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NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the new patent application of

Inventor: David A. Monroe

For: APPARATUS FOR CAPTURING, CONVERTING AND TRANSMITTING A VISUAL IMAGE SIGNAL VIA A DIGITAL TRANSMISSION SYSTEM

Enclosed are:

[x] 33 Pages of specification, claims and abstract.
[x] 21 Sheets of drawings.
[ ] An Assignment (with cover sheet) of the invention to _____.
[ ] A certified copy of a _____ application.
[ ] Applicant claims small entity status.
[x] Declaration and Power of Attorney For Patent Application.
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			Small Entity		Other Than A Small Entity	
	Number Filed	Number Extra	Rate	Fee	Rate	Fee
Basic Fee				375.		750.
Total Claims	42 -20=	22	X 9.		X18.	396.
Indep. Claims	1-3=	0	X42.		X84.	
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APPARATUS FOR CAPTURING, CONVERTING AND TRANSMITTING A VISUAL IMAGE SIGNAL VIA A DIGITAL TRANSMISSION SYSTEM

Inventor: David A. Monroe

APPARATUS FOR CAPTURING, CONVERTING AND TRANSMITTING A VISUAL IMAGE SIGNAL VIA A DIGITAL TRANSMISSION SYSTEM

[0001] This application is a divisional application of and claims priority from a non-provisional United States Application entitled Apparatus For Capturing, Converting And Transmitting A Visual Image Signal Via A Digital Transmission System, Serial No. 09/006,073, having a filing date of January 12, 1998; the specification and drawings of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0002] The invention is generally related to image capture and transmission systems and is specifically directed to an image capture, compression and transmission system for use in connection with land line and wireless telephone systems.

DISCUSSION OF THE PRIOR ART

[0003] Industry has developed and continues to develop and enhance techniques for scanning, compressing, transmitting, receiving, decompressing, viewing and printing documents. This technology, encompassing the full body of facsimile transmission and reception, is currently in widespread use. The current standards, CCITT Group III and Group IV, define methods to scan and transmit high quality, bi-level images with a high degree of success and has become commercially acceptable throughout the world. However, gray scale documents are not easily transmitted because the scanners and algorithms are not tailored to the function. Three dimensional objects will not fit into the flat document scanners and cannot be transmitted.

[0004] Examples of systems that have addressed some of these issues are shown in U.S. Patent No. 5,193,012 which shows a video to facsimile signal converter, and U.S. Patent No. 3,251,937 which discloses a system for transmitting still television pictures over a telephone line.

[0005] Wire photography, and its extension, radio photography, have long been used by the news media. The most common form involves an input device that converts photographs into encoded signals for communication over telecommunications facilities or radio. At the receiving end, reproducing equipment reconverts the encoded image signals by exposing photographic film or other sensitized paper. The term facsimile is often used with these products.

[0006] Still video equipment has recently become available from vendors such as Kodak, Canon and Sony, and is again primarily used by television and print media, although applications are expanding rapidly in such areas as insurance investigations and real estate transactions. A still video camera captures a full color still video image that can be reproduced using a special video printer that converts the still video image data into hard copy form. For applications requiring communication of the still video image, transmit/receive units are available wherein the image begins and ends as a video image.

[0007] The Photophone from Image Data Corporation is an example of a specialty product that combines a video camera, display and storage facility in a terminal package. One terminal can send a real time or stored still video image to another for display or storage, or printing on special video printers. Again, the signal begins and ends as a video image.

[0008] Another example of a specialty product is peripheral equipment available for personal computers that enables the input/output, storage and processing of still video images in digitized formats. For instance, the Canon PV-540 is a floppy disk drive that uses conventional still video disks, digitizing and a still video image using a conventional format, and communicates with the computer through a standard communications I/0 port.

[0009] U.S. Patent No. 5,193,012 discloses a still-video to facsimile conversion system for converting the still-video image frame into a half-tone facsimile reproduction without having to store an entire intermediated gray scale image frame by repeatedly transmitting the still-video image frame from a still-video source to an input circuit with a virtual facsimile page synchronization module. This system permits image to facsimile conversion by utilizing a half tone conversion technique.

[0010] While the various prior art systems and techniques provide limited solutions to the problem of transmitting visual images via a facsimile transmission system, all fall short of providing a reliable and convenient method and apparatus for readily capturing, storing, transmitting and printing visual images in a practical manner.

SUMMARY OF THE INVENTION

[0011] The subject invention is an image capture, compression and transmission system that is specifically designed to permit reliable visual image transmission over land line or wireless communications using commercially available facsimile transmission techniques. The invention incorporates a camera and signal converter into an integrated unit wherein the converted signal may be transmitted on a real time basis or may be stored in memory for later recall and transmission. The design of the invention permits maximum flexibility, with the camera/converter/telephone or other transmission device being designed in a modular configuration wherein any or all of the devices may exist as integrated or independent units.

[0012] The preferred embodiment permits capture of a video image using a digital camera, an analog camera, or a video camera such as a camcorder. The captured video image is then converted into still frame digitized format for transmission over any of a variety of transmission systems ranging from Group-III facsimile to computer, or to a like device at a remote location, in any protocol desired. The invention recognizes that once the signal is digitized, the transmission protocols are virtually endless.

[0013] For example, the present invention, permits a still frame visual image to be

captured at a remote location and sent immediately, over wireless communication systems, to a remote location such as, by way of example, a computer system wherein the image could be merged directly into newsprint. The image may also be sent to and printed as a hard copy using any Group-III facsimile machine, anywhere in the world. Where desired, the images may be stored in memory for later recall, and may be archived on a portable medium such as a memory card or the like.

[0014] The system of the subject invention is particularly useful for applications where immediate transmission of visual images of scenes, people and objects is desirable and sophisticated equipment is not always available for receiving the information. The system also provides a unique and reliable means for transmitting visual data to and from remote locations, such as, by way of example, law enforcement and emergency vehicles and the like.

[0015] In the preferred embodiment of the invention, the system includes a video camera and an integral cellular telephone, wherein the telephone using the standard audio mode or future digital modes, can be used to transmit and receive visual image signals. A desk model is also disclosed and permits connection to a standard land line telephonic system. A mobile console model is disclosed for use in law enforcement vehicles, and the like. Other communication systems are also supported by the subject invention, including hardwired networks, radio and satellite transmission and the like.

[0016] A local facsimile machine may be incorporated with the unit and can serve as a printer for providing hard copy of the captured image at the point of capture, as well as being adapted for receiving facsimile transmissions in the standard fashion.

[0017] The circuitry is disclosed for supporting any of the preferred configurations from a basic real time transmission system via Group-III fax to a comprehensive system supporting both land line and wireless transmission of image, audio and documentary data at both a local and remote station.

[0018] The subject invention also permits digitized collection of audio signals through

the use of an internal microphone, and external input device, a cellular telephone, land line telephone, wireless radio or other communication system, and digitized audio playback, as well. The playback can be via an internal speaker, out an external outjack to a remote device or via a cellular telephone, land line telephone, wireless radio or other communication system.

[0019] The digitized image and audio capture features permit association of audio with an image, as well as data with the image. Useful data associated with the image includes GPS from either internal or external GPS devices, range information from ranging devices, date and time, and text which may be input from an integrated keyboard or from a remote device.

[0020] It is an important feature of the invention that the system supports storage of images in an interim storage format including raw video, compressed video, interim gray scale format and/or half tone format. The image can also be stored in the selected output mode, such as by way of example, a Group III facsimile mode. The versatile capability of the system permits transmission of captured data to a standard bi-level facsimile machine such as Group III, to gray scale facsimile systems or full color facsimile systems, as well as to other remote receiving devices such as, by way of example, personal computers and network servers. The data may be transferred in any of a variety of formats and protocols including JPEG, FAX, wavelets, emerging imagery formats, FAX and computer data protocols. The invention is adapted to operate in multiple modes, with a unitary capture and send mode or separate capture and store, and send modes.

[0021] In the preferred embodiment, the system is adapted for tagging a collected image, video, audio, and other data such as a GPS information, with geospatial information and real time clock and added text. This permits the complete historical data to be transmitted simultaneously with the image signal.

[0022] It is contemplated that the system of the invention would be self-contained with an integral power unit such as a disposable battery, rechargeable battery source or the

like. Therefore, the system is adapted to power up when in use and power down or "sleep" when not activated, preserving power during idle time. The power systems for the video camera, the video input circuits and converters, the modem or other transmission devices and other high drain components may be isolated and only powered when needed. This also permits use of ancillary functions, such as use as a cellular telephone, to proceed without draining the power source by powering idle components. The processor clock rate may also be slowed down during idle mode to further conserve power.

[0023] Where desired, the system also includes camera operation control capability through the use of digital/analog circuits for converting digital commands to analog signals for controlling the gain, pedestal, setup, white clip, lens focus, white balance, lens iris, lens zoom and other functions of the camera from a local input device, a remote device or as automatic or programmed functions. The central processor may also be used to control camera shutter rate. Other camera features and parameters which may be controlled in this manner are compressor resolution (such as high, medium, low user settings) corresponding to compression rate parameters, field/frame mode, color or monochrome, image spatial resolution (640x420 pixels, 320x240 pixels, for example), lens and camera adjustments, input selection where multiple cameras or video sources are used and the like.

[0024] When an integrated communications device is used, such as by way of example, a cellular telephone, the telephone can be isolated from the rest of the system to permit independent use, and independent power up and power off and other cellular phone functions.

[0025] In operation, the system permits not only the manual capture, dial (select) and send of images, but may also be fully automated to capture, dial and send, for example, on a timed sequence or in response to a sensor such as a motion sensor, video motion detection, or from a remote trigger device. The remote trigger also may be activated by an incoming telephone signal, for example.

[0026] The remote device may also be used for remote loading and downloading of firmware, and for setting of the programmable parameters such as to provide remote configuration of sampling modes during capture, compression rates, triggering methods and the like.

[0027] The triggering function permits a multitude of sampling schemes for a simple triggered activation for capturing an image upon initiation to a trigger signal to more complicated schemes for capturing and transmitting images prior to and after receipt of the trigger signal. The trigger function can be set to operate, for example, on a time per sample and number of sample basis, or time per sample and total sample time basis, or number of samples and total time basis. Depending on application, the trigger can sample in a prior to and after signal mode, using in combination the time per sample and number of samples prior and after signal basis, a total time basis, a percent prior versus percent after trigger basis, time per sample basis, time prior to and time after trigger basis, and other combination. For example, if the image capture device is positioned to monitor traffic accidents at a specific location, and an audio signal sensor identifying a crash were used as the trigger, it would be desirable to collect image sample both prior to and after the trigger signal. The number of samples, total sample time, and percentage of samples prior to and after trigger would be controlled by the specific application.

[0028] Circular sampling techniques are supported by the data capture system of the present invention. This is particularly useful when triggering events are used to initiate transmission of collected image data over the communications system. For example, if a triggering event is motion detected at a motion sensor, it may be useful to look at the images captured for a period of time both prior to and after the actual event. The circuitry of the subject invention permits any circular sampling technique to be utilized depending upon application, such as prior to an after trigger, only after trigger or only before trigger or prior to and after the trigger point. Again, as an example, it may be desirable to look primarily at images captured before a triggering event if the event is a catastrophic event such as an explosion or the like. Other circular sampling techniques may be employed, as well,

incorporating multiple cameras, for example, wherein different fields are sampled depending upon the time frame in a sequence of events.

[0029] It is, therefore, an object and feature of the invention to provide an apparatus for capturing, converting and transmitting a visual image via standard facsimile transmissions systems.

[0030] It is another object and feature of the invention to provide an apparatus for compressing the visual image data in order to minimize the capacity requirements of the data capture and storage system.

[0031] It is an additional object and feature of the invention to provide an apparatus for capturing and storing a visual image for later recall and review and/or transmission.

[0032] It is yet another object and feature of the invention to provide an apparatus for storing a captured video image in digital format on a portable storage medium.

[0033] It is an additional object and feature of the invention to provide an apparatus capable of sending and receiving telephonic audio messages, facsimile documents and captured visual images to and from standard, readily available remote stations.

[0034] It is a further object and feature of the invention to provide the means and method for capturing images prior to, prior to and after, or after a triggering event.

[0035] It is also an object and feature of the invention to provide for multiple triggering events and/or optional viewing or review of the captured images prior to printing or transmission.

[0036] It is another object and feature of the invention to provide an apparatus which may be activated from a remote location for initiating the capture of images by the device.

[0037] Other objects and features will be readily apparent from the drawings and detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] Fig. 1. is a block diagram of a basic facsimile camera configuration for capturing an image via a camera and transmitting it via Group III facsimile transmission to a standard hard copy medium.

[0039] Fig. 2 is similar to Fig. 1, but incorporates a memory storage capability, permitting storage and optional review or viewing of the image prior to transmission.

[0040] Fig. 3 is similar to Figs. I and 2, but incorporates a data compression scheme for increasing the capacity of the memory and for increasing efficiency of transmission.

[0041] Fig. 4 includes the capture and transmission configuration of Fig. 2, with multiple transmission format capability including Group-III facsimile, personal computer, modem, parallel and serial transmission schemes.

[0042] Fig. 5 is an exemplary schematic diagram supporting the configurations shown in each of Figs. 1-4.

[0043] Figs. 6A, 6B, and 6C, are block diagrams of the physical components of desktop, portable and comprehensive console embodiments of the invention, respectively.

[0044] Fig. 7A and 7B are perspective drawings of a hand held device for capturing, storing and transmitting an image in accordance with the invention (new drawings to replace Frassinito design.

[0045] Figs. 8A-8L (Formerly Fig. 12) comprises a schematic diagram for an exemplary embodiment of the circuit for supporting the subject invention.

[0046] Fig. 9 is a diagram of the various triggering sequence options.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0047] The image capture and transmission system of the subject invention is suited for capturing one or more single frame analog image or a digital image data signal and transmitting the captured signal via any of a plurality of transmission schemes to a remote receiving station where the image is downloaded in a suitable format for viewing and printing on hard paper copy, a CRT screen image, or other medium. The system is particularly well suited for sending and/or receiving images via a standard Group III facsimile transmission system and permits capture of the image at a remote location using an analog or digital camera. Two generic configurations are shown and described, the first, where each image is transmitted as it is captured, and the second, which permits capture, storage, and selective recall of captured images for transmission. The invention also contemplates a portable storage medium, wherein the captured stored medium may be removed from the capture device and archived for later use. While a system for black and white (gray tones) for Group-III facsimile transmission is described in detail herein, the invention could be readily adapted to transmission of color images utilizing the teachings of the present invention using industry standard color video standards and circuits. Both portable, or hand held, and stationary, or desktop, units are described. The circuitry utilized for both configurations is identical , but stationary configurations do not need a battery.

[0048] Figs. 1-5 are circuit configuration diagrams for the various capture, storage and transmission schemes. The physical embodiments utilized to employ the teachings of the schemes taught in Figs. 1-5 are not limited. Figs. 6-10 are exemplary physical embodiments of the subject invention.

[0049] Turning now to Fig. 1, the simplest embodiment of the invention incorporates a standard analog or digital camera device 10 for capturing a visual image in the typical

fashion. The camera 10 may be operator activated as indicated at 12, or may be programmed to be activated at selected intervals or in response to certain conditions. For example, a motion detector may be utilized to activate the camera 10 in a surveillance installation. Once activated, the camera 10 captures a visual image in typical fashion through a lens (see lens 192, for example, in Fig. 7A). In the illustrated embodiment, the captured image is then transmitted to a gray scale bit map memory device 16, from which it is output to a half-tone conversion scheme 18 to be input into a binary bit map 20 for formatting the captured image in a configuration suitable for transmission via a Group-III facsimile system. The signal generated at 22 by the binary bit map 20 is input into a Group-III encoding and compression network 24 for generating an output signal at 26 which is introduced into a Group III protocol transmission device 28. The output at 30 of the transmission device 28 is then transmitted into any standard transmission interface such as, by way of example, hard line telephonic transmission, cellular transmission, radio signal, satellite transmission or other transmission system 32 via a modem or similar device, as needed(as diagrammatically illustrated at 29), to be received via a compatible interface by a remote Group-III receiving system 34. The Group III receiving system 34 is a typical Group-III facsimile system comprising a Group-III receiver 36, decoder and decompressor 38 and binary bit map 40, from which a facsimile hard copy such as plain paper copy 42 may be generated.

[0050] This configuration is particularly well suited where real near time transmission is desired, for example when the system is operator controlled and a "real time" image is desired at a remote location. An example of such a system may be a photo identification confirmation of an apprehended suspect in law enforcement use, or transmission of images of damaged assets for insurance purposes, or transmission of images of construction job site conditions. This configuration is also well suited for use in those applications where a sensor activates the system and real time transmission of the sensed condition is desired. An example of such a system would be a motion activated camera in a surveillance location, where the image is immediately transmitted to a remote monitoring station. Of course, it will be readily understood by those who are skilled in the art that tagging a transmitted image with information such as, by way

of example, date, time and location, can be incorporated in the transmitted signal so that a receiving station could monitor a plurality of remote image data capture systems. This is also useful for reviewing a body of previously stored or printed images to determine the time and location of such image.

[0051 The embodiment of Fig. 2 is similar to Fig. 1, but incorporates a memory and optional operator viewer system. The image is captured by the camera 10 and conditioned by the gray scale bit map 16, as in Fig. 1. In this embodiment, the output 44 of the bit map 16 is input into a standard digital memory device 46 for later recall. This configuration is particularly well suited for applications where near real time transmission of the image either is not required or is not desirable. It will be noted that with the exception of the insertion of the memory device 46 and the optional viewer device 48, the capture and transmission system of Fig. 2 is identical to that shown and described in Fig. 1. Once the image is captured by the camera 10 and is presented at 44 to the memory device 46, it is stored for later recall and transmission. The specific type of memory device is optional and may include, for example, an SRAM device, a DRAM, Flash RAM, hard drive, floppy disk, PCMCIA format removable memory (see, for example, the PCMCIA card 50 in Fig. 7A), writeable optical media or other storage device. The memory may selectively capture images, as indicated by the operator interface/capture interface 52, or may be programmed to selectively capture periodic images or all images. In the embodiment shown in Fig. 2, an optional viewer device 48 is provided. This permits the operator to recall and view all or selective images before transmission, as indicated by the operator interface/recall interface 54. This permits the operator to review all images retained in the memory 46 and transmit selective images, as desired, to the Group-III transmission system. The remainder of the system of Fig. 2 operates in the same manner as the configuration shown and described in Fig. 1.

[0052] The configuration of Fig. 3 incorporates all of the features of Figs. I and 2, and additionally, includes an interim data compression and decompression scheme to permit increased utilization of the memory or storage medium 46. As shown in Fig. 3, an interim format compressor 56 is inserted between the gray scale bit map 16 and the memory device 46. This permits compression and reduction of the data required to

store the image, effectively increasing the capacity of the storage device. It is an objective of the storage device to preserve the gray scale quality of the image for viewing at the location of capture. An interim format decompression device 58 is inserted between the output of the memory device 46 and the rest of the system, whether the optional viewer 48 is utilized, or the output is entered directly into the half-tone convertor 18. The interim compression/decompression scheme is particularly useful when all of the image data is to be permanently archived, or when limited capacity portable media are used, such as, by way of example, floppy disks or a portable PCMCIA card. It will be noted that the remainder of the system shown in Fig. 3 is identical to the system shown and described in Fig. 2.

[0053] Fig. 4 illustrates the use of the image capture and/or retention configured in any of the optional embodiments of Figs. 1-3 and adapted for use in combination with any of a variety of transmitting and receiving schemes such as, by way of example, the Group-III system shown in Figs. 1-3, a modem, direct connection to a personal computer, serial or parallel transmission, or any selected transmitting/receiving protocol. This illustration demonstrates the versatility of the system once the image has been captured, converted and conditioned by the image capture device of the subject invention. Specifically, once the image is captured by the camera 10 and conditioned by the gray scale bit map 16, it may be stored and transmitted, or transmitted "real time" via any transmitting and receiving scheme. As shown in Fig. 4 the image capture device includes the memory device 46 and the optional viewer 48 for incorporating maximum capability. However, any of the schemes of Figs. 1-3 would be suitable for producing a transmittable signal. In the embodiment shown, a format select interface switch 60 is positioned to receive the fully conditioned signal on line 59. This would permit either automated or manual selection of the transmitting protocol, including the Group-III facsimile system previously described in connection with Figs. 1-3, as indicated by selecting format select switch 60 position A; or PC modem protocol as illustrated by the JPEG compressor 62 and protocol generator 64, as indicated by selecting format select switch position B; or the wavelet compressor and PC modem protocol, as illustrated by the wavelet compressor 66 and PC modem protocol generator 68 by selecting switch position C; or any selected conversion network 65, (if needed)

with a compatible compressor 67 (if needed) and compatible protocol generator 75 (if needed), as indicated by switch position D; or a serial protocol scheme 77, with serial drivers 79 directly to a hardwired personal computer 81 by selecting switch position E. Of course, it will be readily understood by those skilled in the art that one or a plurality of transmitting protocols may be simultaneously selected. Depending on the protocol selected, the signal output is generated at the selected output module and introduced to a communications interface module 83 via a modem or other device, as needed, for transmission via a transmission system to a compatible receiving station such as the Group-III facsimile device 34, the personal computer 85, the video telephone 89, and/or other server or receiving device 91 for distribution.

[0054] An exemplary circuit supporting the configurations of Figs. 1-4 is shown in Fig. 5. With specific reference to Fig. 5, an analog camera is indicated by the "video in" signal at 70. Typically, the video signal is a composite video/sync signal. The diagram shows all of the signal processing necessary to sync up to an NTSC signal 70 coming out of the analog camera and processed for introduction into an integral RAM memory 71 and/or a portable RAM memory via interface 73. An analog to digital (A/D) converter 74 converts the video portion of the analog signal from the camera and produces the digital signal for output at line 76. The digital output data on path 76 is introduced into a data multiplexer circuit 81 and into the RAM memory unit(s) 71, 72. In the exemplary embodiment, the portable RAM memory 72 is an image card such as, by way of example, a PCMCIA SRAM card or a PCMCIA Flash RAM card. However, it will be readily understood that any suitable RAM memory configuration can be used within the teachings of the invention. It is desirable to store compressed rather than raw data in card 72 because of space and transmission speed factors.

[0055] As the signal at 70 is introduced into the circuit, the sync detector 78 strips the sync signal portion off of the video signal. The sync signal drives the video address generator 80 for providing a signal used to generate an address signal at the address multiplexer circuit 82 for synchronizing the scanned in video signal with the locations in RAM to define each frame to be captured. The read/write control 84 controls the coordination of the sync signal 93 with the video signal to define a full frame.

Basically, when the camera is activated either by the operator or by automation, the system processor 86 detects the initiation of the camera and capture sequence and sends a signal via line 88 to the read/write control 84. The read/write control then monitors the incoming video signal 83 to find the horizontal and vertical sync pulse to identify the beginning of a frame. The read/write control then initiates writing to memory at the RAM devices to initiate capture of the frame. The read/write control continues to "write" to memory until the appropriate sync signal is received, indicating the end of the frame. At this point a single frame is captured in RAM 71 and/or on the portable medium RAM 72.

[0056] This frame may now be output from the system via any of the available transmitting schemes. In the exemplary embodiment, the processor 86 may be any processor or such as a microprocessor or DSP, with sufficient capability to perform the described functions. The processor bus is indicated at 87. The circuitry supporting the processor comprises the processor chip 86 and the control store memory (ROM, Flash RAM, PROM, EPROM or the like) 92 for storing the software program executed by the processor. It will be understood that other memory devices could be utilized without departing from the spirit of the invention. For example, a Flash RAM would permit flexibility and replacement of the program for upgrades and enhancements. The user interface commands are generated and interpreted by the software that is being executed by the processor 86.

[0057] The display unit 94 is connected through a typical interface 96, and provides visual user interface at the camera body to give the operator a visual read-out of the status of the collection and transmission of a selected frame. In the exemplary embodiment, the display unit is a two line, multi-character LCD display, but other sizes or technology displays could be readily incorporated, depending, for example, on the amount of graphics desired in the display module. The bank of operator buttons and/or switches 98 are connected to the system through the button interface 100.

[0058] The general purpose control register 102 serves as a latch and permits control bits to be introduced from the processor 86 to the transmitting systems or to transfer

status bits from the transmitting systems back to the processor in the well known manner. The modem 104 may be any of a variety of widely available modems or modem chip sets currently in commercial use. The modem should support CCITT Group III fax format for transmission to Group III fax machines. Once the signal is introduced into the modem 104, it is handled in typical fashion to provide input/output transmissions: (1) from the subject device to a hardwired telephonic line as indicated at 114, (2) from the subject device to the external facsimile machine as indicated at 116, or (3) from the subject device to an external wireless device telephone as indicated at 130. The specific selection is controlled by the user at button module 98 in conjunction with the processor 86.

[0059] An isolation transformer 110 is provided to isolate the circuitry connected to external communications circuit from the circuitry of the subject device. The relays at 108 and 112 permit patching directly into the hardwired telephonic line and to the telephone company system as indicated at 114, to an external handset or fax machine at 116, or to the modem 104, whereby facsimile data can be sent and received via the modem. These relays could be mechanical or solid state. The relay 118 is connected to a tone source 120 for providing an audible tone signaling to the user that the system is being used for transmitting or receiving a captured image.

[0060] With specific reference to the circuitry associated with relay 112, it will be noted that when the handset is switched away from the phone line to the tone source, the modem transformer 110 is switched to the telephone line 114. This blocks normal audio telephone service and permits the transmission of an image signal from the RAM devices 71 or 72, through the modem 104, and to the telephone line 114.

[0061] In the exemplary embodiment, a stand alone facsimile machine can be connected through the external handset jack at 116. With relay 112 set to activate telephone service and the tone generator 120 disconnected, the relay 108 can be set in either of two positions. The first position, as drawn, connects the facsimile machine at jack 116 to the telephone line, permitting standard facsimile transmission. The second or alternative position permits the modem 104 to transmit the image data signal

directly to the facsimile machine at jack 116, for providing an archive copy or the like. In this configuration, the facsimile machine will operate as a local printer for printing the captured images. Signal source 120 may be used as a ringing voltage generator for signaling such facsimile machine prior to connection.

[0062] The system of the present invention also contemplates wireless transmission over a cellular telephone, radio frequency, satellite transmission or the like. In the exemplary embodiment, the specific configuration for a cellular telephone interface is shown in detail. The amplifiers 122, 124 amplify the input of the modem 104 and are controlled by the FETs 126, 128, respectively. The FETs are controlled by the control register 102 and allow selection of the audio either coming in from the cellular interface 130 or from the telephone line 104 to the modem. This permits the cellular phone to be used for three distinct functions: (1) as an audio telephone, (2) as a transmitting system for transmitting the captured image and related signals via a cellular system, and (3) for receiving incoming transmissions to the processor. such as remote control, remote configuration, or images.

[0063] In the exemplary embodiment, the image card 72 is a DRAM card or non volatile storage card such as a Flash RAM or the like and provides a removable medium for storing the image data as either raw or compressed data. The card can also be used to store compressed data sent into the system via external facsimile transmission. As illustrated, the system is capable of both sending and receiving image data via Group-III fax or other protocol. By incorporating the digital to analog (D/A) converter into the system and pulling the signal from the RAM 71 (or portable RAM 72), the signal can be displayed right at the camera viewfinder 134 or other display device connected at port 138. A sync generator 136 is incorporated to provide synchronization of incoming data in the same manner. The sync detector 78 is utilized to define a frame-by-frame correlation of the data generated by the camera at the video input 70 for storage to memory 71 or 72.

[0064] Any standard power source may be utilized, including replaceable or rechargeable batteries 141, or an AC adapter 142. The AC adapter is particularly

suitable for desktop applications.

[0065] The exemplary embodiment includes a speaker or other audio transducer 144 for emitting a detectable signal whenever the user interface merits its use, such as user induced errors, system errors, user attention getting and the like.

[0066] In order to send a facsimile transmission over a typical Group-III Facsimile system, the multiplexer 82 is switched to the processor 86 such that the RAM address is generated by the processor 82 instead of the video address generator signal. In the facsimile transmitting mode, the processor accesses the RAM and manipulates the data representing each frame image. For example, the processor will perform the gray scale to half tone conversions described in connection with Figs. 1-4 to prepare the signal for facsimile transmission. The processor can also perform image compression and output the image as a gray scale. In the facsimile transmission mode, once the half tone conversion is completed, the processor executes a code for performing a bi-level compression of the data and the signal representing the frame data is output over line 90, through the multiplexer 81 and over the processor bus 87 to the processor 86, then to modem 104 for transmission. Other memory and processor configurations could be used without departing from the scope and spirit of the invention, as will be recognized by those skilled in the art.

[0067] Various physical configurations of the invention are shown in Figs.7A & 7B. Figs. 6A, 6B and 6C are block diagrams for desktop and portable units. Figs. 7A and 7B illustrate the subject invention as incorporated in a standard 35 millimeter type camera housing.

[0068] A basic desktop system is shown in Fig. 6A, and includes a console unit having a telephone jack 152, an external telephone connection 154 and a video input/camera power jack 156 for connecting the analog camera 10. A facsimile machine may be also connected at jack 154 to provide local printer capability. The configuration shown in Fig. 6B is a basic portable system, with a battery powered portable module 160 having a self-contained power source 162. The system may include an integral RAM and/or

the removable memory module as indicated by the image card 72. The camera 10 may be an integral feature of the portable module 160, or may be a detached unit, as desired. In this embodiment, a cellular telephone 164 is provided with a data jack 166 for connecting to the output jack 168 of the module, whereby the image data signal may be transmitted via the cellular telephone to a remote facsimile machine over standard cellular and telephone company facilities. When incorporating the circuitry of Fig. 5, the cellular phone may be used as both an input and an output device, and incoming data or stored images may be viewed through the viewfinder 170.

[0069] Fig. 6C shows a comprehensive desk or stationary configuration incorporating all of the features supported by the circuitry of Fig. 5. As there shown, the control module 172 is adapted for receiving the image card 72 and is powered by an AC power adapter as indicated at 142. The camera 10 is connected to the module via a hardwired connection at jack 174. A monitor 176 is provided for viewing data images. A video cassette recorder 178 is provided and may be used as an auxiliary input device for the images transmitted from the system. The facsimile machine 180 can be used as a local printer, or can be used to send facsimiles transmissions in the well-known manner. Direct connections to the telephone line system are provided at jack 182. The FAX/phone jack 186 can be connected to a facsimile machine 180 and/or a standard telephone 184, where the public telephone system can be accessed. A data jack 188 is used to connect to a cellular telephone or the cellular modem, or other wireless device for transmission or reception of image data.

[0070] Turning now to Figs. 7A and 7B, the camera body 190 is similar to a standard 35 millimeter camera housing and is adapted to receive a standard lens 192 with a viewfinder 194. The electronics are housed in the casing in the area normally occupied by the film and film advancing implements. The operator interface button keys 98 are housed within the housing and may be positioned on the back plate 196 of the body. Fig. 8. The LCD unit may be positioned to be visible through the viewfinder 194 or may be in a separate back window 198. The memory card 72 is positioned in a slot 200 provided in a sidewall of the camera body. This camera has the appearance of a standard SLR 35 millimeter camera. In addition, where desired, an integral cellular

phone can be incorporated in the camera housing and transmission can be sent directly from the camera housing to a remote receiving station. The keypad for the telephone is indicated at 202.

[0071] Fig. 8 is an illustration of an exemplary schematic diagram for the circuit of a system according to the teaching of the invention as specifically taught in the diagram of Fig. 5. Pin numbers, wiring harnesses and components are as shown on the drawing. Fig. 8, part A, is the system interconnect and shows the central processor board 300, the video board 302, the power board 304 and the CRT electronic interconnect board 306. The telephone interface is provided at 307. Board 308 is the audio connector board. Board 310 is the serial connector board and board 312 is the video connector board. Fig. 8, part B contains the audio logic, with audio 1/O at 314. The audio amplifiers are designated 316 and 318. A microphone connector is provided at 320, with preamplifier circuit 322. Audio switches are provided at 324 and 326. Summing circuit 328 provides audio summing. The serial RAM for audio is designated 330. Fig. 8, part C includes the camera module 332 and the camera control digital to analog convertor 334. Amplifier 336 is the video buffer. Module 338 is the camera shutter control resistor.

[0072] Fig. 8, part D contains the central processor unit 340. Voltage in is at 342, with the power switch at FET 344. Power shutdown is provided at the video shutdown bit 346. The video connector is designated at 348. Pin I is switched five volts out to video logic. Pins 2-9 are connected to the video data bus and pins 10-22 are video control signals. Buffers 350 and 352 are the video board 1/O isolation buffers. As shown, pin 19 of buffer 352 is the output enable and is connected to the video shutdown bit 346. Line 354 is bus enable. Pin A0 of buffer 350 is the direction control signal and pins Al A7 are connected to the processor data bus. Pins 10-17 of buffer 352 are also connected to the processor bus.

[0073] The system DRAM memory is designated 356. The processor 1/O module is designated 358 and the 1/O decoder is provided at 360. A non-volatile RAM 362 provides system parameters. The processor oscillator is shown at 364 and a real time clock at 366. Controller 368 is the RAM card controller. The PCMCIA socket for the

RAM card is shown at 370a and 370b. The modem is designated 372. The serial controller is shown at 374 with serial controller oscillator 376. Module 378 is a memory module. A signal buffer is provided at 380, and an address decoder at 382. Connectors are designated at 384, 386 and 388.

[0074] Fig. 8, part E shows the modem board connector at 390, the glue logic PLD at 392 and the glue logic module at 394. Module 396 is the synchronous/asynchronous serial controller. Circuit 398 is the signal multiplex relay and circuit 400 is the transmit/PTT relay. Bypass relays are shown at 402. Relay 404 is the digital mode relay. Transformer 406 is the audio isolation transformer. Circuit 408 provides a low speed data filter. The line drivers are designated 410 and the line rectifiers are designated 412, respectively. Connector 414 provides radio/serial data connection.

[0075] Fig. 8, part F shows the status LED's 416 and the PCMCIA door open switch 418. Fig. 8, part G shows the power switches 420. Fig. 8, part H is the battery pack 422.

[0076] Fig. 8, part I is the power supply. The rechargeable battery connection is shown at 424, with DC power input at 426. An internal battery/external DC input transfer relay is provided at 430. The signal for the power switch on the removable disk drive access door is on pins 3,4 of connector 428. The voltage IN regulator is designated at 432, with the processor voltage regulator designated 434. The processor power control bit is at 436. The system power control bit is at 438, with the system voltage regulator at 440. The video power control bits are at 442 and 444, with the video voltage regulators at 446 and 448, respectively. Battery 450 is the real time clock battery. Connector 452 is the battery charger connector. Connector 454 connects processor power, system power, regulated battery power and real time clock power, as shown. Connector 456 connects video power. The power sequencer circuit is at 458.

[0077] Fig. 8, part J shows the direct access arrangement to a land line telephone at 460 and the video viewfinder circuitry (CRT electronics) at 462.

[0078] Fig. 8, part K is the video control circuitry. The video input amplifier is designated at 464. The composite video sync stripper is designated at 466. The video H/V timing pulse generator is at 468 and the video phase lock loop at 470. The register 472 is the video control register. Circuit 474 provide programmable video filters--edge enhancers, with the FET switch designated at 476. The video filter circuit is at 478 and the video filter is at 480. The video reference digital to analog circuit-is shown at 482, with the video analog to digital circuit at 484 and the video analog to digital data out buffer at 486. The voltage reference circuit is designated at 488.

[0079] Fig. 8, part L shows the push button control switches as 490 and 492. The keyboard display is designated 494, and the microcontroller 496 is the keyboard and keyboard display microcontroller. The backlight circuitry is designated at 498, with the back light control at 500. Module 502 is the LCD module.

[0080] The circuitry supports any of the preferred configurations from a basic real time transmission system via Group-III fax to a comprehensive system supporting both land line and wireless transmission of image, audio and documentary data at both a local and remote station.

[0081] The subject invention also permits digitized collection of audio signals through the use of an internal microphone, and external input device, a cellular telephone, land line telephone, wireless radio or other communication system, and digitized audio playback, as well. The playback can be via an internal speaker, out an external out jack to a remote device or via a cellular telephone, land line telephone, wireless radio or other communication system.

[0082] The digitized image and audio capture features permit association of audio with an image, as well as data with the image. Useful data associated with the image includes GPS from either internal or external GPS devices, date and time, and text which may be input from an integrated keyboard or from a remote location.

[0083] It is an important feature of the invention that the system supports storage of

images in an interim storage format including raw video, interim gray scale format and/or half tone format. The image can also be stored in the selected output mode, such as by way of example, a Group III facsimile mode. The versatile capability of the system permits transmission of captured data to a standard bi-level facsimile machine such as Group III, to gray scale facsimile systems or full color facsimile systems, as well as to other remote receiving devices such as, by way of example, personal computers and network servers. The data may be transferred in any of a variety of formats and protocols including JPEG, FAX, emerging imagery formats, wavelets and data protocols. The invention is adapted to operate in multiple modes, with a unitary capture and send mode or separate capture and store, and send modes.
In the preferred embodiment, the system is adapted for tagging a collected image, video, audio, and other data such as a GPS signal, with a real time clock and added text. This permits the complete historical data to be transmitted simultaneously with the image signal.

[0084] It is contemplated that the system of the invention would be self-contained with an integral power unit such as a rechargeable battery source or the like. Therefore, the system is adapted to power up when in use and power down when not activated, preserving power during idle time. The power systems for the video camera, the video input circuits and converters, the modem or other transmission devices and other high drain components may be isolated and only powered when needed. This also permits use of ancillary functions, such as use as a cellular telephone, to proceed without draining the power source by powering idle components. The processor clock rate may also be slowed down during idle mode to further conserve power.

[0085] Where desired, the system also includes camera operation control capability through the use of a digital/analog network for converting digital commands to analog signals for controlling the gain, pedestal, setup, white clip, lens focus, and other functions of the camera from a local input device, a remote device or as programmed functions. The central processor may also be used to control camera shutter rate. Other camera features and parameters which may be controlled in this manner are compressor resolution (high, medium, low), field/frame mode, color or monochrome, image spatial

resolution (640x430, 320x240, for example), lens and camera adjustments, input selection where multiple cameras are used and the like.

[0086] When an integrated communications device is used, such as by way of example, a cellular telephone, the telephone can be isolated from the rest of the system to permit independent use, and independent power up and power off and other cellular phone functions.

[0087] In operation, the system permits not only the manual capture, dial (select) and send of images, but may also be fully automated to capture, dial and send, for example, on a timed sequence or in response to a sensor such as a motion sensor or from a remote trigger device. The remote trigger may be activated by an incoming telephone signal, for example. The remote device may also be use for remote loading and downloading of firmware, and of the programmable devices, as well as to provide remote configuration of sampling modes during both the capture and the send functions.

[0088] Circular sampling techniques are supported by the data capture system of the present invention. Fig. 9 is a diagram illustrating exemplary sampling techniques in accordance with the teachings of the invention. As shown in Fig. 9, the time sequence is indicated by the Time Line: t1, t2...tn, with a sample at each time interval, as indicated by S1... Sn. For purposes of illustration, the triggering event occurs at time interval t10. Based on the predetermined programming of the system, images will start to be collected upon triggering event, as shown at 210, for a predetermined period prior to and after trigger, as shown at 212, or immediately preceding the trigger, as shown at 214. This permits "circular image storage" without requiring that all images be collected and stored in order to look at events surrounding a triggering event. The technique is also very useful when multiple overlapping zones are monitored by multiple devices and it is desirable to sequence from device to device without losing any critical images.

[0089] This is particularly useful when triggering events are used to initiate transmission of collected image data over the communications system. For example,

if a triggering event is motion detected at a motion sensor, it may be useful to look at the images captured for a period of time both prior to and after the actual event. The circuitry of the subject invention permits any circular sampling technique to be utilized depending upon application, such as prior to an after trigger, only after trigger or only before trigger. Again, as an example, it may desirable to look primarily at images captured before a triggering event if the event is a catastrophic event such as an explosion or the like. Other circular sampling techniques may be employed, as well, incorporating multiple cameras, for example, wherein different fields are sampled depending upon the time frame in a sequence of events.

[0090] Other configurations are contemplated and are within the teachings of the invention.While specific embodiments have been shown and described herein, it will be understood that the invention includes all modifications and enhancements within the scope and spirit of the claims.

CLAIMS

What is claimed is:

1. A self-contained image processing system for capturing a visual image and transmitting it to a remote receiving station, the image processing system comprising:
   a. An image capture device;
   b. A processor for generating a data signal representing the image;
   c. A communications device adapted for transmitting the data signal to the remote receiving station;
   d. A wireless transmission system between the communications device and the compatible receiving station.

2. The image processing system of claim 1, further including a memory for receiving and storing the data signal, and wherein the communications device is adapted for recalling the stored data signal from memory.

3. The image processing system of claim 1, wherein said memory is a removable random access medium and wherein the system is adapted for selectively charging and discharging the memory.

4. The image processing system of claim 1, wherein the image capture device is an analog camera for generating an analog image signal and there is further included an analog to digital converter for converting the analog image signal to a digital signal.

5. The image processing system of claim 1, further including a subprocessor for generating a Group-III facsimile compatible signal representing the digital signal.

6. The image processing system of claim 1, wherein the subprocessor comprises:
   a. A gray scale bit map;
   b. A half tone converter; and
   c. A binary bit map.

7. The image processing system of claim 1, wherein there is further included an integrated wireless telephone associated with the communications device.

8. The image processing system of claim 1, further comprising a housing for housing all of the elements of the system in an integrated body.

9. The image processing system of claim 1, wherein said image capture device is a digital camera.

10. The image processing system of claim 2, further including a view screen for viewing the captured and stored image.

11. The image processing system of claim 5, further including a facsimile receiving device associated locally with the system for providing a local printer for reproducing the captured image in hard copy.

12. The image processing system of claim 1 wherein the processor is adapted for generating a signal in any of a plurality of selected protocols and wherein the communications device is adapted for transmitting the signal in the proper protocol to a remote, compatible receiving station.

13. The image processing system of claim 1, wherein:

a. The image capture device is an analog video camera for generating a video signal;

b. The processor further comprises:

i. An analog to digital converter;

ii. A sync detector and a video address generator for synchronizing the digital signal with the analog signal for defining the beginning and end of the signal to define a still frame;

iii. A random access memory for receiving and storing the converted, synchronized signal frame-by-frame;

iv. A processor routine for converting the signals stored in the memory to a protocol adapted for transmission to a remote, compatible protocol receiving station;

c. A communications device for transmitting the signal in the proper protocol to the compatible receiving station.

14. The image processing system of claim 13, wherein the processor routine converts the signals to a Group III facsimile protocol, the system further including a facsimile modem for accepting the signal and transmitting to the compatible receiving station.

15. The image processing system of claim 13, further including a hardwired transmission system and a wireless transmission system associated with the modem and a switching device for selecting in the alternative either the hardwired or the wireless transmission system.

16. The image processing system of claim 13, further including a local facsimile receiving system associated with the modem for providing local hard copy of the stored image signals in the memory.

17. The image processing system of claim 16, further including a switching device for selectively activating and deactivating the local facsimile receiving system.

18. The image processing system of claim 13, further including an integral viewer for viewing the images stored in the memory.

19. The image processing system of claim 13, wherein the memory is a removable memory medium which may be selectively removed from the system.

20. The image processing system of claim 19, wherein the removable memory medium comprises a PCMCIA card memory.

21. The image processing system of claim 1, wherein the system is of modular construction, and the camera, the processor and the communications device are each independent, functional

units which may be coupled to one another for defining the assembled system.

22. The image processing system of claim 1, further comprising an audio signal capture device adapted for capturing an audio signal in correlation with the captured video signal.

23. The image processing system of claim 1, further comprising a data processor for creating a text data signal associated with said image data signal.

24. The image processing system of claim 23, further including an input device for providing text data to the data processor.

25. The image processing system of claim 24, wherein said input device is user controlled.

26. The image processing system of claim 25, wherein said user controlled input device is an integral keyboard.

27. The image processing system of claim 24, said input device comprising a real time clock.

28. The image processing system of claim 24, said input device comprising a global positioning system.

29. The image processing system of claim 2, wherein said image data signal is stored in a raw video format.

30. The image processing system of claim 2, wherein said image data signal is stored in a compressed format.

31. The image processing system of claim 2, wherein said image data signal is stored in a half-tone format.

32. The image processing system of claim 1, wherein the remote receiving station is a standard bi-level facsimile machine and the image data signal is generated in a standard bi-level facsimile machine format and protocol.

33. The image processing system of claim 1, wherein the remote receiving station is a gray-scale facsimile machine and the image data signal is generated in a gray-scale format and protocol.

34. The image processing system of claim 1, wherein the remote receiving station is a color facsimile machine and the image data signal is generated in a full color format and protocol.

35. The image processing system of claim 1, wherein the remote receiving station is a digital device and the image data is digital.

36. The image processing system of claim 1, further comprising a self-contained power source for powering the system.

37. The image processing system of claim 36, wherein said communications device is adapted to be used independently of the image capture device and the processor, and wherein the power supply is adapted for isolating the power to the communications device from the power to the image capture device and processor.

38. The image processing system of claim 37, further including a power initiation device associated with the image capture device and the processor wherein the power to the image capture device and the processor is off when the initiation device is not activated.

39. The image processing system of claim 38, wherein the power initiation device is user controlled.

40. The image processing system of claim 38, further including a trigger device for activating the power initiation device.

41. The image processing system of claim 40, wherein the trigger device is a timer.

42. The image processing system of claim 40, wherein the trigger device is triggered by the presence of an image to be captured.

ABSTRACT

[0091] An image capture, conversion, compression, storage and transmission system provides a data signal representing the image in a format and protocol capable of being transmitted over any of a plurality of readily available transmission systems and received by readily available, standard equipment receiving stations. In its most comprehensive form, the system is capable of sending and receiving audio, documentary and visual image data to and from standard remote stations readily available throughout the world.

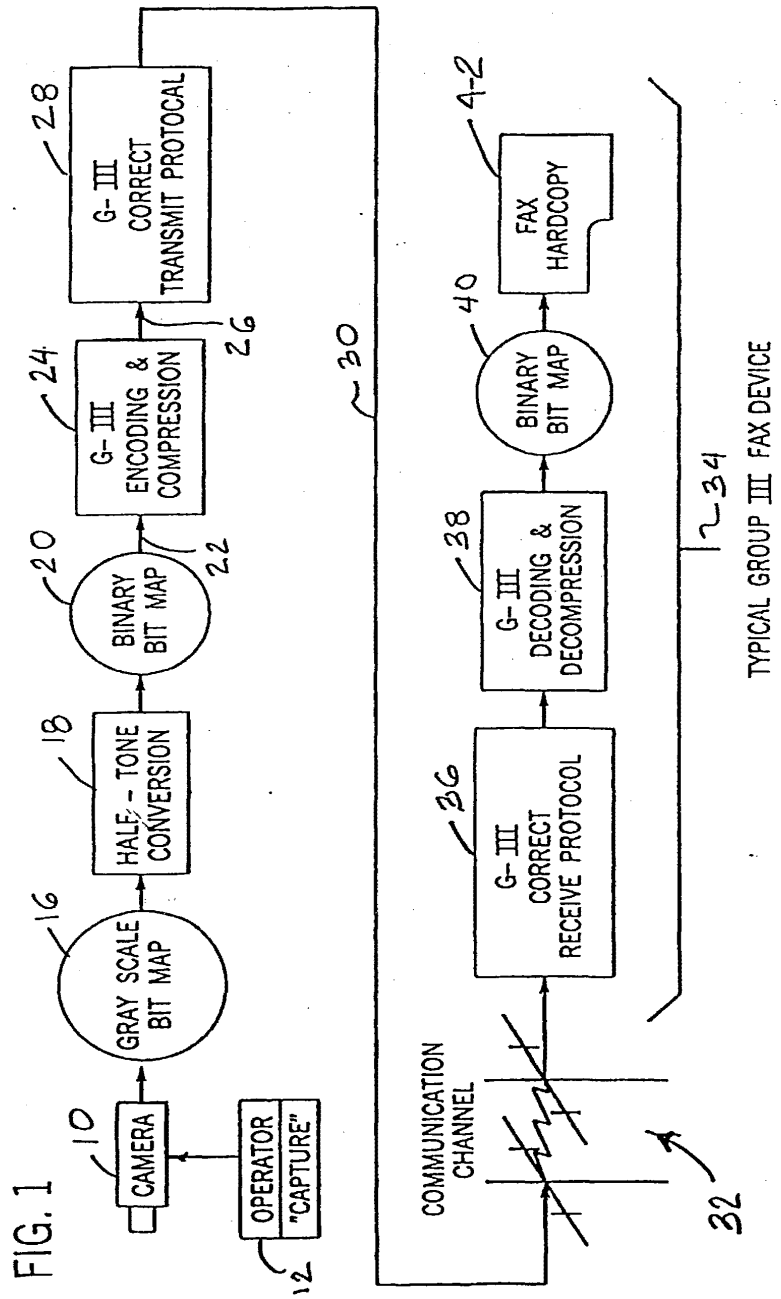

CAMERA
10
OPERATOR "CAPTURE"
12
GRAY SCALE BIT MAP
16
HALF - TONE CONVERSION
18
BINARY BIT MAP
20
22
G-III ENCODING & COMPRESSION
24
G-III CORRECT TRANSMIT PROTOCAL
28
26
30
COMMUNICATION CHANNEL
32
G-III CORRECT RECEIVE PROTOCOL
36
G-III DECODING & DECOMPRESSION
38
BINARY BIT MAP
40
FAX HARDCOPY
42
34
TYPICAL GROUP III FAX DEVICE

FIG. 1

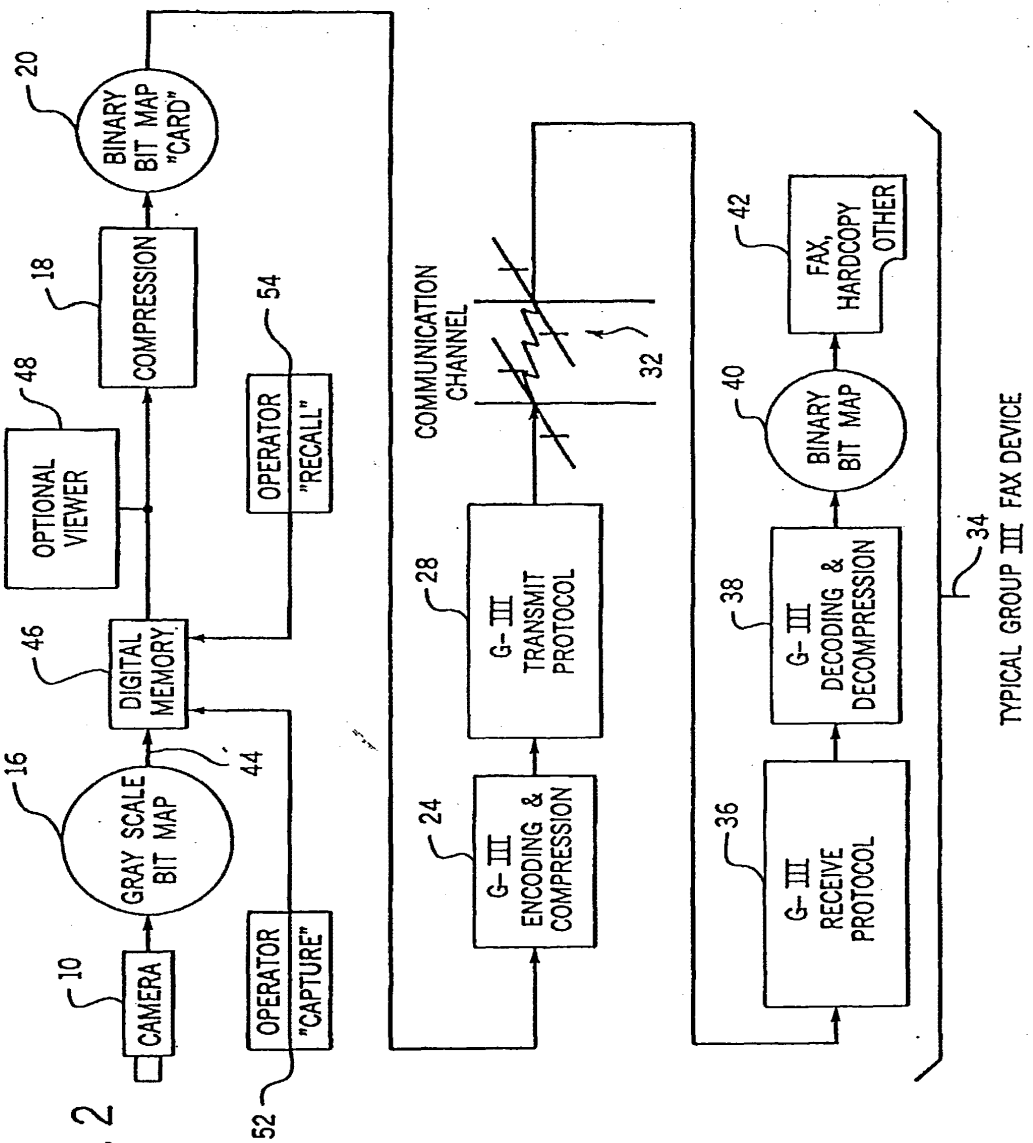

10
CAMERA
16
GRAY SCALE BIT MAP
44
46
DIGITAL MEMORY
48
OPTIONAL VIEWER
18
COMPRESSION
20
BINARY BIT MAP "CARD"
52
OPERATOR "CAPTURE"
54
OPERATOR "RECALL"
24
G-III ENCODING & COMPRESSION
28
G-III TRANSMIT PROTOCOL
COMMUNICATION CHANNEL
32
36
G-III RECEIVE PROTOCOL
38
G-III DECODING & DECOMPRESSION
40
BINARY BIT MAP
42
FAX, HARDCOPY OTHER
34
TYPICAL GROUP III FAX DEVICE

FIG. 2

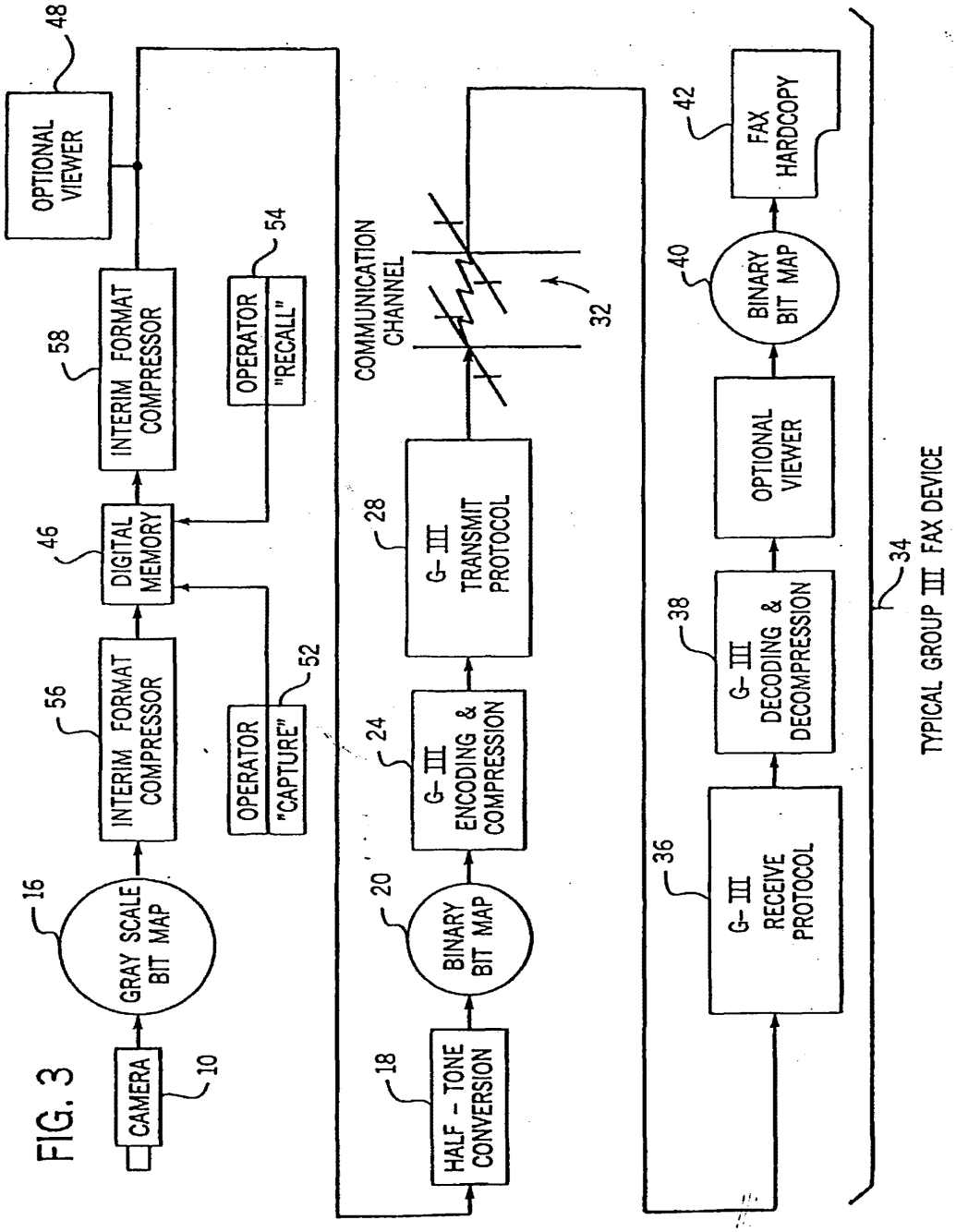


FIG. 3

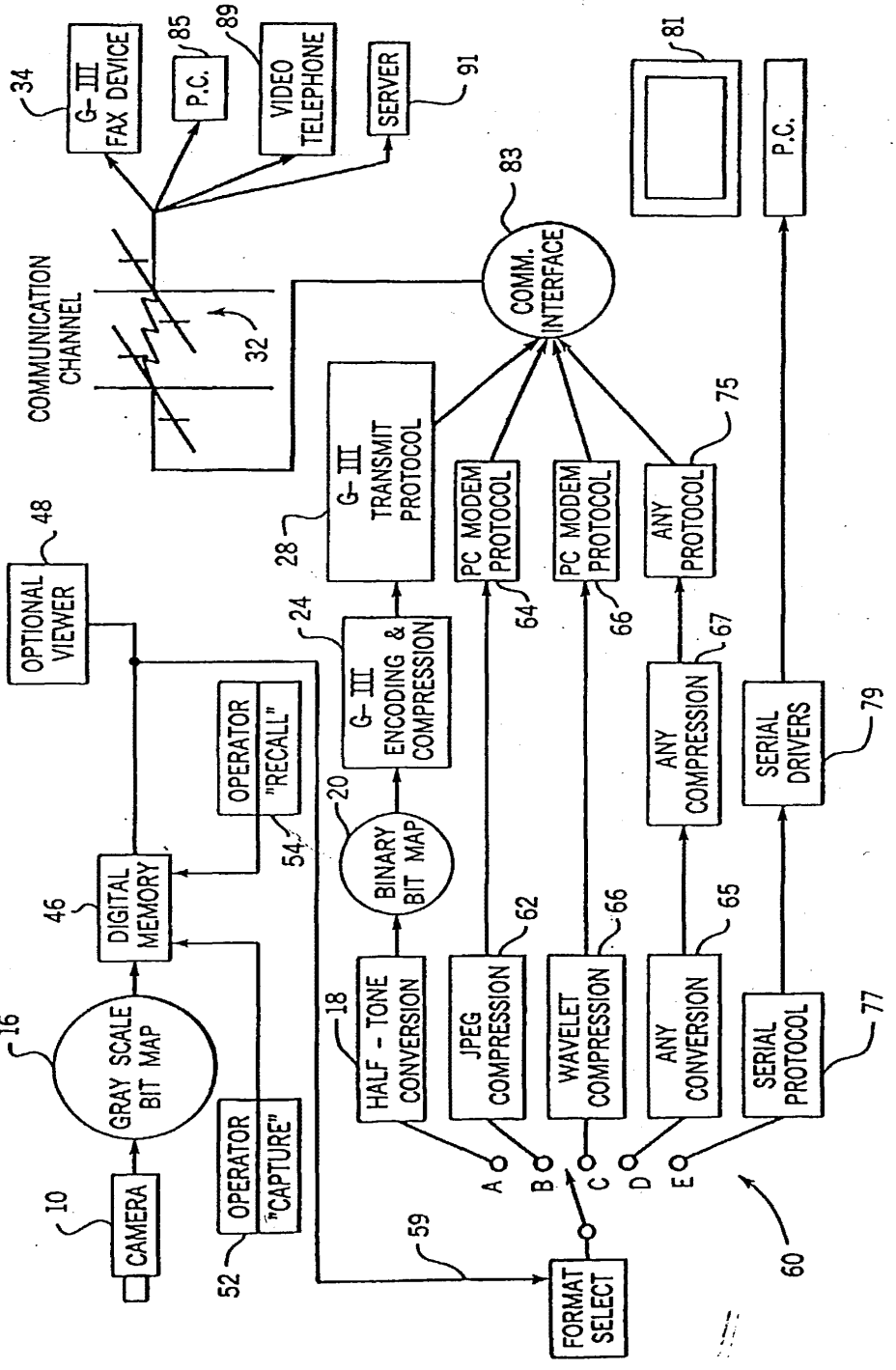

34
G- III FAX DEVICE
85
P.C.
89
VIDEO TELEPHONE
SERVER
91
81
P.C.
83
COMM. INTERFACE
COMMUNICATION CHANNEL
32
G- III TRANSMIT PROTOCOL
28
PC MODEM PROTOCOL
64
PC MODEM PROTOCOL
66
ANY PROTOCOL
75
48
OPTIONAL VIEWER
24
G- III ENCODING & COMPRESSION
67
ANY COMPRESSION
SERIAL DRIVERS
79
OPERATOR "RECALL"
54
20
BINARY BIT MAP
46
DIGITAL MEMORY
16
GRAY SCALE BIT MAP
18
HALF - TONE CONVERSION
62
JPEG COMPRESSION
66
WAVELET COMPRESSION
65
ANY CONVERSION
SERIAL PROTOCOL
77
A
B
C
D
E
10
CAMERA
OPERATOR "CAPTURE"
52
59
FORMAT SELECT
60

FIG. 4

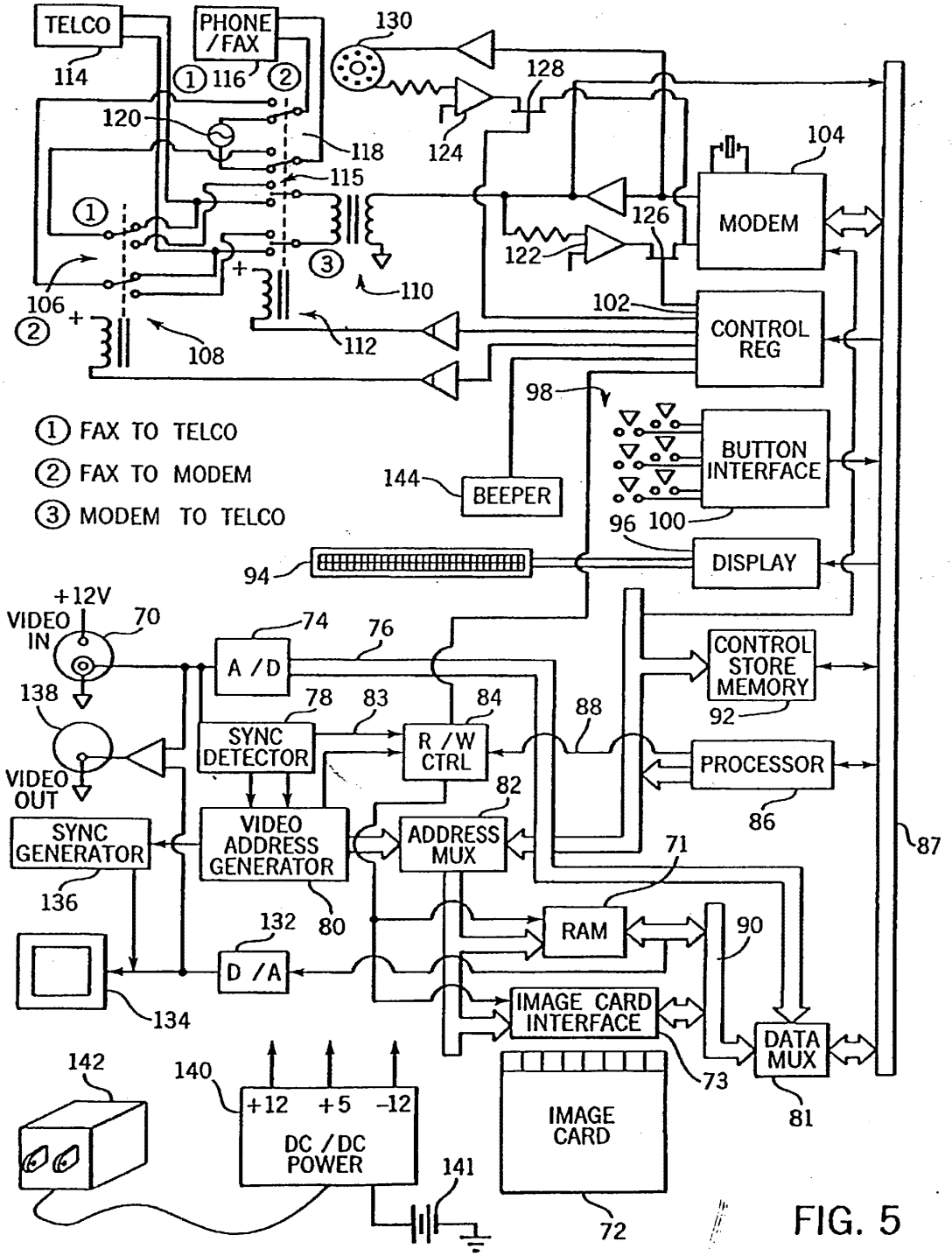

TELCO
PHONE /FAX
114
116
120
118
115
130
128
124
104
MODEM
126
122
102
CONTROL REG
106
108
112
110
98
① FAX TO TELCO
② FAX TO MODEM
③ MODEM TO TELCO
144
BEEPER
BUTTON INTERFACE
96
100
DISPLAY
94
+12V
VIDEO IN
70
74
A /D
76
CONTROL STORE MEMORY
92
138
78
83
84
88
SYNC DETECTOR
R /W CTRL
PROCESSOR
86
VIDEO OUT
82
SYNC GENERATOR
VIDEO ADDRESS GENERATOR
ADDRESS MUX
71
87
136
132
80
RAM
90
D /A
134
IMAGE CARD INTERFACE
DATA MUX
73
81
142
140
+12
+5
-12
DC /DC POWER
141
IMAGE CARD
72

