CONVERTER AND LINK FRAME "TOUCH-TONE®" TYPE E EQUIPMENT DESIGN REQUIREMENTS STEP-BY-STEP 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 converter trunk and link frames in No. 1, 350A, 355A, and 35E97 step-by-step offices for converting TOUCH-TONE calling signals to dial pulses.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

CAPACITY

1.03 A TOUCH-TONE Type E System consists of two trunk groups. Each trunk group has the capacity for 160 trunks and 12 dedicated receiver/converter units. A translator unit is furnished on a once-per-system basis. This equipment is arranged on standard bulb-angle single-bay frames available in both 9-foot 0-inch and 11-foot 6-inch frame sizes as follows:

(a) J38937A—Converter and Link (CV&L-A1) Frame, 9 feet 0 inch.

(b) J38937B—Converter and Link (CV&L-B1) Frame, 9 feet 0 inch.

(c) J38937C—Converter and Link (CV&L-A1) Frame, 11 feet 6 inches.

(d) J38937D—Converter and Link (CV&L-B1) Frame, 11 feet 6 inches.

DESCRIPTION

1.04 The TOUCH-TONE Type E System is intended for use in No. 1, 350A, 355A, and 35E97 step-by-step offices requiring TOUCH-TONE calling capabilities. The system uses electronic components on printed wiring boards and a crossbar switch as the principal equipment elements. The equipment is arranged to provide a compact, low maintenance system that is readily enlarged on a modular basis.

1.05 Fig. 1 is the functional block diagram.

1.06 When a subscriber in a TOUCH-TONE line finder group originates a call, a line relay operates and an idle line finder starts to hunt for the calling line. A sleeve ground, generated by the line finder, operates a converter trunk. The converter trunk bids for a connection to a converter via a crossbar link, splitting the paths between the line finder and the first selector. After the converter has been seized, it performs pre-dial tone tests that may include loop test, party test, 2-MR (message register) trunk signaling, and dial tone first trunk signaling. When the converter completes the necessary tests, the converter returns dial tone to the calling subscriber.

1.07 On TOUCH-TONE originated calls, the keyed digits are detected by a TOUCH-TONE receiver, translated into 2-out-of-5 information and registered. After the first digit is registered, outpulsing to the switchtrain begins. When the last digit determined by translation or timing has been outpulsed, the converter signals the converter trunk to restore the connection between the line finder and the first selector and then releases.

1.08 On rotary dial originated calls, the first digit is pulse repeated to the first selector. The converter signals the converter trunk to restore the con-

