BOM GC76

GC76-MAIN + GC76-GR		
Q.ty	**Resistors:**	**N° on PCB**
2	22k 1% 1/4w	R1, R2
4	750R 1% 1/4w	R3, R4, R5, R6
9	10k 1% 1/4w	R7, R8, R24, R26, R41, R42, R43, R31, R50
1	560k 1% 1/4w	R9
2	1k 1% 1/4w	R10, R14
2	2M2 1% 1/4w	R11, R12
1	56R 1% 1/4w	R18
1	6k8 1% 1/4w	R19
1	200k 1% 1/4w	R20
1	2k 1% 1/4w	R21
1	11k 1% 1/4w	R23
1	8k2 1% 1/4w	R27
1	68k 1% 1/4w	R28
1	2k2 1% 1/4w	R29
2	100k 1% 1/4w	R39, R52
1	1k3 1% 1/4w	R40
2	33R 1% 1/4w	R44, R45
1	3M9 1% 1/4w	R48
1	150k 1% 1/4w	R49
1	330k 1% 1/4w	R53
1	1M8 1% 1/4w	R65
2	47k 1% 1/4w	R66, R67
1	3k6 1% 1/4w	R13
2	12k 1% 1/4w	R15, R51
2	180R 1% 1/4w	R16, R17
1	4k3 1% 1/4w	R22
1	56k 1% 1/4w	R25
1	470R 1% 1/4w	R47
2	56K 1% 1/8w	R68, R69
1	39k 1% 1/8w	R70
2	22k 1% 1/8w	R30, R55
2	820R 1% 1/8w	R57, R71
1	240R 1% 1/8w	R72
1	5k6 1% 1/8w	R73
1	470R 1% 1/8w	R74
1	10M 1% 1/8w	R46
1	100R 1% 1/8w	R54
1	68k 1% 1/8w	R56
4	560R 1% 1/8w	R58, R59, R60, R61
3	680R 1% 1/8w	R62, R63, R64
Q.ty	**Trimmer:**	**N° on PCB**
1	TRIMMER 1K Top Adjust DIST	RA1
1	TRIMMER 5K Top Adjust Q.BIAS	RA2
1	TRIMMER 100K Top Adjust GR.SCALE	RA3
1	TRIMMER 50K Top Adjust GR.NULL	RA4

Q.ty	Diodes:	N° on PCB
2	FDH333	D1, D2
4	1N4007	D3, D4, D5, D6
4	1N914	D7, D8, D9, D10
Q.ty	**Chips:**	**N° on PCB**
1	NE5532	U1
1	NE5534	U3
1	THAT1646	U4
2	TL072	U5, U6
2	LM339	U7, U8
Q.ty	**Ceramic Capacitors:**	**N° on PCB**
4	100pF ceramic p=2;5mm	C5, C6, C32, C33
1	27pF ceramic p=2;5mm	C12
2	220pF ceramic p=2;5mm	C15, C16
3	22pF ceramic p=2;5mm	C19, C22, C26
1	47pF ceramic p=2;5mm	C38
Q.ty	**Tantalum Capacitors:**	**N° on PCB**
2	6.8uF Tantale p=2.5mm	C41, C42
Q.ty	**Electrolytic Capacitors:**	**N° on PCB**
2	47UF/50V BIPOLAR	C1, C2
2	10UF/16V BIPOLAR	C30, C31
5	100uF/50V d=8mm	C3, C20, C25, C27, C37
1	470uF/50V p=5mm	C18
1	47uF/50V p=2.5mm	C36
1	22uF/50V p=2.5mm	C11
1	1000uF/50V p=5mm	C13
Q.ty	**Film Capacitors:**	**N° on PCB**
11	0.1uF WIMA p=5mm	C7, C8, C9, C10, C14, C23, C24,C28, C29, C39,C40
3	1uF WIMA p=5mm	C4, C21, C35
1	220nF WIMA p=5mm	C17
1	33nF WIMA p=5mm	C34
1	22nF WIMA p=5mm	C43
Q.ty	**Transistors:**	**N° on PCB**
2	2N5457	Q1, Q2
1	J109	Q4
1	2N3906	Q5
Q.ty	**Various:**	**N° on PCB**
8	LED green 3mm + spacer	LED1, LED2, LED3, LED4, LED5, LED6, LED7, LED8
1	Rotary Switch NKK MRA206 2x6pos	S2
1	4PDT Push Switch ALTRONICS WBL4UEEGBQR05CLR	SW1
1	POTENTIOMETER 10K LIN	P1
2	POTENTIOMETER 25K LIN	P2,P3
1	POTENTIOMETER 1M LIN	P4
2	Connector Header 14pins (2x7) p=2.54 61201421621	J1, J2
2	Female IDC Connector 14pins (2x7) 61201023021	for J1, J2
1	Ribbon Flat cable 14pins 15cm p=1.27mm	for J1, J2
6	Connector Header 2pins p= 2.54 744-81-02TW0A	TR-OUT, TR-IN, IN, LINK, SC-HP, OUT
6	DIP8 SOCKET	U8, U9, U10, U11, U12, U13
2	Support IC 2x7p	S7, S8
1	PSU Connector 3pins p=2.54 XY308-2.54-3P	CN4

