UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TCT MOBILE (US), INC.; TCT MOBILE (US) HOLDINGS, INC.; HUIZHOU TCL MOBILE COMMUNICATION CO. LTD.; AND TCL COMMUNICATION, INC.,
Petitioners

v.

FUNDAMENTAL INNOVATION SYSTEMS INTERNATIONAL LLC,
Patent Owner

U.S. Patent No. 7,239,111
Issue Date: July 3, 2007
Title: UNIVERSAL SERIAL BUS ADAPTER FOR A MOBILE DEVICE

Case No. IPR2021-_____

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT 7,239,111 CHALLENGING CLAIMS 1-14, AND 16-18 UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104

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1017	Japanese Patent Application No. 2000-165513A ("Morita")
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I. INTRODUCTION

TCT Mobile (US), Inc.; TCT Mobile (US) Holdings, Inc.; Huizhou TCL Mobile Communication Co. Ltd.; and TCL Communication, Inc. ("Petitioners") file this petition for *inter partes* review of claims 1-14, and 16-18 (the "Challenged Claims") of U.S. Patent No. 7,239,111 (the "'111 Patent") on the grounds that they are unpatentable under 35 U.S.C. §103.

The Challenged Claims relate to an adapter or charger that uses industry standard Universal Serial Bus ("USB") ports and connectors to provide power to a mobile device. Providing power through USB ports and connectors was well understood and routine by the priority date of the '111 Patent and taught in the USB Specification. The Challenged Claims purport to "invent" a charger that no longer maintains requirements for enumeration, a series of communication steps between an USB host or hub and a connected device, imposed on USB interfaces by the existing USB Specification to change a port from low-power to high-power. The Challenged Claims essentially do nothing more than allow a charger to provide power through a disabled USB interface where back and forth communications (enumeration) with a connected mobile device are not possible. Rather, in order to indicate to the mobile device that the adapter does not follow the USB Specification, and thus cannot communicate with the mobile device, the Challenged Claims disclose an identification signal, a signal that identifies communication is disabled as taught in the USB Specification.

The Examiner who allowed the Challenged Claims was not made aware of the extensive prior art that already discloses USB adapters that sends identification signals to indicate the absence of a typical USB host or hub. For example, Japanese Patent Application No. 2000-165513A ("Morita"), titled "Charger," discloses a USB charger for charging a mobile device, a mobile videophone device, with identification signal that can indicate the absence of a typical USB host or hub. None of the references that form the grounds of this Petition were disclosed to the Examiner during prosecution.

Because there is a reasonable likelihood that Petitioners will prevail with respect to these claims, Petitioners respectfully request that the Board institute *inter partes* review.

II. SUMMARY OF CHALLENGE 37 C.F.R. §42.104(B)

Petitioners requests that the Board review and cancel claims 1-3, 6-8, and 16-18 of the'111 Patent based on the following grounds.

Ground	Claims	Basis	References
1	1-14, 16-18	pre-AIA 35 U.S.C. §103(a)	Morita and the knowledge of a POSITA

III. INSTITUTION SHOULD BE GRANTED; DISCRETIONARY DENIAL IS NOT APPROPRIATE

Petitioners have established a reasonable likelihood of success on the merits and all other requirements for IPR have been met. The Board should institute IPR.

As explained below, the Board should not exercise its discretion to deny institution under 35 U.S.C. §§ 314(a) or 325(d). If the Board considers exercising its discretion to deny institution, however, Petitioner respectfully requests leave to file a reply to address any discretionary denial arguments made by Patent Owner in its preliminary response.

A. The *Apple/Fintiv* Factors Support Institution

There is a parallel district court proceeding involving the '111 Patent before Judge Connolly in the District of Delaware. Ex. 1018. The complaint was filed in April 23, 2020. However, the *Apple/Fintiv* factors support institution despite the existence of the Delaware litigation. *Apple Inc. v. Fintiv, Inc.,* IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020).

First, potential for a district court stay, is neutral or weighs in favor of institution. Neither party has requested a stay,[1] so at worst this factor is neutral because the Board "will not attempt to predict" how the district court will proceed. *Sand Revolution II, LLC v. Continental Intermodal Group5 Trucking LLC,* IPR2019-

[1] Petitioner does intend to move for a stay of the Delaware district court case.

01393, Paper 24 at 7 (PTAB June 16, 2020) (informative). Congress, however, intended for district courts to be liberal in granting stays pending PTAB proceedings, especially in cases where petitioners moved quickly after service of a complaint. 157 Cong. Rec. S1363 (Mar. 8, 2011) (Sen. Schumer) (Congress placed "a very heavy thumb on the scale in favor of a stay being granted"). Given that Petitioners have moved expeditiously (*see* factor 2 discussion below), this factor favors institution. Furthermore, Judge Connolly has consistently granted stays in similar patent litigation cases, especially those where the petitions are instituted. *See, e.g., Allergen USA, INC. v. Prollenium US Inc.,* No. 1:20-cv-00104, Dkt. No. 34 (D. Del. July 16, 2020); *Uniloc 2017 LLC v. Vudu, Inc.*, No. 1:19-cv-00183, Dkt. No. 72 (D. Del. Mar. 26, 2020).

Second, the proximity of the trial date to the final written decision, weighs in favor of institution. The Court has scheduled a *Markman* hearing for June 23, 2021. Before the time that the Court issues a *Markman* decision, the PTAB will likely have already made an institution decision. If the PTAB institutes trial, Judge Connolly consistently grants stays in that instance. *See id*. Even in the unlikely case that Judge Connolly does not grant a stay, the trial date is scheduled for October 17, 2022. This is several months after the PTAB's expected final written decision based on this Petition's filing date of December 31, 2020, which would tentatively calendar an institution date of approximately July 1, 2021 and final written decision date of approximately July 1, 2022 (depending upon the accorded filing date).

Third, investment in the parallel proceeding, weighs in favor of institution. Discovery will still be in the early stages, with the deadline not until December 17, 2021. It is unlikely that any fact depositions will have taken place before the institution decision. Further, as stated above, it is unlikely that the district court will have issued a *Markman* ruling by the time of the institution decision, and little to no Court resources will have been devoted to analyzing prior art invalidity issues. Again, the parallel district court litigation is likely to be stayed once the present Petition is instituted.

Furthermore, as part of a holistic analysis, the Board considers the speed with which the petitioner acted. *Apple Inc. v. Seven Networks, LLC,* IPR2020-00156, Paper 10 at 11-12 (PTAB June 15, 2020). In cases where the petitioner acted diligently and without meaningful delay, as here, any investment of the parties in the parallel district court litigation is mitigated. *HP Inc. v. Neodron LTD,* IPR2020-00459, Paper 17 at 40 (PTAB Sept. 14, 2020). Here, Petitioners filed this Petition within about four months of the Answer date, and roughly two months after Patent Owner served preliminary infringement contentions. Such diligence favors institution.

Fourth, overlap of issues, is neutral or weighs for institution. The Petition challenges claims that are not asserted in the district court action. And while the petition also challenges the same claims as the parallel district court proceeding, there is a high likelihood that Judge Connolly grants a stay upon institution. In the unlikely instance where a stay is not granted, a final written decision will still issue before the beginning of trial. The final written decision, once issued, will trigger estoppel for in the district court litigation for grounds that were raised or reasonably could have been raised. See 35 U.S.C. §315(e)(2).

Fifth, whether the parties are the same, weighs in favor of institution. The parties with respect to this Petition are the same as those engaged in the parallel district court case.

Finally, other circumstances strongly favor institution. Petitioners advance a targeted Petition with one ground centered on a prior art reference that has never been submitted to the Board previously. The strength of the present Petition strongly weighs in favor of institution. The ’111 Patent has been asserted against several large electronics companies such as Belkin, Lenovo, and Petitioners. Patent Owners assert that USB adapters, which are ubiquitous, and the mobile devices they charge infringe the ’111 Patent and related patents. Given the substantial impact that the ’111 Patent and related patents could have on the mobile device industry, it is in the public interest to address invalidity, especially under new prior art never before submitted to the Board. And as the Supreme Court recently explained, there is a significant public interest against "leaving bad patents enforceable." *Thryv, Inc. v. Click-To-Call Techs., LP*, 140 S. Ct. 1367, 1374 (2020).

B. The General Plastics Factors Support Institution

The *General Plastics* factors support institution despite earlier IPRs being filed by other, unrelated entities. *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 (P.T.A.B. Sept. 6, 2017); *see also* Section X.B (Related Matters). First, the current Petitioner (and the real parties-in-interest) are different from the prior petitioners; nor is there any relation between the current and prior petitioners. *Id.* Second, because when the earlier petitions were filed the current Petitioner had not been sued or provided notice of alleged infringement, the current Petitioner did not know of the prior art in this Petition when the earlier petitions were filed (nor did it have any reason to search for the prior art). *Id.* Third, while the preliminary responses and decisions from the earlier IPRs did issue before the filing of the current Petition, this timing is the result of Patent Owner not suing the current Petitioner until after said issuance and is thus not the result of current Petitioner's delay. *Id.*; *Microsoft Corp. v. Uniloc 2017, LLC*, IPR 2019-01252, Paper 7 at 8-9 (PTAB Dec. 20, 2019). Fourth, Petitioner was diligent in filing the current petition as well as promptly moving to file petitions on the other asserted patents after receiving Patent Owner's selection of claims. Section X.B;

LG Electronics, Inc. v. Bell Northern Research, LLC, IPR 2020-00319, Paper 15 at 13 (PTAB June 23, 2020).

C. The Factors Under 35 U.S.C. § 325(d) Support Institution

The factors under 35 U.S.C. §325(d) also support institution. The primary reference, Morita, was not before the Examiner during prosecution and was not asserted in any of the previous IPRs involving the patent at issue. And the prior art establishing that using a logic high value on the USB data lines was a known identification signal, *see* Sections VI.A-B, was also not before the Examiner. Indeed, Section IV.B explains that Applicant was able to obtain allowance by amending the claims to include limitations requiring an identification signal, *e.g.*, logic high value on the data line (an SE1 signal). But this Petition shows that using such a signal state was not only known but was a natural and obvious selection among the finite options of the USB interface. *See, e.g.*, Sections VI.A-B, VIII.A.1.e.

IV. OVERVIEW OF THE '111 PATENT

A. Disclosure of the '111 Patent

The '111 Patent (Ex. 1001) generally relates to "[a]n adapter for providing a source of power to a mobile device through an industry standard port." '111 Patent, 2:3-4. The '111 Patent states that this can be achieved by the transmission of an identification signal from the adapter to the mobile device. *Id.*, 6:23-42; 9:3-8.

Specifically, the '111 Patent discloses an identification signal, such as the application of "voltages on both the D+ and D- lines of the USB connector [that] are greater than 2 volts," which allows the mobile device to determine that "the device connected to the USB connector 54 is not a typical USB host or hub and that a USB adapter 100 has been detected." *Id.*, 9:35-38. Once the mobile device receives the identification signal, the mobile device can draw power from the USB adapter, while bypassing the USB handshaking process, *i.e.*, enumeration, imposed by the USB Specification. *Id.*, 9:39-42.

Figure 2, reproduced below, is a schematic diagram of the disclosed USB adaptor, 100, coupled to an exemplary mobile device, 10. *Id.*, 6:55-57. The adapter, 100, uses USB connector, 102, to charge mobile device, 10, through USB connector, 54. *Id.*, 7:4-8. The USB adapter, 100, receives power through plug unit 106 from standard power sockets used in North America, UK, and other power sockets. *Id.*, 7:4-8, Figure 2. Power converter, 104, receives energy from a power socket and converts it to +5V to provide energy output to the mobile device on USB pins VBUS and GND. *Id.*, 7:12-26. The '111 patent also states "Optionally, the USB adapter 100 could also transfer energy from the power converter 104 to the auxiliary USB connector 112 thereby providing a device coupled to the auxiliary USB connector 112 with power." *Id.*, 8:60-64. In other words, the USB adapter taught in the '111 patent can provide power via USB connectors ***to both*** the mobile device connected to USB connector 102 and another device connected to USB connector 112.

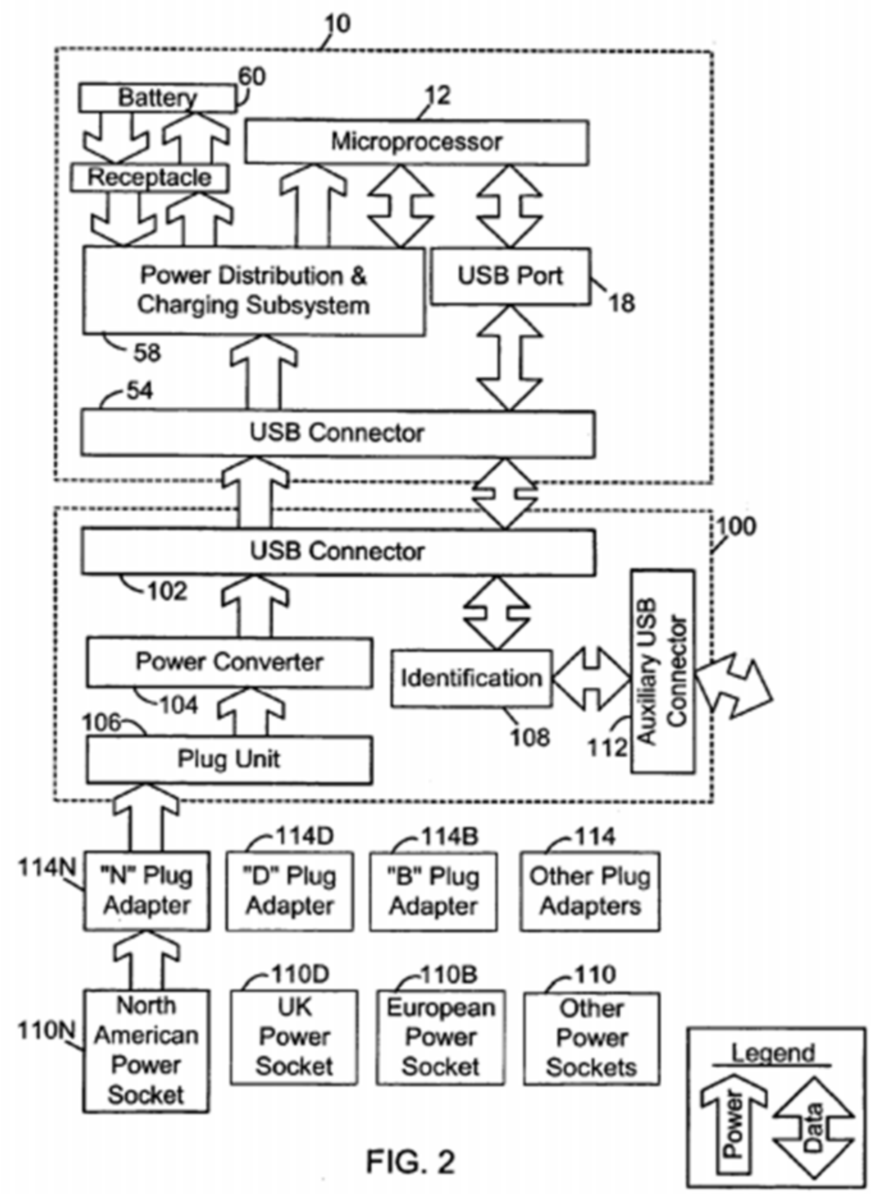

FIG. 2

B. Prosecution History of the ’111 Patent

The ’111 Patent issued from U.S. Patent Application No. 11/175,885, filed on July 6, 2005. ’111 File History (Ex. 1002), 96.

