SUBSCRIBER SENDER FRAME
3-DIGIT OFFICE CODE
EQUIPMENT DESIGN REQUIREMENTS
PANEL SYSTEMS

1. GENERAL

Scope

1.01 This specification, together with the supplementary information listed herein, covers the equipment design requirements for the framework, equipment, and circuits to be used in the manufacture and installation of the decoder-type, coin and noncoin, 3-digit subscriber sender frame, for use with subscriber link-type equipment or modified sender selector and rotary link-type equipment in panel offices. It is also arranged for keypulsing "A" switchboard senders.

1.02 Master key sheets covering circuits arranged for use with line circuits having ground on the cutoff relay shall be used only on additions to existing offices.

1.03 Master key sheets covering circuits arranged for use with line circuits having battery on the cutoff relay shall be used for all new central office equipments.

1.04 This specification is reissued to incorporate previous appendix changes.

Capacity

1.05 Each sender frame has a capacity of five sender units (ten senders) and one interrupter unit. Each sender unit has a capacity of two senders.

Description

1.06 The subscriber sender frame is a steel structure of unit design and of a type generally known as single-sided. It is arranged to mount five sender units and one interrupter unit accommodating the apparatus common to all the sender circuits on one frame.

1.07 Two general types of senders may be mounted on this frame, namely, subscriber senders and keypulsing "A" switchboard senders.

1.08 The subscriber sender is arranged to work with subscriber lines. It is selected by a link or sender selector when the subscriber removes his receiver from the hook, and then it receives and registers the pulses from the subscriber dial. When the first three dial pulls have been registered, the sender establishes connection with a decoder by means of a decoder connector and transmits to the decoder the class of subscriber and the office code as registered from the first two or three pulls of the dial. It then receives back from the decoder full information for completing the call as far as the operations required are affected by the office called.

1.09 In the direct distant dialing program, the functions of the subscriber sender are supplemented by an auxiliary sender which effectively increases the 8-digit storage capacity of the subscriber sender to a total of ten digits on calls to points outside the subscriber home numbering area. Since the auxiliary sender pulses the circuit order forward on a multifrequency basis, it is used on 7-digit local area calls when MF outpulsing is required. On a 10-digit call, subscriber sender recognizes that an auxiliary sender is required if a zero or one is registered as the second digit. In order to save holding time in the auxiliary sender, the subscriber sender waits until the seventh digit is registered before grounding the start lead to the auxiliary sender link circuit. A fast acting link circuit is required to insure that an auxiliary sender is connected before the start of dialing of the ninth digit since this digit must be registered in the auxiliary sender. If the subscriber sender does not receive a signal from the auxiliary sender link that an auxiliary sender is attached before the first pulse of the

