

GRADED MULTIPLE CROSS-CONNECTIONS TRUNK, DISTRICT OR MAIN DISTRIBUTING FRAME PANEL OFFICES

. GENERAL

1.01 This section describes methods of making changes in the cross-connections for convertible trunks so as to increase or decrease the total number of trunks in a graded group or subgroup to meet changing traffic conditions between periods of assignment. These methods apply to offices employing a graded district multiple arrangement and are as follows:

(A) Cross-connections at Trunk or District Distributing Frame.

(B) Cross-connections at Main Distributing Frame.

1.02 This section has been reissued to cover the method of varying the total number of trunks in a graded group or subgroup, as required, in accordance with the plan of multiplying all convertible common trunks straight between subgroups of frames. The provision of two sets of terminals at the bunching blocks for each convertible trunk associated with an ultimate of four or more frame subgroups for outgoing jumpers, is also covered. The information in regard to the termination of graded multiple on the main distributing frame has been added.

Classes of Trunks in a Graded Group

1.03 The graded multiple arrangement, in general, employs three major classes of trunks as determined by the outgoing trunk multiple requirements at the district frames. These are known as individual, common and convertible trunks. The convertible trunks are then further subdivided into convertible individual and convertible common trunks. In certain cases two or more convertible partial common trunks are also provided. All classes of trunks are terminated on either the vertical side of the trunk or district distributing frame or the horizontal side of the main frame, depending upon the cabling plan for the office.

1.04 The individual trunks are located on the lower numbered terminals of a trunk group assignment and are multiplied through a portion of the frames designated as a subgroup. The trunks in each subgroup are cabled to the distributing frame.

1.05 The common trunks appear on the higher numbered terminals of a trunk

group assignment and are multiplied from bank to bank through all the frames in the graded trunk group or subgroup. These trunks are cabled to the distributing frame once per trunk group or subgroup.

1.06 The convertible trunks appear on terminals of the trunk group assignment between the individual and the common trunks. The convertible common trunks are located at the top and the convertible individual trunks at the bottom of this group. The convertible common trunks, like the regular common trunks, appear on all the frames in the graded trunk group or subgroup. The convertible individual trunks, like the individual trunks, appear in frame subgroups. All convertible trunks are cabled to the distributing frame at each subgroup of frames and are so arranged that by means of cross-connections they may be used either as convertible common, partial common or convertible individual trunks. In this manner, the number of trunks in a trunk group may be varied to meet changes in traffic requirements.

Note: In some cases the graded multiple arrangement provided consists of only two classes of trunks. These classes may be individual and convertible trunks or common and convertible trunks depending upon the requirements of the trunk group. For two classes of trunks, the convertible trunks are located above the individual or below the common, as the case may be.

Arrangement of Graded or Non-Graded Trunks Within a Trunk Group

1.07 District multiple terminals in multiples of 10 are used for graded trunk groups or subgroups. The individual trunks are slipped in layers of five. A turnover is made in a layer of five individual trunks only when it is slipped to the bottom layer of the assignment. The common and convertible trunks also are in layers of five trunks. These trunks, however, are not slipped but are multiplied straight between all frames within a frame subgroup. The common trunks are reversed between subgroups of frames while the convertible common and partial common trunks are cross-connected at the distributing frame so as to be multiplied straight between these subgroups.

1.08 When a trunk group is not of sufficient size for grading, a non-graded arrangement is used in which all trunks are multiplied through all frames in the group. These trunks are slipped in layers of five the same as individual trunks in a graded group except that the slip extends continuously through all frames. For this reason the lower or both of the two top groups of five terminals may be assigned in conjunction with the preceding groups of 10 terminals to form a non-graded group of trunks, if desired.

