COMPOSITE SIGNALING

SIGNALING, SIGNAL CONVERTING, REPEATING COIL, BALANCING NETWORK, AND COMPROMISE NETWORK UNITS

EQUIPMENT DESIGN REQUIREMENTS

COMMON 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 composite signaling units.

1.02 This specification is reissued to incorporate previous appendix changes.

Description

1.03 The composite signaling and associated equipments covered herein provide a means of signaling or dialing and signaling, on a CX basis, over lines or trunks between offices. Equipments are provided for use with cable, open wire, or mixed facilities, that is, part open wire and part cable.

1.04 The various units are arranged to be equipped for phantom group or single circuit operation. Complete wiring is, however, furnished on a phantom group basis on all units wired in the shop.

1.05 The composite set and repeating coil units covered in this specification are the same, from a circuit operation standpoint, as units covered in specifications J68622 and J68623 but differ from an equipment standpoint in that 120- or 94-type repeating coils are covered on the drawings listed herein and 62-type coils are covered in the J68622 specification. Where spare equipments per J68622 and J68623 are available, where it is desirable for future toll plans, or where 62-type coils are required on a unit basis, the units covered in the above specifications may be used instead of the units covered herein.

Method of Wiring

1.06 All units are shop wired. Terminal strips are not provided on the J98602G unit but a local cable is furnished by the shop and wired to the apparatus by the installer. This latter unit is appliqued on a standard repeating coil unit. The J98602N, U, and W units are surface wired and do not have terminal strips.

Functions

1.07 In the following descriptions, type "A" (A&M Only) is used to distinguish CX signaling circuits which connect to trunk circuits normally furnishing ground through approximately 115 ohms on the "M" lead from the newer or type "B" CX signaling circuit which connect to trunk circuits normally furnishing direct ground on the "M" lead. The type "B" equipment permits uniform potentiometer connections on the networks for all similar CX signaling circuits in any one office.

1.08 J98602C covers type "A" composite signaling equipment arranged for 2-way signaling only over loops up to 8200 ohms. The unit uses composite leg signaling channels for supervisory signaling in connection with the associated telephone channels and neutralizes the effect of differences of earth potentials between two offices. This circuit is not arranged for dialing.

1.09 The J98602E composite and repeating coil unit provides a means for compositing and terminating toll lines or trunks not equipped

with terminal repeaters. By virtue of the repeating coils, a phantom circuit is obtained from two side circuits and the impedance of the line is reduced to approximately that of the office. The composite equipment provides signaling channels for three circuits with compensated ground or three circuits without compensated ground and one special grounded telegraph circuit. This unit is also used in connection with "G" carrier telephone circuits. This unit is restricted to cable or open wire circuits where high voltage condensers are not required in the composite circuit. This unit contains 120-type repeating coils. However, repeating coil unit J68622A and composite set unit J68623A or S may be used if these units are desired in order to conform with other future toll plans or when there are spare 62-type repeating coils available. When it is desired to use composite set unit J68623A or S and 120-type repeating coils the repeating coils will be mounted in accordance with Note C under J98602E.

1.10 The J98602G compromise network unit provides a terminating arrangement for a V1 or 22-type telephone repeater associated with a toll trunk circuit or with a local tandem trunk circuit. The compromise networks only are furnished under this specification while the repeating coil unit is covered by J68622A.

1.11 J98602H unit covers type "B" CX signaling equipment arranged for 2-way signaling and 2-way dialing on trunks between two 49-volt offices or 2-way signaling and 1-way dialing over trunks from a 38-volt office to a 48-volt dial office. The signals or pulses are transmitted over a CX leg of an open wire or cable circuit or a combination of the two. The unit will also function on trunks between two 48-volt offices where the associated CX set is located in an office some distance away from this signaling equipment. The unit may be equipped for phantom group or nonphantom group operation and is arranged for earth potential variation.

1.12 J98602J covers type "B" CX signaling equipment arranged for 2-way signaling and 2-way dialing with 45- to 50-volt battery over a CX leg of open wire circuits without intermediate VF repeaters. The circuit is arranged for phantom group or nonphantom group circuit operation and for earth potential variation. This equipment may be used for operation over mixed facilities, that is, part cable and part open wire providing the minimum insulation resistance of the open wire section is not less than 200,000 ohms per mile.

