

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SOTERA WIRELESS, INC.
Petitioner

v.

MASIMO CORPORATION
Patent Owner.

Case No. IPR2020-00954
Patent No. 9,788,735

Before JOSIAH C. COCKS, JENNIFER MEYER CHAGNON, and
ROBERT L. KINDER, Administrative Patent Judges.

PETITIONER'S DEMONSTRATIVES FOR ORAL ARGUMENT

Case No. IPR2020-00954
Patent No. 9,788,735

Pursuant to the July 20, 2021 Order Granting Requests for Oral Argument (Paper 34) and 37 C.F.R. § 42.70(b), Petitioner Sotera Wireless, Inc. hereby files its Demonstratives for use at Oral Argument, attached hereto.

Respectfully submitted,

Dated: August 23, 2021

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CERTIFICATE OF SERVICE

I hereby certify that on this 23rd day of August 2021, I caused the foregoing to be served via electronic mail to the attorneys of record for the '735 patent at the following address:

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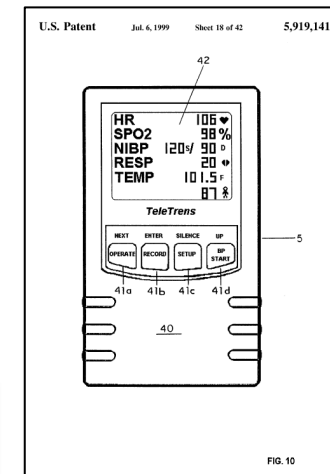
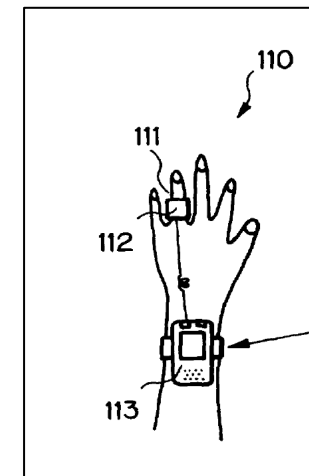
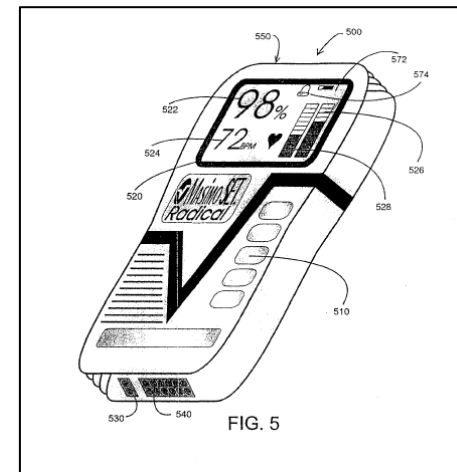
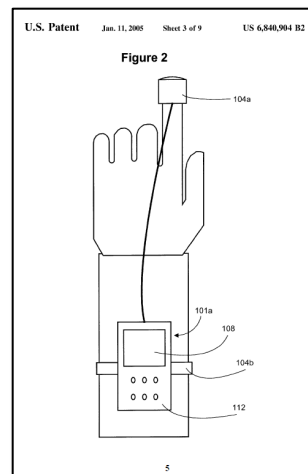
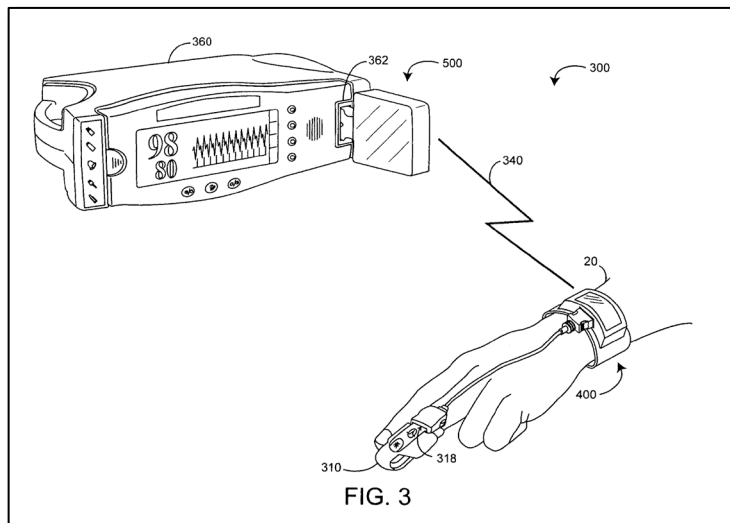


HUSCH BLACKWELL

**Sotera Wireless, Inc.,
Petitioner,
**v. Masimo Corporation,
*Patent Owner.*****

Case Nos. IPR2020-00912; IPR2020-00954; IPR2020-01054; IPR2020-1015

U.S. Patent Nos. 10,213,108; 9,788,735; 9,872,623; 9,795,300



Sotera Wireless, Inc. v. Masimo Corporation

Case Nos. IPR2020-00912, IPR2020-00954, IPR2020-01054, IPR2020-1015

U.S. Patent Nos. 10,213,108; 9,788,735; 9,872,623; 9,795,300

Argument Agenda

- Background/Frame Issues
- Grounds Asserted in the Petition

Exemplary Claim Language – Ports

- **“a first sensor communication port** positioned on a side of the housing...”
 - EX1001 (735), Claim 1
- **“a plurality of additional sensor communications ports** positioned on the housing...”
 - *Id.*

Exemplary Claim Language – Signal Configuration

- “the wired communication with the pulse oximetry sensor **provided at least partly in the analog domain**”
 - EX1001 (735), Claim 1
- “a plurality of additional sensor communications ports positioned on the housing and configured to provide wired communication with a plurality of additional physiological sensors **at least partly in the digital domain**”
 - *Id.*

Exemplary Claim Language –Module Attachment

- “a first sensor communication port positioned on a side of the housing and configured to face a hand of the lower arm of the patient when the mobile medical monitoring device is mounted to the lower arm of the patient”
 - EX1001 (735), Claim 1
- “...the portable monitor is attached to an arm of a patient...”
 - EX1001 (300), Claim 1
- “a housing configured for, and having a size and shape configured for, mounting to a lower arm of the patient...”
 - EX1001 (623), Claim 1
- “...the housing is secured to the arm of the patient...”
 - EX1001 (623), Claim 1

Core Areas in Dispute for All 4 IPRs

- It would have been obvious to use ports on wearable monitors because wired connections were either ports and hardwired connections, and both were well-known.
 - Paper 01 (735), p. 21; EX1003 (735), ¶¶ 64-65
- Patent Owner has never adequately rebutted that a PHOSITA would have been motivated to use ports to allow for easy removal and replacement of sensors while providing a secure wired connection, regardless of context (clinical or at-home).
 - Paper 01 (735), p. 22; EX1003 (735), ¶¶ 65, 76-79
- It would have been obvious to receive signals from a sensor as either an analog or digital signal because there are only two options (analog, digital) and both are well-known.
 - Paper 01 (735), p. 24-25, 28; EX1003 (735), ¶¶ 71-73

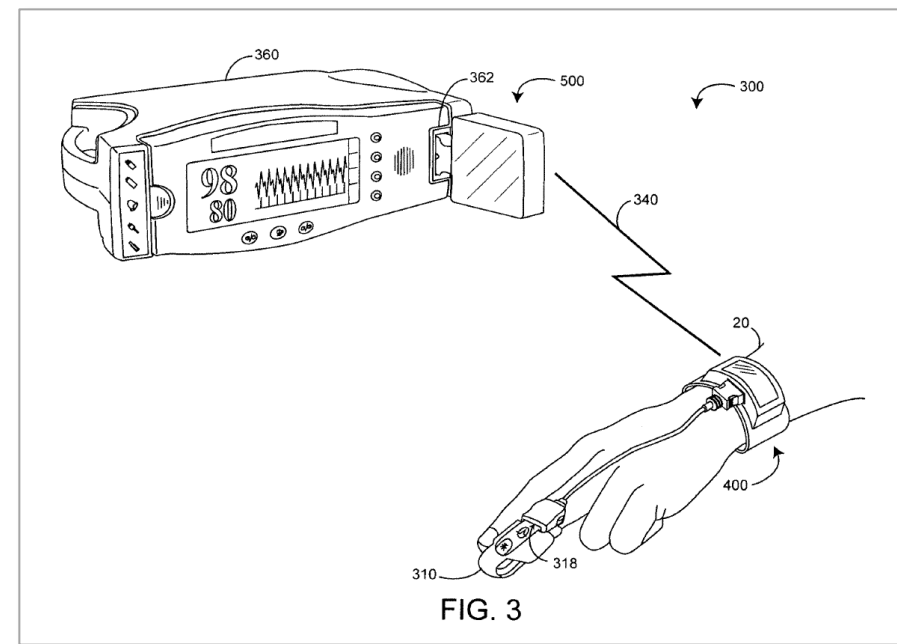
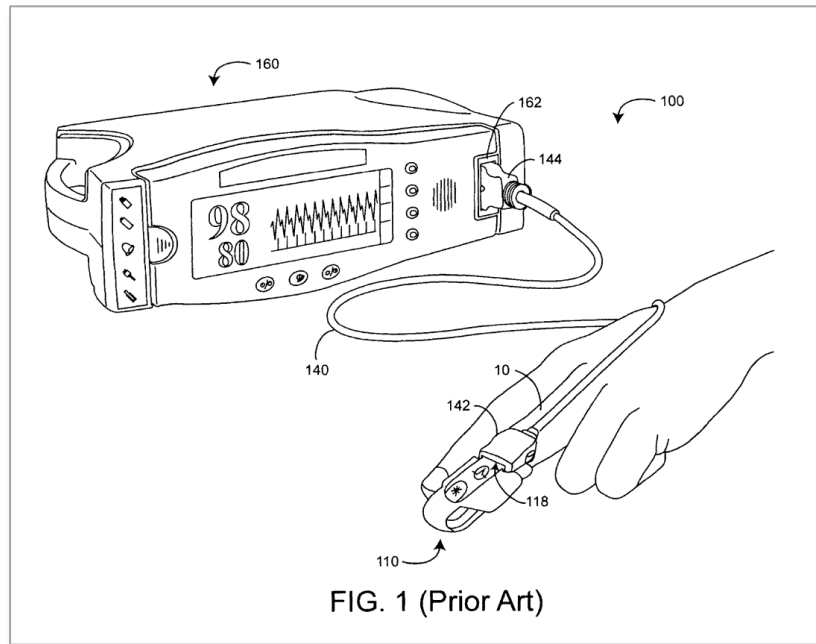
Distinct Issues – 108 IPR

- The 108 IPR uses a different primary reference (Akai, not Money) in the backup grounds
 - Paper 01 (108)
- Some issues are unique only to the backup grounds of the 108 IPR
 - Whether Akai's embodiments can be combined
 - Paper 26 (108), pp. 21-25
 - Whether Akai's strap is mounted to the back of Akai's housing
 - Paper 26 (108), pp. 25-27

The Challenged Patents

U.S. Patent Nos. 9,788,735; 9,795,300; 9,872,623; 10,213,108

Wireless Medical Monitor



EX1001, FIGs. 1 and 3; Paper 01 (735), p. 7

Minimizing Cable Length

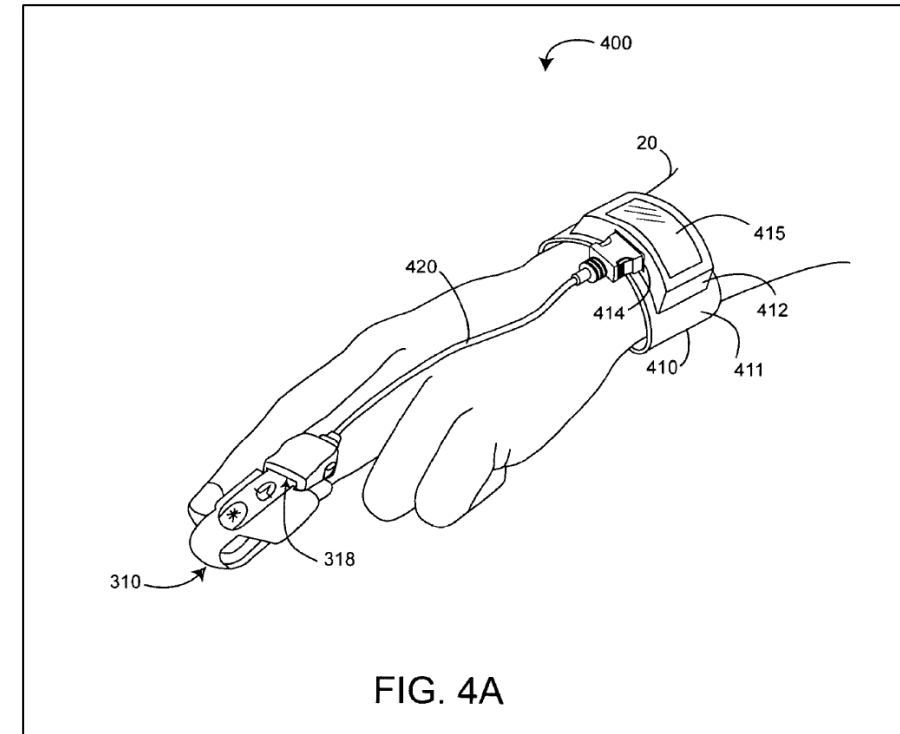
- There is nothing inventive about a body-worn, medical monitor with a port positioned on a side of the monitor facing a patient's hand, i.e., the shortest distance for the wire.
 - Paper 01 (735), p. 4

