REPEATERS, PULSE CORRECTING REPEATERS AND INCOMING TRUNKS RELAY RACK UNITS 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 manufacture and installation of tandem and intertandem trunks and repeaters for use in step-by-step tandem areas.

1.02 This specification is reissued to:

(a) Revise J33019E, Lists 8 and 9.

(b) Rate J33019G Mfr Disc.

(c) Revise J33019H, List 1.

(d) Rate J33019K Mfr Disc.

(e) Revise J33019L, Lists 1, 2, 5, 6, 8, 9, 10 and Notes B, C, and D. Add list 11 and Note E.

(f) Rate J33019P Mfr Disc.

(g) Add J33019R, List 2.

(h) Add J33019S and J33019T.

Description

1.03 It is intended eventually to include in this specification all relay rack units for tandem and intertandem trunks and associated repeaters which are arranged on 2-inch wide mounting plates.

1.04 These relay rack units consist of one or more mounting plates, 2 inches wide by 23 inches long, on which the apparatus for one or more circuits is mounted and surface-wired to one or more unit terminal strips. The terminal strips facilitate shop testing of the circuit, provide a place for the strapping used to obtain circuit options, and serve as a convenient place for the installer to make the necessary external connections. These 2-inch units may be mounted on relay racks drilled for 1-3/4 inch mounting plates by using adapters per ED-92243-( ) illustrated on ED-92242-01.

1.05 All units covered by this specification are surface wired.

1.06 The tandem trunks and repeater equipments covered in this specification provide facilities for handling traffic in step-by-step tandem areas as covered in J32004.

1.07 The choice of a circuit to be used for a particular installation is covered in the J specification or on a keysheet covering that system.

1.08 When making an incoming repeater busy it is ordinarily necessary to do this at the preceding equipment, usually in the distant originating office. As an indication or reminder to this effect, a transparent, red tinted plastic sheet designation card cover per P-40C869 is available for inserting in the repeater designation card holder over the designation card. This imparts a red color to the designation card but does not appreciably reduce the visibility of the information. These covers are available in package lots of 100. They may be applied either by the installer or telephone company maintenance forces, as required.

2. SUPPLEMENTARY INFORMATION

814-000-000—Step-by-Step Systems Index
800-600-000—List of General Equipment Requirements Sections
J38805—814-005-151—355A Offices—General

J39206—814-005-150—No 1 and 350A Offices— General
J93001—801-006-153—Relay Rack Unit Framework and Local Cable

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 Offices
SD-31364-01—350A Offices
SD-31780-01—355A Offices
SD-90250-01—Master Keysheet—All Systems

Framework

ED-91837-( )—Relay Rack Assembly — Angle Type—1-Foot, 0-Inch Sheet Metal Base 9 Feet, 0 Inch, and 11 Feet, 6 Inches High
ED-92242-01—Application of 2-Inch Plates or Units to 1-3/4 Inch Racks or 1-3/4 Inch Plates or Units to 2-Inch Racks—Typical
ED-92243-( )—Relay Rack Unit Framework

4. EQUIPMENT

J33019B—AT&TCo Std—Incoming or Outgoing Pulse Correcting Trunk Unit — Repeating Coil Transmission — With or Without Telephone Repeater

List 2—Wiring and equipment per SD-31929-01, Fig A and Z apparatus, required in addition to list 1 or 16 for all office impedance values when ratio of trunk impedance to office impedance, at 1000 cycles, is below 0.5.

List 3—Wiring and equipment per SD-31929-01, Fig A and X apparatus, required in addition to list 1 or 16 when office impedance value is greater than 1100 ohms and ratio of trunk impedance to office impedance, at 1000 cycles, is between 0.51 and 0.8.

List 4—Wiring and equipment per SD-31929-01, Fig A and Y apparatus, required in addition to list 1 or 16 when office impedance value is 1100 ohms or less and ratio of trunk impedance to office impedance, at 1000 cycles, is between 0.51 and 0.8.

List 5—Wiring and equipment per SD-31929-01, Fig A and W apparatus, required in addition to list 1 or 16 for all office impedance values when ratio of trunk impedance to office impedance, at 1000 cycles, is 0.81 to 1.25.

