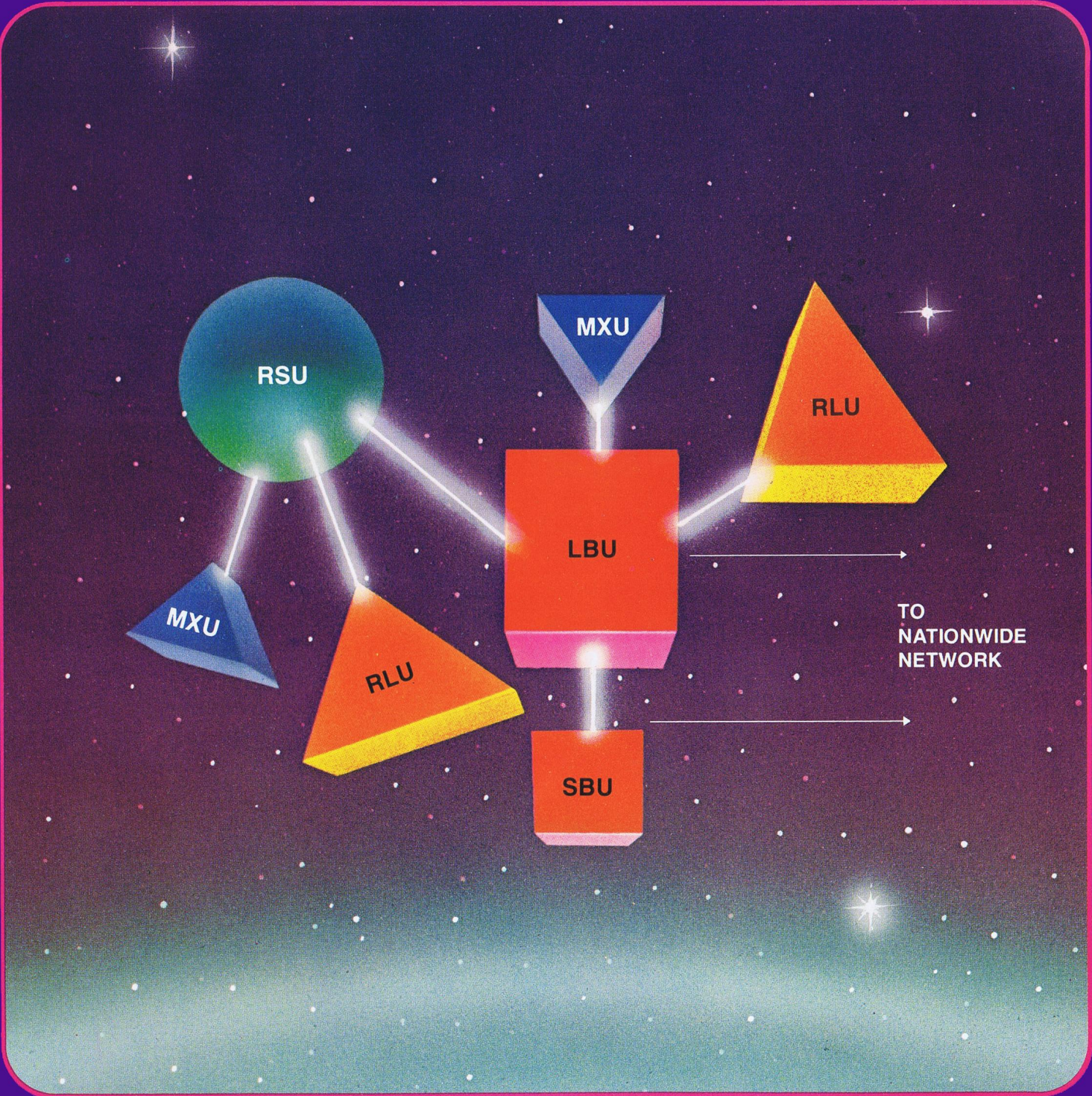GTD No. 5 EAX
The Talk Of Generations To Come

New Technology Opens Up a Broad Vista of Opportunities

GTE Automatic Electric now offers the most technologically advanced, totally integrated line of central office switching equipment in the telephone industry: our new GTD No. 5 EAX family of digital systems.

They are systems far beyond present state-of-the-art thinking. Featuring a new concept: Network Modularity. It enables you to establish a network of modular systems that can meet changing needs without costly sacrifices or replacements.

