INTERCEPTING SERVICE - TRANSMISSION FEATURES

OVER-ALL CONSIDERATIONS

CONTENTS

1. GENERAL

1.01 This is the first in a group of four sections covering the general transmission features and engineering considerations of intercepting service.

1.02 Information concerning specific transmission considerations is contained in related practices as follows: Section AB22.172.2 - Intercepting Service - Transmission Features - Central Office Arrangements; Section AB22.172.3 - Intercepting Service - Transmission Features - Operators with Voice Controlled Positional Gain Units; Section AB22.172.4 - Intercepting Service - Transmission Features - With Announcing Machines.

1.03 Intercepting service is a means for handling calls made to exchange line numbers which are vacant, disconnected, changed or in trouble. Intercepted traffic may be handled either in the office in which the call is terminated (local intercepting service) or may be handled at a centralized point (centralized intercepting service) to which the calls from several offices are routed.

1.04 Because of transmission and circuit complications, no provisions are made for completing any intercepted calls, or for identifying intercepted toll calls.

1.05 One of the major problems in intercepting service is control of a wide range of transmission volumes. Calls reaching intercepting service may be from zero length loops within the same building to a maximum length loop over the most distant trunk encountered. The difference in transmission can be in the order of 30 db. With gradual reduction in trunk losses as now planned, this range in transmission will probably be reduced to less than 20 db.

1.06 Intercepting positions may be employed on a call distributing or key-ended trunk basis for a combination of services (i.e., rate and route, toll information, intercepting and local information services in a prescribed order of preference). The volume of the auxiliary service traffic will influence to a large degree the extent to which these various services may be advantageously combined at a line of desks and also the type of circuit which should be used (call distributing, straightforward or key-ended trunks).

1.07 Intercepting service will have no reactions on automatic message accounting or centralized automatic message accounting since the incoming trunks are arranged for "no charge condition."

1.08 Fig. 1 is a block diagram showing a modern centralized intercept service arrangement.

2. TRANSMISSION CONSIDERATIONS

(A) General

2.01 With extended area service and the increasing application of nationwide subscriber toll dialing, the number of instances of subscribers reaching intercepting service will increase. Instead of reaching the called number as expected, the calling party will be answered by the intercepting operator or connected to a machine announcement. Any misunderstandings resulting from poor transmission on these intercepts would probably be accompanied by unfavorable customer reaction. With either operator or custom toll dialing, the importance of good intercept transmission can not be overestimated.

(B) Local Intercepting Service

2.02 Where intercepted traffic is handled in a terminating manual office (local intercepting service) there are no special transmission considerations since there are no trunks between offices involved. This is also true in crossbar type central offices as calls intercepted in these types of offices are subjected to normal central office losses only. However, in step-by-step and panel type central offices, intercepted calls are subjected to normal central office losses, plus an additional loss resulting from the multipling or bridging of connector or final terminals at the intermediate distributing frame. Since transmission on intercepted calls in these offices is degraded by this additional loss, it is important that it be controlled. Usually if not more than six or seven terminals (telephone number) are bridged to one trunk, the resulting transmission will be satisfactory. Under normal conditions, the average number of bridged terminals per trunk will probably be in the order of six or less. However, after cutover of initial equipment, or an addition, it may be necessary to assign trunks on a more liberal basis than normally provided. While it is recognized that during interim periods this loss must of necessity be relatively high, the objective is as low as economically feasible, depending upon local conditions. Information on calculating this bridged loss is contained in Section AB22.172.2.

(C) Centralized Intercepting Service

2.03 Centralized intercept service involves a trunk between the intercepted central office and the building where the centralized intercepting operator is located. The transmission design of these trunks should assure minimum losses.

2.04 It would, of course, be desirable to operate these trunks at as low a loss as practicable as some of the intertoll calls intercepted may already approach limiting loss for satisfactory understanding of the more difficult subject material, i.e., names and numbers. This would mean operating these trunks at via net loss, if this can be done economically. However, for trunks in the range of say 0 - 2.5 db it may not be possible to justify the addition of the necessary repeaters or the use of other facilities which would reduce their loss to the desired objective. Engineering judgment should be applied in such cases.

2.05 In computing the loss of intercept trunks, the loss of the transformers (repeating coils) in the "outgoing" and "incoming" intercept trunk circuits should be included. Also, for trunks from local step-by-step and panel type offices an allowance should be made for the additional bridged loss encountered on intercepting service in these types of offices. This principle should apply whether designing trunks for use with the negative impedance (E-type) repeaters, or voice controlled positional gain units. For details, see Sections AB22.172.2 and AB22.172.3.

2.06 With the present availability of E-type repeaters, the cost of providing low loss trunks for centralized intercept should usually be much lower than before these repeaters became available. This tends to make the use of the voice controlled gain units at the centralized intercept position generally less attractive than previously. Furthermore, the provision of gains in the trunk rather than in the receiving leg of the operator's circuit should, in the average case, give better results.

2.07 The voice controlled positional gain units were first installed in about 1946 and were very helpful when "V" repeaters were the only method of reducing trunk losses. In some cases room noise was a controlling factor and the high receiving gain served to override this noise. The operator's voice controls whether the unit is in the transmitting or receiving condition and the unit provides receiving gains in the order of 8-14 db depending on the level of incoming speech, and transmitting gains in the order of 4 db.

