

STE sas ELETTRONICA TELECOMUNICAZIONI

15, Via Maniago - 20134 - Milan - Italy

Tel.: +39.02.2153524 / 2153525 / 2157891 Fax: +39.02.26410928

ste@stecom.com

www.stecom.com

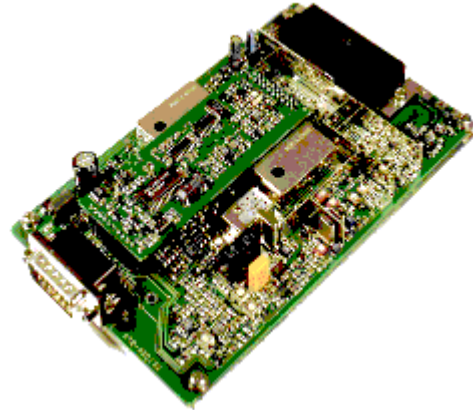
VHF-UHF Synthesized Voice-data FM transceiver

SYNTHESIZED VHF-UHF DATA TRANSCEIVER

AK62/ AK67

DESCRIPTION

The AK62 (VHF) and AK67 (UHF) are synthesized and PC programmable transceivers providing up to 16 switch selectable RF channels for simplex or half duplex operation. They have been designed in accordance with ETS 300-086 (voice) and ETS 300-113 (voice + data) regulations and with the optional modem board they can provide wireless links between a wide variety of data sources and monitoring equipments. They are manufactured using Surface Mount Technology (SMT) and are therefore compact and reliable. A direct connection to the RS232 port of a computer is all it is necessary to program the Tx-Rx channels frequencies, the subaudio encode-decode tones, the RF output power, the Tx time-out time and the special Rx "energy save" function.



VHF BAND 136-160 MHz (BAND#21)
150-176 MHz (BAND#22)

UHF BAND 400-425 MHz (BAND#72)
420-450 MHz (BAND#73)
445-475 MHz (BAND#74)

VHF MARINE BAND 156-162 MHz

FM or PM MODULATION

12,5-20-25-30-50 KHz CHANNEL SPACING

µP CONTROLLED - PC PROGRAMMABLE

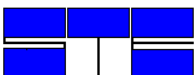
SUBAUDIO TONES

10 - 15 W Tx OUTPUT (25 W MARINE VERSION)

OPTIONAL FFSK 1200 - 2400 - 4800 BAUD MODEM

ENERGY SAVE FUNCTION

A special "Energy Save" function can be programmed to reduce the receive current consumption. By the computer it is possible to program a "sleep" time (0.1 - 25 s) and a "wake-up" time (10ms-2.5s): during the "wake-up" time the normal receiving operation can be restored when a carrier or a subaudio tone is detected.



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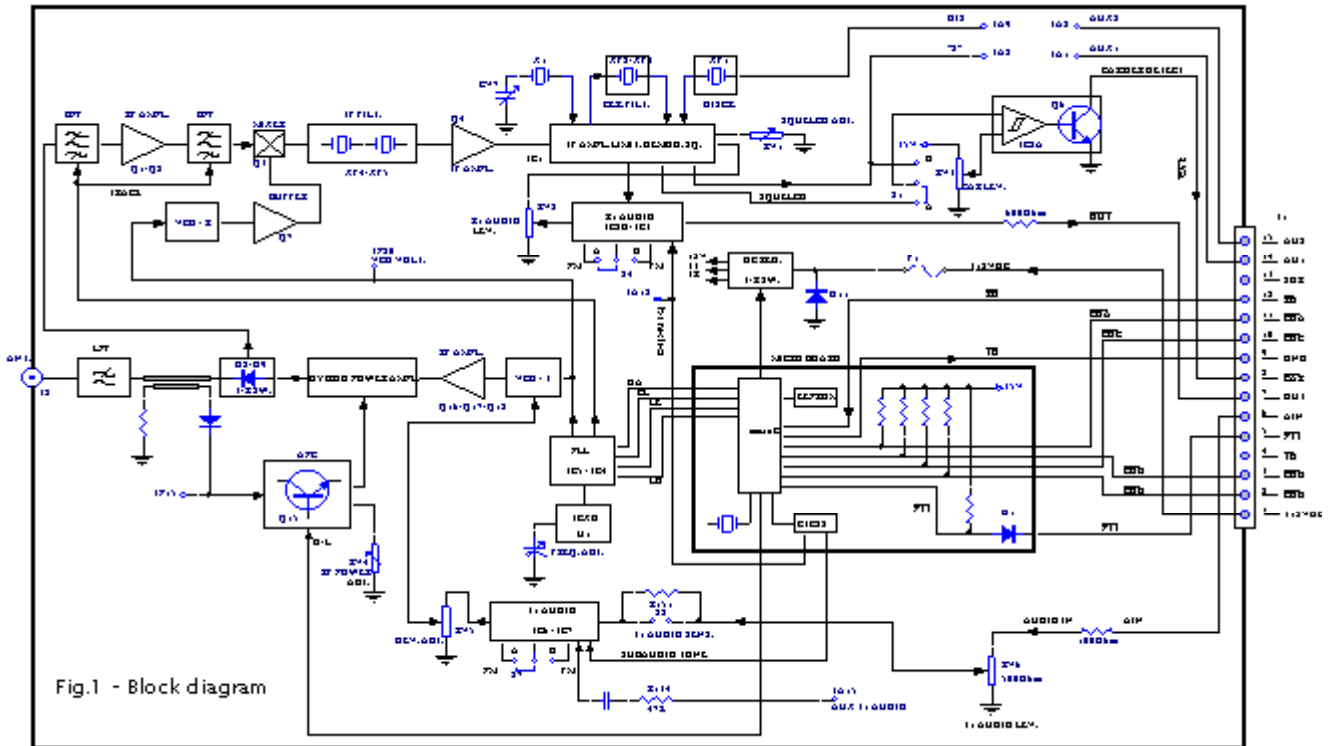


