UNITED STATES DISTRICT COURT
DISTRICT OF COLUMBIA

CASIO INC., **Plaintiff** **v.** **PAPST LICENSING GMBH & CO. KG** **Defendant.**	**Case No. 1:06-CV-01751** **Judge: Gladys Kessler** **Magistrate: Deborah A. Robinson** **Next status conference: December 4, 2007**
PAPST LICENSING GMBH & CO. KG, **Counter-Plaintiff** **v.** **CASIO INC. and CASIO COMPUTER CO., LTD.** **Counter-Defendants**	

MOTION OF CASIO INC. AND CASIO COMPUTER CO. LTD FOR A SEPARATE TRIAL AND A STAY OF DISCOVERY AS TO DAMAGES AND WILLFULNESS

Plaintiff and counter-defendant, Casio Inc. and counter-defendant Casio Computer Co., Ltd. (collectively, "Casio"), hereby move this Court for an Order calling for: 1) a separation of the issues of damages and willfulness from the liability issues; and 2) a stay of discovery as to damages and willfulness pending a determination of liability.

In accordance with Local Rule 7(m), a meet and confer took place by telephone on June 20, 2007 between counsel for Casio and counsel for Papst. Papst maintained its position that it did not agree to separation and a stay of discovery as to damages and willfulness.

Respectfully submitted,

DATED: June 27, 2007

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

CASIO INC., 570 Mount Pleasant Avenue, Dover, New Jersey 07801 Plaintiff, v. PAPST LICENSING GMBH & CO. KG, Bahnhofstrasse 33, 78112 Georgen, Germany Defendant.	**Civil Action No. 1:06 CV 01751** Judge: Gladys Kessler Magistrate: Deborah A. Robinson Next status conference: 12/4/07
PAPST LICENSING GMBH & CO. KG, Bahnhofstrasse 33, 78112 Georgen, Germany Counter-Plaintiff, v. CASIO INC., 570 Mount Pleasant Avenue, Dover, New Jersey 07801, and CASIO COMPUTER CO., LTD., 6-2, Honmachi 1-chome, Shibuya-ku, Tokyo 151-8543, Japan Counter-Defendants.	

[PROPOSED] ORDER

Upon consideration of the Motion of plaintiff and counter-defendant, Casio, Inc. and counter-defendant Casio Computer Co., Ltd., for a Separate Trial and a Stay of Discovery as to Damages and Willfulness, it is hereby

ORDERED, that the Motion is granted and that the issues of willfulness and damages are separated from the liability issues.

ORDERED that discovery as to damages and willfulness is stayed pending a determination of liability.

DATED:_____

_____
Deborah Robinson
United States Magistrate Judge

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UNITED STATES DISTRICT COURT
DISTRICT OF COLUMBIA

CASIO INC., **Plaintiff** **v.** **PAPST LICENSING GMBH & CO. KG** **Defendant.**	**Case No. 1:06-CV-01751** **Judge: Gladys Kessler** **Magistrate Judge: Deborah A. Robinson**
PAPST LICENSING GMBH & CO. KG, Counter-Plaintiff **v.** **CASIO INC. and CASIO COMPUTER CO., LTD.** **Counter-Defendants**	**Next status conference: December 4, 2007**

MEMORANDUM OF LAW IN SUPPORT OF CASIO INC. AND CASIO COMPUTER CO., LTD.'S MOTION FOR A SEPARATE TRIAL AND A STAY OF DISCOVERY AS TO DAMAGES AND WILLFULNESS

I. INTRODUCTION

Pursuant to Fed. R. Civ. P. 42(b), plaintiff and counter-defendant Casio, Inc. and counter-defendant Casio Computer Co. Ltd. (collectively, "Casio") submit this Memorandum in support of their motion to try to liability issues apart from damages and willfulness, and for a stay of discovery as to damages and willfulness issues.

Separation and a stay on damages and willfulness discovery will result in a more effective and expeditious resolution of the liability issues; will almost certainly avoid the costly and burdensome discovery on damages and willfulness; and should also avoid the need for Casio to decide whether or not to waive the attorney client privilege to defend against Papst's charge of willfulness.[1]

II. THE APPLICABLE LAW

Fed. R. Civ. P. 42(b) authorizes separate trials of any issue "in furtherance of convenience or to avoid prejudice, or when separate trials will be conducive to expedition and economy."[2] These criteria are "in the disjunctive instead of in the conjunctive,"[3] so that any one alone is sufficient to warrant separation. "Separation of the issues of liability and damages is an obvious use for Rule 42, since logically liability must be established before the amount of damages can be determined."[4]

Separation of liability from damages is often the preferred practice in patent cases.[5] Some courts have even imposed a presumption in favor of separation.[6]

Even the United States Supreme Court has addressed this issue. In *Sinclair Refining Co. v. Jenkins Petroleum Process Company,*[7] the Supreme Court stated:

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1 Counsel for Casio hereby certifies, pursuant to Local Rule 7(m), that they have conferred with counsel for Papst, and have been unable to resolve this issue.

2 Fed. R. Civ. P. 42(b).

3 *Giro Sport Design v. Pro-Tec, Inc.*, No. C-88-20228-RPA, 1989 U.S. Dist. LEXIS 9423, at *4 (N.D. Cal. Mar. 17, 1989).

4 *Kisteneff v. Tiernan*, 514 F.2d 896, 897 (1st Cir. 1975).

5 *See, e.g., Swofford v. B & W, Inc.*, 336 F.2d 406, 415 (5th Cir. 1964), *cert. denied*, 379 U.S. 962 (1965).

6 *Lemelson v. Apple Computer Inc.*, No. CV-N-92665-HDM (PHA), 1993 U.S. Dist. LEXIS 20128, at *6 (D. Nev. June 4, 1993); *Acme Resin Corp. v. Ashland Oil, Inc.*, 689 F. Supp. 751, 753 (S.D. Ohio 1987), *aff'd*, 1992 U.S. App. LEXIS 1475 (Fed. Cir. 1992) (quoting *Naxon Telesign Corp. v. GTE Information Sys., Inc.*, 89 F.R.D. 333, 341 n.10 (N.D. Ill. 1980)).

7 *Sinclair Refining Co. v. Jenkins Petroleum Process Company,* 289 U.S. 689 (1933).

> There are times when a suit is triable in separate parts, one affecting the right or liability, and the other affecting the measure of recovery. In suits of that order a discovery as to damages will commonly be postponed till the right or liability has been established or declared.
>
> * * *
>
> Thus, a suit . . . to restrain the infringement of a patent culminates, if successful, in an interlocutory decree, which will be followed by an accounting and a discovery of documents. In these and like cases, the accounts will not be probed until the right has been adjudged.[8]

Thus, Supreme Court precedent, circuit court precedent, and precedent in many district courts all favor separation and stay in patent cases.

III. SEPARATION IS APPROPRIATE IN THIS CASE

Courts have identified a myriad of reasons justifying the preference for separation of liability from willfulness and damages in patent cases. These reasons include: (1) the lack of significant evidentiary overlap;[9] (2) the potential for a substantial saving of time and litigation fees;[10] (3) more effective resolution of the technical question of infringement and validity;[11] and (4) the lack of prejudice if granted.[12] Each of these reasons weigh in favor of granting separation in this case. Here, separation is particularly appropriate because the chance of this case going beyond the liability phase is very remote.

A. Separation Will Result In More Effective And Expeditious Resolution Of The Complex Issues

This case involves two patents and will deal with relatively complex scientific and technical subject matter. Undoubtedly, the jury will be presented with conflicting positions based on contested technological evidence. These technological issues will be interwoven with equally complex legal questions. It will be a significant task for the jury to resolve them.

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8 *Id.* at 693-94 (citations omitted).

9 *Industrias Metalicas Marva, Inc. v. Lausell*, 172 F.R.D. 1, 8 (D.P.R. 1997); *Cf. Acme Resin Corp.*, 689 F. Supp. at 752 (noting factor to be considered is whether issues to be separated for trial are significantly different).

10 *Swofford v. B & W, Inc.*, 34 F.R.D. 15, 20 (S.D. Tex. 1963), *aff'd*, 336 F.2d 406 (5th Cir. 1964), *cert. denied*, 379 U.S. 962 (1965); *Acme Resin Corp.*, 689 F. Supp. at 752.

11 *Swofford*, 34 F.R.D. at 19-20; *Lemelson*, 1993 U.S. Dist. LEXIS 20128, at *9.

12 *Swofford,* 336 F.2d 415; *Industrias Metalicas*, 172 F.R.D. at 9; *Acme Resin Corp.*, 689 F. Supp. at 752.

Further encumbering the jury with damages issues at this time is unnecessary.[13] Separation of the damages issues, therefore, will result in a much more effective and easily manageable liability trial.[14] Moreover, conducting a separate trial on validity and infringement would also lead to a more expeditious resolution of the litigation.[15]

B. Damages/Willfulness Discovery Expense And Effort

Discovery on damages in patent cases can be extensive, and extremely costly. Indeed, in this case, Papst has served extensive discovery requests on Casio seeking damages and willfulness discovery.[16]

As shown in part C, below, it is very unlikely that this case will ever see a damages/willfulness phase. Accordingly, separation and a stay of discovery will avoid burdening the Court with the many discovery disputes the parties will have on these issues, and it will save both parties substantial cost and effort.

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13 *Industrias Metalicas*, 172 F.R.D. at 9; *see also Novopharm Limited v. Torpharm, Inc.*, 181 F.R.D. 308, 311 (E.D.N.C. 1998).

14 *Lemelson*, 1993 U.S. Dist. LEXIS 20128, at *9 ("[S]evering the issue of liability from damages permits the court to focus on the technical issues of validity and infringement without the inevitable distraction caused by the presentation of extraneous evidence relating to accounting procedures, costs, marketing and sales . . . .").

15 *Princeton Biochemicals, Inc. v. Beckman Instruments, Inc.*, 180 F.R.D. 254, 256 (D.N.J. 1998) ("[A] preliminary finding on the question of liability may well make unnecessary the damages inquiry, and thus result in substantial saving of time of the Court and counsel and reduction of expense to the parties"); *Lemelson*, 1993 U.S. Dist. LEXIS, at *6-7; *see also Paine, Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 587 F. Supp. 1112, 1117 (D. Del. 1984).

16 The Papst document requests served on Casio Japan are attached as Exhibit A. Requests relating to damages seek: (a) every document that has any relation to any Casio Digital Camera (Request 6); (b) every document having any relation to a communication with any digital camera customer (Request 7); (c) every document having any relation to shipments or receipts of Casio Digital Cameras (Requests 8 and 9); (d) every document relating in any way to any characteristic, property, advantage or disadvantage of any Casio Digital Camera (Request 10); (e) all agreements relating in any way to a Casio Digital Camera (Requests 13, 14, 15, 24, 25, 31); (f) every document and pleading relating to every legal proceeding anywhere in the world relating to any Casio Digital Camera (Requests 16, 17, 18); (g) every document relating to revenue derived from any digital camera made or sold anywhere in the world (Request 28); (h) every document relating in any way to Casio's digital camera costs and profits all over the world (Requests 29, 30); (i) every document relating to any advertisement, price list, or promotional material for Casio Digital Cameras from every country of the world (Requests 35, 36, 37); (j) every document related to every communication on every Papst patent anywhere in the world, specifically not limited to the patents-in-suit (Request 55); and (k) every document ever exchanged with any manufacturer of any Casio Digital Camera (Request 59). Similar requests were served on Casio America. Exhibit B. While we have asked that these requests be stricken in their entirety, and appropriate sanctions be ordered by the Court pursuant to Rule 26(g), the manner in which Papst intends to use the damages and willfulness issues – to drive up Casio expenses and thus improperly coerce Casio to settle – is clear from their actions to date.

C. This Case Will Never See A Damages/Willfulness Phase

This case will never see a damages/willfulness phase. In asserting the claims against the Casio cameras, Papst is stretching these patents beyond anything that the inventor ever contemplated. Indeed, the word "camera" is not even mentioned in either of the two patents, and there are numerous claim limitations in the asserted claims that are not even remotely present in the Casio cameras. The patents are attached as Exhibits C and D and Casio's Interrogatory Response demonstrating the many reasons why these patents are not infringed is attached as Exhibit E. If only one claim element is not met, there can be no infringement. Here, as the attached documents show, there are many missing elements.

Even if Papst could magically broaden these patents to cover cameras, they would be invalid. Indeed, digital cameras with the ability to download pictures to a PC were well known in the prior art. One example, Casio's own prior art camera, is shown in Exhibit F, and our interrogatory response showing how, pursuant to the Papst analysis, every claim element would be met by the prior art, is provided in Exhibit G.[17] And even if Papst could overcome the infringement and validity issues it faces, and somehow prove liability, the case might well settle at that point.

Thus, the chances of this particular case ever having a damages/willfulness phase are extremely remote. Dealing with Papst's overbroad approach to discovery of damages and willfulness, would needlessly require substantial Court resources, and put both parties through extensive cost and effort.

III. IN ACCORDANCE WITH FEDERAL CIRCUIT PRECEDENT, WILLFULNESS SHOULD BE SEPARATED

Separation of the willfulness issue and a stay of discovery will also resolve the dilemma Casio faces with regard to the potential waiver of the attorney-client privilege attached to its opinion of counsel. That is, if willfulness is not separated, Casio will be forced to decide whether or not to waive its attorney-client privilege to defend from the willfulness charge. This will also avoid the numerous and needless battles that Papst is teeing up related to the potential waiver of privilege.[18]

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[17] This analysis is limited because Papst still refuses to provide proper claim interpretation.

[18] See, for example, the Papst document requests that demand production of privilege and work product material, including those from the files of Casio litigation counsel. Exhibit B, Request 64. Papst interrogatories also expressly seek legal advice "after the filing of the Complaint." Exhibit F, interrogatory 3.

"The great weight of authority supports trying the willfulness issue with damages, rather than liability . . . ."[19] Courts have held that "the issues of liability and willfulness are capable of separation and should sometimes be tried separately."[20] Other courts readily agree that "questions of willfulness, deliberateness and increased damages should properly await final judgment,"[21] and that "the better practice in all infringement cases . . . is to delay . . . [the willfulness] finding until final judgment and after an accounting has been had."[22]

The Federal Circuit has expressly suggested separation of the willfulness issue.[23] In *Quantum Corp.* v. *Tandon Corp.*, the Federal Circuit explained why separation is suggested, and again emphasized that district courts should not, without careful consideration, force an infringer to choose between waiving the privilege or risk being found to be a willful infringer:

> Proper resolution of the dilemma of an accused infringer who must choose between the lawful assertion of the attorney-client privilege and avoidance of a willfulness finding if infringement is found, is of great importance not only to the parties but to the fundamental values sought to be preserved by the attorney-client privilege. An accused infringer, therefore, should not, without the trial court's careful consideration, be forced to choose between waiving the privilege in order to protect itself from a willfulness finding, in which case it may risk prejudicing itself on the question of liability, and maintaining the privilege, in which case it may risk being found to be a willful infringer if liability is found. Trial courts thus should give serious consideration to a separate trial on willfulness whenever the particular attorney-client communications, once inspected by the court in camera, reveal that the defendant is indeed confronted with this dilemma. While our court has recognized that refusal of a separate trial will not require reversal in every case involving attorney-client communications bearing on willfulness, we have suggested the advisability of separate trials in appropriate cases.[24]

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19 *Lockwood v. American Airlines, Inc.*, 1992 U.S. Dist. LEXIS 22077, *8 (S.D. Cal 1992).

20 *Pittway Corp. v. Maple Chase Co.*, No. 91 C 3582, 1992 U.S. Dist. LEXIS 19237, at *17 (D. Ill. Dec. 15, 1992); *see also* Robert A. White, *Patent Litigation: Procedures and Tactics*, §8.03[3] at 8-51 (1992) ("it has been said that it is the better practice to delay a finding on the [willfulness issue] until after the accounting").

21 *Swofford*, 336 F.2d at 413.

22 *E-I-M Co., Inc. v. Philadelphia Gear Works, Inc.*, 223 F.2d 36, 42 (5th Cir. 1955), *cert. denied*, 350 U.S. 933 (1956).

23 *Quantum Corp. v. Tandon Corp.*, 940 F.2d 642, 643-44 (Fed. Cir. 1991).

24 *Id.*

The willfulness and liability issues in this action are separate and distinct from each other and are therefore easily severable. The liability question requires a technical comparison between the claims of the patent and the accused products, whereas the willfulness inquiry is directed solely to the issue of Casio's intent; it is relevant only to the damages award, if any, and is not pertinent to issues relating to liability. Separation of willfulness also would help to minimize the possibility of confusion and prejudice at a liability trial.

IV. CONCLUSION

For the foregoing reasons, Casio respectfully requests that this Court separate the issues of damages and willfulness from the liability issues, and stay all discovery relating to damages and willfulness pending a determination of liability.

Respectfully submitted,

DATED: June 27, 2007

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

CASIO INC., 570 Mount Pleasant Avenue, Dover, New Jersey 07801 Plaintiff, v. PAPST LICENSING GMBH & CO. KG, Bahnhofstrasse 33, 78112 Georgen, Germany Defendant.	Civil Action No. 1:06 CV 01751 Judge: Gladys Kessler Magistrate: Deborah A. Robinson Next status conference: December 4, 2007
PAPST LICENSING GMBH & CO. KG, Bahnhofstrasse 33, 78112 Georgen, Germany Counter-Plaintiff, v. CASIO INC. and CASIO COMPUTER CO., LTD. Counter-Defendants	Civil Action No. 1:06 CV 01751 Judge: Gladys Kessler Magistrate: Deborah A. Robinson Next status conference: December 4, 2007

DECLARATION OF JEFFREY M. GOLD, ESQ.

I, Jeffrey M. Gold, hereby declare as follows:

1. I am a partner at the law firm of Morgan, Lewis & Bockius LLP in the New York Office located at 101 Park Avenue, New York, New York 10178.

2. I have been admitted to practice law in the State of New York since 1997. I am further admitted to practice in the Southern and Eastern Districts of New York, the Federal Circuit Court of Appeals and before the Patent and Trademark Office. I am also currently admitted pro hac vice before this court as part of this action.

3. Attached hereto as Exhibit A, is a true and correct copy of Defendant Papst Licensing GMBH & Co. KG's First Set of Requests for the Production of Documents and Things to Casio Computer Co., Ltd., served on April 20, 2007.

4. Attached hereto as Exhibit B is a true and correct copy of Papst Licensing GMBH & Co. KG's First Set of Requests for the Production of Documents and Things to Casio Inc., served on April 20, 2007.

5. Attached hereto as Exhibit C is a true and correct copy of United States Patent Number 6,470,399.

6. Attached hereto as Exhibit D is a true and correct copy of United States Patent Number 6,895,449.

7. Attached hereto as Exhibit E is true and correct copy of Casio Inc.'s Objections and Responses to Papst Licensing GMBH & Co. KG's First Set of Interrogatories, served on counsel for Papst Licensing GMBH & Co. KG on May 21, 2007.

8. Attached hereto as Exhibit F is a true and correct copy of the Owner's Manual for Casio's QV-10 digital camera, bates numbers CAP-021444 through CAP-021466.

9. Attached hereto as Exhibit G is true and correct copy of Casio Inc.'s Supplemental Objections and Responses to Papst Licensing GMBH & Co. KG's First Set of Interrogatories, served on counsel for Papst Licensing GMBH & Co. KG on June 22, 2007.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Dated: June 27, 2007

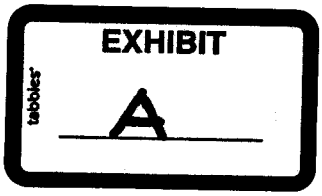
By: _____
Jeffrey M. Gold

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

CASIO INC. Plaintiff, v. PAPST LICENSING GMBH & CO. KG, Defendant.	Civil Action No. 1:06 CV 01751 Judge: Gladys Kessler
PAPST LICENSING GMBH & CO. KG, Counter-Plaintiff v. CASIO INC. and CASIO COMPUTER CO., LTD. Counter-Defendants	

PAPST LICENSING GMBH & CO. KG'S
FIRST SET OF REQUESTS FOR THE PRODUCTION OF DOCUMENTS
AND THINGS TO CASIO COMPUTER CO., LTD.

Pursuant to Rule 34 of the Federal Rules of Civil Procedure, Defendant/Counter-Plaintiff Papst Licensing GmbH & Co. KG ("Papst") requests that Counter-Defendant Casio Computer Co., Ltd. ("Casio"), produce the following documents and things for inspection and copying in accordance with the Definitions and Instructions set forth herein. If the manner of production is not otherwise agreed upon, production shall be at the offices at Welsh & Katz, Ltd., 120 South Riverside, 22nd Floor, Chicago, Illinois 60606, within thirty (30) days after service hereof, or as the parties may otherwise agree.



DEFINITIONS AND INSTRUCTIONS

1. As used herein, "Casio" shall include, but is not limited to, Casio Computer Co., Ltd., Casio Inc. and all of their predecessor(s) and successor(s) in interest, parent(s), subsidiaries, related and affiliated persons or entities, and any person employed by or for any or all of these entities, and all agents or representatives (including but not limited to their attorneys, accountants, and consultants).

2. As used herein, the term "document" shall have the full meaning ascribed to it under Rule 34 of the Federal Rules of Civil Procedure including, without limitation, the original (and every copy of the original which differs in any way from it) of any written or graphic matter or any medium of any type or description upon which intelligence or information is recorded or from which intelligence or information can be perceived, which is or has been in the possession, custody, or control of Casio, or of which Casio has knowledge, including, without limitation: electronic mail; correspondence; memoranda; stenographic or handwritten notes; technical literature; specifications; plans; blueprints; drawings, charts; computer tapes, print-outs, and any other computer or electronic data capable of being produced in document form or displayed electronically; advertising or promotional materials; laboratory notebooks; financial records; contracts; drafts; agreements; instructions; studies; publications; films; prints; voice recordings; reports; surveys; forecasts; minutes; statistical compilations; and every copy of such writing, record, or graphic matter where such copy is a draft or not identical to the original document or where such copy contains any commentary or notation whatsoever, handwritten or otherwise, that does not appear on the other copies or on the original.

3. If any of the information requested to be produced is available in machine-readable form (such as punch cards, paper or magnetic tapes, drums, disks, or core storage), state the form in which it is available and describe the type of computer or other machinery required to access the information. If the information requested is only available in machine-readable form, indicate whether you possess any existing program which will print the records in some form, and identify the person(s) who is/are familiar with the program. If no program exists, state whether you could develop one or whether an existing program could be modified to print records in a readable form.

4. As used herein, the term "relate" (or variants thereof such as "relating" or "related"), when used in connection with a document or thing, shall mean, without limitation, any document or thing that constitutes, contains, embodies, evidences, concerns, reflects, identifies, states, refers directly or indirectly to, or is in any way relevant to the particular subject matter identified.

5. In the event any information, document, or thing responsive to these requests is not provided by reason of a claim of privilege or work product, or for any other reason, then the following shall be provided with respect to such information, document, or thing: (a) a brief description of the subject matter of the information, document, or thing; (b) the identity of the author or creator of the information, document, or thing; (c) the source of the information, document, or thing; (d) all recipients of the information, document, or thing (including, but not limited to those receiving copies and blind copies); (e) the date the information, document, or thing (or any copy or draft thereof which is not identical to the original) was created; and (f) the basis upon which the information, document, or thing is being withheld.

6. As used herein, "and" or "or" shall be construed conjunctively or disjunctively, or both conjunctively and disjunctively, so as to acquire the broadest meaning possible.

7. In the event a responsive document has been destroyed: (a) identify the person(s) who destroyed it; (b) the date it was destroyed; (c) the reasons why it was destroyed; and (d) the circumstances under which it was destroyed.

8. As used herein, the term "day" or "date" shall mean the exact day, month, and year. If the exact date is not ascertainable, the best available approximation should be provided.

9. As used herein, "person" shall include, but is not limited to, any natural person, business, partnership, corporation, or other entity, and any employee, agent, attorney, or representative of any of the foregoing.

10. As used herein, "Casio Digital Camera" shall mean any and all designs, implementations, models, versions, and revisions of any and all products, or methods, relating to any part of any Casio Digital Camera capable of transferring picture data to another device.

11. "Patents-in-Suit" refers to United States Patent No. 6,895,449 ("the '449 patent") and United States Patent No. 6,470,399 ("the '399 patent").

12. Where appropriate, the singular form of a word should be interpreted in the plural and *vice versa*, and the masculine form of a word shall be interpreted to also include the feminine and *vice versa*, to obtain the broadest possible meaning.

13. These document requests are continuing in nature. If after making its initial response hereto (and up until the time of any hearing or trial), Casio or its attorneys,

agents, or representatives obtain or become aware of any further information or documents responsive to these requests that was unavailable at the time of the initial response hereto, Casio is requested to produce such information and documents.

14. Unless indicated otherwise, these requests apply to all documents and materials from 1997 to the present date.

15. The methods and format of Casio's production shall be as follows:

I. Format of Production

A. The parties shall produce all responsive hard copy and electronic documents in single-page Tagged Image File Format ("TIFF") with an accompanying Summation load file, an extracted text file of electronic documents that are unredacted, and an Optical Character Recognition ("OCR") text file of unredacted portions of redacted documents and hard copy documents.

B. Documents that present imaging or formatting problems shall be promptly identified and the Parties shall meet and confer to attempt to resolve the problems. The Parties are not required to produce exact duplicates of electronic documents stored in different electronic locations. The metadata for documents which have been "de-duplicated" across custodial files will indicate the names of the custodians in whose files the documents are located. The parties shall produce documents on either DVD or CD and may produce fact sheets by email in ".pdf" format.

C. Each page of a produced document shall have a legible, unique page identifier ("Bates Number") and confidentiality legend (where applicable) on the face of the image at a location that does not obliterate, conceal, or interfere with any information from the source documents. No other legend or stamp will be placed on the document

image other than the Bates Number, confidentiality legend (where applicable), and redactions addressed above.

D. For redacted documents, the metadata for each document will indicate the basis for the redaction (e.g., "other Casio product," "privacy," or "privilege") at the time the redacted document is produced.

II. Metadata

To the extent possible and practicable, the parties will provide the following metadata fields:

(a) Electronic document type;
(b) Create date;
(c) File name;
(d) File location;
(e) Source location;
(f) Starting production number;
(g) Ending production number;
(h) Custodian;
(i) Last date modified;
(j) Author;
(k) Recipient(s);
(l) Document date (if different from create date);
(m) cc(s);
(n) bcc(s);
(o) Subject;
(p) Title; and
(q) Attachment information (for e-mails).

If a party determines that it is impossible to produce certain metadata fields for a type or types of documents, the party shall so inform opposing counsel. If a party determines that the production of certain metadata fields for a type or types of documents would be impracticable, unduly burdensome or unduly expensive, the party shall so inform opposing counsel, and the parties shall promptly meet and confer on what should

be done, without prejudice to that party's right to object to production of such metadata fields or the opposing party's right to move to compel such production.

REQUESTS FOR DOCUMENTS AND THINGS

1. One sample of each and every Casio Digital Camera that has been used, manufactured, sold, offered for sale, licensed or imported into the United States since October 22, 2002.

2. All documents referring or relating to the research, development, design, re-design, prototype production, testing, licensing, or commercial production of any and all Casio Digital Cameras.

3. All documents identifying all entities or persons involved in the research, development, design, re-design, prototype production, testing, licensing, manufacturing, commercial production, sale, offer for sale or importation of any and all Casio Digital Cameras.

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manuals, technical publications, technical documentation, white papers, or technical bulletins relating to any and all Casio Digital Cameras.

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39. All documents which refer or relate to the Patents-in-Suit.

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41. All documents and things that support, contradict or otherwise provide the basis, in whole or in part, for each of Casio's claims or defenses alleged in this action.

42. All documents and things that support contradict or otherwise provide the basis, in whole or in part, for each of Casio's claims and defenses to the damages claims in this action.

43. All documents and things that support, contradict or otherwise provide the basis, in whole or in part, for Casio's Complaint, Answer, or Affirmative Defenses in this action.

44. All documents authored or authorized under the direction or control of Casio which refer, relate and/or describe, in whole or in part, the subject matter of the Patents-in-Suit, or the inventions described or claimed therein, whether or not the Patents-in-Suit, are expressly named in any such document.

45. All documents, including all legal opinions of counsel, recording, evidencing or referring to Casio having ever made a study of the infringement, patentability, validity or claim scope of the Patents-in-Suit.

46. All documents which establish or tend to establish that Casio has or has not induced others to infringe or contributed to others' infringement of any claim of the Patents-in-Suit.

47. All documents relating to any attempt to design around the Patents-in-Suit.

48. All minutes, notes, or other records, in whatever format that it may exist, which relates to, summarizes, or otherwise reflects any board of directors, management, or similar control group meeting at which the Patents-in-Suit or the subject matter of the present lawsuit was discussed.

49. All documents constituting, recording, evidencing or referring to each United States or foreign patent known to Casio which disclose or claim subject matter falling within the scope of the Patents-in-Suit.

50. All documents, articles or publications concerning the subject matter of the Patents-in-Suit.

51. All documents constituting, recording, evidencing or referring to any alleged prior art relevant to the Patents-in-Suit, including all documents that provide written corroboration that any actual product constituting alleged prior art was or was not on sale or sold anywhere in the world. This request shall have no time limitation.

52. All documents and things supporting or refuting any and all alleged secondary considerations relevant to Casio's invalidity contentions.

53. All documents and things concerning whether Casio Digital Cameras infringe or do not infringe the Patents-in-Suit.

54. All documents and things concerning whether any and all non-Casio digital cameras infringe or do not infringe the Patents-in-Suit.

55. All documents memorializing, summarizing, or otherwise reflecting or relating to communications with any person or entity concerning the Patents-in-Suit or any other patent owned by Papst that relates to digital cameras.

56. All documents which set forth the officers and directors of Casio from 1997 to the present date.

57. All documents identifying Casio's personnel structure, including the names and the titles of Casio's management, sales, licensing, marketing, design and engineering personnel involved with any and all Casio Digital Cameras from 1997 to the present date.

58. All documents showing the corporate structure or organization of Casio, including all past and present individuals or entity(ies) that have (had) a controlling interest in Casio since 1997.

59. All documents of any kind exchanged between Casio and any licensees or product manufacturer relating to any and all Casio Digital Cameras.

60. All documents of any kind exchanged between Casio and any manufacturer relating to the Patents-in-Suit.

61. All documents relating to meetings between Casio employees and employees of any manufacturer relating to any and all Casio Digital Cameras.

62. As to each person Casio expects to call as an expert witness at the trial in this action:

(a). All documents indicating, referring or relating to the subject matter upon which such expert witness is expected to testify, and all documents indicating, referring to, or relating to the qualifications establishing him or her as an expert in such subject matter.

(b). All documents describing the substance of the facts and opinions upon which he or she is expected to testify.

(c). All documents provided to each such expert and all documents provided by the expert to Casio.

63. All legal opinions, conclusions, and work product concerning whether or not any and all Casio Digital Cameras infringe or do not infringe the Patents-in-Suit.

64. All legal opinions, conclusions, and work product concerning whether or not the Patents in Suit are valid and/or enforceable.

65. All documents that Casio, its employees, consultants, or experts have considered, consulted, or relied upon in interpreting or construing the claims of the Patents-in-Suit, including but not limited to excerpts from books, dictionaries, treatises and the like.

66. All documents that show any involvement of Casio's parent companies, sister companies or related entities that are or were involved in the conception, design, research, development, manufacture, use, sale, offer for sale, importation of any and all Casio Digital Cameras.

67. All documents relating to whether Casio has any control over or has the ability to obtain documents from its parent companies, sister companies or related entities that are or were involved with any and all Casio Digital Cameras, including any documents that show:

(a). a common ownership between Casio and any Casio parent company, sister company, subsidiary or related entity;

(b) an exchange or intermingling of board of directors between Casio and any Casio parent company, sister company, subsidiary or related entity;

(c) an exchange of documents in the ordinary course of business between Casio and any Casio parent company, sister company, subsidiary or related entity;

(d) any involvement in this litigation by any Casio parent company, sister company, subsidiary or related entity;

(g) the corporate and financial relationship between Casio and any Casio parent company, sister company, subsidiary or related entity;

(h) any agreements between Casio and any Casio parent company, sister company, subsidiary or related entity;

(i) the power of Casio to elect any board of directors for any Casio parent company, sister company, subsidiary or related entity;

(j) Casio's connection to the conception, design, research, development, manufacture, use, sale, offer for sale, importation of any and all Casio Digital Cameras; and

(k) any and all efforts to sell, market and/or service any and all Casio Digital Cameras by any Casio parent company, sister company, subsidiary or related entity.

68. All copies of Casio's document management and/or retention policies, including all amendments thereto in effect since 1997.

69. All documents that relate to or show a violation or potential violation of Casio's document management and/or retention policies since 1997.

70. All documents that (1) describe the details of Casio's information systems since 1997, (2) describe the types of electronic information stored on those systems, (3) describe the volume of electronic information stored on those system(s), (4) describe the applications that have run and/or displayed each type of electronic information on those

systems, (5) identify those individuals possessing electronic information responsive to these requests, and (6) identify those individuals at Casio with specialized knowledge of their respective computer systems.

71. All documents and things identified in, responsive to, used in responding to, or relating in any way to Papst Licensing's First Set of Interrogatories.

72. Any and all joint defense agreements that refer or relate to (1) the Patents in Suit, (2) any and all Casio Digital Cameras, or (3) Papst Licensing.

73. All documents which refer or relate to the Papst Licensing.

74. Any and all documents that refer or relate to the prosecution of the Patents-In-Suit, and any and all patent applications or patents related to the Patents-In-Suit, including but not limited to, any and all foreign counterpart applications and patents, continuation applications and patents, and divisional applications and patents.

Dated: April 20, 2007

/s/ Joseph E. Cwik
Jerold B. Schnayer
Joseph E. Cwik
WELSH & KATZ, LTD.
120 South Riverside Plaza • 22nd Floor
Chicago, Illinois 60606
(312) 655-1500

Campbell Killefer (Bar No. 268433)
VENABLE LLP
575 7th Street, N.W.
Washington, D.C. 20004
(202) 344-4000
Attorneys for Defendant/Counter-Plaintiff Papst Licensing GmbH & Co. KG

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing PAPST LICENSING GMBH & CO. KG'S FIRST SET OF FIRST SET OF REQUESTS FOR THE PRODUCTION OF DOCUMENTS AND THINGS TO CASIO COMPUTER CO., LTD. was served on this the 20th day of April, 2007 upon the attorneys for Casio Computer Co., Ltd. as follows:

VIA U.S. MAIL and E-MAIL
J. Kevin Fee
MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, NW
Washington, D.C. 20004
Counsel for Casio Inc. and Casio Computer Co.,Ltd.

VIA U.S. MAIL AND E-MAIL
Scott Simpson
Jeffrey Gold
Morgan Lewis & Bockius, LLP
101 Park Avenue
New York, New York 10178

/s/ Joseph E. Cwik
Attorney for Papst Licensing GmbH & Co. KG

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

CASIO INC.

Plaintiff,

v.

PAPST LICENSING GMBH & CO. KG,
Defendant.

PAPST LICENSING GMBH & CO. KG,
Counter-Plaintiff

v.

CASIO INC. and
CASIO COMPUTER CO., LTD.

Counter-Defendants

Civil Action No. 1:06 CV 01751

Judge: Gladys Kessler

PAPST LICENSING GMBH & CO. KG'S
FIRST SET OF REQUESTS FOR THE PRODUCTION OF DOCUMENTS
AND THINGS TO CASIO INC.

Pursuant to Rule 34 of the Federal Rules of Civil Procedure, Defendant/Counter-Plaintiff Papst Licensing GmbH & Co. KG ("Papst") requests that Plaintiff/Counter-Defendant Casio Inc. ("Casio"), produce the following documents and things for inspection and copying in accordance with the Definitions and Instructions set forth herein. If the manner of production is not otherwise agreed upon, production shall be at the offices at Welsh & Katz, Ltd., 120 South Riverside, 22nd Floor, Chicago, Illinois 60606, within thirty (30) days after service hereof, or as the parties may otherwise agree.

EXHIBIT
tabbies
B

DEFINITIONS AND INSTRUCTIONS

1. As used herein, "Casio" means (a) Casio Inc., Casio Computer Co., Ltd. and all of their predecessor(s) and successor(s) in interest, parent(s), subsidiaries, related and affiliated persons or entities, and any person employed by or for any or all of these entities, and all agents or representatives (including but not limited to their attorneys, accountants, and consultants).

