MODIFICATION PROCEDURES TO PROVIDE INCREASED CAPACITY FEATURES EQUIPMENT DESIGN REQUIREMENTS NO. 4 TYPE TOLL SWITCHING 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 and also the general procedures for providing increased capacity features for in-service 4A and 4M toll switching offices.

1.02 This specification is reissued to revise 1.07, 4.03(b), 4.04, 4.06(b), and 5.02 and to add 4.03(c), 4.06(c), and 4.13(e).

Description

1.03 The increased capacity features provide a substantial increase in the traffic handling capacity of the 4A and 4M toll switching systems by expanding the common control capabilities to achieve greater utilization of the intraoffice linkage and available trunk terminations. This is accomplished by decreasing the operational times of the marker and decoder and increasing the complement of decoders and senders per office. Since the marker and decoder functions overlap with those of the senders, card translator, incoming and outgoing links, and the trunk block, decoder, marker, and translator connectors, these circuits must be speeded up in certain phases to attain the maximum increase. In new offices, this will decrease the marker operational time by approximately 36 per cent and that of the decoder by 22 to 25 per cent. However, in existing offices, it is not practical to modify or replace the trunk block connectors and full speedup will apply only to calls through the added growth connectors. Other factors, such as trunk link frame floor space limitations, or economic considerations may also preclude modifying all the other frames. In view of these factors, the increased capacity features may be applied in different package combinations to suit the particular needs of the various 4A and 4M offices. Tables A and B list these packages and the pertinent information to be taken into consideration in ordering them.

1.04 The operational speedup of the common control equipment is accomplished, for the most part, by substituting faster operating wire-spring and multicontact relays in place of slow operating flat-spring and multicontact relays. Since the mountings of general purpose relays and flat-spring relays are not compatible and since the mounting of wire-spring and flat-type relays on the same mounting plate is not practical from the standpoint of maintenance and shop assembly, the application of the increased capacity options is accomplished on a replacing unit, new unit, added mounting plate, and in one case, the replacing of a frame basis. The speedup of the multicontact relays will be accomplished by changing the coil, armature, and the card of the slow 287-type wire-spring relays and by the complete replacement of the 263-type flat spring on a unit basis, with fast operating 287-type relays where so required.

1.05 The maximum number of incoming senders is increased from 378 to 480. The 40-sender group arrangement of assigning senders to sender links and controllers is recommended, when not previously furnished, prior to increasing the existing maximum sender capacity.

1.06 The incoming sender, available for growth in existing offices, is arranged without the pretranslation feature. The removal of this feature provides additional reduction in the machine holding time of the decoder with fast decoder connectors, as shown in Table B, as well as reduction in card translator usage. Therefore, the removal of the pretranslation feature from the existing senders is recommended. However, the decoder and decoder connector are arranged to serve senders with and without this feature with the one restriction that they cannot be assigned to the same connector.

1.07 The maximum number of decoders is increased from 18 to 24. Previously, decoders were furnished in one common group with all senders having access to all decoders through a 5-sender capacity decoder connector. The new standard arrangement provides for two decoder groups with a 12-decoder maximum per each group and each group serving its own decoder connector group of 240 senders.

1.08 In order to minimize the arrangement of existing offices, it is not required that the decoder groups be of equal size. However, it is recommended that in offices where the 18-decoder capacity has been reached, the decoder speedup features be applied before establishing separate decoder groups. Generally, it will be found in a 2-train office of 18 fast decoders that when additional decoder capacity is required, the initial group can be cut back to 16 decoders and a second or B decoder group established for an additional 8 decoders. The added B group of decoders will be assigned to a new basic decoder connector frame arranged for an ultimate of 28 senders, 12 decoders, and 10 markers. The new and existing connectors may be furnished within the same decoder group subject to the limitations per J67449, Table C. In single-train offices, the second group should be established when the existing maximum of ten decoders has been reached and at the time the office is expanded to 2-train combined operation.

