CASES OF DEFECTIVE CHIPS THAT LOST CLOCK OUTPUT**

01:33PM **BECAUSE THE CONNECTION OF THE CRYSTAL INTERNAL TO THE CHIP WAS**

01:33PM **BROKEN.**

01:50PM A. YES. AND I'D JUST LIKE TO EMPHASIZE. IT'S NOT DONE FOR
01:50PM EVERY PART THAT IS SHIPPED. IT'S DONE FOR A BATCH OF DEVICES
01:50PM THAT ARE IN EXTREME CORNERS OF THE PROCESS, FOR INSTANCE, AND
01:50PM THEN THERE'S AN EXTRAPOLATION THAT IS DONE BASED UPON THAT
01:50PM PERFORMANCE FOR THE FINAL PRODUCT TESTING.
01:50PM SO CHARACTERIZATION IS NOT SOMETHING THAT'S DONE ON EVERY
01:50PM CHIP THAT'S SHIPPED. IT'S ONLY DONE ON A SAMPLE OF DEVICES
01:50PM THAT RESIDE ON THE CORNERS, ON THE BOUNDARIES OF THE PVT.
01:50PM Q. UNDERSTOOD. UNDERSTOOD.
01:50PM BUT NO MATTER HOW CAREFUL QUALCOMM IS, NO MATTER HOW
01:50PM CAREFULLY THEY DESIGN THE CHIPS, THERE ARE SOME VARIATIONS FROM
01:50PM CHIP TO CHIP; RIGHT?
01:50PM A. VARIATIONS IN WHAT?
01:50PM Q. IN PERFORMANCE.
01:50PM A. PERFORMANCE OF WHAT? OF THE PLL?
01:51PM Q. OF THE CHIPS. ARE THERE ANY VARIATIONS? I MEAN, EVEN IF
01:51PM QUALCOMM IS CAREFUL TO DESIGN, THAT PROCESS IS NOT PERFECT;
01:51PM RIGHT? THERE ARE SOME VARIATIONS FROM CHIP TO CHIP, ARE THERE
01:51PM NOT?
01:51PM A. ARE YOU REFERRING TO THE PLL PERFORMANCE OR SOMETHING
01:51PM ELSE?
01:51PM Q. I'M JUST REFERRING TO THE PERFORMANCE OF THE CHIP, OF
01:51PM QUALCOMM'S DESIGNS ON SILICON.
01:51PM A. I THINK THAT IS A VERY BROAD SCOPE BECAUSE CHIP
01:51PM PERFORMANCE CAN BE DEFINED BY HOW MUCH POWER IT CONSUMES OR

01:51PM WHAT CLOCK RATE IT DOES, AND SO I'D LIKE TO BE AS SPECIFIC.
01:51PM REGARDING PLL'S, I CAN TELL YOU THAT PLL'S ARE DESIGNED TO
01:51PM MAINTAIN THE TARGET FREQUENCY ACROSS PVT VARIATIONS.
01:51PM IN OTHER WORDS, THE 400 MEGAHERTZ ON A SLOW DEVICE, A SLOW
01:51PM PROCESS DEVICE, IS GOING TO BE DONE WITH THE SAME L, M, N VALUE
01:51PM THAT IS GOING TO BE USED FOR A FAST PROCESS SILICON. L, M, N'S
01:52PM DON'T CHANGE, AND THE HOLY GRAIL OF PLL DESIGN IS TO ENSURE
01:52PM THAT THE CUSTOMERS DO NOT HAVE TO CHANGE THOSE PARAMETERS TO
01:52PM GENERATE THAT SAME TARGET FREQUENCY ACROSS THE CORNERS.
01:52PM Q. NOW, WE'VE HEARD IN THIS TRIAL THAT THE FEATURE SIZE ON
01:52PM THESE DEVICES -- AND WE SHOWED SOME FEATURE SIZES UP HERE
01:52PM (INDICATING) -- I MEAN, THOSE ARE TEN TIMES SMALLER THAN A
01:52PM WAVELENGTH OF LIGHT; RIGHT?
01:52PM A. THOSE ARE VERY SMALL. THEY WERE A LOT BIGGER WHEN I
01:52PM STARTED THIS BUSINESS, SO --
01:52PM Q. FAIR ENOUGH. AND IN FACT, BECAUSE THEY'RE SO SMALL, IT'S
01:52PM VERY DIFFICULT TO GET EVERY SINGLE TRANSISTOR DESIGNED THE
01:52PM SAME?
01:52PM A. ABSOLUTELY. THERE'S GOING TO BE PHYSICAL IMPERFECTION,
01:52PM DIFFERENCES ACROSS ALL OF THIS, ABSOLUTELY, YES.
01:52PM Q. SO WE AGREE THERE. SO THERE'S GOING TO BE SOME PROCESS
01:52PM VARIATION FROM CHIP TO CHIP; RIGHT?
01:52PM A. YES.
01:52PM Q. RIGHT. AND SO THAT'S PART OF THE REASON WHY QUALCOMM
01:52PM PERFORMS TESTING ON ITS CHIPS, ISN'T IT?

01:52PM A. QUALCOMM PERFORMS -- AGAIN, IF YOU'RE REFERRING BY TEST --
01:53PM YOU KNOW, TESTING, AGAIN, IT'S A VERY BROAD STATEMENT. IF YOU
01:53PM ARE TALKING ABOUT CHARACTERIZATION, STRUCTURAL TESTING,
01:53PM FUNCTIONAL TESTING, YOU KNOW, DURABILITY, THEY'RE ALL KINDS OF
01:53PM THINGS UNDER TESTING.
01:53PM BUT IF YOU ARE REFERRING TO CHARACTERIZATION,
01:53PM CHARACTERIZATION IS PERFORMED TO ENSURE FOR THE WIDE RANGE OF
01:53PM PROCESS VARIATIONS THAT WE RECEIVE FROM THE FACTORY AND, YOU
01:53PM KNOW, WE SHIP -- THE PARTS THAT WE SHIP, THE PARTS THAT
01:53PM QUALCOMM SHIPS ARE WITHIN THAT WIDE RANGE.
01:53PM SO CHARACTERIZATION IS DONE TO ENSURE THE PARTS THAT
01:53PM QUALCOMM SHIPS TO CUSTOMER HAVE THE GUARANTEE OF OPERATION
01:53PM WITHIN THOSE VARIATIONS.
01:53PM Q. AND IN FACT, ONE OF THE REASONS THAT QUALCOMM TESTS ITS
01:53PM CHIPS IS SO THAT IT CAN PERFORM SPEED BINNING; RIGHT?
01:53PM A. SPEED BINNING IS A COMPLETELY DIFFERENT ISSUE FROM THIS.
01:53PM Q. OKAY. BUT SPEED BINNING DOES TAKE INTO ACCOUNT PROCESS OR
01:53PM FABRICATION VARIATIONS, DOES IT NOT?
01:54PM A. IT DOESN'T HAVE TO REALLY -- BASICALLY WHAT YOU ARE DOING
01:54PM IS IF YOU DO A SPEED BINNING, YOU DECIDE -- YOU LOOK AT THE
01:54PM RANGE, THE SPECTRUM OF THE CHANGE IN THE PROCESS, LET'S SAY ON
01:54PM THE LEFT-HAND SIDE YOU HAVE THE VERY SLOW PROCESS, ON
01:54PM RIGHT-HAND SIDE YOU HAVE THE VERY FAST PROCESS.
01:54PM WHAT DOES SLOW AND FAST MEAN? IT DOESN'T MEAN YOUR PLL
01:54PM COULD DO 2 GIGAHERTZ HERE AND IT NOW CAN DO 4 GIGAHERTZ. PLL

01:54PM CAN DO 4 GIGAHERTZ ON EITHER SIDE OF THESE CORNERS.
01:54PM WHAT FAST AND SLOW MEAN IS THE RECEIVING CIRCUIT. IN OUR
01:54PM ARGUMENTS, IT'S THE CPU. IT'S CAPABLE OF DOING BETTER THAN IT
01:54PM WAS DESIGNED FOR IN TERMS OF RECEIVING HIGHER SPEED CLOCK IN
01:54PM THE FAST CORNER.
01:54PM SO IT'S A MARKETING OR BUSINESS DECISION THAT, LOOK, WE
01:54PM SPECCED, ORIGINALLY SPECCED THIS PART TO OPERATE THE CPU AT 800
01:54PM MEGAHERTZ, BUT WE SEE THAT FOR 75 PERCENT OR 80 PERCENT OF THE
01:55PM DEVICES THAT WE GET, THAT SUFFICES.
01:55PM NOW, IS THERE A MARKET FOR 1.2 GIGAHERTZ? SURE, THERE IS
01:55PM IF YOU DO THAT. SO WE HAVE A PREMIUM FOR THE FAST CORNER
01:55PM PROCESS DEVICES, AND THEN THE FREQUENCY PLAN, THE PLL PLAN IS
01:55PM GOING TO CHANGE FOR THAT PARTICULAR GROUP OF DEVICES.
01:55PM Q. OKAY. UNDERSTOOD. SO YOU CHANGE THE PLL PLAN BASED ON
01:55PM THE SPEED BIN THAT THE CHIP GOES IN; RIGHT?
01:55PM A. RIGHT. AND THE CHIPS USUALLY ARE GOING TO HAVE A
01:55PM DIFFERENT IDENTIFICATION WHEN THEY ARE AT THE HIGHER SPEED
01:55PM VERSUS THE ONE THAT --
01:55PM Q. AND I THINK YOU CALLED THESE PREMIUM CHIPS, THE FASTER
01:55PM ONES, RIGHT?
01:55PM A. I DON'T KNOW IF IT'S PREMIUM, BUT THE MARKETING GROUP.
01:55PM Q. BUT YOU'RE ABLE TO CHARGE MORE MONEY FOR THOSE CHIPS;
01:55PM RIGHT?
01:55PM A. YES.
01:55PM Q. OKAY. GOOD. AND I WANT TO TAKE A LOOK AT AN IEEE

EXHIBIT 2

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

HTC CORPORATION AND HTC AMERICA, INC., PLAINTIFF, VS. TECHNOLOGY PROPERTIES LIMITED, PATRIOT SCIENTIFIC CORPORATION AND ALLIACENSE LIMITED, DEFENDANT.	C-08-00882 PSG SAN JOSE, CALIFORNIA SEPTEMBER 26 2013 VOLUME 4 PAGES 641-900

TRANSCRIPT OF PROCEEDINGS
BEFORE THE HONORABLE PAUL S. GREWAL
UNITED STATES MAGISTRATE JUDGE

A P P E A R A N C E S:

FOR THE PLAINTIFF: COOLEY LLP
BY: HEIDI KEEFE
RON LEMIEUX
3175 HANOVER STREET
PALO ALTO, CALIFORNIA 94304

APPEARANCES CONTINUED ON NEXT PAGE

OFFICIAL COURT REPORTER: LEE-ANNE SHORTRIDGE, CSR, CRR
CERTIFICATE NUMBER 9595

PROCEEDINGS RECORDED BY MECHANICAL STENOGRAPHY
TRANSCRIPT PRODUCED WITH COMPUTER

APPEARANCES (CONTINUED)

FOR THE PLAINTIFF: COOLEY LLP
BY: STEPHEN R. SMITH
1299 PENNSYLVANIA AVENUE, NW
SUITE 700
WASHINGTON, D.C. 20004

BY: MATTHEW J. LEARY
380 INTERLOCKEN CRESCENT, SUITE 900
BROOMFIELD, COLORADO 80021

ALSO PRESENT: VINCENT LAM

FOR DEFENDANTS TPL AND ALLIACENSE: AGILITY IP LAW
BY: JAMES C. OTTESON
IRVIN E. TYAN
THOMAS T. CARMACK
VINCENT K. YEE
DAVID LANSKY
149 COMMONWEALTH DRIVE
MENLO PARK, CALIFORNIA 94025

FOR DEFENDANT PATRIOT: KIRBY, NOONAN, LANCE & HOGE
CHARLES T. HOGE
35 TENTH AVENUE
SAN DIEGO, CALIFORNIA 92101

ALSO PRESENT: CHARLES MOORE
CLIFFORD FLOWERS
DAN LECKRONE
MACK LECKRONE

INDEX OF WITNESSES

DEFENDANTS'

INDEX OF EXHIBITS

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SAN JOSE, CALIFORNIA SEPTEMBER 26, 2013

P R O C E E D I N G S

(JURY OUT AT 9:01 A.M.)

THE COURT: MR. RIVERA, WOULD YOU CALL THE MATTER THAT'S BEEN SET FOR TRIAL, IF YOU WOULD.

THE CLERK: YES, YOUR HONOR. CALLING HTC CORPORATION, ET AL VERSUS TECHNOLOGY PROPERTIES LIMITED, ET AL, CASE NUMBER CV-08-882 PSG. MATTER ON FOR TRIAL.

COUNSEL, PLEASE STATE YOUR APPEARANCES.

THE COURT: COUNSEL, YOU WANT TO STATE YOUR APPEARANCES, AT LEAST IN A REPRESENTATIVE CAPACITY.

MR. OTTESON: I'M SORRY. YES, JIM OTTESON, AGILITY IP LAW. I REPRESENT DEFENDANTS TPL AND ALLIACENSE.

MR. HOGE: EXCUSE ME, YOUR HONOR. CHARLIE HOGE FOR PATRIOT SCIENTIFIC.

THE COURT: MR. OTTESON, MR. HOGE, GOOD MORNING. GOOD MORNING TO YOUR COLLEAGUES AS WELL.

MS. KEEFE: YOUR HONOR, GOOD MORNING. HEIDI KEEFE FROM COOLEY REPRESENTING HTC, WITH MY COLLEAGUES STEVE SMITH, MATT LEARY, AND RON LEMIEUX.

THE COURT: ALL RIGHT. GOOD MORNING, MS. KEEFE, AND TO EACH OF YOUR COLLEAGUES AS WELL.

MR. SMITH: GOOD MORNING, YOUR HONOR.

THE COURT: I UNDERSTAND WE HAVE AT LEAST A COUPLE OF ISSUES TO ADDRESS, EXHIBITS AND SO FORTH. WHO WANTS TO GO

11:20AM Q. OKAY. SO LET ME PUT IT UP ON THE ELMO. AND THAT'S THE
11:20AM CONSTRUCTION, RIGHT, DOCTOR, THE ENTIRE OSCILLATOR THAT WE JUST
11:20AM SAW IN THE CLAIM IS PROPERLY UNDERSTOOD TO EXCLUDE ANY EXTERNAL
11:20AM CLOCK USED TO GENERATE THE SIGNAL USED TO CLOCK THE CPU; RIGHT?
11:20AM **A. EXCLUDE ANY EXTERNAL CLOCK -- YES, THAT'S CORRECT.**
11:21AM Q. AND YOU APPLIED THAT CLAIM CONSTRUCTION IN OFFERING YOUR
11:21AM OPINION; CORRECT?
11:21AM **A. I DO, ABSOLUTELY.**
11:21AM Q. RIGHT. NOW, WE'RE ALL BOUND BY THIS CONSTRUCTION? WE ALL
11:21AM HAVE TO USE IT?
11:21AM **A. THAT -- THOSE ARE THE RULES OF THE GAME.**
11:21AM Q. THE RULES OF THE GAME, OKAY. AND I WANT TO WALK THROUGH
11:21AM THE RULES OF THE GAME WITH YOU IN A LITTLE BIT OF DETAIL.
11:21AM NOW, IT SAYS, "PROPERLY UNDERSTOOD TO EXCLUDE ANY EXTERNAL
11:21AM CLOCK," AND YOU WOULD AGREE WITH ME, DOCTOR, THAT AN EXTERNAL
11:21AM CLOCK MEANS IT'S OFF THE CHIP; RIGHT?
11:21AM **A. I ABSOLUTELY AGREE WITH YOU, MR. SMITH.**
11:21AM Q. YOU AGREE -- I'M SORRY?
11:21AM **A. ABSOLUTELY I AGREE.**
11:21AM Q. OKAY. THANK YOU.
11:21AM SO -- AND YOU WOULD AGREE WITH ME THAT IF THERE'S AN
11:21AM OFF-CHIP CLOCK THAT'S USED TO GENERATE THE SIGNAL THAT CLOCKS
11:21AM THE CPU, THEN THERE'S NO INFRINGEMENT; RIGHT?
11:21AM **A. THEN THE ELEMENT 13 -- WELL, THE ELEMENT A IS NOT**
11:22AM **SATISFIED AND THAT WILL KNOCK BOTH OF THEM OUT.**

11:22AM Q. BECAUSE YOU HAVE TO HAVE ALL OF THE ELEMENTS TO INFRINGE;
11:22AM RIGHT?
11:22AM **A. THAT IS -- IF I'M BEING A GOOD LAW STUDENT, I THINK THAT'S**
11:22AM **HOW I UNDERSTAND IT.**
11:22AM Q. OKAY. NOW, LET'S GO -- LET'S GO RIGHT TO THE ACCUSED
11:22AM PHONES AND SEE IF WE CAN SEE WHERE WE DISAGREE ON THE CLAIM
11:22AM CONSTRUCTION. LET'S GO RIGHT TO THE HEART OF THE MATTER.
11:22AM **A. RIGHT TO THE HEART, THAT'S RIGHT.**
11:22AM Q. NOW, SOME OF THE -- WE CAN DROP THAT, JIM.
11:22AM SOME OF THE HTC PHONES USE A QUALCOMM CHIP; RIGHT?
11:22AM **A. YES, SOME.**
11:22AM Q. AND SOME USE A TEXAS INSTRUMENTS CHIP?
11:22AM **A. CORRECT.**
11:22AM Q. AND OTHERS, THE REMAINDER, USE THE SAMSUNG CHIPS; RIGHT?
11:22AM **A. THAT IS CORRECT.**
11:22AM Q. AND FOR PURPOSES OF YOUR INFRINGEMENT ANALYSIS, THEY
11:22AM GENERALLY WORK THE SAME WAY; CORRECT?
11:22AM **A. THAT IS CORRECT.**
11:22AM Q. OKAY. AND SO YOU WOULD AGREE WITH ME, DOCTOR, THAT ALL OF
11:22AM THE ACCUSED HTC PHONES THAT YOU LOOKED AT, WHATEVER THE
11:23AM MANUFACTURER OF THE CHIP, ALL HAD A PLL IN THEM; RIGHT?
11:23AM **A. THAT IS CORRECT.**
11:23AM Q. AND I WANT TO PUT YOUR DIAGRAM UP.
11:23AM IF WE CAN GET THE ELMO AGAIN, JIM. THANK YOU.
11:23AM AND YOU REMEMBER THIS -- YOU PREPARED THIS SLIDE; RIGHT?

11:23AM **A. YES.**
11:23AM Q. AND IN ALL OF THE HTC PHONES THAT HAVE THE -- AND ALL OF
11:23AM THEM HAVE PLL, AND THE PLL SENDS OUT A CLOCK THAT CLOCKS THE
11:23AM CPU (INDICATING); CORRECT?
11:23AM **A. THAT IS CORRECT.**
11:23AM Q. AND ALL THE HTC PHONES HAVE AN EXTERNAL REFERENCE
11:23AM (INDICATING); RIGHT?
11:23AM **A. THAT IS CORRECT.**
11:23AM Q. AND THEY'RE ALL DIRECTLY OR INDIRECTLY BASED ON A CRYSTAL;
11:23AM RIGHT?
11:23AM **A. AS WE HAVE SEEN IT, RIGHT.**
11:23AM Q. RIGHT. COULD BE DIRECTLY FROM A CRYSTAL OR IT COULD BE
11:23AM FROM A CLOCK GENERATOR THAT HAS A CRYSTAL; RIGHT?
11:24AM **A. SOMETHING STABLE.**
11:24AM Q. OKAY. BUT THEY ALL COME FROM A CRYSTAL ONE WAY OR THE
11:24AM OTHER; RIGHT?
11:24AM **A. LET'S SAY YES. I MEAN, NOT NECESSARILY, BUT SOMETHING**
11:24AM **STABLE, STABLE REFERENCE, AND CRYSTAL IS USUALLY STABLE**
11:24AM **REFERENCE.**
11:24AM Q. SO THIS IS A STABLE REFERENCE (INDICATING). ALL THE
11:24AM PHONES USE A STABLE REFERENCE INTO THE PLL; CORRECT?
11:24AM **A. THAT IS CORRECT.**
11:24AM Q. AND COULD YOU CALL THAT A FIXED REFERENCE?
11:24AM **A. I WOULD CALL IT STABLE.**
11:24AM Q. STABLE. BECAUSE NOTHING IS PERFECT; CORRECT?