On October 20, 2005, the Examiner rejected claims 1, 2, 4, 6-18 under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 6,130,518 ("Gabehart") (Ex. 1005) and rejected claims 3 and 5 as being obvious over Gabehart under 35 U.S.C. §103(a). *Id.*, 85-89.

In the response filed on January 20, 2006, the Applicants traversed the rejections without making amendments to the claims. Applicants argued that Gabehart does not disclose transmitting an identification signal that is configured to indicate that the power source is not a USB host or hub. *Id.*, 81-84.

In the non-final rejection dated April 4, 2004, the Examiner rejected claims 1, 2, 4, and 6-18 under 35 U.S.C. §102(a) as anticipated by U.S. Patent Application 2004/0215878 ("Veselic") (Ex. 1006) and rejected claims 3 and 5 as being obvious over Veselic under 35 U.S.C. §103(a). *Id.*, 75-77.

In the response dated June 15, 2006, the Applicants noted that the application claims priority to two provisional applications, the latest of which was dated October 23, 2001. Applicants argued that because Veselic has an earliest possible priority date of June 11, 2003, Veselic is not prior art. *Id.*, 54-55.

In the non-final rejection dated August 24, 2006, the Examiner provisionally rejected claims 1-18 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over the claims of co-pending Application No. 10/087,628 (now U.S. 6,936,936) (Ex. 1007). *Id.*, 44-47. Applicant subsequently filed a terminal disclaimer on November 22, 2006. *Id.*, 42. The terminal disclaimer was approved on February 20, 2007. Notices of Allowances and Allowability followed on March 8, 2007. *Id.*, 26-29. No reasons for allowance were indicated.

C. Priority Date

The '111 patent claims priority through a series of continuations to two provisional applications: (1) the '021 provisional (Ex. 1008), filed March 1, 2001; and (2) the '486 provisional (Ex. 1009), filed October 23, 2001. Thus, the earliest potential priority date is March 1, 2001.[2]

V. PERSON OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art ("POSITA") of the subject matter of the '111 Patent would have had either (i) a bachelor's degree in electrical engineering, computer science, or a related field, plus 3-5 years of experience in design of systems with Universal Serial Bus ("USB") or equivalent buses that follow the USB 2.0 and earlier specification, or (ii) a master's degree in electrical engineering, computer science, or a related field, plus 1-2 years of experience in design of systems with USB or equivalent buses that follow the USB 2.0 and earlier specification at the time of the '111 Patent's priority date. Along with this petition, Petitioner submits the

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[2] The Patent Owner in the district court case has asserted that the claims are entitled to the October 23, 2001 priority date. Regardless, the prior art cited herein is prior art to either date.

declaration of Dr. R. Jacob Baker, who has been a POSITA since at least the '111 Patent's claimed priority date. Baker, ¶68. (Ex. 1003).

VI. SUMMARY OF THE PRIOR ART

All elements of the challenged claims were well-known in the prior art before the priority date. Baker, ¶¶69-90, 93-96, 110-152. Simply put, there is nothing novel or non-obvious about the alleged invention of the challenged claims.

A. Background of USB Technology and USB Specification Prior Art

The Universal Serial Bus Specification, Revision 1.1, ("USB 1.1") (Ex. 1010) was published by the USB Implementers Forum, Inc. on September 23, 1998.[3] Baker, ¶69.

Figure 4-1, below, shows the bus topology for a USB system. "There is only one host in any USB system. The USB interface to the host computer system is referred to as the Host Controller. The Host Controller may be implemented in a combination of hardware, firmware, or software. A root hub is integrated within the host system to provide one or more attachment points." USB 1.1 at 16. The key take-away from this statement in USB 1.1 is that a host, with a root hub, is required in a functioning USB system. Baker, ¶70. Connecting, for example as seen below, Hub 1 to a node (a node is a connected device, also called a "function") or Hub 2 without

[3] USB 1.1 was a well-known and widely available industry specification. Baker, ¶69.

connecting Hub 1 to the Host via the Root Hub will not resulting in a function, and communicating, USB system. *Id*.

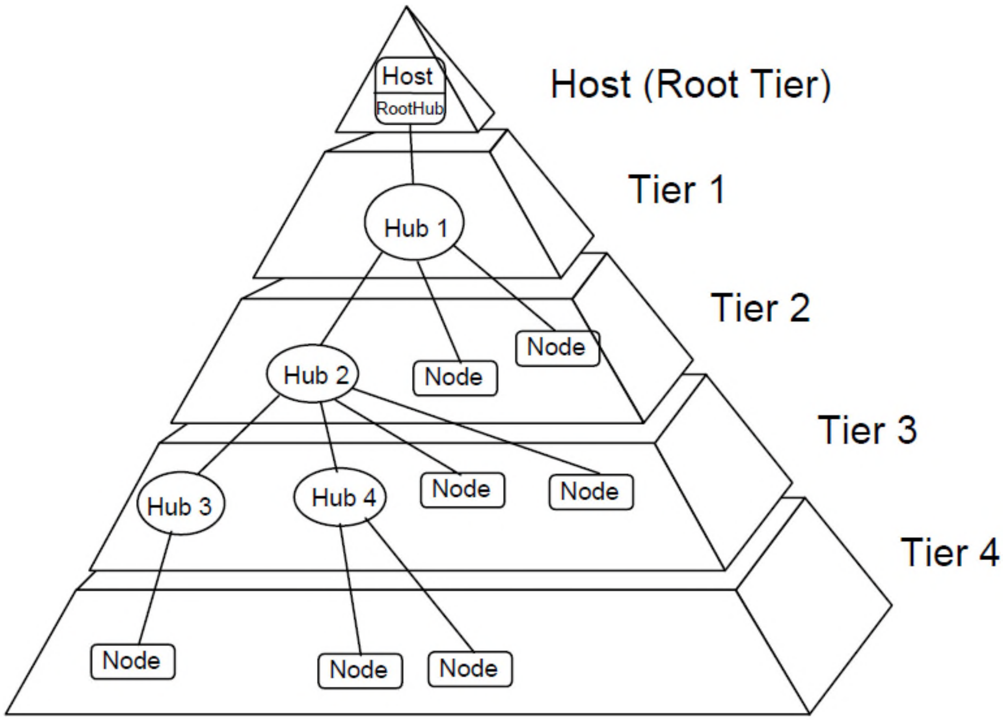


Figure 4-1. Bus Topology

USB 1.1 at 16.

USB 1.1 instructs that a USB device (*i.e.*, node or function) is plugged into a port on a hub using a cable. "A function is a USB device that is able to transmit or receive data or control information over the bus. A function is typically implemented as a separate peripheral device with a cable that plugs into a port on a hub." USB 1.1 at 23. The cable is connected between a USB connector on a USB device and a USB connector on a host or hub.

Figure 4-4 illustrates how hubs provide connectivity in a typical computer environment.

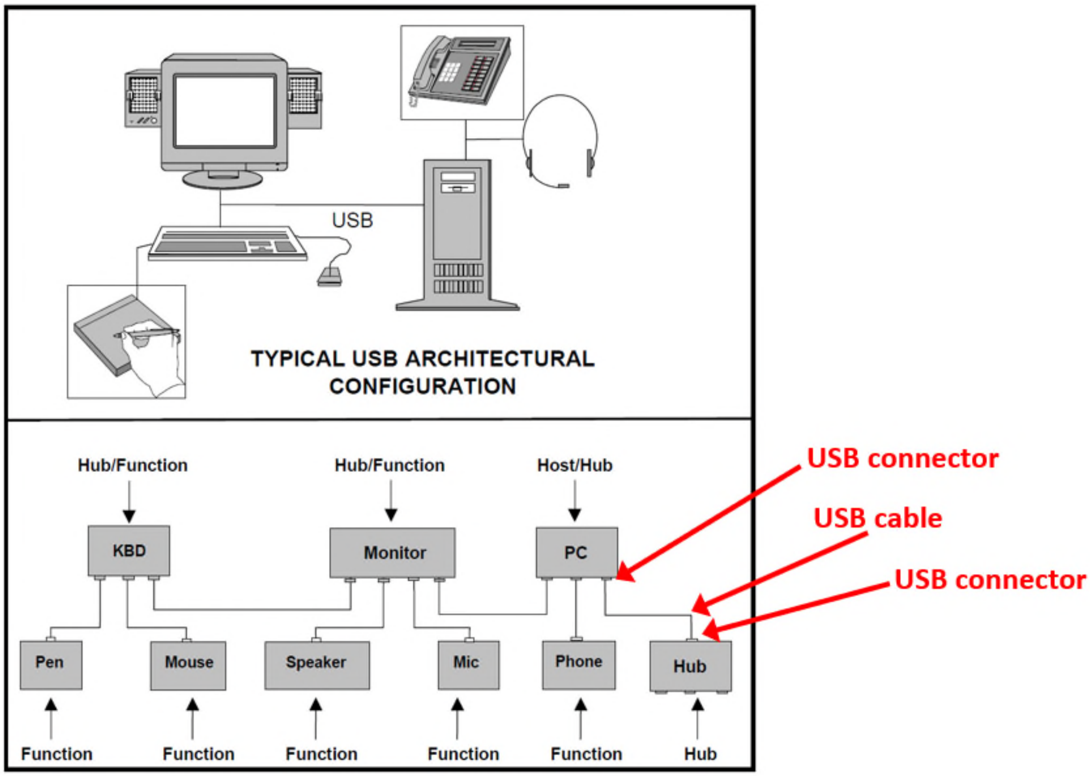


Figure 4-4. Hubs in a Desktop Computer Environment

USB 1.1 at 23 (annotated).

USB 1.1 teaches a POSITA how to implement a USB plug and that a USB connector includes four contacts: VBUS, D+, D-, and GND. Baker, ¶72.

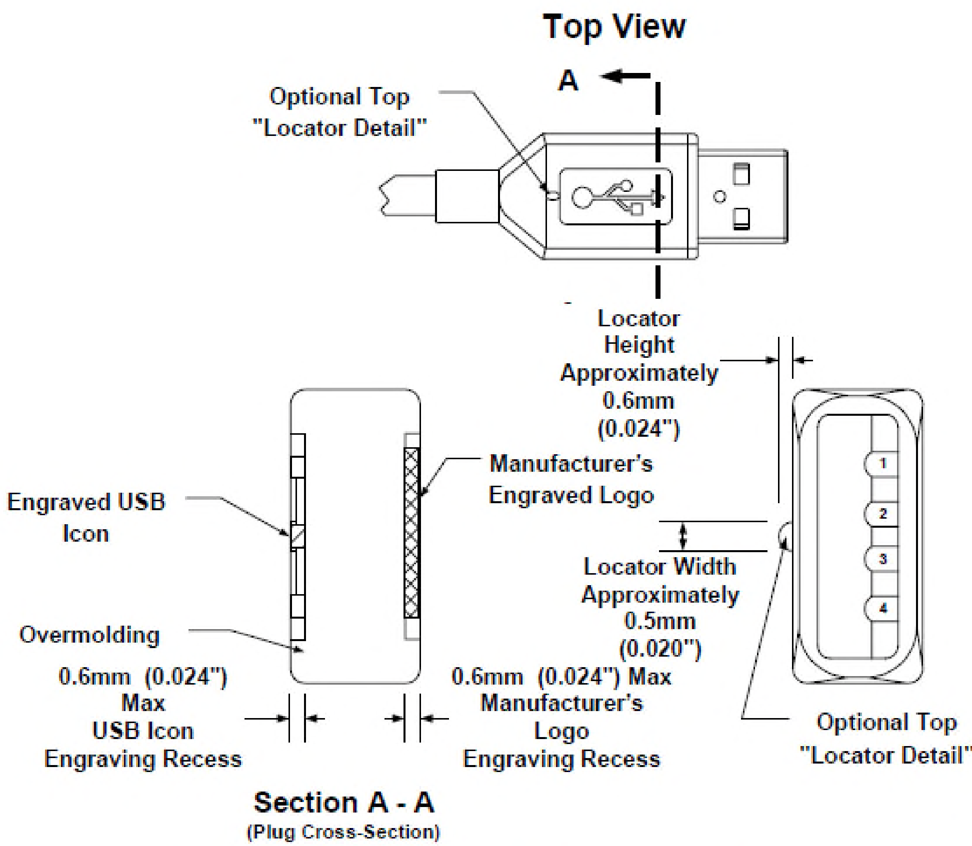


Figure 6-6. Typical USB Plug Orientation

Table 6-1. USB Connector Termination Assignment

Contact Number	Signal Name	Typical Wiring Assignment
1	VBUS	Red
2	D-	White
3	D+	Green
4	GND	Black
Shell	Shield	Drain Wire

USB 1.1 at 81 and 82.

USB 1.1 "describes the bus attributes, the protocol definition, types of transactions, bus management, and the programming interface required to design and build systems and peripherals that are compliant with this standard." USB 1.1 at 1. The standard also describes that power is supplied on the VBUS line and the associated current limits and minimums:

Table 7-5. DC Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Max.	Units
Supply Voltage:					
High-power Port	VBUS	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	VBUS	Note 2, Section 7.2.1	4.40	5.25	V
Supply Current:					
High-power Hub Port (out)	ICCPRT	Section 7.2.1	500		mA
Low-power Hub Port (out)	ICCUPT	Section 7.2.1	100		mA
High-power Function (in)	ICCHPF	Section 7.2.1		500	mA
Low-power Function (in)	ICCLPF	Section 7.2.1		100	mA
Unconfigured Function/Hub (in)	ICCINIT	Section 7.2.1.4		100	mA
Suspended High-power Device	ICCSH	Section 7.2.3 ; Note 15		2.5	mA
Suspended Low-power Device	ICCSL	Section 7.2.3		500	μA

USB 1.1 at 142.

To determine if a connected device is either a "High-power Function (in)" that may draw up to 500 mA or a "Low-power Function (in)" that may draw up to 100 mA a process called "bus enumeration" or simply "enumeration" is performed on the connected function (*i.e.*, device). Baker, ¶74; see also "Bus Enumeration - Detecting and identifying USB devices" USB 1.1 at 3. "At bus enumeration time, its (the attached functions) total power requirements are obtained and compared against the available power budget. If sufficient power exists, the remainder of the function may be powered on." USB 1.1 at 137. One key take-away from Table 7-5 is that while the input USB port of a function (device) may draw up to either 100 mA [Low-power Function (in)] or 500 mA [High-power Function(in)] the same limits do not apply for the output ports on a USB hub. Baker, ¶74. Rather, a "High-power Hub Port (out)" may supply in excess of 500 mA while a "Low-power Hub Port (out)" may supply in excess of 100 mA. *Id*.

USB 1.1 also indicates that the host is responsible for providing power to an attached USB device:

4.9 USB Host: Hardware and Software

The USB host interacts with USB devices through the Host Controller. The host is responsible for the following:

- Detecting the attachment and removal of USB devices
- Managing control flow between the host and USB devices
- Managing data flow between the host and USB devices
- Collecting status and activity statistics
- Providing power to attached USB devices.

The USB System Software on the host manages interactions between USB devices and host-based device software. There are five areas of interactions between the USB System Software and device software:

- Device enumeration and configuration
- Isochronous data transfers
- Asynchronous data transfers
- Power management
- Device and bus management information.