GC76-PSU		
Q.ty	**Resistors:**	**N° on PCB**
2	270R 1/4w 1%	R1', R2'
1	15k 1/4w 1%	R3'
Q.ty	**Trimmer:**	**N° on PCB**
2	Trimmer 5K Top Adjust	RA1', RA2'
Q.ty	**Film Capacitors:**	**N° on PCB**
2	0.1uF Film Capa p=5.08mm	C3',C4'
Q.ty	**Electrolytic Capacitors:**	**N° on PCB**
2	47uF / 50V d=6.5mm	C5',C6'
4	100uF / 50V d=6.5mm	C7', C8', C9', C10'
2	2200uF / 50V d=16mm	C1', C2'
Q.ty	**Diodes:**	**N° on PCB**
1	Diode Bridge KBP310G-BP	BR1
4	1N4007	D1', D2', D3', D4'
Q.ty	**Voltage Regulators:**	**N° on PCB**
1	LM317	REG1
1	LM337	REG2
Q.ty	**Various:**	**N° on PCB**
2	HEATSINK AAVID 592502B34 30W Resistor	HS1, HS2
2	PSU Connector 3pins p=2.54 XY308-2.54-3P	CN1, CN3
1	LED power on	LED
1	TRANSFORMER Toroid 2x15V 30VA	

CALIBRATION

Adjust your PSU's DC output voltages using the trimmers +VOLT and -VOLT as close as possible to +/- 17 Volts.

QBIAS: This is the most important step which sets the bias voltage of the FET and puts it into slight conduction. Make sure the unit is powered on for at least 30 minutes before proceeding.
Set input fully counterclockwise, output fully clockwise, attack and release in the middle, ratio switch fully CCW (OFF position), slam button no pressed.
Turn the QBIAS trimmer fully CW (the right-most pad of resistor R49 should read about 9 Volts DC).
Feed a 1kHz sine signal to the input, set the generator plugin's internal output level to 0 dB and adjust the channel fader to,say -30.0 dBFS.
Slowly turn the input control on the compressor up and watch the return level in your DAW until it also reads -30.0 dBFS.
Slowly turn QBIAS counterclockwise until you see a slight level drop on your DAW meter. Carefully adjust until the return level reads -31.0 dBFS – wait a couple of seconds between each turn until the level settles.

Gain reduction meter tracking: If set right, the first and right-most LED shows 1~2 dB of gain reduction. When the last LED barely lights up, it's about 15 dB. Don't expect too much precision from this LED meter. In slam mode the meter goes haywire, just like on the original. As there is no output meter, the adjustment is a bit different than described in the manual – the principle is the same.
Set the input control fully CW, attack and release to 12 o'clock, ratio to 20:1 (fully CW), slam to off.
Feed a 1kHz sine signal to the input, set the generator plugin's internal output level to 0 dB and adjust the channel fader to, say -45.0 dBFS
Adjust the **output** control on the compressor until the return level also reads -45 dBFS. The level is kept low, so that no compression occurs at this point and the signal stays far below the unit's internal threshold.
Slowly increase the signal using the channel fader in your DAW and keep an eye on the return level. For the first few decibels, the channel's output and the compressor's return level should stay exactly equal.
As soon as you hit the threshold, the numbers start to diverge. Let's say, the channel fader is set to -25 dBFS and the return level reads -26 dBFS. At this point you have 1 dB of gain reduction. Take note of the channel fader's value (-25 dBFS in this case).
Adjust the GRNULL trimmer until the first (right-most) LED is on.
By turning the channel fader further up, try to find the point where you are getting 15 dB of compression. For example: with the channel fader at -8 and return level at -23 the difference is 15 = 15 dB of gain reduction. Take note of the fader's value (-8 dBFS)
Adjust the GRSCALE trimmer until the last (left-most) LED is barely lit.
Set the fader back to the first value, where you had 1 dB GR (-25). Adjust GRNULL until only the first LED is lit again. Each time you move the channel fader, give the compressor's release action some time to settle.
Set the fader to the second value (-8), adjust GRSCALE until the last LED is barely lit and repeat the last two steps until both conditions are met reliably.
Don't touch any other control on the compressor other than the trimmers GRNULL and GRSCALE !

