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Sensor Tag を使う(Bluetooth Low Energy/BLE 接続)

BlueZ のインストール

MA-E300シリーズにBluetoothのプロトコルスタックであるBlueZをインストールします。

BlueZ <http://www.bluez.org/>

まずは、ダウンロード。

```
root@plum:/usr/local/src# wget
http://www.kernel.org/pub/linux/bluetooth/bluez-5.32.tar.xz
--2015-07-16 16:24:07--
http://www.kernel.org/pub/linux/bluetooth/bluez-5.32.tar.xz
Resolving www.kernel.org (www.kernel.org)... 198.145.20.140, 149.20.4.69,
199.204.44.194, ...
Connecting to www.kernel.org (www.kernel.org)|198.145.20.140|:80...
connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://www.kernel.org/pub/linux/bluetooth/bluez-5.32.tar.xz
[following]
--2015-07-16 16:24:07--
https://www.kernel.org/pub/linux/bluetooth/bluez-5.32.tar.xz
Connecting to www.kernel.org (www.kernel.org)|198.145.20.140|:443...
connected.
HTTP request sent, awaiting response... 200 OK
Length: 1634844 (1.6M) [application/x-xz]
Saving to: 'bluez-5.32.tar.xz'

100%[=====>] 1,634,844    1.34MB/s   in 1.2s

2015-07-16 16:24:09 (1.34 MB/s) - 'bluez-5.32.tar.xz' saved
[1634844/1634844]
```

展開とコンパイル。

```
root@plum:/usr/local/src# tar Jxf bluez-5.32.tar.xz
root@plum:/usr/local/src# cd bluez-5.32/
root@plum:/usr/local/src/bluez-5.32# ./configure
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a thread-safe mkdir -p... /bin/mkdir -p
checking for gawk... no
checking for mawk... mawk
checking whether make sets $(MAKE)... yes
checking whether make supports nested variables... yes
checking how to create a pax tar archive... gnutar
```

```
checking for style of include used by make... GNU
checking for gcc... gcc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.out
checking for suffix of executables...
checking whether we are cross compiling... no
checking for suffix of object files... o
checking whether we are using the GNU C compiler... yes
checking whether gcc accepts -g... yes
checking for gcc option to accept ISO C89... none needed
checking whether gcc understands -c and -o together... yes
checking dependency style of gcc... gcc3
checking how to run the C preprocessor... gcc -E
checking for grep that handles long lines and -e... /bin/grep
checking for egrep... /bin/grep -E
checking for ANSI C header files... yes
checking for sys/types.h... yes
checking for sys/stat.h... yes
checking for stdlib.h... yes
checking for string.h... yes
checking for memory.h... yes
checking for strings.h... yes
checking for inttypes.h... yes
checking for stdint.h... yes
checking for unistd.h... yes
checking minix/config.h usability... no
checking minix/config.h presence... no
checking for minix/config.h... no
checking whether it is safe to define __EXTENSIONS__... yes
checking whether make supports nested variables... (cached) yes
checking whether to enable maintainer-specific portions of Makefiles... no
checking for pkg-config... no
checking for C/C++ restrict keyword... __restrict
checking for gcc... (cached) gcc
checking whether we are using the GNU C compiler... (cached) yes
checking whether gcc accepts -g... (cached) yes
checking for gcc option to accept ISO C89... (cached) none needed
checking whether gcc understands -c and -o together... (cached) yes
checking dependency style of gcc... (cached) gcc3
checking whether gcc accepts -fPIE... yes
checking build system type... armv7l-unknown-linux-gnueabi
checking host system type... armv7l-unknown-linux-gnueabi
checking how to print strings... printf
checking for a sed that does not truncate output... /bin/sed
checking for fgrep... /bin/grep -F
checking for ld used by gcc... /usr/bin/ld
checking if the linker (/usr/bin/ld) is GNU ld... yes
checking for BSD- or MS-compatible name lister (nm)... /usr/bin/nm -B
checking the name lister (/usr/bin/nm -B) interface... BSD nm
checking whether ln -s works... yes
```

```
checking the maximum length of command line arguments... 1572864
checking whether the shell understands some XSI constructs... yes
checking whether the shell understands "+="... yes
checking how to convert armv7l-unknown-linux-gnueabi file names to armv7l-
unknown-linux-gnueabi format... func_convert_file_noop
checking how to convert armv7l-unknown-linux-gnueabi file names to
toolchain format... func_convert_file_noop
checking for /usr/bin/ld option to reload object files... -r
checking for objdump... objdump
checking how to recognize dependent libraries... pass_all
checking for dlltool... no
checking how to associate runtime and link libraries... printf %s\n
checking for ar... ar
checking for archiver @FILE support... @
checking for strip... strip
checking for ranlib... ranlib
checking command to parse /usr/bin/nm -B output from gcc object... ok
checking for sysroot... no
checking for mt... mt
checking if mt is a manifest tool... no
checking for dlfcn.h... yes
checking for objdir... .libs
checking if gcc supports -fno-rtti -fno-exceptions... no
checking for gcc option to produce PIC... -fPIC -DPIC
checking if gcc PIC flag -fPIC -DPIC works... yes
checking if gcc static flag -static works... yes
checking if gcc supports -c -o file.o... yes
checking if gcc supports -c -o file.o... (cached) yes
checking whether the gcc linker (/usr/bin/ld) supports shared libraries...
yes
checking whether -lc should be explicitly linked in... no
checking dynamic linker characteristics... GNU/Linux ld.so
checking how to hardcode library paths into programs... immediate
checking whether stripping libraries is possible... yes
checking if libtool supports shared libraries... yes
checking whether to build shared libraries... yes
checking whether to build static libraries... no
checking for signalfd... yes
checking for clock_gettime in -lrt... yes
checking for pthread_create in -lpthread... yes
checking for dlopen in -ldl... yes
checking linux/types.h usability... yes
checking linux/types.h presence... yes
checking for linux/types.h... yes
checking linux/if_alg.h usability... yes
checking linux/if_alg.h presence... yes
checking for linux/if_alg.h... yes
checking for GLIB... no
configure: error: GLib >= 2.28 is required
```

