Zeitzone prüfen/anpassen

- > date
- > sudo dpkg-reconfigure tzdata
 - Europe Berlin

Software einrichten

- > sudo raspi-config
 - (5) Interfacing Options | <P5

Laden der I²C-Treiber

❖ Datei /etc/modules prüfen

- > sudo nano /etc/modules
 - folgende Einträge hinzufügen
 - i2c-dev
 - rtc-ds1307

Updates durchführen / Software installieren

- > sudo apt-get update
- > sudo apt-get upgrade

dauert etwas länger

> sudo apt-get install i2c-tools

❖ überprüfen, ob sich das Uhrenmodul am I2C-Bus angemeldet hat

➤ sudo i2cdetect -y 1

❖ In Datei /etc/rc.local folgendes vor exit 0 einfügen:

- > sudo nano /etc/rc.local
 - echo ds3231 0x68 > /sys/class/i2c-adapter/i2c-1/new device
 - sudo hwclock -s
 - date

neu starten

> sudo reboot

Hardware-Uhr auslesen

> sudo hwclock

Systemzeit und Hardware-Uhr stellen

> sudo date -s "Jul 24 2024 10:15:00" Beispiel

> sudo hwclock -w

Quelle:

https://www.raspberry-pi-geek.de/ausgaben/rpg/2015/03/echtzeituhr-modul-ds 3231-sorgt-fuer-genaue-zeitangaben/rpg/2015/03/echtzeituhr-modul-ds 3231-sorgt-fuer-genaue-zeitangaben/rpg/2015/03/echtzeituhr-genaue-zeitangaben/rpg/2015/03/echtzeituhr-genaue-zeitangaben/rpg/2015/03/echtzeituhr-genaue-zeitangaben/rpg/2015/03/echtzeituhr-genaue-zeitangaben/rpg/2015/03/echtzeituhr-genaue-zeitangaben/rpg/2015/03/echtzei



NTP-Zeitserver mit Chrony

Updates durchführen / Chrony installieren > sudo apt-get update > sudo apt-get upgrade dauert etwas länger > sudo apt -y install chrony Datei /etc/chrony/chrony.conf anpassen > sudo nano /etc/chrony/chrony.conf # Welcome to the chrony configuration file. See chrony.conf(5) for more # information about usuable directives. #pool de.pool.ntp.org iburst # This directive specify the location of the file containing ID/key pairs for # NTP authentication. keyfile /etc/chrony/chrony.keys # This directive specify the file into which chronyd will store the rate # information. driftfile /var/lib/chrony/chrony.drift # Uncomment the following line to turn logging on. #log tracking measurements statistics # Log files location. logdir /var/log/chrony # Stop bad estimates upsetting machine clock. maxupdateskew 100.0 # This directive enables kernel synchronisation (every 11 minutes) of the # real-time clock. Note that it can't be used along with the 'rtcfile' directiv\$ rtcsync # Step the system clock instead of slewing it if the adjustment is larger than # one second, but only in the first three clock updates. makestep 1 3 # Allow NTP client access from local network.

neu starten

> sudo reboot

local stratum 8

testen des NTP-Zeitservers unter Windows (mit Bordmitteln)

Serve time even if not synchronized to a time source.

> w32tm /stripchart /computer:[IP-Adr. des RasPi] /samples:5

Quelle:

https://www.ugg.li/einfaches-ntp-tool-fuer-windows-ntp-server-prue fen



Stand: 24.07.2024

USB GPS-Stick Ublox-7 (VK-172) als NTP-Zeitbasis

Updates durchführen / Software installieren

- > sudo apt-get update
- > sudo apt-get upgrade

dauert etwas länger

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> sudo apt -y install gpsd gpsd-clients python-gps python-gi-cairo