1.13 J98602M covers signaling converter equipment used for connecting type "A" or "B" composite signaling circuits to 20-cycle ringdown circuits (used in offices having No. 1 toll switchboard or in offices having the older type of No. 3 toll switchboard or switchboard No. 11 which is not arranged for direct signaling to the switchboard).

1.14 J98602N covers signaling converter equipment used for connecting type "A" or "B" composite signaling circuits to d-c signaling ringdown circuits (used in offices having the newer type of No. 3 toll switchboard or switchboard No. 11 which is arranged for direct signaling to the switchboard).

1.15 J98602S covers a repeating coil and CX set phantom group unit arranged for 1000-volt breakdown condensers and 120-type repeating coils. This unit utilizes a cable type CX set but is used in conjunction with CX signaling equipment on open wire lines. Repeating coil unit J68622A and composite set unit J68623B, R, or U may be used if these units are desired in order to conform with other future toll plans or when there are spare 62-type repeating coils available. When it is desired to use composite set unit J68623B, R, or U and 120-type repeating coils, the repeating coils will be mounted in accordance with Note C under J98602E.

1.16 J98602W covers telephone set balancing network unit equipment for use with attendant's telephone set.

1.17 J98602Y covers signaling converter equipment used for connecting CX signaling circuits and 1600- and 2000-cycle signaling circuits to ringdown intertoll trunks of toll switchboard No. 3, 3B, 3C, or 3CL for incoming automatic operation.

1.18 The size of the various units of equipment are as follows:

EQUIPMENT	LENGTH	NO. OF 1-3/4" MTG. PLT SPACES
J98602C	19"	2
J98602E	19"	4
J98602G	19"	7
J98602H	19"	4
J98602J	19"	4
J98602M	19"	2
J98602N	19"	1
J98602S, L1-5	19"	5
J98602S, L6	19"	1
J98602W	19"	1
J98602Y	23"	5

Subdivisions of Equipment

J98602C — AT&TCo Std — 2-way Composite Signaling Unit for Use With Intertoll Trunks and Manual Long Lines — For Quadded or Nonquadded Cable Lines — With Earth Potential Variation (19" Relay Rack — One Phantom Group or 2 Physical Circuits)

J98602E — AT&TCo Std — Composite Set and Repeating Coil Unit — With 500-volt Condensers — For 2-wire Nonrepeatered Circuits Arranged for CX Signaling or Dialing — For Open Wire or Quadded or Nonquadded Cable Lines (19" Relay Rack — One Phantom Group or 2 Physical Circuits)

J98602G — AT&TCo Std — Compromise Network Unit — To Be Combined With Open Wire Repeating Coil Unit per J68622A — For Use With Toll or Local Tandem Trunk Circuits Arranged for Composite Signaling or Dialing (19" Relay Rack — 8 Circuits)

J98602H — AT&TCo Std — Type "B" 2-way Composite Signaling and 1- or 2-way Dialing Unit — Open Wire or Cable Circuits Without Intermediate Voice Repeaters — Arranged for Earth Potential Variation (19" Relay Rack — One Phantom Group or 2 Single Circuits)

J98602J — AT&TCo Std — Type "B" 2-way Composite Signaling and 2-way Dialing Unit — Open Wire Circuits Without Intermediate Repeaters — With or Without Earth Potential Variation (19" Relay Rack — One Phantom Group or 2 Single Circuits)

J98602M — AT&TCo Std — Signaling Converter Equipment — For Connecting Type "A" or "B" Composite Signaling Circuits to 20-cycle Ringdown Circuits (19" Relay Rack — 2 Circuits)

J98602N — AT&TCo Std — Signaling Converter Equipment — For Connecting Type "A" or "B" Composite Signaling Circuits to d-c Signaling Ringdown Circuits (19" Relay Rack — 3 Circuits)

J98602S — AT&TCo Std — Composite Set and Repeating Coil Unit with 1000-volt Condensers — For 2-wire Nonrepeatered Circuits Arranged for Composite Signaling or Dialing — For Open Wire Lines (19" Relay Rack — One Phantom Group or 2 Physical Circuits)

J98602W — AT&TCo Std — Telephone Set Balancing Network Unit Equipment for Use With Attendant's Telephone Set

J98602Y — AT&TCo Std — Signaling Converter Unit — For Incoming Automatic Operation With Switchboard No. 3, 3B, 3C, or 3CL Ringdown Intertoll Trunks (23" Mounting Plates — 5 Circuits)