Glib のバージョンが低いとひっかかりました。ひっかかったライブラリを apt-get でインストールしま

す。

```
root@plum:/usr/local/src/bluez-5.32# apt-get install -y libglib2.0-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
(SNIP)

Total disk space freed by localepurge: 0 KiB
```

再び configure を実行。

```
root@plum:/usr/local/src/bluez-5.32# ./configure
(SNIP)
checking for GLIB... yes
checking for DBUS... no
configure: error: D-Bus >= 1.6 is required
```

ひかかったところをアップデートしつつ進めていきます。

最終的な apt-get コマンドは以下の通り。

```
root@plum:/usr/local/src/bluez-5.32# apt-get install -y libglib2.0-dev
libdbus-1-dev libudev-dev libical-dev libreadline-dev
```

そして ./configure (にオプションをつけて)を実行。

```
root@plum:/usr/local/src/bluez-5.32# ./configure --disable-systemd
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a thread-safe mkdir -p... /bin/mkdir -p
checking for gawk... no
checking for mawk... mawk
checking whether make sets $(MAKE)... yes
checking whether make supports nested variables... yes
checking how to create a pax tar archive... gnutar
checking for style of include used by make... GNU
checking for gcc... gcc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.out
checking for suffix of executables...
checking whether we are cross compiling... no
checking for suffix of object files... o
checking whether we are using the GNU C compiler... yes
checking whether gcc accepts -g... yes
checking for gcc option to accept ISO C89... none needed
checking whether gcc understands -c and -o together... yes
checking dependency style of gcc... gcc3
checking how to run the C preprocessor... gcc -E
checking for grep that handles long lines and -e... /bin/grep
```

```
checking for egrep... /bin/grep -E
checking for ANSI C header files... yes
checking for sys/types.h... yes
checking for sys/stat.h... yes
checking for stdlib.h... yes
checking for string.h... yes
checking for memory.h... yes
checking for strings.h... yes
checking for inttypes.h... yes
checking for stdint.h... yes
checking for unistd.h... yes
checking minix/config.h usability... no
checking minix/config.h presence... no
checking for minix/config.h... no
checking whether it is safe to define __EXTENSIONS__... yes
checking whether make supports nested variables... (cached) yes
checking whether to enable maintainer-specific portions of Makefiles... no
checking for pkg-config... /usr/bin/pkg-config
checking pkg-config is at least version 0.9.0... yes
checking for C/C++ restrict keyword... __restrict
checking for gcc... (cached) gcc
checking whether we are using the GNU C compiler... (cached) yes
checking whether gcc accepts -g... (cached) yes
checking for gcc option to accept ISO C89... (cached) none needed
checking whether gcc understands -c and -o together... (cached) yes
checking dependency style of gcc... (cached) gcc3
checking whether gcc accepts -fPIE... yes
checking build system type... armv7l-unknown-linux-gnueabi
checking host system type... armv7l-unknown-linux-gnueabi
checking how to print strings... printf
checking for a sed that does not truncate output... /bin/sed
checking for fgrep... /bin/grep -F
checking for ld used by gcc... /usr/bin/ld
checking if the linker (/usr/bin/ld) is GNU ld... yes
checking for BSD- or MS-compatible name lister (nm)... /usr/bin/nm -B
checking the name lister (/usr/bin/nm -B) interface... BSD nm
checking whether ln -s works... yes
checking the maximum length of command line arguments... 1572864
checking whether the shell understands some XSI constructs... yes
checking whether the shell understands "+="... yes
checking how to convert armv7l-unknown-linux-gnueabi file names to armv7l-unknown-linux-gnueabi format... func_convert_file_noop
checking how to convert armv7l-unknown-linux-gnueabi file names to toolchain format... func_convert_file_noop
checking for /usr/bin/ld option to reload object files... -r
checking for objdump... objdump
checking how to recognize dependent libraries... pass_all
checking for dlltool... no
checking how to associate runtime and link libraries... printf %s\n
checking for ar... ar
checking for archiver @FILE support... @
```

```
checking for strip... strip
checking for ranlib... ranlib
checking command to parse /usr/bin/nm -B output from gcc object... ok
checking for sysroot... no
checking for mt... mt
checking if mt is a manifest tool... no
checking for dlfcn.h... yes
checking for objdir... .libs
checking if gcc supports -fno-rtti -fno-exceptions... no
checking for gcc option to produce PIC... -fPIC -DPIC
checking if gcc PIC flag -fPIC -DPIC works... yes
