

TactoTek® IMSE™ Technology Demonstrator—BatRay

BatRay is an IMSE technology demonstrator created to show popular IMSE features in a form factor that enables designers to envision new possibilities for their own use cases and product designs. It is designed for overhead mounting. Each of the IMSE features can be combined in shapes and styles to create unique products.

BatRay is tested to common auto industry standards for interior parts to show the versatility of IMSE construction for multiple markets. It is not designed to meet specific use case regulatory requirements.



Part Overview

- Single-piece, seamless design
- Thickness: 3.5 mm
- Weight: 200 grams
- In-mold electronics: circuitry, touch controls, BT antenna, lighting (LEDs)
- External system electronics

Primary Production Processes

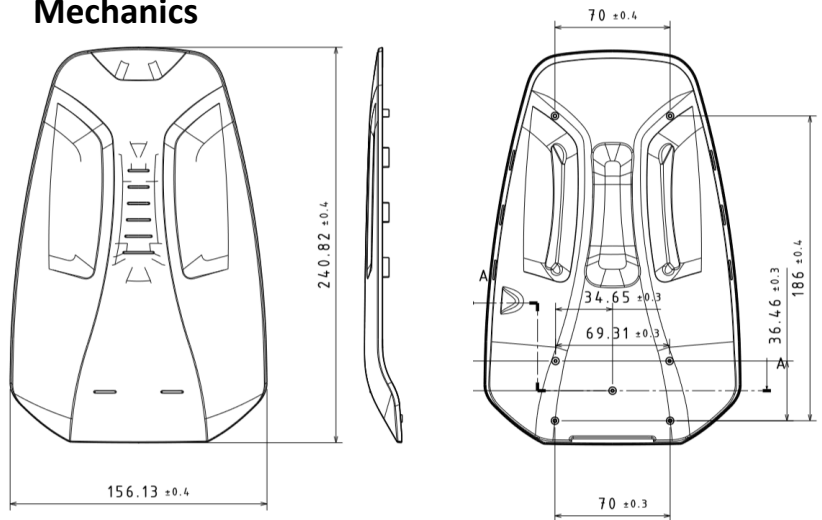
- Screen printing and curing
- Surface mounting electronics—high speed 2-dimensional
- High pressure forming
- Injection molding

Tooling Requirements

- Injection molding tool (1)
- A (top) film forming tool (1)
- B (bottom) film forming tool (1)

BatRay Design

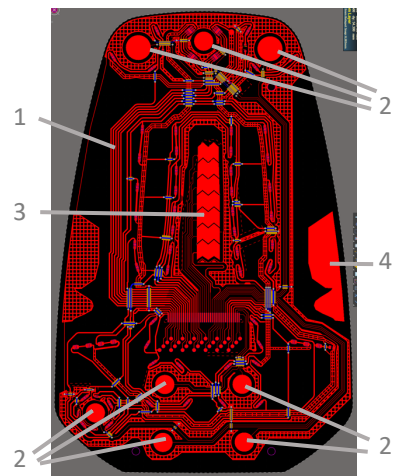
Mechanics



Design and simulation with Catia and related tools using TactoTek IMSE Designer™ rules

In Mold Electronics

1. Circuitry—conductive traces (2 layers) and dielectric insulators between circuit layers
2. Touch buttons (8)
3. Slider control (1 control operating two systems with capacitive mode selection buttons)
4. Bluetooth antenna, printed
5. Illumination—in mold LEDs
 - Side emitting LEDs—icon backlighting (each touch button), slider progress bars, ambient lighting
 - Top emitting LEDs—task lighting, icon illumination

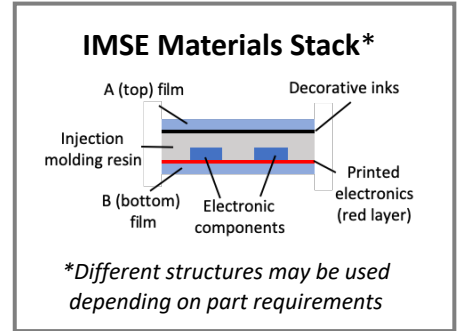
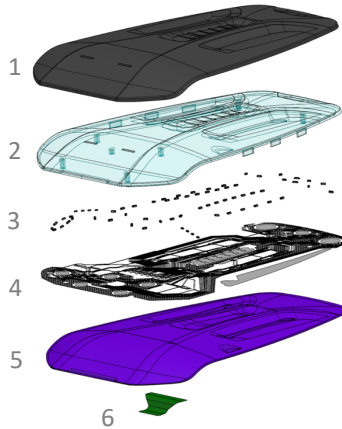


In mold electronics designed to TactoTek IMSE Designer™ rules using Altium Designer

BatRay IMSE Structure and Production

Construction

1. A-surface: Hard coated polycarbonate film, automotive approved 0.375 mm
2. Molding resin: Polycarbonate
3. Electronic components: LEDs, top emitting and side emitting (white, blue, red, RGB)
4. Printed electronics: Conductive inks, dielectrics
5. B-surface (substrate for electronics): Polycarbonate film, 0.25 mm
6. External connection: Flat cable



Production Functional Yield by Process*	%
Printing (decoration/electronics)	98.26
Surface Mounting	99.12
Thermoforming	100.00
Injection Molding	97.39
Compound Functional Yield	95.48

* Electrical function tested after each process step

Validation Criteria (in process)

Electrical

- Conducted RF Emissions: CISPR-25 (Current on all lines in harness)
- Radiated emissions: CISPR-25
- Radiated immunity: BCI - ISO11452-1 and ISO11452-4
- Radiated immunity: ALSE - ISO11452-2

Environmental

- Damp heat: +85C/85RH 1000 hours
- Thermal shock: -40/+85C 1000 cycles
- Aging: +110C 1000 hours

BatRay Features



3D shape

- Capacitive button + hidden until lit icon (white LEDs)
- Capacitive button + illuminated icon (white LEDs)
- Capacitive button + illuminated text (RGB LEDs)
- Capacitive button + illuminated icon (white/blue LEDs)
- Capacitive button + printed icon
- Capacitive touch slider
- Decorative light stripe
- Courtesy lights
- Task lights
- Passive haptics (shape and texture)
- Bluetooth antenna



Cosmetics and electronic functions updated through printing and SMT processes—no tooling changes

Information Requests: info@tactotek.com

www.tactotek.com