1176LN Calibration

Power Supply

1. Run the unit for 5-10 minutes to stabilise.

2. Check the power supply rails. They should be +30VDC (± 0.5V) and -10VDC (± 0.5V).

'Q' Bias Adjustment

Control	Set to
Input	fully CCW
Output	fully CW
Attack	fully CCW (switched to OFF)
Release	fully CW
Compression ratio	20:1
Meter mode	+4dB
Q bias trimmer	fully CCW

1. Set the controls as follows:

2. Apply a 0.775Vrms (0dB) 1kHz sine wave signal to the input.

3. Turn the input control CW until the VU meter reads +1VU on the meter.

4. Slowly turn the Q bias trimmer CW until a drop of 1dB occurs and the meter reads 0VU. The FET is now slightly in conduction.

Gain Reduction Meter Tracking

Control	Set to
Input	middle
Output	fully CW
Attack	fully CCW (switched to OFF)
Release	fully CW
Compression ratio	20:1
Meter mode	GR
VR54 trimmer	1/4 turn from fully CCW

1. Set the controls as follows:

2. With no signal applied, adjust VR55 so that the meter reads 0VU.

3. Apply a 0.245Vrms (-10dB) 1kHz sine wave signal to the input.

4. Switch the meter mode to +4dB.

5. Turn the output level control CW until the meter reads 0VU.

6. Turn the attack control ON (CW) and observe the drop in the meter reading.

7. Adjust the input level control until -10dB is indicated on the VU meter.

8. Turn the attack control OFF (CCW) and re-adjust the output level control for 0VU meter reading if necessary.

9. Repeat steps 7 and 8 until the output drops 10dB whenever the attack control is turned ON.

10.Without adjusting the input or output controls, select the meter mode for GR.

11.Adjust VR54 until the GR meter reading reads -10dB when the attack control is ON.

12.Adjust VR55 until the GR meter reads 0VU when the attack control is OFF.

13.Repeat steps 11 and 12 until the results are consistent.

GR Meter Zero

1. VR55 may be adjusted slightly to zero the GR meter without affecting the other controls.

Signal Preamp Linearity

Control	**Set to**
Input	fully CW
Output	halfway
Attack	fully CCW (switched to OFF)
Release	fully CW
Compression ratio	20:1
Meter mode	GR

1. Set the controls as follows:

2. Apply a 0.0245Vrms (-30dB) 500Hz sine wave signal to the input.

3. Measure the THD of the output signal and adjust VR16 until the minimum amount of distortion is achieved.

1176LN Troubleshooting

If you are having problems getting your newly-constructed 1176 clone calibrating or operating, here's a few things you might like to check to help find the problem.

Steady-state DC bias conditions

Assuming you have the power supply working (first thing to check), use a voltmeter to measure the DC voltages on each of the transistors with compression disabled and ratio set to 20:1.

Q	B	C	E
2	1.04	1.81	0.50
3	1.81	11.8	1.17
4	11.8	30	11.2
5	4.88	28.3	4.40
6	28.3	14.4	28.9
7	28.9	14.4	29.5
8	14.4	30	13.7
9	13.1	0	13.7
12	4.47	15.1	3.89
13	15.1	30	14.5
14	3.45	16.6	2.86
15	16.6	30	16.0

These DC voltages may differ by a few percent, depending on your supply rail settings, transistor types and temperature. However if they are way off then you have a problem, possibly caused by a wrong value resistor or a transistor inserted incorrectly. If you use the testing spreadsheet and fill in the values as you measure them it should indicate which ones are OK and which ones are not.

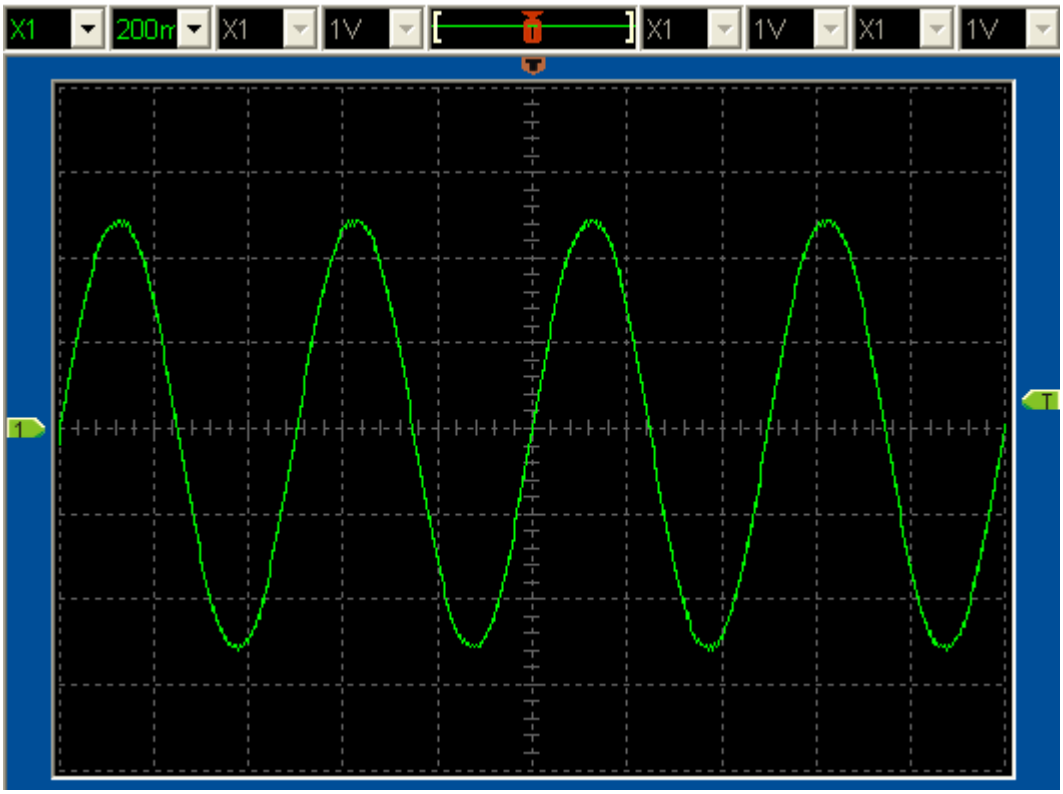
Amplifier Stages - 1kHz AC signal trace

There are three amplifier stages to check.

