A Headset/Mini-Boom Microphone for the FT-817ND

I have built my own inexpensive headset/microphone for my Yaesu FT-817ND. There is not a lot of information on the Internet, and trying to find a circuit diagram for the stock microphone is been difficult. However, I did find some valuable information that helped me in my quest. My criteria for the headset microphone I wanted to use was as follows.

1. Comfort
2. Inexpensive
3. Simple to adapt to amateur radio use.

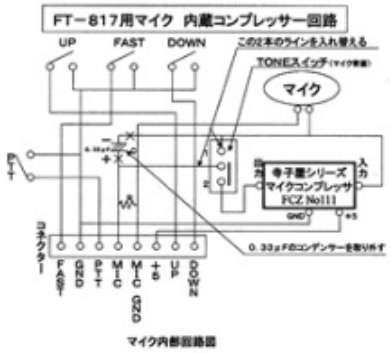
The earpiece/boom microphones utilized by cell phone users are inexpensive and are readily available at any Wal-Marks, K-Marks, etc. These are comfortable and they don't add any bulky weight like so many expensive headset/microphones. I was not about to invest in a Heil headset and boom microphone purely for the reason that they are very expensive. The idea was not congruent with my budget. My budget: $0.00.

Cell phone headset/microphones come in a variety of flavors. There are the really cheapo types that have the microphone dangling on the wire. These will work for this project, but the microphone is best kept close to the mouth. VOX operation is not so good with this type of headset/microphone. Most cell phone owners get one of these with their cell phone equipment when they purchase it from a retailer such as Verizon, T-Mobile and Sprint. Avoid this type if you want good results. The other type of cell phone headset/microphone is the earpiece and mini-boom mic that often comes with accessory packs that include a car charger and case. Some people by these for the car charger and never use the headset/mini-boom microphone in this accessory pack. This is good for amateurs who want to use the VOX or work nearly hands free with their FT-817ND. I have a Verizon cell phone and never use the earpiece/mini-boom microphone that came in my accessory pack on my cell phone. It is too inconvienent for just a few phone calls now and then. The only time I listen would be during a call. SO, to have the earpiece/mini-boom microphone without any audio would be a perfect waste of my radio listening time. Besides, it's just a phone.

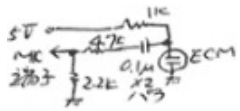
Also, I have a Plantronics cell phone headset/mini-boom microphone that is still available from Wal-Marks for around $29.99. This actually has been recommended by others for converting to amateur radio use.

Research

So, I started my research on the Internet and found some very sketchy information buried in the CLUB817 website. CLUB817 is a Japanese website for users of the Yaesu FT-817. It is mostly a messageboard that allows the inclusion of photos as well as text. However, it has not been updated for a very long time.



This is a schematic diagram of the stock microphone, possibly from Yaesu. I do not have a translation of the Japanese text, but you can get the idea from the picture what is going on here. The only component value I don't see in the schematic is the resistor. This is not too important since anyone could open up the microphone case and look for themselves. I was more concerned about the wiring inside the microphone itself. Also, I found a hand drawn sketch of someone's adaptation of an electret microphone to the Yaesu FT-817 on CLUB817.



