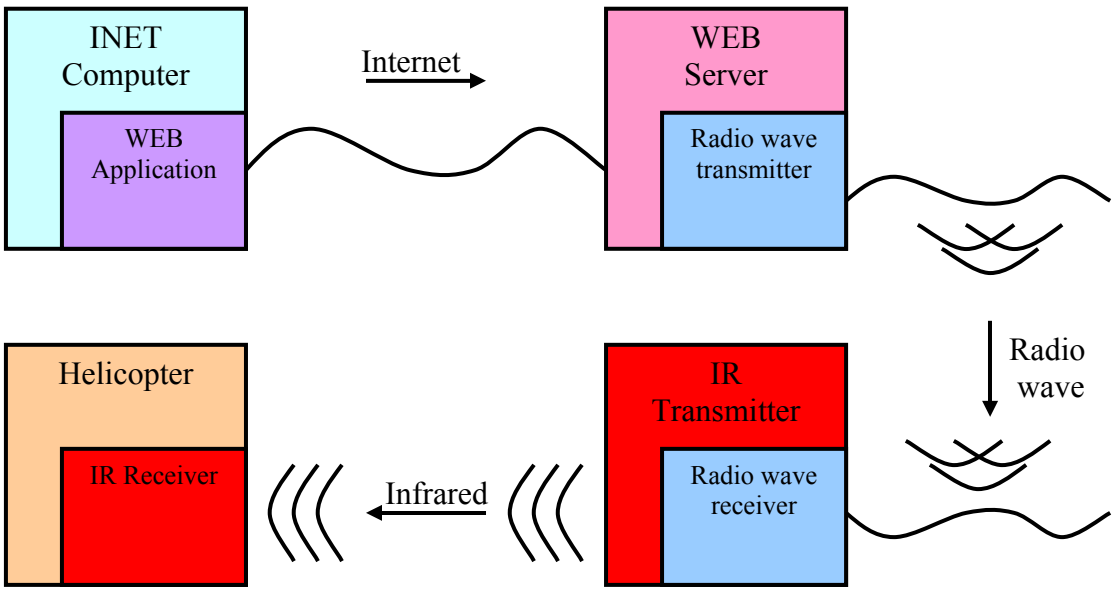
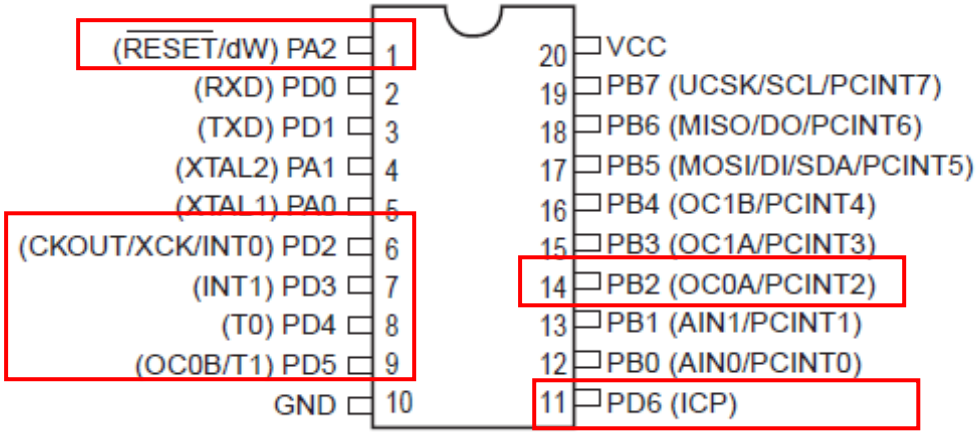
Documentation NETcopter

