TRAFFIC REGISTER EQUIPMENT
USING 400-CAPACITY TRAFFIC REGISTER RACK
EQUIPMENT DESIGN REQUIREMENTS
NO. 1 CROSSBAR AND CROSSBAR TANDEM 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, manufacturing, and installation of traffic register equipment in offices using the 400-capacity register rack.

1.02 This specification is reissued to add provision to permit operation with a traffic data recorder frame and to rate Fig. 38 of SD-25317-01 "Mfr Disc." in agreement with SD-25317-01, Issue 61D.

1.03 The circuits and equipment, covered herein, are based on the 12B message register (Mfr Disc.) which in most applications requires the use of a pulse-help relay. Additions to such offices are made with 14J and 14LE registers on a direct replacement basis, with no change made in the remaining portion of the circuit. In the operating room, the registers are mounted in a 400-capacity rack, which is casing-enclosed and floor-supported. Traffic register equipment per J27059 is furnished for new originating marker groups.

Capacity

1.04 One bay of traffic register rack has a capacity for 400 registers.

1.05 Each four verticals of traffic register distributing frame will, in general, provide facilities for cross-connecting 800 registers.

1.06 One bay of relay rack has a capacity for 57 (60 on bays not accommodating H relay units) 2-inch mounting plates.

Description

1.07 Traffic register equipment provides facilities for obtaining overflow, group busy, peg count, delay, load, dial tone speed, and group busy time duration data on crossbar circuits as required. Other registers measure traffic usage as determined by the traffic usage recorder frame.

1.08 The register portion of the equipment is usually located in the operating room on floor-supported racks equipped with casings. When the registers are located in the switchroom, they are mounted on standard 23-inch relay rack bays, drilled for 1-3/4 inch mounting plates, and equipped with suitable adapters for 1-1/4 by 23-inch register mounting plates.

1.09 In general, one or more relays are associated with each traffic register. These are arranged on standard units located on the traffic register relay rack. The relays are cabled directly to the various equipments served, except as covered in 5.18, and to the vertical side of the traffic register distributing frame for cross-connection to the registers. The registers are cabled to the horizontal side of the distributing frame and cross-connected, as required, to satisfy the assignment of registers on the register rack. Except for the magnetic counters used for marker and transverter peg count, the registers specified on the circuit for traffic register use are the same electrically. The equipment arrangement, therefore, permits any register to be assigned to any service and to be reassigned by changing jumpers on the distributing frame. The relay portion of the register circuit remains connected to its associated equipment. An exception to the arrangement just described are the registers associated with the traffic usage recorder (see 1.11).

1.10 Battery for the operation of high-duty traffic registers, such as those used for peg count, is placed under the control of keys on the traffic register rack, so that the registers can be made inoperative when readings are not being taken (see 1.15).

1.11 ***Usage, detector group usage, and group cycle count registers associated with the traffic usage recorder*** are the 14 type, codes 14E or 14M, and pulse-help relays are not required. These registers are segregated in blocks of 150 for photographing purposes either in new racks or in available space in existing traffic register racks. Formerly, ***detector group usage registers*** associated with the traffic usage recorder were 6-digit magnetic counters which were located in horizontal alignment with the present peg count counters, or if photographing was required, at the top of a camera field. Registers associated with the traffic usage recorder are cabled directly to the traffic usage recorder frame at which point cross-connecting facilities are provided. Space occupied by displaced traffic registers may be used for traffic usage registers by substituting 14E or 14M registers. In such cases, the existing cable to the horizontal side of the traffic register distributing frame is abandoned and the new registers cabled directly to the traffic usage recorder frame.

1.12 ***Automatic photographing of traffic registers and traffic usage registers*** is accomplished by using camera KS-14776 under control of the traffic usage recorder circuit or the traffic register camera control circuit. The camera views a field of 150 registers, usually in the lower or upper half of the bay. Where the office has a traffic usage recorder frame, this circuit is used to control camera operation for traffic registers, as well as for traffic usage registers. Where there is no traffic usage recorder in the office, the traffic register camera control circuit is furnished. The keys, lamp, and program timer for the traffic register camera control circuit, covered in J92605, are enclosed in a metal cabinet with transparent door which is designed for wall- or column-mounting. This is supplemented by a relay rack unit comprising two 2-inch mounting plates. Where the traffic usage recorder circuit is used, the camera control equipment is included in the control panel for that circuit, which also is wall- or column-mounted. A variation of this panel is adapted for 23-inch relay rack mounting as covered in J92604. The control panel is located as specified by the telephone company.

