

DATA TEST CENTER — 904A- AND 904C-TYPES

TEST PROCEDURE — DATA AUXILIARY SET 806A-TYPE

1. GENERAL

1.01 This section describes the procedures to be followed to test Data Auxiliary Set 806A-type (DAS) from a data test center.

1.02 This section is reissued to add information not available for the previous issue. Bandwidth and guard band tests have been added. Marginal arrows indicate additions.

1.03 The DAS is designed to assist in the overall maintenance of the four-wire line facilities serving the customer's data set. This is accomplished by installing the DAS on the customer's premises between the data set and the four-wire line facility.

1.04 When an operate signal is received by the DAS, it functions to loop the data station four-wire facility to the central office by connecting the receive cable pair to the transmit cable pair, through an appropriate 89-type Resistor, to permit transmission testing of the customer's four-wire cable facility. Options are provided for either terminating the data station transmit and receive pairs with 600-ohm resistors, or looping the four-wire facility to the data station by connecting the transmit and receive pairs of the data station together through an appropriate 89-type Resistor. Both the central office loop and the data station terminating or looping functions are performed simultaneously.

1.05 Three types of DAS's are available. The operate signal required is determined by the type of DAS provided. DAS 806A1 requires a continuously applied 48-volt dc signal between the simplex on either pair and ground or bal-

anced between the two pairs to hold it operated during the testing of the cable facilities. Removal of the dc signal will release the set. DAS 806A2 requires a 2800 ± 30 Hz tone applied for five to ten seconds as an operate signal. An option A is provided for the release function. When this option is provided, a second 2800 ± 30 Hz tone is required to release the DAS. When this option is *not* provided, the removal of the first tone releases DAS 806A2. DAS 806A3 is identical to the 806A2 except that the operate signal is 2400 ± 30 Hz. The same optional release feature is provided with the 806A3.

1.06 This test checks the sensitivity, bandwidth, and guard band of the 2800 or 2400 Hz receiver.

Note: The test procedure is identical when testing DAS 806A2 or 806A3. Requirement values shown in () are applicable to DAS 806A3 (2400 Hz receiver).

1.07 This test will be made at the time of installation and when investigating trouble reports.

1.08 DAS 806A2 (806A3) provided with option A should be tested per Steps 1 through 69. Sets without option A should be tested per Steps 1 through 20 and Steps 70 through 84. Both types of sets should be tested per Steps 85 through 96.

1.09 A record, similar to the log sheet (Fig. 1), may be helpful in summarizing the test results. If desired, the log sheet may be made up locally.

STEP	PROCEDURE
1	Insert headset plug into TEL SET jack.
2	<p>Arrange with Plant Service Center (PSC) to connect data station to be tested to the four-wire test trunk from the data test center.</p> <p><i>Note:</i> Verify <i>type</i> of DAS installed at data station. If 806A1 is installed, <i>no</i> test of the 806A1 can be performed by the data test center. Tests should be performed from PSC or STC.</p>
3	<p>If more than one PLS test trunk is provided — Patch, using a 2P4A cord or equivalent, the 2W jack of 4W/PLS jacks to the <i>receive</i> jack associated with the private line serviceboard.</p>
4	<p>If more than one PLS test trunk is provided — Patch, using a 2P4A cord or equivalent, the remaining jack of the 4W/PLS jacks to the <i>transmit</i> jack associated with the private line serviceboard.</p>
5	Operate MONITOR key to HYB OUT.
6	Operate RCVR key to SPKR.
7	Operate VTVM key to HYB IN.
8	Operate HYB IN key to ON and set ATTENUATOR to 0 db.
9	Operate COUNTER key to LOC OSC.
10	Operate OSC 1 key to ON.
11	Adjust frequency of OSC 1 to 2800 ± 5 Hz (2400 ± 5 Hz) on counter.
12	Adjust level of OSC 1 to 0 ± 0.5 dbm using OSC 1 LEVEL control.
13	Set ATTENUATOR to 10 db.
14	Operate LOOP BACK key to 4W/PLS.
15	<p>Adjust OSC 1 LEVEL control until VTVM reads -10 ± 0.5 db.</p> <p><i>Note:</i> Five to ten seconds after operation of LOOP BACK key, tone (2400 or 2800 Hz) should be received at test center which indicates that DAS 806A2 (806A3) has operated (tone heard on speaker). If tone is not heard, slowly reduce ATTENUATOR setting until DAS operates.</p>
16	Measure the frequency of tone returning from 806A2 (806A3) by using BFD (beat frequency detection) method.

