



Remote Record Concentrator Description and Operating Procedures Common Systems

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1. Overview

1.01 This practice describes the Remote Record Concentrator (RRC), an electronic system that interfaces the switched network to a maximum of eight Remote Record Groups (RRGs). Each RRG can be either an ALD3 circuit pack, a 400A or 400B circuit module, or a 400B circuit module. Since each RRG requires one Plain Old Telephone Service (POTS) line, the concentrator circuit allows the user to diminish the number of POTS lines from a maximum of eight to one.

1.02 This practice is being reissued, for the following reason:

- Include the 400B circuit module

1.03 This practice contains an admonishment in the form of a WARNING..

 **WARNING:**

This equipment generates, uses and radiates radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference. The user will be required to take whatever measure to correct this interference at his/her own expense.

1.04 AT&T welcomes your comments on this practice. Your comments will aid us in improving the quality and usefulness of AT&T documentation. Please use the Feedback Form provided at the back of this practice.

1.05 Additional copies of this practice and any associated appendixes may be ordered from the AT&T Customer Information Center as follows:

- Call 1-800-432-6600

or

- Complete Form IND1-80.80 and mail to:

AT&T Customer Information Center
Attention: Order Entry Section
2855 N. Franklin Road
P.O. Box 19901
Indianapolis, IN 46219-1999

1.06 This practice was developed by the AT&T Document Development Organization.

2. General

2.01 The RRC is an electronic, microprocessor controlled unit that is arranged to accommodate two concentrator circuit packs which are coded ALD4 (J1C262A-1 List 2). Each ALD4 can access eight RRGs through one POTS line. Each ALD3 circuit pack can access eight announcement channels (13A, 13A+, or 14A), and each 400A or 400B circuit module can access eight announcement channels (15A or 16A). Therefore, 64 announcement channels can be accessed through each ALD4 circuit pack using a single POTS line.

2.02 The ALD4 is accessed via a POTS line, by way of a Line Interface Circuit (LIC), which resides on the printed wiring circuit pack. When the circuit pack is accessed remotely by a Touch Tone telephone, it interacts with the user via tone prompts. Using the Touch Tone keypad, the user enters a group number (Group Select function) that represents one RRG interfaced to a maximum of eight announcement channels (see Figure 1).

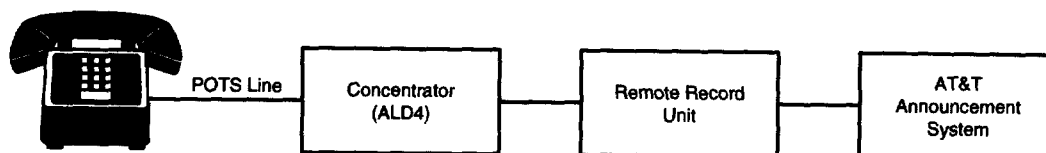


Figure 1. Accessing RRC via POTS Line

2.03 Once an RRG is accessed, the same procedures follow as if the unit was accessed directly through the POTS line. See AT&T 201-519-120, *13A/14A Remote Record Unit Description and Operating Procedures* or AT&T 201-522-101, *15A Announcement System Description and Operating Procedures*, or AT&T 201-523-101, *16A Announcement System Description and Operating Procedures* for instructions for remote recording and playback of messages. After a remote record session with one RRG, the Exit ALD3 - Access Concentrator function can be executed to continue the remote record session with a different RRG connected to the ALD4.

- 2.04** As with the ALD3, recordings can be dubbed through the ALD4 using the 602A Telephone Tape Recorder Adapter (J1C259A-1 List 5). Refer to Figure 2.

