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. 6,936,936
Issue Date: August 30, 2005
Title: MULTIFUNCTIONAL CHARGER SYSTEM AND METHOD

Case No. IPR2021-_____

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT 6,936,936 CHALLENGING CLAIMS 1-3, 6, 12-18, 25, 26, 28-29, 32, 63, 84-86, 99, AND 101 UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104

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Exhibit	*Description*
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1002	U.S. Patent File History of the '936 Patent (the "'936 File History")
1003	Declaration of Dr. Jacob Baker regarding U.S. Patent No. 6,936,936 ("Baker")
1004	*Curriculum Vitae* of Dr. Jacob Baker
1005	U.S. Patent No. 7,239,111 (the "'111 Patent")
1006	U.S. Provisional Application No. 60/273,021 (the "'021 provisional")
1007	U.S. Provisional Application No. 60/330,486 (the "'486 provisional")
1008	Universal Serial Bus Specification, Revision 1.1, September 23, 1998 ("USB 1.1")
1009	Universal Serial Bus Specification, Revision 2.0, April 27, 2000 ("USB 2.0")
1010	U.S. Patent No. 6,531,845 ("Kerai")
1011	U.S. Patent No. 6,625,738 ("Shiga")
1012	U.S. Patent Application Publication No. 2003/0135766 ("Zyskowski")
1013	U.S. Patent No. 6,625,790 ("Casebolt")
1014	Cypress CY7C63722/23 CY7C63742/43 enCoRe™ USB Combination Low-Speed USB & PS/2 Peripheral Controller, by Cypress Semiconductor Corporation, published May 25, 2000 ("Cypress enCoRe" or "Cypress Datasheet")
1015	Japanese Patent Application No. 2000-165513A ("Morita")
1016	Amended Complaint, *Fundamental Innovation Systems Int'l LLC v. TCT Mobile (US) Inc. et al.*, No. 1-20-cv-00552-CFC (D. Del. Sep. 11, 2020) ("Complaint")
1017	U.S. Patent No. 6,668,296 ("Dougherty")
1018	U.S. Patent No. 5,923,146 ("Martensson")

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 1-3, 6, 12-18, 25, 26, 28-29, 32, 63, 84-86, 99, and 101 (the "Challenged Claims") of U.S. Patent No. 6,936,936 (the "'936 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 earliest possible priority date of the '936 Patent, but the Challenged Claims purport to "invent" a charger that provides "an identification signal." For example, the "identification signal" may comprise a logic high value on the two data lines of an USB connection and identify the adapter as a charging device that is not a USB host or hub. In some cases, the identification signal indicates that the USB specification limits do not apply to the charger (e.g., the signal indicates a power adapter that can source power through a wall socket instead of only through a USB host or hub). The Challenged Claims essentially do nothing more than allow a charger to conventionally provide power through a USB interface without appropriately following the USB Specification.

Notably, the Applicant did not tell the Examiner that (nor disclose the art in this Petition that establishes that) this "identification" signal was a well-known signal—known as a SE1 signal. Indeed, because the SE1 signal is "not a standard USB state," it was also known to use the SE1 signal in various contexts, including to identify a wake-up condition, a full power state, and presence of a PS/2 adapter. What's more, the Examiner was not made aware that this SE1 signal was known to "be easily distinguished from USB standard data signals," making it an ideal identification signal. Again, the Examiner was not made aware of this prior art. This Petition establishes that a charger using the SE1 signal as an identification signal was painfully obvious.

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, 12-18, 25, 26, 28-29, 32, 63, 84-86, 99, and 101 of the '936 Patent based on the following ground.

Ground	Claims	Basis	References
1	1-3, 6, 12-18, 25, 26, 28-29, 32, 63, 84-86, 99, and 101	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

As the below explains, the Board should not exercise its discretion to deny institution under 35 U.S.C. §§ 314(a), 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

The *Apple/Fintiv* factors support institution despite existence of a parallel district court litigation.

There is a parallel district court proceeding involving the '936 Patent (Ex. 1005) before Judge Connolly in the District of Delaware. Amended Complaint (Ex. 1016). 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, 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, IPR2019-01393, 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 January 11, 2021, which would tentatively calendar an institution date of approximately early July 2021 and final written decision date of approximately early July 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, 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, 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, weighs in favor of 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 ’936 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 ’936 Patent and related patents. Given the substantial impact that the ’936 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. 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 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, 8-9 (PTAB Dec. 20, 2019). Fourth, Petitioner was diligent in filing the current petition, promptly moving to file this Petition after receiving Patent Owner's selection of claims. Section X.B; *LG Electronics, Inc. v. Bell Northern Research, LLC*, IPR 2020-00319, Paper 15, 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 ’926 Patent. 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 ’936 PATENT

A. Disclosure of the ’936 Patent (Ex. 1001)

The ’936 Patent has 104 claims and contains many different formulations for an "[a]n adapter for providing a source of power to a mobile device through an industry standard port." ’936 Patent, 2:15-16. An "adapter" simply refers to a device that receives a power source (e.g., from a wall socket) and delivers the power to another device (e.g., a mobile device). *E.g.*, Abstract, 1:23-25. At its heart, the ’936 Patent relates to a standard USB adapter that simply ignores certain initiation protocols (i.e., enumeration) or limits that are required and defined in the USB Specification. *E.g., id.*, 1:48-63, 8:1-6, 8:60-9:4. To ignore these USB protocols or limits, the adapter sends an identification signal to inform the mobile device that the adapter is not a USB host or hub (which further indicates that it is not acting in compliance with the USB Specification). *Id.*, 8:60-9:4, 9:15-32. The ’936 Patent discloses several variations of the identification signal, such as “a logic high signal” on the USB data lines (known as a SE1 condition, *see* Section VI.A). *Id.*, 8:21-23; 9:21-25. The adapter is made of conventional components like a plug unit that attaches to a power socket, a power converter (e.g., that down-converts a standard AC wall voltage), and standard USB components. *See id.*, 7:3-56. The ’936 Patent alleges that an adapter configured in such a manner, namely, with an identification signal such as SE1, is allegedly new and non-obvious over prior art. *See, e.g., id.*, 2:31-3:19, Section IV.B (file history summary).

Figure 2, reproduced below, is a schematic diagram of the disclosed USB adapted (100) coupled to an exemplary mobile device (10). *Id.*, 3:23-24.

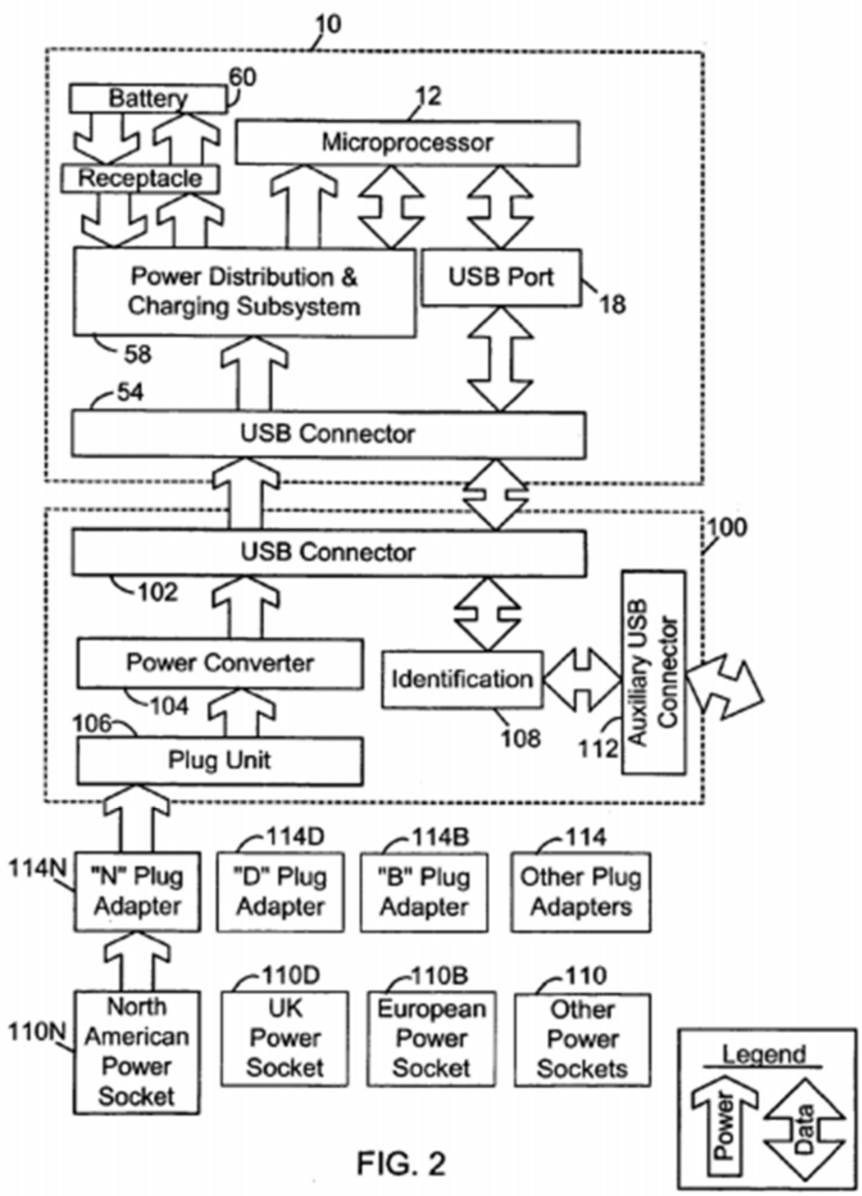


FIG. 2

B. Prosecution History of the '936 Patent (Ex. 1002)

The '936 Patent issued from U.S. Pat. App. No. 10/087,629. Ex. 1002 ("'936 File History"), 137. The below table correlates the independent issued claims that are being challenged in this Petition with the originally-filed claims:

Issued ’939 Independent Claim	Prosecution Claim
1	1
13	8
25	9
63	23
84	37
99	93
101	95

Id., 79.

On September 7, 2004, the Examiner rejected claims 1, 2, 4, 6, and 16-24 as anticipated by U.S. Patent No. 6,668,296 (“Dougherty”) and claims 3, 5, 13-15, 25-27, and 34-36 as obvious over Dougherty. *Id.*, 116-17. The Examiner objected to claims 7-12 and 28-33 for being based on an independent claim but noted they would be allowable if written in independent form. *Id.*

The Applicant used limitations in the allowable claims to ultimately obtain allowance of the issued claims. Allowable prosecution claim 7 recites “wherein the identification signal comprises a logic high signal on the D+ data line and a logic high signal on the D- line.” *Id.*, 27. This is known as a SE1 signal condition on the data lines. *See* Section VI.A. And allowable prosecution claim 8 recites “wherein the identification subsystem comprises a hard-wired connection of a voltage level to one or more data lines in the primary USB connector.” ’936 File History, 27. This is similar to the SE1 signal condition (logic high values on D+/- lines), but this limitation would require that the there is a hard-wiring of voltages that causes the

SE1 signal condition. Dougherty does not disclose the use of the USB date lines to provide an identification signal—unlike the prior art in this Petition.

On December 6, 2004, the Applicant entered an amendment. *Id.*, 83-108. A summary of the relevant amendments to this Petition are as follows:

Issued '939 Independent Claim	Prosecution Claim	Amendment
1	1	Added last limitation (identification signal comprises logic high on D+/D- lines, i.e., SE1 condition)
13	8	Rewritten to independent form, includes limitation of hard-wiring voltage level to data lines (D+/D- lines)
25	9	Amended to include that identification signal comprises logic high on D+/D- lines, i.e., SE1 condition
63	23	Amended to include that identification signal comprises logic high on D+/D- lines, i.e., SE1 condition
84	37	New claim, includes that identification signal comprises logic high on D+/D- lines, i.e., SE1 condition
99	93	New claim, includes that includes limitation of hard-wiring voltage level to data lines (D+/D- lines)
101	95	New claim, includes that USB is operable to provide voltage level to one or more data lines

Id.

