

Exacq Technologies, Inc.  
Exhibit 1002

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	Joe Robert Marchese	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	1883-3001-7	

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4814869		1989-03-21	Oliver	
	2	4991193		1991-02-05	Cecil, et al.	
	3	5311306		1994-05-10	Tanaka, et al.	
	4	5512974		1996-04-30	Abe, et al.	
	5	5561476		1996-10-01	Kershaw, et al.	
	6	5625410		1997-04-29	Washino, et al.	
	7	5724475		1998-03-03	Kirsten	
	8	5761655		1998-06-02	Hoffman	

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9	5786872		1998-07-28	Miyazaki, et al.	
10	5805801		1998-09-08	Holloway, et al.	
11	5861924		1999-01-19	Pan, et al.	
12	6002428		1999-12-14	Matsumura, et al.	
13	6002995		1999-12-14	Suzuki, et al.	
14	6092078		2000-07-18	Adolfsson	
15	6115035		2000-09-05	Compton, et al.	
16	6175622		2001-01-16	Chiniwala, et al.	
17	6178419		2001-01-23	Legh-Smith, et al.	
18	6233428		2001-05-15	Fryer	
19	6269309		2001-07-31	Buckingham	

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	20	6396533		2002-05-28	Hudson	
	21	6516340		2003-02-04	Boys	
	22	6583813		2003-06-24	Enright, et al.	
	23	6891566		2005-05-10	Marchese	

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	1	20010008014		2001-07-12	Farrell, et al.	
	2	20050200714		2005-09-15	Marchese	
	3	20060106729		2006-05-18	Roberts,Jr.	

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1	JP2004178565	JP		2004-06-24	Suga, et al.	English Abstract included	<input type="checkbox"/>
2	GB2329541	GB		1999-03-24	Sony UK Ltd.		<input type="checkbox"/>
3	WO98/34360	WO		1998-08-06	Intellect Network Technologies		<input type="checkbox"/>
4	WO01/69405	WO		2001-09-20	Marchese		<input type="checkbox"/>

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	1	International Search Report for PCT/US01/08133, 26 July 2001, 3 pages	<input type="checkbox"/>
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	3	BISDIKIAN et al. "On the Effectiveness of Priorities in Token Ring for Multimedia Traffic," in Proc. 18th Annual Conference Local Computer Networks, Minneapolis, MN, Sept. 1993, pp. 25-31	<input type="checkbox"/>
	4	A Brief History of the Cygwin Project, retrieved from <a href="http://cygwin.com/history.html">http://cygwin.com/history.html</a> , June 14, 2994, 18 pages	<input type="checkbox"/>
	5	MARSHALL K. MCKUSICK, et al. "A Fast File System for UNIX," ACM Transactions on Computer Systems, Vol. 2, No. 3, August 1984, Pages 181-187	<input type="checkbox"/>

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6	AR(4) Man Page, retrieved Sept. 2, 2003 from <a href="http://docs.sun.com/db/doc/801-6680-01/6i11qc0ml?a=view">http://docs.sun.com/db/doc/801-6680-01/6i11qc0ml?a=view</a> , 4 pages	<input type="checkbox"/>
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9	Beausoft Main Page Archive (February 29, 2000), retrieved from <a href="http://web.archive.org/web/2000229205711/http://beausoft.com/">http://web.archive.org/web/2000229205711/http://beausoft.com/</a> , 2 pages	<input type="checkbox"/>
10	R. FIELDING, et al., "Request for Comments (RFC) 2068", Hypertext Transfer Protocol -- HTTP/1.1, January 1997, 162 pages	<input type="checkbox"/>
11	JPEG Standard, ISO/IEC IS 10918-1 ITU-T Recommendation T.81, September 1992, 186 pages	<input type="checkbox"/>
12	Webcam Watcher Online Help, Webcam Watcher Version 3.0, Copyright 2001 Beau Software, date unknown, 6 pages	<input type="checkbox"/>
13	Beausoft Webcam Watcher Description Page (February 29, 2000), retrieved from <a href="http://web.archive.org/web/2000620224026/www.webcam-watcher.com/wcwindex.html">http://web.archive.org/web/2000620224026/www.webcam-watcher.com/wcwindex.html</a> , 4 pages	<input type="checkbox"/>

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/James D. Stevens/	Date (YYYY-MM-DD)	2010-02-18
Name/Print	James D. Stevens	Registration Number	35691

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## **DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS**

### **CROSS-REFERENCE TO RELATED APPLICATION**

[0001] This application is a continuation of U.S. Application Number 11/125,795 filed May 10, 2005, which is a continuation of U.S. Application Number 09/808,543, filed March 14, 2001, now U.S. Patent No. 6,891,566, which claims the benefit of Provisional Patent Application 60/189,162 filed March 14, 2000. The entire disclosure of these applications are hereby incorporated by reference.

### **TECHNICAL FIELD**

[0002] This invention relates to systems for accessing, recording, and displaying camera images from any of a number of remotely located cameras and, more particularly, to such systems that provide access to images from one or more remote cameras over a public or private computer network.

### **BACKGROUND OF THE INVENTION**

[0003] With the continuing expansion and availability of public and private computer networks it is becoming increasingly common to use these networks for remote video and image surveillance. Historically, analog systems have been used for CCTV systems for purposes such as surveillance. They include an analog video camera, a video cable, and a monitor/ TV and/or a VCR recording device. Multiple cameras can be hooked to multiple recording VCRs for complete coverage of one or more target areas. Specialized equipment known as a multiplexer or 'MUX' can be used to allow multiple cameras to be hooked to a single recording/view device. The multiplexer takes all video feeds in a sequential fashion, recording from one camera at a time. This allows the quantity of cameras to share a single recording tape. Besides the limitations of a serial tape system, additional limitations are introduced when the sequencing rate of the multiplexer is too slow to allow sufficient video record/view speed of a given camera view. Multiplexers are typically expensive and have limited expandability without purchasing additional complete systems. Also, the

configuration of these systems usually requires a skilled technician to be available at the systems site which increases the total cost of implementing such systems.

[0004] Digital systems have become more prevalent with the advent of standardized digital componentry. These systems utilize the same analog cameras and cabling, but introduce a capture card based collector. This collector can be a proprietary digital device or a PC based computer, either of which has analog video inputs directly connected to it. These inputs convert the video to digital for viewing and recording and may even retransmit the signal to analog tape for recording purposes. A factor limiting these digital systems is that an autonomous computer is required relatively near the video sources, sometimes with user intervention required at regular intervals. These machines are also hardware bound. The number of capture cards is limited to the specific design of the collecting equipment. These systems are usually proprietary to a particular manufacturer and can be very expensive. Remote viewing is usually not available. Failover or redundancy function is also limited and expensive, due to the fact that the system is usually duplicated for redundancy. As with the analog systems discussed above, these systems also have configuration requirements that typically require a skilled technician.

[0005] There now exists commercially available networkable cameras that can be accessed over networks running TCP/IP, including both LANs and global networks such as the Internet. Ethernet-based digital video servers are now common that are small, autonomous, and usually contain a web-based configuration utility, as well as administration software. These cameras can be accessed and, in the case of pan/tilt/zoom (PTZ) cameras, controlled over the network using an assigned IP address and standard CGI-based URL syntax or other manufacturer-specified addressing protocols. This allows an authorized user to control the product from anywhere via the Internet or a dialup connection, and allows live images and image streams (video) to be accessed remotely using standard web browsers.

[0006] The video servers exist in two forms. One is a camera server that is a complete product containing both a camera and a web server with an Ethernet port. The other is a component based video server with inputs for one or more analog video feeds, which the user can connect to conventional camera PAL or NTSC video feeds. The inputted analog video feeds are converted to digital signals and sent from the video servers' Ethernet port. Thus, the

video servers (whether integrated in as part of a camera server or as a standalone unit) can be connected to the Ethernet-based networks commonly used in businesses and other computer enabled sites. These video servers can be connected to these network segments and are fully compatible with existing data on these networks. The video data can be received by standard PC computers which require no special hardware other than an Ethernet connection. The cameras can be easily configured by a novice user who has very basic experience with the Internet.

[0007] Ethernet video servers connect to an Ethernet connection and deliver digital video based on user requests or internal scripting agents. A user requests video images via standard CGI enhanced URL syntaxes. These syntaxes control the image metrics and other features of the requested video stream. The images are sent to the user as either static JPG snapshots, or as continuous JPG streams. Rates to 30 FPS are easily attainable. Since these images are delivered by Ethernet, the camera servers are very robust. Although a requested image may not be received completely in an expected time frame, the video server will wait for the user to complete its requests and processing. This virtually guarantees delivery of video, except where a connection to the video server is terminated.

[0008] When the user requests a video image or stream, the user is actually requesting a static image that appears to exist as a file in a directory structure on the video server. When the user requests a copy of this image, the video server actually updates it with a new image from the camera source, and the user receives a picture that is up to date. Subsequent requests are to the identical file name, and the server does the updating of its content.

[0009] Although IP-based network cameras and camera servers have now evolved to a relatively advanced state, the use of a browser-based interface to this hardware has seemingly impeded development of user interfaces that provide simplified, automated control over the acquisition of snapshot and streaming images over the network. Access to the camera images typically requires knowledge of the manufacturer's CGI-based syntax to access snapshot or streaming images. For example, to access a particular camera, the user may have to specify to the browser an address in the form of `http://Uid:PW@111.111.111.111/cgi-bin/fullsize.jpg?camera=1&compression=1`. While this may be handled easily enough for a single camera by bookmarking or pulling the URL out of the browser's history buffer, the task

becomes more difficult when the user desires to change the access parameters or where different cameras need to be accessed. Where the identified camera cannot be accessed, such as for example due to an improper address being specified, the user may simply receive a standard "404 not found" error message that is not helpful in diagnosing either the error or actual reason why access was not available.

[0010] Moreover, browser-based access is typically limited to either a snapshot mode or streaming images. In the snapshot mode, a single image is returned when the appropriate URL is entered into the browser. Subsequent images from the camera are then accessed using the browser's "reload" or "refresh" button. In the streaming mode, once the appropriate URL is specified, the remote server or camera simply begins streaming image files back to the browser. This results in relatively high network utilization that may be undesirable in a shared network environment.

[0011] It is therefore a general object of this invention to provide an improved user interface and approach to the network transmission of images from commercially available network cameras.

### SUMMARY OF THE INVENTION

[0012] In accordance with the invention, there is provided a digital video system which includes a client computer, one or more video servers accessible by the client computer over a network, and a plurality of cameras connected to the video servers. The one or more video servers provide an interface between the cameras and client computer, with images from the cameras being accessed by the video servers and then sent to the client computer upon request by the client computer. The client computer provides a user interface display on the computer that includes a display window for each of the cameras accessed over the network and that displays in each of the display windows an image received from the camera associated with that display window.

[0013] In accordance with another aspect of the invention, there is provided a computer readable medium for use by the client computer in providing the user interface display. The computer readable medium includes a digital storage device and a user interface program



stored on the digital storage device in computer readable form. The program is operable upon execution by the computer to access camera data uniquely identifying the cameras and to attempt access to the cameras over the network using the camera data. The program is further operable to verify access to those ones of the cameras that are accessible over the network and to generate the user interface display and to display in each of the display windows an image received from the camera associated with that display window.

[0014] In accordance with another aspect of the invention, there is provided a computer readable medium and method for use by a computer in detecting motion in a sequence of color video images received by the computer. The computer readable medium includes a digital storage device containing a program that is operable to carry out the motion detection. The program selects one of the video images as a reference image and another of the video images as a selected image to be compared to the reference image. The program then accesses a color component value for each of a number of pixels from the reference image and for each of a number of corresponding pixels from the selected image, with the program being operable to perform pixel comparisons using the color component values and to generate a motion detect signal when the difference in color component values for corresponding pixels from the reference and selected images differ by more than a preselected amount.

[0015] In accordance with yet another aspect of the invention, there is provided a computer readable medium and method for use by a computer in recording a sequence of images, each of which comprises an individual image file in which the image is represented in a graphics file format that includes a first marker identifying the start of the image and a second marker identifying the end of the image. The computer readable medium includes a digital storage device containing a program that is operable to carry out the recording. The program stores the images together as a single file that comprises the group of images concatenated together in sequential order. The program is operable to index the file using the first and second markers. This index can then be used to provide quick access to individual images stored within the single file.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Preferred exemplary embodiments of the invention will hereinafter be described in conjunction with the appended drawings, wherein like designations denote like elements, and wherein:

[0017] Figure 1 is a block diagram showing a preferred embodiment of a digital video system of the present invention;

[0018] Figures 2 and 3 together depict the process flow of the user interface client application of Fig. 1;

[0019] Figure 4 shows the contents of the initialization file used by the user interface client application of Fig. 1;

[0020] Figure 5 is a diagram depicting the main menu structure of the user interface client application;

[0021] Figure 6 is a flow chart showing the process used by the user interface client to provide hardware setup information;

[0022] Figure 7 is a diagram depicting the server setup form displayed by the user interface client;

[0023] Figure 8 is a diagram depicting the camera setup form displayed by the user interface client;

[0024] Figure 9 is a flow chart showing the process used to display a motion form that allows the user to display and record video streams from one of the cameras;

[0025] Figure 10 is a flow chart showing the process flow for the image viewer program of Fig. 1 ;

[0026] Figure 11 is a diagram depicting the menu structure of the image viewer program;

- [0027] Figure 12a is a flow chart of the autoindexing setup process used by the image viewer program;
- [0028] Figure 12b is a flow chart of the archive delete process used by the image viewer program;
- [0029] Figure 13 is an overview of an OCX control used by the user interface client and stream recorder client applications of Fig. 1;
- [0030] Figure 14a is a flow chart of a portion of the OCX control that is used to access individual snapshot images from the cameras used in the digital video system of Fig. 1;
- [0031] Figure 14b is a flow chart of a portion of the OCX control that is used to intermittently access images from a streaming image server;
- [0032] Figure 14c is a flow chart of a portion of the OCX control that is used to access full video streams from a streaming image server;
- [0033] Figure 15 is a flow chart of a portion of the OCX control that is used in the processing and recording of received images and image streams;
- [0034] Figure 16 is a flow chart showing the process flow for the stream recorder client application of Fig. 1; and
- [0035] Figures 17a and 17b together depict the motion detection routine used by the user interface client application of Fig. 1.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

- [0036] Referring to Fig. 1, there is shown a network setup of a digital video system 20 of the present invention. The video system 20 includes a client computer 22, a plurality of cameras 24, and one or more standalone video servers 26. The client computer is connected to the cameras 24 and video servers 26 via a network 28 which can include a private network segment 30 and a public network such as the Internet 32. Other networked components can be used such as a networked storage device 34 and a networked file server 36. Some of the cameras 24 comprise camera servers 38 which include both a video server and camera in a

single integrated unit. The camera servers 38 can be, for example, Axis™ 200, 200+, or 2100 Ethernet cameras, available from Axis Communications Inc., Chelmsford, Massachusetts (www.axis.com). The video servers 26 can be Axis™ 2400, 2401, or 240 video servers, also available from Axis Communications, Inc. The cameras 24 that are connected to the video servers 26 can be industry standard PAL or NTSC video cameras. Client computer 22 can be a conventional personal computer having an Intel™ or compatible CPU running a Windows™ operating system and including a network interface card (not shown) for connecting to the 10/100 Mb Ethernet network 30 that uses the TCP/IP network protocol.

[0037] In accordance with the invention, client computer 22 includes a computer readable memory, such as a fixed hard drive shown at 40 containing magnetic media for digital storage of a user interface client application 42 that includes a user interface program along with a number of additional software components. The user interface program is in computer readable form (such as an .exe file). The additional software components include Microsoft™ Internet Explorer™ Internet extensions (included with Windows™ 95, 98, ME, 2000 and revisions), the Win32API libraries (included with Windows™ operating systems), the WinInet.dll (also included with Windows™ operating systems), and a compression library such as IJL115.dll (available from Intel™) to decode and recompress jpeg images received from the cameras 24.

[0038] Although the user interface client program 42 is shown as being stored on a hard drive 40, it will be appreciated that it can be stored on other digital storage devices as well. As used in the specification and claims, "digital storage device" includes any of a variety of different digital storage devices, including magnetic media such as a hard disk or removable disk, optical storage media such as a CDROM or DVD, or magneto-optical media.

[0039] In general, the user interface client program 42 is operable to access locally stored camera data that uniquely identifies the cameras 24 and then attempts access to those cameras over the network 28. The program 24 is operable to verify access to at least those cameras 24 that are currently accessible, and to generate a user interface display 44 (on the computer's monitor) that includes a display window 46 for each of the cameras 24 accessed over the network 28, and to display in each of the display windows 46 an image 48 received from the camera associated with that display window. As used in the specification and claims in

reference to the program 42 or other executable program code, the phrase "operable to" [carry out some action] means that, when executed by a microprocessor or other processing device of the computer, the program directs the microprocessor to carry out or otherwise cause execution of the specified action.

[0040] In addition to the user interface client application 42, the hard drive 40 also contains a stream recorder client application 50 and an image viewer 52. Stream recorder client 50 permits high speed recording of streamed images (video) in a manner that minimizes network bandwidth utilization. Image viewer 52 permits browsing and viewing of archived images and video using a playback screen display 54. These two programs 50, 52 are discussed farther below in connection with Figs. 10-12 (for viewer program 52) and Fig. 16 (for stream recorder client 50). All three programs 42, 50, and 52 can be developed under Visual Basic 6.0 and Visual C++ 6.0 and designed to run under Windows™ 95, 98, ME, NT, and 2000. User interface client 42 stores all camera, server and image settings to a Microsoft Access™ 7.0 database 56 and camera and user configuration data is stored in an .ini file 58. Digitized recorded video is stored directly on hard disk 40.

[0041] The user interface client application 42 is depicted in various levels of detail by Figs. 2-9 and 13-15, and 17a-17b, with Figs. 2 and 3 together representing the complete process flow through the application starting from program launch. As shown in Fig. 2, once the user has consented to the licensing terms for use of the program, various initialization steps are performed, including:

1. getting camera and user configuration data from the .ini file 58;
2. initializing the database tables 56;
3. configuring the layout of the display form 44 on the client computer 22;
4. reading the camera setups from the database table 56;
5. validating or creating the base path (directories) for recording of images and image streams;
6. formatting user-selectable buttons for the client user interface 44; and
7. retrieving embedded MAC addresses for purposes of validating access to the cameras 24 identified in the database 56.

[0042]           Thereafter, program 42 generates the user interface display 44 and the user can start accessing images or video or can access various menu options shown in Fig. 5 for purposes of maintenance or changing of setup information. If the user has selected "start" to begin accessing images or video, then the next step is to initialize and test the cameras and/or servers by verifying the IP addresses, testing for a valid MAC addresses, and, if the IP addresses and MAC addresses are valid, assigning the user settings and enabling or disabling individual cameras or servers. As is known, the MAC addresses are unique to each camera and server and can be queried via FTP requests to protected areas of the camera or server's memory. Specific locations vary by manufacturer and require parsing and formatting to extract the required data, as will be known by those skilled in the art. This enables the software to be licensed on a per-camera or per-server basis and can be used to prevent access to any cameras or servers for which the user is not licensed.

[0043]           For each camera in the database 56, all control information assigned to that camera is stored in an array data type. This control information includes: Server Enabled, Server Name, Server Model, Server ID, Server IP, Server Mac, Server User ID, Server PW, Server Port, Cam ID, Cam Model, Cam Enabled, Cam Name, Cam Location, Cam Bldg, Cam Room, Cam Tel, Cam Room Contact, Cam Room Contact Tel, Cam Notes, Board Switch Port Nums, Cam Thumb Image Name, Cam Fullimage Name, Record Image Name, Cam Thumb Compression Level, Cam Full Compression Level, Cam Record Compression Level, Tool Tip Text, Last Pan, Last Tilt, Last Zoom, Cam PTZ (y/n), Server Switch Action, Switch Caption, Switch Notes, Email Notification, Email Address, Email Message, Enable Audio Alert, Play Audio File, Last Update Time, Time Lapse Interval, Tie Breaker Count, User Disabled, System Disabled, System Disabled Message, Recompression Value, Pan String, Tilt String, Zoom String, Home String. These parameters all control the camera and/or server used by the application and can be changed via a hardware setup form that is provided by the software for the user and that is described further below.

[0044]           Once all tests are complete, the process moves to Fig. 3 where the program 'listens' for digital input triggers generated by any of the cameras supporting this function. The client program 42 can listen for these trigger events and either flash or highlight the window associated with that trigger input, show a high frame rate view (motion window) or begin

recording an image or series of images in the above formats. Trigger events are recorded to one of the database 56 tables by recording the date, time and image name. The user can review and access images saved during triggering. As will be known to those skilled in the art, triggering is accomplished by enabling a CRON script in the server that will send a message to the client computer 22. Program 42 uses winsock controls to listen on a predefined port (1111 default). If a trigger message is received, the message is parsed for the server ID and port number. This information is compared to the relevant data from database 56 and the appropriate display window 46 is activated. The CRON script comprises one or more control instructions generated by program 42. Although the CRON script can be generated directly using a web browser on the client computer, it will be appreciated that generation of the CRON script by program 42 eliminates common typographical errors encountered in manual CRON programming. Unique identifiers such as host PC and port are automatically added to the CRON script by program 42.

[0045] Once the process begins listening for triggers it then finishes configuring the user interface display grid 44 on the client computer 22. The display grid 44 shown in Fig. 1 is a 3x3 grid for up to nine cameras and it will be appreciated that any size grid can be specified, with the program 42 permitting the user to specify the number of windows and the program then automatically scaling the images 48 to fit the resulting display window size. In configuring the view grid, the program 42 may disable some camera images 48, showing instead a "No Video" or other message in the display box 46 associated with the camera 24. This disabling may be due to, for example, the camera 24 being unreachable, disabled, or invalid. The software also sets the "record" indicators (if enabled), the show port numbers (if enabled), and the camera caption (camera name, if enabled). These are discussed below in connection with Fig. 5.

[0046] Once the screen display 44 has been configured, the display loop begins in which the program accesses and displays images from the cameras 24 on the user's screen, with the software periodically updating the display of each image 48. Starting with the first camera displayed, the program sequentially accesses each camera 24 and displays the received image 48 in the box 46 associated with that camera, scaling the image to fit the user's selected view size. The process runs through the display loop once for each camera 24, incrementing the

current frame (display box) for each iteration until it has retrieved and displayed a snapshot image from each camera. It then continues looping through the display loop, starting again at the first camera, and runs through the process continuously, sequentially polling each camera and updating each window 46 with an updated image 48 received from the associated camera. As each display window is being updated, it can be highlighted using, for example, a colored border to distinguish it from the remaining display windows. This allows the user to see the sequential polling process and is especially useful where the images change little if at all from one update to the next.

[0047] The display loop of Fig. 3 continues until either a trigger event is received, a double-click by the user is detected on one of the displayed windows 46, a stream request is made by double-clicking the port number on the camera window, or the user cancels the monitoring, in which case the program pauses. If the user selects a window 46 by double-clicking anywhere on its image 48, a motion form is displayed that permits viewing a setting of various camera parameters, as well as permitting the user to set recording parameters (such as number of frames to manually record) and initiate recording from the camera associated with the selected display window. The motion form and its use will be described further below in connection with Fig. 9. The program checks during the display loop to determine if the user has enabled recording. If so, the program checks user recording settings that can be set through the hardware setup process of Fig. 6 using the recording camera setup tab of Fig. 8. These user configurable settings include selections to record all frames received, or interval recording where the user can specify that frames are only recorded once every so many seconds or minutes. The user can also specify that recording should only occur when motion is detected in the received video. A preferred routine for implementing the motion detection will be described further below in connection with Figs. 17a and 17b. Once these user settings are read, the program then checks scheduler settings that are also user configurable under the recording camera setup tab. These scheduler settings allow the user to specify certain hours during the day and days during the week when the recording is either to occur or be blocked. Scheduling can be done in 15 minute intervals. Every 15 minutes the user can select No recording, Standard Recording (Fig. 15), or Video Motion Detection Recording Figs. 17a-17b). The program will compare this schedule to the current time of day and adjust the recording functions as necessary. This allows for up to 96 different recording schedules per



day, far exceeding any typical user need. If recording is permitted for the current time on this particular day, then the program proceeds to the appropriate recording routine (record all frames, time interval recording, or motion detection) according to the user configurable settings previously read.

[0048] As a part of the display loop, program 42 requests images or video streams from one of the cameras 24. The requests are formatted as standard CGI based URL syntax, i.e.:

`http//Uid:PW@111.111.111.111/cgi-bin/fullsize.jpg?camera=1&compression=1).`

[0049] The images are downloaded from the cameras 38 and servers 26 to the client computer 22 where they are stored in a memory buffer, which can be implemented in RAM. The buffer is parsed and augmented with formatted date and time stamps, accurate to the millisecond. The image is assigned a name generated by the program based on the date and time of creation. The program 42 then saves the image to the hard drive 40 using the following directory structure:

Mapped Drive and Root Path / Server Name / Camera Name / Year / Month / Day

[0050] This directory structure is generated in real-time as the recording executes. The images are saved in one of the following styles, based on user setup preferences:

[0051] Single Images: Images are saved under the Day directory in a graphics file format such a jpegs. The file naming convention used is hh mm ss.jpg, where hh is the current client computer clock hour in 24 hour format, mm is minutes, and ss is seconds.

[0052] Multiple Images (video): Video images (i.e., time sequences of individual images) are saved at the Month directory level as hh 00 00.jpx, where the .jpx extension represents a jpeg concatenation file (streaming jpeg), which is a single file that is built by the program 42 and that comprises a series of jpeg images concatenated together. hh is the client computer clock hour in 24 hour format. These .jpx files can be read and played back by the image viewer 52.

[0053] Before storing the jpeg image files or concatenating the jpegs onto a jpx stream, the images can be compressed using the compression .dll library noted above. In practice, it has been found that good quality recorded images consume an average of 7,500 bytes per image.

Higher compression levels can yield a smaller file (down to 2,500 bytes) at a reduced quality. Higher quality images can also be recorded at a file size of 70,000 bytes per image up to 250,000 bytes per image.

[0054]           The program 42 can acquire images from the cameras in any of three modes:

[0055]           **Snapshot:** Request one image from the server and close the connection. By running through the display loop rather than requesting a continuous stream from the server, the program iteratively requests snapshots from the cameras and servers thereby providing continuously-updated images in a manner that requires little bandwidth, with network utilization typically peaking at no more than six percent, regardless of network size.

[0056]           **Stream Frame Mode:** Connect in stream mode to each camera and sequentially cycle through each of the cameras, obtaining one or more of the streamed images from one selected camera, pausing the streaming from that camera, and then obtaining one or more streamed images from the next camera until all of the cameras have been accessed and then paused. This cycle is repeated continuously until the user switches the program back out of this stream frame mode. In this mode, the processing is identical to that of the snapshot mode, with the display loop extracting at least one frame from an open stream, and then indexing to the next camera. The connection is periodically reset to remain robustness. This approach to image acquisition yields substantial performance gains over the snapshot mode and is more efficient than a continuous stream. This connection allows the video server to maintain an authorized connection to the client computer, providing enhanced performance and ultimately, augmented received frame rates. Running in this mode requires more bandwidth than the snapshot mode, but will utilize less than the full streaming mode described below, since each stream is paused as the remaining connected cameras are sequentially accessed for a frame of video. The video server buffers surplus video to the point of filling up its internal buffers, at which time the server stops grabbing video frames until the buffer is depleted, or the server is reset. Thus, as will be appreciated by those skilled in the art, this approach can also be used to control the frame rate of displayed and/or recorded video in a manner that minimizes the network bandwidth utilization. Thus, it can be used for only select ones of the cameras and for recording at a frame rate faster than that obtained by individual URL calls, but less than that provided by full streaming from the camera or video server.

[0057]       **Full Streaming Mode:** Launch the stream recorder client 50 as a shelled process, pass the URL and various options via a command line syntax. The client computer connects in stream mode and retrieve images in an infinite loop. The connection is reset periodically to ensure robust connectivity across various network topologies. The received image stream is then parsed for SOI (ASCII 255 + ASCII 216) and EOI (ASCII 255 + ASCII 217) markers, which are the standard start-of-image and end-of-image markers. A buffer is built until these markers are found. When found, the image is displayed and that section is removed from the buffer. This process is then reiterated until a timer expires the session or the user manually closes the connection.

[0058]       When recording, the stream recorder client 50 writes directly to the same directory used by program 42, but uses a different naming convention to avoid contention. This naming convention can be implemented by appending a letter suffix to the filename of the jpx stream. For example, program 42 might record a filename as "11 00 00.jpj", whereas program 50 might record images obtained at the same time as "11 00 00\_s.jpj". Since they are now uniquely named, there is no concern of one program overwriting the image files of the other.

[0059]       Referring now to Fig. 4, the .ini configuration file used for program 42 will now be described. The WindowState = Normal (or Maximized) sets the main camera view grid as either normal, with the display being sized based on the Images\_Across, Images\_Down, Ref\_Image\_Width, and Ref\_Image\_Height parameters. The Ref\_Image\_Width specifies the image width of each display window 46 in units of twips (which is a known measurement unit defined by Microsoft™). There are approximately 1440 twips per inch. The image width is determined by the default image metrics that can be specified by the user via the defined in Setup/Software menu command. The Images\_Across parameter specifies the number of cameras to be shown horizontally within the user interface display 44 and the Images\_Down parameter specifies the number of cameras to be shown vertically. An exemplary 3x3 display grid (for a total of nine camera windows) is shown in Fig. 1. In the event that WindowState = Maximized, the entire screen is filled with the application's main window and displays the camera view grid in the center of the window based on the parameters noted above. The Display = Image (or List) sets the initial display type, with "Image" resulting in a display of

the view grid 44 with camera images 48 shown in the display windows 46 and "List" providing a textual list of the cameras and servers with no images.

[0060] The `HighliteFrameColor` specifies the hex RGB value for the current update window, that is, it identifies the color used for the border placed around the camera window currently being updated at any one time during the display loop of Fig. 3. The default color is blue. The `FlashFrameColor` provides the hex RGB value for the camera window corresponding to the camera for which a trigger has been received. The default color is red. The `ViewBackColor` specifies the hex RGB value for inactive camera windows, with the default being grey. The `TCPPort` parameter specifies the IP port on which the camera server transmits images and the program 42 application listens. This information is used in the base CRON script.

[0061] The `RecordMode` setting can either be `SINGLE` or `MULTIPLE`, which respectively correspond to the single image jpeg and video stream jpx file formats discussed above. For "Single", the received images are written to disk (or other non-volatile storage media) as a single jpeg file using the naming convention provided above. For "Multiple", the images are written as jpx streams, with the `RecordMode` parameter ("24" shown in Fig. 4) referring to how many jpx files are written per 24 hours. This parameter can have any of the following values: 1, 2, 3, 4, 6, 8, 12, 24. Thus, "1" means that the received stream of jpegs are written into a single jpx file over a 24-hour period, whereas "24" means that a new jpx file is started every hour, 24 per day. As mentioned above, the jpx format is a straight concatenation of jpeg files and, by storing the files with the .jpx rather than .jpg extension, the software avoids the possibility that a user opening the file will inadvertently launch a standard .jpg viewer that might hang due to the large sizes of the jpx files.

[0062] The `RecordThumbnails = TRUE` setting is used to tell the software to record the displayed thumbnails rather than recording the image at the Record Image parameter that is specified in the Camera Hardware Setup form of Fig. 8. This setting causes the program to record the same image that is viewed in the display grid 44. When set to `FALSE`, the program accesses and displays one image (a thumbnail) from the camera and then accesses and records a second image (at a different size) without viewing. This allows for different image sizing and/or compression for viewing than for recording.

- [0063] The RecordImagePath sets the base directory path for recording all images; that is, it sets the "mapped drive and root path" shown at the upper level of the directory structure shown above. The program will create all lower levels of the directory structure if they do not already exist. An error message is displayed if the drive is not available or the directories cannot be created or accessed, and no recording will occur.
- [0064] The Camera\_Database setting is a pointer to the database 56 that is used for all camera and camera server settings. Other settings that may be less often accessed are:
- [0065] DisplayWidth: Sets the default user interface display 44 size in twips.
- [0066] BorderWidth: Sets the width of the black spacing between all thumbnail images in pixels.
- [0067] SkipInactivePorts: TRUE - Thumbnails that are disabled will not be displayed when program 42 is running.
- [0068] ShowHighliteFrames: TRUE to show border around currently updated thumbnail.
- [0069] ShowRecordIndicators: TRUE to show the record LED status indicator that can be included at a corner of the display window for each camera.
- [0070] ShowCameraCaptions: TRUE to show the title caption at the bottom of the thumbnails.
- [0071] ShowPortNumbers: TRUE to show the physical thumbnail port numbers.
- [0072] PingTimeout: The number of milliseconds to attempt a ping to the video server before failure abort.
- [0073] PingOnImageRequest: TRUE to allow ping tests on each received image burst.
- [0074] CameraCaptionForeColor: Color of the camera caption in hex RGB
- [0075] CameraCaptionBackColor: Back color of the camera caption in hex RGB
- [0076] HTTPPort: Http port number to access all cameras. This is a global setting.
- [0077] MaxFailOverCount: Number of failed camera requests before shutting down the camera port. The display window 46 will show "Unavailable".
- [0078] ReconnectAttemptIntervalSecs: Seconds to elapse before trying to reconnect a failed camera.
- [0079] DefaultEmailRecipient: Email address to use when sending a motion alert.
- [0080] EmailUserID: UserID used for email account access.
- [0081] EmailUSerPW: User password for email account access.

- [0082] ShowMotionBorder: TRUE to allow the video motion detection routine to highlight the target window when motion is detected.
- [0083] EnableStatusLog: TRUE to allow status info to be written to a text log.
- [0084] EnableErrorLog: TRUE to allow specific Error information to be written to a text log.
- [0085] StreamViewMode: When launching a streamer, the mode it starts in can be:
- 0 = Icon
  - 1 = Small frame window with text info only.
  - 2 = Normal window with video displayed.
- [0086] StreamIntervalSeconds: Number of seconds to allow the streamer to run before closing:
- 0 = Run forever
  - 1 to 84600 = 1 sec to 24 hrs run time before closing.
- [0087] StreamMaxFPS: Maximum number of FPS to stream; 0= Max speed
- [0088] StreamRecord: 0 = no record on program launch, 1 = record on launch.

[0089] Referring now to Fig. 5, there is shown the menu structure for the Main Menu displayed by the program 42 as a part of its user interface. In the Display menu, the "List" command displays the cameras as a text grid only - no image is displayed. The "Thumbnail" command displays the cameras as a graphical grid, displaying images 48 received from the cameras 24 using the display loop of Fig. 3. In the Setup menu, the "Hardware" command launches the Hardware Setup form which permits hardware configuration using the process of Fig. 6. The user can add/delete/edit the different server and camera settings. Also in the setup menu is the 'Software' command which launches a form that allows the user to graphically modify the core setting of the .ini file. The ability to manually edit the file also is available via the 'Other' Tab and then the first 'Edit' button. The ini file can also be edited with any user editor such as Microsoft™ Notepad. The Archive menu contains a single command, "Browse Archived Images" which launches the image viewer 52 executable shown in Fig. 10. The Help menu includes a "Dump all Server Settings" command which writes all server and camera data to a text file. This information will be located in the application's directory in a file called CameraDump.txt. This information can be useful in troubleshooting functional problems with the system.

[0090] Fig. 6 depicts the Hardware Setup routine that is invoked by selecting "Hardware" under the Setup menu. This process is used to add or delete cameras and servers, and to edit existing camera or server setups, if desired. The servers and cameras are shown in a tree structure on the left side of a new window on the computer screen and, where an existing server is selected, a set of server hardware setup tabs (shown in Fig. 7) are displayed on the right side of the screen to permit configuration of various server parameters, including many of the control information items listed above. Where an existing camera is selected, the camera hardware setup tabs of Fig. 8 are displayed on the right side of the screen for editing of camera parameters and control information noted above. All panels for each of the tabs of Figs. 7 and 8 includes an Update button to save changes made on the tab.

[0091] For the server hardware setup tabs of Fig. 7, the Connection tab provides a display that permits the user to set the fundamental server settings for the program's CGI base parameters. These options are used in the URL requests to the server. The Connection tab contains the basic server information. The fields are:

Server Name	Name to identify the server.
Server Model	Name to identify then camera.
Server Enabled	Check to enable, uncheck to disable.
Server Serial Number	Authenticates the server. Numbers and Letters only.
Server IP Address	IP address as 123.123.123.123
Server Root ID	Root user ID. Can also be a regular User ID.
Server Root Password	Root user PW. Can also be a regular User PW.
Server Notes	Notes for this Server, for reference only.

[0092] If the Server Root ID and Server Root Password are not used, the Host Scripting tab will not function. The Connection panel also includes two buttons:

Add New Server	Creates a new Server.
Delete Server	Deletes an existing Server.

[0093] The Switch Inputs tab contains the information related to the digital inputs on the server and can be used to set the program's preference settings for trigger responses from the server. This includes the Show Motion form, Flash Window, and Record Image options shown in Fig. 3. The ports are disabled by default. The fields are:

Switch Port	The port being edited.
Switch Action	The action to be performed upon trigger.
Switch Caption	The name to identify the Switch Action.
Enable Audio Alert	Enables or Disables an Audio alert segment.
Play Audio	Windows .wav file to play upon a trigger event.

[0094] The Relay Output tab provides a display that permits editing of functional settings for latching or pulsing the server relay output. As is known to those skilled in the art, this relay can be attached to a siren, autodialer, or other device compatible with the characteristics and limitations of the server's relay. The fields are:

Enable Relay  
Relay Caption  
Relay Notes

[0095] The Host Scripting tab provides a display for programming or displaying basic CRON scripts on the server. The basic script allows the server to broadcast trigger events from the switch inputs. That is, the script enables to server to send messages to program 42 that are specific to triggering events on the server such as switch closures, infrared, microwave, magnetic, or other forms of sensors. For example, the base CRON script used in Axis™ 2400 series servers is:

```
0-59 0-23 1-31 1-12 0-6 /=xx :
```

```
alert -host yyy.yyy.yyy.yyy -port zzzz -message "Port Trigger";
```

where xx is the server port 1-4, yyy.yyy.yyy.yyy is the IP address of the client computer 22, and zzzz is the port specified in the .ini file for communication between the program 42 and the server. The fields on this tab are:

Enable Script	Enable / Disable CRON script activation.
Script Text	CRON script text.

[0096] The Host Scripting panel also contains four buttons:

Template	Sets a basic CRON script for triggering.
Clear	Clears the Script window.
Download from Server	Retrieves existing CRON script from the Server.
Upload to Server	Sends the Script text to the Server.



[0097] For the camera hardware setup tabs of Fig. 8, the Info tab allows the user to set the camera name, Pan/Tilt/Zoom (PTZ), and text reference fields for each camera, as well as enable or disable the camera. In particular, the Info tab includes the following fields:

Camera Name	Name of Camera.
Camera Model	Camera Model; Select from list.
Camera Enabled	Enables / Disables the Camera Image.
Enable Camera Movement	Indicates whether a camera can move.
Camera Location	This text is for reference only.
Camera Bldg	This text is for reference only.
Camera Room	This text is for reference only.
Camera Room Tel	This text is for reference only.
Camera Room Contact	This text is for reference only.
Camera Room Contact Tel	This text is for reference only.
Camera Notes	This text is for reference only.

[0098] The Presets tab allows the user to define any quantity of user defined presets for Pan/Tilt/Zoom. The user is shown a thumbnail of a static snapshot for any new positional requests. The fields are:

Preset Views	Enables the user to Add/Change Views
Preset Notes	Text Notes for the selected preset.
Pan	Pan Value
Tilt	Tilt Value
Zoom	Zoom Value

[0099] There is one button:

H	Sets the Preset to HOME
---	-------------------------

[0100] There are three slider controls:

Pan	Pan Value
Tilt	Tilt Value
Zoom	Zoom Value

[0101] The Displayed Image tab allows the user to set the image size and compression level request for the camera server image retrieval. These parameters are mapped against CGI type parameters defined by the server. The user representations are simplified terms versus the CGI syntax. Three image styles are defined here. Each style is set for the three image request types. This value is used by the server when sending requested images to the application. The fields are:

Thumbnail Image	Main View with all cameras.
Full View Image	Detailed View of a single camera.
Record Image	Recorded Image style.

[0102] The Thumbnail Image is displayed on the Main form with all the other camera views. The Full View Image is displayed on the Motion form. The Record Image is used whenever a save request is made by the application. Each Image style has a related compression value. The compression values are selectable for each Image style. The following considerations should be used when selecting the Image styles:

[0103] Image Size

Largest images:	slowest access, largest file size
Smallest images:	fastest access, smallest file size

[0104] Compression Value

Lowest compression:	best image quality, slowest access
Highest compression:	worst image quality, fastest access

[0105] The Switch Inputs tab allows the user to bind any or all available digital switch ports to a display window. That is, the digital switch inputs must be bound to camera ports. This setting tells the application which cameras to record/notify when a trigger event occurs and allows the application to notify the user on screen which port trigger(s) is/are associated with a camera view. Each defined switch input is listed with a check box that can be selected to bind the camera to that switch input.

[0106] As mentioned above in connection with Fig. 3, the Recording setup tab permits the user to set automatic recording options for interval recording a camera. The interval is

expressed in seconds. The camera will record an image at the specified interval if the hardware can meet these expectations. Otherwise, the image is recorded as quickly as possible after the interval has expired. The fastest interval that can be used is derived from observing the cycling rate of all cameras. On a quality system the fastest interval is about ¼ second for any camera. The fields are:

Interval Recording	The camera will record images at a set interval.
Record an Image every...	The Interval to record images automatically.
Compression Index	This value sets the save compression value.

[0107] The compression value is used by the compression library to set the amount of compression for image saves. The lower the number, the higher the compression. The range is between 5 and 40. The most commonly-used value is between 30 and 35.

[0108] The Email tab permits the user to set an email address to which an email notification will be sent upon occurrence of a trigger event. An image from the triggered camera can be attached to the email. The Performance tab permits the user to specify a unique User ID so that the camera or video server administrator can set or limit the bandwidth of video transmission on a user-by-user basis.

[0109] When a user double-clicks on a camera window 46, the program 42 brings up a Motion Form which runs the process shown in Fig. 9. This permits the user to bring up a detailed view of the image from a particular camera, with the image being updated at an increased rate. Complete camera and server information is displayed on this form. The user can Pan / Tilt / Zoom supported cameras, click on preset positions, record images, or display any trigger events.

[0110] Fig. 10 depicts the process flow provided by the image viewer program 52, which can be, but need not be, a separate executable than program 42. This process can be launched from within program 42 using the "Browse Archive Images" command in the Archive menu of Fig. 5. This program 52 can include authentication capability to provide the user with access to only those archived images that have come from servers accessible to that user. This is indicated in Fig. 10 where the program reads the database for defined servers and parses the record path for matching servers. Then it will display a tree structure showing only those

archived images and streams that came from cameras or servers defined in the database for that user. Once the user has selected an archived jpg or jpx file, the image is brought up on the screen and, for jpx streams, the user can play, pause, stop, frame advance and review using buttons that emulate a VCR panel. A refresh button can also be provided to reload the archive if additional images are being written to it in the background by the user interface client program 42. The image viewer program 52 can include an autodelete function, in which case a five minute timer is started. The program then checks the archive age against user date settings, and deletes the archived .jpg and .jpx image files that are older than the specified date or time period. The program 52 can also include an autoindex feature which, when enabled, automatically indexes the archived jpx files every hour to build an index into the jpx file for quick access by the program into any point in the jpx file. This index feature is discussed next. If the autoindex feature is not enabled, then the index is not built until the first time the jpx file is loaded.

[0111] In installations where very high speed recording is being performed, the jpx file can become quite large. A typical jpx file for an hour of video is 1 to 5 MB, while high speed recording can easily exceed 20 MB and even reach 100MB. Since the jpx is purely concatenated JPG images, aligned head to tail, the only way to view the images within the jpx file is to parse the SOI and EOI markers and display the image in between them. For incremental playback, this process is easily controlled. However, when a user wants to "rewind", "fast forward", or randomly jump to a portion of video, this process requires the program 52 to process from its current position and read all video frames in between. Jumping over frames does not work for these files since, in order to most efficiently store the images, the images within the jpx file are relatively unique in length. This process of reading in all of the frames can be undesirably slow when the jpx file is large. To overcome this issue, the image viewer program 52 creates an index of the SOI and EOI markers of each image in the jpx file. This index is stored as an array of pointers into the jpx file and is stored using .ndx as its filename extension. The program 52 will look for this index and use it to load the image pointers instead of reading the entire jpx. The image pointers identify the memory locations of the SOI and EOI markers, thereby allowing the program to easily locate and retrieve individual images contained within the jpx file. The ndx file can be loaded in less than a second, as compared with jpx load times of up to a minute or more, depending on jpx

size. The index is created on the first user access to the jpx image file or when an autoindex event is processed, as described above. Successive requests from the user to a jpx will allow the program to read the ndx file rather than a conventional approach which would entail reading the entire jpx file. With the index file, the pointers can be read into memory and accessed quickly, even for very large jpx files.

[0112] The ndx index file also makes possible the use of the image viewer program 52 as a plug-in for commercially available web browsers. In conventional browser-based retrieval of video, the video files can be quite large, and the user can therefore typically only request a small number of frames. The user does not know the stream size, frame count, index of time pointers, etc. By implementing the image viewer 52 as a plug-in component for a web browser, viewer can be used to provide web page access from a web browser to stored jpx images. This alleviates the necessity of a specialized software product to view the archives. Since this image viewer plug-in utilizes the ndx index file, the user can retrieve a wealth of video specific content in a very short period of time, allowing realtime display of video (assuming the user has sufficient bandwidth) of the Internet or other network.

[0113] When implemented as a plug-in, the image viewer 52 can also be used to view "live" a stream that is being recorded on a network server. This can be accomplished using server software that records the jpx files in the manner described herein, with the image viewer then only parse the target jpx file on the network server for the latest video frame. By displaying this video frame, the user sees live video that originated from the camera server, but is being supplied by what can be a much higher performance network server. Thus, since the user is now viewing recorded video from a higher performance server, the number of simultaneous connections to the video feed is highly scalable by implementing standard web server components. This is advantageous since all Ethernet video servers are highly susceptible to overload from multiple user requests and performance is degraded linearly with each simultaneous connection.

[0114] Fig. 11 depicts the main menu for the image viewer program 52. The "Tree" command under the Browse Mode menu item allows the user to browse all permitted archives by server, camera, date, and type. The "Date" command allows the user to search by date/time for a selected server and camera. The 'Directory List' command lets the user

browse all attached drives manually. The Indexing command under the Maintenance menu allows the user to set the autoindexing features described above. The process used by the image viewer program 52 for setting up the autoindex feature is shown in Fig. 12a. The "Delete" command under the Maintenance menu allows the user to manually delete archives or automatically delete archives older than a selected date/time stamp. Fig. 12b depicts the process flow when the "Delete" command is selected. The "Format Conversion" command under the Tools menu allows the user to convert images to other standardized formats. The Display Mode menu allows the user to playback the images either as thumbnails (like images 48 displayed in the windows 46 generated by the user interface client program 46) or in a cinema (fullscreen) mode.

[0115] Rather than using the ActiveX control provided by the camera/server manufacturer, the user interface client program 42 and stream recorder program 50 utilize their own ActiveX control to interface with the cameras and servers. An overview of this OCX control is shown in Fig. 13. Further details of the control for obtaining and displaying an image are shown in Figs. 14a-14c, and further details of the control for obtaining and recording an image are shown in Fig. 15. The implementation of a suitable OCX control using the process steps shown in these figures will be known to those skilled in the art and therefore no further elaboration of the design of this control is necessary.

[0116] Referring now to Fig. 16, there is shown the program flow of the stream recording client program 50, which is a separate executable that permits high speed recording of image streams (video) in a manner that minimizes network utilization. The program 50 enables the streaming output from the camera servers using the OCX control described above internally within the program as direct subroutine calls. Streaming is initiated using a CGI enabled URL that is sent in the same manner as described above for the user interface client program 42, except that the CGI syntax is set to zero to indicate streaming output from the server. As indicated in Fig. 16, the program 50 utilizes a timer to reset the connection to the server before it is automatically terminated by the network. More specifically, for some networks, such as the Internet, a connection cannot typically be permanently held, but rather will be terminated automatically after a period of time (e.g., 50-70 minutes). The program 50 avoids this problem and enables nearly uninterrupted streaming by automatically resetting the connection

before the external termination and then continuing to append the streaming images onto the end of the jpx file. This can be done with the loss of little or no streaming data from the camera.

[0117] Referring now to Figs. 17a and 17b, the video motion detection routine of program 42 is used to allow the recording of images to be performed only when a moving subject is present. When enough motion is present, the system will begin recording video until motion has stopped. When motion is sensed according to this routine, the program will perform any or all of the following functions:

- [00100] record video up until video motion is no longer sensed and an "extra frames" count is exhausted;
- [00101] send an email to a user as selected in the hardware setup panel based on settings from the .ini file;
- [00102] attach an image to the email of the first frame of video that motion was detected on;
- [00103] show a yellow border around the target window where motion was detected;
- [00104] announce motion ON and motion OFF with two wav files, hello.wav and goodbye.wav, which the user may reset to any sounds desirable.

[0118] Figs. 17a and 17b detail the logic flow of this process. In general, the motion detection routine uses RGB color component filtering of the actual pixel data. By breaking down the image into these components, the values of each color component per pixel is represented as a decimal value of 0 (No color) to 255 (bright color). These values are compared to user-defined settings in the program 42 for filtering, allowing specific component or combined colors to exhibit reduced or enhanced movement sensitivity. For example, outdoor cameras are very prone to false triggering when blowing grass/leaves or shadows are present. By filtering out more green component, false triggering is reduced to a very acceptable level. This gives the program the ability to use motion detection in a much more broad range of use than other comparable systems.

[0119] The process begins by taking the first image (i.e., frame) of a video sequence and placing it into a buffer where it will be used as a reference image. The reference image is compared to subsequent video frames on a pixel-by-pixel basis. Preferably, the reference image is compared to subsequent images as they are being received (i.e., as soon as they are

received) by the client computer so that the program is operable to provide real time motion detection. For each pixel in the current image, the program performs a comparison of the color component values for that pixel with the color component values of the corresponding pixel in the reference image. If the difference in color component values for corresponding pixels from the two images differ by more than a preselected amount, the program generates a motion detect signal which can be implemented as the Record Flag shown in Fig. 17b. For each of the RGB color components, a separate counter (Count\_Red, Count\_Green, and Count\_Blue) is used that tracks the total number of pixels within the current image for which that color component value differs from that of the reference image by more than a preselected amount. This is done using a user-selectable filter levels for each of the color components. In particular, if for a particular RGB color component,  $ABS(P_{ref} - P_{cur}) - FilterLevel > 0$  then the Count is incremented for that color component. Separate filter levels are used for each color component and these filter levels can be set by the user. As will be appreciated, the FilterLevel is an offset that aids in removing unwanted noise inherent in video sources, as well as "pixelation" or "tiling" inherent in jpg image sources under compression. When the entire image is processed, the Count\_Red, Count\_Green, and Count\_Blue counters are compared to a user specified minimum, which can be different for each of the color components. If all three exceed their respective minimums, motion is considered present and the Record Flag is set to tell the program to proceed with recording.

[0120] Once motion is detected, the system records video and continues the pixel comparisons for each subsequent frame until the routine detects that motion is no longer present. To prevent the recording from ending before a subject has completely left the camera's field of view, the program continues recording until a specified number of extra frames have been recorded. This is carried out using an Extra Frames counter that is decremented once per frame starting with the first frame received after no further motion has been detected. As with the other counters, the number used for this counter can be user specified. Periodically, a new reference frame is selected from the video stream. This is done at regular intervals as specified by a user "Refresh Interval" setting, which is an image frame count. This Refresh Interval is used in conjunction with a frame counter C\_Ref such that,



once the C\_Ref counter exceeds the Refresh Interval number, the reference buffer is emptied and the counter reset to zero.

[0121] The core function of the video motion detection is based on a count of pixels for which at least one color component value differs from that of the reference image by a preselected amount. Minimum object size detection can be implemented using the routine of Figs. 17a and 17b with the addition of an X by Y (width by height) template that scans the X by Y pixel information. If all pixels have a color component value that differs from that of the reference image by a preselected amount within the X by Y area, motion is detected. The program highlights the object with a bounding rectangle. This process can be used to filter out objects that are too small to be considered motion.

[0122] Apart from minimum object size detection, the program 42 is also operable to permit the user to specify a region of the camera's field of view so that the program performs the pixel comparisons only for those pixels located within that region. This region of interest processing is implemented by providing the user with the ability to mask out specific portions of a video frame, which will then be ignored by the motion detection. This concentrates the motion detection to specific regions of the screen. Typical region of interest masks employ grids or regions based on a grid array of squares. These areas are selected to mask out the regions. This tends to be somewhat granular in use. The program 42 uses a pixel based approach to masking the images. The user first creates a region of interest by defining the mask using the computer mouse to paint a black or other colored area on the image. The painted areas represent those portions not desired for use in detecting motion. A tool palette of square or other shape may be employed to create the painted mask. The mask is converted to a black and white mask and saved as a .bmp file based on the camera name. When video motion detection is used by the program, individual pixels from the reference and current images will be compared only if the corresponding mask pixel is not black. Users may edit the mask in Microsoft™ Paint or other image editor to refine the mask to the pixel level.

[0123] Implementations of this type of streaming media have a common difficulty; namely, Ethernet connectivity is at best a highly reliable but not a totally reliable connection. Occasionally, power fluctuations, excessive image requests, overloaded or failing networks and a multitude of other issues can cause the connection to the camera to fail. Competing

implementations often cause the application to abnormally abort or stop responding, requiring the user to close and restart the application. This condition is very serious since recorded video will not be available while the program is not responding. The user interface client program 42 and stream recorder client program 50 address this issue by identifying three modes of failure, and providing contingency functions to overcome these problems. These modes are:

1. failure upon connect;
2. failure upon image request (read); and
3. failure during midstream read of image.

[0124] Failure types 1 and 2 are easily overcome by the implementation of the default timeout of failed requests by the Wininet.dll and its related components. The program can count these failures on a per camera basis and optionally shut down the camera and reattempt access periodically. This maximum failure count and reattempt connections are user selectable on a global scale.

[0125] Type 3 failures are usually serious and can cause the program to stop responding. By executing the request asynchronously or in a worker thread, the request can be timed and if abnormally long, cancel the request and try again. This allows the application to continue to function consistently. Preferably, the program utilizes both methods to insure robust connectivity.

[0126] It will thus be apparent that there has been provided in accordance with the present invention a digital video system and computer program therefor which achieves the aims and advantages specified herein. It will of course be understood that the foregoing description is of preferred exemplary embodiments of the invention and that the invention is not limited to the specific embodiments shown. Various changes and modifications will become apparent to those skilled in the art. For example, although the invention has been described as it would be implemented using TCP/IP network cameras and camera servers, it will be appreciated that the invention can be used in conjunction with other image sources. For example, rather than specifying a URL to access a particular camera, the invention could be used to specify a memory location or utilize a .dll file to access images from, for example, a video capture card,

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USB or IEEE-1394 (Firewire) ports. All such variations and modifications are intended to come within the scope of the appended claims.

## CLAIMS

I claim:

1. A method of controlling access by a computer to a video server, comprising the steps of:

sending a request from a client computer to a video server over a network;

receiving from the video server a unique number stored in the video server, wherein the unique number is received by the client computer over the network;

determining that access to the video server is authorized by comparing the unique number received by the client computer to one or more authorized unique numbers;

in response to the determination, obtaining at the client computer one or more images from the video server; and

displaying the one or more images on a screen display of the client computer.

2. A method of controlling access by a computer to a hardware device, comprising the steps of:

executing a computer program stored in computer readable form at a computer, the computer being connected to a hardware device via a network;

accessing the hardware device from the computer over the network using an IP address associated with the hardware device;

obtaining a MAC address from the hardware device over the network;

determining if the program is authorized to access the hardware device by validating the MAC address using data accessible to the computer; and

if the program is authorized to access the hardware device, then the method further comprises the steps of:

requesting data from the hardware device by the computer using the computer program; and

receiving the requested data at the computer.

3. A method of licensing a computer program on a per-device basis to prevent unauthorized use of the computer program with hardware devices, comprising the steps of:

identifying one or more authorized hardware devices, each having a MAC address;

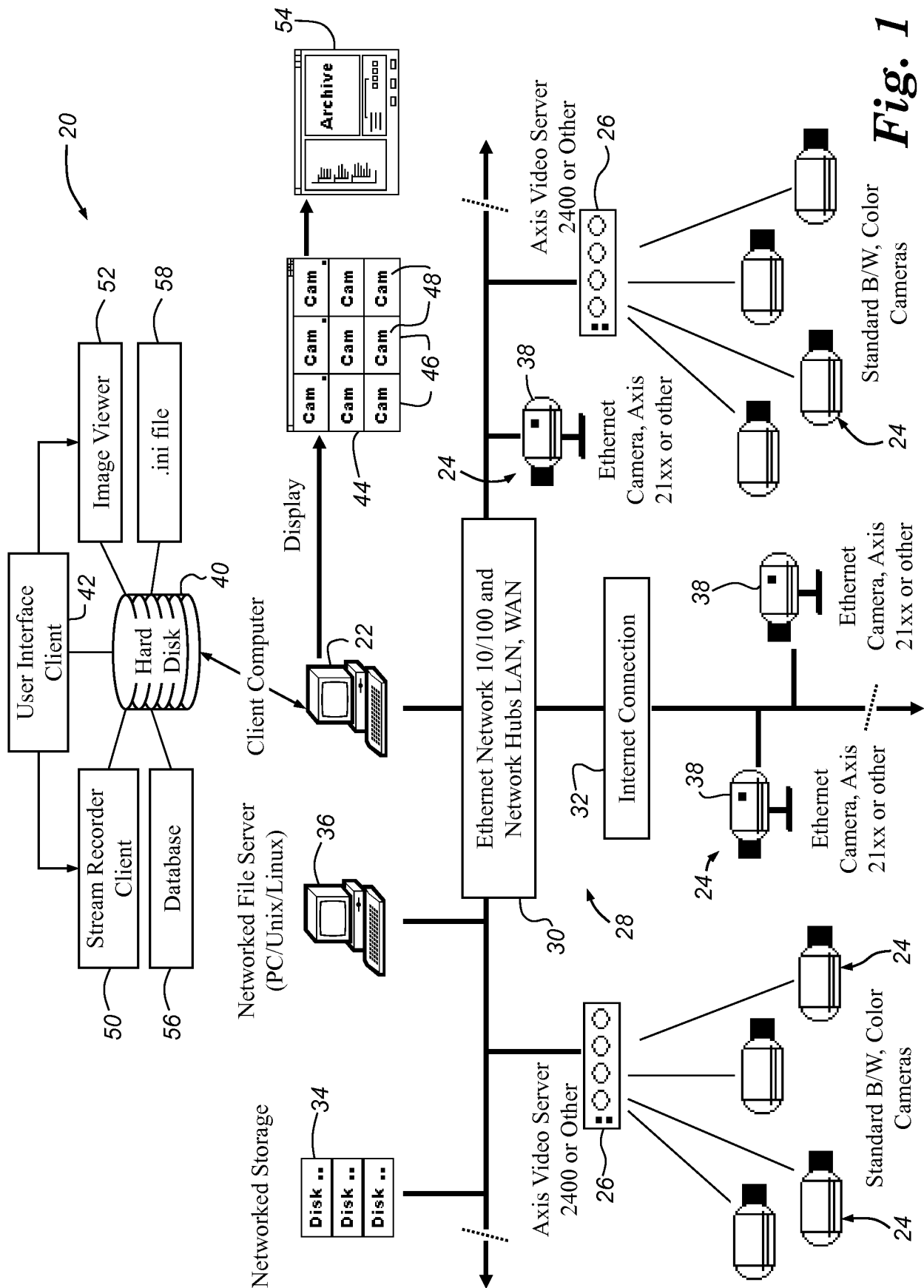
providing a computer program in computer readable form, wherein the computer program is operable upon execution by a computer to permit a user of the computer to input network address information concerning a specific hardware device accessible to the computer via a network;

embedding the MAC address(es) of the authorized hardware device(s) into the computer program; and

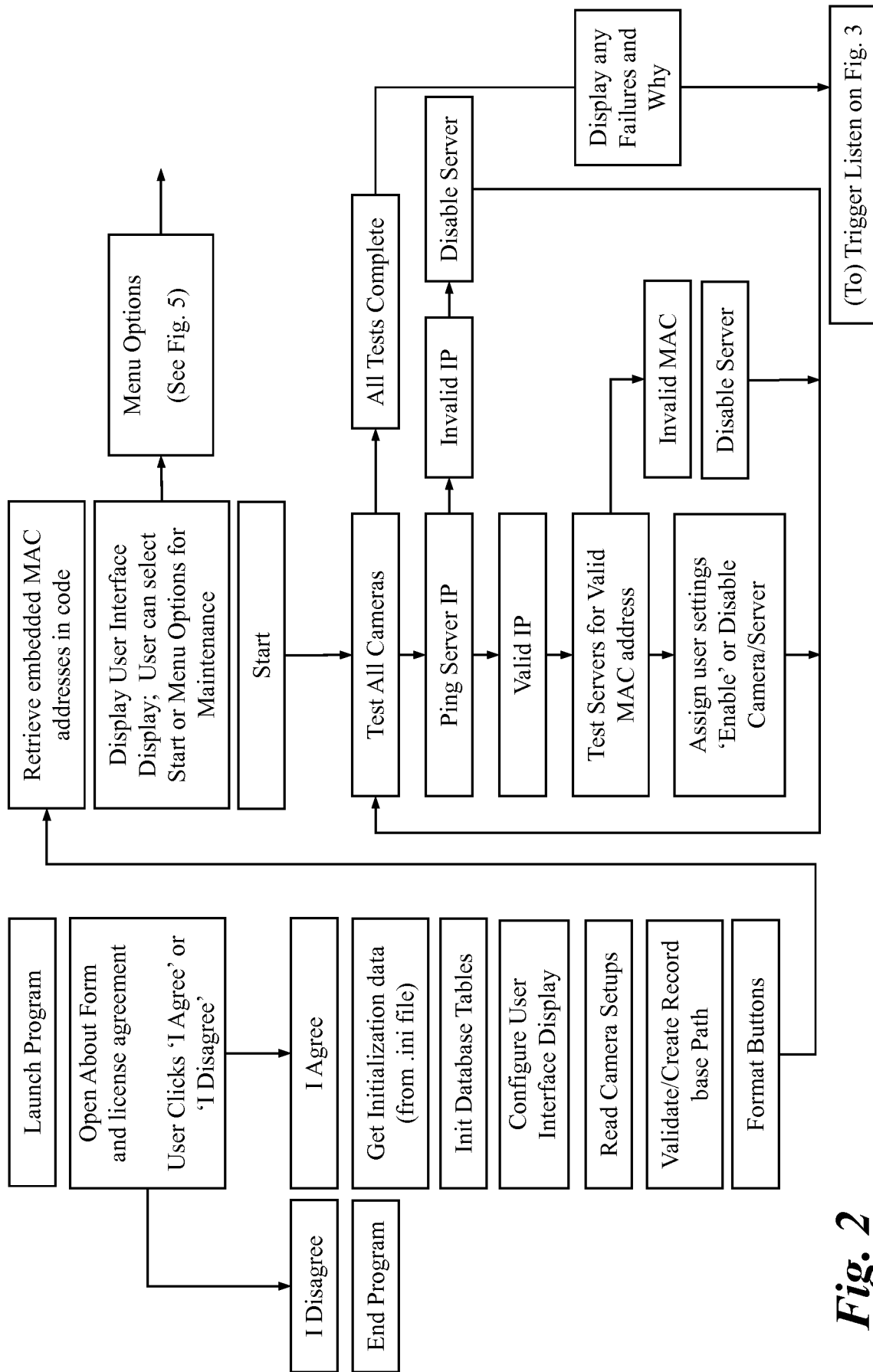
licensing the computer program to a user based on the number of MAC addresses embedded in the computer program.

