



PREVIEWING

Tomorrow's

TELEPHONE SERVICE

MORRIS OFFICE
ILLINOIS BELL TELEPHONE CO.
SITE OF THE
WORLD'S FIRST
ELECTRONIC
CENTRAL
OFFICE



"Morris . . . the site where the electronic era of telephony was born."

William V. Kabler

PRESIDENT, ILLINOIS BELL TELEPHONE CO.

"It is a totally new system making possible a variety of new services which will double the flexibility and hence the potential value of each customer's telephone."

Dr. James B. Fisk

PRESIDENT, BELL TELEPHONE LABORATORIES

"The kind of society we have . . . encourages imaginative private enterprise to accomplish this kind of advance."

Rosel H. Hyde

COMMISSIONER, FEDERAL COMMUNICATIONS COMMISSION

"The speed and excellent service of this equipment I . . . find unbelievable."

Donald Caisley

MAYOR, MORRIS, ILLINOIS

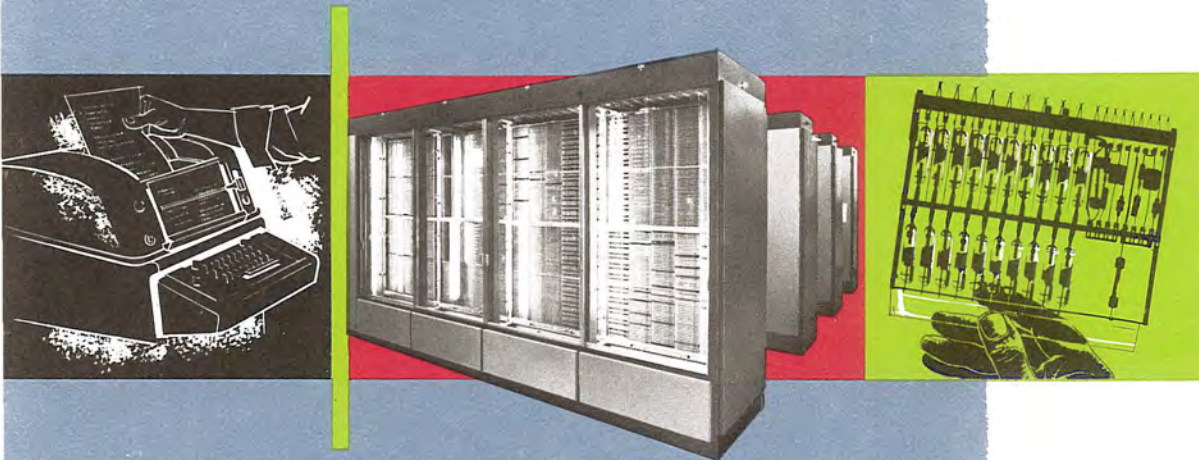
WHAT IS THE **ELECTRONIC CENTRAL OFFICE**

The Electronic Central Office is the result of one of the most massive single research and development projects ever sponsored by a private enterprise.

Its development till now has required the investment of about \$25 million and 750 man-years of work in planning, experimenting and building.

The Electronic Central Office (ECO) represents a technological break-through in telephone service. It is faster, more compact, more versatile and more flexible than present telephone central office equipment. The slowest part of the ECO service is the operation of the person dialing the call.

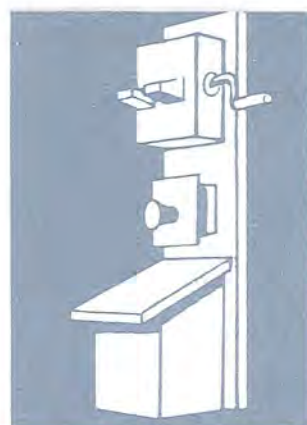
Dr. James B. Fisk, President of Bell Telephone Laboratories, called the Morris experimental model of ECO "the first of a new generation of electronic machines destined for speed and economy, for flexibility, for service."





the **ELECTRONIC
CENTRAL
OFFICE**

GLOWING RED TUBE AT LEFT REPRESENTS A "TALKING PATH" THROUGH THE ECO EQUIPMENT.



provides the
telephone
service of
tomorrow



The Morris ECO isn't much to look at, just several rows of neat gray cabinets filled with thousands of silent electronic components. It bears no resemblance to previous telephone switching systems. It goes about its work quietly and without fanfare. The only evidence it is at work is the blinking of red lights in the neon-filled glass tubes where the telephone connections are made.

There are no moving parts—yet it's faster and more versatile than any telephone system ever invented.

The electronic equipment performs its work with such speed that it has enough "spare" time to continually check its own equipment. When it discovers an error, it locates and diagnoses the trouble and, in some cases, even makes the necessary corrections. If the error cannot be corrected by the machine, it writes out in detail on a teletypewriter what the trouble is, adding the month, day, hour and minute of the malfunction. The repairs then are made by telephone technicians.

