33 AUTOMATIC SEND-RECEIVE (ASR) AND RECEIVE-ONLY (RO) TELETYPEWRITER SETS FOR NO. 1 ESS-ADF (ADNET) AND 85/86 DATA SELECTIVE CALLING STATIONS

TROUBLESHOOTING

CONTENTS PAGE

1. GENERAL

1.01 This section provides off-line troubleshooting information for the 33 Automatic Send-Receive (ASR) and Receive-Only (RO) Teletypewriter Sets for NO. 1 ESS-ADF (ADNET) and 85/86 Data Selective Calling Stations. It includes checkout procedures and trouble analysis for routine or emergency maintenance.

1.02 A complete checkout procedure is provided in two tables. Table A covers the ASR with or without auxiliary RO, and Table B covers the primary RO with or without auxiliary RO.

1.03 Troubleshooting information covering both the ASR with or without auxiliary RO, and primary RO with or without auxiliary RO is provided in Table C.

1.04 The Model 33 Teletypewriter Set operates at 100 wpm using 11-unit code at a baud rate of 110 bits per second.

2. CHECKOUT PROCEDURE

2.01 Each step of the checkout procedure as outlined in Tables A and B, consists of an operation, a normal response, and a trouble reference for use if the equipment does not respond as indicated. The trouble reference numbers key each response to a corresponding number in troubleshooting, Table C.

2.02 The checkout tables are arranged to verify one phase or mode of operation before proceeding to the next. It is important to perform the checkout procedure in the order given.

2.03 In the portions of the tables covering typing units, the checkout procedure applies to both sprocket and friction feed units. If the procedure is restricted to either a sprocket feed unit or a friction feed unit, it will be indicated.

2.04 Before starting the checkout procedure for either the ASR with or without auxiliary RO, or primary RO with or without auxiliary RO, check for the following: The power switch located on the UCC in each set is in the NORM-ON position, the ASR w/auxiliary RO are connected by their "K" cables, and the primary RO w/auxiliary RO are connected by their "K" cables. On the ASR with or without auxiliary RO, check that the mode switch on the ASR is in OFF-LINE position, punch OFF button of the tape punch is depressed, and tape reader control lever is in MAN. STOP position.

3. TROUBLESHOOTING

3.01 Troubleshooting information is provided in Table C. In the column headed "Trouble" the trouble is described, and opposite, in the column headed "Analysis and Corrective Procedures," the methods of analyzing and correcting the trouble are listed.

3.02 In some cases, a variety of troubles can have the same symptoms. In these cases, the analysis either checks the most likely trouble points first or provides a series of steps to isolate the trouble to a given area.

3.03 Troubles and corrective procedures related to either sprocket or friction feed units are clearly indicated in the table.

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3.04 Voltage or continuity tests are required in troubleshooting some problems. Voltage tests are made with the power on and the unit operating (to the extent possible) as specified in the test procedure. Caution must be observed in the placement of the voltmeter test probes to avoid short circuits between terminals.

3.05 Continuity tests are made with the power off. To aid in tracing circuits and checking continuity, references are made to the various wiring diagrams included at the end of this section. If a more thorough circuit analysis is required, refer to the additional diagrams and schematics listed under References.

3.06 Data Leads:

(a) The send data lead of the ASR should conform to the EIA (Electronic Industries Association) Standard RS-232-B as follows:

+5 v to +25 v for spacing signal
-5 v to -25 v for marking signal.

(b) The receive data lead for both the ASR and RO should conform to EIA Standard RS-232-B as follows:

+3 v to +25 v for spacing signal
+0.5 v to -25 v for marking signal.

3.07 Adjustments are made and mechanical operation is best observed with the power off. The unit can be cycled manually to check the mechanical operation and to check contact operations for continuity tests.

CAUTION: TO MINIMIZE SHOCK HAZARD AND AVOID DAMAGE TO COMPONENTS, REMOVE AC POWER BEFORE REPLACING FUSES OR PERFORMING CONTINUITY TESTS.

3.08 Field troubleshooting is intended to locate a trouble area and restore operation as quickly as possible. The repair should be limited to adjustments, lubrication, spring replacements, and other minor routines as stated in the troubleshooting tables. For major repairs, the failing component is usually replaced to restore operation, then repaired in the service shop or returned to a service center with suitable facilities. For troubles not covered in the troubleshooting tables, consider the following:

(1) Exercise locally established routines (contact supervisor, contact service center, etc).

(2) Review operating principles of unit and observe operation of failing component to determine where failure occurs.

(3) If extensive repair is required, replace the entire unit to restore operation until repairs are made.

4. REFERENCES

4.01 A complete wiring diagram package is supplied with the 33 Teletypewriter Set. These diagrams are recommended for additional reference in troubleshooting. The diagrams and components they apply to are as follows:

Component	Actual	Schematic
Typing Unit	7118WD 8155WD	8152WD 8153WD
Keyboard	7120WD	8152WD
Call Control Unit	7121WD 7122WD	8152WD 8153WD
Tape Reader	7119WD	8152WD
Motor Unit	7123WD	8152WD 8153WD
Selector Magnet Driver	7124WD	312352
Reader Power Supply	183087	8152WD
Power Supply (48 v dc)	8602WD	8602WD
Circuit Card (SMD)	312352	312352
Circuit Card (UCC — ASR)	186006	186006
Circuit Card (UCC — RO)	186036	186036

4.02 The following publications are also recommended for reference in troubleshooting.

Teletypewriter Set	Section No.
Description and Operation	574-100-101
Removal and Replacement of Components	574-100-702
Typing Unit	
Description and Principles of Operation	574-122-100
Adjustments	574-122-700
Lubrication	574-122-701
Disassembly and Reassembly	574-122-702
Parts	574-122-800
Keyboard	
Description and Principles of Operation	574-121-100
Adjustments	574-121-700
Lubrication	574-121-701
Disassembly and Reassembly	574-121-702
Parts	574-121-800
Call Control Unit	
Description and Principles of Operation	574-123-100
Parts	574-123-800

Tape Reader	
Description and Principles of Operation	574-124-100
Adjustments	574-124-700
Lubrication	574-124-701
Disassembly and Reassembly	574-124-702
Parts	574-124-800
Tape Punch	
Description and Principles of Operation	574-125-100
Adjustments	574-125-700
Lubrication	574-125-701
Disassembly and Reassembly	574-125-702
Parts	574-125-800
Cover	
General Description	574-126-100
Adjustments	574-126-700
Lubrication	574-126-701
Parts	574-126-800

TABLE A

CHECKOUT PROCEDURE — ASR WITH OR WITHOUT AUXILIARY RO

Note: See Table C for trouble references.

STEP	OPERATION	RESPONSE	TROUBLE REFERENCE
ASR WITH OR WITHOUT AUXILIARY RO (Without Controller and Attendant Set)			
1	Insert set power cords of ASR or ASR with auxiliary RO into properly grounded 3 prong, 115 volts ac 60 Hz outlet power receptacles.	ASR or ASR with auxiliary RO are all properly grounded (chassis ground) to their power source receptacles and receiving power.	1
		Convenience receptacles properly grounded to chassis and receiving power.	1
		SMD outputs should measure 20 v dc between test jack SDG/RCVG (Red) and pin 1 of circuit ground of "A" connector.	1

TABLE A

CHECKOUT PROCEDURE — ASR WITH OR WITHOUT AUXILIARY RO (Continued)

STEP	OPERATION	RESPONSE	TROUBLE REFERENCE
1 (cont)		Power supplies output is 48 v dc: 48 v dc on terminal block in UCC between terminals T-6 (ckt grd) and T-7 (48 v dc).	1,2
		48 v dc between pin 1 (ckt grd) and pins 14 and 40 (+48 v dc) of "A" connector.	1,2
2	Operate power switches on call control units of ASR and RO to their MAINT-ON positions.	Motors turn on (ASR and RO).	3
		Elapsed time indicators turn on (ASR and RO).	4
		Keyboard lock solenoid energizes when mode switch is in LINE position (ASR) and de-energizes when in OFF-LINE position.	5
3	Depress AUX ON button on ASR.	ROR relay energizes (ASR only).	44
		Print suppression solenoid energizes (ASR only) if print suppression option is called for.	45
		AUX ON lamp on ASR lights.	43
4	Depress CTRL and ETX keys simultaneously.	ROR relay de-energizes.	
		Print suppression solenoid de-energizes.	
		AUX ON lamp goes out.	
5	Depress CTRL and DC2 keys simultaneously.	Same responses as in Step 3.	
6	Depress CTRL and DC4 keys simultaneously.	Same responses as in Step 4.	
7	Depress AUX ON button on ASR.	Same responses as in Step 3.	
8	Depress AUX OFF button on ASR.	Same responses as in Step 4.	
9	Operate power switches of ASR and RO to their NORM-ON positions.	Motors turn off.	
		Elapsed time indicators turn off.	