11:24AM **A. THAT IS CORRECT.**
11:24AM Q. OKAY. NOW -- AND THIS IS -- THIS IS EXTERNAL, RIGHT,
11:24AM DOCTOR?
11:24AM **A. THAT IS EXTERNAL.**
11:24AM Q. OKAY. AND ALL THE HTC PHONES THAT YOU LOOKED AT --
11:24AM AND, YOUR HONOR, MAY I APPROACH THE SCREEN?
11:24AM THE COURT: YOU MAY, MR. SMITH.
11:24AM MR. SMITH: THANK YOU.
11:24AM Q. -- THEY ALL CONTAIN EITHER A RING OSCILLATOR OR AN
11:24AM OSCILLATOR IN A PLL; CORRECT?
11:24AM **A. THAT IS CORRECT.**
11:24AM Q. AND YOUR POINT, DOCTOR, IF I UNDERSTOOD YOUR TESTIMONY
11:25AM CORRECTLY, WAS THAT IT'S THE RING OSCILLATOR OR THE OSCILLATOR
11:25AM THAT, APPLYING THE JUDGE'S CLAIM LANGUAGE, IS USED TO GENERATE
11:25AM THE CLOCK SIGNAL; CORRECT?
11:25AM **A. THAT IS CORRECT. IT IS CONNECTED TO THE CPU, IT GENERATES**
11:25AM **THAT CLOCK SIGNAL AS I EXPLAINED TO THE COURT, AND THAT IS THE**
11:25AM **CLOCK GENERATOR.**
11:25AM Q. SO THE ANSWER IS YOU'RE POINTING TO THE RING OSCILLATOR OR
11:25AM THE OSCILLATOR AND SAYING THAT THAT'S USED TO GENERATE THAT
11:25AM CLOCK?
11:25AM **A. THAT IS CORRECT.**
11:25AM Q. RIGHT. AND YOUR POINT IS THAT EVEN THOUGH THERE'S A
11:25AM CRYSTAL OR AN EXTERNAL REFERENCE THAT GOES INTO THE PLL --
11:25AM **A. RIGHT.**

11:25AM Q. -- THIS IS NOT USED TO GENERATE THE CLOCK SIGNAL OVER HERE
11:25AM (INDICATING); RIGHT?
11:25AM A. **THAT IS CORRECT.**
11:25AM Q. THAT'S YOUR OPINION?
11:25AM A. **IT IS NOT USED TO GENERATE.**
11:25AM Q. RIGHT. TO?
11:26AM A. **TO GENERATE. IT IS USED TO BE A REFERENCE. IT IS USED TO**
11:26AM **ADJUST, BUT IT IS NOT USED TO GENERATE.**
11:26AM Q. WE'LL GET THERE, DOCTOR. TRUST ME. BUT I JUST WANT TO
11:26AM MAKE SURE WE KNOW WHERE THE DISPUTE IS. OKAY?
11:26AM SO YOUR POINT IS IT'S THE RING OSCILLATOR OR OSCILLATOR
11:26AM ALONE THAT GENERATES THIS CLOCK SIGNAL; CORRECT?
11:26AM A. **AS I HAVE DEMONSTRATED HERE IN COURT.**
11:26AM Q. RIGHT. BUT I JUST WANT TO MAKE SURE WE'RE ON THE SAME
11:26AM PAGE.
11:26AM A. **YES.**
11:26AM Q. OKAY, GOOD. NOW, YOU'LL AT LEAST AGREE WITH ME, DOCTOR,
11:26AM THAT THIS EXTERNAL REFERENCE RIGHT HERE IS AN ESSENTIAL PART OF
11:26AM THE, OF ALL THE PLL'S IN THE HTC PHONES (INDICATING); RIGHT?
11:26AM A. **I AGREE WITH YOU THAT IF WE ARE TALKING ABOUT PLL, PLL**
11:26AM **NEEDS TO HAVE A REFERENCE. SO IT IS -- LIKE IF WE ARE -- IF I**
11:26AM **AM TEACHING PLL, OKAY, I'LL HAVE TO INCLUDE THE REFERENCE.**
11:26AM Q. RIGHT. SO YOUR POINT IS YOU CAN'T HAVE A -- YOU CAN'T
11:27AM HAVE A PLL WITHOUT A CRYSTAL?
11:27AM A. **WITHOUT A REFERENCE, YES, CORRECT.**

11:27AM Q. OKAY. AND TYPICALLY THE REFERENCE IS A CRYSTAL; CORRECT?
11:27AM A. **YES, LET'S SAY A CRYSTAL.**
11:27AM Q. A STABLE, EXTERNAL REFERENCE; CORRECT?
11:27AM A. **YES, RIGHT.**
11:27AM Q. OKAY. NOW --
11:27AM YOUR HONOR, MAY I APPROACH AGAIN?
11:27AM THE COURT: YOU MAY.
11:27AM MR. SMITH: THANK YOU.
11:27AM Q. NOW, THIS STABLE REFERENCE HAS A RELATIONSHIP TO THE CLOCK
11:27AM SIGNAL IN ALL THE HTC PHONES THAT YOU LOOKED AT (INDICATING);
11:27AM CORRECT?
11:27AM A. **IT IS USED TO ADJUST THE FREQUENCY GENERATED BY THE RING**
11:27AM **OSCILLATOR, SO IT HAS SOME RELATIONSHIP WITH IT.**
11:27AM Q. AND I THINK -- AND IT'S A -- IT'S A FORMULA; RIGHT?
11:27AM A. **YOU CAN PUT IT THIS WAY. AS I EXPLAINED TO THE COURT,**
11:27AM **BASICALLY IF I CAN POINT, THIS FREQUENCY AND THIS FREQUENCY**
11:27AM **HAVE TO BE EQUAL (INDICATING).**
11:27AM Q. BUT IT'S A FORMULA?
11:27AM A. **HOWEVER YOU COME TO THAT, YEAH, YOU CAN MAKE A FORMULA OUT**
11:28AM **OF IT, BUT BASICALLY DIVIDING THE RING OSCILLATOR TO BE EQUAL,**
11:28AM **OR EVEN IF THERE IS -- IF YOU WANT THIS ONE TO RUN EXACTLY**
11:28AM **EQUAL FREQUENCY OF THIS ONE, THEN YOU HAVE TO DIVIDE IT.**
11:28AM Q. WELL, DOCTOR, YOU CALL THIS, THIS RELATIONSHIP, I THINK
11:28AM YOU WERE SMILING WHEN YOU SAID IT, BUT YOU CALLED IT THE SECRET
11:28AM FORMULA; RIGHT?

11:28AM A. **BECAUSE --**
11:28AM Q. BUT THAT'S WHAT YOU SAID, SIR; RIGHT?
11:28AM A. **IT'S A COMMON SENSE.**
11:28AM Q. NO, NO. I DIDN'T --
11:28AM A. **THIS IS EQUAL TO THAT, SO YOU CAN DERIVE THAT RELATIONSHIP**
11:28AM **AND IT'S A TEXTBOOK.**
11:28AM Q. WELL, DOCTOR, I PROMISE YOU, WE WILL GET TO THE FORMULA.
11:28AM A. **OKAY.**
11:28AM Q. BUT I WANT TO JUST ASK SOME SIMPLE QUESTIONS SO WE'RE
11:28AM ROLLING ON THE SAME PAGE.
11:28AM A. **ALL RIGHT.**
11:28AM Q. YOU CALLED THIS RELATIONSHIP BETWEEN THE EXTERNAL
11:28AM REFERENCE AND THIS CLOCK SIGNAL (INDICATING), YOU REFERRED TO
11:28AM IT AS THE SECRET FORMULA; RIGHT? YES?
11:28AM A. **I USED THE TERM BECAUSE IT IS IN EVERY TEXTBOOK, SO I WAS**
11:29AM **SURPRISED IT'S SECRET.**
11:29AM Q. RIGHT. BUT THE FORMULA FOR THE RELATIONSHIP BETWEEN THIS
11:29AM EXTERNAL CRYSTAL, EXTERNAL REFERENCE AND THE CLOCK SIGNALS IS
11:29AM IN EVERY TEXTBOOK? THAT'S YOUR POINT; RIGHT?
11:29AM A. **AND EVERY TEXTBOOK ON PLL WILL TELL YOU THAT THIS, YOU**
11:29AM **KNOW, IS RELATED TO THAT ONE AND IT'S RELATED BY WHATEVER**
11:29AM **DIVIDE FACTOR IT IS, AND IF YOU PUT A DIVIDE FACTOR OVER THERE,**
11:29AM **YOU KNOW, ET CETERA, WHICH MEANS WHAT MR. HAROUN WAS TRYING TO**
11:29AM **DIVIDE HERE --**
11:29AM Q. RIGHT.

11:29AM A. **-- NOT VERY SUCCESSFULLY.**
11:29AM Q. IF WE CAN TAKE DOWN -- AND YOU DISAGREED WITH DR. HAROUN;
11:29AM CORRECT?
11:29AM A. **I DIDN'T HAVE A PRIVILEGE TO SEE THAT FORMULA AND --**
11:29AM Q. JUST IN GENERAL YOU DISAGREE?
11:29AM A. **AND I WONDER IF THAT WOULD BE ANYTHING DIFFERENT THAN**
11:29AM **WHAT'S IN THE TEXTBOOKS.**
11:29AM Q. OKAY. IF WE COULD TAKE DOWN THE ELMO AND PUT UP EXHIBIT
11:29AM 3027. AND LET'S -- WE'VE LOOKED AT A LOT OF SLIDES AND
11:30AM ANIMATIONS IN THIS CASE, DOCTOR, BUT I WANT TO LOOK AT AN
11:30AM ACTUAL DATA SHEET FOR ONE OF THE QUALCOMM CHIPS THAT'S USED IN
11:30AM AN ACTUAL ACCUSED HTC PHONE. RIGHT?
11:30AM A. **YEAH.**
11:30AM Q. AND THIS IS A PLL (INDICATING)?
11:30AM A. **THAT IS A PLL.**
11:30AM Q. AND IT'S FOR 45 NANOMETER MOBILE CPU'S; CORRECT?
11:30AM A. **CORRECT.**
11:30AM Q. AND THE 45 NANOMETER, NM, REFERS TO THE SIZE OF THE CHIP;
11:30AM CORRECT?
11:30AM A. **IT IS FABRICATION TECHNOLOGY, WHICH MEANS THAT MINIMAL**
11:30AM **TRANSISTOR FEATURE SIZE IS 45 NANOMETER.**
11:30AM Q. IT REFERS TO THE PHOTOLITHOGRAPHY PROCESS TO GET TO THE 45
11:30AM NANOMETERS; CORRECT?
11:30AM A. **YES, CORRECT.**
11:30AM Q. OKAY. NOW, THIS DATA SHEET IS CONFIDENTIAL --

11:30AM OH, CAN WE GO DARK ON THE OUTSIDE, PLEASE? OKAY, GREAT.
11:30AM -- IT'S QUALCOMM CONFIDENTIAL AND PROPRIETARY INFORMATION;
11:30AM CORRECT?
11:30AM **A. THAT IS CORRECT.**
11:31AM **Q.** AND THEY SHARE IT WITH THEIR CUSTOMERS SUCH AS HTC;
11:31AM CORRECT?
11:31AM **A. THEY SHARE IT WITH HTC.**
11:31AM **Q.** AND THIS TYPE OF DATA SHEET IS SHARED WITH, TYPICALLY, HTC
11:31AM ENGINEERS; RIGHT?
11:31AM **A. THAT IS CORRECT.**
11:31AM **Q.** OKAY. THIS IS NOT FOR MASS PUBLICATION?
11:31AM **A. THAT IS CORRECT.**
11:31AM **Q.** YOU HAVE TO HAVE A -- YOU'VE GOT TO BE PRETTY TECHNICAL TO
11:31AM READ THESE, DOCTOR; RIGHT?
11:31AM **A. THAT IS CORRECT.**
11:31AM **Q.** OKAY. AND LET'S TAKE A LOOK AT FIGURE 2.1, IF WE COULD,
11:31AM JIM, WHICH IS ON PAGE 9.
11:31AM DOCTOR, THAT SHOULD BE RIGHT IN FRONT OF YOU.
11:31AM **A. YES.**
11:31AM **Q.** AND IF WE COULD BLOW UP THIS PLL CORE (INDICATING).
11:31AM NOW, THIS IS A BLOCK DIAGRAM OF A PLL (INDICATING);
11:31AM CORRECT?
11:31AM **A. YES. AND I THINK I SHOWED THE VERY SAME ONE HERE.**
11:32AM **Q.** OR VERY SIMILAR; RIGHT?
11:32AM **A. NO. THE SAME ONE WAS IN MY PRESENTATION.**

11:32AM **Q.** OKAY. NOW, THIS TCXO, DOCTOR, DO YOU SEE THAT?
11:32AM **A. YES.**
11:32AM **Q.** THAT'S A TEMPERATURE CONTROLLED CRYSTAL OSCILLATOR; RIGHT?
11:32AM **A. AS I EXPLAINED, YES.**
11:32AM **Q.** AND THAT INCLUDES A CRYSTAL; RIGHT?
11:32AM **A. THAT'S A STABLE REFERENCE.**
11:32AM **Q.** STABLE REFERENCE. AND THAT STABLE REFERENCE IS OFF CHIP;
11:32AM CORRECT?
11:32AM **A. THAT IS CORRECT. THAT'S IN THE LITTLE SHINY BOX WHICH I**
11:32AM **HAVE SHOWN.**
11:32AM **Q.** OKAY. AND THE PLL OUT OF THE QUALCOMM CHIP SENDS THE
11:32AM FREQUENCY OF THAT CLOCK TO THE CPU; CORRECT?
11:32AM **A. THAT IS CORRECT.**
11:32AM **Q.** ALL RIGHT. AND SOMETIMES THAT'S REFERRED TO, AS YOU KNOW,
11:32AM CLOCK OUT OR PLL OUT; RIGHT?
11:32AM **A. THAT IS CORRECT.**
11:32AM **Q.** THERE'S NOT ONE STANDARD WAY YOU CAN REFER TO THAT PLL
11:32AM OUT; RIGHT?
11:32AM **A. YES.**
11:32AM **Q.** OKAY. NOW, IF WE LOOK AT PAGE 29 OF EXHIBIT 3027, AND WE
11:33AM CAN BLOW UP THE FIRST PART HERE, IT SAYS "OPERATION" AT THE
11:33AM TOP. JIM, IF WE COULD PULL THAT DOWN JUST A LITTLE BIT. IT
11:33AM SAYS "OPERATION" RIGHT HERE (INDICATING).
11:33AM AND 5.1 STATES "OUTPUT FREQUENCIES," CORRECT; DOCTOR.
11:33AM **A. YES, THAT'S CORRECT.**

11:33AM **Q.** AND IT STATES THAT "THE PLL OUTPUT FREQUENCY IS GIVEN
11:33AM BY" -- AND THE PLL OUTPUT CLOCK IS WHAT WE JUST SAW IN FIGURE
11:33AM 2; RIGHT?
11:33AM **A. YES.**
11:33AM **Q.** OKAY. AND NOW -- AND HERE'S THE SECRET FORMULA, F CLOCK
11:33AM EQUALS FTCXO, AND THIS IS TIMES L TIMES 2; RIGHT? DID I READ
11:33AM THAT RIGHT?
11:33AM **A. YES.**
11:33AM **Q.** THOSE LITTLE ASTERISKS, THEY'RE THE MULTIPLICATIONS --
11:33AM **A. YES.**
11:33AM **Q.** -- IN THIS FORMULA?
11:33AM **A. YES, BECAUSE YOU HAVE -- BECAUSE YOU HAVE DIVIDED THE**
11:33AM **CLOCK BY L AND YOU DIVIDED IT AGAIN BY 2, SO YOU HAVE TO**
11:34AM **MULTIPLY TO GET THAT.**
11:34AM **Q.** AND THAT TCXO WE SAW WAS FROM FIGURE 2; RIGHT?
11:34AM **A. YES.**
11:34AM **Q.** AND THAT'S THE EXTERNAL REFERENCE?
11:34AM **A. THAT'S THE EXTERNAL REFERENCE.**
11:34AM **Q.** AND THAT'S FIXED, OR A STABLE REFERENCE?
11:34AM **A. THAT IS A STABLE REFERENCE.**
11:34AM **Q.** OKAY. AND NOW IF WE GO DOWN TO THE TEXT, IT STATES, THE
11:34AM VALID OUTPUT FREQUENCIES, RIGHT HERE (INDICATING), WITH A 19.2
11:34AM MEGAHERTZ REFERENCE ARE LISTED IN TABLE 5.1. CORRECT? THAT'S
11:34AM WHAT IT SAYS?
11:34AM **A. YES.**

11:34AM **Q.** AND TABLE 5.1 IS NOT HERE, AND WE'LL GET TO THAT IN A
11:34AM MOMENT, BUT THIS 19.2 MEGAHERTZ IS REFERRING TO THE TCXO;
11:34AM CORRECT?
11:34AM **A. THAT IS CORRECT.**
11:34AM **Q.** AND THAT'S WHAT'S THE FREQUENCY THAT'S COMING INTO THE
11:34AM PLL?
11:34AM **A. YES, THAT'S CORRECT.**
11:34AM **Q.** THAT'S THE STABLE REFERENCE SIGNAL?
11:34AM **A. THAT'S THE REFERENCE THAT COMES FROM THE SHINY LITTLE**
11:34AM **HOUSING ON THE CHIP.**
11:34AM **Q.** OKAY. NOW, LET'S WALK THROUGH THIS FORMULA, DOCTOR.
11:34AM MAY I APPROACH AGAIN, YOUR HONOR?
11:34AM THE COURT: YOU MAY.
11:34AM BY MR. SMITH:
11:35AM **Q.** ON THIS TABLE 5-1 SAYS "PLL OUTPUT CLOCK FREQUENCIES WITH
11:35AM 19.2 MEGAHERTZ REFERENCE"?
11:35AM **A. CORRECT.**
11:35AM **Q.** AND AGAIN, THE 19.2 MEGAHERTZ REFERENCE IS REALLY THE TCXO
11:35AM UP THERE (INDICATING); RIGHT?
11:35AM **A. RIGHT.**
11:35AM **Q.** AND THIS INPUT FREQUENCY ON THE LEFT-HAND SIDE, IT'S
11:35AM ALWAYS 19.2; RIGHT?
11:35AM **A. THAT IS CORRECT.**
11:35AM **Q.** AND WHY IT'S CALLED INPUT FREQUENCY, IT'S ACTUALLY
11:35AM INPUTTED INTO THE PLL FROM OFF CHIP?

