

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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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

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U.S. Patent No. 8,232,766  
Issue Date: July 31, 2012  
Title: MULTIFUNCTIONAL CHARGER SYSTEM AND METHOD

Case No. IPR2021-\_\_\_\_\_

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**PETITION FOR *INTER PARTES* REVIEW OF  
U.S. PATENT 8,232,766  
CHALLENGING CLAIMS 1-24  
UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104**

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### **Petitioners' Exhibit List**

<i><b>Exhibit</b></i>	<i><b>Description</b></i>
<b>1001</b>	U.S. Patent No. 8,232,766 to Fischer et al., “Multifunctional Charger System and Method,” filed July 1, 2011 (the “’766 Patent”)
<b>1002</b>	U.S. Patent File History of the ’766 Patent Excerpts (the “’766 Patent File History”)
<b>1003</b>	Declaration of Dr. Jacob Baker regarding U.S. Patent No. 8,232,766 (“Baker”)
<b>1004</b>	<i>Curriculum Vitae</i> of Dr. Jacob Baker
<b>1005</b>	Amended Complaint, <i>Fundamental Innovation Systems Int’l LLC v. TCT Mobile (US) Inc. et al.</i> , No. 1:20-cv-00552-CFC (D. Del. Sep. 11, 2020) (“Complaint”)
<b>1006</b>	U.S. Provisional Application No. 60/273,021 (the “’021 Application”)
<b>1007</b>	U.S. Provisional Application No. 60/330,486 (the “’486 Application”)
<b>1008</b>	Japanese Patent Application No. 2000-165513A (“Morita”)
<b>1009</b>	Universal Serial Bus Specification, Revision 1.1, September 23, 1998 (“USB 1.1”)
<b>1010</b>	Universal Serial Bus Specification, Revision 2.0, April 27, 2000 (“USB 2.0”)
<b>1011</b>	U.S. Patent No. 6,531,845 (“Kerai”)
<b>1012</b>	U.S. Patent No. 6,625,738 (“Shiga”)
<b>1013</b>	U.S. Patent Application Publication No. 2003/0135766 (“Zyskowski”)
<b>1014</b>	U.S. Patent No. 6,625,790 (“Casebolt”)
<b>1015</b>	Cypress CY7C63722/23 CY7C63742/43 enCoRe™ USB Combination Low-Speed USB & PS/2 Peripheral Controller, by Cypress Semiconductor Corporation, published May 25, 2000 (“Cypress”)
<b>1016</b>	U.S. Patent No. 5,923,146 (“Martensson”)
<b>1017</b>	U.S. Patent No. 5,859,522 (“Theobald”)

## I. INTRODUCTION

TCT Mobile (US), Inc.; TCT Mobile (US) Holdings, Inc.; Huizhou TCL Mobile Communication Co. Ltd.; and TCL Communication, Inc. (“Petitioners”) petition for *inter partes* review of claims 1-24 (the “Challenged Claims”) of U.S. Patent No. 8,232,766 (the “’766 Patent”) on the grounds that they are unpatentable under 35 U.S.C. §103.

The Challenged Claims relate to a “mobile device” that uses an industry standard Universal Serial Bus (“USB”) port to draw current for charging. Charging through USB ports was well understood and routine by the priority date of the ’766 Patent, but the Challenged Claims purport to “invent” a device that draws more than 500mA of current via the USB port. The claims state that the claimed device draws this current in response to an “abnormal data condition” on the USB data lines, including, for example, a logic high signal on each of the USB data lines (high/high).

As of the priority date of the ’766 Patent, however, it was well known to charge mobile devices using over 500 mA of current (typically 600mA-1000mA). As numerous references make clear, this allowed for “fast” charging. Indeed, the USB Specification itself indicates that certain USB devices will supply and draw current in excess of 500mA in certain circumstances. The specification states, for example, that “high powered” ports (those connected to external power sources) will provide a *minimum* of 500 mA of current to downstream devices. Accordingly, a

skilled artisan would have understood that charging devices may draw more than 500 mA of current when they are the only downstream device connected to a high-powered port. Indeed, the provisional application to which the '766 Patent claims priority admits that such high powered USB ports already existed and supplied approximately 700mA-800mA of current. Ex. 1006 ('021 Application) (discussing prior art “high powered” hubs configured to supply around 700mA-800mA of current). The patentee removed this admission from the applications that lead to the '766 Patent and related patents so that it could claim chargers and devices that supply and draw this amount of current as an “invention.”

Moreover, it was also well-known that a high/high USB data signal—known commonly as an “SE1” signal—could be used to identify a charging state across a USB connection. Indeed, because high/high was the only signal state not already used by the USB standard (the standard specifically assigns the low/low, low/high, and high/low signals for other uses), various prior art references disclose using the SE1 signal as an identification signal. Such references disclose, for example, using the SE1 signal to, for example, identify a wake-up condition, identify a full power state, and identify the presence of a PS/2 adapter. Use of the SE1 signals was so prevalent that it was added to version 2.0 of the USB Specification, which was published before the priority date of the '766 Patent. It is thus the most obvious

choice for signaling a charging state. Accordingly, as of the priority date of the '766 Patent, this “invention” would have been known and obvious.

The Morita patent has not been considered by the examiner or the PTAB in any proceedings and it renders all 24 claims obvious. Specifically, Morita discloses a “mobile videophone” and an associated charger. The charger plugs directly into a power outlet, contains a high-powered port, and charges a single device (the videophone) in a charging state that does not involve typical communication over the USB data lines. In that state, a POSITA would have found it obvious to draw more than 500mA of current and to do so in response to an SE1 signal. As noted above and discussed herein, both were well known and obvious implementations that a POSITA would have been motivated to use with a likelihood of success.

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 1-24 of the '766 Patent based on the following grounds.

<b>Ground</b>	<b>Claims</b>	<b>Basis</b>	<b>References</b>
1	1-24	Pre-AIA 35 U.S.C. § 103(a)	Morita in view of the knowledge of a POSITA.

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

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

#### **A. The *Apple/Fintiv* Factors Support Institution**

There is a parallel district court proceeding involving the '766 Patent in the District of Delaware. Ex. 1005 (Amended Complaint). The complaint was filed on 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,<sup>1</sup> 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

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<sup>1</sup> Petitioner does intend to move for a stay of the Delaware case.

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. Prolenium US Inc.*, 1-20-cv-00104, Dkt. No. 34 (July 16, 2020); *Uniloc 2017 LLC v. Vudu, Inc.*, 1-19-cv-00183, Dkt. No. 72 (March 26, 2020).

Second, the proximity of the trial date to the final written decision, weighs in favor of institution. In the unlikely case that Judge Connolly does not grant a stay, the trial date is scheduled for October 17, 2022. This is after the PTAB’s expected final written decision based on this Petition’s filing in February 2021, which would tentatively calendar an institution date in August, 2021 and final written decision date of approximately August, 2022 (depending on the accorded filing date).

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

Again, the parallel district court litigation is likely to be stayed once the present Petition is instituted.

Furthermore, as part of a holistic analysis, the Board considers the speed with which the petitioner acted. *Apple Inc. v. Seven Networks, LLC*, IPR2020-00156, Paper 10 at 11–12 (PTAB June 15, 2020). In cases where the petitioner acted diligently and without meaningful delay, as here, any investment of the parties in the parallel district court litigation is mitigated. *HP Inc. v. Neodron LTD*, IPR2020-00459, Paper 17 at 40 (PTAB Sept. 14, 2020). Here, the plaintiff asserted a number of patents in the litigations and Petitioners filed its first petition within about five months of the Answer date, and roughly three months after Patent Owner served preliminary infringement contentions. It has subsequently worked diligently to get this and other petitions on file in a timely manner shortly thereafter. 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 '766 Patent has been asserted against several large electronics companies such as Coolpad, Lenovo, and Petitioners, which litigation remains pending. Patent Owners assert that USB adapters, which are ubiquitous, and the mobile devices they charge, infringe the '766 Patent and related patents. Given the substantial impact that the '766 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 and decisions from the earlier IPRs did issue before the filing of the current Petition, this timing is the result of Patent Owner not suing the current Petitioner until after said issuance and is thus not the result of current Petitioner's delay. *Id.*; *Microsoft Corp. v. Uniloc 2017, LLC*, IPR 2019-01252, Paper 7, 8-9 (PTAB Dec. 20, 2019). Fourth, Petitioner was diligent in filing the current petition, promptly moving to file its petitions 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 '766 Patent. Moreover, The previous IPRs do not present the same or substantially the same arguments as this Petition.

In IPR2018-00214, petitioner relied on U.S. Patent No. 7,360,004 (“Dougherty”) as its primary reference. PR2018-00214, Paper 18 (ID) at 6. The board did not find the petitioner’s arguments persuasive because the petitioner did not explain how using an SE1 signal was compatible with Dougherty’s operation. The board noted that Dougherty allegedly requires typical USB communication across the USB data lines while charging a laptop and the SE1 signal could interfere with that typical communication. *Id.*, 14-16. As discussed in more detail herein, Morita employs a charger for a mobile device that will, in certain circumstances, be used solely to charge the mobile device without a USB host, making typical USB communication irrelevant (and not intended or possible). Thus the Dougherty arguments are irrelevant to this Petition. *See* Sections VI.D, VIII.A.

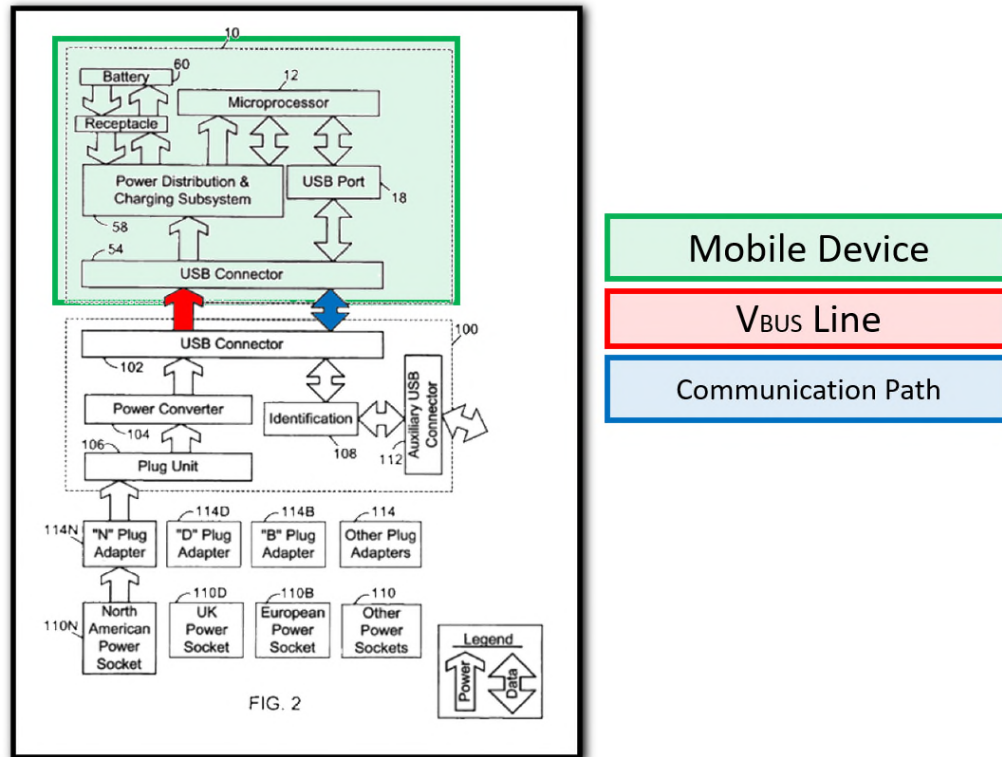
In IPR2018-00215, petitioner relied on Theobald as a primary reference, arguing that it would be obvious to change Theobald’s 8-pin J3 connection to a USB connection. IPR2018-00215, Paper 12 (ID) at 5. The charger and mobile video phone of Morita, in contrast, already employ a USB connection. Accordingly, these arguments are also irrelevant to this Petition. *See* Section VI.D.

In IPR2018-00472 and IPR2018-00508 the petitioner asserted grounds that relied on either Theobald or Dougherty as a primary references. IPR2018-00472, Paper 10 (ID), 8-9; IPR2018-00508, Paper 10 (ID) at 6. The arguments in those petitions were very similar to the arguments in the earlier petitions relying on the same art, and the Board rejected them for similar reasons. Accordingly, they too are irrelevant to the arguments made in this petition.

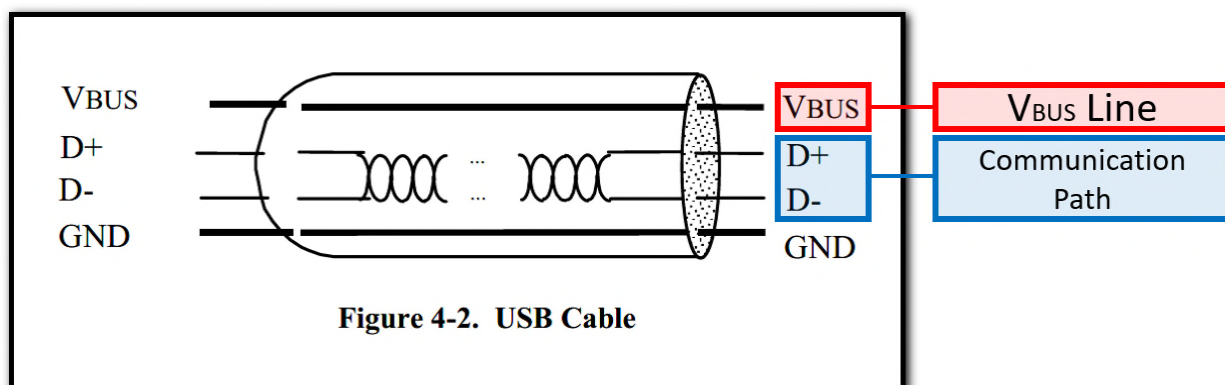
#### **IV. OVERVIEW OF THE '766 PATENT**

##### **A. Disclosure of the '766 Patent**

The '766 Patent discloses “a powering system for a mobile device having a USB connector.” Ex. 1001 ('766 Patent) at 3:6-7. “The powering system comprises a power distribution subsystem in the mobile device that is operable to receive energy through the USB connector and distribute the energy to at least one component in the mobile device.” *Id.* at 3:7-11. The mobile device comprises a “USB  $V_{BUS}$  line” and a “USB Communication Path.” *See id.*, Claims 1 & 9. Figure 2, reproduced below, is a schematic diagram of the disclosed mobile device and an adapter that can be used to charge the device.



Both the “ $V_{BUS}$  line” and the “communication path” were well known and understood components of USB devices. They are expressly accounted for in USB specifications which a POSITA would have been familiar with:



See e.g., Ex. 1009 (USB 1.1) at 17 and Figure 4-2 (annotated). A POSITA would have understood that the VBUS line is typically used to supply/draw current and the

D+/D- lines are used for typical USB communication. Baker, ¶ 73; *See e.g.*, USB. 1.1 at 17 (“The cable also carries VBUS and GND wires on each segment to deliver power to devices.”).

The challenged claims also require that the mobile device have a charging subsystem “enabled to draw current unrestricted by at least one predetermined USB Specification limit.” Ex. 1001 (’766 Patent) at Claims 1, 9. As discussed in more detail herein, this may involve, for example, being configured to draw current in excess of an amount specified by a USB specification (e.g., the 500mA that may be supplied to a particular device) (Claims 2, 7, 10, 15).

