

FERRITES FOR RFI

Ferrite toroidal cores, as well as beads, can be very useful in attenuation of unwanted RF signals but we do not claim them to be a cure-all for all RFI problems. There are different types of noise sources, each of which may require a different approach. When dealing with any noise problem it is helpful to know the frequency of the interference. This is valuable when trying to determine the correct material as well as the maximum turns count.

RFI emanating from such sources as computers, flashing signs, switching devices, diathermy machines, etc. are very rich in harmonics and can create noise in the high and very high frequency regions. For this type of interference, the #43 material is probably the best choice since it has very good attenuation in the 20 MHz to 400 MHz. region. Some noise problems may require additional filtering with hi-pass or low-pass filters. If the noise is of the differential-mode type, an AC line filter may be required. See section on AC line filters and DC chokes.

In some cases the selected core will allow only one pass of the conductor, which is considered to one turn. In other cases it may be possible to wind several turns on to the core. When installing additional cores on the same conductor, impedance will be additive. When multiple turns are passed through a core, the impedance increases proportional to the square of the number of turns.

Keep in mind that because of the wide overlap in frequency range of the various materials, more than one material can provide acceptable results. Normally, the 43 material is recommended for frequency attenuation above 30 MHz., the 77, and 'F' materials for the amateur band, and the 'J' material for frequencies lower than the amateur band. 'W' and 'H' materials are for very low frequencies (below 1 MHz).

Computers are notorious for RF radiation, especially some of the older models which were made when RFI requirements were quite minimal. RFI can radiate from inter-connecting cables, AC power cords and even from the

cabinet itself. ALL of these sources must be eliminated before complete satisfaction can be achieved. First, examine the computer cabinet to make sure that good shielding and grounding practices have been followed. If not, do what you can to correct it. If you suspect that RF is feeding back into the AC power system from your computer, wrap the power cord through an FT-240-77 or F toroidal core 6 to 9 times. This will act as an RF choke on the power cord and should prevent RF from feeding back into the power system where it can affect other electronic devices.

It is possible for an unwanted RF signal to enter a piece of equipment by more than one path, If so, ALL of these paths must be blocked before a noticeable effect is detected. Don't overlook the fact that RFI may be entering the equipment by radiation directly from your antenna feed line due to high SWR. This, of course, can be checked with an SWR meter, and can be corrected by installing an antenna balun, or by placing a few ferrite beads, or sleeves, over the transmission line at the antenna feed point. This should prevent RF reflection back into the outside shield of the coax feed line, which could radiate RFI.

Split bars are especially designed for computer flat ribbon cables. Two or more cores can be placed on the same cable, in which case the impedance will be additive. See following page for more specific information.

RFI in telephones can be substantially reduced with the insertion of an RF choke in each side of the talk circuit. Wind two FT-50A-J cores with about 20 turns each of #26 enameled wire. If possible, place one in each side of the talk circuit within the telephone base. If this is not possible, try mounting them in a small box with phone modular input and output jacks mounted in each end. This can now be used 'in-line' between the phone and the wall jack. Similar results can be achieved by winding 6 to 9 turns of the telephone-to-wall cable through an FT-140A-J ferrite toroidal core.