Forum Rule: Always post complete source code & details to reproduce any issue!

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Thread: Problem with Teensy USB HID / Joystick implementation ?

11-01-2018, 12:06 PM #1

Chris Veigl
Junior Member
Join Date: Oct 2018
Posts: 6

Problem with Teensy USB HID / Joystick implementation ?

I made a special joystick for a boy with a disability using TeensLC and it works nicely on the PC,
however when i attach it to the XBOX adaptive controller
https://www.xbox.com/de-DE/xbox-one/...ive-controller

the joystick does not work at all. (i tested other devices including gamepads and also USB composite devices - they all worked).

I cloned the device-/configuration- and HID-descriptors of working devices (by modifying the teensyduino source code accordingly)
but that did not solve the issue.

i tracked the problem down into the send-routine of the joystick implementation:

```
int usb_flipjoystick_send(void)
{
uint32_t wait_count=0;
usb_packet_t *tx_packet;

while (1) {
if (!usb_configuration) {
return -2;
}
if (usb_tx_packet_count(FLIPJOYSTICK_ENDPOINT) <
TX_PACKET_LIMIT) {
tx_packet = usb_malloc();
if (tx_packet) break;
}
if (++wait_count > TX_TIMEOUT ||
transmit_previous_timeout) {
transmit_previous_timeout = 1;
```

```
return -1;
}
yield();
}

transmit_previous_timeout = 0;
memcpy(tx_packet->buf, usb_flipjoystick_data, 3);
tx_packet->len = 3;
usb_tx(FLIPJOYSTICK_ENDPOINT, tx_packet);

return 0;
}
```

this always runs into the timeout - it seems that usb_tx() does not succeed in sending the packets !

i tried the same with teensy 3.1 and also teensy 2++ (using an AVR MCU) - same problem:
works on PC, does not work on the XBOX adaptive controller !

BTW: the HID joystick implementation in Arduino for the Leonardo/Pro Micro devices works fine...

any ideas what could be wrong or what we could try to solve the issue ?

thanks,
chris

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11-04-2018, 01:30 AM #2

gdsports

Member
Join Date: Jul 2018
Posts: 45

See my reply on this thread about the MSF-XINPUT library which might help.

https://forum.pjrc.com/threads/53786...y-HID-Joystick

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11-04-2018, 10:16 AM #3

Chris Veigl

Junior Member
Join Date: Oct 2018
Posts: 6

Thank you for your reply!

Unfortunately, i have already tried all suggested strategies (implement single joystick device, mimick working joystick HID descriptors, implement XINPUT device)
- and all of them failed.

I think that the problem is a small difference in how the USB interrupts are handled / the usb_tx() function is implemented in the teensyduino code base ...

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11-06-2018, 04:41 PM #4

steve.mcgie

Junior Member

GD, thanks for reviving this thread!

Join Date: Jan 2015
Posts: 7

Modifying the drivers is unfortunately a bit above my level, if you know what I mean. I trust the XInput author over myself on this, for sure.

Unfortunately, I couldn't get XInput working either. I couldn't get "XInput" to show up in the "USB Type" menu, even after copying over all the modified Teensyduino files. And in fact, doing so briefly bricked Teensyduino so that all of the options other than "Board" were greyed out. If anyone reading this tries installing XInput, be sure to back up the originals of those files!

I suspect that this may have something to do with me using a significantly older version (IDE 1.0.6, Teensyduino 1.35). But I've broken some of my other code by updating the IDE before, so I'm hesitant to try that.

In any case, Chris' linked thread doesn't make it sound too optimistic, even if I did get XInput working as intended.

Thanks both of you for your help, but in the end, it sounds like the Adaptive Controller just doesn't like to play nicely with Teensy. Which is a real shame. If there's any device that Microsoft should make open-ended for the DIY community, the Adaptive is it.

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11-06-2018, 05:05 PM #5

Chris Veigl

Junior Member
Join Date: Oct 2018
Posts: 6

Yes - maybe a conflict caused by the older Teensyduino version!
backup of the Teensyduino files before modifying is a good advice indeed
I got the XINPUT USB device code (and menu selection) working nicely, and the USB device appears and works on the PC,
but (as said) no luck on the XBox Adaptive controller also with an XINPUT device implemented using Teensyduino's USB routines ....

> Originally Posted by **steve.mcgie**
> it sounds like the Adaptive Controller just doesn't like to play nicely with Teensy. Which is a real shame. If there's any device that Microsoft should make open-ended for the DIY community, the Adaptive is it.

