DYC-817 Mic.Compressor
Improvements from DG2IAQ

last modified: 12. Sep. 2004

This modification sheet easily fixes some problems the original external DYC-817 microphone compressor has. The same would be for the "MH-31 internal" version of the DYC-817, but unfortunately I haven't one so I can't publish its pictures here too.

1. **Improving performance on "OFF" position**
   Originally the SSM2165 is designed to have an "OFF" position where the input signal isn't compressed (1:1). This is the original behaviour of the DYC-817 too when the switch is on the "OFF" position.
   By comparing the audio of a pure mic capsule to the DYC-817 on its "OFF" position you will hear that WITH the DYC-817 the sound is much lower than with the pure capsule !! So you will raise up the internal menu levels for the AM/FM/SSB mic input levels. But this is the wrong way, cause when you activate the DYC-817 the input is too high now and it will produce distortions ! So how to eliminate this effect ? The solution is simple.
   You have to cut the direct ground line of the switch "OFF" position and solder a resistor of 10k in serial with that instead. So on "OFF" position the SSM2165 has nearly 1:1 behaviour but WITHOUT reducing the output signal significant.
   Now on "OFF" position you have a serial resistance of 10k (=1:1). On the "ON" position you have a serial resistance of R3+P3, meaning 47k up to 147k (=4:1 to 9:1)

2. **Eliminating "popping sound effects" of the noisegate**
   The noisegate always adds a popping signal to your modulation. This can be nearly eliminated by smoothing the open/close curve of the noisegate stage.
   And the original value of C6 (3,3µF) was to small too and sometimes cuts the modulation a little bit. The resulting sound was "wabering", as you have a bad cold.
   Adding a parallel resistor of 100k to C6 (3,3µF) and replacing C6 with a value of 10µF to get back the fast open/close time delay greatly solves both problems.

3. **Improving DC supply**
   The +5V line coming out from the Yaesu FT-817 can be stressed with 10mA only, like described in the 817 handbook. So the more mA current an external compressor use the more could the DC voltage fluctuate when coming close up to the 10mA limit. I added a 100µF or 220µF electrolyt parallel to C10 (100nF) to make the DC line more stable under the "limit conditions". This could prevent some RFI problems too, which never came from real RFI irradiation but from an unstable DC power supply. The resulting RFI sound problems are the same as real RFI irradiation so you can't hear the difference and you mostly try to reduce RFI first and never have the idea to check the DC voltage stability.

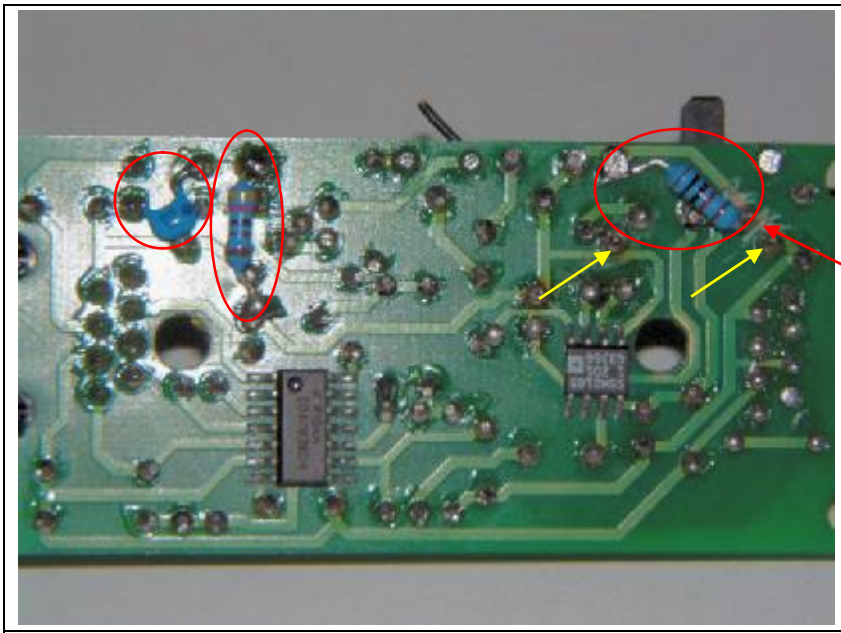
4. **Improving performance by using an electret capsule**
   The stock DYC-817 is designed to be used with the stock dynamic mic capsule of the MH-31 handmike. But when using the external compressor version it would be possible to easily use electret capsules too, maybe by using a headset or so. But an electret capsule has a much higher AF output level than a dynamic capsule. So the electret capsule would overdrive the T1 mic preamp of the DYC-817, which was only need and build in for the dynamic capsule usage. Of course you can AND HAVE TO reduce the AF output level with P3, but you will have unneeded additional distortions from T1 and you have unneeded additional amplification noise of T1 too, so the S/N ratio is real bad under that conditions.
   As I mainly use an external headset with an electret capsule on my DYC-817 I removed the T1 mic amp stage, or I should better say I BRIDGED that stage and go directly via C2 to he input pin of the SSM2165.
   This could be easily done and could be removed as fast too if you still need the mic preamp on a later mike again. I cutted the one leg of C9 which is connected to the DrL2 RF-choke. And I cutted one leg from C2 which is connected to P3. Then I soldered a short piece of isolated wire from DrL2 to the open leg of C2. Later I changed C2 to an elelctrolyt of 4,7µF to get more basses and a better voice dynamic but this step depends on your own voice characteristic and the audio characteristic of your mike. The pluspole of the C2-electrolyt goes toward PIN4 of the SSM2165, the minuspole toward DrL2. But as the input level of my electret capsule still was too high (!!) I added a resistor of 4,7k to ground after DrL2. This removes all distortions.

