INSTALLING NOTES:

76-USE WIRING "U" WHEN LEAD C CURRENT DRAIN IS LESS THAN 0.070 AMPERE.

77-FIGURE CSA (PART OF FIGUERS 9A AND 10A) IS PROVIDED FOR CONVERSION OF FIGURE CS (PART OF FIGURES 3A AND 7A RESPECTIVELY) PER TABLE A. RELAYS K AND L ARE REUSED, READJUSTED PER AH-610144-A.

78-IF THIS CIRCUIT IS NOT REQUIRED TO SUPPLY RING BACK TONE, THE RING BACK TONE LEAD SHOULD NOT BE MULTIPLED BETWEEN POSITIONS ON THE SHELF OR RACK.

79-INSTALLER TO REMOVE STRAP "S" AND TO STRAP RESISTORS R8, R5A, AND R5B IN A MANNER TO OBTAIN FROM 1000 TO 7000 OHM RESISTANCE, AS REQUIRED, TO MEET LEAK TEST IN LOCAL PULSE REPEATING TESTS WITH VARYING MACHINE H-85681 OR EQUIVALENT.

MAINTENANCE NOTES:

90-ELECTRONIC PULSE CORRECTOR FIGURE PC IS FACTORY ADJUSTED FOR THE LIFE OF THE UNIT. DO NOT READJUST IN THE FIELD.

91-AS MANUFACTURED, FIGURE CS PROVIDES APPROXIMATELY ONE OR TWO SECONDS CLASS OF SERVICE TONE. UNITS IN SERVICE MAY BE READJUSTED FOR SHORTER (OR LONGER) TONE BY A DECREASE (OR INCREASE) OF RELAY "G" STROKE WITHIN THE LIMITS: .025 MINIMUM, .035 MAXIMUM.

92-ADJUSTABLE RESISTOR R13 MAY BE READJUSTED TO PROVIDE LENGTH OF CLASS OF SERVICE TONE REQUIRED BY TOLL OFFICE.

ENGINEERING NOTES:

51-WHERE CLASS OF SERVICE TONE IS NOT REQUIRED, INSTRUCT INSTALLER TO REMOVE WIRING "AA" IN FIGURES CSA & CSB OR REMOVE WIRING "AA" & ADD WIRING "BB" IN FIGURE CS.

52-IN FIGURES 3A,4A,7A AND 8A, WHEN THE SPLIT & TERMINATE FEATURE AFTER ANSWER SUPERVISION MUST BE REMOVED TO ALLOW TONE-ON-LINE RE-RING CONTROL, CONVERT TO AN APPROPRIATE FIGURE TO DISABLE FIGURE CS OR TO PROVIDE FIGURE CSA. THEN REFER TO NOTE 29.

53-BEGINNING WITH ISSUE 19, ENGINEER TO INSTRUCT INSTALLER TO ADD "KK" OR "LL" STRAP WHEN THIS CIRCUIT IS USED WITH A C-1 EAX SYSTEM.

MANUFACTURING NOTES: (CON'T)

22-FACTORY SHALL ADJUST RESISTOR R13 TO HOLD RELAY G OPERATED APPROXIMATELY 2 SECONDS. (NOTE 92) ISSUE 9 ONLY, VARIABLE RESISTOR R13 WAS 0-10,000 OHMS.

23-PRIOR TO ISSUE 9, DIODE CR2 WAS FD-1029-DF, APPARATUS AND WIRING "E" WAS PART OF CIRCUIT, AND APPARATUS AND WIRING "K" WAS NOT SHOWN. BEGINNING WITH ISSUE 9, APPARATUS AND WIRING "K" SUPERSEDES APPARATUS AND WIRING "E".

24-PRIOR TO ISSUE 9, APPARATUS AND WIRING "CC" WAS PART OF CIRCUIT. BEGINNING WITH ISSUE 9, APPARATUS AND WIRING "CC" IS NOT SUPPLIED. PRIOR TO ISSUE 9, RESISTOR R6 WAS 2 WATTS.

25-TERMINAL DESIGNATIONS INSIDE PARENTHESES ARE FOR PLATE MOUNTED UNITS.

