AUXILIARY SENDER LINK FRAME AND AUXILIARY SENDER LINK EXTENSION FRAME EQUIPMENT DESIGN REQUIREMENTS NO. 1 CROSSBAR AND 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 engineering, manufacture, and installation of the auxiliary sender link frame and the auxiliary sender link extension frame in the panel and No. 1 crossbar offices.

1.02 This specification is being reissued to bring it into conformity with the general Plant Series numbering plan as a multinumber practice and to add a new BSP number 815-200-152. This specification last appeared under BSP 816-425-150 Issue 4 and under AA388.090 as Issue 3 and Appendix 1.

Capacity

1.03 The auxiliary sender link frame is arranged to mount a maximum of ten link units, each having a capacity to serve ten subscriber senders or a total of 100 subscriber senders per link frame. The auxiliary sender link extension frame is arranged for a maximum of ten link extension units which serve the recycle circuits of the same subscriber senders associated with the corresponding link unit on the auxiliary sender link frame.

1.04 The 100 subscriber senders appearing on a link frame may be arranged to connect to either one or two groups of auxiliary senders. An auxiliary sender group consists of four to ten auxiliary senders.

1.05 A minimum of two link frames shall be provided in an office. The subscriber senders associated with each auxiliary sender group shall be spread approximately equally over at least two but never more than four link frames. Two to four auxiliary sender link frames with their associated auxiliary sender link extension frames, if provided, may be served by a single auxiliary sender group. The first four crossbar switches (units 0 - 3) on the auxiliary sender link and the auxiliary sender link extension frames shall always be associated with the first group of auxiliary senders appearing on the frame. In order to obtain a uniform arrangement and avoid recabling due to growth, space for additional subscriber senders and recycle circuits shall be reserved on the link frames when required. Subscriber senders of the same sender subgroup on a subscriber sender frame should be associated with the same auxiliary sender subgroup. Other auxiliary sender grouping arrangements which may appear desirable shall be referred to the Bell Telephone Laboratories, Incorporated, for recommendations.

1.06 For any link frame arrangement, the subscriber sender and associated recycle circuit appearances are never multipled. The auxiliary senders, in the same auxiliary sender group, however, are multipled to corresponding horizontals of all link units and link extension units and may also be multipled to appear on a maximum of four link frames and associated link extension frames.

1.07 When the auxiliary sender link extension frame is required, it is provided on a one-for-one basis with its associated link frame. The subscriber sender circuits and recycle circuits shall appear on the corresponding verticals of the link and the link extension units. The horizontals of the link extension switches are wired to the same auxiliary senders as the corresponding horizontals of the associated link units.

Description

1.08 The auxiliary sender link frame consists of a bulb-angle-type framework, 11 feet 6 inches high and 3 feet 1/4 inch long, equipped as shown in Fig. 1. A frame with a 12-inch guardrail is used in panel offices, and a 10-inch guardrail frame is used in No. 1 crossbar offices. The frame has a fuse panel, jack panel for mounting the miscellaneous circuit, three mounting plates for the control equipment common to the auxiliary sender link units, and a mounting plate for miscellaneous equipment at the top of the frame. This frame is initially equipped with four auxiliary sender link units. Equipment to serve additional subscriber senders may be added in groups of ten up to the full frame capacity of 100 (ten auxiliary sender link units). Two frame designation cards indicate the relation of the auxiliary sender link to the subscriber and auxiliary senders.

1.09 The auxiliary sender link unit, illustrated in Fig. 3, is a functional surface-wired unit 11-3/8 inches high and

2 feet 10-5/8 inches long. This unit consists of a 200-point, 6-wire crossbar switch (328H) and a mounting plate for relays and other equipment common to the unit. The subscriber senders connect to the verticals of the unit (two verticals per sender) and may be either No. 1 crossbar or panel-type senders (only one type of sender per switch, however). The auxiliary senders are wired to the horizontals of the crossbar switch and multipled to corresponding horizontals on all switches associated with the same group of auxiliary senders. The subscriber senders of a group should be assigned to the switches on a link frame in numerical sequence, since they appear on consecutively numbered subscriber sender frames and are usually cabled directly in groups of five or ten to the auxiliary sender link frame. The auxiliary sender link units are equipped on a frame from 0, 1, 2, etc, in all cases. Only one auxiliary sender group may appear on a link unit.

