SYSTEMS USED IN THE PREPARATION OF WIRING DIAGRAMS

CONTENTS

1. GENERAL

1.01 This section describes the former highway system, the present airline and simplified airline systems, and the manufacturing schematic system of showing connections on wiring diagrams.

1.02 The highway system represented the first step in the improvement of the original full line method of preparing wiring diagrams and was used to a limited extent. It was later replaced by the airline system and then the simplified airline system which has been used to date.

1.03 The airline system was devised as a means of improving legibility, obtaining greater compactness, and simplifying the preparation of wiring diagrams. Circuit labels are still being prepared by this method. A further simplification of the airline system was made possible by the adoption of the practice of marking terminal numbers on the relay conventions to agree with the schematic and omitting the relay winding and spring combination details. This simplification of the apparatus conventions also has made it feasible to apply the simplified airline system to surface wiring. The simplified airline system is also covered in this section.

1.04 Both the airline and highway systems derive their names from their respective basic methods of tracing a connection between two points without the use of a separate and continuous line for every connection.

1.05 The manufacturing schematic system of preparing wiring diagrams is used on step-by-step and PBX switch units.

1.06 Changes in requirements which have been made with this issue are covered under "Reasons for Reissue" at the end of the section. Revised and added information introduced by this issue is of such magnitude that the use of arrows to indicate changed and added items is not practicable.

2. DESCRIPTION

Full Line Method

2.01 The full line method of preparing wiring diagrams involved the use of individual lines between terminating points for each wire. This method is still used on certain relatively small figures and drawings.

Highway System

2.02 The lines representing the individual wires from each piece of apparatus (called feed lines) are carried a short distance and then merged into a common line, in this case called a highway. The feed lines merge into the highway at an angle of 60 degrees and in such a manner as to indicate the direction of travel through the highway. The feed lines are arbitrarily numbered, the same number appearing at the two feed lines representing the originating and terminating ends of a particular connection. By observing the identification number as well as the direction in which the feed lines merge into the highway, a connection may be followed from beginning to end via the highway. No apparatus identification numbers are used for the various apparatus conventions.

Airline System

2.03 Each individual piece of apparatus (each group in some cases) is numbered and the lines representing the individual wires from each piece of apparatus are carried a short distance and terminated at a common or base line, at an angle of 90 degrees. These individual lines between apparatus and base line (called feed lines) are numbered to correspond with the identification number of the piece of apparatus at which the other end of the connection terminates. It is not necessary to follow a connection through the base line and no provision is made for doing so. However, by observing the color and identification number on the feed line, it is possible to jump directly between pieces of apparatus; hence the term "airline." This system is not used for relatively simple figures.

Simplified Airline System

2.04 This system follows, in general, the airline system outlined in 2.03 but with the following simplifications:

(a) Except for keys, lamps, and jacks, apparatus conventions are simplified by the omission of winding, spring, and contact conventions. Apparatus conventions are shown in rectangles with small circles representing the terminals on the apparatus. This type of apparatus convention makes it practicable in many cases to join the rectangles together in strips to represent the physical arrangement on a mounting plate as viewed from the wiring side.

(b) One feed line generally represents all wires connected to a terminal, although an exception may be made to this in order to avoid confusion or congestion due to optional wiring or to differentiate between surface and local cable wiring.

(c) Where the usual conventions to indicate pairing of leads cause congestion, pairing may be shown in a table of paired leads.

(d) "F" stitch designations are shown along the feed lines and close to the apparatus so that they can readily be seen.

2.05 Typical wiring diagrams are attached illustrating the highway system and the two types of airline systems.

Manufacturing Schematic System

2.06 Manufacturing schematics are wiring diagrams prepared in schematic form to facilitate the tracing of connections and are used only for step-by-step and PBX switch units. A typical illustration of a manufacturing schematic is attached.

3. DETAILS OF HIGHWAY SYSTEM

Apparatus Layout

3.01 The individual pieces of apparatus are arranged in rows approximating, as far as possible, the actual physical arrangement of the equipment as viewed from the wiring side.

3.02 The apparatus and wiring on a particular drawing are arranged in one or more figures, as required.

Apparatus Conventions

3.03 All apparatus conventions, except those for 18- and 19-type resistances, keys, lamps, jacks, etc., are enclosed in rectangles drawn with a heavy line.

Highways

3.04 One or more highways per figure are used, as required. One highway may serve all feed lines of a particular row or group of apparatus or only a part of them, depending on the total number of feed lines involved and the particular layout. In general, not over 99 feed lines are merged into the same highway. In many cases, two or more highways are used even though the total number of feed lines involved does not require it. This is done to simplify the tracing of leads through the highways on certain drawings, particularly where a fairly large group of wires of one figure have a common destination either within the figures or to other figures or drawings.

3.05 Relatively simple and small figures, in general, do not require the use of a highway system.

3.06 Wiring between figures on the same drawing may be via the highways or the individual feed lines depending on the following conditions. In the case of the attached highway drawing, the capacity (see 3.04) of highway C was such that it could serve Fig. 2 as well as a part of Fig. 1 and the tracing of connections between these two figures is via the highway. However, if there had been insufficient capacity in the highways of the main figure, a separate highway would have been used for Fig. 2. In the latter case, the association of Figs. 1 and 2 would have been via the individual feed lines.

3.07 Drawings including figures having two or more highways also include a table indicating the highest-numbered feed line in each highway. This table, which is generally located above the title box of the drawing, is used in connection with the revision of drawings to facilitate the future assignment of feed line numbers.

3.08 The highway lines are drawn heavier than the feed lines.

3.09 The horizontal lines representing the highways are joined at one end or the other by vertical lines, as required to complete their continuity.

Designations for Highways

3.10 When more than one highway per figure is used, the highways are prominently designated A, B, C, etc. When a highway is common to two figures, its continuity between figures is broken and the open ends are assigned an arbitrary letter designation and bracketed. The destination of the highway is indicated at the brackets.

Feed Lines

3.11 Feed lines represent the individual wires or leads (except straps) between terminals of apparatus within a figure or between figures when terminal strip punchings are not interposed. Feed lines of a particular figure terminating on terminal punchings forming a part of the same figure are understood to end at that point.

3.12 Feed lines from apparatus terminals approach the highway at an angle of 90 degrees but merge into the highway at an angle of 60 degrees and in such a manner as to indicate their individual direction of travel through the highway. Likewise, where they leave the highway, the 60 degree angle is shown so as to indicate the direction from which they came.

3.13 Feed lines between figures emerge from the highway in the conventional manner described above, are carried a short distance, and bracketed.

Straps

3.14 Straps between terminals of the same or adjacent pieces of apparatus are not run into the highway but instead are run direct.

Interconnecting Leads

3.15 Interconnecting leads represent the individual wires between two figures neither of which have highways. They are also used for connections between the terminal punchings of different figures, whether or not either of the figures have highways.

Designations for Feed Lines and Interconnecting Leads

3.16 The feed lines in each group common to a particular highway are arbitrarily numbered from 1 to 99, inclusive. Not over 99 feed lines are served by one highway (see 3.04). The same number appears at both originating and terminating feed lines of a particular connection. This identification number is placed on the feed lines at a point nearest the highway.

3.17 In addition to the identification number, the color of the wire is also shown at each feed line, at a point between the highway and the piece of apparatus or the bracket. On certain power drawings, where colors are not used, some arbitrary designation is used instead.

3.18 Color codes are shown at each feed line or interconnecting lead. At points where the color code ordinarily would not be shown because of common figure arrangements, they are included in parentheses for soldering information. In general, where this occurs between figures on the same or different drawings, parentheses are omitted at the controlling end and included at the noncontrolling end of connections represented as feed lines and interconnecting leads.

