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Founded 1909

PORTABLE TV TAPE RECORDER

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N Y FIRE COMMUNICATIONS CENTER (PART 2)

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Edgar Felix EDITOR

A Portable Television Tape Recorder

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ABSTRACT

A truly portable television tape recorder-reproducer using the slant track recording technique provides the broadcast industry with a long-awaited storage device for news and special events. Outdoor pick-ups using a vidicon camera and a microphone have provided low-cost, instant playback news event coverages, with a total package weight under 100 pounds, consuming less than 500 watts of power. Excellent compatibility between machines permits the shipment of newly-recorded tapes to a different playback location. The same machine can be used on either the US (525/60) or the CCIR (625/50) standards, with but two simple field adjustments.

INTRODUCTION

It has long been the desire of those connected with news and special eventsdetails of television to be able to make an audio/video recording with truly portable equipment having immediate play-back capability without the need for chemical processing that is required with news film. Small, hand-held Vidicon cameras have been available for some time but until recently, with the advent of the recording machine they have been too bulky to carry in anything but a truck or van.

SLANT TRACK VIDEO TAPE RECORDING.

Slant track video tape recording, introduced about three years ago, when used with solid state or transistorized circuitry and a lot of ingenuity, now has produced self-contained, truly portable audio/video recorders with weight and dimensions about

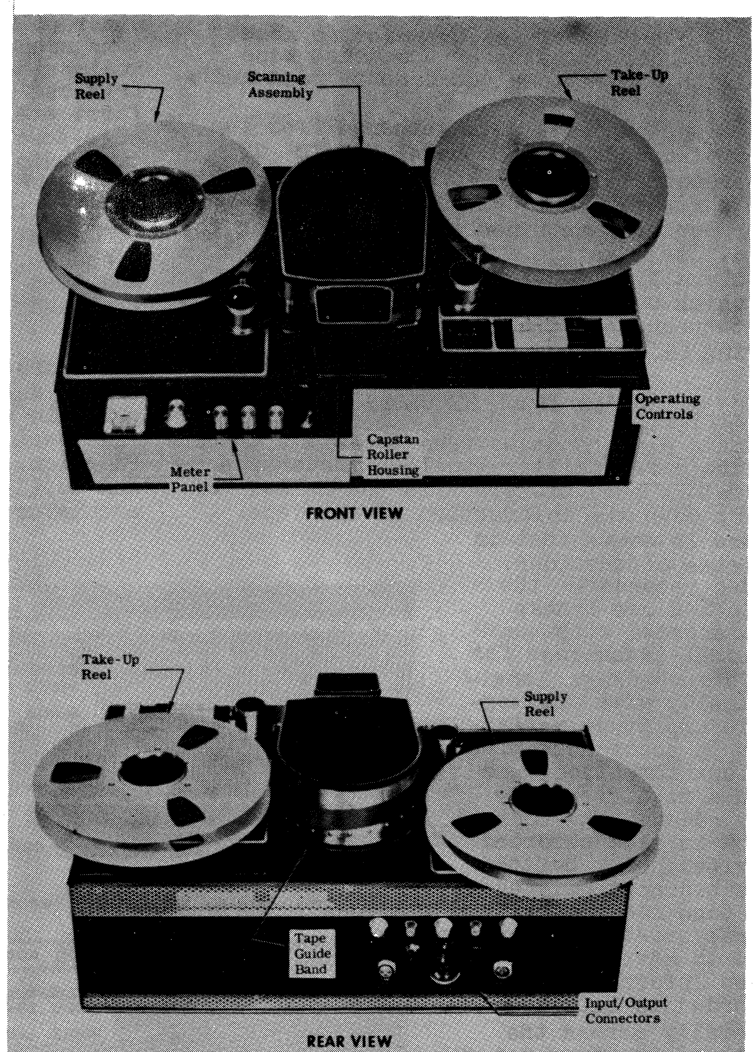

Figure 1 Machtronics MVR-10 Television Tape Recorder

* Presented at the Radio Club technical meeting November 19 1963, by Mr. Pointer.

He has been with the American Broadcasting Company since 1948 when it was just getting into television, coming from RCA where he was designing theater TV equipment. He is a graduate of Iowa State Univ. (BS EE) in 1946.

The co-author Mr. Frank J. Haney has been with ABC since 1962, after periods with WCAU, the CBS Engineering staff, and later with the Autometric Corp. He graduated (1950) from Villanova (B E E).

those of ordinary luggage: 24" wide, 13" deep and 10" high, weighing 65 pounds. It requires about 350 watts of power as compared to the 2.5 to 4 kilowatts for the regular 4 headed TV broadcast tape recording machine, depending on the make and model.

This new portable machine will record for as long as 96 minutes using a 10½ inch reel which holds 3600 feet of a one inch tape such as is commonly used in industrial and instrumentation applications. Playback can either be on the same machine that was used for recording or another of the same type. Operation, much like that of an audio tape recorder, can easily be handled by any non-technical personnel. By comparison the cost of this one inch tape is about $68 per hour, as compared to about $205 per hour with the 2" broadcast tape used with conventional quadrature head units.

This paper presents data gathered from the use of the MACHTRONICS model MVR-10 TV tape recorder as shown in Figure 1, with tape threaded for recording or playback. Other portable machines are now entering the field, such as the AMPEX model 1500 which is only slightly heavier, about 100 pounds but which uses the 2" tape. Again using the slant-track recording technique it has a playing time of over 5 hours per reel.

SLANT TRACK RECORDING

The main difference between the slant track and the more familiar two inch traverse scan quadrature head processes is the method of laying down the information on the tape. Figure 2a shows that in the case of the four headed recorder, the audio and cue tracks are recorded with conventional techniques for audio recording: longitudinally with the magnetic amplitude variations in accordance with audio information, and with a high frequency bias added. The control track is also recorded longitudinally but the bias has been omitted as the tape non-linearity characyeristics are used to advantage. The video information, FM recorded is laid down laterally across the width of the tape using a head rotating approx. 14,000 RPM. Since some seventeen horizontal lines are recorded with each pass of the head in approximately 1.8 inches of tape width, the head-to-tape speed is of the order of 1600 inches per second.

With slant track recording Figure 2b the audio and control tracks are quite similar but the cue track has been deleted. Again the video information is FM recorded, but this time, at approximately 10 degrees with respect to the tape edge. Two heads are employed to accomodate a full television frame (one head per field). Each pass of a head records some 265 lines, just over a full field, in about ten inches of tape. The head-to-tape speed here is some 600 in/sec. The lateral speed of the tape is 7.5 inches per second.

Other points of difference between the systems are the sequence of erasure and the audio/video recording processes. With the traverse or four headed machine the tape is first erased and then the video is recorded edge-to-edge. Next those areas assigned to the audio, cue, and control tracks are erased. Finally the appropriate recording is made in the newly erased tracks. With the slant track machine, the tape is first erased, then the control track is recorded and then the video is recorded in the area assigned and finally the audio.

In Figure 3, showing the slant track system in a block diagram, the audio is processed in normal magnetic fashion with the same head serving the dual record-playback function. The video signal is amplified and applied to a multi-vibrator type of modulator whose frequency shifts upwards

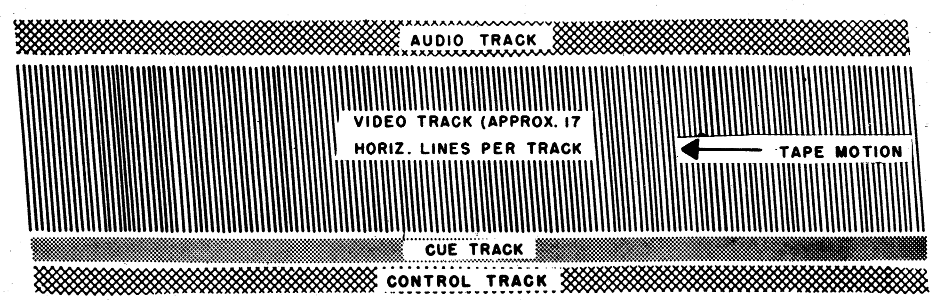

FIG. 2a TRANSVERSE TRACK (2 IN TAPE, QUADRATURE HEAD)

FIG. 2b SLANT TRACK (1 IN TAPE, DUAL HEAD)

from 3.5 megacycles depending upon the instantaneous amplitude of the video waveform. Tip of sync. corresponds to zero amplitude, peak white to maximum amplitude. A small portion of this modulated r-f signal is bled off during recording and is fed into the limiter to permit checking of signal levels and the adjustment of the servo.

