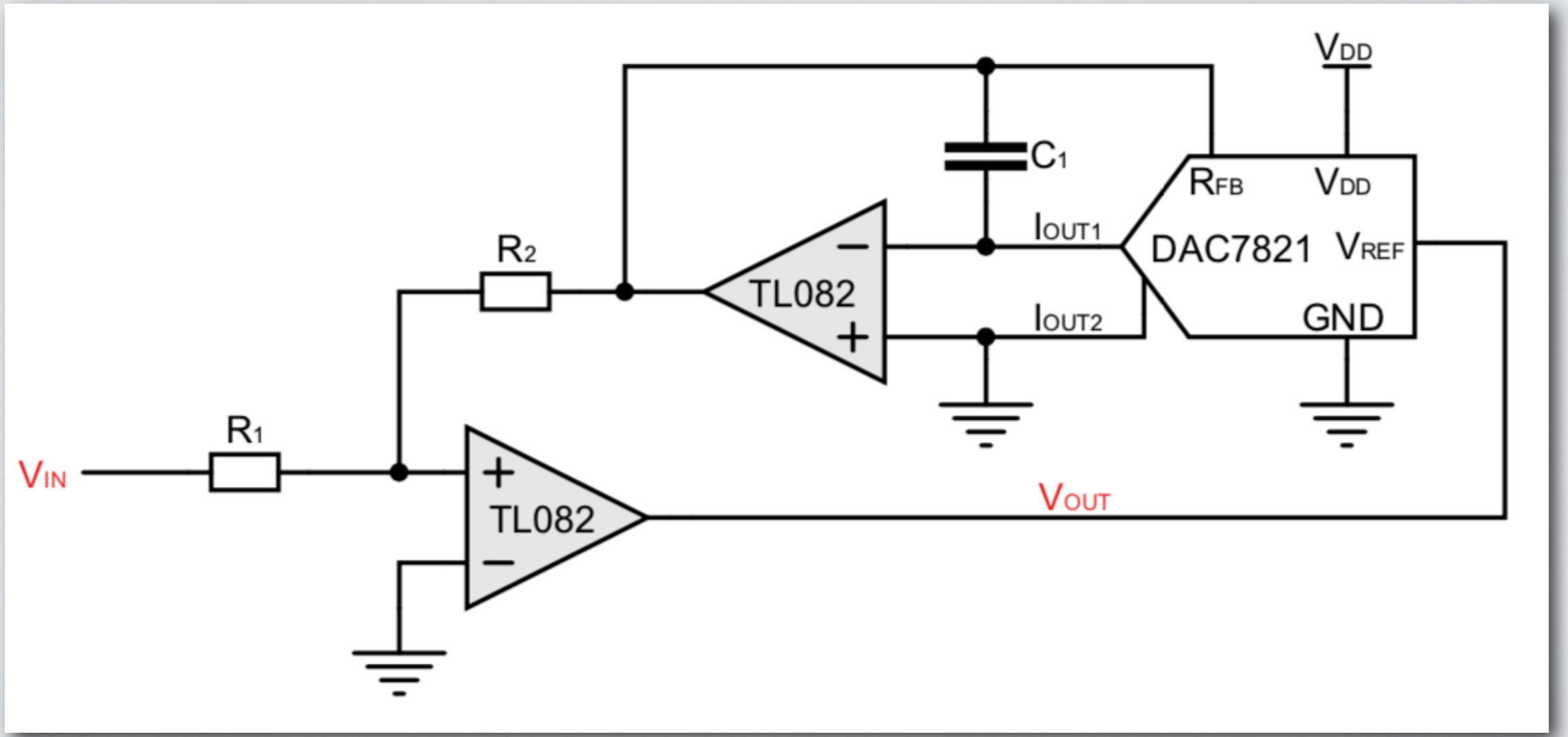
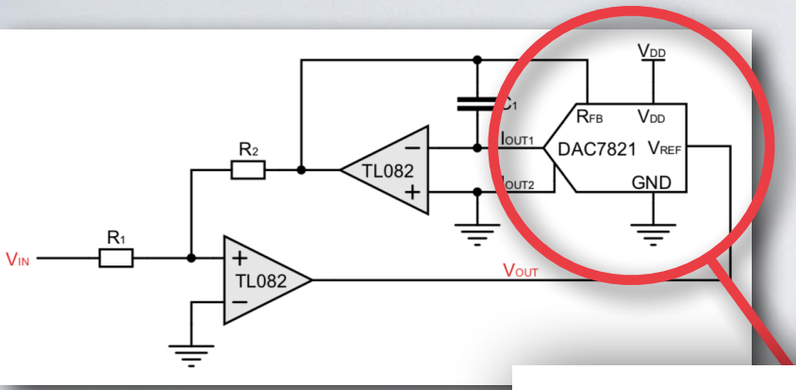
ANALOGE SCHALTUNGSTECHNIK