The key design strategy of our GTD No. 5 EAX family is two-fold: *distributed* processing, plus *centralized* maintenance, administration and control. This outstanding combination provides a new dimension of reliability, and far-reaching opportunities for economy throughout your entire operation.

GTD No. 5 EAX makes possible maximum integration of outside plant and switching equipment. It offers increased revenue opportunities, even in remote areas. And it features design innovations that offer dramatic savings in floor space.

GTD No. 5 EAX is the dawn of a new generation of switching systems. The dawn of an *affordable* future for your company.

The Systems of the GTD No. 5 EAX Family

GTD No. 5 EAX is a complete family of modular systems that can be interlocked and interchanged in a myriad of ways to suit present and foreseeable future requirements. All of them feature commonality of hardware and software. And redundancy of key components. And duplex processing. Each system is designed to function with high reliability.

Revenue-building features are provided by means of stored program control, so in many cases new features can be added by simply updating the software.

GTD No. 5 EAX is designed to meet today's requirements superbly, and to provide for future evolutions of the nationwide network. To make sure you'll never have an expensive surprise. Pulse code modulation (PCM) digital transmission is used at all points where one system must interface with another, so no conversion equipment is required for DS1 compatibility. And future switched services can be accommodated readily.

Here are the systems of the family:

LARGE BASE UNIT (LBU): A switching system that can start up economically at only a few thousand lines, and grow by easy increments to well over 100,000. Capable of functioning as host for a number of remote switching units, remote line units, and multiplexer units. May be installed for Class 5 operation only. May also be installed for Class 4/5 operation, in applications requiring toll switching.

SMALL BASE UNIT (SBU): A switching system arranged for economical start-up in Class 5 applications at only a few hundred lines. Capable of functioning as host for remote switching units, remote line units, and multiplexer units.

REMOTE SWITCHING UNIT (RSU): A small switching system designed to serve outlying communities requiring up to 3,000 lines. Configured for a central office environment, it can be used as a replacement for a CDO. It is linked to, and controlled from, a host base unit, and features survivability. An RSU can also be linked to another, co-located RSU; in such case, both feature survivability.

REMOTE LINE UNIT (RLU): A 768-line pair-gain system designed to serve densely-populated areas. Configured for a central office environment. Connects to a host base unit or remote switching unit via T1-type facilities. An RLU is designed so it can grow easily into an RSU when necessary, thus avoiding a costly changeout.

MULTIPLEXER UNIT (MXU): A pair-gain system intended for use in sparsely-populated areas. Designed for pole, pedestal or pad mounting, it serves up to 96 lines via one or more T1-type lines. Homes on a base unit or remote switching unit.

