

**INSTALLATION INSTRUCTIONS
FOR THE
NARROW BAND AutoKey SYSTEM**

IMPORTANT NOTICE

The Narrow Band AutoKey system is very reliable and easy to use. However, damage could occur if it is installed incorrectly. In particular, it is critical that the Narrow Band AutoKey system is grounded properly. The system contains static sensitive components that can be damaged if it is subjected to static discharge without being properly grounded. Because incorrect installation invalidates the system warranty, we ask that you read these instructions very carefully before attempting installation.

TABLE OF CONTENTS

This document is divided into six (6) sections as follows:

SECTION I BASIC INSTALLATION HINTS AND RULES	1
SECTION II PULLING CABLES.....	2
SECTION III MOUNTING THE CABINET	2
SECTION IV MAKING BASIC CONNECTIONS	3
1. CONNECT SIGNAL LINES.....	3
2. CONNECT SYSTEM POWER.....	3
SECTION V INSTALLING ADDITIONAL FEATURES	4
1. CONNECTING AUXILIARY OPENING/REQUEST ACCESS DEVICES:.....	4
2. CONNECTING A PRINTER.....	4
SECTION VI TESTING AND ADJUSTING THE UNIT	6
1. VERIFYING THE DIP SWITCH POSITION	6
2. TESTING THE POWER LEVEL	6
3. TESTING THE RECEIVER.....	6
4. DATA VALIDATION AND NOISE DETECTION	6
5. TESTING THE GATE/DOOR OPERATION.....	6
APPENDIX A	7
NARROW BAND AutoKey CONTROLLER BOARD -211	7
NARROW BAND AutoKey CONTROLLER BOARD -221	8
FCC REQUIREMENTS.....	9
INSTALLATION.....	9
RADIO FREQUENCY INTERFERENCE	9
IC REQUIREMENTS.....	9

IMPORTANT:

Sentex Systems warranty on this system is conditioned upon Sentex Systems being paid in full for this equipment. This warranty will not be honored until such payment is received by Sentex Systems.

The

Copyright © 2000

All Rights Reserved

This document is protected by copyright, and may not be copied or adapted without the prior written consent of Sentex. This document contains information proprietary to Sentex and such information may not be distributed without the prior written consent of Sentex. The software and firmware included in the Sentex Narrow Band AutoKey system as they relate to this documentation are also protected by copyright and contain information proprietary to Sentex

Sentex Systems

Chatsworth, CA

Visit us at www.sentexsystems.com

SECTION I

BASIC INSTALLATION HINTS AND RULES

PLEASE READ THIS SECTION CAREFULLY BEFORE BEGINNING YOUR INSTALLATION

In the sections that follow, detailed procedures are discussed for each step in installing the Narrow Band AutoKey system. In addition to these specific procedures, there are a number of general hints and rules which will help ensure that your installation is done correctly and efficiently. These are discussed below:

1. **GROUND THE SYSTEM AND YOURSELF THOROUGHLY.** The Narrow Band AutoKey system contains a number of static sensitive components which can be damaged by static discharge during installation or during regular use. This type of damage is not covered under Sentex's warranty. A proper earth ground connected to the system's chassis at the grounding screw (see Appendix A) will greatly reduce the chances of damage or improper operation.

To be effective, the ground connection should be made by running 12 awg copper wire to a good ground point within 12 feet of the system. This ground point must be at an electrical panel, at a metallic cold-water pipe that runs into the earth, or at a grounding rod at least 10 feet in length that is driven into the earth. If you cannot meet these requirements, a ground will be of little value. Nonetheless, you should try to discharge any static before handling the circuit boards.
2. **PROVIDE POWER FROM A DEDICATED SOURCE.** If you are powering the system from an AC source, be sure that it is solely dedicated to the Narrow Band AutoKey system. Specifically, the outlet in which you will plug the transformer provided should be wired back to its own circuit breaker. This will prevent two problems:
 - A) Other equipment cannot introduce spikes, noise, surges, or dips into the power circuit that will affect the Narrow Band AutoKey system, and
 - B) The Narrow Band AutoKey's operation will not be affected if any other equipment develops a short circuit across the power line.
3. **DO NOT OVERLOAD THE TERMINAL BLOCKS.** The terminal blocks used in the Narrow Band AutoKey system make field wiring simple, but they do have their limits. The terminal blocks are unpluggable and the pins are soldered into the boards. To connect your wires, remove the "head" from the correct terminal and open the screws. Insert the wire into the correct opening in the front and tighten the screw until the wire is held snugly. A slight tug on the wire will tell you whether or not you have a secure connection. When you have made all connections for a given "head", plug it back into the pins designated for that terminal block.
4. **READ THE MARKINGS CAREFULLY.** The connection points are marked on the boards clearly. Before making any connection, make sure you read the markings and understand what that connection point is made for.