The generations of ECOs to come will provide new and exciting services for the telephone customer—services designed to make your telephone of even greater value to you.

SPECIAL SERVICES OF ECO



CODE CALLING . . . Customers can signal their extension phones by dialing a two-figure code and use their line as an intercom. For example, if "13" is dialed and the phone hung up, three short rings will sound. Ringing stops when any phone is answered.



ABBREVIATED DIALING . . . A customer with this service can reach another Morris telephone number by dialing two numbers instead of seven. The customer furnishes the telephone company with numbers he calls most frequently.



SERIES COMPLETION . . . Calls are automatically routed to a second number when the original called number is busy. If the second number is busy, the call can be routed to a third number.



FIXED TRANSFER . . . By dialing a four-figure code number, a customer can have his incoming calls automatically routed to another pre-designated local number. The customer terminates the transfer by dialing a second four-figure code number from his own telephone.



REQUESTED TRANSFER . . . The customer calls the telephone business office and gives his number and the Morris number to which he wishes his calls transferred. He specifies the start and termination time of the transfer. The business office calls the customer back to verify the request.



CUSTOMER DIAL TRANSFER . . . A customer dials a four-figure code from his own telephone, the last four figures of his number, then the last four figures of any Morris number to which he wants his calls transferred. To terminate the transfer, the customer dials from his own phone another four-figure code plus the last four figures of his number.



WHAT
MAKES

ECO WORK ?

"Eyes and ears, hands, a brain, electronic note pad and permanent memory" make the Electronic Central Office work.

Sounds almost human, doesn't it? Well, that's right. The Electronic Central Office is almost human. It resembles human activity in several striking ways.

For example, it has electronic eyes and ears which are called scanners—they watch for indications that people have picked up their telephone receivers and are beginning to dial.

The permanent memory is an extremely large, fast photographic memory called the flying spot store, which tells the equipment what to do next at every stage in the completion of a telephone call.

The electronic note pad is really a barrier grid tube that records dialed numbers and other temporary information.

The brain, which is called central control, coordinates the other units. It also directs the hands—the signal distributor and network markers—to set up the proper connections to complete the call.

Each complex function of this electronic "human" is accomplished by dozens of extremely high-speed actions. Because the equipment is so fast, these actions take place a thousand times more quickly than they do in present dial telephone systems.



CATHODE RAY TUBE...

like a TV picture tube. Used to read the information from the photographic plate.



PHOTOGRAPHIC PLATE...

about 560,000 "bits" of information are on each plate.



FLYING SPOT STORE

(PERMANENT MEMORY)

storehouse for 2¼ million "bits" of information in the permanent memory.



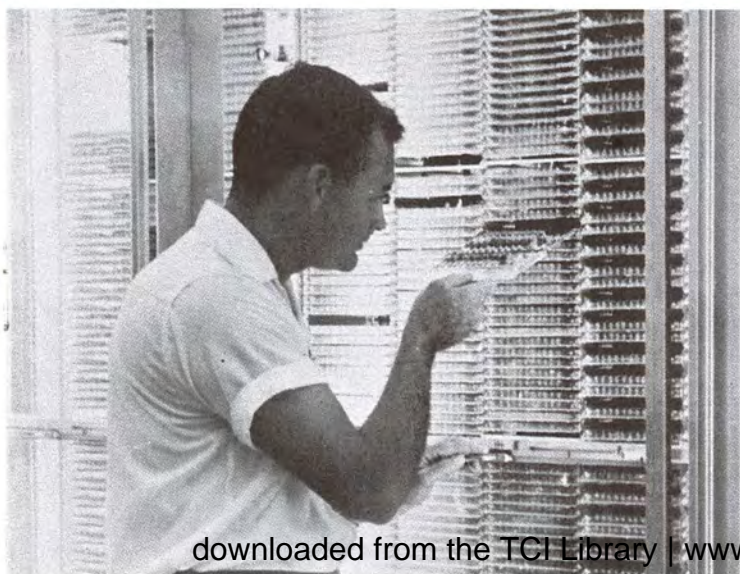
BARRIER GRID TUBE

(ELECTRONIC NOTE PAD)

"scratch pad" for temporary information.