(57)

ABSTRACT

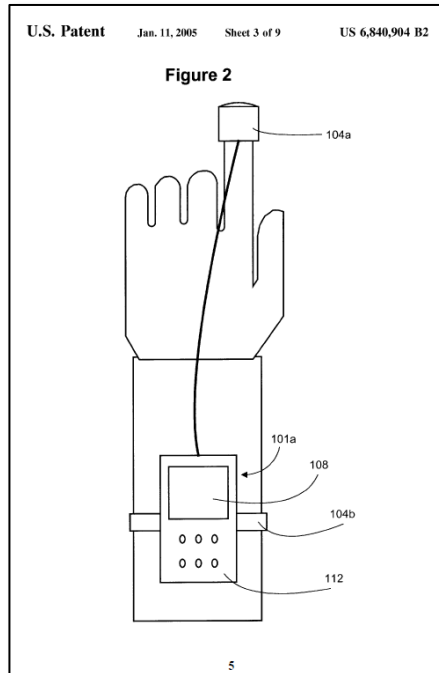
A body worn mobile medical monitoring device configured to minimize cable wiring from a sensor by placement of one or more sensor communication ports. The body worn mobile medical monitoring device includes a housing securable on a lower arm of a patient, a display, and a sensor communication port positioned on a side of the housing and configured to face a hand of the lower arm of the patient when the mobile medical monitoring device is mounted to the lower arm of the patient. The sensor communication port provides wired communication with a pulse oximetry sensor attached to a digit of the hand of the patient, and is positioned on the side of the housing such that a path from the port on the side of the housing to the digit of the patient is shorter than any other path from any other side of the housing to the digit.

EX1001 (735), Abstract



EX1001, FIG. 4A

Goldberg

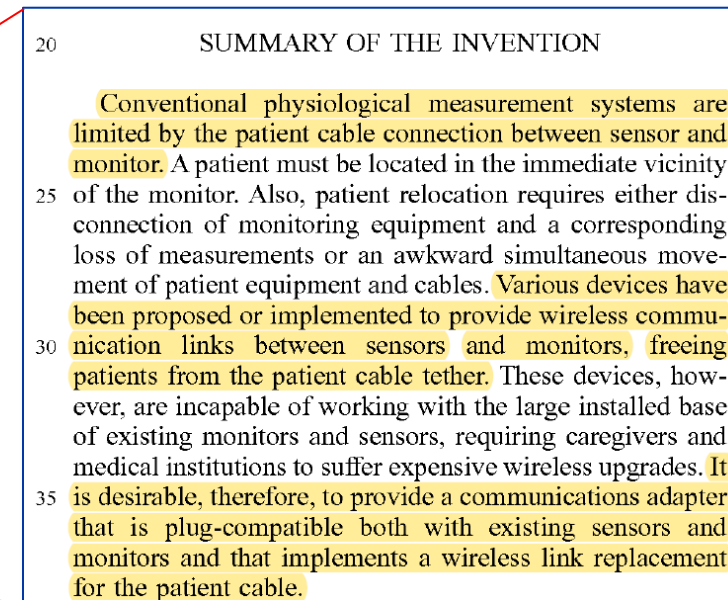
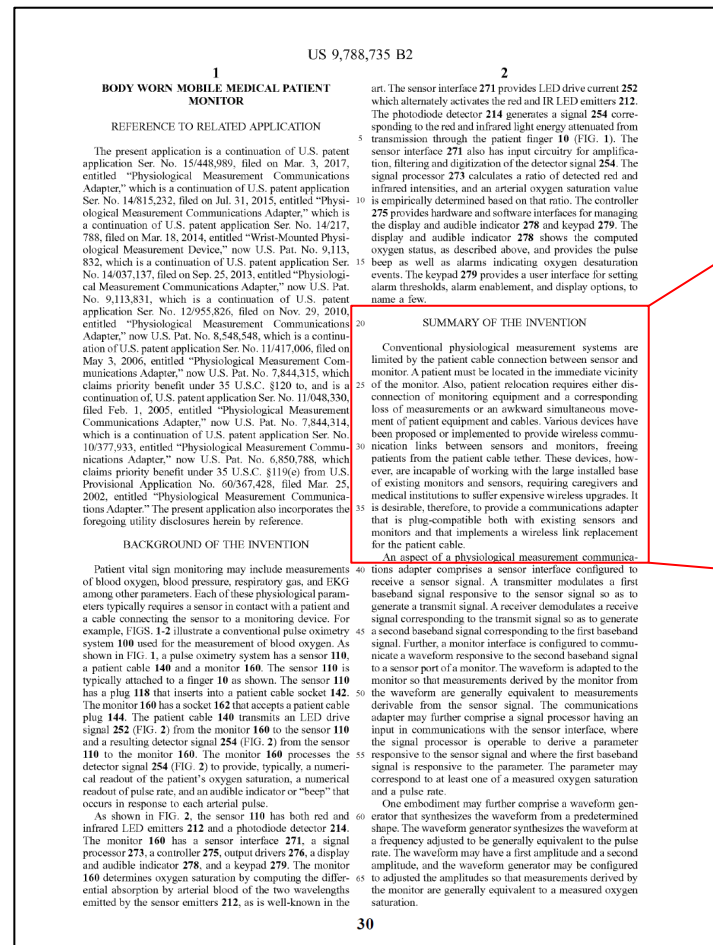


Goldberg, EX1005

- Goldberg teaches a wrist-worn, portable device:
 - Receives data from three or more sensors,
 - Displays sensor data,
 - Minimizes wire length, and
 - Wirelessly transmits sensor data to a remote computer.

Paper 01 (735), pp. 10-11; EX1003 (735), ¶ 37; EX1005, 1:29-44, 2:27-29, 4:20-30, 4:50-56, 5:3-8, 2:37-42, 2:47-55

The Challenged Patents - Object of the Invention

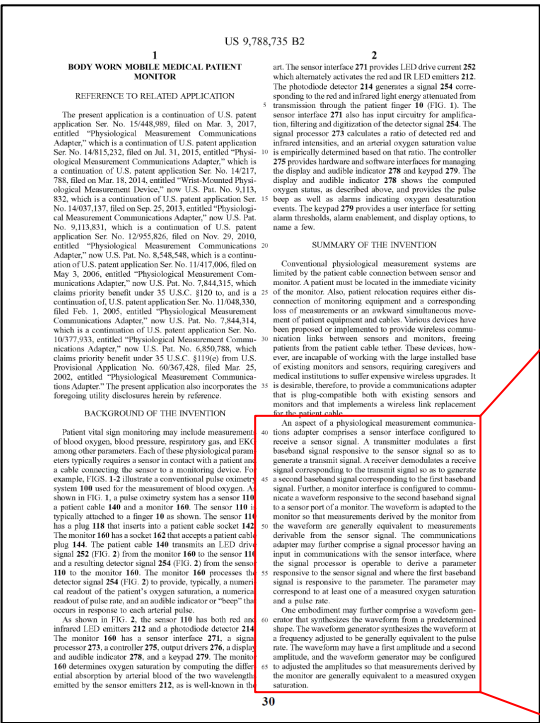


EX1001 (735), 2:19-35; Paper 01 (735), p. 7

- None of the claims are directed to the object of the invention

EX1003 (735), ¶ 29, Paper 01 (735), p. 14

Summary Directed to Adapter



EX1001 (735), 2:39-67;
Paper 01 (735), p. 4

An aspect of a physiological measurement communications adapter comprises a sensor interface configured to receive a sensor signal. A transmitter modulates a first baseband signal responsive to the sensor signal so as to generate a transmit signal. A receiver demodulates a receive signal corresponding to the transmit signal so as to generate a second baseband signal corresponding to the first baseband signal. Further, a monitor interface is configured to communicate a waveform responsive to the second baseband signal to a sensor port of a monitor. The waveform is adapted to the monitor so that measurements derived by the monitor from the waveform are generally equivalent to measurements derivable from the sensor signal. The communications adapter may further comprise a signal processor having an input in communications with the sensor interface, where the signal processor is operable to derive a parameter responsive to the sensor signal and where the first baseband signal is responsive to the parameter. The parameter may correspond to at least one of a measured oxygen saturation and a pulse rate.

One embodiment may further comprise a waveform generator that synthesizes the waveform from a predetermined shape. The waveform generator synthesizes the waveform at a frequency adjusted to be generally equivalent to the pulse rate. The waveform may have a first amplitude and a second amplitude, and the waveform generator may be configured to adjusted the amplitudes so that measurements derived by the monitor are generally equivalent to a measured oxygen saturation.

How the Challenged Patents Described the Disputed Subject Matter

patient 20. The auxiliary cable 420 mates to a sensor 35 connector 318 and a module connector 414, providing a wired link between a conventional sensor 310 and the wrist-mounted module 410. Alternatively, the auxiliary cable 420 is directly wired to the sensor module 400. The

EX1001 (735), 4:35-39

FIG. 6, below. The case 412 is mounted to the wrist strap 411, which attaches the wrist-mounted module 410 to a patient 20. The auxiliary cable 420 mates to a sensor 35

FIG. 4B illustrates a clip-on module 460 having a clip 461, a case 462 and an auxiliary cable 470. The clip 461 attaches the clip-on module 460 to patient clothing or 50 objects near a patient 20, such as a bed frame. The auxiliary

EX1001 (735), 4:33-35, 4:48-51

FIGS. 13-14 illustrate a multiple parameter communications adapter. FIG. 13 illustrates a multiple parameter sensor

As shown in FIG. 13, the sensor interface 1310 conditions and digitizes the sensor signals 1312 as described for a single sensor with respect to FIG. 6, above. The resulting

EX1001 (735), 12:57-58, 12:18-20

- Ports or directly wired
- Wrist-mounted or clip on
- Single or multi-sensor

- Analog or digital

tioned signal 614. Sensor signal conditioning may be performed in the analog domain or digital domain or both and may include amplification and filtering in the analog domain and filtering, buffering and data rate modification in the digital domain, to name a few. The resulting conditioned

EX1001 (735), 6:61-65

Sensors and Ports Stated by Patent to be Conventional

— a cable connecting the sensor to a monitoring device. For example, FIGS. 1-2 illustrate a conventional pulse oximetry system 100 used for the measurement of blood oxygen. As shown in FIG. 1, a pulse oximetry system has a sensor 110, a patient cable 140 and a monitor 160. The sensor 110 is typically attached to a finger 10 as shown. The sensor 110 has a plug 118 that inserts into a patient cable socket 142. The monitor 160 has a socket 162 that accepts a patient cable plug 144. The patient cable 140 transmits an LED drive

EX1001 (735), 1:44-52

Advantageously, the sensor module 400 is plug-compatible with a conventional sensor 310. In particular, the sensor connector 318 connects to the sensor module 400 in a similar manner as to a patient cable. Further, the sensor module 400

EX1001 (735), 4:58-61

From the perspective of a PHOSITA, the claimed housing configuration was not intended to be the source of novelty by the inventors back in 2002. EX1001, 4:49-5:26. This is not surprising because monitor design, its connection to a patient's body, and vital sign monitoring devices is basic. The monitor must attach to the patient somewhere. The monitor must include ports so vital sign monitors can be connected as needed in accordance with the needs of the patient. There must be a screen to view the

EX1003 (735), ¶ 22, Paper 01 (735), p. 9

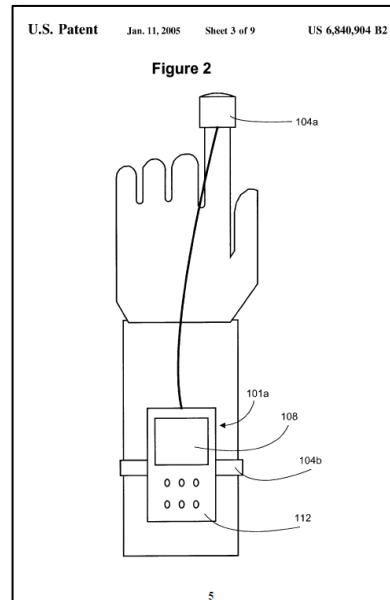
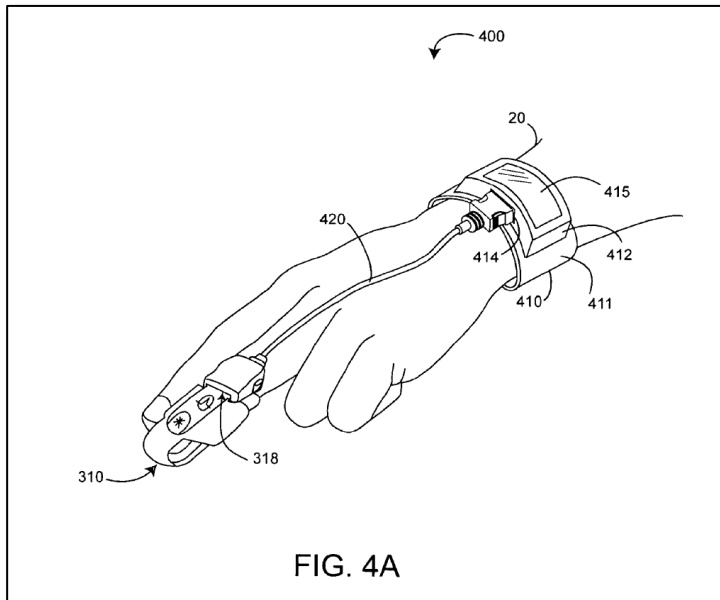
Of course, ports are a basic way to connect and disconnect an electronic device.

