Rapid Prototyping with Click Expansion Boards

SAN19-310

Josh Foster
Introductory

• Bachelors of Science - ASU
  • Electrical Engineering

• Avnet - 3 years
  • FPGA reference design creation
  • Circuit design
  • Creating and executing marketing initiatives
Plug and Play Click Modules

http://avnet.me/click-module-brochure

CLICK BOARDS ARE LIKE LEGO BLOCKS

Add sensors, communication modules, actuators, displays and other modules just like LEGO blocks!
700+ click boards
Click Application Portfolio

- Wireless Connectivity
- Sensors
- Interface
- Displays & LEDs
- Miscellaneous
- Mixed Signal
- Storage
- Motor Control
- Audio & Voice
- Human Machine Interfaces
- Clocking and Timing
- Power Management
MikroElektronika

- Founded in 2001
- Privately owned
- Headquarters in Belgrade, Serbia
- 10 product lines
- 700+ development boards
- 120,000 customers
  - 60% companies
  - 20% universities
  - 20% hobbyists
Exploring the mikroBUS

MINIMUM PIN COUNT - MAXIMUM EXPANDABILITY

mikroBUS™ - a novel standard.
What does this mikroBUS solve?

- No soldering, no wires, no time-wasting
- Over 700 plug and play peripheral expansion modules
- With mikroC PRO for ARM you have access to example code for many modules
- Low-cost sensor attachment
MikroE Click Mezzanine

• Mezzanine only -- $16

• MikroE Click Starter Kit -- $49
  • Mezzanine
  • 3 Modules
    • MIKROE-1985, USB-UART Click
    • MIKROE-2453, LCD Mini Click
    • MIKROE-2731, LSM6DSL Click

• Available Globally

http://Avnet.me/ClickMezzanine
Click Expansion for 96Boards

Follows Linaro 96Boards Mezzanine Design Guidelines
mikroC PRO for ARM

- Cost - $299.00
  - Life Time License
- 410 Code Examples
- 1312 Supported MCUs
- 1200 Library Functions

http://avnet.me/mikroe-arm-compiler
Avnet Click Modules GitHub

https://github.com/Avnet/clickmodules

• Sensor code that can be reused across multiple platforms

• Typically broken down into two or three files
  • Basic sensor/driver code in C
  • Basic C header
  • Optionally a C++ header

• MikroE Click Board Evaluation Blog
  • http://avnet.me/mikroe-sensor-eval

• Barometer Click (https://www.mikroe.com/barometer-click)

• Temp&Hum (https://www.mikroe.com/temp-hum-click)

• OLED-B Click (https://www.mikroe.com/oled-b-click)

• LightRanger Click (https://www.mikroe.com/lightranger-click)

• FLAME Click (https://www.mikroe.com/flame-click)

• RELAY Click (https://www.mikroe.com/relay-click)
MikroE Click Mezzanine on Ultra96

- Ultra96 Introductory Courses
  - Teaches the basics of:
    - Hardware Platform Development
    - Software Development
    - PetaLinux Integration
  - [http://avnet.me/TTC_On_Demand](http://avnet.me/TTC_On_Demand)

- MikroE Click Module Demo Blog
  - [http://avnet.me/mikroe-click-boards-blog](http://avnet.me/mikroe-click-boards-blog)
Click Mezzanine Demonstration

- IoT Application: Log Sensor Data to IBM® Bluemix® Using Ultra96 PetaLinux
  - Use the MQTT protocol to send data
  - See the benefits of PetaLinux by leveraging its built in networking capabilities

http://avnet.me/ultra96_sensor_demo
Your Next Steps

● Explore Click Modules available for your desired application!
  ○ [Link to brochure](http://avnet.me/click-module-brochure)

● Explore the Avnet GitHub Click Module archive!
  ○ [Link to GitHub](https://github.com/Avnet/clickmodules)

● Design with click modules!
  ○ [Link to Mezzanine](http://Avnet.me/ClickMezzanine)
Thank you

Join Linaro to accelerate deployment of your Arm-based solutions through collaboration

contactus@linaro.org
Appendix – Navigating GitHub - Avnet

https://github.com/Avnet

Repository: petailinux
- Repository used to support automated builds under Petailinux tools that use Yocto.
- Shell
- C
- Examples

Repository: clickboard_demos
- Examples for using the clickmodule code on various Avnet platforms
- C
- Shell

Repository: clickmodules
- C Code for MikroE Click Modules used by Avnet
- C
- Shell
Appendix – Navigating GitHub-click_board demos

https://github.com/Avnet/clickboard_demos

Click Board demonstration code

Overview

This repository contains example solutions for the MikroE Click Board software located at https://github.com/Avnet/clickmodules. Specific details for implementing the demo code is documented in the README.md files located in the various platform directories.

