

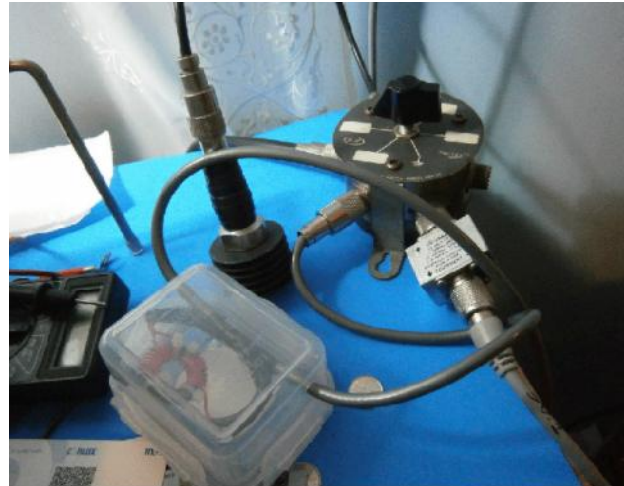
# Insulated RX Transformer

By: Igor Grigorov, va3znw

At my shack I have used a Coaxial Antenna Switch Protax CSR- 5G to change devices switched to my antenna. **Figure 1** shows commutation graph and schematic of the switch. **Figure 2** shows the switch sitting at my table. The switch is very convenient for amateur operation in the Air. I can easy switch antenna from one transceiver (ICOM- 718) to another one (K1) or turn antenna to general coverage receiver (Hallicrafters S-85). I use the receiver to check propagation in the Air and just to catch some interesting HF- stations.

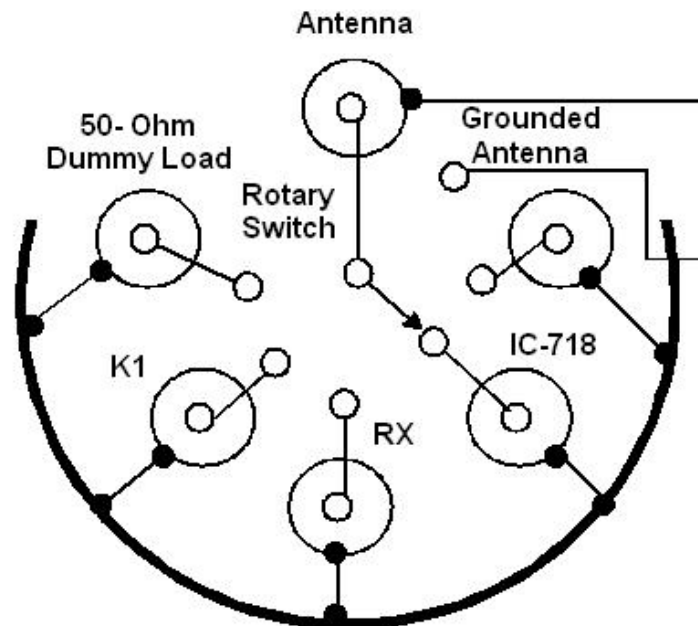
I have bought the switch at some Hamfest for 5 dollars. It is very reliable switch that worked at me without any problem. Somedays I discovered ads of the switch at old 73- Magazine from 1967. **Figure 3** shows old advertising of the switch from 73- Magazine # 1, 1967.

The switch costs \$ 12.50 in 1967. I used online calculator (<http://www.dollartimes.com/index.htm>) to find value of the one dollar from 1967 to dollar in 2015.



**Figure 2** Protax Coaxial Antenna Switch Sitting at my Table

It occurred that one dollar from 1967 cost 7.13 dollars from 2015. So the switch would cost 89 dollars if being sold in the 2015 year.