EX1003 (735), ¶ 29, Paper 01 (735), p. 14

Multi-Parameter Monitoring

Multi-Parameter Monitoring – Common Sense

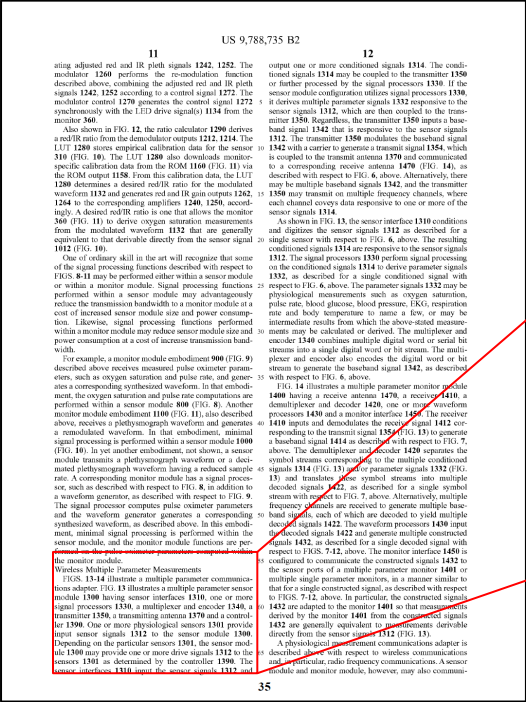
- The Prior Art is replete with examples showing multiple sensor monitoring.
(EX1005, 1006, 1007, 1008)
 - Paper 01 (735) pp. 10-13



24. The claims also include other features, which the Examiner found to be conventional or taught by the prior art. EX1014, pp. 2-6. Particularly, the Examiner did not find anything novel or non-obvious about a wearable device configured to interface with three sensors (because it's not). EX1001, 11:56-12:35; EX1014, pp. 4-6. One skilled in the art would appreciate that the monitor should include enough ports to adequately monitor several vital signs of a patient.

EX1003 (300), ¶ 24; Paper 01 (300), p. 11

Multi-Parameter Monitoring – Minimal Discussion



Wireless Multiple Parameter Measurements

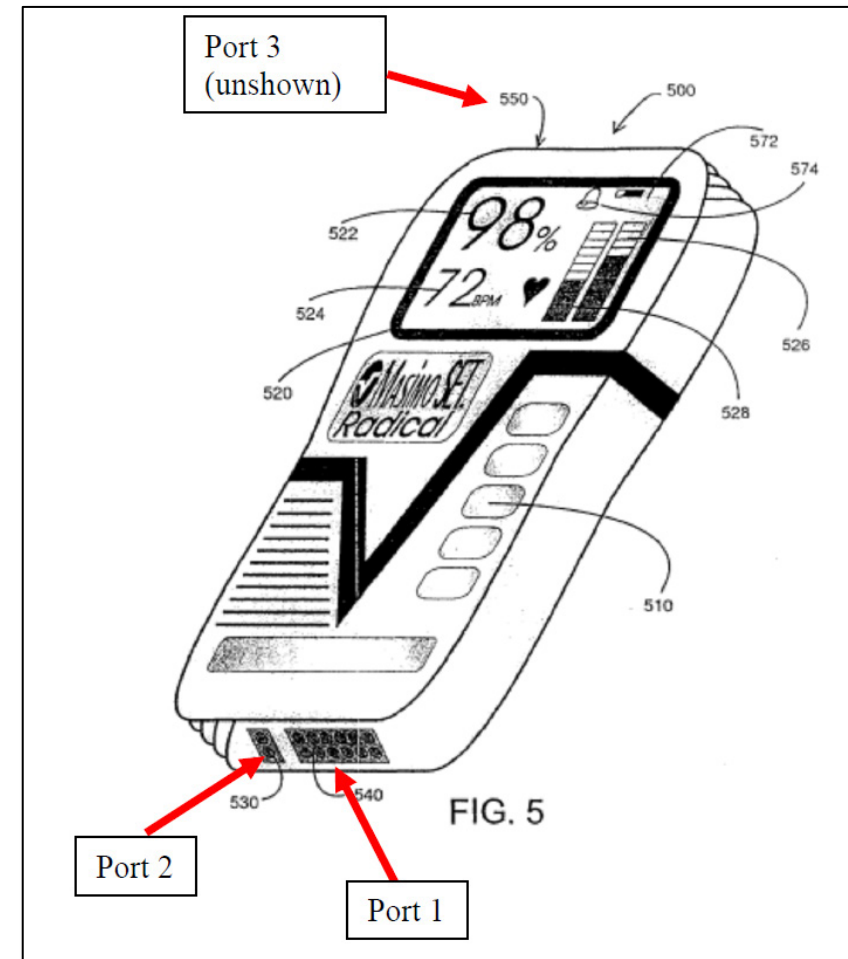
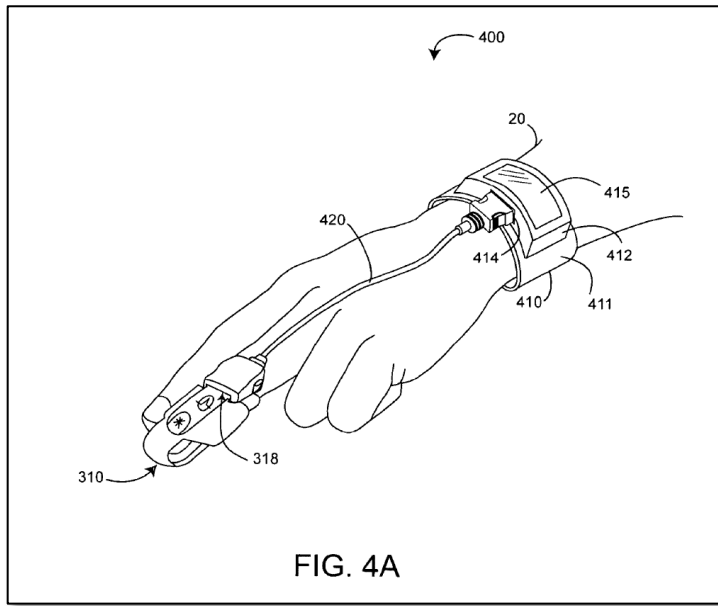
FIGS. 13-14 illustrate a multiple parameter communications adapter. FIG. 13 illustrates a multiple parameter sensor module 1300 having sensor interfaces 1310, one or more signal processors 1330, a multiplexer and encoder 1340, a transmitter 1350, a transmitting antenna 1370 and a controller 1390. One or more physiological sensors 1301 provide input sensor signals 1312 to the sensor module 1300. Depending on the particular sensors 1301, the sensor module 1300 may provide one or more drive signals 1312 to the sensors 1301 as determined by the controller 1390. The sensor interfaces 1310 input the sensor signals 1312 and

EX1001 (735), 11:56-67

- Specifications lack detailed discussion on multi-port, wrist worn monitor
- Paper 01 (735), pp. 7-8

Multiple Ports would not Make a Wearable Device Too Big

- Kiani demonstrated how to fit three ports on a device
 - Paper 25 (735), pp. 12-14



Paper 26 (108), p. 12

Prosecution History

Prosecution History Demonstrates Unpatentability in view of Petitioner's Grounds

UNITED STATES PATENT AND TRADEMARK OFFICE
UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMPTON Building, 14th Floor, 1500
P.O. Box 108
Washington, DC 20540-0108

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	COMPLETION NO.
15448/99	03/05/2017	Amador Al-Ali	MASIMO.311C7	4179

ART. 101
KNORR, MARTINS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER
WYNARTE, ERIC FRANK

ART. 102
371

NOTIFICATION DATE
03/05/2017

TELEPHONE
ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.
The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):
jgpusa.carter@knobbe.com
efiling@knobbe.com

PTEA-90A (Rev. 04/07) 1 EX1012
Petitioner Sotera

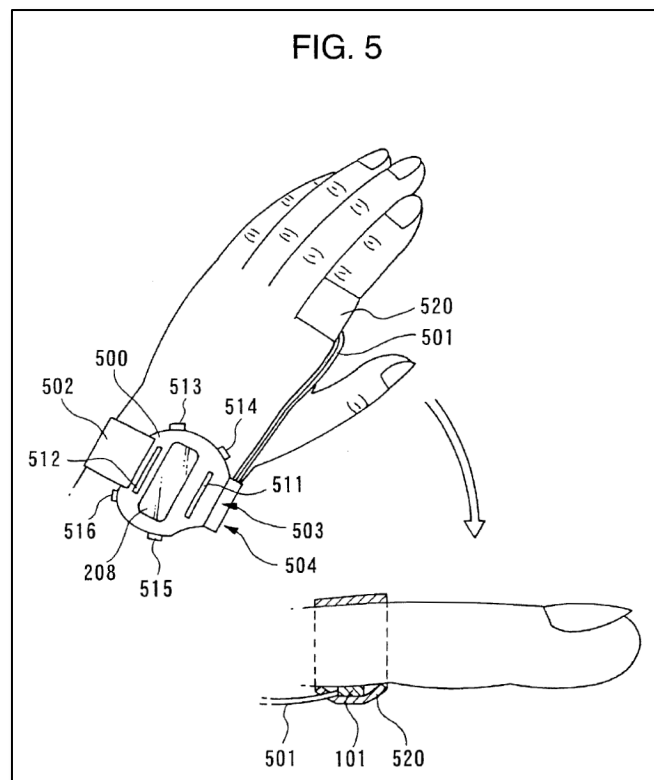
- Claims rejected in view of Exercise Watch
- Examiner found several arguments unpersuasive
- Examiner allowed the claims after an amendment specifying a first port's positioning on a housing
 - EX1012 (735), pp. 4-6; EX1013 (735); EX1014 (735), pp. 6-14; Paper 01 (735), pp. 8-11; Paper 07 (735), p. 8

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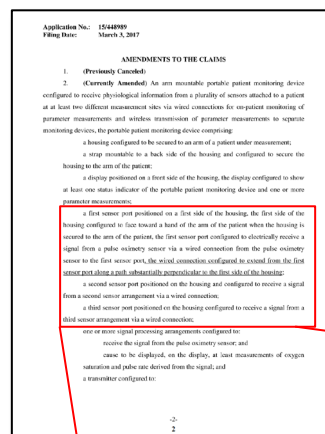
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Expanded Discussion/Commentary		
1		of the subject. The sensor provides data to the processing element through a connector (70). A does not teach: 1) measurement and processing of oximetry data (as optical measurement of pulse data is taught), 2) measurement of additional physiological parameters with ECG or BP sensors, for example, or 3) wireless RF-based telemetry of the physiological information.
1		With regard to item 1), Applicant cited reference 62 (Mathews - 5,431,170) at Figure 2 and Summary of the Invention, teaches that measurement of a second wavelength permits calculation of oxygen saturation in addition to heart rate data from a sensor positioned at the same location. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Amano to use the sensors of Mathews to obtain data for calculation of an additional
1		parameter of interest.
1		With regard to item 2), reference B (David) teaches an alternative wearable arrangement (Figures 2, 6 and the descriptions thereof) for measuring oxygen saturation and additional physiological parameters of interest, including ECG and blood pressure. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Amano and Mathews, to measure and process additional parameters of interest, consistent
1		with David. Further, one of skill in the art would recognize that additional connectors of Amano could be included in the wrist wearable member to permit connection between the processor and additional sensors.

Amendments to Overcome the Prior Art



EX1013, FIG. 5
(Paper 01, p. 9)



a first sensor port positioned on a first side of the housing, the first side of the housing configured to face toward a hand of the arm of the patient when the housing is secured to the arm of the patient, the first sensor port configured to electrically receive a signal from a pulse oximetry sensor via a wired connection from the pulse oximetry sensor to the first sensor port, the wired connection configured to extend from the first sensor port along a path substantially perpendicular to the first side of the housing;

EX1014, p. 2
(Paper 01, p. 9)

Masimo's Prosecution Arguments

UNITED STATES PATENT AND TRADEMARK OFFICE
NOTICE OF ALLOWANCE AND FEES DUE

APPLICANT: MASIMO CORPORATION (MASIMO)
ATTORNEY: KNOBBE, MARTENS, OLSON & BEAR, LLP
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IRVINE, CA 92614

INVENTOR: MASIMO CORPORATION (MASIMO)
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APPLICATION NO. 15/499,619
FILING DATE 03/02/2017
FIRST NAMED INVENTOR: MASIMO CORPORATION (MASIMO)
ATTORNEY DOCKET NO. 15/499,619
COMMUNICATION NO. 15/499,619

TITLE OF INVENTION: ARM-MONITORABLE PORTABLE PATIENT MONITOR

APPLICANT	ENTITY STATUS	ISSUE FEE	PUBLICATION FEE	POST GRANT FEE	TOTAL FEE DUE	PAID FEE
MASIMO CORPORATION	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	\$0.00

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.315 AND MPEP 1206.