1.13 ***115-volt ac outlets for camera operation*** are located in the lower portion of bays arranged for cameras on panels 2-1/16 inches in width. Included on the panel is a 275A relay which serves to control the 115-volt supply to the cameras. This relay is furnished per camera or per six register bays maximum, as required, by the camera control circuit used, provision being made for independent control of traffic register and traffic usage register bays. Bays containing both traffic and traffic usage registers are treated as traffic usage register bays.

1.14 The camera is supported by brackets fastened to the ends of the third and fourth register mounting plates from the top of the camera field. Two 47A brackets are required when the camera field consists of 12- or 14-type registers throughout. Where magnetic counters occupy the upper portion of the field, two 48A brackets and two 122A or 122B adapters are furnished. See ED-25360-10. Because of camera overhang, the lower of two cameras in a bay is inverted. Racks with casings equipped with cameras have the doors removed. The forward projection of the camera beyond the register mounting plates is approximately 22 inches. Special consideration accordingly, such as ladder track blocks, is required when applying the camera to traffic register racks located in the switchroom. Camera KS-14776, L1 is furnished for racks having 19-inch mounting plates (operating room) and camera KS-14776, L2 is furnished for 23-inch mounting plates (switchroom). The two cameras are identical except for handle and hanger assemblies. The 12- and 14-type registers arranged for photographing shall have their plastic windows removed. A further requirement is that unused space in the camera field be equipped with blank mounting plates.

1.15 When traffic registers are arranged for photographing, it is necessary that manual key control of battery supply to the traffic registers be supplemented by camera control. This requires that battery supply relays and associated control keys per Fig. 41 and 42 of SD-25317-01 be furnished instead of battery sup-

ply keys per Fig. 4 and 5, and that "YL" option be furnished in Fig. 17, 30, and 41. Battery supply for line link terminating peg count registers is removed from the individual LK keys per Fig. 12 and placed under the control of a single key supplemented by a battery supply relay and "YL" option. Horizontal line group load registers remain under the control of the individual LK keys because in this case a single set of 10, 20, or 40 registers is used for all line link frames.

1.16 In arranging existing racks for photographing of register readings, it is necessary that the registers be grouped in blocks of 150 to conform with the capacity of the camera. Two such blocks and two cameras can be accommodated in a bay, thereby reducing the capacity of the bay for photographing purposes to 300 registers. Registers beyond this limit, if photographed, must be relocated in other bays or if photographing is not warranted, they may be removed to the lower portion of the bay above the camera 115-volt outlets. Fig. 3 and 4 of ED-25360-10 give an example of the modifications required in an existing office to arrange the traffic register bays for photographing.

1.17 To eliminate difficulties encountered in taking manual readings from traffic register bays equipped with cameras, arrangements are made for providing a multiple appearance of a select group of registers. The multiple registers may be located in a wall-supported traffic register cabinet per J92603. Circuit notes indicate which registers may be multipled.

1.18 When a No. 1 crossbar or crossbar tandem office is part of a Traffic Data Recording System, a traffic data converter frame is provided per J92610. A terminal strip cross-connection field is provided on the TDC frame and pulse leads from various frames requiring registration can bypass the TRDF and be terminated directly on the TDC frame. Traffic registers can be operated in parallel with the TDC circuit, cable being run between the TDC terminal strip and the traffic registers via the TRDF. The TR and TRRR frame will be required to mount various TR relay units and the TRDF will be required for cross-connection of leads from TR circuits to equipment frames for other than registration functions even though no traffic register may be required.

Subdivision of Equipment and Detailed Index

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

EQUIPMENT CODE	RATING OF UNIT	TITLE	EQUIPMENT DRAWING	CIRCUIT DRAWING
ED-91030-01		Traffic Reg Rack Assembly		
ED-91031-01		Casing Assembly		
ED-91183-01		Relay Rack Assembly		
ED-91423-72		End Guard Assembly		
ED-91519-70		Assembly of Dist Fr		
J27054C	A&M Only	E Relay Unit with Common Battery	J27054C-( )	SD-25317-01
J27054D	A&M Only	E Relay Unit with Individual Battery	J27054D-( )	SD-25317-01
J27054E	A&M Only	"A" Relay Unit	J27054E-( )	SD-25317-01
J27054F	A&M Only	Trunk Group Busy Relay Unit	J27054F-( )	SD-25317-01
J27054G	A&M Only	Delay Reg Relay Unit	J27054G-( )	SD-25317-01
J27054H	A&M Only	Subscriber Line Overflow Unit-Crossconnection Type	J27054H-( )	SD-25317-01

