

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TEXAS INSTRUMENTS INCORPORATED,
Petitioner

v.

PARKERVISION, INC.,
Patent Owner

Case IPR2024-00935
Patent 7,865,177

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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EXHIBITS

Exhibit No.	Description
TI-1001	U.S. Patent No. 7,865,177 (“the ’177 patent”)
TI-1002	Excerpts from the Prosecution History of the ’177 Patent (“the Prosecution History”)
TI-1003	Declaration and Curriculum Vitae of Dr. Ian Galton
TI-1004	U.S. Patent No. 6,230,000 (“Tayloe”)
TI-1005	SN74CBT3253 Dual 1-of-4 FET Multiplexer/Demultiplexer Datasheet
TI-1006	Reserved
TI-1007	Reserved
TI-1008	Complaint, <i>ParkerVision, Inc. v. Texas Instruments Incorporated</i> , 6:23-cv-00384, W.D. Tex., filed May 18, 2023
TI-1009	ParkerVision, Inc.’s Proposed Claim Constructions, <i>ParkerVision, Inc. v. Texas Instruments Incorporated</i> , 6:23-cv-00384, W.D. Tex., filed February 14, 2024
TI-1010	ParkerVision Inc.’s Responsive Claim Construction Brief, <i>ParkerVision, Inc. v. Texas Instruments Incorporated</i> , 6:23-cv-00384, W.D. Tex., filed March 27, 2024
TI-1011	Claim Chart For Infringement of U.S. Patent No. 7,865,177 by TI Chips, <i>ParkerVision, Inc. v. Texas Instruments Incorporated</i> , 6:23-cv-00384, W.D. Tex., submitted December 6, 2023
TI-1012	Reserved
TI-1013	Reserved
TI-1014	Declaration of June Ann Munford

TI-1015	Declaration of Rickea McLeod
TI-1016	Reserved
TI-1017	Razavi, <i>A 900-MHz CMOS Direct Conversion Receiver</i> , IEEE Symposium on VLSI Circuits, Kyoto, Japan, 1997, pp. 113-114, doi: 10.1109/VLSIC.1997.623833.
TI-1018	Declaration of Maureen Honeycutt
TI-1019	Ziemer Tranter, <i>Principles of Communications, Systems, Modulation, and Noise</i> , Fourth Edition, Published 1995
TI-1020	Thomas H. Lee, <i>The Design of CMOS Radio-Frequency Integrated Circuits</i> , Cambridge University Press, 1998 (Excerpts)
TI-1021	Reserved
TI-1022	Reserved
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TI-1024	Reserved
TI-1025	Reserved
TI-1026	Uzunoglu, “The Synchronous Oscillator: A Synchronization and Tracking Network,” IEEE Journal of Solid-State Circuits, Vol. SC-20, No. 6, September 1985 pp. 1214-1226
TI-1027-1032	Reserved
TI-1033	Qualcomm’s Motion for Summary Judgment of Noninfringement and Invalidity, <i>ParkerVision, Inc. v. Qualcomm Inc.</i> , 6:14-cv-00687, dkt 494 (MDFL Feb. 16, 2021).

TI-1034	Parkervision, Inc.’s response to Qualcomm’s Motion for Summary Judgement of Noninfringement and Invalidity, <i>ParkerVision, Inc. v. Qualcomm Inc.</i> , 6:14-cv-00687, dkt 523 (MDFL Mar. 2, 2021)
TI-1035	Defendant’s Reply in Support of Their Motion for Summary Judgment of Noninfringement and Invalidity, <i>ParkerVision, Inc. v. Qualcomm Inc.</i> , 6:14-cv-00687, dkt 559 (MDFL Mar. 16, 2021)
TI-1036	Endorsed Order Granting Qualcomm’s Motion for Summary Judgment of Noninfringement and Invalidity, <i>ParkerVision, Inc. v. Qualcomm Inc.</i> , 6:14-cv-00687, dkt 686 (MDFL Mar. 22, 2022).
TI-1037	Claim Construction Order, <i>ParkerVision Inc. v. Qualcomm Inc.</i> , 6:14-cv-00687, dkt 381, (MDFL April 29, 2020)
TI-1038	Reserved
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TI-1041	Stipulation
TI-1042	Special Master’s Report and Recommendation Regarding Claim Construction, <i>ParkerVision, Inc. v. Texas Instruments Incorporated</i> , 6:23-cv-00384, W.D. Tex., October 21, 2024
TI-1043	U.S. Patent Application Serial Number 09/521,879, filed March 9, 2000 (“the ’879 application”)
TI-1044	Excerpt from Plaintiff’s Supplemental Objections and Responses to Defendant’s First Set of Interrogatories (1-6), 6:14-cv-00687-PGB-KRS (MD Florida) (redacted)
TI-1045	D. E. Johnson, J. L. Hilburn, and J. R. Johnson, Basic Electric Circuit Analysis, 7th Edition, Prentice-Hall, 1978.

TI-1046	Adel S. Sedra, Kenneth C. Smith, <i>Microelectronics Circuits</i> , 4th Edition, Oxford University Press, 1997.
TI-1047	D. Tayloe, <i>Norcal NC2030 Low power, High Performance 20m or 30m DC Transceiver</i> , User Manual, December 18, 2005. (https://www.norcalqrp.org/files/NC2030/NC2030_v5.pdf).
TI-1048	CBT (5-V) and CBTLV (3.3-V) Bus Switches, Texas Instruments, August, 1998 (https://www.ti.com/lit/ug/scdd001b/scdd001b.pdf)
TI-1049	Logic Selection Guide, Texas Instruments, August, 1998 (https://web.archive.org/web/20160118225253/https://my.ece.msstate.edu/faculty/reese/EE4743/data_sheets/sdyu001k.pdf)
TI-1050	Thomas H. Lee, <i>The Design of CMOS Radio-Frequency Integrated Circuits</i> , Cambridge University Press, 1998.
TI-1051	Reserved
TI-1052	B. Gilbert, <i>Advances in BJT techniques for high-performance transceivers</i> , Proceedings of the 23rd European Solid-State Circuits Conference, Southampton, UK, 31-38, 1997.
TI-1053	B. Gilbert, “The MICROMIXER: a highly linear variant of the Gilbert mixer using a bisymmetric Class-AB input stage,” in <i>IEEE Journal of Solid-State Circuits</i> , vol. 32, no. 9, pp. 1412-1423, Sept. 1997.
TI-1054	I. Galton and C. Weltin-Wu, “Understanding Phase Error and Jitter: Definitions, Implications, Simulations, and Measurement,” <i>IEEE Transactions on Circuits and Systems I: Regular Papers</i> , vol. 66, no. 1, pp. 1–19, Jan. 2019.