The servo system is shown separately in Fig. 4. During recording, separated vertical sync at frame rate and video head disc positioning pulses are fed into a phase comparator, whose output is a servo-motor-drive voltage whose amplitude and phase depends upon the magnitude and sense of error between the time of head switching and the twelfth line following start of the vertical interval Vertical sync information at frame rate also feeds the control track during recording. During playback, the servo system corrects the errors existing between control track pulse and the video head disc proportioning pulse.

The video disc drive consists of a power line driven motor and a differential type gear box, the second input of which is the servo motor. Under certain conditions it is possible to have the servo motor at rest, such as while recording a video signal that is locked to the same power system that feeds the recorder. On the other hand if the power system is subject to frequency changes of shorter duration than the servo can handle head switching will invariably occur during the vertical pulse period or during the active picture time. Hence it is imperative that the a-c power source be free from short time frequency variations, ruling out many of the low-priced gasoline motor driven generators. A fully servo-driven disc would not be so affected but this would require more powerful transistor drive amplifiers.

It is reasonable to predict that, if during playback a locally generated sync is substituted for the control track signal, the machine could be caused to lock to this vertical rate, and vertical lock or switchlock could be achieved. The machine will operate on the European standard of 625 lines on 50 cycle power and field rate with very minor servo readjustments. One adjustment is to change the free running frequency of the saw-tooth generator in the servo to a frequency slightly below the frame rate of 25 cycles.

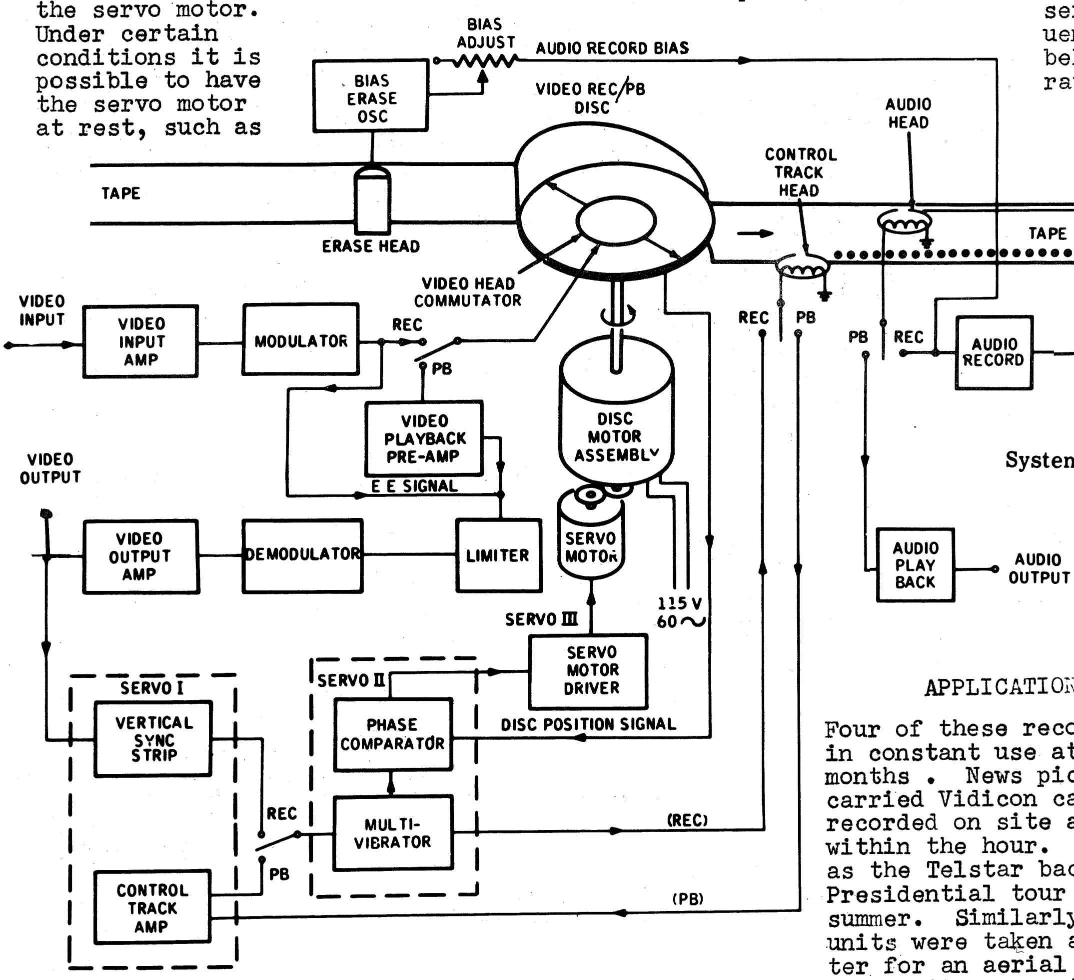

Figure 3

System Block Diagram

APPLICATIONS AT ABC

Four of these recorders have been in constant use at ABC for several months . News pickups using hand-carried Vidicon cameras have been recorded on site and then aired within the hour. A machine served as the Telstar backup during the Presidential tour of Europe last summer. Similarly, several such units were taken aboard a helicopter for an aerial pickup of an automobile race at Daytona. Wide use of these machines will be made

A fifteen pound Vidicon camera with a built-in sync generator and a removable 5 pound Vidicon head with an optical view finder and zoom lens has been developed and is currently in use at ABC as a pickup camera for this system.

Since the sync portion of the video output signal of this machine does not comply with FCC broadcast regulations, a pre-air transfer onto a two inch tape quadrature head machine is made to provide the timing regeneration. This gives an added attraction of permitting standard editing and splicing techniques. One of the unresolved problems with slant track recording is this need for splicing and editing, which would require a diagonal cut across ten inches of tape.

WHAT ABOUT THE FUTURE ?

The outlook is particularly promising, and one can just let his imagination run with the numerous possibilities. It is now possible to have a complete television remote pickup and recording system that is contained in a few pieces of luggage. An automobile trunk could easily accomodate a camera, a recorder, an inverter, a 5" or an 8" monitor and plenty of spare reels of tape. Remote start/stop of the recorder from the camera position appears very attractive. A single miniature cable between camera and recorder will handle camera power as well as audio, intercom, and control from the camera are all possibilities. One person can thus televise any hot news or special event for rapid air use.

Machtronics has announced a "broadcast" version which is purported to meet FCC specifications. Another manufacturer, Ampex, as mentioned above, has recently demonstrated a portable tape recorder that is also designed to meet FCC standards. As slant-track recorders meeting these standards become available, a limited budget station will be able for the first time to enter the television tape field. Stations that have been using the large four headed machines to date may be taking a closer lookiinto using the smaller versions for many applications.

It is reasonable to expect that there will be a tape machine for the consumer for use in his own home. A prototype of such a home video recorder was announced by one manufacturer last July, Such a machine might record one's favorite TV program in his absence or while he is otherwise busy, and play it back on command through his TV receiver. It seems certain that video recording is still in its infancy and that many new and exciting innovations will come about within the next decade.