Fig.1 - Block diagram

DESCRIPTION OF "S" SELECTORS.

SELECTORS ARE USED TO SELECT DIFFERENT CONFIGURATIONS

- A) supply circuit.
- B) receiver and transmitter audio circuit.
- C) carrier detect and squelch circuit.

Note 1 "S" Selectors are made of solder jumpers on the printed circuit: it is recommended to use a welder with tin tip and to take due precautions.

Note 2 In Selectors where the "A" and "B" positions can be chosen, take care for the tin spatter not to short-circuit both positions.

GROUP A - SELECTORS ON THE SUPPLY CIRCUIT

- S9 Receiver audio stages supply.**
In standard position with jumper in "A" the receiver audio stages supply is removed during transmission. When the jumper is in "B" position the supply is steady: therefore the delay in receiving digital signal or selective tones during the transmit-receive switching is reduced.
- S10 Transmitter audio stages supply.**
In standard position with jumper in "A" the modulator audio stages supply is removed during reception. In such a condition consumption is as low as possible. Switching from receiving to transmission, it is necessary to wait approximately 100 ms before the operating point of the various modulators stages is stabilized. If it is necessary to increase the speed of the transmission switching, it is suggested to move the jumper in "B".

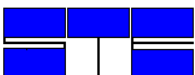
GROUP B SELECTORS ON THE RX-TX AUDIO STAGES

- S4 Selection of "PM" or "FM" modulation (receiver).**
In standard position with a jumper in "A", audio Rx stages have a 6dB/Octave de-emphasis response (PM modulation). If the jumper is in "B" the audio response is flat in the audio band (FM modulation).
- S7 Selection of "PM" or "FM" modulation (transmitter).**
In standard position with a jumper in "A" PM modulation is obtained with a deviation/modulation frequency curve characterized by a 6dB/octave emphasis.

- If the jumper is in "B" an FM modulation is obtained in which deviation remains constant when the modulation frequency changes.
- S3 Cut-off frequency of Rx audio high-pass filter.**
In standard position with S3 open the cut-off frequency is 300 Hz. A tin spatter in S3 (which short-circuits the three bump contacts) changes the cut-off frequency to about 70 Hz.
- S5 Cut-off frequency of Rx audio low-pass filter.**
In standard position with S5 open the cut-off frequency is 3 KHz. A tin spatter in S5 (which short-circuits the three bump contacts) changes the cut-off frequency to 7 KHz.
- S6 Cut-off frequency of Tx audio low-pass filter.**
The standard cut-off frequency is 3 KHz (S6 open). A tin spatter in S6 (which short-circuits the three bump contacts) changes the cut-off frequency to about 7 KHz.
- S8 Tx audio signal level.**
S8 is generally open: in such a case the standard level of the modulation signal input at J1 "AIN" terminal n.6 is -10 dBm (245 mVrms - 700 mVpp) and can be adjusted by RV6 between 50 mV and 2.5 Vrms. If S8 is short-circuited the input audio level changes to 3 mVrms (10 mVpp) and can be adjusted by RV6 between 2 mV and 100 mVrms. The input impedance at "AIN" terminal is always 600Ω.

GROUP C - SELECTORS ON THE RX CARRIER DETECT AND SQUELCH CIRCUIT.