26-PRIOR TO ISSUE 11, FIGURES CSA & CSB PROVIDED CLASS OF SERVICE TONE START, APPARATUS & WIRING "V" WAS PART OF CIRCUIT, AND RELAY G HAD 4000 OHM COIL AND 7 SPRINGS.
BEGINNING WITH ISSUE 11, APPARATUS & WIRING "V" IS NOT PROVIDED, RELAY G HAS 6500 OHM COIL AND 6 SPRINGS WITH NUMBERS NOT IN PARENTHESES, AND CLASS OF SERVICE TONE START IS DISCONTINUED.

27-I.P.T., O.P.T. & BUSY KEY SPRING NUMBERS IN BRACKETS [ ] ARE FOR TURN KEY TYPE, AND THOSE NOT IN BRACKETS ARE FOR BUSY KEY TYPE.

28-BEGINNING WITH ISSUE 14, ALL DIODES ARE FD-1029-DG UNLESS OTHERWISE SPECIFIED.

29-PRIOR TO ISSUE 16, "DD" WIRING WAS PART OF CIRCUIT AND "EE" WIRING WAS NOT SHOWN. BEGINNING WITH ISSUE 16, "EE" WIRING SUPERSEDES "DD" WIRING IN ALL FIGURES EXCEPT 3A,4A,7A, AND 8A. NOTE 52.

MANUFACTURING NOTES: (CONT'D)

8-UNIT IS MANUFACTURED WITHOUT "W" STRAP FOR 900 OHM IDLE LINE TERMINATION. ENGINEER SHALL INSTRUCT THE INSTALLER TO ADD "W" STRAP WHEN 600 OHM IDLE LINE TERMINATION IS REQUIRED.

9-UNIT IS MANUFACTURED WITH "T" STRAP FOR CLR HOLDING. ENGINEER SHALL INSTRUCT THE INSTALLER TO REMOVE "T" STRAP WHEN CLR HOLDING IS NOT REQUIRED.

10-UNIT IS MANUFACTURED WITH "S" STRAP ~~IN PREENERGIZING CIRCUIT FOR OUTGOING PULSING RELAY E. TESTMAN MAY REMOVE "S" STRAP TO MEET LEAK A TEST. RESISTOR R5 WAS 3000 OHMS PRIOR TO ISSUE 9, AND IS 5000 OHMS BEGINNING WITH ISSUE 9~~. SEE NOTE 79.

11-USE SHORT PULSE PEG COUNT CIRCUIT SUCH AS H-75471 FIGURE 12 OR SIMILAR ONLY FOR MESSAGE REGISTER THAT REQUIRES A LONG OPERATE PULSE SUCH AS H-35300 OR SIMILAR.

12-FACTORY ADJUSTED VALUES.

13-FIGURE PC TERMINAL DESIGNATIONS IN PARENTHESES ( ) DENOTE CONNECTION POINTS ON ELECTRONIC PULSE CORRECTOR.

14-NUMBERS IN PARENTHESES ( ) INDICATE SPRING NUMBERS OF RELAY H AND BUSY KEY PRIOR TO ISSUE 2.
BEGINNING WITH ISSUE 2, RELAY H AND BUSY KEY SPRING NUMBERS NOT IN ( ) BECOME PART OF CIRCUIT.

15-PRIOR TO ISSUE 2, "G" WIRING & APPARATUS WAS PART OF CIRCUIT, "H" WIRING & APPARATUS, "F" WIRING AND "J" WIRING WERE NOT SHOWN.
BEGINNING WITH ISSUE 2, "H" WIRING AND APPARATUS SUPERSEDES "G" WIRING. "J" WIRING NORMALLY PROVIDED FOR ATB.
WHEN CHAIN CIRCUIT IS REQUIRED, ENGINEER SHALL INSTRUCT INSTALLER TO REMOVE "J" WIRING FROM ALL SWITCHES IN GROUP AND ADD CHAIN CIRCUIT. ADD "F" WIRING TO FIRST SWITCH IN CHAIN CIRCUIT ONLY.

16-ELECTRONIC PULSE CORRECTOR'S OUTPUT RATIO APPROXIMATES 60 PERCENT BREAK (NOTE 90).

17-ENGINEER SHALL ORDER PRINTS H-850079 FOR CUSTOMER'S FILES.

