

## **CENTREX SERVICE**

### **CROSSBAR TANDEM**

### **APPLICATION WITH STEP-BY-STEP CENTREX**

#### **GENERAL**

Crossbar tandem can be modified to serve step-by-step Centrex installations with various combinations of originating and terminating treatments.

The originating arrangements permit the handling of "O" operator calls, single message unit local calls, service code calls and operator identified CAMA calls.

On these direct outward dialed calls, the tandem provides dial tone via the Centrex trunks to the extension user or Centrex attendant. The message unit and CAMA calls are billed to the listed or trunk number. Extension identification is available on CAMA calls, but only on an operator identified basis. While the tandem can handle single message unit non-timed calls and service code calls, it is suggested that considerable thought be given to the costs of line haul and back haul, and the relative costs of switching through tandem vs. switching through a local dial office.

The terminating arrangements provide the ability to route direct from tandem to a Centrex customer having his own office code, or to route direct to as many as sixty customers on each of ten shared codes. On shared codes, the routing can be direct to the extension user or to the listed number. These arrangements are covered in more detail in the equipment section.

#### **EQUIPMENT**

##### **Direct Outward Dialing from Step-by-Step Centrex Customers**

Arrangements for step-by-step Centrex customers to dial out to the world require direct access trunks to the crossbar tandem. After dialing an access code (such as "9"), the subscriber receives second dial tone. He then dials the desired number. He cannot dial the one-prefix plus seven or ten digits as the tandem is not arranged for this.

The billing process varies. If the call is to a point which is a single message unit without overtime charging, a message register associated with the trunk scores when a completed call is disconnected. All other chargeable calls are billed by operator identification of the Centrex extension number or the directory number.

The DP Sender SD-25999 can be arranged to:

- (1) Upon receipt of a Centrex class of service mark, send second dial tone to the Centrex extension or attendant.
- (2) Handle single digit ("O" operator) and three-digit (X11 and 11X) service codes.
- (3) Permit either CAMA service observing or local dial service observing on incoming trunks from Centrex customers.

The markers can be arranged to:

- (1) Discriminate between Centrex and non-Centrex originated traffic.
- (2) Determine from the route relay whether the call is AMA-charge, message register charge or non-charge.
- (3) Send the proper routing and charging signals to the sender.

The message registers are located on a message register frame in the tandem office.

##### **Direct Inward Dialing to Step-by-Step Centrex Customers**

It is possible to employ crossbar tandem to dial direct to Centrex extensions where a central office type code is unique to a Centrex customer or is shared by more than one Centrex customer. The sharing is accomplished by assigning to the Centrex a number series within a central office code used for Centrex purposes at the crossbar tandem, with each extension assigned a standard seven-digit number. As many as sixty Centrex customers can share one central office code. The marker can be arranged

to recognize the shared office code and arrange for six-digit translation, using the office code and the first three digits of the extension number. This permits reservation of numbers in groups of ten, so that the entire number series is used most efficiently.

The call is routed over a direct trunk group to the Centrex, where the outpulsing of the digits directs the equipment to the attendant or to the proper extension.

Six-digit translation is required where:

- (1) An office code is shared by more than one Centrex. This is the normal condition—non-sharing the abnormal condition.
- (2) The number of digits outpulsed to a Centrex extension is different from the number outpulsed on calls to the Centrex attendant.
- (3) Separate trunk groups are provided for the attendant and for extension users.

The Translator Frame handles a maximum of five Centrex central office codes and/or foreign area codes per pair of translator frames. The crossbar tandem is limited to two pairs of translator frames or ten codes. For each code, the equipment can arrange for sixty different routings. One routing is required per Centrex per quantity of digits to be outpulsed. Also, one routing is needed per code for calls to unassigned numbers.

On a call to a Centrex central office code, the marker signals the sender to try again after receipt of six digits. On calls of this type which are preceded by the home area code, the marker sets up a "loop back" connection. This loops the call through the

office link frame back to the trunk link frame, coming in with the home area code deleted. Three marker seizures are required to complete this call.

For calls to an official Centrex the marker can discriminate among:

- (1) Local calls to extensions to be handled free.
- (2) Toll calls to extensions. These require answer supervision in order to charge for the call.
- (3) Local calls to the attendant to be handled free.
- (4) Toll calls to the attendant. These require answer supervision in order to charge for the call.

The MF Sender SD-27024, DP Sender SD-25999, and PCI Sender SD-25961 can be arranged to recognize the marker signal requesting release and re-seizure when six digits are registered. Also, they can send the thousands, hundreds and tens digits to the marker, can outpulse (as received) one to seven digits to reach an extension, and can reach an attendant on a straightforward basis.

When all trunks to a Centrex are busy, 60 I.P.M. tone is returned. The No Circuit Signal Trunk has been modified to permit its use for this function.

#### **Equipment Quantities**

The provision of equipment for Centrex at the tandem will be determined in accordance with the T.E.P., Division D, Section 6, and with the various letters relating to that section.