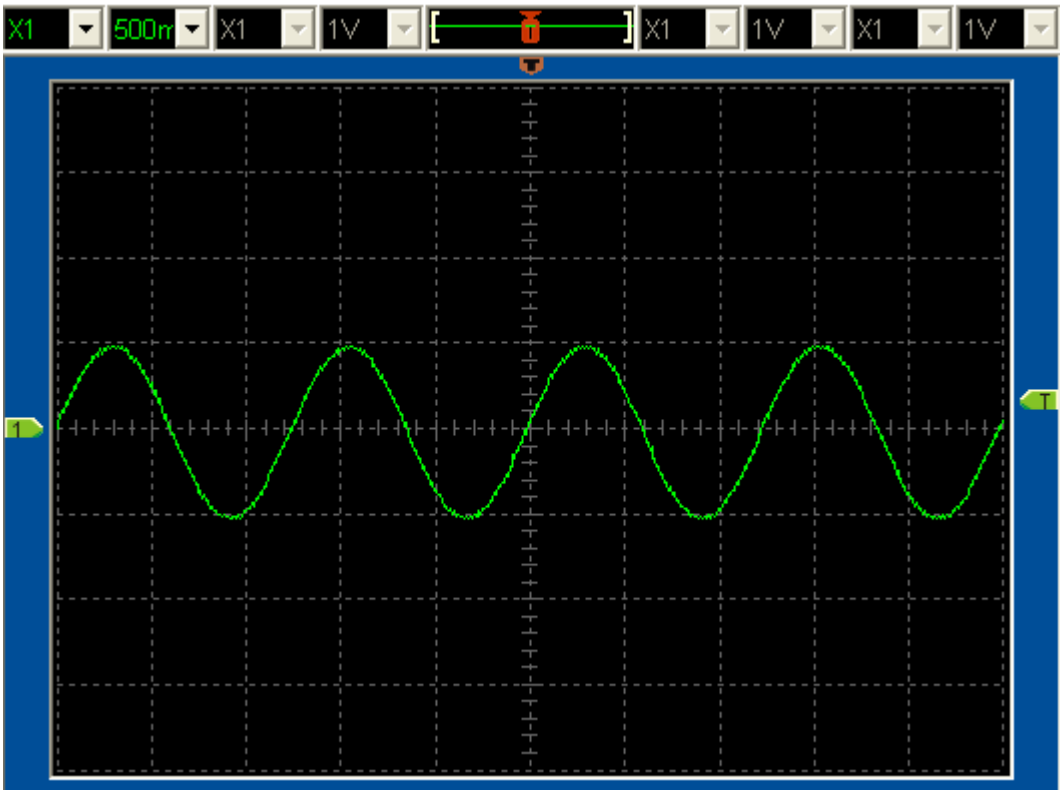
The input amplifier

Unless you are using a transformer input stage, you will have an op-amp balanced input amp. Connect a 1kHz 1Vp-p sine wave to the input connector and measure the output at the top of the Input pot.

Here's a scope snapshot of these waveforms.



