DCF77

Långvåg 3868 m

AM

(+ fasmodulation)

**Datahastighet:
1 bit per sekund**

D = Deutschland
C = Long wave signal
F = Frankfurt
77 = 77.5 kHz

En sändare

Miljontals mottagare

Tid från atomur

Väderinfo från Meteo

Publikt tidsprotokoll

Hemligt
väderprotokoll

Vågutbredning

I Västerås: En kombination av markvåg och rymdvåg

Sändaren

Protokollet

Signal-Amplitude (signal amplitude)

1000 ms
900 ms
1000 ms
800 ms

Sekunde (second)
58   59   60   1   2   3   4

Time frame 1 minute
(index count 1 second)
Time frame

0   5   10   15   20   25   30   35   40   45   50   55   0   5   10

Coding when required — Minutes — Hours — Calendar day — Day of the week — Month — Year

mple: 19.35 h

s   1   2   4   8   10   20   40   P1   1   2   4   8   10   20   P2

20   21   22   23   24   25   26   27   28   29   30   31   32   33   34   35

Start bit

Minutes

Parity bit P1

Hours

Parity bit P2
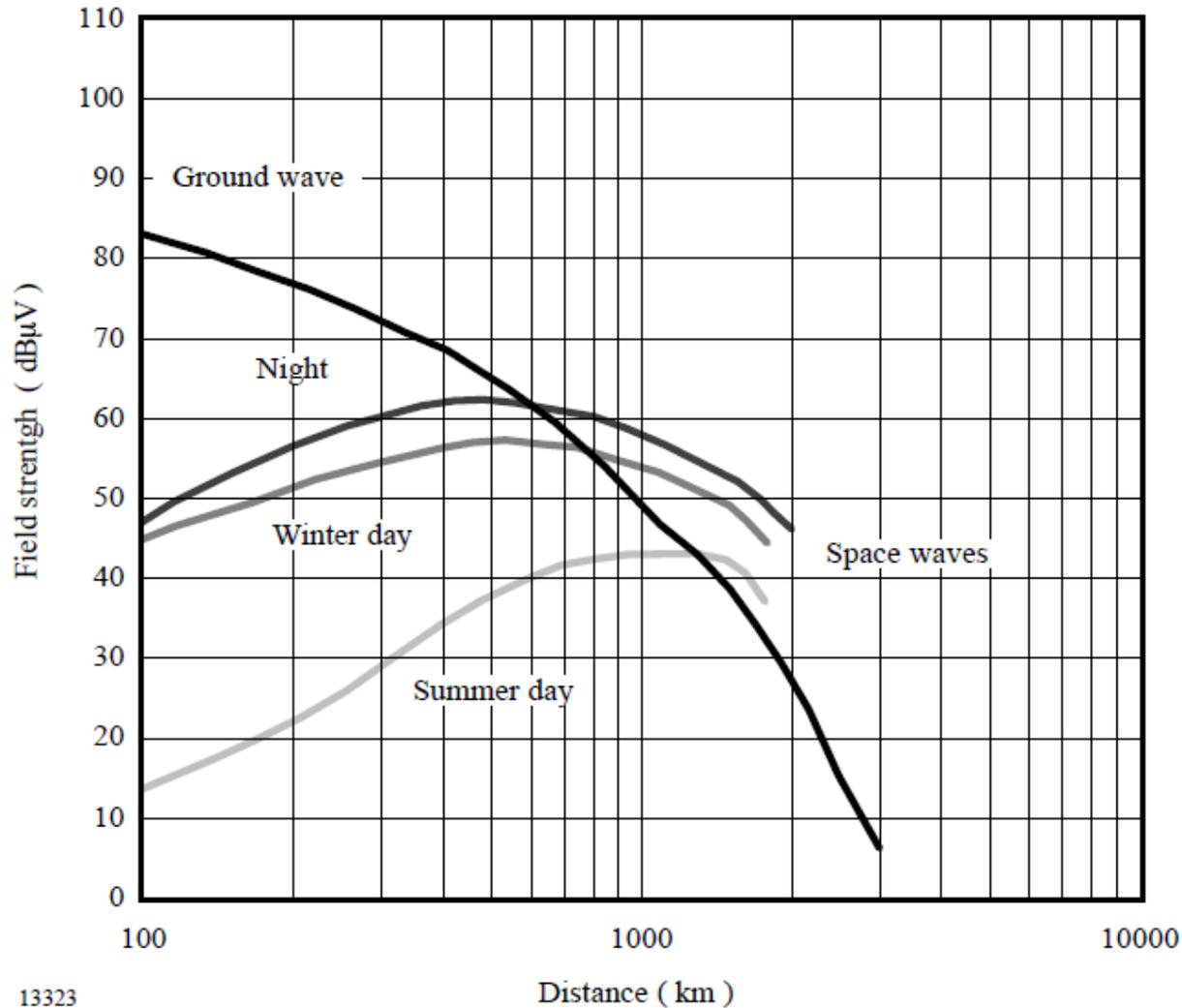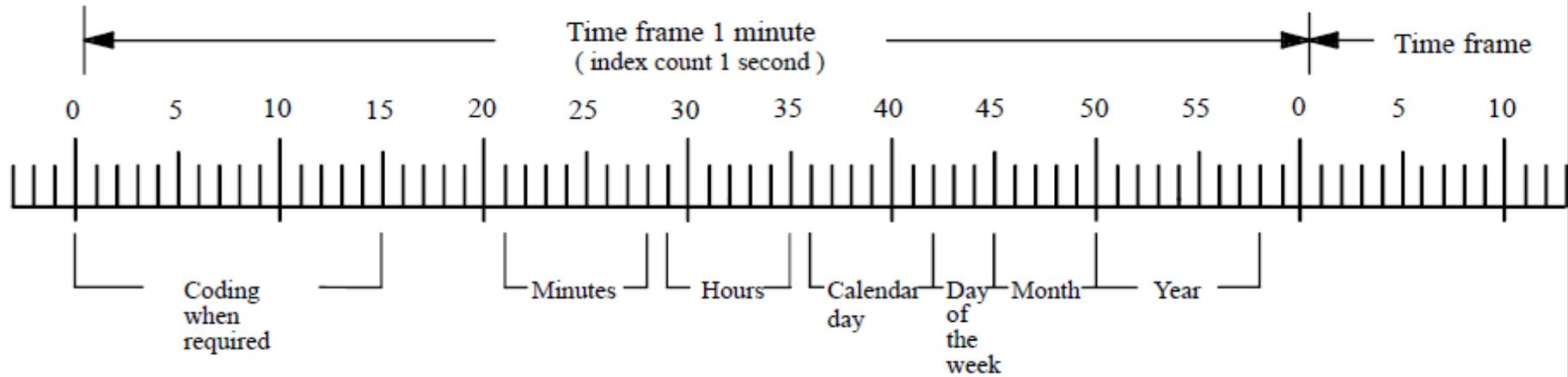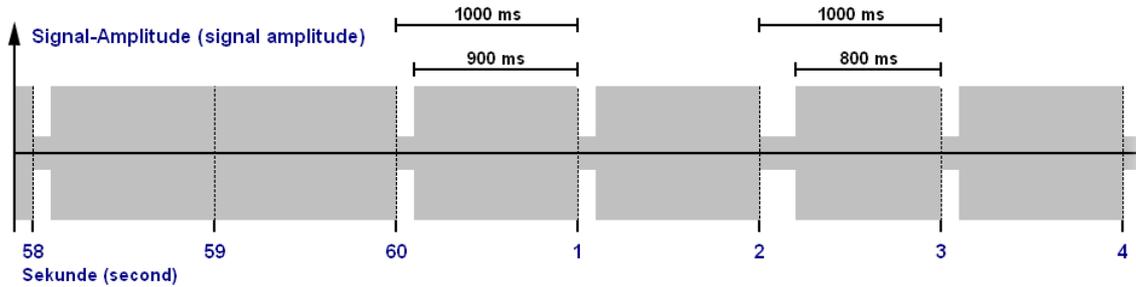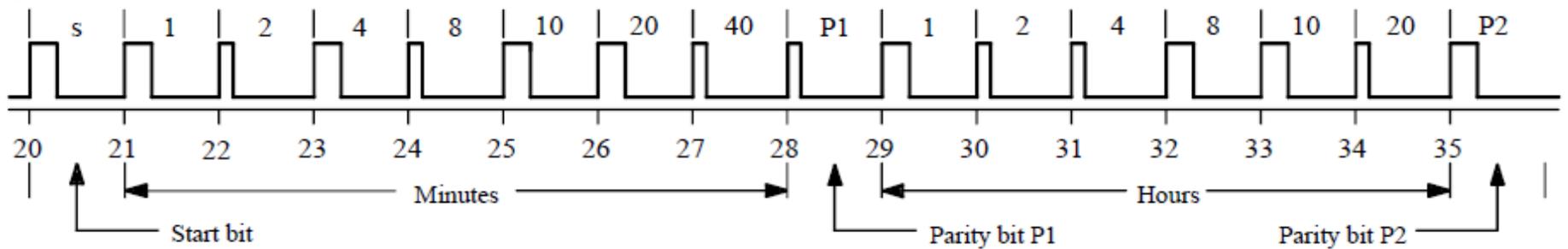
Wert	Bezeichnung
0	kein
1	Schweres Wetter 24 Std.
2	Schweres Wetter Tag
3	Schweres Wetter Nacht
4	Sturm
5	Sturm Tag
6	Sturm Nacht
7	Böen Tag
8	Böen Nacht
9	Eisregen Vormittag
10	Eisregen Nachmittag
11	Eisregen Nacht
12	Feinstaub
13	Ozon
14	Radiation
15	Hochwasser