FIG. 5

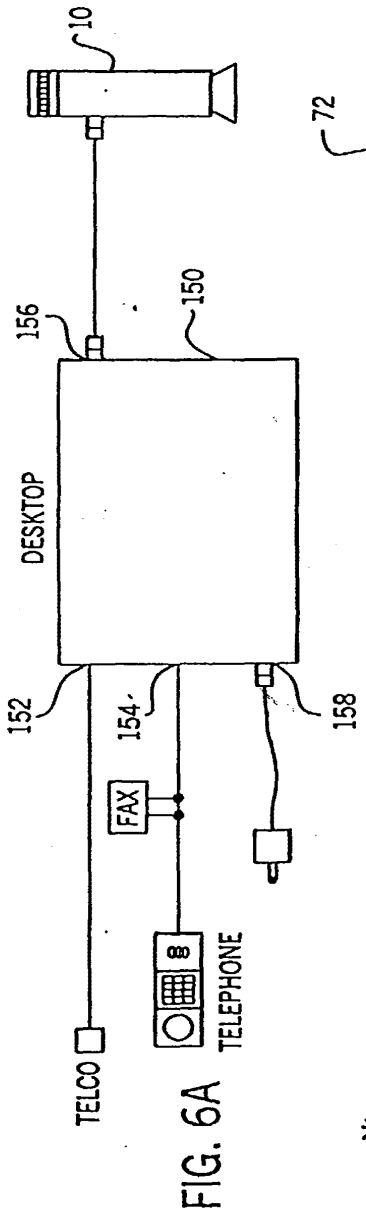


FIG. 6A

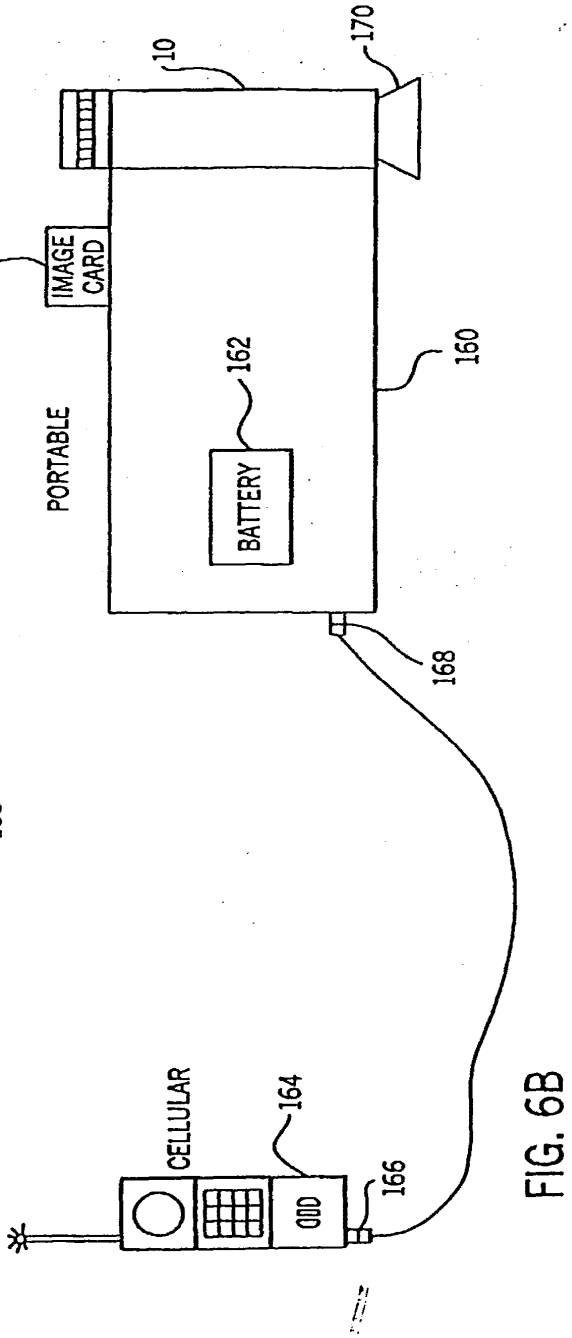


FIG. 6B

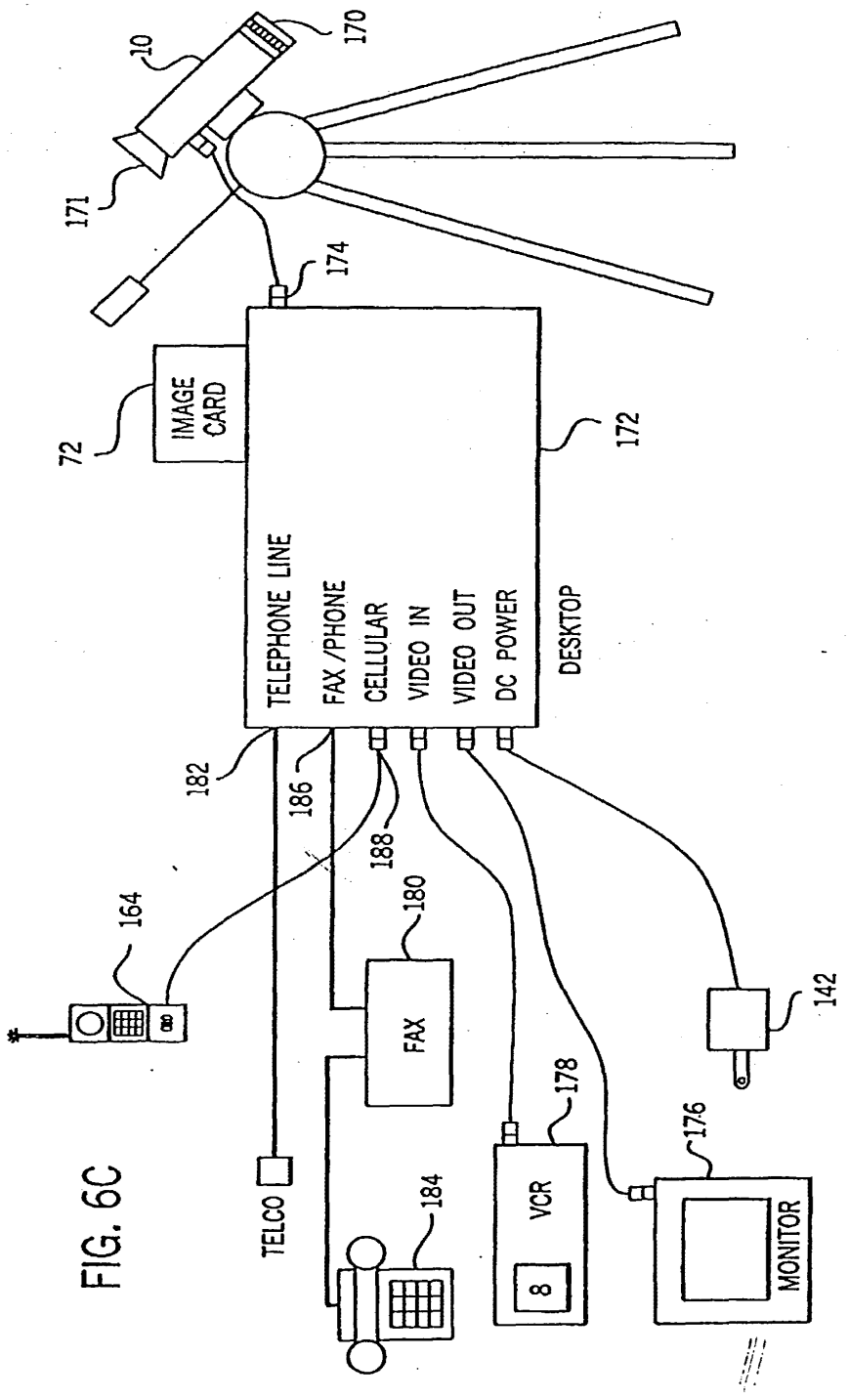

10
170
171
174
IMAGE CARD
72
172
TELEPHONE LINE
FAX /PHONE
CELLULAR
VIDEO IN
VIDEO OUT
DC POWER
DESKTOP
182
186
188
180
164
FAX
142
178
176
TELCO
184
VCR
MONITOR

FIG. 6C

FIG. 7A

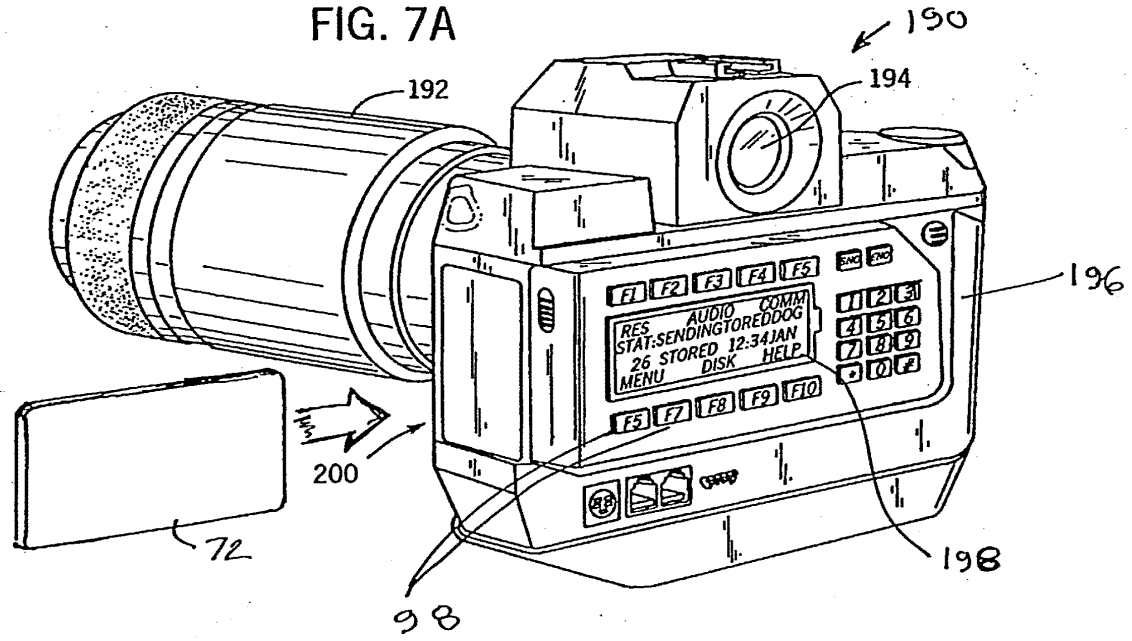

190
192
194
196
198
200
72
98
F1 F2 F3 F4 F5
F5 F7 F8 F9 F10
RES AUDIO COMM
STAT:SENDINGTOREDDOG
26 STORED 12:34JAN
MENU DISK HELP

FIG. 7B

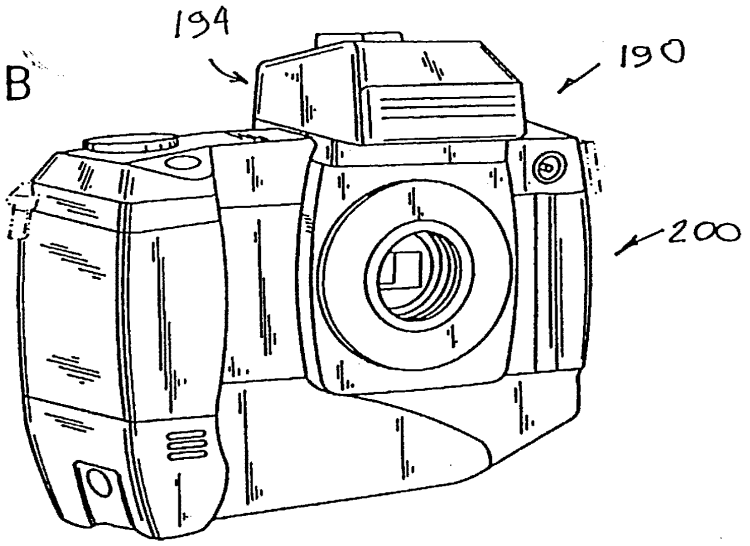

194
190
200

Fig. 8
Part A

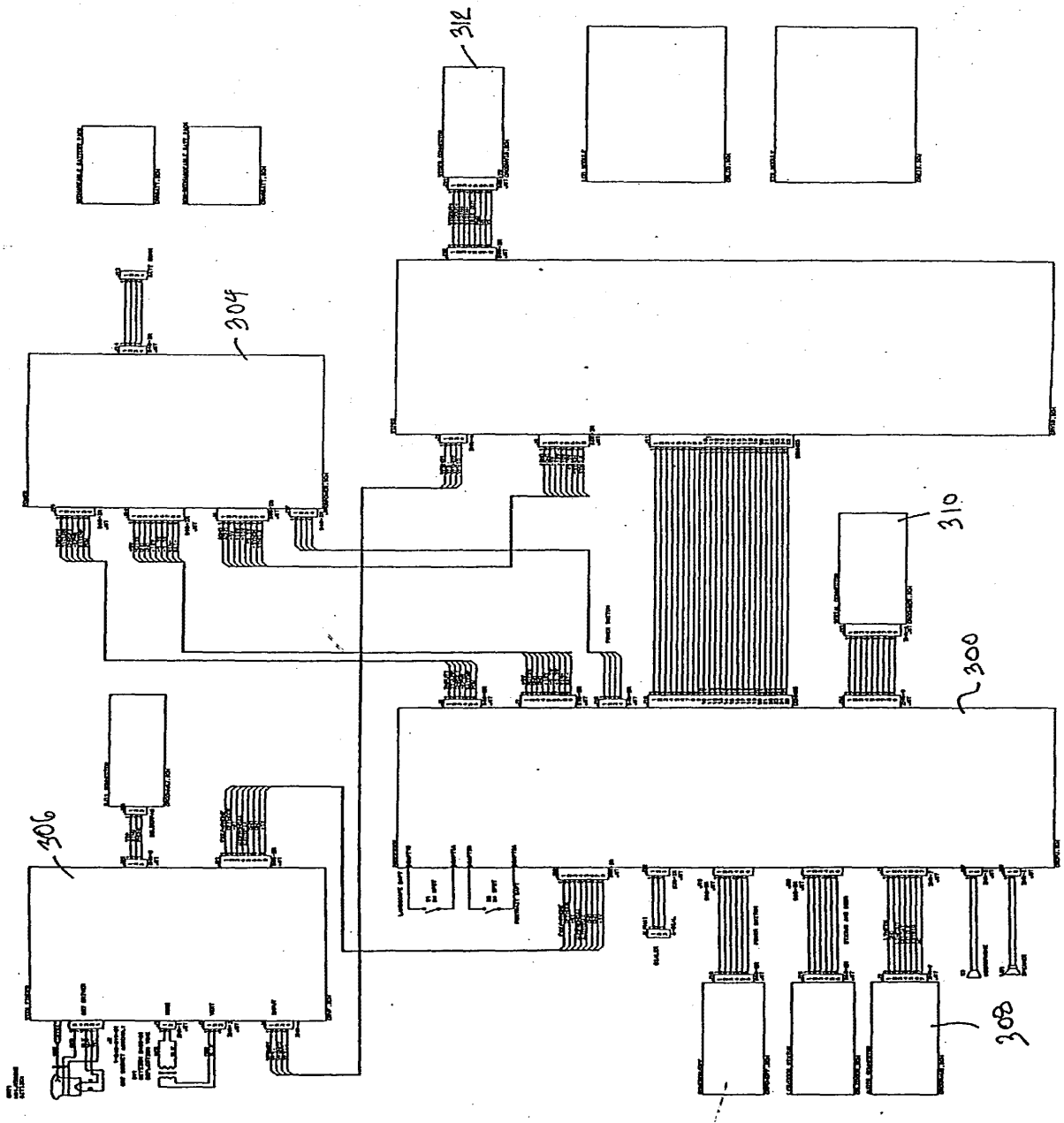


Fig 6 Part B

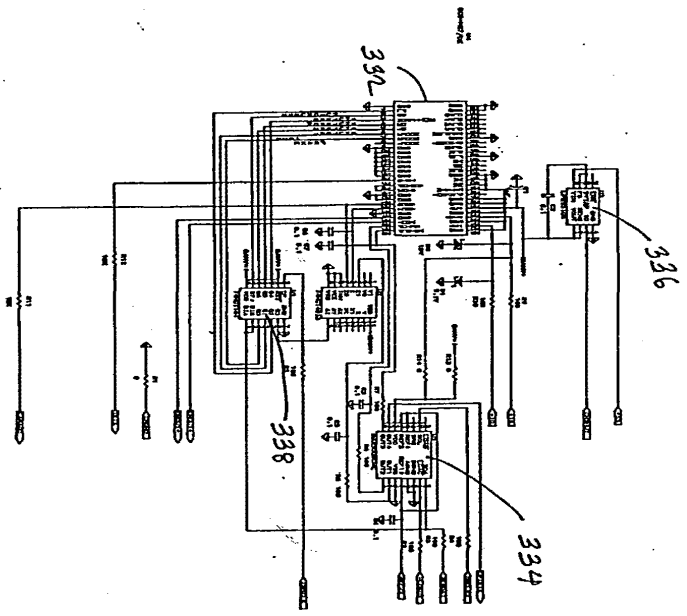
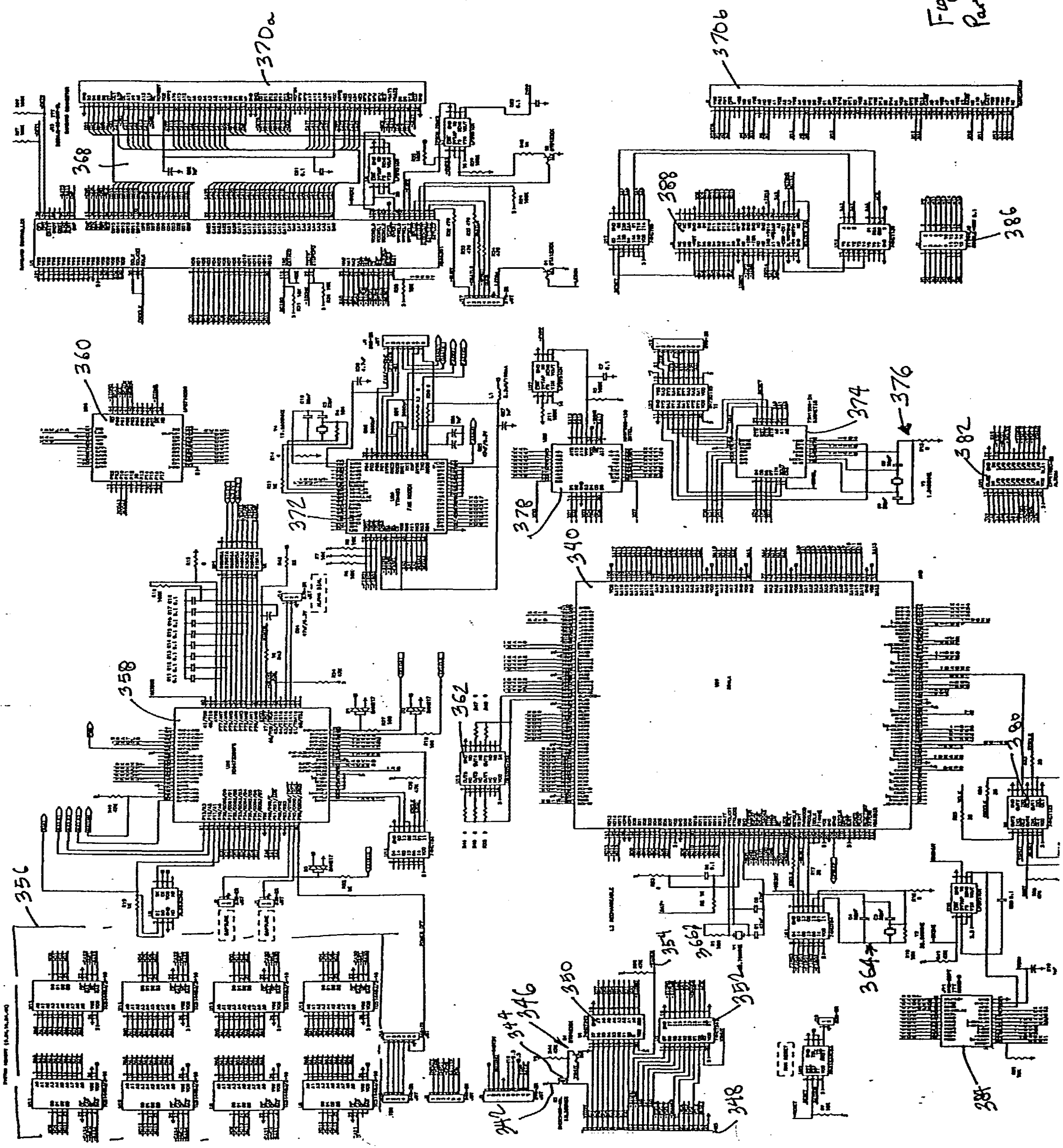


Fig. 8
Part C

Fig. 9 Part D


370a
370b
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384
350
352
346
344
342
348

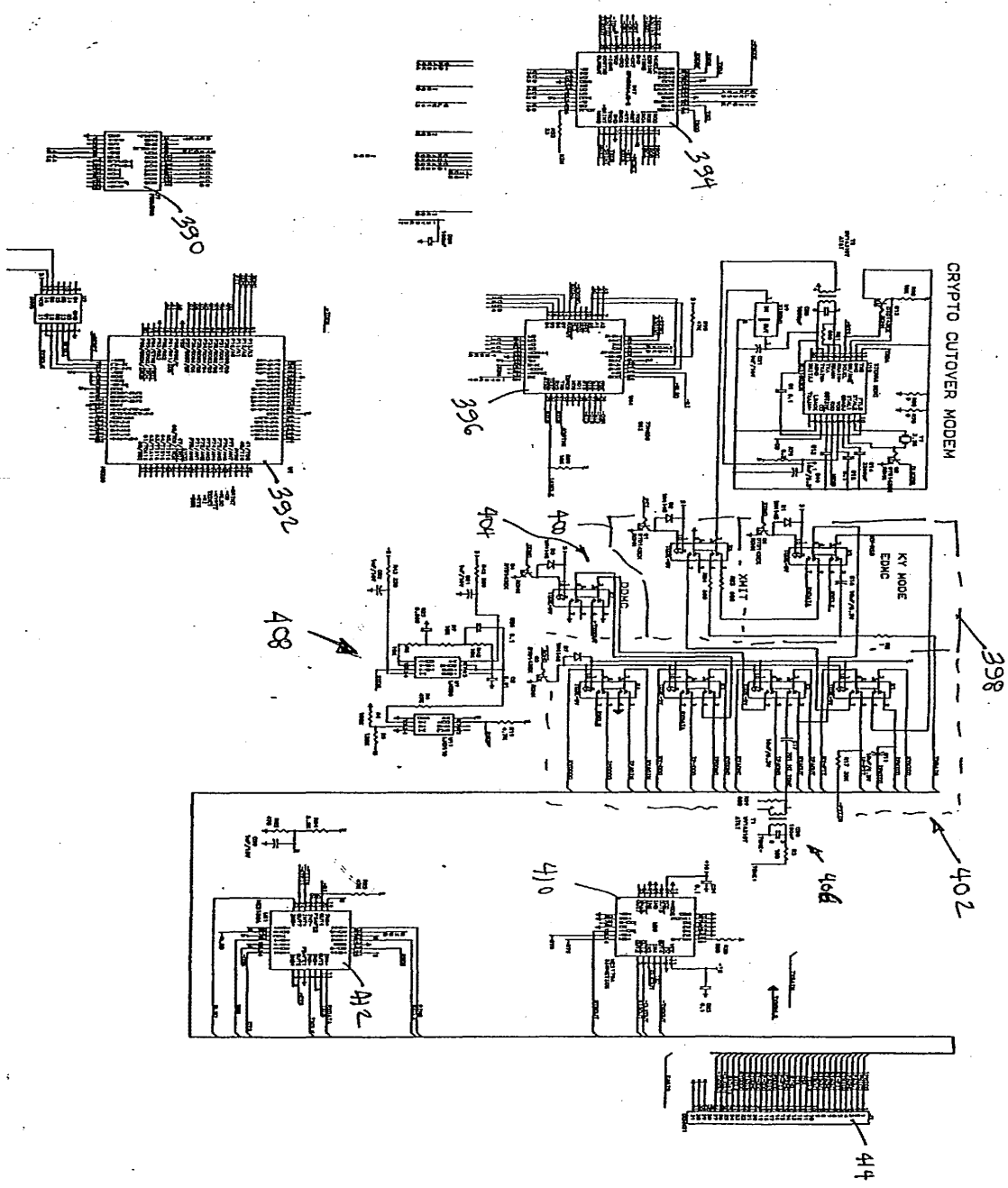


Fig. 8
Part E

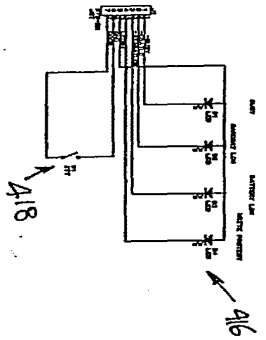


Fig. 8
Art F

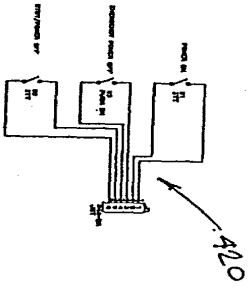
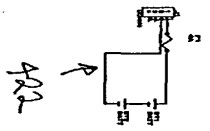


Fig. 8 Part C



Battery Pack

FIG. 8
PRIOR ART

Fig. 8
Part I

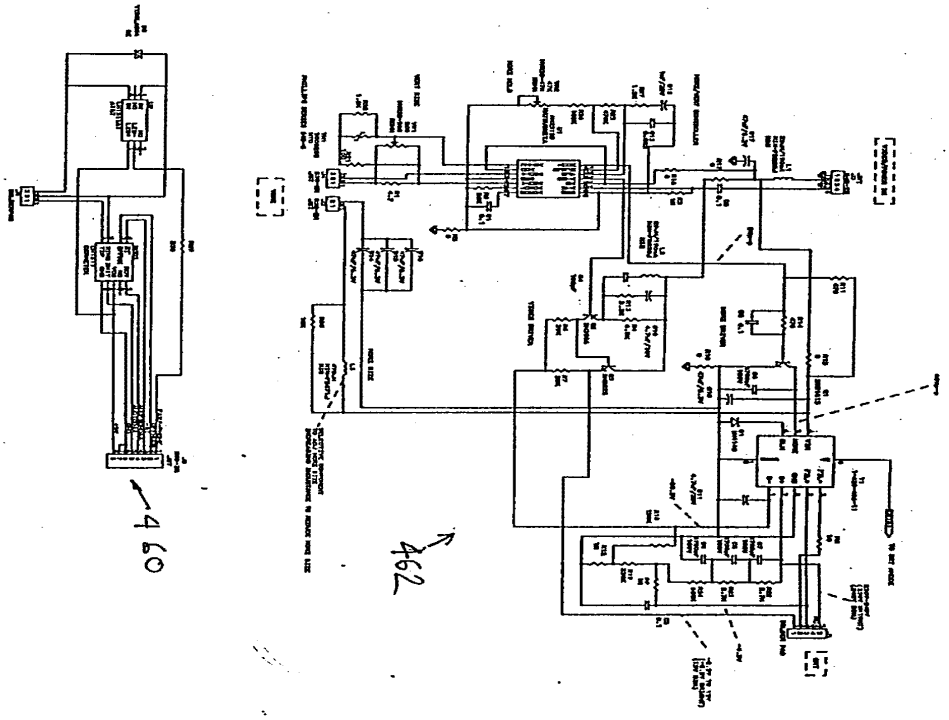


Fig. 6
Part 4

Fig. 8

Fig. 6
Part L

FIG. 9

Attorney Docket No. P-121817.2.43(DIV)

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below-named inventor, I hereby declare that:

This is a divisional application.

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 of the subject matter which is claimed and for which a patent is sought on the invention entitled APPARATUS FOR CAPTURING, CONVERTING AND TRANSMITTING A VISUAL IMAGE SIGNAL VIA A DIGITAL TRANSMISSION SYSTEM, the specification of which is attached hereto.

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

I acknowledge my duty to disclose information which is material to the examination and patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

U.S. Application Serial No. 09/006,073, filed January 12, 1998.

POWER OF ATTORNEY

I hereby appoint the following attorneys to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

Richard R. Ruble, Reg. #45,720;
Mark H. Miller, Reg. #29,197;
William B. Nash, Reg. #33,743;
Thomas E. Sisson, Reg. #29,348.
Robert C. Curfiss, Reg. #26,540;
Daniel D. Chapman, Reg. #32,726;
Cline H. White, Reg. #45,213;

Direct all correspondence and telephone calls to:

Robert C. Curfiss
JACKSON WALKER L.L.P.
112 E. Pecan Street, Suite 2100
San Antonio, Texas 78205
(210) 978-7700

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.

_____, Inventor
David A. Monroe, Inventor

Date: 1/3/02

Residence: San Antonio, Texas
Citizenship: United States
Post Office Address: 740 Lincoln Center, 7800 IH-10 West, San Antonio, Texas 78230

[redacted]

United States Patent & Trademark Office

Office of Initial Patent Examination -- Scanning Division

Application deficiencies found during scanning:

☐ Page(s)_____of_____ were not present for scanning. (Document title)

☐ Page(s)_____of_____were not present for scanning. (Document title)

☒ ***Scanned copy is best available.*** Some drawings are colors

[redacted]

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

01/07/2003 ANABI1 00000017 10336470

01 FC:1001 750.00 OP
02 FC:1202 396.00 OP

PTO-1556
(5/87)

*U.S. Government Printing Office: 2001 — 481-697/59173

PATENT APPLICATION FEE DETERMINATION RECORD
Effective January 1, 2003

Application or Docket Number: P-12181 7.02.043(009)

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	42	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	42 minus 20=	* 22
INDEPENDENT CLAIMS	1 minus 3 =	* 0
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	$375	OR	BASIC FEE	$750
X$ 9=		OR	X$18=	396.00
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL		OR	TOTAL	1146.00

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. 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.

UNITED STATES
PATENT AND
TRADEMARK OFFICE

Commissioner for Patents
Washington, DC 20231
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/336,470	01/03/2003	David A. Monroe	P-121817.02.043(DIV)

CONFIRMATION NO. 8448

Robert C Curfiss
JACKSON WALKER L.L.P.
112 E. Pecan Street, Suite 2100
San Antonio, TX 78205

FORMALITIES LETTER

OC000000009495996

Date Mailed: 02/10/2003

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

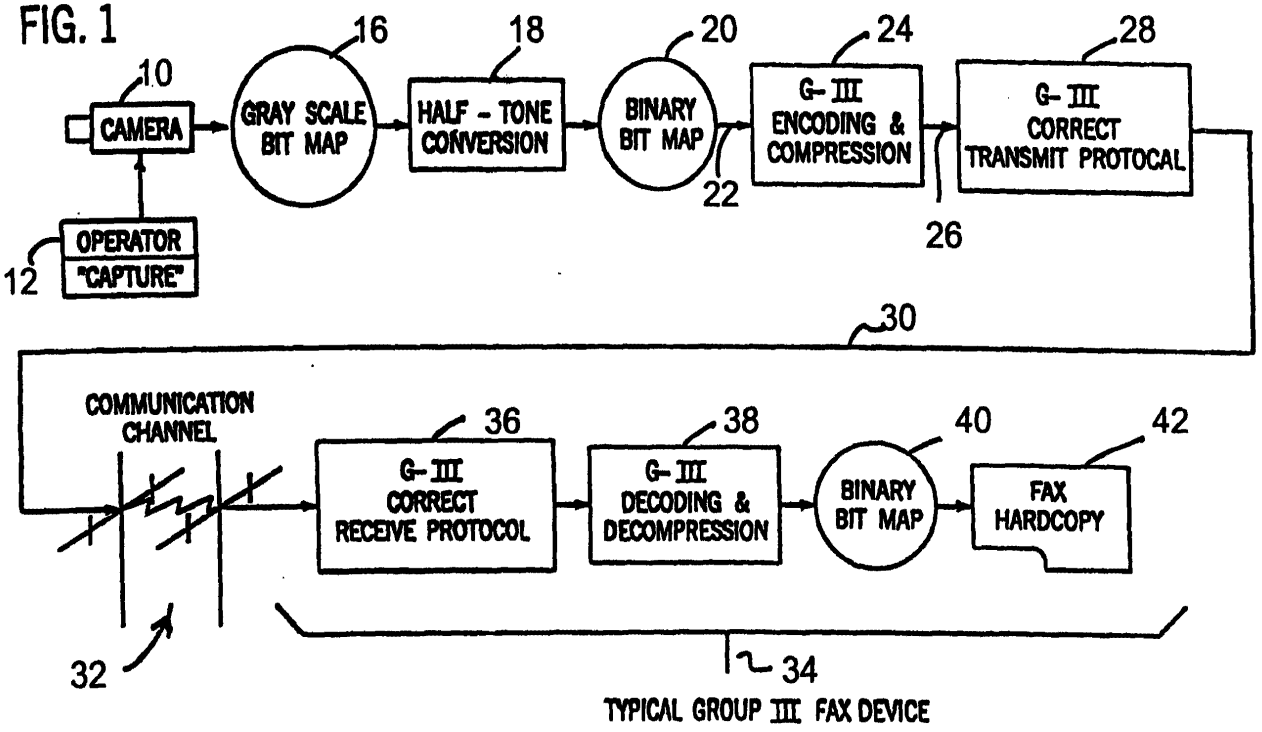
The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121 are required. The drawings submitted are not acceptable because:
    - The drawing sheets do not have the appropriate margin(s) (see 37 CFR 1.84(g)). Each sheet must include a top margin of at least 2.5 cm. (1 inch), a left side margin of at least 2.5 cm. (1 inch), a right side margin of at least 1.5 cm. (5/8 inch), and a bottom margin of at least 1.0 cm. (3/8 inch).See Figures(s) 8.

A copy of this notice MUST be returned with the reply.

Customer Service Center
Initial Patent Examination Division (703) 308-1202
PART 3 - OFFICE COPY