Whenever possible, the USB System Software uses existing host system interfaces to manage the above interactions.

USB 1.1 at 24 (annotated); *see also* Baker, ¶75.

Newer USB specifications, such as the USB 2.0 Specification (USB 2.0) (Ex. 1011), published on April 27, 2000, are fully backward compatible with devices built with previous versions of the specification, such as USB 1.1. Baker, ¶76.

Chapter 3
Background

This chapter presents a brief description of the background of the Universal Serial Bus (USB), including design goals, features of the bus, and existing technologies.

3.1 Goals for the Universal Serial Bus

The USB is specified to be an industry-standard extension to the PC architecture with a focus on PC peripherals that enable consumer and business applications. The following criteria were applied in defining the architecture for the USB:

- Ease-of-use for PC peripheral expansion
- Low-cost solution that supports transfer rates up to 480 Mb/s
- Full support for real-time data for voice, audio, and video
- Protocol flexibility for mixed-mode isochronous data transfers and asynchronous messaging
- Integration in commodity device technology
- Comprehension of various PC configurations and form factors
- Provision of a standard interface capable of quick diffusion into product
- Enabling new classes of devices that augment the PC's capability
- Full backward compatibility of USB 2.0 for devices built to previous versions of the specification

USB 2.0 at 11.

USB 1.1 discloses that an attached device can operate at "full-speed" or "low-speed." Baker, ¶77. USB 1.1 discloses "The speed of an attached device is determined by the placement of a pull-up resistor on the device (*see* Section 7.1.5)." USB 1.1 at 251. The specific nature of how D+ and D- are connected is discussed in detail below and in USB 1.1 "Hubs, and the devices to which they connect, use a combination of pull-up and pull-down resistors to control D+ and D- in the absence of their being actively driven. *Id*. These resistors establish voltage levels used to signal connect and disconnect and maintain the data lines at their idle values when not being actively driven." USB 1.1 at 256; Baker, ¶77.

USB 1.1 discloses "Full-speed devices are terminated as shown in Figure 7-10 with the pull-up resistor on the D+ line." and "Low-speed devices are terminated as shown in Figure 7-11 with the pull-up resistor on the D- line." USB 1.1 at 113. These figures are annotated below to show that a pull-up resistor, labeled R_{pu}, on the D+ line indicates a "full-speed device" while a pull-up resistor, also labeled R_{pu}, on the D- line indicates a "low-speed device." Baker, ¶78.

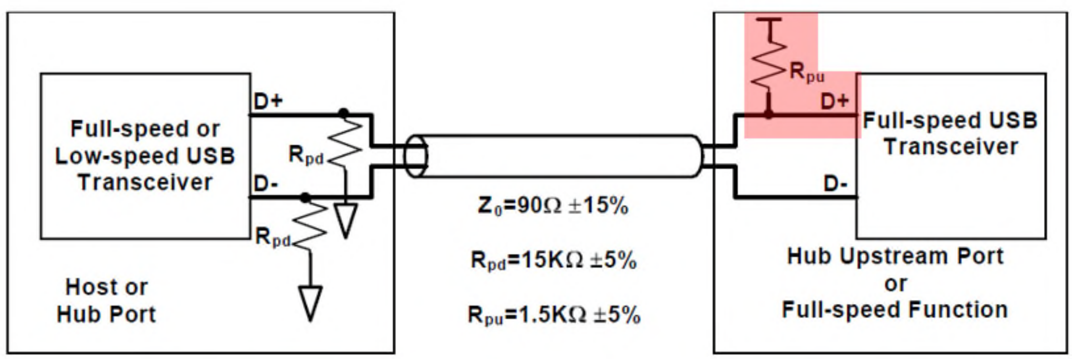


Figure 7-10. Full-speed Device Cable and Resistor Connections

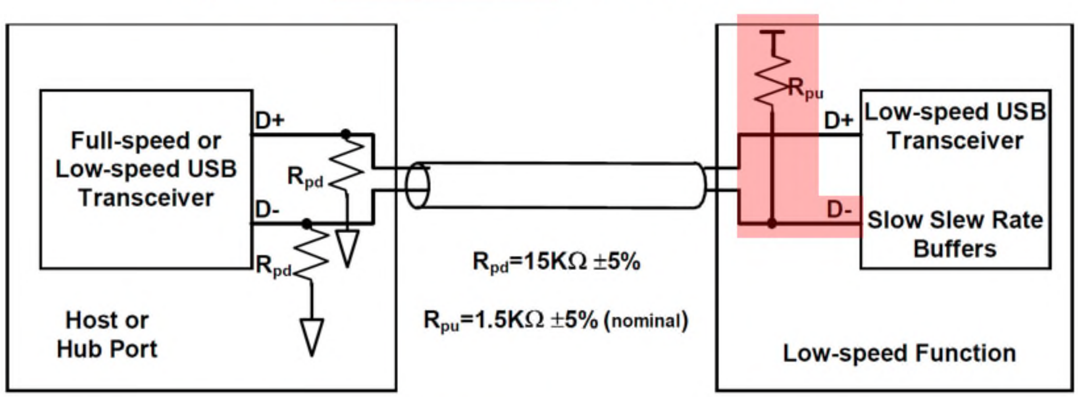


Figure 7-11. Low-speed Device Cable and Resistor Connections

USB 1.1 at 113 and 114 (annotated).

USB 1.1 also discloses that in the host or hub port "The pull-down terminators on downstream ports are resistors of 15kΩ+/-5% connected to ground." USB 1.1 at 113. These resistors are annotated below and labeled R_{pd}. Baker, ¶79.

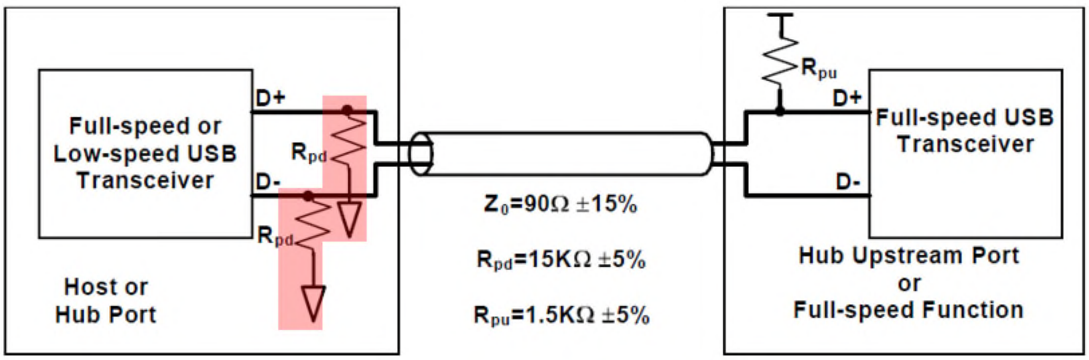


Figure 7-10. Full-speed Device Cable and Resistor Connections

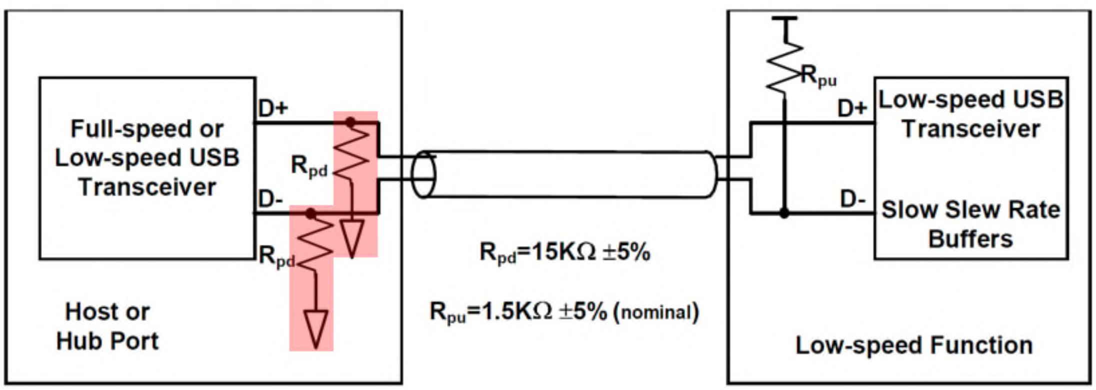


Figure 7-11. Low-speed Device Cable and Resistor Connections

USB 1.1 at 113 and 114 (annotated).

When no pull-up resistor, R_{pu}, is present on D+ and/or D- the corresponding line is pulled to ground through R_{pd}. Baker, ¶80. If both D+ and D- are at ground then no device is connected to the USB host or hub port. *Id.* If D+ is pulled high and D- is at ground the connected device operates in full-speed. *Id.* If D+ is at ground and D- is pulled high the connected device operates in low-speed. *Id*. If D+ and D- are to be used for communications by either full- or low-speed devices then their voltages should never intentionally be pulled high (above 0.8V) at the same time. *Id*. This is taught in the USB 2.0 specification "When determining the speed, full- or low-speed, the pull-up Low-speed and full-speed USB drivers ***must never "intentionally"*** generate an SE1 on the bus. SE1 is a state in which both the D+ and D- lines are at a voltage above VOSE1 (min), which is 0.8 V." USB 2.0 at 123 emphasis added;Baker, ¶80. While an SE1 is present on the data lines, the abnormal data line condition of D+ and D- both being high at the same time, communications are not possible. *Id*. This situation, SE1, is outside normal USB operation.

USB 1.1 states "if both D+ and D- are high at this time, the hub may stay in the Disabled state and set the C_PORT_ENABLE bit to indicate that the hub could not determine the speed of the device." USB 1.1 at 252. A POSITA would have understood that if both the D+ and D- contacts are high at the same time (SE1) in the USB connector on a USB host or hub port the speed of a connected device cannot be determined and thus communications between the host or hub and the connected device are not possible. Baker, ¶81.

The USB 1.1 further states "After the device has been powered, it must not respond to any bus transactions until it has received a reset from the bus. After receiving a reset, the device is then addressable at the default address." USB 1.1 at

178. The connected device, after being powered-up through the connection to the USB port though a USB cable, won't process commands until it receives a reset. Baker, ¶82. However, if the connected device can't communicate, because it's impossible for the host or hub to determine the communication speed, then the connected device can't receive a reset command and thus can't receive or process commands (to, for example, clear the set C_PORT_ENABLE bit which indicates the port speed can't be determined or to power-down). *Id*. **The device simply continues to receive power** via VBUS and GND and waits for the reset command, which it can never receive in this abnormal data line condition with both D+ and D- pulled high. *Id*.

A summary of the relationship between the D+ and D- levels on a USB connector and the port configurations discussed in this section is shown below:

D+	D-	Port configuration
Low	Low	No device connected
High	Low	Full-speed
Low	High	Low-speed
High	High	Abnormal condition (SE1)

B. Use of SE1 State in Various Contexts

As explained herein, the '111 Patent teaches pulling USB D+ and D- lines high (*e.g*., greater than 2V) as an identification signal, which identifies that the adapter and/or power socket is not a host or hub. '111 Patent, 9:3-42. As further explained herein, pulling D+ and D- high was well known and referred to as an SE1 condition or state in the USB specification. *See* Section VI.A above.

It was also well-known that one could use the SE1 condition as a signal in various contexts. Baker, ¶¶84-90. Indeed, a POSITA would have understood that the SE1 condition would be a logical choice for signaling information about a device without interfering with USB signaling because the SE1 is an abnormal condition outside the USB specification's teaching on USB communications. Baker, ¶84. Below are just a few prior art references that disclose using SE1 for this purpose.

1. US Patent 6,531,845 ("Kerai") (Ex. 1012)

U.S. Patent 6,531,845 was filed as Application No. 09/864,273 on May 25, 2001, claimed a priority date of May 26, 2000, and issued on March 11, 2003 to Kanji Kerai and Kalle Tuulos. Thus, Kerai is prior art under at least pre-AIA §102(e).

Kerai used a high state on USB D+ and D- for charging with a charging system. Kerai, Fig 3, 5:43-51. Kerai states "A battery charging circuit is described in which power is derived from a communications port such as a USB interface (22) and is supplied to a rechargeable battery of a communications device." Kerai, Abstract. "**As is well known**, the data lines of a serial connection (D+ and D- in the USB interface) are held high when the connection is inactive and will vary between a high and low state whilst communication over the ports takes place." Kerai, 5:45-48 (emphasis added).

2. US Patent 6,625,738 ("Shiga") (Ex. 1013)

U.S. Patent 6,625,738 was filed as Application No. 09/454,621 on December 6, 1999, claimed a priority date of December 15, 1998, and issued on September 23, 2003 to Sadakazu Shiga. Thus, Shiga is prior art to the '111 Patent under at least pre-AIA §102(e).

Shiga recognizes that, according to USB standards at the time and as discussed above, there are three (D+, D-) signal line states representing three modes: (1) low-speed mode (D+ signal line is set to a low level ("L") and D- line is set to a high level ("H")); (2) full-speed mode (D+ is high and D- is low); and (3) unconnected mode (both D+ and D- are low). These three states are shown in Shiga's Table 1 seen below. Shiga, 5:38-60; Baker,¶86.

TABLE 1

	Low Speed	Full Speed	Unconnected
D+	L (Hi-Z)	H	L (Hi-Z)
D−	H (Hi-Z)	L (Hi-Z)	L (Hi-Z)

In contrast to these three USB standard modes, Shiga also explains that the "fourth mode" signal, which is when both D+ and D- are in the H level state (an SE1 condition), is "not a USB standard state" and can therefore "be easily distinguished from USB standard data signals.” Shiga, 5:60-62, 6:48-58; Baker, ¶87. This fourth mode signal is transmitted by a USB apparatus (*e.g.*, keyboard) to wake up a host computer. Shiga, Abstract, 6:35-47; Baker, ¶87. Accordingly, in 1999, using the signal state that it is not a USB standard mode (*i.e.*, in which both D+ and D- are in the H state) was well-known. Shiga, 5:60-62; 6:48-50; Baker, ¶87.

3. US Patent Application Publication US20030135766 (“Zyskowski”) (Ex. 1014)

U.S. Patent App. Publication No. 2003/0135766 was filed as Application No. 09/453,656 on December 3, 1999 and issued on July 17, 2003 to Paul J. Zyskowski and Greg E. Scott. Thus, Zyskowski is prior art to the ’111 patent under at least pre-AIA §102(e).

Zyskowski is another example of prior art that discloses an SE1 condition (with D+ and D- being set at 5 V) being used by a host device (*e.g.*, computer) to signal its full power state to a connected device (*e.g.*, mass storage device, consumer electronic device). Zyskowski, ¶ 19; Baker, ¶88.

4. US Patent 6,625,790 (“Casebolt”) (Ex. 1015)

U.S. Patent 6,625,790 was filed as Application No. 09/409,683 on October 1, 1999, claimed a priority date of July 8, 1998, and issued on September 23, 2003 to Mark W. Casebolt and Lord Nigel Featherston. Thus, Casebolt is prior art to the ’111 patent under at least pre-AIA §102(e).

Casebolt discloses that an SE1 condition could be used as a special signaling mode in which the D+ and D- data lines would be connected to Vcc (+5V) to signal the presence of a PS/2 adapter (a 6-pin connector used in older computer keyboards and mice). Casebolt, 7:40-54; Baker, ¶89. Indeed, the SE1 state for USB (*i.e.*, when both the D+ and D- data lines are both at H level) is shown in Casebolt's Table 1 below. Baker, ¶¶XX-XX.