Översikt

Svårt väder data

Sannolikhet för nederbörd

Temperatur

Vind

Region

Sändaren

Protokollet för väder

Min. 1
Min. 4
Min. 7

Min. 2
Min. 5
Min. 8

Min. 3
Min. 6
Min. 9

Wetterdatenprotokoll Datenblock 1
Datenblock 2
Datenblock 3
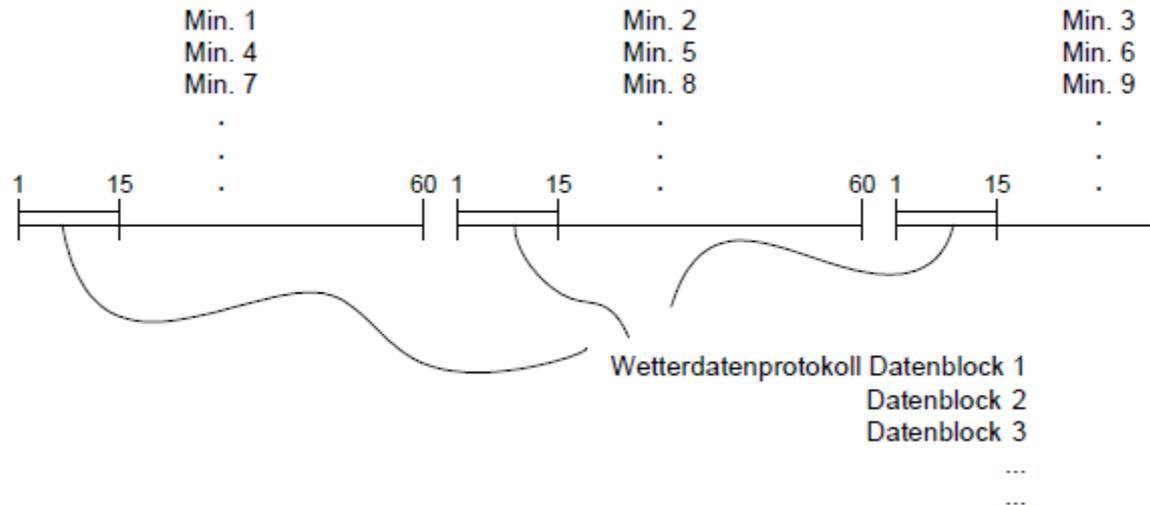
Sändaren

Protokollet

Ljudet

Sändaren

Andra sändare, långvåg

Frequency	Callsign	Country	Location	Aerial type	Power
40 kHz	JJY	Japan	Mount Otakadoya, Fukushima	Capacitance hat, height 250 m	50 kW
60 kHz	GBZ	UK	Anthorn, Cumbria		17 kW
	JJY	Japan	Mount Hagane, Kyushu	Capacitance hat, height 200 m	50 kW
	WWVB	United States	Fort Collins, Colorado	Two capacitance hats, height 122 m	70 kW
66.66 kHz	RBU	Russia	Elektrougli, Moscow		10 kW
68.5 kHz	BPC	China	Xi'an		
75 kHz	HBG	Switzerland	Prangins		20 kW
77.5 kHz	DCF77	Germany	Mainflingen, Hesse	Vertical omni-directional antennas with top-loading capacity, height 150 m	50 kW
162 kHz	TDF	France	Allouis	Two guyed steel lattice masts, height 350 m, fed on the top	2000 kW

Mottagarna

Citizen ATV53-3023
$1000
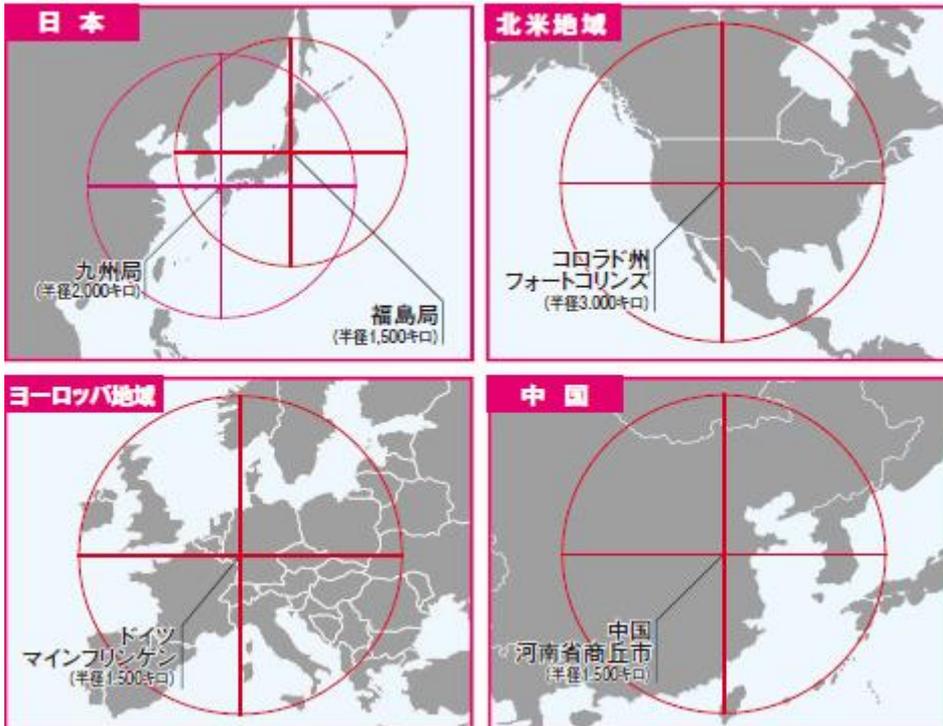
2000 km in the radius of Japan
JJY, Frequency :40 kHz/60 kHz (Fukushima/Kyushu Dual band)

3000 km in the radius of Fort Collins, Colorado
WWVB, Frequency: 60 kHz

1500 km in the radius of Germany
MSF/DCF77, Frequency 60 kHz/77,5 kHz

When Los Angeles, Denver, Chicago, and New York are selected, it receives US wave (WWVB) and the time of the place is corrected.

Mottagarna

Clas Ohlson
99 kr

Klocka med väderstation

Väderprognoser från www.meteotest.ch 2 gånger per dag, bearbetas och skickas ut via DCF/HBG

Mottagarna

Kjell & Co
600 kr
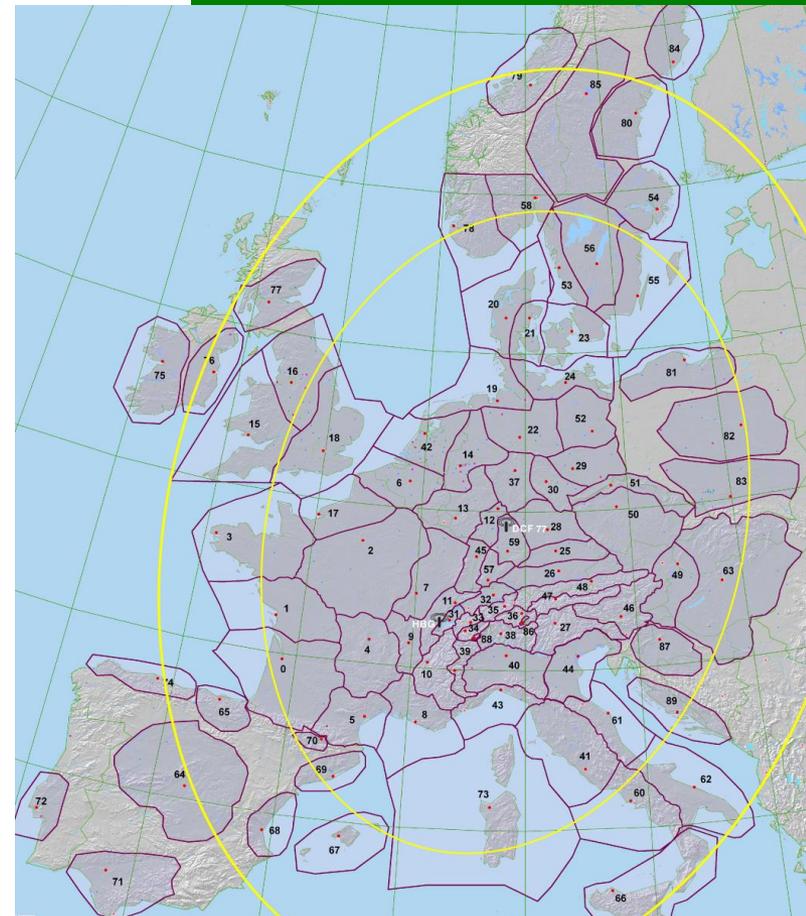
Hans tester:
Oregon digitalur: 58:30
**Analog klocka: 57.00 (?)**
Digital väckarklocka: 00.30
Analog väckarklocka: 00.30