FIG. 1



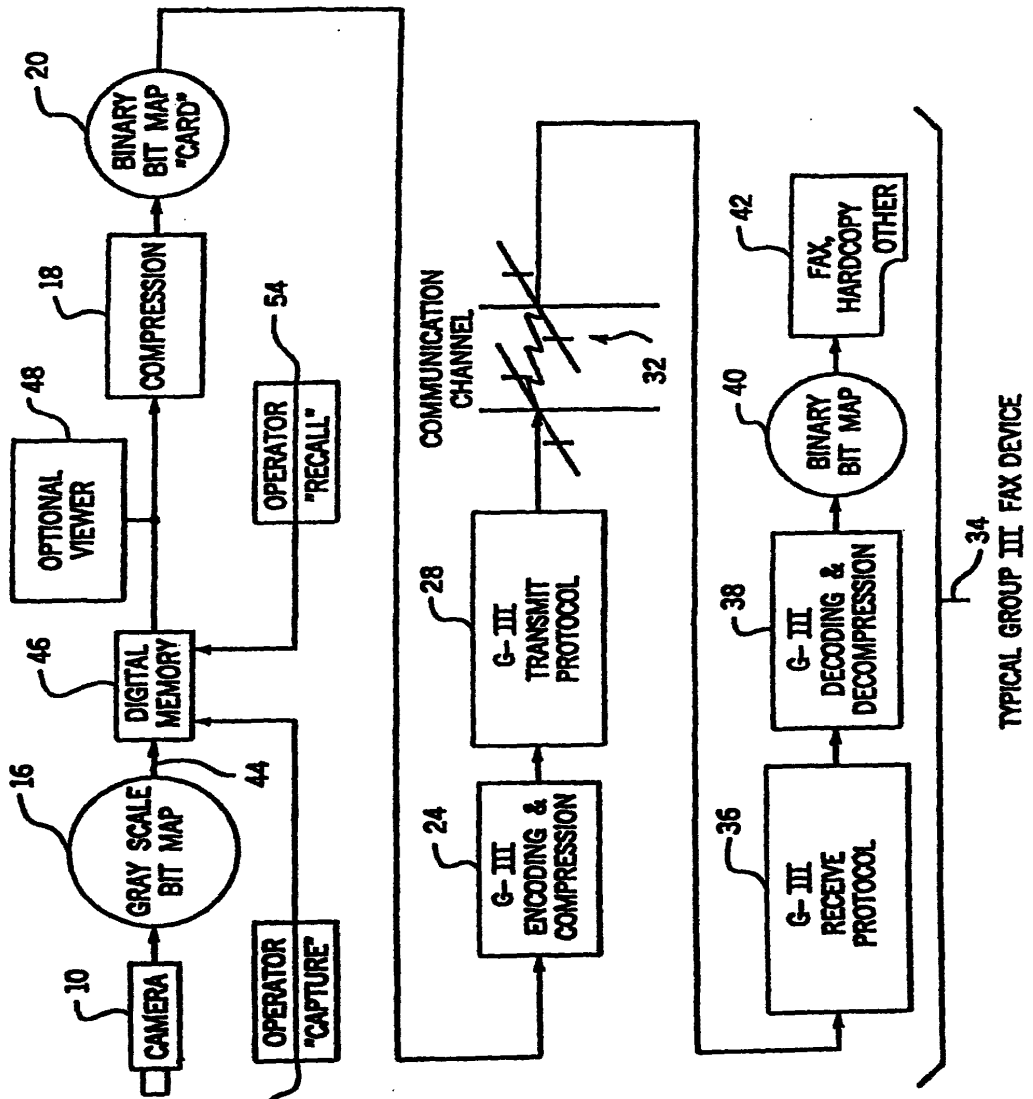


FIG. 2

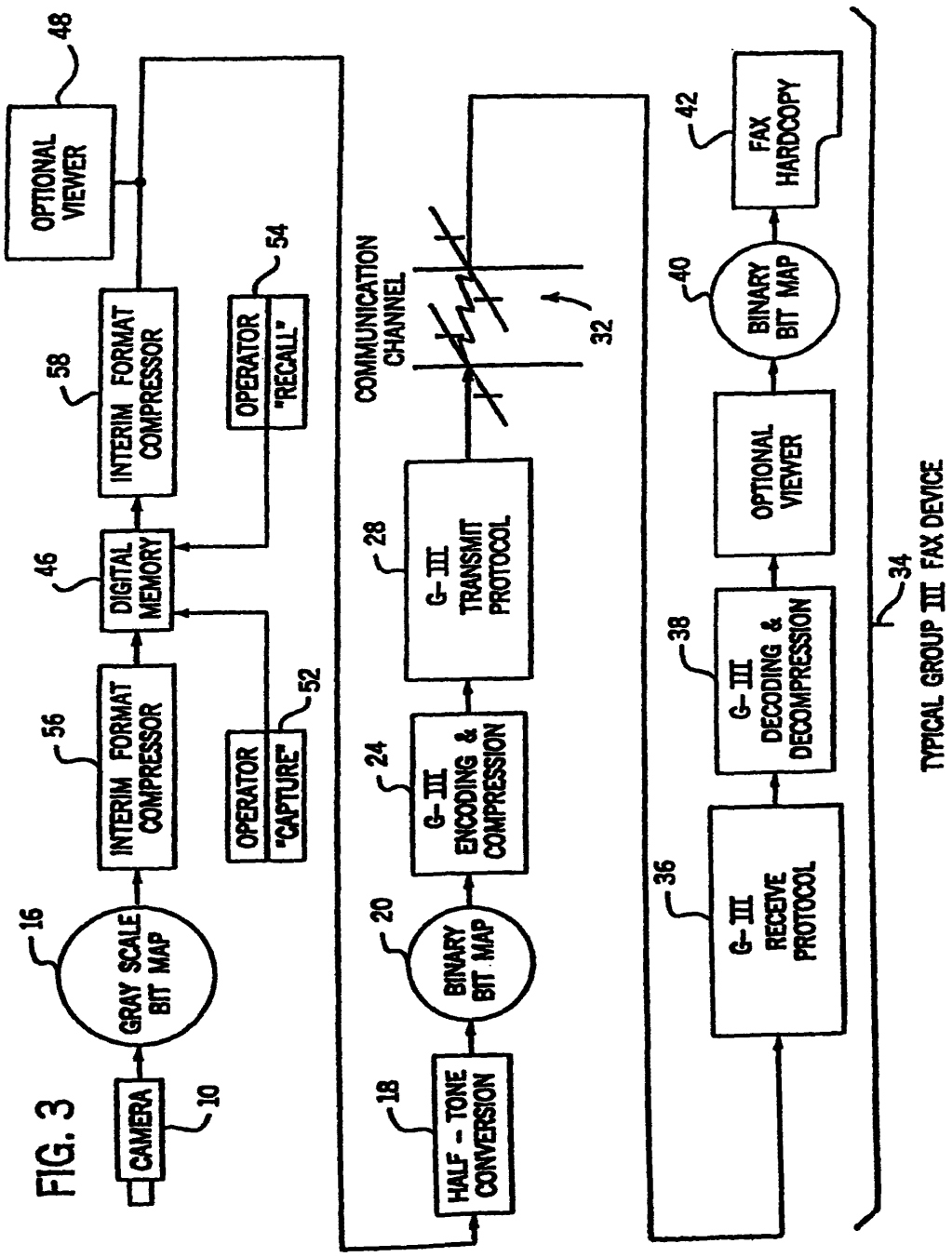


FIG. 3

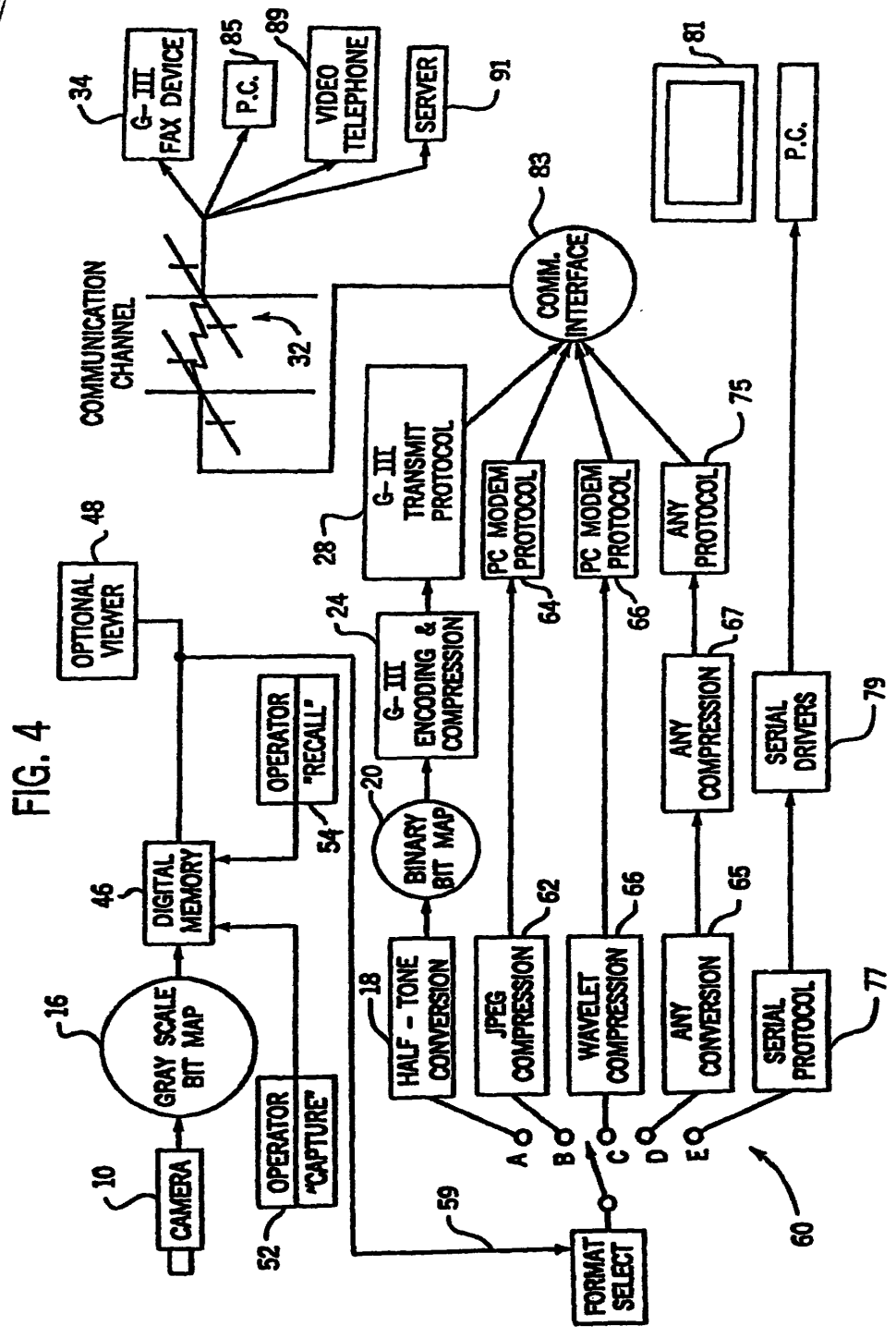


FIG. 4

FIG. 5

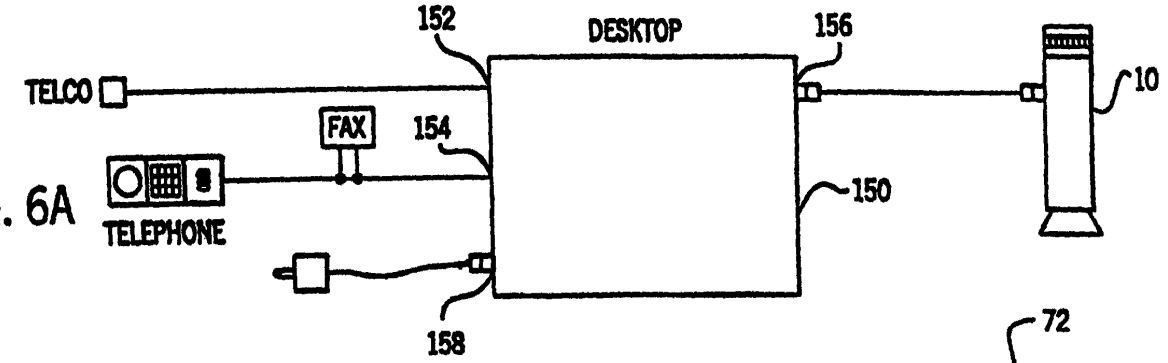


FIG. 6A

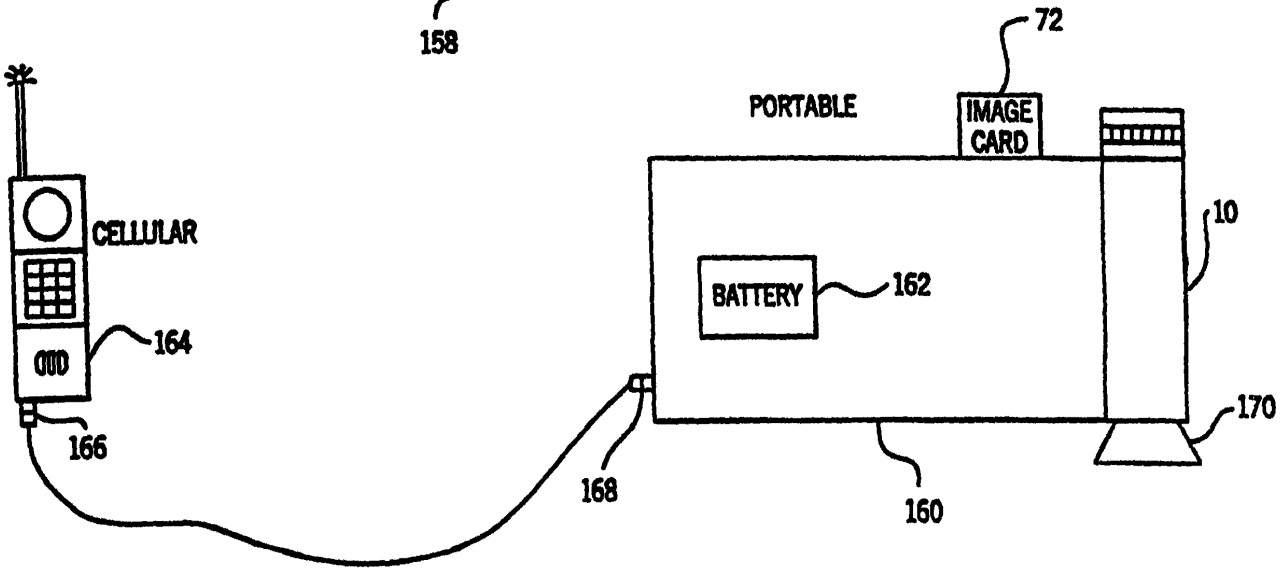


FIG. 6B

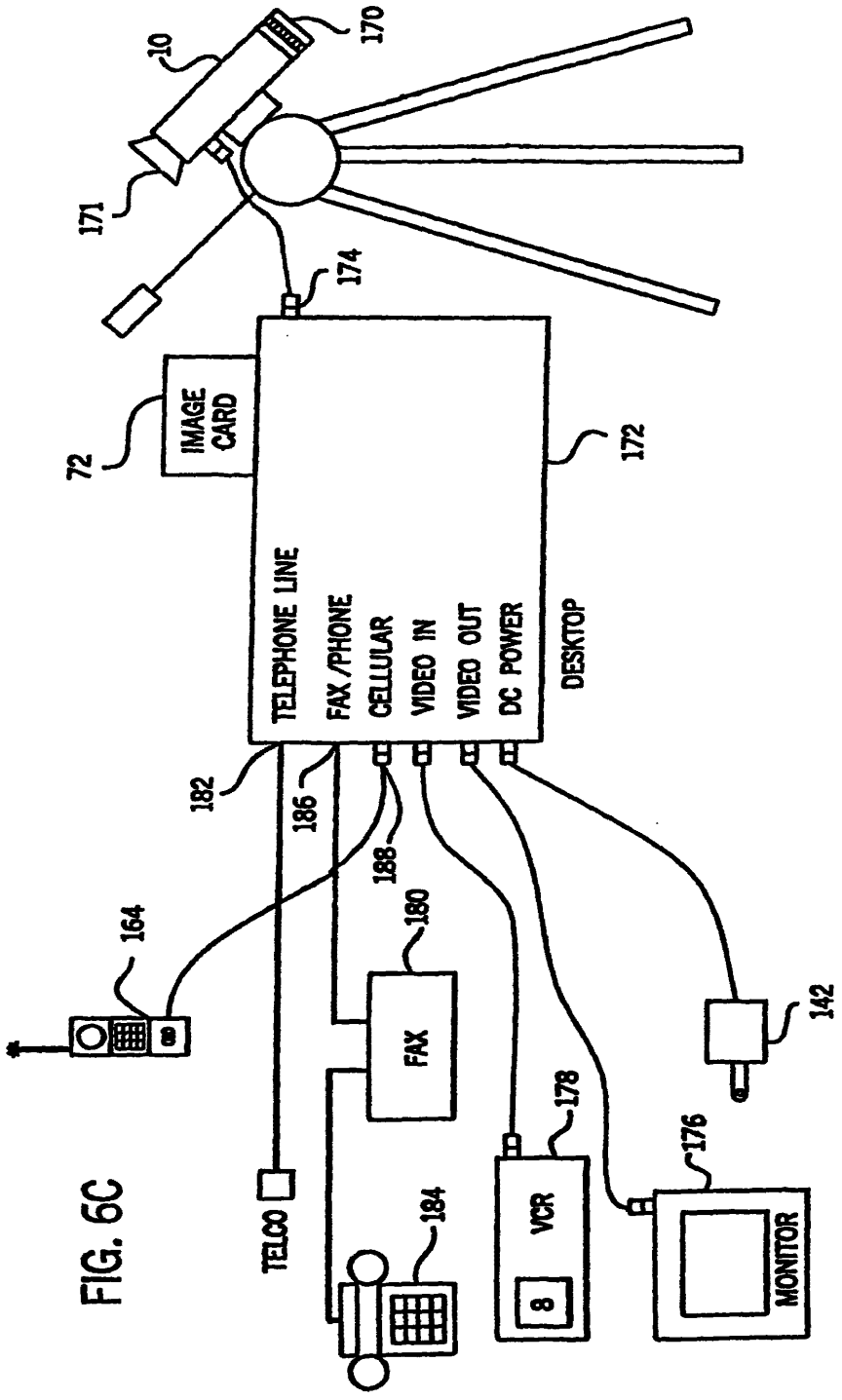


FIG. 6C

FIG. 7A

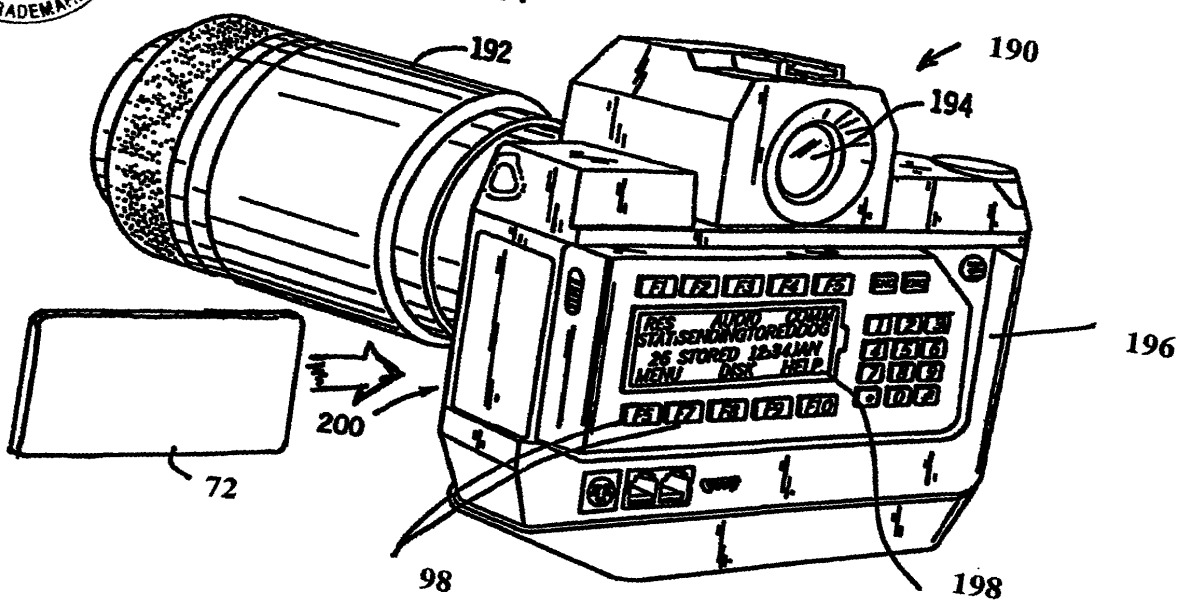


FIG. 7B

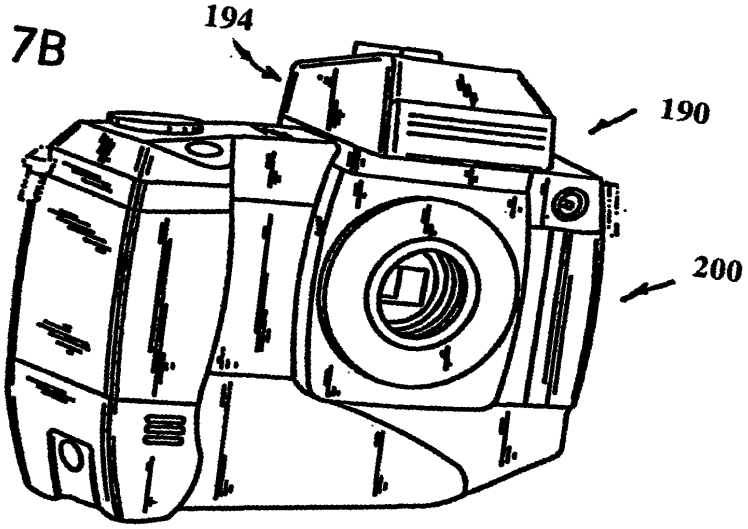


FIG. 8A–1

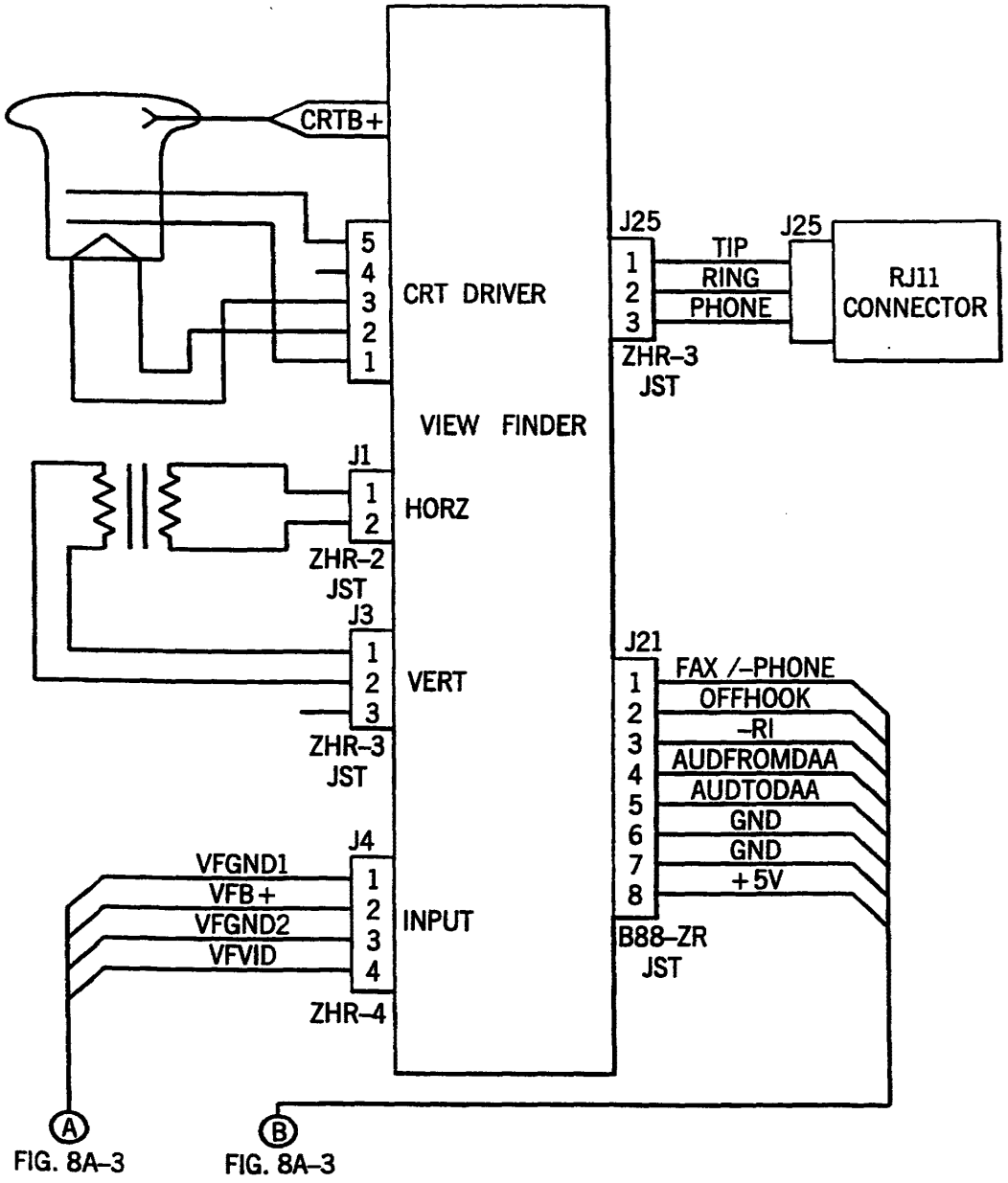


FIG. 8A–2

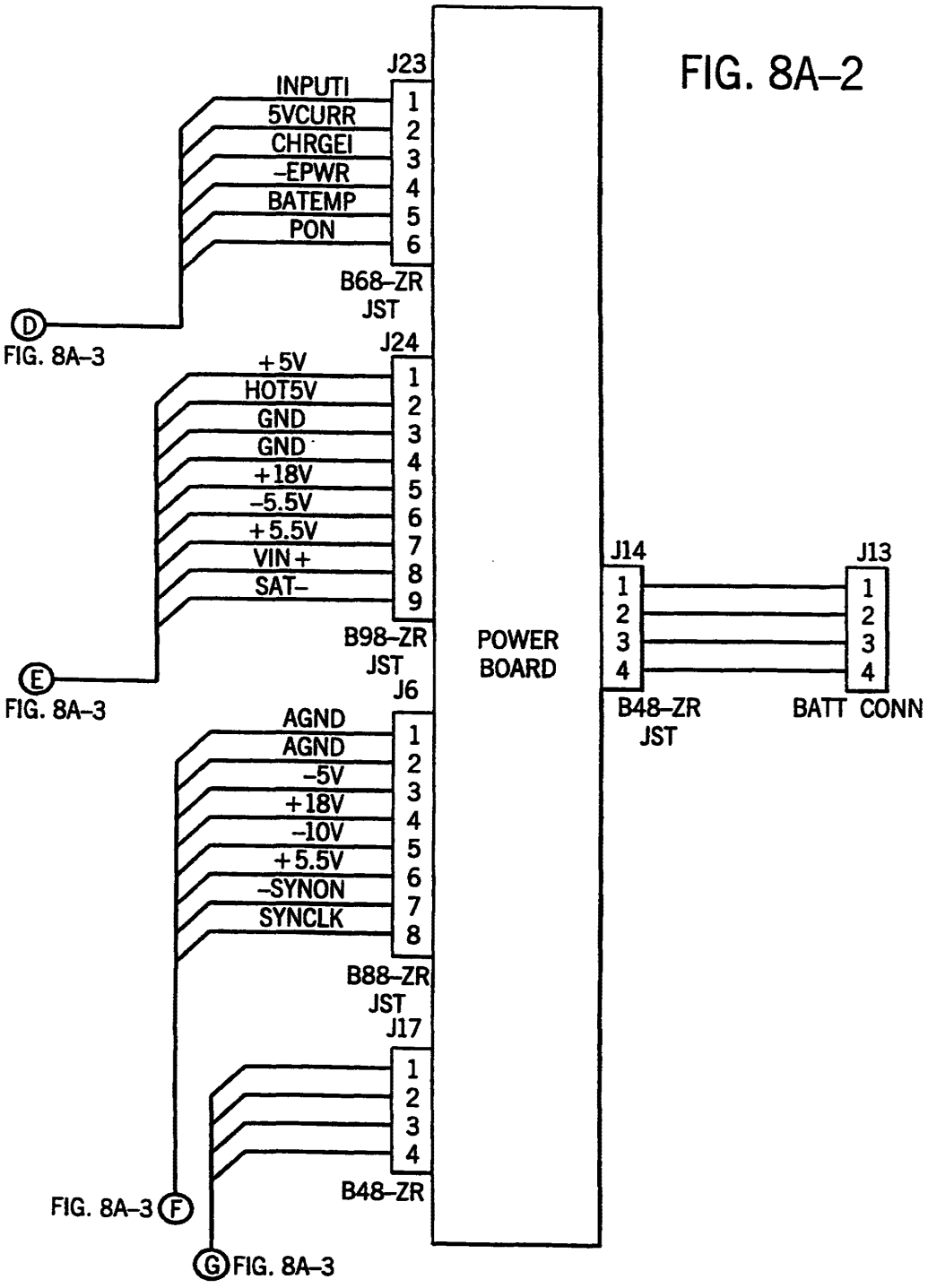


FIG. 8A–3

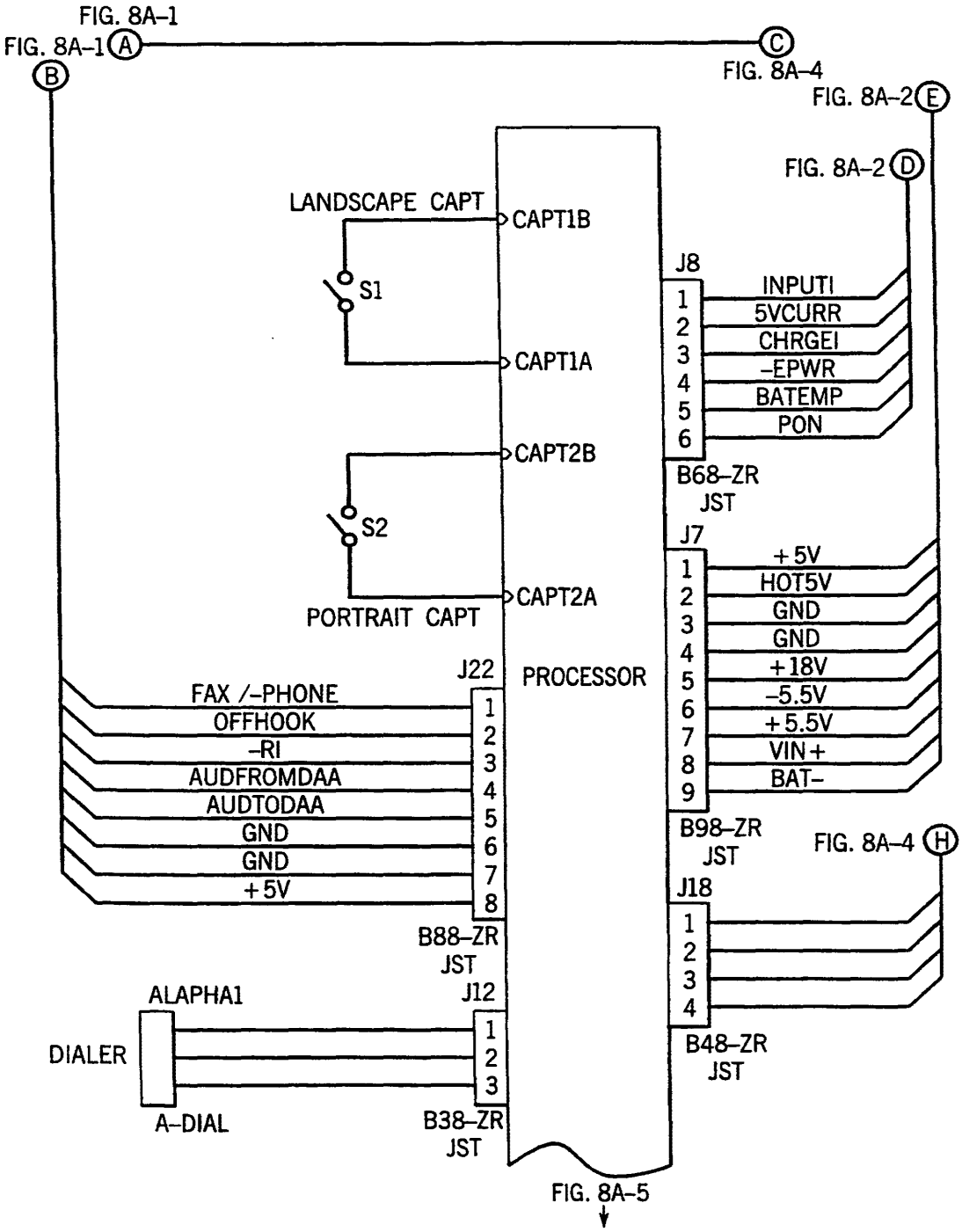


FIG. 8A–4

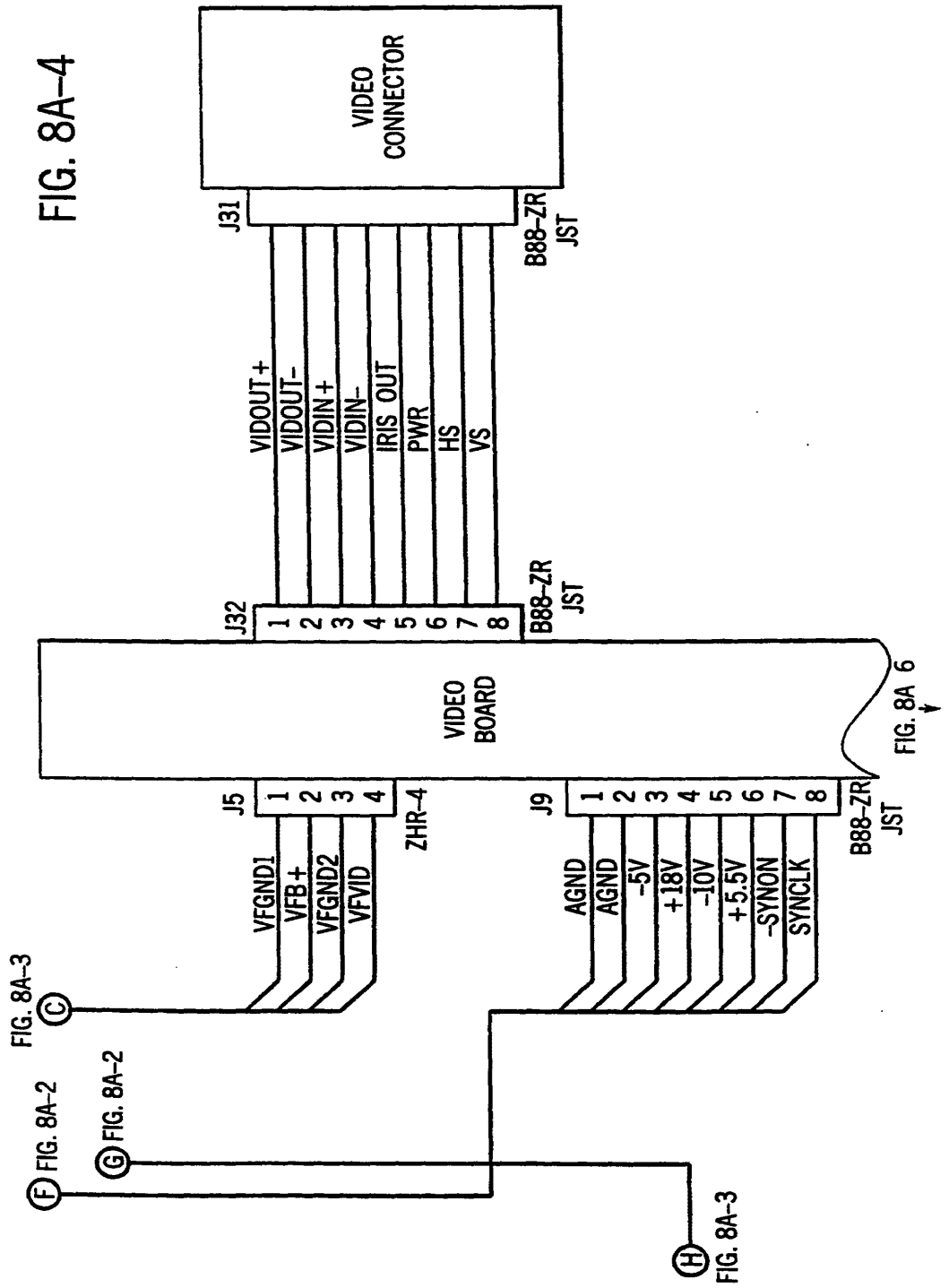


FIG. 8A–5

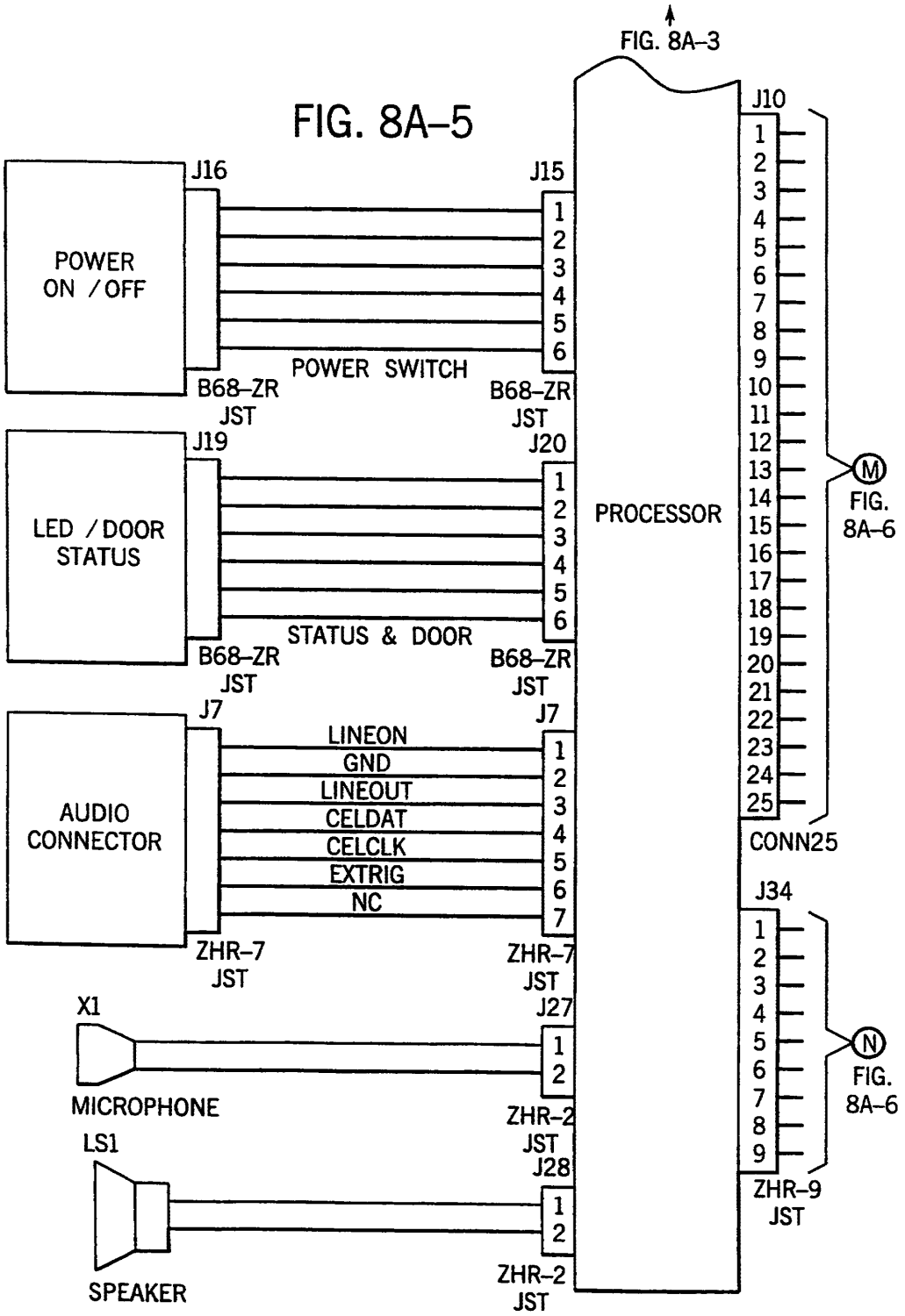
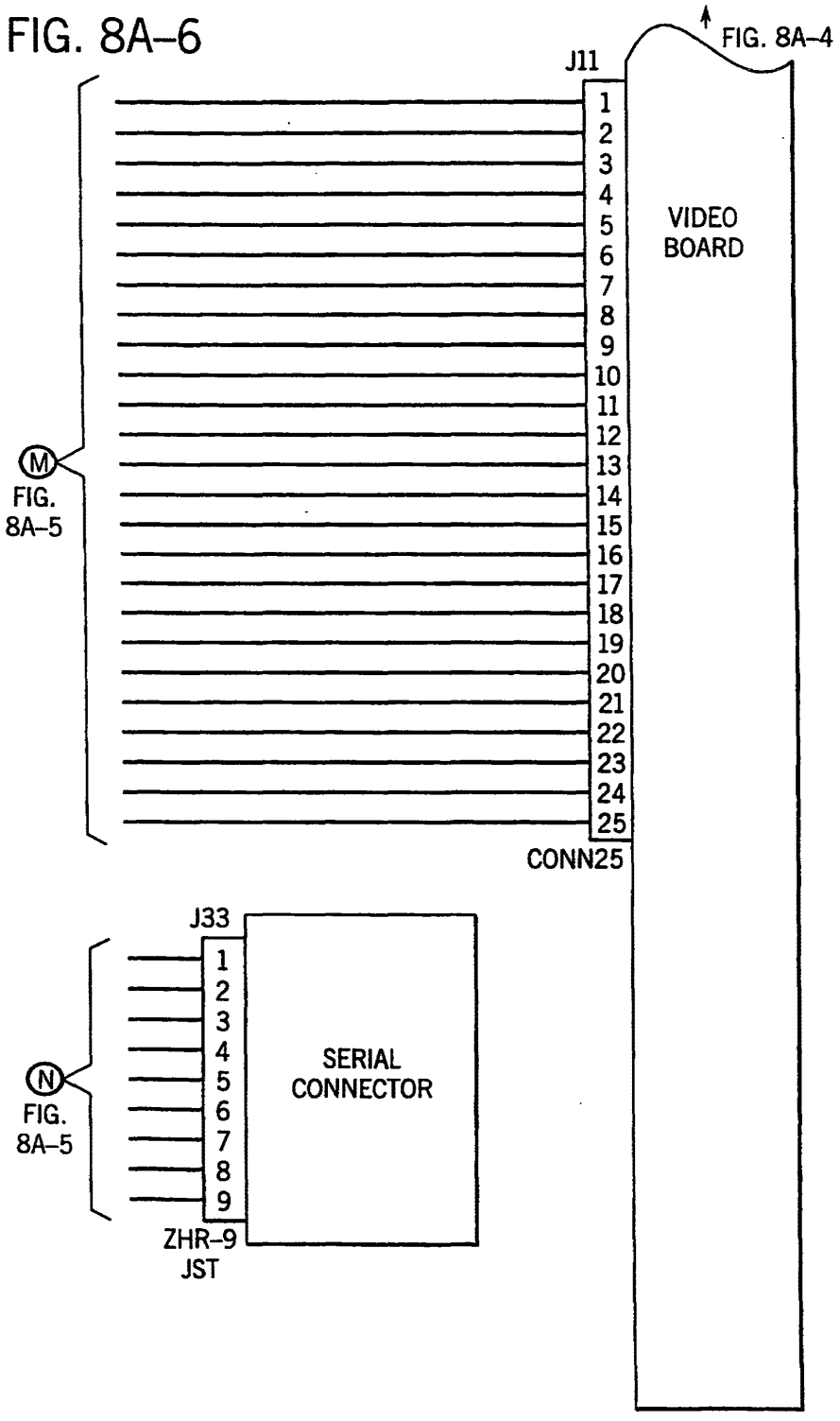


FIG. 8A–6



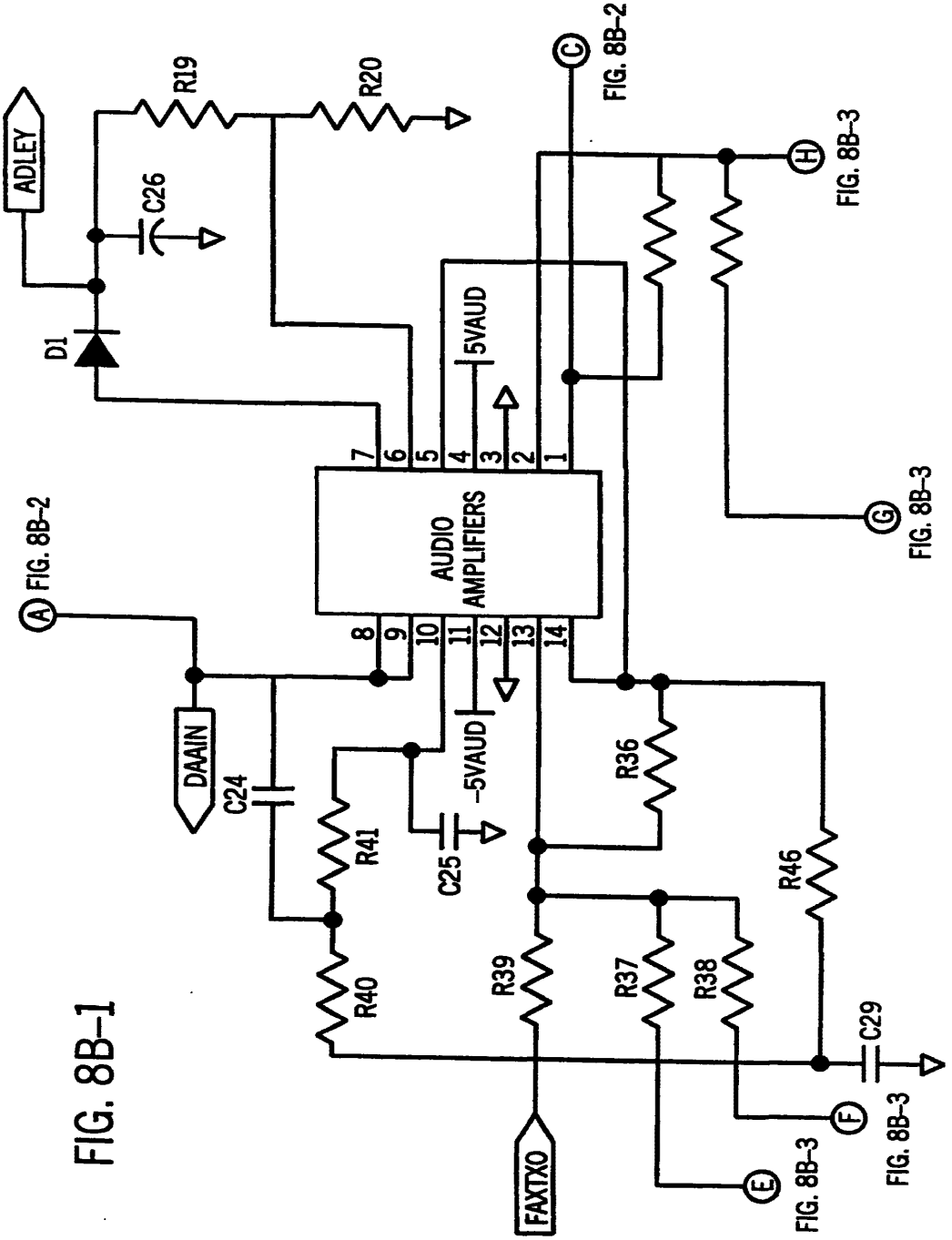
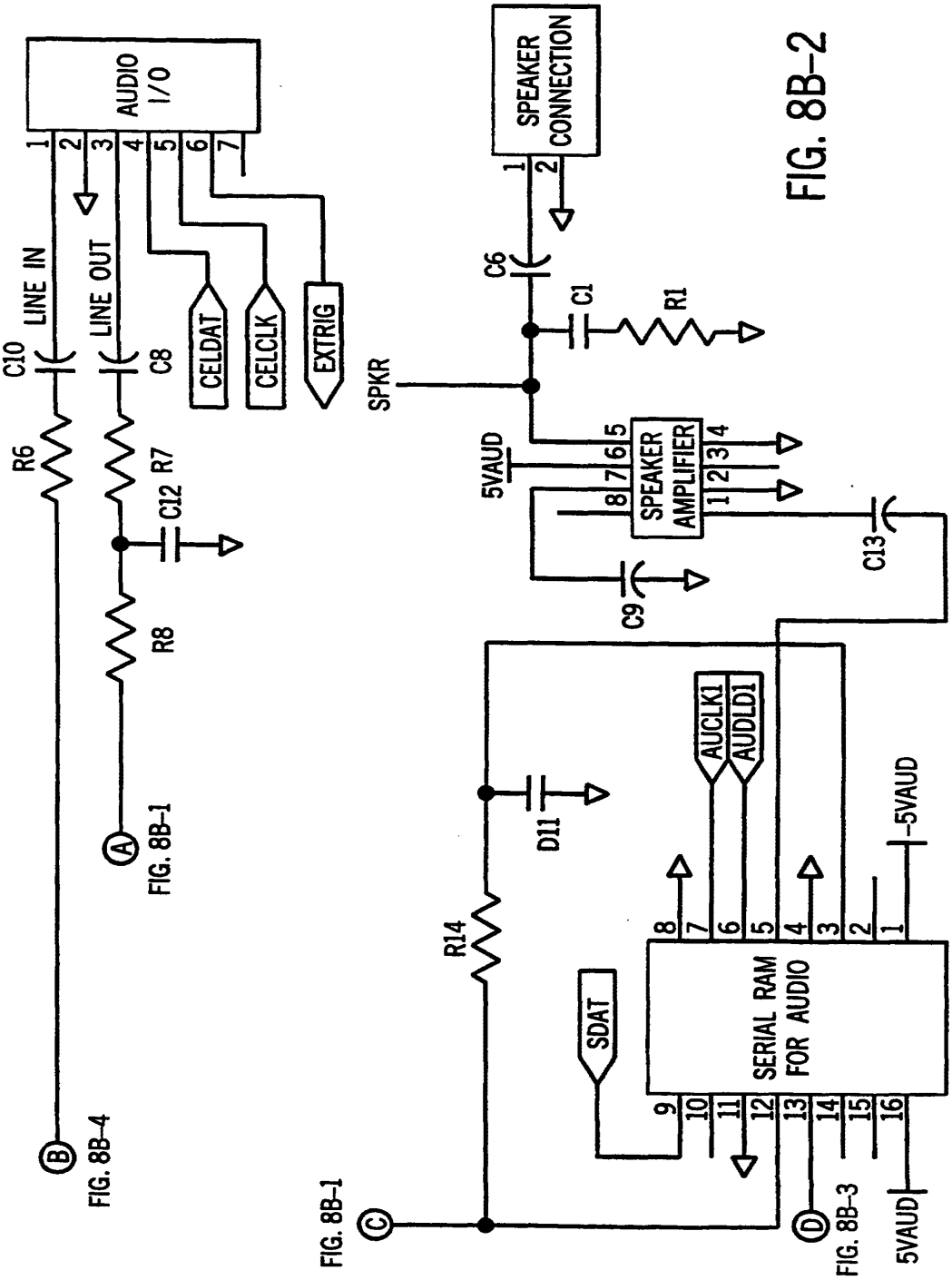


FIG. 8B-1



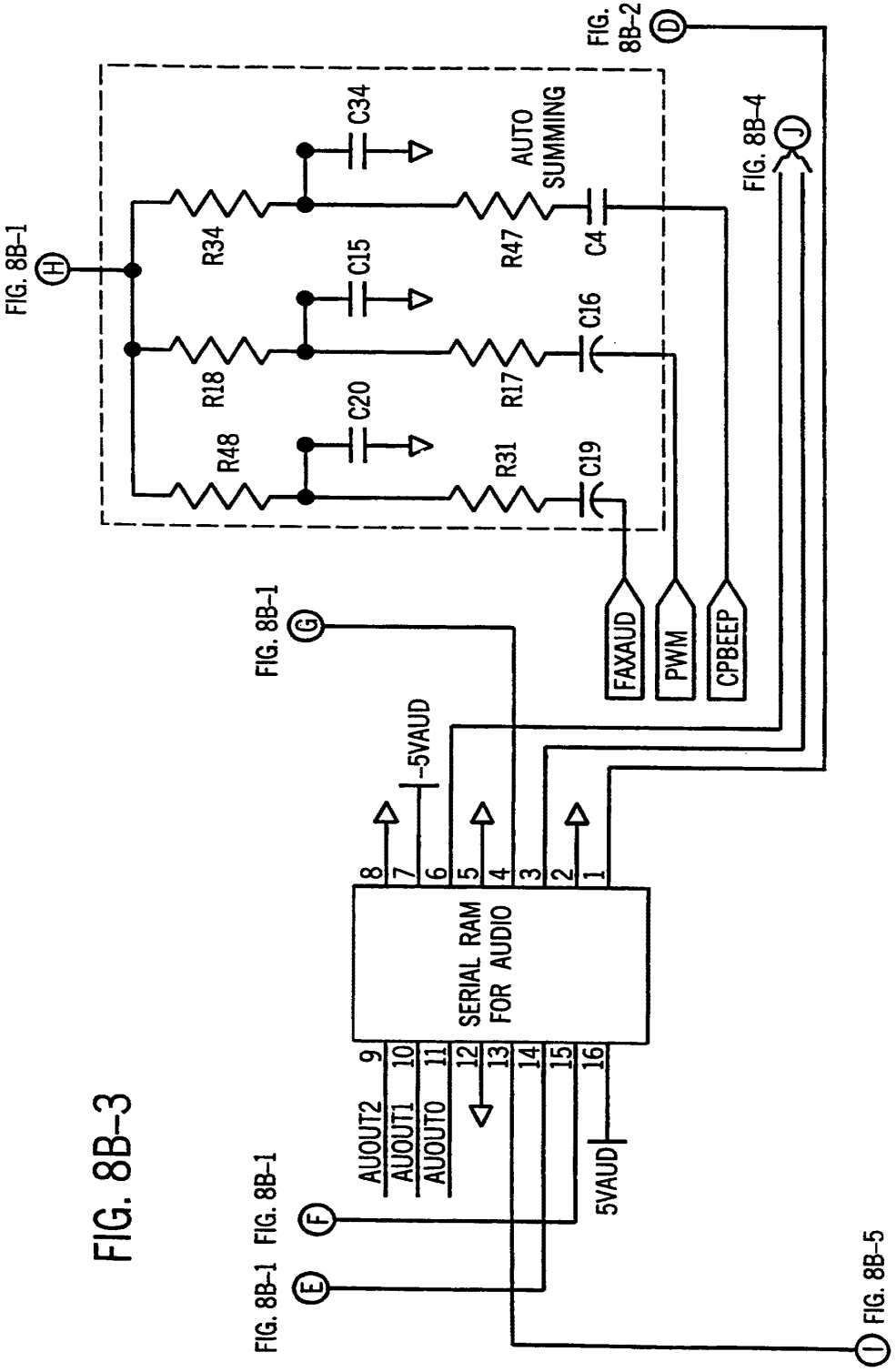


FIG. 8B-3

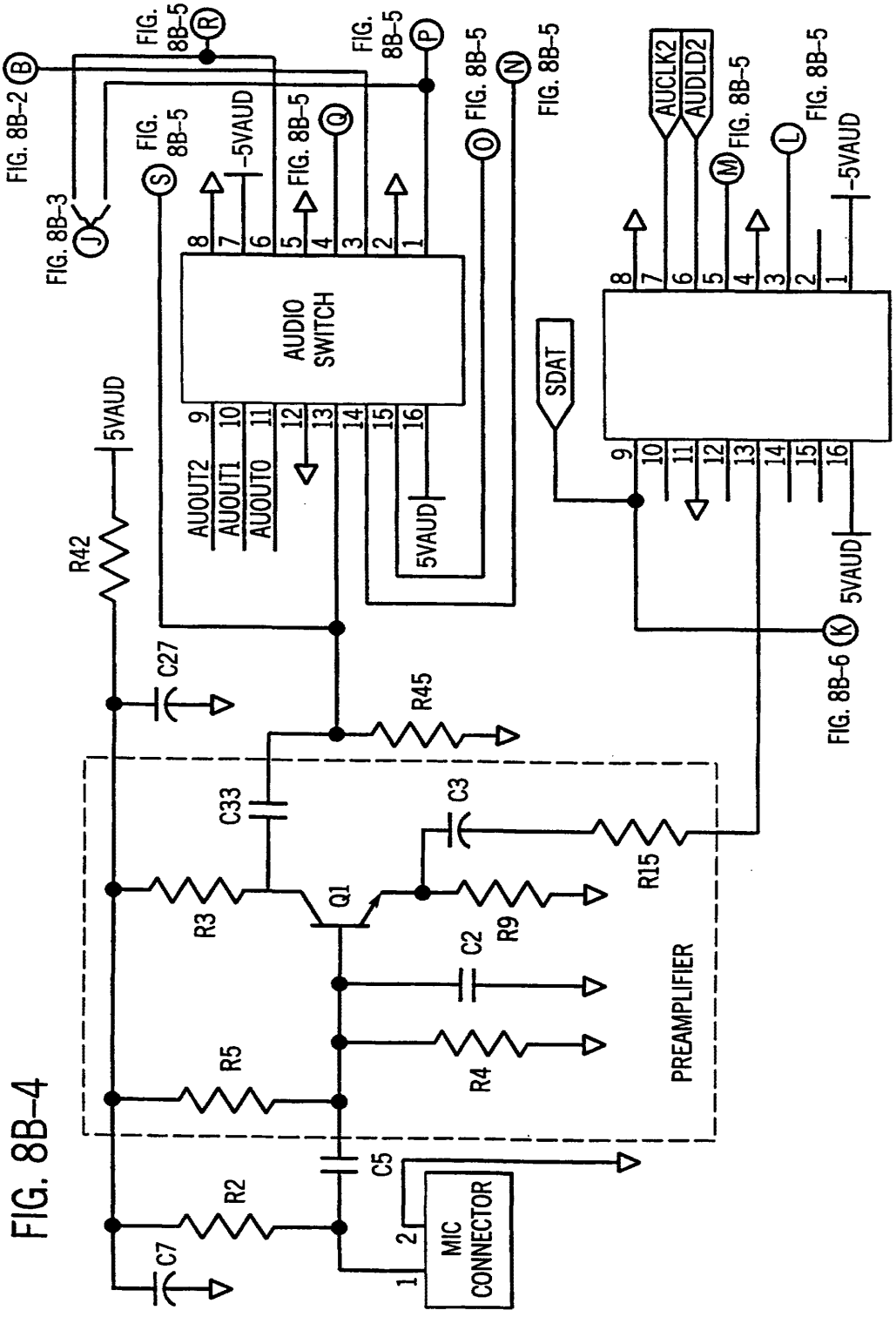


FIG. 8B-4

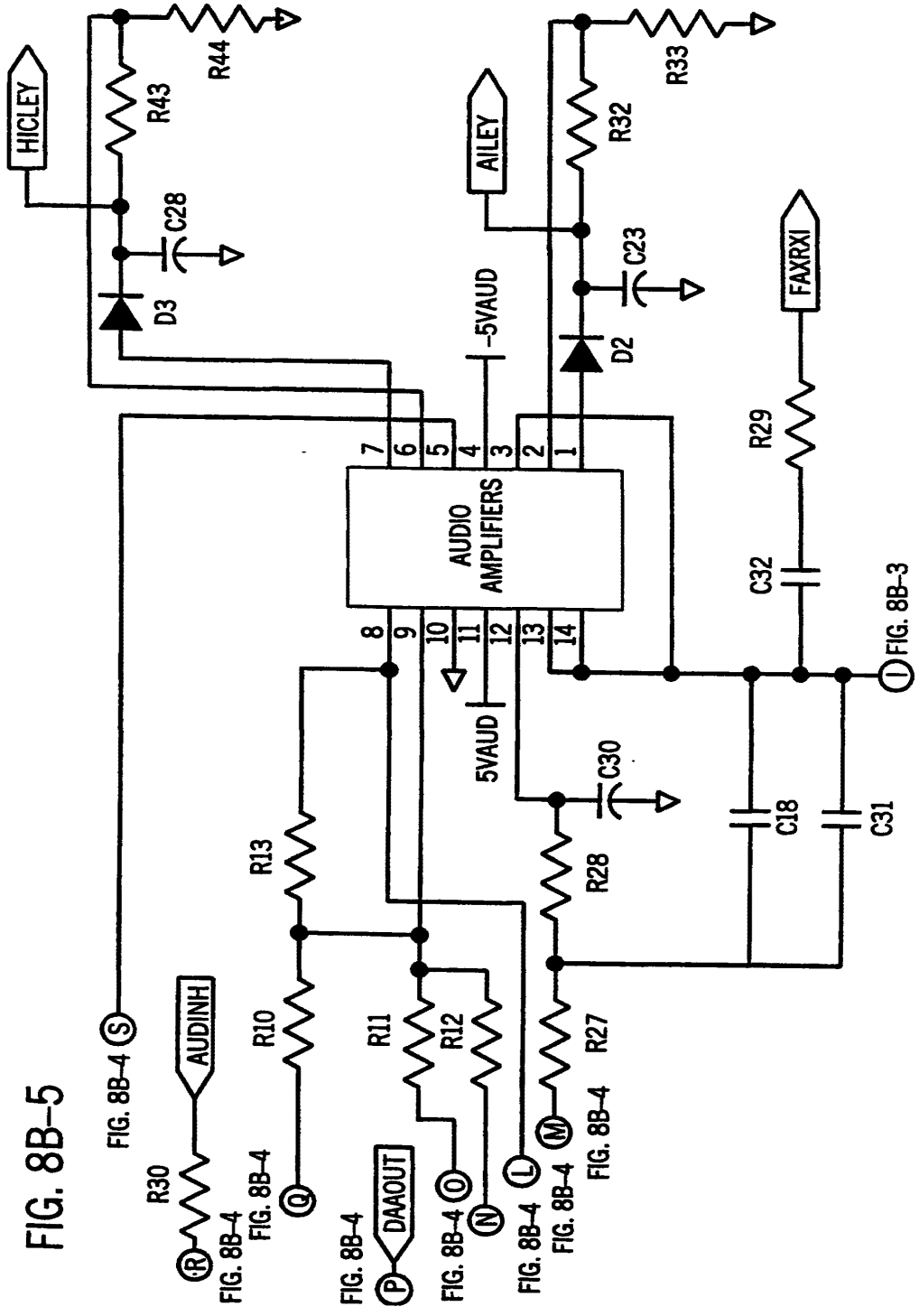


FIG. 8B-5

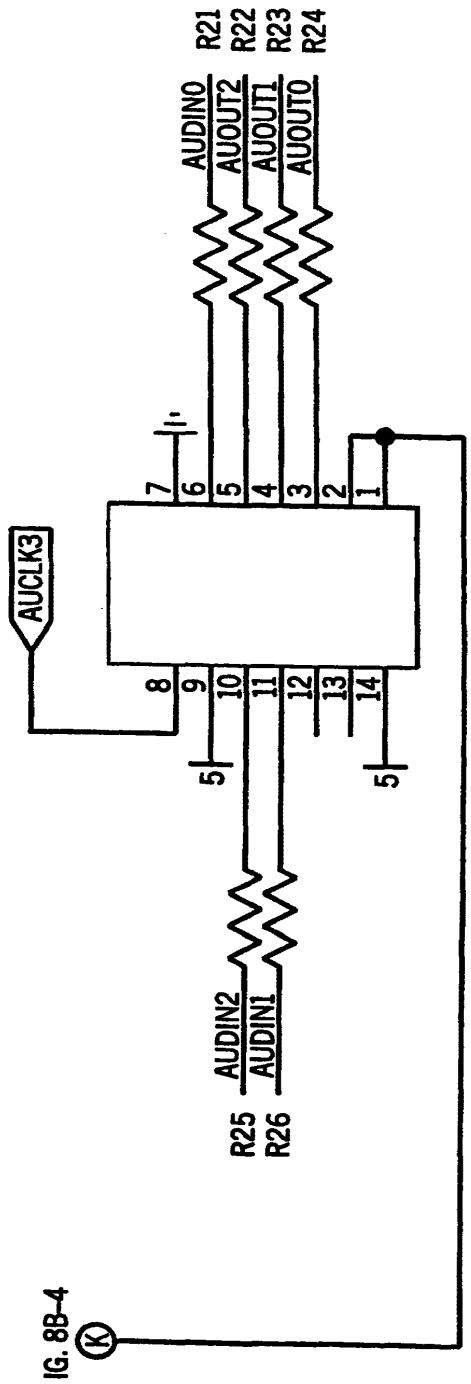


FIG. 8B-6

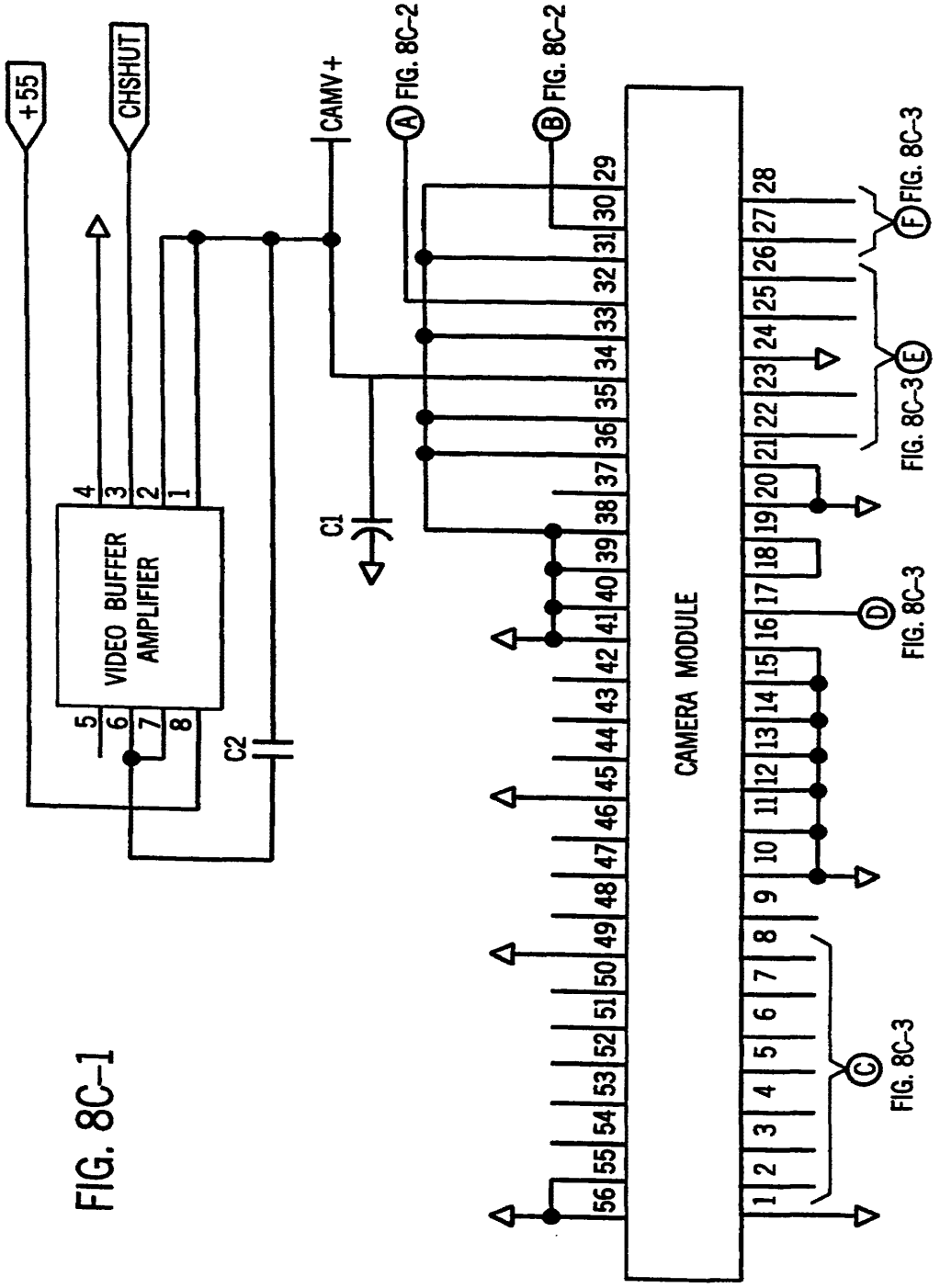
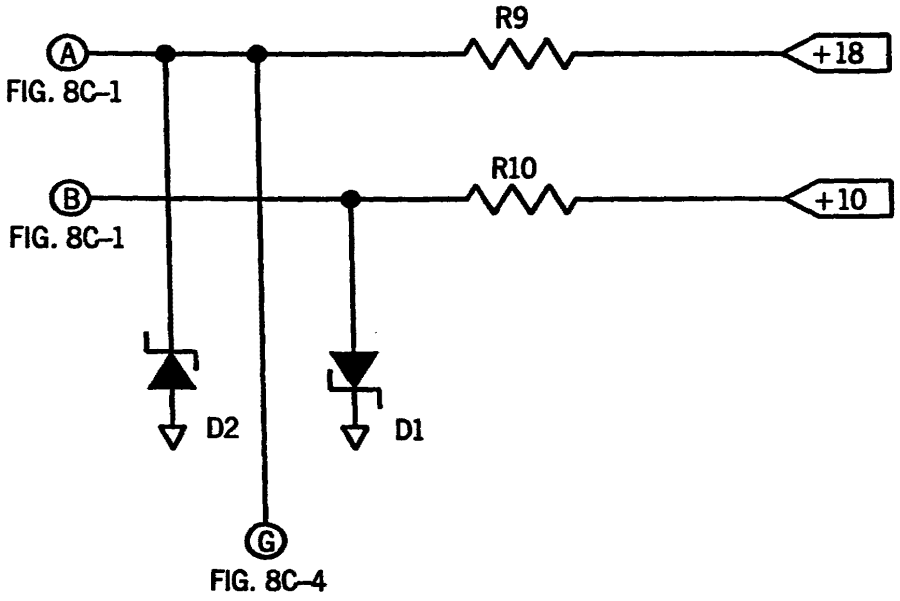


