E2A TELEMETRY

SCOTS-C1 INTERFACE REMOTE AND TCT

MAINTENANCE

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1. INTRODUCTION

1.01 This section provides the maintenance procedures for the E2A telemetry equipment used in the SCOTS-C1 interface application. Separate procedures are provided for the telemetry-to-computer translator (TCT) maintenance and the E2A remote maintenance.

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

2. TCT MAINTENANCE

2.01 A spare TCT should be provided at each SCOTS central location for maintenance purposes. If a TCT malfunctions, it is replaced with the spare as set forth in Chart 1. The defective TCT is sent to Western Electric for repair.

CHART 1

TCT REPLACEMENT

APPARATUS:

None

STEP	PROCEDURE
1	Notify the SCOTS central operator that the TCT is about to be replaced.
2	Remove the front cover from the TCT.
3	Disconnect the power cord and the three cables from connectors J1, J2, and J3 on the back of the TCT.
4	Slide the defective TCT out of the data cabinet and replace it with a spare unit.

CHART 1 (Cont)

STEP	PROCEDURE
5	Reconnect the cables to J1, J2, and J3, and the power cord.
6	Notify the SCOTS central operator that the TCT has been replaced.

3. REMOTE MAINTENANCE (J92621K)

3.01 The SCOTS-C1 interface remote consists of a 202T data set, a basic remote module (BRM), and an expander module (EX), all of which are contained on one J92621K panel. Figure 1 shows a front view of the remote, in addition to the location of each of the circuit packs within the modules.

3.02 If a remote fails to respond to a command(s) sent by the central, an initial check should be made to ensure that the proper voltages are supplied to the P7 connector. The voltages should be as shown below:

P7 CONN PIN NUMBER	VOLTAGE
1, 2	+15
21, 22	−15
3, 15	+5

3.03 Chart 2 provides, in step-procedure form, the maintenance for the SCOTS-C1 interface remote. The chart is divided into three parts. The first part troubleshoots the 202T data set and defines the options within the set which must be set for the SCOTS-C1 application. The second part of the chart checks all the status inputs through the use of the E-telemetry station test set. The test set in this situation sends group report commands to the remote requesting the remote to send back the state of all status points. The test switch on CP 34 allows all status points to be grounded or open, thereby indicating an alarm or no alarm condition to be displayed on the test set. The third part of the chart checks the data output command, which is used by the SCOTS-C1 interface control unit to drive the SCOTS-C1 relay interface unit.

CHART 2

REMOTE MAINTENANCE

APPARATUS:

E-telemetry Station Test Set (KS-20937,L1)

General Purpose Plug-in (KS-20937,L4)

E2A Test Cable (KS-20937,L6)

Oscilloscope, Tektronix 454, or equivalent

CHART 2 (Cont)

STEP	PROCEDURE

APPARATUS (Cont):

    Hewlett-Packard 10525T Logic Probe, or equivalent

    Spare Circuit Packs

STEP	PROCEDURE

Caution:

    • *Prior to any remote maintenance, ensure that the monitored C1 central has been switched to the local control mode.*

    • *Remove power from bay before removing or replacing any circuit pack.*

DATA SET TEST

1   On the 202T data set, depress and hold the LT (Local Test) key for approximately 15 seconds.

Requirements: The MR, RS, CS, CO, and TM lamps shall light and remain lighted for the duration of time that the LT key is depressed. If the TM lamp goes off during the 15-second period, repeat Step 1 four additional times. If the TM lamp continues to go off, replace the data set and repeat the test.

2   Once the original data set or the new data set has met the requirements in Step 1, set the following options in the data set as indicated below:

    • Set shorting plug E21 to E23 for CARRIER DETECT RESET-IN.

    • Set shorting plug E25 to E26 for CONTINUOUS CARRIER-OUT.

    • Set screw switch S1 (inside data set housing) to open for SIGNAL GROUND NOT CONNECTED TO FRAME GROUND.

