MODIFICATION REQUIREMENTS FOR ZONE AND OVERTIME REGISTRATION EQUIPMENT DESIGN REQUIREMENTS PANEL SYSTEMS

1. GENERAL

Scope

1.01 This specification together with the supplementary specifications, keysheets, drawings, equipment explanations and circuit descriptions listed herein covers the equipment design requirements for the modification of existing panel offices for zone and overtime registration. New frames required in the modification are not covered herein but by separate specifications.

1.02 All types of panel offices are covered by this specification with the exception of rotary link type battery on CO relay office. If it is to be modified for zone and overtime registration it shall be referred to the Bell Telephone Laboratories for analysis.

1.03 This specification is reissued to incorporate previous appendix changes and to change the rating from "AT&TCo Standard" to "A&M Only."

Capacity

1.04 The capacity of the various frames in the existing offices are not effected by the modification. The only additional equipment covered by this specification are the applique relay rack units associated with the districts and senders and the additional relay per line for line switch offices. The capacity of these units, the mounting plate capacity for the line switch relay and capacity of the supplementary relay racks is as follows:

	CAPACITY
ZOT District Unit	10 Circuits
ZR Sender Unit	6 Circuits
Line Switch Relay	20 per Mtg. Pl.
Supplementary Relay Rack IMR & L.S. 2 PMR	
District Units	6 Units
2 PMR District Units	5 Units
Sender Units	6 Units
Line Switch Relays	900 Relays

General Description

1.05 The introduction of zone and overtime registration in the panel system, extends the area to which a subscriber may dial directly. The expansion is rendered practicable by this development which permits the subscriber's message register to operate 1 to 5 times for the initial charge depending on the service class of the calling subscriber and the zone in which the called subscriber is located. In addition, the conversation is timed and additional registrations are made on the subscribers message register for the overtime. A further feature of this project is the provision of facilities for timing and registering inital and overtime on local calls as well as zone calls.

1.06 As it is impossible to establish a definite time interval and charge for the initial and overtime periods of the various zones, the circuits have been designed to afford considerable flexibility in the choice of time intervals and number of charges. A study of the charging possibilities in the various sections of the country has indicated that eight charging plans, which are illustrated by table 1, will probably meet the requirements of the various Telephone Companies. Accordingly the equipment has been wired universally for these plans.

1.07 Since the introduction of the panel system numerous improvements have been made in its operation and equipment. These improve-

PLAN	ZONE	INITIAL		OVERTIME	
		TIME IN MIN.	CHARGE	TIME IN MIN.	CHARGE
1	0	UNLIMITED	0	UNLIMITED	0
		UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	1	UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	2	5	2	3	1
	3	5	3	2	1
	4	5	4	2	1
	5	5	5	1	1
2	0	UNLIMITED	0	UNLIMITED	0
		UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	1	UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	2	5	2	3	1
	3	3	3	1	1
	4	3	4	1	1
	5	3	5	1	1
3	0	UNLIMITED	0	UNLIMITED	0
		UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	1	UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	2	5	2	2 1/2	1
	3	5	3	1 1/2	1
	4	5	4	2 1/2	2
	5	5	5	1 1/2	2
4	0	UNLIMITED	0	UNLIMITED	0
		UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	1	UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	2	5	2	5	1
	3	5	3	5	2
	4	5	4	5	2
	5	5	5	5	2

PLAN	ZONE	INITIAL		OVERTIME	
		TIME IN MIN.	CHARGE	TIME IN MIN.	CHARGE
5	0	UNLIMITED	0	UNLIMITED	0
		UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	1	UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	2	5	2	5	2
	3	5	3	5	3
	4	5	4	5	4
	5	5	5	5	5
6	0	UNLIMITED	0	UNLIMITED	0
		UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	1	UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	2	5	2	5	1
	3	5	3	5	1
	4	5	4	5	1
	5	5	5	5	1
7	0	UNLIMITED	0	UNLIMITED	0
		UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	1	UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	2	2 1/2	1	2 1/2	1
	3	2	1	2	1
	4	1 1/2	1	1 1/2	1
	5	1	1	1	1
8	0	UNLIMITED	0	UNLIMITED	0
		UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	1	UNLIMITED	1	UNLIMITED	0
		5	1	5	1
	2	5	2	2 1/2	1
	3	5	3	2 1/2	1
	4	5	4	1 1/2	1
	5	5	5	1 1/2	1

ZONE AND OVERTIME REGISTRATION CHARGING PLANS

TABLE 1

ments have resulted in various types of offices which differ from each other in equipment and in method of completing calls. These types of offices may be divided into the following general classes: line switch, sender selector, rotary link, panel link and decoder. In applying zone and overtime registration to the existing equipment it is impossible due to the variety of frames used in the different offices to adopt one standard plan of modification. The following paragraphs and figures outline in general the frames to be modified and the equipment to be added in applying zone and overtime registration in the various classes of panel offices.

1.08 In the figures of the following paragraphs, the heavy lines designate new equipment, while the light lines indicate the equipment to be modified. The equipment shown by dotted lines remain unchanged and are shown for information only.

Line Switch Office

1.09 The line switch office derives its name from the fact that each subscribers line is equipped with a rotary type line switch which has a capacity of 20 districts. A number of switches are multipled together depending on traffic conditions.

1.10 The present line switch circuit for individual message rate lines is arranged to operate the subscribers message register only once per call. In order for it to function with zone and overtime registration, it is necessary to assure that the message register be released so that it may operate more than once per call. This is accomplished by a relay per line circuit which is to be mounted on the relay rack. This relay is cabled directly to the line switch frame and to the I.D.F. where it is cross-connected to the existing cable to the message register rack. There is no modification of the line switch frame for party lines.

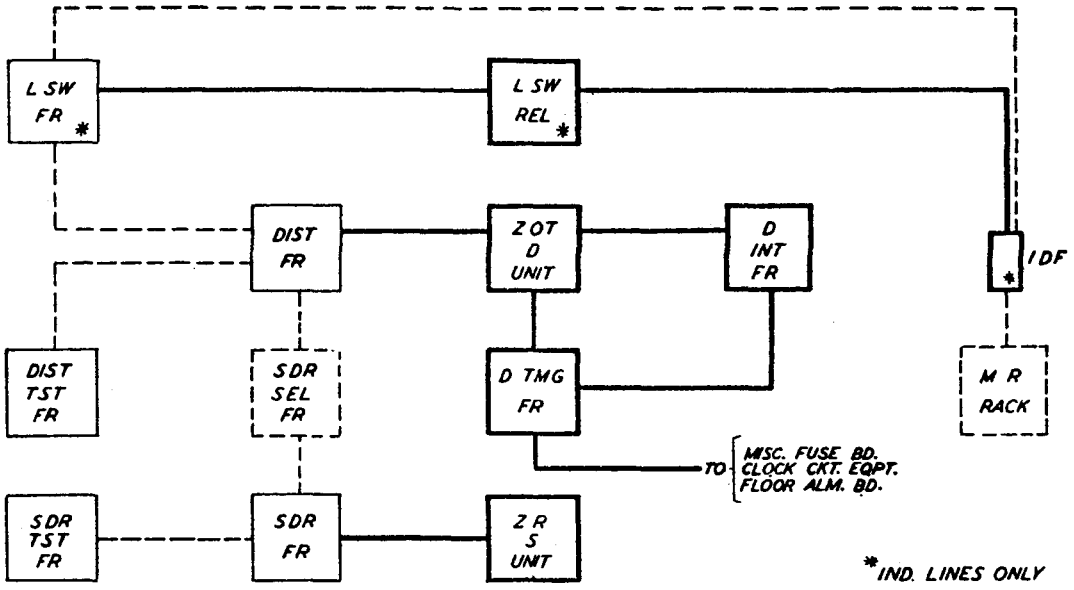

Fig. 1 – Modification of Panel Office Line Switch Type for Zone and Overtime Registration

1.11 The district frame is modified by the addition of applique units located on relay rack. The units are cabled to the district frame where they terminate as supplementary local cables per side of frame. These cables not only contain the leads run in the switchboard cable but additional leads required in modifying the district frame equipment.

1.12 The additional equipment necessary for modifying the sender frame is located either on the frame or on applique relay rack units. The amount of additional equipment depends on the type of sender and the traffic to be handled by these senders after the modification is completed.

1.13 The modification of the district and sender test frames is to be made by the installer. Additional equipment when required can be located on the existing frames.

1.14 A new frame known as the "District Timing Frame" is also required which receives pulses from the master clock equipment modified to incorporate this feature. This frame converts these interruptions into pulse trains which provide interrupted ground to the districts for timing subscriber's calls. Associated with this frame are interrupters mounted on the district interrupter frame, alarm equipment located on the floor alarm board and fuses located on the miscellaneous fuse board. The engineering requirements for these frames are covered in separate specifications.

Sender Selector Offices

1.15 The next stage in the development of the system was a replacement of the rotary type line switch by a panel line finder on which the subscriber's line terminates on a multiple bank. In this office and also in the line switch office a rotary type switch is permanently attached to each district selector for selecting an idle sender. This type of office is commonly called "sender selector" rather than "panel line finder" to distinguish it from later developments which use the panel line finder but not the sender selector switch.