TABLE A

CHECKOUT PROCEDURE — ASR WITH OR WITHOUR AUXILIARY RO (Continued)

STEP	OPERATION	RESPONSE	TROUBLE REFERENCE
KEYBOARD AND TYPING UNIT			
10	Friction Feed Units Install paper roll in typing unit and rotate platen to pick up paper.	Low-paper contacts close.	46
11	Sprocket Feed Units Install form-feed paper in typing unit. Route over cover and under platen. Rotate platen to pick up sprocket holes in paper.	Paper-out contacts close.	47
12	Return power switch to MAINT-ON position.	Motor turns on.	3
13	Depress RETURN key.	Carriage returns to left margin without noticeable bounce.	6
14	Depress each graphic key on keyboard to its normal downstop position.	Keyboard trips once for each key depressed. No evidence of binding or double tripping. Typing unit prints selected characters. Characters are printed with uniform shading and spacing.	7 8,9 10,11,12, 48,49 14 to 19
15	While holding shift key depressed, depress each graphic key to its normal downstop position.	Typing unit prints shift character for each key depressed. Note: Numeral 0 key cannot be depressed in shift mode because it has no shifted equivalent.	20
16	Depress NEW LINE key.	Single line feed occurs each time NEW LINE key is depressed. Option: If new line feature is used, carriage return will occur during line feed.	21

TABLE A

CHECKOUT PROCEDURE — ASR WITH OR WITHOUT AUXILIARY RO (Continued)

STEP	OPERATION	RESPONSE	TROUBLE REFERENCE
	Sprocket Feed Units		
17	Depress CTRL and FF keys simultaneously.	Paper advances rapidly to end of form and stops. Option: If new line feature is used, carriage return will occur during form feed. Note: Depressing CTRL and FF a second time will not cause another form feed. At least one line feed must occur on the new form before another form feed can be produced.	22
18	Depress spacebar several times.	Typing carriage moves one space to right each time spacebar is depressed.	23
19	Depress CTRL key and BELL key simultaneously.	Bell rings for each depression. No printing or spacing occurs.	24 25
20	Depress a character and REPT key simultaneously.	Characters are repeated as long as keys are held depressed. Depending on characters, printing or spacing may or may not occur. Repeated graphic should be uniformly spaced across entire line. End-of-line bell rings when typing carriage approaches right end of line. Option: If automatic carriage return and line feed feature is present, carriage returns to left margin and line feed occurs when carriage reaches right end of line. If feature is not used, characters pile up at right end of line unless carriage return and line feed are keyed.	27 18 24 28
21	Depress DELETE key.	Typing unit cycles but no printing or spacing occurs.	25

TABLE A

CHECKOUT PROCEDURE — ASR WITH OR WITHOUT AUXILIARY RO (Continued)

STEP	OPERATION	RESPONSE	TROUBLE REFERENCE
22	Depress TAB key.	Typing unit cycles but no printing or spacing occurs.	25
23	Friction Feed Units Lift roll of paper at rear of cabinet to simulate a "low-paper" condition.	Low-paper contact opens.	29
24	Sprocket Feed Units Tear next form to simulate a "paper-out" condition. Feed form by depressing CTRL and FF keys or manually rotating platen.	Paper-out contact opens.	30
25	Sprocket Feed Units Reroute paper under platen and rotate platen to pick up sprocket holes in paper.		
TAPE PUNCH			
26	Install roll of paper tape on core and manually route tape through punch.		
27	Depress punch ON button.	No noticeable effect.	
28	Depress DELETE key at least 20 times.	Typing unit cycles for each delete character. No printing or spacing occurs. Tape feeds one position for each delete character, and series of all marking codes are punched in tape. Punched holes should be spaced 10 per inch.	7 25 31,32,33 34
29	Repeat Steps 14 and 15.	Typing unit prints selected unshift and shift characters. Selected unshift and shift characters are punched in tape. Tape advances one character position for each keyboard operation.	

TABLE A

CHECKOUT PROCEDURE — ASR WITH OR WITHOUT AUXILIARY RO (Continued)

STEP	OPERATION	RESPONSE	TROUBLE REFERENCE
30	Type a series of alternate U and * characters.	Typing unit prints and tape unit punches the U and * characters.	
31	Depress punch B. SP. button ten times.	Tape reverse feeds into punch one position each time B. SP. button is depressed. No effect on typing unit.	35
32	Depress DELETE key ten times.	Tape advances one position each time DELETE key is depressed. Previously punched characters are repunched to form all delete characters with no evidence of torn or elongated feed or punch holes. Typing unit cycles but does not print or space.	33
33	Depress CTRL and DC4 keys simultaneously.	Typing unit cycles but does not print or space. Punch disabled by DC4 character.	7,25 36
34	Type a series of delete characters.	Typing unit cycles but does not print or space.	7,25
35	Depress CTRL and DC2 keys simultaneously.	Typing unit cycles but does not print or space. Punch enabled by DC2 character.	7,25
36	Type a series of delete characters.	Typing unit cycles but does not print or space. Tape advances and delete characters are punched in tape.	7,25 37
37	Depress punch OFF button.		
TAPE READER			
38	Insert TP326743 test tape, or a previously prepared tape into reader.		

TABLE A

CHECKOUT PROCEDURE — ASR WITH OR WITHOUR AUXILIARY RO (Continued)

STEP	OPERATION	RESPONSE	TROUBLE REFERENCE
39	Operate typing unit as necessary to begin a new line (friction feed) or new form (sprocket feed).		
40	Move reader control lever to MAN. START position.	Tape moves through reader. Typing unit prints out characters as punched on test tape. For nonprint characters, typing unit cycles but does not print. Depending on character, spacing may or may not occur. Line feeds, carriage returns, etc, occur as punched in tape. Reader and typing unit stop when tight-tape or tape-out condition occurs.	38 39 40
41	Move reader control lever to MAN. STOP position and remove test tape from reader.		
42	Tear off a section of punched tape at last character of printed message and insert tape into reader.		
43	Move reader control lever to MAN. START position and allow several characters to pass through reader. Then move control lever to MAN. STOP position.	Typing unit prints characters until control lever is placed in MAN. STOP position.	42
44	Move reader control lever to MAN. START position and allow remainder of test tape to feed through reader.	Typing unit reproduces message. Reader and typing unit stop when last character of tape read is about four character positions from tape-out pin.	
45	Move reader control lever to FREE position.	Tape can be pulled freely in either direction through reader head.	41
46	Remove tape from reader and move control lever to MAN. STOP position.		

TABLE B

CHECKOUT PROCEDURE — PRIMARY RO WITH OR WITHOUT AUXILIARY RO

Note: See Table C for trouble references.

STEP	OPERATION	RESPONSE	TROUBLE REFERENCE
1	Insert set power cords of primary RO and auxiliary RO into properly grounded 3 prong, 115 v ac 60 Hz outlet power receptacles.	Sets are properly grounded (chassis ground) to power source receptacles and receiving power.	1
		Convenience receptacles properly grounded to chassis and receiving power.	1
		Power supplies output is 48 v dc: 48 v dc on terminal block in UCC between terminals T-6 (ckt grd) and T-7 (+48 v dc).	1,2
		48 v dc between pin 1 (ckt grd) and pins 14 and 40 (+48 v dc) of "A" connector.	1,2
2	Operate power switches of primary RO and auxiliary RO to their MAINT-ON positions.	Motor turns on.	3
		Elapsed time indicators turn on.	4
3	Operate power switches of primary RO and auxiliary RO to their NORM-ON positions.	Motors turn off.	
		Elapsed time indicators turn off.	
4	Depress AUX ON button on primary RO.	AUX ON lamp lights (primary RO only).	43
		ROR relay energizes (primary RO only).	44
		Print suppression solenoid energizes (primary RO only) if print suppression option is called for.	45
5	Depress AUX OFF button on primary RO.	AUX ON lamp goes out.	
		ROR relay de-energizes.	
		Print suppression solenoid in primary RO de-energizes.	
6	Friction Feed Units Install paper roll in typing unit and rotate platen to pick up paper.	Low-paper contacts close.	46

TABLE B

CHECKOUT PROCEDURE — PRIMARY RO WITH OR WITHOUR AUXILIARY RO (Continued)

STEP	OPERATION	RESPONSE	TROUBLE REFERENCE
7	Sprocket Feed Units Install form-feed paper in typing unit. Route over cover and under platen. Rotate platen to pick up sprocket holes in paper.	Paper-out contacts close.	47
8	Return power switch to MAINT-ON position.	Motor turns on.	3
9	Apply test signal from 911 Test Sentence Generator to test jacks TJR and TJB. See Figure 8 for related circuitry.	Typing unit prints characters and performs functions sent from test sentence generator.	12 to 21 23 to 26 48,49
10	Sprocket Feed Unit Send line feed followed by form feed from 911 Test Sentence Generator.	Paper advances rapidly to end of form, and stops.	22,26
11	Send a repeated character from 911 Test Sentence Generator.	If automatic carriage return and line feed feature is present, carriage returns to left margin and line feed occurs when carriage reaches right end of line. If feature is not present, characters pile up at right end of line.	28
12	Send a series of DELETE characters from 911 Test Sentence Generator.	Typing unit cycles for each character but does not print or space.	26
13	Friction Feed Units Lift roll of paper at rear of cabinet to simulate a "low-paper" condition.	Low-paper contacts open.	29
14	Sprocket Feed Units Tear next form to simulate a "paper-out" condition. Feed form by sending form-feed character from 911 Test Sentence Generator, or manually rotating platen.	Paper-out contacts open.	30

TABLE C

TROUBLESHOOTING

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
1	Proper voltages absent.	Check that ac power cord is fully plugged into source power receptacle. Check that all cable connectors are secure. Check that power cord, convenience outlet, and motor are properly grounded to chassis. See Figures 2 (ASR) and 4 (RO) for circuitry. Check that all circuit cards are secure. Check mode switch position. Refer to Figures 2 (ASR) and 4 (RO) for circuitry and check fuses 2A (SL-BL) for TP182241 motor or 2-1/4 A (SL-BL) for TP181870 motor, 3-2/10 A (SL-BL) for set power, and 3/8 A (SL-BL) for selector magnet driver. Refer to Figure 3 for circuitry and check fuses 3/10 A (SL-BL) for reader power, and 1.0 A (SL-BL) for 48 v dc output.
2	No 48 v dc available.	Check that power supply connector (4 pin) is properly mated to UCC connector (BB). See Figures 3 (ASR) and 4 (RO) for circuitry. Check that input power is connected to primary of transformer. See Figures 3 (ASR) and 4 (RO) for circuitry. Check wiring field and connections to power distribution terminal block T2 and T5. See Figures 3 (ASR) and 4 (RO) for circuitry. Check that power supply is mounted in stand properly. Check fuses.
3	Motor does not turn on when power switch is moved to MAINT-ON position.	If motor is completely inoperative, check motor fuse (synchronous motors only). See Figures 2 (ASR) and 4 (RO) for circuitry. If motor hums but does not turn, check for binding or frozen main shaft. Check start relay and start capacitor (TP181870 motor). See Figures 2 (ASR) and 4 (RO) for circuitry.