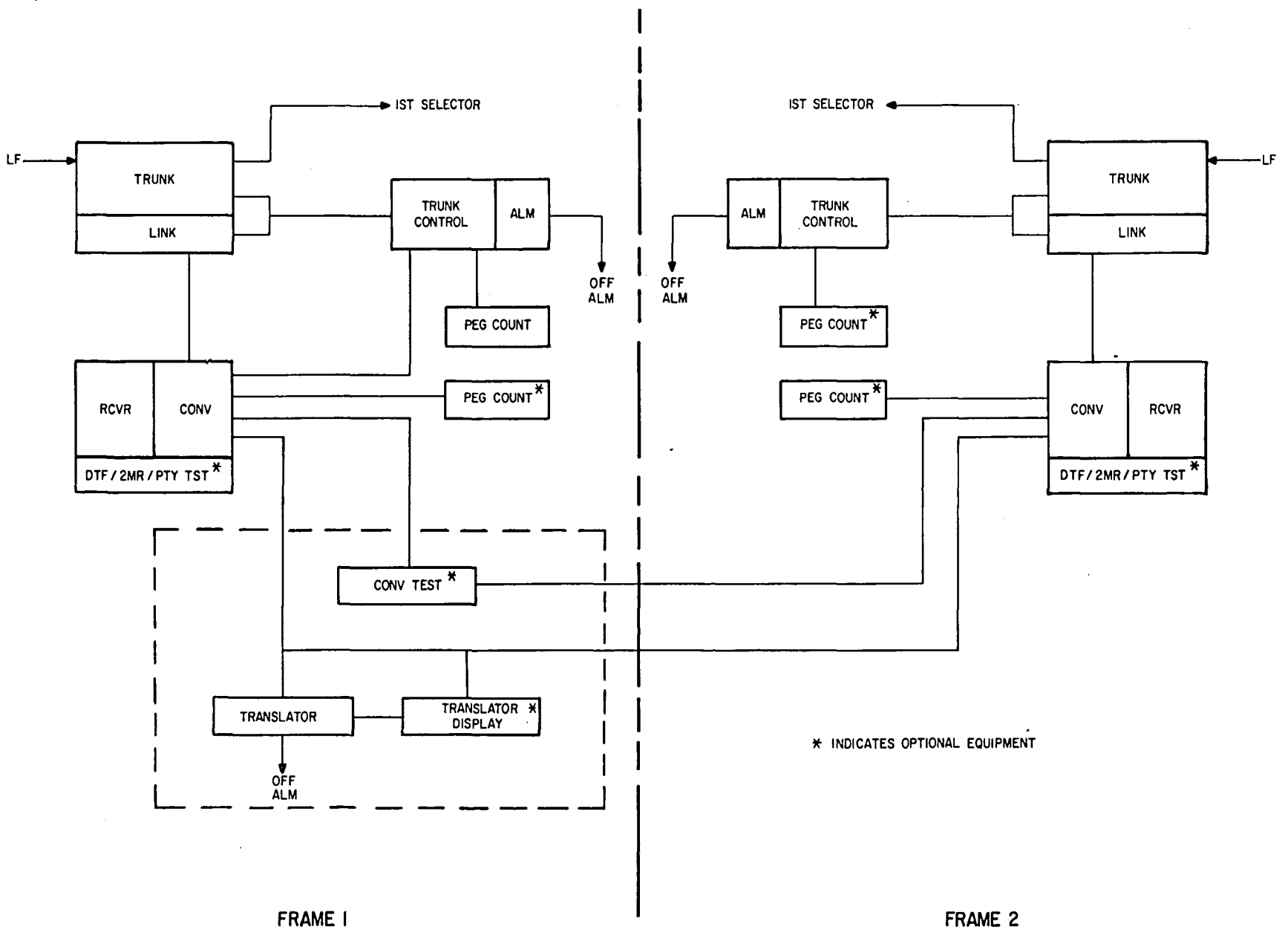

Fig. 1—Step-by-Step TOUCH-TONE Type E, Functional Block Diagram

nection between the line finder and the first selector and then releases during the interdigital interval.

1.09 Dial tone must be removed from all first selectors associated with TOUCH-TONE line finders since the converter provides dial tone. However, dial tone should not be removed from the balance of the first selectors.

1.10 A maximum of eight fundamental line finder groups fully equipped with 20 line finders each would fully utilize the maximum capacity of one trunk group. If traffic characteristics dictate that fewer than 20 line finders per fundamental group be equipped, then fill-in line finder groups may be used. Each trunk group is arranged to accommodate three fill-in line groups. For example, if 18 line finders per fundamental line finder group are used, then eight line finder groups may be served, that is, the eight fundamental line finders groups or 8 x 18 = 148, plus a fill-in group of 12 line finders. (148 + 12 = 160 line finders).

EQUIPMENT ARRANGEMENT

1.11 The 9-foot 0-inch converter and link frames (J38937A and J38937B) are shown in Fig. 2. These frames are standard bulb-angle single-bay frames 2 feet 5/8 inch wide; they are available with 10- or 12-inch guardrails. A 5-inch cable rack is available for frames with 12-inch guardrails.

1.12 Frame terminal strips, a modular frame fuse panel, and a factory formed frame local cable are furnished with the frames. The frame terminal strips are used to connect a maximum of 160 line finders per frame, plus interframe wiring associated with the two frames. The frame local cable contains all wiring required to interconnect all frame components.

1.13 The frames are to be equipped as outlined in Table A for J38937A and in Table B for J38937B. Sixteen trunk and link units can be served by each trunk group. When the capacity of the frame has been exceeded, the overflow units are to be mounted on a miscellaneous relay rack frame. The frames should be installed next to each other for maximum advantages in engineering, installation, and maintenance.

1.14 The 11-foot 6-inch converter and link frames (J38937C and J38937D) are shown in Fig. 3. These frames are standard bulb-angle single-bay frames 2-feet 5/8 inch wide and are available with 10- or 12-inch guardrails.

1.15 Frame terminal strips, a modular frame fuse panel, and a factory formed frame local cable are furnished with the frames. The frame terminal strips are used to connect a maximum of 160 line finders per frame, plus interframe wiring associated with the two frames. The frame local cable contains all the wiring required to interconnect all frame components.

1.16 The frames are to be equipped as outlined in Table C for J38937C and in Table D for J38937D. Sixteen trunk and link units can be served by each trunk group. When the capacity of the frame has been exceeded, the overflow units are to be mounted on a miscellaneous relay rack frame. The frames should be installed next to each other for maximum advantages in engineering, installation, and maintenance.

