

AUTOMATIC NUMBER ANNOUNCER  
 AND VERIFICATION CIRCUIT FOR USE  
 WITH AUTOMATIC NUMBER IDENTIFICATION (ANI)  
 (NS-02504-01)

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1. GENERAL INFORMATION

1.1 Description of Circuit

1.11 The Automatic Number Announcer Circuit (ANAC) is designed to verify central office and station wiring, confirm customer billing and to identify unknown subscriber lines.

1.12 This circuit can be used in Step-by-Step offices that use ANI systems.

2. RECORDS AND REQUIREMENTS

2.1 Records

2.11 The results of these tests should be recorded on forms SD-97-1313 and SD-97-1315. For further information on test records, see Section 6B of Handbook 3.

2.2 Requirements

2.21 The tests of this section are based on NS-02504-01.

3. TEST EQUIPMENT

3.1 Test Sets

<u>Amt</u>	<u>Code</u>	<u>Description</u>
1	ITE-5248	Portable Trunk Test Set

3.2 Cords

<u>Amt</u>	<u>Code</u>	<u>Description</u>
1	ITE-9573	Furnished with and used
	and	on the ITE-5248 Portable
1	ITE-9621	Trunk Test Set

3.3 Accessories

<u>Amt</u>	<u>Code</u>	<u>Description</u>
1	ITE-4546	Reader
*1	ITE-4208A	Hand Set

\* - Only required when M or K Options are provided.

4. SETUP INFORMATION

4.1 Perform the fusing procedures outlined in Handbook 59, Section 351 before applying this section.

4.2 Perform the Multifrequency Receiver Test of Handbook 59, Section 352 before applying this section.

5. TEST OPERATION

5.1 N Option

5.11 Remove the TM timer from its socket.

5.12 Insert the plug of the ITE-9573 cord into the -48V jack of the ITE-5248 test set. At the other end of the cord, connect the tip lead to -48V and the sleeve lead to ground.

5.13 Insert the plug of the ITE-9621 cord into the TRK jack of the ITE-5248 test set. At the other end of the cord, connect the tip and ring leads to T.S. (A) terminals 36 and 26 respectively.

5.14 If the assigned ANI trunk is connected to the ANAC tip and ring leads to T.S. (A) terminals 26 and 36 block nonoperated relay A of the ANI trunk.