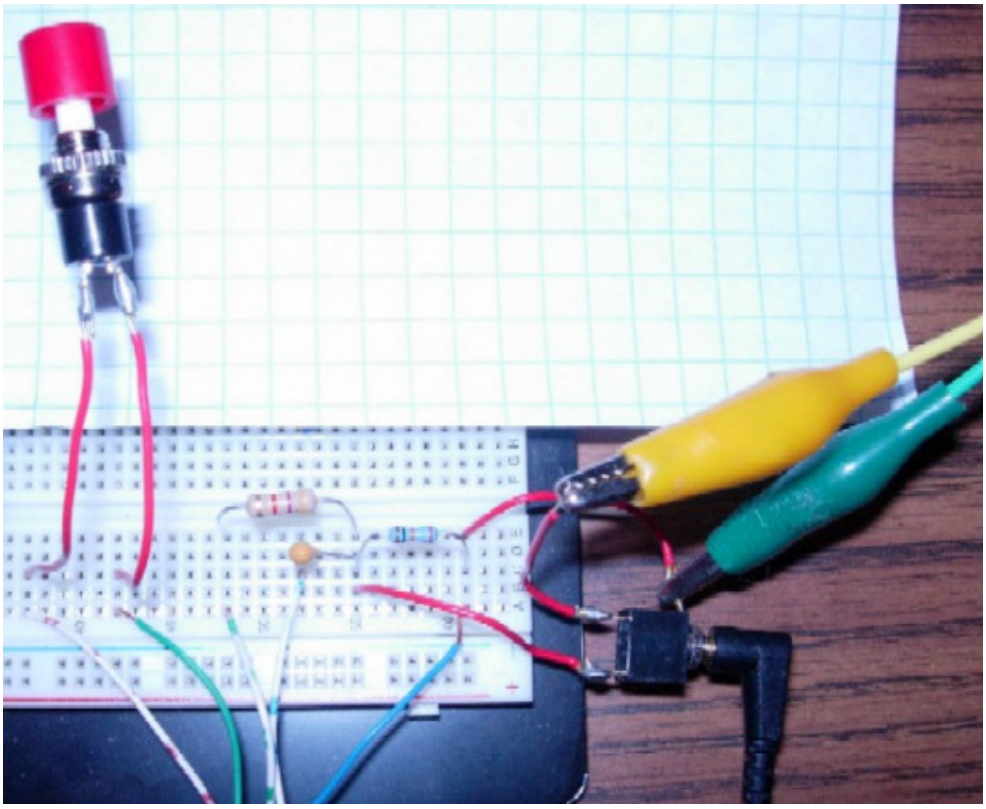
Though, it may be difficult to read the child like scrawl, this circuit was the first real hope for making my plan work. I tried this circuit and it didn't provide enough response. I put this one on the back burner for modification if I was unable to find any other possibilities. Although, I am sure that me and the author of this circuit diagram are not the first who wanted a cheap solution to commercial dynamic headset/boom microphones (such as Heil), I was not about to give up the quest.

I checked the usual FT-817 websites with no information available. One site stated that the microphone circuit diagram would be 'coming soon'. Soon came and went and I stopped checking that site for any updates. It too seems to be out of date. I did find some photos and a circuit diagram for an interface box that someone built to adapt their own computer headset/boom microphone, but after I analyzed the schematic and read some of the messages regarding this circuit, I was not convinced this would be a good circuit to utilize in my setup. Reports that the audio was muffled and transmissions were difficult to hear by other stations on the air was posted on the message board. Hmmmmm.... I was beginning to get somewhat skepticle if this was ever going to be possible.

Realizing that I am dealing with an electret type of microphone, the circuit would need a capacitor inline with the microphone for DC bias and a carefully chosen resistor value placed to the 5 volt line, I was starting to formulate an ideal schematic. Maybe, I was going to need to improve upon the scribbles I found on CLUB817, but I didn't give up. I continued my research on the web and finally, after a long search, found a web site by a gentleman who adapted a computer headset/boom microphone for use with the Yaesu FT-817 transceiver.

Click Here to go to his website.

This one looked reasonable, and the author said it worked. So, I decided to give it a try. I had an old short piece of CAT-5 cable I cut and stripped the ends of the wires. I verified that the cable was in good condition and the wires were not broken. I made a legend to map the wires to the proposed circuit diagram and my FT-817ND. I breadboarded the circuit and connected it to my FT-817 with the Plantronics headset/mini-boom microphone and within minutes I made contact with WA5DJJ and KE5ENR. They both gave me excellent signal reports. I was using one of the local repeaters here in Las Cruces, NM (146.640) at 1 watt input. Both reported that I was a little over dB when I used the Plantronics microphone gain set in the high position. This immediately was resolved once I put the microphone gain in the low position. I enjoyed the QSO and was happy I got it on the first try. I tested my Verizon headset/mini-boom microphone with the same excellent results.

