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# **I. GENERAL INFORMATION**

## **I-1. Introduction and Description**

This manual explains the installation and maintenance of the ACOM2SI Automatic XCVR commutator.

The ACOM2SI is a TX/RX commutator that allows two transceivers to use a common load. It guards each transceiver's input while the other transceiver transmits, prevents simultaneous transmission, and allows simultaneous reception.

ACOM2SI is especially designed to complete the ACOM2000S/SW automatic antenna selector (plus ACOM2000SW remote antenna switch) and the ACOM2000A automatic HF linear amplifier. Nevertheless, it may be used to commute an antenna only, or can be adapted in other systems, too. Operation is fully automatic and the full break-in (QSK) mode is standard.

## **I-2. Owner Assistance**

If assistance is needed, you should contact your local dealer first. If you still have an issue you need to discuss with one of ACOM's specialists, the contact information is as follows: fax: (+359 2) 920 96 56, tel. (+359 2) 920 96 55, e-mail [acom@aster.net](mailto:acom@aster.net), [acom@mail.orbitel.bg](mailto:acom@mail.orbitel.bg) or by mail: bul. Gornobanski Nr.151, 1330 Sofia, Bulgaria.

## **I-3. Equipment Supplied**

The ACOM2SI Automatic XCVR commutator, two control cables, and this manual are shipped in a cardboard carton. Control cables are directly suited for YAESU FT990 and FT1000MP transceivers. Other types need replacement of DIN-8 connector or an adapter (see S.2-2d).

## **I-4. Features**

- Fully automatic.
- QSK in CW mode is standard.

- Up to 200W through-line power.
- VSWR below 1.1:1 (1.8-54MHz); below 1.2:1 up to 80MHz.
- Single 12VDC /30mA power supply (fed from transceivers).

## **I-5. Safety Considerations, Explicit Definitions**

The ACOM2SI Automatic XCVR commutator is powered from 12VDC. Consumption is below 30mA.

This operating manual contains information, precautions and indications for cautions which must be followed by the user to ensure safe operation and to keep the ACOM2SI in safe operating condition.

## **PRECAUTIONS:**

The EXPLICIT DEFINITIONS described below apply to this operating manual:

### *CAUTION*

notes call attention to a procedure which, if not correctly performed, could result in equipment damage, not only in the commutator.

### *NOTE*

notes call attention to a procedure which, if not correctly performed, could result in inconvenience.

### *CAUTION*

To avoid damage (not covered under warranty) read the Installation - Section 2 of this operating manual carefully. If you have any doubts about the installation, operation or safeties of the commutator please consult your dealer.

## NOTE

Some types of transceivers are not suitable to be directly used in the ACOM2SI XCVR commutator system. Delivered control cables are directly suited for YAESU FT990 and FT1000MP but they can easily be modified for several other types. See S.2-2(d) and contact your local dealer for details.

## 2. INSTALLATION

### 2-1. Unpacking and Initial Inspection

#### NOTE

Before you start to install the commutator, thoroughly read this manual. First, carefully inspect the cardboard carton and its contents for physical damage. If damage is noticed, notify your dealer immediately. Delay may infringe carrier's warranty conditions. Keep all packing for possible future transportation!

### 2-2. Connections

Connection of the commutator to your station must be accomplished in the order described below:

- a) Connect a coaxial cable with a PL-259 plug from commutator INPUT A socket to the antenna connector of transceiver A.
- b) Connect a coaxial cable with a PL-259 plug from commutator INPUT B socket to the antenna connector of transceiver B.
- c) Connect a coaxial cable with a PL-259 plug from the commutator OUTPUT socket to the common load (amplifier's input, or antenna switch, or to the antenna directly, whichever is used).

d) Connect both control cables from commutator's CONTROL A and B (4-pin MIC connectors) to the respective transceiver's A and B control connectors. Use BAND DATA connectors for YAESU FT990 and FT1000MP.

