COMMON SYSTEMS
AUTOMATIC NUMBER ANNOUNCER
AND VERIFICATION CIRCUIT
FOR USE WITH AUTOMATIC NUMBER IDENTIFICATION
CROSSBAR NO. 1, NO. 5, PANEL,
ESS NO. 1, NO. 2 OR NO. 3 OFFICES

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 The Automatic Number Announcer and Verification Circuit (ANAC) is designed to save the craftsperson considerable time by automatically identifying unknown subscriber lines, verify office and station wiring, or other assistance in identifying or confirming customer billing of a line by means of a recorded or synthesized voice response.

1.02 The ANAC described in this publication works with the Automatic Number Identification (ANI) system. It can be used in crossbar No. 1, crossbar No. 5, panel, ESS No. 1 arranged with TSPS, and ESS No. 2 and No. 3 offices with ANI.

1.03 Other ANACs are designed to work with step-by-step ANI office and offices that use Automatic Message Accounting (AMA) systems. They are described in:

(a) The NS-02504-01 for use with step-by-step ANI offices.

(b) The NS-02500-01 with NS-02502-01 for use with step-by-step AMA (SAMA) offices.

(c) The NS-02500-01 with NS-02501-01 for use with crossbar No. 1 and No. 5 AMA offices.

2. GENERAL DESCRIPTION OF OPERATION

2.01 To use the ANAC, the craftsperson at the Central Office (CO) connects to the distributing frame pair, dials the access code (usually three digits), ANAC receives the telephone number from CO accounting equipment and converts this information into a voice announcement via relay logic and multichannel or digital recording for audio response over the main frame loudspeaker or optional loudspeaker unit.

2.02 When the installation force uses the ANAC from outside the CO, a 10-digit number is dialed (3-digit access code and the 7-digit subscribers number). If the line being checked is correct, tones will be received to signify the line is verified.

2.03 If the line being checked is incorrect, a security check will be required before being given the correct billing number.

2.04 The ANACs method of operation maximizes security since the Plant Service Center (PSC) employee challenges all mismatched calls from outside the CO. Craftspersons utilizing the ANAC within the CO will automatically receive the billing number over the loudspeaker without a challenge.

TEN-DIGIT DIALING FROM OUTSIDE THE CENTRAL OFFICE

2.05 When a call is made to access the ANAC the assigned ANI outgoing trunk is seized in the normal manner.

2.06 On a normal ANI call, the distant CAMA office sends the ANI outgoing trunk a polarity reversal when:

(a) A CAMA sender is attached.

(b) The CAMA sender is ready to receive the called number.

(c) The CAMA sender is ready to receive the calling number.

2.07 Upon seizure by the ANI outgoing trunk ANAC simulates the normal sequence of reversals of the CAMA office thus requesting outpulsing of the called and calling number.

2.08 The called number is outpulsed from the sender by means of Multifrequency (MF) signals and received by a MF receiver in ANAC. Each digit of the called number is sequentially received and steered into relay storage on a 2-out-of-5 basis (2/5).

2.09 Upon receipt of the start signal from the sender, ANAC sends a polarity reversal which instructs the sender to disconnect and establishes a connection to an Outpulser (OP).

2.10 The calling number is outpulsed by means of MF signals and received by the MF receiver in the ANAC. Each digit of the calling number is then sequentially matched on a 2-out-of-5 basis to the called number previously stored in ANAC.

2.11 If the called and calling numbers match, ANAC sends a combination of 60-IPM tone and high tone to the line as a match and disconnect indication.

2.12 If the called and calling numbers do not match a telephone station in the PSC is signaled, audible ringing is sent to the line and ANAC transfers to its readout condition.

2.13 The outgoing ANI trunk is transferred from the MF receiver input to the Audio Playback Unit (APU) output.

2.14 One of three different APUs may be used with ANAC. Option ZW is an electromechanical unit while options ZV or ZX are solid state units.

A. Option ZW, Electromechancial APU Rated Mfr Disc.

2.15 The APU consists of a motor driven photographic film cylinder with 11 message tracks, a stack of solid-state light sensitive cells, and a light source.

2.16 Spoken numerals 0 through 9 are photographically recorded in each of the ten tracks. The film cylinder rotates once every 5/8 second, giving each track an equal playback period. A reference pulse is generated once every revolution to advance the external circuitry. An amplifier furnishes an adequate output level to a 600-ohm load. Ten imputs are provided to select the particular spoken numeral.

B. Option ZX or ZV, Solid State APU

2.17 The APU is an all solid state voice response system which uses MCS read only memories to generate a natural-sounding voice.

2.18 Spoken numerals 0 through 9 are digitally stored in Read Only Memories (ROMs). The output of the ROM goes to a digital to analog converter which converts it to audio tones. An end of message pulse is generated after each readout to advance the external circuitry. Ten inputs are provided to select the particular spoken numeral. The audio tone is amplified and the output is at -6 dBm into a 600-ohm load.

2.19 After the PSC properly identifies the calling craftsperson, a start signal is sent to the ANAC.

2.20 Audible ringing is discontinued and the reference pulse is sent from the APU.

2.21 When the first reference pulse is received from the APU, the first digit of the calling number is translated from the 2-out-of-5 code and then allowed to close one of ten APU inputs. The APU amplifies the selected numeral sound to the outgoing trunk.

2.22 This sequence repeats itself until all 7 digits of the calling number have been read back to the calling line.

2.23 The ANAC applies a 120-IPM tone to the trunk as a signal to disconnect at end of readout.

2.24 If the calling line does not disconnect within 20 seconds, the ANI outgoing trunk and this circuit are released.

TEN-DIGIT DIALING FROM CENTRAL OFFICE DISTRIBUTING FRAME

2.25 When using 10-digit dialing to seize ANAC from the central office distributing frame, the operation of ANAC is the same as for a call placed from the outside. However, it is best to use 3-digit dialing to access ANAC from CO distributing frame (see 2.28).

A. Option N, Mfr Disc., or Option ZQ

2.26 When a 10-digit call is placed to ANAC from the central office distributing frame, the operation of ANAC is the same as for a call placed from the outside except the plant service center is not involved.

2.27 When a mismatch occurs, the craftsperson releases the stored number to the line by operating a strategically located nonlocking key (option ZQ).

THREE-DIGIT DIALING FROM THE CENTRAL OFFICE DISTRIBUTING FRAME

2.28 When a call is made to the ANAC test code assigned for 3-digit dialing from the main frame, the assigned ANI outgoing trunk is seized in the normal manner. However, outpulsing of the called number is not required and the sender is instructed to release.

2.29 On a normal ANI call, the distant CAMA office sends the ANI outgoing trunk a polarity reversal when:

(a) A CAMA sender is attached.

(b) The CAMA sender is ready to receive the called number.

(c) The CAMA sender is ready to receive the calling number.

2.30 Upon seizure by the ANI outgoing trunk, ANAC simulates the normal sequence of reversal described in 2.29. This causes the ANI outgoing trunk to initial the calling line identification.

2.31 The calling number is outpulsed in the normal manner by way of MF signals and received by an MF receiver in ANAC. Each digit of the calling number is sequentially received and steered into relay storage on a 2-out-of-5 basis.

2.32 Upon receipt of its start signal from the ANI outpulser, ANAC transfers to its readout condition. The APU output is connected to the main frame loudspeaker through a segregated T and R pair.

2.33 When the first reference pulse is received from the APU, the first digit of the calling number is translated from 2-out-of-5 code and then allowed to close one of the ten APU inputs. The APU amplifies the selected numeral sound to the main frame loudspeakers.

2.34 The sequence repeats itself until all 7 digits of the calling number have been read out to the main frame loudspeakers.

2.35 The ANAC applies a 120-IPM tone to the loudspeakers as a signal to disconnect at the end of the readout.

2.36 If the calling line does not disconnect within 20 seconds, the ANI outgoing trunk and this circuit are released.

A. Three-Digit Access From ESS Office Main Frame

2.37 The craftsperson dials a 3-digit code across the line terminals at the MDF to be identified. The translation for this call will be established so as to direct the ESS program to an outgoing trunk. The tip and ring pair of the trunk will be bridged across the tip and ring pair of the ANAC from which the pulses are encoded into oral form and are announced over the MDF loudspeaker system.

B. Ten-Digit Access From Outside of the ESS Office

2.38 The craftsperson dials a 10-digit number from an outside plant station, consisting of a 3-digit access code plus the 7-digit number requiring identification, processing of the 10-digit call is similar to the 3-digit call except as follows.

2.39 The outpulsing program will pulse both the 7-digit telephone number of the originating line plus the 7-digit number dialed by the craftsperson into the ANAC equipment. The ANAC equipment will then compare the two numbers. If matched, a combination of high and busy tones will be sent to the craftsperson, indicating correct identification of the station. If not matched, the ANAC will route the call directly to an attendant at a service desk. The service attendant, after identifying the caller as a telephone craftsperson, forwards an enabling signal to the ANAC which then provides an oral announcement of the correct number over the line to the craftsperson.

C. Shared ANAC - Common Usages By Crossbar No. 1, Crossbar No. 5, Panel, ESS No. 1, No. 2, and No. 3 Offices

2.40 The ANI outgoing trunk cut-through relays are provided for each entry port, on an optional basis, to permit common usage of one ANAC by crossbar No. 1, No. 5, panel, and/or ESS offices. The maximum number of offices that can share one ANAC is 9, see Information Note 319 on NS-02503-01.

D. Multi-ANAC - Interface Between Two or More ANAC Units Used Exclusively for Three-Digit Access

2.41 The ANI outgoing trunk cut-through and make-busy relays are provided for each ANAC associated with the 3-digit access entry port, on an optional basis. This is to permit interface between two or more ANACs (maximum of 10) when the office entities are shared with the same loudspeaker arrangement at a common main frame.

E. Multi-ANAC - Ten-Digit Access

2.42 The 10-digit access from outside the central office to an individual ANAC, which is part of a multi-ANAC configuration, is the same as described for an individual ANAC configuration under 10-digit access.

