

Coast-to-coast reservation system is to be in service by the end of this year, and will include 60 cities. Heavy black lines show basic communication network

# No Waiting for Reservations

**New York Central, New Haven and Santa Fe join forces to provide coast-to-coast Pullman and coach seat reservations to passengers in seconds**

HOW MANY TIMES has this occurred at a railroad ticket office window? A passenger wants a roomette to California, and when he makes his request, the agent says "I'll have to wire for it. I'll let you know this afternoon or tomorrow morning." And the passenger walked away muttering to himself. If the railroad passenger man could provide fast reservation information to customers, he would not only have sales, but satisfied customers who would never (well, hardly ever) think of traveling any other way.

## Electronics to the Rescue

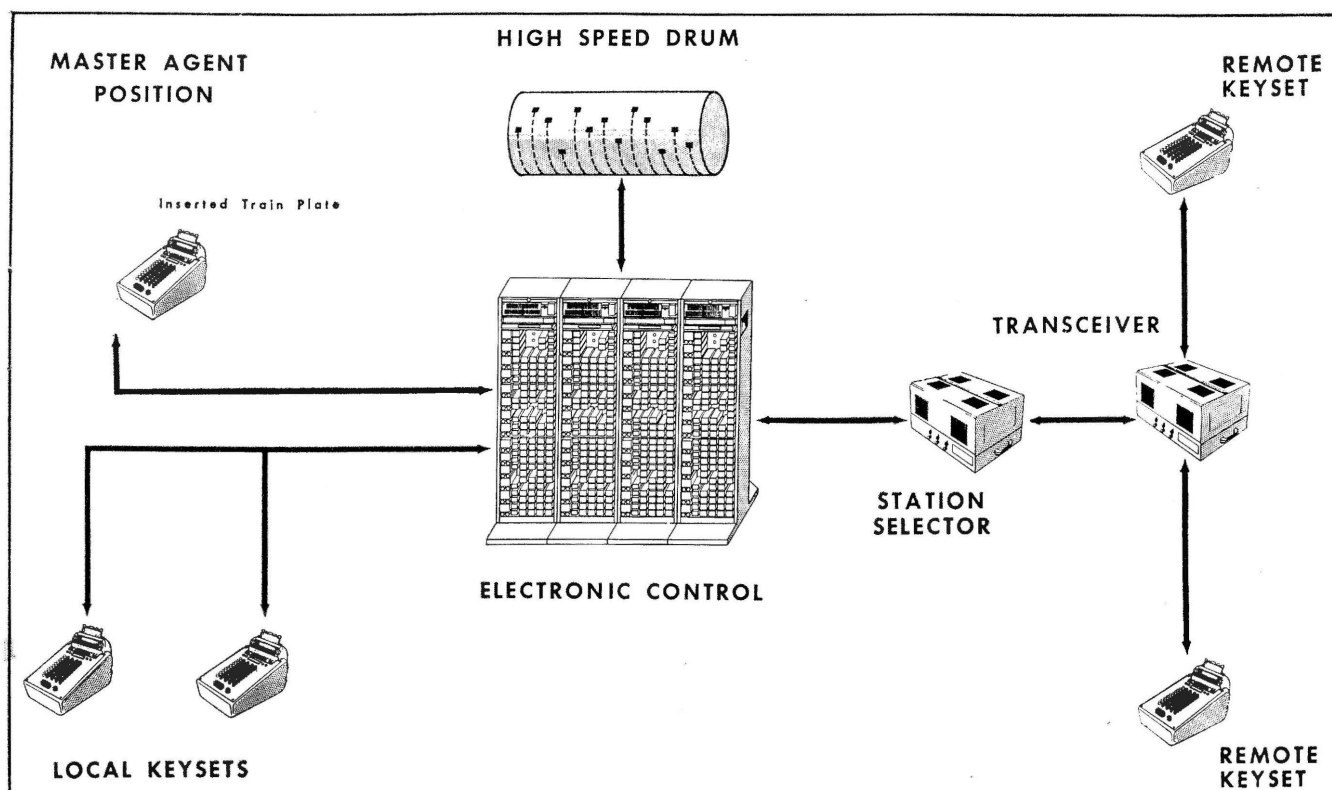
What electronics and "giant brains" have done for other American businesses is now to be applied to the railroads. But let's backtrack and see how it all came about. About five years back, certain railroads de-

cided that something should be done about the time-consuming process of obtaining sleeping, parlor car and coach seat reservations for their customers. They studied the situation, and came up with an idea that the miracle of electronics and special purpose data systems could solve their problem. They consulted The Teleregister Corporation, now a subsidiary of Ogden Corporation, who had developed and installed a nationwide stock quotation system. Because the basic principles employed in the Teleregister system would apply to railroad reservations, Teleregister confirmed this thinking—an electronic reservation system could be built with an initial provision for enabling a ticket agent to find out what space is available, and so inform the passenger within a few seconds.