THE ISSUE FEE AND PUBLICATION FEE OF REQUIREMENT BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REJECTED AS ABANDONED. THIS ATTORNEY FEE CANNOT BE EXTENDED. SEE 37 CFR 1.315. THE ISSUE FEE HERE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REPEAL THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status will apply.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEES DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEES TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity status applies.

II. PART B - FEES: TRANSMITTAL (UP TO WITH YOUR ISSUE FEE and of Part B - Fees) Transmittal should request to supply a previously paid fee of the paper as an equivalent of Part B.

III. All communication regarding this application should be directed to the ATTORNEY OF RECORD.

IMPORTANT REMINDER: Make It is patentee's responsibility to send www.uspto.gov/Patent/blastment

FD-501 (Rev. 02-11)

EX1014 (735 IPR),
p. 12
Paper 07 (735 IPR),
p. 8

Communication mailed 3 July 2017. Applicant pointed to 1) Differences in the environment of use of their device (hospital) and that of Amano (during exercise), and 2) Alleged that there was a need for increased accuracy in the hospital/medical testing setting which was reflected in certain claimed features, particularly placement of ports to permit more direct connection between the sensor and the monitor which serve to reduce potential causes of interference/noise from cable motion/sensor dislodgement. Further, Applicant stressed that 3) by including multiple ports in their device they provide a modular device for building a sensing set. In contrast, Applicant noted that the secondary reference (David) disclosed an all-in-one arrangement with fixed connections between sensor elements and the processor, and thus did not suggest a modular build. Also, the base reference had a single connection with a sensor, consistent with the teaching that it was only processing information to produce pulse rate related outputs. Additionally, differences in the wireless data transmission were

Examiner Disagreed with Masimo's Arguments re Unamended Claims

UNITED STATES PATENT AND TRADEMARK OFFICE

NOTICE OF ALLOWANCE AND FEES DUE

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INVENTOR: AMANO, DAVID
 15499.619

DATE MAILED: 10/09/2019

APPLICANT	INVENTOR	ART UNIT	DATE MAILED
MASIMO CORPORATION (MASIMO)	AMANO, DAVID	15499.619	10/09/2019

TITLE OF INVENTION: ARM MOUNTABLE PORTABLE PATIENT MONITOR

APPLICANT	INVENTOR	ART UNIT	DATE MAILED
MASIMO CORPORATION (MASIMO)	AMANO, DAVID	15499.619	10/09/2019

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 C.F.R. 1.312 AND MPEP § 806.

THE ISSUE FEE AND PUBLICATION FEE, IF REQUIRED, MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OF THIS APPLICATION SHALL BE REWARDED A CANNOT BE EXTENDED. SEE 37 U.S.C. 412. THE ISSUE FEE DUE INDICATED FOR AN PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AS A THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THE TO REPLY TO THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SM, entity status will apply.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEES DUE due to the ENTITY STATUS is changed from that shown above, on PART B - FEES/TRANSMITTAL, "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of non-small entity fees, as fees.

II. PART B - FEES/TRANSMITTAL, or its equivalent, must be completed and return (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are due of Part B - Fees/Transmittal should be completed and an extra copy of the form should request to reapply a previously paid issue fee must be clearly made, and delays in processing the paper is an equivalent of Part B.

III. All communications regarding this application must give the application number. Please (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required).

IMPORTANT REMINDER: Maintenance fees are due to utility patents issuing on. It is patentee's responsibility to ensure timely payment of maintenance fees when due. www.uspto.gov/PatentMaintenanceFees.

Page 1 of 3

Application/Control Number: 15499.619
 Art Unit: 3725

Examiner reiterated that as indicated in the Pre-Interview Communication, 1) the base reference (Amano) sufficiently shows a manner to connect sensor elements with the monitor device, 2) one of ordinary skill in the art would recognize that such a connection could be used with additional sensors, such as those of David, 3) that David was relied upon to show additional physiological parameters of interest and was not provided to suggest the manner of connections, and therefore 4) in implementing Amano with additional sensors, per David, one would recognize the need for connecting the sensors with the monitor and would also be aware of connectable/disposable sensors for a variety of physiological parameters and also would be aware of modular monitoring configurations, and thus would have considered using the already disclosed connector type taught by Amano when implementing the combination with the additional sensors.

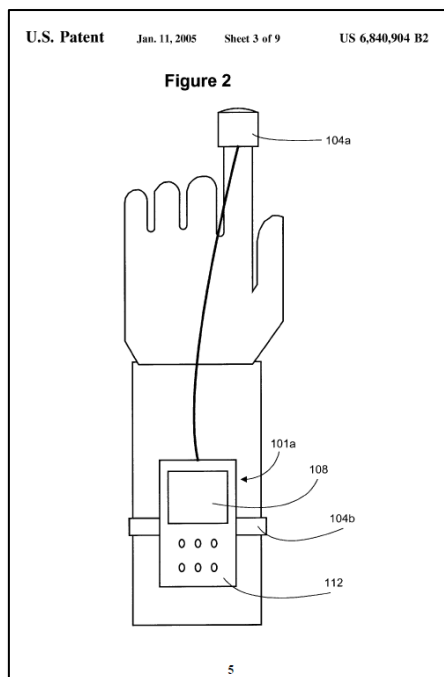
Although no particular conclusion was reached during the interview, Applicant indicated that the interview served to clarify Examiner's interpretations. Applicant requested the opportunity to present a proposed amendment in a follow up discussion to try to better capture the distinguishing characteristics that they had relayed and to overcome the issues Examiner indicated. Examiner agreed to consider such a proposal before mailing a First Action Interview Office Action and Interview Summary.

For the follow up discussion, Scott Cromar contacted the Examiner on 10 August 2017 with the proposed amendment, explained the basis for the changes, and indicated that the changes were intended to address Examiner's concerns. Further, Mr. Cromar indicated that a Terminal Disclaimer would be filed to address the Double Patenting

Examiner reiterated that as indicated in the Pre-Interview Communication, 1) the base reference (Amano) sufficiently shows a manner to connect sensor elements with the monitor device, 2) one of ordinary skill in the art would recognize that such a connection could be used with additional sensors, such as those of David, 3) that David was relied upon to show additional physiological parameters of interest and was not provided to suggest the manner of connections, and therefore 4) in implementing Amano with additional sensors, per David, one would recognize the need for connecting the sensors with the monitor and would also be aware of connectable/disposable sensors for a variety of physiological parameters and also would be aware of modular monitoring configurations, and thus would have considered using the already disclosed connector type taught by Amano when implementing the combination with the additional sensors.

EX1014 (735 IPR), p. 13
 (Paper 07 (735 IPR), p. 8)

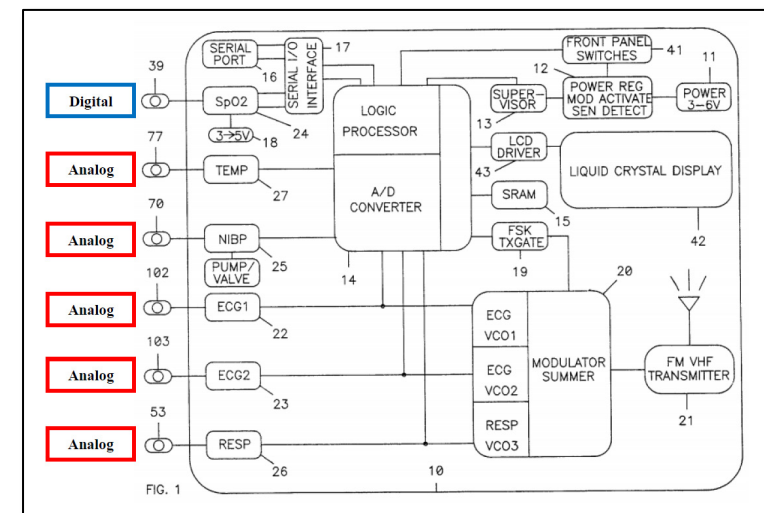
Prior Art Herein Refutes Examiner's Reasons for Allowance



EX1005, FIG. 2

- Petitioner submitted multiple prior art references showing the claimed SpO₂ port positioning
 - Masimo does not refute that the Prior Art teaches this reason for allowance
- Petitioner also submitted prior art teaching a monitor capable of receiving analog and digital information simultaneously

Paper 01 (735), pp. 10-12; Paper 21 (735); Paper 30 (735)



EX1008, FIG. 1 (annotated)
Paper 22 (108), p. 16

Expert Taught Basic Concepts Argued Herein

- Concepts their Expert admitted to teaching as a graduate student
 - EX1042, 164:22-166:15; Paper 25 (735), p. 1

3 Q. Did you teach digital data transmission
4 when you taught earlier in your career?

5 A. So I taught a course when I was working
6 towards my PhD on, like, signals and systems
7 analysis. So there's things like Fourier
8 transform and doing it in the analog domain and
9 discretely, which would be in the digital
10 domain. And it was only analyses. It didn't
11 get into circuit designs.

12 Q. So a PHOSITA would know how to transmit
13 discrete data as a digital signal; correct?

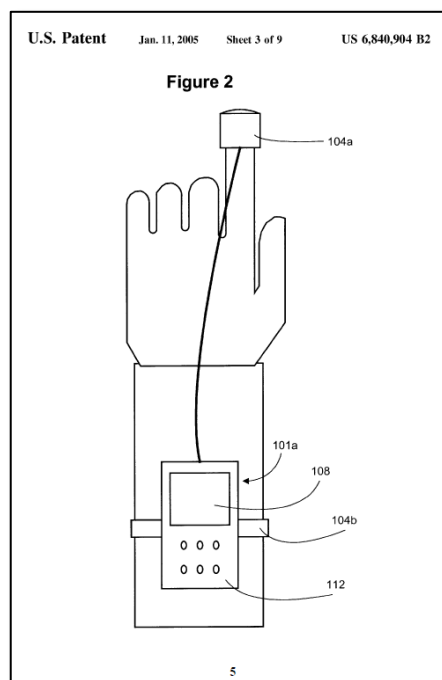
14 A. They would know -- yeah, that's one way
15 of transmitting data.

EX1042, 166-3:15

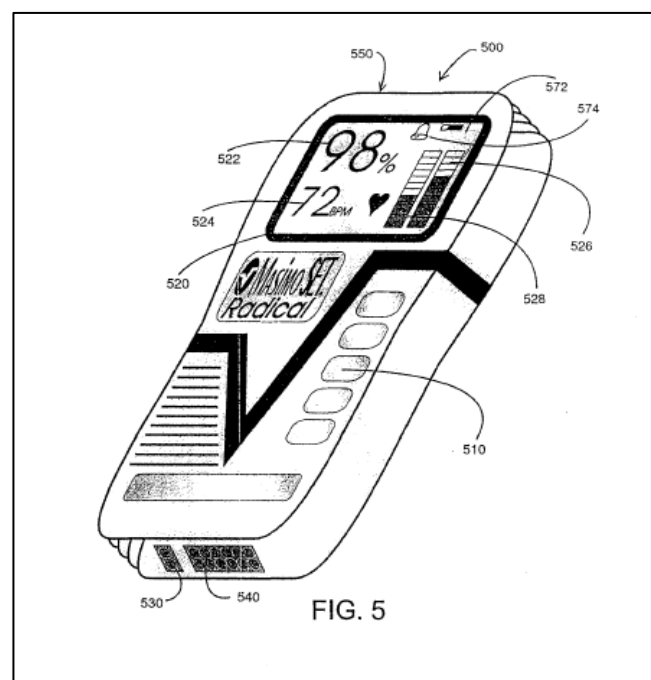
Prior Art – Grounds

Primary Prior Art Combination (generally)	Goldberg in view of Kiani and Money
Second Prior Art Combination (generally)	Money in view of Kiani and Akai

