

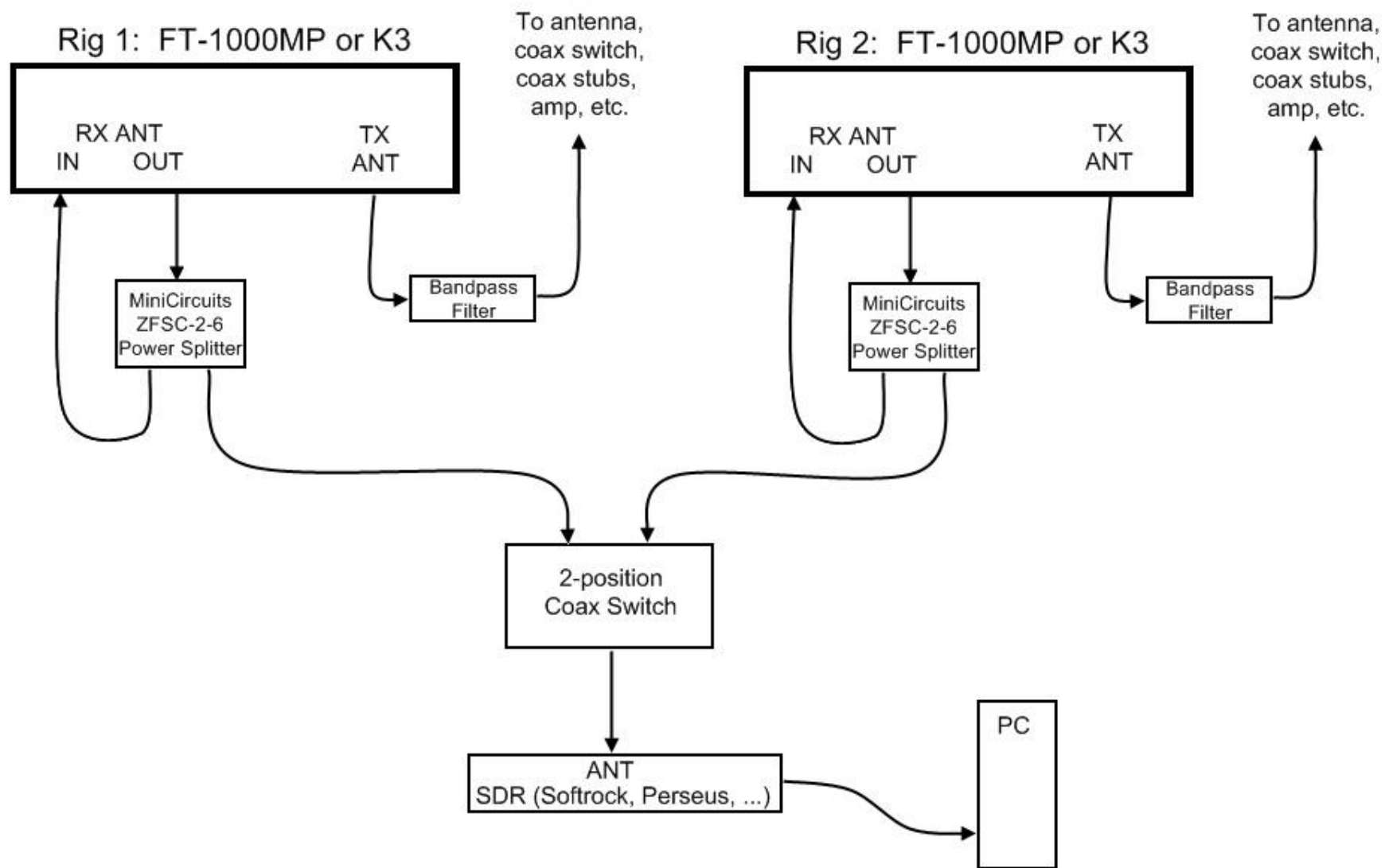
Adding a Software Defined Radio to an SO2R station

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Objective

- Add a good band scope to an existing SO2R station, using a Software Defined Radio (SDR) like a [Microtelecom *Perseus*](#)
- No new antennas dedicated to SDR
- SDR should use *main* antennas, bandpass filters, coax stubs, etc.
- SDR must be protected during transmit
- Architecture must support full break-in CW (QSK)
- Solution on next chart

Adding a Software Defined Radio (SDR) to an SO2R Station



Mini-Circuits® Power Splitter

ZFSC-2-6



- 50 ohms, 0.002 to 60 MHz
- 30 dB isolation
- 0.3 dB insertion loss (above 3 dB loss per port)
- Data sheet [link](#)
- You can try a coax T-connector, but a power splitter should work better

