

SAT-9

Phone line to transmitter
Communicator

TD-900

Standalone SAT-9 Solution



Installation and Programming Guide

PIMA
Pima Electronic Systems Ltd.



Table of Contents

1.	Introduction	3
1.1.	The SAT-9.....	3
1.2.	The TD-900.....	3
1.3.	The SAT-9 main features.....	4
1.4.	Benefits	4
1.5.	Technical specifications.....	5
2.	Instalation.....	5
2.1.	Safety & Mounting guidelines	5
3.	Programming.....	7
3.1.	Connecting the SAT-9	7
3.2.	Connecting the transmitter	8
3.3.	The SAT-9 parameters in the COMAX.....	8
3.3.1.	Accounts & formats table	9
3.3.2.	PSTN & PGM parameters.....	9
3.3.3.	Transmission properties	10
3.3.4.	ACKs	10
3.4.	Report codes tabs.....	10
3.4.1.	The SAT-9 as the primary communicator	11
3.5.	The transmitter parameters in the COMAX	11
4.	Maintenance.....	12

1. INTRODUCTION

Dear Installer/Technician

This guide will introduce you with the SAT-9 communicator - its installation and programming. Please read it in its entirety before installing and programming the SAT-9 and the TD-900. If you have any question, contact your local PIMA distributor, or PIMA support team directly. See contact details at the end of this guide.

1.1. The SAT-9

The SAT-9 is a phone line to radio adapter and communicator. It is made of the SAT-9 card and the TRV-100 or TRU-100 Long-range transmitter.

The SAT-9 can be connected to any control panel and it enables the panel to transmit reports to a Central Monitoring Station (CMS) via the Radio. Both transmitters support two frequencies and a variety of protocols.

The SAT-9 has a built-in encoder and it performs periodic auto-tests and telephone line checks.

The parameters of the SAT-9 and the transmitter' frequencies as well as different transmission parameters are programmed by the COMAX Upload/Download PC/ laptop application.

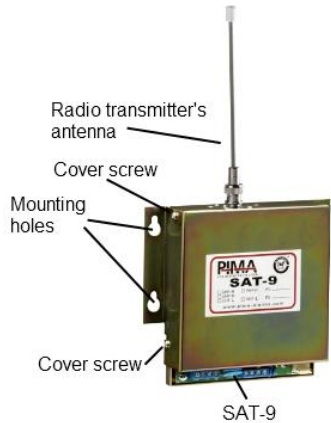


Figure 1. The SAT-9

1.2. The TD-900

For better performance, it is advised to install the SAT-9 within a closed metal box. PIMA offers such a solution - the TD-900 (see the next figure); The TD-900 is a complete standalone solution for the SAT-9.

The TD-900 includes the SAT-9 assembled in a closed metal box with the PS-2 Power Supply and a place for a backup battery (not included), and a optional tamper switch protection.

The TD-900 can be used with either a UHF or VHF transmitter. Note that the UHF and VHF transmitter use different antenna connectors

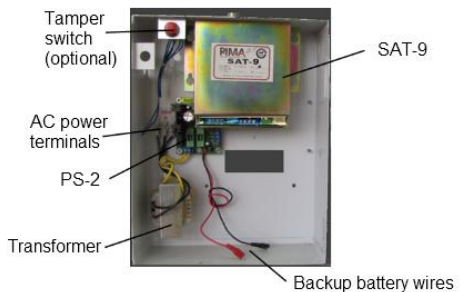


Figure 2. The TD-900

1.3. The SAT-9 main features

- Two operating modes:
 - As main communicator: All events are transmitted via RF;
 - As PSTN backup: Events are transmitted in case of a PSTN problem;
- Supports variety of protocols:
 - Input Protocols (from dialer): Contact ID, Pulse, and DTMF;
 - Output Protocols (RF to CMS): PID, PAF™ / NPAF™, Intrac 2000 and Milcol-D;
- Accounts from panel or internal programmed accounts:
If an account number is not programmed, the SAT-9 uses the account number received from the control panel;
- Supports two frequencies: Each frequency can use a different format
- Control:
 - PGM input: Selects if SAT-9 functions as backup or main communication channel;
 - PSTN monitoring: Performs line check and line interception (with pre-programmed phone number);
- Transmission LED: Turned ON when SAT-9 is transmitting data;
- Auto Test Mode: Periodic transmission test as programmed;
- Manual Test Mode: Manual transmission test with a TEST button;