As can be seen from above, issuance of the allowed claims was based on limitations requiring that the identification signal comprise applying voltage values to the USB data lines (D+/D-), e.g., the SE1 signal condition in which both lines are logic high values. As this Petition explains, however, using the SE1 signal condition as identifying signal was known and obvious, and moreover, in view of Morita (which was not before the Examiner during prosecution), it would have been obvious to use the SE1 signal as an identification signal.

On January 10, 2005, the Examiner allowed the claims without comment. *Id.*, 74.

C. Priority Date

The ’936 Patent claims priority through a series of continuations to two provisional applications: (1) the ’021 provisional (Ex. 1006), filed March 1, 2001; and (2) the ’486 provisional (Ex. 1007), filed October 23, 2001. Thus, the earliest potential priority date is March 1, 2001. The prior art in this Petition is prior art even assuming the priority date of the ’936 Patent is March 1, 2001.[1]

V. PERSON OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) of the subject matter of the ’936 Patent would have either 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 specifications, or a master’s degree in electrical engineering, computer science, or a related field, plus 1-2 years of experience in design of systems with

[1] 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.

USB or equivalent buses that follow the USB 2.0 and earlier specifications at the time of the ’936 patent’s priority date. Along with this petition, Petitioner submits the declaration of Dr. Jacob Baker, who has been a POSITA since at least the ’936 Patent’s claimed priority date. Baker (Ex. 1003) (“Baker”), ¶ 68.

VI. SUMMARY OF THE PRIOR ART

All elements of the challenged claims were well-known in the prior art before the priority date. As this Petition explains, it would have been obvious, and a POSITA would have been motivated with a high expectation of success, to combine these well-known elements to arrive at the Challenged Claims. The below first provides background on the USB specification and then details that using the signal, known as SE1 in the USB specification, to provide various indications was well known. The below then summarizes the Morita reference that discloses an USB adapter in which it would be obvious to use the SE1 signal as an identification signal.

A. Background of USB Technology and USB Specification Prior Art

The Universal Serial Bus Specification, Revision 1.1 was published by the USB Implementers Forum, Inc. on September 23, 1998 and therefore is prior art to the ’936 Patent under at least 35 U.S.C. §102(b). Ex. 1008, (“USB 1.1”), Cover Page, 2 (copyright and revision history); 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, 16. In other words, a host, with a root hub, is required in a functioning USB system (i.e., one in which communication occurs). 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 connecting Hub 1 to the Host via the Root Hub will not result in a function, and communicating, USB system. *Id.*

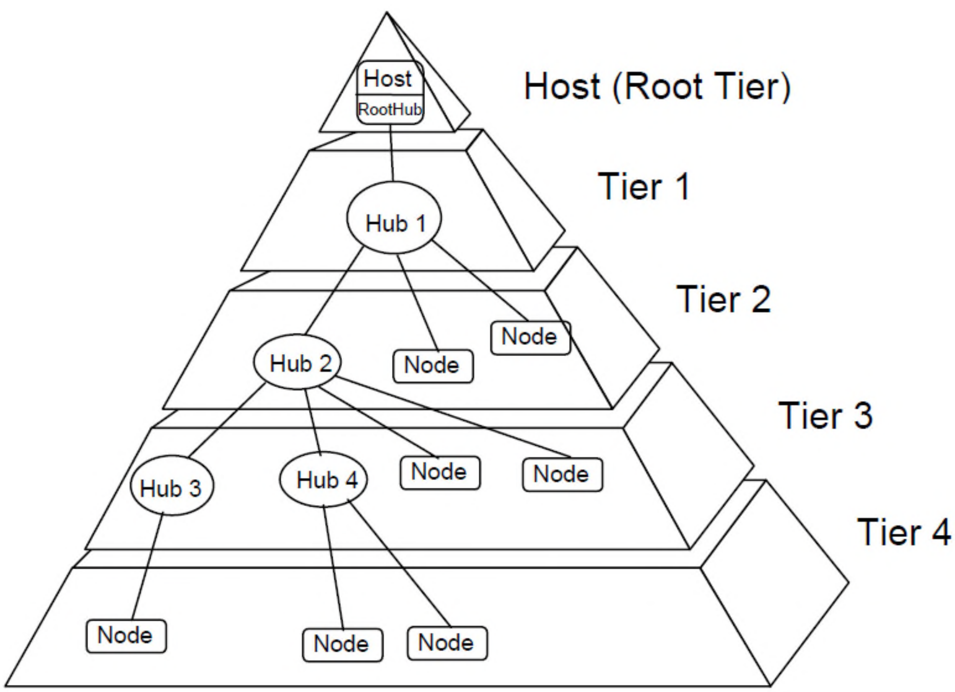


Figure 4-1. Bus Topology

USB 1.1, 16 (annotated).

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, 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.

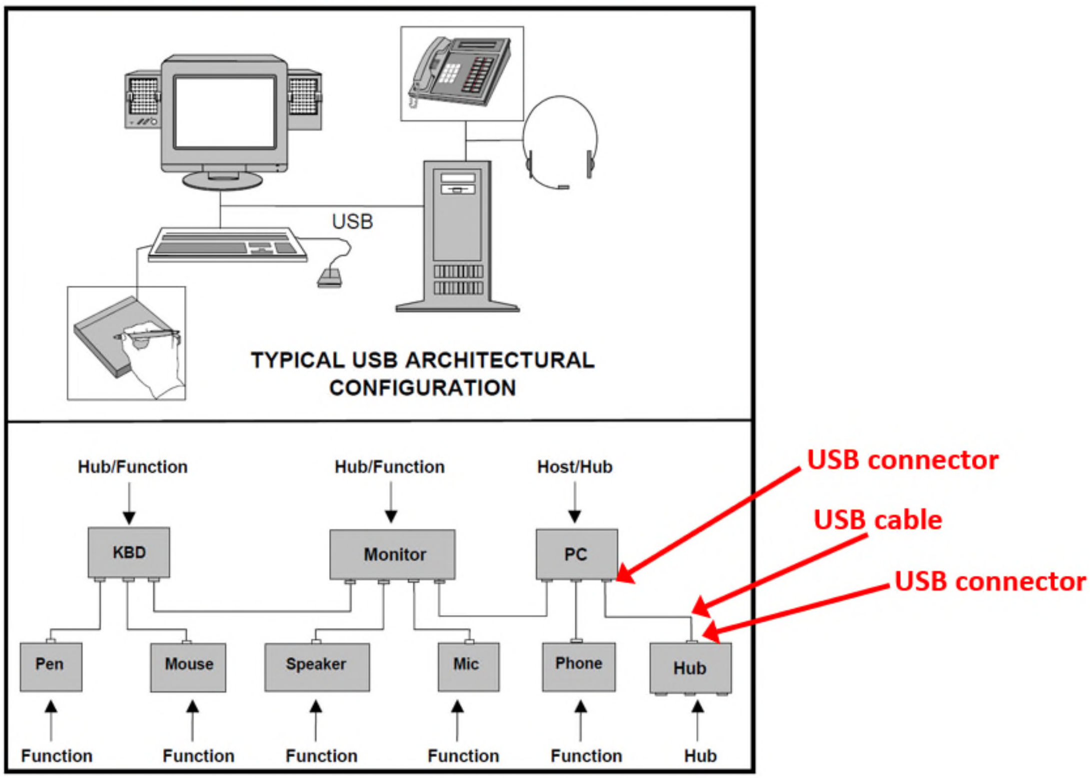


Figure 4-4. Hubs in a Desktop Computer Environment

USB 1.1, 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:

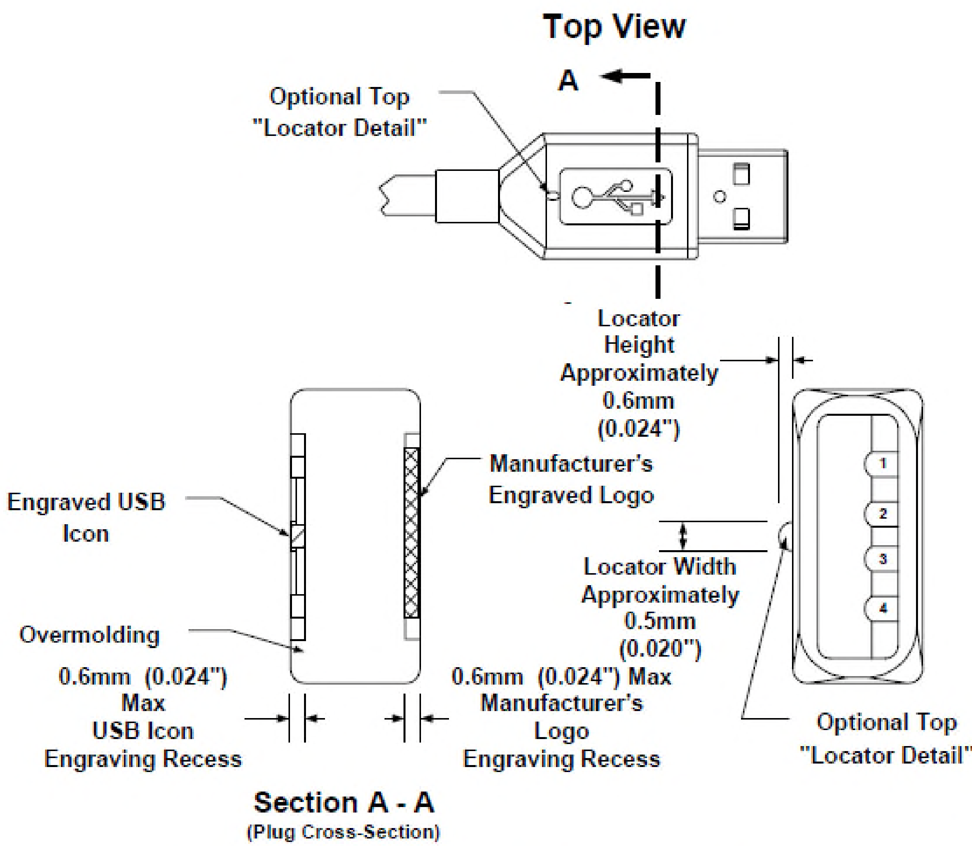


Figure 6-6. Typical USB Plug Orientation

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, 81-82.

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, 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, 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). USB 1.1, 3 ("Bus Enumeration - Detecting and identifying USB devices"). "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, 137. As Table 7-5 illustrates, 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. 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. Baker, ¶ 74.

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, 24 (annotated).

Newer USB specifications, such as the USB 2.0 Specification (USB 2.0) published on April 27, 2000[2], are fully backward compatible with devices built with previous versions of the specification, such as USB 1.1.

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, 11.

USB 1.1 discloses that an attached device can operate at "full-speed" or "low-speed." 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, 251. The specific nature of how D+ and D- are connected is discussed in detail below and in

[2] USB 2.0 is prior art to the '936 Patent under at least 35 U.S.C. §102(a). Ex. 1009, ("USB 2.0"), Cover Page, 2 (copyright and revision history). USB specifications were well-known and accessible standards. Baker, ¶ 69.

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, 256.

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, 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.”

