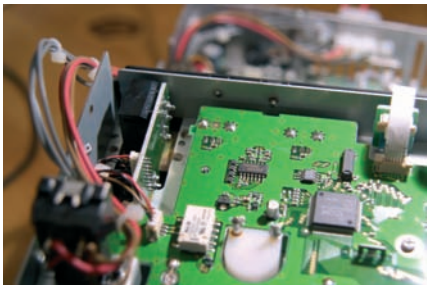
In The Ed's Shack

Kevin Nice fits bhi's latest noise reducing module, the NEDSP1061 inside his Icom R8500.

As regular readers will know I'm very pleased with my bhi noise reducing speaker. It's in constant use in my shack, mainly connected to my flexible Icom R8500. I tend to use the '8500 as the shack workhorse for tuning around and checking my favourite frequencies. It is quite useful to be able to use the NES10 speaker with some of my other radios too. To this end, as I've mentioned previously I've arranged a switching system in conjunction with an audio mixer to cater for most of my requirements. This solution does have its limitations though. One of which is in the case that I pick up the R8500 and take it



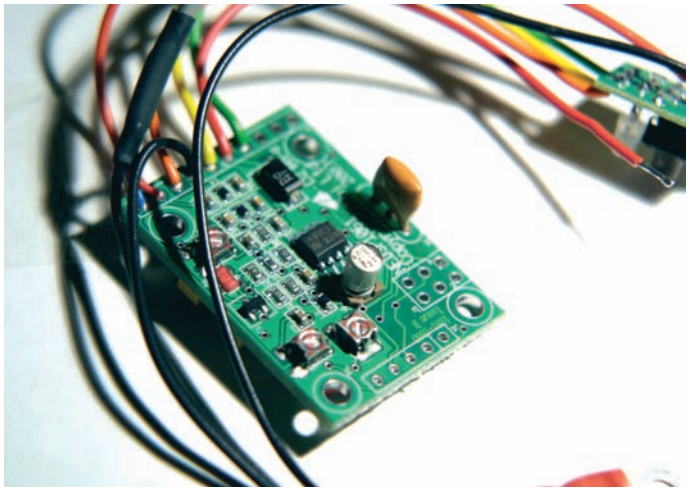
● *The volume control ended up not being the mod site.*

portable or to an alternative location. Not something I do lots, but it does happen.

Imagine my delight when I discovered that bhi, who must be the foremost supplier of d.s.p. noise reduction systems these days, came up with an internal module to fit inside radios. The innovating doesn't seem to stop at bhi. They seem to have produced a constant stream of excellent noise reduction products over the last year or so.

Their latest offering, the NEDSP1061 noise reduction module is actually intended as a 'Dealer Fit' option for Yaesu's mini FT-817 transceiver. After discussion with bhi's technical expert it soon became obvious that I could fit one of these tiny modules inside my R8500 and so allowing me d.s.p. noise reduction wherever I choose to use the set.

That was the theory, the practise turned out to be a little more involved than I had anticipated. The FT-817's audio section is pretty straightforward with what can be called a conventional audio section. The chaps at bhi have configured the NEDSP1061 module to exploit a common feature of the audio section, i.e. the preamplifier section feeds into the power amplifier via the volume control potentiometer via a 100nF or similar capacitor. The method used to tap into the audio path is then to remove this coupling capacitor and use the pre-amp output side to feed the d.s.p. module input. The output is fed back to where the other end of the coupling capacitor was fitted, or in other words the input to the volume control. All pretty straight forward. All that was needed in addition to the audio tapping was to find a d.c. supply between 5 and 15V capable of supplying an additional 45mA, mount the d.s.p. module with a double sided sticky pad and drill the R8500 cabinet with two holes one 3.5 the other 4mm for the control button and indicator l.e.d. Nothing too demanding and well within the capabilities of a keen hobbyist.



● *The NEDSP1061 ready to fit.*

More Thought

My plan was to replicate this arrangement with the install into my '8500. Easy - or so I thought. Without the aid of a circuit diagram or service manual, I started to strip down my Icom.

The upper and lower case shells were first to go, the pile of M3 screws grew rapidly. Next I removed the front panel assembly which contains the display, keypad and rotary controls. It was the p.c.b. on this module which was the target of my attention and intended modification. Once I was able to see the layout of the p.c.b., studied the layout with a view to working out where I could tap into the audio. But it turned out not to be as simple as I'd imagined. After a little visual analysis I couldn't find anything like what I was hoping for. There seemed to be no sign of audio around the volume control. Time to switch on the scope and find the DVM. After a little probing, it was indeed clear that there was not audio around the volume control. Instead the radio 'volume control' simply varied a d.c. level. This then, I presumed, was used to control the audio level by more sophisticated means. The penny then dropped.

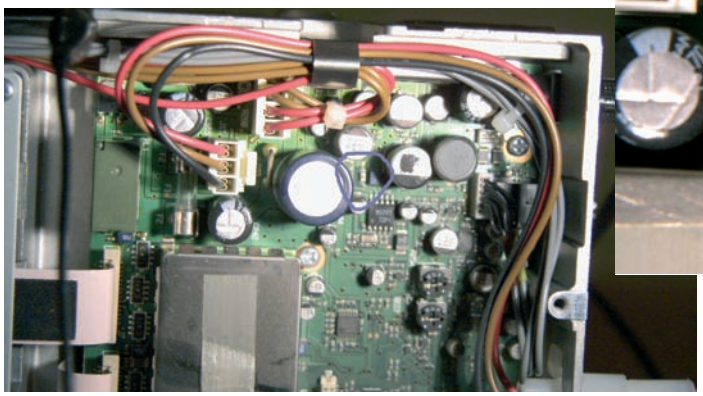
The R8500's volume level can be controlled via the RS-232 port so there was going to be some digital level control involved. Some six hours into investigation I called it a day. The next morning I contacted those very helpful guys at Icom UK's workshop and had a chat. A short while later I was in possession of a FAX of the audio sections circuit diagram.

