

# Nos. 444, 445, & 446

## LINE SECURITY SYSTEM

### GENERAL INFORMATION

The U.L. Listed Advanced Line Security (ALS) System can provide Grade AA Line Security for Police Station Connected Mini-Modularm or Modularm systems. The leased telephone line between headquarters and the protected premises is continuously supervised and sophisticated attempts at compromising the line can be detected.

An Advanced Line Security System consists of:

A No. 445 ALS Transmitter at the protected premises. Connection is required to a 6V. DC local control instrument, preferably one that can provide a dry closure during alarm (e.g.: Nos. 1022, AML, ADL). The 6V. DC source may be full wave A.C. rectified, battery or rechargeable (e.g.: No. 492 or 493...but not No. 497 as it has insufficient capacity).

and

A No. 444 ALS Module at headquarters (for Mini-Modularm installations)

or

A No. 446 ALS Modularm unit at headquarters (for Modularm installations).

The ALS System will operate satisfactorily on good quality signal grade telephone lines. Occasionally, however, telephone company line conditions may be encountered which will require that a voice grade line be used.

Prearranged coded signals continuously flow on the line between the protected premises and headquarters. If these signals are interfered with, a trouble signal will be reported at headquarters: a) In about five seconds if the line is cut, and b) In up to fifteen seconds if other attempts to defeat the system are made (depending on the method used). An alarm condition from the premises control will be reported at headquarters within two seconds. Audible trouble and alarm signals remain latched at headquarters until manually silenced and visual indication remains until the line returns to normal.

### INSTALLATION AND WIRING

#### CODING:

The code to be used on the line is set up in the headquarters and premises ALS equipment at the time of installation. A total of 120 different code combinations is available.

1. No. 445 ALS Transmitter (for Premises): See Diagram 3. Open the cabinet door and cut any two or more of the seven numbered resistors near the left hand edge of the circuit board (e.g.: 2, 3 and 6).

- 2a. No. 444 ALS Module (for Headquarters Mini-Modularm): See Diagram 1. Remove the cover of the No. 444. The resistors are at the edge of the uppermost PC board. Cut the IDENTICAL COMBINATION of two or more numbered resistors that was cut in the No. 445 (e.g.: 2, 3 and 6). Replace the cover.
- b. No. 446 ALS Modularm (for Headquarters Modularm): See Diagram 2. Open the housing of the No. 446 by removing four screws from its side. The top and one side of the unit come off in one piece but wires remain attached to the interior of the housing. The resistors are on the PC Board secured to the opened cover. Cut the IDENTICAL COMBINATION of two or more numbered resistors that was cut in the No. 445 (e.g.: 2, 3 and 6). Reclose the unit.

AT HEADQUARTERS: See Diagram 3.

1. Mini-Modularm: The No. 444 is used in the No. 535 Control Cabinet similarly to a No. 537 Burglar Subscriber Plug-in Module.

Caution: If the No. 535 Control Cabinet is an early model which does not contain a No. 540 Isolating Relay (check for its presence in the lower left corner of the cabinet) one must be added to avoid possible damage to the No. 444.

- a. Connect the telephone line to the terminals in the No. 535 Control Cabinet corresponding to the position to be occupied by the No. 444. Any available line position in the cabinet may be used. Telephone line polarity may be disregarded.
  - b. Plug the coded No. 444 into the No. 535 Control Cabinet. The No. 444 gives its indications, like any other module, on the display panel. (See instructions for the Mini-Modularm system.)
2. Modularm: The No. 446 is used at headquarters similarly to a No. 130 Modularm unit.
    - a. Connect the telephone line at the rear of the Modularm console cabinet position to be occupied by the No. 446. (See Modularm installation instructions.) Telephone line polarity is not important.
    - b. Plug the No. 446 into the Modularm console cabinet. The No. 446 gives its visual indications on its own trouble and alarm lights and audible indication on the horn serving the rest of the Modularm installation. A reset button on the No. 446 will silence the alerting horn but the trouble or alarm light will remain lit until the line returns to normal and then will reset automatically.

AT THE PROTECTED PREMISES: See Diagram 3.

1. Make sure the No. 445 ALS Transmitter to be installed has been coded identically to the No. 444 or 446 receiver unit to be used at headquarters, as described above in the "Coding" section.
2. Mount the No. 445 near the control instrument to which it will be connected.

