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(54) **SYSTEM AND CAMERA FOR TRANSFERRING DIGITAL IMAGES TO A SERVICE PROVIDER**

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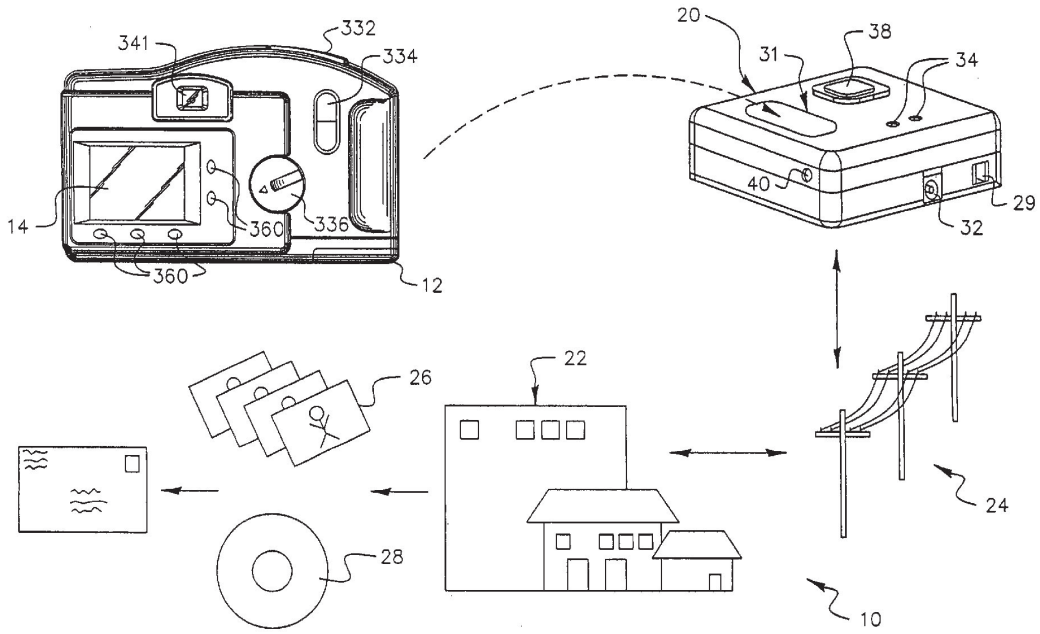
Publication Classification

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(52) **U.S. Cl.** **348/333.11**

(57) **ABSTRACT**

A method and digital camera for capturing images to be provided to a service provider. The camera includes a capture device for capturing digital images; a memory for storing the captured digital images; an interface to a communications device for transmitting the stored images to a service provider; wherein the digital interface automatically transfers images to the network service provider during a specified time period. Rechargeable batteries may be provided for powering the digital camera; wherein the communications device recharges the batteries using the interface. The camera may further include a display for displaying digital files stored in the digital memory and displaying the at least one order status confirmation file on the display.



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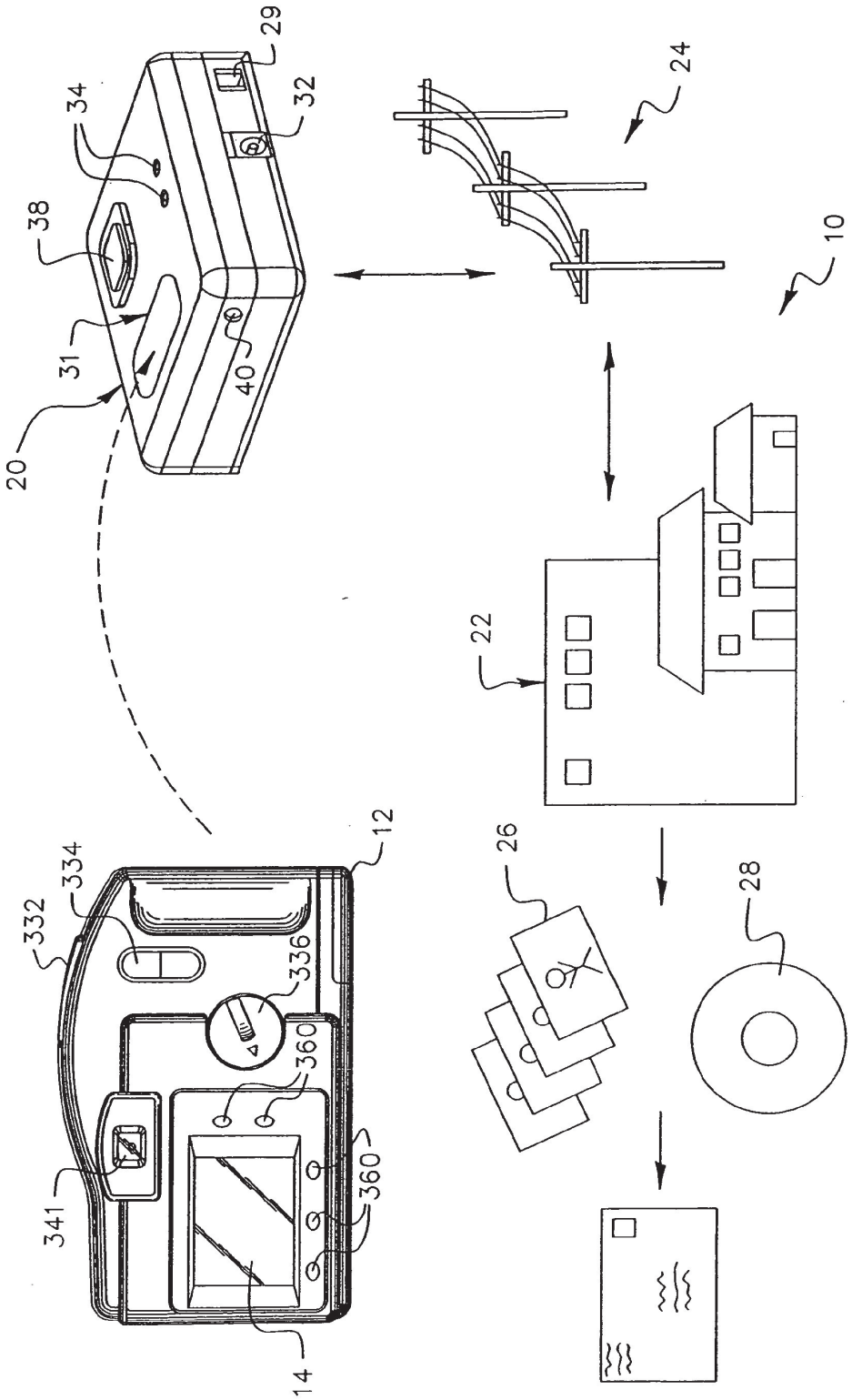


FIG. 1

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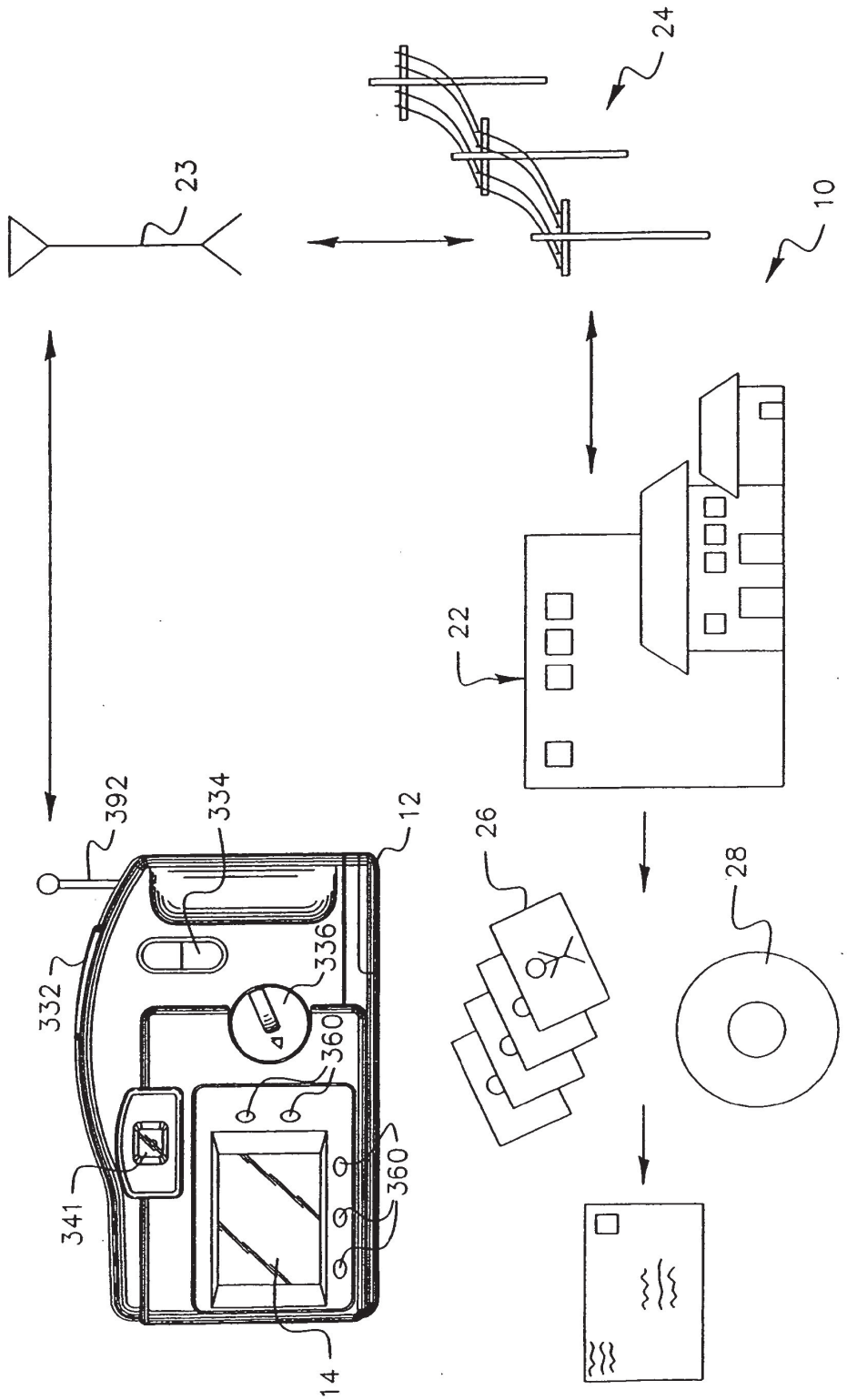


