43 BASIC KSR TELEPRINTER

TROUBLESHOOTING

1. GENERAL

1.01 This section provides troubleshooting information for the 43 Basic KSR Teleprinter.

1.02 This section is reissued to include trouble-shooting information for Basic KSR Teleprinters with terminal auxiliary units (TAU1 and TAU2) and answer-back modification kits.

1.03 Troubleshooting is based on isolation of troubles to major components and the correction of troubles by replacement of these components or by reference to the component troubleshooting sections.

Note: Except for the 153A1 Terminal Data Unit and the 861B1 Terminal Auxiliary Unit which are Western Electric components, all numbers shown in this section are Teletype Corporation part numbers.

1.04 Component troubleshooting sections are:
   574-501-300   43 Printer
   574-502-300   43 Basic Operator Console (Opcon)

1.05 Trouble isolation provided in this section is intended for use by the craftsperson at the same location as the station. Troubles may occur either during an installation, a routine maintenance visit or as the result of a customer trouble report.

1.06 Trouble isolation for the attendant is provided in the 999-300-126, 999-300-127, and 999-300-129 How to Operate Manuals and for the Test Center in Section 668-130-500.

1.07 To facilitate trouble correction, the recommended maintenance spares as listed in the parts Section 574-500-800 should be available. In addition, parts for the repair of components as listed in Section 574-501-800, 574-502-800 and 574-503-800 for the printer, operator console and enclosures and paper handling should be available.

1.08 For component access, refer to the Disassembly/Reassembly Section 574-500-720 and Engineering Options Section 574-500-210.

1.09 For location and identification of station components, refer to the parts Section 574-500-800.

1.10 When replacement of the print head, logic card or opcon corrects the trouble, additional checks should be made to isolate and possibly correct the trouble without returning for repair.

On the print head — check cable continuity.
On the logic card — check terminal unit and power supply cables or fuse.
On the opcon — check the cable and key-switches per opcon troubleshooting.

1.11 When replacement of a component does not correct the trouble, the original component should be reinstalled before going to the next step of the trouble analysis. If there are no more steps provided, go to the last question.

1.12 Circuitry used in the operator console can be damaged by high static voltage discharge. The 346392 wrist strap is available to ground service personnel.

1.13 When returned to the WECO Service Center for repair, the set or components should be packed in the container in which the replacement is received. This includes the conductive (black) plastic bag used with the opcon and logic card for static protection.

1.14 Components returnable for repair and referred to in this section for replacement are:

430850 Print Head
43K101/CAA and CAB Operator Console
410710 Answer-Back Card
410740 Logic Card
410754 Terminal Auxiliary Unit (TAU2)
410755 Terminal Auxiliary Unit (TAU1)
430700 Power Supply
153A1 Terminal Data Unit
861B1 Terminal Auxiliary Unit