3.19 Feed lines and interconnecting leads, when terminating in brackets, are given number or letter designations as required, in addition to such color and identification numbers which they may also include. This is necessary for the proper association of leads between figures on the same or different drawings. Such designations appear at the ends of these leads.

3.20 Information showing type and gauge of wire, pairing, shielding, etc., is shown at both ends of the individual feed lines and interconnecting leads. Cable conventions appear only at one end. "F" stitch designations are included on all wires of duplicate color (except for the first wire of the color), forming a

part of the group of wires normally leaving the cable at the same point, except where these similarly colored wires terminate on the same terminal, in which case "F" stitches are not required except when options are involved and then a change of color is preferred. "F" stitch designations are consecutively assigned F, F1, F2, etc., for each such group of wires and these designations are placed as near the apparatus as possible.

4. DETAILS OF AIRLINE SYSTEM

Apparatus Layout

4.01 The individual pieces of apparatus are arranged in rows approximating, as far as possible, the actual physical arrangement of the equipment as viewed from the wiring side.

4.02 The apparatus and wiring on a particular drawing are arranged in one or more figures, as required.

4.03 Terminal strip punchings are grouped in one location, where practicable, and not scattered over the drawings of a set.

Apparatus Conventions

4.04 All apparatus conventions, except those for 18- and 19-type resistances, keys, lamps, jacks, etc., are enclosed in rectangles in order that they may be easily distinguished from the feed lines.

Apparatus Designations

4.05 Each piece of apparatus is designated with an identification number. In general, these numbers are assigned consecutively from one up for the entire drawing, from left to right, and top down for each figure. Miscellaneous apparatus, such as cord fasteners, terminal punchings, etc., are not assigned individual identification numbers, but instead are arranged in groups and the extent of each group indicated by a bracket. Each bracketed group is considered as one piece of apparatus and given one identification number.

4.06 Where more than one wiring diagram is made from the same schematic, connections between apparatus on separate drawings of the set are made direct, from point to point without the use of brackets, through assignment of identification numbers to each drawing; for example: 1 to 99 assigned to the first drawing, 100-199 to the second drawing, etc. This same method is used between figures on the same drawing except in those instances where the bracket method is more feasible.

4.07 As a rule, each row of terminals (perpendicular to the fanning strip) of a terminal strip is regarded as a single piece of apparatus and given an identification number.

4.08 The identification number is usually placed to the left and above the piece of apparatus it identifies. For conditions such as where two numbers are needed to indicate which leads break out at two stitches, the second number may be placed at the right or in the center as convenience may dictate.

4.09 Identification numbers are purely arbitrary assignments intended for identification purposes only and have no connection with standard position numbers on mounting plates, jack strips, etc.

Base Lines

4.10 In the airline system, base lines are used for the termination of all feed lines. They are not used in the association of figures but serve merely to preserve the unity of a figure thereby simplifying the differentiation of one figure from another.

4.11 Relatively simple and small figures do not require a base line.

Feed Lines

4.12 Feed lines represent the individual wires (except straps) between terminals of apparatus within a figure or between figures when terminal strip punchings are not interposed. Feed lines of a particular figure terminating on terminal punchings forming a part of the same figure are understood to end at that point. A single connection is actually represented by two feed lines, one at the originating end and the other at the terminating end.

4.13 Feed lines are carried a sufficient distance from the apparatus terminals to permit of readily showing the colors and destinations along the lines before terminating at the base line at an angle of 90 degrees. Feed lines between figures start at the base line and are extended and bracketed or they are run to follow the typical airline pattern via base lines.

Straps, PT Leads, and Loop Leads

4.14 Straps and PT (pigtail) leads between terminals of the same or adjacent pieces of apparatus are not carried to the base line but instead are run direct. Loop leads are always carried to the base line and PT leads may be, if suitably designated.

Interconnecting Leads

4.15 Interconnecting leads represent the individual wires between two figures

whether or not either of the figures have base lines. They are also used for connections between the terminal punchings of different figures, whether or not either of the figures have base lines.

Designations for Feed Lines and Interconnecting Leads

4.16 Connections to other figures are made either by the medium of brackets or by direct reference to the terminating apparatus location number. Brackets grouping one or more feed lines for destination to another figure are assigned an identification number, the same as for a piece of apparatus (see 4.05). This establishes the terminating point for the particular connection or connections within that figure. Connections to other circuit drawings are shown in brackets.

4.17 The identification number of the apparatus or bracket where the wire terminates is shown on the feed line at the point where it joins the base line. Likewise, at the terminating end of a wire, the identification number of the apparatus or bracket where the wire originates is shown. These numbers are always shown nearest the base line.

4.18 Adjacent to and in line with the identification number, the color of the wire is also shown at each feed line. In certain cases where distinctive colors are not used, such as cable leads, some arbitrary designation is used instead, generally A, B, C, etc.

4.19 Colors are shown on each feed line or interconnecting lead and are enclosed in parenthesis on the noncontrolling end of those leads running between figures on the same drawing or different drawings.

4.20 When two or more similarly colored wires appear on the same piece of apparatus or would normally come from the same stitch, they are individually distinguished by "F" stitch designations. When two or more such wires terminate on the same terminal, "F" stitches are not used except when options are involved and then a change of color is preferred. "F" stitch designations are consecutively assigned (except for the first wire of the color) F, F1, F2, F3, etc., for each such group of wires, and these designations are placed as near the apparatus as possible.

4.21 Brackets grouping interconnecting leads do not include identification numbers but only information pertaining to the destination of the leads so grouped.

4.22 Feed lines and interconnecting leads, when terminating in brackets, are given number or letter designations as required, in addition to such color and apparatus identification numbers which they may also include. This is necessary for the proper association of leads between figures on the same or different drawings. Such designations appear at the ends of these wires.

4.23 Information showing type and gauge of wire, pairing, shieldings, etc., when necessary, is shown at both ends of the individual wires and interconnecting leads.

4.24 Cable conventions, or information showing type, gauge, pairing, shielding, etc., of wire run in lieu of cable, are shown only on the controlling end of the connection.

5. DETAILS OF SIMPLIFIED AIRLINE SYSTEM

5.01 The simplified airline system now generally in use is the same as described above for the airline system except for the features itemized herein.

Apparatus Layout

5.02 In most cases, the conventions for the individual pieces of apparatus are represented by rectangules, sometimes joined together in rows approximating, as far as possible, the actual physical arrangement of the equipment as viewed from the wiring side.

5.03 The apparatus and wiring on a particular drawing are arranged in one or more figures as required. The figures are, where possible, numbered to correspond, figure for figure, with the circuit schematic drawing. This is not always practicable and the agreement of figures should not be taken for granted.

5.04 Terminal strip punchings are grouped in one location, where practicable, and not scattered over the drawings of a set.

Apparatus Conventions

5.05 In general, apparatus conventions, except those for jacks, lamps, and keys, are shown as rectangles. Terminals are arranged within the rectangles in the order in which they appear on the apparatus viewed from the wiring side. Terminals are designated to agree with the schematic. In the case of relays with more than one stitch, the convention shows division lines, top and bottom, between the terminals in the left and right stitches.

5.06 The contacts and armatures of relays and the winding arrangement of relays, coils, rheostats, resistances, etc., are not shown.

Apparatus Designations

5.07 Apparatus identification numbers are placed within the rectangle of the apparatus convention where possible, and to the left and above singly-mounted or grouped apparatus when not enclosed within a rectangle. Apparatus location number for unequipped mounting positions shall be reserved to permit future additions. Show additional apparatus location numbers for each stitch with the apparatus convention if the apparatus is wired for more than one stitch. Each apparatus location will include all terminals within a stitch. In order to provide for the possible replacement of a "U," "Y," or similar-type relay by a different relay with a second stitch, reserve a second apparatus location number in each case where a single number is assigned.

