C.H.I.P. The world's first nine dollar computer

Presented by

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Today's Topics

1. Introducing myself

2. Introducing the C.H.I.P.

3. C.H.I.P. accessories

4. C.H.I.P. upstream support status
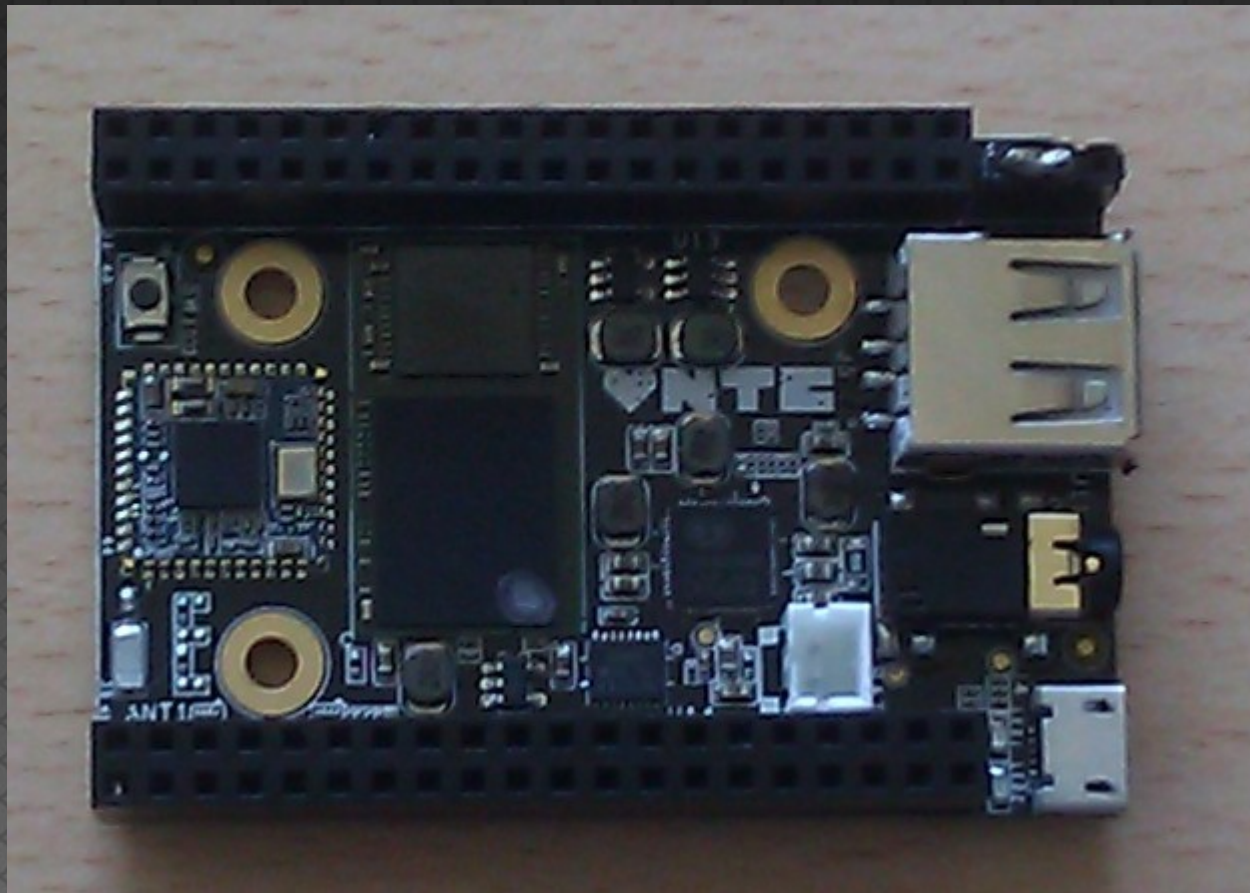
5. Demo?

6. Questions

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Introducing myself