FIG. 2

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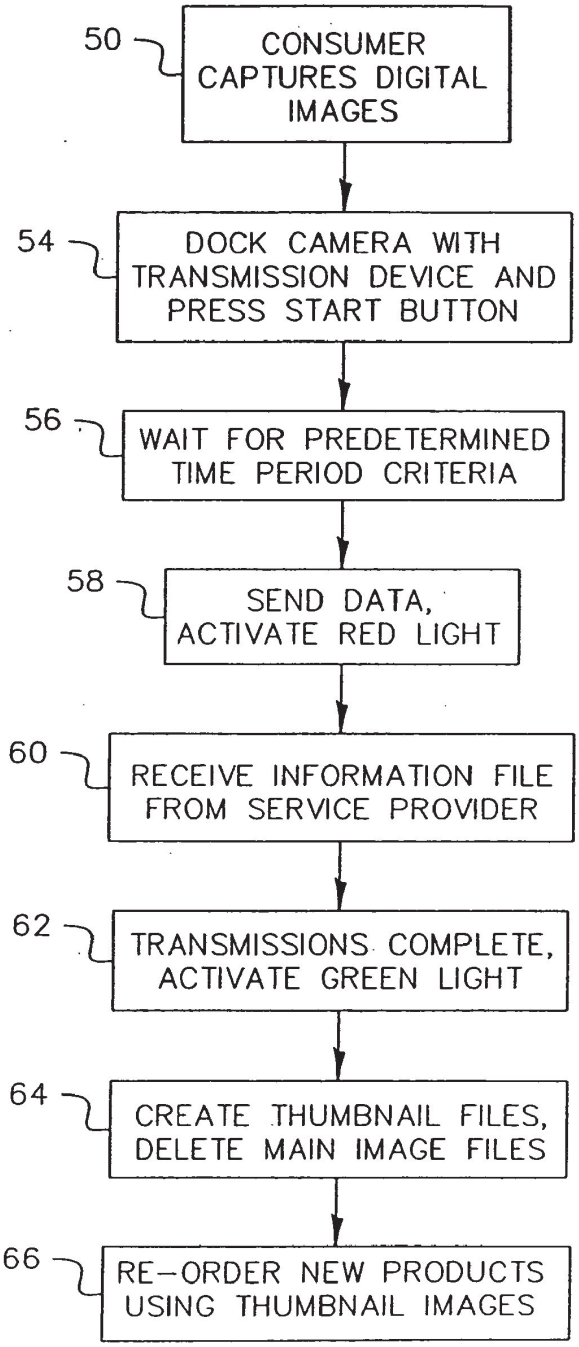


FIG. 3A

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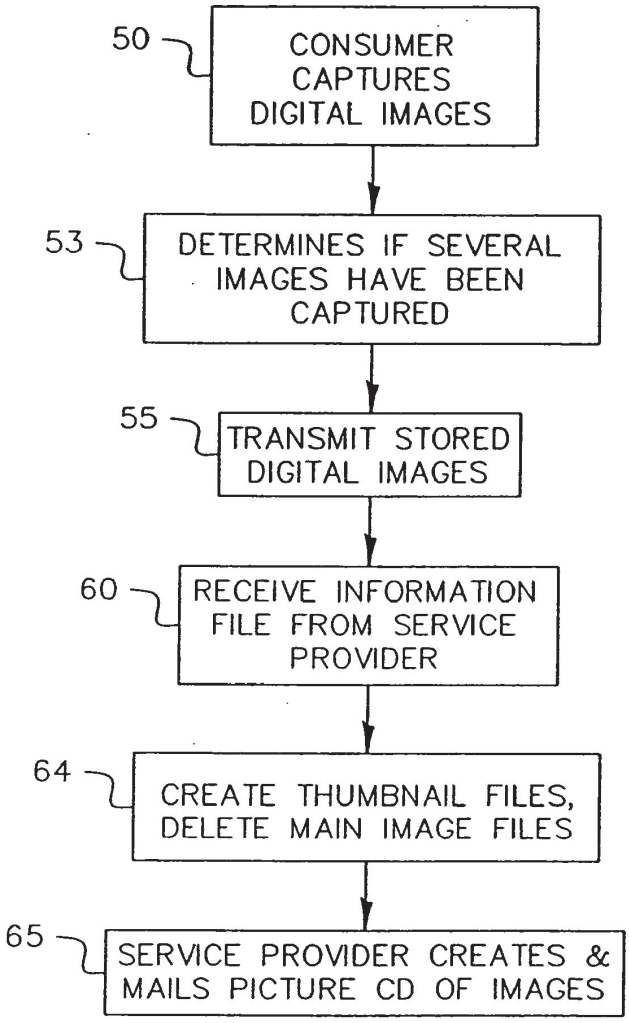


FIG. 3B

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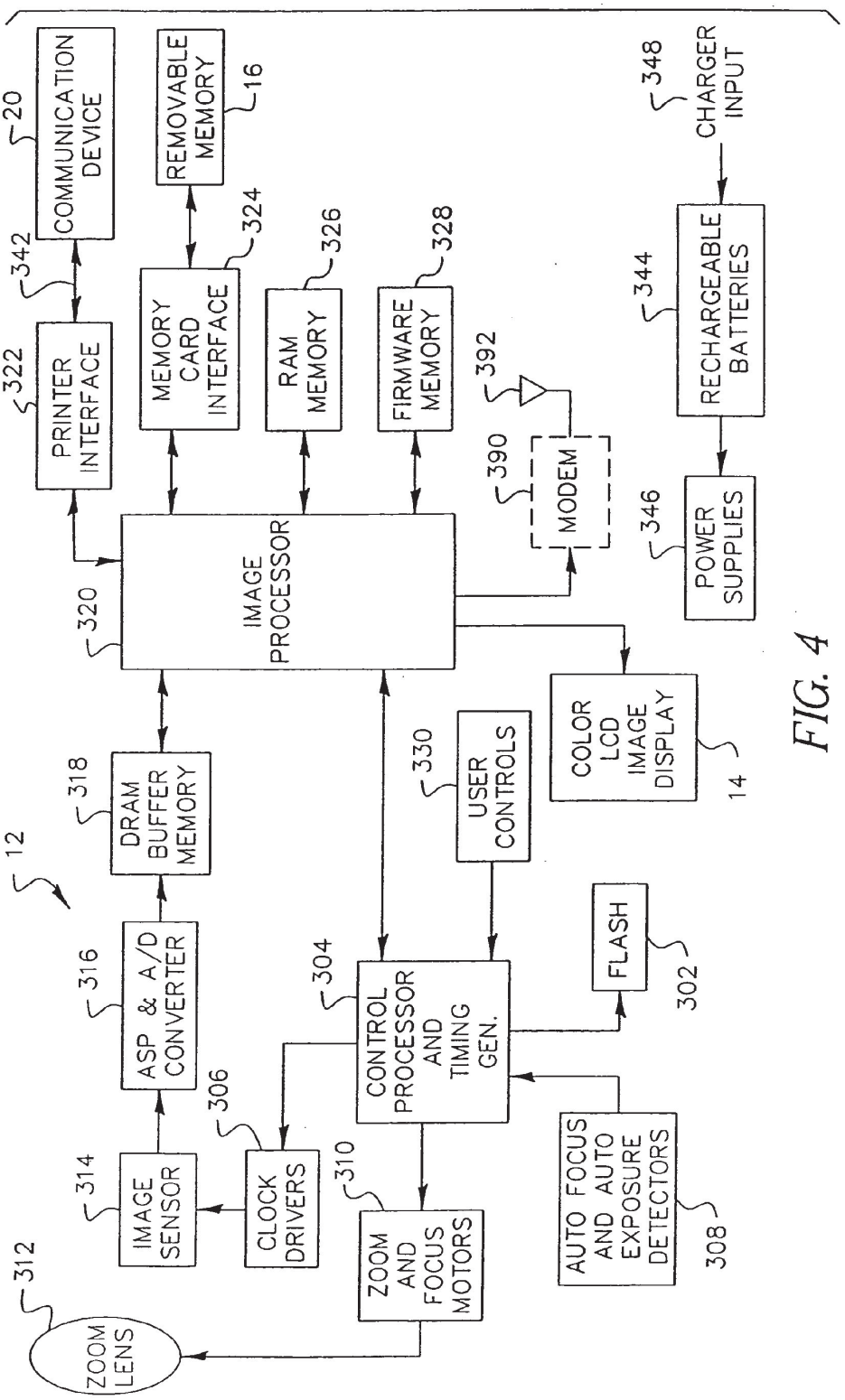