SECTION II - DETAILED DESCRIPTION

1. ANAC SEIZURE - TEN-DIGIT DIALING

TEN-DIGIT DIALING FROM OUTSIDE AND INSIDE THE CENTRAL OFFICE (OPTION N, RATED MFR DISC.) (PART OF SC1)

1.01 After receipt of the 3-digit access code, the subscriber sender (crossbar No. 1, PNL) or originating register (crossbar No. 5) connects to a marker (crossbar No. 1, or 5) or decoder (PNL). The marker or decoder translates the called code to provide the information necessary to select the ANI outgoing trunk assigned to ANAC. Relay A in the ANI trunk operates, cutting through a low-impedance bridge to operate relay S in ANAC.

1.02 Subsequent functions start from 2.02.

TEN-DIGIT DIALING FROM OUTSIDE THE CENTRAL OFFICE - SC9 (NON-ESS)

1.03 After receipt of the 3-digit access code assigned for 10-digit dialing from outside the central office, the subscriber sender (crossbar No. 1, PNL) or originating register (crossbar No. 5) connects to a marker (crossbar No. 1 or 5) or decoder (PNL). The marker or decoder translates the called code to provide the information necessary to select the ANI outgoing trunk assigned to ANAC for 10-digit operation. Relay TEN (10-digit select) in the ANAC and relay A in the ANI trunk operate.

1.04 Relay TEN operated through the ground connection of lead ON (crossbar No. 5) or lead S (crossbar No. 1 or PNL) of the ANI trunk:

(a) Provides idle circuit tip and ring separation from the other ANI trunk assigned for 3-digit dialing from the main frame.

(b) Provides an operating path for relay S.

(c) Connects ground on the D lead (crossbar No. 5), S1 lead (crossbar No. 1), or S lead (PNL) of the ANI outgoing trunk used for 3-digit access from the main frame to simulate an ANAC busy condition.

(d) Lights busy display lamp BD and busy lamps BY (option F only) in all main frame locations.

1.05 Subsequent functions described from 2.01.

TEN-DIGIT DIALING FROM OUTSIDE THE CENTRAL OFFICE - SC11 (ESS CUT THROUGH)

1.06 When a call is routed to the ANAC via a dedicated TSPS or ANI trunk assigned for ANAC usage, as determined by the access code dialed by the craftsperson, the ESS No. 1 system control (see Information Notes 313 and 314) or the ESS No. 2 system control (see Information Notes 330 through 333) or the ESS No. 3 system control (see Information Note 339) causes a connection to the trunk link network as in a normal TSPS or ANI call. The trunk is connected to the ANAC by tip and ring leads.

1.07 The trunk circuit is put into the seized state which then connects to this circuit after reducing the bridge resistance to operate relay ETN (10-digit access).

1.08 Relay ETN operated:

(a) Operates relay TEN which lights lamps BD and BY (option F only).

(b) Prepares a path to operate relay ETN1.

1.09 Relay TEN operated:

(a) Closes the loop to operate relay S.

(b) Removes an operating path for relay THR.

1.10 Relay S operated:

(a) Operates relays ETN1 and P.

(b) Operates thermal timer TM which in turn operates relay TMA to begin a timing interval of 20 seconds.

1.11 Relay ETN1 operated:

(a) Applies reverse battery to the other ESS trunk associated with 3-digit access to simulate an ANAC maintenance busy condition.

(b) Removes relay ETN winding from the line and provides a holding path for its continuous operation.

1.12 Subsequent functions described from 2.03.

TEN-DIGIT DIALING FROM OUTSIDE THE CENTRAL OFFICE - P/O SC13 (SHARED ANAC)

1.13 When more than one type of office and corresponding outgoing trunk (crossbar No. 1, No. 5, PNL, ESS No. 1, No. 2, or No. 3) sharing the same wire center is associated with a common ANAC unit, App Fig. 6 and/or Fig. 5 (associated with ESS) are required to provide idle circuit tip and ring separation of the outgoing trunks and an

interoffice ANAC busy indication. The shared ANAC configuration accepts only one call at a time on bids for service from outside or inside the central office.

A. ESS No. 1, No. 2, or No. 3 Seizure (Shared ANAC)

1.14 When the MF transmitter connects a low-impedance (off-hook signal), to the ANAC via the outgoing trunk, relay ETN(A,-) (10-digit access) is operated. The entry port is determined by the access code dialed by a craftsperson.

1.15 Relay ETN(A,-) operated:

(a) Applies ground to operate relay(s) SMB- corresponding to the 10-digit access trunk(s) associated with crossbar No. 1, crossbar No. 5, and Panel ANI office(s) if provided. Relay(s) SMB- operated supplies a ground on the sleeve lead(s) to the associated outgoing trunk(s) to indicate an ANAC busy condition.

(b) Operates relay(s) EMB(A,-) corresponding to the other ESS trunk(s) associated with 10-digit dialing if provided. Relay(s) EMB(A,-) operated reverses battery (on-hook to off-hook) to simulate an ANAC maintenance busy condition. Upon receipt of the off-hook signal, the ESS program removes the trunk circuit from its idle linked list and places it on the high and wet list.

(c) Transfers T and R leads to prepare an operating path from the S relay to this dedicated ESS trunk which has been seized.

(d) Operates relay TEN.

1.16 Relay TEN operated:

(a) Applies ground to operate relay(s) SBY- corresponding to the 3-digit access trunk(s) associated with crossbar No. 1, crossbar No. 5, and PNL ANI office(s) if provided. Relay(s) SBY- operated applies ground on the sleeve lead(s) to the associated outgoing trunk(s) to indicate an ANAC busy condition.

(b) Operates relay(s) EBY(A,-) which simulates an ANAC maintenance busy condition to all the ESS trunks associated with 3-digit access by providing a T and R reversal (similar to 1.15 (b)).

(c) Cuts through a low-impedance bridge from the outgoing trunk through the make contacts of relay TEN to operate relay S. Relay S operated in turn operates relay LTN(A,-) associated with the seized OGT. Relay LTN(A,-) operated removes relay ETN(A,-) winding from the line and provides a holding path for its continuous operation.

(d) Lights busy display lamp BD and busy lamps BY (option F only) in all main frame locations.

1.17 Subsequent functions described from 2.02.

B. Crossbar No. 1, No. 5, and Panel Seizure (Shared ANAC)

1.18 Ground over the S lead from the district selector (PNL) or crossbar No. 1 ANI OGT via the district junctor circuit or ground on the ON lead from the crossbar No. 5 ANI OGT operates relay STN- (10-digit access). Each entry port is determined by the access code dialed by a craftsperson.

1.19 Relay STN- operated:

(a) Applies ground to operate relay(s) EMB(A,-) which reverses the tip and ring leads to simulate a maintenance busy condition to all ESS trunks assigned for 10-digit access if provided.

(b) Operates relay(s) SMB- corresponding to the other 10-digit access trunk(s) associated with crossbar No. 1, crossbar No. 5, and panel ANI office(s) if provided to make-busy their associated outgoing trunk(s) by supplying a ground on each sleeve lead.

(c) Transfers T and R leads to prepare an operating path from the S relay to this dedicated ANI trunk which has been seized.

(d) Operates relay TEN.

1.20 Relay TEN operated:

(a) Applies ground to operate relay(s) SBY- corresponding to the 3-digit access trunk(s) associated with crossbar No. 1, crossbar No. 5, and PNL ANI offices if provided. Relay(s) SBY- operated applies ground on D lead (crossbar No. 5), S1 lead (crossbar No. 1), and/or S lead (PNL) to indicate an ANAC busy condition.

(b) Operates relay(s) EBY(A,-) which simulates an ANAC maintenance busy condition to all the ESS trunks associated with 3-digit access by providing a T and R reversal (similar to 1.15 (b)).

(c) Cuts through a low-impedance bridge from the outgoing trunk through the make contacts of relays STN- and TEN to operate relay S.

(d) Lights busy display lamp BD and busy lamps BY (option F only) in all main frame locations.

1.21 Subsequent functions described from 2.01.

2. ANAC SEIZURE AND CALLED NUMBER REGISTRATION - TEN-DIGIT DIALING - SC1

2.01 A low impedance across the T and R leads causes relay S to operate.

2.02 Relay S operated:

(a) Operates relay P.

(b) Operates thermal timer TM which in turn operates relay TMA to begin a timing interval of 20 seconds.

2.03 Relay P operated relay ON.

2.04 Relay ON operated:

(a) Reverses the T and R leads indicating off-hook to the OGT. Relay CS(T) operates and in turn operates RV(T) in non-ESS OGT.

(b) Prepares the circuit to receive MF pulses of the called and calling numbers by connecting battery to the MF amplifier and receiver units.

(c) Operates relay SYC1 (option Y) or relay AS (option Z or ZE) or with relay LTN(A,-) released, relay SYC1 operates (option ZE).

(d) Connects the APU pulsing lead to relay SP causing relay SP to follow the pulses.

(e) Opens the operate path of slow-releasing relay P which releases in 145 through 360 milliseconds.

2.05 Relay P released, reverses the T and R leads (on-hook) to return reverse battery wink as a signal (in ESS OGT) or release relay CS(T) which operates relay CS(IT) and releases slow-release relay RV(T) in non-ESS OGT. This commands the sender or auxiliary sender (non-ESS) or the MF transmitter to start MF outpulsing the called number. Relay P released also opens a T1 XFMR shunt path to allow MF pulsing to reach the MF receiver in ANAC.

2.06 The sender outpulses these MF signals:

(a) The KP signal (frequencies 2 and 10).

(b) The 3 access digits [option Y or option ZE with relay LTN(A,-) released].

(c) The called prefix and station number dialed.

(d) The start signal ST [option YZ (frequencies 7 and 10), option ZA (frequencies 1 and 10)].

2.07 When the KP signal is received, relays REC2, RR2, and KP operate, and at the end of the KP signal relays REC2 and RR2 release.

2.08 Relay KP operated:

(a) Prepares a lock path for relays REC0, 1, 2, 4, and 7 (option V, rated Mfr Disc.).

(b) Prepares operate and hold path for relays RR0, 1, 2, 4, and 7 (option T).

(c) Locks through relay D released and relay ON operated.

(d) Prepares operate path for relays RA, NM, and D.

