

## A GENERAL DESCRIPTION

The Given<sup>®</sup> M2A<sup>®</sup> Patency System is comprised of three main subsystems: a disintegrating capsule, a tag, and a reader.

### 1. M2A<sup>®</sup> Patency Capsule

The M2A<sup>®</sup> Patency Capsule is based on similar products used for packaging medication. This specially designed M2A<sup>®</sup> Patency Capsule remains intact in the GI tract for 100 hours. Following this period of time, if still within the body it disintegrates spontaneously. The M2A<sup>®</sup> Patency Capsule harbors an RFID tag which it carries into the GI tract.



Figure 1- M2A Patency  
Capsule Prototype II



Figure 2 - tag (magnified)

The test capsules contain 10% barium sulfate powder acting as radio-opaque material. Thus, it is possible to view the M2A<sup>®</sup> Patency Capsule using fluoroscopy and to document the disintegration time and dynamics of the release of the inert materials and tag. The dimensions of the capsule are 11.4mm in diameter and 26.4mm in length (equal to the M2A<sup>®</sup> Capsule).

## 2. M2A® Patency Tag

Tracking of the M2A® Patency Capsule is based on a RFID tag incorporated into the capsule. The dimensions of the tag are: 3 mm in diameter and 13-15 mm in length. The tag is enclosed in biocompatible plastic housing made of polyurethane.

## 3. M2A® Patency Scanner

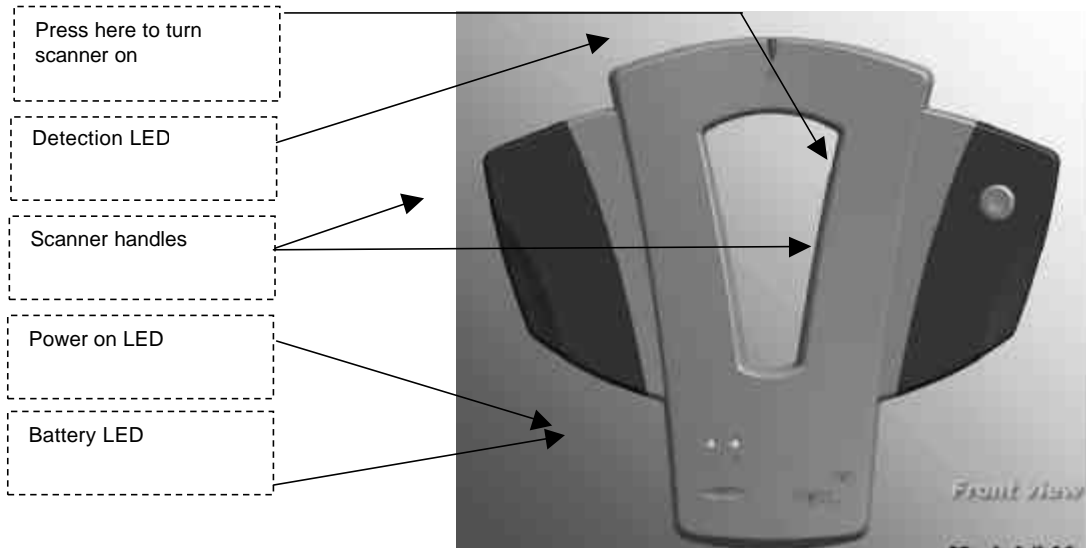
The M2A® Patency Scanner is an external hand held, rechargeable device that transmits RF signals which detect the presence of the tag. It is an off-the-shelf product used in numerous applications such as livestock identification, pet identification and registration and automotive identification.



Figure 1 - M2A® Patency Scanner

The scanner includes a processor, transmitter, receiver, an audible indicator and LEDs for indicating operation and detection of RF signal.

The scanner is used for transmitting the external source RF exciter signal to the Radio Frequency Identified (RFID) tag and for detecting the retransmitted signal from the tag.



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Transmission frequency	128 ± 3kHz
Transmission time	30 Sec. 31% Duty Cycle
Read cycle	24ms
Read Range	≥30cm
Weight	2,300gr +/- 200gr
General Dimensions	497 × 442mm
Housing material	ABS + PC (CYCOLOY C2800)
Power supply	12v, 8 AA 1.5v batteries
Average Current	200mA
Battery type	Lithium L91 from Energizer (Or similar from other manufacturers)
Max Operation time	Up to 600 ON cycles
Operating temp.	5 – 50°C
Storage temp.	(-20) 0°C
Classification	Internally powered

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## B Reader assembly instructions

### 1.0 Battery clips

Insert the battery clips in the battery compartment of the housing.

### 2.0 Receiver coils

Receiver coil I (with push button) is mounted on a fixed location on the right hand site.