Introducing myself

- Software Engineer working for Red Hat on USB, human input devices and nouveau

- Not affiliated with Next Thing Co., the makers of the C.H.I.P. in any way

- Working on u-boot and kernel support for Allwinner SoCs in my spare time
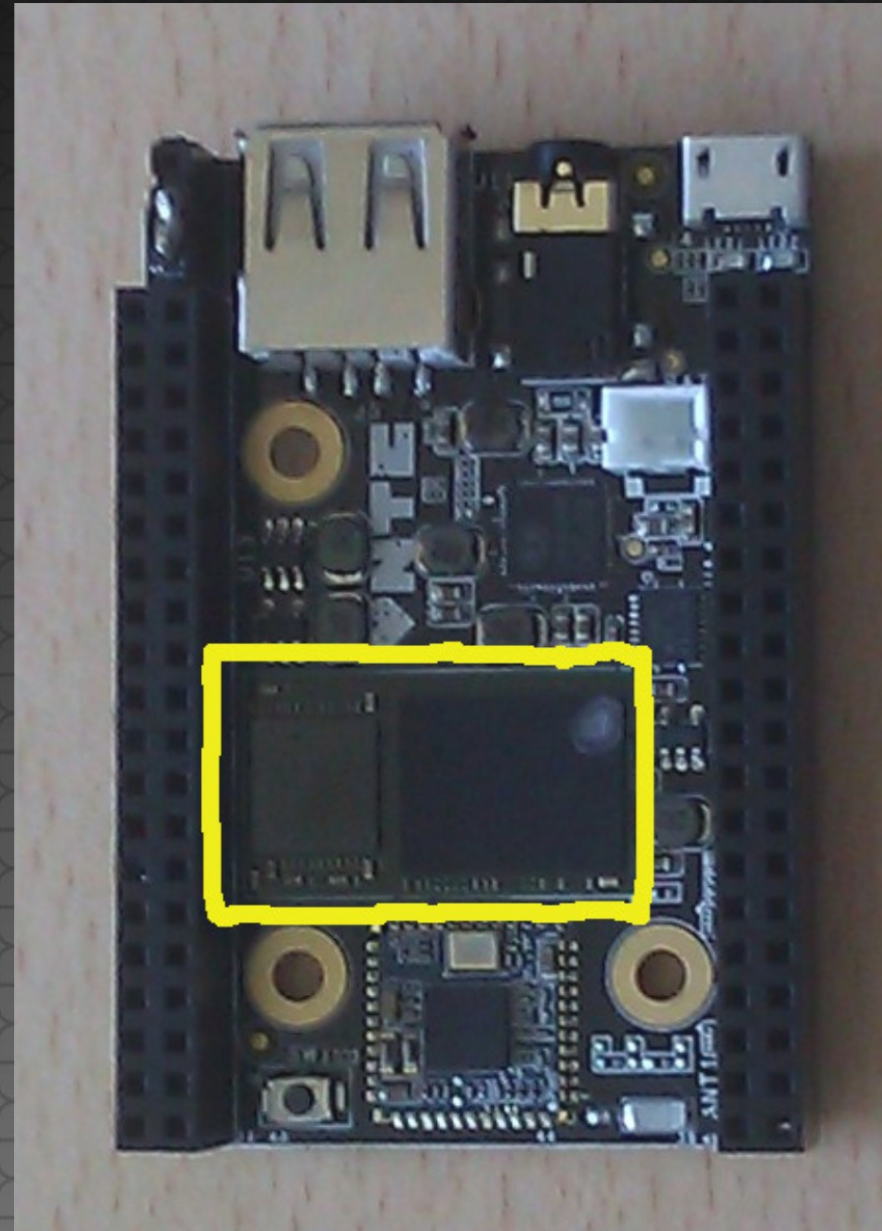
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Introducing the C.H.I.P.

