CABLE PRESSURE TELEMETRY
CENTRAL CONTROL AND CABLE/TRANSDUCERS
TROUBLE LOCATING PROCEDURES

1. GENERAL

1.01 This section provides trouble clearing procedures for the central control bay, cables, and D transducers of the Cable Pressure Telemetry System (SD-5G142).

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

2. APPARATUS

2.01 The apparatus in 2.02 through 2.06 is required for clearing trouble in the central control bay.

2.02 Volt-ohm-milliameter KS-14510 or digital voltmeter.

2.03 Tektronix 564B storage oscilloscope equipped with a 2B67 time base and a 3A1 dual-trace amplifier.

Note: The Tektronix 564B (RM564) storage oscilloscope was initially furnished in L4 main stations as part of the L4 RCC console. It can be easily demounted for use at the transducer control bay. If a 564B is not available, the following equipment is suitable:

(1) Tektronix 434 25 MHz dual-trace storage oscilloscope furnished with two P6105 probes.

(2) Tektronix 7313, equipped with a 7A18 dual-trace amplifier, a 7B50A time base, and two P6101 or P6105 probe.

2.04 Two Tektronix P6011 (MD) or P6028 probes.

2.05 Variable dc power supply, 0 to 30 volts at 1 ampere.

2.06 Spare program patchboard.

2.07 The apparatus in 2.08 through 2.18 is required for clearing cable/transducer trouble.

2.08 Required equipment for pumping water out, checking for gas, and venting a manhole.

2.09 Equipment and material required for entering and closing a splice or apparatus case and repressurizing.

2.10 Spare D transducer.

2.11 Spare B dummy transducer.

2.12 B transducer controller (AT-8526).

2.13 5/8-inch open-end wrench.

2.14 6-inch adjustable wrench.

2.15 Long-nose pliers.

2.16 Electric soldering iron, 90 to 150 watts.

2.17 60/40 activated rosin-core solder.

2.18 Waxed lacing twine.

3. TROUBLE CLEARING PROCEDURES

A. General

3.01 The trouble clearing procedures are presented in flow chart form, with a trouble directory given in Table A.

3.02 For obvious trouble in the central control bay, proceed to Table A; for obvious cable/transducer trouble, proceed to Fig. 2; for troubles which are not obvious, proceed to Fig. 1.

3.03 The connector pins referred to in some of the flow charts are located on the rear of the bay. Test points are located on the front of the circuit packs.

B. Determine if the Trouble is in Inside or Outside Plant

3.04 When an abnormal condition exists, the first determination that should be made is whether the problem is associated with a cable or transducer or with the central control bay. To determine this, refer to Fig. 1. Then, if the problem is verified as a cable transducer trouble, the station where the trouble occurred should be established.

C. Determine the Trouble Station Number

3.05 In most cases this is obvious from the central control bay printout. For example, if the printout shows satisfactory readings out to transducer X, but for transducers X+1 to the end of the cable shows readings that are obviously wrong, then a problem most likely exists either in transducer X, or transducer X+1, or in the cabling between the two. In some cases, the central control bay may unknowingly skip a transducer (but print the correct station number). This problem is indicated by the dummy transducer being printed twice or more at the end of the cable program. The station transducer that is skipped can be determined by comparing the history of the cable, station by station, to the new printout. Sometimes a transducer relay may stick intermittently and cause a transducer to be read more than once per cable cycle. This problem will prevent the dummy transducer from being read at all, but the station number where this occurred will be obvious on the printout.

After establishing the station number at which the problem occurs, the procedures in 3.06 and 3.07 are recommended. Note that either of two procedures is used, depending upon whether station one can be accessed.

D. CABLE/TRANSDUCER TROUBLE ASSOCIATED WITH STATION ONE

3.06 If the central control bay cannot access station one, and since it has previously been determined that the central control bay is operational, the following approach is recommended: Disconnect the electrical connections of the central control bay going to station one (see Fig. 2). This would be pair "A" Tip (Y), pair "A" Ring (S), pair "B" Tip (V), and pair "B" Ring (BL). Connect the B transducer controller (AT-8526) to the leads going to the station one transducer and follow Section 637-080-105 to check the cable and station one transducer (the B transducer controller can also be used from inside plant to access all the stations on the cable). If station one can be accessed and read properly, the problem must reside with the Central Control Unit or the wiring of the cable to the Central Control Unit. Otherwise, remove the B transducer controller and rewire the cable to the central control bay. Then send the cable repairman to manhole one.

Since the central control bay or B transducer controller could not access station one, it would be highly suspected that station one transducer is bad. The cable repairman should follow the BSPs for entering the manhole and opening the splice or apparatus case (whichever the case may be) and follow the procedure covered in Section 637-080-200 for replacing this transducer. Next, contact the central control site and request that a readout of this cable be made with the central control bay. This should solve the problem. If not, look for wiring errors, shorts, opens, etc.

E. CABLE/TRANSDUCER TROUBLE BEYOND STATION ONE

3.07 Sometimes it is possible that a combination of things are wrong or that the central control bay is unable to access stations or "step out" the cable beyond a certain station.

Then, the following approach is recommended: (For clarity, specific station numbers 22 and 23 are used in the procedure, but the procedure applies to any station numbers). If the central control bay reads station 22 transducer as being correct but does not read station 23 transducer, the cable repairman should go to the nearest manhole to the central control site that the trouble appeared on the printout, which in this case would be station 22. He should follow the BSPs for entering the manhole and opening the splice case or apparatus case (whichever the case may be), and disconnect the electrical connections of station transducer 22 going out to station 23 (Figure 2). This would be pair "A" tip (Y-W), pair "A" ring (S), pair "B" tip (V) and pair "B" ring (BL-W). This would still leave station 22 transducer in an operational state. Then, using the spare D transducer and

spare B dummy transducer, make electrical connections per Figure 2. Next, contact the central control site, and request that a readout of this cable be made with the central control bay. (It is not necessary to close the splice or apparatus case or to pressurize the transducers. Unpressurized, the transducers should read the atmospheric or barometric pressure which at sea level is between 14.5 and 17.5 psia. The dummy transducer should read approximately 26 psia.) If the central control bay does not read the station 22 transducer, the spare transducer, and dummy transducer correctly, replace the station 22 transducer. This should solve the problem. If not, look for wiring errors, shorts, opens, etc.

If the central control bay reads station 22, the spare transducer, and the dummy transducer correctly, remove the spare transducer and dummy transducer. Connect the B transducer controller (AT-8526) to the leads going to the next station transducer, which in this case would be station 23, and follow Section 637-080-105 to check the cable and transducer. Does this give a correct reading? If yes, it is possible that transducer 23 is an "electrically weak" transducer and does not get sufficient signal from the central control bay to make it operate since the central control bay may be several miles more distant than the B transducer controller. Replace transducer 23. In any case, remove the B transducer controller (AT-8526) and wire station 23 back to station 22. Close the splice or apparatus case and follow procedure for pressurizing the case. Then go to manhole 23. Repeat the procedure as outlined in the example of station 22 and continue on out the cable until all troubles are cleared.

TABLE A

TROUBLE DIRECTORY

TROUBLE SYMPTOM	FIG. NO.
Bay inoperative/erroneous functions or cable trouble.	1
ALARM CONDITIONS	
1. Alarm not detected by alarm light but is on printout.	14 & 16
2. Erroneous alarms generated.	9 & 13
3. Known alarm condition not detected by lamp or printer.	12
CYCLING	
Bay won't cycle in any mode.	1 & 15
MODUPRINTER/DVM	
1. Cable counter does not select next cable.	10
2. DVM reading 10s, 1s, .1s, or.01s digit wrong.	17
3. DVM reading correctly—moduprinter cycling but not printing.	7
4. DVM reading correctly—moduprinter not printing cable number or printing at random.	7
5. DVM reading high number (85.00-87.00). Moduprinter reading 99.9_ or 00._ _.	6
6. DVM reads correctly—moduprinter does not print.	6
7. Moduprinter and DVM reading 13.8.	5 & 6
8. Moduprinter does not print out station number.	6
9. Moduprinter hangs up in running mode but does not print—DVM reads correctly.	3
10. Moduprinter not printing 10s, 1s, .1s, or .01s digit.	7
11. Moduprinter not printing cable number/station number.	10
12. Moduprinter prints at random—DVM reads correctly.	4
13. Moduprinter reading at random—DVM reads correctly.	6
Station counter does not change to next cable after dummy transducer is read out.	8
Translator does not decode as 1 of 10 outputs.	11

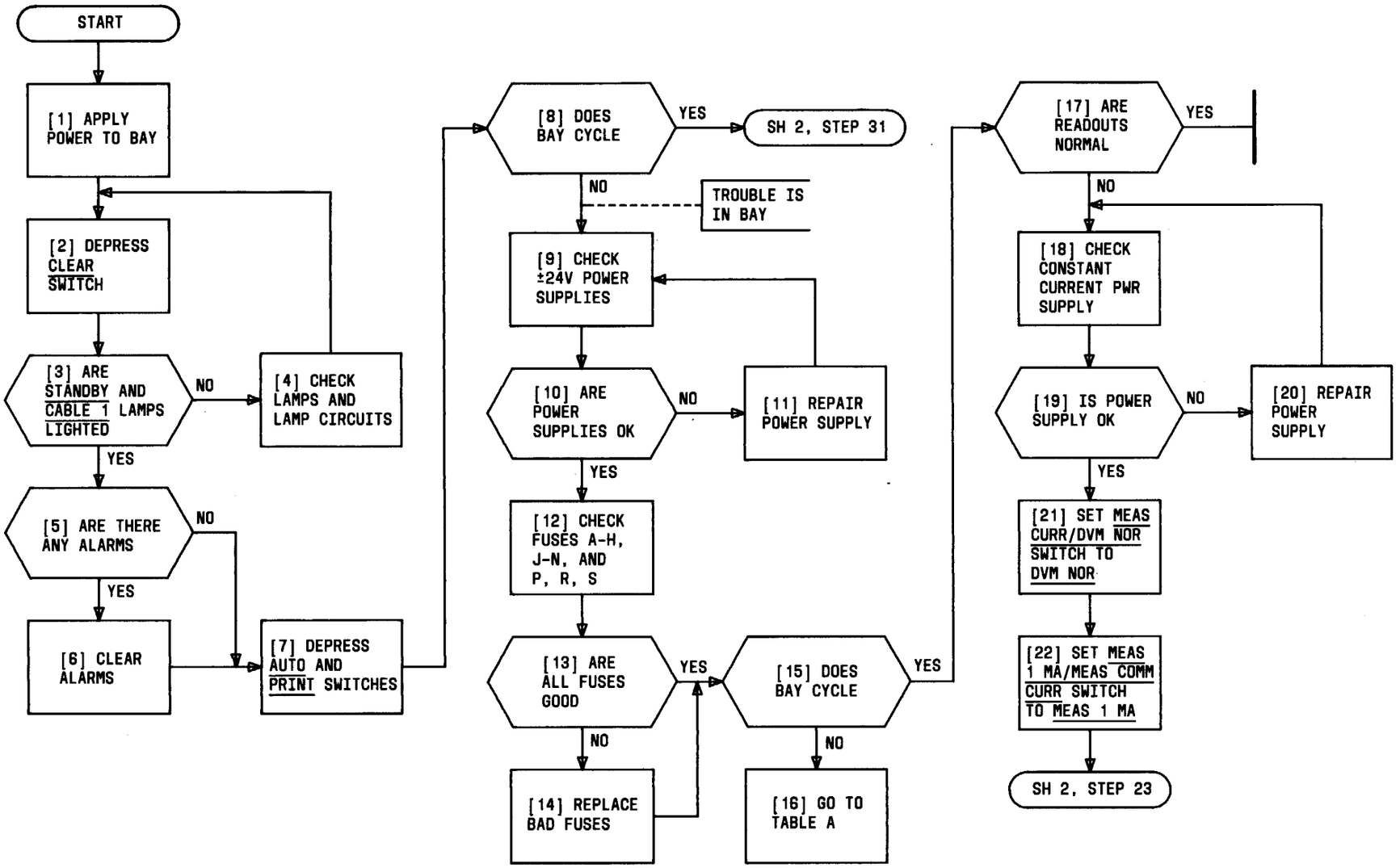


Fig. 1—Clear Central Bay or Cable Trouble (Sheet 1 of 2)

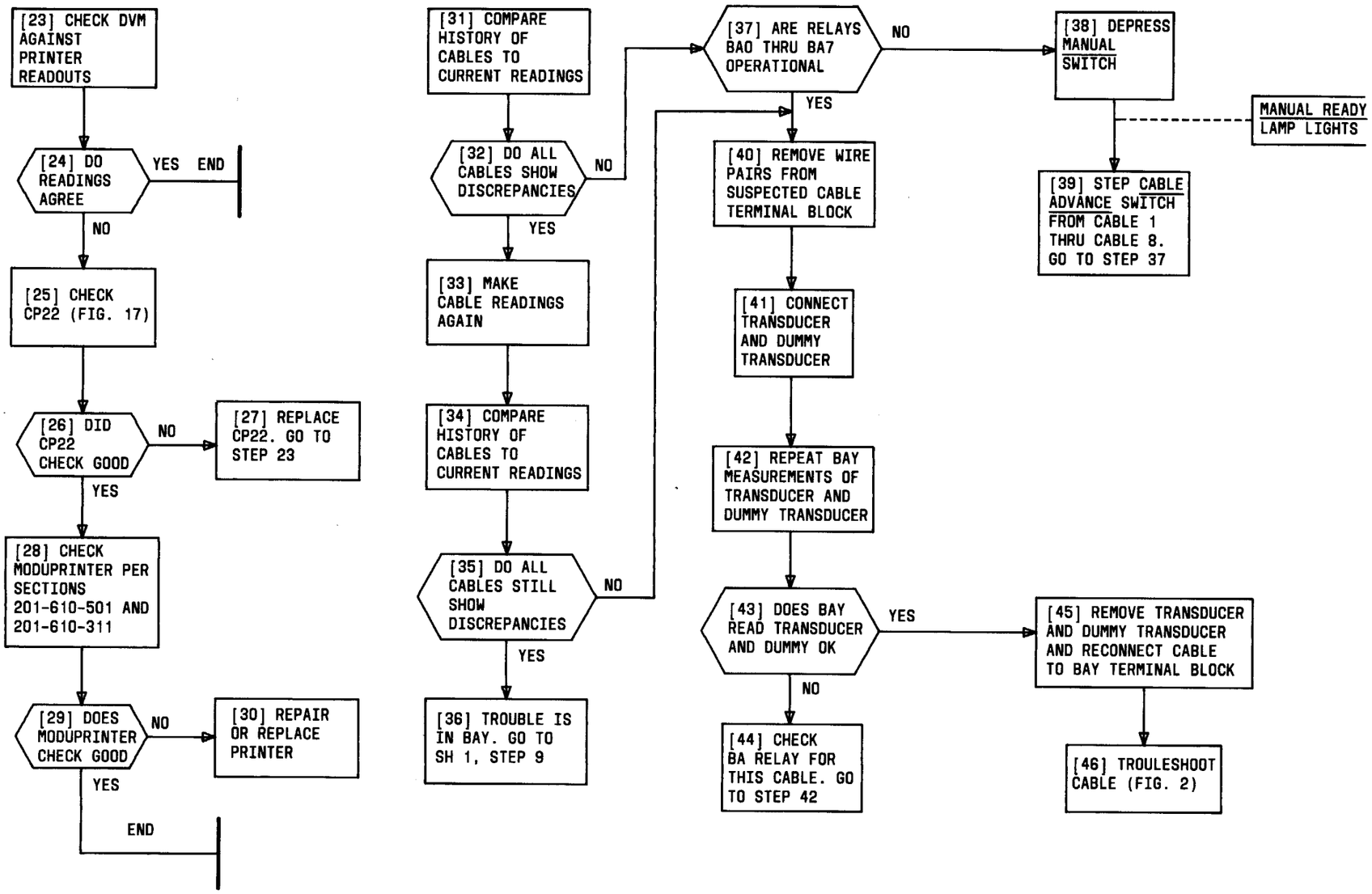
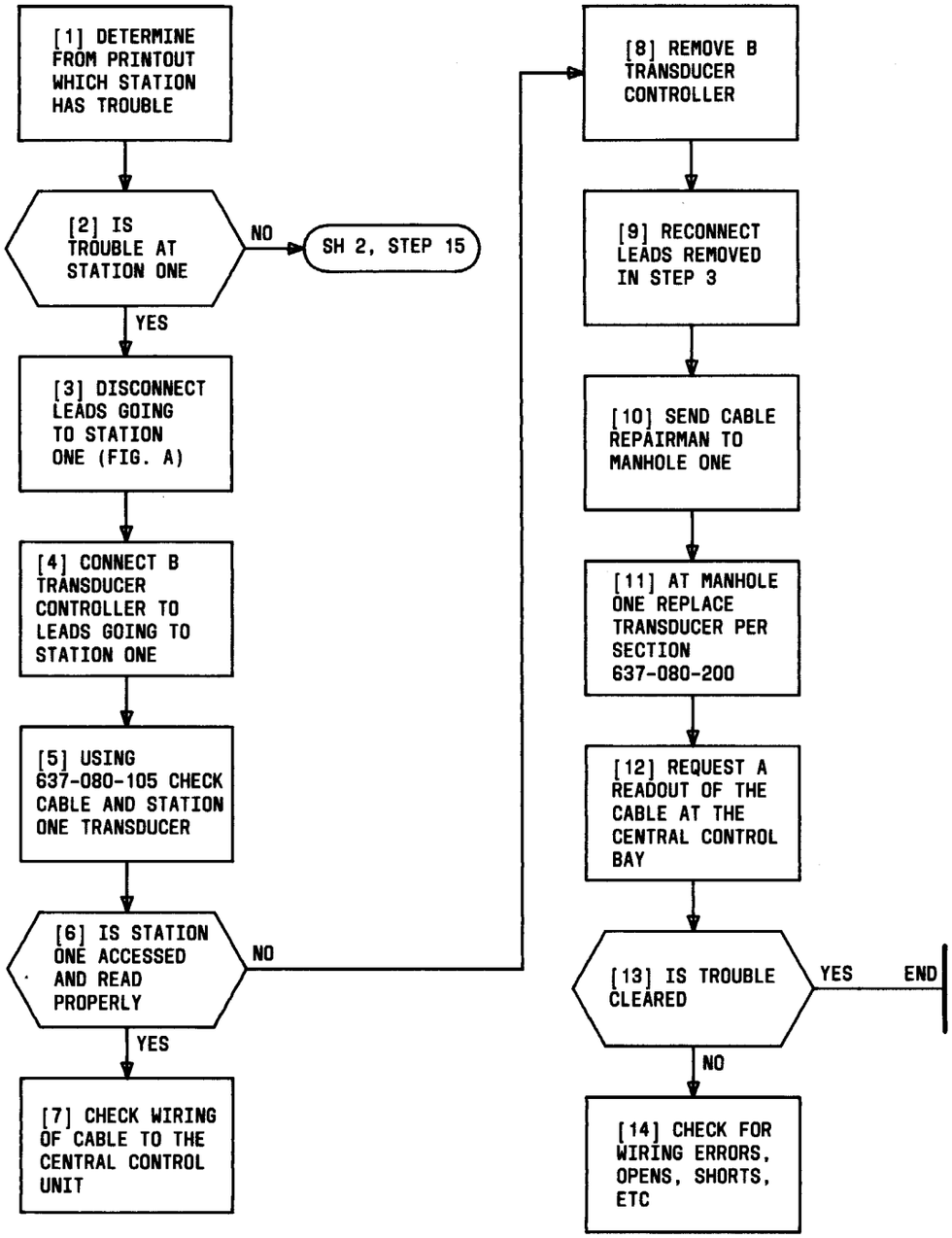


Fig. 1—Clear Central Bay or Cable Trouble (Sheet 2 of 2)



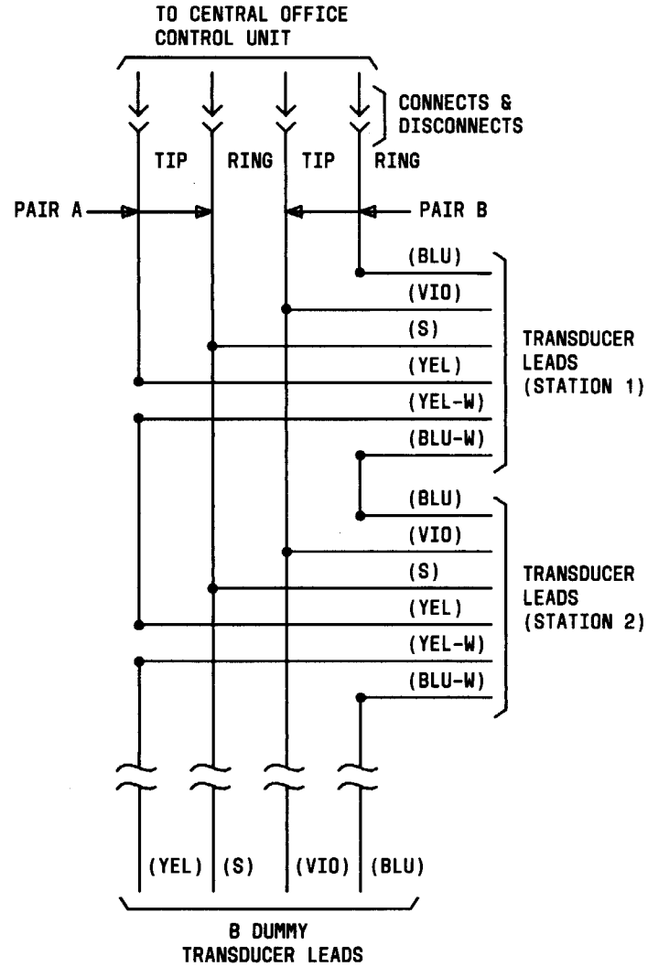
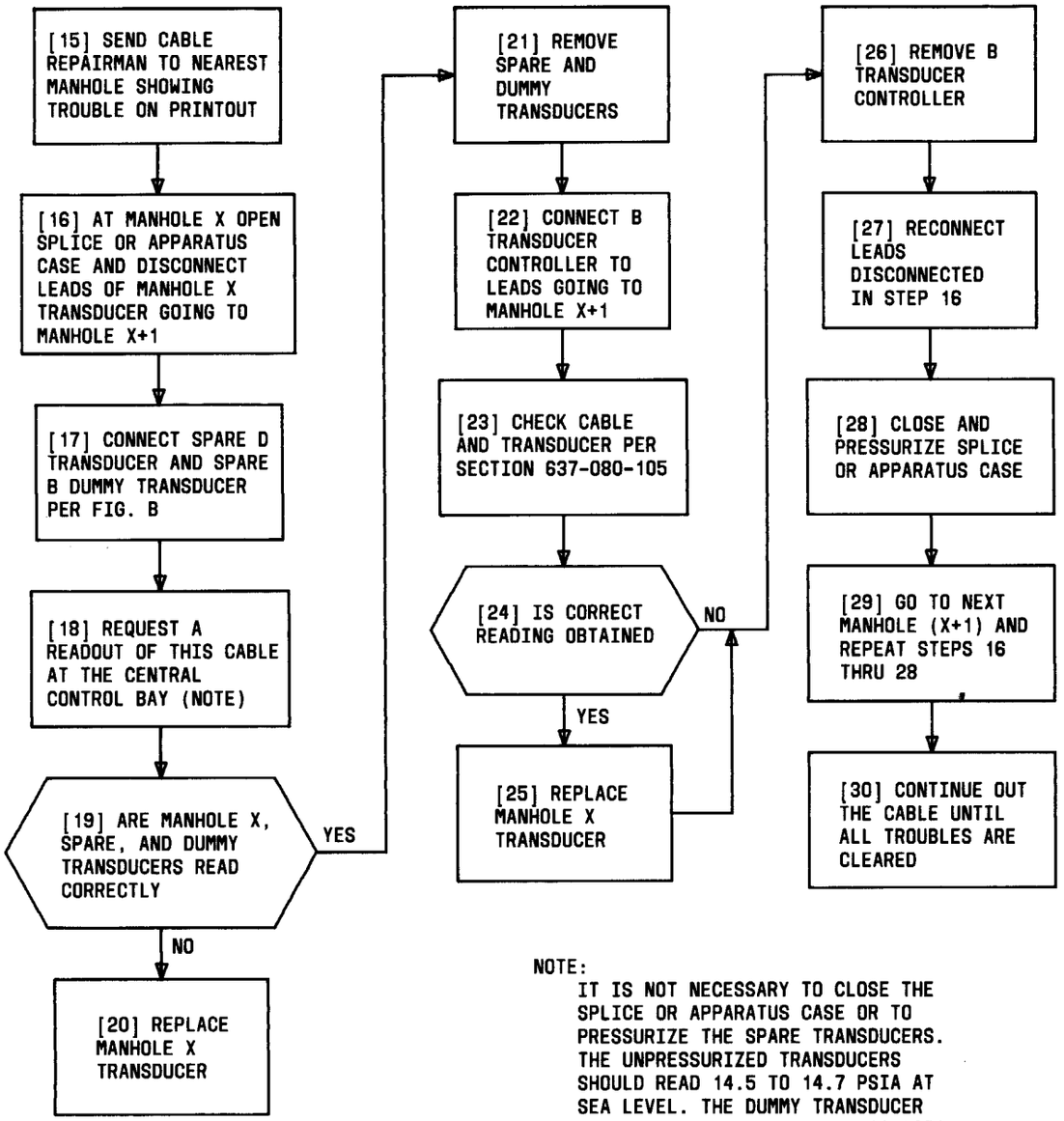


FIG. A

Fig. 2—Clear Cable Trouble (Sheet 1 of 2)



NOTE:
IT IS NOT NECESSARY TO CLOSE THE SPLICE OR APPARATUS CASE OR TO PRESSURIZE THE SPARE TRANSDUCERS. THE UNPRESSURIZED TRANSDUCERS SHOULD READ 14.5 TO 14.7 PSIA AT SEA LEVEL. THE DUMMY TRANSDUCER SHOULD READ APPROXIMATELY 26 PSIA.