Input signal



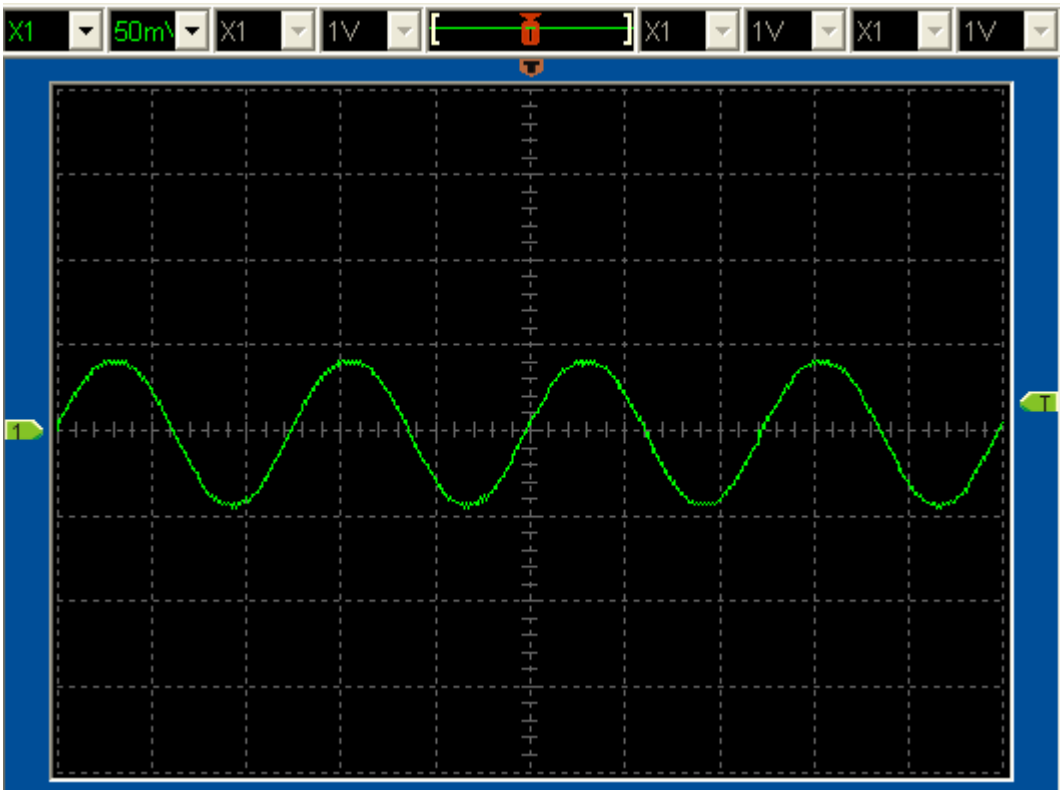
Signal at the top of the Input pot

The signal pre-amp

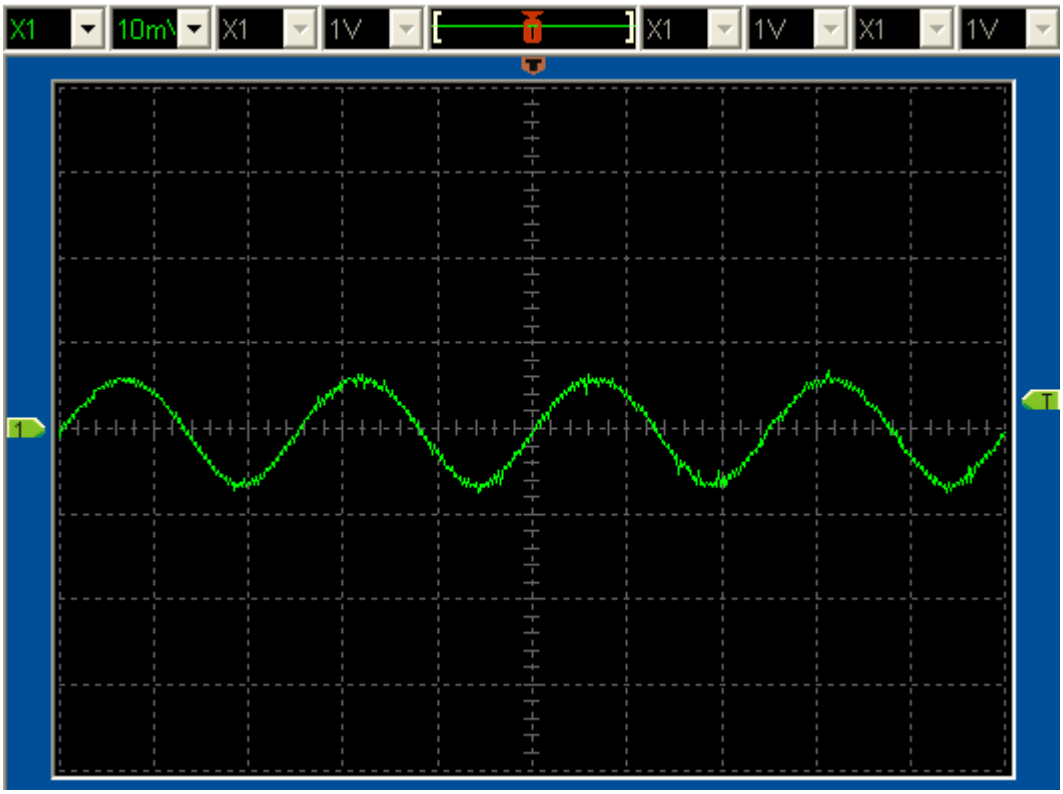
This is the amplifier stage between the input pot and the output pot. Using the same connection as used for the input amplifier test, measure the signal at the base of Q2, Q3 and Q4 and also the top of the Output pot.

The following scope images show typical results for this measurement. The gain of this stage is about 26dB.

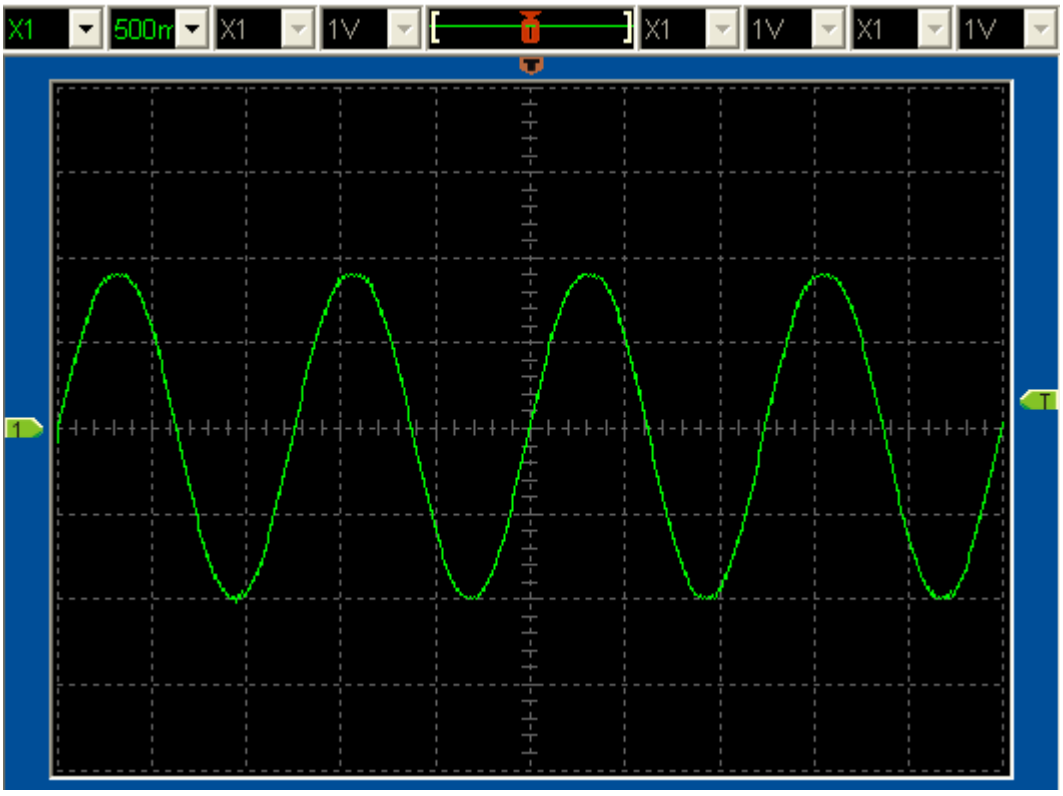
If you use the testing spreadsheet and fill the measured values in it will calculate the gain of the stages and indicate whether there is a problem.