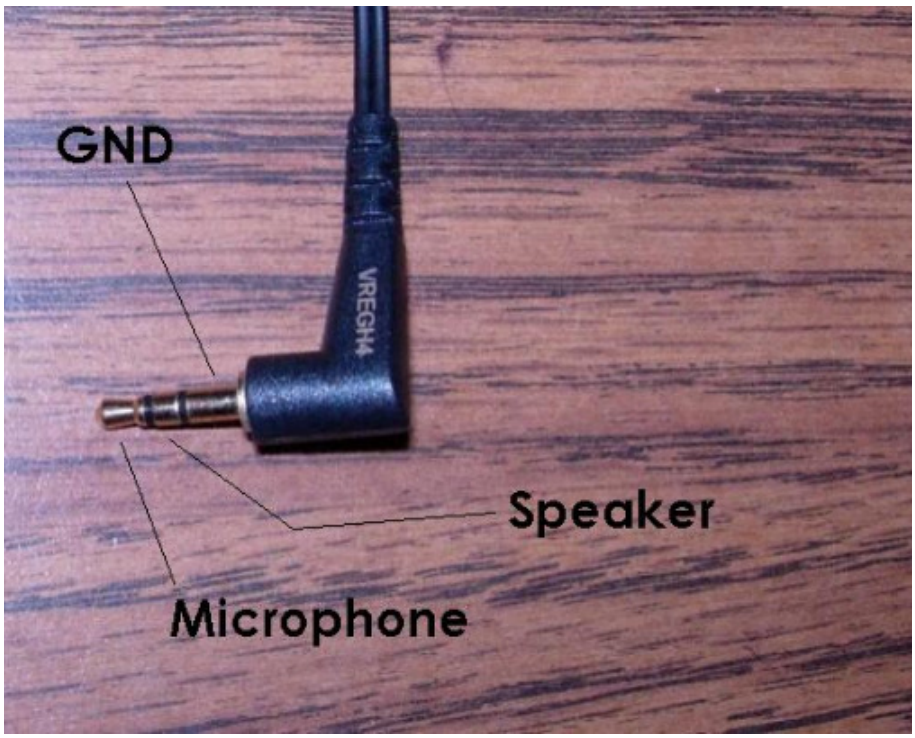


This is a photo of my breadboarded circuit as I tested it on the air with WA5DJJ and KE5ENR. I didn't want to commit to anything until I knew the component values would work with standard cell phone headset/mini-boom microphones.

This is a fairly common Plantronics headset/mini-boom microphone available at Wal-Marks and similar stores. This headset gave me excellent results.

This is the headset/mini-boom microphone that came with my Verizon LG6100 cell phone. It also gave me excellent results using the breadboarded circuit. The Verizon headset/mini-boom microphone sounded better in the earphone and in transmit on my Yaesu FT-817 than it did connected to my LG6100 cell phone.

The three wire mini plug is fairly common and a jack is available at Radio Shack. It is the same type of jack used on the Plantronics and many other cell phone headset/mini-boom microphones. The wiring of cell phone headset/mini-boom microphones are all pretty much the same. Although, I always test them before I assume anything about their wiring. Both of mine were wired as follows.