1.09 In order to minimize the out-of-service period, the new and replacing equipment is furnished with associated frame supplementary local cable leads. This arrangement of shop-furnished units or mounting plates of equipment with associated local cable leads permits the field to add this equipment, in most cases to unassigned mounting space on the affected frames prior to the actual modification effort.

1.10 The general procedure and the equipment required to modify the in-service common control equipment are covered under Part 4 and the new wire-spring frames, which may be added for growth during the modification period are covered under Part 5.

2. SUPPLEMENTARY INFORMATION

818-000-000 — No. 4 Type Toll Switching Systems Index

AA128.006 — Checking List — General Equipment Requirements

818-005-170 — No. 4M Toll Switching System — General

J60103 (818-031-150) — Limiting Conductor Length Between Frames and Units — No. 4A or 4M Toll Switching System

J67408 (818-480-150) — Block Relay Frame — No. 4 or 4A Toll Switching System — Toll Systems

J67430 (818-300-150) — Incoming Sender Frames — No. 4A Toll Switching System — Toll Systems

J67437 (818-200-150) — Incoming Frame — No. 4, 4A and 4M Toll Switching System — Toll Systems

J67438 (818-201-150) — Outgoing Frame — No. 4A Toll Switching System — Toll Systems

J67439 (818-400-150) — Decoder Frame — No. 4A or 4M Toll Switching System — Toll Systems

J67440 (818-450-150) — Marker Frame — No. 4A or 4M Toll Switching System — Toll Systems

J67442 (818-420-150) — Card Translator Equipment — No. 4A or 4M Toll Switching System — Toll Systems

J67443 (818-701-150) — Trouble Recorder Frame — No. 4A Toll Switching System — Toll Systems

J67444 (818-041-150) — Alternate Route Traffic Control Frame — No. 4A and 4M Toll Switching Systems — Toll Systems

J67445 (818-421-150) — Foreign Translator Connector Frame — Emergency Translator Connector and/or Frame Identification Frequency Control Frame — No. 4A or 4M Toll Switching System — Toll Systems

J67446 (818-451-150) — Marker Connector Frame — No. 4A and 4M Toll Switching System — Toll Systems

J67449 (818-401-150) — Decoder Connector Frame and Supplementary Decoder Connector Frame — No. 4A and 4M Toll Switching Systems — Toll Systems

J67452 (818-301-150) — Incoming Sender Frames — No. 4M Toll Switching System — Toll Systems

J67462 (818-702-150) — Incoming Sender and Register Test Frame — No. 4A or 4M Toll Switching Systems — Toll Systems

J67468 (818-303-150) — Incoming MF Sender Frame — No. 4A Toll Switching System
J69202 (818-005-150) — No. 4A Toll Switching System — General
Floor Plan Data — Section 10 — Toll Switching System — No. 4 Type

3. DRAWINGS

ED-68068-01 — Schematic of Marker and Transverter Multiple Cabling to Frame Connectors — No. 4A and 4M Toll Switching Systems
ED-68171-( ) — Incoming, Outgoing and CAMA Sender Link Frames — Sender and Connector Multiple Schematic No. 4A and 4M Toll Switching Systems
SD-68400-01 — Toll Switching System No. 4A — Keysheet
SD-68470-01 — Toll Switching System No. 4M — Keysheet

4. MODIFICATION OF EXISTING EQUIPMENT (See Tables A and B for Package Sequence and Millisecond Reduction per Modified Frame)

J67440A — 4A or 4M Marker (See 4.02)

4.01 The modification of this frame, to speed up the operation within the marker itself, consists of providing the increased capacity feature in accordance with the feature and options table per SD-68388-01. The modification effort will require at least one marker per train to be removed from service. A job supplementary local cable is required for the replacing and added units, including all standard options not previously furnished unless otherwise specified on the circuit. Furnish the shop-replacing units as follows.

one — J67440AC channel test control unit to replace the J67440G unit

one — J67440Y frame check trunk test unit to replace the J67440R unit

one — J67440AB channel test unit to replace the J67440K unit

one — J67440AA frame identification control unit to replace the J67440S unit

4.02 Prior to modifying markers of either train, the decoder-marker test and trouble recorder circuit per SD-68389-01 shall be modified to add the "XH" wiring option.