2. As used herein, the term "document" shall have the full meaning ascribed to it under Rule 34 of the Federal Rules of Civil Procedure including, without limitation, the original (and every copy of the original which differs in any way from it) of any written or graphic matter or any medium of any type or description upon which intelligence or information is recorded or from which intelligence or information can be perceived, which is or has been in the possession, custody, or control of Casio, or of which Casio has knowledge, including, without limitation: electronic mail; correspondence; memoranda; stenographic or handwritten notes; technical literature; specifications; plans; blueprints; drawings, charts; computer tapes, print-outs, and any other computer or electronic data capable of being produced in document form or displayed electronically; advertising or promotional materials; laboratory notebooks; financial records; contracts; drafts; agreements; instructions; studies; publications; films; prints; voice recordings; reports; surveys; forecasts; minutes; statistical compilations; and every copy of such writing, record, or graphic matter where such copy is a draft or not identical to the original document or where such copy contains any commentary or notation whatsoever, handwritten or otherwise, that does not appear on the other copies or on the original.

3. If any of the information requested to be produced is available in machine-readable form (such as punch cards, paper or magnetic tapes, drums, disks, or core storage), state the form in which it is available and describe the type of computer or other machinery required to access the information. If the information requested is only available in machine-readable form, indicate whether you possess any existing program which will print the records in some form, and identify the person(s) who is/are familiar with the program. If no program exists, state whether you could develop one or whether an existing program could be modified to print records in a readable form.

4. As used herein, the term "relate" (or variants thereof such as "relating" or "related"), when used in connection with a document or thing, shall mean, without limitation, any document or thing that constitutes, contains, embodies, evidences, concerns, reflects, identifies, states, refers directly or indirectly to, or is in any way relevant to the particular subject matter identified.

5. In the event any information, document, or thing responsive to these requests is not provided by reason of a claim of privilege or work product, or for any other reason, then the following shall be provided with respect to such information, document, or thing: (a) a brief description of the subject matter of the information, document, or thing; (b) the identity of the author or creator of the information, document, or thing; (c) the source of the information, document, or thing; (d) all recipients of the information, document, or thing (including, but not limited to those receiving copies and blind copies); (e) the date the information, document, or thing (or any copy or draft thereof which is not identical to the original) was created; and (f) the basis upon which the information, document, or thing is being withheld.

6. As used herein, "and" or "or" shall be construed conjunctively or disjunctively, or both conjunctively and disjunctively, so as to acquire the broadest meaning possible.

7. In the event a responsive document has been destroyed: (a) identify the person(s) who destroyed it; (b) the date it was destroyed; (c) the reasons why it was destroyed; and (d) the circumstances under which it was destroyed.

8. As used herein, the term "day" or "date" shall mean the exact day, month, and year. If the exact date is not ascertainable, the best available approximation should be provided.

9. As used herein, "person" shall include, but is not limited to, any natural person, business, partnership, corporation, or other entity, and any employee, agent, attorney, or representative of any of the foregoing.

10. As used herein, "Casio Digital Camera" shall mean any and all designs, implementations, models, and versions of all Casio digital cameras capable of transferring picture information to another device, that have been used, manufactured, sold, offered for sale, licensed or imported into the United States since October 22, 2002.

11. As used herein, "Patents-in-Suit" refers to United States Patent No. 6,895,449 ("the '449 patent") and United States Patent No. 6,470,399 ("the '399 patent").

12. As used herein, "Lawsuit" means any type of legal action where Casio was a party or participant of any kind including, but not limited to, lawsuits filed in federal or state courts, administrative proceedings, ITC proceedings, USPTO proceedings and any international cases or proceedings filed in any tribunal.

13. Where appropriate, the singular form of a word should be interpreted in the plural and *vice versa*, and the masculine form of a word shall be interpreted to also include the feminine and *vice versa*, to obtain the broadest possible meaning.

14. These document requests are continuing in nature. If after making its initial response hereto (and up until the time of any hearing or trial), Casio or its attorneys, agents, or representatives obtain or become aware of any further information or documents responsive to these requests that was unavailable at the time of the initial response hereto, Casio is requested to produce such information and documents.

15. Unless indicated otherwise, these requests apply to all documents and materials from 1997 to the present date.

16. The methods and format of Casio's production shall be as follows:

I. Format of Production

A. The parties shall produce all responsive hard copy and electronic documents in single-page Tagged Image File Format ("TIFF") with an accompanying Summation load file, an extracted text file of electronic documents that are unredacted, and an Optical Character Recognition ("OCR") text file of unredacted portions of redacted documents and hard copy documents.

B. Documents that present imaging or formatting problems shall be promptly identified and the Parties shall meet and confer to attempt to resolve the problems. The Parties are not required to produce exact duplicates of electronic documents stored in different electronic locations. The metadata for documents which have been "de-duplicated" across custodial files will indicate the names of the custodians in whose files

the documents are located. The parties shall produce documents on either DVD or CD and may produce fact sheets by email in ".pdf" format.

C. Each page of a produced document shall have a legible, unique page identifier ("Bates Number") and confidentiality legend (where applicable) on the face of the image at a location that does not obliterate, conceal, or interfere with any information from the source documents. No other legend or stamp will be placed on the document image other than the Bates Number, confidentiality legend (where applicable), and redactions addressed above.

D. For redacted documents, the metadata for each document will indicate the basis for the redaction (e.g., "other Casio product," "privacy," or "privilege") at the time the redacted document is produced.

II. Metadata

To the extent possible and practicable, the parties will provide the following metadata fields:

(a) Electronic document type;
(b) Create date;
(c) File name;
(d) File location;
(e) Source location;
(f) Starting production number;
(g) Ending production number;
(h) Custodian;
(i) Last date modified;
(j) Author;
(k) Recipient(s);
(l) Document date (if different from create date);
(m) cc(s);
(n) bcc(s);
(o) Subject;
(p) Title; and
(q) Attachment information (for e-mails).

If a party determines that it is impossible to produce certain metadata fields for a type or types of documents, the party shall so inform opposing counsel. If a party determines that the production of certain metadata fields for a type or types of documents would be impracticable, unduly burdensome or unduly expensive, the party shall so inform opposing counsel, and the parties shall promptly meet and confer on what should be done, without prejudice to that party's right to object to production of such metadata fields or the opposing party's right to move to compel such production.

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42. All documents and things that support contradict or otherwise provide the basis, in whole or in part, for each of Casio's claims and defenses to the damages claims in this action.

43. All documents and things that support, contradict or otherwise provide the basis, in whole or in part, for Casio's Complaint, Answer, or Affirmative Defenses in this action.

44. All documents authored or authorized under the direction or control of Casio which refer, relate and/or describe, in whole or in part, the subject matter of the Patents-in-Suit, or the inventions described or claimed therein, whether or not the Patents-in-Suit, are expressly named in any such document.

45. All documents, including all legal opinions of counsel, recording, evidencing or referring to Casio having ever made a study of the infringement, patentability, validity or claim scope of the Patents-in-Suit.

46. All documents which establish or tend to establish that Casio has or has not induced others to infringe or contributed to others' infringement of any claim of the Patents-in-Suit.

47. All documents relating to any attempt to design around the Patents-in-Suit.

48. All minutes, notes, or other records, in whatever format that it may exist, which relates to, summarizes, or otherwise reflects any board of directors, management, or similar control group meeting at which the Patents-in-Suit or the subject matter of the present lawsuit was discussed.

49. All documents constituting, recording, evidencing or referring to each United States or foreign patent known to Casio which disclose or claim subject matter falling within the scope of the Patents-in-Suit.

50. All documents, articles or publications concerning the subject matter of the Patents-in-Suit.

51. All documents constituting, recording, evidencing or referring to any alleged prior art relevant to the Patents-in-Suit, including all documents that provide written corroboration that any actual product constituting alleged prior art was or was not on sale or sold anywhere in the world. This request shall have no time limitation.

52. All documents and things supporting or refuting any and all alleged secondary considerations relevant to Casio's invalidity contentions.

53. All documents and things concerning whether Casio Digital Cameras infringe or do not infringe the Patents-in-Suit.

54. All documents and things concerning whether any and all non-Casio digital cameras infringe or do not infringe the Patents-in-Suit.

55. All documents memorializing, summarizing, or otherwise reflecting or relating to communications with any person or entity concerning the Patents-in-Suit or any other patent owned by Papst that relates to digital cameras.

56. All documents which set forth the officers and directors of Casio from 1997 to the present date.

57. All documents identifying Casio's personnel structure, including the names and the titles of Casio's management, sales, licensing, marketing, design and engineering personnel involved with any and all Casio Digital Cameras from 1997 to the present date.

58. All documents showing the corporate structure or organization of Casio, including all past and present individuals or entity(ies) that have (had) a controlling interest in Casio since 1997.

59. All documents of any kind exchanged between Casio and any licensees or product manufacturer relating to any and all Casio Digital Cameras.

60. All documents of any kind exchanged between Casio and any manufacturer relating to the Patents-in-Suit.

61. All documents relating to meetings between Casio employees and employees of any manufacturer relating to any and all Casio Digital Cameras.

62. As to each person Casio expects to call as an expert witness at the trial in this action:

(a). All documents indicating, referring or relating to the subject matter upon which such expert witness is expected to testify, and all documents indicating, referring

to, or relating to the qualifications establishing him or her as an expert in such subject matter.

(b). All documents describing the substance of the facts and opinions upon which he or she is expected to testify.

(c). All documents provided to each such expert and all documents provided by the expert to Casio.

63. All legal opinions, conclusions, and work product concerning whether or not any and all Casio Digital Cameras infringe or do not infringe the Patents-in-Suit.

64. All legal opinions, conclusions, and work product concerning whether or not the Patents in Suit are valid and/or enforceable.

65. All documents that Casio, its employees, consultants, or experts have considered, consulted, or relied upon in interpreting or construing the claims of the Patents-in-Suit, including but not limited to excerpts from books, dictionaries, treatises and the like.

66. All documents that show any involvement of Casio's parent companies, sister companies or related entities that are or were involved in the conception, design, research, development, manufacture, use, sale, offer for sale, importation of any and all Casio Digital Cameras.

67. All documents relating to whether Casio has any control over or has the ability to obtain documents from its parent companies, sister companies or related entities that are or were involved with any and all Casio Digital Cameras, including any documents that show:

(a). a common ownership between Casio and any Casio parent company, sister company, subsidiary or related entity;

(b) an exchange or intermingling of board of directors between Casio and any Casio parent company, sister company, subsidiary or related entity;

(c) an exchange of documents in the ordinary course of business between Casio and any Casio parent company, sister company, subsidiary or related entity;

(d) any involvement in this litigation by any Casio parent company, sister company, subsidiary or related entity;

(g) the corporate and financial relationship between Casio and any Casio parent company, sister company, subsidiary or related entity;

(h) any agreements between Casio and any Casio parent company, sister company, subsidiary or related entity;

(i) the power of Casio to elect any board of directors for any Casio parent company, sister company, subsidiary or related entity;

(j) Casio's connection to the conception, design, research, development, manufacture, use, sale, offer for sale, importation of any and all Casio Digital Cameras; and

(k) any and all efforts to sell, market and/or service any and all Casio Digital Cameras by any Casio parent company, sister company, subsidiary or related entity.

68. All copies of Casio's document management and/or retention policies, including all amendments thereto in effect since 1997.

69. All documents that relate to or show a violation or potential violation of Casio's document management and/or retention policies since 1997.

70. All documents that (1) describe the details of Casio's information systems since 1997, (2) describe the types of electronic information stored on those systems, (3) describe the volume of electronic information stored on those system(s), (4) describe the applications that have run and/or displayed each type of electronic information on those systems, (5) identify those individuals possessing electronic information responsive to these requests, and (6) identify those individuals at Casio with specialized knowledge of their respective computer systems.

71. All documents and things identified in, responsive to, used in responding to, or relating in any way to Papst Licensing's First Set of Interrogatories.

72. Any and all joint defense agreements that refer or relate to (1) the Patents in Suit, (2) any and all Casio Digital Cameras, or (3) Papst Licensing.

73. All documents which refer or relate to the Papst Licensing.

74. Any and all documents that refer or relate to the prosecution of the Patents-In-Suit, and any and all patent applications or patents related to the Patents-In-Suit, including but not limited to, any and all foreign counterpart applications and patents, continuation applications and patents, and divisional applications and patents.

Dated: April 20, 2007

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing PAPST LICENSING GMBH & CO. KG'S FIRST SET OF FIRST SET OF REQUESTS FOR THE PRODUCTION OF DOCUMENTS AND THINGS TO CASIO INC. was served on this the 20th day of April, 2007 upon the attorneys for Casio Inc. as follows:

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US006470399B1

(12) **United States Patent**
Tasler

(10) **Patent No.: US 6,470,399 B1**
(45) **Date of Patent: Oct. 22, 2002**

(54) **FLEXIBLE INTERFACE FOR COMMUNICATION BETWEEN A HOST AND AN ANALOG I/O DEVICE CONNECTED TO THE INTERFACE REGARDLESS THE TYPE OF THE I/O DEVICE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(52) **U.S. Cl.** **710/16**; 710/62; 710/63
(58) **Field of Search** 710/15, 16, 11, 710/12, 62, 63, 64; 703/23, 24, 25

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,291,611	A		3/1994	Davis et al.
5,297,124	A	*	3/1994	Plotkin et al. 703/25
5,430,855	A	*	7/1995	Walsh et al. 703/23
5,444,644	A		8/1995	Divjak
5,487,154	A		1/1996	Gunji
5,499,378	A	*	3/1996	McNeill et al. 703/24
5,506,692	A		4/1996	Murata
5,510,774	A		4/1996	Loncle
5,548,783	A	*	8/1996	Jones et al. 710/15
6,012,113	A	*	1/2000	Tuckner 710/64

FOREIGN PATENT DOCUMENTS

DE	195 28 889 A1	2/1997
EP	0 436 458 A2	7/1991
EP	0 685 799 A1	12/1995
JP	06301607 A	10/1994
JP	08110883 A	4/1996
WO	WO94/19746	9/1994

OTHER PUBLICATIONS

Steve Martin, "PC–based Data Acquisition in an Industrial Environment," pp. 1–3 (1990).
Payne et al., "High Speed PC–based Data Acquisition Systems," IEEE, pp. 2140–2145 (1995).
National Instruments Corporation, "Dynamic Signal Acquisition and DSP Board for the PC AT," IEEE 488 and VXIbus Control, Data Acquuisition, and Analysis, pp. 3–118–3–123, (1994).
IBM Corporation, "Communication Method between Devices through FDD Interface," IBM Technical Disclosure Bulletin, vol. 38 (No. 05), p. 245 (May, 1995).

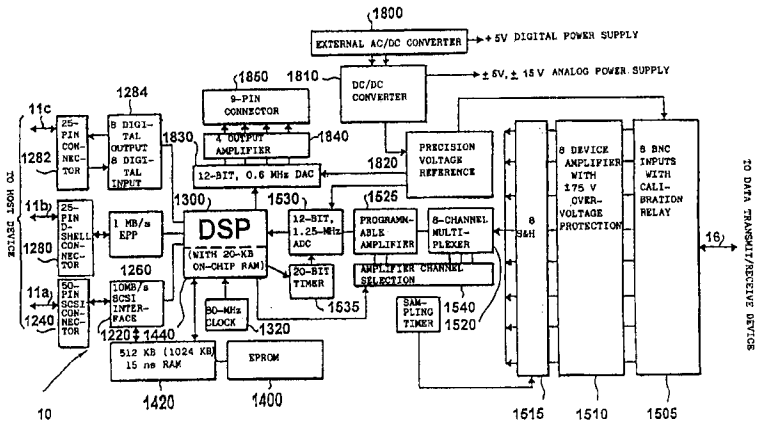
* cited by examiner

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(57) **ABSTRACT**

An interface device (**10**) provides fast data communication between a host device with input/output interfaces and a data transmit/receive device, wherein the interface device (**10**) comprises a processor means (**13**), a memory means (**14**), a first connecting device (**12**) for interfacing the host device with the interface device, and a second connecting device (**15**) for interfacing the interface device (**10**) with the data transmit/receive device. The interface device (**10**) is configured by the processor means (**13**) and the memory means (**14**) in such a way that, when receiving an inquiry from the host device via the first connecting device (**12**) as to the type of a device attached to the host device, regardless of the type of the data transmit/receive device, the interface device sends a signal to the host device via the first connecting device (**12**) which signals to the host device that it is communicating with an input/output device.

15 Claims, 2 Drawing Sheets





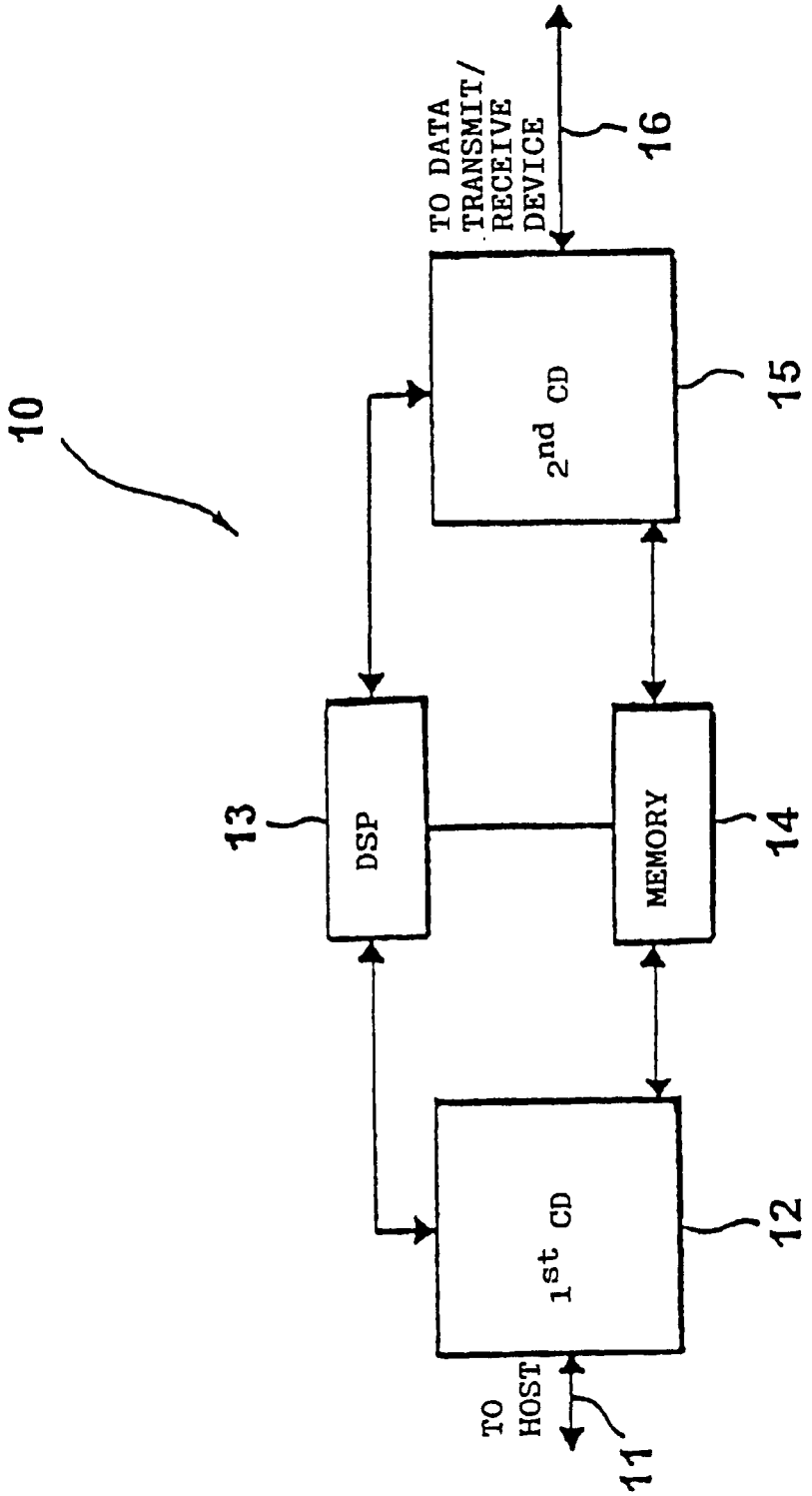

10
TO DATA TRANSMIT/ RECEIVE DEVICE
16
2nd CD
15
13
DSP
MEMORY
14
1st CD
12
TO HOST
11

FIG. 1

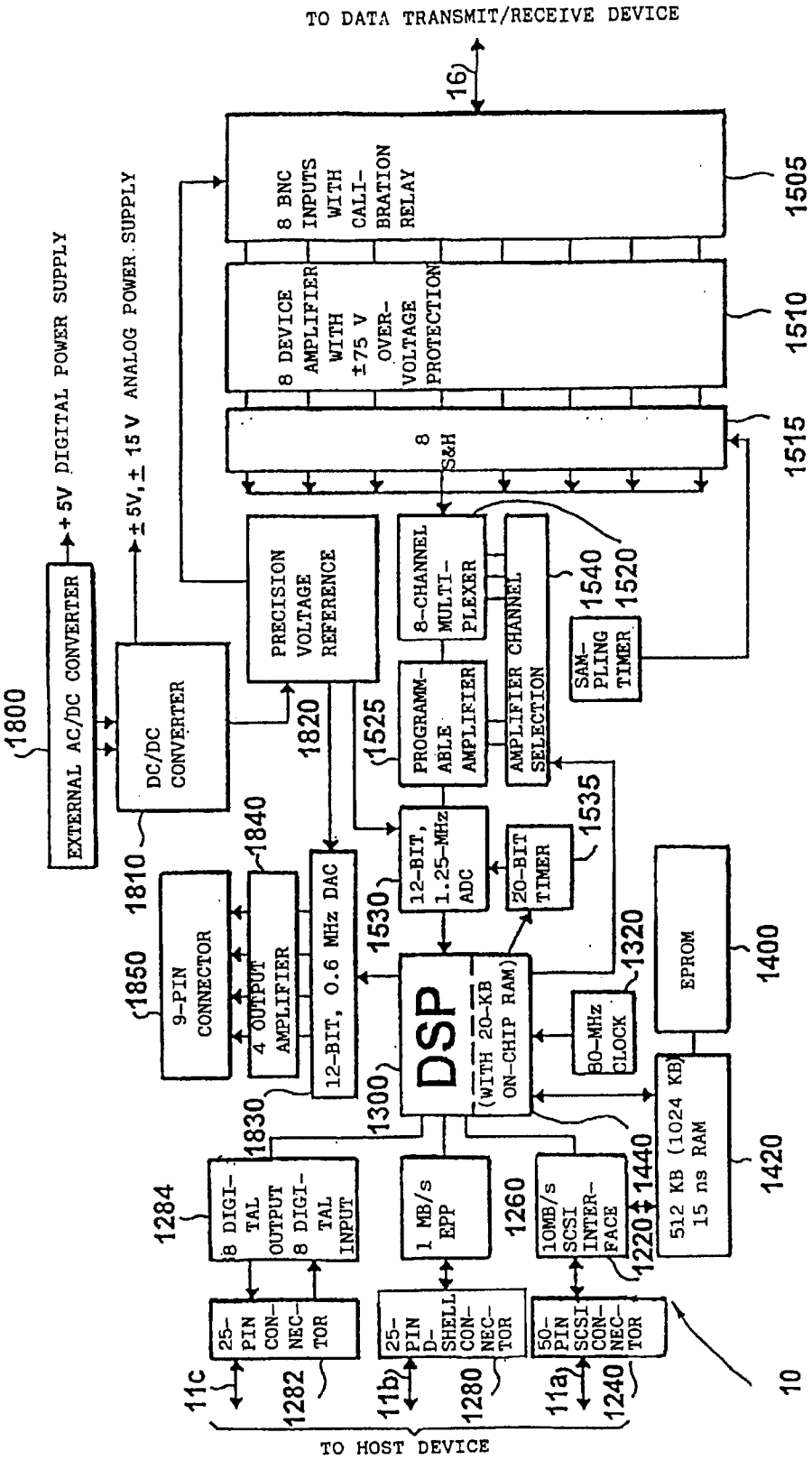

TO DATA TRANSMIT/RECEIVE DEVICE
16
8 BNC INPUTS WITH CALI-BRATION RELAY
1505
8 DEVICE AMPLIFIER WITH ±75 V OVER-VOLTAGE PROTECTION
1510
8 S&H
1515
+5V DIGITAL POWER SUPPLY
±5V, ± 15 V ANALOG POWER SUPPLY
EXTERNAL AC/DC CONVERTER
1800
DC/DC CONVERTER
PRECISION VOLTAGE REFERENCE
1820
8-CHANNEL MULTI-PLEXER
1540
1520
SAM-PLING TIMER
PROGRAMM-ABLE AMPLIFIER
1525
AMPLIFIER CHANNEL SELECTION
1535
1840
1810
12-BIT, 1.25-MHz ADC
20-BIT TIMER
9-PIN CONNECTOR
1850
4 OUTPUT AMPLIFIER
12-BIT, 0.6 MHz DAC
1530
DSP
(WITH 20-KB ON-CHIP RAM)
1300
80-MHz CLOCK
1320
EPROM
1400
1830
1284
8 DIGI-TAL OUTPUT 8 DIGI-TAL INPUT
1 MB/s EPP
1260
10MB/s SCSI INTER-FACE
1220
1440
512 KB (1024 KB) 15 ns RAM
1420
25-PIN CON-NEC-TOR
1282
25-PIN D-SHELL CON-NEC-TOR
1280
50-PIN SCSI CON-NEC-TOR
1240
11c
11b
11a
10
TO HOST DEVICE

FIG.2

FLEXIBLE INTERFACE FOR COMMUNICATION BETWEEN A HOST AND AN ANALOG I/O DEVICE CONNECTED TO THE INTERFACE REGARDLESS THE TYPE OF THE I/O DEVICE

FIELD OF THE INVENTION

The present invention relates to the transfer of data and in particular to interface devices for communication between a computer or host device and a data transmit/receive device from which data is to be acquired or with which two-way communication is to take place.

BACKGROUND OF THE INVENTION

Existing data acquisition systems for computers are very limited in their areas of application. Generally such systems can be classified into two groups.

In the first group host devices or computer systems are attached by means of an interface to a device whose data is to be acquired. The interfaces of this group are normally standard interfaces which, with specific driver software, can be used with a variety of host systems. An advantage of such interfaces is that they are largely independent of the host device. However, a disadvantage is that they generally require very sophisticated drivers which are prone to malfunction and which limit data transfer rates between the device connected to the interface and the host device and vice versa. Further, it is often very difficult to implement such interfaces for portable systems and they offer few possibilities for adaptation with the result that such systems offer little flexibility.

The devices from which data is to be acquired cover the entire electrical engineering spectrum. In a typical case, it is assumed that a customer who operates, for example, a diagnostic radiology system in a medical engineering environment reports a fault. A field service technician of the system manufacturer visits the customer and reads system log files generated by the diagnostic radiology system by means a portable computer or laptop for example. If the fault cannot be localized or if the fault is intermittent, it will be necessary for the service technician to read not only an error log file but also data from current operation. It is apparent that in this case fast data transfer and rapid data analysis are necessary.

Another case requiring the use of an interface could be, for example, when an electronic measuring device, e.g. a multimeter, is attached to a computer system to transfer the data measured by the multimeter to the computer. Particularly when long-term measurements or large volumes of data are involved is it necessary for the interface to support a high data transfer rate.

From these randomly chosen examples it can be seen that an interface may be put to totally different uses. It is therefore desirable that an interface be sufficiently flexible to permit attachment of very different electrical or electronic systems to a host device by means of the interface. To prevent operator error, it is also desirable that a service technician is not required to operate different interfaces in different ways for different applications but that, if possible, a universal method of operating the interface be provided for a large number of applications.

To increase the data transfer rates across an interface, the route chosen in the second group of data acquisition systems for the interface devices was to specifically match the interface very closely to individual host systems or computer systems. The advantage of this solution is that high data transfer rates are possible. However, a disadvantage is that the drivers for the interfaces of the second group are very closely matched to a single host system with the result that they generally cannot be used with other host systems or their use is very ineffective. Further, such types of interface have the disadvantage that they must be installed inside the computer casing to achieve maximum data transfer rates as they access the internal host bus system. They are therefore generally not suitable for portable host systems in the form of laptops whose minimum possible size leaves little internal space to plug in an interface card.

DESCRIPTION OF PRIOR ART

A solution to this problem is offered by the interface devices of IOtech (business address: 25971 Cannon Road, Cleveland, Ohio 44146, USA) which are suitable for laptops such as the WaveBook/512 (registered trademark). The interface devices are connected by means of a plug-in card, approximately the size of a credit card, to the PCMCIA interface which is now a standard feature in laptops. The plug-in card converts the PCMCIA interface into an interface known in the art as IEEE 1284. The said plug-in card provides a special printer interface which is enhanced as regards the data transfer rate and delivers a data transfer rate of approximately 2 MBps as compared with a rate of approx. 1 MBps for known printer interfaces. The known interface device generally consists of a driver component, a digital signal processor, a buffer and a hardware module which terminates in a connector to which the device whose data is to be acquired is attached. The driver component is attached directly to the enhanced printer interface thus permitting the known interface device to establish a connection between a computer and the device whose data is to be acquired.

In order to work with the said interface, an interface-specific driver must be installed on the host device so that the host device can communicate with the digital signal processor of the interface card. As described above, the driver must be installed on the host device. If the driver is a driver developed specifically for the host device, a high data transfer rate is achieved but the driver cannot be easily installed on a different host system. However, if the driver is a general driver which is as flexible as possible and which can be used on many host devices, compromises must be accepted with regard to the data transfer rate.

Particularly in an application for multi-tasking systems in which several different tasks such as data acquisition, data display and editing are to be performed quasi-simultaneously, each task is normally assigned a certain priority by the host system. A driver supporting a special task requests the central processing system of the host device for processor resources in order to perform its task. Depending on the particular priority assignment method and on the driver implementation, a particular share of processor resources is assigned to a special task in particular time slots. Conflicts arise if one or more drivers are implemented in such a way that they have the highest priority by default, i.e. they are incompatible, as happens in practice in many applications. It may occur that both drivers are set to highest priority which, in the worst case, can result in a system crash.

EP 0685799 A1 discloses an interface by means of which several peripheral devices can be attached to a bus. An interface is connected between the bus of a host device and various peripheral devices. The interface comprises a finite

state machine and several branches each of which is assigned to a peripheral device. Each branch comprises a data manager, cycle control, user logic and a buffer. This known interface device provides optimal matching between a host device and a specific peripheral device.

The specialist publication IBM Technical Disclosure Bulletin, Vol. 38, No. 05, page 245; "Communication Method between Devices through FDD Interface" discloses an interface which connects a host device to a peripheral device via a floppy disk drive interface. The interface consists in particular of an address generator, an MFM encoder/decoder, a serial/parallel adapter and a format signal generator. The interface makes it possible to attach not only a floppy disk drive but also a further peripheral device to the FDD host controller of a host device. The host device assumes that a floppy disk drive is always attached to its floppy disk drive controller and communication is initiated if the address is correct. However, this document contains no information as to how communication should be possible if the interface is connected to a multi-purpose interface instead of to a floppy disk drive controller.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an interface device for communication between a host device and a data transmit/receive device whose use is host device-independent and which delivers a high data transfer rate.

In accordance with a first aspect of the present invention, this object is met by an interface device for communication between a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and a data transmit/receive device comprising: a processor; a memory; a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and a second connecting device for interfacing the interface device with the data transmit/receive device, wherein the interface device is configured by the processor and the memory in such a way that the interface device, when receiving an inquiry from the host device as to the type of a device attached to the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is an input/output device customary in a host device, whereupon the host device communicates with the interface device by means of the driver for the input/output device customary in a host device.

In accordance with a second aspect of the present invention, this object is met by an interface device for communication between a host device, which comprises a multi-purpose interface and a specific driver for this interface, and a data transmit/receive device comprising: a processor; a memory; a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and a second connecting device for interfacing the interface device with the data transmit/receive device, wherein the interface device is configured using the processor and the memory in such a way that the interface device, when receiving an inquiry from the host device as to the type of a device attached at the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is an input/output device customary in a host device, whereupon the host device communicates with the interface device by means of the specific driver for the multi-purpose interface.

In accordance with a third aspect of the present invention, this object is met by a method of communication between a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and a data transmit/receive device via an interface device comprising the steps of interfacing of the host device with a first connecting device of the interface device via the multi-purpose interface of the host device; interfacing of the data transmit/receive device with a second connecting device of the interface device; inquiring by the host device at the interface device as to the type of device to which the multi-purpose interface of the host device is attached; regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, responding to the inquiry from the host device by the interface device in such a way that it is an input/output device customary in a host device, whereupon the host device communicates with the interface device by means of the usual driver for the input/output device.

The present invention is based on the finding that both a high data transfer rate and host device-independent use can be achieved if a driver for an input/output device customary in a host device, normally present in most commercially available host devices, is utilized. Drivers for input/output devices customary in a host device which are found in practically all host devices are, for example, drivers for hard disks, for graphics devices or for printer devices. As however the hard disk interfaces in common host devices which can be, for example, IBM PCs, IBM-compatible PCs, Commodore PCs, Apple computers or even workstations, are the interfaces with the highest data transfer rate, the hard disk driver is utilized in the preferred embodiment of the interface device of the present invention. Drivers for other storage devices such as floppy disk drives, CD-ROM drives or tape drives could also be utilized in order to implement the interface device according to the present invention.

As described in the following, the interface device according to the present invention is to be attached to a host device by means of a multi-purpose interface of the host device which can be implemented, for example, as an SCSI interface or as an enhanced printer interface. Multi-purpose interfaces comprise both an interface card and specific driver software for the interface card. The driver software can be designed so that it can replace the BIOS driver routines. Communication between the host device and the devices attached to the multi-purpose interface then essentially takes place by means of the specific driver software for the multi-purpose interface and no longer primarily by means of BIOS routines of the host device. Recently however drivers for multi-purpose interfaces can also already be integrated in the BIOS system of the host device as, alongside classical input/output interfaces, multi-purpose interfaces are becoming increasingly common in host devices. It is of course also possible to use BIOS routines in parallel with the specific driver software for the multi-purpose interface, if this is desired.

The interface device according to the present invention comprises a processor means, a memory means, a first connecting device for interfacing the host device with the interface device, and a second connecting device for interfacing the interface device with the data transmit/receive device. The interface device is configured by the processor means and the memory means in such a way that the interface device, when receiving an inquiry from the host

device via the first connecting device as to the type of a device attached to the host device, sends a signal, regardless of the type of the data transmit/receive device, to the host device via the first connecting device which signals to the host device that it is communicating with an input/output device. The interface device according to the present invention therefore simulates, both in terms of hardware and software, the way in which a conventional input/output device functions, preferably that of a hard disk drive. As support for hard disks is implemented as standard in all commercially available host systems, the simulation of a hard disk, for example, can provide host device-independent use. The interface device according to the present invention therefore no longer communicates with the host device or computer by means of a specially designed driver but by means of a program which is present in the BIOS system (Basic Input/Output System) and is normally precisely matched to the specific computer system on which it is installed, or by means of a specific program for the multi-purpose interface. Consequently, the interface device according to the present invention combines the advantages of both groups. On the one hand, communication between the computer and the interface takes place by means of a host device-specific BIOS program or by means of a driver program which is matched to the multi-purpose interface and which could be regarded as a "device-specific driver". On the other hand, the BIOS program or a corresponding multi-purpose interface program which operates one of the common input/output interfaces in host systems is therefore present in all host systems so that the interface device according to the present invention is host device-independent.

BRIEF DESCRIPTION OF THE DRAWINGS

In the following, preferred embodiments of the present invention will be explained in more detail with reference to the drawings enclosed, in which:

FIG. **1** shows a general block diagram of the interface device according to the present invention; and

FIG. **2** shows detailed block diagram of an interface device according to a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. **1** shows a general block diagram of an interface device **10** according to the present invention. A first connecting device **12** of the interface device **10** can be attached to a host device (not shown) via a host line **11**. The first connecting device is attached both to a digital signal processor **13** and to a memory means **14**. The digital signal processor **13** and the memory means **14** are also attached to a second connecting device **15** by means of bidirectional communication lines (shown for all lines by means of two directional arrows). The second connecting device can be attached by means of an output line **16** to a data transmit/receive device which is to receive data from the host device or from which data is to be read, i.e. acquired, and transferred to the host device. The data transmit/receive device itself can also communicate actively with the host device via the first and second connecting device, as described in more detail in the following.