1.17 A -48 volt filter panel is also furnished with each system. This filter is shipped separately and is to be mounted to cable rack above the first frame of the system, when the frames are adjoining. When the two frames of a system cannot be installed adjoining, a second filter panel is required. The same power source that is used for the first filter must also be used for the second filter so that the logic ground level will be maintained between the frames.

2. SUPPLEMENTARY INFORMATION

814-000-000—Numerical Index—Step-By-Step Systems
800-600-000—Checking List—General Equipment Requirements
J34734—814-645-150—Portable Test Set TOUCH-TONE Type E
J38805—814-005-155—No. 355A Dial Office—General
J39206—814-005-150—List of Requirement Specifications for No. 1 and 350A Offices—General
J39210—814-008-150—No. 35E97 Dial Office
Floor Plan Data—FPD-814-322-151-1
Current Drain Data—
SD-31359-02—No. 1 Office
SD-31364-02—No. 350A Office
SD-31780-02—No. 355A Office
SD-32325-02—No. 35E97 Office

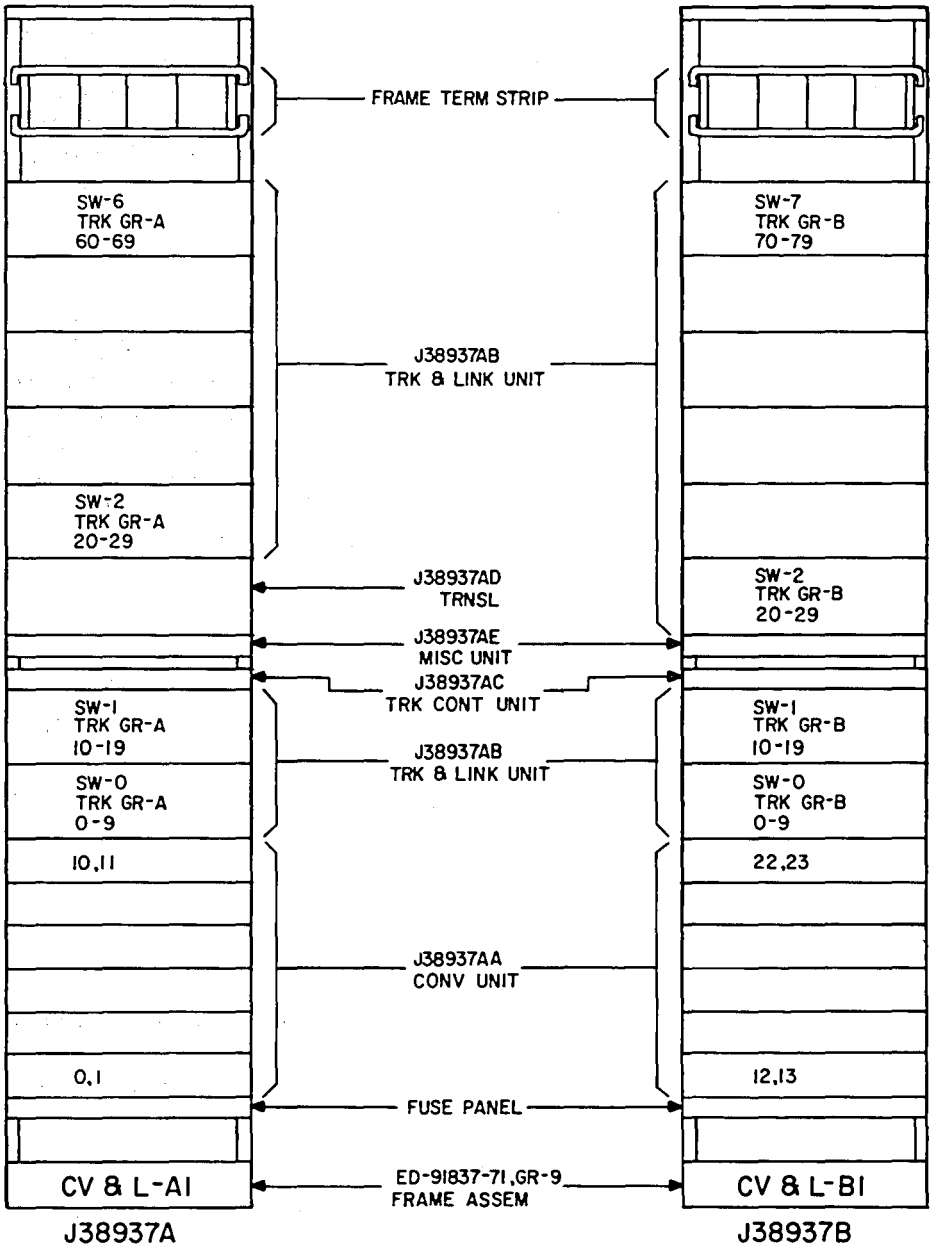

Fig. 2—9-Foot Converter and Link Frames

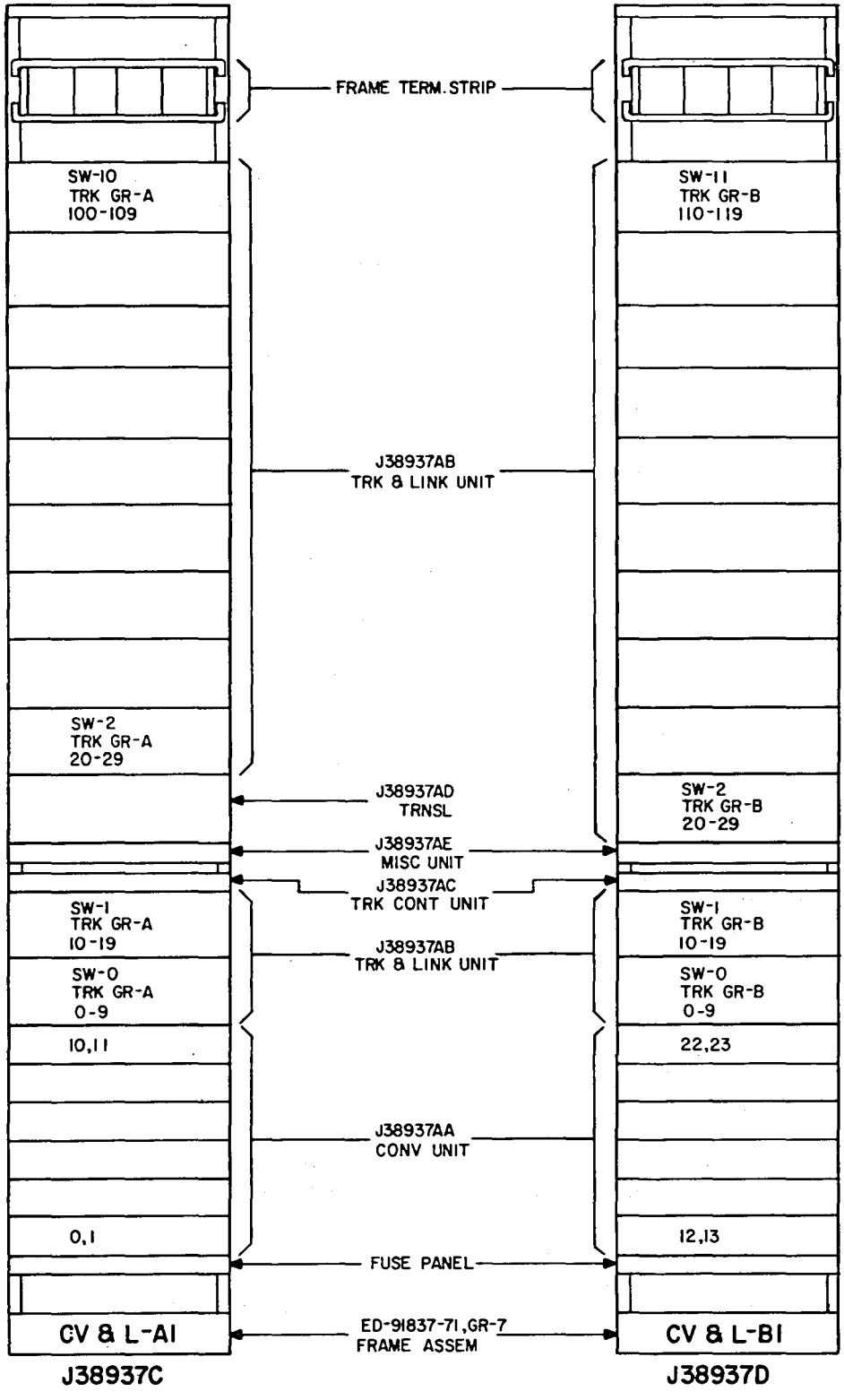

Fig. 3—11-Foot 6-Inch Converter and Link Frames

3. DRAWINGS

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

Keysheets

SD-31359-01—No. 1 Office
SD-31364-01—No. 350A Office
SD-31780-01—No. 355A Office
SD-32325-01—No. 35E97 Office

