Functional Description

1.0 Overview of Product Operation

The use of the Mat Reader device may be illustrated through an example application. A customer enters a fast serve restaurant and places an order. Typically, the customer would present a handheld transponder to the Mat Reader that would be on the counter top. The 134 kHz signal from the Reader "illuminates" the transponder. The transponder then transmits the Customer's ID. If added security is needed, the Reader makes a challenge (transmission to the transponder) which forces the transponder to transmit additional information to prove that the transponder is legitimate. The Reader subsequently passes the Customer ID to a Point of Sale Controller via an RS232 port where the customer billing takes place.

The 134 kHz signal originates in the Micro-Reader (Texas Instruments part number RI-STU-MRD1) which is on the T20656 Assembly. Subsequently, this signal travels over the antenna cable (M01872B001) to the antenna (M01434A001) where it is radiated. The customer transponder replies at 134 kHz with the customer ID once it is energized by the Reader and the proper protocol between the Reader and the transponder is established. The same antenna that transmitted the reader signal receives the transponder reply. The transponder's reply signal is routed from the antenna to the Micro-Reader (RI-STU-MRD1) and then to the T20656 Assembly where the signal is interpreted to determine the customer ID. The customer ID is then relayed via RS232 to a Point of Sale Controller for customer billing.

Product Description

Marconi Commerce Systems Inc.'s product (for which this submittal is being filed) allows customers wishing to purchase products to interface directly with a Point-Of-Sale via a handheld transponder. The product is called Marconi TIRIS™ Mat Reader (TIRIS: Texas Instruments Registration and Identification System). The Marconi TIRIS™ Mat Reader transmits at 134.2kHz, which provides energy to the handheld tag. The handheld tags contain a unique and secure ID code so each customer can be identified by their individually registered tag. The low frequency antennas of the system create magnetic charge-up fields, known as "read-zones". As soon as a tag enters the "read-zone" (the magnetic charge-up field created by the antenna) the reader receives the unique ID code.

The Marconi TIRIS™ Mat Reader (Part # C00016-XXX) is a Radio Frequency Identification Device (RFID) which is designed for use in conjunction with handheld battery-less transponders (Texas Instruments Part # RI-TRP-Series). The user carries the handheld transponder. The transmitter portion of the Marconi TIRIS™ Mat Reader operates at 134.2kHz and is subject to FCC Part 15, Subpart C, "Intentional Radiator"; paragraphs 15.207 and 15.209. The digital electronics portion of the Marconi TIRIS™ Mat Reader is subject to FCC Part 15, Subpart B, "Unintentional Radiator", paragraph 15.109, under the Class A limits and as such, the TRIND™TIRIS™EG™ is incorporated into an application that is subject to Class A limits.

Tested System Details

The Marconi TIRIS™ Mat Reader System is mounted into an application such as a POS terminal counter or other similar industrial applications. The system includes one Indoor Gateway/MicroReader Board (M01803), one mat reader assembly (M01787B001), which includes one 134.2kHz low 'Q' printed circuit board antenna (T20645) and one LCD shutter. The system also includes a 120 VAC to +12VDC LPS Wall Mounted Transformer for input power.

These components are listed in Table 1.1, and the functional relationship is provided in Figure 1: Marconi TIRIS™ Mat Reader RFID Functional Block Diagram. The 134.2 kHz transmit signal originates on the MicroReader located on the Indoor MicroReader Board and travels via its' respective cable to its' respective antenna where it is intentionally radiated. These components are assembled per the drawings in the EMC Components and Electrical Schematics file.

The Marconi TIRIS™ Mat Reader operates from 120VAC converted to +12VDC using a step-down transformer. The +12VDC is then converted to +26VDC and +5VDC by means of switching power supply circuits located on the Indoor Gateway/MicroReader Board. The system functional block diagram is located at the end of this file.

Circuit Board Descriptions

- The Indoor MicroReader Board Assembly (M01803) has digital interface and RS-232 conversion circuitry, a +12VDC to +26VDC boost switcher, a +12VDC to +5VDC buck switcher, and LCD drive circuitry. The Gateway interface portion of this board manages RFID processing and provides simple, generic event messages to the POS electronics via RS-232. The MicroReader is also located on this board and is the origination point of the intentionally radiated 134.2kHz LF signal.

- The MicroReader, (Texas Instruments part number RI-STU-MRD1), is soldered on the Gateway/Indoor MicroReader Board Assembly. It has a serial communications interface (SCI), which supports RS-232 protocol communication and TTL data communication. It provides radio frequency (RF) 134 kHz control functions to read and program TIRIS™ transponders.

- The Marconi TIRIS™ Mat Reader (T20645) antenna is a 47μH, low 'Q' (10-20) antenna that works with the MicroReader. It is energized by the MicroReader at 132kHz to generate the exciter frequency of 134.2kHz. Because of its' low 'Q', it does not need to be tuned any further in this application.

Table 1. 1
TESTED
LF SYSTEM COMPONENTS

Component Description	Marconi Part Number	Texas Instruments Part Number
Indoor MicroReader Board Assembly (1)	M01803	NA
MicroReader (1) (one per M01803)	Q13551-01	RI-STU-MRD1
Marconi Mat Reader Antenna	T20645	NA
+12VDC Wall Mounted Power Supply	M01878B001	NA

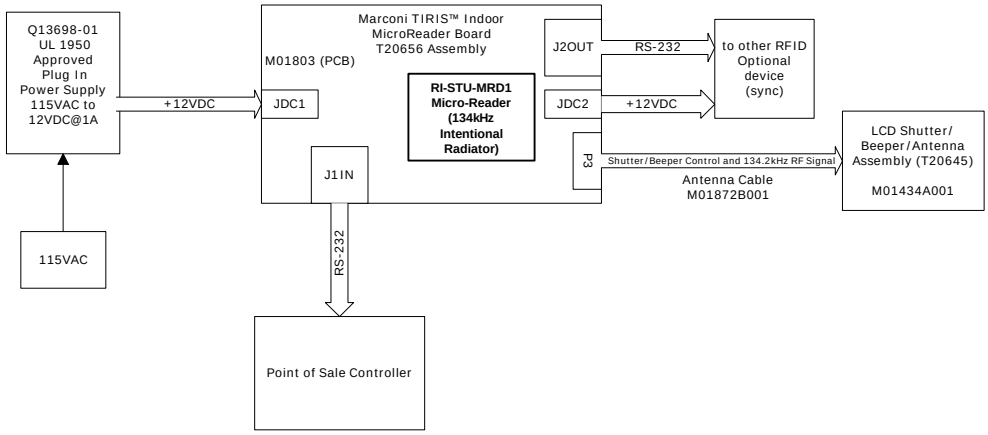

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Figure 1: Marconi TIRIS™Mat Reader Radio Frequency Identification (RFID) Functional Block Diagram