2.09 The sender outpulses the MF codes, representing the 3 access digits and the called number.

Note: The detailed description for the registration of digits will be given for the A digit only. The action for the preceeding access digits is similar if option Y or ZE (with relay LTN(A,-) released) is provided, with the exception that no storage on 2-out-of-5 basis for these digits is provided.

REGISTERING THE A DIGIT (SIMILAR FOR DIGITS B THROUGH U) - SC1

2.10 Digit A frequencies are outpulsed by the sender.

2.11 The 2-out-of-5 frequencies for digit A are amplified by the receiver amplifier and fed to the input of all five receiver units.

2.12 Each receiver unit is a resonant circuit tuned to a particular frequency as follows:

Receiver Unit 0 - 700 Hz

Receiver Unit 1 - 900 Hz

Receiver Unit 2 - 1100 Hz

Receiver Unit 4 - 1300 Hz

Receiver Unit 7 - 1500 Hz

2.13 The A digit frequencies cause two of the five receiver units to detect the signals which are rectified. The resulting negative potential is used to forward-bias transistors of the two receiver units.

2.14 Relays REC0, 1, 2, 4, or 7 are in the collector circuits of the MQ- transistors in the receiver units. When these transistors become forward-biased, these relays operate, and lock (option V, Mfr Disc.), on a 2-out-of-5 basis.

2.15 Relays REC0, 1, 2, 4, and 7 2-out-of-5 operated, operate relays RR0; 1, 2, 4, and 7, on a 2-out-of-5 basis.

2.16 Relays RR0, 1, 2, 4, and 7 2-out-of-5 operated, operate relay RA which locks toany operated REC relay via diodes CR16 through CR20.

2.17 Relay RA operated:

(a) Operates relays A0, 1, 2, 4, and 7 2-out-of-5 in digit register circuit which lock under control of relays ON and NM.

(b) Operates relay BS through make contacts of relay AS in digit steering circuit.

(c) Prepares a holding path for relay AS.

2.18 Relay BS operated:

(a) Transfers the holding circuit for relay AS to operated relay RA.

(b) Locks under control of all succeeding steering relays.

(c) Prepares a circuit to operate relay CS.

(d) Prepares the operating paths for relays B0, B1, B2, B4, and B7 in digit register circuit.

(e) Opens lock path (option V, Mfr Disc.) for REC0, 1, 2, 4, and 7 relays.

2.19 When the pulsing of the MF signal for digit A ends, or (option, V Mfr Disc.) when relay BS operates; relays REC0, 1, 2, 4, and 7 release causing the release of relay RA.

2.20 Relay RA released:

(a) Opens the holding path for relay AS and allows it to release.

(b) Removes ground from leads 0, 2, 4, and 7 2-out-of-5 releasing relays RR0, 1, 2, 4, and 7 2-out-of-5.

2.21 The sender outpulses the multifrequency code for each succeeding digit B through U. Circuit operation is similar to that already described for digit A. However, the information is stored by B, C, TH, H, T, and U relays (0, 1, 2, 4, and 7) on a 2-out-of-5 basis.

RECEIPT OF START SIGNAL AND REQUEST FOR CALLING NUMBER - SC1

2.22 After digits A through U are registered and relay END operated, the sender outpulses a Start (ST) signal (frequencies 7 and 10 option YZ or 1 and 10 option XA). This signal causes ANAC to send a reversal of polarity to the line. This reversal releases the sender and connects the ANI outgoing trunk to an outpulser to initiate the calling line identification.

2.23 The ST signal, (frequencies 7 and 10 option YZ or 1 and 10 option XA), operates relay REC7 or REC1, (recognition of frequency 10 is not required).

2.24 Relay REC7 or REC1 operated, operates relay RR7 or RR1 which in turn operates relay D.

2.25 Relay D operated:

(a) Locks through relay END operated.

(b) Prepares a path to operate relay TRS.

(c) Opens the lock path (option V, Mfr Disc.) for relays REC0, 1, 2, 4, and 7.

(d) Releases (slow-release) relay KP.

2.26 At the end of the ST signal relay REC7 or REC1 release opening the hold path for relay RR7 or RR1.

2.27 Relay KP or REC7 or REC1 released, releases relay RR7 or RR1 which in turn operates relay TRS.

2.28 Relay TRS operated:

(a) Locks through relay S operated.

(b) Reverses the T and R leads (off-hook) as a signal to ESS OGT or releases relay CS(T) in non-ESS ANI OGT, as a command to start MF outpulsing the calling number.

(c) Prepares a path to operate relay SYC3.

(d) Releases relay END.

(e) Prepares a path to operate relay CD.

(f) Prepares a path to receive the Information Digit (ID) that precedes the calling number.

2.29 Relay END released:

(a) Releases relay D.

(b) Operates relay SYC3.

2.30 Relay D released, operates relay CD.

2.31 Relay CD operated:

(a) Locks through relay S operated.

(b) Prepares a path to operate relays TRA and TRA1.

3. RECEIVING THE INFORMATION DIGIT - SC6

3.01 After the command to start MF outpulsing the calling number has been received and the calling number identified, the ANI outpulser sends these multifrequency signals:

(a) The KP signal (frequencies 2 and 10).

(b) An ID.

(c) The calling prefix and station number.

(d) The start signal (frequencies 7 and 10 option YZ or 1 and 10 option XA).

3.02 The KP signal received operates relay REC2 which operates relay RR2. Relay RR2 operated, operates relay KP. At the end of the KP signal relays REC2 and RR2 release.

3.03 Relay KP operated:

(a) Prepares a lock path (option V, Mfr Disc.) for relays REC0, 1, 2, 4, and 7.

(b) Prepares operate and hold path for relays RR0, 1, 2, 4, and 7 (option T).

(c) Locks through relay D released and relay ON operated.

(d) Prepares a path to operate relays RA, NM, and D.

3.04 An ID is transmitted before the calling number. Relays REC0, 1, 2, 4, or 7 operate 2-out-of-5 which in turn operate relays RR0, 1, 2, 4, or 7 2-out-of-5.

3.05 Relays RR0, 1, 2, 4, or 7 2-out-of-5 operated, operate relay RA.

3.06 Relay RA operated:

(a) Held operated through an operated REC relay and KP relay (option T) via diodes CR16 through CR20.

(b) Operates relay AS (with SYC3 previously operated) in preparation for receiving the A digit of the calling number.

(c) Allows identification of the ID.

3.07 The ID is interpreted as follows:

	INFORMATION DIGIT				ANAC SENDS
	NON-OBSERVED	OPERATED 2/5 RELAYS	OBSERVED	OPERATED 2/5 RELAYS	
Automatic Ident	0	4,7	3	1,2	CALLING NUMBER
Operator Ident	1	0,1	4	0,4	HIGH TONE
Trouble In Ident	2	0,2	5	1,4	OVERFLOW (120 IPM TONE) or combined high and overflow tones (Option YC)

CALLING NUMBER IS AUTOMATIC IDENTIFIED

3.08 When the pulsing of the MF signal for the ID ends, relays REC0, 1, 2, 4, or 7 release causing relay RA to release.

3.09 Relay RA released, releases relays SYC3 and RR0, 1, 2, 4, or 7.

3.10 The MF sender outpulses the calling number and a digit comparison is made. Subsequent functions described from 4.01 or 4.03 or 10.01 (3-digit access).

OPERATOR IDENTIFIED CALL OR INDENTIFICATION FAILURE

3.11 Relay NST operates and puts high tone on the line from either of the following conditions:

(a) Relay RR0 operated.

(b) Relays RR0, RR4, and ID4 operated.

3.12 Relay OFT operates and puts overflow tone (LT120, BT120) on the line from either of the following conditions.

(a) Relays RR0, RR2, ID2 operated.

(b) Relays RR1, RR4, and ID4 operated.

3.13 Relays NST and OFT operate and put combined high and overflow tones on the line (option YC) from either following conditions.

(a) Relays RR0, RR2, ID2 operate and END released.

(b) Relays RR1, RR4, and ID4 operate and END released.

3.14 Relay(s) OFT and/or NST operated also operate peg count registers (option W) and removes a locking hold path for relay ON and allows it to be held by relay RA operated.

3.15 When the MF signal ends for the identification digit, relays REC0, 1, 2, 4, or 7 release causing relay RA to release.

3.16 Relay RA released, releases relays SYC3, ON, and RR0, 1, 2, 4, or 7.

3.17 Relay ON released, releases remaining operated relays excluding those held by supervisory relay S which will release upon trunk disconnect.

3.18 Subsequent functions described from 6.01.

4. DIGIT COMPARISON - TEN-DIGIT DIALING - SC2

MATCH CONDITION

4.01 The ANI outpulser sends the MF codes for the calling number digits. If the

called and calling numbers match, operation of the ANAC is the same as outlined in 2.10 through 2.21, with the exception of the A through U0, 1, 2, 4, and 7 relays which were previously operated and locked when registering the called number.

4.02 Subsequent functions from 4.14.

NO MATCH CONDITION

Note: When the called and calling numbers do not match, the called number digits are released from storage and the calling number is registered in the following manner.

4.03 Calling number digit received operates, and locks (option V, Mfr Disc.), relays REC0, 1, 2, 4, and 7 2-out-of-5 and in turn operates relays RR0, 1, 2, 4, and 7 2-out-of-5

4.04 Relays RR 2-out-of-5 operated, operates relay RA which locks to any operated REC relay via diodes CR16 through CR20 and KP operated (option T).

4.05 Relay RA operated:

(a) Advance the steering in the normal manner.

(b) Provides a path to operate additional RR- relays via the 0, 1, 2, 4, and 7 leads.

4.06 When the locking grounds 2-out-of-5 through the make contacts of a particular A to U0, 1, 2, 4, and 7 storage relay are applied to the windings of the RR0, 1, 2, 4, and 7 relays, the RR relays operate on a 3-out-of-5 or 4-out-of-5 basis.

4.07 Relays RR0, 1, 2, 4, and 7 operated 3-out-of-5 or 4-out-of-5 operate relay NM and apply a locking ground REC0, 1, 2, 4, and 7 through diode CR22.

