

SPECIFICATION FOR THE EXPANSION
OF CX-60 TYPE SWITCHBOARDS

0.0 GENERAL

Due to demands for a method of expanding CX-60 type switchboards beyond their planned capacity of 60 lines, these specifications are presented as a method of extending these equipments to an ultimate capacity of 90 lines.

CX-60 type switchboards are normally arranged for an ultimate capacity of 60 lines and 6 links. These equipments are normally contained in one three foot switchboard cabinet, and link expansion can be made by adding one three foot cabinet for every six additional links to be equipped.

It is intended that any expansion as covered by this specification may be made to an existing CX-60 first unit, or with any CX-60 for which additional link units have already been supplied.

Each link of a CX-60 has a multiple of 60 lines of access. In order to expand the capacity of these switchboards to an ultimate of 90 lines, it is deemed advisable to extend the line finder-connector access to a full 90 points.

This method of expansion is intended for use where the original 60 lines is only expected to grow to an ultimate of 90 lines. If the anticipated growth will exceed this figure at any time during the life of the equipment, this method should not be used.

The following specification is a summary of the plan proposed.

1.0 Additional Equipment

- 1.1 One additional unit will be required. This unit will be a 1' x 3' cabinet 6'9" high. It will provide for the following equipment: (Equipment layout per CE-20-47)
 - 1.11 Miscellaneous equipment, including fusing, ringing lamps, link busy jacks, and guard equipments for this unit will be mounted on this frame.
 - 1.12 Thirty line equipments (line, lockout, and cutoff relays) can be provided as a part of this unit.
 - 1.13 Mounting space for an ultimate of four links is provided for in this unit. These links will each have a finder multiple and a connector multiple arranged for 90 lines.
 - 1.14 Multiples for increasing to 90 lines the link access of the original 6 links of the CX-60 will be found in this cabinet.
- 1.2 If the original installation is provided with links in excess of 6, it will be considered advisable to use space available in the additional link unit, for the expansion of the multiple of these links.

2.0 Power Equipment

- 2.1 Since the increased equipment quantities will require the increasing of power facilities, it is suggested that the following procedure be followed:
- 2.11 Charger requirements should be reviewed in the light of increased equipment quantities; and the addition of auxiliary charger units, or replacement of existing units should be made as necessary.
- 2.12 Any required increases in ammeter and power wire sizes should be made as required.

3.0 Numbering Arrangement

- 3.1 The standard CX-60 has a numbering arrangement as follows:

First Digit

- 1 - Vacant-Reset
- 2 - Code Selection digit first group of 10 parties
- 3 - Code Selection digit second group of 10 parties
- 4 -)
- 5 -) Reserved for trunk selection codes as required
- 6 - Busy verification access
- 7 -)
- 8 -)
- 9 -) Reserved for trunk selection codes as required
- 0 -)

Second, third and fourth digits are tens, units, and party selection digits respectively. Second digits 2, 3, 4, 5, 6 and 7 are normally employed for selection of tens groups 20 through 70.

The above arrangement is made on the basis of twenty party service, if ten party ringing is used, first digit "3" is classed as vacant reset. Deviations from this, which do not afford conflictions, are of course possible; and are to be found where local traffic practice demands.

- 3.2 It is proposed in the presentation of this expansion arrangement to allow the following standard digit assignment.

First Digit

There will be no alteration in first digit numbering assignment caused by this expansion.

Second, third and fourth digits are tens, units, and party selection digits respectively. Second digits 2, 3, 4, 5, 6, 7, 8, 9 and 0 will be employed for selection of tens groups 20 through 00.

The above arrangement is made on the basis of twenty party service for all lines. If ten party ringing is used throughout, first digit "3" is classed as vacant reset. Deviations from this numbering scheme, which do not afford conflictions are, of course, possible; and may be used where local traffic practice demands.

4.0 Traffic

4.1 This addition as proposed provides an ultimate 90 line access of both finder and connector to all links.

4.11 Since a four link addition is provided as an ultimate on this additional unit, and due to the full access arrangement of all links, the following is suggested as additional link quantities if existing traffic equivalents are to be approximated.