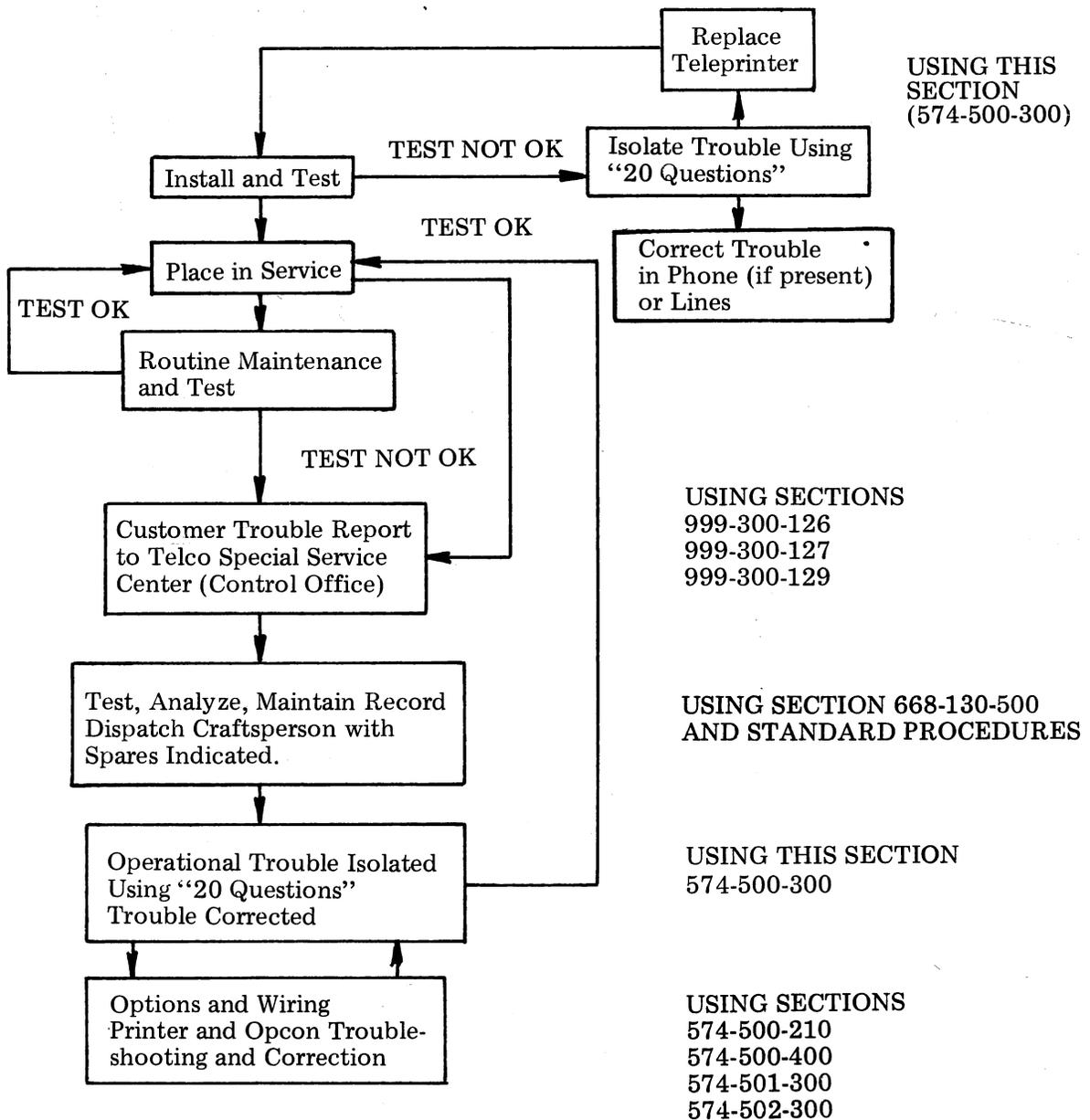1.15 Before disconnecting the internal cables or replacing circuit cards, turn off ac power. Make certain the power cord is connected to a properly polarized and grounded ac outlet.

1.16 Refer to 2. TROUBLESHOOTING DIAGRAM for the intended flow of trouble-shooting procedures.

1.17 Trouble analysis is presented in the form of a "20 Questions" routine in 3. TROUBLESHOOTING GUIDE. The guide, with questions and yes or no columns, should be used always starting with the first question and proceeding according to the "yes" or "no" directive.

2. TROUBLESHOOTING FLOW DIAGRAM

USING THIS SECTION (574-500-300)