checking if gcc static flag -static works... yes
checking if gcc supports -c -o file.o... yes
checking if gcc supports -c -o file.o... (cached) yes
checking whether the gcc linker (/usr/bin/ld) supports shared libraries...
yes
checking whether -lc should be explicitly linked in... no
checking dynamic linker characteristics... GNU/Linux ld.so
checking how to hardcode library paths into programs... immediate
checking whether stripping libraries is possible... yes
checking if libtool supports shared libraries... yes
checking whether to build shared libraries... yes
checking whether to build static libraries... no
checking for signalfd... yes
checking for clock_gettime in -lrt... yes
checking for pthread_create in -lpthread... yes
checking for dlopen in -ldl... yes
checking linux/types.h usability... yes
checking linux/types.h presence... yes
checking for linux/types.h... yes
checking linux/if_alg.h usability... yes
checking linux/if_alg.h presence... yes
checking for linux/if_alg.h... yes
checking for GLIB... yes
checking for DBUS... yes
checking D-Bus configuration directory... /etc
checking D-Bus system bus services dir... /usr/share/dbus-1/system-services
checking D-Bus session bus services dir... /usr/share/dbus-1/services
checking for UDEV... yes
checking for udev_hwdb_new in -ludev... yes
checking udev directory... /lib/udev
checking for ICAL... yes
checking readline/readline.h usability... yes
checking readline/readline.h presence... yes
checking for readline/readline.h... yes
checking that generated files are newer than configure... done
configure: creating ./config.status
config.status: creating Makefile
config.status: creating src/bluetoothd.8
config.status: creating lib/bluez.pc
```



```
config.status: creating config.h
config.status: executing depfiles commands
config.status: executing libtool commands
```

コンパイルとインストール。

```
root@plum:/usr/local/src/bluez-5.32# make && make install
GEN      lib/bluetooth/bluetooth.h
GEN      lib/bluetooth/hci.h
GEN      lib/bluetooth/hci_lib.h
GEN      lib/bluetooth/sco.h
GEN      lib/bluetooth/l2cap.h
GEN      lib/bluetooth/sdp.h
GEN      lib/bluetooth/sdp_lib.h
GEN      lib/bluetooth/rfcomm.h
GEN      lib/bluetooth/bnep.h
GEN      lib/bluetooth/cmt.h
GEN      lib/bluetooth/hidp.h
GEN      src/builtin.h
GEN      obexd/src/builtin.h
CC      lib/bluetooth.lo
CC      lib/hci.lo
CC      lib/sdp.lo
CC      lib/uuid.lo
CCLD    lib/libbluetooth-internal.la
CC      gdbus/mainloop.lo
CC      gdbus/watch.lo
CC      gdbus/object.lo
CC      gdbus/client.lo
CC      gdbus/polkit.lo
CCLD    gdbus/libgdbus-internal.la
CC      src/shared/queue.lo
CC      src/shared/util.lo
CC      src/shared/mgmt.lo
CC      src/shared/crypto.lo
CC      src/shared/ecc.lo
CC      src/shared/ringbuf.lo
CC      src/shared/tester.lo
CC      src/shared/hci.lo
CC      src/shared/hci-crypto.lo
CC      src/shared/hfp.lo
CC      src/shared/uhid.lo
CC      src/shared/pcap.lo
CC      src/shared/btsnoop.lo
CC      src/shared/ad.lo
CC      src/shared/att.lo
CC      src/shared/gatt-helpers.lo
CC      src/shared/gatt-client.lo
CC      src/shared/gatt-server.lo
CC      src/shared/gatt-db.lo
CC      src/shared/gap.lo
```

```
CC      src/shared/io-glib.lo
CC      src/shared/timeout-glib.lo
CCLD    src/libshared-glib.la
CC      src/shared/io-mainloop.lo
CC      src/shared/timeout-mainloop.lo
CC      src/shared/mainloop.lo
CCLD    src/libshared-mainloop.la
CC      client/main.o
CC      client/display.o
CC      client/agent.o
CC      client/gatt.o
CC      monitor/uuid.o
CCLD    client/bluetoothctl
CC      monitor/main.o
CC      monitor/display.o
CC      monitor/hcidump.o
CC      monitor/ellisys.o
CC      monitor/control.o
CC      monitor/packet.o
CC      monitor/vendor.o
CC      monitor/lmp.o
CC      monitor/crc.o
CC      monitor/ll.o
CC      monitor/l2cap.o
CC      monitor/sdp.o
CC      monitor/avctp.o
CC      monitor/rfcomm.o
CC      monitor/bnep.o
CC      monitor/hwdb.o
CC      monitor/keys.o
CC      monitor/analyze.o
CCLD    monitor/btmon
CC      tools/hciattach.o
CC      tools/hciattach_st.o
CC      tools/hciattach_ti.o
CC      tools/hciattach_tialt.o
CC      tools/hciattach_ath3k.o
CC      tools/hciattach_qualcomm.o
CC      tools/hciattach_intel.o
CC      tools/hciattach_bcm43xx.o
CCLD    tools/hciattach
CC      tools/hciconfig.o
CC      tools/csr.o
CCLD    tools/hciconfig
CC      tools/hcitol.o
CC      src/oui.o
CCLD    tools/hcitol
CC      tools/hcidump.o
CC      tools/parser/parser.o
CC      tools/parser/lmp.o
```