2. SUPPLEMENTARY INFORMATION

800-600-000 — List of General Equipment Requirement Sections

801-000-000 — Equipment Design and General Equipment Requirements and Engineering Information — Common Systems

X-67111 — Shop Testing Requirements

J68622 — Mfr Disc. — Repeating Coil Group Units

J68623 — Mfr Disc. — Composite Units

J97014 — 801-006-154 — Relay Racks — Channel Type Framework

Floor Plan Data — Section 3.3, Sheet 11 — I-Beam Relay Rack — Section 3.3, Sheet 12 — Channel Relay Rack

3. DRAWINGS

Circuits

SD-56131-01 — Signaling Converter Circuit for Incoming Automatic Operation with Switchboard No. 3, 3B, 3C, or 3CL Ringdown Intertoll Trunks

SD-64697-01 — Signaling Converter Circuit for Connecting Type "A" or "B" Composite Signaling Circuits to 20-cycle Ringdown Circuits

SD-64698-01 — Signaling Converter Circuit for Connecting Type "A" or "B" Composite Signaling Circuits to d-c Signaling Ringdown Circuits

SD-90517-01 — Compromise and Balancing Networks

SD-95004-01 — Composite Set and Repeating Coil Circuit for Nonrepeatered Circuits Arranged for SX and CX Signaling or Combinations of Ringdown and SX or CX Signaling

SD-95015-01 — Repeating Coil and Compromise Network Circuit

SD-95016-01 — Composite Signaling Circuit — 2-way Signaling Over Cable Circuits for Use With Intertoll and Toll Connecting Trunks and Manual Long Lines — Arranged for Earth Potential Variation

SD-95028-01 — Type "B" Composite Signaling Circuit — 2-way Signaling and 2-way Dialing — Cable Circuits 48-volt Offices

SD-95028-02 — Type "B" Composite Signaling Circuit — For 2-way Signaling and 1-way Dialing on Cable or Open Wire Circuits — When Dial Pulses Originate at 38-volt Offices

SD-95028-03 — Type "B" Composite Signaling Circuit — For 2-way Signaling and 2-way Dialing Over Open Wire or Cable Circuits in 48-volt Offices Where the Associated CX Set Is Located in a Distant Office

SD-95029-01 — Type "B" Composite Signaling Circuit — 2-way Signaling and 2-way Dialing — Open Wire Circuits Without Intermediate Repeaters 48-volt Offices

Framework

ED-90395-01 — Relay Rack Unit Framework

ED-90414-01 — Equipment Guards

ED-90672-01 — Relay Rack Framework — Channel

ED-90782-01 — Relay Rack Unit Assembly

ED-91590-01 — Cable Brackets and Miscellaneous Supports

Equipment

ED-60782-01 — Universal Repeating Coil Unit

ED-63083-01 — Signaling Converter Equipment for Incoming Automatic Operation With Switchboard No. 3, 3B, 3C, or 3CL Ringdown Intertoll Trunk

ED-64697-01 — Signaling Converter Equipment for Connecting Type "A" or "B" Composite Signaling Circuits to 20-cycle Ringdown Circuits

ED-64698-01 — Signaling Converter Equipment for Connecting Type "A" or "B" Composite Signaling Circuits to d-c Signaling Ringdown Circuits

ED-95004-01 — Composite Set and Repeating Coil Unit With 500-volt Condensers for 2-wire Nonrepeatered Circuits Arranged for CX Signaling or Dialing — For Open Wire Lines or Quadded or Nonquadded Cable Lines — 19″ Relay Rack

ED-95004-03 — Composite Set and Repeating Coil — Miscellaneous Equipment Layouts for 2-wire Nonrepeatered Circuits Arranged for CX or SX Signaling or Dialing

ED-95004-04 — Composite Set and Repeating Coil Unit With 1000-volt Condensers for 2-wire Nonrepeatered Circuits Arranged for CX Signaling or Dialing — For Open Wire Lines — 19″ Relay Rack

ED-95015-01 — Repeating Coil and Compromise Network Unit

ED-95016-01 — Composite Signaling Equipment 2-way Signaling Over Cable Circuits — For Use With Intertoll Trunks, Toll Connecting Trunks, and Manual Long Lines — Arranged for Earth Potential Variation