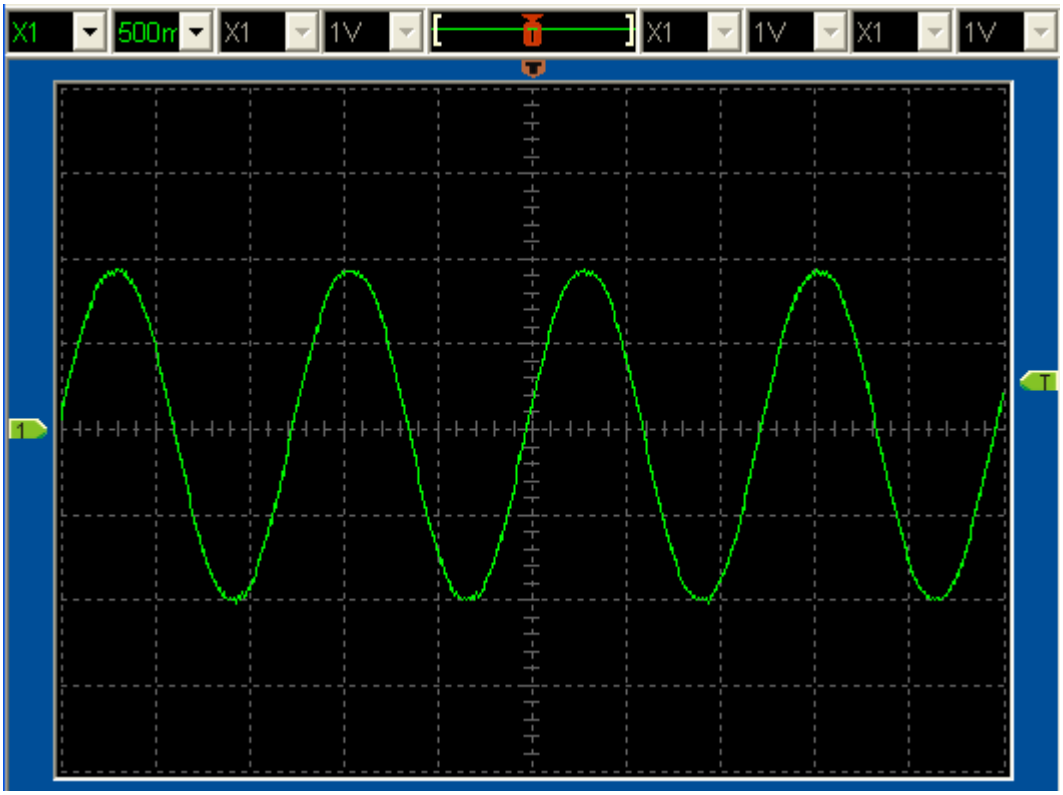
Q2 base



Q3 base



Q4 base

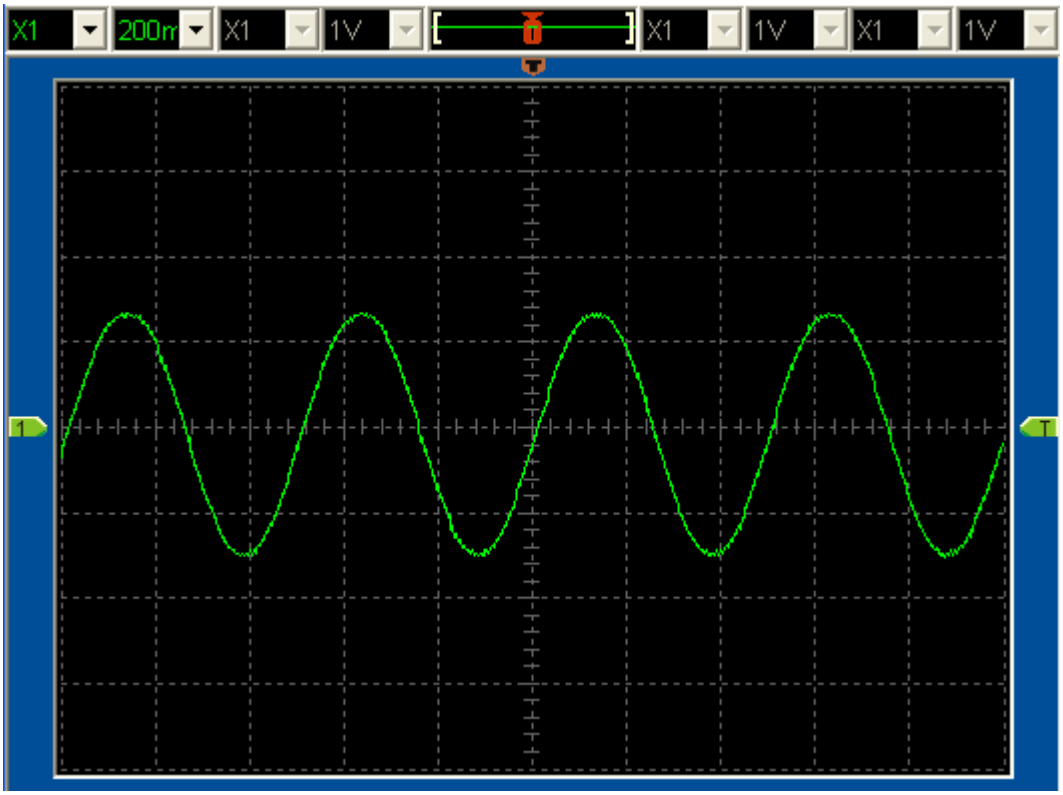


Top of Output pot

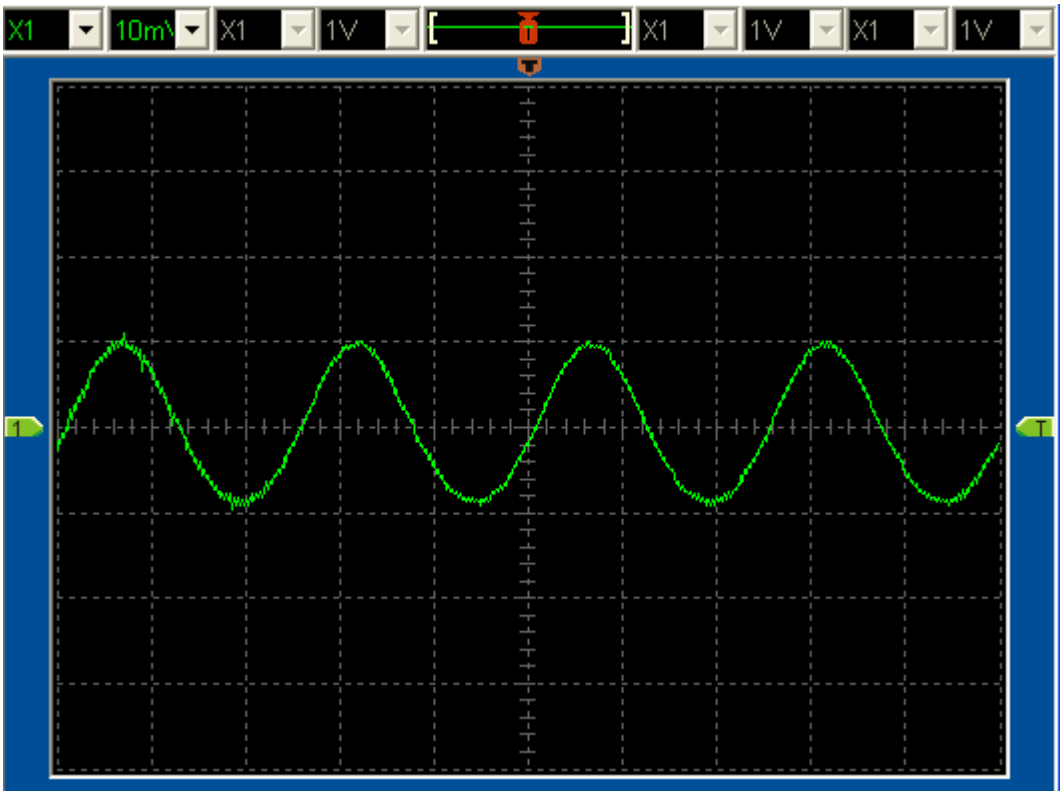
The line driver amp

This amplifier stage drives the transformer at its output and is fed from the Output pot. Continue the measurements on the base of Q5, Q6, Q7, Q8 and Q9 and also on the + side of C15 (ie the output).