1.16 In this office the line finder-district circuit equipment is located both on the line finder and district frames. These frames are modified by the addition of applique units common to both frames which are located on the relay rack. The units are cabled to the line finder frame where they terminate as supplementary local cables per side of frame. These cables not only contain the leads run in the switchboard

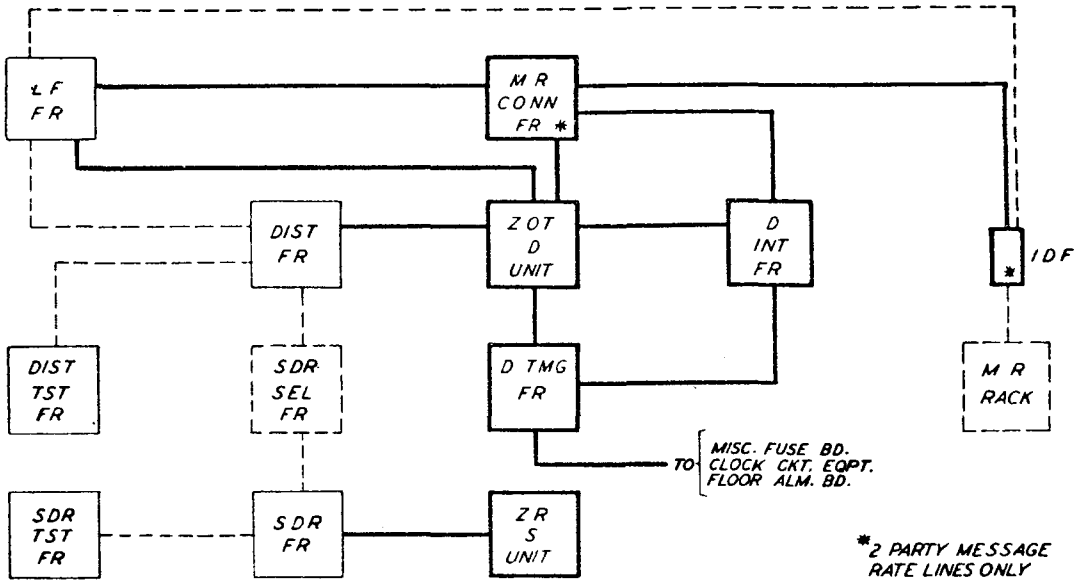

Fig. 2 – Modification of Panel Office Sender Selector Type for Zone and Overtime Registration

cable but additional leads required in modifying the line finder frame equipment. Switchboard cables are also provided between the units and the district frame. These cables, when connected to a District Frame having the repeating coils on the coil rack, are terminated as a supplementary local cable per side of frame containing all additional leads necessary for modification. However, when the repeating coils are on the district frame, the cables shall be run on a five circuit basis directly to the associated five districts.

1.17 For 2-party message rate lines a modification of the line and cut-off relay bay on the line finder frame is required to provide facilities for controlling the operation of the proper message register.

1.18 The additional equipment necessary for modifying the sender frame is located either on the frame or on applique units. The amount of additional equipment depends on the type of sender and the traffic to be handled after the modification is completed.

1.19 The modification of the district and sender test frames is to be made by the installer. Additional equipment when required can be located on the existing frames.

1.20 Three new frames are required; namely, the district timing frame which supplies pulses to the district for timing subscribers calls; the message register connector frame which controls the operation of the proper message register associated with the calling station on 2-party message rate lines and the district interrupter frame for mounting the interrupters associated with the district timing frame, message register connector frame and the district applique units. The engineering requirements for these frames are covered in separate specifications. The alarm equipment and the 24 volt fuses for these frames are located on the floor alarm board and the miscellaneous fuse board respectively.

Rotary Link Office

1.21 The sender selector used in the two previous types of offices for selecting an idle sender was replaced by a rotary link. This link consists of rotary type power driven switches, the function of which is to find the line finder-district associated with the calling subscriber's line, and attach an idle sender.

1.22 With the introduction of the rotary links, the line finder-district circuit relay equipment was located entirely on the district frame.

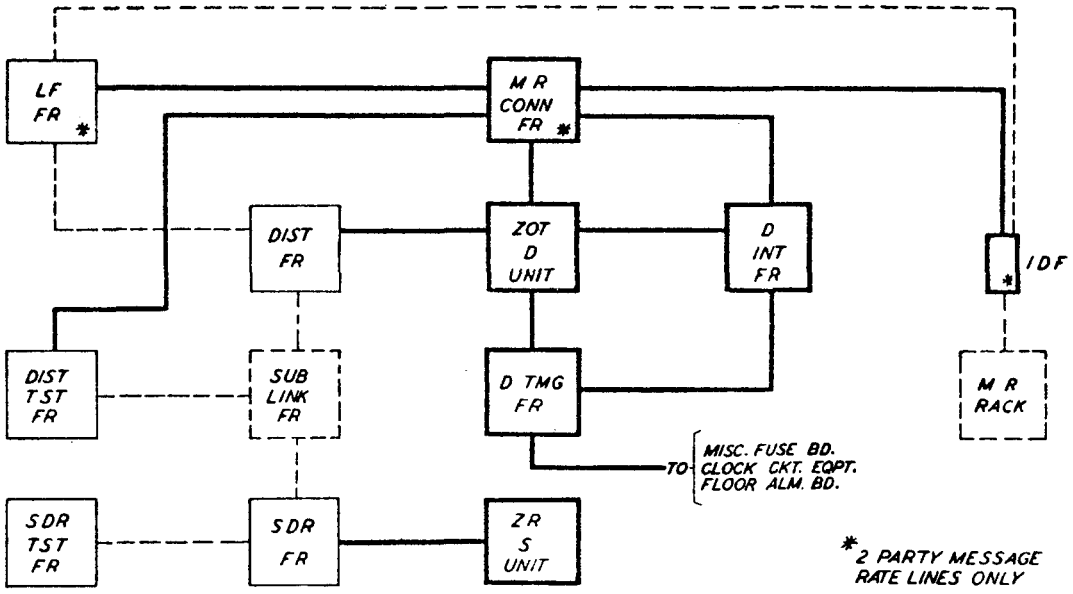

Fig. 3 – Modification of Panel Office Rotary Link Type for Zone and Overtime Registration

In this type office no modification of the line finder frame is required for individual message rate lines. However on two party message rate lines it is necessary to modify the line and cut-off relays to provide facilities for controlling the operation of the proper message register. The district frames, however, are modified by the addition of applique units which are mounted on the relay rack. These units are cabled directly to the district frame. The cables are provided on a five circuit basis and are formed directly to the associated equipment on the district.

1.23 The additional equipment necessary for modifying the sender frame is located either on the frame or on applique relay rack units. The amount of additional equipment depends on the type of sender and the traffic to be handled by the sender after the modification has been completed.

1.24 The modification of the district and sender test frames is to be made by the installer. Additional equipment when required can be located on the existing frames. Also when required, the modification of the subscribers link test set is to be made by the installer.

1.25 The following new frames are also required and the engineering requirements for them are covered in separate specifications:

The District Timing Frame which supplies interrupted ground to the districts for timing the subscriber's calls.

The Message Register Connector Frame which controls the operation of the proper message register associated with the calling station on two party message rate lines.

The District Interrupter Frame which mounts the interrupters associated with the district timing frame, the message register connector frame and the district applique units. In addition the alarm equipment for these frames are located on the floor alarm board and the 24 volt fuses on the miscellaneous fuse board.

Panel Link Offices

1.26 The panel link office uses the same fundamental principle of operation as a rotary link. In place of the rotary type switches for selecting an idle sender and finding the line finder-district associated with the calling subscriber, the link consists of panel multiple banks and selectors which give access to a greater number of senders.