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
3 (cont)		Check MST relay contacts and power switch. See Figures 2 (ASR) and 4 (RO) for circuitry. Check voltage across motor. If 115 v ac is present, motor may be defective.
4	Elapsed time indicator does not turn on when power switch is moved to MAINT-ON position.	Check that position of power switch is not in NORM-ON for operation through MST relay contacts (under control of station controller). Check for open winding. Check 3-2/10 A (SL-BL) fuse. See Figures 2 (ASR) and 4 (RO) for circuitry. Check motor fuses: 2-1/4 A (SL-BL) for TP181870 motor and 2A (SL-BL) for TP182241 motor. See Figures 2 (ASR) and 4 (RO) for circuitry. Check that printer/call control connector is properly mated.
5	Keyboard lock solenoid does not energize when power switch is moved to MAINT-ON position in LINE mode.	Check mode switch (MS2). See Figure 9 for circuitry. Check following adjustments in Section 574-121-700: Latchlever Clearance Trip Cam Clearance Solenoid Spring
6	ASR Carriage does not return to left margin when RETURN key is depressed.	Check following adjustments in Section 574-122-700: Carriage Return Lever — Latch Clearance Carriage Return Lever — Unlatch Clearance
7	ASR Keyboard fails to trip when key is depressed.	Check that H-plate and spring are correctly positioned on keyboard trip arm. Check that universal codebar and tie link are free to move, and that the tie link moves nonrepeat lever and latchlever to right, allowing universal lever to move up.

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
7 (cont)		Check following adjustments in Section 574-121-700: Universal Link Distributor Trip Linkage Trip Lever Engagement
8	Keyboard double trips or runs continuously.	Check latchlever and nonrepeat lever for free operation. Check following adjustments in Section 574-121-700: Latchlever Spring Nonrepeat Lever Spring Distributor Trip Linkage Trip Lever Engagement Check Shoe Lever Gap and Trip Lever Engagement adjustment in Section 574-122-700.
9	Key binds.	Check for broken keytop guideplate, displaced keylever on return spring under guideplate, or bind in codebars or T-levers.
10	Incorrect characters produced by keyboard. Reader produces correct characters.	Check that contact wires are correctly positioned on T-levers. Check action of keyboard code contact wires. Make sure bottom ends of contact wires are secure, and that contacts open and close according to code bits of character (see Figure 1 for character codes). Check keyboard code contact points for any foreign material. Clean as necessary. Check Contact Wires adjustment in Section 574-121-700. Remove keytop guideplate and check that all codebars and tie links are correctly engaged with T-levers.
11	Incorrect characters produced by keyboard and reader.	See Figure 1 for coding of characters. Check distributor contacts.

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
11 (cont)		Adjust range finder setting. If no setting can be found which produces error free operation, operate unit manually from keyboard and observe selection of push levers in selector. If character is incorrect at selector, refer to Trouble No. 12. If character is correct at selector, but incorrect character is printed, refer to Trouble No. 13.
12	Incorrect characters printed — selector push lever combinations do not correspond to character codes.	See Figure 1 for coding of characters. Check operation of selector magnet driver. Check for loose selector magnet wires and/or connectors. See Figures 2 (ASR) and 4 (RO) for circuitry. Check for missing springs in selector. Check for dirt or oil on selector armature. Check the following adjustments in Section 574-122-700: Shoe Lever Gap and Trip Lever Engagement Armature Spring Armature Bracket Position (Preliminary) Belt Tension (Final) Gear Backlash Note: Refine Armature Bracket Position (Preliminary) adjustment by equalizing clearance between armature extension and No. 1 and No. 8 selector levers.
13	Incorrect characters printed — selector produces correct code combination.	Operate unit manually and observe selection of codebars. See Figure 1 for coding of characters. If codebar combinations are incorrect for character selected, check Codebar Reset Lever Position and Selector Blocking Levers Positioning adjustments in Section 574-122-700. If codebar combinations are correct for character selected, check all adjustments related to carriage area in Section 574-122-700.

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
	Friction Feed Units	
14	All characters too light or too dark.	Check Platen — Horizontal Position adjustment in Section 574-122-700.
15	All characters darker on one side than the other.	Check Typewheel "Home" Position (Preliminary) adjustment in Section 574-122-700.
16	All characters darker at top or bottom.	Check Vertical Type Alignment adjustment in Section 574-122-700.
17	Incorrect spacing at left side of copy only.	Check following adjustments in Section 574-122-700: Spacing Belt Tension Left Margin Position Left Margin Printing
18	Repeated characters are unequally spaced at left side of copy.	Check for bind in carriage rollers or dashpot plunger, or for out-of-parallel dashpot. Check Reset Lever Positioning adjustment in Section 574-122-700.
19	Random characters are unequally spaced at left side of copy.	Check following adjustments in Section 574-122-700: Print Hammer Bail Spring Print Hammer Trip Lever Spring Power Bail Roller Clearance
20	No shift characters in shift mode. Reader produces correct characters.	Check movement of shift codebar and associated contact wire. Check Left Shift Contact Wire and Shift Codebar Spring adjustments in Section 574-121-700.
21	Unit fails to line feed, or feeds erratically.	Friction Feed Units Observe operation of line feed drive link. If drive link does not operate, check operation of line feed function lever and line feed blocking lever. (See Trouble No. 26 for function failures.) Check Line Feed Drive Arm Clearance and Line Feed Upstop Bracket Position adjustments in Section 574-122-700. If drive link moves through its full travel, or repeats, check Line Feed Stripper Plate Clearance adjustment in Section 574-122-700.

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
21 (cont)		If drive link travels fully but does not drive platen fully, or drives too far, check following adjustments in Section 574-122-700: Line Feed Selection Detent Position Line Feed Drive Link Position Line Feed Pawl Downstop Position
		Sprocket Feed Units If platen does not advance, check selection of line feed pawl in slot 13. Check Line Feed Selection and Line Feed Pawl Stripping adjustments in Section 574-122-700. If extra line feed occurs, check Line Feed Selection and Line Feed Pawl Stripping adjustments in Section 574-122-700. If line feed is irregular, check Detent Position adjustment in Section 574-122-700.
22	Sprocket Feed Units Form feed does not operate or operates erratically.	If form does not advance, check selection of form-feed pawl in slot 14. If pawl selects but form does not advance, check for bind in reset follower lever. Note: Roller should rest on form-out cam disc after a line feed. Check following adjustments in Section 574-122-700: Form-Out Lever Overtravel Form-Out Lever — Reset Clearance Cam Lobe Position Form-Out Lever Spring If form feed repeats, check following adjustments in Section 574-122-700: Form-Out Lever — Reset Clearance Cam Lobe Position Trip Lever Engagement (Final)

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
22 (cont)		If printed line is off, check Printing Line Position (Final) adjustment in Section 574-122-700. If zero pointer is off, check Cam Zero Position adjustment in Section 574-122-700.
23	Spacing failure or erratic spacing.	Move carriage from left to right to make sure carriage rollers rotate freely. If spacing fails and spacing feed pawl is not blocked, check following adjustments in Section 574-122-700: Carriage Return Lever — Unlatch Clearance Feed Pawl Stop Position Feed Pawl Travel Carriage Return Lever Spring Space Suppression Lever Clearance — Printing Space Suppression Lever Clearance — Spacing
24	Signal bell fails to ring.	If bell fails to ring when bell code is keyed, check selection of function pawl in slot 7. Also check Bell Clapper Gap adjustment in Section 574-122-700. If bell fails to ring when carriage approaches right margin, check selection of function pawl in slot F. Also check Margin Bell Bellcrank Clearance adjustment in Section 574-122-700.
25	Spacing and printing suppression failures.	If unit neither prints nor spaces, and print hammer bail and spacing feed pawl are blocked, check Print Suppression Latch — Vertical Clearance adjustment in Section 574-122-700. If unit fails to space on characters only, check Space Suppression Lever Clearance — Printing adjustment in Section 574-122-700. If unit fails to space on space only, check Space Suppression Lever Clearance — Spacing adjustment in Section 574-122-700. If unit fails to print only, check Print Suppression Latchlever Release adjustment in Section 574-122-700.

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
25 (cont)		If unit fails to suppress on nonprint or nonspace functions, check selection of correct function lever or blank function lever in slot 6. See Trouble No. 26 for function failures. If only print suppression fails, check Print Suppression Latchlever Release adjustment in Section 574-122-700. If only space suppression fails, check Space Suppression Lever Clearance — Printing and Space Suppression Lever Clearance — Spacing adjustments in Section 574-122-700.
26	Function failures.	Check for bent function levers. Check following adjustments in Section 574-122-700: Function Lever Retainer Left Rocker Drive Right Rocker Drive Print Suppression Latch — Horizontal Clearance Print Suppression Latch — Vertical Clearance Function Shaft and Casting Position Function Clutch Trip Lever Engagement
27	Repeat keys fail to generate repeat characters when fully depressed.	Check that there is no obstruction in keylever slot. Check for bind in keytop. Check for bind in universal tie link and/or nonrepeat lever. Make sure repeat keylever engages nonrepeat lever.
28	Incorrect or erratic operation at right margin.	Check Line Length Selection adjustment in Section 574-122-700.