ED-95024-01 — Type "A" Composite Signaling Unit — Short Haul Cable Circuits

ED-95028-01 — Type "B" Composite Signaling Unit — 2-way Signaling and 1- or 2-way Dialing Over Open Wire or Cable Circuits Without Intermediate Repeaters

ED-95029-01 — Type "B" Composite Signaling Unit — 2-way Signaling and 2-way Dialing Open Wire Circuits Without Intermediate Repeaters — With or Without Earth Potential Variation

Wiring

ED-90757-03 — Cabling Plan for Unit

ED-90976-01 — Switchboard Cabling Plan — Direct Cabling to Mounting Plate Equipment

ED-91600-01 — Vertical Local Cable Wiring

4. EQUIPMENT

J98602C — AT&TCo Std — 2-way Composite Signaling Unit for Cable Lines — For Use With Intertoll Trunks, Toll Connecting Trunks, and Manual Long Lines — With Earth Potential Variation (19" Relay Rack — One Phantom Group or 2 Single Circuits)

Equipment — ED-95016-01

List 1 — Framework, assembly, wiring, and common equipment for one unit of one phantom group

	WIRE	EQUIP	NOTES
Framework ED-90782-01, Fig. 1		1	
Ckt SD-95016-01, Figs. 1, 2, & 3	1	0	

List 2 — Equipment required in addition to list 1 for one side ckt (S1) or (S2) per SD-95016-01, Fig. 1 or 3 (see Notes A and B)

List 3 — Equipment required in addition to lists 1 and 2 for one phantom ckt (PH) per SD-95016-01, Fig. 2

List 4 — Equipment for one circuit per SD-95016-01, Fig. 1, 2, or 3 (2-mf condensers only), required in addition to lists 1 and 2 or 3 when the trunk conductor loop resistance is up to 2550 ohms; or required in addition to lists 1, 5, and 2 or 3 when the conductor loop resistance is 4301 to 8200 ohms

List 5 — Equipment for one circuit per SD-95016-01, Figs. 1, 2, or 3 (4-mf condensers only), required in addition to lists 1 and 2 or 3 where the trunk conductor loop resistance is 2551 to 4300 ohms; or required in addition to lists 1, 4, and 2 or 3 when the conductor loop resistance is 4301 to 8200 ohms

Notes

A. The (A) 18AE resistances shall be furnished on all units but shall be connected only when the (PH) circuit is not furnished.

B. One 18BW resistance (B3) in the "T" lead of the (S2) circuit shall be specified in addition to list 2 for each (S2) circuit.

J98602D — A&M Only — Type "A" Composite Signaling and One-way Dialing Unit — For Short Haul Cable Circuits With or Without Earth Potential Variation (19" Relay Rack — One Phantom Group or 2 Single Circuits)

Equipment — ED-95024-01

List 1 — Framework, assembly, universal wiring, and common equipment for one phantom group (3 circuits) unit

	WIRE	EQUIP	NOTES
Framework ED-90782-01, Fig. 1		1	
Ckt SD-95024-01, Figs. 1, A, & B or SD-95024-02, Fig. 1	1	0	A

List 2 — Equipment for one side circuit per SD-95024-01, Fig. 1 ((S1) or (S2) apparatus only) required in addition to list 1 for offices requiring earth potential compensation (see Note B)

List 3 — Equipment for one phantom circuit per SD-95024-01, Fig. 1 ((PH) apparatus only) required in addition to lists 1 and 2 for offices requiring earth potential compensation (see Note B)

List 4 — Equipment for one circuit per SD-95024-01, Fig. A for use with 350, 360, 370, or similar type dial offices, required in addition to lists 1 and 2 for side circuits (S1) or (S2) at sending offices requiring earth potential compensation (see Note D)

List 5 — Equipment for one circuit per SD-95024-01, Fig. B for use with 375, 380A, 380B, 385B, or similar type dial offices, required in addition to lists 1 and 2 for side circuits (S1) or (S2) at sending offices requiring earth potential compensation (see Note D)

List 6 — Equipment for one side circuit per SD-95024-02, Fig. 1 ((S1) or (S2) apparatus only) required in addition to list 1 for offices not requiring earth potential compensation (see Note C)