TI-1055	P. R. Gray and R. G. Meyer, Analysis and Design of Analog Integrated Circuits, Third Edition, John Wiley and Sons, 1993.
TI-1056	D. Knollman, “Designing with op-amps: Single formula technique keeps it simple,” EDN Design Feature Article, 1998.
TI-1057	1988 Linear Products Databook, Analog Devices, Inc.
TI-1058	Reimund Wittmann, Werner Schardein, Bedrich J. Hosticka, Gert Burbach, and Juergen Arndt, <i>Trimless High Precision Ratioed Resistors in D/A and A/D Converters</i> , IEEE Journal of Solid-State Circuits, VOL. 30, NO. 8, pp, 935-938, AUGUST 1995.
TI-1059	A. Abidi, “Low-Power RF-ICs in Wireless Transceivers,” 1994 IEEE Symposium on Low Power Electronics.
TI-1060	Design of Analog-Digital VLSI Circuits for Telecommunications and Signal Processing, J. Franca, Y. Tsividis, ed., 2nd Edition, Prentice-Hall, 1994.
TI-1061	J. C. Rudell, et. al., “A 1.9-GHz Wide-Band IF Double Conversion CMOS Receiver for Cordless Telephone Applications,” IEEE Journal of Solid-State Circuits, vol. 32, no. 12, December, 1997.
TI-1062	J.R. Cogdell, Foundations of Electrical Engineering, 1996 (Prentice Hall 2ed)
TI-1063	Reserved
TI-1064	P. Chang et al, “A CMOS Channel-Select Filter for a Direct-Conversion Wireless Receiver,” IEEE Journal of Solid-State Circuits, VOL. 32, NO. 5, pp. 722-729, MAY 1997.
TI-1065	Deposition Transcript of David Ricketts, dated June 13, 2025
TI-1066	Second Declaration of Dr. Ian Galton

TI-1067	Declaration of Dr. James Dickens
TI-1068	Deposition Transcript of David Sorrells, dated May 23, 2025
TI-1069	Second Declaration of June Munford

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Apator Meters ApS v. Kamstrup A/S, 887 F.3d 1293 (Fed. Cir. 2018)

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See In re Steed, 802 F.3d 1311 (Fed. Cir. 2015)

Dynamic Drinkware, LLC v. Nat'l Graphics, Inc., 800 F.3d 1375 (Fed. Cir. 2015)

Mycogen Plant Sci., Inc. v. Monsanto Co., 243 F.3d 1316 (Fed. Cir. 2001)

Medichem, S.A. v. Rolabo, S. L., 437 F.3d 1157 (Fed. Cir. 2006)

Medtronic, Inc. v. Teleflex Innovations S.À.R.L., 68 F.4th 1298 (Fed. Cir. 2023)
(*MedtronicI*)

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(*MedtronicII*)

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Dawson v. Dawson, 710 F.3d 1347 (Fed. Cir. 2013)

I. INTRODUCTION

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PO's prior art arguments also fail. The claimed matched filtering/correlating module does not require transferring to a load to form a down-converted signal. But even if it did, Tayloe and Razavi transfer to a load. Also Razavi discloses that M_5 - M_6 are switches that are controlled by a squared-up local oscillator (LO).

II. TAYLOE IS PRIOR ART

To antedate Tayloe, PO must demonstrate reduction-to-practice that satisfies claim 14. *MedtronicII*, 86 F.4th at 905. As discussed below, PO fails to show actual reduction-to-practice; and though PO does not argue it, the evidence also fails to prove constructive reduction-to-practice.

A. Legal Standards

To demonstrate actual reduction-to-practice, a patentee must prove that it had "constructed an embodiment or performed a process" that met "all the limitations of the claim." *In re Steed*, 802 F.3d at 1318; *Medichem*, 437 F.3d at

1169. The evidence must also show that, at that time, the invention worked.

Mycogen, 243 F.3d at 1335. Constructive reduction-to-practice requires a patentee demonstrate first conception and then “reasonably continuous diligence” in reducing the invention to practice until its effective filing date. *Medtronic II*, 86 F.3d at 904-906; *Apator*, 887 F.3d at 1297. Conception requires proof that the inventors had a “definite and permanent idea of the complete and operative invention.” *Kolcraft*, 927 F.3d at 1324.

Conception and reduction-to-practice require corroboration of inventor testimony by other, independent information (e.g., documentary evidence, non-inventor testimony, or both). *Medichem*, 437 F.3d at 1171; *REG Synthetic*, 841 F.3d at 962; *Apator*, 887 F.3d at 1295.

