

Fair-Rite Ferrite Clamp-on Core Selection Guide

TABLE 1. Fair-Rite Snap-on Ferrite Cores, Mix 31 Material

Fair-Rite	Mouser Source Link	Description	Cable Dia. (inches, max.)	Price (Each) Source: Mouser.com as of June 2020
0431164181	623-0431164181 Enter Fair-Rite Part Number on Mouser Search Form.	Ferrite Clamp On Cores Low & BB Freq 31 Mat 260Ohm @250MHz Round	0.50 inches	\$3.74 @ Qty 1 \$2.65 @ Qty 10
0431173551	623-0431173551 Enter Fair-Rite Part Number on Mouser Search Form.	Ferrite Clamp On Cores Low & BB Freq 31 Mat 310Ohm @250MHz Round	0.728 inches	\$4.21 @ Qty 1 \$2.81 @ Qty 10
0431177081	623-0431177081 Enter Fair-Rite Part Number on Mouser Search Form.	Ferrite Clamp On Cores Low & BB Freq 31 Mat 340Ohm @250MHz Round	0.99 inches	\$14.31 @ Qty 1 \$10.06 @ Qty 10

Application Usage Note

- 1) Each pass-through of cable (wire, coax, twisted pair, etc.) counts as **one (1)** turn, where **N** is the total number of turns.
- 2) Impedance to RF energy is proportional to **N²** thus large benefit to multiple pass through of core
- 3) Mix-31 ferrite material is commonly used for HF and VHF frequencies

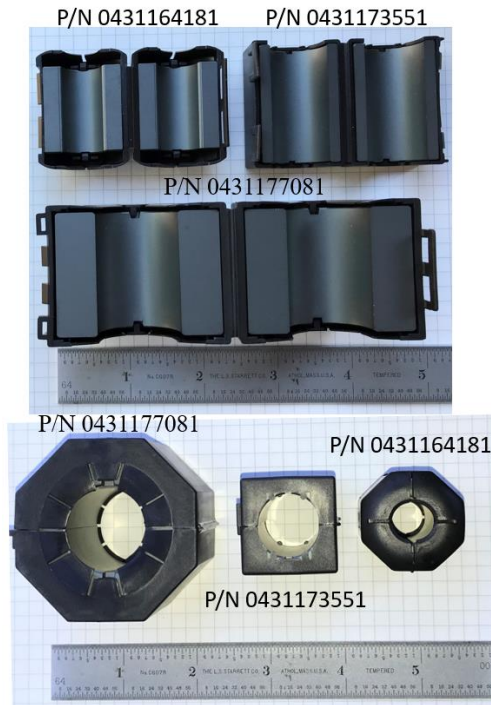


Figure 1. Fair-Rite Clamp-on Ferrites

Application in the Plantronics W720 Wireless Headset

- 1) 9 VDC/0.5 Amp modular DC power and USB to Computer Port connection shown;
- 2) Each cord is wrapped around the same core to keep common mode RF signals from entering the Plantronics base unit;
- 3) RF can still enter the base directly, not through the cords. The base unit cannot be put into a Faraday shield to block RF from entering since the Plantronics 1.9 GHz data transceiver connecting to the headset must not be blocked;
- 4) For stubborn cases, move the base unit further away from the RFI source (your ham radio antenna);
- 5) If the RJ45 audio signals is also used to connect to the ham radio transceiver, this should also be passed through the same or similar core to reduce RFI (not shown in this photo since RJ45 connector is unplugged).
- 6) It is highly recommended that the RJ45 CAT cable be of the shielded variety and the shield be connected to the transceiver ground through the mic connector if possible.



Figure 2. Fair-Rite Clamp-on Ferrite with Power and USB Cord Wrapped Around Core Multiple Times

Additional Remediation to Reduce EMI Into the Headset/Radio

In stubborn cases, radio interference can find its way into the radio to W720 base connection via RF pick up of PTT cables. If this is the case, an example of connecting the shield of the PTT cable and bypassing across the contacts might help with RFI.