The New Haven was the first to

contract for this system, but good news travels fast. The Santa Fe and New York Central joined the New Haven in creating a nationwide electronic communication system with data centers strategically located for handling reservations and allied problems. Some railroads have their own names for this new electronic reservation system, but the manufacturer—Teleregister Corporation—called it the Magnetronic Reservoir. Magnetronic is for the magnetic drum which stores the reservations, and Reservoir is from reservation supervisory control.

Basically the system consists of an electronic device for the storage of information on available, reserved and sold accommodations, and a means of reading out this information and changing it, from many remote ticket selling locations. The system, as now planned, will consist



Reservations by the drumful are available to be "read out" and sold to passengers. Local keysets and master agent positions are at large stations or "on-line" ticket offices. "Off-line" offices will have a remote keyset working through a transceiver

of 60 cities on the AT&SF, NYC and NH with agent's "keysets." The magnetic storage drums will be in New York City and Chicago, and will be able to store reservations for all trains of the three railroads for up to seven months.

### How It Will Work

Let's assume a passenger walks into the Dallas, Tex. ticket office of the Santa Fe and outlines the following business trip: Dallas to Chicago, Ill. and Providence, R. I. Our passenger wants a roomette on the Texas Chief to Chicago and on the Commodore Vanderbilt to New York, with a parlor car seat on the Bay State to Providence. He may request specific space if he wishes. The ticket agent inserts a train plate for the Texas Chief into his keyset (looks like adding machine) unit, depresses keys for the departure date, and operates the sell button. Within five seconds or less the set prints a slip for the desired space. This same procedure is followed for the space from Chicago to New York and New York to Providence. Cancellations can also be made in this same way.

The fact that space is reserved is recorded on the drum in Chicago and New York. At the end of each day, the electronic equipment automatically cancels all reservations

which have expired without being picked up, making the space again available for sale. Wait list and automatic car diagrams are also provided. The magnetronic reservator will handle automatically reservations and related transactions covering the sale, reservation and cancellation of space on all trains departing daily for a period of seven months in advance.

### Circuit Requirements

Several factors must be considered as to the communications circuits for the Teleregister system, the major requirements are listed below:

1—One call can be routed to more than one computer center.

2—One call generates two messages to two computer centers for independent handling.

3—All equipment, including the keyset, station selector equipment, communications equipment, maintenance costs and drum storage may be time shared.

4—Railroad lines, Western Union, telephone and Canadian commercial lines can be fully integrated.

5—Since all messages use standard pulsing techniques, are short and originate randomly, the selection of stations are extremely fast in comparison with conventional teleprinter switching systems.

6—All keyset calls involve a message from a keyset and reply back from the central point. To minimize delay, the line must be held during the data processing, even though the call is routed between computer centers.

7—Under normal traffic conditions, no station can be excluded from the use of the line facility. One station can be called every second, third, fourth or fifth call cycle.

8—Busy stations and key operating points must have maximum access to the line. Here one station may be called two, three, four or five times during one roll call.

9—Provision must be made for the central station to originate traffic to one or several selected keysets on the line.

10—Provision must be made for remote stations to direct traffic to the central station.

11—To achieve maximum speed at minimum cost, speeds up to 100 words per minute must be accommodated.

12—For minimum cost, the use of half duplex (single) circuit is desirable and can be used where traffic warrants. Provision has been made for use of duplex and combinations of duplex and simplex.

13—The selecting means must be capable of operation over facilities that include regenerative repeaters.

Signal quality must be maintained.

14—Priority and additional service must be made available to certain stations at central control during certain periods of the day.

15—Within a station this same flexibility must be available, provided one or more keysets is given more than one call during a normal cycle.

16—Provision must be included to bypass out-of-service stations. For example, some city ticket offices that are open only during normal business hours must be bypassed during their shut down hours.

