HOPE XIV
BADGE GUIDE

RISC-V®

LEGAL

1. STATUS

The HOPE Badge team ("HBT") is a hobby group. Novel Circuits ("NC") is a commercial entity with merchant registrations. Both HBT and NC deliver to computing enthusiasts, students, and researchers the HOPE XV Badge ("HB"), an educational developer product. It is not the intent of HBT or NC to form any partnership, joint venture, agency, employer-employee, or fiduciary relationship.

2. AUDIENCE

HBT and NC coproduce the HB for users ("Users"), who are qualified technicians familiar with handling electrical and mechanical components. Users voluntarily and knowingly assume the risks associated with handling such components, which could potentially lead to shock, fire, serious injury, loss, destruction, and or irreversible damage to property. The HB is an unfinished product intended to be used for experimentation in a controlled research and development setting. Users acknowledge that they use the HB at their own risk and undertake to take all necessary measures to minimize these risks.

3. PURPOSE

The HB is a decorative device which is designed and packaged to be used at the event where it is distributed, and thereafter collected for hobby purposes. At the event users may learn to program the HB to gain experience in the electronic engineering discipline. Users are encouraged to design their own decorative light animations using the RGB LEDs. Various circuits (USB, IR, NFC, switching, and microcontrol) exist to encourage educational exploration at the event.

4. MISUSE

Applications outside the intended purpose are not supported. Misuse of the HB may involve cryptographic security, access control, storage or transfer of value, medical, finance, navigation, or any other application not relating to the purpose.

5. REPRESENTATIONS

Pictures of the HB may vary from the current state of production and distribution.

6. PERMISSIONS

ABOUT

IR, USB, vibration, switch and light animation are supported on this ESP32 RISC-V powered badge. Please sponsor the next HOPE badge production.

Hardware revision three New York edition

THE GREAT SEAL OF THE STATE OF NEW YORK

EXCELSIOR
E PLURIBUS UNUM

HACK

Personalising your badge is possible in two ways.

Solder SAO headers to plug in third party addons. Adding chips (TVOC or fuel gauge) is achieved using a hot air solder station and solder field SF1.

Write new application logic using firmware tools:

```
$ idf.py fullclean set target esp32-c3 menuconfig
$ idf.py build flash (rinse and repeat)
```

Program the ESP-C3 chip with original firmware:

```
$ git clone https://git.sr.ht/~rcs/HiP-Badge/
```

FEATURES

Lights	SUPPORTED
Buttons	SUPPORTED
Infrared	SUPPORTED
Vibra PMOS	UNIMPLEMENTED
HDK on USB	UNIMPLEMENTED
TVOC sensor	UNIMPLEMENTED
SPI EEPROM	UNIMPLEMENTED
SMA antenna	UNIMPLEMENTED
RFID antenna	UNIMPLEMENTED
NFC EEPROM	UNIMPLEMENTED
Smart giftbox	UNIMPLEMENTED
48-hour battery	UNIMPLEMENTED
SAO connector	UNIMPLEMENTED
Secure element	UNIMPLEMENTED

All unimplemented features are available on the *HOPE XV Badge Pro Model.*

Visitor, speaker, and staff editions have identical feature sets.

Help with implementing features greatly appreciated!

-- your HOPE badge team

ACCESS
GMRS CHANNEL 7

MARILLAC TERRACE

VENDORS & VILLAGES

BADGE CLINIC

REGISTRATION

FAQ

Q1: What can my badge do for me?
A1: Anything you develop for RISC-V.
Q2: How long does the battery last?
A2: 20-40 hours, depending on use.
Q3: Is the badge design Opensource?
A3: Yes, on license terms CERN-OHL-S.
Q4: Is this badge design an original?
A4: No, it is derived from the HiP badge.
Q5: Why is input and output instable?
A5: Use of USB interrupts the features.
Q6: Vibration makes my badge freeze?
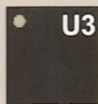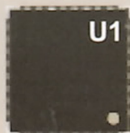**A6:** Disable the vibramotor for stability.

NOVEL CIRCUITS

FRONT SIDE

ELECTRONIC
PARTS

U7
SGP30

U3
MCP73871

U1
ESP32-C3

D1-D16
WS2812B

U5
74LVC1G17

U6
ST25DV04K

J3
SAO-V2

IC1

U4
MAX17048

U2
AP2112K
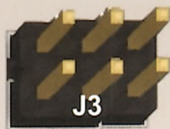
IRM-H638

D23
B15V1IR

BATTERY POWER

Charge State	Red	Green	Yellow
Shutdown	OFF	OFF	OFF
Standby	OFF	OFF	ON
Low Battery	ON	OFF	OFF
Charging	ON	OFF	ON
Charge Complete	OFF	ON	ON
Fault Condition	ON	ON	ON

Press the RST button to reset the MCU. Press the rightmost button while resetting to flash the chip.

BUTTONS LIGHTS

Long press on the third button to iterate the animations. Short press to change the light intensity or totally disable the lights.

The first two buttons act on light animation, and should be reimplemented to your taste.

Animations interrupt on CO_2 congestion.

A white LED indicates a powered on state.

INFRARED 🦉 TV

Press the rightmost button to fire a data code from the infrared diode. RGB lights indicate a successful transmission with an animation.

A badge receiving a transmission will flash the lights according to the code received.

The infrared circuit is able to communicate with a number of common television monitors. The TV-B-Gone boss advised us well enough to allow kludging badge circuits accordingly.

RADIO 🦉 NFC

If your badge includes an NFC EEPROM and RFID loop antenna, then 4Kbits of data can be stored on the EEPROM by aligning the Kapton antenna with a smartphone.

A NDEF Type-5 tag puts data in MIME structs.

Reading and writing are supported, and this works even when the badge has no power. Some people use NFC Tools with a phone.

Some readers cannot work with NDEF Type-5.

TVOC 🦉 AIR

If your badge includes the luxurious total volatile organic compounds (TVOC) sensor, it may flash the lights distinctively to alarm.

A common application involves polling the sensor's CO_2 level and informing of a need to ventilate.

The TVOC communicates on the I2C bus.

CONTACT

HOPE Badge Chat

Join the Signal group (QR)
https://www.novelcircuits.com/
wiki:HOPE_XV_Electronic_Badge
https://gitlab.com/tidklaas/hip-badge/
FRS GMRS (FCC) channel 7 (462.7125 MHz)

To schedule an interview, or to sponsor the
next distribution: hope.badge.team@hope.net

NOTES