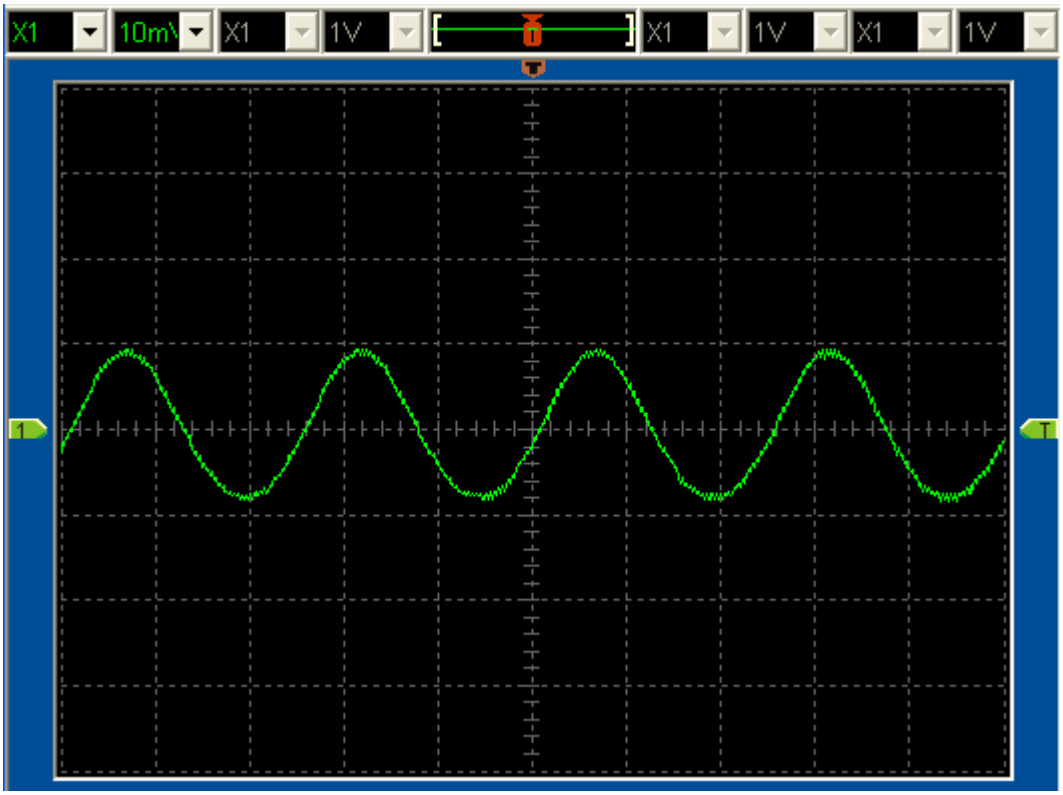
The following scope images show typical waveforms you would expect to find at these points. The gain of this stage is approximately 10dB.