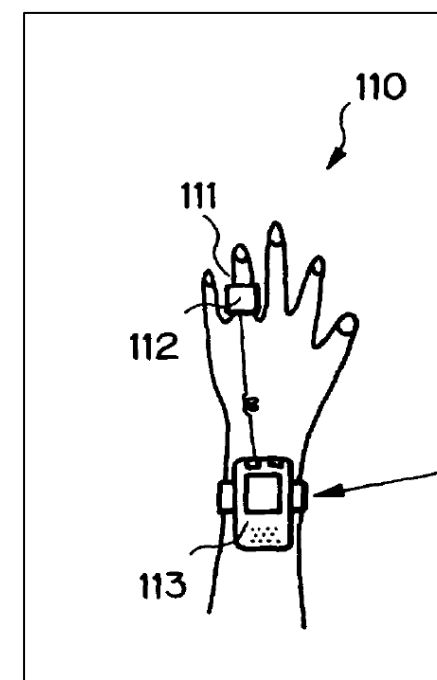
Primary Prior Art



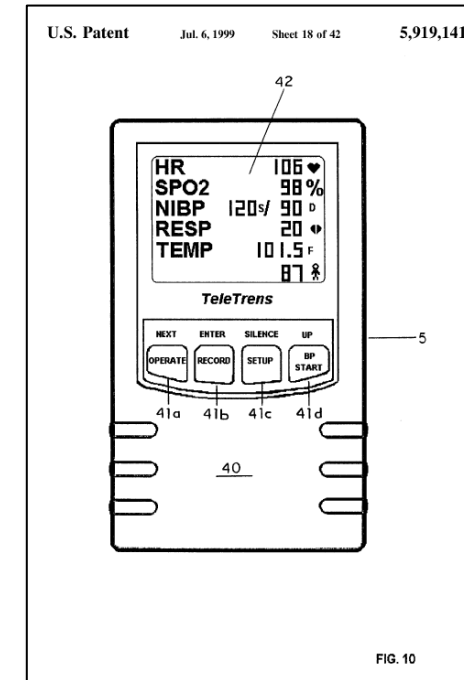
Goldberg, EX1005



Kiani, EX1006

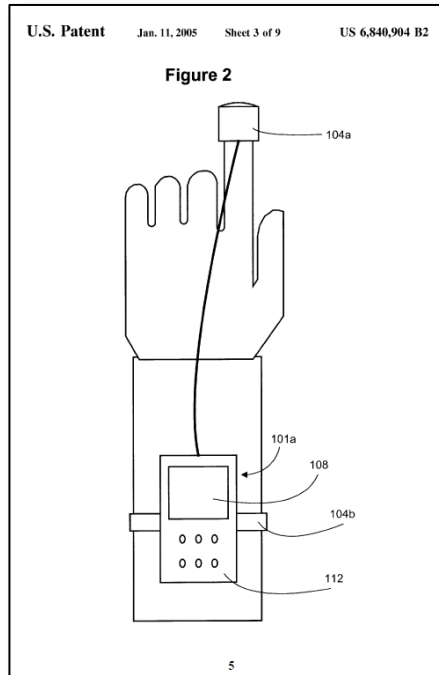


Akai, EX1007



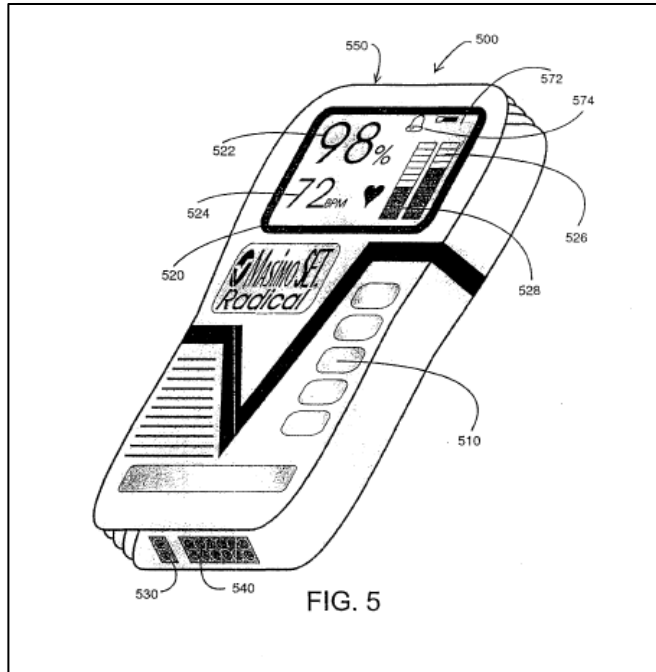
Money, EX1008

Goldberg



Goldberg, EX1005

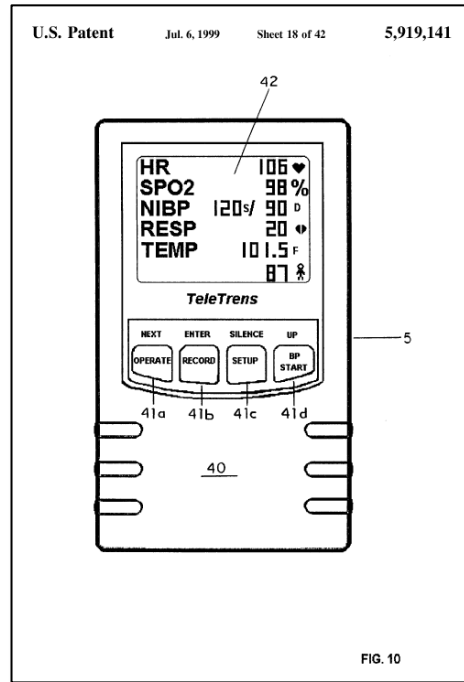
- Goldberg teaches a wrist-worn, portable device:
 - Receives data from three or more sensors,
 - Displays sensor data, and wirelessly,
 - transmits sensor data to a remote computer
 - Paper 01 (735), pp. 10-11; EX1003 (735), ¶ 37; EX1005, 1:29-44, 2:27-29, 4:20-30, 4:50-56, 5:3-8, 2:37-42, 2:47-55



Kiani, EX1006

- Kiani teaches that medical sensors communicate using ports
 - Paper 01 (735), p. 11; EX1003 (735), ¶¶ 40-41; EX1006, 3:21-23, 5:21-22, 8:31-9:2, FIG. 5

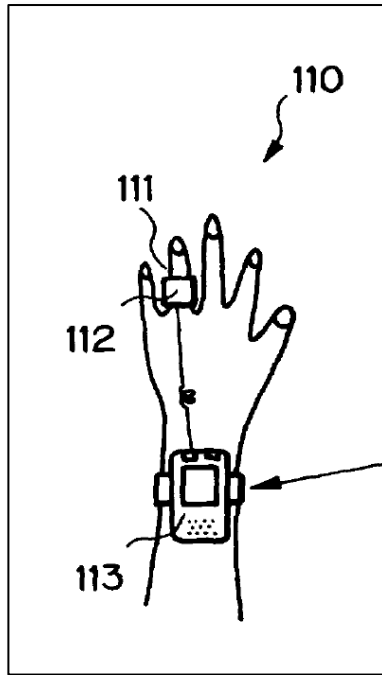
Money



Money, EX1008

- Money teaches a wearable, remote monitoring device that communicates with numerous sensors:
 - the patient monitor receives digital signals from some sensors and analog signals from other sensors,
 - has Ports,
 - displays sensor data, and
 - wirelessly transmits those readings to a central monitoring station.
- Paper 01 (735), p. 12; EX1003 (735), ¶ 42; EX1008, 5:4-28, 5:48-51, 6:21-55, 7:4-8, 7:16-20, 7:58-62, 12:4-7, 13:24-32, FIG. 1

Akai



Akai, EX1007

- Akai teaches a wearable monitoring device:
 - connects to three or more sensors,
 - displays sensor readings, and
 - wirelessly transmits those readings to a central computer.
- Paper 01 (735), p. 12; EX1003 (735), ¶ 43; EX1007, Abstract

Ports

Implicitly Obvious or Obvious in View of Kiani

Goldberg Implicitly Teaches Ports

- Goldberg teaches wired connection, and such manners of coupling are well-known:
 - Wired connections include hardwire and ports, both of which were well-known
 - Goldberg implicitly teaches ports
 - Goldberg teaches connection to “any type of physiological sensor,” which would include a physiological sensor that uses a port

- EX1003 (735), ¶¶ 64-65; EX1042, 23:3-5; Paper 01 (735), p. 21; Paper 25, pp. 5-10

50 The sensors **104** are positioned as to sense physiological characteristics of the monitored person, and in the preferred embodiment, a sensor **104** can be associated with one or more of the monitored person's blood pressure, pulse, oxygen-haemoglobin saturation, glucose, body temperature, 55 respiration, and electrolyte. As mentioned, these sensors are well known in the art and are commercially available.

EX1005, 4:24-29

25 term. Various sensors **104** are known in the art for converting physiological characteristics of the type disclosed herein into electrical signals, and for providing the signals to the controller **102** and/or memory **106**. The sensor(s) **104** can be coupled to the controller **102** and/or memory by wire or wirelessly, and such ways of coupling are well known in the art.

EX1005, 4:50-56

sense Na^{+1} and/or K^{+1} ions. It is contemplated that the medical monitoring device may contain one, all, or any combination of the above-mentioned sensor types, as well as 5 other sensors. It should be further appreciated that present invention may be comprised of any type of physiological sensor **104** suitable or use with a portable monitoring device.

EX1005, 5:3-8

A PHOSITA Would Know Goldberg Implicitly Teaches Ports

- Using ports was a basic design choice readily understood by a PHOSITA
 - EX1003 (735), ¶¶ 54, 66; Paper 01 (735), pp. 16, 20

of vital signs depending on a patient or a patient's ailment. EX1006, 5:3-8. The use of wireless technology to eliminate the wires is not inventive. The remaining features of the claims are directed to **basic components** of a medical vital sign monitoring system and relate to **basic design choices** that are not only obvious design choices but are shown by prior art references as discussed herein.

EX1003 (735), ¶ 54; Paper 01 (735), p. 16

Notably, a PHOSITA would understand in reviewing Figure 2 that a basic diagram is shown reflecting a housing, display, buttons, strap for the wrist, and a sensor wired to the housing. From this basic diagram, **a PHOSITA would readily understand the basic design choices to reduce the diagram to a commercial product.**

EX1003 (735), ¶ 66; Paper 01 (735), p. 20

Experts Agree Regarding Motivation To add Ports to Goldberg

- It would have been obvious to include ports on Goldberg to allow for removal and replacement of a sensor
- Masimo's Expert, Mr. Oslan, opined that a port connection may be appropriate for "disposable" sensors, which are removable and replaceable
- Dr. Bergeron also agreed that removal and replacement of sensors is typical
 - Paper 01 (735), p. 22; Paper 25 (735), p. 15

Alternatively, a port connection may be appropriate if a sensor is designed to be disposable.

EX2010 (735), ¶ 73

Particularly, including a port on Goldberg's housing (if it wasn't already there) would predictably enable wired communication with the pulse oximeter 104a while allowing easy removal and replacement of the sensor 104a and providing a secure, wired connection between the pulse oximetry sensor 104a and the housing 112. EX1006, 2:34-3:4. More specifically, ports generally provide removable wired connections, so a medical worker would replace the pulse oximeter 104a with a different sensor if a new physiological parameter is to be measured. *Id.*

EX1003 (735), ¶ 65

e. Single-use, disposable sensors are commonplace. Dr. Yanulis argued persuasively that ports offer the ability to remove and replace faulty sensors. The same logic applies to disposable sensors. Patent Owner never refuted this motivation, and Mr. Oslan supported it. EX2010, ¶ 73.

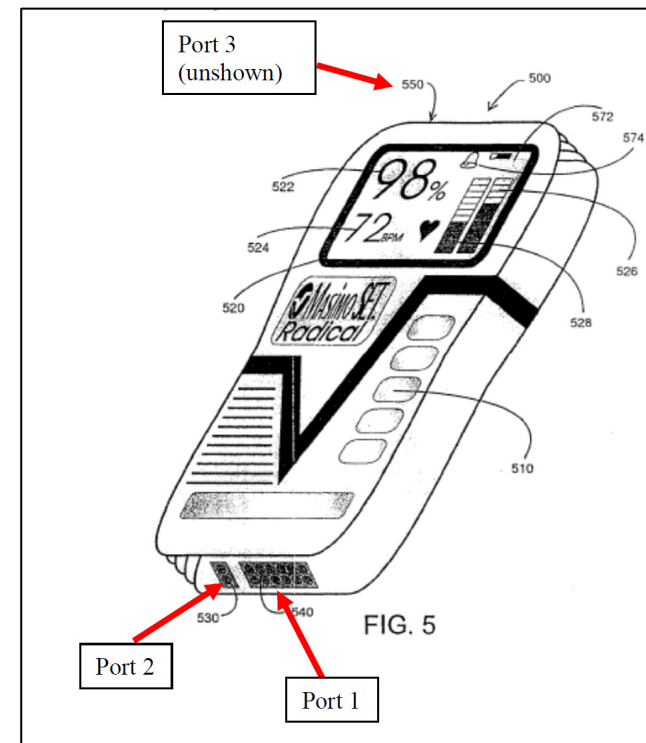
EX1040, (735), ¶ 78

Supposed Disadvantages of Ports

- Masimo submitted numerous arguments regarding alleged disadvantages of ports in Patent Owner Responses, even though their own prior art technology used ports
 - e.g., Paper 22 (735), pp. 29-35; Paper 25 (108), p. 14
- Petitioner rebutted these erroneous arguments because the disadvantages were solved long ago with basic technology
 - Paper 25 (735), p. 15; EX1040, ¶ 78; EX1047, p. 1; EX1048, p. 3; EX1049, p. 1; EX1050, Abstract; EX1042, 88:6-89:1
- Masimo did not challenge Petitioner's rebuttals in the sur-reply
 - Paper 30 (735)

Multiple Ports are Also Obvious

- A PHOSITA would have been motivated to make each respective wired connection to a sensor in Goldberg ported, because Kiani demonstrates ports were a known and improved method for forming wired connections
- Adding more sensor ports is a mere duplication of parts
 - Paper 25 (735), p. 10
- Masimo failed to rebut these arguments in their sur-reply
 - Paper 30 (735)



Paper 25 (735), p. 12

In another aspect of the present invention, a measurement apparatus comprises a first sensor port connectable to a sensor, an upgrade port, a signal processor and a waveform generator.