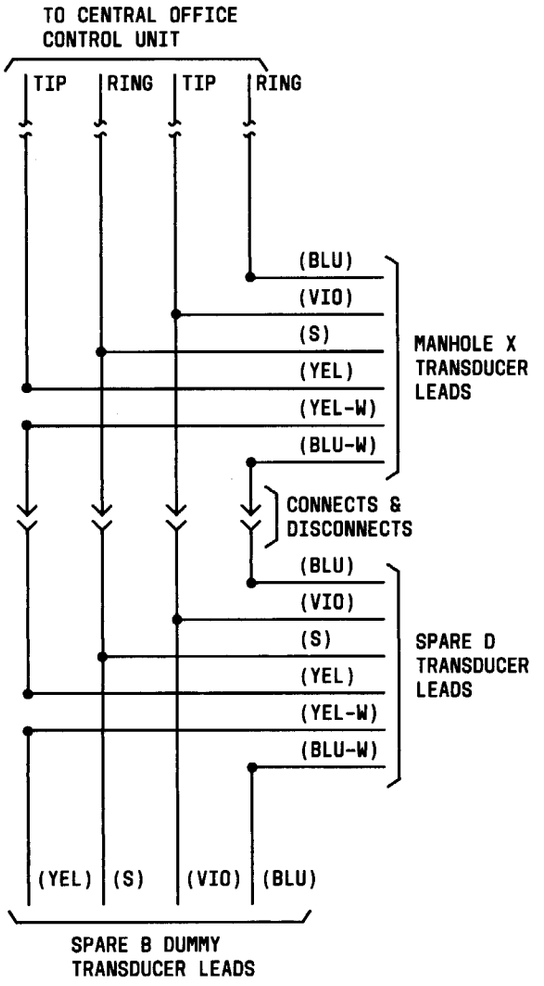


FIG. B

Fig. 2—Clear Cable Trouble (Sheet 2 of 2)

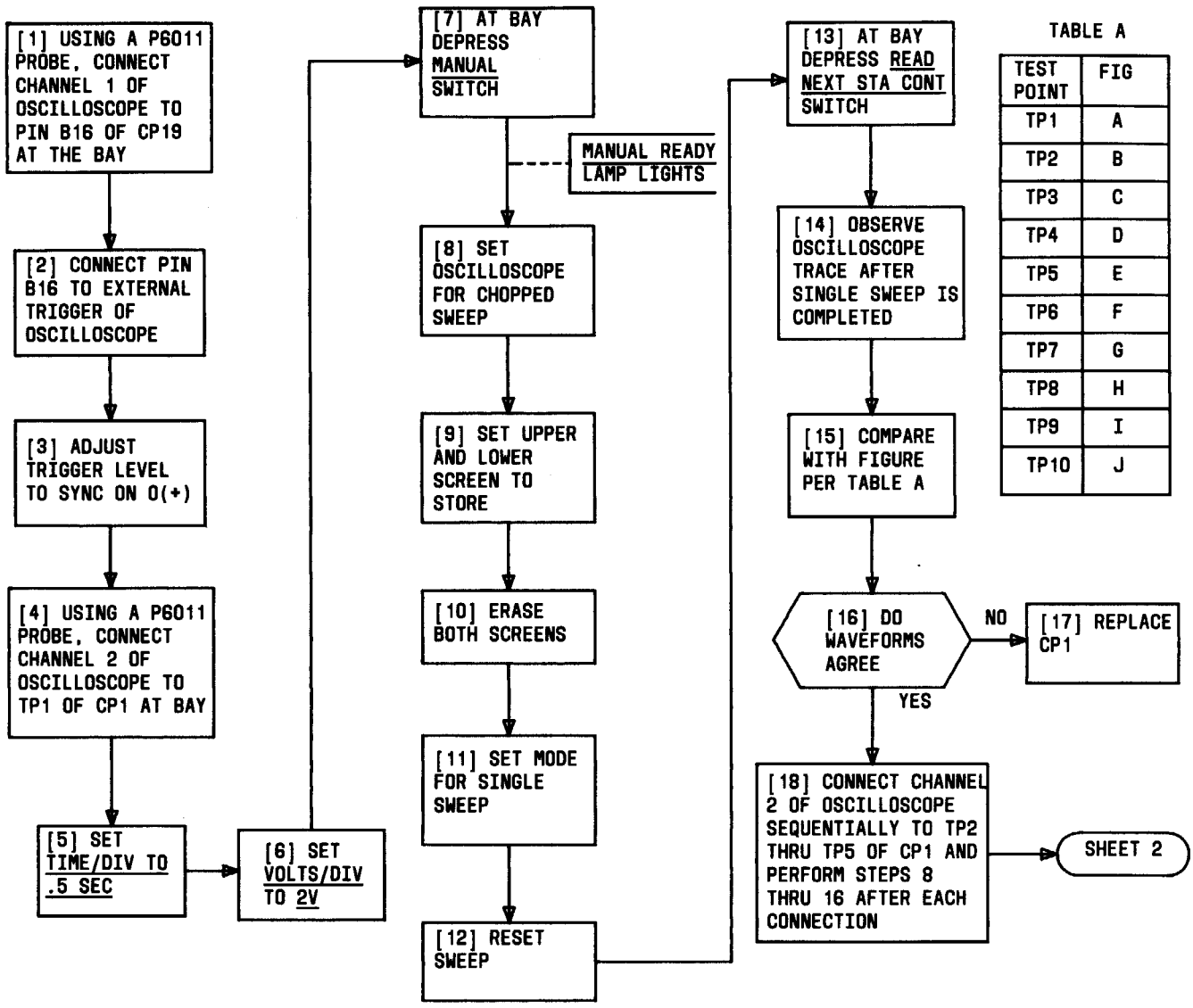


Fig. 3—Clear CP1 Trouble (Sheet 1 of 5)

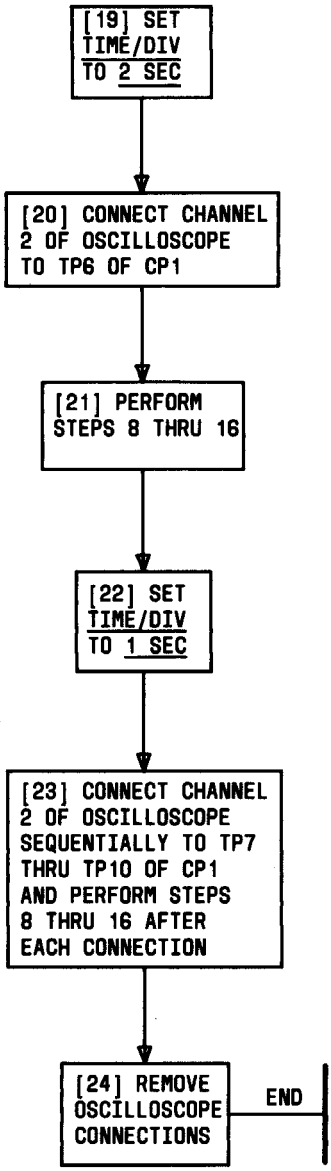


Fig. 3—Clear CP1 Trouble (Sheet 2 of 5)

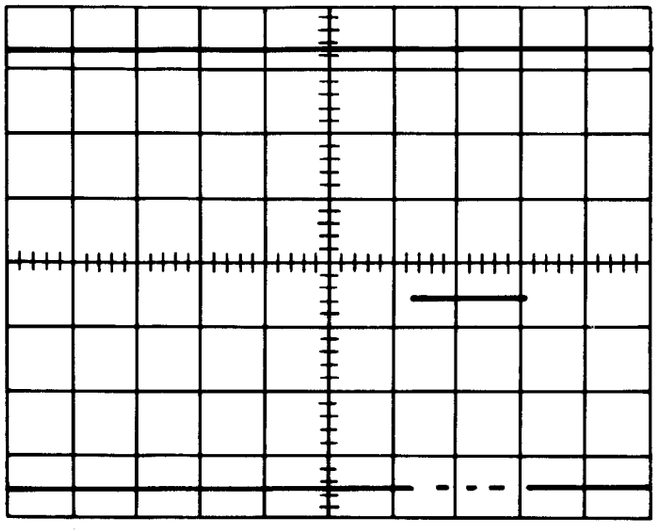


FIG. A

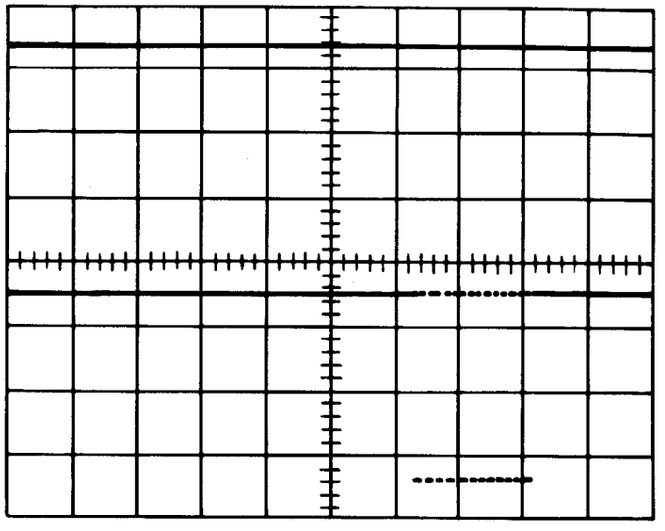


FIG. B

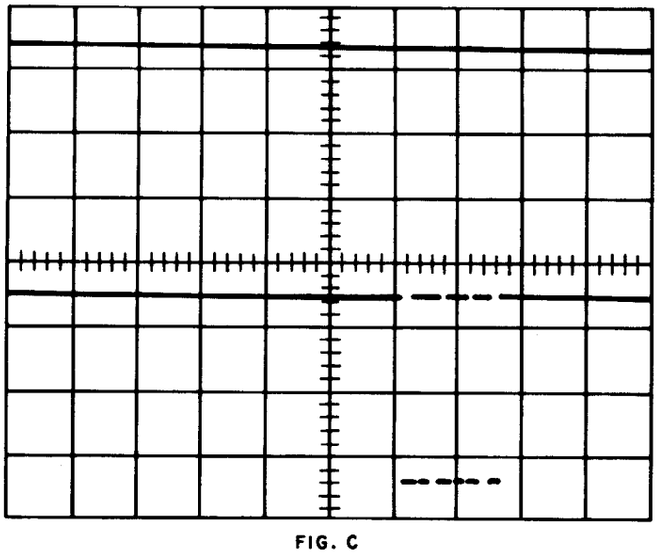


FIG. C

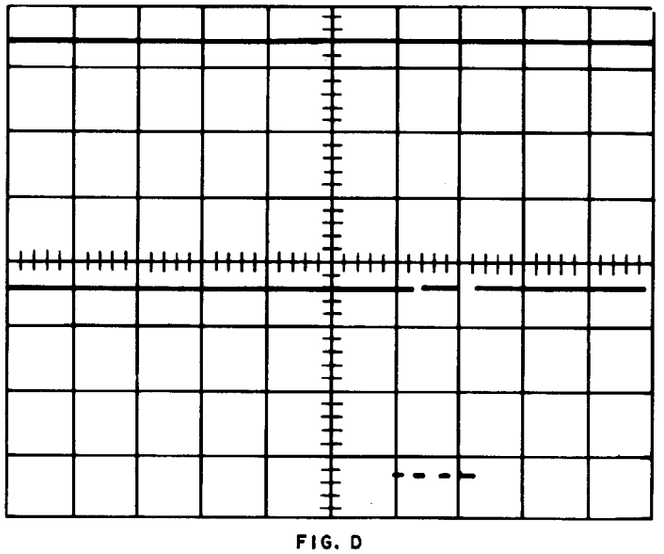


FIG. D

Fig. 3—Clear CP1 Trouble (Sheet 3 of 5)

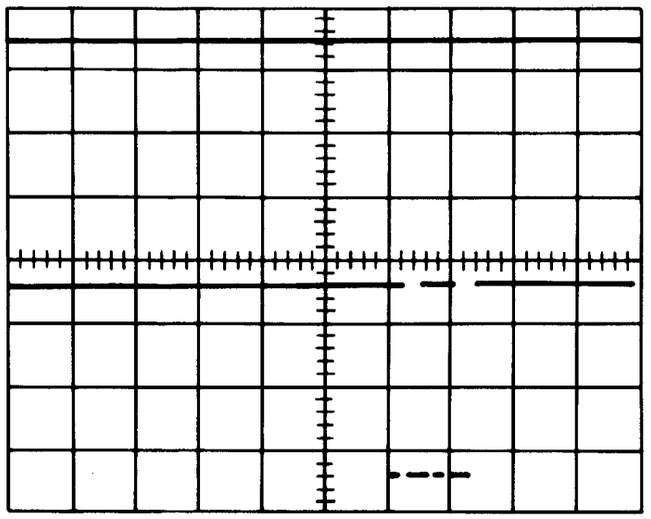


FIG. E

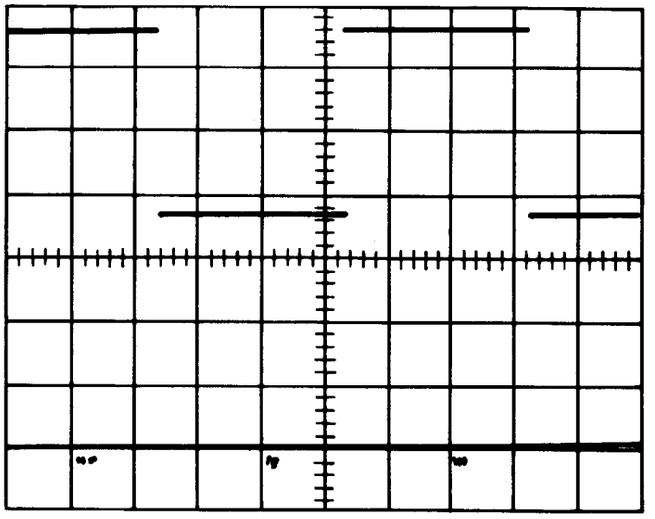


FIG. F

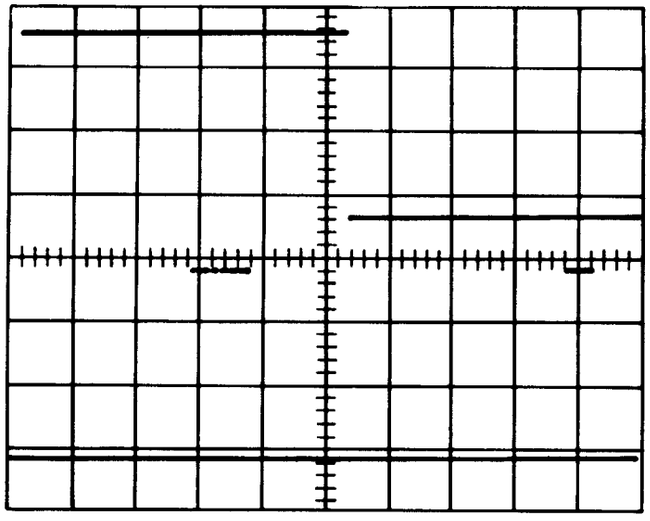


FIG. G

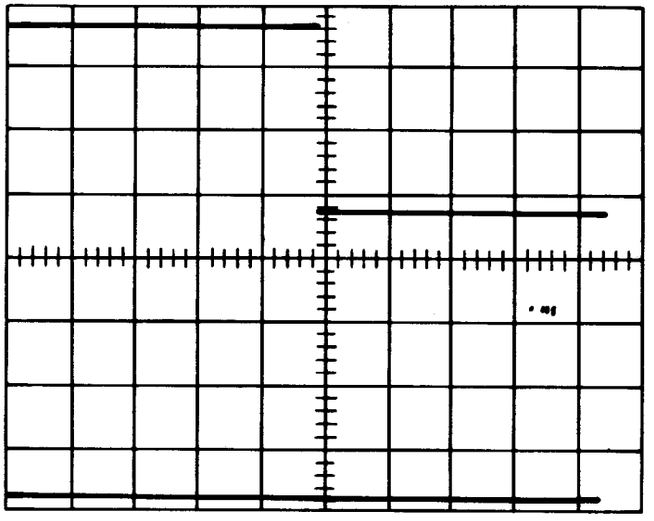


FIG. H

Fig. 3—Clear CP1 Trouble (Sheet 4 of 5)

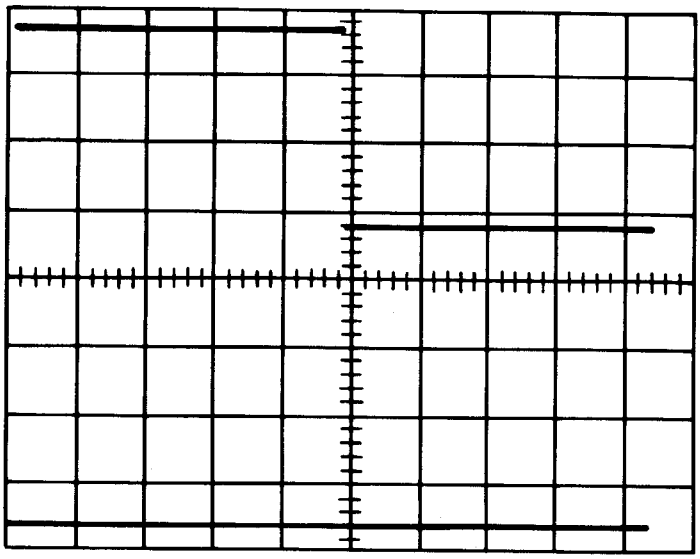


FIG. I

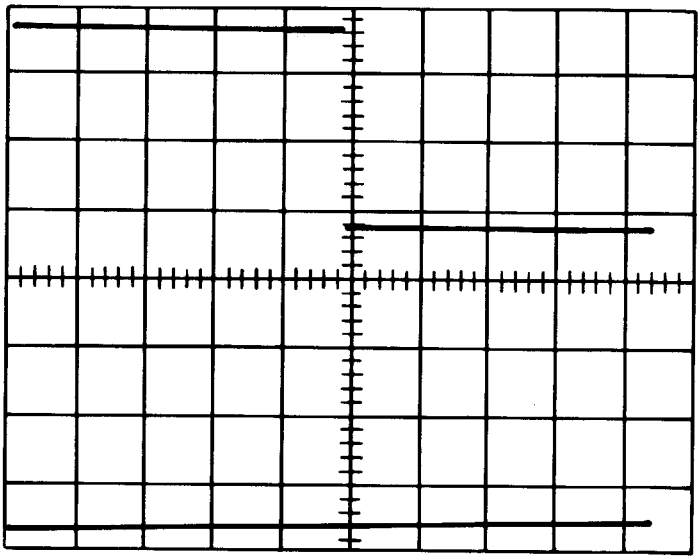


FIG. J

Fig. 3—Clear CP1 Trouble (Sheet 5 of 5)