2.08 In view of the preceding information, there should usually be no need to balance the added cost to reduce the loss of the trunks to the range recommended in Paragraph 2.04 against the cost of providing the voice controlled gain units in the operators' positions. However, where the cost of reducing the trunk losses would be very high, or other special conditions exist, a rough study might be worth while. Unless the savings were very large, however, the low loss trunk plan would be preferred. In some cases where unusually high room noise exists, both instrumentalities might be used.

2.09 Where negative impedance (E-type) repeaters are used, they may be located at either end of the trunk or at an intermediate office. Generally, the ET arrangement should be considered in view of better gain and return loss performance. Details of design for the negative impedance (E-type) repeater may be found in the AB sections on this type of equipment.

2.10 Trunks working into centralized locations equipped with voice controlled positional gain units may be in the order of about 4 or 5 db and still obtain equivalent VNL operation.

2.11 To keep the number of trunks to the centralized point to a minimum, concentrating equipment is provided between the line terminals and these trunks in step-by-step and panel type offices. However, special equipment is not required in crossbar type offices since a type of concentration is an inherent feature of crossbar.

2.12 Transmission considerations relating to intercepting operators' circuits and equipment, except for positions equipped with the voice controlled positional gain unit, are the same as covered in Sections AB22.171.1,AB22.171.2, and AB22.171.3. Information on the voice controlled positional gain unit may be found in Section AB22.172.3.

3. ANNOUNCING MACHINES

3.01 In the average office, about one-half of the intercepted calls originate via vacant or disconnected numbers. Announcing machine facilities are available for use in handling this type of intercepted traffic. With these facilities, calls reaching vacant or disconnected numbers may be screened from other types of intercept calls and automatically routed to an announcement machine. Provision is generally made for cutting through to an operator those customers who remain connected to the machine equipment after a predetermined number of announcements. In some cases, such as in community dial offices, all intercepted calls may be routed to an announcement machine only, with no provisions made for cutting calls through to an operator. At the CDO's the machine announcement generally ends by asking the calling party to call an operator if further information is desired. Further details may be found in Section AB22.172.4.

4. SERVICE OBSERVING ARRANGEMENTS

4.01 Single or multiline service observing circuits may be connected to the machine announcement or to the intercepting operators on a centralized or decentralized basis.

4.02 The transmission design of service observing connections from centralized intercept points should be adjusted to compensate for the loss of intercept trunks. The higher trunk losses associated with positional gain units must be recognized in the design of the service observing connections.

5. CENTRAL OFFICE ARRANGEMENTS

5.01 The introduction of machine intercept requires that the step-by-step, panel and crossbar systems recognize the difference between calls that should be routed to the announcing machine and those that should be handled by an operator. However, in the case of small community dial offices, it is now planned that all intercepted calls be routed only to a recorded announcement system.

5.02 Bridged capacitance encountered on intercepting service is not significant in crossbar type central offices. However, in step-by-step and panel type offices the bridging of a number of unassigned terminals to an intercepting trunk may result in excess transmission losses due to the bridged capacitance. For details, see Section AB22.172.2.

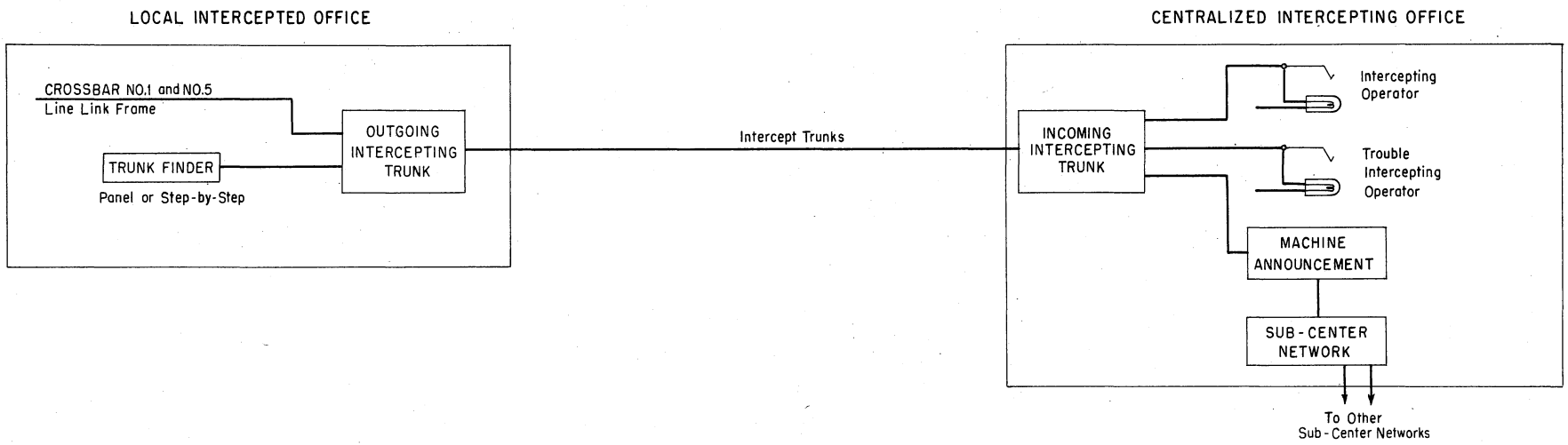

Fig. 1 - Centralized Intercepting Service Arrangements