11:35AM **A. IT IS A REFERENCE, REFERENCE INPUT.**
11:35AM **Q.** FROM OFF CHIP?
11:35AM **A. FROM OFF CHIP.**
11:35AM **Q.** OKAY. AND THEN THE WAY THIS WORKS IS L IS REFERRED TO IN THE FORMULA UP HERE (INDICATING); CORRECT?
11:35AM **A. YEAH, THAT'S A DIVIDE FACTOR. THIS IS HOW MUCH THEY DIVIDE THE VCO FREQUENCY.**
11:35AM **Q.** OKAY. AND THEN THE WAY YOU SET L IS THROUGH THESE BINARY VALUES; CORRECT?
11:35AM **A. THAT IS THE BINARY 10.**
11:35AM **Q.** THAT'S 10, RIGHT THERE (INDICATING).
AND THIS IS A BINARY NUMBER 11 AND SO FORTH (INDICATING); CORRECT?
11:36AM **A. THAT IS CORRECT.**
11:36AM **Q.** OKAY. AND THEN WHEN WE SEE THE OUTPUT FREQUENCY, THIS IS WHAT COMES OUT OF THE PLL (INDICATING); CORRECT?
11:36AM **A. THAT IS -- YES, THAT IS THE FREQUENCY OF THE RING OSCILLATOR.**
11:36AM **Q.** OKAY. THIS -- THIS FREQUENCY IS OUTPUTTED FROM THE PLL; CORRECT?
11:36AM **A. FROM THE -- YES, FROM THE RING OSCILLATOR.**
11:36AM **Q.** WELL, COMING OUT OF THE PLL IS THIS FREQUENCY (INDICATING); RIGHT?
11:36AM **A. BECAUSE PLL IS SURROUNDING RING OSCILLATOR.**
11:36AM **Q.** NO, I UNDERSTAND. I'M JUST ASKING YOU, IT COMES OUT OF

11:36AM THE PLL, THOUGH; RIGHT?
11:36AM **A. IT COMES OUT OF -- IT CORRECTLY COMES OUT OF THE RING OSCILLATOR.**
BUT IF YOU PUT A BOX AROUND IT AND CALL IT PLL, THEN IT COMES OUT OF THE PLL.
11:36AM **Q.** OKAY. AND THE WAY YOU GET THERE, DOCTOR, AND LET ME -- LET'S MOVE BACK A LITTLE BIT.
SO THE USER, LIKE HTC, WOULD GET TO DECIDE WHAT FREQUENCY THEY WANT TO COME OUT OF THAT PLL; RIGHT?
11:36AM **A. THAT IS CORRECT.**
11:36AM **Q.** THAT'S THE PURPOSE OF A PLL? YOU CAN STABILIZE OR FIX THE DIFFERENT FREQUENCIES?
11:36AM **A. TO ADJUST THE FREQUENCY OF THE RING OSCILLATOR WILL BE**
11:37AM **WITH RESPECT TO REFERENCE -- JUST LIKE YOUR CRUISE CONTROL. SO**
11:37AM **THIS IS WHERE YOU'RE SETTING YOUR CRUISE CONTROL (INDICATING).**
11:37AM **Q.** SO YOU CAN SET THESE VALUES DIFFERENTLY DEPENDING UPON
11:37AM WHAT YOU WANT TO ACHIEVE IN THE PHONE; CORRECT?
11:37AM **A. THAT IS CORRECT.**
11:37AM **Q.** OKAY. NOW, THE WAY THIS WORKS -- LET'S GO THROUGH THE FIRST ONE. HERE WE HAVE THE REFERENCE SIGNAL COMING IN, RIGHT, 19.2?
11:37AM **A. YES.**
11:37AM **Q.** AND IT'S MULTIPLIED BY L, TIMES 10, RIGHT? AND THEN IT'S MULTIPLIED BY 2 AGAIN. SO 19.2 TIMES L, WHICH IS 10, TIMES 2, GIVES YOU THE 384; CORRECT?

11:37AM **A. OKAY. LET ME JUST EXPLAIN.**
11:37AM **Q.** NO, NO. CAN YOU JUST ANSWER MY QUESTION, DOCTOR? DID I DO THE MATH RIGHT?
11:37AM **A. YOU HAVE -- BECAUSE YOU DIVIDED. YOU DIVIDED IT BY 2. YOU DIVIDED -- YOU DIVIDED THE 384 BY 10, YOU GET 38, YOU DIVIDE IT BY 2, YOU GET 19.2 SO YOU CAN COMPARE THOSE TWO REFERENCES.**
THE PLL DOESN'T MULTIPLY. IT DIVIDES.
11:37AM **Q.** SO, DOCTOR, YOU'RE DISAGREEING WITH THIS QUALCOMM DOCUMENT; CORRECT?
11:38AM **A. WHAT THEY HAVE PRESENTED --**
11:38AM **Q.** NO. DOCTOR, CAN YOU JUST ANSWER MY QUESTION?
11:38AM **A. THERE IS A RELATIONSHIP BETWEEN --**
MR. SMITH: YOUR HONOR --
THE WITNESS: -- BETWEEN THE CLOCK AND THE REFERENCE, BUT THAT DOES NOT DESCRIBE HOW PLL WORKS. IT JUST TELLS YOU, IF YOU SET THAT ON 10, THIS IS WHAT YOU'RE GOING TO GET OUT.
THE COURT: MR. SMITH, DO YOU WISH TO RAISE AN OBJECTION OR MAKE A REQUEST?
MR. SMITH: I DON'T WANT TO BE ARGUMENTATIVE, YOUR HONOR. I JUST ASKED A VERY SIMPLE QUESTION AND I WOULD INSTRUCT THE WITNESS NOT TO --
THE COURT: YOU'RE ASKING ME TO GIVE THE WITNESS AN INSTRUCTION TO THE WITNESS?
MR. SMITH: YES.

THE COURT: MR. MARSH?
MR. MARSH: YOUR HONOR, WE WOULD JUST ASK THAT THE WITNESS BE PERMITTED TO ANSWER WITHOUT INTERRUPTION.
THE COURT: OKAY. SO LET ME JUST REITERATE SOME GROUND RULES.
DR. OKLOBDZIJA, YOU, LIKE ALL WITNESSES, MUST ANSWER A QUESTION PUT TO YOU IN CROSS-EXAMINATION WITH A "YES" OR "NO" OR "I DON'T KNOW," ASSUMING THE QUESTION ASKS FOR THAT TYPE OF RESPONSE.
MR. MARSH WILL GIVE YOU AN OPPORTUNITY TO CLARIFY ANY CONCERNS YOU MAY HAVE IN HIS REDIRECT.
AS FOR LETTING THE WITNESS ANSWER THE QUESTION, THAT'S A FAIR REQUEST AS WELL.
MR. OKLOBDZIJA, I'M SURE IF YOU ANSWER THE QUESTION, HE WILL GIVE YOU A FULL OPPORTUNITY TO GIVE YOUR ANSWER.
BUT LET'S PROCEED ON THOSE LINES SO WE DON'T WASTE THE JURY'S TIME.
MR. SMITH: THANK YOU, YOUR HONOR.
THE COURT: MR. SMITH, GO AHEAD.
MR. MARSH: THANK YOU, YOUR HONOR.
BY MR. SMITH:
11:39AM **Q.** SO, DR. OKLOBDZIJA, YOU WOULD AGREE WITH ME, 19.2 TIMES 10
11:39AM TIMES 2 EQUALS 384; CORRECT?
11:39AM **A. THAT IS THE BASIC MATH.**
11:39AM **Q.** THAT'S THE BASIC MATH THAT'S IN THIS DOCUMENT; CORRECT?

11:39AM **A. THAT THEY PUT IN A DOCUMENT TO, TO TELL PEOPLE HOW CAN**
THEY GET THE REFERENCE FREQUENCY OR HOW CAN THEY HAVE THE
OUTPUT FREQUENCY WITH RESPECT TO THE REFERENCE, WHICH IS 19.2.
Q. OKAY. AND IT'S ALL BASED UPON THIS FORMULA (INDICATING);
CORRECT?
A. THIS FORMULA SHOWS THE RELATIONSHIP TO IT.
Q. OKAY. WE CAN TAKE THAT ONE DOWN. THANK YOU, DOCTOR.
NOW, DR. OKLOBDZIJA, ONE OF THE -- LET'S SWITCH GEARS.
LET ME TELL YOU WE'RE GOING TO SWITCH GEARS. WE'RE OFF THE
SECRET FORMULA. LET'S TALK ABOUT BINNING.
A. ALL RIGHT.
Q. ALL RIGHT. NOW, BINNING HAS BEEN AROUND FOR A LONG TIME;
RIGHT?
A. NOT FOR SUCH A LONG TIME. I BELIEVE THAT, YOU KNOW, THE
FIRST HALF OF THE TECHNOLOGY LIFE THERE WAS NO BINNING. IT
CAME LATER WHEN VARIATIONS INCREASED.
Q. IT WAS THERE BY THE EARLY '80S; RIGHT?
A. FOR SOME HIGH SPECIALTY PARTS.
Q. OKAY. AND IF WE CAN GO BACK TO THE ELMO, AND JUST SO WE
CAN ORIENT OURSELVES, WHEN YOU PUT UP -- I PUT UP CLAIM 16, OR
13, I BELIEVE, AND WE HAD THE PINK OR PURPLE VARYING TOGETHER,
THAT'S THE SECOND ELEMENT, RIGHT?
A. ELEMENT B.
Q. ELEMENT B. SO WE'VE MOVED ON FROM ELEMENT A. NOW WE'RE
ON ELEMENT B; RIGHT?

A. THAT'S CORRECT.
Q. NOW, BINNING, YOU SAID BINNING IS ONE OF THE REASONS WHY
YOU BELIEVE THAT THE VARYING TOGETHER ELEMENT WAS INFRINGED;
CORRECT?
A. WELL, BECAUSE THEY VARY TOGETHER WHEN YOU PUT THEM IN THE
FAST BIN, THEY'RE FAST TOGETHER. WHEN YOU PUT THEM IN THE SLOW
BIN, THEY'RE SLOW TOGETHER.
Q. SO YOU, YOU SAY THE HTC PHONES INFRINGE THE VARYING
TOGETHER LIMITATION BECAUSE OF BINNING; CORRECT?
A. THAT IS CORRECT.
Q. OKAY. NOW, LET'S GO THROUGH THE PROCESS OF BINNING IN A
LITTLE BIT OF DETAIL. OKAY?
A. ALL RIGHT.
Q. THE CHIPS ARE BASICALLY SORTED BY SPEED CAPABILITY.
YOUR HONOR, MAY I APPROACH AGAIN?
THE COURT: YOU MAY, MR. SMITH.
MR. SMITH: THANK YOU.
Q. BY SPEED; RIGHT? 800 MEGAHERTZ, 1.0 GIGAHERTZ, AND THIS
LOOKS LIKE 1.3 GIGAHERTZ; CORRECT?
A. YEAH. THAT'S ILLUSTRATION.
Q. AND SO THE CHIPS -- AND THE SPEED WE'RE TALKING ABOUT IS
CAPABILITY; RIGHT?
A. WHEN YOU BIN, IT'S THE ACTUAL SPEED.
Q. WELL, YOU COULD SET THE SPEED LOWER THAN 800 MEGAHERTZ;
CORRECT?

A. YOU CAN SET IT LOWER, YES.
Q. THIS IS THE MAXIMUM SPEED; CORRECT?
A. MAXIMUM SAFE SPEED.
Q. MAXIMUM SAFE SPEED, OKAY.
SO THESE CHIPS ARE ALL SORTED INTO DIFFERENT BINS BASED
UPON WHAT YOU CALL MAXIMUM SAFE SPEED; CORRECT?
A. BASED ON THEIR CAPABILITIES.
Q. RIGHT. AND THE WAY YOU DETERMINE WHERE THE CHIP WOULD GO
INTO WHAT BIN IS YOU HAVE TO TEST THESE; RIGHT?
A. THAT IS CORRECT.
Q. AND I THINK YOU SHOWED US SOME VIDEO OR SOME -- OR SLIDES
THAT THERE WERE SEVERAL TESTING STEPS YOU HAVE TO GO THROUGH.
A. THAT IS CORRECT.
Q. AND YOU HAVE TO HOOK THE CHIPS UP AND SEE HOW FAST THEY
RUN?
A. THAT IS CORRECT.
Q. AND IT'S PRETTY SOPHISTICATED EQUIPMENT; RIGHT?
A. THAT IS CORRECT.
Q. OKAY. AND ONCE YOU DETERMINE HOW FAST THESE THINGS ARE,
THE MAXIMUM SAFE SPEED, YOU PUT THEM IN DIFFERENT BINS,
LITERALLY PUT THEM IN SEPARATE FILES (INDICATING); CORRECT?
A. YES, THAT'S CORRECT.
Q. AND THEN THE MANUFACTURER, LIKE QUALCOMM, FOR EXAMPLE,
WOULD SELL THESE CHIPS FOR DIFFERENT PRICES; CORRECT?
A. YES, THAT'S CORRECT.

Q. AND THE SLOW ONES WOULD GO INTO A PHONE, A FLIP TOP PHONE,
FOR EXAMPLE; AND THEN THE MEDIUM WOULD GO IN A DIFFERENT PHONE;
AND SO FORTH AND SO ON; RIGHT?
A. RIGHT.
Q. BUT YOU WOULD AGREE WITH ME, DOCTOR, THESE CHIPS THAT ARE
IN ONE BIN FROM THE OTHER ARE DIFFERENT; CORRECT? THEY'RE
DIFFERENT CHIPS?
A. WITHIN A BIN?
Q. NO, BETWEEN THE BINS.
A. YES.
Q. THIS IS A DIFFERENT SET OF CHIPS (INDICATING) THAN THIS
SET OF CHIPS (INDICATING) THAN THIS SET OF CHIPS (INDICATING);
RIGHT?
A. THEY COME FROM THE SAME WAFER, SO THEY ARE SAME CHIPS, BUT
WITH DIFFERENT CAPABILITIES.
Q. RIGHT. THEY EACH HAVE DIFFERENT CAPABILITIES; RIGHT?
A. THAT'S CORRECT.
Q. AND WITHIN THE BIN, THEY HAVE THE SAME CAPABILITIES,
GENERALLY?
A. WITHIN A RANGE.
Q. IN A NARROW RANGE.
NOW, AGAIN, WE CAN SET THE ACTUAL SPEED LOWER THAN, FOR
EXAMPLE, 800 MEGAHERTZ; CORRECT?
A. IF YOU WANT.
Q. AND YOU COULD SET, FOR EXAMPLE, THIS TO 700 MEGAHERTZ

EXHIBIT 3

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

HTC CORPORATION AND HTC AMERICA, INC., PLAINTIFF, VS. TECHNOLOGY PROPERTIES LIMITED, PATRIOT SCIENTIFIC CORPORATION AND ALLIACENSE LIMITED, DEFENDANT.	C-08-00882 PSG SAN JOSE, CALIFORNIA SEPTEMBER 25, 2013 VOLUME 3 PAGES 410-640

TRANSCRIPT OF PROCEEDINGS
BEFORE THE HONORABLE PAUL S. GREWAL
UNITED STATES MAGISTRATE JUDGE

A P P E A R A N C E S:

FOR THE PLAINTIFF: COOLEY LLP
BY: HEIDI KEEFE
RON LEMIEUX
3175 HANOVER STREET
PALO ALTO, CALIFORNIA 94304

APPEARANCES CONTINUED ON NEXT PAGE

OFFICIAL COURT REPORTER: LEE-ANNE SHORTRIDGE, CSR, CRR
CERTIFICATE NUMBER 9595

PROCEEDINGS RECORDED BY MECHANICAL STENOGRAPHY
TRANSCRIPT PRODUCED WITH COMPUTER

APPEARANCES (CONTINUED)

FOR THE PLAINTIFF: COOLEY LLP
BY: STEPHEN R. SMITH
1299 PENNSYLVANIA AVENUE, NW
SUITE 700
WASHINGTON, D.C. 20004

BY: MATTHEW J. LEARY
380 INTERLOCKEN CRESCENT, SUITE 900
BROOMFIELD, COLORADO 80021

ALSO PRESENT: VINCENT LAM

FOR DEFENDANTS TPL AND ALLIACENSE: AGILITY IP LAW
BY: JAMES C. OTTESON
IRVIN E. TYAN
THOMAS T. CARMACK
VINCENT K. YEE
DAVID LANSKY
149 COMMONWEALTH DRIVE
MENLO PARK, CALIFORNIA 94025

FOR DEFENDANT PATRIOT: KIRBY, NOONAN, LANCE & HOGE
CHARLES T. HOGE
35 TENTH AVENUE
SAN DIEGO, CALIFORNIA 92101

ALSO PRESENT: CHARLES MOORE
CLIFFORD FLOWERS
DAN LECKRONE
MACK LECKRONE

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SAN JOSE, CALIFORNIA SEPTEMBER 25, 2013

P R O C E E D I N G S

(JURY OUT AT 9:04 A.M.)

09:04AM THE COURT: MR. RIVERA, WOULD YOU CALL THE MATTER THAT'S BEEN SET FOR TRIAL?

09:04AM THE CLERK: YES, YOUR HONOR. CALLING HTC CORPORATION, ET AL VERSUS TECHNOLOGY PROPERTIES LIMITED, ET AL CASE NUMBER CV-08-882 PSG. MATTER ON FOR TRIAL.

09:04AM COUNSEL, PLEASE STATE YOUR APPEARANCES.

09:05AM MR. OTTESON: GOOD MORNING, YOUR HONOR. JIM OTTESON FOR THE DEFENDANTS.

09:05AM MR. HOGE: GOOD MORNING, YOUR HONOR. CHARLIE HOGE FOR PATRIOT SCIENTIFIC CORPORATION.

09:05AM MS. KEEFE: GOOD MORNING, YOUR HONOR. HEIDI KEEFE AND MY FRIENDS FOR HTC.

09:05AM THE COURT: ALL RIGHT. GOOD MORNING TO EACH OF YOU.

09:05AM I UNDERSTAND THAT WE HAVE AT LEAST A COUPLE OF ISSUES TO ADDRESS BEFORE WE BRING THE JURY IN THIS MORNING. ONE HAS TO DO WITH MATTERS OF SCHEDULING, AND I ALSO UNDERSTAND THERE MAY BE EVIDENTIARY OBJECTIONS TO ADDRESS AS WELL.

09:05AM WHY DON'T WE START WITH THE SCHEDULING QUESTION? MR. OTTESON, WOULD YOU LIKE TO EXPLAIN TO ME WHAT YOUR POSITION IS AND WHAT YOU WANT ME TO DO?

09:05AM MR. OTTESON: YES. I DON'T THINK THIS IS GOING TO IMPACT THE SCHEDULE HARDLY AT ALL. THE WITNESS WE NEED TO

CONNECTED HERE KEEPS 1 (INDICATING). AND IT'LL KEEP THAT 1 ALWAYS.

SO THAT IS HOW THOSE REGISTERS ARE BUILT THAT HOLD THE VALUE.

NOW, WE HAVE A CLOCK IN ADDITION TO ALLOW IT -- FOR A SIGNAL TO BE LATCHED.

BUT IF I HAVE ODD NUMBER, LET'S SAY 3, THEY'RE ALWAYS CHASING EACH OTHER AS YOU SEE AND THAT PROVIDES AN OSCILLATION. THAT'S AN OSCILLATOR.

Q. AND IN THE CONTEXT OF THE INVENTION OF THE '336 PATENT, WHERE IS THE RING OSCILLATOR LOCATED?

A. ON THE SAME CHIP AS THE CPU.

Q. OKAY. SO LET'S TURN TO THE NEXT SLIDE, DDX-19. AND THIS IS THAT SAME FIGURE?

A. OKAY. LET ME -- LET ME GO BACK ONE, ONE -- LET ME GO BACK TO THE SAME SLIDE.

Q. OKAY.

A. YEAH, I JUST WANT TO SAY SOMETHING.

SO AS YOU HAVE SEEN, THIS IS THE PHYSICAL MECHANISM, OR PHYSICAL PHENOMENA THAT GENERATES THAT CLOCK SIGNAL (INDICATING). THIS CLOCK SIGNAL IS GENERATED BY THE RING OSCILLATOR CHASING ITSELF (INDICATING). THAT PRODUCES THIS SIGNAL (INDICATING). THERE'S NOTHING ELSE THAT YOU SEE ON THAT SLIDE. THERE'S NOTHING EXTERNAL. YOU DON'T SEE A CRYSTAL HERE. YOU DON'T SEE ANOTHER CLOCK HERE.

Q. IS THE --

A. YOU SEE THAT RING OSCILLATOR BY ITSELF GENERATING THE CLOCK.

Q. THANK YOU. OKAY. SO LET'S LOOK AT THE RING OSCILLATOR ON THE CHIP HERE IN DDX-119. WHERE IS THE CHIP OR THE PROCESSOR LOCATED HERE?

A. SO HERE WE HAVE AN EXAMPLE OF THE RING OSCILLATOR SERVING AS A CLOCK (INDICATING). IT'S CONNECTED TO THE CPU (INDICATING). THE CLOCK SIGNAL IS DISTRIBUTED AROUND THE CPU, SO THIS RING OSCILLATOR CLOCKS THE CPU (INDICATING).

AND THE CPU RUNS AT THE SAME FREQUENCY AT WHICH THE RING OSCILLATOR RUNS.