I suspect a small issue so that either the Teensyduino's USB device implementation - or the XBOX adaptive controller's USB host implementation - behaves slightly different from the USB standard. Anyhow: all other USB joysticks and game controllers I tried worked with the adaptive controller - so I suppose the problem _could_ be fixed on the Teensyduino side...

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11-07-2018, 01:17 AM #6

gdsports

Member

I now have an XAC but no USB joysticks. I can confirm the following do not work: MSF_XINPUT, teensyLC

Join Date: Jul 2018
Posts: 45

joystick, and arduinojoysticklibrary on SAMD. I will try the arduino joystick library on a pro micro 32u4.

I hacked the teensy code to remove the teensy serial port so the teensy joystick has only 1 interface but this still does not work. Could be slight differences in the HID report descriptor.

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11-07-2018, 05:14 AM #7

gdsports

Member
Join Date: Jul 2018
Posts: 45

The Teensy LC and probably Teensy 3 work on the Xbox Adaptive Controller (XAC) using the modified Teensyduino 1.44 files are in the zip file. The changes creates a USB Type Joystick which does not include keyboard, mouse, or serial. Auto upload does not work but upload can be manually started by clicking the Teensy program/reset button.

The example program Teensy | USB Joystick | Complete works but change all references from Serial to Serial1. This program is handy because it sends axes movement messages without having to connect hardware joysticks. Very handy on a crowded desk. The XAC is larger than I expected.

I am still not sure why the triple interface Keyboard, Mouse, Joystick USB Type fails.

joystick_teensy.zip

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11-07-2018, 01:39 PM #8

Chris Veigl

Junior Member
Join Date: Oct 2018
Posts: 6

> Originally Posted by **gdsports**
> The Teensy LC and probably Teensy 3 work on the Xbox Adaptive Controller (XAC) using the modified Teensyduino 1.44 files are in the zip file. The changes creates a USB Type Joystick which does not include keyboard, mouse, or serial.
> joystick_teensy.zip

Wow - very cool! This really amazes me because

1) i replicated the configuration-, device- and HID-report descriptors from a working device (which is a single joystick, no serial port) without success,
2) another mouse/keyboard/joystick composite device works fine with the XAD - so this can't be the reason ....

however, in the zip you provided, the usb_desc.c file is identical with the original version of teensyduino 1.44
- could it be that you put the wrong file into that .zip ?

many thanks + cheers!
chris

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11-07-2018, 07:20 PM #9

gdsports

Member
Join Date: Jul 2018
Posts: 45

Oops, that should have been usb_desc.h, not usb_desc.c. Attached is an update zip file.
joystick_teensy_20181107.zip

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11-08-2018, 03:08 PM #10

Chris Veigl

Junior Member
Join Date: Oct 2018
Posts: 6

Hi GD!
i can confirm that the Joystick-only HID version works with the XBox Adaptive Controller! how nice!
thanks for your help

i am still looking for the reason why the composite device with mouse/keyboard/joystick does not work.
in fact, for my application i need the serial CDC device also - so the challenge continues ... but the working joystick is a huge step forward !

best regards,
chris

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11-09-2018, 10:32 PM #11

gdsports

Member
Join Date: Jul 2018
Posts: 45

Chris, I am glad to hear the new Joystick working out.

I sketched out an IMU to joystick program for a head, hand, or finger controlled joystick. I have to step away from XAC for a while so I am posting the code in case someone wants to give it a try.

Code:

```
  Serial1.print(heading);  // heading, nose-ri
  Serial1.print(F(" "));
  Serial1.print(pitch);    // pitch, nose-up i
  Serial1.print(F(" "));
  Serial1.print(roll);     // roll, leftwing-u
  Serial1.println(F(""));
#endif

  // Convert pitch to joystick y axis, roll to
  // Joystick.X, .Y expect values between 0..1
  // Convert -180..180 to 0..1023
  int x = ((round(roll)  + 180) * 1024) / 360;
  int y = ((round(pitch) + 180) * 1024) / 360;
  Joystick.X(x);
  Joystick.Y(y);
#if DEBUG_IMU
  Serial1.print(F("x,y "));
  Serial1.print(x);
  Serial1.print(',');
  Serial1.println(y);
#endif
}

void loop(void)
{
  if (imuElapsed > BNO055_SAMPLERATE_DELAY_MS)
    imuElapsed = 0;
    imu_loop();
    joy_loop();
  }
}
```