List 7 — Equipment for one phantom circuit per SD-95024-02, Fig. 1 ((PH) apparatus only) required in addition to lists 1 and 6 for offices not requiring earth potential compensation

Notes

A. Wiring should be provided for all features of these circuits.

B. "X" and "Z" resistances shall be furnished in all cases and shall be connected in the field as required.

C. "X" resistances shall be furnished in all cases and shall be connected in the field as required.

D. For phantom group operation, this equipment is not required on the S1 circuit.

J98602E — AT&TCo Std — Composite Set and Repeating Coil Unit With 500-volt Condensers — For 2-wire Nonrepeatered Circuits Arranged for CX Signaling or Dialing — For Open Wire or Quadded or Nonquadded Cable Lines (19″ Relay Rack — One Phantom Group or 2 Physical Circuits)

Equipment — ED-95004-01, Fig. 2

List 1 — Framework, assembly, wiring, and common equipment for composite sets and repeating coils for one phantom group or 2 physical circuits

	WIRE	EQUIP	NOTES
Framework ED-90782-01, Fig. 1		1	
CX and Rep Coil Ckt SD-95004-01, Figs. 1, 2, and 3 With "V" and "X" or "Y" Wiring	1	0	A
CX and Rep Coil Ckt SD-95004-01, Fig. A or C	3	0	

List 2 — Equipment required in addition to list 1 for one CX set and series line condenser circuit per SD-95004-01, Figs. 1 and 2 (less the CX set condensers) for one side or physical circuit (see Notes A, B, and C)

List 3 — Equipment required in addition to lists 1 and 2 for one 1-mf blocking condenser per SD-95004-01, Fig. A for each S1, S2, PH, or physical circuit

List 4 — Equipment required in addition to lists 1 and 2 for one 4-mf blocking condenser per SD-95004-01, Fig. A for each S1, S2, PH, or physical circuit (see Note E)

List 5 — Equipment required in addition to lists 1 and 2 for one set of CX set 2-mf, 500-volt condensers per SD-95004-01, Fig. 1 for each (S1), (S2), or physical circuit (see Notes B, D, and F)

List 6 — Equipment required in addition to lists 1 and 2 for one set of CX set 3-mf, 500-volt condensers per SD-95004-01, Fig. 1 for each (S1), (S2), or physical circuit (see Notes B, D, and F)

List 7 — Equipment required in addition to lists 1 and 2 for one set of CX set 4-mf, 500-volt condensers per SD-95004-01, Fig. 1 for each (S1), (S2), or physical circuit (see Notes B, D, and F)

List 8 — Equipment required in addition to lists 1 and 2 for a 500-volt condenser per SD-95004-01, Fig. 1 ("V" apparatus only) when the "R" leg of the S1 circuit connects to a telegraph leg

Notes

A. The repeating coils shown on SD-95004-01, Fig. 3 shall be furnished as required in accordance with table D or as specified by the customer.

B. For offices requiring only one or two circuits, ultimately, on a nonphantom group basis, the apparatus furnished for the S1 and S2 circuits on the unit shall be designated as shown on SD-95004-01, Fig. 4. The unit should be manufactured with the phantom group functional designations as covered in Figs 1, 2, and 3 and changed by the installer to agree with Fig. 4 when required.

C. This unit contains 120-type repeating coils and composite sets and is to be used in either toll or local offices for circuits without repeaters. However, repeating coil and composite set units J68622A and J68623A or S may be used if these units are desired in order to conform with other future toll plans or when there are a large number of spare toll repeating coils (62-type) which it is desirable to use. When it is desired to use composite units J68623A or S and 120-type repeating coils, the repeating coils shall be mounted in accordance with ED-95004-03, Fig. 2 and SD-95004-01, Fig. 3. For combination ringdown and composite signaling with 120-type repeating coil in one side and 102-type repeating coil in the other side circuit, the phantom group equipment shall be mounted in accordance with ED-95004-01, Fig. 3 and SD-95004-01, Figs. 3 and A or C. The necessary wiring modifications should be made by the installer.

D. The mounting plate for the CX set condensers shall be drilled universally for all condenser options.

E. This condenser is not required on the end connected to 24-volt talking battery supply not equipped with an 8A resistance lamp. (See Note 113 of SD-95004-01).

F. 2-mf or 3-mf condensers are required only when specified on the associated CX signaling circuit. For all other conditions furnish 4-mf condensers.