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
	Friction Feed Units	
29	Low-paper contact does not open when a "low-paper" condition is simulated.	Operate low-paper contact operating arm manually and observe contacts. See Figures 8 (RO) and 9 (ASR) for circuitry. Check Low-Paper Contact Operating Arm adjustment in Section 574-126-700.
	Sprocket Feed Units	
30	Paper-out contacts do not open when a "paper-out" condition is simulated.	Operate paper alarm contact lever manually and observe contacts. See Figures 8 (RO) and 9 (ASR) for circuitry. Check following adjustments in Section 574-122-700: Paper Alarm Contact Pressure and Gap Paper Alarm Contact Lever Clearance Paper Lever Spring
31	Tape punch does not operate when punch ON button is depressed.	Check mechanical drive linkage between typing unit and punch. Operate typing unit manually with punch ON button depressed and observe action of drive linkage. Check Tape Punch Drive adjustment in Section 574-125-700.
32	Punched characters do not correspond to characters selected by keyboard and printed by typing unit.	See Figure 1 for coding of characters. Check for missing pawl springs. Check following adjustments in Section 574-125-700: Pawl Upstop Assembly — Final Stripper Bail Upstop Punch Penetration
33	Tape does not feed, or feeds erratically.	Make sure tape roll is installed correctly, and tape feeds from top of roll. Check for jammed tape or chad accumulation in punch block. Check Punch Penetration and Feed Wheel Ratchet and Pawl adjustments in Section 574-125-700.

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
34	Perforations are spaced incorrectly.	Check Feed Wheel Ratchet and Pawl and Ten Characters Per Inch adjustments in Section 574-125-700.
35	Tape does not backspace when B. SP. button is depressed.	Check backspace lever for binds. Check Backspace Lever Spring adjustment in Section 574-125-700.
36	Punch does not turn off when CTRL DC4 are depressed on keyboard.	Check Automatic On adjustment in Section 574-125-700.
37	Punch does not turn on when CTRL DC2 are depressed on keyboard.	Check Automatic On adjustment in Section 574-125-700.
38	Tape reader does not operate when control lever is in MAN. START position.	Manually depress armature of reader trip magnet. If reader operates, check start contact wire with control lever in MAN. START position. Adjust per Section 574-124-700. Make sure taut tape/tape available contact wire is closed. If necessary adjust per Section 574-124-700. Check 3/10A (SL-BL) fuse. See Figure 3 for circuitry. Check reader feed contact, operated by distributor cam when trip magnet is energized. See Figure 3 for circuitry. Check reader connector (RD) for proper mating to TP183087 circuit card. See Figure 3 for circuitry.
39	Printed copy on typing unit does not correspond to code characters on tape when typing unit is operated from reader. Typing unit gives correct print out from keyboard.	See Figure 1 for coding of characters. Check for damaged or bent sensing contacts, or for contacts out of sensing pin slots. See Figure 7 for reader code contact wiring. Check following adjustments in Section 574-124-700: Detent Lever Feed Pawl Sensing Pin

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
40	Reader does not stop when tape runs out or when taut tape condition occurs.	Make sure taut tape/tape available contact opens for either condition. See Figure 9 for circuitry. Check Control (or Tape-Out) Contact Wires adjustment in Section 574-124-700.
41	Tape cannot be pulled freely through head in both directions when control lever is in FREE position.	Check that control lever extension engages blocking pawl and feed pawl when control lever is in FREE position.
42	Reader does not stop when control lever is placed in MAN. STOP position.	Check that stop contact opens when control lever is placed in MAN. STOP position. Adjust as necessary.
43	AUX ON lamp fails to light.	Check 3-2/10A (SL-BL) set power fuse. See Figures 2 (ASR) and 4 (RO) for circuitry. Check operation of ROR relay contacts (make). See Figures 5 (ASR) and 6 (RO) for circuitry. Check for dirty ROR relay contacts. Clean as necessary. Replace lamp.
44	ROR relay fails to operate.	Check wiring field for proper option wiring (strap must be present in wiring field between C-C4 and C-D4). Refer to 8152WD (ASR) and 8153WD (RO) for related circuitry. Check that DC2 (stunt box) contact is closed (ASR or primary RO). See Figures 5 (ASR) and 6 (RO) for circuitry. Check that printer/call control connector is mating securely.
45	Print suppression solenoid does not energize.	Check that printer/call control connector is mating securely. Clean contacts 5 and 6 of ROR relay. Operate ROR relay manually to observe suppression solenoid operate. See Figures 5 (ASR) and 6 (RO) for circuitry. Check that "W" option is present. See Figures 5 (ASR) and 6 (RO) for circuitry.

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
45 (cont)		Check following adjustments in Section 574-122-700: Nonprint Function Lever Clearance Solenoid Bracket Position Release Magnet Overtravel Solenoid Bracket Position
46	Friction Feed Units Low-paper contacts do not close when paper roll is installed in typing unit.	Operate low-paper contact operating arm manually and observe contacts. See Figures 7 (ASR) and 8 (RO) for circuitry. Check Low-Paper Contact Operating Arm adjustment in Section 574-126-700. Check for continuity between pins 31 and 36 of "A" connector.
47	Sprocket Feed Units Paper-out contacts do not close when form-feed paper is installed in typing unit.	Operate paper alarm contact lever manually and observe contacts. See Figures 7 (ASR) and 8 (RO) for circuitry. Check following adjustments in Section 574-122-700: Paper Alarm Contact Pressure and Gap Paper Alarm Contact Lever Clearance Paper Lever Spring Check for continuity between pins 6 and 36 of "A" connector.
48	Selector armature remains in unattracted position (all code levels spacing).	Check range scale setting (normally set between 60 and 75). Check selector magnet driver fuse, 3/8A (SL-BL). See Figures 2 (ASR) and 4 (RO) for circuitry. Check for defective SMD circuit card. Refer to 312352 for circuit card schematic. Check continuity of SMD coils for open winding.

TABLE C

TROUBLESHOOTING (Continued)

NO.	TROUBLE	ANALYSIS AND CORRECTIVE PROCEDURES
48 (cont)		Check following adjustments in Section 574-122-700: Armature Bracket Position Shoe Lever Gap and Trip Lever Engagement Armature Spring Receiving Margins
49	Selector armature remains in attracted position (all code levels marking).	Check range scale setting (normally set between 60 and 75). Check for defective SMD circuit card. Refer to 312352 for circuit card schematic. Check armature for binds. Check following adjustments in Section 574-122-700: Armature Bracket Position Shoe Lever Gap and Trip Lever Engagement Armature Spring Receiving Margins

				b_7	0	0	0	0	1	1	1	1
				b_6	0	0	1	1	0	0	1	1
				b_5	0	1	0	1	0	1	0	1
b_4	b_3	b_2	b_1									
0	0	0	0	NUL	DLE	SP	0	@	P	—	—
0	0	0	1	SOH	XON	!	1	A	Q	—	—
0	0	1	0	STX	TAPE	"	2	B	R	—	—
0	0	1	1	ETX	XOFF	#	3	C	S	—	—
0	1	0	0	EOT	~~TAPE~~	$	4	D	T	—	—
0	1	0	1	WRU	NAK	%	5	E	U	—	—
0	1	1	0	ACK	SYN	&	6	F	V	—	—
0	1	1	1	BELL	ETB	'	7	G	W	—	—
1	0	0	0	BS	CAN	(	8	H	X	—	—
1	0	0	1	TAB	EM	)	9	I	Y	—	—
1	0	1	0	LINE FEED	SUB	*	:	J	Z	—	—
1	0	1	1	VT	ESC	+	;	K	[	—	—
1	1	0	0	FF	FS	,	<	L	\	—	NOTE 2
1	1	0	1	RETURN	GS	-	=	M	]	—	—
1	1	1	0	SO	RS	.	>	N	^	—	—
1	1	1	1	SI	US	/	?	O	—	—	RUBOUT

NOTE 1: 1 = MARK, 0 = SPACE, b_1 = CODE LEVEL NO. 1, b_2 = CODE LEVEL NO. 2

NOTE 2: CANNOT BE GENERATED FROM KEYBOARD.

NOTE 3: BLOCKS NOT INDICATING SHIFT OR CONTROL CHARACTERS CONTAIN PRIMARY KEY CHARACTERS.

NOTE 4: FILLED IN CORNERS OR BLOCKS INDICATE EIGHTH PULSE MARKING (IN NONPARITY UNITS, EIGHTH PULSE IS ALWAYS MARKING).