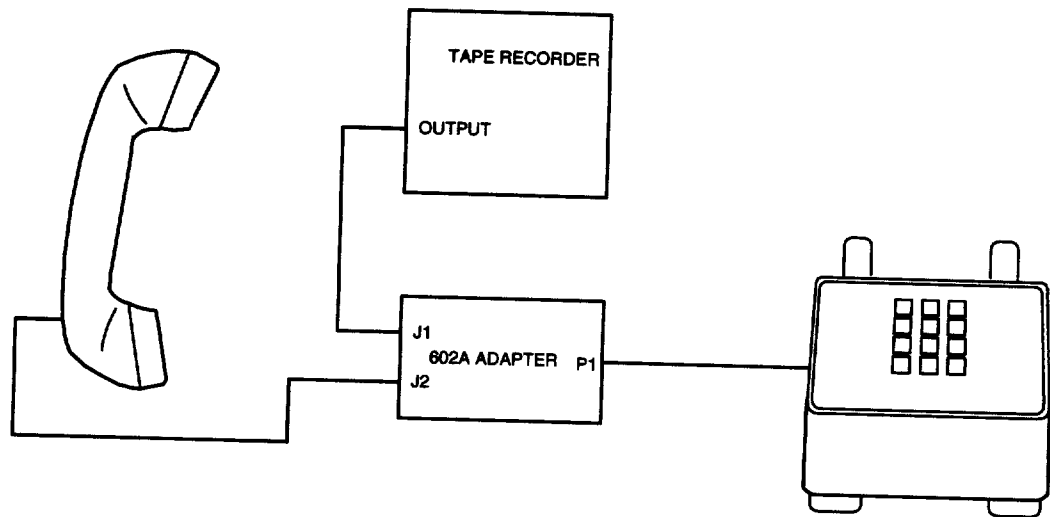


Figure 2. 602A Telephone Tape Recorder Adapter (Tape Dubbing of Announcement Remotely) J1C259A-1 List 5

- 2.05** The RRC as well as the RRGs are compatible with the AT&T Announcement Systems Manager (ASM), the Announcement Systems Manager For Windows (ASMW), a PC-based workstation. These workstations store announcements and keep a database of announcement systems equipment. ASM and ASMW can download a stored announcement to a remote announcement system from a central location. See Figure 3 for the ASM/Remote Record Unit (RRU) architecture.