J67406H, J67406J or J67406K or J67438A, J67438B, or J67438C Outgoing Link Frame (See 4.04, 4.05, and 6.01)

4.03 The modification of this frame consists of speeding up the marker preference, frame lockout, junctor lockout, connector busy, and link connector features in accordance with the feature and options table and circuit notes per SD-68022-01 or SD-68394-01. The modification effort shall be applied on a frame and train basis and on an in-service basis with the affected control circuit operating on mate operation. The shop shall furnish a replacing mounting plate equipped with the replacing wire-spring relays and resistance lamps. The speedup or replacement of the ten (LCH/LCM) multicontact relays is obtained as follows.

(a) Link connectors equipped with 287B (LCH/LCM) relays shall be modified to operate with the comparable speed of the 287D relay by replacing the armature, coil assembly, and card in accordance with D-179967 and X-4187.

(b) Link connectors equipped with 263E (LCH/LCM) relays shall be replaced in the same frame location with a new shop-furnished unit per J67438H or shop furnished assembly equipped with ten 287H (LCH/LCM) relays and the associated supplementary frame local cable.

(c) When new link frames with full increased capacity features (including J67438J, List 5) are added on the same job that adds increased capacity to the link frames they cannot be placed in service until all existing link frames and associated markers are modified for increased capacity.

4.04 Prior to modifying the outgoing or incoming links, the associated train markers per SD-68388-01 shall be modified to replace "VP" option with "VQ" option with the exception of the T and U resistors and the CHT relay of "VP" option which shall be retained until all the outgoing and incoming links of the train are modified, at which, the retained T and U resistors and the CHT relay shall be replaced with the "VQ" option (CHT relay).

4.05 When outgoing link circuits, SD-68022-01 and SD-68394-01, are furnished in the same train, all the outgoing link circuits per

SD-68022-01 shall be modified to replace Fig. 9 with Fig. 25 prior to the modification of any incoming link of the same train.

J67405H or J67437B — Incoming Link Frame (See 4.04, 4.05, and 6.01)

4.06 The modification of this frame consists of speeding up the marker preference, frame lockout, connector busy, and link connector features in accordance with the feature and options table and circuit notes per SD-68020-01 or SD-68393-01. The modification shall be applied on a frame and train basis and on an in-service basis with the affected control circuit operating on mate operation. The shop shall furnish a replacing mounting plate equipped with the replacing wire-spring relays and resistance lamp. The speedup or replacement of the ten (LCH/LCM) multicontact relays is obtained as follows.

(a) Link connectors equipped with 287B (LCH/LCM) relays shall be modified to operate with the comparable speed of the 287D relay by replacing the armature, coil assembly, and card in accordance with D-179967 and X-4187.

(b) Link connectors equipped with 263E (LCH/LCM) relays shall be replaced in the same frame location with a new shop-furnished unit per J67437J or shop-furnished assembly equipped with ten 287H (LCH/LCM) relays and the associated supplementary frame local cable.

(c) When new link frames with full increased capacity features (includes J67437K, List 4) are added on the same job that adds increased capacity to the link frames, they cannot be placed in service until all existing link frames and associated markers are modified for increased capacity.

J67439AB — Decoder Frame (See 4.08)

4.07 The modification of this frame, to speed up the operation within the decoder itself, consists of providing the increased capacity feature in accordance with the feature and options table per SD-68340-01. The modification effort will require at least one decoder at a time to be removed from service. A job supplementary local cable is required for the replacing and added units, including all standard options not previously furnished unless otherwise specified on the circuit. The shop will furnish the new and replacing units as follows.

one — pretranslation and TASI unit per J67439AD

one — increased capacity unit per J67439AE

one — vacant code routing unit per J67439AF to replace the J67439M unit

one — marker selection unit per J67439AG to replace the J67439S, J67439T, or J67439U unit.