TABLE 1

I/O State	D+/CLK	D−/DAT	USB	PS/2
0	L	L	SEO (Single Ended O) or Reset	Host Inhibit
1	L	H	J, Idle	Host Inhibit
2	H	L	K, Xmit Resume	Host Xmit
3	H	H	SE1 (Single Ended 1)	Idle, Confirm Connect

Casebolt, Table 1, *see also* 6:55-7:8.

5. Cypress Semiconductor enCoReUSB Datasheet ("Cypress") (Ex. 1016)

Knowledge regarding the use of a state in which D+ and D- are both high was so common that Cypress Semiconductor integrated it into its enCoReUSB product in 2000. Cypress, 24-25. Baker, ¶90.

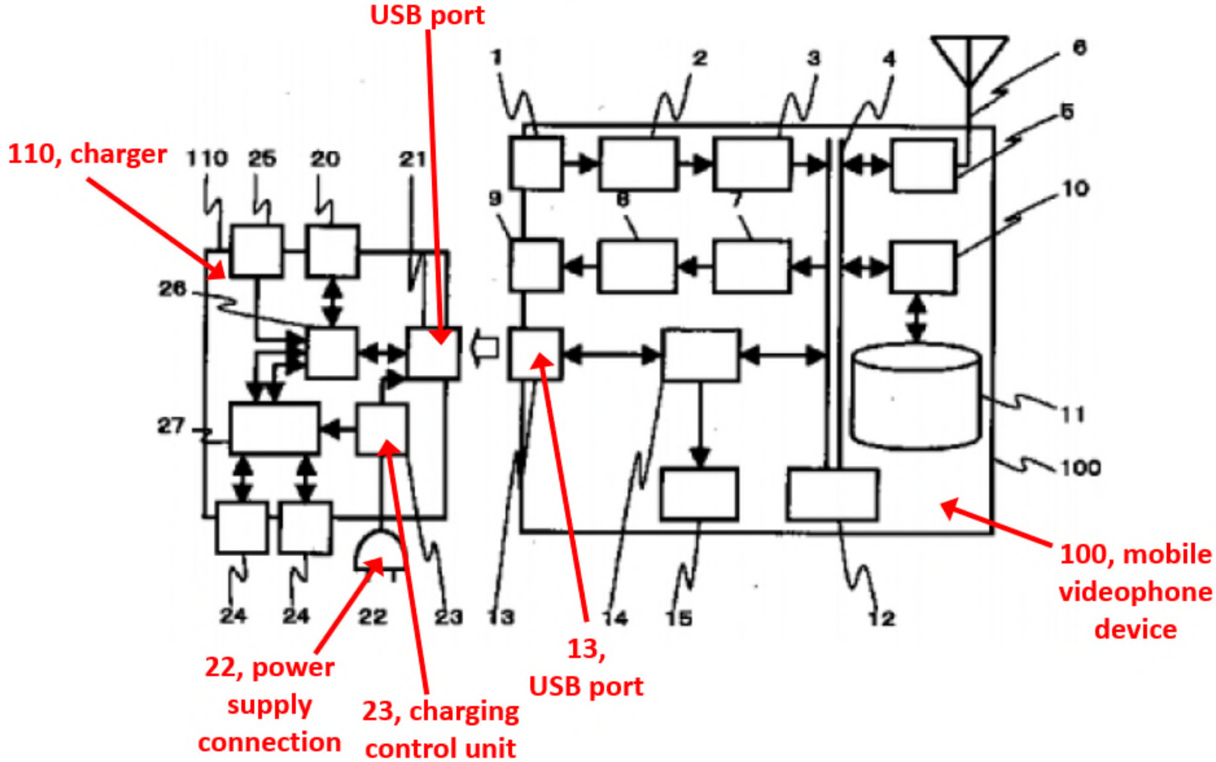
C. Overview of Morita

Japanese Patent Application No. 2000-165513A ("Morita") (Ex. 1017), titled "Charger," was filed on November 30, 1998. Morita is prior art under at least §102(b). Morita was not considered during prosecution.

The aim of Morita is to "provide a hub-controllable charger capable of accessing a plurality of external devices in a state wherein a mobile phone is coupled to the charger, and capable of managing transmission and branching of signals between each." Morita, Abstract; Baker, ¶94. Morita thus discloses a "charger capable of charging a mobile phone and coupling to an external device", specifically, a "USB format charger provided with a HUB function capable of connecting to a plurality of devices." Morita, Technical Field; Baker, ¶94.

Figure 1 of Morita, below, depicts a block diagram of one embodiment of the charger.

[FIG. 1]



Morita, Figure 1 (annotated).

In Figure 1, mobile videophone device 100 draws power from the charger 110. Morita, [0016]. The charger and mobile device have USB ports 21, 13 and the mobile videophone device draws power through USB port 13. *Id.*, [0013]-[0016] The charger draws power from the power supply connection 22 where the power supply cable from an electrical outlet is connected to an outlet. *Id.*, [0016]. The charging control unit 23 takes the power supply voltage supplied from the power supply and supplies a voltage to USB port 21. *Id.*, [0014].

VII. CLAIM CONSTRUCTION

Claim construction is only necessary to the extent it is required to resolve disputes presented in the Petition. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Petitioners submit that, other than the terms addressed below, no terms need to be construed to resolve the issues presented by this Petition and the claims should be afforded their plain and ordinary meaning in view of the '111 Patent's specification and prosecution history, as would have been understood by a POSITA. If Patent Owner attempts to create a claim construction dispute in its preliminary response, Petitioners reserve the right to address the issue in a reply to that preliminary response. If the Patent Owner attempts to create a claim construction issue in its post-institution response, Petitioners will address such issues in their reply.

The Board construes claims in an IPR in accordance with *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). 83 Fed. Reg. 51340, 51340-44 (Oct. 11, 2018). Under the *Phillips* standard, "words of a claim are generally given their ordinary and customary meaning." *Phillips*, 415 F.3d at 1312-13 (internal quotations omitted).

A. "identification signal . . . configured to indicate to the mobile device that the power socket is not a USB host or hub" (Claims 1 and 17)

Claims 1 and 17 both recite an "identification signal . . . configured to indicate to the mobile device that the power socket is not a USB host or hub" ("Identification Signal Limitation").

Petitioner does not believe that an express construction of the Identification Signal Limitation is necessary for the purposes of this IPR proceeding.[4] Instead, the Board need determine only that a SE1 signal (*i.e.*, a logic high signal on both the D+ and D- USB lines) sent from a USB adapter, wherein the USB adapter is connected to a power socket (*e.g.*, "North American Power Socket"), satisfies the Identification Signal Limitation. *Toyota Motor Corp. v. Blitzsafe Texas, LLC,* IPR2016-00422, Institution Decision, at 11 (P.T.A.B. July 6, 2016) ("[O]nly terms which are in controversy need to be construed, and only to the extent necessary to resolve the controversy.") (internal citations omitted). Because the '111 Patent discloses this type of signal as "an identification signal . . . configured to indicate to the mobile device that the power socket is not a USB host or hub," and because there was no disclaimer that would exclude this type of signal from the scope of the Identification Signal Limitation, this type of signal satisfies the Identification Signal Limitation.

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[4] Petitioner has raised invalidity defenses under 35 U.S.C. §112 relating to this term. Invalidity Contentions (Ex. 1019).

The ’111 Patent specification provides several concrete examples of “identification signal[s] . . . [that are] configured to indicate to the mobile device that the power socket is not a USB host or hub.” For example, the ’111 Patent explicitly recites that the “USB adapter 100 may have applied a logic high signal, such as +5V reference, to both D+ and D- lines to identify the attached device as a USB adapter. If the voltages on both the D+ and D− lines of the USB connector are greater than 2 Volts (step 220), then the mobile device 10 determines that the device connected to the USB connector 54 is not a typical USB host or hub and that a USB adapter 100 has been detected (step 230).” ’111 Patent, 9:31-38. In other words, the ’111 Patent specification discloses that a SE1 signal (*i.e.*, a logic high signal on both the D+ and D- USB lines) indicates to the mobile device that the adapter and its corresponding power socket (the “device connected to the USB connector 54”) is not a “typical USB host or hub”). There was nothing in the file history that disclaims this embodiment from the scope of the Identification Signal Limitation. *See* Section IV.B herein discussing the prosecution history of the ’111 Patent. Accordingly, such a SE1 signal satisfies the Identification Signal Limitation.

B. Means-Plus-Function Terms (Claim 18)

Claim terms may be expressed “as a means or step for performing a specified function … and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.” 35 U.S.C.

§112, ¶ 6. "[U]se of the word 'means' creates a presumption that § 112, ¶ 6 applies." *Williamson v. Citrix Online, LLC,* 792 F.3d, 1339, 1349 (Fed. Cir. 2015) (en banc) (internal quotation marks and citations omitted).

Construction of a means-plus-function term is a two-step process. First, the Board must identify the claimed function. Second, the Board "must determine what structure, if any, disclosed in the specification corresponds to the claimed function." *Id.*, 1351 (citation omitted).

Claim 18 of the of the '111 Patent contains four claim limitations, each containing the words "means for." These limitations are thus presumed to be means-plus-functions terms subject to 35 U.S.C. §112, ¶ 6. *See Williamson*, 792 F.3d at 1349.

1. "means for receiving energy from a power socket"

The function is "receiving energy from a power socket."

The '111 Patent discloses three distinct corresponding structures that may perform the recited function. These include a "plug unit" "configured to receive energy from a power socket . . . either directly or through the use of a plug adapter." '111 Patent, 7:12-14, FIG. 2. The '111 Patent uses the terms energy and power interchangeably. *Id.* A POSITA would have understood that energy is the integral of power with respect to time. Baker, ¶102, footnote 1. Accordingly, a POSITA would have understood that the plug unit alone and, alternatively, the plug adapter with the plug unit performs this claimed function. Baker, ¶102.

Therefore, under the *Phillips* standard, the corresponding structure encompasses a plug unit, or a plug adapter used with a plug unit, or an equivalent thereof.

2. "means for regulating the received energy from the power socket to generate a power output"

The function is "regulating the received energy from the power socket to generate a power output." The '111 Patent discloses a "power converter [that] is electrically coupled to the plug unit and is operable to regulate the received energy from the power socket and to output a power requirement to the mobile device." '111 Patent, 2:9-13, 7:27-37, 11:10-14. Therefore, under the *Phillips* standard, the corresponding structure encompasses a power converter or an equivalent thereof.

3. "means for generating an identification signal that indicates to the mobile device that the power socket is not a USB hub or host"

The function is "generating an identification signal that indicates to the mobile device that the power socket is not a USB hub or host."

The '111 Patent discloses that the corresponding structure is an identification subsystem or an equivalent thereof. '111 Patent, 8:23-25 ("[t]he identification subsystem 108 provides an identification signal to the mobile device 10 that the power source is not a USB limited source."); *see also id.* 9:3-8. The '111 Patent describes two different structures for the identification subsystem. "In one embodiment, the identification subsystem 108 comprises a hard-wired connection of a single voltage level to both data lines. In another embodiment, the identification subsystem 108 comprises a USB controller that is operable to communicate an identification signal to the mobile device." '111 Patent, 8:31-36.

Therefore, under the under the *Phillips* standard, the corresponding structure encompasses an identification subsystem including a USB controller or a hard-wired connection of a voltage level, or an equivalent thereof.

4. "means for coupling the power output and identification signal to the mobile device"

The function is "coupling the power output and the identification signal to the mobile device." The preamble of claim 18 recites "[a] Universal Serial Bus ('USB') adapter" that comprises the means.

The '111 Patent discloses that the USB adapter includes a primary USB connector to perform this function. '111 Patent, 7:41-43 ("The power converter 104 provides its energy output to the mobile device 10 via . . . the primary USB connector 102.") The "primary USB connector" also provides "a communication path" for data to and from the mobile device. '111 Patent, 7:4-11. Therefore, under the

Phillips standard, the corresponding structure encompasses a USB connector of a USB adapter or an equivalent thereof.[5]

VIII. ANALYSIS

A. CLAIMs 1-14 AND 16-18 ARE UNPATENTABLE AS OBVIOUS UNDER 35 U.S.C. §103 OVER MORITA AND/OR THE KNOWLEDGE OF A POSITA

1. Claim 1

a. 1[Pre]: A Universal Serial Bus ("USB") adapter for providing power to a mobile device through a USB port, comprising:

To the extent the preamble of claim 1 is limiting, it is rendered obvious by Morita. Baker, ¶110. Morita discloses a charger 110 with USB ports for charging a mobile phone. Morita, [Claim 1], [Claim 2], [0010]-[0011] ; Baker, ¶¶94-96. "In FIG. 2, the mobile videophone device 100 is connected to the USB port 21 of the charger 110. . ." *Id*. at [0016]. "The charger 110 thus performs, as one device, a charging operation of the mobile videophone device 100 . . ." *Id*. A POSITA would have understood Morita's charger 110 to be a "A Universal Serial Bus ("USB") adapter for providing power to a mobile device through a USB port." Baker, ¶110.

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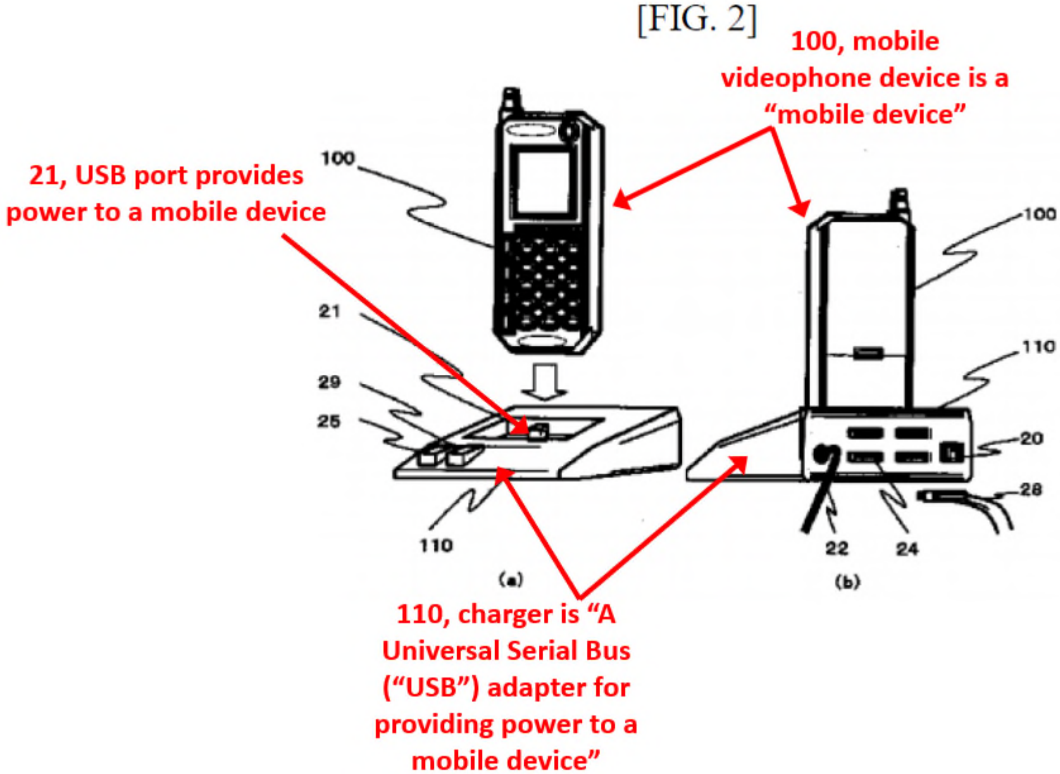
[5] In a previous district court claim construction ruling with respect to this term, the court construed the structure to be "USB connector 102 and USB connector 54, and equivalents thereof." That is, the court's construction included both a connector on the adapter and on the mobile device. Petitioner believes the claim is directed to just the adaptor and would not include structures on the mobile phone. Nonetheless, the prior art herein discloses both connectors. Thus, the issue need not be resolved here because the prior art would cover both constructions.