Why GTD No. 5 EAX is Today's Best Digital Investment

GTD No. 5 EAX systems offer an unparalleled package of advanced equipment features that make them your best investment in the digital central office market today:
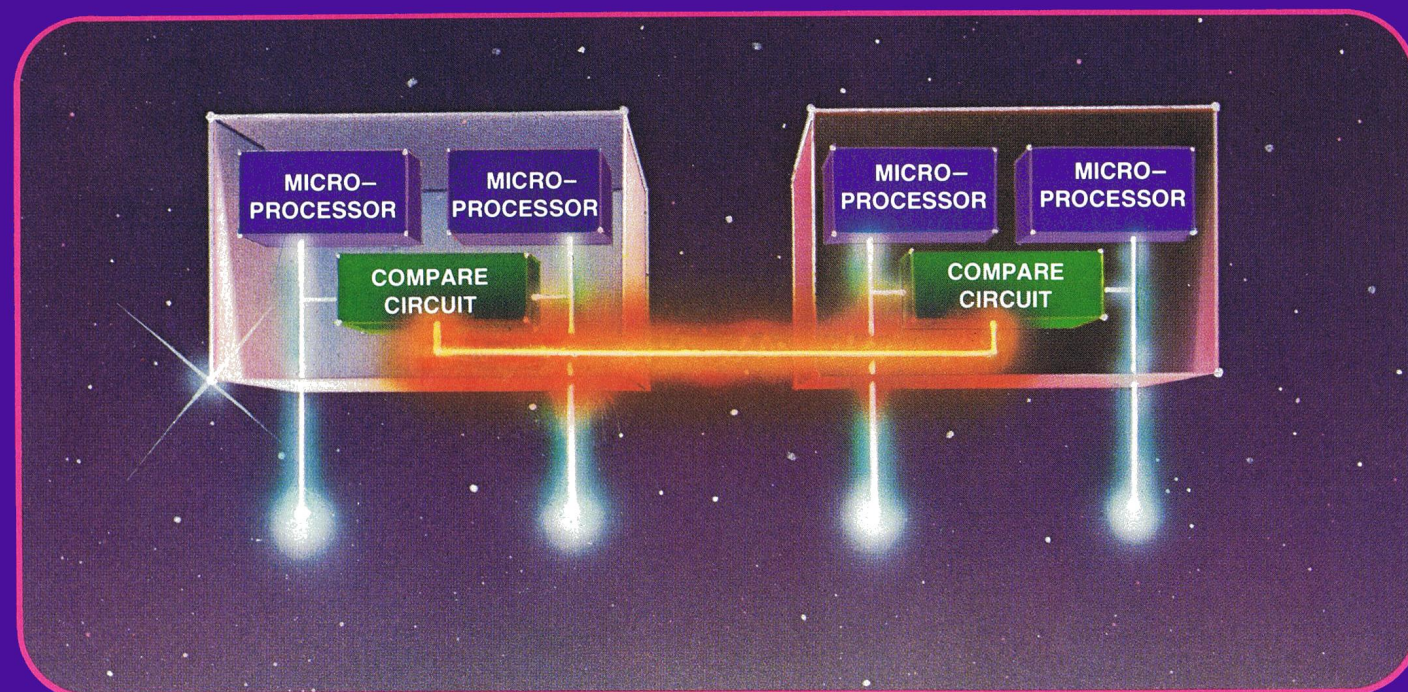
A New Dimension in Reliability

GTD No. 5 EAX features distributed microprocessors as well as a multi-microprocessor control system. The equipment in each sub-system takes orders from its own microprocessors. And the traffic load is distributed, so a malfunction in one section can't jeopardize the entire system.

Sub-systems are duplicated to assure reliability and help eliminate down-time. Sub-system redundancy, duplex processing and busing, equipment modularity and interchangeable parts combine to achieve a completely new dimension in reliability.

Extraordinary Commonality of Hardware

All GTD No. 5 EAX systems are designed on the same principles. So components such as line circuits, processors, net-

work and busing are identical for every system in the family.

This reduces your investment in components, simplifies stocking of cards. It also simplifies training for both administration and maintenance. And when the needs of your area change, the flexible, modular units in your GTD No. 5 EAX network can be expanded and modified. Without costly sacrifices or replacements. Even unanticipated growth can be quickly met.

Your investment is protected for long, fruitful years of customer-satisfying operation.

Simplified Maintenance

Each distributed microprocessor is located with the equipment it controls. Each has the processing power of the large central processor used in an existing stored program central office: that is, it performs scanning, timing, and control functions, plus interface with the central control via data links.

This greatly simplifies the central control, a most attractive equipment economy, particularly in smaller offices. It also simplifies maintenance, because a tiny, single-chip microprocessor with its supporting circuitry requires fewer cards. Which means that there are fewer cards to check. And the processors interface with exchange personnel in clear language, a great time-saver in trouble-shooting.

Extraordinary Commonality of Software

Due to the use of advanced software development techniques and a single, high-level language, the basic generic program is essentially the same for all GTD No. 5 EAX systems. And a single software package provides the particular features each system requires. So your people learn to work with GTD No. 5 EAX software quickly. And adaptations to meet changing requirements and provide new services are easy to make. Changes designed to take advantage of future technological advances and provide the features of the future will also be easy. The data base can be readily changed on-site.

Another GTD No. 5 EAX feature that protects your future is an extra large memory. For example, the data base memory of the base unit is expandable to 9,000,000 words. It enables you to offer an almost limitless variety of new-revenue services.

Centralized Maintenance, Administration and Billing

When GTD No. 5 EAX digital systems are installed to form a local network, administrative functions such as network traffic management and data base administration can be centralized at a base unit, or at a remote center. So can line and switch maintenance, with all trouble reports going to one convenient point for prompt analysis and action. Departmental duplication of effort is minimized. The result is higher efficiency and impressive savings in man hours.

Billing can be handled centrally too, for additional efficiency and economy.