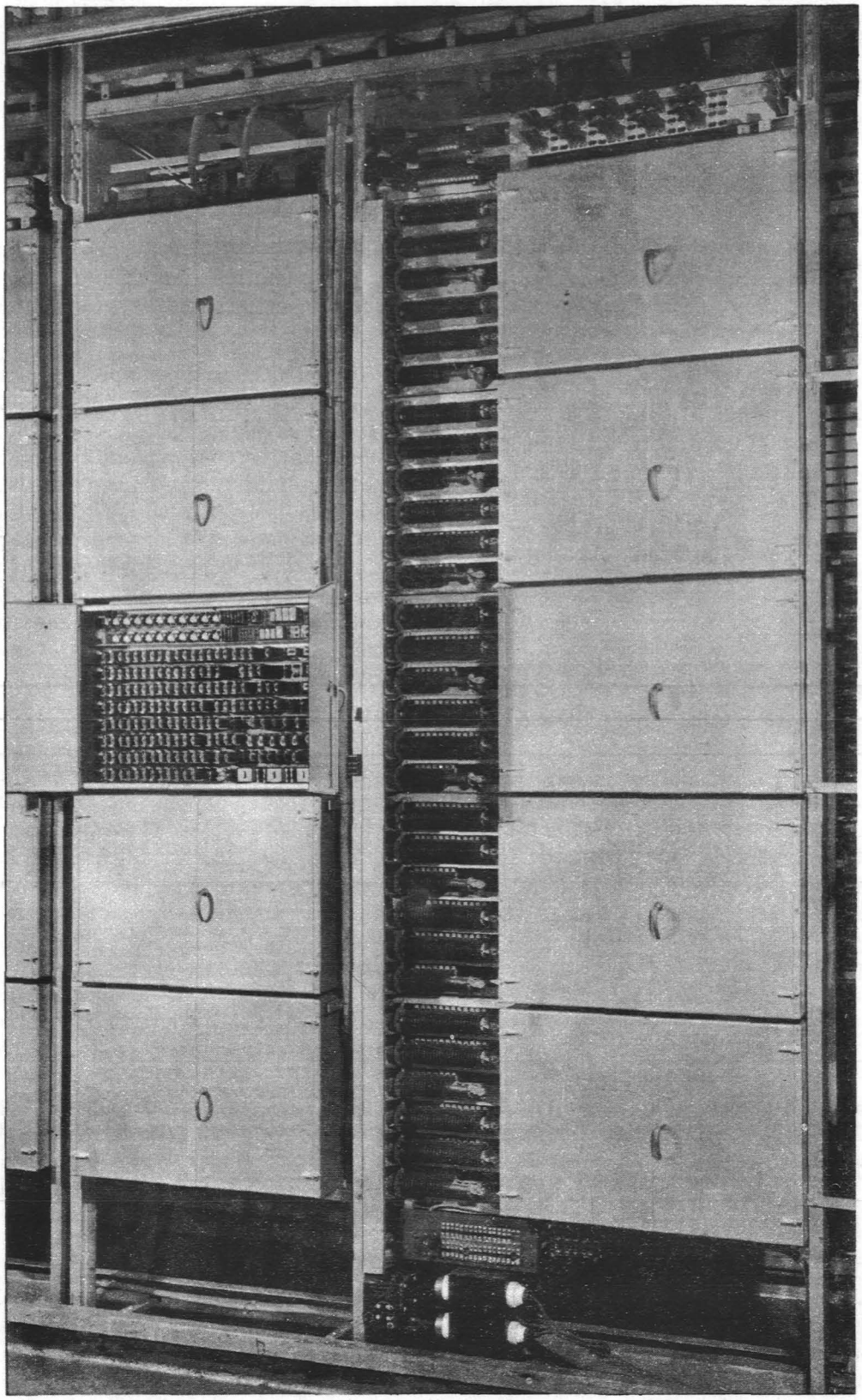

Fig. 1 – 3-digit Subscriber Sender Frame — Decoder Type

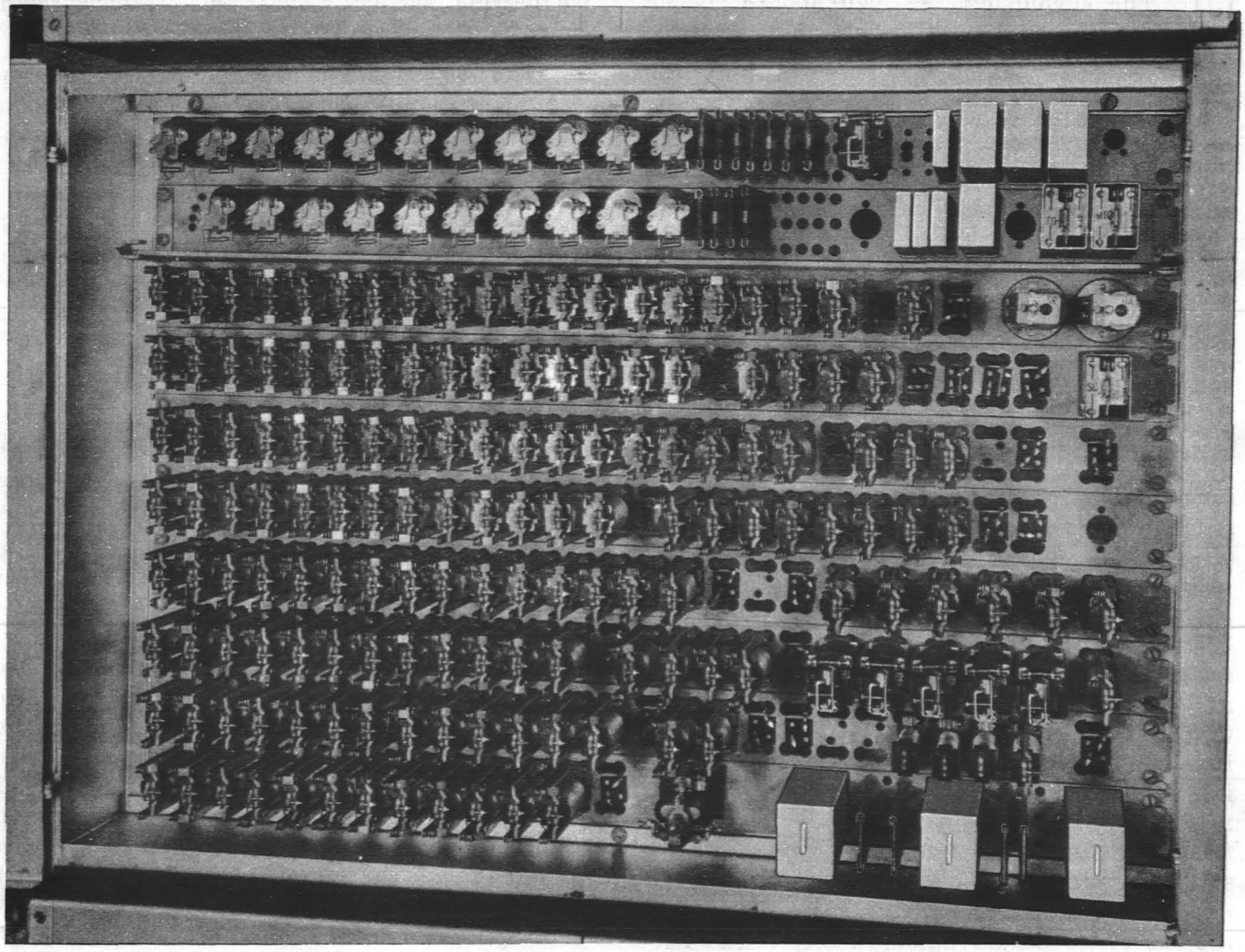

Fig. 2 – 3-digit Subscriber Sender Unit — Decoder Type

ninth digit is received, the call is routed to overflow. On a 7-digit call, class information from the decoder indicates the need for an auxiliary sender. In this case, the subscriber sender grounds the start lead to the auxiliary sender link after the seventh digit is registered and class information is received. On a 10-digit call where only seven digits are to be MF outpulsed, or on a 7-digit call where only five or four digits are to be MF outpulsed, the subscriber sender receives a signal from the decoder that two or three digits are to be skipped and transmits this signal (SK2 or SK3) to the auxiliary sender.

1.10 Since the spare relay mounting space in the sender units is inadequate for the additional relays required for direct distance dialing, the space presently allocated for the cancel coin test feature will be used. This not only provides additional relay space in the sender unit, but also releases for our use in the decoder the class punchings that were previously used for the cancel coin test feature. This avoids a costly modification of the decoder to get additional class punchings. At the present time, the cancel coin test feature is only required in connection with service given a few dozen subscribers in one area to allow them a "dial tone first" coin customer free emergency service. If these customers still desire coin service after direct distance dialing is installed in their area, the telephone company will shift them to crossbar offices in the same building.

1.11 The keypulsing "A" switchboard sender operates in a manner similar to the subscriber sender except that it is arranged to work with an "A" switchboard operator, who is provided with a set of keys which are arranged to transmit pulses corresponding to the pull of the subscriber dial. The keypulsing sender receives and registers these pulses transmitted by the A operator keys and the first two or three sets of pulses received correspond to the first two or three pulls of the dial. After these are received, the sender is connected to a decoder in the same manner as described above for the subscriber sender.