4.08 The trouble recorder miscellaneous circuit per SD-68392-01, Fig. 17 shall be modified, with each decoder modified, to replace "N" option with "M" wiring option.

J67442A — Card Translator Equipment (See 4.10)

4.09 The modification of this equipment, to speed up the operation of the home, emergency, and foreign area card translators, consists of providing the increased capacity feature in accordance with the feature and options table and circuit notes per SD-68342-01. The shop shall furnish a replacing mounting plate per J67442C-( ), Fig. 1, sketch E equipped with two or three replacing wire-spring relays and associated networks.

4.10 The modification of the home and the emergency card translators shall be coordinated with the associated decoder modification per 4.07. The foreign area card translator modification shall be coordinated with the associated foreign translator connector modification per 4.11.

J67445E — Foreign Translator Connector Frame or Supplementary Foreign Translator Connector Frame (See 4.12)

J67445F — Emergency Translator Connector Frame (10-decoder capacitor)

J67445G — Emergency Translator Connector Frame (18-decoder capacitor)

4.11 The modification to speed up the connectors consists of applying the increased capacity feature in accordance with the feature and options table and circuit notes per SD-68341-01. The modification of the connectors of the above listed frames is as follows.

(a) The J67445E basic or supplementary connector modification consists of the removal of the C relays and their associated networks and resistances, the replacement of the P relays, the LO or LO' relay, and associated networks with wire-spring relays and associated networks, and the speedup or replacement of the CO multicontact relays. The shop shall furnish a replacing mounting plate equipped with the replacing wire-spring relays, associated networks, and the associated supplementary frame local cable. The connectors equipped with 287B CO multicontact relays shall be modified to operate with the comparable speed of the 287D relay by replacing the armature, coil assembly, and card in accordance with D-179967 and X-4187. The connectors equipped with 263H CO relays shall be replaced with a replacing shop-furnished J67445H unit equipped with 287H relays. The shop shall also furnish a supplementary frame local cable for the relocated leads of each connector.

(b) The J67445F, 10 capacity, or J67445G, 18 capacity, emergency connector modification consists of the removal of the C relays and their associated networks and resistances and the replacement of the P relays, the LO or LO and LO' relays and associated networks with wire-spring relays and associated networks. The shop shall furnish a replacing mounting plate or plates equipped with the replacing wire-spring relays, associated networks, and the associated supplementary frame local cable.

4.12 The modification of the emergency translator connector of the J67445F or J67445G frame should be completed prior to modifying the foreign area translator connectors of the J67445E frame in order that the emergency card translator may be substituted for one of the two foreign card translators that will be removed from service during the interval required to modify the connectors of the J67445E frame.

J67449B — Decoder Connector Frame For Use in Combined Train Office (6-decoder capacitor)

J67449F — Decoder Connector Frame For Use in Separate Train Office (10-decoder capacitor)

J67449G — Decoder Connector Frame For Use in Combined Train Office (10-decoder capacitor)

J67449H — Supplementary Decoder Connector Frame For Use in Separate Train Office (8-decoder capacitor)

J67449J — Supplementary Decoder Connector Frame for Use in Combined Train Office (4-decoder capacitor)

J67449K — Supplementary Decoder Connector Frame for Use in Combined Train Office Modified to 2-Train Operation (8-decoder capacitor)

4.13 The modification of the connectors furnished in these frames consists of applying the increased capacity feature in accordance with the feature and options table and circuit notes per SD-68339-01. The modification effort of the connectors of the listed frames is as follows.

(a) The basic J67449B, J67449F, or J67449G frame connectors require the replacement of the decoder preference (DP and CB) relays; the marker train (MTA and MTB) relays; the connector control (CHK, RLT, and CA5) relays and associate networks and resistances, with like designated wire-spring relays and associated networks, diodes, and resistances; the removal of the connector control (RLT1) relay and associated resistance lamp; and the addition of two frame terminal strips that are required for the additional decoder preference chain leads provided with the wire-spring preference relays. (See 4.14.)