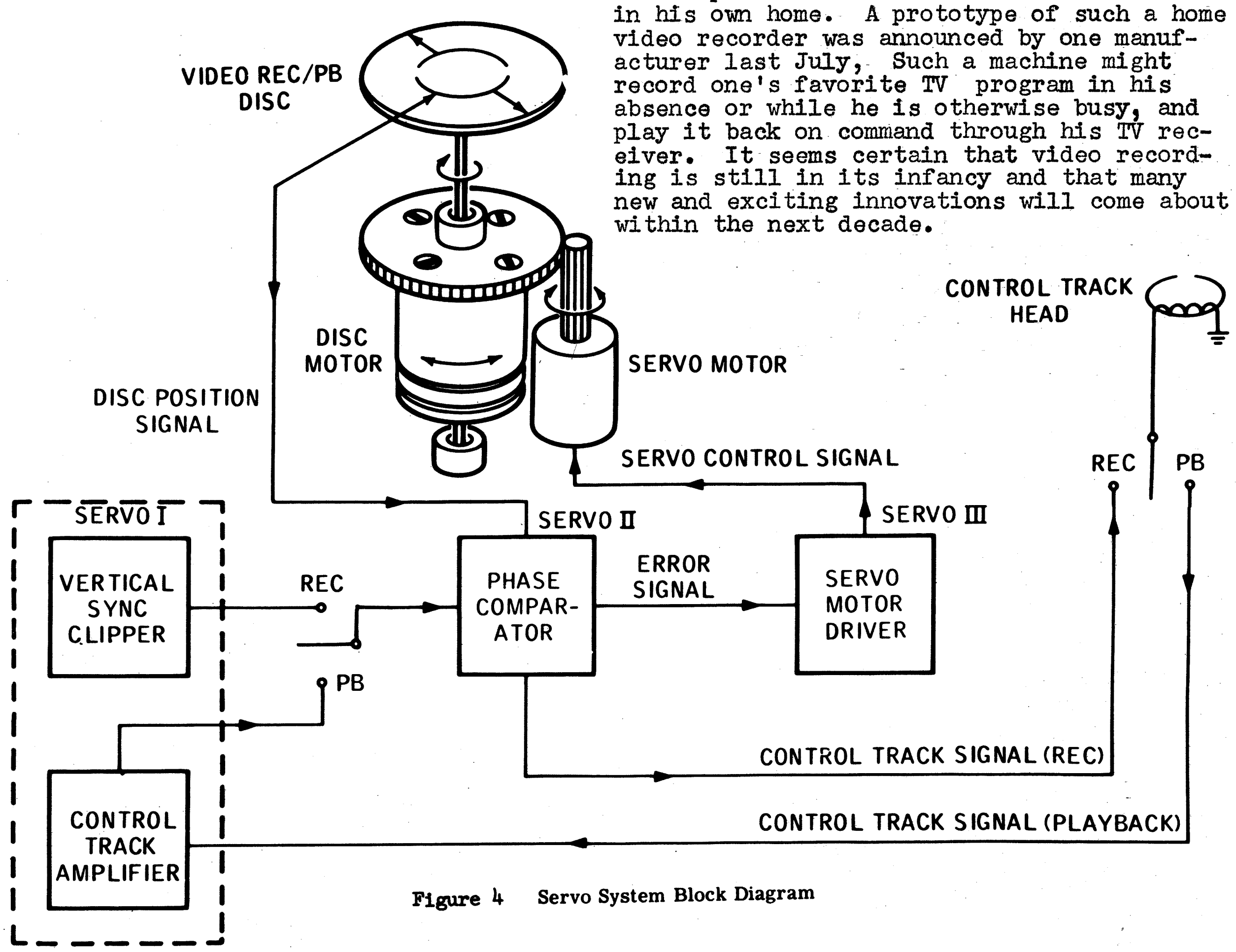

Figure 4 Servo System Block Diagram

NEW YORK'S MODERN FIRE COMMUNICATION CENTER

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AND

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PART II INTRODUCTION

As already mentioned in Part I of this article (published in Vol. 39, No. 3 of the Proceedings) not too many people are aware of the size of the operation of the New York City Fire Department. To most, the operation is confined to fire engines racing through city streets and throwing some water on a blaze. However, like an iceberg, most of its mass is not seen. Many activities, though unseen by the general public, are performed and coordinated to yield an effective fire fighting operation.

The emergency communications equipment used by the fire department is more than just a link between the sender and the receiver. There is in use multiple or alternate channels in the event of failure of the primary channel: the use of fail-safe circuitry that does not interfere with the transmission of basic information even though a malfunction has occurred; the use of continually self-monitoring circuitry which immediatly informs interested parties that a malfunction has occurred. These factors in conjunction with many others transform an ordinary communications system into an emergency communications system.

The Reeves Instrument Company entered the emergency communications field experienced in the design and manufacture of radar and communications systems exhibiting the ultimate in reliable operation. Some of their more-commonly known systems are their Radar Tracking Stations employed at Missile Ranges and in the Project Mercury Space Program. Such systems are also destined to play a vital role in the upcoming Gemini and Apollo programs. Thus, Reeves, in accordance with N. Y. City Fire Department performance specifications was called upon, as the systems sub-contractor to the Meyerbank Electric Company, to design and manufacture the Staten Island Communications System that was covered in Part I.

The overall work task of the project covered many functional areas. However, only two of these will be described here: the Voice Alarm System, and the Fire Alarm Box Receiving System.

2 VOICE ALARM SYSTEM

The Voice Alarm System has added a new dimension to the fire communications field. Heretofore, fire companies were dispatched primarily by a coded bell system which has proven itself as an extremely reliable transmission system, but with one drawback of inflexibility and longer transmission time needed to convey the information. The dispatcher uses the coded bell system to convey to the assigned fire company the number of the incoming box. The fire company, knowing the location of the box would then roll to that location. The particular number is sent in serial form consisting of pulses and spaces which were counted to ascertain the number. For example, the pulse series for Box 5124 would consist of five pulses, space, one pulse, space, two pulses, space and then four pulses. The series of pulses would then be repeated for confirmation. The time required to transmit the Box number twice is approximately 30 seconds.

In the event the report came into the central office via telephone, additional time was required to first cross-reference the street address to the nearest box and then transmit that box number. Only after the equipment was under way and their radio system was on, would the fire company be given the street location. Thus now, the time required has been drastically reduced, since the number and the location of the box is given verbally, which requires much less time than the telegraphic method. In addition, should the address of the fire be known, this information is also given.

The passage of a few seconds may not seem a significant period of time, but to the Fire Department the saving of a few seconds often spells the difference between life and death or between a large fire or a small one. The advent of the Voice Alarm System has not done away with the Coded Bell system. The Fire Department never throws away a valuable tool. Instead, the Coded Bell system has been reassigned to the role of primary back-up to the Voice Alarm System. Through the years, the Fire Department as well as all of us, have learned the valuable lesson of not putting all our eggs in one basket.

The Voice Alarm System consists of the console and the associated equipment racks in the central office. Each Fire Station is provided a Fire House Intercommunication Unit and up to three associated Extension Sets. The Central Office equipment is designed to enable the dispatcher to select quickly any or all of the remote fire stations. The system provides two-way audio communications only between the Central office and the fire stations, and is not used for inter-station communications, since commercial telephone facilities are available for this purpose.