ABSTRACT OF THE DISCLOSURE

A digital video system including a computer connected via a network to a number of video servers and cameras. The computer includes a program that provides a grid of display windows, each of which displays an image received from the camera associated with that window. The program sequentially polls each camera, accessing and displaying an image from the camera in its associated window. The program can access the cameras at different frame rates. The program stores image streams in a single file, concatenating each successive image onto the end of the file. The file is then indexed using SOI and EOI markers to permit fast access to individual images within the file. The program can monitor received video and automatically start recording upon detecting motion within the video stream. Motion detection is implemented by comparing color component values for pixels from different images.

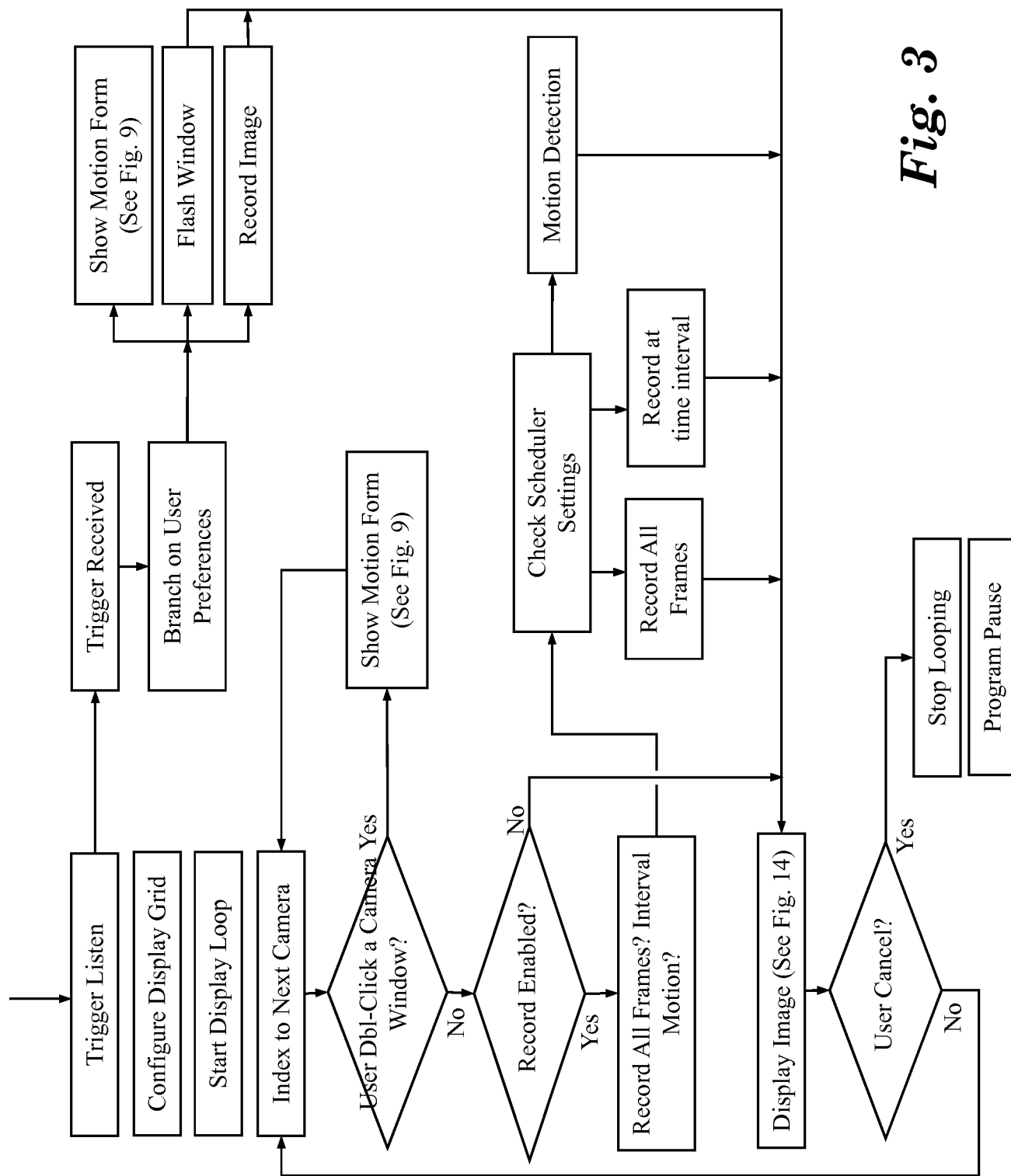


**Fig. 1**



**Fig. 2**





**Fig. 3**

```

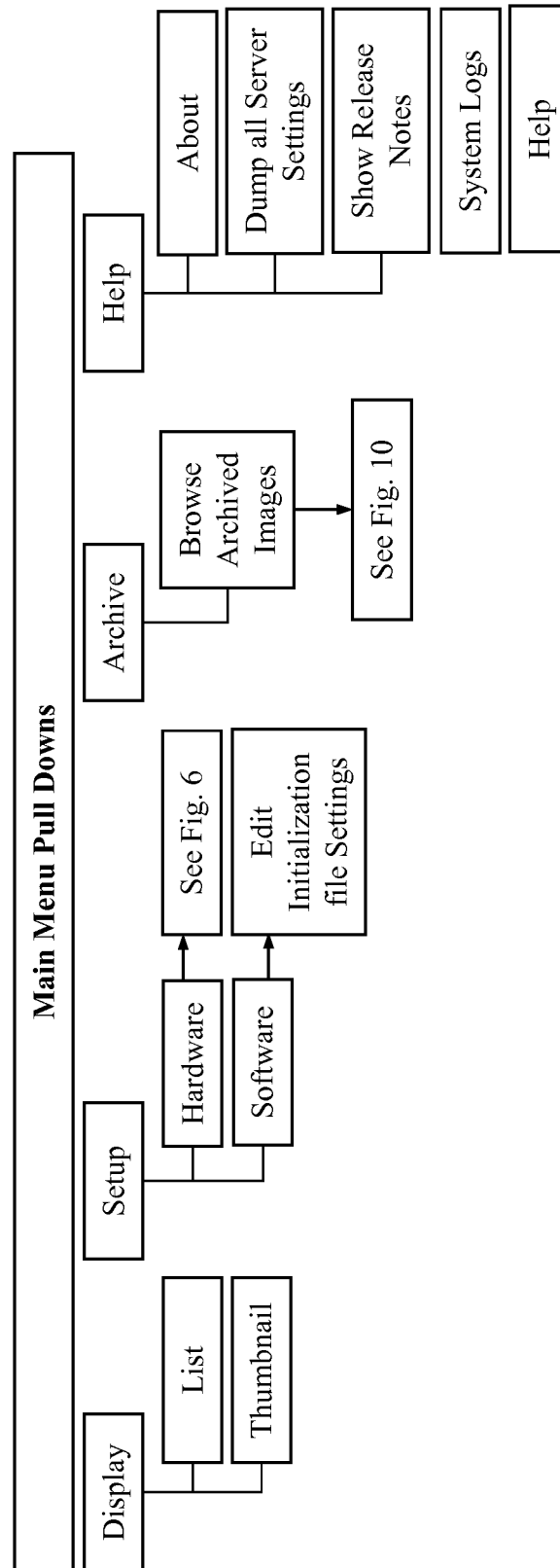
[Initialize]
WindowState = NORMAL
Display = Image
DisplayWidth = 11505
BorderWidth = 2
SkipInactivePorts = True
Images_Across = 4
Images_Down = 2
Ref_Image_Width = 352
Ref_Image_Height = 240
ShowHighlightFrames = TRUE
ShowRecordIndicators = TRUE
ShowCameraCaptions = TRUE
ShowPortNumbers = TRUE

PingTimeout = 5000
PingOnImageRequest = FALSE
HighlightFrameColor = 16744448
;HighlightFrameColor = &H00&
FlashFrameColor = &H000000FF&
ViewBackColor = &H00808080&
CameraCaptionForeColor =
&H00FF00&
CameraCaptionBackColor = &H00&
TCPPort = 1111
HTTPPort = 80
MaxFailOverCount = 50
ReconnectAttemptIntervalSecs = 60
RecordMode = MULTIPLE, 24
RecordThumbNails = TRUE

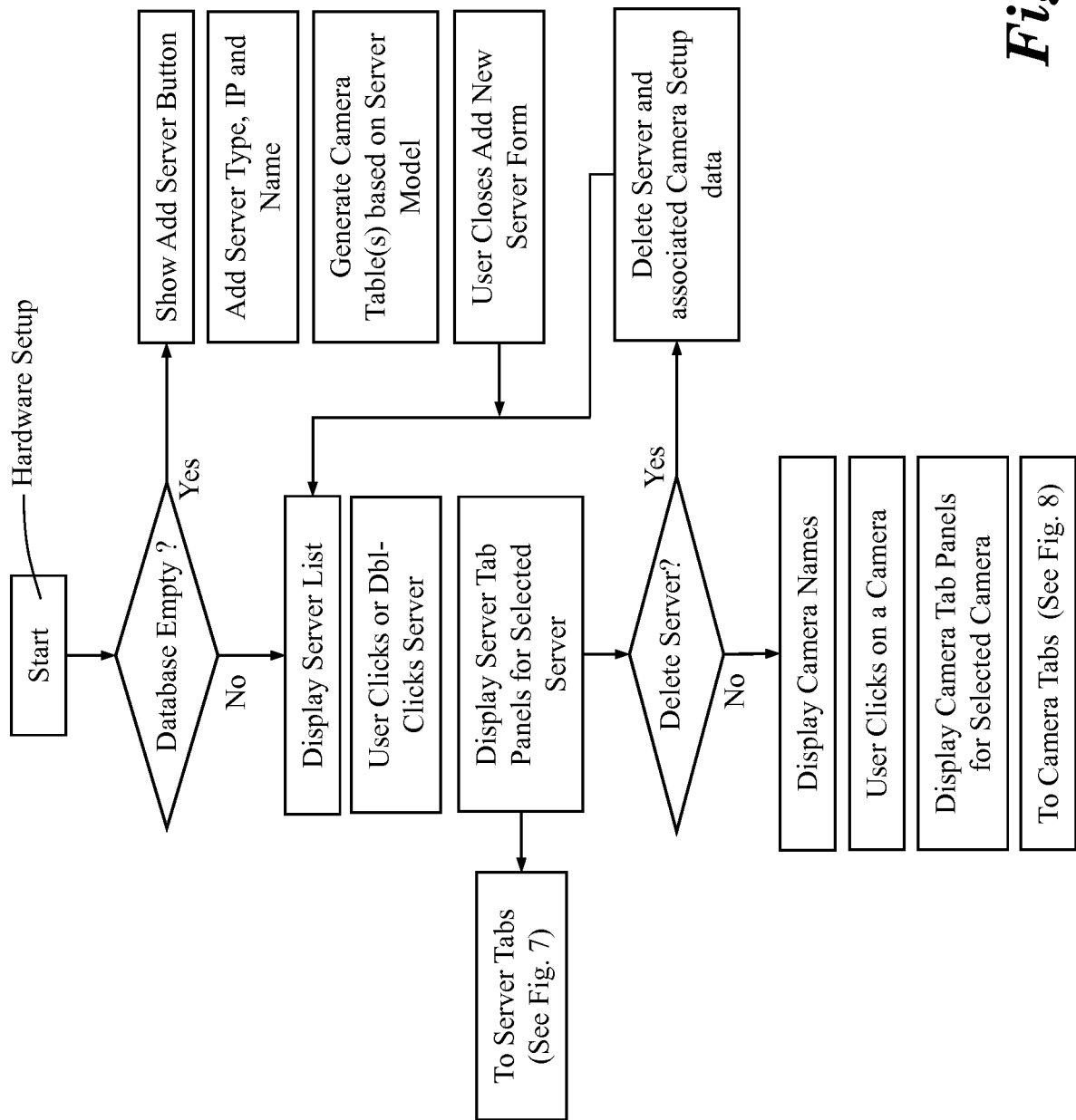
RecordImagesBasePath = C:\Test
DefaultEmailRecipient
=marchesej@teleweb.net
EmailUserID = marchese2
EmailUserPW = sdsdsdsd
ShowMotionBorder = TRUE
EnableStatusLog = TRUE
EnableErrorLog = TRUE
[Camera Servers]
Camera_Database = C:\Program
Files\Softsite32\Database\SoftSite.mdb
[Stream Applet]
StreamViewMode = 2
StreamIntervalSeconds = 0
StreamMaxFPS = 0
StreamRecord = 0

```

**Fig. 4**



***Fig. 5***



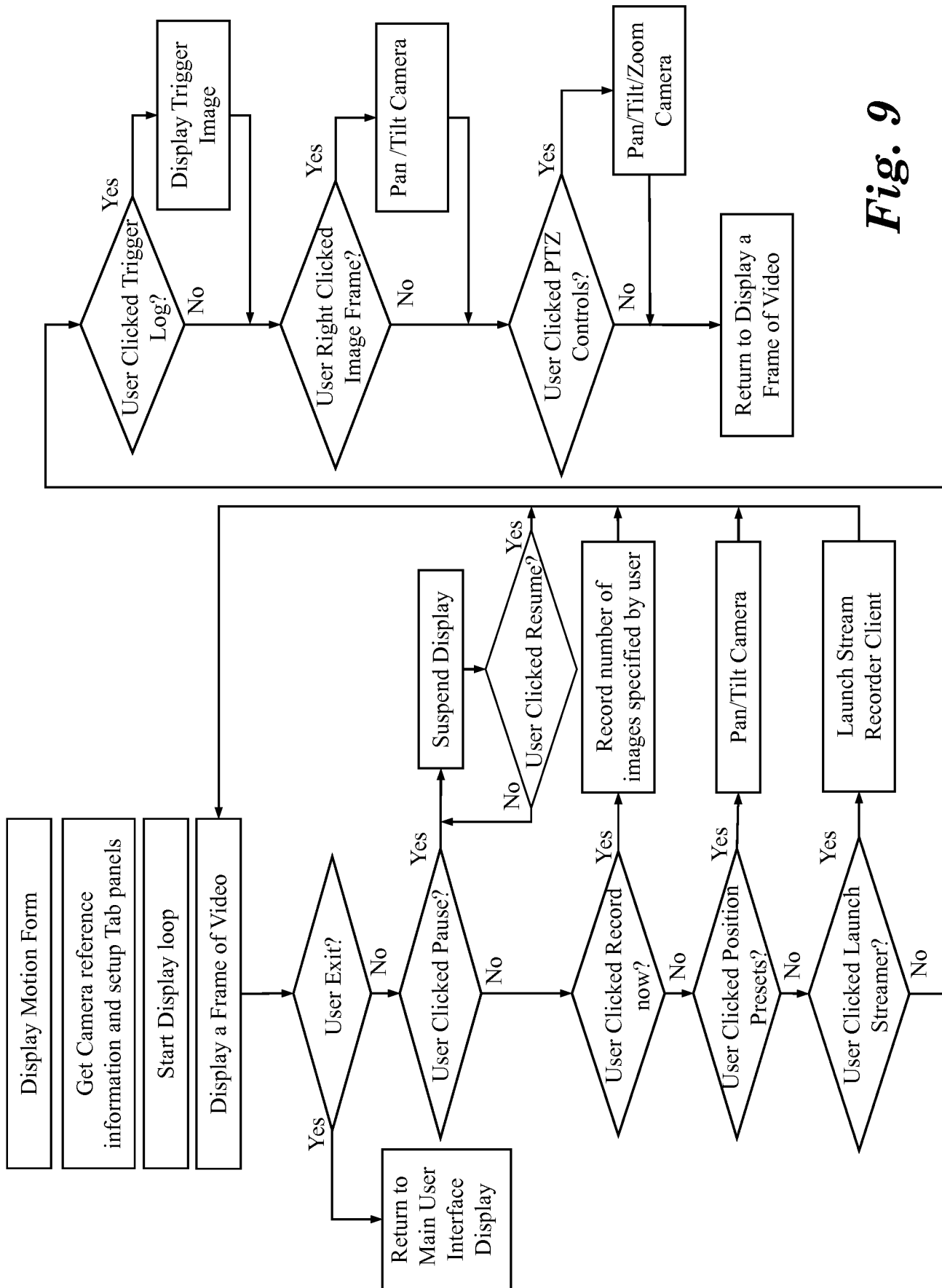
**Fig. 6**

Server Setup Tabs			
Connection	Switch Inputs	Relay Output	Host Scripting
Set Camera Server IP, Name, and MAC address, etc.	Set Camera Server Digital Switch Input characteristics	Set Camera Server Digital Relay Output characteristics	Set Camera Server CRON Script text for Triggering conditions

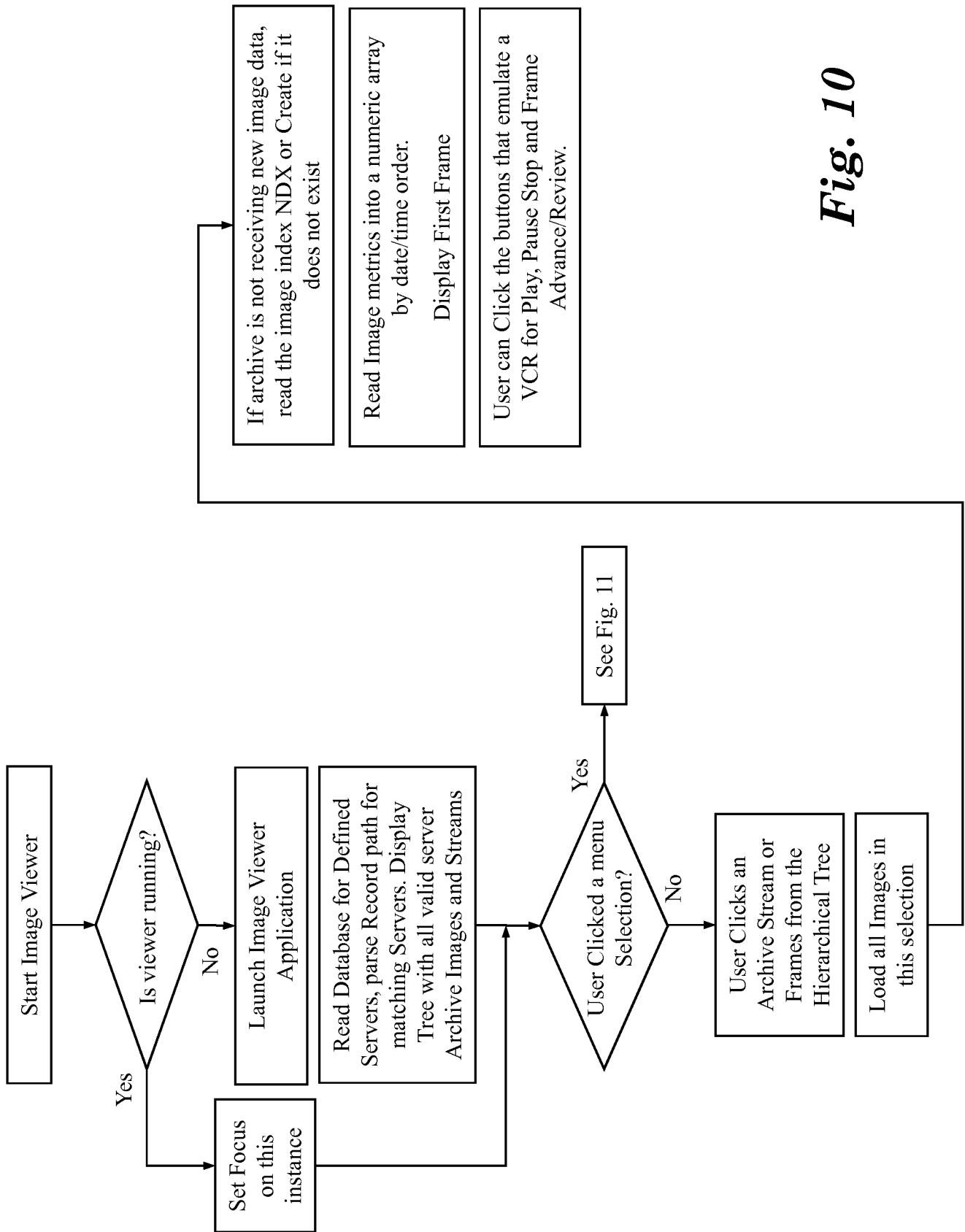
Fig. 7

Camera Setup Tabs					
Info	Presets	Displayed Image	Switch Inputs	Recording	Email
Set Camera Name, PTZ, and reference fields	Set Camera Positional present for PTZ	Set Camera Image types for Thumbnail, Motion and record functions	Logically binds Digital outputs to a camera port for triggering requests	Set Automatic recording options for interval recording a camera	Set email address for email notifications
					Set optional User ID to use with limited bandwidth settings

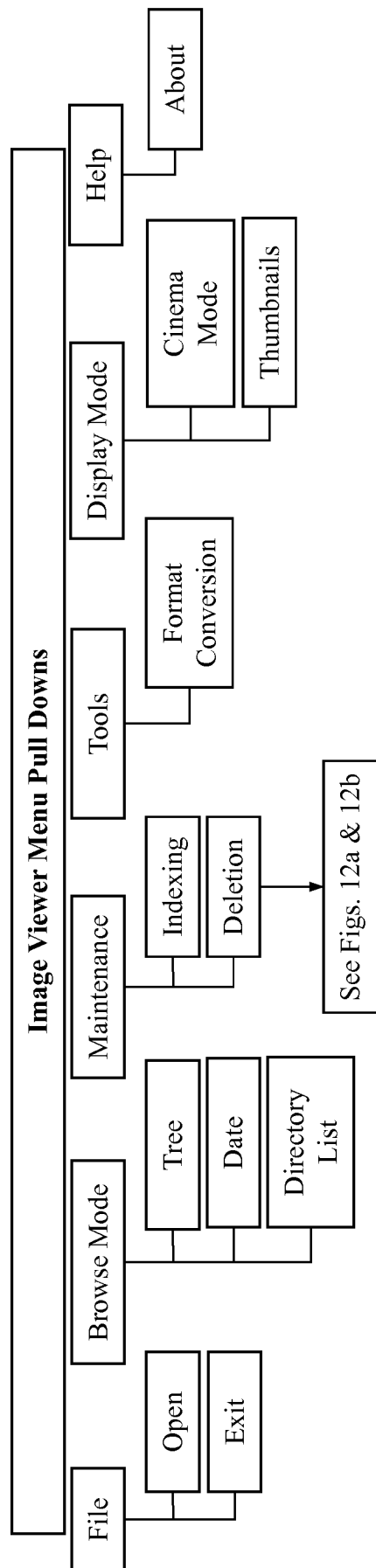
Fig. 8



**Fig. 9**



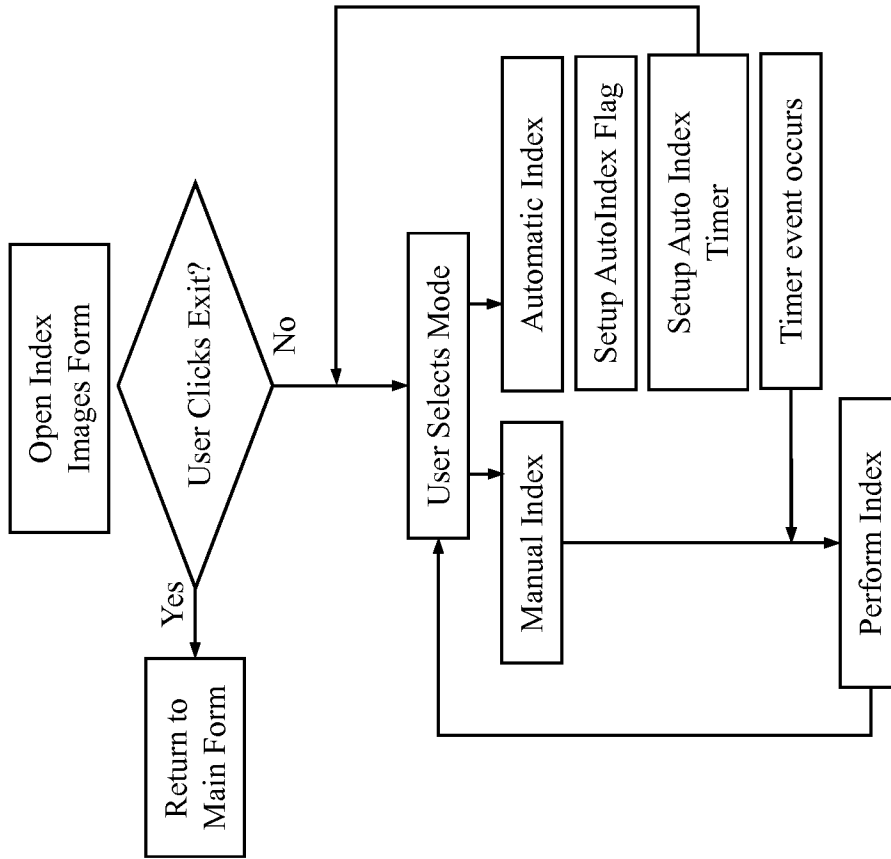
**Fig. 10**



**Fig. 11**

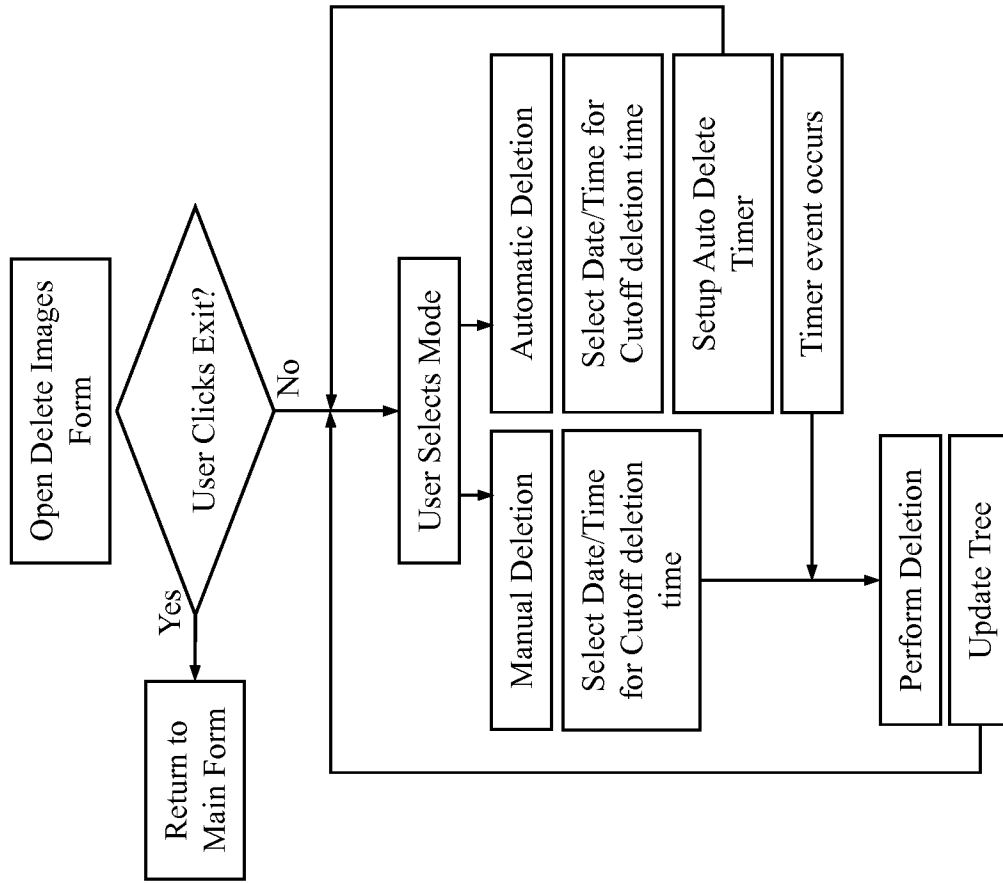


### AutoIndex Menu Selection

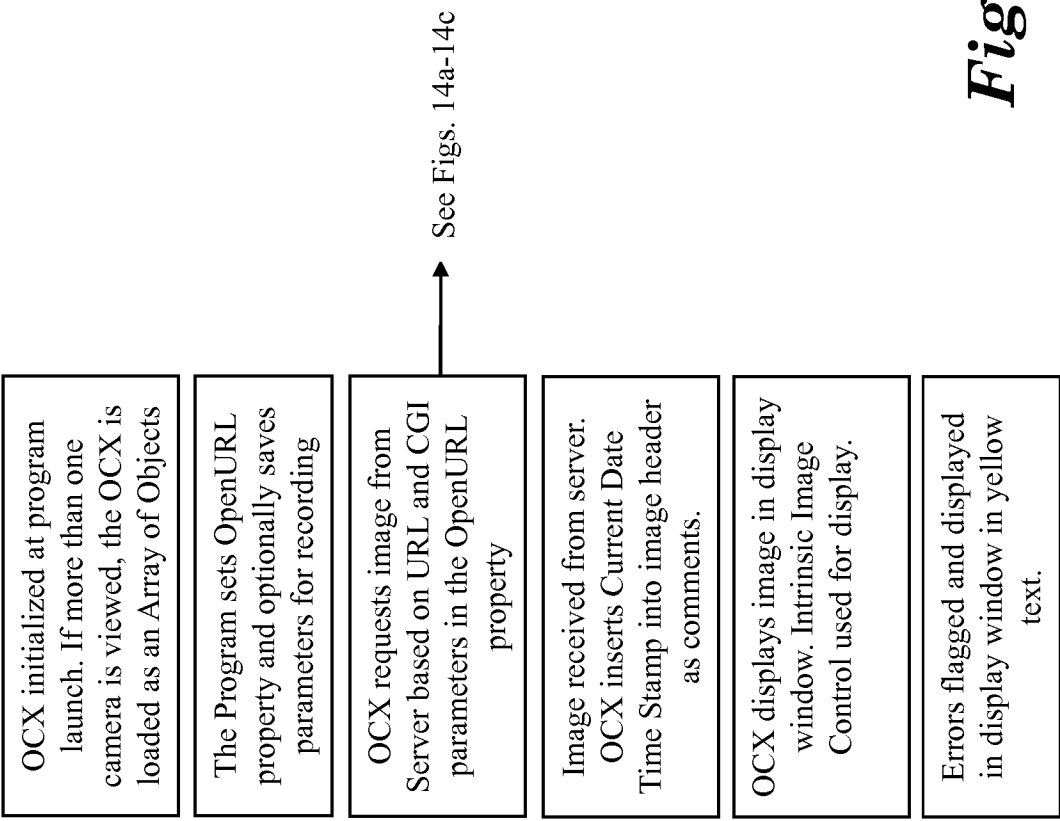


**Fig. 12a**

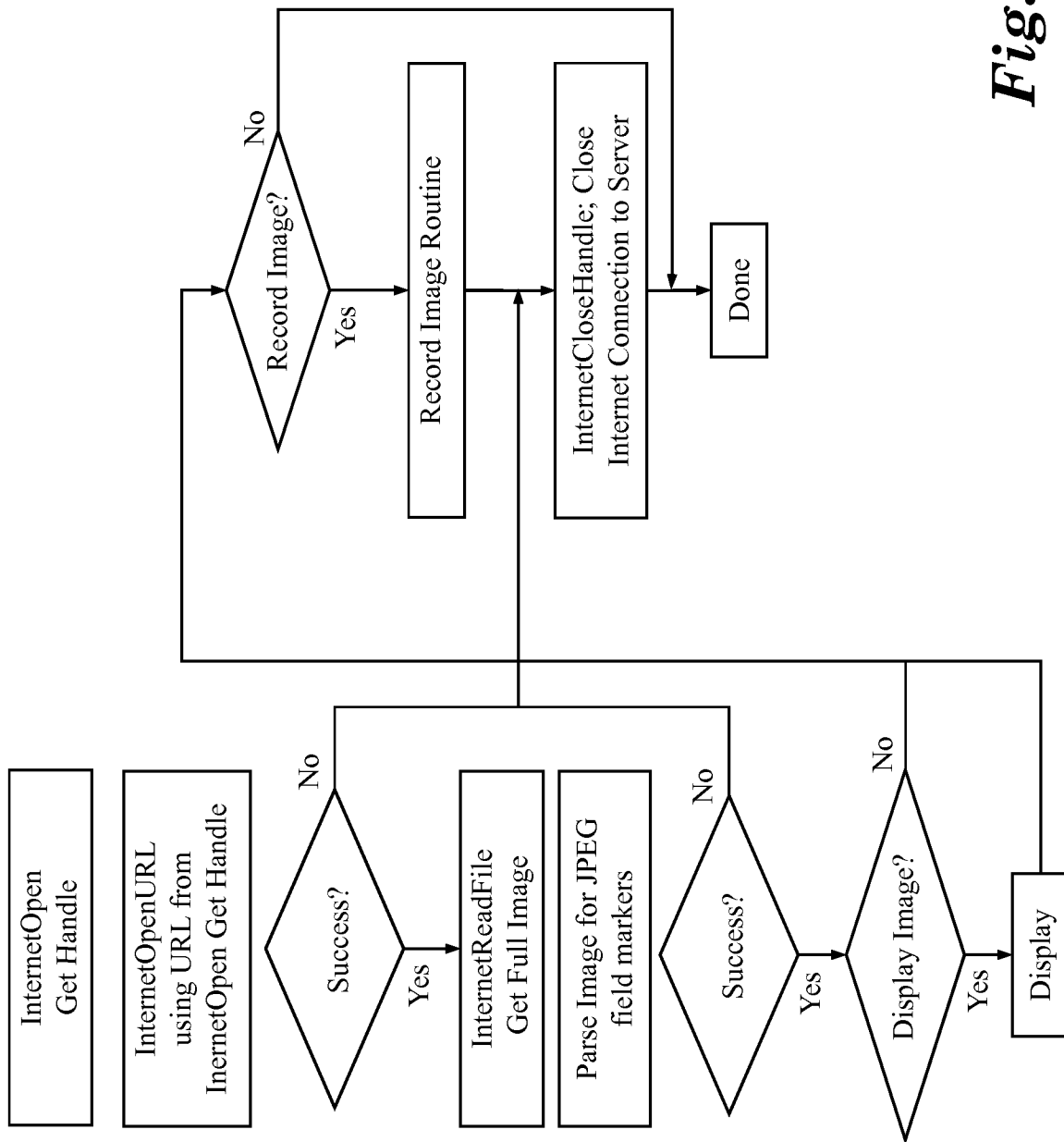
### Deletion Menu Selection



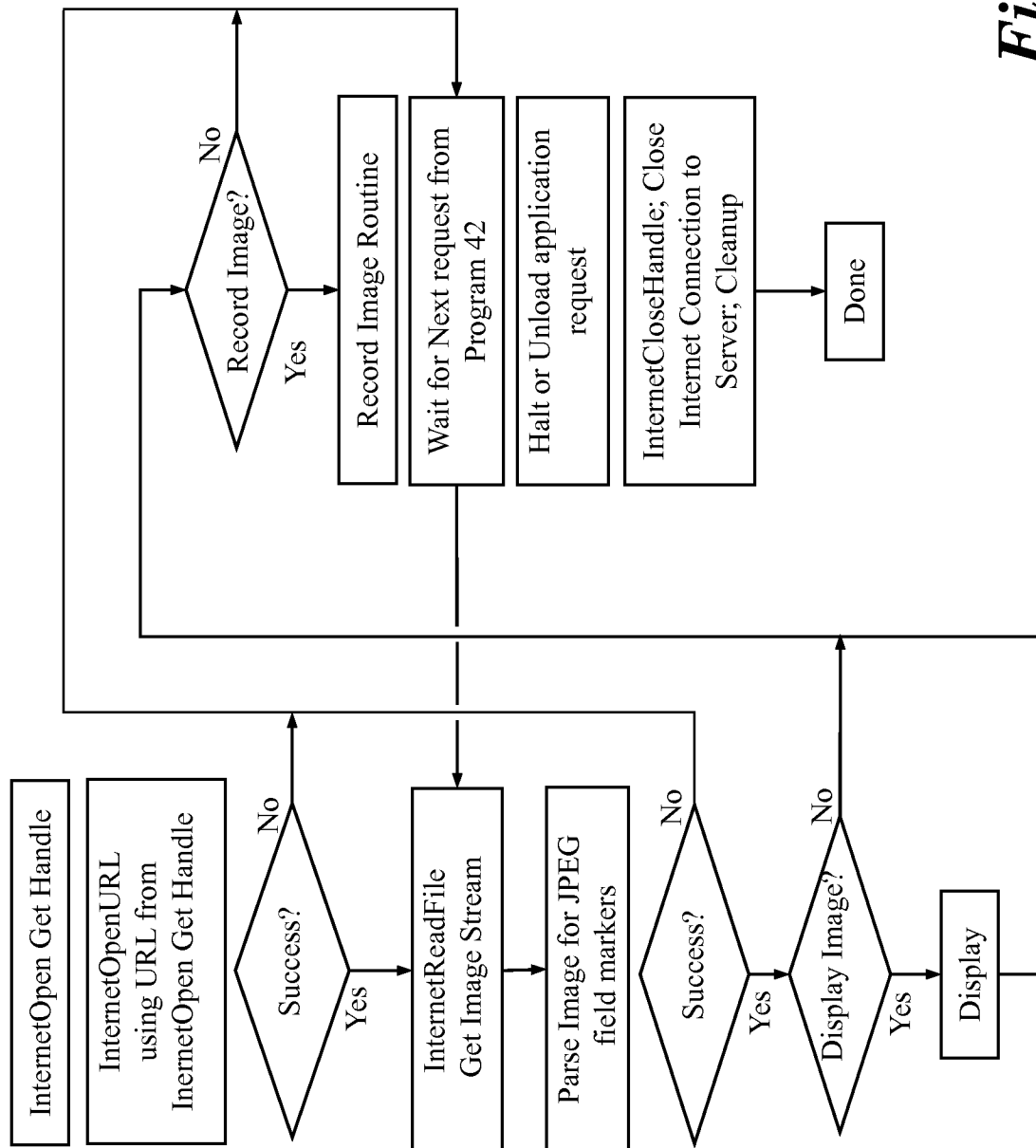
**Fig. 12b**



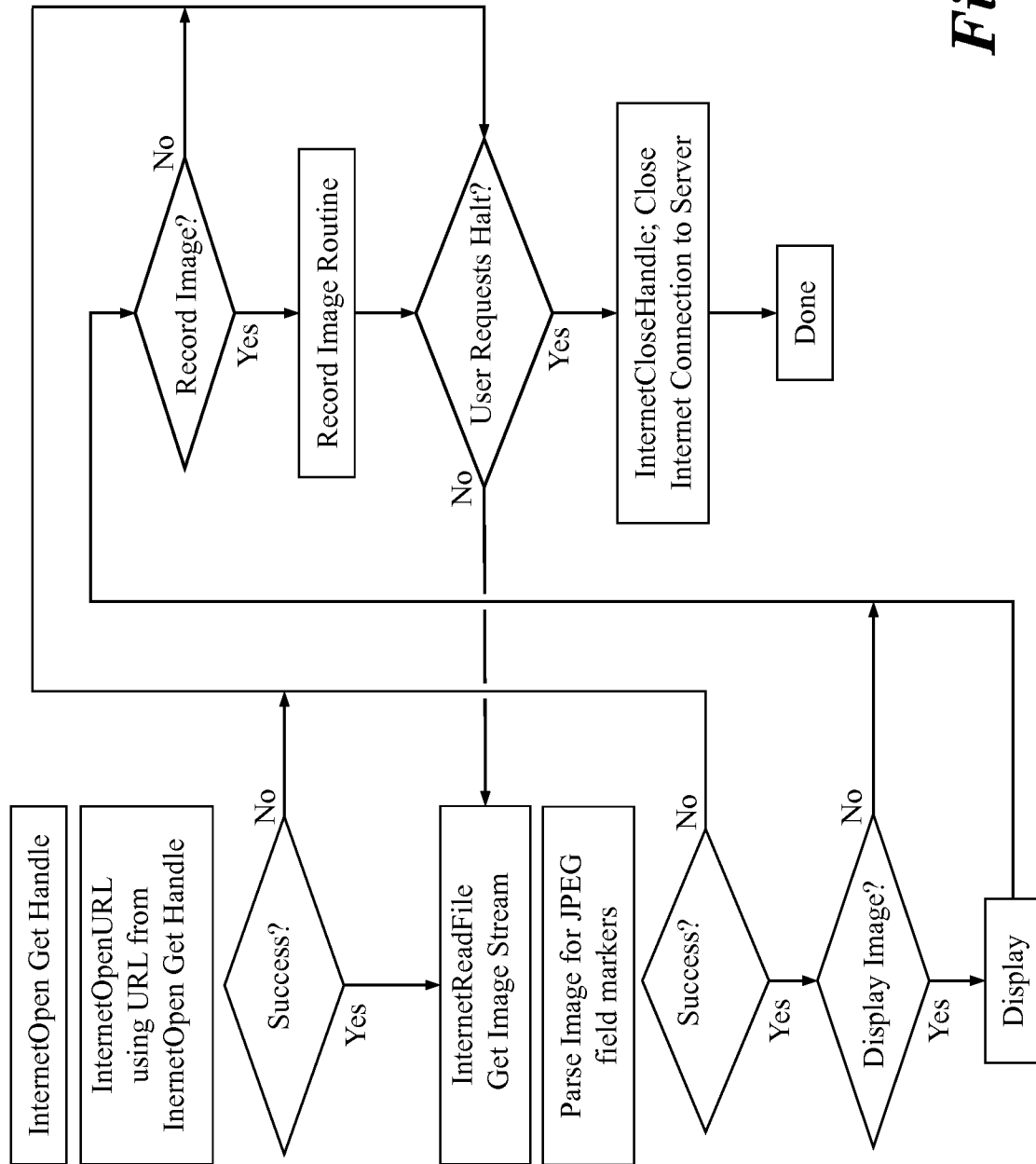
**Fig. 13**



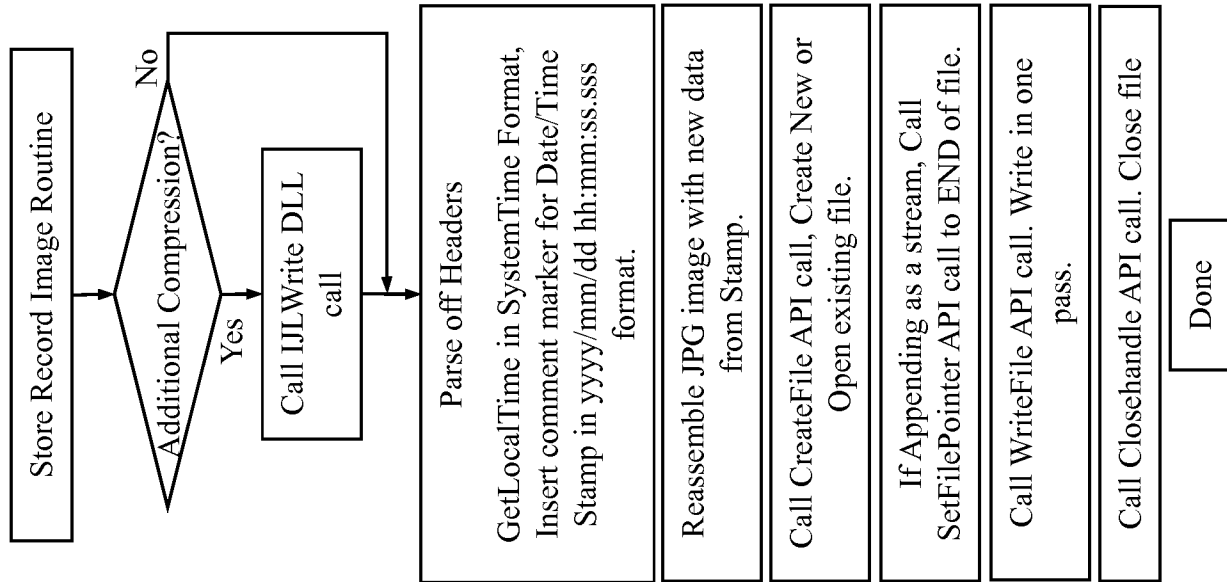
**Fig. 14a**



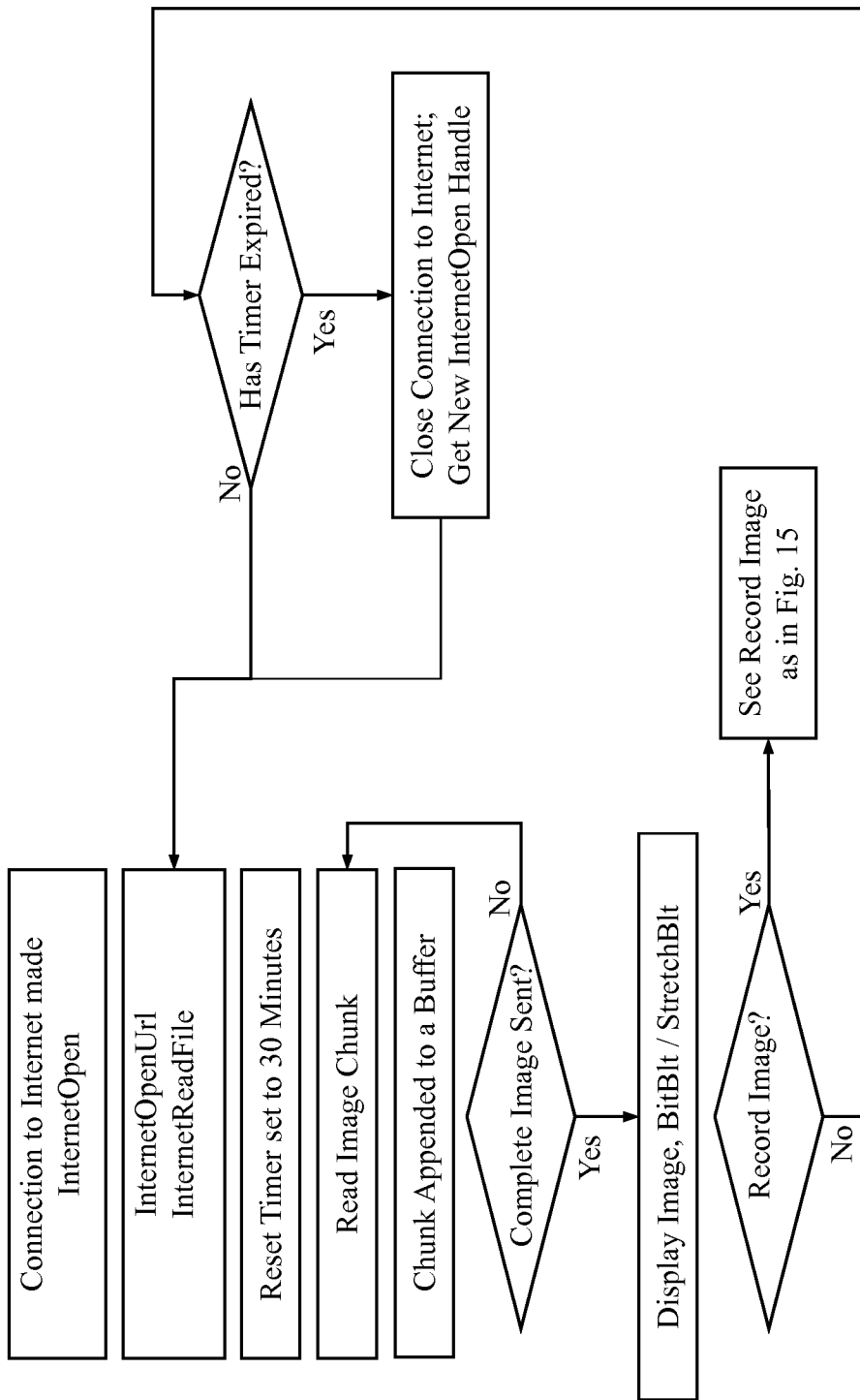
**Fig. 14b**



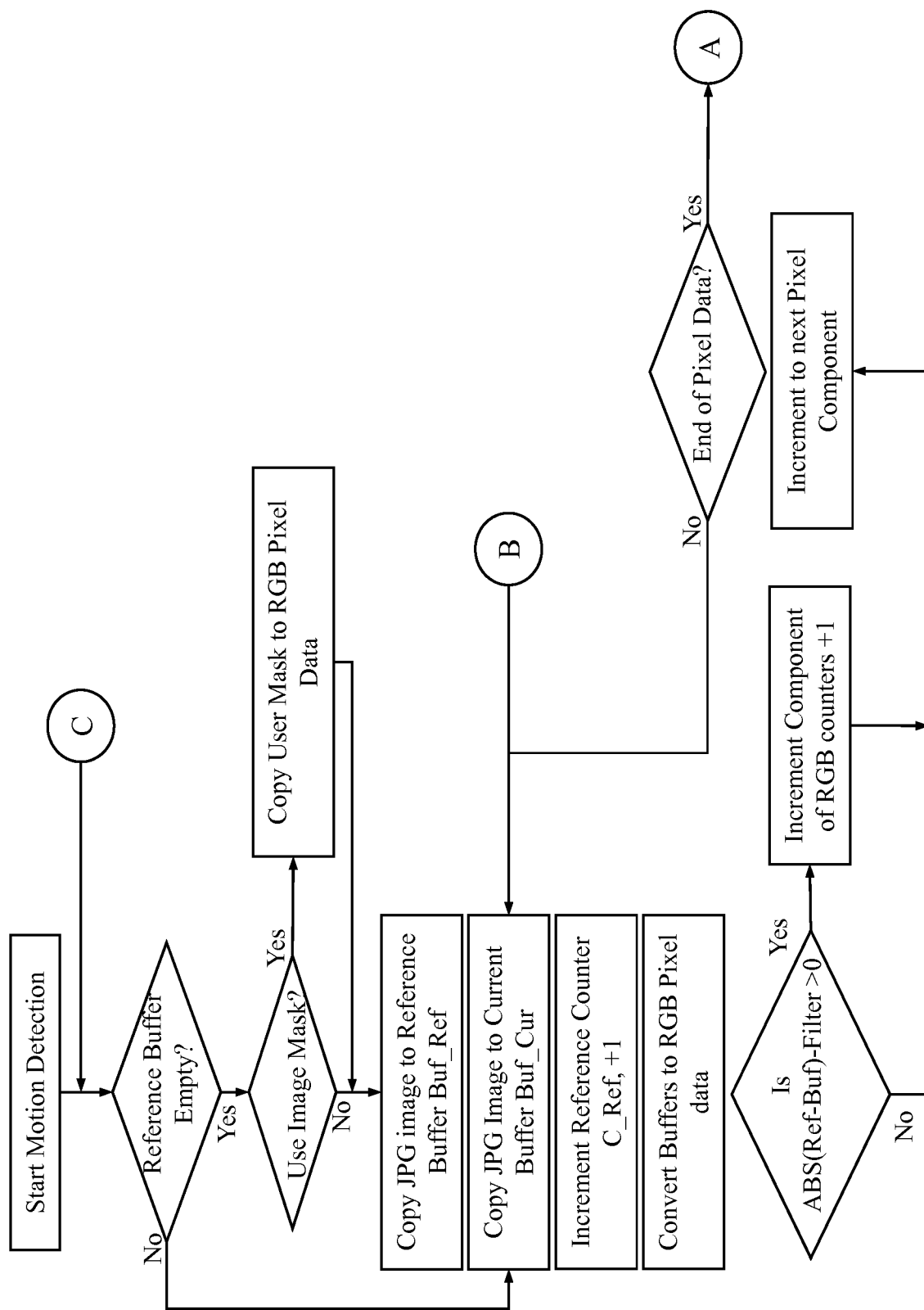
**Fig. 14c**



**Fig. 15**

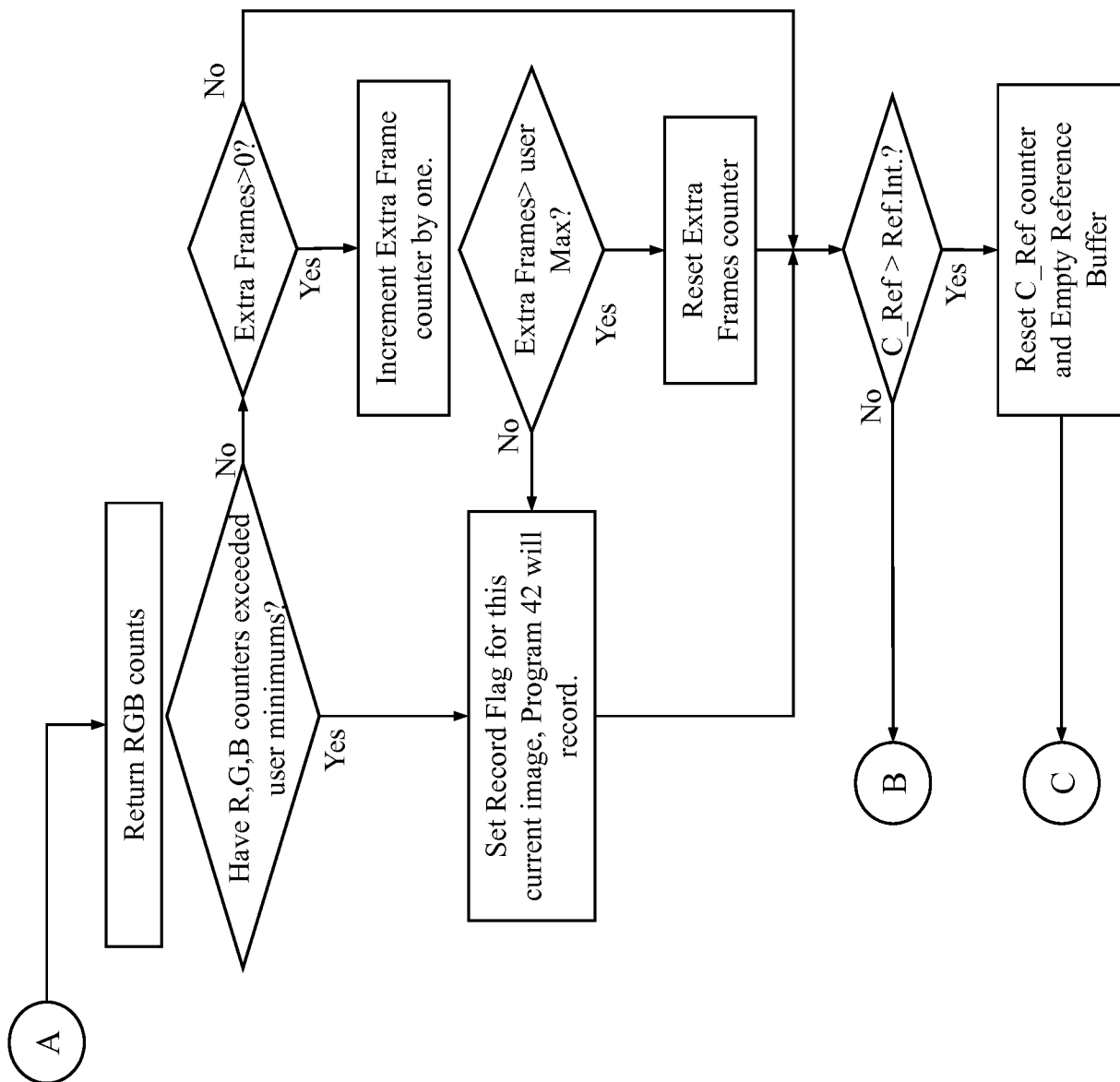


**Fig. 16**



**Fig. 17a**





**Fig. 17b**

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS		
First Named Inventor/Applicant Name:		Joseph Robert Marchese		
Filer:		James D. Stevens		
Attorney Docket Number:		1883-3001-7		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	82	82
Utility Search Fee	2111	1	270	270
Utility Examination Fee	2311	1	110	110
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				462

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	7041892
<b>Application Number:</b>	12708394
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4367
<b>Title of Invention:</b>	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS
<b>First Named Inventor/Applicant Name:</b>	Joseph Robert Marchese
<b>Customer Number:</b>	29318
<b>Filer:</b>	James D. Stevens
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	1883-3001-7
<b>Receipt Date:</b>	18-FEB-2010
<b>Filing Date:</b>	
<b>Time Stamp:</b>	18:32:48
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 462
RAM confirmation Number	7074
Deposit Account	500852
Authorized User	STEVENS,JAMES D

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ADS.pdf	967503	no	4
			512401e525ad514532bfd2a741fad96dd4cbadaa		
Warnings:					
Information:					
2	Foreign Reference	ForeignRef-JP2004-178565.pdf	69125	no	2
			e92615979721412a6c371290d0b490aad127893d		
Warnings:					
Information:					
3	Foreign Reference	GB2329541.pdf	727372	no	14
			d4e800fa06ad5a4fbd51480864114f3f566be73		
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
4	Foreign Reference	WO98-34360.pdf	2657171	no	64
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Warnings:					
Information:					
5	Foreign Reference	WO0169405.pdf	2806666	no	63
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Warnings:					
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7	Foreign Reference	SupplSR.pdf	44369	no	1
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Warnings:					
Information:					
8	NPL Documents	OntheEffectivenessofPriorities.pdf	595574	no	7
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Warnings:					

Information:					
9	NPL Documents	Cygwin.pdf	855772	no	18
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Information:					
10	NPL Documents	AFastFileForUNIX.pdf	1245185	no	17
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Information:					
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Warnings:					
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Information:					
14	NPL Documents	BeauSoftware.pdf	97047	no	2
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16	NPL Documents	CCITT_RecommendationT_81.pdf	5825930	no	186
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Information:					
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Warnings:					
Information:					
19	Information Disclosure Statement (IDS) Filed (SB/08)	IDS.pdf	613745 22ad2e176ccffe508340cd7094f0813fb8564305	no	7
Warnings:					
Information:					
20		PatentApplication.pdf	355255 2c25e8ece668e1fa545ab15948f03f0c46e4e6be	yes	53
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	31	
	Claims		32	33	
	Abstract		34	34	
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Warnings:					
Information:					
Total Files Size (in bytes):			25662110		

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	7041892
<b>Application Number:</b>	12708394
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4367
<b>Title of Invention:</b>	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS
<b>First Named Inventor/Applicant Name:</b>	Joseph Robert Marchese
<b>Customer Number:</b>	29318
<b>Filer:</b>	James D. Stevens
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	1883-3001-7
<b>Receipt Date:</b>	18-FEB-2010
<b>Filing Date:</b>	
<b>Time Stamp:</b>	18:32:48
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 462
RAM confirmation Number	7074
Deposit Account	500852
Authorized User	STEVENS,JAMES D

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ADS.pdf	967503	no	4
			512401e525ad514532bfd2a741fad96dd4cbadaa		
Warnings:					
Information:					
2	Foreign Reference	ForeignRef-JP2004-178565.pdf	69125	no	2
			e92615979721412a6c371290d0b490aad127893d		
Warnings:					
Information:					
3	Foreign Reference	GB2329541.pdf	727372	no	14
			d4e800f4a06ad5a4fbd51480864114f3f566be73		
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
4	Foreign Reference	WO98-34360.pdf	2657171	no	64
			46e8d0a9c51a75414667a9b3ca095e272d80d683		
Warnings:					
Information:					
5	Foreign Reference	WO0169405.pdf	2806666	no	63
			c2ead15fa754c7526dcdbde90d01a561ac013e20		
Warnings:					
Information:					
6	Foreign Reference	SearchReportforPCT0108133.pdf	161886	no	3
			74b1b5d0c1cb43c6580cdc48854409c9130fbc09		
Warnings:					
Information:					
7	Foreign Reference	SupplSR.pdf	44369	no	1
			05dbe7fe4a34dcc946213516d09aa37eca70c101		
Warnings:					
Information:					
8	NPL Documents	OntheEffectivenessofPriorities.pdf	595574	no	7
			ee1771225095712135fa2e3d25510c860faa7901		
Warnings:					

Information:					
9	NPL Documents	Cygwin.pdf	855772	no	18
			3824ecb7b0b58f06e2744f5c7313d93b668c1cc6		
Warnings:					
Information:					
10	NPL Documents	AFastFileForUNIX.pdf	1245185	no	17
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Warnings:					
Information:					
11	NPL Documents	NPLDocs-Sun-AR4-4pages.pdf	158982	no	4
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13	NPL Documents	NPLDocs_Sun-AR1-3pages.pdf	122392	no	3
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Information:					
14	NPL Documents	BeauSoftware.pdf	97047	no	2
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Warnings:					
Information:					
15	NPL Documents	RequestforComments-Fielding.pdf	6066465	no	162
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Warnings:					
Information:					
16	NPL Documents	CCITT_RecommendationT_81.pdf	5825930	no	186
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Warnings:					
Information:					
17	NPL Documents	WebcamWatcher6pgs.pdf	1149881	no	6
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Warnings:					

Information:					
18	NPL Documents	Surveyor-WebcamWatcher.pdf	710160 7a01ac2fc6ca79fbc6e85b251596e16c8c9dcefb	no	4
Warnings:					
Information:					
19	Information Disclosure Statement (IDS) Filed (SB/08)	IDS.pdf	613745 22ad2e176ccffe508340cd7094f0813fb8564305	no	7
Warnings:					
Information:					
20		PatentApplication.pdf	355255 2c25e8ece668e1fa545ab15948f03f0c46e4e6be	yes	53
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	31	
	Claims		32	33	
	Abstract		34	34	
	Drawings-only black and white line drawings		35	53	
Warnings:					
Information:					
21	Fee Worksheet (PTO-875)	fee-info.pdf	33144 f8300401644efc96b85176ac4cf8efd350939b08	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			25662110		

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

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**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	1883-3001-7
		Application Number	
Title of Invention	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

## Secrecy Order 37 CFR 5.2

- ☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

## Applicant Information:

Applicant 1						<a href="#">Remove</a>	
Applicant Authority		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117		<input type="radio"/> Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix			
	Joseph	Robert	Marchese				
Residence Information (Select One)		<input checked="" type="radio"/> US Residency		<input type="radio"/> Non US Residency		<input type="radio"/> Active US Military Service	
City	Ray	State/Province	MI	Country of Residence <sup>i</sup>	US		
Citizenship under 37 CFR 1.41(b) <sup>i</sup>							
Mailing Address of Applicant:							
Address 1		59992 Ray Center Drive					
Address 2							
City	Ray	State/Province	MI				
Postal Code	48096	Country <sup>i</sup>	US				
<p>All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <b>Add</b> button.</p>							

## Correspondence Information:

<p>Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).</p>			
<p><input type="checkbox"/> An Address is being provided for the correspondence Information of this application.</p>			
Customer Number	29318		
Email Address		<a href="#">Add Email</a>	<a href="#">Remove Email</a>

## Application Information:

Title of the Invention	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS		
Attorney Docket Number	1883-3001-7	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	19	Suggested Figure for Publication (if any)	

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	1883-3001-7
		Application Number	
Title of Invention	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS		

**Publication Information:**

<input type="checkbox"/>	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input type="checkbox"/>	<b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application <b>has not and will not</b> be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

**Representative Information:**

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.			
Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	29318		

**Domestic Benefit/National Stage Information:**

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.					
Prior Application Status	Pending		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
	Continuation of	11125795	2005-05-10		
Prior Application Status	Patented		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
11125795	Continuation of	09808543	2001-03-14	6891566	2005-05-10
Prior Application Status	Abandoned		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
09808543	non provisional of	60189162	2000-03-14		
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the <b>Add</b> button.				<a href="#">Add</a>	

**Foreign Priority Information:**

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).
---

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	1883-3001-7
		Application Number	
Title of Invention	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS		

			<b>Remove</b>
Application Number	Country <sup>i</sup>	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			<input checked="" type="radio"/> Yes <input type="radio"/> No
Additional Foreign Priority Data may be generated within this form by selecting the <b>Add</b> button.			<b>Add</b>

## Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.				
<b>Assignee 1</b>				<b>Remove</b>
If the Assignee is an Organization check here. <input type="checkbox"/>				
Prefix	Given Name	Middle Name	Family Name	Suffix
<b>Mailing Address Information:</b>				
Address 1				
Address 2				
City		State/Province	MI	
Country <sup>i</sup>	US	Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the <b>Add</b> button.				
<b>Add</b>				

## Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.					
<b>Signature</b>	/James D. Stevens/			Date (YYYY-MM-DD)	2010-02-18
First Name	James D.	Last Name	Stevens	Registration Number	35691

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**



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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PAT-NO: JP02004178565A

DOCUMENT-IDENTIFIER: JP 2004178565 A

TITLE: SERVER FOR COMMUNICATION MANAGEMENT,  
COMMUNICATION  
METHOD AND PROGRAM

PUBN-DATE: June 24, 2004

INVENTOR-INFORMATION:

NAME	COUNTRY
SUGA, MASANOBU	N/A
HIROBE, YOSHIKAZU	N/A

ASSIGNEE-INFORMATION:

NAME	COUNTRY
WIN ONE'S WAY CO LTD	N/A
SUGA MASANOBU	N/A

APPL-NO: JP2003373839

APPL-DATE: October 31, 2003

PRIORITY-DATA: 2002317150 ( October 31, 2002)

INT-CL (IPC): G06F012/00, G06F012/14 , G06F013/00 , G06F015/00 ,  
G09C001/00

ABSTRACT:

PROBLEM TO BE SOLVED: To securely and efficiently transmit and receive a file by a simple operation.