1.27 In this type office no modification of the line finder frame is required for individual message rate lines. However on two party message rate lines it is necessary to modify the line

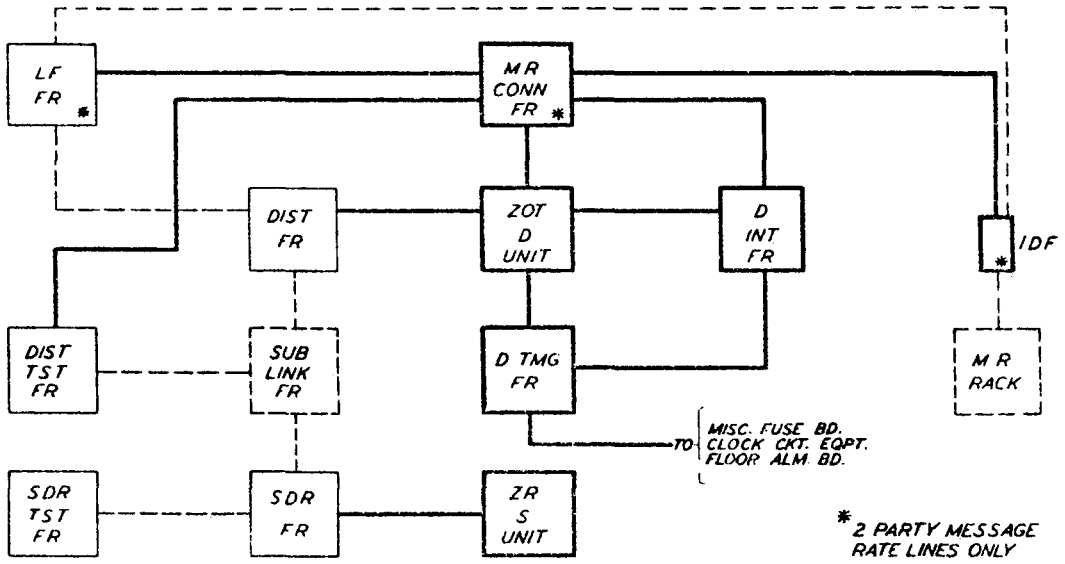

Fig. 4 – Modification of Panel Office Panel Link Type for Zone and Overtime Registration

and cut-off relays to provide facilities for controlling the operation of the proper message register. The district frames, however, are modified by the addition of applique units which are mounted on the relay rack. These units are cabled directly to the district frame. The cables are provided on a five circuit basis and are formed directly to the associated equipment on the district.

1.28 The additional equipment necessary for modifying the sender frame is located either on the frame or on applique relay rack units. The amount of additional equipment depends on the type of sender and the traffic to be handled by the sender after the modification has been completed.

1.29 The modification of the district and sender test frames is to be made by the installer. Additional equipment when required can be located on the existing frames. Also, when required, the modification of the subscribers link test set is to be made by the installer.

1.30 The following new frames are also required and the engineering requirements for them are covered in separate specifications:

The District Timing Frame which supplies interrupted ground to the districts for timing subscriber's calls.

The Message Register Connector Frame which controls the operation of the proper message register associated with the calling station on two party message rate lines.

The District Interrupter Frame which mounts the interrupters associated with the district timing frame, the message register connector frame and the district applique units.

1.31 The alarm equipment and the 24 volt fuses for these new frames are located on the existing Floor Alarm Board and Miscellaneous Fuse Board respectively.

Decoder Offices

1.32 A new means of storing and translating the dial pulses by means of relays instead of 200 type selectors, introduced a new type of office. This office is generally known as "decoder" type, named after the frame principally concerned in the change of operation in the System.

1.33 For individual message rate service, no modification of the line finder frame is required. However, on the line finder frame associated with subscriber's lines having two party message rate service the modification of the line and cutoff relays is required to provide facilities for controlling the operation of the proper mes-

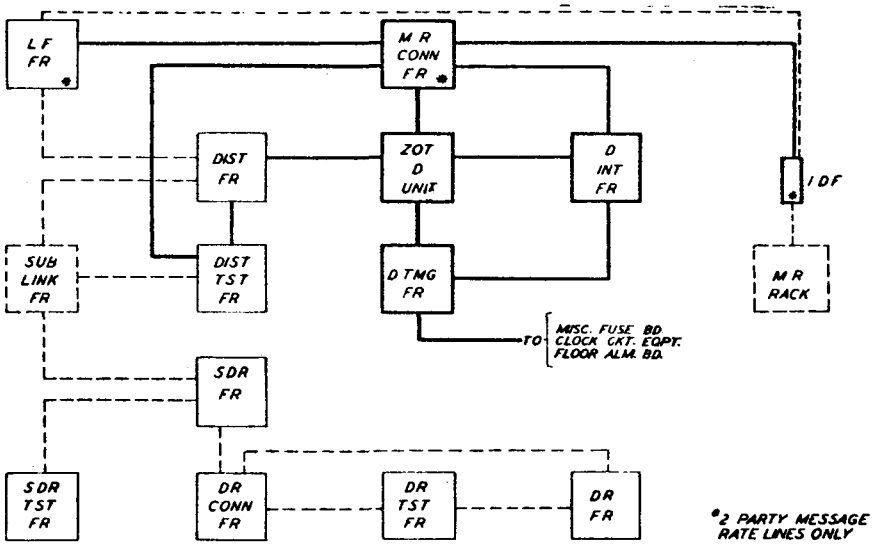

Fig. 5 — Modification of Panel Office Decoder Type for Zone and Overtime Registration

sage register. The district frames, however, are modified by the addition of applique units which are mounted on the relay rack. These units are cabled directly to the district frames. The cables to the district frame are provided on a five circuit basis and are formed to the associated five districts.

1.34 The additional equipment necessary for modifying the sender frame is located on the existing frame.

1.35 In addition to the frames just mentioned, it is necessary to modify the following frames for zone and overtime registration. Sender Test Frame, District Test Frame, Decoder Connector Frame, Decoder Frame and Decoder Test Frame. These frames are to be modified by the installer with the additional equipment located on the existing frames. Also, when required, the modification of the subscriber link test set is to be made by the installer.

1.36 The following new frames are also required and the engineering requirements for them are covered in separate specifications:

The District Timing Frame which supplies interrupted ground to the districts for timing subscriber's calls.

The Message Register Connector Frame which controls the operation of the proper message register associated with the calling station on two party message rate lines.

The District Interrupter Frame which mounts the interrupters associated with the district timing frame, the message register connector frame and the district applique units.

1.37 The alarm equipment and the 24 volt fuses for these new frames are located on the existing Floor Alarm Board and Miscellaneous Fuse Board respectively.

Subdivision of Equipment

J29202K (A&M Only) — Unit for I.M.R. Line Finder — District — Panel Link — Battery on CO Relay Office

2. SUPPLEMENTARY INFORMATION

815-000-000 — Panel Systems Index
AA128.006 — List of General Requirements
X-61200 — List of Engineering Requirement Specifications required in offices having ground on the cut-off relays
X-61400 — List of Engineering Requirement Specifications required in offices having battery on the cut-off relays
J21501 (815-042-150) — Message Register Connector Frame

J22702 (815-007-154) — District Interrupter Frame
J93001 — Relay Rack Unit Framework and Local Cables
J29203 (815-007-150) — Modification of Existing Panel Offices for Overtime Coin Collection.

3. DRAWINGS

Framework

ED-20581-01 — District Test Frame — Panel Link Office
ES-373701 — District Test Frame — Panel Link Office
ES-299185 — District Test Frame — Rotary Link Office — High Speed Drive
ES-373531 — District Test Frame — Rotary Link — Slow Speed Drive
ES-225322 — District Test Frame — Sender Selector Office
ED-90395-01 — Unit Assembly
ED-90395-02 — Unit Assembly

Circuits

ES-262532 — Master Keysheet Sender Selector Equipment — 3 Digit Areas
ES-262647 — Master Keysheet Sender Selector Equipment — 2 and 2-3 Digit Areas
ES-262829 — Master Keysheet "Rotary" Link Equipment — 3 Digit Areas
ES-262849 — Master Keysheet "Rotary" Link Equipment — 2 and 2-3 Digit Areas
SD-21300-01 — Master Keysheet — 3 Digit Office Code "Panel" Link Battery on the Cut-off Relays
SD-21680-01 — Keysheet — Panel Link — Ground on the C.O. Relay

Equipment

ED-20583-01 — District Test Frame — Frame Equipment — Panel Link Office
ED-20359-01 — District Test Frame — Frame Equipment — Panel Link Office
ES-373694 — District Test Frame — Frame Equipment — Panel Link Office
ES-299187 — District Test Frame — Frame Equipment — Rotary Link Office — High Speed Drive
ES-373525 — District Test Frame — Frame Equipment — Rotary Link Office — Low Speed Drive
ES-225329 — District Test Frame — Frame Equipment — Sender Selector Office
ED-20356-01 — District Test Frame — Mtg. Pl. — Panel Link Office
ED-20579-01 — District Test Frame — Mtg. Pl. — Panel Link Office
ES-373695 — District Test Frame — Mtg. Pl. — Panel Link Office
ES-299189 — District Test Frame — Mtg. Pl. — Rotary Link Office
ES-225878 — District Test Frame — Mtg. Pl. — Sender Selector Office
ED-20039-01 — Decoder Connector Frame — Frame Equipment
ED-20040-01 — Decoder Connector Frame — Mtg. Plate
ED-20172-01 — Decoder Frame — Frame Equipment
ED-20176-01 — Decoder Frame — Mtg. Plate
ED-20350-01 — Decoder Test Frame — Frame Equipment
ED-20351-01 — Decoder Test Frame — Mtg. Plate
ED-20352-01 — Decoder Test Frame — Terminal Strip
ED-20353-01 — Decoder Test Frame — Key and Lamp Panel
ED-20461-01 — District Unit Equipment
ED-90146-01 — Clock Ckt. Relay Rack Equipment
ED-20067-01 — Sender Frame — Frame Equipment — 3 and 3-2 Digit Link Type Translator Office
ED-20143-01 — Sender Frame — Frame Equipment — 3 and 3-2 Digit Link Type Decoder Office
ED-20066-01 — Sender Unit Equipment — 3-2 Digit — Panel Link Type Translator Office
ED-20068-01 — Sender Unit Equipment — 3 Digit — Panel Link Type Translator Office
ED-20129-01 — Sender Unit Equipment — 3 and 3-2 Digit — Panel Link Type Decoder Office
ES-225375 — Sender Frame — Mounting Plate Equipment and Numbering — Sender Selector Type Offices