1.4. Benefits

- Easy installation and maintenance: the SAT-9 is fully programmable in the field by a laptop with the COMAX application and a DPU adapter. Parameters that can be programmed:
 - Which transmitter frequency for which PSTN format;
 - Radio format;
 - Account number;
 - No. of Frames per transmission;
 - Transmission intervals;
 - Auto test intervals;
 - Three ACK protocols and frequencies;
 - Report codes for all telephone events;
- Frequency load balance: the two frequencies of the installed VHF/UHF transmitter can be fully utilized by the SAT-9.
- Watchdog;
- Surge and ESD protection.

1.5. Technical specifications

Environment	Temperature: °C (-10) - (+50) Humidity: 75%, non-condensed
Operating voltage	9 -14 VDC (12 nominal)
Current consumption	Idle: 15mA Transmitting: 1.5A
PGM input	Voltage (Open): 12V Current (Closed): 1mA Signal Sensitivity: 500mSec
Telephone set output	Voltage (Open): 12V Resistance: 600 Ohm
Frequency range	VHF Low: 136 - 156MHz VHF High: 154 - 174MHz UHF Low: 400 - 435MHz UHF Mid: 435 - 470MHz UHF High: 470 - 500MHz
Bandwidth	12.5KHz
Output power	VHF: Up to 5W±1dB at 50Ω load UHF: Up to 2.5W±1dB at 50Ω load
Frequency stability	2 PPM max
Carrier modulation	FM
Enclosure dimensions	SAT-9: cm 11W x 11H x 6D; Weight : 460 gr.
	Transmitter unit: cm 14W x 14.5H x 6D; Weight: 129 gr.
	Metal Box (TD-900): cm 23W x 30H x 10D; Weight: 2.64 Kg

2. INSTALATION

2.1. Safety & Mounting guidelines

- Disconnect power before installation;
- Do not mount the SAT-9/TD-900 close to a metal wall or ceiling;
- Make sure to leave enough space for the antenna;
- Install the antenna at a distance from the Control Panel's wiring;
- Connect the antenna only after installing the SAT-9/TD-900;
- Make sure the antenna is not folded and is vertical;

Follow the next steps to install the SAT-9:

1. Mount the SAT-9 on a designated surface (not further than 10 meters from the Alarm System) using the four supplied screws (see Figure 3);
2. Connect the antenna to the antenna connector¹;
3. Connect the SAT-9 to GND;
4. Connect the SAT-9 to a battery, 4A minimum.
5. Connect the control panel's TELEPHONE LINE output to the SAT-9 SET input.

¹ If the RF cover is low or the antenna needs to be installed away from the SAT-9,, an antenna reflector is available for purchasing from PIMA.