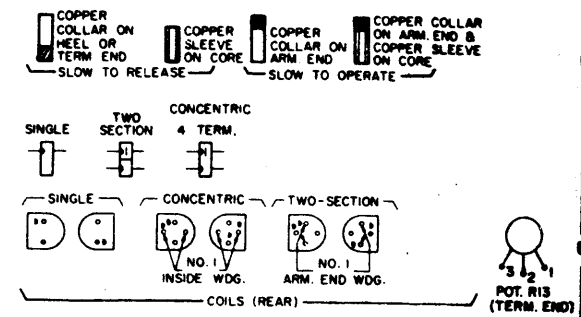
18-PRIOR TO ISSUE 4, WIRING "P" WAS PART OF CIRCUIT AND WIRING "R" WAS NOT SHOWN. WIRING "R" SUPERSEDES WIRING "P".

19-PRIOR TO ISSUE 6, "M" WIRING WAS PART OF CIRCUIT AND "N" WIRING WAS NOT SHOWN. ~~BEGINNING WITH ISSUE 6, "N" WIRING SUPERSEDES "M" WIRING~~. (SEE NOTE 21).

20-PRIOR TO ISSUE 8, WIRING "L" WAS PART OF CIRCUIT AND WIRING "U" WAS NOT SHOWN. BEGINNING WITH ISSUE 8, WIRING "L" IS NOT PROVIDED.

21-BEGINNING WITH ISSUE 9, WIRING "M" IS REINSTATED AND WIRING "N" IS NOT USED. PRIOR TO ISSUE 9, WIRING "MM" WAS PART OF CIRCUIT AND WIRING "NN" WAS NOT SHOWN. BEGINNING WITH ISSUE 9, WIRING "NN": SUPERSEDES WIRING "MM".

SYMBOLS



- INDICATES INSIDE TERMINAL (START OF WINDING)
- TERMINAL ON UNIT TERMINAL BLOCK
- UNIT TERMINAL BLOCK TERMINAL (COMMON)
- JACK TERMINAL
- JACK TERMINAL (COMMON)
- TERMINAL ON TERMINAL ASSEMBLY (TERMINAL NO.1 IS NEAREST SWITCH BASE)

MANUFACTURING NOTES:

1-PRIOR TO ISSUE 2, SHELF JACKS 9 & 11 MAKE CONTACT WHEN SWITCH IS REMOVED. BEGINNING WITH ISSUE 2, SHELF JACKS 9 & 11 AND 14 & 16 MAKE CONTACT WHEN SWITCH IS REMOVED.

2-FOR REVERSE BATTERY SUPERVISION, CONNECT SELECTOR BANKS TO JACKS 19 & 20. FOR NO SUPERVISION TO CALLING LINE, CONNECT TO JACKS 1 & 2.

3-USE EC(1) LEAD ONLY WITH INCOMING SWITCHES ARRANGED FOR 4TH WIRE SUPERVISION.

4-USE EC LEAD WHEN OUTGOING SWITCH TRAIN REQUIRES 4TH WIRE SUPERVISION.

5-FOR "IN" PULSE TESTS USE LEFT TEST JACK WITH I.P.T. KEY OPERATED.
FOR "OUT" PULSE TESTS USE RIGHT TEST JACK WITH O.P.T. KEY OPERATED.

6-UNIT IS MANUFACTURED WITH "X" STRAPS EQUIPPED AND ARRANGED FOR POLAR DUPLEX OR LENKURT TYPE 45 (OR EQUIVALENT) CARRIER OPERATION. ENGINEER SHALL INSTRUCT THE INSTALLER TO REMOVE "X" STRAPS AND PROVIDE "Y" STRAPS FOR LENKURT TYPE 33 (OR EQUIVALENT) CARRIER OPERATION.

7-UNIT IS MANUFACTURED WITHOUT "Z" STRAP FOR IDLE LINE TERMINATION TO BE REMOVED ON TRUNK SEIZURE. ENGINEER SHALL INSTRUCT THE INSTALLER TO PROVIDE "Z" STRAP WHEN IDLE LINE TERMINATION IS TO BE REMOVED ON ANSWER SUPERVISION.

