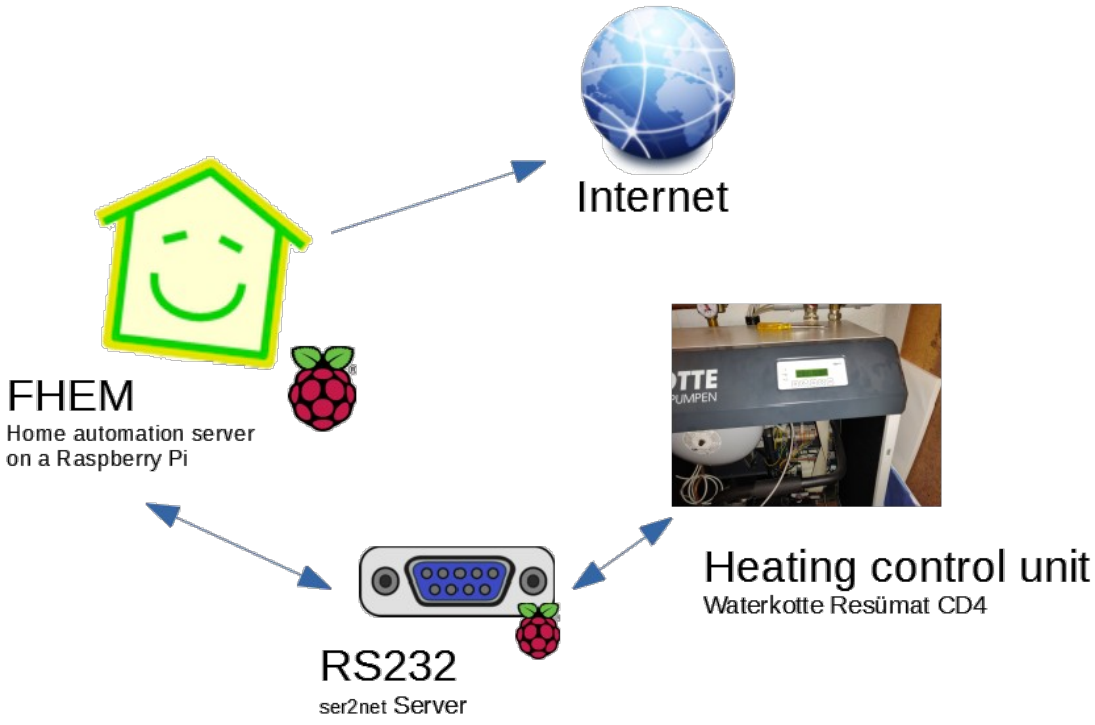
Internet of Things

Explanation

- Waterkotte „Resümat CD4“ (2002) as control unit
- RS232 serial port available

- Serial protocol uses hexadecimal data
- Already reverse engineered by people in online forums

- Protocol has read and write options
- Protocol uses a CRC-16 (checksum) with special parameters



