

## Control of IC746 with external Power Amplifier AMERITRON

After finishing analog TV terrestrial transmission on 50 MHz and therefore ending problems with TVI in my QTH (DVB-T /digital video broadcasting – terrestrial/ started there last year) I wanted to multiply my output power on HF bands by about 4. By the way my time-tested transceiver IC746 had its output power about 80 Watts CW. Finally I chose Solid State Power Amplifier ALS500M(XCE) from AMERITRON as my new external Power Amplifier (PA). Expected output power was 300 Watts for CW. It would add about 1S increase to my topical signal at other radio amateur stations. I would like to underline that an Automatic Antenna Tuner had also been installed in my IC746. I wanted to keep it and to use it for next operation on 50 MHz. I had also External Automatic Antenna Tuner MFJ-994 (power 300W - CW and 600 W PEP - SSB) at my disposal for using it between the (external) PA and my antennas.

Because of the facts described above I had to mainly solve how to switch off the Internal Automatic Antenna Tuner in IC746 and how to tune the External Automatic Antenna Tuner MFJ. I could not use push-button TUNER of IC746 (that switches off either the Internal Antenna Tuner or controls tuning External Antenna Tuner).

I found finally an appropriate solution on the Internet - for transceiver IC706 by G4FZN. I thought that it must have been similar for similar ICOM transceivers. I saw it was right after testing it at my IC746. Then I proceeded with further finding on the Internet, studying Instruction manuals (1,2,3), designing and manufacturing a Control Box (please see its electrical scheme in figure 2) and finally testing the complete configuration of IC746, ALS-500M(XCE) and MFJ-994 on HF ham bands in CW and SSB operation (please see the block scheme of this configuration in figure 1).

I would like to present my results for such radio amateurs who have transceiver IC746 (or similar) and want to use a Power Amplifier behind the transceiver. Original ICOM PA 1kW – PW1 would be too powerful or too expensive for them. I would also like to add that perhaps some simpler solution of this task exists but I do not know it.

I recommend to start by studying Instruction Manuals of the Producers (1,2,3) . Everything necessary is described and explain there.

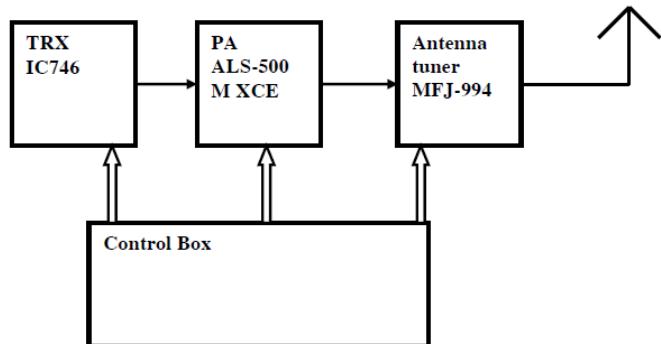
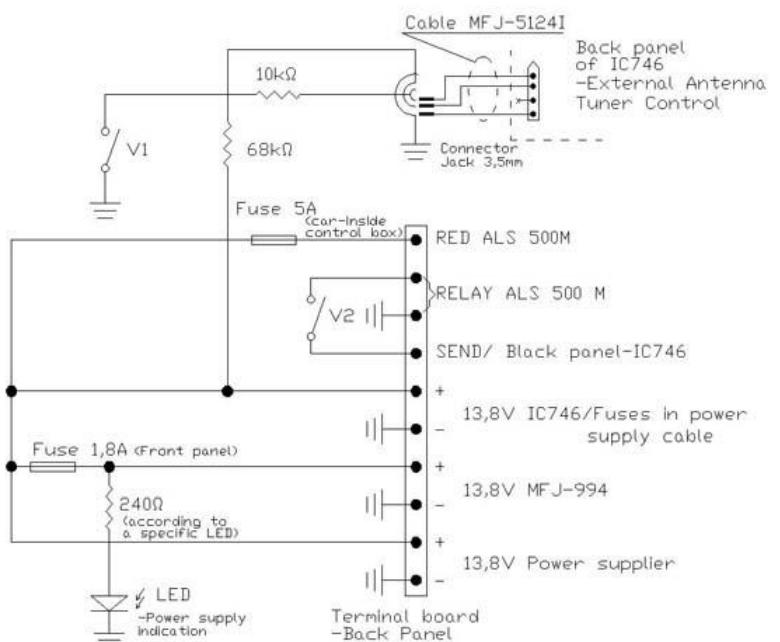


Figure 2 – Control Box



Front panel of the Control Box is shown in figure 3. Display of my IC746 (when the Control Box is connected) is shown in figure 4.

Switching Power Supplier GZV6000 supplies IC746, PA (AMERITRON) and External Antenna Tuner MFJ (13,8V / 60A) in my case. It is important that the power supplier does not interfere receiving HF and VHF radio amateur signals. Control cable MFJ-5124I must be modified for this solution (MFJ's External Antenna



Tuner Control Cable for ICOM transceivers). This cable is not used for any power supply in my case. Good insulation of the cut off part of the cable (power supply part) is necessary.



The tuning of MFJ-994 External Antenna Tuner is described here:

The PA (AMERITRON) is off (either directly by POWER Switch – front panel of the PA - or in the Control Box - switch V2 is switched off). Then switch V1 in the Control Box is being switched on. Now transceiver IC746 transmits a tuning signal to its Output Connector ANT 1. IC746's power is 10 Watts. This tuning power (10 W) is not depend on setting IC746's (internal) Power Amplifier. The PA (AMERITRON) is automatically being by-passed while the one is off. I

remind that an appropriate Input Pass Filter of the PA has to be switched on for a wanted radio amateur band (preparation for next operation). The Automatic Antenna Tuner (MFJ-994) has to tune an antenna for SWR better than 1:2 or maximum 1:2 because that SWR (1:2) is the limit when the PA automatic temperature protection is starting. Final step follows when the antenna tuning process is over: V1 is switched off and V2 or POWER switch of the PA is switched on. Now the PA and MFJ antenna tuner are prepared for operation with transceiver IC746 on the wanted radio amateur band. PA's output power should not be bigger than 300W for CW (MFJ-994). It should be checked up before the operation.

My monitoring transmitted signals (CW, SSB) showed that there were no clicks or splatters (thanks also to the PA circuits – well designed). There was also no TVI of DVB-T in my QTH.

When the Internal Automatic Tuner would not be installed in transceiver ICOM – IC746 it would be simpler - I think so but I do not have my personal experience. I expect that it would be proceeded fully in conformity with Manuals (1,2,3). The Control Cable MFJ-5124I would not be modified (not cutting off the power supply). The External Antenna Tuner would be tuned with press-button TUNER (front panel of transceiver IC746).

Now I would like to add that I need about 25 Watts output from my IC746 to get the PA output power 300W CW (depends on a specific band – higher ones need more).

I would also like to underline on the end: who put the above described solution into practice must have enough knowledge and experience of course.

It will be my pleasure to answer possible questions on my experience that will be sent to my e-mail account.

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References:

- (1) IC746 Instruction Manual, Icom Inc. Osaka - Japan
- (2) AMERITRON ALS-500M Instruction Manual, Starkville – MS, USA
- (3) MFJ Automatic Antenna Tuner Model MFJ-994 Instruction Manual, Starkville - MS, USA