USING SECTIONS
999-300-126
999-300-127
999-300-129

USING SECTION 668-130-500
AND STANDARD PROCEDURES

USING THIS SECTION
574-500-300

USING SECTIONS
574-500-210
574-500-400
574-501-300
574-502-300

3. TROUBLESHOOTING GUIDE   (Teleprinter with TDU)

QUESTION	YES	NO
1. Are any of the three communications mode indicators lit? (Power available and set power on.) (Depress other keys if proper indicator not lit.)	Go to 2.	Go to 1a.
1a. Is there any indication of power in the set? (Indicators flash when power is turned on and off, red lamp on power supply, etc.)	Go to 1b.	Check and replace set F1 fuse if blown. Replace power supply if fuse blows again. If not blown go to 1b.
1b. Is red lamp on power supply lit?	Check P107 opcon cable connector. Replace logic card. Replace opcon.	Disconnect power supply cable. Go to 1c.
1c. Does red lamp on power supply now light?	Unplug TDU, answer-back card (if present) opcon and printer cables (6). Reconnect power supply cable. Go to 1d.	Check F2 fuse on power supply. Replace if blown. Replace power supply. Replace rear frame assembly.
1d. Does red lamp on power supply still light?	Go to 1e.	Replace logic card.
1e. Does red lamp on power supply go out after the TDU, opcon, answer-back card and printer cables are reconnected one at a time?	Replace the TDU, opcon, answer-back card or the printer component (refer to printer troubleshooting) that caused lamp to extinguish.	Intermittent short. Check for foreign objects between circuit lands or terminals.
2. Does AUTO ANSW indicator light when power is turned on?	Go to 3.	Go to 2a.
2a. Does ALARM indicator: 1. Flash? 2. Light (cover closed and paper installed?)	1. Replace logic card. 2. Replace opcon or refer to printer troubleshooting.	Go to 2b.
2b. Does AUTO ANSW indicator light when depressed?	Replace logic card.	Replace opcon.

QUESTION	YES	NO
3. Does LOCAL TALK indicator light when depressed?	Go to 4.	Go to 3a.
3a. Does AUTO ANSW indicator go out?	Replace logic card.	Replace opcon.
4. Does AUTO ANSW indicator light when depressed?	Go to 5.	Replace opcon.
5. Does test message print and perform properly while the PRINTER TEST key is depressed?	Go to 6.	Check option 431 and 432. Go to 5a.
5a. Is red lamp on power supply lit?	Go to 5c.	Disconnect power supply cable. Go to 5b.
5b. Does red lamp on power supply now light?	Reconnect power supply cable. Unplug print head and motor cables then reconnect one at a time to isolate cause of lamp not lit. Replace defective component (refer to printer troubleshooting).	Replace power supply.
5c. Does anything print or perform?	Go to 5d.	Place printer test bypass switch SPD4-2 on logic card to ON position. If ok replace opcon. Replace logic card.
5d. Does anything print?	**Go to 5e.**	Replace logic card. Refer to printer troubleshooting.
5e. Are characters properly formed?	Go to 5f.	Refer to printer troubleshooting. Replace logic card.
5f. Are the proper characters printed?	Go to 5g.	Replace logic card.
5g. Is print density acceptable (Good ribbon)?	May be undefined printing problem. Refer to printer troubleshooting. Replace logic card. Go to 5h.	Refer to printer troubleshooting.

QUESTION	YES	NO
5h. Does paper feed properly (paper supply free)?	Go to 5i.	Check F3 fuse on logic card. Replace line feed motor if fuse blows again. Refer to printer trouble-shooting. Replace logic card.
5i. Does print head space and return properly?	Undefined problem in printer test functions. Refer to printer trouble-shooting.	Refer to printer trouble-shooting. Replace logic card.
6. Did ALARM indicator light during printer test?	Go to 7.	Go to 6a.
6a. Does ALARM indicator light when cover is opened?	Replace logic card.	Replace opcon.
7. Does ALARM indicator light when 1. paper is out and when 2. cover is opened?	Go to 8.	1. Check printer trouble-shooting. 2. Replace opcon. 3. Replace logic card.
8. Do all characters print and functions (except bell and margin set) perform when the keys on the keyboard are operated (local talk mode)?	Go to 9.	Replace opcon. Replace logic card.
9. Does signal bell ring on CTRL G?	Go to 10.	Go to 9a.
9a. Did signal bell ring during printer test?	Replace logic card. Replace opcon.	Check P106 bell connector. Refer to printer (bell) trouble-shooting. Replace logic card.
10. Does signal bell ring eight characters before right margin and at left and right margins?	Go to 11.	Replace logic card.
11. Are margins set and cleared properly?	Go to 12.	Check column indicator positioning adjustment. Replace logic card.