Datei /etc/default/gpsd anpassen

- > sudo nano /etc/default/gpsd
 - # Default settings for the gpsd init script and the hotplug wrapper.
 - # Start the gpsd daemon automatically at boot time START DAEMON="true"
 - $\mbox{\tt\#}$ Use USB hotplugging to add new USB devices automatically to the daemon USBAUTO="true"
 - # Devices gpsd should collect to at boot time.
 - # They need to be read/writeable, either by user gpsd or the group dialout. DEVICES="/dev/ttyACM0"
 - # Other options you want to pass to gpsd GPSD_OPTIONS="-n"

neu starten

> sudo reboot

prüfen, ob gpsd läuft

- > systemctl is-active gpsd
 - active

Rückmeldung

prüfen, ob chronyd läuft

- > systemctl is-active chronyd
 - active Rückmeldung

prüfen, ob gpsd läuft

> cgps -s

1qqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq 1 qqqqqqqq							
x Time: 2024-07-24T08:18:00.000Z	xxP	RN:	Elev:	Azim:	SNR:	Used:	Х
<pre>x Latitude: [Beitengrad N]</pre>	XX	1	79	115	27	Y	Х
x Longitude: [Längengrad E]	XX	3	67	263	20	Y	Х
x Altitude: [Höhe m]	XX	4	19	193	33	Y	Х
x Speed: 0.06 kph	XX	8	10	176	19	Y	Х
x Heading: 0.0 deg (true)	XX	11	45	157	32	Y	Х
x Climb: 0.00 m/min	XX	14	42	061	27	Y	Х
x Status: 3D FIX (4 secs)	XX	17	32	310	22	Y	Х
x Longitude Err: $+/-$ 3 m	XX	22	86	025	26	Y	X
x Latitude Err: $+/-$ 6 m	XX	19	14	323	00	N	X
x Altitude Err: $+/-$ 15 m	XX	28	10	272	21	N	X
x Course Err: n/a	XX	31	14	097	00	N	X
x Speed Err: n/a	XX	32	24	046	16	N	Х
x Time offset: 0.034	XX						X
x Grid Square: [Locator]	XX						X
$\verb mqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq$							

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▶ gpsmon -n

```
/dev/ttyACM0
                NMEA0183>
xTime: 2024-07-20T08:20:00.000Z Lat: [Beitengrad]
                              Non: [Längengrad]
x GPZDA GPGGA GPRMC GPGSA GPGBS GPGSV GPVTG GPGLL
xCh PRN Az El S/N xxTime:
                 082000.00
                                  082000.00
                           xxTime:
                                            Х
   1 121 75 29 xxLatitude:
                   [Beitengrad]
                           xxLatitude: [Beitengrad]
                                            x
                           xxLongitude: [Längengrad]
x 1
   3 268 71 25 xxLongitude: [Längengrad]
                                            Х
   4 193 22 35 xxSpeed:
                 0.0616
x 2
                           xxAltitude: [Höhe]
                                            Х
                                  1
x 3
   8 175 6
        0 xxCourse:
                 310.352
                           xxQuality:
                                    Sats: 07
                                            Х
  11 157 40 28 xxStatus:
                           xxHDOP:
                                  1.18
x 4
                 Α
                    FAA: A
                                            Х
x 5
  14
    58 39
        29 xxMagVar:
                           xxGeoid:
                                  47.1
                                            Х
  x 6
x 7
  19 321 17
        x 8
  22 48 82
        0 xxMode: A3 Sats: 1 3 4 11 14 xxUTC:
                                            Х
x 9
  28 268 8 26 xxDOP: H=1.18 V=1.68 P=2.06 xxMAJ:
                                    MTN:
                                            Х
x10
  31 94 16
        0 xxTOFF: 0.008439795
                           xxORI:
                                    LAT:
                                            X
    45 21 18 xxPPS:
  32
                           xxLON:
                                     ALT:
x11
                                            Х
(52) $GPGLL, [Beitengrad], N, [Längengrad], E, 082000.00, A, A*69
```

Datei /etc/chrony/chrony.conf anpassen

sudo nano /etc/chrony/chrony.conf

```
# Welcome to the chrony configuration file. See chrony.conf(5) for more
# information about usuable directives.
#pool de.pool.ntp.org iburst
server ntpl.fau.de
server ptbtime2.ptb.de
server npt.de0sda.ampr.org
```

This directive specify the location of the file containing ID/key pairs for # NTP authentication.

keyfile /etc/chrony/chrony.keys

- # This directive specify the file into which chronyd will store the rate # information. driftfile /var/lib/chrony/chrony.drift
- # Uncomment the following line to turn logging on.