NOTE: A recommended procedure before installation is to test the transmitter operation at the central station. See TROUBLE 1 at the end of these instructions for details.

3. Connect terminals 1 (+) and 2 (-) of the No. 445 directly to the control instrument's 6 V.DC power supply (in parallel with the control instrument's 6 V.DC supply terminals). Observe polarity! See "Caution" following Step 6.
4. Follow "a" or (if necessary, and its conditions are met) "b" below:
  - a. If normally open dry contacts are available at the control instrument, connect terminals 3 and 4 of the No. 445 to these contacts.
  - b. Alternatively, and under certain conditions described below, if normally open dry contacts are not available at the control instrument, a single wire may be connected between terminal 4 of the No. 445 and the positive (+) alarm (bell) output terminal of the control. In this case, no connection is made to terminal 3 of the No. 445.

Use this arrangement only if all these conditions are met:

- (1) Common 6 V.DC power supply is used for control and its alarm (bell) output.
  - (2) Positive (+) voltage appears on control's (+) alarm output (bell) terminal only during alarm.
  - (3) Bell test has been eliminated.
  - (4) Silent hold-up is not used.
5. Connect terminal 5 of the No. 445 to a cold water pipe ground.
  6. Connect terminals 6 and 7 of the No. 445 to the telephone line. Do not connect the telephone line to any connection points provided in the control instrument.

Caution: Devices which vary the voltage applied to the telephone line (such as the No. 349 Telephone Line Voltage Booster) are neither applicable to nor needed with the ALS system and should not be used.

7. Lock the cabinet of the No. 445. No further adjustments are required for the No. 445 or the No. 444 (or No. 446). As soon as the units at both ends of the telephone line are connected, they begin continuous operation.

#### TROUBLESHOOTING:

Successful system operation should be obtainable on any normal line provided by the Telephone company. If difficulties are experienced and a bad telephone line connection is suspected, the following preliminary tests with a telephone handset (such as the Ademco No. 261) can easily be made before contacting the telephone company.

1. Listen at headquarters with the No. 445 connected at the premises.
  - a. Disconnect the phone line from the Modularm or Mini-Modularm equipment and listen across the line with the handset. A low steady tone should be heard, if the No. 445 is in non-alarm condition.

- b. Have someone at the premises place the No. 445 in alarm condition (short terminals 3 and 4). The tone at headquarters should change to a high steady one.
2. Listen at the premises with the No. 444 or 446 properly connected at headquarters.
- a. Disconnect the phone line from the No. 445 and listen across the line with the handset. Randomly spaced "beeps", seconds apart, should be heard clearly.

If the system is not functioning and if, in either test, proper sounds are not heard, or are heard very faintly, a bad telephone line connection may be the reason. Contact the telephone company and discuss the matter with them, giving them this technical information.

- Phone line attenuation should not exceed 40 db (600 ohm impedance).
- Frequency range of signals is 400 Hz to 2300 Hz.
- Maximum signal into the line is 0 dbm.

SPECIFICATIONS:

	<u>No. 444</u>	<u>No. 446</u>	<u>No. 445</u>
Physical:			
Width:	2 1/8" ( 5.4 cm)	2 5/8" ( 6.7 cm)	7 1/2" (19.0 cm)
Height:	1 7/8" ( 4.8 cm)	3 1/2" ( 8.9 cm)	12" (30.5 cm)
Depth:	4 3/4" (12.1 cm)	4 1/2" (11.4 cm)	3 1/4" ( 8.3 cm)
Electrical:			
Voltage:	6 V.DC (from No. 535's Power Supply)	6 V.DC (from No. 132's Power Supply)	6 V.DC or Full Wave Rectified
Current (max, standby):	25 ma	25 ma	50 ma
Current (max, alarm):	125 ma (incl. lamp)	100 ma	50 ma

NOTE: No. 445 ADVANCED LINE SECURITY TRANSMITTERS manufactured prior to July, 1978 required that a jumper be connected between terminals 2 and 5. This jumper, which is called for in these older units, is not indicated in Diagram 3 of these instructions. Please be advised of this difference in wiring should you be in possession of one of these earlier units.