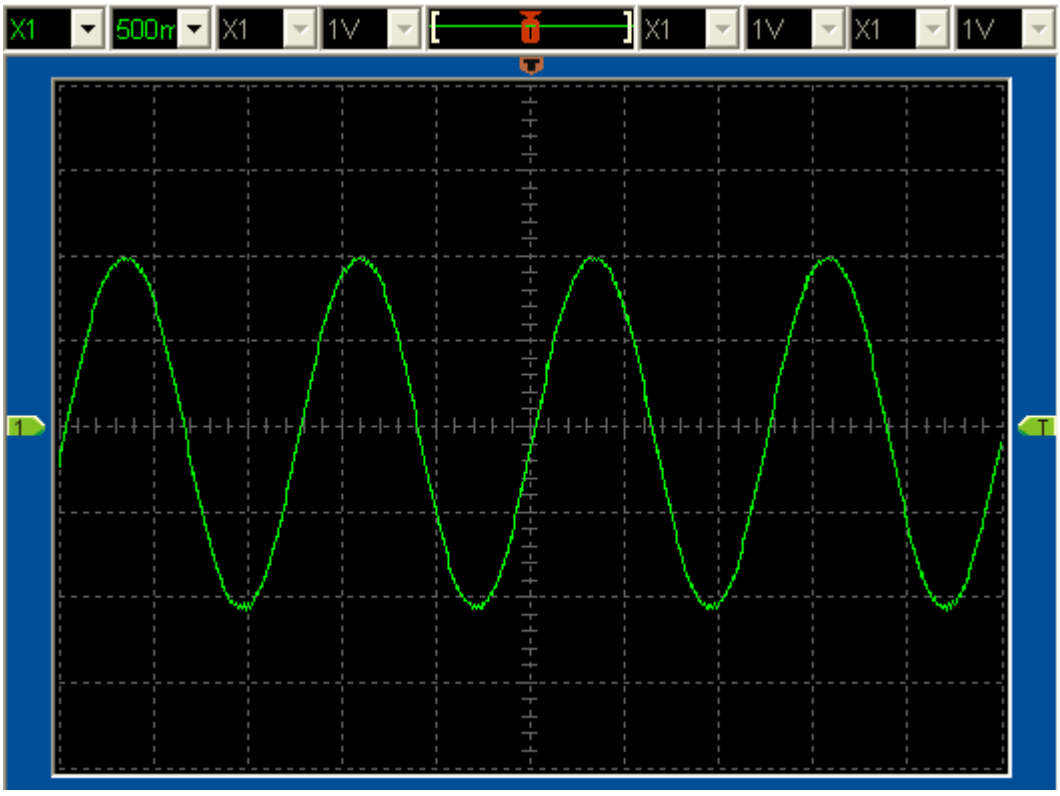
Q5 base



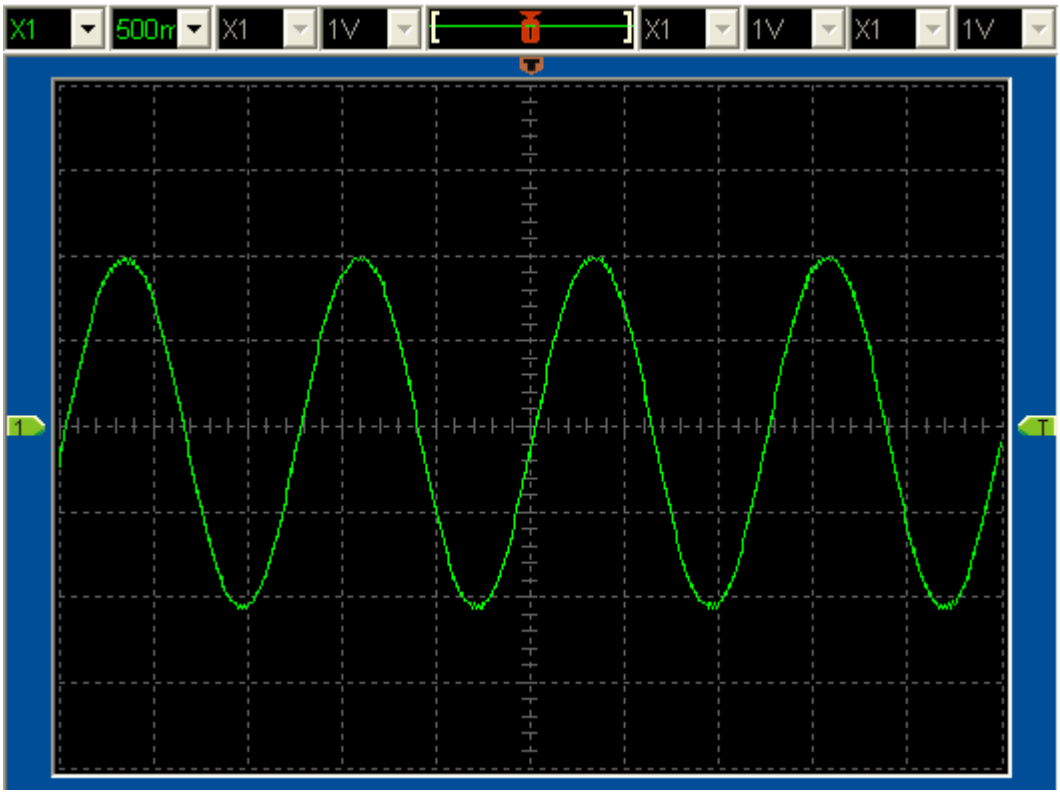
Q6 base



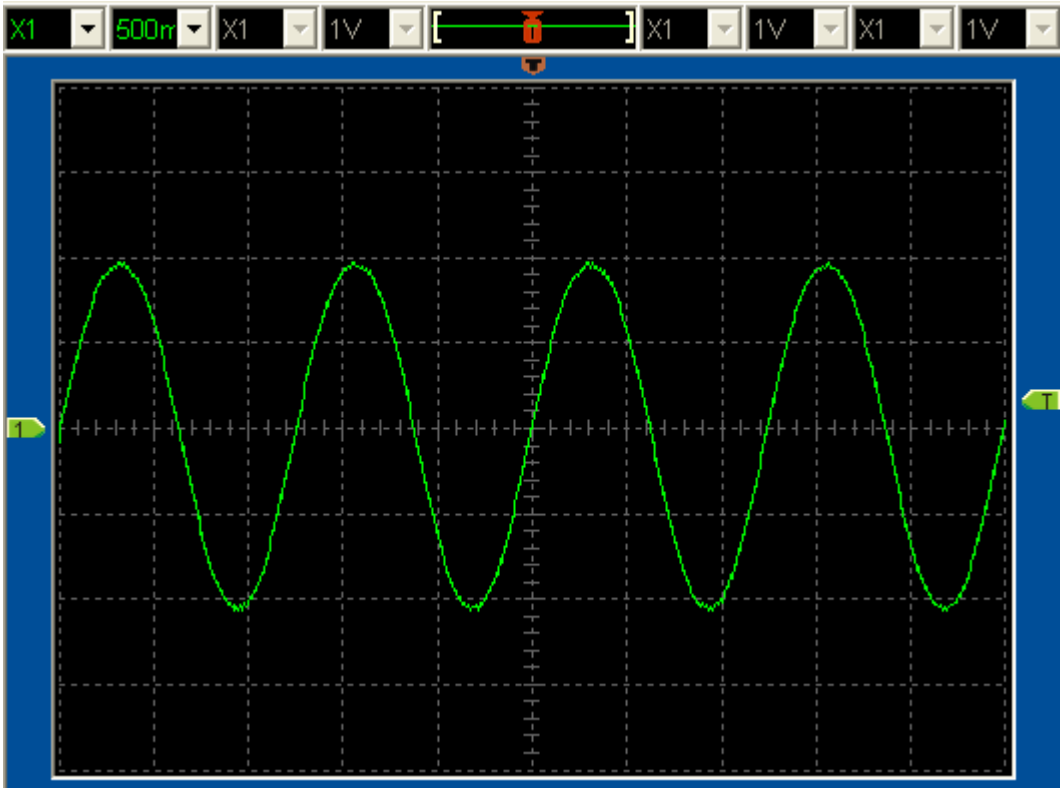
Q7 base



Q8 base



Q9 base



Output signal to transformer

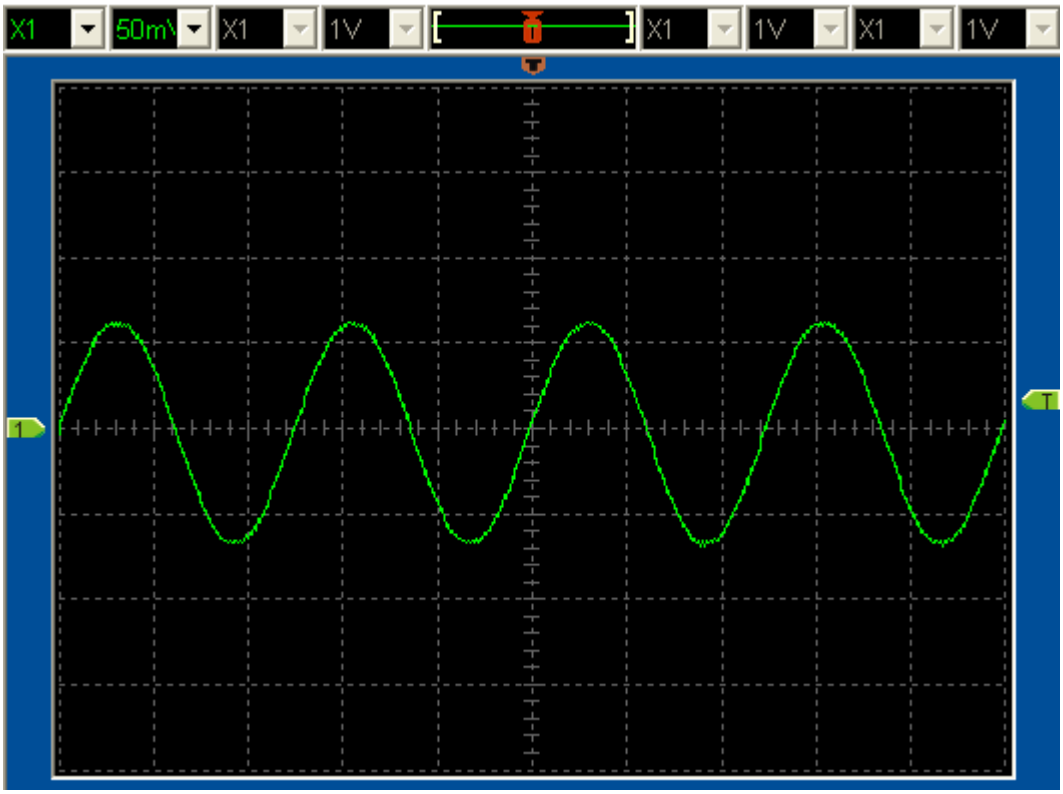
The gain-reduction amplifier and rectifier

The signal at the to top the Ouput pot is fed through a resistor chain and tapped, according to the compression ratio selected, to feed the input of the GR amp stage.

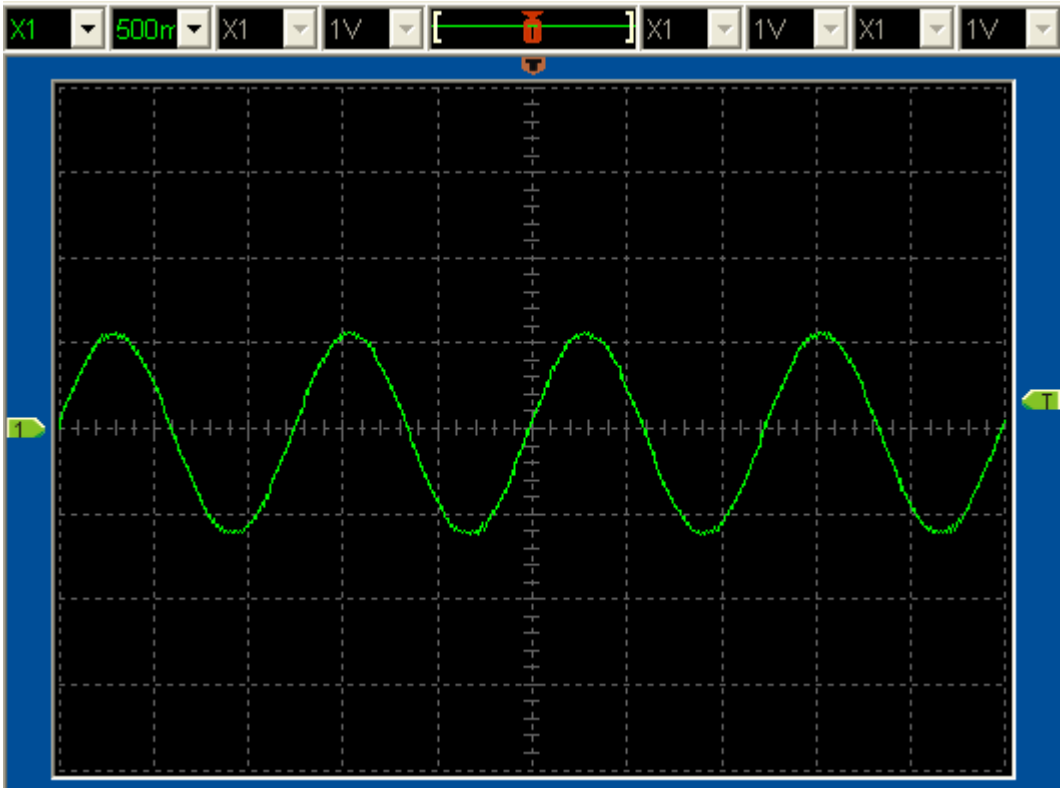