(b) The supplementary J67449J, J67449K, or J67449H frame connectors require the replacement of the decoder preference (DP and CB) relays and associated networks and resistances with like designated wire-spring relays, associated networks, diodes, and resistances, and the addition of two frame terminal strips that are required for the additional decoder preference chain leads provided with the wire-spring preference relays. (See 4.14.)

(c) The basic J67449F frames, when initially furnished for a new 10-decoder capacity A or B group, will require modification effort in addition to that covered in (a) to add toll

completing markers 8 and 9. The required terminal strips, multicontact relays, and preference relays for the added markers in each connector shall be furnished and located in accordance with the associated frame equipment drawing.

(d) The shop shall furnish mounting plates equipped with the replacing wire-spring relays, associated networks, diodes, resistances, frame terminal strips, and the supplementary frame local cables for the modification effort covered in (a), (b), and (c).

(e) When new decoder connector frames with full increased capacity features are added on the same job that adds increased capacity to the decoder connectors, they cannot be placed in service until existing decoder connectors are modified for increased capacity.

4.14 The modification of the decoder connectors shall be applied on a connector and on a decoder group basis. The modification of each connector requires the assigned senders to be removed from service. When all the connectors of the decoder group have been modified, the associated decoders of the group shall be modified in accordance with SD-68340-01 to replace "XL" option with "XM" option.

J67446J — Marker Connector Frame For Use in Separate Train Office

4.15 The application of the increased capacity feature, to speed up the operation of the marker connector in accordance with the feature and options table per SD-68395-01, consists of replacing all the slow-operating flat-type and multicontact relays with fast operating wire-spring and multicontact relays. Since the modification of the existing marker connector is so extensive, from a standpoint of cost and the out-of-service interval required, a field modification of the existing frame would not be practical. Therefore, the speedup is obtained by replacing the existing J67446C or J67446D, 2-connector marker connector frame with the J67446J, 3-connector marker connector frame. This replacement operation is only recommended for an office where the additional marker and decoder holding time reduction, listed in Table B, is essential. Assuming the connector frames to be replaced are associated with a separate train office equipped with the existing ultimate of 18 decoders and 20 markers, the shop shall furnish six new J67446J frames, less the frame marker multiple terminal strips. The frame marker multiple terminal strips from the replaced frame shall be re-used to eliminate the necessity of disconnecting and connecting the in-service marker multiple, in replacing the nine existing frames. The new frame is designed to re-use, wherever practical, the existing marker to connector and decoder to connector cabling. However, a job survey of the existing cables and cable runs will be required to determine the cabling that can be used in place, pulled back, or rerun or supplemental cable leads that will be required with the reassignment of the decoders to the replacing connectors. The step sequence for replacing the frames and reassigning the decoders is as follows.

(a) ***Step 1:*** Make busy decoders 0 and 1, remove and replace marker connector frame 0 in accordance with the following sequence.

(1) On a marker and connector basis, disconnect the switchboard cable leads from the marker preference, MISC, MKR, and connector terminal strips, looping and sleeving the preference chain leads and the frame-to-frame multiple leads.

(2) On a marker basis disconnect the connector vertical marker multiple local cables from the frame marker multiple terminal strips and the frame local cable leads from A and B frame terminal strips.

(3) Remove the frame terminal strip assembly with marker multiple, A and B terminal strips and switchboard cables attached. The assembly shall be tied to the superstructure in a manner which will permit the removal and replacement of the frame.

(4) Remove the power feeders from the fuse panel. Remove and replace the frame with new marker connector frame 0 and connect new fuse panel.

(5) On a marker basis remove the marker multiple terminal strip from the removed assembly, mount on the new frame terminal strip assembly, and connect the associated vertical marker multiple local cable. Disconnect the switchboard cable leads from the removed A and B frame terminal strips, keeping frame-to-frame

multiple leads looped; and connect these cable leads on replacing A and B frame terminal strips.

(6) On a marker basis the cables removed from the MISC, MKR, preference, and connector 0 and 1 terminal strips shall be connected to like designated terminal strips on the replacing frame.

(7) Test decoders 0 and 1 and associated connectors 0 and 1, and return to service.

