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**SINGLE CHANNEL XTAL CONTROLLED
 VHF-UHF TRANSMITTERS**

AT52/AT57

- **VHF 136 - 175 MHz**
- **UHF 400 - 470 MHz**
- **"DATA" INPUT**
- **FM or PM MODULATION**
- **0.8 - 1 W or 4 - 5 W RF OUTPUT POWER**
- **OPEN or ENCLOSED VERSIONS**
- **12.5 - 20 - 25 - 50 KHz CHANNEL SPACING**
- **ANTENNA SWITCH OPTION**

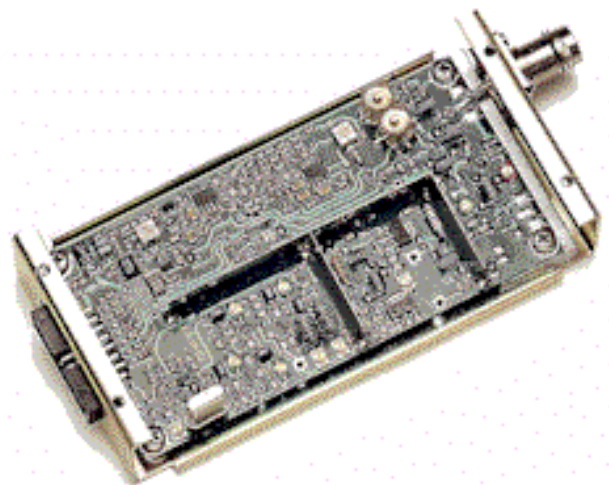
GENERAL SPECIFICATIONS.

Supply voltage	<input type="checkbox"/> 12 VDC nom (10,8 to 15,6 VDC)
Supply current	<input type="checkbox"/> 200 mA (1 W OUTPUT POWER)
	<input type="checkbox"/> 0.9 A (4-5 W OUTPUT POWER)
	<input type="checkbox"/> 10 - 14 mA (STAND BY)
Operating temp.	<input type="checkbox"/> -10 TO 55°C
RF output imped.	<input type="checkbox"/> 50 Ohm
Size (open module)	<input type="checkbox"/> 108 x 55 x14 mm
Weight (open module)	<input type="checkbox"/> 50 g
Size (enclosed module)	<input type="checkbox"/> 120 x 63 x 26 mm
Weight (enclosed mod.)	<input type="checkbox"/> 260 g

GENERAL DESCRIPTION

The AT52 transmitters (136 - 175 MHz VHF band) and the AT57 transmitters (400 - 470 MHz UHF band) have been designed in accordance with ETS 300-086 (VOICE) and ETS 300-113 (VOICE + DATA) regulations and work in frequency modulation. The modules are manufactured using Surface Mount Technology (SMT) and are therefore compact and reliable. The transmission frequency is determined by a crystal which can be rapidly supplied by STE on the frequency required. A special care has been devoted to study the radio frequency circuit and the modulation and supply circuit to make the module suitable to meet the most various requirements. Either the "FM" (constant frequency deviation) or the "PM" (6dB/octave emphasis) modulations can be chosen and the cut-off frequency of the modulation circuit can be changed. Separate, specific inputs are foreseen for the audio signal, the digital data, the subaudio or superaudio tones as well as the DTMF or selective calling tones. Different supplies can be selected for the various circuits in order to guarantee a low consumption (in STAND BY position) or the transmitting-receiving switching speed in case of alarm or digital data transmission.

-X1 CHANNEL CRYSTAL-		
The transmission frequency is determined by the X1 crystal frequency multiplied by 12 in VHF AT52 transmitters and multiplied by 24 in UHF AT57 transmitters.		
X1 Crystals specifications		
Holder	HC49T	(note 1)
Resonance	parallel	
Load capacitance	20 pF	
Calibration tolerance	± 10 ppm	
Temp. stability	± 10 ppm (VHF)	
	± 5 ppm (UHF)	(note 2)
Frequency:		
a) AT52	FX1 = F _T / 12 (MHz)	
b) AT57	FX1 = F _T / 24 (MHz)	
Note 1	HC49T holder is 11 mm high. It is also possible to use HC49U or HC18U holders (13 mm high).	
Note 2	Approximate value; stability specifications depend on operating temperature range.	