1.12 The timed release sender which is "A&M Only" is similar in operation to the subscriber sender except that if it should become stuck in any position due to improper dialing or other causes, it is arranged to automatically release itself after a certain interval of time which obviates the necessity for the services of an operator in the monitoring position at the "A" switchboard. Before it releases, the sender transmits a tone to the subscriber to indicate to him that he should hang up and dial over. This tone is the same as the present dial tone except that it is interrupted. The sender, arranged for automatic priming, is similar in operation to the timed release sender, except any type of subscriber sender can be arranged for automatic priming more economically. When so arranged, the subscriber sender automatically releases itself the same as the timed release sender except, in this case, no tone is transmitted to the subscriber.

1.13 All of the above senders are unit mounted, each unit accommodating the equipment for two senders. There are, however, two types of these sender units: One equipped with two subscriber senders, and one equipped with two keypulsing senders. The same framework is used for all units.

1.14 The sequence switches and terminal strip for the two senders of one unit are placed in the center of the unit with the relay equipment for one sender on the left and that for the other on the right. This portion of the sender is enclosed in a dustproof metal casing, covering both apparatus and wiring. The sequence switches for the left-hand sender are placed below those of the right-hand sender in order to give consecutive numbering and the usual left-to-right bottom-up growth.

1.15 A sheet-metal baffle is mounted on the rear of the frame over the sequence switches of each sender unit as a further protection for the wiring of the switches.