[FIG. 2]

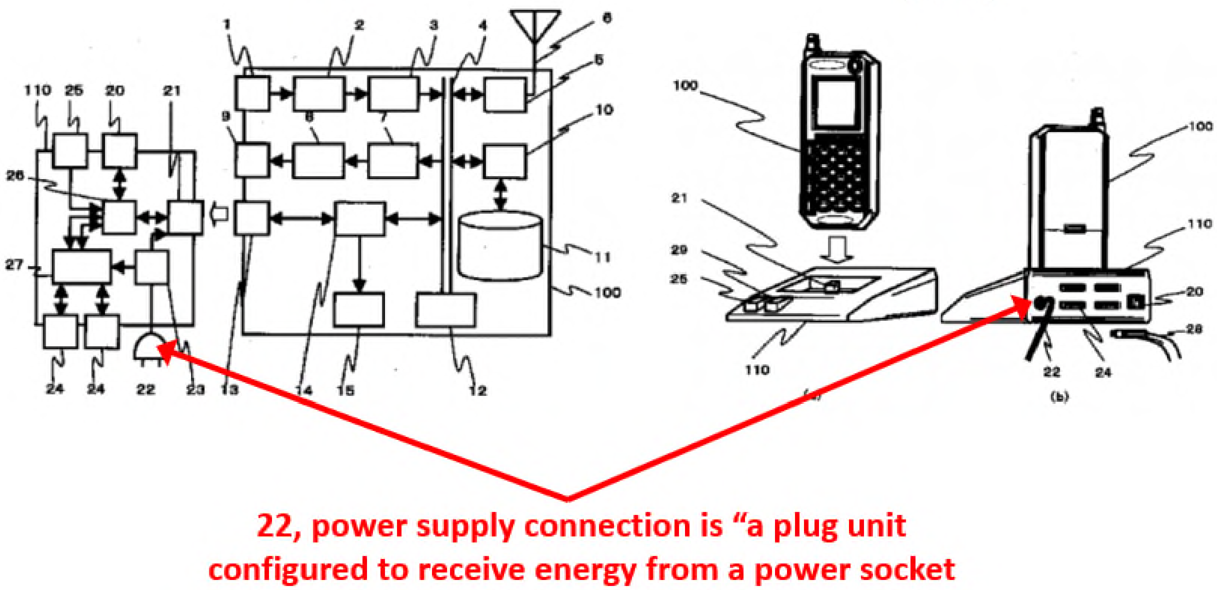


Morita, Figure 2 (annotated).

b. 1[a]: a plug unit configured to receive energy from a power socket

First, Morita discloses a "power supply cable 22" (which a POSITA would have understood to be a "plug unit"). Morita, Figs. 1-2, [0012]; Baker, ¶¶95, 111. As can be seen below, the power supply cable 22 includes an interface to plug into an "outlet" (i.e., a "power socket"). *Id*. at [0016].

[FIG. 1] [FIG. 2]



Id., Figures 1 and 2 (annotated).

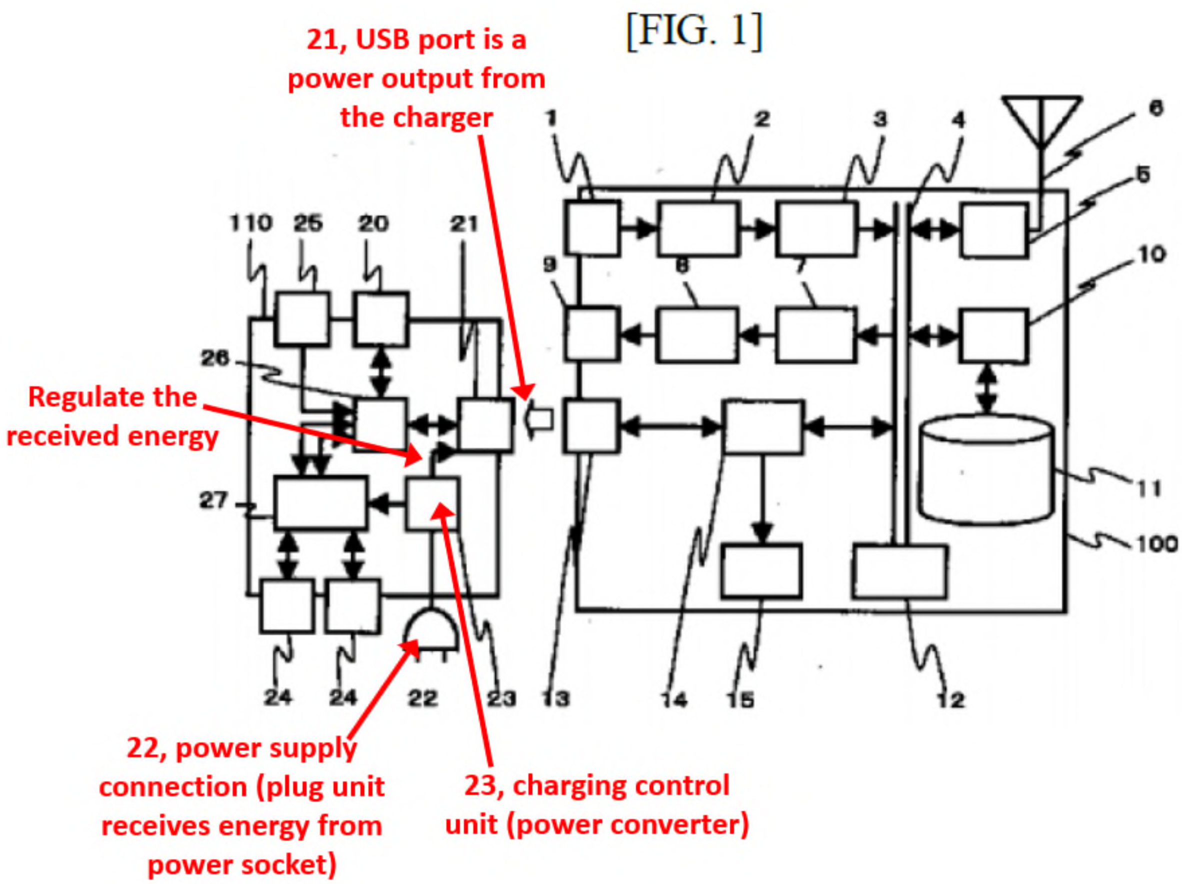
Second, Morita discloses that the power supply cable 22 "is connected to an outlet or the like connected to a commercial power supply" (the outlet being a "power socket"). *Id*. at [0016]. In other words, the power supply cable 22 couples to the power socket. Baker, ¶¶95-96, 111. A POSITA would have understood, and certainly found it obvious, that an "outlet or the like" is a "power socket" (*e.g*., a typical wall outlet). Baker, ¶¶111-112.

Third, a POSITA would have understood, and certainly found it obvious, that the "power supply cable 22" connects to the "outlet" to receive power from the "commercial power supply." Baker, ¶¶95-96, 111-112. As can be seen above, the power supply cable 22 is shown to connect to an outlet (*i.e*., "for coupling to a power socket") so that it can receive power therefrom. *Id.* Thus, Morita renders obvious "a plug unit for coupling to a power socket and for receiving energy from the power socket." *Id.*

c. 1[b]: a power converter coupled to the plug unit, the power converter being configured to regulate the received energy from the power socket to generate a power output

Morita renders claim element 1[b] obvious.

First, Morita discloses charging control unit 23 (the "power converter") that is "electrically coupled" to power supply cable 22 (the "plug unit"). Morita, Figure 1.



Id. at Figure 1 (annotated).

Second, as explained above in connection with claim element 1[a], power supply cable 22 is a plug unit that is connected to an outlet (the "power socket") that receives energy from a commercial power supply. Morita further discloses that the "power supply voltage supplied from a power supply source is supplied from the charging control unit 23 to the USB hub control unit 27 and the second USB port 21." *Id.* at [0014]. That is, Morita discloses that the charging control unit 23 supplies the needed power supply voltage to the USB hub control unit 27 and provides output power to the mobile device via USB port 21. Baker, ¶¶95-96, 113. A POSITA would have understood that the charge control unit is "regulat[ing] the received energy" because, for example, the power supply voltage, VBUS, in a USB connector is specified to operate either between 4.4V and 5.25V or between 4.75V and 5.25V as seen below. Baker, ¶113.

Table 7-5. DC Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Max.	Units
Supply Voltage:					
High-power Port	VBUS	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	VBUS	Note 2, Section 7.2.1	4.40	5.25	V

USB 1.1 at 142.

The received energy would have to be regulated to fall within this range of voltages. Baker, ¶113; Morita, [0016] ("the supplied power supply voltage is supplied to the mobile videophone device 100 via the USB port 21"). For example, the "energy from a commercial power supply," e.g., a wall socket, would be at a much higher voltage, and the power would need to be converted and regulated to fall within the USB voltage specifications (i.e., a "power requirement").

Third, Morita's charging control unit 23 (the "a power converter") is electrically coupled to power supply cable 22 ("the plug unit"), and the charging control unit 23 ("the power converter") would have been understood to, and it certainly it would have been obvious to, "regulate the received energy from the power socket and to output a power requirement to the mobile device." Baker, ¶¶112-113.

d. 1[c]: an identification subsystem configured to generate an identification signal, wherein the identification signal is configured to indicate to the mobile device that the power socket is not a USB host or hub; and

Morita renders the limitations of claim element 1[c] obvious in view of the knowledge of a POSITA. Baker, ¶¶114-124. While Morita does not expressly illustrate in its figures or describe in detail all of the circuitry that comprises the claimed identification subsystem, it does expressly disclose a USB hub control unit, as well as USB connectors and architecture, which a POSITA would have understood included the components for the claimed identification subsystem to generate an identification signal, *e.g.*, an SE1 signal or a high logic signal of greater than 2V on the D+ and D- lines as taught by the '111 Patent. *See*, *e.g*., '111 Patent, Figure 3, 9:21-42; Baker, ¶69-90, 114.

As explained further below, when Morita's adapter lacks a connection to a USB host or hub (e.g., a computer), it would have been obvious, and a POSITA would have been motivated with a high expectation of success, to use the Morita's USB hub control unit / USB port 21 as an identification subsystem "to indicate to the mobile device that the power socket is not a USB host or hub" and the identification signal would be a SE1 signal state[6] (*i.e*., a logic high signal on the D+ data line and a logic high signal on the D− data line"). Baker, ¶¶114-124.

Morita's device is a "charger" and at least one of its stated objectives was to charge a connected mobile device. Morita, Abstract; Baker, ¶94. A POSITA would have found it obvious that although Morita's charger was capable of handling a "plurality of external devices," one possibility would have been that the charger was merely plugged into the power socket (outlet) to charge the mobile device without any other external device (*e.g*., USB host or hub). Baker, ¶¶116-118. Indeed, often

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[6] The '111 Patent includes embodiments in which the SE1 signal is an identification signal that identifies that the adapter (and its corresponding power socket) is not a host or hub. *See* '111 Patent, 9:26-42. Thus, it is indisputable that the SE1 signal qualifies as identification signal.

users just need to charger their mobile device. In other words, although Morita discloses that a USB host or hub (e.g., personal computer) is ***optionally*** connectable to the adapter via USB port 20, it also discloses its device acting as a charger without the operational USB host or hub connection. Morita, [0014] ; Baker, ¶118. Without this optional connection: 1) normal USB communications through the USB adapter with a connected mobile device would not have been possible (USB communications require a USB host and root hub as discussed in Section VI.A) and 2) powering the USB adapter from the absent, and unconnected, USB host or hub would not have been possible. Baker, ¶115. Morita embraces this scenario, because it discloses that the adapter can provide power to the phone via USB connector 21 using the power from the outlet. Morita, [0016]. Thus, in that common situation, the sole source of power to the connected device through Morita's adapter would have to come from the power socket (outlet) via the plug unit (power supply cable 22). Baker, ¶115. In that case, "the power socket is not a USB host or hub" because no USB host or adapter would have been connected to supply power to Morita's charger (adapter).

Without this connection to a USB host or hub via USB port 20, a POSITA would have found it obvious to provide an identification signal via USB port 21 to indicate that the adapter is not a USB host or hub, i.e., is capable of charging via a power socket. A POSITA would have known that the benefit of an adapter powered by a power socket—i.e., which does not have the current limitations of a USB host or hub—is that in all cases the adapter's USB port connected to the mobile phone can operate as a "High-power Hub Port" that can supply at least 500 mA of current as seen below in Table 7-5 from USB 1.1. Baker, ¶116. A POSITA would have also known that if the USB adapter were powered by a USB host or hub instead of a power socket then the connection powering the USB adapter could be a "Low-power Hub Port" that can supply at least 100 mA of current to a connected mobile device. *Id*.

Table 7-5. DC Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Max.	Units
Supply Voltage:					
High-power Port	VBUS	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	VBUS	Note 2, Section 7.2.1	4.40	5.25	V
Supply Current:					
High-power Hub Port (out)	ICCPRT	Section 7.2.1	500		mA
Low-power Hub Port (out)	ICCUPT	Section 7.2.1	100		mA

USB 1.1 at 142.

A POSITA would have been motivated, in this common situation where the power socket was not a USB host or hub, to identify this to the mobile device so that the mobile device could always know to charge from a "High-power Hub Port." Baker, ¶117.

It would have been obvious to use the SE1 signal state (i.e., logic high values on the data lines) to provide this identification. Baker, ¶¶69-90. The data lines were already used to signal connection states. *Id.*; *see* Section VI.A-B. Further, because normal USB communications at low- or full-speed (D+ low and D- high or D+ high and D- low, respectively) were not possible when a USB host or hub was not connected to Morita's USB adapter, and there was a mobile device connected to the USB adapter (so both D+ and D- can't be low), a POSITA would have logically looked to ***the only other possible state of the data lines***, that is, both D+ and D- being high (SE1) to identify[7] to the connected mobile device that the power socket is not a USB host or hub so that the connected mobile device knows that: 1) it cannot communicate via normal USB communications and 2) it is connected to a "High-power Hub Port." Baker, ¶117. Stated differently, a POSITA would have found it obvious and logical to use the SE1 condition (the only state on the data lines not being used to identify that communications from a USB host or hub were about to take place) to signal to the mobile device that the power socket, *i.e.*, the sole source of the signal and power, was **<u>not</u>** coming from a USB host or hub. *Id.* What's more, the Morita USB adapter providing the SE1 to the connected mobile device would confirm and indicate that communication will not occur. Baker, ¶119. As discussed

[7] Although the '111 Patent identifies some additional "dynamic" identification signals, *e.g.*, "a series of pulses or voltage level changes, or other types of electrical signals" ('111 Patent at 8:25-29), a POSITA would not have understood, even after reviewing the teachings of the '111 patent, how dynamic identification signals, such as a series of pulses or varying voltage levels, would be implemented without a USB host or hub connected to the adapter to provide control of, and communicate, the varying D+ and D- data line signals. Baker, ¶117, footnote 2.

above in the USB 1.1 background section, in this situation the connected mobile device would continue to receive power and wait to receive a reset command, which it would not receive without normal USB communications. *See* Section VI.A. Because this was the known result of the SE1 signal, and this is the exact purpose that Morita's adapter would seek to achieve without a host USB connection (*i.e.*, charge without any USB communications), it would be obvious to select this known SE1 signal as the identification signal (and again, it is a selection from among a finite number of known choices, that is, voltages on the two data lines). Baker, ¶119.