1.10 The link unit connects 11 leads between the subscriber senders and the auxiliary senders and one lead between the transverter connector circuit and the auxiliary transverter link circuit through cross points on the crossbar switches. The switches are split at the center with the leads from each subscriber sender connected to two verticals, one on each half of the switch. In addition, a start (ST) lead and a sender attached (SA) lead are connected to the subscriber sender from the link and a busy (B) lead is connected from the link to the auxiliary sender (see Fig. 5).

1.11 The link control relays for the auxiliary senders are located at the top of each link frame which serves the associated group of subscriber senders. When an auxiliary sender link frame is served by two groups of auxiliary senders, link control relays for each group are provided at the top of the link frame. Where the subscriber senders serving a particular central office are distributed over more than one link frame, and are served by a common group of auxiliary senders, link control relays for the auxiliary senders shall be provided on each link frame. In this case, provision is made to prevent two or more link frames from connecting to the same auxiliary sender simultaneously.

1.12 The auxiliary sender link extension frame consists of bulb-angle-type framework 11 feet 6 inches high and 2 feet 0-5/8 inch long equipped as shown in Fig. 2. A frame with a 12-inch guardrail is used in panel offices and a 10-inch guardrail frame is used in No. 1 crossbar offices. The frame has a fuse panel, jack panel for the miscellaneous circuit, and a mounting plate at the top of the frame for terminal strips. The frame is not equipped initially with auxiliary sender link extension units. These units (one unit for each ten sender recycle circuits) are added as required. The full capacity of the frame serves 100 sender recycle circuits (ten auxiliary sender link extension units). Two frame designation cards to show relationship of the auxiliary sender link to the subscriber sender recycle circuits and the auxiliary senders are provided.

1.13 The auxiliary sender link extension unit is a surface-wired unit 12 inches high and 23 inches long. It consists of a 100-point, 6-wire crossbar switch (324M) and a mounting plate with terminal strips (see Fig. 4). The sender recycle circuits are wired to the switch verticals, and the horizontals are used for terminating leads from the auxiliary senders. These units are numbered 0, 1, 2, etc from the bottom up.

1.14 The auxiliary sender link extension frame is employed in direct distance dialing where compressed coin traffic may be routed to traffic service positions. The extension units on this frame provide six leads between a sender recycle circuit and an auxiliary sender for passing the compressed code digit information to the auxiliary sender where reconstruction of the area code is accomplished.

1.15 Only one connection can be set up by the link circuit at a time. However, when this has been established, the link can set up another connection. If the link circuit has not established the connection within a certain time, the link circuit is released to attempt another connection.

1.16 The request for connection to an auxiliary sender is ground on the start (ST) lead from the subscriber sender. The link circuit denies service to other subscriber senders while setting up this connection. An auxiliary sender is seized and its corresponding preference (AP-) relay is operated. The operation of the preference relay operates the proper select and hold magnets on the link frame, connecting the subscriber sender to the selected auxiliary sender. At the same time, if the link extension frame is provided, corresponding select and hold magnets are operated on the link extension unit, connecting sender recycle circuit leads to the auxiliary sender. The hold magnets lock up to the start lead from the subscriber sender and return a ground to the subscriber sender indicating that an auxiliary sender is attached. The auxiliary sender then operates its associated busy (AB-) relay in the link by grounding the busy lead. When the link extension frame is used, the auxiliary sender is informed by ground over LC lead that the link extension cross points are closed. The link circuit is now ready to set up another connection. When the auxiliary sender is no longer required on a call, ground is removed from the start lead by the subscriber sender. This action

releases the link circuit which breaks the connection between the two senders (and sender recycle circuits, if used) and causes the auxiliary sender to restore to normal.

1.17 The busy (AB-) relays appear in a circular link chain circuit in the following order: AB0, AB6, AB3, AB7, AB1, AB8, AB4, AB9, AB2, AB5 and AB0. This order of appearance equalizes wear on the auxiliary senders by insuring that each auxiliary sender will be first choice to approximately the same number of subscriber senders, regardless of the number of auxiliary senders equipped.

1.18 Auxiliary sender link frames and auxiliary sender link extension frames shall be numbered 0, 1, 2, etc, in both panel and No. 1 crossbar offices.