ES-299779 — Sender Frame — Mounting Plate Equipment — Sender Selector Type Offices
ES-373251 — Sender Test Frame for 3 Digit Subscribers' Senders — Frame Equipment — Link Type Office
ED-20043-01 — Sender Test Frame for 3-2 Digit Subscribers' Senders — Frame Equipment — Link Type Office
ED-20156-01 — Sender Test Frame — Frame Equipment — Panel Link Decoder Office
ES-299998 — Sender Test Frame — 3 Digit Senders — Mounting Plate Equipment — Link Type Office
ED-20037-01 — Sender Test Frame — 3-2 Digit Senders — Mounting Plate Equipment — Link Type Office
ED-20158-01 — Sender Test Frame — Mounting Plate Equipment — Panel Link Decoder Office
ES-299065 — Sender Test Frame — Mounting Plate Equipment — Sender Selector Type Offices
ED-20326-01 — Subscribers Link Test Set Equipment
ED-20767-01 — Subscribers Link Test Set Arranged for Two Classes of Service Equipment

Wiring and Cabling

ED-20717-01 — Schematic — Modification of Panel Offices for Zone and Overtime Registration
ED-20582-01 — Dist. Test Frame — Local Cable — Panel Link Office
ED-20358-01 — Dist. Test Frame — Local Cable — Panel Link Office
ES-373696 — Dist. Test Frame — Local Cable — Panel Link Office
ES-299190 — Dist. Test Frame — Local Cable — Rotary Link Office — High Speed Drive
ES-373535 — Dist. Test Frame — Local Cable — Rotary Link Office — Slow Speed Drive
ED-20735-01 — Combination Switchboard and Local Cable — 300 Point Line Finder Frame
ED-20736-01 — Combination Swbd. and Local Cable — 400 Point Line Finder Frames
ED-20653-01 — Combined Local and Swbd. Cable — I.M.R. Dist. Frame — Line Switch and Sender Selector Offices
ED-20653-02 — Combined Local and Swbd. Cable — 2 P.M.R. Dist. Frame — Line Switch and Sender Selector Offices
ED-20655-01 — Combined Local and Swbd. Cable — District Frame Having Repeating Coils on Frame
ED-20737-01 — Superimposed Local Cable — District Frame — Repeating Coils on the Frame
ED-20730-01 — Unit Local Cable — ZOT District Units
ED-90440-02 — Unit Local Cable — ZR Sender Units
ED-20324-01 — Local Cable

4. EQUIPMENT

J29202K (A&M Only) — Zone and Overtime Unit for I.M.R. Line Finder and District—Panel Link Battery on the (CO) Relay Type Office

Equipment — ED-20461-01 Fig. 1
Local Cable — ED-20730-01 Fig. 1

List 1 — Assembly, wiring and equipment for one unit modifying I.M.R. line finder — district circuit SD-21077-01 for zone and overtime registration in panel link battery on the (CO) relay type office.

	WIRE	EQUIP	SEE NOTE
Unit Assembly ED-90395-01		1	
District Selector Ckt. SD-21077-022	10		As Spec. A

Note

A. The following switchboard cables shall be run from this unit; one 6233 cable per five circuits (2 per unit) to the district frame; this cable shall contain all the leads between this unit and the district frame except the leads to the (MR1) interrupter on the district frame which shall be run in one 6050 cable per 30 circuits (3 units); one 6074 cable to the district interrupter frame and one 6016 cable per 60 circuits (6 units) to the district timing frame.

5. GENERAL NOTES

Relay Rack

District Units

5.01 The relay rack units for modifying the line finder and district circuits shall be mounted on standard 23-1/2" (I) beam relay rack. These racks shall be located as near as possible to the district frames with which they are associated.

5.02 In general, except for 2 party message rate lines in sender selector and link type offices, each bay of relay rack shall mount the units associated with one district frame. However, in cases where only a portion of the districts on the frames are to be modified for zone and overtime registration, it will be satisfactory to equip the relay rack bays with units serving several frames. For 2 party message rate lines in offices having sender selectors and subscribers links, a maximum of only 5 instead of 6 units can be mounted on one relay rack bay due to the larger terminal strips required.

5.03 The relay rack shall be equipped from the bottom up in all cases. The odd numbered districts shall appear on the bottom half of the bay and the even numbered on the upper half, except that when the maximum capacity of the bay is 5 units, it may be necessary to reverse this order when the units are associated with two different district frames.

5.04 The connecting blocks and telephone and test jacks shall be located on the jack mounting as shown on Figure 4, ED-20461-01. This equipment shall be located approximately 6′ from the floor on every third bay. Wiring to and from this equipment shall be run in switchboard cable as required.

5.05 It is impossible to forecast what plan or plans of timing and charging will be adopted in the various sections of the country where zone and overtime registration is introduced. To provide flexibility in the choice of time interval and charges the circuits have been designed to provide a total of eight plans. The time intervals and number of charges for these plans are illustrated in Table 1 of this specification. Plans 1, 2, 3 and 4 are covered on the individual message rate districts circuits by Figures A, B, C and D respectively and their associated notes. On 2 party message rate districts only plans 1, 2 and 3 are covered by Figures A, B and C respectively and the associated notes. The wiring for plans 5, 6, 7 and 8 for individual message rate districts and plans 4, 5, 6, 7 and 8 for 2 party message rate districts are included in the figures shown on the respective circuits. Figure E on the individual message rate district and Figure D on the 2 party message rate district cover timing without zoning. The plans covered by the figures and notes represent the charging plans most likely to be used.

5.06 The units shall be wired universally for the various figures shown on their associated circuits. Universal wiring is provided to facilitate change of charging plans after the units have been in service. In addition the universal wiring reduces the number of different local cables that would otherwise be necessary. Although the equipment of many of the units is identical no attempt has been made to establish units which will be wired universally for various types of circuits. This has been avoided due to the large amount of wiring in the unit local cable to care for the charging plans and due to the lack of information as to the probable demand for the various units. However, wherever possible the cross connections of the various units have been made identical to facilitate establishing universal units if this procedure becomes advisable.

5.07 The charging and timing on individual lines is accomplished in the district while on 2 party lines the timing only is made by the district and the charging is accomplished in the control circuit. In view of this difference in operation it was necessary in order to cover the wiring for the 8 charging plans to illustrate 4 charging plans on the individual message rate district circuit and only 3 on the 2 party message rate district. In case a telephone company requests a charging plan not illustrated by the figures and notes of the present circuits for zone and overtime registration the request should be referred to the Bell Telephone Laboratories for analysis. If the desired plan is one that has been wired for, the circuit in question will be reissued to add a figure covering the desired condition. In this case, of course, no change in the wiring of the unit will be necessary.

Sender Units

5.08 The relay rack units for modifying the senders are arranged for mounting on standard 23-1/2" (I) beam relay rack. These racks shall be located as near as possible to the senders with which they are associated.

5.09 In general, each bay of relay rack will mount the units associated with six sender frames (36 senders). The units on a bay shall be numbered consecutively from bottom up.

5.10 The connecting blocks and telephone and test jacks shall be located on a jack mounting as shown on ED-20461-01, Figure 4. This equipment shall be located approximately 6' from the floor in every third bay. Wiring to and from this equipment shall be run in switchboard cable as required.

Clock Circuit Equipment

5.11 In view of the fact that the district timing circuit connects to the master clock circuit, it is necessary to modify the existing clock circuits. The master clock circuit shall be modified to conform with either SD-91018-01 or SD-91019-01 and the position and secondary clock circuit with SD-90409-01. In general this change will mean only the addition of a "CO" key and associated wiring. The location of additional equipment shall conform to the layout shown on ED-90146-01.

5.12 In addition the transfer keys which are located in the "A" switchboard cable turning section shall be located on a mounting board on the relay rack. Formerly these keys were used primarily for stopping the switchboard position clocks. The introduction of zone and overtime feature with its district timing circuit makes it necessary to have these keys located in the switchroom where they can be operated by the maintenance force upon failure of the district timing circuit.

Line Switch Frame — Line Switch Offices

5.13 The message registers associated with individual lines are arranged to operate only once per call. The introduction of zone and overtime registration in this type office makes it necessary to revise the line switch circuit so that the subscribers message register may operate a number of times per call. The modification of the individual line switch circuit ES-207698 to care for this change in operation is covered by SD-21525-01. This modification shall be made by the installer. The additional relays for each shelf of line switches required, shall be located on 750-C mounting plates, twenty relays per plate, and located on standard 23" relay racks. The maximum number of plates which can be located on a bay shall be 45 due to the cabling limitations. The plates shall be equipped on each bay from bottom up. The additional relays shall have the functional designation (RG) and shall be numbered in accordance with the lines with which they are associated.