FIG. 8C-1

FIG. 8C–2



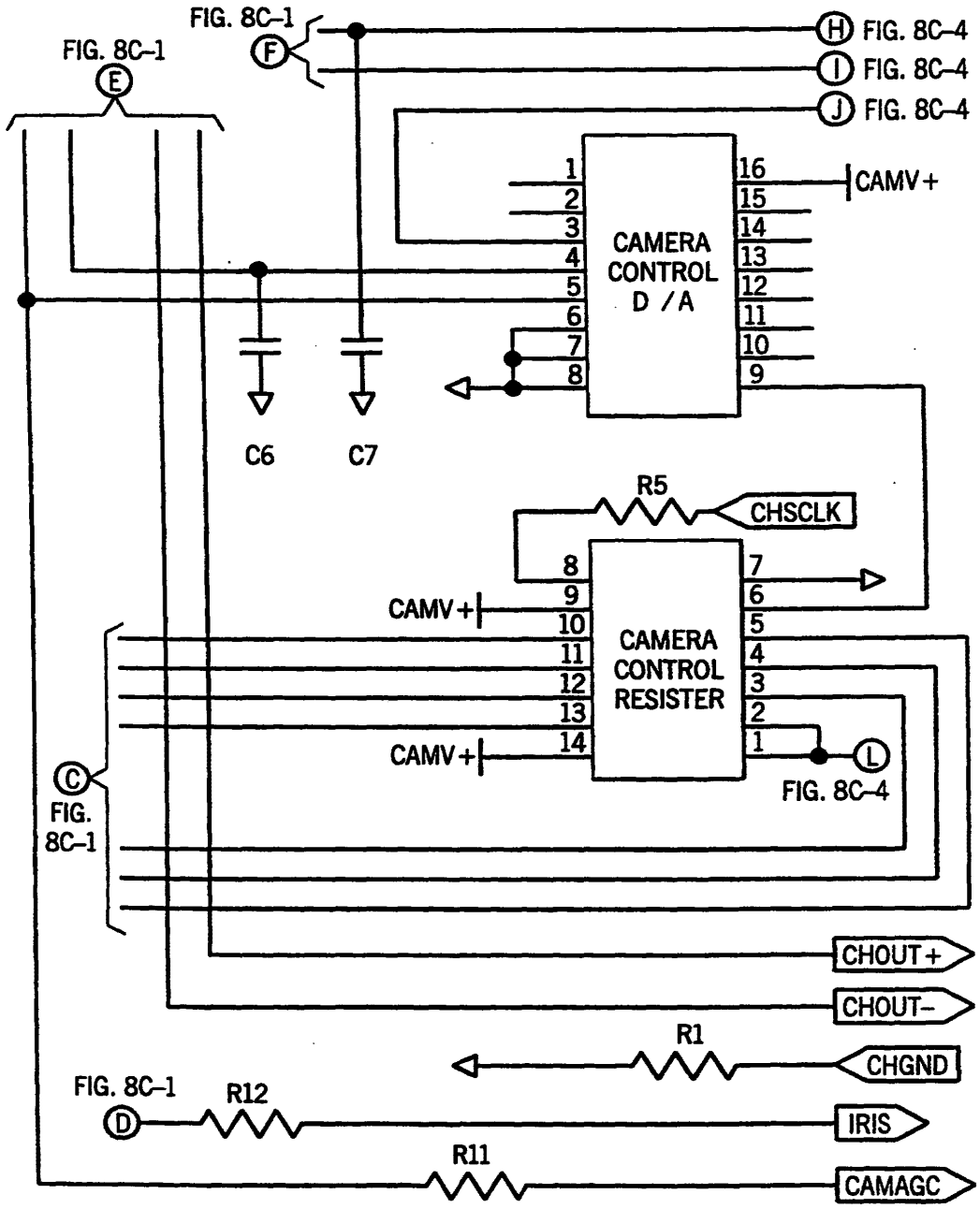


FIG. 8C-3

FIG. 8C-4

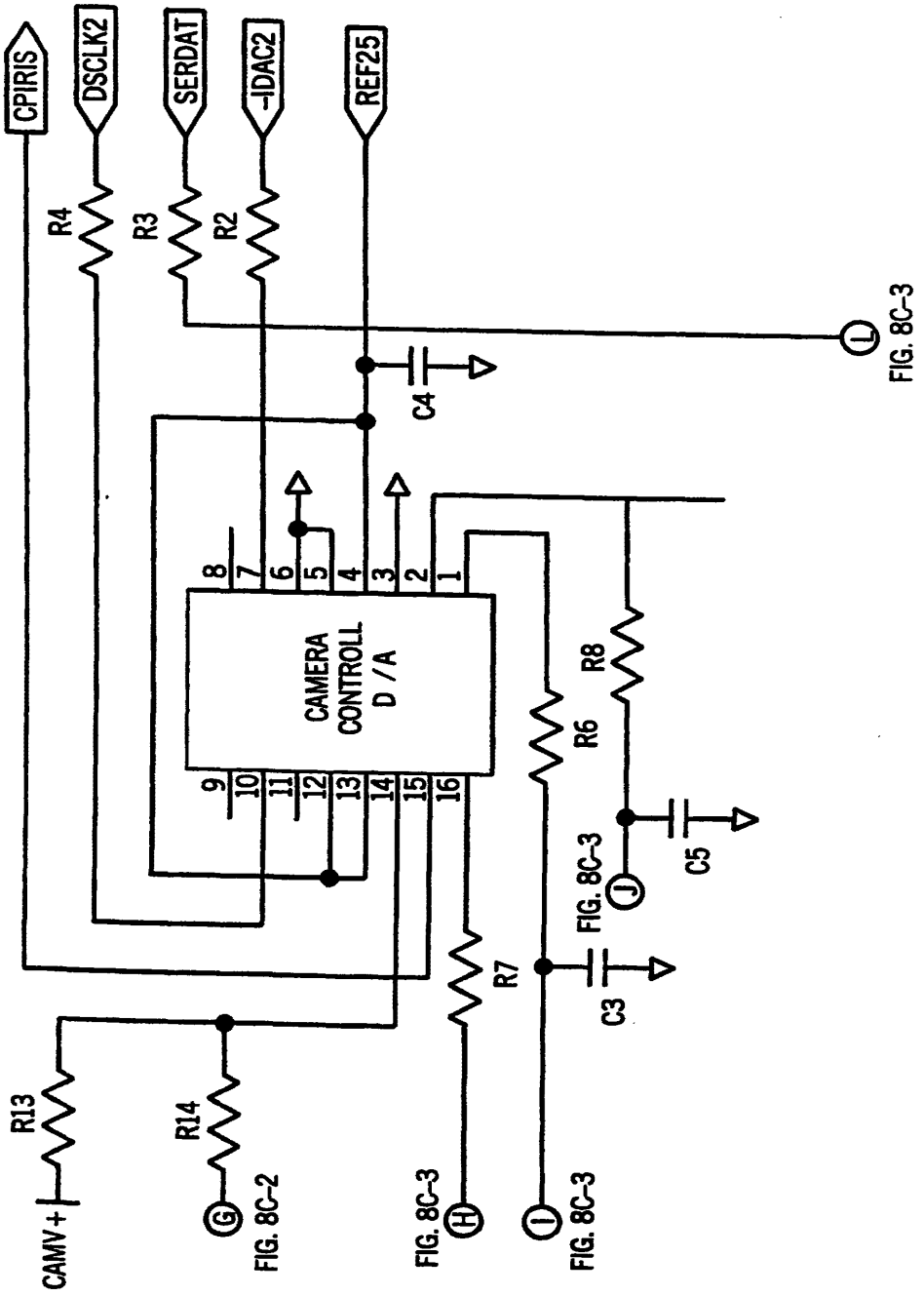


FIG. 8D-1

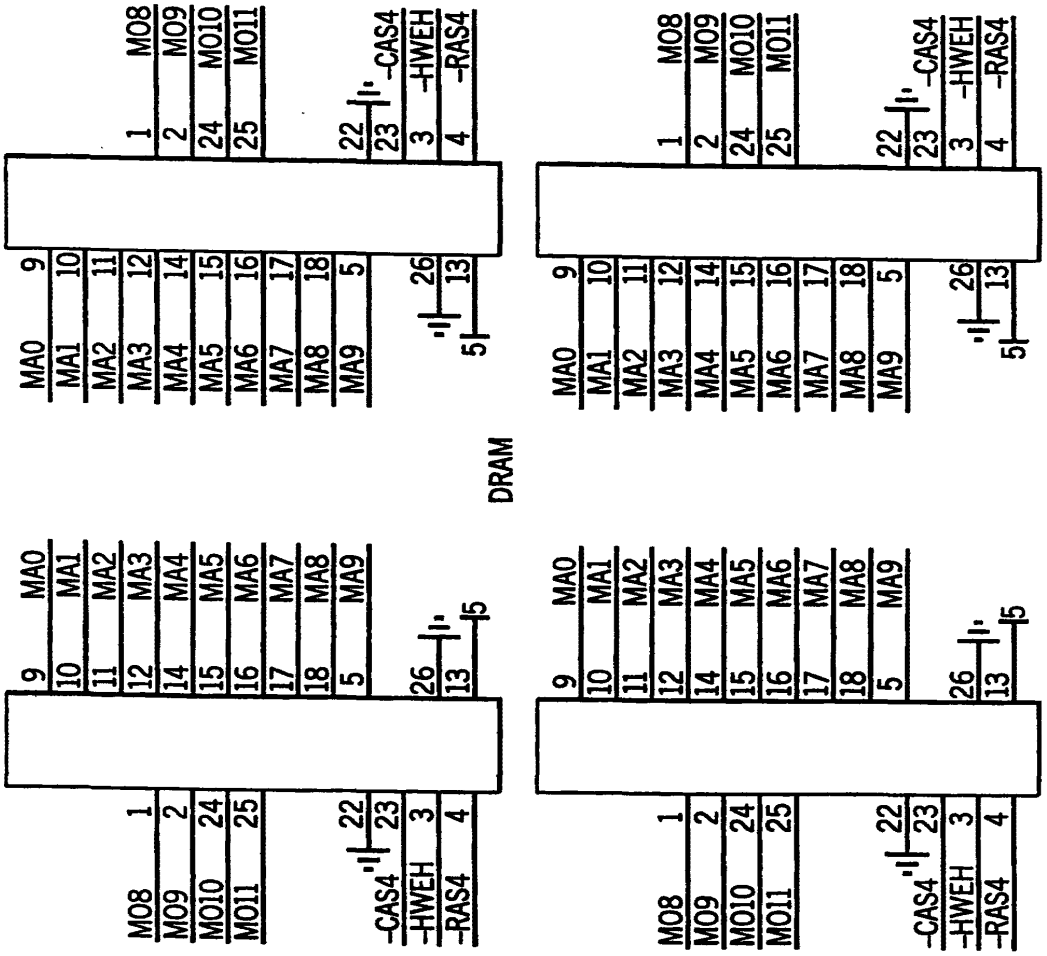


FIG. 8D-2

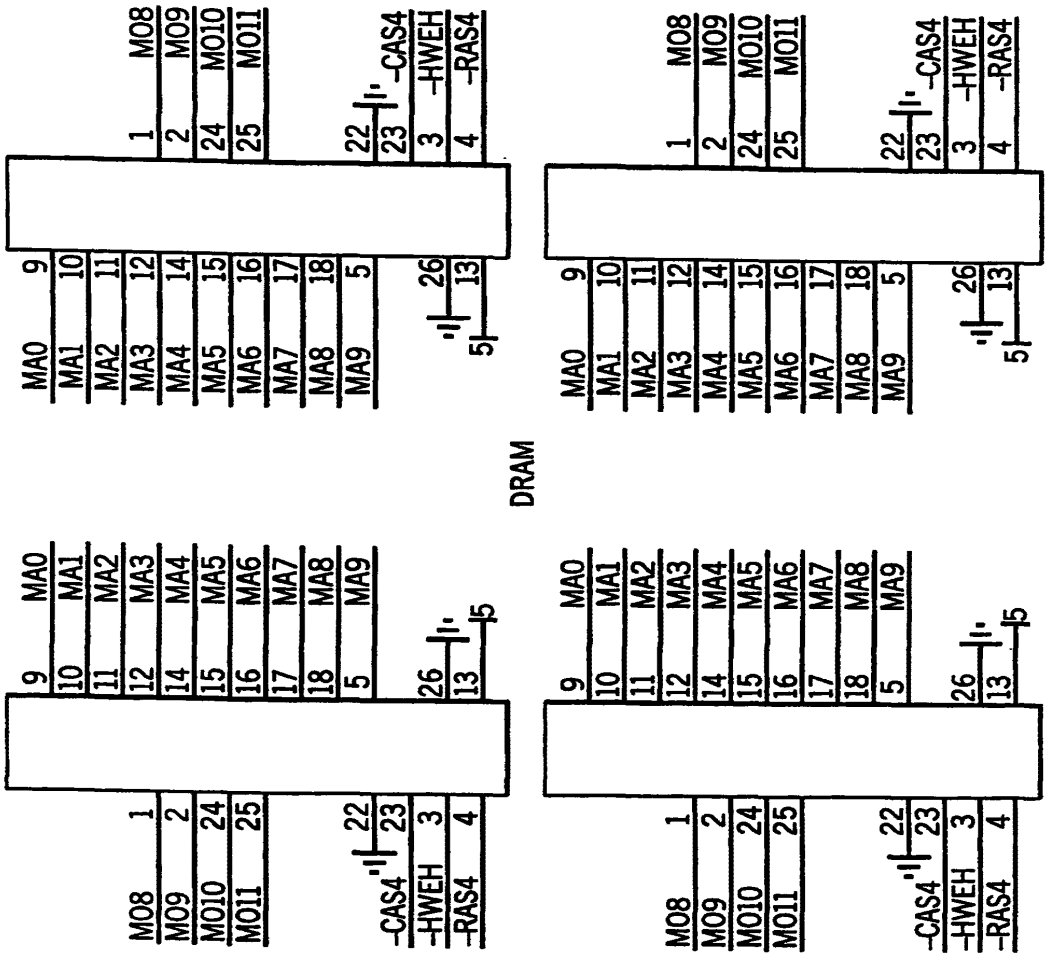


FIG. 8D–3

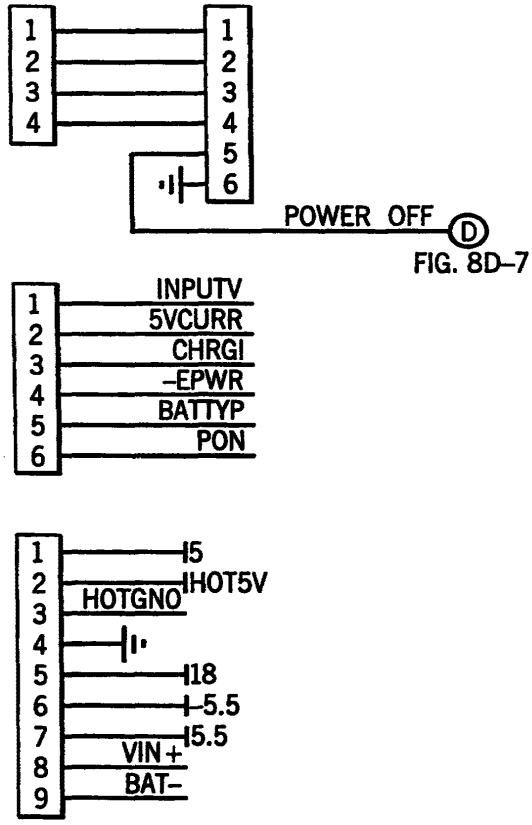


FIG. 8D–4

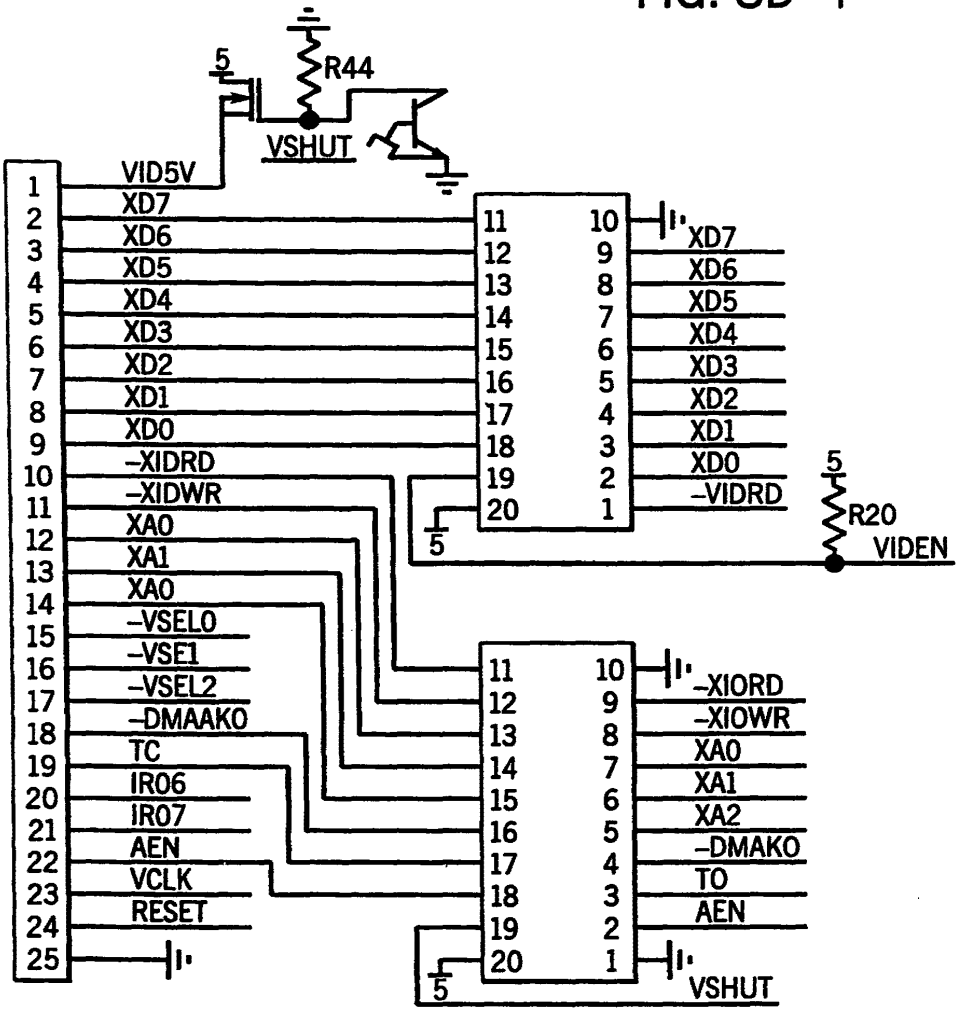


FIG. 8D–5

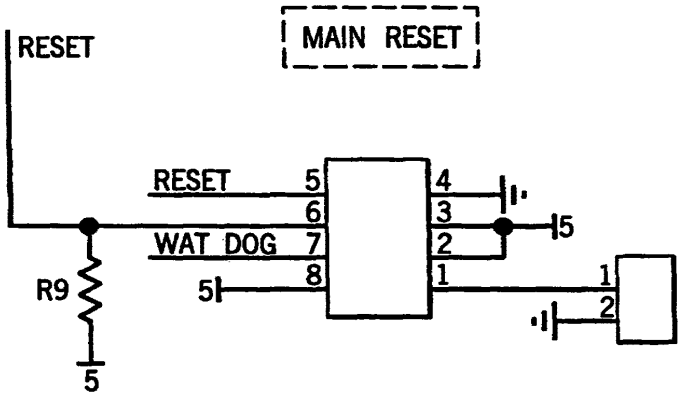


FIG. 8D–6

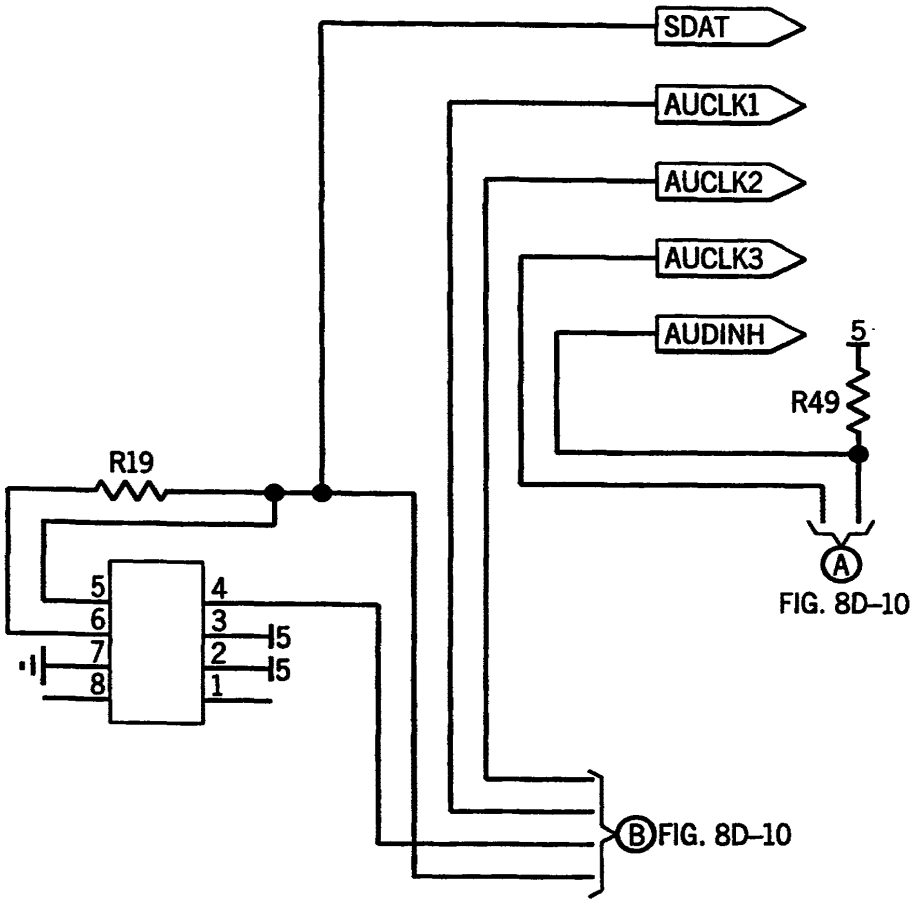


FIG. 8D–7

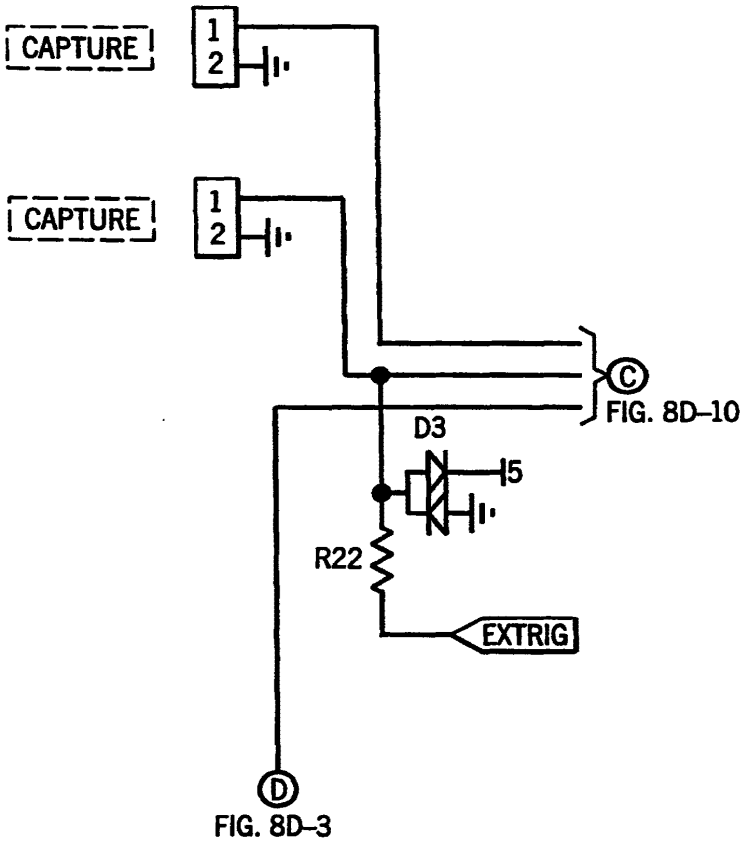


FIG. 8D–8

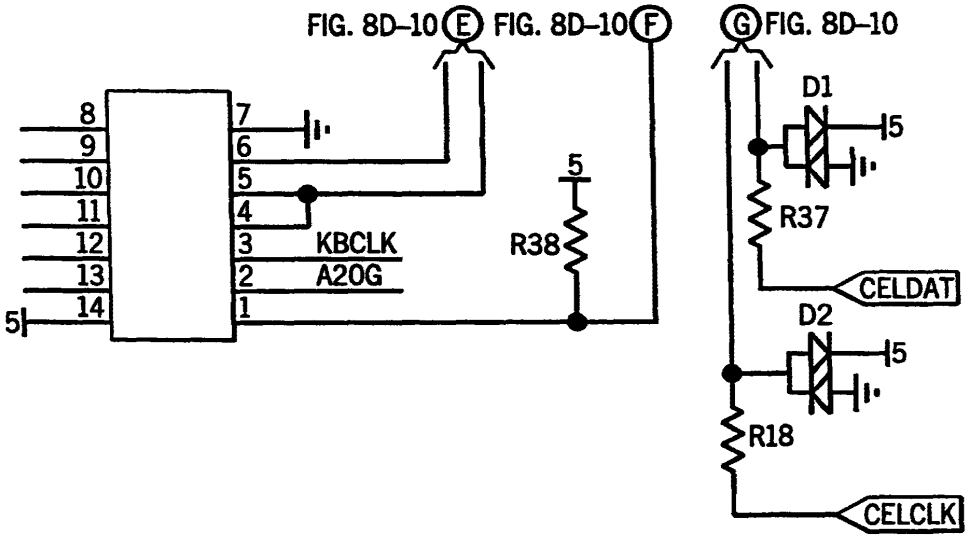


FIG. 8D-9

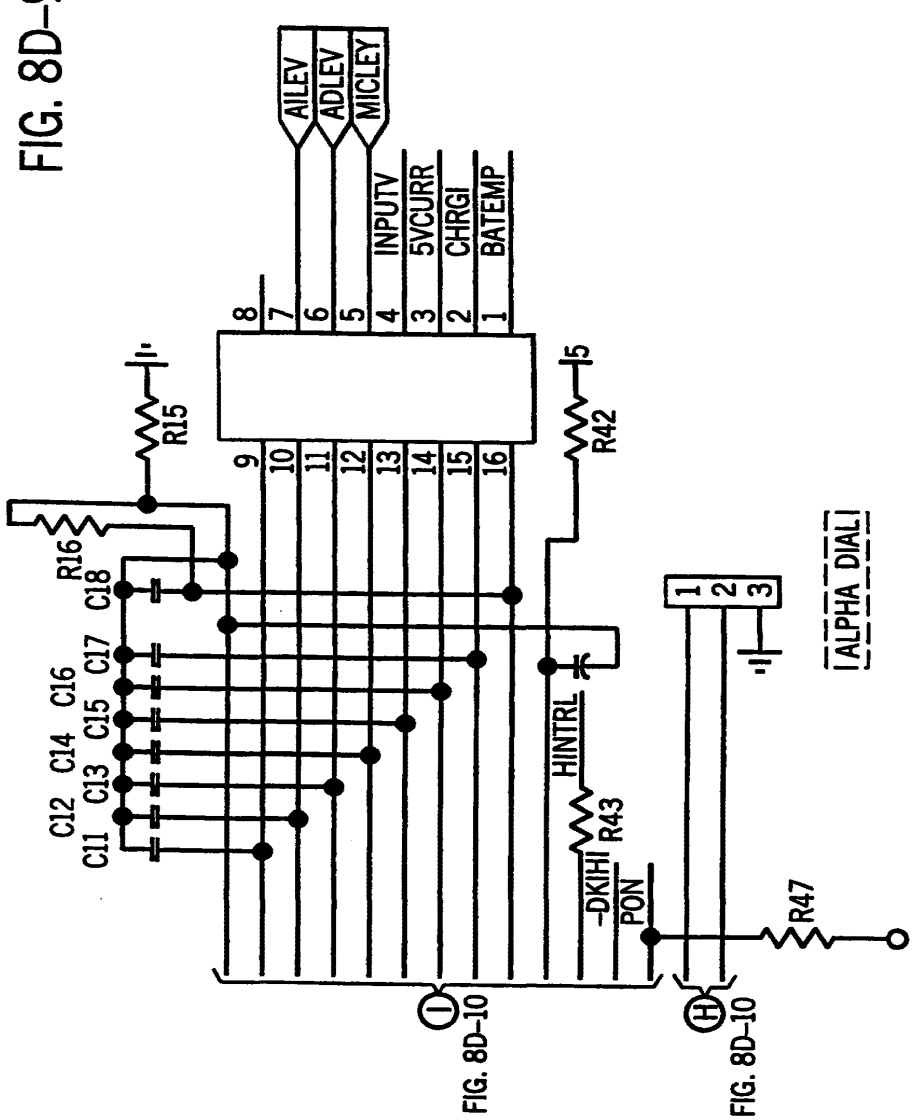


FIG. 8D-10

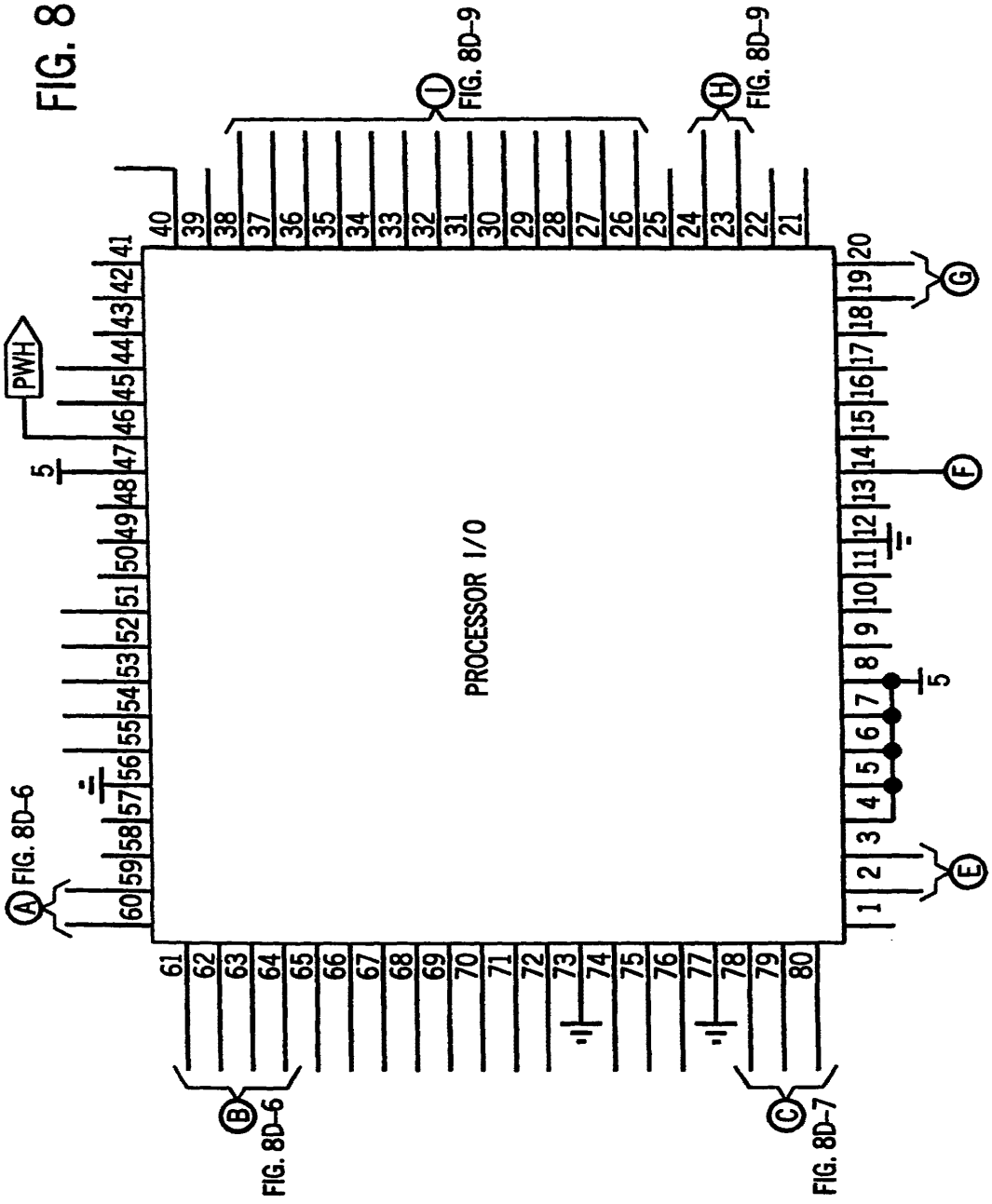


FIG. 8D-11

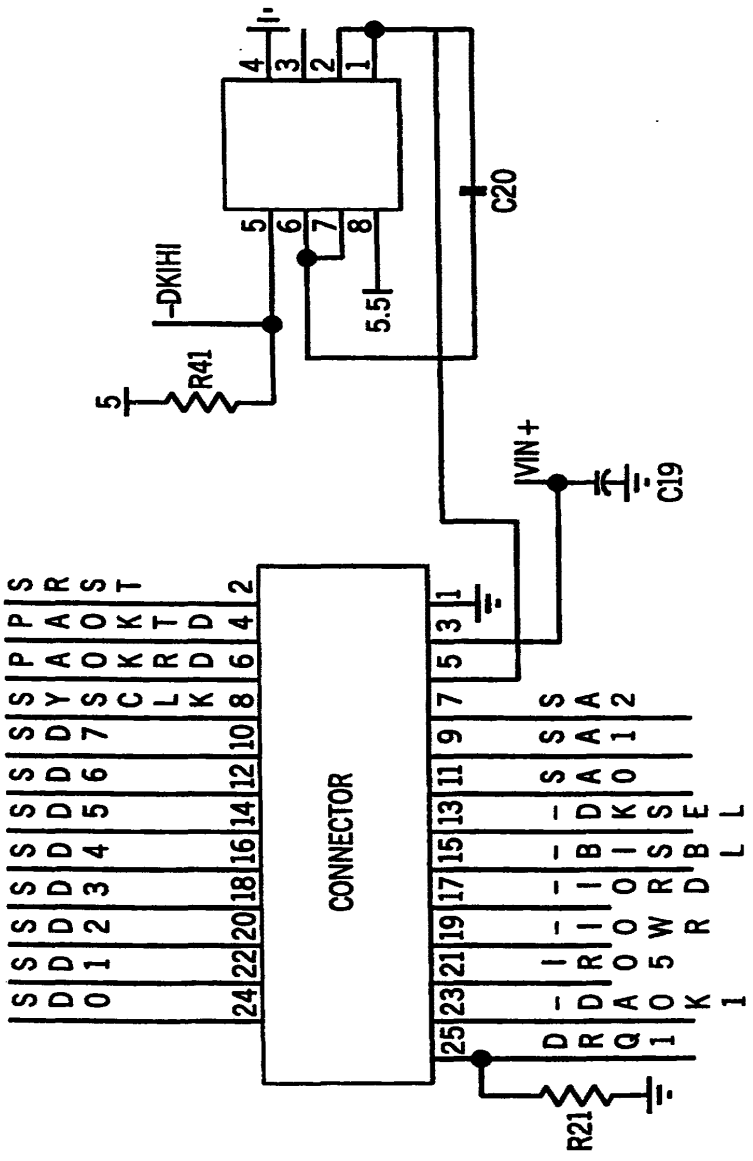


FIG. 8D-12

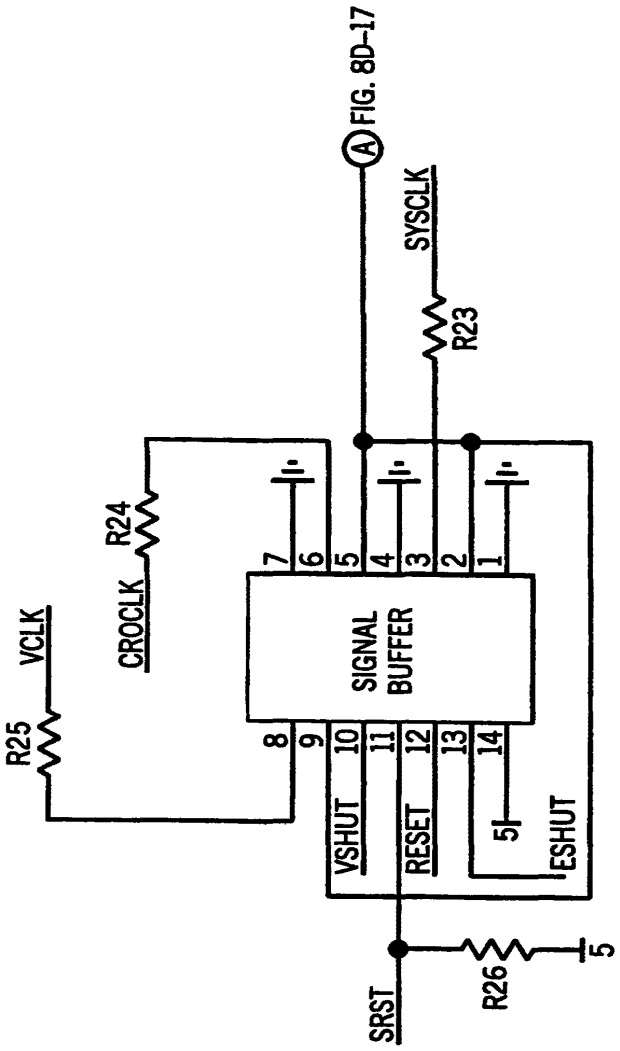


FIG. 8D–13

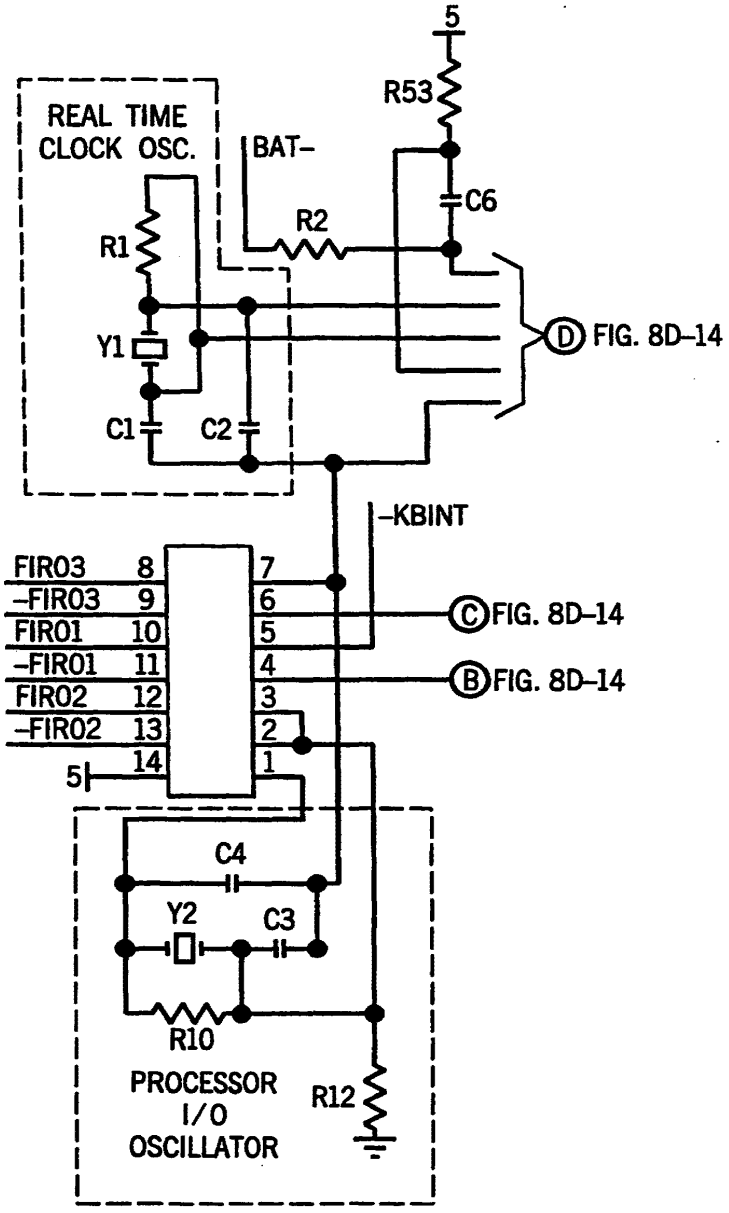


FIG. 8D–14

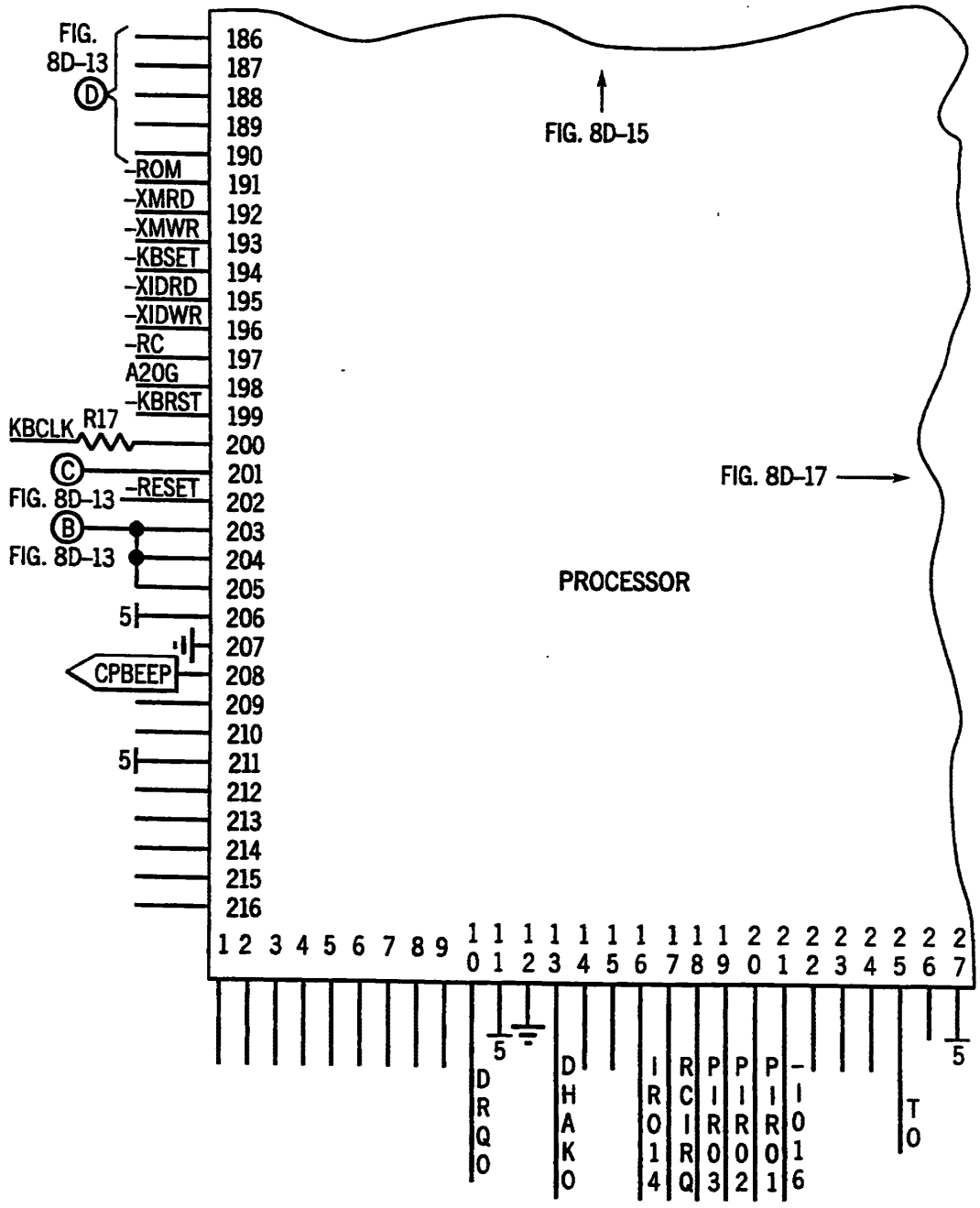


FIG. 8D–15

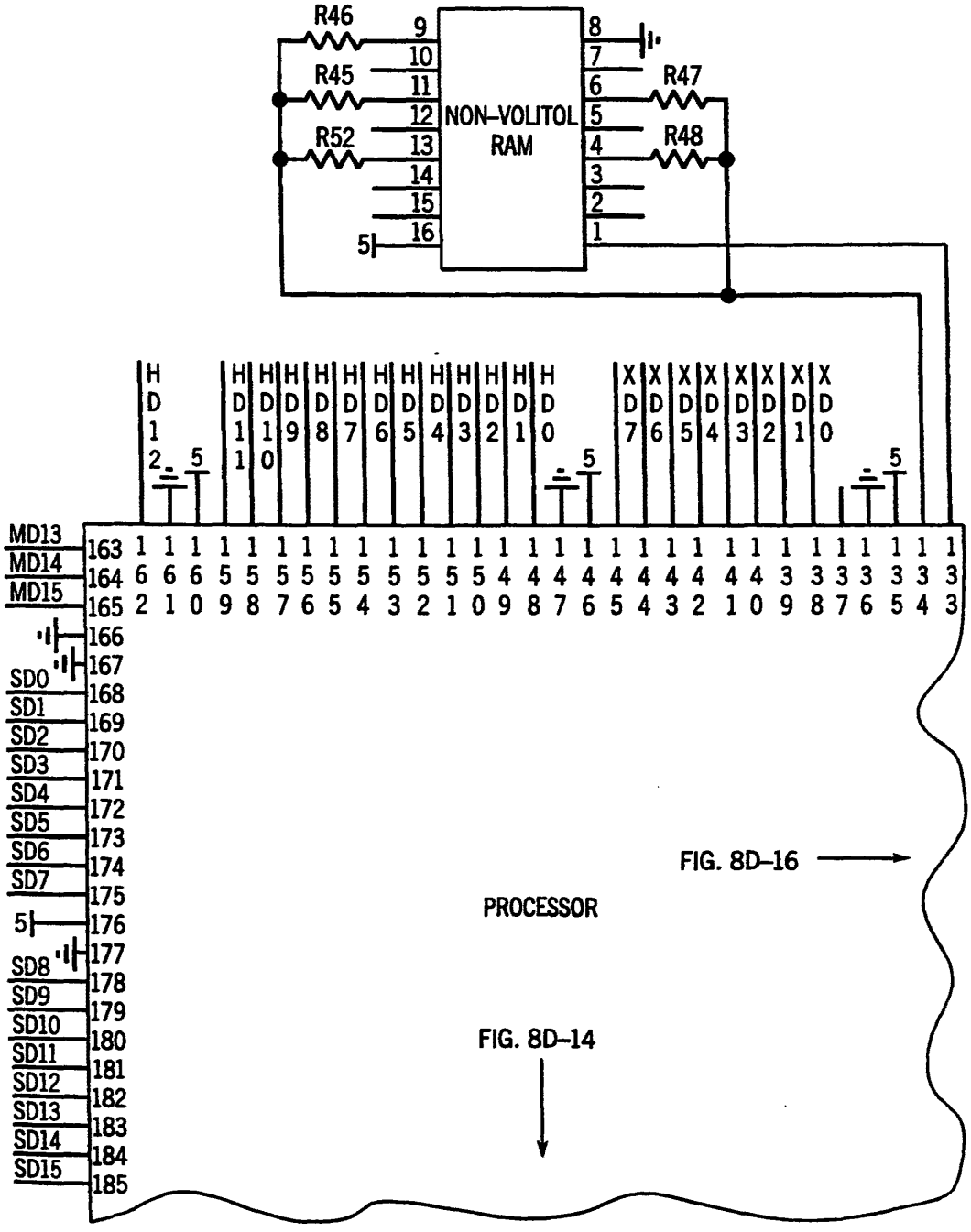


FIG. 8D–16

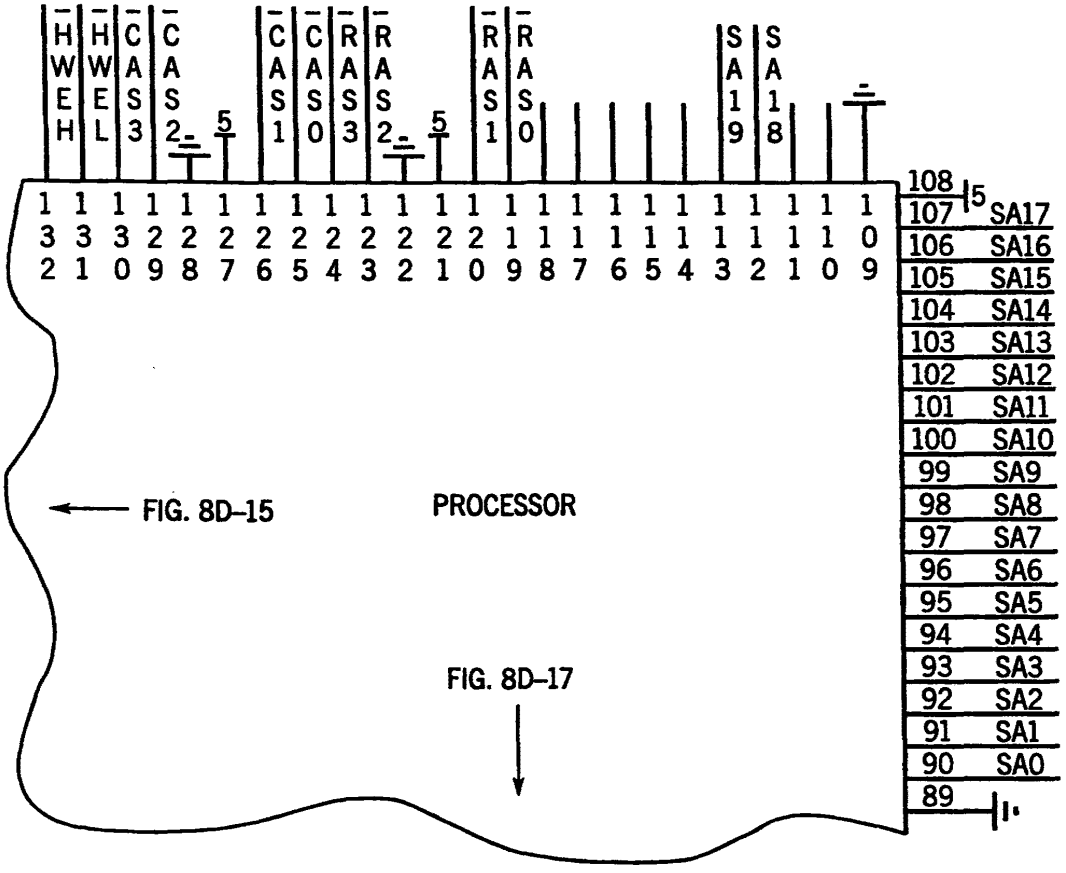


FIG. 8D–17

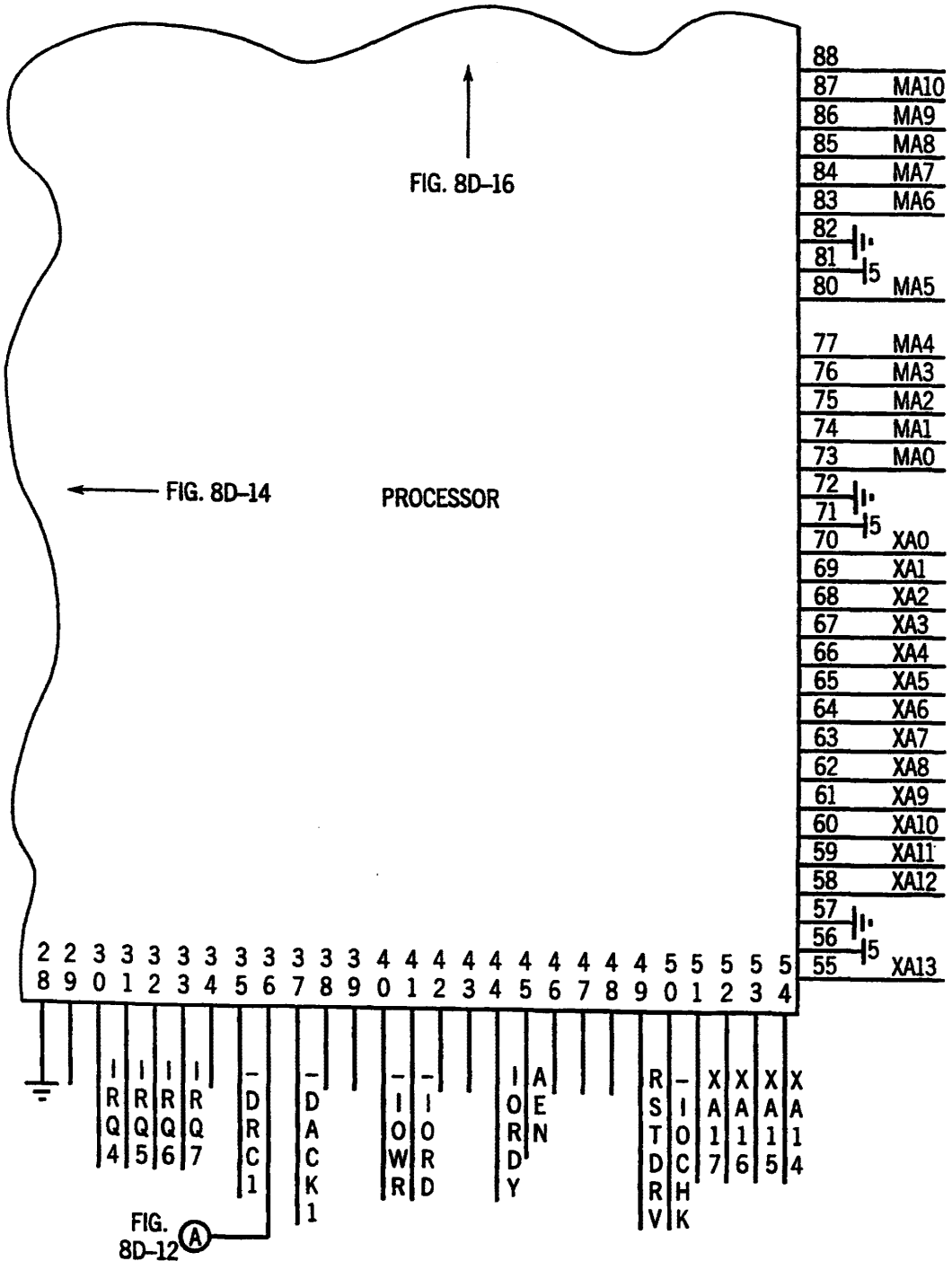


FIG. 8D–18

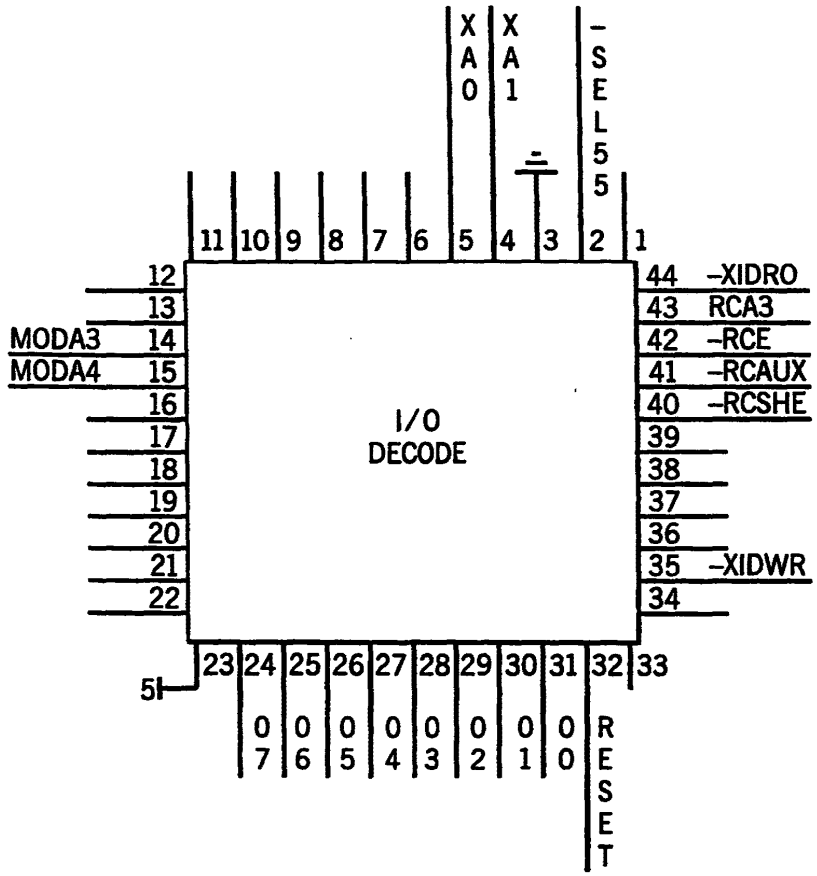
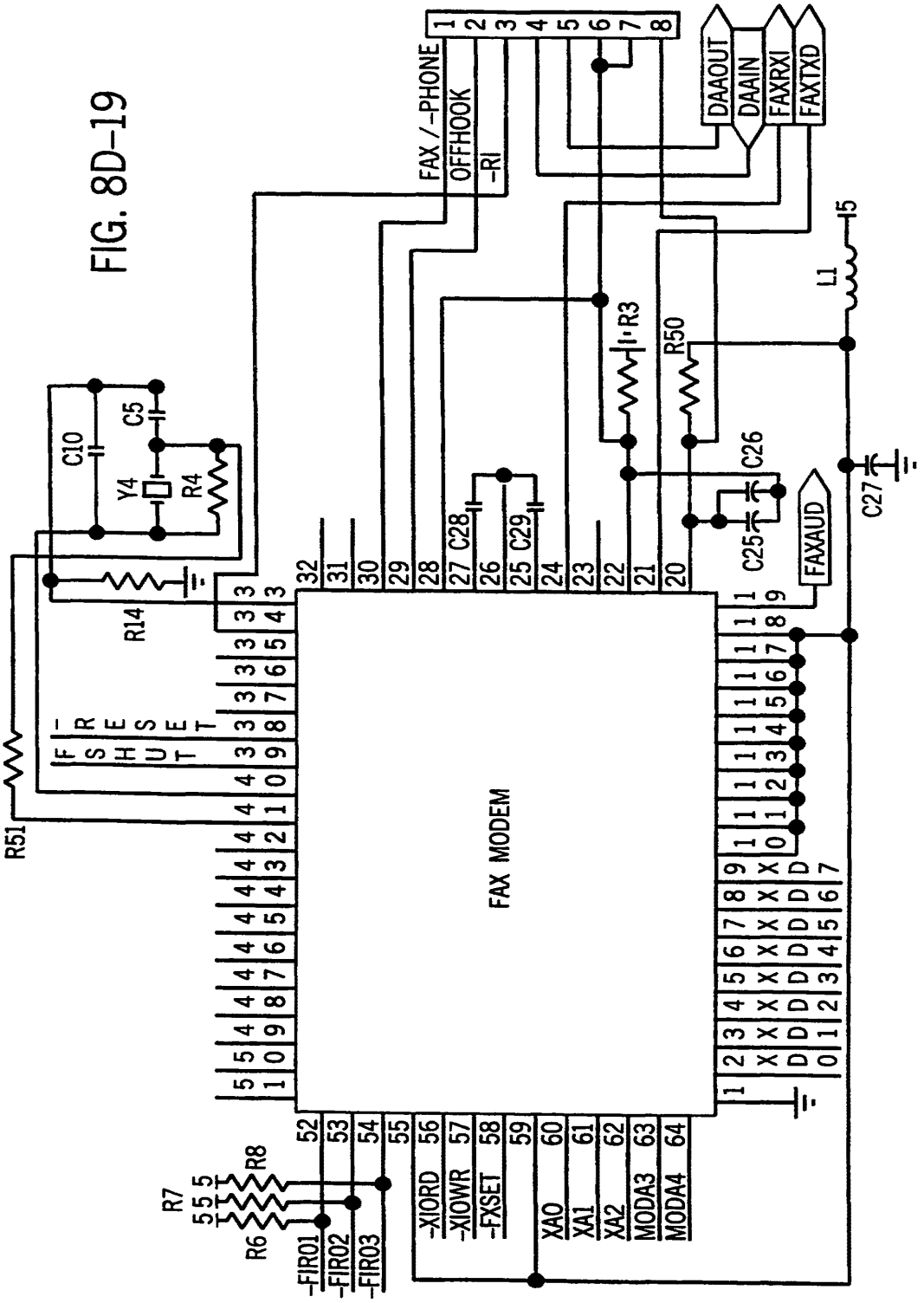


FIG. 8D-19



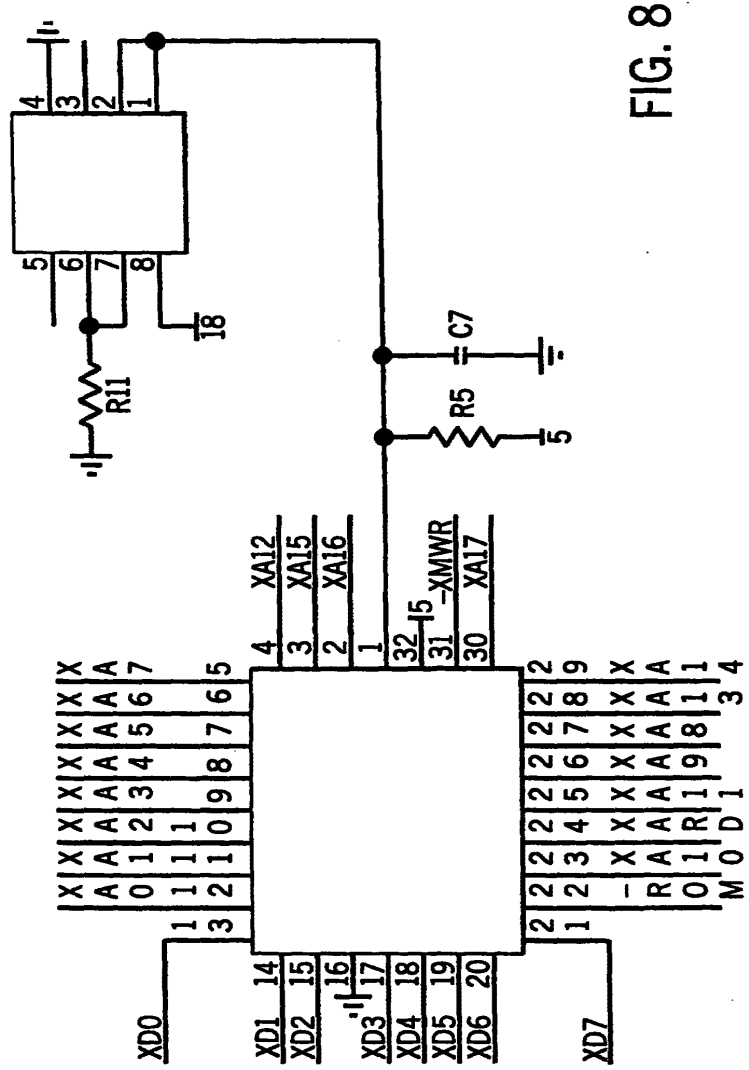


FIG. 8D-20

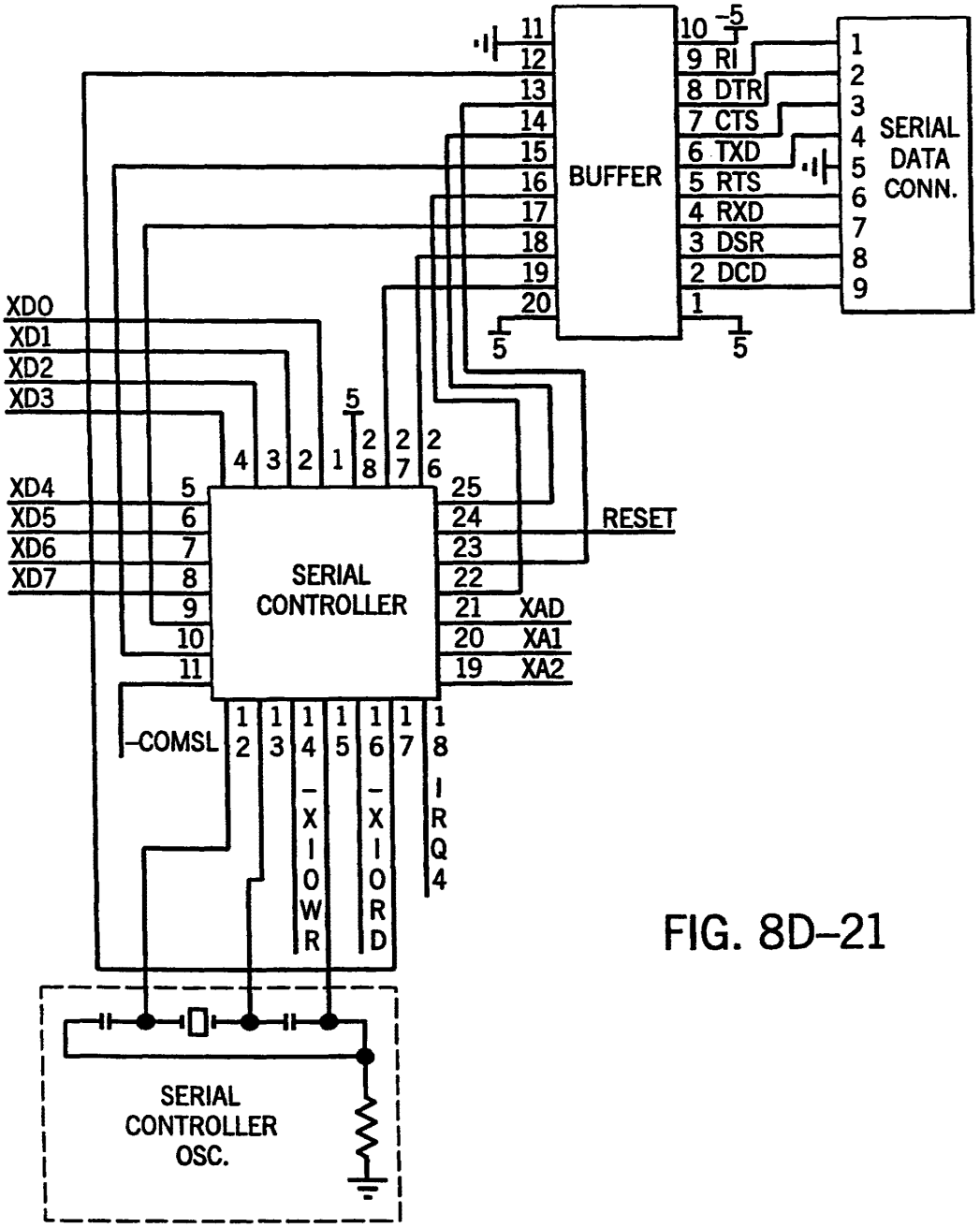


FIG. 8D–21

FIG. 8D–22

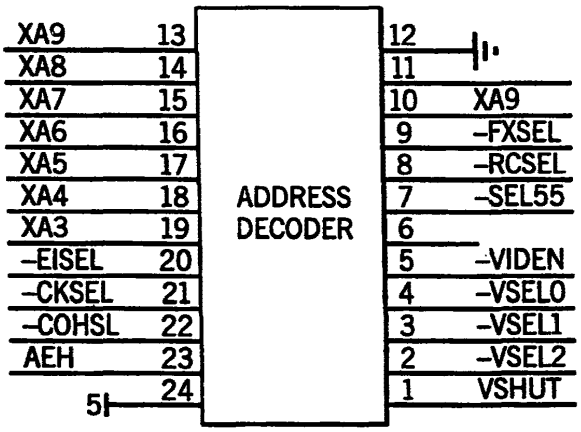
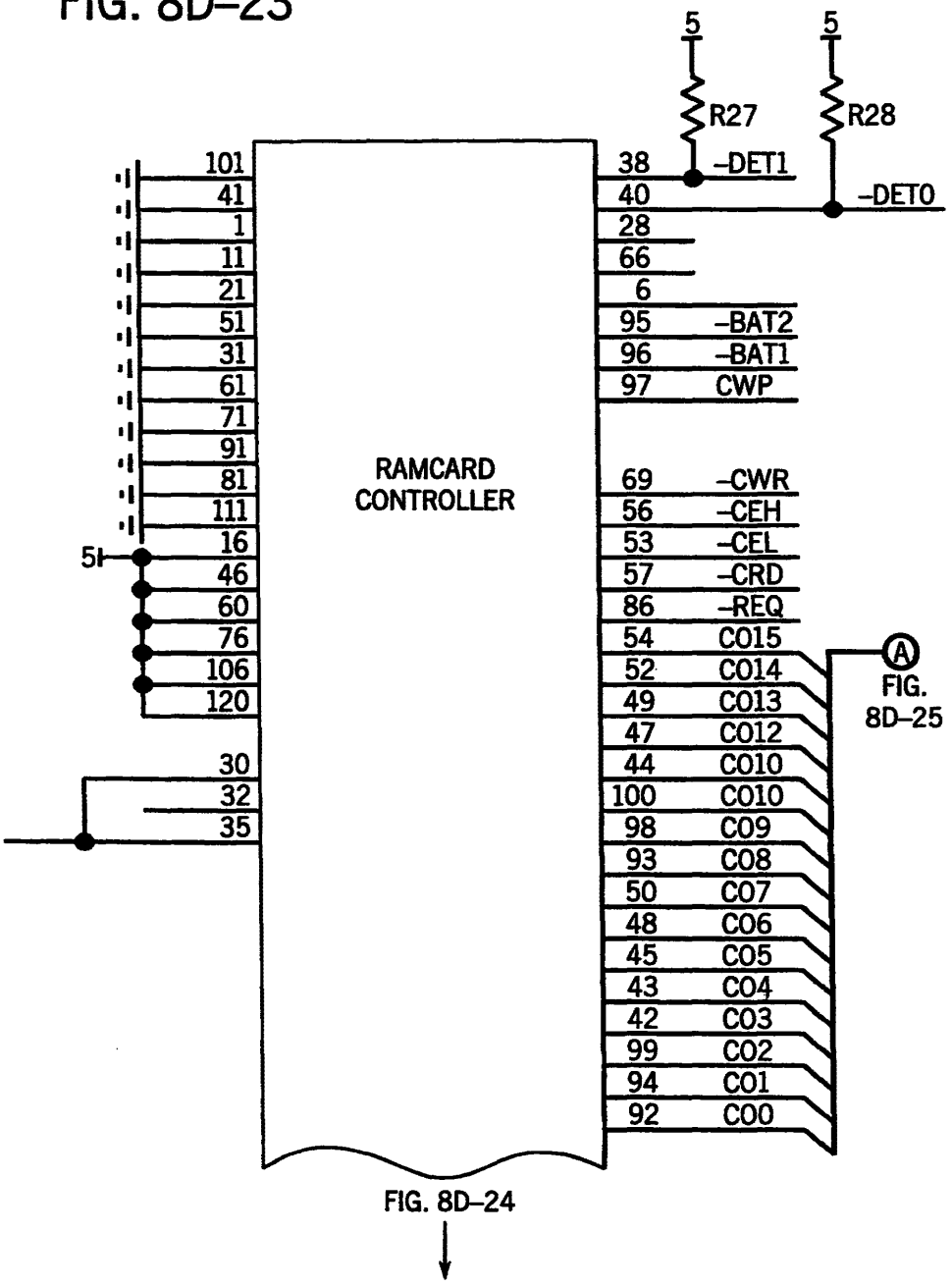


FIG. 8D–23



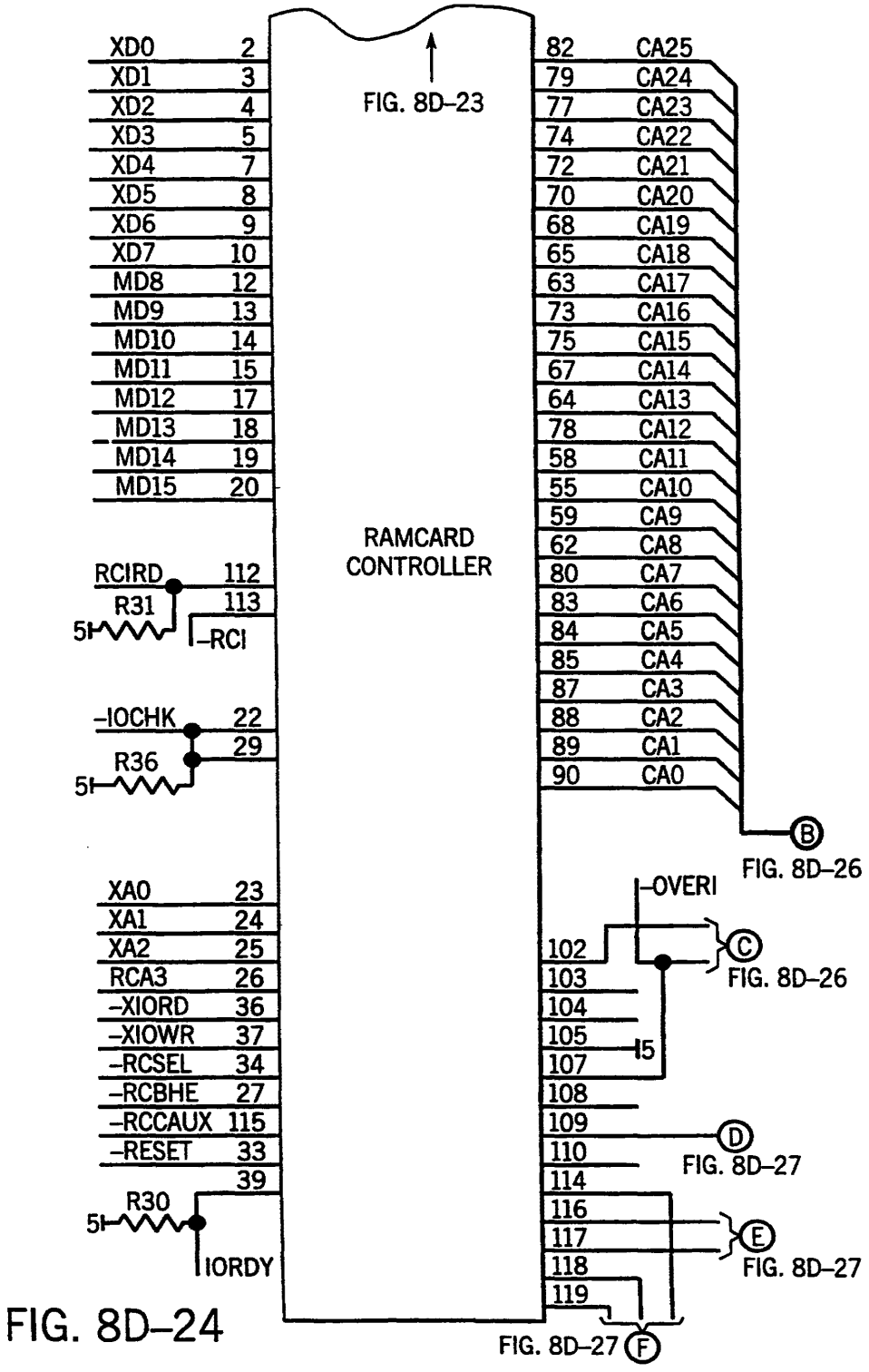


FIG. 8D-24

FIG. 8D–25

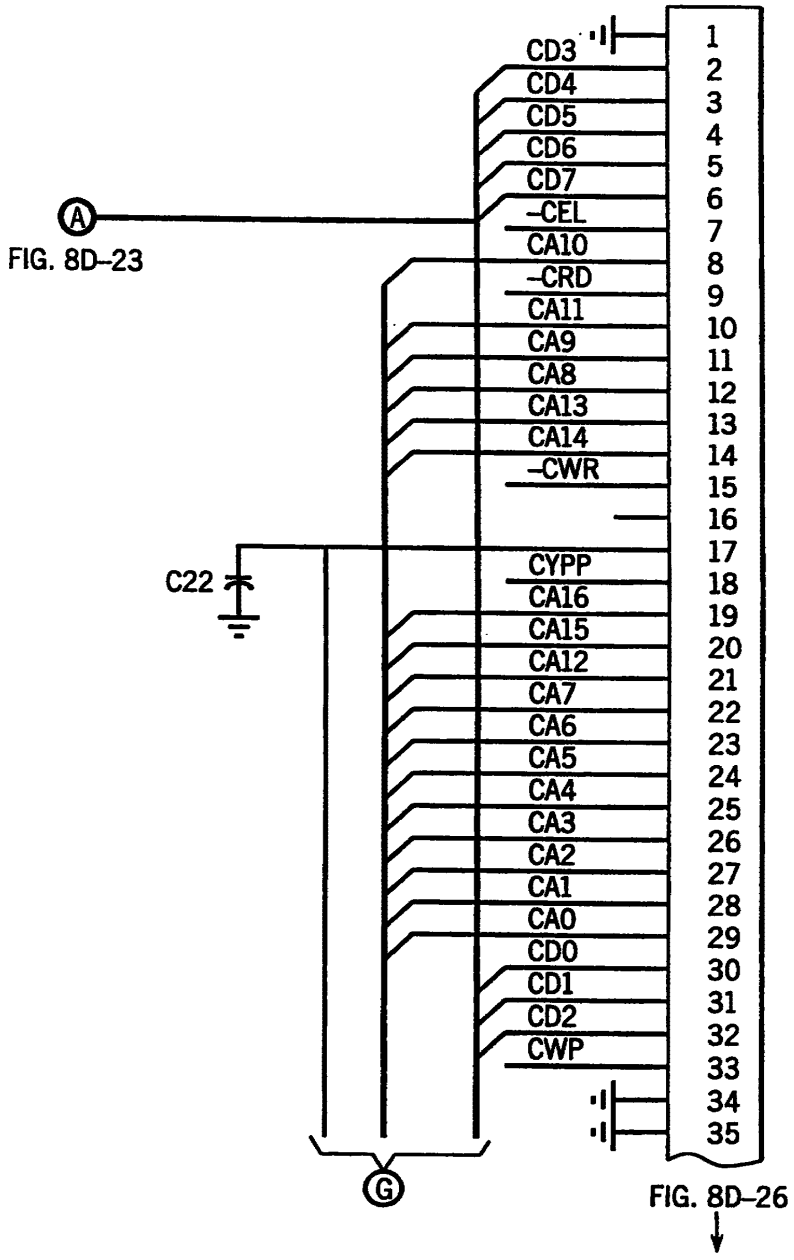
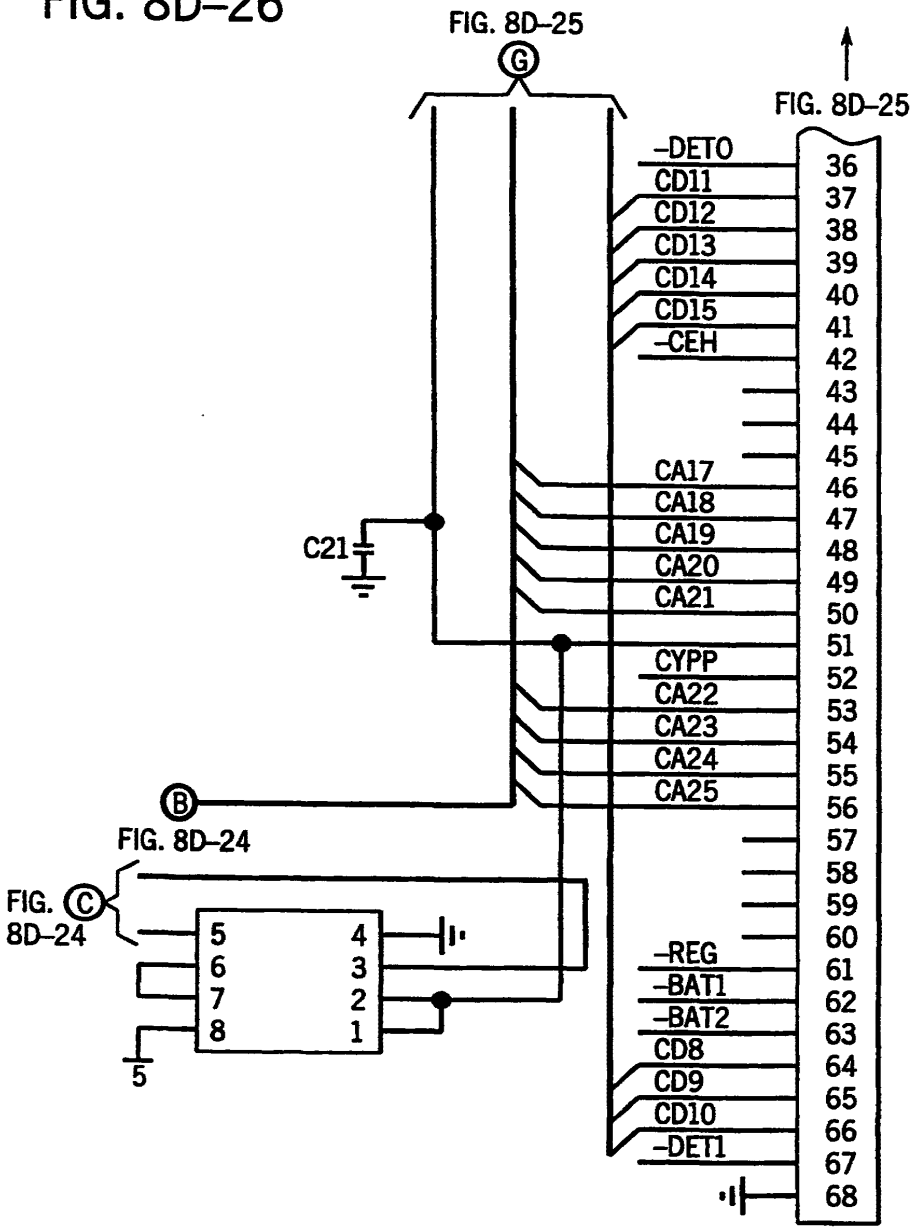