System overview



Used HW components

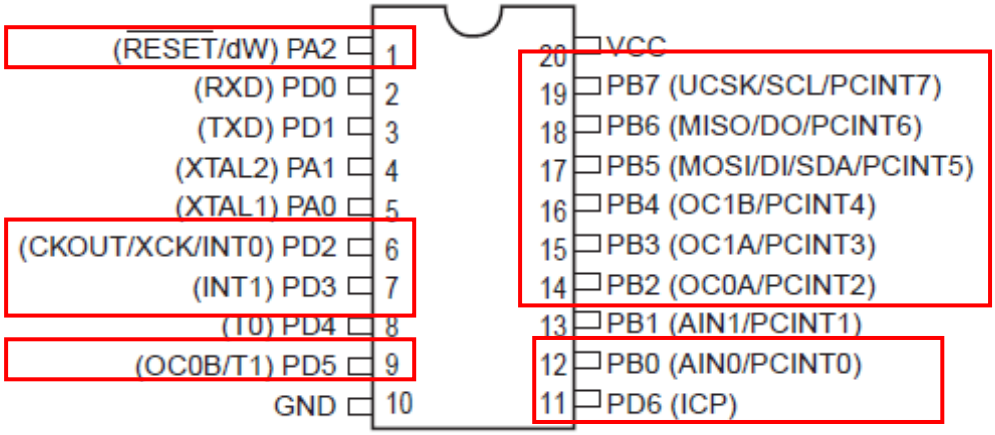
Used HW-pins at ATTiny2313 for radio wave transmitter:



PB7 – SCK
PB6 – MISO
PB5 – MOSI
PB4 – SC
PD2 – nIRQ

LED:
PD5 – red LED
PD6 – red LED

Used HW-pins at ATTiny2313 for radio wave receiver and IR transmitter:



Communication with radio wave module:
PB7 – SCK
PB6 – MISO
PB5 – MOSI
PB4 – SC
PB3 – Data (10kpull up)
PB0 – VDI
PD3 – DCLK
PD2 – nIRQ

LED:
PD5 – red LED
PD6 – red LED

Infrared:
PB2 – IR Output
TCCR1 – frequency 40,07kHz
TCCR0 – Data transmission

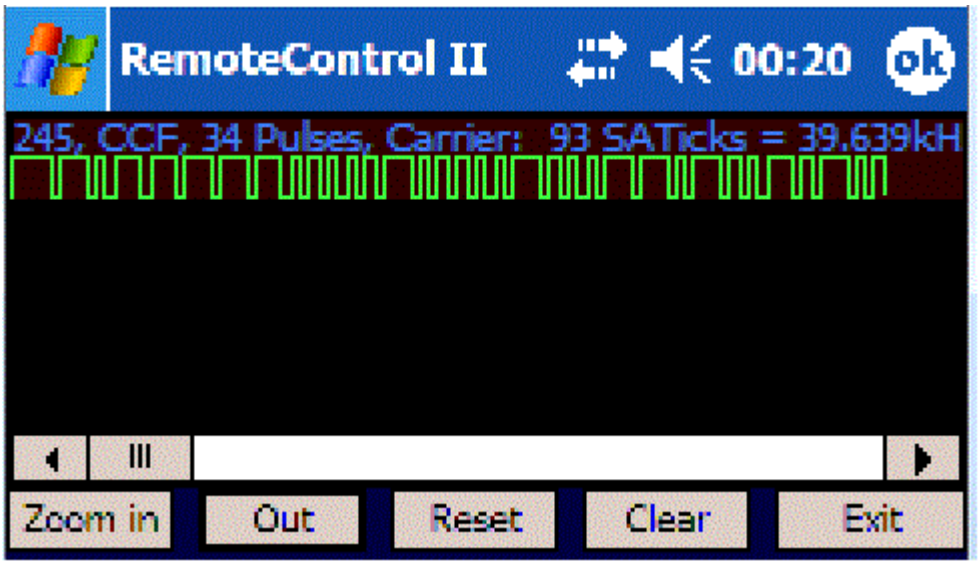
Infrared (IR) control

IR Codes Graupner Nano Star 2

data frame																																		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
header	up/down						left/right						forward/backward						trim: left/right						Channel A/B/C				checksum				Stop	
	value						1/0	value					1/0	value					3F/0	value					4/2/0									
bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
example	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	1	0	1	0	0	0	1	0	1	0	
checksum	15				3			15					8				1			7					4				5					
calculation	modulo16(15+3+15+8+1+7+4) = 5																																	