Communication between the host system or host device and the interface device is based on known standard access commands as supported by all known operating systems (e.g. DOS, Windows, Unix). Preferably, the interface device according to the present invention simulates a hard disk with a root directory whose entries are "virtual" files which can be created for the most varied functions. When the host device system with which the interface device according to the present invention is connected is booted and a data transmit/receive device is also attached to the interface device **10**, usual BIOS routines or multi-purpose interface programs issue an instruction, known by those skilled in the art as the INQUIRY instruction, to the input/output interfaces in the host device. The digital signal processor **13** receives this inquiry instruction via the first connecting device and generates a signal which is sent to the host device (not shown) again via the first connecting device **12** and the host line **11**. This signal indicates to the host device that, for example, a hard disk drive is attached at the interface to which the INQUIRY instruction was sent. Optionally, the host device can send an instruction, known by those skilled in the art as "Test Unit Ready", to the interface device to request more precise details regarding the queried device.

Regardless of which data transmit/receive device at the output line **16** is attached to the second connecting device, the digital signal processor **13** informs the host device that it is communicating with a hard disk drive. If the host device receives the response that a drive is present, it then sends a request to the interface device **10** to read the boot sequence which, on actual hard disks, normally resides on the first sectors of the disk. The digital signal processor **13**, whose operating system in stored in the memory means **14**, responds to this instruction by sending to the host device a virtual boot sequence which, in the case of actual drives, includes the drive type, the starting position and the length of the file allocation table (FAT), the number of sectors, etc., known to those skilled in the art. Once the host device has received this data, it assumes that the interface device **10** according to a preferred embodiment of the present invention is a hard disk drive. In reply to an instruction from the host device to display the directory of the "virtual" hard disk drive simulated by the interface device **10** with respect to the host device, the digital signal processor can respond to the host device in exactly the same way as a conventional hard disk would, namely by reading on request the file allocation table or FAT on a sector specified in the boot sequence, normally the first writable sector, and transferring it to the host device, and subsequently by transferring the directory structure of the virtual hard disk. Further, it is possible that the FAT is not read until immediately prior to reading or storing the data of the "virtual" hard disk and not already at initialization.

In a preferred embodiment of the present invention, the digital signal processor **13**, which need not necessarily be implemented as a digital signal processor but may be any other kind of microprocessor, comprises a first and a second command interpreter. The first command interpreter carries out the steps described above whilst the second command interpreter carries out the read/write assignment to specific functions. If the user now wishes to read data from the data transmit/receive device via the line **16**, the host device sends a command, for example "read file xy", to the interface device. As described above, the interface device appears to the host device as a hard disk. The second command interpreter of the digital signal processor now interprets the read command of the host processor as a data transfer command, by decoding whether "xy" denotes, for example, a "real-time input" file, a "configuration" file or an executable file, whereby the same begins to transfer data from the data transmit/receive device via the second connecting device to the first connecting device and via the line **11** to the host device.

Preferably, the volume of data to be acquired by a data transmit/receive device is specified in a configuration file described in the following by the user specifying in the said configuration file that a measurement is to last, for example, five minutes. To the host device the "real-time input" file then appears as a file whose length corresponds to the anticipated volume of data in those five minutes. Those skilled in the art know that communication between a processor and a hard disk consists of the processor transferring to the hard disk the numbers of the blocks or clusters or sectors whose contents it wishes to read. By reference to the FAT the processor knows which information is contained in which block. In this case, communication between the host device and the interface device according to the present invention therefore consists of the very fast transfer of block numbers and preferably of block number ranges because a virtual "real-time input" file will not be fragmented. If the host device now wants to read the "real-time input" file, it transfers a range of block numbers to the interface device, whereupon data commences to be received via the second connecting device and data commences to be sent to the host device via the first connecting device.

In addition to the digital signal processor instruction memory, which comprises the operating system of the digital signal processor and can be implemented as an EPROM or EEPROM, the memory means **14** can have an additional buffer for purposes of synchronizing data transfer from the data transmit/receive device to the interface device **10** and data transfer from the interface device **10** to the host device.

Preferably, the buffer is implemented as a fast random access memory or RAM buffer.

Further, from the host device the user can also create a configuration file, whose entries automatically set and control various functions of the interface device **10**, on the interface device **10** which appears to the host device as a hard disk. These settings can be, for example, gain, multiplex or sampling rate settings. By creating and editing a configuration file, normally a text file which is simple to understand with little prior knowledge, users of the interface device **10** are able to perform essentially identical operator actions for almost any data transmit/receive devices which can be attached to the second connecting device via the line **16**, thus eliminating a source of error arising from users having to know many different command codes for different applications. In the case of the interface device **10** according to the present invention it is necessary for users to note the conventions of the configuration file once only in order to be able to use the interface device **10** as an interface between a host device and almost any data transmit/receive device.

As a result of the option of storing any files in agreed formats in the memory means **14** of the interface device **10**, taking into account the maximum capacity of the memory means, any enhancements or even completely new functions of the interface device **10** can be quickly implemented. Even files executable by the host device, such as batch files or executable files (BAT or EXE files), and also help files can be implemented in the interface device, thus achieving independence of the interface device **10** from any additional software (with the exception of the BIOS routines) of the host device. On the one hand, this avoids licensing and/or registration problems and, on the other hand, installation of certain routines which can be frequently used, for example an FFT routine to examine acquired time-domain data in the frequency domain, is rendered unnecessary as the EXE files are already installed on the interface device **10** and appear in the virtual root directory, by means of which the host device can access all programs stored on the interface device **10**.

In a preferred embodiment of the present invention in which the interface device **10** simulates a hard disk to the host device, the interface device is automatically detected and readied for operation when the host system is powered up or booted. This corresponds to the plug-and-play standard which is currently finding increasingly widespread use. The user is no longer responsible for installing the interface device **10** on the host device by means of specific drivers which must also be loaded; instead the interface device **10** is automatically readied for operation when the host system is booted.

For persons skilled in the art it is however obvious that the interface device **10** is not necessarily signed on when the computer system is powered up but that a special BIOS routine or a driver for a multi-purpose interface can also be started on the host device during current operation of the computer system in order to sign on or mount the interface device **10** as an additional hard disk. This embodiment is suitable for larger workstation systems which are essentially never powered down as they perform, e.g. mail functions or monitor processes which run continuously, for example, in multi-tasking environments.

In the interface device according to the present invention an enormous advantage is to be gained, as apparent in the embodiment described in the following, in separating the actual hardware required to attach the interface device **10** to the data transmit/receive device from the communication unit, which is implemented by the digital signal processor **13**, the memory means **14** and the first connecting device **12**, as this allows a plurality of dissimilar device types to be operated in parallel in identical manner. Accordingly, many interface devices **10** can be connected to a host device which then sees many different "virtual" hard disks. In addition, any modification of the specific hardware symbolized by the second connecting device **15** can be implemented essentially without changing the operation of the interface device according to the present invention. Further, an experienced user can intervene at any time on any level of the existing second connecting device by making use of the above mentioned option of creating a configuration file or adding or storing new program sections for the second connecting device.

An important advantage of the interface device **10** of the present invention is that it also permits extremely high data transfer rates by using, for data interchange, the host device-own BIOS routines which are optimized for each host device by the host device manufacturer or BIOS system manufacturer, or by using driver programs which are normally optimized and included by the manufacturers of multi-purpose interfaces. Furthermore, due to the simulation of a virtual mass storage device, the data is managed and made available in such a way that it can be transferred directly to other storage media, e.g. to an actual hard disk of the host device without, as it were, intervention of the host device processor. The only limitation to long-term data transfer at high speed is therefore imposed exclusively by the speed and the size of the mass storage device of the host device. This is the case as the digital signal processor **13** already formats the data read by the data transmit/receive device via the second connecting device **15** into block sizes suitable for a hard disk of the host device, whereby the data transfer speed is limited only by the mechanical latency of the hard disk system of the host device. At this point, it should be noted that normally data flow from a host device must be formatted in blocks to permit writing to a hard disk and subsequent reading from a hard disk, as known by those skilled in the art.

The said data transfer rate can be increased further by setting up a direct memory access (DMA) or RAM drive in the host system. As those skilled in the art know, the setting up of a RAM drive requires processor resources of the host device, with the result that the advantage of writing the data to a hard disk drive of the host device essentially without the need for processor resources is lost.

As described above, a data buffer can be implemented in the memory means **14** to permit independence in terms of time of the data transmit/receive device attached to the second connecting device from the host device attached to the first connecting device. This guarantees error-free operation of the interface device **10** even for time-critical applications in multi-tasking host systems.

FIG. **2** shows a detailed block diagram of an interface device **10** according to the present invention.

A digital signal processor (DSP) **1300** is, in a manner of speaking, the heart of the interface device **10**. The DSP can be any DSP but preferably has a 20-MB on-chip random access memory (RAM). Certain instruction sets, for example, can be stored in the RAM already integrated in the DSP. An 80-MHz clock generator is attached to the DSP **1300** in order to synchronize the DSP. The DSP implements a fast Fourier transformation (FFT) in real time and also optional data compression of the data to be transferred from the data transmit/receive device to the host device in order to achieve greater efficiency and to permit interoperation with host devices which have a smaller memory.

In the preferred embodiment of the interface device **10** shown in FIG. **2**, the first connecting device **12** of FIG. **1** contains the following components: an SCSI interface **1220** and a 50-pin SCSI connector **1240** for attachment to an SCSI interface present on most host devices or laptops. The SCSI (small computer system interface) interface **1220** translates the data received via the SCSI connector **1240** into data understood by the DSP **1300**, as known by those skilled in the art. Further, the first connecting device **12** comprises an EPP (enhanced parallel port) with a data transfer rate of approx. 1 MBps which delivers a more moderate data transfer rate of 1 MBps by comparison to the data transfer rate of 10 MBps of the SCSI interface. The EPP **1260** is connected to a 25-pin D-shell connector **1280** to permit attachment to a printer interface of a host device for example. Optionally, the first connecting device **12** also comprises a 25-pin connector **1282** which permits the attachment of 8 digital outputs and 8 digital inputs **1284** at a host device.

Preferably, the second connecting device comprises 8 BNC inputs with the calibration relay **1505**, a block **1510** with 8 device amplifiers with an overvoltage protection of ±75 V, this block being connected in turn to 8 sample/hold (S&H) circuits **1515**. The calibration relays are relays which permit controlled changeover between a test voltage and a calibration reference voltage. Each sample/hold circuit is connected to a corresponding input of an 8-channel multiplexer **1520** which feeds its output signals via a programmable amplifier **1525** into an analog/digital converter (ADC) with 12 bit and 1.25 MHz **1530** and to the DSP **1300**. The ADC **1530** is controlled by means of a 20-bit timer **1535**, as known by persons skilled in the art. The programmable amplifier **1525** and the 8-channel multiplexer **1520** are controlled via an amplifier channel selection circuit **1540** which is in turn controlled by the DSP **1300**.

The complete interface device **10** is supplied with power by an external AC/DC converter **1800** which delivers a digital supply voltage of ±5 V and is attached to a DC/DC converter **1810** which can deliver analog supply voltages of ±5 V and ±15 V as required for the interface device **10**. Further, the DC/DC converter controls a precision voltage reference **1820** which controls the 8 BNC inputs **1505** and the ADC **1530** as well as a digital/analog converter (DAC) **1830** which permits, via an output amplifier block with 4 output amplifiers **1840** and a 9-pin connector **1850**, analog output direct from the DSP **1300** to an output device, e.g. printer device or monitor device, which can be attached via the 9-pin connector **1850**, thus providing the option of monitoring the data transferred to the host device or also, for example, of viewing an FFT to obtain rapid and comprehensive data analysis without using processor time of the host device.

In FIG. **2** the memory means **14** of FIG. **1** is implemented by an EPROM **1400** which, in a preferred embodiment of the present invention, contains the operating system of the digital signal processor **1300**. A random access memory with an access time of 15 ns and a size of 512 KB or optionally 1024 KB **1420** serves as a data buffer to achieve independence in terms of time of the output line **16** from the output lines **11***a*, **11***b* and **11***c* to the data transmit/receive device and to the host device respectively. As described above, in a preferred embodiment of the present invention the digital signal processor **1300** already contains a 20-KB on-chip RAM **1440** which can store certain instruction sets, functions and also smaller application software units.

The connection, symbolized by the line **16**, of the interface device **10** to any data transmit/receive device implements, by means of the blocks 1505–1535, an analog input with a sampling rate of 1.25 MHz and quantization of 12 bits. There are 8 channels with an overvoltage protection of ±75 V. By means of the programmable amplifier **1525** the channels can be programmed independently of each other in voltage ranges up to a maximum of ±10 V. Unused channels can be grounded internally to reduce channel intermodulation. The block **1515** is implemented as a monolithic high-precision, high-speed sample/hold amplifier for simultaneous sampling of all channels. The precision voltage reference **1820** provides a high-precision, temperature-compensated monolithic energy gap voltage reference for auto-calibration of each channel and each gain. Further, offset fine adjustment for each channel is implemented by the same.

The blocks **1830**, **1840** and **1850** implement a direct analog output for the digital signal processor **1300**, and the DAC **1830** provides a data transfer rate of 625 kHz and a quantization of 12 bits. The block **1840** comprises 4 channels with a common output latch.

Further, the interface device **10** comprises a digital input/output device implemented by the blocks **1284** and **1282**. Here there are 8 digital inputs, 8 digital outputs with a common latch, and the digital port can be attached preferably to a side panel of the interface device **10** so that the port itself can easily be accessed.

The digital signal processor **1300** provides on-board digital data processing. In particular, it is a high-performance DSP with a clock speed of 80 MHz and a 20-bit timer **1535**.

As described above, the first connecting device **12** comprises the SCSI interface **1220** with a peak transfer rate of 10 MBps. An optional PCMCIA-to-SCSI adapter permits high-speed communication with laptop computers which are desirable and in widespread use, particularly by mobile service technicians. The EPP **1260** with its associated connector **1280** permits data transfer at a more moderate rate.

As described above, the interface device **10** is supplied with power by means of an external AC/DC adapter which

has a universal power input (85–264 VAC, 47–63 Hz). Interference suppression complies with the standards EN **55022**, curve B and FFC, Class B). Further, it is also in accordance with international safety regulations (TÜV, UL, CSA). The interface device **10** is externally shielded and achieves a value of 55 dB at 30–60 MHz and a value of approximately 40 dB at 1 GHz, and therefore complies with the MILSTD 285-1 standard.

As described above, communication between the host device and the multi-purpose interface can take place not only via drivers for input/output device customary in a host device which reside in the BIOS system of the host device but also via specific interface drivers which, in the case of SCSI interfaces, are known as multi-purpose interface ASPI (advanced SCSI programming interface) drivers. This ASPI driver, which can also be referred to as an ASPI manager, is specific to a special SCSI host adapter, i.e. to a special multi-purpose interface, and is normally included by the manufacturer of the multi-purpose interface. Generally speaking, this multi-purpose interface driver has the task of moving precisely specified SCSI commands from the host system program to the host system SCSI adapter. For this reason, the command set is almost identical to that of the SCSI interface itself. Essentially, only status and reset commands for the host adapter have been added.

The ASPI driver can be used if the hard disk was not already addressable at boot time or if the SCSI-related BIOS routines of the host computer were still disabled. Here too, the steps needed to initialize the interface device, preferably as a virtual hard disk, are similar to the steps taken when initializing at boot time.

In general terms, the ASPI manager comprises two sides. One side is the proprietary, hardware-oriented side. It is responsible for converting all commands into a form required by the corresponding multi-purpose interface. The hardware-oriented side of the ASPI driver is therefore matched to a very specific type of multi-purpose interface or SCSI interface. The other side is known as the user software side. This side is totally independent of the proprietary operating characteristics of the SCSI adapter and is therefore identical for all SCSI interfaces. This permits SCSI programming which is however independent of the individual SCSI adapter types.

In contrast to communication between the host device and the interface device according to the present invention on the basis of a BIOS driver, the use of such an ASPI driver for communication between the host device and the interface device according to the present invention allows various further possibilities of the SCSI multi-purpose interface to be exploited. In the case described above, the interface device which preferably signs on and behaves as a virtual hard disk is detected by the BIOS driver of the host computer at boot time and is configured as a hard disk. This step does not however support active requests sent by the interface device to the host computer. If however the virtual hard disk wishes to write data actively to, for example, a hard disk of the host computer or wishes to initiate communication with the processor of the host computer, the host computer must recognize the request of the virtual hard disk and tolerate a further issuer of instructions on its bus. If the interface device behaves solely like a virtual hard disk, it would always receive and never issue commands. The BIOS has no objections to an additional issuer of commands that actively wishes to place data on the bus of the host device but the BIOS does not support the host device in recognizing corresponding requests of the interface device or in granting the interface device permission to access the bus.

Using the ASPI manager the interface device according to the present invention can now obtain active access to an SCSI hard disk of the host device connected to the same SCSI bus which, in contrast to the interface device, cannot be a virtual but a real SCSI mass storage device or also a further interface device according to the present invention. Thereupon, the interface device according to the present invention can write the desired data to the SCSI hard disk of the host computer totally independently of the host computer or can communicate with the same in some other manner. The interface device according to the present invention therefore initially behaves passively as a virtual hard disk and then, as required and using the driver software for the multi-purpose interface, actively on the same SCSI bus. This means however that the interface device according to the present invention, using a driver software for the multi-purpose interface which comprises the BIOS routines customary in host devices and simultaneously provides the option of active participation, can, regardless of the type of the data transmit/receive device attached to the second connecting device, behave initially as a virtual and at the same time passive hard disk but can, as required, participate actively on the bus so as to be able to initiate communication directly with other SCSI hard disks of the host device by bypassing the processor of the host device.

Using a standard interface of a host device, the interface device according to the present invention permits communication with any host device. By simulating an input/output device to the host device and, in a preferred embodiment, by simulating a virtual mass storage device, the interface device **10** is automatically supported by all known host systems without any additional sophisticated driver software. The simulation of a freely definable file structure on the "virtual" hard disk provides simple operation and expansion options and, through the implementation of any programs, independence from special software implemented on the host device. Help files included on the interface device **10** and plug-and-play support ensure ease of use even in portable, flexible host devices. Despite the very simple user interface, experienced users are free at any time to intervene in the functions of the interface device **10** on system level. The interface device **10** thus provides a universal solution which can cover the entire spectrum of possible data transmit/receive devices.

What is claimed is:

1. An interface device for communication between a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and a data transmit/receive device, the data transmit/receive device being arranged for providing analog data, comprising:

a processor;

a memory;

a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and

a second connecting device for interfacing the interface device with the data transmit/receive device, the second connecting device including a sampling circuit for sampling the analog data provided by the data transmit/receive device and an analog-to-digital converter for converting data sampled by the sampling circuit into digital data,

wherein the interface device is configured by the processor and the memory to include a first command interpreter and a second command interpreter,

wherein the first command interpreter is configured in such a way that the command interpreter, when receiving an inquiry from the host device as to a type of a device attached to the multi-purpose interface of the

host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is an input/output device customary in a host device, whereupon the host device communicates with the interface device by means of the driver for the input/output device customary in a host device, and

wherein the second command interpreter is configured to interpret a data request command from the host device to the type of input/output device signaled by the first command interpreter as a data transfer command for initiating a transfer of the digital data to the host device.

2. An interface device according to claim **1**,

wherein the drivers for input/output drivers customary in a host device comprise a hard disk driver, and the signal indicates to the host device that the host device is communicating with a hard disk.

3. An interface device according to claim **1**,

wherein the memory means comprises a buffer to buffer data to be transferred between the data transmit/receive device and the host device.

4. An interface device according to claim **1**,

wherein the multi-purpose interface of the host device is an SCSI interface and the first connecting device also comprises an SCSI interface.

5. An interface device according to claim **1**,

wherein the processor is a digital signal processor.

6. An interface device according to claim **2**,

wherein the data to be transferred from the data transmit/receive device to the host device in the interface device is formatted in a suitable format for a hard disk present in the host device.

7. An interface device according to claim **2**,

which further comprises a root directory and virtual files which are present on the signaled hard disk drive and which can be accessed from the host device.

8. An interface device according to claim **7**,

wherein the virtual files comprise a configuration file in text format which are stored in the memory means and using which the user can configure the interface device for a specific data transmit/receive device.

9. An interface device according to claim **7**,

wherein the virtual files comprise batch files or executable files for the microprocessor means which are stored in the interface device in order to perform data processing, independently of the host device, of data received via the second connecting device.

10. An interface device according to claim **7**,

wherein the virtual files comprise batch files or executable files for the host device which are stored in the interface device.

11. An interface device for communication between a host device, which comprises a multi-purpose interface and a specific driver for this interface, and a data transmit/receive device, the data transmit/receive device being arranged for providing analog data, comprising:

a processor;

a memory;

a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and

a second connecting device for interfacing the interface device with the data transmit/receive device, the second connecting device including a sampling circuit for sampling the analog data provided by the data transmit/receive device and an analog-to-digital converter for converting data sampled by the sampling circuit into digital data,

where the interface device is configured using the processor and the memory to include a first command interpreter and a second command interpreter,

wherein the first command interpreter is configured in such a way that the interface device, when receiving an inquiry from the host device as to the type of a device attached at the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is an input/output device customary in a host device, whereupon the host device communicates with the interface device by means of the specific driver for the multi-purpose interface, and

wherein the second command interpreter is configured to interpret a data request command from the host device to the type of input/output device signaled by the first command interpreter as a data transfer command for initiating a transfer of the digital data to the host device.

12. An interface device according to claim **11**, wherein in addition to the first connecting device of the interface device, there is a further input/output device at the multi-purpose interface of the host device, and wherein the interface device can communicate directly with said further input/output device via the specific driver for the multi-purpose interface.

13. An interface device according to claim **11**,

wherein the multi-purpose interface is an SCSI interface, and wherein the specific driver for the multi-purpose interface is an ASPI manager.

14. A method of communication between a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and a data transmit/receive device, the data transmit/receive device being arranged for providing analog data, via an interface device, comprising:

interfacing of the host device with a first connecting device of the interface device via the multi-purpose interface of the host device;

interfacing of the data transmit/receive device with a second connecting device of the interface device, the second connecting device including a sampling circuit for sampling the analog data provided by the data/transmit/receive device and an analog-to-digital converter for converting data sampled by the sampling circuit into digital data;

inquiring by the host device at the interface device as to the type of device to which the multi-purpose interface of the host device is attached;

regardless of the type of the data transmit/receive data attached to the second connecting device of the interface device, responding to the inquiry from the host device by the interface device in such a way that it is an input/output device customary in a host device, whereupon the host device communicates with the interface device by means of the usual driver for the input/output device, and

interpreting a data request command from the host device to the type of input/output device customary in the host device as a data transfer command for initiating a transfer of the digital data to the host device.

15. A method according to claim **14**,

wherein the drivers for input/output devices customary in a host device comprise a driver for a storage device and in particular for a hard disk drive.

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Tasler

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(45) **Date of Patent: May 17, 2005**

(54) **FLEXIBLE INTERFACE FOR COMMUNICATION BETWEEN A HOST AND AN ANALOG I/O DEVICE CONNECTED TO THE INTERFACE REGARDLESS THE TYPE OF THE I/O DEVICE**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

5,548,783	A *	8/1996	Jones et al.	710/16
5,596,628	A *	1/1997	Klein	379/93.11
5,628,030	A *	5/1997	Tuckner	710/64
6,012,113	A *	1/2000	Tuckner	710/64
6,266,711	B1 *	7/2001	Ishikawa et al.	710/8
6,363,081	B1 *	3/2002	Gase	370/466
6,725,293	B1 *	4/2004	Nakayama et al.	710/36
6,728,844	B2 *	4/2004	Sanada et al.	711/152

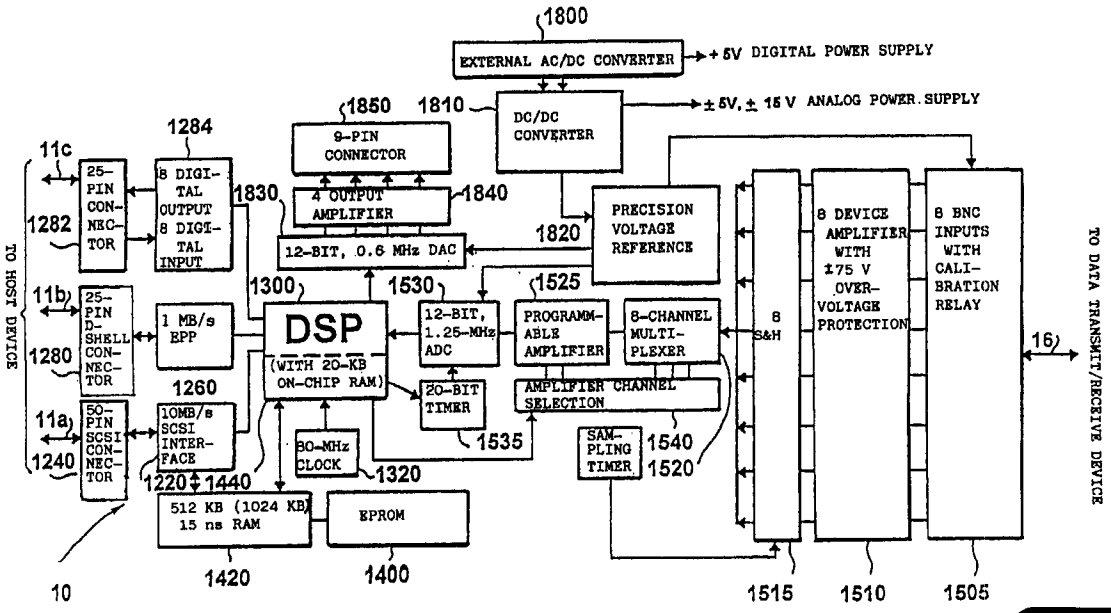
* cited by examiner

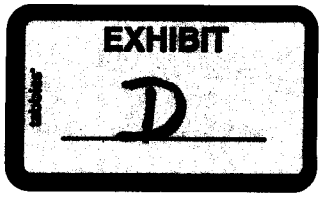
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(57) **ABSTRACT**

An interface device **(10)** provides fast data communication between a host device with input/output interfaces and a data transmit/receive device, wherein the interface device **(10)** comprises a processor means **(13)**, a memory means **(14)**, a first connecting device **(12)** for interfacing the host device with the interface device, and a second connecting device **(15)** for interfacing the interface device **(10)** with the data transmit/receive device. The interface device **(10)** is configured by the processor means **(13)** and the memory means **(14)** in such a way that, when receiving an inquiry from the host device via the first connecting device **(12)** as to the type of a device attached to the host device, regardless of the type of the data transmit/receive device, the interface device sends a signal to the host device via the first connecting device **(12)** which signals to the host device that it is communicating with an input/output device.

18 Claims, 2 Drawing Sheets





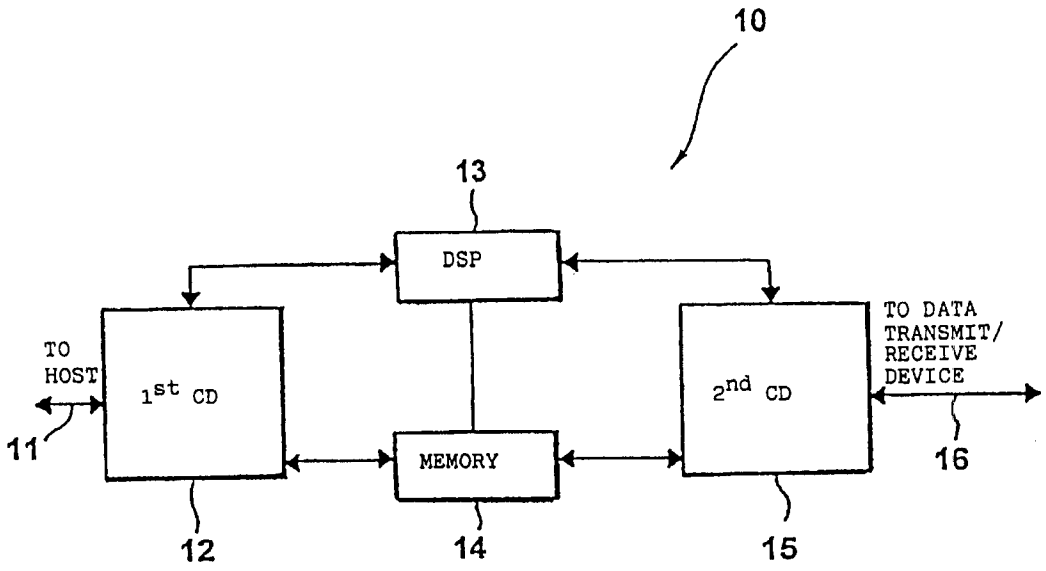

10
13
DSP
TO HOST
1st CD
2nd CD
TO DATA TRANSMIT/ RECEIVE DEVICE
MEMORY
11
12
14
15
16

FIG.1

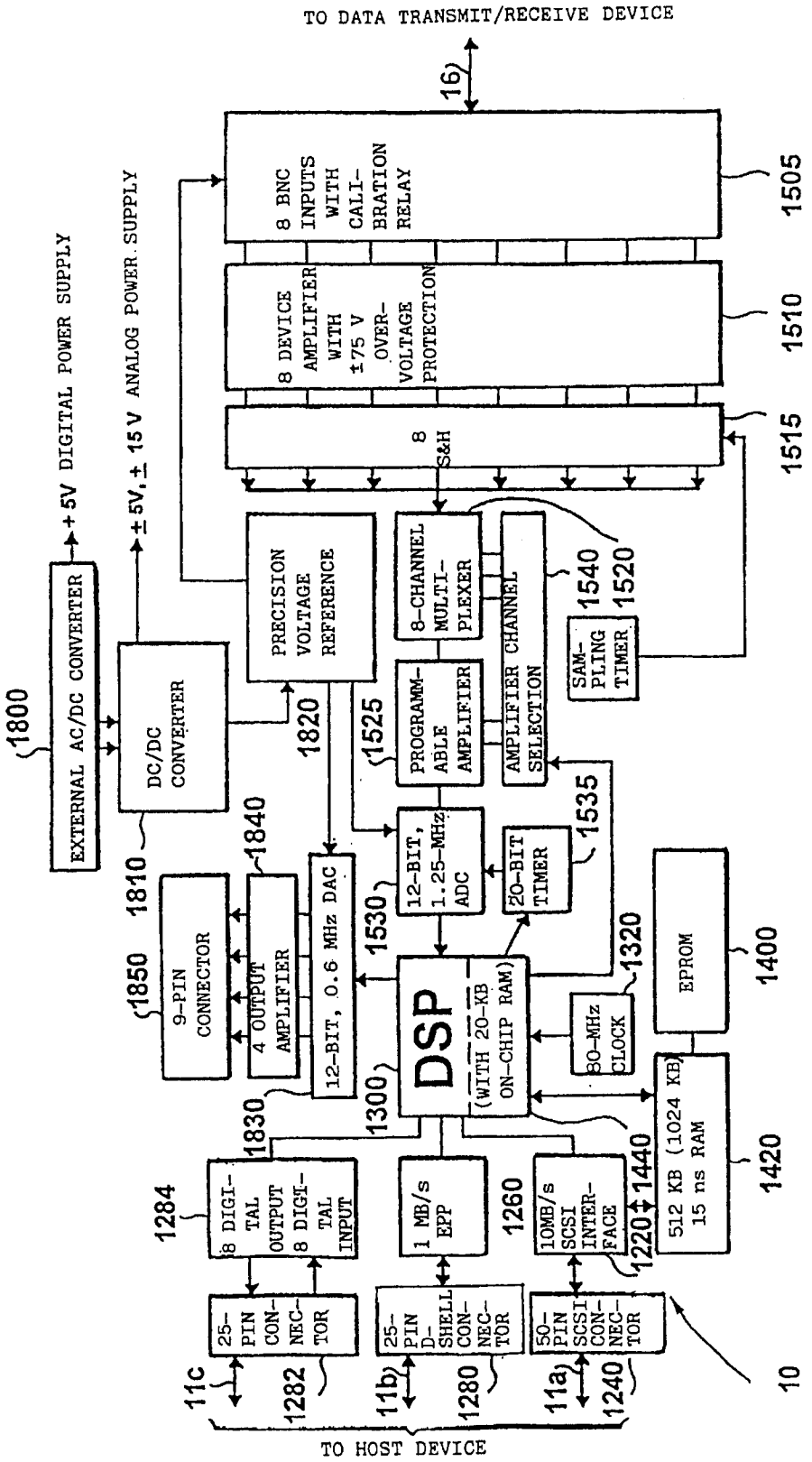

TO DATA TRANSMIT/RECEIVE DEVICE
16
8 BNC INPUTS WITH CALI-BRATION RELAY
1505
8 DEVICE AMPLIFIER WITH ±75 V OVER-VOLTAGE PROTECTION
1510
8 S&H
1515
+5V DIGITAL POWER SUPPLY
±5V, ±15V ANALOG POWER SUPPLY
EXTERNAL AC/DC CONVERTER
1800
DC/DC CONVERTER
PRECISION VOLTAGE REFERENCE
1820
8-CHANNEL MULTI-PLEXER
1540
1520
PROGRAMM-ABLE AMPLIFIER
1525
AMPLIFIER CHANNEL SELECTION
SAM-PLING TIMER
1840
1810
1850
9-PIN CONNECTOR
4 OUTPUT AMPLIFIER
12-BIT, 0.6 MHz DAC
12-BIT, 1.25-MHz ADC
1530
20-BIT TIMER
1535
DSP
(WITH 20-KB ON-CHIP RAM)
1300
1320
80-MHz CLOCK
EPROM
1400
1830
1284
8 DIGI-TAL OUTPUT
8 DIGI-TAL INPUT
1 MB/s EPP
1260
10MB/s SCSI INTER-FACE
1220
1440
512 KB (1024 KB) 15 ns RAM
1420
25-PIN CON-NEC-TOR
1282
25-PIN D-SHELL CON-NEC-TOR
1280
50-PIN SCSI CON-NEC-TOR
1240
11c
11b
11a
10
TO HOST DEVICE

FIG.2

FLEXIBLE INTERFACE FOR COMMUNICATION BETWEEN A HOST AND AN ANALOG I/O DEVICE CONNECTED TO THE INTERFACE REGARDLESS THE TYPE OF THE I/O DEVICE

RELATED APPLICATIONS

This application is a divisional application of copending application Ser. No. 09/331,002 filed Jun. 14, 1999.

DESCRIPTION

The present invention relates to the transfer of data and in particular to interface devices for communication between a computer or host device and a data transmit/receive device from which data is to be acquired or with which two-way communication is to take place.

Existing data acquisition systems for computers are very limited in their areas of application. Generally such systems can be classified into two groups.

In the first group host devices or computer systems are attached by means of an interface to a device whose data is to be acquired. The interfaces of this group are normally standard interfaces which, with specific driver software, can be used with a variety of host systems. An advantage of such interfaces is that they are largely independent of the host device. However, a disadvantage is that they generally require very sophisticated drivers which are prone to malfunction and which limit data transfer rates between the device connected to the interface and the host device and vice versa. Further, it is often very difficult to implement such interfaces for portable systems and they offer few possibilities for adaptation with the result that such systems offer little flexibility.

The devices from which data is to be acquired cover the entire electrical engineering spectrum. In a typical case, it is assumed that a customer who operates, for example, a diagnostic radiology system in a medical engineering environment reports a fault. A field service technician of the system manufacturer visits the customer and reads system log files generated by the diagnostic radiology system by means a portable computer or laptop for example. If the fault cannot be localized or if the fault is intermittent, it will be necessary for the service technician to read not only an error log file but also data from current operation. It is apparent that in this case fast data transfer and rapid data analysis are necessary.

Another case requiring the use of an interface could be, for example, when an electronic measuring device, e.g. a multimeter, is attached to a computer system to transfer the data measured by the multimeter to the computer. Particularly when long-term measurements or large volumes of data are involved is it necessary for the interface to support a high data transfer rate.

From these randomly chosen examples it can be seen that an interface may be put to totally different uses. It is therefore desirable that an interface be sufficiently flexible to permit attachment of very different electrical or electronic systems to a host device by means of the interface. To prevent operator error, it is also desirable that a service technician is not required to operate different interfaces in different ways for different applications but that, if possible, a universal method of operating the interface be provided for a large number of applications.

To increase the data transfer rates across an interface, the route chosen in the second group of data acquisition systems

for the interface devices was to specifically match the interface very closely to individual host systems or computer systems. The advantage of this solution is that high data transfer rates are possible. However, a disadvantage is that the drivers for the interfaces of the second group are very closely matched to a single host system with the result that they generally cannot be used with other host systems or their use is very ineffective. Further, such types of interface have the disadvantage that they must be installed inside the computer casing to achieve maximum data transfer rates as they access the internal host bus system. They are therefore generally not suitable for portable host systems in the form of laptops whose minimum possible size leaves little internal space to plug in an interface card.