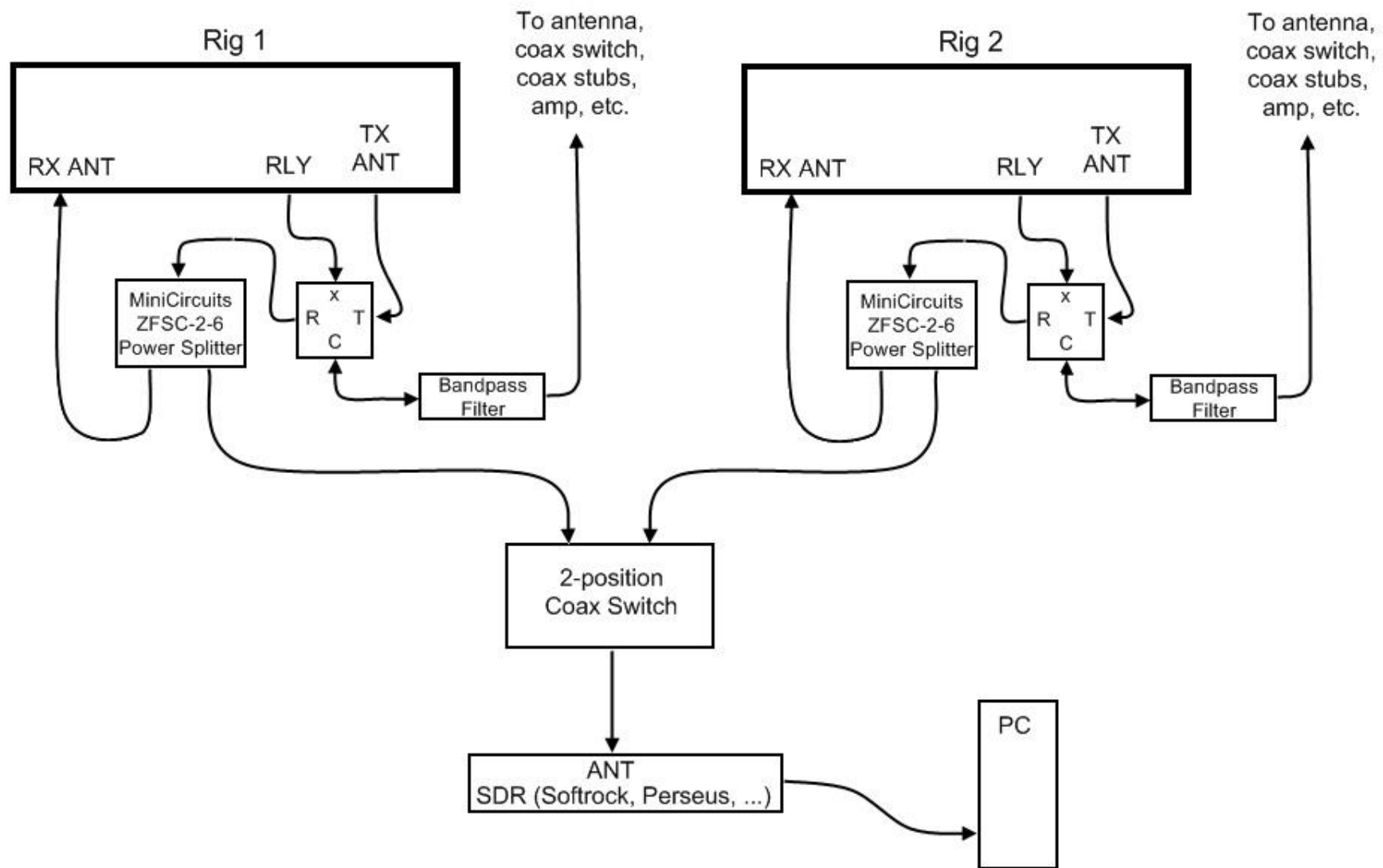
Scenario: Let SDR monitor 15m

- Rig 1 on 20m, Rig 2 on 15m
- CQing on 20m, S&P on 15m
- Press "RX Ant" button on Rig 2 to activate RX ANT IN/OUT connectors
- Move SDR 2-position Coax switch to Rig 2
- Tune SDR to 15m
- While Rig 1 transmits, SDR front end is protected by station bandpass filters, stubs, etc., just like Rig 2
- When Rig 2 transmits, SDR is protected by T/R relays in Rig 2
- When Rig 2 becomes run station, switch SDR to Rig 1, press RX ANT on Rig 1 to activate connector (and press RX ANT on Rig 2 to deactivate it), tune SDR to 20m

What if my rig doesn't have an "RX Out" Connector?