17—The routing of the line must be based on customer requirements. It becomes economical for certain locations only at the inclusion of other customers.

18—Provision must be made for additional traffic and new customers. We can actually go to 30 stations, and 30 keysets per station or 900 input devices per line.

19—Sixty words per minute, 75 wpm and 100 wpm lines must be integrated into a data center of line.

### Circuit Operation

When idle, the communication circuit is in the closed or mark condition. All stations are set to initiate or receive an open or spacing signal. This signal is generated by a station whose agent set seeker has picked up an agent set with a message to send. The starting signal is received by all stations including the central control station. As soon as each station, other than the central, receives this open, it locks out its own ability to generate a start signal, and in addition connects its receiving distributor to the circuit.

The central point, upon receipt of the "open," prepares to send the one-character address of the first station in the roll call. It must delay this signal, however, to insure that the most remote station on the loop has received the start, and locked itself from sending a similar open. Sending of the one character address of the first station, triggers off all receiving distributors. The control checking circuitry at station "A" (first station), recognizes this address and determines if its agent set seeker has a connection set. If it has not (no message to send), it will generate the one character address of the second station (say "B").

When the roll call finally gets to a station with traffic to send, that station will send a de-activating character. This signal will cause all other stations receiving distributors control circuitry to ignore all further transmission until an interruption in

transmission in excess of one character time occurs. The station with traffic will immediately follow the "space" character with the keyset message. The central point will receive the keyset message and prepare for data processing.

As soon as the keyset message is received and one character time has elapsed, all stations receiving distributors control circuits are reactivated. Therefore, when the central point completes the data processing operation, it first sends out the "space" signal and then the reply-back message. The station which originated the keyset message has cycled to expect the reply-back, and feeds the reply-back through its receiving circuit to the originating keyset.

After the reply-back, the central point waits at least one character time and then sends out the address of the next station in its program. The fact that the central point has the option of restarting the roll-call at any station provides a ready means for giving heavily loaded stations preferential treatment. For example, the central point could always restart the roll call at the heaviest loaded station regardless of what station has just transmitted, or could always re-send the address of the station that has just transmitted to determine if more than one set has traffic. By this means, a predetermined number of trials of each busy station could be made.

### Sending With Tape

Any remote station that can originate traffic must also have the ability to send from perforated tape. As far as the selector equipment is concerned, this station will be the same as any other station. Since transmission is from tape, there will be no interruption in transmission to al-

low receiving circuits to restore to the select condition while sending is in progress. The central point will recognize the incoming message as destined for a keyset printer rather than the data processor and will provide the routing.

The central point can originate traffic to stations on the circuit. These keyset printers will be assigned station codes only if they are not normally part of the roll call. The selector equipment for the associated keysets at the station will also serve these keysets. If several keysets are required to receive certain messages, specific addresses will be used for the multiple connection case. For example, if two keysets are in this category, address A would pick up one, address B the other and address C would pick up both.

### Central Station Monitors

The central station will monitor the progress of every roll call. If a particular station fails to act on the receipt of its address, it will time out and then send the address of the station beyond that of the station that fails. It will also indicate that this condition exists. This will enable control station personnel to set the control station to react immediately to the address of the fail station, and thereby eliminate the time out on each roll call. This feature will be used for part-time stations, so that there can be shut-downs when the rest of the system is operating.

If a period of no traffic persists while the system is going through a roll call, the central station will keep track of the stations answering with "no traffic" until all stations have so responded. The central station will then send out a switching character different from any station address (say "Z"). "Z" will restore all remote stations to the "line idle" condition.

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## Adapted to Freight Service

Teleregister engineers have been devoting considerable research to the problem of ticket accounting, and it is projected that provision for this operation will be embodied in the overall system. The electronic reservation system could be adapted to freight car location information, such information being stored in a magnetic drum. Every time a car went through a major yard, that fact with the time and date is sent via communications

circuits to the central location. This same tape could be read into the drum. Freight traffic offices would have keysets, which would enable an agent to select a car and "read out" the latest information concerning that car's location. According to Teleregister Corporation, the freight car system is basically the same as the passenger reservation system, so that an electronic freight car locator service may be "just around the corner."



in a facsimile machine for sending to outstations for pick up if the customer so requests. In this latter instance, when the customer picks up the space at the outstation (down-town city ticket office), this outstation transmits a sales confirmation report which is authorization for the central bureau to remove "reserved"

space from the reservation file and mark as "sold." In all cases, time limits are controlled by the central bureau.