NOTICE - NOT FOR USE OR DISCLOSURE OUTSIDE THE  
 BELL SYSTEM EXCEPT UNDER WRITTEN AGREEMENT

5.15 Apply Table in the order indicated.

5.16 Table D provides ITE-4546 lamp indications corresponding to the digit dialed at the ITE-5248 test set.

TABLE A

STEP	OPERATION	OBSERVATION
1	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the NORMAL position.	S lamp on the ITE-5248 lights. Relays AS and RA1 operate.
2	Plug the ITE-4546 Reader on terminals 15, 25, 35, 45 and 55 of Relay A. Connect the lead from the ITE-4546 Reader to the -48V battery.	
3	Dial digit 0 on the ITE-5248 test set.	See Table D for the lamp indication.
4	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	The ITE-4546 Reader lamps, and the S lamp on the ITE-5248 extinguish. Relays AS and RA1 release.
5	Repeat Steps 1 thru 4 for digits 1 and 2.	See Table D for lamp indications.
6	Remove the ITE-4546 Reader from Relay A.	
7	Plug the ITE-4546 Reader on Terminals 15, 25, 35, 45 and 55 of Relay B and block operated the corresponding steering relay BS.	
8	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the NORMAL position.	The S lamp on the ITE-5248 lights.
9	Dial digit 0 on the ITE-5248 test set.	See Table D for the lamp indication.
10	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 to the OPEN LOOP position.	The ITE-4546 Reader lamps and the S lamp on the ITE-5248 extinguish.
11	Repeat Steps 8 thru 10 for digits 1 and 2.	See Table D for the lamp indications.
12	Unblock relay BS.	
13	Repeat Steps 6 thru 12 for relays C, TH, H, T and U. Block operated the corresponding steering relays CS, THS, HS, TS and US.	
14	Unblock the US relay. Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the NORMAL position.	The S lamp on the ITE-5248 lights. Relay AS operates.
15	Dial digit 0 on the ITE-5248 test set seven times.	Steering relays BS through END, with the exception of PAS, operate and release in sequence advancing in step with each dialing of the digit 0. Upon completion the S lamp on the ITE-5248 extinguishes.
16	Hold operated relay S, operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the REVERSE position and then release relay S.	S lamp on the ITE-5248 lights.
17	Operate and release the KP key on the ITE-5248 test set.	Relay RR2 operates and releases. Relay KP operates.
18	Operate and release the 3 key on the ITE-5248 test set.	Relays RA2 and ID2 operate and release. Relay AS operates.
19	Operate and release the 0 key on the ITE-5248 test set seven times.	The steering relays BS through US, with the exception of PAS, sequentially operate and release, advancing in step with each keying of the digit 0. END operates on the last keying of the 0 digit.
20	Operate and release the ST key on the ITE-5248.	60 IPM high tone will be heard on the ITE-5248 speaker.
21	Restore the NORMAL-OPEN LOOP-REVERSE to the OPEN LOOP position.	The S lamp on the ITE-5248 and the tone extinguish.

TABLE A (Cont'd)

STEP	OPERATION	OBSERVATION
22	Repeat Steps 14 thru 21 for digits 1 and 2.	Same as Steps 14 thru 21.
23	Repeat Steps 14 thru 17.	Same as Steps 14 thru 17.
24	Operate and release the 1 key on the ITE-5248 test set.	High tone is heard on the ITE-5248 speaker.
25	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	The S lamp on the ITE-5248 test set extinguishes.
26	Repeat Steps 14 thru 17.	Same as Steps 14 thru 17.
27	Operate and release the 2 key on the ITE-5248 test set.	120 IPM tone is heard on the ITE-5248 speaker.
28	Restore NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	The S lamp on the ITE-5248 test set and the tone extinguishes.
29	Repeat Steps 14 thru 18.	Same as Steps 14 thru 18.
29A	Set the "B" thru "Y" switches to 333330 respectively.	speaker.
30	Operate and release the 1 key on the ITE-5248 test set.	Relay ROA operates. Steering relays advance from AS to BS.
31	Operate and release the 3 key on the ITE-5248 test set five times and operate and release the 0 key once.	The remainder of the steering relays, with the exception of PAS, operate and release in sequence, advancing in step with the operation and release of the keys. Relay END operates at the end of the sequence.
32	Operate and release the ST key on the ITE-5248 test set.	Audible ringing is heard on the ITE-5248 speaker.
33	(Option 6).	"133-3330" is heard from the ITE-5248 speaker followed by a 120 IPM tone. Option 5 - The audit readout is repeated.
33A	Operate the SYNC relay.	"133-3330" is heard from the ITE-5248 speaker followed by a 120 IPM tone. Option 5 - The audit readout is repeated.
34	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	The 120 IPM tone is removed.
35	Repeat Steps 14 thru 18.	Same as Steps 14 thru 18.
35A	Set the "B" thru "U" switches to 4, 5, 6, 7, 8, 9 respectively (Option 6).	
36	Operate and release the 2, 4, 5, 6, 7, 8, and 9 keys.	The steering relays BS through US, with the exception of PAS, sequentially operate and release, advancing in step with each keying of the digits. END operates on the keying of the last digit.
37	Operate and release the ST key on the ITE-5248 test set.	Audible ringing is heard on the ITE-5248 speaker.
38	(Option 6).	"245-6789" is heard on the ITE-5248 speaker followed by a 120 IPM tone. Option 5 - The audit readout is repeated.
38A	Operate SYNC relay.	"245-6789" is heard on the ITE-5248 speaker followed by a 120 IPM tone. Option 5 - The audit readout is repeated.
39	Restore the NORMAL-OPEN LOOP-REVERSE key to the OPEN LOOP position.	The 120 IPM tone is removed.
40	Insert the TM timer.	

