

1.0 General Information

Product Description

Marconi Commerce Systems Inc.'s product (for which this submittal is being filed) allows customers wishing to purchase motor fuel or other products to interface directly with a fuel dispenser via a handheld transponder. The product is called TRIND™TIRIS™EG™(TRIND: Transmitter/Receiver In Dispenser; TIRIS: Texas Instruments Registration and Identification System; EG: Enhanced Gateway). The TRIND™TIRIS™EG™ 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 TRIND™ TIRIS™ EG™(Part # C00011-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 TRIND™TIRIS™EG™ 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 TRIND™TIRIS™EG™ 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 TRIND™TIRIS™EG™ System is mounted into an enclosure such as a fueling dispenser and in the case of an ADVANTAGE/MPD-3 dispenser the system includes one Enhanced Gateway PCA (T20678), two 134.2kHz low 'Q' printed circuit board antennas (T20524), two Light/Micro-Reader Boards (T20601), one switched DC Power Supply (T20314), one Class II Energy Limiting transformer (R20719), and one EMI Line Filter (Q10895-01).

In the case of an ENCORE™/ECLIPSE™ dispenser the system includes one Enhanced Gateway PCA (T20678), two 134.2kHz low 'Q' printed circuit board Antenna/Light/MicroReader Boards (MO1218), one switched DC Power Supply (T20314), one Class II Energy Limiting transformer (R20719), and one EMI Line Filter (Q10895-01).

These components are listed in Table 1.1, and the functional relationship is provided in Figure 1: TRIND™TIRIS™EG™ RFID Functional Block Diagram. The 134.2 kHz transmit signal originates on the MicroReader located on the Light/MicroReader Board and travels via their respective cables to their respective antennas where it is intentionally radiated. In the case of the MOO1218, there is no connector between the intentional radiator and the antenna as they are part of the same PCA. These components are assembled per the drawings in the EMC Components and Electrical Schematics document, which is included in this submission.

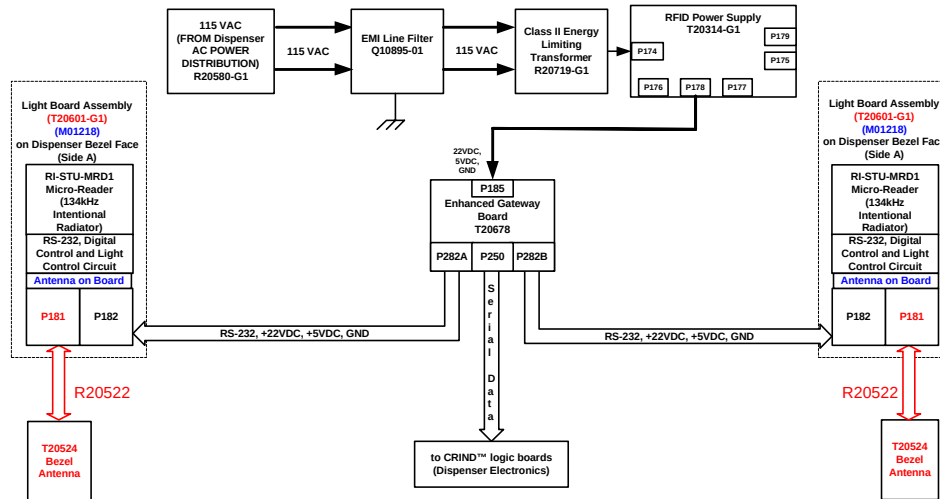
The TRIND™TIRIS™EG™ operates from 120VAC converted to 24VAC using a Class II step-down energy limited transformer. The 24VAC is then rectified and converted to +22.5VDC and +5VDC by means of a switching power supply. The system functional block diagram is located in the EMC Components and Electrical Schematics document, which is included in this submission.

Circuit Board Descriptions

- The RFID Power Supply Circuit Board (T20314) provides switched +22VDC, +5VDC and GND to the Light/MicroReader Boards via the TRIND™TIRIS™ Enhanced Gateway circuit board. The EG Board uses +5VDC and GND from the same connector for its' digital logic circuitry.
- The RFID Light/MicroReader Circuit Board Assembly (T20601) has digital interface and RS-232 conversion circuitry, an eight-bit micro-controller (Philips 87C750) with an embedded program to interact with the MicroReader that is soldered on. It also has current-limited light-emitting diode (LED) light circuits which are the customer indicators when using the system with a key ring tag.
- The MicroReader, (Texas Instruments part number RI-STU-MRD1), is soldered on the Light/MicroReader Circuit 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 and works together with a 47μH, low 'Q' antenna; therefore, the system does not need tuning.
- The T20524 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.
- The Antenna/Light/MicroReader Assembly (MO1218) has digital interface and RS-232 conversion circuitry, an eight-bit micro-controller (Philips 87C750) with an embedded program to interact with the MicroReader that is soldered on. It also has current-limited light-emitting diode (LED) light circuits which are the customer indicators when using the system with a key ring tag. It also has 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.
- The TRIND™TIRIS™ Enhanced Gateway Board (T20678) manages RFID processing and provides simple, generic event messages to the pump electronics via TTL (transistor-transistor-logic).

Table 1. 1
TESTED
LF SYSTEM COMPONENTS

Component Description	Marconi Part Number	Texas Instruments Part Number
Power Supply Circuit Board (1)	T20314	N A
Light/Micro-Reader Board (2) (ADVANTAGE™ / MPD-3™)	T20601	N A
MicroReader (2) (one per T20601) (one per MO1218)	Q13551-01	RI-STU-MRD1
134.2kHz Bezel Antennas (2) (ADVANTAGE™ / MPD-3™)	T20524	N A
Antenna(134.2kHz)/Light/MicroReader Assembly (2) (ENCORE™/ECLIPSE™)	MO1218	N A
TRIND™ TIRIS™ Enhanced Gateway Board (1)	T20678	N A



ADVANTAGE™/MPD-3™
ENCORE™/ECLIPSE™
COMMON PARTS

FCC ID: N6SMRIR6

Figure 1: TRIND™ TIRIS™ EG™ Radio Frequency Identification (RFID) Functional Block Diagram