SOLUTION: The license number information of a user and the scramble code information allocated for every client are stored in this server 1 for communication management for performing the transmission/reception of the file between a user terminal 2 and a client terminal 3 via a communication network, an installation instruction of a communication program is issued to

(19) 日本国特許庁(JP)

(12) 公開特許公報(A)

(11) 特許出願公開番号

特開2004-178565

(P2004-178565A)

(43) 公開日 平成16年6月24日(2004.6.24)

(51) Int. Cl.<sup>7</sup>

G06F 12/00  
G06F 12/14  
G06F 13/00  
G06F 15/00  
G09C 1/00

F 1

G06F 12/00 537A  
G06F 12/00 545M  
G06F 12/14 320B  
G06F 12/14 320F  
G06F 13/00 520A

テーマコード (参考)

5B017  
5B082  
5B085  
5J104

審査請求 未請求 請求項の数 17 O L (全 33 頁) 最終頁に続く

(21) 出願番号 特願2003-373839 (P2003-373839)  
(22) 出願日 平成15年10月31日(2003.10.31)  
(31) 優先権主張番号 特願2002-317150 (P2002-317150)  
(32) 優先日 平成14年10月31日(2002.10.31)  
(33) 優先権主張国 日本国 (JP)

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ウインワンズウェイ株式会社内  
Fターム(参考) 5B017 AA03 BA07 BB10 CA16  
5B082 EA12

最終頁に続く

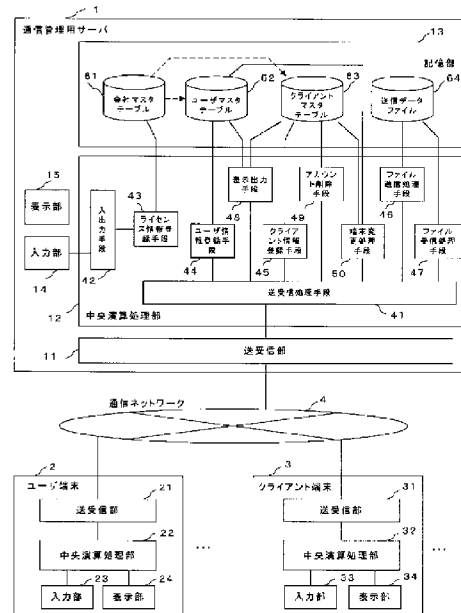
(54) 【発明の名称】 通信管理用サーバ、通信方法、及び、プログラム

(57) 【要約】

【課題】 簡単な操作で、ファイルの送受信を安全かつ効率的に行うこと。

【解決手段】 通信ネットワークを介してユーザ端末2とクライアント端末3との間でファイルの送受信を行うための通信管理用サーバ1に対して、ユーザのライセンス番号情報およびクライアントごとに割り当てられるスクランブルコード情報を記憶しておき、これらの情報をもとに夫々の端末に通信プログラムのインストール指令を出し、インストール後は、MACアドレスも用いて認証し、アイコン操作により両端末間でファイルの転送を行う。

【選択図】 図1



(43) Date of A Publication 24.03.1999

(21) Application No 9719799.0

(22) Date of Filing 17.09.1997

(71) Applicant(s)  
**Sony United Kingdom Limited**  
(Incorporated in the United Kingdom)  
The Heights, Brooklands, WEYBRIDGE, Surrey,  
KT13 0XW, United Kingdom

(72) Inventor(s)  
**John Hudson**

(74) Agent and/or Address for Service  
**D Young & Co**  
21 New Fetter Lane, LONDON, EC4A 1DA,  
United Kingdom

(51) INT CL<sup>6</sup>  
**H04N 7/18**

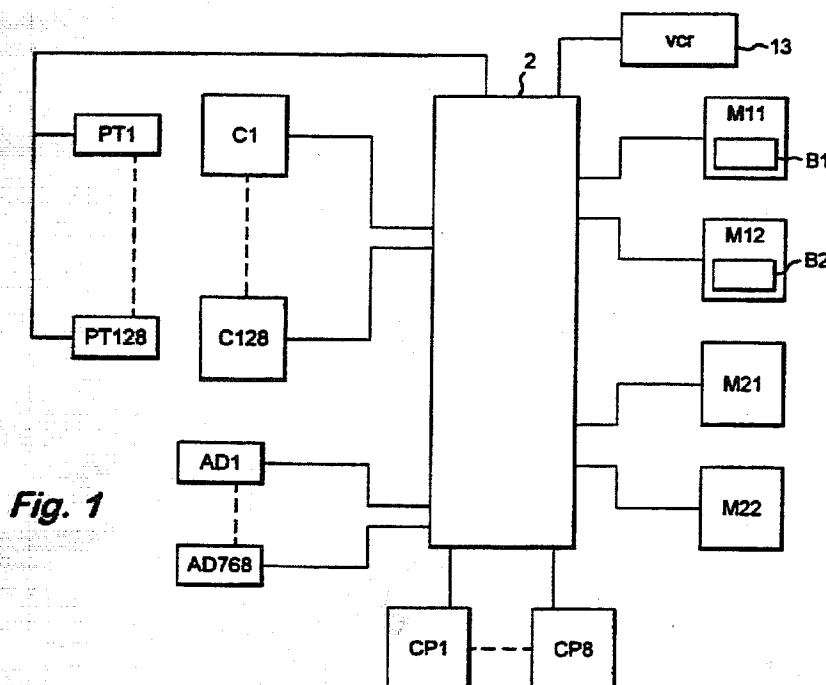
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FD31K**

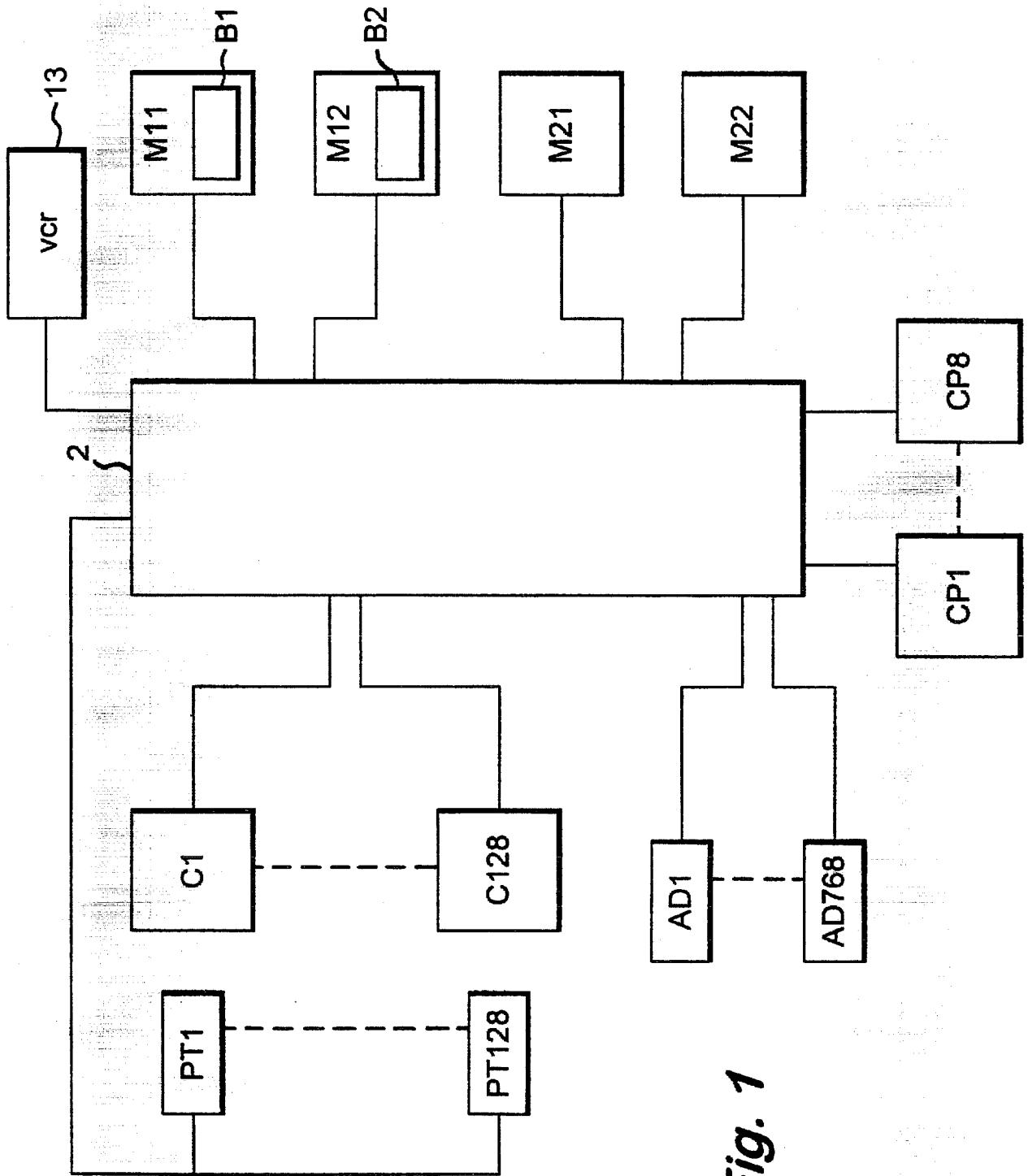
(56) Documents Cited  
**GB 2275585 A EP 0762753 A2 EP 0690628 A1  
WO 96/31984 A1 WO 94/24813 A1 US 4369467 A**

(58) Field of Search  
UK CL (Edition O ) **H4F FAAE FAAX FEG FGG FGH FGS**  
INT CL<sup>6</sup> **H04N 5/232 5/247 5/262 5/268 5/45 7/18**  
Online databases: **WPI, Japio**

(54) Abstract Title  
**Highlighting view from controlled security camera**

(57) A security system comprises many cameras (C1 to C128) and a large number of alarm detectors (AD1 to AD768). A system controller (2) associates alarm detectors with cameras. Views from the cameras (C) are displayed on monitors (M11 to M21). The views are displayed in any one of various formats and any view can, in principle, be displayed on any monitor. At least some cameras have, or each camera has, a pan-and-tilt head (PT1 to PT128). Operators can control the pan-and-tilt heads (PT1 to PT128) and respond to alarms using control panels (CP1 to CP8). An operator may thus be faced with a large number of views. Views associated with active functions of the system are provided with coloured borders (B1, B2) to assist the operator. For example, views with active alarms are provided with flashing red borders (B1). Views associated with active control of a pan-and-tilt head (PT) by an operator are provided with a coloured border (B2) (e.g. green or yellow).





**Fig. 1**

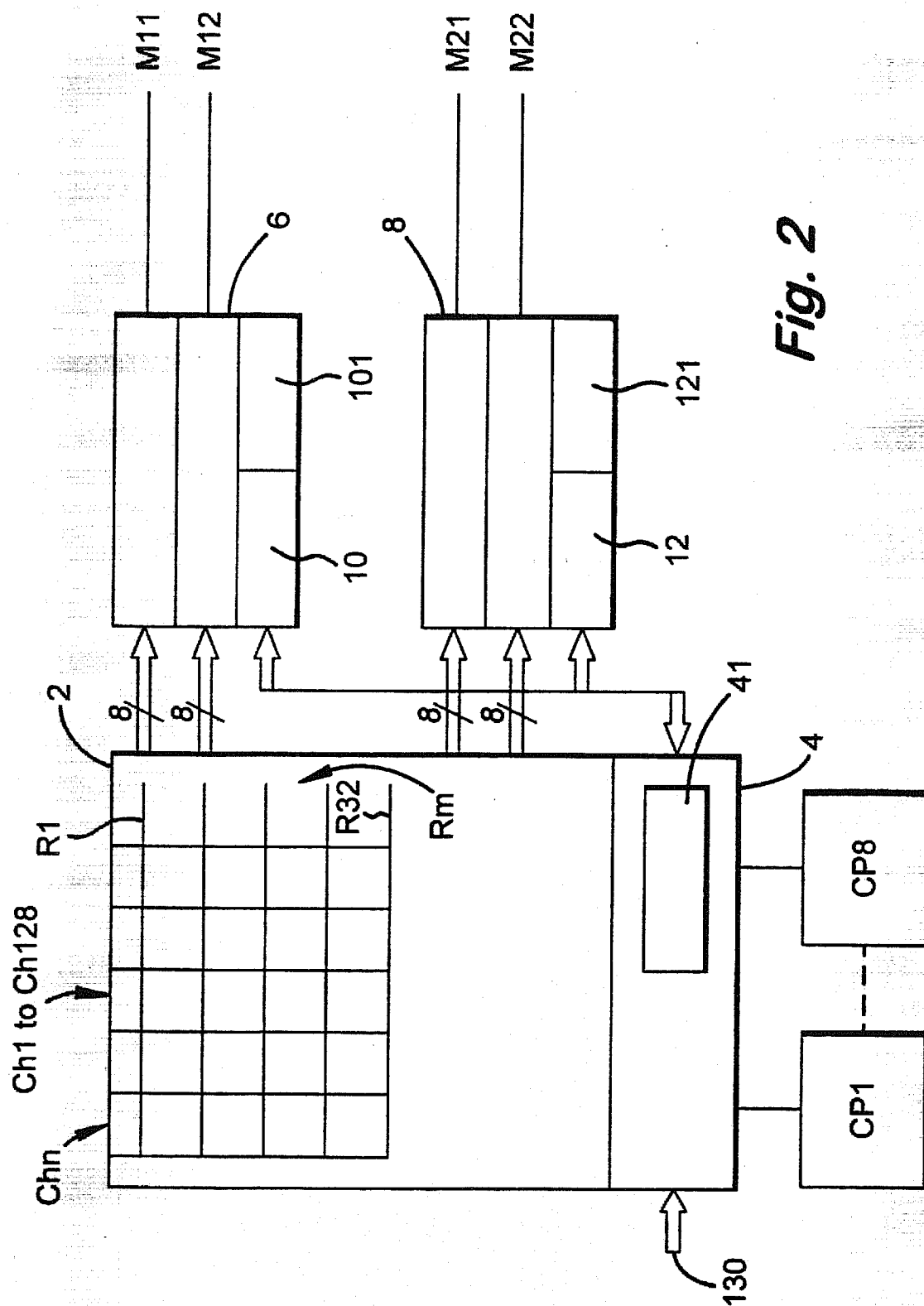
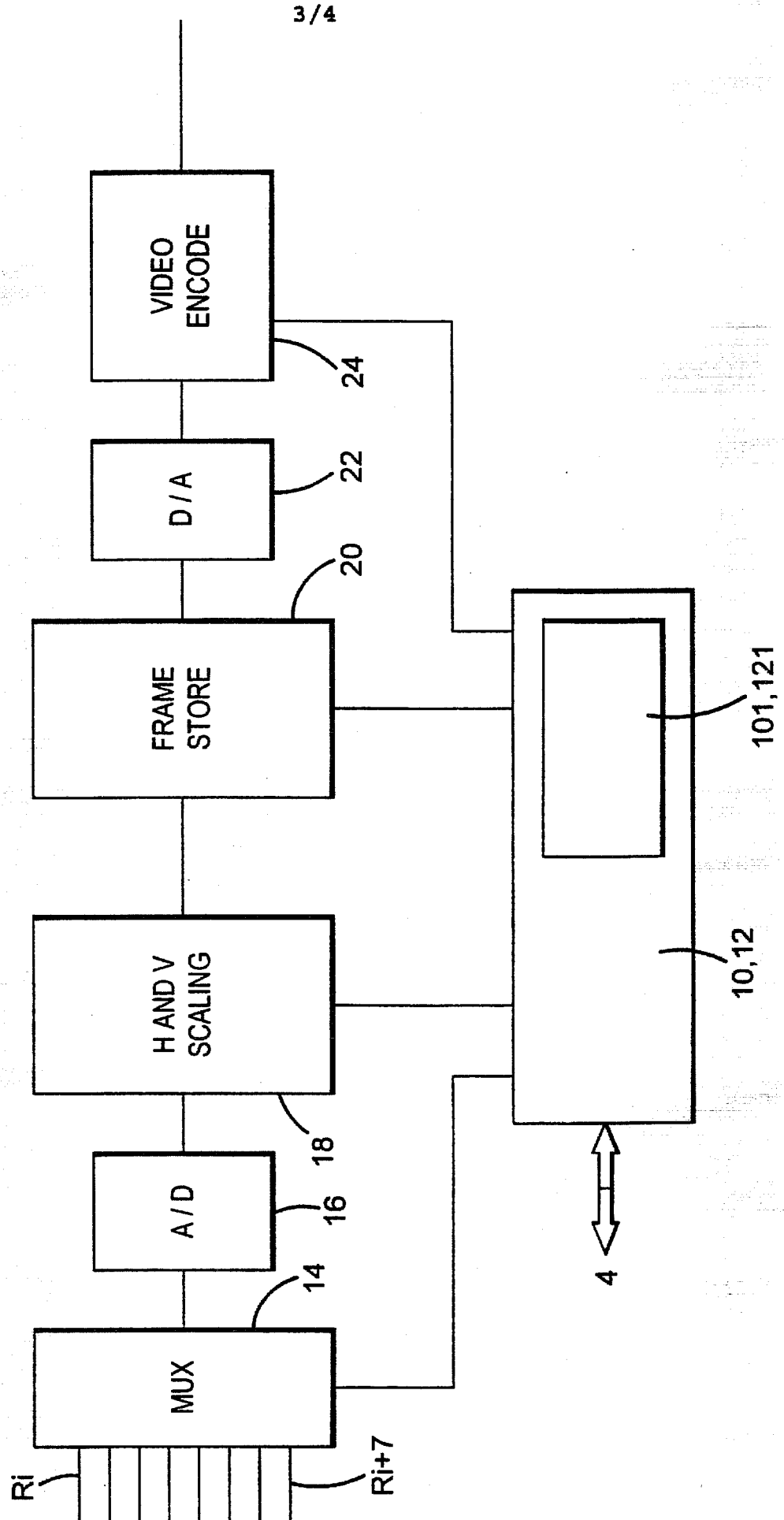
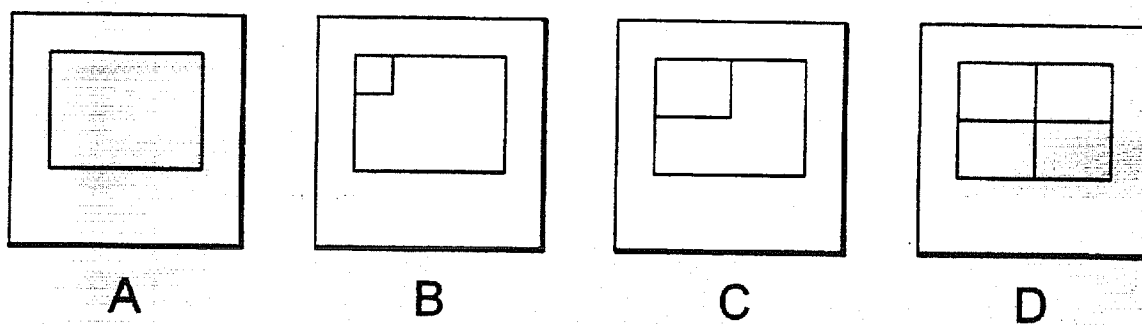


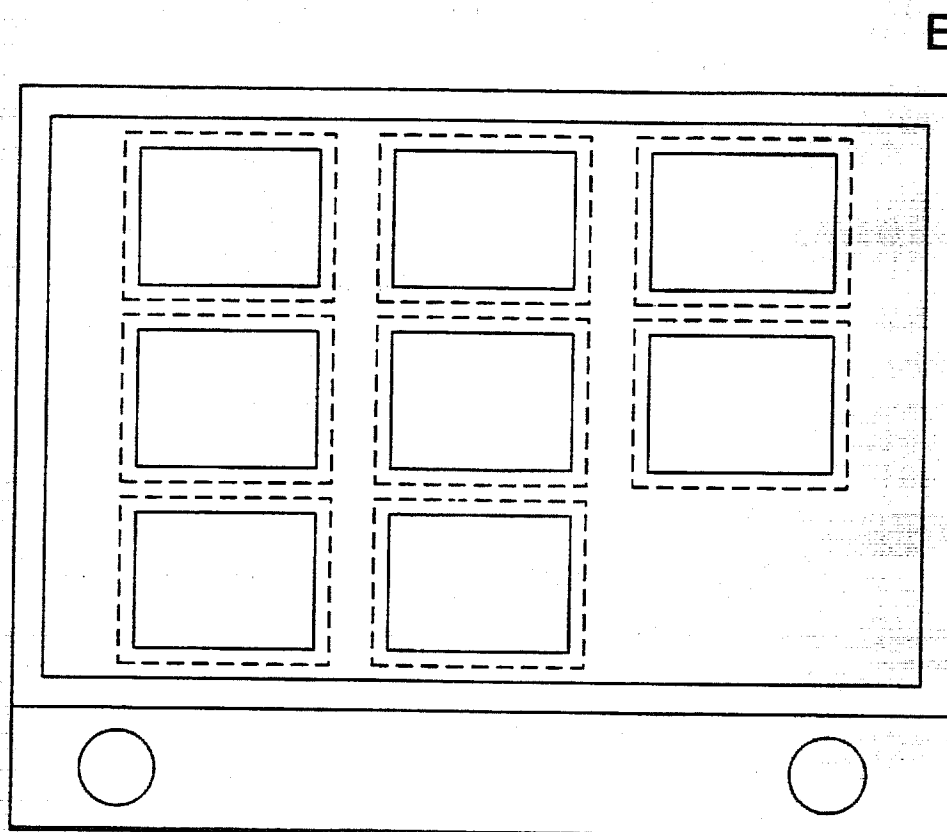
Fig. 2

**Fig. 3**





**Fig. 4**





## SECURITY CONTROL SYSTEM

The present invention relates to a security control system. Illustrative embodiments of the invention relate to a security system comprising video cameras, the control system and monitors for displaying images received by the cameras.

Security CCTV systems are now finding widespread use in monitoring shopping centres, town centres, and commercial and industrial buildings.

The size of these systems may vary from one or two video sources for small retail outlets, petrol stations etc., and the large town centre installations which may have greater than a hundred video sources with hundreds of alarm input signals.

In large installations, a great deal of security information is provided to the operator for evaluation. Such large security systems are typically managed by a system controller which can: provide access to a large number of video sources (for example a hundred video sources) and many hundreds of alarm signals; allow control of pan and tilt heads for each camera; have provide some control panels (e.g. ten or fewer control panels) for enabling an operator to interact with the system; and present video information on some (e.g. 30 or more) video monitors.

Managing this information to ensure that any incident may be efficiently and effectively identified, dealt with and recorded for evidential purposes can be very operator intensive.

To improve the efficiency of the monitoring process, large security sites are often partitioned or broken down into areas, with one operator assigned responsibility for monitoring each area.

System controllers may provide the facilities to effectively partition an installation into a number, (e.g. eight) of fully functioning sub-systems. Each sub-system has a control interface, a number of video monitors, and access to a sub-set of the video sources and alarm information from the complete installation.

The monitors are watched by operators who use the control panels, e.g. in response to alarms, to control the views presented by the cameras in order to determine the cause of an alarm. Even by assigning one operator to each partition of an installation, an event may trigger many alarms and present the operator with an

overwhelming amount of alarm and video information.

Other actions such as controlling pan-and-tilt heads can be confusing for the operator when he views many images on many monitors; it may be difficult to pick out the view which is subject to the pan-and-tilt control.

5 According to the present invention, there is provided a security system comprising:

cameras for producing video signals representing images viewed thereby;

display means for displaying the images; and

control means for controlling the cameras, display means and implementing  
10 other system functions;

the control means controlling the display of the images to visually indicate, in association with an image, an active system function associated with that image.

In preferred embodiments of the invention, the visual indicator is a coloured border. The border may provide further emphasis by flashing. Different coloured  
15 borders may be used to indicate different function, e.g. a red border indicates an alarm condition.

For a better understanding of the present invention, reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 is a schematic block diagram of an illustrative security system in  
20 which aspects of the present invention are implemented;

Figure 2 is a more detailed block diagram of the system controller of the system of Figure 1;

Figure 3 is a schematic block diagram of a video signal processing channel associated with one monitor of the system of Figures 1 and 2; and

25 Figure 4 is a schematic diagram of illustrative display modes.

Referring to Figure 1 an illustrative security system in accordance with the present invention comprises 128 cameras C1-C128. At least some, and in this example all, of the cameras have pan and tilt heads PT1-PT128. The system also comprises 768 alarm detectors AD1-AD768.

30 A system controller 2 receives analogue video from the cameras C1-C128, and alarm signals from the alarm detectors AD1-AD768. The controller 2 provides

control signals to the pan and tilt heads.

Up to eight control panels CP1 to CP8 are provided. There may be more than eight panels. The control panels CP1-CP8 are used to program the system controller 2 and also are used by operators to control the system in use. For example, an operator can select a particular pan-and-tilt head and control it using the control panel.

The controller 2 controls in accordance with its programming the display of video from the cameras, and the display of alarms, on four monitors M11, M12, M21, M22.

The system of Figure 1 also includes one or more video cassette recorders (VCR) 13 for recording events such as evidence of intruders into a building. The operator chooses a view to be recorded and the system control then feeds the appropriate video signal to the VCR 13.

Referring to Figure 2, the system controller 2 comprises a video switcher having 128 analogue video inputs and 32 analogue video outputs. The inputs are shown as (vertical) columns Chn, Ch1 - Ch128 in Figure 2, and the outputs as horizontal rows Rm, R1 - R32. Video switches are controlled by a programmable controller 4, e.g. a special purpose data processor or computer including program storage means 41 to connect the columns Chn to the rows Rm in any desired configuration. In addition, the connections may be varied in time.

The 32 outputs R1 to R32 are organised into four groups of eight outputs. One pair of groups or 16 outputs feed analogue video to a first multi-picture processor 6 and the other pair of groups or 16 outputs feed analogue video to a second multi-picture processor 8.

Each multi-picture processor 6, 8, comprises two identical channels both controlled by a common control processor 10, 12 having a program storage means 101, 121. Each channel processes one group of eight analogue video inputs Ri to Ri+7 e.g. R1 - R8.

The monitors M11 M12 are controlled by the two channels respectively of processor 6 and the monitors M21 and M22 are controlled by the two channels of processor 8.

The control processors 10, 12 are linked to the programmable controller 4 to control the display of information on the monitors in accordance with the programming of the controller 4. Programming of the controller 4 correspondingly programs the control processors 10 and 12.

5 Referring to Figure 3 each channel of the multipicture processors comprises a multiplexer 14 having eight inputs corresponding to one group of video outputs  $R_i - R_{i+7}$  and one output. The multiplexer 14 is controlled by the control processor 10, 12 to feed any selectable one of the inputs  $R_i - R_{i+7}$  to an analogue to digital converter 16. The resulting digital video is fed to a circuit 18 which under the  
10 control of the processor 10, 12 scales the video horizontally and vertically to produce an image of desired size (e.g. full screen, 1/4 size, 1/9 size).

The thus scaled image is stored in a frame store 20 under the control of the processor 10, 12. The processor 10, 12 controls the write addresses of the store to position the scaled image in a desired position for display, to allow picture-in-picture  
15 displays (PIP displays) or a desired number of pictures to be displayed in an array of pictures e.g. four or eight pictures on one monitor, as will be described hereinbelow.

The image or images stored in the frame store 20 are read-out via a digital to analogue converter 22 to a video encoder 24. The video encoder 24 encodes the video to be compatible with the monitors M11, M12, M21, M22. The video encoder  
20 24 is also controlled by the processor 10, 12 to carry out other functions as will be described hereinbelow.

The system described herein above may operate on monochrome video signals. Alternatively colour video signals may be processed. Although the cameras produce analogue signals, the system could be modified to operate on digital signals produced  
25 by the cameras.

A preferred version of the system, as shown in Figure 1 includes the 768 alarm detectors. The programmable controller 4 includes in its program store 41 a look-up table which is programmable to associate the cameras with one or more, e.g. a group of 4, alarm detectors AD.

30 In one mode of operation of the system, a set of images is displayed on a display device and the operator selects one of the images for performing an operation

linked to that image. For example, he may select the image to access a further set of images linked to the selected image.

In this example of the present invention, images which are displayed on the monitors M11 to M22 and which are subject to certain predetermined actions or active events are made visually prominent to the operator in a way which represents the action or event. In this illustrative example this is done by providing coloured borders B1, B2 around the displayed images associated with such actions and events. For example:

10

<u>Action/Event</u>	<u>Border</u>
Alarm	Red
Pan-and-tilt control	Yellow
VCR recording	Blue
15 Normal (no action/event)	White
Image selected for performing further operation	Green

20 For an alarm, the red border may flash.

The borders may be written into the image frame in the frame store by the control processor 10, 12 in response to the action or event which is assigned to it by the controller 4. Preferably, the borders are combined with the video in the video encoder 24.

25 In preferred embodiments of the invention, the multipicture processors 8, 6 display one or more images in any one of the formats shown in Figures 4A to 4E.

<u>Format</u>	<u>Display</u>
30 A	Single image, full screen
B	PIP, 1/9 size image inset
C	PIP, 1/4 size image inset

D

Array of four 1/4 size images

E

Array of eight 1/9 size images

As shown in Figure 4E, by way of example, all eight images have a border.

- 5 The colour the border of an image is varied according to the actions and events associated with that image.

In an illustrative, preferred, embodiment, operator fatigue is reduced and operational efficiency increased by presenting the information more concisely on four monitors and by highlighting important information by the use of coloured borders.

- 10 In summary of the above described embodiments a security system comprises many cameras (C1 to C128) and a large number of alarm detectors (AD1 to AD768). A system controller (2) associates alarm detectors with cameras. Views from the cameras (C) are displayed on monitors (M11 to M21). The views are displayed in any one of various formats and any view can, in principle, be displayed on any
- 15 monitor. At least some cameras have, or each camera has, a pan-and-tilt head (PT1 to PT128). Operators can control the pan-and-tilt heads (PT1 to PT128) and respond to alarms using control panels (CP1 to CP8). An operator may thus be faced with a large number of views. Views associated with active functions of the system are provided with visual emphasis, e.g. coloured borders (B1, B2) to assist the operator.
- 20 For example, views with active alarms are provided with flashing red borders (B1). Views associated with active control of a pan-and-tilt head (PT) by an operator are provided with a coloured border (B2) (e.g. green or yellow).

CLAIMS

1. A security system comprising:  
cameras for producing video signals representing images viewed thereby;  
5 display means for displaying the images; and  
control means for controlling the cameras, display means and implementing  
other system functions;  
the control means controlling the display of the images to visually indicate, in  
association with an image, an active system function associated with that image.  
10
2. A system according to claim 1, wherein the visual indication is a border  
around the image, the colour of the border indicating the active function associated  
with the image.
- 15 3. A system according to claim 2, wherein the border flashes.
4. A system according to claim 2, comprising at least one alarm detector,  
associated with at least one camera for producing an alarm signal production of an  
alarm signal associated with an image key on active system function.  
20
5. A system according to claim 4, wherein an alarm associated with an image is  
indicated by a red border.
6. A system according to claim 4 or 5, wherein an alarm associated with an  
25 image is indicated by a flashing border.
7. A system according to claim 2, 3, 4, 5 or 6, wherein the system comprises at  
least one pan-and-tilt heads associated with at least one of the cameras, and the active  
function is control of a pan-and-tilt head.

8. A system according to claim 2, 3, 4, 5, 6 or 7, wherein the system comprises a video cassette recorder and the active function is actuation of the recorder.
  9. A security system substantially as hereinbefore described with reference to
- 5 Figures 1 to 4 of the accompanying drawings.





Application No: GB 9719799.0  
Claims searched: 1

Examiner: Sue Willcox  
Date of search: 17 November 1997

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): H4F (FAAE, FAAX, FEG, FGG, FGH, FGS)

Int Cl (Ed.6): H04N (5/232, 5/247, 5/262, 5/265, 5/268, 5/45, 7/18)

Other: Online databases: WPI, Japio

### Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Y	GB 2275585 A	SONY CORPORATION - see particularly page 10, lines 10 - 26	2, 7
Y	EP 0762753 A2	MATSUSHITA ELEC. IND. CO., LTD see column 5, line 50 to column 6, line 30	2, 7
X,Y	EP 0690628 A1	SENSORMATICS ELECTRONICS CORP - see column 5, line 53 to column 4, line 8	X: 1 Y: 2, 7
X,Y	WO 96/31984 A1	WASHINO - see particularly page 11, lines 25 - 28	X: 1 Y: 2, 7
X,Y	WO 94/24813 A1	WASHINO - see particularly Figures 5 & 6; page 12, lines 15 - 19; page 13, lines 12 - 26	X: 1 Y: 2, 7
X	US 4369467 A	SMITH - see column 6, lines 32 - 67	X: 1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
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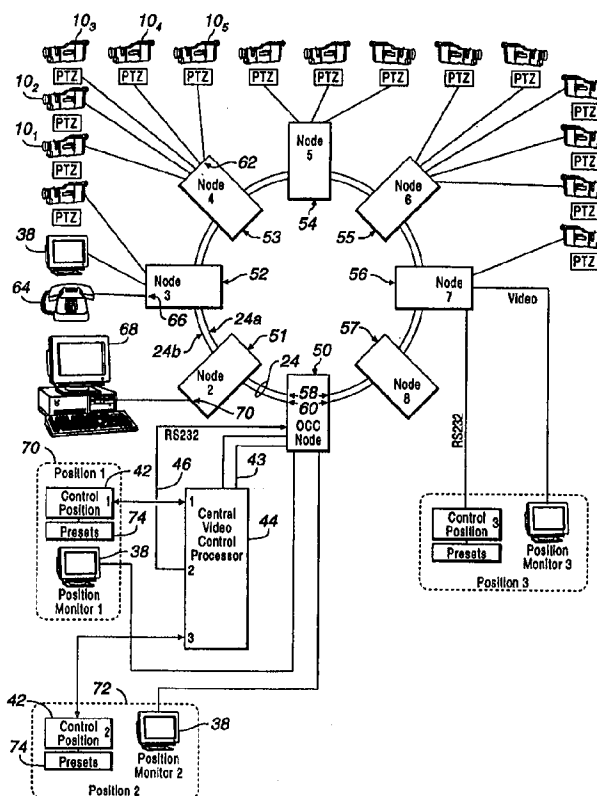


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US98/00061 <b>(22) International Filing Date:</b> 8 January 1998 (08.01.98)  <b>(30) Priority Data:</b> 08/791,201 31 January 1997 (31.01.97) US  <b>(71) Applicant:</b> INTELECT NETWORK TECHNOLOGIES [US/US]; 1100 Executive Drive, Richardson, TX 75081 (US).  <b>(72) Inventor:</b> SHAUNFIELD, John, E.; 3225 Monette Lane, Plano, TX 75025 (US).  <b>(74) Agents:</b> CHAUZA, Roger, N. et al.; Sidley & Austin, Suite 3400, 717 North Harwood, Dallas, TX 75201 (US).		<b>(81) Designated States:</b> AU, BR, CA, CN, JP, KR, SG, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the</i> <i>claims and to be republished in the event of the receipt of</i> <i>amendments.</i>

**(54) Title:** SWITCHABLE MULTI-DROP VIDEO DISTRIBUTION SYSTEM**(57) Abstract**

A technique for controlling node equipment in a SONET ring transmission system. Control signals from a control center are transmitted in a selected byte of the SONET frame to each node (50-57) coupled to the SONET ring (24). Each SONET node includes a decoder (61) for decoding the control signals as to a destination address, and if a match is found, the node decodes a command field to carry out the representative functions. The command may be to activate or deactivate node circuits, or to receive or transmit video signals in specified VT channels of the SONET frame. In this manner, equipment can be switched on or off at the respective node to thereby optimize the bandwidth efficiency of the SONET network.



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## SWITCHABLE MULTI-DROP VIDEO DISTRIBUTION SYSTEM

### RELATED APPLICATION

This application claims the benefit of pending U.S. provisional patent application filed July 16, 1996, Serial No. 60/013,513, and entitled "VIDEO DISTRIBUTION SYSTEM - THE NEXT GENERATION".

5

### TECHNICAL FIELD OF THE INVENTION

The present invention relates in general to the transmission of data through multiple nodes, where data can be extracted, changed or modified at each node. More particularly, the invention relates to the selective control of data transmitters/receivers, such as video cameras and/or monitors, at each node of a video transmission path so that the video equipment can be selectively activated or deactivated to thereby optimize the bandwidth usage of the video transmission system.

10

## BACKGROUND OF THE INVENTION

High speed digital transmission systems have been highly developed and refined to communicate voice, data and other information. The transmission of video signals is also a highly developed technology, both as to analog and digital signals. The transmission of a video image, whether it be still or moving, requires the communication of a substantial amount of information. Present technology is available for transmitting relatively few channels of video information without being unduly complicated or expensive. The digitization of analog signals, including video signals, is a well developed technology. Indeed, digital compression techniques have been developed to compress the digital signals into much lower bandwidths to optimize the usage of the transmission systems. The compression of digital video signals allows for the low cost and efficient transmission of video information on standard digital transmission systems. Such transmission systems can carry voice and data signals, as well as video signals on the same transmission system, without requiring larger or different types of systems.

The transmission of digital signals by way of optical signals is an emerging technology, primarily due to the high speed transmission medium. Moreover, the fiber optic transmission of digital signals has certain inherent advantages as compared to the standard copper twisted pair or coaxial cable counterparts, such as longer life, longer transmission distances without the use of repeaters or regenerators, and much less susceptibility to electromagnetic interference. While the digitalization and compression of data introduces a known amount of signal degradation, the transmission of the compressed digital signals on a fiber optic system adds no further degradation. Indeed, the distance and number of drops in a fiber optic system no longer affect signal quality. This allows video signals to be monitored anywhere in a transmission network without affecting the quality of the video signal. Video signals can thus be more effectively monitored in management or administrative offices as well as at dedicated monitoring stations.

The new video compression standards such as JPEG and MPEG, and others, allow for full motion video to be transmitted in bandwidths as low as 384 kbits/s. Bandwidth requirements affect video quality, with higher bandwidths providing better quality.

Relatively high quality video can now be transmitted in bandwidths as low as 2 Mbits/s. These signals are easily carried on standard transmission protocols such as DS-1, E1, frame relay and ATM. Video signals carried by the public communication network allow a camera to be monitored from a remote location anywhere in the world where there is access to a reliable public communication network.

The Synchronous Optical NETwork (SONET) transmission system is being incorporated into all of the major public telecommunication transmission networks on a world-wide basis. In Europe, the corresponding SONET system is known as the Synchronous Digital Hierarchy (SDH) system. The SONET transmission of optical signals is carried out according to a well-known protocol. With the availability of efficient video compression techniques and the world digital transmission standards of SONET/SDH, video information can be distributed in a manner never before considered by the video industry. These new methods are brought about because of low cost digitalization and compression of the previously high bandwidth analog signals. The low cost compression coupled with new switching capabilities of SONET/SDH now allow a switch base distribution system for video signals.

Current video distribution or transmission can be classified into two primary groups, namely entertainment distribution and video monitoring. The entertainment distribution of video information includes normal broadcast and cable television systems where there are a relative small number of video channels and a large number of monitors or subscribers. The video monitoring field includes the security industry, where a large number of camera or video channels are monitored by a relatively few number of monitors or subscribers. The term security is used in a broad sense to include any remote monitoring for obtaining security or operational information. The video monitoring field includes the remote monitoring of power distribution systems and pipelines, the remote monitoring of air, rail and highway transportation system, and the remote monitoring of large facilities such as airports, prisons, manufacturing facilities, campus environments, government facilities, etc.

FIG. 1 illustrates apparatus that is well known in the video distribution field for switching the video signals of a large number of cameras to a smaller number of video monitors. A plurality of video cameras 10 and associated analog-to-digital converters (not shown) couple digitized signals by way of respective T1 carrier lines 20 to a respective node on a counter-rotating optical network 24. The digitized NTSC signals from each video camera 10 are compressed and coupled by the respective node 22 onto both optical fibers 24a and 24b according to the SONET protocol. The optical fiber 24a is duplicated, in that the same information is carried according to the same protocol on the optical fiber 24b, but in an opposite direction. The counter-rotating nature of the optical network shown in FIG. 1 enhances reliability of the system. Each node 22, 26 and 28 may include many video cameras and associated interfaces, as well as data and digitized voice communication capabilities. A base node 30 couples the video signals via a large video switch matrix 36 to a number of monitors. Moreover, while the system of FIG. 1 illustrates four nodes, there may be fewer or many more nodes, each separated geographically up to 100 miles, or so.

The SONET protocol can operate in different modes. The OC-1 mode includes a frame having a total of 810 bytes (e.g., channels) of data, 27 of which are overhead, and the remaining 783 bytes can be used as payload or data. The cyclic period of each OC-1 SONET frame is 125 microseconds. The OC-1 mode is the most typical operating mode, and operates at 51.84 Mbit/s. An OC-3 mode operates at 155.52 Mbit/s; an OC-12 mode operates at 622.08 Mbit/s; and an OC-48 mode operates at 2488.32 Mbit/s. As can be appreciated, with higher optical carrier operating speeds, much more data can be transmitted per unit of time, but the cost and complexity of the equipment increases accordingly. The SONET protocol is defined in explicit detail in Bellcore Specifications Synchronous Optical Network (SONET) Transport Systems; Common Generic Criteria", Document No. GR-253-CORE, Issue 2, Dec. 1995; and TR-NWT-000496 SONET Add/Drop Multiplex Equipment (SONET ADM), Generic Criteria, Issue 3, May 1992, the disclosure of which is incorporated herein by reference in its entirety.

The video distribution system of FIG. 1 includes a base node 30 having circuits 32 for retrieving the video data from the various SONET VT channels. The video signals are decompressed by the circuit 32 and transferred as basic NTSC video signals on respective coaxial lines 34 to a switching matrix 36. With this arrangement, if the video distribution system had 100 video cameras 10, there would be 100 video cables 34 continuously coupling 100 channels of video signals to the matrix 36. The matrix 36 functions to switch a fewer number of monitors 38 to selectively present the video information on any of the matrix inputs 34. The lines 40 coupling the video monitors 38 to the switching matrix 36 are standard coaxial-type cables. A switch panel 42 is coupled to a computer 44 which, in turn, is coupled by an RS-232 line 46 to the switching matrix 38. The switching matrix 36 includes circuits for decoding the signals on the RS-232 line 46 and for connecting any one monitor 38 to a specific video input 34 of the switch matrix 36. The switch panel 42 may be buttons, switches or a desktop computer and associated mouse, or other equipment.

The conventional video distribution system shown in FIG. 1 is wasteful of bandwidth, in that the video signals of each camera 10 are coupled as continuous live signals to the input of the switch matrix 36, even if the video signal of a camera is not selected by the switch panel 42 for viewing on a monitor 38. As noted above, if 100 cameras are employed in the video distribution system, then the optical network 24 must be capable of simultaneously handling the bandwidth for all 100 channels of video signals, even if only 10 monitors 38 are usable at one time. This type of system is commonly termed a point-to-point system, or a "home run" system, where all the video signals are carried from all cameras to the base node 30. As can be appreciated, the transmission of video signals, even though compressed, requires substantial bandwidth, as compared to other data and digitized voice information. In view that in most transmission systems the bandwidth is limited, the transmission medium becomes quickly and fully utilized, thereby either blocks the communication of other information, or requires long waiting periods for idle times of the transmission medium. It can be seen from the foregoing that a need exists for a technique that reduces the bandwidth requirements of a video distribution system, without limiting the number or flexibility of video cameras utilized therein.



Another need exists for a video distribution system in which the bandwidth requirements are dependent upon the number of video monitors utilized, rather than on the number of cameras employed. Yet another need exists for a technique for activating transmission of video signals of each video camera at its node, only when it is selected at the remote  
5 monitor control center.

## SUMMARY OF THE INVENTION

Disclosed is a video distribution system that overcomes the problems and shortcomings of the prior art systems. In accordance with a preferred form of the invention, monitors and/or video cameras and other equipment can be coupled to each node of an optical network, and switched at the node so that no bandwidth of the transmission medium is required unless the video transmitting apparatus is activated. With this arrangement, no large and expensive video switching matrix is required, thus resulting in a more economical video distribution system where the bandwidth usage is minimized so that more system users or subscribers can be accommodated.

In accordance with a feature of the preferred embodiment of the invention, there is provided a communication from any one node to all other nodes, via a DSO channel of the SONET network. The communication includes a unique address of the target node, a unique address of a device connected to the node, and a command for activating or deactivating the device coupled to the node. Circuits are provided in each node of the optical network, as well as a master node, for intercommunicating to allow specific video cameras to commence transmitting video information in a selected virtual tributary (VT) channel of the SONET frame. Accordingly, when it is desired at the control center to connect, for example, video camera 50 to monitor 5, a frame of serial data is transmitted, on a byte-by-byte basis, according to a Network Management System (NMS) protocol, in a specified byte or DSO channel position of the SONET frame so as to be available to each node. The NMS protocol comprises a frame of information, including a source address (of the transmitting node) and a destination address of the target node and video camera or other equipment coupled to the destination node. The NMS frame also includes many command signals which are decoded by the circuits of each node. When the node to which camera 50 is connected receives the destination address uniquely associated with camera 50, the bytes of the NMS frame of data will be sequentially retrieved from the SONET network, decoded and employed to control the equipment at such node. The NMS frame also includes data fields which specify the selected VT channels of the SONET frame which should be driven with the compressed video data of camera 50. In like manner, the master

node will also receive the NMS frame as well as its address, so that it can retrieve the video data of camera 50 from the selected SONET VT channels, decompress the video data, covert it to corresponding analog video signals and transmit the same directly to monitor 5. In this manner, no large and expensive video switching matrix is required, and no SONET bandwidth is required unless the video camera is selected to actively drive the SONET channels with video information.

Each SONET network node includes duplicated add and drop buses for either retrieving data from specified SONET channels, or for adding new data to the SONET channels. Each node receives commands via the NMS frame (transmitted in a dedicated SONET DSO channel) allowing the addressed video camera to add its video signals to specified SONET VT channels. Other NMS commands can be transmitted to stop the video transmission of a camera to the SONET network, thereby providing camera switching capabilities at each node.

In the preferred embodiment, full moving video is transmitted in a SONET VT Channel, while the NMS commands are coupled around the SONET network in a single DSO byte of the SONET frame. With this arrangement, a number of monitors and/or cameras located at various nodes can be controlled to retrieve the video data from the SONET channels, thereby providing the same video image at the different monitors.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Further features and advantages will become apparent from the following and more particular description of the preferred and other embodiments of the invention, as illustrated in the accompanying drawings in which like reference characters generally refer to the same parts, functions or elements throughout the views, and in which:

FIG. 1 is a generalized block diagram illustrating a video distribution system according to the prior art;

FIG. 2 is a block diagram illustrating the video distribution network constructed according to the preferred embodiment of the invention;

FIG. 3 illustrates the nature of a particular SONET frame protocol;

FIG. 4a illustrates a multi-field frame according to the Network Management System protocol that is transmitted in a SONET DSO channel;

FIG. 4b illustrates a template structure that defines the type of data in a value field of the NMS protocol of FIG. 4;

FIG. 5 illustrates in block diagram form an optical control interface between the SONET network and a duplicated add bus and drop bus backplane that provides connections with other node module equipment;

FIG. 6 is a detailed block diagram of the optical bus controller module of FIG. 5;

FIGS. 7-9 are electrical waveforms illustrating the timing between the SONET bytes and the add and drop buses common within each node of the SONET video distribution system;

5       FIG. 10 is a detailed block diagram of a video module interface; and

FIG. 11 is a detailed block diagram of the Operator Control Center of the video distribution system of the invention.

## DETAILED DESCRIPTION OF THE INVENTION

FIG. 2 illustrates a generalized block diagram of the video distribution system constructed according to the preferred embodiment of the invention. While the optical medium 24 includes counter-rotating optical fiber lines 24a and 24b, the duplicate nature of the optical network is not a necessity to the operation of the invention. For purposes of reliability, each fiber optic line 24a and 24b carries the same information according to the SONET protocol, but such information travels in opposite directions. Also, while the optical network 24 is shown as a loop, the invention can function with equal effectiveness with one or more linear optical lines. Those skilled in the art may find that the principles and concepts of the invention can be applied to the switching of equipment on a network employing a transmission medium other than an optical fiber.

Spaced at desired locations along the optical network 24 are a number of nodes shown by reference numerals 50-57. While eight nodes are shown, any number of nodes can be employed with each node spaced apart anywhere from one foot to 100 miles. Each such node comprises SONET multiplexer/demultiplexer (mux/demux) equipment for receiving data via the SONET frames or for multiplexing data into the various bytes of a SONET frame. While the SONET multiplexer/demultiplexer equipment 50 is termed a master unit, in that it is coupled to an Operator Control Center (OCC) with plural monitors 38, a video camera selection panel 42 at each position, a corresponding computer 44, any SONET multiplexer/demultiplexer node 51-57 can provide functions in parallel with the OCC node 50, or in addition thereto. In accordance with an important feature of the invention, the monitor equipment 38, the camera selection panel 42 and the central video control processor 44 do not require any software or hardware modification for use with the video distribution network of the invention.

Each SONET multiplexer/demultiplexer node 50-57, includes a first optical bus controller 58 providing optical I/O ports for one SONET optical line 24a. A second optical bus controller 60 includes optical I/O ports for interfacing with the other SONET optical line 24b. In situations where a SONET multiplexer/demulti-plexer node 53 is to be equipped with plural video cameras 10<sub>1</sub>-10<sub>5</sub>, a video module 62 configured for encoding

and compressing is provided for receiving the NTSC video data from the respective cameras 10, compressing the data and allowing the compressed video data to be inserted into a specified VT channel of the SONET frame. According to the preferred form of the invention, each video module 62 can accommodate up to eight video cameras, two being  
5 active at any one time. While the video cameras 10 are shown coupled to the video module 62, in practice the cameras are located remotely from the SONET multiplexer/demultiplexer node 53. The video signals are transmitted by way of coax cable or video modems, or similar lines, to the video module 62 of the node. Thus, each of the cameras 10<sub>1</sub>-10<sub>5</sub> may be located a mile or so apart from each other, and coupled to the SONET node 53 by  
10 various types transmission lines.

The SONET multiplexer/demultiplexer node 52 can accommodate voice communications by way of one or more telephones 64. The voice signals are converted to digital form by conventional codecs and transmitted in selected DSO channels of the SONET frame. Telephone interface circuits 66 function to interface the voice signals of the  
15 telephone 64 for transmission on the optical network 24. One or more computers 68 can be coupled by way of a modem, Ethernet, Token ring, etc. to a data interface circuit 70, which can also be a part of the SONET multiplexer/demultiplexer node 51. The computer data signals can be inserted or retrieved from the SONET network 24 by way of selected bytes of the SONET frame. A computer having the Network Management System  
20 software can be coupled to any node via an RS-232 line to communicate NMS signals to the bus controller module and configure the circuits of that node, or the circuits of any other node via the SONET ring.

In practice, the SONET multiplexer/demultiplexer nodes 50-57 include respective equipment shelves with multiple circuit board slots and modules pluggable therein so as to  
25 be connected to a drop and add bus backplane. Each node 50-57 includes two optical bus controllers 58 and 60, and a mix or match of any of the other types of equipment interface circuits described above. Indeed, those skilled in the art may prefer to develop yet other node interface circuits for the transmission and receipt of digital signals with respect to the SONET network 24.

With regard to the OCC or master node 50, there are provided multiple operator positions, two shown as reference numerals 70 and 72, each having a respective monitor 38, camera selection controls 42 and equipment 74 providing preset capabilities to the equipment at the respective operator position. In practice, each operator position includes plural video monitors for monitoring plural scenes captured by remote cameras. An operator at position 70 has available the position monitor 38 for viewing the still or moving video images presented by any one of the video cameras 10 coupled to the system nodes. The operator can manipulate the controls 42 at the position for selecting different video cameras to present the respective video image on the monitor 38. In addition, preset controls 74 are provided to automatically preset the various controls and monitor image parameters to predefined conditions. The second operator position 72 is similarly equipped.

The OCC node 50 is provided with a video module that is configured as a decoder for receiving video signals from the SONET network 24 and presenting the respective video images to the monitors 38 of the positions 70 and 72.

The position controls 42 and the presets 74 are operable by the position operator to control the video image that is presented on the monitor 38. The position controls and presets are coupled to the respective ports of the central video control processor 44. When a different camera is selected, or a different bandwidth or other criteria, such information is coupled from the position control 42 to the respective port of the central control processor 44. The central control processor 44 processes such information, converts it to a serial format for transmission on a RS-232 line 46 to the OCC node 50. The processors within the OCC node 50 convert the RS-232 data into a serial NMS protocol for transmission via a predefined byte in sequential SONET frames to the various nodes of the system. The format or protocol transmitted on the RS-232 line 46 is generally native to the video equipment, and must be translated by node circuits into the NMS protocol. The translation between the different protocols is carried out in software programmed in the node bus controller modules. The NMS protocol includes various levels of destination addresses for communicating with a particular node device or circuit. In addition, the position controls



42 of each operator position include a joystick (not shown) for controlling the pan, tilt or zoom (PTZ) characteristics of the video cameras. The PTZ data generated at each operator position is processed by the central video control processor 44 and coupled to the OCC node by way of the RS-232 line 46. However, the PTZ data is not transferred around the SONET network 24 by way of the NMS protocol, but rather is transmitted in other SONET frame bytes. The PTZ data is not processed by each node, but merely passed therethrough to the PTZ equipment associated with the respective video camera. As noted above, the video distribution network shown in FIG. 2 does not require the large and expensive video switching matrix, and the central video control processor 44 and the equipment of the various operator positions do not require modification in order to function with the invention.

FIG. 3 illustrates the basic protocol of a SONET OC-1 frame. The entire OC-1 frame includes 810 bytes occurring within a 125.0 microsecond time period. The time slot for each byte is thus 155.32 nanoseconds. The SONET OC-1 frame commences with three bytes, termed  $A_1$ ,  $A_2$  and  $C_1$  which are decoded for SONET overhead purposes. Byte 4 is shown as a  $J_1$  byte denoting that the subsequent byte constitutes the first of twenty-eight payload bytes. In practice, the  $J_1$  pointer can be located anywhere in the 783 payload byte positions of the SONET frame to denote that the subsequent bytes are indeed the start of the payload. Bytes 5-32 constitute twenty-eight VT channels that can accommodate data for a corresponding twenty-eight different node devices. SONET frame byte 33 constitutes a fixed stuff byte. Bytes 34-61 constitute a subsequent twenty-eight VT channels. It can be appreciated that byte 5 and byte 34 constitute the first two bytes of a total of 24 bytes transmitted in VT channel one on the SONET network by a node device. While not shown, byte 62 constitutes another  $H_1$  stuff byte. Between SONET frame bytes 4 and 90, there are transmitted three bytes for each of twenty-eight VT channels. In practice, payload bytes 5-32, 34-61 and 63-90 are used for VT channel overhead purposes. The remaining payload byte positions can be used for transmitting VT1.5 channels of video data. With a higher bandwidth, such as VT2.0, more channels would be allocated per video camera, whereby fewer cameras must be utilized to configure each node to determine

the bandwidth and the specific VT channels allocated to each monitor. In addition to using the SONET frame to accommodate specified VT channels for the monitors, the SONET DSO channels can be allocated for PCM voice communications, computer data and for carrying the NMS data. While a maximum of twenty-seven video monitors can  
5 simultaneously use corresponding VT1.5 channels of an OC-1 SONET frame, there are twenty-four DSO channels that can be utilized for carrying other bytes of data. In the preferred embodiment, one DSO channel is allocated during system configuration for carrying the NMS protocol around the SONET ring to each node. AS is well known to those skilled in the art, the DSO channels of a SONET frame are dynamically assigned, and  
10 can be identified and decoded based on the  $V_1$  and  $V_2$  pointers of a SONET superframe.

In the second row of the SONET frame shown in FIG. 3, bytes 91-93 are termed  $G_1$ ,  $C_1$  and  $F_1$  and are again overhead bytes, as are the first three bytes of each of the subsequent rows. As shown in FIG. 3, the first three bytes of the nine rows constitute a total of twenty-seven bytes utilized in the SONET frame for overhead purposes. The next  
15 twenty-eight bytes, namely bytes 95-122 constitute payload bytes for carrying data in the SONET frame. Row two of the SONET frame includes two additional twenty-eight byte locations for carrying payload data. Indeed, each of the remaining rows of the SONET frame includes a total of three, twenty-eight byte sections for carrying payload data.