Q. WHAT'S THE BIG GREEN ARROW HERE (INDICATING)?

A. IT'S THE CONNECTION. I MEAN, THIS IS THE CLOCK SIGNAL -- IF YOU GO ONE SLIDE BACK JUST FOR A SEC.

LET'S SAY I TAKE THIS ONE, THIS IS ONE WE OBSERVED, AND I CONNECT THIS CONNECTION TO THE CPU AND DISTRIBUTE IT ALL OVER AND AROUND THE CPU (INDICATING). I'M CLOCKING THE CPU FROM THIS POINT (INDICATING).

Q. THANK YOU. SO I WANT TO MAKE SURE I UNDERSTAND. SO THE RING OSCILLATOR HAS A CLOCK SIGNAL AND THAT'S THE GREEN ARROW; IS THAT RIGHT?

A. THAT IS THE GREEN ARROW (INDICATING).

Q. AND WHAT DOES THE CPU DO WITH THAT GREEN ARROW?

A. IT DISTRIBUTES TO ALL THE ELEMENTS THAT NEED CLOCK.

Q. AND IS THAT THE CLOCK SIGNAL THAT IT USES TO THEN DECIDE WHEN TO START AND STOP TO DO ITS OPERATIONS?

A. EXACTLY. THAT'S THE START AND STOP OF ALL THE OPERATIONS THAT THE CPU PERFORMS AS WE ILLUSTRATED BEFORE.

Q. AND WHAT'S THIS BIG BLACK PORTION OF THE RECTANGLE THAT WE SEE ON THIS SLIDE?

A. THAT IS LET'S SAY ILLUSTRATING THE PACKAGE, OKAY? THIS IS THE PACKAGE AND THE CHIP IS, IS ENCAPSULATED INTO THIS PACKAGE.

Q. SO THAT WHERE THE -- WHERE ARE THE RING OSCILLATOR AND THE CPU LOCATED EXACTLY WITH RESPECT TO THE PROCESSOR?

A. ON THE SAME CHIP.

Q. NOW, I THINK -- ONE OF OUR JURORS ASKED A QUESTION ABOUT CLOCKING THE RING OSCILLATOR, OR THE SPEED OF THE RING OSCILLATOR IN THE CPU, SO I WANT TO JUST MAKE SURE THAT WE'VE GOT THIS PERFECTLY CLEAR.

IF THE RING OSCILLATOR HAS A SPEED OF 80 MEGAHERTZ, IF THAT'S ITS CLOCK RATE, WHAT WOULD BE THE PROCESSING FREQUENCY OF THE CPU?

A. IT WOULD BE -- AS YOU SEE, THEY ARE CONNECTED. IF YOU HAVE 80 MEGAHERTZ HERE, LIKE THAT GOES HERE AND YOU HAVE 80 MEGAHERTZ IN THE CPU, SO CPU IS OPERATING AT 80 MEGAHERTZ (INDICATING).

SO IT'S EXACTLY THE SAME.

Q. AND WHAT WOULD HAPPEN IF YOU CHANGED THE CLOCK RATE OF THE RING OSCILLATOR TO 100 MEGAHERTZ?

A. THEN THIS IS WIGGLING AT 100 (INDICATING), GOES IN AT 100, AND THE CPU IS OPERATING AT 100 MEGAHERTZ.

Q. SO THAT WOULD BE -- THE CPU PROCESSING FREQUENCY WOULD BE 100 MEGAHERTZ.

SO THE SAME TRUE AT 2 GIGAHERTZ? IF WE GO REALLY FAST AT 2 GIGAHERTZ FROM THE CLOCK OSCILLATOR --

A. IT IS TRUE AT ANY FREQUENCY. WHY? BECAUSE THEY'RE CONNECTED.

THIS IS JUST LIKE IF I GRAB MR. MARSH'S HAND AND I START SHAKING IT AT LIKE 2 HERTZ FREQUENCY, HE'S SHAKING AT TWO HERTZ (INDICATING).

IF I GO AT TEN HERTZ, HE'S SHAKING AT TEN HERTZ (INDICATING). THOSE TWO ARE CONNECTED.

SO IF THIS ONE IS PRODUCING THE OUTPUT OF THE OSCILLATOR AT 2 GIGAHERTZ, IT IS DISTRIBUTED AT 2 GIGAHERTZ.

Q. NOW, IF, IN PRACTICE, I WANTED TO CHANGE THE FREQUENCY THAT THE RING OSCILLATOR IS OPERATING AT, WHAT COULD I DO? HOW WOULD THAT BE IMPLEMENTED IN A MODERN MICROPROCESSOR?

A. OKAY. WHAT I CAN DO IS I CAN LOOK AT -- I CAN CHANGE THE RING OSCILLATOR. SO IF I RAISE THE VOLTAGE OF THE RING OSCILLATOR OR LOWER THE VOLTAGE -- OR IF I FIND A SPOT, LET'S SAY I LIMIT THE CURRENT THAT GOES THROUGH THIS RING OSCILLATOR, OR WHAT IS KNOWN, THE TERM IS LIKE CURRENT STARVING, OKAY, IF I STARVE IT FROM CURRENT, IT'LL SLOW DOWN.

SO IF I DON'T ALLOW THEM TO DRAW AS MUCH CURRENT AS THEY

02:03PM **WANT, THEY WILL SLOW DOWN. SO I CAN DO THAT CURRENT STARVING**
02:03PM **BY VOLTAGE OR BY CURRENT, BASICALLY, SO I CAN ADJUST THE**
02:03PM **FREQUENCY.**
02:03PM SO LET'S SAY IT'S DESIGNED TO BE 2 GIGAHERTZ. YOU SAY
02:03PM THAT'S TOO FAST, I DON'T WANT IT 2. WELL, I WILL STARVE IT
02:03PM UNTIL IT IS 1 GIGAHERTZ.
02:03PM **Q.** AND IS THERE ANY ELECTRONIC CIRCUITRY THAT YOU COULD USE
02:03PM TO CHANGE THE VOLTAGE OF THE RING OSCILLATOR, TO CHANGE ITS
02:03PM SPEED?
02:03PM **A. THAT IS WHAT PLL DOES. AND I THINK WE'LL EXPLAIN IT**
02:03PM **LATER.**
02:03PM **Q.** WELL, LET'S TAKE A LOOK AT THE NEXT SLIDE, DDX-120. WHAT
02:03PM ARE THESE COMPONENTS?
02:03PM **A. THOSE ARE THE COMPONENTS OF THE PLL, AND I WILL EXPLAIN**
02:03PM **HOW PLL DOES IT.**
02:03PM THE OUTPUT OF THIS FILTER IS ACTUALLY THAT VOLTAGE OF
02:03PM CURRENT WHICH WILL START IT AND MAKE IT RUN AT THE FREQUENCY
02:03PM THAT THIS CURRENT DETERMINES (INDICATING).
02:04PM SO WHATEVER COMES OUT OF HERE, THE VOLTAGE OR CURRENT, THE
02:04PM CURRENT STARTS THE RING OSCILLATOR, WILL MAKE IT RUN FASTER OR
02:04PM SLOWER (INDICATING).
02:04PM AND REMEMBER, THIS IS A VOLTAGE THAT COMES OUT HERE
02:04PM (INDICATING). THIS IS NOT THE CLOCK. THIS IS THE VOLTAGE THAT
02:04PM CONTROLS THIS. OKAY?
02:04PM **Q.** SO I SEE YOU'RE STILL USING, IN THIS SLIDE, DDX-121, YOU

02:04PM STILL HAVE A RING OSCILLATOR.
02:04PM **A. YES.**
02:04PM **Q.** WHAT IS THE RING OSCILLATOR DOING IN THIS SLIDE?
02:04PM **A. THE RING OSCILLATOR IS HAPPILY CLOCKING THE CPU.**
02:04PM **Q.** OKAY.
02:04PM **A. OKAY. AND SO I HAVE A FREQUENCY DIVIDER.**
02:04PM **AS MR. HAROUN FROM TI EXPLAINED, THE FREQUENCY CAN BE**
02:04PM **DIVIDED.**
02:04PM **AND HE ALSO SAID AT ONE POINT IT CANNOT BE MULTIPLIED,**
02:04PM **WHICH I AGREE. THE CIRCUIT THAT MULTIPLIES THE FREQUENCY IS**
02:04PM **YET TO BE INVENTED, OKAY?**
02:04PM **WE CAN DIVIDE IT. HOW DO WE DIVIDE IT? WE PASS IT**
02:05PM **THROUGH A DEVICE THAT WOULD JUST CHANGE EVERY OTHER CLOCK, AND**
02:05PM **THEN WE PASS THAT THROUGH A DEVICE THAT CHANGES EVERY OTHER**
02:05PM **CLOCK AND SO FORTH. SO WE DIVIDE BY 2 OR DIVIDE IT BY 4 AND WE**
02:05PM **CAN DIVIDE IT FURTHER.**
02:05PM **SO THAT SIGNAL GOES TO THE FREQUENCY DIVIDER HERE**
02:05PM **(INDICATING).**
02:05PM WE MAY CHOSE NOT TO HAVE A DIVIDER. IF WE WANT TO KIND OF
02:05PM REGENERATE THE CLOCK, WE HAVE A SIGNAL THAT COULD COME IN HERE
02:05PM AND PHASE DETECTOR.
02:05PM THE PHASE DETECTOR COMPARES THIS DIVIDED SIGNAL. SO LET'S
02:05PM SAY THIS IS RUNNING AT 1 GIGAHERTZ AND WE DIVIDE IT 100 TIMES.
02:05PM USUALLY THE NUMBER IS A BINARY NUMBER, SO IT'LL BE 64, 128,
02:05PM 256, 512, 1024, ONE OF THOSE. NOT -- 100 DOESN'T FIT IN THAT

02:05PM RANGE, BUT LET'S SAY WE DIVIDE IT BY 100 JUST FOR SIMPLICITY.
02:06PM AND SO I GET 10 MEGAHERTZ HERE. THIS 10 MEGAHERTZ I WILL
02:06PM COMPARE WITH SOME REFERENCE SIGNAL. AND WHY ARE WE DOING THAT
02:06PM IS BECAUSE WHAT I'M BUILDING HERE IS LIKE A CRUISE CONTROL FOR
02:06PM THAT FERRARI, SO I AM COMPARING THE SPEED AT WHICH FERRARI IS
02:06PM RUNNING TO SOME VALUE FOR WHICH I WANT TO SET IT TO RUN, OKAY?
02:06PM AND LET'S SAY THIS VALUE IS MUCH LOWER, SO I CAN TO DIVIDE
02:06PM IT IN THIS CASE, BUT I DON'T HAVE TO.
02:06PM SO I HAVE TO PUT SOME REFERENCE. LET'S SAY IF I SAY,
02:06PM OKAY, I WANT TO -- I WANT TO SET THAT CAR TO RUN AT 65, I HAVE
02:06PM TO HAVE SOMETHING THAT POINTS TO 65 SO WHEN THE SPEEDOMETER
02:06PM COMES TO 65, I WILL LOCK INTO 65. SO I HAVE TO HAVE REFERENCE.
02:07PM I CANNOT JUST SAY, "OKAY, RUN AT 65." IT DOESN'T KNOW.
02:07PM **Q.** SO I THINK WE HEARD -- WE'VE HEARD DISCUSSION OF A
02:07PM REFERENCE BEFORE. WE HEARD MENTION OF A METRONOME. WHAT DOES
02:07PM A PLL USE FOR ITS REFERENCE?
02:07PM **A. A PLL USES EXTERNAL QUARTZ OSCILLATOR, NOT NECESSARILY,**
02:07PM **OKAY?**
02:07PM WHAT PLL -- WHAT WE WANT TO USE HERE IS SOME STABLE
02:07PM REFERENCE.
02:07PM NOW, STABLE DEPENDS HOW STABLE YOU WANT IT TO BE.
02:07PM **Q.** SO WHY DON'T WE TAKE A LOOK AT DDX-122 WHERE I THINK
02:07PM YOU'VE ILLUSTRATED THE IDEA OF USING A REFERENCE HERE.
02:07PM WHAT DOES THAT SLIDE SHOW US?
02:07PM **A. OKAY. SO THIS SLIDE SHOWS NOW WE HAVE CONNECTED THE**

02:07PM **POINTS, AND LET'S START FROM HERE.**
02:07PM I HAVE THIS ONE RUNNING AT 10 -- AT 1 GIGAHERTZ, DIVIDED
02:07PM BY 100, FOR EXAMPLE, BECAUSE THIS REFERENCE IS 10 MEGAHERTZ
02:08PM (INDICATING).
02:08PM BASICALLY WHAT I WANT IS THIS FREQUENCY AND THIS TO BE THE
02:08PM SAME (INDICATING). WHY? BECAUSE I AM COMPARING THEM.
02:08PM WELL, IF I AM DIVIDING THIS BY 100, I HAVE TO RUN THIS 100
02:08PM TIMES FASTER, OKAY, THAN THE REFERENCE. AND WHY? BECAUSE I
02:08PM DON'T HAVE A FASTER REFERENCE THAN 10 MEGAHERTZ FOR EXAMPLE IN
02:08PM THIS CASE. THAT'S THE FASTEST I CAN HAVE.
02:08PM IF I HAVE A STABLE REFERENCE AT 1 GIGAHERTZ, I WOULD NOT
02:08PM DIVIDE AT ALL. I WOULD JUST FEED IN, COMPARE WITH THAT ONE,
02:08PM AND, AND USE THAT 1 GIGAHERTZ REFERENCE TO RUN THE RING
02:08PM OSCILLATOR AT 1 GIGAHERTZ.
02:08PM AND WE DO THAT OFTEN WHEN WE DO, LIKE, REGENERATION OF THE
02:08PM CLOCK. WHEN I HAVE A MULTIPLE PROCESSOR, MULTIPLE CHIPS AS
02:08PM MR. MOORE SAID, AND I DISTRIBUTE THE CLOCK, I WANT TO
02:08PM RESYNCHRONIZE SO EVERY CHIP IS THE SAME.
02:09PM **Q.** SO I FORGOT TO ASK YOU SOMETHING ON THE PREVIOUS SLIDE
02:09PM THAT I WANT TO ASK YOU ABOUT, WHICH IS I SEE SEVERAL COMPONENTS
02:09PM HERE, AND I -- THERE ARE NO CONNECTIONS ON DDX-121.
02:09PM DO ALL OF THOSE COMPONENTS RECEIVE POWER?
02:09PM **A. YES.**
02:09PM **Q.** DESPITE -- DESPITE NOT SEEING ANY CONNECTIONS ON HERE?
02:09PM **A. YES. EVERYTHING RECEIVES POWER AND WE DON'T PUT THAT ON**

EXHIBIT 4
(BEING FILED UNDER SEAL)

EXHIBIT 5
(BEING FILED UNDER SEAL)

EXHIBIT 6
(BEING FILED UNDER SEAL)

EXHIBIT 7
(BEING FILED UNDER SEAL)

EXHIBIT 8
(BEING FILED UNDER SEAL)

EXHIBIT 9

OMAP730 Technical Reference Manual

Literature Number: SWPU063B
September 2003

OMAP™ TEXAS INSTRUMENTS TECHNOLOGY

5.2 Clock Generation

The clock domains in the OMAP730 hardware engine platform are synthesized by the digital phase-locked loops (DPLL). The DPLL input clock source (CK_REF) is externally supplied from the CLKIN pin.

The DPLL1 output frequencies are programmable and can be further divided down to provide clocks to the MPU, the modem part connection, and the TC domains. The MPU domain, the modem part connection domain, and the TC domain are clocked from DPLL1.

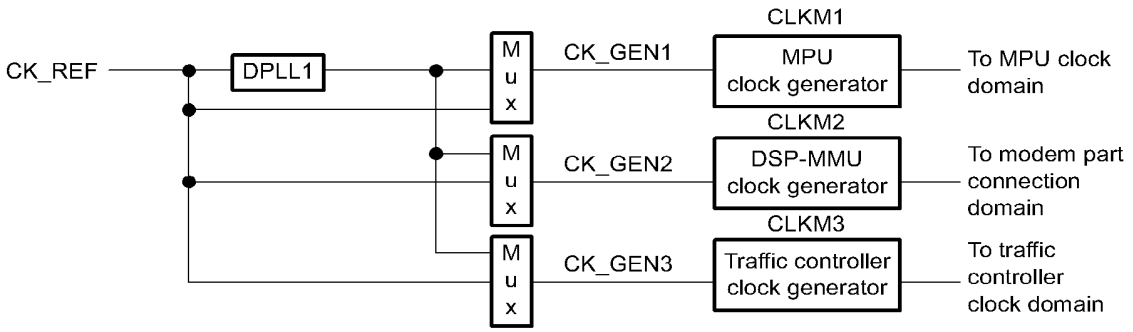
This implementation offers the clock rate selection flexibility to adjust the clock frequency of each clock domain and allows the OMAP730 hardware engine to adjust each clock domain to its optimal frequency. In addition, each domain is further subdivided into subdomains so that each subdomain can be independently activated/deactivated while the remaining part of the clock network is in an idle state. This clocking mode provides a scalable power-saving mechanism for general-purpose and power-hungry applications.

The OMAP clock system is organized around three main clock domains: MPU, modem part connection, and TC.

- The MPU clock domain contains:
  - MPU
  - MPU external peripheral clocks
  - MPU watchdog timer
  - MPU internal timers
  - MPU interrupt handler
- The modem part connection clock domain contains the DSP MMU.
- The TC clock domain contains:
  - TC
  - L3 OCP-I
  - MPUI port interface
  - System DMA controller
  - MPU TIPB bridges
  - LCD controller
  - OCP-T1 and OCP–T2

Figure 5–1 shows the clock generator module.

Figure 5–1. Clock Generator Module



When mixed mode 4 is selected, you must program the divide-down bits of the ARM_CKCTL register so that DSPDIV = DSPMMUDIV = TCDIV. Because ARM_CK supplies the host processor and TC_CK supplies different memory interfaces, the restriction on the speed of TC_CK ensures that the rate of instruction/data fetch is never more than the rate at which data can be processed.

The TC clock frequency must be the same speed or slower than the MPU clock frequency.

5.2.1.4 Bypass Mode

In bypass mode (CLOCK_SELECT = 101), the DPLL is bypassed and the input reference clock is directly fed to the MPU, DSP, and TC clock domains.

5.2.2 DPLL

The DPLL block synthesizes a frequency clock from the fixed reference input clock signal CK_REF using the digital phase-locked loop mechanism. Only the MPU can access the DPLL control register.

5.2.2.1 DPLL Modes

The DPLL can operate either in bypass mode or lock mode:

- Bypass mode

  In bypass mode (PLL_ENABLE bit of the DPLL1_CTL_REG register set to 0), the DPLL output clock can be CK_REF (input reference clock), CK_REF/2, or CK_REF/4, depending on the BYPASS_DIV bit-field value of the DPLL1_CTL_REG register.

- Lock mode

  In lock mode (PLL_ENABLE bit of DPLL1_CTL_REG register set to 1), the output frequency is an integer multiple or fractional multiple (m/n, respectively, in the PLL_MULT and PLL_DIV bit fields of DPLL1_CTL_REG) of the input reference clock CK_REF. With $1 \leq m \leq 31$ and $1 \leq n \leq 4$, the frequency output ranges from CK_REF/4 to 31×CK_REF.

5.2.2.2 Synthesizing a Clock

At reset, the DPLL is in bypass mode and the BYPASS_DIV bit field of DPLL1_CTL_REG is set to 0b00 (DPLL output clock = CK_REF).

The procedure to synthesize a clock at a desired frequency is:

1) Set the PLL_MULT and PLL_DIV bit fields of DPLL1_CTL_REG to the correct value to get the desired multiplication factor.
2) Set the PLL_ENABLE bit to 1 to enter the lock mode.
3) When the DPLL reaches the desired synthesized clock frequency, the bit LOCK bit of DPLL1_CTL_REG register goes to 1 and the output clock gets the synthesized clock.

EXHIBIT 10

SC32442A43

USER'S MANUAL

Revision 1.1

SAMSUNG ELECTRONICS

FUNCTIONAL DESCRIPTION

CLOCK ARCHITECTURE

Figure 7-1 shows a block diagram of the clock architecture. The main clock source comes from an external crystal (XTIpll) or an external clock (EXTCLK). The clock generator includes an oscillator (Oscillation Amplifier), which is connected to an external crystal, and also has two PLLs (Phase-Locked-Loop), which generate the high frequency clock required in the SC32442A.

