

NOTES PERTAINING TO ON-AIR, IC-7700 MICROPHONE TRIALS

A subjective evaluation of various microphones on-air using an Icom IC-7700 was performed 18 July 2010 with VA7JW transmitting to VA7OJ on 15 m. VA7OJ provided opinion of the transmitted voice quality.

It had been noted, and reported variously on the web, that the Heil HC4/HC5 dynamic cartridges have low output, and so Mic gain had to be set rather high to achieve ALC deflection, and achieving compression was difficult. Bass and Treble controls were set at 0dB, factory default.

Possible defects or problems with the VA7JW Heil Pro Set + headset and adaptor cord was eliminated as a possible problem. VA7JW's headset & adaptor were tested VA7OJ's station, noting performance against his Pro Set +, adaptor and IC-7700. Performance was identical.

Audio preamps were built at VA7JW to raise Mic input levels to improve Mic, ALC, COMP gain setting ranges. Two versions were attempted; a discrete 2N3904 amplifier with a 2N3904 emitter follower, and dual op amp MC33172 equivalent, both with 20 dB gain. Both used the +8V supply available at the Mic jack. While they performed well in terms of gain, fidelity and bandwidth, the idle noise produced in both circuits was only about 15 dB below signal. A source of unusual low frequency rumbling (not hiss) was unable to be determined, and was identical under both circuits! The preamp concept was abandoned without resolution.

Mic's tested were:

- Heil IC (electret)
- Heil Pro Set + HC4 and HC5 (dynamic)
- Icom SM-20 Desk Mic (electret)
- Icom HM-36 Hand Mic (electret)

The IC-7700 is connected to a Rigblaster Duo controller.

IC-7700 controls were set at COMP ON WIDE, MIC and COMP varied to achieve ~ 50% ALC and 6-12 dB compression. RF Power set at 100%. Transmit bandwidth was set a 2.4 kHz.

Test 1 Heil IC

Adjusted Bass = 0 dB, Treble = +3 dB ¹
Mic Gain about 11 to 12 o'clock
ALC easily met 50%
COMP easily in range of 5- 10 dB

It was determined that the effect of inserting the Rigblaster DUO, as opposed to connecting the Mic's directly to the 7700, was minimal, with possibly slightly better sound with DUO inserted! Connection through the DUO is metallic but with bias & switching circuits "attached". The DUO was left In-Circuit for all tests except for the (abandoned) pre-amp tests where the connection was direct to the 7700.

Subjective quality was good. Used this as the "standard" against which other Mic's were judged.

¹ This setting determined for 2 reasons. A) judged as best intelligibility over air and B) best setting for power distribution. Voice audio has most power concentrated in the lower frequency range while intelligibility is attributed to the higher frequency range. The 3dB Treble boost accentuates intelligibility under difficult conditions, and by **not** boosting Bass, RF power is made available for the high frequency audio to give punch.

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Test 2 Heil ProSet +

Same Bass / Treble setting

MIC Gain had to be set to 3-4 o'clock to compensate for the low output levels

ALC was 50%, but was limited

COMP just made the 6 -10 dB

HC-5 cartridge sounded much like the Heil IC

HC-4 cartridge sounded good as well but more penetrating.

Concluded HC-4 had the edge for contest & DX'ing

Test 3 SM-20

This is a high output mic and so settings were much the same as the Heil IC

Heil IC sounded better (surprise! – this is supposed to be a very good full range Mic)

Test 4 HM-36

Also a high output mic and so settings were much the same as the Heil IC

Heil IC sounded better. Suitable for portable use.

Other Observations

The spectrum of VA7JW transmitted signal looked good, i.e. no excessive bandwidth occupancy, in all instances as observed by VA7OJ.

A Coaxial Dynamics (Bird equivalent) in line Watt meter measured RF Power Out. This meter is capable of measuring both Average Power and Peak Power. Full peak power was achieved under these tests. It was interesting to observe average power output as COMP is increased. Typically,

- Peak Power 200 W
- Avg Power, No compression 10-15W
- Avg Power, 6-10 dB compression ~ 50 W

ALC and COMP levels used preserved audio quality.

The Heil IC has a higher output than the Heil Pro Set + and provides lots of adjustment headroom.

The Heil IC is a lighter, more comfortable headset compared to the Heil ProSet +