Pulling both D+ and D- high, as discussed in Section VI.A, is an abnormal condition (SE1) since normal USB communications are not possible. Baker, ¶119. A POSITA would have known, because SE1 is an abnormal condition and thus does not fall with normal USB operation, that it could have been used as an identification signal (outside normal USB operation and thus would not impact other USB devices' operations) to a connected mobile device to indicate to the device that the power socket was not a USB host or hub. Baker, ¶¶69-90, 119.

Holding D+ and D- high (SE1) in this situation (for charging a battery and no communications) was known before the priority date of the '111 Patent. Baker, ¶¶69-90, 120; s*ee also* Section VI.B., above. As one example, Zyskowski states "When the host 104 is in a **full power state**, data lines D1 and D2 may be raised to a predefined DC voltage level, for example, 5 volts (systems operating at lower voltages might raise the data paths to 3 volts, 2 volts, or even less). Zyskowski at ¶ 19 emphasis added. As another example, Kerai discloses "A battery charging circuit is described in which power is derived from a communications port such as a USB interface (22) and is supplied to a rechargeable battery of a communications device." Kerai, Abstract. "***As is well known***, the data lines of a serial connection (D+ and D- in the USB interface) are held high when the connection is inactive and will vary between a high and low state whilst communication over the ports takes place." *Id*. at 5:45-48 (emphasis added).

Further, a POSITA would have found it routine to use the SE1 signal as an identification signal, with a high expectation of success, because the SE1 signal can "be easily distinguished from USB standard data signals." Shiga, 5:60-62, 6:48-58. As such, it was well known how to use the SE1 signal as identifying signal, e.g., signal a wake-up condition. Shiga, Abstract, 6:35-47; Baker, ¶121. Again, the use of SE1 as an identification signal to identify various states was well known: Shiga, Abstract, 6:35-47 (wake up signal), Zyskowski, ¶ 19 (full power state), Casebolt, 7:40-54 (presence of PS/2 adapter). Baker, ¶ 110.

Also, a POSITA would have understood how to pull D+ and D- high. Baker, ¶121. As stated in USB 1.1, "Hubs, and the devices to which they connect, use a combination of pull-up and pull-down resistors to control D+ and D- in the absence of their being actively driven. These resistors establish voltage levels used to signal connect and disconnect and maintain the data lines at their idle values when not being actively driven." USB 1.1 at 256. This would have informed a POSITA that pulling D+ and D- high is a simple matter of connecting the R_{pd} resistors high, as the R_{pu} is resistor is connected in the mobile device in the annotated Figure 7-10 from USB 1.1 seen below, instead of to ground. Baker, ¶121.

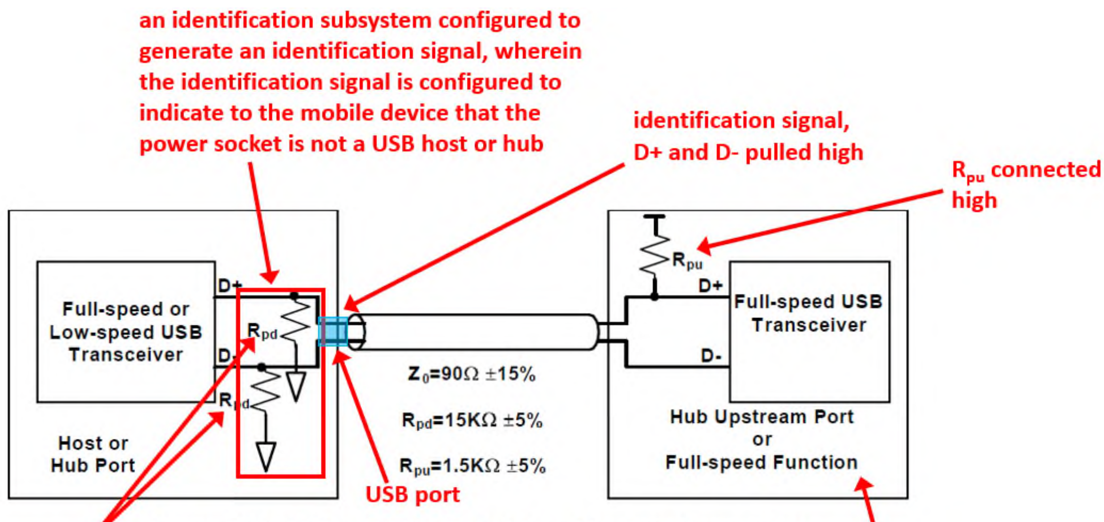


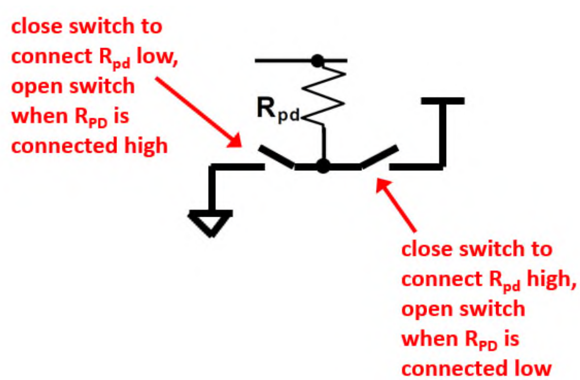
Figure 7-10. Full-speed Device Cable and Resistor Connections

USB 1.1 at 113 (annotated).

The claimed identification subsystem configured to generate an identification signal, both D+ and D- pulled high, includes the resistors, R_{pd}, connected high instead of to ground as indicated in the annotated figure seen above. Baker, ¶121. Just as described in the '111 Patent, when voltages on both the D+ and D- lines of the USB connector are greater than 2 Volts, that will be an indication that the power socket, *i.e.*, the only source of power in this instance, is not a USB host or hub. '111

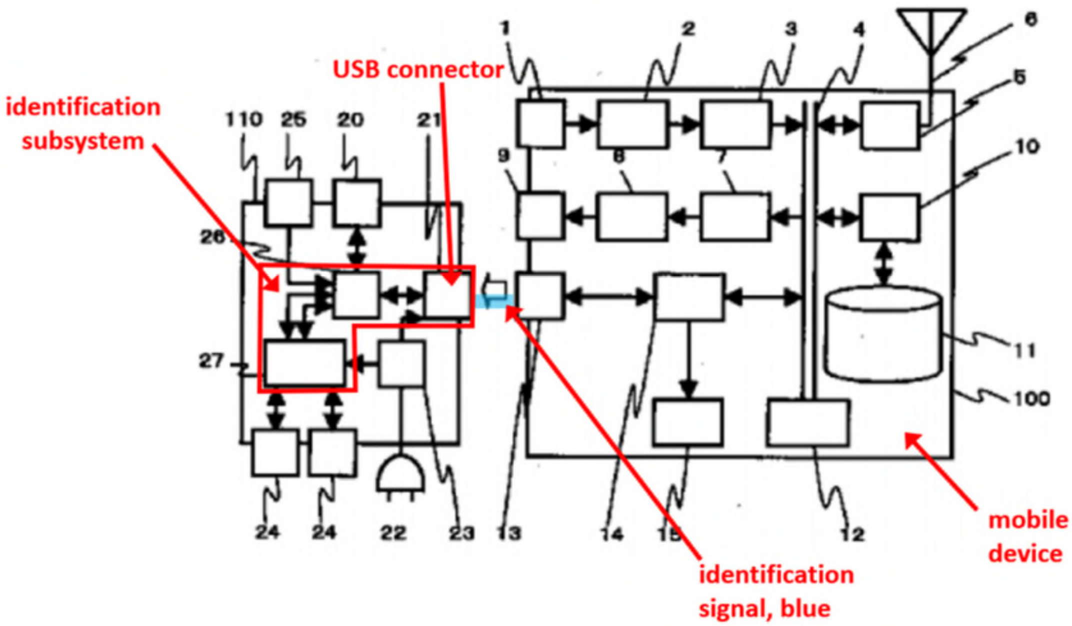
Patent at 9:21-23; Baker, ¶121. Indeed, pulling D+ and D- high **disables** communications, which are not possible when Morita's USB adapter is not connected to a USB host or hub, indicating to the connected mobile device that the power socket is not a USB host or hub. Baker, ¶121.

In order to ensure that the USB port could continue to operate as a normal USB port, and not just a "High-power Port Hub," a POSITA would have known that R_{pd} resistors in a USB host or hub port be connected low (to ground) as seen above in Figure 7-10 from USB 1.1. Baker, ¶122. The addition of two simple switches to each R_{PD} resistor, *see* annotated image below, would have allowed the port to operate as either a normal USB port with normal communications or an abnormal port (SE1 where D+ and D- are both high) where communications are not possible. *Id*.



USB 1.1 at 113 (annotated portion of Figure 7-10). This obvious, and simple, modification to Morita is annotated below in Figure 1 of Morita where the identification signal, D+ and D- pulled high, is highlighted in blue.

[FIG. 1]



Morita FIG. 1 (annotated).

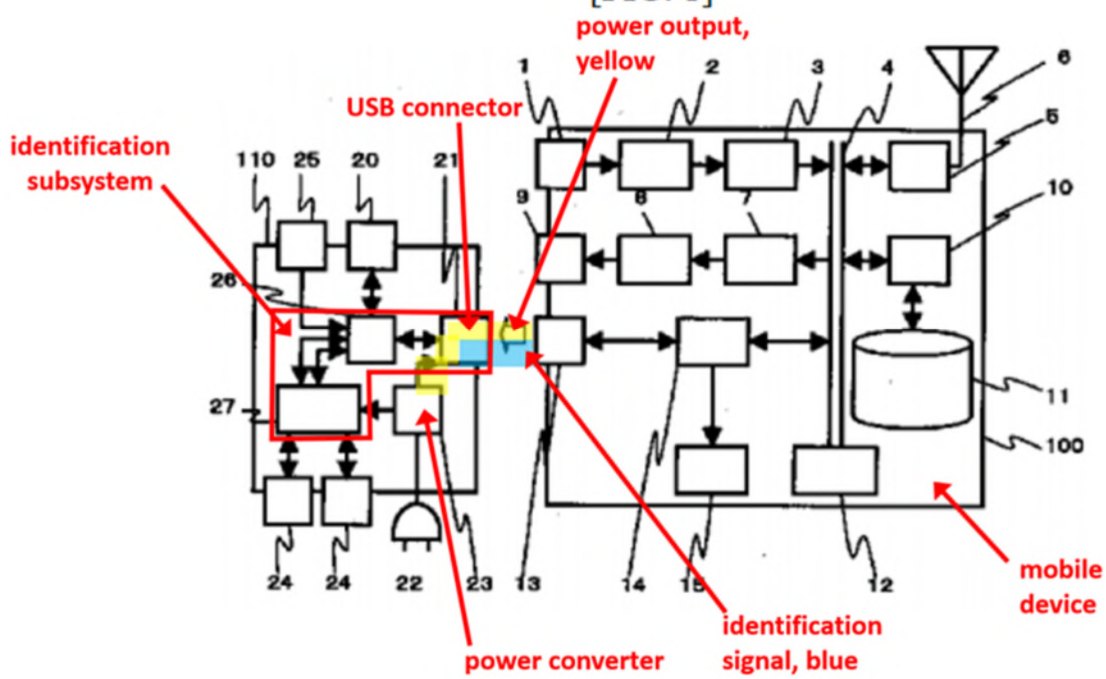
In short, a POSITA would have understood and found obvious that this simple modification would have allowed Morita to maintain all of its stated functionality and operation, while adding the desired benefit of allowing charging from a "High-power Hub Port" for the common situation when no other USB host or hub was connected. Baker, ¶124.

For all of the reasons discussed above, a POSITA would have understood that Morita's system with USB connectors, in view of the knowledge of a POSITA, would have rendered obvious the limitations of claim element 1[c]. Baker, ¶¶114-124.

e. **1[d]: a USB connector coupled to the power converter and the identification subsystem, the USB connector being configured to couple the power output and the identification signal to the mobile device**

Morita discloses "the supplied power supply voltage is supplied to the mobile videophone device 100 via the USB port 21 to charge an internal battery." Morita, [0016]. The yellow annotated shading seen below in Figure 1 shows the USB connector coupled to the power converter and the USB connector being configured to couple power output to the mobile device. Baker, ¶125. The identification subsystem and identification signal were identified in claim 1[c]. The blue annotated shading seen below in Figure 1 shows the USB connector coupled to the identification subsystem and the USB connector being configured to couple the identification signal to the mobile device. Baker, ¶125.

[FIG. 1]



Morita, Figure 1 (annotated).

Therefore, Morita, in view the knowledge of a POSITA, renders obvious the limitations of claim element 1[d].

2. Claim 2. The USB adapter of claim 1, wherein the plug unit is configured to couple directly with the power socket.

See analysis for claim element 1[a] above.

A POSITA would have understood that the power supply cable 22 ("plug unit") would be directly coupled with the outlet ("power socket"). Baker, ¶127. For example, Morita states that the two are "connected." Morita, [0016]. Further, Figure 1 illustrates a common male plug unit configured to be inserted into a female power socket receptacle, *i.e.*, "couple directly." *Id*. at Figure 1; Baker, ¶127. Thus, Morita renders claim 2 obvious.

3. Claim 3. The USB adapter of claim 2, wherein the plug unit is configured to couple to at least one power socket selected from the group consisting of: North American power socket, United Kingdom power socket, European power socket, Australian power socket, airplane power socket, and automobile power socket.

See analysis for claim element 1[a] and claim 2 above.

Morita expressly discloses coupling the power supply cable 22 ("plug unit") directly with an outlet ("power socket") that receives commercial power. Morita, [0016]. Further, Figure 1 of Morita illustrates a common male plug unit, 22, configured to be inserted into a common female power socket receptacle. *Id*. at

Figure 1; Baker, ¶128. A POSITA would have understood the type of power socket selected to be an obvious mere design choice based upon the geographic location of where the charger will be used. Baker, ¶128. Moreover, claim 3's "group consisting of" is inclusive of essentially most types of power sockets available to choose from. *Id*. Thus, it would have been understood, and at least obvious, that the power supply cable 22 would connect to a power socket such as a North America, etc., power socket.

4. Claim 4. The USB adapter of claim 1, further comprising a plug adapter that is configured to couple the plug unit to the power socket.

Claim 4 would have been obvious to a POSITA. Morita expressly discloses an adapter with a plug unit for insertion into a conventional power socket ("outlet"). *See* analysis for claim limitation 1[a]. Plug adapters were well-known and ubiquitous. A POSITA would have understood that a plug adapter would be used between differing types of plug units and power sockets to allow the plug unit to receive energy from a power socket. Baker, ¶129. For example, an adapter would be used between a North American power socket and a United Kingdom plug unit. *Id*. A POSITA would have understood that the type of adapter used is an obvious choice depending on the type of plug unit used in the USB adapter and the power socket associated with a geographic location where the USB adapter is to be used. *Id*.