Distortion adjustment: FETs inherently tend to distort the signal asymmetrically (which results in large amounts of 2nd harmonic) when used as a voltage controlled resistor – unless a small portion of that signal is fed back to the gate of the transistor. The amount of that is adjusted using trimmer DIST. You don't really need a THD analyzer – you could use free software or just about any EQ plugin that has a decent spectrum analyzer built in.
Set input fully CW, output at 12 o'clock, ratio fully CCW (off position), slam to off.
Feed a 1kHz sine signal to the input, set the generator plugin's internal output level to 0 dB and adjust the channel fader to -30 dBFS or lower.
Make sure the analyzer plugin (or software) is fed with the compressor's output signal.
Adjust trimmer DIST until the 2nd harmonic (at 2kHz) is at its lowest. The 3rd won't change at all. DONE!

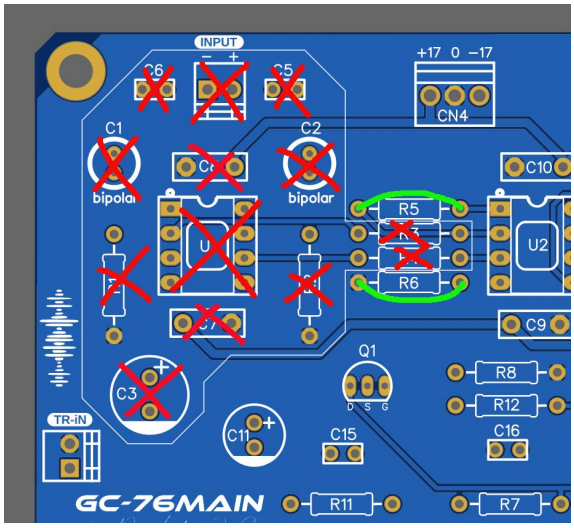
I/O board modifications when using transformers

The current revision has exposed pads to connect transformers. However, those need to be wired manually and mounted off-board and you will have to omit some components from the I/O stages that provide electronic balancing which is then taking care of by the transformers. On the other hand, you would just ignore the additional pads if you decide to stuff the boards as originally intended
– without transformers.

As I haven't built this compressor with transformers,
I don't have any experience with them in this circuit nor any recommendations. Just some thoughts; the original 1176 up to Rev. F had a 2:1 input transformer. It might be a good idea, to keep it that way although the input signal will be 6 dB lower compared to a unit without input iron. The output tranny on the other hand will be directly driven by an NE5534. Although this opamp is perfectly capable of driving 600 ohms, I wouldn't recommend going higher than 1:1 turns ratio, using a transformer which is epecially designed for output stages (eg. has low DC resistance). Either way, there are plenty of options from different manufacturers. If your transformer of choice requires a zobel network or other form of load (the original UTC O-12 has a 270 ohm resistor across the secondary), this must be added at the transformer itself – there are no pads for this on board.

Install the 3-way connector TR-IN and 2-way connector TR-OUT.
Depending on your choice of output transformer, the value of capacitor C27 within the output stage might need to be increased. Check your low frequency response for any unwanted resonance boost because of that series capacitance.

Input stage:
OMIT – U1, R1, R2, R3, R4, C1, C2, C3, C5, C6
INSTALL – jumper in place of R5 and R6, 2-way connector TR-IN



Output stage:
OMIT – U4, C30, C31, C32, C33, D3, D4, D5, D6 INSTALL – 2-way connector TR-OUT