5.08 In addition to the identification number, the functional designation and apparatus code number are shown for each piece of apparatus within the rectangle of the apparatus convention. In other cases, these designations are shown close to the apparatus convention.

Feed Lines

5.09 All wires terminating at one apparatus terminal are represented by one feed line. In such cases, colors of all wires represented by the feed lines together with their terminations, "F" stitch designations, etc., are indicated on the feed line. If congestion results from attempting to show complete information on one feed line, additional feed lines are used whose only function is to relieve congestion and eliminate confusion. An example of such a condition is shown on the typical simplified airline wiring diagram at the rear of this section.

Straps, PT Leads, and Loop Leads

5.10 Straps and PT (pigtail) leads between terminals of the same or adjacent pieces of apparatus are not carried to the base line but instead are run direct, often within the rectangles. Loop leads are always carried to the base line and PT leads may be, if suitably designated.

Designations for Feed Lines

5.11 The identification number of the apparatus or bracket where a lead terminates is shown on a feed line where it joins the base line. Likewise, at the terminating end of a wire, the identification number of the apparatus where the wire originates is shown. These numbers are always shown nearest the base line. Where more than one wire is represented by a single feed line, the identification numbers for all the wires represented by the line are shown thereon.

5.12 Adjacent to and in line with the identification number, the color of the wire is also shown on each feed line. Where more than one wire is represented by one feed line, the identification number nearest the base line is associated with the color nearest the base line, etc. In some cases where distinctive colors are not used, some arbitrary designation is used instead, for example, 6A, 6B, etc.

5.13 When two or more similarly colored wires appear on the same piece of apparatus or would normally come from the same stitch, they are distinguished by "F" stitch designations. Where two or more such wires terminate on the same terminal, the "F" stitches are not used, except in cases where optional wiring is involved and then a change of color is preferred. "F" stitch designations are consecutively assigned (except for the first wire of the color) F, F1, F2, etc., for each group of wires and these designations are placed on the feed line apart from the color and as near as possible to the apparatus. When several wires of the same color are represented by one feed line, a numerical figure representing the number of wires precedes the color designation.

5.14 Information showing the gauge of wire, pairing, shielding, etc., when necessary, is shown at both ends of the wires at the color designation.

5.15 Cable conventions, or information showing type, gauge, pairing, shielding, etc., of wire run in lieu of cable, are shown only on the controlling end of the connection.

5.16 Where "D" wiring is involved, the "D" leads are designated D, D1, D2, or D3, as required, on the airline diagram. However, a separate view will usually be shown for D2 wiring to indicate the position in which the leads are actually wired, as covered on the typical drawing attached.

Surface Wiring

5.17 If all wiring on a unit is surface wiring, it is shown the same as for the simplified airline diagram, except as follows:

(a) The base line may be drawn either inside or outside of the apparatus convention.

(b) Since surface wiring restricts the color used, letters A, B, C, etc., are used on the wiring diagram with the connecting apparatus location number to distinguish between leads where two or more leads run to the same piece of apparatus.

A manufacturing note on the drawing indicates when wiring is surface wiring.

5.18 Where both surface wiring and local cable or switchboard cable are used on the same unit, an additional base line is drawn for the surface wiring and the feed lines run to it, using letter designations as described above to distinguish between the leads. This base line is designated "SW" or "SW1" and may be located either inside or outside of the apparatus convention. A manufacturing note will explain that leads to base lines designated "SW" or "SW1" are surface wiring. See attached illustrations.

5.19 If surface wiring leads are a small percentage of the total, the surface wiring leads are shown the same as the other leads on a simplified airline wiring diagram except that they are designated "SW" or "SW1" and are distinguished from each other by letter designations as described above. A manufacturing note will explain that leads so designated are surface wiring.

6. DETAILS OF MANUFACTURING SCHEMATIC SYSTEM

6.01 In this system, the schematic conventions and terminal numbering for apparatus are used. Optional apparatus and wiring are shown schematically except that the letter designating the option is enclosed in a double circle.

6.02 The full line system of showing wiring is used and the sequence of connecting terminals and doubling-up points is shown by means of arrows as indicated in the attached typical wiring diagram for this system.

REASONS FOR REISSUE

1. This section has been completely rearranged. In specific reasons for reissue, reference is made to paragraphs and corresponding subject matter and figures as arranged in this issue.

2. Paragraph 1.01 to 1.05 were expanded to cover the simplified airline system and the manufacturing schematic system.

3. The "original" method was changed to read "full line" method.

4. In paragraph 2.03, the last sentence was added.

5. Paragraphs 2.04 to 2.06 were added.

6. Paragraph 3.20 was expanded to cover the condition where options are involved.

7. Old paragraphs 4.22 to 4.26 (covered in issue 1) covering the method of tracing connections were omitted since this information is adequately covered in part 3 of this section.

8. Paragraphs 4.03 and 4.06 were added.

9. Paragraph 4.08 was expanded to cover the condition where a piece of apparatus has two local cable stitches.

10. Paragraph 4.10 was rewritten in much simpler form.

11. Paragraph 4.14 was expanded to cover PT (pigtail) leads and loop leads.

12. In paragraph 4.16, the first and last sentences were added.

13. Paragraph 4.19 was rewritten in order to state the condition more clearly.

14. Paragraph 4.20 was expanded to cover the condition where options are involved, and the last sentence was deleted.

15. In paragraph 4.23, all except the first sentence was deleted.

16. Paragraph 4.24 was added.

17. Old paragraphs 3.23 to 3.26 (covered in issue 1) covering the method of tracing connections were omitted since this information is adequately covered in part 4 of this section.

18. Part 5, which includes paragraphs 5.01 to 5.19, and part 6, which includes paragraphs 6.01 and 6.02, were added.

19. The attached typical airline wiring diagram was redrawn to cover the system more clearly.

20. The attached simplified airline wiring diagram, the typical surface wiring diagram, the typical planned wiring diagram, and the typical manufacturing schematic wiring diagram were added.

Bell Telephone Laboratories, Inc.

Attached: Typical Highway Wiring Diagram
Typical Airline Wiring Diagram
Typical Airline Wiring Diagram - Simplified Form
Typical Surface Wiring Diagram
Typical Planned Wiring Diagram
Typical Manufacturing Schematic Wiring Diagram