4.08 Relay NM operated:

(a) Removes the locking ground from the digit storage relay being compared and all succeeding storage relays. This releases all succeeding digits that were stored 2-out-of-5 when the called number was received. All digits previously compared remain locked in via the break contacts of the preceding steering relays.

(b) Removes ground via the make contacts of the digit storage relay being compared to the RR0, 1, 2, 4, and 7 relays thus releasing RR 1/5 or 2-out-of-5.

(c) Operates relay RO.

(d) Closes lock path for REC0, 1, 2, 4, and 7 relays.

4.09 Relay RO operated:

(a) Prepares a path to send audible ringing to the line (option ZF or ZG).

(b) Prepares a path to receive a start signal for the voice read-out via the E lead (option R or YU) or M lead (option Q).

(c) Transfers the lock path of relays REC0, 1, 2, 4, and 7 to relay ROA released

(d) Releases relay NM.

(e) Prepares a path to recycle thermal timer, TM.

(f) Starts timer TM1 (option YR) to begin 2-1/2 minute overall timing during security check cycle.

4.10 Relay NM released:

(a) Reapplies locking ground to the storage relays.

(b) Operates the digit storage relay 2-out-of-5 previously compared and released.

(c) Operates relay ROA.

4.11 Relay ROA operated:

(a) Prepares a path to signal a distant station via the M lead (option R) or E lead (option Q) or via E, M, SB, SG leads (option YU).

(b) Removes the lock path for relays REC0, 1, 2, 4, and 7.

4.12 The mismatched and remaining digits of the calling number are now registered in the same manner as outlined above and in 2.11 through 2.21.

4.13 Subsequent functions described from 4.14.

RECEIPT OF START SIGNAL - SC2 (AFTER CALLING NUMBER)

4.14 After digits A-U of the calling number have been received and compared, the ANI outpulser sends a ST signal (frequencies 7 and 10 option YZ or 1 and 10 option XA).

4.15 The ST signal operates relay REC7 or REC1, (recognition of frequency 10 is not required).

4.16 Relay REC7 or REC1 operated, operates relay RR7 or RR1 which in turn operates relay D.

4.17 Relay D operated:

(a) Locks through relay END operated.

(b) Prepares a path to operate relays TRA and TRA1.

(c) Opens the lock path (option V, Mfr Disc.) for relays REC0, 1, 2, 4, and 7.

(d) Releases (slow-release) relay KP.

4.18 At the end of the ST signal, relay REC7 or REC1 releases, opening the hold path for relay RR7 or RR1.

4.19 Relay KP or REC7 or REC1 released, releases relay RR7 or RR1 which in turn operates relays TRA and TRA1.

MODE TRANSFER (MATCH CONDITION) - SC2

4.20 Relays TRA and TRA1 operated:

(a) Release relay END which releases relay D.

(b) Locks through relay ON operated.

(c) Simultaneously sends busy and high tone to the line as a match and disconnect signal. Subsequent functions are described from 6.01.

MODE TRANSFER (NO MATCH CONDITION) - SC2

4.21 Relays TRA and TRA1 operated:

(a) Prepares a path to operate relay OFT.

(b) Transfer the control of the steering relays from relay RA to relay SP.

(c) Add relay PAS between relays CS and THS in the steering chain. Relay PAS provides a pause between the voice readout of the calling office prefix and station number.

(d) Transfer the T and R leads from MF receiver input to APU output.

(e) Release relay END.

(f) Signals a telset (at the PSC) by putting ground on the E lead (option Q) or battery on the M lead (option R) or closes a loop using E, M, SB, SG, leads (option YU).

(g) Prepares a path to operate relay SYC3 when ground is received on the E lead (option R) or M lead (option Q) or closes a loop using E, M, SB, SG leads (option YU).

(h) Sends audible ringing to the line (option ZF or ZG, multi-ANAC configuration).

(i) Prepares a path to operate relay SA.

(j) Prepares a path to operate relays RR0, 1, 2, 4, and 7 on 2-out-of-5 basis from the A-U register relays.

(k) Stops overall timer (TM) by releasing thermal relay TM and relay TMA (with relay RO previously operated).

(ℓ) Locks through relay ON operated.

4.22 Relay END released, releases relay D.

A. Security Check Cycle

4.23 When the called and calling numbers do not match on 10-digit dialing, a signal is sent on M lead (option R) or E lead (option Q) or leads E, M, SB, SG (option YU, type II signaling) to the plant service center or repair service bureau for verification of the calling craftsperson.

4.24 When the signal is received, relay R on the KTU operates and in turn audible and visual indication is provided on the telephone. The dispatcher operates the PU key and goes off-hook. Relay A (KTU) operates. This connects the line to station caller and identification can begin. Relays AH(KTU), LO(KTU), TB,(KTU) operate and relay R(KTU) release. Audible ringing stops.

4.25 If the dispatcher finds that the caller is not valid, the caller is instructed to hang up. Upon the caller going on-hook, ANAC disconnects in the normal manner. If the caller does not go on-hook within 2-1/2 minutes, thermal time TM1 (option YR) will force an automatic disconnect (see 7.06).

4.26 If identification is verified as a valid caller, the dispatcher operates ST"NL key which operates relay ON (KTU). This signal is sent to ANAC on M lead (option Q or R) or on leads E, M, SB, SG, (type II signaling, option YU) to operate relay SYC3 and release the calling number.

4.27 Relay SYC3 operated:

(a) Prepares a path to operate relay AS and enable read out of calling number.

(b) Operates relay SA.

(c) Operates relay CTA (option YT) which connects the APU to the line.

4.28 Relay SA operated:

(a) Removes ringing from the line.

(b) Removes signaling from the M lead (option R) or E lead (option Q) or opens loop M, SB (option YU).

(c) Restarts overall timer TM.

B. Bypass Security Check and Voice Announcement is via Craftspersons Handset on Ten-Digit MDFAccess - (Option ZQ)

4.29 When using 10-digit MDF access, the operation of ANAC is the same as for a call placed from the outside but with voice announcement via the craftspersons handset at the MDF.

4.30 When the called and calling numbers do not match on 10-digit dialing, a security check is normally made via the PSC, however, with option ZQ the craftsperson can override the security check and release the stored number to the line by operating a non-locking key (32A test set) which plugs into strategically located ST jacks as required throughout the MDF.

4.31 Momentary operation of the ST key after the no match condition, operates relay SYC3 and releases the calling number.

4.32 Relay SYC3 operated:

(a) Prepares a path to operate relay AS and enable read out of calling number.

(b) Operates relay SA.

(c) Operates relay CTA (option YT) which connects the APU to the line.

4.33 Relay SA operated:

(a) Removes ringing from the line.

(b) Removes signaling from the M lead (option R) or E lead (option Q) or opens loop M, SB (option YU).

(c) Restarts timer TM.

4.34 Subsequent functions are from 5.01.

5. READ OUT OF CALLING NUMBER - SC3

5.01 The APU sends a 20-millisecond (minimum) synchronizing pulse about once every 605 milliseconds to operate relay SP.

5.02 Relay SP operated, operates relay AS.

5.03 Relay AS operated:

(a) Holds relay SYC3 under control of relay SP.

(b) Prepares a path to operate relay BS.

5.04 Relay SP releases at the end of the 20 millisecond synchronizing pulse, in turn releasing relay SYC3.

5.05 With relay SYC3 released and AS operated leads A0, A1, A2, A4, and A7 from the A register relays are cut through to operate relays RR0, RR1, RR2, RR4, and RR7 on a 2-out-of-5 basis.

5.06 Relays RR0, RR1, RR2, RR4, and RR7 form a network to translate a 2-out-of-5 code to a 1-out-of-10 (decimal) code. With 2-out-of-the-5 RR- relays operated, a path is now closed to allow the -12 volt from the APU to be applied to 1 of the 10 APU inputs.

PHOTO-OPTICAL AUDIO PLAYBACK UNIT (OPTION ZW, RATED MFR DISC.)

5.07 This causes the APU transistor circuitry to switch the APU transistor amplifier input to the proper sound channel.

5.08 Each channel consists of a photographic recording of a spoken numeral, from 0 to 9. The recordings are made on a film drum rotating continuously. A lamp provides light through the film drum to a group of light-sensitive cells. As the light intensity is varied by the density of each channel on the rotating film, the cells detect the variations to reproduce the recording. One solar cell is provided for each recorded numeral.

The amplified number sound for digit A of the calling number is transmitted to the tip and ring through coupling capacitors in the APU and contacts of relay TRA

DIGITAL AUDIO PLAYBACK UNIT (OPTION ZV OR ZX)

5.09 This causes the synchronous pulse (about 50 milliseconds) to start readout logic. Approximately 200 milliseconds (pause between words) after the synchronous pulse, the APU will output audio for approximately 500 milliseconds.

5.10 When an external switch (1/10 input) in series with the synchronous line is closed, the input information is decoded by a ROM and fed on to a Digital to Analog (D/A) converter. The D/A converter reconstructs the analog waveform, a filter smooths it and an output amplifier sets the output level of each numeral being digitally reproduced.

5.11 The APU control logic provides the internal clock, proper timing, and the necessary interval control lines. It also feeds the synchronous logic which provides the synchronous pulse at the proper time.

5.12 The amplified number sound for A is transmitted to the T and R leads through coupling capacitors in the APU and contacts of relay(s) TRA and CTA (option YT) operated.

5.13 The action described in 5.01 through 5.12 repeats itself until all digits stored in the B, C, TH, H, T, and U (0,1,2, 4,7) relays have been read out. Subsequent functions described from 5.14 or 5.21 (audible readout recycle, App Fig. 8).

RELEASE - SC3

5.14 The operation of relay SP after read out of the U digit, causes relay END to operate.

5.15 Relay END operated:

(a) Transfers the holding path for relay US to control of relay SP.

(b) Locks to relay ON.

5.16 Relay SP which releases at the end of the synchronizing pulse, causes relay US to release.

5.17 With relay US released and relay END operated, relay OFT operates.

5.18 Relay OFT operated:

(a) Locks to relay S.

(b) Releases relay ON.

(c) Sends 120-IPM tone to the line as a signal to disconnect.

(d) Provides ground path to operate peg count registers (option W).