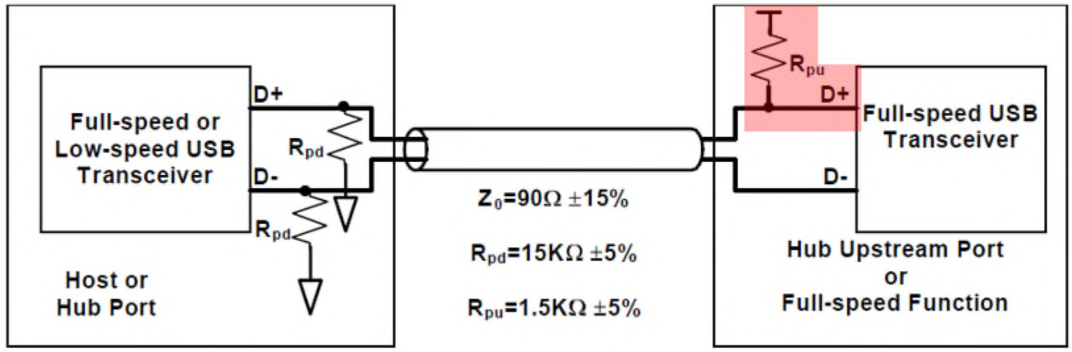


Figure 7-10. Full-speed Device Cable and Resistor Connections

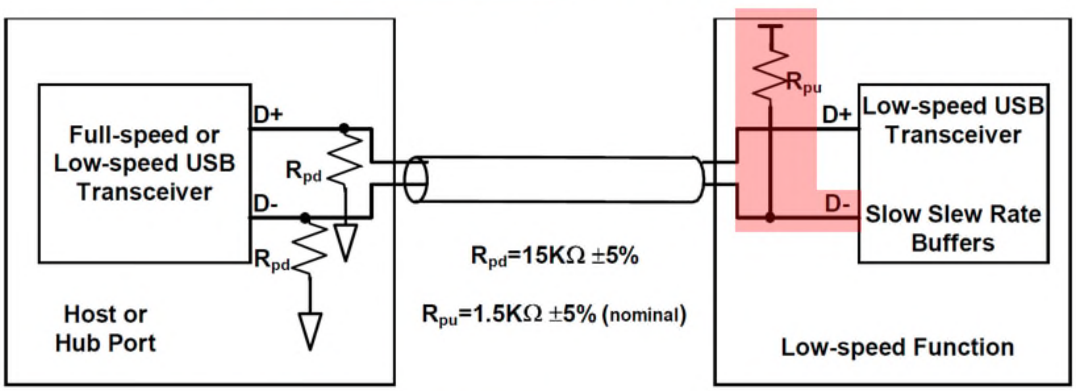


Figure 7-11. Low-speed Device Cable and Resistor Connections

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, 113. These resistors are annotated below and labeled R_{pd}.

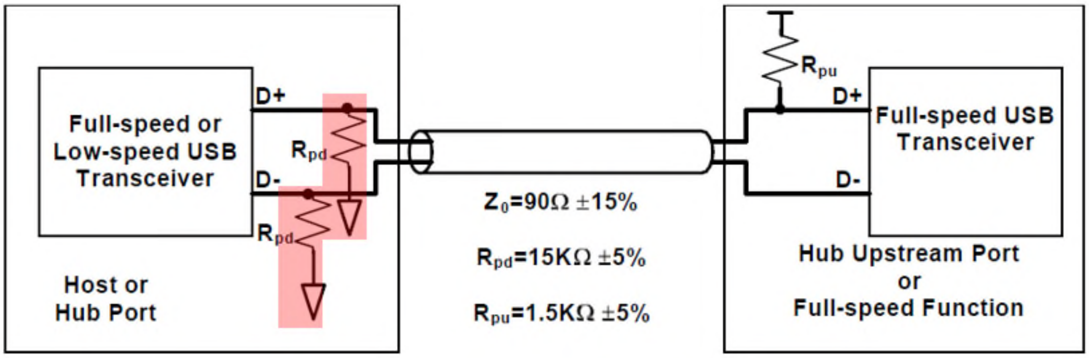


Figure 7-10. Full-speed Device Cable and Resistor Connections

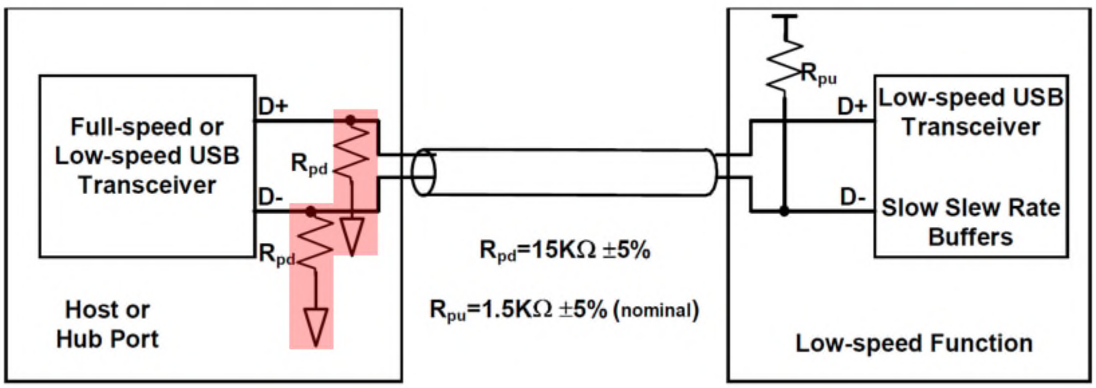


Figure 7-11. Low-speed Device Cable and Resistor Connections

USB 1.1, 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}. If both D+ and D- are at ground then no device is connected to the USB host or hub port. If D+ is pulled high and D- is at ground the connected device operates in full-speed. If D+ is at ground and D- is pulled high the connected device operates in low-speed. 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. 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, 123 (emphasis added). As the below explains, 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. This situation, SE1, is outside normal USB operation. *Id.*; Baker, ¶¶ 78-80.

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, 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, 178. The connected device, after being powered-up through the connection to the USB port though a USB cable, will not process commands until it receives a reset. However, if the connected device cannot communicate, because it is impossible for the host or hub to determine the communication speed, then the connected device cannot receive a reset command and thus cannot receive or process commands (to, for example, clear the set C_PORT_ENABLE bit which indicates the port speed cannot be determined or to power-down). ***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. Baker, ¶ 82.

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

B. Use of SE1 State in Various Contexts

As explained herein, the ’936 Patent teaches pulling USB D+ and D- lines high as an identification signal, which identifies that the adapter and/or power socket is not a host or hub. *See* Section IV.A. 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.

It was also well-known that one could use the SE1 condition as an identifying signal in various contexts. 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. None of the below references was before the Examiner during prosecution.

1. US Patent 6,531,845 ("Kerai") (Ex. 1010)

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. "**<u>As is well known</u>**, 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); Baker, ¶ 85.

2. US Patent 6,625,738 ("Shiga") (Ex. 1011)

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 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. This fourth mode signal is transmitted by a USB apparatus (*e.g.*, keyboard) to wake up a host computer. Shiga, Abstract, 6:35-47. 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, ¶¶ 86-87.

3. US Patent Application Publication US20030135766 ("Zyskowski") (Ex. 1012)

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 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 device (*e.g.*, computer) as an identification signal, specifically, to signal its full power state to a different device (*e.g.*, mass storage device, consumer electronic device). Zyskowski, ¶ 19; Baker, ¶ 88.

4. US Patent 6,625,790 ("Casebolt") (Ex. 1013)

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 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 identify and signal the presence of a PS/2 adapter. Casebolt, 7:40-54; Baker, ¶ 88-89.

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.

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 (Ex. 1014)

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.

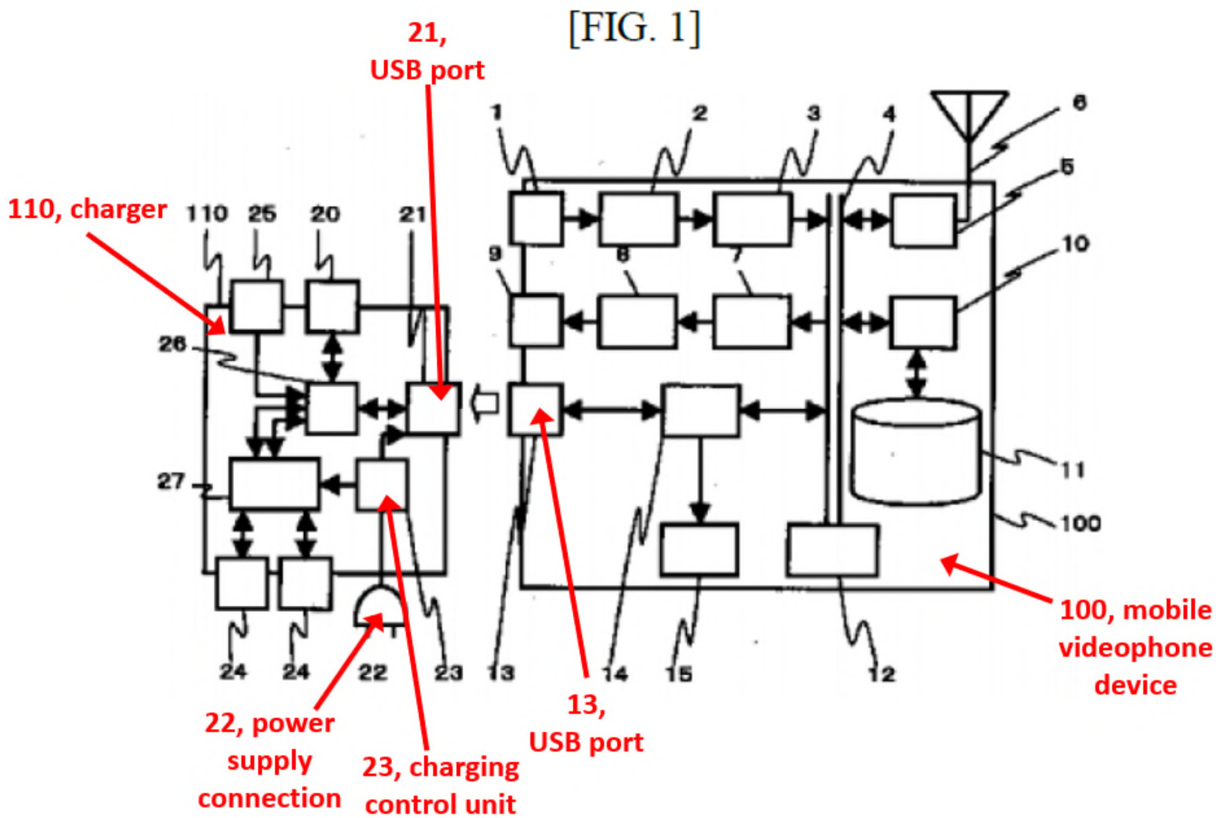
C. Overview of Morita (Ex. 1015)

Ex. 1015, Japanese Patent Application No. 2000-165513A ("Morita"), titled "Charger," was filed on November 30, 1998. Morita is prior art under at least 35 U.S.C. §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. 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.

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.*, [10013]-[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

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).

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 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 '936 Patent's specification and prosecution history, as would have been understood by a POSITA.

Note that in a prior litigation not involving Petitioner, USB was construed to mean Revision 2.0 and related versions of the USB specification. *Fundamental*

Systems International LLC v. Samsung Electronics Co., LTD, 2:17-cv-00145, 22 (E.D. Tex. 2018). The Court reasoned that "USB" "should be limited to the Universal Serial Bus standards that existed at the time of the claimed invention." *Id.*, 20. This construction is irrelevant to this Petition. USB 1.1 is a related version to USB 2.0 because like USB 2.0, it "existed at the time of the claimed invention"; thus, any prior art disclosures for USB 1.1 apply to the claimed USB terms. In any event, the power requirements for the ports are identical in both versions (*compare* Ex. 1008, 142 *with* Ex. 1009, 178), and thus the rationale for seeking to charge from a high-power port is equally applicable to USB 1.1 and 2.0. Finally, both USB 1.1 and 2.0 versions were well known at the time of the alleged invention (*see* Section VI.A.) and USB 2.0 is fully backward compatible with USB 1.1.