An Innovative Approach to Network Planning

The traditional plan for a typical network required an individual central office to be sited in each community served, complete with its own stored program control. This often meant that a different package of customer features was provided in each office area. Functions such as maintenance, administration and billing were provided locally, thus causing considerable duplication of personnel and equipment. And large numbers of cable pairs were needed to provide adequate trunking between offices. It was a costly arrangement that limited the yield-potential of the network.

The new, innovative approach to network design is the consolidation plan. A base unit is installed at a strategically-located site, and remote units home on it. So costly stored program control equipment is required only at the base unit instead of being duplicated at many locations. This effects a substantial economy in equipment cost. And since control functions, features and customer services are provided by the base unit, only
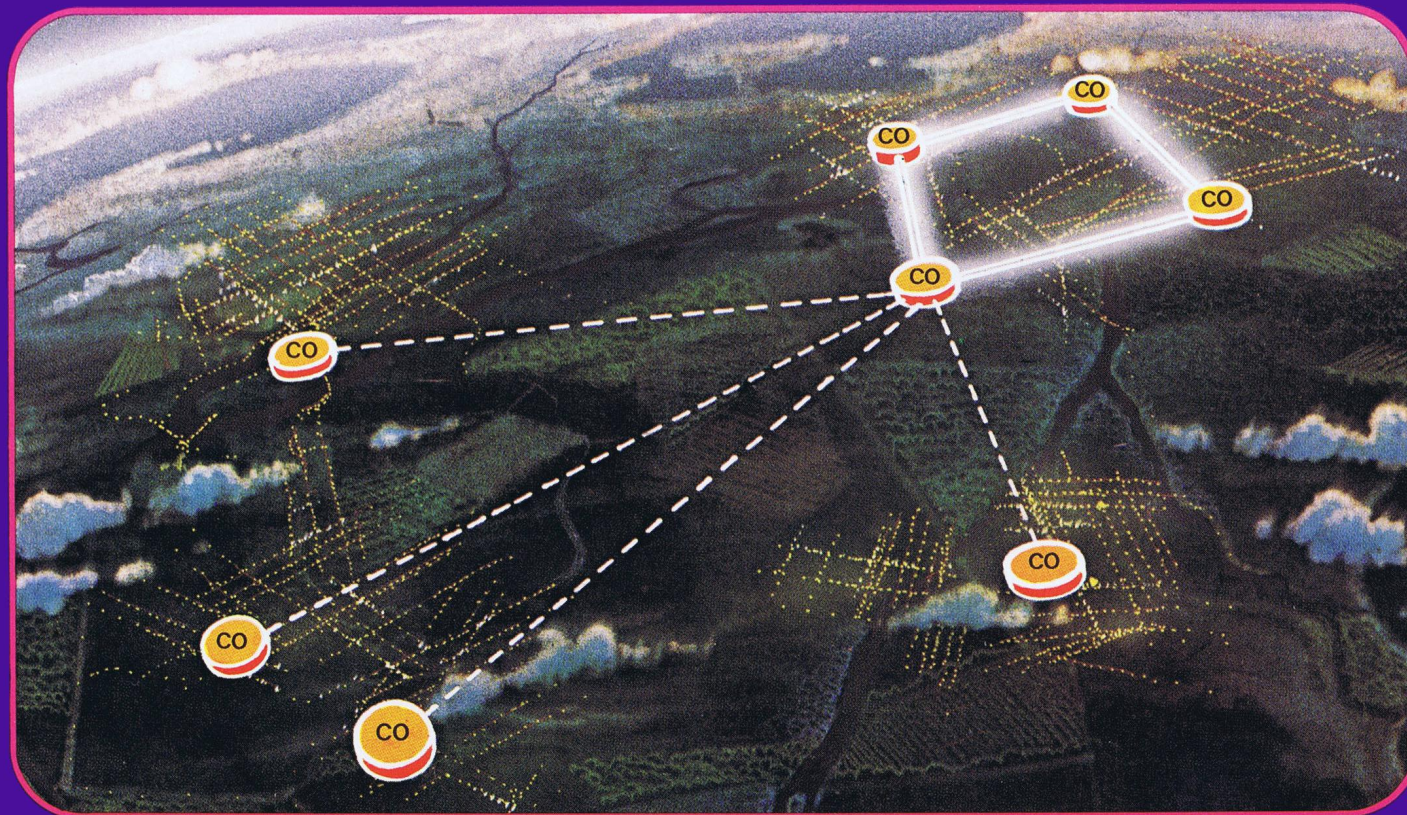
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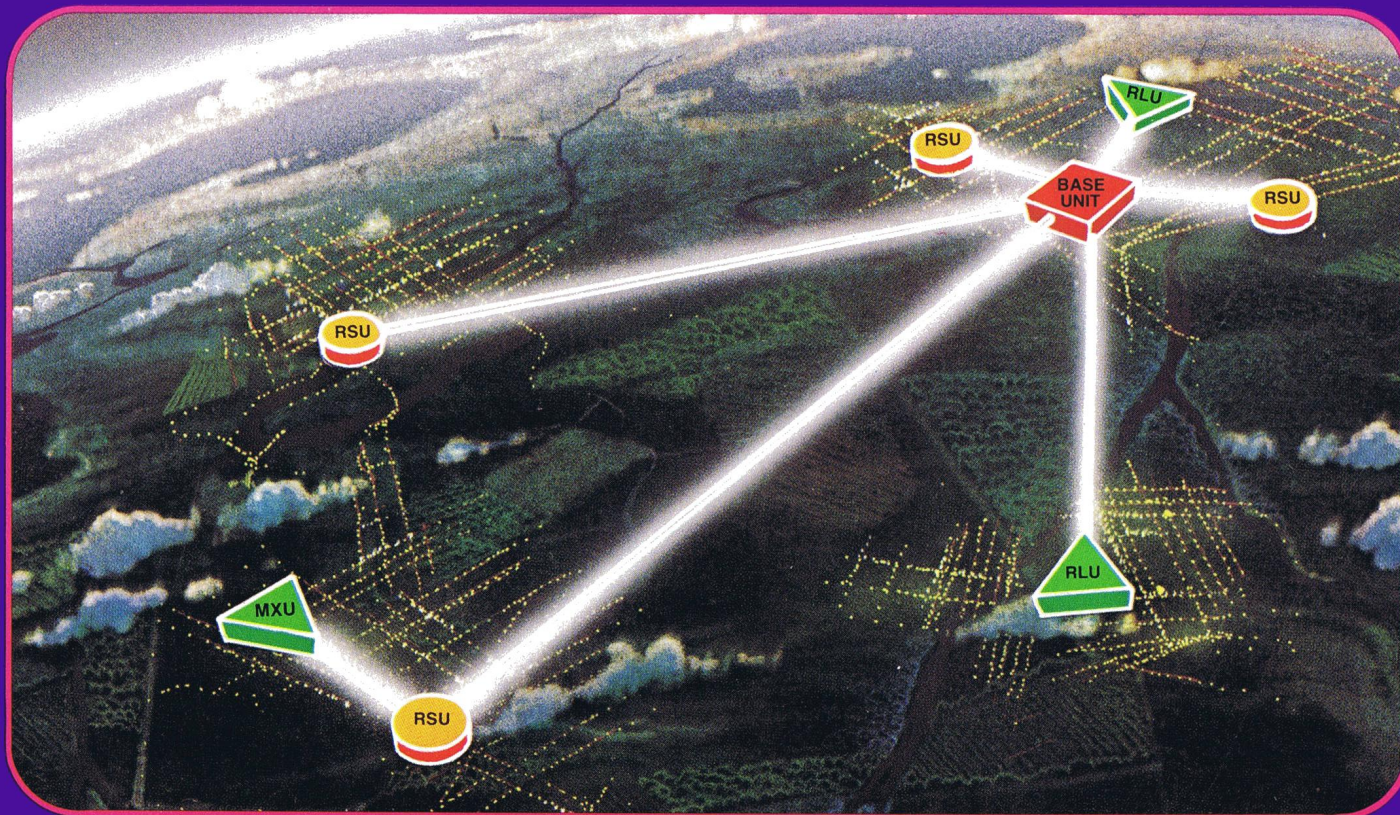
Consolidation Plan

