405-TYPE DATA SYSTEM AND INTERFACE CIRCUIT FOR MESSAGE REGISTER REMOTING INSTALLATION AND CONNECTIONS

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1. GENERAL

1.01 This section provides installation and connection procedures to be followed when installing the 405-type Data System used with the SD-1C451-01 interface circuit. In this section, the SD-1C451-01 interface circuit will be referred to as interface circuit.

1.02 The basic 405-type Data System consists of data set (DS) 405A (transmitter) located at the originating end and DS 405B (receiver) located at the terminating end. The data sets are interconnected by a 2-wire private line voiceband channel. An interface circuit (SD-1C451-01) is required to be used with each data set when the system is used for remote register operation.

1.03 The interface circuit provides the following features:

- Wire-wrap cross-connection for 8, 20, or 32 message registers.
- Means of connecting −48V to 405 data sets.
- Means of connecting data set to transmission facility.
- Means of connecting to central office (CO) alarm circuits.
- Visual alarm indications for data system (located at interface circuit).
- The originating interface circuit provides a test circuit which may be used to verify cross-connections and to test the delay circuit.
- The terminating interface circuit provides an optional 250 to 300 ms delay operating pulse for message registers associated with dial tone speed (machines) register circuits.

1.04 The private line (2-wire) voiceband channel requires conditioning depending on the transmitted bit rate as follows:

- 880 bps—No conditioning
- 1400 bps—C1 conditioning

Note: The output level of DS 405A is factory set to 0 dBm which corresponds to a power level at a +13 dB TLP.

1.05 Each data set and its interface circuit are located in a central office environment.

1.06 This section is to be used in conjuction with Sections 312-809-301 and 312-809-501.

2. OPTIONS

A. Data Set 405-Type

2.01 The data set options required for the remote message register application are factory

installed. Verify that factory-furnished options for DS 405A are properly installed per Table A. The factory-furnished options for DS 405A are defined and keyed to Table A as follows:

- ***Option Y (Continuous Scan):*** This option provides a continuous scan of the input parallel data.
- ***Option W (8 Bits Only):*** This option provides for 8 input data bits and is limited to data set L1A.
- ***No Option W (More Than 8 Bits):*** This option provides 20 or 32 input data bits and is limited to data set L1/2 or L1/3, respectively.
- ***Option R (880 bps):*** This option provides a serial data transmission rate of 880 bits per second.
- ***Option Q (1400 bps):*** This option provides a serial data transmission rate of 1400 bits per second.

2.02 Verify that factory-furnished options for DS 405B are properly installed per Table B. The factory-furnished options for DS 405B are defined and keyed to Table B as follows:

- ***Option Y (End of Word Check):*** This option provides monitoring of the end-of-word signal for proper pattern. This is used in conjunction with the continuous scan mode of DS 405A (also designated option Y).
- ***Option W (8 Bits Only):*** This option provides for 8 input data bits and is limited to data set L1A.
- ***No Option W (More Than 8 Bits):*** This option provides 20 or 32 input data bits and is limited to data sets L1/2 or L1/3, respectively.
- ***Option R (Mark Hold):*** The mark hold option forces all outputs open during an alarm condition or loss of power.
- ***Option N (880 bps):*** This option provides a serial data transmission rate of 880 bits per second.
- ***Option M (1400 bps):*** This option provides a serial data transmission rate of 1400 bits per second.

TABLE A

405A-TYPE TRANSMITTER FACTORY-FURNISHED OPTIONS

OPTION	DESIG	CONNECT TERMINALS	405A LIST NO.		
			L1A	L1/2	L1/3
Continuous Scan	Y	2 (BE 70) to 13 (BE 70) 6 (BE 70) to 19 (BE 70) 4 (BE 70) to 7 (BE 89)	X	X	X
8 Bits Only	W	3 (BE 70) to 27 (BE 70)	X		
More Than 8 Bits	No W			X	X
880 BPS	R	2 (BE 67) to 10 (BE 67) Close S2, Open S1	X	X	
1400 BPS	Q	2 (BE 67) to 8 (BE 67) Close S1, Open S2			X

Note: An X indicates a factory-furnished option.
S1 and S2 are located on BE 67 circuit pack.

TABLE B

405B-TYPE RECEIVER FACTORY-FURNISHED OPTIONS

OPTION	DESIG	CONNECT TERMINALS	405A LIST NO.		
			L1A	L1/2	L1/3
End of Word Check	Y	7 (BE 68) to 10 (BE 71)	X	X	X
8 Bits Only	W	9 (BE 71) to 30 (BE 71)	X		
More Than 8 Bits	No W			X	X
Mark Hold	R	6 (BE 68) to 25 (BE 71)	X	X	X
880 BPS	N	2 (BE 67) to 10 (BE 67) Close S2, Open S1	X	X	
1400 BPS	M	2 (BE 67) to 8 (BE 67) Close S1, Open S2			X

Note: An X indicates a factory-furnished option.
S1 and S2 are located on BE 67 circuit pack.

