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# UPS との接続 (APC)

SD カードや USB HDDなどを接続して、ロガーとして運用する場合などUPS と連動させたい場合もあると思います。

電源断時にシャットダウン処理などができるようUPS と接続する方法を紹介します。

## UPS の選択

- Ubuntu Linux で標準でパッケージが用意されている
- ドキュメントも豊富

という理由から、[APC](#) 社の UPS を使用します。



製品の種類はたくさんありますが、

- MA-E3xx は、PC ほど消費電力は大きくない
- 正弦波出力のほうが安心

といった理由から、[Smart-UPS](#) シリーズの中の、容量が一番小さな製品 (Smart-UPS 500) を使ってみます<sup>1)</sup>

注 現行品は、Ubuntu 14.04 の `apcupsd` (3.14.10) と製品添付のシリアルケーブル (940-0625A) の組み合わせでは動作しません<sup>2)</sup>

- UPS 本体ファームウェアの更新
  - [参考] [How do I update the firmware of my SMT, SMX, SMC, or SRT series Smart-UPS?](#)
- UPS “**modbus**” プロトコルの有効化 (本体パネルでの操作)
- `apcupsd` 3.14.12 への upgrade (v2.4.2α2 で、Ubuntu 15.04α から backport しています)

が必要です。



## 設定

### MA-E3xx との接続

USB ケーブルで、UPS と接続します。  
HID driver で認識されます。

```
[56980.932837] usb 1-1.3: new low-speed USB device number 5 using musb-hdrc
[56981.032473] usb 1-1.3: New USB device found, idVendor=051d,
idProduct=0002
[56981.032513] usb 1-1.3: New USB device strings: Mfr=3, Product=1,
SerialNumber=2
[56981.032523] usb 1-1.3: Product: Smart-UPS 500 FW:650.13.A USB FW:4.2
[56981.032531] usb 1-1.3: Manufacturer: American Power Conversion
[56981.032538] usb 1-1.3: SerialNumber: AS06xxxxxxxx
```

シリアルケーブル (940-0625A 等) で接続する場合、上記ログは出力されません。

### 設定ファイルの編集

APC 社の UPS と連動するためのソフト `apcupsd` はパッケージからインストール済みですので、設定ファイルの編集だけを行います。

参考:

- [apcupsd - Ubuntu Community Help Wiki](#)
- [apcupsd - PukiWiki](#)

`/etc/apcupsd/apcupsd.conf` を編集します。

[apcupsd.conf](#)

```

## apcupsd.conf v1.1 ##
#
# for apcupsd release 3.14.12 (29 March 2014) - debian
#
# "apcupsd" POSIX config file
#
# ===== General configuration parameters =====
#
# UPSNAME xxx
# Use this to give your UPS a name in log files and such. This
# is particularly useful if you have multiple UPSes. This does not
# set the EEPROM. It should be 8 characters or less.
#UPSNMAME
#
# UPSCABLE < cable >
# Defines the type of cable connecting the UPS to your computer.
#
# Possible generic choices for < cable > are:
# simple, smart, ether, usb
#
# Or a specific cable model number may be used:
# 940-0119A, 940-0127A, 940-0128A, 940-0020B,
# 940-0020C, 940-0023A, 940-0024B, 940-0024C,
# 940-1524C, 940-0024G, 940-0095A, 940-0095B,
# 940-0095C, 940-0625A, M-04-02-2000
#
UPSCABLE 940-0625A
#
# To get apcupsd to work, in addition to defining the cable
# above, you must also define a UPSTYPE, which corresponds to
# the type of UPS you have (see the Description for more details).
# You must also specify a DEVICE, sometimes referred to as a port.
# For USB UPSes, please leave the DEVICE directive blank. For
# other UPS types, you must specify an appropriate port or address.
#
# UPSTYPE DEVICE Description
# apcsmart /dev/tty** Newer serial character device, appropriate
for
# SmartUPS models using a serial cable (not
USB).
#
# usb < BLANK > Most new UPSes are USB. A blank DEVICE
# setting enables autodetection, which is
# the best choice for most installations.
#
# net hostname:port Network link to a master apcupsd through
apcupsd's
# Network Information Server. This is used
if the