5.19 Relay ON released, releases relays EDN, TRA, TRA1, RO, ROA, A-U 2-out-of-5, and CTA.

5.20 Relay END released, operates NST (option YC) to provide combined high and overflow tone as a signal to disconnect. Subsequent functions described from 6.01.

AUDIBLE READ OUT RECYCLE (APP FIG. 8)

5.21 The operation of relay SP after read out of the U digit, causes relay END to operate.

5.22 Relay END operated:

(a) Transfers the holding path for relay US to control of relay SP.

(b) Locks to relay ON, through relays RPT1 and D released, and TRS operated.

5.23 Relay SP which releases at the end of the synchronizing pulse, causes relay US to release.

5.24 With relay US released and relay END operated, relay RPT operates.

5.25 The operation of relay SP, with relay RPT operated, causes relay RPT1 to operate.

5.26 Relay RPT1 operated:

(a) Releases relays RPT and END.

(b) Operates relay SRPT which locks under control of relay S. Relay SRPT operated provides ground path to operate peg count registers (option W).

(c) Prepares path for operation of relay SYC3.

5.27 Relay END released, with RPT1 still operated, operates relay SYC3 which in turn is held operated through a ground path in the digit steering circuit chain.

5.28 Relays END, RPT, and/or SP released allows slow-release relay RPT1 to release.

5.29 Relay SYC3 operated, prepares a path to operate relay AS.

5.30 When relay SP operates, relay AS will operate.

5.31 Relay AS operated:

(a) Holds relay SYC3 under control of relay SP.

(b) Prepares a path to operate relay BS.

5.32 Relay SP releases at the end of the (approximate) 20 milliseconds synchronizing pulse, in turn releasing relay SYC3.

5.33 With relays SYC3 released and AS operated, leads A0, A1, A2, A4, and A7 from the A register relays are cut through to operate relay RR0, RR1, RR2, RR4, and RR7 on a 2-out-of-5 basis.

5.34 Relays RR0, RR1, RR2, RR4, RR7 form a network to translate a 2-out-of-5 code to a 1-out-of-10(decimal) code. With 2 out of the 5 RR- relays operated, a path is now closed to the APU input.

5.35 The APU decodes the input information and translates it into a spoken numeral for transmission over the tip and ring leads.

5.36 The action described in 5.33 through 5.35 repeats itself until all digits stored in the B and C (0,1,2,4,7) relays have been read out.

5.37 When relay PAS operates it releases thermal relay TM and relay TMA to stop the 20 second overall timer.

5.38 When relay PAS releases it operates thermal relay TM which in turn operates relay TMA to restart the 20 second overall timer.

5.39 The action described in 5.33 through 5.35 repeats itself until all the digits stored in the TH, H, T, and U (0,1,2,4,7)relays have been read out.

A. Release - (With App Fig. 8)

5.40 The operation of relay SP after read out of the U digit, causes relay END to operate.

5.41 Relay END operated:

(a) Transfers the holding path for relay US to control of relay SP.

(b) Locks to relay ON.

5.42 Relay SP which releases at the end of the synchronizing pulse, causes relay US to release.

5.43 With relay US released and relay END operated, relay RPT operates.

5.44 With relays RPT and SRPT operated, relay OFT operates.

5.45 Relay OFT operated:

(a) Locks to relay S.

(b) Releases relay ON.

(c) Sends 120-IMP tone to the line as a signal to disconnect.

5.46 Relay ON released, releases relays END, TRA, TRA1, RO (10-digit dialing), A-U 2-out-of-5, P1 (3-digit dialing), and CTA.

5.47 Relay END released, operates relay NST (option YC) to provide combined high and overflow tone as a signal to disconnect.

6. NORMAL DISCONNECT - SC4

6.01 When the calling craftsperson disconnects, the ANI OGT releases, releasing relays TEN/THR and S.

6.02 Relay TEN/THR released, extinguishes lamps BD and BY (App Fig. 4).

6.03 Relay S released, releases relays OFT, TRS, CD, TMA, THR2, and all remaining operated relays release.

7. TIME OUT - SC5

NORMAL

7.01 Thermal timer TM operates when relay S or SA operates. Timer TM operated:

(a) Operates relay TMA which locks.

(b) Holds its break contacts open for the timing (cooling) period.

(c) Cools in about 20 seconds and closes its break contacts.

7.02 If some trouble prevents advance of registration or readout of number, timer TM will close its break contacts (in about 20 seconds) and with relay TMA operated, relay TMA1 operates.

7.03 Relay TMA1 operated, operates relay P which in turn reverses T and R on the line, forcing the ANI TRK to function as for called party disconnect.

7.04 Relay S releases, releasing relays ON, CD, TRS, TMA, and/or TMB.

7.05 Relay ON released, releases all remaining operated relays.

AUTOMATIC - DISCONNECT - (OPTION YR)

7.06 Thermal timer TM1 operates when relay RO operates. Timer TM1 operated:

(a) Operates relay TMB which locks.

(b) Holds its break contacts open for the timing (cooling) period.

(c) Cools in about 2-1/2 minutes and closes its break contacts.

7.07 If the calling party fails to go on-hook when denied access to ANAC from plant security during the security check cycle, timer TM1 will close its break contacts (in about 2-1/2 minutes) and with relays TMB operated and TMA released, relay TMA1 operates. Note, timer TM has priority over timer TM1.

7.08 Relay TMA1 operated, operates relay P which in turn reverses T and R on the line, forcing the ANI TRK to function as for called party disconnect.

7.09 Relay S releases, releasing relays ON, CD, TRS, TMB, and/or TMA.

7.10 Relay ON released, releases all remaining operated relays.

8. ANAC SEIZURE - THREE-DIGIT DIALING

THREE-DIGIT DIALING FROM MAIN FRAME - SC7 (NON-ESS)

8.01 After receipt of the 3-digit test code assigned for 3-digit dialing from central office distributing frame, the subscriber sender (crossbar No. 1 or panel) or originating register (crossbar No. 5) connects to a marker (crossbar No. 1 or 5) or decoder (panel). The marker or decoder tra... the selecting code to provide the in... tion necessary to select the ANI outg... trunk assigned for 3-digit operation. THR (3-digit select) in the ANAC and re... A in the ANI trunk operate.

8.02 Relay THR operated through the grou... connection of lead ON (crossbar No. ... or lead S (crossbar No.1 or panel) of the ANI trunk:

(a) Provides an operating path for relay S.

(b) Puts ground on D lead (crossbar No. 5), S1 lead (crossbar No. 1), or S lead (panel) of the ANI outgoing trunk used for 10-digit access from station to simulate an ANAC busy condition.

(c) Lights busy display lamp BD and busy lamps BY (option F only) in all main frame locations.

(d) Prepares a path to operate relay P1.

8.03 Relay A (ANI trunk) operated, reduces the bridge resistance across the tip and ring (T and R), causing relay S to operate.

8.04 Relay S operated:

(a) Operates relay P.

(b) Operates thermal timer TM which in turn operates relay TMA to begin a timing interval of 20 seconds.

8.05 Relay P operated, operates relay ON.

8.06 Relay ON operated:

(a) Reverses the T and R leads causing relay CS in the ANI outgoing trunk to operate.

(b) Prepares the circuit to receive MF pulses of the called and calling numbers by connecting battery to the MF amplifier and receiver units.

(c) Connect the APU pulsing lead to relay SP causing relay SP to follow the pulses.

(d) Opens the operate path of slow-releasing relay P which releases in 145 to 360 milliseconds.

8.07 Relay P released:

(a) Reverses the T and R leads causing relay CS in the ANI outgoing trunk to release.

(b) Operates slow-operate relay P1 in 405 to 620 milliseconds which in turn operates relay TRS.

8.08 Relay TRS operated:

(a) Again reverses the T and R leads causing relay CS in the ANI out-going trunk to operate. The second operation of relay CS in the ANI trunk causes an outpulser to initiate calling line identification.

(b) Operates relay SYC3.

(c) Operates relay CD which locks through relay S operated.

(d) Prepares a path to receive the information digit that precedes the calling number.

(e) Locks through relay S operated.

(f) Prepares a path to operate relay KP.

8.09 Relay CD operated prepares a path to operate relays TRA and TRA1.

8.10 Subsequent functions are described from 9.01.

THREE-DIGIT DIALING FROM CO DISTRIBUTING FRAME - SC12 (ESS CUT THROUGH)

8.11 When a call is routed to the ANAC via a dedicated TSPS or ANI trunk assigned for ANAC usage, as determined by the access code dialed by the craftsperson, the ESS No. 1 system control (see Information Notes 313 and 314), or the ESS No. 2 system control (see Information Notes 330 through 333) or the No. 3 ESS system control (see Information Note 339) causes a connection to the trunk link network as in a normal TSPS or ANI call. The trunk is connected to the ANAC by tip and ring leads.

8.12 The trunk circuit is put into the seized state which then connects to this circuit after reducing the bridge resistance to operate relay ETH (3-digit access).

8.13 Relay ETH operated:

(a) Operates relay THR which lights lamps BD and BY (option F only).

(b) Prepares a path to operate relays ETH1 and D.

8.14 Relay THR operated:

(a) Closes the loop to operate relay S.

(b) Removes an operating path for relay TEN.

8.15 Relay S operated, operates relays ETH1 and P and thermal timer TM which in turn operates relay TMA to begin a timing interval of 20 seconds.

8.16 Relay ETH1 operated:

(a) Applies reverse battery to the other trunk circuit associated with 10-digit access to simulate a ANAC maintanence busy condition.

(b) Removes relay ETH winding from the line and provides a holding path for its continuous operation.

8.17 Relay P operated, operates relay ON which:

(a) Opens the operated path of the slow-releasing relay P which releases in 145 to 360 milliseconds.

(b) Reverses the tip and ring leads

(c) Prepares holding path through relay ETH operated for relay D.

(d) Connects the APU pulsing lead to relay SP causing relay SP to follow the pulses.

(e) Prepares the circuit to receive MF pulses of the calling number (for 3-digit access operation, there will be no called number, therefore only KP and ST will be outpulsed) by connecting battery to the MF amplifier and receiver units.