1.16 Two senders are placed on one unit in order to use the space on the frame most economically and thereby obtain a high degree of motor and floor space efficiency. Usually only one keypulsing sender unit is placed on a frame because there are few of these senders per office and it is desired to distribute them over the frames in such a way that the failure of a drive motor will not put more than 25 per cent of them out of service. The terminal strip serving the two senders is placed in the central location rather than at the end of the frame in order not to block access to the terminals of the lower plate of relays in one cabinet by running a large local cable arm back of it. The relay arms of the local cable are fanned right and left for the same reason. Because the length of the mounting plates is slightly greater than that of the plates previously used, the width of the plates is made 1-7/8 inches for the purpose of securing added rigidity. The 1/8-inch space heretofore left between plates on sender frames is used for this purpose.

Subdivisions of Equipment and Detailed Index

WECo J drawings listed should be ordered by referring to prefix and base number and requesting the highest suffix dash (—) number.

CIRCUIT DRAWING	EQUIPMENT CODE	RATING OF UNIT	TITLE	EQUIPMENT DRAWING
SD-21193-01) SD-21193-02) SD-21193-05) SD-21194-01) SD-21234-01) SD-21382-01)	J27901A	A&M Only	Subscriber Decoder Sender Frame	J27901A-( )

CIRCUIT DRAWING	EQUIPMENT CODE	RATING OF UNIT	TITLE	EQUIPMENT DRAWING
SD-21193-01) SD-21193-02) SD-21193-05) SD-21234-01) SD-21382-01)	J27901B	A&M Only	Interrupter Unit	J27901B-( )
SD-21193-01	J27901C	A&M Only	Subscriber Noncoin Sender Unit	J27901C-( )
SD-21193-02	J27901G	A&M Only	Subscriber Noncoin Sender Unit for Use With Sender Selectors	J27901G-( )
SD-21193-02	J27901J	A&M Only	Ten Sender Capacity Double Connection Release Unit for Use With Sender Selector Type Subscriber Noncoin Senders per J27901G	J27901J-( )
SD-21193-05	J27901H	A&M Only	Subscriber Noncoin Sender Unit Arranged for Timed Release	J27901H-( )
SD-21382-01	J27901F	A&M Only	Keypulsing Sender Unit	J27901F-( )

2. SUPPLEMENTARY INFORMATION

815-000-000 — Panel Systems Index
AA128.002 — List of Equipment Design Requirements Sections
AA128.006 — List of General Equipment Reqirements Sections
J20102 (815-030-150) — Switchboard Power Cable
Floor Plan Data — Section 4.13, Sheet 8

3. DRAWINGS

For additional drawings forming a part of this specification, see listings under Subdivisions of Equipment and Detailed Index.

Key Sheets — Panel Systems

SD-21300-01 — Battery on the Cutoff Relay
SD-21680-01 — Ground on the Cutoff Relay

Framework

ED-20081-01 — Sequence Switch Framework Details
ED-20087-01 — Assembly of Relay Casing
ED-20130-11 — Assembly of Frame
ED-20133-50 — Assembly of Sender Unit
ED-20134-50 — Assembly of Interrupter Unit
ED-20150-01 — Framework Limits
ED-20616-50 — Assembly of Combined Jack and Fuse Panel
ES-392101 — Baffle Details

Equipment

ED-20644-01 — Method of Mounting Baffles

Wiring and Cabling

ED-20034-01 — Local Cable of Frame
ED-20131-01 — Local Cable of Sender Unit
ED-20132-02 — Switchboard Cabling Plan
ED-20138-01 — Local Cable of Interrupter Unit
ED-20146-01 — Schematic of Cabling for Decoder Equipment
ED-20622-01 — Method of Running and Supporting Battery and Ground Leads
ED-20811-01 — Swithboard Power Cabling
ED-25252-01 — Schematic Layout for Offices Having Battery on the Cutoff Relay

4. EQUIPMENT

J27901A (A&M Only) — Subscriber Decoder Sender Frame

Equipment — J27901A-( )
Local Cable — ED-20034-01

List 1 — Framework, assembly, common wiring, and equipment of one subscriber decorder sender frame less the sender units.

	WIRE	EQUIP	SEE NOTES
Framework, ED-20130-11, G2		1	
Combined Jk and Fuse Panel, ED-20616-52, G1		1	

	WIRE	EQUIP	SEE NOTES
Sdr Ckt, SD-21193-01, -02, -05, and SD-21382-01	10	0	A
Misc Ckt, SD-21234-01:			
Fuse Alarm, Fig. 1	1	1	
Fr Line Jk, Fig. 2	1	1	
Spare Jk, Fig. 3	1	1	
Test Bat. Supply, Fig. 4	1	1	B
Remote-cont Jks, Fig. 5, 6, & 7 Each	1	1	
Rel Test Jks, Fig. 8 & 15	1	0	C
Motor Stop, Fig. 10	1	0	

List 2 — Wiring and equipment per SD-21193-01, Fig. CS, SD-21193-02, Fig. CS, or SD-21193-05, Fig. AS, required in addition to list 1 for each sender to arrange the senders for prefix zero special toll code.