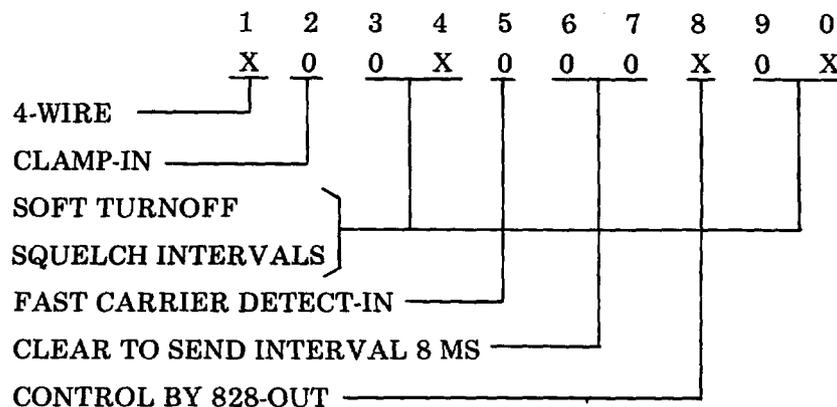   • Set rocker switch S2 to the following positions (x = rocker down on number side):

```
            1   2   3   4   5   6   7   8   9   0
            X   0   0   X   0   0   0   X   0   X
4-WIRE
CLAMP-IN
SOFT TURNOFF
SQUELCH INTERVALS
FAST CARRIER DETECT-IN
CLEAR TO SEND INTERVAL 8 MS
CONTROL BY 828-OUT
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CHART 2 (Cont)

STEP	PROCEDURE

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3   Set rockers on switch S3 to the following positions for 4-wire operation (x = rocker down on number side):

1	2	3	4	5	6	7	8	9	0
0	0	x	x	0	0	0	x	x	x

4   Once the requirement in Step 1 is met and the proper options are set, there is reasonable assurance that the data set is in proper working condition. Additional problems are probably within the remote circuitry. Steps 5 through 28 isolate the remote circuit problems with the data set disconnected.

STATUS GROUP REPORT TEST

5   Insert and connect the general purpose plug-in unit into the E-telemetry station test set.

6   Locate and remove plug P1 from the 202T data set at the remote unit.

7   Locate and remove plugs P4 and P6 from the E2A unit.

8   Mate the female pin connector of the E2A test cable to the P1 plug removed from the data set in Step 6. Plug the other end of the test cable into the J2 connector on the E-telemetry station test set.

9   Set the controls on the E-telemetry station test set as indicated below:

SWITCH	POSITION
POWER	OFF
SYSTEM	E1/E2
PARITY	B
BIT RATE	600
MODE	CONT
ENABLE	NORMAL
DISPLAY ERROR WORD	OFF
DISPLAY WORD SELECT	1
MESSAGE LENGTH	1
RCU	OFF
WORD 1	01011111111000001
WORD 2 through WORD 4	00000000000000000

CHART 2 (Cont)

STEP	PROCEDURE
10	Move the POWER switch to the ON position.
11	Depress in order, the MASTER CLEAR and START pushbutton switches.

Requirement: The TMT, RCV, and VALID WORD lamps shall blink. If the requirement is met, continue with Step 12. If the requirement is not met, repeat Step 11. If the requirement is still not met or the ERROR WORD lamp blinks, replace all of the following circuit packs:

> CP 1
>
> CP 2
>
> CP 3
>
> CP 5
>
> CP 7
>
> CP 48

Inspect CP 34 for proper cross-connections per Note 105 of SD-1C546-01-D1. If the requirement in Step 11 can now be met, determine the defective CP as follows:

Insert the original CPs back in the remote unit, one at a time, repeating Step 10 after each replacement until the unit malfunctions. The last original CP installed is defective and shall be replaced with a spare.