8.18 Relay P released, reverses the T and R leads to return a reverse battery wink as a signal to command the MF transmitter to start outpulsing only the KP and ST signals. The 7-digit called numerals have been programmed to bypass.

8.19 At the end of KP signal, relay KP locks operated to provide a path to operate relay D, which will operate when the ST signal is received.

8.20 At the end of ST signal, relay D operated:

(a) Releases relay KP.

(b) Closes the operate path of slow-operating relay P1 which operates in 55 to 270 milliseconds.

8.21 The operation of relay P1 causes relay TRS to operate which:

(a) Reverses the T and R lead to return a steady off-hook, start identification signal to the MF transmitter to start outpulsing the calling number.

(b) Operates relays CS and SYC3.

(c) Prepares a path to receive the information digit that precedes the calling number.

(d) Locks through relay S operated.

8.22 Relay CD operated, prepares a path to operate relays TRA and TRA1.

8.23 Subsequent functions described from 9.01.

THREE-DIGIT ACCESS FROM CO DISTRIBUTING FRAME - P/O SC13 (SHARED ANAC)

8.24 When more than one type of office and corresponding outgoing trunk (crossbar No. 1, No. 5, PNL, ESS, No. 1, No. 2, or No. 3) sharing the same wire center is associated with a common ANAC unit, App Fig. 6 and/or Fig. 5 (associated with ESS) are required to provide idle circuit tip and ring separation of the outgoing trunks and an interoffice ANAC busy indication. The shared ANAC configuration accepts only one call at a time on bids for service from outside or inside the central office.

A. ESS No. 1, No. 2, or No. 3 Seizure (Shared ANAC)

8.25 When the MF transmitter connects a low-impedance (off-hook signal), to the ANAC via the outgoing trunk, relay ETH(A,-) (3-digit access) is operated. The entry port is determined by the access code dialed by a craftsperson.

8.26 Relay ETH(A,-) operated:

(a) Applies ground to operate relay(s) SBY- corresponding to the 3-digit access trunk(s) associated with (crossbar No. 1, crossbar No. 5, and PNL ANI office(s) if provided. Relay(s) SBY operated supplies a ground on the sleeve lead(s) to the associated outgoing trunk(s) to indicate an ANAC busy condition.

(b) Operates relay(s) EBY(A,-) corresponding to the other ESS trunk(s) associated with 10-digit dialing, if provided. Relay(s) EBY(A,-) operated reverses T and R (on-hook to off-hook) to simulate an ANAC maintenance busy condition. Upon receipt of the off-hook signal, the ESS program removes the trunk circuit from its idle linked list and places it on the high and wet list.

(c) Transfers T and R leads to prepare an operating path from the S relay to this dedicated ESS trunk which has been seized.

(d) Operates relay THR.

8.27 Relay THR operated:

(a) Applies ground to operate relay(s) SMB- corresponding to the 10-digit access trunk(s) associated with crossbar No. 1, crossbar No. 5, and PNL ANI office(s) if provided. Relay(s) SMB- operated applies ground on the sleeve lead(s) to the associated outgoing trunk(s) to indicate an ANAC busy condition.

(b) Operates relay(s) EMB(A,-) which simulates an ANAC maintenance busy condition to all the ESS trunks associated with 10-digit access, [Similar to 8.26 (b)], if provided.

(c) Cuts through a low-impedance bridge from the outgoing trunk through the make contacts of relay THR to operate relay S. Relay S operated in turn operates relay LTH(A,-) associated with the seized OGT. Relay LTH(A,-) operated removes relay ETH (A,-) winding from the line and provides a holding path for its continuous operation.

(d) Lights busy display lamp BD and busy lamps BY (option F only) in all main frame locations.

8.28 Subsequents functions described from 9.01.

B. Crossbar No. 1, No. 5, and Panel Seizure (Shared ANAC)

8.29 Ground over the S lead from the district selector (PNL) or crossbar No. 1 ANI OGT via the district junctor circuit or ground on the ON lead from the crossbar No. 5 ANI OGT operates relay STH- (3-digit access). Each entry port is determined by the access code dialed by a craftsperson.

8.30 Relay STH- operated:

(a) Applies ground to operate relay(s) EBY(A,-) which reverses the tip and ring (T and R) leads to simulate an ANAC maintenance busy condition to all ESS trunks assigned for 3-digit access, if provided.

(b) Operates relay(s) SBY- corresponding to the other 3-digit access trunk(s) associated with crossbar No. 1, crossbar No. 5, and Panel ANI office(s) if provided, to make busy their associated outgoing trunk(s) by supplying a ground on each sleeve lead.

(c) Transfer T and R leads to prepare an operating path from the S relay to this dedicated ANI trunk which has been seized.

(d) Operates relay THR.

8.31 Relay THR operated:

(a) Applies ground to operate relay(s) SMB- corresponding to the 10-digit access trunk(s) associated with crossbar No. 1, crossbar No. 5, and PNL ANI offices if provided. Relay(s) SMB- operated applies ground on D lead (crossbar No. 5), S1 lead (crossbar No. 1) and/or S lead (PNL) to indicate an ANAC busy condition.

(b) Operates relay(s) EMB(A,-) which simulates a ANAC maintenance busy condition to all the ESS trunks associated with 10-digit access by providing a T and R reversal (similar to 8.26 (b)).

(c) Cuts-through a low-impedance bridge from the outgoing trunk through the make contacts of relays STN- and THR to operate relay S.

(d) Lights busy display lamp BD and busy lamps BY (option F only) in all main frame locations.

8.32 Subsequent functions are described from 9.01.

THREE-DIGIT MULTI-ANAC CUT-THROUGH AND MAKE-BUSY - SC14

8.33 Apparatus Fig 7 provides the interface between two or more ANAC units (up to a maximum of ten) used in a multioffice building on the basis of one ANAC per office and all these offices must share the same main frame from which a common loudspeaker system is used.

8.34 One AK22 relay, designated CT and MB, is added per ANAC to affect the appropriate transfer of the announcement after bids from inside plant has been determined. In effect only one 3-digit access call from any ANAC can gain access to the loudspeaker system at one time.

8.35 Upon access from outside the central office (10-digit access), a call can go through without interference from other operated ANACs except when its own 3-digit access relays have been activated first. In this case, the ANI outgoing trunk for 10-digit access would simulate a busy condition to the calling craftsperson.

8.36 When a particular ANAC is seized, relay THR operates to provide a ground to operate cut-through CT relay which:

(a) Extends a ground through the make contact of relay CT to operate all make-busy MB relay(s) associated with other ANACs except its own.

(b) Transfers the readout pair for that particular ANAC to the loudspeaker.

8.37 The operation of relay(s) MB causes:

(a) A ground to be placed over the S lead(s of the panel ANI outgoing trunk(s), if provided, to simulate a local office busy condition.

(b) A ground to be placed over the D lead(s of the crossbar No. 5 ANI outgoing trunk(s), if provided, to simulate a local office busy condition.

(c) A ground to be placed over the S1 lead(of the crossbar No. 1 ANI outgoing trunk(s), if provided, to simulate a local office busy condition.

(d) A T and R lead reversal to the trunk(s) associated with the ESS No. 1, No. 2, or No. 3 office(s) if provided, to simulate a maintenance busy condition.

(e) An operating path to be opened for all CT relay(s) associated with other ANACs to prevent them from operation on 3-digit access.

8.38 Subsequent functions described are from 8.01 or 8.11 (ESS cut through).

9. RECEIVING THE INFORMATION DIGIT - SC6 (THREE-DIGIT DIALING)

9.01 After the command to start MF outpulsi the calling number has been received and the calling number identified, the ANI outpulser sends these multifrequency signals

(a) The KP signal (frequencies 2 and 10)

(b) An ID.

(c) The calling prefix and station number.

(d) The start signal (frenquencies 7 and 10 option YZ, or 1 and 10 option XA).

9.02 The KP signal received operates relay REC2 which operates relay RR2. Relay RR2 operated, operates relay KP. At the end of the KP signal relays REC2 and RR2 release.

9.03 Relay KP operated:

(a) Operates relay THR1.

(b) Prepares a path to operate relays RA, NM, and D.

(c) Prepares a lock path (option V, Mfr Disc.) for relays REC0, 1, 2, 4, and 7.

(d) Prepares operate and hold path for relays RR0, 1, 2, 4, and 7 (option T).

(e) Locks through relay D released and relay ON operated.

9.04 Relay THR1 operated:

(a) Prepares a path to operate relays TRA and TRA1 after the last pulse of the calling digit is over.

(b) Provides a tone path to return high tone and/or overflow tone to the main frame loudspeaker if ANAC encounters trouble in indentification.

(c) Prepares a path to operate relay THR2.

9.05 Subsequent functions are described in 3.04 through 3.17 and continues in 10.01.

10. CALLING DIGIT REGISTRATION AND START SIGNAL FOR THREE-DIGIT DIALING FROM MAIN FRAME - SC8

10.01 A digit frequencies of the calling number are outpulsed by the outpulser.

10.02 The 2-out-of-5 frequencies for digit A are amplified by the receiver amplifier and fed to the input of all five receiver units.

10.03 Each receiver unit is a resonant circuit tuned to a particular frequency as follows:

(a) Receiver Unit 0 - 700 Hz

(b) Receiver Unit 1 - 900 Hz

(c) Receiver Unit 2 - 1100 Hz

(d) Receiver Unit 4 - 1300 Hz

(e) Receiver Unit 7 - 1500 Hz

10.04 The A digit frequencies cause 2 of the 5 receiver units to detect the signals which are rectified. The resulting negative potential is used to forward-bias transistors of the two receiver units.

10.05 Relays REC0, 1, 2, 4, or 7 are in the collector circuits of the MQ- transistors in the receiver units. When these transistors become forward-biased, these relays operate on a 2-out-of-5 basis and lock (option V, Mfr Disc.).

10.06 Relays REC0, 1, 2, 4, and 7 2-out-of-5 operated, operate relays RR0, 1, 2, 4, and 7 2-out-of-5.

10.07 Relays RR0, 1, 2, 4, and 7 2-out-of-5 operated, operate relay RA which locks to any operated REC relay via diodes CR16 through CR20.