Equipment

ED-35090-( )—Printed Wiring Board Receiver/Converter Unit
ED-35091-( )—Printed Wiring Board Receiver/Converter Unit
ED-35092-( )—Printed Wiring Board Receiver/Converter Unit
ED-35093-( )—Printed Wiring Board Receiver/Converter Unit
ED-35094-( )—Printed Wiring Board Receiver/Converter Unit
ED-35095-( )—Printed Wiring Board Translator Unit
ED-35096-( )—Printed Wiring Board Translator Unit
ED-35097-( )—Printed Wiring Board Translator Unit
ED-35098-( )—Printed Wiring Board Translator Unit
ED-35099-( )—Printed Wiring Board Translator Unit
ED-35100-( )—Printed Wiring Board Translator Unit
ED-35101-( )—Printed Wiring Board Translator Unit
ED-35102-( )—Printed Wiring Board Translator Unit
ED-35103-( )—Printed Wiring Board Translator Unit
ED-35104-( )—Printed Wiring Board Trunk and Link Unit
ED-35105-( )—Printed Wiring Board Controller Unit
ED-35106-( )—Printed Wiring Board Controller Unit
ED-35107-( )—Printed Wiring Board Controller Unit
ED-35108-( )—Printed Wiring Board Miscellaneous Unit
ED-92173-( )—Filters—10, 15, 25 and 50 Amperes—Relay Rack, Cable Rack, or Fuse Bay Mounted
ED-95131-( )—Modular Fuse Blocks and Accessories for Fuse Panel Arrangements Adapted for 2-Inch Mounting Plates and 70-Type Fuses

Wiring and Cabling

ED-31296-( )—Method of Running Power Feeders
ED-32264-( )—Wire Gauges and Type of Insulation for Step-by-Step Frames
ED-35109-( )—Switchboard Cabling Plan and Details—Converter and Link Frames, J38937A, B, C, and D.

4. EQUIPMENT

J38937A—AT&TCo Std—Converter and Link Frame—9 Feet 0 Inch—First Frame of System

List 1—Framework, assembly, wiring, and common equipment for one converter and link frame, 9 feet 0 inch high, with 12-inch guardrails. (See Notes F, G, H, and I.)

	WIRE	EQUIP	NOTES
Rcvr & Conv Ckt, SD-35060-01:			
Fig. 1, 2	12	0	
Trk & Link Ckt SD-35061-01:			
Fig. 1	7	0	
Fig. 2	1	0	
Fig. 3	14	0	
Trans, Tst & Alm Ckt, SD-35062-01:			
Fig. 1, 2, 3	1	0	A,B,C,D,E
Misc Ckt, SD-35063-01:			
Fig. 1, 2, 5, 7	1	0	
Fig. 3	12	As Reqd	
Fig. 4	38	As Reqd	

Notes

A. In a No. 1 office furnish options T and Z when the alarm leads for the audible and visual alarms are not paired with ground and furnish options N and Z when they are paired with ground.

B. In a No. 1 office furnish options T and Y when the alarm leads for the pilot lamps are not paired with ground and furnish options Q and Y when they are paired with ground.

C. In a No. 350A office furnish options T and X when the alarm leads are not paired with ground and furnish options R and X when they are paired with ground.

D. In a No. 355A office furnish options T and W when the alarm leads are not paired with ground and furnish options S and W when they are paired with ground.

E. In a 35E97 office furnish option V.

F. See Table A for units which mount on this frame.

G. A -48 volt filter panel per ED-92173-71, Group 10, shall always be furnished with this frame. This filter is shipped loose and is mounted to the cable rack located above the frames.

H. The framework furnished with list 1 has a 12-inch base. The frame is also available with a 10-inch base or a 12-inch base with a 5-inch cable rack.

I. When more than seven trunk and link units are required for this frame, the additional units are located on a miscellaneous relay rack frame.

J38937B—AT&TCo Std—Converter and Link Frame—9 Feet 0 Inch—Second Frame of System

List 1—Framework, assembly, wiring, and common equipment for one converter and link frame, 9 feet 0 inch, with 12-inch guardrails. (See Notes A, B, C, and D.)

	WIRE	EQUIP	NOTES
Rcvr & Conv Ckt, SD-35060-01:			
Fig. 1, 2	12	0	
Trk & Link Ckt, SD-35061-01:			
Fig. 1	8	0	
Fig. 2	1	0	
Fig. 3	16	0	
Misc Ckt, SD-35063-01:			
Fig. 1, 2, 5	1	0	
Fig. 3	12	As Reqd	
Fig. 4	33	As Reqd	

Notes

A. See Table B for units that mount on this frame.

B. When this frame cannot be installed adjoining the first frame (J38937A), it is necessary to furnish a -48 volt filter panel per ED-92173-71, Group 10 for both frames.