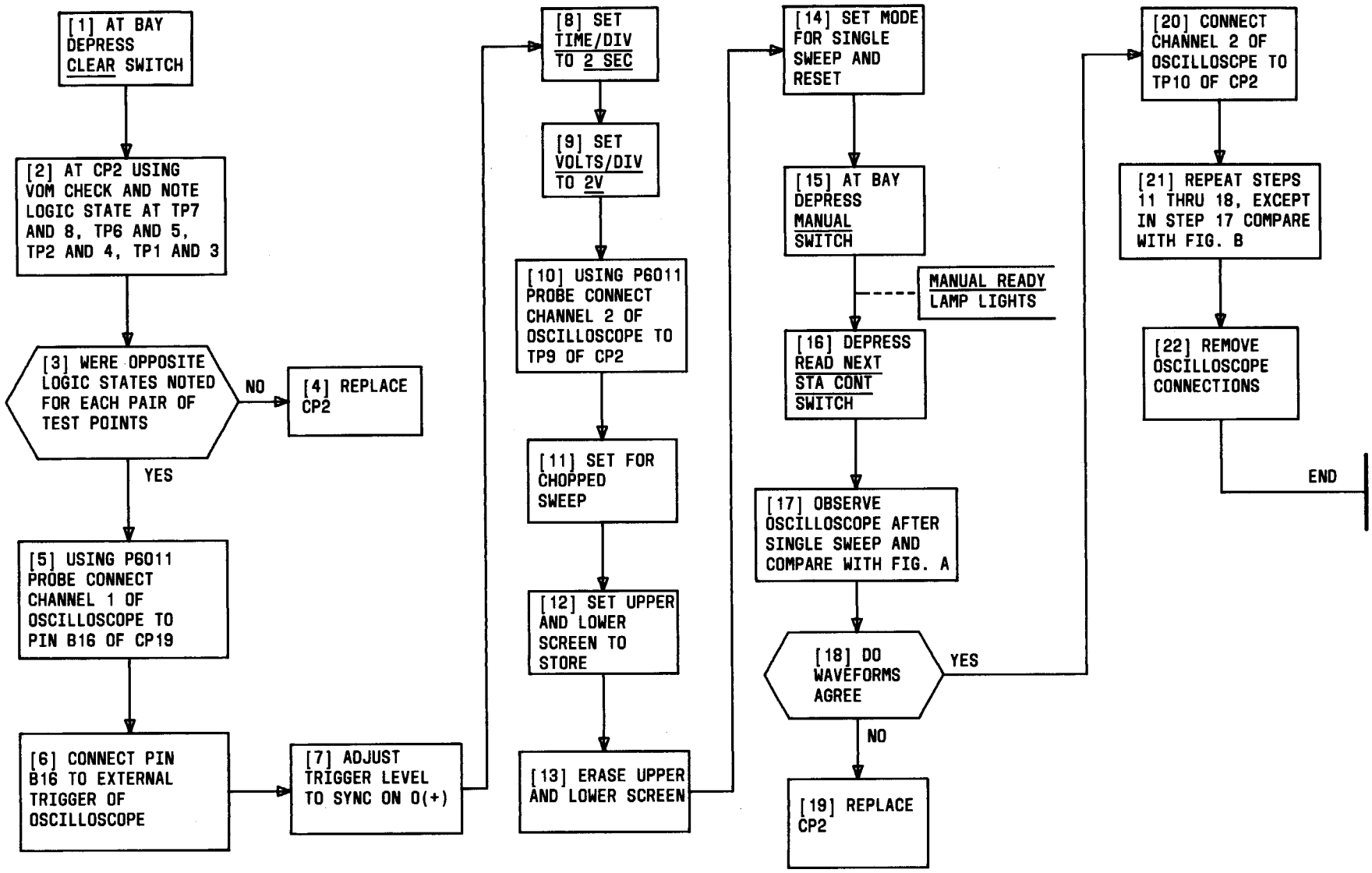


Fig. 4—Clear CP2 Trouble (Sheet 1 of 2)

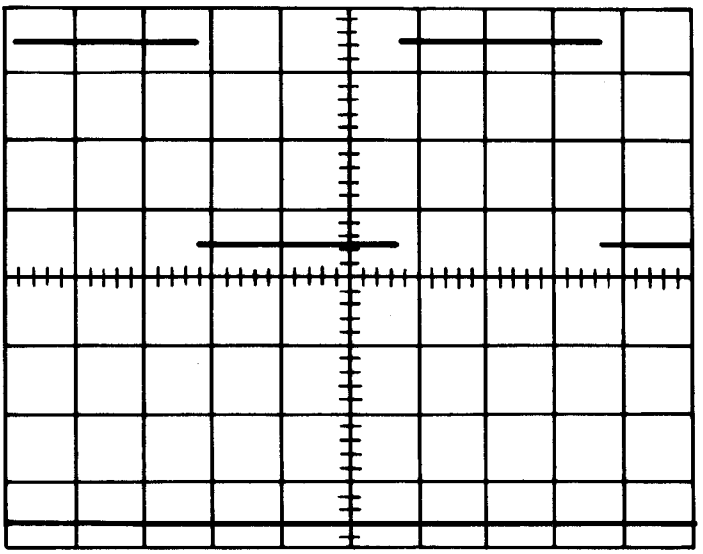


FIG. A

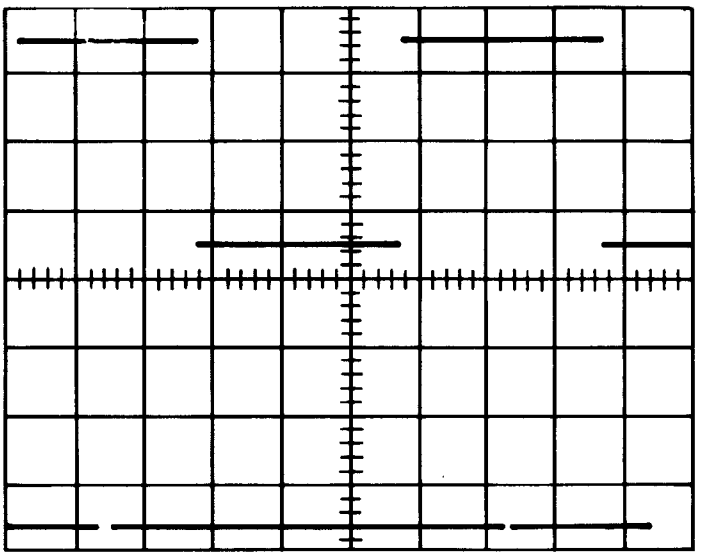


FIG. B

Fig. 4—Clear CP2 Trouble (Sheet 2 of 2)

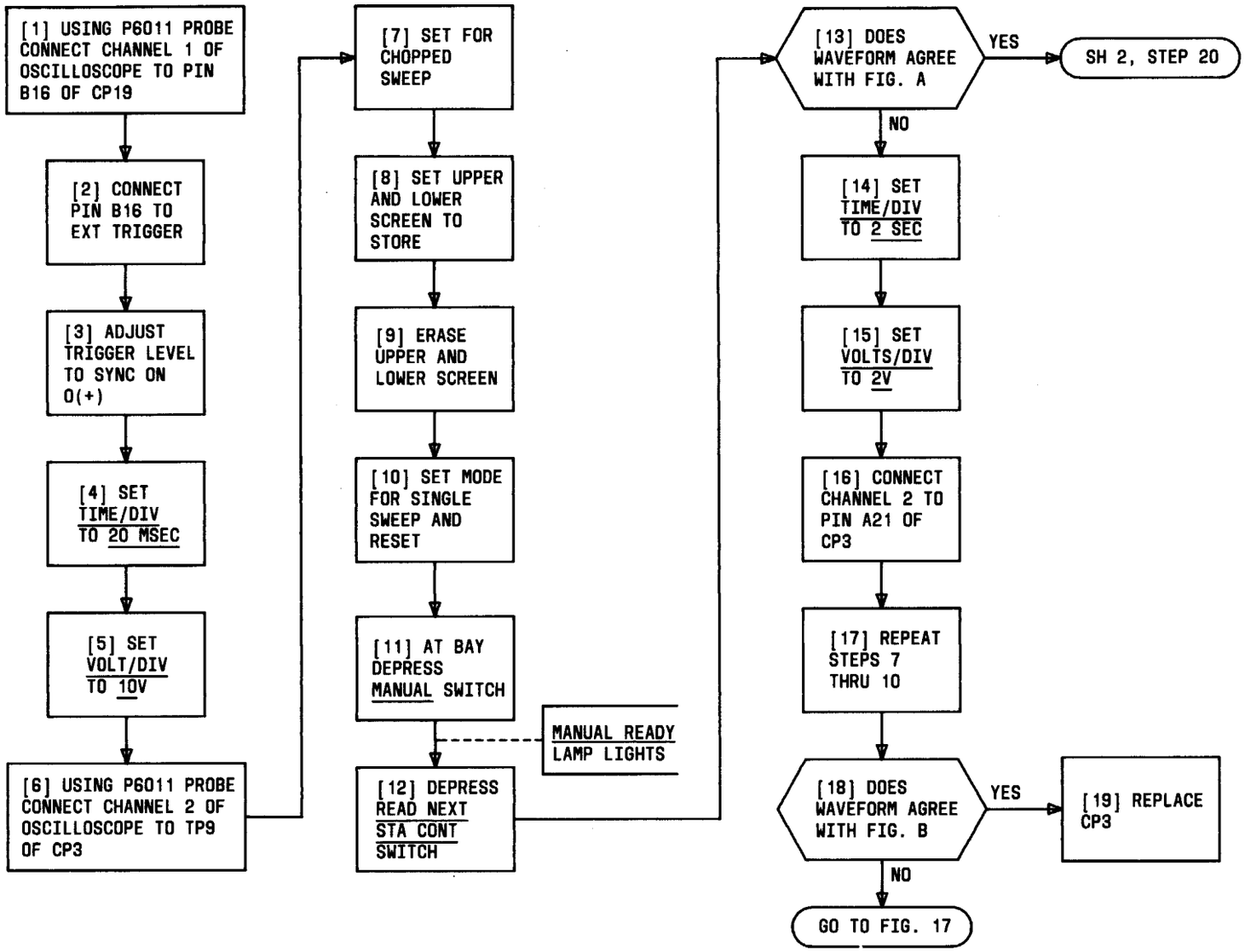


Fig. 5—Clear CP3 Trouble (Sheet 1 of 7)

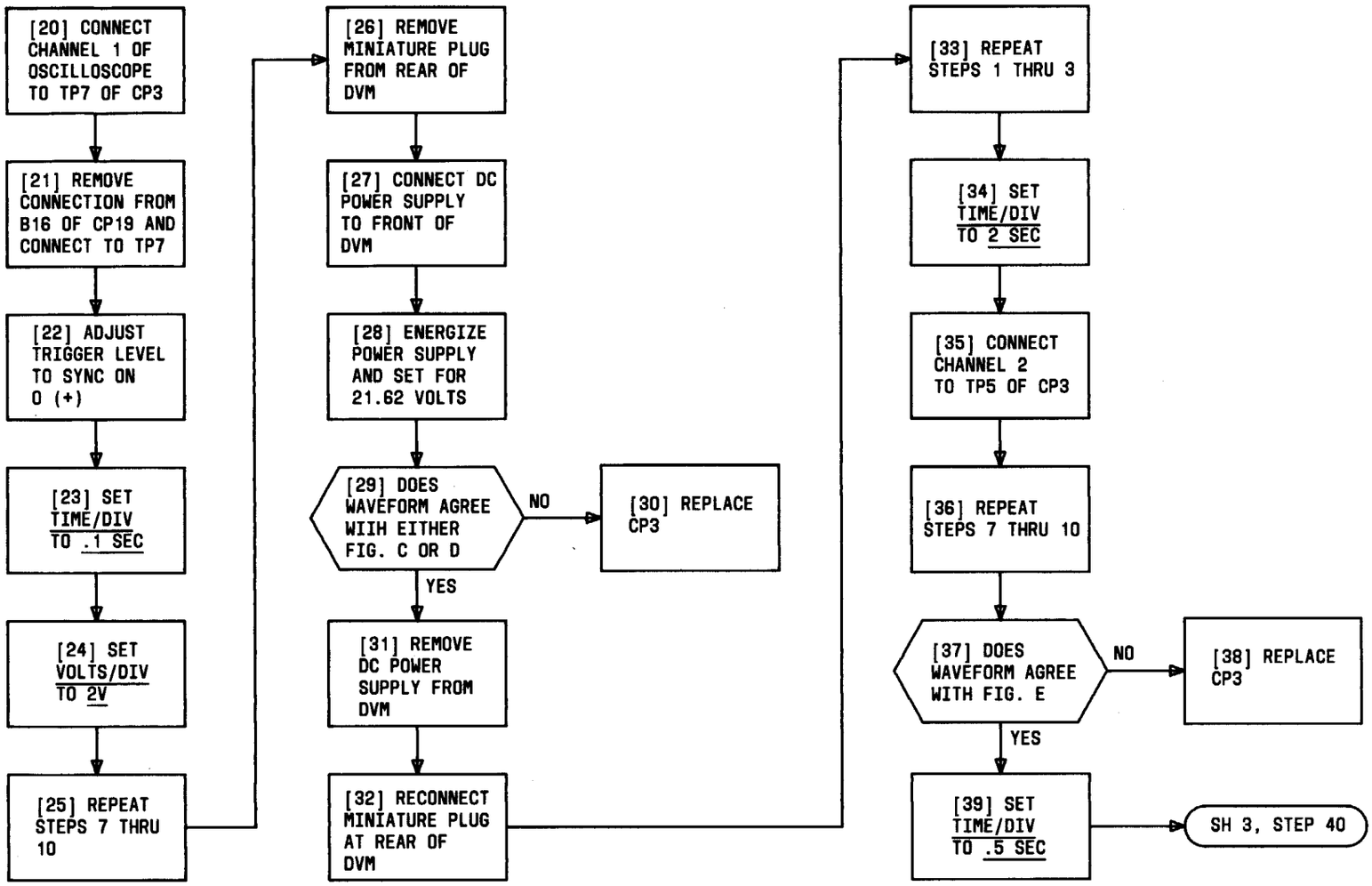


Fig. 5—Clear CP3 Trouble (Sheet 2 of 7)

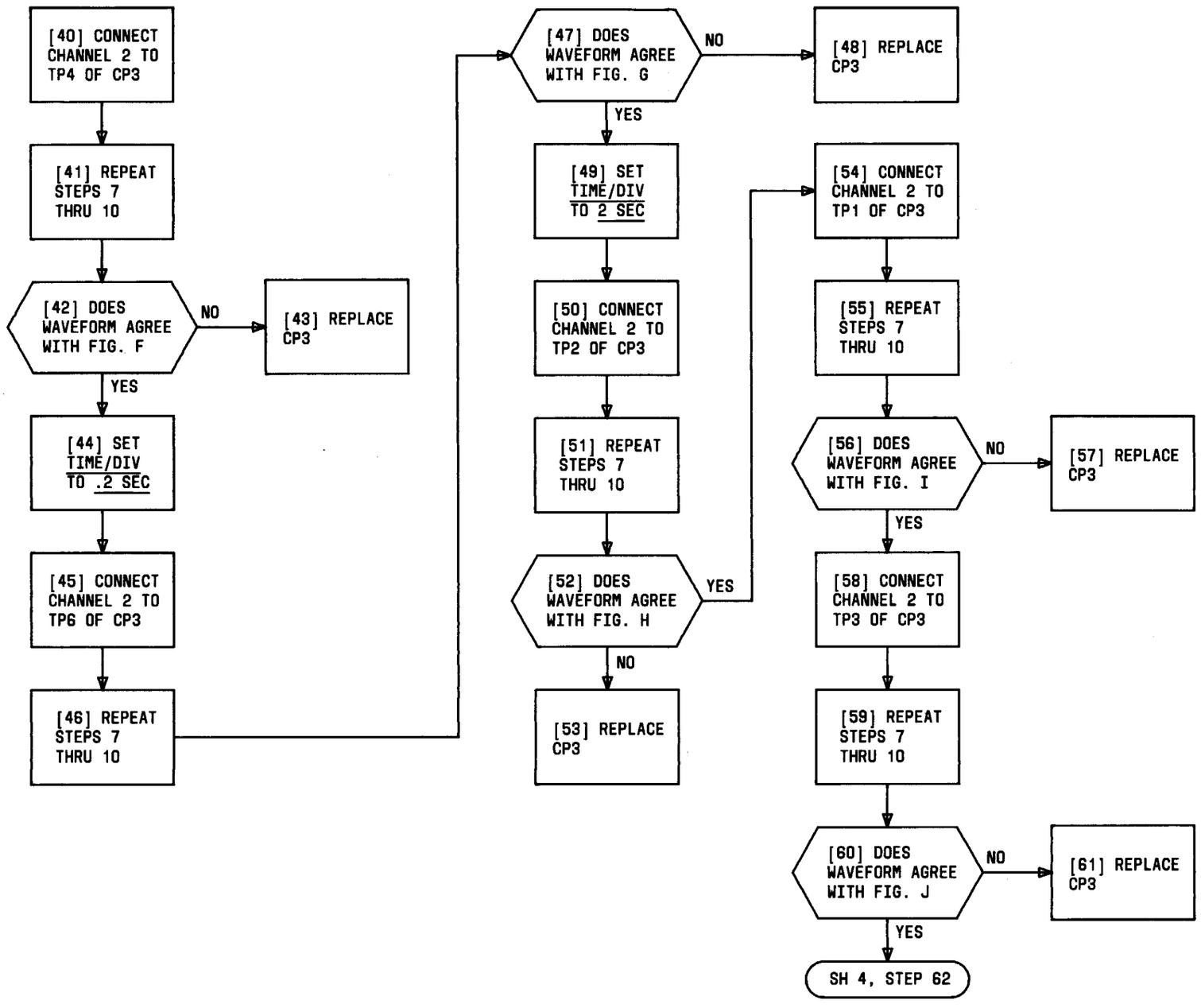


Fig. 5—Clear CP3 Trouble (Sheet 3 of 7)

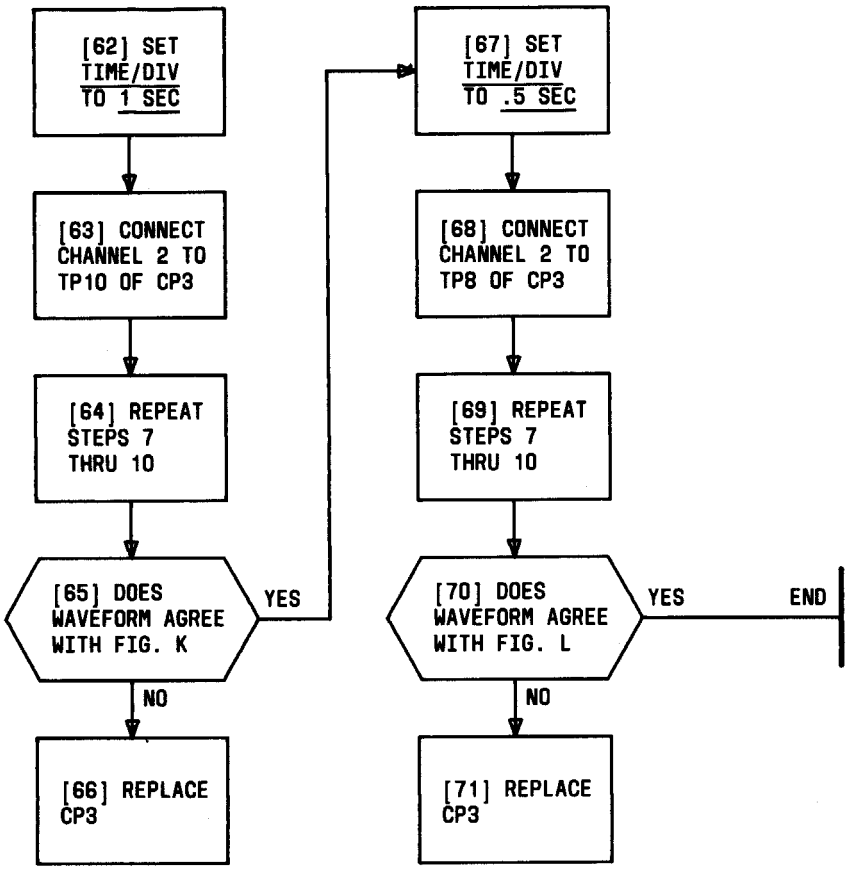


Fig. 5—Clear CP3 Trouble (Sheet 4 of 7)

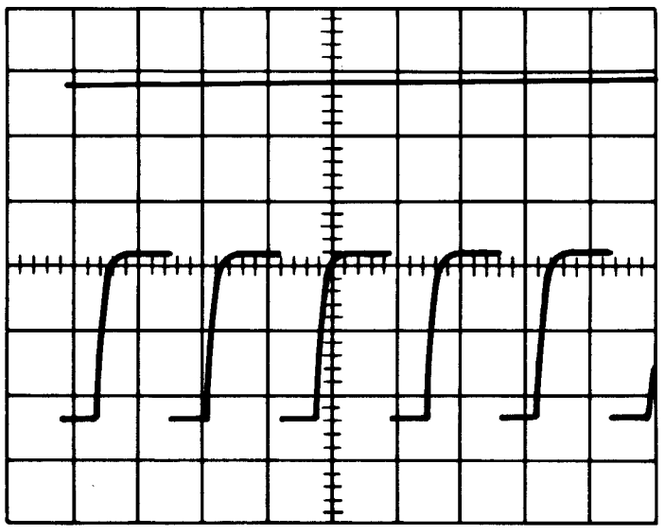


FIG. A

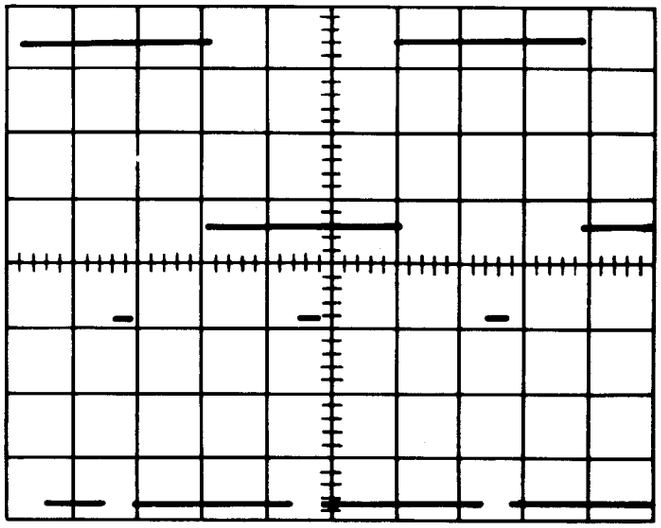


FIG. B

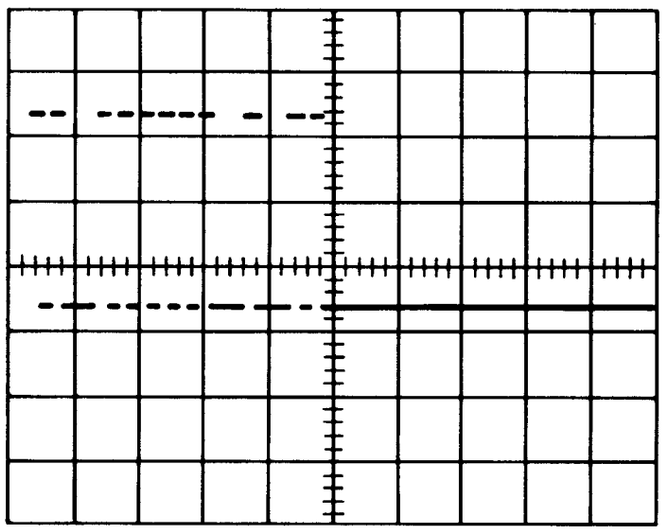


FIG. C

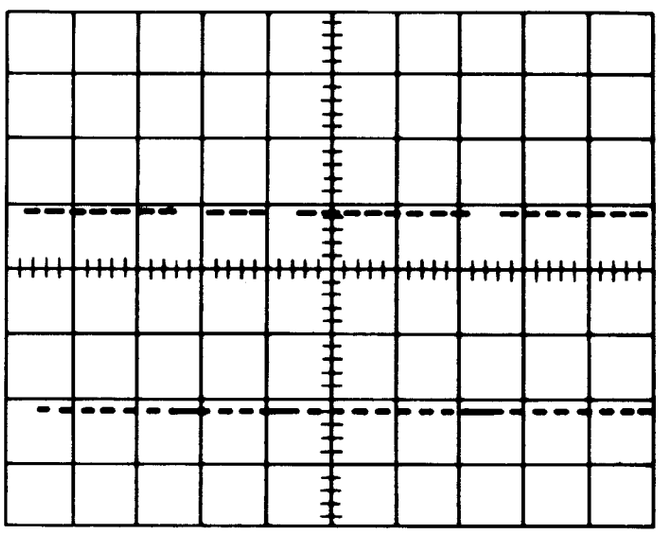


FIG. D

Fig. 5—Clear CP3 Trouble (Sheet 5 of 7)