one location requires updating. Another plus-point: where applicable, the same features are available throughout the network. This makes it possible to use mass media such as radio and TV to merchandise new feature offerings.

A consolidated network adapts itself readily to centralized maintenance, administration and billing. Together, they effect a far-reaching reduction in man hours, and make the entire operation more efficient.

Trunking is vastly simplified, too. Only a few T1-type lines are required instead of hundreds of physical pairs. And since control is at the base unit, links are required only between the base unit and the remote units.

Lower equipment costs, impressive man hour savings, pair-gain economies, and network-wide promotion of extra-revenue features: combine them and you have network operation featuring greater productivity at lower cost. Or, to put it another way, an unprecedented high yield.

Impressive
Space Savings
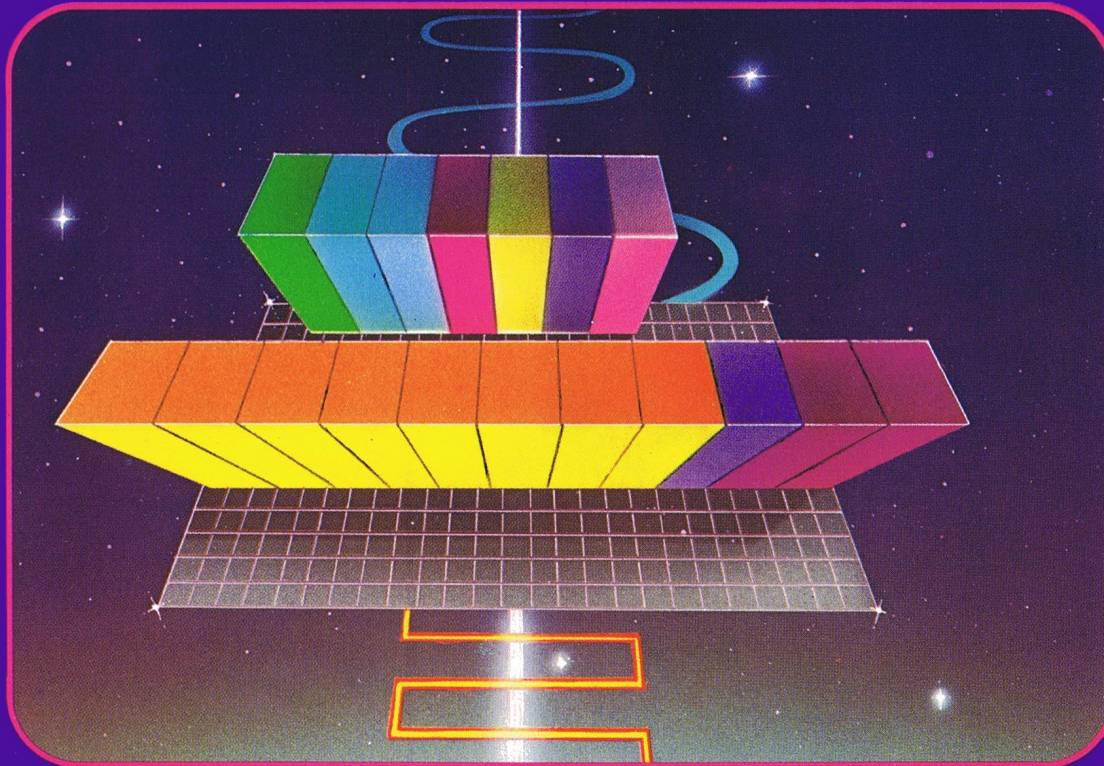
GTD No. 5 EAX systems provide substantial economies in floor space, compared to any other digital central office equipment. This can cut construction costs by reducing the size of a projected new building, or by eliminating the need for new construction altogether.