5.14 The wiring between the (RG) relays and their associated line switch equipment shall be run in switchboard cable. One 6016 cable shall be provided per mounting plate to the associated shelf on the line switch frame. The switchboard cable shall be butted at the terminal strip end of the shelf. One lead per circuit of this cable shall be connected to the W punching of the existing terminal strip. One lead per circuit shall be run to the brush contact of the DS arc and another lead per circuit to the normal contact of the ST arc. This cable shall also contain one lead per twenty circuits to the battery clip on the line switch shelf.

5.15 On the line switch frame in addition to the switchboard cable from the (RG) relays, wiring modifications of the existing equipment are required. These changes shall be made by the installer and shall consist of the following: The lead between spring 2 bottom of the (CO) relay and the normal contact of the DS arc shall be removed. The lead to the brush contact of the DS arc shall be removed and reconnected to the brush contact of the ST arc. These changes in local wiring are based on modifying T-431258 to conform with SD-21525-01.

5.16 A switchboard cable shall be provided between the (RG) relays and the V.I.D.F. Three leads per relay are required for the M1, C and M leads. The size of this cable shall be as required for each individual job. The termination of this cable requires a modification of the existing terminal strip on the V.I.D.F. The modification shall consist of an addition of one row of terminals per strip. In adding this additional row, it will be necessary before removing the

screws holding the strip together to provide a temporary clamp between the top row of terminals and the fanning strip to prevent the strip from falling apart during reassembling. A similar modification is required on the strip located on the H.I.D.F. when the message register leads are cabled directly to this point. This condition is experienced only in offices where the percentage of message rate lines equipped is 100 per cent.

5.17 Th method of cross connecting at the I.D.F. for the various percentages of message rate lines equipped, is covered by the cross connections of SD-21525-01.

Line Finder Frame

Line Relay Bay

5.18 In all offices using line finders a modification of the line and cut-off relay associated with two-party lines is necessary. This change is required to permit connection to the message register connector frame for controlling the operation of the proper message register associated with the calling station on two-party message rate lines.

5.19 The following circuits for the various types of offices using line finders show the modified line circuit required for use with zone and overtime registration on two-party lines:

SD-21464-01 — Sender Selector Office — 300 Point Line Finder
SD-21461-01 — Sender Selector Office — 400 Point Line Finder
SD-21462-01 — Rotary Link Office — Ground on (CO) Relay (No two-party lines have been installed for battery on (CO) relay in Rotary Link Office)
SD-21463-01 — Panel Link Office — Ground on (CO) Relay
SD-21460-01 — Panel Link Office — Battery on (CO) Relay

5.20 The modification of the above line circuits are identical. The change shall be made by the installer and shall consist of removing the leads from punching "M" and "M1" to the (L) relay and running a new lead from the (L) relay to the "M" punching.

Line Finder Frame — Sender Selector Offices

5.21 In sender selector type offices the portion of the line finder-district circuit directly associated with the line finder equipment is located on a supplementary bay on the line finder frame. The modification of this equipment is to be made by the installer.

5.22 In the modification of the individual message rate line finder circuit to agree with SD-21409-01 the switchboard cable from the applique unit shall be butted and formed directly to the associated line finders in accordance with ED-20735-01 for 300 point Line Finders and ED-20736-01 for 400 point Line Finders. This form shall be made up in the shop with switchboard cable of sufficient length to satisfy job conditions. The formed end of this cable shall contain, in addition to the switchboard cable leads, the five leads between the line finder equipment and the unit terminal strip. In addition three leads which are required between the equipment located on the line finder frame and the district frame shall be run in this same switchboard cable and terminated on the unit terminal strips. From these terminals the leads shall be run to the district frame in the same cable with the leads between the unit and the district frame.

5.23 There are in addition three other leads required between the line finder and district frames. These three leads replace existing leads which are terminated on terminal strips on both the line finder and district frames, and reuse the existing cable as shown on the cross-connection of SD-21409-013.

5.24 In addition when modifying individual message rate line finders the relay designated (SL) which is either an E598, E600 or E576 shall be replaced by an E6433.

5.25 In the modification of the two-party message rate line finder circuits to agree with SD-21410-01 the switchboard cable from the applique units shall be terminated by the installer directly on the associated line finder equipment instead of being formed in the shop. This cable shall contain two leads per circuit from the line finder to the relay rack unit. In addition a lead which is required between the line finder and district frames shall be included in this cable to terminate on terminal strips on the relay rack

unit where it shall be run in the same switchboard cable with the leads between the relay rack unit and the district frame.

5.26 When there is inconsistency between the existing circuit and the modification circuit in the designation of equipment, the designations of the existing equipment shall be changed by the installer to conform with the modification circuit.

District Frame

5.27 In designing the modification circuits for zone and overtime registration every effort has been made to reuse existing equipment. Although the new modification circuits are in general based on the latest issue of the circuits to be modified, the equipment (except cams) used on previous issues is shown and reused where possible. The changes in cams due to zone and overtime registration are so extensive that the modification of Issue 1 and the latest issue in so far as equipment of cams is concerned is practically the same.

5.28 Due to the fact that the old equipment is reused wherever possible and that the changes in the wiring of the equipment is so extensive, the difference in wiring to incorporate zone and overtime registration for the various issues of the circuit is practically negligible. If the circuit to be modified is not the latest issue a study should be made to determine the additional leads required. It is not expected that the difference in cost of modifying one issue of a circuit over another will be appreciable.

5.29 The modification of the district frames for zone and overtime registration is based on the assumption that a minimum of 5 districts per group may be put out of service at one time. By keeping this minimum it is expected that the existing equipment will be able to handle the traffic without shifting of subscribers lines. The requirements as to the amount of equipment that may be taken out of service will be determined by the Telephone Company.

5.30 In line switch and sender selector type offices the existing district frame local cables are not in particularly good condition. In many cases the insulation of the leads have faded so it is impossible to judge their color. In addition, these old cables in many cases have had a number of previous modifications so that it is difficult to determine the function of the various leads in the cable. On these old districts it may be desirable to remove the existing local cable and provide new cables.

5.31 A new cable per side of frame will, however, put thirty districts out of service necessitating the transfer of subscribers lines as the remaining districts will not be able to handle the traffic. The number of lines to be transferred is a variable quantity depending on traffic conditions. A further point affecting the number of lines and the advisability of the new cable, is the installation time. It is estimated that it will take approximately five weeks to modify one side of a district frame assuming the old cable is replaced. To keep the installation period within a year, it is evident in offices of more than five district frames that it will be necessary to have access to and to work on more than one side of a frame at a time. Naturally as the number of districts that are necessary to be put out of service increases, the problem of line transfer becomes more complicated and the resulting cost may be prohibitive.

5.32 In general the scheme of replacing the existing cables will cost somewhat more per district but a better job will be obtained. In cases of this kind the telephone company should be consulted and their wishes followed. If it is their wish to provide new cables, the Bell Telephone Laboratories should be so informed so that the necessary local cable drawings when necessary may be prepared.

Line Switch Office

District Circuit SD-21413-01 — Individual Message Rate

5.33 On district frames modified in accordance with SD-21413-01 the switchboard cables from the relay rack units shall be butted at the top of the frame and formed direct to their associated district equipment. This form shall be made in the shop and shipped to the job with switchboard cables of sufficient length to satisfy the job conditions. The formed portion of the cables shall contain not only the switchboard cable leads but also additional leads required in modifying the existing local cable for zone and overtime registration. Due to the fact that the existing cables have been in service for

a considerable time and will in general be in poor condition, the existing local cable shall not be opened to remove the disconnected leads. The only leads in the existing cable that shall be reused are those that can be reconnected from the same stitch. The supplementary local cable shall contain all other leads. The design of this combined switchboard and local cable shall conform to ED-20653-01.

5.34 In installing the supplementary local cable along the middle upright it will be necessary to remove the cable pins or cable brackets. Cable supports per P-69690 or a similar type shall be added to support the supplementary local cable.

5.35 In modifying the existing district frame an additional relay per district is required. This relay which is to be designated "C" is an R888 relay and shall be located in a spare position on the existing mounting plate. In addition, two new interrupters per side of frame are required. The (MR1) interrupter per D-92155 shall be mounted on the district frame, while the (MR2) per D-92154 shall be mounted on the district interrupter frame (specification J22702).

5.36 Where an addition to an office of this type has been installed having district frames equipped with local cables of the "tree" type, the method of modifying these frames for zone and overtime registration shall in general follow the procedure set up in paragraphs 5.46 through 5.53.

District Circuits SD-21414-01 — 2-Party Message Rate

5.37 On district frames modified in accordance with SD-21414-01 the same method of modifying the district frame equipment shall be followed as outlined in paragraphs 5.01 through 5.07 except that the combined switchboard and local cable shall conform in design to ED-20653-02.