List 6—Wiring and equipment per SD-31929-01, Fig A and U apparatus, required in addition to list 1 or 16 when office impedance value is greater than 735 ohms and ratio of trunk impedance to office impedance, at 1000 cycles, is between 1.26 and 2.

List 7—Wiring and equipment per SD-31929-01, Fig A and V apparatus, required in addition to list 1 or 16 when office impedance value is 735 ohms or less and ratio of trunk impedance to office impedance, at 1000 cycles, is between 1.26 and 2.

List 8—Wiring and equipment per SD-31929-01, Fig A and T apparatus, required in addition to list 1 or 16 for all office impedance values when ratio of trunk impedance to office impedance, at 1000 cycles, is above 2.

List 9—Equipment per SD-31929-01, Fig 1, D apparatus only, required in addition to list 1 or 16 for loop pulsing incoming over loop of 0 to 1200 ohms, or battery and ground pulsing incoming over loop 0 to 2000 ohms.

List 10—Equipment per SD-31929-01, Fig 1, E apparatus only, required in addition to list 1 or 16 for loop pulsing incoming over loop of 1200 to 2000 ohms, or battery and ground pulsing incoming over loop of 1200 to 2500 ohms.

List 12—Wiring and equipment per SD-31929-01, Fig A, ZI apparatus only, required in addition to incoming trunks per lists 2 to 8 when used with dialed-in telephone repeaters.

List 13—Wiring and equipment per SD-31929-01, Fig A, ZJ apparatus only, required in addition to outgoing trunks per lists 2 to 8 when used with dialed-in telephone repeaters.

List 14—Wiring and equipment per SD-31929-01, Fig 1, ZE apparatus only, required in addition to list 1 or 16 when battery and ground pulsing is used.

List 15—Wiring and equipment per SD-31929-01, Fig 1, ZU apparatus only, required in addition to list 1 or 16 when loop pulsing is used.

List 16—Framework, assembly, wiring, and equipment for one pulse-correcting trunk unit per SD-31929-01, Fig 1, with ZT apparatus and F, G, and H wiring. (See Note A.) (No of Mtg Plts 2 — No of Ckts 1)

Note

A. When OGT conductor loop is greater than 1200 ohms, SD-31929-01, Fig 1, ZA wiring only, shall be specified in addition to list 1 or 16.

J33019C—A&M Only—Incoming Repeater Unit—Pulse Correcting—For Use With Loops from 0 to 5000 Ohms

List 2—Repeating coil per SD-31542-01, Fig 1, R apparatus only, required in addition to list 1 for one incoming repeater circuit when trunk impedance is 1200 ohms or less at 1000 cycles. (See Notes A, B, and C.)

List 3—Repeating coil per SD-31542-01, Fig 1, Q apparatus only, required in addition to list 1, for one incoming repeater circuit when trunk impedance is greater than 1200 ohms at 1000 cycles. (See Notes A, B, and C.)

List 4—Wiring and equipment per SD-31542-01, Fig 1, H apparatus only, required in addition to list 2 or 3 when repeater circuit is to be used with dialed-in telephone repeaters. (See Note C.)

List 5—Framework, assembly, wiring, and equipment for one incoming repeater per SD-31542-01, Fig 1, with ZF apparatus and W and Z wiring. (No of Mtg Plts 3 — No of Ckts 1)

Notes

A. The A and B straps across the T and R resistors shall be provided in all cases and cut by the installer as required for the particular job.

B. The value of the C, or C and C1 resistors shall be as specified for the particular job.

C. When list 4 is specified, the value of the B capacitor and the wiring of the H capacitor shall be such as to provide the capacities specified on the particular job.

J33019E—AT&TCo Std — Outgoing Repeater Unit—With Repeating Coil Transmission

List 3—Capacitor per SD-31609-01, Fig 1, N apparatus only, required in addition to list 1, 2, 8, or 9 when circuit is used as an outgoing repeater to a selector in a distant office. (See Note B.)

List 5—Repeating coil per SD-31609-01, Fig 1, Q apparatus only, required in addition to list 1, 2, 8, or 9 when ratio of trunk impedance to repeater impedance is 1.25 or less at 1000 cycles. (See Note B.)