SECTION II PULLING CABLES

The following cabling must be run to the Narrow Band AutoKey Controller board:

1. **System Power:** A 2-conductor cable from the location of the 120 VAC outlet into which you will plug the 12 VAC, 50 VA transformer supplied by Sentex (or a 12 VDC power supply that you provide). See Table 1 for wire size and distances:

Table 1. Power Wire Distance.

DC POWER WIRE SIZE	DISTANCE	AC POWER WIRE SIZE
18 AWG	30' and under	18 AWG
18 AWG	30'-75'	16 AWG
18 AWG	75'-150'	14 AWG
18 AWG	150'-250'	12 AWG
18 AWG	250'-500'	10 AWG

2. **Door/Gate Control:** A 2-conductor 16 to 22 awg cable (Belden #9501 or equivalent) from the door strike, magnetic lock, or gate operator for each of the three control relays.
3. **Wiring for additional features:** as required. See Section V for information on connecting additional features to the Narrow Band AutoKey controller board.

SECTION III MOUNTING THE CABINET

1. **Plan the Installation.** Determine which of the openings into the box (back or bottom) will be used to run wires into the cabinet. If the wires can be pulled through the wall or pedestal on which the unit is to be mounted, you should use the back opening of the box since it provides better protection against tampering and vandalism. If this cannot be accomplished, run the wire through the 3/4 inch conduit into the bottom opening of the cabinet. Be sure to connect the conduit to the unit securely.
2. **Remove the Controller Board.** Remove the controller circuit board from the unit by removing the screw in the lower left-hand corner and releasing the board from the plastic stand-offs that hold the other three corners. See Section I for information on static discharge before handling the board.
3. **Remove the Knock-Out Plug.** Carefully remove the knockout plug from the back or bottom (depending on which knockout you are using) of the enclosure.
4. **Mount the Unit.** Mount the unit on the wall or pedestal securely. Mounting hardware is provided if you are using Sentex's pedestal mount. Tighten down all four screws/bolts.
5. **Pull the Wires.** Pull all your wires into the cabinet (if you are using the bottom opening, attach your conduit securely first) and remount the circuit board(s).
6. **Ground the system.** A proper earth ground connected to the system's chassis (at the grounding screw shown in Appendix A) will greatly reduce the chances of damage or improper operation. To be effective, the ground connection should be made by running 12 awg copper wire to a good ground point within 12 feet of the system. This ground point must be at an electrical panel, at a metallic cold-water pipe that runs into the earth, or at a grounding rod at least 10 feet in length that is driven into the earth. If you cannot meet these requirements, a ground will be of little value.

SECTION IV MAKING BASIC CONNECTIONS

There are two steps for installing the basic Narrow Band AutoKey system. These steps are as follows:

1. CONNECT SIGNAL LINES.

Connect the wires from your door strikes and door strike power supply (or other device) to TB1 for relay/gate 1, to TB2 for relay/gate 2, and to TB3 for relay/gate 3 on the controller board (refer to Appendix A). The type of device to be controlled determines the terminals you use, as shown below:

- A. For dry contact closure (most gate operators):** Connect one conductor to the “N.O.” terminal and the other to the “COMMON” terminal.
- B. For magnetic locks or normally unlocked strikes:** Connect one conductor from your power supply to the “N.C.” terminal and one conductor from the door strike to the “COMMON” terminal of the same terminal block. Connect the remaining conductors from each source off the board with wire nuts.

NOTE: It is strongly recommended that a IN4001 diode be installed on the magnetic lock coil to prevent voltage spikes from magnetic locks or DC powered strikes from being induced into the system. Install the diode so its cathode (the banded end) is connected to the positive end of the coil, and the anode is connected to the negative end of the coil.