At first glance the Voice Alarm System seems nothing more than a fancy audio system. It has, however, unique features which sets it apart from the ordinary: the Voice Alarm System is fully supervised by the Dispatcher at the Central Office. The Dispatcher, at his discretion, may place any or all of the remote Fire Communications

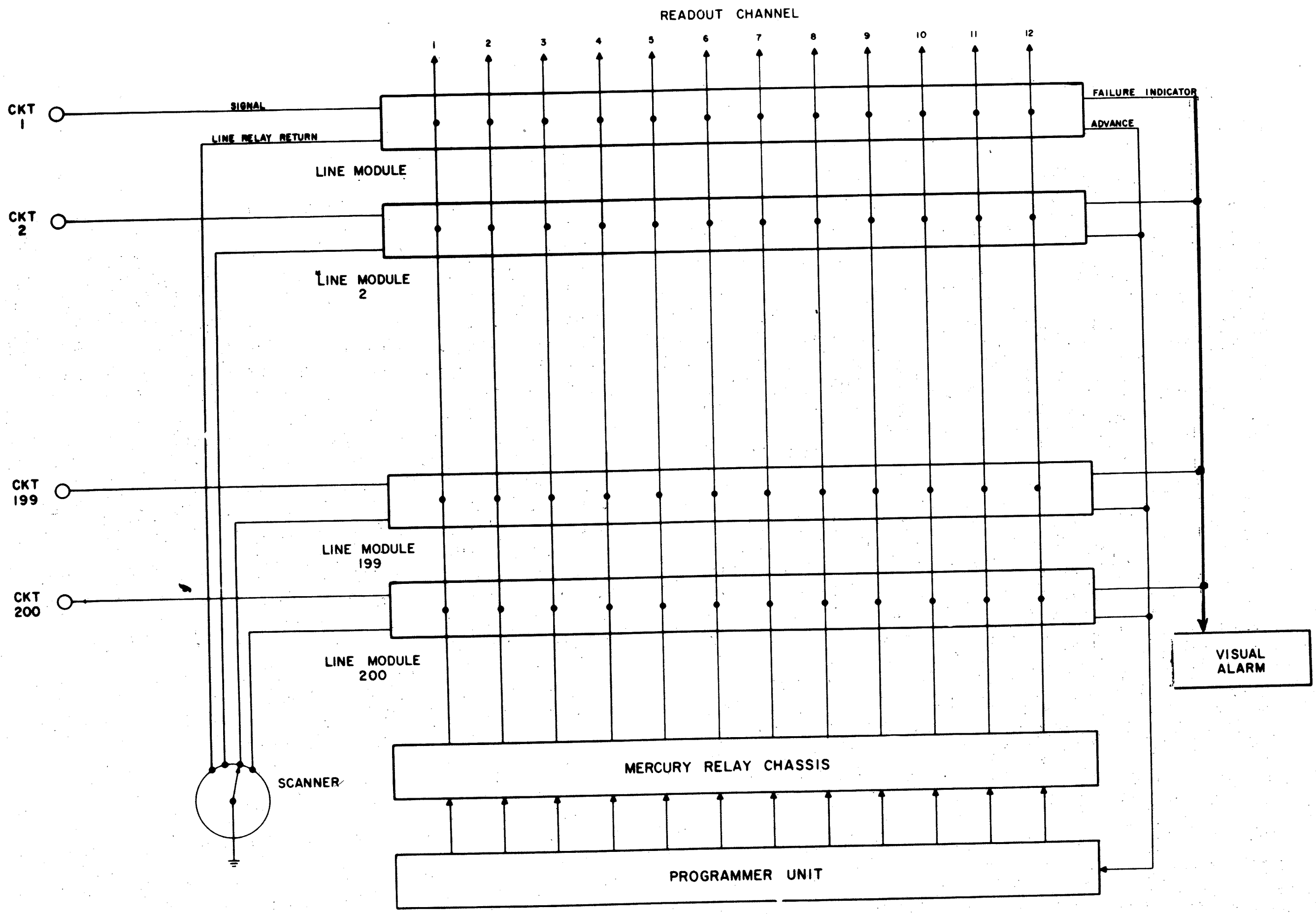


FIG I Automatic Circuit Selector

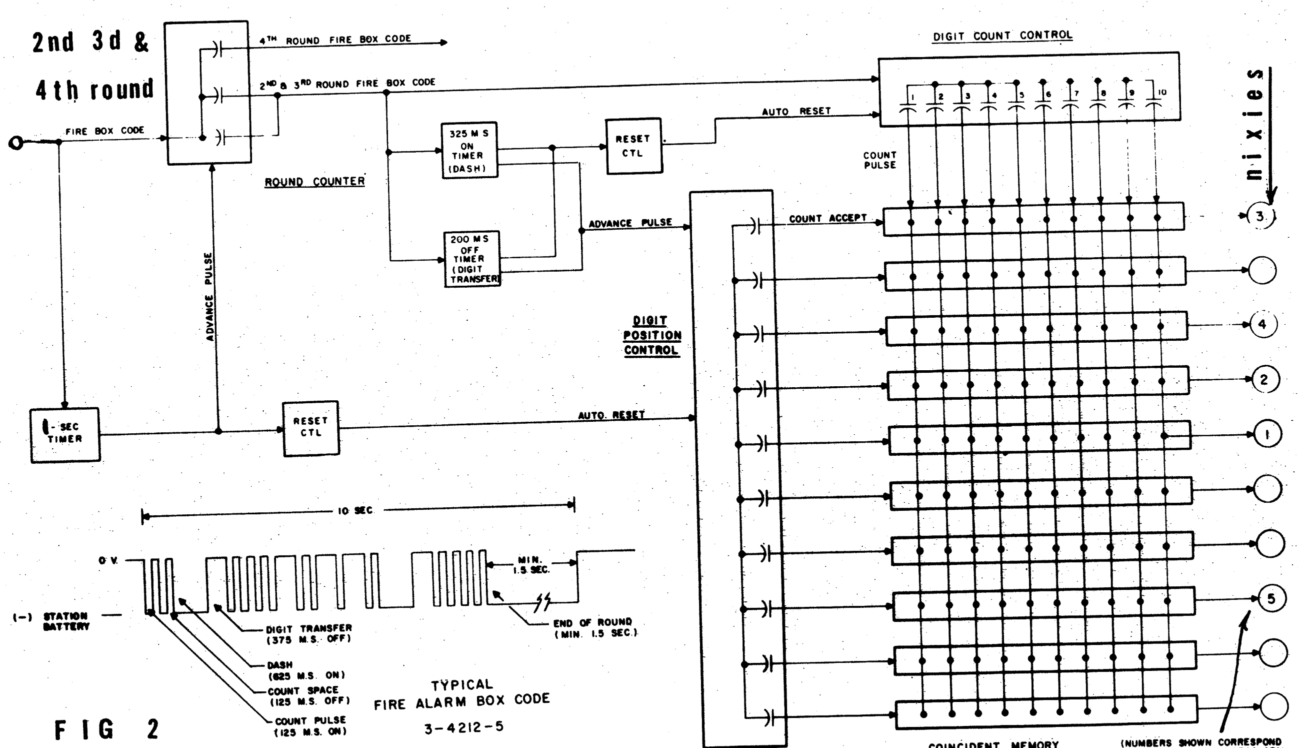


FIG 2 Box Readout System

Units into its receiving mode regardless of any efforts on the part of the Fire Personnel He, thus, has total priority over all transmissions .

Another feature is the extremely high degree of audio intelligibility of the system, avoiding repetition of information. This intelligibility is obtained by keeping overall system distortion down to below 2%, by using high fidelity amplifiers and automatic gain compensating amplifiers to maintain constant bus levels over a wide range of speech intensities. Thus, amplifiers and lines are never over-driven, which is the major source of distortion in commonly designed systems.

Next we insure the highest signal-to-noise ratio possible by providing sufficient amplification prior to transmission via balanced audio pairs to the fire station. The input level to the transmission line is maintained at 20 dbm. Another feature is its almost total solid-state construction. All equipment external to the central office is of solid-state design. In the central office, where some tubed amplifiers are used, complete multiple facilities are "in-being" which may be placed into service by the setting of a single switch.