Continue with the 1kHz input signal and enable compression. Select a ratio of 20:1, which takes its signal from the top of the resistor chain. Turn up the input pot until the signal at the base of Q12 is 0.13Vp-p.

Now measure the signal at the base of Q12, Q13, Q14 and Q15 and finally at the junction of D3 and D4 cathodes (the output of the rectifier).

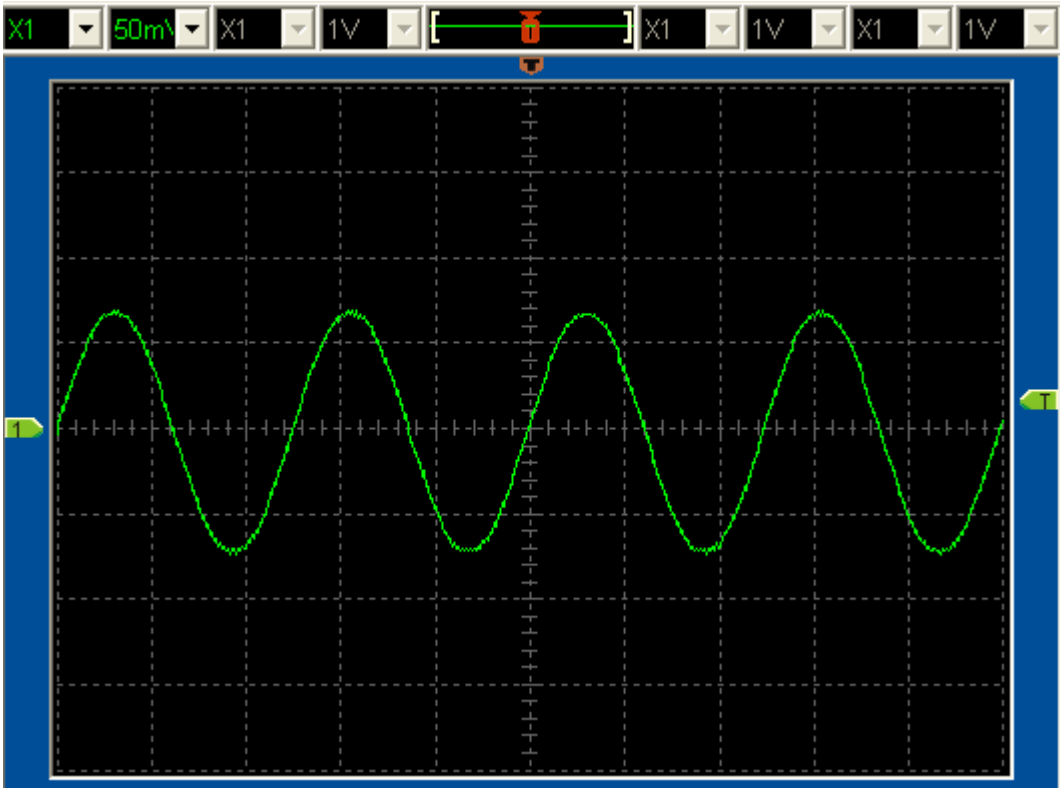
The following scope images show typical waveforms at these points.