- C. For normally locked strikes:** Connect one conductor from your strike power supply to the “N.O.” terminal and one conductor from the door strike to the “COMMON” terminal of the same terminal block. Connect the remaining conductors from each source by tying them together off the board with wire nuts.

2. CONNECT SYSTEM POWER

The Narrow Band AutoKey system will run on either AC or DC power.

- A. If you are using AC power:** Connect the 2-conductor cable to TB5 on the controller board and to the transformer provided with the system. Then plug the transformer into a 120 VAC outlet.

CAUTION

- Placing the system too far from the transformer or power supply may result in inadequate voltage due to line loss (See Table 1 for maximum distances).
- Refer to Section I for requirements on the use of a dedicated AC power circuit.

- B. If you are using DC power:** Connect the 2-conductor cable to TB5 on the controller board and to your power supply. Then plug the power supply into a 120 VAC outlet. Refer to Table 1 for wire sizes and maximum distances.

NOTES:

- The Narrow Band AutoKey will not trickle charge a battery, so DC power must be supplied by an uninterruptible power supply.
- The Narrow Band AutoKey board does not provide a fuse on the DC input. If DC power is used, a fuse between the DC power supply and the system may be installed to protect the system.

SECTION V INSTALLING ADDITIONAL FEATURES

The Narrow Band AutoKey system comes with a variety of standard features which may be hooked up at the time of installation. The installation procedures for these additional features are described below.

IMPORTANT NOTE

Proper system operation depends on using the specified cable types and grounding procedures. If these specifications are not followed, outside sources of electrical interference (nearby power cables or radio broadcast towers) may cause erratic operation or processor resetting/lock-up.

WARNING
Before installing any features, disconnect power from the unit.

1. CONNECTING AUXILIARY OPENING/REQUEST ACCESS DEVICES:

Any device (such as a Knox box or exit button) that provides contact closure can be hooked up to TB4 as shown in the following table:

Table 2. TB4 Connections For Auxiliary Devices.

TB4 CONNECTION	AUXILIARY DEVICE
EXIT1 and COM	RELAY 1
EXIT2 and COM	RELAY 2
EXIT3 and COM	RELAY 3

Use shielded cable and connect the shield to the chassis ground at the ground screw shown in Appendix A. When a contact closure occurs, the system will activate the appropriate relay for the period of time that has been programmed into the system.

2. CONNECTING A PRINTER

The Narrow Band AutoKey system comes with standard RS232/RS422 printer serial interface. Refer to the appropriate section below to connect your printer :

A. Connecting An RS232 Serial Printer: If you are connecting an Okidata 184 Turbo serial printer purchased from Sentex, the printer can be located up to 50 feet from the Narrow Band AutoKey system. For this installation you will need a 3-conductor, 18 to 24 awg shielded cable (such as Belden Datalene #9925) and a DB25 connector (provided with printers purchased from Sentex).

1. Connect the wires that you pulled to the DB25 connector. Using wire nuts, splice each of the wires in your 3-conductor cable to the corresponding wire on the connector.
2. Connect the open end of the cable to terminal TB7 on the Narrow Band AutoKey system as shown in the table below:

Table 3. Connecting to an RS232 Printer.

PRINTER DB25 CONNECTOR PIN NUMBER	CONTROLLER BOARD TB7 TERMINAL
3 ("RECEIVE DATA")	TRANSMIT DATA ("XMIT")
7 ("SIGNAL GROUND")	GROUND ("GND")
2 ("TRANSMIT DATA")	RECEIVE DATA ("RCV")

Installation Notes

- The cable shield should be grounded to the controller board ground screw and this cable should not be part of a larger cable containing wires used for other purposes.
- Ensure your printer is running at the same baud rate as your system. Refer to “USING THE MORE ADVANCED FEATURES OF THE NARROW BAND AutoKey SYSTEM” (Doc. No. 6001220) on how to program the system’s baud rate.
- Ensure that your printer is set for word protocol of:
8 data bits, no parity bits, and 1 stop bit (8-N-1)
Consult your printer manual to set this protocol properly.

B. Connecting A RS422 Serial Printer: If you are connecting an Okidata 184 Turbo serial printer purchased from Sentex, the printer can be located up to 50 feet from the Narrow BandAutoKey system. For this installation, you will need a 3-conductor, 18 to 24 awg shielded cable (such as Belden Datalene #9925) and a DB25 connector (provided with printers purchased from Sentex).