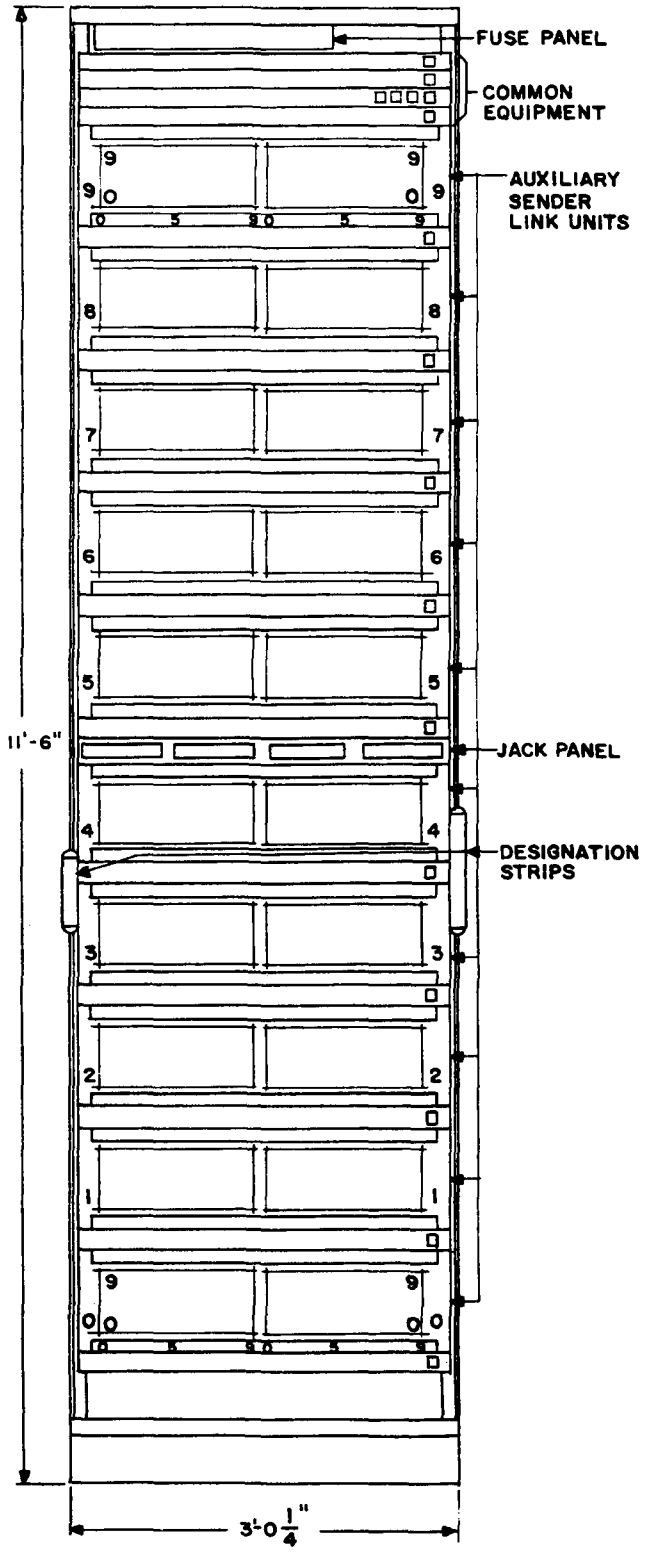

Fig. 1 - Auxiliary Sender Link Frame

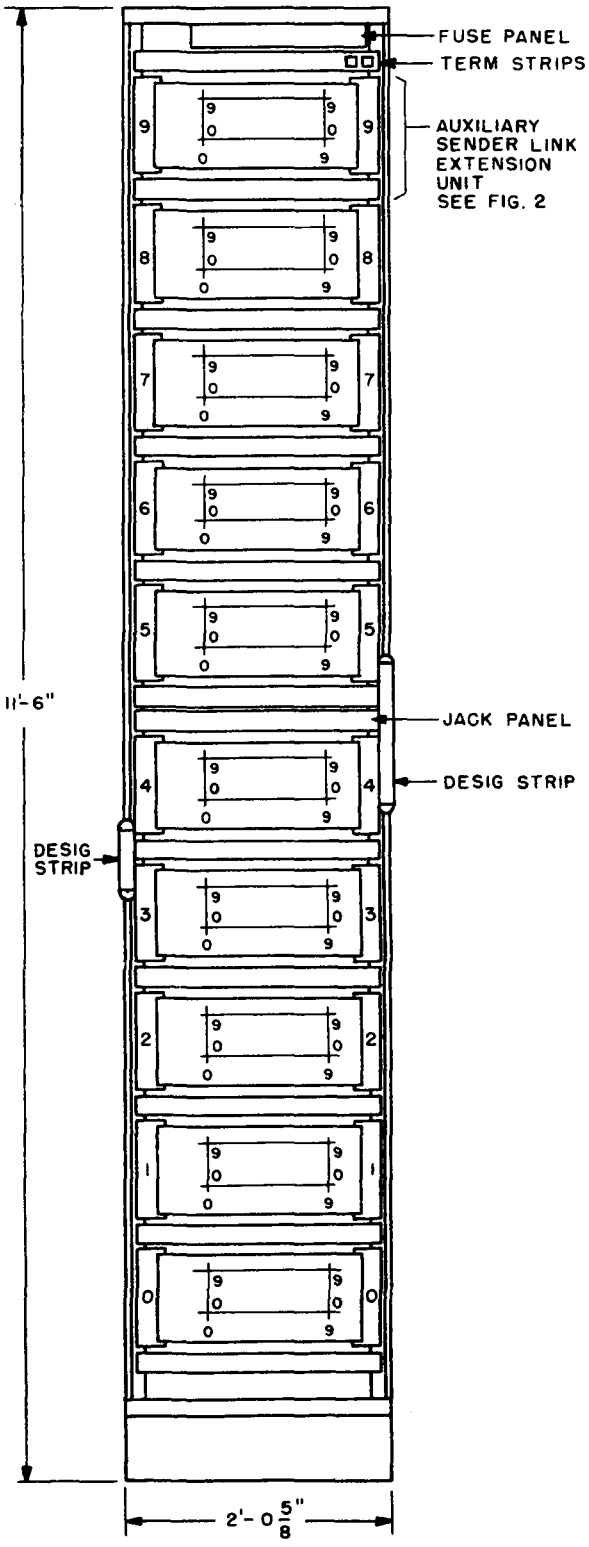

Fig. 2 - Auxiliary Sender Link Extension Frame

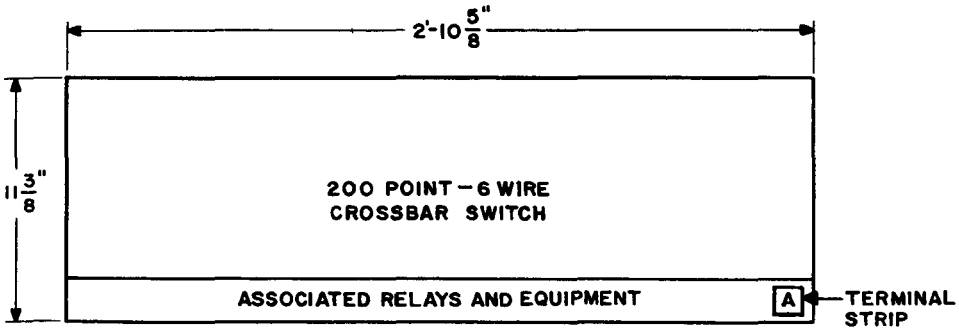

Fig. 3 - Auxiliary Sender Link Unit

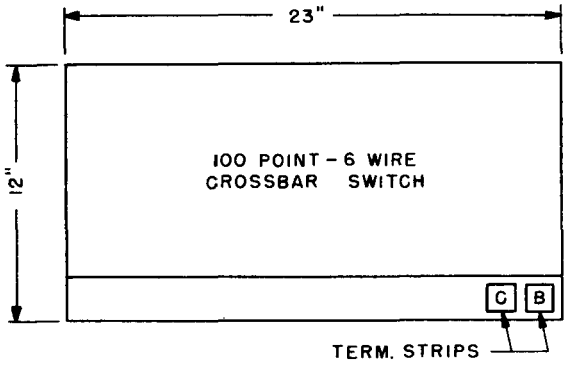

Fig. 4 - Auxiliary Sender Link Extension Unit

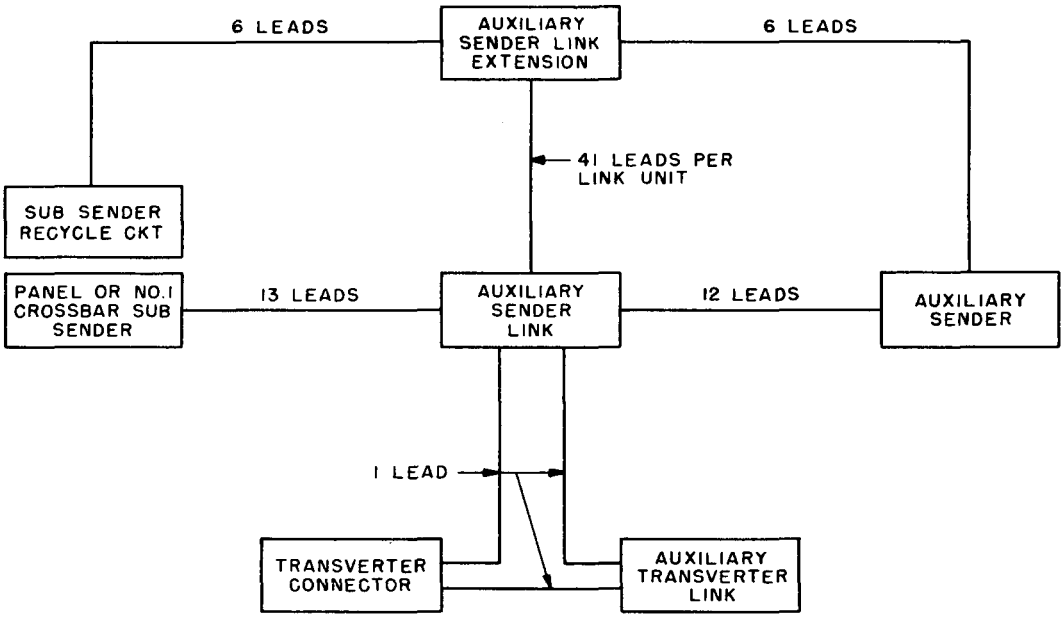

Fig. 5 - Relation Between Auxiliary Sender Link and Connecting Circuits

2. SUPPLEMENTARY INFORMATION

815-000-000 - Panel Systems Index
816-000-000 - No. 1 Crossbar System Index
951-320-100 - Auxiliary Sender Equipment for Direct Distance Dialing - Descriptive Information
J25551 (816-040-150) - End Guard, Aisle Pilot Lamp and DPTS Supports, and Fuse Record Book and Holder
J25552 (816-017-150) - Frame Lighting and Appliance Outlets
J95103 (815-200-151, 816-500-150) - Auxiliary Sender Frame