The new sales and service bureau is expected to be in operation by the end of this year. Overall lighting is to be 50 ft. candles, which is sufficient for cameras and personnel. The

cameras, monitors and receivers operate on 115 volts a.c., and are connected via coaxial cable providing a closed-circuit TV network. The equipment was manufactured by Dage Electronics division of Thompson Products, Inc. The facsimile equipment is Western Union's Intrafax.

## Facsimile for Industrial Ticket Sales

Travelers in New York City will be able to have their Pullman and reserved seat coach tickets reproduced for them in their own offices by direct facsimile transmission from Pennsylvania Station, that will eliminate the necessity for going to a ticket office. This will be made possible by the use of a special Western Union Intrafax private wire system linking the new \$2,000,000 ticket sales and service bureau now under construction at Pennsylvania Station with scores of large industrial companies and other organizations regularly using rail travel. As now planned, the system will link firms in Greater New York City, but it is expected that its wires will be extended later to suburbs within a 25-mile radius.

The Intrafax system leased by the railroad from Western Union will provide instantaneous two-way facsimile communication between the Pennsylvania and any of its customers who subscribe to the service. Each subscriber will be equipped with a sending and receiving facsimile machine, about the size of a typewriter. Into that machine will be fed the requests of officials and employees for tickets and reservations. The operator will merely place a special form provided for the purpose on the machine and press a button. Instantly the form whirls before an electric eye and an exact reproduction is received by the railroad as a picture reproduction of the original form.

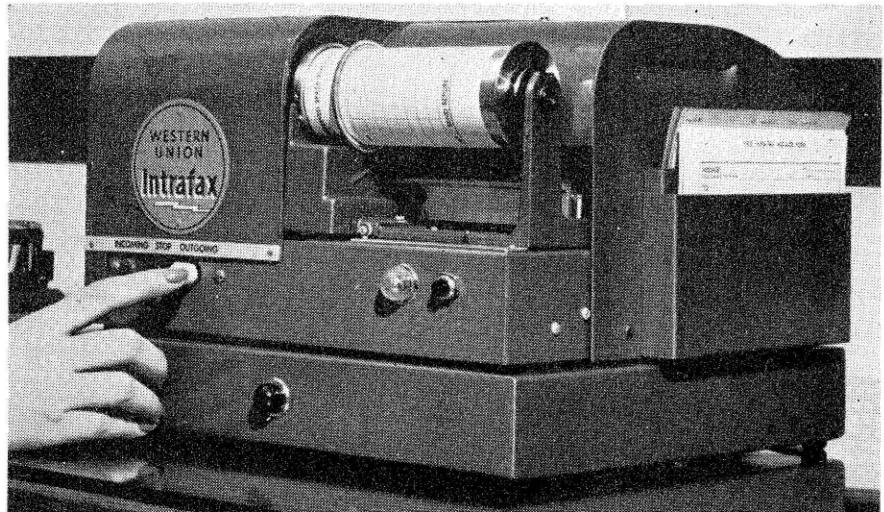
When a Pullman reservation is desired, the receiving clerk checks the availability of the space for the train and date, pulls the appropriate master ticket (similar to a theatre ticket) for the berth or bedroom from the "unsold" rack and transmits it to the customer. The clerk then time-stamps the master ticket and places it in the "sold" file. A further record of the transaction is received by the railroad on an Intrafax monitor from which the customer's bill is prepared.

The facsimile Pullman or coach ticket that is sent to the customer's office becomes the only valid and usable voucher for his reservation. It arrives in a three-part form: (1) the passenger's Pullman or reserved coach ticket which he presents to the conductor; (2) the passenger's receipt; and (3) the stub which provides an office record for the subscribing firm.

If it becomes necessary later for the

customer to cancel the reservation, he can do so with equal facility. He marks his ticket to indicate that it is to be cancelled and transmits it on the Intrafax

system back to the railroad. The railroad then takes the master ticket from the "sold" file and can resell it without loss of time.



Facsimile machine for sending and receiving messages, reservations and tickets



Facsimile equipment in Penn Station: switchboard in center; incoming messages received at left; outgoing reservations or messages sent by scanner at the right