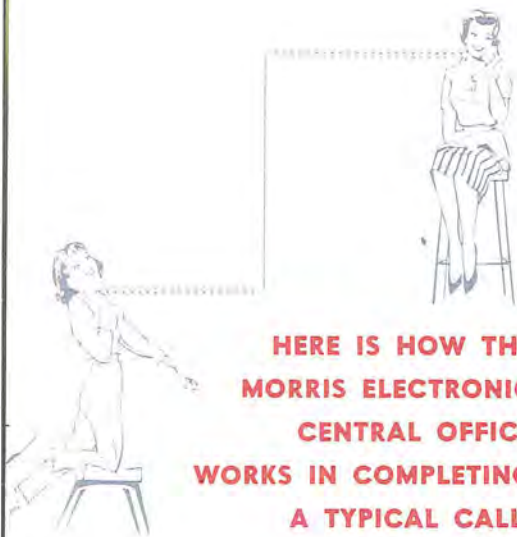


INSTALLATION OF ALL THESE COMPONENTS WAS COMPLETED BY WESTERN ELECTRIC COMPANY



Essential components of Central Control are plug-in packages shown at the right. Similar packages of equipment are used in the scanner — the eyes and ears — and the distribution and concentration markers—the ECO's hands. The switching network works through a series of trays of gas-filled glass tubes as shown at left.





HERE IS HOW THE MORRIS ELECTRONIC CENTRAL OFFICE WORKS IN COMPLETING A TYPICAL CALL:

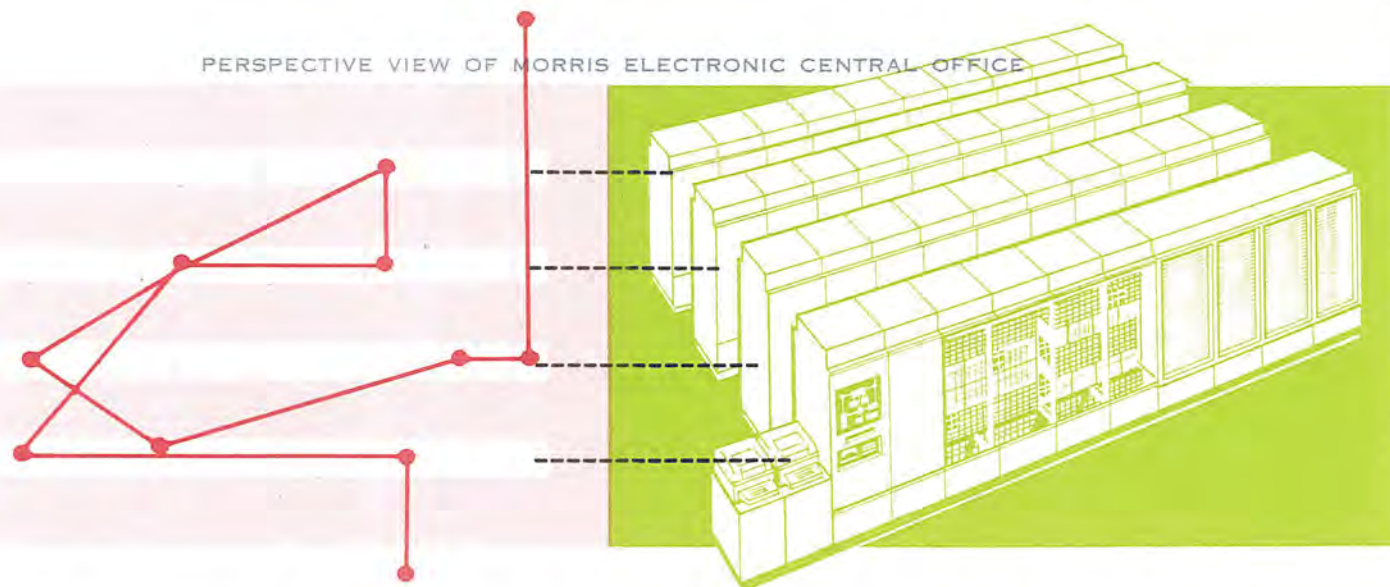
The scanner checks the condition of every telephone line ten times a second. When a customer picks up his telephone receiver to make a call, the scanner detects the action and reports it to the system's memory.

The temporary memory—the barrier grid tube—knows that this is a new call because its record shows that a tenth of a second ago the telephone line was not in use. It also reports that it has no record of anyone trying to reach this line, so central control decides that the customer wants to place a call.

Central control then sends a dial tone to the customer. This lets him know the system is ready to handle his call. At the same time, storage space is reserved in the barrier grid tube for the number to be dialed. The scanner now looks at this customer's line 100 times a second so it won't miss any dial pulses.

Let's assume this customer has abbreviated dialing, the special service which allows him to reach frequently-called numbers by

PERSPECTIVE VIEW OF MORRIS ELECTRONIC CENTRAL OFFICE



dialing two, instead of seven, digits. When this customer dials the two-digit code for his brother's number, the equipment first checks to see if he has abbreviated dialing service. After finding he does, the ECO recognizes the dialed code as the short form for the brother's telephone number. Central control then gets the full number from the permanent memory—the flying spot store—and directs the equipment to set up a ringing circuit to the brother's telephone.