CC	tools/parser/hci.o
CC	tools/parser/l2cap.o
CC	tools/parser/amp.o
CC	tools/parser/smp.o
CC	tools/parser/att.o
CC	tools/parser/sdp.o
CC	tools/parser/rfcomm.o
CC	tools/parser/bnep.o
CC	tools/parser/cmtcp.o
CC	tools/parser/hidp.o
CC	tools/parser/hcrp.o
CC	tools/parser/avdtp.o
CC	tools/parser/avctp.o
CC	tools/parser/avrcp.o
CC	tools/parser/sap.o
CC	tools/parser/obex.o
CC	tools/parser/capi.o
CC	tools/parser/ppp.o
CC	tools/parser/tcpip.o
CC	tools/parser/ericsson.o
CC	tools/parser/csr.o
CC	tools/parser/bpa.o
CCLD	tools/hcidump
CC	tools/rfcomm.o
CCLD	tools/rfcomm
CC	tools/rctest.o
CCLD	tools/rctest
CC	tools/l2test.o
CCLD	tools/l2test
CC	tools/l2ping.o
CCLD	tools/l2ping
CC	tools/sdptool.o
CC	src/sdp-xml.o
CCLD	tools/sdptool
CC	tools/ciptool.o
CCLD	tools/ciptool
CC	tools/bccmd.o
CC	tools/csr_hci.o
CC	tools/csr_usb.o
CC	tools/csr_h4.o
CC	tools/csr_3wire.o
CC	tools/csr_bcsp.o
CC	tools/ubcsp.o
CCLD	tools/bccmd
CC	tools/bluemoon.o
CCLD	tools/bluemoon
CC	tools/hex2hcd.o
CCLD	tools/hex2hcd
CC	tools/mpris-proxy.o
CCLD	tools/mpris-proxy
CC	profiles/cups/main.o

```
CC      profiles/cups/sdp.o
CC      profiles/cups/spp.o
CC      profiles/cups/hcrp.o
CCLD    profiles/cups/bluetooth
CC      plugins/bluetoothd-hostname.o
CC      plugins/bluetoothd-wiimote.o
CC      plugins/bluetoothd-autopair.o
CC      plugins/bluetoothd-policy.o
CC      profiles/audio/bluetoothd-source.o
CC      profiles/audio/bluetoothd-sink.o
CC      profiles/audio/bluetoothd-a2dp.o
CC      profiles/audio/bluetoothd-avdtp.o
CC      profiles/audio/bluetoothd-media.o
CC      profiles/audio/bluetoothd-transport.o
CC      profiles/audio/bluetoothd-control.o
CC      profiles/audio/bluetoothd-avctp.o
CC      profiles/audio/bluetoothd-avrcp.o
CC      profiles/audio/bluetoothd-player.o
CC      profiles/network/bluetoothd-manager.o
CC      profiles/network/bluetoothd-bnep.o
CC      profiles/network/bluetoothd-server.o
CC      profiles/network/bluetoothd-connection.o
CC      profiles/input/bluetoothd-manager.o
CC      profiles/input/bluetoothd-server.o
CC      profiles/input/bluetoothd-device.o
CC      profiles/input/bluetoothd-hog.o
CC      profiles/input/bluetoothd-suspend-none.o
CC      profiles/gap/bluetoothd-gas.o
CC      profiles/scanparam/bluetoothd-scan.o
CC      profiles/deviceinfo/bluetoothd-deviceinfo.o
CC      attrib/bluetoothd-att.o
CC      attrib/bluetoothd-gatt.o
CC      attrib/bluetoothd-gattrib.o
CC      attrib/bluetoothd-gatt-service.o
CC      btio/bluetoothd-btio.o
CC      src/bluetoothd-main.o
CC      src/bluetoothd-log.o
CC      src/bluetoothd-systemd.o
CC      src/bluetoothd-rfkill.o
CC      src/bluetoothd-sdpd-server.o
CC      src/bluetoothd-sdpd-request.o
CC      src/bluetoothd-sdpd-service.o
CC      src/bluetoothd-sdpd-database.o
CC      src/bluetoothd-attrib-server.o
CC      src/bluetoothd-gatt-database.o
CC      src/bluetoothd-sdp-xml.o