The challenged claims also require that the “enablement” to draw said current be “responsive to an abnormal USB data condition detected at said USB communication path.” *See e.g. id.* at Claims 1, 9. Subsequent claims and the ’766 Patent Specification explain that this “abnormal data condition” can be high signals on each of the USB data lines. *E.g., id.* at Claim 6 (“said abnormal USB data line condition is a logic high signal on each of said D+ and D- lines”); *see also id.* at 9:39-44 (“voltages on both the D+ and D- lines of the USB connector [that] are greater than 2 Volts (step 220), [will] determine[] that the device connected to the USB connector 54 is not a typical USB host or hub and that a USB adapter 100 has been detected.”).

## **B. Priority Applications of the '766 Patent**

The '766 patent claims priority through a series of continuations to two provisional applications: (1) U.S. Provisional Application 60/273,021 (the "'021 Application") (Ex. 1006), filed March 1, 2001; and (2) U.S. Provisional Application No. 60/330,486 (the "'486 Application") (Ex. 1007), filed October 23, 2001.

The '021 Application was filed on March 1, 2001. Ex. 1006. The application discloses "a charging circuit" that is part of a mobile device and that can use current received from the mobile device's USB connection to charge the device's battery. *Id.* at 18-20. The '021 Application notes that such a circuit could draw more than 500 mA of current from a high power USB port because, at the time (and as noted in the USB Specifications), there existed USB hubs with high-powered ports that were configured to supply more than 500 mA of current. Indeed, the specification notes that the patentee tested existing USB hubs to see how much current they would supply. *Id.* at 22-33 ("It was determined experimentally that current can be drawn from several USB ports at a high rate"). The patentee further noted that the tested "high powered" hubs were configured to provide up to 700mA-800mA of current before automatically shutting off the power. *Id.* at 22 ("Furthermore, it seems that certain high-power USB ports, such as a self-powered hub, appear to implement only an over-current protection, i.e., they turn off the voltage on the VBUS line for current valued exceeding 700mA-800mA."). The patentee removed this disclosure from the

application that lead to the '766 Patent. The '021 Application noticeably omits any discussion of using an “abnormal data condition” on the USB communication path. *Id.* at 20-30 (discussing various embodiments). *Id.*; *see* Baker, ¶¶ 94-101.

The '486 Application was filed on October 23, 2001. Ex. 1007 ('486 Application). The application discusses, for the first time, the use of “abnormal data line conditions” including a signal in which D+ and D- are held high. *Id.* at 24-25. Accordingly, the challenged claims are entitled to the October 23, 2001 priority date at the earliest. *see* Baker, ¶¶ 94-101

### **C. Prosecution History of the '766 Patent**

There was no substantive prosecution on the merits in the file history of the '766 Patent. There was a November 30, 2011 rejection for double patenting, a February 13, 2012 amendment in response, and a March 28, 2012 notice of Allowance. Ex. 1022 at 80-82, 98-110, and 113-119.

## **V. PERSON OF ORDINARY SKILL IN THE ART**

A person of ordinary skill in the art (“POSITA”) of the subject matter of the '766 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

USB or equivalent buses that follow the USB 2.0 and earlier specifications at the time of the '766 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 '766 Patent's claimed priority date. Baker, ¶ 68.

## **VI. SUMMARY OF THE PRIOR ART AND KNOWLEDGE OF POSITA**

### **A. USB Specification**

The Universal Serial Bus Specification, Revision 1.1, ("USB 1.1") was published by the USB Implementers Forum, Inc. on September 23, 1998. Ex. 1009. It is prior art to the '766 Patent under at least 35 U.S.C. § 102(a) and (b). Moreover, the USB 1.1 Specification would have been part of the knowledge of a POSITA as of the priority date of the '766 Patent. Baker, ¶ 69.

Figure 4-1, below, shows the bus topology for a USB system. Generally, each such system requires a "host" with a "root hub" for purposes of communication. USB 1.1 at 16; Baker, ¶ 70. Without such a hub, there will be no communication among the devices. For example, connecting, 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 functioning/communicating, USB system. *Id.*



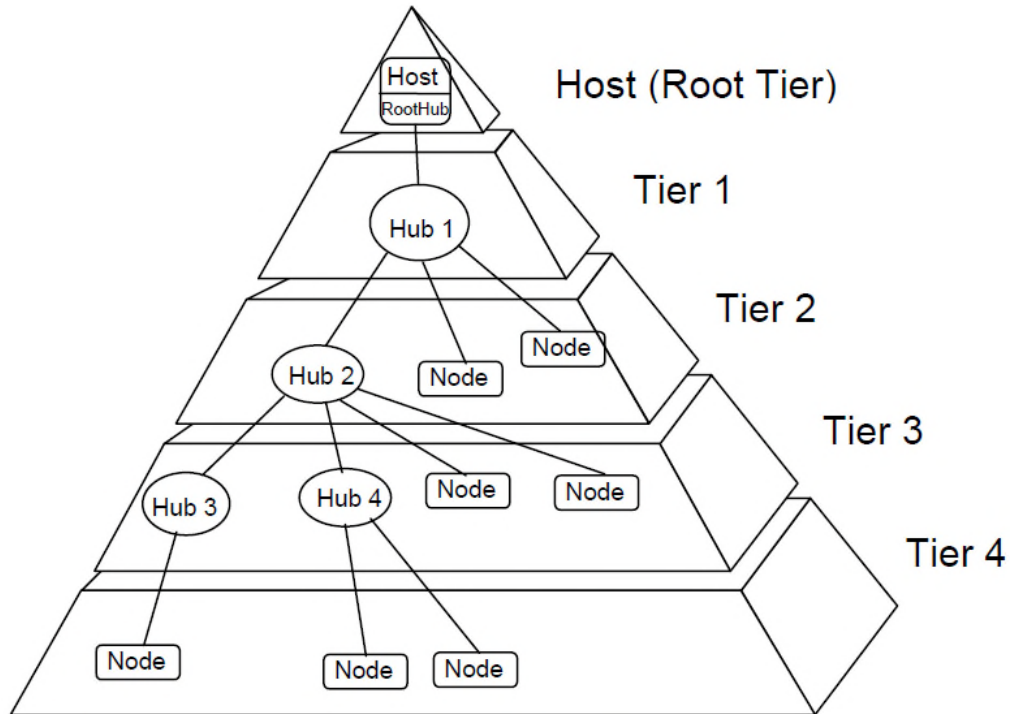


Figure 4-1. Bus Topology

USB 1.1 at 16 (annotated).

Generally, USB 1.1 instructs that a USB device (*i.e.*, node or function) is plugged into a port on a hub using a cable. USB 1.1 at 23. The cable is connected between a USB connector on a USB device and a USB connector on a host or hub.

Baker, ¶ 71.

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

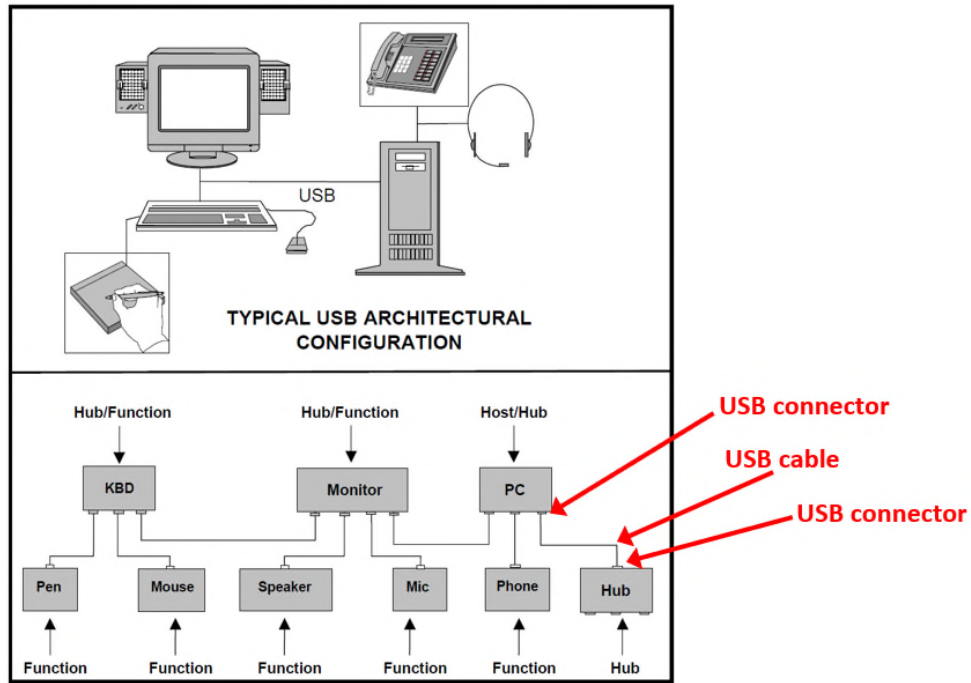
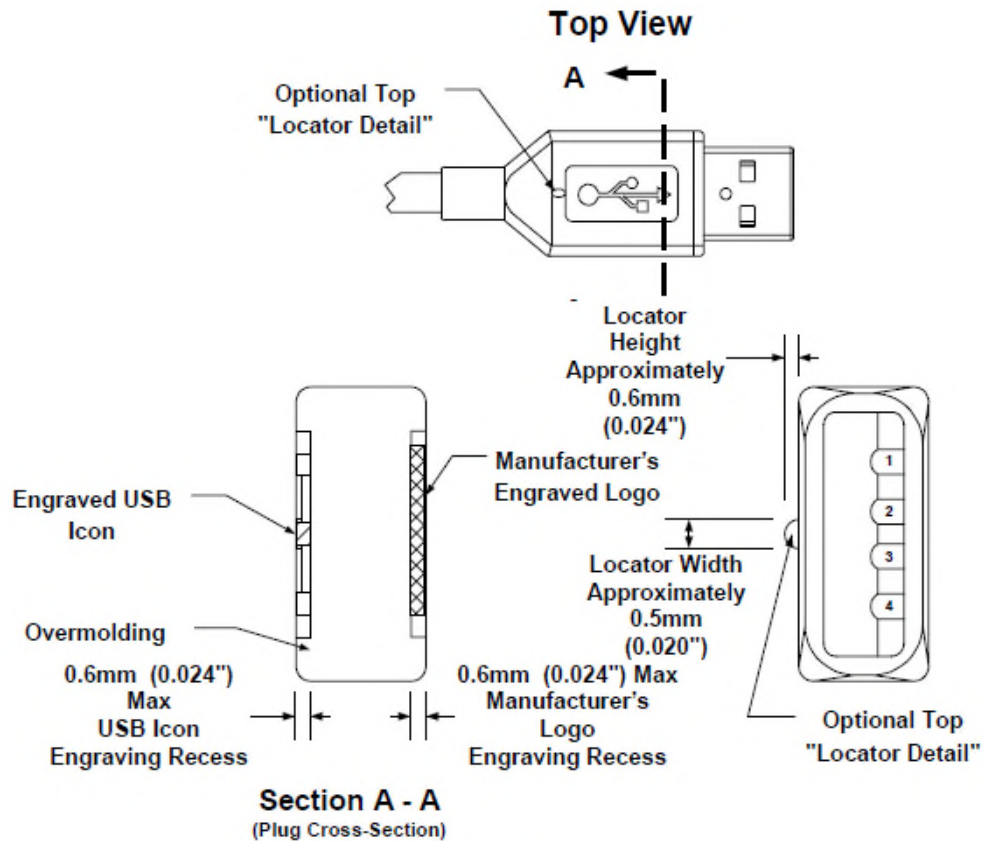


Figure 4-4. Hubs in a Desktop Computer Environment

USB 1.1 at 23 (annotated).

USB 1.1 teaches a POSITA how to implement a USB plug and that a USB connector includes four contacts:  $V_{BUS}$ ,  $D+$ ,  $D-$ , 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 at 81 and 82; Baker, ¶¶ 72-73.

The USB 1.1 Specification indicates that the host is responsible for providing power to an attached USB device. USB 1.1 at 24 (“The host is responsible for . . . [p]roviding power to the attached USB devices.”) The USB Specification also sets forth conditions and limits for providing and drawing power on the  $V_{BUS}$  line. Baker, ¶¶ 73-74. The Specification does so in terms of milliamps (mA) of current and in terms of “unit loads.” USB 1.1 at 134. “A unit load is defined to be 100mA” of current. *Id.* Notably, the USB Specification includes the following current conditions/limitations:

- A “high-power” hub port supplies a minimum of 500mA
- A “low-power” device is supplied with a maximum of 100mA of current
- A “high-power” device is supplied with a maximum of 500 mA of current

These conditions/limitations, as well as others, are listed in table 7-5 of the USB 1.1 Specification:

**Table 7-5. DC Electrical Characteristics**

Parameter	Symbol	Conditions	Min.	Max.	Units
<b>Supply Voltage:</b>					
High-power Port	V <sub>BUS</sub>	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	V <sub>BUS</sub>	Note 2, Section 7.2.1	4.40	5.25	V
<b>Supply Current:</b>					
High-power Hub Port (out)	I <sub>CCPRT</sub>	Section 7.2.1	500		mA
Low-power Hub Port (out)	I <sub>CCUPT</sub>	Section 7.2.1	100		mA
High-power Function (in)	I <sub>CCHPF</sub>	Section 7.2.1		500	mA
Low-power Function (in)	I <sub>CCLPF</sub>	Section 7.2.1		100	mA
Unconfigured Function/Hub (in)	I <sub>CCINIT</sub>	Section 7.2.1.4		100	mA
Suspended High-power Device	I <sub>CCSH</sub>	Section 7.2.3 ; Note 15		2.5	mA
Suspended Low-power Device	I <sub>CCSL</sub>	Section 7.2.3		500	μA

USB 1.1 at 142 (annotated); Baker ¶ 73.

The USB Specification defines a “high power” port as one that obtains its power externally (e.g., from an outlet). *Id.* at 134 (“Systems that obtain operating power externally, either AC or DC must supply at least five unit loads to each port. Such ports are called high-power ports.”) In other words, the USB specification, on its own, acknowledges that certain USB ports (high-powered ports) will supply current in excess of the 500mA limit to a particular USB device (e.g., when the high-power hub port is (1) connected to its own external power sources and (2) connected to a single USB device). *Id.*; Baker, ¶ 74.

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 at 251.

The specific nature of how D+ and D- are connected is discussed in detail below and in USB 1.1. *See* Baker, ¶¶ 77-83. “Hubs, and the devices to which they connect, use a combination of pull-up and pull-down resistors to control D+ and D- in the absence of their being actively driven. These resistors establish voltage levels used to signal connect and disconnect and maintain the data lines at their idle values when not being actively driven.” USB 1.1 at 256.