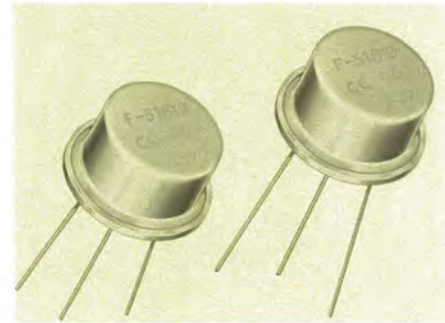
Someone at the brother's home picks up the phone. The scanner detects this within a tenth of a second. Central control orders the switching network to connect a talking circuit and drop the ringing circuit. This all is done before the person answering the phone gets the receiver to his ear.

Since each separate operation needed to handle any one telephone call takes only a few millionths of a second, the ECO equipment can easily keep up with the work involved in making hundreds of other calls during this time.

WHAT'S INSIDE ?

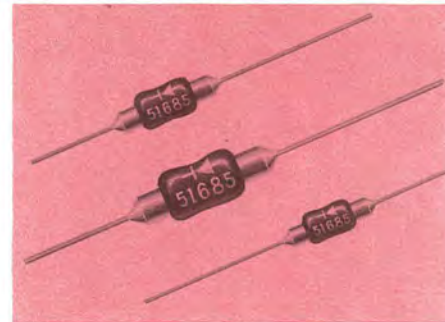
12,000 TRANSISTORS ...

the "mighty mites" invented by the Bell Laboratories — one of the devices that made ECO possible.



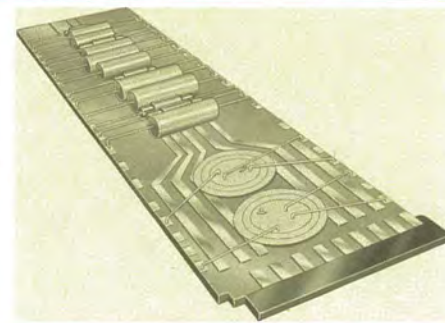
106,000 OTHER SEMI-CONDUCTORS ...

performers of myriads of jobs in the Electronic Central Office.



PLUG-IN PACKAGES ...

easy to change, specialized circuits of modern, compact design.



23,000 NEON-FILLED GAS TUBES ...

blinking "pathfinders" that help speed calls to their proper destination.



history of **ELECTRONIC CENTRAL OFFICE**

Communications scientists have believed for a long time that it would be possible to use electronic switching as a way to provide better, more economical telephone service. Research was started at Bell Laboratories in New Jersey before World War II to outline the eventual needs and possibilities of an electronic switching system. Much of the theory was developed in the immediate post-war period. Investigative work on the first practical ECO was carried on during the same period. By 1954, the development of components like small gas diodes, electronic memories and very reliable transistors made an Electronic Central Office appear feasible.

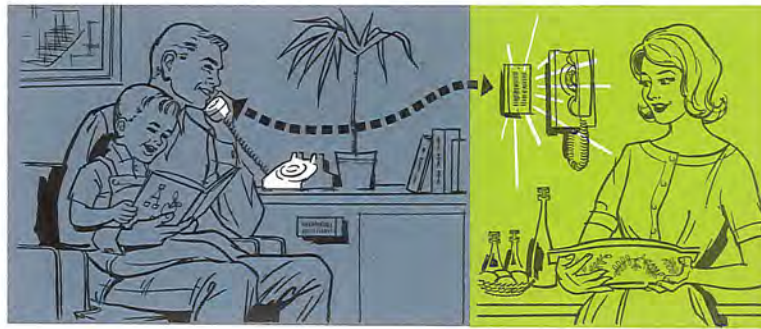
This intensive applied research and device development work was culminated on November 17, 1960, with the official dedication of the world's first Electronic Central Office at Morris and the beginning of a field trial of this modern equipment by a selected group of telephone customers in Morris.





YOU

and the **ELECTRONIC CENTRAL OFFICE**



It will be a few years before Electronic Central Offices begin to go into operation throughout the Bell System.

The Morris Electronic Central Office is, of course, an experimental model. Even as the Morris trial now is in operation, Bell System engineers are well along with the job of creating a production model, suitable for volume manufacture. It is planned that the first production Electronic Central Office will be designed, manufactured, tested, installed and operating in a few years. The site for this installation hasn't been chosen yet.

Additional Electronic Central Offices then will be introduced into the Bell System gradually, to meet the needs of telephone growth and to replace worn out central offices—just as other new switching systems have been introduced previously.



**MORRIS
ELECTRONIC
CENTRAL
OFFICE**

was designed
manufactured
installed
tested
operated
through the joint efforts of:

AMERICAN TELEPHONE & TELEGRAPH CO.
BELL TELEPHONE LABORATORIES
ILLINOIS BELL TELEPHONE COMPANY
WESTERN ELECTRIC COMPANY



and the telephone customers of Morris, Illinois