TABLE A (Cont'd)

STEP	OPERATION	OBSERVATION
41	Block operated relay S1.	Relay TMA operates in approximately 2 seconds.
42	Allow approximately 20 seconds for a time out.	Relay TMA1 operates.
43	Remove all test equipment and restore the circuit to normal.	

5.2 M Option

- 5.21 Remove the TM timer from its socket.
- 5.22 Block relay ADR nonoperated.
- 5.23 Insert the plug of ITE-9573 cord into the -48V jack of the ITE-5248 test set. At the other end of the cord, connect the tip lead to -48V and the sleeve lead to ground.
- 5.24 Insert the plug of the ITE-9621 cord into the TRK jack of the ITE-5248 test set. At the other end of the cord, connect the tip and ring leads to T.S.(A) terminals 58 and 48 respectively if NJ02504B unit is provided or T.S.(A) terminals 36 and 26 respectively if NJ02504A unit is provided.
- 5.25 If the assigned ANI trunk is connected to the ANAC tip and ring leads, block nonoperated relay A of the ANI trunk.
- 5.26 Apply Table B in the order indicated.
- 5.27 Table D provides ITE-4546 lamp indications corresponding to the digit dialed at the ITE-5248 test set.

TABLE B

STEP	OPERATION	OBSERVATION
1	Repeat Steps 1-39 of Table A.	Same as Steps 1-39 of Table A.
2	Remove block on relay ADR.	
3	Operate the NORMAL-OPEN LOOP-REVERSE key on ITE-5248 test set to the NORMAL position.	S lamp on the ITE-5248 lights. Relays AS and RA1 operate.
4	Dial digit 1 on the ITE-5248 test set.	Relay TP operates, after approximately 3 seconds relays TMB1, TMC1, DGS and TMA1 operate.
5	Dial the digit 2 on the ITE-5248 test set twice.	Relays TRS, TRS1 and TRS2 operate. S lamp on the test set goes out.
6	Hold operated relay S, operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the REVERSE position.	S lamp on the ITE-5248 lights.
7	Operate and release the KP key on the ITE-5248 test set.	Relay RR2 operates and releases. Relay KP operates.
8	Operate and release the 3 key on the ITE-5248 test set.	Relays RA2 and ID2 operate and release. Relay AS operates.
9	Operate and release the 1, 2, 3, 4, 5, 6 and 7 keys.  Dial digit 1 on the ITE-5248 test set.	The steering relays, BS through US, with the exception of PAS, sequentially operate and release, advancing in step with each keying of the digits. Relay END operates on the keying of the last digit.
10	Connct the ITE-4208A Hand Set to T.S.(A) terminals 34 and 24 if NJ02504B unit is provided or T.S.(A) terminals 35 and 15 if NJ02504A unit is provided.	Monitor the receiver of ITE-4208A Hand Set when Step 11 is performed.

TABLE B (Cont'd)

STEP	OPERATION	OBSERVATION
11	Operate and release the ST key on the ITE-5248 test set.	"123-4567" followed by 120 IPM tone is heard in the ITE-4208A Hand Set. Option 5 - The audible readout is repeated.
12	Restore the NORMAL-OPEN LOOP-REVERSE key to the OPEN-LOOP position.	
13	Insert the TM timer.	
14	Block operated relay S1.	Relay TMA operates in approximately 2 seconds.
15	Allow approximately 20 seconds for a time out.	Relay TMA1 operates.
16	Remove all test equipment and restore the circuits to normal.	