STEP	PROCEDURE
	<p>Requirement: 2800 \pm20 Hz (2400 \pm20 Hz)</p> <p>Note: If requirement is not met, carrier shift may be suspected.</p>
17	Record measured frequency, Item 1 of log sheet.
18	Measure level of incoming frequency by using BFD method.
19	Record measured level, Item 2 of log sheet.
20	Calculate 806A2 (806A3) receive level (RL), Item 3 of log sheet.
	Sets Equipped With Option A
→ 21	Restore ATTENUATOR to 0 db.
22	Operate LOOP BACK key to LINE.
23	Operate VTVM key to HYB IN.
24	Restore OSC 1 key to normal.
25	Operate COUNTER key to LOC OSC.
26	Operate OSC 2 key to ON.
27	Adjust frequency of OSC 2 to 2770 (2370) \pm 5 Hz on counter.
→ 28	Adjust level of OSC 2 to (-17-RL) db on VTVM using OSC 2 LEVEL control. (This causes operate signal to be received by DAS at -17 dbm.)
29	Operate LOOP BACK key to 4W/PLS.
30	Tone (2770 or 2370 Hz) is heard returning from 806A2 (806A3) for five to ten seconds and then is removed which indicates that 806A2 (806A3) has released.
31	Operate LOOP BACK key to LINE.
↗ 32	Decrease frequency of OSC 2 by 10 Hz on counter.
33	Operate LOOP BACK key to 4W/PLS.
34	After five to ten seconds, DAS may operate. If it does, operate LOOP BACK key to LINE and then back to 4W/PLS. DAS will release after five to ten seconds.
35	Repeat Steps 31 through 34 until DAS does not operate.
↳ 36	Record lower critical frequency, Item 4 of log sheet.

STEP	PROCEDURE
↗	37 Operate LOOP BACK key to LINE.
38	Adjust frequency of OSC 1 to 2830 (2430) ± 5 Hz on counter.
39	Operate LOOP BACK key to 4W/PLS.
40	Tone (2830 or 2430 Hz) is heard returning from 806A2 (806A3) for five to ten seconds and then is removed which indicates that 806A2 (806A3) has released.
41	Operate LOOP BACK key to LINE.
42	Increase frequency of OSC 2 by 10 Hz on counter.
43	Operate LOOP BACK key to 4W/PLS.
44	After five to ten seconds, DAS may operate. If it does, operate LOOP BACK key to LINE and then back to 4W/PLS. DAS will release after five to ten seconds.
45	Repeat Steps 41 through 44 until DAS does not operate.
46	Record upper critical frequency, Item 5 of log sheet.
↘	47 Operate LOOP BACK key to LINE.
48	Adjust OSC 2 LEVEL control until VTVM reads 0 ± 0.5 db.
49	Set ATTENUATOR to calculated value ATT, Item 8 of log sheet.
50	Adjust frequency of OSC 2 to 2800 (2400) ± 5 Hz on counter.
51	Operate LOOP BACK key to 4W/PLS.
	Note: Five to ten seconds after operation of LOOP BACK key, tone (2800 or 2400 Hz) should be received at data test center which indicates that DAS has operated.
52	Record operate (check OK), Item 8 of log sheet.
53	Operate LOOP BACK key to LINE.
↗	54 Restore OSC 2 key to normal.
55	Set ATTENUATOR to 10 db.
56	Operate OSC 1 key to ON.
57	Operate COUNTER key to LOC OSC.
↘	58 Adjust frequency of OSC 1 to 1000 ± 5 Hz on counter.

STEP	PROCEDURE
↗ 59	Adjust OSC 1 LEVEL control until VTVM reads -10 ± 0.5 dbm.
60	Operate LOOP BACK key to 4W/PLS.
61	Measure level of incoming 1000 Hz frequency by using BFD method.
62	Record 1000 Hz received level (ML_2), Item 6 of log sheet.
63	Calculate DAS 1000 Hz received level (RL_2), Item 7 of log sheet.
64	Operate LOOP BACK key to LINE.
65	Restore OSC 1 key to normal.
66	Operate OSC 2 key to ON.
67	Operate LOOP BACK key to 4W/PLS.
	Note: Five to ten seconds after operation of LOOP BACK key, tone (2800 or 2400 Hz) should cease which indicates that DAS has released.
68	Operate LOOP BACK key to LINE.
↘ 69	Restore ATTENUATOR to 0 db.
	Sets Not Equipped With Option A
70	Operate VTVM key to HYB IN.
71	Operate COUNTER key to LOC OSC.
72	Slowly adjust frequency of OSC 1 down to 2770 (2370) ± 5 Hz on counter.
	Requirement: Tone continuously heard in loudspeaker as OSC 1 is adjusted.
	Note: Loss of tone indicates 806A2 (806A3) has released and, therefore, is defective.
↗ 73	Slowly adjust frequency of OSC 1 down until the tone is lost.
74	Record lower critical frequency, Item 4 of log sheet.
↘ 75	Adjust frequency of OSC 1 to 2800 (2400) ± 5 on counter.
76	Slowly adjust frequency of OSC 1 up to 2830 (2430) ± 5 Hz on counter.
	Requirement: Tone continuously heard in loudspeaker as OSC 1 is adjusted.
	Note: Loss of tone indicates that 806A2 (806A3) has released and, therefore, is defective.

