

**PRIVATE LINE INTERCONNECTION ARRANGEMENT
FOR LINE SIDE OF 10-TYPE DATA LINE CONCENTRATOR
TEST PROCEDURES**

1. GENERAL

1.01 This section covers the test procedures to be followed when installing or troubleshooting the private line (PL) interconnection arrangements for the line side of the 10-type data line concentrator. One such arrangement consists of a line-side data set (Data Set 108A, 109A, 109D, or 109E), a concentrator-side data set (Data Set 109D or 109E), an AR463, Series 2 circuit pack, and a 208A adapter, all of which are housed in a 28A1 Data Mounting. Some early installations will be equipped with an AR463, Series 1 circuit pack. The 28A1 Data Mounting is capable of accommodating up to three (when using Data Set 108A or 109A as the line-side data set) or four (when using Data Set 109D or 109E as the line-side data set) of these arrangements.

1.02 This practice is reissued to:

- (a) Include information pertaining to the AR463, Series 2 circuit pack which replaces the AR463, Series 1 circuit pack. The AR463, Series 1 circuit pack has been rated manufacture discontinued (MD).
- (b) Include information pertaining to the use of Data Set 109D or 109E as the line-side data set.
- (c) Remove all reference to the acronym DATREX.

1.03 The tests covered are:

- A. Power Source (Loaded) Test:** This test checks the +24 and -24 volt dc outputs of the 28A1 Data Mounting power source under loaded conditions.
- B. Power Source (Unloaded) Test:** This test checks the +24 and -24 volt dc outputs of the 28A1 Data Mounting power source under unloaded conditions.

C. AR463-Type Circuit Pack Test: This test utilizes the test points of the AR463, Series 1 or Series 2 circuit pack to check the send mark gate (Series 1) or send space gate (Series 2), current squelch circuit, and TEST switch contacts of the AR463-type circuit pack with the associated outlying station idle, on, and on while the AR463-type circuit pack TEST switch is operated. A check is also made of the concentrator-side data set transmitted data (BA) and received data (BB) leads and the line-side data set BA, BB, and carrier fail (CF) leads.

D. Carrier Test: This test checks for the presence of carrier (or current) from the line-side data set (Data Set 108A, 109A, 109D, or 109E).

E. Concentrator-Side Data Set Test: This test checks the output of Data Sets 109D or E when in the unsquelched mode.

F. Trans-Hybrid Loss Test (Data Set 108A Only)

G. Loop-Loss Measurement (Data Set 108A Only)

H. Loop-Back Test (Data Set 108A or 109E Only): This test is performed (if access is provided) by the 904-type Data Test Center (DTC) for arrangements serving stations utilizing PL voiceband data circuits, or by the PL telegraph testboard for arrangements serving stations utilizing PL telegraph channels.

1.04 Both installation and maintenance test procedures are identical, therefore each test is presented only once.

Installation Testing

1.05 The installation tests are designed to verify that the equipment has been properly

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assembled and that the installation is operative. The tests should be performed in the following sequence.

- (1) Test A—Power Supply (Loaded) Test
- (2) Test C—AR463-Type Circuit Pack Test
- (3) Test D—Carrier Test
- (4) Test E—Concentrator-Side Data Set Test.

Test B need only be made if the requirements of Test A are not met.

Maintenance Testing

1.06 The maintenance tests should be performed in accordance with the section entitled Private Line Interconnection Arrangement for Line Side of 10-Type Data Line Concentrator— Maintenance (591-811-302). As for the installation tests, Test B need only be performed when the requirements of Test A are not met.

1.07 When performing Tests C, E, F, G, and H, take proper steps to ensure that the customer is not billed for test calls. Refer to the section entitled Crediting Charges on Test Calls (010-250-001).

1.08 Tests F, G, and H require access to and assistance at a 904-type DTC when testing arrangements using a PL voiceband data channel. When testing arrangements using a PL telegraph

channel, assistance is required at the telegraph testboard.

1.09 Lettered Steps: A letter a, b, c, etc, added to a step number in Part 3 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 series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

Tests A, B, C, D, and E

2.01 KS-16979-L1 volt-ohm-milliammeter, or equivalent.

Test D

2.02 1011-type handset (dial hand test set) equipped with test clips.

Tests F and G

2.03 Portable station test set TTS-28, or equivalent.

Test H

2.04 904-type DTC or telegraph testboard.