VIII. ANALYSIS

A. CLAIMS 1-3, 6, 12-18, 25, 26, 28-29, 32, 63, 84-86, 99, AND 101 ARE UNPATENTABLE AS OBVIOUS UNDER 35 U.S.C. §103 OVER MORITA AND THE KNOWLEDGE OF A POSITA

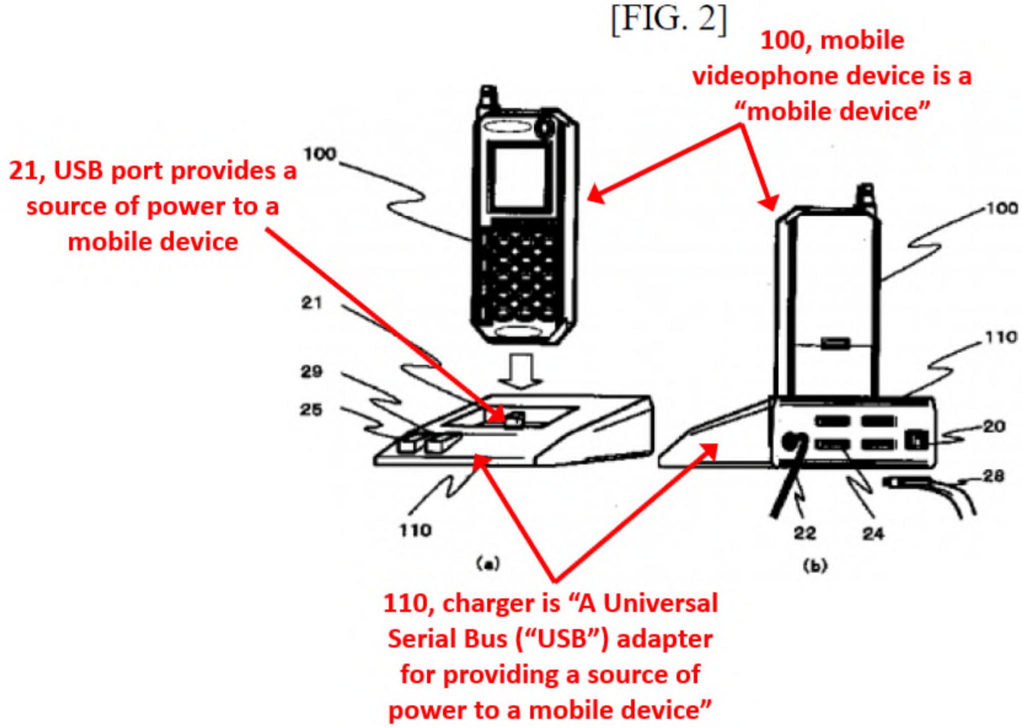
1. Claim 1

a. 1[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 of claim 1 is limiting, it is disclosed, or at a minimum, rendered obvious by Morita. Baker, ¶ 98. Morita discloses a charger 110 with USB ports for charging a mobile phone. Morita, [Claim 1], [Claim 2], [0010]-[0011]. "In FIG. 2, the mobile videophone device 100 is connected to the USB port

21 of the charger 110. . ." *Id.*, [0016]. "The charger 110 thus performs, as one device, a charging operation of the mobile videophone device 100 . . ." *Id.* The charger 110 receives power through power supply cable 22 (which connects, e.g., to an "outlet") and via the charging control unit 23, supplies power to the mobile device. *Id.*, [0014, 16]. Accordingly, a POSITA would have understood Morita's charger 110 to be a "A Universal Serial Bus ("USB") adapter for providing a source of power to a mobile device through a USB port." Baker, ¶ 98.

[FIG. 2]

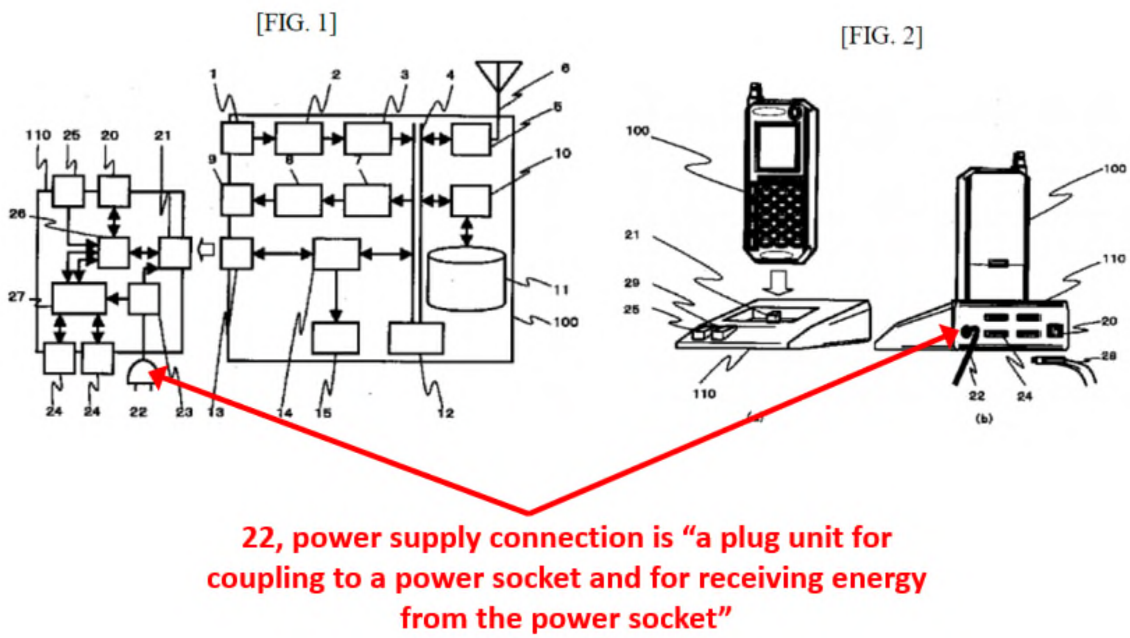


Morita, Figure 2 (annotated).

b. 1[a]: a plug unit for coupling to a power socket and for receiving energy from the power socket;

Morita discloses, and at a minimum, renders obvious this limitation.

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, ¶ 99. As can be seen below, the power supply cable 22 includes an interface to plug into an "outlet" (i.e., a "power socket"). *Id*., [0016].



Id., Figures 1 and 2 (annotated).

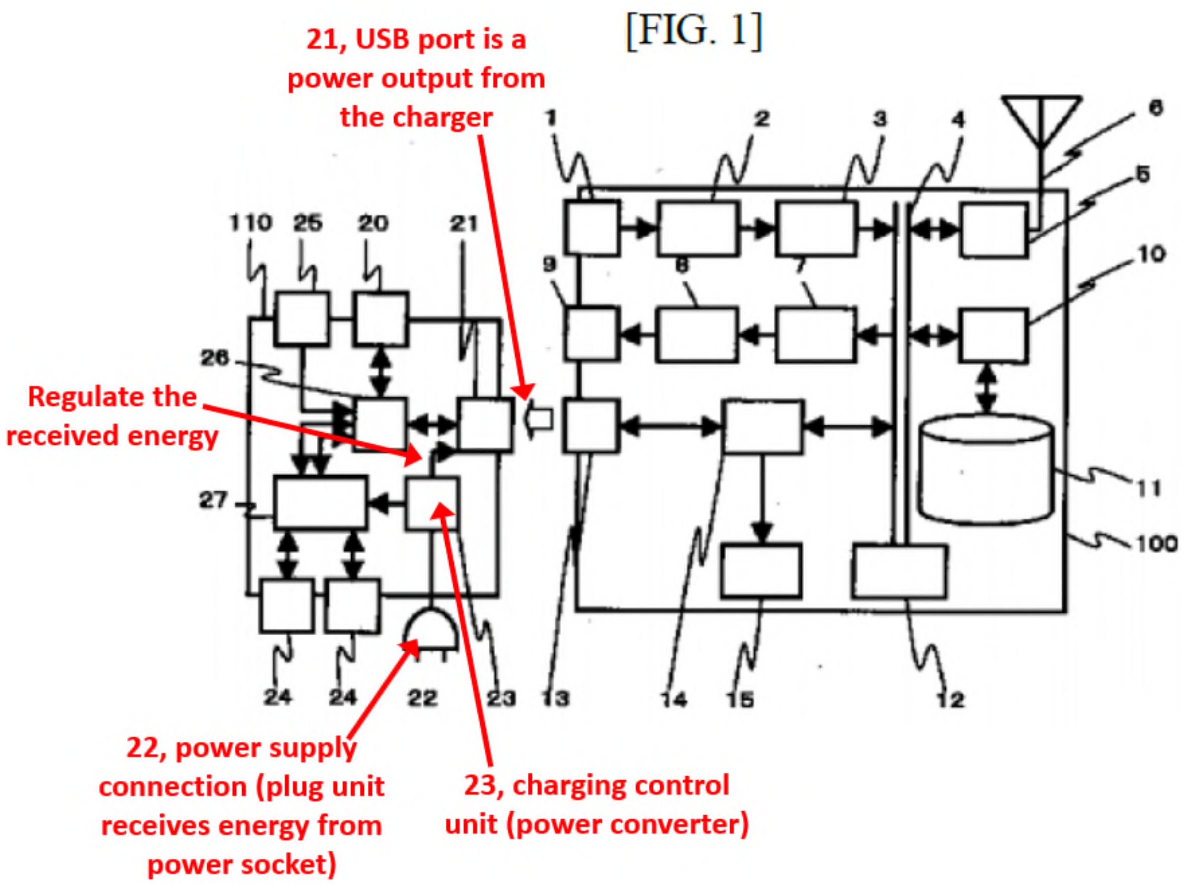
Second, Morita discloses that the power supply cable 22 "is connected to an outlet or the like connected to a commercial power supply" (the outlet being a "power socket"). *Id*., [0016]. In other words, the power supply cable 22 couples to the power socket. A POSITA would have understood, and certainly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

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, ¶ 99. 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 electrically coupled to the plug unit, the power converter being operable to regulate the received energy from the power socket and to output a power requirement to the mobile device;

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., 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.*, [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. 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, ¶¶ 100-01.

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, 142.

The received energy would have to be regulated to fall within this range of voltages. 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"). Baker, ¶ 101.

