# MediaTek Linklt™ Smart 7688 Duo Development Platform

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#### What is it?

- ➤ an affordable development board (7688: \$12.9, 7688 Duo: \$15.90)
  - Linklt Smart 7688: MPU only. Powered by MediaTek MIPS-based Wi-Fi AP SoC MT7688AN.
  - ► Linklt Smart 7688 Duo: MPU and MCU. Powered by MediaTek MT7688 and ATmega32U4.
- key features:
  - 580 MHz MIPS CPU
  - Single input single output(1T1R) Wi-Fi 802.11 b/g/n (2.4 GHz)
  - ▶ Pin-out for GPIO, I2C, SPI,UART, PWM, and Ethernet port
  - ▶ 32MB Flash and 128MB DDR2 RAM
  - USB host
  - ▶ Micro SD slot
  - Support for Arduino (ATmega32U4)
- OS: OpenWrt 15.05
- ▶ Programming environment: C/C++ (cross-compiling), Python, and Node.js
  - ▶ well, it's Linux. You can put whatever you like into your microSDHC and microSDXC cards

```
make[1] world
make[2] target/compile
make[3] -C target/linux compile
make[2] package/cleanup
make[2] package/compile
make[3] -C package/libs/toolchain compile
make[3] -C package/libs/libnl-tiny compile
make[3] -C package/libs/libjson-c compile
make[3] -C package/utils/lua compile
make[3] -C package/libs/libubox compile
make[3] -C package/system/ubus compile
make[3] -C package/system/uci compile
make[3] -C package/network/config/netifd compil
make[3] -C package/system/opkg host-compile
make[3] -C package/system/ubox compile
make[3] -C package/libs/lzo compile
make[3] -C package/libs/zlib compile
make[3] -C package/libs/ncurses host-compile
```

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make[3] -C package/libs/ncurses compile
make[3] -C package/utils/util-linux compile
make[3] -C package/utils/ubi-utils compile
make[3] -C package/system/procd compile
make[3] -C package/system/usign host-compile
make[3] —C package/utils/jsonfilter compile
make[3] -C package/system/usign compile
make[3] -C package/base-files compile
make[3] -C package/system/fstools compile
make[3] -C package/boot/uboot-envtools compile
make[3] -C package/libs/libreadline compile
make[3] -C package/devel/gdb compile
make[3] -C package/devel/strace compile
make[3] -C feeds/linkit/mtk-linkit-webui compil
make[3] -C package/network/utils/wireless-tools
make[3] -C feeds/linkit/mtk-sdk-wifi compile
```

make[3] -C feeds/luci/modules/luci-base host-comake[3] -C package/libs/libtool compile

make[3] -C package/utils/lua host-compile make[3] -C feeds/luci/applications/luci-app-mjp make[3] -C package/network/services/samba36 con make[3] -C feeds/luci/applications/luci-app-sam make[3] -C feeds/luci/libs/luci-lib-json compil make[3] -C feeds/luci/themes/luci-theme-openwrt make[3] -C package/firmware/linux-firmware comp make[3] -C package/kernel/linux compile make[3] -C package/network/utils/iptables compi make[3] -C package/network/config/firewall comp make[3] -C feeds/luci/applications/luci-app-fire make[3] -C feeds/luci/libs/luci-lib-ip compile make[3] -C feeds/luci/libs/luci-lib-nixio comp make[3] -C package/network/utils/iwinfo compile make[3] -C package/system/rpcd compile make[3] -C feeds/luci/modules/luci-base compile 4□ ト 4 □ ト 4 亘 ト 4 亘 ト 9 Q ○

make[3] -C feeds/packages/libs/libjpeg compile make[3] -C feeds/packages/multimedia/mjpg-stream make[3] -C feeds/luci/modules/luci-mod-admin-fu make[3] -C feeds/luci/protocols/luci-proto-ppp make[3] -C feeds/luci/themes/luci-theme-bootstra make[3] -C package/libs/polarssl compile make[3] -C package/libs/ustream-ssl compile make[3] -C package/network/services/uhttpd comp make[3] -C feeds/luci/protocols/luci-proto-ipv6 make[3] -C feeds/luci/collections/luci compile make[3] -C feeds/packages/libs/alsa-lib compile make[3] -C feeds/packages/utils/alsa-utils comp make[3] -C feeds/packages/libs/expat compile make[3] -C feeds/packages/utils/dbus compile make[3] -C feeds/packages/libs/gdbm compile make[3] -C feeds/packages/libs/intltool host-co make[3] -C feeds/packages/libs/libdaemon compil make[3] -C feeds/packages/libs/avahi compile make[3] -C feeds/packages/libs/avahi compile make[3] -C feeds/packages/libs/confuse compile