● *Ready to start, the module and the radio.*

After a quick scrutinise, I discovered that there was a suitable coupling capacitor between the D to A converter used to control level and the set's power amplifier module. I located this 220nF on the R8500's main top p.c.b., a surface mount chip type. After replacing the front panel I'd removed unnecessarily it was on with the soldering

iron. The chip capacitor was soon dispensed with. I took care to remove it intact just in case I want to restore the set to its unmodified state.

The next job was to install the screened lead used by the NEDSP1061 for input/output by soldering the prepared end to the pads intended for the 220nF capacitor. This proved to be quite a tricky job, as access was pretty tight amongst the other components. After much manoeuvring and position changing, I had successfully connected both inner



● *The coupling capacitor to be removed.*

conductors and the screen to the R8500's p.c.b. Time to find a supply and do a quick test.

A few minutes later and the board was working. All the control of the NEDSP1061 module is performed with presses of the button. There are four active levels of noise cancellation, the module informs the user of current status by using both the bi-colour l.e.d. and by injecting a 'pip' into the audio path.

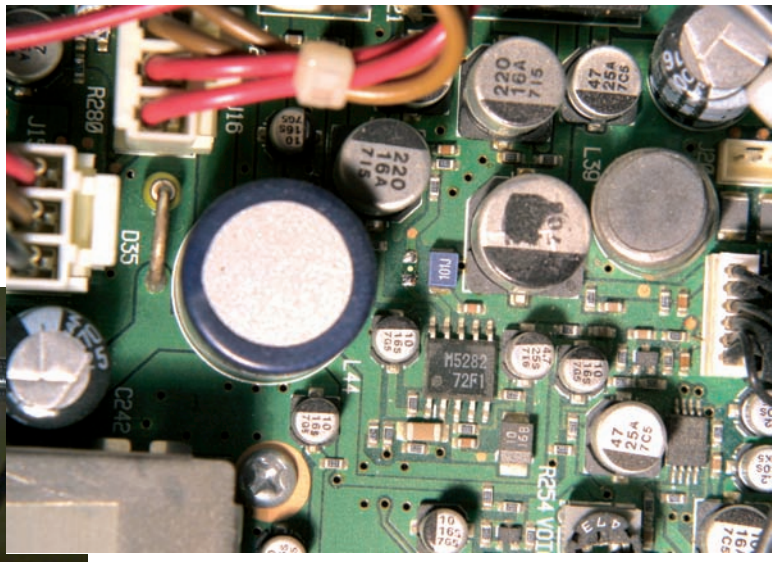
With the noise cancelling module in the off position, the l.e.d. is constantly illuminated red. When it is activated the l.e.d. flashes green and the pip sounds in sync with the flashes a sequence between one and four to indicate the level selected. The l.e.d. is then extinguished,

● *The removed coupling capacitor and the label for the control switch and indicator l.e.d.*

presumably to conserve power, handy if running on batteries. The audio tone level is variable, which is good, as the default level was uncomfortable, I reduced the level just beyond the minimum setting so as not to be obtrusive. The bhi board also features level controls for both input and output levels, I found that they were set to optimum positions.

Once Fitted

In use I found the NEDSP1061 to be as effective as the other two bhi noise cancelling products I've used. I especially like the single button mode selection and reckon that bhi should consider using this method on their other products as in my



● *Now it's gone.*

opinion it's better than the rotary switch alternative especially as the module remembers the last level selected.

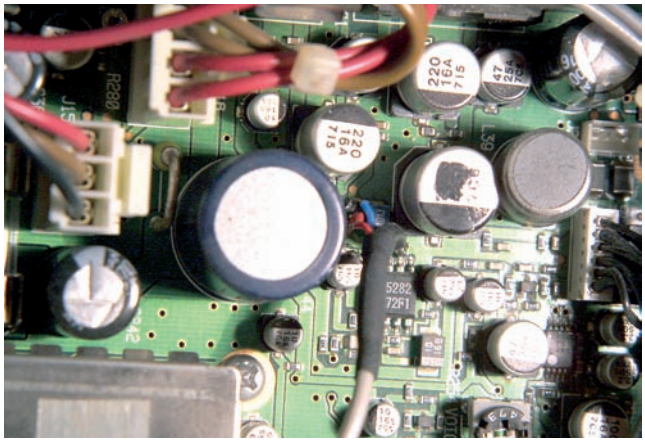
The NEDSP1061 only measure 26 x 37mm and is about 10mm thick at the maximum. The four selectable level of operation perform as follows;

Level	Reduction Noise (dB)	Reduction Tone (dB)
1	11	5
2	13	8
3	19	21
4	35	65

I've yet to finish off the installation, as I've not quite made up my mind exactly where to physically locate the module, but I'm very pleased with the performance. I'm tempted to fit one in my HF-150 now...

The NEDSP1061 is priced at **£89.95** inc VAT and is available from **Waters & Stanton**, **Martin Lynch and Sons**, **Radio World** or direct from **bhi** on **0870-240 7258** or via their website **www.bhi-ltd.co.uk** (new on-line shop).

The NEDSP1061 is also available as a basic pcb module without all the wires and switches priced at **£79.95**.



● *The input/output lead in place.*