- S1 "CAR" output.**
In standard position with jumper in "A" the "CAR" output is activated by the RF receiver signal level and adjusted by RV3. When the jumper is in "B" position the "CAR" output is activated by the "squelch" circuit.
- S2 RX audio mute.**
In standard position with jumper in "A" the audio Rx output ("OUT" terminal of J1) is muted by the "squelch" circuit and adjusted by RV1. When the jumper is in "B" position the audio output mute is controlled by the RF received signal level and adjusted by RV3.



4 – PERFORMANCE DATA

	AK62XX	AK67XX
Frequency	136-176 MHz	400-470 MHz
Channel separation	12.5-20-25-30-50 KHz	12.5-20-25-30-50 KHz
Modulation	FM - PM	FM – PM
Frequency stability	$\pm 2,5$ ppm (-20 +60°C)	$\pm 2,5$ ppm (-20 +60°C)
Operating temp.	-20 +60°C	-20 +60°C
Antenna impedance	50 Ω	50 Ω
Supply voltage	12.5VDC nom. (10.8Vmin -15.6V max)	12.5VDC nom. (10.8Vmin -15.6V max)
Supply current	100 mA (receive) 2.5A (transmit- 10W)	100 mA (receive) 2.5A (transmit- 10W)
Rx-Tx turnaround time	Approx. 25 ms.	Approx. 25 ms.
<u>TRANSMITTER</u>		
Power output	10-15 W @ 13.2 VDC	10-15 W @ 13.2 VDC
Spurious output	<0.25 μ W	<0.25 μ W
Adjacent ch. power	-60 dBc (12.5 KHz), -70 dBc (25 KHz)	-60 dBc (12.5 KHz), -70 dBc (25 KHz)
Audio freq. response	within ± 2 dB from 300 to 3000 Hz	within ± 2 dB from 300 to 3000 Hz
Harmonic distortion	5% max	5% max
<u>RECEIVER</u>		
Sensitivity 20dB SINAD	0.40 μ V	0.45 μ V
Adjacent channel sel.	-60dB (12.5 KHz) -70dB (25 KHz)	-60dB (12.5 KHz) -70dB (25 KHz)
Spurious response	-70dB	-70dB
Spurious emissions	<2 nW	<2 nW
Intermod. rejection	>65 dB	>65 dB
Audio freq. response	within ± 2 dB from 300 to 3000 Hz	within ± 2 dB from 300 to 3000 Hz
Distortion	5% max	5% max

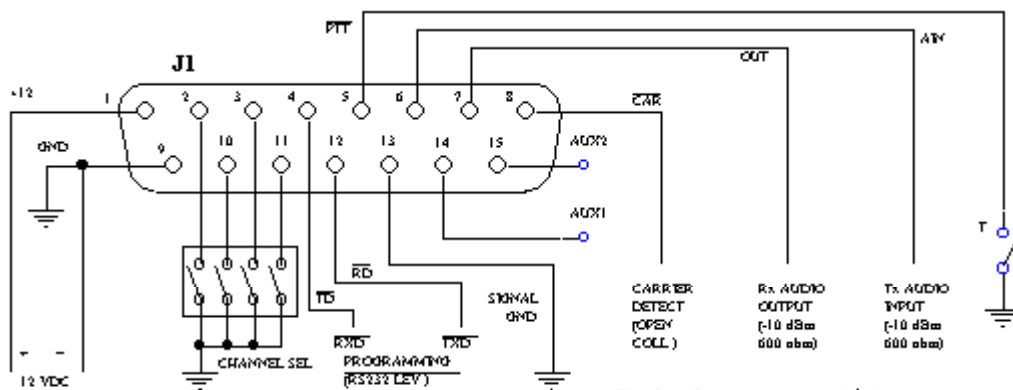
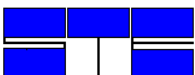


Fig. 2 - J1 connector with its main connections.



AK6XX - "OPEN" MODULES				AK6XX - "METAL ENCLOSURE" TRANSCEIVERS			
AK62N-21	VHF	136-160 MHz	12.5 KHz ch. sep.	AK62NS-21	VHF	136-160 MHz	12.5 KHz ch. sep.
AK62N-22	VHF	150-176 MHz	12.5 KHz ch. sep.	AK62NS-22	VHF	150-176 MHz	12.5 KHz ch. sep.
AK62C-21	VHF	136-160 MHz	25 KHz ch. sep.	AK62CS-21	VHF	136-160 MHz	25 KHz ch. sep.
AK62C-22	VHF	150-176 MHz	25 KHz ch. sep.	AK62CS-22	VHF	150-176 MHz	25 KHz ch. sep.
AK67N-72	UHF	400-425 MHz	12.5 KHz ch. sep.	AK67NS-72	UHF	400-425 MHz	12.5 KHz ch. sep.
AK67N-73	UHF	420-450 MHz	12.5 KHz ch. sep.	AK67NS-73	UHF	420-450 MHz	12.5 KHz ch. sep.
AK67N-74	UHF	445-470 MHz	12.5 KHz ch. sep.	AK67NS-74	UHF	445-470 MHz	12.5 KHz ch. sep.
AK67C-72	UHF	400-425 MHz	25 KHz ch. sep.	AK67CS-72	UHF	400-425 MHz	25 KHz ch.
AK67C-73	UHF	420-450 MHz	25 KHz ch. sep.	AK67CS-73	UHF	420-450 MHz	25 KHz ch.
AK67C-74	UHF	445-470 MHz	25 KHz ch. sep.	AK67CS-74	UHF	445-470 MHz	25 KHz ch.

