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ENCLOSURE 6

BRIEF DESCRIPTION OF THE RF-DSP SYSTEM

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SYSTEM OVERVIEW

DIALOC's RF-DSP electronic article surveillance system dramatically cuts inventory shrinkage losses from customer shoplifting and employee pilferage. Although not foolproof, RF-DSP 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 RF-DSP system consists of:

- One power supply,
- Two antennas,

The basic system consists of a transmitter antenna and receiver antenna. The antennas stand on either side of an entrance, exit, or both, so that people must pass between them.

Store or library personnel attach tags to the items they want to protect. Clerks then remove, detune, or deactivate 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 FM 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.

TECHNICAL DESCRIPTION TRANSMITTER

INTRODUCTION

The RF-DSP 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 transmitter assembly is provided by an external 24VDC (nominal) regulated source.
The supply current passes through a common mode toroidal suppression device which reduces external power line interference effects upon transmitter circuitry, and prevents conducted EMI from the transmitter within acceptable limits. The transmitter is also fuse protected against power supply reversal.

GENERAL DESCRIPTION

The transmitter consists of a DDS module which produces a FM signal .
The centerfrequency of the FM signal can be set on:
- 8.1Mhz with a bandwith of 1.2Mhz

The sweep frequency is 153hz
The endstage amplifier amplifies the FM signal and drives the transmitter loop antenna which is adjusted on the centerfrequency.

LOOP ANTENNA

The transmitter loop antenna is comprised of $1,^5mm^2$ cable, the purpose of which is to form a unique broadband RF magnetic field structure suitable to sensor disturbance applications.
The harmonic suppression of the transmitter is also enhanced by the smallband nature of the antenna.

TECHNICAL DESCRIPTION RF-DSP RECEIVER

INTRODUCTION

The Receiver is part of the DIALOC's Electronic Article Surveillance (EAS) Systems, which functions as a field disturbance sensor system using a wideband modulated RF near-field signal to detect the presence of specially designed tags.

The receiver uses a special broadband loop antenna which is coupled to the RF amplification stages on the receiver board. The received signals are then A/D converted and tested in a DSP processor . The function of the DSP-processor is signal processing and see whether the signal fit into the detection algorithms, in other words it verifies the presence of (desired) field disturbance (tags). The presence of a tag within the field generated by the Tx antenna, will produce an alarm in the Rx. The Rx board will give an audible alarm (output).

GENERAL DESCRIPTION

The near-RF field along with any tag signals and external interference, are received by the smallband antenna. The received signals are then passed onto an RF pre-selector network to reduce adjacent band signal interference, before amplification in a low noise, high dynamic range amplifier.

The amplified signal is then A/D converted
The processed information is then digitised and presented to the DSP-processor for software based digital signal processing techniques which discriminate the presence of the desired tag from background signals and interference. The DSP-processor also creates the alarm output for the use of the receiver system audible alarm.

POWER SOURCE

The primary power for the receiver comes from an external regulated 24VDC power supply. which also powers the system transmitter. The input current 's fused, RE isolated, and further regulated on the receiver board. Special care has been taken to insure that conducted EMI is kept within specifications.

LOOP ANTENNA

The receiver loop antenna is comprised of $1,^5mm^2$ cable, it's has a broadband structure which enhances system performance.
The receiver loop is configured as a variable loss cancelling antenna, whose purpose is to recover sufficient carrier signal from the transmitter, to create a controlled balance to top and bottom tag detection, and cancel any in-band far field signals.

FRONT END

The receiver loop antenna is connected to the pre-amp on the receiver board.
The received signal is pre-amplified via a high dynamic range pre-amplifier, which minimises the crossmode distortion and serves as a RF gain stage, to reduce overdrive conditions and amplify limited signal strength. Than the signal is AM demodulated, and via a low-pass filter the signals are let to the A/D converter.

Outputs from the DSP-processor include an alarm signal to trigger the receive system alarm devices (via the 24V relay).