How to use FreeDSP Classic for 2-way crossovers

Circuit:

LED1: Spannung ok,
       Ausgang eingeschaltet
LED2: Eingang2 aktiv
LED3: Eingang1 aktiv

FreeDSP Eingänge **FreeDSP Ausgänge**
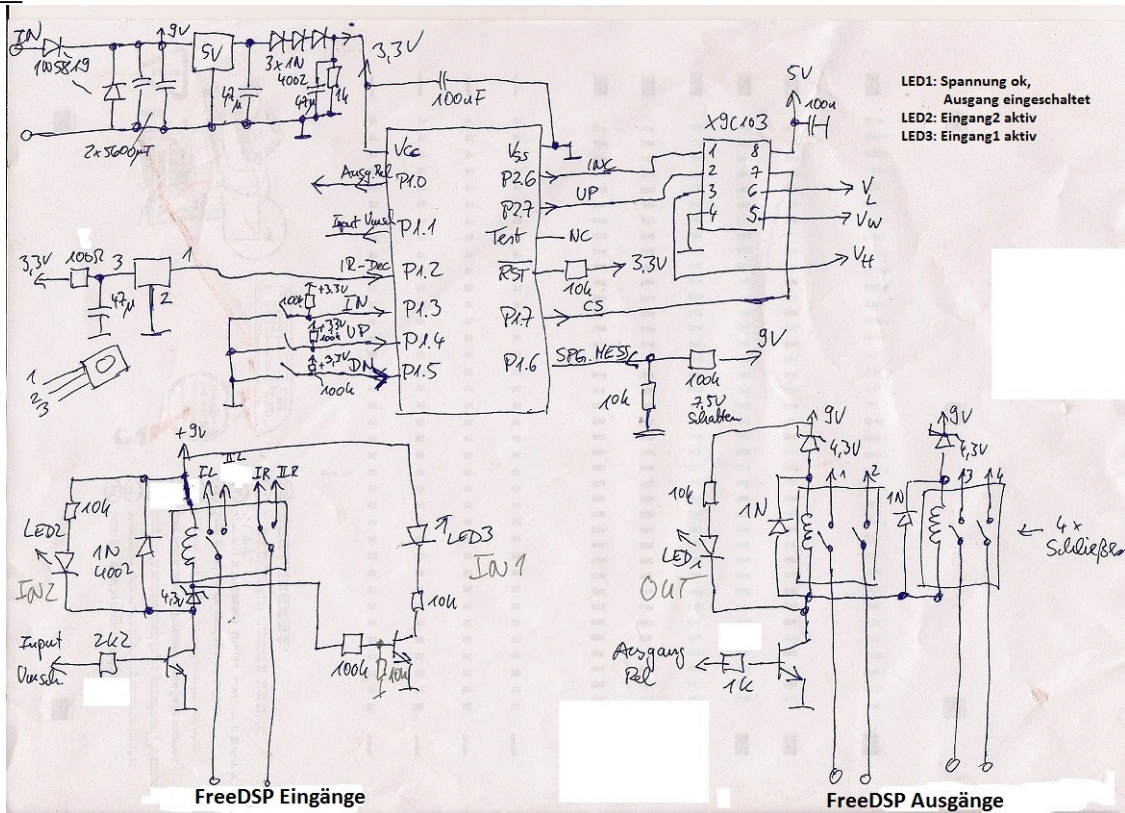
Functions:
1. Switch between 2 Inputs initiated by button press („IN" button)
2. Switching on and off the 4 outputs („Ausgänge") to protect loudspeakers from pop noise
3. 3 LEDs to display status (LED1: Outputs switched on; LED2 and LED3 show the selected input)
4. 2 buttons for volume control („up" and „down")
5. IR decoder for volume control (working with RC1032 from Denon, buttons „folder +" and „folder -"
6. Voltage control

Hardware-Description
1. Power supply: 9V, max. 0,5A
    • Diodes at the power input protect the circuit in case of reverse connection
    • 2 capacitors ensure that the power supply decreases slowly after switching off and the relais can be switched off fast enough
    • The 5V regulator und 3 diodes provide the power supply of the microcontroller (~3.3V)
2. Microcontroller MSP430F2012 controls the different functions => see SW description
3. IR decoder to receive the IR signals from Denon RC-1032
4. 3 buttons to switch between the 2 stereo inputs and to control the volume up and down
5. 1 double relais (5V) to switch the 2 stereo inputs
6. LED3 indicates input #1, LED2 indicates input #2
7. 2 double relais (5V) switch on & off the 4 DSP outputs
8. Voltage divider for supply voltage measurement
9. Programable resistor X9C103 that is connected to the FreeDSP to control the volume

<u>Software description</u>
1. Initialization of microcontroller incl. inputs, outputs and interfaces; RAM clear
2. Main loop (Hauptschleife):
    - Check of power supply; if loss of power supply is detected the output relais are switched off
    - Button control: Depending on buttons detected the different functions are executed: switch between the 2 stereo inputs, volume up and volume down
3. Timer interrupt TA0_ISR: Detection of the end of an IR frame; finalization of volume control activities that have been started before
4. Interrupt routine TA1_ISR: Triggered by a an edge from the IR receiver. It is decided if a received bit of the IR decoder is valid or not, and if it is a „0" or „1". Also the IR code is collected from the received bits and then checked. Finally the function volume up or volume down is executed.