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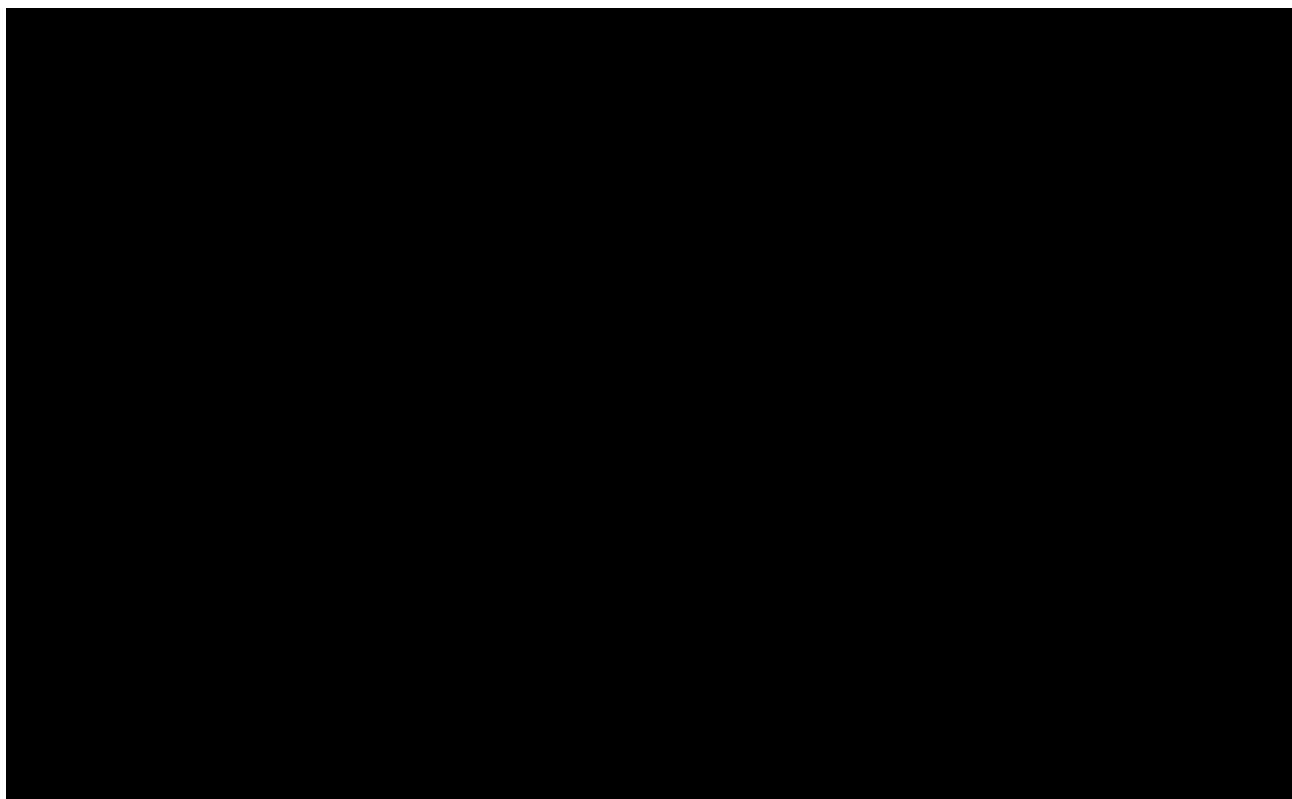
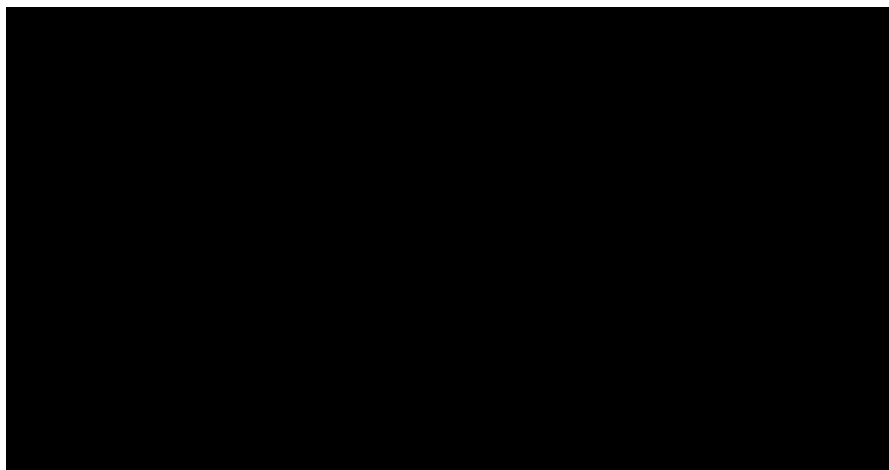
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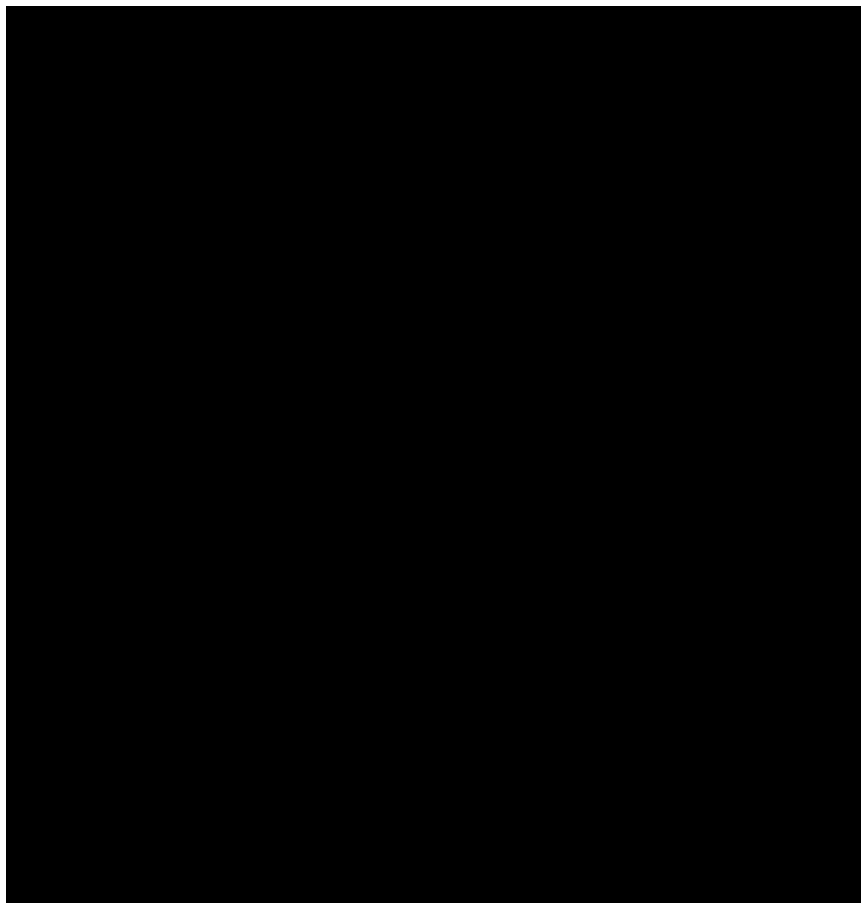
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⁴ The '177 patent is a divisional of 09/550,644 (filed 4/14/2000) (“the '644 application”), which is a CIP of 09/521,879 (filed 3/9/2000) (“the '879 application”), which is a CIP of 09/293,342, (filed 4/16/1999) (“the 342 application”), which is a CIP of 09/176,022 (filed 10/21/1998) (“the 022 application”).

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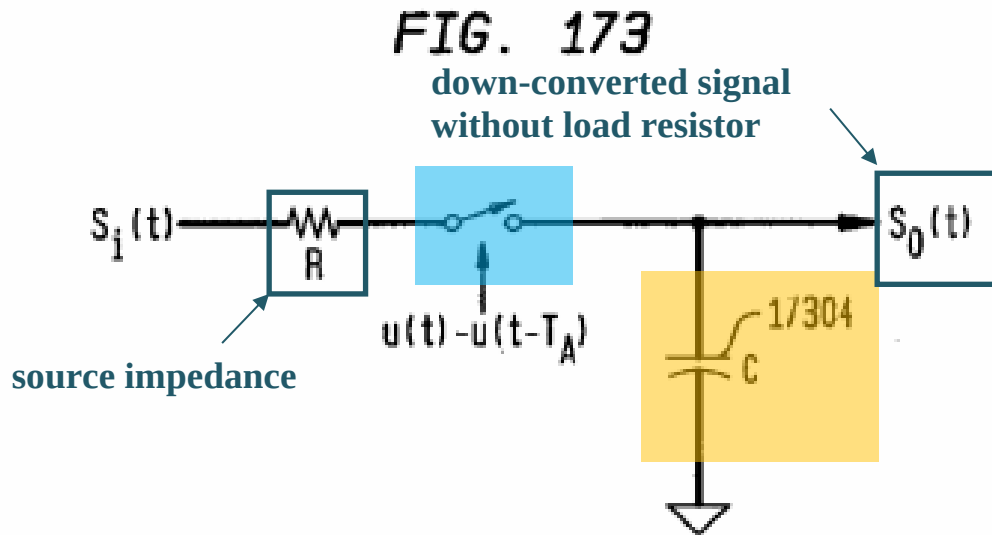
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III. CLAIM CONSTRUCTION