FIG. 8D–26



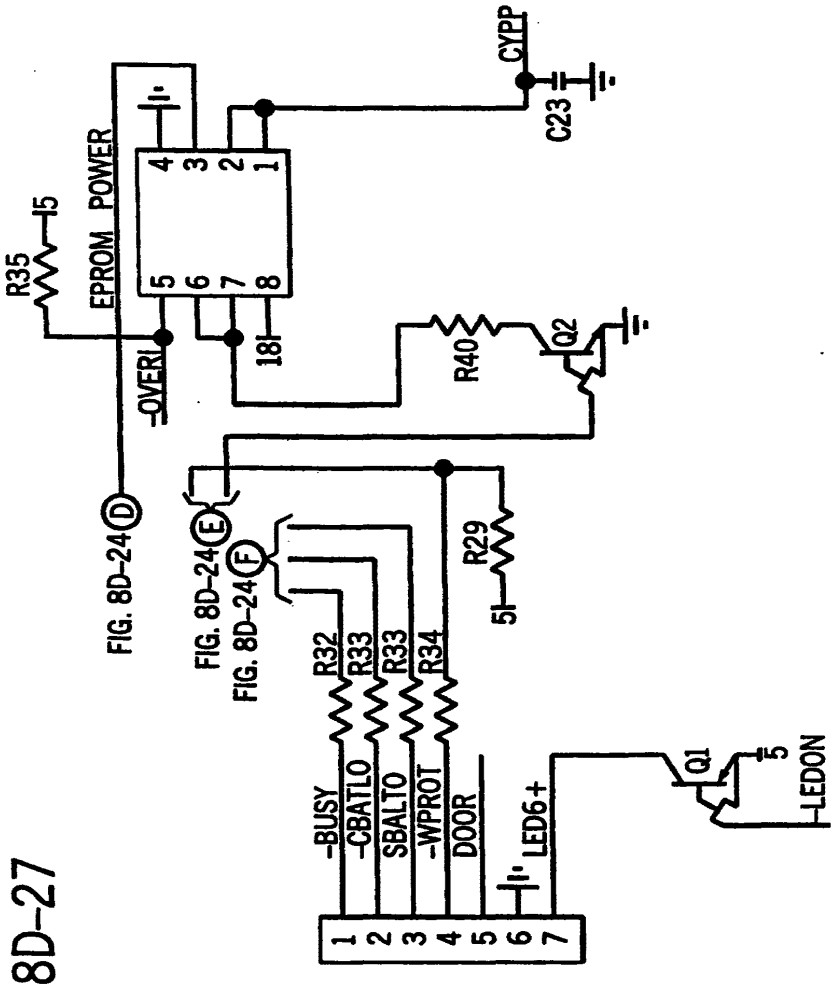


FIG. 8D-27

FIG. 8D–28

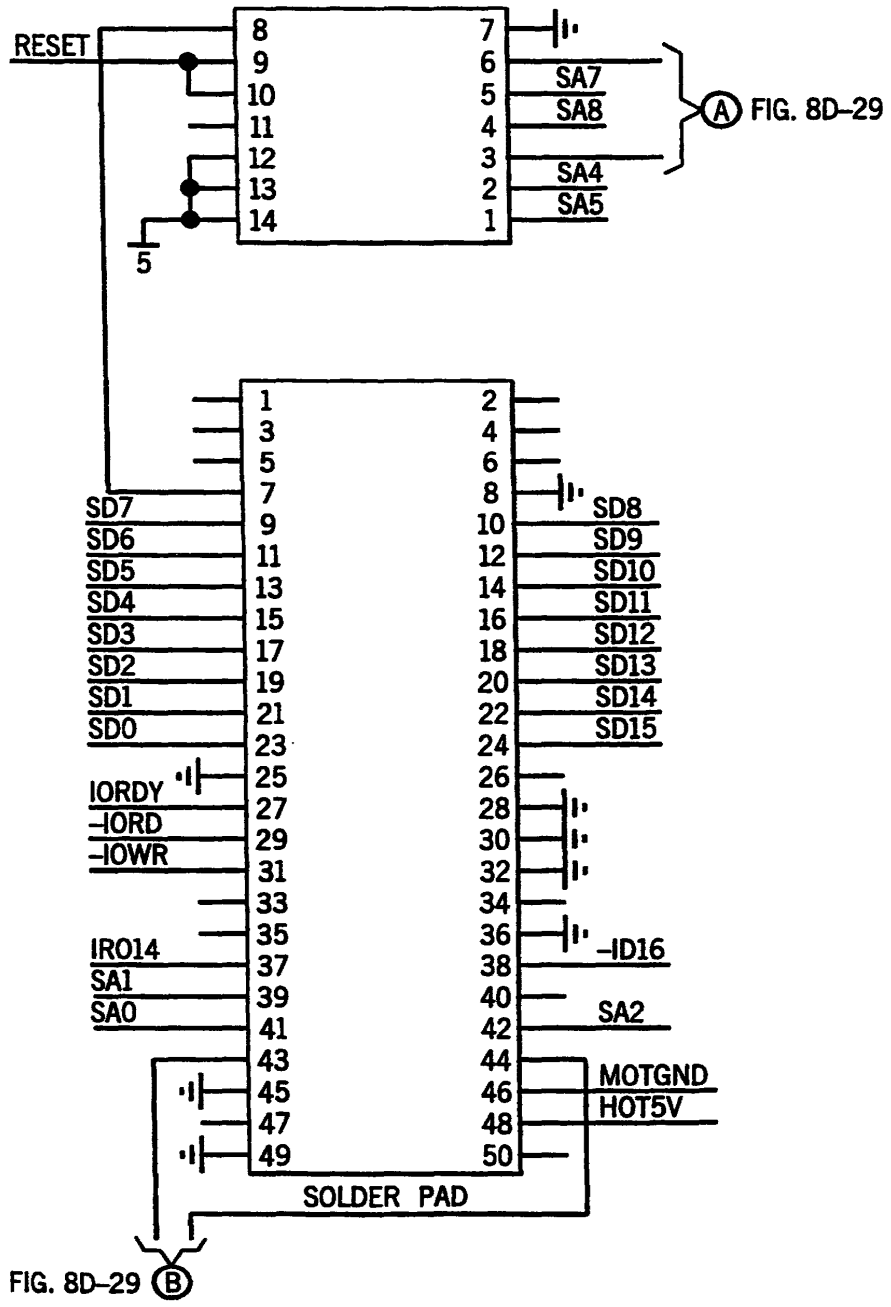


FIG. 8D–29

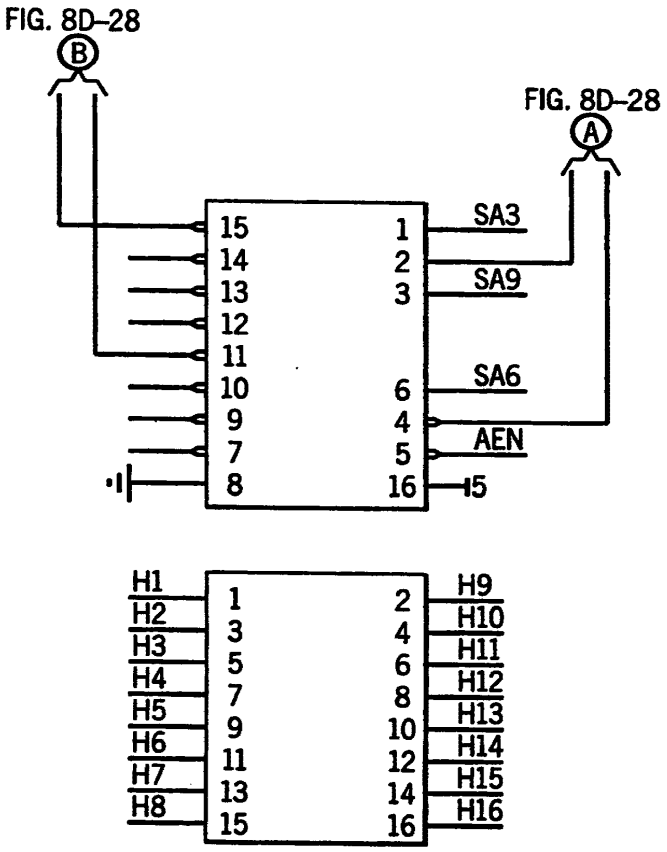


FIG. 8D–30

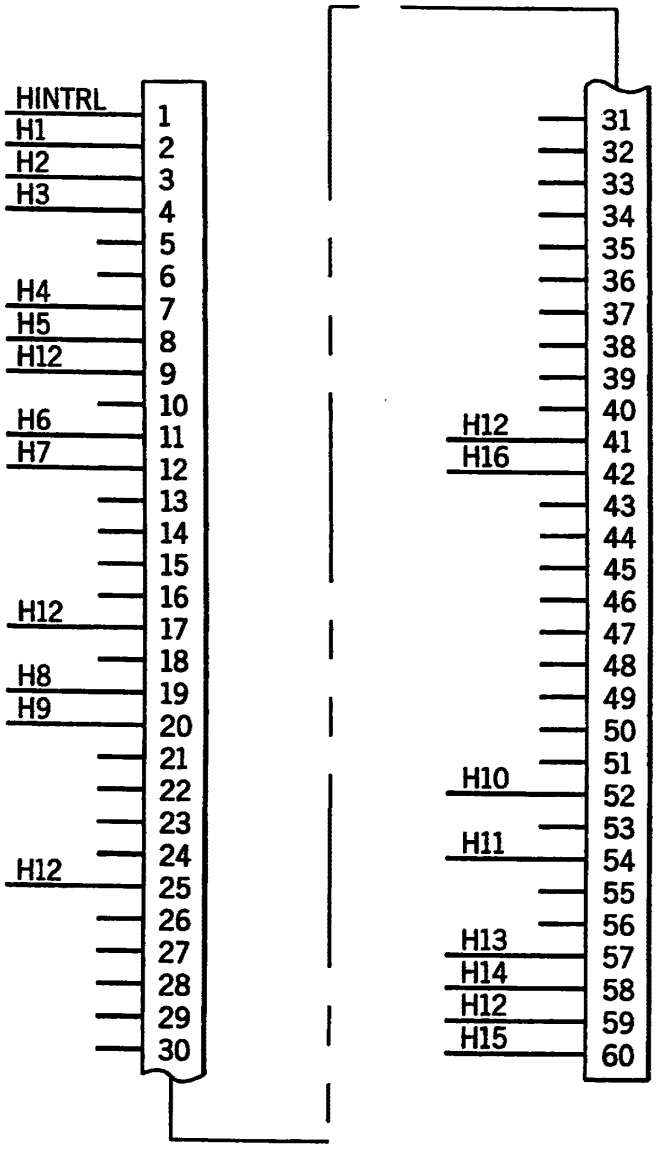


FIG. 8E-1

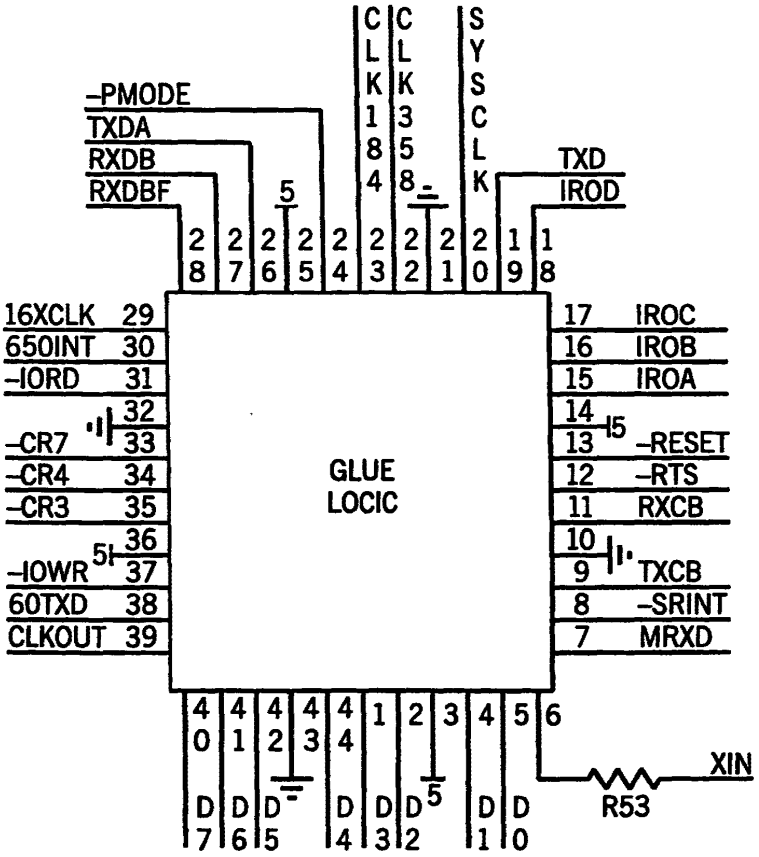


FIG. 8E–2

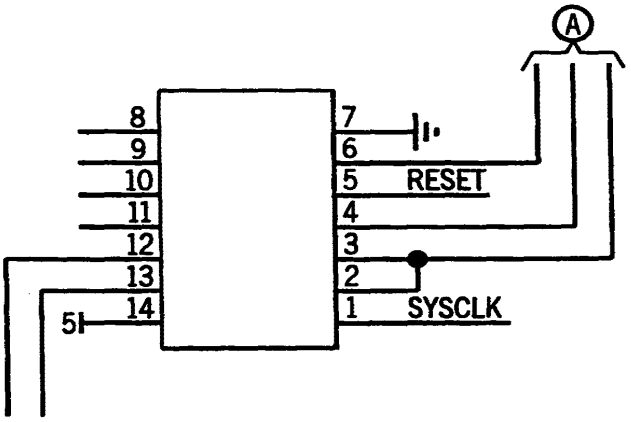


FIG. 8E-3

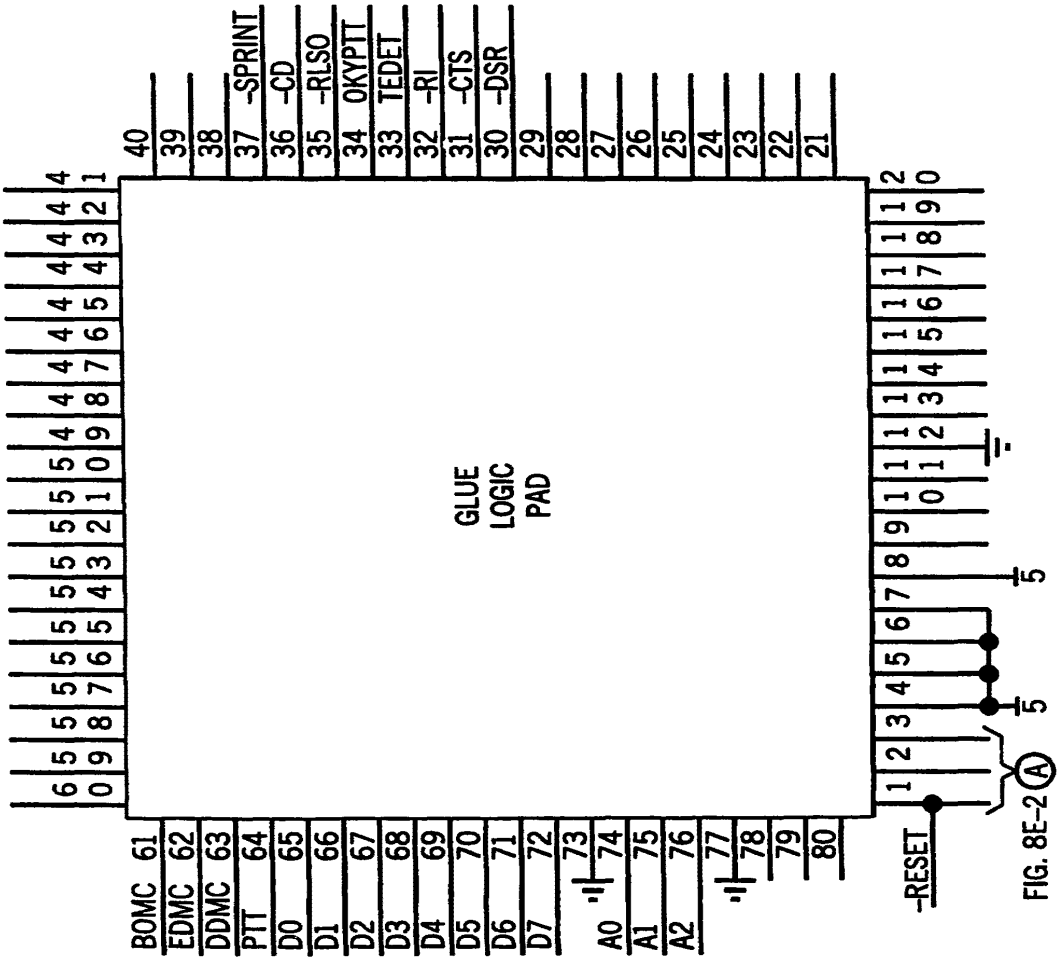


FIG. 8E-4

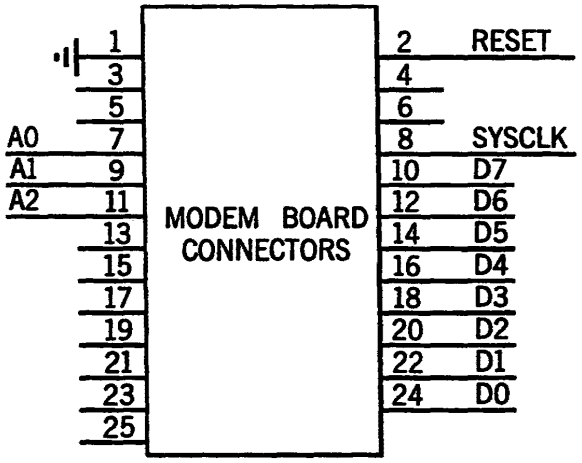


FIG. 8E–5

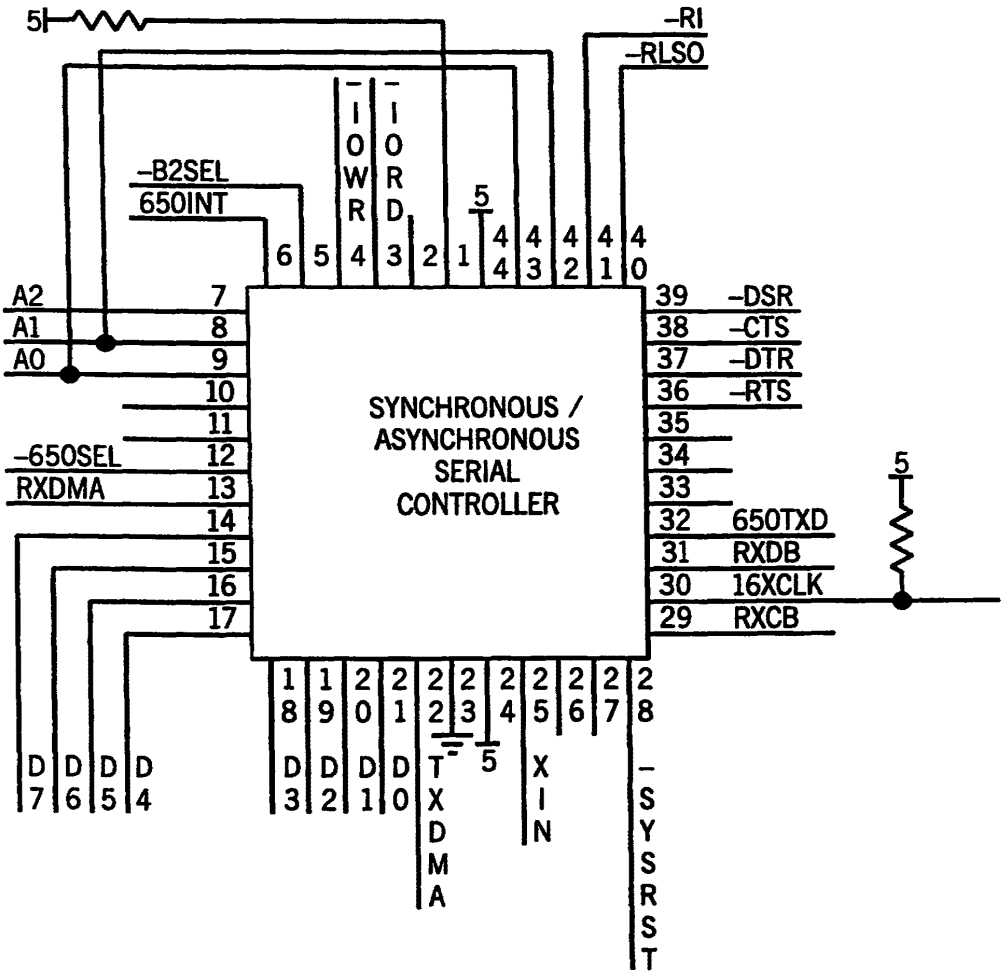


FIG. 8E-6

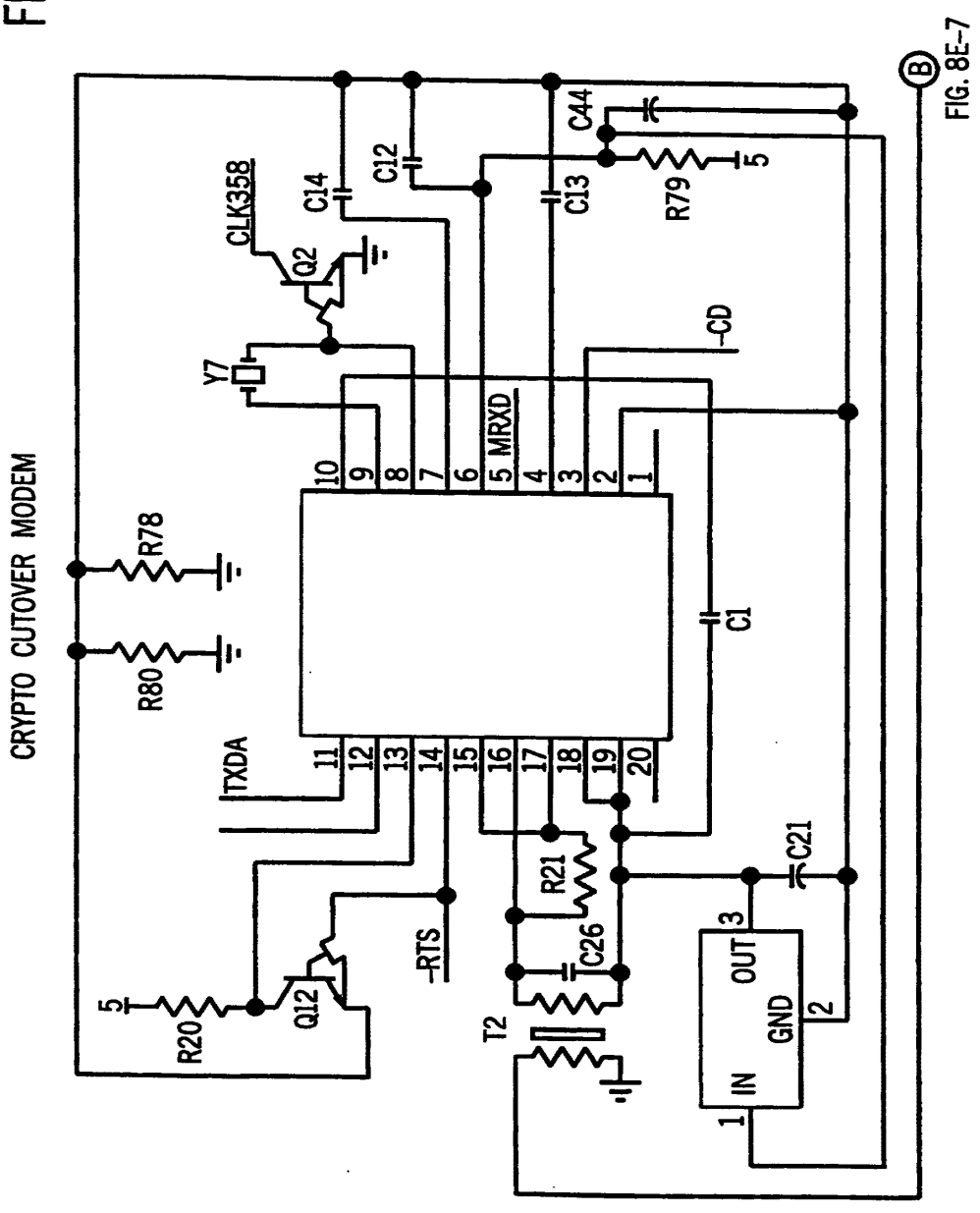
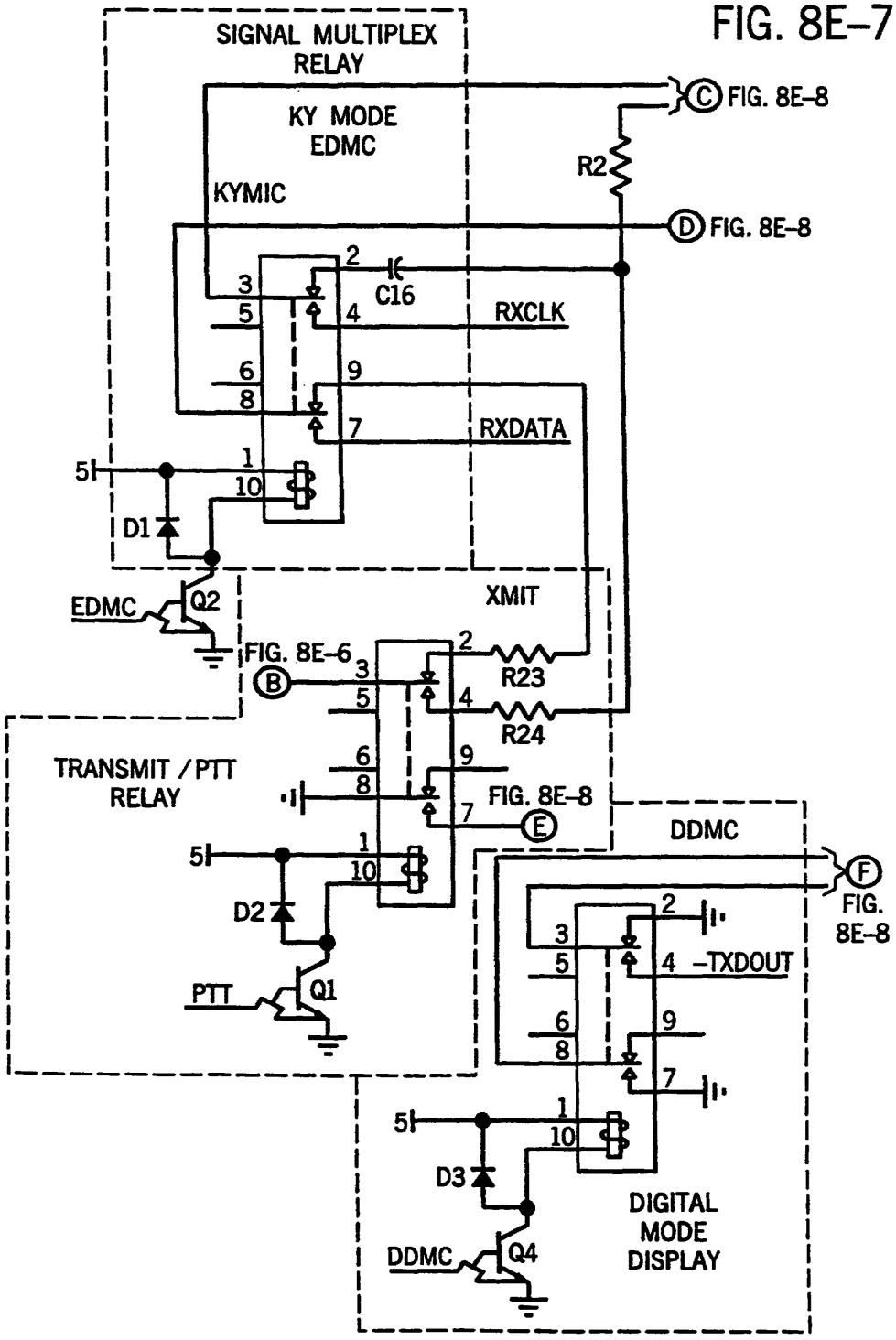


FIG. 8E–7



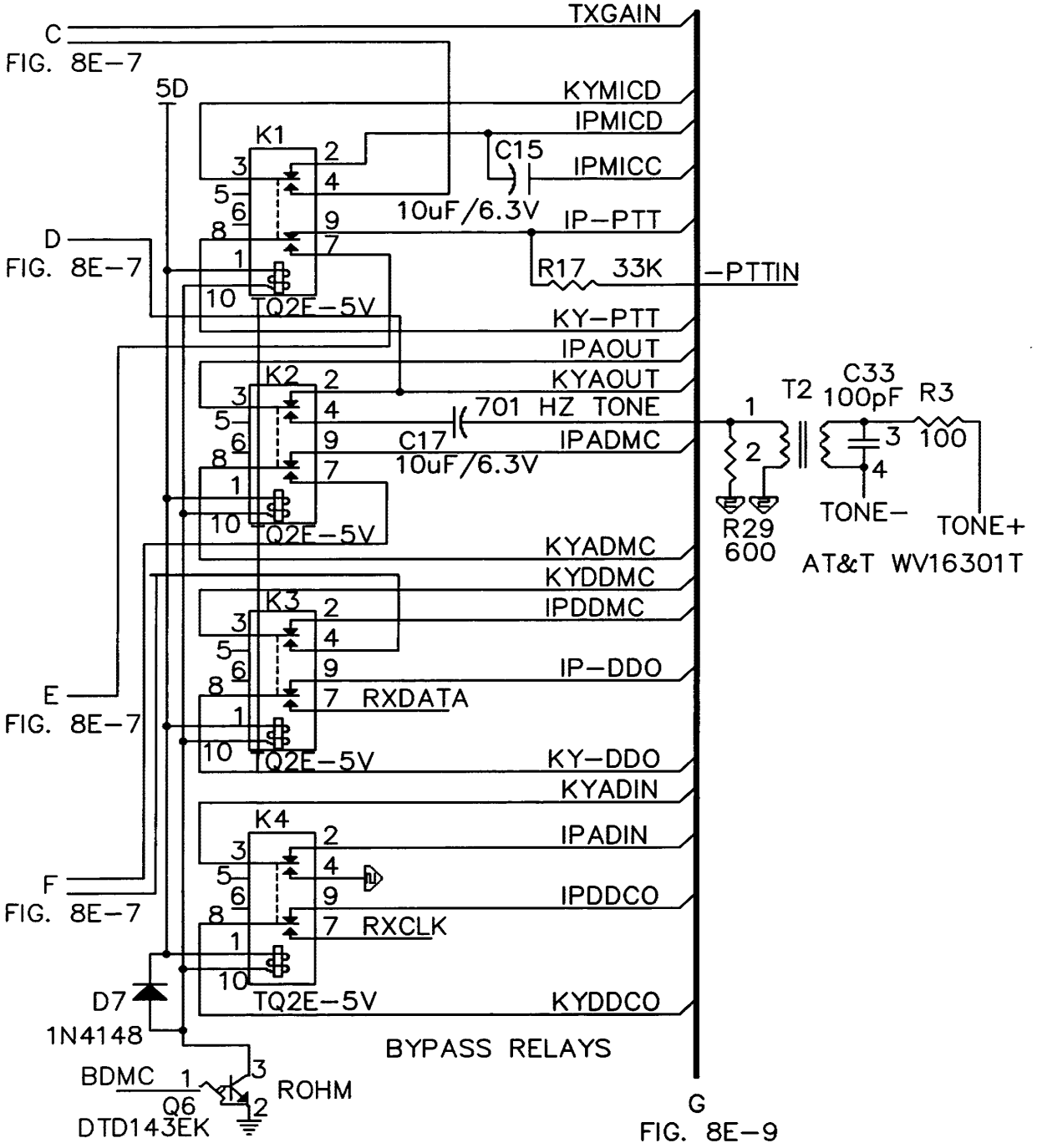


FIG. 8E-8

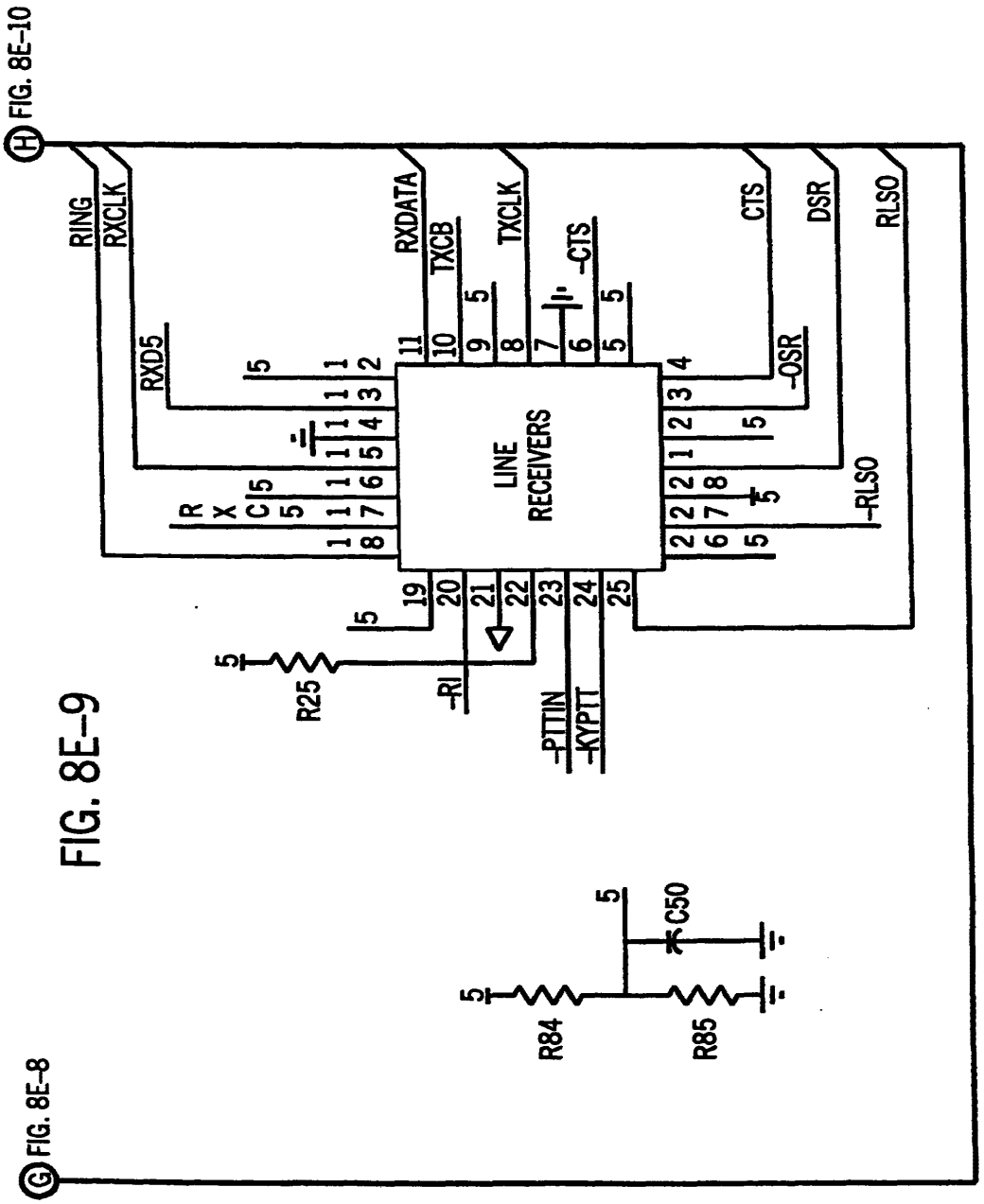


FIG. 8E-9

FIG. 8E–10

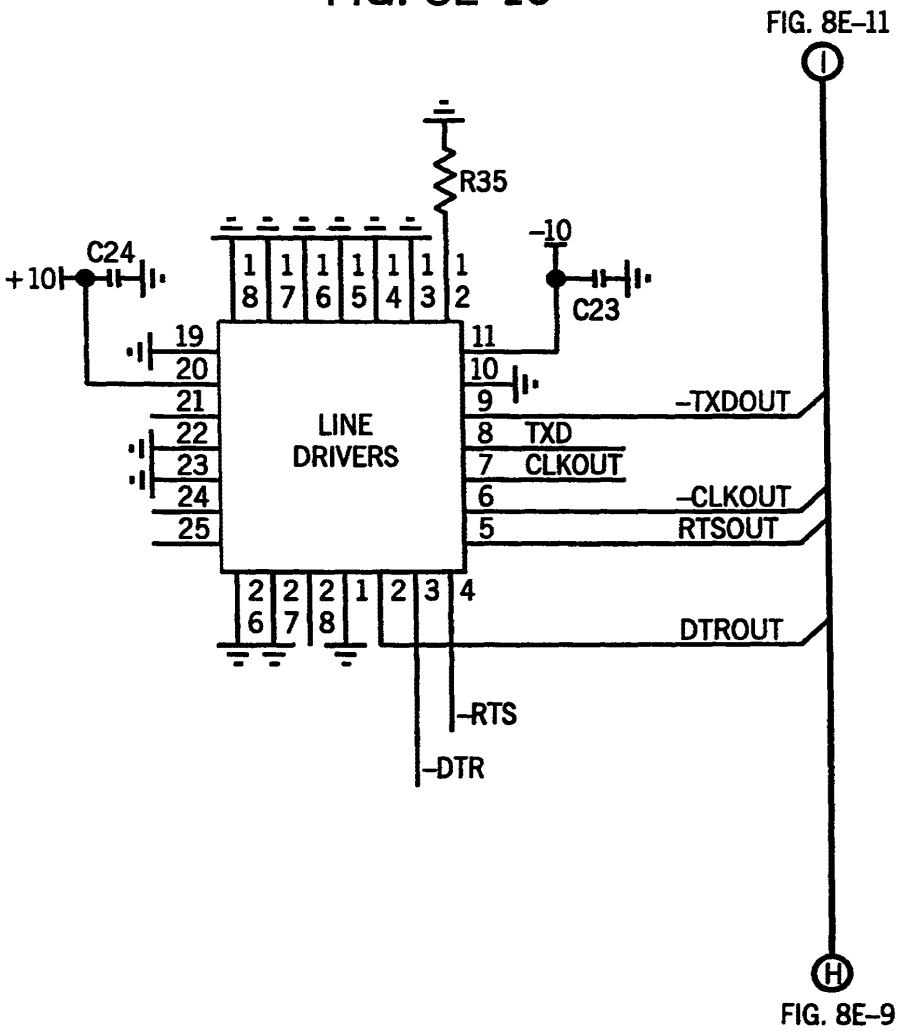
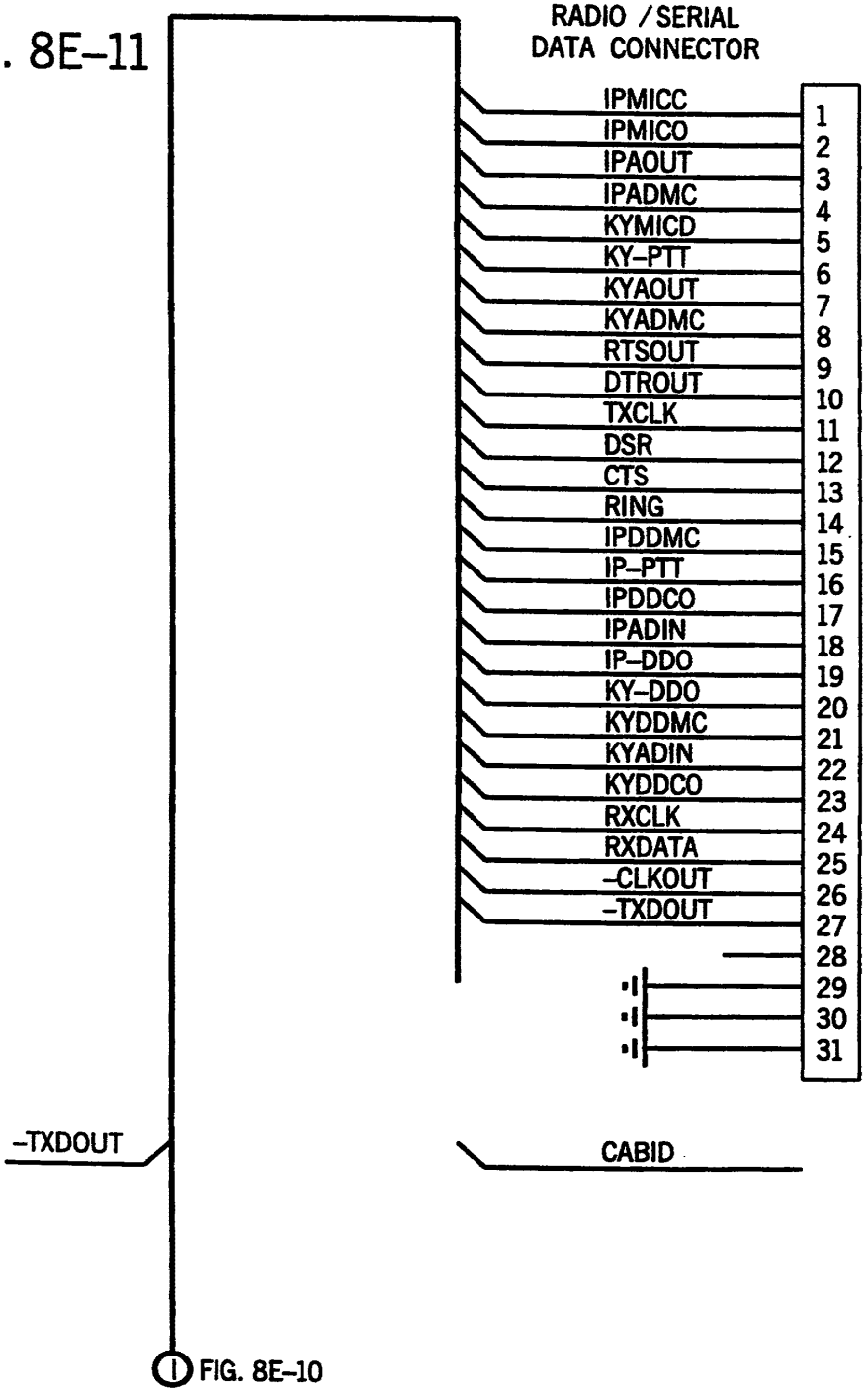


FIG. 8E–11



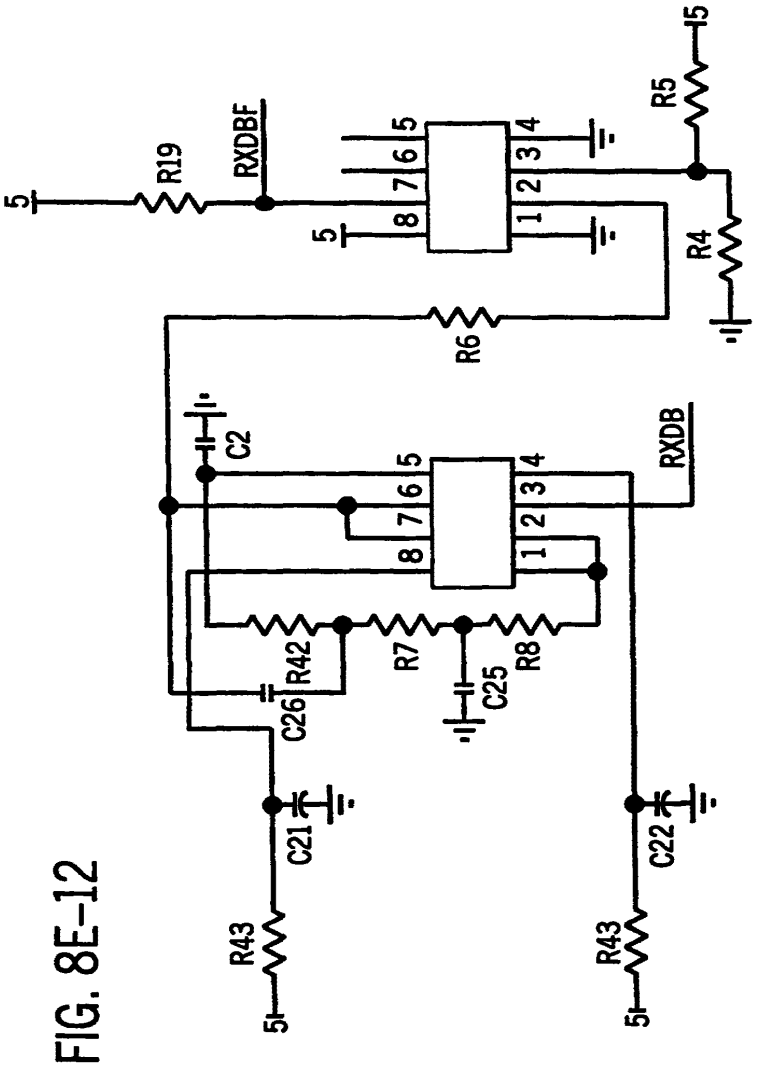


FIG. 8E-12

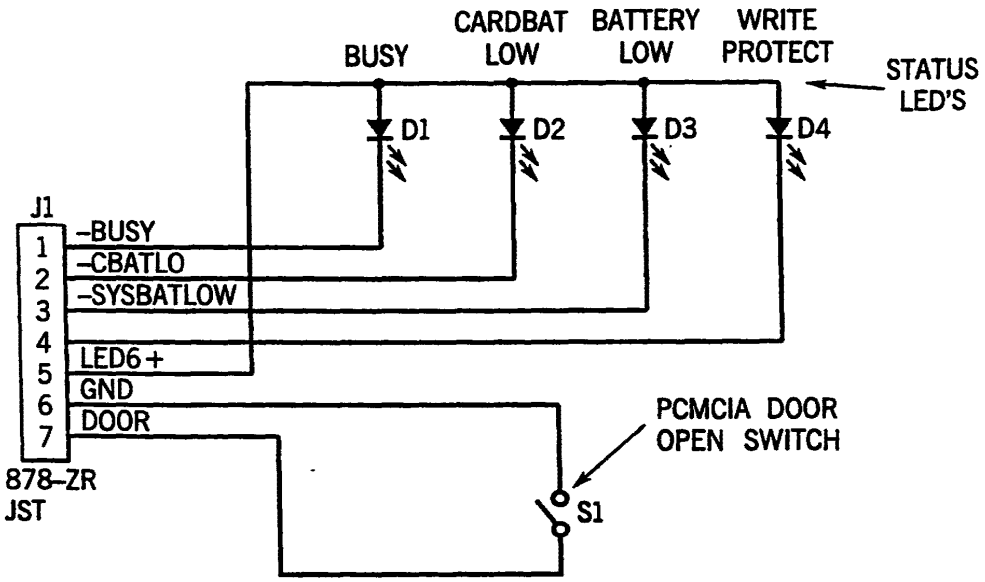


FIG. 8F

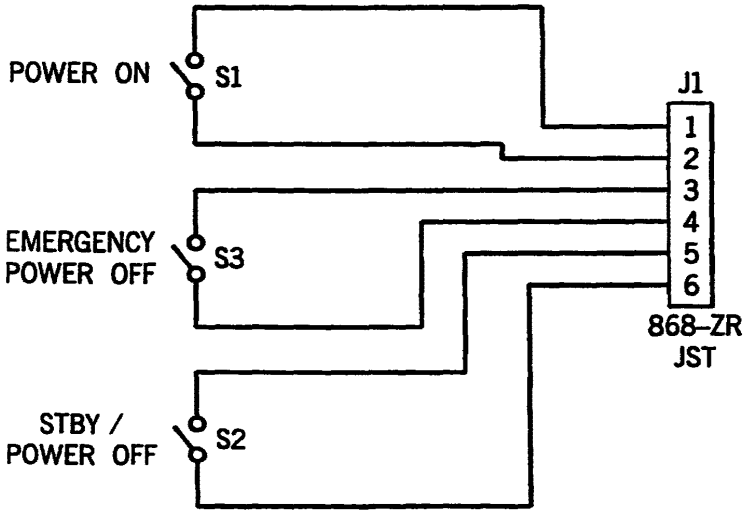


FIG. 8G

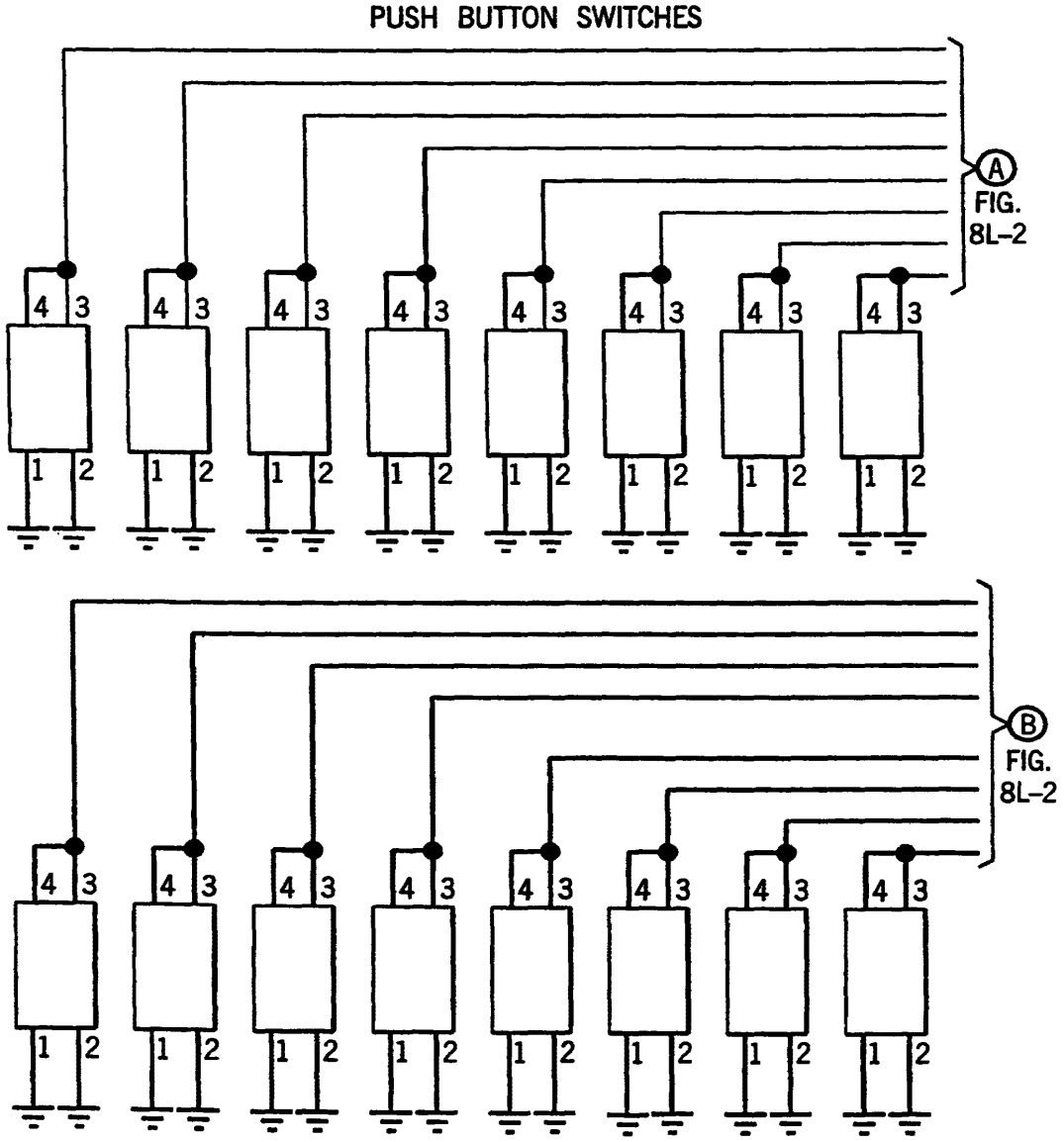


FIG. 8L-1

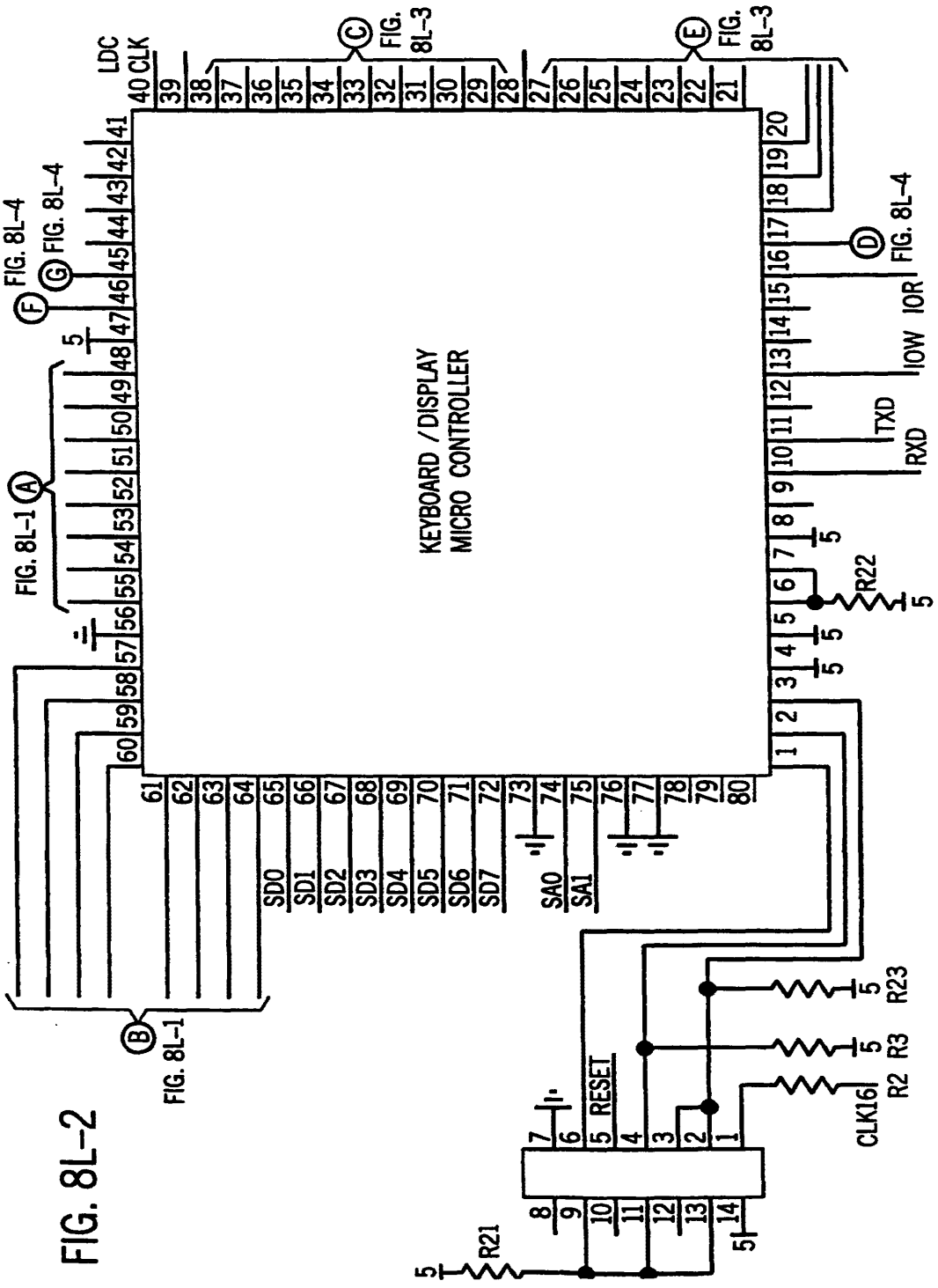


FIG. 8L-2

FIG. 8L–3

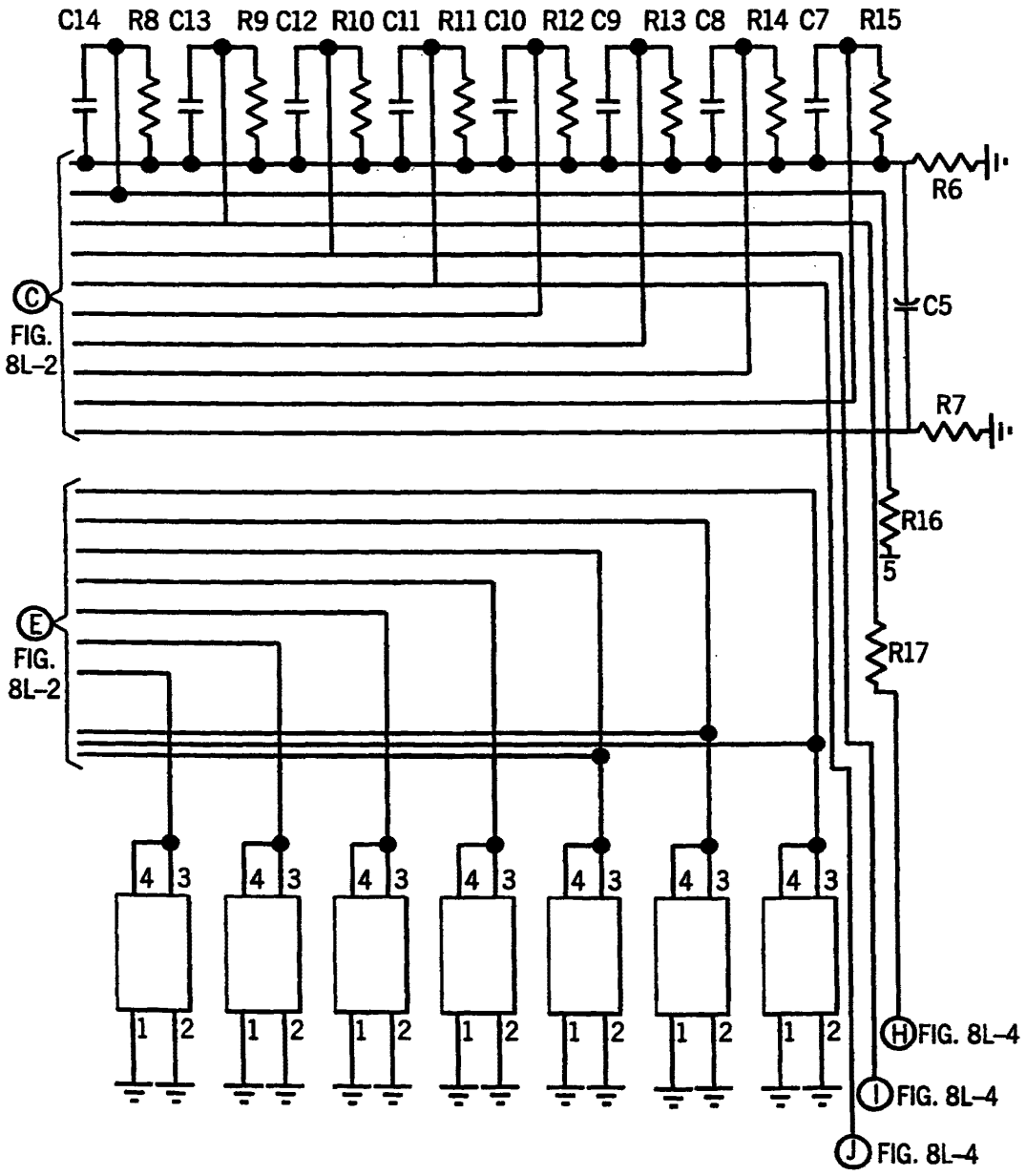
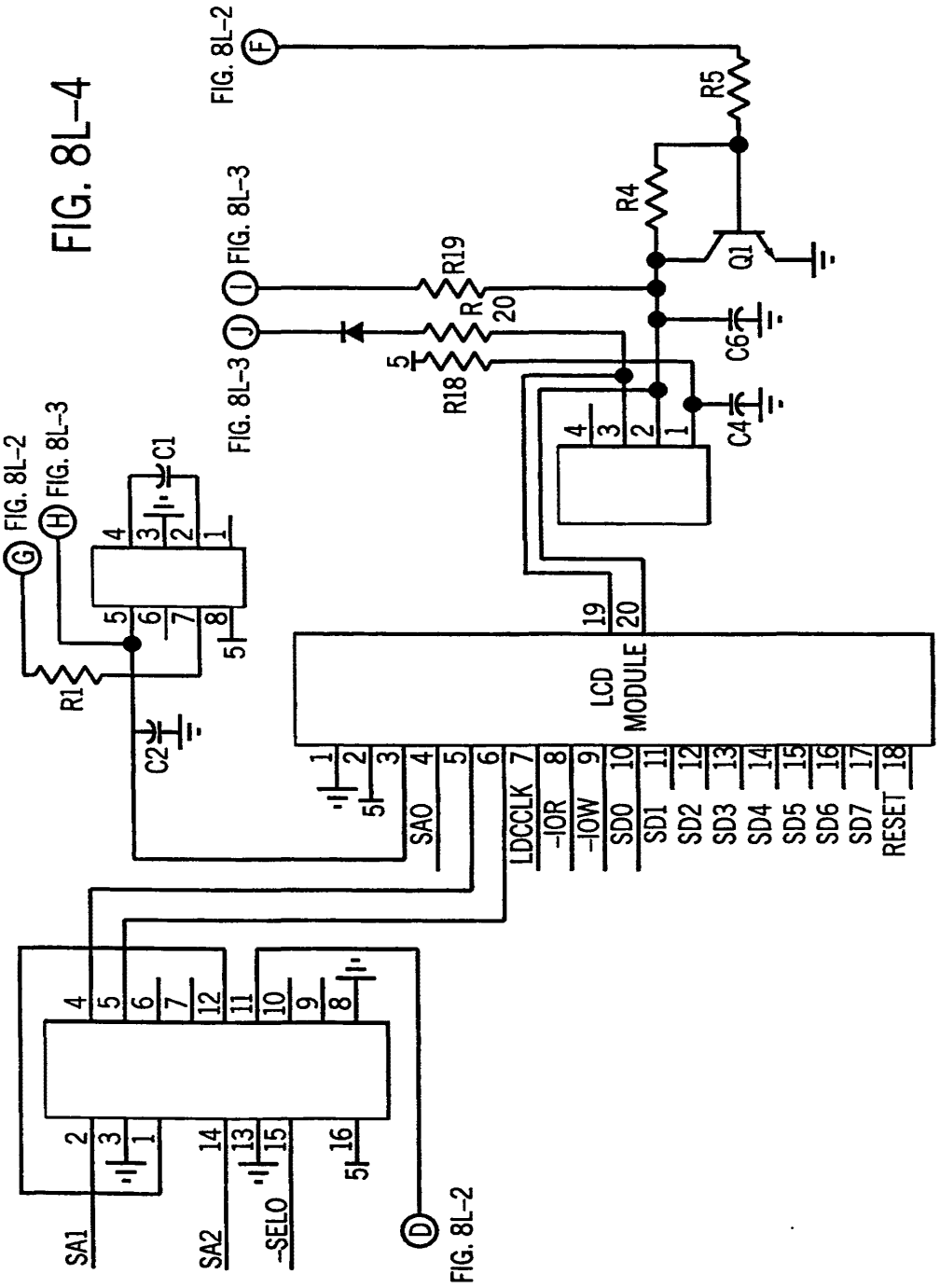


FIG. 8L-4



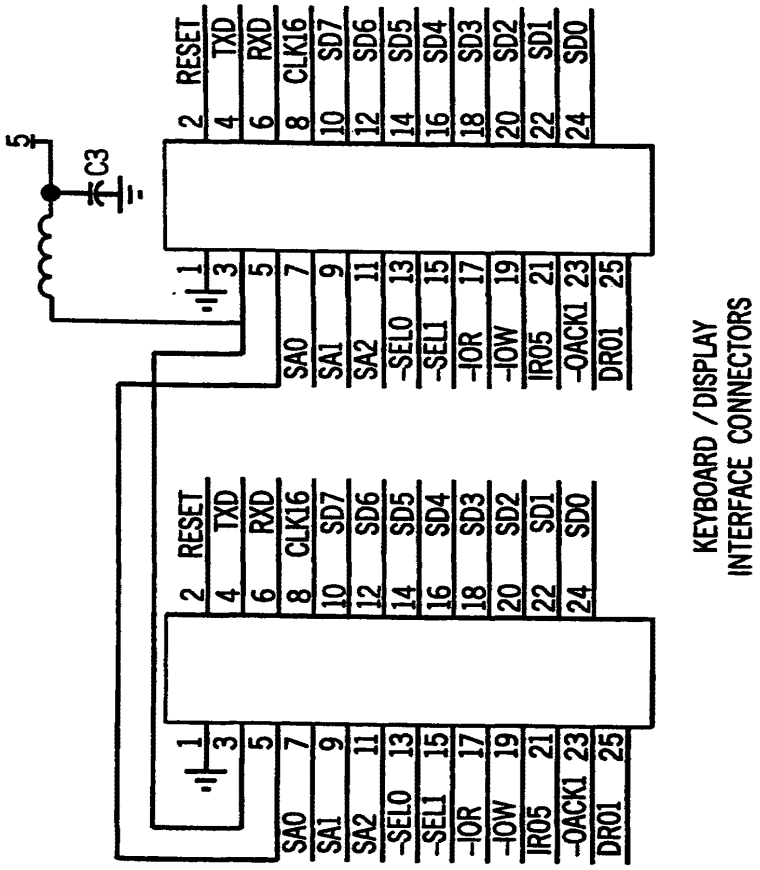


FIG. 8L-5

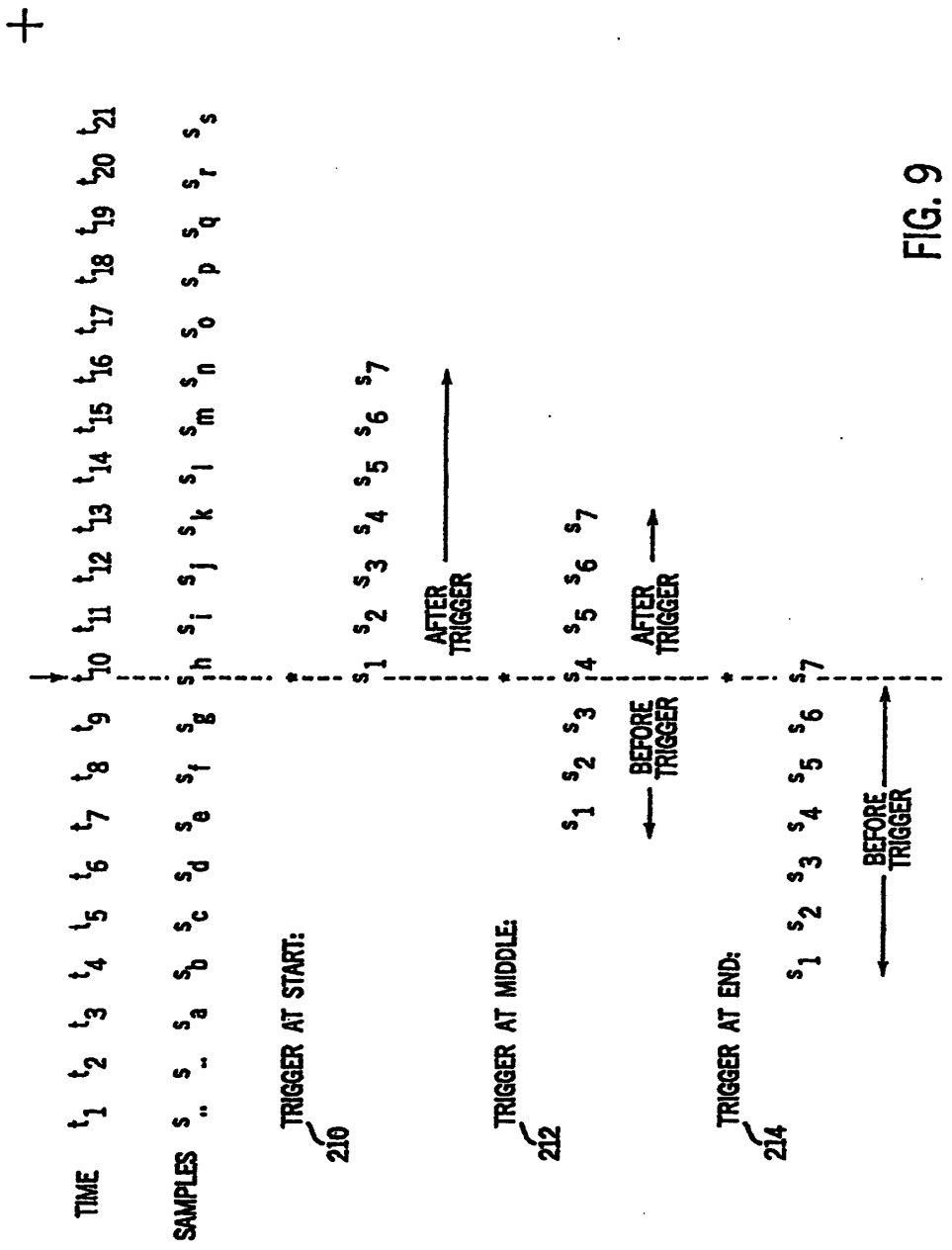


FIG. 9

PTO/SB/22 (10-00)
Approved for use through 10/31/2002. OMB 0651-0031
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.

03cv 8

#3

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 121817.0002.042

In re Application of David A. Monroe	
Application Number 10/336,470	Filed January 3, 2003
For Apparatus for Capturing, Converting and Transmitting a Visual Image Signal Via a Digital Transmission System (FAX CAM I)	
Group Art Unit 2622	Examiner

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a response in the above identified application.

The requested extension and appropriate non-small-entity fee are as follows (check time period desired):

- ☐ One month (37 CFR 1.17(a)(1)) $____
- ☐ Two months (37 CFR 1.17(a)(2)) $____
- ☒ Three months (37 CFR 1.17(a)(3)) $930.00
- ☐ Four months (37 CFR 1.17(a)(4)) $____
- ☐ Five months (37 CFR 1.17(a)(5)) $____

☐ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee amount shown above is reduced by one-half, and the resulting fee is: $ _____ .

☒ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Commissioner has already been authorized to charge fees in this application to a Deposit Account.

☐ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____ .

I have enclosed a duplicate copy of this sheet.

I am the ☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71

Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

☒ attorney or agent of record. Registration No. 45,720

☐ attorney or agent under 37 CFR 1.34(a).

Registration number if acting under 37 CFR 1.34(a). _____ .

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.

July 10, 2003
Date

Signature

Richard R. Ruble
Typed or printed name

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.

Burden Hour Statement: This form is estimated to take 0.1 hours 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

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01 FC:1253 930.00 OP

01-21-04 2622

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: §
§
David A. Monroe § Group Art Unit: 2622
§
Serial No. 10/336,470 § Examiner: Not Assigned
§
Filed: January 3, 2003 §
§
For: APPARATUS FOR CAPTURING, § CONVERTING AND § TRANSMITTING A VISUAL § IMAGE SIGNAL VIA A DIGITAL § TRANSMISSION SYSTEM §
§

CERTIFICATE OF EXPRESS MAILING

37 C.F.R. §110

I hereby certify that this document and its attachments are being deposited with the United States Postal Service as Express Mail Post Office to Addressee Service, as Express Mail No.: **EV 323256546 US** prior to the last scheduled pick up, in an envelope addressed to Commissioner for Patents, Arlington, VA 22313, on the date below:

Jan 20, 2004
Date

Rea Baldwin
Signature

INFORMATION DISCLOSURE STATEMENT

1. Pursuant to 37 C.F.R. §§1.97-1.99, Applicant hereby submits reference of which he or she is aware that may be material to the examination of this application, and of which there may be a duty to disclose in accordance with 37 C.F.R. § 1.56. The filing of this Information Disclosure Statement shall not be construed to be an admission that the information cited in the statement is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56(b), nor shall the filing of this Information Disclosure Statement be construed as a representation that a search has been made.

2. The references are listed on the accompanying Forms PTO-1449, and a copy of each reference is provided herewith.

3. This Information Disclosure Statement:

   [ ] Accompanies a new patent application submitted herewith.

   [ ] Is being filed within 3 months after the filing date of the application.

   [**X**] Before the mailing date of a first Office Action on the merits.

   [ ] After each of the above, but before the mailing date of either a final action or Notice of Allowance and is accompanied by a:

[ ] After all of the above, but before payment of the Issue Fee. The Statement is accompanied by a certification and a petition requesting consideration of the Statement and a petition fee of $130 (37 C.F.R. § 1.17(i)(1).

4. The U.S. Patent and Trademark Office is hereby authorized to charge any fees, if any, or discrepancies in fees required, to Deposit Account 10-0096.

5. Undersigned counsel hereby requests a telephone conference with the Examiner if there are any questions. It is respectfully requested that the references be considered by the Examiner, be made a part of the official record, and be cited in the issued patent.

Respectfully submitted,

Robert C. Curfiss
Registration No. 26,540
Jackson Walker, L.L.P.
112 E. Pecan Street, Suite 2100
San Antonio, Texas 78205
(713)752-4200
(713)752-4221 - Facsimile
ATTORNEY FOR ASSIGNEE

3512423v1

Form PTO-1449 (Modified) SHEET 1 of 2

FORM PTO-1449 (Modified) U.S. Dept. of Commerce Patent & Trademark Office	ATTY DKT. NO.:	SER. NO.:
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary) (37 CFR 1.98(b))	121817.0002.042	10/336,470
	APPLICANT: David A. Monroe	
	FILING DATE: January 3, 2003	GROUP: 2622

U.S. PATENT DOCUMENTS

Examiner Initial		Patent Number	Issue Date		Patentee	Class	Sub-class	Filing Date If Appropriate
		2,642,492	06/16/1953		Hammond, Jr.	348	24	12/11/1948
		3,251,937	05/17/1966		Hoag	358	410	12/20/1962
		3,751,159	08/07/1973		Fisher	355	20	05/19/1971
		3,864,514	02/04/1975		Lemelson	358	409	10/24/1972
		4,074,324	02/14/1978		Barrett	358	296	07/14/1975
		4,530,014	07/16/1985		D'Alayer de Costemore D'Arc	386	119	02/14/1983
		4,652,926	03/24/1987		Withers et al.	347	226	04/23/1984
		4,884,132	11/28/1989		Morris et al.	358	479	12/28/1988
		4,937,676	06/26/1990		Finelli et al.	348	375	02/10/1989
		4,942,477	07/17/1990		Nakamura	358	401	11/10/1988
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		5,047,870	09/10/1991		Filo	358	472	03/17/1988
		5,193,012	03/09/1993		Schmidt	358	3.16	04/29/1991
		5,235,432	08/10/1993		Creedon et al.	358	479	11/22/1991

FOREIGN PATENT OR PUBLISHED FOREIGN PATENT APPLICATION

		Document Number	Publ. Date		Country or Patent Office	Class	Sub-Class	Translation Yes	No

OTHER DOCUMENTS (Including Author, Title, Date, Relevant Pages, Place of Publication)

EXAMINER	DATE CONSIDERED
EXAMINER: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

*It is believed these references are potentially relevant but applicant has not determined whether or not these two online printouts represent prior art as they were a result of search performed after applicant's date of invention.