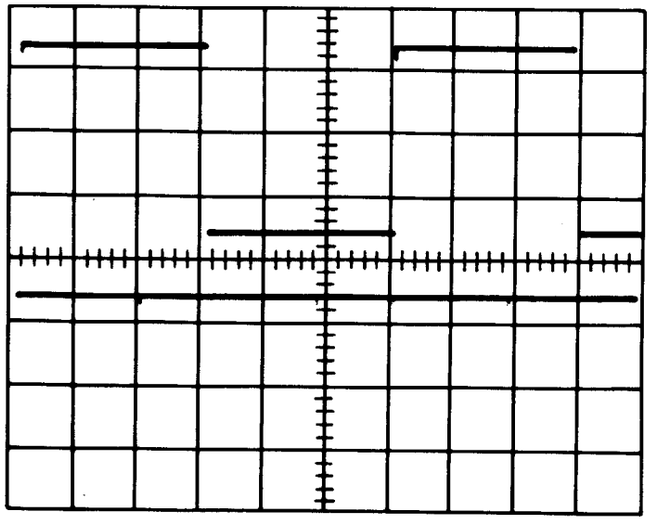


FIG. E

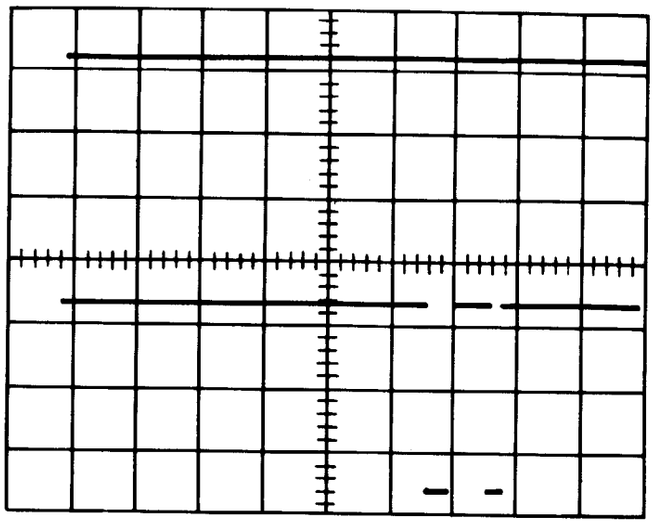


FIG. F

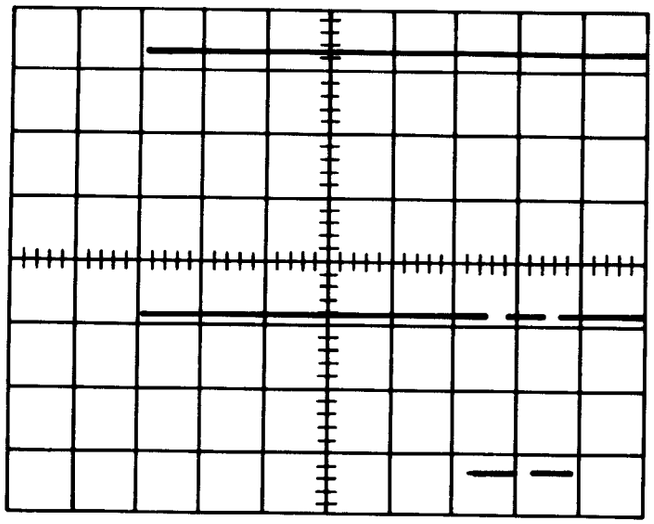


FIG. G

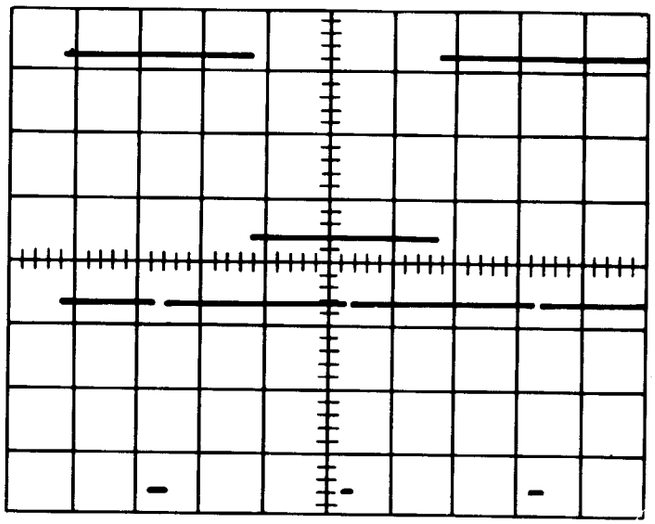


FIG. H

Fig. 5—Clear CP3 Trouble (Sheet 6 of 7)

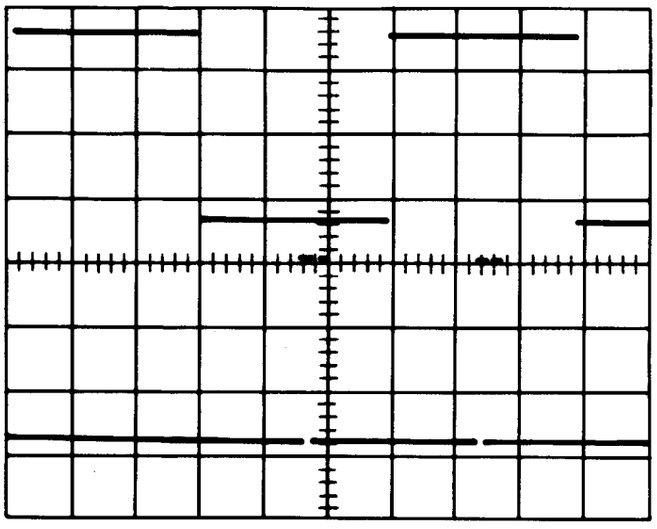


FIG. I

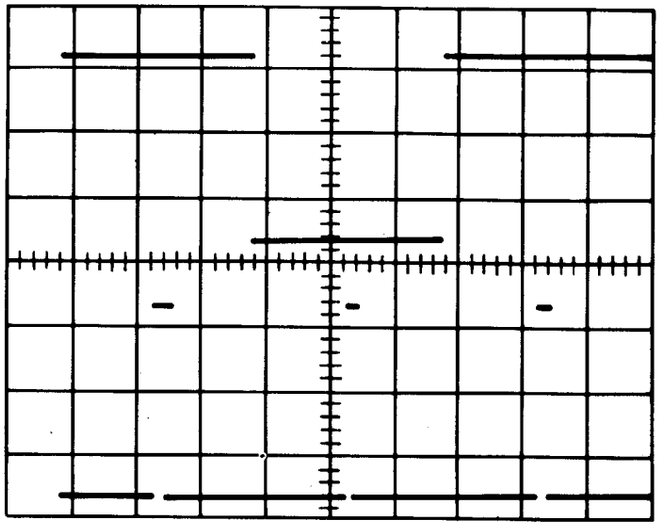


FIG. J

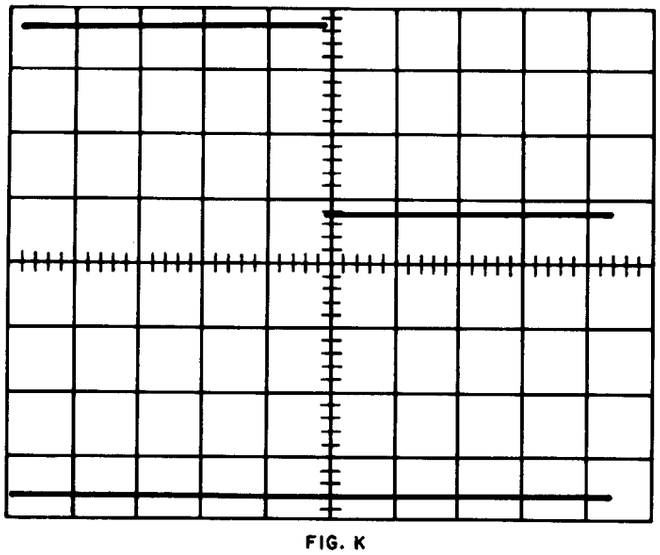


FIG. K

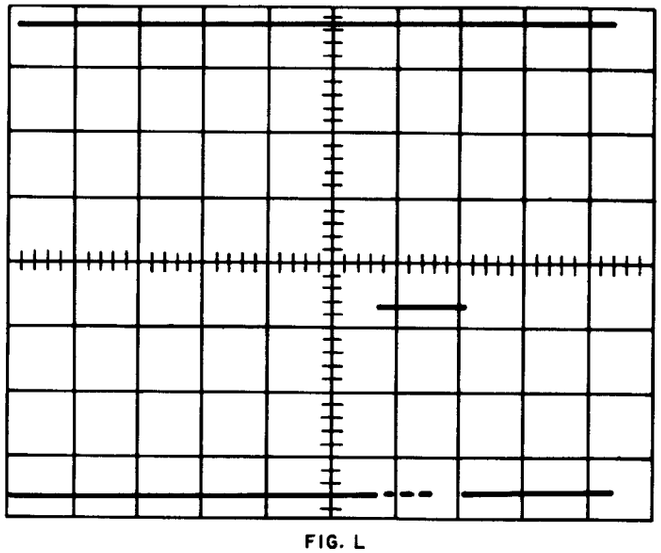


FIG. L

Fig. 5—Clear CP3 Trouble (Sheet 7 of 7)

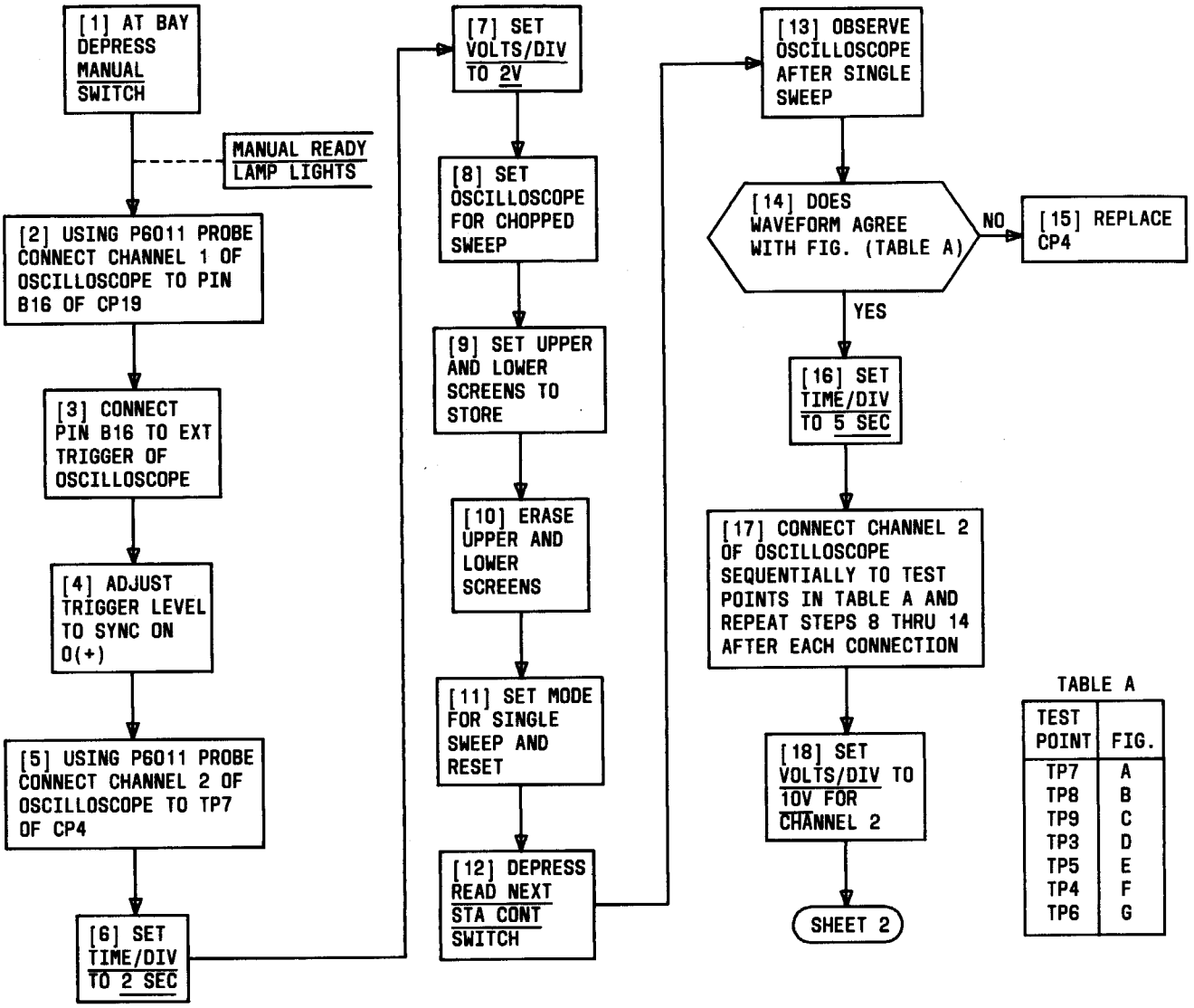


Fig. 6—Clear CP4 Trouble (Sheet 1 of 4)

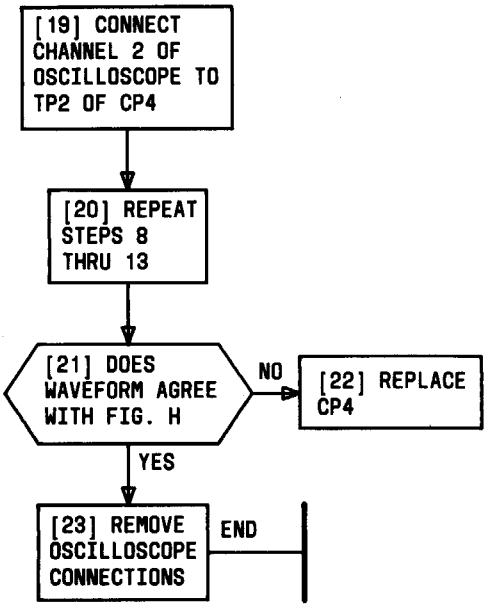


Fig. 6—Clear CP4 Trouble (Sheet 2 of 4)

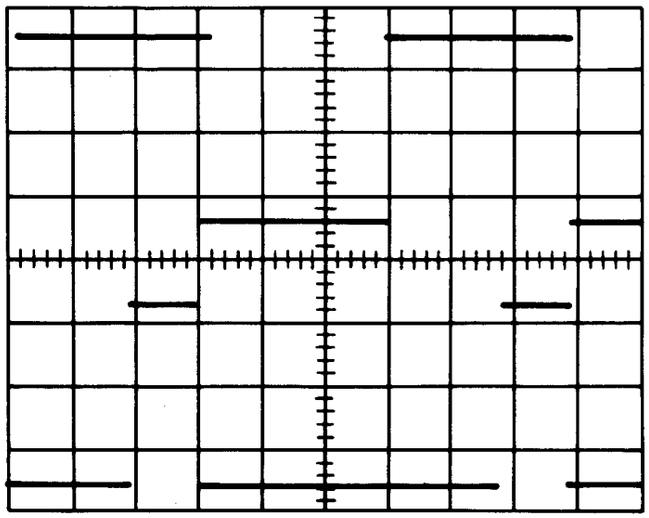


FIG. A

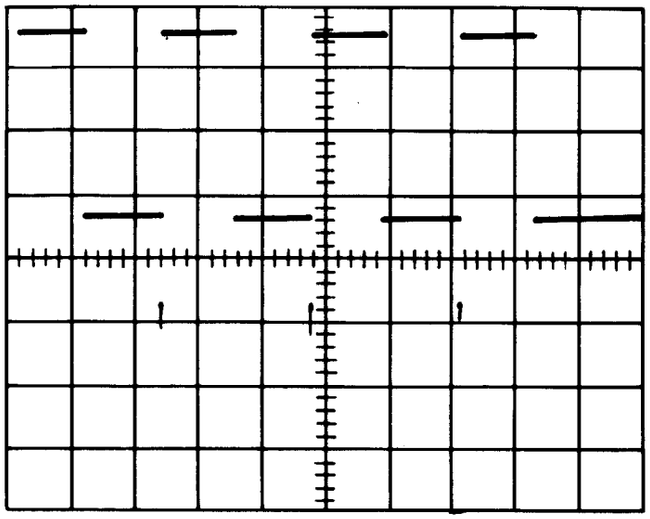


FIG. B

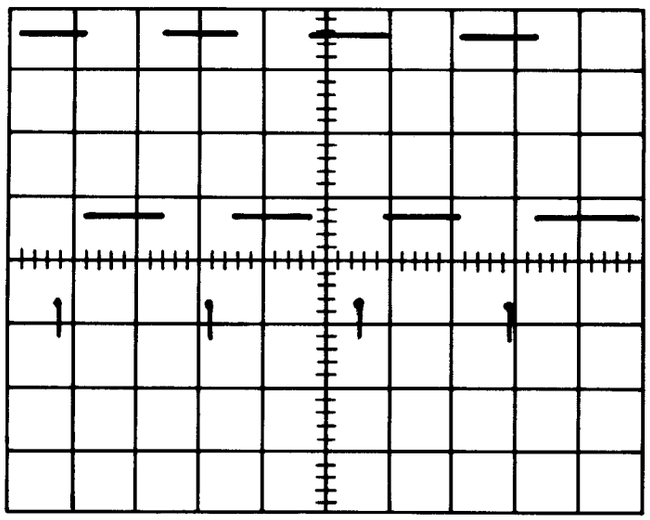


FIG. C

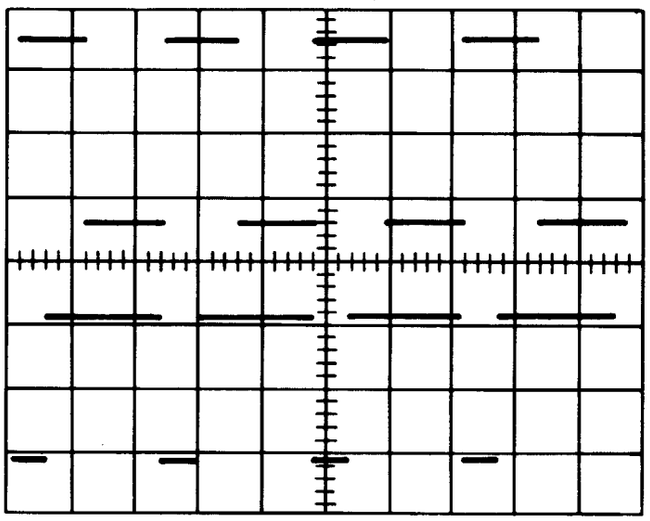


FIG. D

Fig. 6—Clear CP4 Trouble (Sheet 3 of 4)

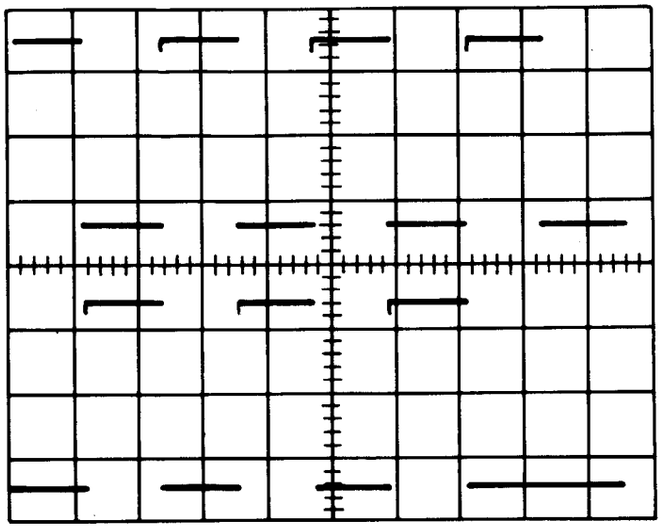


FIG. E

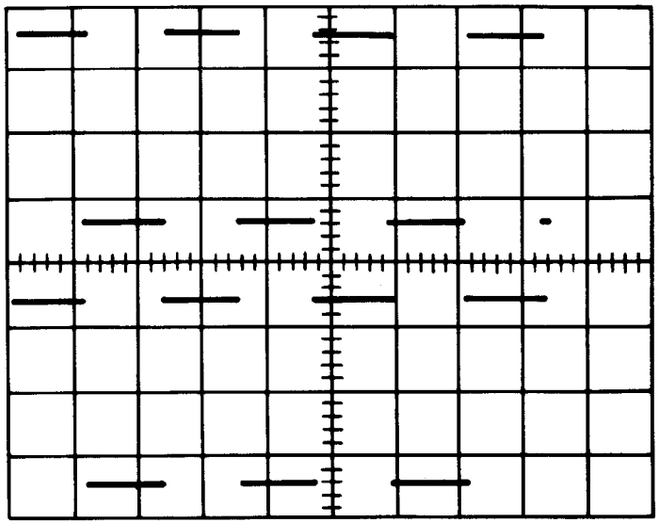


FIG. F

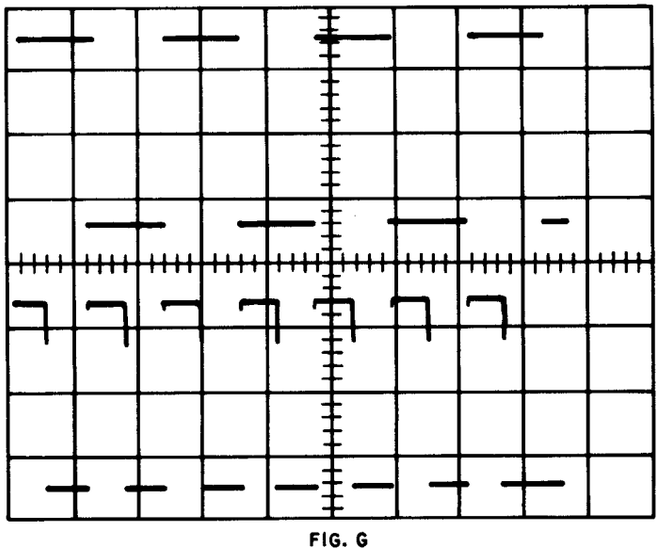


FIG. G

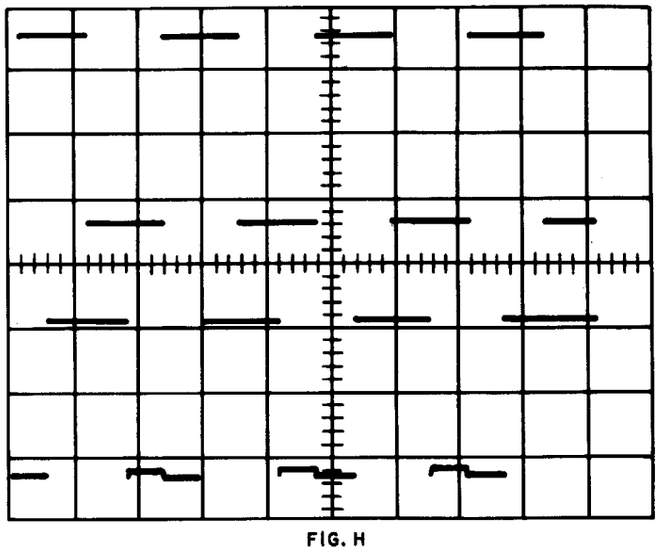


FIG. H

Fig. 6—Clear CP4 Trouble (Sheet 4 of 4)