STOCKLIST DH-610144-A70 (FIG.13A)
STOCKLIST DH-610144-A44 (FIG.11A)
STOCKLIST DH-610144-A43 (FIG.3A)
STOCKLIST DH-610144-A42 (FIG.1A)
STOCKLIST DH-610144-A41 (FIG.3A)
STOCKLIST DH-610144-A40 (FIG.5A)
MFG. DIS.
JUMPER LIST JL-610144-A

ASSOCIATED DRAWINGS		
DRAWING NO.	ISS.	DESCRIPTION
AH-610144-A	12	ADJUSTMENT
E-610144-A	6	EXPLANATION

CURRENT DRAIN DATA	AMPS.
HOLDING CURRENT	
INCOMING CALL	0.43

DESIGNED G.E. MC LEAN — DR. H.V
APP'D. KARL F. STEINHAUER — CK. K.V.
SCALE: — DATE: 11-20-63
DO NOT SCALE DRAWING

TWO WAY TRUNK CIRCUIT
AUTO TO AUTO-AUTO TO MANUAL
DUPLEX SIGNALING
CLR HOLDING, CLASS OF
SERVICE TONE & REVERSE BAT. OR
FOURTH WIRE SW. TRAIN SUPN.

H-610144-A D
SHEET 1 OF 3

H-610144-A

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TABLE A

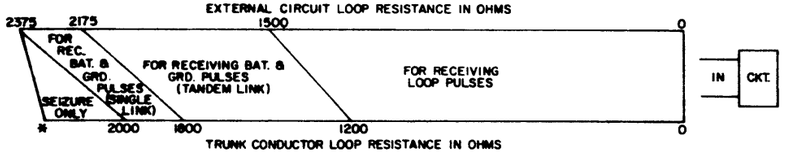
FIG.	APPARATUS & WIRING OPTIONS "A" REV. BAT. SUP'N.	"B" EC LEAD SUP'N.	"C" NO C/S TONE	"D" CLASS OF SERV. TONE	"NC" NO PULSE CORRECTION	"PC" PULSE CORRECTION				FIGURE OPTIONS CS C/S TONE	CSA C/S TONE	CSB C/S TONE	PC PULSE CORRECTION				REMARKS
1A	*		*		*												
2A		*	*		*												NAFM
3A	*			*	*					*							NAFM
4A		*		*	*					*							NAFM
5A	*		*			*							*				
6A		*	*			*							*				NAFM
7A	*			*		*				*			*				NAFM
8A		*		*		*				*			*				NAFM
9A	*			*	*						*						FOR FIELD CONVERSION FROM FIG. 3A(NAFM)
10A	*			*		*					*		*				FOR FIELD CONVERSION FROM FIG. 7A(NAFM)
11A	*			*	*							#					
12A	*			*		*						#	*				
13A	*			*	*							*					UNIT PLATE MOUNTED (NOTE 25)

RANGE CHART

ENGINEERING RANGE AT 48VDC (REF: GSP 780-200-074 & 780-201-070)

INCOMING (RELAY E)

EXTERNAL CIRCUIT LOOP RESISTANCE IN OHMS

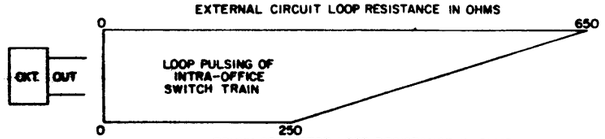


TRUNK CONDUCTOR LOOP RESISTANCE IN OHMS

* REFER TO DISTANT, CONNECTING EQPT.

OUTGOING (RELAY D)

EXTERNAL CIRCUIT LOOP RESISTANCE IN OHMS

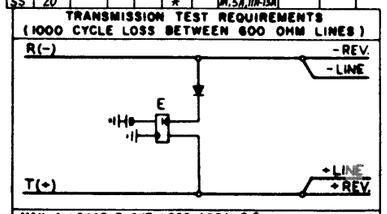


TRUNK CONDUCTOR LOOP RESISTANCE IN OHMS
(DERIVED FROM EXTERNAL CIRCUIT LOOP RESISTANCE BY ASSUMPTION OF 200+200+400 OHM DISTANT INCOMING SWITCH)