1. Remove the flat, 5-hole connector from the end of the “starter” cable provided by Sentex with the printer (not needed for the Narrow Band AutoKey system).
2. Using wire nuts, splice each of the wires in your 3-conductor cable to the corresponding wire on the connector. Connect the open end of the cable to terminal TB6 on the Narrow Band AutoKey system as shown in the table below:

Table 4. Connecting to an RS422 Printer.

PRINTER DB25 CONNECTOR PIN NUMBER	CONTROLLER BOARD TB6 TERMINAL
5	/OUT
6	OUT
7 (“GROUND”)	GND

INSTALLATION NOTES

- The cable shield should be grounded to the controller board ground screw and this cable should not be part of a larger cable containing wires used for other purposes.
- Ensure your printer is running at the same baud rate as your system. Refer to “USING THE MORE ADVANCED FEATURES OF THE NARROW BAND AutoKey SYSTEM” (Doc. No. 6001220) on how to program the system’s baud rate.
- Ensure that your printer is set for word protocol of:
8 data bits, no parity bits, and 1 stop bit (8-N-1)
Consult your printer manual to set this protocol properly.

SECTION VI TESTING AND ADJUSTING THE UNIT

1. VERIFYING THE DIP SWITCH POSITION

For the system to operate properly, the dip switches on S1 of the Controller board must be in the correct position (refer to the Appendix A for location).

- For normal operation and programming, switches S1-1 and S1-2 must be in the OFF position.
- To display a transmitter number on the seven-segment display, switch S1-1 must be in the ON position and switch S1-2 in the OFF position.

2. TESTING THE POWER LEVEL

If incoming power is not within specifications, your system may have problems. To test incoming power:

1. Connect the negative lead of a meter to TP2 (GND) and the positive lead to TP3 (PNRV).
2. Set your voltmeter to read DC voltage on a 0-20V range and then apply power to the unit.
3. The power reading should be between 11.5 and 16.5 VDC. If the reading is above or below this range, make the proper adjustments so the power level is within this range.

3. TESTING THE RECEIVER

To test the receiver's operation, set the system to display incoming transmitter numbers, then press the button on a transmitter. To test the receiver, follow the steps below:

1. On the Controller board, set dip switch S1-1 to the ON position.
2. If you are testing with a two-button transmitter, aim the transmitter at the receiver and press the left transmitter button. If the receiver is operating properly, the system will display the transmitter's seven-digit number on the seven-segment display.
3. If you are testing with a single button transmitter, aim the transmitter at the receiver and press the transmitter button. If the receiver is operating properly, the system will display the transmitter's seven-digit number on the seven-segment display.
4. In both cases, the yellow DATA LED and the red NOISE LED will light when a button is pressed.
5. When you have finished testing the receiver, set dip switch S1-1 to the OFF position.

4. DATA VALIDATION AND NOISE DETECTION

The Data Validation and Noise Detection LEDs are located on the controller board to the left of the keypad. The yellow LED is labelled DATA, and the red LED is labelled NOISE.

- When a transmitter button is pressed the yellow DATA LED should light, and the red NOISE LED may also light. This is normal.
- If a transmitter button is pressed and the red NOISE LED lights but the yellow DATA LED does not, there is too much interference for the transmitter to be detected by the receiver.