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

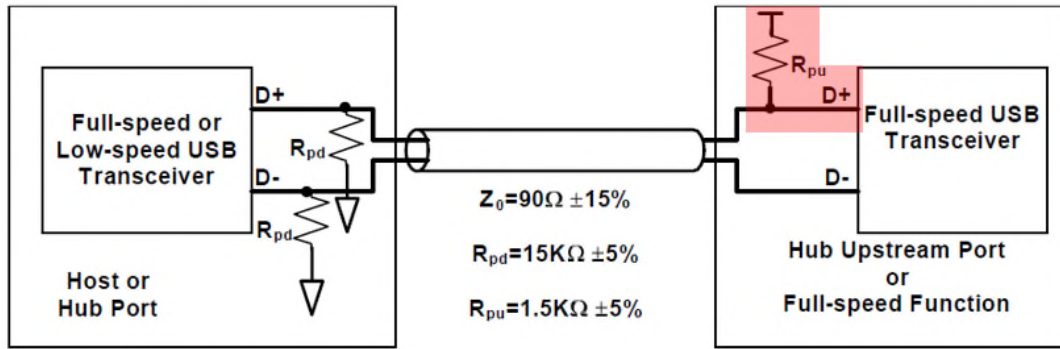


Figure 7-10. Full-speed Device Cable and Resistor Connections

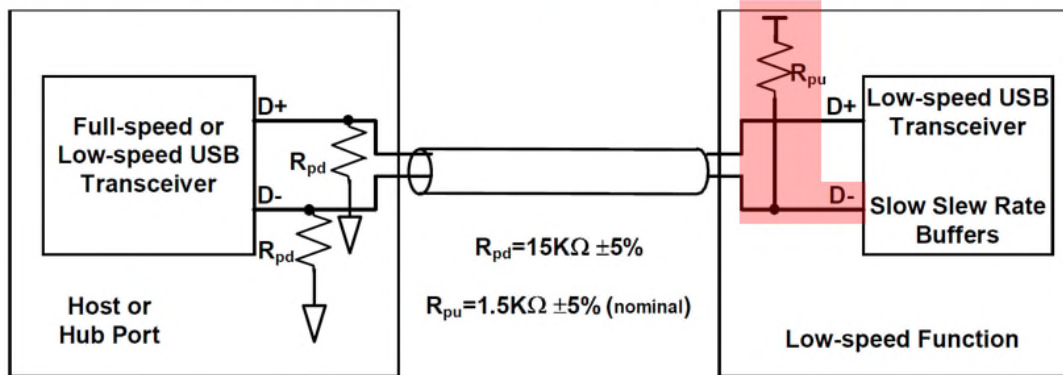


Figure 7-11. Low-speed Device Cable and Resistor Connections

USB 1.1 at 113 and 114 (annotated).

USB 1.1 also discloses that in the host or hub port “The pull-down terminators on downstream ports are resistors of  $15k\Omega \pm 5\%$  connected to ground.” USB 1.1 at 113. These resistors are annotated below and labeled  $R_{pd}$ .

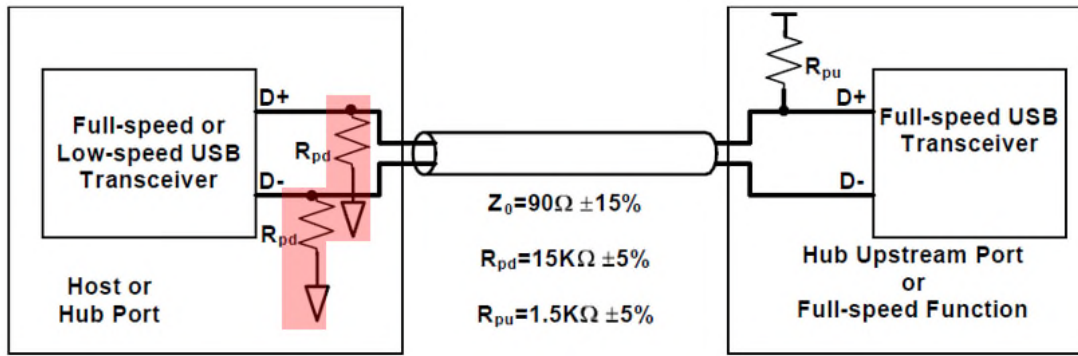


Figure 7-10. Full-speed Device Cable and Resistor Connections

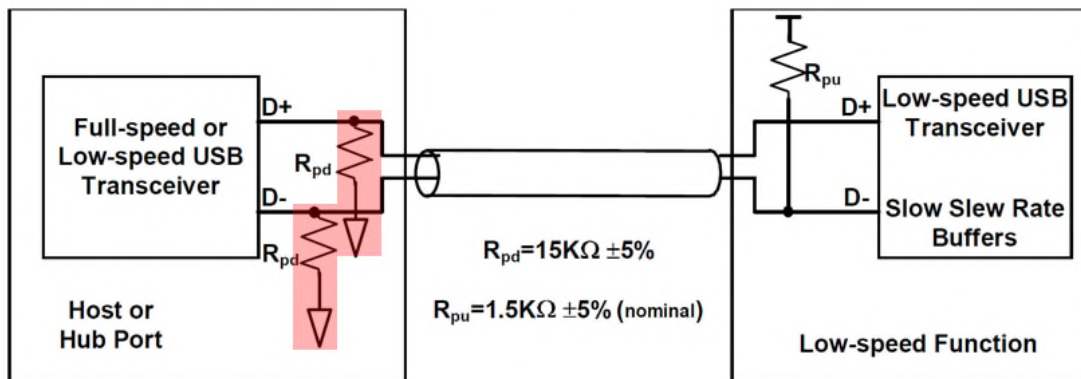


Figure 7-11. Low-speed Device Cable and Resistor Connections

USB 1.1 at 113 and 114 (annotated); Baker, ¶ 79.

When no pull-up resistor,  $R_{pu}$ , is present on D+ and/or D- the corresponding line is pulled to ground through  $R_{pd}$ . Baker, ¶ 80. If both D+ and D- are at ground then no device is connected to the USB host or hub port. If D+ is pulled high and D- is at ground the connected device operates in full-speed. *Id.* If D+ is at ground and D- is pulled high the connected device operates in low-speed. If D+ and D- are to be used for communications by either full- or low-speed devices then their voltages should never intentionally be pulled high (above 0.8V) at the same time. *Id.* 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

Baker, ¶ 83. As discussed in more detail below, the High/High signal on the data lines is also referred to in the art as an “SE1” signal. *See* Section VI.B; Baker, ¶ 80. A POSITA would have been aware of the effects of the SE1 signal on the data lines as disclosed by the USB 1.1 Specification. Baker, ¶¶ 80-84. Specifically, a POSITA would have understood that a device receiving this signal would terminate data communications and standby while receiving power across the V<sub>BUS</sub> line. *Id.*

For example, USB 1.1 states “Note: if both D+ and D- are high at this time, the hub may stay in the Disabled state and set the C\_PORT\_ENABLE bit to indicate that the hub could not determine the speed of the device.” USB 1.1 at 252. Accordingly, a POSITA would have understood that this signal indicates that 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.

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

1.1 at 178. In other words, the connected device, after being powered-up through the connection to the USB port though a USB cable, won't process commands until it receives a reset. Baker, ¶ 82. However, if the connected device can't communicate (e.g., because communication has been disabled by a High/High signal on the data lines) then the connected device can't receive a reset command and thus can't receive or process commands (to, for example, clear the set C\_PORT\_ENABLE bit which indicates the port speed can't be determined or to power-down). *Id.* Accordingly, the device simply continues to receive power via V<sub>BUS</sub> and GND and wait for the reset command (which will not occur with both D+ and D- pulled high). *Id.*

#### **B. Use of SE1 State in Various Contexts**

Persons of ordinary skill in art quickly realized that USB devices could use a High/High signal (SE1) on the D+ and D- lines for a number of purposes. *See e.g.*, Baker, ¶¶ 80-90. This is particularly the case because the signal is an “abnormal” condition that is outside the normal condition signals used by the USB Specification and thus will not be misread as being used for a specified purpose in the specification. Baker, ¶ 84. Indeed, of the four states available on a D+ and D- line (low/low, high/low, low/high, and high/high), the SE1 signal was the only state not already accounted for in the specification. Baker, ¶ 83. Accordingly, as noted below, a number of prior art references disclose using the signal for other purposes.

## **1. US Patent 6,531,845 (“Kerai”) (Ex. 1011)**

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. Thus, Kerai is prior art under at least pre-AIA §102(e).

Kerai used a High/High state on the data lines for the purpose of charging a system while disabling communications. Kerai, Fig 3, 5:43-51. Specifically, Kerai disclosed “A battery charging circuit . . . 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.” *Id.*, Abstract. In its disclosure, Kerai notes that it was “well known” to pull both D+ and D- high when communications were inactive and that this was helpful for purposes of charging a device. *Id.* at 5:45-48 (“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.”) (emphasis added); Baker, ¶ 85.

## **2. US Patent 6,625,738 (“Shiga”) (Ex. 1012)**

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. Thus, Shiga is prior art to the ’766 patent under at least pre-AIA §102(e).

Shiga recognizes that, the existing USB standards accounted for 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, ¶¶ 86-87.

TABLE 1			
	Low Speed	Full Speed	Unconnected
D+	L (Hi-Z)	H	L (Hi-Z)
D-	H (Hi-Z)	L (Hi-Z)	L (Hi-Z)

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

**3. US Patent Application Publication US20030135766 (“Zyskowski”) (Ex. 1013)**

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. Thus, Zyskowski is prior art to the '766 patent under at least pre-AIA §102(e).

Zyskowski is another example of prior art that discloses an SE1 condition (with D+ and D- being set at 5 V) being used by a host device (*e.g.*, computer) to signal its full power state to a connected device (*e.g.*, mass storage device, consumer electronic device). Ex. 1013, ¶ 19; Baker, ¶ 88.

**4. US Patent 6,625,790 (“Casebolt”) (Ex. 1014)**

U.S. Patent 6,625,790 was filed as Application No. 09/409,683 on October 1, 1999, claimed a priority date of July 8, 1998, and issued on September 23, 2003 to Mark W. Casebolt and Lord Nigel Featherston. Thus, Casebolt is prior art to the '766 patent under at least pre-AIA §102(e).

Casebolt discloses that an SE1 condition could be used as a special signaling mode in which the D+ and D- data lines would be connected to Vcc (+5V) to signal the presence of a PS/2 adapter (a 6-pin connector used in older computer keyboards and mice). Ex. 1014 (Casebolt) at 7:40-54; Baker, ¶ 89. Indeed, the SE1 state for USB is shown in Casebolt's Table 1 below. *Id.*

TABLE 1

I/O State	D+/CLK	D-/DAT	USB	PS/2
0	L	L	SEO (Single Ended 0) 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

Ex. 1014, Table 1, *see also* 6:55-7:8.

## 5. Cypress Semiconductor enCoReUSB Datasheet (Ex. 1015)

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. Ex. 1015 (Cypress enCoReUSB), 24-25; Baker, ¶ 90.

## 6. USB 2.0 Specification

The USB 2.0 Specification (USB 2.0) was published on April 27, 2000. Ex. 1010 (USB 2.0). It is prior art to the '766 Patent under at least 35 U.S.C. § 102(a). Moreover, the USB 2.0 Specification would have been part of the knowledge of a POSITA as of the priority date of the '766 Patent. Baker, ¶ 76.

As the USB 2.0 Specification notes, it is fully backwards compatible with devices built with previous versions of the specification, such as USB 1.1. USB 2.0

at 11. The majority of the disclosures of USB 1.1 are also contained in the USB 2.0 Specification. Baker, ¶ 76.

Given the prevalence of the use of the SE1 signal discussed above, the USB 2.0 Specification specifically addresses the SE1 signal. *See e.g.*, USB 2.0 at 123 (“SE1 is a state in which both the D+ and D- lines are at a voltage above  $V_{OSE1}$  (min), which is 0.8 V.”); Baker, ¶¶ 80-84. Among other things, the USB 2.0 Specification discloses that the signal should not be used for devices seeking to utilize data communications over the USB connection (either low-speed or full-speed). *Id.* (“Low-speed and full-speed USB drivers must never “intentionally” generate an SE1 on the bus.”). As noted above, however, persons of ordinary skill in the art understood that the signal could be used for various purposes, including to disable communications for purposes of charging. Baker, ¶¶ 80-90.

### **C. Fast Charging**

Persons of ordinary skill in art as of the priority date of the '766 Patent knew that charging a device like a mobile phone at currents greater than 500 mA allowed for faster charging. *See e.g.*, Baker, ¶ 91. Indeed, it was generally known at the time that drawing more than more than 600 mA of current results in faster charging for such devices. *See e.g., id.*; Ex. 1016 (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”); Ex. 1017 (U.S. Patent No. 5,859,522 “Theobald”)

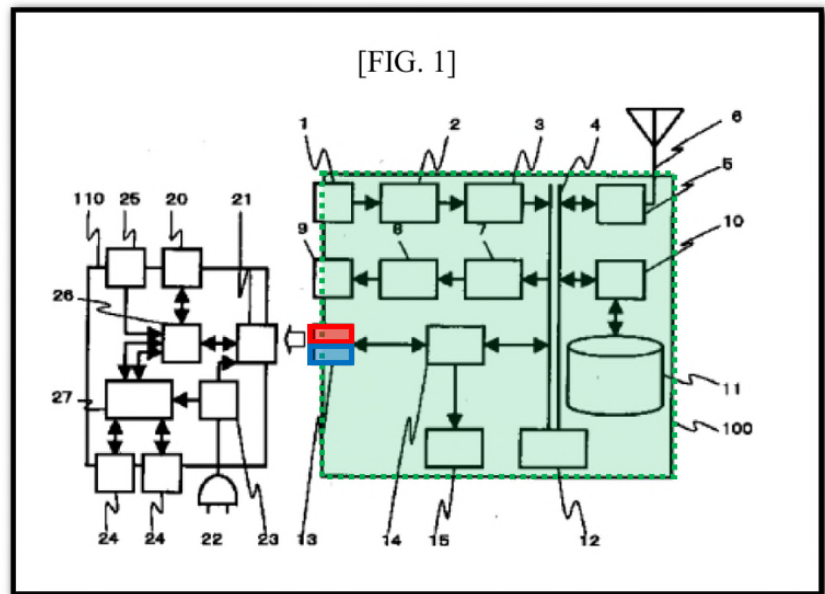
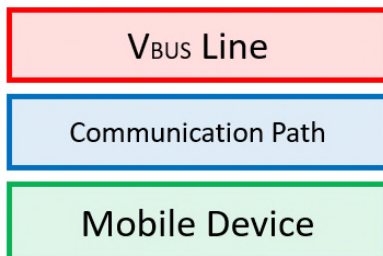
at 4:29-39 (a “mid-rate charger” supplies current at around 340 mA; a “fast rate charger” supplies approximately 850 mA of current).

#### **D. Overview of Morita**

Japanese Patent Application No. 2000-165513A (“Morita”), titled “Charger,” was filed on November 30, 1998. Morita is prior art under at least §102(b). A certified translation of Morita is attached here to as Exhibit 1008. Morita was not considered during prosecution of the ’766 Patent.

Morita discloses a mobile videophone and a charger. The charger has the ability charge the mobile videophone and/or connect the phone to a computer. Specifically, the charger comprises a “first coupling means for coupling to a mobile phone” and a “second coupling means for coupling to an external device.” Ex. 1008 (Morita) at Abstract. Morita discloses that the provided “coupling means” comprises USB connections. *Id.* at [Claim 2]. Figure 1 of Morita discloses the charger, the mobile videophone, and several key components:





Morita at Figure 1 (annotated); Baker, ¶¶ 103-105. As evidenced in Figure 1, the charger of Morita draws power from an outlet (22) to provide to the mobile device through the USB connection (21). *Id.* at column 3 (Embodiment of Invention) (disclosing a “power supply connection unit such as an outlet”); *id.* at [0014] (“A power supply voltage supplied from a power supply source is supplied from the charging control unit 23 to the USB hub control unit 27 and the second USB port 21”). Accordingly, as a POSITA would understand from the USB Specifications, the “first coupling” (21) provided by Morita is a “high powered” USB port that provides a *minimum* of 500mA to the mobile device. Baker, ¶¶ 118-119.