Beginning with byte 91, 181, 271 ... 721, the corresponding three bytes are  
20 employed for SONET overhead purposes, and not for the transmission of payload data. With the SONET OC-1 frame protocol illustrated in FIG. 3, each of the twenty-eight VT channels starting with byte position 95 has twenty-four appearances. Thus, each node device can transmit twenty-four bytes of data in each SONET frame. While the exemplary SONET frame shows the first payload byte starting in byte position 5, occurring  
25 immediately after the  $J_1$  byte, it should be understood that the  $J_1$  byte can occur anywhere in the payload portion of the frame to denote that the next byte is the start of the payload data. It should also be noted that each of the twenty-eight VT channels is divided into seven groups, i.e., data byte groups 95-98, 99-102, 103-106, 107-110, 111-114, 115-118 and 119-122. Each group can be utilized as a different bandwidth. Thus, the SONET

frames can simultaneously accommodate seven different bandwidths of signals. As noted above, the remaining DSO channels, except for the fixed stuff bytes, can be employed for the transmission of PCM voice signals, computer data or any other data desired by a system user. The SONET OC-1 frame shown in FIG. 3 will be referred to in the description of the invention.

5

Those skilled in the art and familiar with the SONET frame protocol will appreciate the purpose and function of the overhead bytes in the overall SONET architecture. It is important to note that one DSO byte is dedicated to carrying the NMS protocol. The NMS frame structure is shown in more detail in FIG. 4a. While the NMS frame may be of variable lengths, it is important to note that if an example NMS frame has a total of fifty bytes, then it would take a total of fifty SONET frames for sequentially carrying one byte of the NMS frame in a SONET DSO byte position. As will be described in more detail below, each of the twenty-eight payload data bytes, starting with byte position 94, can be utilized for carrying video data, digitized voice data, computer data, etc. In view that each SONET frame occurs in a 125 microsecond time period, the frequency of each byte position is 8 kHz. In other words, voice signals sampled at an 8 kHz rate can be digitized and transmitted in a single byte position of the SONET frame. If a larger bandwidth is required, then more than one byte of a SONET frame can be employed for transmitting the data. For example, video signals are generally transmitted on a medium having a bandwidth of at least 1.5 MHz. In order to transmit digitized video signals in a SONET frame at a frequency of 1.5 Mbit/s, then twenty-four byte positions would be utilized. Hence, in transmitting a video byte of one camera in a SONET OC-1 frame, the camera would be assigned a specified VT channel such as identified in the SONET frame of FIG. 3. The digitized video byte of such camera would be placed in the VT channel, for example VT channel slot 1 in twenty-four byte locations of the SONET frame. By transmitting twenty-four bytes of video data in a period of 125 microseconds, a bandwidth of 1.5 Mbit/s is achieved. Moreover, since the twenty-eight VT channels are repeated twenty-four times in the SONET frame, there is a capability of simultaneously transmitting twenty-eight channels of 1.5 Mbit/s continuous data in a SONET frame. If a bandwidth of more than 1.5 Mbit/s is required, then a video module can be programmed or otherwise configured so that the video data of the associated camera is placed in more than one byte position in the twenty-eight VT channel format. While the transmission bandwidth of one camera can be increased with this technique, it is apparent that the bandwidth of other equipment using the SONET frame will be correspondingly decreased. For high bandwidth requirements of a

user of the SONET architecture, higher speed SONET frames such as OC-3, OC-12 or OC-48 can be employed. Although the SONET OC-1 frame is described herein in conjunction with the preferred embodiment, those skilled in the art will readily appreciate that the principles and concepts of the invention can be utilized with equal effectiveness in any type of SONET frame protocol.

With reference again to FIG. 4a, there is illustrated a frame 80 of the Network Management System protocol. As noted above, successive bytes of the NMS frame 80 are transmitted in a DSO byte position of a SONET frame. In this manner, the network nodes can communicate with each other via the SONET frames, using the NMS frame protocol transmitted therein. The NMS frame 80 includes a header byte 82 which indicates the start of the NMS frame or packet 80. A value of 0xFE in the header field 82 indicates a request for data or a request for control. A header field value of 0x80 indicates the packet contains a response to a request for data, or control from a 0xFE packet. A header field value of 0xFD indicates an unsolicited notification message. The notification messages may contain data and/or control information and are typically used to convey automatic protection switch information.

The NMS frame 80 includes a message network label (MN) field 84. The MN field 84 constitutes one byte used by a message originator. The MN field is used to match a response packet to a request packet transmitted from an originating node. This byte may contain any value from 0x00 to 0xFF. A receiving node of a request must return this value in a response packet.

The NMS frame 80 next includes four destination address fields, including a network address field 86, a shelf address field 88, a card address field 90 and an auxiliary address field 92. Each of the four destination address fields includes one byte of information. A 4-byte destination address uniquely identifies a particular module or circuit in a node of the SONET network. When a packet having a full destination address is transmitted by one node, each node in the SONET network receives the NMS frame 80, decodes the destination address fields 86-92, and if a match is found, the remainder of the frame is decoded and processed accordingly. In more detail, the destination address includes the network address (NA) field 86 which is an unsigned byte. The NA field 86 can specify up to 254 sub-network groups. The values 0x00 and 0xFF are wild card addresses. In the preferred form of the invention, the network address field 86 is used to uniquely identify each node coupled to the SONET network. A shelf address (SA) field 88 uniquely identifies an equipment shelf at a respective node. A card address (CA) field 90 uniquely identifies a card or module in a respective shelf of a SONET network node. If a module or card employs more than one identifiable function, an auxiliary address (AA) field 92 is employed to uniquely address different sub-functions on a card.

Much like the destination address fields 86-92, the NMS frame 80 includes four fields carrying a composite source address. The source address fields 94-100 are each one byte in length, and uniquely identify the source of transmission of the NMS frame 80. The source address includes a network address field 94, a shelf address field 96, a card address field 98 and an auxiliary address field 100.

The command field 102 of the NMS frame 80 is a one byte field specifying the commands that are transmitted between the nodes to configure the various functions of the nodes. Two hundred fifty-six different types of commands are possible. A 0x06 value in the command field 102 specifies the reading of a value from a shelf card. A 0x07 command specifies the writing of a value to a card, such as to start using a VT channel. A 0x0A command specifies the writing of a block of bytes to a card. A 0x0E value is carried out to update a nonvolatile memory on a card. A 0x02 command pertains to the busy status of a card.

The NDB field 104 relates to the number of data bytes that will be carried in the data field 106. As its name indicates, the data field 106 carries data that is related to a command transported in the command field 102. For example, if a camera is to be activated to commence transmitting video data on the SONET ring, a 0x07 command will be transmitted in the command field 102 to signify writing to a card, and the data field 106 will include data that specifies that a particular camera is to be coupled to a specified VT channel, with a specified bandwidth. When this is accomplished, the destination node will respond that such action has been accomplished. As can be appreciated, the NMS protocol allows many functions to be controlled without transmitting huge strings of data. It should also be noted that new commands can be utilized that are for controlling video equipment, thereby reducing the number of bytes in the data field 106. For example, a command 0x01 could be used for activating a video camera, and a 0x02 command could be utilized for deactivating a video camera.

The NMS frame 80 includes a CHKSUM field 108. This field holds the checksum value for the frame. The checksum is calculated over all bytes of the frame except for itself, i.e. from the HEADER through the last DATA byte. To calculate the checksum, the

sum of zero is first used. Each byte of the frame is then added thereto, in order starting with HEADER, to the sum modulo 255. Then the two's complement of the sum is taken by inverting all bits (one's complement) and adding one thereto.

5 With reference again to the data field 106, it is noted that data transmitted in the data field 106 includes a two-byte Value Identification (VID) field 110 and data 112 that relates to the VID. A VID 110 relates to a parameter or function such as crop, resolution, queue, VT channel, camera activate, camera deactivate, etc. which specify the operation of a video camera. If the VID 110 corresponds to resolution, the data 112 associated with the VID number corresponds to the extent of resolution. Every card in a node contains a set of  
10 data. This data is used to report alarm conditions and performance monitoring, to set configuration states, and generally control the functions of the card. A uniform mechanism is utilized to manage these pieces of data, called values.

A value can be one of four types; Byte, Word, Long, or String. Each value in a card is referred to by a unique two-byte integer, called the VID 110. When a system, such  
15 as a craft terminal or Network Manager, requests a value from a card, it refers to that value using the VID 110. The card then returns the value. The requesting system must also have a template for the value. The template defines the data by declaring its type, length, constraints, and other important information. Typically, the requester obtains the template only once, and stores it locally for subsequent uses.

20 For multi-byte values in the data field 112 (word, long, string), the bytes are transmitted MSB first, LSB last, in order. All data strings are null terminated. The null terminator must be transmitted with the string. The null terminator is not considered part of the maximum length specified in the template.

25 Templates define the type of data contained in a value. A template structure 113 is shown in FIG. 4b. Templates 113 are referred to by the same VID 114 as its associated value.

A template begins with the VID 114 of the value it is defining. A definition string field 115 contains the type information. A name string field 116 contains the human readable name of the value. This is often used when displaying the value on the craft



terminal or Network Manager System. Both strings must be null-terminated. The fields of the definition string 115 are defined as follows.

5       SIGN field 117 - This field is optional. It defines whether the value is signed or unsigned. If the value defined is to be signed, then an ASCII '-'(minus) is placed in this position. By default, all values are unsigned integers. Placing a '-' in front of a non-integer type has no effect, and is ignored.

      TYPE - This field is required. A value can be defined to be one of several types. A type is selected by placing its one-character name in the type field. The following types are:

      B - Byte, a single byte integer, displayed in base 10 (decimal) format.  
 10       b - byte, a single byte integer, displayed in base 16 (hexadecimal) format.  
      W - Word, a two byte integer, displayed in base 10 (decimal) format.  
      w - word, a two byte integer, displayed in base 16 (hexadecimal) format.  
      L - Long, a four byte integer, displayed in base 10 (decimal) format.  
      l - long, a four byte integer, displayed in base 16 (hexadecimal) format.  
 15       S - String, a variable length, null terminated string.

      T - Time, represents a specific time and date. Time is identical to Long, except that when displayed it is converted to a date/time representation. This measurement is precise to one second.

      P - Precise Time, represents a specific time and date. Precise Time uses a Long to  
 20       represent time precise to one second, and an additional byte to represent 1/100'ths of a second.

      ACCESS field 119 - This field is required. It defines whether a value can be written to.  
 The character 'R' is placed in this field if the value is read-only. The character 'W' is placed  
 25       in this field if the value can be read and written.

      DECIMAL POINT field 121 - This field is optional. It indicates the number of decimal places to the left to move the decimal point when displaying an integer value. The legal values for this field are the ASCII digits '1' through '9'. For decimal (base 10) format divide

the integer to be displayed by 10 to the power of DECIMAL POINT. For hexadecimal (base 16) format divide it by 16 to the power of DECIMAL POINT. This field is invalid for all all non-integer types.

- 5      CONSTRAINTS field 123 - This field is used by the craft terminal or Network Manager System when displaying or altering data. This variable length string places certain constraints on the contents of the defined value. There are three kinds of constraints that can be placed on a value. Only one constraint is allowed per value. The three constraints, Range, Max-Length and Enumeration, are defined as follows.

10

**RANGE:**

A range can be specified to limit the range of legal values for an integer value. This constraint is value only for Bytes, Words, or Longs, This constraint is defined by enclosing a pair of numbers separated by ellipses within parentheses. Examples: (0..255), (1..3)

15

**MAX-LENGTH:**

This constraint is used only for strings. It sets the maximum length of a string. This limit does not include the null terminator byte required at the end of all strings. This constraint is defined by enclosing the length specified within brackets. Examples: [10], [35]

20

**ENUMERATION:**

- This constraint is used to associate a set of names with the legal integers of a value. Enumerations are defined by enclosing the enumeration rule within braces. The definition of the enumeration conforms to the rules for enumerations in ANSIC. A number may be assigned to an enumerated name by using the '='. If no '=' is used, then the first name assumes the value zero. The next unassigned name takes the next highest value, the so on. In the first example below, FALSE is assigned the value 0 (zero), and TRUE is assigned the value 1. In the second example, 2 is assigned to GREEN and 3 is assigned to YELLOW.
- 25

Examples: {FALSE, TRUE), {RED=1, GREEN, YELLOW),  
{MINE=2, YOURS=3, OURS=5}

5 NULL FIELD 125 - The constraints string must be terminated by an ASCII NULL (0x00) character.

The name string field 116 contains any variable length, null-terminated, ASCII string. This string is often displayed next to the value.

10 Several values that are common to all cards are shown below. Each card must contain all of the following VIDs. VIDs from 0x0000 through 0x00FF are reserved for this section.

	0x0000, "BR", "HIGHEST ALARM LEVEL"	/* of this card only */
	0x0001, "SR[10]", "BOARD TYPE"	/* of this card */
15	0x0002, "SR[50]", "BOARD DESCRIPTION"	/* of this card */
	0x0003, "SR[20]", "SOFTWARE PART #"	/* of this card */
	0x0004, "SR[10] SOFTWARE VERSION #"	/* of this card */
	0x0005, "TR", "LAST BOOT"	/* Time of last boot */
	0x0006, "BR", "SLOT NUMBER"	/* Slot Number the card resides in */

20 A typical node request and a node response to the commands "read values from a card", and "write values to a card", are described and shown in the tables below.

25 The command 0x06 - Read Values from a Card requests/returns a value or list of values from a target card. Each card contains a set of variables containing configuration, alarm status, performance monitoring values, etc. As noted above, each value is identified by an integer, called a Value ID 110. The value returned may be a Byte, Word, Long, or String. The Template 113 for a value is used to determine the type, and therefore the length of a value.

30 If a card does not contain a variable matching a requested VID, then the VID will not be included in the list returned to the requestor. In some cases this means the response

will contain only the command number, 0x06. A typical 0x06 request is shown in Table 1 below.

TABLE 1  
REQUEST

5	Byte Number	Field	Value
	0	Command	0x06
10	1	Number of Bytes	n
	2	Value ID#1	VID
15	3	Value ID#2	VID
	...	...	...
	n+1	Value ID#n	VID

20 In the first byte of the command field 102, there will be the one-byte command 0x06, identifying that a value is to be obtained from a node card or module. The next line of Table 1 shows that the NBD field 104 contains a number that identifies the number of bytes in the data field 106, including the one-byte VID field 110 and the value data 112 associated with the VID field 110. Byte number two and three correspond to two VID  
25 numbers. The VID numbers may be parameters corresponding to VT channels, VT bandwidth, camera off, camera on, etc. For every value desired by a requestor, there will be a corresponding VID number in the data field 112. The VID numbers are concatenated together in a string.

Table 2 shows a response to the request shown in Table 1. The command field 102  
30 of the response contains the same command as in the request, namely a read value from a card command 0x06. The next byte shown in Table 2 is the number of bytes in the data field 106. The third and fourth bytes of data contain the most significant bits and the least significant bits of the VID. The fifth byte contains the data corresponding to VID #1. The data in this example contains one byte. The sixth and seventh bytes contain the most and  
35 least significant bits of VID #2. The eighth and ninth bytes of Table 2 show that two bytes are used to return the data value of VID #2.

Table 2  
RESPONSE

26

Byte Number	Field	Value
0	Command	0x06
1	Number of Bytes	7+...
2	Value ID#1 MSB	VID
3	Value ID#2 LSB	VID
4	Value Data #1	Data
5	Value ID#2 MSB	VID
6	Value ID#2 LSB	VID
7	Value Data #2	Data 1
8	Value Data #2	Data 2
...	...	...

**SUBSTITUTE SHEET (RULE 28)**

By requesting and returning values from a node card, it can be determined which VT channel is being used by a camera; which VT channel is being used by a monitor; whether video module is configured as a camera card, a monitor card, or both; whether a bus controller card is configured as a master or slave; whether an elastic store memory is activated in a bus controller card; which one or two cameras of a card are selected, etc.

This command 0x07 - Write Values to a Card writes a value or list of values to a target card. Each value is identified by an integer, called a Value ID 110. The value returned may be a Byte, Word, Long, or String. The Template 113 for a value is used to determine the type.

The VID's are returned to the requestor. This serves to acknowledge that the values were received by the target card. If a card does not have a variable defined for a particular VID, then that VID will not be included in the list returned to the requestor. Tables 3 and 4 below illustrate a request to write a value to a card, and a corresponding response.

Table 3

Request

Byte Number	Field	Value
0	Command	0x07
1	Number of Bytes	NDB
2	Value ID#1	VID
3	Value Data #1	Data
4	Value ID #2	VID
5	Value Data #2	Data 1
6	Value Data #2	Data 2
...	...	...

Table 4

Response

Byte Number	Field	Value
0	Command	0x07
1	Number of Bytes	n*2
2	Value ID#1 MSB	VID
3	Value ID#1 LSB	VID
4	Value ID #2 MSB	VID
5	Value ID #2 LSB	VID

...	...	...
n+1	Value ID#n MSB	VID
n+2	Value ID #n LSB	VID

The "write values to a card" command is carried out in a manner similar to the "read value from a card" described above. However, in writing a value to a card, the circuits of a card are generally reconfigured to carry out a function or activate a device. For example, a VID corresponding to camera activation, a VID corresponding to a VT bandwidth and a VID corresponding to a VT channel can be transferred via the NMS frame 80 to a destination node. The destination node will decode the destination address and identify the target device, e.g., a camera in this example, decode the other fields of the NMS frame 80 and activate the addressed camera to commence transmitting video data into the specified VT channels having the requisite bandwidth. The destination node will, in turn, respond to the request so that the requesting node receives an acknowledgment that the specified action has been carried out. The specific camera can be turned off by transmitting a request having the same VID, but with data values in the field 112 signifying that the camera is to stop transmitting in the specified VT channel. Subsequent requests can be transmitted to change the camera transmission from one assigned VT channel to a different VT channel. By utilizing the NMS protocol of FIGS. 4a and 4b, the node equipment can be controlled to conserve the usage and bandwidth of the SONET network.

In order to practice the present invention using a SONET network for switchably activating video cameras at one or more nodes, each node includes a shelf of equipment with a number of circuit cards or modules. The equipment shelf includes a printed wire backplane having a number of buses interconnecting the circuit modules together. Each equipment shelf of a node includes a pair of optical bus controllers, each for interfacing a respective optical fiber 24a or 24b, to the circuits of the node. FIG. 5 illustrates in block diagram form the interconnections between the optical bus controllers, the backplane buses and the video module cards. Shown are the duplicate optical bus controllers 120 and 122. The optical bus controller 120 is identified as a "working" controller while the other controller 122 is termed the "protect" controller. The working controller 120 is the principle circuit for transmitting the SONET frames on the primary optical fiber 24a, while

the other controller 122 is a backup for duplicating the SONET frame data on the other optical fiber 24b. Functionally, the protect optical bus controller 122 is structured and functions in an identical manner as the working optical bus controller 120. Stated another way, the circuit modules 120 and 122 are interchangeable in the slots of the node equipment shelf. As such, the primary operation of only one bus controller will be explained.

The working bus controller 120 couples from an optical input port thereof the SONET frames carried by the downstream optical fiber 24a. The optical bus controller 120 converts the serial optical signals to corresponding electrical signals, and converts the respective bits of the SONET frame to a byte-serial format output on a drop bus 124. The drop bus includes eight parallel lines for carrying a byte of data, a parity line, a  $C_1J_1$  signal line, a SONET Payload Envelope (SPE) line and a transmit clock signal line. The transmit clock signal line is at a byte frequency of 154.32 nanoseconds. The optical bus controller 120 has a 9-bit input port comprising an add bus 126. The add bus 126 includes eight bits of data and an add signal line. As will be described more fully below, the add signal line identifies when a byte on the drop data bus 124 is to be modified or otherwise changed by a byte on the add bus 126. An add bus byte is inserted as a new byte in the appropriate drop bus byte position. The optical bus controller 120 provides an output reference clock 128 of a 6.48 MHz frequency. In like manner, the protect optical bus controller 122 includes a similar drop bus 130 and add bus 132. The drop bus 130 carries the duplicate bytes of the SONET frame that are carried by the working drop bus 124. The add bus 132 carries duplicate bytes corresponding to those carried on the working add bus 126.

The optical bus controller 120 has an I/O port carrying a 3-bit NMS bus 134. The NMS bus 134 comprises a transmit line, a receive line and a clock line. The function of the NMS bus 134 is for allowing communications between the other modules coupled to the backplane, such as a video module (encoder) 62 or a video module (decoder) 61, shown in FIG. 5. A video module can be configured by way of software to function as either an encoder 62 for coupling video signals from one or more cameras 10 to the add buses 126 and 132, or configured as a decoder 61 for coupling signals from the drop buses 124 and



130 to a video monitor 38. The NMS bus 134 is utilized to communicate with the video modules 61, 62 and any other modules coupled to the backplane, for enabling or disabling circuits, for specifying the particular VT channels to be read or written, etc.

5 The working optical bus controller 120 communicates with the protect optical bus controller 122 by way of an NMS transmit line 136. In like manner, the protect optical bus controller 122 communicates or otherwise responds to the working bus controller 120 by way of an NMS receive line 138.

10 Lastly, the optical bus controller 120 includes a serial input RS-232 port 140 utilized by a local computer for programming or otherwise configuring the various circuits of the node. Network management software loaded into the computer can be utilized to convey NMS frames to the controller 120 for configuring circuits thereof, or for further transfer by the controller 120 to the video or other modules of the node for initial programming thereof. In addition, if the destination address of the NMS frame 80 does not match the node to which the computer is connected, the NMS frame 80 is transmitted in a  
15 DSO channel of the SONET network to the other nodes. The protect optical bus controller 122 includes a similar RS-232 port 140.

FIG. 6 illustrates in detailed block diagram form the optical bus controller 120 and the various circuits thereof. As noted above, the protect optical bus controller 122 is identically configured. The optical bus controller 120 includes an optical/electrical  
20 interface 150, comprising a photo detector circuit 152 for converting the incoming optical signals on the downstream fiber 24a to corresponding serial electrical signals on line 156. The electrical signals on the serial data line 156 correspond identically to the optical signals on the serial downstream fiber 24a. The optical/electrical interface 150 also includes a laser driver and corresponding circuits 154 for converting the serial electrical signals on line 158  
25 to corresponding optical signals on the output downstream fiber 14a. The interface 150 is of conventional design, where the laser driver 154 includes temperature, aging and other compensation circuits well known in the art.

Each OC-1 SONET frame which comprises 810 bytes is transferred in serial form via the serial data line 156 to a clock recovery circuit 160. The clock recovery circuit is of

conventional design for recovering a clock signal from the serial electrical signals of the SONET frame. The clock recovery circuit 160 provides the entire SONET frame on the output serial line 162, and a 51.84 MHz receive clock signal on line 164. This frequency corresponds to the bit rate of the data bits received in a SONET frame. The receive clock  
5 164 is coupled to a phase lock loop circuit 163 and to a transmit clock circuit 165 which is activated to reproduce the same receive clock signal 164 on the transmit clock line 214 of the drop bus 124. When the bus controller is configured as a master, the receive and transmit clock signals are independent of each other. The independent nature between the receive clock and the transmit clock allows an elastic store memory 186 to take into  
10 account the round trip signal delay around the SONET ring so that the total delay is equal to multiples of one complete SONET superframe which occurs in 500  $\mu$ S.

The signals coupled on line 162 and the receive clock signal on line 164 are coupled to a serial-to-parallel (S/P) converter circuit 166. The serial-to-parallel converter circuit 166 is adapted for processing SONET ring signals, and includes a processor interface  
15 coupled by a bus 182 to a processor 168. The S/P converter circuit 166 is identified as either integrated circuit type TXC-03001, manufactured by Transwitch Corporation, Shelton, Connecticut, or as types PM 5343-RI and PM 5344-RI used for OC-3, obtained from Gnubi Communications Inc., Addison, Texas. It is to be noted that all the published data sheets of each integrated circuit identified herein are incorporated by reference as if  
20 fully set forth herein. The S/P converter circuit 166 includes a number of decoders and registers for decoding the SONET overhead bytes for alarm, status and other information. On the detection of various alarms, the S/P converter circuit 166 provides an interrupt to the processor 168 for processing the SONET alarm signals. The S/P converter circuit 166 provides a parallel 8-bit output on bus 170 to a programmable array logic chip 172. In the  
25 preferred embodiment, the PAL chip 172 comprises a field programmable gate array chip. In addition to the data bytes output on bus 170, the S/P converter circuit 166 also provides odd parity,  $C_1J_1$  and SPE signals on respective lines 174, 176 and 178. A two-bit signal is also provided to the PAL circuit 172 on line 180, as decoded by the S/P converter circuit 166 from the  $H_4$  overhead bits of the SONET frame. As noted above, these two bits of the

SONET  $H_4$  byte identify which one of the four frames in the SONET superframe is presently being processed. Lastly, the S/P converter circuit 166 provides a serial line 182 to the processor 168 for carrying the NMS frame 80 (FIG. 4).

The PAL chip 172 is identified as integrated circuit type XC5210PQ240,  
5 manufactured by Xilinx, San Jose, California. The PAL circuit 172 is associated with an elastic store memory 186 which, when enabled, provides a time delay in transferring the SONET bytes from the S/P converter circuit 166 to a drop bus driver 188. While every node in the SONET network of the invention includes at least one optical bus controller 120, only one controller in the SONET network has the elastic store memory 186 enabled.  
10 In the other optical bus controllers of the various nodes, the elastic store memory 186 is disabled. The purpose of the elastic store memory 186 is to prevent the loss of SONET data in networks that are short or have few nodes therein. In view that it takes 125 microseconds to transmit a full OC-1 SONET frame, in short-length networks or networks having few nodes, the initial bytes of a frame transmitted in the SONET ring may be  
15 received by the same transmitting node before such node completes the transmission of all of the bytes of the frame. To prevent the loss of the initial bytes received in a node transmitting such frame, the elastic store memory 186 provides the requisite delay to prevent the loss of any byte of a transmitted SONET frame. The elastic store memory preferably provides a delay of about 0-500 microseconds.

20 In practice, the elastic store 186 comprises a dual port SRAM having 4Kx8 storage capabilities. The elastic store memory 186 includes sufficient addressable locations for storing four SONET frames. Each byte of a SONET frame is carried from bus 170 in the PAL chip 172 to both the data input 190 of the elastic store memory 186 and to one input of a 2:1 multiplexer 192. In addition to writing data in the memory via the 8-bit input 190,  
25 data can be read from the memory 186 via an 8-bit output port 194. The output of the memory 186 is coupled via bus 212 to the other input of the 2:1 multiplexer 192. The output of the multiplexer comprises an 8-bit bus 196 coupled to the drop bus driver 188. Other signals coupled from the PAL chip 172 to the elastic store memory 186 comprise a 12-bit write address bus 198, and a write signal on line 200, a 12-bit read address bus 202

and a read signal line 204. The elastic store memory 186 can be written and read simultaneously, if the read and write addresses are not identical. While not shown, the elastic store memory 186 is partitioned into four 1K sections, each section for storing one SONET frame of a superframe. As is well known to those skilled in the art, four SONET frames comprise a superframe, and the two bits of the  $H_4$  overhead byte define which frame of the superframe is then in existence. Accordingly, the 2-bit bus 180 couples to the PAL chip 172 the  $H_4$  signals employed to identify which section of the elastic store memory 186 the SONET frame is to be written therein.

The PAL chip 172 includes a write address counter and a read address counter (not shown) for providing addresses in the writing and reading of the elastic store memory 186. The address of the write counter and the address of the read counter are offset so that a specified time delay is provided. The offset corresponds to the time difference between the receive clock and the transmit clock of the master bus controller 120. It is noted that the receive clock is used in the writing of the elastic store memory 186 with SONET frame data, and the transmit clock is used in reading such data from the memory 186. For example, with a 3-frame round trip delay (375  $\mu$ S), when the byte of the fourth SONET frame is being written in the fourth section of the elastic store memory 186, the initial byte of the first SONET frame is being read from the first memory section. It is noted that the rate at which the elastic store memory 186 is written and read is the same, but the addresses of the write and read counters are offset to an extent such that the total SONET round trip delay is equal to a factor of 1, 2, 3, etc. times 125  $\mu$ S. The write address counter and the read address counter in the PAL circuit 172 are incremented in a sequential manner, with the specified addresses being offset, and remain at such offset during operation. It should be noted that the technique of utilizing an elastic store memory, as described, in providing a delay in a SONET ring network has been utilized as part of the prior art.

As noted above, the optical bus controller 120 can be configured to either enable or disable the elastic store memory 186 and thus provide or eliminate the delay capability with respect to such module. In practice, one optical bus controller module (pair) will be

enabled in a SONET optical fiber ring, while the elastic store memories of all other nodes connected to the optical fiber will be disabled. The enabling and disabling of the elastic store memory 186 is achieved by a software-controlled signal applied to the control line 210 of the data bus multiplexer 192. When the multiplexer 192 is enabled, the SONET frames pass through the elastic store memory 186, are coupled to the multiplexer 192 on bus 212, and output from the multiplexer on bus 196. Accordingly, the SONET frames undergo a delay in being written and subsequently read from the elastic store memory 186. When the multiplexer 192 is disabled, the SONET frame bytes carried on the bus 170 are passed through the multiplexer to bus 196. When the bus multiplexer 192 is disabled, circuits in the PAL chip 172 also cause the receive clock on line 164 to be reproduced in synchronism as the transmit clock on line 214. The enable signal coupled to the control line 210 of the multiplexer 192 is a latched signal having two states, one for coupling the signals on input bus 212 to the multiplexer output bus 196, and the other state for coupling the other input bus 170 to the multiplexer output bus 196. The state of the signal on control line 210 can be placed in a logic high or low state during the configuration of the optical bus controller 120.

A drop bus driver 188 receives the inputs from the PAL chip 172, as shown in FIG. 6, and drives the backplane lines and buses with the same signals. The drop bus driver 188 is of conventional design for providing the requisite electrical drive capabilities of the signals on backplane conductors of a SONET node shelf. In particular, the drop bus driver 188 drives an 8-bit bus with byte serial data of the SONET frame. In addition, the driver 188 provides a 6.48 MHz transmit clock signal on clock line 214, odd parity signals on line 216, a  $C_1J_1$  signal on line 218, and a synchronous payload envelope (SPE) signal on line 220. The timing relationship between these signals is shown in more detail in FIGS. 7-9.

In addition to driving the 8-bit data bus 212, the drop bus driver 188 also drives a drop bus receiver 222 with the byte serial SONET frame signals. The drop bus receiver 222 couples the byte serial signals on bus 224 to a delay circuit 226 that is part of the PAL chip 172. The delay circuit 226 comprises a FIFO register for delaying each SONET frame byte by three byte intervals, or about four hundred sixty three nanoseconds. After having

been delayed by three clock cycles, the byte serial SONET frame data is coupled on bus 228 to a 2:1 multiplexer 230. The multiplexer has a pair of 8-bit input buses, one being bus 228 and the other being bus 232. The output of the multiplexer 230 comprises an 8-bit bus 234 coupled to a parallel-to-serial (P/S) converter circuit 236. In practice, the P/S  
5 converter circuit 236 is part of the same integrated circuit as the S/P converter circuit 166.

The multiplexer 230 comprises a portion of the circuit for modifying the drop bus bytes with byte data that appears in the corresponding time slots of an 8-bit add bus 238. As noted above, the add bus 132 includes the 8-bit data bus 238 and an add signal line 240. These nine signals are coupled from the add bus 132 to an add bus receiver 242 for driving  
10 the corresponding bus 232 and add signal line 242. Such signals are coupled as inputs to the PAL chip 172, and particularly to the multiplexer 230. A logic high signal on the add bus line 244 configures the multiplexer 230 for passing a byte of data from input add bus 232 to the multiplexer output bus 234. When the add signal line 244 is at a logic low level, the frame byte signals on input drop bus 228 are passed to the multiplexer output bus 234.  
15 Accordingly, the add signal line 244 controls whether each frame byte on the multiplexer output bus 234 is a byte of data carried on the drop bus 212 or the add bus 238. As can be appreciated, if the SONET frame bytes input to the optical bus controller 120 are not modified by the byte signals on the add bus 238, all of the SONET frame bytes input to the controller are output from the controller and pass unchanged to the next node of the  
20 SONET network.

The P/S converter circuit 236 converts the byte serial data on bus 234 to serial bit data on line 158. The series of bit signals on line 158 comprise the composite frame according to the SONET protocol, including all of the overhead bytes and the payload bytes. The serial electrical signals on line 158 are coupled to the optical/electrical interface 150 and particularly to the laser driver 154. The laser driver circuit 154 converts the electrical serial bit signals to corresponding optical serial bit signals on the output thereof to the downstream optical fiber 24a.

The processor 168 is of the type 68302 obtainable from Motorola, and is programmed to transfer NMS frames 80 to the various video and other types of modules coupled to the SONET node shelf. The processor 168 has a serial output port for transmitting NMS frame data on transmit line 248. The transmit line 248 is coupled in parallel to an input port of each additional shelf module. Each shelf module can respond or otherwise transmit NMS data to the optical bus controller processor 168 by way of serial receive line 250. The processor 168 also provides an NMS clock on line 252 to synchronize the transmitting and receiving circuits. In order to allow programming and configuration of the circuits at a node, the processor 168 has a serial input port 140 for receiving signals from a Network Management System computer. The processor 168 is coupled to the PAL chip 172 via a bus 169. The PAL chip 172 can thus be configured and monitored by the processor 168.

While not shown, the processor 168 is also coupled to a standard SONET paddle board that may have an 8x2 video switch and a two-channel driver, or a 4x1 video switch and a one-channel driver.

FIGS. 7-9 illustrate the timing relationship in multiplexing byte data between the drop bus 212 and the add bus 238 on the multiplexer output bus 234 of the optical bus controller 120. The signals shown in FIGS. 7-9 identify in parenthetical notation the various lines or buses on which such signals are carried. The drop data bytes are clocked onto the bus 212 on the rising edge of the transmit clock 214. In like manner, add data is clocked onto the add data bus 238 on the rising edge of the transmit byte clock 214. As noted above, the  $C_1J_1$  signal 218 and the SPE signal 220 are derived from the S/P converter

circuit 116 from the overhead  $C_1$  byte and the overhead  $J_1$  byte. In particular, the SPE signal is at a logic low level to signify an overhead byte and is at a logic high level to signify a payload byte. This is shown in FIG. 8 where the SPE signal is low during the overhead bytes  $A_1$ ,  $A_2$  and  $C_1$ , but is high during the existence of SONET frame payload bytes. With reference to FIG. 9, it is noted that the add data bytes lag the corresponding drop data bytes by three bytes, or three byte clock periods. In other words, the drop byte data that is changed by the add byte data occurs three bytes after the drop byte time slot.

While the add signal line 240 is common to all other cards of the node and constitutes an input to the optical bus controller 120, each of the other module cards of the node shelf can drive such line during a byte time slot to insert a new byte of data in the corresponding drop bus time slot. With reference to FIGS. 6 and 9, the following description illustrates this procedure. Assuming for purposes of example that it is desired to insert add byte 10 into the drop byte 10 time slot. While there is a 3-byte delay between the drop bus bytes and the add bus bytes, the 3-clock delay provided by the delay circuit 226 aligns the corresponding bytes between the drop bus 212 and add bus 238 as inputs to the multiplexer 230. At the beginning of the time slot for add byte 10, the signal on the add line 240 is driven to a logic high, whereby the multiplexer 230 selects the add byte 10, rather than the drop byte 10, for output on the byte serial bus 234. It is important to note that any one of the video modules or other modules in the node shelf can drive the add signal line 240 to a logic high during one or more byte time slots, to thereby insert corresponding add bytes in the drop bus byte positions. Indeed, and as will be set forth more fully below, when a video camera coupled to a video module is enabled for transmitting video data on the SONET line to an operator control center, the signal on the add line 240 is driven to a logic high level during the requisite VT channel periods of the SONET frame to thereby multiplex such video signals within the SONET frame. When the video camera is disabled, the signal on the add line 240 remains at a logic low level, whereby the video signals that are yet being generated by the video camera are not multiplexed onto the SONET time slots. Also to be discussed in more detail below, the operation of a video monitor coupled to a video module does not require the control of the



signal on the add signal line 240, but rather the video signals of the camera carried in the VT channels on the drop bus 212 are simply picked off the bus, decompressed, converted to analog signals and coupled to the video monitor.

With reference back to FIG. 5, there is illustrated two video modules 61 and 62 coupled by two buses 124 and 130 to the respective working and protect drop lines, and by two buses 126 and 132 to the respective working and protect add buses. The video module 61 is shown configured as an encoder for driving one or two monitors 38. As such, such module 61 need only be coupled to the drop bus 124 or 130 to receive the video data during the appropriate VT channels for driving the monitors 38. On the other hand, the video module 62 is shown configured as an encoder for receiving analog video signals from the respective cameras 10<sub>1</sub>-10<sub>8</sub>. When configured as an encoder, the video module 62 provides the video data bytes in the appropriate VT channels assigned thereto, and drives the add signal line to a logic high level during the time slots of the assigned VT channels.

FIG. 10 illustrates in detailed block diagram form a video module constructed according to the preferred form of the invention. The video module has connections thereto for a maximum of eight video cameras 10<sub>1</sub>-10<sub>8</sub> and two video monitors 38<sub>1</sub> and 38<sub>2</sub>. The video module includes two video channels, and thus can be configured to drive two video monitors or to receive video signals from two of the eight video cameras. Alternatively, the video module can be configured to provide one channel of encoding for a video camera and one channel for decoding to drive a video monitor. While the video module of FIG. 10 is shown coupled to the downstream add bus 126 and the downstream drop bus 124, an identically constructed module would be coupled to the upstream add and drop buses 132 and 130, to provide duplicate facilities for purposes of reliability. While not shown, each camera would have parallel inputs to both the upstream video module and the downstream video module. In like manner, the upstream video module and the downstream video module would provide parallel output connections, each for driving the monitors.

The video module includes a conventional phase locked loop circuit 260 driven by the 6.48 MHz byte clock on line 214. The phase lock loop 260 multiplies the frequency so

that when divided, a bit rate of 51.84 Mb/S is obtained. This bit rate corresponds to the OC-1 SONET rate. For OC-3 or other SONET architectures, the phase lock loop circuit 260 can be configured to produce corresponding higher clock rates.

Each video module includes a first codec 270 coupled to a first serial video channel 272. A second codec 274 is coupled to a second serial video channel 276. The codecs 270 and 274 are identical circuits, each identified by type CodecSL-3, made by Enerdyne Corp., Santee, California. The codecs are of conventional design, but without provisions for processing voice analog signals. The codec 270 includes an analog input 278 that carries video signals from a camera 10. The codec 270 includes an analog-to-digital converter for converting the analog video signals to corresponding digital video signals. In addition, the codec 270 compresses the digital video data according to a JPEG algorithm. Additional circuits are employed in the codec 270 for discarding video data in the event that insufficient serial data can be handled by a field programmable gate array chip 280, as received on serial line 272. The second codec 274 functions identically with regard to analog video signals received on an input 282.

In the preferred form of the invention, eight video cameras 10<sub>1</sub>-10<sub>8</sub> can be coupled to the video module 62. An 8:2 multiplexer 284 selects two of the eight video cameras and couples the corresponding analog video signals to the respective lines 278 and 282. The multiplexer 284 comprises a crosspoint switch integrated circuit, where the two inputs of the eight are selected by select signals on bus 286. The select lines 286 of the multiplexer 284 are coupled to a microprocessor 290 of the type MC68LC302, obtainable from Motorola. The microprocessor is coupled to a 1 Meg flash memory and a 1 Meg RAM. The NMS bus 134 is coupled to the respective ports of the microprocessor 290. In this manner, commands in the NMS frame 80 can be transmitted via the SONET network, received and decoded by the microprocessor 290 for configuring the various circuits of the video module.

The microprocessor 290 is coupled by a common data bus, address bus and control lines 292 to the gate array chip 280 and to a quad universal asynchronous receive transmit (UART) integrated circuit 294. The quad UART 294 is utilized to provide additional serial

interface buses for allowing the microprocessor 290 to communicate with the various integrated circuits of the video module. The quad UART 294 includes a first serial line 296 coupled to the codec 270, and a second serial line 298 coupled to the second codec 274. In addition, the quad UART 294 includes third and fourth serial lines 300 and 302, each  
5 coupled to a serial line interface 304. The serial line interface 304 receives the digital signals from the UART 294 and converts the same for driving the lines 306 and 308 according to a RS-232, RS-422 or RS-485 protocol. The I/O ports of the serial line interface 304, 306 and 308 are coupled respectively to the pan, tilt and zoom circuits 310 associated with the respective video cameras 10<sub>1</sub>-10<sub>8</sub>, and to a network controller 312  
10 equipped with network management system software. The video module can be configured by NMS frames 80 received the NMS bus 44, or by way of NMS frames 80 received via the network controller computer 312 on line 308.

While the video module illustrated in FIG. 10 is shown configured as an encoder 61 for processing video signals from the video cameras 10<sub>1</sub>-10<sub>8</sub>, the module can also be  
15 configured as a video module 61 for decoding video signals and driving two monitors 38<sub>1</sub>-38<sub>2</sub>, shown in broken lines via analog video lines 314 and 316. When the codecs 270 and 274 are configured as decoders, the serial, compressed digital signals received via lines 272 and 276, are decompressed and converted to corresponding analog signals for transfer on the analog lines 314 and 316. The codecs 270 and 274 can be configured as either  
20 encoders or decoders by way of signals on the serial communication lines 296 and 298. Moreover, the configuration established in the codecs 270 and 274 can be obtained via the quad UART 294 in response to requests by the microprocessor 290. Once configured as an encoder or decoder, the codecs 270 and 274 remain configured until changed by other software commands. The configuration status of the codecs 270 and 274 is maintained in a  
25 nonvolatile register so that if power is removed from the video module and restored, the codecs maintain the configuration as previously established.

The gate array chip 280 is identified as type XC5215 HQ208, manufactured by Xilinx, San Jose, California. The gate array chip 280 is provided with the 12-bit drop bus 124 for making available to the video module 62 all 810 bytes of a SONET frame, in

addition to the parity bit, the  $C_1J_1$  and SPE signals and a byte clock signal. The gate array chip 280 is responsive to the  $C_1J_1$  and SPE signals for decoding the payload bytes. In addition, the gate array 280 includes counters that are programmable via the microprocessor 290 for responding to selected VT channels of the SONET frame, converting the respective parallel bits of a byte to serial form, and transferring the serial video data stream to a respective codec 270 or 274. Indeed, when the video module is configured as a decoder 61, the gate array chip 280 is programmed to respond independently to two sets of VT channels, one associated with the first codec 270 and the other associated with the second codec 274. The respective serial video data streams are coupled from the gate array chip 280 to the codecs 270 and 274. In the codecs 270 and 274, and as noted above, the respective serial video data streams are decompressed, converted to analog signals and transmitted on the respective lines 314 and 316 to the monitors 38<sub>1</sub>-38<sub>2</sub>. If the gate array chip 280 has been programmed by the microprocessor 290 to provide 1.5 MHz bandwidth signals to the codecs 270 and 274, then for each respective codec, the gate array chip 280 will decode twenty-eight bytes of data from a SONET frame and couple the same to the respective codec. If a higher bandwidth signal is transmitted on the SONET frame, then the gate array chip 280 will be programmed to decode the respective SONET channel payload bytes of a group corresponding to the selected VT channels. When the video module is configured as a decoder 61 to drive two monitors 38<sub>1</sub>-38<sub>2</sub>, the gate array chip 280 does not actively drive the add bus 238 or the add signal on line 240.

In the event the video module is configured as an encoder 62, the gate array chip 280 is programmed by the microprocessor 290 to activate the add bus 238 during the respective VT channels for adding the byte serial video data from the codecs 270 and 274 thereon. If, for example, the first codec 270 has been assigned the twenty-four VT channels of a SONET frame, then twenty-four bytes of video data will be provided to the gate array chip 280 on line 272 and stored in a serial-to-parallel shift register. When the first VT1 channel time slot exists, as determined by the  $C_1J_1$  and SPE signals on the drop bus 124, the add bus 238 will be driven with the eight video bits during the first VT time

slot, and the add signal on line 240 will be driven high. The subsequent twenty-three video bytes will be driven on the add bus 238 during the succeeding twenty-three VT1 channels and the add signal on line 244 will be driven high during the respective VT time slots. The video signals from the second codec 274 will be processed in a similar manner and placed on a different set of VT channels during the respective time slots. The add bus 238 carries the two VT channels of video signals to the optical bus controller 120 and received by the add bus receiver 242. The add data is then multiplexed onto the respective time slots of the multiplexer output bus 234. The gate array chip 280 is fabricated with a tri-state high impedance output for driving the add signal line 240. The add line drivers of the other shelf modules are similarly designed. While not shown, a resistor connected between the add signal line 240 and ground provides a passive pull down for the line. By controlling the signal on the add signal line 240 with the gate array chip 280, the two selected video cameras are thus switched or activated at the node to cause the SONET frame to carry the video signals.

During operation of the video module encoder 62, NMS data frames 80 can be communicated to the microprocessor 290 for selectively driving the video camera multiplexer 284, via bus 286 to select one or two different video cameras for transmitting different images by way of the SONET network. In addition, the gate array chip 280 can be reconfigured on the fly to multiplex the two video streams onto different VT channels of the SONET frame. In the event that one or the other or both video cameras of a video module encoder 62 are to be switched off at the node, NMS command messages are transmitted to the microprocessor 290, decoded therein and coupled to the gate array chip 280 to reconfigure the circuits for preventing the signal on the add signal line 240 from being driven high. While the video camera will still be producing video streams, the digital compressed video stream will not be added to the add bus 238 and thus the cameras will be effectively switched off. It is to be noted that other modules in the node shelf can drive the add line 240 to thus switch on other modules at the node and cause the transmission or reception of video data with respect to the SONET frame. In the event that two modules inadvertently attempt to drive the add signal line 240 high at the same VT channel, the data

added to the add bus 238 will be corrupted and a parity error will result. The parity error will be sensed by the optical bus controller 120 and corrective or diagnostic functions will be carried out.

FIG. 11 illustrates the SONET OCC node 50 coupled to the equipment of the control center shown in FIG. 2. The control center is shown with six video monitors, each pair 38<sub>1</sub> and 38<sub>2</sub> coupled to a respective video module configured as a decoder 61. The control panel 42 and the computer 44 are conventional equipment for allowing an operator to select a particular video camera and present the image on a monitor 38. Each monitor 38 has a unique identity associated therewith, and programmed into the video control computer 44. While the control panel 42 is shown with manual switches for control of the video images, a programmed computer and keyboard and/or mouse can also provide the operator with the ability to select the video images and a respective monitor 38 to display the camera signals. Insofar as numerous vendors provide the video equipment, there are a number of different protocols transmitted by the video control computer 44 on the RS-232 line 46. The signals on line 46, of whatever protocol, essentially transmit commands such as, for example, to connect camera 50 to monitor 5. These serial signals are coupled to the working and protect bus controllers 120 and 122, and particularly to the respective processors 168. The processor 168 in each bus controller 120, 122 is programmed to translate these native commands into corresponding NMS commands. In order to cross-reference camera 50 and monitor 5 to destination addresses shown in FIG. 4a, a look-up table is utilized. For example, camera 50 will be referenced in the look-up table as a destination address having a node address field 86, a shelf address field 88, a card address field 90 and an auxiliary address field 92. The destination address corresponding to camera 50 is unique, and thus only one card in a node will respond. Moreover, during initial configuration of the system, each monitor 38 is assigned a VT channel for receiving video signals, and such channel assignment is stored in the memory of the bus controllers 120 and 122. Accordingly, when the processor 168 of the bus controller receives and decodes the native command concerning monitor 5, it will be cross-referenced in the look-up table to the assigned VT channel. With this information, the processor 168 of the bus controller

will assemble an NMS frame 80 with the destination address of camera 50, a command to write to the module connected to camera 50, and a data field 106 having the VIDs corresponding to camera connect functions and the data corresponding to the VT channel assigned to monitor 5. The NMS frame will be transmitted on a byte-by-byte basis in the designated DSO channel of the SONET frame.

When the node matching the destination address of the transmitted NMS frame receives the frame 80, it will be decoded. The processor 290 in the video module 62 will communicate with the FPGA chip 280 to program the counter to provide outputs corresponding to time slots assigned to monitor 5, control the camera multiplexer 284 to select camera 50, and then provide the compressed video data in the assigned time slots corresponding to the VT channels. With this arrangement, video equipment and other equipment coupled to the SONET network nodes can be controlled.

While the preferred embodiment of the invention has been disclosed with reference to specific apparatus, equipment and the circuits, and methods of operation thereof, it is to be understood that many changes in detail may be made as a matter of engineering choices, without departing from the spirit and scope of the invention, as defined by the appended claims.

**WHAT IS CLAIMED IS:**

1. Apparatus for controlling a circuit coupled to a node of a multi-node optical communication network, comprising:

a control circuit located at a source node of the multi-node network for transmitting on the optical network a control signal for utilizing a time slot of an optical frame to carry data; and

a destination node for receiving the control signal via the optical network for configuring a destination circuit to select said time slot and to couple data from said destination circuit to said time slot, whereby said destination circuit is controlled at said destination node.

2. The apparatus of Claim 1, wherein said destination circuit includes a video camera coupled to a first circuit that is responsive to said time slot for multiplexing video data from said video camera in said time slot, and a second circuit for transferring the video data in a corresponding time slot in the optical frame.

3. The apparatus of Claim 2, wherein said first circuit provides a time slot with said video data to said second circuit together with an enable signal, whereby said second circuit transfers said video data to said optical frame at a time when said enable signal is active.

4. The apparatus of Claim 3, wherein said second circuit includes a drop bus that carries optical frame drop data, and said first circuit includes an add bus that carries add video data, and said second circuit multiplexes the add video data onto said optical frame during an active time of said enable signal.

5. The apparatus of Claim 4, wherein said optical network comprises a SONET network, and enable signal is active 24 times during an OC-1 SONET frame to provide a 1.5 MHZ bandwidth.



6. The apparatus of Claim 3, wherein said first circuit is programmable to respond to one or more time slots of an optical frame, to transfer video data from a single video camera to the optical frame.

7. The apparatus of Claim 6, wherein said first circuit is adapted to receive commands via the SONET network from said source node to activate said enable signal during said one or more time slots to thereby effectively couple the video data from the video camera to the SONET frame.

8. The apparatus of Claim 7, wherein said video camera is effectively disconnected from the SONET network by maintaining said enable signal inactive during said one or more time slots.

9. The apparatus of Claim 1, further including an equipment configuration protocol transmitted in said SONET frame, said equipment configuration protocol having a destination address unique to each node, and a plurality of commands, each said node being responsive to receipt of the configuration protocol to decode the destination address and  
5 compare the same with the unique address, and if a match is found, the command is decoded and carried out to control node equipment.

10. Apparatus for controlling circuits by way of an optical network of the type having a plurality of time slots for carrying optical signals, comprising:

at least one source node coupled to said optical network for transmitting thereon commands to a destination node for controlling the coupling of data from said destination  
5 node in one of said time slots;

at least one said destination node having an optical input coupled to said optical network and an optical output coupled to said optical network, said destination node for receiving said commands and including:

an electric drop bus,

10 an optical-to-electrical converter for converting optical signals via said optical network input to corresponding electrical signals carried on said drop bus,

an electrical add bus for carrying data generated by electrical circuits coupled to said destination node,

15 a selector for selecting electrical signals from either said drop bus or said add bus,

a control signal line for controlling said selector for selecting electrical data from said drop bus or said add bus, and

20 an electrical-to-optical converter for converting electrical signals output from said selector to corresponding optical signals coupled to the optical output of said destination node.

11. The apparatus of Claim 10, wherein said source node includes a processor programmed to provide a communication protocol using said commands, and said source node including circuits for transmitting said communication protocol via time slots of said optical network for controlling the transmission of data generated at said destination node  
5 within time slots of said optical network.

12. The apparatus of Claim 11, wherein said communications protocol includes commands for controlling when said selector control signal is enabled to select between said drop bus and said add bus.

13. The apparatus of Claim 10, wherein said communications protocol includes a command field specifying a function to be carried out, and an associated data field specifying a time slot to be utilized.

14. The apparatus of Claim 10, further including data circuits associated with said destination node for receiving video data via said drop bus and converting said video data for display on a monitor, and data circuits including a video camera for generating video data for transfer to said optical network via said add bus to said selector.

15. A method for controlling circuits by way of an optical network of the type having a plurality of time slots for carrying optical signals, comprising the steps of:

communicating command signals via said optical network to at least one node connected thereto for controlling the transmission of data on said optical network by said  
5 node;

decoding by circuits in said node said commands to identify one or more time slots to be utilized for transmission of data on said optical network;

programming circuits in said node to associate data from at least one data source with the identified time slots;

10 multiplexing the data generated by said data source into said identified time slots of said optical network; and

reprogramming said circuits in said node to cause the multiplexing of the data into other time slots of said optical network in response to a decoding of other commands received by said node via the optical network.

16. The method of Claim 15, further including providing an electrical drop bus and an electrical add bus in said node for respectfully receiving data from the optical network and for transmitting data generated at said node on said optical network.

17. The method of Claim 16, further including overwriting data carried on the electrical drop bus if data generated at said node is to be transmitted in the respective time slots, and at other times allowing data on the drop bus to be retransmitted on the optical network in a form unchanged from that received by said node via said optical network.

18. The method of Claim 15, further including transmitting the data in a first set of time slots corresponding to a first destination, and transmitting data in a second set of time slots corresponding to a second destination.

19. The method of Claim 15, further including communicating said commands by a master node to a plurality of slave nodes connected to said optical network, and controlling by said master node the time slots to be used by each said slave node.

20. The method of Claim 15, further including communicating command signals to a plurality of nodes coupled to said optical network, to thereby dynamically control the time slot usage by each said node.

21. The method of Claim 15, further including changing bandwidth usage of said node by said commands to increase or decrease a number of time slots utilized by the node to transmit data therein.

22. The method of Claim 15, further including communicating different commands to said node to thereby dynamically change the transmission of data from a first set of time slots to a second set of time slots, and to dynamically change the number of time slots utilized to thereby change the bandwidth usage by the node.

23. Apparatus for controlling circuits by way of an optical network of the type having a plurality of time slots for carrying optical signals, comprising:

a network node having an optical input port coupled to said optical network and an optical output port coupled to said optical network, said node including:

5 a bus controller having an optical-to-electrical converter for converting optical signals at said input port to corresponding electrical signals;

a serial-to-parallel converter for converting electrical signals output by said optical-to-electrical converter from serial signals to byte serial data;

10 a parallel-to-serial converter for converting byte serial data to corresponding serial data;

an electrical-to-optical converter for converting the output serial data from said parallel-to-serial converter to corresponding optical signals, said electrical-to-optical converter for coupling the serial optical signals to the optical output port;

a drop bus for carrying said byte serial data;

15 an add bus for carrying byte serial data generated at said node;

a multiplexer having a first input coupled to said drop bus and a second input coupled to said add bus;

20 an output of said multiplexer coupling byte serial data to said parallel-to-serial converter, and a control input for selecting one of said first input or said second input for coupling by the serial data to an output of said multiplexer; and

a control circuit for enabling the control input of said multiplexer to couple byte serial data on said add bus during a specified time slot to said multiplexer output.

24. The apparatus of Claim 23, further including plural data generating circuits associated with said node, said add bus being coupled to each said data generating circuit, and an add signal line connected to said control input being controlled to thereby cause said multiplexer to couple data on said add bus as generated by said data generating circuits to  
5 the output of said multiplexer in different time slots.

25. The apparatus of Claim 24, wherein said control circuit comprises a respective programmable circuit in each said data generating circuit, and further including an enable signal coupled to said multiplexer control input and to each said programmable circuit for coordinating the multiplexing of data on the add bus at different time slots.

26. The apparatus of Claim 23, further including in combination a data generator circuit comprising a video camera for generating video signals, and including a video signal compressor for compressing the video signals.

27. The apparatus of Claim 26, further including a plurality of video cameras coupled to a video signal multiplexer, and said video signal compressor being connected to an output of said video signal multiplexer.

28. The apparatus of Claim 26, whereas said video signal compressor also functions to decompress video signals, and further including at least one video monitor coupled to an output of said compressor for receiving decompressed video signals.

29. Apparatus for controlling circuits by way of an optical network of the type having a plurality of time slots for carrying optical signals, comprising:

at least one slave node coupled to said optical network;

5 a master node coupled to said optical network, said master node including a processor programmed with a communications protocol, said communications protocol providing data identifying each said slave node, providing data identifying circuits in each said slave node and providing data identifying one or more time slots of said optical network to be utilized by the slave node for transmitting therein data generated at the respective slave node;

10 said master node including encoding circuits for encoding said communications protocol into one or more time slots of said optical network so as to be available to each said slave node; and

15 said slave node including decoding circuits responsive to the time slots of the optical network carrying said communications protocol for decoding node identification, circuit identification data and time slot data, and for configuring circuits in said slave node to generate data and transmit the generated data in the time slots specified by said decoded time slot data.

30. The apparatus of Claim 29, further including circuits in said slave node for configuring data processing circuits to receive data in time slots specified according to said decoded communications protocol.

31. The apparatus of Claim 29, further including circuits in said slave node for communicating information to said master node via said communications protocol.