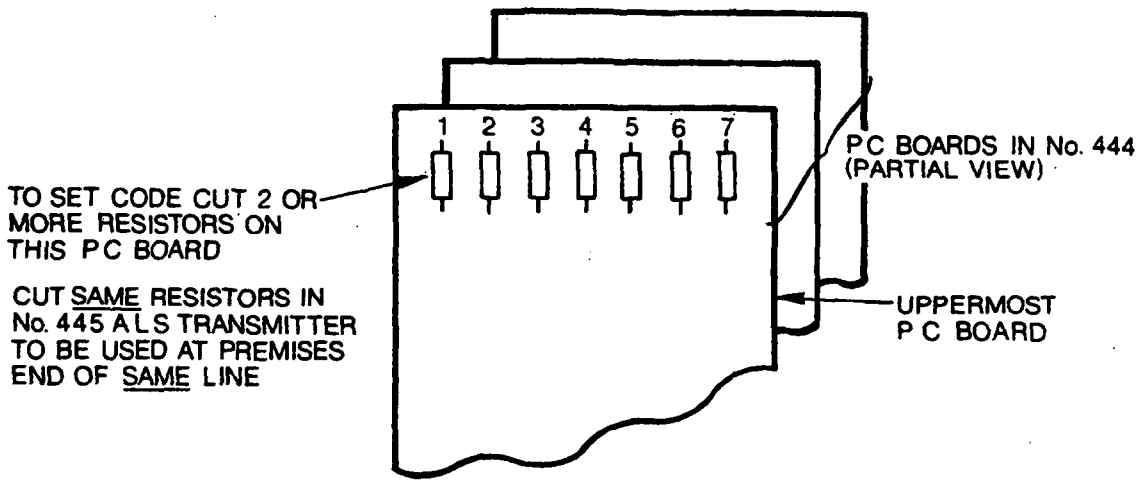


DIAGRAM 1: Coding Resistors for No. 444 A L S Module (Used With Mini-Modularm)

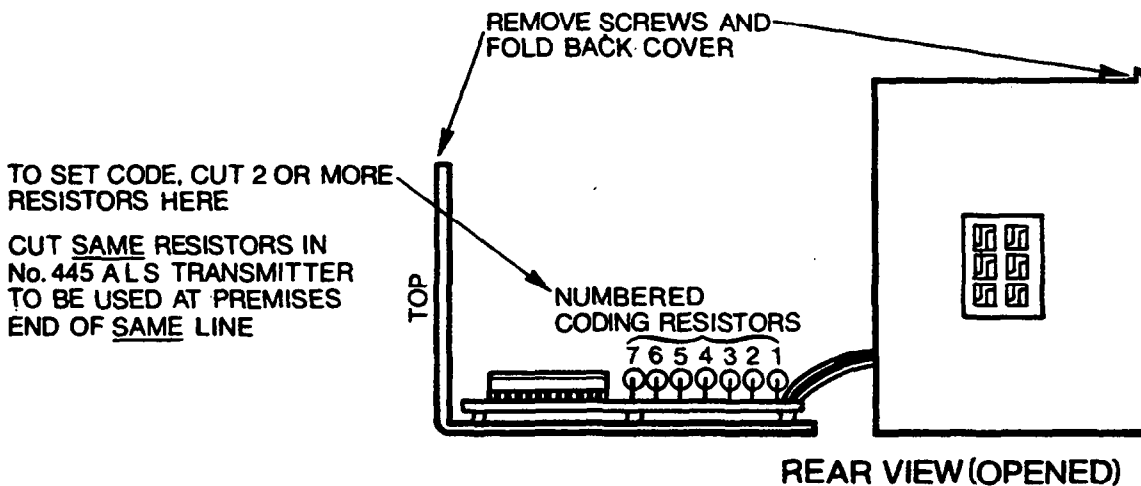
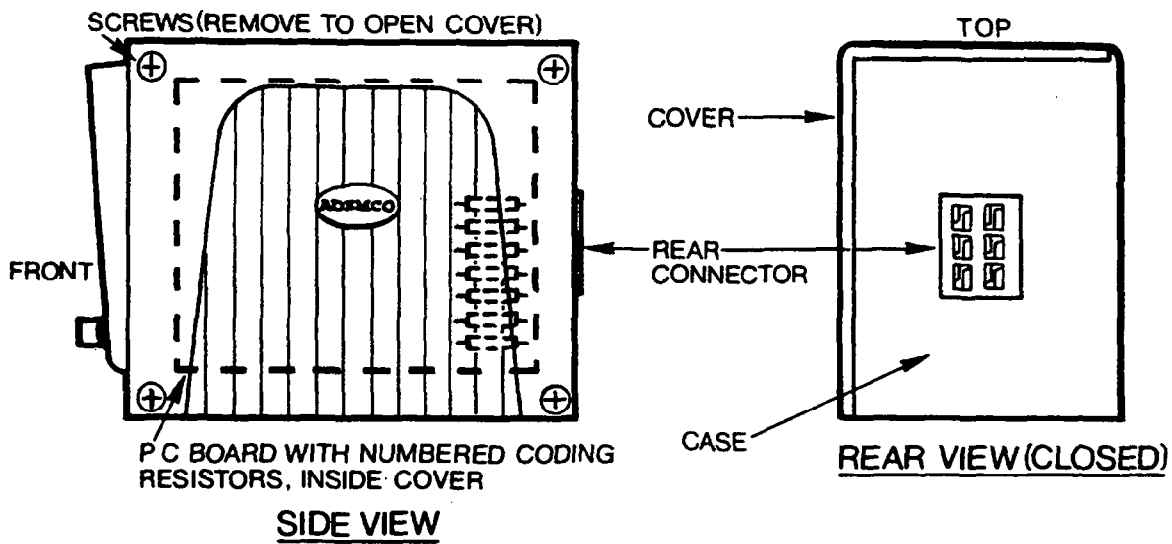