QUESTION	YES	NO
12. Does printer respond properly to keyboard operated in analog loop-back mode? (Entered from keyboard by ESC > sequence (data mode). Ended by ESC = sequence.)	Go to 13.	Check P301 connector. Bypass answer-back card, if present. Go to 12a.
12a. Does printer now respond properly to keyboard operated in analog loop-back mode?	Replace answer-back card.	Reconnect answer-back card. Replace Terminal Data Unit. Replace logic card.
13. Did 1. ALARM indicator flash and 2. DATA indicator light during analog loop-back?	Go to 14.	1. Replace logic card. 2. Replace opcon.
14. Does telephone operate normally in both local talk mode and with set power off?	Go to 15.	Check that modular cords are properly connected at rear of teleprinter and phone. Go to 14a.
14a. Does telephone operate normally (dial tone, dial, talk, ring) when connected directly to line using modular cord that was connected to the teleprinter?	Check modular cord originally between set and phone. If ok Replace Terminal Data Unit. Replace logic card.	Check tip and ring of phone line for 48 V dc. (use 150 V or higher scale). Check proper polarity (if no touch tone dial). Check phone resistance on hook (capacitors only) off-hook (600 ohms). Correct wiring of phone lines or replace phone as indicated.
15. Does DATA indicator flash when depressed in local talk mode? (Handset on hook.)	Go to 16.	Replace opcon. Replace logic card.
16. Does phone ring repeatedly in automatic answer mode?	Replace Terminal Data Unit. Replace logic card.	Go to 17.
17. Does DATA indicator light following a received call in automatic answer mode?	Go to 18.	Remote station must also go to data mode. Check that modular cords are not reversed. Bypass answer-back card, if present. Go to 17a.

QUESTION	YES	NO
17a. Does DATA indicator now light following a received call in automatic answer mode?	Replace answer-back card.	Replace TDU. Replace logic card. Go to 28.
18. Are data messages properly sent and received in the data mode?	Go to 19.	Go to 18a.
18a. Do PARITY, DUPLEX and CPS keys alternately lock down then release up when depressed?	Go to 19.	Replace defective key switch.
19. Can any data be received?	Go to 19a.	Go to 28.
19a. Is answer-back message properly sent and/or printed under all conditions.	Go to 20.	Check options 438 thru 444. Replace answer-back card.
20. Does substitute character print on some characters (PARITY key on)?	Remote station may be sending incorrect parity or be at different speed. Go to 25.	Go to 21.
21. Does printer copy and data transmit properly in half-duplex? (DATA indicator lit.)	Go to 22.	Check option 434. Replace opcon. Replace logic card. Go to 28.
22. Is printer blinded to keyboard transmission in full duplex? (DATA indicator lit.)	Go to 23.	Replace opcon. Replace logic card.
23. Does the carriage return automatically when characters to the right of the right hand margin are received (DATA indicator lit)?	Go to 24.	Check option 435. Replace logic card.
24. Does call disconnect on received EOT and when carrier is not received (in data mode)?	Go to 25.	Check option 433. Replace logic card. Replace TDU.

QUESTION	YES	NO
25. Is INTRPT indicator lit?	(Interrupt received) Go to 25a.	Go to 26.
25a. Does INTRPT indicator go off when depressed?	Go to 26.	Replace opcon. Replace logic card. Go to 28.
26. Does INTRPT indicator light briefly and bell ring when INTRPT indicator is depressed?	Go to 27.	Replace opcon. Replace logic card.
27. Does remote station receive interrupt?	Go to 29.	Go to 28.
28. Does station pass on-line end-to-end tests with Test Center?	Trouble (if any) is in remote station.	Perform distortion, dBm level, or other parameter tests including digital loop-back under control of Test Center to isolate trouble to line, TDU, answer-back card, or logic card (904G, Section 668-400-300).
29. Is trouble present but not defined by Questions 1 to 28?	Refer to printer or opcon troubleshooting for other symptoms. Replace opcon, power supply, TDU, logic card, answer-back card, and/or print head to correct trouble.	