Tid för synkronisering: Ca 2,5 minuter

Mottagarna

**Mottagaren startar för tid-synkronisering vid bestämda tidpunkter**
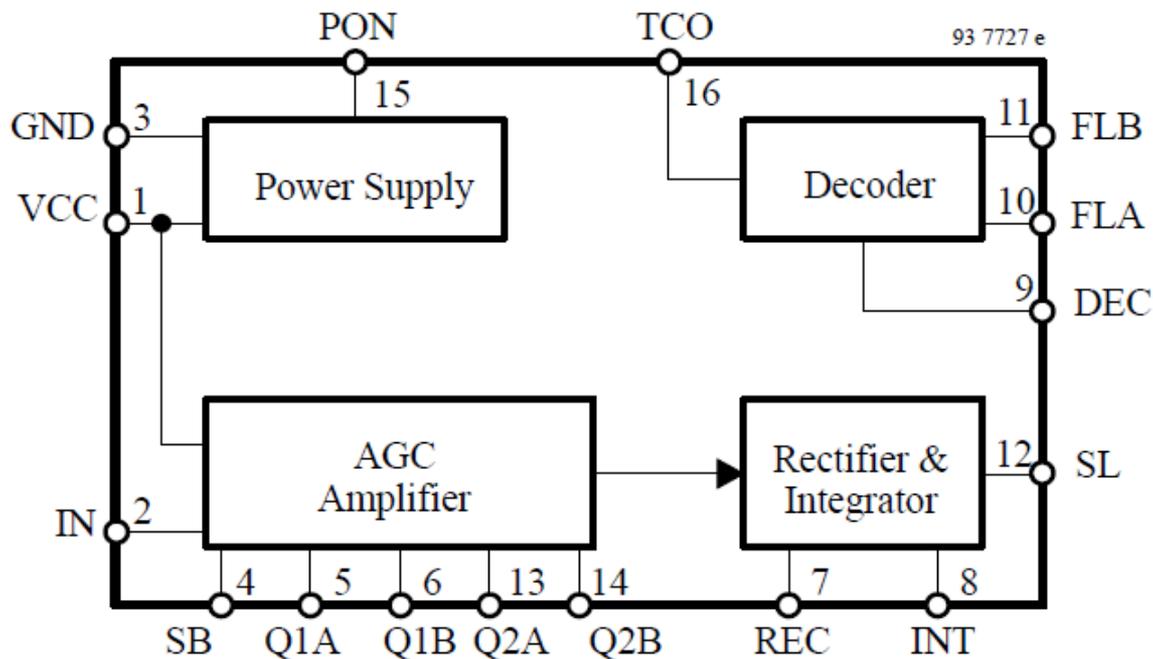
Mottagarna

En radio-IC: U4226B

- Drivspänning: 1.2–5.2 V
- Strömförbrukning: 20 uA
- Hög känslighet: 1 uV typical
- Ett eller två kristallfilter
- AGC hold mode for bridging over known interferences (e.g., stepper motor)

Mottagarna

Komplett klocka

Control lines

Ferrite Antenna
f_{res} = 77.5 kHz

+ V_{CC}

1 | 20 NC
2 | 19 NC
3 | 18 NC
4 | 17 NC

U4226B

77.5 kHz 2)
5
6 | 16 | TCO
15 | PON 3)
| SL 1)

Microcomputer

Keyboard

Display

C_1
6.8 nF
7 | 14
C_2
33 nF
8 | 13
77.5 kHz
9 | 12

C_3
10 nF
10 | 11

1) If SL is not used, SL is connected to V(
2) 77.5 kHz crystal can be replaced by 10
3) If IC is activated, PON is connected to

95 10469
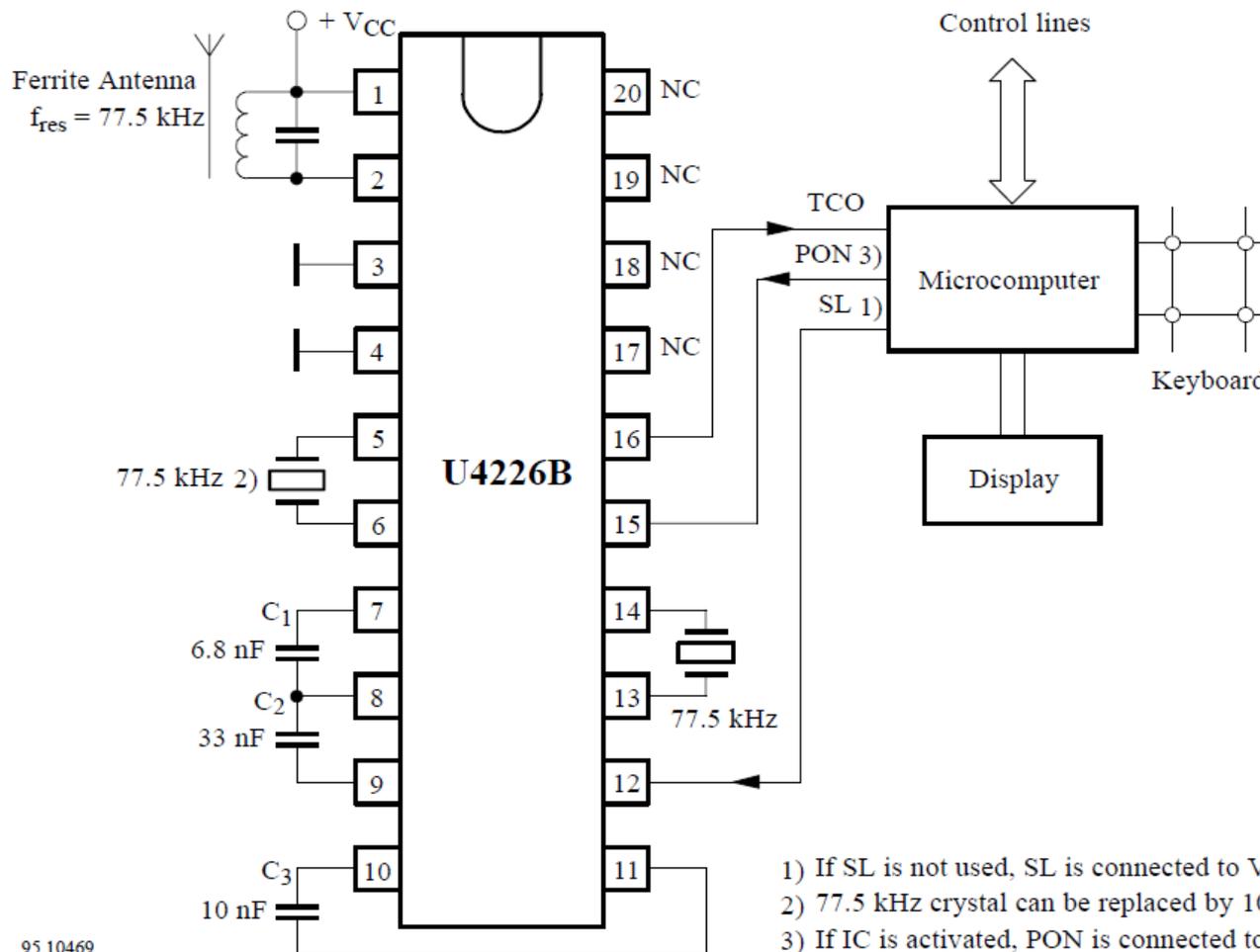
ELPROMA ATOMIC DCF77N CLOCK

THE EXACT TIME FOR NETWORKS AND STAND ALONE PC'S

The Elproma DCF77N clock is developed to guarantee the exact time on LAN or stand-alone computer systems. The DCF77N clock system receives the radio signal which is transmitted by the DCF77 Atomic clock transmitter near Frankfurt in Germany. The time signal is based on the vibration frequency of the caesium atom. The accuracy is about 1 second in 300.000 years. The Elproma DCF77N clock receives this time signal and check whether the time frame is correct or not.

Inside the DCF77N clock a system of 5 internal clocks ensure that the received time is the correct time. In this way improper received time signals can never disturb your computer time and the exact time is guaranteed. Even after 3 days without power and not receiving the DCF signal the accurate time is guaranteed. From now on the accurate time is always available for your operating system and application programs. Special features include a low voltage alarm contact, a switched mains

and relay contact output controlled by a programmable 7 day timer and a 24V slave clock output. The Elproma DCF77N clock has found its way in the market where exact time is essential. Amongst the many applications you will find: time registration systems, banking, stock exchange, transportation com- panies, airlines, research, broadcasting.