#### NOTE

Delivered control cables are ended on DIN-8 connectors that are directly suited for BAND DATA connectors of YAESU FT990 and FT1000MP transceivers. If any of your transceivers is different, you'll need to replace the DIN-8 connector or make a suitable adapter.

Use the ACOM2S1 schematic diagram (Fig.4-1, Fig.4-2) and the manual of your transceiver to reconnect the control signals and power supply according to the following information:

- connect commutator's connector CONTROL-pin-1 (+13V) to any DC supply voltage in the range +11...+14V available from the transceiver.
- connect commutator's connector CONTROL-pin-2 (TX GND) to the transceiver's output providing "ground on transmit" (it's usually dedicated for external amplifier T/R control). Prefer an electronic output to a relay contact. Transceiver producers give different names to this signal, for instance: TX-GND, SEND, T/R-LINE, etc. Some transceivers require that "ground on transmit" is implemented via a software command, or by changing the setting of a switch on the rear panel, or interior of the transceiver. Check your transceiver's manual.
- connect commutator's connector CONTROL-pin-3 (GND,SHIELD) to the common transceiver's ground.
- connect commutator's connector CONTROL-pin-4 (TXINHIBIT) to a dedicated transceiver's input that disables transmission. Transceiver producers give different names to this input and they are for instance TX-INHIBIT, MUTE, LINEAR, ATU, etc. If your transceiver does not have such an input, it cannot be suited to the ACOM2S1 XCVR commutator system (unless any modification is made inside the transceiver to get such TXINHIBIT input). Check your transceiver's manual or consult your dealer.

e) Run a “daisy chain” wiring using Phono (RCA) connector terminated cables:

- from the commutator’s KEY-OUT socket to the amplifier KEY-IN socket.
- from the amplifier KEY-OUT socket to the antenna selector KEY-IN socket.
- from the antenna selector KEY-OUT socket to the KEY-IN socket of the commutator.

If any of the units listed above is not present in the system, go to the next unit. If no external apparatus is used, merely place a bridge between KEY-OUT and KEY-IN sockets of the commutator.

### *CAUTION*

Do not try transmitting until all the system is properly connected to the ACOM2SI according to (a)...(e).

Be extremely careful not to mix A and B control and RF cable pairs. Damage to the commutator and/or other equipment is possible, not covered by the warranty.

## **3. INITIAL CHECK AND OPERATION**

Operation is fully automatic. Anyway, we recommend an initial check to be executed (before using the commutator first time) in the following sequence:

a) After following all instructions in S.2-2, you may turn ON both transceivers. This will apply DC voltage to the commutator. Powering sequence makes no difference. Both LED indicators A and B must be OFF in RX mode. LED indicators A or B light only while the respective transceiver transmits: this indicates to the other transceiver’s operator that he cannot transmit at the same time.

b) Set different bands on both transceivers. Switch the antenna selector ON and the amplifier OFF (if any). Set RF power controls of both transceivers to a possible minimum. Tune both transceivers to hear the typical band noise.

c) Try a short transmission from A – its LED must light during transmission. Hold A to transmit and try simultaneous transmission from B: it must be disabled and LED B must rest dark. B must not be able to break A until you release A. When neither A nor B transmits both transceivers must normally receive.

### CAUTION

LEDs A and B should never light simultaneously. Look for any connection error if you note such condition (see S.2-2)

d) Try the same as described in (c) but with B and A exchanged.

e) Repeat (c) and (d) at a low (5-10 Watts) output level. Try QSK CW from both transceivers: a first pressed KEY must “reject” CW dots and dashes of the second one. The second transceiver must be automatically enabled when the first one returns to RX. Both transceivers must be able to receive in the pauses of transmission.

f) Breaking the KEY-IN / KEY-OUT “daisy chain” wiring at any point must disable transmission of both transceivers.

g) Restore all connections and turn ON the amplifier (if any). Try (e) again. The amplifier must follow the frequency last transmitted by either transceiver. Increase the output to its nominal level – no problems should be met.