Terminal Strip Arrangements at Trunk or District Distributing Frame

1.09 For terminating the district multiple on the trunk or district distributing frame, two forty-circuit terminal strips and one twenty-circuit terminal strip are provided on the vertical side to accommodate the leads from one bank. These terminal strips are mounted on the vertical in the same general position that the terminals appear at the district frames. Each vertical accommodates the terminal strips for five banks and enables a complete multiple of 500 circuits including the overflow leads to be terminated on the same vertical. The individual and convertible trunks for the different frame subgroups will, in general, be terminated on different verticals but on terminals at the same level.

1.10 On the horizontal side of the distributing frame, in addition to the trunk terminal strips required for cross-connecting outgoing jumpers, extra terminal strips known as bunching blocks are provided to care for all the convertible trunks. These bunching blocks facilitate the conversion of convertible trunks to convertible common or partial common trunks, and avoid jumper congestion at the forty-circuit terminal strips.

1.11 The bunching blocks are six terminals wide. One set of terminals (T, R and S) is provided for each frame subgroup in which the convertible trunks appear. Where the ultimate number of frame subgroups is four or more, a set of terminals is provided on each end of the subgroup terminals for cross-connecting to the terminal strip associated with the outgoing end of the trunk, as required. The sleeves, the tips and the rings of the associated subgroup terminals and the corresponding trunk cross-connection terminals are made common by strapping on the underside of the block. Where the trunk is common to all frame subgroups, all terminals are strapped together and one trunk cross-connection terminal is used. In the case of partial common trunks the strapping is removed between subgroups which are not common and both trunk cross-connection terminals are used. If the ultimate number of frame subgroups is less than four only one trunk cross-connection terminal is provided.

1.12 Convertible common and partial common trunks are first cross-connected from the vertical side of the distributing frame to the bunching blocks and then from the bunching blocks to the terminal strips associated with the outgoing end of the trunk. The convertible individual trunks are not terminated on bunching blocks but are cross-connected directly from the vertical side of the frame to the trunk terminal strips. Space is provided on the bunching blocks, however, for all the convertible individual trunks.

Terminal Strip Arrangements at Main Distributing Frame

1.13 Terminal strips arranged for twenty circuits each are used throughout when the district multiple is terminated on the main frame. Due to the use of these terminal strips, jumper congestion at the terminal strip is avoided and bunching blocks are not required. The jumpers are run directly from the multiple terminal strips to the trunk terminal strips or protectors. Where a convertible trunk is common to all frame subgroups, the corresponding terminals on the multiple terminal strip associated with each subgroup are connected by jumpers. The outgoing jumper is connected to one of these terminals. For partial common trunks one of the frame subgroup jumpers is omitted and an outgoing jumper is connected to the second group of terminals which are made common.

Overflow Terminals

1.14 Overflow terminals, both used and unused, are multiplied straight through all the frames in a frame subgroup and are run to the distributing frame between subgroups, except when associated with common trunks. In this case they are run to the distributing frame with the common trunks once per graded trunk group or subgroup and are multiplied straight between all frame subgroups.

1.15 Used overflow terminals are connected to overflow registers. Unused overflow terminals are made busy by strapping and cross-connecting the sleeves to ground at the distributing frame.

2. METHOD

(A) Cross-Connections at Trunk or District Distributing Frame

2.01 A graded multiple trunk group is indicated by Fig. 1, which shows a typical 40-terminal assignment. In this figure four subgroups of frames with four frames in each subgroup are shown. While the cabling between the frames and the distributing frame is shown connected to the first frame in the subgroup, the cabling usually is terminated on the nearest frame. On this frame, which is known as the lead-in frame, the trunks