DIAGRAM 2: Coding Resistors for No. 446 A L S Modularm

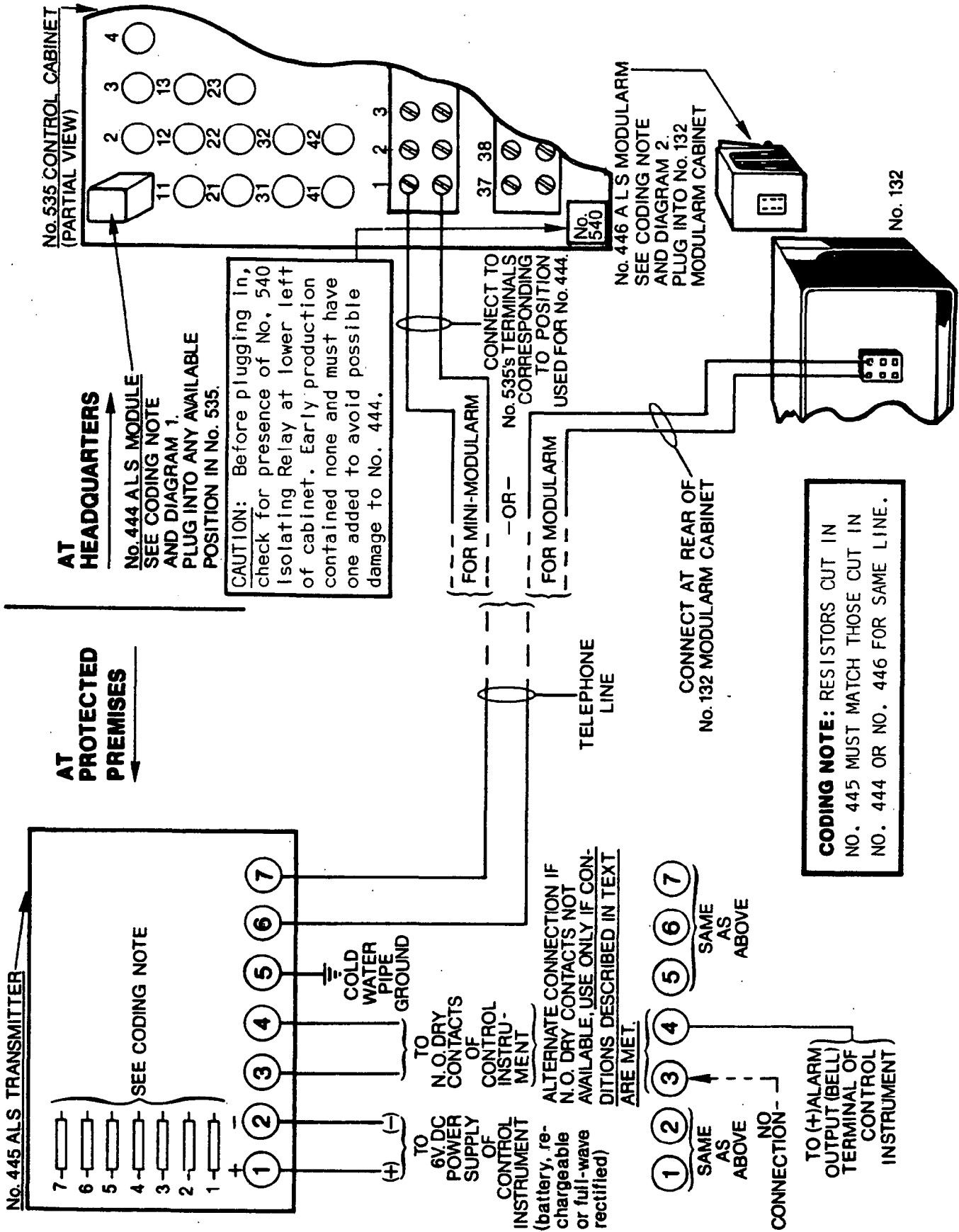


DIAGRAM 3: Field Connections

# TROUBLESHOOTING Nos. 444, 445 & 446

TROUBLE: 1. DIFFICULTIES IN THE TRANSMISSION OF SIGNALS ARE EXPERIENCED.

<u>PROBABLE CAUSE</u>	<u>REMEDY</u>
A. <u>The quality or condition of the phone lines used between the transmitter and central office is insufficient for use with the Line Security System.</u>	A. <u>To readily ascertain if the phone lines are of sufficient quality, follow the recommended checking procedures below:</u>

## 1. FOR CENTRAL STATION MODULARM INSTALLATIONS:

- a. Remove No. 445 Transmitter from protected premises, and take it to the central station facility.
- b. Remove phone lines from terminal block terminals 5 and 6 on the rear of the No. 132 cabinet corresponding to the position of the subscriber's Modularm unit.
- c. Attach a 2200 ohm (2.2K) resistor between terminal 6 of No. 445 and terminal 5 of the Modularm subscriber terminal block mentioned in STEP 2, above.
- d. Attach a second 2200 ohm resistor between terminal 7 of No. 445 and terminal 6 of the Modularm terminal block.

NOTE: Jumper wires with alligator clips are recommended for this procedure.

## 2. FOR CENTRAL STATION MINI-MODULARM INSTALLATIONS:

- a. Remove No. 445 transmitter from protected premises, and take it to the central station facility.
- b. Remove the phone lines from the position on the terminal block of the No. 535 Control Cabinet which corresponds to the subscriber's position.
- c. Attach a 2200 ohm (2.2K) resistor between one of the screw terminals just vacated and terminal 6 of the No. 445.