#log tracking measurements statistics

- # Log files location. logdir /var/log/chrony
- # Stop bad estimates upsetting machine clock. maxupdateskew 100.0
- # This directive enables kernel synchronisation (every 11 minutes) of the # real-time clock. Note that it can't be used along with the 'rtcfile' directiv\$
- # Step the system clock instead of slewing it if the adjustment is larger than # one second, but only in the first three clock updates. makestep 1 3
- # Allow NTP client access from local network.
- # Serve time even if not synchronized to a time source. local stratum 8

refclock SHM 0 offset 0.5 delay 0.2 refid NMEA prefer

neu starten

> sudo reboot



prüfen, ob die Systemzeit via GPS korrekt synchronisiert wird

> chronyc sources -v

```
210 Number of sources = 1
  .-- Source mode '^' = server, '=' = peer, '#' = local clock.
 / .- Source state '*' = current synced, '+' = combined , '-' = not combined,
    '?' = unreachable, 'x' = time may be in error, '~' = time too variable.
                                                  .- xxxx [ yyyy ] +/- zzzz
Reachability register (octal) -.
                                                  | xxxx = adjusted offset,
\prod
        Log2(Polling interval) --.
                                                  yyyy = measured offset,
zzzz = estimated error.
                                                     yyyy = measured offset,
II
                                  MS Name/IP address
                          Stratum Poll Reach LastRx Last sample
#* NMEA
                                0 4 377 23 -911us[-1659us] +/- 100ms
                                                     -63ms[ -63ms] +/-
^- ntp1.rrze.uni-erlangen.de
                                1 10
                                        377
                                              301
                                                                         13ms
^- ptbtime2.ptb.de
                                1 10 377 202
                                                    -65ms[ -65ms] +/- 9955us
```

prüfen, ob die GPS als Referenzzeit genutzt wird

sudo chronyc tracking

```
Reference ID : 4E4D4541 (NMEA)
```

Stratum : 1
Ref time (UTC) : Wen Jul 24 08:25:00 2024

System time : 0.000300016 seconds fast of NTP time Last offset : +0.000174945 seconds

RMS offset : 0.000684822 seconds Frequency : 8.142 ppm slow Frequency : 8.142 ppm slow
Residual freq : +0.168 ppm

Skew : 14.853 ppm
Root delay : 0.200000003 seconds Root dispersion: 0.001425102 seconds

Update interval : 16.0 seconds

Leap status : Normal

Zeitabgleich via GPS durchführen

> sudo chronyc makestep

■ 200 OK Rückmeldung

testen des NTP-Zeitservers unter Windows (mit Bordmitteln)

> w32tm /stripchart /computer:[IP-Adr. des PROXMOX] /samples:5

Haftungsausschluss

Diese Zusammenstellung dient ausschließlich der Info und ist nach bestem Wissen und Gewissen erstellt. Die Anwendung geschieht auf eigenes Risiko und auf eigene Gefahr.

https://photobyte.org/raspberry-pi-stretch-gps-dongle-as-a-time-source-with-chrony-timedatectl https://www.afu.rwth-aachen.de/news/162-autarker-stratum-1-ntp-server-im-hamnet https://www.ugg.li/einfaches-ntp-tool-fuer-windows-ntp-server-pruefen

Bezugsquellen: Stand: 24.07.2024

USB GPS-Stick Ublox-7 (VK-172)

https://www.ebay.de/itm/162713967244 €UR 5,58 zzgl. €UR 1,17 Versand

RTC DS3231

https://www.ebay.de/itm/255283295169 EUR 5,75 inkl. Versand

USB GPS-Maus Ublox-7 (VK-162)

https://www.ebay.de/itm/226088918959 €UR 9,14 inkl. Versand



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