List 6—Repeating coil per SD-31609-01, Fig 1, R apparatus only, required in addition to list 1, 2, 8, or 9 when ratio of trunk impedance to repeater impedance is 1.26 or more, at 1000 cycles. (See Note B.)

List 8—Framework, assembly, wiring, and equipment for two outgoing repeaters, per SD-31609-01, Fig 1, with E, F, and K and less options P, N, and J. (See list 9 and Notes A and C.) (No of Mtg Plts 3 — No of Ckts 2)

List 9—Framework, assembly, wiring, and equipment for one outgoing repeater, per SD-31609-01, Fig 1, with E, F, and K and less options P, N, and J. (See list 8 and Notes A, B, and C.) (No of Mtg Plts 2 — No of Ckts 1)

List 10—Wiring and equipment per SD-31609-01, Fig 1, options P and J only, required in addition to list 8 or 9 where circuit is used as an outgoing repeater and is connected directly to an outgoing pulse corrector in a distant office. (See Note B.)

Notes

A. The value of the C resistor shall be as required for the particular job.

B. When required, one of lists 3, 4, or 10, and 5 or 6 shall be provided with each list 2 or 9 or two such lists with each list 1 or 8.

C. Furnish option H 187A capacitor in addition to list 8 or 9 on a miscellaneous basis and capacitors A and B to be furnished as specified by the telephone company, when trunks connect with telephone repeaters in the same office.

J33019F—AT&TCo Std—Incoming Repeater Unit from Panel Tandem Office

List 2—Framework, assembly, wiring, and equipment for one incoming repeater for trunk from panel tandem office per SD-31162-01, Fig 1 and C, with L apparatus. (See Note A.) (No of Mtg Plts 2 — No of Ckts 1)

Note

A. When the external circuit loop to panel tandem sender is more than 2500 ohms, K straps shall be furnished at the A and B resistors.

J33019H—AT&TCo Std—Outgoing Repeater Unit Arranged to Release Preceding Selectors and Test Busy Momentarily Upon Disconnection at Originating End—For Use With Long Trunk Loops

List 1—Assembly, wiring, and equipment for one outgoing repeater circuit per SD-31428-01, Fig 1, with option M and Y. (See Note A.) (No of Mtg Plts 1 — No of Ckts 1)

Notes

A. Provide X wiring in place of Y wiring when this circuit connects with plunger out trunk switches. Where Y wiring is furnished, last trunk busy registers cannot be associated with repeaters connected directly to the selector multiple since double registration would result.

B. This unit shall be located at the center of a relay rack bay for serving intercepting trunks requiring machine ringing. If there is more than one bay of such trunk equipment, one or more test trunk units as required shall be furnished on the basis that each unit shall be required to serve trunks in the same bay and/or one bay at either side, but no more.

J33019L—AT&TCo Std—Incoming Trunk Unit Arranged for Battery, Ground or Loop Dialing—E, M and N, or E and M Lead Supervision

List 1—Framework, assembly, wiring, and equipment for one incoming trunk unit arranged for pulse correction, per SD-31726-01. Fig 1 and B, with options E, G, H, M, T, ZB, ZJ, ZL, ZM, ZN, and ZO. (No of Mtg Plts 2 — No of Ckts 1)

List 2—Framework, assembly, wiring, and equipment for one incoming trunk unit not arranged for pulse correction, per SD-31726-01. Fig 1 and A, with options H, T, ZB, ZJ, ZL, ZN, and ZO. (No of Mtg Plts 2 — No of Ckts 1)

List 3—Wiring and equipment per SD-31726-01, Fig E and option Y and ZE, required in addition to list 1 or 2 when the maximum OGT conductor loop is less than 1200 ohms. (See Notes A and B.)

List 4—Wiring and equipment per SD-31726-01, Fig E and option K and ZE, required in addition to list 1 or 2 when some OGT conductor loops are less than 1200 ohms and some are 1200 ohms or more on trunks to crossbar tandem, No 1 crossbar connected to dial pulse sender, or No 5 crossbar without bylink. (See Notes A and B.)

List 5—Wiring and equipment per SD-31726-01, Fig G and option ZF required in addition to list 1 or 2 when some OGT conductor loops are less than 1200 ohms and some are 1200 ohms or more on trunk to step-by-step, panel, call indicator, No 1 crossbar connected to subscriber sender, or No 5 crossbar with bylink.