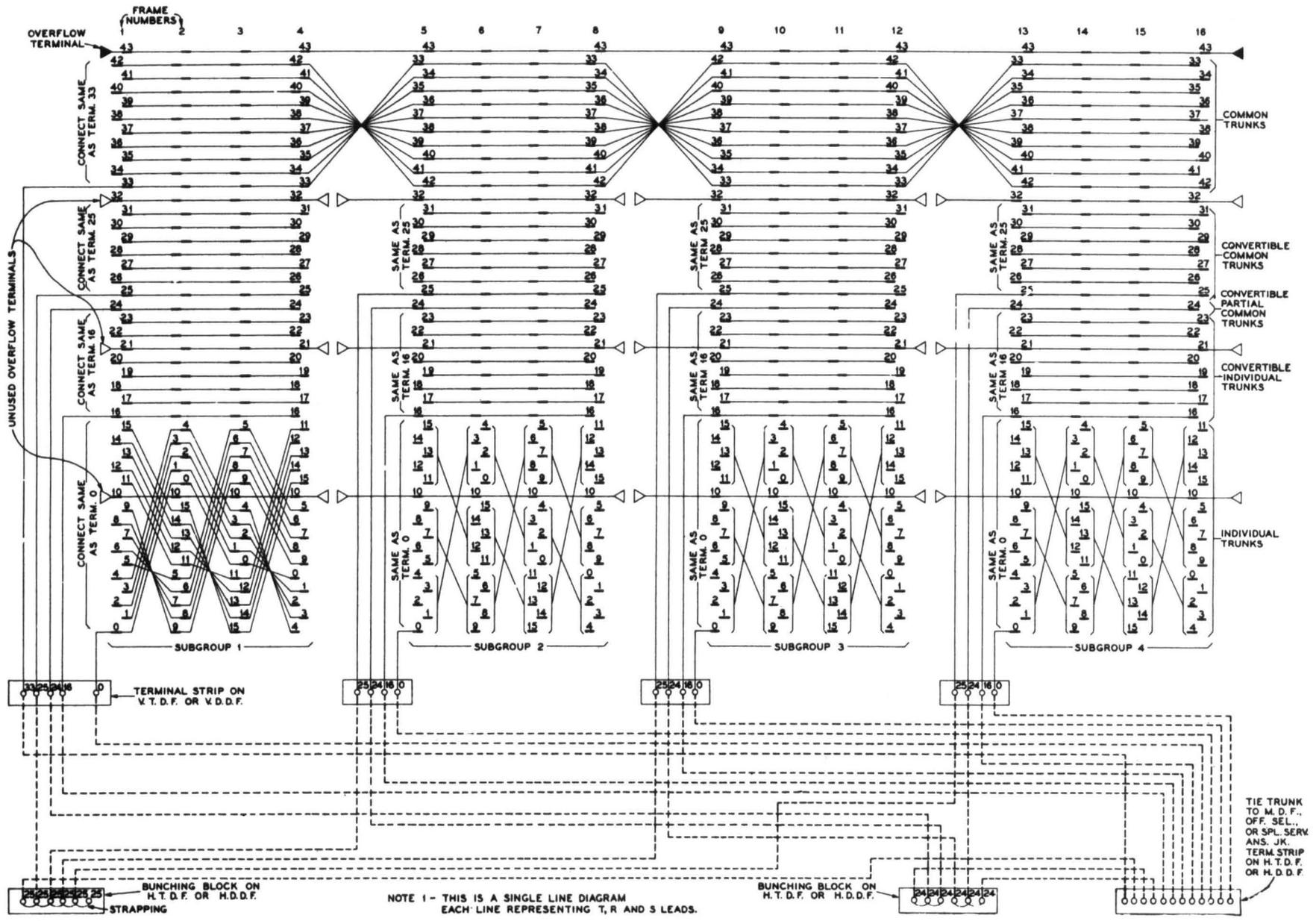


Fig. 1.

SECTION 215-107-301

are assigned in order to the bank terminals. Only the convertible trunk arrangement will be described as these are the trunks affected when the number of trunks in a trunk group is changed.

2.02 Terminals 16 to 31 are wired as convertible trunks. Terminal 21 of this group is an unused overflow terminal. Of these trunks, terminals 25 to 31 are wired as convertible common trunks and appear in and are common to all four frame subgroups. This provides a total of 7 trunks per trunk group.

2.03 Terminal 24 is wired for partial common trunks and consists of two trunks, one being cross-connected to be common to the first two frame subgroups and the other trunk to be common to the last two subgroups. This provides for a total of 2 trunks per trunk group.