Form PTO-1449 (Modified) SHEET 2 of 2

FORM PTO-1449 (Modified) U.S. Dept. of Commerce Patent & Trademark Office **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use several sheets if necessary) (37 CFR 1.98(b))	ATTY DKT. NO.: 121817.0002.042	SER. NO.: 10/336,470
	APPLICANT: David A. Monroe	
	FILING DATE: January 3, 2003	GROUP: 2622

U.S. PATENT DOCUMENTS

Examiner Initial		Patent Number	Issue Date		Patentee	Class	Sub-class	Filing Date If Appropriate
		5,546,194	08/13/1996		Ross	358	445	03/23/1994
		5,550,646	08/27/1996		Hassan et al.	358	442	09/13/1993
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		5,684,716	11/04/1997		Freeman	345	723	07/21/1995
		5,666,159	09/09/1997		Parulski et al.	348	211.2	04/24/1995
		5,539,452	07/23/1996		Bush et al.	348	14.13	09/06/1994
		5,515,176	05/07/1996		Galen et al.	358	403	12/08/1994
		6,072,600	06/06/2000		Wertsberger	358	479	01/28/1997

FOREIGN PATENT OR PUBLISHED FOREIGN PATENT APPLICATION

		Document Number	Publ. Date		Country or Patent Office	Class	Sub-Class	Translation Yes	No

OTHER DOCUMENTS (Including Author, Title, Date, Relevant Pages, Place of Publication)

EXAMINER	DATE CONSIDERED
EXAMINER: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

*It is believed these references are potentially relevant but applicant has not determined whether or not these two online printouts represent prior art as they were a result of search performed after applicant's date of invention.

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EXAMINER	
POKRZYWA, JOSEPH R	
ART UNIT	**PAPER NUMBER**
2622	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/336,470	MONROE, DAVID A.	
	Examiner	Art Unit	
	Joseph R. Pokrzywa	2622	

-- 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) 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 the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- 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 _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ 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

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 July 2003* 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).

11)☐ 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

12)☐ 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) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/20/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The references listed in the Information Disclosure Statement submitted on 1/20/04 have been considered by the examiner (see attached PTO-1449).

Specification

2. The disclosure is objected to because of the following informalities:

in paragraph 0051, line 13, PCMCIA card 50" should read PCMCIA card 72".

Appropriate correction is required.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "81" has been used to designate both the hardwired personal computer in Fig. 4 and the data multiplexer circuit in Fig. 5, and reference character "83" has been used to designate both the communications interface module in Fig. 4 and the sync signal in Fig. 5. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any

required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: reference numeral "29", in paragraph 0049, line 18. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to because in Fig. 4, PC modem protocol box "66" should read "68", as read in paragraph 0053, lines 20 and 21. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement

sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

6. **Claims 3 and 5** are objected to because of the following informalities:

In ***claim 3***, line 1, "claim 1" should read "claim 2", as reference is made to "said memory", introduced in claim 2;

In ***claim 5***, line 1, "claim 1" should read "claim 4", as reference is made to "the digital signal", introduced in claim 4.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. 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.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. **Claims 1, 2, 4-12, 21, 23-27, and 30-36** are rejected under 35 U.S.C. 102(b) as being anticipated by Hassan *et al.* (U.S. Patent Number 5,550,646, cited in the Information Disclosure Statement dated 1/20/04).

Regarding ***claim 1***, Hassan discloses a self-contained image processing system (device 110 in Figs. 1 and 2) for capturing a visual image and transmitting it to a remote receiving station (see abstract, column 1, lines 47 through 52, column 2, lines 43 through 61, and column 3, lines 10 through 20), with the system comprising an image capture device (CCD 203, column 3, lines 21 through 67), a processor (microcontroller 205) for generating a data signal representing the image (column 3, lines 21 through 67), a communications device (facsimile interface 219) adapted for transmitting the data signal to the remote receiving station (column 4, line 65 through column 5, line 9), and a wireless transmission system between the communications device and the compatible receiving station (column 2, lines 4 through 54, and column 3, lines 10 through 20, with the fax modem 240, being "applied as an input to the transmitter section of a cellular telephone", as read in column 5, lines 7 through 9).

Regarding ***claim 2***, Hassan discloses the system discussed above in claim 1, and further teaches of a memory for receiving and storing the data signal (RAM 207), and wherein the communications device is adapted for recalling the stored data signal from memory (column 4, lines 24 through 64).

Regarding ***claim 4***, Hassan discloses the system discussed above in claim 1, and further teaches of the image capture device is an analog camera (lens assembly 201 on a CCD 203) for generating an analog image signal (column 3, lines 21 through 67), and there is further included

an analog to digital converter for converting the analog image signal to a digital signal (column 3, line 47 through column 4, line 67).

Regarding ***claim 5***, Hassan discloses the system discussed above in claim 4 (as understood by the examiner), and further teaches of a subprocessor for generating a Group-III facsimile compatible signal representing the digital signal (column 4, line 65 through column 5, line 9).

Regarding ***claim 6***, Hassan discloses the system discussed above in claim 1, and further teaches that the subprocessor comprises a gray scale bit map, a halftone converter, and a binary bit map (see abstract, column 1, lines 54 through 63, and column 3, lines 47 through 67).

Regarding ***claim 7***, Hassan discloses the system discussed above in claim 1, and further teaches of an integrated wireless telephone associated with the communications device (column 2, lines 4 through 54).

Regarding ***claim 8***, Hassan discloses the system discussed above in claim 1, and further teaches of a housing for housing all of the elements of the system in an integrated body (column 2, lines 39 through 66).

Regarding ***claim 9***, Hassan discloses the system discussed above in claim 1, and further teaches that the image capture device is a digital camera (column 2, lines 39 through 67, and column 3, lines 21 through 46).

Regarding ***claim 10***, Hassan discloses the system discussed above in claim 1, and further teaches of a view screen for viewing the captured and stored image (LCD display 215, column 4, lines 19 through 64).

Regarding ***claim 11***, Hassan discloses the system discussed above in claim 5, and further teaches of a facsimile receiving device associated locally with the system for providing a local printer for reproducing the captured image in hard copy (column 2, line 66 through column 3, line 4, and column 4, line 65 through column 5, line 22).

Regarding ***claim 12***, Hassan discloses the system discussed above in claim 1, and further teaches that the processor is adapted for generating a signal in any of a plurality of selected protocols and wherein the communications device is adapted for transmitting the signal in the proper protocol to a remote, compatible receiving station (column 4, line 65 through column 5, line 10).

Regarding ***claim 21***, Hassan discloses the system discussed above in claim 1, and further teaches that the system is of modular construction (see Fig. 2), and the camera (CCD 203), the processor (microcontroller 205), and the communications device (fax interface 219) are each independent, functional units (column 3, line 21 through column 5, line 9) which may be coupled to one another for defining the assembled system (see Fig. 2).

Regarding ***claim 23***, Hassan discloses the system discussed above in claim 1, and further teaches of a data processor for creating a text data signal associated with the image data signal (column 4, lines 19 through 64).

Regarding ***claim 24***, Hassan discloses the system discussed above in claim 23, and further teaches of an input device for providing text data to the data processor (keypad 211, column 4, lines 1 through 64).

Regarding ***claim 25***, Hassan discloses the system discussed above in claim 24, and further teaches that the input device is user controlled (column 4, lines 1 through 64).

Regarding ***claim 26***, Hassan discloses the system discussed above in claim 25, and further teaches that the user controlled input device is an integral keyboard (keypad 211, column 4, lines 1 through 18).

Regarding ***claim 27***, Hassan discloses the system discussed above in claim 24, and further teaches that the input device comprises a real time clock (column 4, lines 24 through 42).

Regarding ***claim 30***, Hassan discloses the system discussed above in claim 2, and further teaches that the image data signal is stored in a compressed format (column 3, lines 47 through 54).

Regarding ***claim 31***, Hassan discloses the system discussed above in claim 2, and further teaches that the image data signal is stored in a half-tone format (column 3, lines 37 through 67).

Regarding ***claim 32***, Hassan discloses the system discussed above in claim 1, and further teaches that the remote receiving station is a standard bi-level facsimile machine and the image data signal is generated in a gray-scale format and protocol (column 3, lines 50 through 67, column 4, line 65 through column 5, line 9, and column 6, line 62 through column 7, line 2).

Regarding ***claim 33***, Hassan discloses the system discussed above in claim 1, and further teaches that the remote receiving station is a gray-scale facsimile machine and the image data signal is generated in a gray-scale format and protocol (column 3, lines 50 through 67, column 4, line 65 through column 5, line 9, and column 6, line 62 through column 7, line 2).

Regarding ***claim 34***, Hassan discloses the system discussed above in claim 1, and further teaches that the remote receiving station is a color facsimile machine and the image data signal is generated in a full color format and protocol (column 3, lines 50 through 67, column 4, line 65 through column 5, line 9, and column 6, line 62 through column 7, line 2).

Regarding ***claim 35***, Hassan discloses the system discussed above in claim 1, and further teaches that the remote receiving station is a digital device and the image data is digital (column 2, line 45 through column 3, line 33, and column 4, line 65 through column 5, line 9).

Regarding ***claim 36***, Hassan discloses the system discussed above in claim 1, and further teaches of a self-contained power source for powering the system (column 5, lines 23 through 25).

9. **Claims 1-3** are rejected under 35 U.S.C. 102(e) as being anticipated by Wertsberger (U.S. Patent Number 6,072,600, cited in the Information Disclosure Statement dated 1/20/04).

Regarding ***claim 1***, Wertsberger discloses a self-contained image processing system (see Figs. 1 and 2) for capturing a visual image and transmitting it to a remote receiving station (see abstract, column 2, line 50 through column 3, line 25), with the system comprising an image capture device (CCD image sensor 1, column 4, lines 5 through 47), a processor (CPU 16) for generating a data signal representing the image (column 4, lines 20 through 58), a communications device (fax modem circuitry 13) adapted for transmitting the data signal to the remote receiving station (column 4, lines 48 through 67), and a wireless transmission system (telephone interface circuitry 15) between the communications device and the compatible receiving station (column 5, lines 1 through 6).

Regarding ***claim 2***, Wertsberger discloses the system discussed above in claim 1, and further teaches of a memory for receiving and storing the data signal (memory means 11, and secondary storage 20), and wherein the communications device is adapted for recalling the stored data signal from memory (column 4, lines 48 through 67, and column 5, lines 24 through 27).

Regarding ***claim 3***, Wertsberger discloses the system discussed above in claim 2 (as understood by the examiner), and further teaches that the memory is a removable RAM and wherein the system is adapted for selectively charging and discharging the memory (column 5, lines 24 through 27).

10. **Claims 1, 21, and 36-42** are rejected under 35 U.S.C. 102(e) as being anticipated by Parulski *et al.* (U.S. Patent Number 5,666,159, cited in the Information Disclosure Statement dated 1/20/04).

Regarding ***claim 1***, Parulski discloses a self-contained image processing system (see Figs. 1, 2, and 7-9) for capturing a visual image and transmitting it to a remote receiving station (see abstract), with the system comprising an image capture device (camera module 10, column 3, lines 6 through 40), a processor (pen-based computer 12) for generating a data signal representing the image (column 3, lines 27 through column 4, line 6), a communications device (RF transmitter module 14) adapted for transmitting the data signal to the remote receiving station (column 4, lines 4 through 25), and a wireless transmission system between the communications device and the compatible receiving station (column 4, lines 7 through 25).

Regarding ***claim 21***, Parulski discloses the system discussed above in claim 1, and further teaches that the system is of modular construction (see Fig. 1), and the camera (camera module 10) , the processor (pen-based computer 12), and the communications device (RF transmitter module 14) are each independent, functional units which may be coupled to one another for defining the assembled system (see Figs. 1-3).

Regarding ***claim 36***, Parulski discloses the system discussed above in claim 1, and further teaches of a self-contained power source for powering the system (column 3, lines 41 through 60).

Regarding ***claim 37***, Parulski discloses the system discussed above in claim 36, and further teaches that the communications device is adapted to be used independently of the image capture device and the processor, and wherein the power supply is adapted for isolating the power to the communications device from the power to the image capture device and processor (column 3, lines 41 through 56).

Regarding ***claim 38***, Parulski discloses the system discussed above in claim 37, and further teaches of a power initiation device associated with the image capture device and the processor, wherein the power to the image capture device and the processor is off when the initiation device is not activated (column 3, lines 41 through 56).

Regarding ***claim 39***, Parulski discloses the system discussed above in claim 38, and further teaches that the power initiation device is user controlled (column 3, lines 41 through 56).

Regarding ***claim 40***, Parulski discloses the system discussed above in claim 38, and further teaches of a trigger device for activating the power initiation device (column 3, lines 41 through 56).

Regarding ***claim 41***, Parulski discloses the system discussed above in claim 40, and further teaches that the trigger device is a timer (see Fig. 5, and column 3, lines 33 through 60, whereby the flash 24 is equivalent to a timer, as it waits a predetermined amount of time to charge before firing).

Regarding ***claim 42***, Parulski discloses the system discussed above in claim 40, and further teaches that the trigger device is triggered by the presence of an image to be captured (column 3, lines 41 through 60).

Claim Rejections - 35 USC § 103

11. 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 negatived by the manner in which the invention was made.

12. **Claims 13-18, and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hassan *et al.* (U.S. Patent Number 5,550,646, cited in the Information Disclosure Statement dated 1/20/04) in view of Ross (U.S. Patent Number 5,546,194, cited in the Information Disclosure Statement dated 1/20/04).

Regarding ***claim 13***, Hassan discloses the system discussed above in claim 1, but fails to expressly disclose if the image capture device is an analog video camera for generating a video signal.

Ross discloses a self-contained image processing system (see Fig. 1) for capturing a visual image and transmitting it to a remote receiving station, with the system comprising an image capture device (video camera 10, column 3, lines 4 through 5), a processor (control system 22 in Fig. 1, or CPU 44 in Fig. 2) for generating a data signal representing the image (column 3, lines 20 through 29, and column 3, line 63 through column 4, line 20), a communications device (Group III fax transmitter 20 in Fig. 1, and fax modem 50 in Fig. 2) adapted for transmitting the

data signal to the remote receiving station (column 2, lines 15 through 29, wherein the remote receiving station is inherently included in the system), and a subprocessor (Group III formatter 18) for generating a Group-III facsimile compatible signal representing the data signal (column 3, lines 30 through 52). Continuing, Ross teaches that the image capture device is an analog video camera for generating a video signal (column 3, lines 4 through 9). Further Ross teaches that the processor comprises a sync detector (sync separator 24, column 3, lines 53 through 62) and a video address generator (address multiplexer 43, column 4, lines 6 through 11) for synchronizing the digital signal with the analog signal for defining the beginning and end of the signal to define a still frame (column 3, lines 20 through 62), a random access memory (RAM 38) for receiving and storing the converted, synchronized signal frame-by-frame (column 4, lines 3 through 22), a processor routine for converting the signals stored in the memory to a protocol adapted for transmission (column 4, lines 22 through 36) to a remote, compatible protocol receiving station (inherently included), and a communications device (FAX modem 50) for transmitting the signal in the proper protocol to the compatible receiving station (column 5, lines 7 through 16).

Hassan & Ross are combinable because they are from the same field of endeavor, that being systems that transmit images from a camera to a destination via facsimile transmission.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the analog video camera that transmits a video signal, which is taught by Ross, in the system of Hassan.

The suggestion/motivation for doing so would have been that Hassan's system would become usable in more formats, as recognized by Ross in column 1, thereby increasing the system's desirability.

Therefore, it would have been obvious to combine the teachings of Ross with the system of Hassan to obtain the invention as specified in claim 13.

Regarding ***claim 14***, Hassan and Ross disclose the system discussed above in claim 13, and Hassan further teaches that the processor routine converts the signals to a Group-III facsimile protocol, the system further including a facsimile modem for accepting the signal and transmitting to the compatible receiving station (column 4, line 65 through column 5, line 9).

Regarding ***claim 15***, Hassan and Ross disclose the system discussed above in claim 13, and Hassan further teaches of a hardwired transmission system associated with the modem and a switching device for selecting in the alternative either the hardwired or the wireless transmission system (column 3, lines 10 through 17, and column 4, line 65 through column 5, line 9).

Regarding ***claim 16***, Hassan and Ross disclose the system discussed above in claim 13, and Hassan further teaches of a local facsimile receiving system associated with the modem for providing local hard copy of the stored image signals in the memory (column 4, line 65 through column 5, line 22, and column 6, lines 10 through 21).

Regarding ***claim 17***, Hassan and Ross disclose the system discussed above in claim 16, and Hassan further teaches of a switching device for selectively activating and deactivating the local facsimile receiving system (column 6, lines 10 through 21).

Regarding ***claim 18***, Hassan and Ross disclose the system discussed above in claim 13, and Hassan further teaches of an integral viewer for viewing the images stored in the memory (LCD display 215, column 4, lines 19 through 64).

Regarding ***claim 29***, Hassan discloses the system discussed above in claim 2, but fails to expressly disclose if the image data signal is stored in a raw video format.

Ross discloses a self-contained image processing system (see Fig. 1) for capturing a visual image and transmitting it to a remote receiving station, with the system comprising an image capture device (video camera 10, column 3, lines 4 through 5), a processor (control system 22 in Fig. 1, or CPU 44 in Fig. 2) for generating a data signal representing the image (column 3, lines 20 through 29, and column 3, line 63 through column 4, line 20), a communications device (Group III fax transmitter 20 in Fig. 1, and fax modem 50 in Fig. 2) adapted for transmitting the data signal to the remote receiving station (column 2, lines 15 through 29, wherein the remote receiving station is inherently included in the system), and a subprocessor (Group III formatter 18) for generating a Group-III facsimile compatible signal representing the data signal (column 3, lines 30 through 52). Continuing, Ross teaches of a memory for receiving and storing the data signal (RAM 38, column 3, line 65 through column 4, line 11), and that the image data signal is stored in a raw video format (column 3, line 63 through column 4, line 51).

Hassan & Ross are combinable because they are from the same field of endeavor, that being systems that transmit images from a camera to a destination via facsimile transmission.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the analog video camera that transmits a video signal, which is taught by Ross, in the system of Hassan.

The suggestion/motivation for doing so would have been that Hassan's system would become usable in more formats, as recognized by Ross in column 1, thereby increasing the system's desirability.

Therefore, it would have been obvious to combine the teachings of Ross with the system of Hassan to obtain the invention as specified in claim 29.

13. **Claims 19 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hassan *et al.* (U.S. Patent Number 5,550,646, cited in the Information Disclosure Statement dated 1/20/04) in view of Ross (U.S. Patent Number 5,546,194, cited in the Information Disclosure Statement dated 1/20/04), and further in view of Wertsberger (U.S. Patent Number 6,072,600, cited in the Information Disclosure Statement dated 1/20/04).

Regarding ***claims 19 and 20***, Hassan and Ross disclose the system discussed above in claim 13, but fail to expressly disclose if the memory is a removable memory medium which may be selectively removed from the system, with the removable memory medium comprising a PCMCIA card memory.

Wertsberger discloses a self-contained image processing system (see Figs. 1 and 2) for capturing a visual image and transmitting it to a remote receiving station (see abstract, column 2, line 50 through column 3, line 25), with the system comprising an image capture device (CCD image sensor 1, column 4, lines 5 through 47), a processor (CPU 16) for generating a data signal representing the image (column 4, lines 20 through 58), a communications device (fax modem circuitry 13) adapted for transmitting the data signal to the remote receiving station (column 4, lines 48 through 67), and a wireless transmission system (telephone interface circuitry 15)

between the communications device and the compatible receiving station (column 5, lines 1 through 6). Continuing, Wertsberger teaches of a memory for receiving and storing the data signal (memory means 11, and secondary storage 20), and wherein the communications device is adapted for recalling the stored data signal from memory (column 4, lines 48 through 67, and column 5, lines 24 through 27). Further, Wertsberger teaches that the memory is a removable memory medium which may be selectively removed from the system (column 5, lines 24 through 27), with the removable memory medium comprises a PCMCIA card memory (column 5, lines 24 through 27).

Hassan, Ross & Wertsberger are combinable because they are each from the same field of endeavor, that being systems that transmit images from a camera to a destination via facsimile transmission.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the removable PCMCIA card memory, which is taught by Wertsberger, in the system of Hassan and Ross.

The suggestion/motivation for doing so would have been that the system of Hassan and Ross would become more user-friendly, since allowing a user to load data on a portable, removable memory would aid the user's options of data storage, as recognized in column 5 by Wertsberger.

Therefore, it would have been obvious to combine the teachings of Wertsberger with the system of Hassan and Ross to obtain the invention as specified in claims 19 and 20.

14. **Claim 22** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hassan *et al.* (U.S. Patent Number 5,550,646, cited in the Information Disclosure Statement dated 1/20/04) in view of Shibata *et al.* (U.S. Patent Number 5,689,300, cited in the Information Disclosure Statement dated 1/20/04).

Regarding ***claim 22***, Hassan discloses the system discussed above in claim 1, but fails to expressly disclose if an audio signal capture device adapted for capturing an audio signal in correlation with the captured video signal.

Shibata discloses a self-contained image processing system for capturing a visual image and transmitting it to a remote receiving station (see Figs. 1, 8A, and 8B, and abstract), which includes an audio signal capture device adapted for capturing an audio signal in correlation with a captured video signal (column 17, lines 12 through 51).

Hassan & Shibata are combinable because they are from the same field of endeavor, that being systems that transmit images from a camera to a destination via facsimile transmission.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the teachings of capturing an audio signal, recognized by Shibata, in the system of Hassan.

The suggestion/motivation for doing so would have been that Hassan's system would become more convenient for a user, as the user would be able to communicate audio information along with video information, as recognized by Shibata in column 17.

Therefore, it would have been obvious to combine the teachings of Shibata with the system of Hassan to obtain the invention as specified in claim 22.

15. **Claim 28** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hassan *et al.* (U.S. Patent Number 5,550,646, cited in the Information Disclosure Statement dated 1/20/04) in view of Bradley *et al.* (U.S. Patent Number 5,995,041, cited in the Information Disclosure Statement dated 1/20/04).

Regarding ***claim 28***, Hassan discloses the system discussed above in claim 24, but fails to expressly disclose if the input device comprises a global positioning system.

Bradley discloses a self-contained image processing system for capturing a visual image and transmitting it to a remote receiving station (column 2, line 42 through column 3, line 6, and column 7, line 43 through column 8, line 30), with the system comprising an image capture device (column 7, line 43 through column 8, line 24), a processor (500, column 8, line 64 through column 10, line 2), a communications device adapted for transmitting a data signal to the remote receiving station (column 2, line 57 through column 3, line 6), and a wireless transmission system between the communications device and the compatible receiving station (see Figs. 1-3). Further, Bradley teaches that an input device comprises a global positioning system (column 2, lines 42 through 61).

Hassan & Bradley are combinable because they are from the same field of endeavor, that being systems that transmit images from a camera to a destination via facsimile transmission.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include Bradley's teachings of using a global positioning system in the system of Hassan.

The suggestion/motivation for doing so would have been that Hassan's system would become more user-friendly with the addition of Bradley's GPS teachings, since the user would

automatically know the coordinates of where he is located, as recognized by Bradley in column 2.

Therefore, it would have been obvious to combine the teachings of Bradley with the system of Hassan to obtain the invention as specified in claim 28.

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joe Pokrzywa whose telephone number is (703) 305-0146. The examiner can normally be reached on Monday-Friday, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward L. Coles can be reached on (703) 305-4712. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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).

Joseph R. Pokrzywa
Examiner
Art Unit 2622

jrp

Form PTO-1449 (Modified) SHEET 1 of 2

FORM PTO-1449 (Modified) U.S. Dept. of Commerce Patent & Trademark Office	ATTY DKT. NO.:	SER. NO.:
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary) (37 CFR 1.98(b))	121817.0002.042	10/336,470
	APPLICANT: David A. Monroe	
	FILING DATE: January 3, 2003	GROUP: 2622

U.S. PATENT DOCUMENTS

Examiner Initial	Patent Number	Issue Date	Patentee	Class	Sub-class	Filing Date If Appropriate
JP	2,642,492	06/16/1953	Hammond, Jr.	348	24	12/11/1948
JP	3,251,937	05/17/1966	Hoag	358	410	12/20/1962
JP	3,751,159	08/07/1973	Fisher	355	20	05/19/1971
JP	3,864,514	02/04/1975	Lemelson	358	409	10/24/1972
JP	4,074,324	02/14/1978	Barrett	358	296	07/14/1975
JP	4,530,014	07/16/1985	D'Alayer de Costemore D'Arc	386	119	02/14/1983
JP	4,652,926	03/24/1987	Withers et al.	347	226	04/23/1984
JP	4,884,132	11/28/1989	Morris et al.	358	479	12/28/1988
JP	4,937,676	06/26/1990	Finelli et al.	348	375	02/10/1989
JP	4,942,477	07/17/1990	Nakamura	358	401	11/10/1988
JP	5,032,911	07/16/1991	Takimoto	358	501	04/26/1990
JP	5,047,870	09/10/1991	Filo	358	472	03/17/1988
JP	5,193,012	03/09/1993	Schmidt	358	3.16	04/29/1991
JP	5,235,432	08/10/1993	Creedon et al.	358	479	11/22/1991

FOREIGN PATENT OR PUBLISHED FOREIGN PATENT APPLICATION

		Document Number	Publ. Date	Country or Patent Office	Class	Sub-Class	Translation Yes	No

OTHER DOCUMENTS (Including Author, Title, Date, Relevant Pages, Place of Publication)

EXAMINER	Joseph R Pokrzywa
DATE CONSIDERED	9/21/04

EXAMINER: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

*It is believed these references are potentially relevant but applicant has not determined whether or not these two online printouts represent prior art as they were a result of search performed after applicant's date of invention.

Form PTO-1449 (Modified) SHEET 2 of 2

FORM PTO-1449 (Modified) U.S. Dept. of Commerce Patent & Trademark Office	ATTY DKT. NO.:	SER. NO.:
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary) (37 CFR 1.98(b))	121817.0002.042	10/336,470
	APPLICANT: David A. Monroe	
	FILING DATE: January 3, 2003	GROUP: 2622

U.S. PATENT DOCUMENTS

Examiner Initial	Patent Number	Issue Date	Patentee	Class	Sub-class	Filing Date If Appropriate
JP	5,546,194	08/13/1996	Ross	358	445	03/23/1994
JP	5,550,646	08/27/1996	Hassan et al.	358	442	09/13/1993
JP	5,689,300	11/18/1997	Shibata et al.	348	14.07	07/31/1995
JP	5,684,716	11/04/1997	Freeman	345	723	07/21/1995
JP	5,666,159	09/09/1997	Parulski et al.	348	211.2	04/24/1995
JP	5,539,452	07/23/1996	Bush et al.	348	14.13	09/06/1994
JP	5,515,176	05/07/1996	Galen et al.	358	403	12/08/1994
JP	6,072,600	06/06/2000	Wertsberger	358	479	01/28/1997

FOREIGN PATENT OR PUBLISHED FOREIGN PATENT APPLICATION

		Document Number	Publ. Date	Country or Patent Office	Class	Sub-Class	Translation Yes	No

OTHER DOCUMENTS (Including Author, Title, Date, Relevant Pages, Place of Publication)

EXAMINER	Joseph R Pokrzywa
DATE CONSIDERED	9/21/04

EXAMINER: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

*It is believed these references are potentially relevant but applicant has not determined whether or not these two online printouts represent prior art as they were a result of search performed after applicant's date of invention.

3512265v1

Index of Claims

Application No.	Applicant(s)	
10/336,470	MONROE, DAVID A.	
Examiner	**Art Unit**	
Joseph R. Pokrzywa	2622	

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
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Claim		Date
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Search Notes

Application No.	Applicant(s)	
10/336,470	MONROE, DAVID A.	
Examiner	**Art Unit**	
Joseph R. Pokrzywa	2622	

SEARCHED

Class	Subclass	Date	Examiner
358	1.15	9/04	JP
	402		
	403		
	~~407~~		
	442		
	468		
	~~474~~		

INTERFERENCE SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)

	DATE	EXMR
USED REFERENCES & SEARCH FROM DIVISIONAL APPLICATION.	9/04	JP

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
David A. Monroe	§	Group Art Unit: 2622
Serial No.: 10/336,470	§	Examiner: Joseph R. Pokrzywa
Filed: January 3, 2003	§	Docket No. 121817.0002.042
For: **APPARATUS FOR CAPTURING, CONVERTING AND TRANSMITTING A VISUAL IMAGE SIGNAL VIA A DIGITAL TRANSMISSION SYSTEM**	§	

Mail Stop RESPONSE/FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

RESPONSE TO OFFICE ACTION DATED SEPTEMBER 27, 2004

Sir:

This is a response to the Office Action mailed on September 27, 2004 and is timely filed. Please amend the application as follows:

In the Specification:

Please amend the specification as follows:

Delete the reference to Fig. 7A and 7B

Paragraph 0051, line 361, change "PCMCIA card 50" to --PCMCIA card 72--.

Paragraph 0054, line 427, change "81" to --81a--.

Paragraph 0055, line 443, change "83" to --83a--.

Paragraph 0066, line 552, change "81" to --81a--.

In the Drawings:

Please amend the drawings in accordance with the letter to the Office Draftsman, attached hereto and filed concurrently herewith.

01/10/2005 CNGUYEN 00000001 503322 10336470

02 FC:1202 350.00 DA
03 FC:1201 200.00 DA

In the Claims:

Please amend the claims as follows:

Cancel Claims 5, 6, 10, 11, 14-17, 21, 31-34.

Amend Claim 3 as follows: Line 1, change "1" to --2--.

Add the following new Claims 43-62, as follows:

43 (New). A handheld self-contained cellular telephone and integrated image processing system for both sending and receiving telephonic audio signals and for capturing a visual image and transmitting it to a remote receiving station, the system comprising:

a. A housing;
b. An image capture device comprising a electronic camera contained within the housing;
c. A display for displaying an image framed by the camera;
d. A processor in the housing for generating an image data signal representing the image framed by the camera;
e. A telephonic system in the housing for sending and receiving digitized audio signals and adapted for sending the image data signal;
f. Alphanumeric input keys in the housing for permitting manually input digitized alphanumeric signals to be input to the processor, the telephonic system being further adapted for sending the digitized alphanumeric signals;
g. A wireless communications device adapted for transmitting any of the digitized signals to a compatible remote receiving station; and
h. A power supply in the housing for powering the system.

44. (New) The self-contained image processing system of Claim 43, further comprising a display for framing the image to be captured by the image capture device and for displaying the image at the system whereby the operator can view and frame the image prior to capture.

45. (New) The self-contained image processing system of Claim 43, wherein the display is adapted for viewing alphanumeric messages input at the alphanumeric keys.

46. (New) The self-contained image processing system of Claim 43, wherein the communications system is adapted for receiving incoming alphanumeric messages from a remote station and wherein the display is adapted for viewing such incoming alpha numeric messages.

47. (New) The self-contained image processing system of Claim 43, wherein the communications system is adapted for receiving incoming image data signals and wherein the display is adapted for viewing such incoming image data signals.

48. (New) The self-contained image processing system of Claim 43, further comprising a removable memory module adapted to be removably housed in the housing for storing captured image data signals.

49. (New) The self-contained image processing system of Claim 43, wherein the system is adapted for operating in any combination of three distinct functions: (1) an audio telephone, (2) a transmitting system for transmitting captured image data signals via a cellular telephone, and (3) for receiving incoming transmissions such as configuration signals or incoming image data signals.

50. (New) The self-contained image processing system of Claim 49, wherein the display is adapted for viewing incoming image data signals.

51. (New) A handheld cellular telephone having an integrated electronic camera for both sending and receiving telephonic audio signals and for capturing a visual image, converting the visual image to a digitized image data signal and transmitting digitized image data signal via a cellular telephone network, the cellular telephone comprising:

a. A housing;
b. A cellular telephone in the housing, the cellular telephone further including a transmitter/receiver for transmitting and receiving audio telephone messages over a cellular network, a keypad for entering manually input alphanumeric signals to be

transmitted over the cellular telephone network, and a display window for viewing the manually input alphanumeric signals;

c. An electronic camera in the housing, the digitized camera adapted for visually framing a visual image to be captured and for capturing and digitizing the framed image in a format adapted for transmission over the cellular network via the cellular telephone;

d. An integrated power supply for powering both the cellular telephone and the camera.

52. (New) The cellular telephone of Claim 51, wherein the display window for viewing the alphanumeric signals is within the display for framing the visual image.

53. (New) The cellular telephone of Claim 51, further including a memory in the housing for storing the captured framed image.

54. (New) The cellular telephone of Claim 53, wherein the memory is selectively removable from the housing.

55 (New) A combination of handheld cellular telephone and electronic camera comprising:

a. A housing;

b. A electronic camera in the housing;

c. A display in the housing;

d. A processor for processing the image framed by the camera;

e. A cellular telephone in the housing and adapted for accepting and digitizing audio signals to be transmitted and for converting received digitized audio signals into acoustic audio, the cellular telephone further adapted for transmitting and receiving non-audio digital signals including digitized image signals;

f. Alphanumeric input keys in the housing for permitting manually input alphanumeric signals to be input into the cellular telephone, the manually input alphanumeric signals being presented in a display;

g. A power supply in the housing for powering the processor, the cellular telephone, the display and the camera;
h. A wireless transmitter/receiver in the housing for transmitting digital signals sent from and receiving digital signals sent to the cellular telephone.

56 (New) The combination of Claim 55 further comprising a display for framing the image to be captured by the image capture device and for viewing the image at the system whereby the operator can view and frame the image prior to capture.

57 (New) The combination of Claim 55 wherein the display is adapted for viewing alphanumeric messages input at the alphanumeric input keys.

58 (New) The combination of Claim 55, wherein the cellular telephone is adapted for receiving incoming alphanumeric messages from a remote station and wherein the display is adapted for viewing such incoming alphanumeric messages.

59. (New) The combination of Claim 55, wherein the cellular telephone is adapted for receiving incoming image data signals and wherein the display is adapted for viewing such incoming image data signals.

60. (New) The combination of Claim 55, further comprising a removable memory module adapted to be removably housed in the housing for storing captured image data signals.

61. (New) The combination of Claim 60, further adapted for operating in any combination of three distinct functions: (1) an audio telephone, (2) a transmitting system for transmitting captured image data signals via a cellular telephone, and (3) for receiving incoming transmissions such as incoming image data signals.

62. (New) The combination of Claim 60, wherein the display is adapted for viewing incoming image data signals.

ARGUMENT

The applicant appreciates the thoroughness applied by the Examiner in the examination of the application. After a careful review of the Examiner's comments, Applicant has canceled claims 5, 6, 10, 11, 14-17, 21, 31-34 and has added claims 43-62, including independent claims 43, 51 and 55.

Applicant has amended the errors in the specification as noted by the Examiner. It is respectfully submitted that no new matter has been added in these corrections.

The amendments to the drawings have been made in accordance with the Examiner's recommendations in a separate document filed with the Office Draftsman, concurrently herewith.

In view of the amendments to the claims, the specific objection regarding informalities in Claim 5 is rendered moot, this claim having been canceled.

Claim 3 has been amended in accordance with the requirements of the Examiner.

Applicant has filed concurrently herewith an affidavit under 37 CFR 1.131, establishing an invention date at least earlier than March 23, 1993, more than one year before the filing date of the earliest patent relied upon by the Examiner. The affidavit and exhibits attached thereto clearly establish conception and reduction to practice and confirm due diligence between the conception date and the effective filing date of this application. For this reason, applicant submits that none references cited by the Examiner can be used as prior art in the subject application.

Moreover, as stated in the affidavit, none of these references combine a handheld system with the circuitry to support it, which as indicated in the affidavit, was a years long effort. It is respectfully submitted that the claims, as now pending are allowable in view of the invention date established by applicant and such action is requested.

In any event, applicant has discussed the various rejections made by the Examiner for sake of completion of the record.

Based on the affidavit and the arguments made herein it is respectfully submitted that this application is now in condition for allowance and such action is respectfully solicited.

Claim Rejections

Amended Claims Summary

Claims 1, 2, 4-12, 21, 23-27 and 30-36 have been rejected as anticipated by the Hassan et al '646 patent, under 35 U.S.C. §102(b), and anticipated by the Westberger '600 patent under 35 U.S.C §102(e), and anticipated by the Parulski et al '159 patent under 35 U.S.C. §102(e). Since this art is not relevant in view of the 131 Affidavit, this rejection should be withdrawn. However, the Examiner's arguments have been carefully considered in forming the new claims, in particular the new independent claims 43, 52 and 56, as well as original claim 1. The '646 patent, '600 patent and '159 patent will be reviewed with respect to the currently pending claims for sake of completeness of record.

The Hassan et al '646 Patent

The Examiner has stated the '646 patent "discloses a self-contained image processing system...for capturing a visual image and transmitting it to a remote receiving station...a processor...a communications device...adapted for transmitting the data signal to the remote receiving station and a wireless transmission system between the communications device and the compatible receiving station."

With all due respect, while '646 patent mentions a cellular telephone at Column 2, line 5 and again at Column 2, line 53 and once again at Column 3, line 13, there is never any discussion as to how this may be accomplished. All of the embodiments shown and described in the '646 patent require hard wiring to a land line, as indicated by the RJ-11 jack 130 as shown in Figs. 1 and 2. There is not any discussion as to how the signal may need to be conditioned for transmission over a wireless system. For this reason, it is believed that the '646 patent is not a sound reference for rejection of original Claim 1 under 35 U.S.C. §102(b). In viewing the application for the '646 patent at the time it was filed, the reference to cellular telephone transmission can only be considered to be wishful thinking on the part of Hassan et al. However, in as much as Claim 1 has been substantially amended, applicant respectfully submits that the '646 patent cannot be applied as an anticipatory reference without pursuing the argument relative to wireless interconnectivity.

A clear reading of the '646 patent shows that it is directed to an imaging system adapted for converting an analog camera captured image to a fax data signal for transmission via a fax modem over a wired telephone line. While the '646 patent may suggest other uses,

it does not suggest how such uses may be implemented. Without the application of hindsight the '646 patent cannot be shown to read on anything other than a system utilizing an analog camera to create an image which may be converted to a Group-III fax for transmission over a typical fax modem and land line telephone to a remote recipient Group-III fax machine.

The Wertsberger '600 Patent

The Examiner has stated that the Wertsberger '600 patent "discloses a self-contained image processing system...for capturing a visual image and transmitting it to a remote receiving station...with the system comprising an image capture device...a processor...for generating a data signal for representing the image...a communications device...adapted for transmitting the data signal to the remote receiving station...and a wireless transmission system...between the communications device and the compatible receiving station."

Applicant does not disagree generally with this interpretation of the '600 patent. However, applicant would like to note, for the record, that only mention of wireless interconnectivity is at Column 5, lines 1-6, wherein it is stated:

> "The Fax Modem Circuitry [13] is connected to Telephone Interface Circuitry [15] that allows the Fax Camera to connect to a public switched telephone network, or a cellular telephone communication link. Additionally, cellular telephone circuitry [70] may be built into the fax camera to provide self contained communications capability."

It is respectfully submitted that this reference to cellular technology does not disclose a system that is adapted for generating a data signal in an integrated unit for transmission over a wireless network. In order for the system to work as shown and described, it must be hardwired to something. There simply is not disclosed any wireless gateway.

In essence, the '600 patent discloses a camera with a digital convertor for generating a Group-III fax for transmission over a standard fax modem and which is hardwired to a telephone interface circuit (see, in particular, Fig. 1).

Parulski et al '159 Patent

The Examiner has stated that the Parulski '159 patent discloses "a self-contained image processing system...for capturing a visual image and transmitting it to a remote receiving station...with the system comprising an image capture device...a processor for generating a data signal representing the image...a communications device...adapted for

transmitting the data signal to the remote receiving communications device and the compatible receiving station."

The '159 patent discloses an electronic camera system for selectively transmitting electronic image data to a plurality of remote base units. The camera module is detachably coupled to a computer having a display screen and a data entry device. Basically, this patent discloses a mechanism for connecting a camera to a computer with a display screen. The image data is then loaded into the computer and a transmitter associated with the computer is utilized transmit the data to remote locations. There is a so-called camera/telephone embodiment shown in Fig. 7. As stated in the '159 patent, at Column 4, lines 26-53:

> "A second embodiment of the invention is illustrated, in FIGS. 7 and 8. In this embodiment, a cellular telephone is provided with the components of an electronic image camera to form a combined telephone/camera unit 48. The top of the combined unit 48 includes a lens 50, a flip-up flash unit 52, and an antenna 54. The front face of the combined unit 48 is provided with a liquid crystal display screen 56 and a telephone keypad 58, both of which are coupled to an internal bus 60 along with a control processing unit 62, memory unit 64, and cellular transceiver 66 as shown in FIG. 9. The internal bus 60 is also connected to a camera module 68, which includes the same basic components as illustrated in FIG. 4, with the exception that the output from the image signal processor is supplied directly to the internal bus 60 instead of a connector.
>
> In operation, as illustrated in greater detail by the flow diagram illustrated in FIG. 10, the user takes a picture by flipping up the flash unit 52 and pressing an image capture switch (not shown). Alternatively, a key (for example the # key) on the keypad 58 can be utilized as the image capture switch in an image capture mode of operation. The digitized picture data generated by the camera module 68 is stored in the memory unit 64 and displayed on the display screen 56. To transmit the image, the user dials the telephone number of a desired fax machine that is to receive the image using the keypad 58. The number is transmitted to the fax machine via the cellular transceiver 66."

It should be noted that the "159 patent does not disclose, nor does it suggest the use of a combined camera and cellular telephone wherein the system is capable of being used as both a telephone and a camera. Further, there is not any disclosure of a system capable of receiving image data signals or other input from outside the unit. Again, assuming that the '159 patent discloses such a capability is an application of hindsight from information not available at the time the '159 patent was conceived. As with the '646 patent and the '600

patent, the '159 patent is directed to a means for generating a Group-III fax from a camera collected image.

Claim 43

It is respectfully claim 43 clearly distinguishes and distinctly claims the invention over the '600 patent and the '159 patent, as well.

As Claim 43 states, applicant's invention is directed to a self-contained cellular telephone and integrated image processing system for both sending and receiving telephonic audio signals and for capturing a visual image and transmitting it to a remote receiving station, wherein the image capture comprises a digital camera contained within a unitary housing also containing the telephonic system. There is a viewer for displaying an image framed by the camera, and a self-contained processor in the housing for generating an image data signal representing the image framed by the camera. The telephonic system not only transmits the image data signal but also operates as an audio telephone for sending and receiving digitized audio signals. The invention as described in amended claim 1 includes a keypad for permitting manually input digitized text signals to be input to the processor, the telephonic system being further adapted for sending the digitized alphanumeric signals. The wireless communications device is capable of transmitting any of the digitized signals (image, audio and alphanumeric) to any of a plurality of compatible remote receiving stations. An integrated power supply is included.

It is respectfully submitted that the '646 patent does not disclose a viewer or suggest a viewer or that one would be desirable or necessary in the collection and transmission of a fax image, as contemplated. It is also submitted that the '646 patent does not disclose a system of capable of sending and receiving audio and alphanumeric signals as well as image data signals. Therefore, it is respectfully submitted that the '646 patent neither teaches nor suggests applicant's invention as now recited in amended Claim 1. It is respectfully requested that the rejection under 35 U.S.C. §102(b) be withdrawn.

The '600 patent has the same shortcomings as the '646 patent relative to amended claim 1 and therefore, it is respectfully requested that rejection of Claim 1, as amended, under 35 U.S.C. §102(e) be withdrawn.

The '159 patent discloses a modular system wherein a discrete camera is attached to a discrete computer and the discrete computer is connected to a transmission system. While

one embodiment mentions the use of a camera/telephone combination, however the image created is receivable only at a Group-III fax machine. In addition, there is not any capability for either both receiving and displaying images from a remote system, or for utilizing the telephone in an audio telephone configuration.

New independent Claim 43 is directed to a combination telephone and camera wherein the system can operate as a standard telephone or as a camera or both. The images transmitted are digital photographs not limited to Group-III fax or similar facsimile systems. It is respectfully submitted that the invention as now set forth in Claim 43 is allowable over the art of record.

New Claim 51

New Claim 51 is directed to a cellular telephone having an integrated digital camera for both sending and receiving telephonic audio signals and for capturing a visual image, converting the visual image to a digitized image data signal and transmitting digitized image data signal via a cellular telephone network. The cellular telephone includes a transmitter/receiver for transmitting and receiving audio telephone messages over a cellular network, a keypad for entering manually input alphanumeric signals to be transmitted over the cellular telephone network, and a display window for displaying the manually input alphanumeric signals. An integrated digital camera includes a viewer for visually framing a visual image to be captured, a processor for capturing and digitizing the framed image in a format adapted for transmission over the cellular network via the cellular telephone. An integrated power supply for powering both the cellular telephone and the digital camera.

As discussed above, none of the art of record contemplates the combined camera/telephone as claimed in new Claim 51. It is respectfully submitted that Claim 51 is allowable over the art of record.

New Claim 55

New independent Claim 55 covers a combination cellular telephone and digital camera wherein an integrated system is contained in a single housing having a digital camera, a viewer associated with the camera for displaying an image framed by the camera, a processor for processing the image framed by the camera and for converting it into a digitized image signal, and a cellular telephone adapted for receiving and digitizing audio signals to be transmitted and for converting received digitized audio signals into audio, the

cellular telephone further adapted for transmitting and receiving non-audio digital signals including digitized image signals. A keypad in the housing permits manually input alphanumeric signals to be input into the cellular telephone, the manually input alphanumeric signals being displayed in the viewer. A power supply is provided in the housing for powering the processor, the cellular telephone and the digital camera. An integrated wireless transmitter/receiver provides for transmitting digital signals sent from and receiving digital signals sent to the cellular telephone.

It is respectfully submitted that none of the '646 patent, '600 patent and the '159 patent provides for or remotely suggests wireless transmission and reception of digital image data and the means for displaying the same in a cellular telephone/camera combination as called for in new Claim 55. Wherefore, it is respectfully submitted that such claim is allowable over the art of record.

Remaining Art Specifically Relied On By the Examiner

Ross '194 Patent: This patent shows another system for collecting images via a camera and converting them to a Group-III Fax. In view of the amended claims it is submitted that this reference is not particularly relevant.

Shibita et al '300 Patent: This patent is directed to teleconferencing equipment utilizing desk top units and has the capability of receiving and displaying faxed images in a video teleconference. In view of the amended claims it is submitted that this reference is not particularly relevant.

Bradley et al '041 Patent: This patent shows interconnectivity between ground and satellite based communications systems. In view of the amended claims it is submitted that this reference is not particularly relevant.

REMARKS

Applicant and his attorney appreciate the courtesies extended by the Examiner at the interview of December 20, 2004.

As will be noted by the Examiner, new claims have been added in view of the art cited by the Examiner in the Office Action of September 27, 2004. The claims are now more clearly directed to and distinctly point out what applicant believes to be his invention. In addition, in view of the affidavit under 37 CFR 1.131, none of the art is applicable.

Moreover, the subject invention, as supported by the claims as amended are distinct from the art of record. It is respectfully submitted that each of the independent Claims 1, 43, 51 and 55 are now in condition to be allowed.

It is also respectfully submitted that the dependent claims are allowable for the same reasons. It is, therefore, respectfully requested that the Examiner withdraw his rejections of the claims and place this application in condition for allowance.

All of the objections and rejections of the Examiner having been met by the amendments made herein, it is respectfully requested that this case be passed to allowance.

Respectfully submitted,

Robert C. Curfiss
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Reg. No. 26,540

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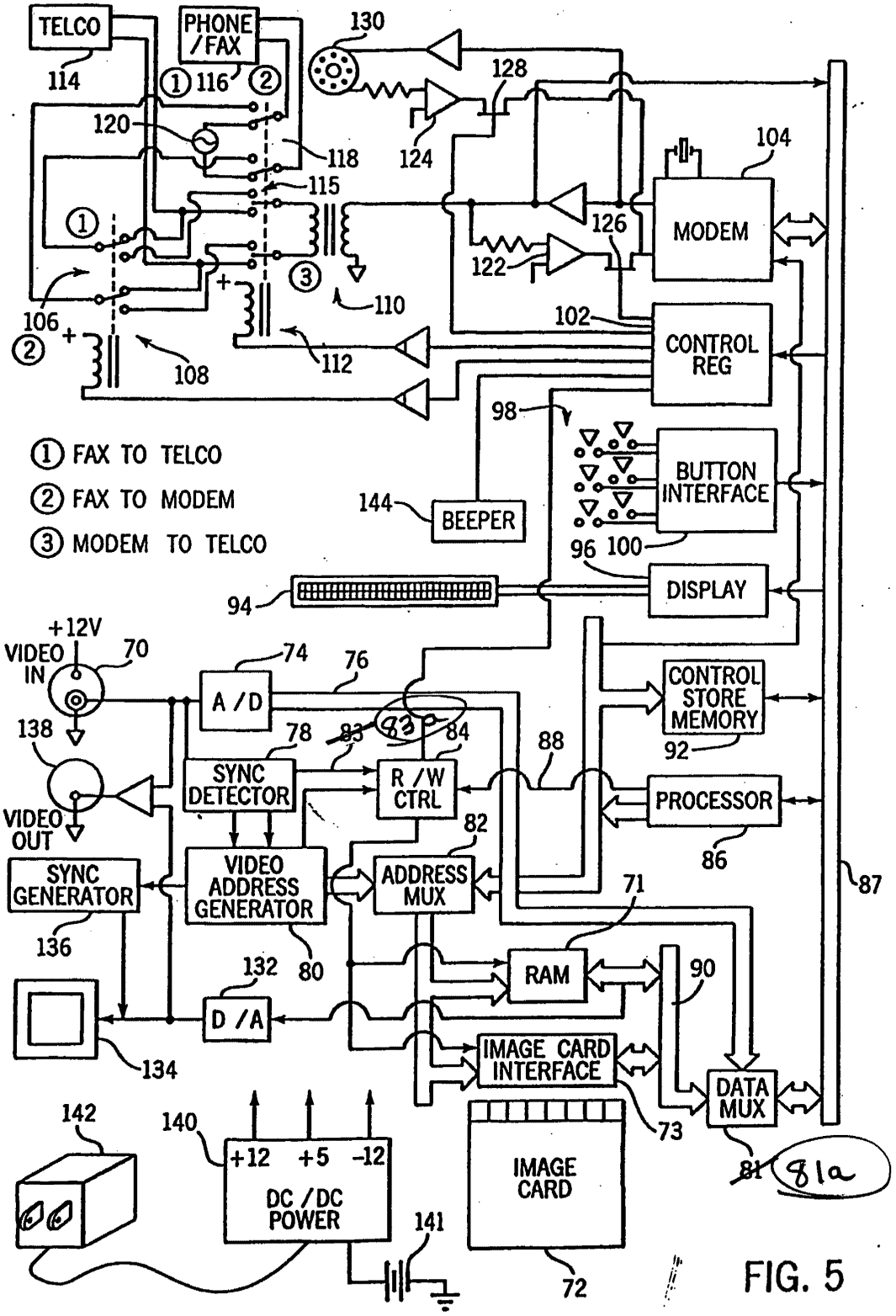
TELCO
PHONE /FAX
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FIG. 5

CLEAN VERSION OF THE PENDING CLAIMS IN PROPOSED ORDER

1. A self-contained image processing system for capturing a visual image and transmitting it to a remote receiving station, the image processing system comprising:

a. an image capture device;

b. a processor for generating a data signal representing the image;

c. a communications device adapted for transmitting the data signal to the remote receiving station;

d. a wireless transmission system between the communications device and the compatible receiving station.

2. The image processing system of claim 1, further including a memory for receiving and storing the data signal, and wherein the communications device is adapted for recalling the stored data signal from memory.

3. The image processing system of claim 2, wherein said memory is a removable random access medium and wherein the system is adapted for selectively charging and discharging the memory.

4. The image processing system of claim 1, wherein the image capture device is an analog camera for generating an analog camera for generating an analog image signal and there is further included an analog to digital converter for converting the analog image signal to a digital signal.

7. The image processing system of claim 1, wherein there is further included an integrated wireless telephone associated with the communications device.

8. The image processing system of claim 1, further comprising a housing for housing all of the elements of the system in an integrated body.

9. The image processing system of claim 1, wherein said image capture device is a digital camera.

12. The image processing system of claim 1, wherein the processor is adapted for generating a signal in any of a plurality of selected protocols and wherein the communications device is adapted for transmitting the signal in the proper protocol to a remote, compatible receiving station.

13. The image processing system of claim 1, wherein:

a. the image capture device is an analog video camera for generating a video signal;

b. the processor further comprises:

i. an analog to digital converter;

ii. a sync detector and a video address generator for synchronizing the digital signal with the analog signal for defining the beginning and end of the signal to define a still frame;

iii. a random access memory for receiving and storing the converted, synchronized signal frame-by-frame;

iv. a processor routine for converting the signals stored in the memory to a protocol adapted for transmission to a remote, compatible protocol receiving station;

c. a communications device for transmitting the signal in the proper protocol to the compatible receiving station.

18. The image processing system of claim 13, further including an integral view for viewing the images stored in the memory.

19. The image processing system of claim 13, wherein the memory is a removable memory medium which may be selectively removed from the system.

20. The image processing system of claim 19, wherein the removable memory medium comprises a PCMCIA card memory.

22. The image processing system of claim 1, further comprising an audio signal capture device adapted for capturing an audio signal in correlation with the captured video signal.

23. The image processing system of claim 1, further comprising a data processor for creating a text data signal associated with said image data signal.

24. The image processing system of claim 23, further including an input device for providing text data to the data processor.

25. The image processing system of claim 24, wherein the input device is user controlled.

26. The image processing system of claim 25, wherein said user controlled input device is an integral keyboard.

27. The image processing system of claim 24, said input device comprising a real time clock.

28. The image processing system of claim 24, said input device comprising a global positioning system.

29. The image processing system of claim 24, wherein said image data signal is stored in a raw video format.

30. The image processing system of claim 2, wherein the image data signal is stored in a compressed format.

35. The image processing system of claim 1, wherein the remote receiving station is a digital device and the image data is digital.

36. The image processing system of claim 1, further comprising a self-contained power source for powering the system.

37. The image processing system of claim 36, wherein said communications device is adapted to be used independently of the image capture device and the processor, and wherein the power supply is adapted for isolating the power to the communications device from the power to the image capture device and processor.

38. The image processing system of claim 37, further including a power initiation device associated with the image capture device and the processor wherein the power to the image capture device and the processor is off when the initiation device is not activated.

39. The image processing system of claim 38, wherein the power initiation device is user controlled.

40. The image processing system of claim 38, further including a trigger device for activating the power initiation device.

41. The image processing system of claim 40, wherein the trigger device is a timer.

42. The image processing system of claim 40, wherein the trigger device is triggered by the presence of an image to be captured.

43. A handheld self-contained cellular telephone and integrated image processing system for both sending and receiving telephonic audio signals and for capturing a visual image and transmitting it to a remote receiving station, the system comprising:

a. A housing;
b. An image capture device comprising a electronic camera contained within the housing;
c. A display for displaying an image framed by the camera;
d. A processor in the housing for generating an image data signal representing the image framed by the camera;

e. A telephonic system in the housing for sending and receiving digitized audio signals and adapted for sending the image data signal;
f. Alphanumeric input keys in the housing for permitting manually input digitized alphanumeric signals to be input to the processor, the telephonic system being further adapted for sending the digitized alphanumeric signals;
g. A wireless communications device adapted for transmitting any of the digitized signals to a compatible remote receiving station; and
h. A power supply in the housing for powering the system.

44. The self-contained image processing system of Claim 43, further comprising a display for framing the image to be captured by the image capture device and for displaying the image at the system whereby the operator can view and frame the image prior to capture.

45. The self-contained image processing system of Claim 43, wherein the display is adapted for viewing alphanumeric messages input at the alphanumeric keys.

46. The self-contained image processing system of Claim 43, wherein the communications system is adapted for receiving incoming alphanumeric messages from a remote station and wherein the display is adapted for viewing such incoming alpha numeric messages.

47. The self-contained image processing system of Claim 43, wherein the communications system is adapted for receiving incoming image data signals and wherein the display is adapted for viewing such incoming image data signals.

48. The self-contained image processing system of Claim 43, further comprising a removable memory module adapted to be removably housed in the housing for storing captured image data signals.

49. The self-contained image processing system of Claim 43, wherein the system is adapted for operating in any combination of three distinct functions: (1) an audio telephone, (2) a transmitting system for transmitting captured image data signals via a cellular telephone, and (3) for receiving incoming transmissions such as configuration signals or incoming image data signals.

50. The self-contained image processing system of Claim 49, wherein the display is adapted for viewing incoming image data signals.

51. A handheld cellular telephone having an integrated electronic camera for both sending and receiving telephonic audio signals and for capturing a visual image, converting the visual image to a digitized image data signal and transmitting digitized image data signal via a cellular telephone network, the cellular telephone comprising:

a. A housing;
b. A cellular telephone in the housing, the cellular telephone further including a transmitter/receiver for transmitting and receiving audio telephone messages over a cellular network, a keypad for entering manually input alphanumeric signals to be transmitted over the cellular telephone network, and a display window for viewing the manually input alphanumeric signals;
c. An electronic camera in the housing, the digitized camera adapted for visually framing a visual image to be captured and for capturing and digitizing the framed image in a format adapted for transmission over the cellular network via the cellular telephone;
d. An integrated power supply for powering both the cellular telephone and the camera.

52. The cellular telephone of Claim 51, wherein the display window for viewing the alphanumeric signals is within the display for framing the visual image.

53. The cellular telephone of Claim 51, further including a memory in the housing for storing the captured framed image.

54. The cellular telephone of Claim 53, wherein the memory is selectively removable from the housing.

55. A combination of handheld cellular telephone and electronic camera comprising:

a. A housing;
b. A electronic camera in the housing;
c. A display in the housing;
d. A processor for processing the image framed by the camera;
e. A cellular telephone in the housing and adapted for accepting and digitizing audio signals to be transmitted and for converting received digitized audio signals into acoustic audio, the cellular telephone further adapted for transmitting and receiving non-audio digital signals including digitized image signals;
f. Alphanumeric input keys in the housing for permitting manually input alphanumeric signals to be input into the cellular telephone, the manually input alphanumeric signals being presented in a display;
g. A power supply in the housing for powering the processor, the cellular telephone, the display and the camera;
h. A wireless transmitter/receiver in the housing for transmitting digital signals sent from and receiving digital signals sent to the cellular telephone.

56. The combination of Claim 55, further comprising a display for framing the image to be captured by the image capture device and for viewing the image at the system whereby the operator can view and frame the image prior to capture.

57. The combination of Claim 55, wherein the display is adapted for viewing alphanumeric messages input at the alphanumeric input keys.

58. The combination of Claim 55, wherein the cellular telephone is adapted for receiving incoming alphanumeric messages from a remote station and wherein the display is adapted for viewing such incoming alphanumeric messages.

59. The combination of Claim 55, wherein the cellular telephone is adapted for receiving incoming image data signals and wherein the display is adapted for viewing such incoming image data signals.

60. The combination of Claim 55, further comprising a removable memory module adapted to be removably housed in the housing for storing captured image data signals.

61. The combination of Claim 60, further adapted for operating in any combination of three distinct functions: (1) an audio telephone, (2) a transmitting system for transmitting captured image data signals via a cellular telephone, and (3) for receiving incoming transmissions such as incoming image data signals.

62. The combination of Claim 60, wherein the display is adapted for viewing incoming image data signals.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
	§	
David A. Monroe	§	Group Art Unit: 2622
	§	
Serial No.: 10/336,470	§	Examiner: Joseph R. Pokrzywa
	§	
Filed: January 3, 2003	§	
	§	
For: **APPARATUS FOR CAPTURING, CONVERTING AND TRANSMITTING A VISUAL IMAGE SIGNAL VIA A DIGITAL TRANSMISSION SYSTEM**	§	

AFFIDAVIT OF DAVID A. MONROE UNDER 37 CFR 1.131

David A. Monroe, being duly sworn, states as follows:

1. I am over 21 years of age and am competent to make this declaration.

2. I am the named inventor of the applications for patent, U.S. Serial Nos. 10/326,503 and 10/338,470, each of which have an effective filing date of January 12, 1998.

3. During the prosecution of these applications I have become aware of a number of patents and publications which may be relevant to the scope of my invention. These patents and publications (the "131 Prior Art") have an effective prior art date which is earlier than my filing date but later than the date of the invention in each of the respective applications.

4. Some, but not all of the 131 Prior Art has been cited by the Examiner during prosecution of each of the subject applications. However, in the interest of thoroughness I desire to disclose all of the 131 Prior Art known to me at this time. The relevant 131 Prior Art is as follows:

Patent/Publication	Earliest Effective Date	Cited by Examiner
U.S. Pat. No. 5,546,194	March 23, 1994	SN 10/336,470
U.S. Pat. No. 5,550,654	May 13, 1994	SN 10/336,470
U.S. Pat. No. 5,689,300	November 18, 1997	SN 10/336,470
U.S. Pat. No. 5,754,227	September 28, 1994	NOT CITED

U.S. Pat. No. 5,854,694	October 17, 1995	NOT CITED
U.S. Pat. No. 5,893,037	December 9, 1994	NOT CITED
U.S. Pat. No. 5,517,683	January 18, 1995	NOT CITED
U.S. Pat. No. 5,711,013	January 18, 1995	NOT CITED
U.S. Pat. No. 5,666,159	April 24, 1995	SN 10/336,470
U.S. Pat. No. 5,793,416	December 29, 1995	SN 10/326,503
U.S. Pat No. 5,825,408	March 18, 1994	SN 10/326,503
U.S. Pat. No. 5,893,037	December 9, 1994	SN 10/326,503
U.S. Pat. No. 5,929,901	October 6, 1997	NOT CITED
U.S. Pat. No. 5,995,041	December 30, 1996	SN 10/336,470
U.S. Pat. No. 5,969,750	September 4, 1996	SN 10/326,503
U.S. Pat. No. 6,072,600	January 30, 1996	SN 10/336,470
U.S. Pat. No. 5,806,005	May 10, 1996	SN 10/326,503
U.S. Pat. No. 5,864,766	August 13, 1996	NOT CITED
U.S. Pat. No. 6,043,839	January 12, 1998	NOT CITED
U.S. Pat. No. 6,085,112	November 7, 1996	NOT CITED
U.S. Pat. No. 6,111,863	December 29, 1995	SN 10/326,503
U.S. Pat. No. 6,122,526	April 24, 1997	NOT CITED
PCT Publication WO 97/26744	July 24, 1997	SN 10/326,503
U.S. Pat. No. 6,181,954	January 12, 1998	SN 10/326,503
U.S. Pat. No. 6,452,626	October 6, 1997	NOT CITED

5. The earliest effective date of any of the 131 Prior Art is March 18, 1994. My invention date for each of the inventions shown and described in the subject applications is more than one year earlier than the earliest effective date of any of the 131 Prior Art, namely, earlier than March 18, 1993. This is supported by the schematic drawings Exhibits 10 and 11, that are dated earlier than March 18, 1993, and by the design renderings and sketches contained in Exhibits 7, 8, and 9, all of which are dated earlier than March 18, 1993.

6. During the period from the date of the inventions to the filing date of January 12, 1998 I was diligent in pursuing the invention and did not abandon the inventions. During this period the invention conceived and shown in Exhibits 6-16 was continually refined and revised, primarily in an effort to achieve a viable commercial product that met all the requirements of the inventions while at the same time being feasible. Commercial success demanded meeting both acceptable performance criteria and financial (cost) criteria.

7. I began working with the concept of sending image data over transmission systems as early as 1983, In 1983 I developed the "PhotoPhone™", a pioneering desktop device ultimately was extensively used and thrived as an early "tele-radiology" system for the transmission of medical X-Ray images, see Exhibit 1.

8. In 1985 I started a company called PhotoTelesis that focused on extending the PhotoPhone to specific Government applications. In 1986 I extended this desktop technology to enable transmission over radio circuits, including cellular. This was done by the addition of a cellular/radio interface circuit board called "CIS", see Exhibit 2. On May 26, 1986, a press release was released that discussed several new products that were announced at the Armed Forces Communication and Electronics Associations in Washington, D.C. The Com-RIT ™ product included the CIS board and provided image transmission from a desktop unit over mobile telephones and portable satellite terminals, see Exhibit 3.

9. Over the next several years, I developed several Remote Image Transceivers or R.I.T.'s for the United States Military, see Exhibit 4, and as shown and described in the 1987 Business Plan of my company PhotoTelesis, see Exhibit 5. In 1989 I conceived the circuitry for a concept model R.I.T. which could be handheld, see Exhibit 6. Over the next several years I continued to develop the handheld R.I.T. while continuing to work on, develop and build the military R.I.T. systems such as those shown in the 1986 Business Plan,Exhibit 5. Evidence of this continuing effort is the design concept drawings of Exhibits 7 and 8, dated 1990. Additional concepts were generated during 1991 (Exhibit 9). In addition, in 1991, the first detailed schematic was generated (Exhibit 10), which would permit a prototype circuit to be built.

10. I perceived that a small, handheld image RIT was needed and in 1989 I conceived the circuit architecture for a concept model R.I.T. that could be handheld, see Exhibit 6. This design, although functionally viable, was in practice power hungry and slow in performance. Over the next several years I continued my efforts to develop the handheld R.I.T. while continuing to work on, develop and build the larger specialized tactical military R.I.T. systems such as those shown in the 1987 Business Plan, Exhibit 5. Evidence of this continuing effort are the design concept drawings generated in corroboration with an industrial designer shown in Exhibits 7 and 8, dated 1990. In addition, in 1991 I developed the enhanced architecture that enabled the first detailed schematic (Exhibit 10), which would permit a higher performance and low-power prototype circuit to be built.

11. In 1992, the first comprehensive circuit was completed for a handheld R.I.T., as shown in Exhibit 11. This circuit became Fig. 8 of U.S. Application No. 10/336,470. Continued work done in 1992 on a packaging modification that would be more desirable to Government Customers, as is shown in Exhibits 12 and 13. Some of the design concepts of the 1992 and earlier period were also included in the Government model as was shown in the Application. Compare, for example, Fig. 6 in the application to the 1992 concept drawings Exhibits 12 and 13.

12. Over the next several years, 1993-1997, Photo-Telesis became the standard R.I.T. for Government tactical image transmission. The tactical systems developed and commercialized by PhotoTelesis were employed by the U.S. Government in many systems. Many of the products developed and sold by PhotoTelesis followed the concepts shown and described in the 1987 Business Plan (Exhibit 5).