List 6—Wiring and equipment per SD-31726-01, option D, required in addition to list 1 or 2 when carrier or voice frequency repeaters other than E-type are used. (See Note C.)

List 7—Wiring and equipment per SD-31726-01, Fig C and option X required in addition to list 1 or 2 when pulsing from dials or both dials and senders, and busy flash signal to operators over local train is not required.

List 8—Wiring and equipment per SD-31726-01, Fig H with options W and H, required in addition to list 1 and 2 when pulsing from senders only and busy flash signal to operator or supervision from free service lines over local train is required. (See Note D.)

List 9—Wiring and equipment per SD-31726-01, Fig H with option R, required in addition to list 1 or 2 when pulsing from dials or both dials and senders, and busy flash signal to operator or supervision from free service lines over local train is required.

List 10—Equipment per SD-31726-01, options ZG and ZH, required in addition to list 8 when this unit is associated with No 4 toll or No 5 crossbar office requiring timed off-hook signal on seizure.

List 11—Wiring and equipment per SD-31726-01, Fig H with options W, ZG, and ZH, required in addition to list 1 or 2 when this unit is associated with a No 4 toll or No 5 crossbar office requiring timed off-hook signal on seizure, with pulsing from senders only on A-B toll trains or on local trains not arranged to return busy flash signal to the operator.

Notes

A. Furnish wiring per Fig F and option ZF in addition to list 1 or 2 when minimum OGT conductor loop is 1200 ohms.

B. Furnish option ZD in addition to list 1 or 2 for trunks to step-by-step, panel, call indicator, No 1 crossbar connected to subscriber sender through incoming repeaters, or No 5 crossbar with bylink. Otherwise, furnish option ZC.

C. When list 6 is furnished, provide options B and C when office impedance at 1000 hertz is less than 785 ohms, option B when it is 785 to 1265 ohms, and option C when it is over 1265 ohms.

D. Furnish Fig C and option W in addition to list 1 or 2 when list 11 is not required, and pulsing from senders only is required on A-B toll trains or on local trains not arranged for busy flash signal to the operator.

E. Provide V installer strapping at unit terminal strip per list 1 or 2 when calls are completed to another office without an outgoing repeater or trunk circuit through an outgoing selector or ROT selector.

J33019R—AT&TCo Std—Outgoing Pulse Correcting Repeater Unit

List 1—Framework, assembly, wiring, and equipment for one outgoing pulse correcting repeater unit per SD-32346-01, Fig 1 from local or toll selector multiple arranged for battery and ground pulsing and reverse battery supervision, and for direct inward dialing to PBXs. (See Notes A and B.) (No of Mtg Plts 2 — No of Ckts 1)

List 2—Wiring and equipment per SD-32346-01, option V, required in addition to list 1 when reserved number or vacant level intercept and/or measured rate service is required.

Notes

A. Strapping per option Y (reverse battery supervision not required) or strapping per option Z (reverse battery supervision required) shall be provided by the installer as required.

B. The strapping per option X shall be provided at all times and cut by the installer when the outgoing trunk loop exceeds 500 ohms.

J33019S—AT&TCo Std—Incoming or Outgoing Pulse Correction Repeater Unit

List 1—Framework, assembly, wiring, and equipment for one outgoing pulse correcting repeater unit when pulsing over a subscriber loop of 0 to 1500 ohms, a trunk loop of 0 to 1200 ohms, or a battery and ground loop of 0 to 2000 ohms per SD-32184-02, Fig 1 or 3 with option Y. (See Notes A, D, and E.) (No of Mtg Plts 1 — No of Ckts 1)

List 2—Framework, assembly, wiring, and equipment for one incoming pulse correcting repeater unit for an incoming loop of 0 to 5000 ohms or for an outgoing pulse correcting repeater unit when the input is from other than a selector multiple or ROTS per SD-32184-02, Fig 1 and 2 with option Z. (See Notes B, C, and D.) (No of Mtg Plts 1 — No of Ckts 1)

List 3—Wiring and equipment required in addition to list 1 when circuit is used as an outgoing repeater in a 35-E-97 office per SD-32184-02, option R.