Exakt tid

SPECIFICATIONS / FEATURES

- Synchronizes your server or PC time with the DCF-radiosignal. The DCF-signal is broadcasted by the to Amic-clock transmitter near to Frankfurt (Germany).
- Signal quality indication on display
- Equipped with a special multi-clock system to guarantee the exact time and date
- Designed to function in systems which are performing time-related processes
- Up to 3 days without power & without receiving the DCF-signal, the accurate time is guaranteed
- The Elproma-DCF-clock has an attractive design and a LCD-display showing time, date, signal quality and relay status

Hypotes:
**Man borde väl kunna simulera DCF77-signalen?**

DCF Simulator

Examensuppgift KTH

DCF77

Time generation comparison

32768 Hz

Transmitting bit: 32
=0
13:59:32   DST=0
2094-/6-01 Monday
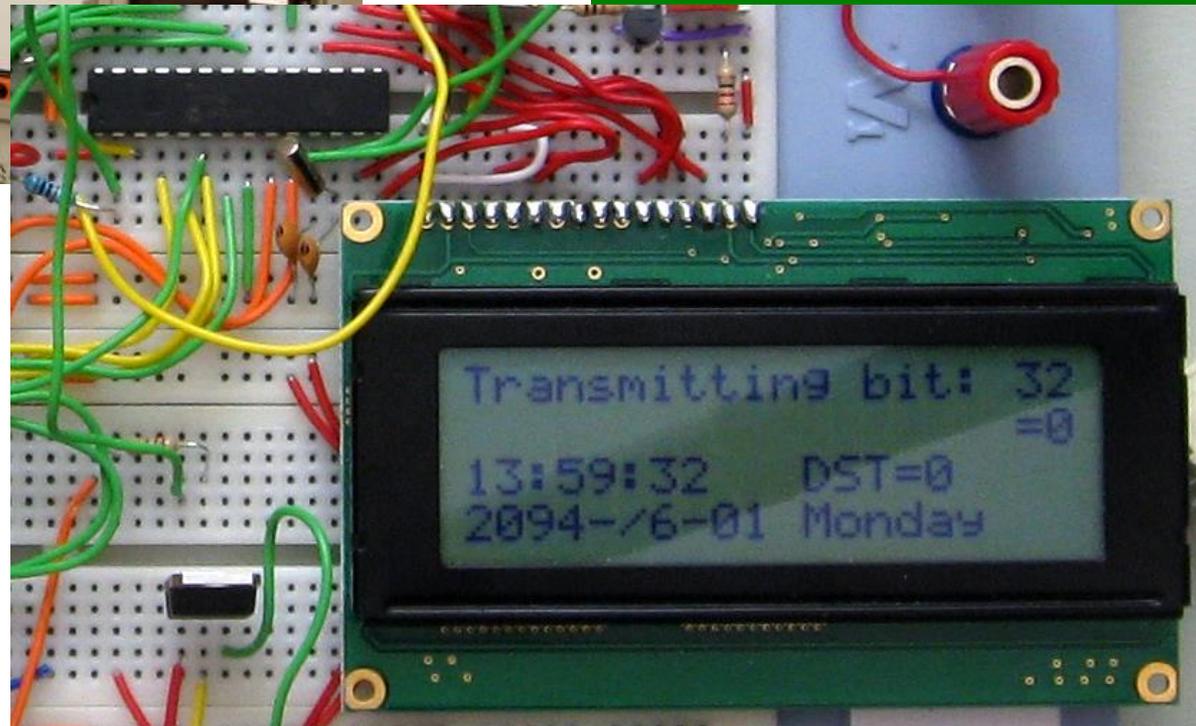
Mainflingen:

50 kW, emitted 25 kW

DCF77

Transmitter comparison

Simulator: 0.2 W, emitted ???

DCF77

Antenna comparison
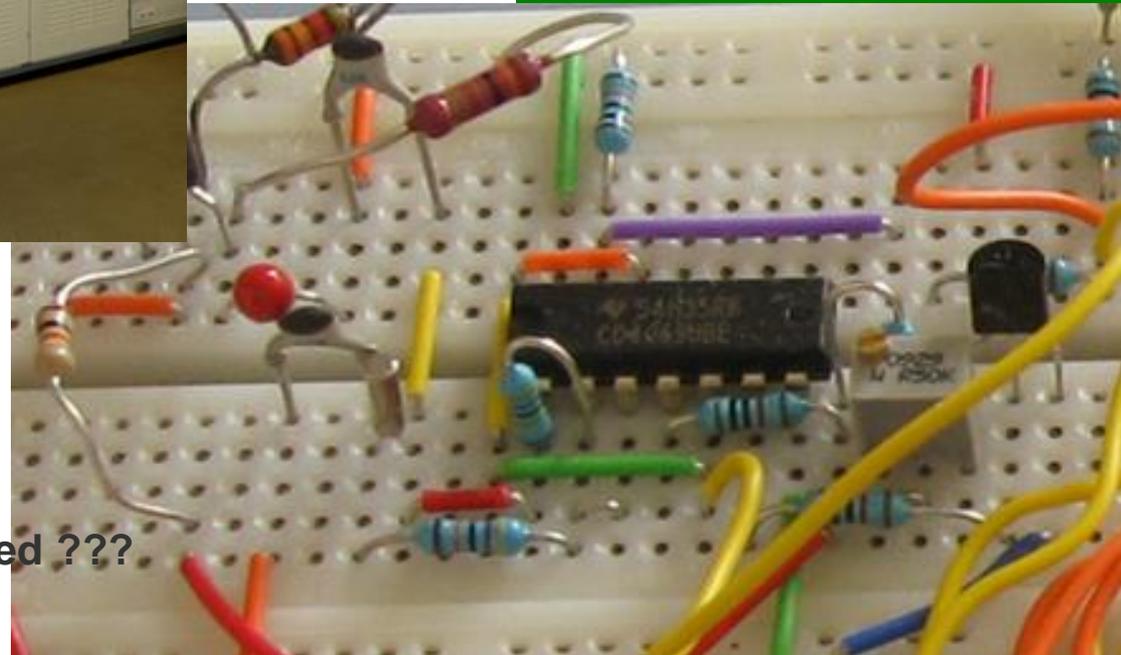
Mainflingen:

150m high vertical omnidirectional antenna with top capacitance

07.06.2004

**Simulator:** 10 cm ferrite antenna
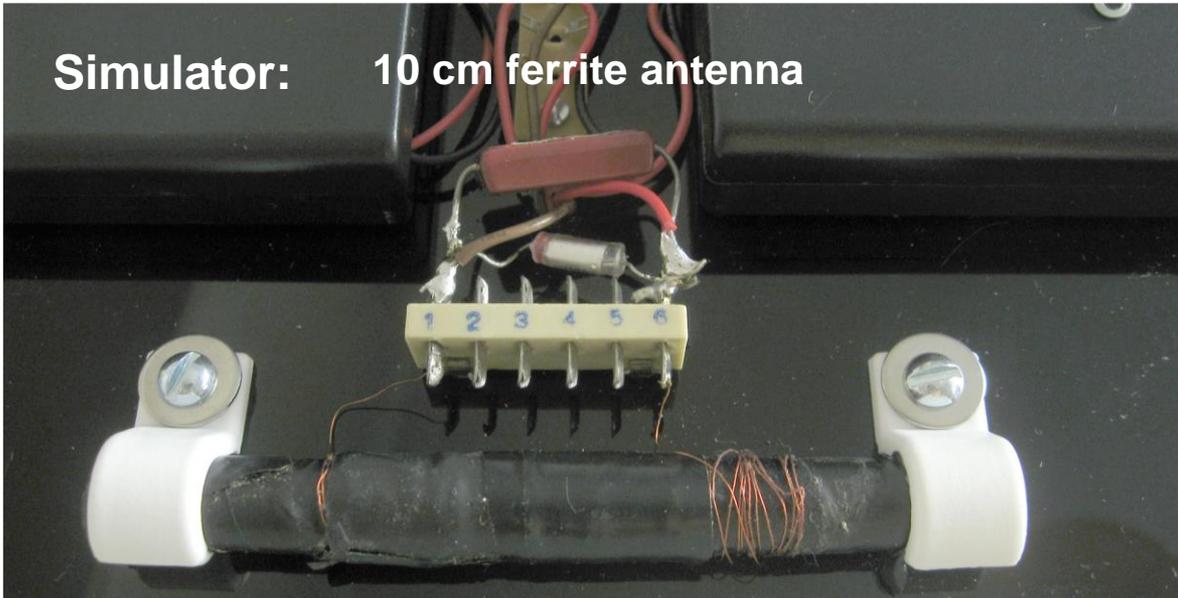
DCF Simulator

1 → 2 → 3 mikropro.
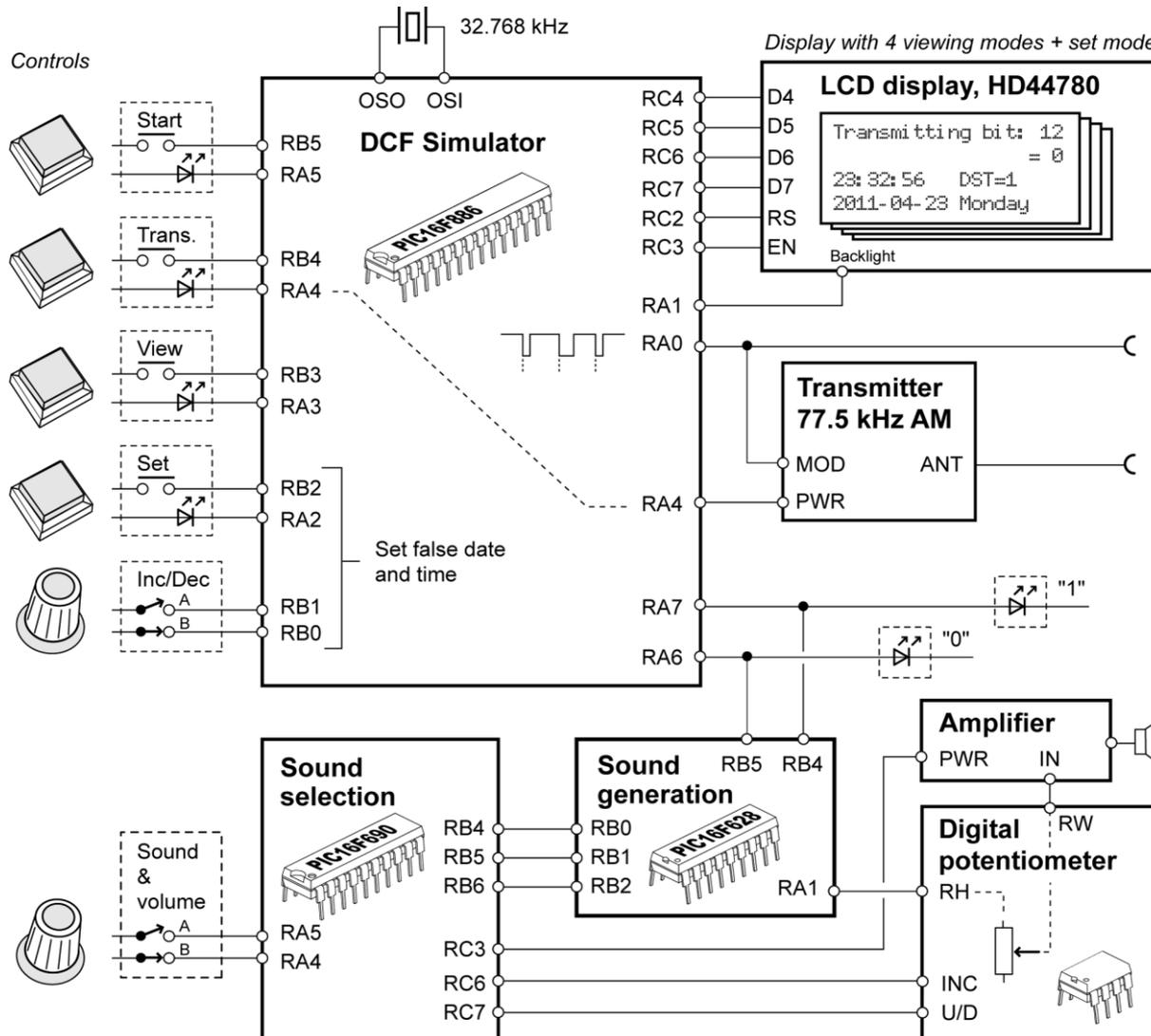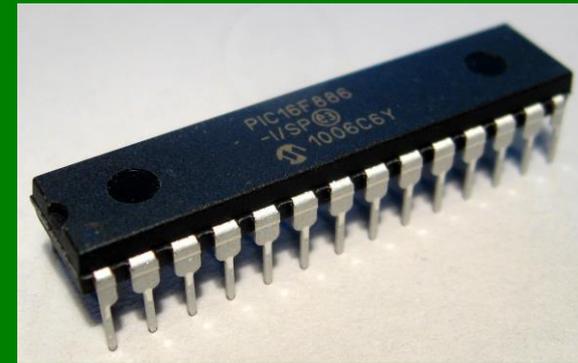
- PIC16F886
- Clock frequency 8 MHz
- 8 kB EEPROM för program
- 0.368 kB RAM
- 24 I/O
- 49 kr hos Kjell & Co
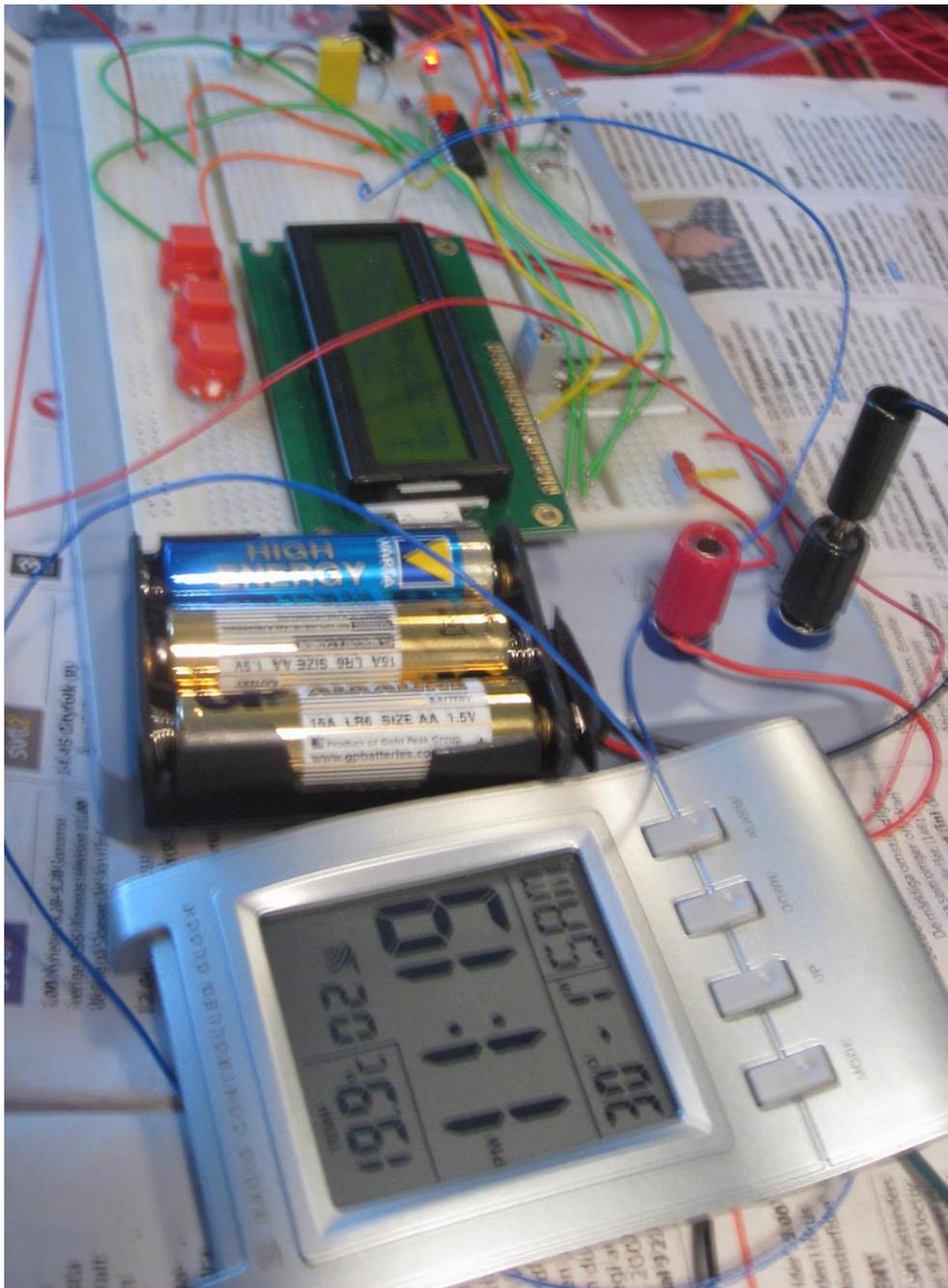
DCF Simulator