LEGEND

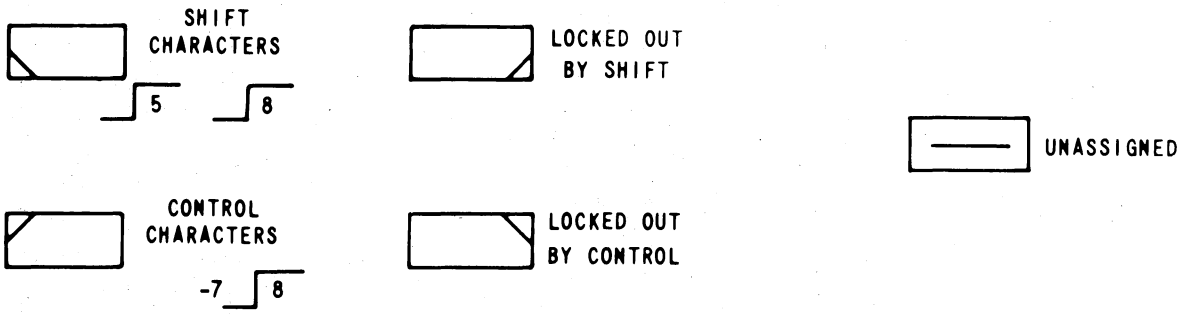

Figure 1 - ASCII (American National Standard Code for Information Interchange)

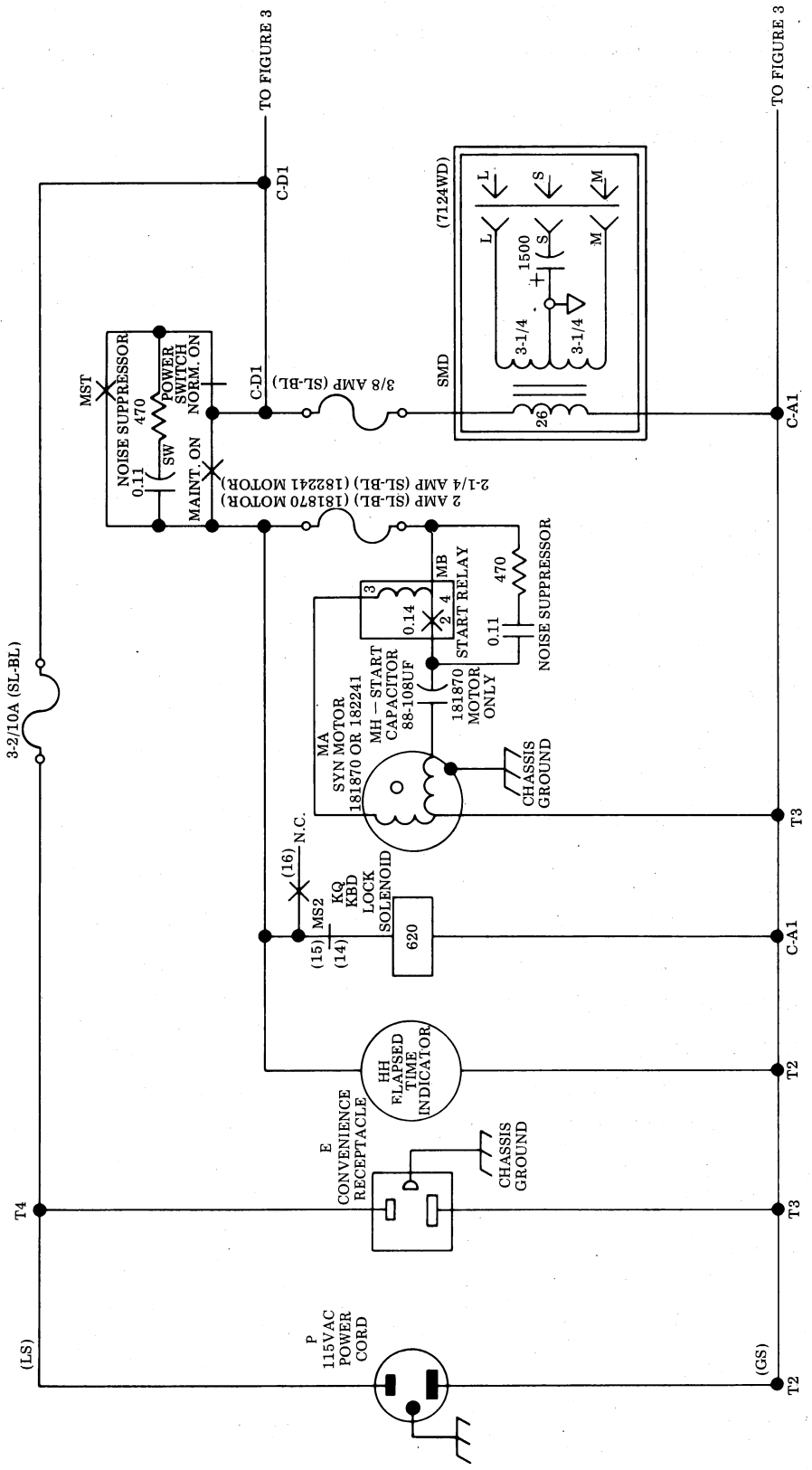

Figure 2 - ASR Power Conversion and Distribution (8152WD)

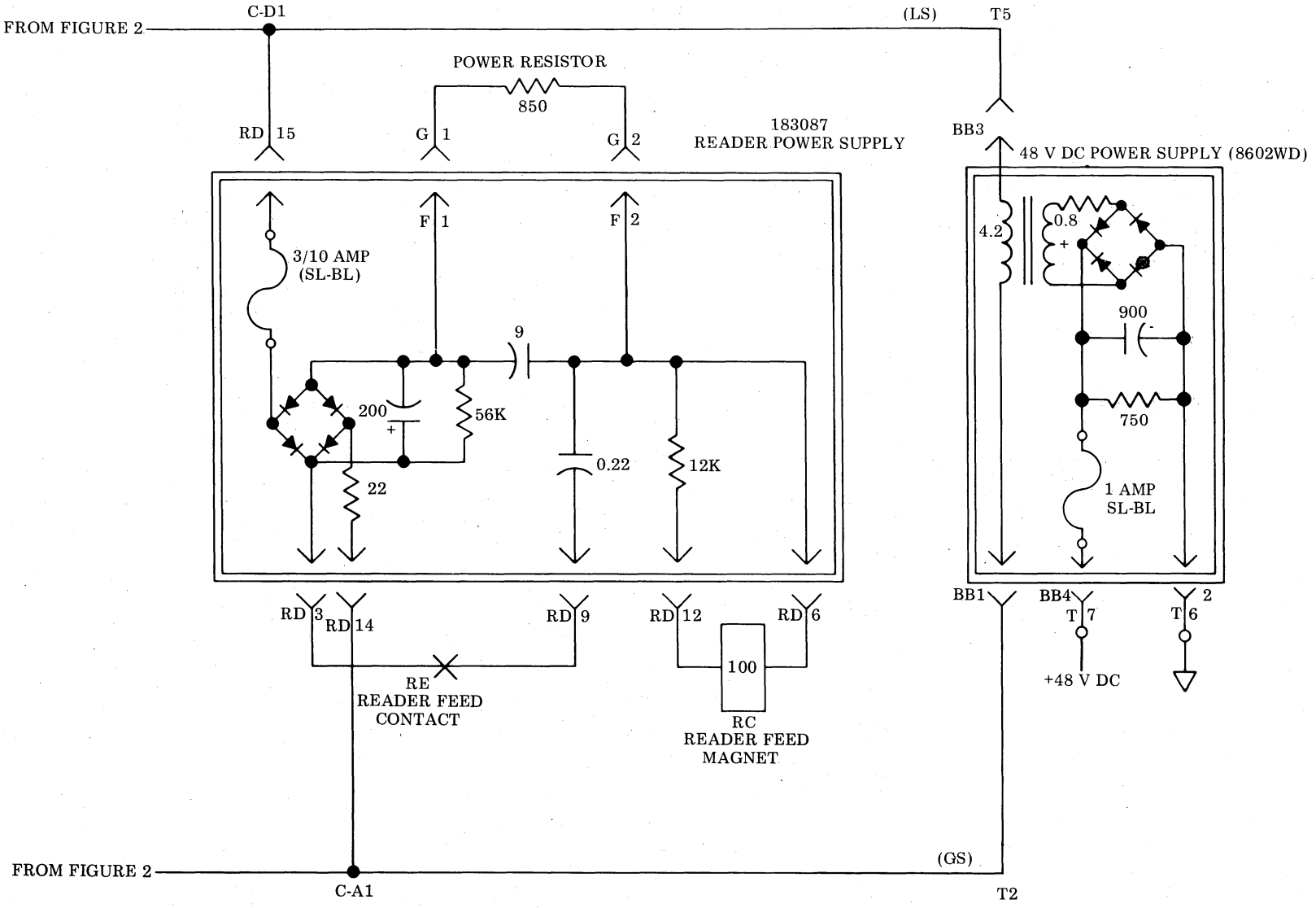

Figure 3 - ASR Power Conversion and Distribution (8152WD)