FIG. 4

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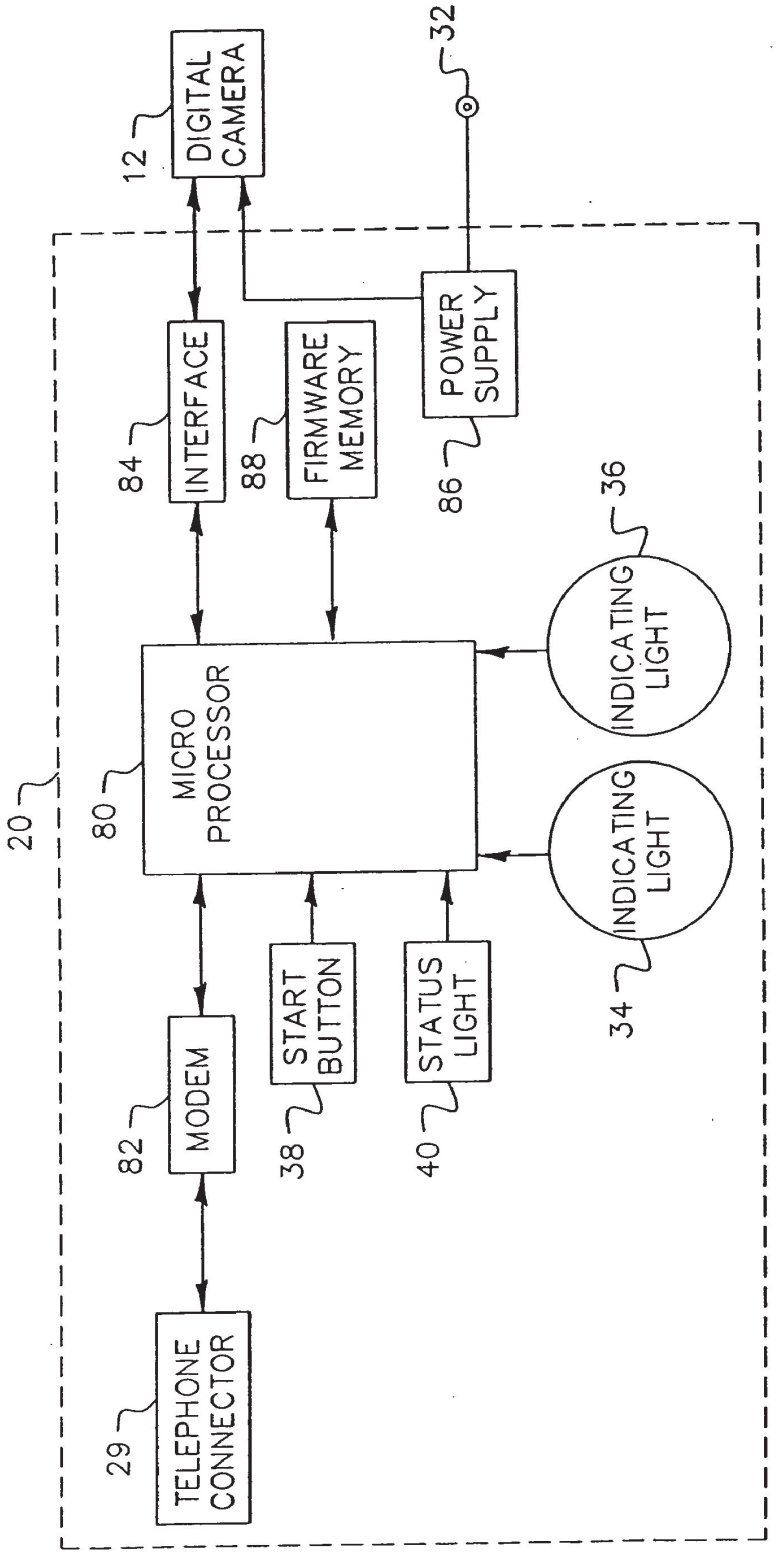


FIG. 5

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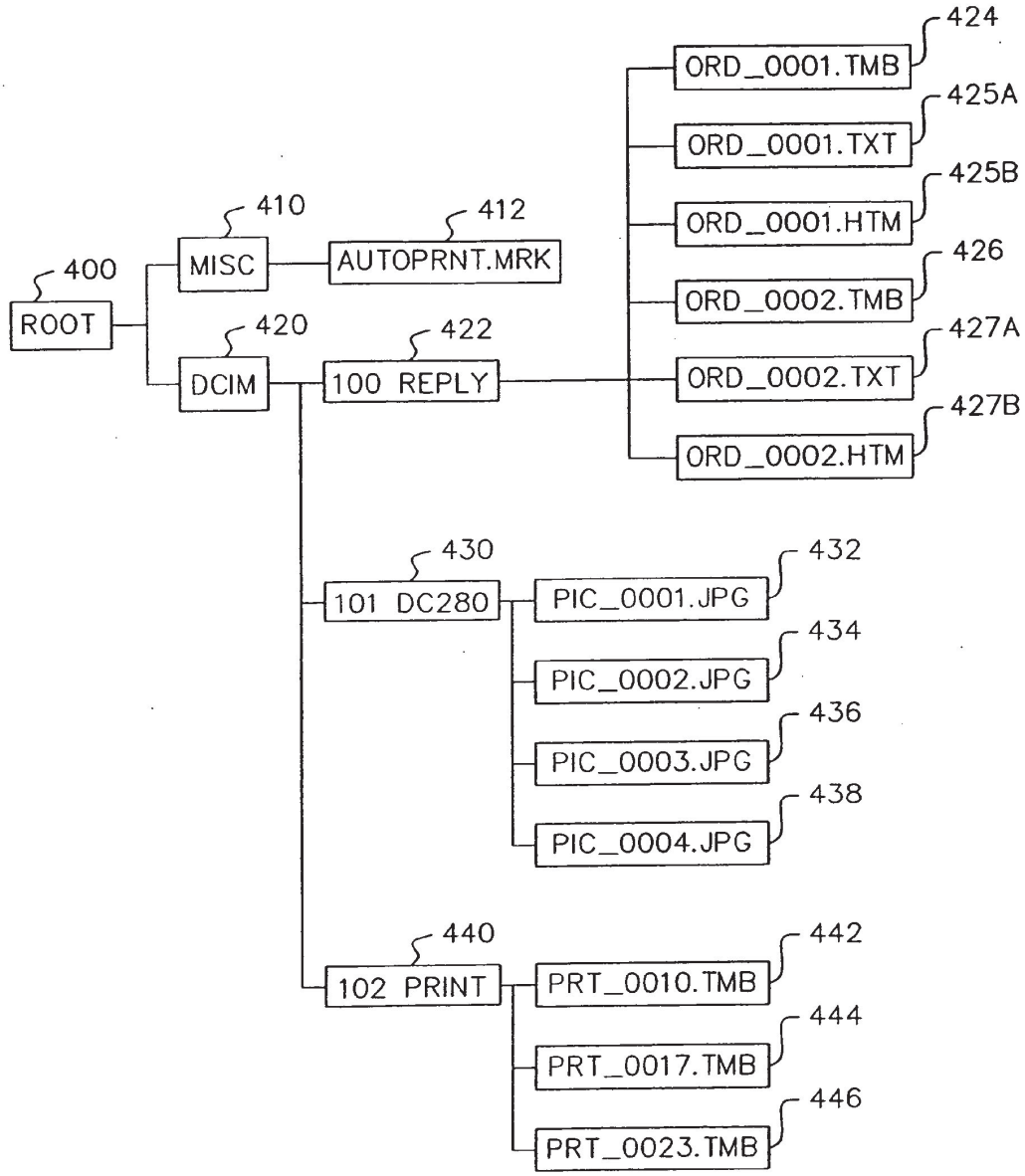


