

# INVISIO ASM17360

Bluetooth Low Energy Module

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USER MANUAL

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## Disclaimer

The information in this INVISIO User Manual (the “User Manual”) is subject to change without notice and INVISIO is under no obligation to provide the user with updates, amendments or modifications.

This User Manual describes the use of the INVISIO System (the “Product”) which includes headset, control unit, cables and accessories.

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By assembling and/or using the Product, the user agrees that he or she has read and understood the entire User Manual, including, without limitation, all instructions and warnings contained herein, prior to using the Product. The user also agrees that he or she will ensure that any additional or subsequent user of the Product will read, understand, and comply with the User Manual, including, without limitation, all instructions and warnings contained therein, prior to allowing that person to use the Product.

The Product is designed exclusively for use by trained, professional personnel (“Authorized Personnel”) performing their duties in their official capacity. Under no circumstances should the Product be used in any manner other than that described in this User Manual.

Opening or otherwise tampering with one or more of the control units, headsets, or accessories voids any warranty. Only original, manufacturer-approved accessories and batteries may be used with the Product.

The user must activate, adjust, clean, and maintain the Product in accordance with this User Manual. Failure to activate, adjust, clean, and maintain the Product in accordance with this User Manual voids any warranty. In consideration of receiving the Product, the user hereby agrees to the fullest extent permitted by law, as follows:

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IN NO EVENT WILL INVISIO OR ITS RELATED PARTIES BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE USER MANUAL OR THE PRODUCT.

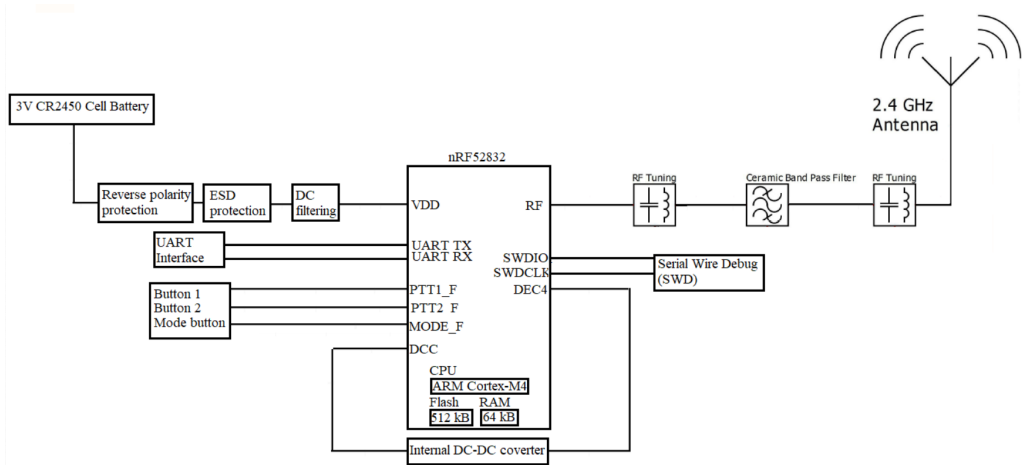
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# ASM17360 Block schematics



ASM11370 uses BLE to share button events to connected target, e.g.

ASM11374. Main system blocks:

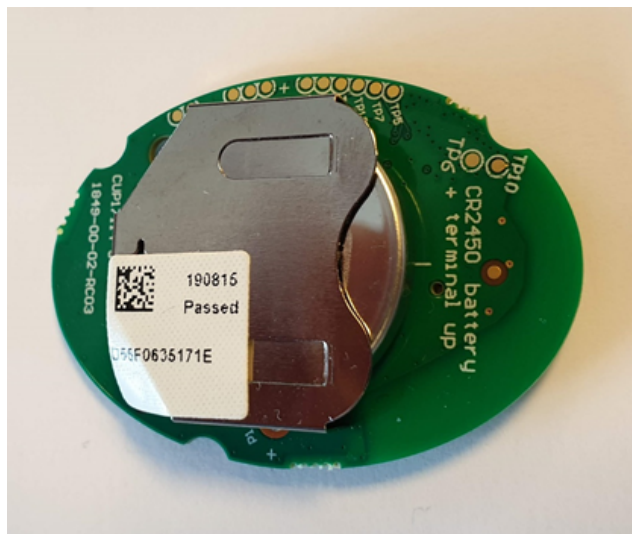
- 3V CR2450 Cell Battery
- Microcontroller nRF52832 with ARM Cortex M4 CPU, 512kB flash and 64kB RAM memory
- 3 Buttons which individual status, e.g. press, release, etc, are exposed via BLE
- Communication during production test is done via Universal asynchronous receiver transmitter interface (UART)
- Programming is done via Serial Wire Debug Interface (SWD)
- Internal DC DC converter supplies microcontroller with 1.3 V to make it more energy efficient
- RF Tuning at 50 Ohm before and after Bluetooth Band Pass filter that feeds the signal into a 2.4 GHz Antenna
- The Antenna type is Bended monopole
- The Antenna Gain is 0.5dBi (includes a saw filter with 2dBi)

The software is written in C and based on Nordic Semiconductor's Software Development Kit labeled nRF5 SDK v15.3.0. The software consists of three parts:

- Bootloader used for upgrades
- Softdevice used for BLE radio parts
  - the softdevice is not modified, it's provided as a binary from chipset supplier Nordic Semiconductor
- Application used for the specific functionality.

When a connection is established via BLE to the ASM17360 unit, it routes push button presses via BLE. The source code, SDK and scripts are stored in a Git repository.





## Regulatory

|                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>This appliance complies with European Directives 2014/35/EU, 2014/30/EU, 2011/65/EU and hearing protection Regulation (EU) 2016/425.</p> <p>This product complies with the hearing protection standard: EN 352-1:2002, EN 352-4:2001 + A1:2005</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|  | <p>This device is approved by Bluetooth SIG.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|  | <p>FCC-ID: 2AUGTASM17360</p> <p>INVISIO Communications AS has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment.</p> <p>INVISIO Communications AS n'approuve aucune modification apportée à l'appareil par l'utilisateur, quelle qu'en soit la nature. Tout changement ou modification peuvent annuler le droit d'utilisation de l'appareil par l'utilisateur.</p> <p>This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.</p> <p>Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.</p> <p>This equipment complies with FCC and ICSED radiation exposure limits set forth for an uncontrolled environment.</p> <p>Cet appareil est conforme aux limites d'exposition aux rayonnements de l'ISDE pour un environnement non contrôlé.</p> |

## Regulatory

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|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                   | <p>This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:</p> <ul style="list-style-type: none"> <li>- Reorient or relocate the receiving antenna.</li> <li>- Increase the separation between the equipment and receiver.</li> <li>- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.</li> <li>- Consult the dealer or an experienced radio/TV technician for help.</li> </ul> |
| <b>IC-ID</b>                                                                      | <p>This Class B digital apparatus complies with Canadian ICES-003.</p> <p>Cet appareil numérique de classe B est conforme à la norme canadienne NMB-003.</p> <p>IC-ID: 25405-ASM17360</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|  | <p>This device complies with RCM rules.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|  | <p>The WEEE symbol indicates that this product may not be treated as household waste. Instead it must be handed over to the applicable collection point for the recycling of electrical and electronic equipment. Disposal must be carried out in accordance with local environmental regulations for waste disposal. For more detailed information about treatment, recovery and recycling of this product, please contact your local city office, your household waste disposal service or the seller from whom you purchased the product.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

Technical details can be seen in the  
attached instruction for nRF52832

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