A solution to this problem is offered by the interface devices of IOtech (business address: 25971 Cannon Road, Cleveland, Ohio 44146, USA) which are suitable for laptops such as the WaveBook/512 (registered trademark). The interface devices are connected by means of a plug-in card, approximately the size of a credit card, to the PCMCIA interface which is now a standard feature in laptops. The plug-in card converts the PCMCIA interface into an interface known in the art as IEEE 1284. The said plug-in card provides a special printer interface which is enhanced as regards the data transfer rate and delivers a data transfer rate of approximately 2 MBps as compared with a rate of approx. 1 MBps for known printer interfaces. The known interface device generally consists of a driver component, a digital signal processor, a buffer and a hardware module which terminates in a connector to which the device whose data is to be acquired is attached. The driver component is attached directly to the enhanced printer interface thus permitting the known interface device to establish a connection between a computer and the device whose data is to be acquired.

In order to work with the said interface, an interface-specific driver must be installed on the host device so that the host device can communicate with the digital signal processor of the interface card. As described above, the driver must be installed on the host device. If the driver is a driver developed specifically for the host device, a high data transfer rate is achieved but the driver cannot be easily installed on a different host system. However, if the driver is a general driver which is as flexible as possible and which can be used on many host devices, compromises must be accepted with regard to the data transfer rate.

Particularly in an application for multi-tasking systems in which several different tasks such as data acquisition, data display and editing are to be performed quasi-simultaneously, each task is normally assigned a certain priority by the host system. A driver supporting a special task requests the central processing system of the host device for processor resources in order to perform its task. Depending on the particular priority assignment method and on the driver implementation, a particular share of processor resources is assigned to a special task in particular time slots. Conflicts arise if one or more drivers are implemented in such a way that they have the highest priority by default, i.e. they are incompatible, as happens in practice in many applications. It may occur that both drivers are set to highest priority which, in the worst case, can result in a system crash.

EP 0685799 A1 discloses an interface by means of which several peripheral devices can be attached to a bus. An interface is connected between the bus of a host device and various peripheral devices. The interface comprises a finite state machine and several branches each of which is assigned to a peripheral device. Each branch comprises a

data manager, cycle control, user logic and a buffer. This known interface device provides optimal matching between a host device and a specific peripheral device.

The specialist publication IBM Technical Disclosure Bulletin, Vol. 38, No. 05, page 245; "Communication Method between Devices through FDD Interface" discloses an interface which connects a host device to a peripheral device via a floppy disk drive interface. The interface consists in particular of an address generator, an MFM encoder/decoder, a serial/parallel adapter and a format signal generator. The interface makes it possible to attach not only a floppy disk drive but also a further peripheral device to the FDD host controller of a host device. The host device assumes that a floppy disk drive is always attached to its floppy disk drive controller and communication is initiated if the address is correct. However, this document contains no information as to how communication should be possible if the interface is connected to a multi-purpose interface instead of to a floppy disk drive controller.

It is the object of the present invention to provide an interface device for communication between a host device and a data transmit/receive device whose use is host device-independent and which delivers a high data transfer rate.

This object is achieved by an interface device according to claim **1** or **12** and by a method according to claim **15**.

The present invention is based on the finding that both a high data transfer rate and host device-independent use can be achieved if a driver for an input/output device customary in a host device, normally present in most commercially available host devices, is utilized. Drivers for input/output devices customary in a host device which are found in practically all host devices are, for example, drivers for hard disks, for graphics devices or for printer devices. As however the hard disk interfaces in common host devices which can be, for example, IBM PCs, IBM-compatible PCs, Commodore PCs, Apple computers or even workstations, are the interfaces with the highest data transfer rate, the hard disk driver is utilized in the preferred embodiment of the interface device of the present invention. Drivers for other storage devices such as floppy disk drives, CD-ROM drives or tape drives could also be utilized in order to implement the interface device according to the present invention.

As described in the following, the interface device according to the present invention is to be attached to a host device by means of a multi-purpose interface of the host device which can be implemented, for example, as an SCSI interface or as an enhanced printer interface. Multi-purpose interfaces comprise both an interface card and specific driver software for the interface card. The driver software can be designed so that it can replace the BIOS driver routines. Communication between the host device and the devices attached to the multi-purpose interface then essentially takes place by means of the specific driver software for the multi-purpose interface and no longer primarily by means of BIOS routines of the host device. Recently however drivers for multi-purpose interfaces can also already be integrated in the BIOS system of the host device as, alongside classical input/output interfaces, multi-purpose interfaces are becoming increasingly common in host devices. It is of course also possible to use BIOS routines in parallel with the specific driver software for the multi-purpose interface, if this is desired.

The interface device according to the present invention comprises a processor means, a memory means, a first connecting device for interfacing the host device with the interface device, and a second connecting device for interfacing the interface device with the data transmit/receive device. The interface device is configured by the processor means and the memory means in such a way that the interface device, when receiving an inquiry from the host device via the first connecting device as to the type of a device attached to the host device, sends a signal, regardless of the type of the data transmit/receive device, to the host device via the first connecting device which signals to the host device that it is communicating with an input/output device. The interface device according to the present invention therefore simulates, both in terms of hardware and software, the way in which a conventional input/output device functions, preferably that of a hard disk drive. As support for hard disks is implemented as standard in all commercially available host systems, the simulation of a hard disk, for example, can provide host device-independent use. The interface device according to the present invention therefore no longer communicates with the host device or computer by means of a specially designed driver but by means of a program which is present in the BIOS system (Basic Input/Output System) and is normally precisely matched to the specific computer system on which it is installed, or by means of a specific program for the multi-purpose interface. Consequently, the interface device according to the present invention combines the advantages of both groups. On the one hand, communication between the computer and the interface takes place by means of a host device-specific BIOS program or by means of a driver program which is matched to the multi-purpose interface and which could be regarded as a "device-specific driver". On the other hand, the BIOS program or a corresponding multi-purpose interface program which operates one of the common input/output interfaces in host systems is therefore present in all host systems so that the interface device according to the present invention is host device-independent.

In the following, preferred embodiments of the present invention will be explained in more detail with reference to the drawings enclosed, in which:

FIG. **1** shows a general block diagram of the interface device according to the present invention; and

FIG. **2** shows a detailed block diagram of an interface device according to a preferred embodiment of the present invention.

FIG. **1** shows a general block diagram of an interface device **10** according to the present invention. A first connecting device **12** of the interface device **10** can be attached to a host device (not shown) via a host line **11**. The first connecting device is attached both to a digital signal processor **13** and to a memory means **14**. The digital signal processor **13** and the memory means **14** are also attached to a second connecting device **15** by means of bi-directional communication lines (shown for all lines by means of two directional arrows). The second connecting device can be attached by means of an output line **16** to a data transmit/receive device which is to receive data from the host device or from which data is to be read, i.e. acquired, and transferred to the host device. The data transmit/receive device itself can also communicate actively with the host device via the first and second connecting device, as described in more detail in the following.

Communication between the host system or host device and the interface device is based on known standard access commands as supported by all known operating systems (e.g. DOS, Windows, Unix). Preferably, the interface device according to the present invention simulates a hard disk with

a root directory whose entries are "virtual" files which can be created for the most varied functions. When the host device system with which the interface device according to the present invention is connected is booted and a data transmit/receive device is also attached to the interface device **10**, usual BIOS routines or multi-purpose interface programs issue an instruction, known by those skilled in the art as the INQUIRY instruction, to the input/output interfaces in the host device. The digital signal processor **13** receives this inquiry instruction via the first connecting device and generates a signal which is sent to the host device (not shown) again via the first connecting device **12** and the host line **11**. This signal indicates to the host device that, for example, a hard disk drive is attached at the interface to which the INQUIRY instruction was sent. Optionally, the host device can send an instruction, known by those skilled in the art as "Test Unit Ready", to the interface device to request more precise details regarding the queried device.

Regardless of which data transmit/receive device at the output line **16** is attached to the second connecting device, the digital signal processor **13** informs the host device that it is communicating with a hard disk drive. If the host device receives the response that a drive is present, it then sends a request to the interface device **10** to read the boot sequence which, on actual hard disks, normally resides on the first sectors of the disk. The digital signal processor **13**, whose operating system in stored in the memory means **14**, responds to this instruction by sending to the host device a virtual boot sequence which, in the case of actual drives, includes the drive type, the starting position and the length of the file allocation table (FAT), the number of sectors, etc., known to those skilled in the art. Once the host device has received this data, it assumes that the interface device **10** according to a preferred embodiment of the present invention is a hard disk drive. In reply to an instruction from the host device to display the directory of the "virtual" hard disk drive simulated by the interface device **10** with respect to the host device, the digital signal processor can respond to the host device in exactly the same way as a conventional hard disk would, namely by reading on request the file allocation table or FAT on a sector specified in the boot sequence, normally the first writable sector, and transferring it to the host device, and subsequently by transferring the directory structure of the virtual hard disk. Further, it is possible that the FAT is not read until immediately prior to reading or storing the data of the "virtual" hard disk and not already at initialization.

In a preferred embodiment of the present invention, the digital signal processor **13**, which need not necessarily be implemented as a digital signal processor but may be any other kind of microprocessor, comprises a first and a second command interpreter. The first command interpreter carries out the steps described above whilst the second command interpreter carries out the read/write assignment to specific functions. If the user now wishes to read data from the data transmit/receive device via the line **16**, the host device sends a command, for example "read file xy", to the interface device. As described above, the interface device appears to the host device as a hard disk. The second command interpreter of the digital signal processor now interprets the read command of the host processor as a data transfer command, by decoding whether "xy" denotes, for example, a "real-time input" file, a "configuration" file or an executable file, whereby the same begins to transfer data from the data transmit/receive device via the second connecting device to the first connecting device and via the line **11** to the host device.

Preferably, the volume of data to be acquired by a data transmit/receive device is specified in a configuration file described in the following by the user specifying in the said configuration file that a measurement is to last, for example, five minutes. To the host device the "real-time input" file then appears as a file whose length corresponds to the anticipated volume of data in those five minutes. Those skilled in the art know that communication between a processor and a hard disk consists of the processor transferring to the hard disk the numbers of the blocks or clusters or sectors whose contents it wishes to read. By reference to the FAT the processor knows which information is contained in which block. In this case, communication between the host device and the interface device according to the present invention therefore consists of the very fast transfer of block numbers and preferably of block number ranges because a virtual "real-time input" file will not be fragmented. If the host device now wants to read the "real-time input" file, it transfers a range of block numbers to the interface device, whereupon data commences to be received via the second connecting device and data commences to be sent to the host device via the first connecting device.

In addition to the digital signal processor instruction memory, which comprises the operating system of the digital signal processor and can be implemented as an EPROM or EEPROM, the memory means **14** can have an additional buffer for purposes of synchronizing data transfer from the data transmit/receive device to the interface device **10** and data transfer from the interface device **10** to the host device.

Preferably, the buffer is implemented as a fast random access memory or RAM buffer.

Further, from the host device the user can also create a configuration file, whose entries automatically set and control various functions of the interface device **10**, on the interface device **10** which appears to the host device as a hard disk. These settings can be, for example, gain, multiplex or sampling rate settings. By creating and editing a configuration file, normally a text file which is simple to understand with little prior knowledge, users of the interface device **10** are able to perform essentially identical operator actions for almost any data transmit/receive devices which can be attached to the second connecting device via the line **16**, thus eliminating a source of error arising from users having to know many different command codes for different applications. In the case of the interface device **10** according to the present invention it is necessary for users to note the conventions of the configuration file once only in order to be able to use the interface device **10** as an interface between a host device and almost any data transmit/receive device.

As a result of the option of storing any files in agreed formats in the memory means **14** of the interface device **10**, taking into account the maximum capacity of the memory means, any enhancements or even completely new functions of the interface device **10** can be quickly implemented. Even files executable by the host device, such as batch files or executable files (BAT or EXE files), and also help files can be implemented in the interface device, thus achieving independence of the interface device **10** from any additional software (with the exception of the BIOS routines) of the host device. On the one hand, this avoids licensing and/or registration problems and, on the other hand, installation of certain routines which can be frequently used, for example an FFT routine to examine acquired time-domain data in the frequency domain, is rendered unnecessary as the EXE files are already installed on the interface device **10** and appear in the virtual root directory, by means of which the host device can access all programs stored on the interface device **10**.

In a preferred embodiment of the present invention in which the interface device **10** simulates a hard disk to the host device, the interface device is automatically detected and readied for operation when the host system is powered up or booted. This corresponds to the plug-and-play standard which is currently finding increasingly widespread use. The user is no longer responsible for installing the interface device **10** on the host device by means of specific drivers which must also be loaded; instead the interface device **10** is automatically readied for operation when the host system is booted.

For persons skilled in the art it is however obvious that the interface device **10** is not necessarily signed on when the computer system is powered up but that a special BIOS routine or a driver for a multi-purpose interface can also be started on the host device during current operation of the computer system in order to sign on or mount the interface device **10** as an additional hard disk. This embodiment is suitable for larger workstation systems which are essentially never powered down as they perform, e.g. mail functions or monitor processes which run continuously, for example, in multi-tasking environments.

In the interface device according to the present invention an enormous advantage is to be gained, as apparent in the embodiment described in the following, in separating the actual hardware required to attach the interface device **10** to the data transmit/receive device from the communication unit, which is implemented by the digital signal processor **13**, the memory means **14** and the first connecting device **12**, as this allows a plurality of dissimilar device types to be operated in parallel in identical manner. Accordingly, many interface devices **10** can be connected to a host device which then sees many different "virtual" hard disks. In addition, any modification of the specific hardware symbolized by the second connecting device **15** can be implemented essentially without changing the operation of the interface device according to the present invention. Further, an experienced user can intervene at any time on any level of the existing second connecting device by making use of the above mentioned option of creating a configuration file or adding or storing new program sections for the second connecting device.

An important advantage of the interface device **10** of the present invention is that it also permits extremely high data transfer rates by using, for data interchange, the host device-own BIOS routines which are optimized for each host device by the host device manufacturer or BIOS system manufacturer, or by using driver programs which are normally optimized and included by the manufacturers of multi-purpose interfaces. Furthermore, due to the simulation of a virtual mass storage device, the data is managed and made available in such a way that it can be transferred directly to other storage media, e.g. to an actual hard disk of the host device without, as it were, intervention of the host device processor. The only limitation to long-term data transfer at high speed is therefore imposed exclusively by the speed and the size of the mass storage device of the host device. This is the case as the digital signal processor **13** already formats the data read by the data transmit/receive device via the second connecting device **15** into block sizes suitable for a hard disk of the host device, whereby the data transfer speed is limited only by the mechanical latency of the hard disk system of the host device. At this point, it should be noted that normally data flow from a host device must be formatted in blocks to permit writing to a hard disk and subsequent reading from a hard disk, as known by those skilled in the art.

The said data transfer rate can be increased further by setting up a direct memory access (DMA) or RAM drive in the host system. As those skilled in the art know, the setting up of a RAM drive requires processor resources of the host device, with the result that the advantage of writing the data to a hard disk drive of the host device essentially without the need for processor resources is lost.

As described above, a data buffer can be implemented in the memory means **14** to permit independence in terms of time of the data transmit/receive device attached to the second connecting device from the host device attached to the first connecting device. This guarantees error-free operation of the interface device **10** even for time-critical applications in multi-tasking host systems.

FIG. **2** shows a detailed block diagram of an interface device **10** according to the present invention.

A digital signal processor (DSP) **1300** is, in a manner of speaking, the heart of the interface device **10**. The DSP can be any DSP but preferably has a 20-MB on-chip random access memory (RAM). Certain instruction sets, for example, can be stored in the RAM already integrated in the DSP. An 80-MHz clock generator is attached to the DSP **1300** in order to synchronize the DSP. The DSP implements a fast Fourier transformation (FFT) in real time and also optional data compression of the data to be transferred from the data transmit/receive device to the host device in order to achieve greater efficiency and to permit interoperation with host devices which have a smaller memory.

In the preferred embodiment of the interface device **10** shown in FIG. **2**, the first connecting device **12** of FIG. **1** contains the following components: an SCSI interface **1220** and a 50-pin SCSI connector **1240** for attachment to an SCSI interface present on most host devices or laptops. The SCSI (small computer system interface) interface **1220** translates the data received via the SCSI connector **1240** into data understood by the DSP **1300**, as known by those skilled in the art. Further, the first connecting device **12** comprises an EPP (enhanced parallel port) with a data transfer rate of approx. 1 MBps which delivers a more moderate data transfer rate of 1 MBps by comparison to the data transfer rate of 10 MBps of the SCSI interface. The EPP **1260** is connected to a 25-pin D-shell connector **1280** to permit attachment to a printer interface of a host device for example. Optionally, the first connecting device **12** also comprises a 25-pin connector **1282** which permits the attachment of 8 digital outputs and 8 digital inputs **1284** at a host device.

Preferably, the second connecting device comprises 8 BNC inputs with the calibration relay **1505**, a block **1510** with 8 device amplifiers with an overvoltage protection of ±75 V, this block being connected in turn to 8 sample/hold (S&H) circuits **1515**. The calibration relays are relays which permit controlled changeover between a test voltage and a calibration reference voltage. Each sample/hold circuit is connected to a corresponding input of an 8-channel multiplexer **1520** which feeds its output signals via a programmable amplifier **1525** into an analog/digital converter (ADC) with 12 bit and 1.25 MHz **1530** and to the DSP **1300**. The ADC **1530** is controlled by means of a 20-bit timer **1535**, as known by persons skilled in the art. The programmable amplifier **1525** and the 8-channel multiplexer **1520** are controlled via an amplifier channel selection circuit **1540** which is in turn controlled by the DSP **1300**.

The complete interface device **10** is supplied with power by an external AC/DC converter **1800** which delivers a digital supply voltage of ±5 V and is attached to a DC/DC

converter **1810** which can deliver analog supply voltages of ±5 V and ±15 V as required for the interface device **10**. Further, the DC/DC converter controls a precision voltage reference **1820** which controls the 8 BNC inputs **1505** and the ADC **1530** as well as a digital/analog converter (DAC) **1830** which permits, via an output amplifier block with 4 output amplifiers **1840** and a 9-pin connector **1850**, analog output direct from the DSP **1300** to an output device, e.g. printer device or monitor device, which can be attached via the 9-pin connector **1850**, thus providing the option of monitoring the data transferred to the host device or also, for example, of viewing an FFT to obtain rapid and comprehensive data analysis without using processor time of the host device.

In FIG. **2** the memory means **14** of FIG. **1** is implemented by an EPROM **1400** which, in a preferred embodiment of the present invention, contains the operating system of the digital signal processor **1300**. A random access memory with an access time of 15 ns and a size of 512 KB or optionally 1024 KB **1420** serves as a data buffer to achieve independence in terms of time of the output line **16** from the output lines **11***a*, **11***b* and **11***c* to the data transmit/receive device and to the host device respectively. As described above, in a preferred embodiment of the present invention the digital signal processor **1300** already contains a 20-KB on-chip RAM **1440** which can store certain instruction sets, functions and also smaller application software units.

The connection, symbolized by the line **16**, of the interface device **10** to any data transmit/receive device implements, by means of the blocks **1505**–**1535**, an analog input with a sampling rate of 1.25 MHz and quantization of 12 bits. There are 8 channels with an overvoltage protection of ±75 V. By means of the programmable amplifier **1525** the channels can be programmed independently of each other in voltage ranges up to a maximum of ±10 V. Unused channels can be grounded internally to reduce channel intermodulation. The block **1515** is implemented as a monolithic high-precision, high-speed sample/hold amplifier for simultaneous sampling of all channels. The precision voltage reference **1820** provides a high-precision, temperature-compensated monolithic energy gap voltage reference for auto-calibration of each channel and each gain. Further, offset fine adjustment for each channel is implemented by the same.

The blocks **1830**, **1840** and **1850** implement a direct analog output for the digital signal processor **1300**, and the DAC **1830** provides a data transfer rate of 625 kHz and a quantization of 12 bits. The block **1840** comprises 4 channels with a common output latch.

Further, the interface device **10** comprises a digital input/output device implemented by the blocks **1284** and **1282**. Here there are 8 digital inputs, 8 digital outputs with a common latch, and the digital port can be attached preferably to a side panel of the interface device **10** so that the port itself can easily be accessed.

The digital signal processor **1300** provides on-board digital data processing. In particular, it is a high-performance DSP with a clock speed of 80 MHz and a 20-bit timer **1535**.

As described above, the first connecting device **12** comprises the SCSI interface **1220** with a peak transfer rate of 10 MBps. An optional PCMCIA-to-SCSI adapter permits high-speed communication with laptop computers which are desirable and in widespread use, particularly by mobile service technicians. The EPP **1260** with its associated connector **1280** permits data transfer at a more moderate rate.

As described above, the interface device **10** is supplied with power by means of an external AC/DC adapter which has a universal power input (85–264 VAC, 47–63 Hz). Interference suppression complies with the standards EN 55022, curve B and FFC, Class B). Further, it is also in accordance with international safety regulations (TÜV, UL, CSA). The interface device **10** is externally shielded and achieves a value of 55 dB at 30–60 MHz and a value of approximately 40 dB at 1 GHz, and therefore complies with the MILSTD 285-1 standard.

As described above, communication between the host device and the multi-purpose interface can take place not only via drivers for input/output device customary in a host device which reside in the BIOS system of the host device but also via specific interface drivers which, in the case of SCSI interfaces, are known as multi-purpose interface ASPI (advanced SCSI programming interface) drivers. This ASPI driver, which can also be referred to as an ASPI manager, is specific to a special SCSI host adapter, i.e. to a special multi-purpose interface, and is normally included by the manufacturer of the multi-purpose interface. Generally speaking, this multi-purpose interface driver has the task of moving precisely specified SCSI commands from the host system program to the host system SCSI adapter. For this reason, the command set is almost identical to that of the SCSI interface itself. Essentially, only status and reset commands for the host adapter have been added.

The ASPI driver can be used if the hard disk was not already addressable at boot time or if the SCSI-related BIOS routines of the host computer were still disabled. Here too, the steps needed to initialize the interface device, preferably as a virtual hard disk, are similar to the steps taken when initializing at boot time.

In general terms, the ASPI manager comprises two sides. One side is the proprietary, hardware-oriented side. It is responsible for converting all commands into a form required by the corresponding multi-purpose interface. The hardware-oriented side of the ASPI driver is therefore matched to a very specific type of multi-purpose interface or SCSI interface. The other side is known as the user software side. This side is totally independent of the proprietary operating characteristics of the SCSI adapter and is therefore identical for all SCSI interfaces. This permits SCSI programming which is however independent of the individual SCSI adapter types.

In contrast to communication between the host device and the interface device according to the present invention on the basis of a BIOS driver, the use of such an ASPI driver for communication between the host device and the interface device according to the present invention allows various further possibilities of the SCSI multi-purpose interface to be exploited. In the case described above, the interface device which preferably signs on and behaves as a virtual hard disk is detected by the BIOS driver of the host computer at boot time and is configured as a hard disk. This step does not however support active requests sent by the interface device to the host computer. If however the virtual hard disk wishes to write data actively to, for example, a hard disk of the host computer or wishes to initiate communication with the processor of the host computer, the host computer must recognize the request of the virtual hard disk and tolerate a further issuer of instructions on its bus. If the interface device behaves solely like a virtual hard disk, it would always receive and never issue commands. The BIOS has no objections to an additional issuer of commands that actively wishes to place data on the bus of the host device but the BIOS does not support the host device in recognizing corresponding requests of the interface device or in granting the interface device permission to access the bus.

Using the ASPI manager the interface device according to the present invention can now obtain active access to an SCSI hard disk of the host device connected to the same SCSI bus which, in contrast to the interface device, cannot be a virtual but a real SCSI mass storage device or also a further interface device according to the present invention. Thereupon, the interface device according to the present invention can write the desired data to the SCSI hard disk of the host computer totally independently of the host computer or can communicate with the same in some other manner. The interface device according to the present invention therefore initially behaves passively as a virtual hard disk and then, as required and using the driver software for the multi-purpose interface, actively on the same SCSI bus. This means however that the interface device according to the present invention, using a driver software for the multi-purpose interface which comprises the BIOS routines customary in host devices and simultaneously provides the option of active participation, can, regardless of the type of the data transmit/receive device attached to the second connecting device, behave initially as a virtual and at the same time passive hard disk but can, as required, participate actively on the bus so as to be able to initiate communication directly with other SCSI hard disks of the host device by bypassing the processor of the host device.

Using a standard interface of a host device, the interface device according to the present invention permits communication with any host device. By simulating an input/output device to the host device and, in a preferred embodiment, by simulating a virtual mass storage device, the interface device **10** is automatically supported by all known host systems without any additional sophisticated driver software. The simulation of a freely definable file structure on the "virtual" hard disk provides simple operation and expansion options and, through the implementation of any programs, independence from special software implemented on the host device. Help files included on the interface device **10** and plug-and-play support ensure ease of use even in portable, flexible host devices. Despite the very simple user interface, experienced users are free at any time to intervene in the functions of the interface device **10** on system level. The interface device **10** thus provides a universal solution which can cover the entire spectrum of possible data transmit/receive devices.

What is claimed is:

1. An interface device for communication between a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and a data transmit/receive device comprising the following features:

a processor;

a memory;

a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and

a second connecting device for interfacing the interface device with the data transmit/receive device,

wherein the interface device is configured by the processor and the memory in such a way that the interface device, when receiving an inquiry from the host device as to the type of a device attached to the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is a storage device customary in a host device, whereupon the host device communicates with the interface device by means of the driver for the storage device customary in a host device, and

wherein the interface device is arranged for simulating a virtual file system to the host, the virtual file system including a directory structure.

2. An interface device in accordance with claim **1**, in which the directory structure has a configuration file for setting and controlling functions of the interface device or an executable or a batch file for conducting a routine stored in the memory or a data file used for transferring data from the data transmit/receive device to the host device or a help file for giving help on handling the interface device.

3. An interface device in accordance with claim **2** wherein the configuration file is a text file.

4. An interface device in accordance with claim **2** wherein the executable file includes a Fast Fourier Transform routine for transforming data acquired by the second connecting device into the frequency domain and for examining frequency domain data.

5. An interface device in accordance with claim **2** wherein the executable file includes a data compression routine for compressing data to be transmitted from the data transmit/receive device to the host device.

6. An interface device in accordance with claim **1** wherein, in response to a request from the host to read a boot sequence, the processor is arranged to send a virtual boot sequence to the host.

7. An interface device in accordance with claim **6** wherein the virtual boot sequence includes a starting position and a length of a file allocation table, an indication of a type of the storage device or a number of sectors of the storage device.

8. An interface device in accordance with claim **7** wherein, in response to a request from the host to display a directory of the storage device, a processor is arranged for transferring the file allocation table and the directory structure to the host.

9. An interface device in accordance with claim **1** wherein the file allocation table and the directory structure is transferred to the host in response to a request from the host to read data from or store data to the storage device.

10. An interface device in accordance with claim **1** wherein the directory structure includes a data file for transferring data from the data transmit/receive device to the host device wherein the processor is arranged to interpret a request from the host to read the data file as a request for a data transfer from the data transmit/receive device to the host, so that data is transmitted from the second connecting device to the first connecting device and to the host.

11. An interface device in accordance with claim **10** wherein the directory structure further includes a configuration file for specifying a time period for a measurement by the data transmit/receive device, wherein the interface device is arranged for simulating a length of the data file to the host that corresponds to an anticipated volume of data produced by the data transmit/receive device in the specified time period.

12. An interface device in accordance with claim **1** wherein the file allocation table includes information on numbers of blocks occupied by the data file wherein the interface device is arranged for receiving block numbers or a block number range from the host when the host wants to read the data file, and wherein the interface device is arranged to start a data transfer to the host, when the block numbers or the block number range is received from the host.

13. An interface device in accordance with claim **12** wherein the processor is arranged for formatting the data

acquired by the second connecting device into blocks having a predetermined size, the predetermined size being suited for the storage device.

14. An interface device in accordance with claim **1** wherein the functions are gain, multiplex or synchronization settings of the second connecting device.

15. An interface device in accordance with claim **1** wherein the storage device is a hard disk.

16. An interface device in accordance with claim **1** wherein the memory has a data buffer for permitting independence in terms of time of the data transmit/receive device attachable to the second connecting device from the host device attachable to the first connecting device.

17. An interface device for communication between a host device, which comprises a multi-purpose interface and a specific driver for this interface, and a data transmit/receive device comprising the following features:

a processor;

a memory;

a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and

a second connecting device for interfacing the interface device with the data transmit/receive device,

where the interface device is configured using the processor and the memory in such a way that the interface device, when receiving an inquiry from the host device as to the type of a device attached at the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is a storage device customary in a host device, whereupon the host device communicates with the interface device by means of the specific driver for the multi-purpose interface, and

wherein the interface device is arranged for simulating a virtual file system to the host, the virtual file system including a file allocation table and a directory structure.

18. A method of communication between a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and a data transmit/receive device via an interface device comprising the following steps:

interfacing of the host device with a first connecting device of the interface device via the multi-purpose interface of the host device;

interfacing of the data transmit/receive device with a second connecting device of the interface device;

inquiring by the host device at the interface device as to the type of device to which the multi-purpose interface of the host device is attached;

regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, responding to the inquiry from the host device by the interface device in such a way that it is a storage device customary in a host device, whereupon the host device communicates with the interface device by means of the usual driver for the storage device, and

wherein the interface device is arranged for simulating a virtual file system to the host, the virtual file system including a file allocation table and a directory structure.

* * * * *

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

CASIO INC. Plaintiff, v. PAPST LICENSING GMBH & CO. KG Defendant.	Civil Action No. 1:06 CV 01751 Judge: Gladys Kessler Magistrate: Deborah A. Robinson
PAPST LICENSING GMBH & CO. KG Counter-Plaintiff v. CASIO INC. and CASIO COMPUTER CO., LTD. Counter-Defendants.	

CASIO INC.'S OBJECTIONS AND RESPONSES TO
PAPST LICENSING GMBH & CO. KG'S
FIRST SET OF INTERROGATORIES TO CASIO INC.

Pursuant to Rule 33 of the Federal Rules of Civil Procedure, Plaintiff /Counter-Defendant, Casio Inc., through counsel, responds to each of the Papst Licensing GmbH & Co. KG ("Papst") Interrogatories below.

GENERAL OBJECTIONS

Casio Inc. generally objects to Papst's Interrogatories and its Instructions and Definitions as follows. These objections are incorporated by reference into each specific response and specific objection below as though set forth fully therein. The assertion of the same, similar, or

EXHIBIT E

additional objections in Casio Inc.'s specific objections to an individual interrogatory or the failure to assert any additional objection to an interrogatory does not waive any of the objections set forth in this section.

1. Casio Inc. objects to Papst's Interrogatories to the extent they seek to impose obligations beyond those set forth in Rules 26 and 33 of the Federal Rules of Civil Procedure and any applicable local rules. Casio Inc. will respond to Papst's Interrogatories in the manner required by the Federal Rules of Civil Procedure and applicable local rules.

2. Casio Inc. objects to Papst's Interrogatories to the extent they are overly broad, unreasonably burdensome, or seek discovery of information that is not relevant to the claims or defenses of any party to this action.

3. Casio Inc.'s answers are made without waiving or intending to waive any objections as to relevancy, materiality, privilege, or admissibility of any information in this or in any subsequent proceeding or at trial of this or any other action, on any ground. A partial answer to any interrogatory that has been objected to, in whole or in part, is not intended to be a waiver of the objection.

4. Casio Inc. objects to Papst's Interrogatories to the extent they employ imprecise specifications of the information sought, and will provide only that non-objectionable information which can reasonably be identified in each category.

5. Casio Inc. objects to Papst's Interrogatories to the extent they seek discovery of information that is protected from disclosure by the attorney-client privilege, work-product doctrine, or other applicable privilege or immunity.

6. Casio Inc. objects to Papst's Interrogatories to the extent they are vague, ambiguous, and susceptible to varying interpretations or call for a legal conclusion. Casio Inc.

will answer Papst's Interrogatories based upon its understanding of them and subject to and without waiving its objections.

7. Casio Inc. objects to Papst's Interrogatories to the extent they call for the disclosure of confidential, sensitive, or proprietary information. Such confidential, sensitive or proprietary information will be produced pursuant to the Protective Order entered in this proceeding. Casio Inc. particularly objects to production of any confidential information to Welsh & Katz, as that firm is prosecuting applications related to the patents-in-suit.

8. Casio Inc. objects to Papst's Interrogatories to the extent that the information sought is within Papst's unique knowledge or is not yet known to Casio Inc. Casio Inc. notes that discovery and its investigations are ongoing and reserves the right to supplement its responses at a later time and in accordance with applicable rules.

9. Casio Inc. objects to Papst's Interrogatories to the extent they prematurely seek information regarding experts retained by Casio Inc. Casio Inc. will serve its experts' opinions, and the materials relied upon in support of those opinions, as provided for under the Federal Rules and the Court's Scheduling Order relating to expert discovery.

10. Casio Inc. objects to Papst's Interrogatories to the extent they contain multiple subparts, each of which is counted as a separate interrogatory.

11. Casio Inc. objects to the entirety of these interrogatories, as they were not served in good faith and clearly were prepared in violation of Federal Rule of Civil Procedure 26(g). The only possible purpose for Papst serving discovery requests of this nature is to increase the expense to Casio Inc. in an attempt to force it to settle. Papst has deceptively "defined" its interrogatories to be much broader than the individual interrogatory appears. Papst is hereby put on notice that Casio Inc. intends to seek sanctions for this discovery abuse, and that these

interrogatories will be used as evidence to support Casio Inc.'s vigorous pursuit of attorney fees and costs in this litigation. Casio Inc. will respond to some portions of Papst's interrogatories, but in doing so does not in any way agree that any portion of these interrogatories were proper.

12. Neither these general objections nor the specific responses set forth below are an admission relative to the existence of any information sought, the relevance or admissibility of any response, or the truth or accuracy of any statement or characterization contained in any particular interrogatory.

13. Casio Inc. objects at this time to the production of any information relating in any way to damages or willfulness, which issues will be subject to Casio's motion to bifurcate.

OBJECTIONS TO INSTRUCTIONS AND DEFINITIONS

1. Casio Inc. objects to Papst's Instructions and Definitions to the extent they seek to impose obligations beyond those set forth in Rules 26 and 33 of the Federal Rules of Civil Procedure and any applicable local rules. Casio Inc. will respond to Papst's Interrogatories in the manner required by the Federal Rules of Civil Procedure and applicable local rules.

2. Casio Inc. objects to the definition of "Plaintiff," "you," "your," and "Casio," as overly broad, unduly burdensome, and as calling for irrelevant information not reasonably calculated to lead to the discovery of admissible evidence. Casio, Inc. will respond for Casio, Inc. only. While the shorthand term "Casio" may be used in these responses and objections, it is to be understood to refer only to Casio, Inc. and no other party to the litigation or third party.

3. Casio Inc. objects to instruction 1. Casio Inc. will provide information in its possession, custody, or control, and not otherwise, nor will Casio Inc. provide "sources" or

"nature" of information, as these requests are unduly burdensome, irrelevant, and call for information not likely to lead to admissible evidence.

4. Casio Inc. objects to instruction 2 as overly broad, unduly burdensome, and as calling for irrelevant information not reasonably calculated to lead to the discovery of admissible evidence. Casio Inc. will provide information on privileged communications as required by Federal and Local Rules, and not otherwise.

5. Casio Inc. objects to instruction 6. If a Papst interrogatory is not clear, Casio Inc. will object to it on that ground and will not guess as to what Papst might have meant.

6. Casio Inc. objects to instruction 8, as it is deceptive, and redefines the interrogatory in a way that no one could reasonably read the interrogatory. If Papst desires to serve an interrogatory as laid out in instruction 8, it must do so directly. This practice violates Federal Rule 26(g), and Casio Inc. objects on the grounds that the instruction is overbroad, unduly burdensome, calls for irrelevant information not reasonably calculated to lead to the discovery of admissible information, calls for information that is subject to the attorney client privilege, work product, or other applicable immunity, calls for disclosure of confidential information to Welsh & Katz, and calls for documents and information that are only relevant to the damages and willfulness issues, which will be subject to Casio's motion to bifurcate.

7. Casio Inc. objects to instruction 9, as it is deceptive, and redefines the interrogatory in a way that no one could reasonably read the interrogatory. If Papst desires to serve an interrogatory as laid out in instruction 9, it must do so directly. This practice violates Federal Rule 26(g), and Casio Inc. objects on the grounds that the instruction is overbroad, unduly burdensome, calls for irrelevant information not reasonably calculated to lead to the discovery of admissible information, calls for information that is subject to the attorney client

privilege, work product, or other applicable immunity, and calls for documents and information that are only relevant to the damages and willfulness issues, which will be subject to Casio's motion to bifurcate.