5.38 In modifying the existing 2-party districts an additional relay and resistance per district is required. The relay, R888, designated "C" and the resistance, an 18 type, designated "E" shall be located in spare positions on the existing mounting plates. In addition the present E737 relay designated "RC" shall be replaced by an R114 relay. This replacing relay shall also bear the functional designation — "RC". In addition, two new interrupters per side of frame are required. The (MR1) interrupter per D-92155 shall be mounted on the district frame, while the (MR2) per D-92154 shall be mounted on the district interrupter frame. (Specification J22702.)

5.39 Where an addition to an office of this type has been installed having district frames equipped with local cables of the "tree" type, the method of modifying these frames for zone and overtime registration shall in general follow the procedure set up in paragraphs 5.46 through 5.53.

Sender Selector Office

District Circuit SD-21409-01 — Individual Message Rate

5.40 In sender selector type offices where the district repeating coils are located on the coil rack, the local cable of the associated district frame is of the "Ladder" type as shown on ES-225503. When district frames having this type cable are modified in accordance with SD-21409-01, the same method of modification shall be followed as outlined in paragraphs 5.01 through 5.07.

5.41 Where the district repeating coils are located on the district frame the design of the local cable is of the "tree" type as shown on ES-299580. When a district frame of this type is to be modified, the method of modification shall in general follow the procedure which is outlined in paragraphs 5.46 through 5.53.

5.42 In modifying existing individual message rate districts an additional relay per district is required. This relay, which is an R-118 designated "C" shall be located in position 1 of the existing mounting plates. In case of inconsistencies between the existing and modification circuits in the designation of equipment, the existing equipment shall be changed to conform with the modification circuit. In addition, two new interrupters per side of frame are required. The (MR1) interrupter 165-AU and the (MR2) per D-92154 shall both be mounted on the district interrupter frame. (Specification J22702.)

District Circuit SD-21410-01 — Two-Party Message Rate

5.43 In sender selector type offices where the district repeating coils are located on the coil rack, the local cable of the associated district frame is of the "Ladder" type as shown on ES-225503. When district frames having this type cable are modified in accordance with SD-21410-01, the same method of modification shall be followed as outlined in paragraphs 5.01 through 5.07.

5.44 Where the district repeating coils are located on the district frame, the design of the local cable is of the "tree" type as shown on ES-299580. When a district frame of this type is to be modified, the method of modification shall in general follow the procedure which is outlined in paragraphs 5.46 through 5.53.

5.45 In modifying existing two-party message rate districts the B-223 relay designated "G" (one per district) shall be removed. In case of inconsistencies between the existing and modification circuits in the designation of equipment, the existing equipment shall be changed to conform with the modification circuit. One new 165-AU interrupter (MR1) per side of frame is required and shall be mounted on the district interrupter frame. (Specification J22702.)

Rotary Link Office

District Circuits SD-20251-02 and 20192-02 — Individual Message Rate

5.46 In this type office and also in a sender selector office where the district repeating coils are located on the district frame as well as in panel link and decoder type offices, the district frame is equipped with a local cable of the same general type. It is true that there is a slight variation in the cable for the various types of offices due to the difference in sequence switch spacing and other minor developments in apparatus and design of the frame but in general the same method of modifying the equipment for zone and overtime registration can be applied.

5.47 When a district frame of this type is to be modified for zone and overtime registration the switchboard cable from the units shall be run on a five circuit basis directly to the associated five districts. This switchboard cable shall be formed in the shop and shall contain, in addition to the switchboard cable leads, the additional leads required for the modification of the associated five districts except where these additional leads connect to the equipment which is located outside the five circuit equipment.

5.48 The additional leads for the modification of the districts that connect to equipment on the district frame but outside the 5 circuit equipment such as commutators, interrupters, clutches and jacks shall be made up in a local cable by the shop and superimposed on the existing local cable by the installer. In rotary and panel link type offices where the existing district local cable is in good condition, it is important to keep the number of leads in this superimposed cable a minimum. Leads in the existing cable shall be reused wherever possible by cutting them back in the form. In addition, it will be satisfactory to transfer leads, in the existing sequence switch cable arm, one stitch by taking up slack where this can be done without stretching the wire.

5.49 Leads in existing local cable arms to the relays and sequence switches which are not required after the conversion of the equipment to zone and overtime registration shall be cut back to the main vertical arm.

5.50 The leads remaining in these cable arms shall be sewed to the supplementary cable. The removal of these unused leads will reduce the size of the arms to the relays and sequence switches thereby facilitating maintenance of this equipment.

5.51 The advisability of removing the unused leads from the main vertical arm is dependent upon the following conditions: where the five arms of the supplementary local cable to the sequence switches cross the main vertical arm of the existing cable, the distance from the outside of these arms to the face of the channel must not exceed 2-7/8". This dimension must be maintained so that the multiple banks may be removed without first removing the selector rods. To keep this dimension, it may be necessary in some cases to remove the unused leads from the main vertical arm of the existing cable. In some cases it will be possible to keep within the maxi-

mum dimension by flattening or broom-stitching the supplementary cable arms at the point they cross the main vertical arm. In other cases, especially where the cable is made of the tight wrapped wire, it will not be necessary to modify either the vertical arm of the supplementary local cable to maintain this maximum dimension. In determining the method to follow the Installation Department shall bear in mind that in addition to the combined switchboard and local cable that a shop made local cable is also required for the leads to the commutators, interrupters, clutches and jacks. The condition of the existing cable is another factor which should be taken under consideration. The cable may be in such poor condition that there is a danger of affecting the satisfactory operation of circuits in service if the main vertical arm is opened. It may be that by opening the existing cable and removing the unused leads, an improvement in general appearance can be realized.

5.52 In modifying the existing districts to conform with either SD-20129-02 or SD-20251-02 the following equipment changes are involved. An E1107 relay per district, designated "D1", is required and shall be located in position 1 on the existing mounting plate. In addition a 2 MF condenser, designated "B" is required per district. When the district equipment is located on 14-1/2" mounting plates as shown on ES-373658, the "B" condensers for five circuits shall be located on a plate with the existing "A" condensers. It will be necessary to replace the existing 942-D mounting plate, mounting the five 90-B condensers (A) by a D-92605 mounting plate. The five 90-B condensers "A" will be replaced by 139-A condensers. This D specification plate will mount 10 — 139-A condensers. The "A" condensers for five circuits shall be located in the odd positions while the "B" condensers shall be located in the even positions.

5.53 When the district equipment is located on 16-1/2" mounting plates, as shown on ED-20267-01, figure 3, the "B" condenser shall be located in spare drillings if available. When no spare drillings have been provided for either a 90-B or 139-A condenser, the "B" condensers for five districts shall be located on a 910-B mounting plate. This mounting plate shall mount five 139-A condensers in positions 1 to 5. This plate shall be located in the spare mounting plate position above the associated five districts. The condensers shall be numbered in accordance with the associated district. The first and fifth condenser shall bear the functional designation. Two new interrupters per side of frame are required. The (MR1) interrupter per D-92155 for 3-1/4" spacing or 165-AU for 3.4" spacing shall be mounted on the district frame, while the (MR2) per D-92154 shall be mounted on the district interrupter frame. (Specification J22702.)

District Circuit SD-20253-02 — 2-Party Message Rate

5.54 In modifying district frames equipped with this circuit, the switchboard cables from the associated relay rack units shall terminate on the district frame as five circuit supplementary local cables. The design of the local cable and the general method of modification of the frame shall follow practice outlined in paragraphs 5.46 through 5.53.

5.55 In modifying the existing districts to conform to SD-20253-02 the following equipment changes are necessary. The R811 relay (G) and the E1088 relay (OF) shall be removed. The R89 relay (CH) shall be replaced by an R177; the R252 relay (RC) by an E1084 relay; the R367 relay (T1) by an R1135 relay and the R453 relay (D1) by an R427. In addition an 18-ET resistance designated "B", shall be located in a spare position on the existing mounting plate. One new 165-AU interrupter (MR1) is required and shall be mounted on the district interrupter frame.

Panel Link Office — (Ground)

District Circuit SD-21030-02 — Individual Message Rate

5.56 In modifying district frames equipped with this circuit, the switchboard cables from the associated relay rack unit shall terminate on the district frame as five circuit supplementary local cables. The design of the local cable and the general method of modification of the frame shall follow the practice outlined in paragraphs 5.46 through 5.53. In addition a switchboard cable per side of frame shall be run to the associated units. This cable which contains leads to the MR1 interrupter located at the top of the district frame shall run directly from the interrupter to punching 24 of the unit terminal strips.

5.57 In modifying the existing district to conform with SD-21030-02, the following equipment changes are involved. An E1107 relay, designated "D1", shall be added per district and shall be located in position 1 on the existing mounting plate. In addition a 2 MF condenser, designated "B" is required per district. When the district equipment is located on 14-1/2" mounting plates, as shown on ES-373658, the "B" condensers for five circuits shall be located on a plate with the existing "A" condensers shown on figure 2 of ES-373658. It will be necessary to replace the existing 942-D mounting plate now mounting the five 90-B condensers "A" by a D-92605 mounting plate. The five 90-B condensers "A" will be replaced by 139-A condensers. This D specification plate will mount 10 — 139-A condensers. The "A" condensers for five circuits shall be located in the odd positions while the "B" condensers shall be located in the even positions.