J95501 - Central Office Lighting Equipment, Appliance Outlets, and Miscellaneous Conduits
J95503 - Central Office Lighting Fluorescent Type
Floor Plan Data - Section 7.1, Sheets 42 and 82

3. DRAWINGS

WECo J drawings should be ordered by referring to the prefix and base number and requesting the current dash (-) number.

Keysheets

SD-21300-01 - Panel System - Battery Cutoff Office
SD-21680-01 - Panel System - Ground Cutoff Office
SD-25000-01 - Crossbar System No. 1

Circuits

SD-96483-01 - Auxiliary Sender Link Circuit
SD-96492-01 - Miscellaneous Circuit

Framework

ED-25021-53 - Jack, Key, and Lamp Panels
ED-25212-01 - Designation Cards
ED-25278-30 - Jack, Key, and Lamp Panels
ED-25529-70 - Guardrail Junctions
ED-91710-74 - Bulb-Angle Frame Assembly
ED-92925-01 - Fuse Panel Assembly

Equipment

J95104A-( ) - Auxiliary Sender Link Frame
J95104B-( ) - Auxiliary Sender Link Unit
J95104C-( ) - Subscriber Sender Start Peg Count Unit
J95104D-( ) - Auxiliary Sender Link Extension Frame
J95104E-( ) - Auxiliary Sender Link Extension Unit

Wiring and Cabling

ED-25346-14
ED-25346-15 - Method of Running Power Feeders
ED-25346-16
ED-27114-01 - Table of Wire Gauges and Types of Insulation
ED-92951-10 - Switchboard Cable Details - Auxiliary Sender Link Frame
ED-92951-11 - Switchboard Power Cable Details - Auxiliary Sender Link Frame

4. EQUIPMENT

J95104A (AT&TCo Std) - Auxiliary Sender Link Frame

Equipment - J95104A-( )

List 1 - Framework, assembly, wiring, and equipment for one 10-inch guardrail auxiliary sender link frame arranged for ten link units and equipped with four link units and the common control equipment for four auxiliary senders. (See notes A, B, C, and D.)