32. The apparatus of Claim 29, wherein said optical network comprises a Sonet ring.



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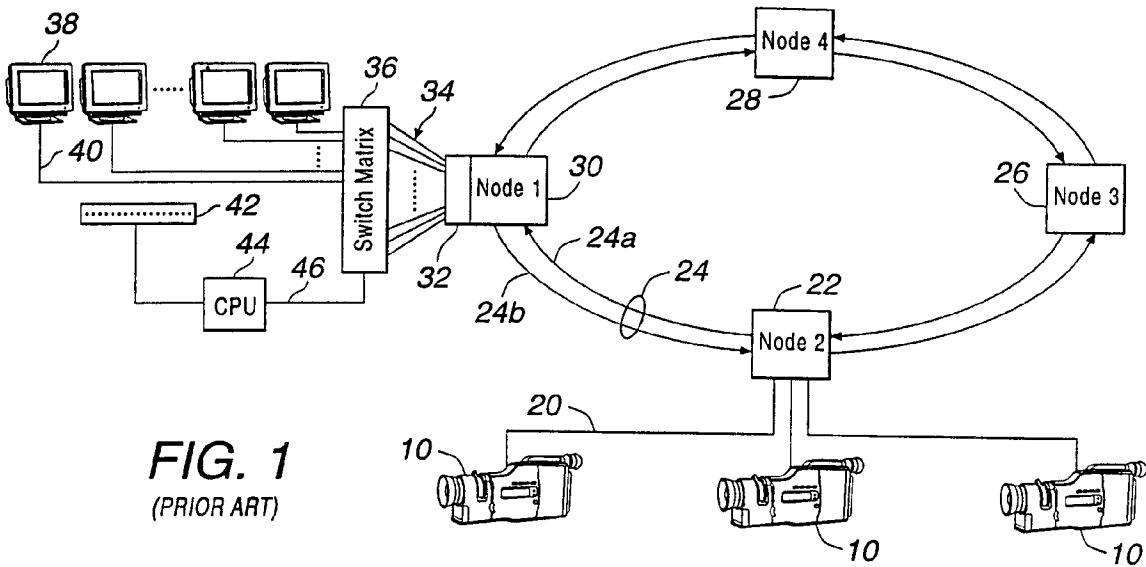


FIG. 4a  
NMS PROTOCOL

80

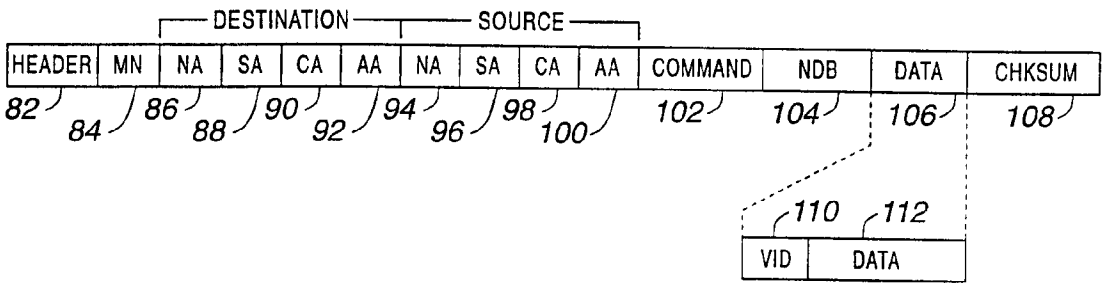
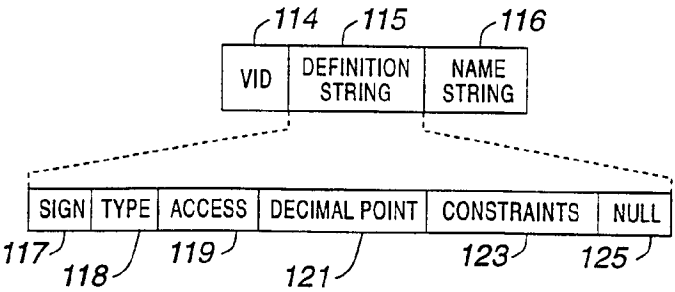
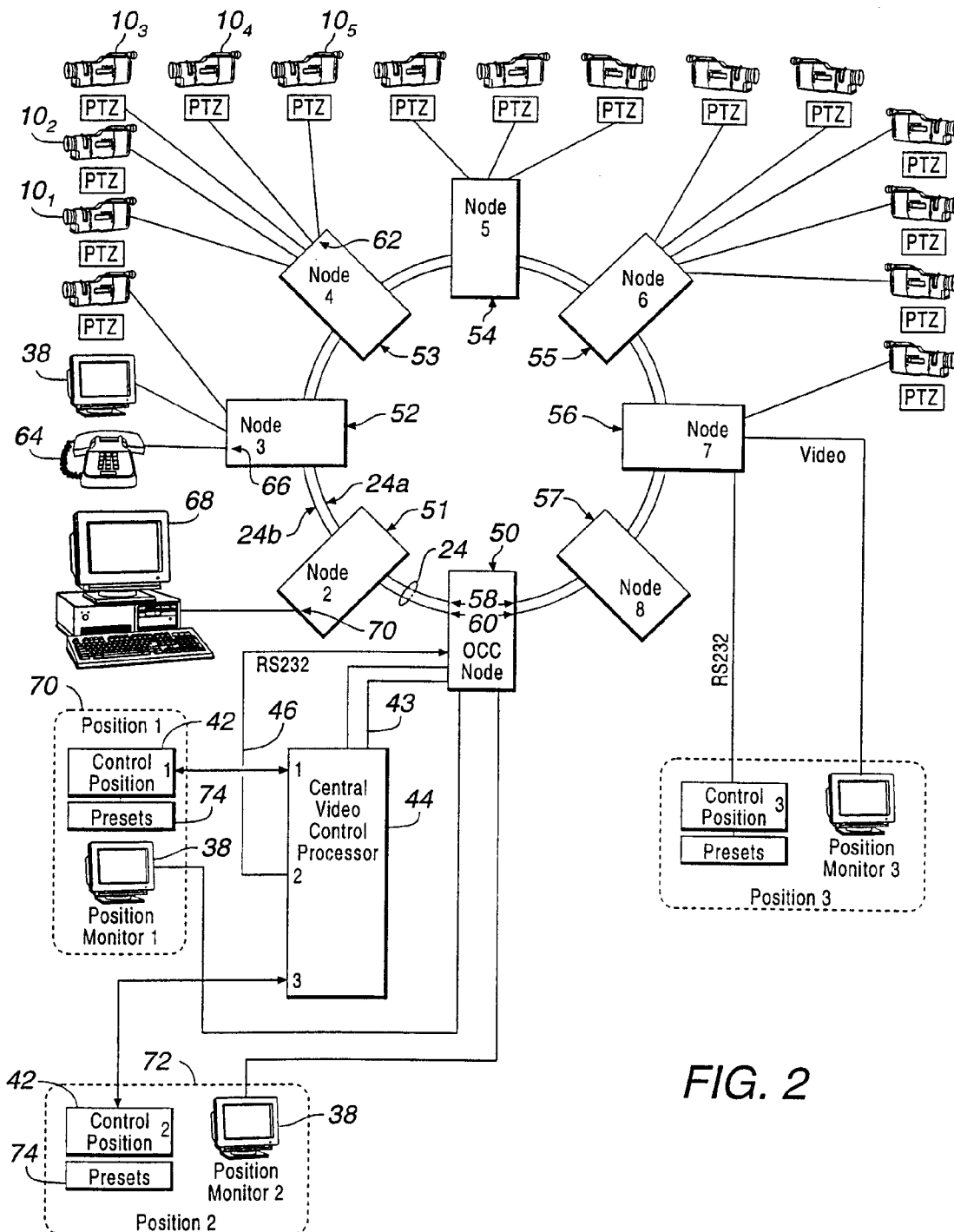


FIG. 4b

113

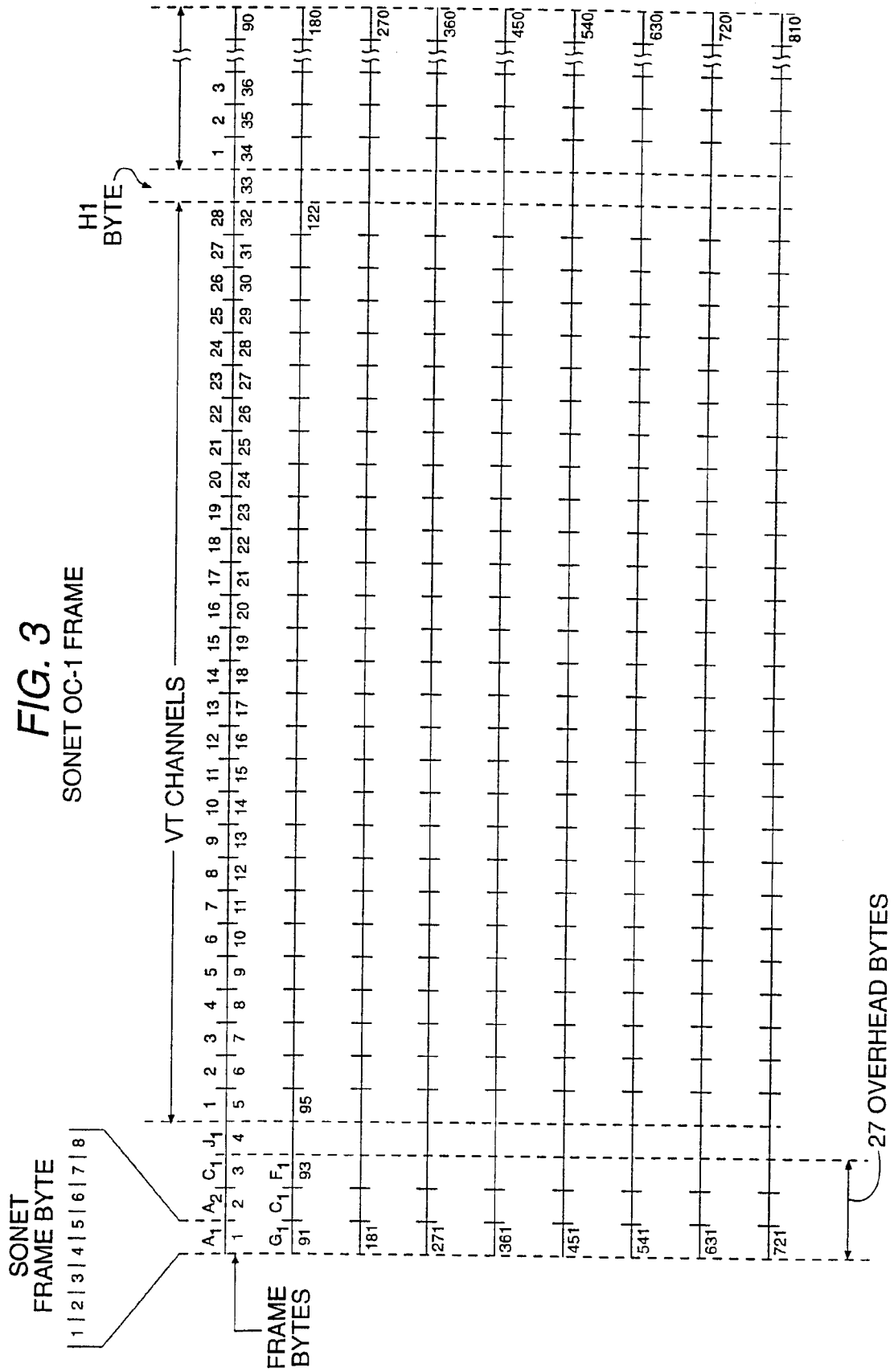




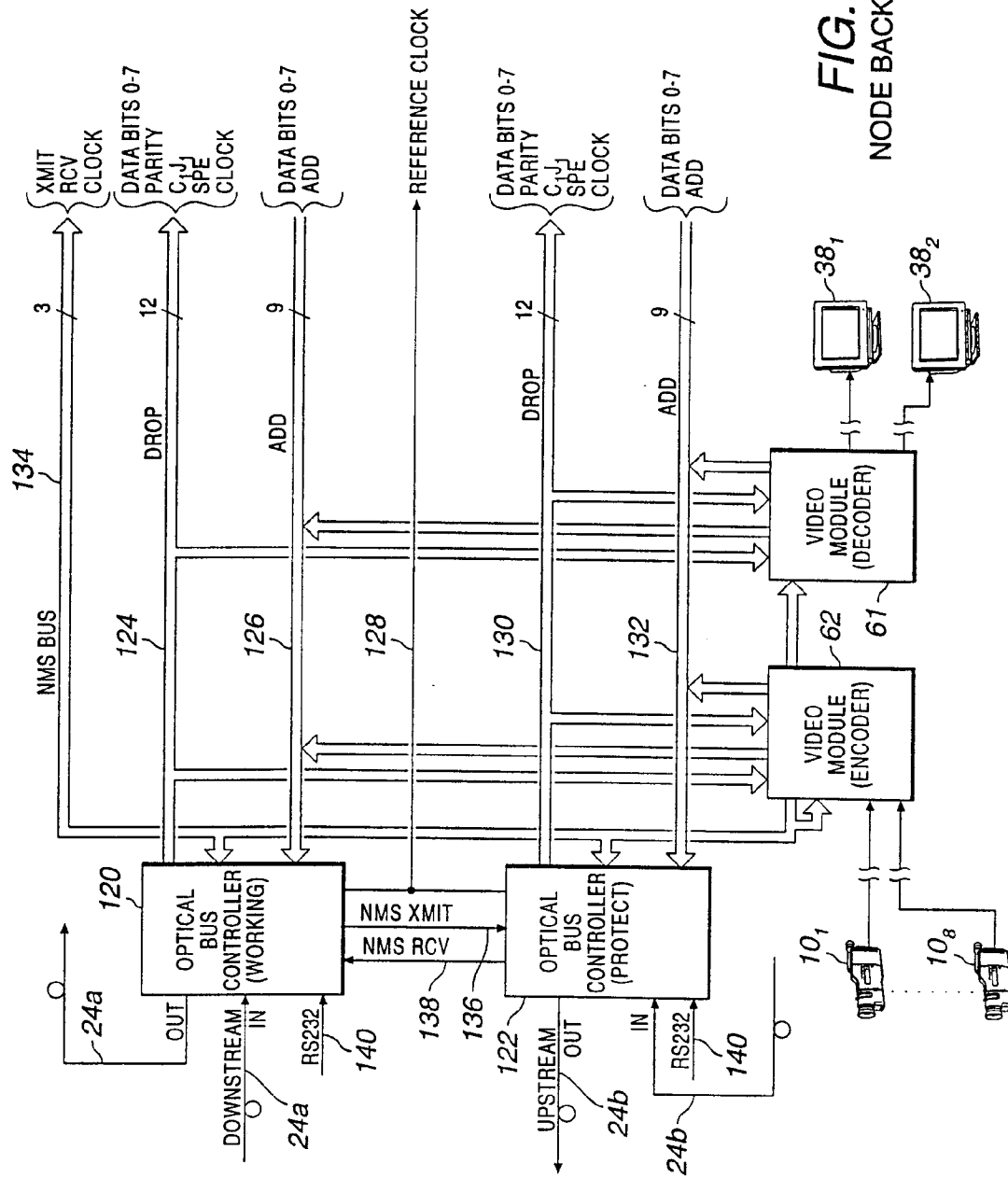
**FIG. 2**

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**FIG. 3**  
SONET OC-1 FRAME

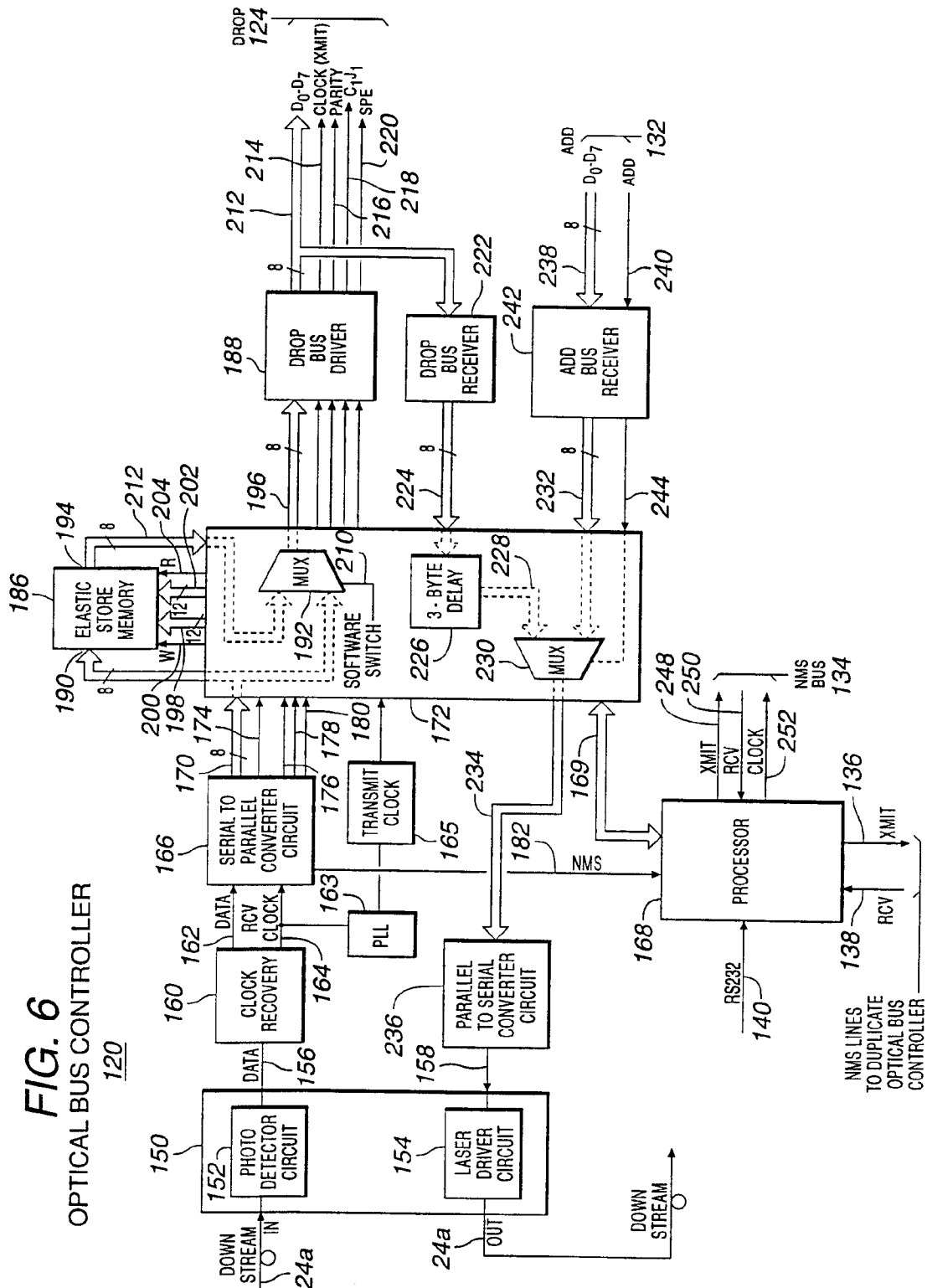


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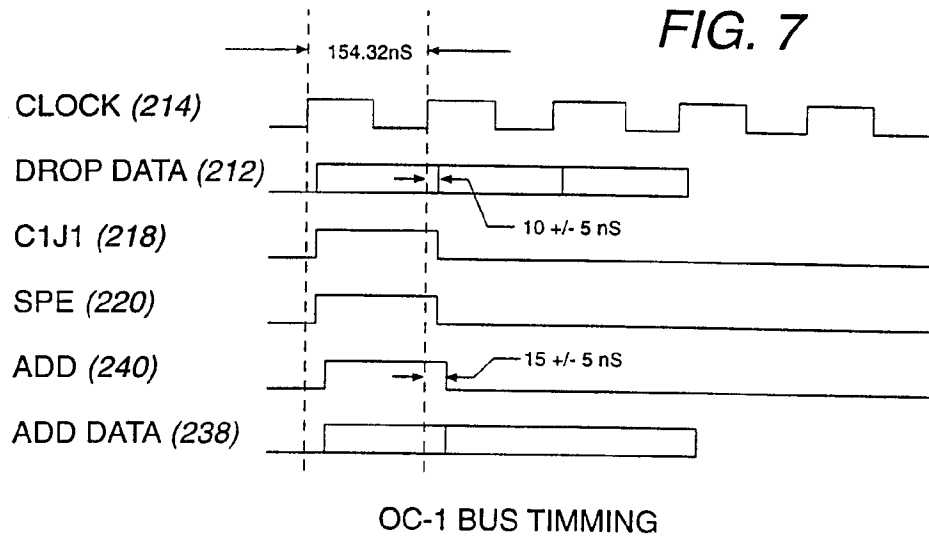
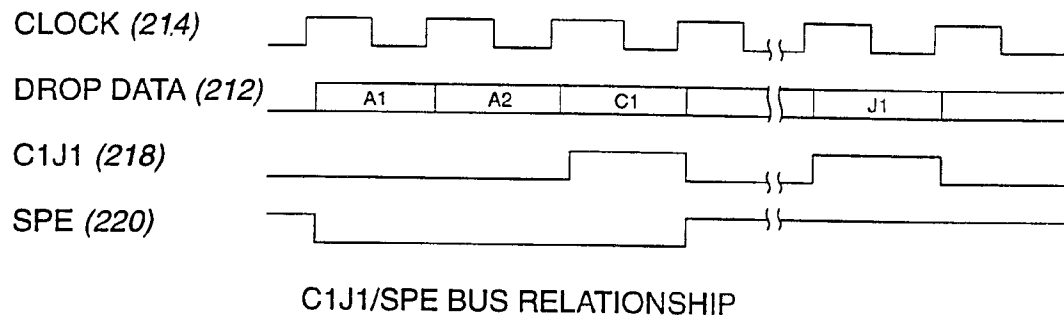
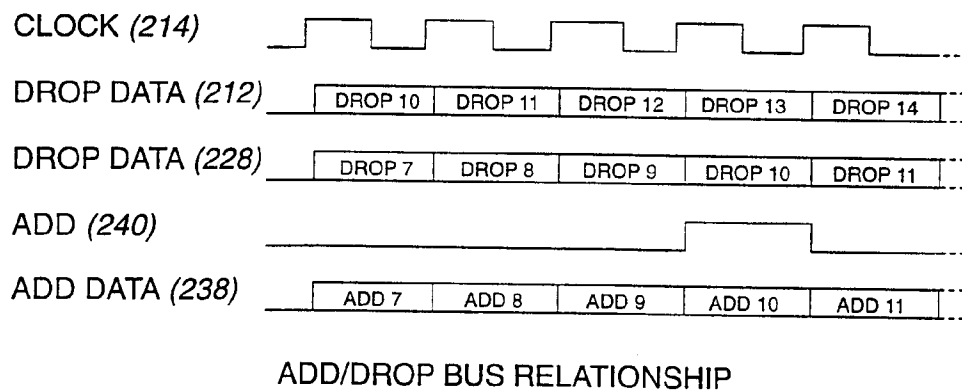


**FIG. 5**  
NODE BACKPLANE

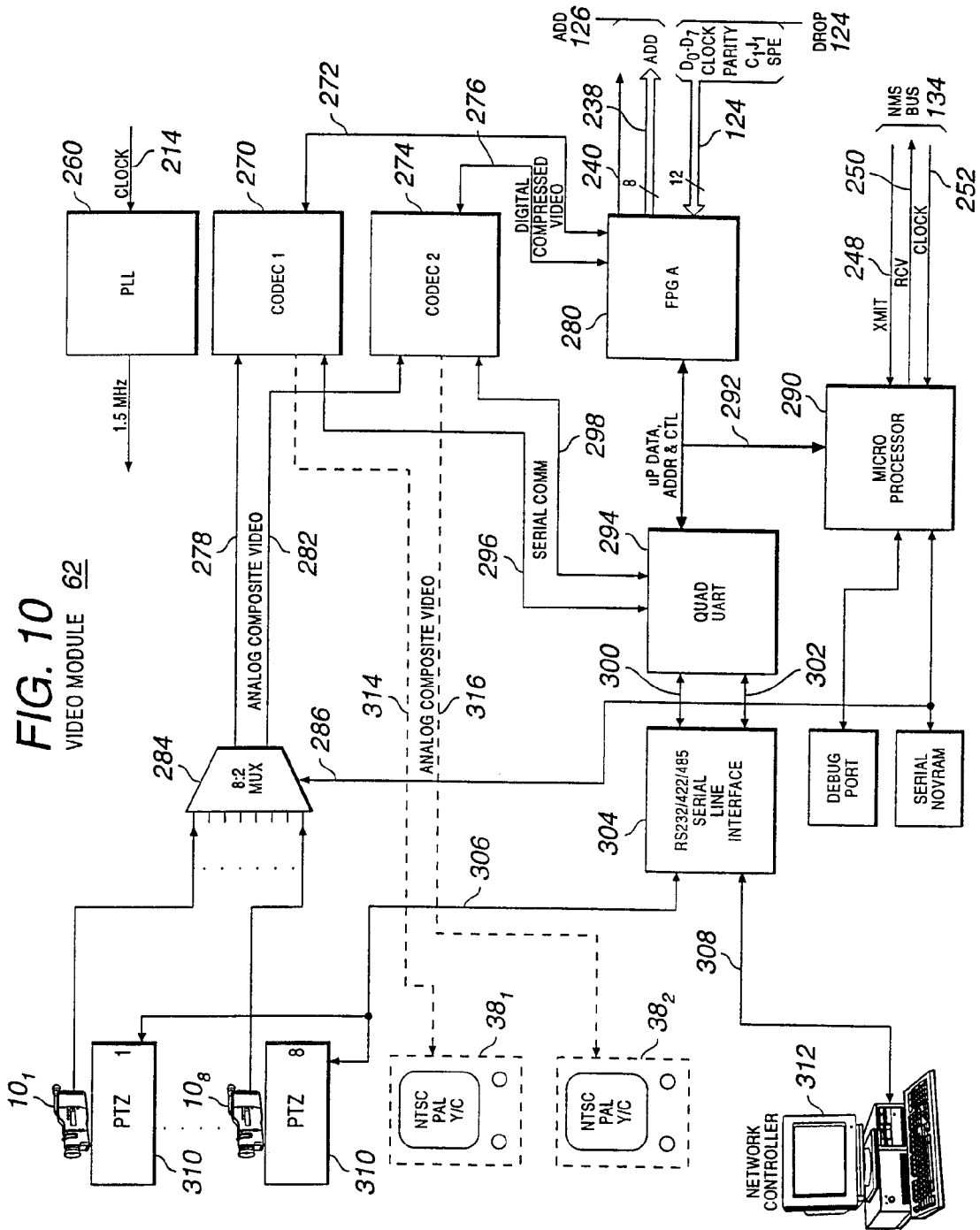
**FIG. 6**  
OPTICAL BUS CONTROLLER



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**FIG. 7****FIG. 8****FIG. 9**

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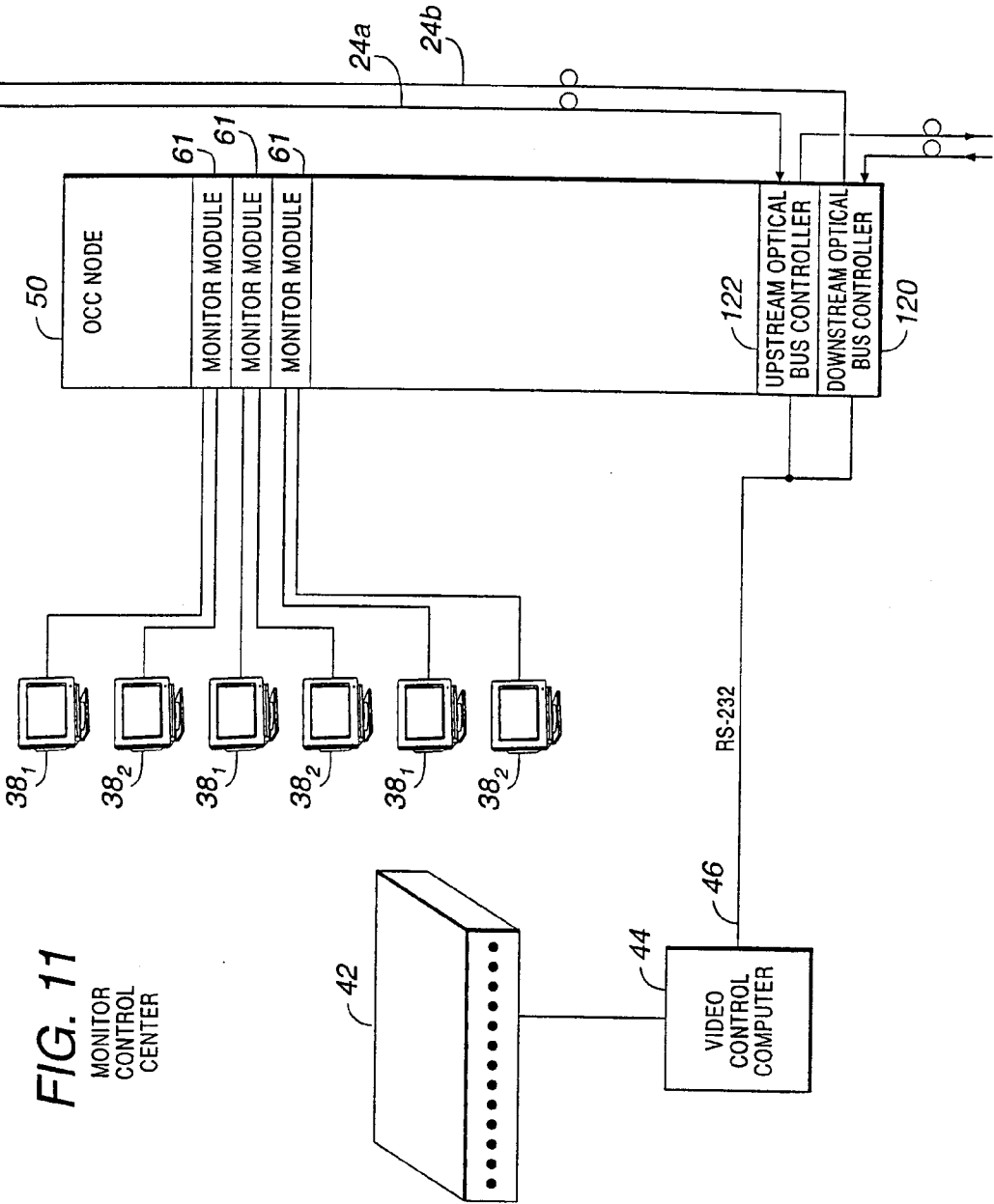


FIG. 11  
MONITOR  
CONTROL  
CENTER



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/00061

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) : H04J 3/00, 3/02, 3/16; H04Q 11/04; H04N 7/10

US CL : 370/222, 254, 259, 260, 346, 352, 362, 395, 396, 397; 348/6, 7

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 370/222, 254, 259, 260, 346, 352, 362, 395, 396, 397; 348/6, 7

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS

search terms: SONET, optical network, time slot, control circuit, bandwidth, activate, switched on

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,583,864 A (LIGHTFOOT et al.) 10 December 1996, col. 7 lines 48-56, col. 10 lines 36-64, col. 33 lines 18-26.	1, 10, 11, 15, 16, 20, and 21
T	US 5,684,799 A (BIGHAM et al) 04 November 1997, col. 10 line 63 to col. 11 line 6, col. 3 line 62 to col. 4 line 10, col. 5 line 58 to col. 6 line 5, col. 4 lines 11-27, col. 18 lines 47-59, col. 18 lines 10-36, col. 16 line 55 to col. 17 line 12.	1-32
T	US 5,668,803 A (TYMES et al) 16 September 1997, see entire document.	1-32

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 16 APRIL 1998	Date of mailing of the international search report 10 JUL 1998
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer SHICK HOM Telephone No. (703) 305-4742



## DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS

### TECHNICAL FIELD

This invention relates to systems for accessing, recording, and displaying  
5 camera images from any of a number of remotely located cameras and, more particularly, to such systems that provide access to images from one or more remote cameras over a public or private computer network.

### BACKGROUND OF THE INVENTION

With the continuing expansion and availability of public and private computer  
10 networks it is becoming increasingly common to use these networks for remote video and image surveillance. Historically, analog systems have been used for CCTV systems for purposes such as surveillance. They include an analog video camera, a video cable, and a monitor/ TV and/or a VCR recording device. Multiple cameras can be hooked to multiple recording VCRs for complete coverage of one or more target  
15 areas. Specialized equipment known as a multiplexer or 'MUX' can be used to allow multiple cameras to be hooked to a single recording/view device. The multiplexer takes all video feeds in a sequential fashion, recording from one camera at a time. This allows the quantity of cameras to share a single recording tape. Besides the limitations of a serial tape system, additional limitations are introduced when the  
20 sequencing rate of the multiplexer is too slow to allow sufficient video record/view speed of a given camera view. Multiplexers are typically expensive and have limited expandability without purchasing additional complete systems. Also, the configuration of these systems usually requires a skilled technician to be available at the systems site which increases the total cost of implementing such systems.

25 Digital systems have become more prevalent with the advent of standardized digital componentry. These systems utilize the same analog cameras and cabling, but introduce a capture card based collector. This collector can be a proprietary digital device or a PC based computer, either of which has analog video inputs directly connected to it. These inputs convert the video to digital for viewing and recording

and may even retransmit the signal to analog tape for recording purposes. A factor limiting these digital systems is that an autonomous computer is required relatively near the video sources, sometimes with user intervention required at regular intervals. These machines are also hardware bound. The number of capture cards is limited to the specific design of the collecting equipment. These systems are usually proprietary to a particular manufacturer and can be very expensive. Remote viewing is usually not available. Failover or redundancy function is also limited and expensive, due to the fact that the system is usually duplicated for redundancy. As with the analog systems discussed above, these systems also have configuration requirements that typically require a skilled technician.

There now exists commercially available networkable cameras that can be accessed over networks running TCP/IP, including both LANs and global networks such as the Internet. Ethernet-based digital video servers are now common that are small, autonomous, and usually contain a web-based configuration utility, as well as administration software. These cameras can be accessed and, in the case of pan/tilt/zoom (PTZ) cameras, controlled over the network using an assigned IP address and standard CGI-based URL syntax or other manufacturer-specified addressing protocols. This allows an authorized user to control the product from anywhere via the Internet or a dialup connection, and allows live images and image streams (video) to be accessed remotely using standard web browsers.

The video servers exist in two forms. One is a camera server that is a complete product containing both a camera and a web server with an Ethernet port. The other is a component based video server with inputs for one or more analog video feeds, which the user can connect to conventional camera PAL or NTSC video feeds. The inputted analog video feeds are converted to digital signals and sent from the video servers' Ethernet port. Thus, the video servers (whether integrated in as part of a camera server or as a standalone unit) can be connected to the Ethernet-based networks commonly used in businesses and other computer enabled sites. These video servers can be connected to these network segments and are fully compatible with existing data on these networks. The video data can be received by standard PC computers which require no special hardware other than an Ethernet connection. The

cameras can be easily configured by a novice user who has very basic experience with the Internet.

Ethernet video servers connect to an Ethernet connection and deliver digital video based on user requests or internal scripting agents. A user requests video images via standard CGI enhanced URL syntaxes. These syntaxes control the image metrics and other features of the requested video stream. The images are sent to the user as either static JPG snapshots, or as continuous JPG streams. Rates to 30 FPS are easily attainable. Since these images are delivered by Ethernet, the camera servers are very robust. Although a requested image may not be received completely in an expected time frame, the video server will wait for the user to complete its requests and processing. This virtually guarantees delivery of video, except where a connection to the video server is terminated.

When the user requests a video image or stream, the user is actually requesting a static image that appears to exist as a file in a directory structure on the video server. When the user requests a copy of this image, the video server actually updates it with a new image from the camera source, and the user receives a picture that is up to date. Subsequent requests are to the identical file name, and the server does the updating of its content.

Although IP-based network cameras and camera servers have now evolved to a relatively advanced state, the use of a browser-based interface to this hardware has seemingly impeded development of user interfaces that provide simplified, automated control over the acquisition of snapshot and streaming images over the network. Access to the camera images typically requires knowledge of the manufacturer's CGI-based syntax to access snapshot or streaming images. For example, to access a particular camera, the user may have to specify to the browser an address in the form of `http://Uid:PW@111.111.111.111/cgi-bin/fullsize.jpg?camera=1&compression=1`. While this may be handled easily enough for a single camera by bookmarking or pulling the URL out of the browser's history buffer, the task becomes more difficult when the user desires to change the access parameters or where different cameras need to be accessed. Where the identified camera cannot be accessed, such as for example due to an improper address being specified, the user may simply receive a

standard "404 not found" error message that is not helpful in diagnosing either the error or actual reason why access was not available.

Moreover, browser-based access is typically limited to either a snapshot mode or streaming images. In the snapshot mode, a single image is returned when the appropriate URL is entered into the browser. Subsequent images from the camera are then accessed using the browser's "reload" or "refresh" button. In the streaming mode, once the appropriate URL is specified, the remote server or camera simply begins streaming image files back to the browser. This results in relatively high network utilization that may be undesirable in a shared network environment.

It is therefore a general object of this invention to provide an improved user interface and approach to the network transmission of images from commercially available network cameras.

#### SUMMARY OF THE INVENTION

In accordance with the invention, there is provided a digital video system which includes a client computer, one or more video servers accessible by the client computer over a network, and a plurality of cameras connected to the video servers. The one or more video servers provide an interface between the cameras and client computer, with images from the cameras being accessed by the video servers and then sent to the client computer upon request by the client computer. The client computer provides a user interface display on the computer that includes a display window for each of the cameras accessed over the network and that displays in each of the display windows an image received from the camera associated with that display window.

In accordance with another aspect of the invention, there is provided a computer readable medium for use by the client computer in providing the user interface display. The computer readable medium includes a digital storage device and a user interface program stored on the digital storage device in computer readable form. The program is operable upon execution by the computer to access camera data uniquely identifying the cameras and to attempt access to the cameras over the network using the camera data. The program is further operable to verify access to those ones of the cameras that are accessible over the network and to generate the user

interface display and to display in each of the display windows an image received from the camera associated with that display window.

5 In accordance with another aspect of the invention, there is provided a computer readable medium and method for use by a computer in detecting motion in a sequence of color video images received by the computer. The computer readable medium includes a digital storage device containing a program that is operable to carry out the motion detection. The program selects one of the video images as a reference image and another of the video images as a selected image to be compared to the reference image. The program then accesses a color component value for each  
10 of a number of pixels from the reference image and for each of a number of corresponding pixels from the selected image, with the program being operable to perform pixel comparisons using the color component values and to generate a motion detect signal when the difference in color component values for corresponding pixels from the reference and selected images differ by more than a preselected amount.

15 In accordance with yet another aspect of the invention, there is provided a computer readable medium and method for use by a computer in recording a sequence of images, each of which comprises an individual image file in which the image is represented in a graphics file format that includes a first marker identifying the start of the image and a second marker identifying the end of the image. The computer  
20 readable medium includes a digital storage device containing a program that is operable to carry out the recording. The program stores the images together as a single file that comprises the group of images concatenated together in sequential order. The program is operable to index the file using the first and second markers. This index can then be used to provide quick access to individual images stored  
25 within the single file.

### BRIEF DESCRIPTION OF THE DRAWINGS

Preferred exemplary embodiments of the invention will hereinafter be described in conjunction with the appended drawings, wherein like designations denote like elements, and wherein:

30 Figure 1 is a block diagram showing a preferred embodiment of a digital video system of the present invention;

Figures 2 and 3 together depict the process flow of the user interface client application of Fig. 1;

Figure 4 shows the contents of the initialization file used by the user interface client application of Fig. 1;

5        Figure 5 is a diagram depicting the main menu structure of the user interface client application;

Figure 6 is a flow chart showing the process used by the user interface client to provide hardware setup information;

10       Figure 7 is a diagram depicting the server setup form displayed by the user interface client;

Figure 8 is a diagram depicting the camera setup form displayed by the user interface client;

Figure 9 is a flow chart showing the process used to display a motion form that allows the user to display and record video streams from one of the cameras;

15       Figure 10 is a flow chart showing the process flow for the image viewer program of Fig. 1 ;

Figure 11 is a diagram depicting the menu structure of the image viewer program;

20       Figure 12a is a flow chart of the autoindexing setup process used by the image viewer program;

Figure 12b is a flow chart of the archive delete process used by the image viewer program;

Figure 13 is an overview of an OCX control used by the user interface client and stream recorder client applications of Fig. 1;

25       Figure 14a is a flow chart of a portion of the OCX control that is used to access individual snapshot images from the cameras used in the digital video system of Fig. 1;



Figure 14b is a flow chart of a portion of the OCX control that is used to intermittently access images from a streaming image server;

Figure 14c is a flow chart of a portion of the OCX control that is used to access full video streams from a streaming image server;

5           Figure 15 is a flow chart of a portion of the OCX control that is used in the processing and recording of received images and image streams;

Figure 16 is a flow chart showing the process flow for the stream recorder client application of Fig. 1; and

10           Figures 17a and 17b together depict the motion detection routine used by the user interface client application of Fig. 1.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 1, there is shown a network setup of a digital video system 20 of the present invention. The video system 20 includes a client computer 22, a plurality of cameras 24, and one or more standalone video servers 26. The client 15 computer is connected to the cameras 24 and video servers 26 via a network 28 which can include a private network segment 30 and a public network such as the Internet 32. Other networked components can be used such as a networked storage device 34 and a networked file server 36. Some of the cameras 24 comprise camera servers 38 which include both a video server and camera in a single integrated unit. The camera 20 servers 38 can be, for example, Axis™ 200, 200+, or 2100 Ethernet cameras, available from Axis Communications Inc., Chelmsford, Massachusetts (www.axis.com). The video servers 26 can be Axis™ 2400, 2401, or 240 video servers, also available from Axis Communications, Inc. The cameras 24 that are connected to the video servers 26 can be industry standard PAL or NTSC video 25 cameras. Client computer 22 can be a conventional personal computer having an Intel™ or compatible CPU running a Windows™ operating system and including a network interface card (not shown) for connecting to the 10/100 Mb Ethernet network 30 that uses the TCP/IP network protocol.

In accordance with the invention, client computer 22 includes a computer readable memory, such as a fixed hard drive shown at 40 containing magnetic media for digital storage of a user interface client application 42 that includes a user interface program along with a number of additional software components. The user interface program is in computer readable form (such as an .exe file). The additional software components include Microsoft™ Internet Explorer™ Internet extensions (included with Windows™ 95, 98, ME, 2000 and revisions), the Win32API libraries (included with Windows™ operating systems), the WinInet.dll (also included with Windows™ operating systems), and a compression library such as IJL115.dll (available from Intel™) to decode and recompress jpeg images received from the cameras 24.

Although the user interface client program 42 is shown as being stored on a hard drive 40, it will be appreciated that it can be stored on other digital storage devices as well. As used in the specification and claims, "digital storage device" includes any of a variety of different digital storage devices, including magnetic media such as a hard disk or removable disk, optical storage media such as a CDROM or DVD, or magneto-optical media.

In general, the user interface client program 42 is operable to access locally stored camera data that uniquely identifies the cameras 24 and then attempts access to those cameras over the network 28. The program 24 is operable to verify access to at least those cameras 24 that are currently accessible, and to generate a user interface display 44 (on the computer's monitor) that includes a display window 46 for each of the cameras 24 accessed over the network 28, and to display in each of the display windows 46 an image 48 received from the camera associated with that display window. As used in the specification and claims in reference to the program 42 or other executable program code, the phrase "operable to" [carry out some action] means that, when executed by a microprocessor or other processing device of the computer, the program directs the microprocessor to carry out or otherwise cause execution of the specified action.

In addition to the user interface client application 42, the hard drive 40 also contains a stream recorder client application 50 and an image viewer 52. Stream recorder client 50 permits high speed recording of streamed images (video) in a

manner that minimizes network bandwidth utilization. Image viewer 52 permits browsing and viewing of archived images and video using a playback screen display 54. These two programs 50, 52 are discussed farther below in connection with Figs. 10-12 (for viewer program 52) and Fig. 16 (for stream recorder client 50). All three programs 42, 50, and 52 can be developed under Visual Basic 6.0 and Visual C++ 6.0 and designed to run under Windows™ 95, 98, ME, NT, and 2000. User interface client 42 stores all camera, server and image settings to a Microsoft Access™ 7.0 database 56 and camera and user configuration data is stored in an .ini file 58. Digitized recorded video is stored directly on hard disk 40.

The user interface client application 42 is depicted in various levels of detail by Figs. 2-9 and 13-15, and 17a-17b, with Figs. 2 and 3 together representing the complete process flow through the application starting from program launch. As shown in Fig. 2, once the user has consented to the licensing terms for use of the program, various initialization steps are performed, including:

1. getting camera and user configuration data from the .ini file 58;
2. initializing the database tables 56;
3. configuring the layout of the display form 44 on the client computer 22;
4. reading the camera setups from the database table 56;
5. validating or creating the base path (directories) for recording of images and image streams;
6. formatting user-selectable buttons for the client user interface 44; and
7. retrieving embedded MAC addresses for purposes of validating access to the cameras 24 identified in the database 56.

Thereafter, program 42 generates the user interface display 44 and the user can start accessing images or video or can access various menu options shown in Fig. 5 for purposes of maintenance or changing of setup information. If the user has selected "start" to begin accessing images or video, then the next step is to initialize and test the cameras and/or servers by verifying the IP addresses, testing for a valid MAC addresses, and, if the IP addresses and MAC addresses are valid, assigning the user settings and enabling or disabling individual cameras or servers. As is known, the MAC addresses are unique to each camera and server and can be queried via FTP requests to protected areas of the camera or server's memory. Specific locations vary

by manufacturer and require parsing and formatting to extract the required data, as will be known by those skilled in the art. This enables the software to be licensed on a per-camera or per-server basis and can be used to prevent access to any cameras or servers for which the user is not licensed.

5           For each camera in the database 56, all control information assigned to that camera is stored in an array data type. This control information includes: Server Enabled, Server Name, Server Model, Server ID, Server IP, Server Mac, Server User ID, Server PW, Server Port, Cam ID, Cam Model, Cam Enabled, Cam Name, Cam Location, Cam Bldg, Cam Room, Cam Tel, Cam Room Contact, Cam Room Contact  
10   Tel, Cam Notes, Board Switch Port Nums, Cam Thumb Image Name, Cam Fullimage Name, Record Image Name, Cam Thumb Compression Level, Cam Full Compression Level, Cam Record Compression Level, Tool Tip Text, Last Pan, Last Tilt, Last Zoom, Cam PTZ (y/n), Server Switch Action, Switch Caption, Switch Notes, Email Notification, Email Address, Email Message, Enable Audio Alert, Play Audio File,  
15   Last Update Time, Time Lapse Interval, Tie Breaker Count, User Disabled, System Disabled, System Disabled Message, Recompression Value, Pan String, Tilt String, Zoom String, Home String. These parameters all control the camera and/or server used by the application and can be changed via a hardware setup form that is provided by the software for the user and that is described further below.

20           Once all tests are complete, the process moves to Fig. 3 where the program 'listens' for digital input triggers generated by any of the cameras supporting this function. The client program 42 can listen for these trigger events and either flash or highlight the window associated with that trigger input, show a high frame rate view (motion window) or begin recording an image or series of images in the above  
25   formats. Trigger events are recorded to one of the database 56 tables by recording the date, time and image name. The user can review and access images saved during triggering. As will be known to those skilled in the art, triggering is accomplished by enabling a CRON script in the server that will send a message to the client computer  
22. Program 42 uses winsock controls to listen on a predefined port (1111 default). If  
30   a trigger message is received, the message is parsed for the server ID and port number. This information is compared to the relevant data from database 56 and the appropriate display window 46 is activated. The CRON script comprises one or more

control instructions generated by program 42. Although the CRON script can be generated directly using a web browser on the client computer, it will be appreciated that generation of the CRON script by program 42 eliminates common typographical errors encountered in manual CRON programming. Unique identifiers such as host  
5 PC and port are automatically added to the CRON script by program 42.

Once the process begins listening for triggers it then finishes configuring the user interface display grid 44 on the client computer 22. The display grid 44 shown in Fig. 1 is a 3x3 grid for up to nine cameras and it will be appreciated that any size grid can be specified, with the program 42 permitting the user to specify the number of  
10 windows and the program then automatically scaling the images 48 to fit the resulting display window size. In configuring the view grid, the program 42 may disable some camera images 48, showing instead a "No Video" or other message in the display box 46 associated with the camera 24. This disabling may be due to, for example, the camera 24 being unreachable, disabled, or invalid. The software also sets the "record"  
15 indicators (if enabled), the show port numbers (if enabled), and the camera caption (camera name, if enabled). These are discussed below in connection with Fig. 5.

Once the screen display 44 has been configured, the display loop begins in which the program accesses and displays images from the cameras 24 on the user's screen, with the software periodically updating the display of each image 48. Starting  
20 with the first camera displayed, the program sequentially accesses each camera 24 and displays the received image 48 in the box 46 associated with that camera, scaling the image to fit the user's selected view size. The process runs through the display loop once for each camera 24, incrementing the current frame (display box) for each iteration until it has retrieved and displayed a snapshot image from each camera. It  
25 then continues looping through the display loop, starting again at the first camera, and runs through the process continuously, sequentially polling each camera and updating each window 46 with an updated image 48 received from the associated camera. As each display window is being updated, it can be highlighted using, for example, a colored border to distinguish it from the remaining display windows. This allows the  
30 user to see the sequential polling process and is especially useful where the images change little if at all from one update to the next.

The display loop of Fig. 3 continues until either a trigger event is received, a double-click by the user is detected on one of the displayed windows 46, a stream request is made by double-clicking the port number on the camera window, or the user cancels the monitoring, in which case the program pauses. If the user selects a window 46 by double-clicking anywhere on its image 48, a motion form is displayed that permits viewing a setting of various camera parameters, as well as permitting the user to set recording parameters (such as number of frames to manually record) and initiate recording from the camera associated with the selected display window. The motion form and its use will be described further below in connection with Fig. 9.

10 The program checks during the display loop to determine if the user has enabled recording. If so, the program checks user recording settings that can be set through the hardware setup process of Fig. using the recording camera setup tab of Fig. 8. These user configurable settings include selections to record all frames received, or interval recording where the user can specify that frames are only recorded once every

15 so many seconds or minutes. The user can also specify that recording should only occur when motion is detected in the received video. A preferred routine for implementing the motion detection will be described further below in connection with Figs. 17a and 17b. Once these user settings are read, the program then checks scheduler settings that are also user configurable under the recording camera setup

20 tab. These scheduler settings allow the user to specify certain hours during the day and days during the week when the recording is either to occur or be blocked. Scheduling can be done in 15 minute intervals. Every 15 minutes the user can select No recording, Standard Recording (Fig. 15), or Video Motion Detection Recording (Figs. 17a-17b). The program will compare this schedule to the current time of day and adjust the recording functions as necessary. This allows for up to 96 different

25 recording schedules per day, far exceeding any typical user need. If recording is permitted for the current time on this particular day, then the program proceeds to the appropriate recording routine (record all frames, time interval recording, or motion detection) according to the user configurable settings previously read.

30 As a part of the display loop, program 42 requests images or video streams from one of the cameras 24. The requests are formatted as standard CGI based URL syntax, i.e.:

`http/Uid:PW@111.111.111.111/cgi-bin/fullsize.jpg?camera=1&compression=1).`

The images are downloaded from the cameras 38 and servers 26 to the client computer 22 where they are stored in a memory buffer, which can be implemented in RAM. The buffer is parsed and augmented with formatted date and time stamps, accurate to the millisecond. The image is assigned a name generated by the program  
5 based on the date and time of creation. The program 42 then saves the image to the hard drive 40 using the following directory structure:

Mapped Drive and Root Path / Server Name / Camera Name / Year / Month / Day

This directory structure is generated in real-time as the recording executes. The images are saved in one of the following styles, based on user setup preferences:

10           Single Images: Images are saved under the Day directory in a graphics file format such as jpegs. The file naming convention used is hh mm ss.jpg, where hh is the current client computer clock hour in 24 hour format, mm is minutes, and ss is seconds.

15           Multiple Images (video): Video images (i.e., time sequences of individual images) are saved at the Month directory level as hh 00 00.jpx, where the .jpx extension represents a jpeg concatenation file (streaming jpeg), which is a single file that is built by the program 42 and that comprises a series of jpeg images concatenated together. hh is the client computer clock hour in 24 hour format. These .jpx files can be read and  
20 played back by the image viewer 52.

Before storing the jpeg image files or concatenating the jpegs onto a jpx stream, the images can be compressed using the compression .dll library noted above. In practice, it has been found that good quality recorded images consume an average of 7,500 bytes per image. Higher compression levels can yield a smaller file (down to  
25 2,500 bytes) at a reduced quality. Higher quality images can also be recorded at a file size of 70,000 bytes per image up to 250,000 bytes per image.

The program 42 can acquire images from the cameras in any of three modes:

**Snapshot:** Request one image from the server and close the connection. By running through the display loop rather than requesting a continuous stream from the  
30 server, the program iteratively requests snapshots from the cameras and servers

thereby providing continuously-updated images in a manner that requires little bandwidth, with network utilization typically peaking at no more than six percent, regardless of network size.

**Stream Frame Mode:** Connect in stream mode to each camera and sequentially cycle through each of the cameras, obtaining one or more of the streamed images from one selected camera, pausing the streaming from that camera, and then obtaining one or more streamed images from the next camera until all of the cameras have been accessed and then paused. This cycle is repeated continuously until the user switches the program back out of this stream frame mode. In this mode, the processing is identical to that of the snapshot mode, with the display loop extracting at least one frame from an open stream, and then indexing to the next camera. The connection is periodically reset to remain robustness. This approach to image acquisition yields substantial performance gains over the snapshot mode and is more efficient than a continuous stream. This connection allows the video server to maintain an authorized connection to the client computer, providing enhanced performance and ultimately, augmented received frame rates. Running in this mode requires more bandwidth than the snapshot mode, but will utilize less than the full streaming mode described below, since each stream is paused as the remaining connected cameras are sequentially accessed for a frame of video. The video server buffers surplus video to the point of filling up its internal buffers, at which time the server stops grabbing video frames until the buffer is depleted, or the server is reset. Thus, as will be appreciated by those skilled in the art, this approach can also be used to control the frame rate of displayed and/or recorded video in a manner that minimizes the network bandwidth utilization. Thus, it can be used for only select ones of the cameras and for recording at a frame rate faster than that obtained by individual URL calls, but less than that provided by full streaming from the camera or video server.

**Full Streaming Mode:** Launch the stream recorder client 50 as a shelled process, pass the URL and various options via a command line syntax. The client computer connects in stream mode and retrieve images in an infinite loop. The connection is reset periodically to ensure robust connectivity across various network topologies. The received image stream is then parsed for SOI (ASCII 255 + ASCII



216) and EOI (ASCII 255 + ASCII 217) markers, which are the standard start-of-image and end-of-image markers. A buffer is built until these markers are found. When found, the image is displayed and that section is removed from the buffer. This process is then reiterated until a timer expires the session or the user manually closes  
5 the connection.

When recording, the stream recorder client 50 writes directly to the same directory used by program 42, but uses a different naming convention to avoid contention. This naming convention can be implemented by appending a letter suffix to the filename of the jpx stream. For example, program 42 might record a filename  
10 as "11 00 00.jpj", whereas program 50 might record images obtained at the same time as "11 00 00\_s.jpj". Since they are now uniquely named, there is no concern of one program overwriting the image files of the other.

Referring now to Fig. 4, the .ini configuration file used for program 42 will now be described. The WindowState = Normal (or Maximized) sets the main camera  
15 view grid as either normal, with the display being sized based on the Images\_Across, Images\_Down, Ref\_Image\_Width, and Ref\_Image\_Height parameters. The Ref\_Image\_Width specifies the image width of each display window 46 in units of twips (which is a known measurement unit defined by Microsoft™). There are approximately 1440 twips per inch. The image width is determined by the default  
20 image metrics that can be specified by the user via the defined in Setup/Software menu command. The Images\_Across parameter specifies the number of cameras to be shown horizontally within the user interface display 44 and the Images\_Down parameter specifies the number of cameras to be shown vertically. An exemplary 3x3 display grid (for a total of nine camera windows) is shown in Fig. 1. In the event that  
25 WindowState = Maximized, the entire screen is filled with the application's main window and displays the camera view grid in the center of the window based on the parameters noted above. The Display = Image (or List) sets the initial display type, with "Image" resulting in a display of the view grid 44 with camera images 48 shown in the display windows 46 and "List" providing a textual list of the cameras and  
30 servers with no images.

The HighliteFrameColor specifies the hex RGB value for the current update window, that is, it identifies the color used for the border placed around the camera

window currently being updated at any one time during the display loop of Fig. 3. The default color is blue. The FlashFrameColor provides the hex RGB value for the camera window corresponding to the camera for which a trigger has been received. The default color is red. The ViewBackColor specifies the hex RGB value for  
5 inactive camera windows, with the default being grey. The TCPPort parameter specifies the IP port on which the camera server transmits images and the program 42 application listens. This information is used in the base CRON script.

The RecordMode setting can either be SINGLE or MULTIPLE, which respectively correspond to the single image jpeg and video stream jpx file formats  
10 discussed above. For "Single", the received images are written to disk (or other non-volatile storage media) as a single jpeg file using the naming convention provided above. For "Multiple", the images are written as jpx streams, with the RecordMode parameter ("24" shown in Fig. 4) referring to how many jpx files are written per 24 hours. This parameter can have any of the following values: 1, 2, 3, 4, 6, 8, 12, 24.  
15 Thus, "1" means that the received stream of jpegs are written into a single jpx file over a 24-hour period, whereas "24" means that a new jpx file is started every hour, 24 per day. As mentioned above, the jpx format is a straight concatenation of jpeg files and, by storing the files with the .jpx rather than .jpg extension, the software avoids the possibility that a user opening the file will inadvertently launch a standard  
20 .jpg viewer that might hang due to the large sizes of the jpx files.

The RecordThumbnails = TRUE setting is used to tell the software to record the displayed thumbnails rather than recording the image at the Record Image parameter that is specified in the Camera Hardware Setup form of Fig. 8. This setting causes the program to record the same image that is viewed in the display grid 44.  
25 When set to FALSE, the program accesses and displays one image (a thumbnail) from the camera and then accesses and records a second image (at a different size) without viewing. This allows for different image sizing and/or compression for viewing than for recording.

The RecordImageBasePath sets the base directory path for recording all  
30 images; that is, it sets the "mapped drive and root path" shown at the upper level of the directory structure shown above. The program will create all lower levels of the directory structure if they do not already exist. An error message is displayed if the

drive is not available or the directories cannot be created or accessed, and no recording will occur.

The Camera\_Database setting is a pointer to the database 56 that is used for all camera and camera server settings. Other settings that may be less often accessed are:

- 5       • DisplayWidth: Sets the default user interface display 44 size in twips.
- BorderWidth: Sets the width of the black spacing between all thumbnail images in pixels.
- SkipInactivePorts: TRUE - Thumbnails that are disabled will not be displayed when program 42 is running.
- 10       • ShowHightlightFrames: TRUE to show border around currently updated thumbnail.
- ShowRecordIndicators: TRUE to show the record LED status indicator that can be included at a corner of the display window for each camera.
- ShowCameraCaptions: TRUE to show the title caption at the bottom of the thumbnails.
- 15       • ShowPortNumbers: TRUE to show the physical thumbnail port numbers.
- PingTimeout: The number of milliseconds to attempt a ping to the video server before failure abort.
- PingOnImageRequest: TRUE to allow ping tests on each received image burst.
- 20       • CameraCaptionForeColor: Color of the camera caption in hex RGB
- CameraCaptionBackColor: Back color of the camera caption in hex RGB
- HTTPPort: Http port number to access all cameras. This is a global setting.
- MaxFailOverCount: Number of failed camera requests before shutting down the camera port. The display window 46 will show "Unavailable".
- 25       • ReconnectAttemptIntervalSecs: Seconds to elapse before trying to reconnect a failed camera.
- DefaultEmailRecipient: Email address to use when sending a motion alert.
- EmailUserID: UserID used for email account access.
- 30       • EmailUSerPW: User password for email account access.
- ShowMotionBorder: TRUE to allow the video motion detection routine to highlight the target window when motion is detected.

- EnableStatusLog: TRUE to allow status info to be written to a text log.
- EnableErrorLog: TRUE to allow specific Error information to be written to a text log.
- StreamViewMode: When launching a streamer, the mode it starts in can be:
  - 5                   0 = Icon
  - 1 = Small frame window with text info only.
  - 2 = Normal window with video displayed.
- StreamIntervalSeconds: Number of seconds to allow the streamer to run before closing:
  - 10                0 = Run forever
  - 1 to 84600 = 1 sec to 24 hrs run time before closing.
- StreamMaxFPS: Maximum number of FPS to stream; 0= Max speed
- StreamRecord: 0 = no record on program launch, 1 = record on launch.

Referring now to Fig. 5, there is shown the menu structure for the Main Menu displayed by the program 42 as a part of its user interface. In the Display menu, the "List" command displays the cameras as a text grid only - no image is displayed. The "Thumbnail" command displays the cameras as a graphical grid, displaying images 48 received from the cameras 24 using the display loop of Fig. 3. In the Setup menu, the "Hardware" command launches the Hardware Setup form which permits hardware configuration using the process of Fig. 6. The user can add/delete/edit the different server and camera settings. Also in the setup menu is the 'Software' command which launches a form that allows the user to graphically modify the core setting of the .ini file. The ability to manually edit the file also is available via the 'Other' Tab and then the first 'Edit' button. The ini file can also be edited with any user editor such as Microsoft™ Notepad. The Archive menu contains a single command, "Browse Archived Images" which launches the image viewer 52 executable shown in Fig. 10. The Help menu includes a "Dump all Server Settings" command which writes all server and camera data to a text file. This information will be located in the application's directory in a file called CameraDump.txt. This information can be useful in troubleshooting functional problems with the system.

Fig. 6 depicts the Hardware Setup routine that is invoked by selecting "Hardware" under the Setup menu. This process is used to add or delete cameras and

servers, and to edit existing camera or server setups, if desired. The servers and cameras are shown in a tree structure on the left side of a new window on the computer screen and, where an existing server is selected, a set of server hardware setup tabs (shown in Fig. 7) are displayed on the right side of the screen to permit configuration of various server parameters, including many of the control information items listed above. Where an existing camera is selected, the camera hardware setup tabs of Fig. 8 are displayed on the right side of the screen for editing of camera parameters and control information noted above. All panels for each of the tabs of Figs. 7 and 8 includes an Update button to save changes made on the tab.

For the server hardware setup tabs of Fig. 7, the Connection tab provides a display that permits the user to set the fundamental server settings for the program's CGI base parameters. These options are used in the URL requests to the server. The Connection tab contains the basic server information. The fields are:

Server Name	Name to identify the server.
Server Model	Name to identify then camera.
Server Enabled	Check to enable, uncheck to disable.
Server Serial Number	Authenticates the server. Numbers and Letters only.
Server IP Address	IP address as 123.123.123.123
Server Root ID	Root user ID. Can also be a regular User ID.
Server Root Password	Root user PW. Can also be a regular User PW.
Server Notes	Notes for this Server, for reference only.

If the Server Root ID and Server Root Password are not used, the Host Scripting tab will not function. The Connection panel also includes two buttons:

Add New Server	Creates a new Server.
Delete Server	Deletes an existing Server.

The Switch Inputs tab contains the information related to the digital inputs on the server and can be used to set the program's preference settings for trigger responses from the server. This includes the Show Motion form, Flash Window, and Record Image options shown in Fig. 3. The ports are disabled by default. The fields are:

Switch Port	The port being edited.
Switch Action	The action to be performed upon trigger.

Switch Caption	The name to identify the Switch Action.
Enable Audio Alert	Enables or Disables an Audio alert segment.
Play Audio	Windows .wav file to play upon a trigger event.

The Relay Output tab provides a display that permits editing of functional settings for latching or pulsing the server relay output. As is known to those skilled in the art, this relay can be attached to a siren, autodialer, or other device compatible with the characteristics and limitations of the server's relay. The fields are:

Enable Relay  
Relay Caption  
Relay Notes

The Host Scripting tab provides a display for programming or displaying basic CRON scripts on the server. The basic script allows the server to broadcast trigger events from the switch inputs. That is, the script enables to server to send messages to program 42 that are specific to triggering events on the server such as switch closures, infrared, microwave, magnetic, or other forms of sensors. For example, the base CRON script used in Axis™ 2400 series servers is:

0-59 0-23 1-31 1-12 0-6 /=xx :

alert -host yyy.yyy.yyy.yyy -port zzzz -message "Port Trigger";

where xx is the server port 1-4, yyy.yyy.yyy.yyy is the IP address of the client computer 22, and zzzz is the port specified in the .ini file for communication between the program 42 and the server. The fields on this tab are:

Enable Script	Enable / Disable CRON script activation.
Script Text	CRON script text.

The Host Scripting panel also contains four buttons:

Template	Sets a basic CRON script for triggering.
Clear	Clears the Script window.
Download from Server	Retrieves existing CRON script from the Server.
Upload to Server	Sends the Script text to the Server.

For the camera hardware setup tabs of Fig. 8, the Info tab allows the user to set the camera name, Pan/Tilt/Zoom (PTZ), and text reference fields for each camera, as

well as enable or disable the camera. In particular, the Info tab includes the following fields:

	Camera Name	Name of Camera.
	Camera Model	Camera Model; Select from list.
5	Camera Enabled	Enables / Disables the Camera Image.
	Enable Camera Movement	Indicates whether a camera can move.
	Camera Location	This text is for reference only.
	Camera Bldg	This text is for reference only.
	Camera Room	This text is for reference only.
10	Camera Room Tel	This text is for reference only.
	Camera Room Contact	This text is for reference only.
	Camera Room Contact Tel	This text is for reference only.
	Camera Notes	This text is for reference only.