CC      src/bluetoothd-sdp-client.o
CC      src/bluetoothd-textfile.o
CC      src/bluetoothd-uuid-helper.o
CC      src/bluetoothd-plugin.o
```

```
CC      src/bluetoothd-storage.o
CC      src/bluetoothd-advertising.o
CC      src/bluetoothd-agent.o
CC      src/bluetoothd-error.o
CC      src/bluetoothd-adapter.o
CC      src/bluetoothd-profile.o
CC      src/bluetoothd-service.o
CC      src/bluetoothd-gatt-client.o
CC      src/bluetoothd-device.o
CC      src/bluetoothd-dbus-common.o
CC      src/bluetoothd-eir.o
GEN      src/bluetooth.service
CCLD     src/bluetoothd
CC      btio/obexd-btio.o
CC      gobex/obexd-gobex.o
CC      gobex/obexd-gobex-defs.o
CC      gobex/obexd-gobex-packet.o
CC      gobex/obexd-gobex-header.o
CC      gobex/obexd-gobex-transfer.o
CC      gobex/obexd-gobex-apparam.o
CC      obexd/plugins/obexd-filesystem.o
CC      obexd/plugins/obexd-bluetooth.o
CC      obexd/plugins/obexd-opp.o
CC      obexd/plugins/obexd-ftp.o
CC      obexd/plugins/obexd-irmc.o
CC      obexd/plugins/obexd-pbap.o
CC      obexd/plugins/obexd-vcard.o
CC      obexd/plugins/obexd-phonebook-dummy.o
CC      obexd/plugins/obexd-mas.o
CC      obexd/plugins/obexd-messages-dummy.o
CC      obexd/client/obexd-mns.o
CC      obexd/src/obexd-main.o
CC      obexd/src/obexd-plugin.o
CC      obexd/src/obexd-log.o
CC      obexd/src/obexd-manager.o
CC      obexd/src/obexd-obex.o
CC      obexd/src/obexd-mimetype.o
CC      obexd/src/obexd-service.o
CC      obexd/src/obexd-transport.o
CC      obexd/src/obexd-server.o
CC      obexd/client/obexd-manager.o
CC      obexd/client/obexd-session.o
CC      obexd/client/obexd-bluetooth.o
CC      obexd/client/obexd-sync.o
CC      obexd/client/obexd-pbap.o
CC      obexd/client/obexd-ftp.o
CC      obexd/client/obexd-opp.o
CC      obexd/client/obexd-map.o
CC      obexd/client/obexd-map-event.o
CC      obexd/client/obexd-transfer.o
CC      obexd/client/obexd-transport.o
```

```
CC      obexd/client/obexd-dbus.o
CC      obexd/client/obexd-driver.o
CCLD    obexd/src/obexd
CC      attrib/gatttool.o
CC      attrib/att.o
CC      attrib/gatt.o
CC      attrib/gattrib.o
CC      btio/btio.o
CC      attrib/interactive.o
CC      attrib/utils.o
CC      src/log.o
CCLD    attrib/gatttool
CC      gobex/gobex.o
CC      gobex/gobex-defs.o
CC      gobex/gobex-packet.o
CC      gobex/gobex-header.o
CC      gobex/gobex-transfer.o
CC      gobex/gobex-appparam.o
CC      tools/obex-client-tool.o
CCLD    tools/obex-client-tool
CC      tools/obex-server-tool.o
CCLD    tools/obex-server-tool
CC      tools/bluetooth-player.o
CCLD    tools/bluetooth-player
CC      tools/obexctl.o
CCLD    tools/obexctl
CC      tools/hid2hci.o
CCLD    tools/hid2hci
GEN      tools/97-hid2hci.rules
make --no-print-directory install-am
/bin/mkdir -p '/usr/local/bin'
/bin/bash ./libtool  --mode=install /usr/bin/install -c