2.04 Terminals 16 to 23 (21 not included) are wired as convertible individual trunks in each frame subgroup. This provides 7 trunks per subgroup or a total of 28 trunks per trunk group.

2.05 The convertible common trunks (terminals 25 to 31) and the convertible partial common trunks (terminal 24) are cabled to the distributing frame at each frame subgroup and cross-connected from the vertical side to bunching blocks. The bunching block arrangement is shown on Fig. 2. Six sets of terminals are provided on the bunching block for each bank terminal number, one set for each of the four frame subgroups and two sets, one on

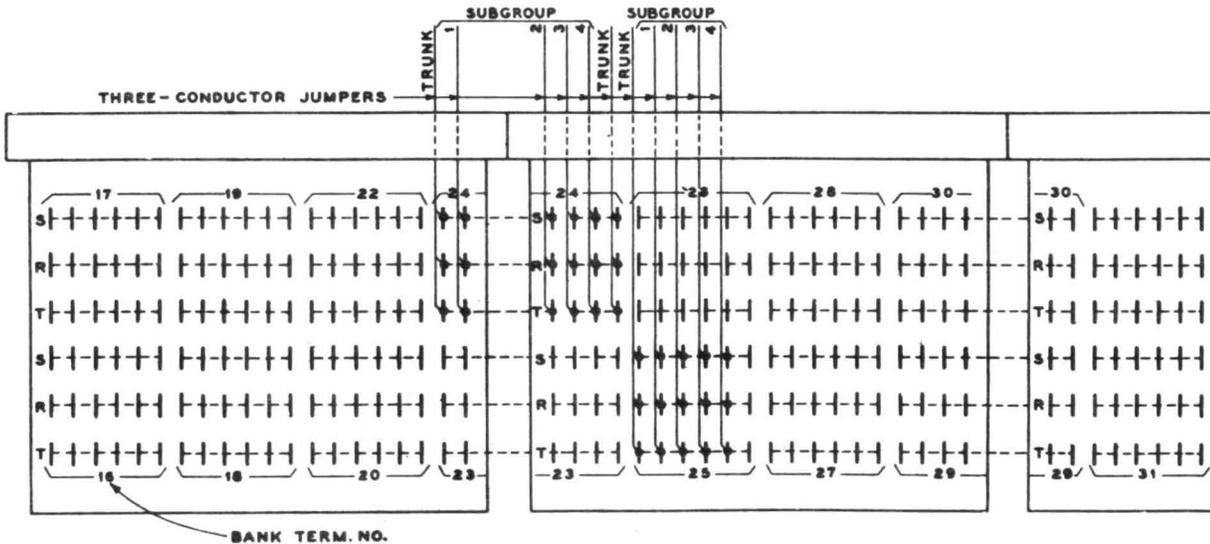
each end of the subgroup terminals for an outgoing jumper. As shown on both Figs. 1 and 2, a trunk is made common to all subgroups by strapping all associated terminals together. Partial common trunks are made by omitting the strapping between the proper subgroups, and connecting a second outgoing jumper to the end set of terminals associated with the second group of terminals which were separated from the original group by this change. On the bunching blocks shown on Fig. 2, bank terminals Nos. 16 to 23 are vacant and are reserved for the convertible individual trunks in the event these trunks are changed to convertible common or partial common. Bank terminals Nos. 26 to 31 are connected the same as terminal 25.

2.06 With the terminal assignment shown on the drawing, a total of 107 trunks are provided in the trunk group. The trunks are as follows:

Common	10
Convertible common	7
Convertible partial common	2
Convertible individual	28
Individual	60

2.07 Assume that traffic conditions are such that it is desirable to increase the trunk group by 3 trunks, to a total of 110 trunks.

