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Medical Imaging *RDE*

Medical Imaging Electronics Group

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Concerning: Operational Description Drystar 5300 (FCC ID: HPL5365)

The Drystar 5300 is a dry digital tabletop printer for producing medical diagnostic images. It can print two formats (11x14" or 14x7") blue-based and clear-based film from a single film cassette.

The Drystar 5300 is a network printer (LAN, 10 or 100Mbit). It has a service port (RS232) which is only used during service and never during normal operation.

In the film pack (100 sheets) is located a RFID tag on a back cover sheet. This tag contains information about the type of film and other (material) parameters. This information is accessed by the Drystar 5300 by means of a RFID tag reader, which is located in the film cassette tray. The communication is wireless and uses the ISM frequency band of 13.56MHz.

When a pack of film is inserted in the cassette and after cassette tray is closed the RFID tag reader will try to access the tag. After a successful data exchange the RFID reader is disabled until the next closuring of the film cassette.

The RFID tag reader is acquired as a module from an external manufacturer. The communication between the Drystar 5300 printer and RFID tag reader is based on RS232. The internal operation of the RFID tag reader is transparent for the Drystar 5300 printer.

The Drystar 5300 printer provides +5V power (with fuse, filtering and surge protection).

A detailed description of the RFID tag reader can be found in the Annex of this document.

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Operational description of OEM 410

History

Version 0.1 – Document created

Version 1.0 – First release 26th of March 2003

1 Introduction

I2r Ltd. is a wholly owned UK subsidiary of Sirit Technologies inc. of Toronto Canada and forms the design and development arm of the corporation.

This document covers the Operational description of the OEM 410 RFID reader module. The module is designed for incorporation into a range of printers.

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2 Functional Description

Refer to block diagram

The Module is supplied with regulated +5v from the host printer. The power is fed in via a fused, filtered & surge limiting circuit. This module is command driven by the host printer and is completely transparent to the end user of the printer. The host also has the ability to reset the module remotely via the RS232 interface.

The heart of the module is a sine wave crystal oscillator running at 27.12MHz, the output from this oscillator is “squared-up” and fed to the micro controller as its master clock signal. the 27.12MHz is also divided by two to give 13.56MHz that is fed to the PA driver stage.

The PA driver stage has 2 functions, firstly, it amplifies the 13.56MHz signal from the divider output and secondly the transmitter on-off function is implemented in this stage under the control of the micro-controller.

The output from the driver stage is fed into the PA stage, which receives approximately 10% amplitude modulation via the PA power supply. The PA output is fed to a multi-pole low pass filter and then to a switchable 10dB attenuator, which is intended for future use and is not used in the current application. The output from the attenuator is fed through matching and tuning components to the internal loop antenna.

Depending on the type of transponder, communication between the transponder and the reader is by “load modulating” the transmitter RF signal in one of two ways either On Off Keying (OOK) at Fc/32 or FSK with keying frequencies at Fc/32 or Fc/28.

The transponder modulation signal is picked off at the antenna and fed to the detector, after detected signal is passed to the first two stages of the receiver, which are identical band pass filter/amplifier stages. The amplified signal is then passed to the discriminator stage which acts in two ways in the case of OOK signals this are passed straight through with amplification or in the case of FSK signals these are converted to OOK signals by the action of the discriminator and also receive some amplification.

The final two stages of the receiver comprise the envelope detector and data slicer which respectively convert the signal back to baseband data and convert the data to a suitable form to present to the micro-controller for further processing and error checking.

Verified transponder data is passed back to the host via the RS232 interface.

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