PAPST'S INTERROGATORIES

INTERROGATORY NO. 1: Describe in full and complete detail how each Casio Digital Camera does not infringe each of the Patents-in-Suit.

OBJECTIONS:

Casio Inc. objects to the deceptive nature in which this interrogatory was written. Stating the interrogatory in this manner, and "defining" it to be wildly overbroad and to request information not even remotely related to the request as written, is an obvious attempt to deceive Casio Inc. into inadvertently waiving objections, or dupe the Court into thinking that Papst is being reasonable in its requests. The request violates Federal Rule 26(g) as "defined" in the Papst instructions, and Papst is hereby put on notice that, in the event this interrogatory is ever brought before the Court, the full overbroad scope of what Papst seeks must be shown to the Court, including the deceptive manner in which Papst attempted to get that information.

Casio Inc. objects to the definition provided to this interrogatory, as overbroad, unduly burdensome, calling for irrelevant information not reasonably calculated to lead to the discovery of admissible information, as calling for information that is subject to the attorney client privilege, work product, or other immunity, and calls for disclosure of confidential information to Welsh & Katz. Casio will respond only by considering the actual interrogatory recited above, and will provide information only for the first independent claims of the patents as Papst has to date refused to (or has been unable to) explain how the Casio cameras supposedly infringe on these patents, and has not identified any allegedly infringed claims. Casio will only address the

claim elements that are missing, not every claim element, and Casio will provide reasonable detail on the reasons for non-infringement. All other requests are overly broad, unduly burdensome, call for information that is irrelevant and not reasonably calculated to lead to the discovery of admissible evidence.

Casio reserves its right to supplement this response as the case proceeds, including but not limited to supplementation after the Court construes the claims, or upon learning Papst's proposed constructions and contentions which, to date, Papst has been unable to provide.

Casio objects to this Interrogatory as improperly being characterized as one interrogatory because its many subparts constitute separate interrogatories. See Fed. R. Civ. P. 33(a).

Subject to its general and specific objections, Casio responds as follows.

RESPONSE

Casio's cameras do not infringe Papst's patents because Casio's cameras do not meet every claim limitation either literally or under the doctrine of equivalents when comparing the properly construed claims to the accused products. At least the following claim elements are missing from Casio's cameras. Citations in this section are to the '399 patent, but as the '449 patent has the same specification, the support can equally be found in that patent and Casio will rely on the specifications of both patents.

Interface device

No Casio Digital Camera has the required limitation of an "interface device" as that term is properly construed. Both patents teach an interface device that is separate from the transmit/receive ("T/R") device. For example, the '399 patent states at 8:23-33: "In the interface device according to the present invention, an enormous advantage is to be gained . . . in

separating the actual hardware . . . [which] allows a plurality of dissimilar device types. . . .". Similarly, at 1:55-64, the patent discusses different uses of the interface, e.g., a "large number of applications," and it refers to "any data transmit/receive devices which can be attached to the second connecting device. . . ." (7:41-43). The patents also state that "the interface device according to the present invention . . . [can be used] as an interface between a host device and almost any data transmit/receive device" ('399 patent, 7:45-49).

The patent claims also clearly require that the interface be separate from the transmit/receive device. See, for example, the language that requires connecting devices for interfacing them, and the language that requires the host to ask what type of device is "attached" to the interface, and requires the interface device to send a signal to the host "regardless of the type of the data transmit/receive device attached." Thus, the claim language itself makes the ability of a transmit/receive device to "attach" very clear, particularly when considered in light of the specification noted above.

The patents distinguish prior art devices with specific drivers for specific transmit/receive devices. See, e.g ., '399 patent at 1:20-34. They also teach that the interface must be "flexible to permit attachment of very different electrical or electronic systems to a host device by means of the interface...." Id. At 1:56-60. Every embodiment disclosed in the patents has a separate interface device, and there is inadequate support under 35 U.S.C. 112 for anything but a separate interface device.

All these teachings are inconsistent with an analysis that has the interface device be a selected group of components within the camera itself. This concept runs through both patents and there is never any indication that the applicants had anything in mind other than a separate structure for the interface.

As with all missing claim elements, it is very difficult for Casio to try to explain why there is no infringement by equivalents, as Papst has been unable to provide even a literal infringement analysis, let alone an analysis by equivalents. However, it is clear that any attempt to read this interface limitation and the related language of the claim requiring that devices "attach" to the interface would improperly vitiate this claim language. Moreover, there are clearly very substantial differences in the Casio products and the claimed structure. Indeed, the "enormous advantage" taught by the patents themselves, and the "flexible" nature of the claimed structure are completely missing in the Casio cameras. And given that prior art was distinguished on this ground, no reasonable equivalents analysis could capture the Casio cameras. Casio reserves its right to supplement this response, should Papst ever be able to provide a realistic infringement analysis.

Data transmit/receive device

No Casio Digital Camera has the required limitation of a "data transmit/receive device" ("T/R device") as that term is properly construed. A T/R device would be understood by a person of ordinary skill in the art to mean a device that transmits and receives information in the same form. Thus, the CCD identified by Papst as the T/R device could not possibly meet this limitation, as it converts light into an electrical signal – a completely different form of data.

If the patentee had meant that different types of data could be transmitted and received, the claim could have said "a transmit device and a receive device" and these could have transmitted and received different types of data. A data/transmit device is not a device for converting data from one form to another, as is the CCD of the Casio cameras.

With regard to equivalents, this required element is completely missing, and thus any attempt to capture the Casio products under the doctrine of equivalents would improperly vitiate

these claim terms in their entirety. It is clear that the Casio CCD functions in a substantially different way, and achieves a different result. Casio has no idea how Papst intends to try to use the doctrine of equivalents to eviscerate this claim limitation, or even if Papst will continue to believe the CCD meets this limitation, and so reserves its right to supplement this response should Papst ever attempt to make such an argument.

Communication between

Further, because Casio's Digital Cameras lack the required limitation that there be a communication between the lens/CCD and host, Casio does not infringe any claim of the '399 or '449 patents.

The "communication between" limitation is part of every claim of the '399 and '449 patents. When properly construed, the T/R device and host must have two-way communication, not just data transfer from one to the other. The word "between" requires two-way communication, and later language in the claims uses the words "from" and "to" showing a contrast with the "between" language used for this communication. *Cf. e.g.*, "a data request command from the host device to the type of input/output device…" and "transfer of the digital data to the host device." This language also shows that communication between the host and T/R device must be bi-directional (commands from the host and data transfer from the T/R device, i.e., if the host requests the data, the T/R device must be able to send data in response thereto). There must be an interchange or exchange of data, as claimed and as plainly taught in the specification. *See, e.g.,* the abstract ("communication between"); '399, 1:9-14 (distinguishing data acquisition and two-way communication).

The lens/CCD of the Casio cameras (which counsel for Papst has alleged to be the T/R device) never receives data from the computer, and in fact, that lens/CCD is not functional at all

when the camera is connected to the computer. The only communication with the computer is a communication between the computer and the camera memory, the computer never "communicates" with the lens/CCD.

Even if "communication between" is construed to not require two-way communication, the Casio lens/CCD combination does not communicate at all with the host computer. Rather, the lens/CCD merely sends data to the Analog to Digital ("A/D") converter, and that data is stored in the camera memory. When the camera is attached to the computer, the computer collects information directly from the camera memory. The lens/CCD is not involved in the function of communicating with the computer. The '399 patent, at column 5, lines 47-63, discusses first that data must be "acquired, and transferred to the host device," and in the very next sentence distinguishes that from communication: "The data transmit/receive device itself can also communicate actively with the host device." The communication is described as something different from an intermediate memory merely storing and then sending on data to the host, and it requires, as the claims state, actual communication between the T/R device and the host computer. See also, 6:55-68 (the host computer user reading data "from the data transmit/receive device . . ." and discussing the interface function of transferring data "from the data transmit/receive device . . . to the host device . . . ."). The patents distinguish the claimed communication between the host and T/R device from "communication between the host device and interface device" ('399 patent, at 7:14-15).

With regard to equivalents, this required element is completely missing, and thus any attempt to capture the Casio products under the doctrine of equivalents would improperly vitiate these claim terms in their entirety. Moreover, the Casio products function in a substantially different way, in that the cameras do not perform a function that is substantially the same as bi-

directional communication. Rather, communication cannot take place between the host device and the imaging portion of the camera. Casio does not know how, if at all, Papst intends to try to use the doctrine of equivalents to eviscerate this claim limitation, and so reserves its right to supplement this response should Papst ever attempt to make such an argument.

Configured by the processor and memory

Even assuming that the Casio CPU and memory are part of an "interface device" as counsel for Papst has asserted, the interpreters in that alleged interface are certainly not configured "by" the processor and memory as expressly required by the claims. The "interpreters" in that alleged interface, to the extent they can even be argued to exist, are software. This software is simply loaded into the memory. The Casio processor has nothing to do with that operation. The memory of the Casio cameras also do not "configure" this in any way, but merely store the software.

The requirement that the interface device interpreters be configured by the processor and memory is not only clear from the claim language, but also from the specification. *See, e.g.*, '399 patent, 3:36-47, 3:58-67, 4:65-5:6.

With regard to equivalents, this required element is completely missing, and thus any attempt to capture the Casio products under the doctrine of equivalents would improperly vitiate these claim terms in their entirety. Moreover, the Casio products function in a substantially different way, in that the processor and memory do nothing to configure as required by the claims, and instead software is simply loaded into the Casio cameras. The prosecution history also provides guidance. *See e.g.*, March 18, 2002 Response to Office Action. Casio has no idea how Papst intends to try to use the doctrine of equivalents to eviscerate this claim limitation, and

so reserves its right to supplement this response should Papst ever attempt to make such an argument.

Input/output device customary in a host device, regardless of the device attached

Further, no claim of the '399 patent nor the '449 patent are infringed by Casio because no Casio Digital Camera has the required limitation of an "input/output device customary in a host device," as that term is properly construed. The claims require that the first command interpreter send a signal to the host that it is an "input/output device customary in a host device." The Casio camera signals that it is a Casio camera, not a device "customary in a host device," and it does not provide this information "regardless" of "the device attached".

The patent specification clearly supports the plain and ordinary meaning. *See, e.g.,* Abstract (regardless of the device attached); '399 patent, 3:36-47; 3:59-67, 4:8-20, 4:60-5:6; 6:19-22.

The claims and the file history both require that the interface device "lie" to the host computer about the real nature of the device. Indeed, prior art was distinguished on precisely this ground during prosecution, creating an estoppel. As above, Casio cameras never lie to the host computer. Rather, the Casio cameras identify themselves as Casio cameras.

This required element is also completely missing, and thus any attempt to capture the Casio products under the doctrine of equivalents would improperly vitiate these claim terms in their entirety. Moreover, the Casio products function in a substantially different way, in that the cameras identify themselves to a host device only for the specific hardware arrangement of the camera itself and no other. This is neither substantially the same function as "regardless" of "the device attached" nor substantially the same way. Casio does not know how Papst intends to try

to use the doctrine of equivalents to eviscerate this claim limitation, and so reserves its right to supplement this response should Papst ever attempt to make such an argument.

Virtual file system

With respect specifically to the claims of the '449 patent, all require the interface device to simulate a virtual file system. A virtual file system is described, for example, in the '399 patent at 6:1-3: the interface device "simulates a hard disk with a root directory whose entries are 'virtual' and can be created for the most varied functions." Also, as described in the '449 patent at 11:1-6 and the '339 patent at 11:66-12:4: "Using the ASPI manager the interface device according to the present invention can now obtain active access to an SCSI hard disk of the host device connected to the same SCSI bus which, in contrast to the interface device, cannot be a virtual but a real SCSI mass storage device or also a further interface device according to the present invention." *See also*, '399 patent, 12:25-33, and the '449 prosecution history (e.g., 5/17/04 Notice of Allowability).

In the Casio cameras, the computer directly accesses a real file system. The system is not "virtual" in any sense of the word.

With regard to equivalents, this required element is also completely missing, and thus any attempt to capture the Casio products under the doctrine of equivalents would improperly vitiate these claim terms in their entirety. Moreover, the Casio products function in a substantially different way, in that with respect to Casio cameras, the computer directly accesses a real file system. The system is not "virtual" in any way. Casio has no idea how Papst intends to try to use the doctrine of equivalents to eviscerate this claim limitation, and so reserves its right to supplement this response should Papst ever attempt to make such an argument.

INTERROGATORY NO. 2: Describe in full and complete detail the bases for the allegations in Casio's Complaint that the Patents-in-Suit are invalid for failing to comply with the patent laws of the United States.

OBJECTIONS

Casio, Inc. objects to the deceptive nature in which this interrogatory was written. Stating the interrogatory in this manner, and "defining" it to be wildly overbroad and to request information not even remotely related to the request as written, is an obvious attempt to deceive Casio into inadvertently waiving objections, or dupe the Court into thinking that Papst is being reasonable in its requests. The request violates Federal Rule 26(g) as "defined" in the Papst instructions, and Papst is hereby put on notice that, in the event this interrogatory is ever brought before the Court, the full overbroad scope of what Papst seeks must be shown to the Court, including the deceptive manner in which Papst attempted to get that information.

Casio objects to the definition provided to this interrogatory, as overbroad, unduly burdensome, calling for irrelevant information not reasonably calculated to lead to the discovery of admissible information, as calling for information that is subject to the attorney client privilege, work product, or other immunity, calls for disclosure of confidential information to Welsh & Katz, and calls for documents and information that are only relevant to the damages and willfulness issues, which will be subject to Casio's motion to bifurcate. Casio will respond only by considering the actual interrogatory recited above, and will provide information only for the first independent claims of the patents as Papst has to date refused to (or has been unable to) explain how the Casio cameras supposedly infringe on these patents. After receiving the Papst analyses, Casio will provide reasonable detail on the reasons for its defenses. All other requests are overly broad, unduly burdensome and calls for information that is irrelevant and not reasonably calculated to lead to the discovery of admissible evidence.

Casio reserves its right to supplement this response as the case proceeds, including but not limited to supplementation after the Court construes the claims, and upon learning Papst's proposed constructions and contentions which, to date, Papst has been unable to provide.

Casio objects to this Interrogatory as improperly being characterized as one interrogatory because its many subparts constitute separate interrogatories. See Fed. R. Civ. P. 33(a).

Subject to its general and specific objections, Casio responds as follows.

RESPONSE:

The claims of the Papst patents, particularly if read broadly enough to cover any Casio camera, would be invalid under at least 35 U.S.C. sections 112, 102, and 103. Unfortunately, despite this Court's order that discovery proceed and Papst's obligation to provide this information, Papst has refused to (or been unable to) provide claim constructions and analyses as to how these patents could possibly be read broadly enough to cover the Casio cameras. If and when Papst does so, Casio will show how the Papst claim constructions cannot read on the Casio cameras without also encompassing the prior art and otherwise rendering the patents invalid.

INTERROGATORY NO. 3: Separately with respect to each of the Patents-In-Suit, state:

(A) The dates upon which, and the circumstances under which, Casio first became aware of the Patents-In-Suit, and the persons who became aware of them;

(B) Whether Casio received legal advice at any time, including after the filing of the Complaint, that it did not infringe each of the patents in suit, or that each of the Patents-In-Suit was invalid or unenforceable and, if so, identify the date upon which, and the circumstances under which Casio obtained such legal advice, or caused any studies relating to such advice to be made, as well as any oral or written opinion of legal counsel, with respect to:

(i) the infringement or non-infringement of the Patents-In-Suit; and/or

(ii) the validity, invalidity, enforceability or unenforceability of the Patents-In-Suit;

(C) Identify all persons having knowledge of the subject matter of Casio's response to this interrogatory, and locate and identify all documents pertaining to the subject matter of Casio's response to this interrogatory; and

(D) Identify all discussions, communications, events or documents that relate to or refer to any legal advice received by Casio with respect to:

(i) the infringement or non-infringement of the Patents-In-Suit; and/or

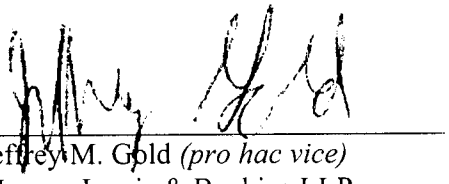
(ii) the validity, invalidity, enforceability or unenforceability of the Patents-In-Suit.

RESPONSE:

Casio objects to this Interrogatory as overly broad, unduly burdensome and not likely to lead to the discovery of admissible evidence. Casio further objects to this Interrogatory as improperly being characterized as one interrogatory, because its many subparts constitute separate interrogatories towards the presumptive 25 interrogatory limit. See Fed. R. Civ. P. 33(a). Casio further objects to this Interrogatory as seeking information protected by the attorney client privilege and/or that is attorney work product, and as calling for information that is only relevant to the damages or willfulness issues, which will be subject to a motion to bifurcate.

Subject to its general and specific objections, Casio responds that it first became aware of Papst's patents when Papst approached Casio and identified them on or about March 14, 2006 in a letter to Mr. John Clough of Casio Inc.

DATED: May 21, 2007



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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing CASIO INC.'S OBJECTIONS TO PAPST LICENSING GMBH & CO. KG'S FIRST SET OF INTERROGATORIES TO CASIO INC. was served on this, the 21st day of May, 2007, upon the attorneys for Papst as follows:

VIA U.S. MAIL and E-MAIL
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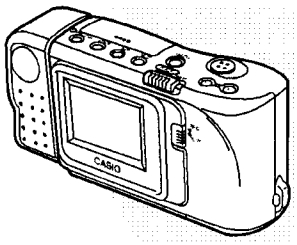
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Attorneys for Defendant/Counter-Plaintiff,
Papst Licensing GmbH & Co. KG

Liquid Crystal Digital Camera

QV-10 B

Owner's Manual



Introduction

Congratulations upon your selection of the QV-10 Liquid Crystal Digital Camera. The QV-10 comes with its own built-in liquid crystal color monitor that let's you instantly view the pictures you take.
To get the most out of the QV-10, be sure to carefully read this manual and follow the instructions contained in it.

CASIO

Please refer to this manual for the QV-10, QV-10A & QV-11 models

■ Before using the QV-10...

Note the following precautions before attempting to use the QV-10.

- CASIO COMPUTER CO., LTD. assumes no responsibility for any damage or loss resulting from the use of this manual.
- CASIO COMPUTER CO., LTD. assumes no responsibility for any loss or claims by third parties which may arise through the use of the QV-10.
- CASIO COMPUTER CO., LTD. assumes no responsibility for any damage or loss caused by deletion of data as a result of malfunction, repairs, or battery replacement. Be sure to back up all important data on other media to protect against its loss.

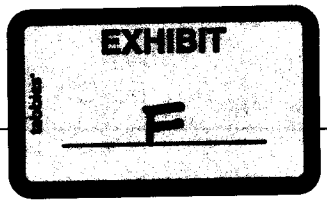
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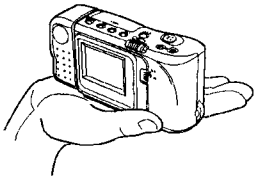
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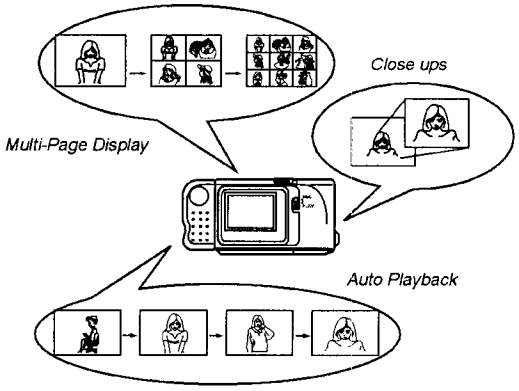
Lightweight and compact design

The QV-10 is the first camera to incorporate a built-in monitor into a compact configuration.



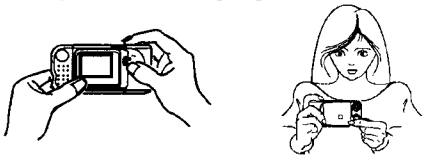
Versatile features and functions

The versatile features and functions of the QV-10 include: simultaneous display of multiple memory pages, close-up capabilities, automatic sequential display of memory pages, and more.



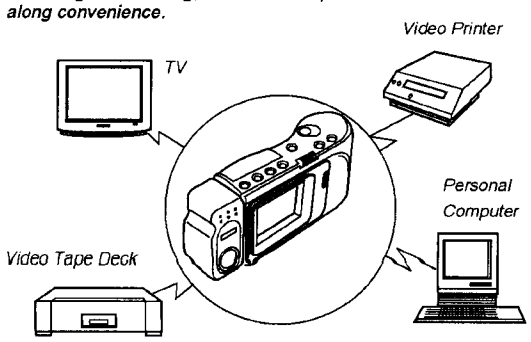
Picture composition without looking through a viewfinder

The QV-10's high-resolution, low-glare TFT liquid crystal display provides clear pictures even in bright light.



VIDEO OUT and digital transfer function for unlimited application of digital images

The VIDEO OUT capabilities of the QV-10 makes it possible to connect to a television to use images for presentations and other applications. Digital images can be transferred to a personal computer for storage and editing, or from a computer to the QV-10 for take-along convenience.



General Precautions

Be sure to observe the following imporatnt precautions whenever using the QV-10.

- Never try to take pictures or use the built-in display while operating a motor vehicle or while walking. Doing so creates the danger of serious accident.
- Never try to open the case of the camera or attempt your own repairs. High-voltage internal components create the risk of electrical shock when exposed. Always leave maintenance and repair work up to authorized CASIO service providers.
- Keep the camera away from water and other liquids, and never let it get wet. Moisture creates the danger of fire and electrical shock. Never use the camera outdoors in the rain or snow, at the seashore or beach, in the bathroom, etc.
- Should foreign matter or water ever get into the unit, immediately turn power off, unplug the AC adaptor from the power outlet, and contact your dealer or nearest CASIO service provider. Using the unit under these conditions creates the danger of fire and electrical shock.
- Should you ever notice smoke or a strange odor coming out of the unit, immediately turn power off and unplug the AC adaptor from the power outlet. Using the unit under these conditions creates the danger of fire and electrical shock. After making sure there is no more smoke coming from the unit, take it to your nearest CASIO service provider for repair. Never attempt your own maintenance.
- If the unit's case should ever become cracked due to dropping it or otherwise subjecting it to rough treatment, immediately turn power off, unplug the AC adaptor from the power outlet, and contact your nearest CASIO service provider.
- Never use the unit inside of an air craft or in any other areas where its use is prohibited. Doing so can result in an accident.

- Physical damage and malfunction of this unit can cause the image data stored in its memory to be deleted. Be sure to always keep backup copies of data by recording them on video tape or by transferring them to personal computer memory.
- Never open the battery compartment cover, disconnect the AC adaptor from the camera or unplug it from the wall socket while the "WAIT" message is on the LCD. Doing so will not only make storage of the current image impossible, it can also corrupt other image data already stored in camera memory.

MEMORY ERROR message

The following error appears on the built-in monitor whenever the camera's flash memory becomes disabled due to malfunction or improper operation.



Whenever this happens, all of the digital images stored in the camera's memory will be lost. You will not be able to view stored images or record new ones. Take your camera to your dealer or an authorized CASIO service provider as soon as possible after the MEMORY ERROR message appears.

Operating conditions

- This camera is designed for use in temperatures ranging from 0°C to 40°C (32°F to 104°F).
- Do not use or keep the camera in the following areas.
  - In areas subject to direct sunlight
  - In areas subject to high humidity or dust
  - Near air conditioners, heaters, or other areas subject to temperature extremes
  - Inside of a closed vehicle, especially one parked in the sun
  - In areas subject to strong vibration

Condensation

- When you bring the camera indoors on a cold day or otherwise expose it to a sudden change of temperature, there is the possibility that condensation can form on the exterior or on interior components. Condensation can cause malfunction of the camera, so you should avoid exposing it to conditions that might cause condensation.
- To keep condensation from forming, place the camera into a plastic bag before moving it into a location that is much warmer or colder than your current location. Leave it in the plastic bag until the air inside the bag has a chance to reach the same temperature as the new location. If condensation does form, remove the batteries from the camera and leave the battery compartment cover open for a few hours.

GUIDELINES LAID DOWN BY FCC RULES FOR USE OF THIS UNIT IN THE U.S.A. (not applicable to other areas).

NOTICE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution : Changes or modification to the product not expressly approved by CASIO could void the user's authority to operate the product.

Properly shielded cables with ferrite core must be used for connection to computer in order to meet FCC emission limits.

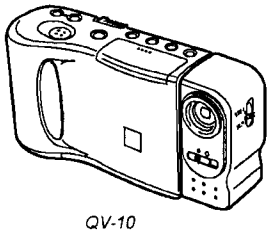
Getting Acquainted

This part of the manual contains information on unpacking, the names of controls and components, and power supply information. It also has sections that cover basic operations to let you begin enjoying the QV-10 as quickly as possible.

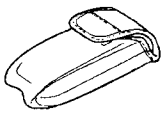
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Unpacking

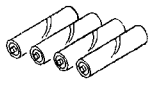
Check to make sure that all of the items shown below are included with your QV-10. If something is missing, contact your dealer as soon as possible.



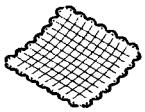
QV-10



Soft case



Alkaline batteries (AA-size × 4)



Cleaning Cloth



Special video cable



Wrist Strap

• See page 17 for installation instructions.



Manual and warranty

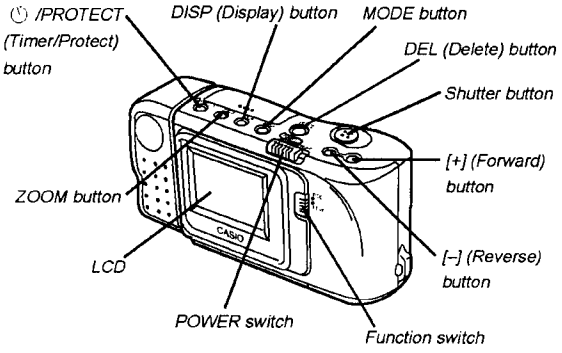


AC adaptor AD-C60

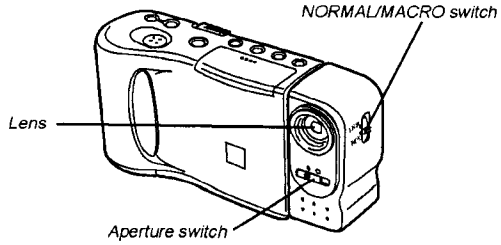
General Guide

The following illustrations show the names of each component, button and switch on the camera.

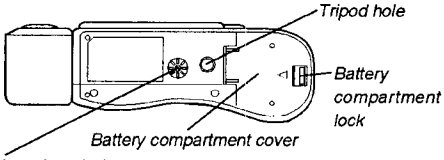
Top and Display



Lens



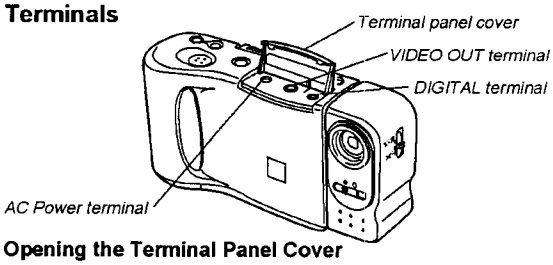
Bottom



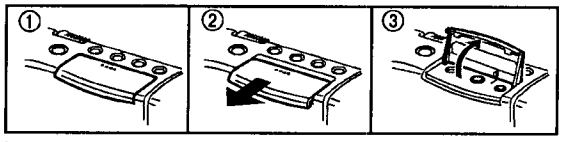
BRIGHT (brightness) control

- BRIGHT control adjusts the brightness of the image on the LCD. The brightness is set at the factory to the optimum setting, and normally does not need adjustment. Use BRIGHT control to make adjustments after replacing batteries, or any other time you feel the LCD image brightness is too dark or too light.

Terminals



Opening the Terminal Panel Cover

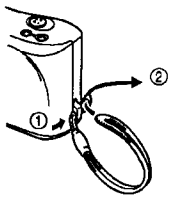


Important!

Make sure that the terminal panel cover is slid fully away as shown in step ② above before trying to raise it. Forcing the cover up can seriously damage it.

Connecting the Wrist Strap

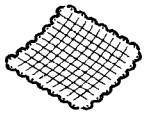
Pass the wrist strap through the hole on the side of the camera a shown in the illustration.



Using the Cleaning Cloth

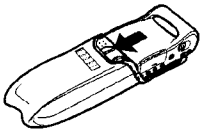
Use the cleaning cloth to wipe fingerprints and smudges from the LCD and lens.

- Be sure to avoid applying too much pressure when wiping the LCD. Too much pressure can cause permanent discoloration, abnormal images, and cracks.



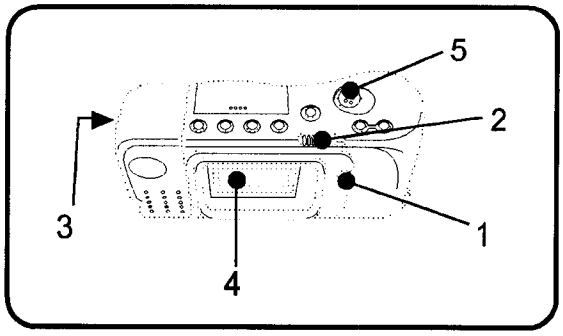
Using the Soft Case

Keep the camera in its soft case to protect it when not in use.



To record an image

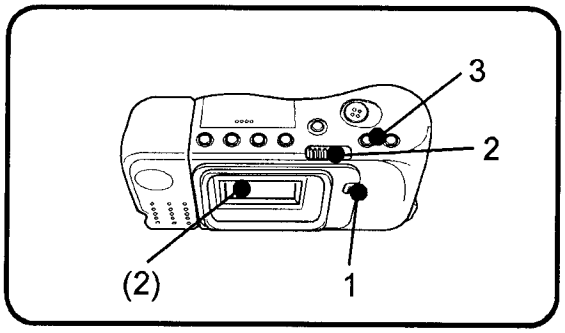
- Be sure to load batteries (page 25) before operation.



1. **Set to REC.**
2. **Slide to the right to turn on power.**
3. **Set to NORMAL.**
   - *Set to MACRO for close-ups. See page 40 for information on the difference between NORMAL and MACRO.*
4. **While viewing the image on the LCD, slowly move the camera so the image appears as you want it.**
5. **Press the shutter button.**
   - *The message "WAIT" appears on the LCD for about four seconds along with the image that was recorded when you pressed the shutter button. You can use the camera to take the next picture after the "WAIT" message disappears.*
   - *The camera can hold up to 96 images in memory*

To view images stored in memory

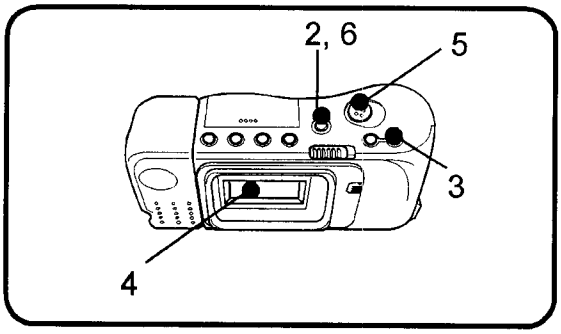
You can recall images and view them on the LCD.



1. **Set to PLAY.**
2. **Slide to the right to turn on power.**
   - *An image appears on the LCD when power comes on.*
3. **Press [+] to display the next memory page or [–] to display the previous page.**

To delete images stored in memory

After you delete an image you can store a new one it its place.



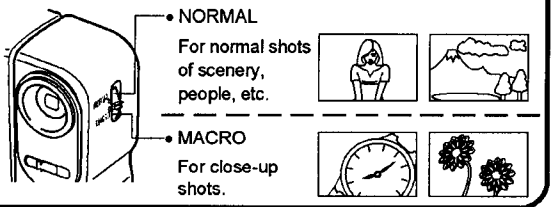
1. **Display the image you want to delete (page 19).**
2. **Press DEL.**
   - *The following steps are performed in accordance with prompts that appear on the LCD.*
3. **Press [+].**
4. **A message appears to confirm that you really want to delete the image.**
   - *To abort the delete operation without deleting anything, press DEL here.*
5. **Press the shutter button to delete the image shown on the LCD.**
6. **After you finish deleting all the images you want, press DEL to quit the delete procedure.**

Record Functions

The following describes features and functions that you can use when recording images.

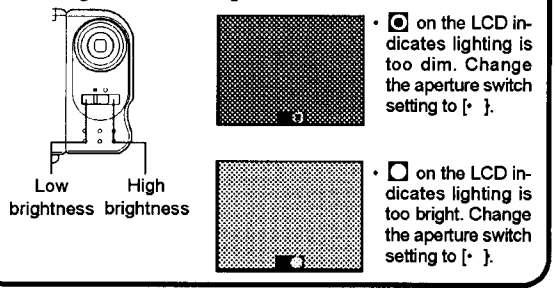
NORMAL/MACRO Switch (Page 40)

Select the setting that suits the distance between the camera and object whose image is being recorded.



Aperture Switch (Page 42)

Use this switch to select from one of two aperture settings and control the brightness of the image.



Exposure Adjustment (page 41)

The camera normally adjusts exposure automatically, using aperture priority AE. You can also perform manual exposure adjustments, while viewing the image on the LCD.

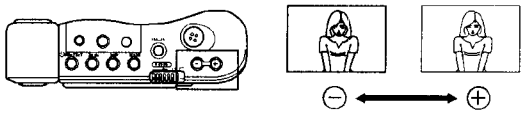
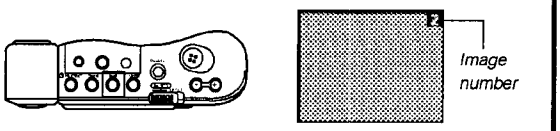


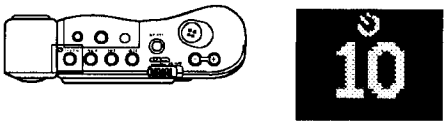
Image Number (Page 43)

This value indicates the number of the next image that will be recorded.



Self-Timer (Page 47)

Press a button and the shutter releases automatically 10 seconds later.

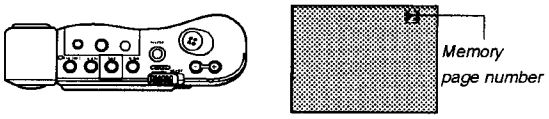


Playback Functions

The following functions help you view the images stored in memory quickly and easily.

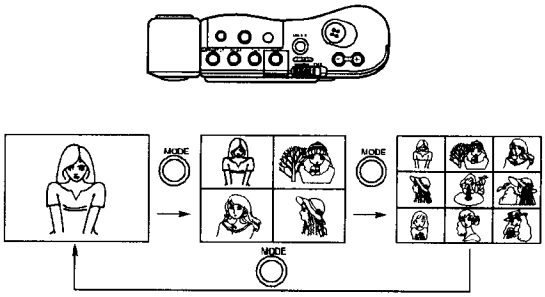
Memory Page Number (Page 52)

This value indicates the number of the memory page whose contents are currently shown on the LCD.



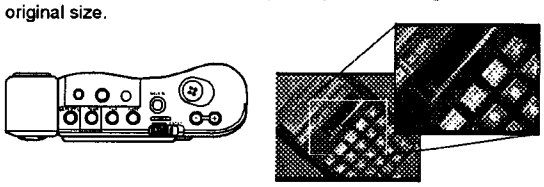
Multi-Page Display (Page 53)

This function lets you view four or nine memory pages at the same time.



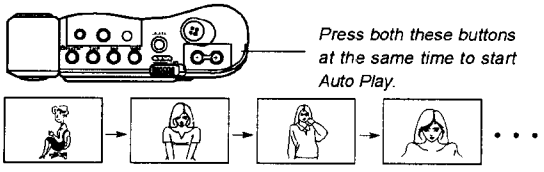
Zoom (Page 57)

This function lets you enlarge a specific part of an image to twice its original size.



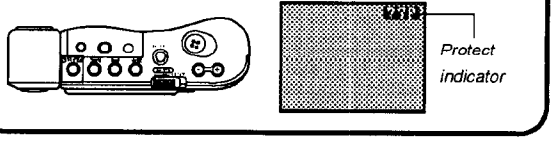
Auto Play (Page 59)

This function automatically scrolls through the camera's memory pages.



Protect Function (Page 67)

Use this function to protect specific memory pages against being deleted.



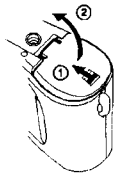
Power Supply

The QV-10 features a two-way power supply that lets you use either batteries (AA-size Alkaline) or household AC current.