## 4. MAINTENANCE

### 4-1. Cleaning

#### WARNING

**Do not use solvents for cleaning - they may be dangerous both for you and for the amplifier paint or plastics.**

You don't need to open the commutator for cleaning. The outer surface can be wiped with a piece of soft cotton cloth lightly moistened with clean water.

### 4-2. The ACOM2SI Schematic Diagram

Look at ACOM2SI Schematic Diagram (Fig.4-1). Power supply is fed to the commutator from any transceiver via diodes D1 and D2. Both transceiver RF paths are controlled by the contacts of relays K1 and K2 (shown in RX position). When A transmits, INA is connected to the OUT via K2, while INB is grounded via K1. Relay's contacts are monitored through chokes RFC1...RFC4. Respective signals GA and GB are used by the logic to disable transmission while the opposite antenna input is not yet grounded. Two other signals PA and PB disable transmission if no RF input is connected to the output.

The transmission requests \*TXA or \*TXB are controlled via a trigger-logic composed by U3B, U3C, U4A, and U4B. It judges which request is earlier and disables the other until the first one finishes transmission. The opposite RF relay is switched over via U4 (A or B) in order to save its RX input. Simultaneously, the transmission request is passed to the KEYOUT through U3D, U2C, and the transistor Q1. At least one of PA or PB is wanted to be logical high by U3A, otherwise U2C would prevent KEYEOUT going low.

The logical low KEYOUT signal must be returned to the KEYIN by the amplifier and/or antenna selector when they are ready to transmit. A direct jumper must be placed between KEYOUT and KEYIN if no external apparatus is used. After \*KIN signal is tied low, a second trigger (composed



by U1 and U2) is enabled. It is intended to check GA and GB signals, i.e. whether the opposite relay has already grounded the second transceiver's RX input. When grounded, the respective inhibit signal (INHA or INHB) is enabled and its LED lights. This returns a low INHIBIT confirmation signal to the transceiver that requested transmitting earlier. The other INHIBIT signal remains HIGH in order not to let simultaneous transmission.

### **4-3. Troubleshooting**

In case of trouble inspect all cabling according to S.2-2. Clean connectors with alcohol as needed and check the cables for continuity or parasitic connections.

Please make an initial operational check according to S.3 before contacting your dealer (S.1-2).

## **5. SPECIFICATIONS**

### **5-1. Parameters**

- a) Frequency Coverage: All amateur bands 1.8-54MHz.
- b) Through-line Power: up to 200W PEP or continuous carrier.
- c) Input and Output Impedances:
  - 50 Ohm nominal, unbalanced, UHF (SO239) type connectors.
  - VSWR below 1.1:1 (1.8-54MHz); below 1.2:1 up to 80MHz.
- d) Power Supply: 11-14 VDC, less than 30mA consumption.
- e) Size & Weight (operating): W110mm x D42mm x H67mm, 350g, incl. cables  
(4-1/3"W x 1-2/3"D x 2-2/3"H, 0.8Lbs).
- f) Operating Temperature Range: 0...+50 deg. Celsius.

## **5-2. Functions**

a) T/R System: QSK mode capable.

b) Protections:

- one transceiver's input is grounded while the other transceiver transmits;
- simultaneous transmission is prevented;
- T/R sequencing and RF relay contacts are continuously monitored.

## **5-3. Storage and Shipment**

a) Storage environments: the commutator can be kept packed in dry and ventilated unheated premises without chemically active substances (acids, alkalis etc.) in the following climatic environment:

- Temperature range: -40 to +70 deg. Celsius;
- Humidity: up to 75% @ +35 deg. Celsius.

b) Shipping Size and Weight: W200mm x D150mm x H70mm, 450g (8"W x 6"D x 2-3/4"H, 1Lbs).