TYPICAL HIGHWAY WIRING DIAGRAM

FIG. 1

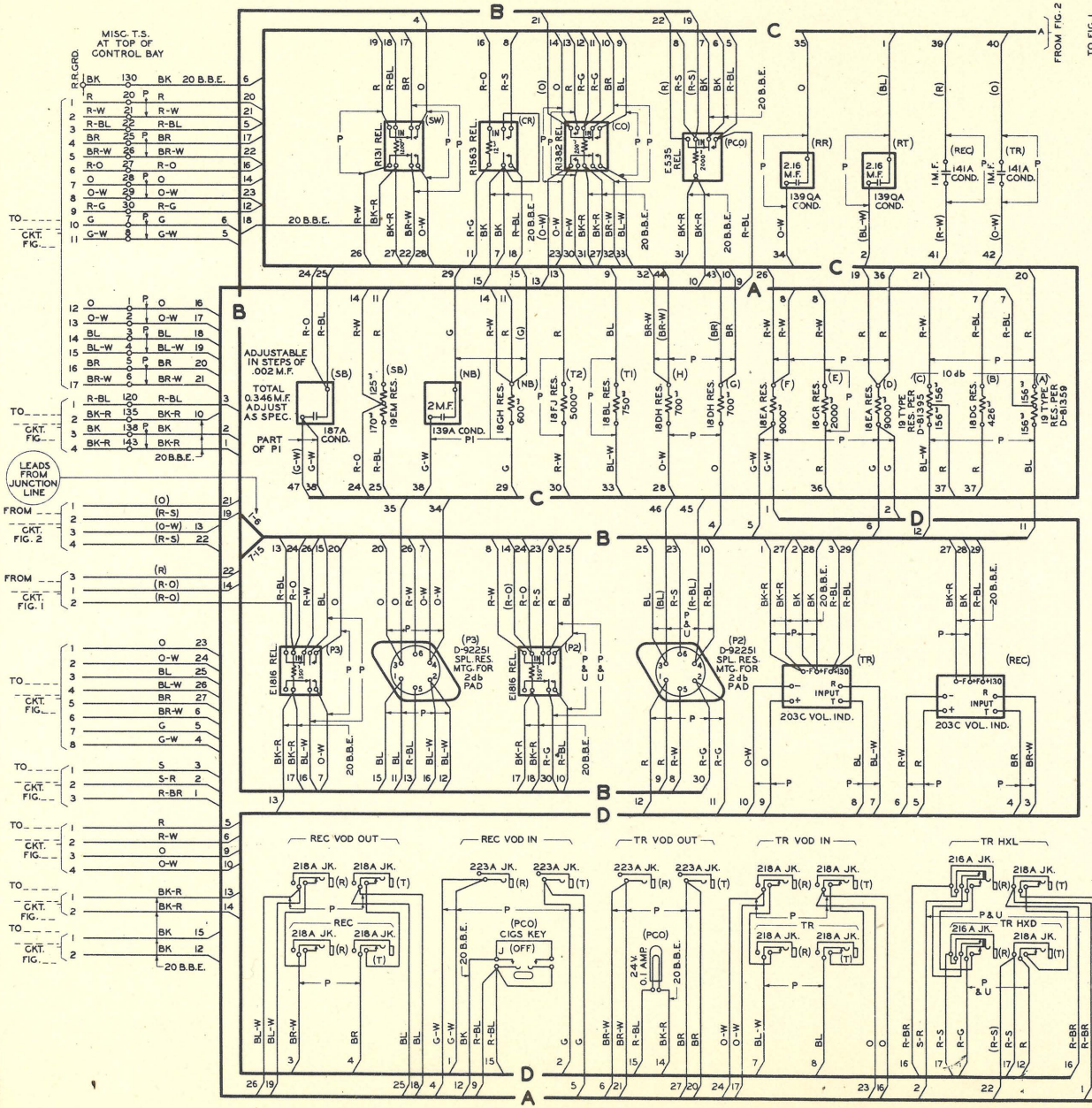
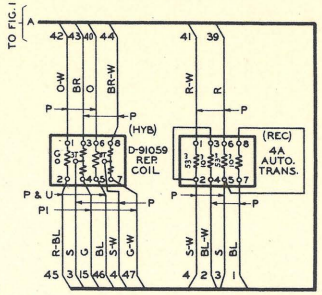
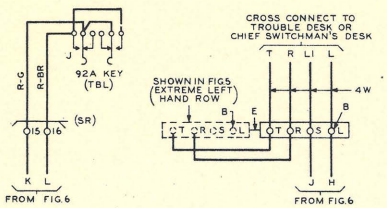


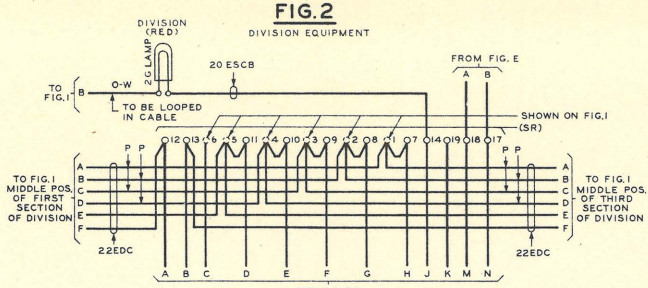
FIG. 2
APPARATUS WIRED FROM FRONT OF BAY

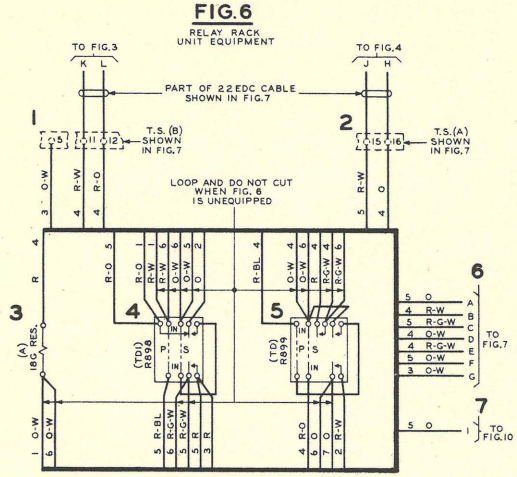


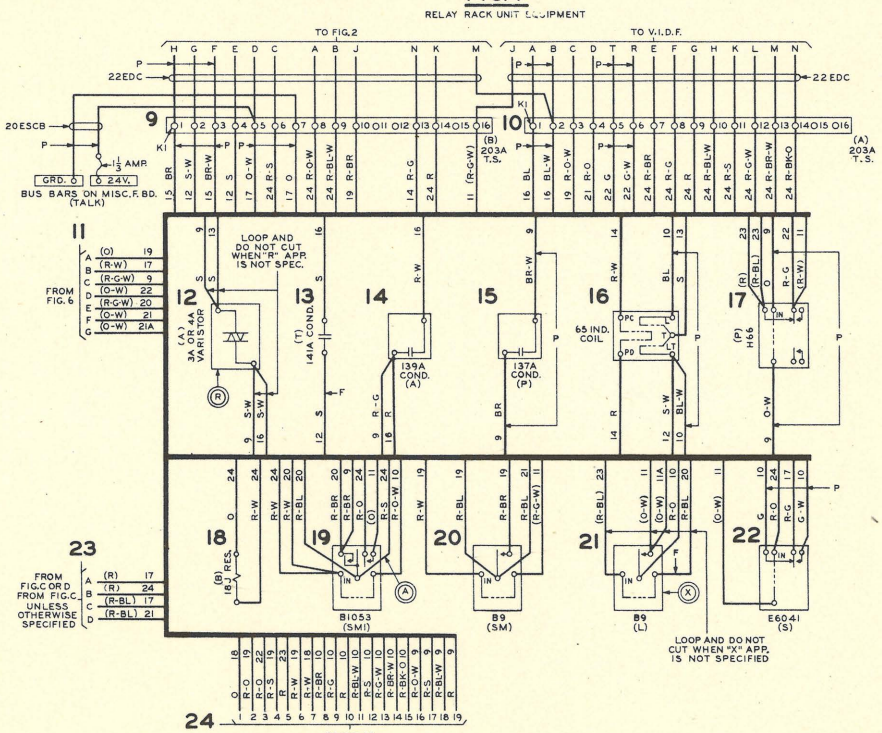
2	27	30	47	17
DWG. ISS.	A	B	C	D
	HIGHEST NO. USED ON HIGHWAY			