J98602G — AT&TCo Std — Compromise Network Unit — To be Combined With Open Wire Repeating Coil Unit per J68622A — For Use With Toll or Local Tandem Trunk Circuits Arranged for Composite Signaling or Dialing (19″ Relay Rack — 8 Circuits) (See Note D)

Equipment — ED-95015-01, Fig. 2

List 1 — Framework, assembly, wiring, and common equipment for one compromise network unit (see Notes A, B, and C)

	WIRE	EQUIP	NOTES
Framework ED-90782-01, Fig. 1		1	
Ckt SD-95015-01, Fig. 3B	8	0	

List 2 — Equipment required in addition to list 1 for one circuit per SD-95015-01, Fig. 3B (see Notes A and C)

Notes

A. Resistance (NBO) shall be strapped in accordance with field requirements.

B. The local cable is connected to the apparatus at one end and is formed out to connect to the terminal strips of the associated repeating coil unit at the other end.

C. This compromise network is combined with the repeating coil unit per J68622A, which is modified by replacing one 171C with a 181A terminal strip to provide terminals for the additional leads from the mid-taps of the repeating coils. This is covered on ED-60782-01. In addition, the functional designations of the coils and condensers of this J68622A unit are changed to agree with those shown on ED-95015-01, Fig. 2 and SD-95015-01, Fig. 3. When the associated trunk circuit is an intertoll trunk circuit or when used with a local tandem trunk circuit the J68622A unit shall be modified in accordance with ED-95015-01, Fig. 2 and SD-95015-01, Figs. 3 and 5.

D. When equipment per SD-95015-01, Figs. 1, 1A, 2, and 6 or 7 is required, it shall be in-

stalled on a miscellaneous basis per ED-95015-01, Fig. 1.

J98602H —AT&TCo Std — Type "B" 2-Way Composite Signaling and 1- or 2-way Dialing Unit for Open Wire or Cable Circuits Without Intermediate Voice Repeaters — Arranged for Earth Potential Variation (19" Relay Rack — One Phantom Group or 2 Single Circuits)

Equipment — ED-95028-01, Fig. 1

List 1 — Framework, assembly, universal wiring, and common equipment for one phantom group (3 circuits)

	WIRE	EQUIP	NOTES
Framework ED-90782-01, Fig. 1		1	
Ckt SD-95028-01, Figs. 1, 2, & 3, SD-95028-02, Fig. 1, 2, or 3, or SD-95028-03, Figs. 1, 2, & 3 With All Options	1	0	

List 2 — Equipment required in addition to list 1 for one side circuit (S1) or (S2) per SD-95028-01, Fig. 1, (less (B) res), or Fig. 3 arranged for 2-way signaling and dialing over short haul cable circuits between 48-volt offices (see Notes A and C)

List 3 — Equipment required in addition to lists 1 and 2 for one phantom circuit per SD-95028-01, Fig. 2 (see Note B)

List 4 — Equipment required in addition to list 1 for one side, (S1) or (S2), circuit per SD-95028-02, Fig. 1 (less (B) res) or Fig. 3 arranged for 2-way signaling and one-way dialing over cable or open wire circuits. Furnish for trunks between 38-volt and 48-volt offices (see Notes A, B, C, and D)

List 5 — Equipment required in addition to lists 1 and 4 for one phantom circuit per SD-95028-02, Fig. 2 for trunks between 38-volt and 48-volt offices (see Notes B and D)

List 6 — Equipment required in addition to list 1 for one side circuit, (S1) or (S2), per SD-95028-03, Fig. 1 (Less (B) res) or Fig. 3 for 2-way dialing and signaling over short cable or open wire circuits between 48-volt offices. Furnish in offices where the associated CX set is in a distant office (see Notes A, B, and C)

List 7 — Equipment required in addition to list 1 and 6 for one phantom circuit per SD-95028-03, Fig. 2 for trunks between 48-volt offices where the associated CX set is located at a distant office

Notes

A. "M" apparatus shall be furnished in all cases but shall be connected only when this unit is used for nonphantom group operation.

B. The (N5) and (N6) resistances shall be connected to battery and ground, by the installer, in accordance with information shown on the circuit drawing.