FIG. 6

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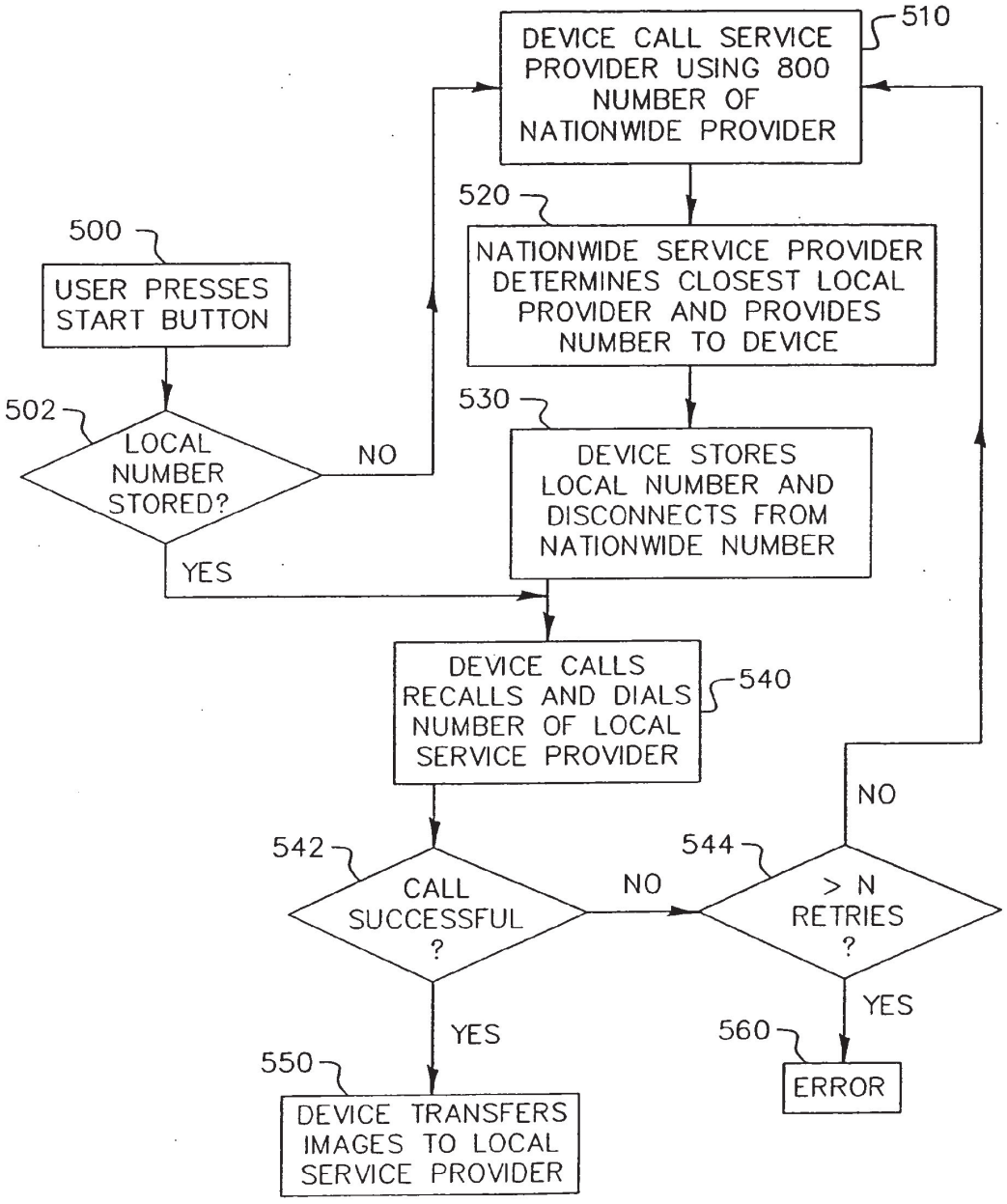


FIG. 7

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SYSTEM AND CAMERA FOR TRANSFERRING DIGITAL IMAGES TO A SERVICE PROVIDER

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This is a divisional application of Ser. No. 09/718,018 filed Nov. 20, 2000, which is a continuation-in-part of application Ser. No. 09/569,079, filed 11 May 2000, entitled: "SYSTEM AND CAMERA FOR AUTOMATICALLY FORWARDING DIGITAL IMAGES TO A SERVICE PROVIDER" by Kenneth A. Parulski and John R. Fredlund.

FIELD OF THE INVENTION

[0002] The present invention is directed to an apparatus and system for forwarding digital images. More particularly, it is directed to an apparatus and system for transferring images captured by a digital camera to a service provider over a communication network.

BACKGROUND OF THE INVENTION

[0003] As prices of digital cameras fall, image quality improves and ease of use increases, more and more consumers will use electronic digital cameras to fill their image capturing needs. Digital electronic cameras offer many benefits. However, they also present some difficulties. In particular, obtaining high quality prints from electronic digital cameras can be difficult.

[0004] There are many methods for printing images from electronic cameras. Image files may be transferred to a computer via physically transferring a memory card or by a data link between the computer and the camera. Once the image resides in the memory of the computer, a computer program can be used to print the images on a local printer. Also, a computer may use a modem to transfer images over the phone lines or other communication network to a remote photofinisher wherein images may be printed. While the foregoing methods can be used to obtain prints from the digital image files, they are often time consuming and can often require complex use of a computer.

[0005] Another method of getting hard copy prints from digital image files captured by an electronic digital camera is to transfer the digital image files directly to a printer via transferring a memory card or by a data link between the printer and the camera. This approach may have equal appeal according to ease of use, but the quality of the print is limited to the print quality of the local printer. Additionally, the consumer is forced to maintain the printer.

[0006] Digital images may also be printed at a retail kiosk where the digital image files are transferred to an internal computer or to a printer by physically transferring the memory card or by transferring the digital data by a data link between the kiosk and camera. The utility of the kiosk is limited by its physical location, thus requiring a specific time for the consumer to access these machines which are typically only accessible during business hours.

[0007] As described in commonly-assigned U.S. patent application Ser. No. 09/004,046 filed Jan. 7, 1998 entitled "NETWORK CONFIGURATION FILE FOR AUTOMATICALLY TRANSMITTING IMAGES FROM AN ELECTRONIC STILL CAMERA" to Ward et. al., the disclosure of which is herein incorporated by reference, there exists in the prior art digital electronic cameras that have built-in communication modems. These cameras may be used to send digital image files directly to a photofinisher. However, the camera must be connected to the transmission line for the duration of the transfer of the digital image files, and is of course out of service as a portable image capture device during this time period.

[0008] As described in commonly-assigned U.S. Pat. No. 5,666,159 "ELECTRONIC STILL CAMERA WITH PROGRAMMABLE TRANSMISSION CAPABILITY" to Paruiski et. al., the disclosure of which is herein incorporated by reference, there also exists in the prior art cellular phones with built-in camera modules. The cellular modems in these phones may be used for transferring digital image files to a receiver.

[0009] The present invention provides a simple and economic solution to the problems of the prior art by providing a digital camera system which allows for automatically transferring digital image data, which is simple in construction and easy to use, and which allows digital prints to be automatically printed by a service provider, and for reprints to be conveniently re-ordered by the user.

SUMMARY OF THE INVENTION

[0010] In accordance with one aspect of the present invention there is provided a method for ordering image products or services with respect to stored digital images at a remote location utilizing a communication network comprising:

[0011] creating a high resolution image file for an image captured on a device;

[0012] transferring a copy of the high resolution image file to a remote service provider over a communication network;

[0013] storing a reduced resolution image file corresponding to the high resolution image file on the device;

[0014] deleting the high resolution image file from the device;

[0015] displaying a reduced resolution image corresponding to the reduced resolution image file on the device; and

[0016] ordering goods or services with respect to the displayed reduced resolution image using the corresponding transferred copy of the high resolution image file.

[0017] These and other aspects, objects, features and advantages of the present invention will be more clearly understood and appreciated from a review of the following detailed description of the preferred embodiments and appended claims, and by reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] In the detailed description of the preferred embodiments of the invention presented below, reference is made to the accompanying drawings in which:

[0019] **FIG. 1** illustrates in block form a system and apparatus made in accordance with the present invention;

[0020] **FIG. 2** illustrates in block form another system and apparatus made in accordance with a second embodiment of the present invention;

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[0021] **FIG. 3A** is a flow chart illustrating the method of operation of the system of **FIG. 1**;

[0022] **FIG. 3B** is a flow chart illustrating the method of operation of the system of **FIG. 2**;

[0023] **FIG. 4** illustrates in block form the camera depicted in **FIGS. 1 and 2**;

[0024] **FIG. 5** illustrates in block form the transmitting device depicted in **FIG. 1**;

[0025] **FIG. 6** illustrates the arrangement of files stored on a removable memory card by the camera and transmitting device; and

[0026] **FIG. 7** is a flow diagram illustrating the method of automatically determining the phone number of the closest service provider.