CLOCK SOURCE SELECTION

Table 7-1 shows the relationship between the combination of mode control pins (OM3 and OM2) and the selection of source clock for the SC32442A. The OM[3:2] status is latched internally by referring the OM3 and OM2 pins at the rising edge of nRESET.

Table 7-1. Clock Source Selection at Boot-Up

Mode OM[3:2]	MPLL State	UPLL State	Main Clock source	USB Clock Source
00	On	On	Crystal	Crystal
01	On	On	Crystal	EXTCLK
10	On	On	EXTCLK	Crystal
11	On	On	EXTCLK	EXTCLK

NOTE

1. Although the MPLL starts just after a reset, the MPLL output (Mpll) is not used as the system clock until the software writes valid settings to the MPLLCON register. Before this valid setting, the clock from external crystal or EXTCLK source will be used as the system clock directly. Even if the user does not want to change the default value of MPLLCON register, the user should write the same value into MPLLCON register.
2. OM[3:2] is used to determine a test mode when OM[1:0] is 11.

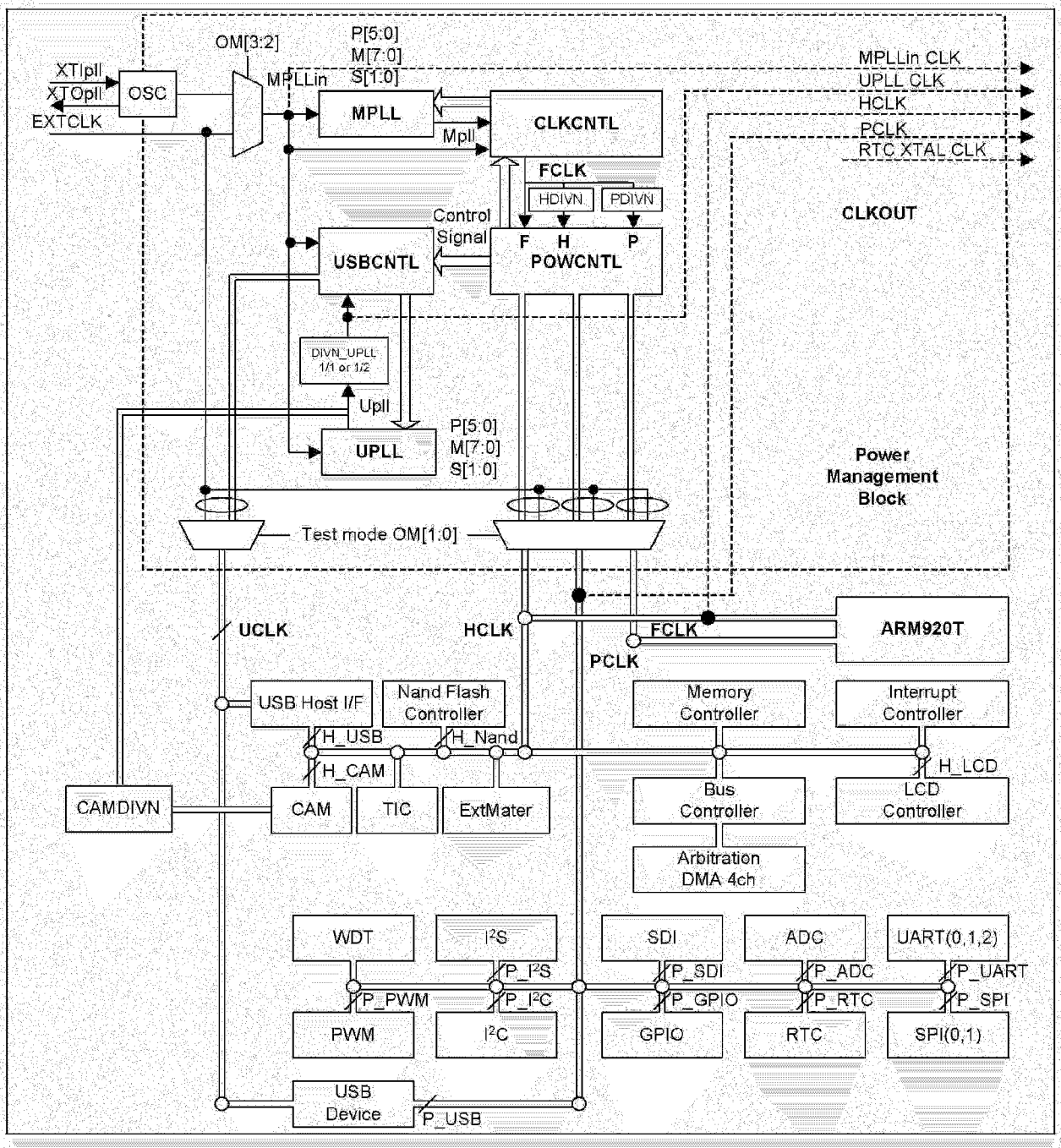


Figure 7-1. Clock Generator Block Diagram

PHASE LOCKED LOOP (PLL)

The MPLL within the clock generator, as a circuit, synchronizes an output signal with a reference input signal in frequency and phase. In this application, it includes the following basic blocks as shown in Figure 7-2: the Voltage Controlled Oscillator (VCO) to generate the output frequency proportional to input DC voltage, the divider P to divide the input frequency (Fin) by p, the divider M to divide the VCO output frequency by m which is input to Phase Frequency Detector (PFD), the divider S to divide the VCO output frequency by "s" which is Mpll (the output frequency from MPLL block), the phase difference detector, the charge pump, and the loop filter. The output clock frequency Mpll is related to the reference input clock frequency Fin by the following equation:

$$Mpll = (2*m * Fin) / (p * 2^{s})$$

m = M (the value for divider M)+ 8, p = P (the value for divider P) + 2

The UPLL within the clock generator is similar to the MPLL in every aspect.

The following sections describes the operation of the PLL, including the phase difference detector, the charge pump, the Voltage controlled oscillator (VCO), and the loop filter.

Phase Frequency Detector (PFD)

The PFD monitors the phase difference between Fref and Fvco, and generates a control signal (tracking signal) when the difference is detected. The Fref means the reference frequency as shown in the Figure 7-2.

Charge Pump (PUMP)

The charge pump converts PFD control signals into a proportional change in voltage across the external filter that drives the VCO.

Loop Filter

The control signal, which the PFD generates for the charge pump, may generate large excursions (ripples) each time the Fvco is compared to the Fref. To avoid overloading the VCO, a low pass filter samples and filters the high-frequency components out of the control signal. The filter is typically a single-pole RC filter with a resistor and a capacitor.

Voltage Controlled Oscillator (VCO)

The output voltage from the loop filter drives the VCO, causing its oscillation frequency to increase or decrease linearly as a function of variations in average voltage. When the Fvco matches Fref in terms of frequency as well as phase, the PFD stops sending control signals to the charge pump, which in turn stabilizes the input voltage to the loop filter. The VCO frequency then remains constant, and the PLL remains fixed onto the system clock.

Usual Conditions for PLL & Clock Generator

PLL & Clock Generator generally uses the following conditions.

Loop filter capacitance	C_{LF}	MPLLCAP: 820 pF ± 5%
		UPLLCAP: 1500 pF ± 5%
External X-tal frequency	-	12 – 20 MHz (note)
External capacitance used for X-tal	C_{EXT}	15 – 22 pF

NOTES:
1. The value could be changed.
2. $FCLK_{OUT}$ must be bigger than 200MHz(It does not mean that the ARM core has to run more than 200Mhz).

EXHIBIT 11
(BEING FILED UNDER SEAL)

EXHIBIT 12

OMAP850

(A Member of Texas Instruments OMAP ™ Family of Products)

Technical Reference Manual

Literature Number: SWPU080A
November 2005

OMAP
TEXAS INSTRUMENTS TECHNOLOGY

PRINTED WITH SOY INK

TEXAS INSTRUMENTS

Printed on Recycled Paper

D.1 OMAP850/OMAP730 Comparison Overview

The Texas Instruments OMAP850 multimedia processor is a close derivative of OMAP730 processor. OMAP850 is an improved platform for key performance aspects. OMAP850 also receives some changes in MPU-S peripheral features list and pin multiplex. High compatibility level is preserved in both hardware and software, as follows:

- Package
  - Identical package: 289 ball grid array (BGA)
  - Identical package pins location: pins name and pins assignment to balls
  - Compatible pin multiplex (with few exceptions, see removed features below)
  - Pin multiplex additions for new features and enhanced support
- GSM-S features
  - GPRS-EDGE feature
  - Binary software compatibility
- MPU-S enhanced features
  - Optimized internal SRAM interface for higher frame-buffer performances
  - Optimized OMAP3.2 core for DDR and DMA performances
  - 8-bit parallel camera interface data throughput improvement (same camera features; camera support moved from MPU-S peripheral bus to MPU-S TC OCP-T interface) for bigger sensor/higher frame-rate
- MPU-S removed features
  - CompactFlash interface not supported anymore
  - GPIO_72/73/74 removed from pin multiplex on DQSH/DQSL/SDCLKX DDR pins (DDR timings constraints)
- MPU-S new features
  - Addition of DDR memory support to SDRAM. See application note WMN_030_1 which describes how to use OMAP750/850/16xx Delay Locked Loop (DLL) and Digitally Controlled Delay Lines (DCDL) to access reliably Dual Data Rate (DDR) SDRAM.
  - Addition of external DMA request line support for EMIFS components
  - Addition of SHPLCD for glueless interfacing of LCD controller to Sharp TFT-LCD panels
  - Addition of traffic controller burst doubler feature in OMAP3.2 core for ARM926EJS cache-fill performance improvement

EXHIBIT 13
(BEING FILED UNDER SEAL)

EXHIBIT 14

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

HTC CORPORATION AND HTC AMERICA, INC., PLAINTIFF, VS. TECHNOLOGY PROPERTIES LIMITED, PATRIOT SCIENTIFIC CORPORATION AND ALLIACENSE LIMITED, DEFENDANT.	C-08-00882 PSG SAN JOSE, CALIFORNIA SEPTEMBER 24, 2013 VOLUME 2 PAGES 227-409

TRANSCRIPT OF PROCEEDINGS
BEFORE THE HONORABLE PAUL S. GREWAL
UNITED STATES MAGISTRATE JUDGE

A P P E A R A N C E S:

FOR THE PLAINTIFF: COOLEY LLP
BY: HEIDI KEEFE
RON LEMIEUX
3175 HANOVER STREET
PALO ALTO, CALIFORNIA 94304

APPEARANCES CONTINUED ON NEXT PAGE

OFFICIAL COURT REPORTER: LEE-ANNE SHORTRIDGE, CSR, CRR
CERTIFICATE NUMBER 9595

PROCEEDINGS RECORDED BY MECHANICAL STENOGRAPHY
TRANSCRIPT PRODUCED WITH COMPUTER

APPEARANCES (CONTINUED)

FOR THE PLAINTIFF: COOLEY LLP
BY: STEPHEN R. SMITH
1299 PENNSYLVANIA AVENUE, NW
SUITE 700
WASHINGTON, D.C. 20004

BY: MATTHEW J. LEARY
380 INTERLOCKEN CRESCENT, SUITE 900
BROOMFIELD, COLORADO 80021

ALSO PRESENT: VINCENT LAM

FOR DEFENDANTS TPL AND ALLIACENSE: AGILITY IP LAW
BY: JAMES C. OTTESON
IRVIN E. TYAN
THOMAS T. CARMACK
VINCENT K. YEE
DAVID LANSKY
149 COMMONWEALTH DRIVE
MENLO PARK, CALIFORNIA 94025

FOR DEFENDANT PATRIOT: KIRBY, NOONAN, LANCE & HOGE
CHARLES T. HOGE
35 TENTH AVENUE
SAN DIEGO, CALIFORNIA 92101

ALSO PRESENT: CHARLES MOORE
CLIFFORD FLOWERS
DAN LECKRONE
MACK LECKRONE

INDEX OF WITNESSES

DEFENDANTS'

INDEX OF EXHIBITS

SAN JOSE, CALIFORNIA SEPTEMBER 24, 2013

P R O C E E D I N G S

(JURY OUT AT 9:12 A.M.)

09:12AM THE COURT: ALL RIGHT, COUNSEL. I UNDERSTAND THAT THERE WERE AT LEAST THREE MOTIONS FILED ON THE DOCKET SINCE WE LAST SPOKE. LET'S BEGIN WITH NUMBER 619, WHICH DEALS WITH MR. MOORE'S TESTIMONY REGARDING THE GREENARRAYS.

IT'S YOUR MOTION, MS. KEEFE, GO AHEAD.

09:13AM MS. KEEFE: VERY SIMPLY, YOUR HONOR, WHAT WE DID AFTER -- AT THE SIDE-BAR, YOUR HONOR SAID THAT IF WE COULD FIND THAT THERE HAD BEEN DISCOVERY REQUESTS THAT WOULD HAVE CALLED FOR THE GREENARRAY TO HAVE BEEN DISCLOSED AS AN INFRINGING DEVICE, THAT I SHOULD --

THE COURT: YOU'RE TALKING SPECIFICALLY ABOUT THE 144 PRODUCT?

MS. KEEFE: THAT'S CORRECT, YOUR HONOR. THAT'S CORRECT, THE ONE THAT WAS MENTIONED BY MR. MOORE IN TESTIMONY.

AND POTENTIALLY MORE PROBLEMATIC WAS NOT THAT MR. MOORE WAS TALKING GENERICALLY ABOUT WHAT HE'S WORKING ON, BUT WHEN ASKED WHY IT WAS RELEVANT, OPPOSING COUNSEL SAID THAT IT PRACTICING THE INVENTION, WHICH OF COURSE IS SOMETHING THAT GAVE US A LITTLE BIT OF HEARTBURN.

SO WHAT WE WENT BACK AND DID WAS FOUND DISCOVERY REQUESTS THAT WOULD HAVE CALLED FOR IT, WE LAID THEM OUT FOR YOUR HONOR AND SHOWED THAT.

COULD BE PART OF THAT, SIR.

Q. NOW, THE RING OSCILLATORS IN THE TEXAS INSTRUMENT CHIPS, THE OMAP CHIPS WE'RE TALKING ABOUT HERE, ARE THEY -- ARE THEY ICO'S, CURRENT CONTROL OSCILLATORS, OR VCO'S, VOLTAGE CONTROL OSCILLATORS?

A. I DON'T KNOW THAT FOR A FACT, BUT MY UNDERSTANDING IS THEY WERE USING DIGITAL CONTROL DELAY LINES. THAT'S THE TERMINOLOGY THAT WAS USED INTERNALLY AT THE TIME.

WHEN I START THE NEW GENERATION, WE WENT AWAY FROM THAT INTO WHAT IS REFERRED TO HERE IN THE PAPER OF CURRENT CONTROL OR VOLTAGE CONTROL. WE CURRENTLY USE CURRENT CONTROL.

Q. BUT ONE OF THE INPUTS TO THE RING OSCILLATOR IS EITHER A CURRENT OR VOLTAGE OR MAYBE MULTIPLE CURRENTS AND VOLTAGES?

A. THAT'S CORRECT.

Q. THE AMOUNT OF CURRENT OR VOLTAGE THAT IS INPUT INTO AN OSCILLATOR IS WHAT DETERMINES THE FREQUENCY THAT IS OUTPUT FROM THE OSCILLATOR; CORRECT?

A. THAT IS CORRECT. IF IT IS DIGITALLY CONTROLLED, IT'S THE VALUE OF THE DIGITAL BITS THAT ARE CONTROLLED.

SO IF THERE'S A DIGITAL INPUT, THERE ARE MULTIPLE LINES AND EACH ONE OF THEM WOULD HAVE A CERTAIN VALUE, A 0 OR A 1, AND DEPENDING ON THAT CONFIGURATION, THE SPEED OF THE DELAY LINE IN THE OSCILLATOR, WHICH IS THE SEQUENCE OF STAGES, WOULD CHANGE. IT WOULD SLOW DOWN OR SPEED UP.

Q. OKAY. LET'S HAVE THE DIAGRAM OF THE PLL UP AGAIN. LET ME

JUST ASK YOU --

IF I MAY APPROACH?

THE COURT: YOU MAY.

MR. CARMACK: THANK YOU.

Q. WE HAVE THIS ARROW OVER HERE THAT IS BASICALLY IN THIS FIGURE NOT POINTING TO ANYTHING, BUT WE CAN ASSUME THAT THIS IS POINTING TO SOME SORT OF INTERNAL, EXTERNAL REFERENCE CLOCK; CORRECT?

A. THAT'S CORRECT.

Q. SO LIKE A CRYSTAL OSCILLATOR?

A. YES.

Q. SO THE TYPE OF SIGNAL THAT WOULD BE COMING IN HERE TO THE PHASE DETECTOR IS AN UP AND DOWN CLOCK SIGNAL?

A. THAT'S CORRECT. IT'S A VARYING SIGNAL, YES.

Q. OKAY. THE PURPOSE OF THE PHASE DETECTOR IS TO COMPARE THE CLOCK SIGNAL FROM THE RING OSCILLATOR AND ITS EXTERNAL CLOCK SIGNAL TO SEE IF THEY'RE IN PHASE; RIGHT?

A. IT COMPARES SPECIFICALLY WHAT YOU CALL THE EDGES OF THE SIGNAL, YOU HAVE VERY FAST EDGES AND IT PICKS ONE STYLE TO SAY THE RISING ON BOTH CLOCKS AND IT COMPARES THE RELATIVE TIME BETWEEN THEM.

Q. OKAY. SO THE INPUTS TO THE PHASE DETECTOR ARE UP AND DOWN CLOCK SIGNALS?

A. THAT'S CORRECT.

Q. NOW, THE OUTPUT OF THE PHASE DETECTOR IS ACTUALLY NOT A

CLOCK SIGNAL; CORRECT?

A. IN -- IF YOU'RE TALKING ABOUT AN ANALOG PLL, IT IS NOT A CLOCK SIGNAL, BUT IT LOOKS LIKE A CLOCK. IT'S A TIME PERIOD. IT'S A DISTANCE OF TIME BETWEEN THE TWO EDGES. THAT'S WHAT THE PHASE DETECTOR USES, SOMETHING PROPORTIONAL TO THE DELAY BETWEEN ONE OF THE EDGES RELATIVE TO THE OTHER.

Q. OKAY. LET'S TALK ABOUT THE OUTPUT OF THE FILTER INTO THE OSCILLATOR. THIS DOES NOT HAVE A FREQUENCY; CORRECT?

A. SO I WANT CLARIFICATION.

Q. YES.

A. ARE YOU TALKING THE ANALOG PLL OR DIGITAL PLL? BECAUSE THE DIFFERENCE IS THE SIGNAL IS -- IN AN ANALOG IS A FINITE, IS A CONTINUOUS, VERY SMALL UP AND DOWN, ANY VALUE CAN CONTAIN, WHEREAS DIGITAL IS QUANTIFIED NUMBER THAT IS VERY SPECIFIC CODE THAT COMES IN.

AND BOTH ARCHITECTURES EXIST. DIGITAL USES DIGITAL VALUES TO CONTROL OSCILLATORS, WHERE ANALOG USES AN ANALOG CONTINUOUS VALUES TO CONTROL THE OSCILLATOR.

SO IF YOU'RE TALKING ABOUT THE ANALOG PLL, WE CAN TALK ABOUT THE ANALOG IN THAT CONTEXT.

Q. OKAY. IN AN ANALOG SITUATION LIKE THIS, THE OUTPUT OF THE FILTER IS VERY SMOOTH VOLTAGE OR CURRENT?

A. YES, CORRECT.

Q. IN OTHER WORDS, THE RING OSCILLATOR DOES NOT RECEIVE ANY CLOCK SIGNAL AS SUCH?

A. NO, IT DOES NOT. IT RECEIVES A CONTROL PARAMETER.

Q. OKAY. SO IT RECEIVES -- WHEN YOU SAY "CONTROL PARAMETER," YOU MEAN A CURRENT OR A VOLTAGE?

A. THAT IS CORRECT.

Q. A SMOOTH CURRENT OR A VOLTAGE?

A. THAT IS CORRECT.

Q. SO THE RING OSCILLATOR TAKES IN A SMOOTH CURRENT OR VOLTAGE AND WHAT IT OUTPUTS IS ON OSCILLATION, WHICH MEANS A HIGH, LOW SQUARE WAVE; CORRECT?