C. One 18AJ resistance (B) shown in Fig. 1 shall be specified in addition to list 2, 4, or 6 for S1 circuits.

D. "K" and "L" apparatus shall be furnished on all units and shall be connected as specified on the circuit drawing.

J98602J — AT&TCo Std — Type "B" 2-way Composite Signaling and 2-way Dialing Unit — For Open Wire Lines Without Intermediate Repeaters — With or Without Earth Potential Compensation (19" Relay Rack — One Phantom Group or 2 Single Circuits)

Equipment — ED-95029-01, Fig. 1

List 1 — Framework, assembly, wiring, and common equipment for one phantom group (3 circuits)

	WIRE	EQUIP	NOTES
Framework ED-90782-01, Fig. 1		1	
Ckt SD-95029-01, Figs. 1, 2, & 3 With All Options	1	0	

List 2 — Equipment required in addition to list 1 for one side circuit (S1) or (S2) per SD-95029-01, Fig. 1 or 3 (see Notes A, B, and C)

List 3 — Equipment required in addition to lists 1 and 2 for one phantom group circuit per SD-95029-01, Fig. 2 (see Notes B and C)

Notes

A. "M" apparatus shall be furnished in all cases but shall be connected only when this equipment is to be operated on a single circuit basis.

B. "Z" apparatus shall be furnished on all units and shall be connected only as directed on the circuit drawing.

C. The (B) resistance in Fig. 1 shall be specified in addition to list 2 for "S1" equipment.

J98602M — AT&TCo Std — Signaling Converter Equipment — For Connecting Type "A" or "B" Composite Signaling Circuit to 20-cycle Ringdown Circuits (19" Relay Rack — 2 Circuits)

Equipment — ED-64697-01, Fig. 1

List 1 — Assembly, wiring, and common equipment for two signaling circuits per SD-64697-01, Figs. 1 and 3 or 4, "X" or "Y" wiring.
List 2 — Equipment required in addition to list 1 for one signaling circuit per SD-64697-01, Fig. 1 (see Note A)
List 3 — Equipment required in addition to list 2 for one signal converter circuit arranged for ringing directly into a No. 3 toll or No. 11 switchboard of the earlier type equipped for low voltage 20-cycle ringing per SD-64697-01, Fig. 3
List 4 — Equipment required in addition to list 2 for one signal converter circuit per SD-64697-01, Fig. 4

Note

A. "Y" wiring shall be connected by the installer for offices having "Machine Start" ringing and "X" wiring for offices having a continuous ringing supply.

J98602N — AT&TCo Std — Signaling Converter Equipment — For Connecting Type "A" or "B" Composite Signaling Circuits to d-c Signaling Ringdown Circuits (19" Relay Rack — 3 Circuits)

Equipment — ED-64698-01, Fig. 1

List 1 — Assembly and equipment for one signaling circuit per SD-64698-01, Fig. 1 (see Note A)
List 2 — Equipment only required in addition to list 1 for second or third signaling circuit per SD-64698-01, Fig. 1. Wiring within the unit shall be surface wiring. Connections to auxiliary circuits shall be made directly from apparatus terminals

J98602S — AT&TCo Std — Composite Set and Repeating Coil Unit With 1000-volt Condensers — For 2-wire Nonrepeatered Circuits Arranged for CX Signaling or Dialing — For Open Wire Lines (19" Relay Rack — One Phantom Group or 2 Physical Circuits)

Equipment — ED-95004-04, Figs. 1 and 2

List 1 — Framework, assembly, wiring, and common equipment for one phantom group (3 circuits) unit

	WIRE	EQUIP	NOTES
Framework ED-90782-01, Fig. 1		1	
CX and Rep Coil Ckt SD-95004-01, Figs. 1 2, and 3 With "X" or "Y" Wiring	1	0	A
CX and Rep Coil Ckt SD-95004-01, Fig. A or C	3	0	

List 2 — Equipment required in addition to list 1 for one CX set and series line condenser circuit per SD-95004-01, Figs. 1 & 2 (less the CX set condensers) for one side or physical circuit (see Notes A, B, and C)
List 3 — Equipment required in addition to lists 1 and 2 for one 1-mf blocking condenser per SD-95004-01, Fig. A for each S1, S2, PH, or physical circuit associated with toll trunks

List 4 — Equipment required in addition to lists 1 and 2 for one 4-mf blocking condenser per SD-95004-01, Fig. A for each S1, S2, PH, or physical circuit associated with local trunks

List 5 — Equipment required in addition to lists 1 and 2 for one set of CX set 4-mf, 1000-volt condensers per SD-95004-01, Fig. 1 for each S1, S2, or physical circuit (see Note B)

List 6 — Assembly and equipment required in addition to lists 1 and 2 for 1000-volt condensers per SD-95004-01, Fig. 1 ("V" apparatus only) when the "R" leg of the S1 circuit connects to a telegraph leg

Notes

A. The repeating coils shown on SD-95004-01, Fig. 3 shall be furnished as required in accordance with table D or as specified by the customer.