If the remote still fails to operate correctly after replacing all the designated CPs, either a spare CP is defective or the BRM backplane wiring is faulty. When this occurs, refer to SD-1C533-01 and SD-1C546-01.

STEP	PROCEDURE
12	Hold the TEST switch on CP 34 in the 1 (up) position.

Requirement: INFORMATION lamps 1 through 17 shall light. If this requirement is not met, replace the appropriate CP corresponding to the station test set switch settings (WORD 1, switches 14 through 17, and the DISPLAY WORD SELECT switch) per Table A.

STEP	PROCEDURE
13	Hold the TEST switch on CP 34 in the 0 (down) position.

Requirement: INFORMATION lamp number 1 shall remain lighted, and lamps 2 through 17 shall extinguish. If the requirement is not met, replace the appropriate CP corresponding to the station test set switches per Table A.

STEP	PROCEDURE
14	Repeat the procedure used in Steps 12 and 13 for each set of switch settings in group 2, subgroups 2 and 3, as shown in Table A.
15	Set the station test set switches for group 3, subgroup 1, as shown in Table A.

CHART 2   (Cont)

STEP	PROCEDURE

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16   Depress in order, the MASTER CLEAR and START pushbutton switches.

17   Hold the TEST switch on CP 34 to the 1 (up) position.

Requirement: RECEIVE-INFORMATION lamps 1 through 17 shall light.   If the requirement is not met, replace the CP associated with the WORD 1 (group-subgroup) settings and repeat the step.

18   Hold the TEST switch on CP 34 to the 0 (down) position.

Requirement: RECEIVE-INFORMATION lamp number 1 shall remain lighted, and lamps 2 through 17 shall extinguish.   If the requirement is not met, replace the CP associated with the WORD 1 (group-subgroup) settings and repeat the step.

19   Repeat the procedure used in Steps 17 and 18 for subgroups 2 through 4, setting the station test set switches as shown in Table A.

Note: If the requirements are met in Steps 12 through 19, all status points are reporting correctly.   The remainder of the test checks the data output commands and the READ pulse.

DATA OUTPUT TEST

20   Depress the MASTER CLEAR pushbutton on the station test set.

21   Set the switches on the station test set as indicated below:

SWITCH	POSITION
MODE	ONCE
DISPLAY WORD SELECT	1
MESSAGE LENGTH	3
WORD 1	01001111111011111
WORD 2	10011111111000000
WORD 3	11010101010101010
WORD 4	00000000000000000

22   Depress the START pushbutton.

Requirement: RECEIVE-INFORMATION lamp number 12 shall light. If the requirement is not met, repeat Steps 20 through 22.

CHART 2 (Cont)

STEP	PROCEDURE