List 4—Wiring and equipment required in addition to list 1 when input is from a trunk loop of 1200-2000 ohms per SD-32184-02, option N. (Omit option Y.)

Notes

A. Provide option T in addition to list 1 when connection to selector bank multiple circuit is required for trunks not connected through outgoing repeater.

B. Provide option X in addition to list 2 when succeeding switch must be held busy by means of a ground supplied forward on the sleeve lead.

C. The straps across the X1, X2, X3, X4, Y1, Y2, Y3, and Y4 resistors shall be added by the installer on CA3 and CA4, respectively, per individual job requirements.

D. Provide option Q when outgoing loop is over 600 ohms.

E. Provide option K when reserved number or vacant level intercept and/or measured rate service is required.

J33019T—AT&TCo Std — Outgoing Repeater Unit— With Battery and Ground Pulsing — Long Range Reverse Battery Supervision—Type B TB Supply

List 1—Framework, assembly, wiring, and equipment for one outgoing repeater per SD-32087-02, Fig 1, and option X. (See Note A.)

List 2—Equipment required in addition to list 1 when trunk impedance at 1000 hertz is greater than 1100 ohms per SD-32087-02, option W, omit option X. (See Note A.)

Note

A. The cross connect straps for options Y and Z shall be added by the installer on CA2 per individual job requirements.

5. GENERAL NOTES AND INDEXES

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
J33019A	Mfr Disc	2	J33019L
J33019B,L1 & L11	Mfr Disc	2	J33019B,L16 & L15
J33019C	A&M Only	3	—
J33019C,L1	Mfr Disc	3	J33019C,L5
J33019D	Mfr Disc	3	—
J33019E,L1, L2,L4	Mfr Disc	2	J33019E,L8, L9, & L10
L7	Mfr Disc	2	—
J33019F,L1	Mfr Disc	3	J33019F,L2
J33019G	Mfr Disc	5	J33019P
J33019J	Cancelled	3	—
J33019K	Mfr Disc	5	J33019T
J33019M	Mfr Disc	2	—
J33019N	Mfr Disc	2	—
J33019P	Mfr Disc	5	J33019S

SUBDIVISIONS OF EQUIPMENT AND DETAILED INDEX

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

EQUIPMENT CODE	AT&T RATING OF UNIT	TITLE	EQUIPMENT DRAWING	CIRCUIT DRAWING
J33019B	Std	Incoming or Outgoing Pulse Correcting Trunk Unit—Repeating Coil Transmission—With or Without Telephone Repeater	J33019B-( )	SD-31929-01
J33019C	A&M Only	Incoming Repeater Unit—Pulse Correcting—For Use With Loops from 0 to 5000 Ohms	J33019C-( )	SD-31542-01
J33019E	Std	Outgoing Repeater Unit—With Repeating Coil Transmission	J33019E-( )	SD-31609-01
J33019F	Std	Incoming Repeater Unit—From Panel Tandem Office	J33019F-( )	SD-31162-01
J33019H	Std	Outgoing Repeater Unit—Arranged to Release Preceding Selectors and Test Busy Momentarily upon Disconnection at Originating End—For Use With Long Trunk Loops	J33019H-( )	SD-31428-01
J33019L	Std	Incoming Trunk Unit Arranged for Battery Ground, or Loop Dialing E, M and N, or E and M Lead Supervision	J33019L-( )	SD-31726-01

EQUIPMENT CODE	AT&T RATING OF UNIT	TITLE	EQUIPMENT DRAWING	CIRCUIT DRAWING
J33019R	Std	Outgoing Pulse Correcting Repeater Unit	J33019R-( )	SD-32346-01
J33019S	Std	Incoming or Outgoing Pulse Correction Repeater Unit	J33019S-( )	SD-32184-02
J33019T	Std	Outgoing Repeater Unit—Battery and Ground Pulsing—Long Range Reverse Battery Supervision—Type B TB Supply	J33019T-( )	SD-32087-02

Circuit Schematic Index

CIRCUIT DRAWING	J33019 EQUIP CODE
SD-31162-01	F
SD-31428-01	H
SD-31542-01	C
SD-31609-01	E
SD-31726-01	L
SD-31929-01	B
SD-32087-02	T
SD-32184-02	S
SD-32346-01	R

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