DETAILED DESCRIPTION OF THE INVENTION

[0027] **FIG. 1** illustrates a system **10** made in accordance with the present invention. The system **10** includes an electronic digital still camera **12**. The camera is shown in block diagram form in **FIG. 4**.

[0028] The digital camera **12** produces digital images that are stored on the removable memory card **16**. The camera is powered by rechargeable batteries **344** that connect to power supply **346** which supplies power to the camera circuits depicted in **FIG. 4**. A charger input **348** is provided as an external connection (which can be included as part of interface connection **342**) so that the rechargeable batteries **344** can be recharged by an external power source. The digital camera **12** includes a zoom lens **312** having zoom and focus motor drives **310** and an adjustable aperture and shutter (not shown). The user composes the image using the optical viewfinder **341** and the zoom lens control **334**, and then depresses the shutter button **332** to begin capture of a still image. The zoom lens **312** focuses light from a scene (not shown) on an image sensor **314**, for example, a single-chip color CCD image sensor, using the well-known Bayer color filter pattern. The image sensor **314** is controlled by clock drivers **306**. The zoom and focus motors **310** and the clock drivers **306** are controlled by control signals supplied by a control processor and timing generator circuit **304**. The control processor and timing generator circuit **304** receives inputs from autofocus and auto-exposure detectors **308** and controls a flash **302**. The analog output signal from the image sensor **314** is amplified and converted to digital data by the analog signal processing (ASP) and analog-to-digital (A/D) converter circuit **316**. The digital data is stored in a DRAM buffer memory **318** and subsequently processed by a processor **320** controlled by the firmware stored in the firmware memory **328**, which can be flash EPROM memory.

[0029] The processed digital image file is provided to a memory card interface **324** which stores the digital image file on the removable memory card **16**. Removable memory cards **16** are one type of removable image digital storage medium, and are available in several different physical formats. For example, the removable memory card **16** can include memory cards adapted to the PCMCIA card interface standard, as described in the *PC Card Standard, Release* 2.0, published by the Personal Computer Memory Card International Association, Sunnyvale, Calif., September 1991. The removable memory card **16** can also be adapted to the Compact Flash interface standard, such as described in the *CompactFlash Specification Version* 1.3, published by the CompactFlash Association, Palo Alto, Calif., Aug. 5, 1998, or to the well-known SmartMedia, MemoryStick or SD memory card formats. Other types of removable image digital storage media, such as magnetic hard drives, magnetic tape, or optical disks, can alternatively be used to store the digital images.

[0030] The processor **320** performs color interpolation followed by color and tone correction, in order to produce rendered sRGB image data. The rendered sRGB image data is then JPEG compressed and stored as a JPEG image file on the removable memory card **16**. The JPEG file uses the so-called "Exif" image format defined in "*Digital Still Camera Image File Format (Exif)*" version 2.1, July 1998 by the Japan Electronics Industries Development Association (JEIDA), Tokyo, Japan. This format includes an Exif application segment that stores particular image metadata, for example the date and time the picture was captured, the lens f/number and other camera settings, and image captions or comments that can be selected or entered by the camera user.

[0031] The processor **320** also creates a low-resolution "thumbnail" size image, which can be created as described in commonly-assigned U.S. Pat. No. 5,164,831 "ELECTRONIC STILL CAMERA PROVIDING MULTI-FORMAT STORAGE OF FULL AND REDUCED RESOLUTION IMAGES" to Kuchta, et. al., the disclosure of which is herein incorporated by reference. This thumbnail image has 160×120 pixels, to conform to the DCF rules described later, and is stored in RAM memory **326** and supplied to the color LCD image display **14**.

[0032] The Exif image files, containing the JPEG compressed main image, thumbnail image, and the image metadata, are stored on the removable memory card **16** using a directory structure conforming to the so-called "DCF" rules defined in "*Design Rule For Camera File System*" version 1.0, Dec. 1998 by the Japan Electronics Industries Development Association (JEIDA), Tokyo, Japan. An example directory structure recorded on DOS formatted memory card **16** by the digital camera **12** and the communication device **20** is depicted in **FIG. 6**. Two directories are recorded under the root directory **400**, MISC directory **410** containing a file **412** named AUTOPRNT.MRK and DCIM directory **420** which contains subdirectories **422**, **430** and **440**. File **412** is a Digital Printer Order Format (DPOF) file which specifies images to be printed, as will be described later. Subdirectory **430** is named 101DC280, to conform to the DCF rules, and contains four JPEG compressed Exif image files, PIC_0001.JPG **432**, PIC_0002.JPG **434**, PIC_0003.JPG **436**, and PIC_0004.JPG **438**. Files **432**, **434**, **436**, and **438** are Exif image files captured by the digital camera.

[0033] Subdirectory **422** is named 100REPLY, to conform to the DCF rules. The purpose of subdirectory **422** is to provide a known location for the image processor **320** (see **FIG. 4**) to store confirmation files onto removable memory card **16** as the images stored by the digital camera **12** in subdirectory **430** are transmitted to the service provider **22**. These confirmation files can be reviewed after the transmission is complete. The confirmation files stored in subdirectory **422** can include the thumbnail size JPEG compressed image confirmation files, file **424** named ORD_0001.TMB

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and file **426** named ORD_0002.TMB, the corresponding text confirmation files, file **425**A named ORD_0001.TXT and file **427**A named ORD_0002.TXT, or the corresponding HTML (hyper-text markup language) confirmation files, file **425**B named ORD_0001.HTM and file **427**B named ORD_0002.HTM, or a combination of these JPEG image files, text files, and HTML files. These confirmation files are sent to the removable memory card by the service provider. Files **424**, **425**A, **425**B, **426**, **427**A, and **427**B are recorded on the removable memory card **16** as the Exif images stored in subdirectory **430** are transferred to the service provider **22**, as will be described later. The thumbnails and other files stored in subdirectory **422** are received from the service provider **22** and describe or depict the status of an order transmitted to the service provider.

[**0034**] Subdirectory **440** is named 102PRINT, to conform to the DCF rules. The purpose of subdirectory **440** is to provide a known location for image processor **320** (see **FIG. 4**) to store thumbnail image files onto removable memory card **16** as the full resolution images previously stored by the digital camera **12** in subdirectory **430** are transmitted to the service provider **22** and then deleted from the removable memory card **16**. The deletion of the full resolution images from the memory card will not occur until verification of receipt has been established. Means such as check sums can be used to accomplish the verification. At a later time, the user can review the thumbnail image files stored in subdirectory **440** and decide to order additional prints of particular images, or other types of products. Because the full resolution images are retained by the service provider, only the user ID and image identifier (e.g. the image file name or number) need to be communicated to the service provider **22**. Thus, high quality reprints can be obtained by using the full resolution image data previously transferred to the service provider **22**. The image thumbnail files stored in subdirectory **440** are simply the 160×120 thumbnail images previously stored inside the image files stored subdirectory **430** (e.g. image files **432**, **434**, **436**, or **438**) as part of the Exif image file when the picture was captured. This thumbnail file is extracted from the main image file (e.g. file **432**) when the particular file is transferred by communication device **20**, and stored in subdirectory **440**. Subdirectory **440** may contain a large number of these small thumbnail files, such as file **442** named PRT_0010.TMB, file **444** named PRT_0017.TMB, and file **446** named PRT_0023.TMB. Because of their small size, the removable memory card **16** can store a large number (e.g. hundreds or thousands) of thumbnail image files.

[**0035**] The graphical user interface displayed on the color LCD image display **14** is controlled by mode dial **336** and push buttons **360** shown in **FIG. 1**. The electronic camera **12** can also include a video output driver and connector (not shown) for displaying the captured images or the print status information on a TV (not shown). The user places the mode dial **336** in the "capture" position prior to capturing images. The user places the mode dial **336** in the "review" position in order to review the captured images (e.g. image files **432**, **434**, **436** and **438** in **FIG. 6**.) The user can review the image files and delete undesirable images using push buttons **360**.

[**0036**] When the mode dial **336** is in the "place order" position, the user can decide which images to print, and how many copies to make. The camera creates an image utilization file, as described in commonly-assigned U.S. Ser. No. 09/004,046 filed Jan. 7, 1998 entitled "NETWORK CONFIGURATION FILE FOR AUTOMATICALLY TRANSMITTING IMAGES FROM AN ELECTRONIC STILL CAMERA" to Ward et. al., the disclosure of which is herein incorporated by reference. Using push buttons **360**, the user provides instructions concerning whether to print all or some of the image files (e.g. files **432**, **434**,**436**, and **438** in **FIG. 6**) stored on memory card **16**, and how many copies to make of each particular file. File **412**, named AUTOPRNT.MRK, is an ASCII text file containing these instructions, and is known as a Digital Print Order Format (DPOF) file.