	Wire	Equip	See Notes
Fuse Panel, ED-92925-01, Fig. 3		1	
Jack, Key, and Lamp Panel, ED-25021-53, G14 & G8		1	
Auxiliary Sender Link Ckt, SD-96483-01:			
Start and Hold Ckt, Group and Select Ckt, Fig. 1	10	4	A,B,C
Busy and Preference Ckt, Fig. 2	10	4	C
Gate and Timed Release Ckt, Fig. 3	1	1	C
Trouble Preference Advance, Fig. 8	20	0	
Gate Alarm, Fig. 9	1	1	
Miscellaneous Ckt, SD-96492-01:			
Fig. 1	1	1	C
Fig. 2	2	1	C
Fig. 3	4	1	

List 2 - Equipment per SD-96483-01, Fig. 2 required in addition to list 1 for each auxiliary sender in excess of the minimum number of four auxiliary senders in the first auxiliary sender group on a frame.

List 3 - Equipment per SD-96483-01, Fig. 2 and 3 required in addition to list 1 for the minimum of four auxiliary senders in the second auxiliary sender group on a link frame. (See note E.)

	Wire	Equip	See Notes
Auxiliary Sender Link Ckt, SD-96483-01:			
Busy and Preference Ckt, Fig. 2	10	4	
Gate and Timed Release Ckt, Fig. 3	1	1	
Gate Alarm, Fig. 9	1	1	
Miscellaneous Ckt, SD-96492-01, Fig. 2	0	1	A

List 4 - Equipment per SD-96483-01, Fig. 2 required in addition to list 3 for

each auxiliary sender in excess of the minimum of four auxiliary senders in the second auxiliary sender group on a frame.

List 5 - Framework required in addition to list 1 for use in offices where a 1-foot, 0-inch guardrail is required. Omit framework specified in list 1.

List 6 - Equipment per SD-96483-01, ten Fig. 8 required in addition to list 1 for trouble preference advance for ten senders in one link circuit.

List 7 - Equipment per SD-96492-01, Fig. 3 required in addition to list 1 for connection to the second, third, or fourth sender test frame.

Notes

A. The J95104A auxiliary sender link frame, is equipped initially with a minimum of four link units per J95104B.

B. Two vertical multiple cables are required for each link unit except the first link unit on a frame. These multiple cables connect horizontal levels of a link unit with the corresponding horizontal levels of the next lower-numbered link unit on each half of the crossbar switch and contain the wiring for ten auxiliary senders. The two multiple cables that connect link unit 5 with link unit 4 on a link frame must be longer, since they cross the jack, lamp, and key panel. Verticals 4 and 5 on each half of the crossbar switch are used alternately to connect the horizontal levels. For example:

Connect Verticals	On Link Unit	To Verticals	On Link Unit
5L, 5R	1	5L, 5R	0
4L, 4R	2	4L, 4R	1
5L, 5R	3	5L, 5R	2

C. The frame local cable contains all multiple wiring between link units except the vertical multiple cables between horizontal levels on the crossbar switches and the battery and ground leads from the frame fuse panel to the link units, except F battery for the second auxiliary sender group on a frame. The frame local cable contains the following wiring for the first auxiliary sender group on a frame: the wiring from the terminal strips at the top of the frame to the link units, the wiring between the (AB0-3) or the (AP0-3) and other equipment, and all wiring involving contacts of the AB4-9 relays and the AP4-9 relays. The frame local cable also contains the following for two auxiliary sender groups on a frame: the battery and ground leads from the frame fuse panel to the common equipment, and the frame miscellaneous circuit wiring. The frame local cable is looped at the position of unequipped link units and unequipped control relays.

D. List 1 includes terminal strips B, C, and D (CAD Fig. 2, 3, and 4) and a No. 231A mounting plate at the top of the frame equipped with a D5A terminal strip and drilled for AF relays and other equipment.