<u>No. of Links on Existing 60 Line Switchboard</u>	<u>Number of Lines Added in New Line Group</u>	<u>No. of Links in New Unit</u>
5	10	1
5	20	1
5	30	2
6	10	1
6	20	1
6	30	2
7	10	1
7	20	1
7	30	2
8	10	1
8	20	2
8	30	2
9	10	1
9	20	2
9	30	3
10	10	1
10	20	2
10	30	3
11	10	1
11	20	2
11	30	3
12	10	2
12	20	3
12	30	4

5.0 Comments

5.1 The preceding specifications are based on ultimate figures, but it will be possible to add any part of the above equipment which will provide for a completely operating switchboard.

6.0 Drawings

6.1 As a part of these specifications, the following drawings are being supplied:

- (a) C.E.-20-47 Tentative Layout Additional Unit
- (b) C.E.-21-47 Trunking Arrangement
- (c) C.E.-22-47 Typical Floor Plan
- (d) C.E.-23-47 Layout Additional Multiple Links 7-12

August 13, 1947
JCB:mm

MISC. (SECTION 1.11)	F80		LINK	EXTENSION			
	C80						
	F90						
	C90						
	F00						
	C00						
LINE EQUIP (SECTION 1.12)	MISC. (SECTION 1.11)						
	LINK CONTROL		(SECTION 1.13)				
	LINK-1					LINK-4	
F80	F80						
C80	C80	S					
F90	F90	F1	F5				
C90	C90	F6	F0				
F00	F00	C1	C5				
C00	C00	C6	C0				
LINK-2 (SECTION 1.14)	LINK-5	F20					
		C20					
		F30					
		C30					
		F40					
		C40					
LINK-3	LINK-6	F50					
		C50					
		F60					
		C60					
		F70					
		C70					
LINK0+1		0+2	0+3	0+4			