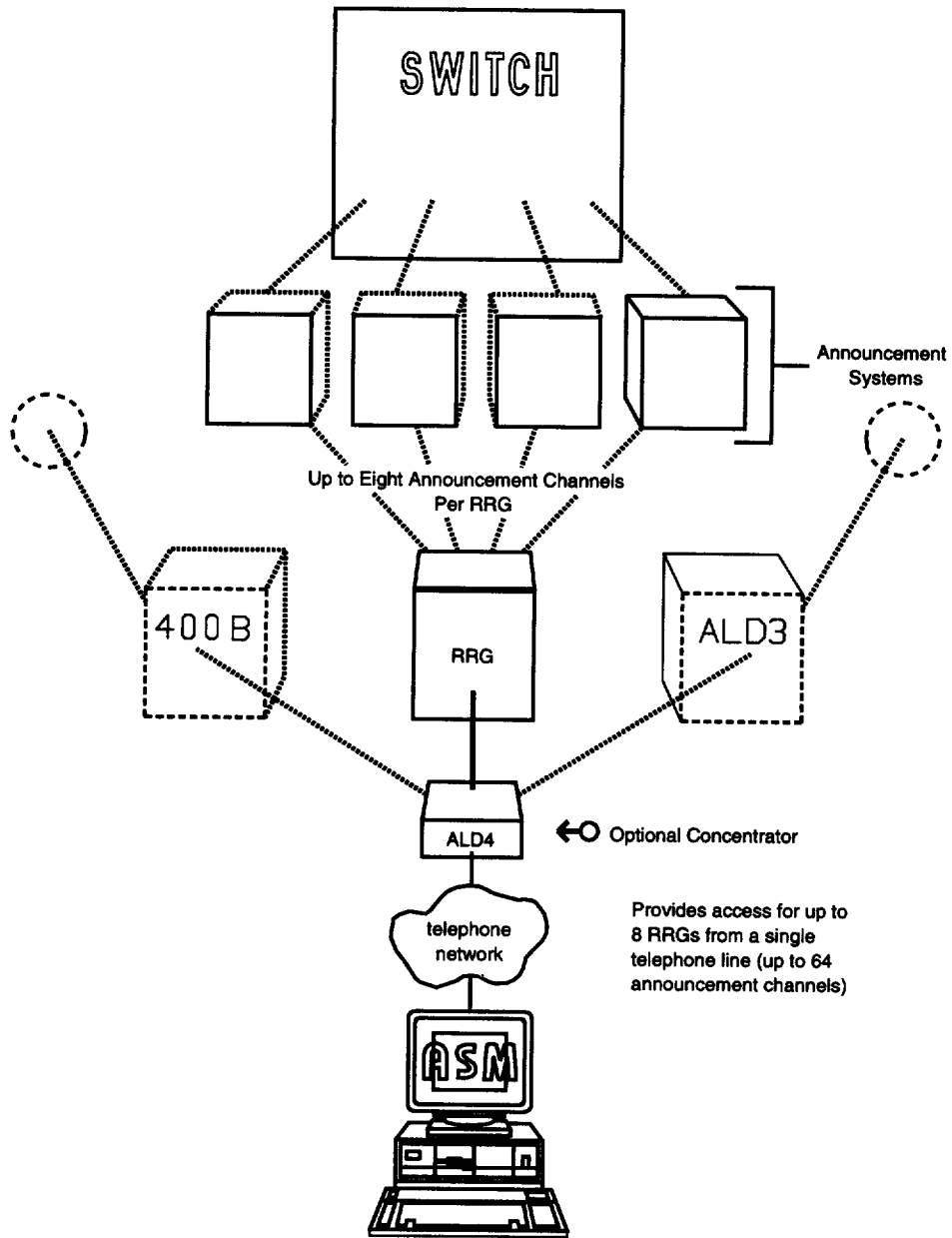


Figure 3. ASM/RRU Architecture

3. Description

Physical Design

- 3.01** The RRC shares the same physical configuration as the 14A Announcement System. The unit is 2 inches high by 23 inches wide by 11-1/2 inches deep, including the mounting plate and apparatus mountings for two independent channels (See Figure 4). The ALD4 circuit pack(s) connect to 940A connectors mounted on the mounting plate. Wire wrap pins on the 940A connector's wiring side interconnect the unit for power and distribution to the RRUs. The two apparatus mountings attached to the mounting plate receive the ALD4 circuit packs and guide them into the connectors via sliders. Table A describes the major components of the ALD4 circuit pack.
- 3.02** Two different types of mounting brackets are available to secure the unit to the standard equipment frames and cabinets.
- 3.03** System controls and indicators are located on the faceplate of the ALD4 (see Figure 4). These are described in Table B.

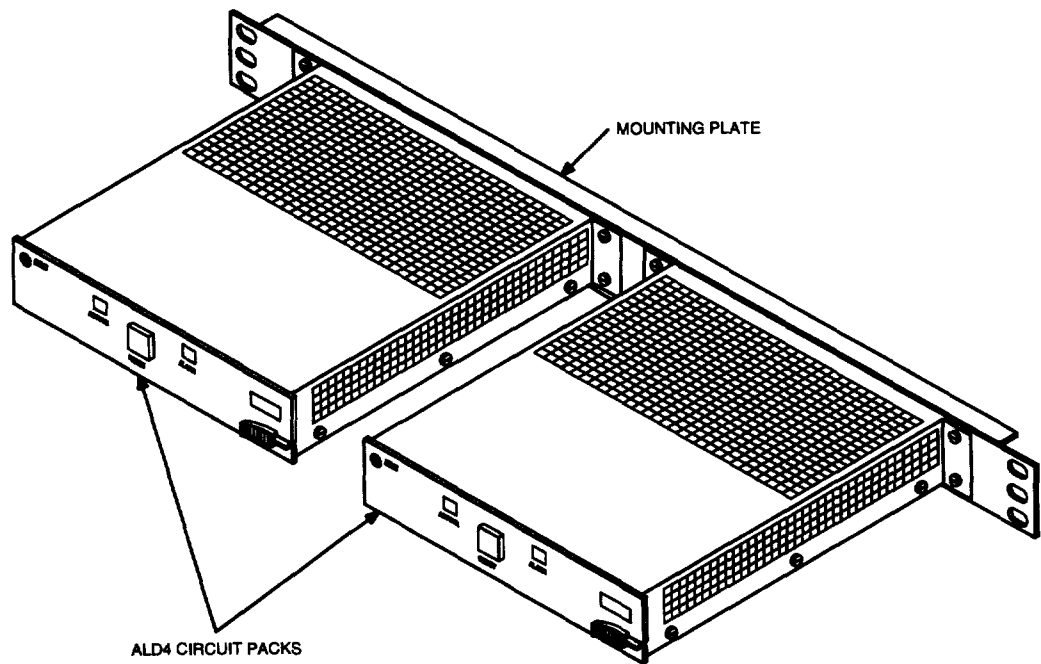


Figure 4. Remote Record Concentrator Equipped with Two ALD4 Circuit Packs

Table A. ALD4 Circuit Pack Major Components

Component	Description
Microcomputer	Handles overall control of the pack, including diagnostics to monitor for proper operation, detect failures, and initiate alarms.
Tone Generator	Generates tones which are the means of interaction with the user.
Touch Tone Decoder	Decodes the user's Touch Tone input.
Transformer Coupled Line Interface Circuit	Provides line interface capability including nominal 900 ohm impedance, ring detection, and hybrid function.

Table B. ALD4 Controls and Indicators

Component	Description
RESET	A pushbutton switch used to clear alarm conditions caused by a temporary fault.
ACTIVE	A green light emitting diode (LED) used to show the ALD4 has been accessed by a user and is in an off-hook condition.
ALARM	A red LED used to show a failure has occurred in the ALD4.

Table C. J1C262A-1 Remote Record Concentrator Equipment List

Equipment	List No.	Qty.
Apparatus and common equipment for Remote Record Concentrator arranged for two Concentrator circuits.	1	1
Apparatus (ALD4 circuit pack) required in addition to List 1 to equip one remote record concentrator circuit.	2	*
Mounting brackets required to adapt the unit to mount in the ESS™ switch type framework as ED-97735-70, Group 1.	3	1
Mounting brackets required to adapt the unit to mount in the No. 5 Crossbar-type framework, as ED-26524-70, Groups 2 & 7.	4	1

* Maximum of two List 2 per each List 1.