## VII. CLAIM CONSTRUCTION

Claim construction is only necessary to the extent it is required to resolve disputes presented in the Petition. *Nidec Motor Corp. v. Zhongshan Broad Ocean*

*Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Petitioners submit that 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 '766 Patent's specification and prosecution history, as would have been understood by a POSITA. If Patent Owner attempts to create a claim construction dispute in its preliminary response, Petitioners reserve the right to address the issue in a reply to that preliminary response. If the Patent Owner attempts to create a claim construction issue in its post-institution response, Petitioners will address such issues in their reply.

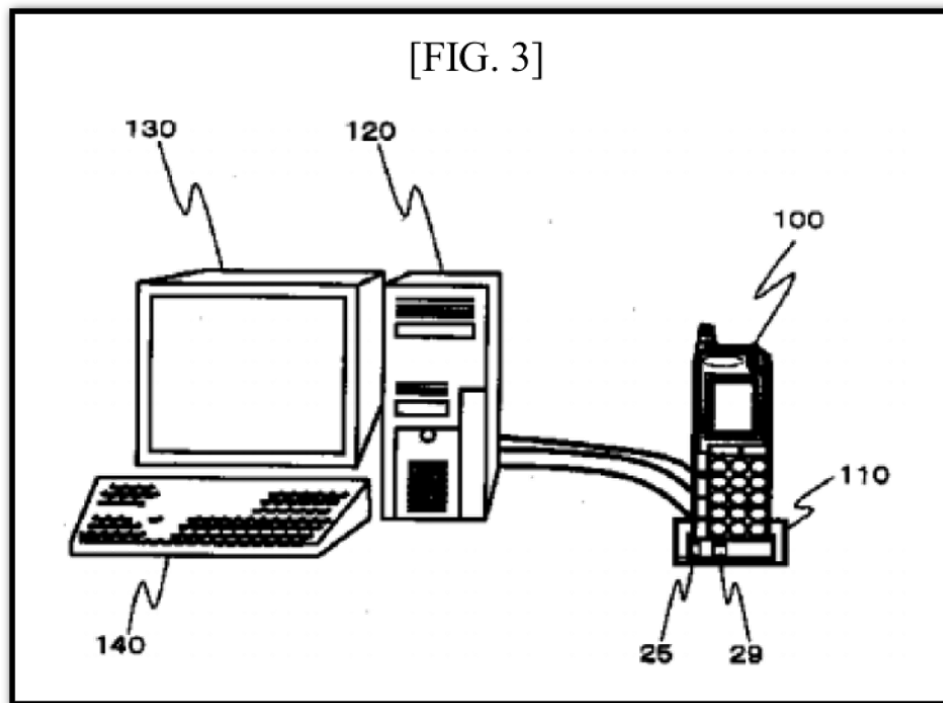
## **VIII. ANALYSIS**

### **A. Morita in View of the Knowledge of a POSITA Renders The Subject Matter Of Claims 1-24 Obvious.**

As noted above and herein, Morita discloses a mobile videophone and charging device that connects to and charges the videophone via USB port. *See e.g.*, Ex. 1008 (Morita) at [Claim 1]. Morita further discloses that the charger and videophone of Morita can be connected in two different configurations or states because the charger is *optionally* connected to a USB host (i.e., a personal computer) while charging the videophone. *See e.g.*, Morita at [Claim1], [0001], [0014]-[0017]; Baker, ¶¶ 106-109.

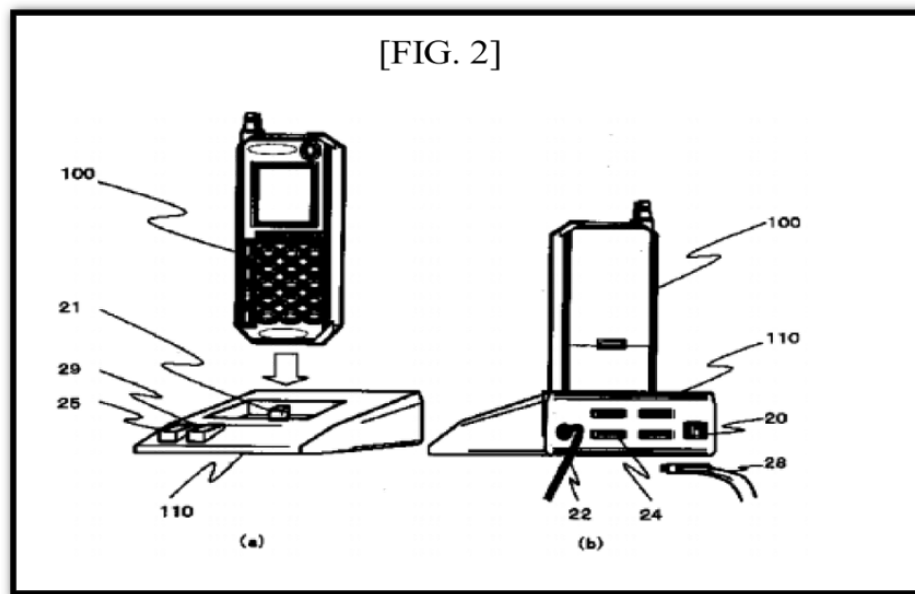
In the first configuration, the charger is connected to both the videophone and a USB host (i.e., a personal computer). Morita at [Claim 1] ("A charger capable of

charging a mobile phone and coupling to an external device, comprising: first coupling means for coupling to a mobile phone [and] one or a plurality of second coupling means for coupling to an external device.”) (emphasis added); *id.* at [0001] (“The present invention relates to a charger capable of charging a mobile phone and coupling to an external device) (emphasis added).



*Id.* at Figure 3; Baker, ¶ 108. In this configuration the external device (personal computer) (host) communicates with the mobile videophone via the charger. Morita at [0017] (“In Figure 3, the mobile video phone device 100 is connected to a personal computer console 120, a monitor 130, and a keyboard 140 via the USB hub control unit 27 in the charger 110 in a state of being connected to the charger 110.”); Baker, ¶ 108.

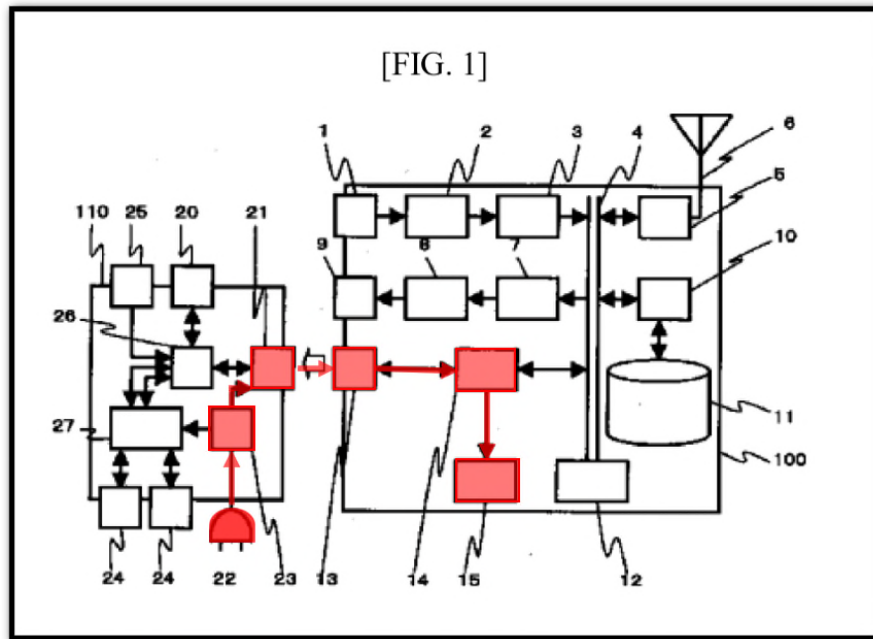
In the second configuration, the charger is connected to the videophone without connecting to a corresponding personal computer. *See* Morita at [0015] (“On the other hand, when the mobile videophone device is used as the host personal computer, the connection switching unit 26 connects the second USB port 21 to the USB hub control unit 27 as the host end, and the first USB port 20 is not connected to the USB hub control unit 27 and is in a disconnected state.”) (emphasis added); Baker, ¶109. If no peripheral equipment is connected, the charger is used simply to charge the videophone. Morita at [0016] (“FIG 2 is one embodiment of the charger of the present invention and a diagram illustrating coupling of a mobile phone and charger.”)



*Id.* at Figure 2; Baker, ¶ 109. In this “charging” configuration/state, a POSITA would have understood that typical USB communication and enumeration does not

occur and that the charger cannot charge the videophone from the host computer.

*See* Section VI.A; Baker, ¶ 110. Instead, the charger simply performs the function of a typical charger and charges the videophone from the outlet.



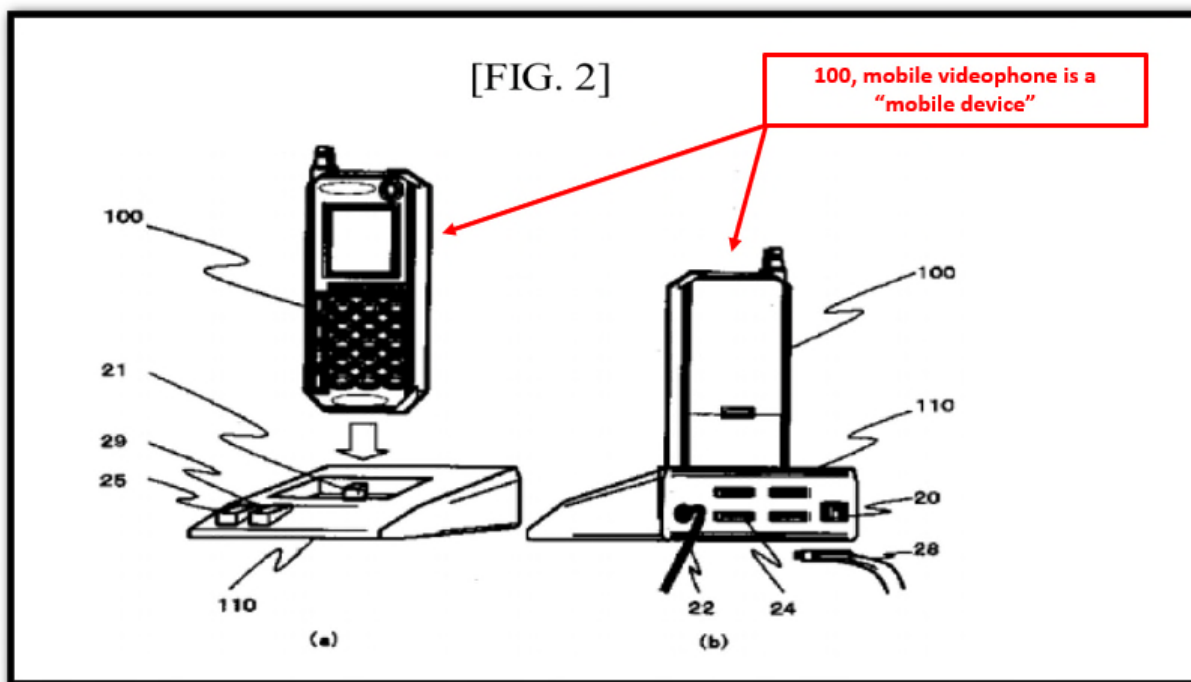
Morita at Figure 1 (annotated) (showing flow of current from outlet, through USB connection, to videophone battery); Baker, ¶ 110. As discussed in more detail herein, a POSITA would have found it obvious (1) to identify this “charging” state with an “SE1” signal, which was well-known signal commonly used to identify such states (*see e.g.*, claim element 1[d]) and (2) to configure the mobile videophone to draw more than 500mA of current (*see e.g.*, claim element 1[c]).

## 1. Claim 1

### a. 1[a]. A mobile device, comprising

To the extent the preamble of claim 1 is limiting, it is disclosed by Morita.

Baker, ¶¶ 111-112. Morita discloses a mobile videophone:



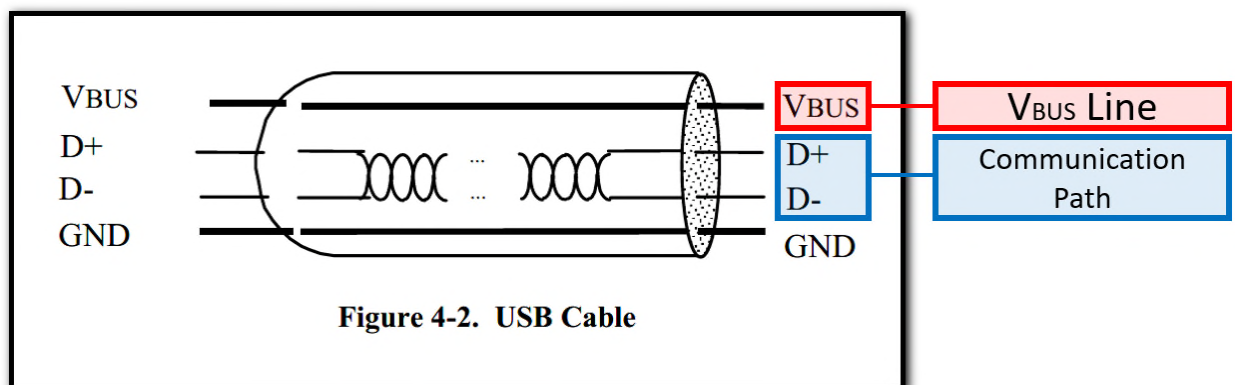
Morita, Figure 2 (annotated); *see also, e.g.*, Morita at [0016] (“In FIG. 2, the mobile videophone device 100 is connected to the USB port 21 of the charger 110. . .”); *see also id.* at [0010]-[0011]. A POSITA would have understood the mobile videophone of Morita to be a “mobile device.” Baker, ¶¶ 111-112; Morita, [0003].

### b. 1[b]. a USB communication path

Morita discloses that the mobile videophone comprises “a USB communication path.” Baker, ¶¶ 113-115.

Specifically, Morita discloses that the mobile videophone connects to the charger through a “first coupling means” that is configured in a “USB format.” *See e.g.*, Morita at Claim 1 (“A charger capable of charging a mobile phone . . . comprising: first coupling means for coupling to a mobile phone”) and Claim 2 (“The charger according to claim 1, wherein the first coupling means . . . are configured from a USB format.”); *id.* at [0016] (“In FIG. 2, the mobile videophone device 100 is connected to the USB port 21 of the charger 110 . . .”).

A POSITA would have understood that the “USB” “coupling means” of the videophone comprises a “USB communication path.” Indeed, the USB Specifications—which would have been known to a POSITA—expressly disclose that USB connections contain such a path. Baker, ¶ 113. Specifically, they disclose that such connections have four wires/contacts: V<sub>BUS</sub> and GND (ground) lines that provide power and D+ and D- lines that carry signals for communication. *See e.g.*, Ex. 1009 (USB 1.1) at 15-18, 80-82; Ex. 1010 (USB 2.0) at 15-18, 93-94, and 173-175; Baker, ¶¶ 113-114.