There is also an article on element14 at https://www.element14.com/community/blogs/jimflynn/2019/07/12/using-mikroe-click-boards-with-microsoft-sphere that shows how the demonstration code is used in the projects listed here.

Common code usage

In all the demo programs, the code from https://github.com/Avnet/clickmodules is first compiled into a linkable library. The specific demo code is then compiled and linked with the newly created library to produce an executable image.
### Appendix – Navigating GitHub – click_modules

<table>
<thead>
<tr>
<th>Directory</th>
<th>Description</th>
<th>Last Updated</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIRQUALITY5</td>
<td>adding AIRQUALITY5 (#11)</td>
<td>29 days ago</td>
</tr>
<tr>
<td>BAROMETER</td>
<td>Update barometer.h</td>
<td>5 months ago</td>
</tr>
<tr>
<td>FLAME</td>
<td>Docs and LSM6DSL support (#6)</td>
<td>3 months ago</td>
</tr>
<tr>
<td>HEARTRATE4</td>
<td>Jflyn129 dev (#9)</td>
<td>3 months ago</td>
</tr>
<tr>
<td>LCDMINI</td>
<td>Jflyn129 dev (#9)</td>
<td>3 months ago</td>
</tr>
<tr>
<td>LIGHTTRANGER</td>
<td>Jflyn129 dev (#9)</td>
<td>3 months ago</td>
</tr>
<tr>
<td>LSM6DSL</td>
<td>Docs and LSM6DSL support (#6)</td>
<td>3 months ago</td>
</tr>
<tr>
<td>OLED-B</td>
<td>first commit</td>
<td>6 months ago</td>
</tr>
<tr>
<td>RELAY</td>
<td>adding relay schematic (#3)</td>
<td>5 months ago</td>
</tr>
<tr>
<td>TEMP_HUM</td>
<td>first commit</td>
<td>6 months ago</td>
</tr>
<tr>
<td>UART_I2CSPi</td>
<td>adding in jflyn129_dev (#4)</td>
<td>4 months ago</td>
</tr>
<tr>
<td>.project</td>
<td>Update .project</td>
<td>4 months ago</td>
</tr>
<tr>
<td>.gitignore</td>
<td>adding in jflyn129_dev (#4)</td>
<td>4 months ago</td>
</tr>
<tr>
<td>.project</td>
<td>adding in jflyn129_dev (#4)</td>
<td>4 months ago</td>
</tr>
<tr>
<td>LICENSE</td>
<td>first commit</td>
<td>6 months ago</td>
</tr>
<tr>
<td>README.md</td>
<td>Update README.md</td>
<td>5 months ago</td>
</tr>
</tbody>
</table>
Appendix – Advanced MikroE Click Filtering

https://www.mikroe.com/click
Appendix – Advanced MikroE Click Filtering

https://www.mikroe.com/click

<table>
<thead>
<tr>
<th>CATEGORIES</th>
<th>TYPE</th>
<th>INTERFACE</th>
<th>INPUT VOLTAGE</th>
<th>FEATURED TECHNOLOGY</th>
</tr>
</thead>
</table>
Appendix – Advanced MikroE Compiler Filtering

- Click Boards
- Compilers
  - Compilers for PIC
  - Compilers for dsPIC / PIC24
  - Compilers for PIC32
  - Compilers for ARM
  - Compilers for AVR
  - Compilers for FT50x
  - GUI Development Software
  - Supporting software
- Development Boards
- Starter Boards
- Programmers and Debuggers
- Smart Displays
- MCU Cards
- Accessories
- Development Kits
- Legacy Products

https://www.mikroe.com/compilers