A. Matched Filtering/Correlating Module Does Not Require “Transferred to a Load”

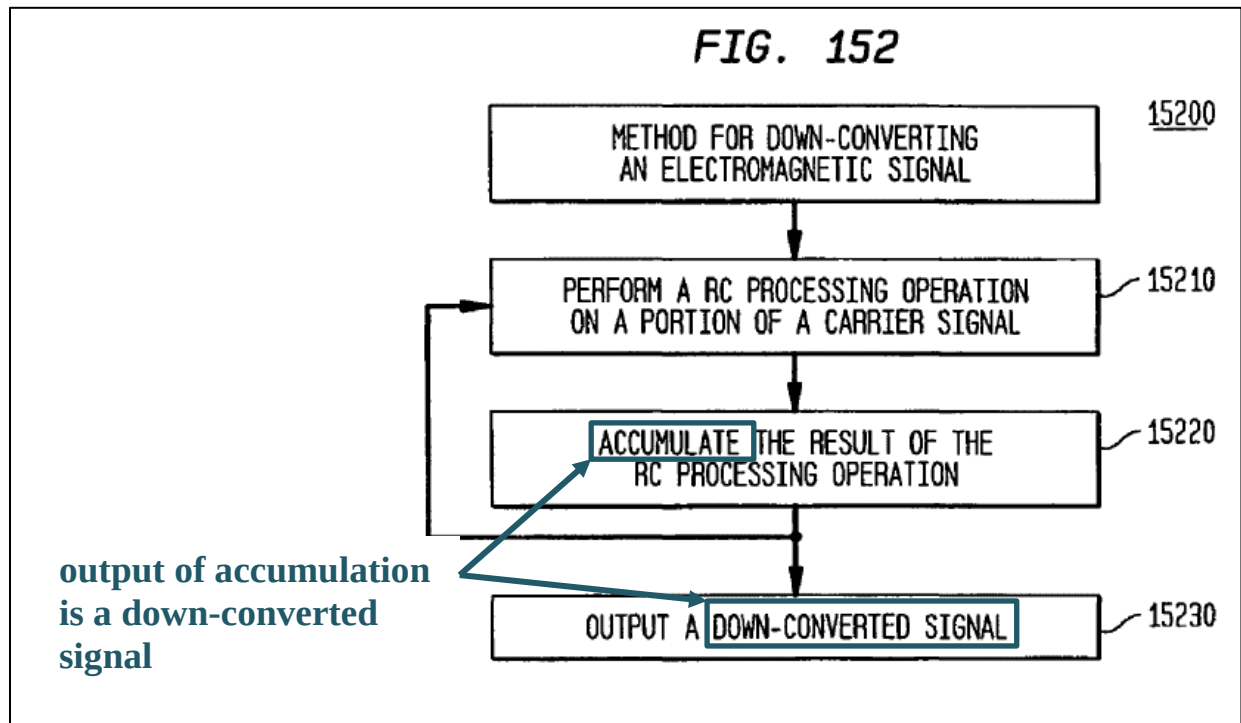
PO’ construction for matched filtering/correlation module requires “energy of the input signal is integrated *and transferred to a load to form a down-converted signal.*” POR, 67 (emphasis added). This construction improperly shoehorns in multiple limitations not in the plain meaning of the phrase, including the concept of transferring to a load. EX1042, 25-37; EX2006, 2.

The ’177 patent does not require that down-converting using a matched filtering/correlating module involve transferring to a load. TI-1066, ¶¶5-26. For example, the POR cites FIG. 173 (and in FIG. 153) as an example matched filtering/correlating module. POR, 61-62; TI-1066, ¶¶5-9. But, in FIG. 173, the down-converted signal is output without a load:



POR, 61-62

See also, TI-1001, 145:47-58 (FIG. 173 is a matched filtering/correlating module);
POR, 62 (describing FIG. 173 as a matched filtering/correlating module). In
addition, according to FIG. 152, the result of accumulating charge is a down-
converted signal. FIG. 152 does not require transferring to a load:



TI-1001, FIG. 152 (annotated)⁶

See also, TI-1001, 134:16-20 (“In step 15220, the result of the matched filtering/correlating operation in step 15210 is accumulated, preferably in an energy storage device.”); TI-1066, ¶¶5-26.

The ’177 patent describes optimizing the RC processor by selecting values for the capacitor and the source impedance. TI-1001, 145:46-58. The description of the RC optimization for FIG. 173, “R” is the “source impedance,” and there is no mention of the load impedance.

⁶ “FIG. 153 illustrates an example RC processing system 15300, which can be used to implement method 15200.” TI-1001, 134:31-33.

Likewise, the equations describing charge accumulation for FIG. 173 do not depend on the load. TI-1066, ¶¶5-15. For example, the '177 patent describes the charge to be dependent on the voltage V_0 and capacitance c :

Maximizing the charge, q , requires maximizing EQ. (37) with respect to t and β

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$$\frac{\partial^2 V_0(t)}{\partial t \partial \beta} = 0 \quad \text{EQ. (55)}$$

45 It is easier, however, to set $R=1, T_A=1, A=1, f_A=T_A^{-1}$ and then calculate $q=cV_0$ from the previous equations by recognizing that

50

$$q = \frac{\beta^{-1}}{R} V_0 = cV_0,$$

charge independent of load impedance

55 which produces a normalized response.

E.g., '177 patent, 146:37-55 (where $\beta = (RC)^{-1}$, and R is the source impedance),

and where EQ. 37 is:

$$V_0(t) = \int_{-\infty}^{\infty} A \sin(\pi f_A \tau + \phi) \cdot \frac{e^{-\frac{(t-\tau)}{RC}}}{RC} \left[\frac{u(t-\tau) - u(t-\tau-T_A)}{1} \right] d\tau \quad \text{EQ. (37)}$$

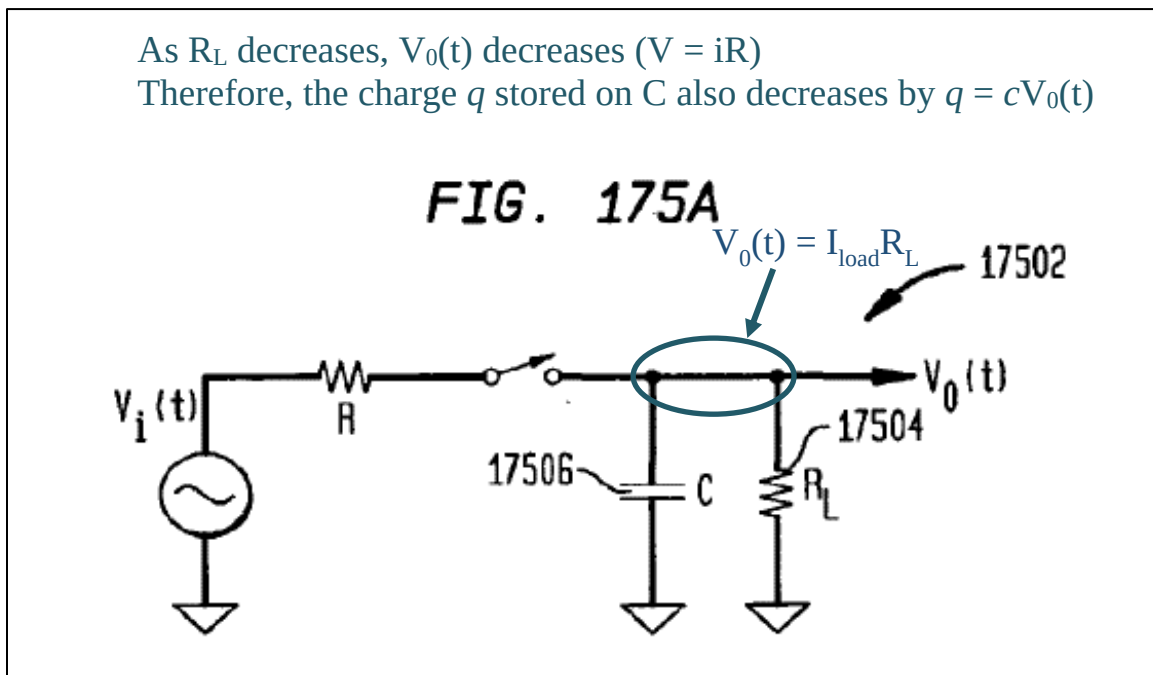
where

$$f_A \Delta 2f = T_A^{-1}$$

'177 patent, 142:5-9

EQ. (37) also does not contain a load resistance (R is the source resistance). TI-1066, ¶18.