client/bluetoothctl monitor/btmon tools/hciattach tools/hciconfig
tools/hcitool tools/hcidump tools/rfcomm tools/rctest tools/l2test
tools/l2ping tools/sdptool tools/ciptool tools/bccmd tools/blumoon
tools/hex2hcd tools/mpiris-proxy '/usr/local/bin'
libtool: install: /usr/bin/install -c client/bluetoothctl
/usr/local/bin/bluetoothctl
libtool: install: /usr/bin/install -c monitor/btmon /usr/local/bin/btmon
libtool: install: /usr/bin/install -c tools/hciattach
/usr/local/bin/hciattach
libtool: install: /usr/bin/install -c tools/hciconfig
/usr/local/bin/hciconfig
libtool: install: /usr/bin/install -c tools/hcitool /usr/local/bin/hcitool
libtool: install: /usr/bin/install -c tools/hcidump /usr/local/bin/hcidump
libtool: install: /usr/bin/install -c tools/rfcomm /usr/local/bin/rfcomm
libtool: install: /usr/bin/install -c tools/rctest /usr/local/bin/rctest
libtool: install: /usr/bin/install -c tools/l2test /usr/local/bin/l2test
libtool: install: /usr/bin/install -c tools/l2ping /usr/local/bin/l2ping
libtool: install: /usr/bin/install -c tools/sdptool /usr/local/bin/sdptool
```

```
libtool: install: /usr/bin/install -c tools/ciptool /usr/local/bin/ciptool
libtool: install: /usr/bin/install -c tools/bccmd /usr/local/bin/bccmd
libtool: install: /usr/bin/install -c tools/bluemoon /usr/local/bin/bluemoon
libtool: install: /usr/bin/install -c tools/hex2hcd /usr/local/bin/hex2hcd
libtool: install: /usr/bin/install -c tools/mpiris-proxy
/usr/local/bin/mpiris-proxy
/bin/mkdir -p '/usr/local/libexec/bluetooth'
/bin/bash ./libtool --mode=install /usr/bin/install -c src/bluetoothd
obexd/src/obexd '/usr/local/libexec/bluetooth'
libtool: install: /usr/bin/install -c src/bluetoothd
/usr/local/libexec/bluetooth/bluetoothd
libtool: install: /usr/bin/install -c obexd/src/obexd
/usr/local/libexec/bluetooth/obexd
/bin/mkdir -p '/usr/local/lib/cups/backend'
/bin/bash ./libtool --mode=install /usr/bin/install -c
profiles/cups/bluetooth '/usr/local/lib/cups/backend'
libtool: install: /usr/bin/install -c profiles/cups/bluetooth
/usr/local/lib/cups/backend/bluetooth
/bin/mkdir -p '/etc/dbus-1/system.d'
/usr/bin/install -c -m 644 src/bluetooth.conf '/etc/dbus-1/system.d'
/bin/mkdir -p '/usr/local/share/man/man1'
/usr/bin/install -c -m 644 tools/hciattach.1 tools/hciconfig.1
tools/hcitool.1 tools/hcidump.1 tools/rfcomm.1 tools/rctest.1 tools/l2ping.1
tools/sdptool.1 tools/ciptool.1 tools/bccmd.1 tools/hid2hci.1
'/usr/local/share/man/man1'
/bin/mkdir -p '/usr/local/share/man/man8'
/usr/bin/install -c -m 644 src/bluetoothd.8 '/usr/local/share/man/man8'
/bin/mkdir -p '/lib/udev/rules.d'
/usr/bin/install -c -m 644 tools/97-hid2hci.rules '/lib/udev/rules.d'
/bin/mkdir -p '/lib/udev'
/bin/bash ./libtool --mode=install /usr/bin/install -c tools/hid2hci
'/lib/udev'
libtool: install: /usr/bin/install -c tools/hid2hci /lib/udev/hid2hci
```