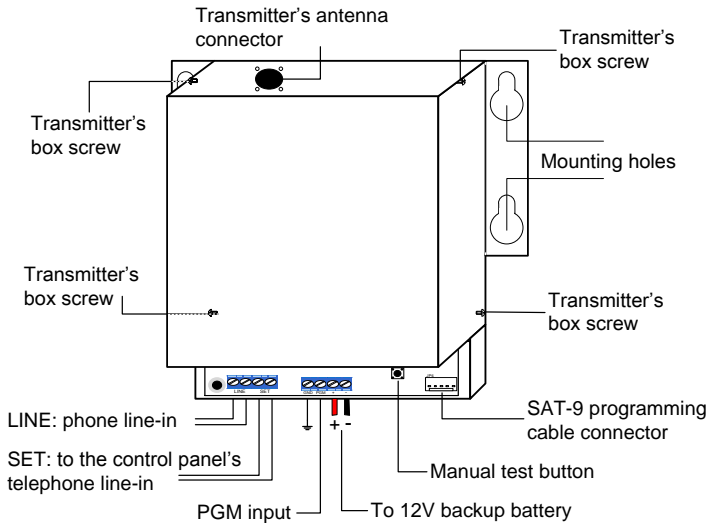


Figure 3. The SAT-9 diagram

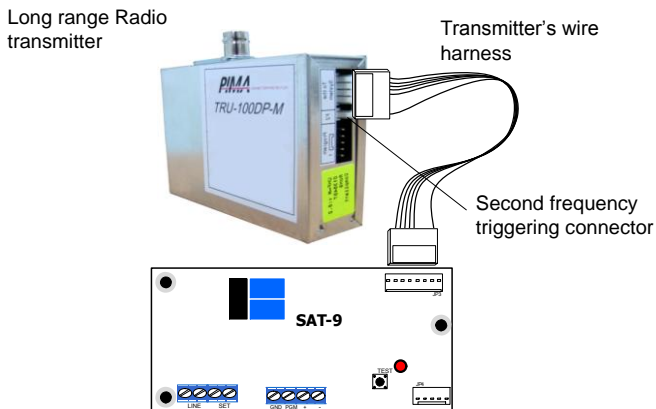


Figure 4. The SAT-9 and transmitter wiring diagram

6. If the SAT-9 is to be used as a backup the PSTN line, connect the line wires to the LINE terminals.
7. If the SAT-9 is to be used as the primary communicator (i.e., the control panel has no access to a telephone line), shortcut the PGM input to the GND terminal.
8. If the SAT-9 will be triggered by the control panel, connect the PGM input to a control panel's output and connect the alarm system's (-) to SAT-9's (-)

3. PROGRAMMING

Both the SAT-9 and the TRU/TRV-100 Long range transmitters are programmed by PIMA's COMAX PC/laptop application. The application must be obtained from PIMA.

To connect the PC to the SAT-9 and the TRV/TRU-100 transmitter you will need the DPU adapter (P/N 8420005); the adapter kit includes the necessary cables to connect both products to the PC/laptop.



Before connecting the SAT-9 and the transmitter to the PC, make sure the SAT-9's wiring harness to the control panel is NOT connected.

3.1. Connecting the SAT-9

1. Connect the DPU's MOLEX/MOLEX harness between the DPU and the SAT-9's programming connector. See the next figure.
2. Connect the DPU's USB/MOLEX cable to a USB port on the PC/laptop.

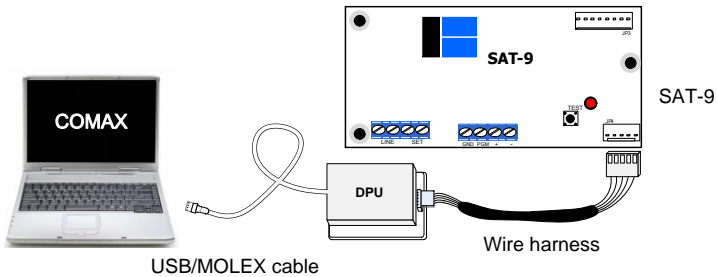


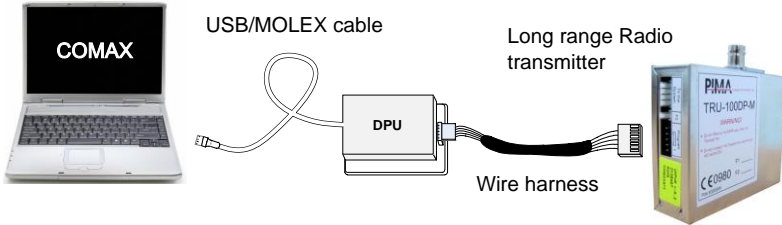
Figure 5. Connecting SAT-9 to COMAX

3. Run the COMAX application.
4. Select "SAT-9" from the Account/New drop down list².
5. Set the SAT-9 parameters. See section 10 on page 8.
6. Download the parameters to the SAT-9.
7. Remove the Programming cable from the SAT-9.
8. Connect the SAT-9 to the control panel.
9. Connect the transmitter's antenna.
10. Test the communication between the SAT-9 and the monitoring station: perform a manual transmission test by pressing the test button on the SAT-9 PCB. See Figure 2 on page 3.