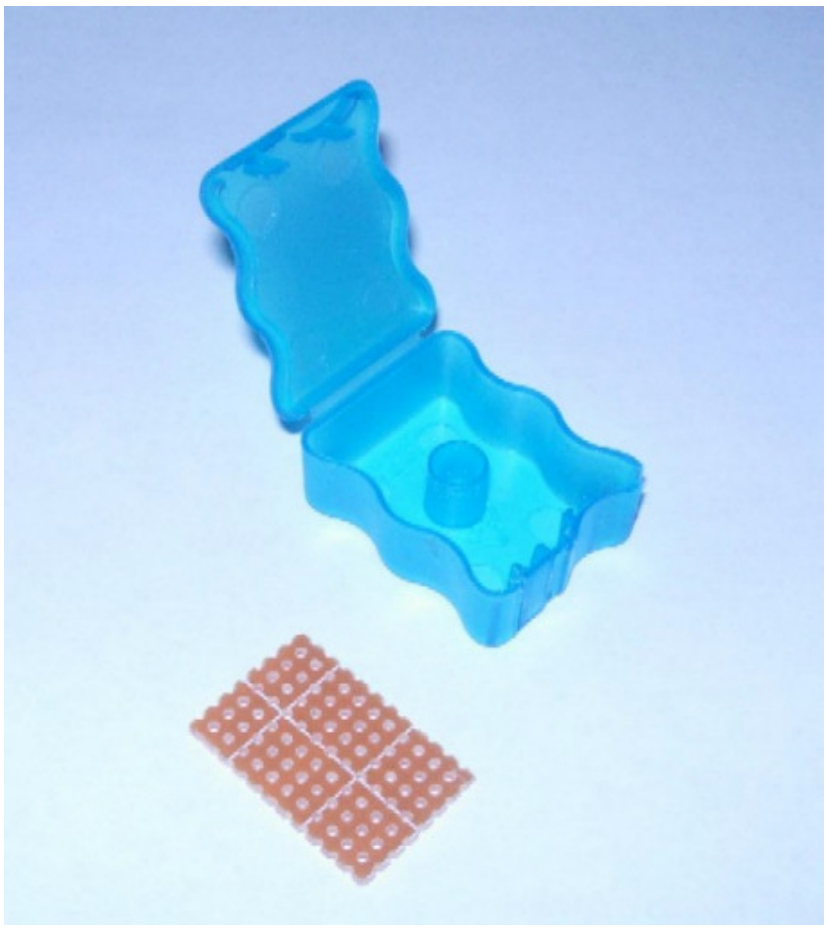


I usually connect them to my computer sound card inputs and outputs to identify the speaker and microphone pins before I connect them to my transceiver. I have a old die hard computer on my test bench for this sort of thing. If I hear an audio file playing through the earpiece then I know I have located the correct pins for the headphone. Also, if I can hear my voice coming from the computer speakers when I speak, then I know I have identified the microphone connectors. The three pin connectors are the easiest to identify because the earpiece and the microphone share a ground wire. Other connectors may be used as long as a mating jack is available. I always choose to stay with the three conductor plug that comes with the headset/mini-boom microphone because I don't need to change anything. I just use a mating jack avaiable from Radio Shack to make the connection. The FT-817 microphone jack uses a standard CAT-5 cable connector, available at Home depot, Lowe's and Radio Shack. It's easier just to buy a one-foot length of CAT-5 computer network cable and cut one end off for preparation to connect the wires into the new earpeice/mini-boom microphone circuit. Then you don't need to have a CAT-5 cable crimper to put a new connector on a short piece of cable. I noticed my local Home Depot sells one-foot lengths of CAT-5 cable with connectors for around two dollars and eighty-five cents. Any good quality momentary SPST switches may be utilized for the PTT, Up, Down and Fast buttons. I found a cheap quality switch in my junk box just to test the circuit.