Modular concept is another important feature even in the solid-state and relay circuitry which ordinarily show a high degree of operational reliability. In the case of the central office equipment, independent plug-in modules, one for each fire station, are employed and may be quickly replaced by a replacement should the need arise. All amplifiers are, in addition, of plug-in configuration.

This modular concept has also been followed in the design of the Fire Station Equipment. All amplifiers, power supplies, and relays may be quickly replaced by system spares. If the malfunction is even greater, such as in electronic circuitry external to these modules, the entire door, which houses 95% of the electronic equipment may be quickly replaced. The door is attached to its mounting case by "quick-disconnect" hinges and a plug terminated cable assembly. Thus any module, or if need be, the entire unit may be replaced and returned to the repair shop for servicing where the natural timing required to repair it is not as severe as in operational equipment. During more than a year's operation, the system has already proven itself of value. As a result it is planned to use the Voice Alarm System in all boroughs of the City of New York.

3. FIRE ALARM BOX RECEIVING SYSTEMS

The ability of the public to indicate to the Fire Department that an emergency exists is paramount. In smaller communities, this is usually accomplished by phoning the local Fire Department. In larger communities, in addition to the telephone, a fire box system is employed. Modern fire box have evolved to become an extremely reliable instrument. It is able to convey its information in all forms of weather, and operates even though one side of its circuit has been interrupted by a line break. It represents the ear of the dispatcher.

When the handle is pulled, the mechanism begins to run, opening and closing the circuit in a coded sequence signifying the number of the box. This number is repeated four times, requiring approximately forty seconds for the four rounds. These coded interruptions actuate lamps and buzzers to permit the visual and audible reading of the incoming code. In reading the code for box 23 he would count two pulses, a space and then three pulses. He will also count the second round of pulses and compares this to what he received during the first round. If both are the same he considers the box as being confirmed and dispatches his equipment accordingly. If not identical, he will wait until the third or fourth round before proceeding.

The single transmission system just described rarely presents any problems. However most systems employ more than one box circuit. In the case of Staten Island there are two-hundred box circuits to monitor. The usual procedure followed in the case of the sounding of several simultaneous alarms, is to assign one man to read each box. The receipt of several simultaneous alarms is usually indicative of a major fire or some other disaster.

As in the case of the Voice Alarm System, the Fire Alarm Box Receiving System, which is one part of the overall system, was designed to assist the dispatcher to discharge his responsibilities more effectively. Heretofore, the dispatcher was required to collect and record the incoming box first and then exercise his decision-making function in the assignment of the fire company to respond. Now his time is devoted more to decision making than to routine collecting and recording of incoming data.

The design of the new system had to be based upon situations that would occur during major disasters. By reviewing the records over the past thirty years, it was found that there were never more than six simultaneous alarms received at any one time. Thus by providing for twelve channels a double margin of safety is obtained. This function is accomplished by an Automatic Circuit Selector and a Fire Alarm Box Readout and Recording System. A Box Receiving Console is also provided.

A. AUTOMATIC CIRCUIT SELECTOR

Locating the particular circuit element (or circuits) over which fire alarm traffic is being conducted from among the two-hundred Boxes is the task of the Automatic Circuit

Selector, which can be generally classified as a programmed two-hundred by twelve matrix It consists of two hundred Line Modules, a Programmer, a Scanner, and a Mercury Relay Chassis. The performance of this Selector is shown in Figure 1 . Here the Programmer Unit controls the Mercury Relay chassis which identifies to the two-hundred Line Modules which of the Readout Channels the incoming signal is to be connected to. The design is such that only one signal may appear on the incoming circuit at a time.

Each Line Module contains a Line Relay and twelve coincident current selection relays. These latter require current in each half of the dual winding in order to operate. Once operated, current in only one winding will maintain closure. One current (bias) is provided by the Mercury Relay chassis, the other by the Line Relay on the Line Module. The Line Relay responds to the incoming negative pulses, which are first impressed onto an RC network which stores the DC energy. The top terminal of the Line Relay is connected to this RC network, but the return circuit, being normally open does not immediatley respond to the incoming series of pulses.

The start of a series of pulses on any of the two-hundred Box Circuits causes the activation of a Scanner, which completes the return circuit for each of the two-hundred line relays in sequence, one at a time. When closure is effected on the Line Relay of the active Line Module, the DC energy derived from the incoming pulses operates it, closing a latching circuit that keeps it operated for the duration of the signal. It also closes a DC source to the twelve coincident current relays described above. Now provided with two sources of current it operates, connecting the incoming code to the Readout Channel and disconnecting both the code signal and the DC source from the remaining selection relays to the right of the activated selection relay.

The connection of the Readout Channel causes a pulse into the Programmer that steps the bias current one step to the right. The selection relay once activated and latched does not release. This all occurs during the OFF time of the scanner. In the case of two adjacent circuits the first connects to the first Readout, the second to the next channel, so that two signals will never be summed up onto any one Readout Channel.

At the end of the incoming code the Line Relay releases, releasing the Coincident Current Selection Relay and then the Line Relay readies itself for additional calls if present. Unique features incorporated in the Automatic Circuit Selector include a self-monitored where if any calls remain unconnected to a Readout (either because more than twelve calls are present or due to a malfunction) a visual alarm is actuated so that the dispatcher can record the signal by some alternate means. Another feature is the use of reed relays which have an operational life in excess of 400 million operations and require no periodic maintenance. Packaged on printed wiring boards permits quick and easy replacement should a failure occur.

There now remains the task of reading, confirming and recording the incoming traffic, the function of the Readout and Recording System.

B. READOUT AND RECORDING SYSTEM.

Twelve Readout Units employed in the overall system are connected as described above. The Programmer in turn operates on a Priority-Sequential operation as determined by the Logic Relay system of the Readout. Here the first incoming code is transfered to the Readout #1, the second to Readout #2, etc. After appropriate action by the dispatcher he manually resets the Readout Unit. If only # 1 was active, the next call would again go to #1 but if #2 were still active the second call would go to # 3 Readout, the last call being connected always to the first of the remaining twelve Readout Units. The dispatcher may thus proceed in an orderly manner, acting on signals presented to him and restoring each individual Readout Unit as he goes along.

The incoming signals are a series of pulses and spaces, which are then counted up to signify the particular call box number. Most codes are fairly simple, such as a number 5124, but some contain dashes (or spaces) as a part of the box number, such as Box 3 - 4212 - 5. The Readout Unit decodes the pulses using the time relationships. Pulse timings are all measured by solid-state timing modules. Referring to Figure 1., a typical Class 3 pulse train is depicted that would be transmitted from Box 3 - 4212 - 5. The first round of pulses is used to locate and connect the active Box with one of the Readout Units, taking about 7 seconds before coming to the "End of Round" pulse.

The Readout Unit is insensitive to any pulses prior to the receipt of this End Of Round pulse. A ONE SECOND TIMER connected to the incoming circuit at all times does not respond to any pulse of less than one second duration. Upon receipt of a longer pulse it readies itself to deliver an Advance Pulse upon the termination of the End of Round pulse that advances the Round Counter. The Readout Unit is then ready to decode the incoming pulses. Each negative pulse Count Pulse causes the Digit Count Control to step once, so that, in the case under discussion, the latter is advanced three steps. The third pulse provides the third count to the Digit Count Control and also signifies that the " 3 " is to be followed by a Dash.

The 325 MS Timer is insensitive to all pulses shorter than 325 milliseconds, so after a 325 ms duration of the DASH it delivers a pulse to the Coincident Memory Nixie Matrix, thereby energizing the "3" cathode of the Nixie. This Matrix will fire the appropriate cathode only when two inputs, one from the Digit Count Control and one from the Digit Position Control are present. The pulse also causes the Digit Position Control to step to the second level.