EX1006, 3:21-22; Paper 01 (735), p. 22

Ported Blood Pressure Sensor Connection on Goldberg

Implicitly Obvious or Obvious in View of Kiani

Masimo is Wrong Regarding Goldberg's Blood Pressure Sensor

- Masimo incorrectly submitted that Goldberg's blood pressure sensor was positioned within the housing 112 without any evidence from Goldberg to support that theory – only expert conjecture
 - e.g., Paper 21 (735), pp. 38-39
- Petitioner rebutted these arguments pointing out that Goldberg unequivocally describes an external blood pressure cuff *sensor*
 - Paper 25 (735), p. 17; EX1005, FIG. 2

Goldberg teaches Blood pressure sensor external to housing

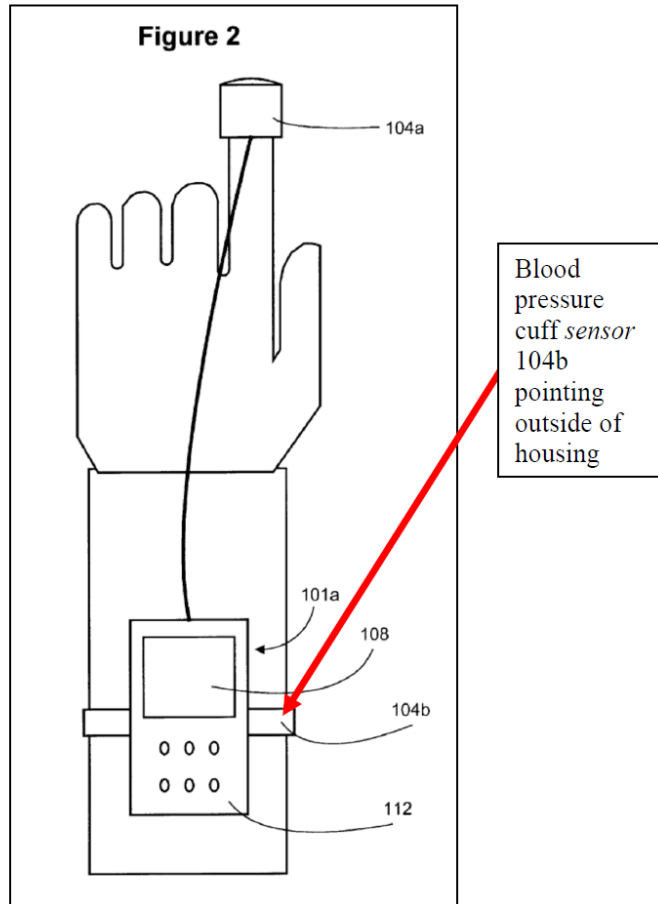


FIG. 2 depicts a portable device **100a** mounted in an assembly or housing **112** that is sized to be carried by an individual, and in this embodiment, strapped to the persons wrist or forearm by any conventional strap apparatus. FIG. 2 also depicts somewhat schematically a sensor **104a** positioned on a finger of the monitored person. Sensor **104a** in this embodiment is a pulse oximetry sensor **104a** to sense the monitored person's oxygen-haemoglobin saturation. In addition, a blood pressure cuff sensor **104b** is used to sense the monitored person's blood pressure and strap also functions to the device **101a** to a person's forearm or wrist. In

EX1005, 4:57-67; Paper 01 (735), p. 26

EX1005, FIG. 2;
Paper 25 (735), pp. 17-18

Obvious to connect Blood Pressure Sensor via a Port

- Goldberg describes a sensor as an electrical device, and that all sensors can be connected via wire
 - EX1005, 4:19-23, 4:64-67, Paper 01 (735), pp. 26-28, Paper 25 (735), pp. 17-19
- Masimo failed to rebut Goldberg’s clear teachings, arguing “the location of the pressure sensor is not the claim limitation”
 - Paper 30 (735), p. 9
- Because BP sensor is external, it would have been obvious to use a port
 - Paper 25 (735), p. 17

25 term. Various sensors **104** are known in the art for converting physiological characteristics of the type disclosed herein into electrical signals, and for providing the signals to the controller **102** and/or memory **106**. The sensor(s) **104** can be coupled to the controller **102** and/or memory by wire or wirelessly, and such ways of coupling are well known in the art.

EX1005, 4:50-56

20 circuit (ASIC). The sensor(s) **104** convert physiological characteristics of the monitored person into electrical signals that are provided to the electronic controller **102** or to the memory **106**, where they are stored temporarily or longer

EX1005, 4:19-23

Motivations for Ports Apply Equally to BP Sensor

78. Even so, Kiani shows that sensor input ports 550 were a known vehicle for wired communication. EX1006, 3:21-27, 8:31-9:2. Like I said before, Kiani expressly teaches something that a PHOSITA would assume reading Goldberg. Nevertheless, it would have been obvious to combine Goldberg and Kiani to include a second and third port on the housing 112 as part of the wired connections with the second and third sensors. Like above, modifying Goldberg with Kiani would have been a combination of known concepts (wired electrical communication and wired electrical communication using ports) to yield predictable results. EX1005, 4:19-29; EX1006, 3:21-27, 8:31-9:2. Particularly, including second and third ports on Goldberg's housing would have predictably enabled wired communication with the second and third sensors while allowing easy removal and replacement of the third sensor and providing a secure, wired connection between the blood pressure sensor 104b and the housing 112. EX1006, 2:34-3:4; *See* paragraphs 63-64 above.

EX1003 (735), ¶ 78; Paper 01 (735), pp. 27-28

Signal Configuration – Goldberg

It Would Have Been Obvious to Transmit Data as Either an Analog
or Digital Signal in Goldberg's System

Analog and Digital Limitations were Obvious

- Goldberg teaches connection to “any sensor,” which includes analog and digital sensors
 - EX1005, 5:3-8, Paper 01 (735), p. 28, Paper 25 (735), pp. 19-20
- There are only two signal types: analog or digital – would have been obvious to try either
 - Paper 01 (735), p. 28, EX1003 (735), ¶ 80, Paper 25 (735), pp. 19-20, EX1040 (735), ¶ 86
- Continuous data (e.g., SpO₂) is best represented with an analog signal; discrete data (e.g., temperature) can be easily represented with a digital signal
 - Paper 25 (623), pp. 79-80, EX1003 (623), ¶¶ 289-292, Paper 01 (735), pp. 28-29, EX1003 (735), ¶¶ 80-86
- Manufacturers offer most sensors in both analog and digital version – simple design choice
 - Paper 01 (735), pp. 28-29, EX1003 (735), ¶ 85, Paper 25 (735) pp. 19-21, EX1040 (735), ¶ 86
- A PHOSITA is equally facile working with both analog and digital signals
 - Paper 25 (735) pp. 19-21, EX1040 (735), ¶ 86

Analog or Digital Both Obvious Options

- Modification of signal type is a mere reversal of parts (MPEP 2144.04(IV)(A)) or the simplest of substitutions
 - Paper 25 (735), p. 21

86. A POSITA would be equally facile working with analog and digital versions of a given sensor, would know that manufactures offer most sensors in both analog and digital version, and would match the interface of the microcontroller or port to the signal type transmitted by the sensor (either analog or digital). A POSITA would know not to connect an analog interface to a digital sensor, and vice versa. Any differences in cost would be negligible and not part of an obviousness consideration. As Money points out, and what the Examiner apparently was not aware of, microcontroller cards and other hardware circa 2002 intended to communicate with sensors commonly received both analog and digital signals from both analog and digital sensors and other devices. EX1008, 7:4-8.

EX1040 (735), ¶ 86
(Paper 01 (735), pp. 28-29)

A PHOSITA Would Know Analog and Digital Sensors Existed

- Sensors were known to be analog and digital
- Goldberg wished to talk to “any” sensor
 - EX1005, 5:3-8; Paper 01 (735), pp. 28-29; Paper 25 (735), pp. 19-20

85. It would have been obvious to modify Goldberg with Money so that the system of Goldberg would function with more sensors and more sensor types. Goldberg teaches that it wishes to communicate with any conventional sensor. EX1005, 4:50-56. Some conventional sensors communicate digital data, and some conventional sensors communicate using analog data. EX1008, 5:48-51, 7:4-8, 7:16-20, 13:24-32. So, Goldberg provides the motivation to adopt the teachings of Money so that Goldberg’s portable device would be able to communicate with any conventional sensors (both analog and digital). EX1005, 4:50-56. That said, all of Money’s teachings regarding power requirements RS232 protocol, and circuitry to communicate with both analog and digital sensors are extremely basic electrical engineering concepts that would be well-known to a PHOSITA. So, Goldberg likely included such circuitry but omitted the description of this circuitry because it was so basic and unnecessary to enable his invention.

EX1003 (735), ¶ 85 (Paper 01 (735) p. 29)

Finite Number of Signal Types

- Despite arguing that a PHOSITA wouldn't be motivated to modify an analog signal into a digital one (or vice versa), Masimo has not refuted that:
 - There are only a finite number of options (two) for transmitting signals: analog or digital choosing analog (or digital) would have been, at worst, obvious to try
 - Paper 01 (735), p. 24-25, 28-29

80. Lastly, I again fail to see how it matters from a patentability standard why the additional ports provide digital domain communication. There are only two signal options (analog or digital), and both are well-known to any PHOSITA. Indeed, a PHOSITA would have been well-versed with analog signal circuitry and digital signal circuitry. So, it would have been obvious to a PHOSITA to provide digital information via Goldberg's additional ports.

EX1003 (735), ¶ 80
(Paper 01 (735), p. 28)

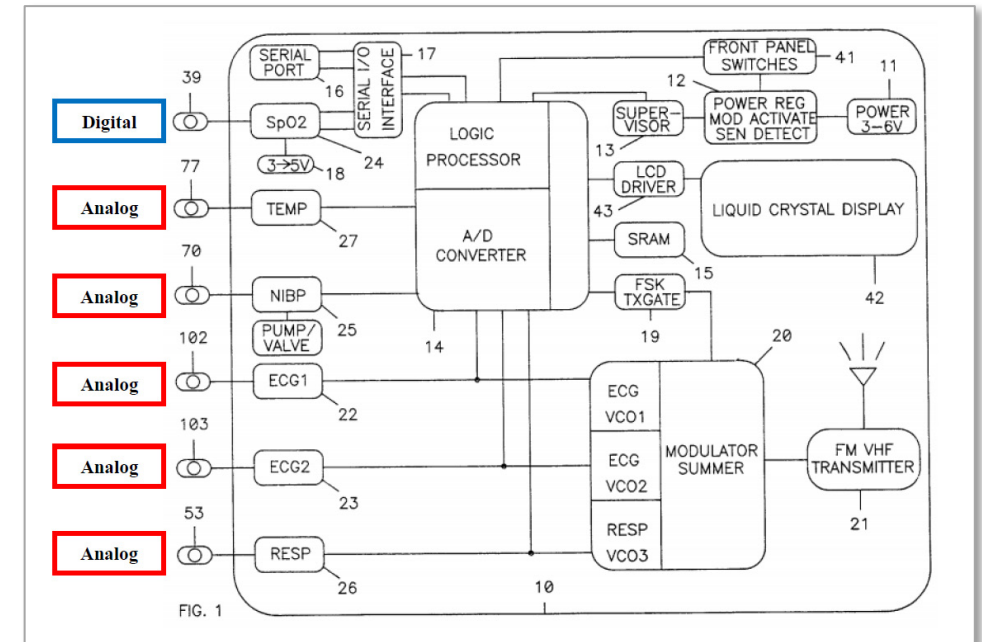
73. Lastly, signals are either analog or digital. There are only two options, so it would have been obvious to transmit signals as either digital or analog signals. So, at the very least, it would have been obvious for the pulse oximeter to provide an analog signal because there are only two signal options.

EX1003 (735), ¶ 73
(Paper 01, p. 25)

Patent Owner Annotated Figure Shows that Money teaches the Examiner's Reason for Allowance

The prior art does not teach or suggest the positioning of the port in conjunction with two additional ports and in relation to the optical sensor components, as recited in the amended claims, in combination with the other claimed features, but rather indicates the connector is positioned at the 6 o'clock position (Amano - at col 9, lines 4 - 9) and button/switches for data entry/mode selection are positioned at 2, 4, 8 and 10 o'clock positions. Further, the connection of Amano receives analog data from a single sensor having one emitter and one detector; there is no teaching or suggestion in the prior art to receive some data in analog form through a first port and other physiological data in digital form through a second port.