(b) ***Step 2:*** Make busy decoders 2 and 3, remove and replace marker connector frame 1 in a step sequence similar to Step 1 with the following exceptions.

(1) The cables that were associated with decoder 2 and connector 0 shall be pulled back or rerun and connected to the associated terminal strips on connector 2 of marker connector frame 0.

(2) The cables that were associated with decoder 3 and connector 1 shall be rerun and connected to the associated terminal strips on connector 0.

(3) Decoders 2 and 3 and their associated connectors can be tested and returned to service.

(c) ***Steps 3 through 6:*** These steps shall cover the replacement of marker connector frames 2 to 5 in a step sequence similar to step 1 and the reassignment of decoders 4 through 17, in a numerical step sequence similar to step 2.

(d) ***Step 7:*** At the completion of the replacement period, the associated markers shall be modified in accordance with SD-68388-01 to replace "VR" option with "VS" option.

(e) ***Step 8:*** On a marker basis disconnect the frame-to-frame marker multiple, and all other frame-to-frame multiples between replacing frame 5 and existing frame 6, and remove the unassigned marker connector frames 6 to 8. The floor space made available by the removed frames may be reassigned to future decoders when more than 18 decoders are required.

J67430B — 4A Dial Pulse Incoming Sender

J67430C — 4A Multifrequency Pulse Incoming Sender

J67452B — 4M Dial Pulse Incoming Sender

J67452C — 4M Multifrequency Pulse Incoming Sender

4.16 The modification of these senders consists of removing the pretranslation feature in accordance with the following. (See 4.17.)

(a) Modify the 4A dial pulse sender in accordance with circuit note 103 per SD-68221-01, Issue 26D.

(b) Modify 4A multifrequency pulse sender in accordance with circuit note 103 per SD-68222-01, Issue 29D.

(c) Modify the 4M dial pulse sender in accordance with circuit note 104 per SD-68423-01, Issue 10D.

(d) Modify the 4M multifrequency pulse sender in accordance with circuit note 103 per SD-68424-01, Issue 16D.

4.17 The removal of the pretranslation feature from the incoming senders can be accomplished before, with, or after the application of the increased capacity feature to their assigned decoder connector. However, whenever the modification is applied, all the senders assigned to one connector shall be modified. The associated connecting circuits to be modified in a coordinated sequence with the removal of the sender pretranslation feature are as follows.

(a) Before returning the modified senders to service, the associated decoder connector circuit shall be modified in accordance with circuit note 102 per SD-68339-01.

(b) Before returning the first modified decoder connector of (a), all the decoders of the decoder group shall be modified in accordance with circuit note 120 par. 15 per SD-68340-01.

(c) Before returning the modified senders of (a) to service, the incoming sender test or the incoming sender and register test circuit shall be modified in accordance with circuit note 102 per SD-68226-01 or circuit note 108 and 102C per SD-68491-01.

(d) When the pretranslation feature has been removed from all the incoming dial and multifrequency pulse senders, all the decoders of the decoder group shall be modified to replace the option applied in (b) with the option covered in circuit note 102C per SD-68340-01.

(e) When the pretranslation feature has been removed from all the incoming senders, all of the decoder connectors served by the same decoder group, regardless of the type of sender assigned, shall be modified in accordance with circuit note 102 per SD-68339-01.

J67433A — 4A or 4M Incoming Sender Test Frame (See 6.01)

J67462A — 4A or 4M Incoming Sender and Register Test Frame

4.18 The modification of these test frame circuits consists of arranging the circuit to test incoming dial and multifrequency pulse senders arranged with and without the pretranslation feature. The modification shall be coordinated with 4.16, and is obtained as follows.

(a) Modify the incoming sender test circuit in accordance with note 102 per SD-68226-01. The modification consists of adding one flat-type relay.

(b) Modify the incoming sender and register test circuit in accordance with circuit notes 108 and 102C per SD-68491-01. The modification consists of adding one wire-spring relay.