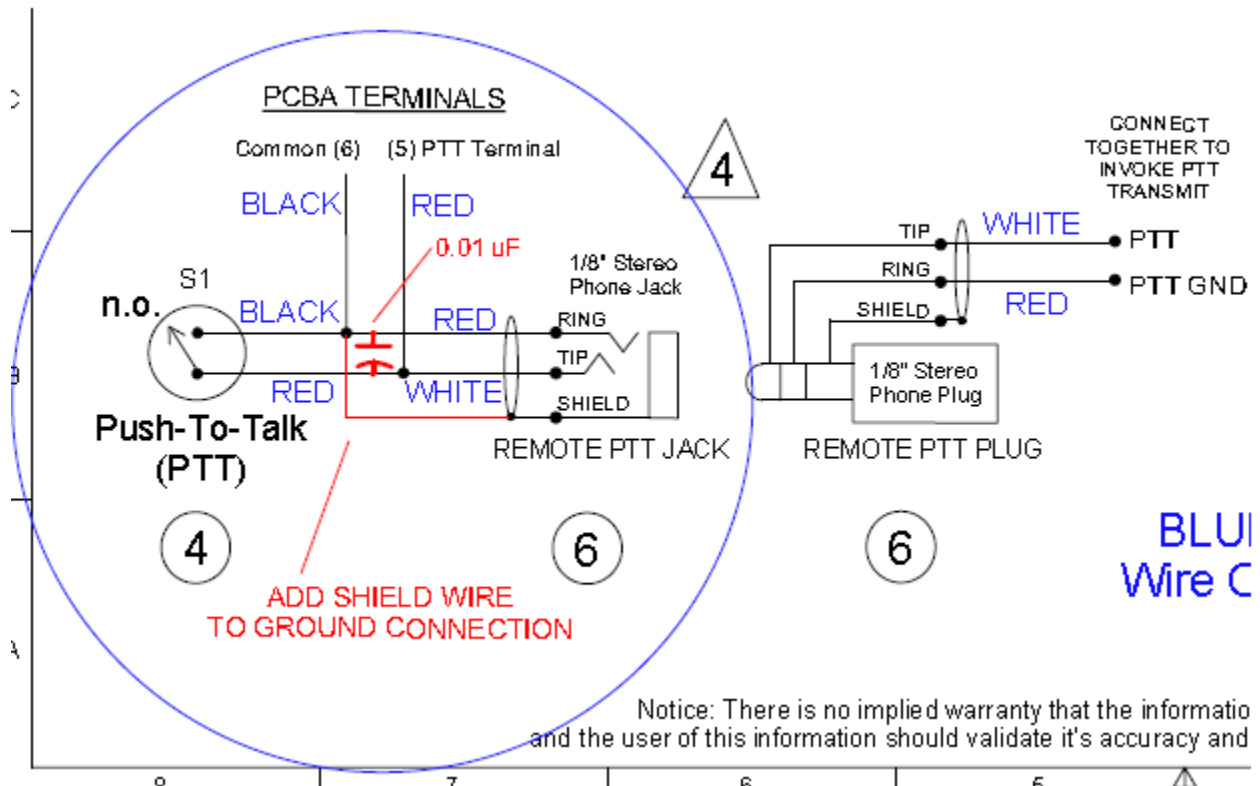


Figure 3. Capacitor Across Push-to-Talk (PTT) Cable Connections and Using Shielded Cables

- 1) Add a 0.01 uF disc ceramic capacitor across the PTT switch or connection nearest the radio to provide an RF ground at that point.
- 2) Tie the shield wire, if available, to the ground connection inside the remote PTT switch black box (shown as the red wire in the Figure 3 above). If a shielded cable was not used for the PTT, consider changing this to reduce RF pickup.
- 3) Consider adding a small disk ceramic capacitor, 1000 pF, directly across the microphone pins at the nearest point to the microphone connector.

Appendix – A

Fair-Rite Specifications Sheets for Ferrite Clamp-on Cores

- Source File, 431164181.pdf
- Source File, 431173551.pdf
- Source File, 431177081.pdf