

exwhyscope

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2019

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2 exwhyscope.c

```

/*
exwhyscope -- a simple XY oscilloscope using JACK and OpenGL
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20 */

#include <assert.h>
#include <stdio.h>
#include <jack/jack.h>
25 #include <GL/glew.h>
#include <GLFW/glfw3.h>

#define C 8
// must be multiple of JACK block size
30 #define N 65536
jack_client_t *client;
jack_port_t *in_port[C][2];
int ix = 0;
float xy[C][N][2];
35
int processcb(jack_nframes_t n, void *arg)
{
    (void) arg;
    if (ix + n <= N)
    40 {
        for (int c = 0; c < C; ++c)
        {
            jack_default_audio_sample_t *x = (jack_default_audio_sample_t *)

```

```

        jack_port_get_buffer(in_port[c][0], n);
45    jack_default_audio_sample_t *y = (jack_default_audio_sample_t *)
        jack_port_get_buffer(in_port[c][1], n);
        for (jack_nframes_t i = 0; i < n; ++i)
        {
            xy[c][ix + i][0] = x[i];
50        xy[c][ix + i][1] = y[i];
        }
    }
    ix += n;
55    if (ix >= N) ix = 0;
    return 0;
}

int main()
60 {
    // start JACK
    if (! (client = jack_client_open("exwhyscope", 0, 0)))
    {
        fprintf(stderr, "jack server not running?\n");
65        return 1;
    }
    jack_set_process_callback(client, processcb, 0);
    for (int c = 0; c < C; ++c)
    {
70        char x[7] = { 'i', 'n', '-', '1' + c, '-', 'x', 0 };
        char y[7] = { 'i', 'n', '-', '1' + c, '-', 'y', 0 };
        in_port[c][0] = jack_port_register(client, x, JACK_DEFAULT_AUDIO_TYPE, ↵
            ↵ JackPortIsInput, 0);
        in_port[c][1] = jack_port_register(client, y, JACK_DEFAULT_AUDIO_TYPE, ↵
            ↵ JackPortIsInput, 0);
    }
75    if (jack_activate(client))
    {
        fprintf(stderr, "cannot activate JACK client");
        return 1;
    }
80    // start OpenGL
    glfwInit();
    glfwWindowHint(GLFW_RESIZABLE, GL_FALSE);
    glfwWindowHint(GLFW_DECORATED, GL_TRUE);
    glfwWindowHint(GLFW_FLOATING, GL_TRUE);
85    GLFWwindow *window = glfwCreateWindow(512, 512, "exwhyscope", 0, 0);
    assert(window);
    glfwMakeContextCurrent(window);
    glewExperimental = GL_TRUE;
    glewInit();
90    glGetError(); // discard common error from glew
    glClearColor(0, 0, 0, 0);
    glDisable(GL_DEPTH_TEST);
    GLuint vbo;
    glGenBuffers(1, &vbo);
95    glBindBuffer(GL_ARRAY_BUFFER, vbo);
    glBufferData(GL_ARRAY_BUFFER, C * N * 2 * sizeof(GLfloat), xy, GL_STREAM_DRAW) ↵
        ↵ ;
    glVertexPointer(2, GL_FLOAT, 0, 0);

```

```

glEnableClientState(GL_VERTEX_ARRAY);
// main loop
100 while (1)
{
    glfwPollEvents();
    if (glfwWindowShouldClose(window)) { break; }
    glClear(GL_COLOR_BUFFER_BIT);
105 glBufferSubData(GL_ARRAY_BUFFER, 0, C * N * 2 * sizeof(GLfloat), xy);
    for (int c = 0; c < C; ++c)
    {
        const GLfloat colour[C][4] =
110         { { 1, 0, 0, 1 }
          , { 0, 1, 0, 1 }
          , { 0, 0, 1, 1 }
          , { 1, 1, 0, 1 }
          , { 0, 1, 1, 1 }
          , { 1, 0, 1, 1 }
115         , { 1, 1, 1, 1 }
          , { 0.5, 0.5, 0.5, 1 }
        };
        glColor4fv(&colour[c][0]);
        glDrawArrays(GL_POINTS, c * N, N);
120     }
        glfwSwapBuffers(window);
        GLint e;
        while ((e = glGetError()))
            fprintf(stderr, "OpenGL ERROR %d\n", e);
125     }
    // cleanup
    glfwDestroyWindow(window);
    glfwTerminate();
    return 0;
130 }

```

3 .gitignore

exwhyscope

4 Makefile

```

all: exwhyscope

clean:
    -rm exwhyscope

5 exwhyscope: exwhyscope.c
    gcc -std=c99 -Wall -Wextra -pedantic -O3 -Ofast -march=native -ffast-math \
        ↪ math -o exwhyscope exwhyscope.c -ljack -lGL -lGLEW -lglfw

```

5 README.md

```

# exwhyscope

<https://mathr.co.uk/exwhyscope>

5 ## what

```


A simple XY-scope using JACK for audio input and OpenGL for video output.

but

There are other software oscilloscopes supporting JACK, but I couldn't find one with XY mode.

get

Browse repository at <<https://code.mathr.co.uk/exwhyscope>>.

```
git clone https://code.mathr.co.uk/exwhyscope.git
```

build

```
make
```

run

```
./exwhyscope
jack_connect system:capture_1 exwhyscope:in_x_1
jack_connect system:capture_2 exwhyscope:in_y_1
```

config

The window size, JACK client name, and input channels (8 XY pairs) are hardcoded for now. Edit the source code and recompile to change them.

legal

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<<https://mathr.co.uk>>