

## 1.0 General Information

FCC ID: N6SGBIR15

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IC: 827B-GBIR15

### Product Description

Gilbarco 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 or other point-of-sale device via a handheld transponder. The product is called TRIND™ (TRIND: Transmitter/ Receiver In Dispenser). The TRIND™ 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 reader receives the unique ID code.

The TRIND™ is a Radio Frequency Identification Device (RFID) which is designed for use in conjunction with passive transponders (not requiring a battery), Texas Instruments Part # RI-TRP-Series. The user/customer carries the handheld transponder. The transmitter portion of the TRIND™ 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™ is subject to FCC Part 15, Subpart B, "Unintentional Radiator", paragraph 15.109, under the Class A limits and as such, the TRIND™ is incorporated into an application that is subject to Class A limits.

### Tested System Details

The TRIND™ System is typically mounted into an enclosure such as a fueling dispenser and, in the case of an Encore S Series dispenser, the system includes one Enhanced Gateway PCA (T20678), two 134.2kHz low 'Q' printed circuit board antennas (M06074), two Light/Micro-Reader Boards (M06100) (M06074 and M06100 are both part of the assembly p/n M06143), and one switched DC Power Supply (M04104).

These components are listed in Table 1.1, and the functional relationship is provided in Figure 1: TRIND™ 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 M06143, there is no connector between the intentional radiator and the antenna as that assembly relies on the conductivity of the metal PC board stand-offs to electrically connect the antenna PCA to the Light/MicroReader PCA. These components are assembled per the drawings in the EMC Components and Electrical Schematics document, also included with this submission.

The TRIND™ operates on 120VAC converted to 24VAC. The 24VAC is then rectified and converted to +22.5VDC and +5VDC by means of a switching power supply that is integral to the M06100 PCA. The system functional block diagram is located in the EMC Components and Electrical Schematics document, also included in this submission.