USB 1.1 at Figure 4-2.

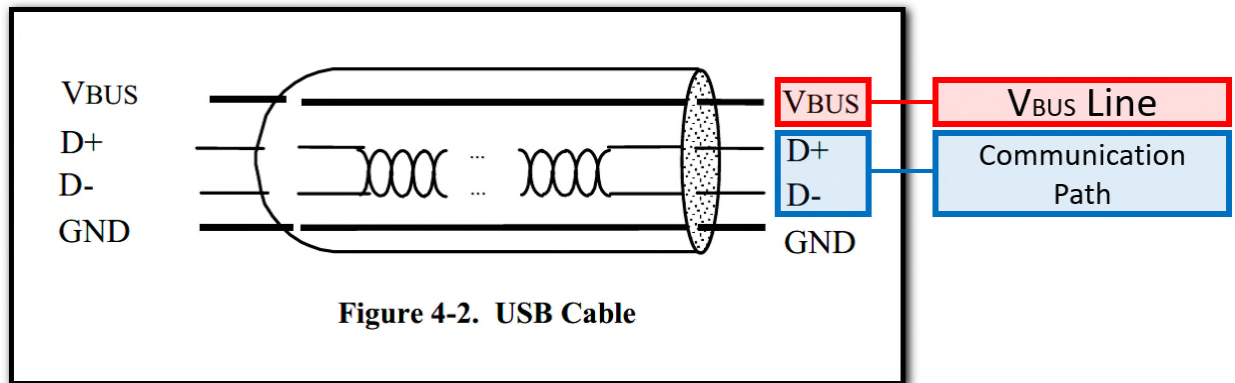
**Table 6-1. USB Connector Termination Assignment**

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

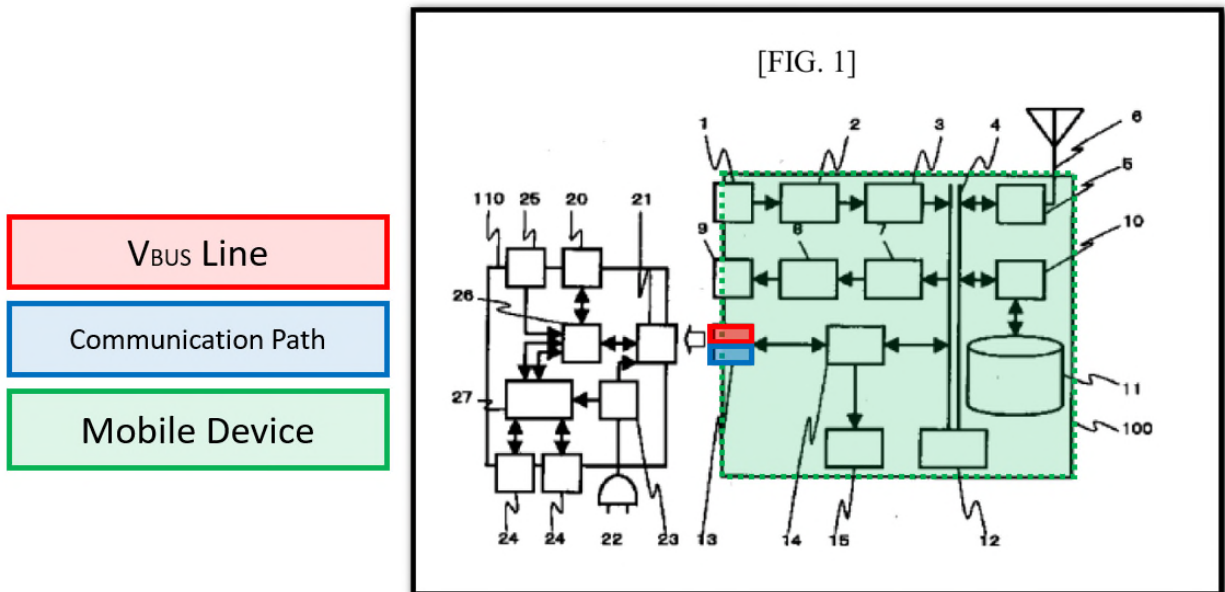
USB 1.1 at Table 6-1.

A POSITA would have understood that the data connections, including the data lines (D+ and D-), provide a “USB communication path” as required by Claim 1. *See e.g.* USB 1.1 at 25 (“The USB provides communication services between a host and attached USB devices.”); Baker, ¶ 115. Indeed, dependent claims of the ’766 Patent identify the D+ and D- lines as the primary example of the claimed “USB communication path.” *See e.g.*, Ex. 1001 (’766 Patent) at claim 4 (“The device of claim 1, wherein said USB communication path includes a D+ and D- line.”).





USB 1.1 at Figure 4-2 (annotated).



Morita at Figure 1 (Annotated).

Accordingly, a POSITA would understand that the Morita's videophone includes "a USB communication path."

**c. 1[c]. a charging subsystem enabled to draw current unrestricted by at least one predetermined USB Specification limit**

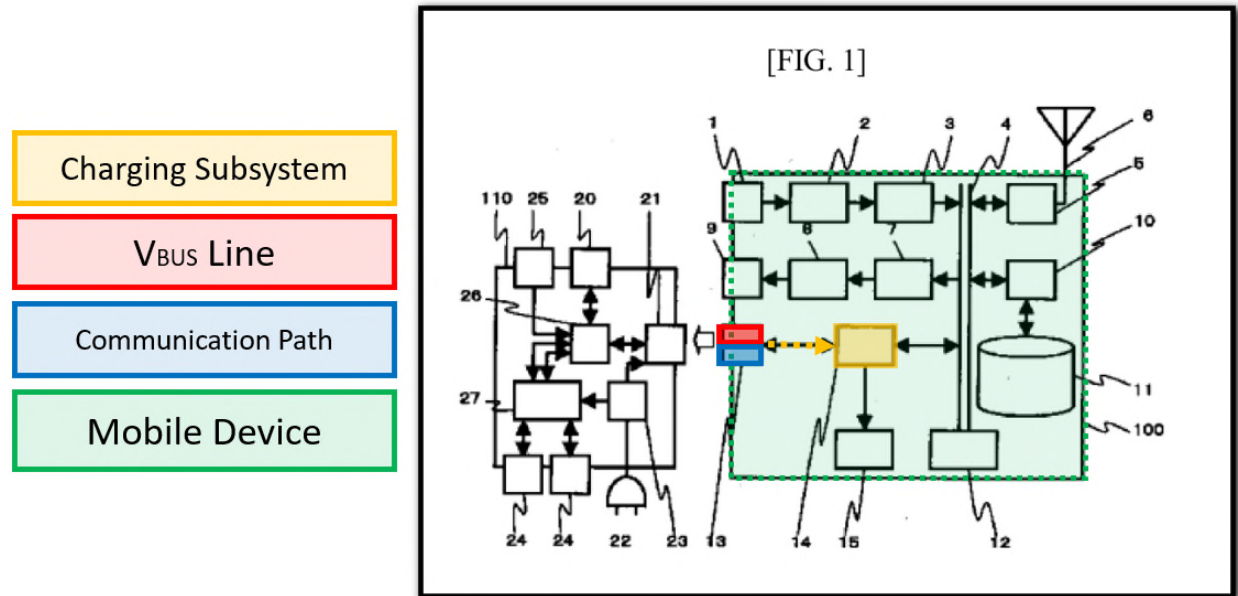
Morita renders obvious a videophone with “a charging subsystem enabled to draw current unrestricted by at least one predetermined USB Specification limit.” Baker, ¶¶ 116-125.

Morita discloses “a charging subsystem enabled to draw current,”<sup>2</sup> namely, USB controller 14. Morita discloses that “the power supply of the mobile videophone device 100 is supplied from the USB controller 14 to the battery 15 by coupling to a charger via a USB format capable of supplying data and power.” Morita, [0013], [0012] (discussing that the Morita charger charges the mobile phone by providing power from a power outlet to the mobile phone via USB ports 13 and 21). In other words, as shown below, the USB controller 14 receives power from

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<sup>2</sup> The '766 Patent does not alter the plain and ordinary meaning of “charging subsystem,” i.e., components that perform a charging function. Baker, ¶ 123. The '766 Patent largely discusses what its “charging subsystem” “may be capable of” and “may have the ability” to do. '766 Patent, 6:27-42. The only thing that the '766 Patent states that its “charging subsystem” can do is either use an external USB connection to power the device or charge the battery (or both), and this is precisely what USB controller 14 of Morita does. *Id.*, 8:4-7.

the Morita charger and provides it to battery 15, thus charging it (or it feeds power from the battery to the mobile device). *Id.*; Baker, ¶¶ 123-124.



Morita at Figure 1 (annotated) (showing USB controller 14 (orange), which a POSITA would understand to be a charging subsystem, drawing current (orange arrow)).

Moreover, a POSITA would have understood or at least found obvious that the USB controller of Morita (charging subsystem) draws current “unrestricted by at least one predetermined USB Specification limit.” Specifically, as explained in the following subsections, a POSITA would have understood or found obvious that the mobile videophone of Morita (1) is enabled to draw more than 500 mA of current and (2) is enabled to draw more than 100 mA of current without performing USB

enumeration, which are each predetermined USB Specification limits. *Id.*, ¶¶ 116-122.

**(1) Drawing More than 500mA of Current.**

Morita does not expressly state the amount of current that the mobile videophone draws, but a POSITA would have understood that it is capable of drawing more than 500mA of current, which is sufficient to satisfy this limitation. *See ParkerVision, Inc. v. Qualcomm Inc.*, 903 F.3d 1354, 1361 (Fed. Cir. 2018); Baker, ¶¶ 116-122. At a minimum, a POSITA would have found it obvious to configure the videophone with this capability for several reasons.

*First*, a POSITA would have understood that the charger of Morita is configured to supply more than 500mA to the mobile videophone. Baker, ¶¶ 118-119. Specifically, as noted above, Morita discloses that the charger draws power directly from an outlet at least when it is not connected to a host (personal computer). *See e.g.*, Morita at Figure 2 (component 22, outlet connection) and [0014] (“A power supply voltage supplied from a power supply source is supplied from the charging control unit 23 to the USB hub control unit 27 and the second USB port 21”). Accordingly, a POSITA would have understood that the “first coupling” provided by Morita is, in such configurations, a “high powered” port that is configured to provide a *minimum* of five “unit loads” of current (500mA) to the mobile videophone. USB 2.0 at 171 (“Systems that obtain operating power externally,

either AC or DC, must supply at least five unit loads [500mA] to each port. Such ports are called high-power ports.”) (emphasis added); *see also* USB 1.1 at 134 (same); Baker, ¶ 118.

Table 7-7. DC Electrical Characteristics

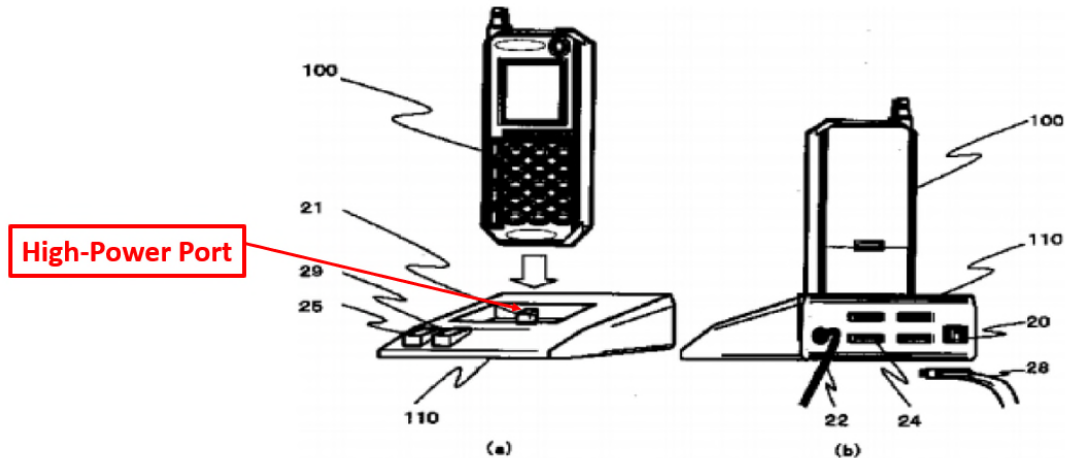
Parameter	Symbol	Conditions	Min.	Max.	Units
<b>Supply Voltage:</b>					
High-power Port	V <sub>BUS</sub>	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	V <sub>BUS</sub>	Note 2, Section 7.2.1	4.40	5.25	V
<b>Supply Current:</b>					
High-power Hub Port (out)	ICC <sub>PRT</sub>	Section 7.2.1	500		mA
Low-power Hub Port (out)	ICC <sub>UPT</sub>	Section 7.2.1	100		mA
High-power Function (in)	ICC <sub>HPF</sub>	Section 7.2.1		500	mA
Low-power Function (in)	ICC <sub>LPF</sub>	Section 7.2.1		100	mA
Unconfigured Function/Hub (in)	ICC <sub>INIT</sub>	Section 7.2.1.4		100	mA
Suspended High-power Device	ICC <sub>SH</sub>	Section 7.2.3; Note 15		2.5	mA
Suspended Low-power Device	ICC <sub>SL</sub>	Section 7.2.3		500	A

USB 2.0 at 178 (Table 7-7) (annotated); *see also* USB 1.1 at 142 (Table 7-5) (same). Because 500mA is the *minimum* amount of current the charger is to supply, a POSITA would have understood that it is actually capable of supplying much more than 500mA. Indeed, the '021 Application discloses that such high-powered ports existed prior to the priority date of the '766 Patent and generally supplied between “700mA-800mA” before automatically terminating the power supply. Ex. 1006 ('021 Application) at 23.

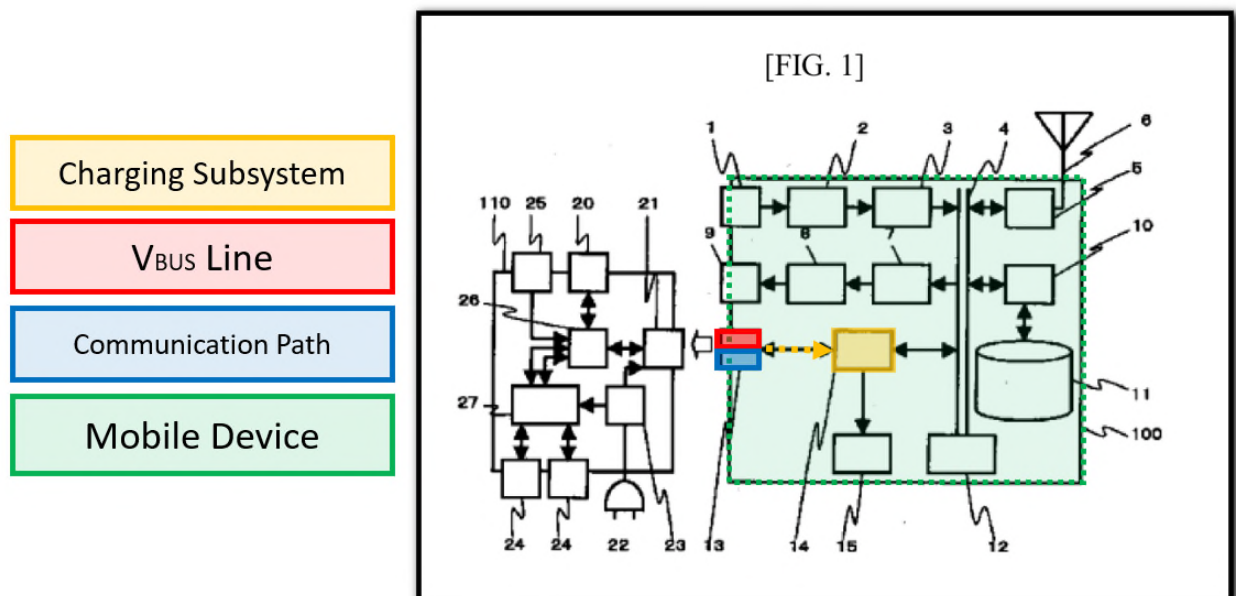
*Second*, a POSITA would have understood that the videophone can draw the entire amount of current supplied by the high power port (which, as noted above, is more than 500mA) because it is the only device connected to that port. Baker, ¶

119. Indeed, a POSITA would understand that the high-power port of the charger is designed to charge the videophone only. *Id.* There would never be any additional downstream devices connected to the videophone. *Id.*

[FIG. 2]



Morita at Figure 2 (annotated).