B. SD-1C451-01 Interface Circuit

2.03 The interface circuit provides wiring options which are installed per local operating needs. The interface options are defined as follows:

- ***Option W:*** Major central office alarm (connected to pins 12 and 13) at transmitting and/or receiving interface circuit.
- ***Option X:*** Minor central office alarm (connected to pins 12 and 13) at transmitting and/or receiving interface circuit.
- ***Option Y:*** 250 ms delay circuit associated with dial tone speed register in receiving interface circuit only. Refer to Fig. 1.
- ***Option Z:*** Receiving interface circuit with ***no*** 250 ms delay circuit or transmitting interface circuit.

3. INSTALLATION AND CONNECTION PROCEDURE

3.01 Figure 1 illustrates the connecting arrangement for the 405-type Data System (with expansion units as required) when arranged for remote message register operation. Table C provides the interface pin assignment for the 405-type Data System. Table C is used in conjunction with Fig. 1 when installing the 405-type Data System. The procedure is as follows:

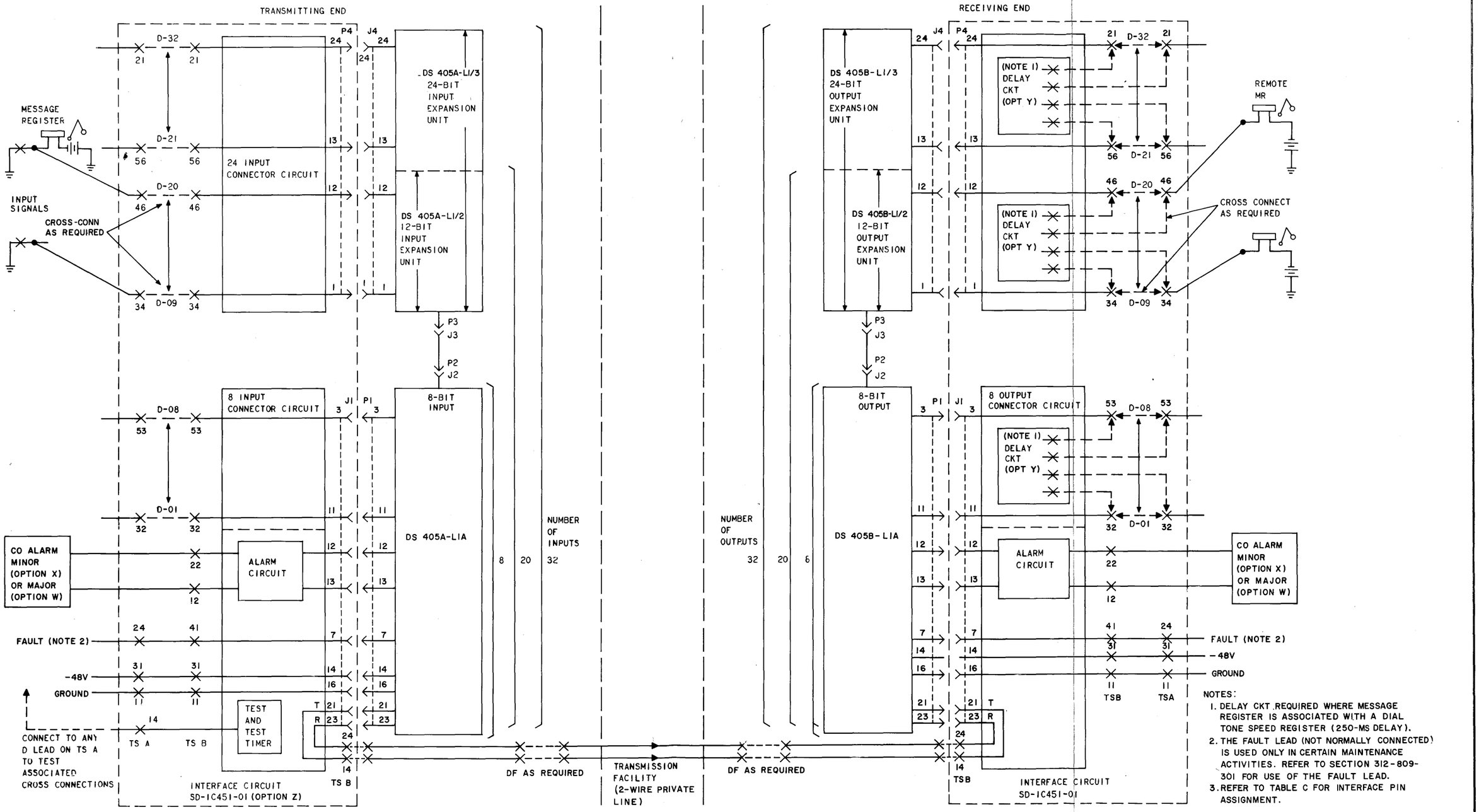
STEP	PROCEDURE
	A. Data Set 405A and Interface Circuit
1	Mount data set as required (23- or 25-inch wide central office frame).
2	Mount transmitting interface circuit directly above or below data set. (Do not plug data set and interface circuit together until after Step 3.) ***Note:*** Refer to Table C for interface pin assignment.
3	Wire-wrap −48 volts and GRD to the interface circuit.
4	Connect data set (P1) to interface circuit via interface cable (8-bit 405A-L1A). For 20-bit 405A-L1/2 or 32-bit 405A-L1/3, a second interface cable is connected to the data set (J4). ***Requirement:*** The red alarm lamp on the interface circuit lights for about 2 seconds and then extinguishes.
5	Measure signal level between tip and ring of the interface circuit using a TMS (600Ω termination). ***Requirement:*** Meter reads between 0 dBm and −0.5 dBm.
6	Wire-wrap tip and ring of private line to the interface circuit terminals designated tip and ring.
7	Call the receiving station and perform the verification test per Section 312-809-501.
8	Unplug connectors (P1, J4). J4 is present for DS 405A-L1/2 or L1/3.
9	Wire-wrap data inputs to the pins of the interface circuit designated as follows: • DS 405A-L1A D1 through D8 • DS 405A-L1/2 D1 through D20 • DS 405A-L1/3 D1 through D32. Refer to Table C for interface pin assignment. ***Note:*** Each data input should be a contact closure to ground. All relay or message register coils associated with the data inputs must have contact protection.
10	Wire-wrap the alarm circuit of the interface circuit to the central office alarm circuit.