3.04 The RRC apparatus mountings and faceplates are Central Office white to comply with the Central Office Equipment standards. See Table C for an equipment list for the J1C262A-1 Remote Record Concentrator.

3.05 The ALD4 has two fuses in a series between the telephone network (Tip and Ring) and the LIC on the printed wiring circuit pack (see Figure 5). The fuses protect the ALD4 circuitry against lightning induced transients and power cross. The replacement fuses are BUSSMAN* MDQ - 1/2 amp.

* Registered trademark of Cooper Industries, Inc.

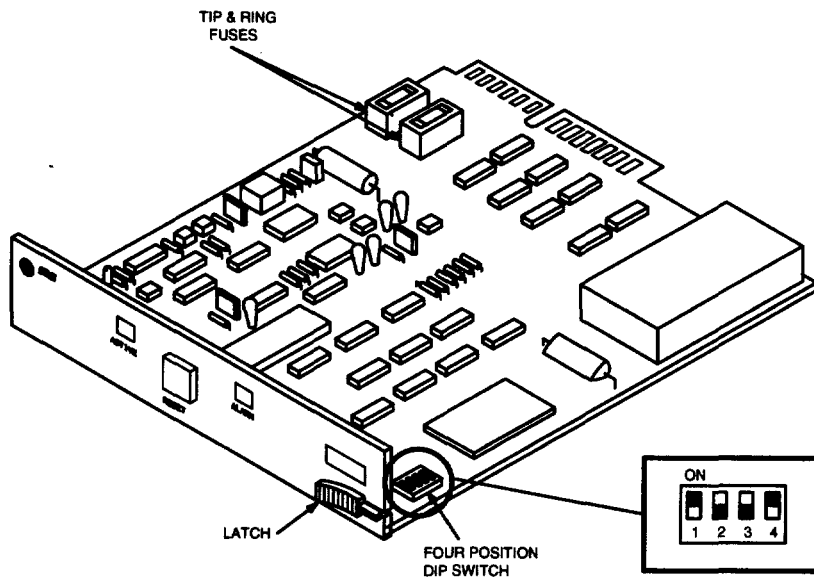


Figure 5. Remote Record Concentrator ALD4 Circuit Pack

DIP Switch Setting

3.06 The ALD4 has a four-position DIP switch that is preset at the factory (see Figure 5). When the ALD4 is received, the DIP switch setting should match the Enable Fuse Check configuration in Table D. If it does not, change the settings to match the configuration in Figure 5. There may be an occasion when the configuration may be altered. This is discussed in Section 12, "Trouble Analysis." Table E is a listing of the ALD4 DIP switch representations.

Table D. Recommended ALD4 DIP Switch Settings

Configuration	Setting
Enable Fuse Check (typical)	1 - ON
	2 - OFF
	3 - OFF
	4 - ON
Disable Fuse Check	1 - OFF
	2 - OFF
	3 - OFF
	4 - ON

Note: Place switch number 4 in the OFF position if required by Announcement Systems Manager (ASM) PC-based system.

Table E. ALD4 DIP Switch Representations

Switch Number	Position	Mode
1	OFF	Disable Fuse Check
	ON	Enable Fuse Check
2	OFF (for manufacturing test only)	Disable LIC Test
3	OFF	NOT USED
4	OFF	Tone Level (Max. -5 dBm)
	ON	Tone Level (Max. -9 dBm)

ALD3 Interface

- 3.07** Each ALD4 can interface up to eight RRGs to a switched telephone network. Each RRG can be either an ALD3 circuit pack (for a 13A, 13A+, or 14A Announcement System), a 400A or 400B circuit module (for a 15A Announcement System or a 16A Announcement System). Since each RRG can interface up to eight announcement channels, a total of 64 announcement channels can be accessed through a single concentrator circuit.
- 3.08** The ALD4 has been certified to operate properly at distances up to 600 feet from the ALD3. The actual limitation on this distance in most applications will be the loop attenuation (8 dB) due to the capacitance of the Tip and Ring lines. However, it is advisable to mount the ALD4 as close as possible to the RRG.
- 3.09** A 1-inch space should be left between the Remote Record Concentrator (ALD4) circuit and the adjacent equipment to allow for proper ventilation.