Morita at Figure 1 (annotated).

*Third*, although the high-power port of the Morita charger supplies a *minimum* of 500 mA, a POSITA would have been motivated to supply and draw more than 500mA (likely 600-1000 mA) in order to charge the phone more quickly. Baker, ¶ 120. It was well known at the time that drawing more than 500mA of current (when such current is available, as it is here) results in faster charging. See Section VI.C; Ex. 1016 (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”); Ex. 1017 (U.S. Patent No. 5,859,522 “Theobald”) at 4:29-39 (a “mid-rate charger” supplies current at around 340 mA; a “fast rate charger” supplies approximately 850 mA of current); Baker, ¶ 120.

Because the charging subsystem of Morita’s mobile videophone is capable of drawing more than 500mA of current, a POSITA would have understood that it is “enabled to draw current unrestricted by at least one predetermined USB Specification limit” as required by claim element 1[c]. Baker, ¶ 117. Indeed, the USB Specification discloses as a condition/limit that a USB device should not be supplied with more than 100mA to a “low-power” power or 500 mA to a “high-power” device:

**Table 7-7. DC Electrical Characteristics**

Parameter	Symbol	Conditions	Min.	Max.	Units
<b>Supply Voltage:</b>					
High-power Port	V <sub>BUS</sub>	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	V <sub>BUS</sub>	Note 2, Section 7.2.1	4.40	5.25	V
<b>Supply Current:</b>					
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)	ICCNIT	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	A

USB 2.0 at 178 (Table 7-7) (annotated); *see also* USB 1.1 at 142 (Table 7-5) (same).

A POSITA would have been motivated to configure the mobile phone of Morita in this manner even though it is inconsistent with the 500mA current limit in the USB Specification. Baker, ¶¶ 121-122. Notably, and as discussed above, Morita discloses that the USB charger is connected to an outlet and can be used for the sole purpose of charging the mobile videophone (i.e., without also being connected to a hub or host). *See* Section VIII.A.3. In this charging state, there are no typical USB communications to disrupt and no other downstream devices that need to be powered. *Id.*; Baker, ¶¶ 121-122. The USB Specification itself implies that, under such circumstances, the 500 mA limit may be disregarded.

Specifically, the USB Specification indicates that the port of the charger is a “high-power port” that will supply a *minimum* of 500 mA. USB 2.0 at 178 (Table 7-7);



USB 1.1 at 142 (Table 7-5); Baker, ¶ 121. In other words, given the configuration of Morita, a POSITA would have understood that drawing more than 500 mA of current would not disrupt the charger from (1) communicating with the mobile videophone (because it is not communicating with the videophone) or (2) powering any other downstream devices (because there are no such other devices). Accordingly, such a POSITA would be motivated to configure the mobile videophone draw more than 500mA of current.

**(2) Drawing More than 100mA of Current without Enumeration.**

Moreover, a POSITA would have understood or found obvious that the mobile videophone of Morita is configured to draw more than 100 mA of current without performing enumeration. Baker, ¶ 122. USB “enumeration” is the communication engaged in by USB devices when connected in order to configure them, but the charger and videophone of Morita cannot engage in that process because there is no USB communication in the charging state. Baker, ¶¶ 74, 110.

Specifically, as discussed in more detail above, a POSITA would have understood that, in some circumstances, the charger of Morita would not be connected to a computer and thus, would act only as a charging device. *See e.g.*, Morita at Figure 2; Baker, ¶¶ 107-110, 122. In those situations, the two devices have no reason or ability to communicate over the data lines (D+ and D-) and thus enumeration is not possible. *Id.* Accordingly, as noted above, the charging device

would provide a *minimum* of 500 mA of current on the  $V_{\text{BUS}}$  to the mobile videophone without enumeration. This disregards the USB Specification's condition/limit on the amount of current that may be supplied without enumeration, which is one unit load (100 mA). USB 2.0 at 171 ("Devices must also ensure that the maximum operating current drawn by a device is one unit load, until configured."); Baker, ¶ 117.

Accordingly, for each of these reasons, a POSITA would have understood or found obvious that the mobile videophone of Morita would draw current without regard to at least one condition of the USB Specification.

**d. 1[d]. said enablement being responsive to an abnormal USB data condition detected at said USB communication path.**

Morita renders obvious "said enablement being responsive to an abnormal USB data condition detected at said USB communication path." Baker, ¶¶ 126-134. Specifically, a POSITA would have found it obvious to configure the videophone of Morita to draw more than 500 mA of current in response to an SE1 signal, which is an "abnormal data condition" that would be "detected at said USB communication path."

As discussed above, the charger of Morita will, in some cases, charge the mobile videophone without also being connected to a USB host (i.e., a personal computer). *See* Section VIII.A. A POSITA would have understood that the charger

must identify the charging state so that the mobile videophone does not default to charging at the “low-power” 100mA level. USB 1.1.; Baker, ¶ 128. A POSITA would have further understood that in this “charging” configuration/state, the charger and the videophone cannot engage in typical USB communication or enumeration and, accordingly, the charger must identify the charging state in some other way. Baker, ¶ 128. Using an SE1 signal on the data lines to identify this state was the most obvious choice for several reasons.

*First*, the data lines in the USB connectors of Morita are already used to signal connection states so they are the natural choice for sending an identification signal. Moreover, in the charging state, they are not needed for other purposes (e.g., typical USB enumeration or communications), and the only other lines (VBUS and Ground) are already being used to provide power. Accordingly, data lines are the obvious choice for signaling the charging state. Baker, ¶ 128.

*Second*, there are only four available signals that could be used to signal the charging state on the D+ and D- lines (both high, both low, high/low, and low/high), and the SE1 signal (both high) is the only legitimate option. Baker, ¶ 128. A POSITA would know not to use the low/high (D+ low and D- high) and high/low (D+ high and D- low) signals because they are already used by the USB Specification to indicate low-speed or full-speed communications across the USB port. See Section VI.A-B; Baker, ¶ 128. As noted above, the charging state of

Morita does not allow for low-speed or full-speed communications (or any typical USB communications) so those signals, if used, would be interpreted incorrectly. *Id.* A POSITA would also have known not to use the low/low signal because it is used by the USB Specification to indicate that no device is connected and, in the charging state of Morita, the charger and the device are connected. *Id.*; Baker, ¶ 128. Accordingly, 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 the charging state. Baker, ¶ 128. In other words, a POSITA would have looked for an identification signal that is not utilized in normal USB communications so that it would not impact other USB operations, and there is only one such signal available (SE1). Baker, ¶¶ 128-129.

***Third***, that the SE1 signal is the obvious choice for an identification signal was known in the art and, thus, is described throughout various relevant prior art references. As those references indicate, a POSITA would have understood that the SE1 signal is the obvious choice because it is not utilized by the USB Specification and, thus, can “be easily distinguished from USB standard data signals.” Shiga, 5:60-62, 6:48-58. Indeed, holding D+ and D- high in this situation (for charging a battery with no communications) was well-known before the priority date of the ’766 Patent. *See* Section VI.B; Baker, ¶¶ 84-90, 130-131. For example, Kerai discloses “A battery charging circuit . . . 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. It states that “[a]s 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).

Other references similarly disclose using the SE1 signal as an identification signal for other purposes. It was known, for example, to use the SE1 signal to identify a power state (analogous to high-power port charging being available). As noted above, Zyskowski employs the SE1 signal to identify its full power state to a different device (*e.g.*, mass storage device, consumer electronic device). Zyskowski, ¶ 19; Baker, ¶ 131. In particular, Zyskowski discloses that “[w]hen the host 104 is in a full power state, data lines D1 and D2 may be raised to a predefined DC voltage level, for example, 5 volts (systems operating at lower voltages might raise the data paths to 3 volts, 2 volts, or even less.” *Id.*; *see also* Shiga, Abstract, 6:35-47 (wake up signal), Casebolt, 7:40-54 (signaling presence of PS/2 adapter).

Moreover, although it is not used in typical USB communications, the SE1 signal is also taught in the USB 2.0 Specification, which refers to this state as “single ended one” or “SE1.” Indeed, while the SE1 signal was not disclosed or referenced in the USB 1.1 specification (1998), it had become so widely used by 2000 that it was added to the USB 2.0 specification in April 2000 (six months prior to the ’486

Application in which the patentee first disclosed using this signal). *See e.g.*, USB 2.0 at 123 (“SE1 is a state in which both the D+ and D- lines are at a voltage above  $V_{OSE1}(\min)$ , which is 0.8 V.”); Baker, ¶ 130.

**Table 7-2. Low-/full-speed Signaling Levels**

Bus State	Signaling Levels		
	At originating source connector (at end of bit time)	At final target connector	
		Required	Acceptable
Differential “1”	$D+ > V_{OH}(\min)$ and $D- < V_{OL}(\max)$	$(D+) - (D-) \geq 200 \text{ mV}$ and $D+ \geq V_{IH}(\min)$	$(D+) - (D-) \geq 200 \text{ mV}$
Differential “0”	$D- > V_{OH}(\min)$ and $D+ < V_{OL}(\max)$	$(D-) - (D+) \geq 200 \text{ mV}$ and $D- \geq V_{IH}(\min)$	$(D-) - (D+) \geq 200 \text{ mV}$
Single-ended 0 (SE0)	$D+ \text{ and } D- < V_{OL}(\max)$	$D+ \text{ and } D- < V_{IL}(\max)$	$D+ \text{ and } D- < V_{IH}(\min)$
Single-ended 1 (SE1)	$D+ \text{ and } D- > V_{OSE1}(\min)$	$D+ \text{ and } D- > V_{IL}(\max)$	

USB 2.0 at 145 (excerpted and annotated).

**Table 11-8. Upstream Facing Port Receiver Signal/Event Definitions**

Signal/Event Name	Event/Signal Source	Description
HS	Internal	Port is operating in high-speed
Tx_active	Transmitter	Transmitter in the Active state
J	Internal	Receiving a 'J' (IDLE) or an 'SE1' on the upstream facing port
HJ	Internal	Receiving an HJ on the upstream facing port
EOI	Internal	End of timed interval
EOITR	Internal	Generated 24 full-speed bit times after the K->SE0 transition at the end of resume
HK, K	Internal	Receiving an HK, 'K' on the upstream facing port
Tx_resume	Transmitter	Transmitter is in the Sresume state
HS_Idle	Internal	Receiving an Idle state on the high-speed upstream facing port
SE0	Internal	Receiving an SE0 on the full-speed upstream facing port
EOR	Internal	End of Reset signaling from upstream
POR	Implementation-dependent	Power_On_Reset

USB 2.0 at 320 (annotated).

**Fourth**, because the SE1 signal can “be easily distinguished from USB standard data signals,” a POSITA would have found it routine to use the SE1 signal as an identification signal with a high expectation of success. *See* Shiga, 5:60-62, 6:48-58. Indeed, as noted above, the prior art is replete with disclosures of receiving and detecting SE1 signals. *E.g.*, Kerai, 5:49-53 (disclosing two instances of a “logic detector 50,” and each instance “detects the state of” a data line (i.e., D+ or D-) to detect the SE1 signal); Shiga, 6:59-7:15 (disclosing comparing means and an AND gate to detect the SE1 signal); Zyskowski, ¶ 19 (detecting high voltage on D lines to recognize SE1 state); Casebolt, 6:6-16, 7:30-45 (disclosing “controller 144” to detect the SE1 condition); Baker, ¶ 131. Similarly, it was well within the knowledge and skill of a POSITA to detect the SE1 signal at the mobile videophone. Baker, ¶ 157.

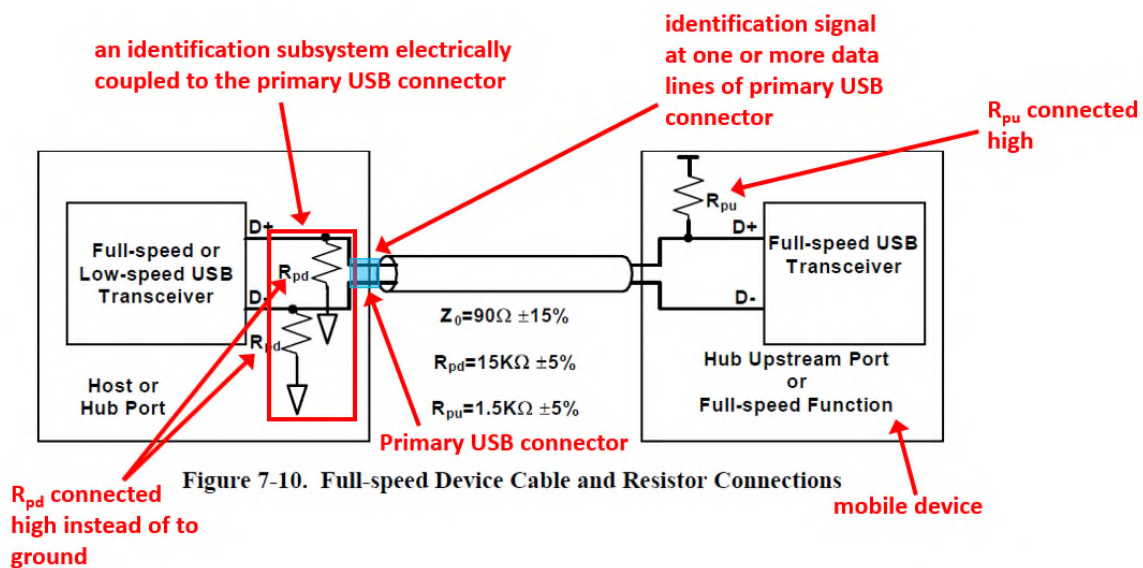
**Fifth**, although the USB 2.0 Specification states that “Low-speed and full-speed USB drivers must never “intentionally” generate an SE1 on the bus,” that would not discourage a POSITA from using the signal here. *See* USB 2.0 at 123; Baker, ¶¶ 129-130. As noted above, the charger is not acting as a low-speed or high-speed driver; indeed, it is not engaging in typical USB communication at all. Baker, ¶¶ 129-130. Accordingly, the USB specification does not teach away from using the SE1 signal for this purpose. To the contrary, by indicating that the signal should not be used during typical USB communications, the USB 2.0 specification itself

implicitly suggests that the SE1 signal can be used to signal a charging-only state in which communication and enumeration is not occurring. As noted above, by providing the SE1 signal, the charger would confirm and indicate that communication will not occur, while still allowing the mobile device to continue receiving 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, ¶ 129.