By contrast, FIG. 175A is described as *adding* a load resistor R_L to the RC processor of FIG. 173. TI-1001, 147:39-42; TI-1066, ¶¶8-11.



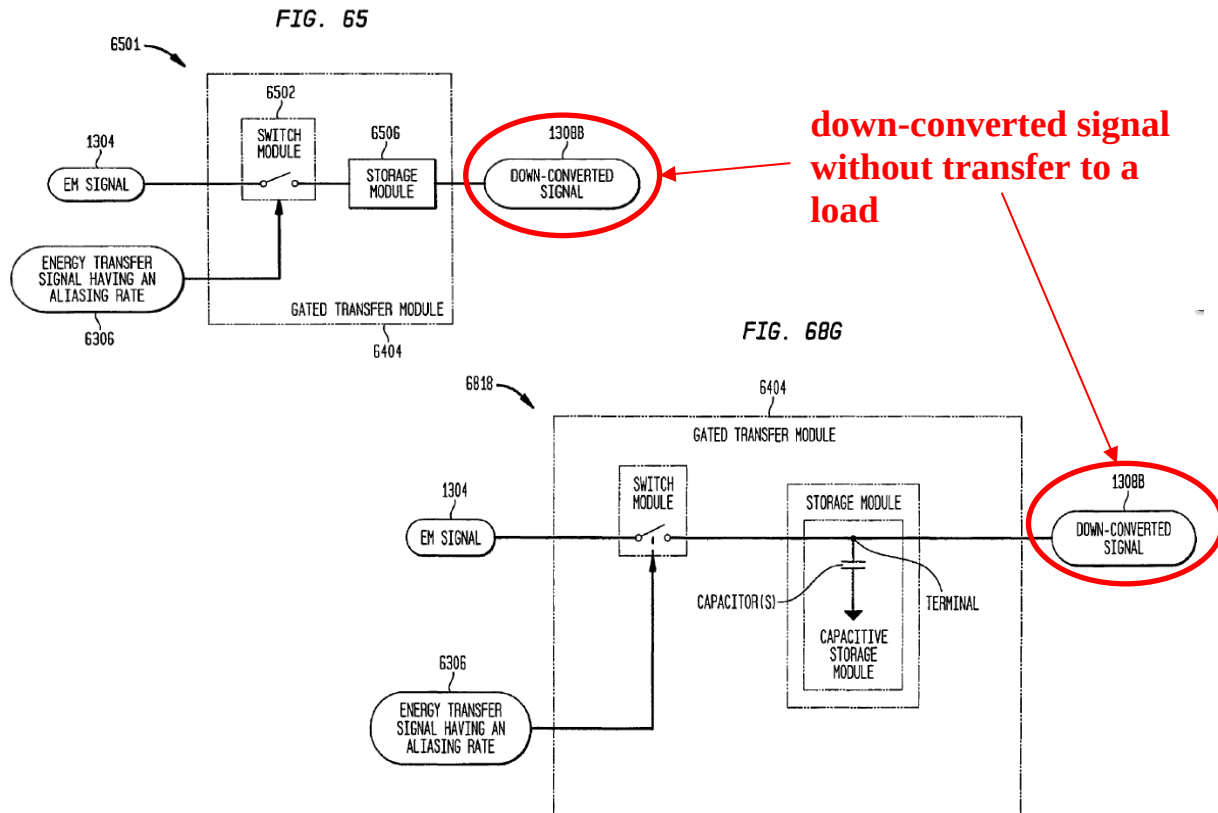
TI-1001, FIG. 175A (annotated)

Moreover, the '177 patent provides a separate section where it considers the effect of a load resistance applied across the integrating capacitor. TI-1001, 147:35-149:20 ("5.2 Load Resistor Consideration"). That the '177 patent illustrates the load resistor considerations to the RC processor is further evidence

that the '177 patent does not require a load to achieve down-conversion. TI-1066, ¶¶8-11.

When describing FIG. 173, which lacks the load resistor, the '177 patent states that “SNR is simultaneously optimized melding the best of two features of the present invention.” TI-1001, 147:31-33. The '177 patent's SNR equations show that SNR is optimized for the RC processing embodiment without considering the load resistor. TI-1001, 147:19-35 151:50-152:17; TI-1066, ¶¶8-15. Thus, according to the '177 patent itself, SNR is optimized even without transferring energy to a low-impedance load, and the inclusion of transferring to a load should not be part of the claim construction.

The '177 patent provides embodiments of energy transfer that do not include transferring to a load:



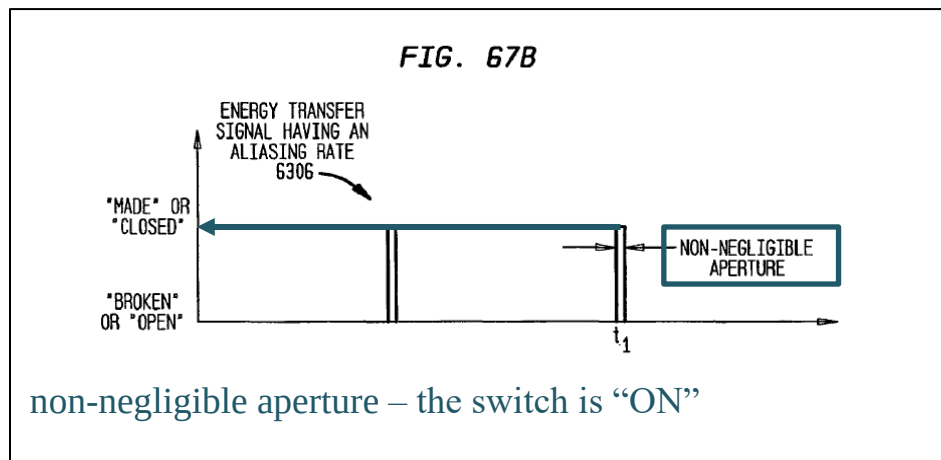
'177 patent, FIGS. 65, 68G (annotated)

See also, TI-1001, 104:35-37 (regarding FIG. 65, “Preferably, the switch module 6502 and the storage module 6506 transfer energy from the EM signal 1304 to down-convert it....”). The energy transfer “from the EM signal” to the capacitor occurs “during a non-negligible aperture period.” TI-1001, 106:30-53.