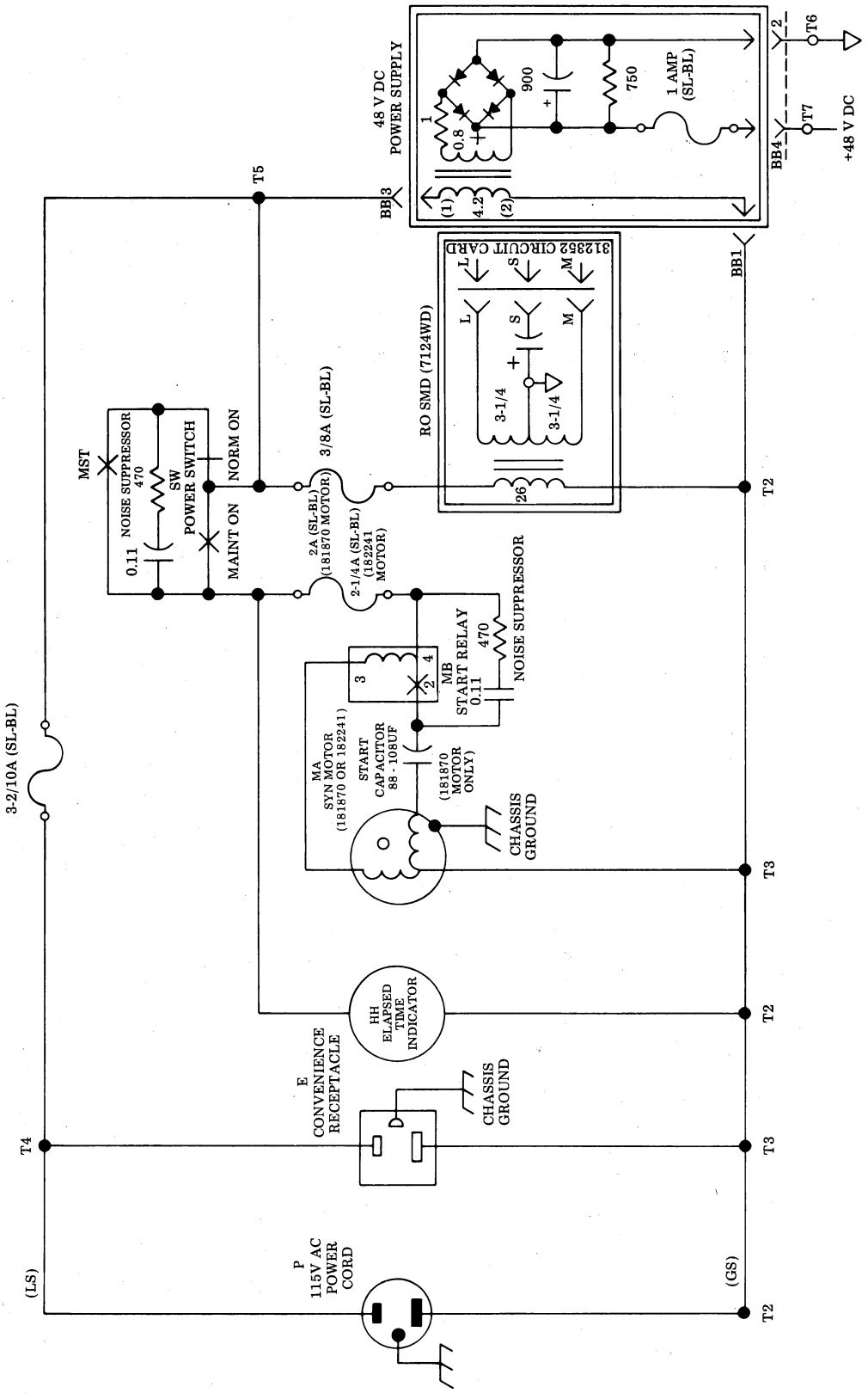

Figure 4 - RO Power Conversion and Distribution (8153WD)

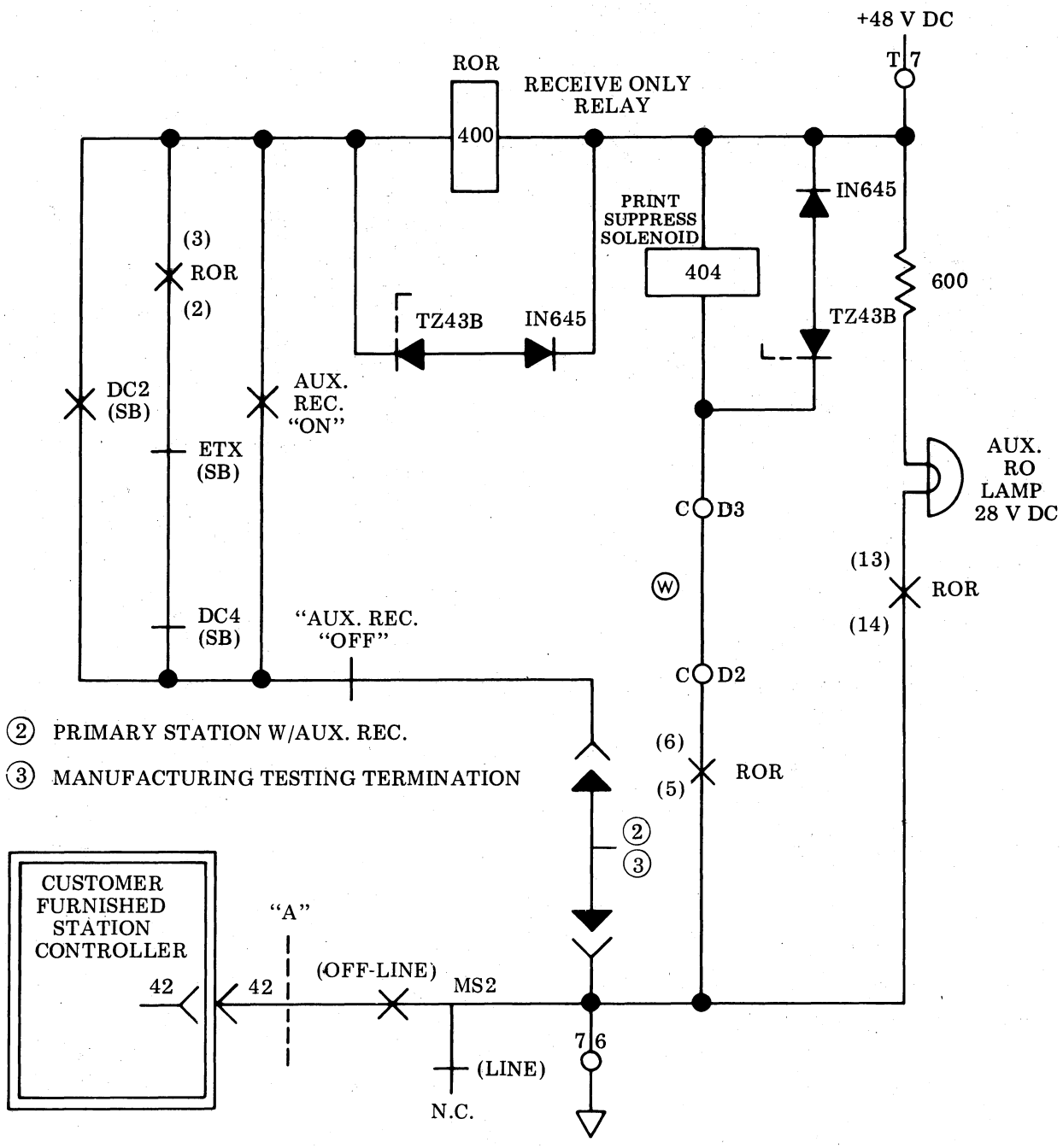

Figure 5 - ASR Auxiliary Receiver Control Circuit (8152WD)

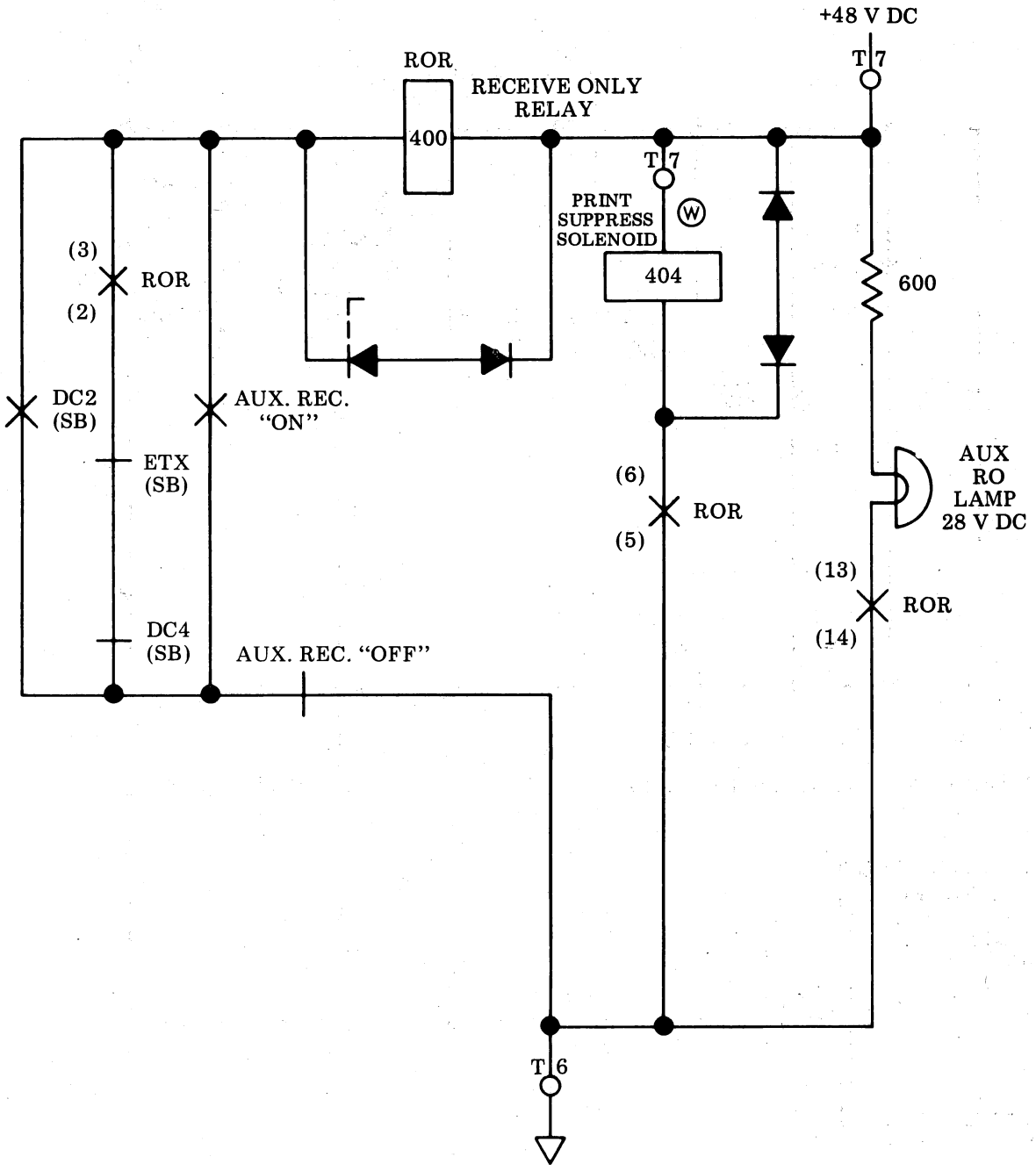

Figure 6 - RO Auxiliary Receiver Control Circuit (8153WD)