² Please refer to the COMAX Manual for more information on programming.

3.2. Connecting the transmitter

1. Remove the four fastening screws of the transmitter’s cover and take it off. See Figure 3 on page 6.
2. Connect the DPU’s MOLEX/MOLEX harness between the DPU and the transmitter’s ‘Program’ connector. Note the sticker on the transmitter for the direction of the Molex plug. See the next figure.
3. Connect the DPU’s USB/MOLEX cable to a USB port on the PC/laptop.



4. Run the COMAX application.
5. Select “TRANSMITTER” from the Account/New drop down list³
6. Set the designated frequencies. See section 3.5 on page 11.
7. Download the frequencies to the transmitter.
8. Remove the Programming cable from the transmitter.
9. Connect the SAT-9 to the control panel.
10. Connect the transmitter’s antenna.
11. Test the communication between the SAT-9 and the monitoring station: perform a manual transmission test by pressing the test button on the SAT-9 PCB. See Figure 2 on page 3. If verify fails, check that the Molex connector is connected as drawn on the transmitter label.

3.3. The SAT-9 parameters in the COMAX

General	Report Codes(1-112)	Report Codes(113-224)	Report Codes(225-336)	Report Codes(337-448)	Report Codes(449-500)
	First Frequency	Second Frequency	Check Line	<input checked="" type="checkbox"/>	
Account No	0	0	Check PGM	<input type="checkbox"/>	
Radio Format	0	0	PGM Input	N.O.	
			Dial Number		
Frames per Transmission	10		Ack - 1	Ack - 2	Ack - 3
Transmit No	5		Ack Frequency	LoHi	Inactive
Transmit Int(sec)	10		Format	CID	4x2 CS
Auto Test(min)	0		Signal	DTMF	PULSE
			Radio Frequency	First	Second

The SAT-9 parameters are displayed under the ‘General’ tab; they’re divided into 4 tables: Accounts & formats, PSTN & PGM parameters, transmission properties and ACKS. All parameters are described in the next sections.

³ Please refer to the COMAX guide for more information on programming.

3.3.1. Accounts & formats table

	First Frequency	Second Frequency
Account No	0	0
Radio Format	0	0

In this table the Account numbers and transmitter formats of the two (optional) transmitter frequencies must be entered:

- **Account No.:** the account ID to be used with each one of the two frequencies. Note that if no account ID is programmed, the SAT-9 only passes the alarm system's account ID, however, in such a case it is not possible to perform manual tests.
- **transmitter Format:** the radio formats for each of the frequencies; the formats must be entered in PIMA transmitter format pattern (which can be obtained from the Monitoring Station)



At least one frequency MUST be programmed both for SAT-9 and the transmitter.

3.3.2. PSTN & PGM parameters

Check Line	<input checked="" type="checkbox"/>
Check PGM	<input type="checkbox"/>
PGM Input	N.O
Dial Number	

In this table you program the control panel's parameters when SAT-9 transmits events via RF:

- **Check Line:** the SAT-9 will intercept the PSTN line if it detects a PSTN failure and generate a dial tone (for the alarm system).
- **Check PGM:** the SAT-9 will intercept the PSTN line when the PGM input is triggered. The line is released ONLY after the PGM input returns to normal
- **PGM Input:** set the PGM input contact, Normally Open or Normally Close.
- **Dialed Number:** the SAT-9 will intercept the PSTN line when this number is dialed by the alarm system.