*Sixth*, although it is not necessary for purposes of the claims of the '766 Patent, a POSITA would have found it obvious to generate the SE1 signal at the charger of Morita. Baker, ¶¶ 132-134. The claims require only that the charging subsystem of the mobile device be enabled to draw current in response to the abnormal signal (e.g., SE1); they do not contain any limitations about the manner in which the adapter generates the signal. Nonetheless, to the extent that Patent Owner argues that it would not have been obvious or predictable to generate the SE1 signal using Morita's adapter, Patent Owner's argument fails for two reasons. First, the claims do not recite any component that generates the SE1 signal. Second, the above prior art illustrates that it was routine to generate the SE1 signal as an identifying

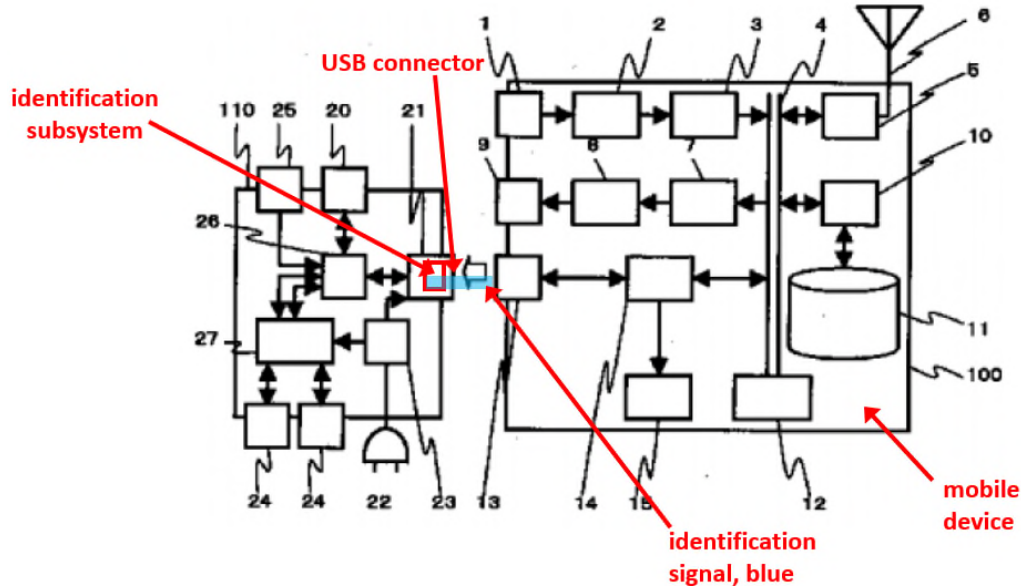


signal. Indeed, a POSITA would have understood how to pull D+ and D- high to provide the SE1 identifying signal. Baker, ¶¶ 132-134. As stated in USB 1.1, “Hubs, and the devices to which they connect, use a combination of pull-up and pull-down resistors to control D+ and D- in the absence of their being 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  $R_{pu}$  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.



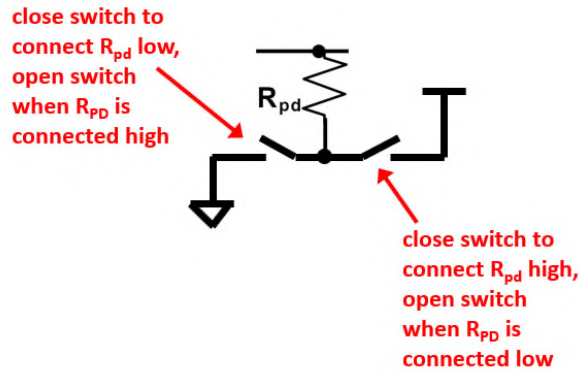
USB 1.1, 113 (annotated).

[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, ¶¶ 132-134



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

In short, a POSITA would have understood, found obvious, and 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 in the common situation when no other USB host or hub was connected.

For all of the reasons discussed above, a POSITA would have found it obvious for the charging subsystem of Morita’s videophone to draw in excess of 500 mA and without enumeration in response to an SE1 signal. Moreover, a POSITA would have understood that the SE1 signal is an “abnormal data condition.” Baker, ¶ 129. Subsequent dependent claims of the ’766 Patent identify the High/High signal (SE1) as the exemplary “abnormal data condition.” *E.g.*, ’766 Patent at Claim 6. Accordingly, Morita’s system, in view of the knowledge of a POSITA, renders this limitation obvious. Baker, ¶¶ 126-134.

**2. Claim 2: The device of claim 1, where said predetermined USB Specification limit is a current limit.**

As explained above, Morita discloses or renders obvious the device of claim 1. A POSITA would have understood that Morita also renders obvious that “said predetermined USB Specification limit is a current limit.” As explained above with respect to claim element 1[c], Morita renders obvious a mobile phone that draws more than 500mA of current and more than 100 mA without enumeration. *See* Section VIII.A.1.c; Baker, ¶ 135. Both are predetermined USB Specification current limits.

**3. Claim 3: The device of claim 1, wherein said enabling of the charging subsystem occurs without USB enumeration.**

As explained above, Morita discloses the device of claim 1. Morita also renders obvious that “said enabling of the charging subsystem occurs without USB enumeration.” Baker, ¶¶ 136-138.

Morita discloses a mobile videophone and associated charging device. Morita, Abstract. As discussed in more detail above, although Morita’s charger was capable of handling a “plurality of external devices,” a POSITA would have understood that, in at least some cases, the charger would act as a charger only. Baker, ¶¶ 107-110, 137; Morita, [0014-0015]. That is, the charger would be plugged into the power socket (e.g., wall outlet) and connected to the videophone for

charging purposes, but not connected to any other external devices (*e.g.*, a personal computer or any other USB host or hub or peripherals).

A POSITA would have understood that in this “charging” state/configuration, (1) normal USB communications between the charger and the videophone are not possible (USB communications require a USB host and root hub as discussed above in Section VI.A) and (2) powering the USB charger from the absent, and unconnected, USB host or hub is not possible. Baker, ¶ 138. Morita embraces this scenario, because it discloses that the adapter can provide power to the phone via USB connector 21 using the power from a wall outlet. Morita, at [0016]. Because normal USB communications are not possible, a POSITA would have further understood that enumeration cannot occur and, thus, that videophone of Morita draws current without enumeration. Baker, ¶ 138. Accordingly a POSITA would have found obvious that “said enabling of the charging subsystem occurs without USB enumeration.”

**4. Claim 4: The device of claim 1, wherein said USB communication path includes a D+ line and a D– line.**

As explained above, Morita renders the device of claim 1 obvious. Moreover, a POSITA would have understood that “said USB communication path” of the videophone of Morita “includes a D+ line and a D– line.” As explained above with respect to claim 1, Morita discloses a mobile videophone that is connected to a

charger via a “USB” coupling, which a POSITA would have understood comprises a D+ and a D- line. *See* Section VIII.A.1.b.

**5. Claim 5: The device of claim 4, wherein said abnormal data condition is an abnormal USB data line condition on said D+ line and said D- line.**

As explained above, Morita renders the device of claim 4 obvious. Morita further renders obvious that “said abnormal data condition is an abnormal USB data line condition on said D+ line and said D- line.” Baker, ¶¶ 126-134, 140. As explained above with respect to claim element 1[d], a POSITA would have been motivated to use an SE1 signal, which a POSITA would have understood is an “abnormal data condition” on the D+ and D- lines (high/high). *See* Section VIII.A.1.d.

**6. Claim 6: The device of claim 5, wherein said abnormal USB data line condition is a logic high signal on each of said D+ and D- lines.**

As explained above, Morita renders the device of claim 5 obvious. Morita further renders obvious that “said abnormal USB data line condition is a logic high signal on each of said D+ and D- lines.” Baker, ¶¶ 126-134, 141. As noted above with respect to claim element 1[d], the “abnormal data condition” is an SE1 signal provided by the D+ and D- lines. *See* Section VIII.A.1.d. As explained by the USB 2.0 specification, and as would be known to persons of skill in the art, this signal is a logic high on each of said D+ and D- lines (at least 0.8V). *See e.g.*, USB 2.0 (“SE1

is a state in which both the D+ and D- lines are at a voltage above  $V_{OSE1}(\text{min})$ , which is 0.8V.”).

**Table 7-2. Low-/full-speed Signaling Levels**

Bus State	Signaling Levels		
	At originating source connector (at end of bit time)	At final target connector	
		Required	Acceptable
Differential "1"	$D+ > V_{OH}(\text{min})$ and $D- < V_{OL}(\text{max})$	$(D+) - (D-) \geq 200 \text{ mV}$ and $D+ \geq V_{IH}(\text{min})$	$(D+) - (D-) \geq 200 \text{ mV}$
Differential "0"	$D- > V_{OH}(\text{min})$ and $D+ < V_{OL}(\text{max})$	$(D-) - (D+) \geq 200 \text{ mV}$ and $D- \geq V_{IH}(\text{min})$	$(D-) - (D+) \geq 200 \text{ mV}$
Single-ended 0 (SE0)	$D+ \text{ and } D- < V_{OL}(\text{max})$	$D+ \text{ and } D- < V_{IL}(\text{max})$	$D+ \text{ and } D- < V_{IH}(\text{min})$
Single-ended 1 (SE1)	$D+ \text{ and } D- > V_{OSE1}(\text{min})$	$D+ \text{ and } D- > V_{IL}(\text{max})$	

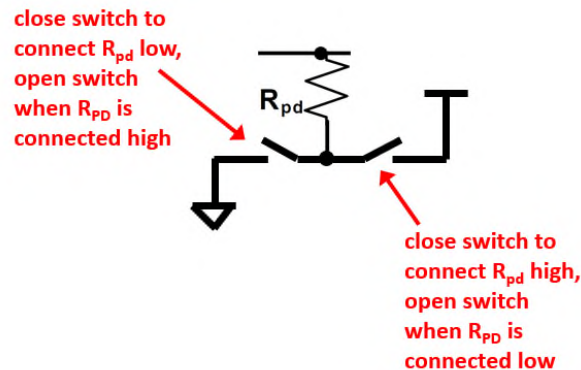
USB 2.0 at 145 (excerpted and annotated).

**7. Claim 7: The device of claim 1 wherein said predetermined USB Specification limit is a current limit of 500 mA.**

As explained above, Morita discloses the device of claim 1. A POSITA would have understood that Morita also discloses or renders obvious that “said predetermined USB Specification limit is a current limit of 500 mA.” Baker, ¶¶ 116-122, 142. As explained above with respect to claim element 1[c], Morita renders obvious a mobile videophone that is capable of drawing more than 500mA of current. *See* Section VIII.A.1.c.(1). As such, the device draws current unrestricted by a predetermined USB Specification limit of 500 mA. *Id.*

**8. Claim 8: The device of claim 6, wherein each said logic high signal is greater than 2V.**

As explained above, Morita renders the device of claim 6 obvious. Morita further renders obvious that “each said logic high signal is greater than 2V.” Baker, ¶¶ 132-134, 143. Specifically, the USB Specifications—which were within the knowledge of a POSITA—teach that implementing a logic high signal on the D+ and D- lines would be accomplished by connecting the lines through a pull-up resistor to  $V_{\text{TERM}}$ . Baker, ¶ 127-134, 138.



USB 1.1 at 113 (annotated portion of Figure 7-10). Moreover, a person of ordinary skill in the art would have understood that  $V_{\text{TERM}}$  is typically 3.0 to 3.6 V, which is greater than 2.0V. Baker, ¶ 138.

**9. Claim 9:**

**a. 9[a]. A mobile device, comprising**

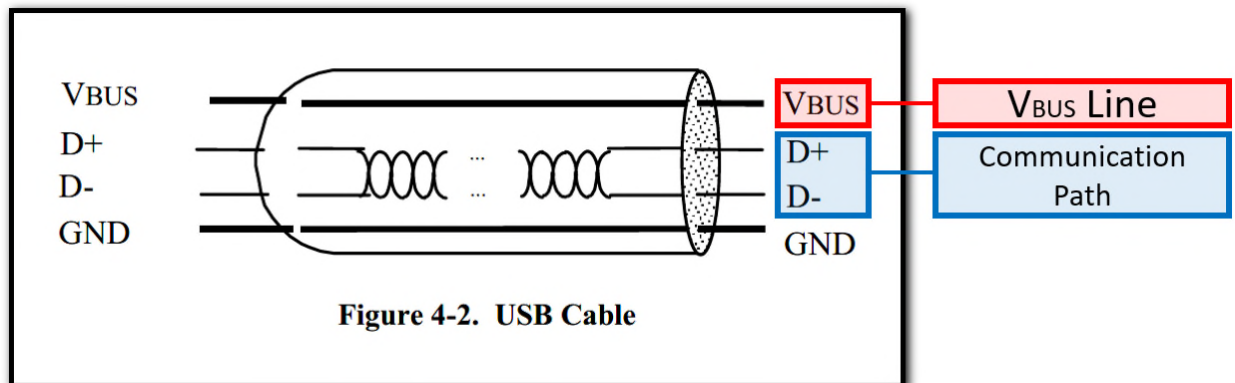
As explained above with respect to claim element 1[a], Morita discloses a mobile device. *See* Section VIII.A.1.a.



**b. 9[b]. a USB communication path and a USB  $V_{BUS}$  line;  
and**

Morita discloses that the mobile videophone comprises “USB communication path and a USB  $V_{BUS}$  line.” Baker, ¶¶ 113-115.

Specifically, as discussed in more detail with respect to claim element 1[b], Morita discloses that the mobile videophone connects to the charger through a “first coupling means” that is configured in a “USB format,” and a POSITA would have understood from the USB Specification that this includes four wires or contacts:  $V_{BUS}$  and GND (ground) lines that provide power and D+ and D- lines that carry signals for communication. *See* Section VIII.A.1.b; *see also e.g.*, Ex. 1009 (USB 1.1) at 15-18, 80-82; Ex. 1010 (USB 2.0) at 15-18, 93-94, and 173-175; Baker, ¶¶ 113-114.