Digital Controlled Gain Stage Amplifier

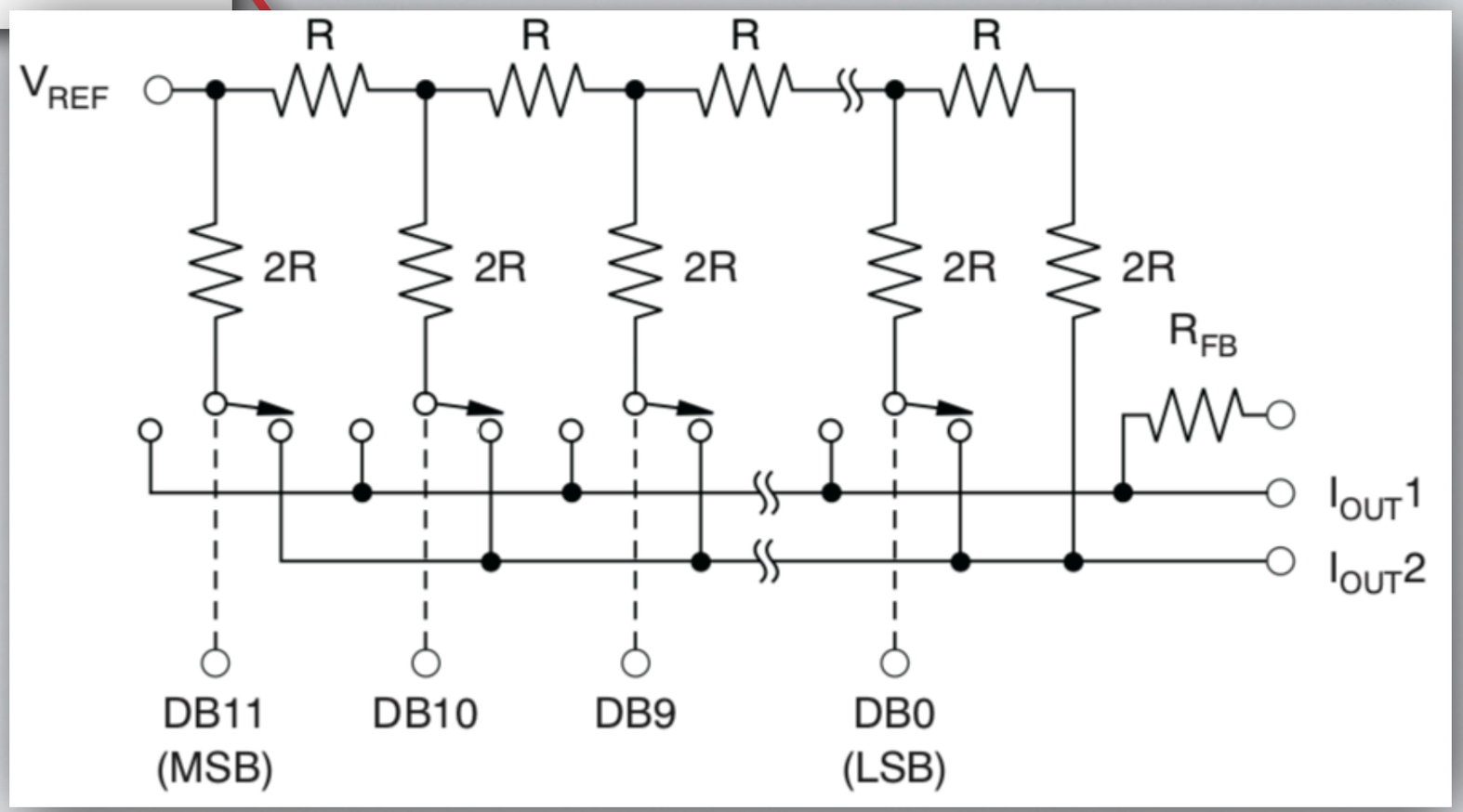
DIGITALLY CONTROLLED GAIN STAGE AMPLIFIER



DIGITALLY CONTROLLED GAIN STAGE AMPLIFIER



Digital Analog Converter



$$I_{out}1 = \frac{V_{ref}}{R_{ges}} \cdot \frac{CODE}{2^{n_{Bits}}}$$

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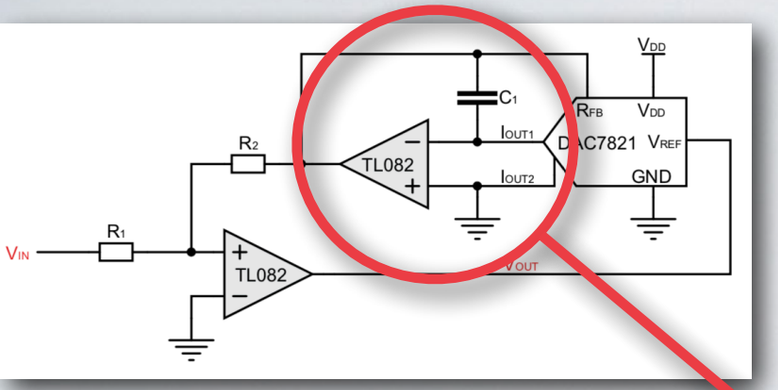
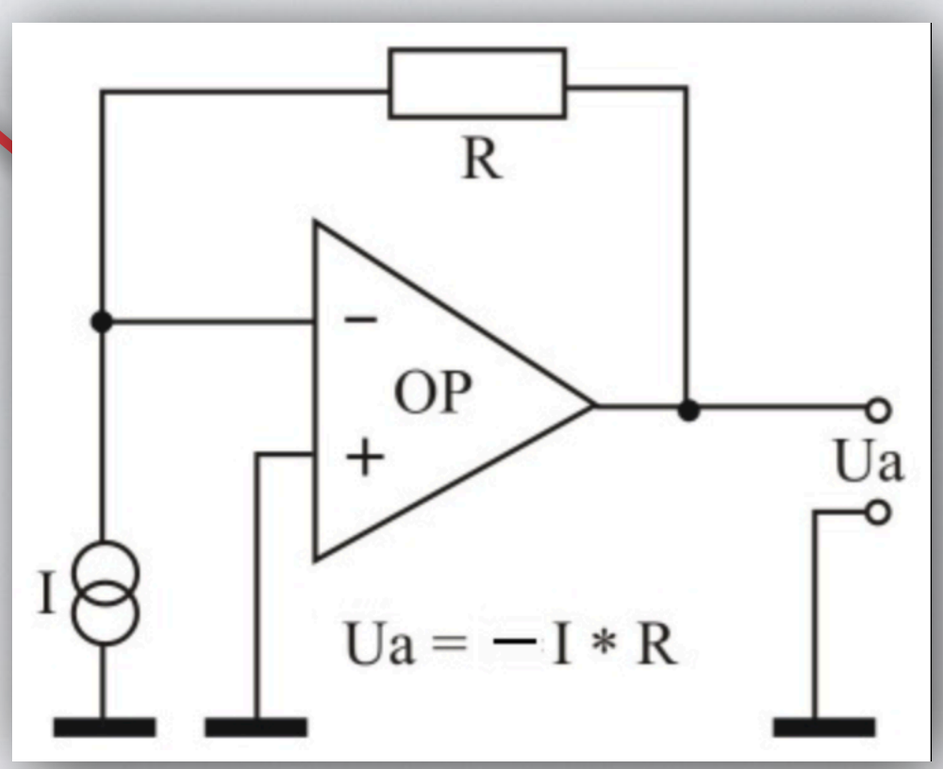