[**0037**] The user may also provide instructions for creating combination images such as album pages, as described in commonly-assigned U.S. Pat. No. 5,940,121 entitled: HYBRID-CAMERA SYSTEM WITH ELECTRONIC ALBUM CONTROL to McIntyre et. Al., the disclosure of which is herein incorporated by reference. In this case, the user controls **330** and color LCD image display **14** allow the user to group images that should be printed on the same album pages. In some embodiments, the camera can also include a user interface for inputting annotated text which can be added to album pages. The album-related data is stored in the DPOF file **412** using the DPOF vendor extension mechanism, and the DPOF file **412** is transmitted to the service provider **22** along with the appropriate images from subdirectory **430**. The album-related data within the DPOF file **412** allows the service provider **22** to automatically print the images in an album-like format.

[**0038**] In a camera capable of digitally zooming and cropping an image file after it is captured, the thumbnail images may reflect the zoomed and cropped portion of the image. This may be achieved by storing thumbnails which only reflect the final zoomed and cropped image, or by overlaying a zoom and crop retical on the thumbnail image of the original (uncropped) image. The entire full resolution image may be sent to the service provider along with the cropping co-ordinates, or only the portion necessary for printing may be sent.

[**0039**] The user may establish a default order condition. The user may use push buttons **360** for selecting or modifying a default order condition. This default order condition may contain information on print size, print paper surface, selection of particular album page styles, number of copies, and many other selections. The camera may automatically assign these conditions to prints not specified otherwise by the user in the DPOF file. Alternatively, the default order condition may be stored by the service provider and used to perform the default services unless the DPOF file specifies otherwise. The user may specify the default order condition to the service provider by a number of means including a file created by the camera, a phone conversation, or a file created on a computer.

[**0040**] The user can also review the thumbnail image files stored in subdirectory **440**. Using push buttons **360**, the user reviews the thumbnail image files, (e.g. files **442**, **444**, **446** in **FIG. 6**) and selects one or more images that they would like to reprint. This might typically occur as the user shares images with friends or family by showing them the thumbnail image files on the color LCD image display **14**. To order reprints, the user selects, using push buttons **360**, which images to print, how many copies to make, etc. The Digital Print Order Format (DPOF) file **412** is then updated to

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include this print order, and to indicate via the image pathname, that the images to be printed are already stored at the service provider **22**.

[**0041**] The mode dial **336** includes an "order status" position. This order status mode allows the user to review any confirmation files written by image processor **320** into the 100REPLY subdirectory **422** on removable memory card **16**. The confirmation files in subdirectory **422** indicate the status of previous print orders made using this memory card. The confirmation files include thumbnail images (e.g. thumbnail image files **424** and **426** in **FIG. 6**) that can be viewed as standard images on any DCF compliant digital camera. These thumbnail images may include text messages, icons, etc. The confirmation files can also include text confirmation files (e.g. the ORD_0001.TXT file **425**A and the ORD_0002.TXT file **427**A) or html confirmation files (e.g. the ORD_0001.HTM file **425**B and the ORD_0002.HTM file **427**B) that can be viewed on a camera designed to support these file types. The text confirmation files **425**A and **427**A and the html confirmation files **425**B and **427**B may contain detailed information concerning order status, special pricing advertisements, etc., that the user can scroll through using user controls **330**. These file types allow more detailed confirmation information to be conveyed in a small size file, compared to the JPEG thumbnail confirmation files **424** and **426**. The user can review the confirmation files in 100REPLY subdirectory **422**, and delete some or all of the confirmation files if desired, using push buttons **360** in **FIG. 4**. Alternatively, the processor **320** can automatically display any new confirmation files stored in the 100REPLY subdirectory **422** as soon as they are received from service provider **22**. The user can review the confirmation files in 100REPLY subdirectory **422**, and delete some or all of the confirmation files if desired, using push buttons **360**.

[**0042**] An interface connection **342** can be used to connect between the interface **322** in the electronic camera **12** and the corresponding camera interface in the communication device **20**. The interface connection **342** may conform to, for example, the well-know universal serial bus (USB) interface specification, or to many other standard interfaces. The interface connection **342** can alternatively be connected to a host computer (not shown), which can serve as an alternative communication device. The interface connection **342** is used to transfer images from removable memory card **16** to communication device **20**. The interface connection **342** can also be used to transfer data from the host computer (not shown) to firmware memory **328** in camera **12**. In particular, it can optionally be used to transfer phone numbers, e-mail addresses, Internet URLs, etc. to firmware memory **328**, as described in previously cited U.S. patent application Ser. No. 09/004,046. In this case, when the user places the mode dial **336** in the "place order" position, the user can also decide to transmit some or all of the digital images to one or more e-mail addresses, or to upload the images to one or more web sites. The e-mail addresses, web site URLs, and image lists are recorded in the DPOF file **412** using the DPOF vendor extension mechanism. In addition, other types of photo products, such as a Picture CD **28** in **FIG. 1** having digital image files stored thereon, photo albums, mugs, T-shirts, etc. may be optionally ordered from digital camera **12** by uploading the appropriate information from host computer (not shown) or service provider **22** to firmware memory **328**, or by storing the appropriate information on removable memory card **16**.

[**0043**] As illustrated by **FIG. 1**, after the image files (e.g. image files **432**, **434**, **436** and **438**) and print utilization file (e;g. DPOF file **412**) have been recorded by digital camera **12**, the digital camera **12** is connected to communication device **20**. The communication device **20** is designed to dock with the digital camera using the interface connection **342**. The communication device **20** can include a recess **31** into which the digital camera **12** is placed, which also aligns an electrical connector (not shown) on the digital camera **12** with a mating connector (not shown) on the communication device **20** in order to provide the interface connection **342**. Alternatively, an appropriate cable, such as a USB cable, can serve as the interface connection **342** between the digital camera **12** and the communication device **20**.

[**0044**] When the digital camera **12** is connected to the communication device **20** using interface connection **342**, the processor **320** in the digital camera **12** and the microprocessor **80** in the communication device **20** co-operate to transfer the DPOF file **412** (see **FIG. 6**) and the appropriate images from subdirectory **422** referenced by the DPOF file to the service provider **22**. The communication device **20** is one type of communication device, and is designed to communicate with service provider **22** over a communication network **24**. In the particular embodiment illustrated in **FIG. 1**, the communication network **24** comprises phone lines. However, it is to be understood that that the communication device may utilize any other type of communication network, including wireless networks, as will be described in reference to **FIG. 2**. The service provider **22** produces the appropriate goods and/or services which in the particular embodiment may comprise prints **26**, picture CDs **28** having digital image files stored thereon, photoalbums, mug, T-shirts, and other items incorporating personal images. The ordered goods or services can then be returned or provided to the customer. In the case of goods, these are delivered to the customer, for example through the mail system.

[**0045**] The communication device **20** is a relatively simple to use, dedicated device for transferring images from digital camera **12** to service provider **22**. The communication device **20** is shown in block diagram form in **FIG. 5**. The communication device **20** includes a low cost microprocessor **80** which is controlled by firmware stored in firmware memory **88** and a camera interface **84** which interfaces with interface **322** in digital camera **12** via interface connection **342**. Firmware memory **88** can be Flash EPROM memory. The communication device **20** also includes a modem **82**. The modem **82** is connected to a telephone connector **29**, which is designed to be connected to a phone line in the same manner as a telephone and other similar type equipment. It should be noted that the microprocessor **80**, modem **82**, memory card interface **84** and firmware memory **88** can alternately be fabricated on the same integrated circuit.

[**0046**] The communication device **20** also includes two indicating lights **34** and **36**. In the embodiment illustrated indicating light **34** is a green status light indicating that the digital data has been sent to the service provider and indicating light **36** is a red light that indicates that the data has not yet been transmitted to the service provider **22**.

[**0047**] A power connector **32** is provided for providing electrical power to the power supply **86** within communi-

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cation device **20**. The power supply **86** may also supply power to the digital camera **12** for charging the rechargeable batteries **344** (see **FIG. 4**) via charger input **348**. The charger input **348** of the digital camera **12** may be connected to the communications device **20** as part of interface connection **342**, or using a separate electrical connector. The communication device **20** also includes a start button **38** which is be used to initiate operation of communication device **20** by the user. Alternately, the docking of the digital camera **12** can be automatically detected by camera interface **84**, so that the start button **38** is not required.

[**0048**] The microprocessor **80** in the communication device **20** reads DPOF file **412** to determine which images need to be transmitted to the service provider **22**. Additionally, the microprocessor **80** includes an internal clock (not shown) that is regulated in accordance with a standard time clock such that the transmission of digital data occurs at certain designated time periods. For example, data may be transmitted only at off hours, (e.g. during the middle of the night) when transmission rates are low and there is a relatively lower chance of disruption to the user in the use of the network system. It is of course understood that the communication device **20** may be programmed for allowing transmission during at any desired time period. A status light **40** may also be provided for indicating that power is being supplied to the communication device **20**.