5. **Claim 5. The USB adapter of claim 4, wherein the plug adapter is configured to couple to at least one power socket selected from the group consisting of: North American power socket, United Kingdom power socket, European power socket, Australian power socket, airplane power socket, and automobile power socket.**

See analysis for claims 3 and 4 above.

6. **Claim 6. the USB adapter of claim 1, wherein the identification signal comprises a voltage level that is applied to at least one data line in the USB connector.**

See analysis for claim element 1[c] above.

Morita renders claim 6 obvious in view of the knowledge of a POSITA. As discussed in the analysis for claim element 1[c] data lines, D+ and D- are pulled high through resistors, R_{pd}, like resistor R_{pu} (which is pulled high to a terminating voltage V_{TERM}, *see* USB 1.1 at 113) instead of being connected to ground as illustrated below. Baker, ¶129.

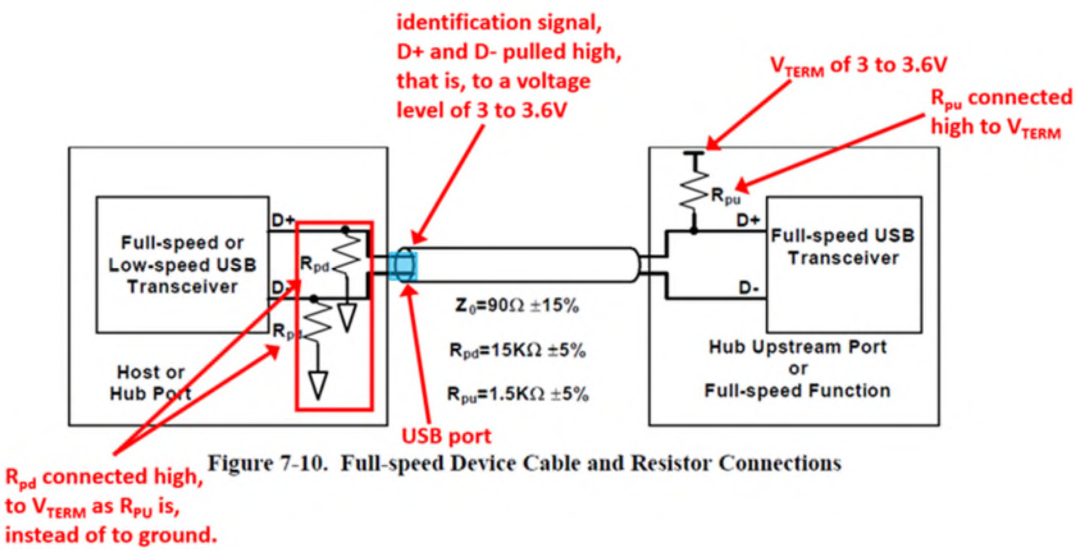


Figure 7-10. Full-speed Device Cable and Resistor Connections

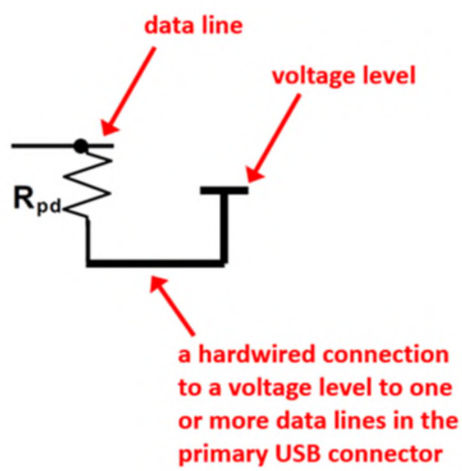
USB 1.1 at 113 (annotated).

The USB 1.1 specification teaches that V_{TERM} is a voltage having a minimum value of 3.0V and a maximum value of 3.6V. USB 1.1 at 143. Thus, connecting the R_{pd} resistors to the V_{TERM} voltage ranging from 3 to 3.6V connects both data lines in the USB connector D+ and D- to a voltage level of V_{TERM}. Baker, ¶129.

7. Claim 7. The USB adapter of claim 1, wherein the identification subsystem comprises a hard-wired connection of a voltage level to one or more data lines in the USB connector.

Morita in view of the knowledge of a POSITA renders the limitations of claim 7 obvious because it would be obvious, beneficial, and routine to provide an identification subsystem that provides an identifying signal for the same reasons set forth in under limitation 1[c]. Baker, ¶130; s*ee also* analysis for claim limitation 1[c] and claim 6.

As discussed with respect to claim element 1[c] above, two switches on each Rp_d resistor in the USB connector can be used to ensure that the USB port operates as a normal USB port, which can communicate (one of either D+ or D- is pulled high while the other is low), or a "High-power Port Hub" which cannot communicate (both D+ and D- are pulled high to provide an identification signal to the connected device) and only supplies power to a connected mobile device. Baker, ¶130. In the latter case, the identification signal must be provided to the connected device to inform the connected device that it's connected to a "High-power Port Hub," because normal USB communications are not possible, as discussed above in claim element 1[c]. A POSITA would have known that R_{pd} resistors on the data lines in the primary USB connector 21 of Morita can be a hardwired connection of a voltage level, that is, connected without a switch (see image below), if the USB port would only be serving as a USB adapter for providing power to a mobile device. This is a simple and obvious modification to Morita in the case where Morita is to be only a USB adapter and thus not have USB host or hub connectivity.



USB 1.1 at 113 (annotated portion of Figure 7-10).

Further, claim 7 differs from claim 1 in that its wherein clause states that "the identification subsystem comprises a hard-wired connection of a voltage level to one or more data lines in the primary USB connector." As Section V.III.A.1.c explains, it would be obvious to employ selectable pull-up and pull-down resistors as part of the USB port 21 to selectively provide an SE1 signal when Morita's charger does not have a connection on USB port 20, *i.e.*, it is acting as an USB adapter and not a USB host or hub. It would be obvious to modify Morita to be only a USB adapter without USB host or hub connectivity as well. As the below explains, in this case, it would be obvious to hard-wire a voltage high to the data lines in the primary USB connector to fix the signal state as a SE1.

Part of the Morita adapter's benefit is the simplicity of connecting the mobile phone to the adapter. *See* Morita, Fig. 2. Indeed, Morita touts that "the mobile videophone device 100 can be easily connected to the charger and a USB-connectable external device by simply placing the mobile ideophone device 100 on the charger 110, and when the mobile videophone device 100 receives an incoming call, the mobile videophone device 100 can be easily removed from the charger 110 to respond to the incoming call." *Id.* at [0016]. Accordingly, Morita teaches one benefit of its adapter's is the simple and convenient connection to charge the mobile phone. What's more, Morita clearly states that the adapter can charge the mobile phone with the power socket (through the power supply cable 22 that connects to a wall socket), and thus does not require any host USB connection via USB port 20 to accomplish its charging function. *Id.* Accordingly, Morita itself teaches to a POSITA that it still would be beneficial to use its adapter only as a charger without any USB host connection. Baker, ¶¶116, 118.

Obviously, it would be less expensive to manufacture Morita's device without the additional USB 20 port for a host USB connection and all the accompanying circuitry and hardware for implementing the host connection through USB port 20 (e.g., the switching means 26). Thus, in the case of implementing Morita to achieve the charging convenience through its adapter separate and apart from any host USB connection, it would be obvious to implement Morita without USB ports 20 and 24 for host USB functionality. In such a case, there is not the possibility of USB communication between USB ports 21 (adapter's USB connector) and 13 (mobile phone connector) because the system excludes any host USB. *See* Section VI.A. In such a case, the only use of the data lines is to signal the SE1 state and thus a POSITA would hard-wire the data lines to logic high. In other words, there would be no point to add the additional selectable pull-down resistors (see claim 1 description) that would add additional cost.

8. Claim 8. The USB adapter of claim 1, wherein the identification subsystem comprises a USB controller that is configured to provide a voltage level to one or more data lines in the USB connector.

The wherein clause of claim 8 differs from claim 1 in that it requires the "identification subsystem comprises a USB controller that is configured to provide a voltage level to one or more data lines in the USB connector." For the same reasons as set forth in limitation 1[d], it would be obvious to include a USB controller to apply the voltage signals to the data lines. Baker, ¶131. Indeed, it would be understood that the USB controller applies the voltage to the data lines. *Id*. Specifically, Morita discloses that the adapter includes USB hub control unit 27 (i.e., an USB controller) that controls the USB port 21 (which connects to the mobile phone). Morita, [0015]. This USB controller, for example, transmits signals, attaches remotes devices, and determines the speed of devices. *Id.* at [0012]. Thus, it would be understood, and certainly obvious, that this USB controller (USB hub control unit 27) is part of the "identification subsystem" and is what would apply the high voltages to the data lines using pull-up resistors as discussed above in claim 1[c]. Baker, ¶133.

D+	D-	Port configuration
Low	Low	No device connected
High	Low	Full-speed
Low	High	Low-speed
High	High	Abnormal condition (SE1)

Moreover, as shown in the above table, in order to enter the state of SE1, both the D+ and D- lines have to be set above VOSE1 (min) which is 0.8 V. It is clear that the USB controller provides a voltage level to one or more data lines in order to enter or switch the state. Baker, ¶133.

9. Claim 9. The USB adapter of claim 1, wherein the identification subsystem further comprises a switch that is configured to couple the power output to the USB connector.

Morita renders claim 9 obvious in view of the knowledge of a POSITA. Baker, ¶134. Morita expressly discloses that its USB adapter (charger 110) provides USB HUB function capability. "The present invention relates to a charger capable of charging a mobile phone and coupling to an external device and more specifically relates to a USB format charger provided with a HUB function capable of connecting a plurality of external devices." Morita at Technical Field of Invention. Further, as discussed above in claim 1[c], the identification subsystem in Morita consists of USB hub control unit 27. A POSITA would have understood that within the USB hub control unit 27 is the control for the hub port power. Baker, ¶134. Indeed, USB 1.1 specifies hub port power control and states "Self-powered hubs may have power switches that control delivery of power downstream ports but it is not required. Bus-powered hubs are required to have power switches. A hub with power switches can switch power to all ports as a group/gang, to each port individually, or have an arbitrary number of gangs of one or more ports ." USB 1.1 at 255. That is, the USB specification suggests and allows for the claimed switches. Baker, ¶134. A POSITA would have been motivated to use such switches in light of the USB specifications suggestion to use them. *Id*. Moreover, a POSITA would have understood and found it obvious that Morita's adapter could include the claimed switches as expressly suggested and taught in the USB specification, i.e., switches that are configured to couple the power output to the USB connector (21 in Morita). *Id*.

10. Claim 10. The USB adapter of claim 9, wherein the identification subsystem is configured to cause the switch to disconnect the power output from the USB connector.

Morita renders claim 9 obvious in view of the knowledge of a POSITA. Baker, ¶135. A POSITA would have understood that a switch that is configured to couple the power output to the USB connector would only be useful, and thus a part of the USB adapter, if it could be both opened (to disconnect the power output from the USB connector) and closed (to reconnect the power output to the USB connector). Baker, ¶135.

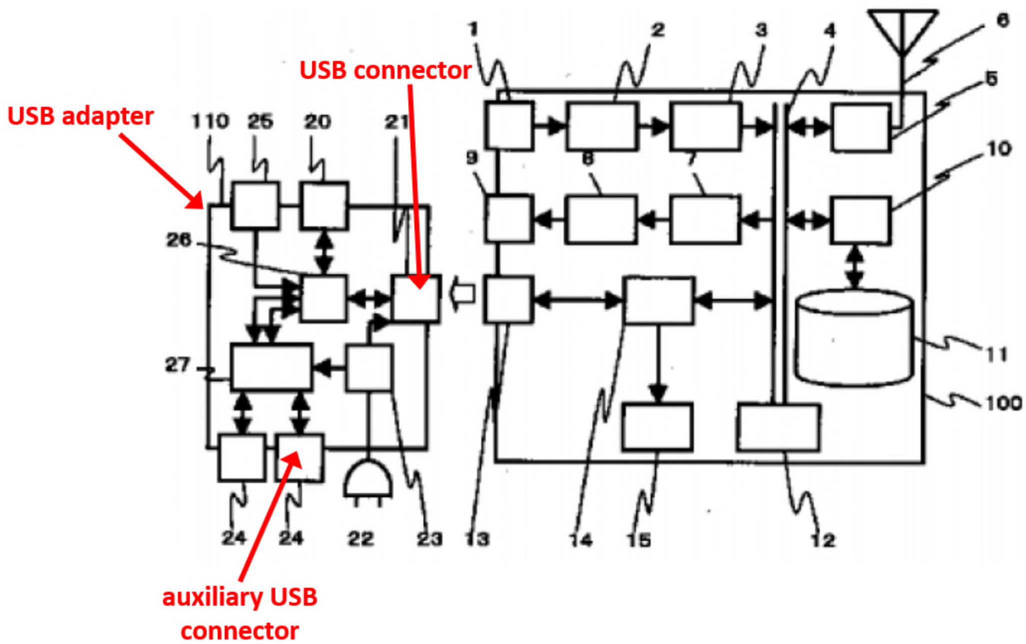
11. Claim 11. The USB adapter of claim 10, wherein the identification subsystem is configured to cause the switch to reconnect the power output to the USB connector.

See analysis for claim element 10 which explains that Morita in view of the knowledge of a POSITA discloses the identification subsystem is configured to cause the switch to reconnect the power output to the USB connector. Baker, ¶136.

12. Claim 12. The USB adapter of claim 1, further comprising an auxiliary USB connector.

Morita renders Claim 9 obvious in view of the knowledge of a POSITA. Baker, ¶137. Morita expressly discloses an auxiliary USB connector as, for example, USB port 24. Morita at Embodiment of Invention ("24 illustrates a third USB port for coupling devices such as a mouse, keyboard, and monitor . . ."); [0014] (". . . the second USB port 21 is connected to the USB port 13 of the mobile videophone device 100, and the third USB port 24 is connected to external peripherals such as a mouse and a keyboard.").