List 3 — Wiring and equipment per SD-21193-01, Fig. FB, or SD-21193-02, Fig. DB, or SD-21193-05, Fig. AZ, required in addition to list 1 for each sender when TOUCH-TONE calling signal converter, arranged for operation with TOUCH-TONE manual dialing and automatic dialers per SD-21993-01, is specified.

Notes

A. The frame local cable containing the common and miscellaneous leads shall be universally wired between the interrupter unit, the sender units, and the combined jack and fuse panel.

B. One 24-volt battery and high-resistance ground supply per SD-21234-01, Fig. 13 shall be furnished per office for decoder-type subscriber sender frames. Fuse alarm aisle pilots per SD-21234-01, Fig. 12 shall be furnished as required in accordance with the circuit note.

C. The E and F jacks in Fig. 8 and 15 shall be universally wired and connected in accordance with the notes on the circuit.

J27901B (A&M Only) — Interrupter Unit

Equipment — J27901B-( )
Local Cable — ED-20138-01

List 1 — Framework, assembly, wiring, and equipment of one interrupter unit less variable apparatus.

	WIRE	EQUIP	SEE NOTES
Framework, ED-20134-50		1	
Sdr Ckt, SD-21193-01, -02, -05, and SD-21382-01	10	10	A
Misc Ckt, SD-21234-01:			
Fig. 9	1	1	
Fig. 16	1	0	

List 2 — Equipment per SD-21234-01, Fig. 16 required in addition to list 1 to equip the sender frame for intersender timing control relays, when all subscriber senders on the fame are associated with the same sender group.

List 3 — Wiring and equipment per SD-21234-01, Fig. 17 required in addition to list 1 to equip the sender frame for intersender timing control relays when the subscriber senders on the frame are associated with two sender groups.

Note

A. The interrupter unit local cable shall be universally wired for the Ward-Leonard resistors, frame busy relays, intersender timing control, and interrupters for all types of decoder senders. The variable apparatus shall be provided as required for each particular job.

J27901C (A&M Only) — Subscriber Noncoin Sender Unit

Equipment — J27901C-( )
Local Cable — ED-20131-01

List 1 — Framework, assembly, wiring, and equipment of one sender unit equipped with two 3-digit noncoin senders (less variable apparatus).

	WIRE	EQUIP	SEE NOTES
Framework, ED-20133-50, G3		1	
Rel Casing, ED-20087-01:			
Item 17R		1	
Item 17L		1	
Sdr Ckt, SD-21193-01	2	2	A,B

List 3 — Equipment per SD-21193-01, Fig. DP required in addition to list 1 to equip each subscriber sender to handle direct distance dialing calls.

List 4 — Equipment per SD-21193-01, Fig. DP, "DE" option only, required in addition to list 1 when 7- to 8-digit multifrequency outpulsing is required.

List 5 — Equipment per SD-21193-01, Fig. DP, "DF" option only, required in addition to list 1 where the "skip 3" feature is required.

List 6 — Equipment per SD-21193-01, Fig. DP, "DG" option only, required in addition to list 1 where the "skip 2" feature is required.

List 7 — Equipment per SD-21193-01, Fig. DV, DW, and DX, with "DI" option, required in addition to list 1 to equip the intersender timing feature in each subscriber sender circuit.

List 8 — Equipment per SD-21193-01, Fig. CR required in addition to list 1 to equip the 6-digit translation (recycle) feature in each subscriber sender.

List 13 — Wiring and equipment per SD-21193-01, Fig. DP, FB option only, required in addition to list 3 when list 4 is furnished.

List 14 — Wiring and equipment per SD-21193-01, Fig. DP, FD option only, required in addition to list 3 when list 4 is not furnished.

List 15 — Wiring and equipment per SD-21193-01, Fig. DA, FP option only, required in addition to list 1 when TOUCH-TONE dial tone (TT1) is provided and the rotary dial condition is equipped.

List 16 — Wiring and equipment per SD-21193-01, HP option, required in addition to list 8 for use with TOUCH-TONE sets using TOUCH-TONE converter SD-21993-01.

Notes

A. The variable apparatus shall be wired for in all cases except the timed release feature, but shall be equipped as required for each particular job.

B. Wiring per Fig. DP, DV, DW, and DX and "DC," "DD," "DE," and "DI" options shall be included in the unit local cable on all new sender units.

C. All new sender units shall be wired universally for Fig. CQ and CR. Much of Fig. CQ can be administered through terminal strip strapping.