4. TROUBLESHOOTING GUIDE (Teleprinter without TDU)

QUESTION	YES	NO
1. Are any of the three communications mode indicators lit? (Power available and set power on.) (Depress other keys if proper indicator not lit.)	Go to 2.	Go to 1a.
1a. Is there any indication of power in the set? (Indicators flash when power is turned on and off, red lamp on power supply, etc.)	Go to 1b.	Check and replace set F1 fuse if blown. Replace power supply if fuse blows again. If not blown go to 1b.
1b. Is red lamp on power supply lit?	Check P107 opcon cable connector. Replace logic card. Replace opcon.	Disconnect power supply cable. Go to 1c.
1c. Does red lamp on power supply now light?	Unplug terminal unit and answer-back card, if present, opcon and printer (6) cables. Reconnect power supply cable. Go to 1d.	Check F2 fuse on power supply. Replace if blown. Replace power supply. Replace rear frame assembly.
1d. Does red lamp on power supply still light?	Go to 1e.	Replace logic card.
1e. Does red lamp on power supply go out after the terminal unit, opcon, answer-back card and printer cables are reconnected one at a time?	Replace the terminal unit, opcon, answer-back card or the printer component (refer to printer troubleshooting) that caused lamp to extinguish.	Intermittent short. Check for foreign objects between circuit lands or terminals.
2. Does ALARM indicator: 1. Flash? 2. Light (cover closed and paper installed)?	1. Replace logic card. 2. Replace opcon or refer to printer troubleshooting.	Go to 3.

QUESTION	YES	NO
3. Does LOCAL indicator light when depressed?	Go to 4.	Go to 3a.
3a. Does DATA indicator go out?	Replace logic card.	Replace opcon.
4. Does test message print and perform properly while the PRINTER TEST key is depressed?	Go to 5.	Check option 431 and 432. Go to 4a
4a. Is red lamp on power supply lit?	Go to 4c.	Disconnect power supply cable. Go to 4b.
4b. Does red lamp on power supply now light?	Reconnect power supply cable. Unplug print head and motor cables then reconnect one at a time to isolate cause of lamp not lit. Replace defective component (refer to printer troubleshooting).	Replace power supply.
4c. Does anything print or perform?	Go to 4d.	Place printer test bypass switch SPD4-2 on logic card to ON position. If ok replace opcon. Replace logic card.
4d. Does anything print?	Go to 4e.	Replace logic card. Refer to printer troubleshooting.
4e. Are characters properly formed?	Go to 4f.	Refer to printer troubleshooting. Replace logic card.
4f. Are the proper characters printed?	Go to 4g.	Replace logic card.
4g. Is print density acceptable (good ribbon)?	May be undefined printing problem. Refer to printer troubleshooting. Replace logic card. Go to 4h.	Refer to printer troubleshooting.

QUESTION	YES	NO
4h. Does paper feed properly (paper supply free)?	Go to 4i.	Check F3 fuse on logic card. Replace line feed motor if fuse blows again. Refer to printer troubleshooting. Replace logic card.
4i. Does print head space and return properly?	Undefined problem in printer test functions. Refer to printer troubleshooting.	Refer to printer troubleshooting. Replace logic card.
5. Did ALARM indicator light during printer test?	Go to 6.	Go to 5a.
5a. Does ALARM indicator light when cover is opened?	Replace logic card.	Replace opcon.
6. Does ALARM indicator light when 1. paper is out and when 2. cover is opened?	Go to 7.	1. Check printer troubleshooting. 2. Replace opcon. 3. Replace logic card.
7. Do all characters print and functions (except bell and margin set) perform when the keys on the keyboard are operated (local mode)?	Go to 8.	Replace opcon. Replace logic card.
8. Does signal bell ring on CTRL G?	Go to 9.	Go to 8a.
8a. Did signal bell ring during printer test?	Replace logic card. Replace opcon.	Check P106 bell connector. Refer to printer (bell) troubleshooting. Replace logic card.
9. Does signal bell ring eight characters before right margin and at left and right margins?	Go to 10.	Replace logic card.
10. Are margins set and cleared properly?	Go to 11.	Check column indicator positioning adjustment. Replace logic card.