A. THAT IS CORRECT.

Q. THAT'S -- THE REASON WE CALL IT AN OSCILLATOR IS BECAUSE IT OSCILLATES BETWEEN HIGH AND LOW?

A. THAT IS CORRECT.

Q. NOW, ALL OF THE -- NOW, ALL OF THE OMAP CHIPS USE PLL'S WITH -- THAT HAVE A REFERENCE SIGNAL FROM AN EXTERNAL CLOCK; CORRECT?

A. THAT IS CORRECT.

Q. HAS TI EVER PRODUCED A, AN OMAP CHIP LIKE THESE THAT YOU KNOW OF THAT USES AN EXTERNAL REFERENCE, LIKE A CRYSTAL, WITHOUT USING A PLL BETWEEN THE CRYSTAL AND THE CPU?

A. IT IS POSSIBLE THAT WE'VE -- WE'VE DEVELOPED MANY SYSTEMS THAT ONLY USE A CONSTANT CLOCK FROM OUTSIDE. IT IS VERY POSSIBLE THAT THAT EXISTS, YES.

Q. WHEN YOU SAY "CONSTANT CLOCK," YOU MEAN -- DO YOU MEAN THAT --

01:26PM A. AN EXTERNAL ONE, COMING FROM -- THE CONTROL IS OUTSIDE THE
01:27PM CHIP.
01:27PM Q. SO WITH AN EXTERNAL REFERENCE CLOCK, IF IT'S CRYSTAL, THE
01:27PM FREQUENCY WILL NEVER CHANGE; CORRECT?
01:27PM A. THE FREQUENCY OF THE EXTERNAL CRYSTAL WILL NEVER CHANGE.
01:27PM ON-CHIP, YOU CAN ALWAYS GO DOWN IN FREQUENCY BY PICKING
01:27PM EVERY SECOND EDGE OR EVERY THIRD EDGE.
01:27PM Q. IN OTHER WORDS, YOU CAN DIVIDE?
01:27PM A. YOU CAN DIVIDE, CORRECT.
01:27PM Q. BUT THE SIGNAL THAT COMES FROM A CRYSTAL OSCILLATOR
01:27PM OFF-CHIP IS WITH A WE CALL A FIXED FREQUENCY SIGNAL?
01:27PM A. YES.
01:27PM Q. OKAY. AND SO IF YOU USE AN EXTERNAL CRYSTAL TO DIRECT THE
01:27PM CLOCK TO THE CPU WITH NO PLL IN BETWEEN, YOU'RE GOING TO BE
01:27PM STUCK WITH THE SPEED OF THAT CRYSTAL, OR SOME DIVISION OF IT?
01:27PM A. THAT IS CORRECT.
01:27PM Q. SO -- BUT IN THE CASE OF THE OMAP CHIPS THAT WE'RE TALKING
01:27PM ABOUT NOW, THE CPU DOESN'T RUN AT THE SPEED OF THE EXTERNAL
01:27PM CRYSTAL; CORRECT?
01:27PM A. IT RUNS AT EITHER AN INTEGER MULTIPLE OR INTEGER DIVIDE.
01:28PM SOMETIMES COULD BE FRACTIONAL DEPENDING, YES.
01:28PM Q. WHAT IS THE TYPICAL SPEED OF AN EXTERNAL REFERENCE CRYSTAL
01:28PM IN THESE CHIPS?
01:28PM A. IN THE OMAP730 OR 850 GENERATION, THE TYPICAL CRYSTAL --
01:28PM THERE WAS TWO CRYSTALS TYPICALLY, ONE 113 MEGAHERTZ AND THE

01:28PM OTHER ONE IS 32 KILOHERTZ. THESE ARE TYPICAL VALUES IN CELL
01:28PM PHONES.
01:28PM Q. SO IF WE TOOK ONE OF THOSE OMAP PROCESSORS AND REDESIGNED
01:28PM IT SO IT DIDN'T HAVE THE PLL, ALL IT HAD WAS THE EXTERNAL
01:28PM CRYSTALS, THE FASTEST IT COULD RUN WOULD BE AT EITHER 32
01:28PM KILOHERTZ OR 13 MEGAHERTZ; RIGHT?
01:28PM A. THAT IS CORRECT. YOU NEED, YOU NEED A CLOCK MULTIPLIER TO
01:28PM BE ABLE TO GET TO HIGHER FREQUENCY.
01:28PM Q. SO THE PLL ALLOWS THESE OMAP CHIPS TO RUN MANY TIMES
01:28PM FASTER THAN AN EXTERNAL CRYSTAL?
01:28PM A. THAT IS CORRECT.
01:28PM Q. AND THE PORTION OF THE PLL THAT OUTPUTS THAT HIGHER
01:29PM FREQUENCY IS THE RING OSCILLATOR; CORRECT?
01:29PM A. AGREED. AS WE DISCUSSED, IN A DIGITAL PLL, THE OSCILLATOR
01:29PM COULD HAVE -- DOES NOT -- YOU COULD RECYCLE AN EDGE AND
01:29PM GENERATE MULTIPLES OF IT AND START/STOP.
01:29PM SO THERE ARE DIFFERENT STRUCTURES WHERE IT IS COMPLETELY
01:29PM CONTROLLED BY THE DIGITAL CODE WORD.
01:29PM SO AS I SAID, IF WE'RE TALKING ABOUT ANALOG PLL HERE, AND
01:29PM I'M TALKING ABOUT -- SO WHICH ONE ARE YOU TALKING ABOUT,
01:29PM DIGITAL PLL OR ANALOG PLL? BECAUSE THEY MAY SLIGHTLY DIFFERENT
01:29PM IN TERMS OF OSCILLATOR AND HOW THE CIRCUIT GENERATING EDGES
01:29PM WORKS.
01:29PM Q. I UNDERSTAND. LET ME ASK IS THIS WAY: WHETHER IT'S A
01:29PM DIGITAL OR AN ANALOG PLL, THERE'S NO OTHER PORTION OF THE PLL

01:29PM THAT OUTPUTS THE CLOCK SIGNAL OTHER THAN THE OSCILLATOR; RIGHT?
01:29PM A. THERE IS -- THE INPUT EDGE COMING FROM THE CRYSTAL
01:29PM TRIGGERS IN SOME FORMS OF PLL'S, I'M NOT SURE IF IT IS ON THE
01:29PM OMAP730, THE FIRST EDGE RUNS THROUGH AND IT BECOMES AN OUTPUT
01:30PM EDGE, AND THEN IT RECIRCULATES TO GENERATE N EDGES, TEN EDGES
01:30PM EXTRA, VERY FAST, YOU GET A SEQUENCE OF EDGES.
01:30PM AND THEN THE ELEVENTH ONE WOULD BE ACTUALLY A NEW ONE FROM
01:30PM THE CRYSTAL COMING IN FOLLOWED BY ANOTHER N EDGE.
01:30PM SO IN THIS CASE, THE SEQUENCE OF PULSES COMING OUT WOULD
01:30PM BE TRIGGERED BY THE REFERENCE CLOCK.
01:30PM THE COUNT WOULD BE CONTROLLED BY THE LOOP THAT TRIGGERED
01:30PM THAT N EDGES TO MAKE SURE IT'S EXACTLY TEN EDGES IN SPACE.
01:30PM SO THAT'S WHY I'M SAYING, COMPLETELY SAYING THE OSCILLATOR
01:30PM IS GENERATING, IT'S ACTUALLY -- IN SOME FORMS OF THESE
01:30PM OSCILLATOR, IT TAKES A FIRST EDGE TO RUN THROUGH THE DELAY LINE
01:30PM AND THEN IT COMES BACK AND IT'S STOPPED BY THE CONTROL LOCK
01:30PM BEFORE IT PROCEEDS AGAIN.
01:30PM SO YOU CAN CALL THAT A LOOP, BUT THE CONTROL SYSTEM IS IN
01:30PM FULL CONTROL OF HOW THE EDGES ARE FLOWING THROUGH.
01:30PM Q. OKAY.
01:30PM A. SO YOUR EXACT DESCRIPTION IS NOT -- YOU KNOW, THERE COULD
01:30PM BE VARIATIONS OF WHAT YOU DESCRIBED.
01:30PM Q. OKAY. LET ME CLARIFY IT THIS WAY: THERE'S NO OTHER
01:30PM PORTION IN THE PLL BESIDES THE RING OSCILLATOR THAT CAN CREATE
01:30PM A FREQUENCY THAT'S SO MUCH HIGHER THAN THE EXTERNAL CRYSTAL;

01:31PM CORRECT?
01:31PM A. THAT IS CORRECT. THAT IS WHERE IT'S -- WHERE THE EXTRA
01:31PM EDGES ARE GENERATED, YES.
01:31PM MR. CARMACK: THANK YOU.
01:31PM THE COURT: THANK YOU, MR. CARMACK.
01:31PM MR. SMITH.
01:31PM MR. SMITH: THANK YOU, YOUR HONOR.
01:31PM **CROSS-EXAMINATION**
01:31PM BY MR. SMITH:
01:31PM Q. GOOD AFTERNOON, DR. HAROUN.
01:31PM A. GOOD AFTERNOON.
01:31PM Q. YOU AND I HAVEN'T SPOKEN BEFORE, HAVE WE?
01:31PM A. NO, WE HAVE NOT.
01:31PM Q. I BELIEVE YOU SAID DURING COUNSEL'S EXAMINATION, I HAVE IT
01:31PM WRITTEN DOWN THERE, THAT YOU'RE THE SENIOR FELLOW AND ALSO THE
01:31PM DIRECTOR OF THE EMBEDDED SYSTEMS LABORATORIES AT TEXAS
01:31PM INSTRUMENTS.
01:31PM CAN YOU EXPLAIN A LITTLE BIT WHAT THAT MEANS, DR. HAROUN?
01:31PM A. OKAY. SO SENIOR FELLOW IS AN ELECTED TITLE INSIDE
01:31PM TEXAS INSTRUMENTS. WE HAVE A MANAGEMENT CHAIN AND WE HAVE WHAT
01:31PM WE CALL A TECHNICAL LADDER CHAIN, TECHNICAL -- YOU GET PROMOTED
01:31PM BY BEING ELECTED BY YOUR PEERS AND THE PEOPLE THAT ALREADY HAVE
01:31PM BEEN ELECTED BEFORE YOU BECAUSE OF YOUR TECHNICAL CONTRIBUTIONS
01:32PM TO THE COMPANY.
01:32PM SO I HAVE BEEN ELECTED TO BE A MEMBER OF THE TECHNICAL

LADDER, AND THEN SENIOR MEMBER, DISTINGUISHED, A FELLOW, AND A SENIOR FELLOW, AND THAT'S THE HIGHEST TITLE WE HAVE AT TI TODAY, AND WE HAVE FIVE SENIOR FELLOWS IN THE WHOLE COMPANY.

Q. WHAT'S THE HIGHEST TITLE? I'M SORRY.

A. IT'S A SENIOR FELLOW, TEXAS INSTRUMENTS SENIOR FELLOW, AND WE HAVE FIVE SENIOR FELLOWS AT TEXAS INSTRUMENTS TODAY.

Q. AND HOW MANY EMPLOYEES ARE THERE AT TEXAS INSTRUMENTS?

A. THERE'S ABOUT 30,000 EMPLOYEES.

Q. AND DR. HAROUN, YOU ALSO SAID THAT YOU WERE THE DIRECTOR OF THE EMBEDDED SYSTEMS LABORATORY. WHAT DOES THAT MEAN, SIR?

A. WE HAVE A BUSINESS UNIT CALLED EMBEDDED PROCESSING. INSIDE THAT BUSINESS UNIT, WE BUILD DIGITAL SIGNAL PROCESSORS, MICRO CONTROLLERS, WIRELESS CONNECTIVITY CHIPS.

AND IT HAS A RESEARCH LABORATORY CALLED EMBEDDED SYSTEM LABORATORY, AND I DIRECT ALMOST 48 PH.D.'S INTO THAT LAB TO DEVELOP FUTURE GENERATION SYSTEMS, NEW ARCHITECTURES, SOFTWARE THAT RUNS ON THESE PROCESSORS TO DO FUNCTIONS, DIFFERENT FUNCTIONS FROM IMAGING FUNCTIONS TO RADAR AND OTHER THINGS LIKE THAT.

Q. WHAT TYPE OF PH.D.'S DO THESE EMPLOYEES HAVE?

A. THESE ARE TYPICALLY PH.D.'S OF ELECTRICAL ENGINEERING, DEPARTMENTS ACROSS THE COUNTRY AND WORLDWIDE.

Q. AND CAN YOU PLEASE TELL US A LITTLE BIT ABOUT YOUR EDUCATIONAL BACKGROUND, DOCTOR.

A. OKAY. I GOT BY BACHELOR'S AND MASTER'S FROM A UNIVERSITY

IN CAIRO, EGYPT CALLED AIN SHAMS UNIVERSITY; AND THEN I WENT TO GET MY DEGREE AND MY PH.D. FROM THE UNIVERSITY OF WATERLOO IN ONTARIO, CANADA. I GRADUATED IN 1990 FROM UNIVERSITY OF WATERLOO WITH A PH.D.

AND I GOT EMPLOYED IN UNIVERSITY OF CONCORDIA IN MONTREAL FOR ALMOST SIX YEARS FROM VERY LATE 1989 BEFORE I GOT GRANTED THE PH.D. UNTIL I ACTUALLY GOT PROMOTED TO ASSOCIATE PROFESSOR AND GOT TENURE, AND I WENT TO TEXAS INSTRUMENTS TO WORK THERE ON A SABBATICAL FROM UNIVERSITY AND I ACTUALLY DECIDED TO CONTINUE WORKING FOR TEXAS INSTRUMENTS FROM THAT TIME ON.

Q. AND I BELIEVE COUNSEL ASKED YOU ABOUT THE TI OMAP CHIPS THAT ARE AT ISSUE IN THIS CASE. DO YOU RECALL GENERALLY THAT TESTIMONY?

A. THAT'S CORRECT, YES.

Q. AND THERE'S THE 730 AND THE 850. DO YOU RECALL THAT?

A. YES.

Q. AND YOU'VE READ THE, I BELIEVE, THE TECHNICAL DOCUMENTATION RELATING TO BOTH OF THOSE CHIPS?

A. YES, I LOOKED AT THE TECHNICAL REFERENCE MANUAL ONLY RECENTLY ACTUALLY.

Q. AND COUNSEL ASKED YOU A NUMBER OF QUESTIONS ON THIS, ON PLL'S. DO YOU RECALL THAT?

A. THAT'S CORRECT, YES.

Q. WHAT'S A PLL IN VERY GENERAL TERMS?

A. THE PHASE LOCKED LOOP, IT'S AN ACRONYM THAT STANDS FOR

PHASE LOOKED LOOP, IT IS A BLOCK THAT GENERATES A NUMBER OF EDGES THAT ARE AN INTEGER, TYPICALLY AN INTEGER MULTIPLE OF INPUT EDGES THAT ARE CALLED REFERENCE CLOCK.

SO A REFERENCE CLOCK GENERATES EQUAL TIME, EQUAL TIME TO THE EDGES, WHAT'S CALLED GOING UP AND DOWN. ONE OF THOSE EDGES -- SO THEY HAVE A CONSTANT TIME.

THEN THE PHASE LOCK LOOP IS A BLOCK THAT FILLS IN BETWEEN THESE EDGES AN EXTRA NUMBER OF -- WHAT WE CALL AN INTEGER NUMBER, LIKE AN EXTRA TEN EDGES IN THE MIDDLE, EQUAL SPACE.

SO THE OUTPUT CLOCK WOULD BE A MULTIPLE OF THE INPUT CLOCK.

AS PART OF THE PHASE LOCK LOOP, YOU CAN ALSO DIVIDE THE INPUT CLOCK OR DIVIDE THE OUTPUT CLOCK SO YOU CAN ACTUALLY MULTIPLY BY TEN OR DIVIDE BY THREE. SO YOU GET THE INTEGER RATIOS, SO 10 DIVIDED BY 3, A MULTIPLICATION OF THE INPUT THROUGHOUT.

Q. IS THERE AN OUTPUT OF A PLL?

A. THERE IS TYPICALLY MULTIPLE OUTPUTS. THE MOST IMPORTANT ONE IS CALLED A CLOCK OUTPUT, WHICH IS A SIGNAL THAT GENERATES EVENTS OF EQUAL TIME SPACING AT A KNOWN FREQUENCY.

Q. IS THAT A CLOCK OUTPUT TO CLOCK A CPU?

A. TYPICALLY IT IS USED TO CLOCK PROCESSORS. IT COULD CLOCK OTHER MODULES, TOO, BUT TYPICALLY IT'S USED TO CLOCK PROCESSORS.

Q. AND DO BOTH OF THE TI OMAP CHIPS THAT YOU'VE BEEN

DISCUSSING TODAY INCLUDE A PLL?

A. YES, THEY DO.

Q. IF WE COULD TURN TO EXHIBIT 3115, WHICH IS THE 730 REFERENCE MANUAL THAT YOU WERE ASKED ABOUT, IT JUST HAS A DIFFERENT EXHIBIT NUMBER ON IT.

A. OKAY.

Q. AND WE CAN -- LET'S TURN TO PAGE 5-6. AND SPECIFICALLY IF WE CAN BLOW UP 5.2.2.1.

CAN YOU SEE THAT ON YOUR SCREEN, DOCTOR?

A. YES, I CAN, YES.

Q. AND THIS REFERS TO DPLL MODES?

A. YES.

Q. AND WHAT'S A DPLL MODE IN JUST VERY HIGH LEVEL, GENERAL TERMS?

A. IT'S A DIGITAL PLL. IT DESCRIBES THE WAY THAT THE PLL WORKS. ITS CONTROL IS DONE IN A DIGITAL MANNER VERSUS AN ANALOG MANNER. THESE ARE THE TWO MAJOR TYPES.

Q. OKAY. AND DOES THE DPLL IN THESE TWO TI OMAP CHIPS HAVE AN OUTPUT?

A. YES, THEY DO.

Q. AND WHAT'S THAT OUTPUT USED FOR?

A. THE OUTPUT IS USED TO CLOCK PROCESSORS. IN THE CASE OF DPLL1, IT CLOCKS MPU SUBSYSTEM.

Q. AND THAT MPU SUBSYSTEM INCLUDES A CPU?

A. YES, IT DOES.

01:37PM Q. AND DOES THE OUTPUT -- EXCUSE ME. STRIKE THAT.
IS THE OUTPUT FREQUENCY FROM THE DPLL STABLE?
A. THAT IS PART OF THE SPECIFICATION. IN OTHER WORDS, THE OUTER CLOCK IS ALWAYS KNOWN TO HAVE A KNOWN VALUE WITHIN A TIGHT RANGE. THAT'S HOW THE SPECIFICATION ON THE PLL IS DEVELOPED.
SO YES, THE ANSWER IS CORRECT, IT'S STABLE. IT'S A KNOWN VALUE.
Q. AND THEN, DOCTOR, IF YOU CAN SEE, THERE'S A REFERENCE TO CK UNDERSCORE --
A. REF.
Q. -- REF RIGHT THERE (INDICATING)?
A. YES.
Q. WHAT DOES THAT REFER TO, DOCTOR?
A. THAT IS TYPICALLY A CLOCK REFERENCE. THIS IS A KNOWN REFERENCE THAT COMES FROM OFF CHIP, FROM A KNOWN -- TYPICALLY A CRYSTAL OR ANOTHER CLOCK SOURCE OF A KNOWN HIGH ACCURACY.
Q. AND WHAT DO YOU MEAN THAT IT COMES FROM OFF CHIP?
A. YOU NEED A SPECIAL PROCESS TECHNOLOGY, LIKE A CRYSTAL, TO HAVE THE ACCURACY ASSOCIATED WITH IT. TYPICALLY IT'S DONE IN A VERY TIGHT SUB.1 PERCENT, A THOUSAND PPL OR A HUNDRED PART PER MILLION ACCURACY.
SO THESE ARE BUILT AS CRYSTALS AND THEY GET CONNECTED TO THEIR OWN OSCILLATORS AND THEY GENERATE THESE EDGES THAT ARE VERY ACCURATE TIME INTERVALS.