C. The framework furnished with list 1 has a 12-inch base. The frame is also available with a 10-inch base or a 12-inch base with a 5-inch cable rack.

D. When more than eight trunk and link units are required for this frame, the additional units shall be located on a miscellaneous relay rack frame.

J38937C—AT&TCo Std—Converter and Link Frame—11 Feet 6 Inches—First Frame of System

List 1—Framework, assembly, wiring, and common equipment for one converter and link frame, 11 feet 6 inches, with 12-inch guardrails. (See Notes F, G, H, and I.)

	WIRE	EQUIP	NOTES
Rcvr & Conv Ckt, SD-35060-01:			
Fig. 1, 2	12	0	
Trk & Link Ckt, SD-35061-01:			
Fig. 1	11	0	
Fig. 2	1	0	
Fig. 3	22	0	
Trans, Tst & Alm Ckt, SD-35062-01:			
Fig. 1, 2, 3	1	0	A,B,C,D,E
Misc Ckt, SD-35063-01:			
Fig. 1, 2, 5, 7	1	0	
Fig. 3	12	As Reqd	
Fig. 4	38	As Reqd	

Notes

A. In a No. 1 office furnish options T and Z when the alarm leads for the audible and visual alarms are not paired with ground and furnish options N and Z when they are paired with ground.

B. In a No. 1 office furnish options T and Y when the alarm leads for the pilot lamps are not paired with ground and furnish options Q and Y when they are paired with ground.

C. In a No. 350A office furnish options T and X when the alarm leads are not paired with ground and furnish options R and X when they are paired with ground.

D. In a No. 355A office furnish options T and W when the alarm leads are not paired with ground and furnish options S and W when they are paired with ground.

E. In a 35E97 office furnish option V.

F. See Table C for units that mount on this frame.

G. A -48 volt filter panel per ED-92173-71, Group 10, shall always be furnished with this frame. This filter is shipped loose and is mounted to the cable rack located above the frames.

H. The framework furnished with list 1 has a 12-inch base. The frame is also available with a 10-inch base or a 12-inch base with a 5-inch cable rack.

I. When more than seven trunk and link units are required for this frame, the additional units are located on a miscellaneous relay rack frame.

J38937D—AT&TCo Std—Converter and Link Frame—11 Feet 6 Inches—Second Frame of System

List 1—Framework, assembly, wiring, and common equipment for one converter and link frame, 11 feet 6 inches, with 12-inch guardrails. (See Notes A, B, C, and D.)

	WIRE	EQUIP	NOTES
Rcvr & Conv Ckt, SD-35060-01:			
Fig. 1, 2	12	0	
Trk & Link Ckt, SD-35061-01:			
Fig. 1	12	0	
Fig. 2	1	0	
Fig. 3	24	0	
Misc Ckt, SD-35063-01:			
Fig. 1, 2, 5	1	0	
Fig. 3	12	As Reqd	
Fig. 4	33	As Reqd	

Notes

A. See Table D for units that mount on this frame.

B. When this frame cannot be installed adjoining the first frame (J38937C), it is necessary to furnish a -48 volt filter panel per ED-92173-71, Group 10 for both frames.

C. The framework furnished with list 1 has a 12-inch base. The frame is also available with a 10-inch base or a 12-inch base with a 5-inch cable rack.

D. When more than eight trunk and link units are required for this frame, the additional units shall be located on a miscellaneous relay rack frame.

J38937AA—AT&TCo Std—Receiver and Converter Unit

List 1—Assembly, wiring, and equipment for one receiver and converter unit.

	WIRE	EQUIP	NOTES
Rcvr & Conv Ckt, SD-35060-01:			
Fig. 1 with option Z	2	0	
Fig. 2	2	0	

List 2—Equipment required in addition to list 1 for one receiver and converter per SD-35060-01, Fig. 1. (Maximum 2 list 2 per list 1.)

List 3—Equipment required in addition to list 1 when party test circuit is required per SD-35060-01 Fig. 2, omit option Z. (Maximum 2 list 3 per list 1.)

J38937AB—AT&TCo Std—Trunk and Link Unit

List 1—Assembly, wiring, and equipment for one trunk and link unit wired for, ten trunks and equipped for five.

	WIRE	EQUIP	NOTES
Trk & Link Ckt, SD-35061-01:			
Fig. 1	1	1	
Fig. 3	2	2	

List 2—Equipment required in addition to list 1 per SD-35061-01, Fig. 3 when five additional trunks are required. (Maximum 1 list 2 per each list 1.)