2.08 This is accomplished by changing the convertible partial common trunks on terminal 24 to a convertible individual trunk in each frame subgroup and changing the convertible common trunk on terminal



NOTES 1. DOTTED LINES INDICATE STRAPPING BETWEEN TERMINALS ON UNDERSIDE OF BUNCHING BLOCK. THE STRAPPING BETWEEN TERMINALS ON ADJACENT BLOCKS IS RUN THROUGH THE BOTTOM HOLES.

Fig. 2.

25 to partial common trunks. No other trunks are affected. These changes in the trunk arrangements are made by changing the cross-connections at the distributing frame.

Note: To decrease the number of trunks, the procedure should be opposite to increasing the trunks and involves changing partial common trunks to convertible common trunks and convertible individual trunks to partial common or convertible common trunks. The convertible common or partial common trunks provided by this change would be multiplied straight between frame subgroups.

2.09 Check that the trunks are idle and then temporarily make busy district terminals 24 and 25 in each of the frame subgroups. This may be done at the lead-in frame of each subgroup by connecting the sleeve bank soldering lug for each of these terminals to ground at the most convenient point. In this case the lugs for these two terminals appear on opposite sides of the frame. When the connections have been completed, test these sleeve terminals at a multiple bank in each subgroup to check that the ground is present.

Note: Where two or more terminals are made busy on one side of the district frame, the sleeve bank soldering lugs should be strapped together and the strap connected to ground. The strapping should not be soldered but the wire should be wrapped tightly around the bank soldering lug.

2.10 To discontinue the use of terminal 24 for partial common trunks, remove the two groups of jumpers associated with this terminal at the distributing frame. The one group of jumpers are the four frame subgroup jumpers between the multiple terminal strips on the vertical side and the bunching block. The second group of jumpers are the two outgoing jumpers between the bunching block and the trunk terminal strip. The connections at the trunk end should be opened first.

2.11 After the jumpers have been removed, cross-connect terminal 24 as an individual trunk in each frame subgroup. This is done by running a jumper direct from the multiple terminal strip associated with each subgroup and terminating it on the proper terminal on the trunk terminal strip.

2.12 To change terminal 25 from a convertible common trunk to partial common trunks, first remove the strapping between frame subgroups 2 and 3 at the bunching block and then cross-connect the spare terminal associated with subgroups

3 and 4 to a separate terminal on the trunk terminal strip. After these changes have been completed, the cross-connections for terminal 25 should correspond to the previous arrangement for terminal 24.

Note: In case the partial common trunk arrangement is applied to an installation where a spare terminal is not available on the bunching block for the additional trunk connection, the outgoing jumper should be terminated on one of the subgroup terminals.

2.13 If trunks to a call indicator office are involved when making a change in the trunk group, the cross-connections to the call indicator make-busy switches, if provided, should be rearranged accordingly.

2.14 The usual tests shall be made on the converted trunks before they are released for service. To place the trunks in service, remove the strapping which was connected to the sleeve terminals in accordance with 2.09.

(B) Cross-Connections at Main Distributing Frame

2.15 The graded multiple arrangement where the district multiple is terminated on the main frame is the same as shown on Fig. 1 and described in 2.01 to 2.06, except that all trunks are cabled to multiple terminal strips on the horizontal side of the distributing frame and all bunching blocks are omitted. In this case the convertible common and partial common trunks are cross-connected direct to the trunk terminal strip or protectors. A convertible trunk is made common or partial common by connecting the corresponding terminals in the frame subgroups together by means of jumpers.

2.16 Assume that it is desirable to increase the size of the trunk group by 3 trunks, the same number as under method (A).

2.17 Proceed in accordance with 2.08 to 2.14, except that since bunching blocks are not provided, the changes consist only of removing the two subgroup jumpers associated with terminal 24 and one subgroup jumper associated with terminal 25 and then connecting these trunks as convertible individual and partial common trunks, respectively. The jumper removed for terminal 25 should be between subgroups 2 and 3. Subgroups 3 and 4, which are left common are then cross-connected to a terminal on the trunk terminal strip.

3. RECORDS

3.01 All Plant Department records involved should be corrected.