EQUIPMENT CODE	RATING OF UNIT	TITLE	EQUIPMENT DRAWING	CIRCUIT DRAWING
J27054J	A&M Only	"A" Switchboard Peg Count Unit	J27054J-( )	SD-25317-01
J27054M	A&M Only	Translation Unit for Plug and Jack-type Subscriber Line Overflow Reg Equip	J27054M-( )	SD-25381-01
J27054P	A&M Only	Mkr Pref Unit for Plug and Jack-type Subscriber Line Overflow Reg Equip	J27054P-( )	SD-25381-01
J27054Q	A&M Only	Subscriber Sender Load Reg Unit Without Load Control	J27054Q-( )	SD-25317-01
J27054R	A&M Only	No. Checking Unit for Plug and Jack-type Subscriber Line Overflow Reg Equip	J27054R-( )	SD-25381-01
J27054S	A&M Only	No. Selection Jack Panel for Plug and Jack-type Subscriber Line Overflow Reg Equip	J27054S-( )	SD-25381-01
J27054U	A&M Only	Line Link H Relay Unit	J27054U-( )	SD-25317-01
J27054Y	A&M Only	Tandem Sender Group Load Reg Unit	J27054Y-( )	SD-25317-01
J27054Z	A&M Only	Tandem Sender Group Load Reg Unit	J27054Z-( )	SD-25317-01

2. SUPPLEMENTARY INFORMATION

816-000-000 — No. 1 Crossbar System Index
817-000-000 — Crossbar Tandem System Index
J27059 (816-043-150, 817-064-150) — Traffic Register Equipment — Using 14-type Registers and 300-capacity Register Cabinet
J92604 — Traffic Usage Recorder Frame and Traffic Usage Recorder Control Panels
J92605 — Traffic Register Camera Control Panel and Traffic Register Camera Control Unit
J92610 — Traffic Data Converter Frame
J97025 — Relay Rack — Angle Type
J97029 — Distributing Frame — Single Sided 11 Feet 6 Inches High — 10-Inch Guardrail Width Verticals on 8-Inch Centers
Floor Plan Data — Section 9.2, Sheet 7 — Relay Rack
Section 9.2, Sheet 10 — Register Rack
Section 9.4, Sheet 5 — Distributing Frame

3. DRAWINGS

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

Key Sheet

SD-25000-01 — Crossbar System No. 1
SD-25435-01 — Tandem Crossbar

Framework

ED-25020-01 — Miscellaneous Details and Cable Brackets
ED-25439-70 — Jack Panel Assembly
ED-90410-01 — TRR Key Mounting Assembly
ED-91030-01 — TRR Assembly
ED-91031-01 — TRR Casing Assembly
ED-91183-30 — Relay Rack Assembly
ED-91210-01 — Relay Racks Mounting and Connecting Block Details
ED-91423-72 — End Guards
ED-91457-01 — Adapters
ED-91519-70 — Distributing Frame Assembly

Equipment

ED-25360-10 — Traffic Register Rack
ED-25361-11 — Traffic Register Relay Rack
ED-25362-10 — Traffic Register Distributing Frame
ED-25778-01 — Tandem Office Traffic Register Relay Rack and Distributing Frame Equipment

Wiring and Cabling

ED-25341-10 — Cabling Plan for Distributing Frame
ED-25366-01 — Cabling of Traffic Register Relay Rack
ED-91432-01 — Cabling Plan for Traffic Register Rack

4. EQUIPMENT

ED-91030-01 — Traffic Register Relay Rack Assembly

Group 1 — One bay of traffic register rack.

ED-91031-01 — Casing Assembly

Group 1 — Casing for one bay of traffic register rack.

ED-91183-30 — Relay Rack Assembly

Group 1 — One bay 11 feet 6 inches high for 1-3/4 by 23-inch mounting plates.

Group 2 — One bay 11 feet 6 inches high for 2- by 23-inch mounting plates.

Group 3 — Two bays 11 feet 6 inches high for 1-3/4 by 23-inch mounting plates.

Group 13 — Two bays 11 feet 6 inches high for 2- by 23-inch mounting plates.

Notes

A. The relay bays shall be equipped with a 1-inch by 1/8-inch ground bar mounted on the front top angle per ED-91210-01, Item 13.

B. The relay bays shall be equipped with a No. 6 bare-tinned copper ground wire connected to the ground bar per ED-91210-01, Fig. 7 and supported by ground clips per P-401965.

C. When the traffic registers are located on relay rack bays, the 23-inch register mounting plates shall be equipped with adapters per ED-91457-01, Groups 9, 10, and 11.

ED-91423-72 — End Guard Assembly

Group 1 — End guard for either end of distributing frame.

ED-91519-70 — Assembly of Distributing Frames

Group 1 — Originating unit of five verticals.

Group 2 — Supplementary unit of four verticals.

Group 9 — One distributing ring and mounting bolts.