```

```
#           UPS powering your computer is connected to
a
#           different computer for monitoring.
#
# snmp      hostname:port:vendor:community
#           SNMP network link to an SNMP-enabled UPS
device.
#           Hostname is the ip address or hostname of
the UPS
#           on the network. Vendor can be can be "APC"
or
#           "APC_NOTRAP". "APC_NOTRAP" will disable
#           SNMP trap
#           catching; you usually want "APC". Port is
usually
#           161. Community is usually "private".
#
# netsnmp   hostname:port:vendor:community
#           OBSOLETE
#           Same as SNMP above but requires use of the
#           net-snmp library. Unless you have a
specific need
#           for this old driver, you should use 'snmp'
instead.
#
# dumb      /dev/tty**      Old serial character device for use with
#           simple-signaling UPSes.
#
# pcnet     ipaddr:username:passphrase:port
#           PowerChute Network Shutdown protocol which
can be
#           used as an alternative to SNMP with the
#           AP9617
#           family of smart slot cards. ipaddr is the
#           IP
#           address of the UPS management card.
#           username and
#           passphrase are the credentials for which
the card
#           has been configured. port is the port
#           number on
#           which to listen for messages from the UPS,
#           normally
#           3052. If this parameter is empty or
#           missing, the
#           default of 3052 will be used.
#
# modbus    /dev/tty**      Serial device for use with newest SmartUPS
models
#           supporting the MODBUS protocol.
#
```

```
UPSTYPE modbus
DEVICE /dev/tty01

# POLLTIME <int>
# Interval (in seconds) at which apcupsd polls the UPS for status.
This
# setting applies both to directly-attached UPSes (UPSTYPE apcsmart,
usb,
# dumb) and networked UPSes (UPSTYPE net, snmp). Lowering this
setting
# will improve apcupsd's responsiveness to certain events at the cost
of
# higher CPU utilization. The default of 60 is appropriate for most
# situations.
#POLLTIME 60

# LOCKFILE <path to lockfile>
# Path for device lock file. Not used on Win32.
LOCKFILE /var/lock

# SCRIPTDIR <path to script directory>
# Directory in which apcontrol and event scripts are located.
SCRIPTDIR /etc/apcupsd

# PWRFAILDIR <path to powerfail directory>
# Directory in which to write the powerfail flag file. This file
# is created when apcupsd initiates a system shutdown and is
# checked in the OS halt scripts to determine if a killpower
# (turning off UPS output power) is required.
PWRFAILDIR /etc/apcupsd

# NOLOGINDIR <path to nologin directory>
# Directory in which to write the nologin file. The existence
# of this flag file tells the OS to disallow new logins.
NOLOGINDIR /etc

#
# ===== Configuration parameters used during power failures
=====
#

# The ONBATTERYDELAY is the time in seconds from when a power failure
# is detected until we react to it with an onbattery event.
#
# This means that, apcontrol will be called with the powerout
argument
# immediately when a power failure is detected. However, the
# onbattery argument is passed to apcontrol only after the
# ONBATTERYDELAY time. If you don't want to be annoyed by short
# powerfailures, make sure that apcontrol powerout does nothing
```

```
# i.e. comment out the wall.
ONBATTERYDELAY 6

#
# Note: BATTERYLEVEL, MINUTES, and TIMEOUT work in conjunction, so
# the first that occurs will cause the initiation of a shutdown.
#

# If during a power failure, the remaining battery percentage
# (as reported by the UPS) is below or equal to BATTERYLEVEL,
# apcupsd will initiate a system shutdown.
BATTERYLEVEL 5

# If during a power failure, the remaining runtime in minutes
# (as calculated internally by the UPS) is below or equal to MINUTES,
# apcupsd, will initiate a system shutdown.
MINUTES 3

# If during a power failure, the UPS has run on batteries for TIMEOUT
# many seconds or longer, apcupsd will initiate a system shutdown.
# A value of 0 disables this timer.
#
# Note, if you have a Smart UPS, you will most likely want to disable
# this timer by setting it to zero. That way, you UPS will continue
# on batteries until either the % charge remaining drops to or below
BATTERYLEVEL,
# or the remaining battery runtime drops to or below MINUTES. Of
course,
# if you are testing, setting this to 60 causes a quick system
shutdown
# if you pull the power plug.
# If you have an older dumb UPS, you will want to set this to less
than
# the time you know you can run on batteries.
TIMEOUT 0

# Time in seconds between annoying users to signoff prior to
# system shutdown. 0 disables.
ANNOY 300

# Initial delay after power failure before warning users to get
# off the system.
ANNOYDELAY 60

# The condition which determines when users are prevented from
# logging in during a power failure.
# NOLOGON <string> [ disable | timeout | percent | minutes | always ]
NOLOGON disable

# If KILLDELAY is non-zero, apcupsd will continue running after a
# shutdown has been requested, and after the specified time in
```



```
# seconds attempt to kill the power. This is for use on systems
# where apcupsd cannot regain control after a shutdown.
# KILLDELAY <seconds> 0 disables
KILLDELAY 0