STEP	PROCEDURE
11	Connect the data set to interface circuit (P1, J4). Screw the plugs down. ***Requirement:*** Alarm lamp lights for a few seconds and then extinguishes. The central office (CO) alarm should activate for the same interval of time.
12	End of installation.
	B. Data Set 405B and Interface Circuit
1	Mount data set as required (23- or 25-inch wide central office frame).
2	Mount the receive interface circuit directly above or below data set. ***Note:*** Refer to Table C for interface pin assignment.
3	Wire-wrap −48 volts and GRD to the interface circuit.
4	Wire-wrap all data outputs (designated D per Table C) to the message register coils.
5	Wire the other side of each coil (Step 4) to −48 volts. ***Note:*** The message register coil resistance must be greater than or equal to ($\geq$) 600Ω. IF THE COIL RESISTANCE IS less than ($<$) 600Ω, a series resistor of sufficient value must be added to the coil. No contact protection is required.
6	Wire-wrap the alarm circuit of the interface circuit to the CO alarm circuit.
7	Call the transmitting station.
8	When the transmitter (DS 405A-type) has been connected to the private line, measure the signal level between tip and ring of the receive interface circuit with a TMS (600Ω termination). ***Requirement:*** The meter at the receiving location reads as follows: • 405A-L1A (8 bits) −8.0 to −18.5 dBm • 405A-L1/2 (20 bits) or L1/3 (32 bits) −13 to −17.5 dBm.
9	Wire-wrap tip and ring of the private line to receive interface circuit pins designated tip and ring.
10	Connect data set to interface circuit (P1, J4). ***Requirement:*** The red alarm lamp on the interface circuit lights for about 2 seconds and then extinguishes. The CO alarm activates for the same amount of time.
11	When the transmitting end is ready, perform the verification test per Section 312-809-501.

TABLE C

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	—	—		



NOTES:

1. DELAY CKT REQUIRED WHERE MESSAGE REGISTER IS ASSOCIATED WITH A DIAL TONE SPEED REGISTER (250-MS DELAY).
2. THE FAULT LEAD (NOT NORMALLY CONNECTED) IS USED ONLY IN CERTAIN MAINTENANCE ACTIVITIES. REFER TO SECTION 312-809-301 FOR USE OF THE FAULT LEAD.
3. REFER TO TABLE C FOR INTERFACE PIN ASSIGNMENT.

Fig. 1—405 Data System in Remote Message Register Application—Connection

4. REFERENCES

4.01 The following documents pertain to data sets 405-type and interface circuit SD-1C451-01 used in the remote message register application:

- CD- & SD-1D203-01 Data Set 405A-Type
- CD- & SD-1D204-01 Data Set 405B-Type
- CD- & SD-1C451-01 Interface Circuit for Use Between 405-Type Data Sets and Message Registers

SECTION	TITLE
252-140-101	Interface Circuit for Use Between 405-Type Data Sets and Message Registers in Remote Registers Operation (SD-1C451-01), Description
252-140-501	Interface Circuit for Use Between 405-Type Data Sets and Message Registers in Remote Register Operation (SD-1C451-01), Verification Procedure
312-809-100	405-Type Data Systems, Description
312-809-150	405-Type Data System, Supplementary Information
312-809-200	405-Type Data System, Installation and Connections
312-809-301	405-Type Data System and Interface Circuit for Message Register Remoting, Maintenance
312-809-501	405-Type Data System and Interface Circuit for Message Register Remoting, Test Procedures.