J27054C (A&M Only) — E Relay Unit With Common Battery

Equipment — J27054C-( )

List 1 — Assembly, wiring, and common equipment for one E relay unit arranged for a common battery supply, wiring only for ten circuits per SD-25317-01, Fig. 10. (See note A.)

List 2 — One E relay required in addition to list 1 for each equipped circuit.

Note

A. The wiring of this unit shall include only the following: Strap between 2T and 5T relay terminals, common battery, and ground straps including connection to the relay rack ground. The relay terminal holes shall be kept free for switchboard cable connections.

J27054D (A&M Only) — E Relay Unit With Individual Battery

Equipment — J27054D-( )

List 1 — Assembly, wiring, and common equipment for one E or LF relay unit arranged for individual battery leads, wiring only for ten circuits per SD-25317-01, Fig. 10 or 23. (See note A.)

List 2 — One E relay required in addition to list 1 for each equipped circuit.

List 3 — One LG relay per SD-25317-01, Fig. 17 required in addition to list 1 for line link frame originating traffic peg count registers.

List 4 — One LF relay required in addition to list 1 for each equipped circuit.

Note

A. The wiring of this unit shall include only the following: Strap between the 2T and 5T terminals of the E relay, or strap between 2B and 4TR of the LF relay, the common ground strap including the connection to the relay rack ground, and the battery strap on the LG relay. The relay terminal holes shall be kept free for switchboard cable connections. The leads between the LG and E or LF relays shall be run by the installer with the switchboard cabling.

J27054E (A&M Only) — "A" Relay Unit

Equipment — J27054E-( )

List 1 — Assembly, wiring, and common equipment for one "A" relay unit, wiring only for ten circuits per SD-25317-01, Fig. 7. (See note A.)

List 2 — One "A" relay required in addition to list 1 for each equipped circuit.

Note

A. The wiring for this unit shall include only the following: Strap between the 2T and 5T relay terminals, common battery strap, and the common ground strap for the 1B relay terminal including connection to the relay rack ground. The relay terminal holes shall be kept free for switchboard cable connections. The strap between the 1B and 3T relay terminal shall be run by the installer when required.

J27054F (A&M Only) — Trunk Group Busy Relay Unit

Equipment — J27054F-( )

List 1 — Assembly, wiring, and common equipment for one trunk group busy relay unit.

	WIRE	EQUIP	SEE NOTES
Trk Group Busy Rel Ckt, SD-25317-01:			
Fig. 3	1	1	
Fig. 24	10	0	A

List 2 — One B relay required in addition to list 1 for each equipped circuit.

Notes

A. The wiring for this unit shall include only the following: The ground strap including connection to relay rack ground, and the R strap including connection to the test jack and the straps between jack contacts. The relay terminal holes shall be kept free for switchboard cable connections.

B. The ten relays associated with the test jack may be assigned to different circuits. It is not necessary to provide a separate jack for each class of register served.

J27054G (A&M Only) — Delay Register Relay Unit

Equipment — J27054G-( )

List 1 — Assembly, wiring, and common equipment for one delay register relay unit, wiring only for two circuits per SD-25317-01, Fig. 15.

List 2 — Equipment per SD-25317-01, Fig. 15 required in addition to list 1 for one delay register relay circuit.

J27054H (A&M Only) — Subscriber Line Overflow Unit — Cross-connection Type

Equipment — J27054H-( )

List 1 — Assembly, wiring, and common equipment for one subscriber line overflow unit, wiring only for two circuits per SD-25317-01, Fig. 10 and 16.

List 2 — Equipment per SD-25317-01, Fig. 10 and 16 required in addition to list 1 for one subscriber line overflow circuit.

J27054J (A&M Only) — "A" Switchboard Peg Count Unit

Equipment — J27054J-( )

List 1 — Assembly, wiring, and common equipment for one "A" switchboard peg count unit, wiring only for five circuits per SD-25317-01, Fig. 11.

List 2 — Equipment per SD-25317-01, Fig. 11 required in addition to list 1 for one "A" switchboard peg count circuit.

J27054M (A&M Only) — Translation Unit for Plug and Jack-type Subscriber Line Overflow Register Equipment

Equipment — J27054M-( )

List 1 — Assembly, wiring, and equipment for one translation circuit per SD-25381-01, Fig. A, and wiring only for six office selection circuits per SD-25381-01, Fig. 7. (See note A.)

List 2 — One OFF relay required in addition to list 1 for each crossbar office in the building.

Note

A. The wiring for the OFF relays shall include only the common battery strap. The relay terminal holes shall be kept free for switchboard cable connections.