10 02 01 15 0000 00FF 10 03 7C1A

START MODE OFFSET BYTES END CRC

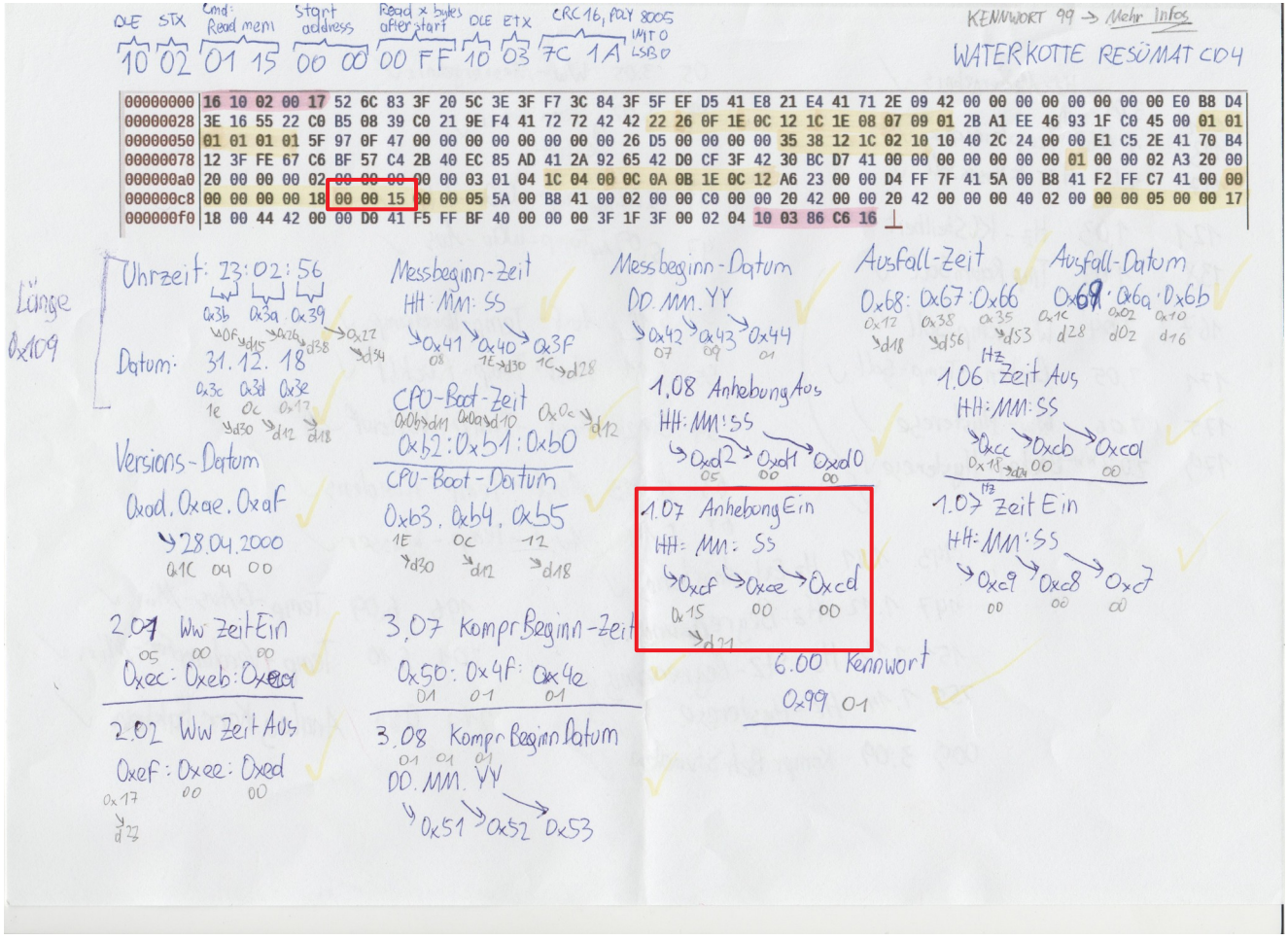
Read 255 bytes starting from 0x00

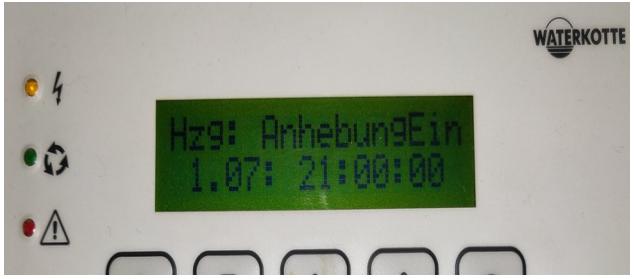
Available modes:

- 01 15 Read
- 01 14 Set clock (time + date)
- 01 13 Write

CRC-16 (Hex)
CRC-16/BUYPASS

Poly: 0x8005
Init: 0x0000
LSB: 0x0000
Inp. rev: no
Res. rev: no
https://crccalc.com





- Finding out offsets/addresses by comparing hex data with values on the display
- Floats: IEEE 754
  (little endian)
- Used hex editor: Bless