The C.H.I.P.
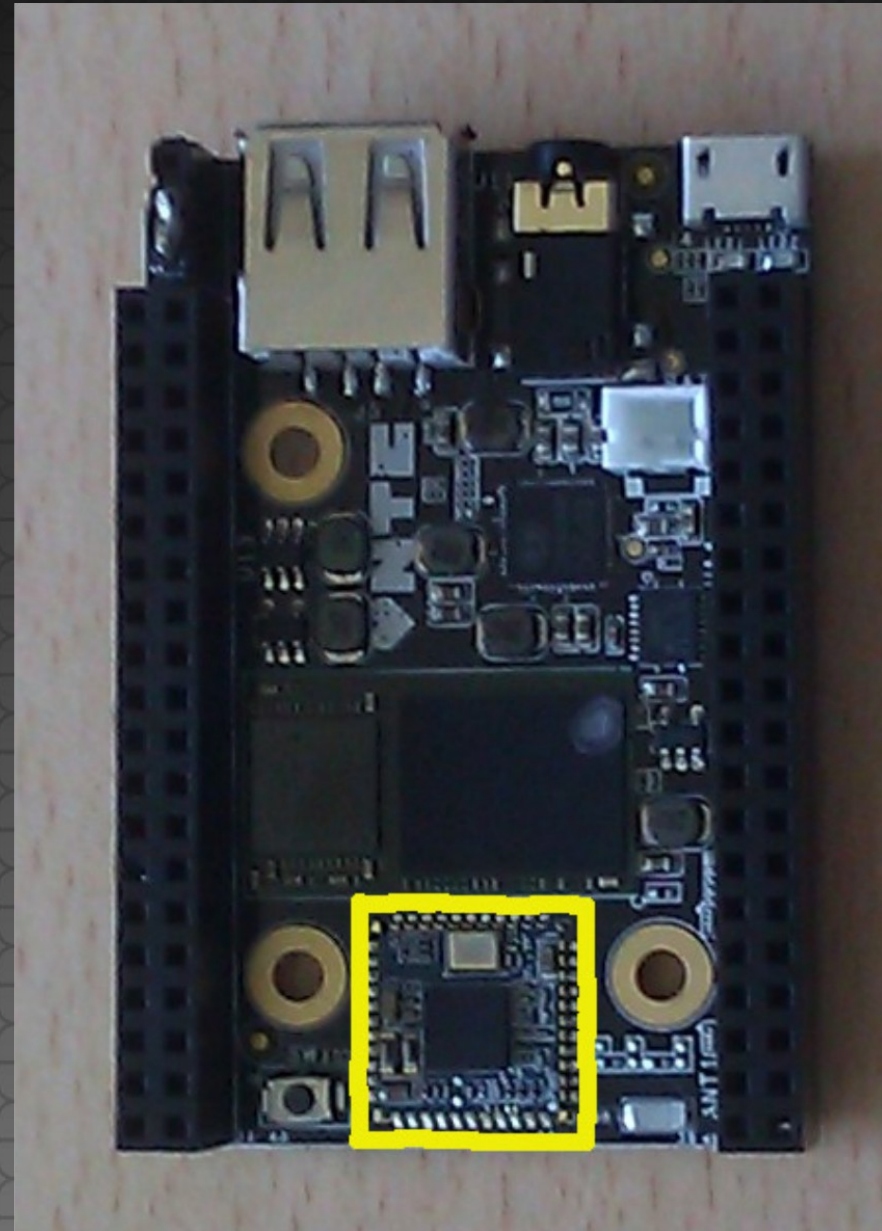
- A full computer for $9 in 60mm x 41mm