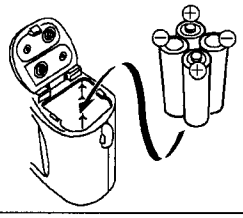
To load batteries

Be sure that camera power is turned off whenever loading or replacing batteries.

1. **Slide the battery compartment lock on the bottom of the camera in the direction indicated by arrow (1), and swing open the battery compartment cover as indicated by arrow (2).**



2. **Insert four batteries.**



Be sure to use only AA-size **Alkaline** batteries. Never use manganese batteries (see precautions on the next page).

- Make sure that the positive ⊕ and negative ⊖ ends of the batteries are facing correctly.

3. **Close the battery compartment cover.**



- Press down on the battery compartment cover at the point marked Ⓐ in the nearby illustration until the cover locks into place with a click.

Battery Handling Precautions

Incorrect use or handling of batteries can cause them to leak or burst and seriously damage your camera. Be sure to note the following important precautions to avoid problems with batteries.

⚠ Caution Never load manganese batteries into the camera! Doing so not only results in shortened battery life, it also causes batteries to generate heat that can cause serious damage to the camera. Always use Alkaline batteries only.

- Make sure that the positive ⊕ and negative ⊖ ends of the batteries are facing properly when you load them in the camera.
- Remove batteries from the camera if you do not plan to use it for more than two weeks.
- Never mix old batteries with new ones.
- Never recharge batteries, never allow direct connection between two ends of a battery, and never try to take batteries apart.
- Do not expose batteries to direct heat or dispose of them by burning. Doing so can create the danger of explosion.

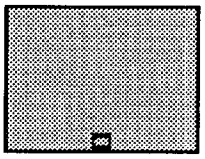
- Never mix batteries of different types.
- Dead batteries are susceptible to leakage, which can cause serious damage to your camera. Remove batteries from the camera as soon as you notice they are dead.

Standard Battery Life

You can generally expect to get about 120 minutes of operation from a fresh set of LR6 (AM3) Alkaline batteries at normal temperature. Note that battery life is shortened by extreme cold.

Low Battery Indicator

A low battery indicator (▬) appears on the LCD whenever remaining battery power drops below a certain level.



When this indicator appears, replace all four batteries with a fresh set of new ones. Once the low battery indicator appears, you can expect only about 10 more minutes of operation before total power failure.

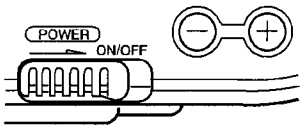
Flash Memory

The QV-10 features flash memory for storage of images. Flash memory does not require electrical power to store data, so image data is retained in memory even when you turn camera power off. If batteries go dead, simply load a set of new batteries or connect the AC adaptor and you will be able to view images in camera memory.

Auto Power Off

Power automatically turns off whenever you do not perform any camera operation for a period of time. Power turns off after about two minutes in the Record Mode or after about five minutes in the Playback Mode.

* To restore power, simply slide the POWER switch to the right as you normally do.



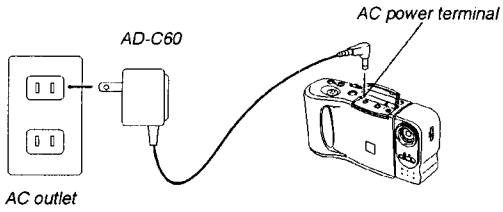
Important!

The Auto Power Off function does not operate under the following conditions.

- During Auto Play (page 59)
- When operations are being performed on a computer connected to the camera via the camera's DIGITAL terminal (page 81).

Using AC Power

To power the camera from standard AC power, use the AC adaptor (AD-C60) that comes with this camera.



Caution

AC Adaptor precautions

- Always be sure to use the AD-C60 AC adaptor only. Using any other AC adaptor can cause damage to the camera not covered by the warranty.
- When unplugging the AC adaptor from the wall socket, be sure to grasp the adaptor (not the cord).
- Avoid an undue bending, pulling, and twisting of the AC adaptor's cord, and never try to lengthen the cord by splicing it with other wire.

- If the power cord should become damaged (exposed wires, disconnection, etc.), please purchase a new AC adaptor. Use of a damaged power cord may cause fire or electrical shock.
- Be sure to switch power off before connecting or disconnecting the adaptor.
- Always turn camera power off before disconnecting the AC adaptor, even if the camera has batteries installed. It you don't the camera will turn off automatically when you disconnect the AC adaptor. Even so, you run the risk of damaging the camera whenever you disconnect the AC adaptor without first turning power off.
- The AC adaptor may become warm to the touch after extended periods of use. This is normal and is not cause for alarm.
- After use turn off the power switch of the camera and unplug adaptor from the AC outlet.

Operation

This section explains how to actually operate the camera. It includes information on adjustments you can make when recording an image, various formats you can use when viewing images stored in memory, and how to delete images from memory.

Recording Images 34
- To record an image 34
- How to avoid hand movement... 36
- Flourescent Lighting 36
- Infrared Light 37
- Changing the Lens Orientation 38
- NORMAL/MACRO Switch 40
- Exposure Adjustment 41
- Changing the Aperture Setting 42
- Record Mode Displays 43
- Using the Self-Timer 47

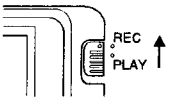
Playing Back Images 49
- Displaying Images on the Camera's LCD 49
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- Using Auto Play 59
- Protecting Memory Pages 67

Deletting Memory Pages 70
- To delete a single memory page 70
- To delete all unprotected memory pages 73

The following procedure provides the basic steps for recording an image.

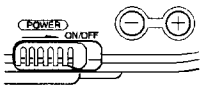
To record an image

1. Enter the Record Mode.



- Slide the function switch to the REC position.

2. Turn on the camera.



- Slide the POWER switch in the direction indicated by the arrow.
- The POWER switch automatically slides back to its original position when you release it.
- When power comes on, the image of the object that is in front of the camera's lens appears on the LCD.
- You can perform steps 1 and 2 in either order (1 then 2, or 2 then 1).

3. Set the NORMAL/MACRO switch to the NORMAL position.

- If the object whose image you are recording is about 15 centimeters from the lens (about 6 inches), set the NORMAL/MACRO switch to MACRO. See page 42 for details on using this switch.



Note

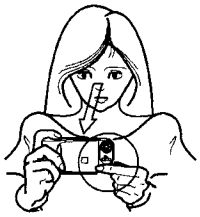
- The QV-10 is designed to refresh the image on the LCD about seven times per second. Because of this, you may experience a feeling of jerkiness in the changing image if you move the camera quickly. This is normal and does not indicate malfunction.

4. Record the image.

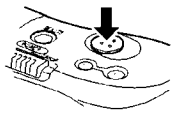
- Compose the image you want to record while viewing it on the LCD.
- It is best to look at the LCD directly, and not from an angle.



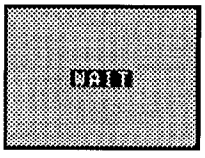
- Take care that your finger is not blocking the lens.



- When the image is situated on the LCD as you want it, press the shutter button.
- Press the shutter button lightly to avoid moving the camera. See page 36 for information on how to avoid hand movement.



- The message "WAIT" appears on the LCD for about four seconds along with the image that was recorded when you pressed the shutter button. You can use the camera to take the next picture after the "WAIT" message disappears.
- Here you could change the function switch to the PLAY position and view the image you just recorded.



⚠ Caution

- Never open the battery compartment cover, disconnect the AC adaptor from the camera or unplug it from the wall socket while the "WAIT" message is on the LCD. Doing so will not only make storage of the current image impossible, it can also corrupt other image data already stored in camera memory.

How to avoid hand movement...

Any hand movement when you press the shutter button can causes blurring of the recorded image. Note the following points on avoiding hand movement.

- Make sure there is no excessive movement of the image of the object on the LCD.
- Use a tripod whenever possible when recording images in dim lighting. The QV-10 automatically adjusts shutter speed in accordance with the brightness of the object whose image is being recorded. Shutter speed is quite slow for dimly lit objects, increasing the possibility of blurring caused by hand movement.

Fluorescent Lighting

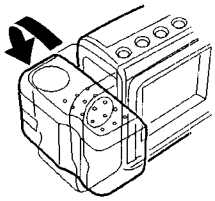
Fluorescent lighting actually flickers at a frequency that cannot be detected by the human eye. When using the camera indoors under such lighting, you may experience some brightness or color problems with recorded images. The actual extent of the problems depends on what cycle of the fluorescent light's flicker is occurring when the camera's shutter actually releases. Because of this, we recommend that you use incandescent lighting or some other non-fluorescent lighting whenever possible.

Infrared Light

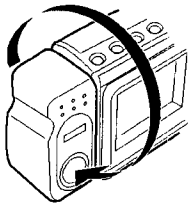
Infrared light generated by a flash or other source can create image color problems, such as red areas being recorded as green. Such color problems will show up in the LCD while you are composing the image.

Changing the Lens Orientation

The lens of the camera is built into a lens body that is designed to rotate. This means you can change the angle of the lens without moving the rest of the camera.

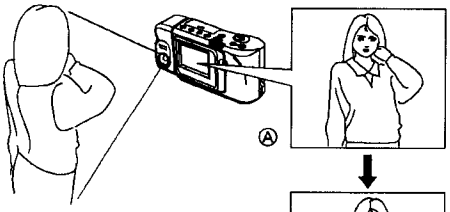


Rotates up to 90° towards the front



Rotates up to 180° towards the back

- Any images recorded while the lens body is rotated so the lens is pointed from the back of the camera are stored as mirror images of the image that appears in the LCD before the shutter button is pressed.



Ⓐ – **– LCD when shutter button is pressed (in the Record Mode)**

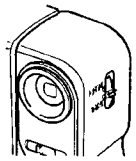
Ⓑ – **– LCD when image is played back from camera memory**

Important!

- Do not apply excessive force when rotating the lens body. Doing so can cause serious damage to the lens.
- Do not carry the camera or move it around while holding onto only the lens body.
- Return the lens body to its normal position (with the lens pointing from the front of the camera) before storing the camera.

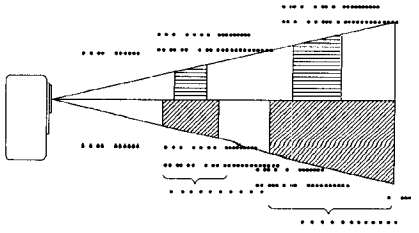
NORMAL/MACRO Switch

The NORMAL/MACRO switch tells the camera how much distance there will be between the lens and the object whose image you are recording. The following table describes the conditions covered by each switch setting.



Switch position		NORMAL	MACRO
Aperture	F2 (•)	0.6 to 3.1meters For portraits taken indoors	13 to 16cm For close ups taken indoors
	F8 (•)	0.3 meters to ∞ For general outdoor images	10 to 24 cm For outdoor close-ups

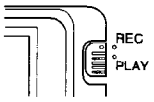
* See page 42 for details on how to change the aperture.



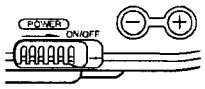
Exposure Adjustment

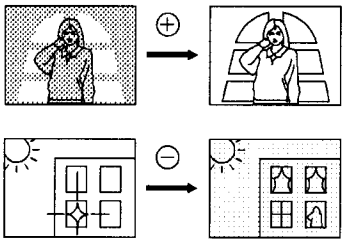
This camera features an automatic exposure (AE) function that automatically changes the shutter speed in accordance with lighting. In addition, you can also manually adjust the exposure to compensate for backlighting, indirect indoor lighting, dark backgrounds, and other special conditions.

To manually adjust the exposure



1. **Enter the Record Mode.**
   - Set the function switch to the REC position.
2. **Use the [+] and [–] buttons to manually adjust the exposure.**
   - Pressing [+] makes the image on the LCD brighter. Use it to adjust for dim indoor lighting and backlighting.
   - Pressing [–] makes the image on the LCD darker. Use it to adjust for bright sunlight.





3. **After adjusting the exposure, press the shutter button to record the image.**

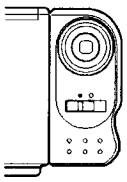
Notes

- Exposure adjustment is generally expressed in terms of an exposure adjustment value. The exposure adjustment value is always set to zero whenever you turn on the camera.
- The exposure adjustment value is changed by 0.25 with each press of [+] or [–]. The range of the value is -2 to +2.
- The exposure adjustment value automatically reverts to zero whenever the shutter button is pressed. To reset the exposure adjustment value to zero without pressing the shutter button, turn the camera off and on again, or change the position of the function switch to PLAY and then back to REC.

Changing the Aperture Setting

There are two aperture settings you can use to match lighting conditions. Use the aperture switch to change the aperture setting.

- Use the [•] (F8) setting to decrease exposure. This setting works best outdoors and with back lit images.
- Use the [•] (F2) setting to increase exposure. This setting works best indoors.



Note

- Also see page 45 for information about exposure warning indicators.

Record Mode Displays

The following provides details on the images, indicators and messages that appear on the LCD in the Record Mode.

Image Display

An image of the object that is picked up by the camera's lens appears on the LCD. The QV-10 is designed to refresh the image on the LCD about seven times per second. Because of this, you may experience a feeling of jerkiness in the changing image if you move the camera quickly. This is normal and does not indicate malfunction.

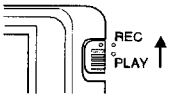
Note

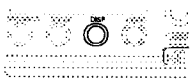
- The LCD image that appears in the Playback Mode is more detailed than the image produced in the Record Mode (page 49). Because of this, you should consider the Record Mode image to be a reasonable facsimile of the image that is actually stored in memory.

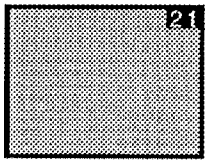
Displaying the Image Number

The image number is a value that indicates the number of the next image that will be recorded. Up to 96 images can be stored in camera memory.

1. **Enter the Record Mode.**
   - Set the function switch to the REC position.
2. **Press the DISP button.**







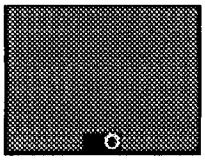
- The image number appears in the upper right corner of the LCD. It indicates the number of the next image that will be recorded. The number 21, for example, indicates that there are 20 images in memory, and the next image will be number 21.
- To clear the image number from the LCD, press the DISP button again.

Note

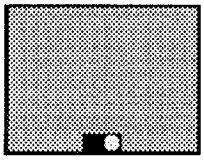
- Note that turning display of the image number on and off in the Record Mode also affects the display of the memory page number in the Playback Mode (page 52), and the zoom area indicator used in the zoom operation (page 57). If you turn display of the image number off in the Record Mode, for example, the memory page number will not be shown in the Playback Mode.

Exposure Warning Indicators

Exposure warning indicators appear on the LCD whenever the light being picked up by the lens would result in under exposure or over exposure of an image.



Under exposure



Over exposure

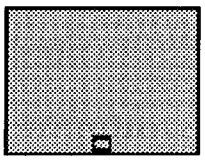
Use the procedure described on page 42 to change the aperture or change the lighting of the image so the indicator disappears from the LCD.

Important!

- The exposure warning indicators also appear when lighting is outside the range of the camera. In such a case, changing the aperture will not clear the indicator from the LCD.
- The manual exposure adjustment procedure (page 41) cannot be used when an exposure warning indicator is on the LCD. Clear the warning indicator by changing the aperture switch setting.

Low Battery Indicator

The low battery indicator (▬) appears on the LCD whenever remaining battery power drops below a certain level.



When this indicator appears, replace all four batteries with a fresh set of new ones. Once the low battery indicator appears, you can expect only about 10 more minutes of operation before total power failure.

• See page 25 for details on how to replace batteries.

Memory Full Message

The message "MEMORY FULL" appears on the LCD whenever you press the shutter button while camera memory is full.



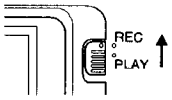
If you want to record more images, you must first delete some of the images already stored in camera memory. See page 70 for details on how to delete images.

Using the Self-Timer

With the Self-Timer, the shutter is released 10 seconds after you press the ⏲ /PROTECT button.

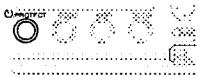
1. Enter the Record Mode.

- Set the function switch to the REC position.

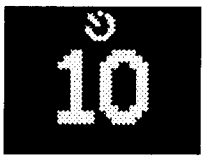


2. Start the Self-Timer operation.

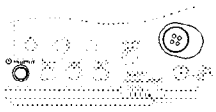
- Place the camera securely on a tripod, desk or other stable surface, with the image to be recorded in the LCD.



- After composing the image, press the ⏲ /PROTECT button.
- A 10-second countdown starts on the LCD. The shutter will release automatically when the end of the countdown is reached.



- To cancel on ongoing Self-Timer operation, press the ⏲ /PROTECT button or shutter button.



Note

- If you use the Self-Timer with the lens body rotate 180° (page 38), you can view the countdown on the LCD while waiting for the shutter to release.

Important!

- If battery power is low, camera power may turn off while a countdown is in progress. If this happens, replace the batteries with new ones.

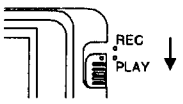
This section describes how to recall and view images stored in camera memory.

Displaying Images on the Camera's LCD

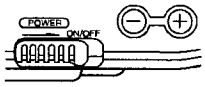
The QV-10 can store up to 96 images in memory. Images are sequentially numbered from 1 through 96. Think of camera memory like a 96-page album of the images you record.

The following procedure describes how to display images on the camera's built-in LCD.

1. **Enter the Playback Mode.**
   - Slide the function switch to the PLAY position.



2. **Turn on the camera.**
   - Slide the POWER switch in the direction indicated by the arrow. The POWER switch automatically slides back to its original position when you release it.
   - When power comes on, the page that was displayed when you last turned power off appears on the LCD.
   - You can perform steps 1 and 2 in either order (1 then 2, or 2 then 1).



3. **Scroll through the memory pages until the image you want to view is displayed.**
   - Press [+] to display the next memory page or [–] to display the previous memory page.



Notes

- If you set the function switch to PLAY after recording an image, that image appears on the LCD first.
- The message "MEMORY EMPTY" appears on the LCD if there are no images stored in memory when you enter the Playback Mode.

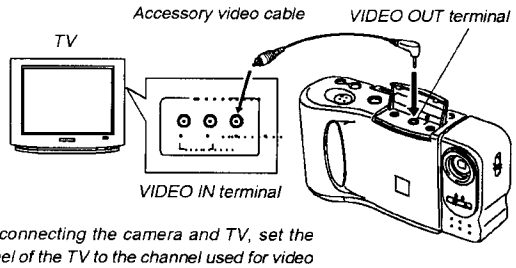


Displaying Images on a TV Screen

Use the special video cable that comes with the camera to connect the QV-10 to a television as illustrated below, and you can then view the images stored in camera memory on the TV's screen.

Important!

- The camera can be connected only to a TV that is equipped with a VIDEO IN terminal.
- Make sure that the power of both the camera and the TV are turned off when making connections.



After connecting the camera and TV, set the channel of the TV to the channel used for video input.

After connecting the camera and TV, use the same procedures as those described under "Displaying Images on the Camera's LCD" on page 49.

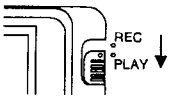
Important!

- Note that only images already stored in camera memory can be viewed on the TV screen. If you change to the camera's Record Mode, the image picked up by the camera's lens will not appear on the TV screen.

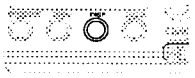
Displaying the Memory Page Number

The memory page number is a value in the upper right corner of the LCD that indicates the number of the currently shown memory page.

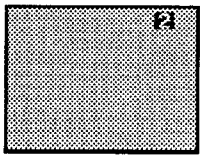
1. **Enter the Playback Mode.**
   - Set the function switch to the PLAY position.



2. **Press the DISP button.**



- The memory page number appears in the upper right corner of the LCD.



- To clear the memory page number from the LCD, press the DISP button again.

Notes

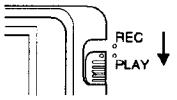
- The letter "P" next to the memory page number indicates that page is "protected" and cannot be deleted. See page 67 for details about protecting memory pages.
- Note that turning display of the memory page number on and off in the Playback Mode also affects the display of the image number in the Record Mode (page 43), and the zoom area indicator used in the zoom operation (page 58).

Producing a Multi-Page Display

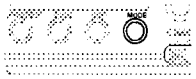
Four or nine memory pages can be displayed at the same time. This feature can be used to display multiple memory pages on the camera's built-in LCD, or on the screen of a connected TV.

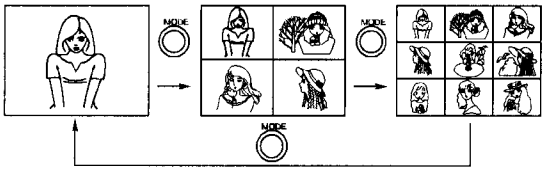
1. Enter the Playback Mode and turn on the camera.

2. Switch to multi-page display.



- Press the MODE button to change between the different display formats.
- Each press of MODE changes the display format in the following sequence.

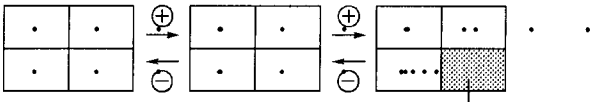




* *The memory page that is shown on the screen when you change to the 4-page or 9-page format is in the first (upper left) position in the multi-page display.*

3. Scroll through the pages on the display.

- Use [+] (forward) and [–] (back) to scroll through the memory pages. Pages are scrolled one, four, or nine at a time, depending on the display format you are using.



Unused pages are colored gray.

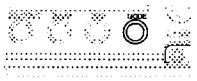
Note

- The brightness of the images on a multi-page display may differ slightly from the brightness when a single image is shown. This is because the camera automatically uses the brightness setting for the brightest image contained in the multi-page display for all of the images.

Selecting a Memory Page in a Multi-Page Display

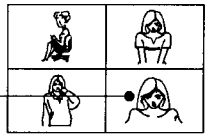
You can use the following procedure to select one of the memory pages in a multi-page display. Then when you return to the 1-page display, the memory page you selected will be the one displayed. The following procedure uses the 4-page display as an example, but you can use the same procedure with the 9-page display.

1. In the Playback Mode, press the MODE button.



- This changes to the 4-page display.

In this example, we will select this page.



2. Press the DISP button.

- This causes a white line to appear under the first (upper left) page. This white line indicates the memory page that is currently selected.
- If you do not perform any operation for about 10 seconds, the white line disappears from the display.



3. Move the white line to the memory page that you want to select.

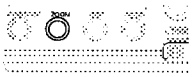
- Press [+] to move the line to the right or [–] to move it to the left. In this example, press [+] three times or [–] once.





4. Press the ZOOM button.

- The image in the selected memory page appears as a 1-page display.

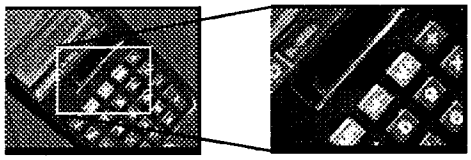




Using the Zoom Function

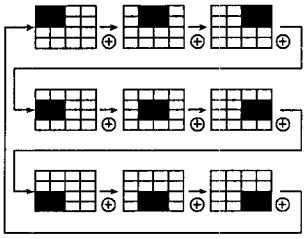
This function lets you select a specific part of a stored image and enlarge it to twice its normal size.

1. **Display an image.**
2. **Press the ZOOM button to zoom in on the center of the image.**
   - The center of the image is enlarged to twice its normal size.



3. **Change the position of the zoom area.**
   - You can use [+] and [–] to change the position of the zoom area in the sequence shown on page 58.
4. **Press the ZOOM button again to return the image to its original size.**

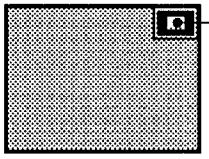
Changing the Location of the Zoom Area



- Pressing [–] moves the zoom area in the opposite direction.

Notes

- If the page number is displayed in the upper right corner of the screen when you perform a zoom operation, the number is replaced by a zoom area indicator. This indicator shows you what part of the image is currently enlarged on the display. You can turn the zoom area indicator on and off by pressing the DISP button.



- Note that turning display of the zoom area indicator on and off during a zoom operation also affects the display of the image number in the Record Mode (page 52), and the memory page number in the Playback Mode (page 43).

Using Auto Play

Auto play lets you automatically scroll through the camera's memory pages quickly and easily. You can specify the speed of the scroll, the display format (1-page, 4-page, or 9-page), and the range of pages to be included in the scroll operation.

Important!

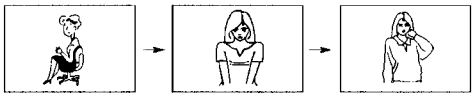
- The camera's Auto Power Off function (page 29) does not function while an auto play operation is in progress. If you forget to turn the camera off, there is the danger that auto play will continue until batteries are dead. To avoid this, make sure that you stop the auto play operation and turn the camera off when you finish viewing.

To start the auto play operation

1. **Enter the Playback Mode and turn on the camera.**
2. **Start the auto play operation.**
   - Hold down the [+] and [–] buttons until the message "AUTO PLAY START" appears.
   - There must be at least two images (two pages) recorded in memory to use the auto play operation. Otherwise, the "AUTO PLAY START" message will not appear on the display.

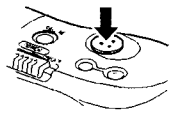


   - After about one second, this message disappears and the auto play operation starts.



   - Auto play continues to loop through the memory pages. This means that when it reaches the last page, it starts again from the first page.

3. **Press the shutter button to stop the auto play operation.**
   - Pressing any button except the MODE button stops the auto play operation.
   - Note that the buttons of the camera do not operate while a page change operation is in progress. Make sure that an image is shown on the display when you press a button to stop the auto play operation.



Other Auto Play Features

When using auto play, you can specify the speed of the scroll, the display format (1-page, 4-page, or 9-page), and the range of pages to be included in the scroll operation.

Accessing Auto Play Features

You can call up screens for control of auto play features by pressing the MODE button while an auto play operation is in progress.

1. **Enter the Playback Mode and turn on the camera.**
2. **Start the auto play operation.**
3. **Press the MODE button to display the screen for the auto play feature you want to use.**
   - Each press of MODE changes the screen in the following sequence.



Speed Setting



Display Format



Page Range

   - Make sure that there is an image shown and that a page change operation is not in progress when you press MODE.

4. **After you make the settings you want, press the shutter button to start the auto play operation.**
   - To abort the auto play feature setting procedure without changing anything, turn the camera off and on again, or change the position of the function switch to REC and then back to PLAY.

To set the auto play speed

1. **Display the auto play speed screen.**



Indicates the number of seconds between page changes.

   - See page 61 for information on how to display auto play feature screens.

2. **Use [+] (increase) and [–] (decrease) to change the auto play speed setting.**



   - You can set the auto play speed in 3-second increments, in the range of 3 to 30.

3. **After you are finished setting the auto play speed, you can use MODE to change to another screen or press the shutter button to start the auto play operation.**

To specify the display format

1. **Display the display format screen.**



   - See page 61 for information on how to display auto play feature screens.

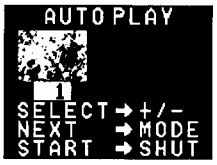
2. **The highlighted display format is the one that is currently selected. Use [+] (right) and [–] (left) to change the display format selection.**



3. **After you are finished setting the display format, you can use MODE to change to another screen or press the shutter button to start the auto play operation.**

To specify the page range

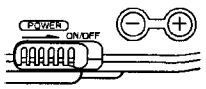
1. **Display the page range screen.**
   - See page 61 for information on how to display auto play feature screens.



Indicates the starting page number.

   - For the starting page number, the page range screen shows either page 1 or the last page number you specified.

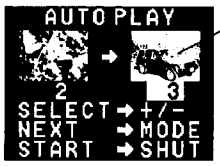
2. **Use [+] (increase) and [–] (decrease) to change the starting page number.**





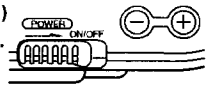
3. **Press the MODE button to change to display the current ending page number setting.**

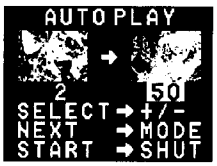




The ending page is automatically set as the page following the starting page you specify.

4. **Use [+] (increase) and [–] (decrease) to change the ending page number.**

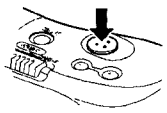




Important!

- Be sure to specify an ending page number. If you do not change the ending page number in step 4, the starting page specification you made will also be ignored. This means that the auto play operation will be performed using the page range settings that were in effect before you started this procedure.

5. **After you are finished setting the page range, you can use MODE to change to another screen or press the shutter button to start the auto play operation.**



Note

- If the starting page you specify for the page range comes after the ending page (if you specify 12 as the starting page and 2 for the ending page, for example), the auto play operation will be performed in reverse order (from 12 to 2).
- An auto play page range specification is automatically cancelled whenever you delete an image from memory (page 70). This is true regardless of whether the deleted image is inside or outside of the page range. Following deletion of an image, auto play will display all pages starting with page 1 and ending with the last page that contains an image.

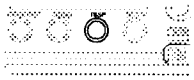
Protecting Memory Pages

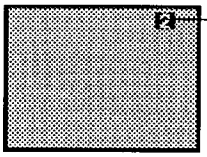
You can protect specific memory pages to ensure that they are not accidently deleted.

To protect a page

1. **Enter the Playback Mode and turn on the camera.**

- Slide the function switch to the PLAY position.
- Slide the POWER switch in the direction indicated by the arrow.
- If the page number is not shown in the upper right of the page, press DISP.

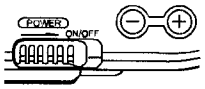


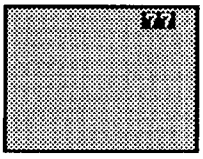


Page number

2. **Scroll through the memory pages until the one you want to protect is displayed.**

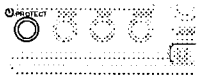
- Press [+] to display the next memory page or [–] to display the previous memory page.

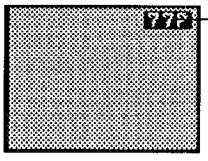




3. **Protect the page.**

- Press the /PROTECT button to protect the page.
- The letter "P" appears to the right of the page number to indicate that page is protected.





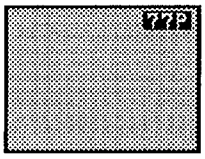
Protect indicator

Note

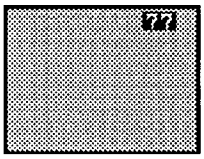
- If the page number is not displayed when you press the /PROTECT button, the page number along the protect indicator appears about a second after you press the button.

To unprotect a page

1. **Enter the Playback Mode and turn on the camera.**
2. **Scroll through the memory pages until the one you want to unprotect is displayed.**



3. **Press the ⏲ /PROTECT button.**
   - The letter "P" disappears, indicating that page is no longer protected.



Note

- If the page number is not displayed when you press the ⏲ /PROTECT button, the page number appears about a second after you press the button.

Deleting Memory Pages

Use the procedures described in this section to delete memory pages. You can delete individual pages, or all the pages currently stored in memory.

Warning!

The delete operation cannot be undone!

Before performing any of the procedures described in this section, make sure that you really do not need the images recorded on the memory pages you are deleting. Be especially careful when you are using the all delete operation.

To delete a single memory page

1. **Enter the Playback Mode and turn on the camera.**
   - Slide the function switch to the PLAY position.
   - Slide the POWER switch in the direction indicated by the arrow.
2. **Scroll through the memory pages until the one want to delete is displayed.**
   - Press [+] to display the next memory page or [–] to display the previous memory page.
   - Remember that you cannot delete a protected page. If the page you want to delete is protected, use the procedure on page 69 to unprotect it before proceeding.

3. **Press DEL.**

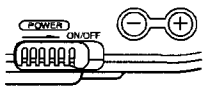


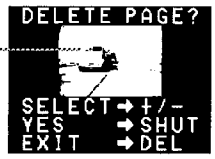


One-page delete
All page delete
Exit this screen

** This screen clears automatically from the display if you do not perform any operation for about 30 seconds.*

4. **Press the [+] button to specify deletion of a single page.**
   - If the page you selected in step 2 is protected, the contents of the nearest unprotected page appear in the above screen.





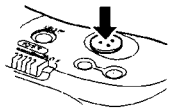
The contents of the memory page you displayed in step 2 appear here.

** This screen clears automatically from the display if you do not perform any operation for about 30 seconds.*

5. **Make sure that you really want to delete the page that contains the contents shown on the display.**
   - You can use [+] and [–] to change the memory page. When you do, protected pages are skipped (not displayed).

- To abort the delete operation without deleting anything, press DEL.

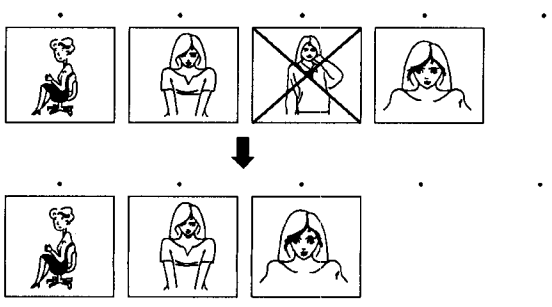
6. **To delete the page whose contents are shown, press the shutter button.**
   - Pressing the shutter button deletes the page you selected and displays the next page.



7. **Repeat steps 5 and 6 as many times as you want to delete memory pages.**
   - After you are finished deleting pages, press DEL to exit the delete operation.

Note

- Deleting a page causes the remaining pages to be renumbered. Blank pages are not left inserted between non-blank pages.



To delete all unprotected memory pages

1. **Enter the Playback Mode and turn on the camera.**

2. **Press DEL.**

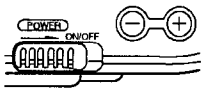




One-page delete
All page delete
Exit this screen

** This screen clears automatically from the display if you do not perform any operation for about 30 seconds.*

3. **Press the [–] button to specify deletion of all unprotected pages.**
   - To abort the delete operation without deleting anything, press DEL.





** This screen clears automatically from the display if you do not perform any operation for about 30 seconds.*

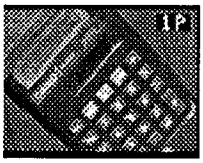
Warning!

The following operation deletes all unprotected memory pages and cannot be undone. Make sure that you do not need any of the images stored in memory before performing this operation.

4. **To delete all unprotected pages, press the shutter button.**
   - If there were no protected pages in memory, the message "MEMORY EMPTY" appears on the display after all memory pages are deleted.



   - If there were protected pages in memory, they are the only pages that remain after the delete operation is complete.



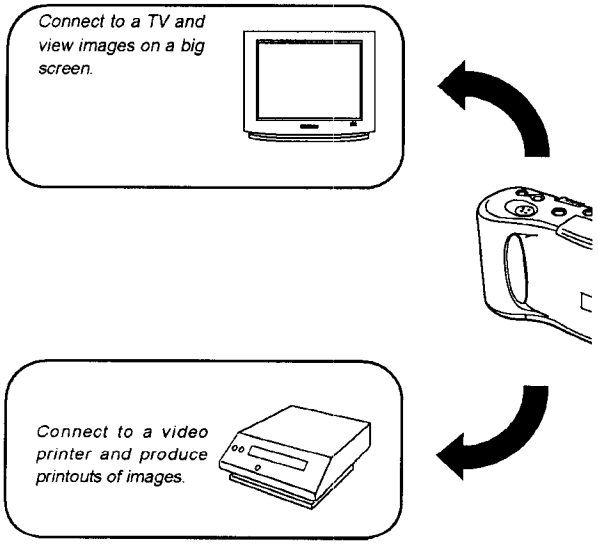
Connecting to Other Devices

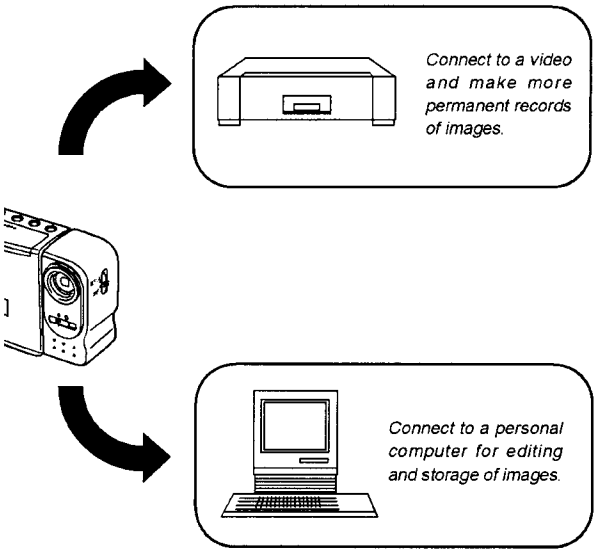
This part of the manual provides details about connecting to televisions, video tape decks, personal computers, and other devices. Be sure to read the information presented here before connecting to any other device.