### Circuit Board Descriptions

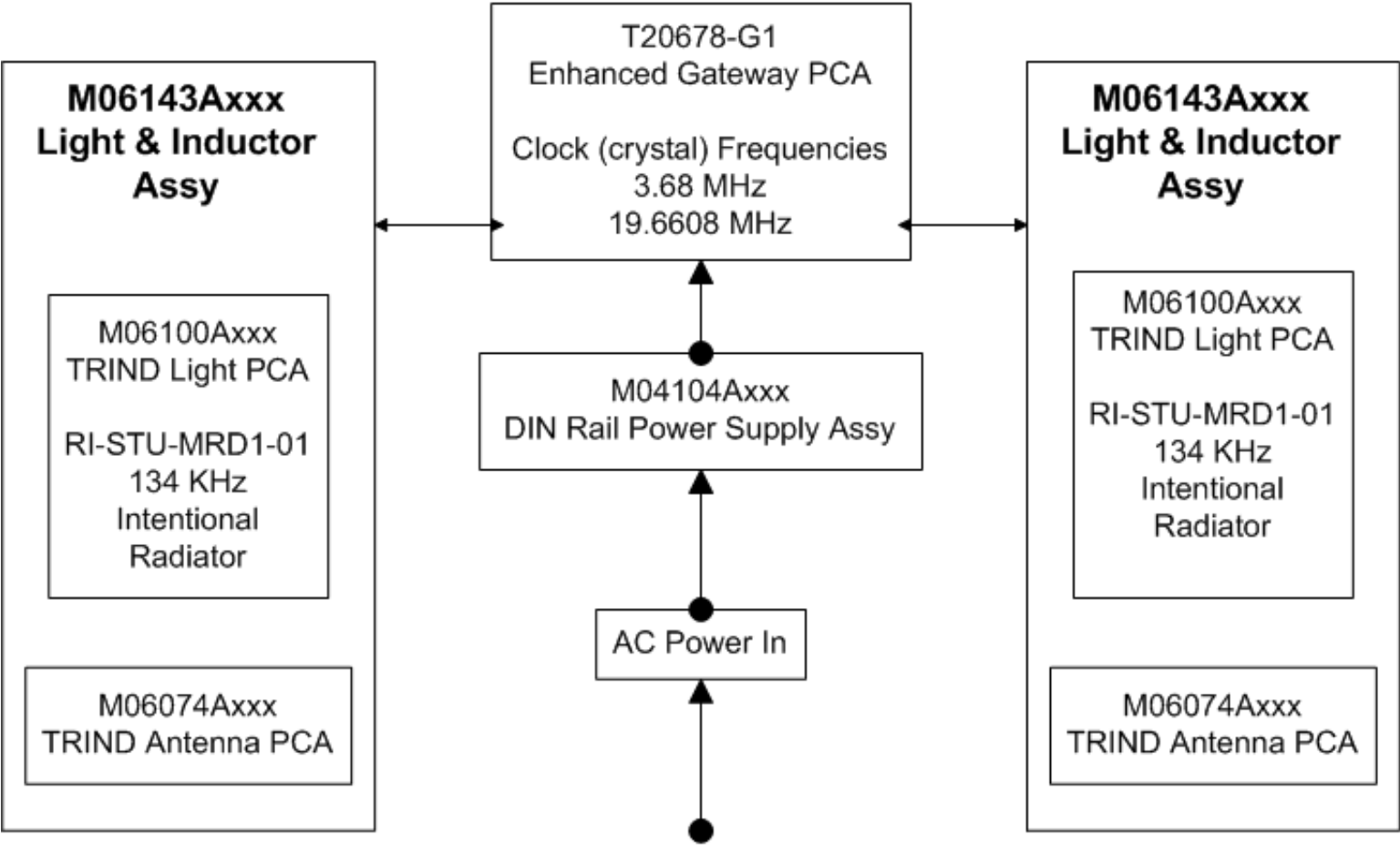
- The Power Supply Assembly (M04104) provides switched +24VDC to the Enhanced Gateway PCA (T20678) where it is passed through to the Light/MicroReader PCA (M06100).
- The Light/MicroReader PCA converts the +24VDC to +22VDC, +5VDC and GND to feed the MicroReader from Texas Instruments (part of the M06100 PCA) and to also feed back to and power the Enhanced Gateway PCA (via loop-back circuitry on the M06100 PCA). The Enhanced Gateway PCA uses +5VDC and GND created on the M06100 PCA (from the same connector that feeds the M06100) to operate its digital logic circuitry.
- The RFID Light/MicroReader PCA (M06100) 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 a current-limited light-emitting diode (LED) circuit that functions as an indicator to the customer confirming that hand-held transponder has been read and is in use.
- The MicroReader, (Texas Instruments part number RI-STU-MRD1 or RI-STU-MRD1-01), is soldered onto the Light/MicroReader PCA. 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 appropriate Texas Instruments transponders and works together with a 47 $\mu$ H, low 'Q' antenna. This equipment configuration does not require tuning.
- The M06074 Antenna PCA is a 47 $\mu$ H, low 'Q' (10-20) antenna that works with the MicroReader. The M06074 Antenna PCA is electrically connected to the Light/MicroReader PCA via two of the three metal PC board stand-offs. This mechanical hardware functions in place of connectors and/or cabling and is insulated with heat shrink tubing, per details found on the M06143 assembly drawing, also included with this submittal. The M06074 Antenna PCA is energized by the MicroReader (on the Light/MicroReader PCA) 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 (M06143) is simply an assembly of the M06100 Light/MicroReader PCA and the M06074 Antenna PCA. This assembly also includes a metal shield and associated fastening hardware that protects and shields the rear of the assembly as typically mounted in a gasoline dispenser.
- The TRIND™ Enhanced Gateway PCA (T20678) manages RFID processing and provides simple, generic event messages to the gasoline dispenser electronics via TTL (transistor-transistor-logic).

**Table 1. 1**

**TESTED  
LF SYSTEM COMPONENTS**

<b>Component Description</b>	<b>Gilbarco Part Number</b>	<b>Texas Instruments Part Number</b>
Power Supply (1)	M04104	NA
Light/Micro-Reader PCA (2)	M06100	NA
MicroReader (2) (one per M06100) (one per M06143)	Q13551-01	RI-STU-MRD1 or RI-STU-MRD1-01
134.2kHz Bezel Antenna PCA (2)	M06074	NA
Antenna(134.2kHz)/Light/ MicroReader Assembly (2)	M06143	NA
TRIND™ Enhanced Gateway PCA (1)	T20678	NA

# Encore S series TRIND Configuration



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