LINK 0+1

0+2

0+3

0+4

CX-60 EXPANSION
UNIT

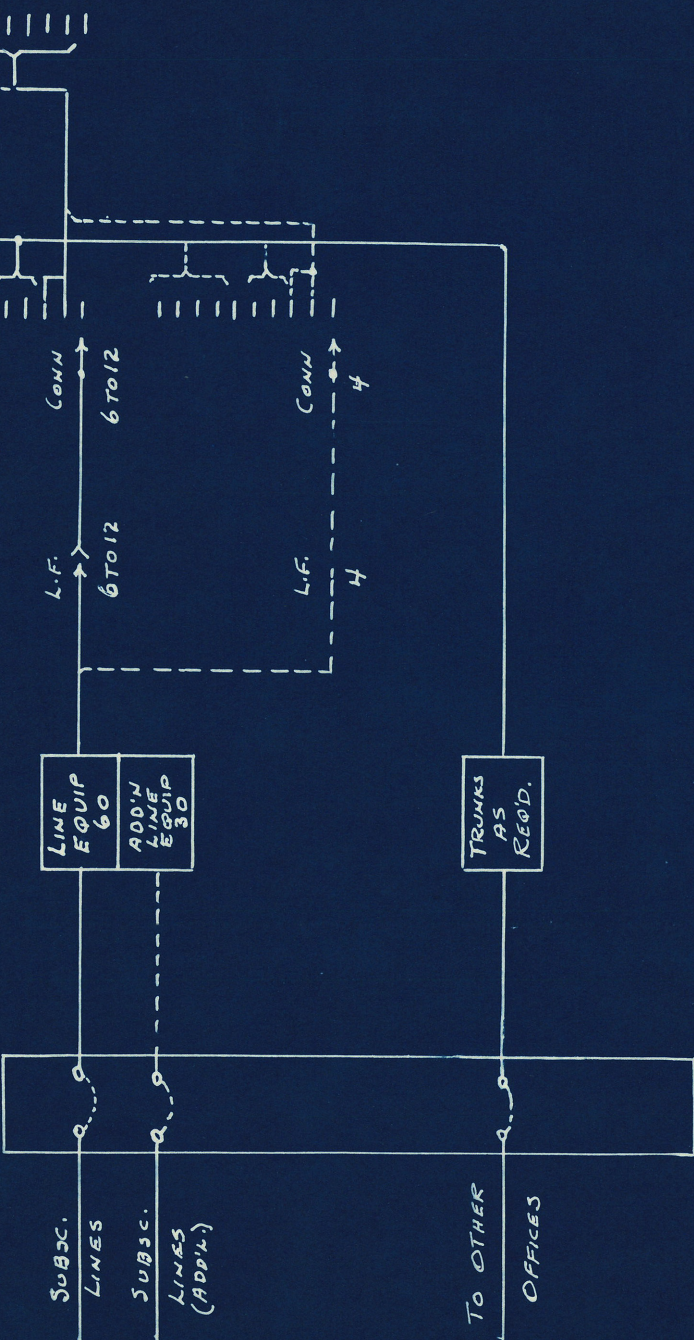
C.E. 20-47

8/8/47

J. H. S.

FIRST DIGIT

2ND DIGIT

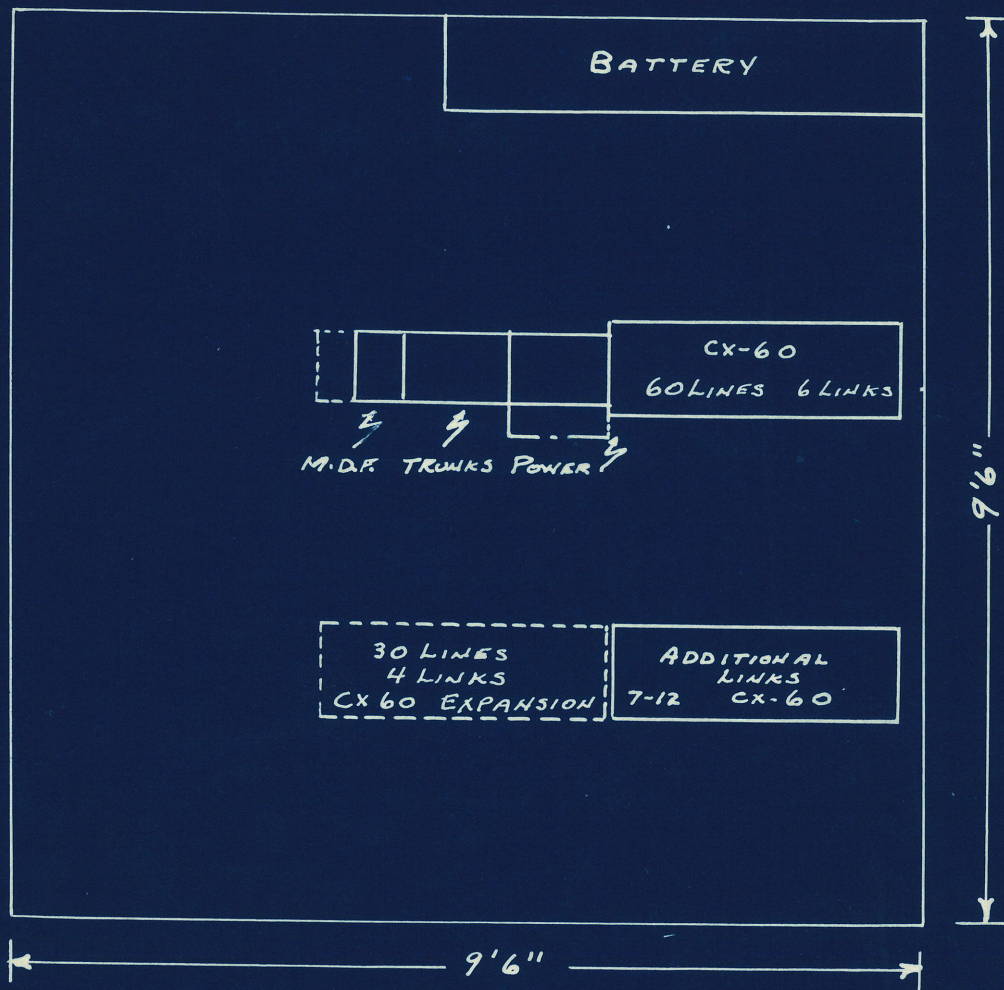


TRUNKING ARRANGEMENT
CX-60 EXPANSION

C.F 21-47

8/8/47

J. G. B.



CX-60 EXPANSION
TYPICAL FLOOR PLAN

C.E. 22-47

J.M.B. 8/8/47

SPECIFICATION FOR THE EXPANSION
OF CX-100 TYPE SWITCHBOARDS

0.0 GENERAL

Due to demands for a method of expanding CX-100 type switchboards beyond their planned capacity of 100 lines, these specifications are presented as a method of extending these equipments to an ultimate capacity of 150 lines.