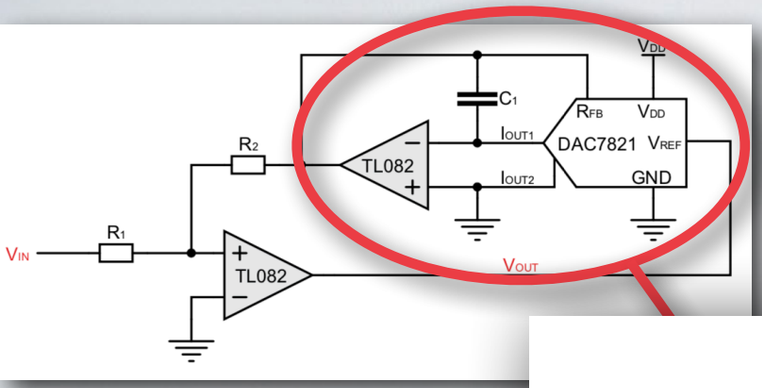
Strom-Spannungswandler



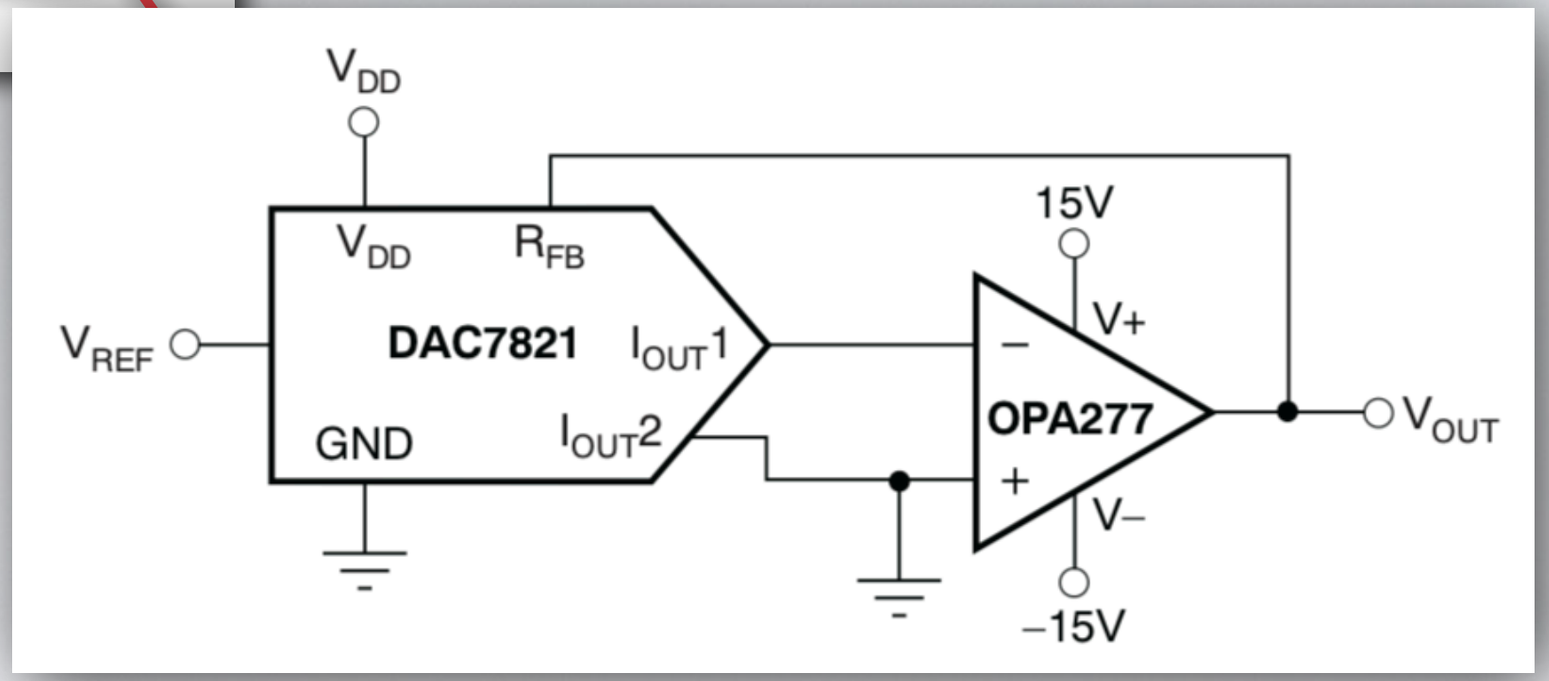
$$I_{out}1 = \frac{V_{ref}}{R_{ges}} \cdot \frac{CODE}{2^{n_{Bits}}}$$