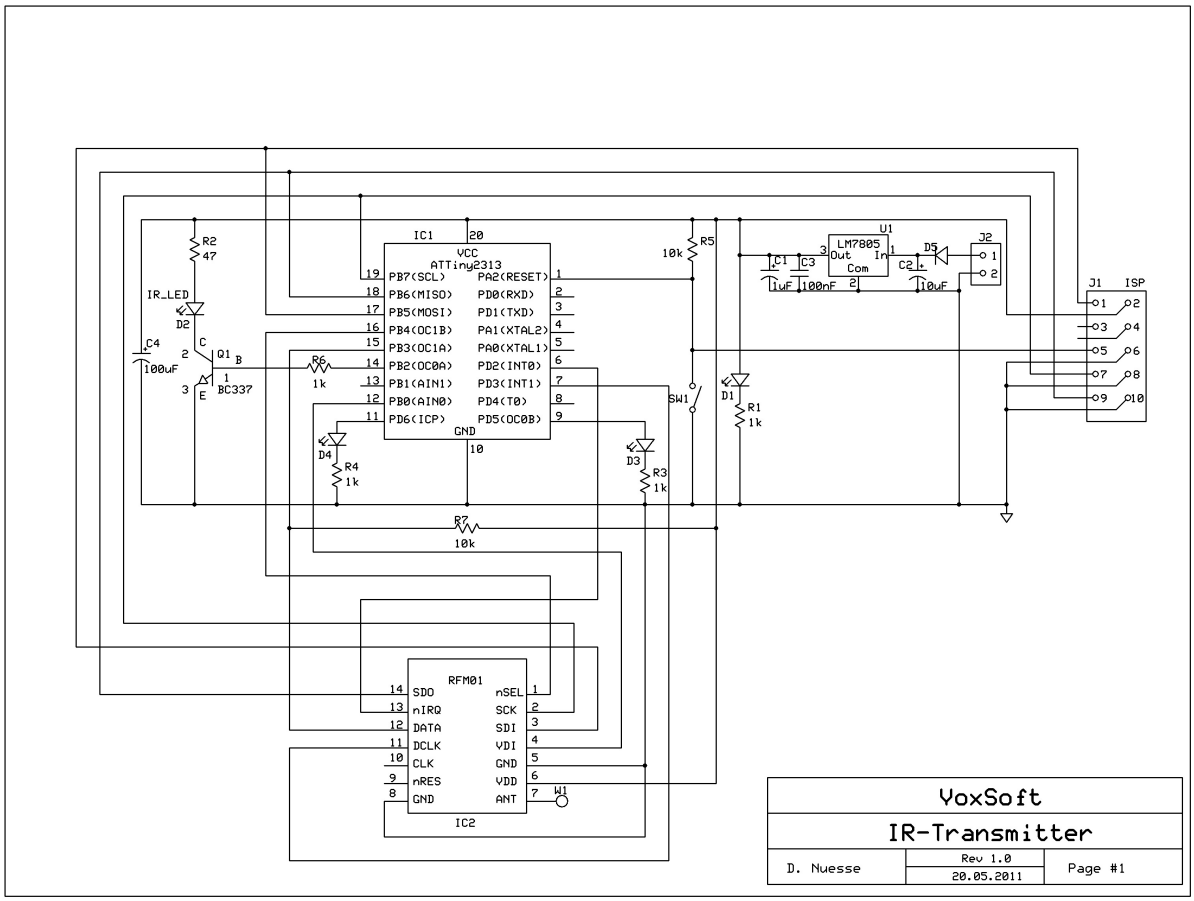
Initialisation frame to synchronize with the helicopter:
Header + 00000010000010000011111010 01110 + stop bit (0)

Saved data frame from a remote control program for a PDA
Data: header + 10111110000010000010001101001010 + stop bit