Jochen Heilemann, DG2IAQ
P.O. Box 1106
D - 75218 Niefern-Öschelbronn Germany

Phone: +49 (0)7233 972 340
Fax: +49 (0)7233 972 341
e-Mail: dg2iaq@web.de

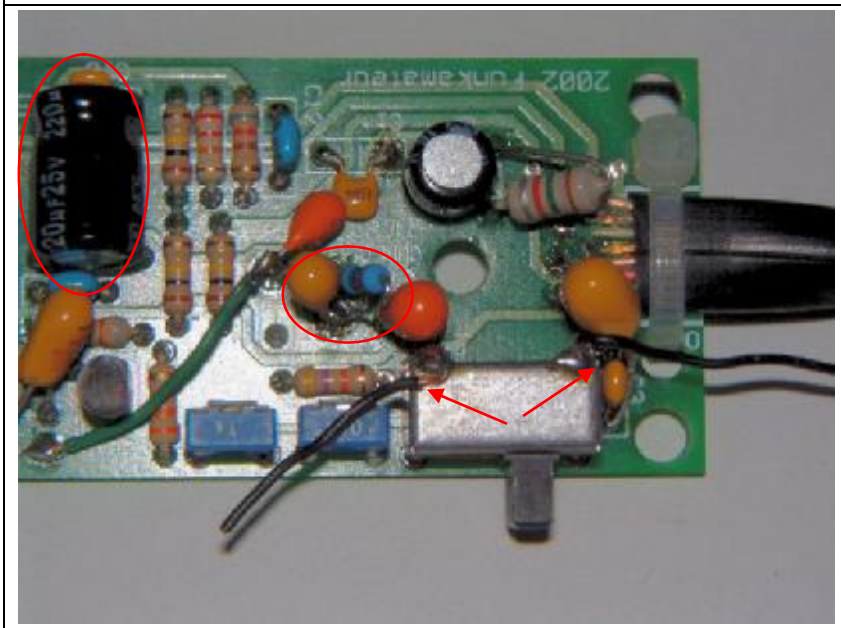
5. **Improfing against RFI problems**
You can paint the internal sides of the both plastic cases with silver fluid (known from repairing model railways) and fix two wires there with glue to have an electronic connection. Then you would have a nearly "metallic case" which is great for RFI shielding.

As I had a lot of spare copper foil I cutted two pieces which fit into the inside of the both cases and fixed them with glue too.



(see 4. – electret capsule improvement))
Added a 4k7 to reduce input level. Added a 1nF to remove RFI.

(see 1. – low compression level improvement)
Cutted the ground line here and added a 10k for the "OFF" position.
The total ground line isn't cutted of course ! Otherwise the DYC-817 wouldn't work at all now. As you can see on the yellow arrows the case of the switch make a bridge from left to right, so actually only the direct connection to the "OFF" position switch is cutted, but not all the ground line at all.