5. TESTING THE GATE/DOOR OPERATION

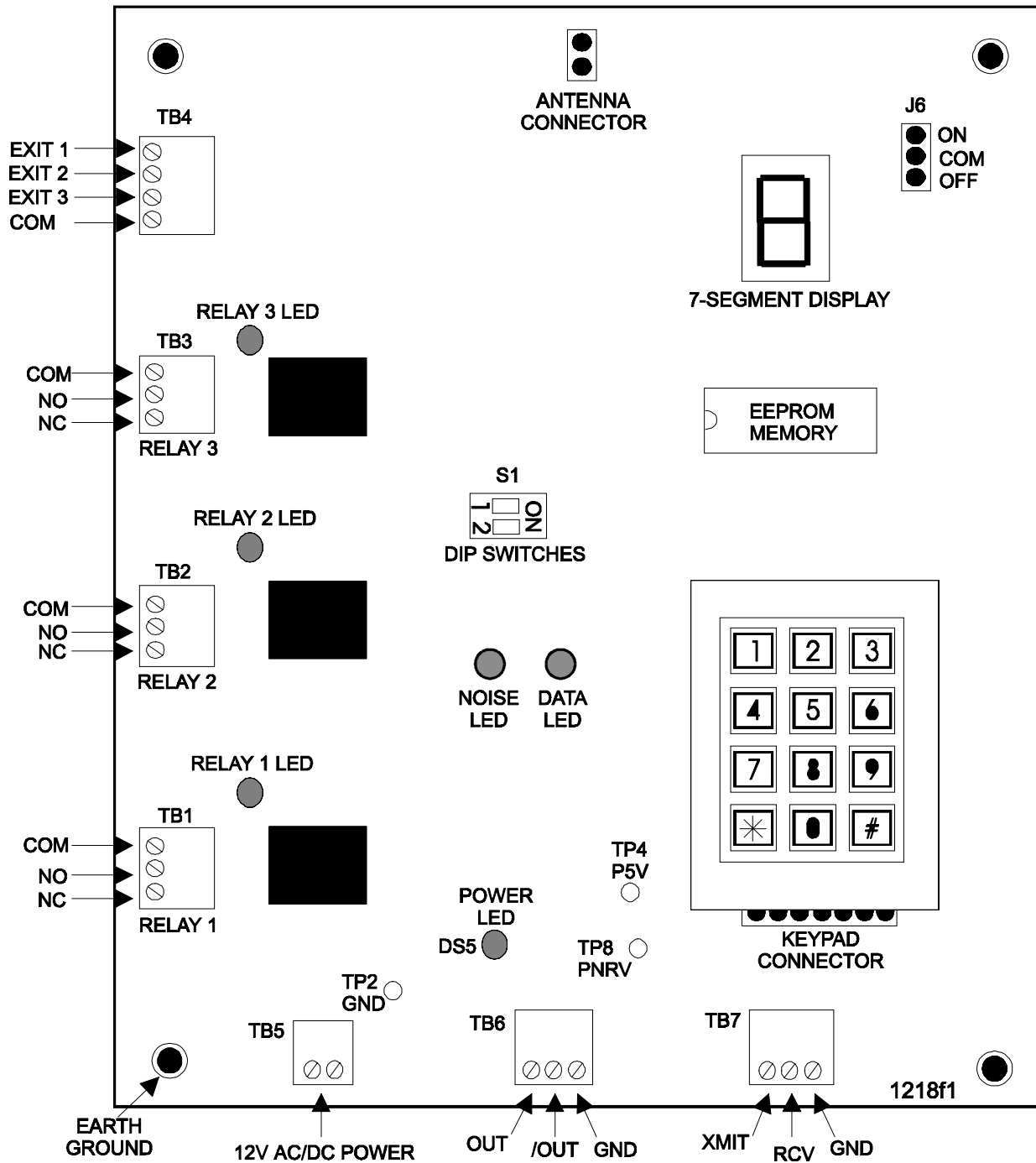
Test the gate/door operation of the system by using the auxiliary open inputs as follows:

1. Test relay 1 by shorting between "EXIT1" and "COM" of terminal TB4, or if an exit request device is attached, activate the exit request device. The gate/door attached to relay 1 should open.
2. Test relay 2 by shorting between "EXIT2" and "COM" of terminal TB4, or if an exit request device is attached, activate the exit request device. The gate/door attached to relay 2 should open.
3. Test relay 3 by shorting between "EXIT3" and "COM" of terminal TB4, or if an exit request device is attached, activate the exit request device. The gate/door attached to relay 3 should open.