CX-100 type switchboards are normally arranged for an ultimate capacity of 100 lines and 10 links. These equipments are normally contained in one six foot switchboard cabinet, and link expansion can be made by adding one three foot cabinet for every six links to be equipped.

Each link of a CX-100 has a multiple of 100 lines of access. In order to expand the capacity of these switchboards to an ultimate of 150 lines, it is deemed advisable to extend only the connector access to a full 150 points, and to introduce a new group of line-finder connectors with a 50 point finder access, and connector access of 150 points.

This method of expansion is intended for use where the original 100 lines is only expected to grow to an ultimate of 150 lines. If the anticipated growth will exceed this figure at any time during the life of the equipment, this method should not be used.

The following specification is a summary of the plan proposed.

1.0 Additional Unit

- 1.1 One additional unit will be required. This unit will be a 1' x 6' cabinet 6'9" high. It will provide for the following equipment. (Equipment Layout per CE-10-47)
- 1.11 Miscellaneous equipment, including fusing, ringing lamps, link busy jacks, and guard and guard control equipments for this unit will be mounted on this frame.
- 1.12 Fifty line equipments (line, lockout, and cutoff relays) can be provided as a part of this unit.
- 1.13 Mounting space for an ultimate of eight links is provided for in this unit. These links will each have a finder multiple arranged for 50 lines and a connector multiple arranged for 150 lines.
- 1.11 Connector multiples for increasing to 150 lines the connector access of the original 10 links of the CX-100 will be found in this cabinet. Space for multiple is also provided in this cabinet for increasing to 150 lines a total of 16 links on the original CX-100, if required.

2.0 Power Equipment

- 2.1 Since the increased equipment quantities will require the increasing of power facilities, it is suggested that the following procedure be followed:
 - 2.11 Charger equipments should be reviewed in the light of increased

equipment quantities; and the addition of auxiliary charger units, or replacement of existing units should be made as necessary.

- 2.12 Any required increases in ammeter and power wire sizes should be made as required.

3.0 Numbering Arrangement

- 3.1 The standard CX-100 has a numbering arrangement as follows:

First Digit

- 1 - Vacant-Reset
- 2 - Code selection digit first group of 10 parties
- 3 - Code selection digit second group of 10 parties
- 4 -)
- 5 -) Reserved for trunk selection codes as required
- 6 - Busy verification access
- 7 -)
- 8 -)
- 9 -) Reserved for trunk selection codes as required
- 0 -)

Second, third and fourth digits are tens, units, and party selection digits respectively.

The above arrangement is made on the basis of twenty party service, if ten party ringing is used, first digit "3" is classed as vacant reset. Deviations from this, which do not afford conflicts, are of course possible; and are to be found where local traffic practice demands.

- 3.2 It is proposed in the presentation of this expansion arrangement to allow the following standard digit assignment.

First Digit

- 1 - Vacant-Reset
- 2 - Selection digit first group of 10 parties first 100 lines
- 3 - Selection digit second group of 10 parties first 100 lines
- 4 - Selection digit first group of 10 parties second 100 lines
- 5 - Reserved for trunk selection codes as required
- 6 - Busy verification access
- 7 -)
- 8 -)
- 9 -) Reserved for trunk selection codes as required
- 0 -)

Second, third and fourth digits are tens, units, and party selection digits respectively.

The above arrangement is made on the basis of twenty party service for the first 100 lines only, and ten party service for all lines in the additional 50 line group. If ten party ringing is used throughout, first digit "3" is classed as vacant reset. Deviations from this numbering scheme, which do not afford conflicts are, of course, possible; and may be used where local traffic practice demands.

4.0 Traffic

- 4.1 This addition as proposed divides originating traffic into two groups, one group 100 lines access, and the other with 50 line access. All terminating traffic will, however, be unaffected since each connector is to have access to the full 150 lines.
- 4.11 The first 100 line group (lines 210-200) will have, if required, originating access to a total of 16 links. This results in a traffic capacity, with one lost call per 100 calls, of approximately 2.94 u.c. per line.
- 4.12 The additional 50 line group (410-450) will have originating access to a total of 8 links if required. This results in a traffic capacity, with one lost call per 100, of 105 u.c. or approximately 2.1 u.c. per line for the full 50 line capacity.
- 4.13 Since this arrangement does not conveniently allow for more than eight links in the additional 50 line group, it is suggested that the following table be used in specifying additional lines, to obtain similar traffic equivalents in both groups.