The Presets tab allows the user to define any quantity of user defined presets for Pan/Tilt/Zoom. The user is shown a thumbnail of a static snapshot for any new positional requests. The fields are:

	Preset Views	Enables the user to Add/Change Views
	Preset Notes	Text Notes for the selected preset.
	Pan	Pan Value
20	Tilt	Tilt Value
	Zoom	Zoom Value

There is one button:

H	Sets the Preset to HOME
---	-------------------------

There are three slider controls:

25	Pan	Pan Value
	Tilt	Tilt Value
	Zoom	Zoom Value

The Displayed Image tab allows the user to set the image size and compression level request for the camera server image retrieval. These parameters are mapped against CGI type parameters defined by the server. The user representations are simplified terms versus the CGI syntax. Three image styles are

defined here. Each style is set for the three image request types. This value is used by the server when sending requested images to the application. The fields are:

	Thumbnail Image	Main View with all cameras.
	Full View Image	Detailed View of a single camera.
5	Record Image	Recorded Image style.

The Thumbnail Image is displayed on the Main form with all the other camera views. The Full View Image is displayed on the Motion form. The Record Image is used whenever a save request is made by the application. Each Image style has a related compression value. The compression values are selectable for each Image style. The following considerations should be used when selecting the Image styles:

#### Image Size

Largest images:	slowest access, largest file size
Smallest images:	fastest access, smallest file size

#### 15      Compression Value

Lowest compression:	best image quality, slowest access
Highest compression:	worst image quality, fastest access

The Switch Inputs tab allows the user to bind any or all available digital switch ports to a display window. That is, the digital switch inputs must be bound to camera ports. This setting tells the application which cameras to record/notify when a trigger event occurs and allows the application to notify the user on screen which port trigger(s) is/are associated with a camera view. Each defined switch input is listed with a check box that can be selected to bind the camera to that switch input.

As mentioned above in connection with Fig. 3, the Recording setup tab permits the user to set automatic recording options for interval recording a camera. The interval is expressed in seconds. The camera will record an image at the specified interval if the hardware can meet these expectations. Otherwise, the image is recorded as quickly as possible after the interval has expired. The fastest interval that can be used is derived from observing the cycling rate of all cameras. On a quality system the fastest interval is about 1/4 second for any camera. The fields are:

Interval Recording	The camera will record images at a set interval.
--------------------	--



Record an Image every...	The Interval to record images automatically.
Compression Index	This value sets the save compression value.

The compression value is used by the compression library to set the amount of compression for image saves. The lower the number, the higher the compression.

5 The range is between 5 and 40. The most commonly-used value is between 30 and 35.

The Email tab permits the user to set an email address to which an email notification will be sent upon occurrence of a trigger event. An image from the triggered camera can be attached to the email. The Performance tab permits the user

10 to specify a unique User ID so that the camera or video server administrator can set or limit the bandwidth of video transmission on a user-by-user basis.

When a user double-clicks on a camera window 46, the program 42 brings up a Motion Form which runs the process shown in Fig. 9. This permits the user to bring up a detailed view of the image from a particular camera, with the image being

15 updated at an increased rate. Complete camera and server information is displayed on this form. The user can Pan / Tilt / Zoom supported cameras, click on preset positions, record images, or display any trigger events.

Fig. 10 depicts the process flow provided by the image viewer program 52, which can be, but need not be, a separate executable than program 42. This process

20 can be launched from within program 42 using the "Browse Archive Images" command in the Archive menu of Fig. 5. This program 52 can include authentication capability to provide the user with access to only those archived images that have come from servers accessible to that user. This is indicated in Fig. 10 where the program reads the database for defined servers and parses the record path for

25 matching servers. Then it will display a tree structure showing only those archived images and streams that came from cameras or servers defined in the database for that user. Once the user has selected an archived jpg or jpx file, the image is brought up on the screen and, for jpx streams, the user can play, pause, stop, frame advance and review using buttons that emulate a VCR panel. A refresh button can also be

30 provided to reload the archive if additional images are being written to it in the background by the user interface client program 42. The image viewer program 52

can include an autodelete function, in which case a five minute timer is started. The program then checks the archive age against user date settings, and deletes the archived .jpg and .jpx image files that are older than the specified date or time period. The program 52 can also include an autoindex feature which, when enabled, automatically indexes the archived jpx files every hour to build an index into the jpx file for quick access by the program into any point in the jpx file. This index feature is discussed next. If the autoindex feature is not enabled, then the index is not built until the first time the jpx file is loaded.

In installations where very high speed recording is being performed, the jpx file can become quite large. A typical jpx file for an hour of video is 1 to 5 MB, while high speed recording can easily exceed 20 MB and even reach 100MB. Since the jpx is purely concatenated JPG images, aligned head to tail, the only way to view the images within the jpx file is to parse the SOI and EOI markers and display the image in between them. For incremental playback, this process is easily controlled. However, when a user wants to "rewind", "fast forward", or randomly jump to a portion of video, this process requires the program 52 to process from its current position and read all video frames in between. Jumping over frames does not work for these files since, in order to most efficiently store the images, the images within the jpx file are relatively unique in length. This process of reading in all of the frames can be undesirably slow when the jpx file is large. To overcome this issue, the image viewer program 52 creates an index of the SOI and EOI markers of each image in the jpx file. This index is stored as an array of pointers into the jpx file and is stored using .ndx as its filename extension. The program 52 will look for this index and use it to load the image pointers instead of reading the entire jpx. The image pointers identify the memory locations of the SOI and EOI markers, thereby allowing the program to easily locate and retrieve individual images contained within the jpx file. The ndx file can be loaded in less than a second, as compared with jpx load times of up to a minute or more, depending on jpx size. The index is created on the first user access to the jpx image file or when an autoindex event is processed, as described above. Successive requests from the user to a jpx will allow the program to read the ndx file rather than a conventional approach which would entail reading the entire jpx file. With the index file, the pointers can be read into memory and accessed quickly, even for very large jpx files.

The ndx index file also makes possible the use of the image viewer program 52 as a plug-in for commercially available web browsers. In conventional browser-based retrieval of video, the video files can be quite large, and the user can therefore typically only request a small number of frames. The user does not know the stream size, frame count, index of time pointers, etc. By implementing the image viewer 52 as a plug-in component for a web browser, viewer can be used to provide web page access from a web browser to stored jpx images. This alleviates the necessity of a specialized software product to view the archives. Since this image viewer plug-in utilizes the ndx index file, the user can retrieve a wealth of video specific content in a very short period of time, allowing realtime display of video (assuming the user has sufficient bandwidth) of the Internet or other network.

When implemented as a plug-in, the image viewer 52 can also be used to view "live" a stream that is being recorded on a network server. This can be accomplished using server software that records the jpx files in the manner described herein, with the image viewer then only parse the target jpx file on the network server for the latest video frame. By displaying this video frame, the user sees live video that originated from the camera server, but is being supplied by what can be a much higher performance network server. Thus, since the user is now viewing recorded video from a higher performance server, the number of simultaneous connections to the video feed is highly scalable by implementing standard web server components. This is advantageous since all Ethernet video servers are highly susceptible to overload from multiple user requests and performance is degraded linearly with each simultaneous connection.

Fig. 11 depicts the main menu for the image viewer program 52. The "Tree" command under the Browse Mode menu item allows the user to browse all permitted archives by server, camera, date, and type. The "Date" command allows the user to search by date/time for a selected server and camera. The 'Directory List' command lets the user browse all attached drives manually. The Indexing command under the Maintenance menu allows the user to set the autoindexing features described above. The process used by the image viewer program 52 for setting up the autoindex feature is shown in Fig. 12a. The "Delete" command under the Maintenance menu allows the user to manually delete archives or automatically delete archives older than a selected

date/time stamp. Fig. 12b depicts the process flow when the "Delete" command is selected. The "Format Conversion" command under the Tools menu allows the user to convert images to other standardized formats. The Display Mode menu allows the user to playback the images either as thumbnails (like images 48 displayed in the windows 46 generated by the user interface client program 46) or in a cinema (fullscreen) mode.

Rather than using the ActiveX control provided by the camera/server manufacturer, the user interface client program 42 and stream recorder program 50 utilize their own ActiveX control to interface with the cameras and servers. An overview of this OCX control is shown in Fig. 13. Further details of the control for obtaining and displaying an image are shown in Figs. 14a-14c, and further details of the control for obtaining and recording an image are shown in Fig. 15. The implementation of a suitable OCX control using the process steps shown in these figures will be known to those skilled in the art and therefore no further elaboration of the design of this control is necessary.

Referring now to Fig. 16, there is shown the program flow of the stream recording client program 50, which is a separate executable that permits high speed recording of image streams (video) in a manner that minimizes network utilization. The program 50 enables the streaming output from the camera servers using the OCX control described above internally within the program as direct subroutine calls. Streaming is initiated using a CGI enabled URL that is sent in the same manner as described above for the user interface client program 42, except that the CGI syntax is set to zero to indicate streaming output from the server. As indicated in Fig. 16, the program 50 utilizes a timer to reset the connection to the server before it is automatically terminated by the network. More specifically, for some networks, such as the Internet, a connection cannot typically be permanently held, but rather will be terminated automatically after a period of time (e.g., 50-70 minutes). The program 50 avoids this problem and enables nearly uninterrupted streaming by automatically resetting the connection before the external termination and then continuing to append the streaming images onto the end of the jpx file. This can be done with the loss of little or no streaming data from the camera.

Referring now to Figs. 17a and 17b, the video motion detection routine of program 42 is used to allow the recording of images to be performed only when a moving subject is present. When enough motion is present, the system will begin recording video until motion has stopped. When motion is sensed according to this routine, the program will perform any or all of the following functions:

- record video up until video motion is no longer sensed and an "extra frames" count is exhausted;
- send an email to a user as selected in the hardware setup panel based on settings from the .ini file;
- 10 • attach an image to the email of the first frame of video that motion was detected on;
- show a yellow border around the target window where motion was detected;
- announce motion ON and motion OFF with two wav files, hello.wav and  
15 goodbye.wav, which the user may reset to any sounds desirable.

Figs. 17a and 17b detail the logic flow of this process. In general, the motion detection routine uses RGB color component filtering of the actual pixel data. By breaking down the image into these components, the values of each color component per pixel is represented as a decimal value of 0 (No color) to 255 (bright color).  
20 These values are compared to user-defined settings in the program 42 for filtering, allowing specific component or combined colors to exhibit reduced or enhanced movement sensitivity. For example, outdoor cameras are very prone to false triggering when blowing grass/leaves or shadows are present. By filtering out more green component, false triggering is reduced to a very acceptable level. This gives the  
25 program the ability to use motion detection in a much more broad range of use than other comparable systems.

The process begins by taking the first image (i.e., frame) of a video sequence and placing it into a buffer where it will be used as a reference image. The reference image is compared to subsequent video frames on a pixel-by-pixel basis. Preferably,  
30 the reference image is compared to subsequent images as they are being received (i.e., as soon as they are received) by the client computer so that the program is operable to provide real time motion detection. For each pixel in the current image, the program

performs a comparison of the color component values for that pixel with the color component values of the corresponding pixel in the reference image. If the difference in color component values for corresponding pixels from the two images differ by more than a preselected amount, the program generates a motion detect signal which  
5 can be implemented as the Record Flag shown in Fig. 17b. For each of the RGB color components, a separate counter (Count\_Red, Count\_Green, and Count\_Blue) is used that tracks the total number of pixels within the current image for which that color component value differs from that of the reference image by more than a preselected amount. This is done using a user-selectable filter levels for each of the  
10 color components. In particular, if for a particular RGB color component,  $ABS(P_{ref} - P_{cur}) - FilterLevel > 0$  then the Count is incremented for that color component. Separate filter levels are used for each color component and these filter levels can be set by the user. As will be appreciated, the FilterLevel is an offset that aids in removing unwanted noise inherent in video sources, as well as "pixelation" or  
15 "tiling" inherent in jpg image sources under compression. When the entire image is processed, the Count\_Red, Count\_Green, and Count\_Blue counters are compared to a user specified minimum, which can be different for each of the color components. If all three exceed their respective minimums, motion is considered present and the Record Flag is set to tell the program to proceed with recording.

20 Once motion is detected, the system records video and continues the pixel comparisons for each subsequent frame until the routine detects that motion is no longer present. To prevent the recording from ending before a subject has completely left the camera's field of view, the program continues recording until a specified number of extra frames have been recorded. This is carried out using an Extra Frames  
25 counter that is decremented once per frame starting with the first frame received after no further motion has been detected. As with the other counters, the number used for this counter can be user specified. Periodically, a new reference frame is selected from the video stream. This is done at regular intervals as specified by a user "Refresh Interval" setting, which is an image frame count. This Refresh Interval is  
30 used in conjunction with a frame counter C\_Ref such that, once the C\_Ref counter exceeds the Refresh Interval number, the reference buffer is emptied and the counter reset to zero.

The core function of the video motion detection is based on a count of pixels for which at least one color component value differs from that of the reference image by a preselected amount. Minimum object size detection can be implemented using the routine of Figs. 17a and 17b with the addition of an X by Y (width by height) template that scans the X by Y pixel information. If all pixels have a color component value that differs from that of the reference image by a preselected amount within the X by Y area, motion is detected. The program highlights the object with a bounding rectangle. This process can be used to filter out objects that are too small to be considered motion.

Apart from minimum object size detection, the program 42 is also operable to permit the user to specify a region of the camera's field of view so that the program performs the pixel comparisons only for those pixels located within that region. This region of interest processing is implemented by providing the user with the ability to mask out specific portions of a video frame, which will then be ignored by the motion detection. This concentrates the motion detection to specific regions of the screen. Typical region of interest masks employ grids or regions based on a grid array of squares. These areas are selected to mask out the regions. This tends to be somewhat granular in use. The program 42 uses a pixel based approach to masking the images. The user first creates a region of interest by defining the mask using the computer mouse to paint a black or other colored area on the image. The painted areas represent those portions not desired for use in detecting motion. A tool palette of square or other shape may be employed to create the painted mask. The mask is converted to a black and white mask and saved as a .bmp file based on the camera name. When video motion detection is used by the program, individual pixels from the reference and current images will be compared only if the corresponding mask pixel is not black. Users may edit the mask in Microsoft™ Paint or other image editor to refine the mask to the pixel level.

Implementations of this type of streaming media have a common difficulty; namely, Ethernet connectivity is at best a highly reliable but not a totally reliable connection. Occasionally, power fluctuations, excessive image requests, overloaded or failing networks and a multitude of other issues can cause the connection to the camera to fail. Competing implementations often cause the application to abnormally

abort or stop responding, requiring the user to close and restart the application. This condition is very serious since recorded video will not be available while the program is not responding. The user interface client program 42 and stream recorder client program 50 address this issue by identifying three modes of failure, and providing  
5 contingency functions to overcome these problems. These modes are:

1. failure upon connect;
2. failure upon image request (read); and
3. failure during midstream read of image.

Failure types 1 and 2 are easily overcome by the implementation of the default  
10 timeout of failed requests by the Wininet.dll and its related components. The program can count these failures on a per camera basis and optionally shut down the camera and reattempt access periodically. This maximum failure count and reattempt connections are user selectable on a global scale.

Type 3 failures are usually serious and can cause the program to stop  
15 responding. By executing the request asynchronously or in a worker thread, the request can be timed and if abnormally long, cancel the request and try again. This allows the application to continue to function consistently. Preferably, the program utilizes both methods to insure robust connectivity.

It will thus be apparent that there has been provided in accordance with the  
20 present invention a digital video system and computer program therefor which achieves the aims and advantages specified herein. It will of course be understood that the foregoing description is of preferred exemplary embodiments of the invention and that the invention is not limited to the specific embodiments shown. Various changes and modifications will become apparent to those skilled in the art. For  
25 example, although the invention has been described as it would be implemented using TCP/IP network cameras and camera servers, it will be appreciated that the invention can be used in conjunction with other image sources. For example, rather than specifying a URL to access a particular camera, the invention could be used to specify a memory location or utilize a .dll file to access images from, for example, a video  
30 capture card, USB or IEEE-1394 (Firewire) ports. All such variations and modifications are intended to come within the scope of the appended claims.



CLAIMS

I claim:

1. A computer readable medium for use by a computer in providing an  
5 interface to multiple cameras accessible to the computer via a network, comprising:  
a digital storage device;  
a user interface program stored on said digital storage device in computer  
readable form, said program being operable upon execution by the computer to access  
camera data uniquely identifying the cameras and to attempt access to the cameras  
10 over the network using the camera data;  
wherein said program is further operable to verify access to those ones of the  
cameras that are accessible over the network and to generate a user interface display  
on the computer that includes a display window for each of the cameras accessed over  
the network and to display in each of the display windows an image received from the  
15 camera associated with that display window.
2. A computer readable medium as defined in claim 1, wherein said program  
is operable to sequentially access each of the cameras that are accessible over the  
network and is further operable to update the image displayed in the window  
20 associated with each accessed camera using an updated image received from that  
camera.
3. A computer readable medium as defined in claim 2, wherein said program  
is operable to sequentially update the display windows using the updated images  
25 received from the cameras associated with those windows.
4. A computer readable medium as defined in claim 3, wherein said program  
is operable to sequentially highlight each display window as it is being updated.
- 30 5. A computer readable medium as defined in claim 1, wherein said program  
is operable to sequentially poll each of the cameras that are accessible over the

network and to update the display window associated with a polled camera using an updated image received from the polled camera.

5       6. A computer readable medium as defined in claim 1, wherein said program is operable to scale the images received according to the number of display windows contained in the user interface display.

10       7. A computer readable medium as defined in claim 1, wherein said program is operable to permit a user of the computer to select the number of display windows included in the user interface display.

15       8. A computer readable medium as defined in claim 1, wherein said program is operable to receive the images as image files in which the images are represented using a graphic file format.

      9. A computer readable medium as defined in claim 8, wherein said program includes a compression library and is operable to compress the size of the image files using said compression library.

20       10. A computer readable medium as defined in claim 9, wherein said program is operable to permit a user of the computer to select a level of compression used by said compression library.

25       11. A computer readable medium as defined in claim 1, wherein said program is operable to monitor the network for a trigger event generated by one of the cameras.

30       12. A computer readable medium as defined in claim 11, wherein said program is operable to send control instructions to a selected one of the cameras defining conditions under which the trigger event is generated by the selected camera.

      13. A computer readable medium as defined in claim 1, wherein said program is operable to open a connection to a selected one of the cameras using a network protocol supported by the network and to initiate streaming of images from the

selected camera, and wherein said program is operable to periodically pause and resume the streaming of images from the selected camera to thereby control the frame rate of images received from the selected camera.

5           14. A computer readable medium as defined in claim 13, wherein said program is operable to pause the streaming of images temporarily following each received image from the selected camera.

10           15. A computer readable medium as defined in claim 13, wherein said program is operable to pause the streaming of images during which time it accesses images from one or more other cameras.

15           16. A computer readable medium as defined in claim 13, wherein said program is operable to open a connection to a plurality of selected cameras using the network protocol and to initiate streaming of images from each of the selected cameras, and wherein the program is operable to sequentially cycle through each of the selected cameras, obtaining one or more of the streamed images from one selected camera, pausing the streaming from that selected camera, and then obtaining one or more streamed images from a next one of the selected cameras until all of the plurality of selected cameras have been accessed and paused and thereafter repeating the cycle one or more times for the selected cameras.

20           17. A computer readable medium as defined in claim 13, wherein the network is an Ethernet network and the network protocol is TCP/IP.

25           18. A computer readable medium as defined in claim 1, wherein said program is operable to launch a separate process that is itself operable to open a connection to a selected one of the cameras using a network protocol supported by the network and to initiate streaming of images from the selected camera.

30           19. A computer readable medium as defined in claim 1, wherein said program is operable to access a plurality of remote cameras via a video server connected between the remote cameras and the network.

20. A computer readable medium as defined in claim 1, wherein said program is operable to store images received from a selected one of the cameras in a hierarchical directory structure on a digital storage device, with the images being stored within a subdirectory located below a directory unique to the camera from which the images being stored originated, and wherein the subdirectory is identified according to date information that relates to when the image was stored.

21. A computer readable medium as defined in claim 1, wherein said program is operable to record sequences of individual images received by the computer from one or more of the cameras, with the individual images being stored together in a single file.

22. A computer readable medium as defined in claim 21, wherein said program is operable to build the single file by concatenating each image onto the end of the file upon receipt of the image by the computer.

23. A computer readable medium as defined in claim 22, wherein said program is operable to index the images within the single file and store the index as a separate index file.

24. A computer readable medium as defined in claim 22, further comprising an image viewer program that is operable to index the images within the single file.

25. A computer readable medium as defined in claim 24, wherein said image viewer program is operable to generate the index as a set of pointers to start-of-image and end-of-image markers contained within the single file.

26. A computer readable medium as defined in claim 24, wherein said image viewer program is operable upon user selection of the single file to use the index to locate individual images within said single file.

27. A computer readable medium as defined in claim 1, wherein said program is operable to detect motion in a sequence of images received by a camera by processing color component information contained in the images.

28. A computer readable medium as defined in claim 27, wherein said program is operable to store a first image from the sequence as a reference image and to compare color component values for pixels from one or more subsequent images in the sequence to the color component values of corresponding pixels in the reference image.

29. A computer readable medium as defined in claim 28, wherein said program is operable to maintain a count of the number of pixels for which the difference in color component values for corresponding pixels from the reference and selected images differ by more than the preselected amount.

30. A computer readable medium as defined in claim 1, wherein said program is operable in response to user selection of a display window to display a form that permits the user to initiate recording of images from the camera associated with that display window.

31. A computer readable medium for use by a computer in detecting motion in a sequence of color video images received by the computer, comprising:

- a digital storage device;
- a program stored on said digital storage device in computer readable form, said program being operable upon execution by the computer to select one of the video images as a reference image and another of the video images as a selected image to be compared to the reference image;

wherein said program is operable to access a color component value for each of a number of pixels from the reference image and for each of a number of corresponding pixels from the selected image, with said program being operable to perform pixel comparisons using the color component values and to generate a motion detect signal when the difference in color component values for corresponding pixels from the reference and selected images differ by more than a preselected amount.

32. A computer readable medium as defined in claim 31, wherein said program is operable to generate the motion detect signal only if more than a

predetermined number of corresponding pixels from the reference and selected images have color component values that differ by more than the preselected amount.

5           33. A computer readable medium as defined in claim 31, wherein said program is operable during comparison of the selected and reference images to maintain a count of the number of pixels for which the difference in color component values for corresponding pixels from the reference and selected images differ by more than the preselected amount.

10           34. A computer readable medium as defined in claim 33, wherein said program is operable to generate the motion detect signal when the count exceeds a predetermined number.

15           35. A computer readable medium as defined in claim 34, wherein said program is operable to permit user selection of the predetermined number.

20           36. A computer readable medium as defined in claim 33, wherein each pixel has a plurality of different color component values associated therewith and wherein said program is operable to maintain a separate counter for each of the different color component values and to increment the counter associated with a particular color component value if that color component value for a pixel from the selected image differs from that same color component value for the corresponding pixel from the reference image by more than a preselected offset associated with that color component.

25           37. A computer readable medium as defined in claim 36, wherein said program is operable to generate the motion detect signal when, for each of the counters, the count stored in that counter exceeds a predetermined minimum count associated with the color component value associated with that counter.

30           38. A computer readable medium as defined in claim 37, wherein the different color component values comprise RGB component values, each of which has its own offset and minimum count.

39. A computer readable medium as defined in claim 38, wherein said program is operable to permit user selection of the offsets and minimum counts for each of the RGB component values.

5           40. A computer readable medium as defined in claim 31, wherein said program is operable during receipt of the video images by the computer to compare the video images with the reference image as those video images are received by the computer, whereby said program provides real time motion detection processing of the received images.

10           41. A computer readable medium as defined in claim 40, wherein said program is operable to periodically select a new reference image from the video images being received by the computer.

15           42. A computer readable medium as defined in claim 31, wherein said program is operable to perform the pixel comparisons only for those pixels located within a region of the reference and selected images.

20           43. A computer readable medium as defined in claim 42, wherein said program is operable to permit a user to specify the region using a mask.

25           44. A computer readable medium as defined in claim 43, wherein said program is operable to provide a display window containing one of the images and to enable the user to create the mask by erasing a portion of the image contained in the display window.

30           45. A computer readable medium as defined in claim 31, wherein said program is operable to begin recording of the video images in response to the motion detect signal.

          46. A computer readable medium as defined in claim 45, wherein said program is operable to continue the comparison of the reference image with selected images during recording of the video images.

47. A computer readable medium as defined in claim 46, wherein said program is operable to stop recording after no further motion is detected using the pixel comparisons.

5           48. A computer readable medium as defined in claim 47, wherein said program is operable to stop recording after no further motion is detected and a specified number of extra images have been recorded.

10           49. A computer readable medium as defined in claim 45, wherein said program is operable to concatenate the video images and store them in a single file.

15           50. A computer readable medium for use by a computer in recording a sequence of images, each of which comprises an individual image file in which the image is represented in a graphics file format that includes a first marker identifying the start of the image and a second marker identifying the end of the image, comprising:

          a digital storage device;

20           a program stored on said digital storage device in computer readable form, said program being operable to store the images together as a single file that comprises the images concatenated together in sequential order;

          wherein said program is further operable to index the file using the first and second markers.

25           51. A computer readable memory as defined in claim 50, wherein said single file comprises a digital video file and said program is operable to store a plurality of digital video files on the data storage device.

30           52. A computer readable memory as defined in claim 51, wherein said program is operable to automatically index the digital video files on a periodic basis.

          53. A computer readable memory as defined in claim 50, wherein said program comprises an image viewer program that is operable upon user selection of the single file to use the index to locate individual images within said single file.



54. A computer readable memory as defined in claim 53, wherein said program is operable to display the individual images on the computer.

55. A computer readable memory as defined in claim 53, wherein said  
5 program is operable upon user selection of the single file to search for the index and, if not found, is further operable to create the index.

56. A computer readable memory as defined in claim 50, wherein said  
10 program is operable to store the images into the single file using a start of image marker and an end of image marker for each image in the file.

57. A computer readable memory as defined in claim 56, wherein the markers  
for each image within the file are stored at particular memory locations and wherein  
said program is operable to generate the index as a set of pointers identifying the  
15 memory locations of at least some of the markers.

58. A computer readable memory as defined in claim 57, wherein the  
individual images comprise jpg images concatenated together into the single file.

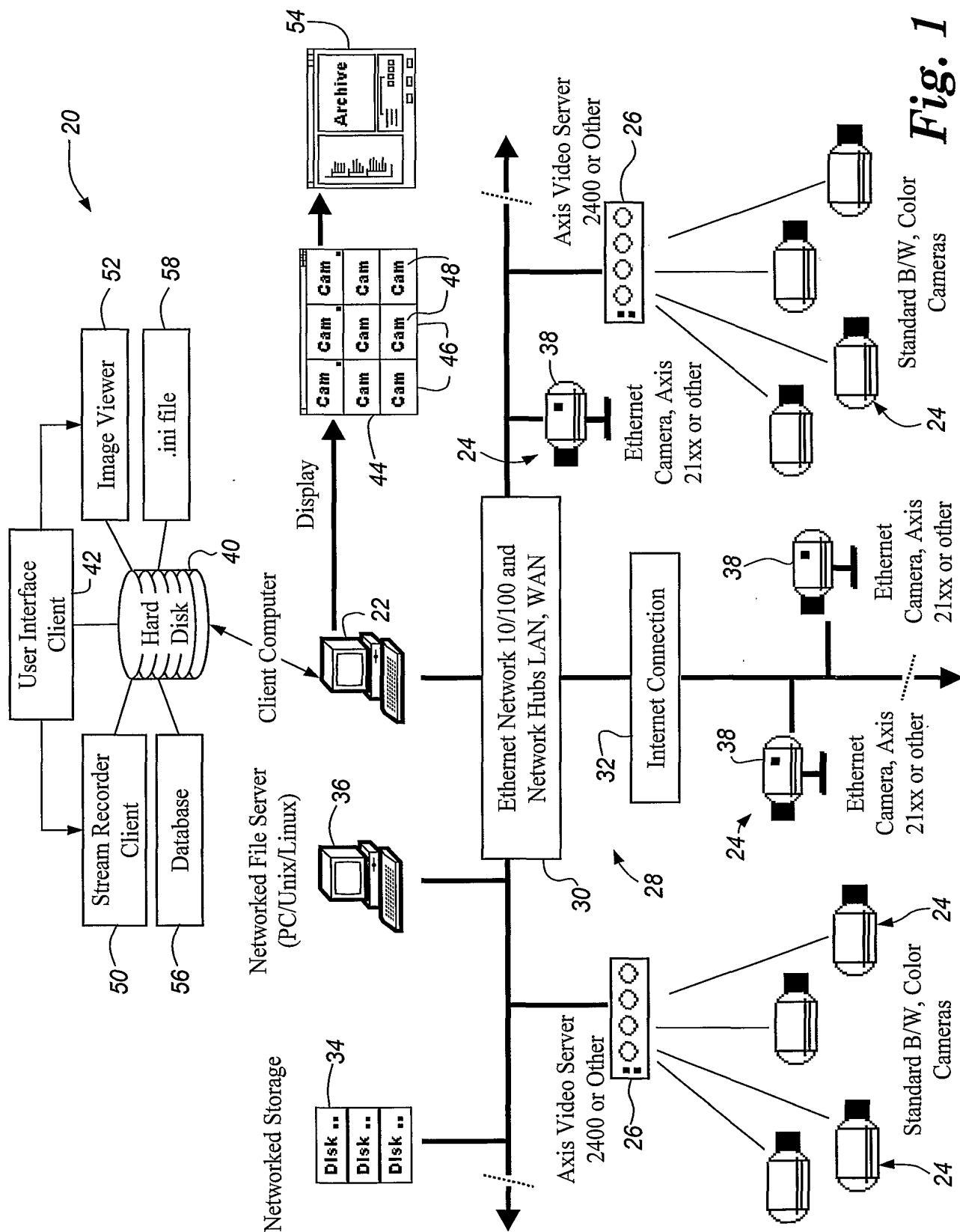
20 59. A digital video system, comprising:  
a client computer,  
one or more video servers accessible by the client computer over a network;  
a plurality of cameras connected to the video server(s), said video server(s)  
providing an interface between the cameras and client computer in which images from  
25 the cameras are accessed by the video server(s) and then sent to the client computer  
upon request by the client computer;

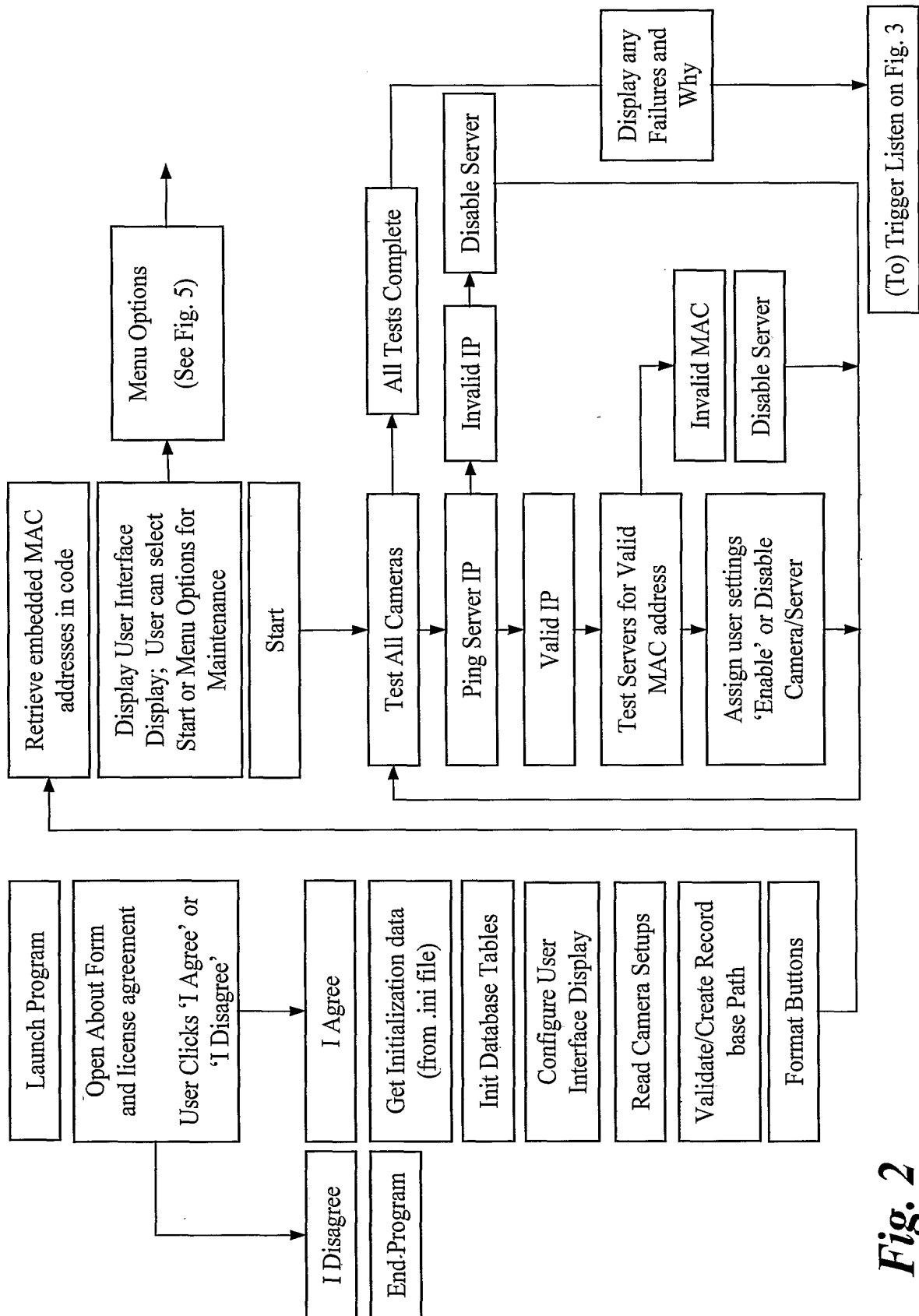
wherein the client computer provides a user interface display on the computer  
that includes a display window for each of the cameras accessed over the network and  
that displays in each of the display windows an image received from the camera  
30 associated with that display window.

60. The digital video system of claim 59, wherein the one or more video  
servers comprises a plurality of video servers.

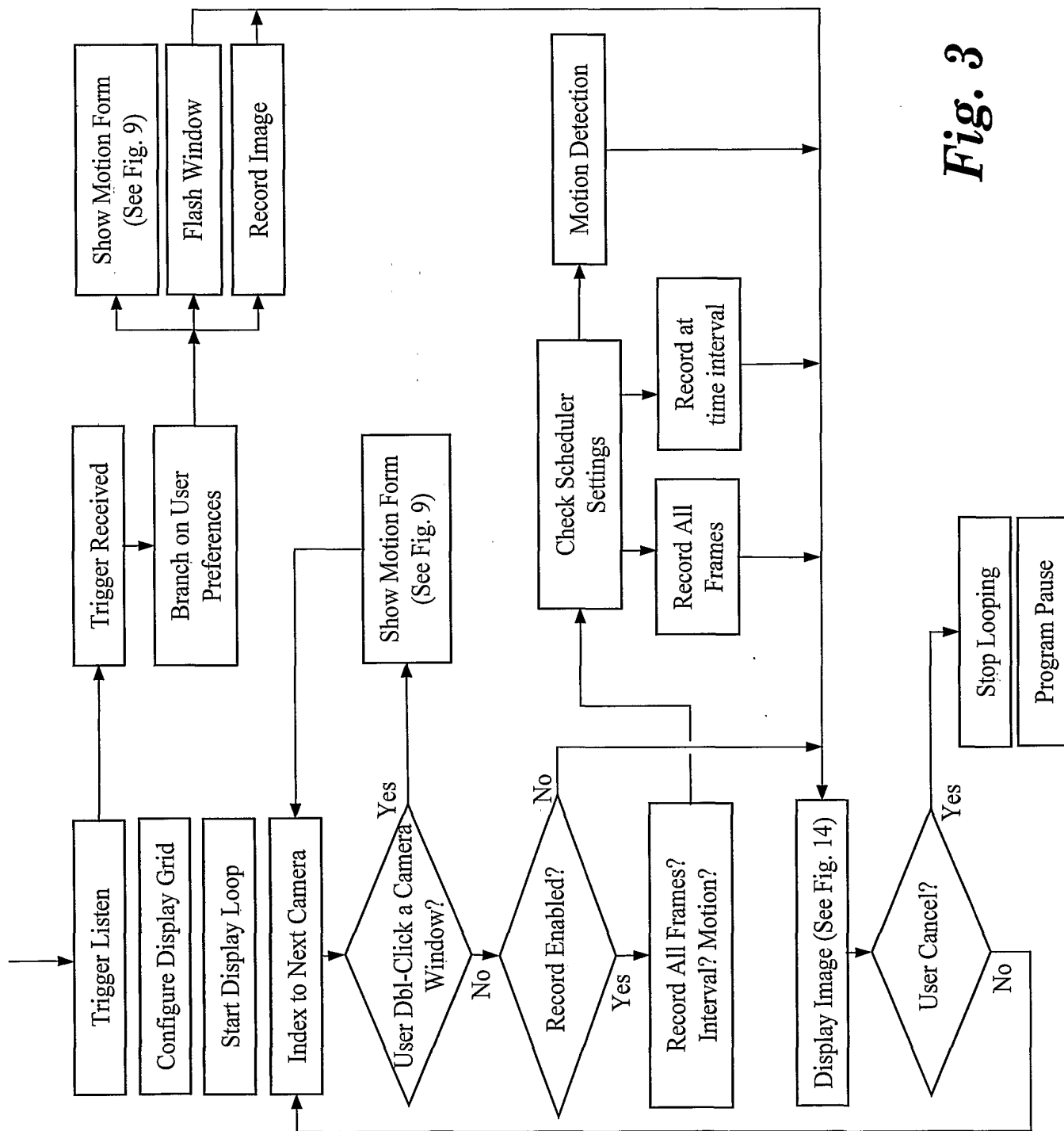
61. The digital video system of claim 60, wherein one of the cameras includes one of the video servers incorporated therein, whereby that camera comprises a camera server.

- 5           62. The digital video system of claim 59, wherein the one or more video servers includes a multi-camera video server connected to at least two of the cameras.



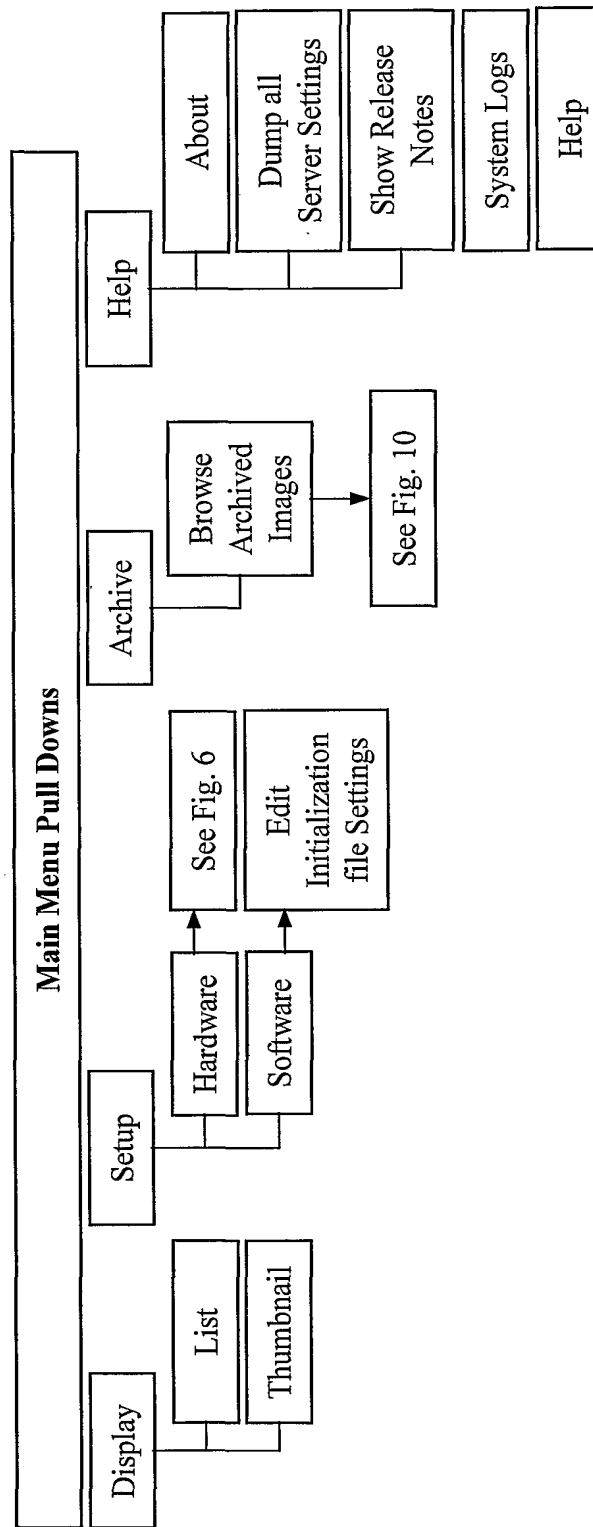


**Fig. 2**

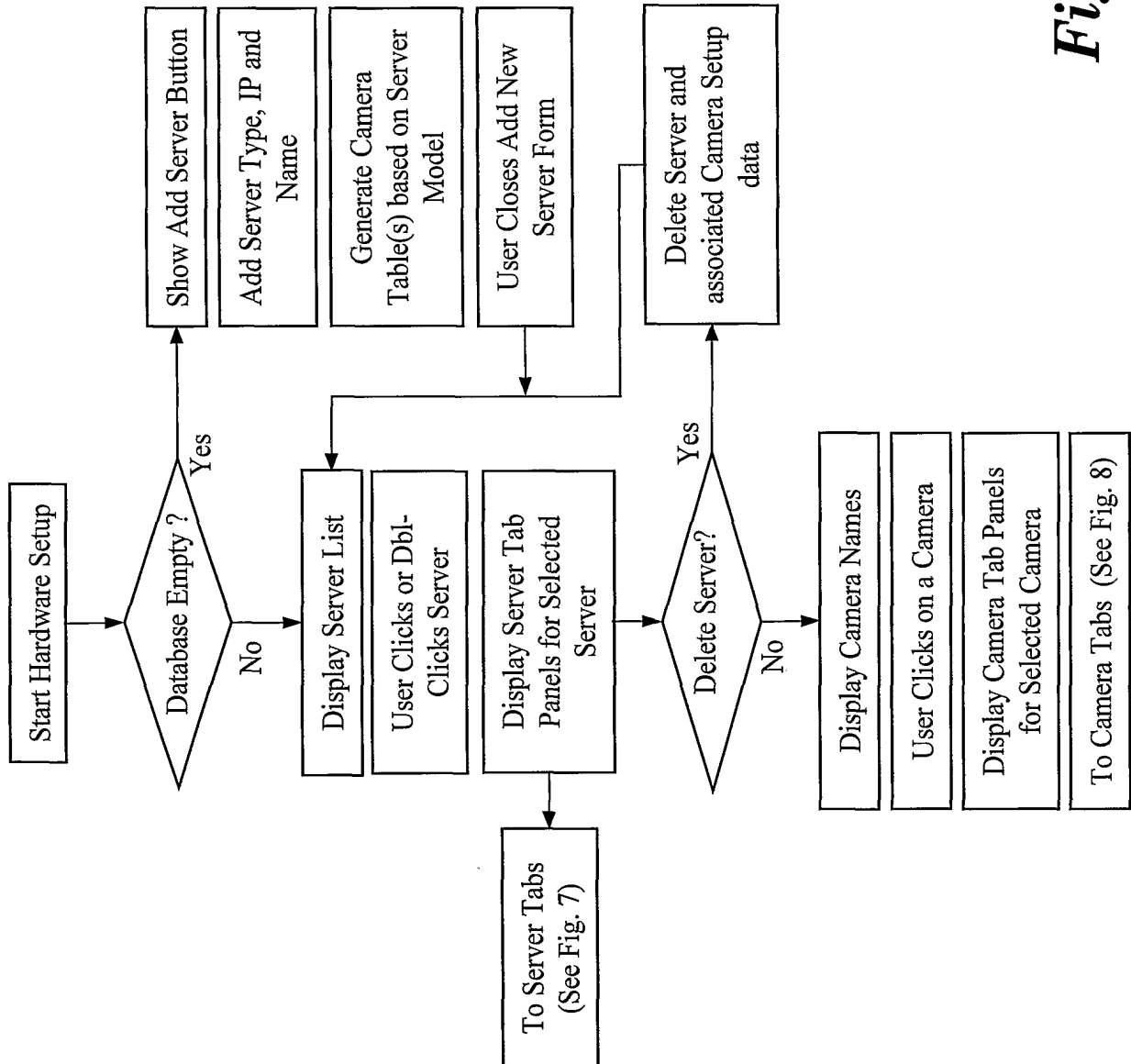
**Fig. 3**

[Initialize]	PingTimeout = 5000	RecordImagesBasePath = C:\Test
WindowState = NORMAL	PingOnImageRequest = FALSE	DefaultEmailRecipient
Display = Image	HighlightFrameColor = 16744448	=marchesej@teleweb.net
DisplayWidth = 11505	;HighlightFrameColor = &H00&	EMailUserID =marchese2
BorderWidth = 2	FlashFrameColor = &H000000FF&	EmailUserPW =sdsdsd
SkipInactivePorts = True	ViewBackColor = &H00808080&	ShowMotionBorder = TRUE
Images_Across = 4	CameraCaptionForeColor =	EnableStatusLog = TRUE
Images_Down = 2	&H00FF00&	EnableErrorLog = TRUE
Ref_Image_Width = 352	CameraCaptionBackColor = &H00&	[Camera Servers]
Ref_Image_Height = 240	TCPPort = 1111	Camera_Database = C:\Program
ShowHighlightFrames = TRUE	HTTPPort = 80	Files\Softsite32\Database\SoftSite.mdb
ShowRecordIndicators = TRUE	MaxFailOverCount = 50	[Stream Applet]
ShowCameraCaptions = TRUE	ReconnectAttemptIntervalSecs = 60	Stream ViewMode = 2
ShowPortNumbers = TRUE	RecordMode = MULTIPLE, 24	StreamIntervalSeconds = 0
	RecordThumbNails = TRUE	StreamMaxFPS = 0
		StreamRecord = 0

**Fig. 4**



**Fig. 5**

**Fig. 6**

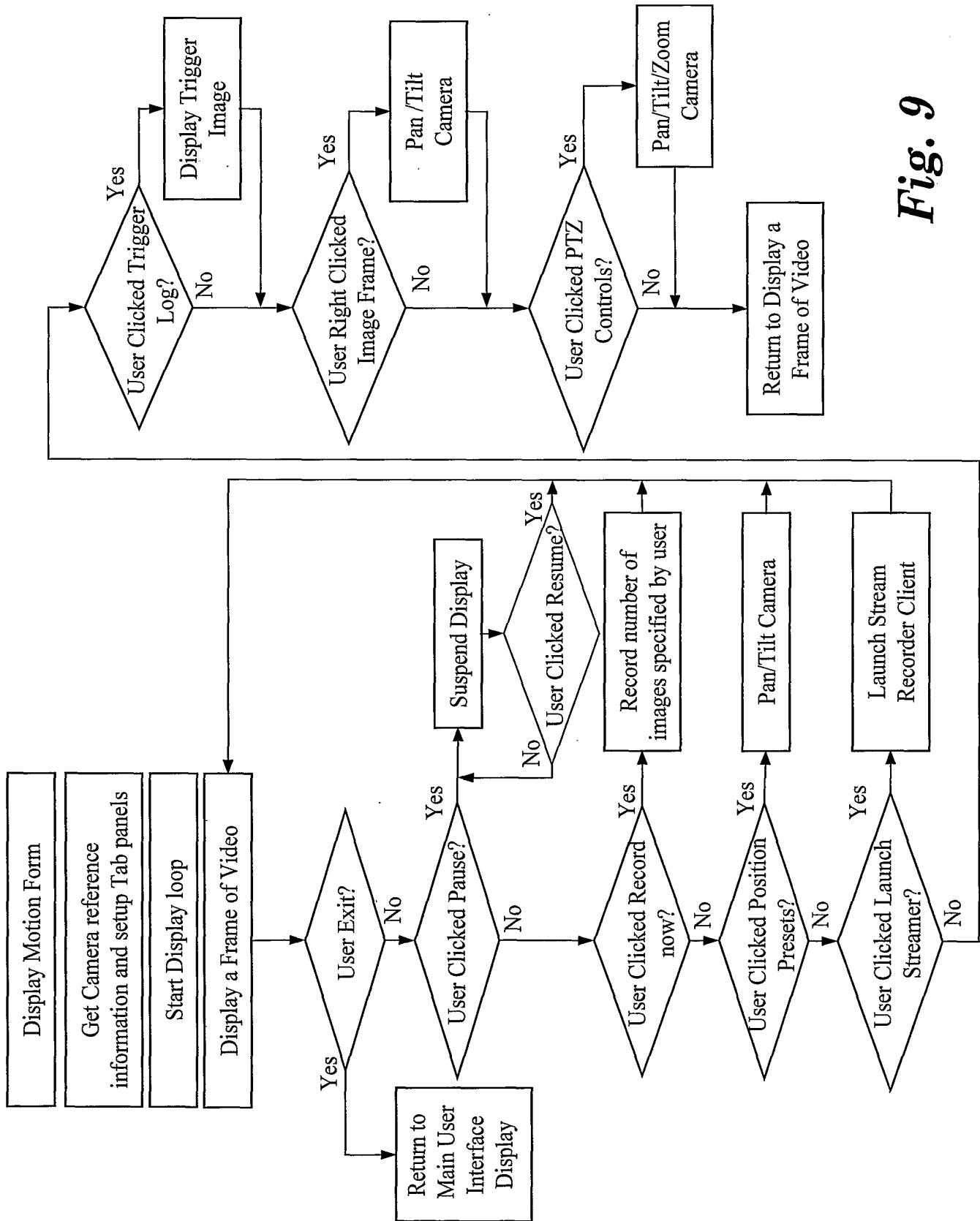


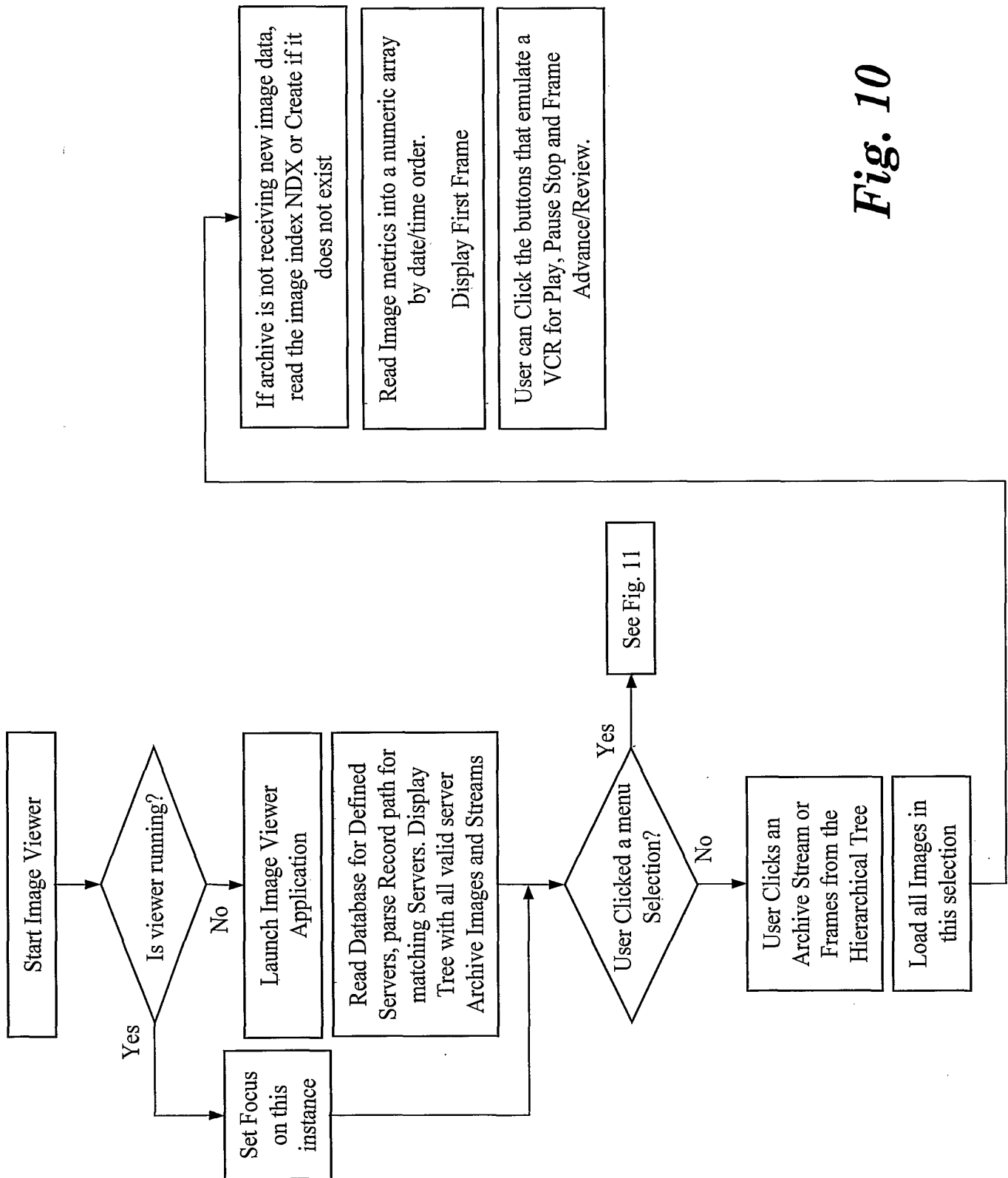
Server Setup Tabs			
Connection	Switch Inputs	Relay Output	Host Scripting
Set Camera Server IP, Name, and MAC address, etc.	Set Camera Server Digital Switch Input characteristics	Set Camera Server Digital Relay Output characteristics	Set Camera Server CRON Script text for Triggering conditions

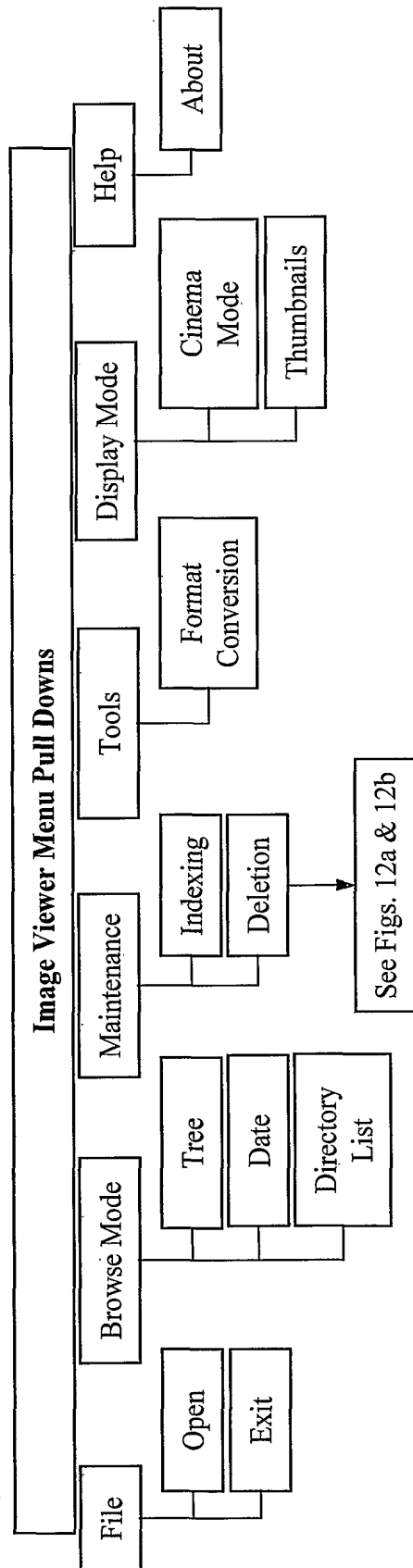
Fig. 7

Camera Setup Tabs					
Info	Presets	Displayed Image	Switch Inputs	Recording	Email
Set Camera Name, and PTZ, and reference fields	Set Camera Positional present for PTZ	Set Camera Image types for Thumbnail, Motion and record functions	Logically binds Digital outputs to a camera port for triggering requests	Set Automatic recording options for interval recording a camera	Set email address for email notifications
					Performance
					Set optional User IDs to use with limited bandwidth settings