[FIG. 1]



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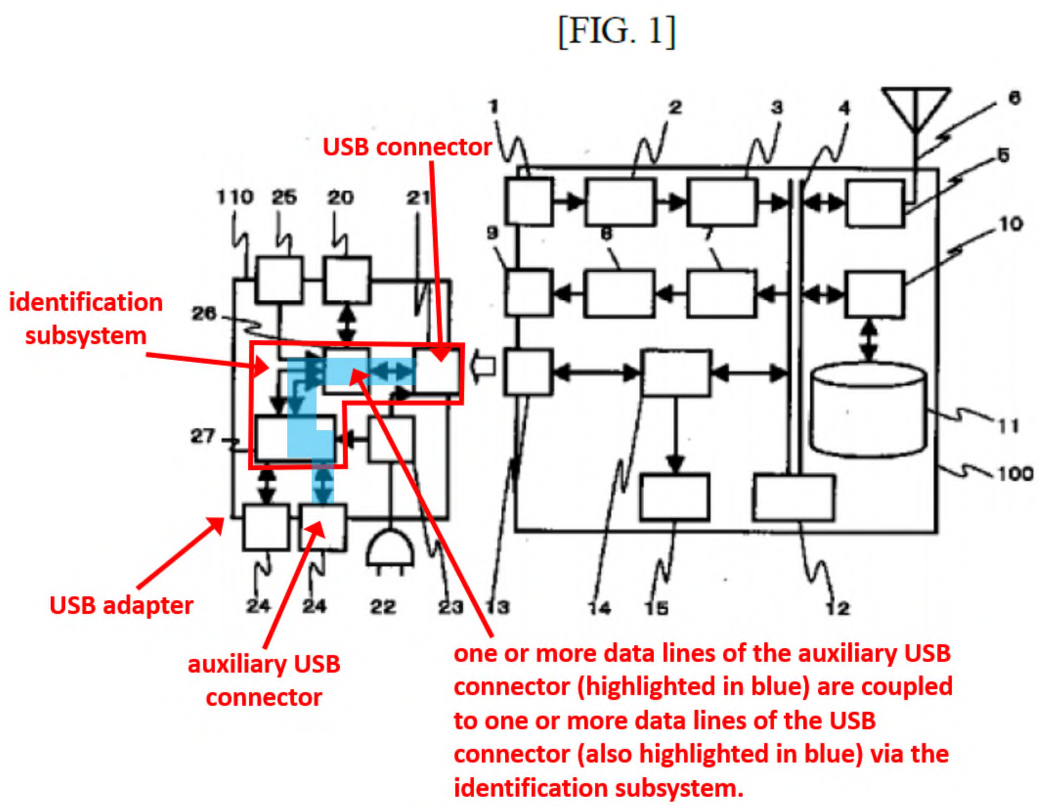
Morita FIG. 1 (annotated).

13. Claim 13. The USB adapter of claim 12, wherein one or more data lines of the auxiliary USB connector are coupled to one or more data lines of the USB connector via the identification subsystem.

Morita renders claim 13 obvious in view of the knowledge of a POSITA. Baker, ¶138. "The USB hub control unit 27 manages the connection of the first USB port 20, the second USB port 21, and the third USB port 24." "Also external peripherals (devices) connected to the third USB port 24 are connected as peripherals of the mobile videophone device 100." Morita at [0014]. As seen below in annotated FIG. 1 of Morita the data lines from the USB port, 24, are coupled (highlighted in blue) to the data lines of the USB connector, 21, through switching unit 26. A POSITA, as discussed above in the USB 1.1 background of the technology section, would have understood that a USB connector, such as 21 and 24 of Morita, has two data lines, D+ and D-. Baker, ¶138.



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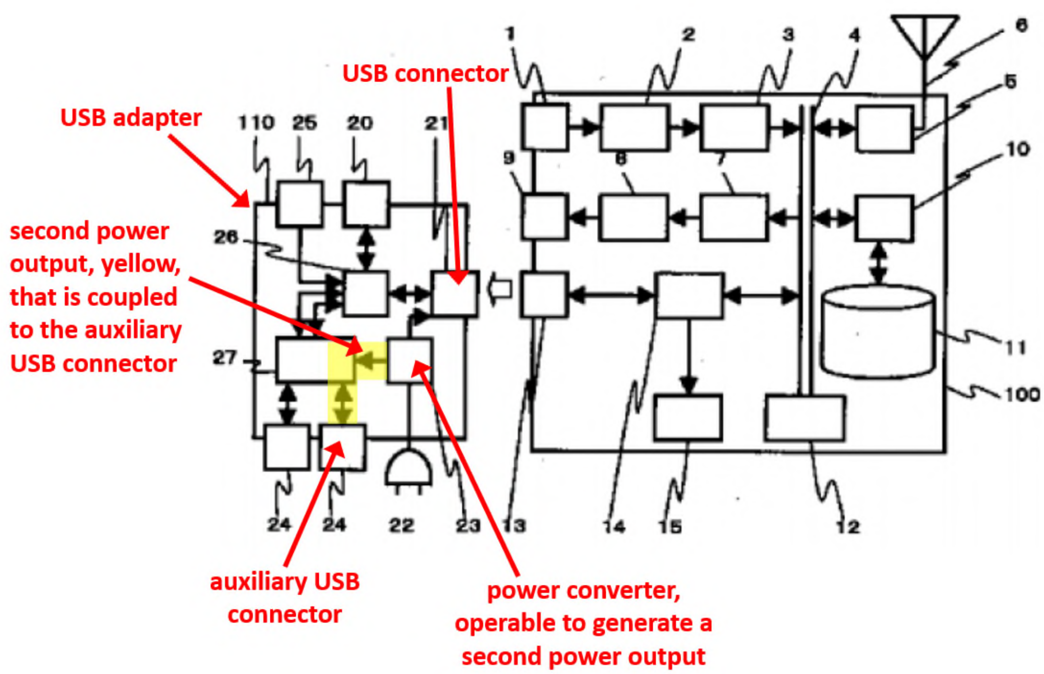
Morita FIG. 1 (annotated).

14. Claim 14. The USB adapter of claim 12, wherein the power converter is operable to generate a second power output that is coupled to the auxiliary USB connector.

Morita renders claim 14 obvious in view of the knowledge of a POSITA. Baker, ¶139. “A power supply voltage supplied from a power supply source is supplied from the charging control unit 23 to the USB hub control unit 27 and the second USB port 21." Morita at [0014]. "The charger 110 thus performs, as one device, a charging operation of the mobile videophone device 100 and an operation as a USB hub to which the first USB port 20 and the second USB port 24 are connected, and thus the number of connection ports of the power supply source is reduced, and space is saved." Morita at [0016]. A POSITA would have known, as discussed above in the USB 1.1 background section, that a device connected to USB port 24 (the claimed auxiliary USB connector) would be powered by the VBUS pin in the port. Baker, ¶139. Therefore, Morita's power converter (23 charging control unit) is operable to generate a second power output, as highlighted in yellow below, that is coupled to the auxiliary USB connector, USB port 24 of Morita's adapter. *Id*.

[FIG. 1]



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Morita FIG. 1 (annotated).

15. Claim 16. The USB adapter of claim 1, wherein the power converter comprises at least one component selected from the group consisting of: switching converter, transformer, DC source, voltage regulator, linear regulator and rectifier.

Claim 16 is also rendered obvious by Morita in view of the knowledge of a POSITA. Baker, ¶140.

Morita discloses a power converter that regulates the received energy from the power socket to generate a power output. *See* analysis with respect to claim element 1[b]. A POSITA would have understood that the charge control unit would contain at least one of the following circuits or circuit components to change the outlet voltage into the +5V VBUS voltage required in a USB connection: switching converter, transformer, voltage regulator, linear regulator, and/or rectifier. Baker, ¶140. A POSITA would have known that it is not possible to design a power converter that regulates power in the way Morita discloses without at least one of these components being a component in the power converter. *Id*. Thus, using one of the components recited in claim 16 would have been obvious and a mere design choice. *Id*.

16. Claim 17

a. 17[Pre]: A method for providing energy to a mobile device using a USB adapter that includes a USB connector for coupling the USB adapter to the mobile device, comprising:

As explained in connection with claim 1 above, Morita discloses a charger 110 ("adapter") for providing energy from a commercial power supply via an outlet ("power socket") power supply cable 22 ("plug unit"), power converter, and USB connector to a mobile device. *See* claim 1 analysis above. The mobile device 100 and charger 110 are coupled via USB connectors 13 and 23. *Id*. Morita discloses the device is "capable" of performing the functions for which it is designed, *e.g.,* charging the mobile phone. *See, e.g*., Morita, Abstract, [Claim 1], [0001]; Baker, ¶141. Moreover, Morita expressly discloses that the system "operates" as designed and discussed herein. Morita, [004], [0013], and [0014]-[0016]. Indeed, Morita's disclosure is from the viewpoint of how it operates. *See, e.g*., *Id*. [0016] ("the supplied power supply voltage ***is supplied*** to the mobile videophone device 100 via the USB port 21 ***to charge*** an internal battery…", "The charger 110 thus ***performs***, as one device, ***a charging operation*** of the mobile videophone device 100…") (emphasis added).

Thus, a POSITA would have understood Morita to disclose a method for using the charging system as disclosed to charge a mobile phone. That is, "a method for providing energy to a mobile device using a USB adapter that includes a USB connector for coupling the USB adapter to the mobile device." Baker, ¶141-142.

b. 17[a]: receiving a power input from a power socket;

See analysis for claim element 1[a], which explains that Morita discloses a plug unit that receives supplied power supply voltage ("power input") from an outlet ("power socket"). Morita, [0016].

c. 17[b]: generating a regulated DC power output from the power input;

See analysis for claim element 1[b] above.

d. 17[c]: generating an identification signal that is configured to indicate to the mobile device that the power socket is not a USB host or hub;

See analysis for claim element 1[c] above.

The high voltage levels ("identification signal") discussed in the analysis for claim element 1[c] is applied to data lines, D+ and D-. Baker, ¶145. As explained, it would have been obvious to a POSITA that high voltage levels applied ("generated on") to data lines, D+ and D-, would signal ("identification signal") to a mobile device (connected via a USB connector) that the power socket is not a USB host or hub. *Id*.

e. 17[d]: providing the identification signal on one or more data pins of the USB connector; and

See analysis for claim elements 1[c] and 6 above.

A POSITA would have understood, as taught in the USB 1.1 specification, that the data lines D+ and D- are connected to the data pins of a USB connector and thus "providing the identification signal on one or more data pins of the USB connector" as required by the claim element. *See* Section VI.A; Baker, ¶146.

f. 17[e]: providing the power output on one or more power pins of the USB connector.

A POSITA would have understood that Morita's power output was supplied on the VBUS pin of the USB connector as required by the USB specification and discussed above in the "Background of USB Technology and USB Specification Prior Art" section. Baker, ¶147.

17. Claim 18

a. 18[Pre]: A Universal Serial Bus ("USB") adapter for providing a source of power to a mobile device through a USB port, comprising:

To the extent the preamble is a limitation, *see* analysis for claim element 1[Pre] above.

b. 18[a]: means for receiving energy from a power socket;

See analysis for claim element 1[a], which explains that Morita discloses a plug unit configured to receive energy from a power socket.

c. **18[b]: means for regulating the received energy from the power socket to generate a power output;**

See analysis for claim element 1[b], which explains that Morita discloses a power converter that performs the recited function of claim element 18[b].

d. **18[c]: means for generating an identification signal that indicates to the mobile device that the power socket is not a USB hub or host; and**

See analysis for claim element 1[c], which explains that Morita discloses an identification subsystem that performs the recited function of claim element 18[c].

e. **18[d]: means for coupling the power output and identification signal to the mobile device.**

See analysis for claim element 1[d], which explains that Morita discloses a USB connector that performs the recited function of claim element 18[d].

IX. CONCLUSION

For the foregoing reasons, there is a reasonable likelihood that Petitioners will prevail as to the Challenged Claims of the '111 Patent. Accordingly, *inter partes* review of claims 1-14, and 16-18 is requested.

X. MANDATORY NOTICES – 37 C.F.R. §42.8

A. Real Party-in-Interest (37 C.F.R. §42.8(b)(1)))

The real parties-in-interest in this Petition are TCT Mobile (US), Inc.; TCT Mobile (US) Holdings, Inc.; Huizhou TCL Mobile Communication Co. Ltd.; and TCL Communication, Inc. Petitioners certify that no other party exercised control or could exercise control over Petitioners' participation in this proceeding, the filing of this Petition, or the conduct of any ensuing trial. Petitioner and the other listed real parties-in-interest do not dispute that the estoppel provisions apply to their subsidiaries.

B. Related Matters (37 C.F.R. §42.8(b)(2)))

To the best knowledge of the Petitioner, the '111 Patent is involved in the following litigation as of the filing date of this Petition:

- *Fundamental Innovation Systems International LLC v. Coolpad Group Limited, et al.,* No. 2:20-cv-00117 (E.D. Tex.).
- *Fundamental Innovation Systems International LLC v. Belkin, Inc., et al.,* No. 1:20-cv-00550 (D. Del.).
- *Fundamental Innovation Systems International LLC v. Lenovo (United States) Inc., et al.,* No. 1:20-cv-00551 (D. Del.).
- *Fundamental Innovation Systems International LLC v. TCT Mobile (US) Inc., et al,* No. 1:20-cv-00552 (D. Del.). Petitioner is the named Defendant in this pending case. Petitioner was served with the complaint in this action on April 23, 2020, and thus this Petition is timely under 35 U.S.C. §315(b).

C. Lead/Back-up Counsel (37 C.F.R. §42.8(b)(3))

Lead Counsel: Jeffrey Johnson USPTO Reg. No. 53,078

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Petitioners consent to service by electronic mail at the following addresses: 3J6PTABDocket@orrick.com, R75PTABDocket@orrick.com, and TCL-FISI_OHS@orrick.com. Petitioners' Power of Attorney is attached.

The USPTO is authorized to charge the filing fee and any other fees incurred by Petitioners to the deposit account of Orrick, Herrington & Sutcliffe LLP: 15-0665.

D. Service Information (37 C.F.R. §42.8(b)(4))

Please direct all correspondence to lead and backup counsel at the above address. Petitioners consent to electronic service at the email addresses above.

XI. GROUNDS FOR STANDING – 37 C.F.R. §42.104(A)

Petitioner certifies that: (i) the '111 Patent is available for IPR and (ii) Petitioner is not barred or estopped from requesting an IPR challenging the '111 patent's claims. Specifically, Petitioner certifies that: (1) no Petitioner entity or real party-in-interest has filed a civil action challenging the validity of any claim of the '111 patent; (2) Petitioner filed this petition within one year of the date they were served with a complaint asserting infringement of the '111 patent; and (3) the estoppel provisions of 35 U.S.C. § 315(e)(1) do not prohibit this IPR.

XII. FEES – 37 C.F.R. §42.15(A)

The Office is authorized to charge the filing fee and any other necessary fees that might be due in connection with this Petition to Deposit Account No. 15-0665 for the fees set forth in 37 C.F.R. §42.15(a).

Dated: December 31, 2020

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

By: */Jeffrey Johnson/*

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CERTIFICATE OF COMPLIANCE – 37 CFR § 42.24

Pursuant to 37 C.F.R. §42.24 *et seq*., the undersigned certifies that this document complies with the type-volume limitations. This document contains 13,450 words (excluding table of contents, table of authorities, listing of exhibits listing and certificates of service and word count) as calculated by the "Word Count" feature of Microsoft Word Office 365, the word processing program used to create it.

Dated: December 31, 2020

/*Jeffrey Johnson*/

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CERTIFICATION OF SERVICE ON PATENT OWNER

Pursuant to 37 C.F.R. §§42.6(e), 42.8(b)(4) and 42.105, the undersigned certifies that on December 31, 2020, a complete and entire copy of this Petition for *Inter Partes* Review of U.S. Patent 7,239,111 and all supporting documents and exhibits were served via Federal Express, postage prepaid, on the Patent Owner by serving the correspondence address of record for the '111 Patent:

BOTOS CHURCHILL IP LAW LLP
FISI
430 MOUNTAIN AVENUE, SUITE 401
NEW PROVIDENCE, NJ 07974

A courtesy copy was provided on December 31, 2020 to Patent Owner's litigation counsel in the action *Fundamental Innovation Systems International LLC v. TCT Mobile (US), Inc.; TCT Mobile (US) Holdings, Inc.; Huizhou TCL Mobile Communication Co. Ltd.; and TCL Communication, Inc.*, District of Delaware Case No. 1:20-cv-00552, pending between Petitioners and Patent Owner and involving the '111 Patent:

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