J27054P (A&M Only) — Marker Preference Unit for Plug and Jack-type Subscriber Line Overflow Register Equipment

Equipment — J27054P-( )

List 1 — Assembly, wiring, and common equipment for four marker preference circuits per SD-25381-01, Fig. 1.

List 2 — Equipment per SD-25381-01, Fig. 1 required in addition to list 1 for one marker preference circuit.

J27054Q (A&M Only) — Subscriber Sender Load Register Unit Without Load Control

Equipment — J27054Q-( )

List 1 — Assembly, wiring, and common equipment for two subscriber sender load registers without load control feature per SD-25317-01, Fig. 7 and 14.

List 2 — Equipment per SD-25317-01, Fig. 7 and 14 required in addition to list 1 for one subscriber sender load register without load control feature.

J27054R (A&M Only)—Number Checking Unit for Plug and Jack-type Subscriber Line Overflow Register Equipment

Equipment — J27054R-( )

List 1 — Assembly, wiring, and common equipment for two number checking circuits per SD-25381-01, Fig. 3.

List 2 — Equipment per SD-25381-01, Fig. 3 required in addition to list 1 for one number checking circuit.

J27054S (A&M Only)—Number Selection Jack Panel for Plug and Jack-type Subscriber Line Overflow Register Equipment

Equipment — J27054S-( )

List 1 — Jack mounting assembly, common equipment, and lettering for four overflow register circuits.

List 2 — Jack equipment required in addition to list 1 for two equipped overflow register circuits per SD-25381-01, Fig. 2, 4, and 5.

J27054U (A&M Only) — Line Link H Relay Unit

Equipment — J27054U-( )

List 1 — Assembly, wiring, and common equipment for one line link H relay unit, wiring only for 40 circuits per SD-25317-01, Fig. 13.

List 2 — One H relay required in addition to list 1 for each equipped circuit.

J27054Y (A&M Only)—Tandem Sender Group Load Register Unit

Equipment — J27054Y-( )

List 1 — Assembly, wiring, and common equipment for two tandem sender load control register circuits per SD-25317-01, Fig. 7 and 28.

List 2 — Equipment per SD-25317-01, Fig. 7 and 28 required in addition to list 1 for one tandem sender load control register circuit.

J27054Z (A&M Only) — Tandem Sender Group Load Register Unit

Equipment — J27054Z-( )

List 1 — Assembly, wiring, and common equipment for two tandem sender load register circuits per SD-25317-01, Fig. 7 and 29.

List 2 — Equipment per SD-25317-01, Fig. 7 and 29 required in addition to list 1 for one tandem sender load register circuit. (See note A.)

Note

A. List 2 includes resistances A through F, which shall be connected in accordance with the circuit note to agree with the size of the sender group.

5. GENERAL NOTES

Traffic Register Rack

5.01 The register rack is a self-supporting structure, held to the floor by bolts in the base angles. When located in the operating room, the bays are equipped with casings; when the traffic registers are located in the switchroom they are mounted on standard 2-foot 0-5/8 inch relay rack drilled for 1-3/4 by 23-inch mounting plates and equipped as required with adapters for 1-1/4 by 23-inch register mounting plates. The jacks, keys, etc., associated with the traffic register rack, are provided with offset adapters when located in the switchroom, as indicated on ED-25360-10, Fig. F, G, M, and N.

5.02 Where the traffic register racks are located in the operating room and casings are provided, any blank spaces existing because of unequipped register mounting plates shall be filled with dummy mounting plates. When located in the switchroom, dummy plates are provided only when the registers are photographed.

5.03 Unless otherwise specified by the telephone company, the LK battery keys associated with the line link frames shall be located at the bottom of the first register rack bay and the battery and ground keys associated with the remainder of the equipment shall be located in the second bay, except on small installations where all the keys may be grouped on the first bay. When the registers are located in the switchroom, these keys are placed at the top of the rack to avoid accidental operation.

5.04 Magnetic counters are located preferably at the bottom of the register space occupying the space of three register mounting plates or 30 registers. They are arranged as follows.

(a) Four KS-7495 magnetic counters mounted on two 1-1/4 inch wide mounting plates (Mfr Disc.).

(b) Four KS-14395 magnetic counters mounted on two 1-1/4 inch wide mounting plates (Mfr Disc.).

(c) Four KS-16493 magnetic counters mounted on two 1-1/4 inch wide mounting plates (A&M Only).

(d) Eight KS-16493 magnetic counters mounted on two 1-3/4 inch wide mounting plates (A&M Only).

(e) Six KS-16493 magnetic counters mounted on a 1-1/4 inch wide mounting plate. This arrangement may be expanded to two or three such mounting plates, enlarging the capacity to 12 or 18 KS-16493 magnetic counters.