Fig. 8

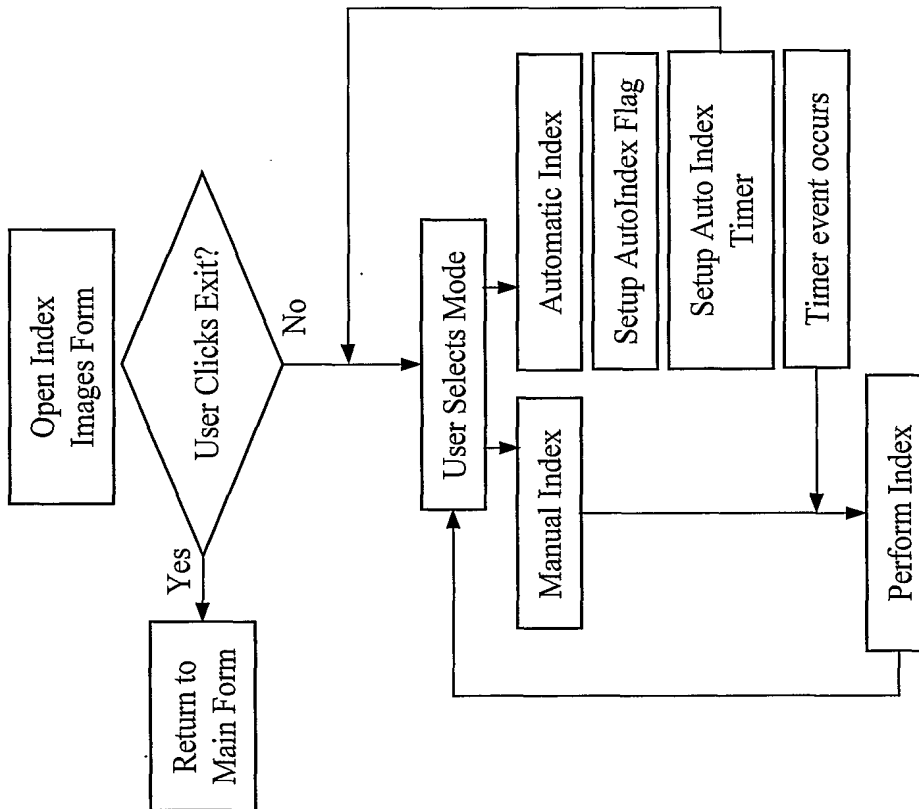
**Fig. 9**

**Fig. 10**



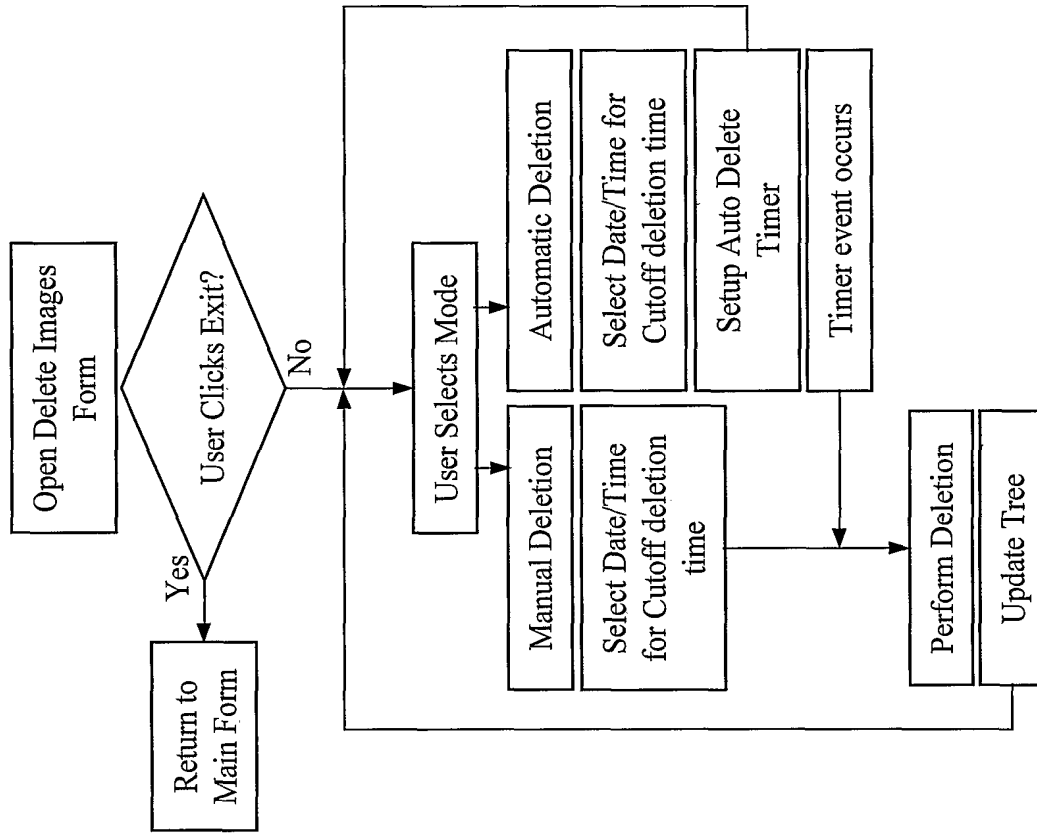
**Fig. 11**

### AutoIndex Menu Selection

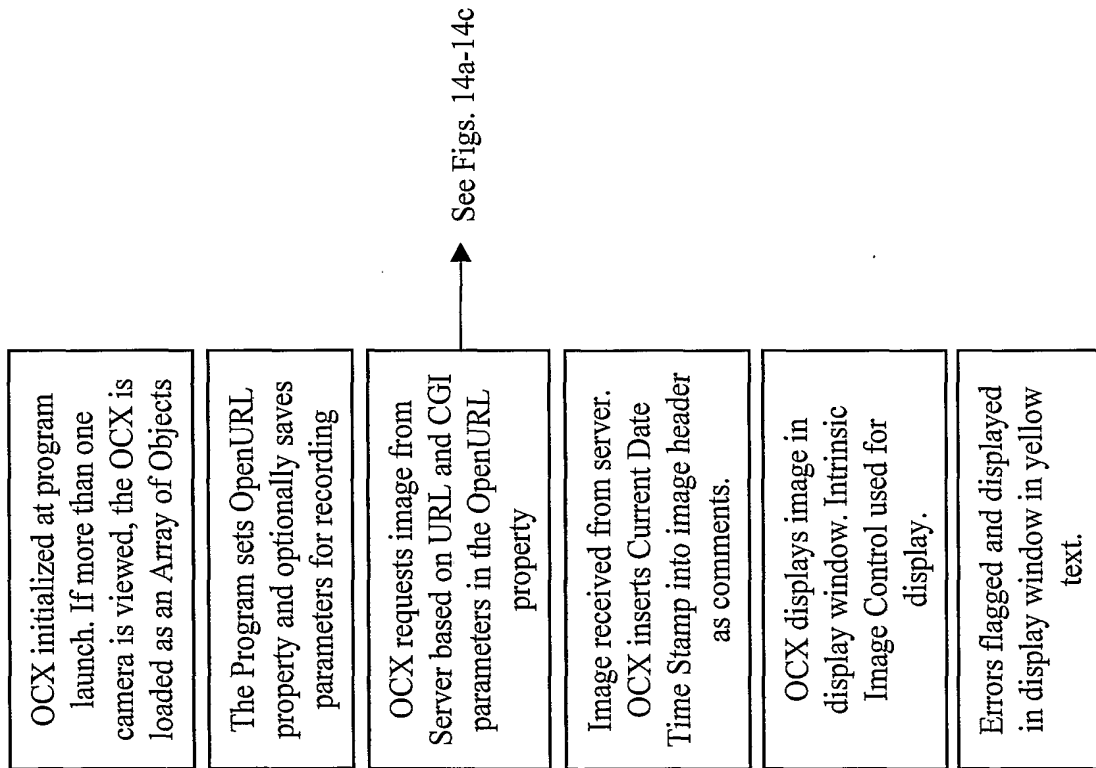


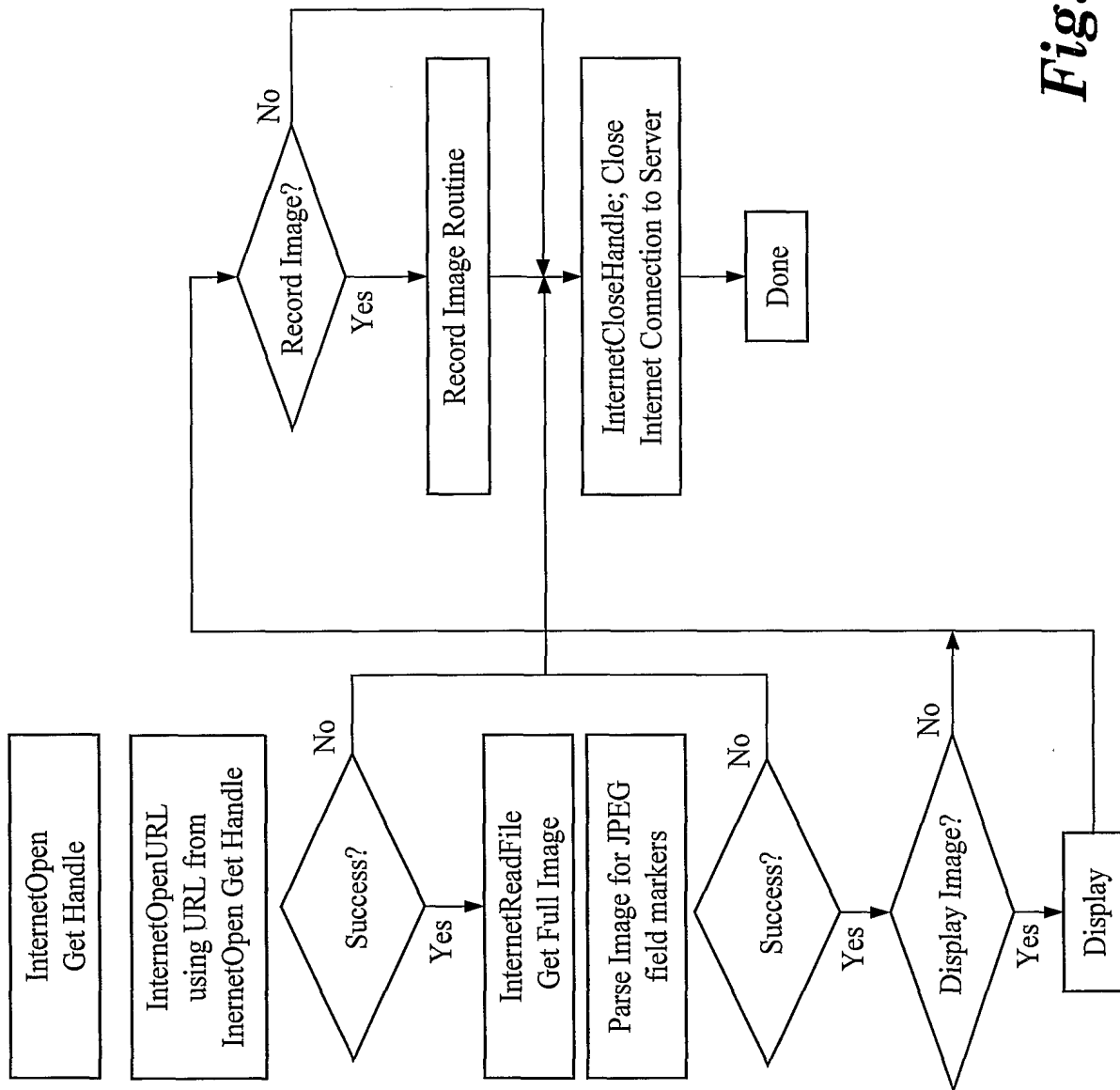
**Fig. 12a**

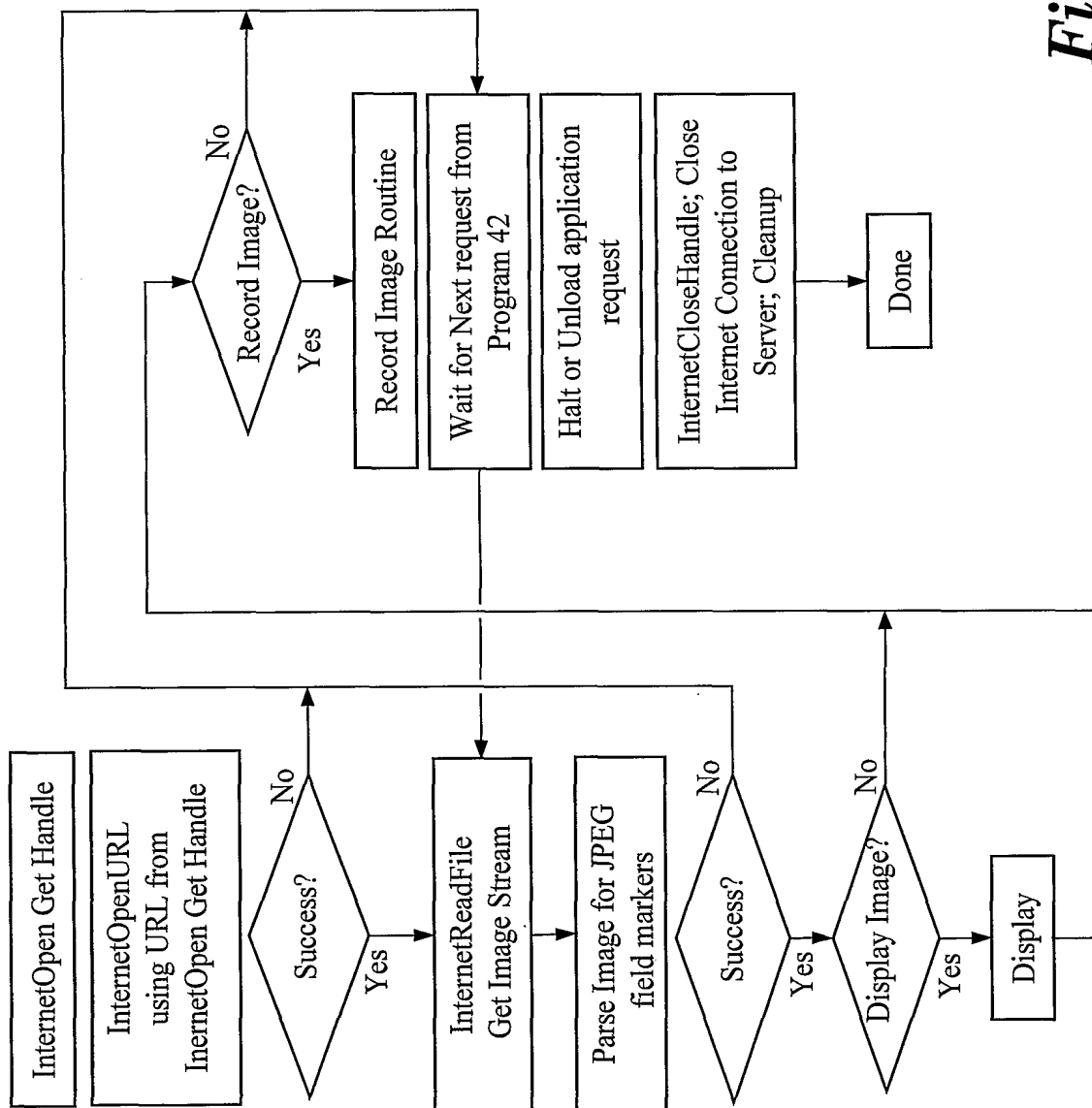
### Deletion Menu Selection



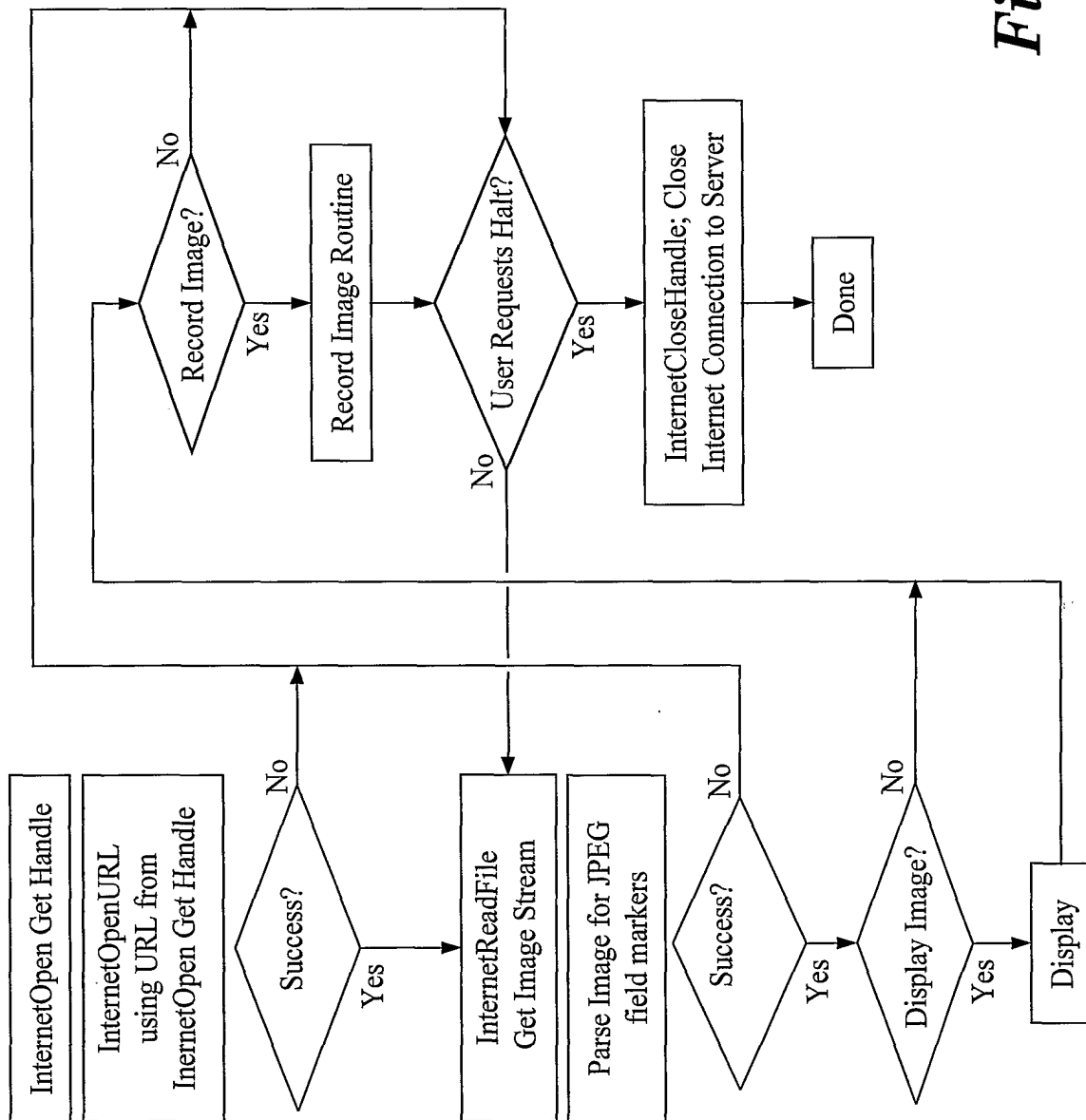
**Fig. 12b**

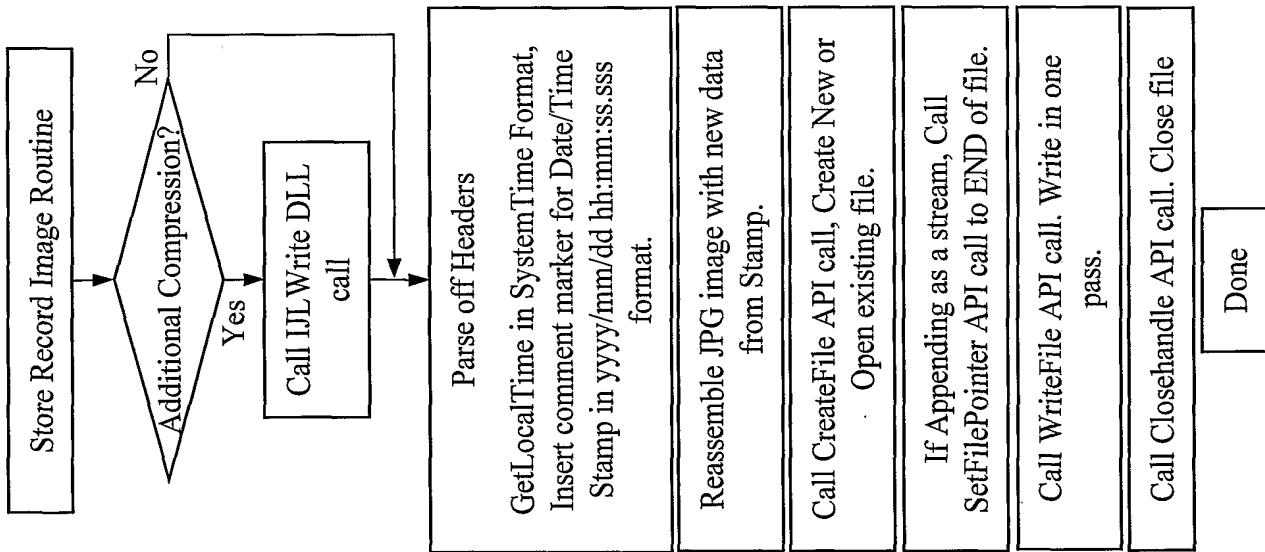
**Fig. 13**

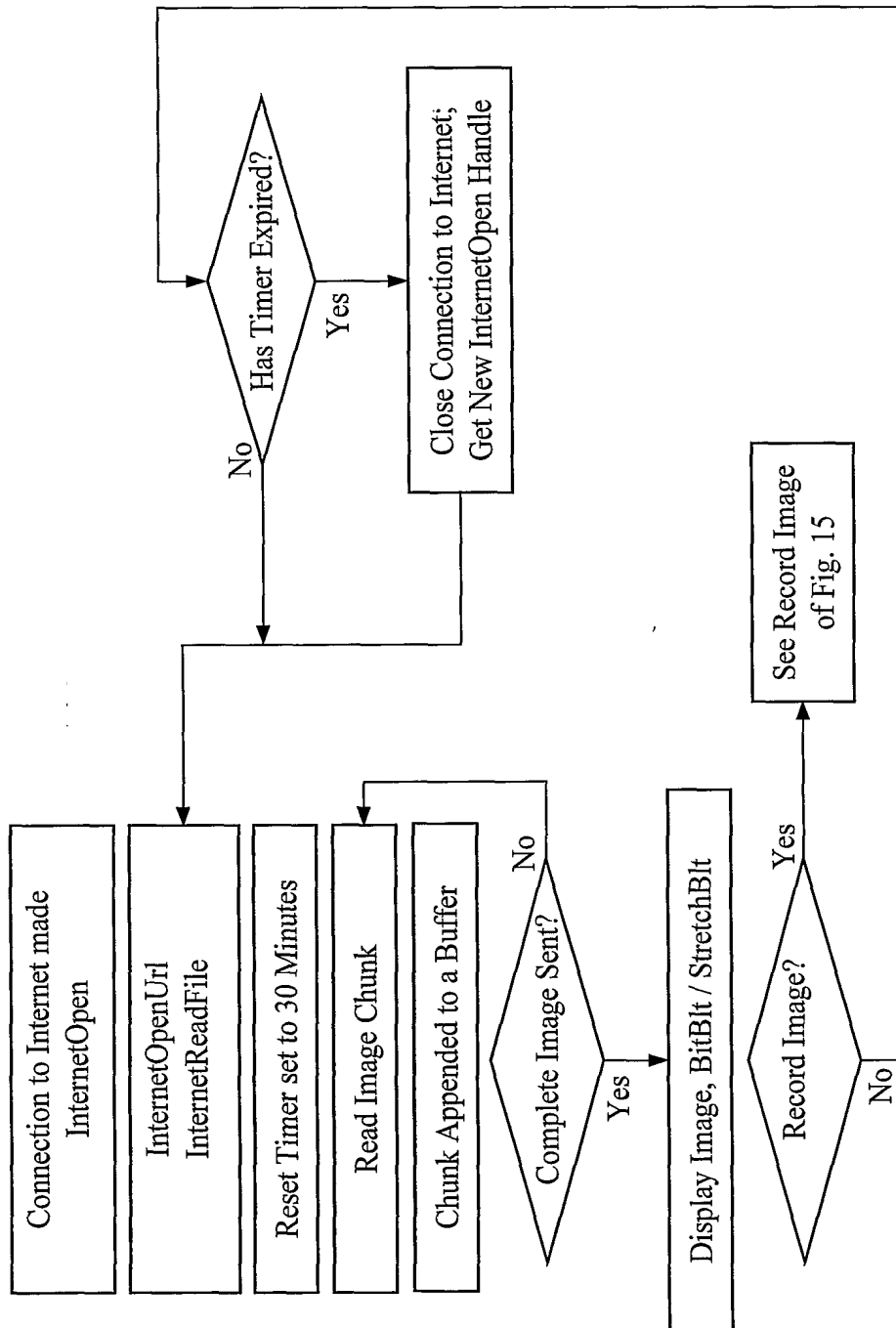
**Fig. 14a**

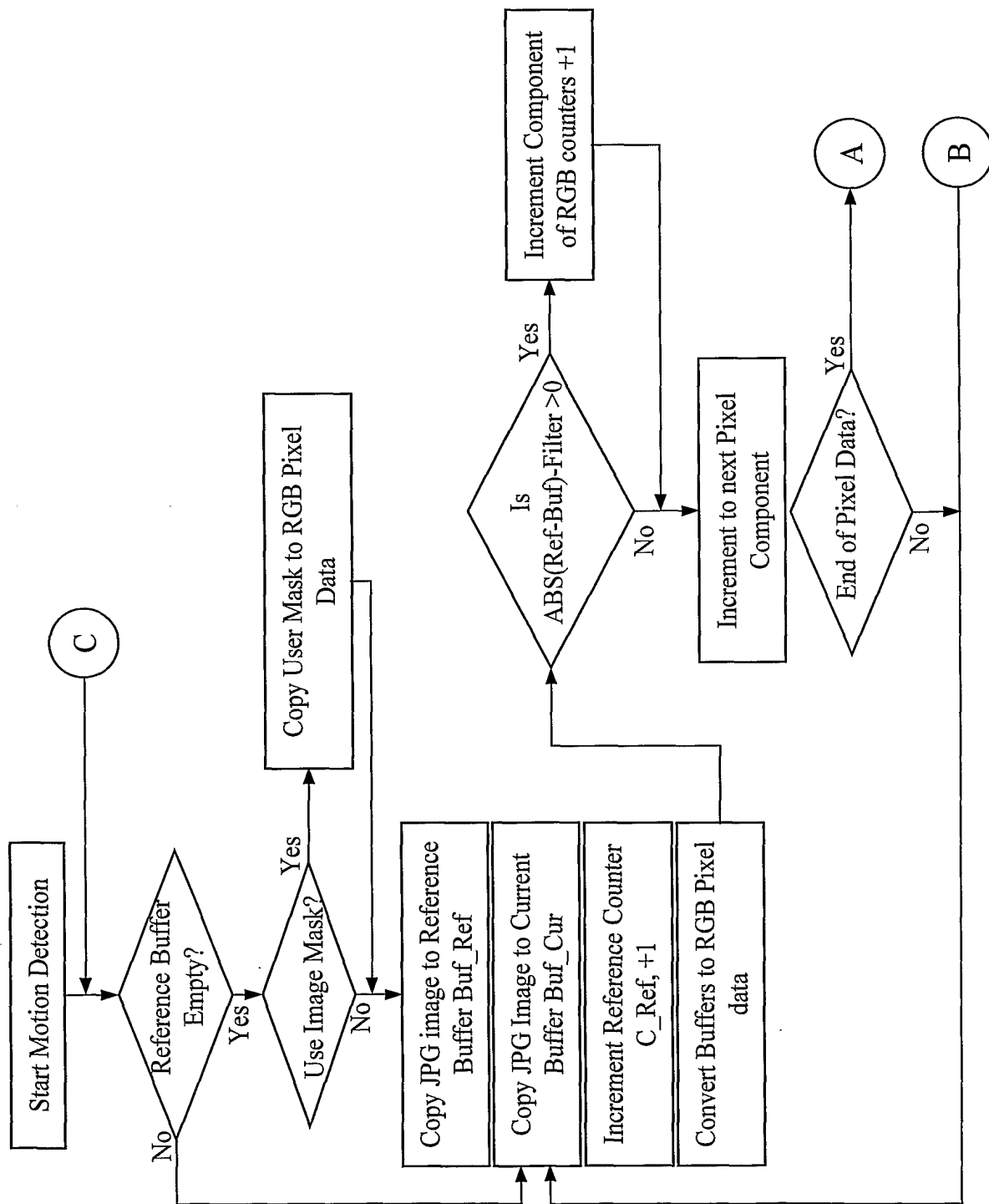
*Fig. 14b*

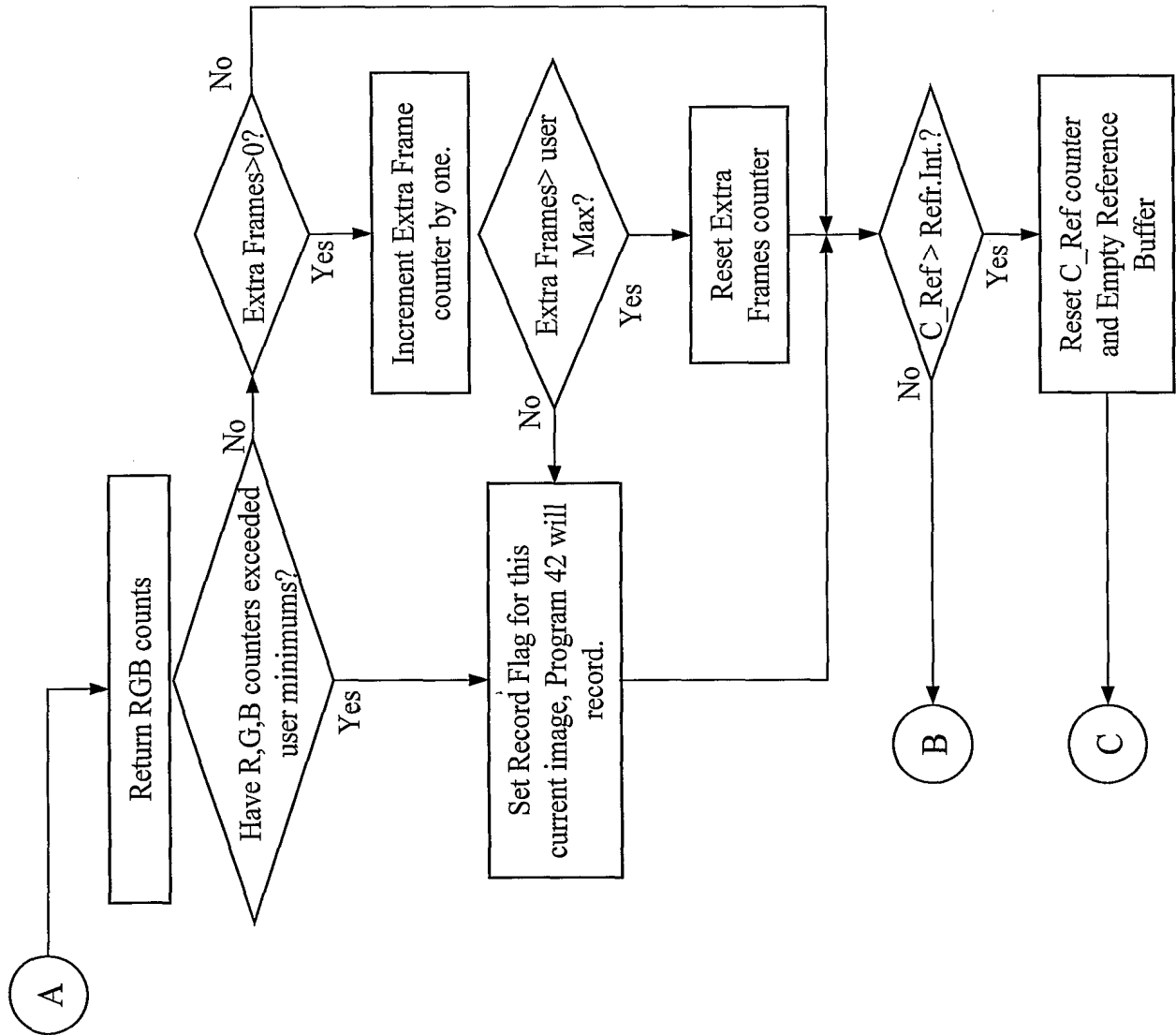


**Fig. 14c**

**Fig. 15**

**Fig. 16**

*Fig. 17a*

**Fig. 17b**

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/08133

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 15/16, H04N 1/40, 1/387, G09G 3/00, G06F 11/00, 15/00  
US CL : 709/217, 247; 358/448, 450, 453; 345/30; 382/254; 702/188, 172

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 709/217, 247; 358/448, 450, 453; 702/192; 382/254

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
STN

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,002,995 A (SUZUKI et. al.) 14 December 1999, col. 3, lines 57-col. 4, lines 4, col. 4, lines 30-34, and 48-65, col. 6, lines 13-32, col. 5, line 44-col. 5, line 67, col. 7, lines 14-37, col. 7, line 65-col. 8, line 17, col. 8, lines 36-47.	1-30 and 50-62
Y	US 5,724,475 A (KIRSTEN) 03 March 1998, col. 9, line 56-61, col. 11, lines 37-60, col. 3, lines 16-19, and 53-62, col. 9, lines 16-39, and 45-62, col. 8/lines 30-41, col. 9, lines 53-6, col. 3, lines 16-20, and 53-62.	1-30 and 50-62

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier document published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

27 JUNE 2001

Date of mailing of the international search report

26 JUL 2001

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

BEATRIZ PRIETO

Telephone No. (703) 305-0750

*James R. Matthews*

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/08133

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
1-30 and 50-62

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/08133

## BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

2. This international search authority has found two (2) inventions claimed in the international application by claims indicated below:

This application contains the following inventions or groups of inventions, which are not linked as to form a single inventive concept under PCT rule 13.1. In order for all the invention to be searched, the appropriate additional search fees are required.

Group I, claims 1-30 and 50-62; are drawn to a computer readable medium for use by a computer in providing an interface to multiple cameras accessible to the computer via a network, comprising means for; selectively accessing/storing/compressing camera data uniquely identifying the cameras generate a user interface display having a display window for displaying image received from each of the cameras accessed over the network.

Group II, claims 31-49; are drawn to a computer readable medium for use by a computer in detecting motion in a sequence of color video images received by the computer, comprising means for; select one of the video images as a reference image and another of the video images as a selected image to be compared to the reference image; performing pixel comparisons using the color component values and to generate a motion detect signal when the difference in color component values for corresponding pixels from the reference and selected images differ by more than a preselected amount.

3. The inventions listed as Groups I-II do not relate to a single invention concept under PCT Rule 13.1 because under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

a) *the technical features of the Group I invention* are specific to a computer readable medium for use by a computer in providing an interface to multiple cameras accessible to the computer via a network, comprising means for; selectively accessing/storing/compressing camera data uniquely identifying the cameras generate a user interface display having a display window for displaying image received from each of the cameras accessed over the network, as mentioned above, *and are independent and distinct from the technical features of the Group II invention*, which are specific to a computer readable medium for use by a computer in detecting motion in a sequence of color video images received by the computer, comprising means for; select one of the video images as a *reference image* and another of the video images as a selected image to be compared to the reference image; performing pixel comparisons using the color component values and to generate a motion detect signal when the difference in color component values for corresponding pixels from the reference and selected images differ by more than a preselected amount, as mentioned above.



# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/08133

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 15/16, H04N 1/40, 1/387, G09G 3/00, G06F 11/00, 15/00  
US CL : 709/217, 247; 358/448, 450, 453; 345/30; 382/254; 702/188, 172

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## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 709/217, 247; 358/448, 450, 453; 702/192; 382/254

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
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Date of the actual completion of the international search

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*James R. Matthews*

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International application No.  
PCT/US01/08133

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because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

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This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

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2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
1-30 and 50-62

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/08133

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Group I, claims 1-30 and 50-62; are drawn to a computer readable medium for use by a computer in providing an interface to multiple cameras accessible to the computer via a network, comprising means for; selectively accessing/storing/compressing camera data uniquely identifying the cameras generate a user interface display having a display window for displaying image received from each of the cameras accessed over the network.

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3. The inventions listed as Groups I-II do not relate to a single invention concept under PCT Rule 13.1 because under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

a) *the technical features of the Group I invention* are specific to a computer readable medium for use by a computer in providing an interface to multiple cameras accessible to the computer via a network, comprising means for; selectively accessing/storing/compressing camera data uniquely identifying the cameras generate a user interface display having a display window for displaying image received from each of the cameras accessed over the network, as mentioned above, *and are independent and distinct from the technical features of the Group II invention*, which are specific to a computer readable medium for use by a computer in detecting motion in a sequence of color video images received by the computer, comprising means for; select one of the video images as a *reference image* and another of the video images as a selected image to be compared to the reference image; performing pixel comparisons using the color component values and to generate a motion detect signal when the difference in color component values for corresponding pixels from the reference and selected images differ by more than a preselected amount, as mentioned above.

Date: 02/18/10

Approved for use through 7/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875						Application or Docket Number <b>12/708,394</b>	
<b>APPLICATION AS FILED – PART I</b>							
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	<b>82</b>	N/A	
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A		N/A	<b>270</b>	N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	<b>110</b>	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	<b>3</b>	minus 20 =		x\$26		x\$52	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	<b>3</b>	minus 3 =		x\$110		x\$220	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$260 (\$130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				195		390	
* If the difference in column 1 is less than zero, enter "0" in column 2.				<b>TOTAL</b>	<b>462</b>	<b>TOTAL</b>	
<b>APPLICATION AS AMENDED – PART II</b>							
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDI-TIONAL FEE (\$)	OR OTHER THAN SMALL ENTITY
Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR X =
Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR X =
Application Size Fee (37 CFR 1.16(s))							OR
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR N/A
					<b>TOTAL</b>		OR <b>TOTAL</b>
					ADD'T FEE		OR ADD'T FEE
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDI-TIONAL FEE (\$)	OR OTHER THAN SMALL ENTITY
Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR X =
Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR X =
Application Size Fee (37 CFR 1.16(s))							OR
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR N/A
					<b>TOTAL</b>		OR <b>TOTAL</b>
					ADD'T FEE		OR ADD'T FEE
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.							

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
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P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/708,394	02/18/2010	Joseph Robert Marchese	1883-3001-7

CONFIRMATION NO. 4367

FORMALITIES LETTER



29318  
JAMES D. STEVENS  
REISING ETHINGTON P.C.  
P.O. BOX 4390  
TROY, MI 48099

Date Mailed: 03/04/2010

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted*

**Items Required To Avoid Abandonment:**

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The oath or declaration is missing.

*A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.*

*Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.*

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of **\$65** for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this notice.

**SUMMARY OF FEES DUE:**

Total additional fee(s) required for this application is **\$65** for a small entity

- **\$65** Surcharge.

Replies should be mailed to:

Mail Stop Missing Parts  
Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.  
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/jmilani/

---

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/708,394	02/18/2010	2624	462	1883-3001-7	3	3

**CONFIRMATION NO. 4367**

29318

JAMES D. STEVENS  
REISING ETHINGTON P.C.  
P.O. BOX 4390  
TROY, MI 48099

**FILING RECEIPT**



\*OC000000040387726\*

Date Mailed: 03/04/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

## Applicant(s)

Joseph Robert Marchese, Ray, MI;

**Power of Attorney:** None

## Domestic Priority data as claimed by applicant

This application is a CON of 11/125,795 05/10/2005  
which is a CON of 09/808,543 03/14/2001 PAT 6,891,566  
which claims benefit of 60/189,162 03/14/2000

## Foreign Applications

**If Required, Foreign Filing License Granted:** 03/02/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/708,394**

**Projected Publication Date:** To Be Determined - pending completion of Missing Parts

**Non-Publication Request:** No

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS

**Preliminary Class**

382

**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

#### **NOT GRANTED**

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Please type a plus sign (+) inside this box →



PTO/SB/01 (10-00)

Approved for use through 10/31/2002. OMB 0651-0032  
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**DECLARATION FOR UTILITY OR  
DESIGN  
PATENT APPLICATION  
(37 CFR 1.63)**

☒ Declaration Submitted With Initial Filing  
OR  
☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	P-3001-2 JDS
First Named Inventor	Joseph Robert Marchese
<b>COMPLETE IF KNOWN</b>	
Application Number	/
Filing Date	Herewith
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS**

the specification of which (Title of the Invention)

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY) as United States Application Number or PCT International

Application Number and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY) Country	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.
60/189,162	03/14/2000	

[Page 1 of 2]

Burden Hour Statement: This form is estimated to take 21 minutes to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

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+

PTO/SB/01 (10-00)

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## DECLARATION — Utility or Design Patent Application

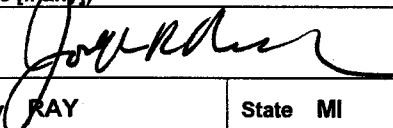
Direct all correspondence to: ☒ Customer Number or Bar Code Label **23399** OR ☐ Correspondence address below

<b>Name</b>			
<b>Address</b>			
<b>Address</b>			
<b>City</b>		<b>State</b>	<b>ZIP</b>
<b>Country</b>	<b>Telephone</b>		<b>Fax</b>

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**NAME OF SOLE OR FIRST INVENTOR**

☐ A petition has been filed for this unsigned inventor

<b>Given Name</b> (first and middle [if any]) <b>JOSEPH ROBERT</b>		<b>Family Name</b> or Surname <b>MARCHESE</b>	
<b>Inventor's Signature</b> 			<b>Date</b> 3/14/01
<b>Residence: City</b> <b>RAY</b>	<b>State</b> <b>MI</b>	<b>Country</b> <b>USA</b>	<b>Citizenship</b> <b>USA</b>

**Mailing Address** **59992 RAY CENTER ROAD**

**Mailing Address**

<b>City</b> <b>RAY</b>	<b>State</b> <b>MI</b>	<b>ZIP</b> <b>48096</b>	<b>Country</b> <b>USA</b>
------------------------	------------------------	-------------------------	---------------------------

**NAME OF SECOND INVENTOR**

☐ A petition has been filed for this unsigned inventor

<b>Given Name</b> (first and middle [if any])		<b>Family Name</b> or Surname	
<b>Inventor's Signature</b>			<b>Date</b>
<b>Residence: City</b>	<b>State</b>	<b>Country</b>	<b>Citizenship</b>

**Mailing Address**

**Mailing Address**

<b>City</b>	<b>State</b>	<b>ZIP</b>	<b>Country</b>
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☐ Additional inventors are being named on the \_\_\_\_\_ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	12708394			
<b>Filing Date:</b>	18-Feb-2010			
<b>Title of Invention:</b>	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS			
<b>First Named Inventor/Applicant Name:</b>	Joseph Robert Marchese			
<b>Filer:</b>	James D. Stevens/Sue Wilson			
<b>Attorney Docket Number:</b>	1883-3001-7			
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
Late filing fee for oath or declaration	2051	1	65	65
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				65

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	7528343
<b>Application Number:</b>	12708394
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4367
<b>Title of Invention:</b>	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS
<b>First Named Inventor/Applicant Name:</b>	Joseph Robert Marchese
<b>Customer Number:</b>	29318
<b>Filer:</b>	James D. Stevens/Sue Wilson
<b>Filer Authorized By:</b>	James D. Stevens
<b>Attorney Docket Number:</b>	1883-3001-7
<b>Receipt Date:</b>	30-APR-2010
<b>Filing Date:</b>	18-FEB-2010
<b>Time Stamp:</b>	16:27:10
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$65
RAM confirmation Number	3285
Deposit Account	500852
Authorized User	STEVENS,JAMES D

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Oath or Declaration filed	Declaration-signed.pdf	113466 131fc074f281cf47eaababca273a9e95994b cd0b	no	2
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	30515 a7bd979c36bed767894e21dbd7b60e9666 350e6c	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			143981		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>            If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>            If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>            If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/708,394	02/18/2010	2624	527	1883-3001-7	3	3

**CONFIRMATION NO. 4367**

**UPDATED FILING RECEIPT**



29318  
JAMES D. STEVENS  
REISING ETHINGTON P.C.  
P.O. BOX 4390  
TROY, MI 48099

Date Mailed: 05/10/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Applicant(s)**

Joseph Robert Marchese, Ray, MI;

**Power of Attorney:** None

**Domestic Priority data as claimed by applicant**

This application is a CON of 11/125,795 05/10/2005 ABN  
which is a CON of 09/808,543 03/14/2001 PAT 6,891,566  
which claims benefit of 60/189,162 03/14/2000

**Foreign Applications**

**If Required, Foreign Filing License Granted:** 03/02/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/708,394**

**Projected Publication Date:** 08/19/2010

**Non-Publication Request:** No

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***



**Title**

DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS

**Preliminary Class**

382

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/708,394	02/18/2010	Joseph Robert Marchese	1883-3001-7

**CONFIRMATION NO. 4367**

## PUBLICATION NOTICE



\*OC000000043118896\*

29318  
JAMES D. STEVENS  
REISING ETHINGTON P.C.  
P.O. BOX 4390  
TROY, MI 48099

**Title:**DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS

**Publication No.**US-2010-0212024-A1

**Publication Date:**08/19/2010

## NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at [www.uspto.gov](http://www.uspto.gov). The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at [www.uspto.gov](http://www.uspto.gov) using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/708,394

02/18/2010

Joseph Robert Marchese

1883-3001-7

4367

29318 7590 12/02/2011

JAMES D. STEVENS  
REISING ETHINGTON P.C.  
P.O. BOX 4390  
TROY, MI 48099

EXAMINER

CERVETTI, DAVID GARCIA

ART UNIT

PAPER NUMBER

2436

MAIL DATE

DELIVERY MODE

12/02/2011

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	12/708,394	MARCHESE, JOSEPH ROBERT	
	<b>Examiner</b>	<b>Art Unit</b>	
	David García Cervetti	2436	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 5) ☒ Claim(s) 1-3 is/are pending in the application.
- 5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1-3 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 18 February 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/18/10</u> .   | 6) <input type="checkbox"/> Other: ____.                          |

### DETAILED ACTION

1. Claims 1-3 are pending and have been examined.

#### *Specification*

2. The disclosure is objected to because of the following informalities: the reference to application numbers provided in page 1 needs to be updated to reflect applications that have matured into patents. Appropriate correction is required.

#### *Double Patenting*

3. Claims 1-3 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-54 of Patent No. 6891566. Although the conflicting claims are not identical, they are not patentably distinct from each other because

- “A method of controlling access by a computer to a video server, comprising the steps of: sending a request from a client computer to a video server over a network; receiving from the video server a unique number stored in the video server, wherein the unique number is received by the client computer over the network; determining that access to the video server is authorized by comparing the unique number received by the client computer to one or more authorized unique numbers; in response to the determination, obtaining at the client computer one or more images from the video server; and displaying the one or more images on a screen display of the client computer” (**claim 1, instant application**) is analogous to

- “A computer readable medium for use by a computer in providing an interface to multiple cameras via one or more video servers accessible to the computer via a network, comprising: a digital storage device; a user interface program stored on said digital storage device in computer readable form, said program being operable upon execution by the computer to access server data uniquely identifying each video server and to attempt access to the video servers over the network, said program also being operable to obtain from each of the accessible video servers a hardware address stored in the video server; wherein said program is further operable to validate the hardware addresses received from the video servers using the server data and, for those video servers having valid hardware address, said program is operable to generate a user interface display on the computer that includes a display window for each of the cameras accessed via the validated servers over the network and to display in each of the display windows an image received from the camera associated with that display window” (**claim 1, patent 6891566**).

4. This is a provisional obviousness-type double patenting rejection because the conflicting claims of the instant application have not in fact been patented.

5. The claims of the conflicting patents and/or applications contain every element of claims 1-3 of the instant application and thus anticipate the claims of the instant application. Claims 1-3 of the instant application therefore are not patently distinct from the copending application claims and as such are unpatentable for obvious-type double

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patenting. A later patent/application claim is not patentably distinct from an earlier claim if the later claim is anticipated by the earlier claim.

6. “A later patent claim is not patentably distinct from an earlier patent claim if the later claim is obvious over, or anticipated by, the earlier claim. In re Longi, 759 F.2d at 896, 225 USPQ at 651 (affirming a holding of obviousness-type double patenting because the claims at issue were obvious over claims in four prior art patents); In re Berg, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (affirming a holding of obviousness-type double patenting where a patent application claim to a genus is anticipated by a patent claim to a species with that genus). “ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001).

7. “Claim 12 and Claim 13 are generic to the species of invention covered by claim 3 of the patent. Thus, the generic invention is “anticipated” by the species of the patented invention. Cf., Titanium Metals Corp. v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (holding that an earlier species disclosure in the prior art defeats any generic claim) 4. This court’s predecessor has held that, without a terminal disclaimer, the species claims preclude issuance of the generic claim. In re Van Ornum, 686 F.2d 937, 944, 214 USPQ 761, 767 (CCPA 1982); Schneller, 397 F.2d at 354. Accordingly, absent a terminal disclaimer, claims 12 and 13 were properly rejected under the doctrine of obviousness-type double patenting.” (In re Goodman (CA FC) 29 USPQ2d 2010 (12/3/1993).

### ***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. **Claim 3 is rejected under 35 U.S.C. 102(b) as being anticipated by Coley (5790664).**

**Regarding claim 3, Coley teaches**



A method of licensing a computer program on a per-device basis to prevent unauthorized use of the computer program with hardware devices, comprising the steps of: identifying one or more authorized hardware devices, each having a MAC address; providing a computer program in computer readable form, wherein the computer program is operable upon execution by a computer to permit a user of the computer to input network address information concerning a specific hardware device accessible to the computer via a network (col.4, lines 20-67, license program to hardware address or ip address);

embedding the MAC address(es) of the authorized hardware device(s) into the computer program; and licensing the computer program to a user based on the number of MAC addresses embedded in the computer program (col.5-6, license record in client and validating license).

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**11. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sistanizadeh (5790548), and further in view of Borsato (6895511).**

**Regarding claims 1 and 2,** Sistanizadeh teaches

A method of controlling access by a computer to a video server, comprising the steps of:

sending a request from a client computer to a video server over a network;  
receiving from the video server a unique number stored in the video server, wherein the unique number is received by the client computer over the network (col.9, line 60-col.10, line 15, MAC authenticated, IP sent to machine);

Sistanizadeh does not expressly disclose, however Borsato teaches determining that access to the video server is authorized by comparing the unique number received by the client computer to one or more authorized unique numbers; in response to the determination, obtaining at the client computer one or more images from the video server; and displaying the one or more images on a screen display of the client computer (summary, col.3-4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to authenticate entities according to Borsato's teachings in the system of Sistanizadeh. One of ordinary skill in the art would have been motivated to perform such a modification to increase security of transactions (Borsato, abstract, col.3-4).

***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Garcia Cervetti whose telephone number is (571)272-5861. The examiner can normally be reached on Monday-Tuesday and Thursday-Friday.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nasser Moazzami can be reached on (571)272-4195. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

14. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David García Cervetti/  
Primary Examiner, Art Unit 2436

<b>Notice of References Cited</b>	Application/Control No. 12/708,394		Applicant(s)/Patent Under Reexamination MARCHESE, JOSEPH ROBERT	
	Examiner David García Cervetti		Art Unit 2436	Page 1 of 1

#### U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,649,185 A	07-1997	Antognini et al.	726/2
*	B	US-5,790,664 A	08-1998	Coley et al.	709/203
*	C	US-5,790,548 A	08-1998	Sistanizadeh et al.	370/401
*	D	US-5,903,762 A	05-1999	Sakamoto et al.	717/178
*	E	US-6,101,182 A	08-2000	Sistanizadeh et al.	370/352
*	F	US-2001/0011253 A1	08-2001	COLEY et al.	705/59
*	G	US-6,452,925 B1	09-2002	Sistanizadeh et al.	370/352
*	H	US-6,574,612 B1	06-2003	Baratti et al.	705/59
*	I	US-2004/0030926 A1	02-2004	Clark, James R.	713/201
*	J	US-6,760,324 B1	07-2004	Scott et al.	370/352
*	K	US-6,895,511 B1	05-2005	Borsato et al.	726/5
*	L	US-7,136,838 B1	11-2006	Peinado et al.	705/59
	M	US-			


#### FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

#### NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<b>Search Notes</b>  	<b>Application/Control No.</b>  12708394	<b>Applicant(s)/Patent Under Reexamination</b>  MARCHESE, JOSEPH ROBERT
	<b>Examiner</b>  David García Cervetti	<b>Art Unit</b>  2436

SEARCHED			
Class	Subclass	Date	Examiner
726	27	11/29/2011	DGC

SEARCH NOTES		
Search Notes	Date	Examiner
inventor name search, acm, ieee, springer, google, scholar, east history attached	11/29/2011	DGC

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

	/David García Cervetti/ Primary Examiner.Art Unit 2436
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# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

Application Number

Filing Date

First Named Inventor

Joe Robert Marchese

Art Unit

Examiner Name

Attorney Docket Number

1883-3001-7

## **U.S.PATENTS**

[Remove](#)

Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	4814869		1989-03-21	Oliver	
	2	4991193		1991-02-05	Cecil, et al.	
	3	5311306		1994-05-10	Tanaka, et al.	
	4	5512974		1996-04-30	Abe, et al.	
	5	5561476		1996-10-01	Kershaw, et al.	
	6	5625410		1997-04-29	Washino, et al.	
	7	5724475		1998-03-03	Kirsten	
	8	5761655		1998-06-02	Hoffman	

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12708394 - GAU: 2436
Filing Date	
First Named Inventor	Joe Robert Marchese
Art Unit	
Examiner Name	
Attorney Docket Number	1883-3001-7

9	5786872		1998-07-28	Miyazaki, et al.	
10	5805801		1998-09-08	Holloway, et al.	
11	5861924		1999-01-19	Pan, et al.	
12	6002428		1999-12-14	Matsumura, et al.	
13	6002995		1999-12-14	Suzuki, et al.	
14	6092078		2000-07-18	Adolfsson	
15	6115035		2000-09-05	Compton, et al.	
16	6175622		2001-01-16	Chiniwala, et al.	
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18	6233428		2001-05-15	Fryer	
19	6269309		2001-07-31	Buckingham	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12708394 - GAU: 2436	
	Filing Date			
	First Named Inventor	Joe Robert Marchese		
	Art Unit			
	Examiner Name			
	Attorney Docket Number	1883-3001-7		

	20	6396533		2002-05-28	Hudson	
	21	6516340		2003-02-04	Boys	
	22	6583813		2003-06-24	Enright, et al.	
	23	6891566		2005-05-10	Marchese	

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	1	20010008014		2001-07-12	Farrell, et al.	
	2	20050200714		2005-09-15	Marchese	
	3	20060106729		2006-05-18	Roberts,Jr.	

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12708394 - GAU: 2436	
	Filing Date			
	First Named Inventor	Joe Robert Marchese		
	Art Unit			
	Examiner Name			
	Attorney Docket Number	1883-3001-7		

1	JP2004178565	JP		2004-06-24	Suga, et al.	English Abstract included	<input type="checkbox"/>
2	GB2329541	GB		1999-03-24	Sony UK Ltd.		<input type="checkbox"/>
3	WO98/34360	WO		1998-08-06	Intellect Network Technologies		<input type="checkbox"/>
4	WO01/69405	WO		2001-09-20	Marchese		<input type="checkbox"/>

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	1	International Search Report for PCT/US01/08133, 26 July 2001, 3 pages	<input type="checkbox"/>
	2	Supplemental European International Search Report for EP 01 91 6650, 4 February 2009, 1 page	<input type="checkbox"/>
	3	BISDIKIAN et al. "On the Effectiveness of Priorities in Token Ring for Multimedia Traffic," in Proc. 18th Annual Conference Local Computer Networks, Minneapolis, MN, Sept. 1993, pp. 25-31	<input type="checkbox"/>
	4	A Brief History of the Cygwin Project, retrieved from <a href="http://cygwin.com/history.html">http://cygwin.com/history.html</a> , June 14, 2994, 18 pages	<input type="checkbox"/>
	5	MARSHALL K. MCKUSICK, et al. "A Fast File System for UNIX," ACM Transactions on Computer Systems, Vol. 2, No. 3, August 1984, Pages 181-187	<input type="checkbox"/>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12708394 - GAU: 2436	
	Filing Date			
	First Named Inventor	Joe Robert Marchese		
	Art Unit			
	Examiner Name			
	Attorney Docket Number	1883-3001-7		

6	AR(4) Man Page, retrieved Sept. 2, 2003 from <a href="http://docs.sun.com/db/doc/801-6680-01/6i11qc0ml?a=view">http://docs.sun.com/db/doc/801-6680-01/6i11qc0ml?a=view</a> , 4 pages	<input type="checkbox"/>
7	Tar(1) Man Page for Solaris 2.4, retrieved Sept. 2, 2003 from <a href="http://docs.sun.com/db/doc/801-6680-01/6i11qc0ml?a=view">http://docs.sun.com/db/doc/801-6680-01/6i11qc0ml?a=view</a> , 8 pages	<input type="checkbox"/>
8	AR(1) Man Page, retrieved Sept. 2, 2003 from <a href="http://docs.sun.com/db/doc/801-6680-01/6i11qc0ml?a=view">http://docs.sun.com/db/doc/801-6680-01/6i11qc0ml?a=view</a> , 3 pages	<input type="checkbox"/>
9	Beausoft Main Page Archive (February 29, 2000), retrieved from <a href="http://web.archive.org/web/2000229205711/http://beausoft.com/">http://web.archive.org/web/2000229205711/http://beausoft.com/</a> , 2 pages	<input type="checkbox"/>
10	R. FIELDING, et al., "Request for Comments (RFC) 2068", Hypertext Transfer Protocol -- HTTP/1.1, January 1997, 162 pages	<input type="checkbox"/>
11	JPEG Standard, ISO/IEC IS 10918-1 ITU-T Recommendation T.81, September 1992, 186 pages	<input type="checkbox"/>
12	Webcam Watcher Online Help, Webcam Watcher Version 3.0, Copyright 2001 Beau Software, date unknown, 6 pages	<input type="checkbox"/>
13	Beausoft Webcam Watcher Description Page (February 29, 2000), retrieved from <a href="http://web.archive.org/web/2000620224026/www.webcam-watcher.com/wcwinde.html">http://web.archive.org/web/2000620224026/www.webcam-watcher.com/wcwinde.html</a> , 4 pages	<input type="checkbox"/>

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#### EXAMINER SIGNATURE

Examiner Signature	/David Garcia Cervetti/	Date Considered	11/29/2011
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<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	4436	ip adj address near6 (authenticat\$)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:33
L2	1973	ip adj address near8 (authenticat\$) near8 (server gateway proxy firewall router gatekeeper)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:34
L3	454	(client terminal device apparatus) near8 ip adj address near8 (authenticat\$) near8 (server gateway proxy firewall router gatekeeper)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:34
L4	12	(acl access near4 control near4 list) near8 ip adj address near8 (authenticat\$)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:36
L5	245	(acl access near4 control near4 list) near8 ip adj address	US-PGPUB; USPAT	OR	ON	2011/12/01 09:36
L6	1705	(client terminal device apparatus) near8 address near8 (authenticat\$) near8 (server gateway proxy firewall router gatekeeper)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:37
L7	63	(client terminal device apparatus) near8 address near8 (authenticat\$) near8 (server gateway proxy firewall router gatekeeper) and (address identifier) near5 (embed\$ stored included) near8 (application software program)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:38

L8	107	(client terminal device apparatus) near8 (address identifier) near8 (authenticat\$) near8 (server gateway proxy firewall router gatekeeper) and (address identifier) near5 (embed\$ stored included) near8 (application software program)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:41
L9	37	(license licensing) near8 (client terminal device apparatus) near8 (address identifier) near8 (validate validating authorize authorized authorizing authenticate authenticating authorization authenticat \$) near8 (server gateway proxy firewall router gatekeeper)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:57
L10	368	(license licensing) near8 (address identifier) near8 (validate validating authorize authorized authorizing authenticate authenticating authorization authenticat \$)	US-PGPUB; USPAT	OR	ON	2011/12/01 10:24
L11	25	(license licensing) near8 (address identifier) near8 (validate validating authorize authorized authorizing authenticate authenticating authorization authenticat \$) and (address identifier) near5 (embed \$ stored included) near8 (application software program)	US-PGPUB; USPAT	OR	ON	2011/12/01 10:25
L12	66	(license licensing) near8 (address identifier) near5 (embed\$ stored included) near8 (application software program)	US-PGPUB; USPAT	OR	ON	2011/12/01 10:27
L13	85	(license licensing) near8 mac near5 address	US-PGPUB; USPAT	OR	ON	2011/12/01 10:29

L14	350	(license licensing) near8 ip near5 address	US-PGPUB; USPAT	OR	ON	2011/12/01 10:31
L15	79	(license licensing) near8 ip near5 address and (address ) near8 (validate validating authorize authorized authorizing authenticate authenticating authorization authenticat \$)	US-PGPUB; USPAT	OR	ON	2011/12/01 10:32
L16	353	(license licensing) near8 (ip internet near2 protocol) near5 address	US-PGPUB; USPAT	OR	ON	2011/12/01 10:35
L17	20	(license licensing) near8 (bind binding) near6 hardware	US-PGPUB; USPAT	OR	ON	2011/12/01 10:46
L18	10	(license licensing) near8 (associate associating) near6 hardware	US-PGPUB; USPAT	OR	ON	2011/12/01 10:47
L19	229	(license licensing) near8 hardware near6 computer	US-PGPUB; USPAT	OR	ON	2011/12/01 10:47
L20	311	(license licensing) near8 hardware near6 (computer terminal client)	US-PGPUB; USPAT	OR	ON	2011/12/01 10:47
S1	2790	726/27.ccls.	US-PGPUB; USPAT	OR	ON	2011/11/29 14:31
S2	26	("20010008014"   "20050200714"   "20060106729"   "4814869"   "4991193"   "5311306"   "5512974"   "5561476"   "5625410"   "5724475"   "5761655"   "5786872"   "5805801"   "5861924"   "6002428"   "6002995"   "6092078"   "6115035"   "6175622"   "6178419"   "6233428"   "6269309"   "6396533"   "6516340"   "6583813"   "6891566").PN.	US-PGPUB; USPAT	OR	ON	2011/11/29 17:31
S3	2	("6002995" "5724475"). pn.	US-PGPUB; USPAT	OR	ON	2011/11/29 17:37
S4	5	("5805801" "4991193" "6175622" "6178419" "20010008014").pn.	US-PGPUB; USPAT	OR	ON	2011/11/29 17:40

S5	673	(validate validating authorize authorized authorizing authenticate authenticating) near5 mac near4 address	US-PGPUB; USPAT	OR	ON	2011/11/29 17:47
S6	165	(validate validating authorize authorized authorizing authenticate authenticating) near5 mac near4 address near8 (server client)	US-PGPUB; USPAT	OR	ON	2011/11/29 17:54
S7	1	"5790548".pn. and (validate validating authorize authorized authorizing authenticate authenticating) near5 address	US-PGPUB; USPAT	OR	ON	2011/11/30 11:50
S8	607	(validate validating authorize authorized authorizing authenticate authenticating) near5 (ip unique) near4 address near8 (server client)	US-PGPUB; USPAT	OR	ON	2011/11/30 11:51
S9	177	(validate validating authorize authorized authorizing authenticate authenticating) near5 (unique near3 identifier) near8 (server client)	US-PGPUB; USPAT	OR	ON	2011/11/30 11:51
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S12	1209	(authentication authenticate authenticating) near5 (ip unique) near4 address near8 (server client)	US-PGPUB; USPAT	OR	ON	2011/11/30 12:07
S13	1187	(authentication authenticate authenticating) near5 (ip ) near4 address near8 (server client)	US-PGPUB; USPAT	OR	ON	2011/11/30 12:07

S14	81	(authentication authenticate authenticating) near5 (ip ) near4 address near8 (server client) with mac	US-PGPUB; USPAT	OR	ON	2011/11/30 12:07
S15	1187	(authentication authenticate authenticating) near5 (ip ) near4 address near8 (server client)	US-PGPUB; USPAT	OR	ON	2011/11/30 12:07
S16	654	(authentication authenticate authenticating) near5 (ip ) adj address near8 (server client)	US-PGPUB; USPAT	OR	ON	2011/11/30 12:14
S17	2042	(authentication authenticate authenticating) near5 (ip ) adj address	US-PGPUB; USPAT	OR	ON	2011/11/30 12:14
S18	528	(authentication authenticate authenticating) near5 (ip ) adj address near8 server	US-PGPUB; USPAT	OR	ON	2011/11/30 12:14
S19	633	(authentication authenticate authenticating) near5 (ip ) adj address near8 (server proxy router firewall gateway)	US-PGPUB; USPAT	OR	ON	2011/11/30 12:14

**EAST Search History (Interference)**

&lt;This search history is empty&gt;

**12/1/2011 10:53:35 AM****H:\Workspaces\Workspaces\12-708-394-11-29-2011.wsp**



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
 United States Patent and Trademark Office  
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 Alexandria, Virginia 22313-1450  
 www.uspto.gov

## BIB DATA SHEET

CONFIRMATION NO. 4367

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/708,394	02/18/2010	726	2436	1883-3001-7

**APPLICANTS**  
 Joseph Robert Marchese, Ray, MI;

**\*\* CONTINUING DATA \*\*\*\*\***  
 This application is a CON of 11/125,795 05/10/2005 ABN  
 which is a CON of 09/808,543 03/14/2001 PAT 6,891,566  
 which claims benefit of 60/189,162 03/14/2000

**\*\* FOREIGN APPLICATIONS \*\*\*\*\***

**\*\* IF REQUIRED, FOREIGN FILING LICENSE GRANTED \*\* \*\* SMALL ENTITY \*\***  
 03/02/2010

Foreign Priority claimed 35 USC 119(a-d) conditions met Verified and Acknowledged	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No /DAVID GARCIA CERVETTI/ Examiner's Signature	<input type="checkbox"/> Met after Allowance DGC Initials	STATE OR COUNTRY MI	SHEETS DRAWINGS 19	TOTAL CLAIMS 3	INDEPENDENT CLAIMS 3
--	--	---	---------------------------	--------------------------	----------------------	----------------------------

**ADDRESS**  
 JAMES D. STEVENS  
 REISING ETHINGTON P.C.  
 P.O. BOX 4390  
 TROY, MI 48099  
 UNITED STATES

**TITLE**  
 DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS

<b>FILING FEE RECEIVED</b> 527	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	<input type="checkbox"/> All Fees
		<input type="checkbox"/> 1.16 Fees (Filing)
		<input type="checkbox"/> 1.17 Fees (Processing Ext. of time)
		<input type="checkbox"/> 1.18 Fees (Issue)
		<input type="checkbox"/> Other _____
		<input type="checkbox"/> Credit



<b><i>Index of Claims</i></b>  	<b>Application/Control No.</b>  12708394	<b>Applicant(s)/Patent Under Reexamination</b>  MARCHESE, JOSEPH ROBERT
	<b>Examiner</b>  David García Cervetti	<b>Art Unit</b>  2436

✓	<b>Rejected</b>	-	<b>Cancelled</b>	N	<b>Non-Elected</b>	A	<b>Appeal</b>
=	<b>Allowed</b>	÷	<b>Restricted</b>	I	<b>Interference</b>	O	<b>Objected</b>

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47			
CLAIM		DATE							
Final	Original	11/29/2011							
	1	✓							
	2	✓							
	3	✓							

**BROOKS KUSHMAN P.C.**

1000 Town Center, 22nd Floor  
Southfield, Michigan 48075-1238  
Telephone: (248) 358-4400 -- Facsimile (248) 358-3351

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JAN 23 2012

TO: UNITED STATES PATENT AND TRADEMARK OFFICE

GROUP ART UNIT: 2436

NAME: David Garcia Cervetti

FAX NO.: (571) 273-8300

SERIAL NO.: 12/708,394

OUR FILE NO.: JDSC 0100 A

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**Certificate of Transmission under 37 C.F.R. § 1.8 (FACSIMILE)**

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Number of Sheets

(including this cover): 3 which includes the following documents: Proposed Claims

Dear Examiner Cervetti:

We look forward to discussing these proposed claims in light of the pending rejections. Please do not hesitate to contact me with any questions.