The next pulse is an "OFF" period of 325 milliseconds, transferring the next series of pulses to the next Nixie tube. After an interval of 200 milliseconds, as a result of the Digit Transfer pulse, the 200 MS OFF timer sets itself, and at the start of the first negative pulse fires a pulse into the Digit Position Control advancing it to the third level and sending a pulse to the Reset Control. The next group of four negative Count Pulses advances the Digit Count control to the "4" position and fires Coincident Memory Nixie Matrix and then advances the Digit Position Control to the fourth level. The third Nixie shows a "4". The rest of the display is registered the same way. Note that while the Nixies are shown in Figure 1 as a vertical array they are actually mounted horizontally.

At the end of the first round a pulse from the one-second timer advances the Round Counter to the Confirm position and by the way of the Reset Control drops the Digit Position Control back to the first row. The next series of pulses should duplicate the first so will reset the same cathodes on the Nixies. Otherwise one or more of the Nixies will show two figures alerting the dispatcher All Nixies remain lighted until released by the dispatcher.

At the end of the third round the Round Counter is advanced, connecting the incoming circuit to the Recorder, resetting the Readouts and displaying the "Confirmed" signal. The paper feed to the Recorder starts and runs until the END OF ROUND counter functions The dispatcher is thus provided with a counted, confirmed and recorded report of the Fire Alarm Box code. Being independent of his own activities this system becomes an important tool, especially during hectic periods associated with a major disaster.

This part of the system also used reed relays modular construction and self-monitored circuits. It can operate over an extremely wide range of fire alarm box speeds, even though the Boxes in New York are closely timed. The next generation of Readout Units may have an almost infinite range of code speed acceptance since it is proposed to add a comparison network that will monitor the timing of the calling box and then adjust the timing modules accordingly.

4. CONCLUSION

This system constitutes an effective emergency communications tool for the N.Y. City Fire Department. No attempt was made to replace the decision-making capability of man, for he, when properly trained, is far superior to any computer. Instead, the system eliminates details which take up his valuable time.

Since we all live under the danger of massive disaster, either by design or accident, it is comforting to note that a community spends funds and energy to protect its citizens. This effort is not at an end, but rather a beginning. "Those who rest on their laurels have their laurels in the wrong place."

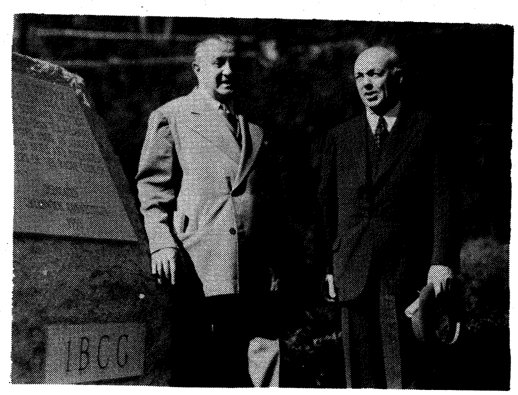
GEORGE EHRET BURGHARD

The Radio Club lost a life-long member and one of its organizers with the passing of George Burghard on December 8th 1963, in the Lenox Hill Hospital after a heart attack. He was 68 years old. George received an A. B. degree from Columbia in 1916, and served as an Ensign in W W 1, commanding the Compass School at the Pelham Bay Naval Training School. In 1918 he graduated from the Columbia Law School.

He was President of the Radio Club from '21 to '25, and was one of the group of Club members that set up the first short-wave station to span the Atlantic - the famous 1BCG transmitter, a feat for which he received a bronze medal from the Club in 1950. George was a close friend of the late Edwin H. Armstrong, and was an organizer of the Armstrong Memorial Research Foundation in 1955, continuing as its head until his death.

He served almost continually on the Board of Directors of the Club during the more than a half-century of its operations, and was ever present during its deliberations and promotional activities. He was a Sen. Member of the IEEE, a Trustee of the Lenox Hill Hospital, a member of the Engineering Council of Columbia University School of Engineering and Applied Science, a member of the Veteran Wireless Operators Assn., the Amateur Radio Relay League, the Quarter Century Wireless Association, and others. He also was an internationally-known philatelist a won many medals in exhibitions in many countries. In 1962 he was elected to the roll of Distinguished Philatelists by the Philatelic Congress of Great Britain.

We will all miss him.



George Burghard with E. H. Armstrong on the site of the 1BCG memorial. Both will long be remembered for their long devotion to the interests of the Club.

THE 1963 ANNUAL CLUB BANQUET

One of our best banquets was held at the 7th Regiment Armory on December 12th, with 125 in attendance. It was agreed that this location was an excellent choice. With Jack Poppele as Master of Ceremonies, things were kept moving at a brisk pace. Our main speaker was Dr. William E. Schevill, of the Woods Hole Oceanographic Institute. He talked on "Whales, Porpoises and Sonar". Dr. Schevill is an internationally known consultant on bio-acoustics. His talk, and the questions afterward were taped by Bill Offenhauser, and will be published in these Proceedings in another issue.

Two honored guests were selected by the Committee this year : William J. Halligan, Sr. and Elmer E. Bucher. A last minute hospital engagement prevented Elmer's presence. He is probably best known to most of our older members as the guy who ran that radio school during W W 1, and who wrote all the books on how to operate a station during that war era. We got Elmer to jot down a few reflections covering his sixty years of activity. They appear elsewhere in this issue.

Writing up the notes of Bill Halligan's work we can best refer to the tapes of Poppele's introduction of Bill during the banquet:

"We are pleased this evening to join in the celebration of a mile-stone in the life of William J. Halligan, Chairman of the Board of Hallicrafters, since he is observing the fiftieth year of his activities in electronics. It dates back to 1913 when, in his early teens he started with home-made gear, getting commercial and amateur licenses in 1916. After graduating from high school he sailed as a wireless man aboard costal and deep sea vessels. His continuing interest led him to West Point for an education in engineering, to a Boston newspaper as one of the first "radio columnists", to a successful career as sales manager for an importing firm, and finally to the establishment of the Hallicrafters Company which during the past thirty years, under Bill's guidance has made the most significant contributions in many fields, that of radio and TV receivers for home entertainment, most notable contributions in amateur gear, and in specialized military fields.

The Club is especially proud of Bill's record in all these fields, and we look forward to seeing many additional contributions in the future."

The Chairman of the Banquet Committee this year was Edgar Felix, assisted by Ernest Amy, Ralph R. Batcher, W. G. H. Finch, Harry Houck Lloyd Jacquet, R. H. McMann, Sr., and Bill Offenhauser.

1963 BANQUET

BACK ROW
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WALTER WATTS,
RALPH R. BATCHER
DR. WILLIAM GONDIN,
DR. T. H. FAY,
ROBERT MERRIAM

SEATED
EDGAR FELIX
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DR. R. C. WALKER,
WILLIAM OFFENHAUSER, Jr.

ELMER BUCHER REPORTS IN

The following reflections covering sixty years of activity in this "wireless" field were asked for, in lieu of Elmer Bucher's inability to appear as Honored Guest at our recent Banquet. Elmer, once such a prolific writer of technical articles could have filled many issues with interesting reports on "That was the time that we". His reply was:

"Greetings :

Let me thank you for your gracious invitation to attend your annual Banquet this year but for reasons that Harry Houck can explain I am unable to attend. I will certainly be with you in the spirit of the event. Where may I ask, can one find a finer group of pioneers of a "new" art than the roster of the Radio Club ? To me you are the elite of the wireless profession. You warrant this accolade because even if you started as radio hams and hobbyists, you made substantial contributions to the future development of the electronic science.