J67443S — Trouble Recorder Test Frame

J67443T — Trouble Recorder Perforator Frame

4.19 The modification of these test circuits consists of adding the options and equipment which are required to operate with the added increased capacity features of the common control circuits, in accordance with the feature and options table and circuit notes per SD-68389-01 and SD-68392-01. The modification consists of the following:

(a) The modification items specified in 4.02 and 4.08.

(b) Adding the additional equipment consisting of jacks, keys, lamps, and relays when the office requires more than 18 decoders and 378 incoming senders. The added equipment and the rearrangement of the existing jack and lamp panels shall be in accordance with the added figures and sketches on the associated J drawings.

(c) The replacement of the existing single- or double-sided trouble card with a replacing double-sided trouble card when more than 18 decoders and 378 senders are required. The replacement of the trouble card requires a major rearrangement of the lead assignment of the frame scanning relay circuit to conform with the new assignment shown on Table 14C of SD-68389-01. Since the installation effort will require the trouble recorder frame to be made busy during the reassignment of the scanning relays, a light load period, such as a weekend, will be required. In order to minimize the out-of-service period, a supplementary frame local cable shall be furnished to replace the existing local cable leads that are involved in the scanning relay reassignment. Also, since the majority of the switchboard cable leads assigned to the scanning relays are affected, new switchboard cables will be required unless sufficient slack can be obtained in the existing cables to permit reforming and connecting to their new assignments.

J67444C — Alternate Route Traffic Control Frame or Supplementary Alternate Route Traffic Control Frame

4.20 This new basic and supplementary frame, arranged for an ultimate of 12 decoders and 100 routes in each frame, replaces the existing J67444A basic and supplementary frame when the added common control increased capacity features require more than 18 decoders or when the greater traffic control flexibility is desired. Since this replacement operation requires the existing frames to be removed on an in-service basis, a light load period, such as a weekend, will be required. In order to minimize this replacement period, all the associated switchboard cables shall be replaced. The new cables shall be connected at the new frames with the associated decoder end of these cables formed to permit the removal of the existing cables and the connecting of the new cables on

a decoder basis. This cable replacement will eliminate the necessity of splicing out the existing cable leads.

5. ADDED INCREASED CAPACITY GROWTH EQUIPMENT

J67408B — 4A or 4M Block Relay Frame

5.01 Furnish this frame, arranged for an ultimate of three trunk block connectors, for growth in combined and separate train offices. When this frame is added to an existing block relay group, the associated markers of the group shall be modified in accordance with circuit note 115A per SD-68388-01.

J67449Y — Basic Decoder Connector Frame for Use in Combined or Separate 4A or 4M Train Office

J67449AA — Supplementary Decoder Connector Frame for Use in Separate 4A or 4M Train Office

5.02 Furnish the basic frame, arranged for an ultimate of 4 decoder connectors, 28 incoming senders, 12 decoders, 10 intertoll markers, and the supplementary frame, (one per two basic frames) arranged for an ultimate of eight decoder connectors and ten toll completing markers, when establishing a second decoder group in an existing separate train office or in a combined train office being expanded to separate train operation. The new and old vintage decoder connector frames may be furnished within the same decoder group subject to the limitations per J67449, Table C. The frames to be furnished for growth in the initially furnished decoder group shall be in accordance with J67449, Table B.

J67462A — 4A or 4M Incoming Sender and Register Test Frame

5.03 Furnish this frame for testing incoming senders and registers associated with the second decoder group established per 5.02.

J67468A — 4A Incoming Multifrequency Pulse Sender (This J specification will be available January, 1964)

5.04 Furnish this frame, arranged for an ultimate of three senders with each sender unit containing its own multifrequency receiver circuit, for growth in existing offices. This new sender can be assigned in an existing or new decoder group. However, the existing group must be arranged to serve senders with and without the pretranslation feature. (See 4.17.)

J67446J — Marker Connector Frame for Use in Separate 4A or 4M Train Office

J67446K — Marker Connector Frame or Supplementary Marker Connector Frame for Use in Combined 4A or 4M Train Office

5.05 Furnish these frames arranged for an ultimate of three connectors and ten or twenty markers, as required, for growth in existing separate or combined train offices. These wire-spring connectors are compatible with existing connectors that have not been replaced per 4.15.