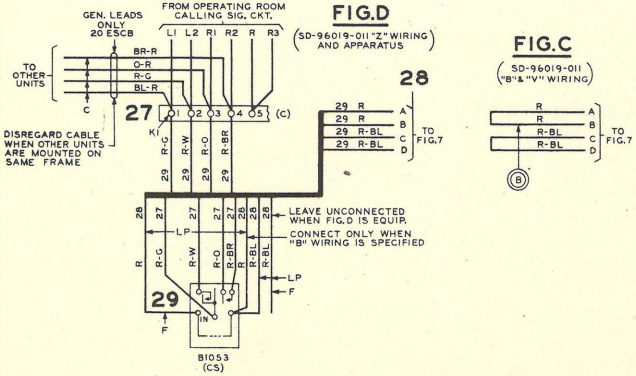
TYPICAL AIRLINE WIRING DIAGRAM

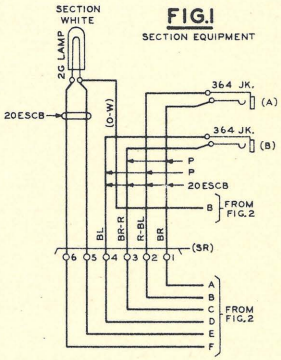


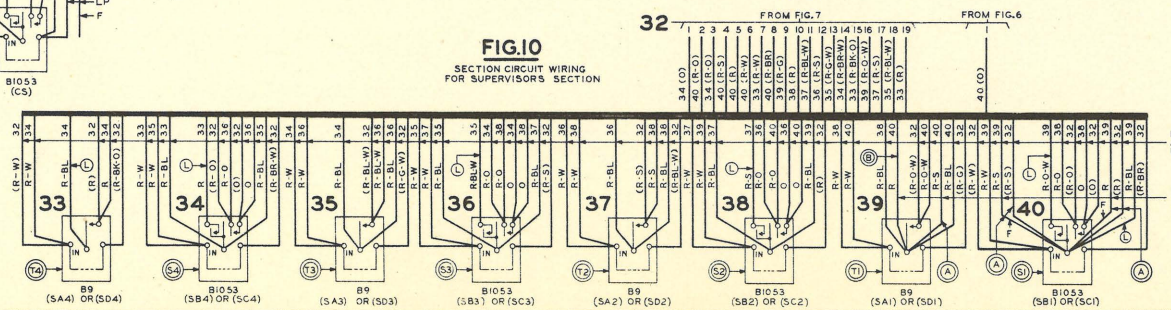


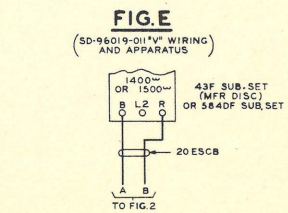












MANUFACTURING NOTES

CONVENTIONS

DENOTES CABLE

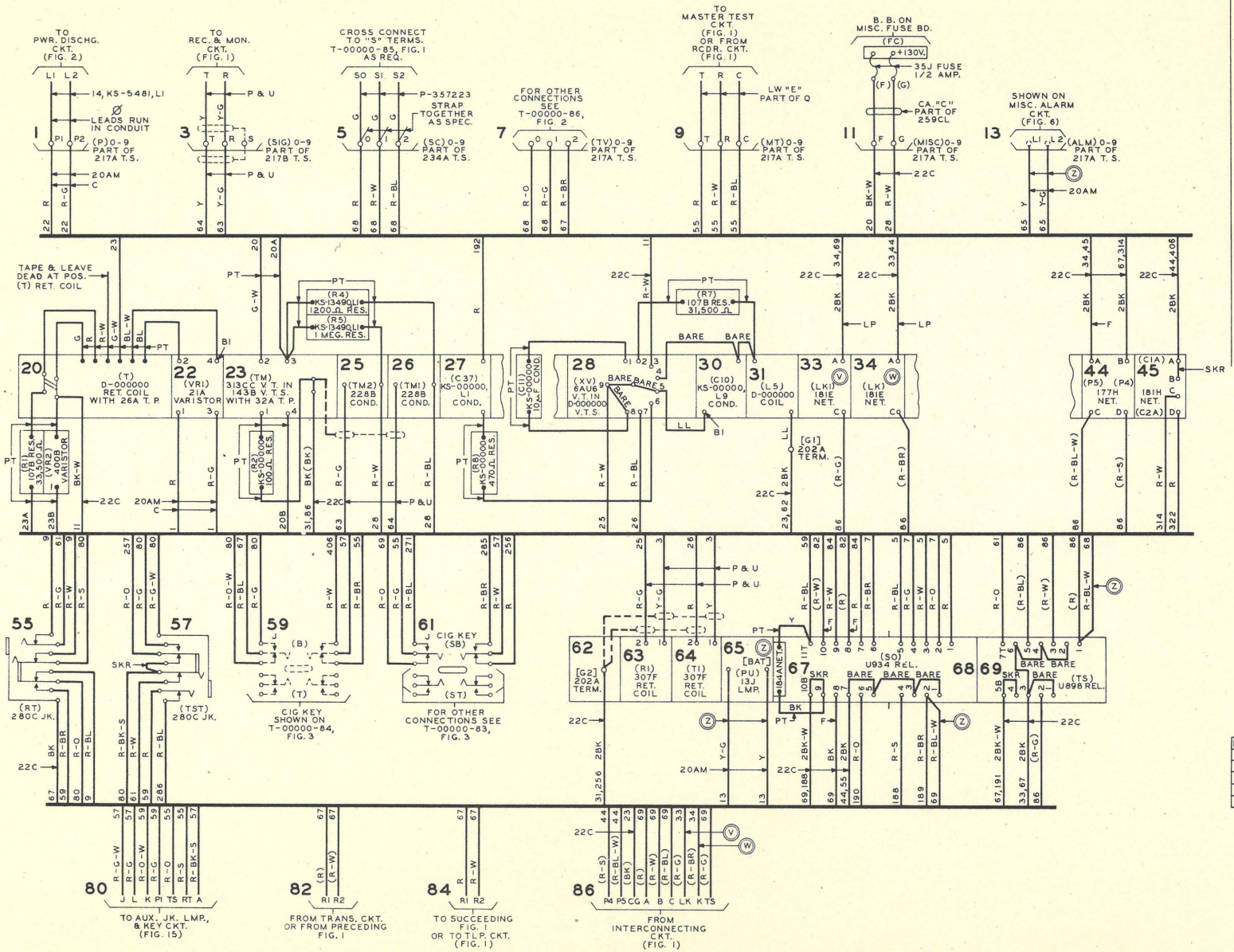
1. WIRES NOT OTHERWISE SPECIFIED SHALL BE 22 DCL.
2. "P" DENOTES PAIR.
3. "F" BRING FROM CABLE FORM AT SEPARATE STITCH.
4. "B" TERMINAL PUNCHING NEAREST BASE OF TERMINAL STRIP.
5. "E" DENOTES ADJACENT ROWS OF PUNCHINGS.
6. "LP" LOOP AND DO NOT CUT WHEN POSITION IS WIRED ONLY.
7. "KI" DENOTES TOP OR LEFT TERMINAL ON STRIP.
8. "J" TOP OR LEFT SIDE OF KEY LOOKING AT TERMINAL SIDE.
9. "4W" DENOTES FOUR CONDUCTOR JUMPER WIRE.
10. (L) DENOTES LIVE LEADS TO BE INSULATED WHEN NOT CONNECTED AS FOLLOWS:

FIG.	APPARATUS	COLOR	FIG.	APPARATUS	COLOR
10	(SB1) OR (SC1)	R-BL	10	(SB3) OR (SC3)	R-BL-W
10	(SB1) OR (SC1)	R-O-W	10	(SB4) OR (SC4)	R
10	(SB2) OR (SC2)	R-S	10	(SA4) OR (SD4)	R-BL

11. "C" WIRING IN SEPARATE CABLE FORM SEWED TO OUTSIDE OF REGULAR CABLE FORM FOR ELECTRICAL REASONS.

TYPICAL AIRLINE WIRING DIAGRAM SIMPLIFIED FORM

FIG. 1
FRAME CKT.