R8 Module

- Allwinner R8 SoC
  - 1GHz Cortex A8
  - Mali400 GPU
- 512MB DDR3 RAM
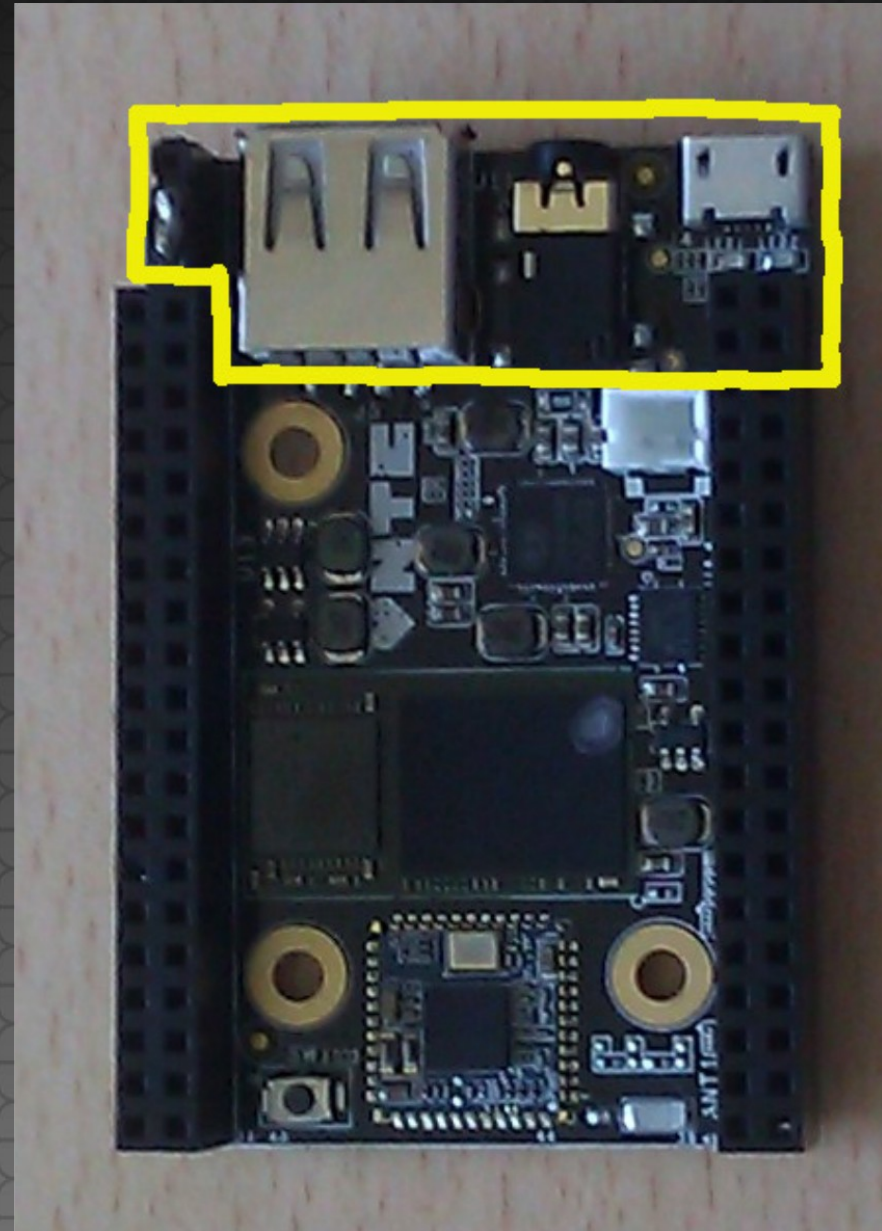- 4 GB Nand flash storage

RTL8723BS wifi/bt

- 802.11b/g/n 1/1 2.4 GHz
- Bluetooth 4.0

Connectors

- USB-A connected to an EHCI/OHCI controller pair

- 3.5mm headphone jack:

  - Stereo audio out

  - Microphone in or composite video out selected by jumper

- Micro USB-B USB-2 OTG

- LiOn / LiPo battery connector

Headers

ALPHA C.H.I.P. (v0.21) PINOUT

U13

Left	Pin	Pin	Right
GND	1	2	CHG-IN
VCC-5V	3	4	GND
VCC3V3	5	6	TS
VCC-1V8	7	8	BAT
TWI1-SDA	9	10	PWRON
TWI1-SCK	11	12	GND
X1	13	14	X2
Y1	15	16	Y2
LCD-D2	17	18	PWM0
LCD-D4	19	20	LCD-D3
LCD-D6	21	22	LCD-D5
LCD-D10	23	24	LCD-D7
LCD-D12	25	26	LCD-D11
LCD-D14	27	28	LCD-D13
LCD-D18	29	30	LCD-D15
LCD-D20	31	32	LCD-D19
LCD-D22	33	34	LCD-D21
LCD-CLK	35	36	LCD-D23
LCD-VSYNC	37	38	LCD-HSYNC
GND	39	40	LCD-DE

U14

| Left	Pin	Pin	Right
GND	1	2	VCC-5V
UART1-TX	3	4	HPL
UART1-RX	5	6	HPCOM
UBOOT	7	8	HPR
LRADC	9	10	MICM
GND	11	12	MICIN1
XIO-P0	13	14	XIO-P1
XIO-P2	15	16	XIO-P3
XIO-P4	17	18	XIO-P5
XIO-P6	19	20	XIO-P7
GND	21	22	GND
AP-EINT1	23	24	AP-EINT3
TWI2-SDA	25	26	TWI2-SCK
CSIPCK	27	28	CSICK
CSIHSYNC	29	30	CSIVSYNC
CSID0	31	32	CSID1
CSID2	33	34	CSID3
CSID4	35	36	CSID5
CSID6	37	38	CSID7
GND	39	40	GND