5.05 The direct recorders talking line equipment ED-25360-10, Fig. K is required when the recording is done on an individual office basis. The dialing recorders talking line equipment ED-25360-10, Fig. L is required when centralized recording is employed. The equipment, as specified, should be located at the bottom of the traffic register rack as shown on ED-25360-10, Fig. 1. The equipment per Fig. 4 or 6 of SD-25067-01, associated with direct recorders talking lines or with the dialing recorders talking lines, respectively, is located at the

recorders position. The jacks associated with the recorders lines, Fig. 5 or 8 of SD-25067-01, are located on mountings at the bottom of the bays as required. The telephone set per Fig. 7 of SD-25067-01 is furnished only when requested by the telephone company.

5.06 A pair of telephone jacks shall be provided in accordance with SD-25067-01, Fig. 2, and shall be located in the mounting at the bottom of each register bay.

5.07 One test battery supply circuit should be provided on each register rack in accordance with SD-25067-01, Fig. 1, as shown on ED-25360-10, Fig. 1. When the traffic registers are located on a relay rack in the switchroom, the test battery supply and talking jacks are furnished per SD-25440-01, Fig. 1 and 5 and ED-25360-10, Fig. P.

5.08 Where subscriber line overflow register equipment of the plug and jack type is specified, one jack panel per ED-25360-10, Fig. M is required for each four register circuits. These jack panels shall all be located at the bottom of one traffic register rack bay usually in the second bay on multibay installations or the third bay when space limitations makes this necessary. One plug holder P-430348 is required for each eight equipped register circuits. This holder shall be mounted near the jack equipment as shown on ED-25360-10.

5.09 When dial tone speed register circuits are furnished, the D and T registers per SD-96403-01, Fig. 2 shall be located on the traffic register rack, as covered on ED-25360-10. The start (ST) keys shall also be mounted on the rack in accordance with this drawing. Wherever possible, all registers and all start keys shall be located in one bay of rack. In any case, all registers associated with the same dial tone speed register circuit shall be located in one bay, preferably, on the same or adjacent mounting plates.

5.10 Where the 12B, 14LE, or 14J message register is supplemented by a pulse-help relay, a 1000-ohm noninductive resistance is required across the winding of the register. Since the assignment of registers is subject to change in connection with office growth and rearrangements, the resistance is applied generally to all registers whether or not associated with a pulse-help relay. The resistance is furnished with bare wire leads which are soldered directly to the winding terminals of the register as shown in Fig. 8 of ED-91432-01. The 1000-ohm resistance is not required with registers associated with the traffic usage recorder.

5.11 ***Maintenance access to the registers*** is obtained by removing the mounting plate screws and moving the plate forward, allowing it to rest on the registers on the plate below. Wiring flexibility for this purpose is shown on ED-91432-01.

Traffic Register Relay Rack

5.12 The OGT, PC, and OFL registers are operated from the route relays in the markers. Prior to SD-25016-01, Issue 60D, provision was made in No. 1 offices for a maximum of 80 PC and 80 OFL registers per correspondingly numbered route relay bays at the markers. The windings of the pulse-help relays for these registers are cabled directly to the markers where they appear on the TR terminal strips of like-numbered route relay bays. The PC and OFL contacts of the route relays are wired to PC and OFL terminal strips located immediately above the TR terminal strips. Cross connections at each marker between the two sets of terminal strips associate a given route relay on each marker with a given pulse-help relay, and a jumper at the TRDF assigns the contacts of the pulse-help relay to a given traffic register. Certain trunk groups such as those to call indicator positions and "A" board operators may be required to give an alarm or make-busy indication via the HMDF when all trunks are busy. To provide for this condition, a sufficient number of relays per SD-25317-01, Fig. 1, calculated to the nearest ten, are furnished for each set of like-numbered route relay bays. These are assigned the lowest numbers in the group of 80 OFL relays serving the bays and may be used universally for straight overflow or for returning an alarm or make-busy indication.

5.13 A modification of the above arrangement covered by SD-25016-01, Issue 60D makes provision for 100 PC and 100 OFL register leads per set of route bays instead of 80. By furnishing a full complement of 100 PC and 100 OFL

relays, jumper changes at the marker frames are largely avoided. With such exceptions, as overflow trunk groups and trunk groups required to return an alarm or make-busy indication or to give peg count class-of-service discrimination, the jumpers between the PC and OFL terminal strips and the TR terminal strips on the markers can be assigned in sequence, and when once installed, need not be disturbed. This modification can be applied to existing offices by reducing the J-TR multiple at the route relay bays from 80 to 40 and using the vacated punchings to terminate the windings of the added 20 PC and 20 OFL relays.