3.3.2.1. Examples

<table border="1"> <tbody> <tr> <td>Check Line</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Check PGM</td> <td><input type="checkbox"/></td> </tr> <tr> <td>PGM Input</td> <td>N.O</td> </tr> <tr> <td>Dial Number</td> <td></td> </tr> </tbody> </table>	Check Line	<input checked="" type="checkbox"/>	Check PGM	<input type="checkbox"/>	PGM Input	N.O	Dial Number		Check Line: the SAT-9 will either serve as a backup channel to the PSTN line, or as a main channel where PSTN line is unavailable.
Check Line	<input checked="" type="checkbox"/>								
Check PGM	<input type="checkbox"/>								
PGM Input	N.O								
Dial Number									
<table border="1"> <tbody> <tr> <td>Check Line</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Check PGM</td> <td><input type="checkbox"/></td> </tr> <tr> <td>PGM Input</td> <td>N.O</td> </tr> <tr> <td>Dial Number</td> <td>8888</td> </tr> </tbody> </table>	Check Line	<input type="checkbox"/>	Check PGM	<input type="checkbox"/>	PGM Input	N.O	Dial Number	8888	Dial Number: the SAT-9 will intercept and transmit events when "8888" is dialed by the control panel.
Check Line	<input type="checkbox"/>								
Check PGM	<input type="checkbox"/>								
PGM Input	N.O								
Dial Number	8888								
<table border="1"> <tbody> <tr> <td>Check Line</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Check PGM</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>PGM Input</td> <td>N.C</td> </tr> <tr> <td>Dial Number</td> <td></td> </tr> </tbody> </table>	Check Line	<input type="checkbox"/>	Check PGM	<input checked="" type="checkbox"/>	PGM Input	N.C	Dial Number		Check PGM: the SAT-9 will intercept and transmit events when the PGM input is triggered (by the control panel).
Check Line	<input type="checkbox"/>								
Check PGM	<input checked="" type="checkbox"/>								
PGM Input	N.C								
Dial Number									

3.3.3. Transmission properties

Frames per Transmission	10
Transmit No	5
Transmit Int(sec)	10
Auto Test(min)	0

- **Frames per Transmission:** the number of frames per each transmission.
- **Transmit No.:** the number of re-transmissions per single event.
- **Transmit Int. (sec):** the interval (in seconds) between transmissions.
- **Auto Test (min):** the interval (in minutes) between auto test transmissions; if set to zero, no auto test transmissions will be executed.

3.3.4. ACKS

	Ack - 1	Ack - 2	Ack - 3
Ack Frequency	LoHi	Inactive	
Format	CID	4x2 CS	4x2 DR
Signal	DTMF	PULSE	PULSE
Radio Frequency	First	Second	Second

The SAT-9 supports up to three different ACKs, which enable it to support up to three different formats. The first ACK must match the format.

Each cell in the ACK table is has a hidden clickable drop-down list

- **ACK Frequency:** click and select the frequency for each ACK from drop-down list. The options are: Inactive, LoHi, 1400/2300.
- **Format:** click and select the format from list for each ACK from drop-down list. The options are: 3X1/3X2/4X1/4X2 DR/CS, CID and Ademco Express.
- **Signal:** click and select the signal type for each ACK from drop-down list. The options are: DTMF and PULSE.
- **Transmitter Frequency:** click and select which frequency will be used with the assigned format. The options are: First and Second.

3.4. Report codes tabs

Alarm	Event Codes(1-10)	Report Codes(10-100)	Report Codes(100-200)	Report Codes(200-400)	Report Codes(400-600)
Test/ALM. Format1	00	00	00	00	00
Alarm Zone 1	01	01	01	01	01
Alarm Zone 2	02	02	02	02	02
Alarm Zone 3	03	03	03	03	03
Alarm Zone 4	04	04	04	04	04
Alarm Zone 5	05	05	05	05	05
Alarm Zone 6	06	06	06	06	06
Alarm Zone 7	07	07	07	07	07
Alarm Zone 8	08	08	08	08	08
Alarm Zone 9	09	09	09	09	09
Alarm Zone 10	10	10	10	10	10
Alarm Zone 11	11	11	11	11	11
Alarm Zone 12	12	12	12	12	12
Alarm Zone 13	13	13	13	13	13
Alarm Zone 14	14	14	14	14	14
Alarm Zone 15	15	15	15	15	15
Alarm Zone 16	16	16	16	16	16
Alarm Zone 17	17	17	17	17	17
Alarm Zone 18	18	18	18	18	18
Alarm Zone 19	19	19	19	19	19
Alarm Zone 20	20	20	20	20	20
Alarm Zone 21	21	21	21	21	21
Alarm Zone 22	22	22	22	22	22
Alarm Zone 23	23	23	23	23	23
Alarm Zone 24	24	24	24	24	24

