

# **AVID Identification Systems, Inc.**

## **READER TECHNICAL DESCRIPTION**

### **1. SUMMARY**

The AVID POWER TRACKER V READER provides a low-frequency RF electromagnetic field to energize an activated transponder (TAG) within its range of operation.

The activated transponder (TAG) absorbs varying amounts of energy from the READER in a predetermined pattern according to an identity code contained within the TAG.

The READER senses the variations in absorption of its magnetic field and transforms this information into a code sequence congruent to that contained in the TAG. The READER analyzes the sequence thus obtained and displays a valid ID CODE when it is found.

### **2. GENERAL DESCRIPTION**

#### **User documentation**

The reader has a one line, 16 character display for showing the system status as well as displaying identification numbers. There is also a push on/push off power switch as well as a momentary contact trigger switch. There is also an RS-232 port that allows for remote operation and data logging.

When turned on (by depressing the on/off button) the reader checks the battery voltage. If the voltage is low, then a low tone is emitted and "LOW BATTERY" is displayed. If the battery voltage is OK then two high tones are emitted and "AVID ID READY" is displayed. If "LOW BATTERY" is displayed, the reader may still function but with diminished range. The batteries should be replaced as soon as possible.

When the trigger button is pressed, the reader begins looking for identification tags within range and it displays "LOOKING". The reader will continue to look for tag until the trigger is correctly read, a double high tone is emitted and the identification number displayed. In addition, an indicator LED will blink rapidly for up to 5 seconds or until the READ switch is released. To read another tag the trigger must be released and then pressed. If the trigger is released before an identification tag is read, a low tone will be emitted and "NO ID FOUND" will be displayed.

#### **Operational considerations**

There are many factors which may affect the distance at which a tag is read -- or if it is read at all. The following is a nonexclusive list of factors:

1. Angle of the reader. Try moving the reader around.
2. Interference from Computers or other electronics.
3. Low battery power.

#### **RS-232 operation**

The reader may be operated via a standard RS-232 serial connection. The connection is at 9600 baud, 8 bits and no parity. The interface to this port is very simple. All text sent to the display is sent out over the RS232 port. This includes the identification numbers, and all other displayed information. After the display is sent, a carriage return character and then line feed character are sent over the RS-232 port. This is so that a printer or terminal may be used as an interface without need for any additional software.

## **3 BLOCK DIAGRAM**

### **3.1 Analog signal processing**

The analog signal processing block serves to extract the ID signal transmitted (by variations in loading) by the tag, and convert it into a digital signal appropriate for processing by the digital analysis software in the reader.

The sections in this block are: diode bridge sensor of the field coil, passive filters, active filters, FSK decoder.

### **3.2 Field coil driver**

The transmit coil driver provides energy to the field coil. The sections in the driver are divider, level shifter, complementary mosfet driver, resonant coil circuit.

### **3.3 Power supply**

The power supply provides regulated voltage to the digital and analog processing sections of the reader, derived from the battery or external power source.

### **3.4 Digital circuitry**

The digital circuitry provides control, analysis, timing, communication and audible functions for the reader. The sections are: microprocessor (80C52 TYPE), crystal, RS-232 interface, LCD display, Piezo buzzer(beeper).

## **4 Transmit coil driver**

### **4.1 FET pairs**

Each integrated circuit comprises a complementary pair of power MOSFETS, which provide maximum power efficiency drive to the resonant L-C energizing coil circuit.

### **4.2 Resonant section**

The resonant energizing coil section is a series L-C resonant circuit driven by the complementary driver circuit.

By carefully tuning the trimmer capacitor to the maximum resonance, a very high sinusoidal voltage at the energizing frequency is developed at the L-C junction.

This provides maximum power output of the radiated field, as well as maximum sensitivity of the circuit to variations in field loading caused by the ID tag, if present.

## **5 POWER SUPPLY**

### **5.1 Battery and ext. power**

Power for operation of the unit is supplied from either the NiCAD battery (7.2 volt) or an external 8VDC power supply through the DB-9 connector.

Diodes protects the coil driver section from reverse battery insertion. The voltage regulator is self protected against reverse polarity.

## **6 DIGITAL CIRCUITRY**

### **6.1 RS-232 interface**

The RS-232 interface provides communication between the reader microprocessor and an external data communication channel. The reader can be remotely controlled over the serial port to start and stop the reader and change the mode of operation.