SYSTEM OVERVIEW

DIALOC's SX- electronic article surveillance system dramatically cuts inventory shrinkage losses from customer shoplifting and employee pilferage. Although not foolproof, SX-1000 can reduce losses in retail stores so effectively that savings will quickly exceed the system's cost. Refer to the DIALOC User's Guide for detailed information on how store personnel should use the system.

A complete SX system consists of:

- One 15VAC power supply,
- One antenna,
- tags attached to protected inventory.
- Detacher.

The basic system consists of a combined transmitter and receiver antenna. The antenna stands on one side of an entrance or exit, so that people must pass the system.

Store or library personnel attach tags to the items they want to protect. Clerks then remove these tags from purchased items at checkout. If someone should try to exit through the system with an item protected by an active tag, an alarm sounds. Facility personnel can then intercept or verify whether the item has been properly purchased or checked out.

HOW THE SYSTEM WORKS

The transmitter generates a continuous low level RF-signal, creating a pulsed magnetic field . When a DIALOC tag enters this field, it responds to the transmitter's signal by resonating. As the receiver picks up the tag's signal, it verifies the signal electronically. If verification is positive, the receiver triggers an alarm. Items other than DIALOC tags might enter the field and respond with their own signals, the receiver will verify them but reject these signals, so no alarm will sound.

Introduction

The SX-1000 System is a radio frequency one antenna anti-shoplifting system which functions at a frequency of 2.21 MHz. The system is used in combination with hard and/or softtags which generate an alarm when brought into the field of the antenna.

The tags contain a resonant circuit, and when this circuit is excited by the transmitter of the system, it starts to oscillate. This oscillation is received by a receiver circuit which verifies it and if positive, it makes an alarm.

The SX-System is a combined transmitter/receiver antenna, which operates as a single antenna unit. The antenna cycles through a burst of 16 transmit/receive sequences of approx. 1.8 millisecond and a pause of approx. 14.9 milliseconds .
The receiver circuit is self-adjusting i.e. the background noise is measured, and the receiver will adapt itself to the optimum range under the given circumstances. After an initialising time of 4 to 5 minutes the SX-1000 system has reached this optimum.

TECHNICAL DESCRIPTION SX-System

INTRODUCTION

The SX system is compatible with the current standards for field disturbance and immunity (CE).
Emission characteristics were assessed according to the following product standards EN 55011 and EN 55014.
The susceptibility was established in accordance the requirements of the
generic immunity standard EN 50082-1.

POWER SOURCE

The power source for the SX assembly is provided by an external 15VAC PSU.

GENERAL DESCRIPTION

Figure 4 (page 4) is a block diagram of the SX-System .

The transmitter consists of a crystal oscillator of 4.4336Mc.
The PAL which is connected to this oscillator generates a signal by deviding and calculation as shown in the block diagram.

ENDSTAGE

The signal which is generated in the PAL, is amplified in the endstage amplifier .
The endstage amplifier drives an transmitter loop antenna.

LOOP ANTENNA

The transmitter loop antenna is comprised of black 1.5mm cable, the purpose of which is to form a unique
broadband RF magnetic field structure suitable to sensor disturbance applications.
The far-field radiation is kept within specification by means of the large area cancellation-loop configuration
of the transmitter antenna, while harmonic suppression of the transmitter is enhanced by the broadband nature of the antenna.
In the same antenna the receiver loop is configured.
This loop is connected to the band-pass filter on the PCB.

BAND-PASS filter

The band-pass filter is tuned on the transmitter frequency of 2.21Mc because we only can expect here the information of the RF-tag.
The bandwidth of the filter is small to prevent interference of other signals.

SAMPLE & HOLD

The sample and hold converts the analogue signal into a digital signal which can be checked in the PAL detector.
There are two sample an hold devices op the PCB, one for the noise and one for the tag-signal

PAL-DETECTOR

In the pal-detector is a software routine running which can detect a tag-signal.
The pal checks several parameters of the incoming signal if they meet the requirements of a pre-determined tag signal.
When a tag-signal is detected the pal gives via a buzzer an acoustic alarm.
The pal can give several types of alarm sounds which can be selected via an dip-switch.

Settings

Access to the circuit-board is found by removing the front cover of the electronic box.
Different beeper-sounds are possible. The sound can be changed by the DIP-switch, in the lower right corner of on the PC board (see fig.1). Switch 1 : gives a rapid pulsating sound
Switch 2 : gives a pulse with halve the speed of the sound from switch 1
and so on.
This option is useful when more SX-1000 systems are installed in the same area or shop.

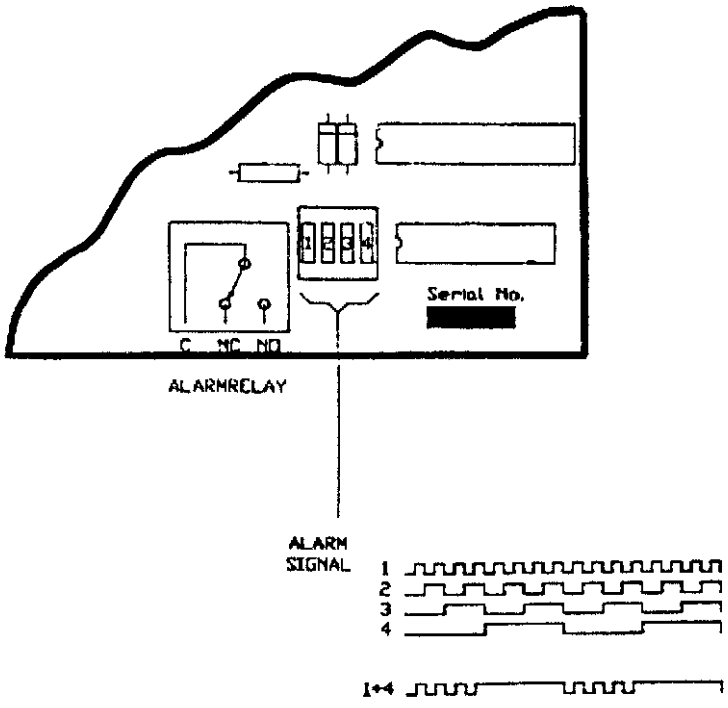

Figure 1 - Beeper pitch settings

Adjustments of the SX System

GREEN LED: The green LED is a simple power-on indication.

YELLOW LED: The receiver circuit is self-adjusting i.e. the first 4-5 minutes after power on, the background noise will be measured, and the receiver will adapt itself to the optimum range with the given background noise.

After initialising time, the yellow LED will flicker.

RED LED: The red LED shows how close the system is to set off an alarm. One of the criteria for alarm is uninterrupted light in both the red and the yellow LED at the same time.

The potentiometer marked "RANGE", it can be set as close to an alarm you want. Set the potentiometer in a position where the yellow LED gives a short flash every 2-3 second.

The adjustment procedure is as follows:

1) After having connected the system to the mains, wait for the yellow LED to flicker, app. 4 minutes.
2) Turn the RANGE pot fully clockwise (the red LED will probably be constantly on) now turn slowly counter-clockwise until the LED gives only short flashes every 2-3 seconds.
3) Check the range by holding a 2.217 MHz RF-tag horizontal in the same height as the horizontal bar in the middle of the antenna, and starting from a position app. 1, 1 m from the antenna move the RF-tag towards the antenna with a fast movement. The antenna should then give an alarm at a distance of at least 1m.