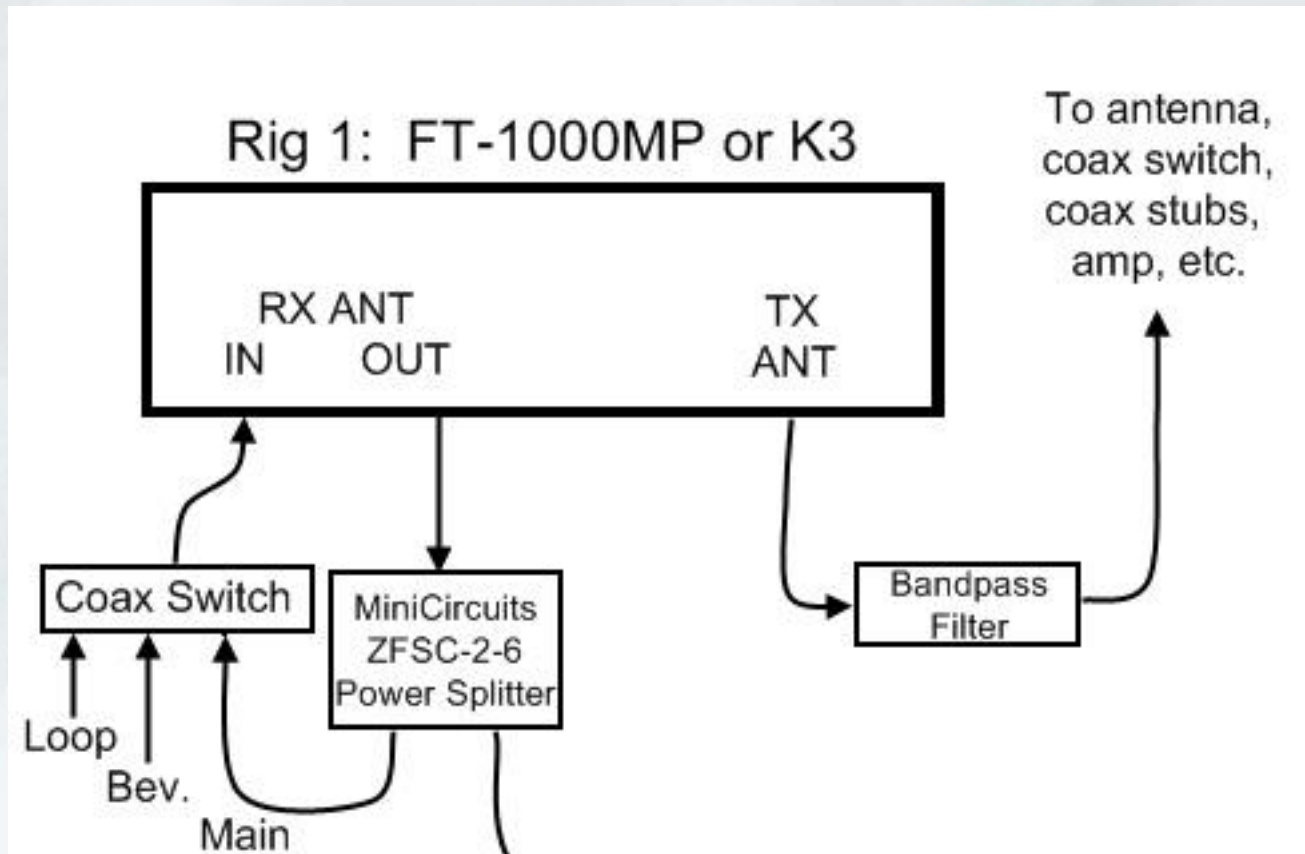
- If it has an RX IN connector, use a very good fast switching 100W external T/R Relay with high isolation
- QSK will be a challenge
- Use with caution: station damage likely if T/R lines connected improperly
- Disclaimer: I have *not* tried the following scenario myself

Adding an SDR to an SO2R Station Using External T/R Relays



What if I'm already using RX IN for a Beverage or Rx Loop?

- Just add a coax switch to the RX ANT input:



- Fancier switching required to connect Rx Ants to SDR
- Independent bandpass filters recommended on Beverage

Recommendations and Considerations

- Get your SO2R station working first, then add the SDR
 - An SDR makes a great band scope
- If you have an FT-1000MP, K3, or other radio with RX IN/OUT connectors, use them! Don't use external relays.
- When the radio and the SDR are both listening on the same antenna through the power splitter, receive signals will be 3 dB down in each (50% power = -3 dB).
- With FT-1000MP / K3, just press RX ANT button again to get the 3 dB back
 - This disconnects the RX OUT line, so SDR will have no antenna
- With other radios, given the previous circuit, you can't get the 3 dB back without using additional relays to bypass the power splitter (adding complexity, probably not worth it)

Summary

- An SDR can be safely added to a properly configured high power SO2R station with little risk of damage
- Use the RX ANT IN/OUT lines
- Use a good 50 ohm power splitter
- Use bandpass filters on both transmitters -- SDR will benefit from having those in line
- Having a good band scope is worth the effort