EX1014, p. 14
(Paper 26, p. 9)



Paper 22 (108), p. 16

Goldberg's Context

Clinical or “At-Home” is Irrelevant to the Obviousness of Ports

Context Doesn't Matter

- Masimo has not refuted that the primary benefits of ports applies equally to at-home and clinical settings
 - In both settings a user could remove and replace a faulty, disposable, or removable sensor and replace it with a new sensor
 - Masimo's context arguments merely attempt to refute the additional benefit of ports: adaptability
 - Paper 25, pp. 15-17; Paper 21; Paper 30

81. Also, the motivation to combine arguments in the Petition apply equally to both at-home use and clinical use. Sensors fail in both at-home settings and clinical settings, so a POSITA would be motivated to use a port to allow a user or a clinician to remove and replace a sensor.

EX1040 (735), ¶ 81
(Paper 25 (735), p. 16)

80. Even if Masimo were correct about Goldberg's setting, I fail to see why a POSITA wouldn't include ports on a device used at home. Lay people were very used to ports in many settings around their home, such as Ethernet ports, USB ports, telephone jacks, RCA cables on TVs, coaxial cable connections, parallel ports, serial ports, etc. So, a POSITA would not believe that ported connections would intimidate a non-medical user or result in a device too complicated for an at-home user.

EX1040 (735), ¶ 80
(Paper 25 (735), p. 16)

Money as a Primary Reference

Money Would Obviously Be Worn on the Wrist

Money's Size Can Be Worn on the Lower Arm

- Money is unequivocally a wearable device
- Money lists approximate dimensions and a *maximum* weight
 - Paper 25 (735), p. 22

[57]

ABSTRACT

A device for remote monitoring of hospitalized patient vital signs is incorporated into a portable housing, wearable by an ambulatory patient. Interfaces are provided for external connection of pulse oximetry, ECG, respiration, temperature, and blood pressure transducers. An RF transmitter transmits analog and digital vital sign data to a remote monitoring station.

EX1008, Abstract (Paper 01 (735), p. 16)

Hardware Overview

The remote patient monitoring device, designated at **10** on FIG. 1, is a self-contained, portable and patient-wearable unit, with all hardware and software mounted in a housing approximately one inch thick, three inches wide, and six inches long. The housing **5** has a front panel **40** (FIG. 10) having a liquid crystal display **42** and four front panel switches **41a-d**. Device **10** is preferably adapted for use as both a stand-alone patient vital sign monitor and for wireless transmission of vital sign data to a central monitoring station.

EX1008, 5:4-13 and 3:40-41
(Paper 01 (735), p. 65)

Accordingly, the present is intended to limit the device weight to no more than 16 ounces including batteries. It was

Money's Maximum Size Can be Worn on the Wrist

- Even so, Money's maximum size is still "configured for, and having a size and shape configured for, mounting to a lower arm of the patient"
- Masimo's contention that Money is worn on a patient's belt finds no support in Money
 - Also, Patients do not wear belts in a hospital setting (gowns)
 - Paper 25, pp. 21-24

197. Money teaches a housing 5 intended to be worn by a patient. EX1008, 5:4-8. Money does not expressly teach a specific or intended location where a patient is to wear the monitor 10, but Money does teach the housing's dimensions (3" x 6" x 1"). A PHOSITA would know that a housing of this size would easily be worn on a patient's wrist.

EX1003 (735), ¶ 197
(Paper 01 (735), p. 65)

90. Furthermore, it isn't clear that any change in size was necessary. Money merely lists approximate dimensions and a maximum weight. EX1008, 5:6-8, 3:40-41. Hence, a POSITA would understand that smaller sized versions of Money's device were envisioned, all of which could be strapped to the wrist.

EX1040 (735), ¶ 90
(Paper 25 (735), p. 22)

Money's Monitor is Logically Worn on the Wrist

- A PHOSITA would have been motivated to position Money's monitor on the wrist because the SpO₂ measurement site would be at the finger.
 - EX1003 (735), ¶ 196, (Paper 01 (735), p. 64)

Money doesn't teach where the wearable monitor 10 is worn by a patient, but it would have been obvious to position the wearable monitor 10 on a patient's wrist after modified by Akai because the pulse oximetry measurement site would be moved to the patient's finger. The reason the wrist is highly desirable is it makes it easy for the patient to show the monitor to the physician, and the patient can also view the monitor. *See* EX1007, 5:51-55, 7:44-46, FIG. 1.

EX1003 (735), ¶ 196
(Paper 01 (735), p. 64)

Motivation to Modify Money

Pulse Oximetry Cuff Transducers were Uncomfortable and Unnecessary

Money's Describes an SpO₂ sensor that squeezes an artery

- Money teaches a pulse oximetry *cuff* transducer
- SpO₂ *cuff* transducers, like blood pressure *cuffs*, squeeze arteries to measure SpO₂
- A PHOSITA would know that a “cuff transducer” squeezes an artery
- Patients find artery squeezing cuffs uncomfortable
 - Paper 01 (735), pp. 63-64; Paper 25 (735), pp. 26-27

Pulse oximeter interface circuit 24 receives raw data from a conventional pulse oximeter cuff transducer 39. A separate voltage converter 18 is used to deliver regulated DC power to pulse oximeter interface circuit 24.

Non-invasive blood pressure data is received from a blood pressure cuff transducer 70 by blood pressure interface circuit 25.

EX1008, 5:38-43

(Paper 01 (735), p. 72, 87, Paper 25, p. 26)

even in 2002 (the priority date of the '735 Patent). Pulse oximetry cuff transducers,

like the one taught in Money, are bulky and uncomfortable when worn by a patient.

EX1003, ¶ 195

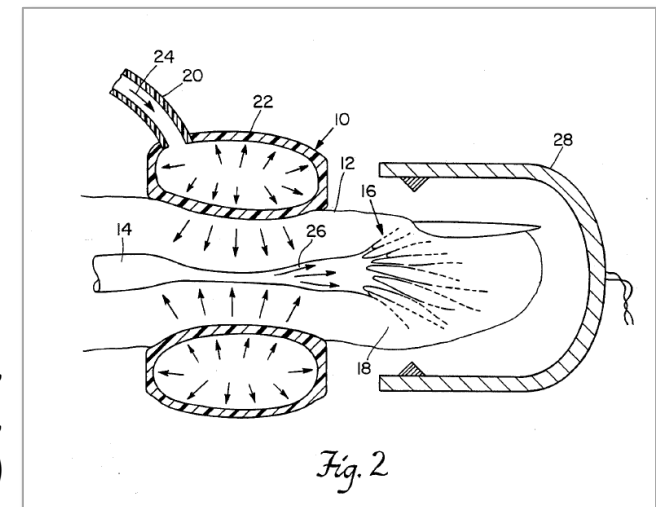
(Paper 01 (735), p. 63)

A PHOSITA Would Know that Cuffs Squeeze Arteries

96. Additionally, Petitioner and Dr. Yanulis were correct that a POSITA would be motivated to substitute Money's pulse oximetry cuff transducer with a pulse oximetry sensor that does not also engage an artery using a cuff. A POSITA would know that a "cuff" in the medical field is a device that constricts an artery. EX1057, 1:44:56. Some pulse oximetry systems were known to both constrict a blood vessel to measure pulse oximetry. EX1057, Abstract, 1:42-48. However, it is not required to constrict a blood vessel to measure pulse oximetry, and pulse oximetry can be measured using light without constricting a blood vessel. EX1057, 1:7-39; EX1006, 1:15-21. So, the use of a pulse oximetry *cuff* transducer would be unnecessary and uncomfortable for the patient because the cuff would squeeze a body part and constrict a blood vessel while frequently measuring SpO₂. EX1057, FIG. 2. Constricting a blood vessel is further uncomfortable for patients because constricting a blood vessel results in a throbbing feeling or paresthesia. So, knowing that pulse oximetry can be measured without an uncomfortable cuff and without constricting an artery, I agree with Dr. Yanulis that a POSITA would be motivated to substitute Money's pulse oximetry cuff transducer with a pulse oximetry sensor that omits the cuff. EX1003, ¶ 195. The result of the substitution

EX1040 (735), ¶ 96
(Paper 25 (735), p. 26)

- SpO₂ sensors that squeeze arteries were known
- SpO₂ could be accurately measured without squeezing an artery
- Knowing this, a PHOSITA would have been motivated to substitute the cuff for a more comfortable option for the patient
 - Paper 01 (735), pp. 63-64, Paper 25 (735), p. 26-27



EX1057 (735),
Abstract, 1:42-48,
(Paper 25 (735), p. 26)

Money Describes an SpO₂ sensor that squeezes an artery

- SpO₂ sensor without cuffs were known and typically transmitted analog data
- Analog data is preferred for SpO₂ sensors because SpO₂ sensors can transmit continuous data
 - EX1008, 5:38-43; Paper 01 (735), p. 72; EX1057; EX1003 (623), ¶ 195; Paper 01 (623), pp. 79-80

Pulse oximeter interface circuit 24 receives raw data from a conventional pulse oximeter cuff transducer 39. A separate voltage converter 18 is used to deliver regulated DC power to pulse oximeter interface circuit 24.

Non-invasive blood pressure data is received from a blood pressure cuff transducer 70 by blood pressure interface circuit 25.

EX1008, 5:38-43;
Paper 01 (735), p. 72

291. Instead, a PHOSITA would have obviously been motivated to modify the pulse oximetry receiving circuitry 24 so that the monitor 10 receives the continuous, analog signals from the analog SpO₂ sensor 112 of Akai. EX1007, 5:30-34. Kiani teaches that finger-positioned pulse oximetry sensors, like the

EX1003 (623), ¶ 195;
Paper 01 (623), pp. 79-80

Money efficiently uses a dual-purpose Serial Port/Interface

- A PHOSITA would have been motivated to continue using the dual-purpose RS232 port/interface for efficient usage of a port
- Continuing to use the RS232 port would mean receiving digital data from at least one sensor
- Sensors measuring discrete data are the best candidates (temperature) for digital transmission
 - Paper 01, pp. 73-76, EX1003, ¶¶ 220-224, Paper 25 (735), p. 26-27, EX1040 (735) , ¶¶ 98-99

there are seven semaphores. The Serial semaphore is used as a resource lock so that the DEBUG and pulse oximetry (SpO₂) tasks can share the same serial port. The SpO₂

EX1008, 11:51-53;
(Paper 25 (735), p. 26)

Accordingly, a serial data I/O interface unit **17** is provided in device **10** to allow the user to use the serial communications interface (SCI) port on processor **14** to communicate with an external terminal for either debugging and programming purposes, or to receive data from pulse oximetry cuff transducer **39**.

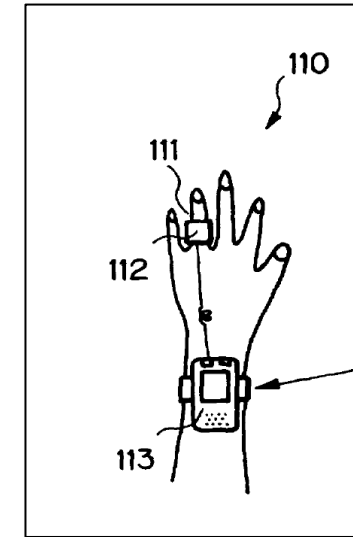
EX1008, 6:15-20;
(Paper 01 (735), p. 75)

Fiber Optic Cable

Masimo Mischaracterizes the Petition

Petitioner Never Suggested Using Akai's cable

- Petitioner argued it would have been obvious to substitute Money's SpO₂ sensor with an analog SpO₂ sensor
- Petitioner argued it would have been obvious to follow Akai's wire *positioning*
- Regardless, Akai teaches a wire, mentioning fiber optic only as an example. Akai teaches and connection using a flexible material (e.g., an electrical wire)
 - Paper 01 (735), 63-65; Paper 25 (735), p. 25



Akai, EX1007

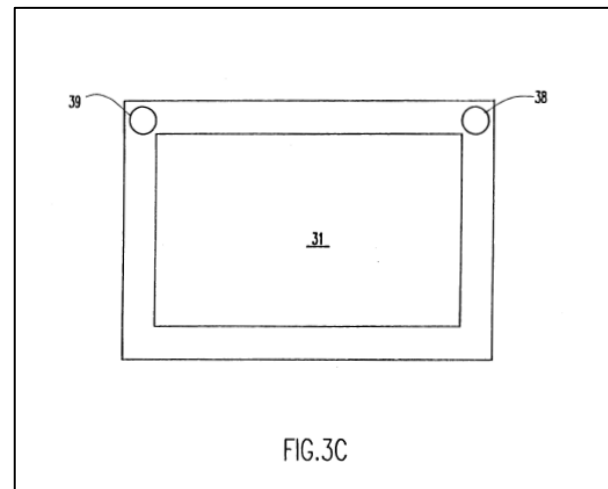
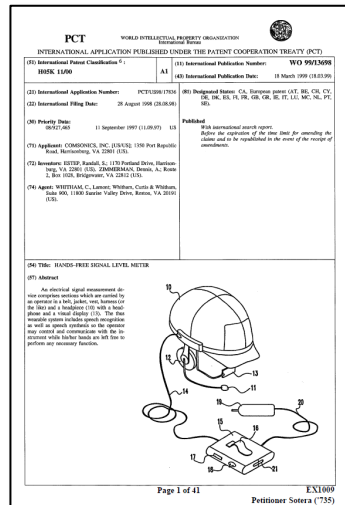
121, and emergency sound generating unit 122. Further, data processing unit 113 has an appropriate interface **such as an optic fiber** between itself and sensor unit 112. The connection between data processing unit 113 and sensor unit 112 is **made of a material having an appropriate flexibility.**