<u>No. of Links 1st</u> <u>100 Line Group</u>	<u>Maximum No. of</u> <u>Lines Added in</u> <u>50 Line Group</u>	<u>No. of Links in</u> <u>50 Line Group</u>
7	50	5
8	50	6
9	50	6
10	50	7
11	50	7
12	50	8
13	50	8
14	45	8
15	40	8
16	35	8

5.0 Comments

- 5.1 The preceding specifications are based on ultimate figures, but it will be possible to add any part of the above equipment which will provide for a completely operating switchboard.

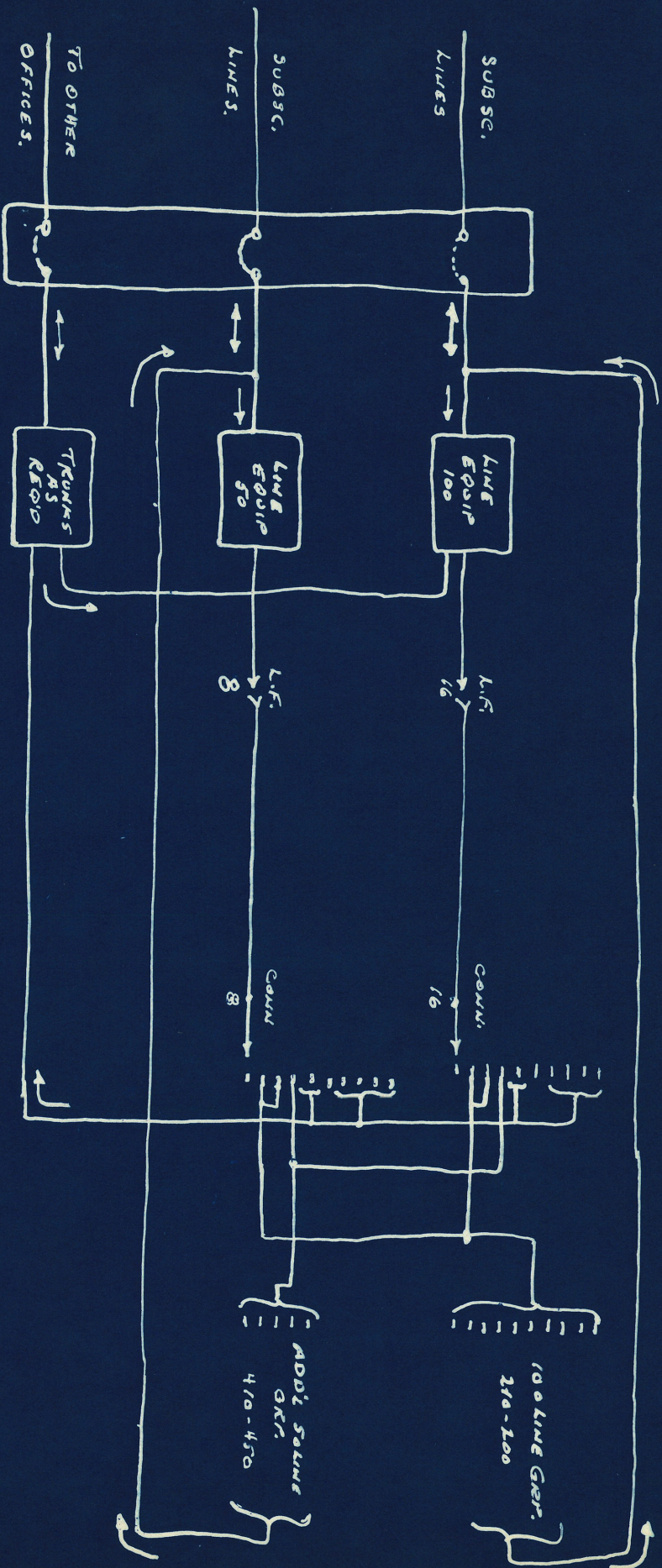
6.0 Drawings

- 6.1 As a part of these specifications, the following drawings are being supplied.