5.3 K Option

- 5.31 Remove the TM timer from its socket.
- 5.32 insert the plug of the ITE-9573 cord into the -48V jack of the ITE-5248 test set. At the other end of the cord, connect the tip lead to -48V and the sleeve lead to ground.
- 5.33 Insert the plug of the ITE-9621 cord into the TRK jack of the ITE-5248 test set. At the other end of the cord, connect the tip and ring leads to T.S.(A) terminals 58 and 48 respectively if NJ02504B unit is provided or T.S.(B) terminals 58 and 48 respectively if NJ02504A unit is provided.
- 5.34 If the assigned ANI trunk is connected to the ANAC tip and ring leads, block nonoperated relay A of the ANI trunk.
- 5.35 Block relay AC7 operated.
- 5.36 Apply Table C in the order indicated.
- 5.37 Table D provides ITE-4546 lamp indications corresponding to the digit dialed at the ITE-5248 test set.

TABLE C

STEP	OPERATION	OBSERVATION
1	Repeat Steps 1-39 of Table A.	Same as Steps 1-39 of Table A.
2	Remove tip and ring leads of the ITE-9621 cord from terminals 58 and 48. Connect the tip and ring leads to T.S.(A) terminals 57 and 47 respectively if NJ02504B is provided or T.S.(B) terminals 57 and 47 respectively if NJ02504A unit is provided.	
3	Remove block from relay AC7 and block operated relay AC1.	
4	If the assigned ANI trunk is connected to the ANAC tip and ring terminals 57 and 47 block nonoperated relay A of the ANI trunk.	
5	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the NORMAL position.	S lamp on the ITE-5248 lights. Relays AS and RA1 operate.
6a	Dial the digit 1 on the ITE-5248 test set.	Relays TP, TMA1 and DGS operate.
6b	On the ITE-5248 test set to the NORMAL position.	Relays TRS, TRS1 and TRS2 operate. The S lamp on the ITE-5248 test set goes out

TABLE C (Cont'd)

STEP	OPERATION	OBSERVATION
7	Hold operated relay S, operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the REVERSE position.	S lamp on the ITE-5248 lights.
8	Operate and release the KP key on the ITE-5248 test set.	Relay RR2 operates and releases. Relay KP operates.
9	Operate and release the 3 key on the ITE-5248 test set.	Relay RA2 and ID2 operate and release. Relay AS operates.
10	Operate and release the 1, 2, 3, 4, 5, 6 and 7 keys.	The steering relays BS through US, with the exception of PAS, sequentially operate and release, advancing in step with each keying of the digits. Relay END operates on the keying of the last digit.
11	Connect the ITE-4208A Hand Set to T.S.(A) terminals 34 and 24 if NJ02504B unit is provided or T.S.(A) terminals 35 and 25 if NJ02504A unit is provided.	Monitor the receiver of the ITE-4208A Hand Set when Step 12 is performed.
12	Operate and release the ST key on the ITE-5248 test set.	"123-4567" followed by 120 IPM is heard in the ITE-2580C Talking Set. Option 5 - The audible readout is repeated.
13	Restore the NORMAL-OPEN LOOP-REVERSE to the OPEN LOOP position.	
14	Insert the TM timer.	
15	Block operated relay S1.	Relay TMA operates in approximately 2 seconds.
16	Allow approximately 20 seconds for a time out.	Relay TMA1 operates.
17	Remove all test equipment and restore the circuit to normal.	

TABLE D

DIGITS	ITE-4546 LAMP INDICATION
0	4 and 7
1	0 and 1
2	0 and 2
3	1 and 2
4	0 and 4
5	1 and 4
6	2 and 4
7	0 and 7
8	1 and 7
9	2 and 7

#### 5.4 Systems Test

5.41 Obtain from the Telephone Company the 3-digit access for the ANAC.

5.42 Arrange with the Telephone Company for the use of three line circuits from which test calls can be made. The numbers (4-digit station numbers) assigned to these line circuits should be such that each bit of the 2-out-of-5 code can be validated for each digit of the number. If YA option is provided a tip party line will be needed. Option 6 - Only one line circuit will be required.

EXAMPLE 1 - Three numbers such as XXX-1111, XXX-6666 and XXX-7777; digit 1 validates bits 0 and 1, digit 6 validates bits 2 and 4, and digit 7 validates bits 0 and 7.