You did more: you enlivened and sustained layman interest in space communications among so many who were prone to declare that wireless had no future, technically or commercially. Your researches attracted attention of leaders in science generally who, in turn, added their contributions to the art's progressive growth. Your Ham transmissions produced valuable information on wave propagation at various frequencies, a subject on which there was very little information when your Club was started.

Your observations on equipment performance, antenna design, communication ranges were of great importance. You educated yourselv in this art and helped others to gain basic understandings of electronic techniques. You aided in creating a reservoir of talent that was so valuable to our Armed Services in W. W. 1. Your experimentations with the DeForest tube, with Armstrong's regenerative receiver, with his superheterodyne, his second-harmonic receiver (developed by Houck) were stepping stones of progress. The Club's pioneer experiences in shortwave transoceanic transmission, Ballantine's radio direction finder system, and his automatic volume control, Runyon's crystal-controlled FM system, Hogan's UniControl were all of great importance . Brevity prevents mention of other pioneer contributions from other members of the Radio Club.

During the first two decades of the century we saw the Marconi coherer bow out to the magnetic detector, followed by Fessenden's and DeForest's barreters, then the Dunwoody carborundum, the silicon of Pickard, and the galena, the perikon and other crystal type detectors, in close succession. After 1906 DeForest's vacuum tube was soon to reign supreme in both transmission and reception. I was able to test three from his first lot of tubes - what a performance they gave ! Well do I remember the hours of arguments with DeForest on how they operated. But it was Armstrong who gave us the first oscillographic disclosures showing its true mode of operation.

Progress from early spark systems through to present day systems has been equally impressive. During these six decades I have witnessed, and in many instances been at the center of many such steps of progress. Starting in 1901 with a Marconi-type station built from ideas gleaned from the Scientific American and the Electrical World I achieved sending readable signals over a six mile jump This was set up in Northern, Ohio, and some of the components were built at the plant of the Rawson Electric Co. at Elyria. In Nov. 1903 I got employment with the DeForest W.T. Company in Cleveland, which soon became the American DeForest Wireless Telegraph Co. that again became absorbed by the United Wireless Telegraph Company, which also took in the International Telegraph Construction Company, (Shoemaker's organization) and continued to build spark type transmitters. Organization changes came about about as rapidly as equipment changes, since the United soon merged with the Marconi W. T. Co. of America, with the Massie W.T.Co. following soon thereafter.

On December 1st 1919 the American Marconi, the General Electric Co, merged their radio assets, and patents, forming the Radio Corporation of America, with Westinghouse and others joining later. I was quite active in this venture, first as Commercial Engineer, then General Sales Manager, then V. P. and then Executive V. P. of the RCA Radiophone, Inc. introducing the GE-RCA sound on film talking pictures.

Rewarding experiences followed the organizing in 1909 of an operators training school, having found a great shortage of trained operators, but found I had to prepare my own texts for effective education of the students. This work continued until after the RCA was organized. With that Company I was privileged to promote a version of the Armstrong-Houck superhet for broadcast reception, and many other innovations in that fast-growing field.

Close association with, and under the direction of General Sarnoff, (incidentally an Honorary Member of the Radio Club), let me witness his plans and objectives at closer range - which were to create an organization that would give the United States a position of world leadership in international communications and to create applications of electronics in non-radio fields. This problem was stupendous, in 1919 the radio art lacked correlation - too many loose joints in the whole structure. Patents were widely owned but no one had enough rights to put together any effective operating system. With the advent of broadcasting this need for resolving patent entanglements was seen to be essential for everybody. One-by-one he found solutions to complex situations that seemed to defy correction. He always seemed to be a decade ahead of current thinking on the future of electronic science.

Pioneers then lived in a whirlwind of constructive activity and planning to produce practical results. To build a better world, men of sci ence may be called upon more and more to step out of their science roles periodically to help with social problems that affect so many people. What a challenge! But out of all this global upheaval I forsee a better world in the next century that will be startlingly unlike the present one in motive and deed. We earth-bound mortals will not see it, but who knows what further adventures are in store for us when we pass ithe great divide."

(Elmer's reflections appearing here are substantially abridged so that they could get into this issue. We hope to get more from him later.)

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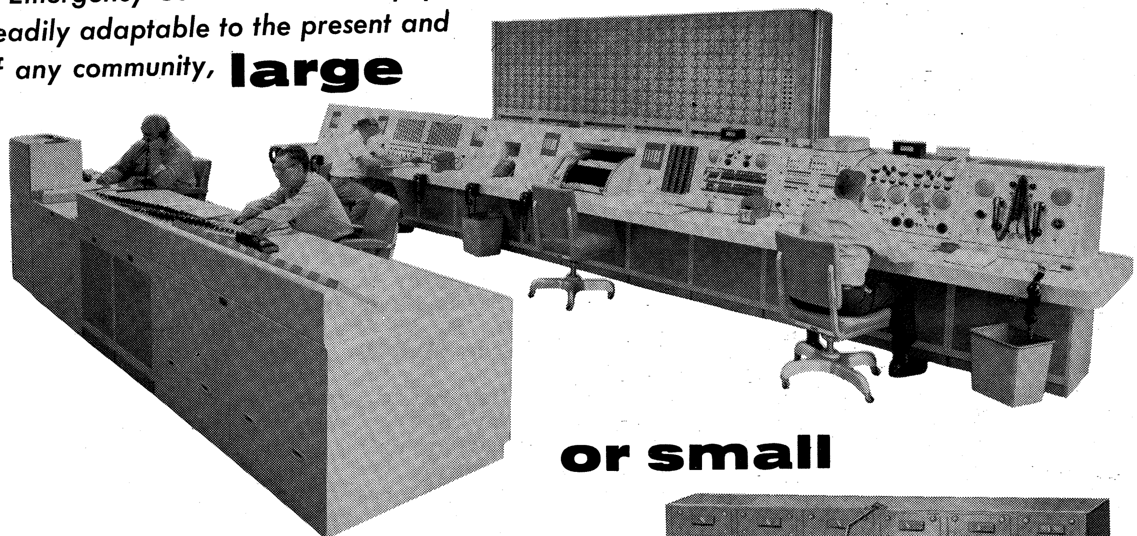

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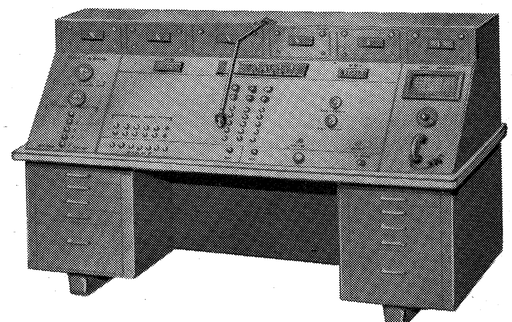

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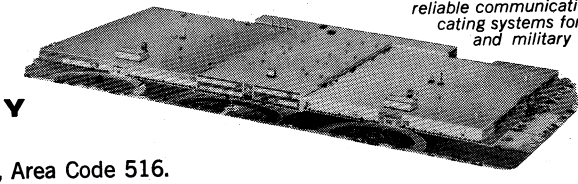