$$U_{out} = -\frac{V_{ref}}{R_{ges}} \cdot \frac{CODE}{2^{n_{Bits}}} \cdot R$$

DIGITALLY CONTROLLED GAIN STAGE AMPLIFIER



Gaincontroller gesamt

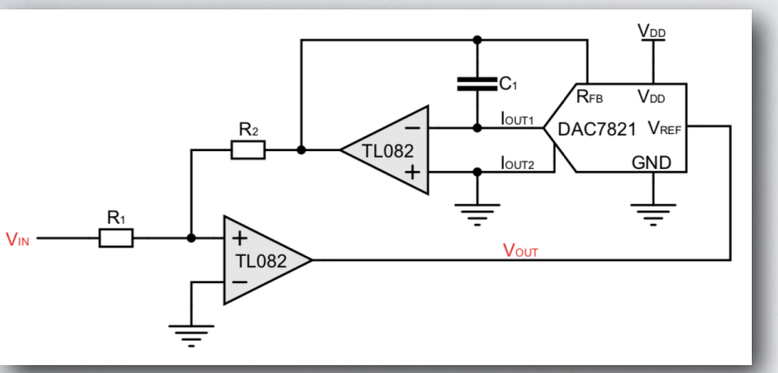


$$R_{ges} = R_{FB}$$

$$\downarrow$$

$$V_{out} = -V_{ref} \cdot \frac{CODE}{2^{n_{Bits}}}$$

DIGITALLY CONTROLLED GAIN STAGE AMPLIFIER

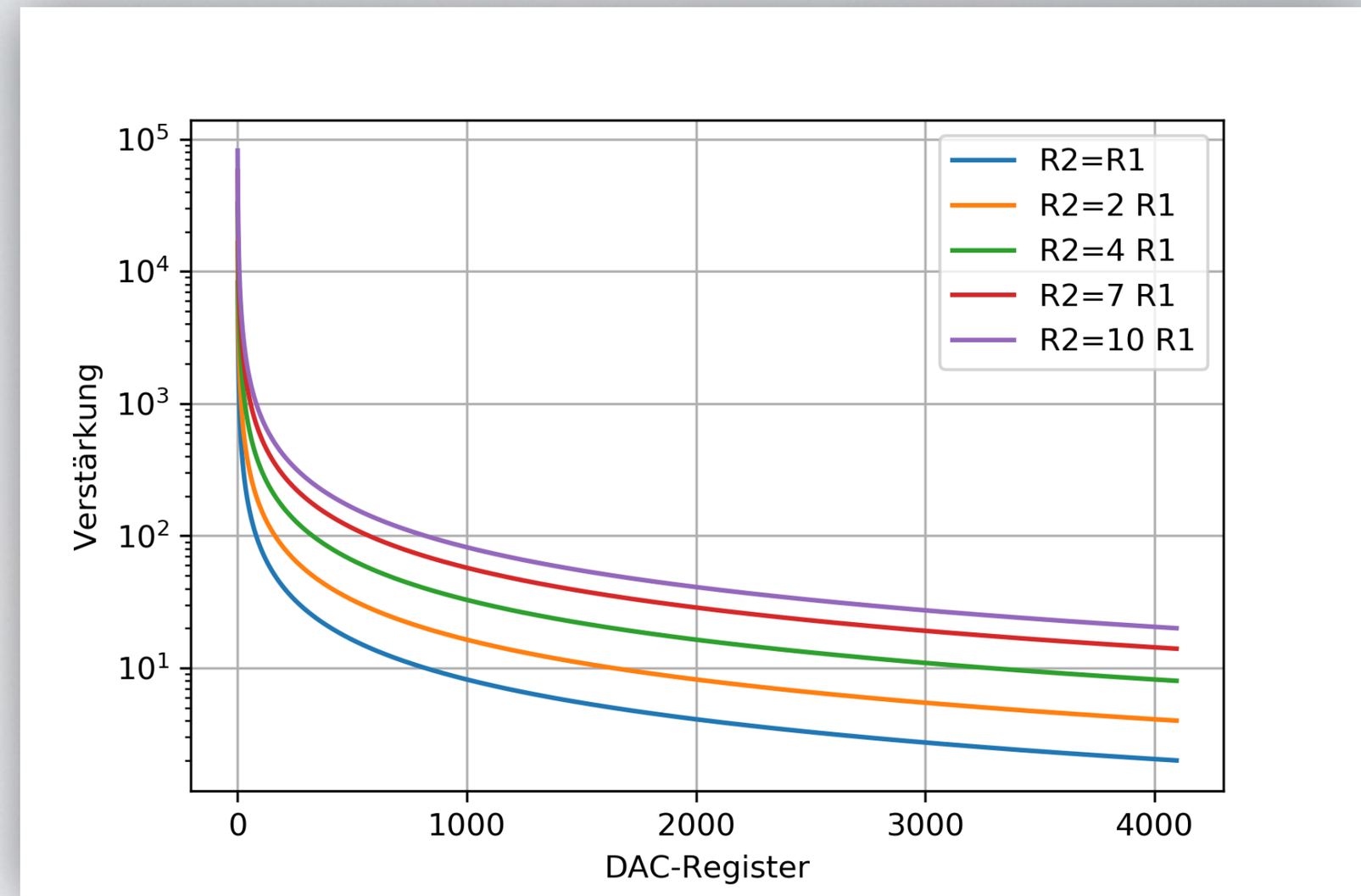


$$\frac{V_{out}}{V_{in}} = \frac{R2}{R1}$$

$$\frac{V_{out} \cdot \frac{CODE}{2^{n\ Bits}}}{V_{in}} = \frac{R2}{R1}$$

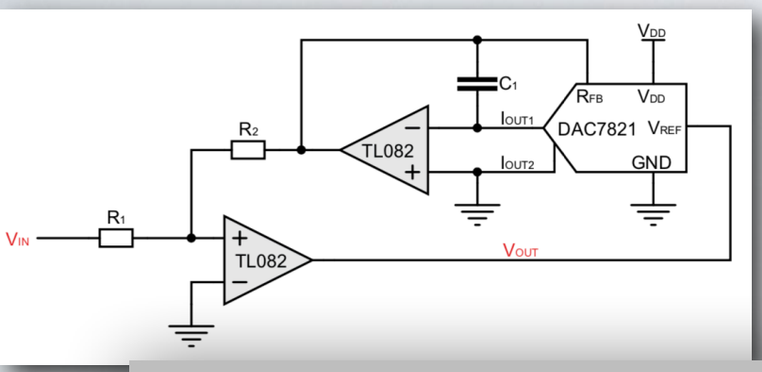
$$V_{out} = V_{in} \cdot \frac{R2}{R1} \cdot \frac{2^{n\ Bits}}{CODE}$$