The '177 patent describes transferring energy from the input signal *to the capacitor* based on the non-negligible aperture window, but that is not the same as transferring to the load. *E.g.*, TI-1001, 29:15-37, FIG. 46C; TI-1066, ¶¶15-17.

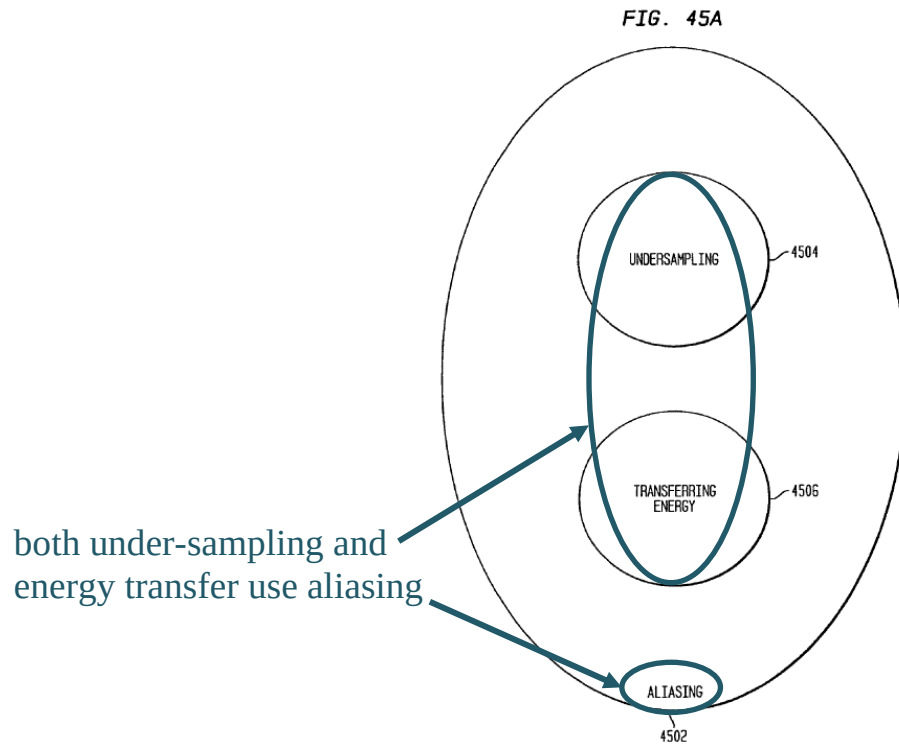
The '177 patent makes it clear that it is the duration of the aperture pulses (and not

the aliasing rate or the load) that distinguishes “under-sampling” from “energy transfer.” *E.g.*, TI-1001, 73:5-12. The non-negligible aperture and the capacitance is what “allows the **storage capacitance 8208 to store energy transferred from the input EM signal 8204.**” TI-1001, 73:54-65. The non-negligible aperture is the duration of the control signal that closes the switch:



TI-1001, , FIG. 67B, 105, 37-40

Similarly, the '177 patent uses aliasing for “under-sampling” **and** “transferring energy,” as shown below:



TI-1001, FIG. 45A (annotated)

The '177 patent makes it clear that the transfer of energy to achieve down-conversion is from the EM signal to the capacitor, and not from the EM signal to the load resistor. Put simply, during the non-negligible aperture period, when the switch is closed (“ON”), energy is transferred from the EM signal to the capacitor for storage. TI-1066, ¶¶15-21, 55, 60, 92-97.

At best, the '177 patent states that a benefit of the energy transfer system is the ability to drive low-impedance loads. But the '177 patent states that, “the non-negligible amounts of transferred energy ensure that, **even for low impedance loads**, the storage capacitance 8208 accepts and maintains sufficient energy or charge to drive the load.” '177 patent, 74:16-18 (emphasis added). This statement

implies that a benefit of the energy transfer system is the ability to drive low-impedance loads. TI-1066, ¶¶15-18. But energy transfer is achieved independent of the load. TI-1066, ¶¶5-26. Likewise the '177 patent states that for under-sampling, “loads can be classified as high impedance loads or low impedance loads.” '177 patent, 74:5-6. Thus, the distinction between under-sampling and energy transfer is not based on the magnitude of the load impedance. TI-1066, ¶¶15-18. Moreover, the load impedance is not a requirement of the energy transfer system. TI-1066, ¶¶5-26.

As Dr. Galton explained, the claimed matched filtering/correlating module requires, among other things, synchrony between the received signal and the known correlating signal. TI-1003, ¶¶28, 63. Conventional application or otherwise, matched filtering/correlating at least requires matching or correlating the input signal to a known signal—here, the local oscillator. *E.g.*, '177 patent, 145:15-17. PO does not dispute this. It is noteworthy, however, that the concept of synchrony was introduced only in the March 9, 2000 disclosure, and not before. TI-1066, ¶¶29-31. Thus, given that synchrony is a critical aspect of the claimed matched filtering/correlating module, such claims are only entitled to the March 9, 2000 priority date.

PO's claim construction should also be rejected as unclear whether it requires energy to be integrated *and* transferred or integrated *then* transferred to

form the down-converted signal. If the former, the claim construction is not supported by the specification, which says that “resultant down-converted signals also have sufficient energy *to drive lower impedance circuits.*” TI-1001, 70:6-8 (emphasis added), *see also id.*, 69:34-42, 72:6-11, 73:16-20, 74:10-18, 74:46-50 (the down-converted signals “can effectively drive lower impedance loads”). If the latter, then the down-converted signals are formed upstream of the load, rendering PO’s entire argument moot and claim 14 unpatentable in view of the Grounds.

Accordingly, PO’s claim construction should be rejected.

B. PO Mischaracterizes Dr. Galton’s Testimony

The embodiments of the asserted invention disclosed by the ’177 patent are widely varied. Yet the two features that they all have in common are synchrony and sampling at an “aliasing rate.” TI-1066, ¶¶29-31. It is true that the embodiments also integrate/accumulate energy from the input signal, but this is a function of the embodiments, not a feature of them. TI-1066, ¶¶29-31. Nevertheless, the dispute is incidental in that the prior art satisfies PO’s constructions.

IV. THE PRIOR ART RENDERS CLAIM 14 UNPATENTABLE

A. Tayloe/TI-Datasheet Renders Claim 14 Obvious

PO’s rebuttal of obviousness in view of Tayloe/TI-Datasheet rests in its erroneous claim construction. As discussed above, “transferred to a load” is not

required by the '177 patent for the matched filtering/correlating module “to form a down-converted signal.” Thus, Tayloe/TI-Datasheet renders claim 14 obvious for the reasons discussed in the Petition.⁷ Assuming that transferring energy to a load were required for down-conversion (it is not), Tayloe describes it.

