

**TECHNICAL REPORT  
HID CORPORATION  
31xxA iCLASS™ OEM MODULES**

**2/10/06**

This report concerns the Intentional Radiator and Antenna portions of a composite system that includes a computing device.

Equipment Type: R.F. Identification Proximity Transmitter/Receiver

Equipment Authorization: Part 15.201

Frequency of Operation: 13.56MHz

Equipment Market: OEM Industrial

Technical Report prepared by:

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0.459 Request that submitted material be withheld from Public and OEM Inspection

It is requested that the following material be withheld from public and OEM inspection:

Description of 3100A, 3101A, 3111A, and 3131A iClass OEM Modules, Circuit Functions, how the device operates, Ground System, Antenna, Block Diagram, and Schematic.

These materials are considered HID Corporation Proprietary and Confidential.

Revealing the fundamental design for the product to the public and our competition would put us at a competitive disadvantage.

We feel we have a product cost/design advantage over our competition with our iClass OEM Module family and therefore ask that the above specified materials be withheld from public inspection.

2.1033(b)(1) Full Name & Mailing Address of the Manufacturer

HID Corporation  
9292 Jeronimo Road  
Irvine, CA 92618-1905

2.1033(b)(4) Description of the iClass OEM Modules, Circuit Functions, how the device operates, Ground System, and Antennas

### **Models Marketed and Sold**

3100A (6091-301) iCLASS OEM 100/TTL  
3101A (6091-301) iCLASS OEM 100/RS232  
3111A (6092-301) iCLASS OEM 300  
3131A (3131-300) iCLASS OEM 50

### **Differences between Models**

There are two antenna sizes for the OEM 100 and OEM300 and variable sizes for the OEM 50. See the antenna descriptions.

All models have identical electronics except for Serial Interface capability.

### **System Description & How the Device Operates**

The HID iClass OEM Module family of products are designed to be integrated into an OEM's final or end product. The units are capable to read from or in some product configurations to write to EEPROM in a transponder IC with an RF interface at a distance of up to 5". The transmitter/receiver antenna emits a 13.56MHz AC magnetic field. The field "powers up" a passive tag which is brought into the vicinity of the antenna. The tag, when powered, operates as a field disturbance device and either receives or returns a serial data stream.

The iClass OEM Module devices receive power (10-16VDC) and commands from the OEM's electronics. The iClass OEM Module has two modes of operation referred to as "HID mode" and "Pass-through mode".

When in HID mode, the units will normally be running with the RF field turned off. The RF field will be turned on every 100 milliseconds to poll for a transponder in the field. If there is no transponder in the field, the field will remain on for approximately 10 milliseconds and then turn off for the next 90 milliseconds. If there is a transponder in the field, the field will remain on for approximately 57 milliseconds while the reader reads the HID Access Control ID from the transponder.

In Pass-through mode, the unit will receive commands over the serial port. If the command involves interaction with a transponder, the field will turn on until it completes the transaction. It will then remain on for 500 milliseconds after the last transponder transaction waiting for a subsequent command. After the 500 milliseconds has elapsed, the field turns off and remains off until the next command involving a transponder transaction comes in.

### **Circuit Functions**

Please refer to the Block Diagram. All circuit blocks including the transmitter/receiver antenna are physically located on the printed circuit board for the OEM 100 and OEM 300. The antenna for the OEM 50 is off the board. For the OEM 100/RS232, the serial interface electronics are located on a small daughter board mounted to the main board.

The 13.56 MHz crystal oscillator output is buffered through a pico-gate and is fed to the transmitter driver.

The series and parallel tuning capacitors and antenna coil are tuned to provide a 50 ohm, 0 degree load at 13.56 MHz. When this circuit is turned on, a modulated 13.56 MHz AC Magnetic field is radiated from the antenna.

When a transponder enters the field, it is powered by the RF field from the reader/writer device. If this causes the transponder to "wake-up", the transponder will now load modulate the field to send its responses/data back to the reader/writer unit.

### **Ground System**

The transmitter driver circuitry, analog circuitry and digital circuitry all connect to the same ground plane.

### **Antennas**

The transmit/receive antenna consist of a few turn loop antenna etched into an inner layer of the board. The antenna areas are:

3100A	3101A	0.0026 m <sup>2</sup>
3111A		0.0039 m <sup>2</sup>
3131A		OEM Designed