## 5.42 (Cont'd)

EXAMPLE 2 - Three numbers such as XXX-1234, XXX-0579 and XXX-2741. Refer to Table D for a list of the 2-out-of-5 coding for the decimal digits.

## 5.43 Perform the tests per Table E or Table F (Option 6).

NOTE: Prior to performing any system tests, authorization must be obtained from the Telephone Company representative for those operations that utilize in-service equipment or cause equipment to be temporarily taken out of service.

5.44 If trouble is encountered during the performance of the system test, check that the cross connections in the marker, sender, etc. are run properly according to the information supplied by the telephone company. If the test still fails, contact the telephone company personnel for advice and assistance. The proper programming of the common control equipment is the responsibility of the telephone company. Adding an ANAC unit is the same as establishing a new trunk route.

TABLE E

STEP	OPERATION	OBSERVATION
1	From a line circuit arranged for test, connect the ITE-4208A Hand Set to the line circuit, at the MDF or DF, and dial the ANAC access code and the station directory number with at least 1 digit dialed incorrectly.	Ringing is heard in the telephone receiver.
2	When the line is answered request the readout (see NOTE).	An audible readout of the station directory number followed by 120 IPM is obtained via the telephone receiver. Option 5 - The audible readout is repeated.
3	From the second and third line circuits arranged for test, repeat the operations per Steps 1 and 2.	Same as Steps 1 and 2.
4	From a line circuit arranged for test, dial the access code for the ANAC and dial the correct station directory number.	A combination of 60 IPM and high tone is heard in the telephone receiver.
5	Connect the Talking Set to a line circuit that is not assigned for service, dial the access code and the Station directory number.	High Tone is heard in the receiver.
6	<u>ZS Option</u> - From a line circuit arranged for test, dial the ANAC Access code and the station line directory number with at least one digit dialed incorrectly.	Ringing is heard in the telephone receiver.
7	<u>ZS Option</u> - Instruct security attendant not to permit the ANAC readout and do not hang up the handset.	In approximately 2.5 minutes all relays will release.
8	<u>ZU Option</u> - Block relay CTA nonoperated. Dial the ANAC access code and the station line directory number with at least one digit dialed incorrectly.	Ringing is heard in the telephone receiver.
9	<u>ZU Option</u> - When the line is answered request the readout.	Audible readout is not heard.
10	<u>ZU Option</u> - Remove block on CTA relay.	
11	<u>YA Option</u> - From the tip party line arranged for test, dial the ANAC access code plus digit 1 and then the lost 6 digits of the station directory number.	A combination of 60 IPM and high tone is heard in the telephone receiver.

NOTE: If the 255 A KTR has not been connected to the ANAC a readout can be obtained by operating relay SYC.

TABLE F

STEP	OPERATION	OBSERVATION
1	From the line circuit arranged for test, connect the ITE-4208A Hand Set to the line circuit, at the MDF or DF, and dial the ANAC access code and the security check number set on the B-U switches (dial 7 digits).	Ringin <sup>g</sup> is heard in the telephone receiver.
2	If digits set on B-U switches match the number dialed.	An audible readout of the station directory number followed by 120 IPM is obtained via the telephone receiver. Option 5 - The audible readout is repeated.

## 6. TROUBLE LOCATING PROCEDURES

### 6.1 General

6.11 Cognitronics Model 630 - Test and Maintenance instructions for the electro-mechanical APU are provided on the back of the front panel of the Audio Playback Unit.

6.12 Normal Operation - The Master Specialties Company Audio Playback Unit is considered to be functioning normally if -12V (Pin 15 or 16) is applied to any one of the ten inputs (pin 1 through 10) and the output is a clear audible number (zero through nine).

6.121 Troubleshooting - The following three tests are to be utilized to verify the normal operation of the APU. If the APU does not pass all three tests it should be returned to MSC for repair.

A) Input Check - When any input is selected the voltage at the input must be -12V DC. When none of the inputs are selected the voltage at the inputs must be approximately 5V DC, otherwise the system is not operating normally.

