405-TYPE DATA SYSTEM AND INTERFACE CIRCUIT FOR MESSAGE REGISTER REMOTING—TEST PROCEDURE

CONTENTS PAGE

1. GENERAL

1.01 This section describes the test procedures to be followed when investigating trouble conditions associated with the 405 Data System used with the SD-1C451-01 interface circuit. The section also provides the test requirements to be met at the time of installation. In this section the SD-1C451-01 interface circuit will be referred to as the interface circuit.

1.02 This section is to be used in conjunction with Sections 312-809-201 and 312-809-301.

1.03 The following is a complete list of test equipment necessary to perform the test outlined in this section:

- 901B DTS cover, or equivalent
- M25A-61 cord (used with 901B DTS cover)
- TTS-4 ANH, or equivalent
- 1W13A cord
- KS-14510-L1 VOM, or equivalent.

1.04 In some of the following test procedures, the use of a 901B DTS cover, or equivalent, is required to gain access to the interface between the data set and interface circuit. This test enables the Telco employee to isolate trouble in either the data set or interface circuit. If a 901B DTS cover, or equivalent, is ***not*** available, the test may be performed by taking the required measurements from the cross-connections located on terminal strip (TS) A or B of the interface circuit. This test will have the same requirements, but it ***will not*** isolate data set trouble from interface circuit trouble.

1.05 ***Lettered Steps:*** A letter a, b, c, etc, added to a step number of this section indicates an action which may or may not be required, depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the PROCEDURE column, and all steps governed by the same condition are designated by the same letter within the test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. VERIFICATION TEST

2.01 This test verifies operation of the input/outputs of data sets (DS) 405A and B and the cross-connections at the receiving end interface circuit. When the receiving end interface circuit is equipped with a delay circuit, the operation of this delay circuit is also checked.

2.02 The test is performed during the installation procedure prior to connecting the transmitting end data inputs to terminal strip A of the 405A interface circuit. The procedure requires the use of a 1W13A cord, or equivalent, at the transmitting end.

2.03 The verification test may also be used as a maintenance test to verify correct operation of one or more of the input/outputs of the 405 data system. During the verification test, the transmitting end input(s) to DS 405A must be disconnected from TS A of the interface circuit. The receiving end outputs from DS 405B remain connected during the verification test.

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STEP	PROCEDURE
	Note: Do not connect transmitting end message registers to terminal strip A (TS A) when performing verifications.
1	At transmitting end interface circuit— Connect one end of 1W13A cord to terminal 14 (TST) on TS A.
2	Connect the other end of the 1W13A cord to the terminal on TS A associated with the message register cross-connection to be verified.
	Note: Refer to Table A for terminal strip, terminal number, D lead number, and connector pin number.
3a	For message registers arranged for delay— Operate TSTA Key.
4	Read the indication on TST message register.
5	Call receiving location and request Telco employee to read the indication on the message register associated with the cross-connection to be verified.
6	Operate TST key 10 times.
	Requirement: As follows: • At transmitting end interface circuit, TST message register operates 10 times. • At receiving end interface circuit, message register associated with cross-connector to be verified operates 10 times.
7b	For message registers ***not*** arranged for delay— Disconnect 1W13A cord from cross-connection on transmit interface circuit.
8b	Repeat Steps 2 through 7B, as required, for each terminal associated with message register cross-connection to be verified. At time of installation, repeat steps 2 through 7b for ***every*** D lead.
9b	If no further verifications are required, go to Step 16.
10a	For message registers arranged for delay— Release TSTA key.
11a	Read the indication on TST message register.
12a	Verify (via telephone) that receiving location has read the indication on the message register associated with the cross-connection to be verified (receive interface circuit).
13a	Operate TST key 10 times.

TABLE A

INTERFACE PIN ASSIGNMENT FOR THE 405A-TYPE TRANSMITTER AND 405B-TYPE RECEIVER

DS	DESIG	J1/P1 NO.	TS A NO.	TS B NO.	DESIG	J4/P4 NO.	TS A NO.	TS B NO.	DS	DS
	None	1	—	—	D9	1	34	34		
	None	2	—	—	D10	2	44	44		
	D8	3	53	53	D11	3	54	54		
	D7	4	43	43	D12	4	15	15		
	D6	5	33	33	D13	5	25	25		
	D5	6	23	23	D14	6	35	35	L1/2	
	Fault	7	24	41	D15	7	45	45		
	D4	8	13	13	D16	8	55	55		
	D3	9	52	52	D17	9	16	16		
	D2	10	42	42	D18	10	26	26		
	D1	11	32	32	D19	11	36	36		
L1A	Alarm	12	—	22	D20	12	46	46		
	Alarm	13	—	12	D21	13	56	56		
	−48V	14	31	31	D22	14	17	17		L1/3
	None	15	—	—	D23	15	27	27		
	Ground	16	11	11	D24	16	37	37		
	None	17	—	—	D25	17	47	47		
	None	18	—	—	D26	18	57	57		
	None	19	—	—	D27	19	18	18		
	None	20	—	—	D28	20	28	28		
	Tip	21	—	14	D29	21	38	38		
	None	22	—	—	D30	22	48	48		
	Ring	23	—	24	D31	23	58	58		
	G1	24	—	—	D32	24	21	21		
	EOW	25	—	—	—	25	—	—		

STEP	PROCEDURE
	Requirements: As follows: • At transmitting end interface circuit, TST message register operates 10 times. • At receiving end interface circuit, message register associated with cross-connection to be verified does ***not*** operate.
14a	Disconnect 1W13A cord from cross-connection on transmit interface circuit (connected in Step 2).
15a	Repeat Steps 2 through 14a, as required, for each terminal associated with message register cross-connection to be verified. At time of installation, repeat steps 2 through 14a for ***every*** D lead arranged for delay (option Y).
16	Disconnect 1W13A cord from interface circuit and restore locations to normal condition.
17	End of verification.