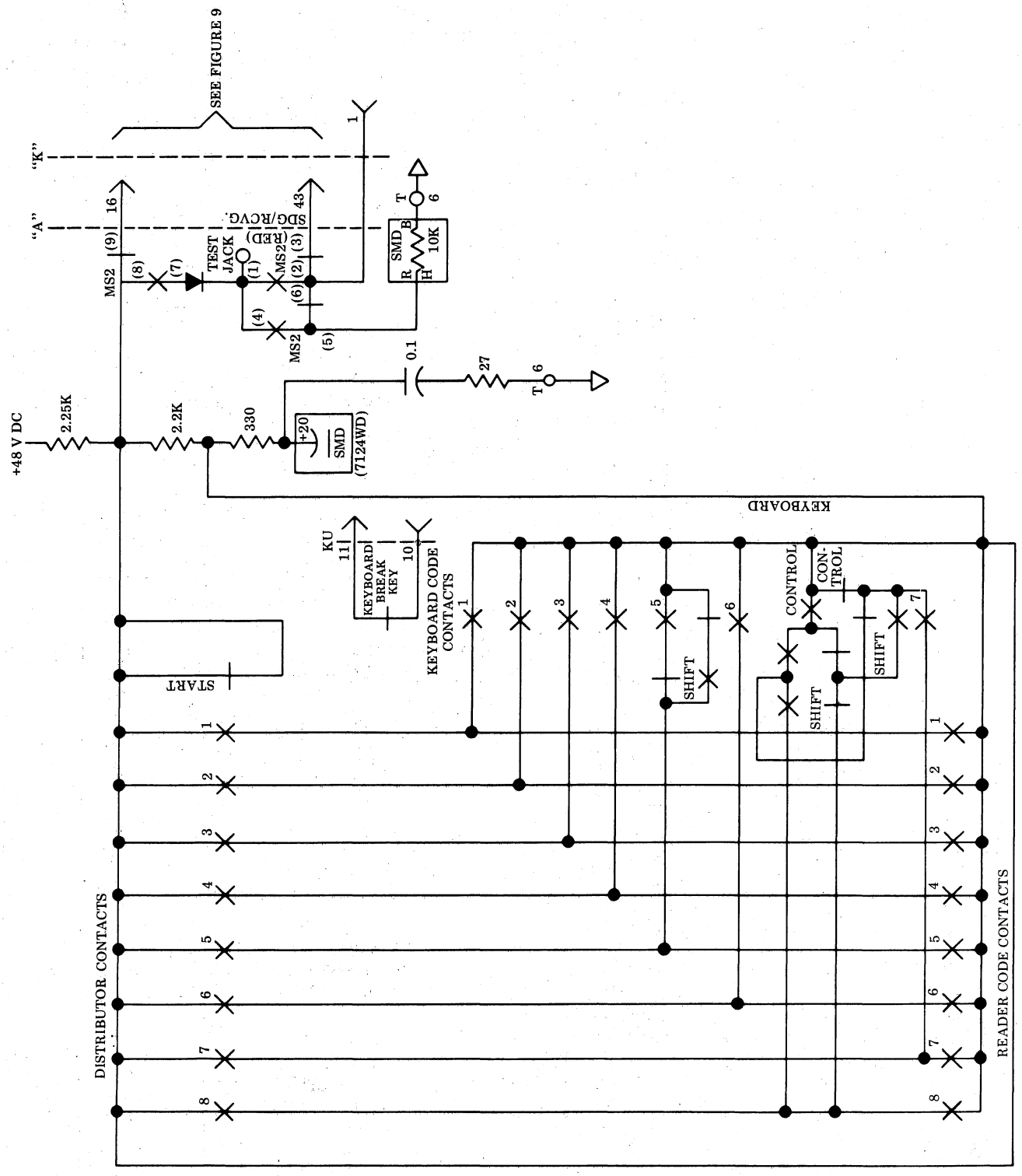

Figure 7 - ASR Signal Generation (8152WD)

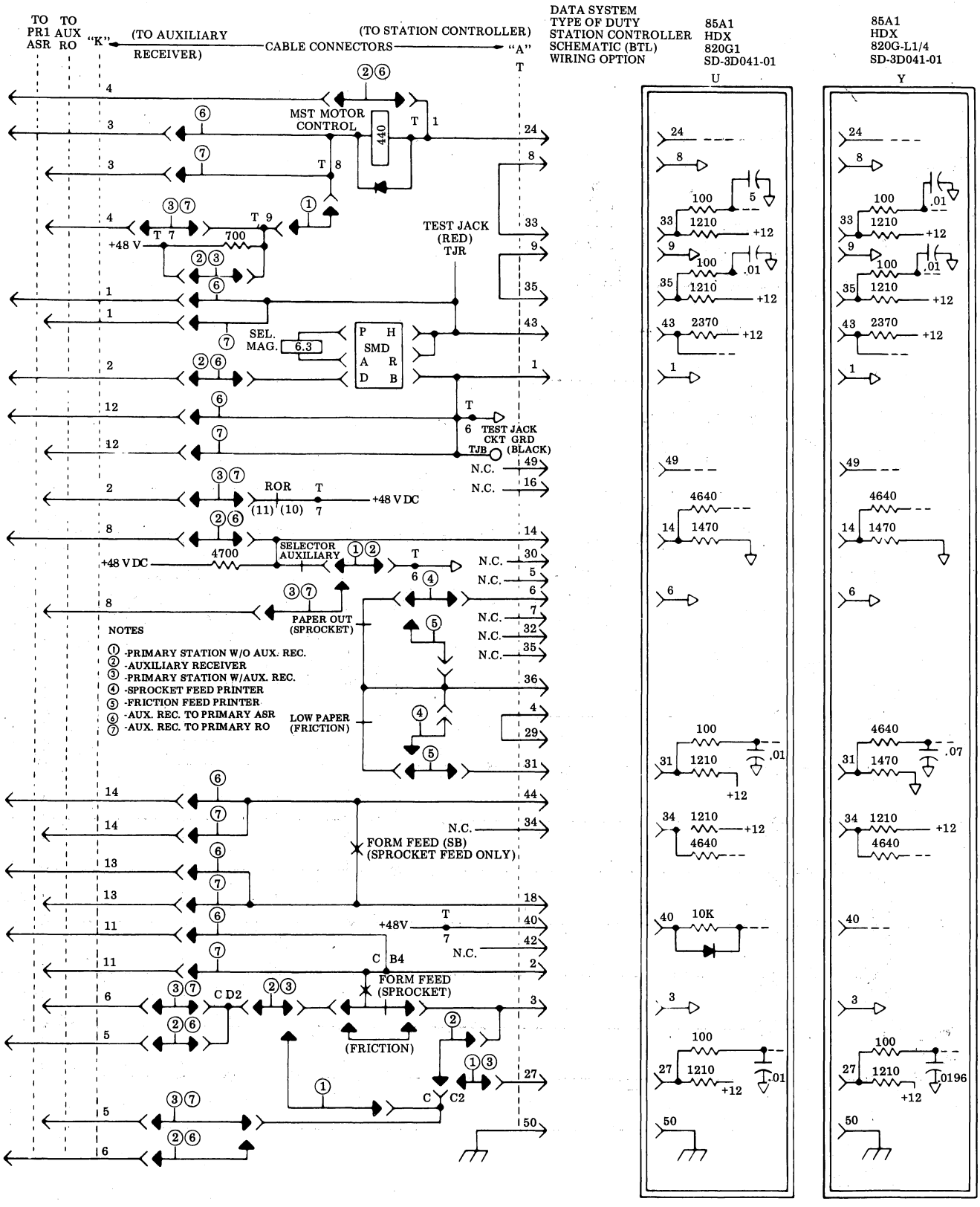

Figure 8 - RO Set (Primary Station With or Without Auxiliary Receiver (8153WD)