5.58 When the district equipment is located on 16-1/2" mounting plates as shown on ED-20267-01, figure 3, the "B" condensers shall be located in spare drillings if available. When no spare drillings have been provided for either 90-B or 139-A condensers, the "B" condensers for five districts shall be located on a 910-B mounting plate. This mounting plate shall mount five 139-A condensers in positions 1 to 5. This plate shall be located in the spare mounting plate position above the associated five districts. The condensers shall be numbered in accordance with the associated district. The functional designation shall be stamped in the first and fifth condenser. Two new interrupters per side of frame are required. The (MR1) 165-AU interrupter shall be mounted on the district frame, while the (MR2) per D-92154 shall be mounted on the district interrupter frame.

District Circuit SD-21032-02 — 2-Party Message Rate

5.59 In modifying district frames equipped with this circuit, the switchboard cables from the associated relay rack unit shall terminate on the district frame as five circuit supplementary local cables. The design of the local cable and the general method of modification of the frame shall follow practice outlined in paragraphs 5.46 through 5.53.

5.60 In modifying the existing districts to conform with SD-21032-01 the following equipment changes are involved. The R888 relay (CH) shall be replaced by an R177 relay, the R453 relay (D1) by an E6053 relay and the R252 relay (RC) by an R163 relay. The R811 relay designated "G" and E1088 designated "OF" shall be removed. One new 165-AU interrupter (MR1) per side of frame is required and shall be mounted on the district interrupter frame.

Panel Link Office — (Battery) Decoder Type

District Circuit SD-21077-02 — Individual Message Rate

5.61 In modifying district frames equipped with this circuit, the switchboard cables from the associated relay rack units shall terminate on the district frame as five circuit supplementary local cables. The design of the local cable and the general method of modification of the frame shall follow the practice outlined in paragraphs 5.46 through 5.53. In addition a switchboard cable per side of frame shall be run to the associated units. This cable which contains leads to the MR1 interrupter located at the top of the district frame shall run directly from the interrupter to punching 24 of the unit terminal strips.

5.62 In modifying the existing district to conform to SD-21077-02 a R1607 relay designate "D1" shall be added per district. This relay shall be located in position 1 on the existing mounting plate. In addition a 2 MF condenser, designated "B" is required per district. Where the district equipment is in accordance with issue 10 or subsequent issues of ED-20178-02 the "B" condensers for five districts shall be 139-A condensers and shall be located in positions 1 to 5 on the 909-C mounting plates. This plate is drilled for five 139 type condensers in these positions. If the layout of the district equipment is in agreement with an issue previous to issue 10, it will be necessary to mount the five "B" condensers (139-A) in positions 1 to 5 on a 910-B mounting plate. This mounting plate shall be located in the spare mounting plate position above the associated five circuits. The added condensers shall be numbered in accordance with the associated district. The first and fifth condenser shall be stamped with the functional designation "B". Two new interrupters per side of frame are required. The (MR1)

165-AU interrupter shall be mounted on the district frame, while the (MR2) per D-92154 shall be mounted on the district interrupter frame.

District Circuit SD-21079-02 — 2-Party Message Rate

5.63 In modifying district frames equipped with this circuit, the switchboard cables from the associated relay rack units shall terminate on the district frame as five circuit supplementary local cables. The design of the local cable and the general method of modification of the frame shall follow the practice outlined in paragraphs 5.46 through 5.53.

5.64 In modifying the existing districts to conform with SD-21079-02 the following equipment changes are involved. The R811 relay (G); R1478 relay (OF) and the 59-D resistance (A) shall be removed. The R812 relay (CH) is replaced by an R177 relay, the R883 relay (D1) by an E6053 relay and the E1714 relay (RC) by an R1557 relay. One new 165-AU interrupter (MR1) is required and shall be mounted on the district interrupter frame.

Sender Frame

Line Switch and Sender Selector Type Offices

5.65 In the sender selector type office the sender groups contain a maximum of 40 senders per group. Because of the small sender groups it has been decided to arrange this type of sender for but two classes of service since traffic requiring more than two classes can be distributed over several different sender groups.

5.66 The senders provided in some sender selector type offices are on a frame basis and for these offices no Bell Telephone Laboratories' equipment drawings are available. In the event of an office of this type being modified for zone registration the job sender frame equipment and mounting plate equipment drawings shall be referred to the Bell Telephone Laboratories for comments and recommendations. Sender circuits which have been installed on a frame basis are ES-240051, ES-240053 and ES-240067.

5.67 It is anticipated that when modifying these senders for zone registration service, the additional equipment will mount on the original sender frames in most cases. Where sufficient space is not available, applique units will be provided as shown in Figures 1 and 2.

3 Digit — Translator Sender Circuit — ES-240051 — For Sender Selector Offices — (Coin and Non-Coin)

5.68 Senders equipped with this circuit when modified for zone registration shall be changed in accordance with Issue 34-D.

3 Digit — Translator Type Sender Circuit — ES-240053 — For Sender Selector Offices — (Coin and Non-Coin)

5.69 Senders equipped with this circuit when modified for zone registration shall be changed in accordance with Issue 35-D.

3 Digit — Translator Sender Circuit — ES-240067 — For Sender Selector Offices — (Coin and Non-Coin)

5.70 Senders in accordance with this circuit which are installed on a non-unit basis shall be modified for zone registration in accordance with Issues 36-D and 37-AR.

5.71 Unit type senders equipped with this circuit when modified for zone registration shall be changed in accordance with Issues 36-D and 37-AR. The additional equipment required shall be located on the sender unit as shown on drawing ES-225375.

3 Digit — Translator Sender Circuit — ES-20028-01 — For Sender Selector Offices — (Non-Coin)

5.72 Sender units equipped with this circuit when modified for zone registration shall be changed in accordance with Issue 14-D. The additional equipment required for zone registration feature shall be located as shown on drawing ES-299779.

Link Type Offices

3 Digit — Translator Sender Circuit — ES-20011-01 — For Link Type Offices — (Non-Coin)

5.73 Senders equipped with this circuit when modified for zone registration shall be changed in accordance with Issues 26-D and 27-D. Senders modified for zone registration and

one class of service will have all the additional equipment located on the sender unit, as shown on ED-20068-01. Senders modified for zone registration and 2 to 4 classes of service will require applique units as outlined herein. The switchboard cable from a terminal strip on the unit shall be terminated on the apparatus of the associated sender unit as covered by the cross-connections for this circuit.

3 Digit — Translator Sender Circuit — ES-20012-01 — For Link Type Offices — (Coin and Non-Coin)

5.74 Senders equipped with this circuit when modified for zone registration shall be changed in accordance with issue 24-D. Senders modified for zone registration and one class of service will have all the additional equipment located on the sender unit, as shown on ED-20068-01. Senders modified for zone registration and 2 to 4 classes of service will require applique units as outlined herein. The switchboard cable from a terminal strip on the unit shall be terminated on the apparatus of the associated sender unit as covered by the cross-connections for this circuit.

3-2 Digit — Translator Sender Circuit — ES-21001-01 — For Panel Link Type Offices — (Non-Coin)

5.75 Senders equipped with this circuit when modified for zone registration shall be changed in accordance with Issues 8-D and 9-D. Senders modified for zone registration and one class of service shall have the additional equipment mounted on the sender unit as shown on ED-20066-01. Senders modified for zone registration and 2 to 4 classes of service shall have the additional equipment mounted on applique units as outlined herein. The switchboard cable from a terminal strip on the unit shall be terminated on the apparatus of the associated sender unit as covered by the cross-connections for this circuit.

3-2 Digit — Translator Sender Circuit — ES-21002-01 — For Panel Link Type Offices — (Coin and Non-Coin)

5.76 Senders equipped with this circuit when modified for zone registration shall be changed in accordance with Issues 12-D and 13-D. Senders modified for zone registration and one class of service shall have the additional equipment mounted on the sender unit as shown on ED-20066-01. Senders modified for zone registration and 2 to 4 classes of service shall have the additional equipment mounted on applique units as outlined herein. The switchboard cable from a terminal strip on the unit shall be terminated on the apparatus of the associated sender unit as covered by the cross-connections for this circuit.

Decoder Type Offices — (Non-Coin)

3 Digit — Decoder Type Sender Circuit — SD-21193-01 — For Panel Link Type Decoder Offices — (Non-Coin)

5.77 Sender units equipped with Issue 7-D or subsequent issues of SD-21193-01 have been wired for the zone registration feature. Offices thus wired may be arranged for zone registration per SD-21193-03 by adding the necessary additional equipment on the sender unit as shown on ED-20129-01. No additional wiring will be required on these units as the local cable will contain the additional leads. Sender units equipped with circuits previous to Issue 7-D may be arranged for zone registration by modifying them per SD-21193-03 and having the additional wiring superimposed on the existing unit local cables. The additional equipment shall be located as shown on ED-20129-01.