J38937AC—AT&TCo Std—Controller Unit

List 1—Assembly, wiring, and equipment for one controller unit per SD-35061-01, Fig. 2.

J38937AD—AT&TCo Std—Translator Unit

List 1—Assembly, wiring, and equipment for one translator unit.

	WIRE	EQUIP	NOTES
Trans, Tst, & Alm Ckt, SD-35062-01:			
Fig. 1	1	1	
Fig. 2, 3	1	0	

List 2—Equipment required in addition to list 1 per SD-35062-01, Fig. 2 when a translator display is required.

List 3—Equipment required in addition to list 1 per SD-35062-01, Fig. 3 when converter testing is required.

J38937AE—AT&TCo Std—Miscellaneous Unit

List 1—Assembly, wiring, and equipment for one miscellaneous unit per SD-35063-01, Fig. 1.

List 2—Equipment required in addition to list 1 per SD-35063-01, Fig. 5 when traffic and converter plant registers are required.

List 3—Equipment required in addition to list 1 per SD-35063-01, Fig. 6 when unit is installed in a 35E97 office. (See Note A.)

List 4—Equipment required in addition to list 1 per SD-35063-01, Fig. 7 when a precise tone plant is not required. (See Note B.)

Notes

A. Lists 3 and 4 are required only on the first frame of a TOUCH-TONE Type E system.

B. Furnish option X in addition to list 4 in a 355A or 35E97 office.

GENERAL NOTES AND INDEXES

5.01 Codes J38937E through J38937Y are unassigned.

5.02 When a TOUCH-TONE dial tone supply is furnished, the maximum length of the TT3 shielded wire shall be 600 feet per lead.

5.03 Because of the large number of trunks located in each frame, it is impractical to provide assignments on the equipment. A trunk record book, mounted in the first frame of a system, is furnished for this purpose.

5.04 When specified by the telephone company spare circuit packs are to be furnished as follows:

PACK NO	USED ON	CENTRALIZED MAINTENANCE ARRANGEMENT QUANTITY	DEDICATED OFFICE ARRANGEMENT QUANTITY
ED35090-( )	J38937AA-( )	1 Spare per Each Group of 96	0
ED35091-( )	J38937AA-( )	1 Spare per Each Group of 96	0
ED35092-( )	J38937AA-( )	1 Spare per Each Group of 48	0
ED35093-( )	J38937AA-( )	1 Spare per Each Group of 48	0
ED35094-( )	J38937AA-( )	1 Spare per Each Group of 96	0
JD30	J38937AA-( )	1 Spare per Each Group of 96	0
JD31	J38937AA-( )	1 Spare per Each Group of 96	0
JD40	J38937AA-( )	1 Spare per Each Group of 96	0
ED35104-( )	J38937AB-( )	1 Spare per Each Group of 48	1
ED35105-( )	J38937AC-( )	1 Spare per Each Group of 20	1
ED35106-( )	J38937AC-( )	1 Spare per Each Group of 20	1
ED35107-( )	J38937AC-( )	1 Spare per Each Group of 20	1
ED35095-( )	J38937AD-( )	1 Spare per Each Group of 20	1
ED35096-( )	J38937AD-( )	0	0
ED35097-( )	J38937AD-( )	1 Spare per Each Group of 20	1
ED35098-( )	J38937AD-( )	1 Spare per Each Group of 20	1
ED35099-( )	J38937AD-( )	1 Spare per Each Group of 20	1
ED35100-( )	J38937AD-( )	1 Spare per Each Group of 20	1
ED35101-( )	J38937AD-( )	1 Spare per Each Group of 20	1
ED35102-( )	J38937AD-( )	1 Spare per Each Group of 20	1
ED35103-( )	J38937AD-( )	0	0
ED35108-( )	J38937AE-( )	0	0