1:a versionen:
Elektriskt interface

DCF Simulator

2:a versionen : Radio-interface
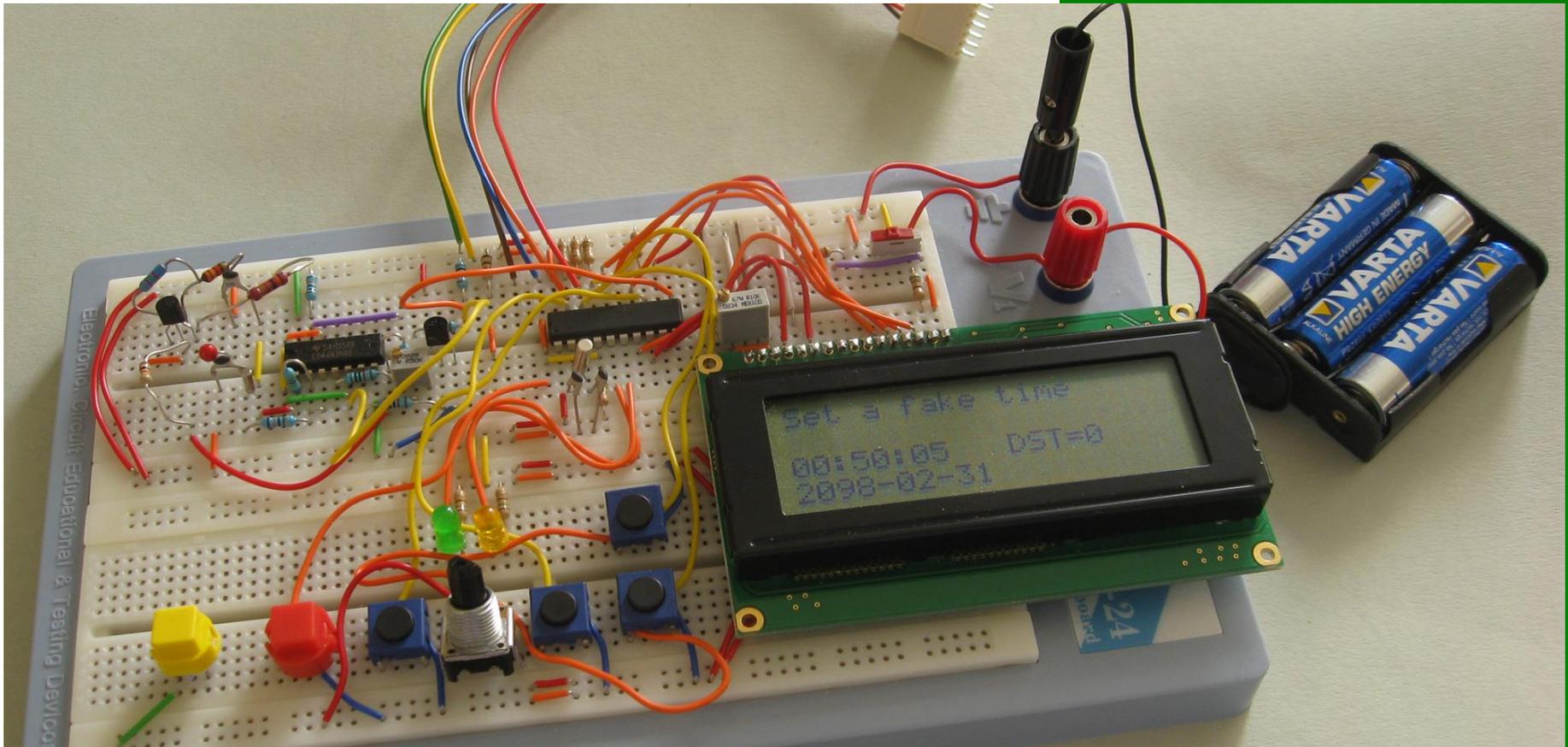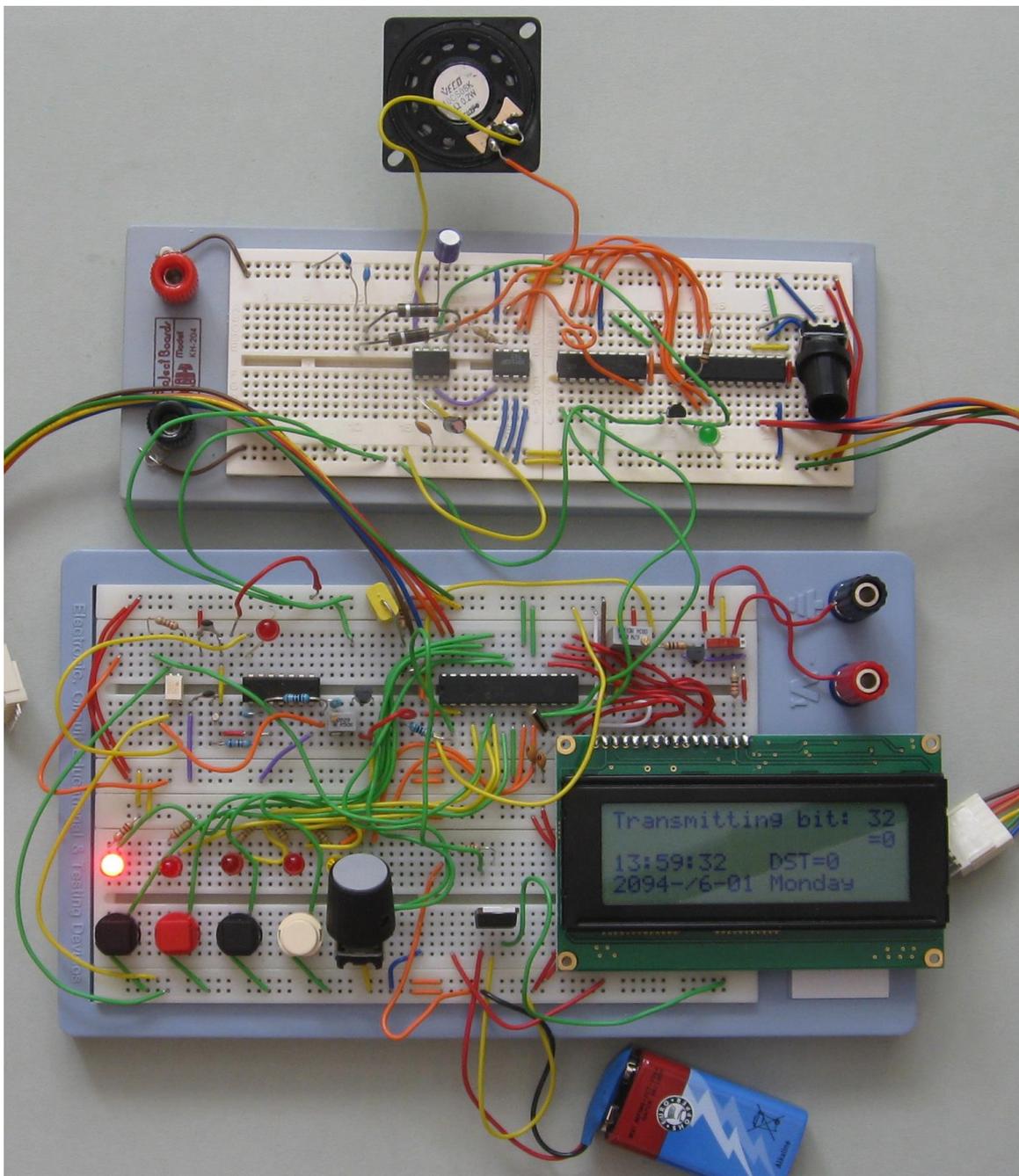
DCF Simulator

3:e versionen : Radio-interface och utökad human-device-interface

-Info på display

-Ljud för "1" och "0"

DCF Simulator

Programmet:

ca 2000 rader C-kod

= 4000 code words

```c
bit_value[20] = 1;                        // Always 1
bit_value[21] = min1.0;                   // Minutes, BCD 1
bit_value[22] = min1.1;
bit_value[23] = min1.2;
bit_value[24] = min1.3;
bit_value[25] = min10.0;
bit_value[26] = min10.1;
bit_value[27] = min10.2;

no_of_ones = 0;
for (i=21; i<28; i++)
    {
    no_of_ones = no_of_ones+bit_value[i];
    }
bit_value[28] = no_of_ones%2;      // Even parity bi
bit_value[29] = hour1.0;                  // Hours, BCD lea
bit_value[30] = hour1.1;
bit_value[31] = hour1.2;
bit_value[32] = hour1.3;
bit_value[33] = hour10.0;
bit_value[34] = hour10.1;

no_of_ones = 0;
for (i=29; i<35; i++)                     // Calculate numk
    {
    no_of_ones = no_of_ones + bit_value[i];
    }
bit_value[35] = no_of_ones%2;      // Even parity bi
bit_value[36] = day1.0;                   // Day of month,
bit_value[37] = day1.1;
```