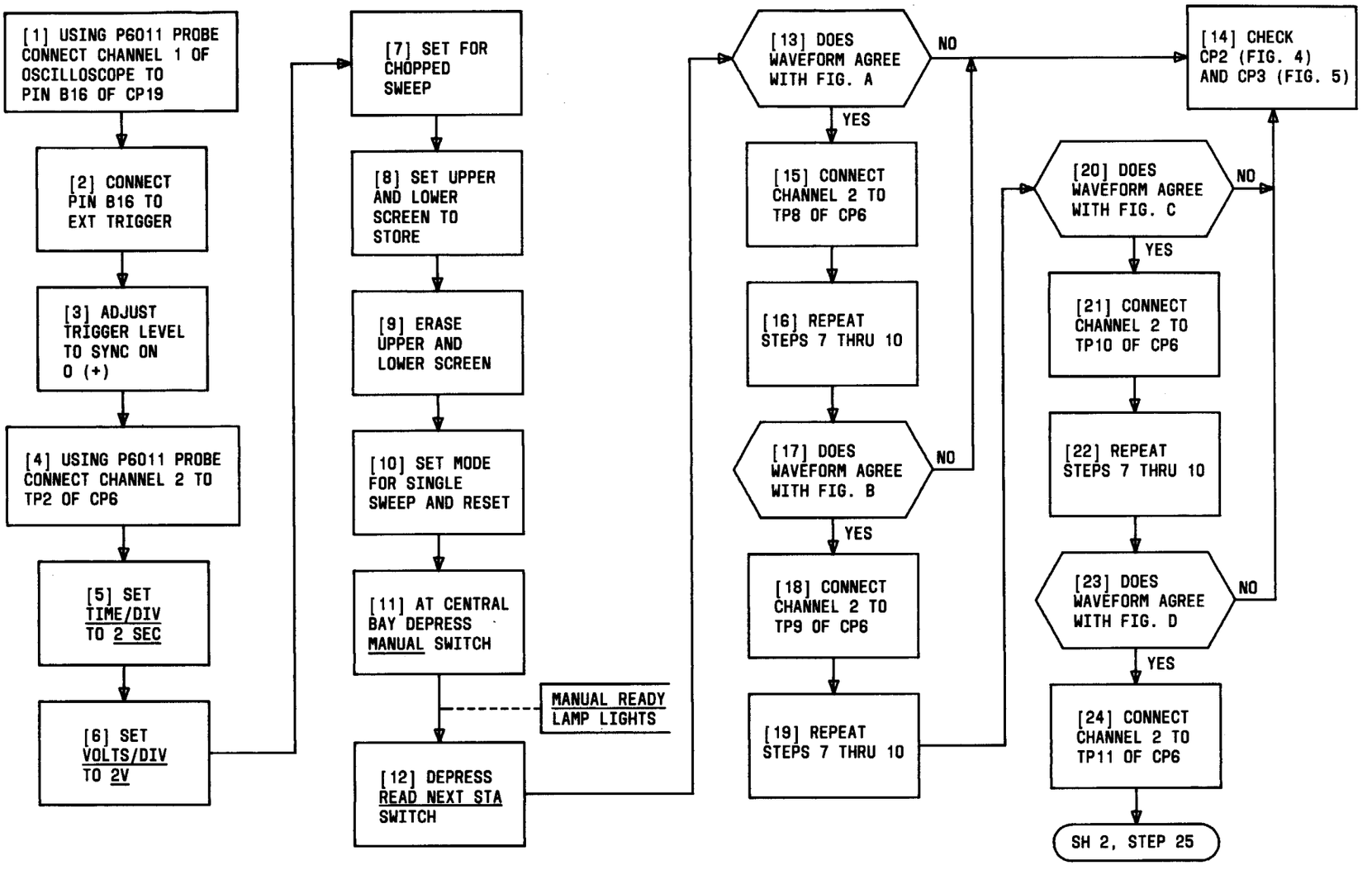


Fig. 7—Clear CP6 Trouble (Sheet 1 of 6)

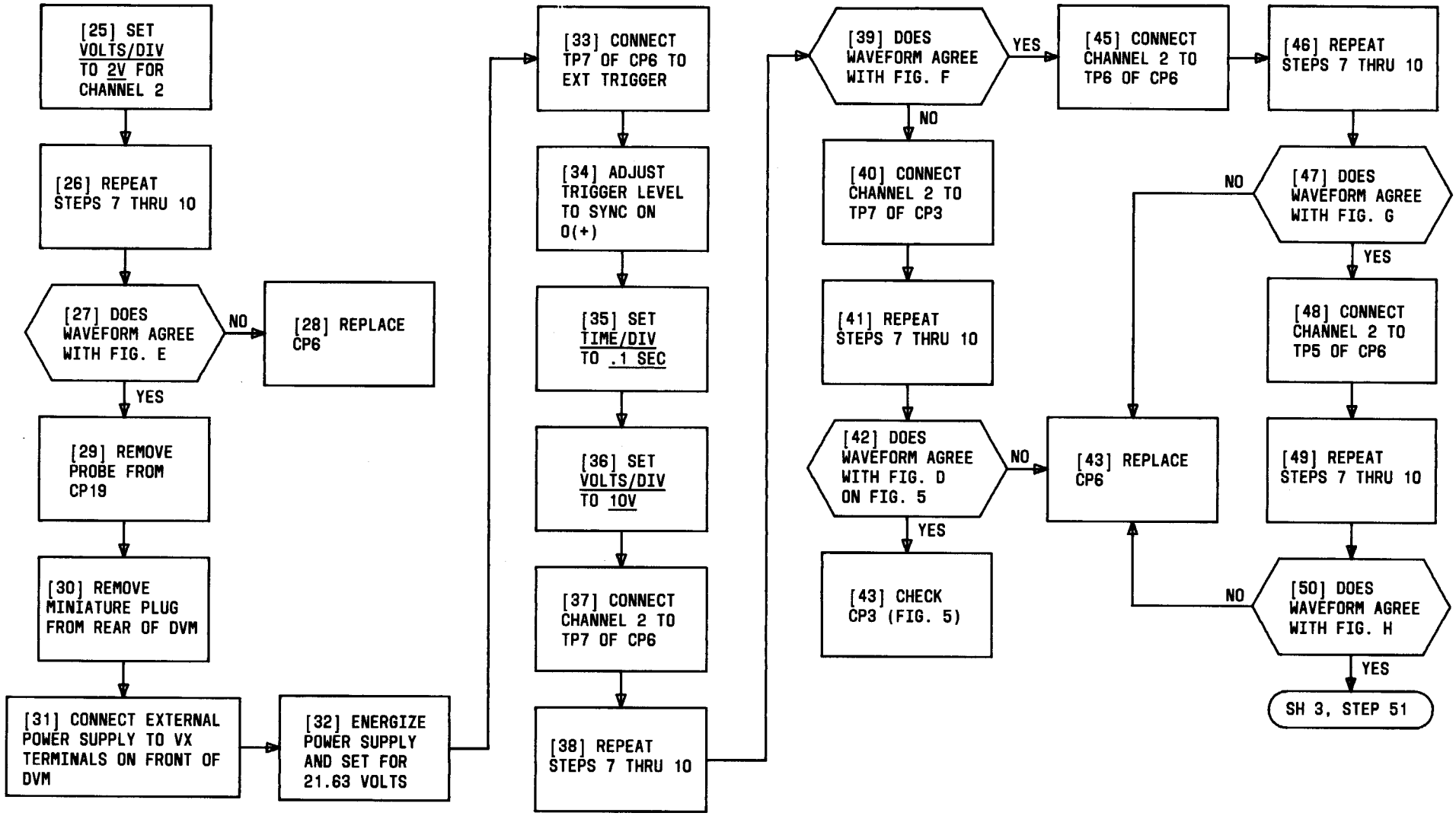


Fig. 7—Clear CP6 Trouble (Sheet 2 of 6)

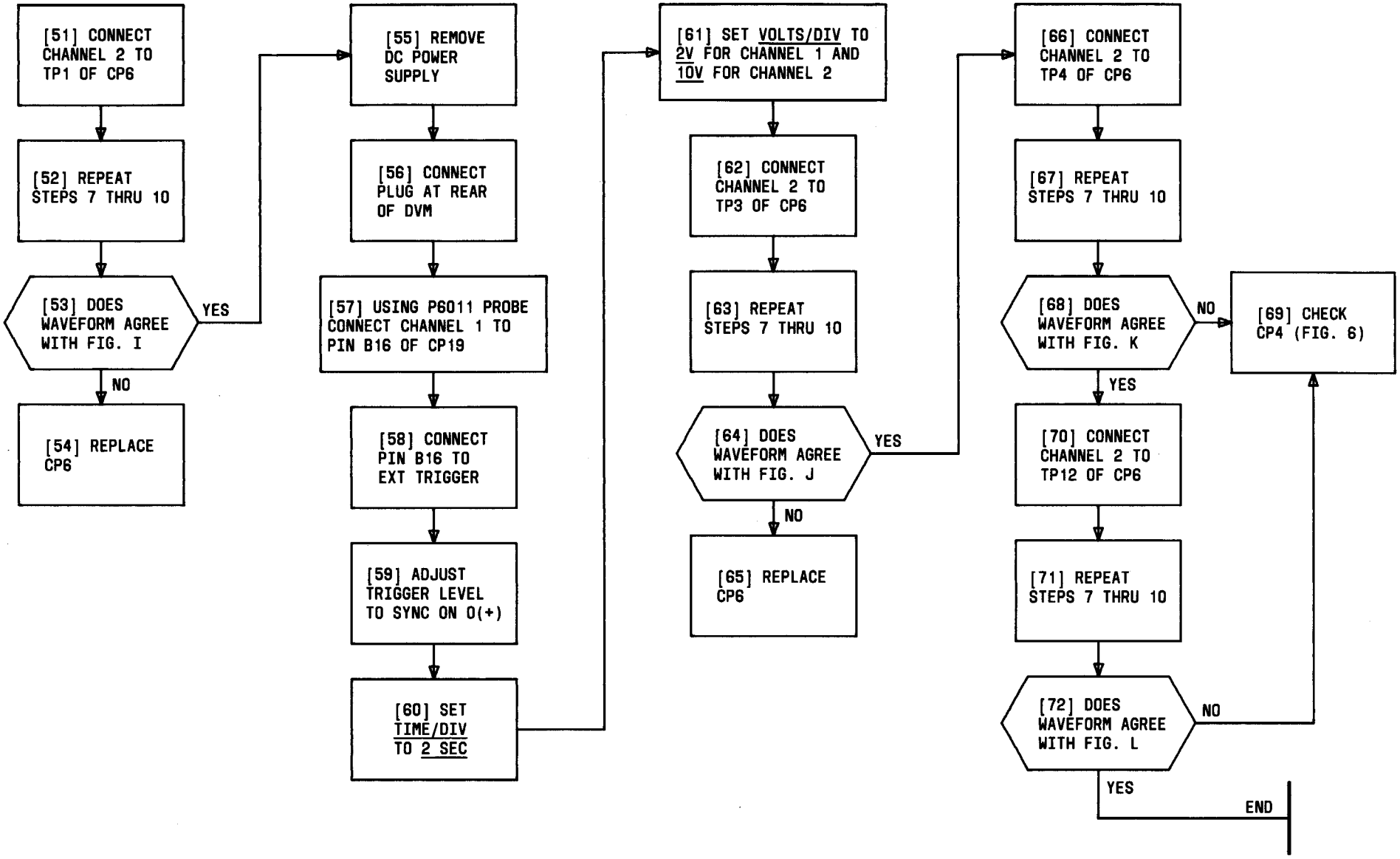


Fig. 7—Clear CP6 Trouble (Sheet 3 of 6)

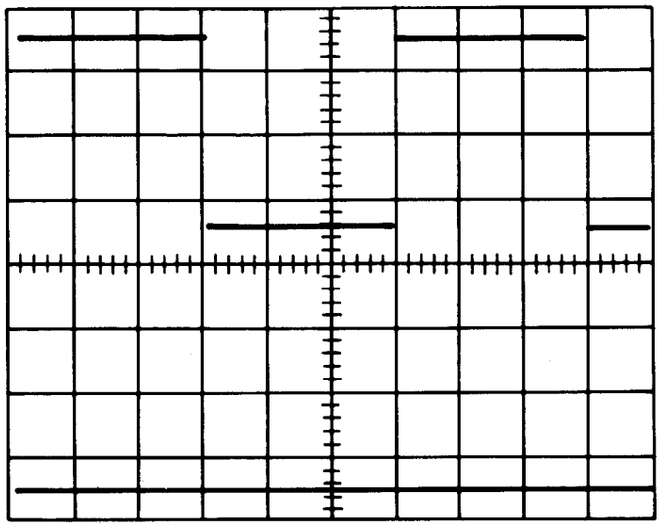


FIG. A

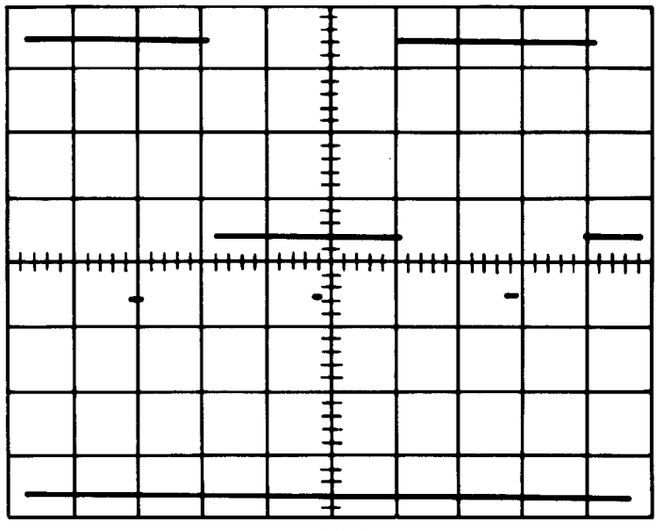


FIG. B

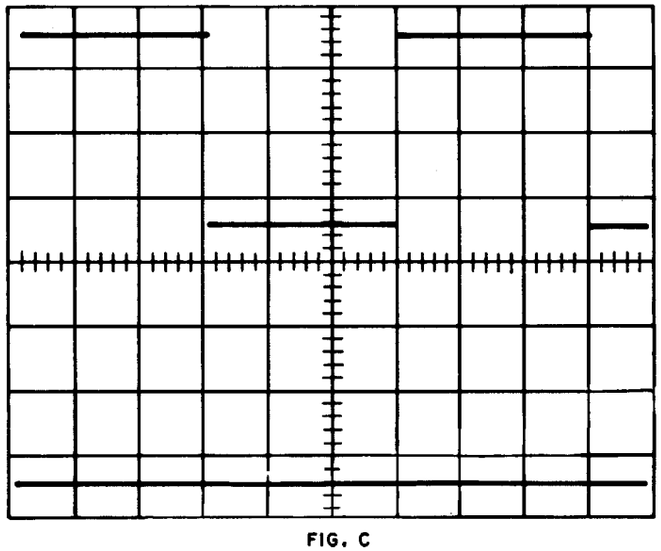


FIG. C

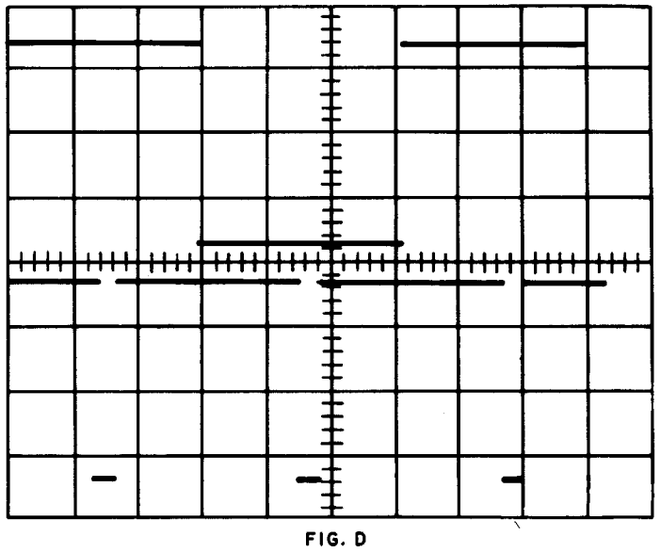


FIG. D

Fig. 7—Clear CP6 Trouble (Sheet 4 of 6)

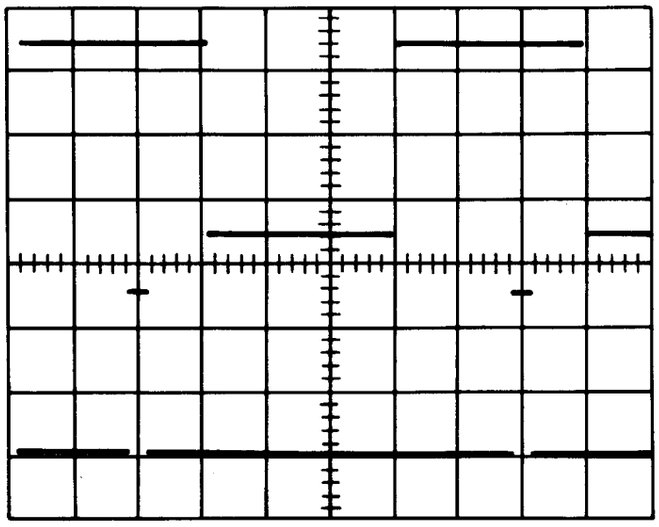


FIG. E

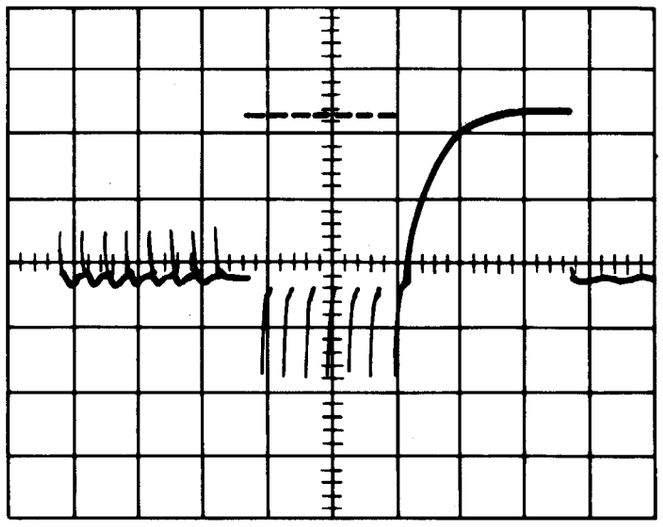


FIG. F

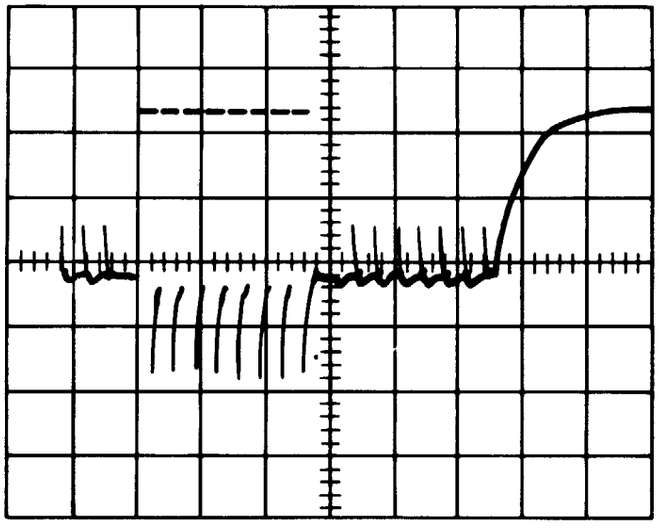


FIG. G

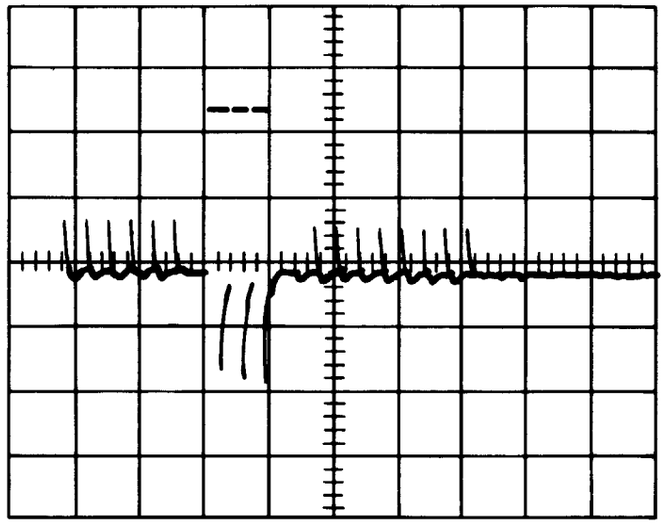


FIG. H

Fig. 7—Clear CP6 Trouble (Sheet 5 of 6)

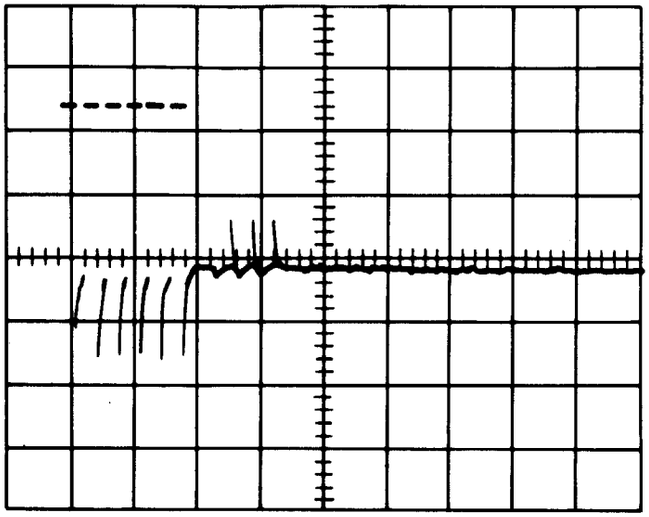


FIG. I

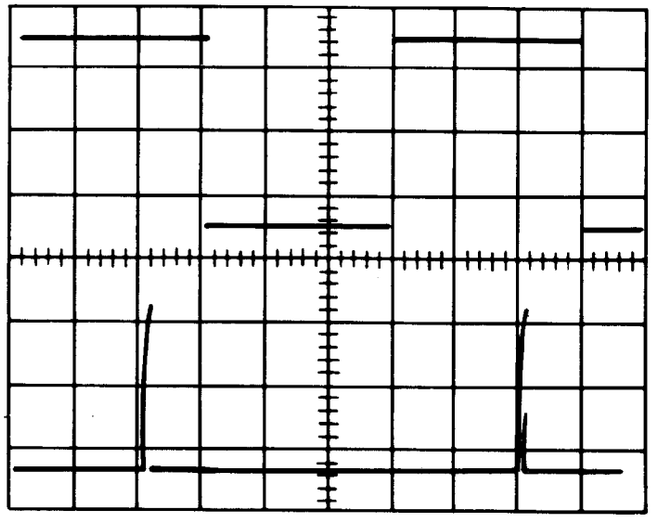


FIG. J

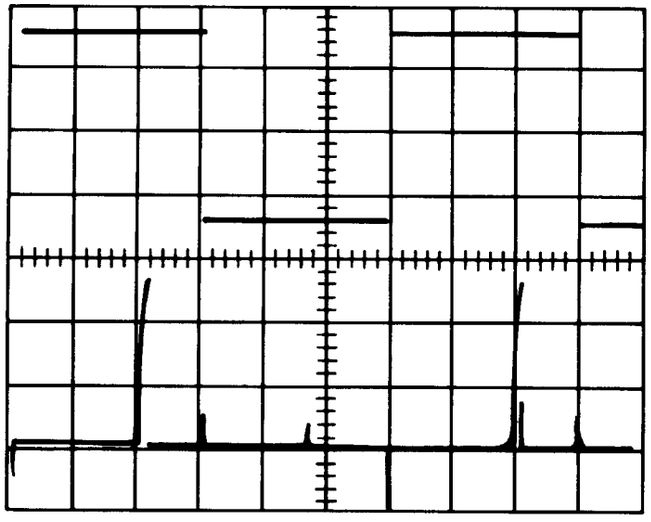


FIG. K

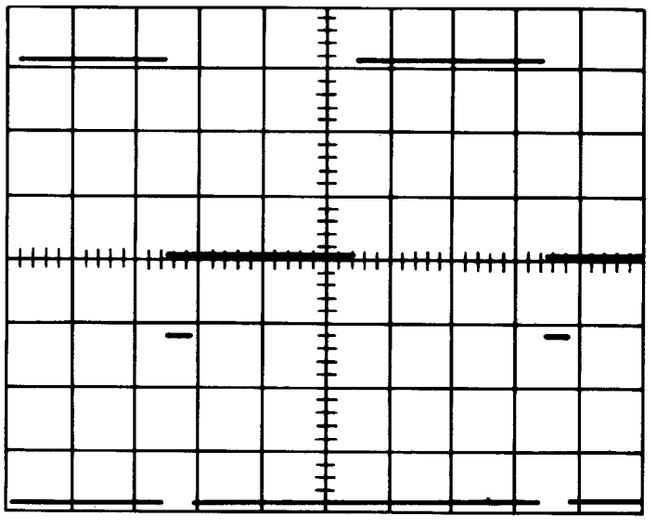


FIG. L

Fig. 7—Clear CP6 Trouble (Sheet 6 of 6)