```
make[3] -C package/libs/libusb compile
make[3] -C feeds/packages/libs/libftdi1 compile
make[3] —C package/utils/bzip2 compile
make[3] -C package/libs/gettext compile
make[3] -C package/libs/libiconv compile
make[3] -C package/libs/argp-standalone compile
make[3] -C package/libs/elfutils compile
make[3] -C package/libs/libusb-compat compile
make[3] -C feeds/packages/utils/avrdude compile
make[3] -C feeds/packages/net/cgi-io compile
make[3] -C feeds/packages/utils/attr compile
make[3] —C feeds/packages/utils/acl compile
make[3] -C package/libs/gmp compile
make[3] -C feeds/packages/utils/coreutils compi
make[3] -C feeds/packages/kernel/exfat-nofuse c
make[3] -C package/libs/ocf-crypto-headers comp
make[3] -C package/libs/openssl compile
make[3] -C package/network/utils/curl compile
```

```
make[3] -C package/system/ca-certificates compi
make[3] -C feeds/packages/net/git compile
make[3] -C feeds/packages/libs/hidapi compile
make[3] -C feeds/packages/libs/libuv compile
make[3] -C feeds/packages/libs/expat host-comp
make[3] -C package/utils/bzip2 host-compile
make[3] -C feeds/packages/lang/python host-comp
make[3] -C feeds/packages/lang/node compile
make[3] -C feeds/packages/lang/node host-compil
make[3] -C feeds/packages/libs/libxml2 compile
make[3] -C package/libs/uclibc++ compile
make[3] -C feeds/packages/libs/db47 compile
make[3] -C feeds/packages/libs/libffi compile
make[3] -C feeds/packages/libs/sqlite3 compile
make[3] -C feeds/packages/lang/python compile
make[3] -C feeds/packages/utils/swig host-comp
make[3] -C feeds/packages/libs/libmraa compile
make[3] -C feeds/packages/libs/libupm compile
```

make[3] -C feeds/packages/libs/libid3tag compil make[3] -C feeds/packages/libs/libmad compile make[3] -C feeds/packages/sound/madplay compile make[3] -C feeds/packages/lang/node-serialport make[3] -C feeds/packages/lang/node-arduino-firm make[3] -C feeds/packages/lang/node-cylon compi make[3] -C feeds/packages/lang/node-hid compile make[3] -C feeds/packages/lang/python-setuptool make[3] -C feeds/packages/lang/python-pip compi make[3] -C feeds/packages/lang/python-pyserial make[3] -C feeds/packages/utils/spi-tools compi make[3] -C feeds/packages/utils/yunbridge compi make[3] -C package/system/mountd compile make[3] -C feeds/linkit/mtk-linkit compile make[3] -C package/kernel/gpio-button-hotplug c make[3] -C package/network/config/swconfig comp make[3] -C package/network/ipv6/odhcp6c compile make[3] -C package/network/services/dnsmasq con

```
make[3] -C package/network/services/dropbear co
make[3] -C package/network/services/hostapd con
make[3] -C package/network/services/odhcpd comp
make[3] -C package/libs/libpcap compile
make[3] -C package/network/utils/linux-atm comp
make[3] -C package/network/utils/resolveip comp
make[3] -C package/network/services/ppp compile
make[3] -C package/system/mtd compile
make[3] -C package/system/opkg compile
make[3] -C package/utils/busybox compile
make[2] package/install
make[3] package/preconfig
make[2] target/install
make[3] -C target/linux install
make[2] package/index
```

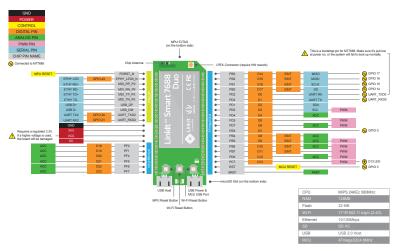
#### Some Caveats

- ▶ if you don't like FAT, vFAT, and exFAT, build your own kernel
- 'make menuconfig' or 'make kernel\_menuconfig' in OpenWrt building environment
- zeroconf and dual-stack problem: use http://ipv4-address or http://ipv6-address instead of http://something.local
- surely it's easier to use USB flash drive to update firmware
- NOT all the packages in OpenWrt are tested to be built on OS X
  - adding /opt/local/libexec/gnubin to PATH helps a lot
  - ▶ /bin/tar
  - gyp, node\_gyp

- bootloader, u-boot, source code
- ▶ kernel, 3.18-based, here
  - some of them are upstreamed to mainline, some are not (yet)
  - one big exception now is the Wi-Fi driver
  - should be possible to use mainline kernel
- ► Since there is lua, we can build lua-rs232 and use it to communicate with Arduino

### Linklt<sup>™</sup> Smart 7688 Duo





## **LinkIt**<sup>™</sup> **Smart** 7688