DCF Simulator

Praktiskt test

DCF Simulator

Veroboard-version

Kretsschema

DCF Simulator

DCF77 Simulator
with LCD display and sound
Design: Hans Sundgren, May 2010

dcf77_simulator_f
2010-05-03 22:27:30

Hans Sundgren 12 maj 2011
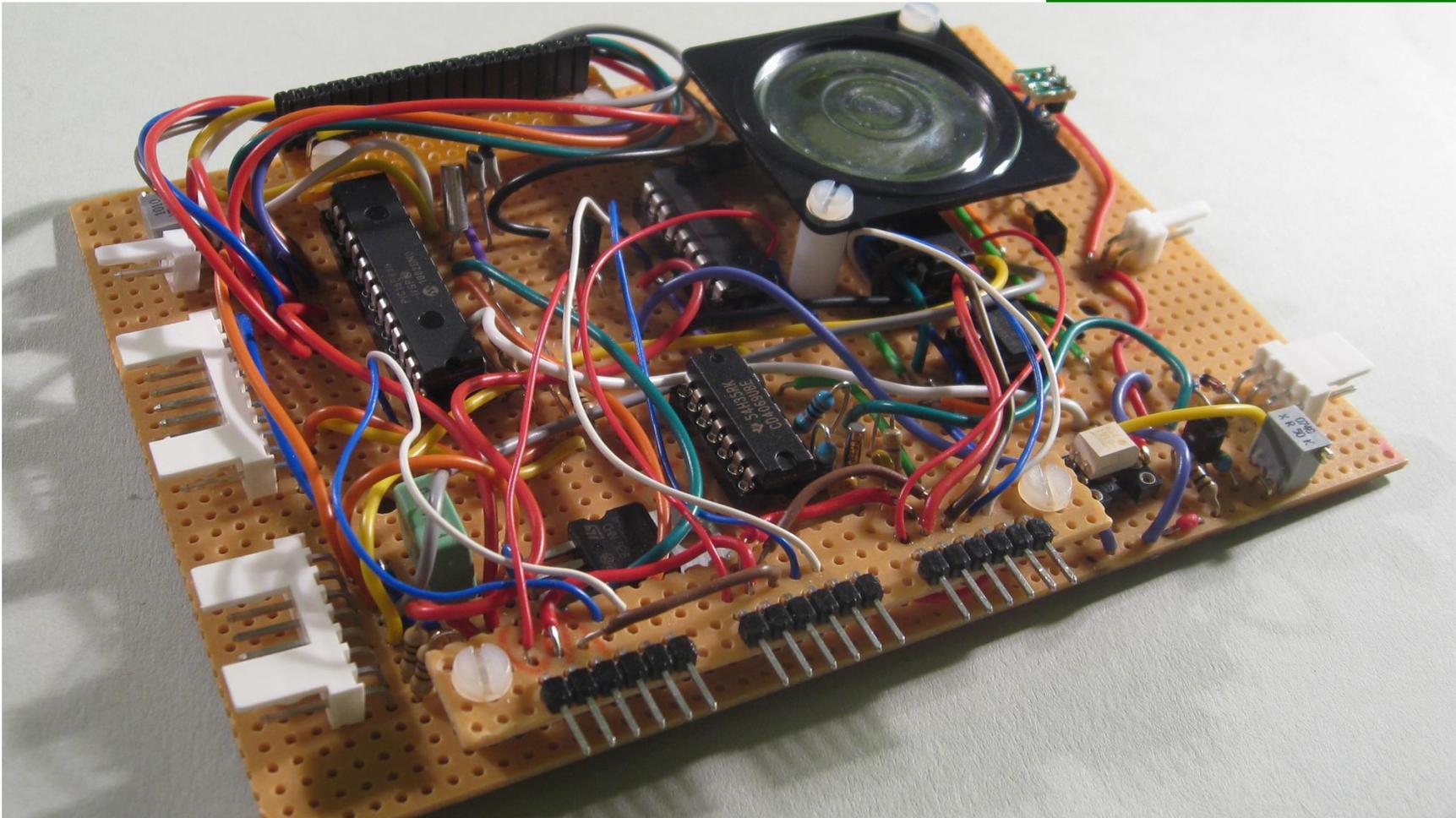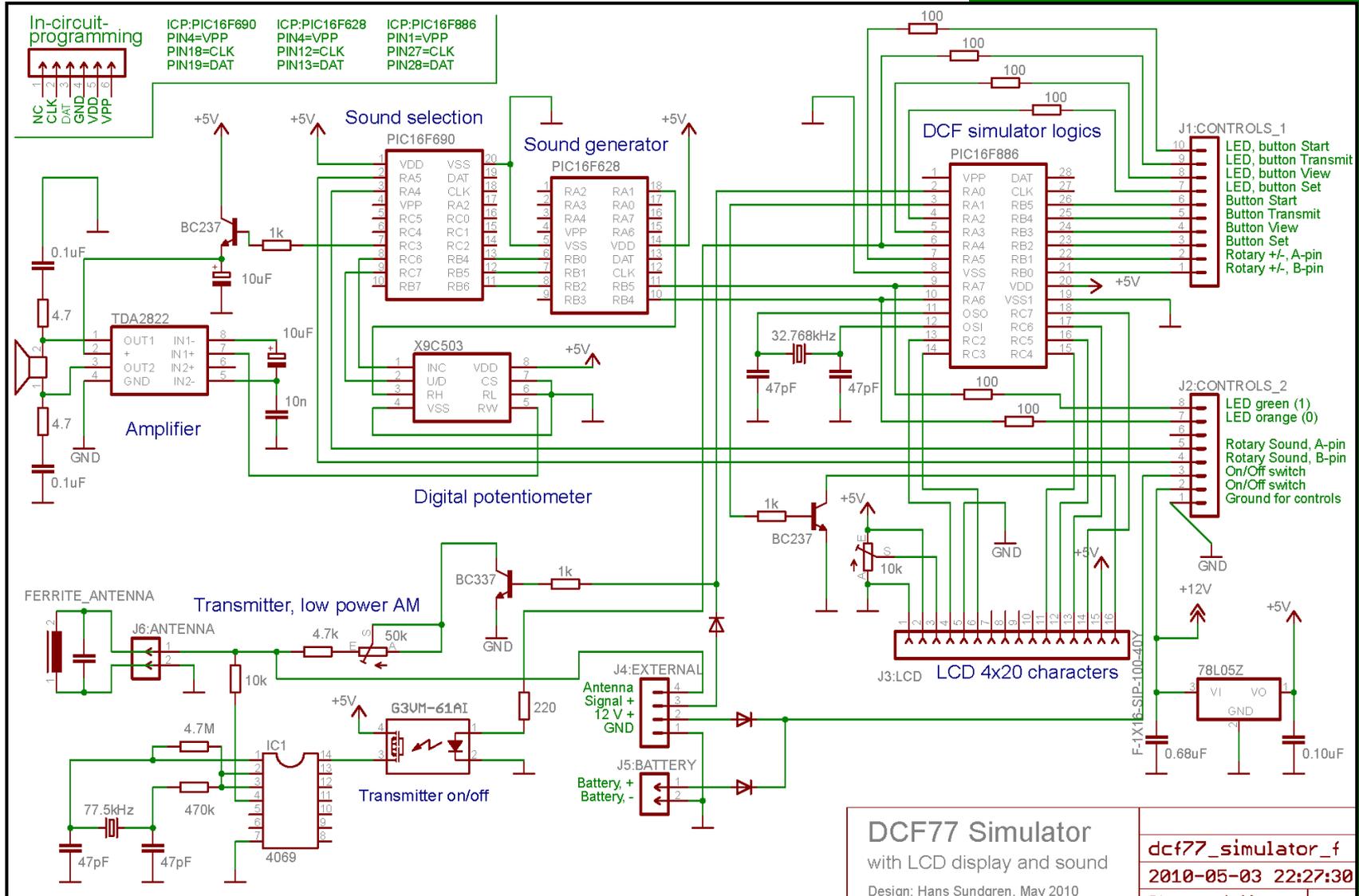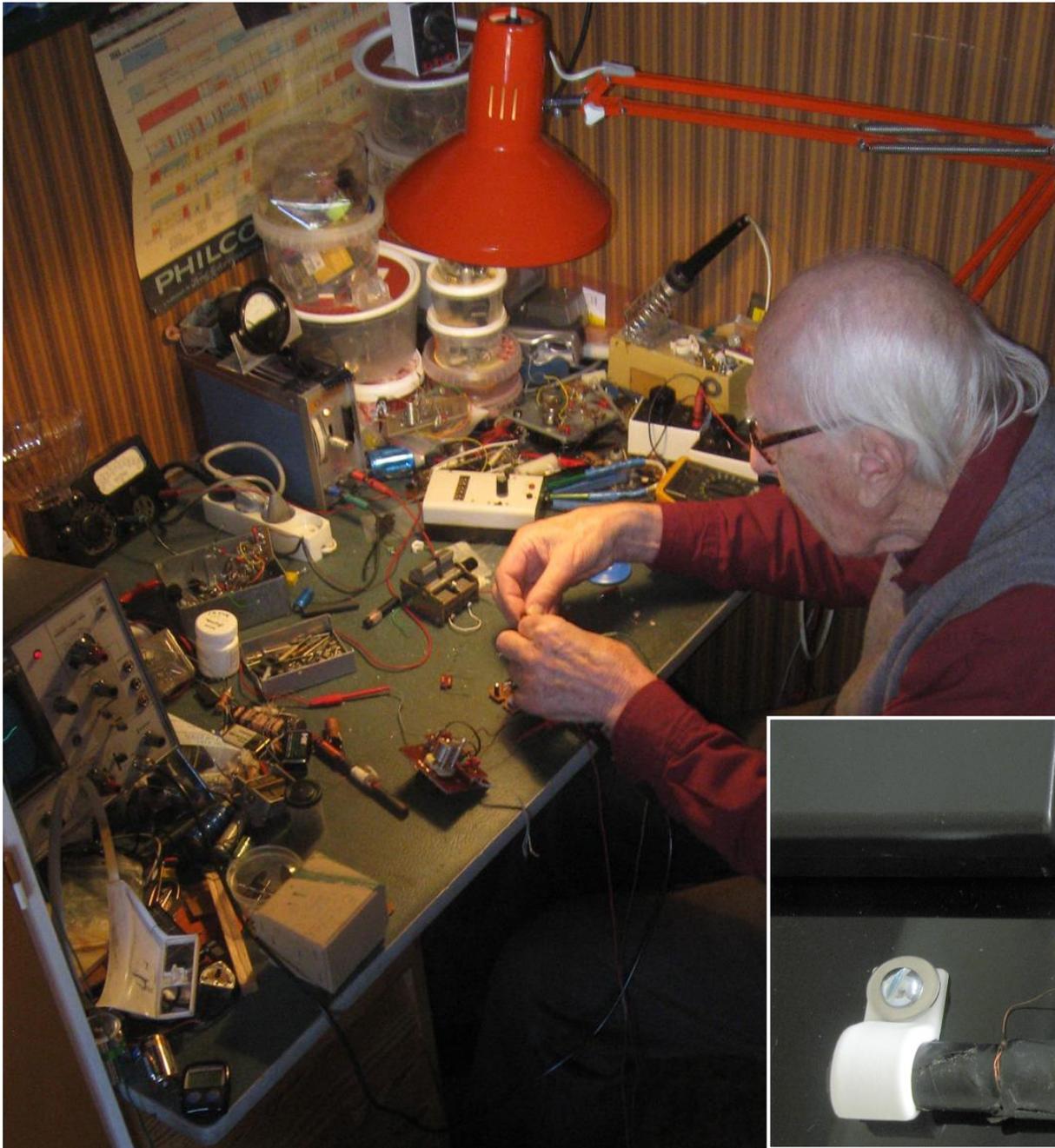
DCF Simulator