6. GENERAL NOTES

Equipment

6.01 The modification effort covered under Part 4, for the most part, is listed under the standard J codes. However, the modification and the equipment arrangement for similar nonlisted replaced codes is the same as the listed standard codes and can be applied on a job basis.

Cable Lead Limitations

6.02 The floor plan layout should be checked at the time of the engineering of the increased capacity feature modification to insure that the critical lead limitations are in accordance with J60103.

Power

6.03 The drain requirements for the added increased capacity feature equipment should be checked against the existing discharge fuses and lead sizes.

TABLE A — MARKER SPEEDUP

NEW FRAMES OR THOSE MODIFIED FOR INCREASED CAPACITY FEATURE			MARKER HOLDING TIME (MS) REDUCTION	FRAMES MODIFIED FOR MARKER PACKAGE NO.					APPROXIMATE EXTENT OF MODIFICATIONS							
									REMOVE REL			ADD REL			ADD MISC	SUBSTITUTE FAST FOR SLOW MC REL
FRAME	CIRCUIT	PAR. REF		—	1	2	3	4	FLAT SPRING	MER-CURY	POLAR	FLAT SPRING	WIRE SPRING	MER-CURY		
Marker	SD-68388-01	4.01, 4.02	80		√	√	√	√	74	42	1	8	54	23	Diode Ntwk	–
Incoming Link	SD-68020-01 SD-68393-01	4.03 thru 4.06	60			√	√	√	17	–	–	3	15	–	Res Lp	10
Outgoing Link	SD-68022-01 SD-68394-01					√	√	√	15	–	–	2	13	–	Res Lp	10
Decoder Connector and Marker Connector	See Table B		15				√	√	See Table B							
Block Relay	SD-68027-01	5.01	25					√	Field Modification Not Recommended*							
Over-All Marker Holding Time in Milliseconds For Average Call				500	420	360	345	320	*Time Shown For Package 4 For Calls Using New Block Relay Frames as Additions							

TABLE B — DECODER SPEEDUP

NEW FRAMES OR THOSE MODIFIED FOR INCREASED CAPACITY FEATURE			DECODER HOLDING TIME (MS) REDUCTION	FRAMES MODIFIED FOR DECODER PACKAGE NO.							APPROXIMATE EXTENT OF MODIFICATIONS				
											REMOVE	ADD			SUBSTITUTE FAST FOR SLOW MC REL
FRAME	CIRCUIT	PAR. REF		—	1	2	3	4	5	6	FLAT-SPRING REL		WIRE-SPR REL	MISC	
Decoder	SD-68340-01	4.07, 4.08	28-77		√	√	√	√	√	√	60	3	49	Res Cap. Diodes	–
Card Translator	SD-68342-01	4.09, 4.10	7 per Card Drop			√	√	√	√	√	2	2	3	–	–
Translator Connector	SD-68341-01	4.11, 4.12	26				√	√	√	√	2 per Dr	–	2 per Dr	–	1 per Dr
Decoder Connector	SD-68339-01	4.13, 4.14, 5.02	28					√	√	√	5 per Conn. & 2 per Dr	–	5 per Conn. & 2 per Dr	Res Frame TS	–
Sender	Various	4.16, 4.17, 5.04	10						√	√	10-14	5	–	–	–
Marker Connector	SD-68395-01	4.15, 5.05	16							√	Frame Replacement Recommended				
Marker	See Table A		10	May be Furnished With Any Decoder Package Subtract 10 From Totals Below							See Table A				

Over-All Decoder Holding Time in Milli-Seconds For Typical Calls			—	1	2	3	4	5	6
	3-digit Routing	1 Card	360	332	325	325	297	287	271
		2 Card Relay Route	640	563	549	549	521	511	495
	6-digit Routing	2 Card	591	553	539	513	485	475	459
		Prin City With FAT	673	615	601	575	547	537	521

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