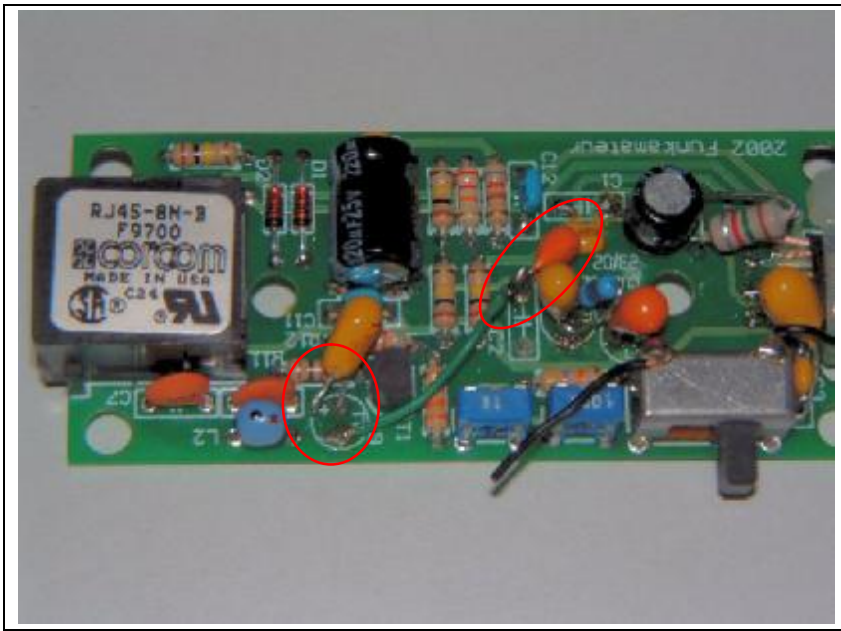
(see 3. – DC improvement)
Added a parallel 220µF electrolyt

(see 2. – noise gate improvement))
Added a parallel 100k and changed C6 to 10µF

(see 5. – RFI improvement)
Here you can see the connections of the two black "ground wires" which go to the both copper foils later.
(I had to cut them only to get a better photo so please make them longer !! Hihi.).

Jochen Heilemann, DG2IAQ
P.O. Box 1106
D - 75218 Niefern-Öschelbronn Germany

Phone: +49 (0)7233 972 340
Fax: +49 (0)7233 972 341
e-Mail: dg2iaq@web.de



(see 4.)
Cutted one leg of C9, cutted one leg of C2 (later changed C2 to a 4,7µF as shown here) and soldered an isolated wire from DrL2 to C2.

This bridges the internal mic.preamp of the DYC-817 to be usable with electret capsules.

To prevent distortions and overmodulation a proper alignment is necessary !!!

Here are my optimum results which I have with my Dierking GD-5 Headset:

FT-817 menu

05	AM Mic	=	50	
29	FM Mic	=	9	(!!)
46	SSB Mic	=	60	
51	VOX Gain	=	30	

The low value of the "FM Mic" is only cause of my "FM-Modulation mod", you can find on "www.mods.dk -> Yaesu FT-817". Normally this value should be much higher too as the others are. So I would expect a value of "50" on a non-modified FT-817 too.

DYC-817

Mic.Preamp removed
P3 turn full anticlockwise (= compression 4:1, minimum)

I never would go up more than "P3 = middle" which means a compression level of "6:1" as the distortions greatly raise up too and that wouldn't be helpful under poor conditions. On FM the compressor is switched off.

Hope you enjoy that sheet.

73,
Jochen Heilemann ---DG2IAQ---

Jochen Heilemann, DG2IAQ
P.O. Box 1106
D - 75218 Niefern-Öschelbronn Germany

Phone: +49 (0)7233 972 340
Fax: +49 (0)7233 972 341
e-Mail: dg2iaq@web.de

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This modifications mostly need to be done by a electronic specialist who had enough practise and who has knowledge in SMD soldering. **You do the modifications on your own risk !**

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Jochen Heilemann, DG2IAQ
P.O. Box 1106
D - 75218 Niefern-Öschelbronn Germany

Phone: +49 (0)7233 972 340
Fax: +49 (0)7233 972 341
e-Mail: dg2iaq@web.de