MANUFACTURING NOTES

CONVENTIONS
DENOTES CABLE
DENOTES SHIELD CONNECTION

1. WIRES NOT OTHERWISE SPEC. TO BE 24C.
2. "BI" TERMINAL NEAREST MTG. PLATE.
3. "C" WIRING TO BE SEPARATE CABLE SEWED TO OUTSIDE OF REGULAR CABLE.
4. DESIGNATIONS IN BRACKETS [ ] ARE FOR WIRING INFORMATION ONLY.
5. "F" BRING FROM CABLE FORM AT SEPARATE STITCH.
6. INSULATE ALL UNCONNECTED LEADS.
7. "J" TOP END OF KEY LOOKING AT TERMINAL SIDE.
8. LEADS DESIGNATED Ø TO BE RUN BY THE INSTALLER.
9. "LL" DENOTES TERMINALS OF ADJACENT APPARATUS SOLDERED TOGETHER. ALL TERMINAL TO TERMINAL CONNECTIONS SHALL BE WRAPPED WITH APPROXIMATELY 2 TURNS OF 24 GAUGE BARE TINNED COPPER WIRE BEFORE SOLDERING.
10. "LP" LEADS TO BE LOOPED AT POSITION OF APPARATUS WHEN UNEQUIPPED.
11. "LW" DENOTES WIRE RUN LOOSE ON FRAME SAME AS SWITCHBOARD CABLE AND SHALL BE 20AM UNLESS OTHERWISE SPECIFIED.
12. "P" DENOTES PAIR.
13. "PT" DENOTES LEADS PART OF APPARATUS.
14. "Q" DENOTES QUADRUPLE.
15. "U" DENOTES 22P SHIELDED WIRE.
16. "SKR" DENOTES SKINNER CONNECTION.

APPARATUS LOCATION

DRAWING NUMBER		LOCATION NUMBER
	-80	1-99
	-81	100-199
T-00000-	-82	200-299
	-83	300-399
	-84	400-499

TYPICAL SURFACE WIRING DRAWING

FIG. 1

SURFACE WIRING ONLY

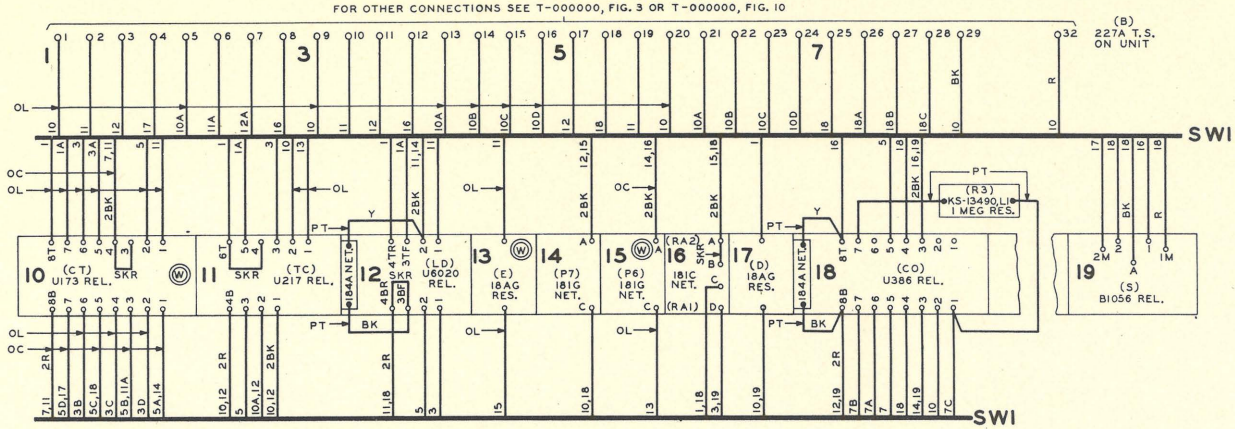
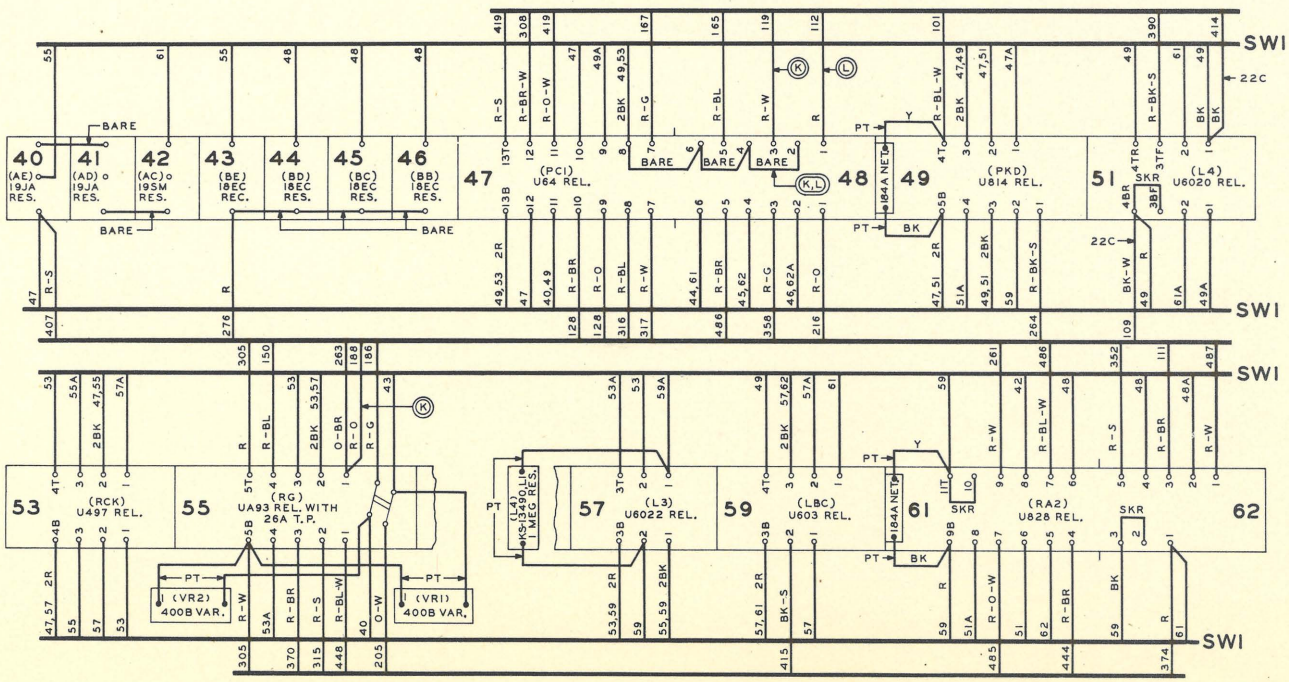


FIG. 2

SURFACE WIRING COMBINED WITH LOCAL CABLE WIRING



MANUFACTURING NOTES

1. WIRES NOT OTHERWISE SPECIFIED TO BE 24C.
2. "SWI" WIRING TO BE 24BG WIRE COLORED GREEN UNLESS OTHERWISE SPECIFIED, NOT TO BE SEWED INTO CABLE FORM BUT RUN LOOSE AND DRESSED BACK AGAINST THE MOUNTING PLATE IN THE MOST CONVENIENT MANNER.
3. "SKR" DENOTES SKINNER CONNECTION.
4. "PT" DENOTES LEADS PART OF APPARATUS.
5. "OC" DENOTES OMIT CONNECTION AND CONSIDER AS A CONTINUOUS LEAD WHEN ASSOCIATED APPARATUS IS NOT FURNISHED.
6. "OL" DENOTES OMIT LEAD UNLESS CONNECTION FOR BOTH ENDS IS PROVIDED.
7. NO LEADS ON THIS DRAWING TO BE RUN BY THE INSTALLER.