J27901F (A&M Only) — Keypulsing Sender Unit

Equipment — J27901F-( )
Local Cable — ED-20131-01

List 1 — Framework, assembly, wiring, and equipment of one sender unit equipped with two 3-digit keypulsing "A" switchboard senders (less variable apparatus).

	WIRE	EQUIP	SEE NOTE
Framework, ED-20133-50, G3		1	
Rel Casing, ED-20087-01:			
Item 17R		1	
Item 17L		1	
Sdr Ckt, SD-21382-01	2	2	A

Note

A. The variable apparatus shall be wired for in all cases but shall be equipped as required for each particular job.

J27901G (A&M Only) — Subscriber Noncoin Sender Unit for Use With Sender Selectors

Equipment — J27901G-( )
Local Cable — ED-20131-01

List 1 — Framework, assembly, wiring, and equipment of one sender unit equipped with two 3-digit noncoin senders (less variable apparatus).

	WIRE	EQUIP	SEE NOTES
Framework, ED-20133-50, G3		1	
Rel Casing, ED-20087-01:			
Item 17R		1	
Item 17L		1	
Sdr Ckt, SD-21193-02	2	2	A,B

List 3 — Equipment per SD-21193-02, Fig. CF required in addition to list 3 to equip each subscriber sender to handle direct distance dialing calls.

List 4 — Equipment per SD-21193-02, Fig. CF, "BE" option only, required in addition to list 3 where 7- to 8-digit multifrequency outpulsing is required.

List 5 — Equipment per SD-21193-02, Fig. CF, "BE" option only, required in addition to list 3 where the "skip 3" feature is required.

List 6 — Equipment per SD-21193-02, Fig. CF, "BF" option only, required in addition to list 3 where the "skip 2" feature is required.

List 7 — Equipment per SD-21193-02, Fig. CH, CI, and CJ, with "BN" and "BP" options, required in addition to list 1 to equip the intersender timing feature in each subscriber sender circuit.

List 8 — Equipment per SD-21193-02, Fig. CL required in addition to list 1 to equip the 6-digit translation (recycle) feature in each subscriber sender.

List 13 — Wiring and equipment per SD-21193-02, Fig. CF, FC option only, required in addition to list 3 when list 4 is furnished.

List 14 — Wiring and equipment per SD-21193-02, Fig. CF, FE option only, required in addition to list 3 when list 4 is not furnished.

List 15 — Wiring and equipment per SD-21193-02, Fig. AE, FG option only, required in addition to list 1 when TOUCH-TONE dial tone (TT1) is provided and the rotary dial condition is equipped.

List 16 — Wiring and equipment per SD-21193-02, FJ option, required in addition to list 8 for use with TOUCH-TONE sets using TOUCH-TONE converter SD-21993-01.

Notes

A. The variable apparatus shall be wired for in every case but shall be equipped as required for each particular job.

B. Wiring per Fig. CF, CH, CI, and CJ and "BE," "BF," "BG," "BN," and "BP" options shall be included in the unit local cable on all new sender units.

C. All new sender units shall be wired universally for Fig. CK and CL. Much of Fig. CK can be administered through terminal strip strapping.

J27901H (A&M Only) — Subscriber Noncoin Sender Unit Arranged for Timed Release

Equipment — J27901H-( )
Local Cable — ED-20131-01

List 1 — Framework, assembly, wiring, and equipment of one sender unit equipped with two 3-digit noncoin senders arranged for timed release (less variable apparatus).

	WIRE	EQUIP	SEE NOTES
Framework, ED-20133-50, G3		1	
Rel Casing, ED-20087-01:			
Item 17R		1	
Item 17L		1	
Sdr Ckt, SD-21193-05	2	2	A,B

List 3 — Equipment per SD-21193-05, Fig. AH required in addition to list 3 to equip each subscriber sender to handle direct distance dialing calls.

List 4 — Equipment per SD-21193-05, Fig. AH, "BJ" option only, required in addition to list 3 where 7- to 8-digit multifrequency outpulsing is required.

List 5 — Equipment per SD-21193-05, Fig. AH, "BK" option only, required in addition to list 3 where the "skip 3" feature is required.

List 6 — Equipment per SD-21193-05, Fig. AH, "BL" option only, required in addition to list 3 where the "skip 2" feature is required.

List 7 — Equipment per SD-21193-05, Fig. AJ, AK, and AL, with "BP" option, required in addition to list 1 to equip the intersender timing feature in each subscriber sender circuit.

List 8 — Wiring and equipment per SD-21193-05, Fig. AM and wiring Options "BV" and "CD," required in addition to lists 1

and 3 to arrange the sender for 6-digit translation (sender recycle).