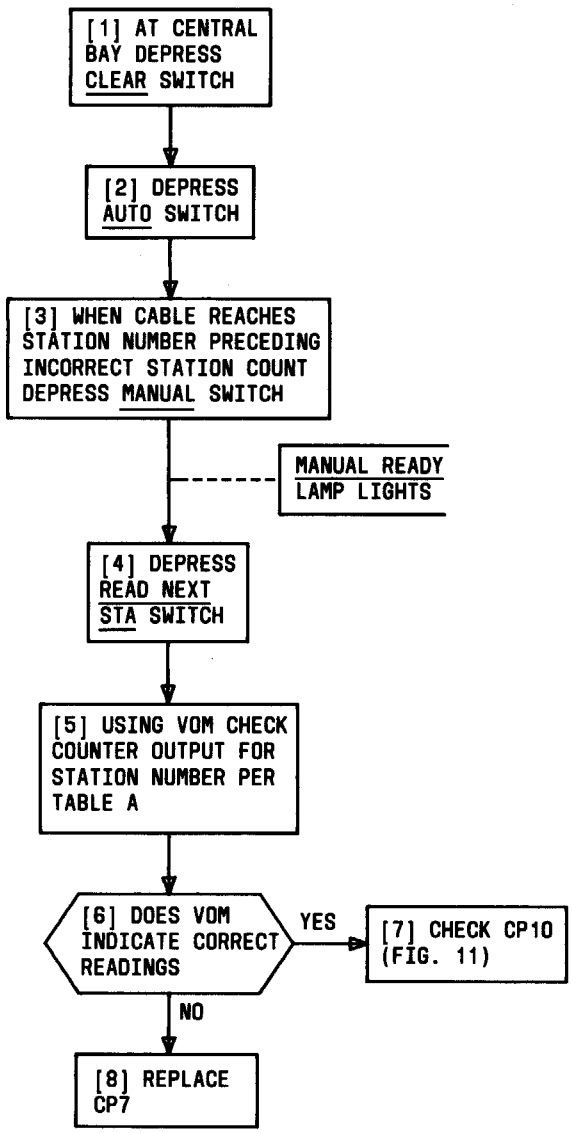


TABLE A

DECIMAL NO.	OUTPUT TEST POINTS AND PIN NUMBERS									
	TP5	TP4	TP3	TP2	TP1	B39	B35	B34	B31	B29
0	0	0	0	0	0	1	1	1	1	1
1	1	0	0	0	0	0	1	1	1	1
2	1	1	0	0	0	0	0	1	1	1
3	1	1	1	0	0	0	0	0	1	1
UNITS 4	1	1	1	1	0	0	0	0	0	1
5	1	1	1	1	1	0	0	0	0	0
6	0	1	1	1	1	1	0	0	0	0
7	0	0	1	1	1	1	1	0	0	0
8	0	0	0	1	1	1	1	1	0	0
9	0	0	0	0	1	1	1	1	1	0
	TP9	TP8	TP7	TP6	TP10	B26	B23	B22	A39	A38
00	0	0	0	0	0	1	1	1	1	1
10	1	0	0	0	0	0	1	1	1	1
20	1	1	0	0	0	0	0	1	1	1
30	1	1	1	0	0	0	0	0	1	1
TENS 40	1	1	1	1	0	0	0	0	0	1
50	1	1	1	1	1	0	0	0	0	0
60	0	1	1	1	1	1	0	0	0	0
70	0	0	1	1	1	1	1	0	0	0
80	0	0	0	1	1	1	1	1	0	0
90	0	0	0	0	1	1	1	1	1	0
HUNDREDS	TP11									
000	0									
100	1									

Fig. 8—Clear CP7 (Station Counter) Trouble

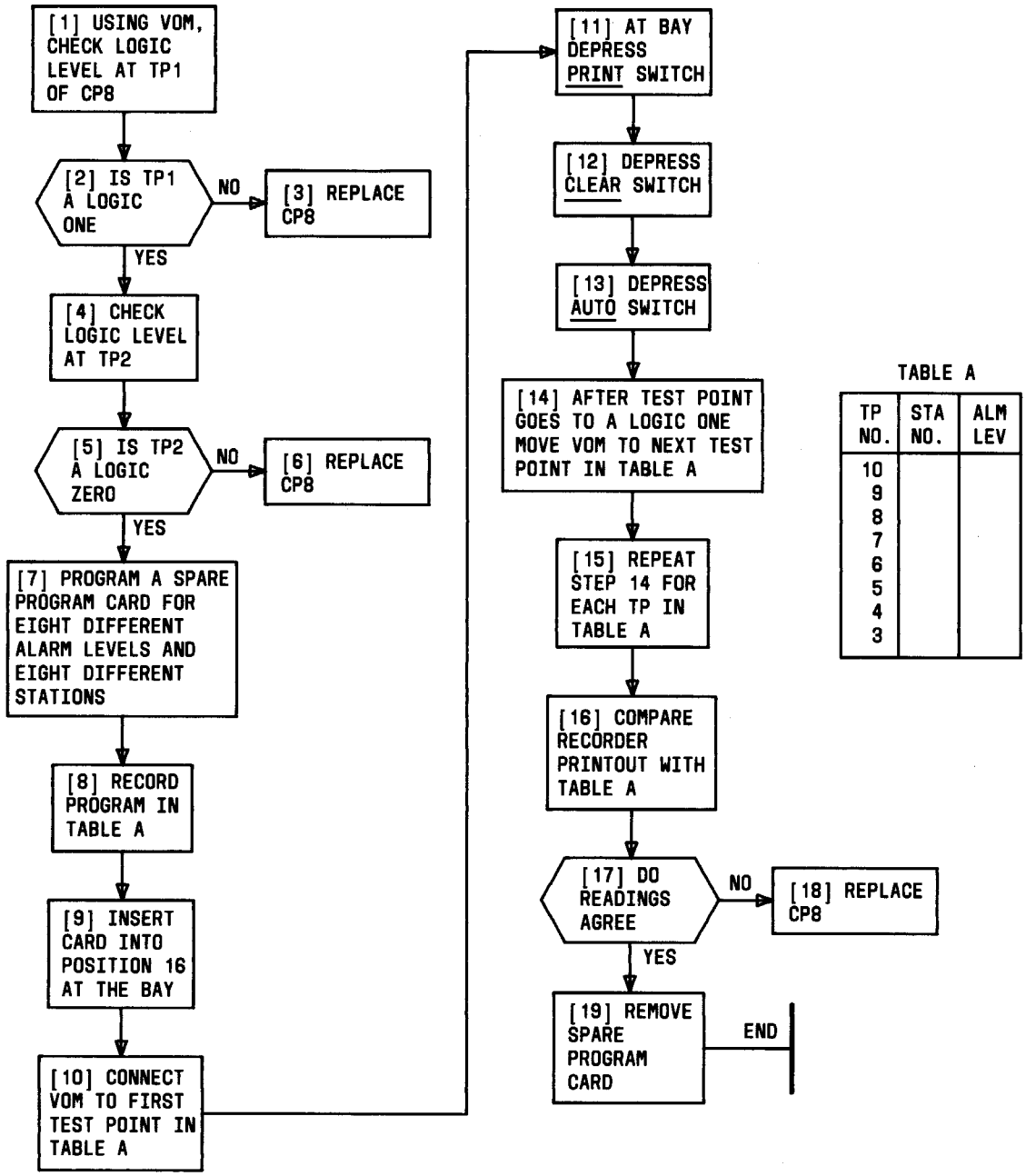


Fig. 9—Clear CP8 Trouble

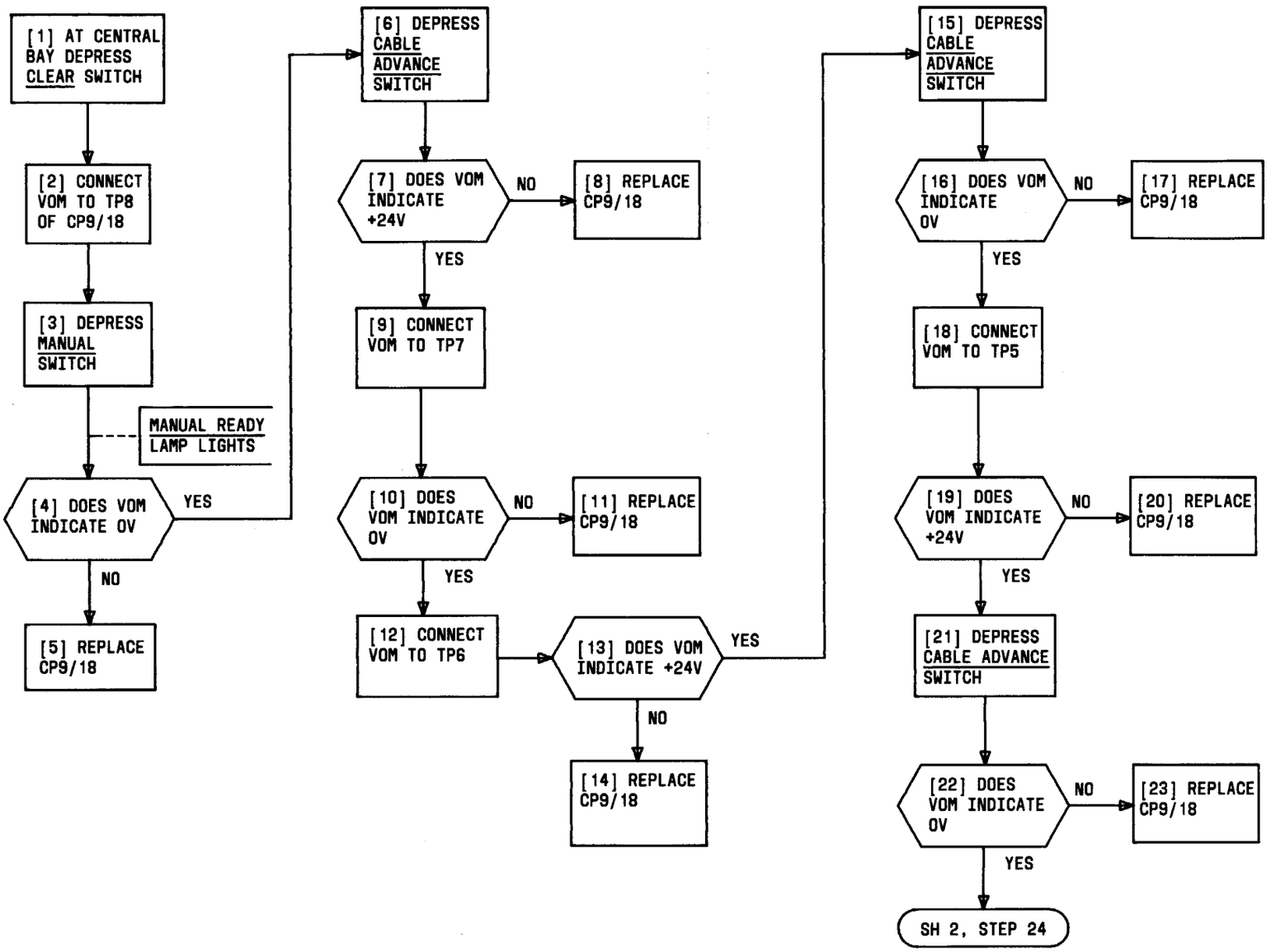


Fig. 10—Clear CP9/18 Trouble (Sheet 1 of 3)

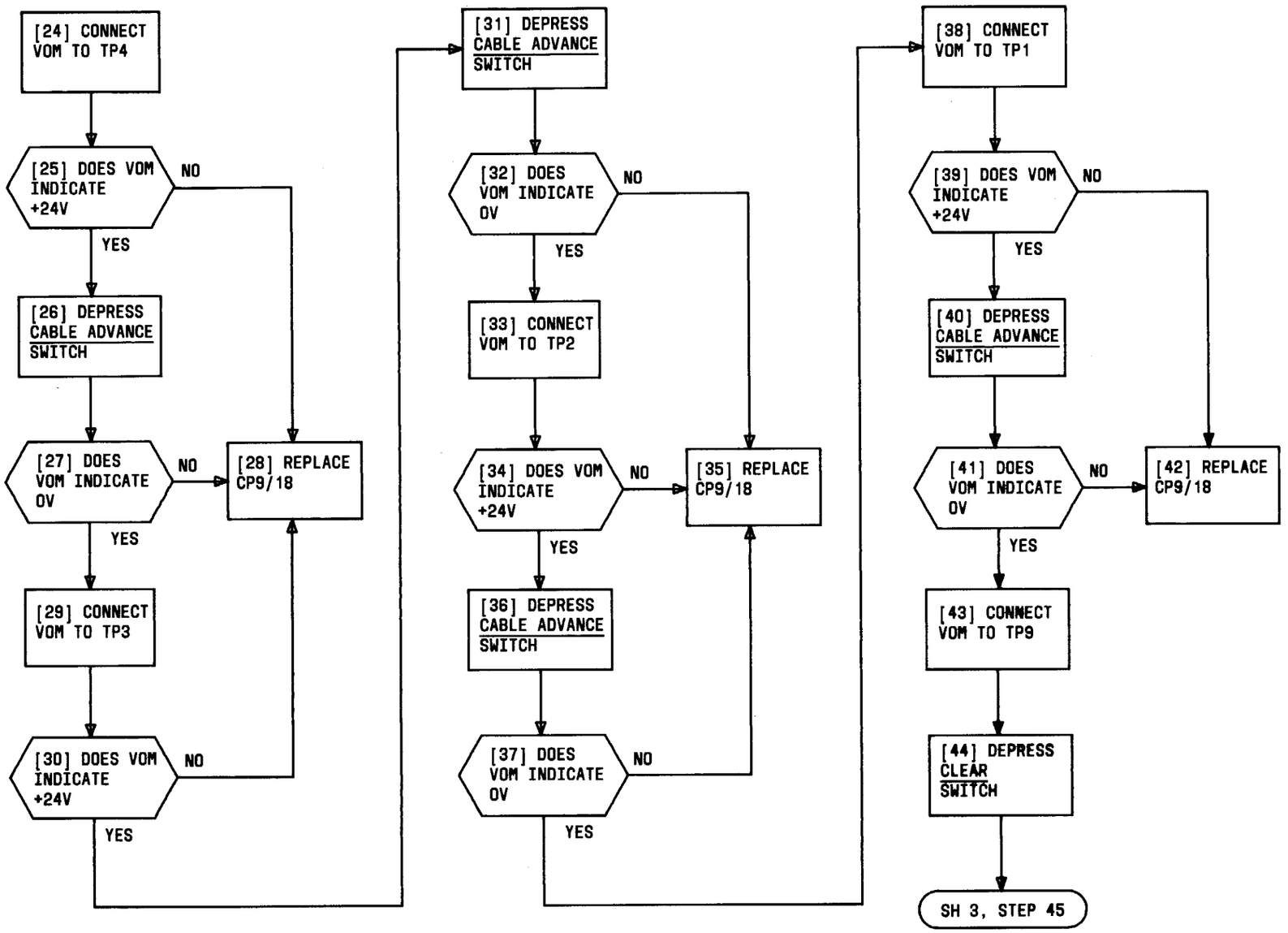


Fig. 10—Clear CP9/18 Trouble (Sheet 2 of 3)

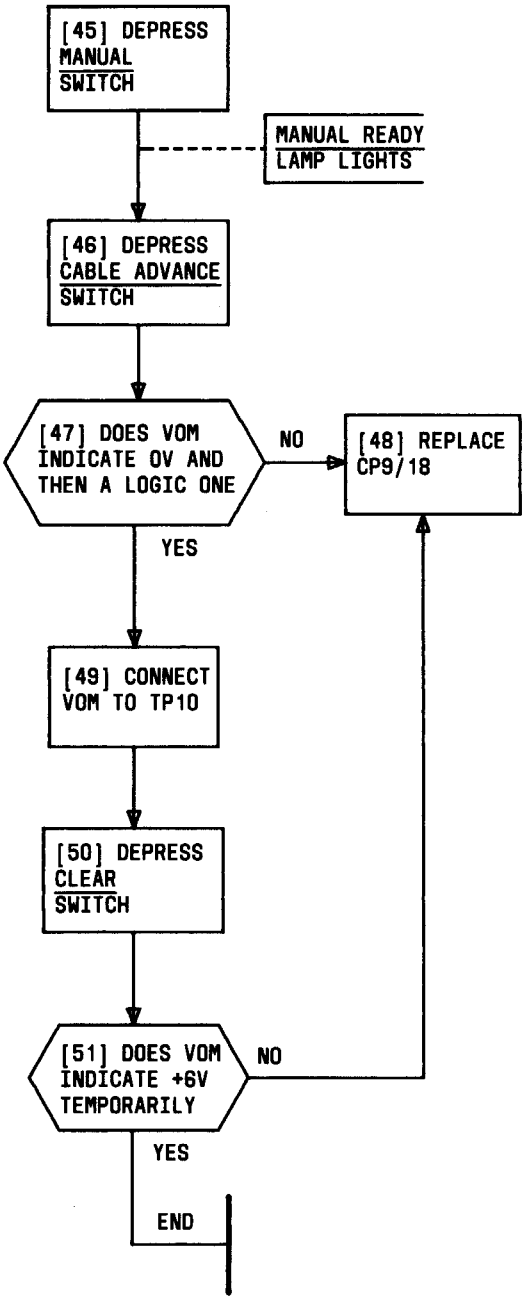


Fig. 10—Clear CP9/18 Trouble (Sheet 3 of 3)

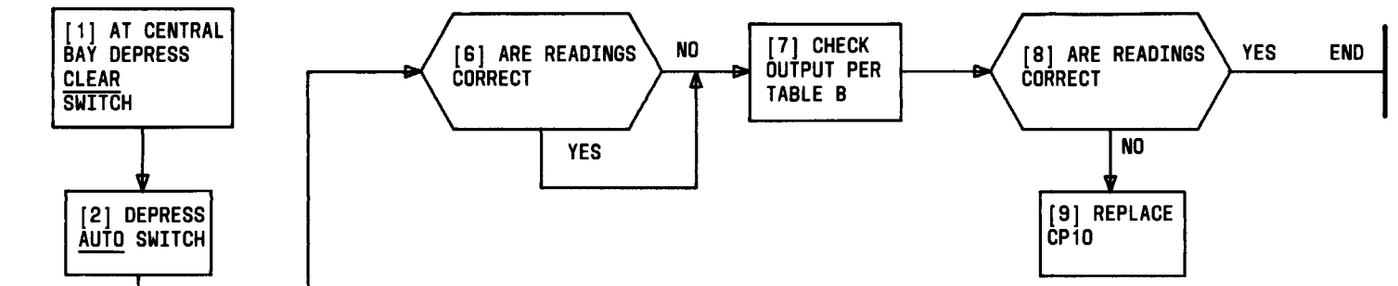


TABLE A

DECIMAL NO.		INPUT PIN NUMBERS									
		B23	A8	B4	A11	A33	A13	B21	A10	B24	A12
UNITS	0	0	0	0	0	0	1	1	1	1	1
	1	1	0	0	0	0	0	1	1	1	1
	2	1	1	0	0	0	0	0	1	1	1
	3	1	1	1	0	0	0	0	0	1	1
	4	1	1	1	1	0	0	0	0	0	1
	5	1	1	1	1	1	0	0	0	0	0
	6	0	1	1	1	1	1	0	0	0	0
	7	0	0	1	1	1	1	1	0	0	0
	8	0	0	0	1	1	1	1	1	0	0
	9	0	0	0	0	1	1	1	1	1	0
		B39	B37	B1	B35	B17	B18	B40	B36	B2	B19
TENS	00	0	0	0	0	0	1	1	1	1	1
	10	1	0	0	0	0	0	1	1	1	1
	20	1	1	0	0	0	0	0	1	1	1
	30	1	1	1	0	0	0	0	0	1	1
	40	1	1	1	1	0	0	0	0	0	1
	50	1	1	1	1	1	0	0	0	0	0
	60	0	1	1	1	1	1	0	0	0	0
	70	0	0	1	1	1	1	1	0	0	0
	80	0	0	0	1	1	1	1	1	0	0
	90	0	0	0	0	1	1	1	1	1	0

TABLE B

DECIMAL NO.		OUTPUT PIN NUMBERS									
		A2	A37	A4	A17	A3	A18	A6	A16	A5	A22
UNITS	0	1	0	0	0	0	0	0	0	0	0
	1	0	1	0	0	0	0	0	0	0	0
	2	0	0	1	0	0	0	0	0	0	0
	3	0	0	0	1	0	0	0	0	0	0
	4	0	0	0	0	1	0	0	0	0	0
	5	0	0	0	0	0	1	0	0	0	0
	6	0	0	0	0	0	0	1	0	0	0
	7	0	0	0	0	0	0	0	1	0	0
	8	0	0	0	0	0	0	0	0	1	0
	9	0	0	0	0	0	0	0	0	0	1
		B5	B20	B6	A14	B26	B8	B25	A19	B28	A15
TENS	00	1	0	0	0	0	0	0	0	0	0
	10	0	1	0	0	0	0	0	0	0	0
	20	0	0	1	0	0	0	0	0	0	0
	30	0	0	0	1	0	0	0	0	0	0
	40	0	0	0	0	1	0	0	0	0	0
	50	0	0	0	0	0	1	0	0	0	0
	60	0	0	0	0	0	0	1	0	0	0
	70	0	0	0	0	0	0	0	1	0	0
	80	0	0	0	0	0	0	0	0	1	0
	90	0	0	0	0	0	0	0	0	0	1