B. For offices requiring only one or two circuits, ultimately, on a nonphantom group basis, the apparatus furnished for the S1 and S2 circuits on the unit shall be designated as shown on SD-95004-01, Fig. 4. The unit should be manufactured with the phantom group functional designations as covered in Figs. 1, 2, and 3 and changed by the installer to agree with Fig. 4 when required.

C. This unit contains 120-type repeating coils and is to be used in either toll or local offices for circuits without repeaters. However, standard repeating coil and composite set units J68622A and J68623B, R, or V may be used if these units are desired in order to conform with other future toll plans or when there are a large number of spare toll repeating coils (62-type) which it is desirable to use. When it is desired to use composite units J68623B, R, or U and 120-type repeating coils, the repeating coils shall be mounted in accordance with ED-95004-03, Fig. 2 and SD-95004-01, Fig. 3. For combination ringdown and composite signaling with 120-type repeating coil in one side and 102-type repeating coil in the other side circuit, the phantom group equipment shall be mounted in accordance with ED-95004-01, Fig. 3 and SD-95004-01, Figs. 3 and A or C. The necessary wiring modifications should be made by the installer.

J98602W — AT&TCo Std — Telephone Set Balancing Network Unit — For Use With Attendant's Telephone Set (19" Relay Rack — One Circuit)

Equipment — J98602W-( )

List 1 — Assembly, equipment, and wiring for telephone set balancing network unit per SD-90517-01, Fig. 6 (see Notes A and B)

Notes

A. All wiring shall be surface wiring using 22 gauge "BG" wire and external leads shall terminate directly on apparatus terminals.

B. Provide "X," "Y," and "Z" wiring per SD-90517-01, Fig. 6 as required.

J98602Y — AT&TCo Std — Signaling Converter Unit — For Incoming Automatic Operation With Switchboard No. 3, 3B, 3C, or 3CL Ringdown Intertoll Trunks (23" Mounting Plates — 5 Circuits)

Equipment — ED-63083-01, Fig. 1
Local Cable — ED-91600-01, Fig. 1

List 1 — Framework, assembly, wiring, and common equipment for one unit of five signaling converter circuits

	WIRE	EQUIP	NOTES
Framework ED-90782-01, G5		1	
Signaling Converter Circuit SD-56131-01, Fig. 1 and "Y" and "Z" Wiring (see Note A)	5	0	

List 2 — Equipment per SD-56131-01, Fig. 1 required in addition to list 1 for one signaling converter circuit

Note

A. That part of "Y" wiring calling for strapping "T" and "R" leads of the connected trunk shall be done by installer at the distributing frame.

Miscellaneous Equipment

4.01 Equipment guards per ED-90414-01 shall only be furnished when specifically ordered by the customer. Guards shall be installed on only the front side of the relay rack and located as specified by the customer.

4.02 Channel iron relay racks with sheet metal base shall be furnished per ED-91590-01, G1.

Bell Telephone Laboratories, Inc.

Dept. 6261

5. GENERAL NOTES

List of A&M Only and Mfr Disc. Equipment

EQUIPMENT	RATING	COVERED IN ISSUE	REPLACING EQUIPMENT
J98602A	Mfr Disc.	4	J98602L or J98606J & K
J98602B	Mfr Disc.	5	—
J98602D	Mfr Disc.	6	J98602H
J98602F	Mfr Disc.	4	ED-95004-03, Fig. 2
J98602K	Mfr Disc.	5	J98605D
J98602L	Mfr Disc.	4	J98606J & K
J98602P	Mfr Disc.	4	J98605
J98602R	Mfr Disc.	4	J98605
J98602T	Mfr Disc.	4	J98606G & H
J98602U	Mfr Disc.	6	—

5.01 The above equipment has been replaced as indicated.