List 13 — Wiring and equipment per SD-21193-05, Fig. G, CW option only, required in addition to list 1 when TOUCH-TONE dial tone (TT1) is provided and the rotary dial condition is equipped (1000-ohm dialing range only).

List 14 — Wiring and equipment per SD-21193-05, CZ option, required in addition to list 8 for use with TOUCH-TONE sets using TOUCH-TONE converter SD-21993-01.

Notes

A. The variable apparatus shall be wired for in all cases but equipped as required for each particular job.

B. Wiring per Fig. AH, AJ, AK, and AL and "BJ," "BK," "BL," and "BP" options shall be included in the unit local cable on all new sender units.

J27901J (A&M Only) — Ten Sender Capacity Double Connection Release Unit for Use With Sender Selector Type Subscriber Noncoin Senders per J27901G

Equipment — J27901J-( )

List 1 — Framework, equipment, assembly and wiring for one double connection release unit equipped and wired with ten circuits per SD-21193-02, Fig. CM.

Note

A. The double connection release unit is mounted at the bottom of the sender frame and is wired with a local cable having a tail extending to the frame fuse panel and the sender unit terminal strips.

5. GENERAL NOTES

Equipment Notes

5.01 Due to the close association of the sender frames with the decoder connector, decoder, and district sender selector or link frames, they should be located as near these frames as practicable. In order to keep the number of drive motors to the minimum, the sender frames should be located in pairs when practicable.

5.02 As there are two senders on each sender unit, the senders should in general be furnished in multiples of two, although an odd number of senders can be furnished if specified. It should be noted, however, that an odd number of senders involves installing the relays and sequence switches of the second sender on the unit in the field at the time the additional sender is required, and for this reason, fully equipped units can probably be justified unless a considerable period intervenes before the additional sender is needed.

5.03 In general, the subscriber decoder-type sender frames are fully equipped with the exception of the last frame which may or may not be fully equipped depending upon the number of senders required in the office. The senders on a particular frame shall be served by only one connector, since the senders are made busy by the failure of the connector or by the motor stop alarm circuit. In the case of a partially equipped frame, the equipment should begin at the bottom of the frame or with sender designated A and equipped in alphabetical order.

5.04 Where senders of different classes are mounted on the same frame, each different class shall be grouped together.

5.05 When the number of senders in an office is 70 or more, two sender frames shall be driven with a common motor. The sender frame, without the motor, shall be equipped with a 9A bearing which shall be mounted in the location shown on the frame assembly drawing.

5.06 When the number of senders in an office is less than 70, each sender frame shall be driven with an individual motor. When sender frames are added so that the total is more than six frames, the drives shall be changed in order that one motor will drive two frames. In order to facilitate making this change, the 1034A drive, which is arranged to drive an adjacent frame through the medium of a 2C connecting shaft, shall be furnished for each frame that is equipped with a motor, except in the case of odd frames in a line-up or where the floor plan arrangement indicates that two frames could not be placed adjacent to each other. In such cases, the 1034B drive shall be provided instead of the 1034A drive. In offices where the ultimate number of frames is six or less, 1034B drives shall be provided.

5.07 Four sender frames should be furnished in all cases, and if less than 40 senders are specified, the senders should be divided as equally as possible (in groups of two) over the four frames in order that the failure of a drive motor will not put more than approximately 25 per cent of the senders out of commission.

5.08 In general, two keypulsing senders shall be mounted on the subscriber sender frames in the position usually occupied by subscriber senders J and K. However, when the number of subscriber sender frames that are furnished is not sufficient to accommodate all of the keypulsing senders under the above arrangement, a maximum of five of these units may be mounted on one subscriber sender frame, if necessary. The keypusing senders should however be distributed over the frames in such a way that the failure of a drive motor will not put more than 25 per cent of them out of service.

5.09 Drive and motor equipment shall not be furnished as a part of the lists in this specification but should be furnished separately.

5.10 In arranging the fuses on the miscellaneous fuseboard for the LT2 dial tone and TN timed release disconnect tone leads associated with the subscriber sender frames, the total number of frames in each sender group shall be divided into two equal parts (or as nearly thereto as possible), and the fuses for the frames in each half shall be located on separate bus bars served by separate tone supply leads. This arrangement is followed to prevent putting out of service (with respect to the tone supply) more than one half of the senders in one sender group in the event that the tone supply lead should become accidentally grounded.

5.11 The so called postpayment subscriber coin sender unit per J27901D was rated "Mfr Disc." to agree with issue 60-D of its associated circuit SD-21194-01. The cancel coin test feature has been deactivated wherever this sender is installed and it operates as a noncoin or prepayment coin sender the same as subscriber sender circuit SD-21193-01 covered by J27901C. (See 1.10.)