[**0049**] The communication device **20** may be simpler or alternately more complex, than the device depicted in **FIG. 5**. In order to minimize the cost and maintenance of the communication device **20**, the firmware memory **88** in the communication device **20** or the firmware memory **328** in the digital camera **12** may be preprogrammed with a phone number of the service provider **22** which will be automatically accessed over the phone lines. Alternate or back-up phone numbers can be also programmed in the event that the first number called is busy or becomes inaccessible. However, this is transparent to the user as this may be automatically done by the software program used to operate communication device **20**. This software-program, along with the appropriate phone numbers, can be stored in firmware memory **88**, which can be a Flash EPROM memory.

[**0050**] Alternatively, the process illustrated in **FIG. 7** may be used to determine the location of the nearest phone connection to a service provider. This is useful in the situation where the user is traveling (e.g. on vacation), and wants to transfer images to the service provider from various locations. Using a nearest service provider normally reduces the cost of the telephone call when transferring images, and shortens the shipping time. When the user presses the start button **38** in block **500**, the processor **80** determines if there is a local number stored in the firmware memory **88** (block **502**). The first time the communication device **20** is used, a local number is not stored. In this case, the processor **80** retrieves from firmware memory **88** a toll-free phone number (e.g. an "800" number), and dials the number in block **510**. In block **520**, the nationwide service provider receives the call and determines, using the local exchange information, the location of the communication device **20**. The nationwide service provider then communicates the phone number of the closest local service provider to the communication device **20**. In block **530**, the communication device **20** stores the number of the local service provider in firmware memory **88** and disconnects from the nationwide number.

[**0051**] In block **540**, the communication device **20** then dials the newly stored number of the closest local service provider. If in step **502** a local number has previously been stored, blocks **510**, **520**, and **530** are skipped, and the local number is immediately dialed in block **540**. If the call is successfully answered in block **542** by the local service provider, the communication device **20** transfers the images to the local service provider in block **550**, and then disconnects. In some cases, the call is not successful in block **542**. For example, the communication device **20** may have been moved from one city to another, or the local service provider may be experiencing a service outage. In this case, the processor **80** determines how many "retries" have occurred (block **544**) since the start button was pressed in block **500**. If there have been less than a preset number N of retries (e.g. N=2), the communication device **20** repeats steps **510**, **520**, and **530** to obtain a new local service provider number.

[**0052**] If there have been more than N retries, the communication device provides a error indication to the user in block **560**. This error indication can be provided by blinking the red indicating light **36**, and by creating an error file, and storing the file in subdirectory **422** on removable memory card **16**. The error file provides, using text and icons, the details of why the images could not be successfully transferred to a local service provider, and has the same structure as the confirmation files stored in subdirectory **422**. Thus, the error file can include a thumbnail size JPEG compressed image files, similar to file **424** named ORD_0001.TMB, or a corresponding text confirmation file, similar to file **425**A named ORD_0001.TXT, or a corresponding HTML (hypertext markup language) confirmation files, similar to file **425**B named ORD_0001, or a combination of these JPEG image files, text files, and HTML files. The error file can be reviewed by the user on the color LCD image display **14** of the digital camera **12**.

[**0053**] In order for the customer to obtain the appropriate services from the service provider **22**, the owner of communication device **20** registers the serial number of the device and provides an appropriate method for paying for the goods and/or services that are to be provided. For example, a payment identifier (e.g. a credit card or debit card number) of a customer account could be provided at time of registration. The customer's account that is debited can, of course, be located at a remote financial institution. Typically, as with credit cards, this financial institution will make payment to service provider **22**. This is generally done by wiring the amount into the direct provider's account, generally an account established with another financial institution. Alternately, the customer could be billed or maintain an account which is billed on a periodic basis and would remain opened as long as the customer appropriately pays in an appropriate manner.

[**0054**] In one form of the present invention, the consumer buys the digital camera **12** and communication device **20**, and signs up for service from service provider **22**. This may be done via a network such as the Internet, using the method described in commonly-assigned U.S. patent application Ser. No. 09/534,471, filed Mar. 24, 2000, entitled "LEASING A CONFIGURED CAMERA SYSTEM", to Parulski,

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the disclosure of which is herein incorporated by reference. Alternatively, the customer may visit a retail establishment to buy or rent the digital camera **12** and the communication device **20**. The customer may get the digital camera **12** and the communication device **20** free or at a reduced fee as part of a service plan. The consumer provides a payment identifier, phone number, and address to the service provider via the retail establishment. Alternatively, the network service provider may be responsible for billing, so the credit card number will be unnecessary.

[**0055**] After the consumer has docked the digital camera **12** into the communication device **20**, the customer may press button **38** to initiate data transfer. Alternatively, the communication device **20** may wait to initiate data transfer until a predetermined time when transmission rates are low or use of the transmission network by the consumer is unlikely. The communication device **20** may make a call to the service provider immediately to receive a preferred time for transmission. This preferred time may be determined by the service provider on the basis of lowest transmission rates, volume of data being received at the service provider, or unlikely utilization of the transmission network by the consumer. The communication device **20** may also monitor consumer usage of the transmission network and choose transmission times (periods) which are unlikely to interfere with other consumer usage. If the communication device **20** should lose its time reference, it may call the service provider **22** to reprogram its clock. The device may also include an input device for correcting of the internal time clock of the communication device. **20**. Alternatively, the service provider **22** may check the communication device **20** to determine that the internal clock is correct. If the internal clock of communication device **20** is not correct, the service provider **22** may reprogram the communication device **20** with the correct time by providing appropriate commands.

[**0056**] In some embodiments, the communication device **20** is dedicated to a single service provider **22**. When the communication device **20** calls the service provider **22**, it provides a unique identification number (unique ID) to the service provider **22**. This identification number is stored in firmware memory **88** and is not known to the user. The service provider **22** receives the identification number and then enables the communication device **20** to function in order to transfer images. In these embodiments, the communication device **20** is programmed to call only the number provided by the service provider **22**. In the event that the service provider **22** changes phone lines by which the appropriate communication is to be made, the service provider can call the communication device **20** and download the new number to the communication device **20**, which stores the new number in firmware memory **88**. Since the service provider is the only entity that knows the unique identification number of the communication device **20**, the number can not be inadvertently removed or changed.

[**0057**] If for any reason the interface connection **342** used to connect between the interface **322** in the electronic camera **12** and the corresponding camera interface in the communication device **20** is broken, the incomplete transmission must be addressed. The service provider may time out the connection after a specific time period. The camera will also need to end transmission after a time of no response from the service provider. When the interface is reestablished, transmission may be continued from the previous logical breakpoint which insures no image data has been lost. Additionally, if the user desires to use the camera, transmission may be terminated on the basis of termination conditions such as touching or moving the camera. Upon detecting termination conditions, the camera may send a termination message to the service provider and cease transmission. In this manner, the camera will be ready for use whenever the user desires.

[**0058**] In order to more clearly understand the embodiment illustrated in **FIG. 1**, a description of the operation of digital camera **12** and communication device **20** in system **10** will now be discussed as illustrated by **FIG. 3A**. In block **50**, the consumer captures appropriate digital images with the digital camera **12** which are stored on removable memory card **16** as Exif image files containing appropriate metadata. When the consumer has completed capturing of the images and creating an appropriate DPOF order file **412** in **FIG. 6**, at block **54** the digital camera **12** is connected (e.g. docked) with the communication device **20** and the start button **38** is activated. Alternately, the insertion of the memory card can be automatically detected, so that the start button **38** is not needed.

[**0059**] Thereafter, the communication device **20** will remain dormant at block **56** until the predetermined time period criteria has been met for transmitting of the data to the service provider. For example, if the communication device **20** has been programmed to transmit the digital images and DPOF file **412** during the time period from 12 Midnight to 3 in the morning, the communication device **20** will remain dormant and then at block **58** will send the data at the appropriate time. The red light will be maintained as long as the images have not yet been transferred. In the unlikely event that the consumer needs the phone while data transmission is being conducted, transmission will terminate. This information can be noted by communication device **20** and when the phone line frees up, the continued transmission can be automatically re-instituted at the point at which it was stopped.

[**0060**] At block **60**, the service provider **22** downloads one or more confirmation files to the communication device **20**, which records these confirmation files on removable memory card **16**. These confirmation files can include thumbnail image files (e.g. files **424** and **426**) that are displayed on the color LCD image display **14** on the camera when the user places the mode dial **336** in the "order status" position, as described earlier in relation to **FIG. 4**. The confirmation thumbnail image files (e.g. files **424** and **426**) can contain text and icons to acknowledge how many images have been received, and what good/services are to be provided. The confirmation thumbnail image files (e.g. files **424** and **426**) can also include other information, such as how much the order will cost, the expected arrival time, and other product offerings, including promotional offers.

[**0061**] Upon completion of transmission of the device at block **62**, the green indicating light **34** is activated. At block **64**, following successful transmission to the service provider **22**, the thumbnail images from the Exif image files in subdirectory **430** (see **FIG. 6**) are transferred to subdirectory **440** as appropriately named thumbnail files, so that additional prints can be ordered in the future. The digital image files are retained by the service provider **22** for a period of time (e.g. 1 year) or indefinitely, depending on the service

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arrangement. The full resolution image files in subdirectory **430** and the DPOF file **412** are deleted from removable memory **16**, thus freeing up most of the memory contained on removable memory **16** for use by the camera **12**. Alternatively, the digital image files and associated data may be retained on the memory card until deleted by the user.