B) Sync Pulse Check - The Sync Pulse varies between +12 and -12V DC with 50 msec. duration. This pulse occurs at the end of each digit, approximately 800 msec. between pulses. Any error caused by the sync pulse signal will create a malfunction in the APU.

C) Output Check - The audio output signal should vary between -6 dbm and 0 dbm when any input to the system is activated. The output level is externally adjusted by the volume control potentiometer, accessed through the hole in the front of the APU.

6.13 Cognitronics Model 640 - The solid-state Cognitronics APU is equipped with an LED which provides a visual indication that the unit is functioning normal. The volume control potentiometer is accessed through a hole in front of the APU. See NOTE 115 on NS02504-01.

### 6.2 Unit Procedures

6.21 Table 1 lists the troubles which may appear in certain steps of Table A. The possible causes are also listed.

TABLE 1

STEP	OPERATION	OBSERVATION
1	Relays AS and RA1 fail to operate.	Check the operate paths for failure of relays S, S1 or ON to operate.
4	Relays AS and RA1 fail to release.	Check for failure of relays ON, S1 or S to release.
15	Steering relays will not advance after dialing of digit 0.	1. Check for failure of relay P2A to operate after the first dialing of digit 0.
15	S lamp on the ITE-5248 fails to extinguish upon completion of dialing.	2. Check for failure of relays TRS and TRS1 to operate upon completion of dialing.
18	Relays RA2 and ID2 fail to operate.	1. Check the operate path for failure of relays REC1, REC2, RR1 and RR2 to operate when the 3 key on the ITE-5248 is operated. 2. If relay(s) REC1 and/or REC2 fail to operate, check the corresponding MF receiver for proper tuning.
19	Steering relays fail to advance.	1. Check the operate path for failure of relays REC4, REC7, RR4, RR7 and RA2 to operate and release in step with the 0 key on the ITE-5248. 2. If relay(s) REC4 and/or REC7 fail to operate, check the corresponding MF receiver for proper tuning.
20	Interrupted high tone is not heard.	1. Check for failure of relays REC7, RR7, and D to operate and release in step with the ST key on the ITE-5248. 2. Check for failure of relay END to release and relays TRA and TRA1 to operate after keying.
24	High tone fails to appear.	Check for failure of relay NST to operate.
27	High tone fails to appear.	Check for failure of relay OFT to operate.
30	Relay ROA fails to operate.	1. Check for failure of relay NM to operate and release. 2. Check for failure of relay RO to operate.
33	Number readout fails to occur.	Check for failure of relay SA to operate when relay SYC is operated.
38	Number readout is not completed, and the circuit hangs up.	Check for proper tuning of the 2/5 MF receivers corresponding to the digit which would next be readout if normal operation were to resume (i.e., if the readout progressed to 245-6...and hung up, check MF receivers 0 and 7 for the next digit which would be 7).

6.3 Table 2 lists troubles which may appear in Table B. The possible causes are also listed:

TABLE 2

STEP	OPERATION	OBSERVATION
4	S lamp on the ITE-5248 fails to extinguish upon completion of dialing.	Check for failure of relay TMB1 to operate momentarily.
4	120 IPM tone is not heard on ITE-5248 speaker.	Check for failure of relay TMC1 to operate.
10	Number readout is not heard.	Check for failure of relay TRA2 to operate when the ST key is released.

6.4 Table 3 lists trouble which may appear in Table C. The possible causes are also listed.

TABLE 3

STEP	OPERATION	OBSERVATION
6	Failure of S lamp on the ITE-5248 test set to extinguish.	Check for failure of relay ADR and CK to operate momentarily.
12	Number readout is not heard. speaker.	Check for failure of relay TRA2 to operate when the ST key is released.

Arrowed Lines indicate new or changed information.

Manager, Product Engineering  
Control Center

Reason for Reissue:  
Add test info. for Security Check Feature,  
Option 6.