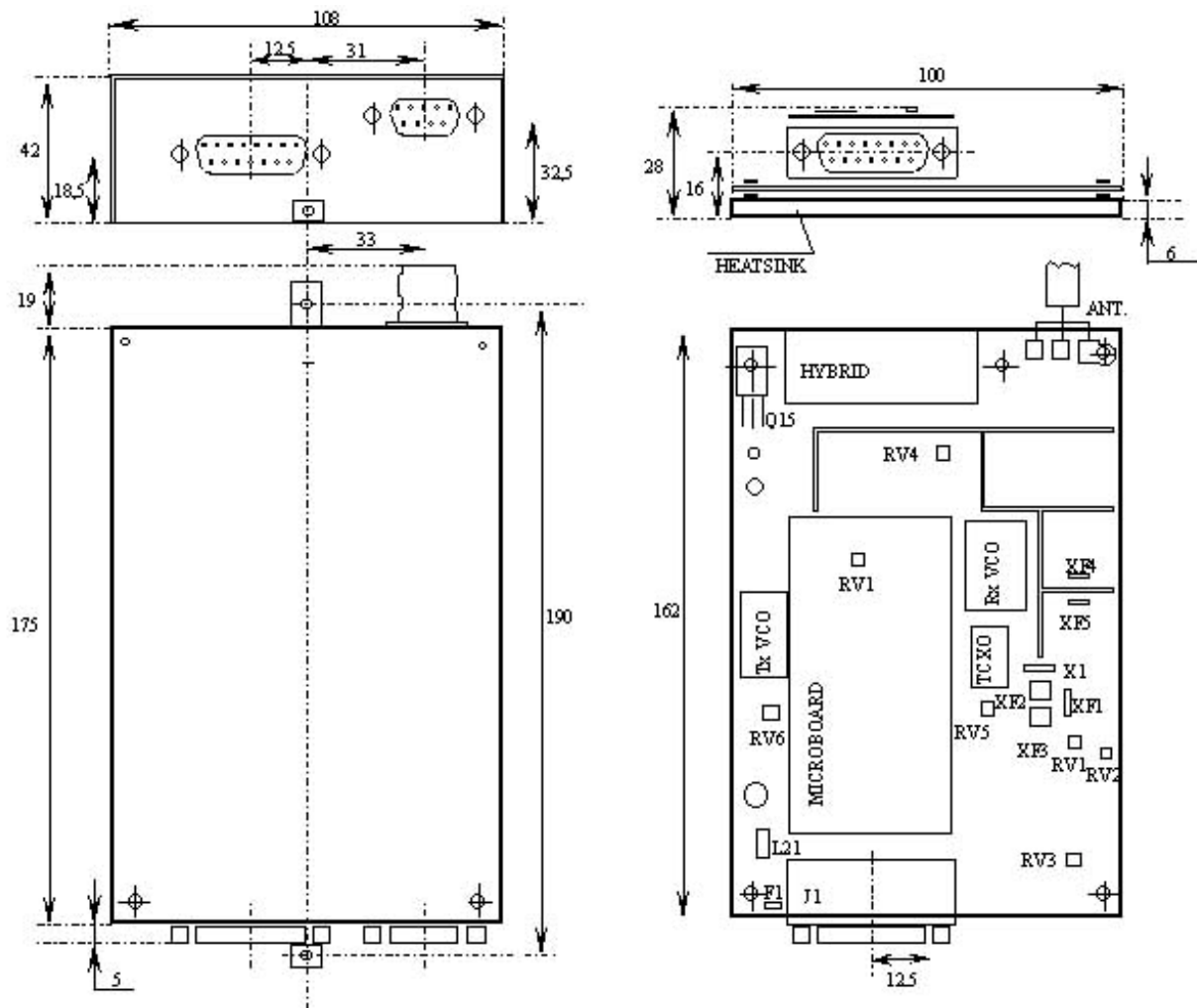


Fig.3 – Mechanical size

