

The *MOD Duo* as a Platform for Audio Programming

Jakob Dübel

MOD Devices GmbH
Berlin

Programmable Audio Workshop

2018-12-01

GRAME, Centre National de Création Musicale

Outline

The *Duo* Device

Cross-Compiling Plug-ins

Slides are online:

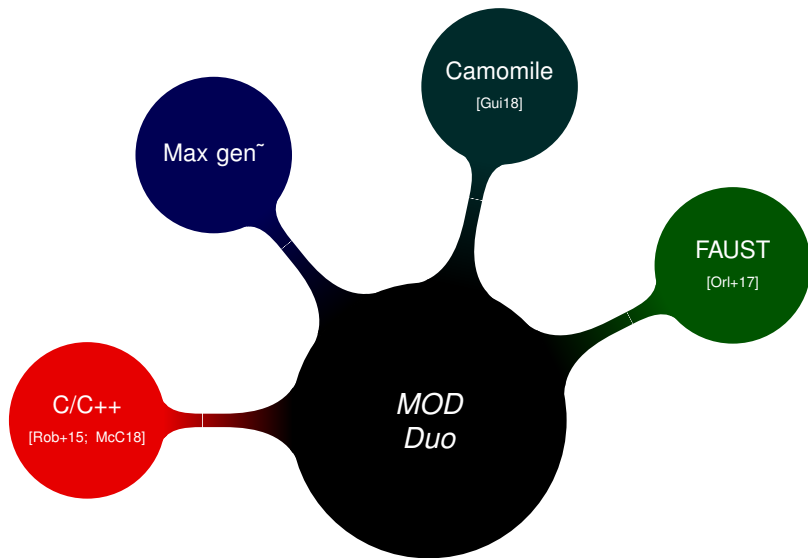
<https://github.com/jkbd/noise/>

The *Duo* Device



- ▶ 2 inputs, 2 outputs
- ▶ 2 encoders, 2 footswitches
- ▶ stand-alone LV2 host
- ▶ ARM Cortex A7, 912 MHz.

Where do the Plug-ins come from?



Fast-Forward: Build and Deploy

- ▶ **TODO: Insert 5 slides of painstaking preparation here**
- ▶ Cross-compile package to LV2 bundle

```
D> ./build the-package-name
```

- ▶ Deploy LV2 bundle to *Duo* via HTTP

```
> cd ~/plugins/  
> tar cz the-bundle-name.lv2 | base64 | \  
curl -F 'package=@-' http://192.168.51.1/sdk/install
```

Prerequisite: Example LV2 Plug-in

► Noise

```
> git clone https://github.com/jkbd/noise
> cd noise
> cat noise.dsp
import("stdfaust.lib");
process = no.noise;
```

- Valid TTL metadata.
- Makefile honors `PREFIX` and `DESTDIR`.
- Makefile calls `$(CXX)`, not `g++` !

Prerequisite: *Buildroot* Package

► Clone MOD Plug-in Builder

```
> git clone \
git@github.com:moddevices/mod-plugin-builder.git
```

► Create `noise.mk` file for the example

```
> cd ~/mod-plugin-builder/plugins/package/
> mkdir noise
> cd noise
> nano noise.mk
```

with the following contents...

Prerequisite: *Buildroot* Package (continued)

```
NOISE_VERSION = 1aebb5df94a9971a2fdbb91b6e7a70e6db72257a
NOISE_SITE = $(call github,jkdb,noise,$(NOISE_VERSION))
NOISE_BUNDLES = noise.lv2
NOISE_TARGET_MAKE = $(TARGET_MAKE_ENV) \
    $(TARGET_CONFIGURE_OPTS) $(MAKE) NOOPT=true -C $(@D)

define NOISE_BUILD_CMDS
    $(NOISE_TARGET_MAKE)
endef

define NOISE_INSTALL_TARGET_CMDS
    $(NOISE_TARGET_MAKE) install \
        DESTDIR=$(TARGET_DIR) PREFIX=/usr
endef

$(eval $(generic-package))
```


Prerequisite: Docker

- ▶ Docker installed
It will save you from dependency hell
- ▶ MOD Plug-in Builder Docker image
Contains *Buildroot* cross-compile toolchain

```
> mkdir ~/plugins
> docker run --privileged -ti \
-v ~/mod-plugin-builder:/home/builder/mod-plugin-builder \
-v ~/plugins:/home/builder/mod-workdir/plugins \
moddevices/mod-plugin-builder
D> exit
```

Install FAUST inside Docker Container

► Start Docker

```
> docker start -i priceless_hodgkin
```

► Install FAUST with dependencies

```
D> sudo apt-get update
D> sudo apt-get install cmake lv2-dev libboost-all-dev
D> git clone https://github.com/grame-cncm/faust.git
D> cd faust
D> git submodule update --init
D> make
D> sudo make install
```

Again: Build and Deploy

► Cross-compile package to LV2 bundle

```
D> ./build noise
...
Finished copying noise.lv2
D> ls ~/mod-workdir/plugins/noise.lv2
manifest.ttl  noise.so  noise.ttl      # yeah!
```

► Deploy LV2 bundle to *Duo* via HTTP

```
> cd ~/plugins/
> tar cz noise.lv2 | base64 | \
curl -F 'package=@-' http://192.168.51.1/sdk/install
```

Where to get help

- ▶ **MOD Wiki** https://wiki.moddevices.com/wiki/Creating_Audio_Plugins
- ▶ **Explore the packages in MOD Plug-in Builder**

Summary

Contents

- ▶ The *MOD Duo* device
- ▶ Cross-compile a FAUST based LV2 plug-in

Summary

Contents

- ▶ The *MOD Duo* device
- ▶ Cross-compile a FAUST based LV2 plug-in

If you have a *Duo*, try out:

- ▶ Peak Limiter `co.limiter_1176_R4_stereo`
- ▶ Moog Voltage Controlled Filter `ve.moog_vcf`
- ▶ Harmonic Exciter `dm.exciter`
- ▶ Bart Brouns Compressors

<https://github.com/magnetophon/faustCompressors>

References I

- [Gui18] Pierre Guillot. *Camomile: Creating audio plugins with Pure Data*. 2018. URL: <http://lac.linuxaudio.org/2018/pdf/44-paper.pdf> (visited on 11/29/2018).
- [McC18] Mark McCurry. *Introduction to LV2. A Plugin Host Perspective*. 05/06/2018. URL: <http://fundamental-code.com/tmp/lv2-host-perspecitive.html> (visited on 11/29/2018).
- [Orl+17] Yann Orlarey et al. *FAUST Quick Reference*. Version 0.9.100. Centre National de Création Musicale. 06/07/2017. URL: <http://faust.grame.fr/images/faust-quick-reference.pdf> (visited on 08/09/2017).
- [Rob+15] David Robillard et al. *Programming LV2 Plugins*. 04/08/2015. URL: <http://lv2plug.in/book/> (visited on 11/29/2018).

Questions?

(My name is Jakob Dübel)