TABLE B

SUF. ARNG OR WRG	ISSUES FIRST USED	ISSUES LAST USED	WAS PART OF	SUP'D BY	WIRED BY FACTORY	WIRED BY INST	FIGURE	TABLE	NOTES
A	1				*		1A,3A,5A, 7A,9A-13A	A	
B	1				*		2A, 4A, 6A, 8A	A	
C	1				*		1A,2A,5A, 6A	A	
D	1				*		3A, 4A, 7A-13A	A	
E	1	8		K	*				23
F	2					*			15
G	1	1		H	*				15
H	2				*				15
I	1	10		O	*				
J	2				*				15
K	9				*				23
L	1	7			*				20
M	1	5		N	*				19,21
	9				*				
N	6	8		M	*				19,21
Q	11				*				
P	1	3		R	*				18
R	9	10	K	O					
S	4				*				18
T	1				*				10
U	8	8				*	3A, 4A, 7A-10A		9
V	1	10							20,76
W	1					*			26
X	1				*				8
Y	1					*			6
Z	1					*			6
CC	1	8			*				7
MM	1	8		NN	*				24
NN	9				*				21
NC	1				*		1A-4A, 9A, 11A,13A	A	21
PC	1				*		5A-8A, 10A, 12A	A	
AA	1	8	CS	BB	*		CS		51
	9	14	CSA, CSB				CSA, CSB		
BB	15					*	CS		51
DD	1	15	CKT	EE	*		1A, 2A, 5A, 6A, 9A-13A		29 & 52
EE	16				*				
FF	1	16		GG	*		1A-13A		
GG	17				*		1A-13A		79
FF	9	16	CSA	GG		*	CSA	A	
GG	17					*	CSA	A	
HH	19				*		11A-13A		
JJ	19				*		1A-13A		
KK	19					*	13A		53
LL	19					*	1A-12A		53
PP	19				*		13A		
RR	1	19	SS		*		1A,5A,11A-13A		
SS	20				*		1A,5A,11A-13A		

TRANSMISSION TEST REQUIREMENTS
(1000 CYCLE LOSS BETWEEN 600 OHM LINES)



MAX. ALLOWABLE CKT. LOSS (DB) 0.2

SUFFIX

* INDICATES APP FOR WHICH INDIV. LOSSES ARE NOT REQ.

ALLOWABLE INDIVIDUAL APPARATUS LOSSES (DB)

APPARATUS	DESIG.	MAX. LOSS	MIN. LOSS
RELAY 210/210	E	0.9	

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FIG. 1A TO 13A
(SEE TABLE A)