01:38PM SO THEY'RE OFF CHIP, YES.
Q. AND DOCTOR, DO YOU CONSIDER A CRYSTAL TO BE ACCURATE?
A. IT IS DESIGNED TO BE ACCURATE, YES.
Q. THAT'S THE POINT OF A CRYSTAL? IS THAT FAIR?
A. YES, CORRECT.
Q. AND CAN YOU TELL FROM THESE, FROM THIS PAGE, DOCTOR, THIS LITTLE BLOW UP --
A. YES.
Q. -- HOW YOU CAN DETERMINE THE OUTPUT OF THE DPLL'S?
01:39PM A. YES. IT IS -- THE OUTPUT OF THE PLL HAS TWO PHASES. ONE IS CALLED BYPASS MODE AND THE SECOND ONE IS CALLED LOCK MODE. THESE ARE THE TWO PHASES THAT DESCRIBE THE OUTPUT OF THE PLL.
Q. LET'S GO THROUGH THE BYPASS MODE QUICKLY. WHAT DOES THAT REFER TO?
A. IN THE BYPASS MODE, WHAT IT REFERS TO IS THAT THE OUTPUT OF A PLL IS PRODUCED, IS TAKING THE INPUT, WHICH IS CALLED A CLOCK REFERENCE, AND EITHER AS IT IS OR DIVIDED BY A FACTOR OF 2, MEANING SKIPPING EVERY SECOND EDGE, OR DIVIDED BY 4, MEANING PICKING EVERY FOURTH EDGE, AND TAKING IT AND PRODUCING IT AND PUTTING IT IN ITSELF. SO IT'S BYPASSED.
Q. OKAY. AND SO CAN YOU TELL IN THIS BYPASS MODE, DR. HAROUN, WHETHER THE OUTPUT THAT CLOCKS, I BELIEVE YOU SAID THE MPU, IS RELATED TO THIS CK_REF?
01:40PM A. YES, IT IS RELATED EITHER EQUAL OR DIVIDED BY 2 OR DIVIDED BY 4 AS THE STATEMENT SAYS THERE.

01:40PM Q. WOULD YOU CONSIDER THAT RELATIONSHIP A MATHEMATICAL RELATIONSHIP?
A. IT IS AN ACCURATE, AN EXACT DIVIDED BY 2 OR EXACT DIVIDED BY 4 IN THE FREQUENCY.
Q. SO WOULD YOU CONSIDER IT A FORMULA?
A. YES, IT IS.
Q. AND SO MAY I --
YOUR HONOR, MAY I APPROACH AND PUT UP THE --
THE COURT: YOU MAY, MR. SMITH.
MR. SMITH: THANK YOU, YOUR HONOR. PARDON ME.
(PAUSE IN PROCEEDINGS.)
MR. SMITH: BECAUSE THIS IS CONFIDENTIAL INFORMATION, I THINK WE MAY HAVE TO PUT IT IN A WAY --
THE COURT: GO AHEAD. AND IF TPL OR PATRIOT NEEDS TO STEP UP TO SEE WHAT'S ON THE BOARD, YOU HAVE MY PERMISSION AS WELL.
MR. CARMACK: THANK YOU.
MR. SMITH: AND, YOUR HONOR, CAN I INVITE THE WITNESS TO COME DOWN AND USE THE EASEL?
THE COURT: YOU MAY. YOU MAY STEP DOWN, DOCTOR.
01:41PM MR. SMITH: IF YOU COULD PUT THAT BACK UP, 5.1.
Q. AND DOCTOR --
AND YOUR HONOR, MAY I HAVE A LITTLE FREEDOM TO GO LOOK AT THAT?
THE COURT: YOU HAVE SOME LATITUDE.

01:41PM MR. SMITH: THANK YOU.
Q. AND SO, DOCTOR, I BELIEVE WE WERE TALKING ABOUT THE BYPASS MODE.
A. THAT'S CORRECT.
Q. AND THAT THERE'S A RELATIONSHIP BETWEEN THE REFERENCE INPUT THAT COMES FROM THE CRYSTAL AND THE OUTPUT THAT COMES OUT OF THE DPLL IN THIS MODE.
A. YES.
Q. DO YOU RECALL THAT?
A. YES.
Q. COULD YOU -- COULD YOU WRITE OUT THAT MATHEMATICAL FORMULA FOR US, DOCTOR?
A. SO WHAT WE WOULD DO IS THE FREQUENCY OF THE --
Q. DOCTOR, CAN I STOP YOU ONE MOMENT SO THAT THE JUDGE CAN SEE, TOO, AND THE COURT REPORTER?
A. OKAY. SO THE FREQUENCY OF THE OUTPUT WOULD BE EQUAL TO THE FREQUENCY OF -- AND HERE THE SIGNAL IS CALLED THE CLOCK REFERENCE, SO I'M GOING TO PUT A DASH CLOCK REFERENCE (INDICATING).
AND THIS MEANS THE FREQUENCY, WHICH IS THE RATES OF EDGES THAT COME OUT OF THE CLOCK REFERENCE (INDICATING).
SO THE OUTPUT IS EQUAL TO THE FREQUENCY OF THE CLOCK REFERENCE DIVIDED BY, AND EITHER 2 OR, LIKE IT SAYS IN HERE, DIVIDED BY 4 (INDICATING).
SO IN ONE CASE, DEPENDING ON THE SETS OF THE BITS, IT

01:42PM COULD BE THIS EQUATION, THIS WOULD BE CASE A (INDICATING); CASE
01:42PM B, IT COULD BE THE FREQUENCY OF CLOCK REFERENCE DIVIDED BY 4
01:42PM (INDICATING).
01:42PM I THINK THE FIRST CASE IT SAYS IT COULD BE INPUT REFERENCE
01:42PM CLOCK OR THE CLOCK REV BY 2 OR THE CLOCK REV BY 4 (INDICATING).
01:42PM I BELIEVE THAT'S CORRECT. YES.
01:42PM SO IT COULD BE ALSO THE LAST ONE, THE FIRST ONE ON THIS
01:42PM STATEMENT, COULD BE NOT EXACTLY EQUAL TO THE FREQUENCY OF THE
01:42PM CLOCK REV. SO THE OUTPUT IS EXACTLY EQUAL TO IT. IT'S THE
01:42PM BYPASS.
01:42PM Q. IS THAT --
01:43PM A. THESE ARE THE THREE OPTIONS. THIS COMES FIRST
01:43PM (INDICATING). IT'S ONE OF THOSE THREE IS WHAT IS BEING SAID.
01:43PM Q. THANK YOU, DOCTOR.
01:43PM SO C, IT WOULD BE AN ACCURATE STATEMENT TO SAY THAT IT'S
01:43PM DIRECTLY FROM CLOCK -- THE CK_REF IS DIRECTLY CLOCKING THE CPU?
01:43PM A. YES. AND THE REASON WHY I MENTION FREQUENCY, BECAUSE WHAT
01:43PM IS -- WHAT MATTERS IS EXACT TIME BETWEEN THE EDGES ARE OR
01:43PM GREATER THAN THE EDGES. THAT'S REALLY WHAT IS BEING PASSED ON.
01:43PM Q. AND AGAIN, JUST SO WE'RE CLEAR, CK_REF, WHAT DOES THAT
01:43PM REFER TO?
01:43PM A. CK_REF IS THE INPUT SIGNAL THAT IS COMING FROM THE
01:43PM REFERENCE CRYSTAL OR THE REFERENCE INPUT CRYSTAL, THE INPUT
01:43PM CRYSTAL THAT GENERATES THE REFERENCE CLOCK.
01:43PM Q. DR. HAROUN, IF YOU WOULD BE SO KIND, COULD YOU JUST PUT ON

01:43PM THE TOP OF THAT BYPASS MODE SO WE KNOW WHICH IT IS?
01:43PM A. YES, THIS ONE IS BYPASS (INDICATING). THIS IS WHAT WE
01:43PM WERE DISCUSSING. THAT'S THE FIRST OF THEM.
01:43PM Q. NOW, LET'S TALK ABOUT LOCK MODE, AND IF YOU DON'T MIND TO
01:43PM FLIP OPEN THE -- FLIP OVER THE CHART.
01:43PM A. OKAY.
01:44PM Q. AND LET ME ASK YOU THE SAME QUESTIONS.
01:44PM THERE'S A CK_REF THAT'S REFERRED TO. WHAT IS THAT
01:44PM REFERRING TO RIGHT HERE?
01:44PM A. THE CK_REF IN HERE, THAT'S THE SAME AS THIS ONE HERE
01:44PM (INDICATING). IT'S THE CLOCK REFERENCE THAT IS THE INPUT TO
01:44PM THE PLL COMING FROM THE REFERENCE, FROM THE REFERENCE SIGNAL,
01:44PM THE CRYSTAL.
01:44PM Q. AND IS THERE AN OUTPUT FROM THE DPLL IN THE TI OMAP CHIPS
01:44PM IN LOCK MODE?
01:44PM A. YES. THIS IS OUTPUT (INDICATING). IT'S THE SAME CLOCK
01:44PM OUTPUT THAT THAT CLOCK OUTPUT IS THE OUTPUT FROM THE PLL.
01:44PM Q. AND WHAT'S IT USED TO CLOCK?
01:44PM A. IT IS CLOCKING THE MPU SUBSYSTEM IN THE CASE OF DPLL.
01:44PM Q. AND DOES THAT INCLUDE A CPU?
01:44PM A. YES, THAT INCLUDES A CPU.
01:44PM Q. AND IS THERE A MATHEMATICAL RELATIONSHIP BETWEEN THE
01:44PM CK_REF AND THE OUTPUT OF THE DPLL IN LOCK MODE FOR THE TI OMAP
01:44PM CHIPS?
01:44PM A. THAT'S CORRECT. THERE IS -- THE RELATIONSHIP IS MULTIPLE,

01:45PM WHICH IS THE M FACTOR HERE WITH THE DECLARE, WHICH COULD BE A
01:45PM NUMBER SET BY REGISTER BETWEEN 1 AND 31, SO 1, 2, 3, 4, ALL THE
01:45PM WAY UP TO 31 ARE OPTIONS.
01:45PM AND IT'S DIVIDED DOWN BY AN INTEGER THAT IS -- SO THE
01:45PM INPUT CLOCK REFERENCE IS M EQUALS 31 AND 1 LESS THAN N LESS
01:45PM THAN 4, SIGNAL EQUALS 4 IS THE OTHER INTEGER (INDICATING).
01:45PM AND, YEAH, AND SO BASICALLY THE OUTPUT CLOCK RANGE IS THE
01:45PM MINIMUM OF CLOCK REFERENCE BY 4 TO 31 TIMES CLOCK REFERENCE.
01:45PM THIS IS THE MAXIMUM AND MINIMUM OF WHAT THE PLL WOULD DO.
01:45PM THIS TYPICALLY IS WHAT YOU CALL THE INPUT DIVIDER AND THIS
01:45PM TYPICALLY IS CALLED THE FEEDBACK (INDICATING). BUT M IS THE
01:45PM FEEDBACK DIVIDER VALUE, AND N IS THE INPUT DIVIDER NUMBER.
01:45PM AND BOTH OF THESE SET THE MATHEMATIC EQUATION THAT USES
01:45PM THESE TWO EXTREME VALUES. THIS IS THE MINIMUM POSSIBLE VALUE
01:46PM THAT CAN BE PRODUCE, AND THAT'S THE MAXIMUM POSSIBLE VALUE OUT
01:46PM OF THESE NUMBERS (INDICATING).
01:46PM Q. DOCTOR, DOES THIS FORMULA IN THE LOCK MODE REQUIRE THE
01:46PM CK_REF?
01:46PM A. YES, OF COURSE. IT'S A MULTIPLE, SO THE EXACT OUTPUT IS A
01:46PM MULTIPLE OF THE CLOCK FREQUENCY, IN THIS CASE IT'S 31 TIMES THE
01:46PM CLOCK REFERENCE, THAT'S THE HIGHEST POSSIBLE (INDICATING), AND
01:46PM HERE THE MINIMUM IS THE CLOCK REFERENCE DIVIDED, BEING SLOWED
01:46PM DOWN BY A FACTOR OF 4, EVERY FOURTH PAGE (INDICATING), WHERE
01:46PM HERE FOR EVERY EDGE YOU GET FROM THE CLOCK REFERENCE, YOU
01:46PM ACTUALLY FILL IN 31, 30 EXTRA EDGES, SO A TOTAL OF 31 EDGES FOR

01:46PM THE CLOCK (INDICATING).
01:46PM Q. AND DOCTOR, DO YOU MIND PUTTING UP THAT FORMULA FOR THE
01:46PM LOCK MODE OF THE DPLL IN THE TI OMAP CHIPS?
01:46PM A. OKAY. SO THE FREQUENCY OF THE OUTPUT WOULD BE EQUAL TO,
01:46PM AND HERE IT'S ACTUALLY BECAUSE ALL OF THE MOST WE ARE
01:46PM REPRESENTED BY A MATHEMATIC EQUATION, IT WOULD BE THE FREQUENCY
01:47PM OF THE CK_REF AND IT IS GOING TO BE MULTIPLIED THE INTEGER M IN
01:47PM HERE DIVIDED BY THE INPUT N (INDICATING). AND THAT IS THE
01:47PM EQUATION.
01:47PM SO THIS IS THE EQUATION OF THE CLOCK OUTPUT AS A
01:47PM FUNCTION -- THE FREQUENCY OF THE CLOCK OUTPUT AS A FUNCTION OF
01:47PM THE FREQUENCY OF THE CLOCK INPUT, WHICH IS CALLED CLOCK
01:47PM REFERENCE, MULTIPLIED BY AN INTEGER CALLED M AND ANOTHER
01:47PM INTEGER CALLED N (INDICATING).
01:47PM AND HERE M (INDICATING), AND I'M REPEATING HERE FROM THIS
01:47PM SPECIFICATION, EQUALS, IT COULD BE ANY NUMBER BETWEEN 1 AND --
01:47PM ACTUALLY, I SHOULD WRITE IT, STRIKE THAT, BIGGER THAN 1 OR
01:47PM EQUAL OR LESS THAN UP TO 31 (INDICATING). SO THIS M CAN BE 1,
01:47PM 2, 3 DEPENDING ON THE SETTING.
01:47PM AND THE N CAN BE ANY NUMBER BETWEEN 1 AND 4, WHICH I THINK
01:47PM IS WRITTEN DOWN HERE (INDICATING).
01:47PM SO N CAN BE EQUAL TO 1 OR IT CAN BE EQUAL TO 2 OR 3 OR 4,
01:47PM AND M CAN BE EQUAL TO 1, 2, OR 3, OR UP TO 31.
01:48PM Q. OKAY.
01:48PM A. SO IF YOU LOOK AT THIS EQUATION, IT HAS M AND N, THE

EXHIBIT 15

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

HTC CORPORATION AND HTC AMERICA, INC., PLAINTIFF, VS. TECHNOLOGY PROPERTIES LIMITED, PATRIOT SCIENTIFIC CORPORATION AND ALLIACENSE LIMITED, DEFENDANT.	C-08-00882 PSG SAN JOSE, CALIFORNIA OCTOBER 1, 2013 VOLUME 7 PAGES 1488-1637

TRANSCRIPT OF PROCEEDINGS
BEFORE THE HONORABLE PAUL S. GREWAL
UNITED STATES MAGISTRATE JUDGE

A P P E A R A N C E S:

FOR THE PLAINTIFF: COOLEY LLP
BY: HEIDI KEEFE
RON LEMIEUX
3175 HANOVER STREET
PALO ALTO, CALIFORNIA 94304

APPEARANCES CONTINUED ON NEXT PAGE

OFFICIAL COURT REPORTER: LEE-ANNE SHORTRIDGE, CSR, CRR
CERTIFICATE NUMBER 9595

PROCEEDINGS RECORDED BY MECHANICAL STENOGRAPHY
TRANSCRIPT PRODUCED WITH COMPUTER

APPEARANCES (CONTINUED)

FOR THE PLAINTIFF: COOLEY LLP
BY: STEPHEN R. SMITH
1299 PENNSYLVANIA AVENUE, NW
SUITE 700
WASHINGTON, D.C. 20004

BY: MATTHEW J. LEARY
380 INTERLOCKEN CRESCENT, SUITE 900
BROOMFIELD, COLORADO 80021

ALSO PRESENT: VINCENT LAM

FOR DEFENDANTS TPL AND ALLIACENSE: AGILITY IP LAW
BY: JAMES C. OTTESON
IRVIN E. TYAN
THOMAS T. CARMACK
PHILIP W. MARSH
DAVID LANSKY
149 COMMONWEALTH DRIVE
MENLO PARK, CALIFORNIA 94025

FOR DEFENDANT PATRIOT: KIRBY, NOONAN, LANCE & HOGE
CHARLES T. HOGE
35 TENTH AVENUE
SAN DIEGO, CALIFORNIA 92101

ALSO PRESENT: CHARLES MOORE
CLIFFORD FLOWERS
DAN LECKRONE
MACK LECKRONE

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SAN JOSE, CALIFORNIA OCTOBER 1, 2013

P R O C E E D I N G S

01:06PM (JURY OUT AT 1:06 P.M.)

01:06PM THE COURT: GOOD AFTERNOON. MR. RIVERA, WOULD YOU PLEASE CALL THE MATTER THAT'S BEEN SET FOR TRIAL.

01:06PM THE CLERK: YES, YOUR HONOR. CALLING HTC CORPORATION, ET AL VERSUS TECHNOLOGY PROPERTIES LIMITED, ET AL, CASE NUMBER CV-08-882 PSG, MATTER ON FOR TRIAL.

01:06PM COUNSEL, PLEASE STATE YOUR APPEARANCES.

01:06PM MR. OTTESON: GOOD AFTERNOON, YOUR HONOR. JIM OTTESON FROM AGILITY IP LAW REPRESENTING DEFENDANTS TPL AND ALLIACENSE, ACCOMPANIED BY MANY OF MY COLLEAGUES AND CLIENTS.

01:06PM MR. HOGE: GOOD AFTERNOON, YOUR HONOR. CHARLIE HOGE FOR PATRIOT SCIENTIFIC.

01:06PM THE COURT: MR. HOGE, MR. OTTESON, GOOD AFTERNOON.

01:06PM MS. KEEFE: GOOD AFTERNOON, YOUR HONOR. HEIDI KEEFE FOR COOLEY FOR HTC, ALONG WITH MY TEAM AND THE CLIENT.

01:06PM THE COURT: GOOD AFTERNOON TO YOU AS WELL, MS. KEEFE.

01:06PM MS. KEEFE: GOOD AFTERNOON.

01:06PM THE COURT: ALL RIGHT. COUNSEL, BEFORE WE RESUME MATTERS IN THIS TRIAL, ARE THERE ANY EVIDENTIARY ISSUES OR

01:07PM OTHER MATTERS WE CAN ADDRESS?

01:07PM MR. LEARY. IT IS THE AFTERNOON, SO I WASN'T EXPECTING TO SEE YOU.

01:07PM (LAUGHTER.)

02:22PM WELL, WHAT IS IT EXACTLY? LET'S LOOK AT CLAIM 6 IF WE
02:22PM LOOK AT COLUMN 2, LINES 18 TO 20. IT SAYS HERE THAT "AN ENTIRE
02:22PM OSCILLATOR DISPOSED UPON SAID INTEGRATED CIRCUIT SUBSTRATE,"
02:23PM THAT'S THE CHIP, "AND CONNECTED TO CENTRAL PROCESSING UNIT,
02:23PM SAID OSCILLATOR CLOCKING SAID CENTRAL PROCESSING UNIT AT A
02:23PM CLOCK RATE."
02:23PM SO WHAT DOES THE EVIDENCE SHOW?
02:23PM WELL, LET ME BACK UP. JUDGE GREWAL HAS ACTUALLY PUT AN
02:23PM EXTRA GLOSS ON THE MEANING OF "ENTIRE OSCILLATOR," AND YOU'RE
02:23PM GOING TO GET THIS IN YOUR JURY INSTRUCTIONS, TOO, SO LET'S TALK
02:23PM ABOUT WHAT THAT IS.
02:23PM SO IN YOUR JURY INSTRUCTIONS, AFTER CLOSING ARGUMENTS,
02:23PM JUDGE GREWAL IS ALSO GOING TO TELL YOU THIS ABOUT WHAT "ENTIRE
02:23PM OSCILLATOR" MEANS.
02:23PM "THE TERM 'ENTIRE OSCILLATOR' IN CLAIMS 6 AND 13 IS
02:23PM PROPERLY UNDERSTOOD TO EXCLUDE ANY EXTERNAL CLOCK USED TO
02:23PM GENERATE THE SIGNAL USED TO CLOCK THE CPU."
02:23PM OKAY. THIS GOES TO WHAT THEIR NON-INFRINGEMENT ARGUMENT
02:23PM IS, SO WE'RE GOING TO TALK ABOUT IT RIGHT NOW.
02:23PM BUT LET'S REVIEW THE EVIDENCE. FIRST OF ALL, AS I THINK
02:23PM YOU HEARD A NUMBER OF TIMES FROM MR. DENA, FROM DR. HAROUN,
02:24PM FROM TI, AND ALSO FROM MR. GAFFORD, THEY ADMIT THAT EVERY
02:24PM SINGLE ACCUSED PRODUCT HAS A MICROPROCESSOR CHIP WITH AN
02:24PM ON-CHIP RING OSCILLATOR IN A PLL THAT'S ON THE SAME SILICON
02:24PM CHIP AS THE CPU.