E. List 3 includes E, F, and G terminal strips (CAD Fig. 5, 6, and 7) at the top of the frame and wiring for the second auxiliary sender group on a frame. This wiring contains all leads labeled "local cable" on the circuit cross-connection information, all wiring between the equipment of Fig. 2 and Fig. 3, and all wiring involving contacts of the AB4-9 relays and the AP4-9 relays. This wiring is sewed in the local cable provided in list 1 and looped at the positions of unequipped link units and unequipped control relays.

J95104B (AT&TCo Std) - Auxiliary Sender Link Unit

Equipment - J95104B-( )

List 1 - Assembly, wiring, and equipment per SD-96483-01, Fig. 1 and 10 for one auxiliary sender link unit. (See J95104A, Note B.)

J95104C (AT&TCo Std) - Subscriber Sender Start Peg Count Unit

Equipment - J95104C-( )

List 1 - Common equipment and wiring per SD-96483-01, Fig. 4 for one peg count subscriber sender start for either panel or No. 1 crossbar senders.

List 2 - Equipment and wiring per SD-96483-01, Fig. 4 required in addition to list 1 for a second subscriber sender peg count unit.

List 3 - Equipment and wiring per SD-96483-01, Fig. 6, and "S" option, required in addition to list 1 when used with traffic register circuit SD-25942-01.

List 4 - Equipment per SD-96483-01, Fig. 7 required in addition to list 1 when used with traffic register circuits other than SD-25942-01.

List 5 - Equipment and wiring per SD-96483-01, Fig. 6,and "S" option, required in addition to list 2 when used with traffic register circuit SD-25942-01.

List 6 - Equipment per SD-96483-01, Fig. 7 required in addition to list 2 when used with traffic register circuits other than SD-25942-01.

J95104D (AT&TCo Std) - Auxiliary Sender Link Extension Frame

Equipment - J95104D-( )

List 1 - Framework, assembly, wiring, and equipment for one 10-inch guardrail auxiliary sender link extension frame arranged for ten link extension units and wired for a maximum of ten auxiliary senders in the first auxiliary sender group on the frame. (See note D.)

	Wire	Equip	See Notes
Fuse Panel, ED-92925-01, G25	1	1	E
Jack, Key, and Lamp Panel, ED-25278-30, G11		1	
Auxiliary Sender Link Circuit, SD-96483-01, Link Extension Select Magnet Operate and Hold Magnet Check Circuit Leads "SEO-9" for First Auxiliary Sender Group	10		
Miscellaneous Circuit, SD-96492-01:			
Fig. 1	1	1	
Fig. 3	4	1	

List 2 - Framework required in addition to list 1 for use in offices where a 1-foot 0-inch guardrail is required. Omit framework specified in list 1.

List 3 - Equipment per SD-96492-01, Fig. 3 required in addition to list 1 for connection to the second, third, or fourth sender test frame (maximum three list 3 per frame).

Notes

A. The auxiliary sender link extension frame is not equipped initially with J95104E link extension units. These units are added, as required, in the same positions as the associated link units on the link frame.

B. A vertical multiple cable is required for each link extension unit except the first unit on a frame. This multiple cable connects the horizontal levels of a link extension unit with the corresponding levels of the next lower-numbered extension unit and contains the wiring for ten auxiliary senders. The multiple cable that connects unit 5 with unit 4 on the link extension frame must be longer than the others, since it crosses the jack and key panel. Verticals 4 and 5 of the crossbar switch are used alternately to connect the horizontal levels. For example:

Connect Vertical	On Link Extension Unit	To Vertical	On Link Extension Unit
5	1	5	0
4	2	4	1
5	3	5	2

C. The frame local cable contains all the multiple wiring between the link extension units except the vertical multiple cables between horizontal levels of the crossbar switches. The frame local cable also contains the following wiring for the first auxiliary sender group on a frame: the wiring from the A terminal strip at the top of the frame to B terminal strip of the first link extension unit; frame test battery and ground (TBS) from the frame fuse panel to the jack and key panel; FA alarm lead from the frame fuse panel to the miscellaneous terminal strip and leads from the miscellaneous terminal strip to the jack and key panel for telephone jacks, B jack, and SDT jacks. The frame local cable is looped at the positions of unequipped link extension units.

D. When a second auxiliary sender group connects to this frame, provide the pigtail local cable (shown on SD-96483-01, CAD Fig. 14 and 15) between A terminal strip at the top of the link extension frame and B terminal strip on the first link extension unit associated with the second auxiliary sender group on the frame.