4. Function

- 4.01** The ALD4 is an interface between a user on the switched network and a RRG. The ALD3 is accessed through a LIC that resides on the printed wiring board labeled Tip and Ring (see Table F). The user enters a group number in the form of Touch Tones to select an ALD3, 400A, or 400B (a group of announcement channels).
- 4.02** Five interface leads are required between the ALD4 and the RRG. Two of these are analog lines labeled Tx and Rx (where x represents the channel number). Tx and Rx (see Table F) connect each of the RRGs Tip and Ring to the ALD4. Two additional lines transfer digital signals between the ALD4 and the RRG labeled SELx and EXDx (where x represents the channel number). SELx and EXDx (see Table F) are respectively used for RRG selection and off-hook acknowledge. The remaining lead is ground.

Table F. ALD4 Functions

Designation	Pin Number	Function
-48	49	TALK battery connection
-48RET	50	
Tip	26	Tip and Ring leads
Ring	1	
OA1	27	Office alarm signal. OA1 and OA2 are closed during alarm. OA2 and OA3 are open during alarm.
OA2	2	
OA3	28	

Table F. ALD4 Functions (Contd)

Designation	Pin Number	Function
SEL0	38	Group select leads for RRG groups 0-7.
SEL1	37	
SEL2	36	
SEL3	35	
SEL4	34	
SEL5	33	
SEL6	32	
SEL7	31	
Bufln	3	Input and output buffer
Bufout	39	
EXD0	11	Off-hook monitor leads for RRG groups 0-7
EXD1	10	
EXD2	9	
EXD3	8	
EXD4	7	
EXD5	6	
EXD6	5	
EXD7	4	
T0	48	Differential audio lines that interface to RRG's 0-7 Tip and Ring.
R0	23	
T1	47	
R1	22	
T2	46	
R2	21	
T3	45	
R3	20	
T4	44	
R4	19	
T5	43	
R5	18	
T6	42	
R6	17	
T7	41	
R7	16	
GRD	12	Common to ALD4 RRGs and announcement systems.
GRD	13	
GRD	14	
GRD	15	

4.03 A complete list of functions available at the 940A connector for the ALD4 is given in Table F. All wiring information for the Concentrator (ALD4) to the Remote Record Group (ALD3 or 400A) should be referenced to SD-97812-01.

5. Power Requirements

5.01 The power required for the remote unit is -48 V DC. The operating voltage are -39.5 to -57.0 V DC and will not be damaged up to -60 V DC. The preferred source of this power is TALK battery, but Signal Battery is acceptable if TALK battery is not available in the frame in which the RRC is installed. The normal current drain is 0.125 amperes per ALD4. Power is protected by a separate 0.25A fuse for each ALD4 in the frame distribution circuitry.

6. Applications

- 6.01** The RRC can be retrofitted into the 1/1A ESS switch, 5ESS® switch, and electromechanical frames and cabinets at the Telco site.
- 6.02** 1/1A ESS Switch Application - The J1C262A-1 Remote Record Concentrator can be retrofitted into the J1A058C-1 (13A) Recorded Announcement Frame, J1A058D-1 (14A) Recorded Announcement Frame, and J1A058E-1 (14A) Recorded Announcement Frame.
- 6.03** 5ESS Switch Application - The J1C262A-1 Remote Record Concentrator can be retrofitted into the J5D005C-1 Miscellaneous Cabinet.
- 6.04** Electromechanical Switch - The J1C262A-1 Remote Record Concentrator can be procured and installed as individual shelf units on miscellaneous relay racks as near to the Remote Record Unit (ALD3) as possible or wherever space permits in the central office.
- 6.05** See Table C for the J1C262A-1 Remote Record Concentrator Equipment List.
- 6.06** The J1C262A-1 Remote Record Concentrator has been certified to operate properly at distances up to 600 feet from the ALD3. The actual limitation on this distance in most applications will be the loop attenuation (8 dB) due to the capacitance of the Tip and Ring lines. However, it is advisable to mount the ALD4 as close as possible to the RRG circuit packs.
- 6.07** In all application cases, a 1-inch space should be left between the J1C262A-1 RRC circuit and the adjacent equipment to allow for proper ventilation.

7. Restrictions

7.01 The following restrictions apply to the RRC:

- Mount the concentrator away from equipment which produces heavy electrical interference.
- Leave ventilation space, minimum 1- inch clearance, between the concentrator and other equipment mounted in the frame.
- Cabling between the concentrator and the RRU should be handled in accordance with SD-97812-01.

8. Installation and Removal of the ALD4

Installation of the ALD4

8.01 The ALD4 does not require any additional setup procedure once the circuit pack is installed in its housing. To install ALD4 circuit packs:

- (1) Place the removed circuit pack or its replacement in the apparatus mounting tracks and slide it forward until it is fully mated with the 940A connector. See Figures 4, 5 and 6.
- (2) Hold the spring-loaded latch forward until the pack is fully mated.
- (3) Release the latch and check to see if it is in the latched position.