After this coil has been tightened, the next coil must be fixed in such a way that both mass connections are pointing to the same side. In this way the coils will be reverted from each other.

Coil II is not secured yet.

Coax cables from the receiver coils have to go down to the area for the printed circuit board.

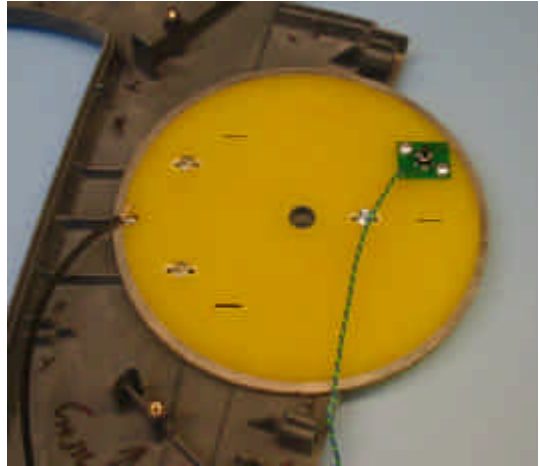
### 3.0 Detection LED (Blue)

The detection LED is placed in the top of the housing. The wires have to go down as shown in the picture.

### 4.0 Exciter coil

Insert and secure the exciter coil in the housing as shown in picture III.

The wires from the exciter have to come out on top of the exciter.



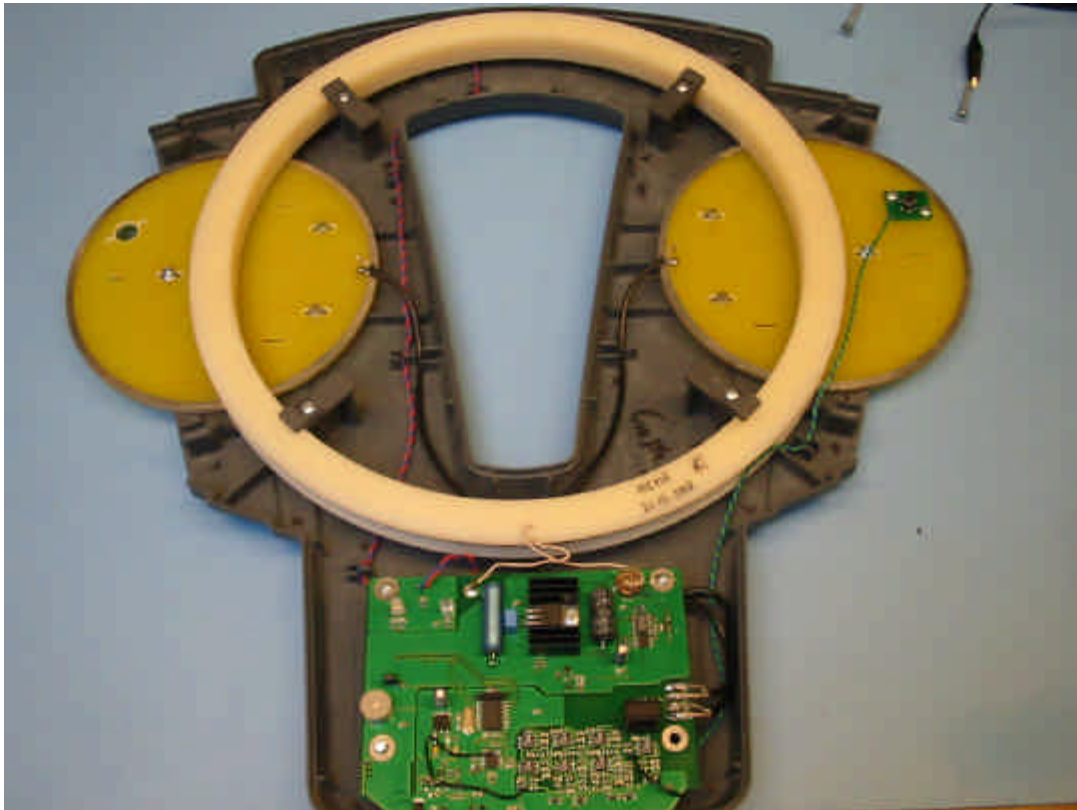
## 5.0 Printed circuit board.

Before the printed circuit board is fixed by using the two upper screws, the following connections have to be made:

- Detection LED
- Both receivers coils
- Trigger button
- Exciter coil

Make sure the coax-mass and signal are connected

When attaching the exciter coil make sure that the inside of the exciter is connected on the right hand side through the synchronisation coil.



## 6.0 Tuning of receiver coils

After the board is secured the batteries can be inserted in order to tune the receiver coils.

The signal from the receiver coils should be as small as possible (general  $< 0,1$  Volt). This value can be measured after the first filter.