Antenna tuning
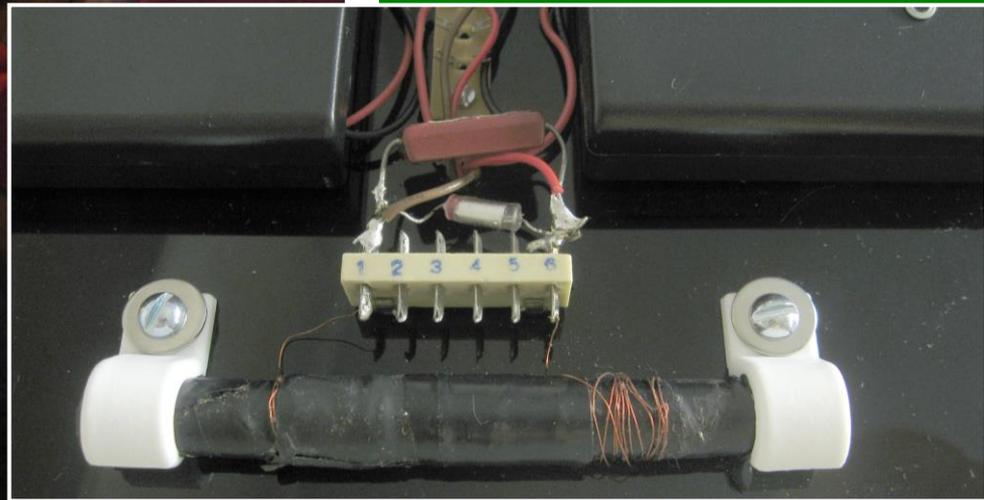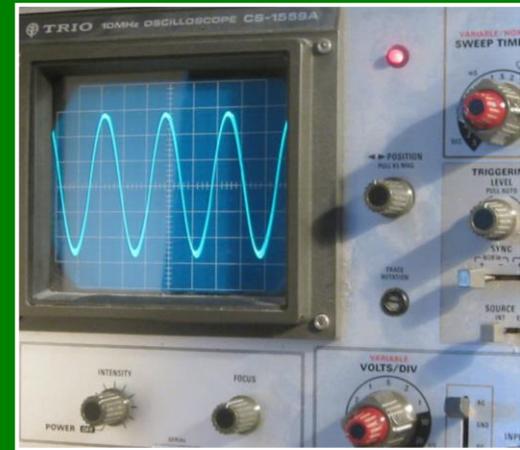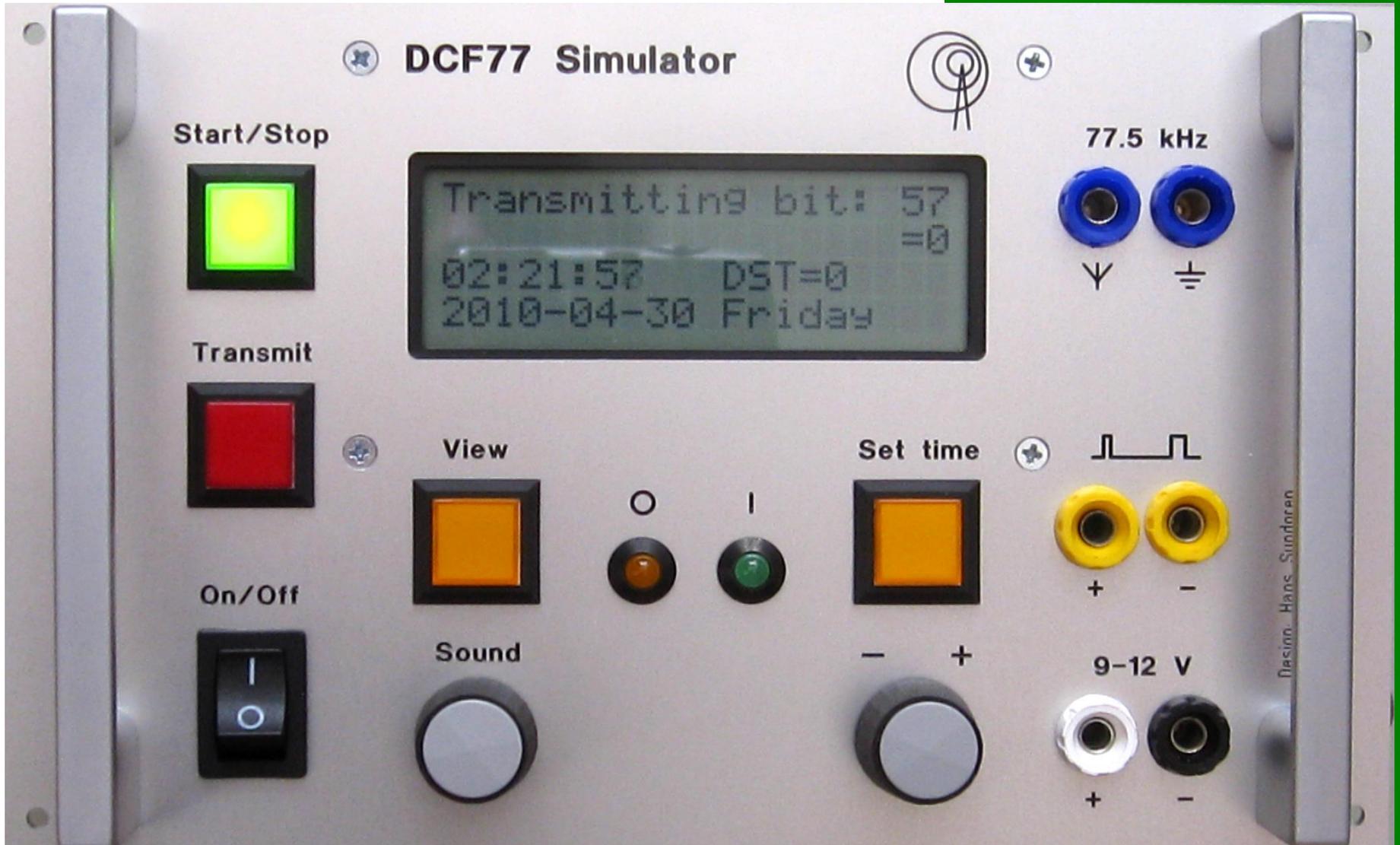
DCF Simulator

Matthias Franz, HB9EFY

DCF Simulator

Andra:

- **Schweiz**

- **Australien**

- **Sydamerika**

- **Sydafrika**

DCF Simulator

Test