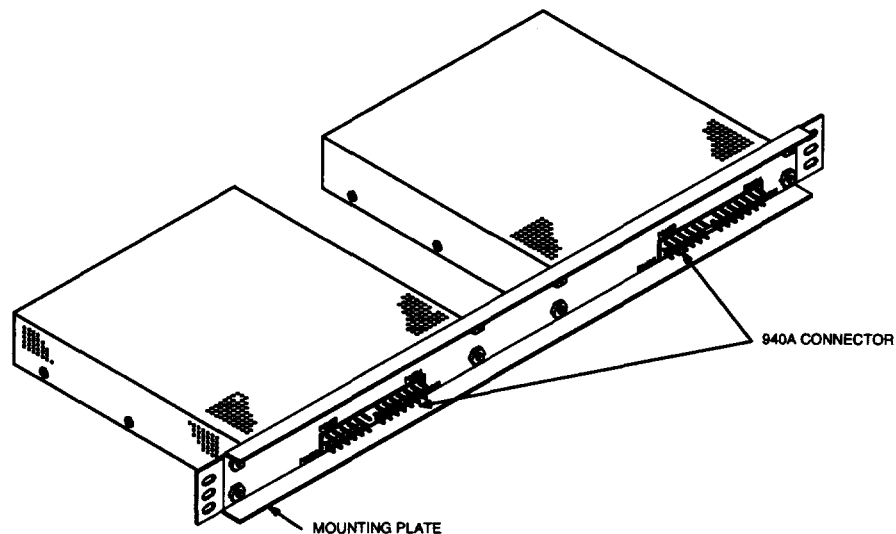


Figure 6. Remote Record Concentrator Rear Mounting Plate

8.02 Diagnostics will automatically run on the ALD4. If no alarms are generated (ALARM LED lights) after approximately 5 seconds, the installation procedure is complete.

Removal of the the ALD4

8.03 Follow local procedures first before removing the ALD4 circuit pack. To remove the the ALD4 circuit pack:

- (1) Pull the spring-loaded latch located on the right side of the pack forward and hold it there (see Figure 5).
- (2) Pull the circuit pack forward and out of the apparatus mounting. (No electrical damage will be caused to an ALD4 by removing it with the power on).

9. Operations

ALD4 Functions

9.01 The ALD4 has the capability to interface the LIC of an RRG to the Tip and Ring of the telephone network. The RRG is selected using the Group Select Function. A group represents one ALD3 or one 400A connected to an announcement system.

9.02 The user will also have the capability to reaccess the ALD4 after communication has been established with an RRG. This allows access to eight RRGs (64 announcement channels) remotely without hanging up.

9.03 For a more detailed description and instructions for using these functions, see Part 10, "Executing System Functions."

ALD4 Generated Tones

9.04 Two tones are generated by the ALD4 to serve as a communication mechanism to the user. See Table G for a quick reference guide to tone definitions. The ALD4 generated tones are:

- Initial Access Tone (IAT)
- Transmission Error Tone.

Table G. ALD4 Tone Generation

Tone	Definition
Initial Access Tone (IAT)	A high-pitched tone, a low-pitched tone, and a Touch Tone
	Duration - 1 second
	Generated when ALD4 is first accessed.
Transmission Error Tone (TET)	A series of three tones, high-, medium-, and low-pitched played twice
	Duration - 1.5 seconds
	Generated whenever the ALD4 cannot establish communications or has lost communications with a channel

A. Initial Access Tone

9.05 When the ALD4 is first accessed, the system responds with the Initial Access Tone, a high-pitched tone, a low-pitched tone, and a Touch Tone for 1 second. After the tone, the user must enter a Group Number within 15 seconds or the system will hang up.

B. Transmission Error Tone

9.06 The Transmission Error Tone is a series of high-, medium-, and low-pitched tones that are generated twice. This tone is heard if the ALD4 cannot establish communication with the RRG.

Time Outs

9.07 The ALD4 is designed to time-out to safeguard against being left off-hook or left hanging by a system interface. The ALD4 monitors response time and will time out under the following conditions:

- If a Group Number is not entered within 15 seconds after the user is prompted, the ALD4 will hang up.
- If the ALD4 cannot establish communication with the selected RRG, a Transmission Error Tone is generated. If this error occurs five consecutive times, the ALD4 will hang up.

End Session

9.08 To end a session, hang up the phone.

Diagnostics

9.09 The ALD4 performs three self-diagnostic tests:

- Read Only Memory (ROM) checksum test
- Fuse test
- Tone generator/Touch Tone decoder test.

If any of these tests fail, a red alarm light LED on the front panel of the ALD4 will turn on. An alarm relay will turn on shorting pins 2 and 27 and opening pins 2 and 28 on the connector. Also, the ALD4 will not respond to a ring detection (initiate an off-hook condition).