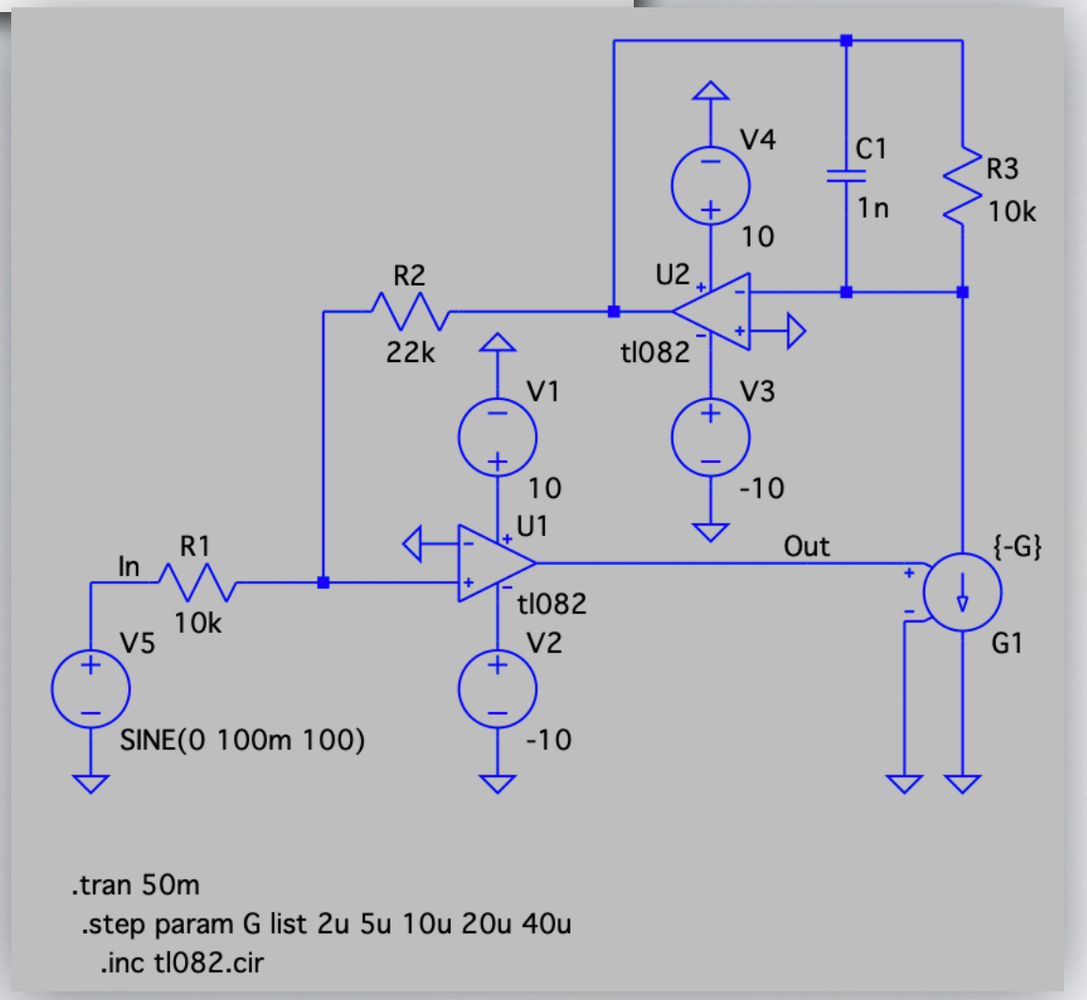
Verstärker gesamt



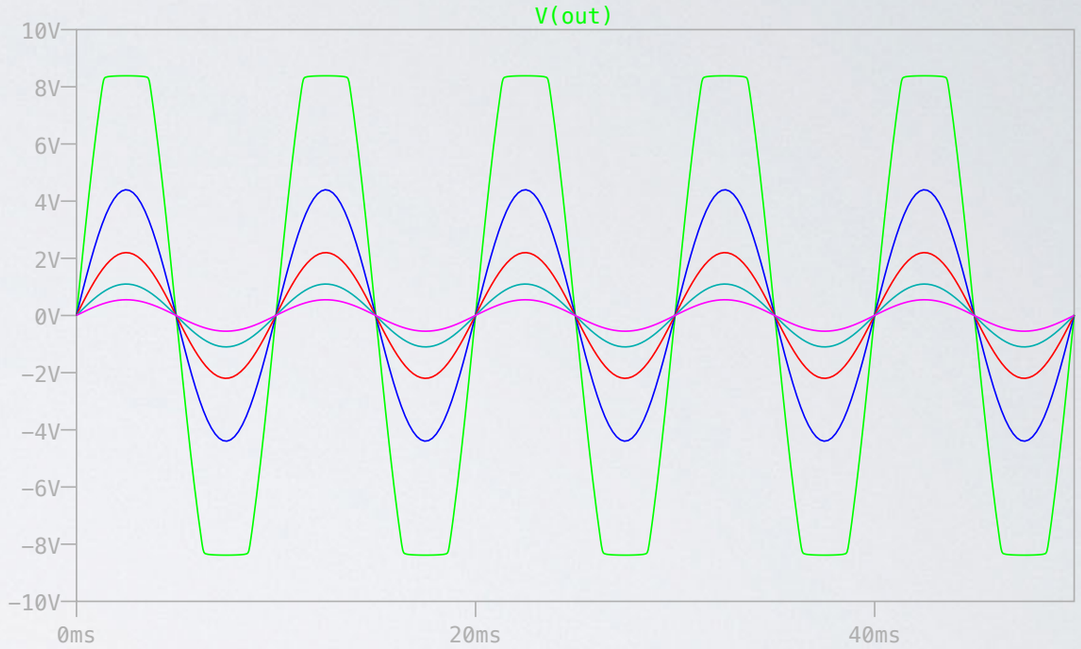
Verstärkungskennlinie Digitale Controller Main Stage Amplifier