The floor plan shows a GTD No. 5 EAX base unit equipped to serve 3,072 lines and 384 trunks. Only about 150 square feet are required.
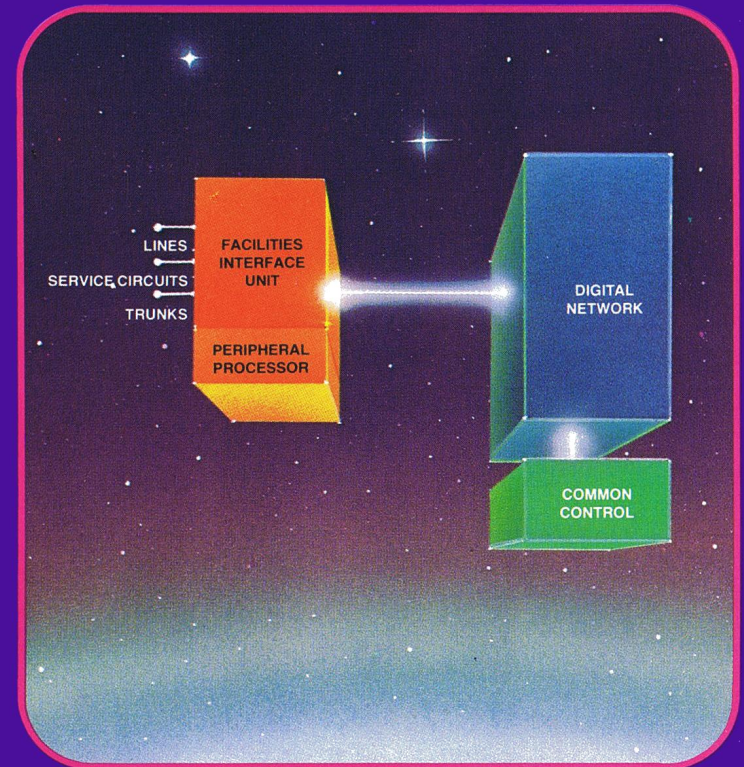
Meeting Changing Needs Economically

The illustration shows the basic organization of a system in the GTD No. 5 EAX family. All lines, service circuits and trunks terminate on a facilities interface unit (FIU), and complete control is provided by duplicated peripheral processors. Interface with the digital network is

via duplicated 192-channel PCM buses. Modular design of all components and sub-systems enables a system to grow in size and capabilities, easily and economically.

GTD No. 5 EAX Line Circuits Offer Outstanding Features

- Integrated PAM bus assures high quality transmission, streamlines backplane design.
- CODEC per line minimizes crosstalk.
- Ring trip, loop sense, and dial pulse sensors eliminate metallic path to semiconductors. Permit you to use existing central office protectors without modification.
- Universal line card featured in all GTD No. 5 EAX systems. Cuts inventory requirements. Simplifies training and maintenance.
- Selectable network balance allows one network to serve all loaded and non-loaded facilities.
- Primary/secondary testing isolates outside problems from those originating inside. Simplifies trouble-shooting. Eliminates unnecessary trouble trips.

A New Dimension in Maintenance Economy

GTD No. 5 EAX is destined to set new records for maintenance economy in central office switching systems.

Stopping trouble before it starts
The equipment is engineered to minimize potential *sources* of trouble.

Microprocessors and other key components are duplicated for security.

Automatic routining maintains constant vigilance over the operation of each system. Related microprocessors constantly check each other.

Should trouble be encountered, key information regarding it is displayed on the maintenance and control console at the base unit, or at a maintenance center. A trouble report is also printed out. By checking the printout or display, and related diagnostic information, a maintenance man can readily determine which system in a local network has developed trouble. He will also determine the nature and specific location of the fault, so that prompt remedial action can be taken.

Simple corrective procedures
Line circuits, trunk circuits, network circuits, and processors are all on plug-in cards. Should one of them malfunction, it can be replaced promptly. Once a card has been replaced, the maintenance man requests a diagnostic verification to make sure that the trouble has been completely corrected. The defective unit is then sent to GTE Automatic Electric for repair.

Our Investment Protection Plan

We offer a comprehensive, four-point plan that protects your investment in GTD No.5 EAX. It makes sure that your equipment will be compatible with existing service in your area—and that it will be ready for changing trends and the features of the future. It is positive assurance that when you buy a GTD No.5 EAX system you are making the right decision.

Our four-point plan:

1. Extra-Revenue Features Available on a Network-Wide Basis.

GTD No.5 EAX enables you to offer modern Custom Calling services to *all* your subscribers. This revolutionary concept is made possible by a memory that grows easily to 9,000,000 words—an expandable data base that permits you to assign features as needed to every subscriber in your network. It also gives you extensive reserve capacity for the features of the future.

2. Automatic Message Accounting for Local and Toll Operation.

GTD No.5 EAX develops automatic message accounting far beyond its previously known capabilities, and gives it a whole new dimension. Take for example, usage-sensitive pricing that permits you to provide detailed billing for all local and toll calls. It's built into GTD No.5 EAX—so you can activate it quickly and easily, should the day come that you need it. And our AMA recording equipment is designed to provide traffic analysis data you can use to make a historical analysis of your central office needs. This data can also help you centralize billing and administration.

3. Customer Service Diagnostic Center.

A customer service diagnostic center in GTD No.5 EAX gives you the controls you need for fast, effective analysis and correction of service troubles.