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" as the above explains. Baker, ¶ 101.

d. 1[c]: a primary USB connector electrically coupled to the power converter for connecting to the mobile device and for delivering the power requirement to the mobile device; and

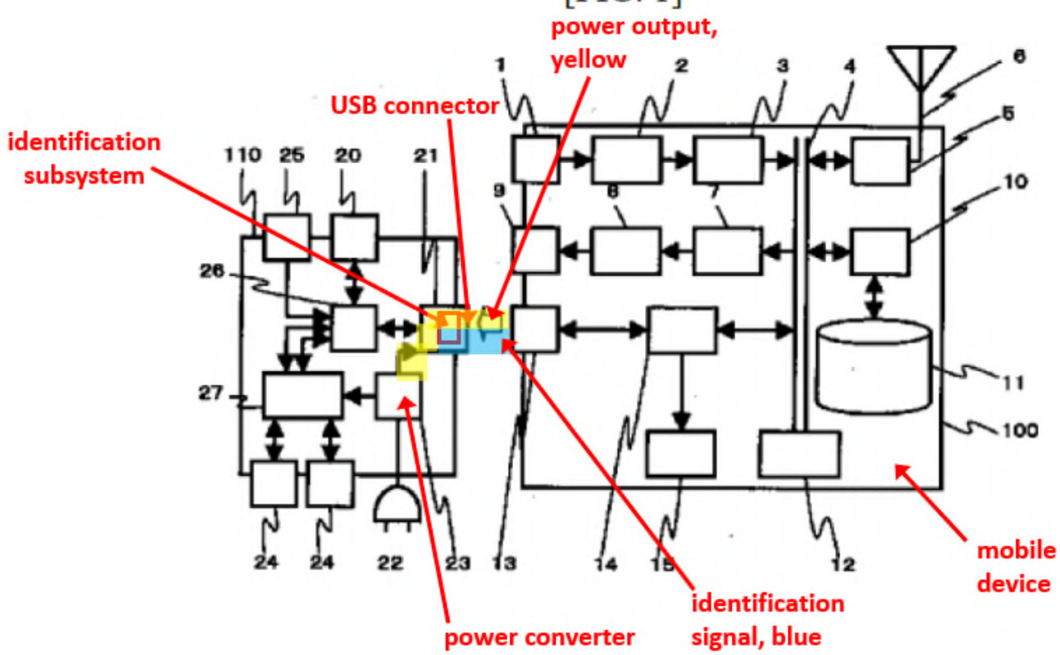
Morita discloses this limitation.

First, Morita discloses "USB port 21" (a "primary USB connector") that connects to charging control unit 23 (that is, is "coupled to the power converter"). Morita, [0016]. Second, Morita discloses that "the supplied power supply voltage is supplied to the mobile videophone device 100 via the USB port 21 to charge an internal battery." *Id.*, [0016]. In other words, the USB port 21 ("a primary USB connector")[3] is "for connecting to the mobile device and for delivering the power requirement to the mobile device" (the power flows through the USB connection). *Id.*

The yellow annotated shading seen below in Figure 1 shows the USB port 21 (a "primary USB connector") electrically coupled to charging control unit 23 ("the power converter") and for connecting to, and delivering the power requirement to,

[3] Note that the '936 Patent uses "primary USB connector" to refer to, and include, the USB connector of the adapter that couples to, and delivers power to, the mobile device. '916 Patent, 2:15-30.

the mobile device. Baker, ¶ 102. The identification subsystem and identification signal are discussed below in reference to limitation 1[d].



Morita, Figure 1 (annotated).

e. **1[d]: an identification subsystem electrically coupled to the primary USB connector for providing an identification signal at one or more data lines of the primary USB connector, wherein the identification signal comprises a voltage level that is applied to at least one of the data lines in the primary USB connector, and the identification signal comprises a logic high signal on the D+ data line and a logic high signal on the D− data line.**

Morita renders the limitations of claim element 1[d] obvious in view of the knowledge of a POSA. While Morita does not expressly disclose this limitation, it does disclose that a USB host or hub (e.g., a personal computer) is optionally connectable to the adapter. Morita, [0014-0015] (first USB port optionally connectable to a computer that functions as a USB host or hub). As the below explains, when the Morita adapter lacks a connection to a USB host or hub (e.g., a computer via USB port 20), 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 27 / USB port 21 as an identification subsystem "for providing an identification signal at one or more data lines of the primary USB connector" and the identification signal would be a SE1 signal state[4] (i.e., "the identification signal comprises a voltage level that is applied to at least one of the data lines in the primary USB connector, and the identification signal comprises a logic high signal on the D+ data line and a logic high signal on the D− data line"). Note that the USB specifications, at the time of the invention and Morita, required resistors as part of the USB architecture to manipulate the voltage levels on the D+ and D- lines, i.e., generate signals on the communication lines. Section VI.A. A POSITA would have understood that in order to comply with the USB specifications, Morita's system must have included those resistors. Baker, ¶ 111. As the below details, a POSITA would have understood the identification subsystem to have included the resistors that generate the identification signal, i.e., the SE1 signal. Baker, ¶¶ 111-13.

[4] The '936 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* '936 Patent, 9:16-32. Thus, it is indisputable that the SE1 signal qualifies is an example of an identification signal. Again, it was widely known to use the SE1 signal as an identification signal. *See* Section VI.B.

Morita's device is a "charger" and at least one of its stated objectives was to charge a connected mobile device. Morita, Abstract. 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). Indeed, often users just need to charger their mobile device. Baker, ¶ 105. 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 merely acting as a charger.[5] Morita, [0014-0015]. Without this optional connection, 1) normal USB communications through the USB adapter with a connected mobile device are not possible (USB communications require a USB host and root hub as discussed above in Section VI.A) and 2) powering the USB adapter from the absent, and unconnected, USB host or hub is not possible. Baker, ¶ 106. 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, at [0016]. Thus, in this common situation, the sole source of power to the connected device through Morita's adapter would

[5] Note that when Morita's adapter connects to the mobile phone to charge it under this ground, the mobile device would not act as the host USB, because that would mean the host (Morita's phone) would be responsible for providing power to the adapter. Baker, ¶ 105, n. 3. In other words, this obviousness ground considers Morita's adapter performing its charging function to charge the mobile device.

have to come from the power socket (outlet) via the plug unit (power supply cable 22). Baker, ¶ 106.

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 powered by a power socket and is not a USB host or hub. 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, ¶¶ 107-08. 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.

Given this, a POSITA would have been motivated, in this common situation where the power socket is not a USB host or hub (i.e., Morita's adapter without a connection via USB port 20), to identify this to the mobile device so that the mobile device could always know to charge from a "High-power Hub Port" to effectuate faster charging. Baker, ¶¶ 107-08.

It would have been obvious to use the SE1 signal state (i.e., logic high values on the data lines) to provide this identification. The data lines were already used to signal connection states. *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) are not possible when a USB host or hub is not connected to the USB adapter, and there is a mobile device connected to the USB adapter (so both D+ and D- cannot 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, to identify 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, ¶ 108.

Pulling both D+ and D- high[6], as discussed in Section VI.A, is an abnormal condition (SE1) since normal USB communications are not possible. Baker, ¶ 109.

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[6] As this analysis and Section VI.A. explains, the SE1 states involves pulling both data lines in the USB connector high (i.e., to a high voltage). Thus, the SE1 signal "comprises a voltage level that is applied to at least one of the data lines in the

A POSITA would have known, because SE1 is an abnormal condition and thus does not fall with normal USB operation, that it could be 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 adapter was not a USB host or hub and capable of operating as a High-power Hub Port. Baker, ¶¶ 108-09. What's more, the Morita adapter providing the SE1 device would further confirm and indicate that communication will not occur, but the signal results in the mobile device continuing to receive power over the power lines so that it can charge. *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). Baker, ¶ 110.

Indeed, holding D+ and D- high in this situation (for charging a battery and no communications) was known before the priority date of the '936 Patent. *See* Section VI.B., above. For 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."

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primary USB connector, and the identification signal comprises a logic high signal on the D+ data line and a logic high signal on the D− data line." Baker, ¶ 114.

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*., 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. 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.

And a POSITA would have understood how to pull D+ and D- high to provide the SE1 identifying signal. Baker, ¶¶ 111-13. 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, 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. The claimed identification subsystem configured to generate an identification signal, both D+ and D- pulled high, are the resistors, R_{pd}, connected high instead of to ground as indicated in the annotated figure seen below.

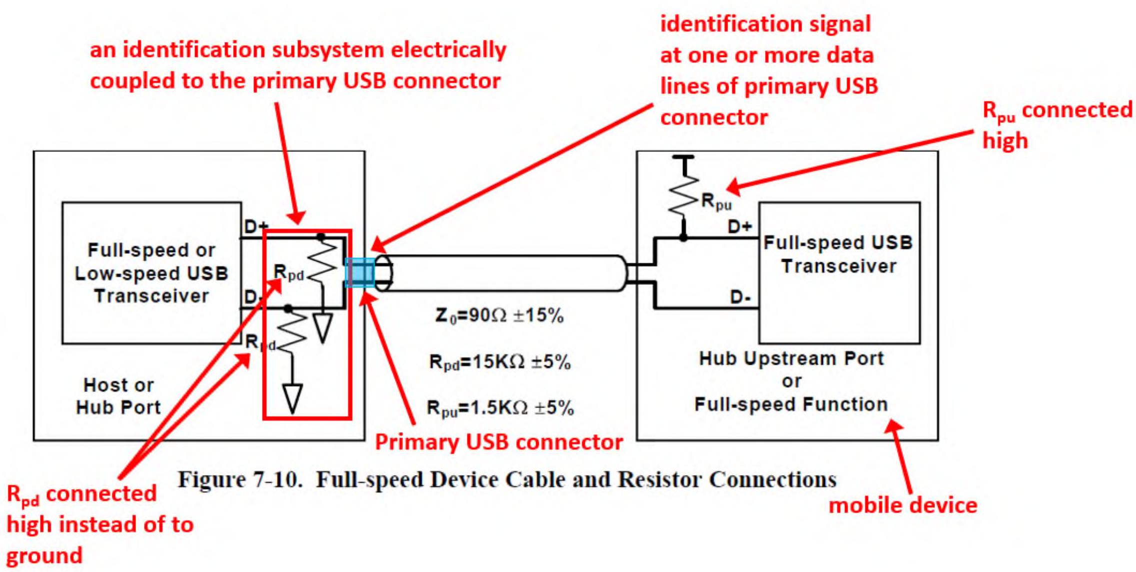
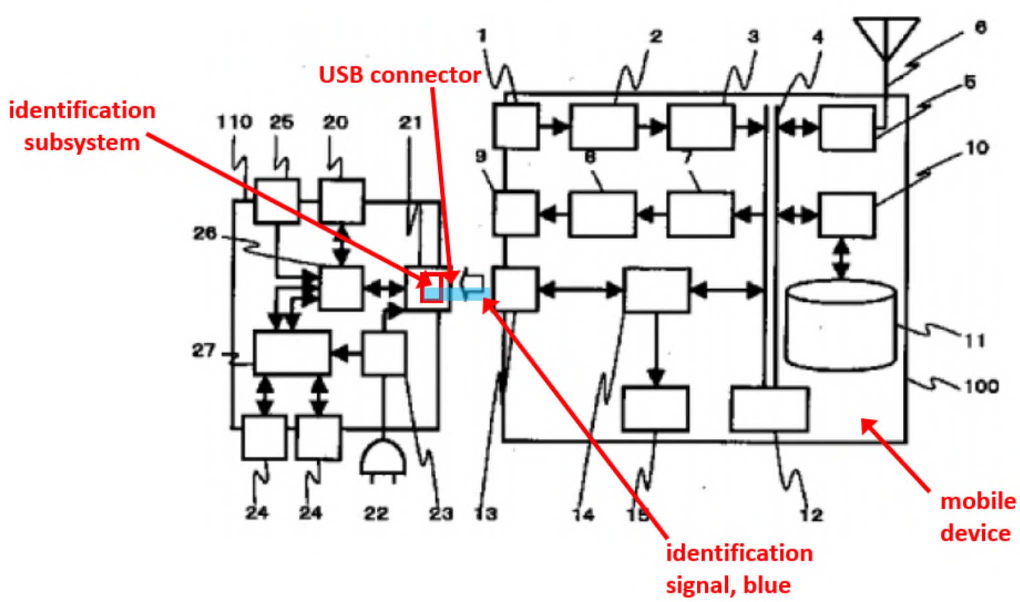


Figure 7-10. Full-speed Device Cable and Resistor Connections

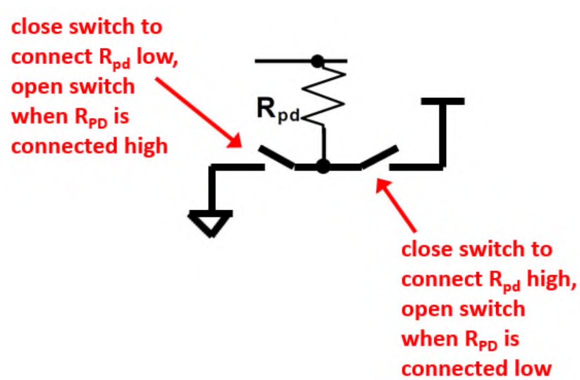
USB 1.1, 113 (annotated).