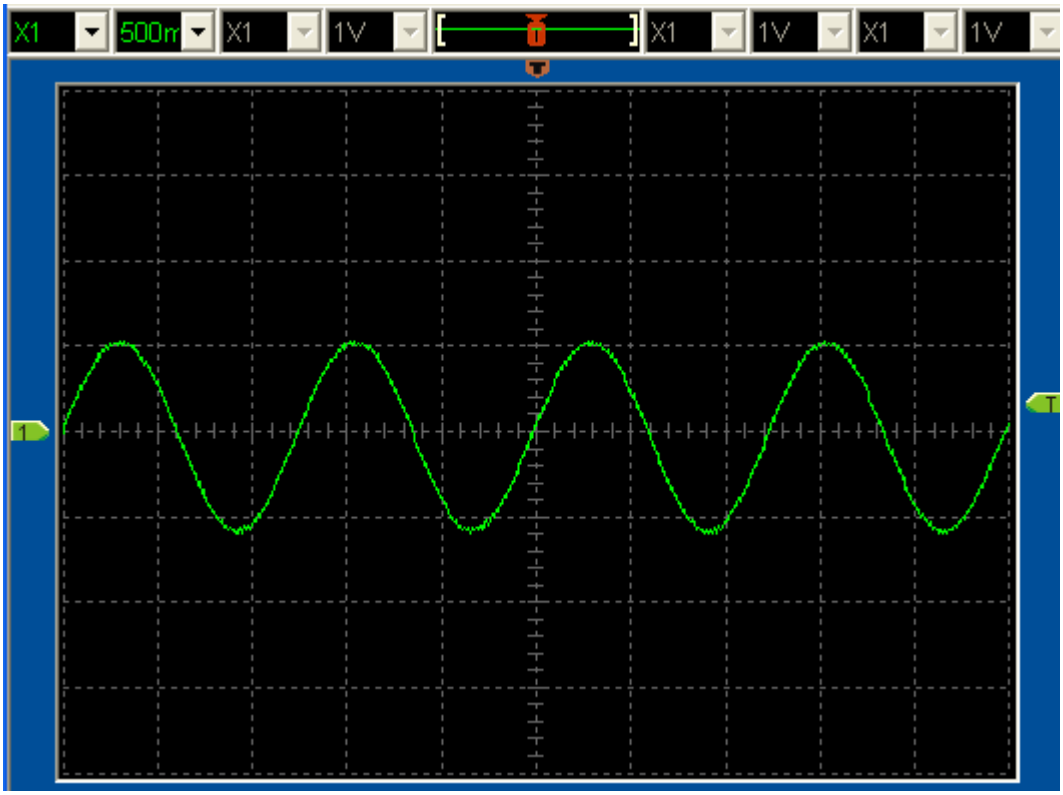
Q12 base



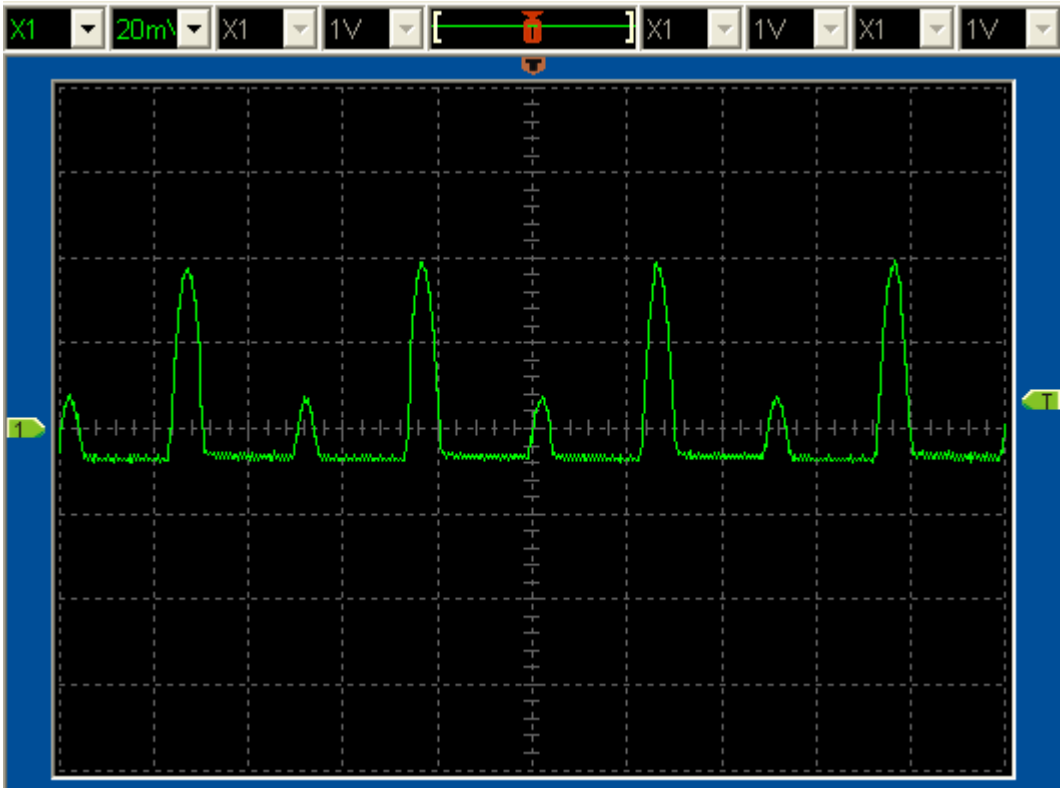
Q13 base



Q14 base



Q15 base



Output of rectifier (D3/D4 cathode)