#
# ===== Configuration statements for Network Information Server =====
#

# NETSERVER [ on | off ] on enables, off disables the network
# information server. If netstatus is on, a network information
# server process will be started for serving the STATUS and
# EVENT data over the network (used by CGI programs).
NETSERVER on

# NISIP <dotted notation ip address>
# IP address on which NIS server will listen for incoming connections.
# This is useful if your server is multi-homed (has more than one
# network interface and IP address). Default value is 0.0.0.0 which
# means any incoming request will be serviced. Alternatively, you can
# configure this setting to any specific IP address of your server and
# NIS will listen for connections only on that interface. Use the
# loopback address (127.0.0.1) to accept connections only from the
# local machine.
NISIP 127.0.0.1

# NISPORT <port> default is 3551 as registered with the IANA
# port to use for sending STATUS and EVENTS data over the network.
# It is not used unless NETSERVER is on. If you change this port,
# you will need to change the corresponding value in the cgi directory
# and rebuild the cgi programs.
NISPORT 3551

# If you want the last few EVENTS to be available over the network
# by the network information server, you must define an EVENTSFILE.
EVENTSFILE /var/log/apcupsd.events

# EVENTSFILEMAX <kilobytes>
# By default, the size of the EVENTSFILE will be not be allowed to
# exceed
# 10 kilobytes. When the file grows beyond this limit, older EVENTS
# will
# be removed from the beginning of the file (first in first out). The
# parameter EVENTSFILEMAX can be set to a different kilobyte value, or
# set
# to zero to allow the EVENTSFILE to grow without limit.
EVENTSFILEMAX 10

#
# ===== Configuration statements used if sharing =====
# a UPS with more than one machine
```

```
#
# Remaining items are for ShareUPS (APC expansion card) ONLY
#

# UPSCLASS [ standalone | shareslave | sharemaster ]
# Normally standalone unless you share an UPS using an APC ShareUPS
# card.
UPSCLASS standalone

# UPSMODE [ disable | share ]
# Normally disable unless you share an UPS using an APC ShareUPS
# card.
UPSMODE disable

#
# ===== Configuration statements to control apcupsd system logging
# =====

# Time interval in seconds between writing the STATUS file; 0 disables
# STATTIME 0

# Location of STATUS file (written to only if STATTIME is non-zero)
# STATFILE /var/log/apcupsd.status

# LOGSTATS [ on | off ] on enables, off disables
# Note! This generates a lot of output, so if
# you turn this on, be sure that the
# file defined in syslog.conf for LOG_NOTICE is a named pipe.
# You probably do not want this on.
LOGSTATS off

# Time interval in seconds between writing the DATA records to
# the log file. 0 disables.
DATATIME 0

# FACILITY defines the logging facility (class) for logging to syslog.
# If not specified, it defaults to "daemon". This is useful
# if you want to separate the data logged by apcupsd from
# other
# programs.
# FACILITY DAEMON

#
# ===== Configuration statements used in updating the UPS EEPROM
# =====

#
# These statements are used only by apctest when choosing "Set EEPROM
```

```
with conf
# file values" from the EEPROM menu. THESE STATEMENTS HAVE NO EFFECT ON
APCUPSD.
#
# UPS name, max 8 characters
#UPSNAME UPS_IDEN
# Battery date - 8 characters
#BATTDATE mm/dd/yy
# Sensitivity to line voltage quality (H cause faster transfer to
batteries)
# SENSITIVITY H M L          (default = H)
#SENSITIVITY H
# UPS delay after power return (seconds)
# WAKEUP 000 060 180 300    (default = 0)
#WAKEUP 60
# UPS Grace period after request to power off (seconds)
# SLEEP 020 180 300 600    (default = 20)
#SLEEP 180
# Low line voltage causing transfer to batteries
# The permitted values depend on your model as defined by last letter
# of FIRMWARE or APCMODEL. Some representative values are:
#   D 106 103 100 097
#   M 177 172 168 182
#   A 092 090 088 086
#   I 208 204 200 196      (default = 0 => not valid)
#LOTRANSFER 208
# High line voltage causing transfer to batteries
# The permitted values depend on your model as defined by last letter
# of FIRMWARE or APCMODEL. Some representative values are:
#   D 127 130 133 136
#   M 229 234 239 224
#   A 108 110 112 114
#   I 253 257 261 265      (default = 0 => not valid)
#HITTRANSFER 253
# Battery charge needed to restore power
# RETURNCHARGE 00 15 50 90 (default = 15)
#RETURNCHARGE 15
# Alarm delay
# 0 = zero delay after pwr fail, T = power fail + 30 sec, L = low
battery, N = never
# BEEPSTATE 0 T L N          (default = 0)
#BEEPSTATE T
```

```
# Low battery warning delay in minutes
# LOWBATT 02 05 07 10      (default = 02)
#LOWBATT 2

# UPS Output voltage when running on batteries
# The permitted values depend on your model as defined by last letter
# of FIRMWARE or APCMODEL. Some representative values are:
#   D 115
#   M 208
#   A 100
#   I 230 240 220 225      (default = 0 => not valid)
#OUTPUTVOLTS 230

# Self test interval in hours 336=2 weeks, 168=1 week, 0N=at power on
# SELFTEST 336 168 0N OFF  (default = 336)
#SELFTEST 336
```