EX1007, 5:14-19; Paper 25 (735), p. 25

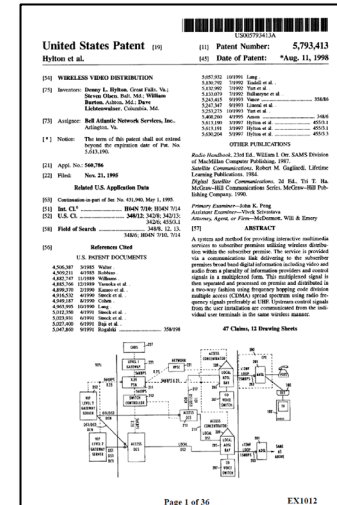
Non-Analogous Art

Neither Reference is Necessary, but Still Directed to the Same Problem

Non-Analogous Art – Estep and Hylton



EX1009 (735), FIG. 3C; Paper 01 (735), p. 48

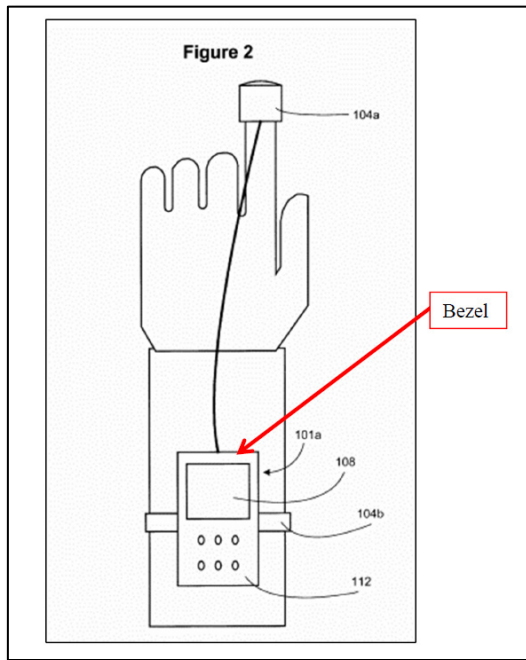


The MUX 1325 serves to multiplex a number of DS-1 signals for transmission over one fiber of an optical fiber pair 1335 to the HDT 1180 and to demultiplex signals received over the other fiber of the pair 1335. The fiber pairs between

EX1012 (623), 18:32-35; Paper 01 (623), p. 16

Estep – “Bezel”

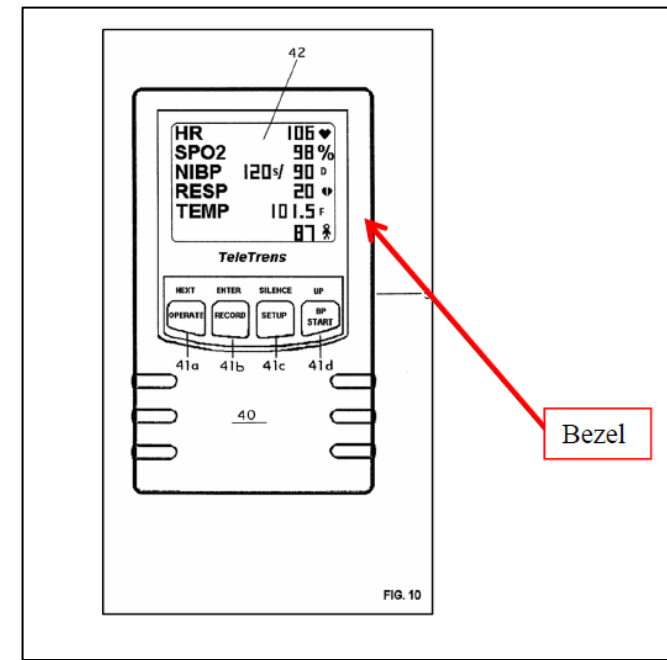
- Estep isn't necessary – Goldberg and Money both teach bezels alone



Paper 01 (735), p. 47; EX1005, FIG. 2

To the extent Estep is necessary for this combination (see Ex. 1003 ¶ 144), we will closely examine whether Estep's electrical signal measurement device used to measure the characteristics of electrical signals, such as radio frequency signal level, is analogous art. See Ex. 1009, 1:5–11.

Paper 13 (735),
p. 45



Paper 01 (735), p. 91; EX1008, FIG. 10

Hylton – “Multiplexer”

- Hylton isn’t necessary – Goldberg and Money both teach multiplexers alone
- Multiplexer had one function: combining multiple signals into one signal
 - Goldberg and Money both teach that multiple signals are combined into one signal for wireless transmission
 - A multiplexer was the known electrical component to perform this electrical function
 - Hylton merely demonstrates this well-known fact
 - Paper 01 (623), p. 59, 95, Paper 24 (623), pp. 26-27

173. This claim limitation claims the well-known functionality of a multiplexer. All multiplexers do what is claimed. Thus, this limitation is merely claiming a multiplexer.

174. Goldberg almost certainly includes a multiplexer. Even if it didn’t, multiplexers were so well-known that inclusion of a multiplexer in any circuitry, whether in the medical field or not, would be obvious to any PHOSITA. Thus, Goldberg teaches a multiplexer, or it would have been obvious to include a well-known multiplexer to perform the multiplexer functions claimed. The results would be predictable because, as I said, the claimed function is simply performing the function of a multiplexer.

EX1003 (623), ¶¶173-175
Paper 01 (623), p. 84

Estep – Analogous Art

- Estep’s bezel was directed to including a display on a wearable device; ‘735 and ‘623 Patents also directed to including a display on a wearable device
- Estep surrounds a display with a bezel
- Reasonably pertinent to the problem the inventor was trying to solve

Paper 24 (623), pp. 25-26

“In determining whether a reference is reasonably pertinent to the problem, ‘[i]t is necessary to consider ‘the reality of the circumstances’ ... in other words, common sense.’”

Ex Parte John Lamperd & Lloyd Kaiser, Appeal 2014-001795, 2015 WL 8166000, at *4 (P.T.A.B. Nov. 24, 2015).

Paper 24 (623), p. 26

Hylton – Analogous Art

- Hylton's multiplexer was directed to the problem of combining multiple signals for transmission
- The '623 and '300 Patents were also directed to the problem of combining multiple signals for transmission
- Hylton combines multiple signals for transmission using a multiplexer
- Reasonably pertinent to the problem the inventor was trying to solve
 - Paper 24 (623), p. 26

one, which is the well-known function of a multiplexer. Paper 1, p. 49. Indeed, common sense can supply *unusually simple* limitations, as here. *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1362 (Fed. Cir. 2016).

Paper 24 (623), p. 26

Claim Construction

“sensor port”; “sensor communication port”

Proposed Claim Constructions

- The Board invited the parties to construe the term “sensor port” if the term has a special meaning
 - Paper 15 (108), p. 22.
 - Masimo’s construction: “a connector that mates with a compatible connector from a sensor”
 - Paper 22 (108), p. 17
 - Petitioner’s construction: “a permanent or removable input/output interface for a sensor”
 - Paper 26 (108), p. 5

No Reason to Construe “Sensor Port”

- Construction of this term is not case dispositive
 - Masimo does contend the ports known in the prior art and taught by at least Kiani are different than the claimed ports, as construed.
 - Masimo’s expert admitted that ports, as construed, were known
 - Claim differentiation refutes Masimo’s position that ports were inherently removable
 - Paper 26 (108), p. 1-3

3 Yes, within the context of the '735
4 technology, those types of ports were known in
5 2002.

EX1042, 23:3-5

108 Specific Issues

Issues Specific to Using Akai as a Primary Reference Rather than Money

All Akai Embodiments Build Off Each Other

- Akai omits description of features previously described
 - Paper 26 (108), p 23.
- Akai does not teach internal sensors because the first embodiment taught an external sensor
 - Paper 26 (108), p 23.

Since the processing operation of the physical data by CPU 321 in this third embodiment is similar to those in the monitoring systems of the first and second embodiments, the same description will not be repeated here. However, in addition to the already described fea-

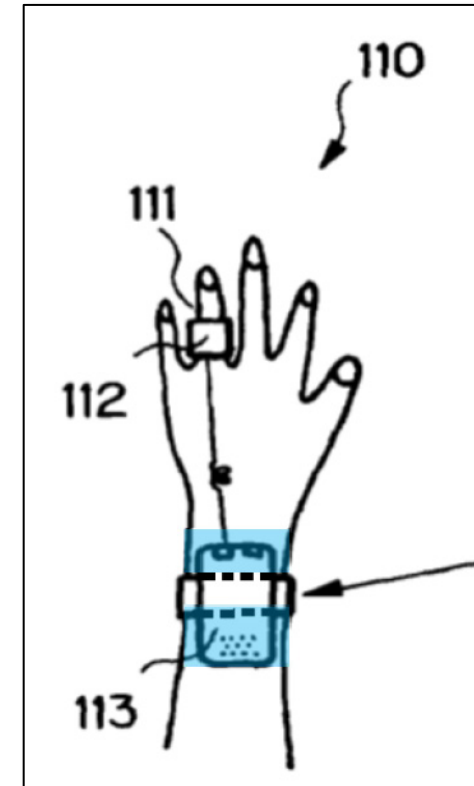
EX1007, 11:23-27, Paper 26, p. 23

While three illustrative embodiments of the invention have been shown and described, numerous variations and alternate embodiment will occur to those skilled in the art. Such variations and alternate embodiments are contemplated, and can be made without departing from the spirit and scope of the invention as defined in the appended claims.

EX1007, 11:32-38, Paper 26, p. 24

Akai's Strap Being on the Back would not Block Any Sensors

- Sensors requiring skin contact would obviously exist in the blue area without being covered by the strap
 - Paper 26 (108), p 26



EX1007, FIG. 1, Paper 26 (108), p 26

Representative Claims

Claim 1, '735 Patent

1. A body worn mobile medical monitoring device configured to minimize cable wiring from a sensor by placement of one or more sensor communication ports, the mobile medical monitoring device comprising:

- a housing configured to be secured on a lower arm of a patient being monitored via a strap extending around the lower arm of the patient;
- a display positioned on a face of the housing, opposite the strap, so as to be visible to a user;
- a first sensor communication port positioned on a side of the housing and configured to face a hand of the lower arm of the patient when the mobile medical monitoring device is mounted to the lower arm of the patient, wherein:
 - the side of the housing faces the hand of the lower arm of the patient of the patient when the mobile medical monitoring device is mounted to the lower arm of the patient,
 - the first sensor communication port is configured to provide wired communication with a pulse oximetry sensor attached to a digit of the hand of the patient,
 - the wired communication with the pulse oximetry sensor provided at least partly in the analog domain, and

the first sensor communication port is positioned on the side of the housing such that a path from the first sensor communication port on the side of the housing to the digit of the patient is substantially perpendicular to the side of the housing and shorter than any other path from any other side of the housing to the digit of the patient;

- a plurality of additional sensor communications ports positioned on the housing and configured to provide wired communication with a plurality of additional physiological sensors at least partly in the digital domain; and
- one or more processors and a transmitter configured to:
 - display, on the display, physiological measurements derived from the pulse oximetry sensor and the plurality of additional physiological sensors; and
 - wirelessly transmit information indicative of the physiological measurements to a remote computing device.

Claim 1, '108 Patent

1. An arm mountable portable patient monitoring device configured to receive physiological information from a plurality of sensors attached to a patient at at least two different measurement sites via wired connections for on-patient monitoring of parameter measurements and wireless transmission of parameter measurements to separate monitoring devices, the portable patient monitoring device comprising:

- a housing configured to be secured to an arm of a patient under measurement;
- a strap mountable to a back side of the housing and configured to secure the housing to the arm of the patient;
- a display positioned on a front side of the housing, the display configured to show at least one status indicator of the portable patient monitoring device and one or more parameter measurements;
- a first sensor port positioned on a first side of the housing, the first side of the housing configured to face toward a hand of the arm of the patient when the housing is secured to the arm of the patient, the first sensor port configured to electrically receive a signal from a pulse oximetry sensor via a wired connection from the pulse oximetry sensor to the first sensor port, the wired connection configured to extend from the first sensor port along a path substantially perpendicular to the first side of the housing;

- a second sensor port positioned on the housing and configured to receive a signal from a second sensor arrangement via a wired connection;
- a third sensor port positioned on the housing configured to receive a signal from a third sensor arrangement via a wired connection;
- one or more signal processing arrangements configured to:
 - receive the signal from the pulse oximetry sensor; and
 - cause to be displayed, on the display, at least measurements of oxygen saturation and pulse rate derived from the signal; and
- a transmitter configured to:
 - wirelessly transmit information indicative of the measurements of oxygen saturation and pulse rate to a separate monitoring device configured to receive the information indicative of the measurements of oxygen saturation and pulse rate.

Thank you