DIGITALLY CONTROLLED GAIN STAGE AMPLIFIER





Simulation in LT Spice

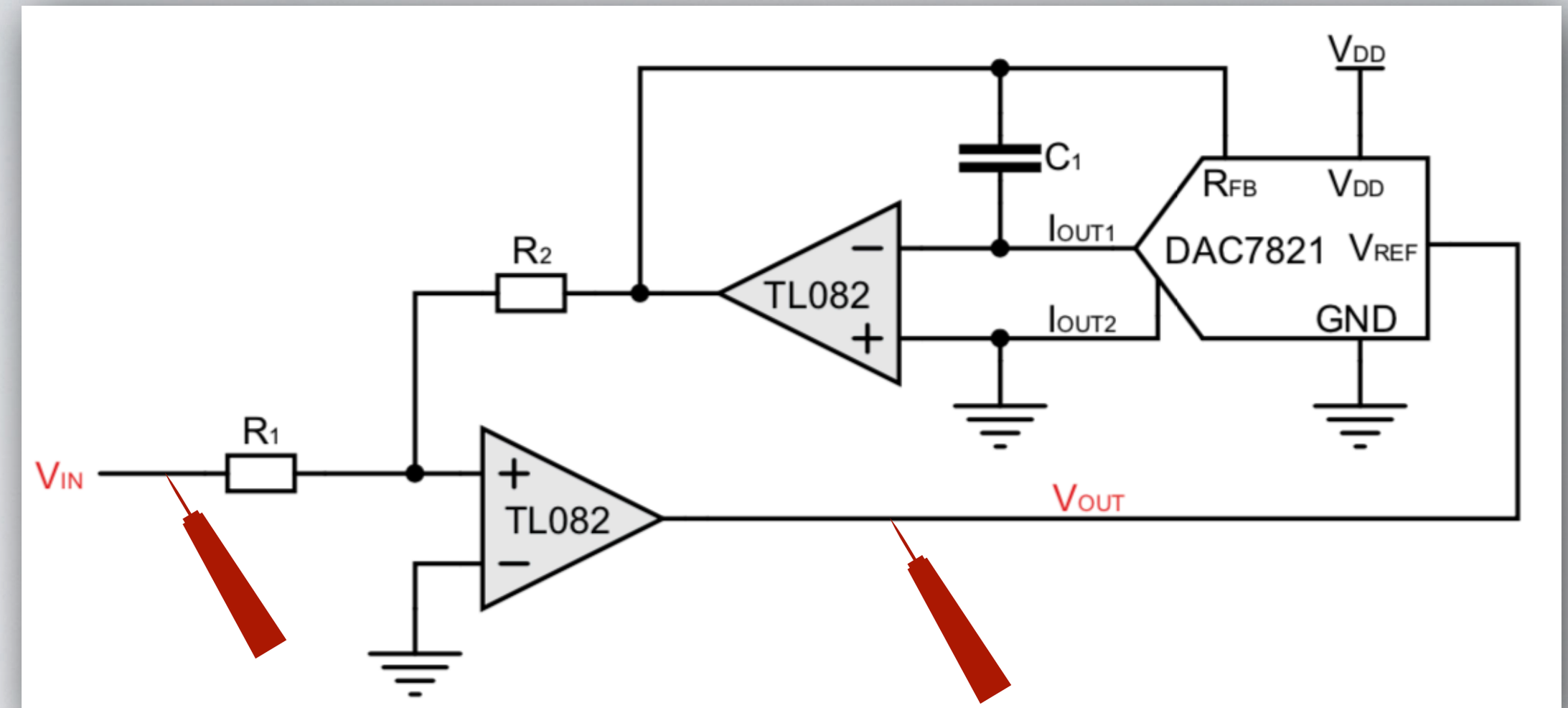


Zeitaufnahme Sinus bei 100Hz

Verstärkungskennlinien Digitale Controller Main Stage Amplifier