QUESTION	YES	NO
11. Does printer respond properly to keyboard operation in loop-back mode?	Go to 12.	Check P301 connector. Bypass answer-back card, if present. Go to 11a.
11a. Does printer now respond properly to keyboard operation in loop-back mode?	Replace answer-back card.	Replace logic card. Replace Terminal Unit.
12. Did ALARM indicator flash and DATA indicator light during loopback?	Go to 13.	Replace logic card. Replace opcon.
13. Does external device connected to interface connector go to data mode (DATA indicator depressed, exclusion key lifted, etc)? (TTL interface — Data Ready, pin 15 on, 0 V) (EIA interface — Carrier Detect, pin 8 on, + 12V)	Go to 14.	Go to 13a.
13a. Is Terminal Ready pin 5, TTL interface on, 0 V, TERM READY (AUTO ANSWER) on?	Go to 13b.	Bypass answer-back card, if present. Go to 13b.
13b. Is Terminal Ready pin 5, TTL interface now on, 0 V?	Replace answer-back card.	Reconnect answer-back card. Replace logic card.
13c. Does external device require Request to Send (EIA interface) to be on?	Use issue 2A logic card or strap ON in cable (Sets w/TAU). Sets with Terminal Unit — go to 13d.	Sets without Terminal Unit — trouble is in external device.
13d. Is Data Term Ready pin 20 EIA interface on, + 12V?	Trouble is in external device.	Replace TAU or TAU1. Go to 13e. (Sets w/TAU2)
13e. Is Data Term Ready auxiliary pin 20 on, + 12V?	Replace TAU2	Trouble is in external auxiliary device.
14. Does DATA indicator on opcon light when external device is in data mode?	Go to 15.	Go to 14a.

QUESTION	YES	NO
14a. Is EIA interface Clear to Send, pin 5, Carrier Detect pin 8, and Data Set Ready, pin 6 on, + 12V? (Request to Send on if requested by external device (strapped or Issue 2A logic card present — Sets w/TAU).	Go to 14b.	Trouble in external device.
14b. Is TTL interface Data Ready, pin 15 on?	Replace logic card.	Bypass answer-back card. Go to 14c.
14c. Is TTL interface Data Ready, pin 15 now on?	Replace answer-back card.	Replace Terminal Unit.
15. Are data messages properly sent and received in the data mode?	Go to 18.	Go to 15a.
15a. Do PARITY, DUPLEX and CPS keys alternately lock down and release up when depressed.	Go to 16.	Replace opcon.
16. Can any data be received?	Go to 16a.	Replace logic card. Replace Terminal Unit. Go to 25.
16a. Is answer-back message properly sent and/or printed under all conditions.	Go to 17.	Check options 438 thru 444. Replace answer-back card.
17. Does substitute character print on some characters (PARITY key on)?	Remote station may be sending incorrect parity or be at different speed. Go to 22.	Go to 18.
18. Does printer copy and data transmit properly in half-duplex (DATA indicator lit)?	Go to 19.	Check option 434. Replace opcon. Replace logic card. Replace Terminal Unit. Go to 25.
19. Is printer blinded to keyboard transmission in full duplex (DATA indicator lit)?	Go to 20.	Replace opcon. Replace logic card.
20. Does the carriage return automatically when characters to the right of the right hand margin are received (DATA indicator lit)?	Go to 21.	Check option 435. Replace logic card.

QUESTION	YES	NO
21. Does Term Ready turn off momentarily on received EOT and when carrier is not received (in data mode) (call disconnect on switched network)?	Go to 22.	Check option 433. Replace logic card. Replace Terminal Unit if present.
22. Is INTRPT indicator lit?	(Interrupt received) Go to 22a.	Go to 23.
22a. Does INTRPT indicator go off when depressed?	Go to 23.	Replace opcon. Replace logic card. Go to 25.
23. Does INTRPT indicator light briefly and bell ring when INTRPT indicator is depressed?	Go to 24.	Replace opcon. Replace logic card.
24. Does remote station receive interrupt?	Go to 26.	Go to 25.
25. Does station pass on-line end-to-end tests with Test Center?	Trouble (if any) is in remote station.	Perform distortion, dBm level, or other locally developed tests including digital loop-back under control of Test Center to isolate trouble to line, Terminal Unit, answer-back card if present, or logic card.
26. Is trouble present but not defined by questions 1 to 25?	Refer to printer or opcon troubleshooting for other symptoms. Replace opcon, power supply, Terminal Unit, answer-back card, logic card, and/or print head to correct trouble.	