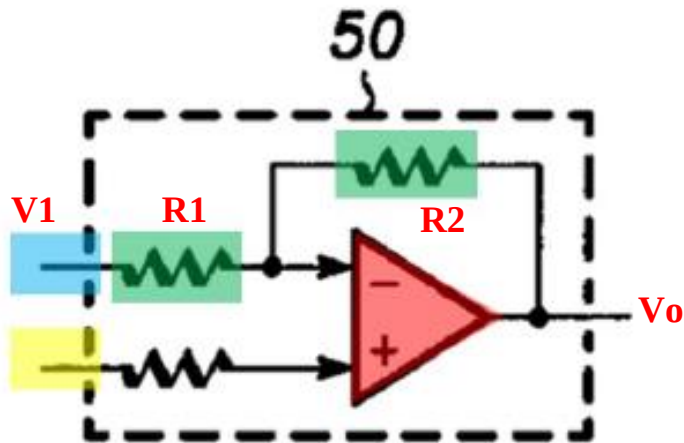
First, PO does not dispute that Tayloe samples at an aliasing rate using a non-negligible aperture. And as explained by the '177 patent, this is how non-negligible charge is accumulated on the capacitor while the switch is closed. *E.g.*, '177 patent, 143:38-51; TI-1066, ¶¶15-21, 55-60, 92-97. Thus, PO does not dispute that in Tayloe, non-negligible energy is accumulated on the capacitor when the switch is closed. That, by itself, is enough to show that Tayloe/TI-datasheet renders claim 14 unpatentable. Instead, PO's core premise is that Tayloe does not transfer energy when the switch is open because of a high impedance at Tayloe's summing amplifiers 50, 52.⁸ POR, 95. As discussed above, no such transferring to a load is required by the claim or even to achieve down-conversion. *See, supra*

⁷ Petitioner notes that the POR does not address the mapping of Tayloe based on the Florida District Court's constructions.

⁸ PO makes the same argument under their new construction (POR, §VIII.A.2) or the Florida District Court's construction (POR, §VIII.A.3).

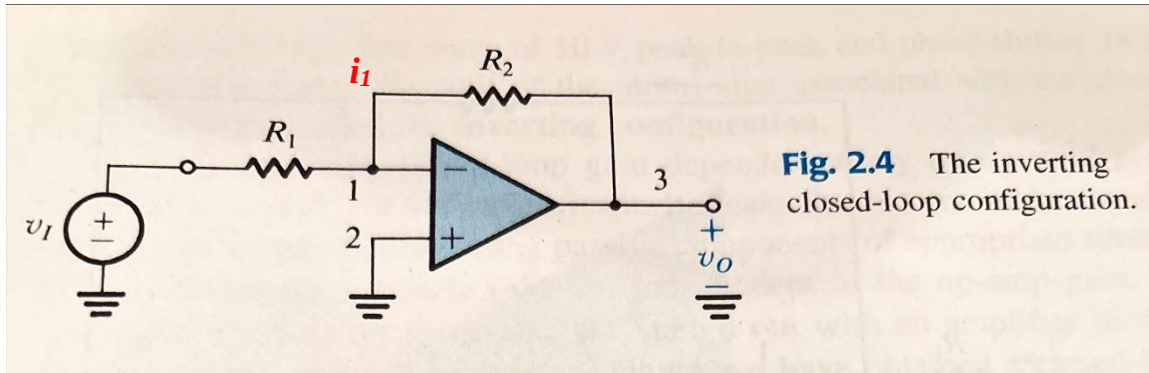
§III.A. Moreover, PO's argument is based on a misunderstanding of operational amplifiers and a misrepresentation of Dr. Galton's testimony.

Taylor's op-amp is reproduced below:



POR, 97 (**annotated**)

This op-amp is not in isolation but is in an inverting, closed-loop configuration, with an input resistor R_1 and a feedback resistor R_2 . TI-1066, ¶¶ 32-45, 49-55. A similar configuration is shown by the Sedra/Smith textbook:



TI-1046, FIG. 2.4 (annotated)

The inverting configuration exhibits “low input resistance.” TI-1046, 79 (characterizing a few mega ohms as “impractically large”). Per Sedra/Smith, current flows “through R_2 to the low-impedance terminal 3.” TI-1046, 75-76.

And “the input resistance of the closed-loop inverting amplifier of FIG. 2.4 is simply equal to R_1 .” TI-1046, 78. In view of the foregoing, Tayloe’s summing amplifier circuits exhibit low impedance and satisfy even PO’s construction. Note that in Tayloe, the + terminal is connected to a capacitor. When the switch coupling the EM signal to the – terminal is closed (“ON”), the voltage on the + terminal is held constant, which is the equivalent of holding it to a fixed reference voltage or ground. TI-1066, ¶¶43, 49-53. Thus, under those conditions, the

behavior of Tayloe mimics the behavior of the inverting, closed-loop configuration described by Sedra/Smith. TI-1066, ¶¶32-55.⁹

A POSITA would have found it obvious to select a low resistor value for R1, much lower than the impedance of the op-amp itself. TI-1066 ¶¶42-55 (citing TI-1047 for 100Ω resistor). The advantages of low resistor values in the above configuration were well known to a POSITA. A POSITA would have also known that large resistor values contribute to increased noise (i.e., lower SNR). TI-1066, ¶¶45-47; TI-1047, 111, TI-1055, 12-13, FIG.11.7; TI-1062, 20-21 (“The intensity of the power spectrum is proportional to the resistance. For this reason, large values of resistance are avoided in sensitive electronic amplifiers.”). For large values of R2, bandwidth and noise performance decrease. TI-1062, 21; TI-1046, 79; TI-1066, ¶¶45-47. Thus, a POSITA would have understood that, to optimize SNR, lower resistor values for R1 and R2 would have been selected. This is confirmed by Tayloe’s implementation of the circuit. TI-1047; *see also* TI-1001, 147:19-35; TI-1066, ¶¶42-48.

Tayloe’s circuit satisfies the Florida court’s construction for similar reasons. Given that Tayloe’s summing amplifiers exhibit low impedance (not high

⁹ Tayloe does not use a frequency of 1 kHz; 1 kHz is the input bandwidth. TI-1004, 5:49-54 (also describing resistor 32 as 50 Ω); TI-1066, ¶56.

impedance, as PO argues) and given that PO does not dispute that Tayloe samples at an aliasing rate using non-negligible aperture, Tayloe's circuit transfers the non-negligible energy accumulated on the capacitor to the low impedance load when the switch is open. TI-1066, ¶¶42-55; TI-1003, ¶¶119-127.

B. Razavi Renders Claim 14 Obvious

As discussed above, claim 14 does not require transferring to a load. Thus, PO's arguments about the directionality of the current flow are not relevant.

PO admits that Razavi uses a 50% duty cycle LO, which is a non-negligible aperture. POR, 26-27, 89; TI-1001, 73:43-47; TI-1066, ¶95; TI-1065, 57:17-59:12. And Razavi teaches a 900 MHz aliasing rate. TI-1003, ¶¶94-98; TI-1001, 29:59-71; TI-1066, ¶83-86. Accordingly, because of the aperture and aliasing rate, Razavi performs "energy transfer," and delivers real power. See §III.A-B.