これで Bluez のインストールは完了しました。

Bluetooth アダプタの挿入

実際に、Bluetooth アダプタを MA-E300 に指して動くかどうか確認してみましょう。今回は、Buffalo 製の BSBT4D09BK を使用しました。

MA-E300に挿入したら下記コマンドで確認します。

```
root@plum:~# lsusb
Bus 002 Device 003: ID 0482:0848 Kyocera Corp.
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 005: ID 0a12:0001 Cambridge Silicon Radio, Ltd Bluetooth
Dongle (HCI mode)
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

```
root@plum:~# hcitool dev
Devices:
    hci0      00:1B:DC:06:C8:1D
```

周りの Bluetooth アダプタを探してみましょう。 このコマンドは、Cntrl+C を押すまで止まりません。

```
root@plum:~# hcitool lescan
LE Scan ...
44:13:19:07:19:E2 (unknown)
44:13:19:07:19:E2 (unknown)
44:13:19:07:19:E2 (unknown)
44:13:19:07:19:E2 (unknown)
44:13:19:07:19:E2 (unknown)
44:13:19:07:19:E2 (unknown)
44:13:19:07:19:E2 (unknown)
44:13:19:07:19:E2 (unknown)
44:13:19:07:19:E2 (unknown)
44:13:19:07:19:E2 (unknown)
...
```

Sensor Tag との接続

今度は、Sensor Tag の横のスイッチを押してから同様に探してみます。

```
root@plum:~# hcitool lescan
LE Scan ...
44:13:19:07:19:E2 (unknown)
B4:99:4C:64:10:D6 (unknown)
B4:99:4C:64:10:D6 SensorTag
44:13:19:07:19:E2 (unknown)
B4:99:4C:64:10:D6 (unknown)
B4:99:4C:64:10:D6 SensorTag
44:13:19:07:19:E2 (unknown)
B4:99:4C:64:10:D6 (unknown)
B4:99:4C:64:10:D6 SensorTag
B4:99:4C:64:10:D6 (unknown)
B4:99:4C:64:10:D6 SensorTag
44:13:19:07:19:E2 (unknown)
...
```

Sensor Tag を見つけられました。

今度は、Sensor Tag からデータを取得してみましょう。 データの取得には `gatttool` というツールを利用します。

```
root@plum:~# gatttool -b B4:99:4C:64:10:D6 --primary
attr handle = 0x0001, end grp handle = 0x000b uuid:
00001800-0000-1000-8000-00805f9b34fb
attr handle = 0x000c, end grp handle = 0x000f uuid:
00001801-0000-1000-8000-00805f9b34fb
```



```
attr handle = 0x0010, end grp handle = 0x0022 uuid:
0000180a-0000-1000-8000-00805f9b34fb
attr handle = 0x0023, end grp handle = 0x002d uuid: f000aa00-0451-4000-
b000-000000000000
attr handle = 0x002e, end grp handle = 0x0038 uuid: f000aa10-0451-4000-
b000-000000000000
attr handle = 0x0039, end grp handle = 0x0043 uuid: f000aa20-0451-4000-
b000-000000000000
attr handle = 0x0044, end grp handle = 0x004e uuid: f000aa30-0451-4000-
b000-000000000000
attr handle = 0x004f, end grp handle = 0x005d uuid: f000aa40-0451-4000-
b000-000000000000
attr handle = 0x005e, end grp handle = 0x0068 uuid: f000aa50-0451-4000-
b000-000000000000
attr handle = 0x0069, end grp handle = 0x006d uuid:
0000ffe0-0000-1000-8000-00805f9b34fb
attr handle = 0x006e, end grp handle = 0x0074 uuid: f000aa60-0451-4000-
b000-000000000000
attr handle = 0x0075, end grp handle = 0x007f uuid: f000ccc0-0451-4000-
b000-000000000000
attr handle = 0x0080, end grp handle = 0xffff uuid: f000ffc0-0451-4000-
b000-000000000000
```

```
root@plum:~# gatttool -b B4:99:4C:64:10:D6 --characteristics
handle = 0x0002, char properties = 0x02, char value handle = 0x0003, uuid =
00002a00-0000-1000-8000-00805f9b34fb
handle = 0x0004, char properties = 0x02, char value handle = 0x0005, uuid =
00002a01-0000-1000-8000-00805f9b34fb
handle = 0x0006, char properties = 0x0a, char value handle = 0x0007, uuid =
00002a02-0000-1000-8000-00805f9b34fb
handle = 0x0008, char properties = 0x08, char value handle = 0x0009, uuid =
00002a03-0000-1000-8000-00805f9b34fb
handle = 0x000a, char properties = 0x02, char value handle = 0x000b, uuid =
00002a04-0000-1000-8000-00805f9b34fb
handle = 0x000d, char properties = 0x20, char value handle = 0x000e, uuid =
00002a05-0000-1000-8000-00805f9b34fb
handle = 0x0011, char properties = 0x02, char value handle = 0x0012, uuid =
00002a23-0000-1000-8000-00805f9b34fb
handle = 0x0013, char properties = 0x02, char value handle = 0x0014, uuid =
00002a24-0000-1000-8000-00805f9b34fb
handle = 0x0015, char properties = 0x02, char value handle = 0x0016, uuid =
00002a25-0000-1000-8000-00805f9b34fb
handle = 0x0017, char properties = 0x02, char value handle = 0x0018, uuid =
00002a26-0000-1000-8000-00805f9b34fb
handle = 0x0019, char properties = 0x02, char value handle = 0x001a, uuid =
00002a27-0000-1000-8000-00805f9b34fb
handle = 0x001b, char properties = 0x02, char value handle = 0x001c, uuid =
00002a28-0000-1000-8000-00805f9b34fb
handle = 0x001d, char properties = 0x02, char value handle = 0x001e, uuid =
00002a29-0000-1000-8000-00805f9b34fb
handle = 0x001f, char properties = 0x02, char value handle = 0x0020, uuid =
```