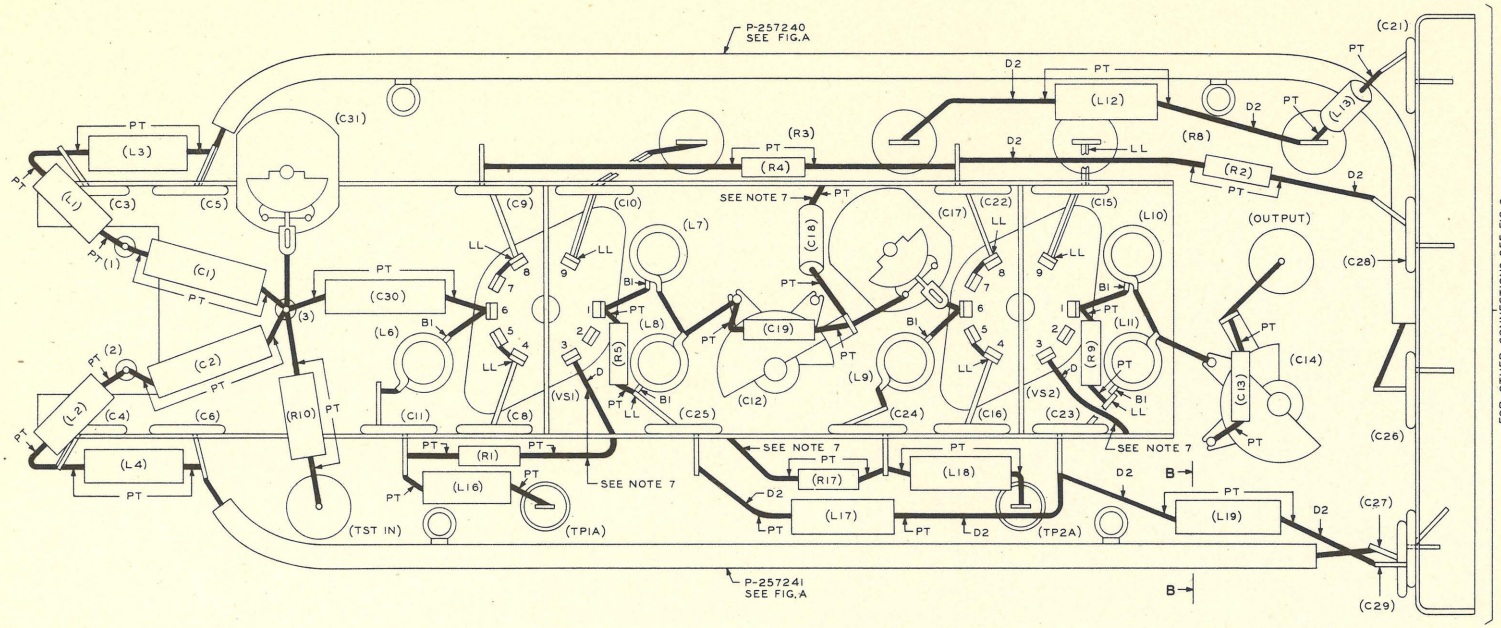
APPARATUS LOCATION

DRAWING NUMBER		LOCATION NUMBER
T-00000-	-80	1-99
	-81	100-199
	-82	200-299
	-83	300-399
	-84	400-499

TYPICAL PLANNED WIRING DRAWING

FIG. 1

I.F. PREAMPLIFIER
PLANNED WIRING FOR T-00000-80



MANUFACTURING NOTES

1. ALL WIRING TO BE "DI" WIRING 20 GAUGE BARE TINNED COPPER WIRE UNLESS OTHERWISE SPECIFIED AND RUN DIRECT FROM TERMINAL TO TERMINAL IN THE SHORTEST MANNER POSSIBLE.
2. "D" LEADS TO BE 16 GAUGE SOLID WIRE PER KS-13385 COLORED BLACK UNLESS OTHERWISE SPECIFIED, RUN PARALLEL AND PERPENDICULAR TO THE PLANE AND EDGES OF THE PANEL IN THE SHORTEST MANNER POSSIBLE.
3. "D2" SHALL BE DRESSED BACK AGAINST THE PANEL AND RUN APPROXIMATELY IN PATHS AND LOCATIONS AS SHOWN.
4. "PT" DENOTES LEADS PART OF APPARATUS.
5. "LL" DENOTES TERMINALS OF ADJACENT APPARATUS SOLDERED TOGETHER. ALL TERMINAL TO TERMINAL CONNECTIONS SHALL BE WRAPPED WITH APPROXIMATELY 2 TURNS OF 24 GAUGE BARE TINNED COPPER WIRE BEFORE SOLDERING.
6. "BI" DENOTES TERMINAL NEAREST PANEL OR CHASSIS.
7. LEADS SHOWN TERMINATED IN MOUNTING BRACKET SHALL BE INSERTED IN HOLES AND SOLDERED.
8. NO LEADS ON THIS DRAWING ARE TO BE RUN BY THE INSTALLER.
9. DESIGNATIONS IN BRACKETS [ ] ARE FOR WIRING PURPOSES ONLY.
10. RESISTORS OR CAPACITORS MOUNTED BY THEIR LEAD-IN WIRES SHALL BE LOCATED AS NEARLY AS POSSIBLE IN A LINE BETWEEN TERMINALS TO WHICH THEY CONNECT. CONNECTIONS SHALL BE MADE AS CLOSE AS POSSIBLE TO THE RESISTOR OR CAPACITY BODY, BEING CAREFUL TO USE MINIMUM HEAT NECESSARY FOR A GOOD JOINT.

FIG. 2

POWER TRANS.
DIRECT WIRING PLAN

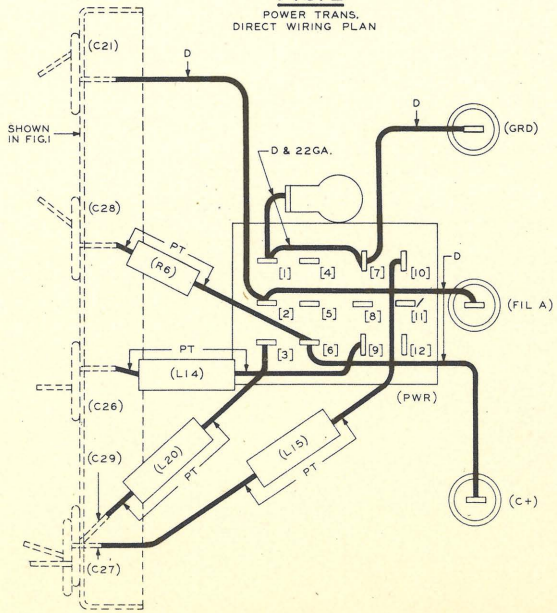
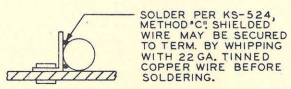
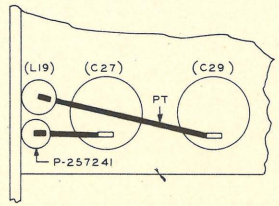