Fig. 11—Clear CP10 (Translator) Trouble

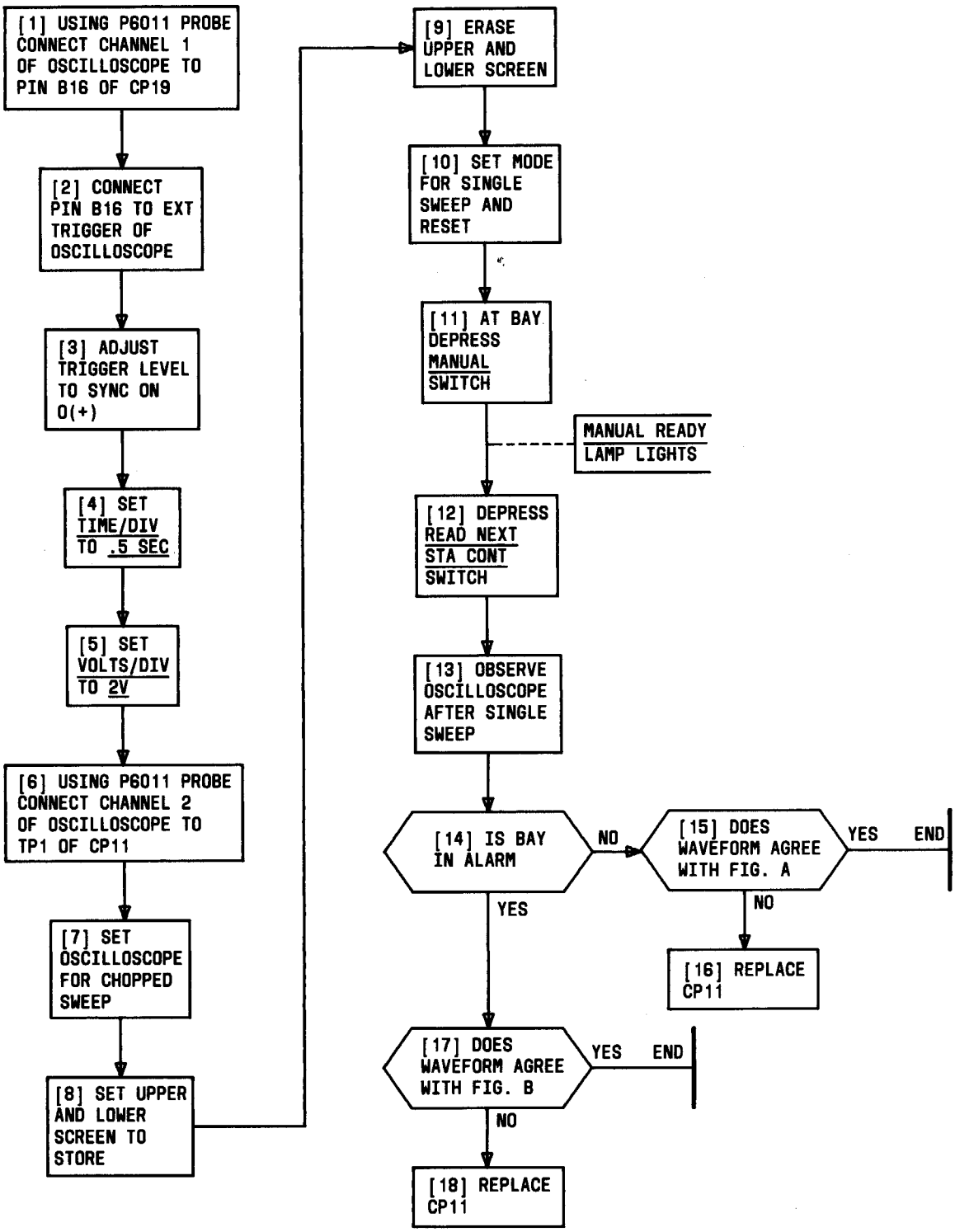


Fig. 12—Clear CP11 Trouble (Sheet 1 of 2)

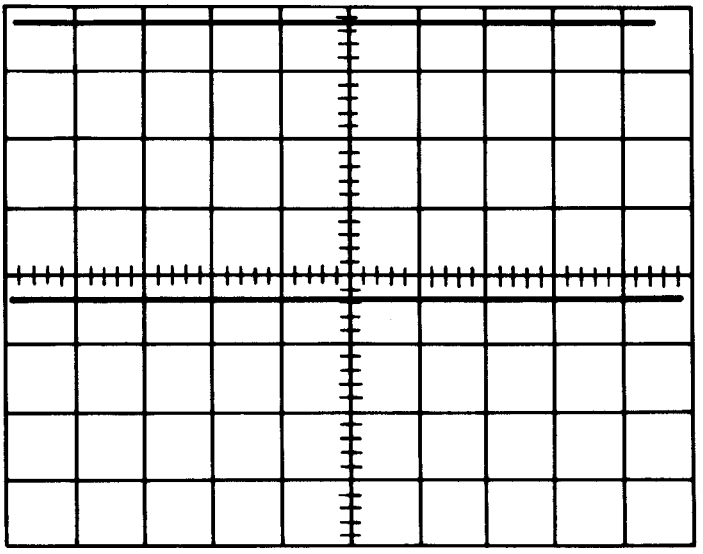


FIG. A

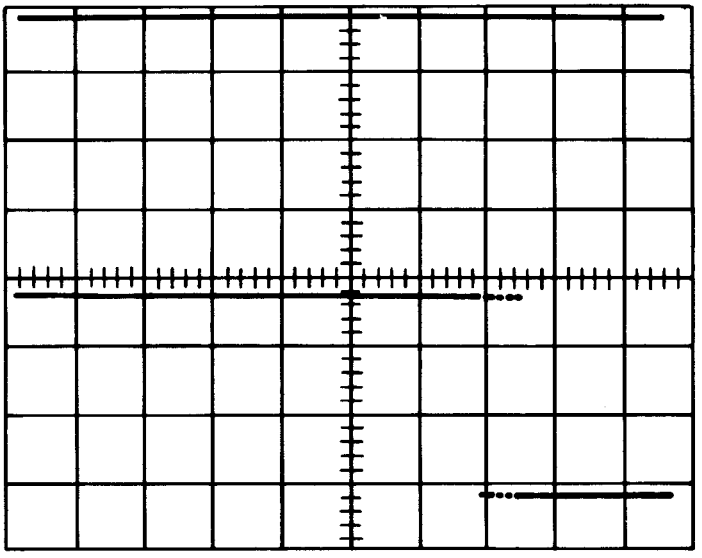


FIG. B

Fig. 12—Clear CP11 Trouble (Sheet 2 of 2)

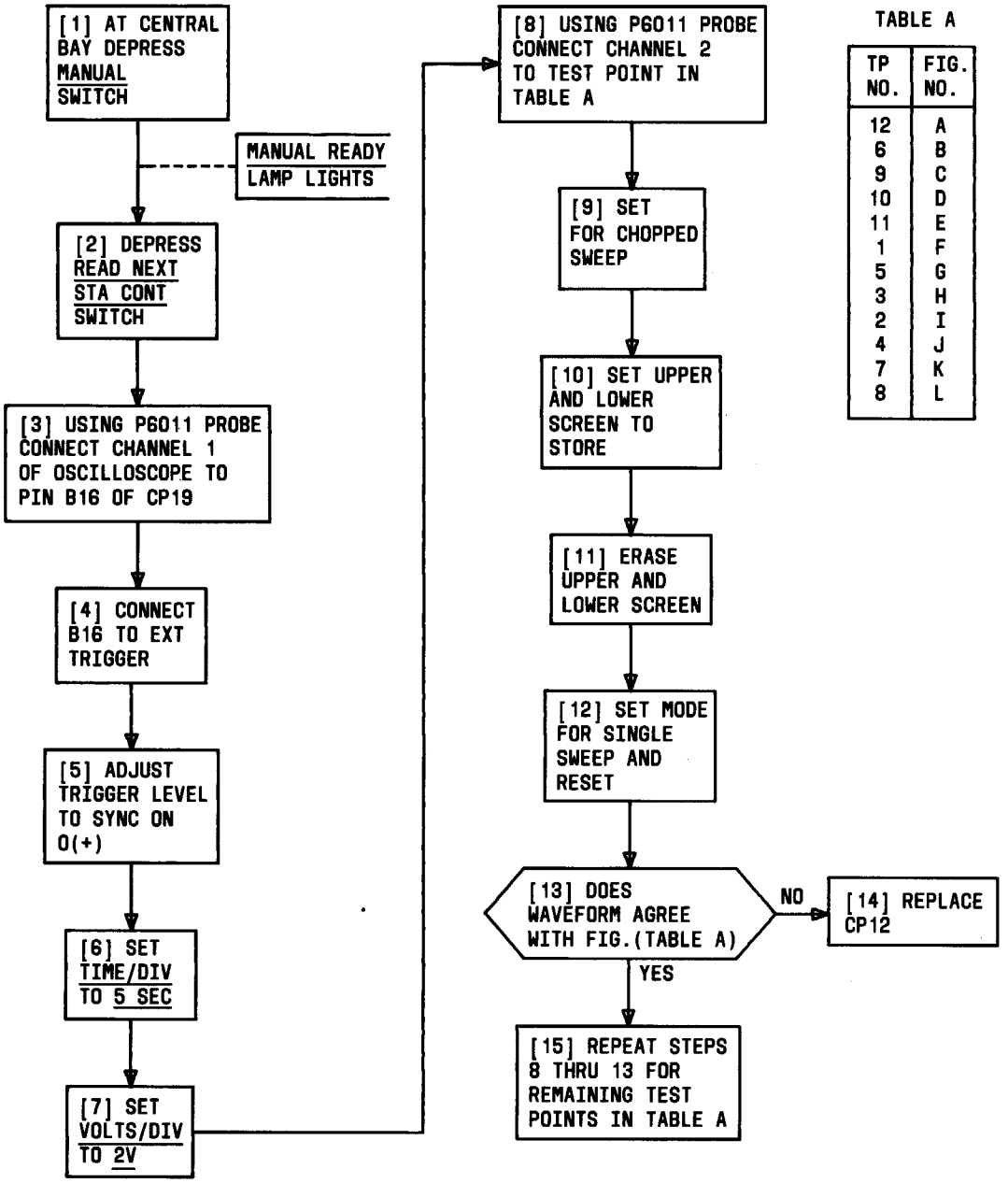


Fig. 13—Clear CP12 Trouble (Sheet 1 of 4)

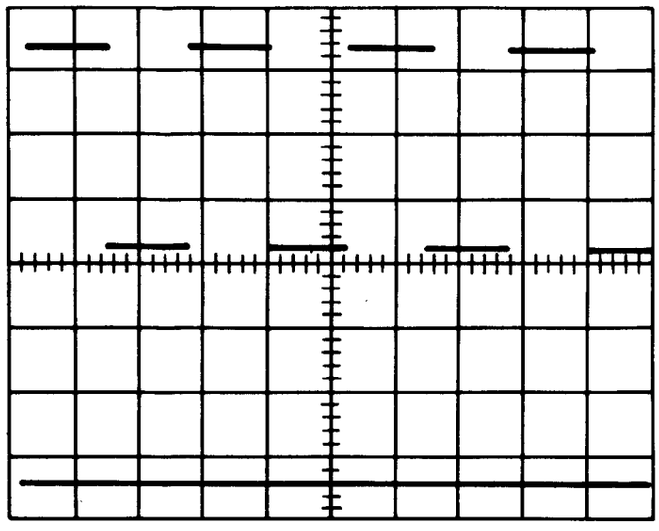


FIG. A

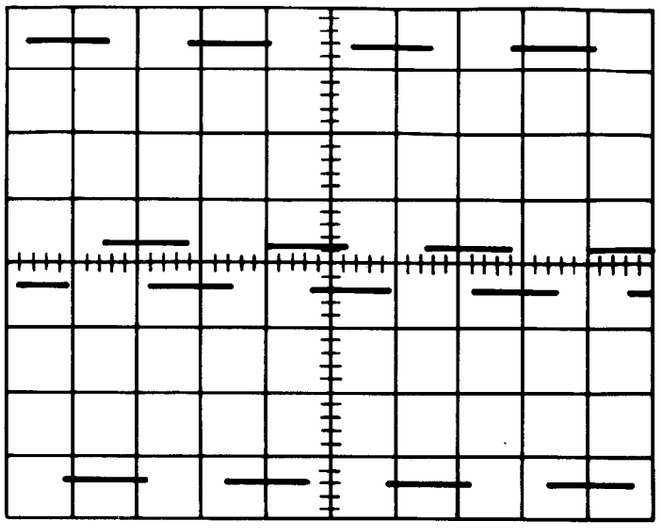


FIG. B

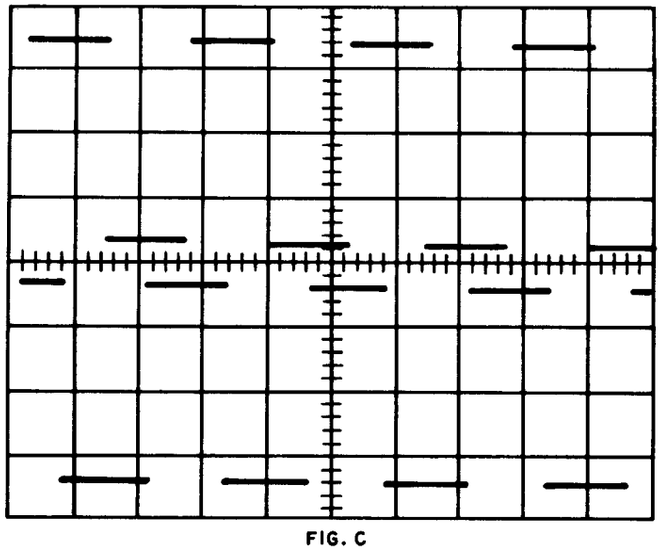


FIG. C

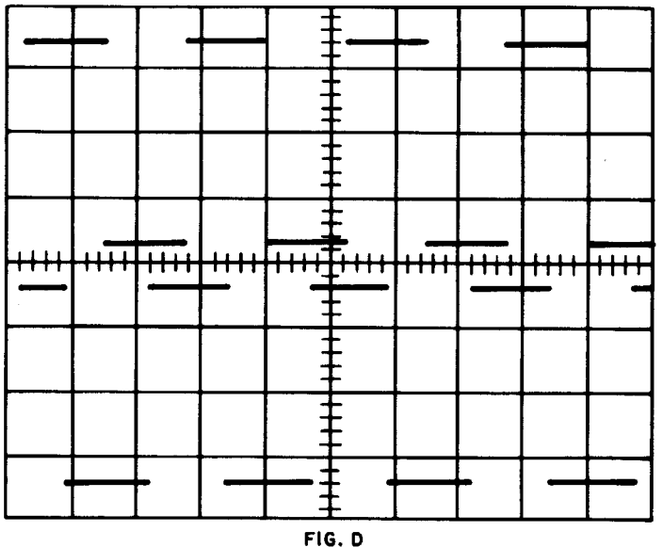


FIG. D

Fig. 13—Clear CP12 Trouble (Sheet 2 of 4)

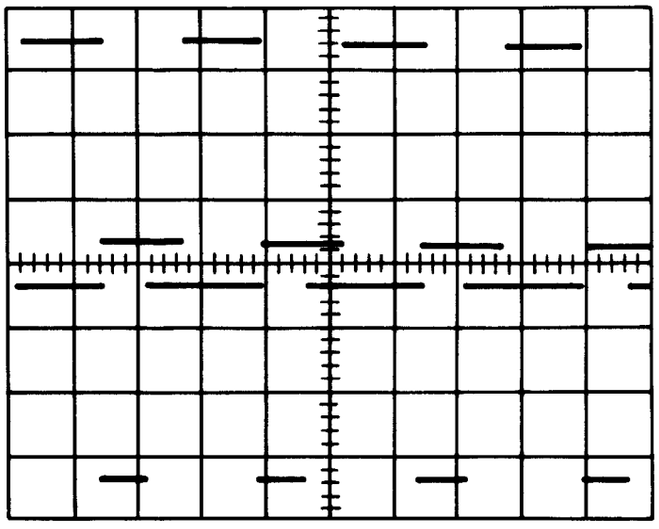


FIG. E

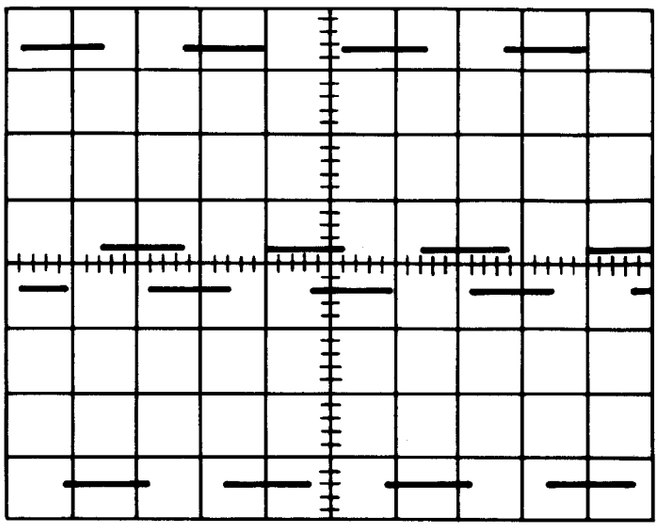


FIG. F

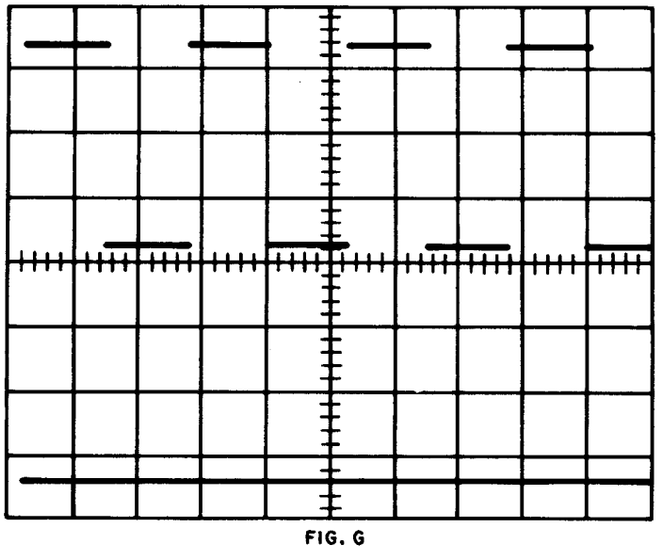


FIG. G

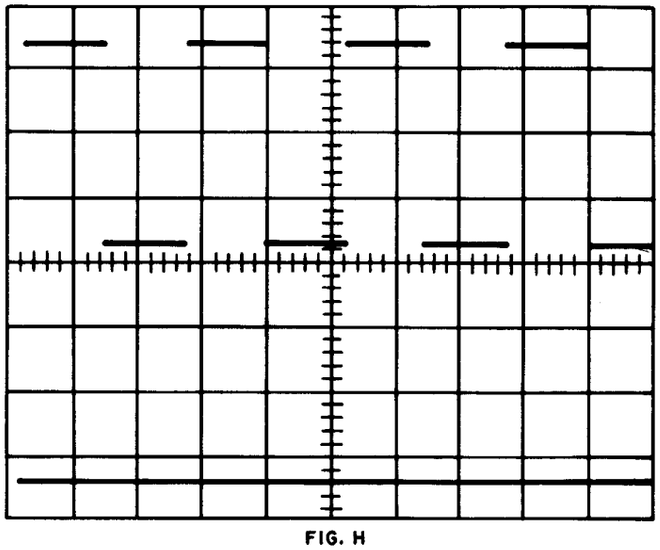


FIG. H

Fig. 13—Clear CP12 Trouble (Sheet 3 of 4)

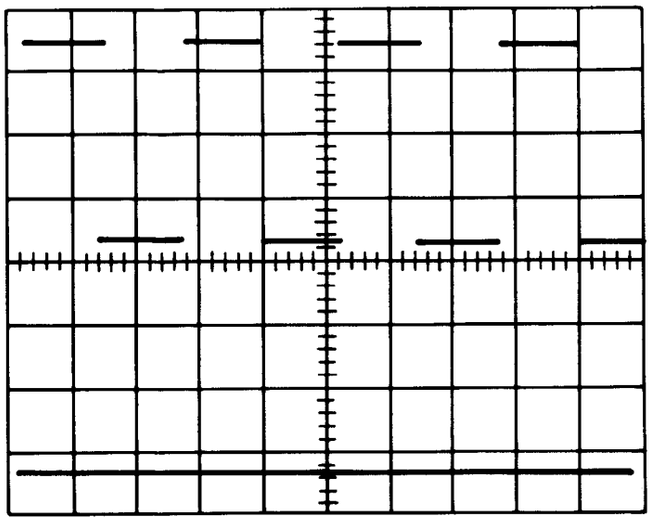


FIG. I

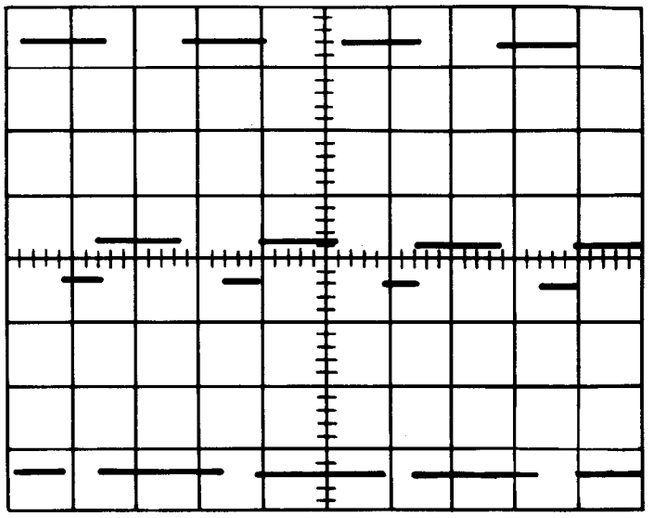


FIG. J

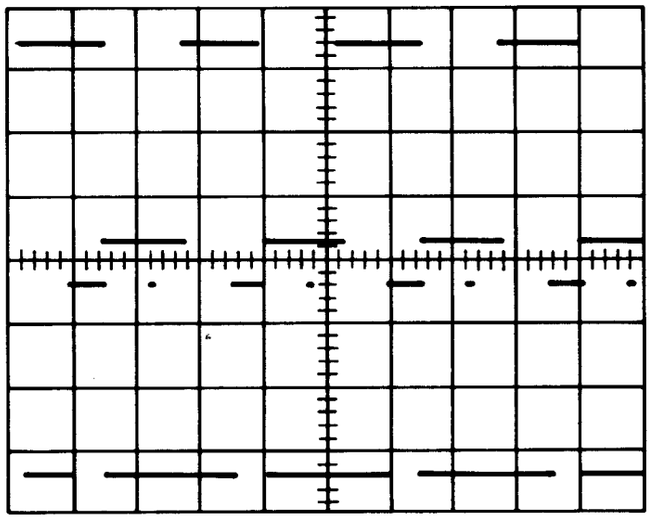


FIG. K

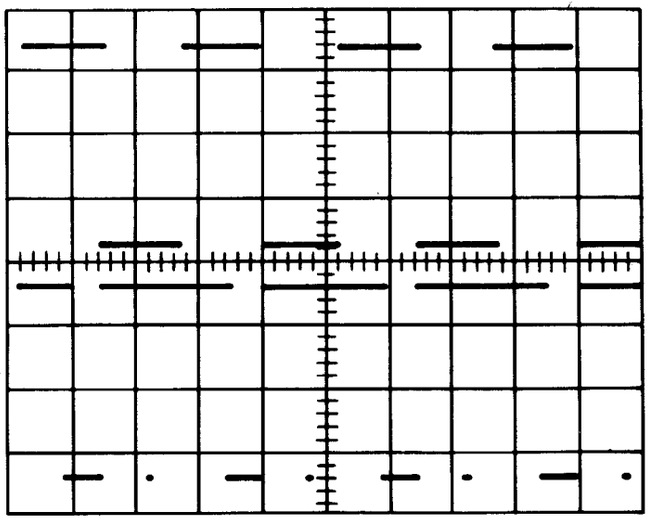


FIG. L

Fig. 13—Clear CP12 Trouble (Sheet 4 of 4)