3 Digit — Decoder Type Sender Circuit — SD-21194-01 — For Panel Link Type Decoder Offices — (Coin and Non-Coin)

5.78 Sender units equipped with Issue 7-D or subsequent issues of SD-21194-01 have been wired for the zone registration feature. Offices thus wired may be arranged for zone registration by adding the necessary additional equipment on the sender unit as shown on ED-20129-01. No additional wiring will be required on these units as the local cable will contain the additional leads. Sender units equipped with circuits previous to Issue 7-D may be arranged for zone registration by modifying them per SD-21194-01 issue 7-D and having the additional wiring superimposed on the existing unit local cables. The additional equipment shall be located as shown on ED-20129-01.

Decoder and Decoder Connector Frames

5.79 Decoder Connector Frames equipped with issue 4-D or subsequent issues of SD-21187-01 have been wired for zone and overtime registration. When an office having such a frame is to be modified the necessary equipment shall be located in accordance with ED-20039-01 and ED-20040-01.

5.80 No additional wiring is required as the local cable contains the additional leads necessary to connect the zone and overtime registration. However when a Decoder Connector Frame is to be modified which is equipped with an issue of SD-21187-01 previous to issue 4-D the additional wiring must be superimposed on the existing form. The additional equipment shall be located in accordance with ED-20039-01 and ED-20040-01.

5.81 The modification of decoder frames on which the equipment is in agreement with SD-21277-02, issue 5-D or subsequent issues will consist of connecting the leads in the existing equipment to the additional equipment required to modify the frame for zone and overtime registration. If the frame has been installed with a previous issue of the circuit, it is necessary for the installer to modify the local cable and to add the additional leads required for zone and overtime registration. Additional equipment on this type of frame shall be located in accordance with equipment drawings ED-20172-01 and ED-20176-01.

Test Frames

District Test Frames

5.82 The changes required on the District Test Frame shall be completed before any of the Districts modified for zone and overtime registration are ready to be cut back into service. As only a comparatively few districts will be changed at a time, the District Test Frame must be available for routining these modified districts as they are completed.

5.83 The equipment and, in some cases, the construction of the District Test Frame differs in the various types of Panel Offices. In designing modification circuits for the various test circuits, the modification circuits are based on the latest issue of the test circuits. Therefore, in modifying existing frames where the latest issue of the circuit has not been used, it will be necessary to include the changes involved in bringing the circuit up to latest issue at the same time the modificaton for zone and overtime registration is made.

5.84 In modifying a District Test Frame in a Line Switch Office, the job, with a complete set of drawings covering the existing frame shall be referred to the Bell Telephone Laboratories for analysis.

5.85 In Sender Selector type offices, it will be necessary to modify the existing framework to provide facilities for mounting the additional equipment. The assembly change is shown on ES-225322 and the location of the equipment is covered by ES-225329 and ES-225878. The wiring to this additional equipment shall be superimposed on the existing form in general conforming in design to the existing local cable.

5.86 In Rotary Link Offices there are two types of District Test Frames, one arranged for high speed drives and the other for slow speed drives. When these frames are to be modified for zone and overtime registration it is necessary to modify the existing framework per ES-299185 for frames arranged for high speed drives and ES-373531 for slow speed drives. The location of the additional equipment required for zone and overtime registration for the two types of test frames is covered in ES-299187 and ES-299189 for the frames arranged for high speed drives and ES-373525 and ES-299189 for low speed drive frames. The wiring for the additional equipment for the above frames shall be superimposed on the existing frame local cable. This test frame cable for the two frames shall conform in design to ES-299190 and ES-373535.

5.87 In Panel Link Offices where the frame is wired in accordance with SD-20240-021 to -26 and the frame is constructed in accordance with ED-20581-01, no modification of the frame or local cable is required. The local cable for this frame contains the additional wiring for zone and overtime registration. In modifying this frame the additional equipment shall be located in accordance with the equipment drawing ED-20583-01 and ED-20579-01. The leads in the existing local cable associated with the zone and overtime equipment will be connected by the installer.

5.88 In Panel Link Offices where the District Test Frame was not arranged initially for zone and overtime registration, it will be necessary to modify the existing framework to provide facilities for mounting the additional equipment. The assembly change is shown on ES-373701 and the location of equipment is covered on ES-373694 and ES-373695 or ED-20359-01 and ED-20356-01. The wiring to this additional equipment shall be superimposed on the existing form conforming in design to the local cable plans ES-373696 or ED-20358-01.

Sender Test Frames

5.89 The equipment, and in some cases the construction of the sender test frame differs in the various types of panel offices. In designing modification circuits for the various test circuits, the modification circuits are based on the latest issue of the test circuits, therefore, in modifying existing frames where the latest issue of the circuit has not been used it will be necessary to include the changes involved in bringing the circuit up to the latest issue at the same time the modification for zone registration is made.

5.90 The sender test circuit for 3 digit sender selector type offices is in accordance with drawing ES-239493. When this test circuit is to be arranged for testing senders with the zone registration feature it shall be modified as shown on issue 37-D. The additional equipment required to incorporate this feature shall be located as shown on drawing ES-299065.

5.91 The sender test circuit in 3 digit link type offices may be in accordance with either ES-20013-01 or SD-21026-01.

5.92 Offices with a test circuit per ES-20013-01 wired with issues subsequent to Issue 20-D will contain the wiring for testing the zone registration feature in the senders. The additional equipment shall be located in accordance with ES-299998 and ES-373251. Offices with a local cable of a previous issue may be arranged for testing senders with the zone registration feature by bringing them up to Issue 20 and superimposing the additional wiring on the outside of the existing frame local cable. The additional equipment shall be located per ES-299998 and ES-373251. Offices with a test circuit per SD-21026-01 wired with issues subsequent to Issue 6-D will contain the wiring for testing the zone registration feature in the senders. The additional equipment shall be located in accordance with ED-20156-01 and ED-20158-01. Offices with a local cable of a previous issue may be arranged for testing senders with the zone registration feature by bringing them up to Issue 6 and superimposing the additional wiring on the outside of the existing frame local cable. The additional equipment shall be located per ED-20156-01 and ED-20158-01. This test circuit is also satisfactory for use in panel link offices.

5.93 The sender test circuit in 3-2 digit panel link type offices is in accordance with ES-21027-01. Offices having the test circuit installed in accordance with issues subsequent to 10-D will be arranged for testing senders with the zone registration feature. The equipment for this feature will be located as shown on ED-20037-01 and ED-20043-01.

5.94 In offices installed prior to Issue 10-D of ES-21027-01 it will be necessary to modify them to agree with this issue locating the additional equipment in accordance with the arrangement shown on ED-20037-01 and ED-20043-01. The additional leads required for this change shall be superimposed on the existing frame cable.

Decoder Test Frame

5.95 Decoder Test Frames equipped with issue 6-D or subsequent issues of SD-21188-01 have been wired for the zone and overtime registration feature. When an office having such a frame is to be modified the necessary equipment shall be located in accordance with the equipment drawings ED-20350-01 and ED-20351-01. No additional wiring is required as the local cable contains the additional leads necessary to connect the zone and overtime equipment.

5.96 When a test frame is to be modified which is equipped with an issue of SD-21188-01 previous to issue 6-D the equipment and additional wiring must be installed. The additional equipment shall be located as shown on

the equipment drawings ED-20350-01 and ED-20351-01.

Test Sets

Subscribers Panel Link Test Set

5.97 Subscribers Panel Link Test Sets equipped with issue 9A or subsequent issues of SD-20343-01, issue 7-D or subsequent issues of ES-20142-01 or issue 1 of SD-21683-01 have been arranged for the zone and overtime registration feature.

5.98 When a test set is to be modified which is equipped with an issue of SD-20343-01 previous to issue 9A or ES-20142-01 previous to issue 7-D the equipment and wiring must be changed in accordance with 9A of SD-20343-01 or issue 7-D of ES-20142-01 depending upon which circuit the test set is wired. The equipment for this feature shall be located as shown on ED-20326-01.

Bell Telephone Laboratories, Incorporated

Dept 5653

List of "A&M Only" and "Mfr Disc." Equipment

The following equipment has been replaced as indicated. Where "A&M Only" items appear, the issue numbers shown are those of the issue in which the rating was first applied.

EQUIPMENT	RATING	DETAILS LAST SHOWN IN ISSUE	REPLACING EQUIPMENT
J29202A	Mfr Disc.	3	–
J29202B	Mfr Disc.	3	–
J29202C	Mfr Disc.	3	–
J29202D	Mfr Disc.	3	–
J29202E	Mfr Disc.	3	–
J29202F	Mfr Disc.	3	–
J29202G	Mfr Disc.	3	–
J29202H	Mfr Disc.	3	–
J29202J	Mfr Disc.	3	–
J29202L	Mfr Disc.	3	–
J29202M	Mfr Disc.	3	–
J29202N	Mfr Disc.	3	–
J29202P	Mfr Disc.	3	J29202M
J29202Q	Mfr Disc.	3	J29202N