SUBDIVISIONS OF EQUIPMENT AND DETAILED INDEX

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

EQUIPMENT CODE	AT&T RATING OF UNIT	TITLE	EQUIPMENT DRAWING	CIRCUIT DRAWING	PER UNIT
J38937A	Std	Converter and Link Frame—9 Feet 0 Inch—First Frame of System	J38937A-( )	SD-35060-01 SD-35061-01 SD-35062-01 SD-35063-01	
J38937B	Std	Converter and Link Frame—9 Feet 0 Inch—Second Frame of System	J38937B-( )	SD-35060-01 SD-35061-01 SD-35063-01	
J38937C	Std	Converter and Link Frame—11 Feet 6 Inches—First Frame of System	J38937C-( )	SD-35060-01 SD-35061-01 SD-35062-01 SD-35063-01	
J38937D	Std	Converter and Link Frame—11 Feet 6 Inches—Second Frame of System	J38937D-( )	SD-35060-01 SD-35061-01 SD-35063-01	
J38937AA	Std	Receiver and Converter Unit	J38937AA-( )	SD-35060-01	2
J38937AB	Std	Trunk and Link Unit	J38937AB-( )	SD-35061-01	10
J38937AC	Std	Controller Unit	J38937AC-( )	SD-35061-01	1
J38937AD	Std	Translator Unit	J38937AD-( )	SD-35062-01	1
J38937AE	Std	Miscellaneous Unit	J38937AE-( )	SD-35063-01	1

Circuit Schematic Index

CIRCUIT DRAWING	J38937 EQPT CODE
SD-35060-01	A,B,C,D,AA
SD-35061-01	A,B,C,D,AB,AC
SD-35062-01	A,C,AD
SD-35063-01	A,B,C,D,AE

TABLE A

SUPPLEMENTARY CONVERTER AND LINK FRAME—9 FEET 0 INCH—J38937A

COMPONENT EQUIPMENT UNITS SHALL BE EQUIPPED AS FOLLOWS:				
UNIT		QUANTITY TO BE PROVIDED		DESCRIPTION
CODE	LIST NO.	ALWAYS	FOR OPTION INDICATED	
J38937AA	1	2	4	Receiver/Converter Unit
	2	4	8	
	3		12	When Parity Test is Required
J38937AB	1	2	5	Trunk and Link Unit*
	2	1	6	When second set of five trunks is required
J38937AC	1	1		Controller Unit
	1	1		Translator Unit
J38937AD	2		1	When a Translator Display is Required
	3		1	When converter testing is required
	1	1		Miscellaneous Unit
J38937AE	2		1	When Traffic and Converter Registers are required
	3		1	When installed in 35E97 office
	4		1	When a precise tone supply is not required

* Nine additional units are miscellaneous relay rack mounted.

TABLE B

CONVERTER AND LINK FRAME—9 FEET 0 INCH—J38937B

COMPONENT EQUIPMENT UNITS SHALL BE EQUIPPED AS FOLLOWS:				
UNIT		QUANTITY TO BE PROVIDED		DESCRIPTION
CODE	LIST NO.	ALWAYS	FOR OPTION INDICATED	
J38937AA	1	2	4	Receiver/Converter Unit
	2	4	8	
	3		12	When parity test is required
J38937AB	1	2	6	Trunk and link unit*
	2	1		When second set of five trks is required
J38937AC	1	1		Controller Unit
J38937AE	1	1		Miscellaneous Unit
	2		1	When Traffic and Converter Registers are required

* Eight additional units are miscellaneous relay rack mounted.

TABLE C

SUPPLEMENTARY CONVERTER AND LINK FRAME—11 FEET 6 INCHES—J38937C

COMPONENT EQUIPMENT UNITS SHALL BE EQUIPPED AS FOLLOWS:				
UNIT		QUANTITY TO BE PROVIDED		DESCRIPTION
CODE	LIST NO.	ALWAYS	FOR OPTION INDICATED	
J38937AA	1	2	4	Receiver/Converter Unit
	2	4	8	
	3		12	When parity test is required
J38937AB	1	2	9	Trunk and link unit*
	2	1	10	When second set of five trunks is required
J38937AC	1	1		Controller Unit
	1	1		Translator Unit
J38937AD	2		1	When a translator display is required
	3		1	When converter testing is required
J38937AE	1	1		Miscellaneous Unit
	2		1	When Traffic and Converter registers are required
	3		1	When installed in 35E97 office
	4		1	When a precise tone supply is not required

* Five additional units are miscellaneous relay rack mounted.

TABLE D

CONVERTER AND LINK FRAME—11 FEET 6 INCHES—J38937D

COMPONENT EQUIPMENT UNITS SHALL BE EQUIPPED AS FOLLOWS:				
UNIT		QUANTITY TO BE PROVIDED		DESCRIPTION
CODE	LIST NO.	ALWAYS	FOR OPTION INDICATED	
J38937AA	1	2	4	Receiver/Converter Unit
	2	4	8	
	3		12	When parity test is required
J38937AB	1	2	10	Trunk and Link Unit*
	2	1		When second set of five trunks is required
J38937AC	1	1		Controller Unit
J38937AE	2		1	When Traffic and Converter Registers are required

* Four additional units are miscellaneous relay rack mounted.

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WE Dept 2313-AJP/JJK-WEA