Matthew M. Jakubowski  
Signature

Matthew M. Jakubowski  
Typed or Printed Name of Attorney/Agent

S/N: 12/708,394

Att. Docket No.: JDSC 0100 A

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NOT TO BE ENTERED INTO THE RECORD***

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**PROPOSED CLAIMS FOR EXAMINER REVIEW**

1. (Currently Amended) A method of controlling access by a computer to a video server, comprising the steps of:

sending a request from ~~the a-client~~ computer to a video server over a network;

receiving at the computer from the video server a unique identifier number stored in and identifying the video server, wherein the unique identifier number is received by the client computer over the network; and

determining that access to the video server is authorized by comparing the unique identifier number received by the client computer to one or more authorized unique identifiers numbers; and

in response to the determination, obtaining at ~~the-client~~ computer one or more images from the video server for displaying; and

~~displaying the one or more images on a screen display of the client computer.~~

2. (Currently Amended) A method of controlling access by a computer to a hardware device, comprising the following steps performed at the computer [[of]]:

executing a computer program stored in computer readable form at the [[a]] computer, the computer being connected to a hardware device via a network;

accessing the hardware device from the computer over the network using an IP address associated with the hardware device;

transmitting a request from the computer over the network for a MAC address of the hardware device;

~~obtaining a~~ receiving at the computer the MAC address [[from]] of the hardware device over the network; and

determining if the computer program is authorized to access the hardware device by validating the MAC address using data accessible to the computer; and

~~if the program is authorized to access the hardware device, then the method further comprises the steps of:~~

S/N: 12/708,394

Att. Docket No.: JDSC 0100 A

***SUBMITTED FOR DISCUSSION PURPOSES ONLY -  
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~~requesting data from the hardware device by the computer using the computer  
program, and  
receiving the requested data at the computer.~~

3. (Canceled)

4. (New) The method of claim 1, wherein the unique identifier is a MAC address.

5. (New) The method of claim 1, wherein the video server is a camera server that includes a camera and a web server with an Ethernet port or a component based video server including inputs for one or more analog video feeds.



# UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/708,394	02/18/2010	Joseph Robert Marchese	1883-3001-7	4367
29318	7590	01/26/2012		
JAMES D. STEVENS REISING ETHINGTON P.C. P.O. BOX 4390 TROY, MI 48099			EXAMINER CERVETTI, DAVID GARCIA	
			ART UNIT 2436	PAPER NUMBER
			MAIL DATE 01/26/2012	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b><i>Applicant-Initiated Interview Summary</i></b>	<b>Application No.</b> 12/708,394	<b>Applicant(s)</b> MARCHESE, JOSEPH ROBERT	
	<b>Examiner</b> David García Cervetti	<b>Art Unit</b> 2436	

All participants (applicant, applicant's representative, PTO personnel):

(1) David García Cervetti. (3) \_\_\_\_.

(2) Matt Jakubowski (Reg.No.44801). (4) \_\_\_\_.

Date of Interview: 24 January 2012.

Type:    ☒ Telephonic    ☐ Video Conference  
           ☐ Personal [copy given to: ☐ applicant    ☐ applicant's representative]

Exhibit shown or demonstration conducted:    ☐ Yes    ☐ No.  
     If Yes, brief description: \_\_\_\_.

Issues Discussed    ☐101    ☐112    ☒102    ☒103    ☐Others  
 (For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1-3.

Identification of prior art discussed: Sistanizadeh, Borsato.

**Substance of Interview**  
 (For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

The 102 rejection will be withdrawn in view of canceling claim 3, the proposed amendment for claims 1-2 appears to overcome the 103 rejection. Examiner will update the search once a formal amendment is filed.

**Applicant recordation instructions:** The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

**Examiner recordation instructions:** Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/David García Cervetti/ Primary Examiner, Art Unit 2436	
--	--

## Summary of Record of Interview Requirements

### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

#### Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

#### 37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

JOSEPH ROBERT MARCHESE

Serial No.: 12/708,394

Filed: February 18, 2010

For: DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS

Attorney Docket No.: JDSC 0101 PUSP2

Group Art Unit: 2436

Examiner: David Garcia Cervetti

**REPLY UNDER 37 C.F.R. § 1.111**

Mail Stop Amendment  
Commissioner for Patents  
U.S. Patent & Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In response to the non-final Office Action mailed December 2, 2011, Applicant hereby responds to the rejection of pending claims 1-3 and requests reconsideration in view of the present amendments and following remarks:



**AMENDMENTS TO THE CLAIMS:**

*This listing of claims will replace all prior versions, and listings, of claims in the application:*

1. (Currently Amended) A method of controlling access by a computer to a video server, comprising the steps of:

sending a request from the a-client computer to a video server over a network;

receiving at the computer from the video server a unique identifier number stored in and identifying the video server, wherein the unique identifier number is received by the client computer over the network; and

determining that access to the video server is authorized by comparing the unique identifier number received by the client computer to one or more authorized unique identifiers numbers; and

in response to the determination, obtaining at the client computer one or more images from the video server for displaying; and

~~displaying the one or more images on a screen display of the client computer.~~

2. (Currently Amended) A method of controlling access by a computer to a hardware device, comprising the following steps performed at the computer [[of]]:

executing a computer program stored in computer readable form at the [[a]] computer, the computer being connected to a hardware device via a network;

accessing the hardware device from the computer over the network using an IP address associated with the hardware device;

transmitting a request from the computer over the network for a MAC address of the hardware device;

~~obtaining a~~ receiving at the computer the MAC address [[from]] of the hardware device over the network; and

determining if the computer program is authorized to access the hardware device by validating the MAC address using data accessible to the computer; and

~~if the program is authorized to access the hardware device, then the method further comprises the steps of:~~

~~requesting data from the hardware device by the computer using the computer program; and~~

~~receiving the requested data at the computer.~~

3. (Canceled)

4. (New) The method of claim 1, wherein the unique identifier is a MAC address.

5. (New) The method of claim 1, wherein the video server is a camera server that includes a camera and a web server with an Ethernet port or a component based video server including inputs for one or more analog video feeds.

**REMARKS**

This application has been carefully reviewed in light of the most recent Office Action. At the time of the Office Action, claims 1-3 were pending in the application. Each of the pending claims has been rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of U.S. Patent No. 6,891,566. Concurrently with this amendment, Applicant files a Terminal Disclaimer in order to obviate this double patenting rejection.

Claim 3 has been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,790,664 to Coley et al. (hereinafter *Coley*). Claims 1 and 2 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,790,548 to Sistanizadeh et al. (hereinafter *Sistanizadeh*) in view of U.S. Patent No. 6,895,511 to Borsato et al. (hereinafter *Borsato*). With this Amendment, Applicant cancels pending claim 3, thereby obviating the anticipation rejection. Additionally, Applicant amends claims 1 and 2 and adds new claims 4 and 5. Applicant does not admit that these amendments are necessary in view of the Examiner's rejections. On the contrary, these amendments have been made to better clarify the claimed subject matter of the present invention. No new matter has been introduced by these amendments and both the amended and new claims are fully supported by the originally-filed specification.

An examiner interview discussing the present claim amendments and the prior art references to *Sistanizadeh* and *Borsato* took place on January 24, 2012. During the interview, the Examiner indicated that pending claims 1 and 2, as currently amended, are sufficient to overcome the section 103 rejection in light of *Sistanizadeh* and *Borsato*. The Examiner also confirmed that the section 102 rejection would be withdrawn as a result of the cancellation of claim 3. In accordance with both the discussion during the interview and the presently-filed Terminal Disclaimer, Applicant respectfully requests that the Examiner remove all of the current rejections.

**CONCLUSION**

In view of the above amendments and remarks, Applicant submits that the pending claims patentably define over the cited references.

Applicant has made a genuine effort to respond to each of the Office's rejections in advancing the prosecution of this case. Applicant believes that all formal and substantive requirements for patentability have been met and that all of the claims are in condition for allowance, which action is respectfully requested. If the Examiner believes that a discussion or claim amendment of a minor nature would advance prosecution of this application, the Examiner is encouraged to telephone Applicant's attorney at the number given below.

Respectfully submitted,

**JOSEPH ROBERT MARCHESE**

By /Matthew Jakubowski/  
Matthew M. Jakubowski  
Reg. No. 44,801  
Attorney for Applicant

Date: January 27, 2012

**BROOKS KUSHMAN P.C.**  
1000 Town Center, 22nd Floor  
Southfield, MI 48075-1238  
Phone: 248-358-4400  
Fax: 248-358-3351

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	12708394			
<b>Filing Date:</b>	18-Feb-2010			
<b>Title of Invention:</b>	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS			
<b>First Named Inventor/Applicant Name:</b>	Joseph Robert Marchese			
<b>Filer:</b>	Matthew Jakubowski/Gayle Lorenzen			
<b>Attorney Docket Number:</b>	1883-3001-7			
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Statutory or terminal disclaimer	2814	1	80	80
Total in USD (\$)				80

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	11940183
<b>Application Number:</b>	12708394
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4367
<b>Title of Invention:</b>	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS
<b>First Named Inventor/Applicant Name:</b>	Joseph Robert Marchese
<b>Customer Number:</b>	29318
<b>Filer:</b>	Matthew Jakubowski/Gayle Lorenzen
<b>Filer Authorized By:</b>	Matthew Jakubowski
<b>Attorney Docket Number:</b>	1883-3001-7
<b>Receipt Date:</b>	27-JAN-2012
<b>Filing Date:</b>	18-FEB-2010
<b>Time Stamp:</b>	17:13:59
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$80
RAM confirmation Number	4478
Deposit Account	023978
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File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	Power_of_Attorney.pdf	141682	no	2
			8fb7506c1268caad64bc3489d33c06ddaaa8a42c		
Warnings:					
Information:					
2	Terminal Disclaimer Filed	Terminal_Disclaimer.pdf	210489	no	2
			8ef2352c8c3d34c7bd07ca9ed5dd0c76bef3c0ec		
Warnings:					
Information:					
3		Amendment.pdf	214513	yes	5
			1253b250a5360817e6e13532fe4d864851be7285		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	3	
	Applicant Arguments/Remarks Made in an Amendment		4	5	
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30361	no	2
			da1127011b914c0f7ec469ddafeb1d1a36fc8996		
Warnings:					
Information:					
Total Files Size (in bytes):			597045		



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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING  
REJECTION OVER A "PRIOR" PATENT**Docket Number (Optional)  
JDSC 0101 PUSP2

In re Application of: JOSEPH ROBERT MARCHESE

Application No.: 12/708,394

Filed: February 18, 2010

For: Digital Video System Using Networked Cameras

The owner\*, Joseph Robert Marchese, of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term **prior patent** No. 6,891,566 as the term of said prior patent is defined in 35 U.S.C. 154 and 173, and as the term of said **prior patent** is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;  
is held unenforceable;  
is found invalid by a court of competent jurisdiction;  
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;  
has all claims canceled by a reexamination certificate;  
is reissued; or  
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 44,801

/Matthew M. Jakubowski/

Signature

1/27/2012

Date

Matthew M. Jakubowski

Typed or printed name

248-358-4400

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

\*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).  
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
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**POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO**

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:



Practitioners associated with the Customer Number:

22045

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:



The address associated with Customer Number:

22045

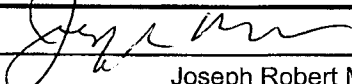
OR

<input type="checkbox"/> Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

Joseph Robert Marchese (d/b/a JDS Digital Security Systems LLC)  
59992 Ray Center Drive  
Ray Michigan 48096**A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.****SIGNATURE of Assignee of Record**

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	December 16, 2011
Name	Joseph Robert Marchese	Telephone	586-749-6342
Title			

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12708394
	Filing Date		2010-02-18
	First Named Inventor	Joseph Robert Marchese	
	Art Unit	2436	
	Examiner Name	David Garcia Cervetti	
	Attorney Docket Number	JDSC 0101 PUSP2	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4513318		1985-04-23	Wilensky et al.	
	2	4575124		1986-03-11	Morrison	
	3	4628342		1986-12-09	Desmons et al.	
	4	5155585	A	1992-10-13	Ishikawa	
	5	5313280	A	1994-05-17	Straus	
	6	5666152	A	1997-09-09	Stoker	
	7	6449426	B1	2002-09-10	Suga et al.	
	8	6539124	B2	2003-03-25	Sethuraman et al.	

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9	6591022	B2	2003-07-08	Dewald	
10	7185240	B2	2007-02-27	Saito et al.	
11	5663951	A	1997-09-02	Danneels et al.	
12	5745161	A	1998-04-28	Ito	
13	6014183	A	2000-01-11	Hoang	
14	6763023	B1	2004-07-13	Gleeson et al.	
15	7289995	B2	2007-10-30	Motoyama et al.	
16	7392310	B2	2008-06-24	Motoyama et al.	
17	7478152	B2	2009-01-13	Holt et al.	
18	7500003	B2	2009-03-03	Motoyama et al.	
19	7596749	B2	2009-09-29	Motoyama et al.	

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Examiner Name	David Garcia Cervetti
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	20	7610380	B2	2009-10-27	Igarashi et al.	
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Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20010033335	A1	2001-10-25	Kubota et al.	
	2	20050231596	A1	2005-10-20	Marchese	
	3	20050268141	A1	2005-12-01	Alben et al.	
	4	20070237141	A1	2007-10-11	Marchese	
	5	20030050718	A1	2003-03-13	Tracy et al.	
	6	20040128315	A1	2004-07-01	Motoyama et al.	
	7	20040128365	A1	2004-07-01	Motoyama et al.	
	8	20040209617	A1	2004-10-21	Hrastar	



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First Named Inventor	Joseph Robert Marchese	
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Attorney Docket Number		JDSC 0101 PUSP2

9	20040214559	A1	2004-10-28	Date et al.	
10	20040240453	A1	2004-12-02	Ikeda et al.	
11	20050165927	A1	2005-07-28	Motoyama et al.	
12	20050201273	A1	2005-09-15	Shimizu	
13	20060059255	A1	2006-03-16	Motoyama et al.	
14	20060067304	A1	2006-03-30	McDowall et al.	
15	20060159032	A1	2006-07-20	Ukrainetz et al.	
16	20060279774	A1	2006-12-14	Matsuoka et al.	
17	20070011450	A1	2007-01-11	McCreight et al.	
18	20070124455	A1	2007-05-31	Motoyama et al.	
19	20080189405	A1	2008-08-07	Zarenin et al.	

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Filing Date	2010-02-18
First Named Inventor	Joseph Robert Marchese
Art Unit	2436
Examiner Name	David Garcia Cervetti
Attorney Docket Number	JDSC 0101 PUSP2

20	20090019141	A1	2009-01-15	Bush et al.	
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**FOREIGN PATENT DOCUMENTS**

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Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1							<input type="checkbox"/>

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1		<input type="checkbox"/>

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Examiner Signature		Date Considered	
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12708394
Filing Date	2010-02-18
First Named Inventor	Joseph Robert Marchese
Art Unit	2436
Examiner Name	David Garcia Cervetti
Attorney Docket Number	JDSC 0101 PUSP2

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Matthew M. Jakubowski/	Date (YYYY-MM-DD)	2012-01-27
Name/Print	Matthew M. Jakubowski	Registration Number	44,801

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	12708394			
<b>Filing Date:</b>	18-Feb-2010			
<b>Title of Invention:</b>	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS			
<b>First Named Inventor/Applicant Name:</b>	Joseph Robert Marchese			
<b>Filer:</b>	Matthew Jakubowski/Gayle Lorenzen			
<b>Attorney Docket Number:</b>	1883-3001-7			
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	1806	1	180	180
<b>Total in USD (\$)</b>				<b>180</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	11942536
<b>Application Number:</b>	12708394
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4367
<b>Title of Invention:</b>	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS
<b>First Named Inventor/Applicant Name:</b>	Joseph Robert Marchese
<b>Customer Number:</b>	29318
<b>Filer:</b>	Matthew Jakubowski/Gayle Lorenzen
<b>Filer Authorized By:</b>	Matthew Jakubowski
<b>Attorney Docket Number:</b>	1883-3001-7
<b>Receipt Date:</b>	27-JAN-2012
<b>Filing Date:</b>	18-FEB-2010
<b>Time Stamp:</b>	17:16:04
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 180
RAM confirmation Number	4518
Deposit Account	023978
Authorized User	

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File Listing:					
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1	Information Disclosure Statement (IDS) Form (SB08)	updated_IDS.pdf	613585 da789642f55524e7de1bddee0e37d48cf9e570e	no	7
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30539 ab7eb2d22ac412028885f128079b216f8c34af24	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			644124		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>            If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>            If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>            If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875					Application or Docket Number <b>12/708,394</b>		Filing Date <b>02/18/2010</b>		<input type="checkbox"/> To be Mailed	
<b>APPLICATION AS FILED – PART I</b>										
(Column 1)			(Column 2)			SMALL ENTITY <input checked="" type="checkbox"/> OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$	=	OR	X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.					TOTAL		TOTAL			
<b>APPLICATION AS AMENDED – PART II</b>										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	01/27/2012	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 4	Minus	** 20	=	0	OR	X \$	=	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	=	0	OR	X \$	=	
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))										
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
					TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE		
(Column 1)			(Column 2)			(Column 3)				
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=		OR	X \$	=	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		OR	X \$	=	
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))										
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>										

Legal Instrument Examiner:  
/JACQUELINE COUPLIN/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/708,394	02/18/2010	Joseph Robert Marchese	1883-3001-7

29318  
JAMES D. STEVENS  
REISING ETHINGTON P.C.  
P.O. BOX 4390  
TROY, MI 48099

**CONFIRMATION NO. 4367**  
**MISCELLANEOUS NOTICE**



Date Mailed: 02/03/2012

A communication which cannot be delivered in electronic form has been mailed to the applicant.



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
 United States Patent and Trademark Office  
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 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
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APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/708,394	02/18/2010	Joseph Robert Marchese	1883-3001-7

CONFIRMATION NO. 4367

29318  
 JAMES D. STEVENS  
 REISING ETHINGTON P.C.  
 P.O. BOX 4390  
 TROY, MI 48099



\*OC000000052370266\*

Cc: BROOKS KUSHMAN P.C.  
 1000 TOWN CENTER  
 TWENTY-SECOND FLOOR  
 SOUTHFIELD, MI 48075

Date Mailed: 02/03/2012


## DENIAL OF REQUEST FOR POWER OF ATTORNEY

The request for Power of Attorney filed 01/27/2012 is acknowledged. However, the request cannot be granted at this time for the reason stated below.

- ☐ The Power of Attorney you provided did not comply with the new Power of Attorney rules that became effective on June 25, 2004. See 37 CFR 1.32.
- ☐ The revocation is not signed by the applicant, the assignee of the entire interest, or one particular principal attorney having the authority to revoke.
- ☒ The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73(b) has not been received.
- ☐ The person signing for the assignee has omitted their empowerment to sign on behalf of the assignee.
- ☐ The inventor(s) is without authority to appoint attorneys since the assignee has intervened as provided by 37 CFR 3.71.
- ☐ The signature(s) of \_\_\_\_\_, a co-inventor in this application, has been omitted. The Power of Attorney will be entered upon receipt of confirmation signed by said co-inventor(s).
- ☐ The person(s) appointed in the Power of Attorney is not registered to practice before the U.S. Patent and Trademark Office.
- ☐ The POA is being rejected because the appointment of two CN simultaneously is not acceptable. The two CN represent dual correspondence and cannot be considered for POA. You will need to send in a new POA and select one CN for appointment.

Questions relating to this Notice should be directed to the Application Assistance Unit.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

<b>Application Number</b> 	<b>Application/Control No.</b> 12/708,394	<b>Applicant(s)/Patent under Reexamination</b> MARCHESE, JOSEPH ROBERT	

<b>Document Code - DISQ</b>	<b>Internal Document – DO NOT MAIL</b>
-----------------------------	--

<b>TERMINAL DISCLAIMER</b>	<input type="checkbox"/> APPROVED	<input checked="" type="checkbox"/> DISAPPROVED
<b>Date Filed : 01/27/2012</b>	<b>This patent is subject to a Terminal Disclaimer</b>	

**Approved/Disapproved by:**

Dorethea Lawrence

The Power of Attorney is from an assignee and the Certificate required by CFR 3.73(b) has not been received.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS</b>	<b>Application Number</b>	12/708,394
	<b>Filing Date</b>	February 18, 2010
	<b>First Named Inventor</b>	Joseph Robert Marchese
	<b>Title</b>	Digital Video System Using Networked Camera
	<b>Art Unit</b>	2436
	<b>Examiner Name</b>	David Garcia Cervetti
	<b>Attorney Docket Number</b>	1883-3001-7

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

22045

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified application to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the:

☒ Applicant/Inventor.

OR

☐ Assignee of record of the entire interest. See 37 CFR 3.71.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on \_\_\_\_\_.

**SIGNATURE of Applicant or Assignee of Record**

Signature

Name

Joseph Robert Marchese

Date

2012-02-24

Telephone

586-749-6342

Title and Company

**NOTE:** Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below\*.

☒ \*Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

## Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING  
REJECTION OVER A "PRIOR" PATENT**Docket Number (Optional)  
JDSC 0101 PUSP2

In re Application of: JOSEPH ROBERT MARCHESE

Application No.: 12/708,394

Filed: February 18, 2010

For: Digital Video System Using Networked Cameras

The owner\*, Joseph Robert Marchese, of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term **prior patent** No. 6,891,566 as the term of said prior patent is defined in 35 U.S.C. 154 and 173, and as the term of said **prior patent** is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 44,801

/Matthew M. Jakubowski/

Signature

1/27/2012

Date

Matthew M. Jakubowski

Typed or printed name

248-358-4400

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

\*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).  
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

## Privacy Act Statement

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	12162094
<b>Application Number:</b>	12708394
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4367
<b>Title of Invention:</b>	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS
<b>First Named Inventor/Applicant Name:</b>	Joseph Robert Marchese
<b>Customer Number:</b>	29318
<b>Filer:</b>	Matthew Jakubowski/Gayle Lorenzen
<b>Filer Authorized By:</b>	Matthew Jakubowski
<b>Attorney Docket Number:</b>	1883-3001-7
<b>Receipt Date:</b>	28-FEB-2012
<b>Filing Date:</b>	18-FEB-2010
<b>Time Stamp:</b>	11:44:17
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	Transmittal_Ltr.pdf	97564 4754bdcbfd302cb7f0c1b4ee26dd2ed7773bbf5a	no	1

### Warnings:

### Information:

2	Power of Attorney	POA.pdf	336048 8b2392a79d01f80f57165f467963cc09c159dc9a	no	2
<b>Warnings:</b>					
<b>Information:</b>					
3	Terminal Disclaimer Filed	Terminal_Disclaimer.pdf	210489 8ef2352c8c3d34c7bd07ca9ed5dd0c76bef3c0ec	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			644101		
<p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</b></p>					

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

Joseph Robert Marchese

Group Art Unit: 2436

Serial No.: 12/708,394

Examiner: David Garcia Cervetti

Filed: February 18, 2010

For: DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS

Attorney Docket No.: 1883-3001-7

**TRANSMITTAL LETTER**

Commissioner for Patents  
U.S. Patent & Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450

Commissioner:

Enclosed with reference to the above matter are the following documents:

1. Power of Attorney; and
2. Terminal Disclaimer To Obviate A Double Patenting Rejection Over A  
“Prior” Patent.

Please be advised that the Terminal Disclaimer filing fee of \$80.00 was previously paid on January 27, 2012 and charged to Deposit Account No. 02-3978 via electronic authorization. The Commissioner is hereby authorized to charge any fees or credit any overpayments as a result of the filing of this paper to Deposit Account No. 02-3978.

Respectfully submitted,

**Joseph Robert Marchese**

By /Matthew M. Jakubowski  
Matthew M. Jakubowski  
Reg. No. 44801  
Attorney/Agent for Applicant


Date: February 27, 2012

**BROOKS KUSHMAN P.C.**  
1000 Town Center, 22nd Floor  
Southfield, MI 48075-1238  
Phone: 248-358-4400 — Fax: 248-358-3351

Document code: WFEE

United States Patent and Trademark Office  
Sales Receipt for Accounting Date: 03/01/2012

LHIXON	SALE	#00000001	Mailroom Dt:	02/28/2012	023978	12708394
		01	FC : 1814		160.00	DA

<b>Application Number</b> 	<b>Application/Control No.</b> 12/708,394	<b>Applicant(s)/Patent under Reexamination</b> MARCHESE, JOSEPH ROBERT	
<b>Document Code - DISQ</b>		<b>Internal Document – DO NOT MAIL</b>	

<b>TERMINAL DISCLAIMER</b>	<input checked="" type="checkbox"/> <b>APPROVED</b>	<input type="checkbox"/> <b>DISAPPROVED</b>
<b>Date Filed : 02/28/12</b>	<b>This patent is subject to a Terminal Disclaimer</b>	

**Approved/Disapproved by:**

Lawana Hixon



# UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/708,394	02/18/2010	Joseph Robert Marchese	1883-3001-7

22045  
BROOKS KUSHMAN P.C.  
1000 TOWN CENTER  
TWENTY-SECOND FLOOR  
SOUTHFIELD, MI 48075

**CONFIRMATION NO. 4367**  
**POA ACCEPTANCE LETTER**



Date Mailed: 03/05/2012

## NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/28/2012.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/hsarwari/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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## NOTICE OF ALLOWANCE AND FEE(S) DUE

22045 7590 04/12/2012  
BROOKS KUSHMAN P.C.  
1000 TOWN CENTER  
TWENTY-SECOND FLOOR  
SOUTHFIELD, MI 48075

EXAMINER

CERVETTI, DAVID GARCIA

ART UNIT

PAPER NUMBER

2436

DATE MAILED: 04/12/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/708,394

02/18/2010

Joseph Robert Marchese

1883-3001-7

4367

TITLE OF INVENTION: DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$870	\$300	\$0	\$1170	07/12/2012

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

### HOW TO REPLY TO THIS NOTICE:

#### I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**

## PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**  
**or Fax** **(571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

22045 7590 04/12/2012  
**BROOKS KUSHMAN P.C.**  
**1000 TOWN CENTER**  
**TWENTY-SECOND FLOOR**  
**SOUTHFIELD, MI 48075**

## Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/708,394

02/18/2010

Joseph Robert Marchese

1883-3001-7

4367

TITLE OF INVENTION: DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$870	\$300	\$0	\$1170	07/12/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
CERVETTI, DAVID GARCIA	2436	726-029000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

1 \_\_\_\_\_

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2 \_\_\_\_\_

3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☐ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/708,394	02/18/2010	Joseph Robert Marchese	1883-3001-7	4367

22045 7590 04/12/2012  
BROOKS KUSHMAN P.C.  
1000 TOWN CENTER  
TWENTY-SECOND FLOOR  
SOUTHFIELD, MI 48075

EXAMINER

CERVETTI, DAVID GARCIA

ART UNIT	PAPER NUMBER
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2436

DATE MAILED: 04/12/2012

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 196 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 196 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	12/708,394	MARCHESE, JOSEPH ROBERT	
	<b>Examiner</b>	<b>Art Unit</b>	
	David García Cervetti	2436	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 1/27/2012.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 1,2,4 and 5.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</li> <li>3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br/>Paper No./Mail Date <u>1/27/12</u></li> <li>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br/>of Biological Material</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Notice of Informal Patent Application</li> <li>6. <input type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date ____.</li> <li>7. <input type="checkbox"/> Examiner's Amendment/Comment</li> <li>8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>9. <input type="checkbox"/> Other ____.</li> </ol> |
|--|--|

/David García Cervetti/  
Primary Examiner, Art Unit 2436

### **DETAILED ACTION**

1. Applicant's amendment filed 1/27/2012 has been fully considered.
2. Claims 1-2 and 4-5 are pending and have been examined. Claim 3 has been canceled.

### ***Response to Amendment***

3. The provisional Double Patenting rejection is withdrawn in view of the Terminal Disclaimer filed on 2/28/2012.
4. This communication warrants No Examiner's Reason for Allowance, applicant's reply makes evident the reasons for allowance, satisfying the "record as a whole" provision of the rule 37 CFR 1.104(e). Specifically, applicant's arguments filed on 1/27/2012 are persuasive, as such the reasons for allowance are in all probability evident from the record and no statement is deemed necessary (see MPEP 1302.14).

### ***Terminal Disclaimer***

5. The terminal disclaimer filed on 2/28/2012 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent 6891566 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### **EXAMINER'S AMENDMENT**

6. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

7. Authorization for this examiner's amendment was given in a telephone interview with Matthew Jakubowski, Reg.No.44,801, on 4/04/2012.
8. Please amend paragraph 1 of the specification as follows:

This application is a continuation of U.S. Application Number 11/125,795 filed May 10, 2005, **now abandoned**, which is a continuation of U.S. Application Number 09/808,543, filed March 14, 2001, now U.S. Patent No. 6,891,566, which claims the benefit of Provisional Patent Application 60/189,162 filed March 14, 2000. The entire disclosure of these applications are hereby incorporated by reference.

***Allowable Subject Matter***

9. Claims 1-2 and 4-5 are allowed.
10. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Art Unit: 2436

***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David García Cervetti whose telephone number is (571)272-5861. The examiner can normally be reached on Monday-Friday 8 AM to 5 PM.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip J. Chea can be reached on (571)272-3951. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David García Cervetti/  
Primary Examiner, Art Unit 2436

<b>Notice of References Cited</b>	Application/Control No. 12/708,394		Applicant(s)/Patent Under Reexamination MARCHESE, JOSEPH ROBERT	
	Examiner David García Cervetti		Art Unit 2436	Page 1 of 2

#### U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,649,185 A	07-1997	Antognini et al.	726/2
*	B	US-5,790,664 A	08-1998	Coley et al.	709/203
*	C	US-5,790,548 A	08-1998	Sistanizadeh et al.	370/401
*	D	US-5,903,762 A	05-1999	Sakamoto et al.	717/178
*	E	US-6,101,182 A	08-2000	Sistanizadeh et al.	370/352
*	F	US-2001/0011253 A1	08-2001	COLEY et al.	705/59
*	G	US-2002/0003575 A1	01-2002	Marchese, Joseph Robert	348/231
*	H	US-6,452,925 B1	09-2002	Sistanizadeh et al.	370/352
*	I	US-6,574,612 B1	06-2003	Baratti et al.	705/59
*	J	US-2003/0197785 A1	10-2003	White et al.	348/207.99
*	K	US-2004/0030926 A1	02-2004	Clark, James R.	713/201
*	L	US-2004/0078825 A1	04-2004	Murphy, Greg	725/109
*	M	US-6,760,324 B1	07-2004	Scott et al.	370/352

#### FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

#### NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<b>Notice of References Cited</b>	Application/Control No. 12/708,394		Applicant(s)/Patent Under Reexamination MARCHESE, JOSEPH ROBERT	
	Examiner David García Cervetti		Art Unit 2436	Page 2 of 2

#### U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,895,511 B1	05-2005	Borsato et al.	726/5
*	B	US-6,928,656 B1	08-2005	Addington, Timothy Hall	725/111
*	C	US-7,136,838 B1	11-2006	Peinado et al.	705/59
*	D	US-7,451,312 B2	11-2008	Medvinsky et al.	713/168
*	E	US-7,523,481 B2	04-2009	Creamer et al.	725/105
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

#### FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

#### NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	


\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



<b><i>Index of Claims</i></b>  	<b>Application/Control No.</b>  12708394	<b>Applicant(s)/Patent Under Reexamination</b>  MARCHESE, JOSEPH ROBERT
	<b>Examiner</b>  David García Cervetti	<b>Art Unit</b>  2436

✓	<b>Rejected</b>	-	<b>Cancelled</b>	N	<b>Non-Elected</b>	A	<b>Appeal</b>
=	<b>Allowed</b>	÷	<b>Restricted</b>	I	<b>Interference</b>	O	<b>Objected</b>

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant				<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
CLAIM		DATE							
Final	Original	11/29/2011	04/04/2012						
1	1	✓	=						
4	2	✓	=						
	3	✓	-						
2	4		=						
3	5		=						

<b>Search Notes</b>  	<b>Application/Control No.</b>  12708394	<b>Applicant(s)/Patent Under Reexamination</b>  MARCHESE, JOSEPH ROBERT
	<b>Examiner</b>  David García Cervetti	<b>Art Unit</b>  2436

SEARCHED			
Class	Subclass	Date	Examiner
726	27,29	4/4/2012	DGC

SEARCH NOTES		
Search Notes	Date	Examiner
inventor name search, acm, ieee, springer, google, scholar, east history attached	4/4/2012	DGC

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
726	27,29	4/4/2012	DGC

	/David García Cervetti/ Primary Examiner.Art Unit 2436
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Receipt date: 01/27/2012

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

12708394 - GAI: 2436

Approved for use through 07/31/2012. OMB 0651-0031

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12708394
	Filing Date		2010-02-18
	First Named Inventor	Joseph Robert Marchese	
	Art Unit	2436	
	Examiner Name	David Garcia Cervetti	
	Attorney Docket Number	JDSC 0101 PUSP2	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4513318		1985-04-23	Wilensky et al.	
	2	4575124		1986-03-11	Morrison	
	3	4628342		1986-12-09	Desmons et al.	
	4	5155585	A	1992-10-13	Ishikawa	
	5	5313280	A	1994-05-17	Straus	
	6	5666152	A	1997-09-09	Stoker	
	7	6449426	B1	2002-09-10	Suga et al.	
	8	6539124	B2	2003-03-25	Sethuraman et al.	

<b>Receipt date: 01/27/2012</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		12708394	12708394 - GAU: 2436
	Filing Date		2010-02-18	
	First Named Inventor	Joseph Robert Marchese		
	Art Unit	2436		
	Examiner Name	David Garcia Cervetti		
	Attorney Docket Number	JDSC 0101 PUSP2		

	9	6591022	B2	2003-07-08	Dewald	
	10	7185240	B2	2007-02-27	Saito et al.	
	11	5663951	A	1997-09-02	Danneels et al.	
	12	5745161	A	1998-04-28	Ito	
	13	6014183	A	2000-01-11	Hoang	
	14	6763023	B1	2004-07-13	Gleeson et al.	
	15	7289995	B2	2007-10-30	Motoyama et al.	
	16	7392310	B2	2008-06-24	Motoyama et al.	
	17	7478152	B2	2009-01-13	Holt et al.	
	18	7500003	B2	2009-03-03	Motoyama et al.	
	19	7596749	B2	2009-09-29	Motoyama et al.	

<b>Receipt date: 01/27/2012</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12708394	12708394 - GAU: 2436
	Filing Date		2010-02-18	
	First Named Inventor	Joseph Robert Marchese		
	Art Unit	2436		
	Examiner Name	David Garcia Cervetti		
	Attorney Docket Number	JDSC 0101 PUSP2		

	20	7610380	B2	2009-10-27	Igarashi et al.	
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**U.S.PATENT APPLICATION PUBLICATIONS**

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Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20010033335	A1	2001-10-25	Kubota et al.	
	2	20050231596	A1	2005-10-20	Marchese	
	3	20050268141	A1	2005-12-01	Alben et al.	
	4	20070237141	A1	2007-10-11	Marchese	
	5	20030050718	A1	2003-03-13	Tracy et al.	
	6	20040128315	A1	2004-07-01	Motoyama et al.	
	7	20040128365	A1	2004-07-01	Motoyama et al.	
	8	20040209617	A1	2004-10-21	Hrastar	

<b>Receipt date: 01/27/2012</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		12708394	12708394 - GAU: 2436
	Filing Date		2010-02-18	
	First Named Inventor	Joseph Robert Marchese		
	Art Unit	2436		
	Examiner Name	David Garcia Cervetti		
	Attorney Docket Number	JDSC 0101 PUSP2		

9	20040214559	A1	2004-10-28	Date et al.	
10	20040240453	A1	2004-12-02	Ikeda et al.	
11	20050165927	A1	2005-07-28	Motoyama et al.	
12	20050201273	A1	2005-09-15	Shimizu	
13	20060059255	A1	2006-03-16	Motoyama et al.	
14	20060067304	A1	2006-03-30	McDowall et al.	
15	20060159032	A1	2006-07-20	Ukrainetz et al.	
16	20060279774	A1	2006-12-14	Matsuoka et al.	
17	20070011450	A1	2007-01-11	McCreight et al.	
18	20070124455	A1	2007-05-31	Motoyama et al.	
19	20080189405	A1	2008-08-07	Zarenin et al.	

<b>Receipt date: 01/27/2012</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		12708394	12708394 - GAU: 2436
	Filing Date		2010-02-18	
	First Named Inventor	Joseph Robert Marchese		
	Art Unit	2436		
	Examiner Name	David Garcia Cervetti		
	Attorney Docket Number	JDSC 0101 PUSP2		

	20	20090019141	A1	2009-01-15	Bush et al.	
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Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1							<input type="checkbox"/>

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<b>Receipt date: 01/27/2012</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		12708394      12708394 - GAU: 2436
	Filing Date		2010-02-18
	First Named Inventor	Joseph Robert Marchese	
	Art Unit	2436	
	Examiner Name	David Garcia Cervetti	
	Attorney Docket Number	JDSC 0101 PUSP2	

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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**OR**

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☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Matthew M. Jakubowski/	Date (YYYY-MM-DD)	2012-01-27
Name/Print	Matthew M. Jakubowski	Registration Number	44,801

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	78	("20050200714"   "20060106729"   "4991193"   "5625410"   "6760324"   "20040240453"   "20060279774"   "4513318"   "4628342"   "5313280"   "7478152"   "5861924"   "6583813"   "20010011253"   "6449426"   "6539124"   "7500003"   "4814869"   "5786872"   "5805801"   "6092078"   "6175622"   "5649185"   "6101182"   "20050165927"   "20070124455"   "5761655"   "5790548"   "6895511"   "20060059255"   "4575124"   "7289995"   "5724475"   "6233428"   "6269309"   "20040128365"   "20050231596"   "20060067304"   "20070011450"   "5663951"   "6591022"   "5311306"   "6115035"   "6396533"   "5790664"   "6452925"   "7136838"   "20050201273"   "20070237141"   "5155585"   "7185240"   "7392310"   "7596749"   "20010008014"   "5512974"   "5561476"   "6002428"   "6002995"   "6178419"   "6891566"   "5903762"   "6574612"   "20030050718"   "20040128315"   "20040209617"   "20040214559"   "20060159032"   "5666152"   "5745161"   "6516340"   "20040030926"   "20010033335"   "20050268141"   "20080189405"   "20090019141"   "6014183"   "6763023"   "7610380").PN.	US-PGPUB; USPAT	OR	OFF	2012/04/04 13:42
L2	52	l1 and (mac near3 address address identif\$ near4 server camera near4 network)	US-PGPUB; USPAT	OR	OFF	2012/04/04 13:44
L3	41	l1 and (mac near3 address (address identif\$ ) near4 server camera near4 network)	US-PGPUB; USPAT	OR	OFF	2012/04/04 13:45
L4	29069	(mac near3 address (address identif\$ )) near4 server near8 (client terminal)	US-PGPUB; USPAT	OR	OFF	2012/04/04 13:57
L5	9376	(send sending communicate communicating request requesting) near6 (mac near3 address (address identif\$ )) near4 server near8 (client terminal)	US-PGPUB; USPAT	OR	OFF	2012/04/04 13:57
L6	368	(send sending communicate communicating request requesting) near6 (mac near3 address (address identif\$ )) near4 server near8 (client terminal) and mac near3 address near5 server	US-PGPUB; USPAT	OR	OFF	2012/04/04 13:58
S1	2790	726/27.ccls.	US-PGPUB; USPAT	OR	ON	2011/11/29 14:31
S2	26	("20010008014"   "20050200714"	US-	OR	ON	2011/11/29

		"20060106729"   "4814869"   "4991193"   "5311306"   "5512974"   "5561476"   "5625410"   "5724475"   "5761655"   "5786872"   "5805801"   "5861924"   "6002428"   "6002995"   "6092078"   "6115035"   "6175622"   "6178419"   "6233428"   "6269309"   "6396533"   "6516340"   "6583813"   "6891566").PN.	PGPUB; USPAT			17:31
S3	2	("6002995" "5724475").pn.	US- PGPUB; USPAT	OR	ON	2011/11/29 17:37
S4	5	("5805801" "4991193" "6175622" "6178419" "20010008014").pn.	US- PGPUB; USPAT	OR	ON	2011/11/29 17:40
S5	673	(validate validating authorize authorized authorizing authenticate authenticating) near5 mac near4 address	US- PGPUB; USPAT	OR	ON	2011/11/29 17:47
S6	165	(validate validating authorize authorized authorizing authenticate authenticating) near5 mac near4 address near8 (server client)	US- PGPUB; USPAT	OR	ON	2011/11/29 17:54
S7	1	"5790548".pn. and (validate validating authorize authorized authorizing authenticate authenticating) near5 address	US- PGPUB; USPAT	OR	ON	2011/11/30 11:50
S8	607	(validate validating authorize authorized authorizing authenticate authenticating) near5 (ip unique) near4 address near8 (server client)	US- PGPUB; USPAT	OR	ON	2011/11/30 11:51
S9	177	(validate validating authorize authorized authorizing authenticate authenticating) near5 (unique near3 identifier) near8 (server client)	US- PGPUB; USPAT	OR	ON	2011/11/30 11:51
S10	3525	(authenticate authentication authenticating) near5 (ip unique) near4 address	US- PGPUB; USPAT	OR	ON	2011/11/30 12:06
S11	1105	(authenticate authentication authenticating) near5 (ip unique) near4 address near5 (server client)	US- PGPUB; USPAT	OR	ON	2011/11/30 12:06
S12	1209	(authentication authenticate authenticating) near5 (ip unique) near4 address near8 (server client)	US- PGPUB; USPAT	OR	ON	2011/11/30 12:07
S13	1187	(authentication authenticate authenticating) near5 (ip ) near4 address near8 (server client)	US- PGPUB; USPAT	OR	ON	2011/11/30 12:07
S14	81	(authentication authenticate authenticating) near5 (ip ) near4 address near8 (server client) with mac	US- PGPUB; USPAT	OR	ON	2011/11/30 12:07
S15	1187	(authentication authenticate authenticating) near5 (ip ) near4 address near8 (server client)	US- PGPUB; USPAT	OR	ON	2011/11/30 12:07
S16	654	(authentication authenticate authenticating) near5 (ip ) adj address near8 (server client)	US- PGPUB; USPAT	OR	ON	2011/11/30 12:14
S17	2042	(authentication authenticate authenticating) near5 (ip ) adj address	US- PGPUB; USPAT	OR	ON	2011/11/30 12:14
S18	528	(authentication authenticate authenticating) near5 (ip ) adj address near8 server	US- PGPUB;	OR	ON	2011/11/30 12:14

			USPAT			
S19	633	(authentication authenticate authenticating) near5 (ip ) adj address near8 (server proxy router firewall gateway)	US-PGPUB; USPAT	OR	ON	2011/11/30 12:14
S20	4436	ip adj address near6 (authenticat\$)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:33
S21	1973	ip adj address near8 (authenticat\$) near8 (server gateway proxy firewall router gatekeeper)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:34
S22	454	(client terminal device apparatus) near8 ip adj address near8 (authenticat\$) near8 (server gateway proxy firewall router gatekeeper)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:34
S23	12	(acl access near4 control near4 list) near8 ip adj address near8 (authenticat\$)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:36
S24	245	(acl access near4 control near4 list) near8 ip adj address	US-PGPUB; USPAT	OR	ON	2011/12/01 09:36
S25	1705	(client terminal device apparatus) near8 address near8 (authenticat\$) near8 (server gateway proxy firewall router gatekeeper)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:37
S26	63	(client terminal device apparatus) near8 address near8 (authenticat\$) near8 (server gateway proxy firewall router gatekeeper) and (address identifier) near5 (embed\$ stored included) near8 (application software program)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:38
S27	107	(client terminal device apparatus) near8 (address identifier) near8 (authenticat\$) near8 (server gateway proxy firewall router gatekeeper) and (address identifier) near5 (embed\$ stored included) near8 (application software program)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:41
S28	37	(license licensing) near8 (client terminal device apparatus) near8 (address identifier) near8 (validate validating authorize authorized authorizing authenticate authenticating authorization authenticat\$) near8 (server gateway proxy firewall router gatekeeper)	US-PGPUB; USPAT	OR	ON	2011/12/01 09:57
S29	368	(license licensing) near8 (address identifier) near8 (validate validating authorize authorized authorizing authenticate authenticating authorization authenticat\$)	US-PGPUB; USPAT	OR	ON	2011/12/01 10:24
S30	25	(license licensing) near8 (address identifier) near8 (validate validating authorize authorized authorizing authenticate authenticating authorization authenticat\$) and (address identifier) near5 (embed\$ stored included) near8 (application software program)	US-PGPUB; USPAT	OR	ON	2011/12/01 10:25
S31	66	(license licensing) near8 (address identifier) near5 (embed\$ stored included) near8 (application software program)	US-PGPUB; USPAT	OR	ON	2011/12/01 10:27
S32	85	(license licensing) near8 mac near5 address	US-PGPUB; USPAT	OR	ON	2011/12/01 10:29

S33	350	(license licensing) near8 ip near5 address	US-PGPUB; USPAT	OR	ON	2011/12/01 10:31
S34	79	(license licensing) near8 ip near5 address and (address ) near8 (validate validating authorize authorized authorizing authenticat authenticating authorization authenticat\$)	US-PGPUB; USPAT	OR	ON	2011/12/01 10:32
S35	353	(license licensing) near8 (ip internet near2 protocol) near5 address	US-PGPUB; USPAT	OR	ON	2011/12/01 10:35
S36	20	(license licensing) near8 (bind binding) near6 hardware	US-PGPUB; USPAT	OR	ON	2011/12/01 10:46
S37	10	(license licensing) near8 (associate associating) near6 hardware	US-PGPUB; USPAT	OR	ON	2011/12/01 10:47
S38	229	(license licensing) near8 hardware near6 computer	US-PGPUB; USPAT	OR	ON	2011/12/01 10:47
S39	311	(license licensing) near8 hardware near6 (computer terminal client)	US-PGPUB; USPAT	OR	ON	2011/12/01 10:47
S40	788	video near3 server near8 (identifier address ticket)	US-PGPUB; USPAT	OR	OFF	2012/04/03 21:03
S41	82	video near3 server near8 (identifier address ticket) and (compare comparing match matching) near8 (identifier address ticket)	US-PGPUB; USPAT	OR	OFF	2012/04/03 21:04
S42	2401	(request requesting) near6 server near6 (identifier address ticket) and (authoriz\$ authenticat\$) near5 server near8 (identifier address ticket)	US-PGPUB; USPAT	OR	OFF	2012/04/03 21:15
S43	1187	(client terminal device computer) near6 (request requesting) near6 server near6 (identifier address ticket) and (authoriz\$ authenticat\$) near5 server near8 (identifier address ticket)	US-PGPUB; USPAT	OR	OFF	2012/04/03 21:15
S44	843	(client terminal device computer) near6 (request requesting) near6 server near6 (identifier address ticket) and (authoriz\$ authenticat\$) near5 server near8 (identifier address ticket) and (receiv\$ transmit\$ send sending communicat\$) near6 server near6 (identifier address ticket) near8 (client terminal device computer)	US-PGPUB; USPAT	OR	OFF	2012/04/03 21:17
S45	443	(client terminal device computer) near6 (request requesting) near6 server near6 (identifier address ticket) and (authoriz\$ authenticat\$) near5 server near8 (identifier address ticket) and (receiv\$ transmit\$ send sending communicat\$) near6 server near6 (identifier address ticket) near8 (client terminal device computer) and (mac nic network ethernet) near4 address	US-PGPUB; USPAT	OR	OFF	2012/04/03 21:20
S46	307	(client terminal device computer) near6 (request requesting) near6 server near6 (identifier address ticket) and (authoriz\$ authenticat\$) near5 server near8 (identifier address ticket) and (receiv\$ transmit\$ send	US-PGPUB; USPAT	OR	OFF	2012/04/03 21:37

		sending communicat\$) near6 server near6 (identifier address ticket) near8 (client terminal device computer) and (mac nic network ethernet) near4 address near6 server				
S47	50	("20080208698"   "20060023066"   "20060228692"   "20040136388"   "20040223054"   "20070157264"   "20010028399"   "20050153785"   "20090045353"   "20090278917"   "20090113505"   "20010038412"   "20020003575"   "20020075307"   "20020111727"   "20030144004"   "20040073935"   "20040078825"   "20040263636"   "20050039197"   "20050039211"   "20050174229"   "20050216193"   "20060023073"   "20080136973"   "20090150591"   "20090154353"   "20100225732"   "20030068098"   "20110154326"   "20020180726"   "20110267418"   "20030124499"   "20040186743"   "20080281485"   "20040027460"   "20100245588"   "20100245665"   "20100274891"   "20050102704"   "20020049979"   "20030197785"   "20030231179"   "20070118281"   "20110279678"   "20060205397"   "20040243482"   "20040133347"   "20060031291"   "20070055976").PN.	US-PGPUB; USPAT	OR	OFF	2012/04/03 22:39
S48	53	network near4 camera and camera near4 server and (authentikat\$ authoriz\$) near5 server and (mac nic network ethernet) near4 address near6 server	US-PGPUB; USPAT	OR	OFF	2012/04/03 22:41
S49	842	(authentikat\$ authoriz\$) near5 server near6 (mac nic network ethernet) near4 address	US-PGPUB; USPAT	OR	OFF	2012/04/03 22:45
S50	801	(authentikat\$ authoriz\$) near5 server near6 (mac nic network ethernet) near3 address	US-PGPUB; USPAT	OR	OFF	2012/04/03 22:45
S51	263	(authentikat\$ authoriz\$) near5 server near6 (mac nic network ethernet) near3 address and (client terminal) near6 (mac nic network ethernet) near3 address near6 server	US-PGPUB; USPAT	OR	OFF	2012/04/03 22:46
S52	13	("20080208698"   "20060023066"   "20060228692"   "20040136388"   "20040223054"   "20070157264"   "20010028399"   "20050153785"   "20090045353"   "20090278917"   "20090113505"   "20010038412"   "20020003575"   "20020075307"   "20020111727"   "20030144004"   "20040073935"   "20040078825"   "20040263636"   "20050039197"   "20050039211"   "20050174229"   "20050216193"   "20060023073"   "20080136973"   "20090150591"   "20090154353"   "20100225732"   "20030068098"   "20110154326"   "20020180726"   "20110267418"   "20030124499"   "20040186743"   "20080281485"   "20040027460"	US-PGPUB; USPAT	OR	OFF	2012/04/03 22:55

		"20100245588"   "20100245665"   "20100274891"   "20050102704"   "20020049979"   "20030197785"   "20030231179"   "20070118281"   "20110279678"   "20060205397"   "20040243482"   "20040133347"   "20060031291"   "20070055976").PN. and (authentic\$ authoriz\$ mac near4 address)				
S56	18525	(virtual virtualization hypervisor) near8 (config configure configuration)	US- PGPUB; USPAT	OR	OFF	2012/04/04 10:57
S57	21	(virtual virtualization hypervisor) near8 (config configure configuration) near8 (compliant compliance according)	US- PGPUB; USPAT	OR	OFF	2012/04/04 10:58
S58	91	advance near4 configuration near6 power near5 interface	US- PGPUB; USPAT	OR	OFF	2012/04/04 11:04
S59	2818	(advance advanced) near4 configuration near6 power near5 interface	US- PGPUB; USPAT	OR	OFF	2012/04/04 11:04
S60	140	(advance advanced) near4 configuration near6 power near5 interface and guest	US- PGPUB; USPAT	OR	OFF	2012/04/04 11:04
S61	139	(advance advanced) near4 configuration near6 power near5 interface and guest and operating near4 system	US- PGPUB; USPAT	OR	OFF	2012/04/04 11:04
S62	2	("20080059556" "20080134175").pn.	US- PGPUB; USPAT	OR	OFF	2012/04/04 11:10
S63	2974	726/27.ccls.	US- PGPUB; USPAT	OR	OFF	2012/04/04 12:14
S64	1065	726/29.ccls.	US- PGPUB; USPAT	OR	OFF	2012/04/04 12:14

EAST Search History (I nterference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S53	18	network near4 camera and camera near4 server and (authenticat\$ authoriz\$) near5 server and (mac nic network ethernet) near4 address near6 server	USPAT; UPAD	OR	OFF	2012/04/03 22:43
S54	313	(authenticat\$ authoriz\$) near5 server near6 (mac nic network ethernet) near4 address	USPAT; UPAD	OR	OFF	2012/04/03 22:45
S55	313	(authenticat\$ authoriz\$) near5 server near6 (mac nic network ethernet) near4 address	USPAT; UPAD	OR	OFF	2012/04/03 22:45

4/ 4/ 2012 2:01:12 PM  
H:\ Workspaces\ Workspaces\ 12-708-394-11-29-2011.wsp



## PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**  
**or Fax** **(571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

22045 7590 04/12/2012  
**BROOKS KUSHMAN P.C.**  
**1000 TOWN CENTER**  
**TWENTY-SECOND FLOOR**  
**SOUTHFIELD, MI 48075**

## Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

12/708,394 02/18/2010 Joseph Robert Marchese 1883-3001-7 4367

TITLE OF INVENTION: DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$870	\$300	\$0	\$1170	07/12/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
CERVETTI, DAVID GARCIA	2436	726-029000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

1 Brooks Kushman P.C.

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2 \_\_\_\_\_

3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee  
☒ Publication Fee (No small entity discount permitted)  
☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.  
☐ Payment by credit card. Form PTO-2038 is attached.  
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 023978 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Matthew M. Jakubowski/

Date April 17, 2012

Typed or printed name Matthew M. Jakubowski

Registration No. 44801

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal				
Application Number:		12708394		
Filing Date:		18-Feb-2010		
Title of Invention:		DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS		
First Named Inventor/Applicant Name:		Joseph Robert Marchese		
Filer:		Matthew Jakubowski/Gayle Lorenzen		
Attorney Docket Number:		JDSC0101PUSP2		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	2501	1	870	870
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1170

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	12557254
<b>Application Number:</b>	12708394
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4367
<b>Title of Invention:</b>	DIGITAL VIDEO SYSTEM USING NETWORKED CAMERAS
<b>First Named Inventor/Applicant Name:</b>	Joseph Robert Marchese
<b>Customer Number:</b>	22045
<b>Filer:</b>	Matthew Jakubowski/Gayle Lorenzen
<b>Filer Authorized By:</b>	Matthew Jakubowski
<b>Attorney Docket Number:</b>	JDSC0101PUSP2
<b>Receipt Date:</b>	17-APR-2012
<b>Filing Date:</b>	18-FEB-2010
<b>Time Stamp:</b>	15:21:51
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1170
RAM confirmation Number	1859
Deposit Account	023978
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	Issue_Fee_Transmittal.pdf	90707 b9c929e660b9c1dac0fea735dec811346e498dd8	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32074 c2026a6c979b3e52b1557d46aefc63734a9b3c2c	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			122781		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>            If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>            If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>            If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/708,394	05/22/2012	8185964	JDSC0101PUSP2	4367

22045 7590 05/02/2012  
BROOKS KUSHMAN P.C.  
1000 TOWN CENTER  
TWENTY-SECOND FLOOR  
SOUTHFIELD, MI 48075

## ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 196 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Joseph Robert Marchese, Ray, MI;

AO 120 (Rev. 08/10)

TO: **Mail Stop 8**  
**Director of the U.S. Patent and Trademark Office**  
**P.O. Box 1450**  
**Alexandria, VA 22313-1450**

**REPORT ON THE  
 FILING OR DETERMINATION OF AN  
 ACTION REGARDING A PATENT OR  
 TRADEMARK**

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Michigan on the following

☐ Trademarks or ☒ Patents. ( ☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:12-CV-12276	DATE FILED May 24, 2012	U.S. DISTRICT COURT Eastern District of Michigan
PLAINTIFF Joseph Robert Marchese, d/b/a JDS Digital Security Systems LLC		DEFENDANT Milestone Systems, Inc.

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
6,891,566	5/10/2005	Joseph Robert Marchese
8,185,964	5/22/2012	Joseph Robert Marchese

In the above-entitled case, the following patent(s)/trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading			
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK		

In the above-entitled case, the following decision has been rendered or judgment issued:

DECISION/JUDGMENT		
CLERK	(BY) DEPUTY CLERK	DATE

Copy 1 – Upon initiation of action, mail this copy to Director

Copy 2 – Upon filing document adding patent(s), mail this copy to Director

Copy 3 – Upon termination of action, mail this copy to Director

Copy 4 – Case file copy

AO 120 (Rev. 08/10)

<b>TO:</b> <b>Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Michigan on the following

☐ Trademarks or ☒ Patents. ( ☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:12-CV-12276	DATE FILED May 24, 2012	U.S. DISTRICT COURT Eastern District of Michigan
PLAINTIFF Joseph Robert Marchese, d/b/a JDS Digital Security Systems LLC		DEFENDANT Milestone Systems, Inc.

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
6,891,566	5/10/2005	Joseph Robert Marchese
8,185,964	5/22/2012	Joseph Robert Marchese

In the above-entitled case, the following patent(s)/trademark(s) have been included:

DATE INCLUDED	INCLUDED BY	
	<input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK

In the above-entitled case, the following decision has been rendered or judgment issued:

DECISION/JUDGMENT		
CLERK	(BY) DEPUTY CLERK	DATE

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Copy 2 – Upon filing document adding patent(s), mail this copy to Director

Copy 3 – Upon termination of action, mail this copy to Director

Copy 4 – Case file copy



AO 120 (Rev. 08/10)

<b>TO:</b> <b>Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Missouri/Eastern Division on the following

☐ Trademarks or ☒ Patents. ( ☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 4:11cv01579TCM	DATE FILED 9/12/2011	U.S. DISTRICT COURT Eastern District of Missouri/Eastern Division
PLAINTIFF Compression Technology Solutions LLC		DEFENDANT CA, Inc., et al.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 5,414,650	5/9/1995	Compression Research Group, Inc.
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK HOLDER OF PATENT OR TRADEMARK
1	
2	
3	
4	
5	

In the above—entitled case, the following decision has been rendered or judgement issued:

<b>DECISION/JUDGEMENT</b> On April 6, 2012, Judge Mummert, III, transferred this case to the Northern District of California as case 4:12-cv-01746. Enclosed is a copy of the Memorandum and Order and Order of Transfer.
--

CLERK <i>James G. Woodward</i>	(BY) DEPUTY CLERK <i>Melanie Berg</i>	DATE 5-24-12
-----------------------------------	--	-----------------

Copy 1—Upon Initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director  
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

<b>TO: Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Michigan on the following

☐ Trademarks or ☒ Patents. ( ☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 2:15-CV-10387-NGE-MKM	DATE FILED 1/28/15	U.S. DISTRICT COURT Eastern District of Michigan
PLAINTIFF JDS TECHNOLOGIES, INC.		DEFENDANT EXACQ TECHNOLOGIES, INC.

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
6,891,566	05/10/2005	Joseph Robert Marchese
8,185,964	05/22/2012	Joseph Robert Marchese

In the above-entitled case, the following patent(s)/trademark(s) have been included:

DATE INCLUDED	INCLUDED BY	
	<input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK

In the above-entitled case, the following decision has been rendered or judgment issued:

DECISION/JUDGMENT
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CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1 – Upon initiation of action, mail this copy to Director

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Copy 3 – Upon termination of action, mail this copy to Director

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AO 120 (Rev. 08/10)

<b>TO: Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Michigan on the following

☐ Trademarks or ☒ Patents. ( ☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:15-cv-10385-AC-EAS	DATE FILED 1/28/15	U.S. DISTRICT COURT Eastern District of Michigan
PLAINTIFF JDS TECHNOLOGIES, INC.		DEFENDANT AVIGILON USA CORPORATION, INC., and AVIGILON CORPORATION

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
6,891,566	05/10/2005	Joseph Robert Marchese
8,185,964	05/22/2012	Joseph Robert Marchese

In the above-entitled case, the following patent(s)/trademark(s) have been included:

DATE INCLUDED	INCLUDED BY	
	<input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK

In the above-entitled case, the following decision has been rendered or judgment issued:

DECISION/JUDGMENT		
-------------------	--	--

CLERK	(BY) DEPUTY CLERK	DATE
-------	-------------------	------

Copy 1 – Upon initiation of action, mail this copy to Director

Copy 2 – Upon filing document adding patent(s), mail this copy to Director

Copy 3 – Upon termination of action, mail this copy to Director

Copy 4 – Case file copy



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY.DOCKET NO./TITLE	REQUEST ID
12/708,394	02/18/2010	Joseph Robert Marchese	JDSC0101PUSP2	7405

## Acknowledgement of Loss of Entitlement to Entity Status Discount

The entity status change request below filed through Private PAIR on 11/13/2015 has been accepted.

### CERTIFICATIONS:

#### Change of Entity Status:

✕ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be notification of loss of entitlement to small or micro entity status, as applicable.

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Matthew M. Jakubowski/
Name:	Matthew M. Jakubowski
Registration Number:	30876