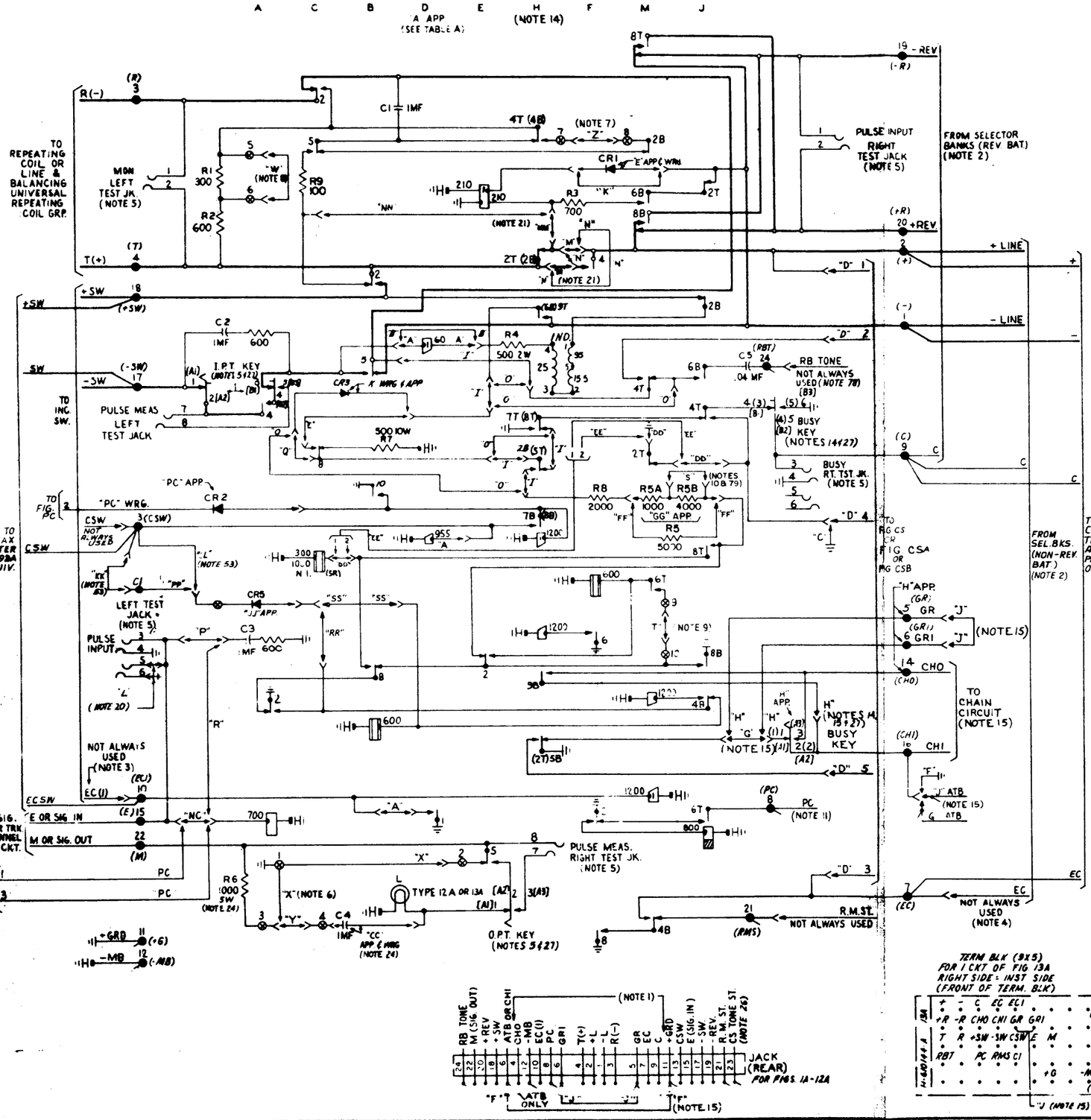


FIG. CS (NAFM)
(SEE TABLE A)
(NOTE 91)

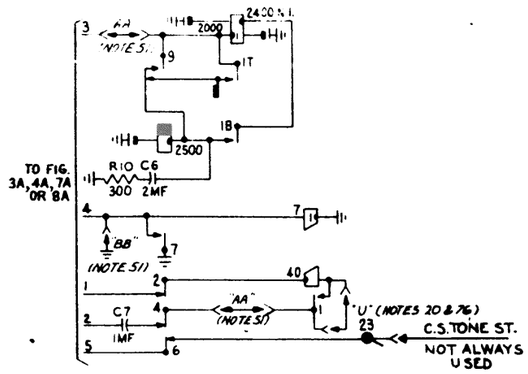


FIG. PC
PULSE CORRECTOR (H-850079)
(FOR REF. ONLY) (NOTES 13, 16, 17 & 90

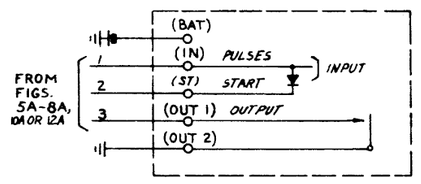


FIG. CSA (NAFM)
(SEE TABLE A) (NOTE 77)

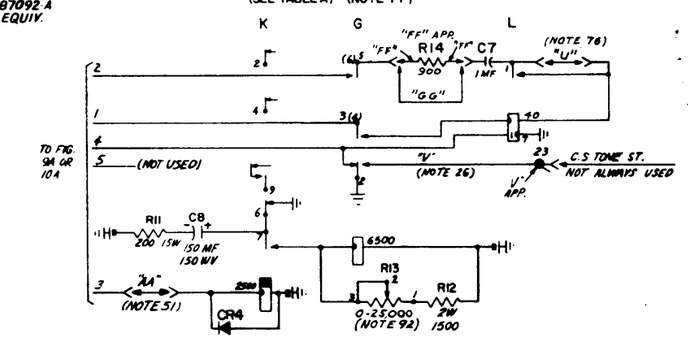
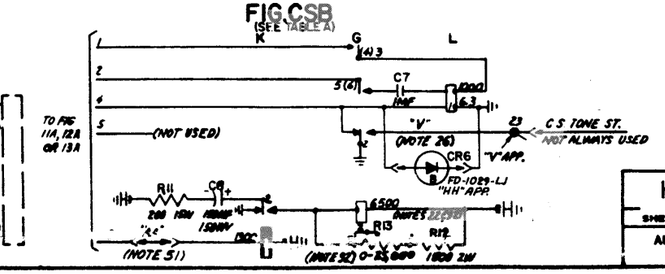


FIG. CSB
(SEE TABLE A)



TERM BLK (9X5) FOR 1 CKT OF FIG 13A RIGHT SIDE = INST SIDE (FRONT OF TERM. BLK)