- d. Attach a second 2200 ohm resistor between the other empty screw terminal and terminal 7 of No. 445.

NOTE: Jumper wires with alligator clips are recommended for this procedure.

This procedure simulates ideal phone line conditions between the transmitter (No. 445) and the central station facilities.

## 3. SIMULATE NORMAL CONDITIONS BETWEEN TRANSMITTER AND RECEIVER.

- a. Connect a 6 volt battery to terminals 1 and 2 of transmitter. Observe polarity 1(+), 2(-).
- b. If transmitter/receiver module is working correctly, a normal indication will be apparent at the monitoring unit.

## 4. SIMULATE A "TROUBLE CONDITION":

Disconnect one of the 2200 ohm resistors mentioned earlier. Look for a trouble indication displayed by the monitoring unit. Reset Modularm or Mini-Modularm and restore resistor.

5. SIMULATE AN ALARM CONDITON:

Short terminals 3 and 4 together on the No. 445. Look for an alarm indication displayed by the monitoring unit. Reset Modularm or Mini-Modularm and remove jumper from terminals 3 and 4.

If all above tests check out normally, yet the system is experiencing problems when installed in the subscriber's premises, suspect the phone lines as not being of sufficient quality to faithfully render the transmission. In such instance, contact the telephone company and request type 3001 voice grade lines be used for the system.

TROUBLE: 2. THE CODED SIGNALS BETWEEN TRANSMITTER AND RECEIVER DO NOT MATCH.

PROBABLE CAUSE

Improper matching of cut resistors in transmitter and receiving module.

REMEDY

Inspect inside of transmitter and receiving module to see if cut resistor pattern matches between units. Correct if mismatched.