STEP	PROCEDURE
→ 77	<i>Slowly</i> adjust frequency of OSC 1 <i>up</i> until the tone is lost.
→ 78	Record this upper critical frequency, Item 5 of log sheet.
79	Adjust frequency of OSC 1 <i>down</i> to 2800 (2400) ± 5 Hz on counter.
80	Slowly increase ATTENUATOR setting in 1-db steps until tone in loudspeaker is no longer heard. <i>Note:</i> Increase MON VOL control to compensate for reduced level of tone being transmitted to determine when tone ceases which indicates that DAS has released.
81	Read and record ATTENUATOR setting, Item 8 of log sheet.
82	Calculate sensitivity using formula, Item 8 of log sheet. <i>Requirement:</i> ATT setting (Step 81) will be larger number than calculated ATT (Step 82).
83	Record release (check OK) if requirement for Step 82 is met. Check NOT OK if requirement is not met.
84	Restore ATTENUATOR to 0 db.
	All Sets
↗ 85	Adjust OSC 1 to 1000 Hz on counter and set its level to $(-10-RL_2) \pm 1$ dbm on VTVM using OSC 1 LEVEL control. <i>Note:</i> If option A is not used, use $RL_2 = RL$ and correct per Step 93.
86	Restore OSC 1 key to normal.
87	Operate OSC 2 key to ON.
88	Adjust frequency of OSC 2 to 2800 (2400) ± 5 Hz on counter.
89	Adjust level of OSC 2 to $(-17-RL) \pm 1$ dbm on VTVM using OSC 2 LEVEL control.
90	Operate OSC 1 key to ON.
91	Operate LOOP BACK key to 4W/PLS. <i>Note:</i> The DAS should <i>not</i> operate.
92	<i>Slowly</i> decrease the level of OSC 1 using OSC 1 LEVEL control until DAS operates. <i>Note:</i> A five- to ten-second lag in DAS operation and release (with option A) requires slow level changes. A rate of ten seconds per 2-db step should be sufficient.
↘ 93	Record level found in Step 92, Item 9 of log sheet. <i>Note:</i> If option A is not used and guard band level is not met, obtain difference (D) between 1000 Hz loss and 2800 (2400) Hz loss from Circuit Layout Record. Compute corrected guard band level.

STEP	PROCEDURE
94	Requirement: $(-12-RL-D) \geq$ corrected guard band level $\geq (-22-RL-D)$ Check OK, Item 9 of log sheet, if requirement is met. Check NOT OK if requirement is not met.
95	If option A is used, operate LOOP BACK key to LINE and then back to 4W/PLS for ten seconds.
96	Arrange with PSC to remove connections established in Step 2.
96	End of test — restore all keys to normal, restore ATTENUATOR to 0, and remove patch cords to 4W/PLS jacks.

**DATA SET 806A-TYPE
LOG SHEET — TEST RESULTS**

Data Set Serial No. _____

ITEM	TEST	REQUIREMENT	MEASURED	OK	NOT OK
1	Received frequency	2800 ±20 Hz (2400 ±20 Hz)	_____	_____	_____
2	Received level		ML _____	_____	_____
3	Calculate 806A2 (806A3) received level		RL _____	_____	_____
	Use formula:	$\frac{-ML + (ATT - 2) + X}{2} = RL$			
	Note:	X equals the value of 89-type Resistor installed in AT1 at 806A2 (806A3)			
	Example:	ML = -47, X = -5, ATT = -10			
	Substituting:	$\frac{-(-47) + (-10 - 2) + (-5)}{2} =$ $\frac{47 - 10 - 2 - 5}{2} =$ $\frac{47 - 17}{2} = \frac{30}{2} = 15 \text{ db loss}$	RL -15		
↗	4	Lower critical frequency (f _L)	2730 (2330) ≤* 2770 (2370) ≥†	f _L	_____
	5	Upper critical frequency (f _H)	2830 (2430) ≤ 2870 (2470) ≥	f _H	_____
	6	1000 Hz received level	ML ₂ _____		
	7	Calculate DAS 1000 Hz received level (use formula, Item 3)	RL ₂ _____		
↘	8	Sensitivity -23 dbm at station	ATT _____		
		Use formula: (23 + RL) - 1 = ATT	ATT SET _____		
		Example: RL (Item 3) = -15			
		Substituting: 23 + (-15) - 1 =			
		(23 - 15) - 1 =			
		8 - 1 = 7	ATT 7		
→	9	Guard band level	≤ (-12 - RL ₂) ≥ (-22 - RL ₂)		

* Equal to or less than
† Equal to or greater than

Telephone No. _____
Station Location _____
City _____ State _____

Fig. 1 — Log Sheet, Test Results, Data Set 806A2 (806A3)

S A M P L E