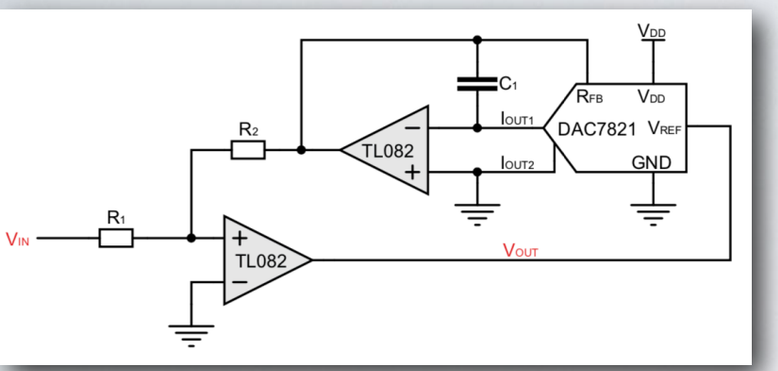
DIGITALLY CONTROLLED GAIN STAGE AMPLIFIER

Messung mit Experimentierboard



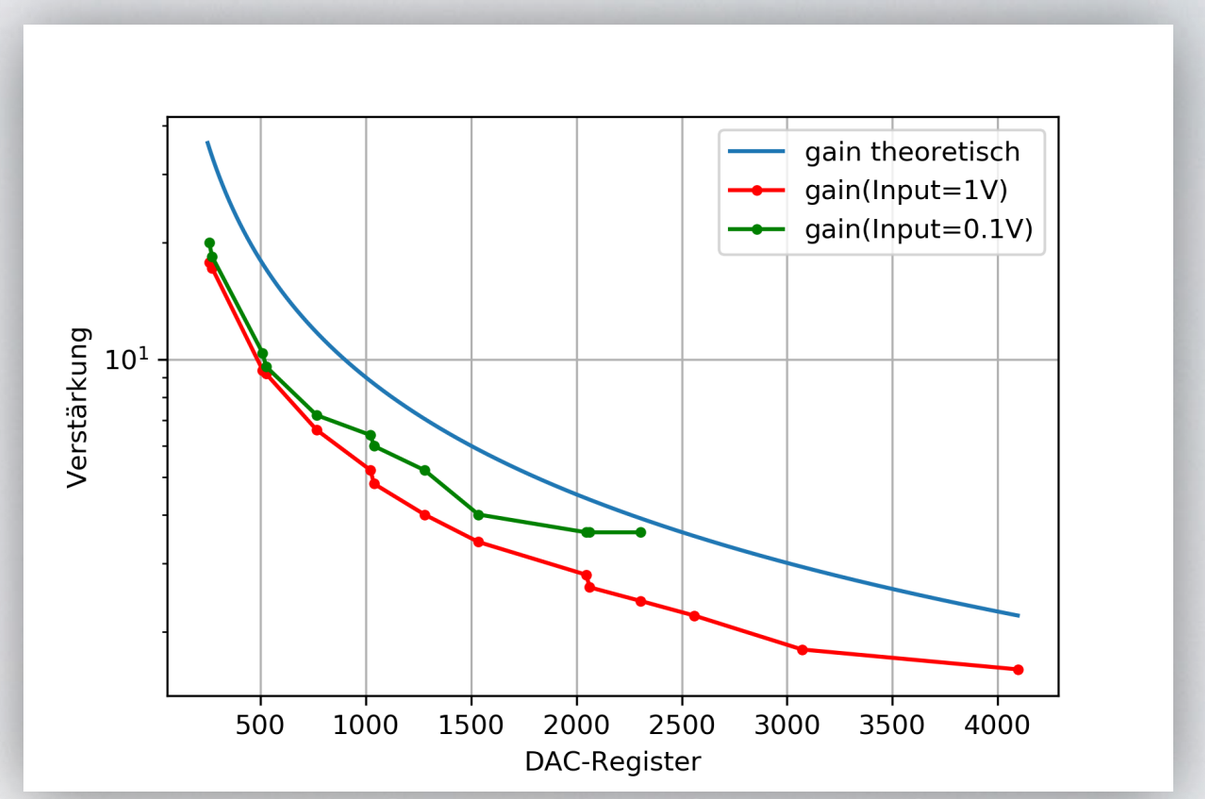
$R_1 = 10k\Omega$ $R_2 = 22k\Omega$ $C_1 = 10nF$