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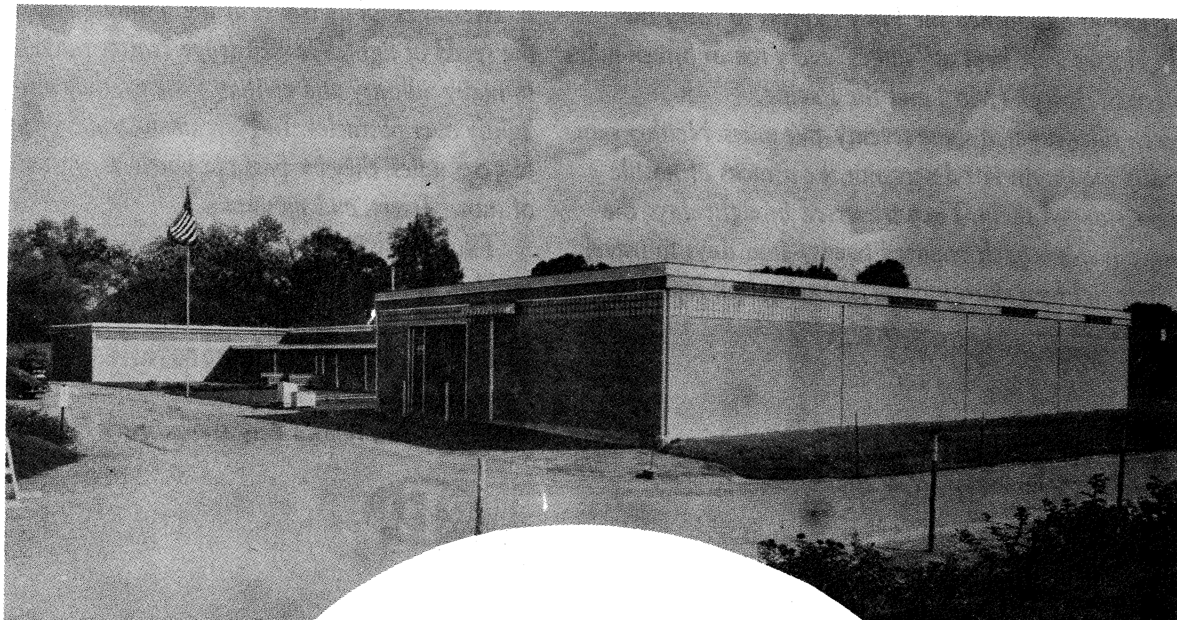

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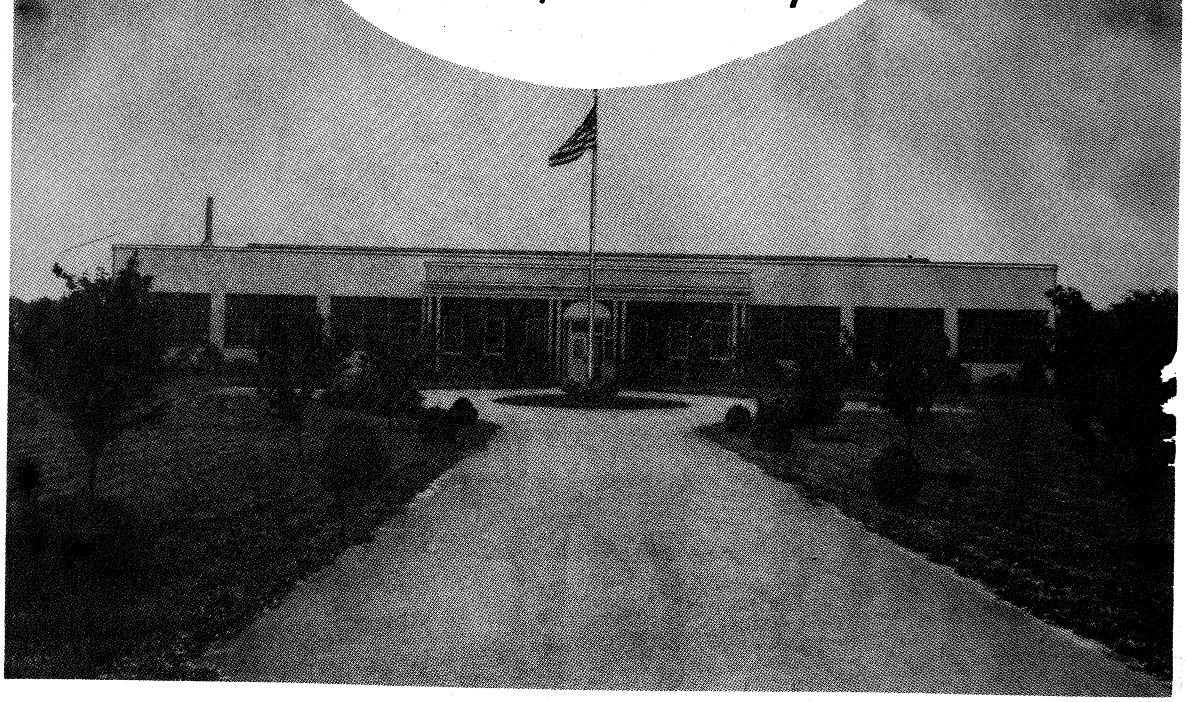

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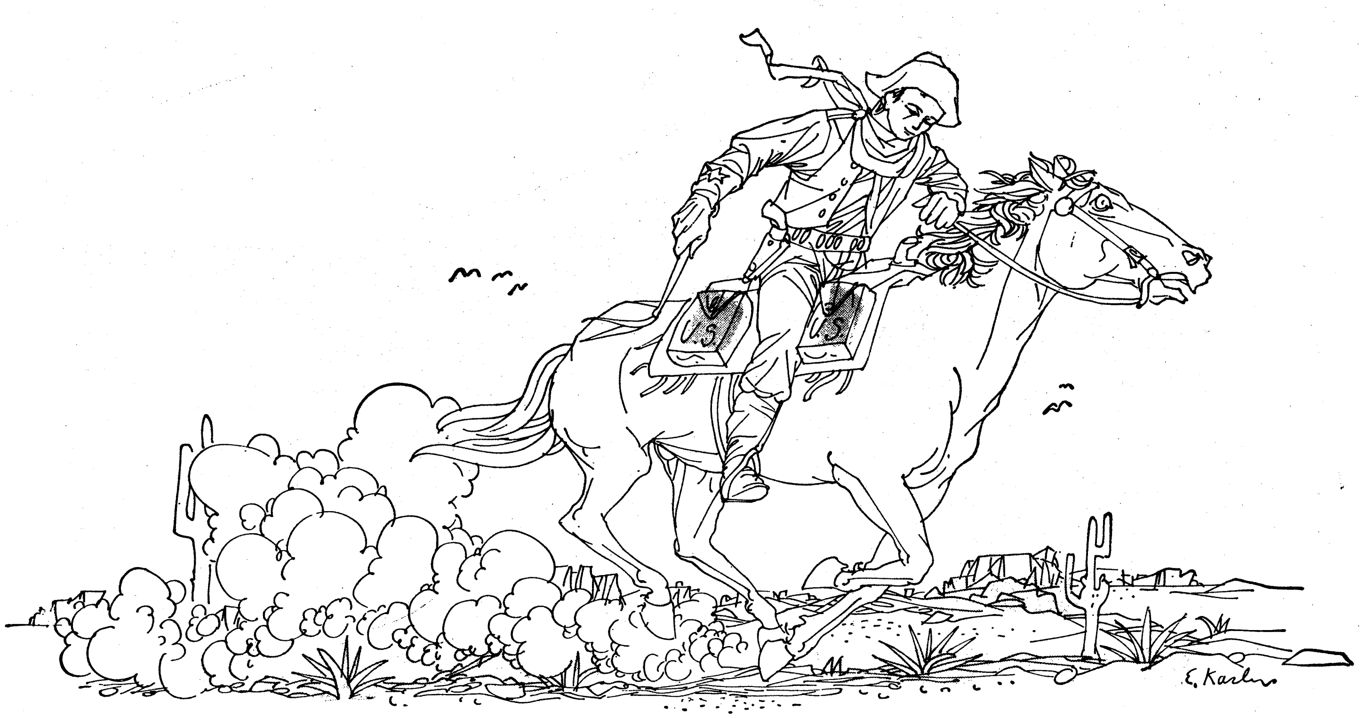

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