13. During this time, I continued to be interested in and continued to develop the concept of a true handheld R.I.T. product. In fact, I came up with a formal proposal of a handheld R.I.T. in 1995 and put together a concept proposal in November, 1995 (Exhibit 14), using secure radio transmission. Ultimately this project was never Government funded, I went on to fund and develop a commercially feasible handheld R.I.T. that was first publicly disclosed in late 1997 and first sold to the Government in 1998.

14. While the proposal shown in Exhibit 14 did not feature a cellular telephone compatible R.I.T., it was architecturally consistent and a development stepping-stone toward that goal. The final product incorporated my design concepts of 1993 and earlier, and did include cellular telephone compatibility. A first prototype of this product is embodied in physical Exhibit 15. Physical Exhibit 15, which was shown to the Examiner in charge of prosecution of each subject cases during an interview, is a prototype of the first commercial embodiment of the invention. This was completed in mid-1997 and was first publicly disclosed sometime early 1998. Photographs of this one-of-a-kind prototype are contained in this record as Exhibit 15.

15. The circuitry for supporting the product resulting from the 1995 proposal is provided in the schematics of Exhibit 16, which ultimately became Fig. 5 of Application No. 10/326,503.

16. The product based on the prototype (Exhibit 15 and Exhibit 16) was put into production and sold to the Government. One of the production units, Physical Exhibit 17 as is photographed in Exhibit 17, was demonstrated transmitting over cellular telephone to the Examiner.

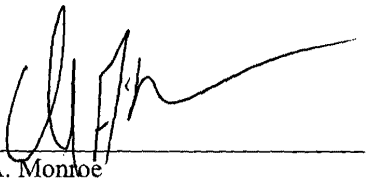
17. As shown by the Exhibits attached hereto, I conceived the invention at least as early as March 18, 1993 and worked diligently in developing a commercially viable product culminating in the first commercial handheld R.I.T. in late 1997. This handheld R.I.T. used cellular telephone transmission technology, as evidenced by Exhibits 15-17 as first conceived and document as early as March 18, 1993, see Exhibits (6 -13).

18. The subject applications were timely filed, being within one year of the first public disclosure of the inventions, and in fact, prior to any public disclosure.

19. The above facts establish reduction to practice prior to the earliest effective dates of the 131 Prior Art, or as a minimum, establish conception of the invention prior to the earliest effective date of the 131 Prior Art coupled with due diligence from prior to this date to a subsequent reduction of practice culminating in the prototype of the commercial embodiment Exhibit 15 in mid-1997.

Further affiant sayeth naught.

Executed this 27th day of December, 2004, by:



David A. Monroe

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
	§	
David A. Monroe	§	Group Art Unit: 2622
	§	
Serial No.: 10/336,470	§	Examiner: Joseph R. Pokrzywa
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Filed: January 3, 2003	§	
	§	
For: **APPARATUS FOR CAPTURING, CONVERTING AND TRANSMITTING A VISUAL IMAGE SIGNAL VIA A DIGITAL TRANSMISSION SYSTEM**	§	

INDEX

5/26/86

PHOTOTELESIS

Remote Image Transmission Systems

OK DM

OK

Press Release
For Immediate Release

PhotoTelesis and Image Data Sign Agreement

Secure Remote Image Transmission over Telephone & Tactical Transceivers

May 26, 1986. San Antonio, TX. Secure video image transmission between any remote sites over telephone, wireless radio and satellite circuits are now possible through an agreement between Image Data Corporation, makers of the commercial Photophone, and PhotoTelesis.

PhotoTelesis is a San Antonio based video systems integration company supplying video teleconferencing rooms, video teleconferencing equipment and specializing in image transmission equipment for government applications. The agreement makes PhotoTelesis the official vendor of Photophones specially adapted for Government applications.

PhotoTelesis introduced three new product lines at the Armed Forces Communcation and Electronics Association annual Convention and Exposition May 27, 28, and 29 at the Washington D.C. Convention Center. Three special versions of the commercially successful Photophone are produced and marketed by PhotoTelesis. All enable freeze frame monochrome video pictures to be transmitted in seconds over various carriers. They are called RITs - for Remote Image Transceivers.

Tac-RIT™ transmits images over secure tactical line of sight and satellite receivers. Since the units are compatible with current standard military radio transceivers, fast reliable visual communication can now be added to tactical communication and command centers.

Sec-RIT™ is compatible with secure (encrypted) COMSEC gear, including STU II, STU III, and PSV (Personal Secure Voice) secure telephones over common dial-up lines.

801 Lincoln Center 7800 IH 10 West San Antonio, Texas 78230 (512) 349-2020

The PhotoTelesis units offer the additional advantages of allowing voice and video over the same channel, enabling discussion of the picture. An interactive pointer controlled by either party allows discussion of the document as though the two parties were across the table from each other rather than half-way around the world.

PhotoTelesis will introduce three new product lines of RITs at the Armed Forces Communication and Electronics Association annual Convention and Exposition May 27, 28, and 29 at the Washington D.C. Convention Center.

Tac-RIT™ transmits images over secure tactical line of sight and satellite receivers. Since the units are compatible with current standard military radio transceivers, fast reliable visual communication can now be added to tactical communication and command centers.

Sec-RIT™ is compatible with secure (encrypted) COMSEC gear, including STU II, STU III, and PSV (Personal Secure Voice) secure telephones over common dial-up lines.

Com-RIT™ provides compatibility with non-secure mobile cellular telephones and private portable carrier satellite communication systems.

PhotoTelesis is a San Antonio based video systems integration company supplying video teleconferencing rooms, video teleconferencing equipment and specializing in image transmission equipment for government applications.

PHOTOTELESIS
Business Plan

1987

PHOTOTELESIS Business Overview Copy #_____

January 27, 1987

The information contained in this memorandum concerning image transmission products for government applications is furnished to the recipient on a confidential basis for the recipient's exclusive use. By acceptance of this confidential memorandum the recipient agrees not to transmit, divulge, reproduce, or make available to anyone other than himself, this confidential memorandum and any exhibits and documents supplied in connection therewith. *Violation of this confidentiality requirement may place the recipient and the preparers of this document in violation of the Texas and Federal securities laws and the applicable securities laws of other states.*

Any decision to invest in this enterprise should be deferred until the recipient has had the opportunity to review a confidential private placement memorandum now in the process of completion which will describe the specific terms under which an investment may be made and the substantial risks involved in any such investment in addition to any risks which may be described herein.

Prior to the sale of any securities related to the corporation described herein, the preparers of this memorandum will undertake to make available to the recipient hereof the same kind of information that is specified in Schedule A of the Securities Act of 1933, to the extent such persons possess such information or can acquire it without unreasonable effort or expense.

Signature

PHOTOTELESIS Business Overview Copy #_____

January 27, 1987

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Signature

CONTENTS

EXECUTIVE SUMMARY

Overview

The charter of PHOTOTELESIS is to provide advanced image communications and processing systems to the U.S. Federal Government market. These systems are being developed using proprietary technology and integration of industry-standard components. The company provides total solutions to its customers including development, integration, manufacturing, marketing, support and training, using resources within the company as well as external contract resources.

The PHOTOTELESIS product line permits the capture, manipulation, storage and communication of images, documents and graphics using advanced techniques which permit communication to take place over ordinary voice grade telephone lines or specialized radio or satellite circuits.

The company specializes in providing products which may be connected to U.S. Government approved encryption devices, permitting secure (scrambled) operation over a variety of existing equipment designed for secure voice communications. PHOTOTELESIS also provides specialized packaging of its products to meet needs in desktop, airborne, naval and vehicular environments.

The company's objective is to develop its business to achieve annual revenues of over $7 million by the end of fiscal 1991, with pre-tax earnings of $1.6 million.

Company Background

PHOTOTELESIS was founded in September, 1985 to address specific vertical markets with image communications product needs. The company conducted extensive test marketing before selecting the Federal Government sector as the most promising area to develop. After consulting many high-level users within policy-making groups, the company generated product requirements which it felt would address broad needs within selected government departments and agencies.

The products developed from these requirements were announced at a major trade conference in May of 1986, and active marketing began. Initial product shipments commenced in June of 1986.

In the fall of 1986 the company completed development of its business strategy, assembled the executive team, and began work on a business plan to solicit funding for a significant expansion of marketing and manufacturing activities.

EXECUTIVE SUMMARY

The PHOTOTELESIS management team brings together broad skills in the management of high technology companies, as well as specific expertise in the development and marketing of image communications and processing systems. The company intends to focus its personnel on the key activities of marketing, product development, and administration, while utilizing outside contractors for manufacturing, certain specialized engineering, contract development and technical publications.

Market Potential

PHOTOTELESIS conducted intensive market research in 1986 in selected segments of the Federal Government market, and concluded that a significant opportunity exists for the company's products. Key indicators in forming this conclusion include:

- An identified and unfulfilled need for low cost image communications to support the development of major program-level initiatives in Communications, Command, Control and Intelligence systems (known as C^3I) for defense-related applications. The current budget calls for expenditures of $17.4 billion in fiscal 1987 to support major programs.

- The planned deployment of a new generation of secure and mobile communications equipment for the D.O.D. arena, with program-level expenditures on the order of billions of dollars in the next five years.

- The burgeoning market for products designed to government standards for handling classified information, called TEMPEST, presently estimated at $350 million and expected to double or triple in size by 1990.

- The absence of significant entrenched competition in providing packaged image systems to Department of Defense and related markets.

- The trend toward use of commercial equipment as opposed to high cost procurement of MIL-SPEC components.

The above indicators prompted PHOTOTELESIS management to test market reaction to its image communications technology and determine the applications, feature requirements and price points necessary for success in the targeted markets.

These activities resulted in the identification of highly receptive user groups in the following government departments:

- Department of Defense
- Executive Office of the President
- Department of Energy
- Department of Justice
- Department of Treasury
- NASA

PHOTOTELESIShas made revenue shipments of evaluation quantities to target customers during 1986 and has received orders for additional equipment for delivery in 1987. In addition, high-level user groups have been identified in each of the above departments who are prospects for sale in 1987.

Marketing Strategy

PHOTOTELESIS sells its products directly to major accounts in its target markets through government purchasing contracts, and plans to offer its products on the G.S.A. (General Services Administration) price lists. The company will also develop indirect marketing channels through Prime Contractors, Sales Representatives, and Value Added Resellers who specialize in government electronics marketing.

The company markets "top down" by identifying major program initiatives in high-level policy-making groups, and selling "seed units" to elite users who can set requirements for large volume contracts in the future.

PHOTOTELESIS management believes that rapid deployment of its image communications technology in high-level user groups will lead to the company's products becoming a defacto standard, as new users develop who require compatible technology. This strategy will provide a significant barrier to future competition in the image communications arena.

EXECUTIVE SUMMARY

Product Line Overview

The PHOTOTELESIS products are known as Remote Image Transceivers, or R.I.T.'s. The RIT is based on technology and components purchased on an O.E.M. basis from Image Data Corporation, who markets their product as The Photophone™.

The company has developed three versions of the RIT which are specialized for its target markets:

Desktop Products The company provides desktop RIT's which offer specialized communications options for secure, radio, or cellular operation, and provides an advanced high-resolution camera and shipping cases as standard features. A version of the desktop secure product is being developed for use in classified applications which require special design features and certification by the National Security Agency.

ATR-RIT Products This product is a repackaging of the desktop technology into an industry standard Aircraft Transport Racking (ATR) form factor suitable for mounting in aircraft, marine or mobile environments. The ATR-RIT is offered with both secure and non-secure communications options and may be powered by an optional battery pack or available DC power. The ATR-RIT permits image communications to take place from field locations such as battlefields, airspace or intelligence monitoring sites where conventional packaging techniques would be impractical.

Briefcase Products Test marketing has uncovered a great interest in a portable or "briefcase" version of the RIT for both secure and non-secure applications where portability is a necessity. The packaging technology for the ATR-RIT will be adapted for the briefcase products, yielding a package that will fit inside a standard briefcase form factor, including display, keypad, electronics, battery pack and communications interface. This product will siignificantly increase the market potential of the RIT technology and push the product into applications in which image communications has not heretofore been available. Target field applications include infantry, disaster recovery, paramedic, construction, surveliance and security.

EXECUTIVE SUMMARY

Financial Overview

PHOTOTELESIS anticipates that revenues from its presently identified markets will be in excess of $13 million over the next three years, with near break-even profitability achieved during 1987 on revenue of $1.6 million. Pretax profits are planned to grow to $1.6 million by the end of calendar 1989 on revenues of $7.2 million. These forecasts assume penetration of presently identified markets only and do not include substantial potential for the company's products in other markets which have been tested.

The company's financial projections assume that the corporation is funded with $750,000 by the end of May, 1987. The funds will be used to expand marketing and product development activities, and to ramp up volume manufacturing through a subcontractor.

Notes

The Company

ABOUT THE COMPANY

History

Founded
PHOTOTELESIS was founded in SEPTEMBER 1985 and was chartered as a Texas Corporation in January 1987. The business purpose of the corporation is to address specific vertical markets with customized video transmission products.

Test Marketing
Specific product concepts were successfully test marketed at policy-making levels within NASA, the Pentagon, and Federal law enforcement agencies. User groups within each market sector were also consulted, and specific product specifications were derived.

Product Announcement
The first products were announced at the Armed Forces Communication & Electronics Association (AFCEA) 1986 International Conference & Exhibition in Washington, D.C. in May of 1986.

Development
The first product prototypes, Sec-RIT and ATR-RIT, were completed in January of 1987.

Orders and Shipments
Shipment of the Com-RIT product to the FBI occurred in June of 1986. Initial orders for Sec-RIT and ATR-RIT were taken in October and November of 1986, respectively.

Organization
Additional marketing and financial expertise were added when it became apparent the business opportunity was there. In December of 1986, a corporate strategy and business plan were developed.

NOTE: See product literature in this package for more details about specific products.

ABOUT THE COMPANY

Strategy

Our business strategy
Our business strategy is to take commercially available, "off-the-shelf" products, add our own technology, packaging, and marketing expertise, then sell to our customers. We will make use of contract personnel when appropriate to keep overhead costs down. Here's how it works:

Suppliers
Suppliers provide us with commercially available products, such as

- Image communication subassemblies
- Video equipment
- PC's and PC peripheral equipment.

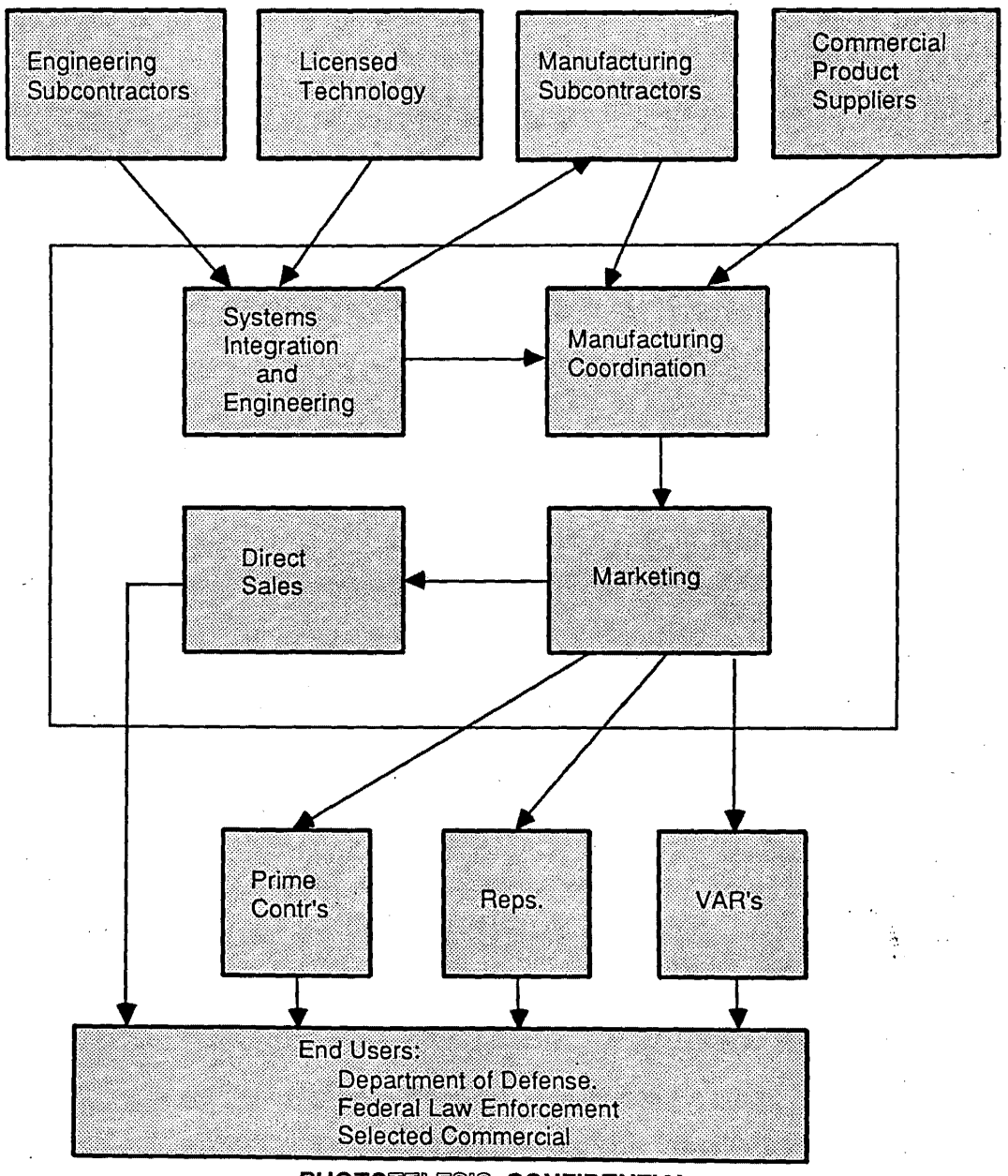
PHOTOTELESIS
Then we add our own technology and packaging to create our product. And we market these products to our vertical market sector.

Contract Personnel
We use contract professionals where possible. In particular, this is appropriate for legal work, certain engineering work, technical publications, documentation, advertising, and manufacturing.

As a result, we can produce specialized products from off-the-shelf products at very competitive prices. We offer these products through a variety of distribution channels. By using contractors where possible for our needs, we greatly reduce overhead costs.

ABOUT THE COMPANY

Strategy Illustration



ABOUT THE COMPANY

Organization

Present Organization
Presently our staff includes:

- David Monroe, President
- Larry Glidewell, Marketing and Sales
- George Leonard, Marketing and Sales
- Mike Huffman, Finance and Administration
- Eric Schweppe, Engineering

Planned Expansion
During 1987, we plan to add these staff functions:

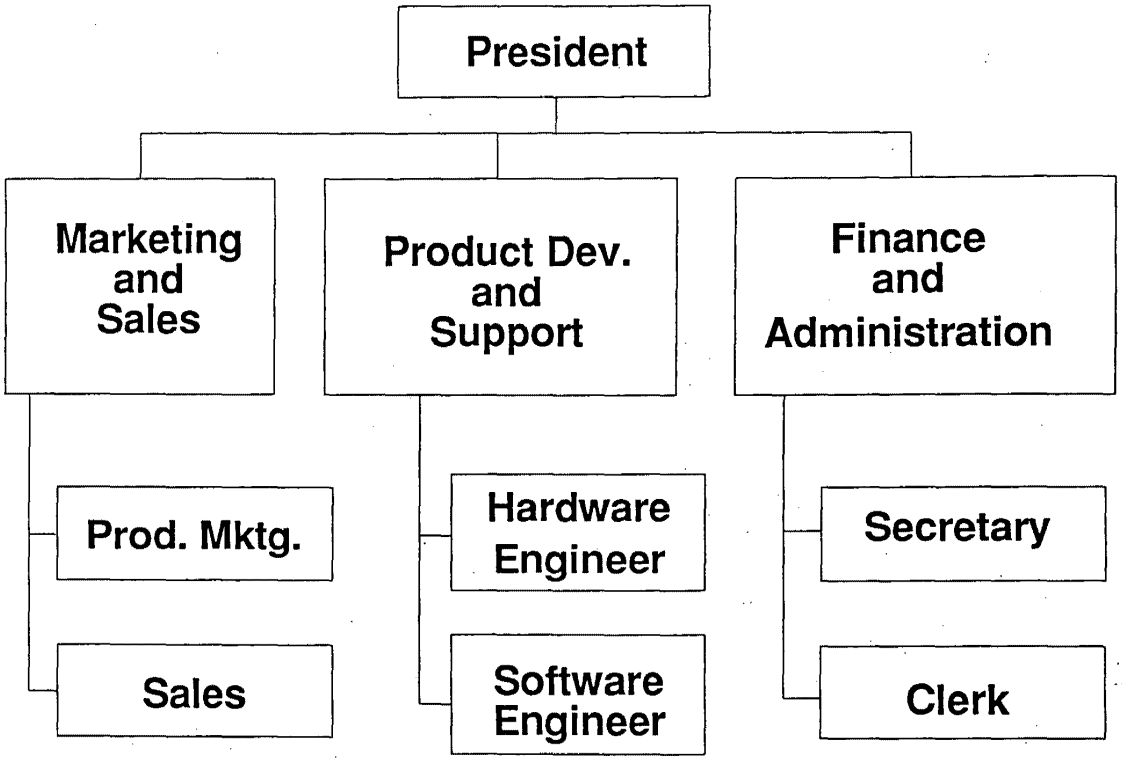
- Hardware Engineer
- Software Engineer
- Secretary
- Clerk

External Functions
These functions will be handled by contract personnel:

- Manufacturing
- Government Contract Development
- Customer Service
- Accounting and Legal
- Technical Publications and Documentation
- Engineering Services

ABOUT THE COMPANY

Organization Chart



ABOUT THE COMPANY

Management Profiles

The PHOTOTELESIS executive team contains the key strengths in management, finance, engineering and marketing that are required for success in the high technology systems field. This section presents brief profiles of each individual on the team.

David A. Monroe
David Monroe, 34, has worked as an engineer and scientist throughout his career, from individual contributor positions progressing to President and Founder of PHOTOTELESIS Corporation.

Prior to starting PHOTOTELESIS, Mr. Monroe was Vice President and Co-Founder of Image Data Corporation, where he developed the PHOTOPHONE video telephone product from concept through manufacturing startup and product introduction.

Mr. Monroe was previously Vice President of Office Graphics Systems of Datapoint Corporation, where he was responsible for the management of several of Datapoint's most complex development programs, including the company's Laser Printer, Color Graphics System, Impact Printers and Facsimile products. Prior to Datapoint, Mr. Monroe was Principal Engineer with Mnemonics, Inc., a San Antonio and Sunnyvale-based startup in the field of solid state memory systems.

As President, Mr. Monroe brings vital skills in management of high-technology startups, including research and development, product and market strategy, and general management of electronics and computer products companies.

Mr. Monroe's educational background includes Undergraduate curricula in Physics and Computer Science, University of Kansas, 1970-1973, Wharton Short Course on Finance, 1979, and AMA Management Course, 1980.

ABOUT THE COMPANY

Management Profiles

Larry P. Glidewell

Mr. Glidewell, 35, has a varied professional background in communications, organizational development, training, and marketing. Mr. Glidewell created the marketing function at PHOTOTELESIS to conduct the market research and test marketing required to define the business opportunities for the company's technology.

Prior to PHOTOTELESIS, Mr. Glidewell was a partner in Interactive Video Solutions in San Antonio, where he developed the marketing opportunity for computer controlled laser videodisc technology in the military and goverment markets. Mr. Glidewell previously was Founder and President of MAP Development in Houston, which was a pioneer in the use of interactive video and computer aided instruction for the oil and gas industry. Prior to this, Mr. Glidewell held management positions at NL Industries and Modern Management Methods in industrial and business training and development.

Mr. Glidewell's background provides the company with key strengths in management, business and marketing, as well as specific expertise in the application of high technology videodisk and teleconferencing systems in business.

Mr. Glidewell's educational background includes a B.S. in Communication, 1973, and an M.A. in Organizational Development, 1975, both from Oklahoma State University.

ABOUT THE COMPANY

Management Profiles

Michael L. Huffman
Mr. Huffman, 37, has an extensive background in finance, accounting, administration, and planning. Mr. Huffman joined PHOTOTELESIS to assume the management of the financial and administrative operations for the company.

Prior to this, he was Director of Finance and Administration for Network Standards Corporation in San Antonio, where he managed all financial, accounting and administrative operations for the company. Previously, Mr. Huffman held management positions in finance and administration at Datapoint Corporation, where he was actively involved in both marketing and product development functions. Prior to this, he held positions in financial analysis and business development with Duncan Smith Co. and Electronic Data Systems.

Mr. Huffman brings excellent credentials and experience to the company in the management of finance, accounting and planning functions, with specific expertise in high technology businesses.

Mr. Huffman's educational background includes a Bachelor of Arts and a Bachelor of Science in Civil Engineering from Bucknell University, 1972, and an MBA in Finance and Management from the University of Texas, 1978.

ABOUT THE COMPANY

Management Profiles

George L. Leonard

Mr. Leonard, 37, has a varied background in high technology electronic systems that includes product development, product management, marketing and sales. He joined PHOTOTELESIS to provide additional emphasis in the marketing and sales of the company's products.

Prior to joining the company, Mr. Leonard was Director of Marketing and Sales, Advanced Products Division, for Datapoint Corporation, where he managed the market research, introduction and marketing activities for a new generation of desktop networked video conferencing equipment. Previously, Mr. Leonard held various management positions in product marketing, product development and planning for Datapoint's office automation product line. Prior to this, Mr. Leonard was engaged in product development and engineering management at Basic Four Corporation, Panhandle Eastern Pipeline, and GeoSource International.

Mr. Leonard brings key skills to the company in sales, marketing, and product management, with specific expertise in the field of desktop video conferencing.

Mr. Leonard's educational background includes a Bachelor of Science, Electrical Engineering, 1972, and a Master of Electrical Engineering, 1973, both from Rice University.

Notes

The Market

THE MARKET

Background

Initial Marketing Contacts

In the fall of 1985 PHOTOTELESIS became interested in the possible application of video telephone technology in the Department of Defense. Through an association with General Doyle Larson, USAF (Ret.), introductions were made to Donald Latham, Assistant Secretary of Defense, Communication, Command, Control, and Intelligence.

After an initial briefing on the product in Washington, Mr. Latham was sufficiently impressed with the product that he arranged a briefing with General Rice, Chief of Joint Special Operations Command, and General Perroots, Director of the Defense Intelligence Agency, and their staffs, to introduce them to the image transmission capabilities that PHOTOTELESIS had to offer. This meeting, although scheduled for only twenty minutes, lasted for two and a half hours.

What We Learned

The need for image transmission was well known at the policy levels represented in the briefings, and there was significant interest expressed for products which could provide this need. Mr. Latham was a strong proponent for the military buying and, if necessary, modifying existing commercial equipment rather than incurring the time and expense of developing specifications for bid with large companies that specialize in custom government products. Our product not only fit his model of acquisition and cooperation with the corporate sector, but also fulfilled a need within the C3I (Communication, Command, Control, and Intelligence) community, which is involved in communications across all branches of the military.

We learned that several changes to the standard desktop product would be necessary for widespread use within the C3I arena. First, the unit would have to be made compatible with standard encryption devices (known as COMSEC, for Secure Communications), already in use in the military. Second, the product would have to be modified to meet a government standard known as TEMPEST, in order to permit it to handle classified information in a manner that could not be detected electronically by enemy groups.

We also presented a prototype of a portable image transceiver which fit in a briefcase. There was a great deal of interest in this product for use in the field where small size, battery power and radio or satellite communications is required.

THE MARKET

Background

Results

Based on the positive reception to our product concept, we were given points of contact within specific user groups and encouraged to discuss our capabilities and their requirements for image transmission products. We concluded that discussions and demonstrations with these groups would allow us to test whether there was indeed a market opportunity for our products.

THE MARKET

Test Marketing

Objectives

The enthusiastic reception to our products in the C3I market convinced us that a project should be initiated to test the overall market firsthand. The use of image transmission technology in this market was so new that there was no market research data readily available, but we determined that collecting primary market data from potential users would be even more valuable. The objectives of the market test were to determine

- the user needs and potential volume for image transmission products
- how the government would go about purchasing the products
- what competitive products might already exist
- what features and pricing would be required

Initial Product Demonstrations

Initial user groups that were contacted within the C3I community included the National Security Agency, Joint Chiefs of Staff, Special Operations Command Atlantic (SOCLANT), FBI, NASA, Secret Service, White House Communications, Defense Communications Agency, Defense Intelligence Agency, and groups from the Department of the Army. We held additional briefings in Washington with Army Intelligence, Drug Enforcement Administration, U.S. Postal Investigation Service, Voice of America, Joint Special Operations Agency, and Army Psychological Operations.

The information that was collected from presenting the product to these user groups confirmed that there was a substantial market opportunity for off-the-shelf image transmission equipment. The requirements for COMSEC compatibility and TEMPEST certification were also validated by these groups. We also collected additional information on the need for units that could operate in mobile or portable applications, communicating imagery back to a central "base station" Many groups indicated that the product concept and price range was superior to other imaging products available to the government, and that in fact there was no incumbent product in widespread use.

THE MARKET

Test Marketing

Placement of First Units

The test marketing activities led directly to purchases of initial units from the FBI and Army groups located at Ft. Eustis and Ft. Belvoir. Ft. Bragg SOCLANT, who provided valuable information in defining product features and assistance in compatibility testing, took delivery of the first two prototype encryption-compatible units, which would later become the Sec-RIT. The FBI purchased two units for evaluation, including the first delivery of a unit later called the Com-RIT that could transmit images from a vehicle over cellular telephone. An Army group awarded us a contract for a unit that could be mounted on an aircraft and transmit images over satellite-based secure voice equipment to a distant command center.

Conclusions - the Opportunity

Several conclusions were evident from the market test. First, there appeared to be a substantial immediate market opportunity in the groups that were sampled for a relatively low-cost, off the shelf image transceiver. Although the purpose of our test marketing was to gather information, we received orders in addition. There did not appear to be substantial entrenched competiton for encryption-compatible image transceivers that could operate over existing voice communications facilities. Although more market data was needed to properly measure the total opportunity, there was enough primary data available from talking to prospects and initial customers to justify moving ahead with a major product announcement.

Conclusions - Product Requirements

Second, specific product modifications in the packaging and communications areas were mandatory to allow interested groups to use even evaluation quantities of units. We concluded that three product families would be required:

- desktop units, for command centers and other stationary installations
- mobile units, for use in vehicle, aircraft or marine platforms
- portable units, for personal use anywhere in the field

Each of these families had to operate over existing secure voice communications systems, and at least the desktop units would have to meet TEMPEST standards to address the broad market. We also saw needs for networking these products together, to allow for multi-site briefings or access to remote image databases.

THE MARKET

Test Marketing

We concluded that this product line could meet broad-based needs in defense or federal law enforcement markets, where, combined with existing communications, complete image networks could be constructed. This concept is illustrated in the accompanying diagram.

Conclusions - Applications

Many of the applications that we found for our products are in the intelligence community for use by analysts who deal with image-based information on a daily basis. While the specific applications of our users are classified, some of the areas of use include :

- real-time collection and dissemination of reconnaissance imagery from video or radar-based sources
- remote access to documents, drawings, maps, or technical illustrations
- multi-site briefings with graphic support
- communication of images from stationary imaging systems to remote sites
- remote access to image archives for personnel identification, medical records, or intelligence files
- real-time visual access for remote expert consultation and problem solving

Conclusions - Marketing

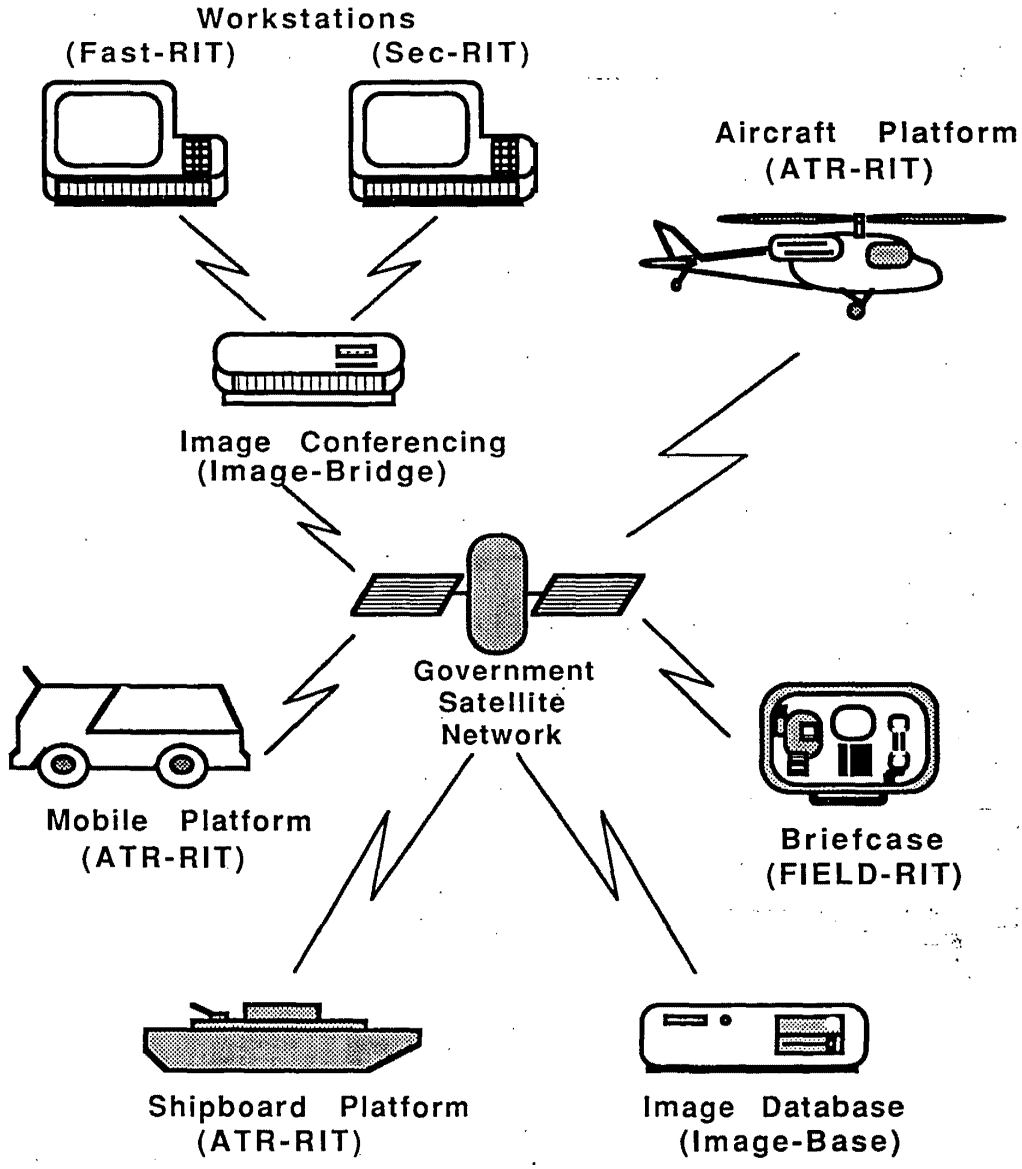
We discovered that the user community that was interested in our products was tightly knit because of common requirements, so that initial success in one group could spread by word of mouth to other groups with similar needs. *As a result, it looked like a small but highly focused marketing effort could be highly productive.*

We also discovered that interoperability, a term for the ability of different communications or computer equipment to work together, is a key factor for market success. Because of the different custom imaging systems we found installed, there is no widespread interoperability in place between groups. *We concluded that marketing*

THE MARKET

Test Marketing

This diagram illustrates our products in a typpical customer appiication.



success with one group could lead to requirements for new groups to have compatible equipment.

We also concluded that our marketing success depended on working through a triangular relationship of policy makers, user groups, and contracting officers or acquisition groups. Understanding the overall direction of government programs and gaining the support of the policy makers allows us to select key user groups to address. Placing evaluation, or "seed" units in these groups gains us influence in the development of specifications for future volume contracts. Finally, working through the acquisition groups to win major contracts for our products can create substantial barriers to future competition.

In short, we had found a market niche that had immediate requirements, had funds available to spend, and could be successfully penetrated by a small, aggressive company that could be more responsive to user needs than the established government contractors.

During the test marketing project we demonstrated our products to over thirty user groups who have an application which they are interested in pursuing. These groups form the basis for our 1987 forecast, which is detailed in the Marketing section that follows.

Announcement

In May of 1986, PHOTOTELESIS announced the Sec-RIT and Com-RIT product lines, as well as future directions in portable and TEMPEST qualified units. The products were announced at a major military trade show known as AFCEA (Armed Forces Communications and Electronics Association). There was strong user interest at the show, resulting in over fifty qualified leads for future business. Press releases were published in magazines targeted at both defense and communications audiences which have to date resulted in over 250 leads for Com-RIT and Sec-RIT products. Copies of our press releases may be found in the Appendix.

THE MARKET

Market Statistics

Introduction

During the test marketing campaign, we concluded that additional data should be gathered on the size of the markets we were interested in, and on major policy directions in the Department of Defense that were influencing the market and might be advantageous to us in the future. Since no research reports on image communications equipment in the military was readily available to us, we began to collect statistics through a variety of sources, including books, articles, newspaper stories and personal interviews with highly placed individuals in the military.

Our primary focus remained the C3I market: Command, Control, Communications and Intelligence. Within that umbrella term for all D.O.D. communications programs, we identified three major government programs that were relevant to our market thrust:

- TEMPEST qualified products
- STU-III Secure Telephone Units
- Mobile Subscriber Equipment

Each of these programs is described on the following pages, including forecasts of future market opportunity. Then we will draw conclusions about their importance to our marketing direction.

THE MARKET

Market Statistics

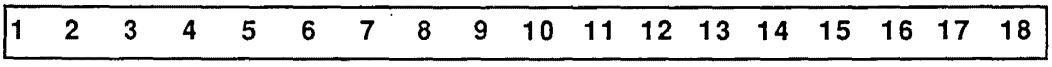
Command, Control, Communications and Intelligence (C3I)
Programs that involve D.O.D secure communications in all branches of the Military are grouped into this classification for administrative control. The Assistant Secretary for C3I reports to the Secretary of Defense, and oversees all policies and budgets regarding agencies, programs, and acquisitions of equipment.

Deployment is accomplished through the Joint Chiefs of Staff to all Military service Command, Control, Communications and Intelligence branches through their world-wide organizational structure composed of CINC's (Commanders in Chief) representing regional and strategic commands. Departments of Army, Navy, Air Force, and Marines may have individual programs, but C3I seeks to ensure inter-service and NATO compatibility.

The growth of budgets for C3I programs provides a broad market opportunity for adding our secure image communications products to D.O.D.secure communications systems.

FY '86 C3I Budgets ($14.298)

FY '87 C3I Budgets ($17.406)



Billions of Dollars

Source: C3I Handbook, P. 262, Defense Electronics, 1986.

THE MARKET

Market Statistics

TEMPEST

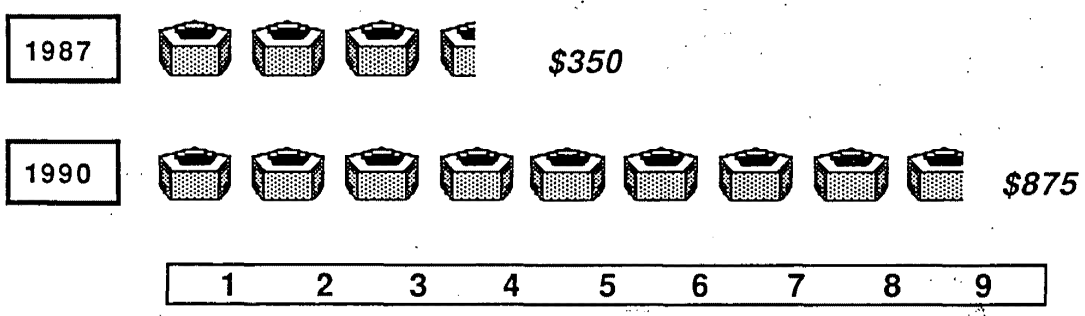
TEMPEST is the Federal government's word for the countermeasures taken on electronic and data processing equipment to prevent them from emitting electronic signals that can be detected by unauthorized persons. TEMPEST requirements are quite common in the Federal government, thus creating an opportunity for TEMPEST qualified image transmission systems.

TEMPEST equipment is required in many office environments in the U.S. Federal government which deal with classified information, and for almost all non-tactical applications outside the U.S. TEMPEST-qualified products command a high price premium in the market compared to comparable commercial versions.

"Government and industry officials are forecasting a steady demand for TEMPEST equipment and services over the next five to ten years.

Current expenditures are $350 million, a number that might easily double or triple by the end of the decade."

We will provide TEMPEST-compatible desktop and portable Remote Image Transceivers to take advantage of the tremendous growth in this market area.



Source: C3I Handbook, Pp 181-200, Defense Electronics, 1986.

THE MARKET

Market Statistics

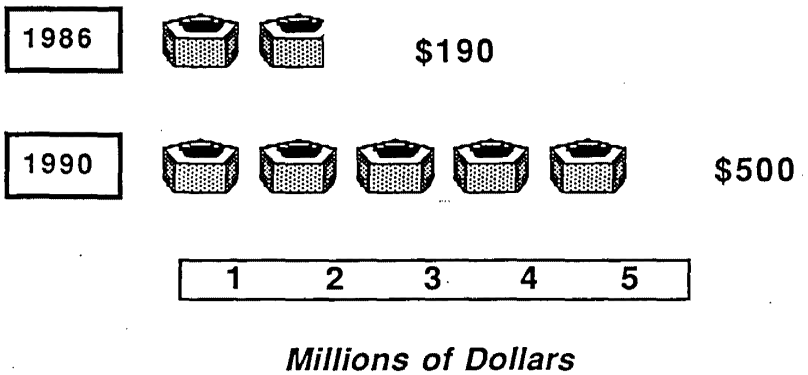
Secure Telephone Units

STU-III is the acronym for the third-generation Secure Telephone Unit program. This program extends to all Federal agencies and contractors, creating a tremendous market opportunity for encryption-compatible desktop image transceivers.

Special Secure Telephone Units (STU's) are being developed and produced under a National Security Agency sponsored program. Initial contracts let in 1986 worth $190 million will allow the secure telephone market to expand from the current STU-II's to up to 50,000 new STU-III's. Ten thousand units will be produced per month and will sell for around $2000. Initial contracts were let to RCA ($84.7M), AT&T ($55.2M) and Motorola ($50.1M). Industry estimates forecast a market size of $500 million by 1990, resulting in an installed base of up to 500,000 units over the next ten years.

Our Sec-RIT product is designed for compatibility with STU-III, opening a vast new market for us as these telephone systems come into use. ***For example, if five percent of the expected STU-III desktops are candidates for image transmission, that represents a total available market of 25,000 units over the next ten years.***

Contracts in Place and Future Growth



Source: The NewYork Times, Tuesday, July 8, 1986
Defense Electronics, March, 1987.

THE MARKET

Market Statistics

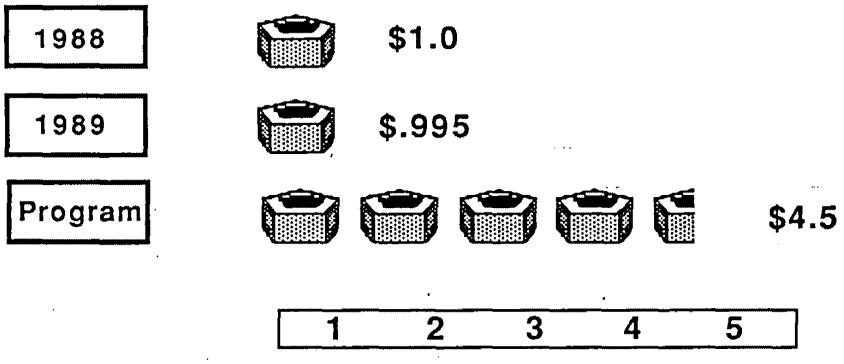
Mobile Subscriber Equipment

The Mobile Subscriber Equipment (MSE) program is a new U.S. Army program which provides vehicular and man-portable communications equipment.

The largest procurement of tactical communications equipment in history, MSE is often described as "the Army's Cellular System". With initial operation scheduled for 1988, the program will provide a worldwide secure switched network for voice, data, teletype, and facsimile communications for digital radio telephone users, switched system subscribers, information processing facilities, and combat-net radio users. This program is slated for expenditures of $1.0 billion in Fiscal 1988 and $995 million in Fiscal 1989. Total program expenditures are expected to top $4.5 billion.

Our ATR-RIT and briefcase product families will be compatible with these new cellular systems. ***If the market for image transmission is only one percent the size of the totoal MSE market, it represents a $10 million opportunity for us in 1988 alone.***

MSE Program Expenditures



Source: C3I Handbook, P.119, Defense Electronics, 1986; Microwave Journal, February1987.

THE MARKET

Market Statistics

Conclusions

Our investigation into these major programs has yielded several important conclusions:

First, the overall C3I market is receiving major funding for communications equipment and is projected to have strong future growth. We have developed direct contacts to policy makers in this arena who are enthusiastic supporters for our products. Moreover, C3I has the organizational focus across all branches to allow us to market our products using a top-down approach without needing a large direct sales force.

Second, the market for TEMPEST equipment is growing at a rapid pace and is projected to continue to do so over the next five to ten years. This indicates a ready market for TEMPEST-compatible versions of our products, important because the broad market opportunities for us are in applications which demand TEMPEST certification.

Third, the STU-III market indicates a major shift in thinking about COMSEC, or Secure Communications, in the Federal Government, from a few expensive units in limited locations to a broad deployment across all branches of the government that deal in classified information. Since these units are just now beginning to appear in the market and are being manufactured in very large quantities, we are well positioned with our COMSEC and future TEMPEST-compatible product line on the leading edge of an important new market.

Fourth, the projected growth in the Mobile Subscriber Equipment market points to a vastly increased emphasis on world-wide military communications in the field. We are well positioned to take advantage of this new market with our secure mobile and portable products.

Taken in total, we have concluded that these programs point to a major market being formed for products which are compatible with the new generation of secure communications equipment. Our research points to strong growth in this market over the next five years, creating a total available market measured in the billions of dollars, and tens of thousands of "sockets" into which we can plug our products. We have already made significant strides in developing compatible products for this market and have focused our marketing resources on tracking and penetrating major contract opportunities for our image-based product line.

Notes

Competition

COMPETITION

Products

Introduction

A key factor in assessing the market opportunity for the PHOTOTELESIS product line is the presence of competition, particularly in the areas of image transmission systems that offer COMSEC compatibility, can operate over existing voice communications facilities, and are offered in TEMPEST versions. One of our best sources of competitive information is our own customers, who have consistently told us that our product concept is unique in the market.

We realize, however, that there are many communications products and systems in the federal government that are competing for contract dollars, even though they may cover a wide diversity of features and price points. This section takes a look at the competitive environment that currently exists and draws several conclusions that influence our marketing strategy.

Video Conferencing Products

Currently, video transmission in the Federal arena is primarily confined to full-motion (i.e. closed circuit television) systems. These systems are installed in expensive, custom conference rooms for use between high-level management groups. The cost per room is usually in the range of $100-250 thousand, and the cost per hour of use ranges from $250-750. Communications lines which can handle the high speed video information between rooms are highly specialized and in short supply. Although some of these rooms operate over encrypted circuits, security remains a significant problem. Some rooms utilize lower-cost freeze-frame equipment which can send still pictures over standard telephone lines, but the equipment is customized for each installation and, like the full-motion systems, complex to operate.

Tactical Imaging Requirements

Many groups within the Federal government deal with image-based information on a routine basis. Military and law enforcement groups who collect images in the field often record the images on video tape, which must then be delivered by courier. Alternately, they use conventional camera technology, which must be developed and printed before the images can be couriered to their destination or sent by facsimile.

The advantages of video transmission are that any image, whether it be a document, object, person, or scene, can be captured instantly from any video camera source. Once captured, the image, now in digital form, is compressed and sent over a standard voice-grade communications circuit.

COMPETITION

Products

Key factors in applying this technology are:

- the resolution, or clarity, of the image received, including documents, objects, persons, or scenes
- the speed at which an image can be transmitted
- the ability of the transmission device to achieve error-free communication
- the ability to use all types of voice communications circuits, including telephone, radio, and satellite, in both secure and non-secure modes
- the ability to operate the device in fixed, mobile and portable environments
- the ability to transmit classified information without risk of electronic detection
- ease of use to minimize training time
- low cost to acquire and operate
- reliability
- off-the-shelf availability

Freeze-Frame Video Transmission Systems

There are two principal vendors providing commercial video image transmission systems to the Federal Government: Interrand Corportation and Colorado Video. There are also two main vendors providing military equipment: Dalmo-Victor (division of Singer), and E-Systems. Detailed comparisons of these products against the PHOTOTELESIS products are presented in tabular form at the end of this section. A few salient points are worth noting here:

- The commercial products, which have been used mainly in conference room applications, are not known to have government-supplied encryption interface capabilities, operate only on standard telephone circuits, are not offered in TEMPEST form, and are not available in versions which can be used in mobile or portable applications.

- The military products are very expensive, not available off-the-shelf, do not operate in a network which permits multi-point briefings or remote image database retrieval, are difficult to use, and are not offered in compatible desktop versions.

In short, although some competitive features are offered by each product, no one product meets all the required characteristics defined above.

Facsimile Products

Facsimile technology provides a way to electronically scan flat images, such as documents or photographs, and send them over ordinary telephone lines. Facsimile technology is capable of high resolution, or image clarity, for black and white images, but suffers in comparison to video techniques where the image has many intermediate levels of gray, such as images of objects, people, or scenes. Facsimile devices attempt to accomodate for this deficiency by using a technique called *half-toning,* which uses closely spaced patterns of black and white dots to simulate shades of gray.

Two military facsimile devices currently in use are the Tactical Field Fax, available from various manufacturers under D.O.D. contract, and the MDFT, manufactured under federal contract by Video Masters. These devices are compared to the PHOTOTELESIS products in a table at the end of this section. The main conclusions of this comparison are as follows:

- Facsimile devices are the preferred alternative for the transmission of documents only, where their high resolution and low cost are significant advantages.

- Facsimile is poorly suited to other kinds of imagery, since the image must first be captured and printed by some other means before it can be fed into the facsimile scanner, a time-consuming process which also degrades the image. Facsimile transfer does not faithfully reproduce the shades of gray in an image, which is vital in many tactical applications including personnel identification, reconnaissance imagery, etc. Therefore, video techniques will be preferred when one device must be usable with a variety of image sources.

- Facsimile protocols are sensitive to communications line quality; "drop-outs" on the line can cause portions of the image to be destroyed, necessitating resending the entire image. The PHOTOTELESIS products use a coding technique known as forward error correction for error-free transmission over a wide range of line quality.

COMPETITION

Products

Desktop Products

Feature	PHOTOTELESIS	INTERRAND	COLORADO VID.
Resolution (pixels)	592x440x128	640X480X256	512x480x256
Speed (seconds)	10-40	10 for partial resolution 80 for full resolution	25
Error Correction	block transmission forward error correction	error checked	no
Transmission	telephone, radio, cellular, satellite	telephone	telephone
Encryption Compatible	yes, programmable	unknown	unknown
Packaging	desktop,mobile, portable	desktop or console	rack mount
Ease of Use	menu based, helps	manual controls	manual controls
Cost	$10,000-24,500	$11,000-75,000	$15,000 est.
Availability	off-the-shelf	off-the-shelf	off-the-shelf

Note: Data sheets are included in the Appendices.

COMPETITION

Products

Military Products

Feature	PHOTOTELESIS	DALMO-VICTOR	E-SYSTEMS
Resolution (pixels)	592x440x128	256x256X256	512X480X256
Speed (seconds)	10-40	3-180	120
Error Correction	block transmission forward error correction	yes	none specified
Transmission	telephone, radio, cellular, satellite	radio, satellite	radio, satellite
Encryption Compatible	yes, programmable	yes	yes
Packaging	desktop,mobile, portable	mobile	two man portable
Ease of Use	menu, help screens	manual controls	manual controls
Cost	$18,500-24,500	$50-100,000	unknown
Availability	off-the-shelf	special order	unknown

Note: Data sheets are included in the Appendices.

COMPETITION
Products

Facsimile Products

Feature	PHOTOTELESIS	FIELD FAX	MDFT
Resolution (pixels)	592x440 per image	204x19per inch	75-300 per inch
Gray Scale	128 levels	4-16 levels	5-33 levels
Input Medium	high res. camera	flat scanner	flat scanner
Speed (seconds)	10-40	7-15	15
Error Correction	block transmission forward error correction	none	none
Transmission	telephone, radio, cellular, satellite	radio, satellite	radio, satellite
Encryption Compatible	yes, programmable	yes	yes
Packaging	desktop,mobile, portable	rack mount, 110v.	two suitcase portable
Ease of Use	menu, help screens	manual controls	manual controls
Cost	$18,500-24,500	$7800-16,800	unknown
Availability	off-the-shelf	D.O.D. contract	unknown

Note: Data Sheets are included in the Appendices.

COMPETITION

Conclusions

We have drawn several conclusions from our analysis of the competition:

First, the PHOTOTELESIS approach to image transmission is clearly different and superior to other solutions on the market. We believe that we uniquely meet all the requirements for success stated earlier:

- we offer high resolution combined with full gray-scale capability that gives excellent image clarity with a variety of subject material
- our transmission protocols achieve error-free communication even with marginal communications channel quality
- we can send a typical image over encrypted circuits in 20-30 seconds, and over standard telephone lines in under 10 seconds
- we use a wide variety of voice communications circuits and encryption devices
- we can operate in fixed, mobile and portable environments
- our TEMPEST version will permit us to transmit classified information without risk of electronic detection
- we offer ease of use through simplified control panels and menu-based operation
- our products are low cost to acquire and operate
- our design has proven reliability
- we offer off-the-shelf availability

Second, although there are different, incompatible products available which meet some of the needs above, our product line meets them all in one family of interoperable products.

COMPETITION

Conclusions

Third, we believe that we can minimize competitive threats from other companies with substantially greater resources than ours by

- offering products which are tailored to meet specific user needs by providing compatibility with a wide range of communications systems and encryption devices
- offering a range of compatible product solutions which can work together
- providing products at attractive price points
- concentrating on penetrating key applications early and establishing our products as the standard, thus locking out competition with incompatible communications protocols

Notes

Marketing

MARKETING

Sales Process

Customer Model

We view our customers and prospects in groups which may be represented as a market pyramid. In an emerging market, penetration occurs at the top of the pyramid where there are a limited number of innovative groups who are eager to purchase state-of-the-art technology. Moving down the pyramid we find larger groups of users, but they are more risk-averse and depend on a more established market before they will commit to purchase. Relating this model to our own customers, we see the market pyramid in four broad groupings:

Advocates

Product advocates are willing to take standard products for Test & Evaluation, then upgrade to meet full requirements. Purchase volumes: 2 units per order.

Early initiators

These users must have encryption-compatible units, but do not need to meet all feature requirements initially. Their applications are limited to CONUS (Continental U.S.) operations, since TEMPEST qualification is required for most work off-shore. Purchase volumes: 2-6 units per order

Test bed users

These groups must prove their products through their own testing and evaluation. Then they will use them in a "test bed" or representative tactical application. They will do their own TEMPEST testing if required. Purchase volumes: 6-30 units per order.

Large groups with established requirements

Volume orders (30-500 units) over a period of time on open contract, through GSA schedule, or in conjunction with a large contract for other equipment. Many applications will require full TEMPEST certification. Contracts are usually associated with a major program, e.g. STU III, MSE etc.

MARKETING

Sales Process

The Role of Product Advocates

The product advocates mentioned at the top of the market pyramid are extremely important to us as we penetrate new application areas for our products. These users are well known for their expertise in communications and have sufficient "clout" to purchase test and evaluation units. They make their reputation by being the first to use a product in a new area, and are eager to participate in product demonstrations to other user groups. They become "inside salesmen" for the product and are invaluable in establishing early successes. We have developed such champions in each of the initial user groups we have sold into and view their role as an important element of our marketing strategy.

Sales Process

We have found that successful sales of our products follow this pattern:

- We identify a potential user group through referrals from policy makers or other user groups. They might be identified by their function within a service group or their association with a major communications program.

- Our customers must meet the following qualifications:

  - funds presently budgeted for imaging systems, either on a line-item or discretionary basis
  - defined requirements in place which either fit our products or can be influenced
  - a high priority assigned to the project
  - active involvement of a contracting officer or acquisition group
  - a visible product advocate

- After initial contact by telephone, and assuming the group meets our qualification criteria, we send out a letter and documentation package tailored to their application.

- A follow-up call after the literature is delivered tests interest and identifies specific applications and requirements. A demonstration and briefing is arranged, at headquarters or the customer site.

- The demonstration briefing is held, with participation from key decision makers and their staff. The demonstration is tailored to their applications. We ask for an order for test and evaluation (T&E) units.
- Based on immediate funds availability, the T&E units are purchased and used internally to evaluate the group's broader requirements.

- Based on use of the T&E units, the user groups develop written requirements and assign a contracting officer to develop the contract. Key issues involving contract type, price, quantitiy, contract options for future purchases, and options for other groups to purchase from the same contract are negotiated. More information about contract development is contained in a later section.

Our strategy is to use the above process as a model for our direct marketing activities, tracking the progress of each account through the steps outlined above. In this way we plan to minimize unproductive use of our marketing resources and maximize our focus on accounts that can be developed into volume contracts for our products.

MARKETING

Pricing

Pricing Strategy

We have set our product pricing based on a value-added premium to the commercial PHOTOPHONE product offered by Image Data Corporation, and our analysis of the competition in our market segment. Our goal is to achieve high product gross margins while offering our products at a substantial price advantage to present competition. Our ability to achieve these opposing goals of high margins and price leadership reflects our belief that we have developed and can defend a market niche that has very attractive potential profitability.

Our financial model assumes that our pricing declines by 10% in the second year after product introduction, and 5% per year thereafter, to account for the effects of emerging competition and continued price reductions in the commercial market. We believe that our gross margins will not be eroded by this price reduction due to manufacturing cost efficiencies as our shipment volumes increase.

Commercial Product

Our Fast-RIT product is priced competitively with the PHOTOPHONE at $10,000, including high-resolution solid state camera and shipping case.

Secure Desktop Products

Our Sec-RIT product is priced at $18,500. We do not offer the secure interface as an optional upgrade to the Fast-RIT since the price premium is greater than the market would bear for an encryption interface alone. We estimate that the TEMPEST Sec-RIT, when introduced in 1988, will have a list price of $28,000, reflecting the substantial premium that TEMPEST products command in the marketplace.

Mobile Products

The ATR Sec-RIT carries a list price of $24,480. Although a high margin product, this price is much lower than anything presently offered in today's market.

Briefcase Products

We estimate that the Field Sec-RIT, when introduced in 1988, will have a list price of $18,500, slightly higher than the 1988 price for the Sec-RIT of $16,650. We believe that offering this product at only a slight price premium to our desktop product, while providing substantial additional functionality, will serve to stimulate this new segment

of our market. This product will be introduced in a TEMPEST version in 1989 for $28,000.

Options and Spare Parts

Each of our products are offered with optional features such as encryption interface cables and video printers. Many of our customers also require on-site quantities of spare parts. While these contribute to our revenues and profitability, our financial model does not include them.

Discounting

Our published pricing does not include discounts for volume purchases. We anticipate that all volume purchases of our units will be by contract, and prefer to negotiate these on a case-by-case basis. We believe we can minimize volume discounting in the initial years due to the lack of substantial direct competition and the relatively small size of anticipated purchase contracts during the Test and Evaluation and Test Bed phases of our market development.

Price and Gross Margin Summary

Product	List Price	Gross Margin %
Fast-RIT	$10,000	41
Sec-RIT	$18,500	67
ATR *Sec*-RIT	$24,480	81
Field *Sec*-RIT	$18,500 (est.)	75
TEMPEST *Sec*-RIT	$28,000 (est.)	70
TEMPEST Field *Sec*-RIT	$28,000 (est.)	70

MARKETING

Sales Status

Background
During our test marketing project we demonstrated our products to a number of user groups, some of whom became customers or placed orders in 1986. We started 1987 with a sales backlog and a growing list of groups who are interested in purchasing our products now that they have reached production status. We also have a list of groups who are interested in our products and are waiting for a product demonstration. Additional prospects have been identified who have received our literature, read a press release, or seen us at a conference. We are well positioned as our marketing activities expand in 1987 with an exisiting customer base and a database of qualified prospects to address.

This is our sales status as of the end of March, 1987:

Current Customers
We have three customer accounts presently in our target markets.

Groups with Orders Pending
A total of five customers have orders presently in progress, one of which is presently booked.

Qualified Prospects
We have demonstrated our products to 42 user groups who have applications for and interest in our products.

Target Organizations
Our database contains over 70 organizations in our target market known to have applications for imaging products. We believe that many of these organizations will yield multiple interested user groups as we address them.

Press Release Responses
We presently have 67 responses from our ***Sec*-RIT** press release to pursue.

MARKETING

Forecasts

Introduction

In this section we will discuss our model of the sales cycle for our products, how we develop our forecasts from this model, the prospect list we are targeting, and our detailed forecasts. We will present our a monthly forecast by product for 1987 and yearly for 1988-1991.

Sales Cycle Model

Purchasing practices in the Federal Government market differ substantially from the commercial market. We have already described the sales process in a previous section. The sales cycle model takes each step of this process and maps it against an approximate timeframe to complete each step. This model has been tested against our experience over the last year and by consultation with individuals who are experienced with government procurement, both on the user and vendor sides:

Prospect Identification

We have at present over 70 groups identified in the Department of Defense, Executive Office of the President, Department of Energy, Department of Justice, Department of the Treasury, and NASA.

Step 1: Prospect Qualification

We qualify the prospect through an initial telephone call before and after sending our product literature. *Elapsed time: one to two weeks.*

Step 2: Demonstration Briefing

Setting up and conducting the demonstration for the key decision makers and their staffs. *Elapsed time: two to four weeks.*

Note: In many cases the first two steps may occur without our direct involvement, as present custmers interest related user groups in our products.

Step 3: Test and Evaluation Units

We close an order for two test and evaluation units and ship to the customer. *Elapsed time: three months.*

Step 4: Contract for Test Bed

Once the test and evalution units are in place, we work with the user group to define their requirements, begin a dialog with the acquisition group who issues the contract, and then go through the contract submission and evaluation process. During this step

we strive to influence the requirements and work toward a streamlined method of contracting (sole source or limited competition). *Elapsed time: five months.*

Step 5: Delivering Test Bed Units

This step involves our lead times and the delivery schedule specified on the contract. *Elapsed time: three months.*

Step 6: Volume Contract
A large contract, or Basic Ordering Agreement, is a lengthy process that results in a competitive contract. This type of contract may involve volumes in the hundreds of units. *Elapsed time: one year.*

In summary, we plan on a four month process with a new account to close and ship our first order for two units, and an additional five months to turn on a contract for ten additional units. A year later we have the opportunity to win a large contract for volumes in the hundreds of units.

Forecast Development Assumptions
We have made the following assumptions in the development of our forecasts:

- We have developed our forecasts by mapping the sales cycle model defined above against our prospect list.
- We expect that approximately forty percent of our revenues for 1987 will come from "test bed" contracts from a few key customers who presently have test and evaluation units in place. We expect that the other sixty percent will come from initial shipments of test and evaluation units to new customers.
- During 1988 we expect the initial seed units to develop into test beds, and additional test and evaluation units for new accounts.
- We have not forecasted large contract volumes until 1989.
- Our forecasts assume that our first year revenues are entirely generated through direct sales.
- During 1987 we will develop indirect channels of distribution which we expect to contribute to our revenues in 1988-1991.

MARKETING

Forecasts

- Our forecasts are for our primary encryption-compatible image transceivers for the government market. Sale of networking products, or sale of non-secure versions of our products into the commercial market, are not included. Spare parts and options, such as cables or video printers, are also not included. Therefore we believe that there is upside potential in our forecasts.

Prospect List

Although we have a large prospect list already generated, we expect from past history that we will add many new prospects through customer referrals, trade shows, advertising, and future marketing partnerships with companies who will represent or resell our products. During our test marketing, we developed a list of over thirty qualified prospects for our products, by agency, department, and contact point.This list is highly proprietary and is therefore not presented here.

The following organizations within the Federal Government represent the market from which our present and future prospects are taken:

- **Department of Defense**
  - Joint Chiefs of Staff
  - National Military Command System
  - Joint Special Operations Agency
  - Joint Special Operations Command
  - Joint Tactical Command, Control, & Communications Agency
  - Unified and Specified Commands (Commanders in Chief)
    - CINCLANT
    - CINCPAC
    - CINCEUR
    - US SOUTHCOM
    - NORAD
    - Space Command
    - Strategic Air Command
    - Tactical Air Command
    - Military Airlift Command
  - National Security Agency
  - Defense Intelligence Agency
  - Defense Communications Agency
  - **Department of the Army**
    - Army Intelligence
    - Army Special Operations
    - Information Systems Command
    - Training & Doctrine Command
    - CECOM

MARKETING

Forecasts

- **Department of the Navy**
  - Navy Intelligence
  - Information Systems Command
  - SEALS
- **Department of the Air Force**
  - Information Systems Command
  - Command, Commmunications, Control and Computers
  - Air Force Intelligence
  - Air Force Special Operations
- **Department of the Marine Corps**
  - Marine Intelligence

- **Executive Office of the President**
  - White House Communications Agency
  - Central Intelligence Agency
- **Department of Energy**
  - Los Alamos Labs
  - Sandea Labs
- **Department of Justice**
  - Federal Bureau of Investigation
  - Drug Enforcement Adminstration
- **Department of the Treasury**
  - Secret Service
- **N A S A**
  - N A S A Headquarters
  - Johnson Space Center
  - Goddard Space Flight Center
  - Jet Propulsion Laboratories
  - Kennedy Space Center
  - Vandenberg AF
  - White Sands Test Facility
  - Ames Research Center
  - International Tracking Stations
    - Goldstone Tracking Station
    - Madrid Tracking Station
    - Australia Tracking Station

MARKETING

Forecasts

Shipment Forecast - 1987

The accompanying chart presents our forecast for 1987. We have made additional assumptions in developing this forecast:

- Shipments for January-May reflect units to present customers and prospects who have been waiting for test and evaluation units. No active marketing occurs during this interval, pending availability of funding to expand marketing activities.