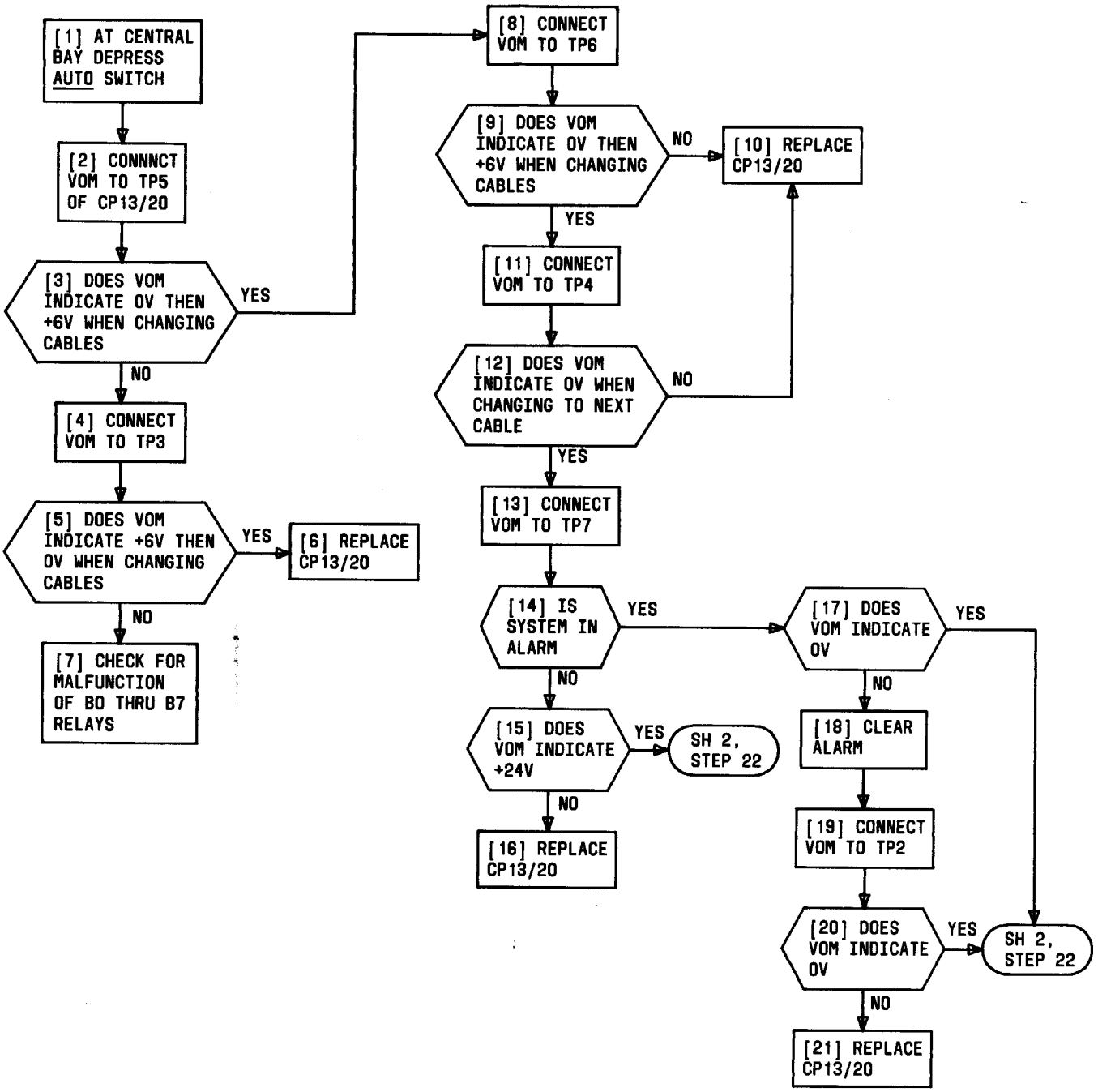


Fig. 14—Clear CP13/20 Trouble (Sheet 1 of 2)

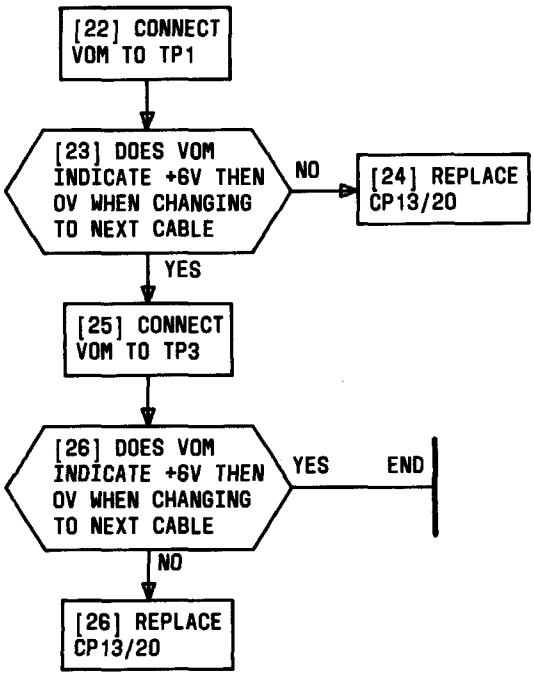


Fig. 14—Clear CP13/20 Trouble (Sheet 2 of 2)

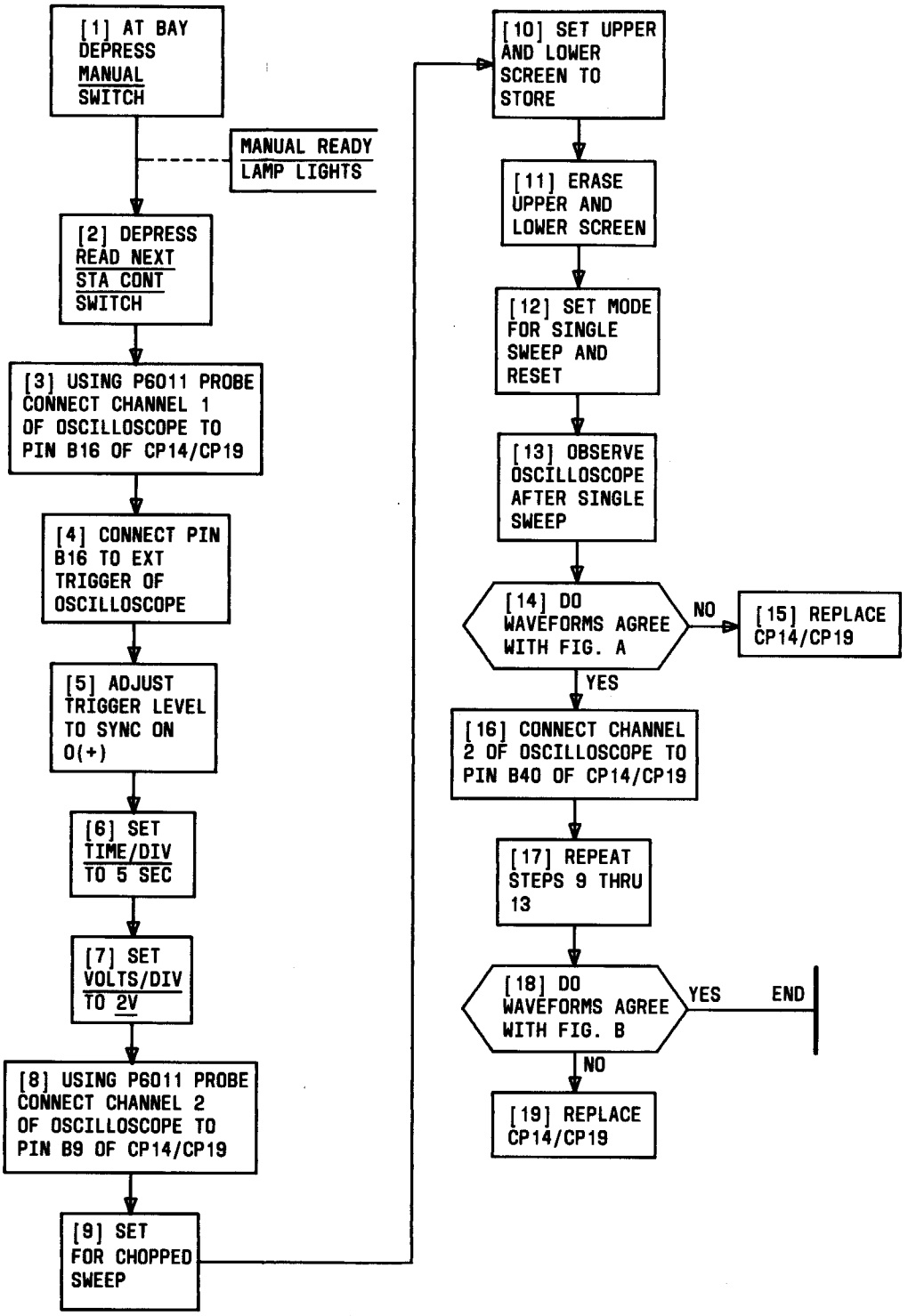


Fig. 15—Clear CP14/19 Trouble (Sheet 1 of 2)

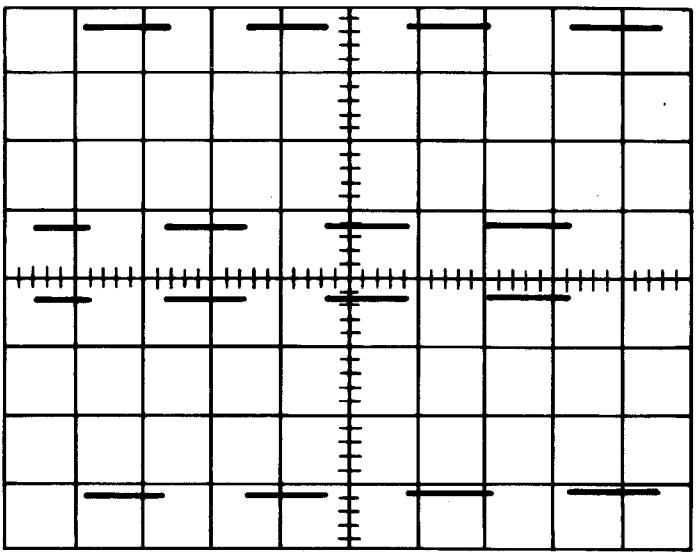


FIG. A

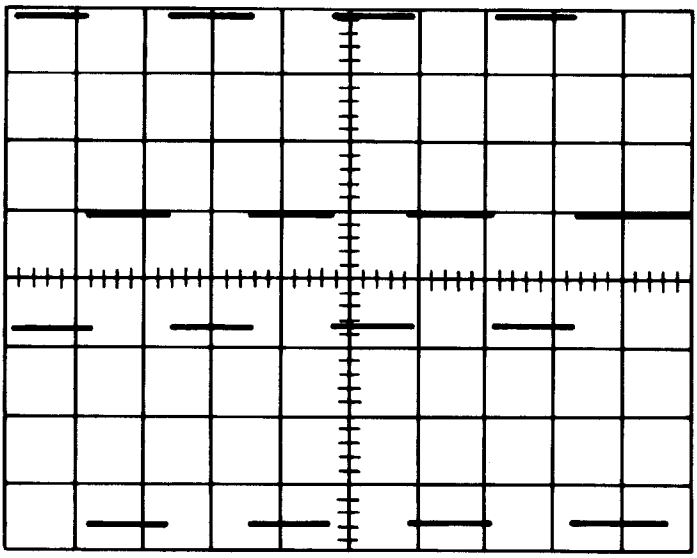


FIG. B

Fig. 15—Clear CP14/19 Trouble (Sheet 2 of 2)

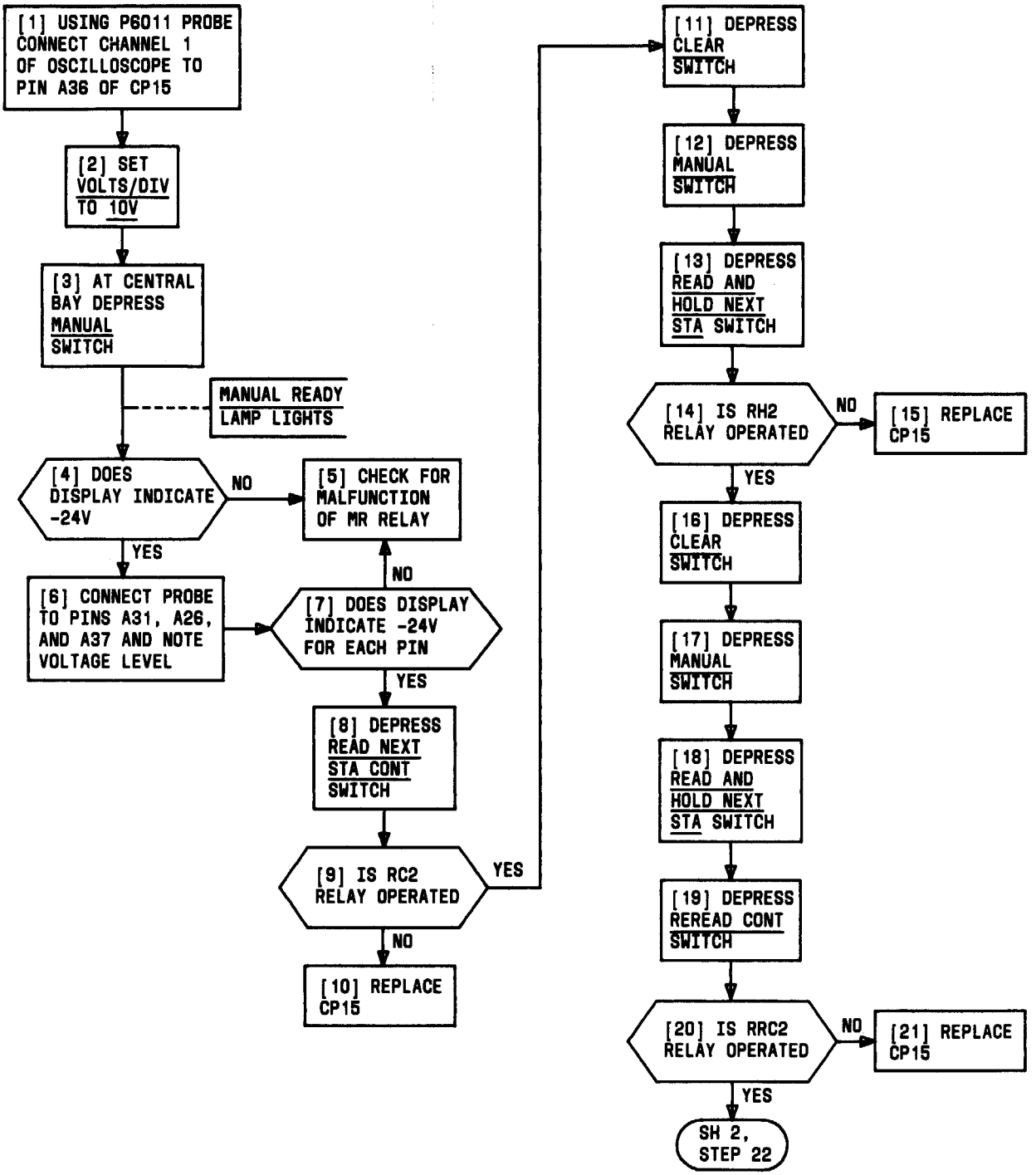


Fig. 16—Clear CP15 Trouble (Sheet 1 of 2)

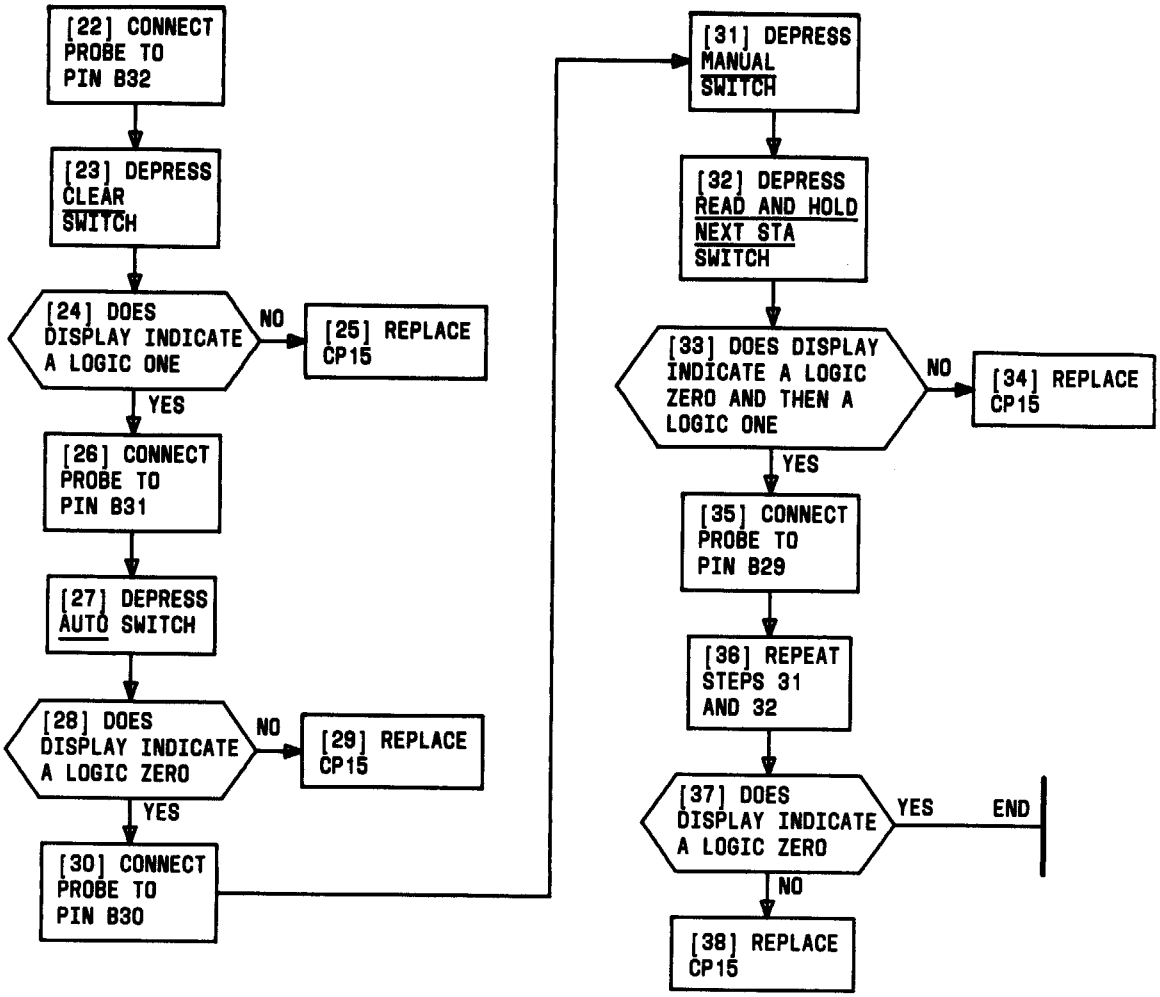


Fig. 16—Clear CP15 Trouble (Sheet 2 of 2)

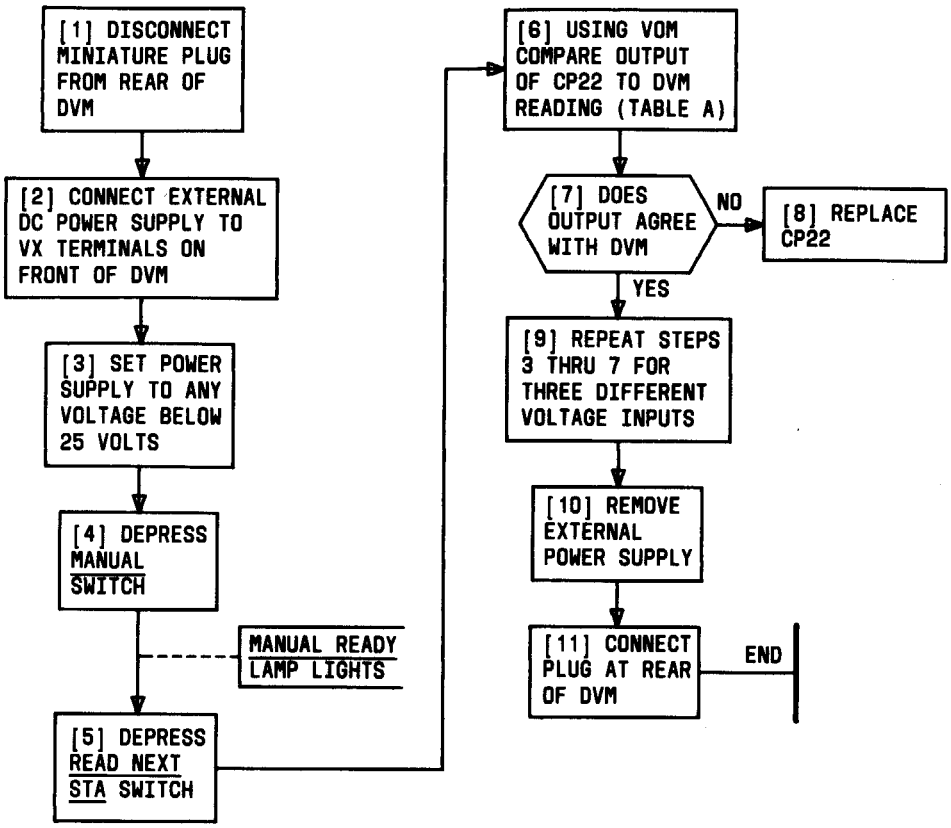


TABLE A

OUTPUT TERMINAL		CODE
TENS	A7	4
	A6	2
	A5	2
	A4	1
UNITS	B4	4
	B3	2
	B2	2
	B1	1
TENTHS	B30	4
	B29	2
	B10	2
	B9	1
HUNDRETHS	B40	4
	B39	2
	B20	2
	B19	1

TABLE B
EXPLANATION OF CODE

DECIMAL COUNT	BINARY WEIGHTING 1 2 3 4
0	0 0 0 0
1	1 0 0 0
2	0 1 0 0
3	1 1 0 0
4	0 0 0 1
5	1 0 0 1
6	0 0 1 1
7	1 0 1 1
8	0 1 1 1
9	1 1 1 1

Fig. 17—Clear CP22 Trouble