23 Remove P13 from J13; and using an oscilloscope, check the state of each of the following points on connector J13.

Requirement: The logic state of each point shall be as given below:

J13 Pin Number (See Fig. 2) 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10 — 11 — 12 — 13 — 14 — 15 — 16

LOGIC STATE 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0

Note: 1 = LIGHTED Probe

0 = EXTINGUISHED Probe

If the requirement is not met, replace CP 5 in location AJ and repeat the Step.

24 Set the WORD 3 switches on the station test set to 101010101010101.

25 Depress the START pushbutton.

26 Using a logic probe or oscilloscope, check the state of the following points on connector J13.

Requirement: The logic state of each point shall be as given below:

J13 Pin Number 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10 — 11 — 12 — 13 — 14 — 15 — 16

LOGIC STATE 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1

If the requirement is not met, replace CP 5 in location AJ and repeat Steps 23 through 26.

READ PULSE TEST

27 Reconnect P13 to J13; and using an oscilloscope, monitor pin 17 on the rear of J13.

28 Depress the START pushbutton.

Requirement: The oscilloscope shall display a positive pulse for a duration of approximately 0.6 milliseconds. If the requirement is not met, repeat the step. If the requirement still cannot be met, replace CP 5 in location AJ and repeat the step. When all requirements are met, remote testing is complete.

4. REFERENCES

4.01 The following is a list of Bell System Practices (BSP), Circuit Descriptions (CD), and Schematic Drawings (SD) associated with the operation and maintenance of the TCT and E2A remote unit.

SECTION	TITLE
103-117-101	E-Telemetry Station Test Set—Description, Operation, and Maintenance

SECTION	TITLE
190-205-000	SCOTS—TOP
190-205-303	SCOTS—Operator Defined Tasks
592-031-100	Data Set 202T—Description and Operation
592-031-300	Data Set 202T—Maintenance
592-031-500	Data Set 202T-Test Procedures

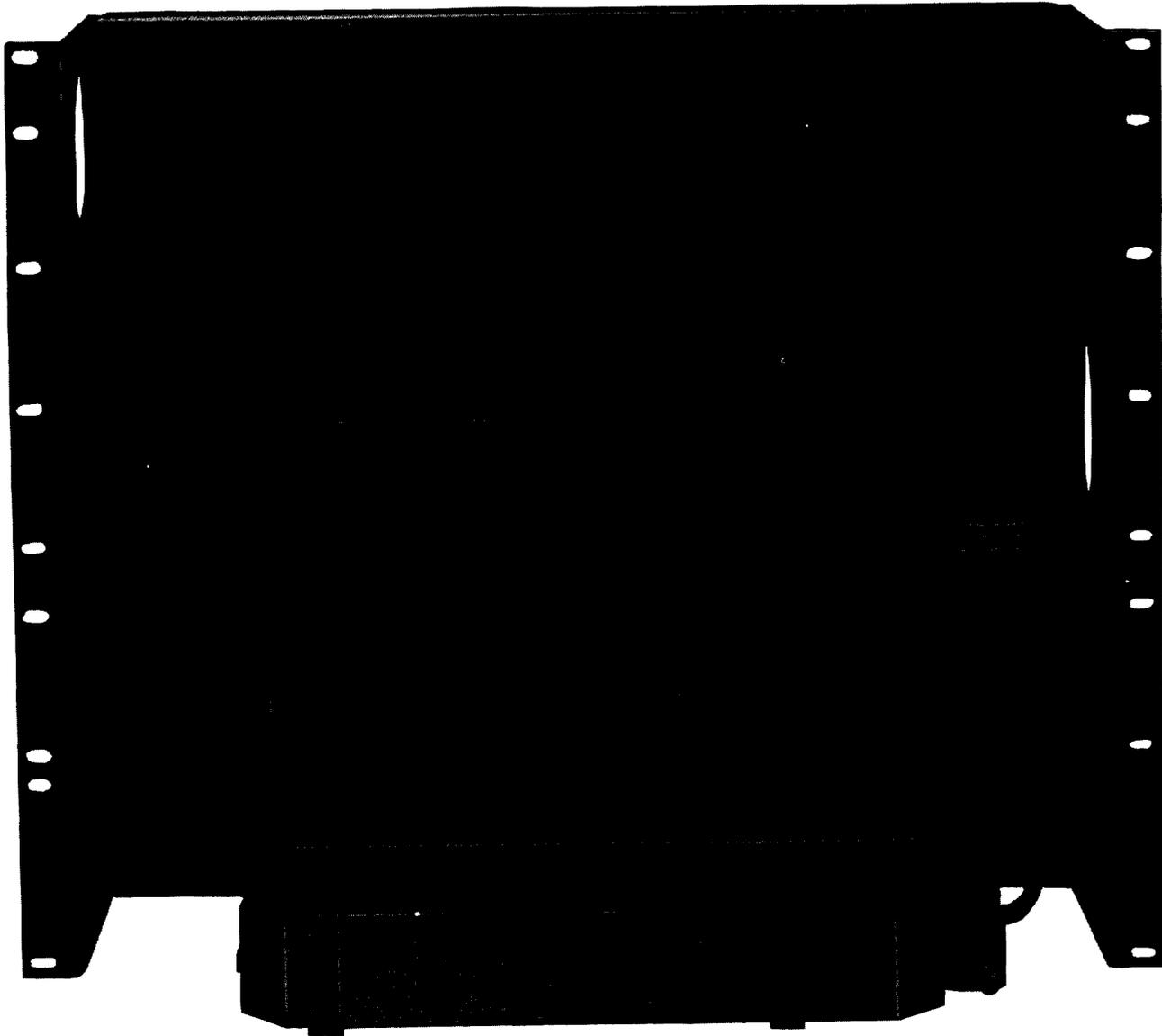| CD-SD	TITLE	CD-SD	TITLE
1C533-01	E2A—Remote Circuit Modules	1C546-01	E2A Telemetry—SCOTS-C1 Interface—Remote Application Schematic
1C542-01	TCT—Application Schematic		

Fig. 1—SCOTS-C1 Remote Unit (J92621K)

TABLE A

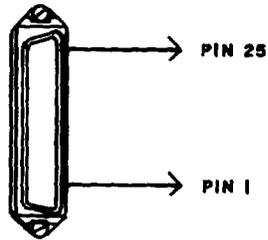| GROUP	SUBGROUP	WORD 1 SWITCH SETTINGS — SWITCH NUMBER				DISPLAY WORD SELECT SWITCH	ASSOCIATED CP	
		14	15	16	17		CP	LOC
2	1	0	0	0	1	1	10	BA
2	2	0	0	0	1	2	10	BB
2	3	0	0	0	1	3	10	BC
3	1	0	0	1	0	1	35	BD
3	2	0	0	1	0	2	35	BD
3	3	0	0	1	0	3	35	BE
3	4	0	0	1	0	4	35	BE

→ PIN 25

→ PIN 1

Fig. 2—J13 Connector Front View