- Shipments of 10 units per month for June-August assume that we are awarded a contract for a "test bed" for our **ATR-RIT**.

- Shipments of 8 units per month for August-November are test and evaluation units placed in 20 user groups that are presently identified. It is assumed that active marketing to these groups begins in May, 1987 after the corporation is funded to expand marketing activities.

- Shipment volumes are forecasted for two products only: the ***Sec*-RIT** and the **ATR-RIT**.

MARKETING

Forecasts

PHOTOTELESIS 1987 SHIPMENT FORECAST

Prod.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Sec RIT	0	1	2	2	1	3	3	7	8	8	18	0	53
ATR RIT	0	1	0	1	0	7	7	11	0	0	0	0	27
Total	0	2	2	3	1	10	10	18	8	8	18	0	80
Cum.	0	2	4	7	8	18	28	46	54	62	80	80	80

MARKETING

Forecasts

Shipment Forecast for 1987-1991

Our five-year shipment forecast is presented in the accompanying chart, including the summary from the 1987 results. Assumptions specific to this forecast are as follows:

- In 1988 we assume that the test and evalution units placed in 1987 grow into test bed units, yielding approximately 200 units from the initial 20 customers. In addition, we develop 20 new customers who order initial test and evaluation units.

- No major contract volumes are forecasted for 1988, but it is assumed that contracts are bid starting in 1988 which will account for significant growth in volumes from 1989 through 1991.

- We begin shipments of our **Field *Sec*-RIT**, or military briefcase product, the first quarter of 1988.

- Our TEMPEST desktop units begin shipments mid-year in 1988. This is followed by our briefcase TEMPEST unit in the first quarter of 1989. Shipments of our non-TEMPEST ***Sec*-RIT** declines as the TEMPEST units become dominant.

- Shipments of the ***Fast*-RIT** product are flat over the forecast period, reflecting a modest level of non-secure product demand, predominately through listing on the Government Services Administration price lists.

MARKETING

Forecasts

PRODUCT SHIPMENTS 1987-1991

Product/Year	87	88	89	90	91	Total
Fast-RIT	0	50	50	50	50	200
Sec-RIT	53	150	100	50	0	353
ATR Sec-RIT	27	100	250	500	700	1577
Field Sec-RIT	-	70	150	300	500	1020
TEMPEST Sec-RIT	-	30	150	500	1000	1680
TEMPEST Field-RIT	-	-	100	200	300	600
Total Shipments	80	400	800	1600	2550	5783

MARKETING

Distribution

Distribution Strategy
Our distribution strategy combines direct sales methods using our own personnel and indirect methods using resellers.

Direct Sales
PHOTOTELESIS personnel are responsible for direct sales. We intend for direct sales to provide the bulk of our business in 1987 because

- our technology is new and complex
- we can provide closer customer contact and better support
- we realize greater profits

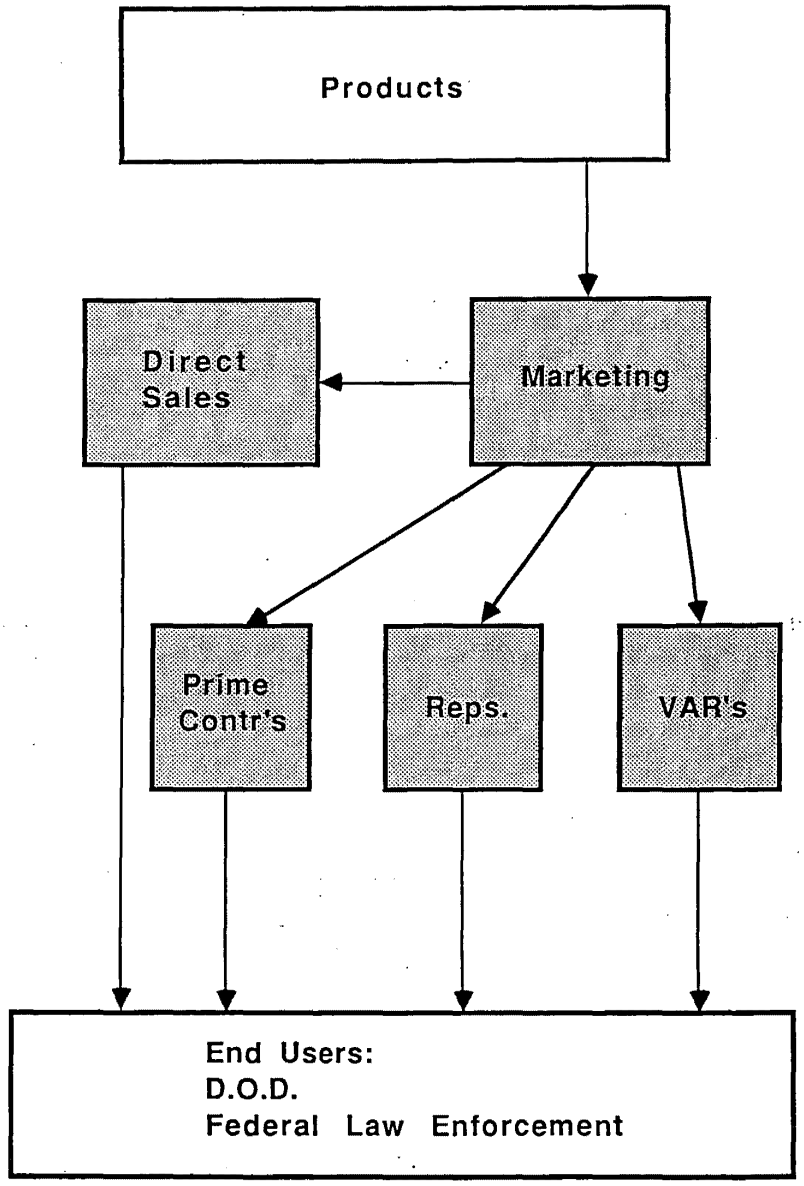
Indirect Sales
We will use indirect sales channels to increase our market penetration without a large increase in marketing and sales overhead. We will select resellers who are well known in our markets, can support our volume requirements, and are willing to provide the level of support and service our customers demand. These indirect channels include

- Manufacturers Representatives
- Value-Added Resellers
- Prime Contractors

MARKETING

Distribution

This diagram illustrates our distribution strategy:



MARKETING

Government Contracts

Small Department of Defense Contracts
Department of Defense purchases for $25,000 or less are handled through oral or brief written requests, known as Request for Quotations (RFQ's). The successful quoter is issued a purchase order, and compliance with the order constitutes contract acceptance and fulfillment. The contracting officer has the discretion to choose how widely the RFQ is solicited.

This procedure can be used by our prospects and customers on a limited basis when purchasing test and evaluation units, although two of our encrypted Sec-RIT or ATR-RIT products exceed the $25,000 order maximum.

Bids and Proposals
However, although these purchase orders represent nearly 98 percent of DOD's contract actions, they are only 20 percent of the procurement dollars spent. The other 80 percent involve formal solicitation procedures that require written offers called sealed bids or competitive proposals. Sealed bids are sought by means of **Invitations for Bids (IFBs)**; competitive proposals are sought by **Requests for Proposals (RFPs)**.

Because major RFPs and IFBs are complex to administer, it may take up to a year for a large contract to be awarded. Shortcuts have been developed which permit the timeframe to be shortened for situations where there is only one source or a limited number of sources for the product or service.

Competitive Unpublished Contracts: Some contracts which have a value under $1 million can avoid publishing the proposed procurement in the government's Commerce Business Daily newspaper. This shortens the procurement cycle and also limits the number of possible responses.

Sole Source Contracts: In very limited circumstances, where a contract requirement can only be filled by one vendor, the contracting office can greatly speed up the puchase by soliciting only one contractor. This method is usually restricted to contracts of $125,000 or less.

We expect that most contracts for our products will be IFBs or RFPs; based on experience, we believe that our product uniqueness will allow many contracts for test and evaluation units or test beds to use a streamlined process.

MARKETING

Government Contracts

Unsolicited Proposals

Some contracts result from unsolicited proposals submitted by groups who feel they have an innovative and unique method or approach to accomplish a DOD mission. We have used this approach in one instance during our test marketing and plan to continue its use as our marketing activities expand.

General Services Administration Contracts

A special type of contract is administered through the General Services Administration (GSA), which provides catalog purchasing abilities on a pre-negotaited basis to government and government-related groups. Many groups who are interested in our products have expressed a desire to be able to purchase limited quantities through the GSA. Orders under GSA are typically limited to $50,000, although this ceiling can be waived under selected circumstances. We plan to introduce our product on the GSA's New Products Listing this year and have applied for a new listing category for image transmission products for future use.

The following chart summarizes the types of contracts described above, the approximate contract lead time, and the typical per order dollar ceiling.

MARKETING

Government Contracts

This chart summarizes the types of contracts that the government will use to purchase our products.

Contract Type	Lead Time	Per Order Limit
Purchase Order	2-3 months	$25,000
Bid and Proposal -SoleSource	3-6 months	$125,000
Bid and Proposal -Competitive Unpublished	3-6 months	$1 million
Bid and Proposal - Competitive Published	up to 1 year	no limit
General Services Administration	none - prenegotiated	$50,000

Notes

Technology

TECHNOLOGY

PHOTOTELESIS Proprietary

Proprietary Technology

We have developed proprietary technology which enables us to meet the needs of our customers for image communications products. Our investment in market research, and our products which reflect that research, represent our uniqueness in the market and the principal barrier to future competition.

We presently own the following proprietary technology:

- COMSEC (secure communicatons) interface designs which enable us to connect with government-supplied encryption devices
- RF-shielded packaging, which enables us to work in environments which process sensitive information
- Radio interface designs, which enable us to connect to non-secure radios and cellular telephones
- Low-power-consumption electronics designs, which enable us to work with DC and battery power
- ATR (Aircraft Transport Racking) packaging, which enables us to work in vehicular environments such as aircraft, ships, and land vehicles.

We are presently developing technology for...

- briefcase packaging
- image database systems
- TEMPEST qualification.

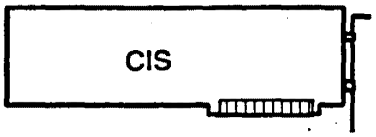
TECHNOLOGY

PHOTOTELESIS Proprietary

Our proprietary technology is contained in these subsystems and products:

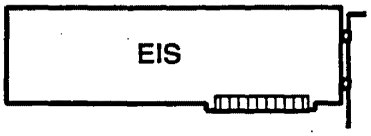
Communication Interface Subsystem

Cellular
Satellite
Two-way Radio



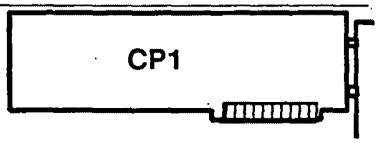
Encryption Interface Subsystem

Ground to Air
Satellite
Line of Sight



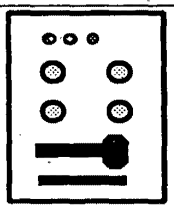
Control Processor I

Forward Error Correction
Custom communications software
Remote control capability



ATR Package

Aircraft Transport Racking spec.
DC or battery power
Ruggedized
Cellular or
Secure



Field Package

Briefcase Portable
Battery powered
Cellular or
Secure

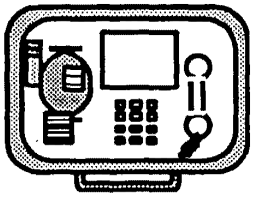
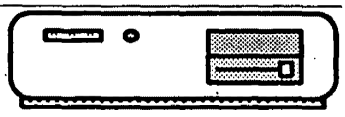


Image Data Base

Software Database
Multi-user
Telephone or Secure



TECHNOLOGY

Licensed

We buy certain off-the-shelf equipment and license certain technology from Image Data Corporation.

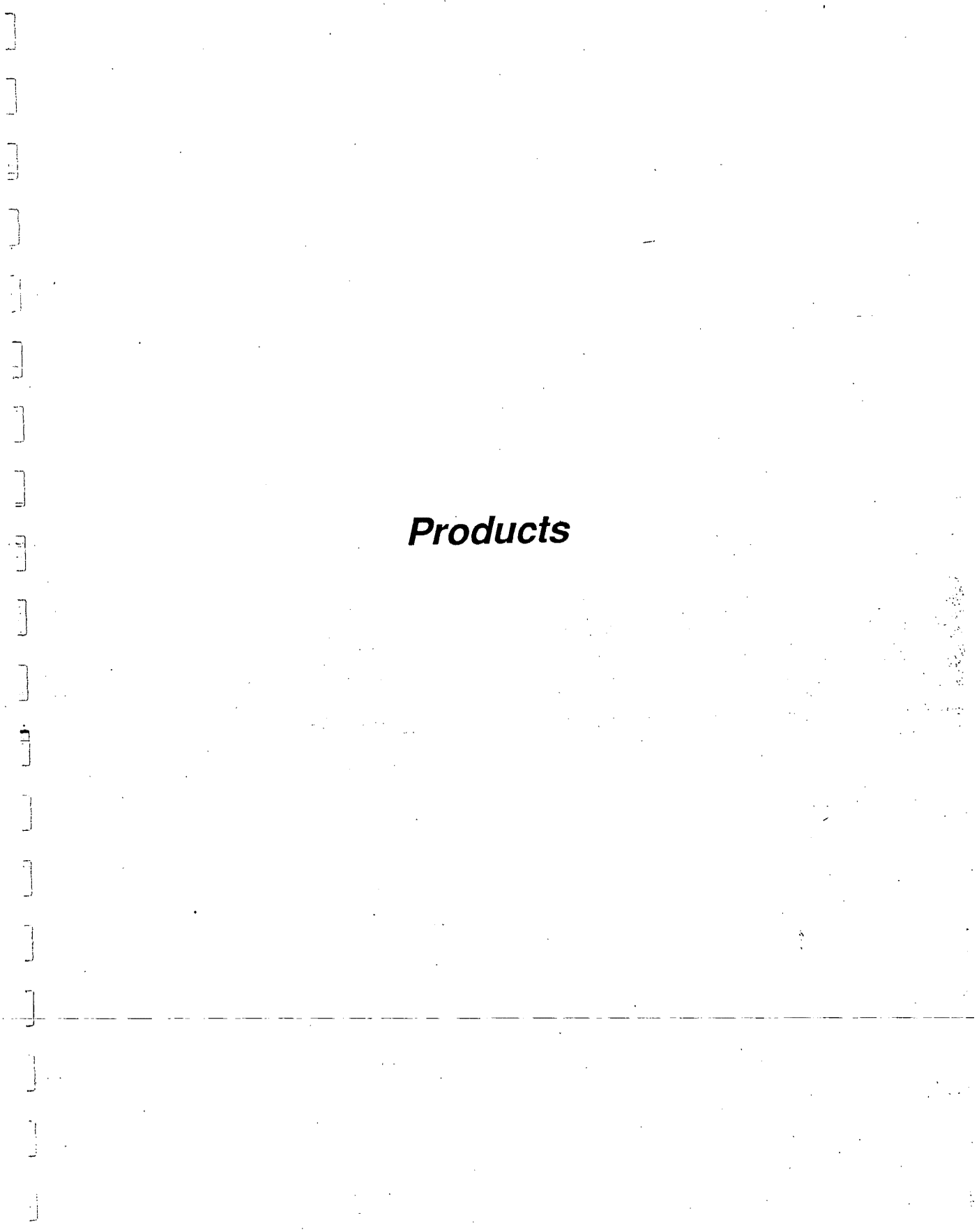
Specific technology we presently license from Image Data includes:

- Processor design
- Video subsystem design
- Software design.

Our unique value added lies in:

- Communications subsystems
- Packaging
- Specialized software.

Notes


Products

PRODUCTS

Introduction

In this section of the business plan we will introduce our products. We will provide a rationale as to how we arrived at our product mix. Then we will give you specific information about each of the products. Finally, we will provide a product availablility schedule showing our product timetable.

Promotional literature containing further information about our products is included in this package for your information.

About our products

Basically, our products consist of a matrix of packaging and communications options. Not all combinations are offered because not all combinations make sense. Essentially, we provide configurations to suit the practical requirements of the government's various combinations of applications and communications requirements.

PRODUCTS

Strategy

Our product strategy
Our product strategy begins with commercially available products, to which we add significant proprietary value. These enhanced products become our product line.

Core Technology
We begin with standard, "off-the-shelf" technology from Image Data Corporation:

- PHOTOPHONE™
- PHOTOBRIDGE™
- PHOTOGATE™

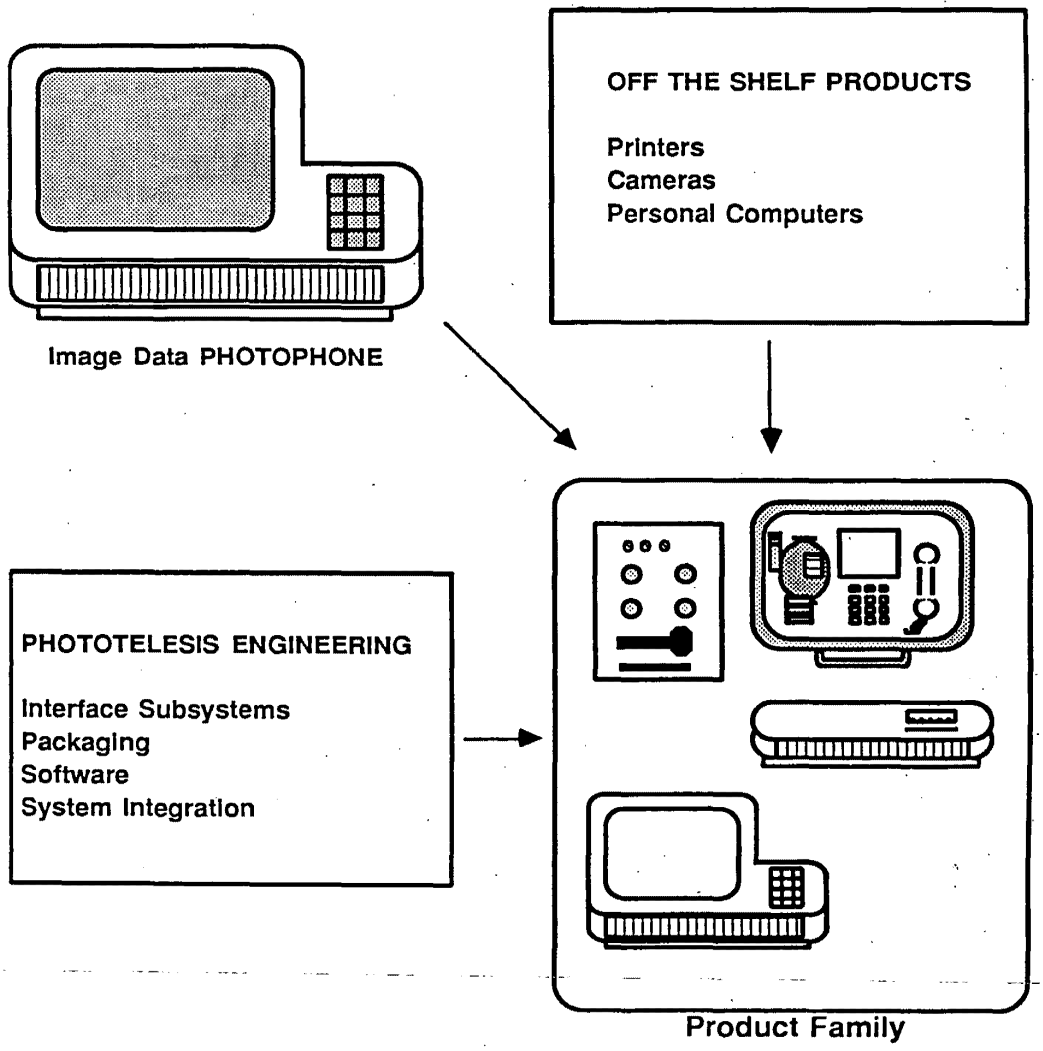
Added Technology
Then, after acquiring off the shelf base units, we develop new designs based on technology licensed from Image Data, integrate off-the-shelf OEM components, and then add our proprietary technology.

Result
The resulting products and systems comprise the PHOTOTELESIS product family. This strategy is illustrated on the facing page.

PRODUCTS

Strategy Illustration

Here, in graphic form, is the product strategy discussed on the previous page.

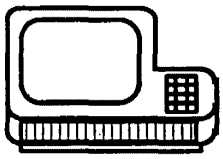


PRODUCTS

Packaging Options

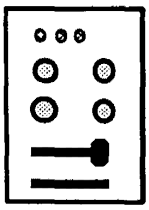
Different appications require different packages; our product line meets those requirements.

Desktop Products:



Our desktop family allows image communications in the office, acting as a "base station" for remote units located in the field.

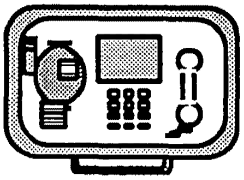
ATR *Products*



Our ATR family puts image communications to work in the field, where it may be mounted on:
- aircraft,
- shipboard, or
- in a vehicle.

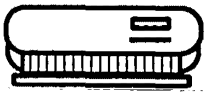
We offer both secure and non-secure versions for many types of existing communications systems.

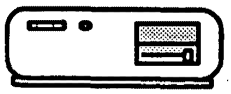
Briefcase Products



Our briefcase family is the ultimate in portable image communications, with battery operation and a full range of secure and non-secure communications options.

Network Products





We meet needs for networking images with:

- ImageBridge, for image conferencing, and
- ImageBase, for remote image storage and retrieval.

Table of Contents

SECTION 1

EXECUTIVE SUMMARY

MicroRIT™ Proposal

2 November 1995

EXECUTIVE SUMMARY

This unsolicited proposal describes a state-of-the-art image transmitter that is specifically designed for field agent applications with handheld and vehicle mounted digital/secure radios. The MicroRIT image transmitter will capture and transmit high quality monochrome or color images over typical radio circuits, such as the Government Saber Secure Radio on the B-Radio net or commercial cellular phone circuits. The MicroRIT is unique because it can transmit a high quality image in ten to twenty seconds from a unit that is small, low power, and *low cost*. This unique capability is currently unavailable and is crucial for field law enforcement applications.

This MicroRIT miniaturized image transmitter proposal is submitted by PhotoTelesis, a Business of Texas Instruments Incorporated. The PhotoTelesis group is a world leader in Tactical Image Transmission technology, and Texas Instruments (TI) is a world leader in Digital Signal Processing technology and Micro Electronics technology. The proven track records and technology bases of the PhotoTelesis/TI combined team places this technically challenging program well within reach.

1.0 The PhotoTelesis Organization Background:

PhotoTelesis has a 10 year history of specialization in Government tactical image transmission. PhotoTelesis is the leader in tactical transmission of monochrome or color imagery, captured from either television or digital cameras over Government secure radios, Government satellite circuits, and commercial cellular and satellite radios.

The company has installed more than 1000 systems within the Army, Navy, Air Force, Special Operations, Federal Law Enforcement, and Intelligence groups. These systems have been used in classified and unclassified operations. The PhotoTelesis name has become well known as the leader in the tactical image transmission field.

The PhotoTelesis comprehensive product line provides users with a full complement of hardware and software, to support operation from various platforms, including:

- ⇒ Man Portable Applications
- ⇒ Covert Operations
- ⇒ Aircraft Platforms
- ⇒ Ground Vehicle Platforms
- ⇒ Portable Base Stations
- ⇒ Fixed Base Stations

The tactical communications functions of the PhotoTelesis products include:

- ⇒ Distribution of images, text and data over all government secure voice bandwidth circuits.
- ⇒ Database Archiving of stored images and text data.
- ⇒ Traditional Data Processing activities in MS-DOS and Windows
- ⇒ Interoperability with Government NITFS 2.0 "National Imagery Transmission Systems"

Distinctive Competence

A unique blend of Independent Research and Development, combined with commercial off-the-shelf technology, has allowed PhotoTelesis to offer products with innovative designs and superior performance at competitive prices. The modular construction of products allows easy technology insertion of hardware and software enhancements lowering life cycle costs.

The success of PhotoTelesis can be attributed to a commitment to service and providing solutions to our customer problems. Our reputation has been earned by focusing our expertise in the following key areas:

• **Reliable/Dependable Transmission of Data.** Imagery and Data can be sent from a harsh tactical environment where air time for transmissions is limited. Users depend upon their equipment to transmit images and data reliably over wideband SATCOM or narrowband communication channels. To compensate for natural and man-made noise, PhotoTelesis' proprietary protocols incorporate error correction techniques and compression algorithms that provide both efficient and reliable transmissions. These message and image transmission protocols are specifically designed for noisy narrow-band radio communications, and are currently heavily used in operations involving Command, Control, Communications, and Intelligence (C4I) applications.

• **Ease of Operation for the User.** The operational simplicity and versatility of both hardware and software design allow non-technical user compatibility with a wide range of cryptologic devices, secure telephones, and radios. The systems are designed to be automatically configured by cable connections reducing hardware damage by operator error. The equipment is built with user friendly interfaces (GUI) or a menu driven screen.

• **Products for Various Platforms.** The company has focused on customer requirements to develop, with IR&D funds, products used on various platforms, i.e., vehicle, aircraft, and man-portable units. This has resulted in building a repertoire of off-the-shelf products for Aircraft, Special Operations, and Law Enforcement.

• **Rapid Product Development.** PhotoTelesis has reduced the time and cost of product development, from product definition through design, development, and pilot production. This is accomplished by significant technology re-use, in conjunction with strong specialized skill sets of the engineering team. The majority of the PhotoTelesis products have been sold as Non-

Developed-Items on Indefinite Delivery Order or Fixed Priced Contracts, thus reducing customer financial and technical risks.

1.1 Texas Instruments (TI) Incorporated Background:

Texas Instruments has diverse capability in micro-electronics, Government, commercial, and consumer products. TI is a high technology company with sales or manufacturing operations in more than 30 countries; a major supplier of integrated high performance EO based fire control systems, high performance processors, thermal sensors, missile systems, and radar components to the U.S. Department of Defense (DoD). The MicroRIT program will utilize several key TI capabilities:

TI is a world leader in Digital Signal Processing (DSP) technology. The DSP is key to the MicroRIT's small size, low power, and low cost. Commercial technology and the capability for high volume production also provide opportunity for significant unit cost reductions, allowing for *extensive* deployment of the technology at a *very affordable* cost.

1.2 The Combined PhotoTelesis/Texas Instruments Team:

On August 18, 1995, PhotoTelesis Corporation was acquired by Texas Instruments Incorporated. PhotoTelesis' expertise with tactical image transmission combined with the financial strength of Texas Instruments offer our customers innovative and cost effective tactical imaging product solutions.

PhotoTelesis and Texas Instruments have a two year continuing history of cooperation and teaming on other Government imagery programs, including the US Army Hunter Sensor Suite program and the Lightweight Video Reconnaissance System (LVRS) program.

PhotoTelesis/Texas Instruments is excited about the opportunity to provide new state-of-the-art capability through more closely integrated efforts on the part of all team members.

1.3 The Program Background:

Tactical Imagery has proven to be the most efficient and quickest means to distribute critical information to the decision maker. Imagery in the field can provide agents with near-real time secure surveillance that improves their situational awareness, suspect identification capability, and thus, reduces allocation of limited personnel resources. Unfortunately, both military and commercial products used for transmission of Tactical Imagery are currently unsuitable for law enforcement because the military products are too large and too expensive, and the commercial products are too large and are not capable of operation over Government tactical radio circuits.

Current-generation Remote Image Transceivers (RIT's) manufactured by PhotoTelesis are in operation over the Motorola digital radio systems owned by the Government for the purpose of transmitting secure (encrypted) imagery from mobile platforms to fixed sites.

Still Imagery is being transmitted using the SABER II, with the Secure INDICTOR option, at 12Kbps. A primary requirement of maintaining minimum data transmission times and a quick restoration of the radio-to-voice communications have been met in product demonstrations of this capability. At a recent test, using the PhotoTelesis man-pack TAC-RIT, monochrome images at a resolution 592 by 440, 8-bit pixels were transmitted in 8 seconds using Wavelet compression, and 21 seconds using industry standard JPEG compression.

This proposal describes an engineering program that miniaturizes the PhotoTelesis current capability into a very small, covert, low power Remote Image Transmitter (MicroRIT) *specifically* designed for agent use. The primary goals for field agent use are:

- ⇒ Very Small Size (Cellular phone size)
- ⇒ Low Power (2-4 watts)
- ⇒ Simple User Interface
- ⇒ Fast Transmission Time
- ⇒ Monochrome or Color Use

SECTION 2

TECHNICAL APPROACH

TECHNICAL APPROACH

Until the advent of small, low power digital signal processor (DSP) semiconductors, the MicroRIT was unfeasible. Now, however, such DSP's allow the design of very small, but highly sophisticated data acquisition and processing devices. In fact, the DSP component is the heart of the MicroRIT, controlling all aspects of its operation from video acquisition, to image compression, to tactical communications protocol, to user interface.

A digital signal processor, or DSP, is a special type of microprocessor that has been highly optimized for numerical computations (namely digital signal processing) which involve long sequences of multiplication and addition operations. Digital filters, spectrum analyzers, and data compression algorithms fall squarely in this category. While the DSP is not often used as a generalized host processor (such as an 80486, Pentium, or 68000), it can certainly be used as a host CPU. Because of the particular hardware optimizations that were implemented for digital signal processing, a DSP tends to have smaller address spaces (under 1 megabyte) and less support for string-oriented operations (for handling character strings). However, several DSP variants can quite easily be used as an embedded controller and signal processor - obviating the need for two separate processors. This often simplifies the hardware design and interprocessor communications mechanisms.

The MicroRIT was conceptualized specifically with a DSP as the system controller in mind to reduce the size and power requirements of the unit. In addition, to controlling the overall system function, the DSP is responsible for controlling the digitization of video, the compression of this captured video, and the communications protocol and link-layer interface. These functions would occur serially. That is, it would not be possible to be capturing video while sending a compressed image at the same time. This one-at-a-time restriction is due to two problems. The first is the limited amount of multi-tasking support in the DSP architecture. Few DSP operating systems are available that support preemptive multi-tasking. The second is the limited address space of the DSP. Many DSP's have a fairly limited address space - often under 64K words! This will require that both the codespace and the dataspace be page-swapped. Page-swapping essentially means that only one software function can be active at a time - which implies the serial nature of the major functions.

2.0 Capturing Video

A conventional frame grabber contains a great deal of circuitry necessary for demodulating the video signal, identifying and triggering off the vertical sync signal, stripping the sync signals from the image data, digitizing the demodulated data, and storing it in a dual-ported RAM. This is required because the host processor has neither access to the raw video signal, nor the processing power to execute these functions in a real-time fashion. The DSP used in the MicroRIT approach, will however, be controlling the video digitization while itself does the vertical sync identification. External analog-to-digital converters (ADC) will still be used to digitize the video signal, rather than using any onboard ADC capabilities of the DSP chip, because most DSP ADC's are not fast enough to digitize at video rates (at least those DSP's that can meet our low-power requirements). Another subtle point about this approach is that video need only be digitized on user demand. This implies that the video ADC circuitry only has to be energized for 1-2 frame times to acquire the image. Video ADC's can consume several watts if left free running. The non-requirement for video output allows this digitization-on-demand

approach that should significantly help reduce size, weight, and heat dissipation, as well as extend battery life.

2.1 Video Demodulation

A color video signal, in particular a composite color video signal, carries the luminance and color (chrominance) information in different frequency bands. Usually, an analog filter is used to separate these signals into two analog channels that can then be digitized separately. In order to save power and space in the MicroRIT, we will perform this demodulation in software running on the DSP after a frame's worth of video data has been captured. Even an S-Video signal carries two color channels on the chrominance signal (which is physically separated from the luminance channel). The same type of *software* demodulation will be done on the S-Video chrominance channel for S-Video. The video demodulation is performed after a frame acquisition, not during. This is significant because it restricts the MicroRIT to performing system functions in a serial fashion. That is, one high level function after another is performed by the central processor (the DSP). There is no multitasking of system functionality in the MicroRIT. This is due in part to the lack of multitasking DSP operating systems as well as the somewhat limited addressing capability of today's DSP's (under 1 megabyte of codespace). Thus, after the user specifies that an image is to be acquired, the video digitization circuitry powers up, acquires a frame of video data, and passes control to the video demodulation software which then separates luminance from the color signal by a digital filter.

2.2 Image Compression

After the image has been digitized, separated, and demodulated by the system DSP, it will be compressed with either the JPEG or PhotoTelesis wavelet image compressor. This choice is user selectable (via the set of buttons and alphanumeric display). The wavelet compressor is well suited to the S-Video type of input since it was designed to work on L/Cr/Cb video data. Like all other PhotoTelesis implementations of the wavelet codec, the user will be able to select several choice of compression ratio and/or "quality". PhotoTelesis is constantly improving its image compression technology. These improvements affect compression/decompression time and image quality. They also affect compression features such as, quality specification (Q-Factor), multiresolution compression, and industry standardization. The contractor will strive to incorporate image compression improvements into the MicroRIT product, subject to the program schedule.

2.3 Image Storage

There will be enough battery-backed SRAM within the MicroRIT to hold 40 wavelet compressed color images. These can be held on-board until downloaded to a host computer via an RS-232 port. Originally, it was conceived to use a PCMCIA SRAM card for this image storage. However, the physical size of the mechanical PCMCIA slot and the extra interface circuitry was not justified. If the images are stored within the MicroRIT, the user will have to bring back something, be it the MicroRIT or a PCMCIA card, in order to offload the images to some sort of Base Station unit. Thus, the SRAM memory was chosen over PCMCIA.

2.4 Communications

The MicroRIT will be able to connect to all standard COMSEC equipment including STU-III's, SINCGAR's, SABER and RACAL (MHSR) radios, KY-57, KY-58, and Sunburst. The DSP processor will run the PTAC and PTAC-2 (required for file pull capability) protocols in order to

be backward compatible with existing PhotoTelesis equipment. The DSP will also directly control all COMSEC control lines (PTT, BDMC, etc.) as well. The DSP and some glue logic will essentially replace the original EIS card of the PhotoTelesis ACT product line.

Note that this version of the MicroRIT will not include the NITFS TACO-2 protocol. There is an assumption that the MicroRIT will be communicating with other PhotoTelesis equipment (i.e., Base Stations) which do have the TACO-2 capability.

Note that the automatic voice/data cutover modes for the KY-57 and KY-58 will not be implemented. Manual data switching will be used.

2.5 User Interface

The user will be able to interface to the MicroRIT two ways: 1) the set of onboard pushbuttons, 2) an RS-232 cable linking the MicroRIT to a host computer. There will be five (5) buttons on the MicroRIT to control normal operation of the system. There will also be an alphanumeric display for status and menu information. The functions on the MicroRIT will include power (on/off), capture, send, and menu. The menu will allow the specification of compression type, compression ratio, protocol, call sign information, send/hold modes, etc.

The RS-232 interface to the MicroRIT will be used for 3 functions: 1) Update system software (stored in FlashRAM on the MicroRIT), 2) download configuration information to the MicroRIT (call sign lists, compression defaults, etc.), and 3) download compressed/stored images from the MicroRIT to a workstation (such as an MIT-301). This will be a very simple RS-232 interface with a subminiature connector on the MicroRIT to the standard 9-pin COM connector on a PC.

2.6 Hardware

2.6.1 Packaging. The MicroRIT is designed to utilize standard snap on cellular telephone batteries. Several battery sizes and capacities are available from telephone retail outlets. The MicroRIT's overall size approximates that of a hand-held cellular flip-phone. High capacity battery life is estimated at 1 hour of full operation, with standby time approaching 30 hours.

The initial design and packaging will be implemented with an aluminum machined case. The finish will be black anodized for cosmetic finish. High volume applications could be done with a plastic injected molded case, but these costs are not included in the funding proposals submitted. A conceptual drawing is shown in Figure 1. The display and interface panel will allow system status and operational menus to be displayed to the operator. There is a recessed subminature-D connector on the bottom edge of the unit that provides all input/output connections. If this unit is used in embedded system applications, external power can also be provided through this same connector. The connector is recessed to prevent damage to the connector by accidental dropping or stricking other objects. The connector is installed on the bottom edge to provide best comfort to the operator when the cable is installed.

This MicroRIT package design will also include the ability to embed this device in higher capability equipment. Examples include radios, portable video equipment, or other equipment including cameras and radio transmission capabilities. This concept is similar to equipment with font cartridges, game cartridges, etc. The operator interface and display panel will not be included on these embedded applications. Power will be supplied through the external I/O connector.

2.6.2 Hardware Implementation. The MicroRIT architecture is based on the Texas Instruments TMS320 series of Digital Signal Processors. This DSP is the core of the design, with additional components providing the input/output interfaces to the operator, external power source, radios/Cryptos, and external computer links. There is one D-subminiature connector that provides these I/O functions. There are 5 control buttons, along with an alpha-numeric LED display for operator control and feedback status. The Overall block diagram is shown in Figure 2.

2.6.3 Memory. The memory implemented in the MicroRIT consists of low-power Static Rams (S-Rams). These memories are page partitioned to provide both program storage, raw video data workspace, as well as compressed video image storage. The design goal is to provide the capability to store a minimum of 40 images of 32K each in compressed image size. The architecture provides one memory page per image when storing compressed images.

2.6.4 I/O Ports. There are 2 input/output Serial ports incorporated into the design. One is designated for communication over radios, Crypto's, and STU type telephone devices. The other is intended for interfacing to other standard RS-232 computer devices such as Global Positioning Systems, some camera devices, and personal computer links for downloading image data or downloading operating program software. If the system needs to be reprogrammed for different mission requirements, the planned mechanism is to download from any serial computer device, the operating parameters and program software. If the user elects to save images, rather than send them immediately, these saved images could also be downloaded from the internal S-RAM memory via this serial port.

2.6.5 Power Sources. The MicroRIT is powered from either an attached cellular phone compatible battery, or via external power input through the I/O connector. For extended operating times, the external power mode is used. The input DC voltage range is 5.5-8.0 volt.

SECTION 3

COST

COST

The project represents a significant development effort with a medium level of risk. The contractor is keenly aware of the budget constraints and has taken steps to reduce the government's cost. The proposed cost has been reduced by the contractor's program investment of $576K and utilization of the contractor's Image Compression and Communication Software, which was previously developed with IR&D funds.

The development effort is allocated into hardware engineering and software engineering as follows:

Hardware	$661,093.80
Software	$984,492.21
Total Development Effort	$1,645,586.01
Less:Contractor's Investment	($645,586.01)
Cost to government	$1,000,000.00

Upon completion of the project the government will receive 2 prototypes. The production cost per unit is targeted to be $3,000.00-$4,000.00 in lot sizes of 100. Cost reductions are possible by tooling the cage for plastic injection molding based upon higher volumes.

3.0 Schedule

The contractor anticipates the project will require 12 months from inception to prototype delivery. After prototype delivery, unit production could begin immediately. Attached are program schedules for Hardware and Software.

3.1 GFE

The contractor will require two SABRE II radios for testing during the program.

3.2 Personnel

The contractor will assign two Engineering managers and one program manager to this project. Their resumes are attached:

SOFTWARE

Dr. Bruce Mather.....Manager of Software Engineering

ELECTRONICS HARDWARE

Roger Vest.....Manager of Hardware Engineering

PROGRAM MANAGEMENT

Bill Kidd.....Program Manager

3.3 Attachments:

1. Micro-RIT Technical Specifications
2. Block Diagram
3. Drawing
4. Program Schedule
5. Detail Costs

SECTION 4

PRODUCT SPECIFICATIONS

MicoRIT Functional & Physical Specifications

Video Input:	Color/Monochrome Composite/S-Video 640 x 480 x 16-bit color (8-bit grayscale) 768 x 512
Image Storage:	Onboard flash (or battery-backed SRAM) for 40 + compressed color images (@32K)
Video Output:	None
Audio:	Digitized voice annotation will be provided
Comms:	PTAC (KY-57, Sunburst/STU-III, Sincgars, Saber)
RS-232 Interface:	External GPS receiver, S/W update, offload images, system configuration (call sign download, etc.)
User Controls:	Five (5) buttons - (1) On/Off and (4) controls: On/Off switch, Call Sign Select, Grab Image, Send Image, Settings (scrolls menus)
Display:	5x7 dot alpha-numeric low power green LED's (like cellular phones) One (1) flashing "battery low" LED

* User Controls & Display are optional for embedded applications (i.e., RIT can be built without them)

Power:	2-4 watts @ full operation (idle mode when not doing imaging portion)
Battery:	Internal battery and/or external power 30 hours idle, 1 hour operational Disposables or Rechargeable (like cellular phone)
Weight:	1 pound (plastic) 1.5 pounds (metal)
Size:	1" x 4" x 3" (Hand-Held Cellular Size)
Temperature:	-20° to 50° C

System does only one function at a time:

Grab image	one frame at a time
Color demodulation	
Image Compression	< 5 seconds (to grab, demodulate, and compress)
Store image (40+)	< 1 second per image
Send Image	12Kbit line - 15 seconds goal for image xmit; up to 64Kbit comm link

Modem functions - built in FEC

Remote Control (configure) capability:

- New call signs
- Set compression ratio
- Snap picture
- Retrieve image

SECTION 5

DRAWING AND BLOCK DIAGRAM

Figure 1 - Micro ™ Drawing

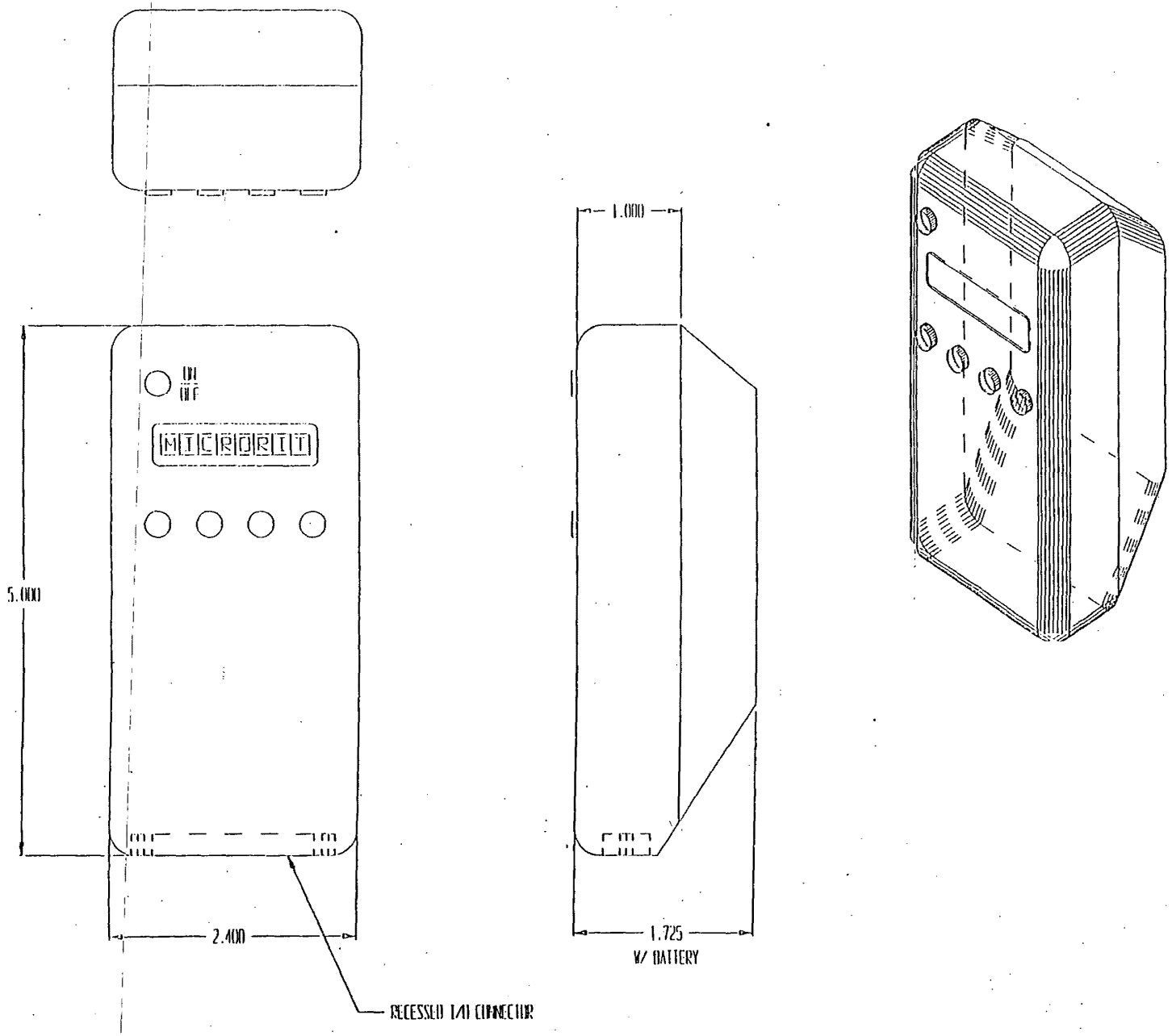
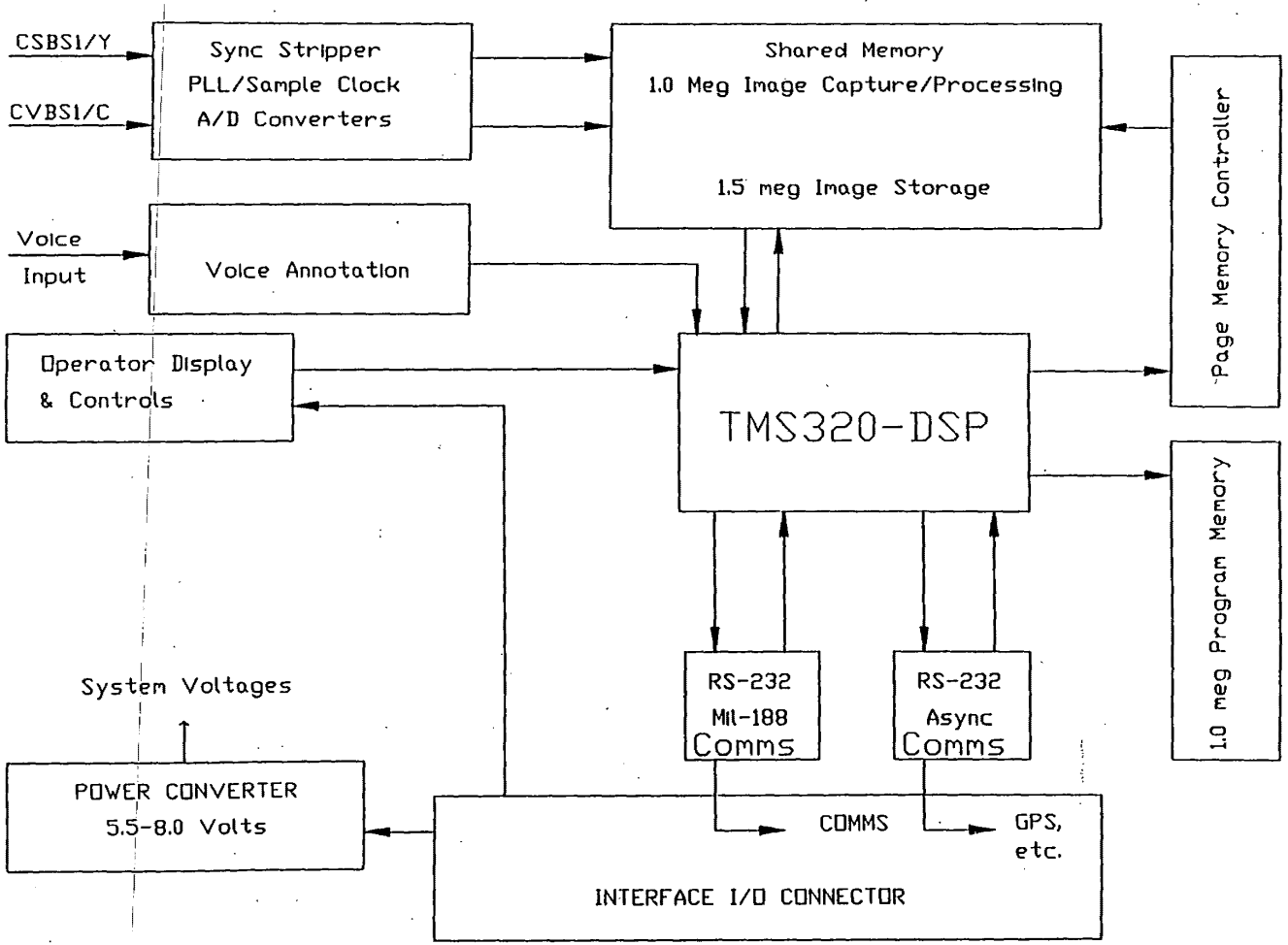


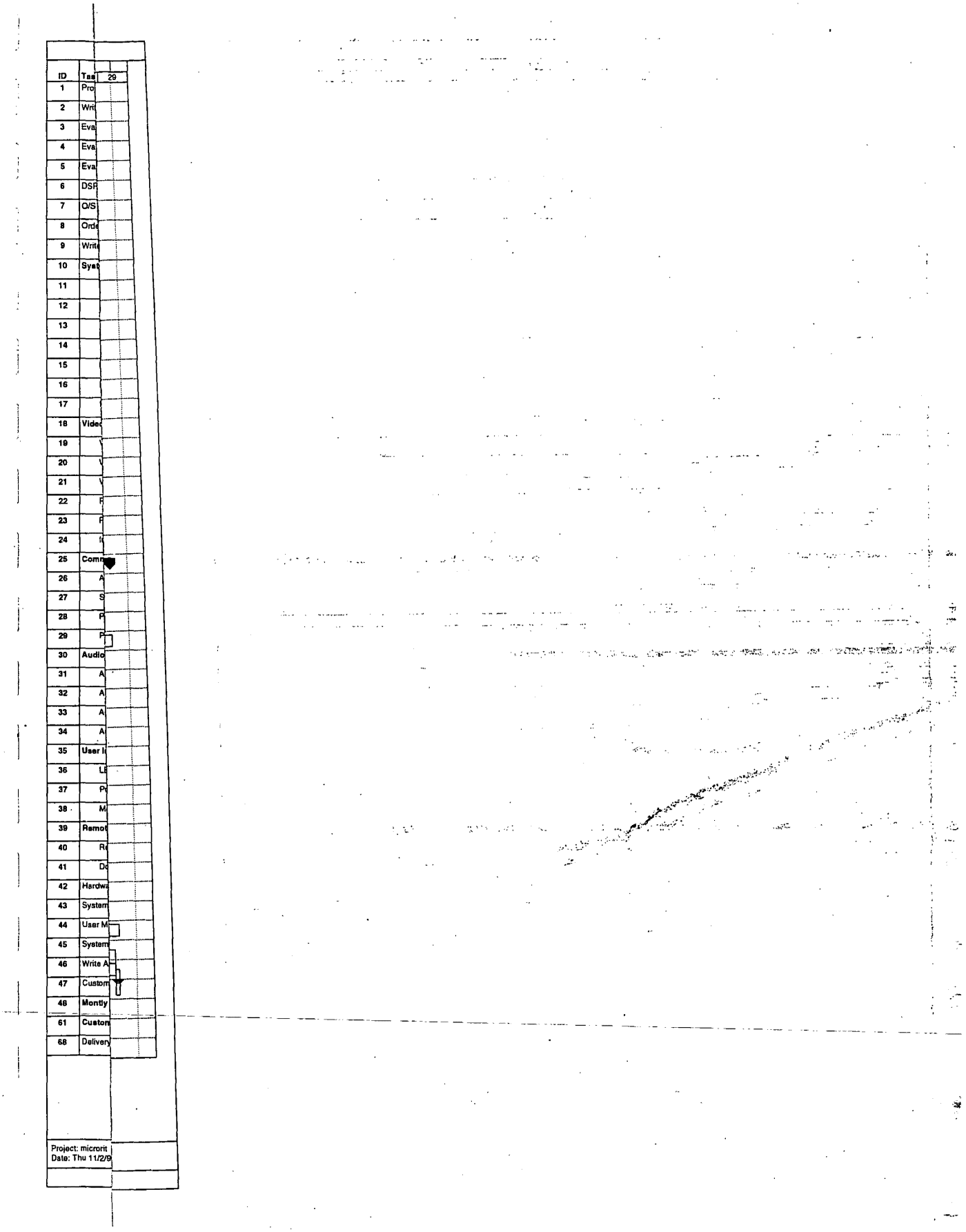
Figure 2 - MicroRIT™ Block Diagram



MICRO-RIT ™ BLOCK DIAGRAM

SECTION 6

SCHEDULE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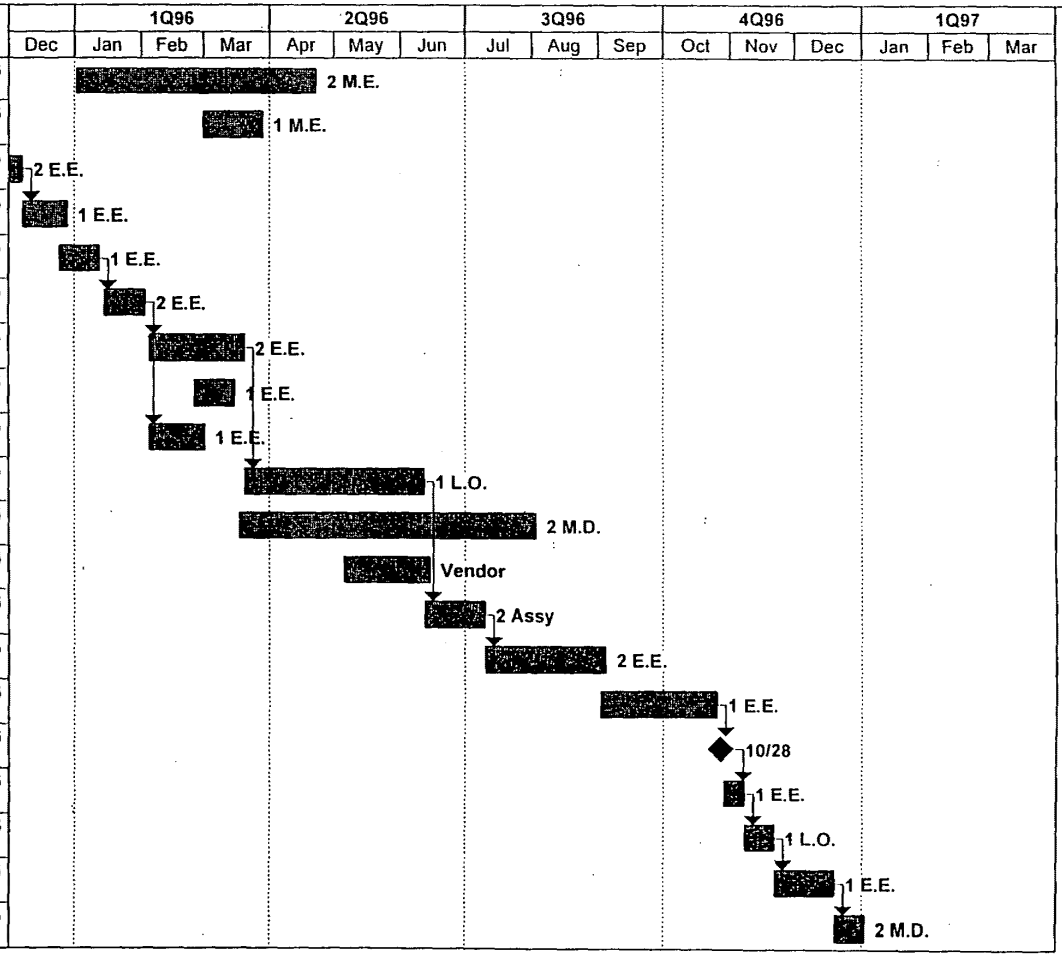
Project: microrit
Date: Thu 11/2/9

MicroRit Hardware Development

ID	Task Name	Duration	Start
1	Package Design	16w	Tue 1/2/96
2	Control Panel & I/O Interface	4w	Fri 3/1/96
3	DSP Evaluation/Selection	1w	Fri 12/1/95
4	Block Diagram	3w	Fri 12/8/95
5	Engineering Specs	3w	Mon 12/25/95
6	Component Selection	3w	Mon 1/15/96
7	Schematic Design/Capture	6.5w	Mon 2/5/96
8	Power Heat Analysis	3w	Mon 2/26/96
9	Interconnect & Cabling Design	4w	Mon 2/5/96
10	PWB Artwork Layouts (3 ea)	12w	Wed 3/20/96
11	Documentation	20w	Mon 3/18/96
12	Prototype Build (FAB)	6w	Mon 5/6/96
13	Prototype Build (Assy)	4w	Wed 6/12/96
14	Prototype Checkout	8w	Wed 7/10/96
15	System Integration H/W-S/W	8w	Mon 9/2/96
16	Prototype Delivery (2 ea)	1d	Mon 10/28/96
17	Schematic Updates (Pass 2)	1.5w	Tue 10/29/96
18	Artwork Updates (Pass 2)	2w	Thu 11/7/96
19	Assy/Checkout (Pass 2)	4w	Thu 11/21/96
20	Pass 2 Updates/Release	2w	Thu 12/19/96



SECTION 7

COST DETAIL

MICRO-RIT
PHOTOTELESIS

Micro-Rit

Hardware

	Hours	Rates	Labor $	Materials	Overhead	Total Cost
Mechanical design						
Packaging	1040	$26.62	$27,684.80		$69,212.00	$96,896.80
Control Panel & I/O Interface	160	$27.47	$4,395.20		$10,988.00	$15,383.20
Electrical design						
DSP Evaluation /Selection	80	$30.52	$2,441.60		$6,104.00	$8,545.60
Block Diagram	120	$30.52	$3,662.40		$9,156.00	$12,818.40
Engineering Specifications/ Updates	240	$30.52	$7,324.80		$18,312.00	$25,636.80
Component Selection	180	$30.52	$5,493.60		$13,734.00	$19,227.60
Power/Heat Analysis	120	$42.19	$5,062.80		$12,657.00	$17,719.80
Interconnect/Cabling Design	160	$26.62	$4,259.20		$10,648.00	$14,907.20
Schematic Design/Capture	520	$30.56	$15,891.20		$39,728.00	$55,619.20
Schematic update Pass2 (3 each)	80	$30.56	$2,444.80		$6,112.00	$8,556.80
PWB artwork desgin/layout (3 each)	480	$22.92	$11,001.60		$27,504.00	$38,505.60
PWB layout Pass 2 (2 each)	120	$22.92	$2,750.40		$6,876.00	$9,626.40
Documentation	800	$19.53	$15,624.00		$39,060.00	$54,684.00
Prototype						
Assembly /Checkout labor	960	$21.93	$21,052.80		$52,632.00	$73,684.80
Materials & Fab				$30,000.00		$30,000.00
H/W Project Management	480	$42.19	$20,251.20		$50,628.00	$70,879.20
Project review	320	$42.19	$13,500.80		$33,752.00	$47,252.80
Development Equipment						
DSP Development station	320	$27.47	$8,790.40	$15,000.00	$21,976.00	$45,766.40
DSP Evaluation Kit	160	$27.47	$4,395.20		$10,988.00	$15,383.20
Total Hardware	6340		$176,026.80	$45,000.00	$440,067.00	$661,093.80

CONFIDENTIAL DATA

MICRO-RIT
PHOTOTELESIS

Software	Hours	Rates	Labor $	Materials	Overhead	Total Cost
Specification Document	80	$32.81	$2,624.80		$6,562.00	$9,186.80
Evaluate and select DSP	80	$32.81	$2,624.80		$6,562.00	$9,186.80
Evaluate and Select Operating system	170	$31.51	$5,356.70		$13,391.75	$18,748.45
Evaluate and Select Complier	170	$31.51	$5,356.70		$13,391.75	$18,748.45
Other Development O/S complier				$15,000.00	$0.00	$15,000.00
Software Specification	170	$32.81	$5,577.70		$13,944.25	$19,521.95
System Management Functions						
Memory Management Routines						
Code Space Manager	320	$30.21	$9,667.20		$24,168.00	$33,835.20
Data Space Manager	320	$32.81	$10,499.20		$26,248.00	$36,747.20
Reflash Interface	160	$25.00	$4,000.00		$10,000.00	$14,000.00
Interrupt Handling	160	$32.81	$5,249.60		$13,124.00	$18,373.60
Power Management	320	$25.00	$8,000.00		$20,000.00	$28,000.00
Video System						
Video Frame Grabber S/W	420	$28.91	$12,140.10		$30,350.25	$42,490.35
Video Demodulation S/W S-Video	160	$32.81	$5,249.60		$13,124.00	$18,373.60
Video Demodulation S/W Composite	160	$32.81	$5,249.60		$13,124.00	$18,373.60
Port Wavelet compressor	240	$32.81	$7,874.40		$19,686.00	$27,560.40
Port JPEG compressor	240	$25.00	$6,000.00		$15,000.00	$21,000.00
Image Storage Handler	80	$30.21	$2,416.80		$6,042.00	$8,458.80
Communications System						
Asynch Port Interface	60	$25.00	$1,500.00		$3,750.00	$5,250.00
Synch Port Interface	120	$25.00	$3,000.00		$7,500.00	$10,500.00
Port PTAC	1650	$28.91	$47,693.25		$119,233.13	$166,926.38
Port PTAC-2	240	$25.00	$6,000.00		$15,000.00	$21,000.00
Audio System	545	$32.64	$17,791.00		$44,477.50	$62,268.50
User Interface	160	$30.21	$4,833.60		$12,084.00	$16,917.60
LED Display Driver	60	$25.00	$1,500.00		$3,750.00	$5,250.00
Push Button Interface	60	$25.00	$1,500.00		$3,750.00	$5,250.00
Menuing Interface	120	$25.00	$3,000.00		$7,500.00	$10,500.00
Remote Control/Host Mode						
Remote Control Interface	480	$30.21	$14,500.80		$36,252.00	$50,752.80
Docking Station Interface	320	$30.21	$9,667.20		$24,168.00	$33,835.20

CONFIDENTIAL DATA

MICRO-RIT
PHOTOTELESIS

Software	Hours	Rates	Labor $	Materials	Overhead	Total Cost
System Integration	1200	$28.26	$33,906.00		$84,765.00	$118,671.00
User Manuals	280	$21.10	$5,906.60		$14,766.50	$20,673.10
System Checkout & rework	475	$25.72	$12,217.30		$30,543.24	$42,760.54
Write acceptance test plan	120	$38.91	$4,668.60		$11,671.50	$16,340.10
Customer Acceptance test Plan	14	$45.84	$641.76		$1,604.40	$2,246.16
Management	277.2	$38.91	$10,784.47		$26,961.17	$37,745.63
Total Software	9431.2		$276,997.77	$15,000.00	$692,494.43	$984,492.21
Combined	15771.2		$453,024.57	$60,000.00	$1,132,561.43	$1,645,586.01

CONFIDENTIAL DATA

SECTION 8

PERSONNEL RESUMES

BRUCE C. MATHER

Manager of Software Engineering
PhotoTelesis...a business of Texas Instruments Incorporated

Dr. Mather joined PhotoTelesis Corporation in December 1993, as Director of Software Engineering. Prior to joining PhotoTelesis, he was a Senior Research Engineer at Southwest Research Institute where he was employed for seven years. He also serves as an Adjunct Professor at St. Mary's University where he teaches a course in Digital Speech Processing.

Among Dr. Mather's technical areas of expertise are robotic systems, image processing, machine perception, neural networks, virtual reality, multimedia database systems and digital signal processing. He is a member of the Institute of Electrical and Electronic Engineers (IEEE), the Society of Manufacturing Engineers (SME), and the International Neural Network Society (INNS).

Dr. Mather attended the University of Illinois in Champaign, Urbana, where he earned his BSEE degree in 1980, his MSEE in 1983, and his PhD in Electrical Engineering in 1986. He graduated with highest honors and received the Eta Kappa Nu Senior Honor Award for academic excellence. His PhD dissertation involved advanced, multidimentional digital signal processing (DSP) of synthetic aperture radar (SAR) data.

At Southwest Research Institute, while working in their Advanced Robotics Department, he designed and developed interprocess and intercomputer communication and synchronization in the C programming language under the Unix operating system.

In 1991, Bruce joined the Advanced Training Concepts Section at SWRI and was instrumental in the development of the Visual Information System multimedia database product which runs under Windows 3.1. He also worked on an IR&D project involving a Virtual Environment system for multidimensional data visualization. His other areas of interest include speech recognition, position sensing, and holographic sound.

ROGER D. VEST

Manager of Hardware Engineering
PhotoTelesis...a business of Texas Instruments Incorporated

Mr. Vest joined PhotoTelesis Corporation in January of 1994 as Director of Hardware Engineering. Previously, he was Manager of Engineering for CompuAdd Express Corporation in Austin, Texas. In that position, he reported to the President and was responsible for all phases of product development and product sourcing. During his time there, three portable computer (notebook) products were introduced.

Prior to CompuAdd Express, Mr. Vest was employed by Texas Instruments, also in Austin, for over fifteen years. When he resigned to accept the CompuAdd Express position, he was a Senior Member of the Technical Staff. During his last year with TI, Mr. Vest managed a PWB design/layout center for their Custom Manufacturing Group. This effort included initial layout, prototype PWB fabrication, PWB assembly, and prototype checkout of customer products for several high volume computer suppliers. He has an extensive background in surface-mount technology, including footprint design, PWB layout guidelines and automatic test compatibility. He has published several articles on surface-mount technology design rules and footprint requirements.

Mr. Vest graduated from Texas Tech University in Lubbock, Texas, with a Bachelor of Science degree in Electrical Engineering. He was on the Dean's list at the time of his graduation.