FIG. A

METHOD OF SECURING SHIELDED WIRE TO GROUND TERMINALS

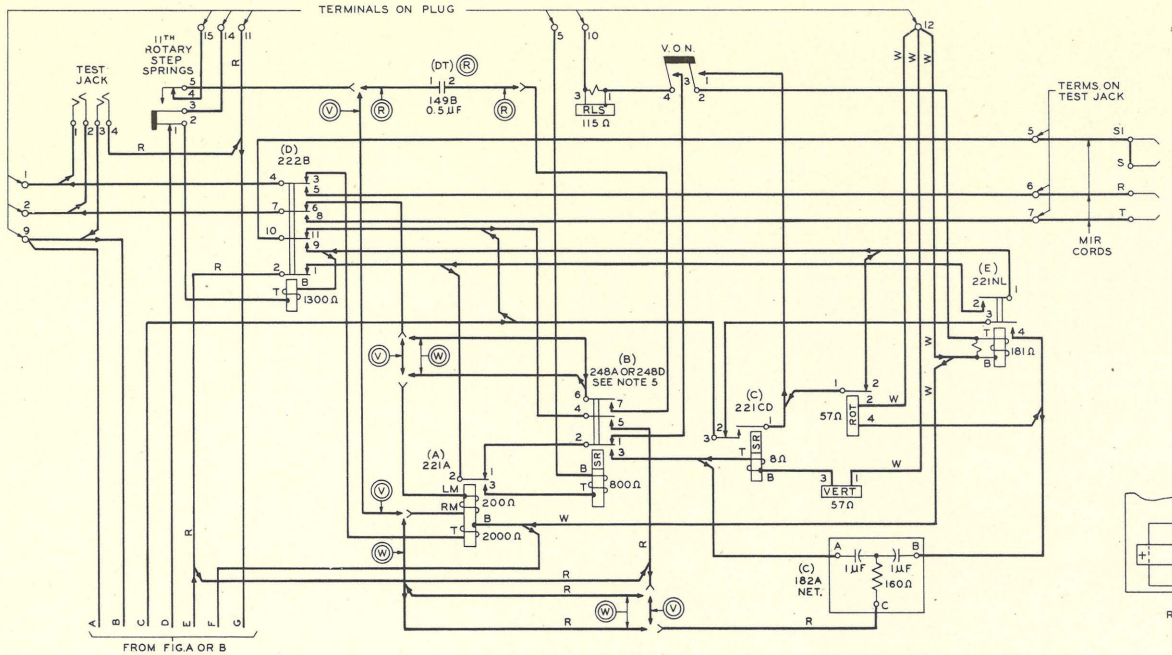


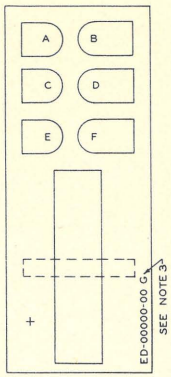
SECT. B-B



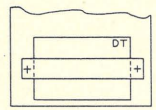
TYPICAL MANUFACTURING SCHEMATIC WIRING DIAGRAM

FIG. 1
SELECTOR CKT.

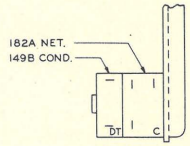




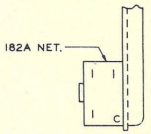
SK. A



REAR COVER
SK. B



END VIEW OF REAR COVER
SK. C



END VIEW OF REAR COVER
SK. D

MANUFACTURING NOTES:

1. ALL WIRING TO BE 24BG COLORED GREEN UNLESS OTHERWISE SPECIFIED, RUN AS SURFACE WIRING.
2. NO LEADS ON THIS DRAWING ARE TO BE RUN BY INSTALLER.
3. THE GROUP NUMBER OF THE SWITCH ORDERED SHALL BE STAMPED ON THE APPARATUS MOUNTING PLATE.
4. WHEN LOCAL CABLES ARE USED FOR LEADS PASSING THRU MTG. PLATE, THE ASSOCIATED LOCAL CABLE DRAWING IS ED-00000-01.
5. TERMINALS 6 & 7 (B) RELAY ARE PART OF THE 248D RELAY ONLY.
6. THE GROUP NUMBER AT THE TOP OF THE STOCKLIST GROUP COLUMN, APPLIES TO ALL ITEMS FOR WHICH GROUP DESIGNATIONS ARE NOT SHOWN.

FIG. A

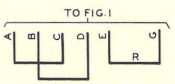
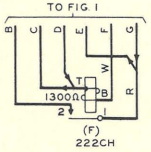


FIG. B



WIRING DIAGRAM-SCHEMATIC CROSS-REFERENCE TABLE ( ) ITEMS IN PARENTHESES ARE FOR INFORMATION ONLY											
T-00000-00			SCHEMATIC				IF OFF RECORDS DO NOT SPEC. W.D. OPTION	THIS OPTION WAS FURNISHED		REMARKS
FIG.	WRG.	APP.	SD-DRAWING	FIG.	WRG.	APP.		W.D.	SCHEM.	
1	V		SD-00000-01	1	K,N,V	V				
	(R) (W)	(R)		NOT SHOWN						NO. EQUIV. SD OPTION
(A)				(1)						
1	R W	R	SD-00000-02	1	J,N,Q	H,Q				
	(V)			NOT SHOWN						NO. EQUIV. SD OPTION
(A)				(1)						
1	V		SD-00000-03	1	V	V,M,P Q,S				
	(R) (W)	(R)		NOT SHOWN						NO EQUIV. SD OPTION
(B)				(1)						
SEE BANK & JACK WIRING DRAWINGS FOR ADDITIONAL OPTIONS										

GRP. 5,6,8	QUAN. PER GRP.	CODE	DESCRIPTION	NOTE	LINE
	1	985D	MTG. PLT. EQPD. WITH SK.A		1
	1	110A	COVER SK.B		
	1	221A	REL. POS. 1		
5,8	1	248A	REL. POS. 2		
6	1	248D	REL. POS. 2		5
	1	221CD	REL. POS. 3		
	1	222B	REL. POS. 4		
	1	221NL	REL. POS. 5 SK.A		
	1	222CH	REL. POS. 6		
	1	197A	SWITCH IN POS. 8 WITH		10
	1	MIR	CORD 4" LONG (UPPER)		
	2	MIR	CORD 43/4" LONG (LOWER)		
	1	242A	PLUG POS. 9		
6	1	149B	COND. SK.B,C		
	1	182A	NETWORK SK.C,D		15
					20

RATING	GRP.	EQUIPMENT	NO	CKT. FIG. WIRED & EQUIP.
	8	WIRING & EQPT. FOR ONE LOCAL SEL. SW. ARRANGED FOR SLEEVE REPEATING FOR NO.1 OR 350A OFFICE	1	T-00000-00 FIG. 1 & B "V" WIRING
A&M ONLY	6	WIRING & EQPT. FOR ONE INCOMING SEL. SW. FOR 360A OFFICE WHEN IT IS REQUIRED TO RETURN DIAL TONE TO OPRS.	1	T-00000-00 FIG. 1 & A "W" & "R" WIRING "R" APPARATUS
	5	WIRING & EQPT. FOR ONE LOCAL SEL. SW. FOR NO.1, 350A OR 360A OFFICE INC. SEL. SW. FOR NO.1 OR 350A OFFICE OR INC. SEL. SW. FOR 360A OFFICE WHEN IT IS NOT REQUIRED TO RETURN DIAL TONE TO OPR.	1	T-00000-00 FIG. 1 & A "V" WIRING

TABLE A

LINE	NAME	SCHEMATIC	NUMBER	FIG.	OPT. WIRING	WIRED	NOTES	REMARKS
4								
1	SELECTOR CIRCUIT	SD-00000-01 SD-00000-02 SD-00000-03	T-00000-00	AS SPECIFIED IN TABLE "A"				
	CIRCUITS							

SURFACE WIRING PROVIDED

II	INFORMATION DRAWING SHOWING NUMBERING AND DESIGNATIONS OF APPARATUS TERMINALS	ES-000000			
=	SURFACE WIRING RUNNING LIST	ED-00000-01	MIR CORDS DRESSING AND ATTACHING		ED-00000-01
	NAME	NUMBER	NAME		NUMBER

DRAWINGS DESIGNATED = WILL NOT BE REQUIRED BY INSTALLER
LIST OF ASSOCIATED DRAWINGS