Connection Guide 76
QV-10 Terminals 78
Using the QV-10 with a Connected Device 79
Television 79
Video Tape Deck 79
Video Printer 80
Video Phone 81
Computer (Using special cable and software) 81
Computer (Video Capture) 82

Connection Guide

The QV-10 is equipped with two terminals for connection to other devices: VIDEO OUT and DIGITAL.

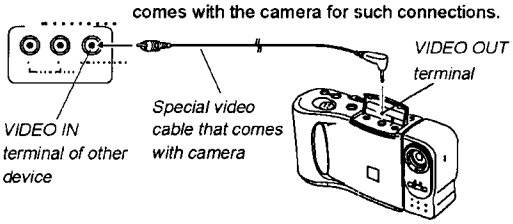




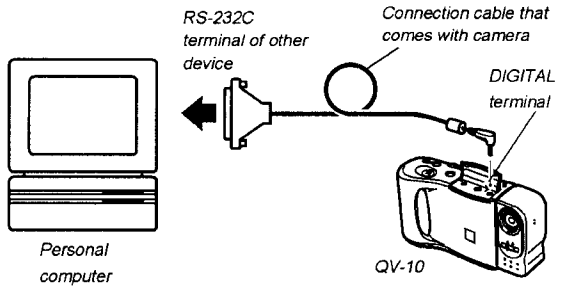
QV-10 Terminals

The following describes which QV-10 terminal you should use for each type of connection.

VIDEO OUT – Use this terminal when connecting to the VIDEO IN terminal of a TV, video tape deck, video printer, or other similar device. Use the special video cable that comes with the camera for such connections.



DIGITAL – Use this terminal when connecting to a personal computer. Note that connection with a personal computer requires a personal computer connection kit.



Using the QV-10 with Different Connected Devices

The following section provides specific information on how you can use the QV-10 after connecting to various types of devices. In each case, the QV-10 terminal you should connect to is indicated in the title as VIDEO and DIGITAL.

Important!

- Make sure that the power of all devices is turned off before connecting them.
- You should also check the owner's manuals of the device you are connecting to the camera for precautions and other information.

Television VIDEO

- See page 51 of this manual for details about connecting to a television and displaying images from camera memory on a TV screen.

Video Tape Deck VIDEO

You can use the video tape deck to record images from the QV-10.

To record QV-10 images on video tape

1. Use the special video cable that comes with the camera to connect to the VIDEO IN terminal of the video tape deck.
2. Set up the video tape deck to record images input through its VIDEO IN terminal.
- Consult the owner's guide that comes with the tape deck for details about how to set up for recording.
3. Enter the QV-10 Playback Mode (page 49) and start the video deck record operation.
- It is probably best to use auto play (page 59) when recording QV-10 images to video tape, because it changes pages automatically at a preset speed.

- Page numbers (page 52) are also recorded on the video tape if they are turned on. Be sure to turn off display of page numbers if you do not want them in the taped images.
- If the low battery indicator (page 28) is displayed while you are recording to video tape, it will also be recorded with the image. If this happens, either replace batteries or use the AC adaptor.

Video Printer VIDEO

You can use Video Printer to print copies of images in QV-10 memory.

To print QV-10 images on a Video Printer

1. Use the special video cable that comes with the camera to connect to the VIDEO IN terminal of the video printer.
2. Set up the video printer to print images input through its VIDEO IN terminal.
- Consult the owner's guide that comes with the video printer for details about how to set up for printing.
3. Enter the QV-10 Playback Mode (page 49) and display the image you want to print.
4. Start the video printer's print operation.
- Page numbers (page 52) are also included on the print if they are turned on. Be sure to turn off display of page numbers if you do not want them in the print.
- If the low battery indicator (page 28) is displayed while you are printing, it will also be printed with the image. If this happens, either replace batteries or use the AC adaptor.

Computer (Using special cable and software) DIGITAL

This package includes special software (two versions, for Windows and the Macintosh) and a special cable that allow you to transfer images from the QV-10 to a personal computer. Images are transferred as digital data, which ensures minimum loss of image quality.

Certain requirements concerning your computer model and its operating system must be met to use the special software that comes in this package. For details, see the Owner's Manual that comes with the Connection Kit.

Note:You can also connect directly to a computer that has video capture capabilities (page 82).

Computer (Video Capture) VIDEO

You can use the special video cable that comes with the QV-10 to connect directly to the VIDEO IN terminal of a personal computer equipped with video capture capabilities.

To transfer QV-10 images to a personal computer (video capture)

1. Use the special video cable that comes with the camera to connect to the VIDEO IN terminal of the computer.
2. Enter the QV-10 Playback Mode (page 49) and display the image you want to send.
3. Perform the required operation on the computer.

• Consult the owner's guide that comes with the computer or its video capture board for details about how to set up to capture images.

Important!

• With this configuration, you cannot send images from the personal computer to the QV-10.

• The QV-10 can be connected directly to a personal computer or video capture board that is equipped with a VIDEO IN terminal (RCA pin jack). It cannot be connected directly to an S-VIDEO terminal.

Reference

This part of the manual contains information on troubleshooting, available accessories, specifications, and other information you may need to reference only occasionally.

Troubleshooting... 84
Specifications 88
About the camera's backlight 89

Troubleshooting

	Symptom	Probable Cause	Action
Power Supply	No power	1. Batteries not loaded correctly. 2. Dead batteries 3. Wrong AC adaptor	1. Correctly load batteries (page 25). 2. Replace batteries with new ones (page 25). 3. Use only recommended AC adaptor (AD-C60).
	Sudden power failure	1. Operation of Auto Power Off 2. Low battery power Use of manganese batteries	1. Turn power back on. 2. Replace batteries with new ones (page 25). Replace manganese batteries with alkaline batteries.
	indicator on LCD	Low battery power	Replace batteries (page 25).
Recording	No recording when shutter button is pressed	Function switch set to PLAY	Set function switch to REC.
	Power failure during self-timer operation	Low battery power	Replace batteries (page 25).
	indicator on LCD	Over exposure	Change aperture switch setting to [•] (page 42).
	indicator on LCD	Under exposure	Change aperture switch setting to [•] (page 42).

	Sympton	Probable Cause	Action
Recording	Poor LCD image focus	Incorrect NORMAL/ MACRO switch setting	Use NORMAL for scenery and group photos, and MACRO for close-ups (page 40).
	Poor color and brightness when indoors	Indoor fluorescent lighting	Shoot under incandescent or other non-fluorescent lighting (page 36).
Playback	Color of recorded image is strange.	1. Reflection from sunlight or light from another source 2. Difference between Record Mode and Playback Mode characteristics.	1. Reorient the camera so that light is not shining directly into lens. 2. This difference does not indicate a problem or malfunction.
	No [+]/[–] button operation during multi-page display	Button operation during page change	Wait until an image is on the LCD before performing a button operation.
	Cannot start auto play operation	Only one image in memory	Auto play can be used only when there are two or more images in camera memory.
	All pages do not appear during auto play	Auto play page range specification	Change the auto play page range specification to include the pages you want to view.

	Sympton	Probable Cause	Action
Playback	No display of image on connected TV screen	1. Function switch set to REC 2. Incorrect connection 3. Wrong TV channel	1. Set the function switch to PLAY. 2. Use the special video cable that comes with the camera and connect correctly (page 51). 3. Set the TV to the correct channel. See the TV's owner's manual for details.
Deletion	Delete operation does not start when DEL is pressed	1. All pages are protected 2. Multi-page display (page 00) or zoom display (page 00)	1. Unprotect the page you want to delete (page 69). 2. Change to a normal-size, 1-page display format.
Other	All buttons and switches do not operate	Malfunction due to static electrical charge or strong impact	Remove batteries and disconnect the AC adaptor if you are using one. Restore power and turn the camera on. If this does not work, contact your dealer or an authorized CASIO service provider.
	Very bright or very dark LCD image	Wrong BRIGHT setting	Adjust the BRIGHT setting (page 16).

Messages

MEMORY FULL	All 96 memory pages are used. Pages must be deleted (page 70) before further recording is possible.
MEMORY EMPTY	No images are stored in memory.
MEMORY ERROR CALL TECH SUPPORT	Problem with internal memory. Contact your dealer or an authorized CASIO service provider.

General

Recording System ... Digital (JPEG based)/Field recording
Signal System ..... NTSC
Recording Medium .. Built-in 16-Mbit flash memory
Number of Pages 96
Delete Functions ..... Single page; All pages (with page protect feature)
Imaging Device ..... 1/5-inch CCD (Total Number of Pixels: 250,000)
Lens ..... Fixed focus with macro position; F2/f = 5.2mm
Aperture ..... F2/F8 manual switching
Focal Length ..... F2/NORMAL :60cm to 310cm;
F2/MACRO :13cm to 16cm
F8/NORMAL :28cm to ∞;
F8/MACRO :10cm to 24cm
(from lens protection filter)
Light Metering ..... TTL center point by photographic element
Exposure Metering .. Aperture priority AE
Exposure Range ..... EV +5 to 18
Exposure Adjustment .. -2EV to +2EV
Shutter System ..... Electronic
Shutter Speed ..... 1/8 to 1/4000 second
White Balance ..... Automatic
Self-timer 10-second
Monitor ..... 61,380-pixel 1.8-inch TFT low-glare color LCD; doubles as finder
Terminals ..... DIGITAL; VIDEO OUT; DC IN 6V
Power Supply ..... Batteries (AA-size Alkaline batteries X 4)/AC Adaptor (AD-C60)
Battery Life ..... Approximately 120 minutes
Dimensions ..... 66(H) X 130(W) X 40(D)mm /
2.6" (H) X 5.12" (W) X 1.6" (D)
Weight ..... Approximately 190g / 6.7oz (excluding batteries)

Accessories ..... Wrist strap; soft case; special video cable; AC adaptor (AD-C60) Alkaline batteries (LR6 X 4); cleaning cloth; owner's manual; personal computer connection kit

- The liquid crystal panel built into this camera is the product of precision engineering, with an effective pixel rate of 99.99%. This also means, however that 0.01% of the pixels can be expected to fail to light or to remain lit at all times.

About the camera's backlight

- The camera is equipped with a fluorescent light source to provide the back lighting for its LCD.
- The normal service life of the backlight is approximately six years, when the camera is used for about two hours a day.
- Should the LCD image appear abnormally dark, take the camera to your dealer or an authorized CASIO service provider to have the light source replaced. Note that you will be charged for this replacement.
- Under very cold conditions, the backlight may require more time than normal to light, or reddish bands may appear in the image. These conditions do not indicate malfunction, and normal operation should return at higher temperatures.

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

CASIO INC. Plaintiff, v. PAPST LICENSING GMBH & CO. KG Defendant.	Civil Action No. 1:06 CV 01751 Judge: Gladys Kessler Magistrate: Deborah A. Robinson
PAPST LICENSING GMBH & CO. KG Counter-Plaintiff v. CASIO INC. and CASIO COMPUTER CO., LTD. Counter-Defendants.	

CASIO INC.'S SUPPLEMENTAL OBJECTIONS AND RESPONSES TO PAPST LICENSING GMBH & CO. KG'S FIRST SET OF INTERROGATORIES TO CASIO INC.

Pursuant to Rule 33 of the Federal Rules of Civil Procedure, Plaintiff /Counter-Defendant, Casio Inc., through counsel, hereby provides a supplemental response to Papst's First Set of Interrogatories.

GENERAL OBJECTIONS

The General Objections and Objections to Instructions and Definitions provided in Casio's initial response to these interrogatories are incorporated by reference.

EXHIBIT G

PAPST'S INTERROGATORIES

INTERROGATORY NO. 1: Describe in full and complete detail how each Casio Digital Camera does not infringe each of the Patents-in-Suit.

OBJECTIONS:

Casio Inc. objects to the deceptive nature in which this interrogatory was written. Stating the interrogatory in this manner, and "defining" it to be wildly overbroad and to request information not even remotely related to the request as written, is an obvious attempt to deceive Casio Inc. into inadvertently waiving objections, or dupe the Court into thinking that Papst is being reasonable in its requests. The request violates Federal Rule 26(g) as "defined" in the Papst instructions, and Papst is hereby put on notice that, in the event this interrogatory is ever brought before the Court, the full overbroad scope of what Papst seeks must be shown to the Court, including the deceptive manner in which Papst attempted to get that information.

Casio Inc. objects to the definition provided to this interrogatory, as overbroad, unduly burdensome, calling for irrelevant information not reasonably calculated to lead to the discovery of admissible information, as calling for information that is subject to the attorney client privilege, work product, or other immunity, and calls for disclosure of confidential information to Welsh & Katz. Casio will respond only by considering the actual interrogatory recited above, and will provide information only for the first independent claims of the patents as Papst has to date refused to (or has been unable to) explain how the Casio cameras supposedly infringe on these patents, and has not identified any allegedly infringed claims. Casio will only address the claim elements that are missing, not every claim element, and Casio will provide reasonable detail on the reasons for non-infringement. All other requests are overly broad, unduly burdensome, call for information that is irrelevant and not reasonably calculated to lead to the discovery of admissible evidence.

Casio reserves its right to supplement this response as the case proceeds, including but not limited to supplementation after the Court construes the claims, or upon learning Papst's proposed constructions and contentions which, to date, Papst has been unable to provide.

Casio objects to this Interrogatory as improperly being characterized as one interrogatory because its many subparts constitute separate interrogatories. See Fed. R. Civ. P. 33(a).

Subject to its general and specific objections, Casio responds as follows.

FIRST RESPONSE

Casio's cameras do not infringe Papst's patents because Casio's cameras do not meet every claim limitation either literally or under the doctrine of equivalents when comparing the properly construed claims to the accused products. At least the following claim elements are missing from Casio's cameras. Citations in this section are to the '399 patent, but as the '449 patent has the same specification, the support can equally be found in that patent and Casio will rely on the specifications of both patents.

Interface device

No Casio Digital Camera has the required limitation of an "interface device" as that term is properly construed. Both patents teach an interface device that is separate from the transmit/receive ("T/R") device. For example, the '399 patent states at 8:23-33: "In the interface device according to the present invention, an enormous advantage is to be gained . . . in separating the actual hardware . . . [which] allows a plurality of dissimilar device types. . . .". Similarly, at 1:55-64, the patent discusses different uses of the interface, e.g., a "large number of applications," and it refers to "any data transmit/receive devices which can be attached to the second connecting device. . . ." (7:41-43). The patents also state that "the interface device according to the present invention . . . [can be used] as an interface between a host device and almost any data transmit/receive device" ('399 patent, 7:45-49).

The patent claims also clearly require that the interface be separate from the transmit/receive device. See, for example, the language that requires connecting devices for interfacing them, and the language that requires the host to ask what type of device is "attached" to the interface, and requires the interface device to send a signal to the host "regardless of the type of the data transmit/receive device attached." Thus, the claim language itself makes the ability of a transmit/receive device to "attach" very clear, particularly when considered in light of the specification noted above.

The patents distinguish prior art devices with specific drivers for specific transmit/receive devices. See, e.g ., '399 patent at 1:20-34. They also teach that the interface must be "flexible to permit attachment of very different electrical or electronic systems to a host device by means of the interface...." Id. At 1:56-60. Every embodiment disclosed in the patents has a separate interface device, and there is inadequate support under 35 U.S.C. 112 for anything but a separate interface device.

All these teachings are inconsistent with an analysis that has the interface device be a selected group of components within the camera itself. This concept runs through both patents and there is never any indication that the applicants had anything in mind other than a separate structure for the interface.

As with all missing claim elements, it is very difficult for Casio to try to explain why there is no infringement by equivalents, as Papst has been unable to provide even a literal infringement analysis, let alone an analysis by equivalents. However, it is clear that any attempt to read this interface limitation and the related language of the claim requiring that devices "attach" to the interface would improperly vitiate this claim language. Moreover, there are clearly very substantial differences in the Casio products and the claimed structure. Indeed, the "enormous advantage" taught by the patents themselves, and the "flexible" nature of the claimed structure are completely missing in the Casio cameras. And given that prior art was distinguished on this ground, no reasonable equivalents analysis could capture the Casio cameras. Casio reserves its right to supplement this response, should Papst ever be able to provide a realistic infringement analysis.

Data transmit/receive device

No Casio Digital Camera has the required limitation of a "data transmit/receive device" ("T/R device") as that term is properly construed. A T/R device would be understood by a person of ordinary skill in the art to mean a device that transmits and receives information in the

same form. Thus, the CCD identified by Papst as the T/R device could not possibly meet this limitation, as it converts light into an electrical signal – a completely different form of data.

If the patentee had meant that different types of data could be transmitted and received, the claim could have said "a transmit device and a receive device" and these could have transmitted and received different types of data. A data/transmit device is not a device for converting data from one form to another, as is the CCD of the Casio cameras.

With regard to equivalents, this required element is completely missing, and thus any attempt to capture the Casio products under the doctrine of equivalents would improperly vitiate these claim terms in their entirety. It is clear that the Casio CCD functions in a substantially different way, and achieves a different result. Casio has no idea how Papst intends to try to use the doctrine of equivalents to eviscerate this claim limitation, or even if Papst will continue to believe the CCD meets this limitation, and so reserves its right to supplement this response should Papst ever attempt to make such an argument.

Communication between

Further, because Casio's Digital Cameras lack the required limitation that there be a communication between the lens/CCD and host, Casio does not infringe any claim of the '399 or '449 patents.

The "communication between" limitation is part of every claim of the '399 and '449 patents. When properly construed, the T/R device and host must have two-way communication, not just data transfer from one to the other. The word "between" requires two-way communication, and later language in the claims uses the words "from" and "to" showing a contrast with the "between" language used for this communication. *Cf. e.g.*, "a data request command from the host device to the type of input/output device..." and "transfer of the digital data to the host device." This language also shows that communication between the host and T/R device must be bi-directional (commands from the host and data transfer from the T/R device, i.e., if the host requests the data, the T/R device must be able to send data in response thereto). There must be an interchange or exchange of data, as claimed and as plainly taught in the specification. *See, e.g.*, the abstract ("communication between"); '399, 1:9-14 (distinguishing data acquisition and two-way communication).

The lens/CCD of the Casio cameras (which counsel for Papst has alleged to be the T/R device) never receives data from the computer, and in fact, that lens/CCD is not functional at all when the camera is connected to the computer. The only communication with the computer is a communication between the computer and the camera memory, the computer never "communicates" with the lens/CCD.

Even if "communication between" is construed to not require two-way communication, the Casio lens/CCD combination does not communicate at all with the host computer. Rather, the lens/CCD merely sends data to the Analog to Digital ("A/D") converter, and that data is stored in the camera memory. When the camera is attached to the computer, the computer collects information directly from the camera memory. The lens/CCD is not involved in the function of communicating with the computer. The '399 patent, at column 5, lines 47-63, discusses first that data must be "acquired, and transferred to the host device," and in the very next sentence distinguishes that from communication: "The data transmit/receive device itself can also communicate actively with the host device." The communication is described as something different from an intermediate memory merely storing and then sending on data to the

host, and it requires, as the claims state, actual communication between the T/R device and the host computer. See also, 6:55-68 (the host computer user reading data "from the data transmit/receive device . . ." and discussing the interface function of transferring data "from the data transmit/receive device . . . to the host device . . . ."). The patents distinguish the claimed communication between the host and T/R device from "communication between the host device and interface device" ('399 patent, at 7:14-15).

With regard to equivalents, this required element is completely missing, and thus any attempt to capture the Casio products under the doctrine of equivalents would improperly vitiate these claim terms in their entirety. Moreover, the Casio products function in a substantially different way, in that the cameras do not perform a function that is substantially the same as bi-directional communication. Rather, communication cannot take place between the host device and the imaging portion of the camera. Casio does not know how, if at all, Papst intends to try to use the doctrine of equivalents to eviscerate this claim limitation, and so reserves its right to supplement this response should Papst ever attempt to make such an argument.

Configured by the processor and memory

Even assuming that the Casio CPU and memory are part of an "interface device" as counsel for Papst has asserted, the interpreters in that alleged interface are certainly not configured "by" the processor and memory as expressly required by the claims. The "interpreters" in that alleged interface, to the extent they can even be argued to exist, are software. This software is simply loaded into the memory. The Casio processor has nothing to do with that operation. The memory of the Casio cameras also do not "configure" this in any way, but merely store the software.

The requirement that the interface device interpreters be configured by the processor and memory is not only clear from the claim language, but also from the specification. *See, e.g.*, '399 patent, 3:36-47, 3:58-67, 4:65-5:6.

With regard to equivalents, this required element is completely missing, and thus any attempt to capture the Casio products under the doctrine of equivalents would improperly vitiate these claim terms in their entirety. Moreover, the Casio products function in a substantially different way, in that the processor and memory do nothing to configure as required by the claims, and instead software is simply loaded into the Casio cameras. The prosecution history also provides guidance. *See e.g.*, March 18, 2002 Response to Office Action. Casio has no idea how Papst intends to try to use the doctrine of equivalents to eviscerate this claim limitation, and so reserves its right to supplement this response should Papst ever attempt to make such an argument.

Input/output device customary in a host device, regardless of the device attached

Further, no claim of the '399 patent nor the '449 patent are infringed by Casio because no Casio Digital Camera has the required limitation of an "input/output device customary in a host device," as that term is properly construed. The claims require that the first command interpreter send a signal to the host that it is an "input/output device customary in a host device." The Casio camera signals that it is a Casio camera, not a device "customary in a host device," and it does not provide this information "regardless" of "the device attached".

The patent specification clearly supports the plain and ordinary meaning. *See, e.g.,* Abstract (regardless of the device attached); '399 patent, 3:36-47; 3:59-67, 4:8-20, 4:60-5:6; 6:19-22.

The claims and the file history both require that the interface device "lie" to the host computer about the real nature of the device. Indeed, prior art was distinguished on precisely this ground during prosecution, creating an estoppel. As above, Casio cameras never lie to the host computer. Rather, the Casio cameras identify themselves as Casio cameras.

This required element is also completely missing, and thus any attempt to capture the Casio products under the doctrine of equivalents would improperly vitiate these claim terms in their entirety. Moreover, the Casio products function in a substantially different way, in that the cameras identify themselves to a host device only for the specific hardware arrangement of the camera itself and no other. This is neither substantially the same function as "regardless" of "the device attached" nor substantially the same way. Casio does not know how Papst intends to try to use the doctrine of equivalents to eviscerate this claim limitation, and so reserves its right to supplement this response should Papst ever attempt to make such an argument.

Virtual file system

With respect specifically to the claims of the '449 patent, all require the interface device to simulate a virtual file system. A virtual file system is described, for example, in the '399 patent at 6:1-3: the interface device "simulates a hard disk with a root directory whose entries are 'virtual' and can be created for the most varied functions." Also, as described in the '449 patent at 11:1-6 and the '339 patent at 11:66-12:4: "Using the ASPI manager the interface device according to the present invention can now obtain active access to an SCSI hard disk of the host device connected to the same SCSI bus which, in contrast to the interface device, cannot be a virtual but a real SCSI mass storage device or also a further interface device according to the present invention." *See also*, '399 patent, 12:25-33, and the '449 prosecution history (e.g., 5/17/04 Notice of Allowability).

In the Casio cameras, the computer directly accesses a real file system. The system is not "virtual" in any sense of the word.

With regard to equivalents, this required element is also completely missing, and thus any attempt to capture the Casio products under the doctrine of equivalents would improperly vitiate these claim terms in their entirety. Moreover, the Casio products function in a substantially different way, in that with respect to Casio cameras, the computer directly accesses a real file system. The system is not "virtual" in any way. Casio has no idea how Papst intends to try to use the doctrine of equivalents to eviscerate this claim limitation, and so reserves its right to supplement this response should Papst ever attempt to make such an argument.

SUPPLEMENTAL RESPONSE

All the objections and responses in our First Responses are incorporated by reference.

Casio Inc.'s proposed claim constructions were already provided above for the elements that appear to be at issue, but Casio, Inc. herein supplements those constructions in a good faith

effort to address questions of counsel for Papst, and despite Papst's refusal to provide proper claim constructions as ordered by the Court. Casio reserves its right to supplement this response as the case proceeds, including but not limited to supplementation after the Court construes the claims, or upon learning Papst's proposed constructions and contentions which, to date, Papst has been unable to provide.

Casio notes that it has not been accused of direct infringement of any claim, nor could it be because it does not make or sell the host. Despite repeated Court orders to explain how it is contending that Casio infringes, Papst has not provided any cogent theory of infringement. Papst should be precluded from advancing any infringement theory now, but to the extent that ever happens, Casio will respond and supplement as necessary.

I. Claim 1 of United States Patent 6,470,399

A. An interface device for communication between

"Interface Device" interpretation: "Interface Device" means a physically separate and distinct component different from the host device or the Data Transmit/Receive Device that is capable of regulating the electrical communications between host device and a plurality of interchangeable data transmit/receive devices.

Both patents teach an interface device that is separate from the transmit/receive ("T/R") device. For example, the '399 patent states at 8:23-33: "In the interface device according to the present invention, an enormous advantage is to be gained . . . in separating the actual hardware . . . [which] allows a plurality of dissimilar device types. . . .". Similarly, at 1:55-64, the patent discusses different uses of the interface, e.g., a "large number of applications," and it refers to "any data transmit/receive devices which can be attached to the second connecting device. . . ." (7:41-43). The patents also state that "the interface device according to the present invention . . .

[can be used] as an interface between a host device and almost any data transmit/receive device" ('399 patent, 7:45-49). See also the claims, which refer to a "multi-purpose" interface.

The patent claims also clearly require that the interface be separate from the transmit/receive device. See, for example, the language that requires connecting devices for interfacing them, and the language that requires the host to ask what type of device is "attached" to the interface, and requires the interface device to send a signal to the host "regardless of the type of the data transmit/receive device attached." Thus, the claim language itself makes the ability of a transmit/receive device to "attach" very clear, particularly when considered in light of the specification noted above.

The patents distinguish prior art devices with specific drivers for specific transmit/receive devices. *See, e.g* ., '399 patent at 1:20-34. They also teach that the interface must be "flexible to permit attachment of very different electrical or electronic systems to a host device by means of the interface...." *Id.* at 1:56-60. Every embodiment disclosed in the patents has a separate interface device, and there is inadequate support under 35 U.S.C. 112 for anything but a separate interface device. Casio also relies on the plain and ordinary meaning of these terms.

"communication between" interpretation: "Communication Between" means two-way communication directly between the host and input/output device.

The "communication between" limitation is part of every claim of the '399 and '449 patents. When properly construed, the T/R device and host must have two-way communication, not just data transfer from one to the other. The word "between" requires two-way communication, and later language in the claims uses the words "from" and "to" showing a contrast with the "between" language used for this communication. *Cf. e.g.*, "a data request command from the host device to the type of input/output device..." and "transfer of the digital

data to the host device." This language also shows that communication between the host and T/R device must be bi-directional (commands from the host and data transfer from the T/R device, i.e., if the host requests the data, the T/R device must be able to send data in response thereto). There must be an interchange or exchange of data, as claimed and as plainly taught in the specification. *See, e.g.*, the abstract ("communication between"); '399, 1:9-14 (distinguishing data acquisition and two-way communication).

The '399 patent, at column 5, lines 47-63, also discusses first that data must be "acquired, and transferred to the host device," and in the very next sentence distinguishes that from communication: "The data transmit/receive device itself can also communicate actively with the host device." The communication is described as something different from an intermediate memory merely storing and then sending on data to the host, and it requires, as the claims state, actual communication between the T/R device and the host computer. *See also*, 6:55-68 (the host computer user reading data "from the data transmit/receive device . . ." and discussing the interface function of transferring data "from the data transmit/receive device . . . to the host device . . . ."). The patents distinguish the claimed communication between the host and T/R device from "communication between the host device and interface device" ('399 patent, at 7:14-15). Casio also relies on the plain and ordinary meaning of these terms.

No Infringement

The Casio cameras are not and do not have Interface Devices as properly construed, as they have no separate interface, and they have nothing with the ability to regulate a plurality of interchangeable devices. The Casio cameras also do not have two way communications between the host device and interface device. Accordingly, these elements provide two reasons

why there is no infringement. With regard to equivalents, that has not been asserted by Papst. See also Casio's first response.

B. a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and

Interpretation : "Host Device" means a separate and distinct hardware component from the interface device or the data transmit/receive device. The host device must include software drivers for input/output devices that are connected to the interface device and "customary in a host device" (see below), and also drivers for a multipurpose interface. Casio also relies on the plain and ordinary meaning of these terms.

"customary" interpretation: The term "customary" in the context of the '399 and '449 patents is vague and unsupported for any interpretation other than for "drivers for hard disks, for graphics devices or for printer devices ... or other storage devices such as floppy disk drives, CD-ROM drives or tape drives." In any event, there is nothing in the patents that suggests that cameras would be "customary". See '399 patent col. 4, lns. 27-39. Indeed the word "camera" never appears in the patent specification at all. Casio also relies on the plain and ordinary meaning of these terms.

No Infringement

The Casio cameras do not have host devices as properly construed. They are sold as stand-alone cameras. Casio cameras also have nothing to do with any "customary" drivers for hard disks, for graphics devices or for printer devices or other storage devices such as floppy disk drives, CD-ROM drives or tape drives. With regard to equivalents, that has not been asserted by Papst. See also Casio's first response.

C. a data transmit/receive device, the data transmit/receive device being arranged for providing analog data, comprising:

Interpretation : "Data Transmit/Receive Device" means a distinct piece of hardware separate from an Interface Device capable of providing and/or receiving analog data directly to and/or from a host device through the separate Interface Device. The Data Transmit/Receive Device must transmit and receive information in the same form.

A Data Transmit/Receive Device limitation is part of every claim of the '399 and '449 patents. A "T/R" device would be understood by a person of ordinary skill in the art to mean a device that transmits and receives information in the same form. Moreover, if the patentee had meant that different types of data could be transmitted and received, the claim could have said "a transmit device and a receive device" and these could have transmitted and received different types of data. A data/transmit device is not a device for converting data from one form to another. Further, one of ordinary skill in the art would recognize that the claim itself requires that the data format of the communication be analog, as opposed to digital. Casio also relies on the plain and ordinary meaning of these terms.

No Infringement

Casio's digital cameras are unitary pieces of hardware without interface devices separate from data transmit/receive devices. Casio's digital cameras do not have any components that can both transmit and receive analog data, and the components alleged by Papst to meet these limitations do not transmit and receive data in the same form. With regard to equivalents, that has not been asserted by Papst. See also Casio's first response.

D. a processor;

Interpretation: Processor means the microprocessor of a computer capable of receiving and executing logical instructions. Casio also relies on the plain and ordinary meaning of this term.

No Infringement

Casio does not dispute that its cameras have a processor, but does not infringe due to the many other missing claim elements. See also Casio's first response.

E. a memory;

Interpretation: Memory has its ordinary meaning, and includes any memory. '399 patent col. 7, lns 23-29. Casio also relies on the plain and ordinary meaning of this term.

No Infringement

Casio does not dispute that its cameras have a memory, but does not infringe due to the many other missing claim elements. See also Casio's first response.

F. a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and

Interpretation: "First connecting device" means the component of the interface device that electrically connects the host device to the separate interface device. The first connecting device also allows direct, two way communication between the host device and the interface device.

No Infringement

Casio does not provide any host device with its digital cameras and so does not meet this element of the claim, and Papst has not asserted any indirect claims of infringement. Moreover, as Casio has no "interface device" as properly interpreted, that provides another reason why this language is not met. With regard to equivalents, that has not been asserted by Papst. See also Casio's first response.

G. **a second connecting device for interfacing the interface device with the data transmit/receive device, the second connecting device including a sampling circuit for sampling the analog data provided by the data transmit/receive device and an analog-to-digital converter for converting data sampled by the sampling circuit into digital data,**

Interpretation: This language means a component of the interface device that electrically connects a transmit/receive device to the separate interface device. The second connecting device also must allow direct, two way communication between a transmit/receive device and the interface device. Also, the second connecting device must include both a circuit for sampling the analog data that is provided by the data transmit/receive device and an analog-to-digital converter for converting data sampled by the sampling circuit into digital data. Casio also relies on the plain and ordinary meaning of this phrase.

No Infringement

Casio's digital cameras have no second connecting device that electrically connects a transmit/receive device to a physically separate interface device. Casio's digital cameras also have no second connecting device that allows direct, two way communication between a transmit/receive device to the separate interface device. With regard to equivalents, Papst has not asserted infringement by equivalents. See also Casio's first response.

H. **wherein the interface device is configured by the processor and the memory to include a first command interpreter and a second command interpreter,**

Interpretation: This phrase means that the processor and the memory built into the interface device together are responsible for the configuration of the interface device into a distinct first command interpreter and a distinct second command interpreter. First command interpreter and second command interpreter are defined elsewhere. The interface device must be configured by the processor and memory, which does not include simply downloading software into the camera from an external source.

The requirement that the interface device interpreters be configured by the processor and memory is not only clear from the claim language, but also from the specification. *See, e.g.*, '399 patent, 3:36-47, 3:58-67, 4:65-5:6.

This configuration must also create all of the functionality required as defined in the definition of the first command interpreter and second command interpreter.

No Infringement

The Casio processor and memory do not configure anything that functions as a distinct first command interpreter or a distinct second command interpreter. With regard to equivalents, Papst has not asserted infringement by equivalents. See also Casio's first response.

I. **wherein the first command interpreter is configured in such a way that the command interpreter, when receiving an inquiry from the host device as to a type of a device attached to the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is an input/output device customary in a host device,**

Interpretation: This means a structure within the interface device that is configured by the processor and memory of the interface device. The first command interpreter must be capable of sending a signal to the host device when an inquiry from the host device is received requesting the type of a device that is attached to the interface device. The signal sent to the host by the first command interpreter must "lie" to the host and tell the host that something other that what is connected to the host is connected. *See, eg.*, File History of the '399 patent. This means that regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, the host device must receive a signal that an input/output device "customary" (see response to Interrogatory No. 2) in a host device is attached to the second

connecting device of the interface device. Casio also relies on the plain and ordinary meanings of this phrase.

No Infringement

Casio's digital cameras have no structure or functionality that is configured by any interface device's processor and memory that functions as required by this claim language. Further, Casio's digital cameras never "lie" to the host computer about what is connected. With regard to equivalents, Papst has not asserted infringement by equivalents. See also Casio's first response.

J. whereupon the host device communicates with the interface device by means of the driver for the input/output device customary in a host device, and

Interpretation: This phrase means that the host device communicates with the interface device using a driver that is "customary" in a host device. The communication, through the "customary" driver must occur regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device. See the response to Interrogatory No. 2 regarding the "customary" language of the claim.

No Infringement

Casio's digital cameras do not communicate using a "customary" driver, as that term is not clear. See the response to Interrogatory No. 2. With regard to equivalents, Papst has not asserted infringement by equivalents. See also Casio's first response.

K. wherein the second command interpreter is configured to interpret a data request command from the host device to the type of input/output device signaled by the first command interpreter as a data transfer command for initiating a transfer of the digital data to the host device.

Interpretation: "Second command interpreter" means a structure or component within the interface device that is configured by the processor and memory of the interface device. This

second command interpreter must be capable receiving a data request command from a host computer in the format of a device that the first command interpreter had previously "lied" to the host computer about. This second command interpreter must be capable of understanding the data request command from the host as a data transfer command for initiating the transfer of digital data to the host device.

No Infringement

Casio's digital cameras have no structure or functionality that is configured by any interface device's processor and memory that functions as required by the term second command interpreter. With regard to equivalents, Papst has not asserted infringement by equivalents. See also Casio's first response.

II. Claim 1 of U.S. Patent No. 6,895,449

A. An interface device for communication between

"Interface Device" interpretation: "Interface Device" means a physically separate and distinct component different from the host device or the Data Transmit/Receive Device that is capable of regulating the electrical communications between host device and a plurality of interchangeable kinds of data transmit/receive devices.

Both patents teach an interface device that is separate from the transmit/receive ("T/R") device. For example, the '449 patent states at 7:23-30: "In the interface device according to the present invention, an enormous advantage is to be gained . . . in separating the actual hardware . . . [which] allows a plurality of dissimilar device types. . . .". Similarly, at 1:56-65, the patent discusses different uses of the interface, e.g., a "large number of applications," and it refers to "any data transmit/receive devices which can be attached to the second connecting device. . . ." (6:41-42). The patents also state that "the interface device according to the present invention . . .

[can be used] as an interface between a host device and almost any data transmit/receive device" ('449 patent, 6:45-49). See also the claims, which refer to a "multi-purpose" interface.