[FIG. 1]



Morita FIG. 1 (annotated).

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 must also connect low (to ground) as seen above in Figure 7-10 from USB 1.1. 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. Baker, ¶ 112.



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

In short, a POSITA would have understood, found obvious, and would have had a high expectation of success that this simple modification would have allowed Morita to maintain all of its stated functionality and operation, while adding the desired benefit of identifying and allowing charging to the common situation when no other USB host or hub was connected. Accordingly, for all of the reasons discussed above, a POSITA would have understood that Morita's system, in view of the knowledge of a POSA, would have rendered obvious the limitations of claim element 1[c]. Baker, ¶¶ 106-13,

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

Morita discloses this limitation.

A POSITA would have understood that the power supply cable 22 ("plug unit") would be directly coupled with the outlet ("power socket"). Baker, ¶ 115. For example, Morita states that the two are "connected." *Id.*, [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.*, Figure 1.

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.

Morita renders this limitation obvious.

Morita expressly discloses coupling the power supply cable 22 ("plug unit") directly with an outlet ("power socket") that receives commercial power. *Id.*, [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.*, Figure 1. 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, ¶ 116. 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 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.

Morita renders claim 6 obvious in view of the knowledge of a POSA.

As discussed in the analysis for claim element 1[d] (Section VIII.A.1.e), it would be obvious to provide an identification signal by pulling data lines D+ and D- high through resistors, R_{pd}, like resistor R_{pu} (which is pulled high to a terminating voltage V_{TERM}) instead of being connected to ground as illustrated below. Baker, ¶ 117.

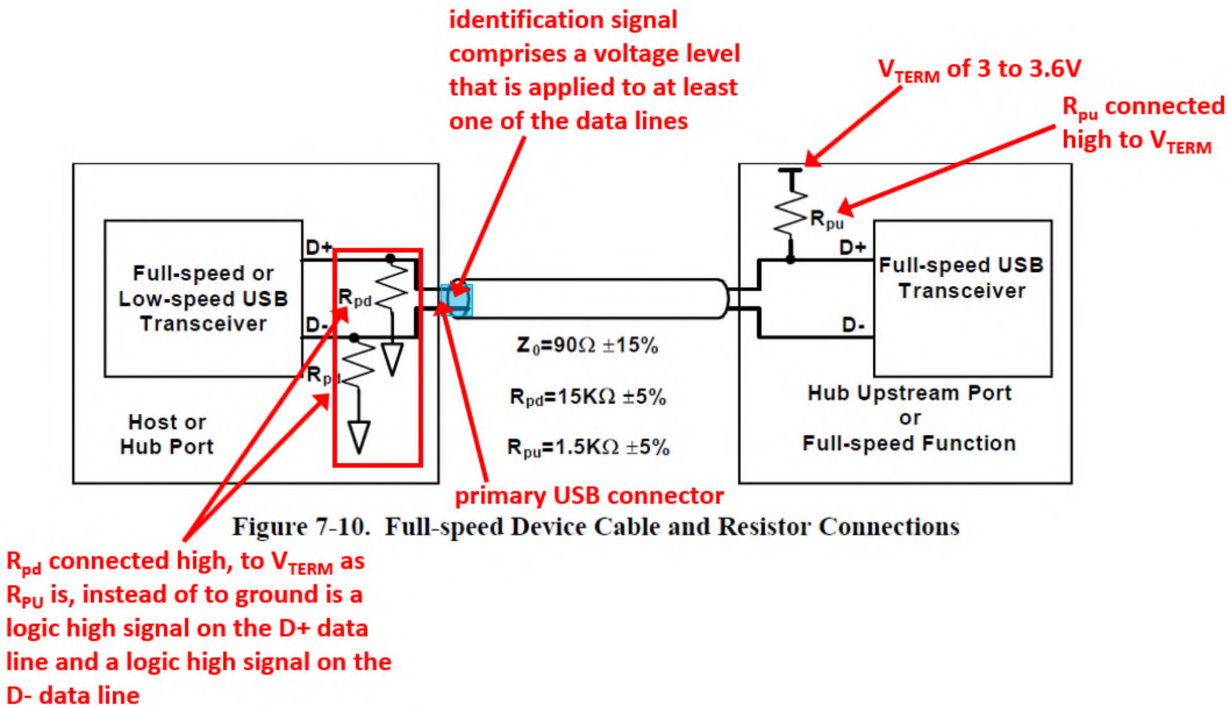


Figure 7-10. Full-speed Device Cable and Resistor Connections

USB 1.1, 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, 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, ¶ 117.

5. Claim 12. 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.

Morita renders obvious this limitation.

Morita discloses a power converter (Morita's "charge control unit") that regulates the received energy from the power socket to generate a power output. *See* analysis with respect to claim element 1[b] (Section VIII.A.1.c). A POSITA would have understood that Morita's charge control unit would contain at least one of the following circuits or circuit components to change the outlet voltage, e.g., from a wall power socket of 110 V, into the +5V VBUS voltage required in a USB connection: switching converter, transformer, voltage regulator, linear regulator, and/or rectifier. 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. Baker, ¶ 118. Thus, using one of the components recited in claim 12 would have been obvious and a mere design choice. *Id.*

6. Claim 13.

a. 13 [Pre]: 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 of claim 13 is limiting, it is disclosed, or at a minimum, rendered obvious by Morita. *See* analysis for claim limitation 1[Pre], Section VIII.A.1.a (identical limitation).

b. 13[a]: a plug unit for coupling to a power socket and for receiving energy from the power socket;

Morita discloses, and at a minimum, renders obvious this limitation. *See* analysis for claim limitation 1[a], Section VIII.A.1.b (identical limitation).

c. 13[b]: a power converter electrically coupled to the plug unit, the power converter being operable to regulate the received energy from the power socket and to output a power requirement to the mobile device;

Morita renders this limitation obvious. *See* analysis for claim limitation 1[b], Section VIII.A.1.c (identical limitation).

d. 13[c]: a primary USB connector electrically coupled to the power converter for connecting to the mobile device and for delivering the power requirement to the mobile device; and

Morita discloses this limitation. *See* analysis for claim limitation 1[c], Section VIII.A.1.d (identical limitation).

e. 13[d]: an identification subsystem electrically coupled to the primary USB connector for providing an identification signal at one or more data lines of the primary USB connector, wherein the identification subsystem comprises a hard-wired connection of a voltage level to one or more data lines in the primary USB connector.

Morita renders the limitations of claim element 13[d] obvious in view of the knowledge of a POSITA.

The first part of this limitation ("an identification subsystem electrically coupled to the primary USB connector for providing an identification signal at one or more data lines of the primary USB connector") is identical to claim limitation 1[d]. Morita in view of the knowledge of a POSITA render this limitation 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[d]. *See* analysis for claim limitation 1[d], Section VIII.A.1.e (identical limitation before the "wherein" clause). As the below explains, claim 13 requires a different identification subsystem than set forth in claim 1.

Claim 13 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 connection." As Section VIII.A.1.e explains, it would be obvious to employ selectable pull-up and pull-down resistors as part of the USB port 21 / controller 27 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 (there are no USB data communications). It would be obvious to modify Morita to be always and 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.

To start, 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.*, [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 a as charger without any USB host connection. Baker, ¶¶ 124-26.

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), as well as take less time and result in a smaller device. Baker, ¶ 127. 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 hardwire 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, and instead hardwire the data lines to a high voltage through pull-up resistors.

7. Claim 14. The USB adapter of claim 13, wherein the plug unit is configured to couple directly with the power socket.

Morita discloses this limitation. *See* analysis for claim limitation 2, Section VIII.A.2 (identical limitation).

8. Claim 15: The USB adapter of claim 13, 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.

Morita renders this limitation obvious. *See* analysis for claim limitation 3, Section VIII.A.3 (identical limitation).

9. Claim 16: The USB adapter of claim 13, further comprising a plug adapter that is configured to couple the plug unit to the power socket.

Morita discloses this limitation. *See* analysis for claim limitation 4, Section VIII.A.4 (identical limitation).

10. Claim 17: The USB adapter of claim 16, 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.

Morita renders this limitation obvious. See analysis for claim limitation 3, Section VIII.A.3 (identical limitation).

11. Claim 18: The USB adapter of claim 13 wherein the identification signal comprises a voltage level that is applied to at least one of the data lines in the primary USB connector.

Morita discloses this limitation. *See* analysis for claim limitation 6, Section VIII.A.4 (identical limitation).

12. Claim 25

a. 25 [Pre]: 25. 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 of claim 25 is limiting, it is disclosed, or at a minimum, rendered obvious by Morita. *See* analysis for claim limitation 1[Pre], Section VIII.A.1.a (identical limitation).

b. 25 [a]: a plug unit for coupling to a power socket and for receiving energy from the power socket;

Morita discloses, and at a minimum, renders obvious this limitation. *See* analysis for claim limitation 1[a], Section VIII.A.1.b (identical limitation).

c. 25 [b]: a power converter electrically coupled to the plug unit, the power converter being operable to regulate the received energy from the power socket and to output a power requirement to the mobile device;

Morita renders this limitation obvious. *See* analysis for claim limitation 1[b], Section VIII.A.1.c (identical limitation).

d. 25 [c]: a primary USB connector electrically coupled to the power converter for connecting to the mobile device and for delivering the power requirement to the mobile device; and

Morita discloses this limitation. *See* analysis for claim limitation 1[c], Section VIII.A.1.d (identical limitation).

e. 25 [d]: an identification subsystem electrically coupled to the primary USB connector for providing an identification signal at one or more data lines of the primary USB connector, wherein the identification subsystem comprises a USB controller that is operable to provide a voltage level to one or more data lines in the primary USB connector.

Morita renders the limitations of claim element 25[d] obvious in view of the knowledge of a POSITA.

The first part of this limitation ("an identification subsystem electrically coupled to the primary USB connector for providing an identification signal at one or more data lines of the primary USB connector") is identical to claim limitation 1[d]. Morita in view of the knowledge of a POSITA render this limitation 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[d]. *See* analysis for claim limitation 1[d], Section VIII.A.1.e (identical limitation before the "wherein" clause).

The wherein clause of claim 25 differs than the claim 1's wherein clause in that it requires the "identification subsystem comprises a USB controller that is operable to provide a voltage level to one or more data lines in the primary USB connector" (and lacks the requirement of the identification specifically requiring logic high values on the data lines). For the same reasons as set forth in limitation 1[d], it would be obvious to include a USB controller to apply the high voltage signals to the data lines. Indeed, it would be understood that the USB controller applies the high voltage to the data lines. 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.*, [0012]. Thus, it would be understood, and certainly obvious, that this USB controller is part of the "identification subsystem" and is what would apply the high voltages to the data signals lines (in other words, the pull-up resistors would be part of this USB controller to effectuate the SE1 condition or would be part of the USB port 21, but in either case, because USB hub control unit

27 transmits signals, the USB hub control unit would be part of the identification subsystem). Baker, ¶ 139.