[**0062**] At block **66**, the user reviews the thumbnail images stored in subdirectory **440** during block **64**. The user selects particular images of interest, and orders photo products (e.g. reprints, PictureCD, mugs, T-shirts) using these images. Since the full resolution image has been previously uploaded to the service provider **22**, only the product information and image identifier need to be communicated from the camera **12** to the service provider **22**. This enables the user to show their friends and family previously uploaded images, using display **14** of digital camera **12**, and then order extra prints or other photo products without having to retain the full resolution digital images on the removable memory **16**.

[**0063**] In an alternative embodiment depicted in **FIG. 2**, the digital camera **12**A includes a cellular modem **390** (see **FIG. 4**) connected to a RF antenna **392**, so that a separate communication device **20** is not necessary. The digital camera **12** communicates with a cellular RF antenna tower **23** and associated equipment that connects to telephone communications network **24** in order to communicate with service provider **22**.

[**0064**] The digital images stored on the memory card **16** are automatically transferred from the digital camera **12** to the service provider **22** via the cellular modem after several images (e.g. after four images) have been captured by the digital camera **12**. As a result, the capacity of the removable memory **16** can be greatly reduced. Alternatively, the removable memory **16** can be replaced by a smaller internal (non-removable) memory.

[**0065**] In order to more clearly understand the embodiment illustrated in **FIG. 2**, a description of the operation of digital camera **12** and communication device **20** in system **10** will now be discussed as illustrated by **FIG. 3B**. In block **50**, the consumer captures appropriate digital images with the digital camera **12** which are stored on removable memory card **16** as Exif image files containing appropriate metadata. In block **53**, the image processor **320** in the digital camera **12** determines when a factory default (or alternatively a user predefined) number of images have been captured (e.g. after each image is captured, or after 4 images have been captured, or after 10 images, etc.).

[**0066**] In block **55**, after the proper number of digital images have been captured and stored in subdirectory **430** (see **FIG. 6**), the image processor in the digital camera **12** initiates transfer of the stored captured images via the cellular modem **390**. The phone number called is the phone number of the local service provider stored in the firmware memory **328** of digital camera **12**. Alternatively, the method described earlier in relation to **FIG. 7** can be used. In this case, an 800 number of a nationwide service provider is used to determine the closest local service provider.

[**0067**] At block **60**, the service provider **22** transfers confirmation files to the digital camera **12**. As described earlier, these confirmation files can include one or more confirmation thumbnail image files, text files, and/or HTML files, which the image processor **320** records on removable memory **16** in subdirectory **422**. These confirmation thumbnail image information files (e.g. files **424** and **426**) are displayed on the color LCD image display **14** on the camera when the user places the mode dial **336** in the "order status" position, as described earlier in relation to **FIG. 4**. The confirmation thumbnail image files (e.g. files **424** and **426**) can contain text and icons to acknowledge how many images have been received, how much the order will cost, the expected arrival time, and other product offerings, including promotional offers. Each time a group of images is transferred, a new confirmation thumbnail image file may be created containing status information for all of the transfers for a set period of time (e.g. all of the transfers for that day) so that the user does not need to review a large group of confirmation thumbnail image files.

[**0068**] At block **64**, following successful transmission to the service provider **22**, the thumbnail images from the Exif image files in subdirectory **430** (see **FIG. 6**) are transferred to subdirectory **440** as appropriately named thumbnail files, so that additional prints may be ordered in the future. The digital image files are retained by the service provider **22** for a period of time (e.g. 1 year) or indefinitely, depending on the service arrangement. The digital image files in subdirectory **430** and the DPOF file **412** are deleted from removable memory **16**, thus freeing up most of the memory contained on removable memory **16** for use by the camera **12**.

[**0069**] At block **65**, the service provider produces a PictureCD write-once optical disc, or other type of digital image data recording using magnetic or optical media. The PictureCD is then mailed to an address supplied by the user when the user initiated the service. This may be done on a calendar basis (e.g. every month or every year) or after a specific number of digital images (e.g. after 200 images) have been transferred from the digital camera **12** to the service provider **22**. In addition, the service provider **22** may make the digital images available to the user via an Internet web site.

[**0070**] The invention has been described in detail with particular reference to certain preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the scope of the invention. The present invention being defined the claims that follow.

PARTS LIST

[**0071**] **10**. system

[**0072**] **12**. camera

[**0073**] **14**. image display

[**0074**] **16**. memory card

[**0075**] **20**. communication device

[**0076**] **22**. service provider

[**0077**] **23**. antenna tower

[**0078**] **24**. communication network

[**0079**] **26**. prints

[**0080**] **28**. Picture CD

[**0081**] **29**. telephone connector

[**0082**] **31**. recess

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[0083] **32**. power connector
[0084] **34**. indicating light
[0085] **36**. indicating light
[0086] **38**. start button
[0087] **50**. block
[0088] **53**. block
[0089] **54**. block
[0090] **55**. block
[0091] **56**. block
[0092] **58**. block
[0093] **60** block
[0094] **62**. block
[0095] **64**. block
[0096] **66**. block
[0097] **80**. microprocessor
[0098] **82**. modem
[0099] **84**. interface
[0100] **86**. power supply
[0101] **88**. firmware memory
[0102] **302**. flash
[0103] **304**. timing generator circuit
[0104] **306**. clock drivers
[0105] **308**. auto-exposure detectors
[0106] **310**. focus motors
[0107] **312**. zoom lens
[0108] **314**. image sensor
[0109] **316**. converter circuit
[0110] **318**. DRAM buffer memory
[0111] **320**. processor
[0112] **322**. interface
[0113] **324**. memory card interface
[0114] **326**. RAM memory
[0115] **328**. firmware memory
[0116] **330**. user controls
[0117] **332**. shutter button
[0118] **334**. zoom lens control
[0119] **336**. mode dial
[0120] **341**. optical view finder
[0121] **342**. interface connection
[0122] **344**. batteries
[0123] **346**. power supply
[0124] **348**. charger input
[0125] **360**. push buttons
[0126] **390**. cellular modem
[0127] **392**. antenna
[0128] **400**. root directory
[0129] **410**. MISC directory
[0130] **412**. file
[0131] **420**. DCIM directory
[0132] **422**. subdirectory
[0133] **424**. file
[0134] **425**A. file
[0135] **425**B. file
[0136] **426**. file
[0137] **427**A. file
[0138] **427**B. file
[0139] **430**. subdirectory
[0140] **432**. JPEG compressed Exif image file
[0141] **434**. JPEG compressed Exif image file
[0142] **436**. JPEG compressed Exif image file
[0143] **438**. JPEG compressed Exif image file
[0144] **440**. subdirectory
[0145] **442**. file
[0146] **500**. block
[0147] **502**. block
[0148] **510**. block
[0149] **520**. block
[0150] **530**. block
[0151] **540**. block
[0152] **542**. block
[0153] **544**. block
[0154] **550**. block
[0155] **560**. block

1. A method for ordering image products or services with respect to stored digital images at a remote location utilizing a communication network comprising:

creating a high resolution image file for an image captured on a device;

transferring a copy of the high resolution image file to a remote service provider over a communication network;

storing a reduced resolution image file corresponding to the high resolution image file on the device;

displaying a reduced resolution image corresponding to the reduced resolution image file on the device; and

ordering goods or services with respect to the displayed reduced resolution image using the corresponding transferred copy of the high resolution image file.

2. The method of claim 1, wherein ordering goods or services further comprises transmitting an identifier associ-

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ated with the displayed reduced resolution image corresponding to the transferred high resolution image file to the remote service provider.

3. The method of claim 1, wherein storing the reduced resolution image file further comprises storing the reduced resolution file on removable storage medium.

4. The method of claim 1, wherein creating the high resolution image file further comprises creating the high resolution image file of an image captured on a camera.

5. The method of claim 1, wherein creating the high resolution image file further comprises creating the high resolution image file of an image captured on a wireless device.

6. The method of claim 1, wherein transferring the high resolution image file further comprises transferring a high resolution digital image file.

7. The method of claim 1 further comprising providing confirmation from the service provider that the high resolution image file has been transmitted to the service provider.

8. The method of claim 7 wherein providing the confirmation further comprises providing a confirmation using low resolution images.

9. The method of claim 7 wherein providing the confirmation from the service provider further comprises providing the confirmation using a text file.

10. The method of claim 1, wherein transferring the copy of the high resolution image file further comprises transferring the high resolution image file having cropping coordinates.

11. The method of claim 1, wherein transferring the copy of the high resolution image file further comprises transferring a portion of the high resolution image file.

12. The method of claim 2, wherein transmitting the identifier further comprises transmitting the identifier indicating selected services and indicating the high resolution image file to the service provider.

13. The method of claim 1 further comprising deleting the high resolution image file from the device.

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