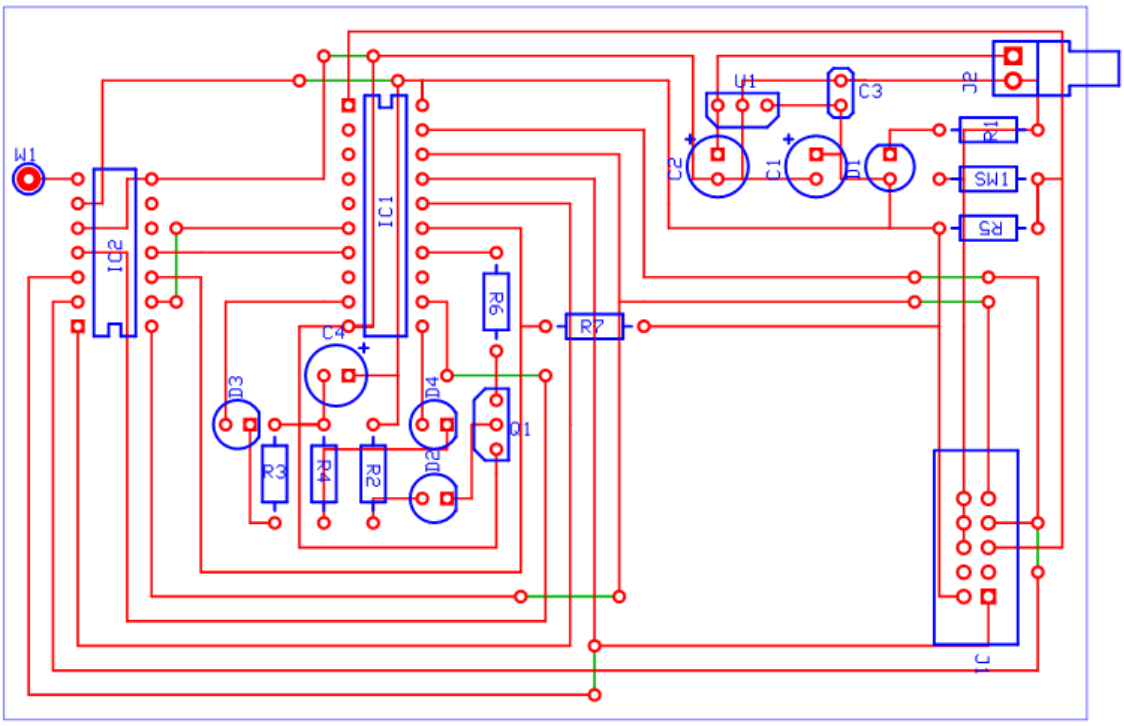


Documents for radio wave receiver and IR-Transmitter

Schematic:

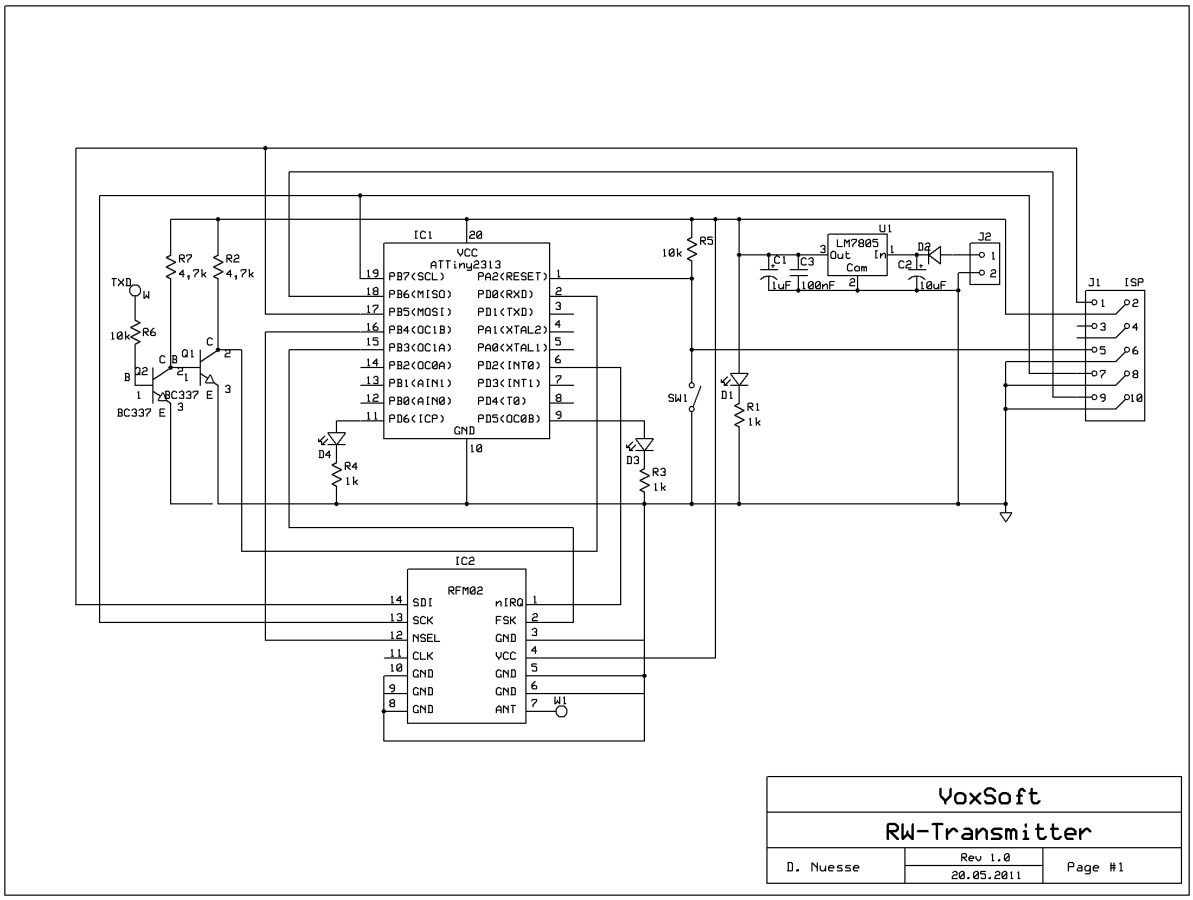


PCB layout:



Documents for radio wave transmitter

Schematic:



SW for WEB Server interface and radio wave transmitter

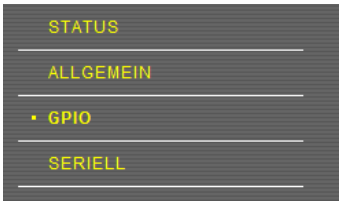
Source code -> see web page

The following functions were added to the project NETraction:

- UART Init
- Flight control functions

UART Init

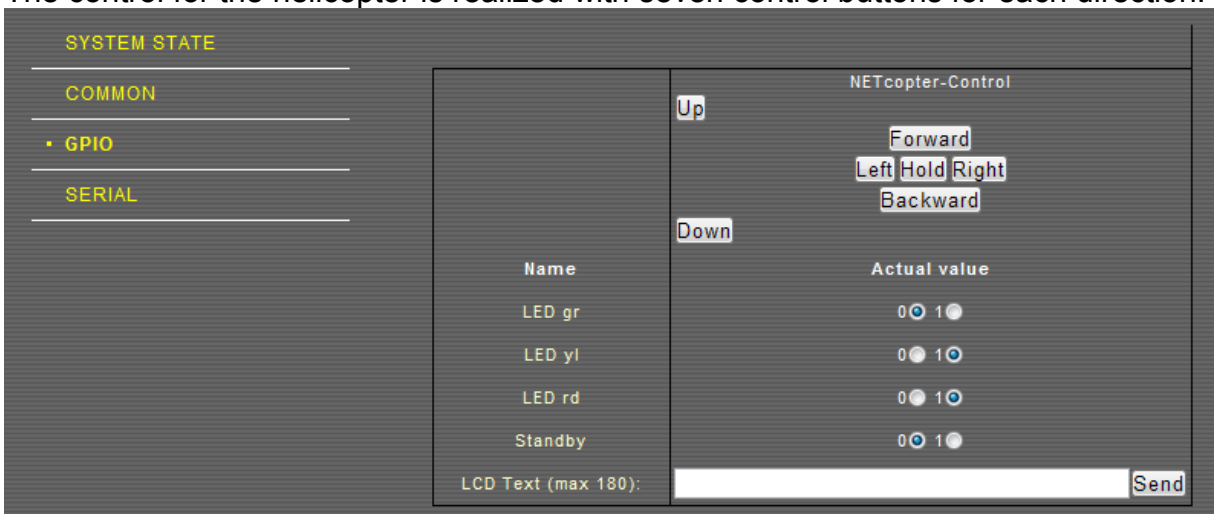
The initialisation of the UART was already implemented in the “Netzer” project and could be activated via the “Seriell” web page.
To activate the UART change the mode in the “Allgemein” web page. An indication of the mode is a “High”(3V) level at TX pin.



In the project “NETcopter” the radio wave transmitter (ATtiny2313 @8MHz) works with a baud rate of 19200, because of an internal clock divider by 8 the effective baud rate is nearly2400 (adjustable by register settings UDRL/H, here 42dez).
Setting for the Web server can be selected in the web page “Seriell”.

Flight control

The control for the helicopter is realized with seven control buttons for each direction.



SW for radio wave receiver and IR-Transmitter

Source code -> see web page