APPENDIX A

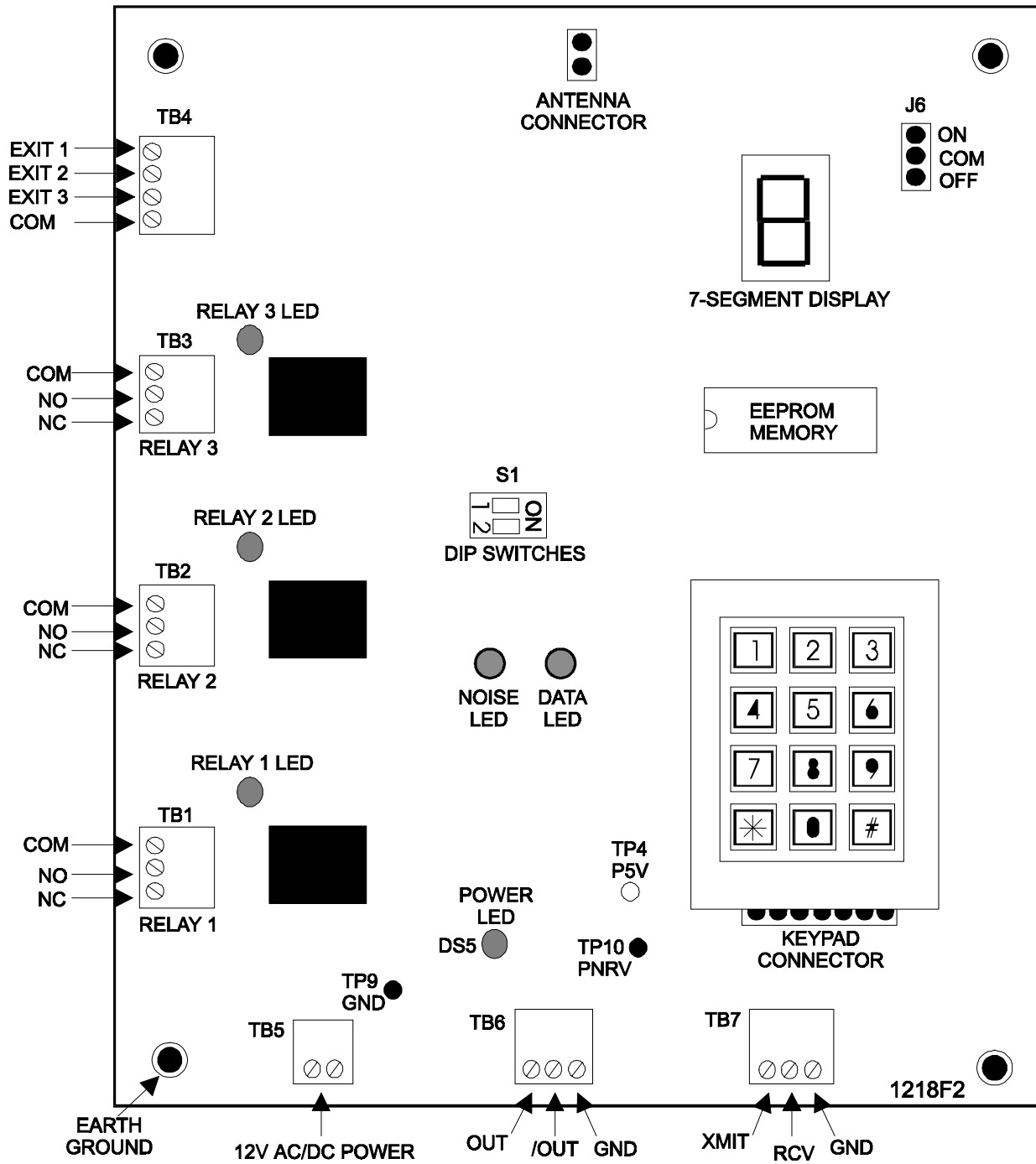
NARROW BAND AutoKey CONTROLLER BOARD -211

A Guide to Connections, Adjustments and Indicators.



NARROW BAND AutoKey CONTROLLER BOARD -221

A Guide to Connections, Adjustments and Indicators.



FCC REQUIREMENTS

INSTALLATION

This device complies with part 15, subpart J of the FCC rules, and is subject to the two following conditions:

- (1) This device may not cause interference, and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

On the front inside of the cabinet is a label with the FCC registration number for the unit, **DS8AKRCV**.

RADIO FREQUENCY INTERFERENCE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from the receiver.

If required, consult your dealer or an experienced radio/television technician for additional suggestions. The FCC booklet: "How to Identify and Resolve Radio-Television Interference Problems" is available from the United States Government Printing Office, Washington D.C., 20402, Stock No. 004-000-00345-4.

IC REQUIREMENTS

All equipment certified under this Standard shall be labeled in accordance with RSP-100, and with the statement: "Complies with ISC:RSS-210; en conformité avec ISC:CNR-210". When size does not permit this, the statement may be abbreviated to "ISC:RSS/CNR210".

This device complies with RSS-210 of Industry and Science Canada. Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device."