13. Claim 26: The USB adapter of claim 25, 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.

Morita renders obvious this limitation. *See* analysis for claim limitation 12, Section VIII.A.12 (identical limitation).

14. Claim 28: The USB adapter of claim 25, wherein the plug unit is configured to couple directly with the power socket.

Morita discloses this limitation. *See* analysis for claim limitation 2, Section VIII.A.2 (identical limitation).

15. Claim 29: The USB adapter of claim 25, 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.

Morita renders this limitation obvious. *See* analysis for claim limitation 3, Section VIII.A.3 (identical limitation).

16. Claim 32: The USB adapter of claim 25 wherein the identification signal comprises a voltage level that is applied to at least one of the data lines in the primary USB connector.

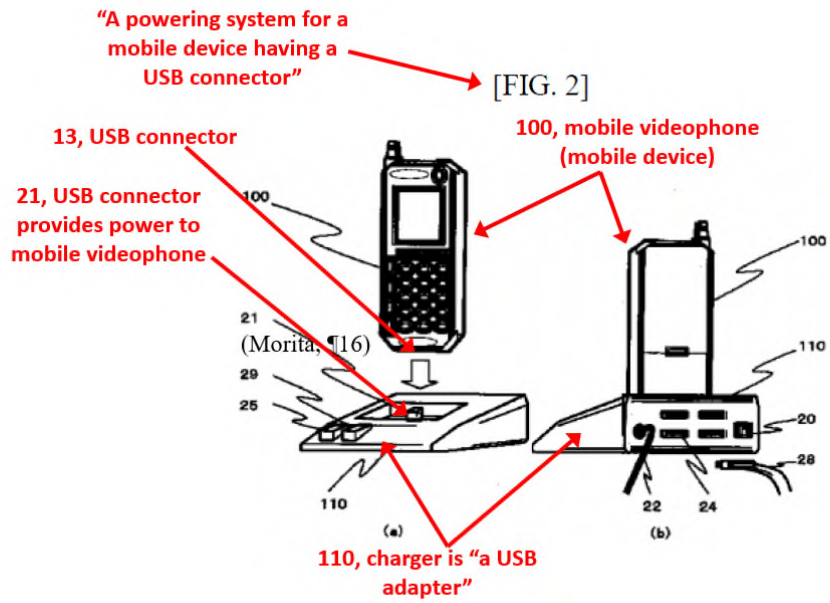
Morita discloses this limitation. *See* analysis for claim limitation 25(d), Section VIII.A.12.e (describing that the identification signal is a high voltage level, i.e., SE1, which applies to the data lines on primary USB connector plug 21 in Morita).

17. Claim 63

a. 63[Pre]: A powering system for a mobile device having a USB connector; comprising:

To the extent the preamble of claim 63 is limiting, it is disclosed, or at a minimum, rendered obvious by Morita. *See* analysis for claim limitation 1[Pre], Section VIII.A.1.a; Baker, ¶ 144. The preamble of 63 differs from claim 1 in that it requires a "powering system" and that the mobile device has a USB connector. Morita's adapter provides power, e.g., when charging, to the mobile device, which in turn distributes the power to the battery in the mobile device, and is thus a "powering system."[7] Morita, [Claim 1], [Claim 2], [0010-0011, 0016). And Morita discloses that its mobile device has USB port 13 for a USB connection to USB port 21 of the adapter. Morita, [0013].

[7] Note that the "powering system" must include the "USB adapter" and "identification subsystem" in the adapter as well given that the "powering system" comprises these elements. *See* Claim 63.

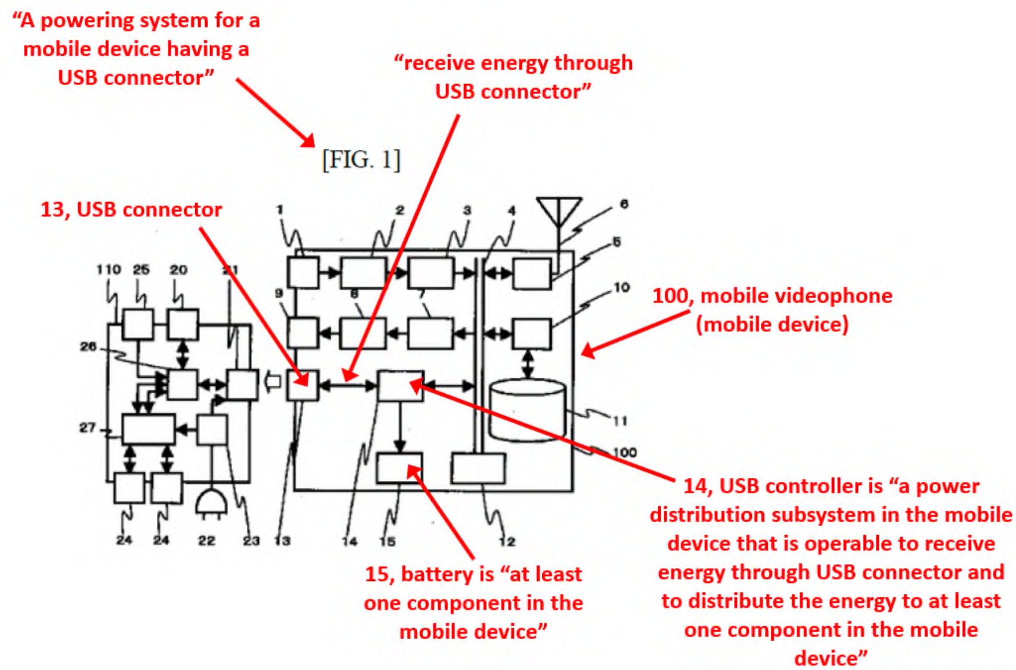


Morita FIG. 2 (annotated).

b. 63[a]: a power distribution subsystem in the mobile device that is operable to receive energy through the USB connector and to distribute the energy to at least one component in the mobile device; and

Morita discloses this limitation.

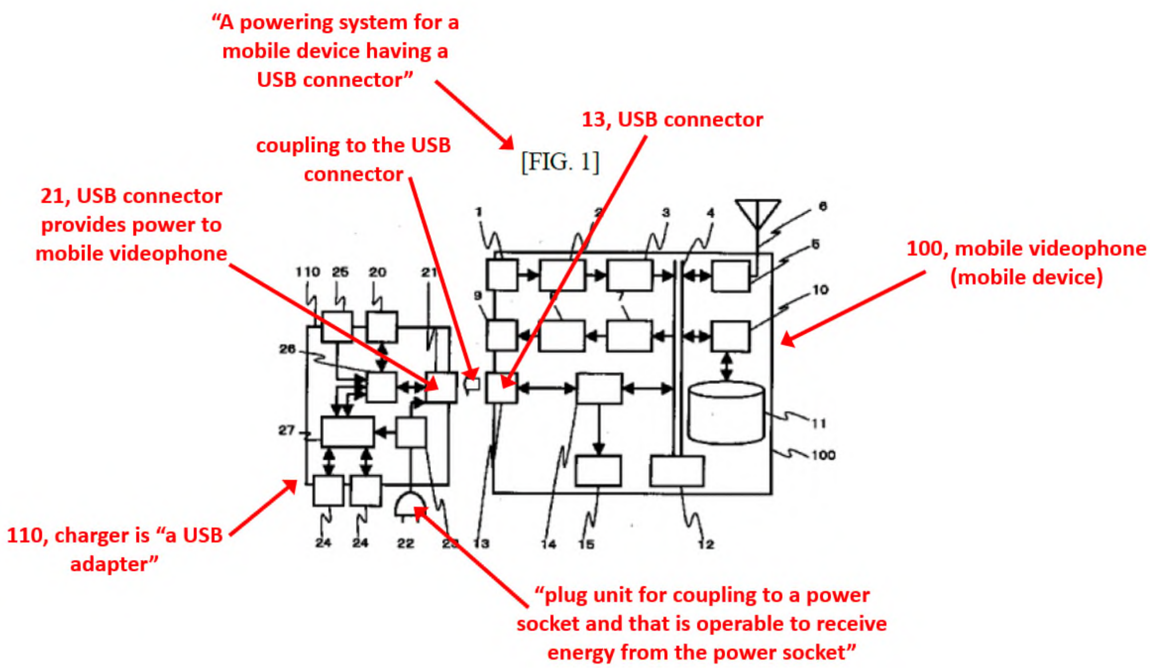
Morita discloses a power distribution subsystem in the mobile device that includes USB connector port 13 for receiving power, USB controller 14 for routing the power (i.e., it "distribute[s] the energy") from the USB connector port 13, and battery 15 that receives the power from USB controller 14 (the battery is the "at least one component in the mobile device"). *See* Morita, Fig. 2, [0013]; Baker, ¶ 145.



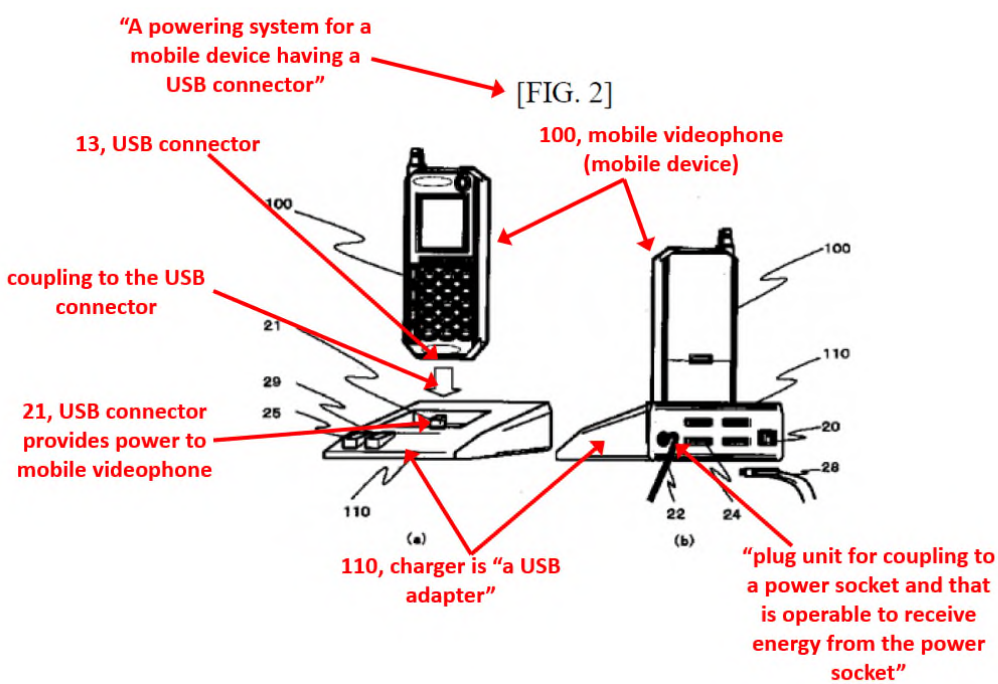
Morita FIG. 1 (annotated).

c. 63[b]: a USB adapter for coupling to the USB connector, the USB adapter comprising a plug unit for coupling to a power socket and that is operable to receive energy from the power socket,

Morita discloses this limitation. For "USB adapter for coupling to the USB connector," see analysis for claim 1[Pre], Section VIII.A.1.a. Note that Morita's adapter (charger 110) couples to the USB connector (USB port 13 of the mobile phone 110) via its USB connector plug 21. *See* Morita, Fig. 1, [0013]. For the "plug unit" limitation, see analysis for claim limitation 1[a], Section VIII.A.1.b (identical limitation except this limitation says it is "operable to receive energy" instead of "for receiving energy" like claim limitation 1[a]); Baker, ¶ 146.