The patent claims also clearly require that the interface be separate from the transmit/receive device. See, for example, the language that requires connecting devices for interfacing them, and the language that requires the host to ask what type of device is "attached" to the interface, and requires the interface device to send a signal to the host "regardless of the type of the data transmit/receive device attached." Thus, the claim language itself makes the ability of a transmit/receive device to "attach" very clear, particularly when considered in light of the specification noted above.

The patents distinguish prior art devices with specific drivers for specific transmit/receive devices. *See, e.g .*, '449 patent at 1:21-34. They also teach that the interface must be "flexible to permit attachment of very different electrical or electronic systems to a host device by means of the interface...." *Id.* at 1:58-60. Every embodiment disclosed in the patents has a separate interface device, and there is inadequate support under 35 U.S.C. 112 for anything but a separate interface device. Casio also relies on the plain and ordinary meaning of these terms.

"communication between" interpretation: "Communication Between" means two-way communication directly between the host and input/output device.

The "communication between" limitation is part of every claim of the '399 and '449 patents. When properly construed, the T/R device and host must have two-way communication, not just data transfer from one to the other. The word "between" requires two-way communication, and later language in the claims uses the words "from" and "to" showing a contrast with the "between" language used for this communication. *Cf. e.g.*, "a data request command from the host device to the type of input/output device..." and "transfer of the digital

data to the host device." This language also shows that communication between the host and T/R device must be bi-directional (commands from the host and data transfer from the T/R device, i.e., if the host requests the data, the T/R device must be able to send data in response thereto). There must be an interchange or exchange of data, as claimed and as plainly taught in the specification. *See, e.g.*, the abstract ("communication between"); '399, 1:13-17 (distinguishing data acquisition and two-way communication).

The '449 patent, at 4:46-62, also discusses first that data must be "acquired, and transferred to the host device," and in the very next sentence distinguishes that from communication: "The data transmit/receive device itself can also communicate actively with the host device." The communication is described as something different from an intermediate memory merely storing and then sending on data to the host, and it requires, as the claims state, actual communication between the T/R device and the host computer. *See also*, 5:55-67 (the host computer user reading data "from the data transmit/receive device . . ." and discussing the interface function of transferring data "from the data transmit/receive device . . . to the host device . . . ."). The patents distinguish the claimed communication between the host and T/R device from "communication between the host device and interface device" ('449 patent, at 6:13-15). Casio also relies on the plain and ordinary meaning of these terms.

No Infringement

The Casio cameras are not and do not have Interface Devices as properly construed, as they have no separate interface, and they have nothing with the ability to regulate a plurality of interchangeable devices. The Casio cameras also do not have two way communications between the host device and interface device. Accordingly, these elements provide two reasons why there

is no infringement. With regard to equivalents, that has not been asserted by Papst. See also Casio's first response.

B. a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and

Interpretation : "Host Device" means a separate and distinct hardware component from the interface device or the data transmit/receive device. The host device must include software drivers for input/output devices that are connected to the interface device and "customary in a host device" (see below), and also drivers for a multipurpose interface. Casio also relies on the plain and ordinary meaning of these terms.

"customary" interpretation: The term "customary" in the context of the '399 and '449 patents is vague and unsupported for any interpretation other than for "drivers for hard disks, for graphics devices or for printer devices ... [or] other storage devices such as floppy disk drives, CD-ROM drives or tape drives." In any event, there is nothing in the patents that suggests that cameras would be "customary". See '449 patent 3:30-43. Indeed the word camera never appears in the patent specification at all.

No Infringement

The Casio cameras do not have host devices as properly construed. They are sold as stand-alone cameras. Casio cameras also have nothing to do with any "customary" drivers for hard disks, for graphics devices or for printer devices or other storage devices such as floppy disk drives, CD-ROM drives or tape drives. With regard to equivalents, that has not been asserted by Papst. See also Casio's first response.

C. a data transmit/receive device comprising the following features:

Interpretation : "Data Transmit/Receive Device" means a distinct piece of hardware separate from an Interface Device capable of providing and/or receiving analog data directly to and/or

from a host device through the separate Interface Device. The Data Transmit/Receive Device must transmit and receive information in the same form.

A Data Transmit/Receive Device limitation is part of every claim of the '399 and '449 patents. A "T/R" device would be understood by a person of ordinary skill in the art to mean a device that transmits and receives information in the same form. Moreover, if the patentee had meant that different types of data could be transmitted and received, the claim could have said "a transmit device and a receive device" and these could have transmitted and received different types of data. A data/transmit device is not a device for converting data from one form to another. Further, one of ordinary skill in the art would recognize that the claim itself requires that the data format of the communication be analog, as opposed to digital. Casio also relies on the plain and ordinary meaning of these terms.

No Infringement

Casio's digital cameras are unitary pieces of hardware without interface devices separate from data transmit/receive devices. Casio's digital cameras do not have any components that can both transmit and receive analog data, and the components alleged by Papst to meet these limitations do not transmit and receive data in the same form. With regard to equivalents, that has not been asserted by Papst. See also Casio's first response.

D. a processor;

Interpretation: Processor means the microprocessor of a computer capable of receiving and executing logical instructions. Casio also relies on the plain and ordinary meaning of this term.

No Infringement

Casio does not dispute that its cameras have a processor, but does not infringe due to the many other missing claim elements. See also Casio's first response.

E. a memory;

Interpretation: Memory has its ordinary meaning, and includes any memory. '449 patent, at 6:23-29. Casio also relies on the plain and ordinary meaning of this term.

No Infringement

Casio does not dispute that its cameras have a memory, but does not infringe due to the many other missing claim elements. See also Casio's first response.

F. a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and

Interpretation: "First connecting device" means the component of the interface device that electrically connects the host device to the separate interface device. The first connecting device also allows direct, two way communication between the host device and the interface device.

No Infringement

Casio does not provide any host device with its digital cameras and so does not meet this element of the claim, and Papst has not asserted any indirect claims of infringement. Moreover, as Casio has no "interface device" as properly interpreted, that provides another reason why this language is not met. With regard to equivalents, that has not been asserted by Papst. See also Casio's first response.

G. a second connecting device for interfacing the interface device with the data transmit/receive device,

Interpretation: This language means a component of the interface device that electrically connects a transmit/receive device to the separate interface device. The second connecting device also must allow direct, two way communication between a transmit/receive device and the interface device. Casio also relies on the plain and ordinary meaning of this phrase.

No Infringement

Casio's digital cameras have no second connecting device that electrically connects a transmit/receive device to a physically separate interface device. Casio's digital cameras also have no second connecting device that allows direct, two way communication between a transmit/receive device to the separate interface device. With regard to equivalents, Papst has not asserted infringement by equivalents. See also Casio's first response.

H. **wherein the interface device is configured by the processor and the memory in such a way that the interface device, when receiving an inquiry from the host device as to the type of a device attached to the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is a storage device customary in a host device,**

Interpretation: This term means that the processor and the memory built into the interface device together are responsible for the configuration of the interface device to provide the specific functionality described in the rest of the claim. This configuration must enable the interface device to be able to signal to the host that a storage device customary in the host device is attached to the interface device regardless of the type of transmit/receive device actually attached to the interface device.

The interface device must be configured by the processor and memory, which does not include simply downloading software into the camera from an external source. The requirement that the interface device interpreters be configured by the processor and memory is not only clear from the claim language, but also from the specification. *See, e.g.*, '449 patent, 4:6-10.

No Infringement

The processor in combination with the memory in Casio digital cameras do not configure anything to provide functionality to an interface device allowing a signal to be sent to a host that a storage device customary in the host device is attached to the interface device regardless of the

type of transmit/receive device actually attached to the interface device. With regard to equivalents, Papst has not asserted infringement by equivalents. See also Casio's first response.

I. whereupon the host device communicates with the interface device by means of the driver for the storage device customary in a host device, and

Interpretation: This phrase means that the host device sends messages to the interface device using a storage device driver that is "customary" in a host device. The communication, through the "customary" driver must occur regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device

The specific language "customary in a host device" is not capable of interpretation. See response to Interrogatory No. 2.

No Infringement

Casio's digital cameras can not be interpreted as customary devices, to the extent the term is definable. Casio's digital cameras are cameras and require drivers associated with cameras, not storage devices.

J. wherein the interface device is arranged for simulating a virtual file system to the host, the virtual file system including a directory structure.

"virtual file system" interpretation: A file system that is not real, but instead simulates a hard disk file system.

A virtual file system is described, for example, in the '449 patent at 4:67-5:2: the interface device "simulates a hard disk with a root directory whose entries are 'virtual' files which can be created for the most varied functions." Also, as described in the '449 patent at 11:1-6 and the '399 patent at 11:66-12:4: "Using the ASPI manager the interface device according to the present invention can now obtain active access to an SCSI hard disk of the host device connected to the same SCSI bus which, in contrast to the interface device, cannot be a

virtual but a real SCSI mass storage device or also a further interface device according to the present invention." *See also*, '449 patent, 12:25-33, and the '449 prosecution history (e.g., 5/17/04 Notice of Allowability).

No Infringement

The file system associated with photographic data in Casio's digital cameras is not virtual, but is an actual file system associated with the storage of data on the internal memory card of Casio's digital cameras.

INTERROGATORY NO. 2: Describe in full and complete detail the bases for the allegations in Casio's Complaint that the Patents-in-Suit are invalid for failing to comply with the patent laws of the United States.

OBJECTIONS

Casio, Inc. objects to the deceptive nature in which this interrogatory was written. Stating the interrogatory in this manner, and "defining" it to be wildly overbroad and to request information not even remotely related to the request as written, is an obvious attempt to deceive Casio into inadvertently waiving objections, or dupe the Court into thinking that Papst is being reasonable in its requests. The request violates Federal Rule 26(g) as "defined" in the Papst instructions, and Papst is hereby put on notice that, in the event this interrogatory is ever brought before the Court, the full overbroad scope of what Papst seeks must be shown to the Court, including the deceptive manner in which Papst attempted to get that information.

Casio objects to the definition provided to this interrogatory, as overbroad, unduly burdensome, calling for irrelevant information not reasonably calculated to lead to the discovery of admissible information, as calling for information that is subject to the attorney client privilege, work product, or other immunity, calls for disclosure of confidential information to Welsh & Katz, and calls for documents and information that are only relevant to the damages and willfulness issues, which will be subject to Casio's motion to bifurcate. Casio will respond only by considering the actual interrogatory recited above, and will provide information only for the first independent claims of the patents as Papst has to date refused to (or has been unable to) explain how the Casio cameras supposedly infringe on these patents. After receiving the Papst analyses, Casio will provide reasonable detail on the reasons for its defenses. All other requests are overly broad, unduly burdensome and calls for information that is irrelevant and not reasonably calculated to lead to the discovery of admissible evidence.

Casio reserves its right to supplement this response as the case proceeds, including but not limited to supplementation after the Court construes the claims, and upon learning Papst's proposed constructions and contentions which, to date, Papst has been unable to provide.

Casio objects to this Interrogatory as improperly being characterized as one interrogatory because its many subparts constitute separate interrogatories. See Fed. R. Civ. P. 33(a).

Subject to its general and specific objections, Casio responds as follows.

FIRST RESPONSE:

The claims of the Papst patents, particularly if read broadly enough to cover any Casio camera, would be invalid under at least 35 U.S.C. sections 112, 102, and 103. Unfortunately, despite this Court's order that discovery proceed and Papst's obligation to provide this information, Papst has refused to (or been unable to) provide claim constructions and analyses as to how these patents could possibly be read broadly enough to cover the Casio cameras. If and when Papst does so, Casio will show how the Papst claim constructions cannot read on the Casio cameras without also encompassing the prior art and otherwise rendering the patents invalid.

SUPPLEMENTAL RESPONSE

Section 112 and the Papst proposed interpretations

If any of the Papst claim constructions are seriously considered, then those terms are indefinite as the true interpretation is far different and Papst could not have particularly pointed out or distinctly claimed the invention. Further, it appears that if Papst were to sufficiently set forth its proposed claim constructions such that its claims could read on digital cameras, they would likely be refutable based on statements made during the prosecution of the Papst patents. *Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473 (Fed. Cir. 1998). Moreover, if those extremely broad interpretations are accepted, then the claims are invalid for lack of enabling disclosures and failure to satisfy the written description requirements. As none of the Papst claim constructions are correct, however, Casio simply reserves its right to argue these issues if any one or more of the interpretations is seriously considered by the Court. The support for all these arguments is found in the response and supplemental response to Interrogatory 1. That is, the patent specifications clearly teach that the Casio interpretations are correct, and if another interpretation is seriously considered then the specifications do not enable that broad scope or show that the alleged inventor was in possession of that broad scope. Please see the responses to Interrogatory 1.

Section 112 and "customary"

All the claims require that the interface device tell the personal computer that what is attached is a device "customary" in a host computer. The patent specifications and claims have no sufficient indication of the meaning of that term, of what might be included, and it provides no standard for how one would measure what is or is not "customary" to a host. Indeed, there is no standard "host" in the claims that could even serve as a basis by which to attempt to judge this "customary" language.

The specifications and prosecution history provide no guidance as to what devices might be considered "customary" in a host, and particularly in situations like the present case where there is close prior art, the claims should be properly declared invalid.

Prior Art

Casio strongly disagrees with the Papst claim analysis. The following claim charts show, however, that even if Papst could read the claims on the Casio cameras, the prior art would invalidate those claims. Papst has refused, despite multiple court orders, to provide its proposed claim interpretations, and so it is not possible to properly compare the Papst analysis to the prior art. However, for these prior art references, there is no difference from the accused cameras insofar as these patent claims are concerned. Because Papst failed to comply with the Court orders and provide its proposed interpretations, we are forced to use the Papst language attempting to apply the claim language to the Casio cameras. Casio reserves the right to supplement this response should Papst ever fulfill its discovery obligations and comply with the Court orders.

1. **Prior art against the '399 patent (priority date 3/4/97, Germany)**

a. US Patent No. 6,088,532

This patent was filed in the US on 12/29/95 and is 102(e) art (its Japanese priority application, published on 7/23/96, is 102(b) art). Figures 30-31 and Col. 22, line 15-col. 23, line 43 of the '532 patent teach an embodiment where a camera itself incorporates an interface device between a computer and a hard disk. When the "external hard disk" mode is set, the digital camera is used as an external memory for the computer. The computer first issues a standard "INQUIRY" SCSI command and the camera outputs data indicating it is now used as a hard disk. The computer can then issue other standard SCSI command such as "READ CAPACITY" and "FORMAT UNIT" to the camera to control and hard disk (see 23:30-43).

The '532 patent would invalidate by anticipation the '399 patent based on Papst's analysis as far as it can be understood, while Papst still refuses to provide claim interpretations.

See the Claim Chart Comparing the '399 patent and the '532 Patent below:

Claim 1 of the '399 Patent	US Patent No. 6,088,532 (the '532 Patent)
1. An interface device for communication between	The '532 patent includes an "interface device" that is formed by at least a portion of the CPU (included in the system control circuit **20**) and the on-chip memory **64** that are part of the camera (see Figures 2, 30 and 6:7-10).
A host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and	The '532 camera can be connected to, for example, a personal computer that utilizes drivers for a variety of input/output devices. The PC has at least one SCSI port, which is a multi-purpose interface. (see Figures 1 and 30, 22:15-32, 23: 7-10 (mentioning SCSI interface)). As for the required driver for devices "customary" in a host, Papst fails to provide that interpretation.

A data transmit/receive device, the data transmit/receive device being arranged for providing analog data, comprising:	The '532 camera includes a "data transmit/receive device" formed at least in part by a lens **12** and the diode array formed in a CCD chip **44** that converts light into analog data that is representative of an image (see Figures 2, 30 and 6:11-7:3).
A processor;	The '532 patent includes system control circuit **20** that includes a microprocessor (see 6:7-10).
A memory;	The camera also has a memory **64** for storing the digitized image data (see Fig. 30). The system control circuit **20** also includes on-chip memory that stores the programs used by the microprocessor.
A first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and	The '532 camera includes an output terminal **17**, which can be a SCSI socket that can be connected to a SCSI port of a personal computer by a SCSI cable (see Fig. 30 and 23:7-10). The '532 camera also includes a SCSI interface that is located on the camera. The "first connecting device" is formed by at least the SCSI socket, the SCSI interface on the camera, and the electrical connection between the two.
A second connecting device for interfacing the interface device with the data transmit/receive device,	The '532 camera includes a CCD chip **44** having a gates and registers block for sampling the analog data provided by the CCD as well as an analog-to-digital converter **62** and a CCD controller **47** for converting data sampled by the sampling circuit into digital data (see Figures 2, 30 and 6:66-7:42). The a/d converter, the gates and registers block, and the CCD controller form at least a portion of the "second connecting device."
the second connecting device including a sampling circuit for sampling the analog data provided by the data transmit/receive device and	The '532 camera includes a gates and registers block that forms a part of a CCD chip **44** and a CCD controller **47** that forms a part of a CCD controller chip. At least the gates and registers block and the CCD controller form at least a portion of a "sampling circuit."

An analog-to-digital converter for converting data sampled by the sampling circuit into digital data,	The '532 camera includes an a/d converter **62**. The a/d converter **62** converts the analog data supplied to it from the gates and registers block into digital data that is representative of an image (see Figures 2, 30 and 6:66-7:42).
wherein the interface device is configured by the processor and the memory to include a first command interpreter and a second command interpreter,	An instruction set is programmed into the on-chip memory of the system control circuit **20** of the '532 camera (see 6:7-10). At least a portion of the instruction set forms a "first command interpreter" and a "second command interpreter".
wherein the first command interpreter is configured in such a way that the command interpreter, when receiving an inquiry from the host device as to a type of a device attached to the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is an input/output device customary in a host device,	The output terminal **17** of the '532 camera is adapted to receive inquiry signals that the computer sends to its SCSI port to determine when something is operatively coupled thereto. The "first command interpreter" is adapted to cause the microprocessor on the '532 camera to send, after the output terminal is coupled to the PC's SCSI port, and after an inquiry signal has been received and processed, a response signal comprising data stored in the on-chip memory defined in the camera to the PC's SCSI port. (see 22:15-32, 23: 7-43). When the '532 camera is in the "external hard disk mode", the response signal contains information that, when received and processed by the PC, causes the PC to recognize that it can communicate with the "interface device" by means of a software driver for the hard disk (see 23:30-44).
whereupon the host device communicates with the interface device by means of the driver for the input/output device customary in a host device, and	When the '532 camera is in the "external hard disk mode", the instruction set stored in the on-chip memory of the '532 camera is adapted to utilize a software driver for the hard disk to communicate with the PC.
wherein the second command interpreter is configured to interpret a data request command from the host device to the type of input/output device signaled by the first command interpreter as a data transfer command for initiating a transfer of the digital data to the host device.	The output terminal 17 of the '532 camera is adapted to receive data request commands that the PC sends through the SCSI port. The "send command interpreter" is adapted to cause the microprocessor to interpret a data request command from the PC as being a command to initiate a transfer of digital data to the PC. The digital data can include digitized still pictures (see 23:30-43).

b. Casio QV-10

The Casio QV-10 camera was first on sale in the US more than one year before the earliest priority date of the '399 patent, and it is thus 102(b) art. It can be connected to a computer through the standard RS-232C interface (pp. 78 of QV-10 user manual, bates-numbered CAP-010511 - CAP-010533). When connected, a user may use the interface provided by the "QV-LINK" software to retrieve images stored in the camera's memory (pps 6, 13-14 and 18-19 of the QV-LINK Owner's manual). Thus, to the extent that Papst contends that the accused products meet the claim language, and although we are unable to compare the Papst interpretations with the prior art due to Papst's refusals to comply with the Court orders, there is not reasonable distinction between the accused cameras and this prior art insofar as these patents are concerned.

See the Claim Chart Comparing the '399 Patent and QV-10 below:

Claim 1 of the '399 Patent	Casio QV-10 Digital Camera
1. An interface device for communication between	The QV-10 camera includes an interface device that is formed by at least a portion of the CPU and the on-chip memory that are part of the camera.
a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and	The QV-10 camera can be connected to, for example, a personal computer that utilizes drivers for a variety of input/output devices. The PC has at least a RS-232C interface (pp. 78 of QV-10 user manual), which is a multi-purpose interface.
a data transmit/receive device, the data transmit/receive device being arranged for providing analog data, comprising:	The QV-10 camera includes a "data transmit/receive device" formed at least in part by a lens and the diode array formed on a CCD chip that converts light into analog data that is representative or an image.
a processor;	The QV-10 camera includes a processor (CPU).
a memory;	The QV-10 camera includes an on-chip

	memory that is located on the camera. The on-chip memory forms at least a portion of the claimed "memory."
a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and	The QV-10 camera includes a socket that can be connected to a RS-232 port of a personal computer by a cable (pp. 78 of QV-10 user manual). The "first connecting device" is formed by at least the socket, the RS-232 interface on the camera, and the electrical connections between the two.
a second connecting device for interfacing the interface device with the data transmit/receive device,	The QV-10 camera includes a CCD chip having a gates and registers block, as well as a CCD controller. At least the a/d converter, the gates and resisters block, and the CCD controller form at least a part of a "second connecting device."
the second connecting device including a sampling circuit for sampling the analog data provided by the data transmit/receive device and	The QV-10 camera includes a gates and registers block that forms a part of a CCD chip and a CCD controller that forms a part of a CCD controller chip. At least the gates and registers block and the CCD controller form at least a portion of a first "sampling circuit."
an analog-to-digital converter for converting data sampled by the sampling circuit into digital data,	The QV-10 camera includes an a/d converter that converts the analog data supplied to it from the gates and registers block into digital data that is representative of an image.
wherein the interface device is configured by the processor and the memory to include a first command interpreter and a second command interpreter,	An instruction set is programmed into the memory of the QV-10 camera. At least a portion of the instruction set forms a "first command interpreter" and a "second command interpreter".
wherein the first command interpreter is configured in such a way that the command interpreter, when receiving an inquiry from the host device as to a type of a device attached to the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is an input/output device customary in a host device,	The socket of the QV-10 camera is adapted to receive inquiry signals that the PC sends to its port to determine when something is operatively connected thereto. The "first command interpreter" is adapted to cause the processor on the QV-10 camera to send, after it is coupled to the PC's RSC-232 port, and after an inquiry signal has been received and processed, a response signal comprising data stored in the on-chip memory defined in the camera. The response signal contains information that, when received and processed by the PC, causes the PC to recognize that it

	can communicate with the "interface device" by means of a software driver for a device that stores digital images.
whereupon the host device communicates with the interface device by means of the driver for the input/output device customary in a host device, and	The computer communicates with the QV-10 camera by means of the QV-LINK driver software to allow the "interface device" to communicate with the PC.
wherein the second command interpreter is configured to interpret a data request command from the host device to the type of input/output device signaled by the first command interpreter as a data transfer command for initiating a transfer of the digital data to the host device.	A user may use the interface provided by the "QV-LINK" software to view the images stored in the QV-10 camera's memory in a directory structure and retrieve the image files (pps 6, 13-14 and 18-19 of the QV-LINK Owner's manual). The QV-10 camera includes a second command interpreter that is adapted to cause the processor of the QV-10 camera to interpret a data request command from the PC as being a command to initialize a transfer of digital data to the PC. The digital data can include digitized pictures.

c. The Kodak DCS 200

The Kodak DCS 200 camera was first on sale in the US around 1992-93 and is thus 102(b) art. It can be connected to a computer through the standard SCSI interface (pp. 5-10 through 5-11 of Kodak DCS description, bates-numbered CAP-22804-805). Like the QV-10, it needs a software driver to retrieve images stored in the camera's memory (Id.). To the extent Papst asserts that the claims cover the accused cameras, they would also cover this prior art.

See the Claim Chart Comparing the '399 Patent and Kodak DCS 200 below:

Claim 1 of the '399 Patent	Kodak DCS 200 Digital Camera
1. An interface device for communication between	The DCS200 camera includes an interface device that is formed by at least a portion of the CPU and the on-chip memory that are part of the camera.
a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and	The DCS200 camera can be connected to, for example, a personal computer that utilizes drivers for a variety of input/output devices.

	The PC has at least a SCSI (pp. 8 of Kodak DCS description), which is a multi-purpose interface.
a data transmit/receive device, the data transmit/receive device being arranged for providing analog data, comprising:	The DCS200 camera includes a "data transmit/receive device" formed at least in part by a lens and the diode array formed on a CCD chip that converts light into analog data that is representative or an image .
a processor;	The DCS 200 camera includes a processor (CPU).
a memory;	The DCS 200 camera includes an on-chip memory that is located on the camera. The on-chip memory forms at least a portion of the claimed "memory."
a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and	The DCS200 camera includes a socket that can be connected to a SCSI interface of a person computer by a cable (pp. 8 of Kodak DCS description). The "first connecting device" is formed by at least the socket, the SCSI interface on the camera, and the electrical connection between the two.
a second connecting device for interfacing the interface device with the data transmit/receive device,	The DCS200 camera includes a CCD chip having gates and registers block, as well as a CCD controller chip that includes an a/d converter and a CCD controller. At least the a/d converter, the gates and register block, and the CCD controller form at least a part of a "second connecting device." The sample circuit and the a/d converter form at least a portion of the "second connecting device."
the second connecting device including a sampling circuit for sampling the analog data provided by the data transmit/receive device and	The DCS200 camera includes a gates and registers block that forms a part of a CCD chip and a CCD controller that forms a part of a CCD controller chip. At least the gates and registers block and the CCD controller form at least a portion of a first "sampling circuit."
an analog-to-digital converter for converting data sampled by the sampling circuit into digital data,	The DCS200 camera includes an a/d converter that converts the analog data supplied to it from the gates and registers block into digital data that is representative of a image.

wherein the interface device is configured by the processor and the memory to include a first command interpreter and a second command interpreter,	An instruction set is inherently programmed into the on-chip memory of the DCS200 camera. At least a portion of the instruction set forms a "first command interpreter" and a "second command interpreter".
wherein the first command interpreter is configured in such a way that the command interpreter, when receiving an inquiry from the host device as to a type of a device attached to the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is an input/output device customary in a host device,	The socket of the DCS200 camera is adapted to receive inquiry signals that the PC sends to its port to determine when something is operatively connected thereto. The "first command interpreter" is adapted to cause the processor on the DCS200 camera to send, after it is coupled to the PC's SCSI port, and after an inquiry signal has been received and processed, a response signal comprising data stored in the on-chip memory defined in the camera. The response signal contains information that, when received and processed by the PC, causes the PC to recognize that it can communicate with the "interface device" by means of a software driver for a device that stores digital images.
whereupon the host device communicates with the interface device by means of the driver for the input/output device customary in a host device, and	The computer communicates with the DCS200 camera by means of the DCS200 driver software to allow the "interface device" to communicate with the PC.
wherein the second command interpreter is configured to interpret a data request command from the host device to the type of input/output device signaled by the first command interpreter as a data transfer command for initiating a transfer of the digital data to the host device.	A user may use the interface provided by the driver software to view the images stored in the DCS 200 camera's memory in a directory structure and retrieve the images files. The DCS200 camera inherently includes a second command interpreter that is adapted to cause the processor of the DCS200 camera to interpret a data request command from the PC as being a command to initialize a transfer of digital data to the PC. The digital data can include digitized pictures.

2. Prior art against the '449 patent (priority date 3/4/97, Germany)

The '449 patent is a continuation of the '399 patent.

a. Claim Chart Comparing the '449 patent and the '532 Patent

Claim 1 of the '449 Patent	US Patent No. 6,088,532 (the '532 Patent)
1. An interface device for communication between	The '532 patent includes an "interface device" that is formed by at least a portion of the CPU (included in the system control circuit **20**) and the on-chip memory **64** that are part of the camera (see Figures 2, 30 and 6:7-10).
a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and	The '532 camera can be connected to, for example, a personal computer that utilizes drivers for a variety of input/output devices. The PC has at least one SCSI port, which is a multi-purpose interface. (see Figures 1 and 30, 22:15-32, 23: 7-10 (mentioning SCSI interface)). As for the required driver for devices "customary" in a host, Papst fails to provide that interpretation.
a data transmit/receive device comprising the following features:	The '532 camera includes a "data transmit/receive device" formed at least in part by a lens **12** and the diode array formed in a CCD chip **44** that converts light into analog data that is representative or an image (see Figures 2, 30 and 6:11-7:3).
a processor;	The camera includes system control circuit **20** that includes a microprocessor (see 6:7-10).
a memory;	The camera also has a memory **64** for storing the digitized image data (see Fig. 30). The system control circuit **20** also includes on-chip memory that stores the programs used by the microprocessor.
a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and	The '532 camera includes an output terminal **17**, which can be a SCSI socket that can be connected to a SCSI port of a person computer

	by a SCSI cable (see Fig. 30 and 23:7-10). The '532 camera also includes a SCSI interface that is located on the camera. The "first connecting device" is formed by at least the SCSI socket, the SCSI interface on the camera, and the electrical connection between the two.
a second connecting device for interfacing the interface device with the data transmit/receive device,	The '532 camera includes a CCD chip **44** having a gates and registers block for sampling the analog data provided by the CCD as well as an analog-to-digital converter **62** and a CCD controller **47** for converting data sampled by the sampling circuit into digital data (see Figures 2, 30 and 6:66-7:42). At least, the a/d converter, the gates and registers block, and the CCD controller form at least a portion of the "second connecting device."
wherein the interface device is configured by the processor and the memory in such a way that the interface device, when receiving an inquiry from the host device as to the type of a device attached to the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is a storage device customary in a host device,	The SCSI socket of the '532 camera is adapted to receive inquiry signals that the PC sends to its SCSI port to determine when something is operatively coupled thereto. An instruction set is programmed into the on-chip memory of the camera of the '532 camera. The instruction set is adapted to cause the CPU on the camera to send, after the SCSI socket is coupled to the PC's SCSI port, and after an inquiry signal has been received and processed, a response signal comprising data stored in the on-chip memory defined in the camera and audio chip to the PC's SCSI port. When the '532 camera is in the "external hard disk mode", the response signal contains information that, when received and processed by the PC, causes the PC to recognize that it can communicate with the "interface device" by means of a software driver for a disk drive, which is an input/output device customary in a computer (see 22:15-32, 23: 7-44).
whereupon the host device communicates with the interface device by means of the driver for the storage device customary in a host device, and	When the '532 camera is in the "external hard disk mode", the instruction set stored in the on-chip memory of the '532 camera is inherently adapted to utilize a software driver for hard disk to communicate with the PC.
wherein the interface device is arranged for simulating a virtual file system to the host, the	The instruction set stored in the on-chip memory of the '532 camera is adapted to store

virtual file system including a directory structure.	pictures in a file system and a directory structure defined in its memory. The file system is "virtual" – the digitized pictures being representatives of images.

b. Claim Chart Comparing the '449 Patent and QV-10

Claim 1 of the '449 Patent	Casio QV-10 Digital Camera
1. An interface device for communication between	The QV-10 camera includes an interface device that is formed by at least a portion of the CPU and the on-chip memory that are part of the camera.
a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and	The QV-10 camera can be connected to, for example, a personal computer that utilizes drivers for a variety of input/output devices. The PC has at least a RS-232C interface (pp. 78 of QV-10 user manual), which is a multi-purpose interface.
a data transmit/receive device comprising the following features:	The QV-10 camera includes a "data transmit/receive device" formed at least in part by a lens and the diode array formed on a CCD chip that converts light into analog data that is representative or an image.
a processor;	The QV-10 camera includes a processor (CPU).
a memory;	The QV-10 camera includes an on-chip memory that is located on the camera. The on-chip memory forms at least a portion of the claimed "memory."
a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and	The QV-10 camera includes a socket that can be connected to a RS-232 port of a personal computer by a cable (pp. 78 of QV-10 user manual). The "first connecting device" is formed by at least the socket, the RS-232 interface on the camera, and the electrical connections between the two.
a second connecting device for interfacing the interface device with the data transmit/receive device,	The QV-10 camera includes a CCD chip having a gates and registers block, as well as a CCD controller chip that includes an a/d converter and a CCD controller. At least, the a/d converter, the gates and registers block, and the CCD controller form at least a portion of the "second connecting device."

wherein the interface device is configured by the processor and the memory in such a way that the interface device, when receiving an inquiry from the host device as to the type of a device attached to the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is a storage device customary in a host device,	The socket of the QV-10 camera is adapted to receive inquiry signals that the PC sends to its port to determine when something is operatively connected thereto. An instruction set is programmed into the on-chip memory of the camera. The instruction set is adapted to cause the processor on the QV-10 camera to send, after it is coupled to the PC's RSC-232 port, and after an inquiry signal has been received and processed, a response signal comprising data stored in the on-chip memory defined in the camera. The response signal contains information that, when received and processed by the PC, causes the PC to recognize that it can communicate with the "interface device" by means of a software driver for a device that stores digital images.
whereupon the host device communicates with the interface device by means of the driver for the storage device customary in a host device, and	The instruction set stored in the on-chip memory of the QV-10 camera is adapted to utilize a software driver to allow the "interface device" to communicate with the PC.
wherein the interface device is arranged for simulating a virtual file system to the host, the virtual file system including a directory structure.	The instruction set stored in the on-chip memory of the QV-10 camera is adapted to store pictures in a file system and a directory structure defined in its memory. The file system is "virtual" – the digitized pictures being representatives of images. After the socket of the QV-10 camera is coupled to a RSC-232 port on a PC, a representation of all of the digitized analog data that are stored in the memory is shown on the screen of the PC as being contained in a file folder (pps 6, 13-14 and 18-19 of the QV-LINK Owner's manual).

c. Claim Chart Comparing the '449 Patent and Kodak DCS 200

Claim 1 of the '449 Patent	Kodak DCS 200 Digital Camera
1. An interface device for communication between	The DCS200 camera includes an interface device that is formed by at least a portion of the CPU and the on-chip memory that are part of the camera.

a host device, which comprises drivers for input/output devices customary in a host device and a multi-purpose interface, and	The DCS200 camera can be connected to, for example, a personal computer that utilizes drivers for a variety of input/output devices. The PC has at least a SCSI (pp. 8 of Kodak DCS description), which is a multi-purpose interface.
a data transmit/receive device comprising the following features:	The DCS200 camera includes a "data transmit/receive device" formed at least in part by a lens and the diode array formed on a CCD chip that converts light into analog data that is representative or an image .
a processor;	The DCS 200 camera includes a processor (CPU).
a memory;	The DCS 200 camera includes an on-chip memory that is located on the camera. The on-chip memory forms at least a portion of the claimed "memory."
a first connecting device for interfacing the host device with the interface device via the multi-purpose interface of the host device; and	The DCS200 camera includes a socket that can be connected to a SCSI interface of a person computer by a cable (pp. 8 of Kodak DCS description). The "first connecting device" is formed by at least the socket, the SCSI interface on the camera, and the electrical connection between the two.
a second connecting device for interfacing the interface device with the data transmit/receive device,	The DCS200 camera includes a CCD chip having a gates and registers block, as well as a CCD controller chip that includes an a/d converter and a CCD controller. At least, the a/d converter, the gates and registers block, and the CCD controller form at least a portion of the "second connecting device."
wherein the interface device is configured by the processor and the memory in such a way that the interface device, when receiving an inquiry from the host device as to the type of a device attached to the multi-purpose interface of the host device, sends a signal, regardless of the type of the data transmit/receive device attached to the second connecting device of the interface device, to the host device which signals to the host device that it is a storage device customary in a host device,	The socket of the DSC200 camera is adapted to receive inquiry signals that the PC sends to its port to determine when something is operatively connected thereto. An instruction set is programmed into the on-chip memory of the camera. The instruction set is adapted to cause the processor on the DCS200 camera to send, after it is coupled to the PC's SCSI port, and after an inquiry signal has been received and processed, a response signal comprising data stored in the on-chip memory defined in the camera. The response signal contains

	information that, when received and processed by the PC, causes the PC to recognize that it can communicate with the "interface device" by means of a software driver for a device that stores digital images.
whereupon the host device communicates with the interface device by means of the driver for the storage device customary in a host device,	The instruction set stored in the on-chip memory of the DCS200 camera is adapted to utilize a software driver to allow the "interface device" to communicate with the PC.
and wherein the interface device is arranged for simulating a virtual file system to the host, the virtual file system including a directory structure.	The instruction set stored in the on-chip memory of the DCS200 camera is adapted to store pictures in a file system and a directory structure defined in its memory. The file system is "virtual" – the digitized pictures being representatives of images.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing CASIO INC.'S SUPPLEMENTAL OBJECTIONS AND RESPONSES TO PAPST LICENSING GMBH & CO. KG'S FIRST SET OF INTERROGATORIES TO CASIO INC. was served on this, the 22nd day of June, 2007, upon the attorneys for Papst as follows:

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