5.14 The arrangement of the OGT, PC, and OFL register equipment in tandem offices agrees with the plan for No. 1 offices described in 5.12, except that 100 PC and 100 OFL relays are furnished for each set of route relay bays, the latter in this case accommodating 120 route relays each. On the tandem markers the PC and OFL terminal strips are in the midportion of the frame where jumper changes can be made more readily than on No. 1 marker frames.

5.15 A typical layout of the traffic register relay rack equipment is shown on ED-25361-11. When the relays for a particular register condition occupy less than a mounting plate, they may be grouped with like relays for other circuits. Otherwise the relays for each kind of circuit should be confined to separate mounting plates.

5.16 For cabling reasons, the H relay units are located at the top of the traffic register relay rack bays: ordinarily not more than one unit to a bay. Should two units be placed in the same bay, a space of 4 inches shall be left above the lower unit for forming and turning the switchboard cables.

5.17 Test battery supply and talking line circuits per SD-25440-01, Fig. 1, 2, and 5 shall be provided for the traffic register relay rack in both local and tandem offices. The equipment for these circuits shall be mounted on a combined connecting block and jack mounting per ED-91210-01, Item 19 located as shown on ED-25361-11, Sk D for local and ED-25778-01, Fig. 2 for tandem offices. One set of these circuits shall be provided on the middle bay of three in one line, on alternate bays beginning with the second bay when there are more than three bays in one line, or on the first bay when there is only one bay furnished.

5.18 Examples of trunk busy and trunk peg count circuits which require flexibility between the relays and the associated equipments are listed as follows:

"A" switchboard outgoing trunk (GB)

"B" switchboard auxiliary incoming trunk (GB)

Toll number checking, toll incoming, or miscellaneous trunk (GB) and (PC)

Keypulsing district junctor (GB)

"A" switchboard outgoing trunk idle indicating (CB)

"A" switchboard number checking trunk (PC) and (GB)

No. 3A announcement system trunks (PC)

Tandem trunks (GB)

Step-by-step district junctor (GB)

Facilities for terminating the leads for the various associated equipments, as well as for strapping out and cross-connecting to the proper GB or PC register relay winding, are provided on the vertical traffic register distributing frame. A typical arrangement of terminal strips for this purpose is covered by Fig. A, B, and C of ED-25362-10. In tandem offices, where the GB registrations are obtained in the tandem office instead of in the local offices, the PB leads from the tandem trunks are cabled to verticals on the TRDF for cross-connection to the GB relays. Since grouping facilities cannot be provided at the tandem trunk frames, bunching blocks for this purpose are provided at the distributing frame. These are located on the lower shelves of the frame where they cross-connect to the GB relay windings on verticals. The contacts of the GB relays also appear on verticals of the frame for cross-connection to the registers above.

5.19 The relay rack circuits, shown in Table A, are furnished on an installer-wired basis.

TABLE A

CIRCUIT DWG SD-25317-01	TITLE	EQUIPMENT DWG
Fig. 6, 17, & 20	Orig mkr & class-of-service peg count	ED-25361-11, Sk C & Sk H
Fig. 25	Clock per count reg	ED-25361-11, Sk D
Fig. 30, 31, 32, 33, 34, 35, & 36	GB time duration reg	ED-25361-11, Sk F
Fig. 37	Term. sdr GB or term. sdr load reg	ED-25361-11, Sk B
Fig. 3, 24, & 37	Tandem CAMA sdr GB, & inc reg GB	ED-25778-10, Sk B1