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Alternative header use

- LCD pins D2-D5: UART2
- LCD pins other: 100Mbit eth (with external phy)
- CSI clks + sync: SPI2
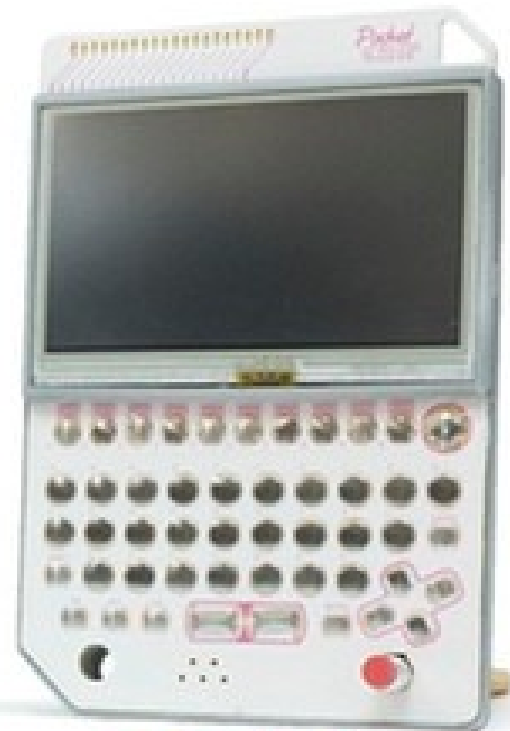- CSI D0-D5: MMC2

C.H.I.P. Accessories

C.H.I.P. Accessoiries
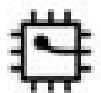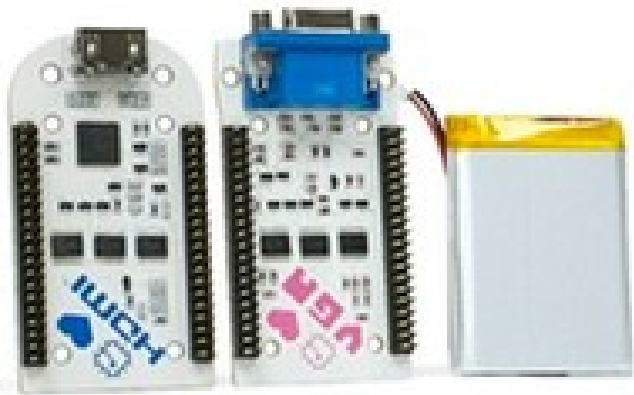
❤ Accessories

CHIP

Pocket CHIP

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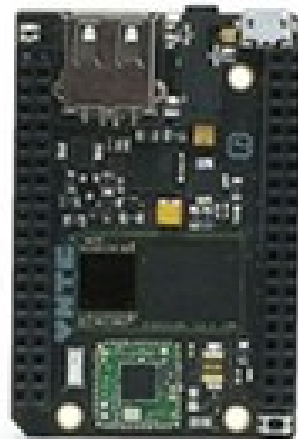
PocketC.H.I.P.

Use a Pencil as a Kickstand

Tough Injection Molded Case

Built In GPIO Breakouts

Attach a Shoelace and Carry PocketChip Anywhere

C.H.I.P. Upstream
support status

U-boot support

- Upstream u-boot fully supports the C.H.I.P.

- Except for the NAND flash

  - The first-stage loader (SPL) supports loading the second stage (u-boot) from NAND already

  - But u-boot is missing a full MTD nand driver for UBI(FS) access to load the kernel, dtb, etc.

- Next Thing Co.'s github u-boot repository does have preliminary support for this

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Linux support

- Upstream Linux supports most of the C.H.I.P.

- Not supported yet are:

  - NAND

  - Wifi/Bt module

  - Hardware video encoding / decoding engine

  - GPU

  - Video output

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Linux support

- NAND: Boris Brezillon from Free Electrons is working on this. Next Thing Co.'s github linux repository has preliminary support.

- Wifi/Bt: There is an out of tree driver for this: https://github.com/hadess/rtl8723bs Hopefully this can be added to drivers/staging soon.

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Linux support

- Hardware video encoding / decoding: this has been reverse-engineered but no one is working on a driver. The plan is to have an out-of-tree kernel driver which allows using Allwinner's userspace binaries for this

- GPU: The plan is to have an out-of-tree kernel driver which allows using ARM's userspace binaries for this

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Video output

- U-Boot has video output support and the kernel can take over the framebuffer through simplefb

- Maxime Ripard from Free Electrons is working on a kms driver

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Demo ?

Questions?

Contact:
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Git repositories:
https://github.com/jwrdegoede/