- (a) C.E.-10-47 Tentative Layout Additional Unit
- (b) C.E.-11-47 Trunking Arrangement
- (c) C.E.-12-47 Typical Floor Plan

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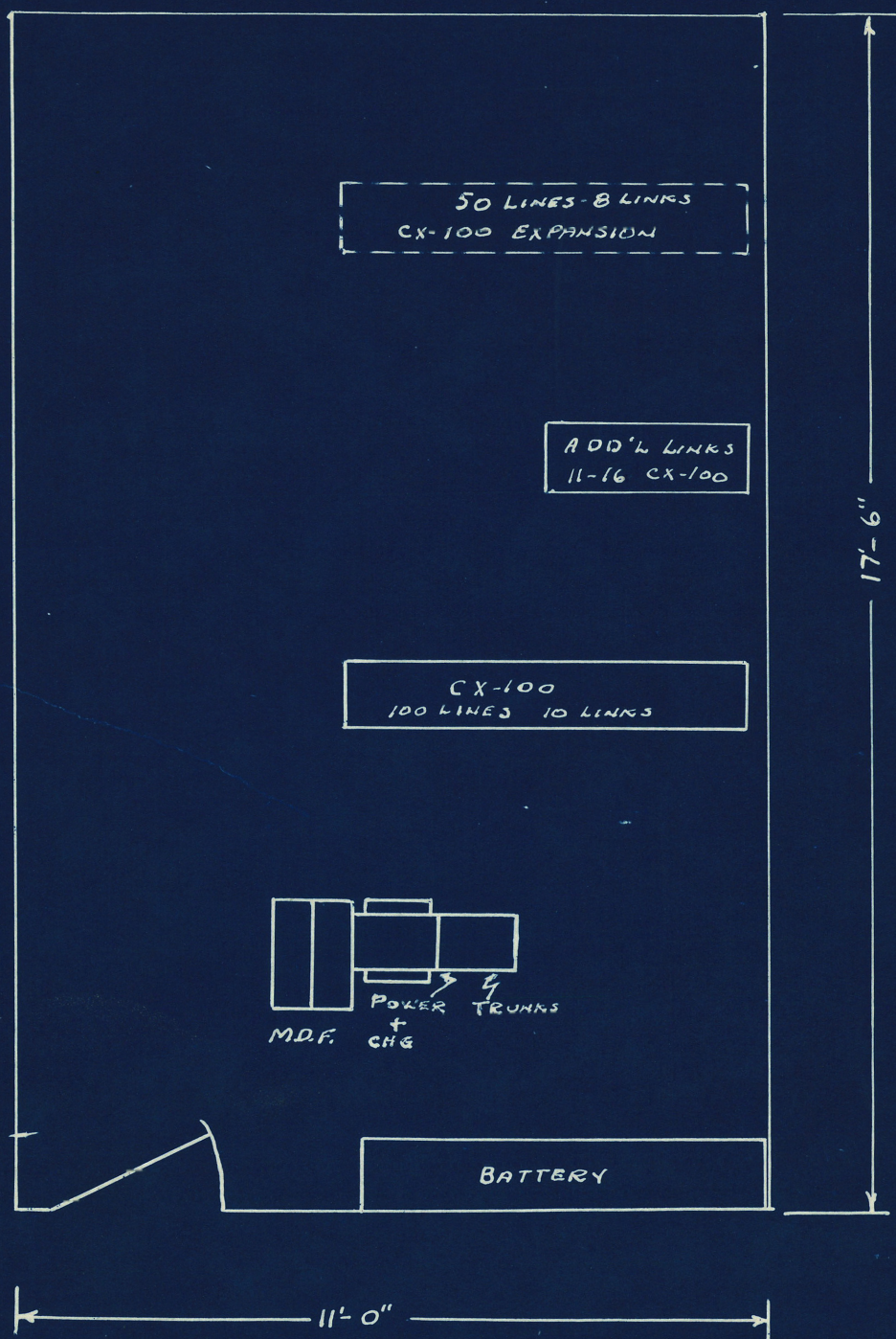
TRUNKING DIAGRAM.

CX-100 EXP.

C.E. 11-47

2/1/47

J. M. J.



CX-100 EXPANSION
TYPICAL FLOOR PLAN

C.E.-12-47

2/3/57

J.M.