Further, PO's description of Razavi's circuit operation defies physics. TI-1066, ¶¶65-71. The experts agree that, in Razavi's Figure 2, electrons from the input signal flow through the transistors M_5 and M_6 toward the positive supply terminal V_{DD} . TI-1066, ¶¶65-71; TI-1065, 12:1-14:25. PO's assertion that "no current from the RF input signal passes through M_5 or M_6 from the source to the drain" is both misleading and erroneous, based in an artificial current convention, not actual current flow. POR, 98-103, 70; TI-1066, ¶¶65-71.

Tellingly, PO's own annotation demonstrates transferring energy as an output of Razavi's switches (i.e., M_5 - M_6). As reproduced below, PO argues that "current A" representing "the RF input signal flowing into the node" causes "current B," which, is "flowing from VDD to M_7 ," to oscillate so that the oscillation is reflected on V_{out} terminals. POR, 68-69. Hence energy reflected on V_{out} terminals is transferred from the RF input signal. TI-1066, ¶¶72-82.

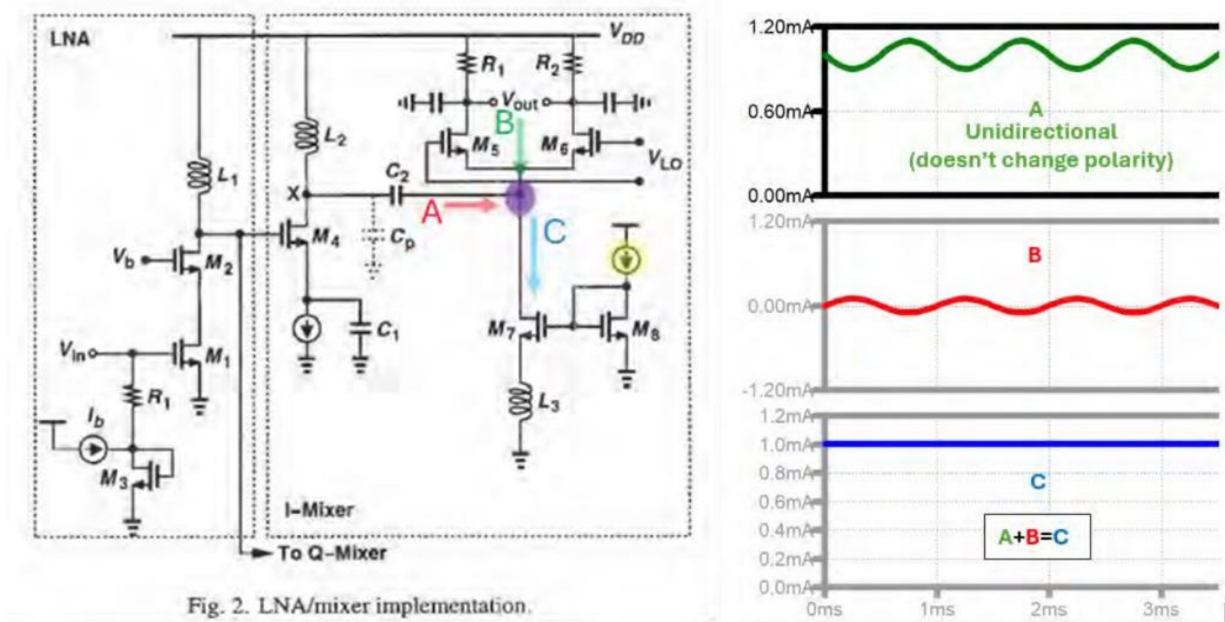


Fig. 2. LNA/mixer implementation.

POR, 68-69 (annotating EX1017, FIG. 2)

Thus, in Razavi, electrons (charge) from the received signal flow from A, through M_5 and accumulate on the capacitors when the switch M_5 is ON. TI-1066, ¶¶89-99. When M_5 is OFF, charge stored on the capacitors discharges through R_1 (i.e., energy is transferred to the load R_1). TI-1066, ¶¶89-99. As discussed in the

Petition, Razavi satisfies the correct construction of claim 14. Pet., 72-80. But, for at least the reasons above, Razavi also satisfies PO's claim constructions.

Razavi's matched filtering/correlating modules include switches M_5 - M_6 . Razavi expressly calls M_5 and M_6 "a switching pair." *E.g.*, Razavi, 1. So, regardless of the shape of the LO, Razavi expressly describes two matched filtering/correlating modules, each with a switch. But a POSITA would have recognized that Razavi uses a squared-up LO based on the cross-connected transistors used in the LO/Divider circuit:

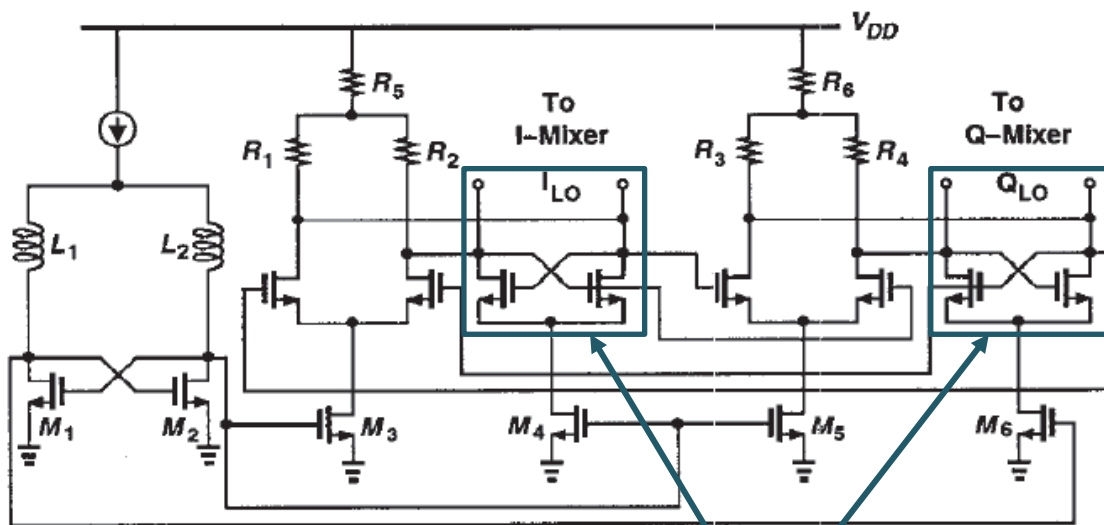


Fig. 3. LO/divider circuit.

flipflops output discrete highs and lows

TI-1017, FIG. 3 (annotated)

TI-1066, ¶¶100-102. Dr. Ricketts explained that the flip-flops hold a high value or a low value until the value is changed. TI-1065, 104:6-13.

V. CONCLUSION

ParkerVision has failed to rebut the grounds in the Petition. Accordingly, the Board should find the Challenged Claims of the '177 patent unpatentable.

Respectfully submitted,

Date: June 20, 2025

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CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petitioners' Reply to Patent Owner's Response totals 5,546, which is less than the 5,600 allowed under 37 CFR § 42.24.

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e), the undersigned certifies that on June 20, 2025, a complete and entire copy of the Petitioner's Reply to Patent Owner's Response and Accompanying Exhibits were provided by email to the Patent Owner by serving the correspondence addresses of record as follows:

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