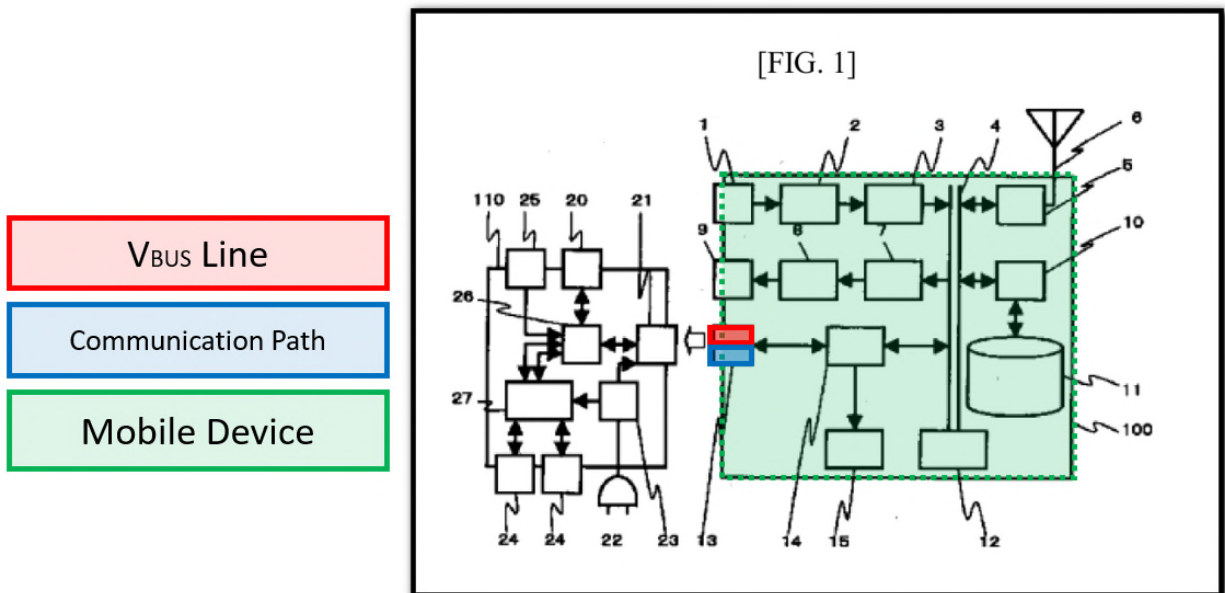
USB 1.1 at Figure 4-2.

### Table 6-1. USB Connector Termination Assignment

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

USB 1.1 at Table 6-1.

As discussed with respect to claim element 1[b], the D+ and D- lines constitute a “USB communications path.” *See* Section VIII.A.1.b. Moreover, a POSITA would have understood that the “V<sub>BUS</sub>” line of the USB Specification is the same V<sub>BUS</sub> line of Claim 9. Baker, ¶ 113.



Morita at Figure 1 (Annotated).

Accordingly, a POSITA would understand that the mobile phone of Morita includes “a USB  $V_{BUS}$  line and a USB communication path” as required by Claim 1 of the ’766 Patent.

**c. 9[c]. a charging subsystem enabled to draw power unrestricted by at least one predetermined USB Specification limit**

Morita discloses or renders obvious “a charging subsystem enabled to draw power unrestricted by at least one predetermined USB Specification limit.” As explained above with respect to claim element 1[c], Morita discloses a charging subsystem that draws more than 500mA from a high-powered port without enumeration. *See* Section VIII.A.1.c. As such, the charging subsystem “draws power unrestricted by” the “predetermined USB Specification limit[s]” that (1) no more than 500 mA of current be supplied to a single device and (2) no more than 100mA of current be supplied to a single device without enumeration. *Id.*

**d. 9[d]. said enablement being responsive to said USB VBUS line being externally powered and an abnormal USB data condition detected at said USB communication path.**

Morita renders obvious that “said enablement being responsive to said USB VBUS line being externally powered and an abnormal USB data condition detected at said USB communication path.” Baker, ¶¶ 107-110, 116-134, 147.

As discussed above, the charger and videophone of Morita can be connected in two different configurations because the charger is optionally connected to a USB

host (i.e., a personal computer) while charging the videophone. *See* Section VIII.A; Baker, ¶¶ 107-110. In the first configuration, the charger is connected to both the videophone and a USB host (i.e., a personal computer). *Id.* This allows the USB host to power and communicate with the mobile video phone through the charger. *Id.*

In the second configuration, the charger is connected to the videophone only. In this configuration, the charger must charge the phone using power from the wall socket and typical USB communication is not possible. *Id.* In this “charging” configuration/state a POSITA would have been motivated to charge the videophone with more than 500mA of current for faster charging (typically 600mA-1000mA as of the priority date of the ’766 Patent). *See* claim element 1[c]; Baker, ¶¶ 116-125. Moreover, a POSITA would have understood that the charger must identify the charging state in some way and would have found it obvious to use an SE1 signal to do so. *See* claim element 1[d]; Baker, ¶¶ 126-134. Because the charging subsystem is enabled to draw more than 500 mA in response to the charging state, and because the charging state includes (1) the SE1 identification signal and (2) the VBUS line being powered from the wall socket, a POSITA would have understood that charging subsystem of Morita satisfies this limitation, i.e., that “said enablement” of the charging subsystem of the videophone of Morita is “responsive to said USB VBUS

line being externally powered and an abnormal USB data condition detected at said USB communication path.” Baker, ¶ 147.

**10. Claim 10: The device of claim 9, wherein said predetermined USB Specification limit is a current limit defined by the USB Specification.**

As explained above with respect to claim 9, Morita discloses the device of claim 9. Moreover, as explained above with respect to claim 2, Morita discloses or renders this additional limitation. *See* Section VIII.A.2.

**11. Claim 11: The device of claim 9, wherein said enabling of the charging system occurs without USB enumeration.**

As explained above with respect to claim 9, Morita discloses the device of claim 9. Moreover, as explained above with respect to claim 3, Morita discloses or renders obvious this additional limitation. *See* Section VIII.A.3.

**12. Claim 12: The device of claim 9, wherein said USB communication path includes a D+ line and a D– line.**

As explained above with respect to claim 9, Morita renders the device of claim 9 obvious. Moreover, as explained above with respect to claim 4, Morita discloses this additional limitation. *See* Section VIII.A.4.

**13. Claim 13: The device of claim 12, wherein said abnormal USB data condition is an abnormal USB data line condition on said D+ line and said D– line.**

As explained above with respect to claim 12, Morita renders the device of claim 12 obvious. Moreover, as explained above with respect to claim 5, Morita renders this additional limitation obvious. *See* Section VIII.A.5.

**14. Claim 14: The device of claim 13, wherein said abnormal USB data line condition is a logic high signal on each of said D+ and D- lines.**

As explained above with respect to claim 13, Morita renders the device of claim 13 obvious. Moreover, as explained above with respect to claim 6, Morita renders this additional limitation obvious. *See* Section VIII.A.6.

**15. Claim 15: The device of claim 9, wherein said predetermined USB Specification limit is a current limit of 500 mA.**

As explained above with respect to claim 9, Morita renders the device of claim 9 obvious. Moreover, as explained above with respect to claim 7, Morita discloses or renders obvious this additional limitation. *See* Section VIII.A.7.

**16. Claim 16: The device of claim 13, wherein each said logic high signal is signals greater than 2V.**

As explained above with respect to claim 13, Morita renders the device of claim 13 obvious. Moreover, as explained above with respect to claim 8, Morita renders this additional limitation obvious. *See* Section VIII.A.8.

**17. Claim 17:**

**a. 17[a]. A method of charging a mobile device having a charging subsystem and a USB communication path, comprising:**

To the extent the preamble of claim 17 is limiting, it is disclosed by Morita. As discussed in more detail above with respect to claim 1, Morita discloses a mobile

device (claim element 1[a]) comprising a charging subsystem (claim element 1[c]) and a USB communication path (claim element 1[b]). *See* Section V.A.1[a]-[c].

**b. 17[b]. upon detection of an identification signal on said path, drawing current in excess of at least one USB Specification defined limit; and**

Morita renders obvious the step of “upon detection of an identification signal on said path, drawing current in excess of at least one USB Specification defined limit.” Baker, ¶¶ 157-158.

As discussed above, in the “charging” configuration, the charger of Morita is connected to the videophone only. In this configuration, the charger must charge the phone using power from the wall socket and typical USB communication is not possible. *Id.* In this “charging” configuration/state a POSITA would have been motivated to charge the videophone with more than 500mA of current for faster charging (typically 600mA-1000mA as of the priority date of the ’766 Patent). *See* claim element 1[c]. Moreover, a POSITA would have understood that the charger must identify the charging state in some way and would have found it obvious to use an SE1 signal to do so. *See* claim element 1[d]. A person of ordinary skill in the art would have understood the SE1 signal to constitute an “identification signal.” *See* Section VIII.A.1.d; Baker, ¶ 156. Indeed, the claims that depend on Claim 17 specifically identify an SE1 signal (high/high on the data lines) as an example of an “identification signal.” ’766 Patent at Claims 19-21. Moreover, it would have been

well within the knowledge and skill of a POSITA to detect and use this signal at the mobile videophone. Baker, ¶ 157.

Because the charging subsystem of the Morita videophone is enabled to draw more than 500 mA in response to the charging state, and because the charging state includes the SE1 identification signal, a POSITA would have understood that charging subsystem of the Morita videophone performs this step, i.e., “upon detection of an identification signal on said path, drawing current in excess of at least one USB Specification defined limit.”

**c. 17[c]. if said identification signal is not detected, drawing current in accordance with said USB Specification.**

Morita renders obvious the step of “if said identification signal is not detected, drawing current in accordance with said USB Specification.” Baker, ¶¶ 159-163. As discussed above with respect to claim element 17[b], it would have been obvious to configure the videophone of Morita to draw current in excess of 500mA without enumeration in response to an SE1 signal.

Conversely, a POSITA would have understood or at least found obvious that the charger would not send an SE1 signal to the mobile videophone when it is connected to a USB host personal computer. Baker, ¶ 160. Rather, in that state, typical communication and enumeration would occur between the personal and computer and the mobile video phone through the charger. Morita at [0015]



(“Normally, when connecting another host personal computer, the other host personal computer is connected to the first USB 20 via USB cable, the connection switching unit 26 connects the connection destination of the first USB port 20 to the USB hub control unit 27, the connection destination being the host end, and the mobile videophone device 100 connected to the second USB port 21 is connected to the USB hub control unit 27 as a device.”) and [0017] (“Thus, the hard disk inside the mobile videophone device 100 is accessed by the operation of keyboard 140 while viewing the display 130 from the personal computer console 120 . . . .”) ; Baker, ¶ 161.

A POSITA would have understood that, when the mobile videophone does not receive the SE1 signal, at least in some circumstances, it will operate consistently with the USB specification and thus perform this step. For example, because the videophone is connected to a host computer in this state, typical USB communication and enumeration can occur. Baker, ¶¶ 161-162. As a result, the mobile videophone engage in enumeration before drawing more than 100mA and thus would comply with the specification in that regard. *Id.* Moreover, in at least some cases, the mobile videophone would draw less than 500 mA. If for example, the mobile phone was fully charged when connected to the computer through the charger of Morita, it would not draw more than 500mA and would thus comply with the USB Specification in that regard. *Id.*

Accordingly, a POSITA would have understood that Morita renders obvious the step of “if said identification signal is not detected, drawing current in accordance with said USB Specification.”

**18. Claim 18: The method of claim 17, wherein said USB Specification defined limit is a current limit defined by USB Specification**

As explained above with respect to claim 17, Morita discloses the device of claim 17. Moreover, as explained above with respect to claim 2, Morita discloses or renders this additional limitation. *See* Section VIII.A.2.

**19. Claim 19: The method of claim 17, wherein the identification signal includes an abnormal signal on the USB communication path.**

As explained above with respect to claim 17, Morita discloses the device of claim 17. Moreover, a POSITA would have understood that the “identification signal includes an abnormal signal on the USB communication path.” As explained above with respect to claim elements 1[d], 9[d], and 17[b], the “identification signal” is an “SE1” signal and the data lines, which a POSITA would have understood to be an abnormal signal on the USB communication path. *See* VIII.A.1[d], 9[d], and 17[b].

**20. Claim 20: The method of claim 19, wherein said USB communication path includes a D+ line and a D- line.**

As explained above with respect to claim 19, Morita discloses the device of claim 19. Moreover, as explained above with respect to claim 4, Morita discloses this additional limitation. *See* Section VIII.A.4.

**21. Claim 21: The method of Claim 20, wherein the abnormal signal includes logic high signals on said D+ line and said D- line.**

As explained above with respect to claim 20, Morita discloses the device of claim 20. Moreover, as explained above with respect to claim 6, Morita discloses or renders this additional limitation. *See* Section VIII.A.6.

**22. Claim 22: The method of claim 18, wherein said current limit is a current limit of 500 mA.**

As explained above with respect to claim 18, Morita discloses the device of claim 18. Moreover, as explained above with respect to claim 7, Morita discloses or renders this additional limitation. *See* Section VIII.A.7.

**23. Claim 23. The method of claim 20, wherein said logic high signals are greater than 2V.**

As explained above with respect to claim 20, Morita discloses the device of claim 20. Moreover, as explained above with respect to claim 8, Morita discloses or renders this additional limitation. *See* Section VIII.A.8.

**24. Claim 24:**

**a. 24[a]. A mobile device comprising:**

As explained above with respect to claim element 1[a], Morita discloses a mobile device. *See* Section VIII.A.1.a.

**b. 24[b]. a charging subsystem enabled to draw current in excess of 500 mA**

As explained above, with respect to claim element 1[c], Morita discloses or renders obvious “a charging subsystem enabled to draw current in excess of 500 mA.” *See* Section VIII.A.1.c.

**c. 24[c]. said enablement being responsive to signals in excess of 2V detected at each of said D+ and D- lines; and**

Morita renders obvious that “said enablement being responsive to signals in excess of 2V detected at each of said D+ and D- lines.” As explained above with respect to claim element 1[d], Morita discloses or renders obvious that said enablement is responsive to an SE1 signal. *See* Section VIII.A.1.d. As explained in more detail with respect to claims 6 and 8, POSITA would have understood that the SE1 signal comprises “signals in excess of 2V detected at each of said D+ and D- lines.” *See* Sections VIII.A.6 and VII.A.8.

**d. 24[d]. said enablement occurring without USB enumeration.**

As explained above with respect to claim element 3, Morita discloses or renders obvious that “said enablement occurring without USB enumeration.” *See* Section VIII.A.1.c(2) and VIII.A.3.

**IX. CONCLUSION**

For the foregoing reasons, there is a reasonable likelihood that Petitioners will prevail as to the Challenged Claims of the '766 Patent. Accordingly, *inter partes* review of claims 1-24 is requested.

Dated: February 26, 2021

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE  
LLP

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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 '766 Patent is involved in the following litigation as of the filing date of this Petition:

- *Fundamental Innovation Systems International LLC v. Coolpad Group Limited et al.*, Case No. 2-20-cv-00117, Eastern District of Texas.
- *Fundamental Innovation Systems International LLC v. Lenovo (United States) Inc. et al.*, Case No. 1-20-cv-00551, District of Delaware.
- *Fundamental Innovation Systems International LLC v. TCT Mobile (US) Inc. et al.*, Case No. 1-20-cv-00552, District of Delaware.

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).

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

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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 '766 Patent is available for IPR and (ii) Petitioner is not barred or estopped from requesting an IPR challenging the '766 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 '766 patent; (2) Petitioner filed this petition within one year of the date they were served with a complaint asserting infringement of the '766 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).

**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. The substance of this document (*i.e.*, excluding table of contents, table of authorities, mandatory notices, listing of exhibits, and certificates of service and word count) contains 13,966 words as calculated by the “Word Count” feature of Microsoft Word Office 365, the word processing program used to create it.

Dated: February 26, 2021

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**CERTIFICATION OF SERVICE ON PATENT OWNER**

Pursuant to 37 C.F.R. §§42.6(e), 42.8(b)(4) and 42.105, the undersigned certifies that on February 26, 2021, a complete and entire copy of this Petition for *Inter Partes* Review of U.S. Patent 8,232,766 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 '766 Patent:

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A courtesy copy was provided on February 26, 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 '766 Patent:

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