Morita FIG. 1 (annotated).



Morita FIG. 2 (annotated).

d. 63[c]: a power converter electrically coupled to the plug unit for regulating the received energy and for providing a power requirement to the power distribution subsystem, and

Morita renders this limitation obvious. *See* analysis for claim limitation 1[b], Section VIII.A.1.c (nearly identical limitation). Note that this claim requires providing the power requirement to the power distribution subsystem (instead of just the mobile device as claim 1). As the analysis for claim limitation 1[b] explains, Morita discloses providing the power requirement to the mobile device by the mobile device's port 13 (via the USB power lines). This is the first part of the mobile phone's power distribution systems, as the power then flows to the USB controller 14 and then to battery 15. *See* Morita, Fig. 2, [0013]; Baker, ¶ 147; Section VIII.A.17.a.

e. 63[d]: an identification subsystem that is operable to transmit an identification signal that is operative to identify the USB adapter as not being limited by the power limits imposed by the USB specification, wherein the identification signal comprises a logic high signal on the D+ data line and a logic high signal on the D− data line.

Morita renders the limitations of claim element 63[d] obvious in view of the knowledge of a POSITA. *See* analysis for claim limitation 1[d], Section VIII.A.1.e.

In comparison to claim limitation 1[d], this limitation also requires the identification signal to be "operative to identify the USB adapter as not being limited by the power limits imposed by the USB specification." As Section VIII.A.1.e explains, it would be obvious and routine to employ the SE1 signal as the identification signal (and a POSITA would have had high expectation of success in doing so). As further explained, a POSITA would have known, because SE1 is an abnormal condition and thus does not fall within normal USB operation, that it could be used as an identification signal to a connected mobile device to indicate to the device is not a USB host or hub and that the mobile device can charge from a "High-power Hub Port." Baker, ¶¶ 103-07, 148-54. As the below explains, it would have been further obvious, and a POSITA would have been motivated with a high expectation of success, to use this identification signal to identify the ability to charge from a "High-power Hub Port" and "identify the USB adapter as not being limited by the power limits imposed by the USB specification," specifically, to identify that greater than 500 mA is available to charge the mobile device (the "power limits" being that USB devices are limited to receiving 500 mA according to the USB specification).

First, USB 1.1 teaches that an USB output connector (21 on the adapter in Morita) can supply greater than 500 mA ("High-power Hub Port (out)") as seen below in Table 7-5 of USB 1.1 (as shown, the specification defines only minimum values). Because the USB specification states that 500 mA is only a ***minimum*** current supply, it would have been obvious to output more than 500 mA (also, *see infra* for motivation to charge the mobile device faster with a higher current supply).

Indeed, a provisional application to which the ’926 Patent references admits that High-power Hub Ports at the time of the invention were providing more than 500 mA. Ex. 1006 (’021 Application), 23 (“700mA-800mA”). Baker, ¶ 149.

Second, according to the USB specification, the USB input connector (13 of the mobile videophone 100 of Morita) must have input current of less than either 100 mA (“Low-power Function (in)”) or 500 mA (“High-power Hub Function (in)”). That is, this is the “power limits imposed by the USB specification” for the USB Low/High-Power Function (in). However, a POSITA would have been motivated to exceed these power limits. First, a higher current source was available (see above). Second, the high current source was known to be desirable to charge Morita’s mobile phone faster. Ex. 1018 (U.S. Pat. No 5,923,146, “Martensson”), 1:5-8 (invention relates to charging “cellular radio telephone”), 1:30-34 (“fast-charged” technique using “600-1000 mA”). Accordingly, it would have been obvious for Morita’s charger to provide greater than 500 mA without regard to the associated condition specified in the USB specification that an input port (on the mobile phone) take less than 500 mA (High-power Hub Function (in) (or less than 100 mA). Thus, Morita and the knowledge of a POSITA teaches a “without regard to at least one associated condition specified in a USB specification.” Baker, ¶ 149.

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

USB 1.1, 142; Baker, ¶ 149.

Further, a POSITA would have found it routine to use the SE1 signal as an identification signal that was operative to identify the USB adapter as not being limited by the power limits imposed by the USB specification, 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. 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. In the same way the SE1 signal was known to indicate these various states, it would be obvious to use the SE1 signal to indicate the state of not being limited by the power limits imposed by USB specification, and the motivations are the same as set forth in Section VIII.A.1.e—this will indicate a wall socket with a larger power supply and faster charging capability is available to the mobile device. Further, as discussed above, USB adapters were already known to provide a current source of greater than 500 mA (Ex. 1006, 23), and it was already known how to charge mobile devices with greater than 500 mA (Ex. 1018, 1:5-8, 1:30-34). Baker, ¶ 149.

18. Claim 84

a. 84[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 of claim 84 is limiting, it is disclosed, or at a minimum, rendered obvious by Morita. *See* analysis for claim limitation 1[Pre], Section VIII.A.1.a (identical limitation).

b. 84[a]: a plug unit for coupling to a power socket and for receiving energy from the power socket;

Morita discloses, and at a minimum, renders obvious this limitation. *See* analysis for claim limitation 1[a], Section VIII.A.1.b (identical limitation).

c. 84[b]: a power converter electrically coupled to the plug unit, the power converter being operable to regulate the received energy from the power socket and to output a power requirement to the mobile device;

Morita renders this limitation obvious. *See* analysis for claim limitation 1[b], Section VIII.A.1.c (identical limitation).

d. 84[c]: a primary USB connector electrically coupled to the power converter for connecting to the mobile device and for delivering the power requirement to the mobile device; and

Morita discloses this limitation. *See* analysis for claim limitation 1[c], Section VIII.A.1.d (identical limitation).

e. 84[d]: an identification subsystem electrically coupled to the primary USB connector for providing an identification signal at one or more data lines of the primary USB connector, wherein the identification signal comprises a logic high signal on the D+ data line and a logic high signal on the D− data line.

Morita renders the limitations of claim element 84[d] obvious in view of the knowledge of a POSITA. *See* analysis for claim limitation 1[d], Section VIII.A.1.e. This limitation is identical to 1[d] except that it excludes the requirement that "the identification signal comprises a voltage level that is applied to at least one of the data lines in the primary USB connector" (though in effect, this is a corollary requirement of the logic high signal requirement on the data lines).

19. Claim 85: The USB adapter of claim 84, wherein the plug unit is configured to couple directly with the power socket.

Morita discloses this limitation. *See* analysis for claim limitation 2, Section VIII.A.2 (identical limitation).

20. Claim 86: The USB adapter of claim 84, 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.

Morita renders this limitation obvious. *See* analysis for claim limitation 3, Section VIII.A.3 (identical limitation).

21. Claim 99

a. 99[Pre]: A powering system for a mobile device having a USB connector; comprising:

To the extent the preamble of claim 99 is limiting, it is disclosed, or at a minimum, rendered obvious by Morita. *See* analysis for claim limitation 63[Pre], Section VIII.A.10.a (identical limitation).

b. 99[a]: a power distribution subsystem in the mobile device that is operable to receive energy through the USB connector and to distribute the energy to at least one component in the mobile device; and

Morita discloses this limitation. *See* analysis for claim limitation 63[a], Section VIII.A.10.b. (identical limitation).

c. 99[b]: a USB adapter for coupling to the USB connector, the USB adapter comprising a plug unit for coupling to a power socket and that is operable to receive energy from the power socket,

Morita discloses this limitation. *See* analysis for claim limitation 63[b], Section VIII.A.10.c (identical limitation).

d. 99[c]: a power converter electrically coupled to the plug unit for regulating the received energy and for providing a power requirement to the power distribution subsystem, and

Morita discloses this limitation. *See* analysis for claim limitation 63[c], Section VIII.A.10.d (identical limitation).

e. 99[d]: an identification subsystem that is operable to transmit an identification signal that is operative to identify the USB adapter as not being limited by the power limits imposed by the USB specification, wherein the identification subsystem comprises a hard-wired connection of a voltage level to one or more data lines in the primary USB connector.

Morita renders the limitations of claim element 99[d] obvious in view of the knowledge of a POSITA.

The first clause of this limitation is identical to the first clause of claim limitation 63(d). *See* analysis for claim limitation 63[d], Section VIII.A.10.e.

The second clause (wherein clause) of this limitation is identical to the wherein clause in claim 13. *See* analysis for claim limitation 13[d], Section VIII.A.6.e. As the analysis in claim 13 demonstrates, it would be obvious to implement the hardwiring in systems in which the adapter does not include host or hub functionality.

22. Claim 101

a. 101[Pre]: A powering system for a mobile device having a USB connector; comprising:

To the extent the preamble of claim 101 is limiting, it is disclosed, or at a minimum, rendered obvious by Morita. *See* analysis for claim limitation 63[Pre], Section VIII.A.10.a (identical limitation).

b. 101[a]: a power distribution subsystem in the mobile device that is operable to receive energy through the USB connector and to distribute the energy to at least one component in the mobile device; and

Morita discloses this limitation. *See* analysis for claim limitation 63[a], Section VIII.A.10.b. (identical limitation).

c. 101[b]: a USB adapter for coupling to the USB connector, the USB adapter comprising a plug unit for coupling to a power socket and that is operable to receive energy from the power socket,

Morita discloses this limitation. *See* analysis for claim limitation 63[b], Section VIII.A.10.c (identical limitation).

d. 101[c]: a power converter electrically coupled to the plug unit for regulating the received energy and for providing a power requirement to the power distribution subsystem, and

Morita discloses this limitation. *See* analysis for claim limitation 63[c], Section VIII.A.10.d (identical limitation).

e. 101[d]: an identification subsystem that is operable to transmit an identification signal that is operative to identify the USB adapter as not being limited by the power limits imposed by the USB specification, wherein the identification subsystem comprises a USB controller that is operable to provide a voltage level to one or more data lines in the primary USB connector.

Morita renders the limitations of claim element 84[d] obvious in view of the knowledge of a POSITA.

The first clause of this limitation is identical to the first clause of claim limitation 63(d). See analysis for claim limitation 63[d], Section VIII.A.10.e.

The second clause of this limitation is identical to the second clause (wherein clause) of claim limitation 25(e). *See* analysis for claim limitation 25[d], Section VIII.A.8.e.

IX. CONCLUSION

For the foregoing reasons, there is a reasonable likelihood that Petitioners will prevail as to the Challenged Claims of the '936 Patent. Accordingly, *inter partes* review of claims 1-3, 6, 12-18, 25, 26, 28-29, 32, 63, 84-86, 99, AND 101 is requested.

Dated: January 11, 2021

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

By: */Jeffrey Johnson/*

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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.

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

To the best knowledge of the Petitioner, the '936 Patent is involved in the following litigation as of the filing date of this Petition:

- *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.*** Petitioners were served with the complaint in this action on April 23, 2020, and thus this Petition is timely under 35 U.S.C. §315(b).

To the best knowledge of the Petitioner, the '936 Patent was involved in three IPR proceedings: IPR2018-00605-07. These petitions were filed on February 9, 2018. Each of these proceedings were terminated before an institution decision.

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

Lead Counsel:

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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 ’936 Patent is available for IPR and (ii) Petitioner is not barred or estopped from requesting an IPR challenging the ’936 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 ’936 Patent; (2) Petitioner filed this petition within one year of the date they were served with a complaint asserting infringement of the ’936 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).

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 January 11, 2021, a complete and entire copy of this Petition for *Inter Partes* Review of U.S. Patent 6,936,936 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 '936 Patent:

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

A courtesy copy was provided on January 11, 2021 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 '936 Patent:

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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 13,858 words as calculated by the "Word Count" feature of Microsoft Word Office 365, the word processing program used to create it.

Dated: January 11, 2021

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