10.08 Relay RA operated:

(a) Operates relays A0, 1, 2, 4, and 7 2-out-of-5 in digit register circuit which lock under control of relay ON.

(b) Operates relay BS through make contacts of relay AS in digit steering circuit.

(c) Prepares a holding path for relay AS.

10.09 Relay BS operated:

(a) Transfers the holding circuit for relay AS to operated relay RA.

(b) Locks under control of all succeeding steering relays.

(c) Prepares a circuit to operate relay CS.

(d) Prepares the operating path for relays B0, B1, B2, B4, and B7 in digit register circuit.

(e) Opens lock path (option V, Mfr Disc.) for REC0 1, 2, 4, and 7 relays.

10.10 When the pulsing of the MF signal for digit A ends, or (option V, Mfr Disc.) when relay BS operates, relays REC0, 1, 2, 4, and 7 release, causing the release of relay RA.

10.11 Relay RA released:

(a) Opens the holding path for relay AS and allows it to release.

(b) Removes ground from leads 0, 1, 2, 4, and 7 2-out-of-5, releasing relays RR0, 1, 2, 4, and 7 2-out-of-5.

10.12 The ANI outpulser sends the multifrequency code for each succeeding digit, B through U. Circuit operation is similar to that already described for digit A. However, the information is stored by B, C, TH, H, T, and U relays (0, 1, 2, 4, and 7) on a 2-out-of-5 basis.

RECEIPT OF START SIGNAL - SC8 (AFTER CALLING NUMBER)

10.13 After digits A through U of the calling number are registered and relay END operated, the ANI outpulser sends a start signal (frequencies 7 and 10 option YZ or 1 and 10 option XA). The start signal causes ANAC to transfer from the MF signal receiving to the APU readout mode.

10.14 The ST signal, (frequencies 7 and 10 option YZ or 1 and 10 option XA), operates relay REC7 or REC1, (recognition of frequency 10 if not required).

10.15 Relay REC7 or REC1 operated, operates relay RR7 or RR1 which in turn operates relay D.

10.16 Relay D operated:

(a) Locks through relay END operated.

(b) Prepares a path to operate relays TRA and TRA1.

(c) Opens the lock path (option V, Mfr Disc.) for relays REC0, 1, 2, 4, and 7.

(d) Releases (slow-release) relay KP.

10.17 At the end of the ST signal, relay REC7 or REC1 release opening the hold path for relay RR7 or RR1.

10.18 Relay KP or REC7 or REC1 released, releases relay RR7 or RR1 which in turn operates relays TRA and TRA1.

10.19 Relays TRA and TRA1 operated;

(a) Prepares a path to operate relay OFT.

(b) Transfer the control of the steering relays from relay RA to relay SP.

(c) Add relay PAS between relays CS and THS in the steering chain. Relay PAS provides a pause between the voice readout of the calling office prefix and station number.

(d) Transfer the T and R leads from MF receiver input to APU output.

(e) Releases relay END which in turn releases relay D.

(f) Operates relay THR2.

(g) Prepares a path to operate relay SYC3.

(h) Prepares a path to operate relay SA.

(i) Locks through relay ON operated.

10.20 Relay THR2 operated:

(a) Reoperates relay SYC3.

(b) Transfers the T and R leads from the line to the main frame loudspeakers to the output of the APU.

(c) Prepares a path to operate relays RR0, 1, 2, 4, and 7 on a 2-out-of-5 basis from the A-U register relays.

(d) Prepares a path to return 120 IPM tone to the loudspeaker after readout.

(e) Releases relay THR1.

10.21 Relay SYC3 operated:

(a) Prepares a path to operate relay AS.

(b) operates relay SA.

(c) Operates relay CTA (option YT) which locks through relay ON operated. Relay CTA operated connects the APU to the line or loudspeaker.

10.22 Relay SA operated:

(a) Removes unwanted tones from going to the loudspeaker.

(b) Prepares a path for peg count registration on completed calls (option W),

10.23 Subsequent functions are described from 5.01 through 6.03.

11 TEST MAKE BUSY - SC10

11.01 Test jacks APU-T and APU-R provide access to the APU for test and repair purposes. When ready for testing, a pair of

plugs in the head telephone set (52-type typical) are inserted to the test jacks located in the ANAC unit. This operates relay JT.

11.02 Relay JT operated;

(a) Puts ground on the D lead (crossbar No. 5), S1 lead (crossbar No. 1), S lead (panel), or T and R reversal (ESS), of the dedicated ANI outgoing trunks to simulate an ANAC busy condition to all entry ports either originated from inside or outside the central office.

(b) Lights busy display lamp BD and busy lamps BY (option F only) in all main frame locations.

12. PEG COUNT (OPTION W)

12.01 Whenever the ANA circuit functions on trouble in line identification, lead PC1 to traffic register circuit is grounded through the operation of relay OFT and break contact of relay SA.

12.02 Whenever the ANA circuit functions on ANAC completed calls, registration is made through a ground supply from the operated relays OFT or relay SRPT (App Fig. 8) and SA to lead PC2 after readout.

12.03 Whenever ANAC functions on operator identified calls, registration is made through ground supplied through the operated relay NST to lead PC3 (option ZP) or through break contact of relay SA to lead PC1 (option ZO, Mfr Disc.).

13. SEVEN-DIGIT OUTSIDE PLANT ACCESS TO ANAC - APP FIG. 9

13.01 Caution: When 7-digit outside plant access (App Fig. 9) is provided, assign a NNX office code which enables the CO switching equipment to recognize that these dialed digits require an outgoing ANI trunk to complete a call. In addition, auxiliary sender is needed to MF outpulse the called number.

13.02 The ANAC is seized in the normal manner as in the 10-digit access mode except that only 7-digits are dialed. The craftsperson dials the 3-digit access code assigned to ANAC followed by the last 4 digits of the called number. When the MF sender outpulses the 7-digit called number, the first 3 digits A, B, and C are blocked from being stored in the ANAC memory circuit. The called numerals, however, are allowed to register. Upon receiving the calling directory number, the prefix digits are immediately stored in ANAC without the match or no-match sequence since the called prefix was previously not stored. The balance of the calling numerical digits are allowed to compare with the called number. The sequence of operation, thereafter, is the same as the 10-digit dialing operation.

13.03 Example: Office code 637 has corresponding 3-digit access code 250 assigned for office A. Office B is 889 with corresponding 3-digit access code 260 assigned. When using ANAC, the installation force must know what the prefix is before dialing the appropriate 3-digit access code. For example, if the installation force is testing from prefix 637 he would dial 250-1234. The called number is outpulsed 250-1234, but relay 7DA not operated prevents the prefix 250 from being stored in ANAC, only the last 4 numbers are stored. When relay END operates, after the called number is stored, relay 7DA operates. Relay 7DA operated allows the full 7-digit calling number to be stored. When the calling number is MF outpulsed, 637-1234, the prefix 637 is registered in ANAC without being compared. Only the last 4 digits, 1234, would be compared against the called number previously stored.

13.04 When 3-digit dialing from the main frame is used, relay ON operated, with relays THR and S previously operated, causes relay 7DA to operate. Relay 7DA operated allows the normal 7 digits to be stored when they are MF outpulsed.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 The central office unit must be equipped with an automatic number identification system so as to be able to outpulse the calling telephone number by way of multifrequency signals.

	SPV (ETN/ETH) Relay -45 Volt Min	SPV (s) Relay -45 Volt Min	E and M Lead
Max Ext Ckt Loop Res	500	500	
Min Insulation Res	15,000	15,000	
E and M Lead Res			400

2. FUNCTIONAL DESIGNATIONS

2.01 Relays

Designation	Meaning
A0,1,2,4,7	A Digit Register
AS	A Digit Steering
B0,1,2,4,7	B Digit Register
BS	B Digit Steering
C0,1,2,4,7	C Digit Register
CD	Called Number Complete
CS	C Digit Steering
CT	Cut Through
CTA	Cut Through APU
D	Delay
EBY(A,-)	Electronic Busy A,B,--
EMB(A,-)	Electronic Make-Busy A,B,-,-
END	End of Steering
ETH	Electronic Three Digit
ETH(A,-)	Electronic Three A,B,-,-
ETN	Electronic Ten Digit
ETN(A,-)	Electronic Ten A,B,-,-
ETH 1	Electronic Three Digit 1
ETN 1	Electronic Ten Digit 1
H0,1,2,4,7	Hundreds Digit Register
HS	Hundreds Digit Steering
ID2	Identification Digit 2
ID4	Identification Digit 4
JT	Jack Test
KP	Key Pulse
LTH(A,-)	Line Three A,B,-,-
LTN(A,-)	Line Ten A,B,-,-
MB	Make Busy
NM	No Match
NST	No Such Number Tone
OFT	Overflow Tone
ON	Off-Normal
P	Pulse
P1	Pulse 1
PAS	Pause
RA	Register Advance
REC0,1,2,4,7	Receive Frequencies 0,1,2,4,7
RO	Read-Out
ROA	Read-Out Auxiliary
RPT	Repeat
RPT1	Repeat 1
RR0,1,2,4,7	Receive Frequencies 0,1,2,4,7 Aux
S	Supervisory
SA	Stop Audible
SBY-	Shared Busy 1,2,...
SMB-	Shared Make Busy 1,2,...
SP	Synchronizing Pulse
SRPT	Stop Repeat
STH-	Shared Three 1,2,...
STN-	Shared Ten 1,2,...
SYC1	Synchronizing Steering 1
SYC2	Synchronizing Steering 2

Designation (Cont)	Meaning
SYC3	Synchronizing Steering 3
TEN	Ten-Digit Select
T0,1,2,4,7	Tens Digit Register
THR	Three-Digit Select
TH0,1,2,4,7	Thousands Digit Register
THR1	Three-Digit Select 1
THS	Thousands Steering
THR2	Three-Digit Select 2
TM	Timer
TM1	Timer 1
TMA	Timer Auxiliary
TMB	Timer B
TMA1	Timer Auxiliary 1
TRA	Transfer Auxiliary
TRA1	Transfer Auxiliary 1
TRS	Transfer
TS	Tens Digit Steering
U0,1,2,4,7	Units Digit Register
US	Units Digit Steering
7DA	7-Digit Access

3. FUNCTIONS

3.01 The automatic number announcer for use with ANI has the following functions:

(a) To recognize calls between the 10-digit access from outside the central office and the 3-digit access from the central office main frame.