9.10 The 8051 ROM checksum test, fuse test, and the tone generator/Touch Tone decoder test are performed whenever the ALD4 is powered up or when the reset switch on the faceplate is pressed. The fuse test will be performed as long as position 1 of the DIP switch is ON (see Table D and Figure 5).

9.11 The 8051 ROM checksum test and the fuse test are performed while the ALD4 is idle and waiting for a ring detection. The fuse test will be performed if position 1 of the DIP switch is in the ON position. This test will be executed every 5 minutes. Upon a ring detection, the ALD4 will perform the tone generator/Touch Tone decoder test.

10. Executing System Functions

10.01 The ALD4 performs two functions: the Group Select Function and the Exit ALD3 - Access Concentrator function. Figure 7 is a users' flowchart for accessing the Remote Record Concentrator as well as execution of system functions. The following is a description of ALD4 System Functions.

Group Select

10.02 The Group Select Function selects an RRG based on a Touch Tone Group Number entered by the user. Since eight RRGs can be interfaced to an ALD4, the range of Group Numbers are from 0 through 7. Once a valid Group Number is entered, the ALD4 attempts to connect the appropriate RRG to the Tip and Ring of the telephone network. If communication cannot be established with the selected RRG, a Transmission Error Tone will be heard (see Paragraph 9.06). If this error occurs five consecutive times, the ALD4 will hang up. If the ALD4 establishes communication with the selected RRG, then the user will hear the Initial Access Tone from the RRG and the Remote Record Unit procedures should be followed (see AT&T 201-519-110, AT&T 201-522-101, or AT&T 201-523-101). The ALD4 will then monitor the RRG for further instructions.

10.03 Table H describes how the Telco user or the Commercial user accesses ALD4 and executes system functions.

Table H. User Procedures

Step	Action	System Response
1	Access the ALD4 by dialing the dedicated line interface.	Initial Access Tone (a high-pitched tone), a low-pitched tone and a Touch Tone for 1 second.
2	Enter the RRU Group Number followed by a *.	<p>Initial Access Tone from RRU (a high-pitched tone and a Touch Tone).</p> <p>Error Conditions - ALD4 will hang up if:</p> <ul style="list-style-type: none"> ■ An invalid Group Number is entered, or ■ An entry is not made within 15 seconds.
3	Enter security code and proceed with RRU functions.	See AT&T 201-519-110, AT&T 201-522-101, or AT&T 201-522-101 for RRU procedures.