02:24PM SO WE KNOW THAT.
02:24PM AND ACCORDING TO MR. GAFFORD, THE RING OSCILLATORS IN
02:24PM THESE PLL'S ARE USED TO CLOCK THE CPU.
02:24PM SO THEN THE QUESTION BECOMES WHETHER THE EXTERNAL
02:24PM REFERENCE CRYSTAL EITHER GENERATES THE SIGNAL USED TO CLOCK THE
02:24PM CPU, OR WHETHER IT IS USED TO GENERATE THE SIGNAL THAT IS USED
02:24PM TO CLOCK THE CPU.
02:24PM AND THE ANSWER TO BOTH OF THOSE QUESTIONS IS AN EMPHATIC
02:24PM NO.
02:24PM SO LET'S START WITH THE FIRST QUESTION BY REVIEWING THE
02:24PM EVIDENCE.
02:24PM AND FOR THIS WE'RE GOING TO HAVE TO DARKEN THE BACK
02:25PM SCREEN, JIM. THANK YOU.
02:25PM THIS IS EXHIBIT 365, FIGURE 2-1 THAT DR. OKLOBDZIJA WAS
02:25PM JUST TESTIFYING ABOUT, AND ALSO MR. GAFFORD TESTIFIED ABOUT IT
02:25PM IN SOME DETAIL YESTERDAY.
02:25PM SO LET'S TALK ABOUT HOW THIS WORKS. I THINK -- I THINK
02:25PM NOW YOU'RE GETTING IT, BUT LET'S JUST REVIEW IT QUICKLY.
02:25PM YOU'VE GOT THE RING OSCILLATOR HERE (INDICATING) THAT IS
02:25PM GENERATING A CLOCK SIGNAL BY VIRTUE OF HAVING POWER BECAUSE
02:25PM EACH ONE OF THE INVERTERS IN THE RING OSCILLATOR HAS POWER.
02:25PM AND MR. DENA, YOU'LL RECALL, SAID THAT THE RING
02:25PM OSCILLATORS GET AN INDEPENDENT POWER SUPPLY FROM THE CHIP'S
02:25PM MAIN POWER.
02:25PM SO THEY'RE OSCILLATING AT A VERY HIGH FREQUENCY. THE ONE

02:25PM THAT IS SELECTED AT ANY GIVEN TIME, THAT IS USED TO THEN CLOCK
02:25PM THE CPU.
02:25PM IN ADDITION, IN THE PLL, AS YOU KNOW, IT GOES DOWN TO THIS
02:25PM DIVIDE THAT DIVIDED THAT VERY, VERY FAST, HIGH FREQUENCY CLOCK
02:26PM SIGNAL DOWN TO, IN THE QUALCOMM CHIPS, 19.2 MEGAHERTZ
02:26PM (INDICATING).
02:26PM WHY? BECAUSE THAT'S THE FREQUENCY OF THE TCXO
02:26PM (INDICATING), THE EXTERNAL REFERENCE CRYSTAL.
02:26PM AND THE REASON THEY WANT THEM TO BE THE SAME FREQUENCY IS
02:26PM BECAUSE THEY THEN WANT TO MATCH UP THOSE SQUARE WAVES, THEY
02:26PM WANT TO MATCH UP THE EDGES OF THE SQUARE WAVES HERE IN THE
02:26PM PHASE DETECTOR (INDICATING).
02:26PM AND THEN WHAT HAPPENS? THEN WHAT DOES THE PLL DO WITH
02:26PM THAT CLOCK SIGNAL? WELL, WHAT HAPPENS NEXT IS IT MAKES LITTLE
02:26PM ADJUSTMENTS WITH THE CHARGE PUMP AND IT STORES CORRECTION
02:26PM CHARGES HERE (INDICATING).
02:26PM NOW, DO WE HAVE THAT 19.2 MEGAHERTZ CLOCK SIGNAL SQUARE
02:26PM WAVE CONTINUING THROUGH TO THE RING OSCILLATORS (INDICATING)?
02:26PM NO. NO WAY. THAT CLOCK SIGNAL FROM THE EXTERNAL REFERENCE IS
02:27PM NOT USED TO GENERATE THE CLOCK SIGNAL OF THE RING OSCILLATORS.
02:27PM IT STOPS.
02:27PM WHAT GENERATES THE CLOCK SIGNAL FOR THESE CLOCK -- FOR
02:27PM THESE RING OSCILLATORS IS POWER, AND THEY'VE GOT THAT, ALL FOUR
02:27PM OF THEM HAVE THAT ALL THE TIME, EVEN THE ONES THAT AREN'T
02:27PM SELECTED TO BE IN THE PLL AT ANY GIVEN TIME. THEY'RE ALWAYS

02:27PM GENERATING A CLOCK SIGNAL.
02:27PM NOW, LET'S TAKE A LOOK AT DDX-24 IF WE COULD, PLEASE, AND
02:27PM WE CAN TURN THE BACK SCREEN BACK ON.
02:27PM AGAIN, THIS ILLUSTRATES THE POINT I WAS MAKING EARLIER.
02:27PM AS WE'VE DISCUSSED, EACH OF THESE INVERTERS HAS POWER, AND IT
02:27PM GETS IT FROM THE CHIP'S MAIN POWER SUPPLY.
02:27PM NOW, IS THERE EXTRA VOLTAGE OR CURRENT THAT IS SUPPLIED TO
02:27PM TRY TO REGULATE OR ADJUST THE SPEED? YES.
02:28PM BUT THAT IS NOT GENERATING THE CLOCK SIGNALS.
02:28PM SO THERE IS A DIFFERENCE, VERY IMPORTANT DIFFERENCE
02:28PM BETWEEN GENERATING A CLOCK SIGNAL, WHICH THAT HAPPENS BECAUSE
02:28PM THE RING OSCILLATORS HAVE POWER, THERE'S A BIG DIFFERENCE
02:28PM BETWEEN THAT AND REGULATING OR LIMITING THE FREQUENCY OF THAT
02:28PM CLOCK SIGNAL, BECAUSE FREQUENCY AND CLOCK SIGNAL ARE NOT THE
02:28PM SAME. FREQUENCY IS A CHARACTERISTIC OF A CLOCK SIGNAL.
02:28PM THAT IS WHAT THE CRYSTAL IS USED FOR. THE CRYSTAL IS USED
02:28PM TO LIMIT OR REGULATE THE SPEED OF THE CLOCK SIGNAL THAT IS
02:28PM GENERATED BY THE RING OSCILLATOR.
02:28PM NOW, WE TALKED ABOUT MR. DENA, THAT HE TESTIFIED THAT IN
02:28PM THE QUALCOMM CHIPS THEY'RE ALL POWERED AND THEY OSCILLATE AND
02:29PM GENERATE A CLOCK SIGNAL ON THEIR OWN. THEY DON'T NEED AN
02:29PM EXTERNAL REFERENCE CLOCK TO GENERATE A CLOCK SIGNAL.
02:29PM SO, AGAIN, WHAT THAT EXTERNAL REFERENCE CRYSTAL IS USED
02:29PM FOR -- ARE WE DARK ON THE BACK SCREEN? SORRY. -- AGAIN, WHAT
02:29PM THAT EXTERNAL REFERENCE CRYSTAL IS USED FOR, IT IS USED AS A

02:29PM REFERENCE. IT IS A COMPARATOR. A COMPARISON IS MADE BETWEEN
02:29PM THIS (INDICATING) AND THAT HERE (INDICATING).
02:29PM AND THAT COMPARISON IS USED TO ADJUST THE SPEED, BUT NOT
02:29PM GENERATE THE CLOCK SIGNAL FROM THE RING OSCILLATOR.
02:29PM NOW, YESTERDAY I DISCUSSED --
02:29PM LET'S TAKE THAT DOWN. THANK YOU.
02:29PM YESTERDAY I DISCUSSED AN ANALOGY WITH MR. GAFFORD TO
02:29PM ILLUSTRATE WHAT THE CRYSTAL IS USED FOR, AND WE'RE GOING TO PUT
02:30PM UP A GRAPHIC HERE TO ILLUSTRATE THAT. THAT WAS IT. YEAH,
02:30PM THAT'S IT.
02:30PM THIS IS DDX-401. AS YOU CAN SEE, THERE IS A SPORTS CAR
02:30PM THAT IS TRAPPED GOING UP A HILL BEHIND AN RV, OR A MOTOR HOME,
02:30PM GOING UP A HILL, SOLID YELLOW LINE, CAN'T PASS. THE RV IS
02:30PM GOING, SAY, 50 MILES AN HOUR AND THAT SPORTS CAR WANTS TO GO
02:30PM FASTER THAN THAT.
02:30PM SO IS THE RV LIMITING THE SPEED OF THE SPORTS CAR? YES.
02:30PM IT'S LIMITING THE SPEED OF THE SPORTS CAR.
02:30PM BUT IS THE RV AND THE ENGINE IN THAT MOTOR HOME, IS THAT
02:30PM USED TO GENERATE THE CLOCK SIGNAL, OR THE ENGINE POWER FOR THE
02:30PM SPORTS CAR? NO WAY. NO WAY. THE SPORTS CAR HAS ITS OWN
02:31PM ENGINE, GENERATES ITS OWN POWER.
02:31PM SO WHAT THE RV IS DOING IS LIMITING THE SPEED THAT THE
02:31PM SPORTS CAR CAN GO, BUT IT'S NOT USED TO GENERATE THE POWER FOR
02:31PM THAT SPORTS CAR.
02:31PM AND INITIALLY YESTERDAY, AT LEAST INITIALLY, MR. GAFFORD

02:31PM AGREED WITH ME THAT THE MOTOR HOME WAS NOT GENERATING THE POWER
02:31PM FOR HIS SPORTS CAR WHEN HE WAS STUCK BEHIND IT, AND THAT -- AND
02:31PM HE ALSO AGREED INITIALLY THAT THE MOTOR HOME WAS NOT BEING USED
02:31PM TO GENERATE THE POWER FOR THE SPORTS CAR.
02:31PM LET'S LOOK AT WHAT HE SAID.
02:31PM OH, NO. WE NEED TO GO TO THE TESTIMONY, BILL. DO YOU
02:31PM HAVE THAT? THIS IS AT 1382, 1 THROUGH 14.
02:31PM OKAY. SO I SAID, "SO YOU'RE DRIVING YOUR ALFA, YOU'RE
02:32PM STUCK BEHIND THIS MOTOR HOME GOING 50. AT THAT POINT, WHICH
02:32PM VEHICLE IS GENERATING THE POWER FOR YOUR CAR? YOUR ALFA? OR
02:32PM THE MOTOR HOME?"
02:32PM HE SAYS, "MY ALFA IS GENERATING THE POWER FOR THAT CAR."
02:32PM AND THEN I COME DOWN HERE AND I SAY, HEY, "IN FACT, THAT
02:32PM MOTOR HOME IS NOT BEING USED TO GENERATE POWER FOR ALFA,
02:32PM EITHER, IS IT?"
02:32PM HE SAYS, "IT'S NOT BEING -- IT'S CERTAINLY NOT BEING USED
02:32PM TO GENERATE THE POWER. IT IS, HOWEVER, BEING USED TO GENERATE
02:32PM THE SIGNAL THAT TELLS ME HOW MUCH POWER I WANT TO GENERATE."
02:32PM YEAH, THAT'S RIGHT. THAT MOTOR HOME IS NOT BEING USED TO
02:32PM GENERATE THE POWER FOR HIS CAR, BUT IT IS A CUE TO HIM. SO IT
02:32PM DOES LIMIT HIS SPEED.
02:32PM BUT, AGAIN, HE DECIDED HE DIDN'T REALLY LIKE THE WAY THE
02:32PM QUESTIONS WERE GOING, SO LET'S SEE WHAT HE SAID ON THE NEXT
02:32PM PAGE AT 1382:20 TO 1383:13.
02:33PM SO HE SAID -- TAKE THE BACK ONE FIRST THERE, YEAH. "SO

02:33PM LET'S IMAGINE WE HAVE A VERY CALM AND CONSISTENT MOTOR HOME
02:33PM DRIVER WHO ALWAYS DRIVES AT 50 MILES AN HOUR AND YOU'RE STUCK
02:33PM BEHIND HIM."
02:33PM INCIDENTALLY, MY GRANDFATHER, HE DIDN'T HAVE A MOTOR HOME
02:33PM OR AN RV -- WELL, HE HAD A FIFTH WHEEL TRAILER AND HE TOWED IT
02:33PM WITH HIS CHEVY PICKUP ALL AROUND THE WESTERN UNITED STATES FOR
02:33PM ABOUT THE LAST 15 YEARS THAT HE AND MY GRANDMOTHER WERE ALIVE.
02:33PM AND I'LL TELL YOU, HE WAS VERY CONSISTENT. HE WAS A VERY SLOW,
02:33PM CONSISTENT DRIVER, SAFE IN HIS MIND, BUT TOO SLOW TO BE SAFE
02:33PM FOR A LOT OF OTHER PEOPLE.
02:33PM NOW -- I'M LOSING MY POWER HERE MYSELF.
02:33PM "SO THE MOTOR HOME IS NOT BEING USED TO GENERATE, BEING
02:33PM USED TO GENERATE THE POWER OF YOUR ALFA, IS IT? IT IS LIMITING
02:33PM THE SPEED OF YOUR ALFA, BUT IT IS NOT BEING USED TO GENERATE
02:33PM THE SPEED OF YOUR ALFA; RIGHT?"
02:34PM WELL, NOW HE DOESN'T LIKE THE ANALOGY ANYMORE. SO YOU SEE
02:34PM WHAT HE SAYS HERE? HE SAYS, "IT IS BEING USED TO GENERATE THE
02:34PM POWER BECAUSE I'M CONTROLLING THE AMOUNT OF POWER I GET OUT OF
02:34PM MY ENGINE IN RESPONSE TO THE MOTOR HOME."
02:34PM WELL, THAT IS JUST NOT TRUE. AND IT'S NOT TRUE WITH RING
02:34PM OSCILLATORS AND EXTERNAL REFERENCE CRYSTALS EITHER.
02:34PM LET'S TAKE THAT DOWN, PLEASE.
02:34PM NOW, THERE'S ANOTHER WAY TO LOOK AT WHAT THE EXTERNAL
02:34PM REFERENCE CRYSTAL DOES, AND THAT IS -- IF WE COULD HAVE
02:34PM DDX-403, PLEASE. OH, NO, THAT'S NOT IT. DDX-403. THERE YOU

02:34PM GO. PERFECT.
02:34PM OKAY. SO YOU'VE SEEN THESE, RIGHT? THE "YOUR SPEED"
02:34PM SIGNS. THERE'S ONE BETWEEN -- JUST DOWN THE STREET FROM WHERE
02:34PM I LIVE AND THAT'S, THAT'S PRETTY GOOD, 32 IN A 25. I MEAN, I
02:34PM TRY TO KEEP CLOSE TO THAT, I GUESS.
02:34PM BUT THE POINT IS THAT WHAT THE "YOUR SPEED" COMBINED WITH
02:35PM THE SPEED LIMIT SIGN DOES IS IT'S A CUE, IT'S A SIGN TO YOU
02:35PM ABOUT NEEDING TO ADJUST YOUR SPEED. SO A SPEED LIMIT SIGN ON
02:35PM THE FREEWAY OR THE ROAD DOES THE SAME THING, BUT THIS ONE DOES
02:35PM IT A LITTLE BIT MORE.
02:35PM AND I'LL GIVE YOU THAT THE EXTERNAL REFERENCE CRYSTAL DOES
02:35PM A LITTLE BIT MORE. NOT ONLY DOES IT TELL YOU WHAT THE SPEED
02:35PM SHOULD BE, IT SAYS, "HEY, YOUR SPEED'S TOO HIGH. YOU SHOULD DO
02:35PM SOMETHING ABOUT IT."
02:35PM BUT THEN IF YOU THINK BACK TO THAT PLL, DOES THAT SIGNAL
02:35PM PROPAGATE ALL THE WAY THROUGH ALL THOSE COMPONENTS IN THE PLL?
02:35PM NO. IT'S USED FOR A COMPARISON AND THEN IT STOPS AT THE PHASE
02:35PM DETECTOR, JUST LIKE THIS "YOUR SPEED" SIGN SITUATION IS NOT
02:35PM USED TO GENERATE THE SPEED OR GENERATE -- NOT USED TO GENERATE
02:35PM THE POWER FOR YOUR CAR. IT ALLOWS YOU TO MODERATE YOUR SPEED,
02:36PM BUT IT IS NOT GENERATING THE POWER FOR YOUR CAR, JUST LIKE A
02:36PM RING OSCILLATOR HAS ITS OWN POWER SUPPLY AND THE EXTERNAL
02:36PM REFERENCE CRYSTAL IS NOT BEING USED TO GENERATE THAT CLOCK
02:36PM SIGNAL, EITHER. IT ONLY LIMITS IT.
02:36PM NOW, I WANT TO CONTRAST A COUPLE OF THESE ANALOGIES WITH

COOLEY LLP
HEIDI L. KEEFE (SBN 178960) (hkeefe@cooley.com)
MARK R. WEINSTEIN (SBN 193043) (mweinstein@cooley.com)
RONALD S. LEMIEUX (SBN 120822) (rlemieux@cooley.com)
KYLE D. CHEN (SBN 239501) (kyle.chen@cooley.com)
Five Palo Alto Square, 4th Floor
3000 El Camino Real
Palo Alto, California 94306-2155
Telephone: (650) 843-5000
Facsimile: (650) 857-0663

STEPHEN R. SMITH (*pro hac vice*) (stephen.smith@cooley.com)
One Freedom Square
Reston Town Center
11951 Freedom Drive
Reston, VA 20190-5656
Telephone: (703) 456-8000
Facsimile: (703) 456-8100

Attorneys for Plaintiffs
HTC CORPORATION and HTC AMERICA, INC.

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

HTC CORPORATION and HTC AMERICA, INC.,

Plaintiffs,

v.

TECHNOLOGY PROPERTIES LIMITED, PATRIOT SCIENTIFIC CORPORATION and ALLIACENSE LIMITED,

Defendants.

Case No. 5:08-cv-00882 PSG

[Related to Case No. 5:08-cv-00877 PSG]

[PROPOSED] ORDER GRANTING PLAINTIFFS' RENEWED MOTION FOR ENTRY OF JUDGMENT AS A MATTER OF LAW OF NON-INFRINGEMENT

Complaint Filed: February 8, 2008
Trial Date: September 23, 2013

Having considered HTC Corporation and HTC America Inc.'s ("Plaintiffs") Renewed Motion for Entry of Judgment as a Matter of Law on Non-Infringement (Per Fed. R. Civ. P. 50(b)), the record in this case, and all related facts and circumstances, and good cause appearing

therefore, **IT IS HEREBY ORDERED THAT**:

Plaintiffs' Renewed Motion for Entry of Judgment as a Matter of Law on Non-Infringement (Per Fed. R. Civ. P. 50(b)) is **GRANTED.** A final judgment of non-infringement of U.S. Patent No. 5,809,336 in favor of Plaintiffs shall be entered.

IT IS SO ORDERED.

Dated: December ____, 2013

Hon. Paul S. Grewal
United States Magistrate Judge