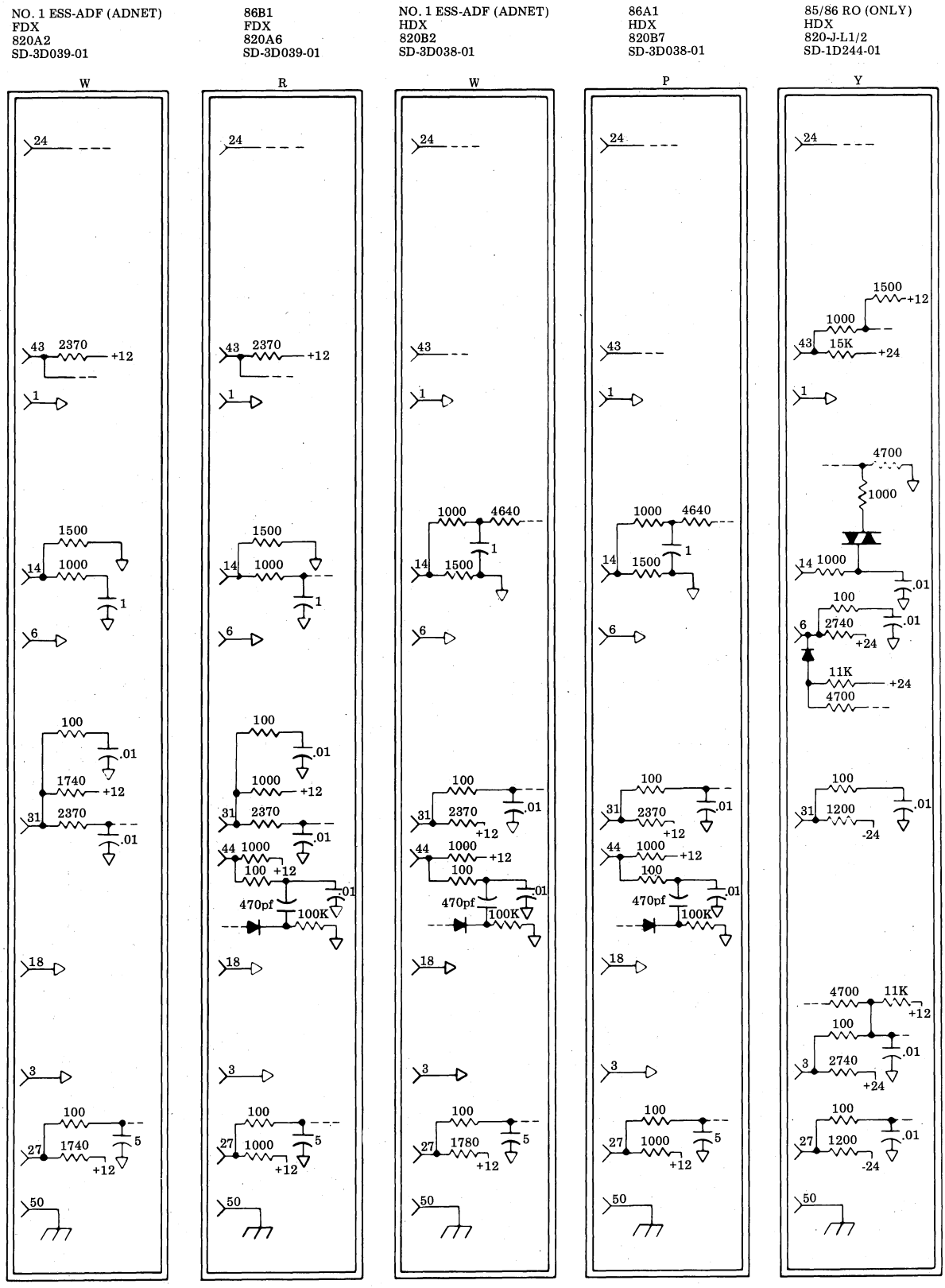

Figure 8 - RO Set (Primary Station With or Without Auxiliary Receiver (8153WD) (Continued)

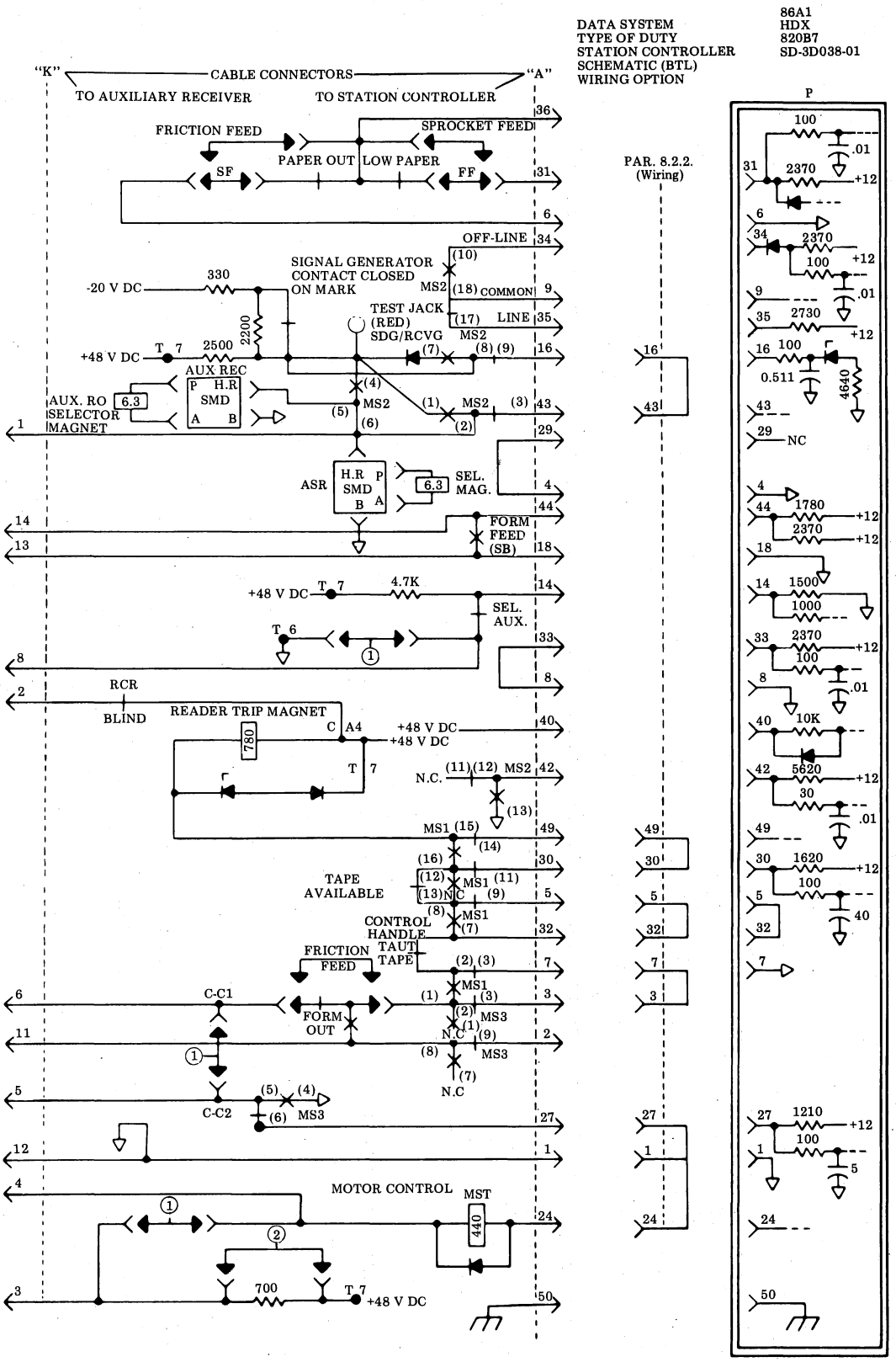

Figure 9 - ASR Set (Primary Station With or Without Auxiliary Receiver (8152WD)

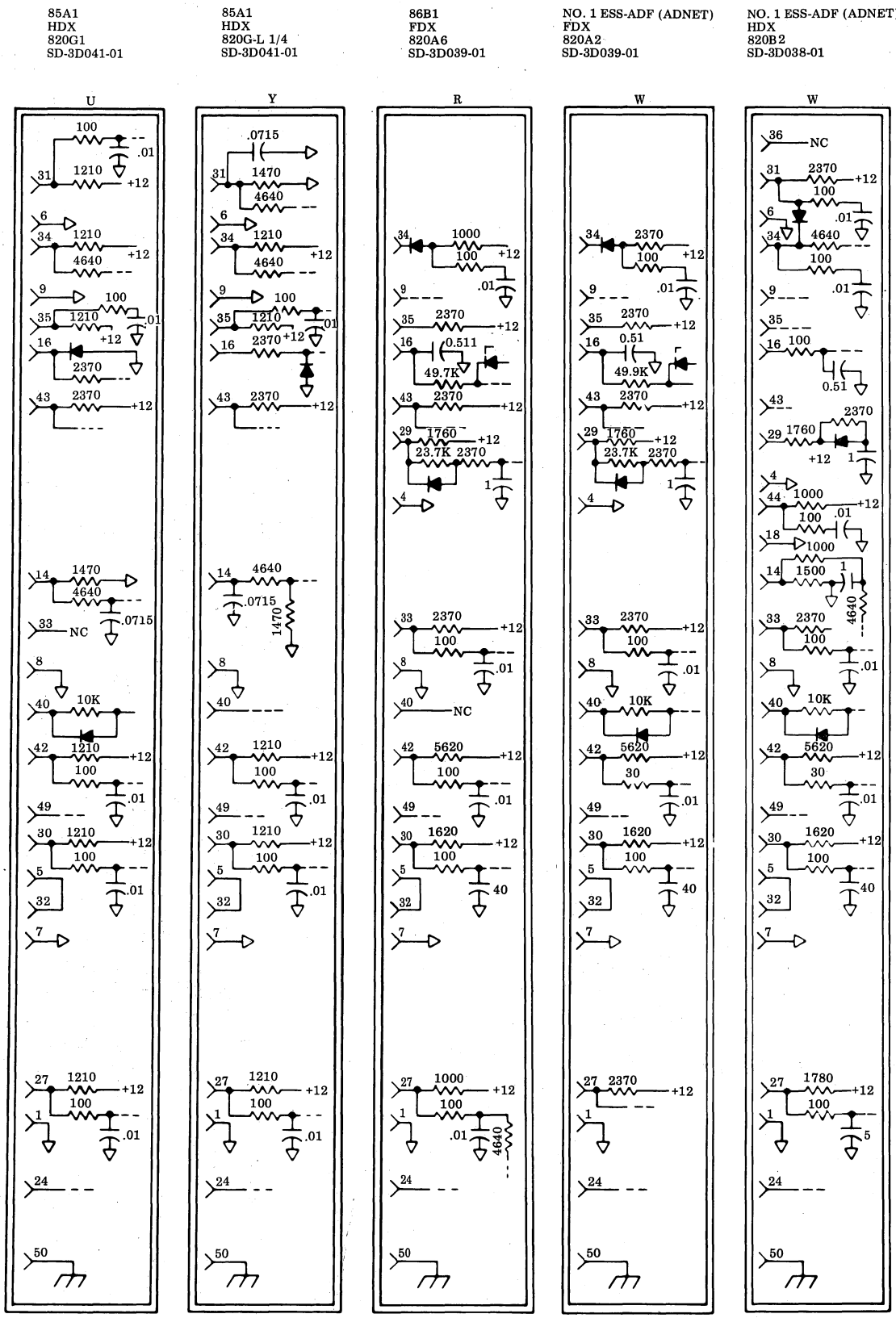

Figure 9 - ASR Set (Primary Station With or Without Auxiliary Receiver (8152WD) (Continued)