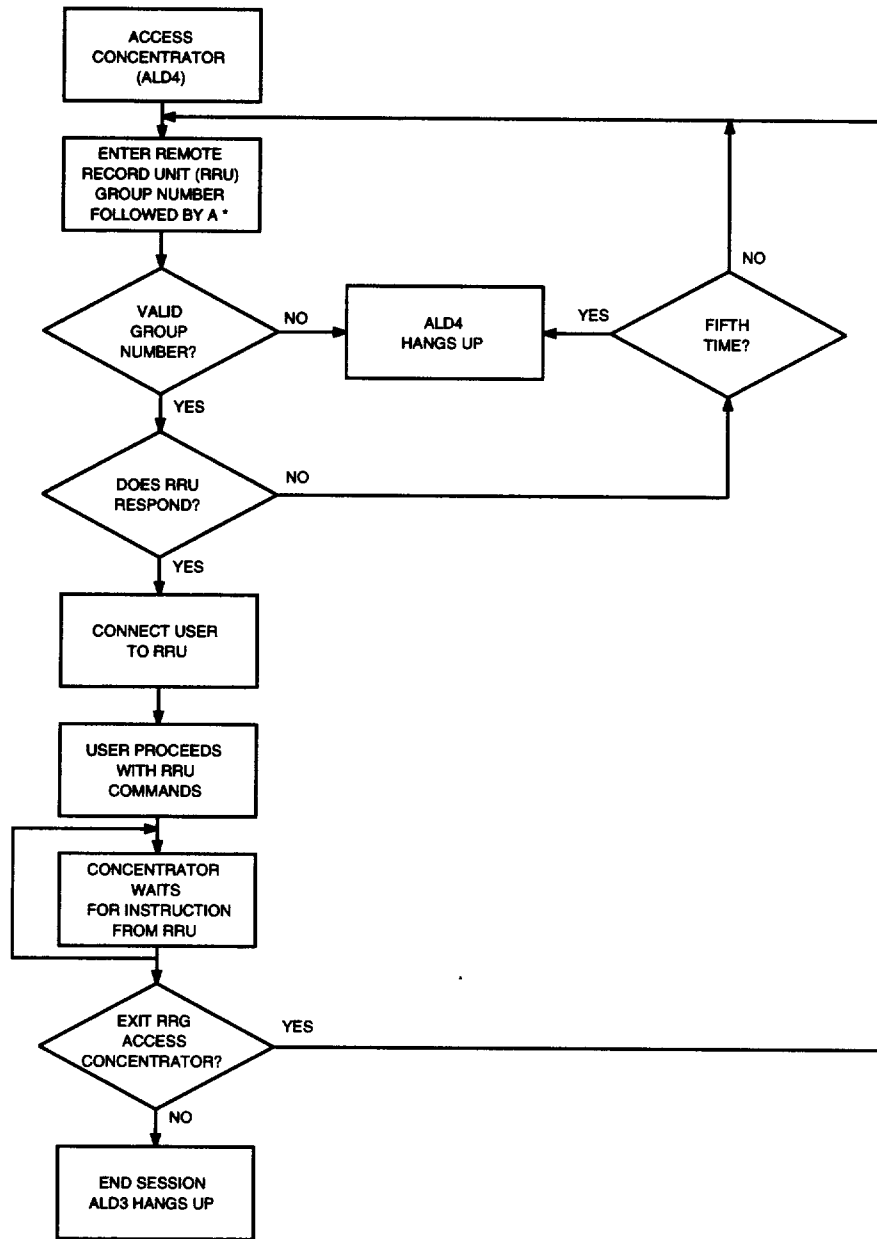


Figure 7. Remote Record Concentrator User Flowchart

Exit RRU - Access Concentrator

10.04 While the ALD4 is monitoring the ALD3 or 400B for further instruction, the user has the option to end the session (with the RRG) by hanging up which results in the RRG and ALD4 initiating an on-hook condition, or the user has the capability to reaccess the Concentrator by Access Concentrator Function (*7, see AT&T 201-519-110 or AT&T 201-522-101). This function will signal the RRG to initiate an on-hook condition, and signal the ALD4 to stay off-hook and receive further instructions from the user. As a result, the Initial Access Tone (IAT) from the ALD4 is played and the user can enter a Group Number (see Table H). Take note that a Commercial user cannot use this function.

11. Maintenance

11.01 Since the Remote Record Concentrator is completely electronic, no routine maintenance is required. A microcomputer routinely diagnoses the circuitry and signals an alarm when a hard fault is discovered.

12. Trouble Analysis

12.01 Due to routine diagnoses by the on-board microcomputer, trouble detectors, and analysis connection to the ALD4 is simplified. Troubles are indicated by system alarms and lighted indicators on the ALD4 (see Table B). Once the trouble area is located, most problems are solved by replacing the circuit pack.

12.02 If the ALD4 does not operate and the ALARM LED does not light, check the fuse in the -48 V battery supply. If the fuse is blown, replace it. If it blows again, replace the circuit pack(s).

12.03 When the ALD4 circuit pack is plugged in, a series of diagnostic tests will be performed. This includes a test to check if there is continuity between the LIC through the fuses to the Tip and Ring of the telephone network. When this test is performed, the ALD4 will initiate an off-hook condition. Then it will test if a dial tone is present across the Tip and Ring. If this test fails, the ALD4 will retest the circuit two additional times. If on the third try no tone is detected, the ALARM LED and relay will turn on.

12.04 If the fuse test fails, try the following steps:

- (1) Remove the circuit pack.
- (2) Verify fuses are not blown and are properly seated in the fused block.
- (3) If the fuses are blown, replace them. Replacement fuses are BUSSMAN MDQ- 1/2A.
- (4) Install the circuit pack in the mounting apparatus.
- (5) Diagnostics will automatically run on powerup.
- (6) If the circuit pack still fails, check to see if the Tip and Ring is properly connected.
- (7) If the circuit pack still fails, disable fuse test by setting position 1 of the DIP switch to the OFF position.
- (8) If the circuit pack passes, check operation. If the pack operates normally, leave this test disabled.
- (9) If the circuit pack fails again, replace the circuit pack.

12.05 If the ALD4 does not initiate an off-hook condition when accessed, check if there is an alarm and reset the board. Access the circuit pack again to see if the ALARM occurs again. If the alarm persists, replace the ALD4 circuit pack.

12.06 If the ALD4 does not initiate an off-hook condition when accessed and there is no alarm, check the fuses, Tip and Ring connections (pins 1 and 26 on the connector), and the -48 V power connections (pins 49 and 50). If proper connection is made, replace circuit pack.

12.07 If the circuit pack cannot establish communication with the RRG (initiate and off-hook condition):

- Check that both units are plugged in and powered.
- Check that pin 3 (OS2) on the ALD3 connector is grounded. Be sure that the Group Number entered matches the RRG that was wired (see SD-97812-01).
- If communication still fails, replace one or both of the circuit packs.

12.08 For additional information or technical assistance, please contact your AT&T account representative or call 1-800-352-5563.