- Computer-controlled automatic routing of lines and trunks identifies equipment that affects customer service.
- Automatic transfer control assures uninterrupted service.
- Inboard diagnostic programs search constantly for malfunctions.
- Built-in system performance index evaluates quality of service.
- Easy-to-use commands make it easy to obtain prompt action.
- Versatile communications via video display and teleprinter terminals.
- Remote unit testing from base unit eliminates unnecessary trips to unattended offices.
- Remote unit memories can be updated and reloaded from base unit.
- Human-engineered system status and control display complex expedites service responses.
- "On-command" testing of individual circuits or selected groups of circuits.
- Sophisticated, dynamic debugging tools permit examination of software at specific points to isolate operational data.
- System diagnostics check hardware down to card or component level.

4. Full Range of Line Services—Built In.

With GTD No.5 EAX, every line service offered in a modern exchange area is built right into the equipment. For example, all commonly used ringing schemes are provided. So are all types of coin service including compatibility with ABC. You know that, whatever your particular needs may be, your equipment will be able to satisfy them.

The Big +
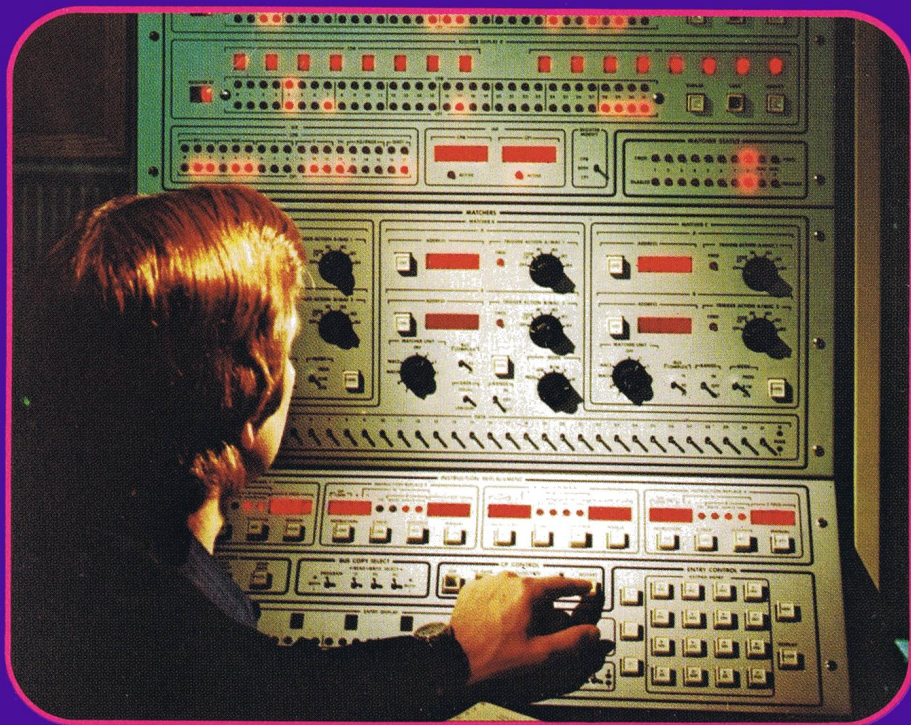
You get a big plus when you decide to buy your new digital equipment from GTE Automatic Electric: superior reliability.

We check everything with sophisticated testing equipment. For example, electronic components are given automated tests, prior to assembly on printed wiring cards. Then, each card is tested as a unit, and critical cards are given additional tests under conditions simulating actual operation. Finally, frames and cards are tested together.

It all adds up to less on-site testing, and earlier cutovers. And lower maintenance costs. And a whole new standard of dependable telephone service.

Let Us Help You

We're ready to work with you, whenever you say. We welcome the opportunity to study your service requirements and answer your questions.

Such as . . . where can you use digital equipment profitably? Which services can you offer economically? How should growth in lines, trunks and automatic message accounting be planned in your long-range program?

We'll be glad to help you find the answers. And to help you plan a switching system or a network that will give you the greatest return on your investment.

Ask our representative to arrange a consultation for you with our staff engineers.

GTE AUTOMATIC ELECTRIC

INNOVATORS IN ELECTRONICS

C-2022 10M 179M

PRINTED IN U.S.A.