```
00002a2a-0000-1000-8000-00805f9b34fb
handle = 0x0021, char properties = 0x02, char value handle = 0x0022, uuid =
00002a50-0000-1000-8000-00805f9b34fb
handle = 0x0024, char properties = 0x12, char value handle = 0x0025, uuid =
f000aa01-0451-4000-b000-000000000000
handle = 0x0028, char properties = 0x0a, char value handle = 0x0029, uuid =
f000aa02-0451-4000-b000-000000000000
handle = 0x002b, char properties = 0x0a, char value handle = 0x002c, uuid =
f000aa03-0451-4000-b000-000000000000
handle = 0x002f, char properties = 0x12, char value handle = 0x0030, uuid =
f000aa11-0451-4000-b000-000000000000
handle = 0x0033, char properties = 0x0a, char value handle = 0x0034, uuid =
f000aa12-0451-4000-b000-000000000000
handle = 0x0036, char properties = 0x0a, char value handle = 0x0037, uuid =
f000aa13-0451-4000-b000-000000000000
handle = 0x003a, char properties = 0x12, char value handle = 0x003b, uuid =
f000aa21-0451-4000-b000-000000000000
handle = 0x003e, char properties = 0x0a, char value handle = 0x003f, uuid =
f000aa22-0451-4000-b000-000000000000
handle = 0x0041, char properties = 0x0a, char value handle = 0x0042, uuid =
f000aa23-0451-4000-b000-000000000000
handle = 0x0045, char properties = 0x12, char value handle = 0x0046, uuid =
f000aa31-0451-4000-b000-000000000000
handle = 0x0049, char properties = 0x0a, char value handle = 0x004a, uuid =
f000aa32-0451-4000-b000-000000000000
handle = 0x004c, char properties = 0x0a, char value handle = 0x004d, uuid =
f000aa33-0451-4000-b000-000000000000
handle = 0x0050, char properties = 0x12, char value handle = 0x0051, uuid =
f000aa41-0451-4000-b000-000000000000
handle = 0x0054, char properties = 0x0a, char value handle = 0x0055, uuid =
f000aa42-0451-4000-b000-000000000000
handle = 0x0057, char properties = 0x0a, char value handle = 0x0058, uuid =
f000aa44-0451-4000-b000-000000000000
handle = 0x005a, char properties = 0x02, char value handle = 0x005b, uuid =
f000aa43-0451-4000-b000-000000000000
handle = 0x005f, char properties = 0x12, char value handle = 0x0060, uuid =
f000aa51-0451-4000-b000-000000000000
handle = 0x0063, char properties = 0x0a, char value handle = 0x0064, uuid =
f000aa52-0451-4000-b000-000000000000
handle = 0x0066, char properties = 0x0a, char value handle = 0x0067, uuid =
f000aa53-0451-4000-b000-000000000000
handle = 0x006a, char properties = 0x10, char value handle = 0x006b, uuid =
0000ffe1-0000-1000-8000-00805f9b34fb
handle = 0x006f, char properties = 0x02, char value handle = 0x0070, uuid =
f000aa61-0451-4000-b000-000000000000
handle = 0x0072, char properties = 0x0a, char value handle = 0x0073, uuid =
f000aa62-0451-4000-b000-000000000000
handle = 0x0076, char properties = 0x12, char value handle = 0x0077, uuid =
f000ccc1-0451-4000-b000-000000000000
handle = 0x007a, char properties = 0x08, char value handle = 0x007b, uuid =
```

```
f000ccc2-0451-4000-b000-000000000000  
handle = 0x007d, char properties = 0x08, char value handle = 0x007e, uuid =  
f000ccc3-0451-4000-b000-000000000000  
handle = 0x0081, char properties = 0x1c, char value handle = 0x0082, uuid =  
f000ffc1-0451-4000-b000-000000000000  
handle = 0x0085, char properties = 0x1c, char value handle = 0x0086, uuid =  
f000ffc2-0451-4000-b000-000000000000
```

無事、取得できているようです。

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