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11-25-2018, 12:41 AM #12

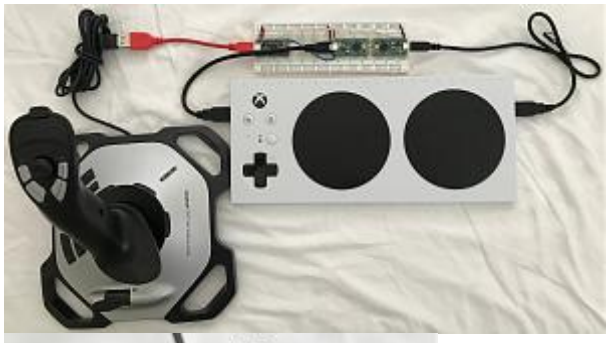
gdsports

Member
Join Date: Jul 2018
Posts: 45

The Microsoft Xbox Adaptive Controller (XAC) ignores the hat switch on the Logitech Extreme 3D Pro flight stick. The joystick splitter project is one way to solve this problem using Arduino compatible boards.

- Joystick X,Y maps to the left thumbstick
- Hat 8-way switch maps to the right thumbstick
- 4 top buttons map to A, B, X, Y
- Front trigger maps to right bumper
- Side trigger maps to left bumper

https://github.com/gdsports/xac-joystick-splitter



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12-02-2018, 08:57 AM #13

gdsports

Member
Join Date: Jul 2018
Posts: 45

The attached file has patches for Teensyduino 1.44 to add USB types Joystick and Joystick + Serial. The Serial is USB CDC ACM. The Microsoft Xbox Adaptive Controller works with both options. The Joystick + Serial option is new.
joystick_teensy_20181201.zip

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12-02-2018, 11:46 PM #14

gdsports

Member
Join Date: Jul 2018
Posts: 45

The Microsoft Xbox Adaptive Controller (XAC) ignores all USB HID devices except for joysticks. This project converts USB HID mouse messages into USB HID joystick messages. This allows the use of USB mice, track balls, and some touchpads.

https://github.com/gdsports/xac-mouse2joy

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12-05-2018, 07:18 PM #15

gdsports

Member
Join Date: Jul 2018
Posts: 45

The attached file has patches for Teensyduino 1.44 to add USB types Joystick and Joystick + Serial. The Serial is USB CDC ACM. The Microsoft Xbox Adaptive Controller works with both options. The Joystick + Serial option is new.
NEW: The Joystick + Serial option was only available for Teensy 3.6. The option is now available for all Teensy 3.x and LC.

joystick_teensy_20181205.zip

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07-20-2019, 08:56 AM #16

electron

Junior Member
Join Date: Jul 2019
Posts: 1

Hello, i am trying the joystick_teensy_20181205 and it's not work witch XAC.
When I put a value in Joystick.X or Joystick.Yy, do I have to write a command to send the value to the USB port or not ?. Could you show me a file? Cordially. Christian

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08-01-2019, 07:38 PM #17

gduck24

Junior Member
Join Date: Aug 2019
Posts: 2

This thread seems close to what I want to do so I thought I would ask here. I hacked a gamepad together that uses a teensy and analog joystick to work with my XIM on xbox. The code below works as a joystick with the XIM, but I want to directly plug into the xbox one and play with this as a keyboard and analog. I didnt write this code, only slightly modified it so I dont know what i am doing. I understand the xbox can recognize composite devices, which makes sense because my mouse has keyboard keys and the xbox recognizes the mouse and its keyboard keys.

Is it possible to modify this code below to make my device work on an xbox but still keep the analog joystick function?

Code:

```
}
void loop() {

        Joystick.button(1, !digitalRead(2));
        Joystick.button(2, !digitalRead(3));
        Joystick.button(3, !digitalRead(4));
        Joystick.button(4, !digitalRead(5));
        Joystick.button(5, !digitalRead(6));
        Joystick.button(6, !digitalRead(7));
        Joystick.button(7, !digitalRead(8));
        Joystick.button(8, !digitalRead(9));
        Joystick.button(9, !digitalRead(10));
```

```
        Joystick.button(10, !digitalRead(11));
        Joystick.button(11, !digitalRead(12));
        Joystick.button(12, !digitalRead(24));
        Joystick.button(13, !digitalRead(25));
        Joystick.button(14, !digitalRead(26));
        Joystick.button(15, !digitalRead(27));
        Joystick.button(16, !digitalRead(28));

        Joystick.X(analogRead(0));
        Joystick.Y(analogRead(1));

        if(touchRead(18) > 3000) Joystick.butt
        else Joystick.button(17, 0);
        if(touchRead(19) > 3000) Joystick.butt
        else Joystick.button(18, 0);

        Joystick.send_now();
}
```

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