変更した点は下記になります (conf ファイル中に書いてあるドキュメントのままですが)。

項目	初期値	設定値	
		USB接続	シリアルケーブル
UPSCABLE	smart	usb	940-0625A
UPSTYPE	apcsmart	usb	modbus
DEVICE	/dev/ttyS0	“ ” (空欄)	/dev/ttyO1

Ubuntu の daemon が起動時に参照するファイル (/etc/default/apcupsd) も変更します。

## apcupsd

```
# Defaults for apcupsd initscript

# Apcupsd-devel internal configuration
APCACCESS=/sbin/apcaccess
ISCONFIGURED=yes
```

ISCONFIGURED を “no” から “yes” に変更します。

## apcupsd の起動

設定ファイルの編集ができたら service を起動します。

```
user1@plum:~$ sudo service apcupsd start
Starting UPS power management: apcupsd.
```

```
user1@plum:~$
```

MA-E3xx の起動時にデフォルトで起動させるためには `update-rc.d` コマンドで有効化します。

```
user1@plum:~$ sudo update-rc.d apcupsd enable
update-rc.d: warning: start runlevel arguments (none) do not match apcupsd
Default-Start values (2 3 4 5)
update-rc.d: warning: stop runlevel arguments (none) do not match apcupsd
Default-Stop values (0 1 6)
Enabling system startup links for /etc/init.d/apcupsd ...
Removing any system startup links for /etc/init.d/apcupsd ...
/etc/rc0.d/K80apcupsd
/etc/rc1.d/S41apcupsd
/etc/rc2.d/K59apcupsd
/etc/rc3.d/K59apcupsd
/etc/rc4.d/K59apcupsd
/etc/rc5.d/K59apcupsd
/etc/rc6.d/K80apcupsd
Adding system startup for /etc/init.d/apcupsd ...
/etc/rc0.d/K80apcupsd -> ../init.d/apcupsd
/etc/rc1.d/S41apcupsd -> ../init.d/apcupsd
/etc/rc6.d/K80apcupsd -> ../init.d/apcupsd
/etc/rc2.d/S41apcupsd -> ../init.d/apcupsd
/etc/rc3.d/S41apcupsd -> ../init.d/apcupsd
/etc/rc4.d/S41apcupsd -> ../init.d/apcupsd
/etc/rc5.d/S41apcupsd -> ../init.d/apcupsd
user1@plum:~$
```

## UPSの状態確認

UPS の状態を確認することができます。

```
user1@plum:~$ sudo service apcupsd status
APC      : 001,036,0846
DATE     : 2014-11-18 10:58:39 +0900
HOSTNAME : plum
VERSION  : 3.14.12 (29 March 2014) debian
UPSNAME  : APCUPS
CABLE    : Custom Cable Smart
DRIVER   : MODBUS UPS Driver
UPSMODE  : Stand Alone
STARTTIME: 2014-11-18 10:51:09 +0900
MODEL    : Smart-UPS 500
STATUS   : ONLINE
LINEV    : 103.6 Volts
```

```
LOADPCT   : 0.0 Percent
BCHARGE   : 100.0 Percent
TIMELEFT  : 383.0 Minutes
MBATTCHG  : 5 Percent
MINTIMEL  : 3 Minutes
MAXTIME   : 0 Seconds
OUTPUTV   : 103.6 Volts
DWAKE     : 0 Seconds
DSHUTD    : 90 Seconds
ITEMP     : 34.6 C
BATTV     : 26.8 Volts
LINEFREQ  : 50.0 Hz
NUMXFERS  : 0
TONBATT   : 0 Seconds
CUMONBATT : 0 Seconds
XOFFBATT  : N/A
SELFTEST  : OK
STATFLAG  : 0x05000008
MANDATE   : 2013-09-20
SERIALNO  : AS133xxxxxxx
BATTDATA  : 2014-09-15
NOMOUTV   : 100 Volts
NOMPOWER  : 360 Watts
FIRMWARE  : UPS 09.1 / 00.4
END APC   : 2014-11-18 10:59:38 +0900
user1@plum:~$
```

1)  
手持ちの旧型機で写真のものとは異なるものを使っています

2)  
[apcupsd can't connect to the UPS \(serial\)](#)

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