5.20 ***Group busy time duration register*** facilities include a TG relay and GBT register per group or subgroup of trunks, a T relay under the control of a start key and the clock circuit for supplying battery at 6-second intervals to the registers, and an ET register operating from the T relay to record the elapsed time of the group busy test. The T battery supply relay serves a maximum of 60 registers. Since there is one ET register per T relay, the capacity of the relay is 59 GBT registers. The TG relays are furnished in sets of one, two, or three for nondivided trunk groups and those having two or three subgroups. An example of the latter is an intertoll group having terminal, via, and common subgroups. The contacts and winding terminal of the TG relays are cabled to the VTRDF in sets of one, two, or three, at which point the E0 to E4 leads from the contacts are cross-connected to GBT registers and the windings are cross-connected to GB leads representing groups or subgroups of trunks. The contacts of the T relay likewise are cabled to the VTRDF for cross-connection to a single ET register, and to GBT registers as required. The mounting plate per Sk F on ED-25361-11 accommodates a test jack for the normally operated TG relays on the plate, a T relay furnished on the first plate of a group, and space for 11 TG relays. On plates other than the first plate of a group served by a T relay, there is space for 12 TG relays. The plate therefore accommodates three or four sets of three TG relays, five or six sets of two TG relays, or 11 or 12 single TG relays. Ordinarily, a plate is limited to sets of one, two, or three, each series being numbered 0- up. If desired, a 3-relay set may be used for three individual groups of trunks by assigning registers to the E0, E1, and E2 leads; or it may be used for a trunk group having two subgroups by using the TG1 and TG2 relays and contacts E0, E1, and E3, in which case the TG3 relay and the E2 contact are available for an individual trunk group, if desired. Likewise a 2-relay set may be used for two individual trunk groups. Access to the GB leads of intertoll trunks may be obtained in either of two ways: (1) the grouping of the individual GB leads may be done at the toll IDF, in which case a lead per group or subgroup is brought up to the HTRDF over a tie cable for cross-connection to the windings of the TG relays, (2) the individual GB leads may be brought up to the HTRDF and grouped with the aid of bunching blocks in the manner used in tandem offices for GB registers. The bunching blocks are located on the HTRDF preferably in the lower portion. The foregoing description is based on Fig. 33, 34, and 35 of SD-25317-01. The same general arrangement applies to Fig. 36 of SD-25317-01 used for idle trunk indicating groups, except that the RC relays are always furnished individually, no test jack is required, and bunching facilities for the OL leads are not needed. The GBT registers associated with RC relays may use the same T relay, ST key, and ET register that is furnished for the TG relays.

Traffic Register Distributing Frame

5.21 The traffic register distributing frame provides full flexibility between any traffic register in the office and any traffic register relay circuit. The arrangement will facilitate changes in traffic assignments made necessary by additions to the office or for other reasons.

Tandem Offices

5.22 The traffic register equipment for a tandem office may be added to the traffic register rack, traffic register relay rack, and traffic register distributing frame serving No. 1 crossbar equipment in the same building, but more generally in segregated on separate frames associated with the tandem equipment.

5.23 Where traffic register relays and cross connections are segregated, ED-25778-10 and ED-25778-11 shall be followed. The relay rack and distributing frame assemblies shown on these drawings are the same as used in No. 1 offices for the traffic register equipment. One bay of relay rack will, in most non-AMA offices, have sufficient capacity for any tandem office limited to two bays of marker route relays (240); beyond this, a second bay will be needed. Likewise, an initial unit of four bays of distributing frame will suffice, except where general use is made of GB registers on the tandem trunks. As explained in 5.18, facilities are available on the distributing frame for grouping the PB leads of tandem trunks, where the group busy registrations for these trunks are obtained in the tandem office instead of in the local offices.

Wiring and Cabling

5.24 No. 24 gauge type "C" wire shall be used in the local cables of traffic register relay rack units, except battery and ground distributing leads which shall be No. 22 gauge type "C" wire.

5.25 Where the traffic register relay equipment is arranged on a 10-circuit-per-plate basis, no terminal strips are furnished, and as covered under Part 4, such units have no local cable. Instead, the common leads, such as for battery and ground and the leads required between contacts on the same relay, shall be run as straps with No. 22 gauge standard strap wire.

5.26 With the exception of the unit local cable forms, no local cable forms will be required in connection with the traffic register relay equipment. Such interunit wiring, as is required, will be made with No. 24 gauge type "C" wire or cable sewed in the switchboard cable forms on the rear of the bay.

5.27 Traffic registers shall be cabled to the register distributing frame with 50-circuit No. 24 gauge cables. Where partial equipment of the traffic register rack is provided, one or more cables may be omitted for each consecutively numbered group of 50 circuits.

5.28 The switchboard cables to the vertical side of the traffic register distributing frame are butted in groups of 100 circuits. In cabling the relay equipment to the distributing frame, it is important that switchboard cable sizes be selected so as to avoid splitting cables between the first and second 100 circuits on each vertical.

5.29 Except for battery leads, 24 gauge type "CL" switchboard cables shall be provided between the traffic register relay racks and the various points of termination.

5.30 No. 22 gauge type "C" wire shall be used for the battery leads from the miscellaneous fuseboard to the relay rack and from the fuseboard to the battery keys in the register rack, as well as from the keys to the traffic register relay rack or distributing frame.

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
J27054A	Mfr Disc.	2	J27054U
J27054B	Mfr Disc.	2	J27054U
J27054K	Mfr Disc.	3	—
J27054K,L1 & L2	Mfr Disc.	1	J27054K,L3 to L5
J27054L	Mfr Disc.	6	—
J27054N	Mfr Disc.	2	—
J27054S,L3	Mfr Disc.	4	J27054S,L1
J27054T	A&M Only	3	J27054W
J27054T	Mfr Disc.	6	—
J27054W	Mfr Disc.	6	—