3. METHOD

STEP

ACTION

VERIFICATION

A. Power Source (Loaded) Test

- 1 Condition meter to measure 24 volts dc.
- 2 At TB1 of 28A1 Data Mounting—
Connect meter leads in accordance with Table A.

Meter indicates 22 to 26 volts dc.

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STEP	ACTION	VERIFICATION
C. AR463-Type Circuit Pack Test		
STEP	ACTION	VERIFICATION
1	Verify with station that terminal equipment is in the idle mode (off).	
2	Connect negative meter lead to TB1-3 of 28A1 Data Mounting.	
3	At AR463-type circuit pack — Connect positive meter lead to TP2.	AR463, Series 1 circuit pack — Meter indicates between 3 and 24 volts dc (line-side data set BB lead spacing). AR463, Series 2 circuit pack — Meter indicates between 3 and 24 volts dc (line-side data set CF lead on—line signal detected).
4a	If testing AR463, Series 1 circuit pack — Disconnect positive meter lead and connect it to TP3.	Meter indicates between 3 and 24 volts dc (line-side data set CF lead on—line signal detected).
5a	Disconnect positive meter lead and connect it to TP12.	Meter indicates near 0 volts dc (concentrator-side data set CSQ lead off—line signal squelched).
6b	If testing AR463, Series 2 circuit pack — Disconnect positive meter lead and connect it to TP1.	Meter indicates between 3 and 24 volts dc (line-side data set BB lead spacing).
7	Disconnect both meter leads.	
8	Connect positive meter lead to TB1-3 of 28A1 Data Mounting.	
9a	If testing AR463, Series 1 circuit pack — Connect negative meter lead to TP1.	Meter indicates between 3 and 24 volts dc (concentrator-side data set BA lead marking).
10b	If testing AR463, Series 2 circuit pack — Disconnect negative meter lead and connect it to TP12.	Meter indicates near 0 volts dc (concentrator-side data set CSQ lead off—line signal squelched).
11	Disconnect negative meter lead and connect it to TP11.	Meter indicates between 3 and 24 volts dc (concentrator-side data set BB lead marking).
12	Disconnect negative meter lead and connect it to TP14.	Meter indicates between 3 and 24 volts dc (line-side data set BA lead marking).
13	Using nearby telephone — Call the station and request the attendant to initiate a call.	When attendant at station operates ON key on terminal equipment — Meter indicates between 3 and 24 volts dc (line-side data set BA lead marking).

STEP	ACTION	VERIFICATION
14	Pull out TEST switch (◆AR463, Series 1 circuit pack) or operate TEST switch to TEST position (AR463, Series 2 circuit pack).◆	Meter indication remains the same as for Step 13.
15b	◆If testing AR463, Series 2 circuit pack— Disconnect negative meter lead and connect it to TP12.◆	◆Meter indicates near 0 volts dc (concentrator-side data set CSQ lead off—line signal squelched).◆
16	Disconnect both meter leads.	
17	Connect negative meter lead to TB1-3 of 28A1 Data Mounting.	
18a	◆If testing AR463, Series 1 circuit pack—◆ Connect positive meter lead to TP12.	Meter indicates near 0 volts dc (concentrator-side data set CSQ lead off —◆line signal squelched).◆
19	Push in TEST switch ◆(AR463, Series 1 circuit pack) or operate TEST switch to NORMAL position (AR463, Series 2 circuit pack).◆	
20	◆If testing AR463, Series 2 circuit pack— Connect positive meter lead to TP12.◆	Meter indicates between 3 and 24 volts dc (concentrator-side data set CSQ lead on—◆line signal unsquelched.)◆
21	Disconnect both meter leads and request station be returned to idle.	

D. Carrier Test

Data Set 108A

- At intermediate distribution frame (IDF) or connector block for PL facilities and concentrator lines—
Connect 1011-type handset to tip and ring of PL facility associated with Data Set 108A of arrangement being tested in accordance with Table C.

TABLE C

P3 PIN ASSIGNMENTS FOR TIP AND RING OF PRIVATE LINE FACILITIES

DATA SET IN SLOT	TIP	RING
5	P3-5	P3-30
8	P3-8	P3-33
13	P3-13	P3-38
14	P3-14	P3-39

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STEP	ACTION	VERIFICATION
2	Remove Data Set 108A under test from 28A1 Data Mounting.	Tone from distant end heard in handset.
3	Reinstall Data Set 108A in the 28A1 Data Mounting.	Two tones should be heard. The weaker of the two is the carrier from the distant-end data set. The louder tone is from the Data Set 108A.
4	Disconnect 1011-type handset from private line facility.	