DIGITALLY CONTROLLED GAIN STAGE AMPLIFIER

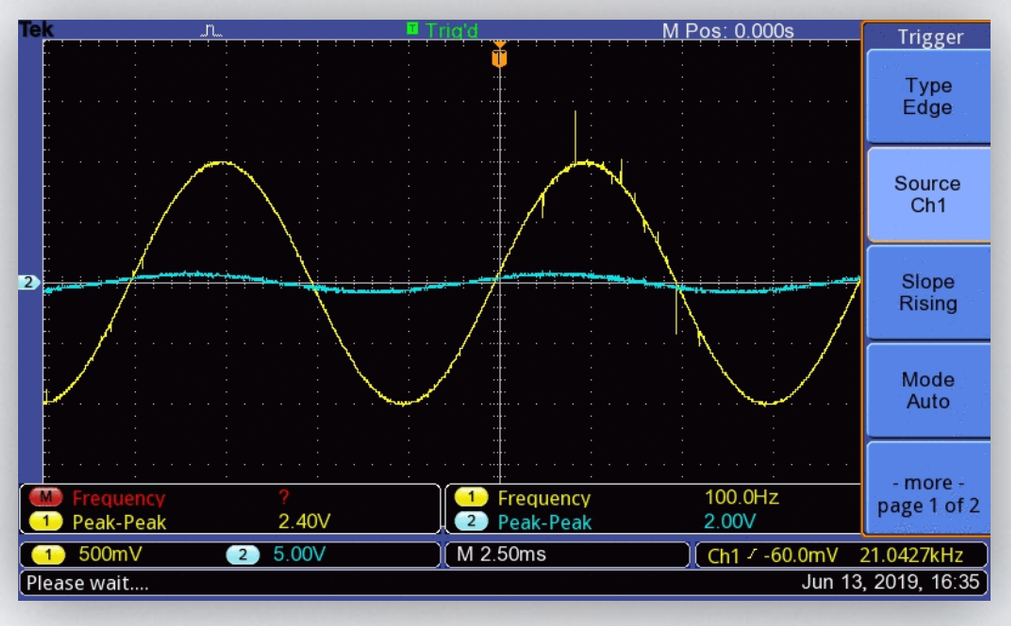


$$gain = \frac{V_{out}}{V_{in}}$$

Messergebnis

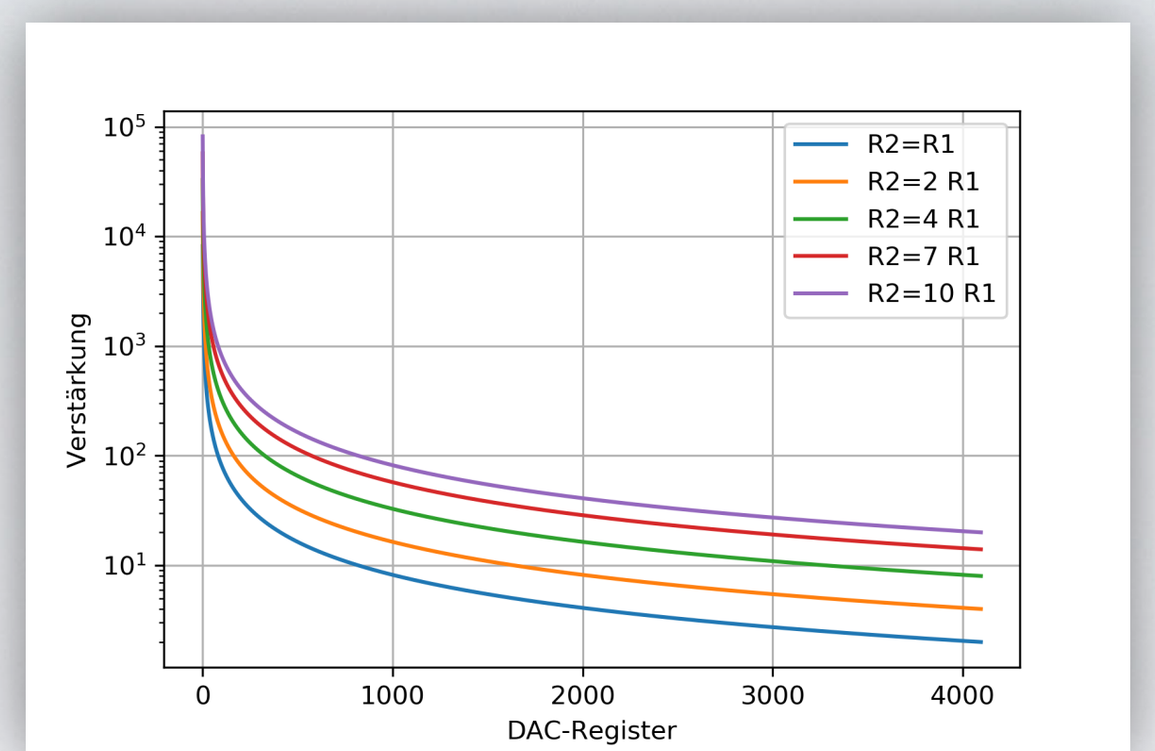


Verstärkung Digitale Controller Main Stage Amplifier aus Messung



DIGITALLY CONTROLLED GAIN STAGE AMPLIFIER

Anmerkungen:



Sinnvoller Arbeitsbereich ~250-4096