E. The fuse panel is arranged and stamped as shown on J95104D.

J95104E (AT&TCo Std) - Auxiliary Sender Link Extension Unit

Equipment - J95104E-( )

List 1 - Assembly, wiring, and equipment, per SD-96483-01, Fig. 11, for one auxiliary sender link extension unit. (See J95104D, Notes A, B, C, and D.)

5. GENERAL NOTES

5.01 The auxiliary sender link frames should be located near their associated subscriber sender frames. The link frames serving the subscriber senders of a particular central office should be located in two separate lines. In No. 1 crossbar offices, the link frames associated with a particular group of auxiliary senders should not be placed with their wiring sides facing each other.

5.02 The auxiliary sender link extension frames should be located near their associated auxiliary sender link frames.

5.03 Panel and No. 1 crossbar subscriber senders shall not appear together on the same link unit. The subscriber senders and recycle circuits shall be cabled to the link and link extension frames in a minimum of five per group.

5.04 Three conditions may exist on a link frame and associated link extension frame, if provided, as follows.

(a) The frame may always be served by only one group of auxiliary senders.

(b) The frame may initially be served by one group of auxiliary senders. At a later date, the frame may be split and served by two groups of auxiliary senders.

(c) The frame may be served initially by two groups of auxiliary senders.

Typical examples of these conditions are shown in Fig. 3 of Section 815-200-170/816-500-170.

5.05 Under condition as described in 5.04(b), the following wiring between the last link unit associated with the second auxiliary sender group must be disconnected when the frame is split:

(a) SO to S9, AP-G, GA-ST, AB-G, and F leads on the auxiliary sender link frame.

(b) SEO to SE9 leads on the auxiliary sender link extension frame.

(c) The vertical multiple cables between horizontal levels of the crossbar switches of the link and link extension frames.

When two auxiliary sender groups appear on a link and link extension frame initially, the leads mentioned above must not be connected.

5.06 Auxiliary sender link frames and auxiliary sender link extension frames are furnished with 10- or 12-inch guardrails and may be lined up with frames having other guardrail widths. The method of joining guardrails of different widths is covered on ED-25529-70.

Wiring and Cable

5.07 When the auxiliary sender link extension frame is installed, the following cabling is required.

(a) Ten leads are required from B terminal strip at the top of the auxiliary sender link frame to A terminal strip at the top of the associated auxiliary sender link extension frame for first auxiliary sender group leads "SEO-9".

(b) When the second auxiliary sender group is connected to a frame, ten leads are required from G terminal strip at the top of the auxiliary sender link frame to A terminal strip at the top of the associated auxiliary sender link extension frame for the second auxiliary sender group leads "SEO-9".

(c) Each link extension unit added requires 41 conductors between the link unit on the link frame and B and C terminal strips of the associated link extension unit on the extension frame for leads "SEGO-9", "HEO-9", "CAO-9", "CBO-9", and "HMG".

(d) Twenty leads are required from the miscellaneous terminal strip on auxiliary sender link to the miscellaneous terminal strip on the extension frame for the miscellaneous circuit.

5.08 The gauge and type of insulation for wire shall be in accordance with ED-27114-01.

5.09 The code numbers of the switchboard cables to the various circuits are shown on the switchboard cable detail drawing. The cross-connection information on the circuit drawing indicates the leads that are to be combined in the same cables. The auxiliary sender cables are connected to the horizontal levels on link unit 0 (and link extension unit 0 if provided; otherwise, connect to lowest numbered link extension unit) at verticals 8L and 8R for the first auxiliary sender group on the frame with the first appearance. Auxiliary sender leads multiple to succeeding frames from verticals 7L and 7R. If two auxiliary sender groups appear on a frame, the auxiliary sender cables for the second auxiliary sender group are connected to the horizontal levels of the lowest-numbered link (and link extension) unit associated with the second auxiliary sender group at verticals 8L and 8R of the frame with the first appearance.

5.10 The nature of the class circuit in the auxiliary sender restricts the resistance of the "CL" lead, which extends from the subscriber sender through the auxiliary sender link to the auxiliary sender. The resistance of the "CL" lead must not exceed 10 ohms. The following table shows the maximum size wire that may be used for the "CL" lead.

Size of Wire	Maximum Length
24	350 Feet
22	560 Feet
20	925 Feet

5.11 Unequipped link units and link extension units shall be bridged with switchboard cable by the installer at verticals 6L and 6R.