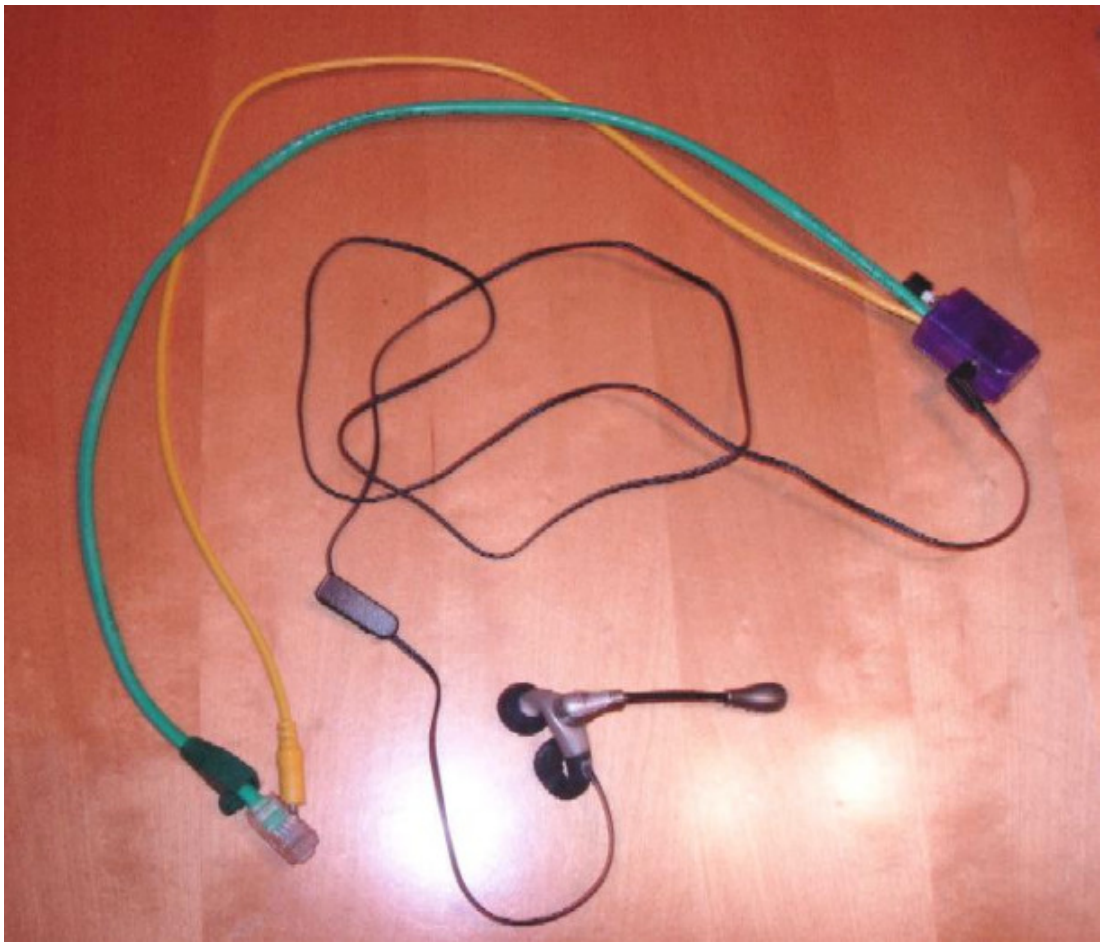
Putting It All Together

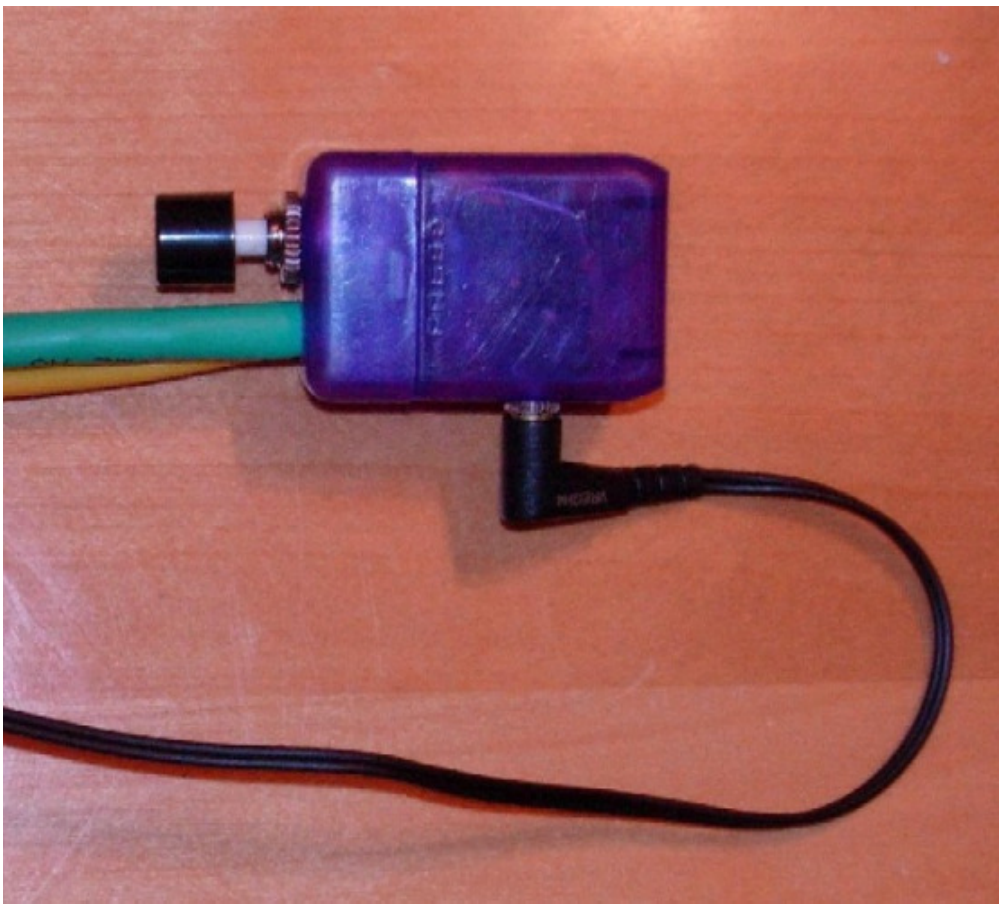
I wanted to mount all of this in a handheld package that was easy to build, compact and comfortable to use. In fact, smaller than 'handheld' was most desirable. I was hoping for something that would fit in a small tube and then I could use small momentary switches. One idea I have considered is using part of a pen body. The middle section on a large diameter pen may prove to eb a good canidate to mount a small pc board with all the parts soldered to it. I want to use pc board micro switches for the control buttons and PTT button. I could epoxy or super glue the board into the pen body and then cover the whole thing with black heat shrink tubing to seal the ends.