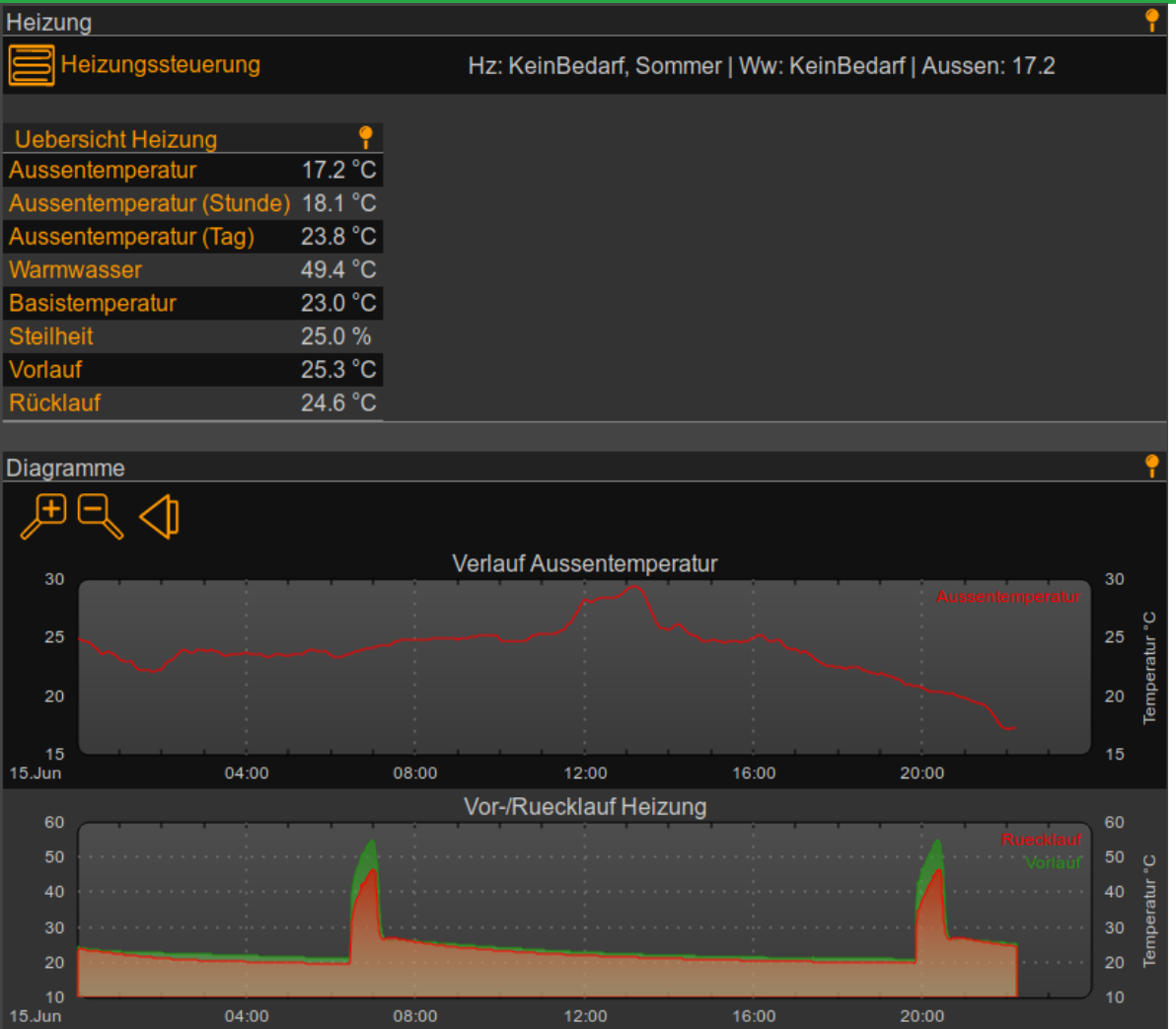
Feldname	Menünummer	Adresse	Länge	Typ
Temp-Aussen	0.00	0	4	f
Temp-Aussen-24h	0.01	4	4	f
Temp-Aussen-1h	0.02	8	4	f
Temp-Ruecklauf-Soll	0.03	0C	4	f
Temp-Ruecklauf	0.04	10	4	f
Temp-Vorlauf	0.05	14	4	f
Temp-Raum	0.06	18	4	f
Temp-Raum-1h	0.07	1C	4	f
Temp-WQuelle-Ein	0.08	20	4	f
Temp-WQuelle-Aus	0.09	24	4	f
Temp-Verdampfer	0.10	28	4	f
Temp-Kondensator	0.11	2C	4	f
Ww-Temp	2.03	30	4	f
Uhrzeit	3.00	34	3	t
Datum	3.01	37	3	d
Messbeginn-Zeit	3.02	3A	3	t
Messbeginn-Datum	3.03	3D	3	d
Hz-Messergebnis	3.04	41	4	f
Ww-Messergebnis	3.05	44	4	f
Mess-Reset	3.06	48	1	c
KomprBeginn-Zeit	3.07	49	3	t
KomprBeginn-Datum	3.08	4C	3	d
KomprBetrStunden	3.09	4F	4	f
Kompr-Mess-Reset	3.10	53	1	c
Unterbrechungen	4.00	54	1	b
Warnung-Eingang	4.01	55	1	b
Warnung-Ausgang	4.02	56	1	b
Warnung-Sonstige	4.03	57	1	b
Ausfaelle	4.04	58	1	b
Fuehler-Ausfall	4.05	59	1	b
Fuehler-KurzSchl	4.06	5A	1	b
FuehlerZaehler0	4.07	5B	2	n
FuehlRaum-Ausfall	4.08	5D	1	b
FuehlRaum-KurzSchl	4.09	5E	1	b
FuehlRaum-Zaehler0	4.10	5F	2	n
Ausfall-Zeit	5.00	61	3	t
Ausfall-Datum	5.01	64	3	d
Ausfall-Betriebszust.	5.02	67	1	b
Ausfall-Do-Buffer	5.03	68	1	b
Ausfall-Di-Buffer	5.04	69	1	b
Ausfall-FuehlAusfall	5.05	6A	1	b

- Inserting the new addresses into the FHEM plugin (Perl)
- Add some own improvements (writing special fields)

```
my %frameReadings = (
 'Temp-Aussen'           => { addr => 0x000, bytes => 0x004,
                      menu => '0.00', fmat => '%0.1f', unp => 'f<' },

 'Temp-Ruecklauf-Soll‘   => { addr => 0x00C, bytes => 0x004,
                      menu => '0.03', fmat => '%0.1f', unp => 'f<' },

 'Temp-Ruecklauf‘        => { addr => 0x010, bytes => 0x004,
                      menu => '0.04', fmat => '%0.1f', unp => 'f<' },

 'Temp-Vorlauf'          => { addr => 0x014, bytes => 0x004,
                      menu => '0.05', fmat => '%0.1f', unp => 'f<' }
);
```

- FHEM plugin requests and processes heating data every minute

JavaScript source code
for refreshing the chart/slider.



Thanks for your attention!

Further questions?

Sources:

- Private knowledge
- https://www.iotforall.com
- https://www.wired.co.uk
- https://www.pocket-lint.com
- https://digibusters.com
- https://www.sap.com