3. SIGNAL LEVEL MEASUREMENT

3.01 When measuring the signal level at the transmitting end (DS 405A), a TTS-4 ANH, or equivalent, is required. When measuring the signal level at the receiving end (DS 405B), a TTS-4 ANH and a 901B DTS cover, or equivalent, are required. The procedures are as follows.

STEP	PROCEDURE
1	Using a TTS-4 ANH, or equivalent, operate REC IMP switch to 600Ω (high impedance termination) and prepare test set to measure a signal level.
2a	For DS 405A (transmitter)— Measure the signal level across tip and ring (terminals 14 and 24 on TS B) of the interface circuit via the TTS-4 ANH with data set powered. ***Requirement:*** 0 ±1 dBm.
3a	Go to Step 8. ***Note:*** If a 901B DTS cover, or equivalent, is ***not*** available, the signal level measurement at the receiving end may be taken at terminals 14 and 24 on TS B of the interface circuit. The requirement will be the same as the requirement following Step 7b.
4b	For DS 405B (receiver)— Remove P1 connector from rear of data set. ***Note:*** Removal of P1 connector from the data set will cause a data set alarm and may cause a score on some of the message registers associated with DS 405B.

STEP	PROCEDURE
5b	Insert 901B DTS cover, or equivalent (914-Type DTS), between the data set and interface circuit via P1 connector cord and M25A-61 cord.
6b	Verify that all shorting bars on 901B DTS cover are closed. If 914-Type DTS is used, depress all interface selector switches A or B as required.
7b	Measure the signal level across tip and ring (terminals 21 and 23, respectively) of the interface circuit via TTS-4 ANH with both DS 405A and B powered and connected to the private line facility. ***Requirement:*** −21 dBm to −8 dBm.
8	Remove 901B DTS cover (914-Type DTS) and restore P1 connector to data set.
9	End of test.

4. POWER MEASUREMENT

4.01 The following procedure is used to measure the voltage at DS 405A and B or the appropriate interface circuit. When measuring the voltage at the interface circuit, a KS-14510-L1 VOM, or equivalent, is required. If measuring the voltage at the data set, a 901B DTS cover (M25A-61 cord) is required in addition to the VOM.

STEP	PROCEDURE
1a	To measure the voltage at the interface circuit— Gain access to the rear of the interface circuit.
2a	Set VOM FUNCTION switch to 60 Vdc.
3a	Connect negative lead of VOM to terminal 31 (−48V terminal) of TS A and positive lead to terminal 11 (ground) of TSA. ***Requirement:*** −48 volts.
4a	Remove VOM leads from terminals.
5a	Go to Step 12. ***Note:*** If a 901B DTS cover, or equivalent, is ***not*** available, power problems at DS 405A and B ***cannot*** be isolated.
6b	To measure the voltage at the data sets— Disconnect data set from interface circuit by removing P1 connector at rear of data set.

STEP	PROCEDURE
	Note: If the data set being disconnected in Step 6B is the 405A, an alarm will occur at DS 405B.
7b	Insert 901B DTS cover, or equivalent (914-Type DTS), between data set and interface circuit via P1 connector and M25A-61 cord.
8b	Verify that all shorting bars on 901B DTS cover are closed. If 914-type DTS is used, depress all interface selector switches.
	Note: If an alarm occurred in Step 6b, it should stop.
9b	Connect the negative lead of the VOM to pin 14 (−48V) and the positive lead to pin 16 (ground) of the 901B DTS cover on data set side.
	Requirement: −48 volts.
10b	Remove VOM leads from 901B DTS cover.
11b	Remove 901B DTS cover, or equivalent, and restore P1 connector to the data set.
12	End of test.

5. INTERFACE CIRCUIT ALARM CHECK

5.01 The following procedure is used to check the circuit alarms at both transmitter and receiver interface circuits. The check requires the use of a 901B DTS cover (M25A-61 cord) and KS-20538-L1 VOM, or equivalent.

STEP	PROCEDURE
1	Gain access to rear of interface circuit.
2	Disconnect data set from interface circuit by removing P1 connector.
	Note: If the data set being disconnected in Step 2 is the 405A, an alarm will occur at DS 405B.
3	Insert 901B DTS cover between data set and interface circuit via P1 connector and M25A-61 cord.
4	Verify that all shorting bars on 901B DTS cover are closed.
	Note: If alarm occurred in Step 2, it should stop.
5	Open shorting bars on 901B DTS cover associated with terminals 12 and 13.

STEP	PROCEDURE
	Requirement: • The alarm light on the interface circuit extinguishes if the data set problem caused the alarm. If the alarm light remains lighted, an interface circuit problem caused the alarm.
6	Using a VOM, check the continuity between terminals 12 and 13 on the data set side (EQ terminals) of 901B DTS cover. ***Requirement:*** • A short indicates a data set problem caused the alarm. No short indicates an interface circuit problem caused the alarm.
7	Remove VOM leads from 901B DTS cover.
8	Remove 901B DTS cover and restore P1 connector to data set.
9	End of test.