This table, which spreads over four tabs, contains the conversion codes between the PSTN and radio formats (i.e. which telephone event code is associated with which radio event code).

The table has four columns: The first two to the left [“CID Event” and “4(3)x2(1) Events”] are the PSTN event codes (Contact-ID and 4x2) and the last two are the corresponding radio event codes (first and second frequencies).

The Contact-ID format supports 444 events and the 4x2 format supports 256 (FF) events. By default, the RF1 includes the PAF™ event codes and RF2 includes the NPAF™ codes. To use a different radio format, these values need to be re-programmed.

For example:

‘Alarm Zone 1’ in ContactID® will be converted to ‘JD’ in PAF and to ‘AA’ in NPAF.

‘1F’ in 4x2 will be converted to ‘KS’ in PAF and to ‘BE’ in NPAF.

3.4.1. The SAT-9 as the primary communicator

When the SAT-9 is to be used as primary communicator (i.e., the control panel has no access to a telephone line):

1. Short the PGM input to the GND;
2. In the COMAX do the following (see next section for programming with COMAX):
 - a. Check the ‘Check Line’ parameter OR program the alarm system not to check for dial tone;
 - b. Check the ‘Check PGM’ parameter;
 - c. Set the ‘PGM Input’ to N.O.;

3.5. The transmitter parameters in the COMAX

The two parameters of the transmitter in the COMAX are the two frequencies: the First and the optional Second one.

General	
First Frequency	000.0000
Second Frequency	000.0000

4. MAINTENANCE

Follow these steps in order to remove the SAT-9 from TD-900 for maintenance operations and transmitter programming:

1. Open the TD-900 box and locate the SAT-9 (see Figure 4 on page 6)
2. Disconnect the power cords from the SAT-9
3. Remove the SAT-9 antenna
4. Remove the two screws (B1 & B2) holding the SAT-9 in the box and gently remove the SAT-9 (see Figure 4 on page 6)

To reassemble the TD-900, simply follow the above steps in reverse order.

Limited Warranty

PIMA Electronic Systems Ltd. does not represent that its product may not be compromised and/or circumvented, or that the Product will prevent any death, personal and/or bodily injury and/or damage to property resulting from burglary, robbery, fire or otherwise, or that the Product will in all cases provide adequate warning or protection. The User understands that a properly installed and maintained equipment may only reduce the risk of events such as burglary, robbery, and fire without warning, but it is not insurance or a guarantee that such will not occur or that there will be no death, personal damage and/or damage to property as a result.

PIMA Electronic Systems Ltd. shall have no liability for any death, personal and/or bodily injury and/or damage to property or other loss whether direct, indirect, incidental, consequential or otherwise, based on a claim that the Product failed to function.

Please refer to a separate warranty statement found on PIMA website at:

<http://www.pima-alarms.com/site/Content/t1.asp?pid=472&sid=57>

This document may not be duplicated, circulated, altered, modified, translated, reduced to any form or otherwise changed; unless PIMA's prior written consent is granted.

All efforts have been made to ensure that the content of this manual is accurate. Pima retains the right to modify this manual or any part thereof, from time to time, without serving any prior notice of such modification.

Copyright © 2012 PIMA Electronic Systems Ltd. All rights reserved.

PIMA Electronic Systems Ltd.,

5 Hatzoref Street

Holon 58856, ISRAEL

Tel: +972.3.6506414

Fax: +972.3.5500442

Email: support@pima-alarms.com

Web: <http://www.pima-alarms.com>

4410141



Ver: B, XX en (Aug 2012)