**Figure 1** Commutation Graph and Schematic of the Switch

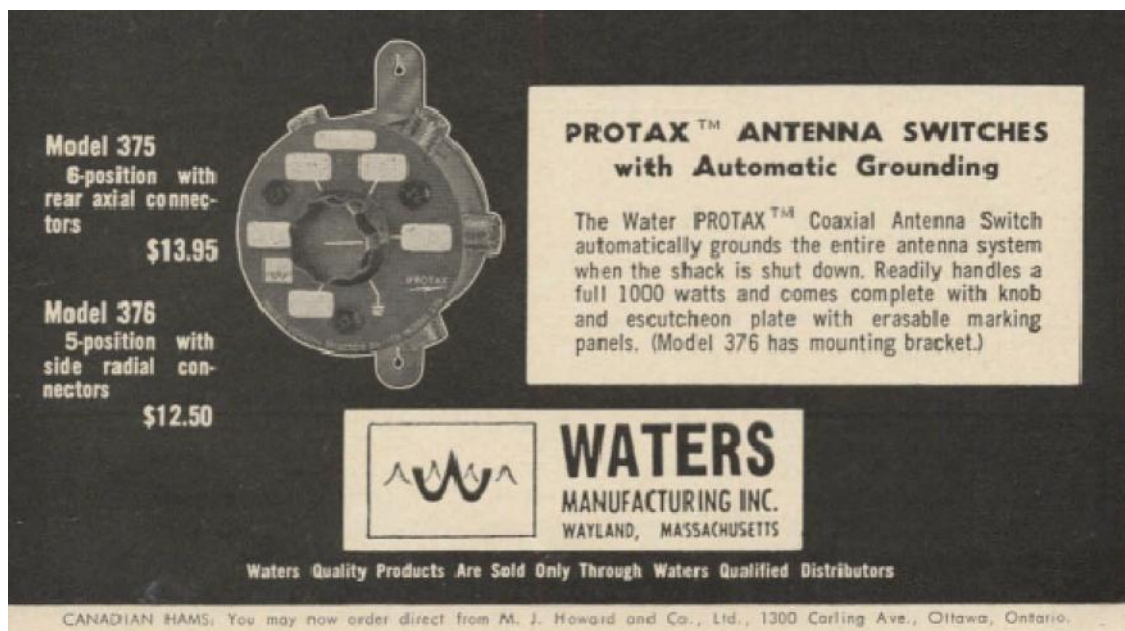


Figure 3 Advertising of the Coaxial Antenna Switch Protax from 73- Magazine # 1, 1967

Please, take attention that a 50- Ohm dummy load is switched there. Why? The switch has position when the antenna is grounded. It is very useful at lightning time or time when static could copy on to antenna wires. It is time of strong winds, snowfall or before lighting period. When antenna is grounded the static goes to the ground and could be not damaged devices that are switched to the Coaxial Switch. However it is worked well when antenna does not contains a ferrite transformer (s) in the design. If antenna had ferrite transformer in the design and the antenna is grounded to the natural ground, antenna current caused by static or lighting discharge may be strong enough to destroy the ferrite transformer.

I use to the switch with Beverage Antenna that is described at that issue (Antentop 01- 2015, pp.: 35-41). My Beverage Antenna has ferrite matching transformer at the end. So theoretically the transformer may be damaged when switch grounded the antenna directly to the ground.

At professional radio communication an antenna that has ferrite parts in the design newer being directly grounded to the natural ground. Such antenna is grounded through a low ohm resistor that as usual has nominal equal to surge impedance of the transmission line. In this case the current going through the antenna ferrite parts would be limited by the resistor and the ferrite parts would not be destroyed by the lightning and static electricity. I use 50- Ohm coaxial cable so I turn on my antenna to a Dummy Load 50- Ohm when the antenna is not in use.

The main lack of the Coaxial Antenna Switch Protax CSR- 5G is that one position rotary switch is used at the device. So grounds of all devices connected together at the switch. It may be caused that interferences catching by one device may penetrate to another one having common ground. Professional Antenna Commutator as usual has 2 position rotary switch that commutate simultaneously input and ground of antenna or used device.

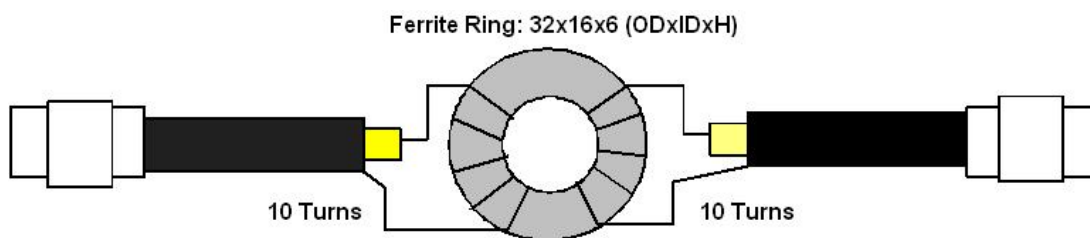


Figure 4 Design of the Insulation Transformer

## ANTENTOP- 01- 2015, # 019

In my case I mentioned that connecting on receiver Hallicrafters S-85 to the Coaxial Switch went to increasing noise at transceivers connected to the Switch. Insulation transformer helped me to remove the effect. **Figure 4** shows design of the transformer. **Figure 5** shows Hallicrafters S-85 on the bench.

Transformer was made with ferrite ring that I saved from an old Computer PIII. The ring had dimensions 32x16x6 (ODxDxH). Permeability of the ring was unknown for me. Transformer had two identical inductors, each contained 10 turns coiled by wire in 0.5- mm diameter (24 AWG). The inductors were placed at opposite sides of the ferrite ring. Two lengths of coaxial cable in 20 cm were connected to the ring. The design was placed in plastic food box.

The transformer was installed between Coaxial Antenna Switch Protax CSR- 5G and coaxial cable going to receiver Hallicrafters S-85. **Figure 6** shows the transformer inside opened food box. **Figure 7** shows the closed food box with insulation transformer. **Figure 2** shows the closed food box sitting beside the Coaxial Antenna Switch.

The insulation transformer allows use the Hallicrafters S-85 without any noise influences to transceivers connected to the switch. Reception of the receiver was improved with the insulation transformer. Stations sound clearly with the transformer. I was mention that there were less noise and clicks in the receiver especially at lighting and pre storm period.



**Figure 7** Closed Food Box with Insulation Transformer

## Insulation RX Transformer



**Figure 5** Hallicrafters S-85



**Figure 6** Insulation Transformer Inside Opened Food Box

I measured SWR when the transformer was connected to the 50- Ohm coaxial cable going from Beverage antenna and to MFJ-259B. SWR was in limit 3...4 up to 4- MHz. Then SWR was sharply increased and reach 25 at 20- MHz. However, such high SWR does not hinder the reception. It is more important for the receiver is to cut low frequencies interferences going from static, lighting and some home and industrial equipment. The insulation transformer does it in good way.

**73! I.G., va3znw**