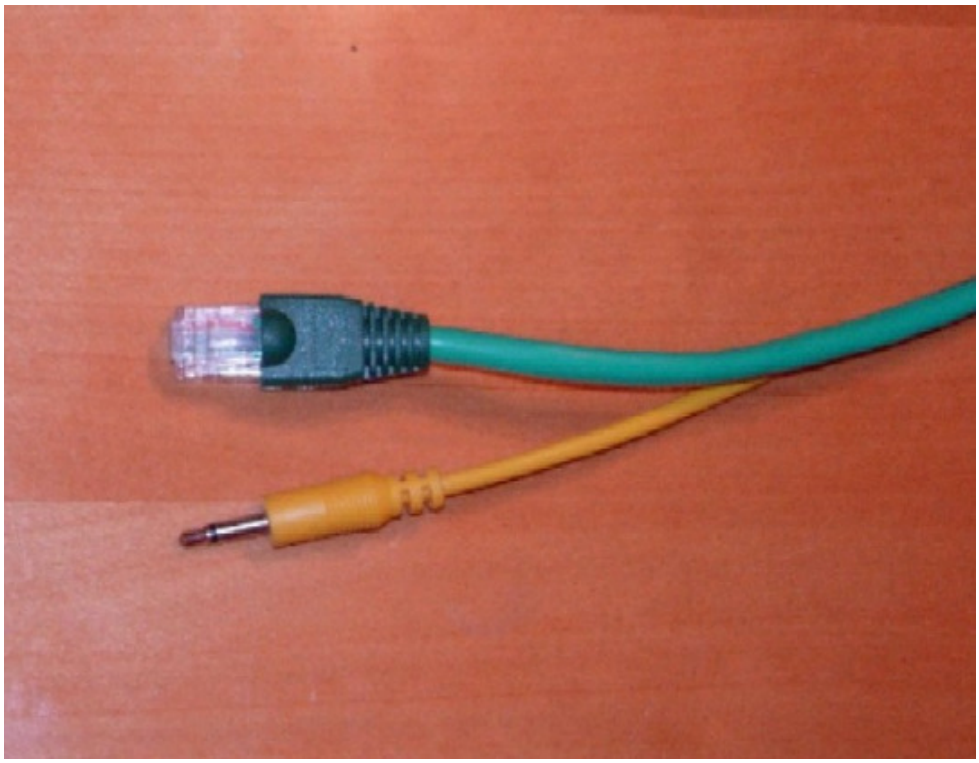
I was condsidering this senario, until I I fould an old sample dental floss box would work even better. In fact These little boxes are so good, The first box I found would make a perfect interface box. Some of these boxes have extra plastic inside that may be trimmed out using a pocket knife or exacto knife. The future interface box didn't need any trimming and has the most room of any of these boxes I have found. (My step daughter is instructed to get a handful the next time she goes to the orthodonist.)



This is a photo of a terrific interface box complete with PC board I can use on a future construction project. The nice thing about this box is that it is roomy inside and has room on one end for a DB9 connector and a phone jack on the other end. Hmmm...maybe a Hamcomm type of interface? The second dental floss box was just barely big enough inside to accomodate the parts for a simple PTT circuit, Momentary SPST switch and a subminature three conductor jack.







This is photo of the completed PTT box for my FT-817. I didn't pick the colors. These were items in my junk box and the colors just sort of picked me. I have switched the top of the PTT button with the red top from my breadboard circuit to make it even more colorful.

I decided not to add the other buttons, just because I wanted a basic PTT box that was lightweight and easy to hold. I was considering PC mount microswitches, but I didn't want to search for the switch while I driving. Any Cell phone headset/mini-boom microphone may be used with this PTT box and I am finding it is very convienent to use. I never thought flossing would be good for a transceiver too.

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