Data Set 109A, 109D, or 109E

5	Condition VOM to read 3 milliamps.	
6	At IDF or connector block for PL facilities and concentrator lines— Disconnect the tip or ring of the PL facility associated with the Data Set 109A, 109D, or 109E of the arrangement being tested, in accordance with Table C.	
7	Connect the VOM between the line and the IDF or connector block.	Meter indicates approximately 3 mA.
8	Disconnect the VOM and reconnect the line.	

Data Set 109E

9	Condition VOM to read 0.5 volts dc.	
10	At Data Set 109E under test— Connect positive meter lead to TP10 and negative meter lead to TP12.	Meter indicates approximately 0.45 volts dc.
11	Disconnect both VOM leads.	

E. Concentrator-Side Data Set Test

1	Condition VOM to measure 4 volts dc.	
2	At Data Set 109D or 109E— Connect positive and negative meter leads to TP10 and TP11, respectively.	Meter indicates 0 volts.
3	Using a nearby telephone— Call the station and request the attendant to initiate a call.	When attendant at station operates ON key at terminal equipment— Meter indicates 4 volts. Lamp on faceplate of Data Set 109D or E extinguished.

STEP	ACTION	VERIFICATION
4	Disconnect both meter leads and request station be returned to idle.	
F. Trans-Hybrid Loss Test (Data Set 108A Only)		
1	Request that a 900-ohm termination (quiet line) be placed on the line associated with Data Set 108A being tested.	
2	Set FUNCTION switch of TTS-28 to DBM BRDG 0 position.	
3	At Data Set 108A— Connect + and – terminals of TTS-28 to TP1 and TP2, respectively.	
4	Record reading of TTS-28 meter.	
5	Disconnect TTS-28.	
6	Set FUNCTION switch to DBM BRDG –10 position.	
7	At Data Set 108A— Connect + and – terminals of TTS-28 to a good ground and TP3, respectively.	Meter indication should not be more positive than reading recorded in Step 4.
		<i>Note:</i> Meter actually reads 10 dB different from reading of Step 4 due to TTS-28 FUNCTION switch position.
8	Disconnect TTS-28.	
9	Request 900-ohm termination be removed from the line, and reconnect line.	
G. Loop-Loss Measurement (Data Set 108A Only)		
1	At IDF or connector block for the PL facilities and concentrator lines— Disconnect tip and ring of PL facility associated with Data Set 108A being tested in accordance with Table C.	
2	Set FUNCTION switch of TTS-28 to DBM 900Ω TERM 0 position.	
3	Connect + and – terminals of TTS-28 to tip and ring of PL facility.	
4	Request DTC or telegraph testboard to send 1000 Hz at 0 dBm and record TTS-28 meter indication.	Meter indication should not deviate from limits given in Table D.

STEP

ACTION

VERIFICATION

Note: It may be necessary to set TTS-28 FUNCTION switch to DBM 900Ω TERM -10 position to obtain a meter indication.

Note: Meter indications are the actual measured loss (AML) of the transmission facility. The station layout card shows the expected measured loss (EML) when the facility was designed. The maximum AML for voiceband data circuits should be -16 dB and -24 dB for telegraph channel circuits.

TABLE D
LOOP LIMITS

TYPE OF LOOP	AML LIMITS
Without repeaters or carriers	EML ±1 dB
With E7 repeaters	EML ±1 dB
With all other repeaters and/or carriers	EML ±2 dB

- 5a If AML is not within limits—
Replace PL facility with one that is and turn the faulty facility in for repair.
- 7 Disconnect TTS-28.
- 8 Reconnect tip and ring connections removed.

H. Loop-Back Test (Data Set 108A or 109E Only)

- 1 Using nearby telephone—
Call 904-type DTC or telegraph testboard and request a test of the arrangement.
- 2 At AR463-type circuit pack —
Pull out TEST switch (AR463, Series 1 circuit pack) or operate TEST switch to TEST position (AR463, Series 2 circuit pack).
- 3 When informed by DTC or telegraph testboard that test is complete—
Push in TEST switch (AR463, Series 1 circuit pack) or operate TEST switch to NORMAL position (AR463, Series 2 circuit pack).

Test is now under control of the 904-type DTC or telegraph testboard.