Wiring Notes

Local

5.12 ***Battery and Ground Leads:*** The battery and ground leads "A," "B," and "C" for each sender circuit shall be wired throughout with No. 20 gauge wire to insure a minimum voltage drop.

5.13 ***Registers:*** One stuck sender (SS), one group busy (PB), and one partial dial (PD) register timed release only is required per sender group. When specified, one group register (GR) and one intersender timing register (IT) per sender group should also be furnished. The stuck sender and partial dial registers are maintenance registers and are mounted on the sender make-busy frame. The group registers are traffic registers and are mounted on the traffic register rack. The wiring for each register for each sender terminates on a terminal strip on the interrupter unit where they are strapped together in the proper sender group. In order that the switchboard power cable will terminate on only one terminal strip on each sender frame, one set of "PD," "SS," "GR," "ITR," and "PB" leads for each sender group shall be run between the register and miscellaneous terminal strips.

Switchboard Power Cabling

5.14 Switchboard power cables containing the miscellaneous wiring from the centralized DPTS shall be run on top of the cable rack for each row of sender frames. At each frame the cables shall be looped at the miscellaneous terminal strip and connected as required.

Cabling

5.15 ***To Subscriber Link Frames:*** The number and size of the cables between the sender and link frames depend on the arrangement of the sender groups and the spread of the senders over the link frames.

5.16 ***To Keypulsing Sender Selector Units on Miscellaneous Relay Rack:*** The keypulsing "A" switchboard senders shall be cabled to the sender selector units on the miscellaneous relay rack. The number of circuits per cable depends on the number of keypulsing senders mounted on each sender frame.

5.17 ***To District Sender Selector Frame:*** The senders shall be generally cabled in groups of ten circuits to the terminal strips on the district sender selector frames. The number of circuits per cable, however, depends on the grouping of the senders and the number of senders per frame.

5.18 ***To Decoder Connector Frames:*** The sender circuits shall be cabled in groups of two circuits in switchboard cable direct to the sender multicontact relays on the decoder connector frames.

5.19 ***To Sender Test Frame:*** The sender circuits shall be generally cabled in groups of ten circuits in switchboard cable to the subscriber sender test frame. However, partially equipped frames shall be cabled as required.

5.20 ***To Sender Monitoring Distributing Terminal Strip:*** When all of the senders on the frame are in the same group, the sender monitoring circuit and the leads to the sender make-busy frame shall be cabled from each sender frame to the sender monitor distributing terminal strip in one switchboard cable. These leads are cabled from the sender monitoring distributing terminal strip in groups of 20 circuits to the sender monitoring position in the dial system "A" switchboard and to the sender make-busy frame. The sender monitor distributing terminal strips are equipped with two extra punchings for doubling up leads from the "A" board with similar leads to the sender make-busy equipment. Since the leads from the "A" switchboard and the sender make-busy frame are cabled in groups of 20 circuits, they are distributed over two adjacent sender monitoring distributing terminal strips. Care should be exercised in arranging the cabling to see that the leads connected to these blocks are in the same sender group.

5.21 When the senders on a frame are in two or more groups, separate cables shall be furnished for each group in order that the equipment at the "A" board and the sender make-busy frame will be arranged in consecutive order by groups.

5.22 ***To Sender Make-busy Frame in Offices Without an "A" Switchboard:*** The timed release senders shall be cabled in groups of ten circuits in switchboard cable direct to the sender make-busy frame.

5.23 ***Miscellaneous:*** Cables consisting of 20 AM wires shall be used for the battery, ground, etc, leads from the distributing power terminal strip to the miscellaneous fuseboard. The cabling between the distributing power terminal strip and the points of termination of the various circuits shall be run in the largest switchboard cable consistent with the grouping of leads and the points of termination. Cables shall be No. 22 gauge wire, except ringing tone or battery leads requiring larger gauge wire.

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 number shown is that in which the rating was first applied.

EQUIPMENT	RATING	DETAILS LAST SHOWN IN ISSUE	REPLACING EQUIPMENT
J27901C,L2	Mfr Disc.	7	J27901C,L1
J27901D	Mfr Disc.	8	J27901C
J27901D,L2	Mfr Disc.	7	J27901D,L1
J27901E	Mfr Disc.	8	J27901F
J27901E,L2 & L4	Mfr Disc.	7	J27901E,L1 & L3
J27901F,L2	Mfr Disc.	7	J27901F,L1
J27901G	A&M Only	1	—
L2	Mfr Disc.	7	J27901G,L1
J27901H	A&M Only	6	—
L2	Mfr Disc.	7	J27901H,L1

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