(b) To give call pricrity to station caller over main frame craftsperson when simultaneous seizure occurs in the panel system.

(c) To signal the associated trunk for the called number (10-digit access).

(d) To signal the associated trunk to identify the calling line.

(e) To receive the multifrequency outpulsed called number (10-digit access) or calling number (3-digit access).

(f) To receive the multifrequency outpulsed identification digit and calling number.

(g) To recognize an identification digit 2 or 5 as trouble and return an overflow tone to the calling line (10-digit access) or main frame loudspeaker (3-digit access).

(h) To recognize identification digit 1 or 4 as a call from a line that must be identified by an operator and return a high tone to the calling line (10-digit access) or main frame loudspeaker (3-digit access).

(i) To compare the called and calling numbers (10-digit access).

(j) To give back busy and high tone when called and calling numbers match (10-digit access).

(k) To give a verbal readout of the calling line directory number when called and calling numbers do not match (10-digit access).

(ℓ) To return an overflow tone to the line (10-digit) or to the loudspeaker (3-digit) after the readout is complete.

(m) To time out after 20 seconds or 2-1/2 minutes and cause the associated trunk to release.

(n) To give visual indication of ANA idle-busy condition.

(o) To simulate ANA busy condition to a craftsperson while allowing the other to complete the call.

(p) To make busy all entry ports during maintenance.

(q) To provide peg count registration of ANAC completed calls and trouble in identification and operator identified calls.

(r) To permit two or more ANI office entities in a wire center to use the same ANAC unit.

(s) To permit the interface between two or more ANAC units when the office entities are shared with the same loudspeaker arrangement at a common main frame.

(t) To operate with Shared Security Attendant Preference Circuit - NS-02516-01.

(u) To provide automatic-disconnect when calling party fails to go on-hook when denied access from PSC during security check to ANAC.

(v) To provide type II signaling interface for use with ESS in security check cycle.

(w) To provide optional audible readout recycle feature to repeat readout once.

(x) To provide optional 7-digit outside plant access as alternative to present 10-digit access if compatible and when it is required.

4. CONNECTING CIRCUITS

4.01 The automatic number announcer circuit for use with ANI is designed to work with the following circuits:

(a) Outgoing Trunk MF Pulsing - (Panel System) - SD-21972-01.

(b) Outgoing Trunk PCI Pulsing - (Panel) SD-21974-01.

(c) Outgoing Trunk MF Pulsing (No. 1 Crossbar System) - SD-26209-01.

(d) Outgoing Trunk PCI Pulsing - (Crossbar No. 1) SD-26210-01.

(e) Outgoing Trunk Circuit - (Crossbar No. 5 CAMA, Automatic Identification) SD-26085-01.

(f) Power, Ringing and Tone Distribution Circuit - (Crossbar No. 5) - SD-25599-01.

(g) Miscellaneous Tones and Interrupters - (Panel System) - ES-20255-01.

(h) No. 1 or Tandem Crossbar Office Interrupter Frame Circuit - (Crossbar System) SD-25062-01.

(i) Modification of 255A KTU Arranged for 2 Wire Subscriber Line Circuit with E and M Lead Signaling and Manual M lead Control - NS-02503-01.

(j) MDF Loudspeaker Telephone Circuit - SD-96471-01.

(k) TSPS Outgoing Trunk for No. 1 ESS Office - SD-1A203-01.

(l) DX Signal Circuit (Typical) SD-95487-01, SD-1C363-01.

(m) MDF Loud Speaker Telephone Circuit - SD-90222-01.

(n) Line and Balancing Repeating Coil Circuit (Typical) - SD-96452-01.

(o) Shared Security Attendant Preference Circuit - NS-02516-01.

(p) Outgoing Trunk Circuit for No. 2 ESS Office - SD-2H144-01.

(q) Outgoing Trunk Circuit for No. 2 ESS office - SD-2H103-02.

(r) Remote Testing MDF Telephone and Loudspeaker Circuit - Far End - SD-97559-01.

(s) Tone Circuit, Interruption Control and Distribution (ESS) - Typical - SD-81652-01.

(t) Outgoing Trunk Circuit for No. 3 ESS Office - SD-3H220-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 The automatic number announcer circuit per NS-02503-01 shall be capable of performing all functions specified in this Circuit Description and shall meet all requirements of the Circuit Requirement Tables.

SECTION IV - REASONS FOR REISSUE

A. Changed and Added Functions

A.01 Added

(u) To provide automatic disconnect when the calling party fails to go on-hook when denied access from PSC during security check to ANAC.

(v) To provide type II signaling interface for use with ESS in security check cycle.

(w) To provide optional audible readout recycle feature to repeat readout once.

(x) To provide optional 7-digit outside plant access as alternative to present 10-digit access if compatible and when it is required.

A.02 Changed

(m) To time out after 20 seconds, or 2-1/2 minutes and cause the associated trunk to release.

B. Changes in Apparatus (Components)

B.01 Added

TMB - 1/2 AK22 Relay - FS4, App Fig. 1, Option YR

TMB - 185A Network - FS4, App Fig. 1, Option YR

CTA - 1/2 AK22 Relay - FS4, App Fig. 1, Option YT

CTA - 185A Network - FS4, App Fig. 1, Option YT

TM1 - KS-16615 L21 Thermal Relay - FS4, App Fig. 1, Option YR

CREC - 542AD Capacitor - FS1, App Fig. 1, Option XD

App Fig 8

App Fig 9

B.02

Superseded	Superseded By
CR8 - 446C Diode - FS1, App Fig. 1, Option XC	CR8, CR9, CR10 - 813H Diode - FS1, App Fig. 1, Option XD
CR9 - 446B Diode - FS1, App Fig. 1, Option XC	
CR10 - 446B Diode - FS1, App Fig 1, Option XC	
R2 - 60-Ohm 18AE Resistor - FS1 App Fig. 1, Option XC	R2 - 294-Ohm 18HY Resistor - FS1, App Fig. 1, Option XD

B.03

Removed	Replaced By
446F and 533F Diodes	533K Diode
ANA-Spkr Set - 107A-( ) Loudspeaker Set - FS7, App Fig. 4	ANA-Spkr Set - 107B-( ) Loudspeaker Set - FS7, App Fig. 4

D. Description of Changes

D.01 In FS4, option YR is added to provide automatic disconnect when calling party fails to go on-hook when denied access from plant service center during security check to ANAC.

D.02 In FS2 and FS4, options YS and YT are added, and options YA and YS are rated Mfr Disc. Option YT removes the APU during security check cycle to reduce loading and improve transmission quality.

D.03 In FS3 and FS5 option YU is added, and Information Note 338 is also added, to provide type II signaling interface for use with ESS in security check cycle.

D.04 The FS6 and FS8 were revised, Information Note 339 is added and Circuit Note 124 is revised to provide compatibility with ESS No. 3.

D.05 The FS2, 3, 4, 6, and 8, App Fig. 5, and Information Notes 315 and 319 are revised to allow expansion of shared ANAC configuration to handle four ESS offices.

D.06 In FS2 and 4, and App Fig. 1, contacts 8 and 3 of relay ON are designated option YV (rated Mfr Disc.) and are swapped around and redesignated option YW. Contact 7M, option YW, of relay P is added to FS4. The above contact swap on relay ON and the addition of contact 7M of relay P was done to prevent a marginal relay race condition.

D.07 Circuit Note 102 and Information Notes 323, 324 were revised to rate electromechanical APU (Speechmaker Model 630) option ZW, as Mfr Disc., due to its electromechanical design and the excessive maintenance required.

D.08 Information Notes 340, 341, and 342 were added regarding ANAC use with crossbar No. 5.

D.09 In FS3 and 4, option YX and Fig. 8 are added. Apparatus Fig. 8 provides audible readout recycle feature as an aid in hearing audible readout in a noisy environment by allowing the readout to occur twice. Corresponding option YX is provided when App Fig. 8 is not provided.

D.10 The FS4 and App Fig. 1 are revised to provide for selection of the ST signal. Options YY, YZ, XA, are added, option YY is rated Mfr Disc. For ST signal frequencies 1 and 10 provide option YZ, for frequencies 7 and 10 provide option XA.

D.11 The FS1, 4, and 6, App Fig. 1 are revised and Information Note 343 and App Fig. 9 are added to provide 7-digit outside plant access to ANAC as alternative to present 10-digit access if compatible and when it is required by the Telco.

D.12 Circuit Notes 102, 104, and 123 are revised to rate REC AMP option YD as Mfr Disc. Option ZY, REC AMP has a higher gain and will always be provided.

D.13 The FS1 and App Fig. 1 are revised to provide an improved zener power supply for the REC circuit. Options XC and XD were added, option XC rated Mfr Disc. Option XD changes the values of the resistor and three zener diodes and adds a filter capacitor to provide more current and better regulation.

D.14 Loudspeaker set type 107A was rated Mfr Disc. and is replaced on a line-out basis by type 107B in App Fig. 4.

D.15 In FS4, options XE and XF are added. Option XE is rated Mfr Disc. Option XF relocates contact 2 of relay NST to improve peg count operation and to provide compatibility with audible readout recycle feature.

D.16 Diodes 446F, 533F are replaced by 533K diode on a no-record line-out basis.

D.17 Miscellaneous changes were made in FS2, FS6, Notes 102, 108, 402, 403, 336, and Notes 128, 129 are added to correct or clarify ANA circuit.

D.18 Sequence Charts SC1, 2, 4, 5, 6, 8, 11, 12, 13, 14, Circuit Requirements Table, Notes 102, 104, and 336 were revised to reflect the changes noted above.

D.19 Note: This reissue also covers information authorized by the following appendixes to Issue 3B of the CD.

Appendix 1AC - Dwg Issue 9AC

Appendix 2B - Dwg Issue 10B

Appendix 3B - Dwg Issue 11AC

Appendix 4AC - Dwg Issue 12AC

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