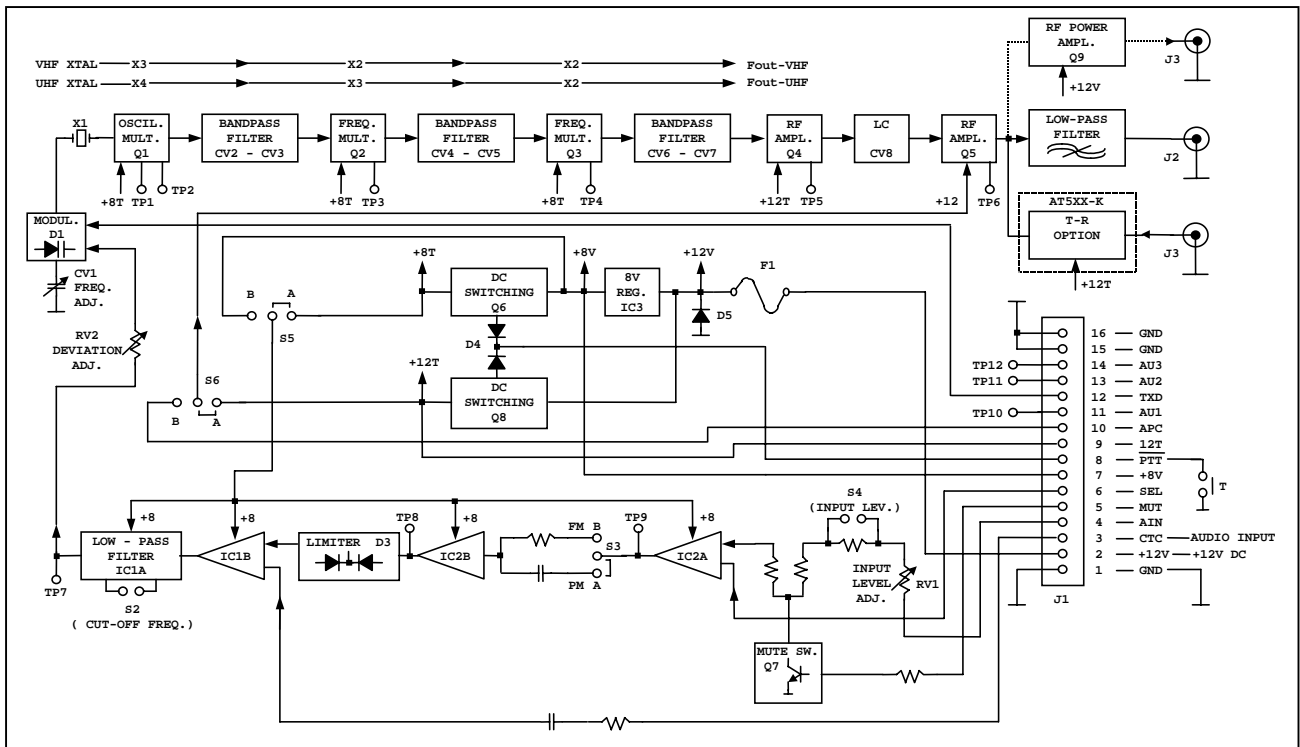
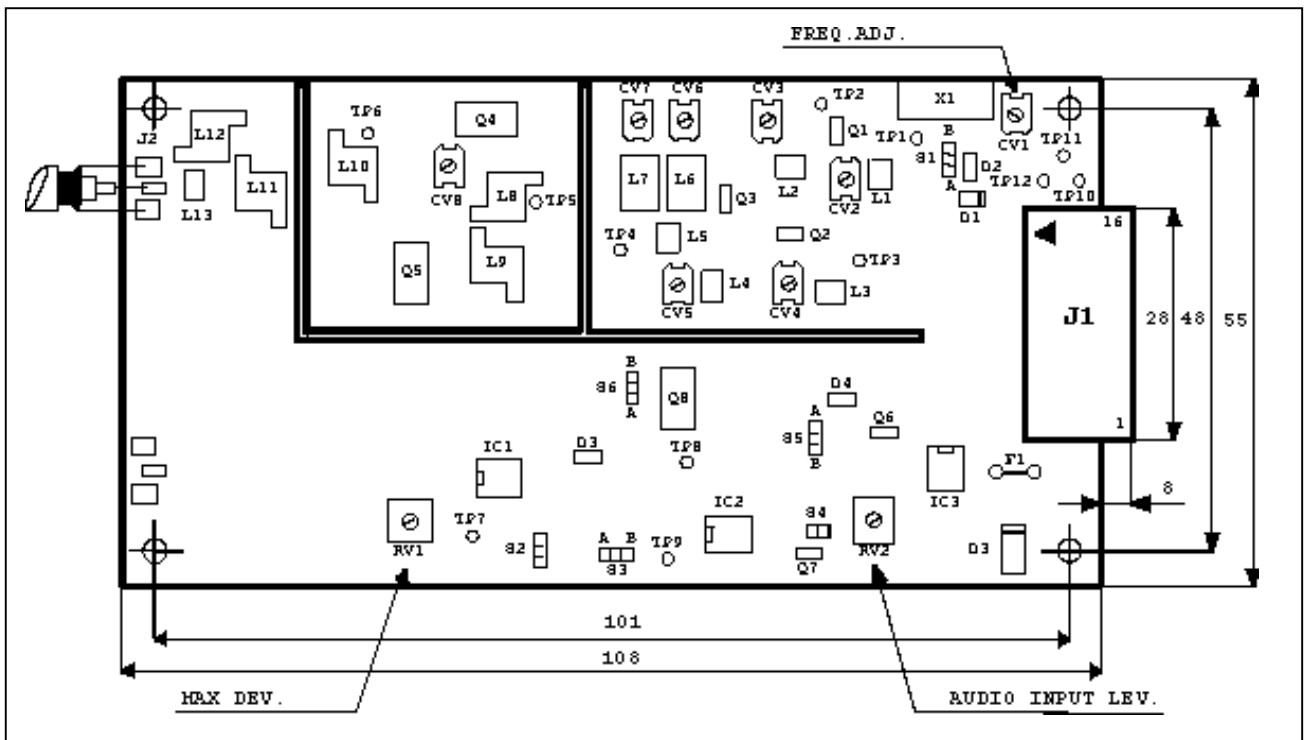


Fig. 1: Block diagram

Fig. 2 : size and components' dislocation.



DESCRIPTION OF "S" SELECTORS

Note 1 - "S" selectors are made of solder jumpers on the printed circuit. It is recommended to use a welder with thin 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.

S2 - CUT-OFF FREQUENCY OF THE MODULATOR LOW-PASS FILTER.

The standard cut-off frequency (-3dB) is 3.3 KHz.

A tin spatter in S2 (which short-circuits the three bump contacts) changes the cut-off frequency to about 7 KHz.

S3 - SELECTION OF THE MODULATION (PM or FM).

A) The standard condition is "PM" modulation obtained with a tin spatter located in "A" position of S3. In "PM" modulation the deviation/modulation frequency curve is characterized by a 6dB/octave emphasis. This means that by keeping the modulation voltage amplitude (supplied to "AIN") constant and by varying its frequency (from 300 to 3000 Hz) the resulting frequency deviation is proportional to the modulation frequency.

N.B. : The amplitude of the modulation frequency must be such that the amplitude limiter does not switch also for higher frequencies.

B) By short-circuiting "B" of S3 an "FM" modulation is obtained, in which deviation remains constant when the modulation frequency changes (between 300 and 3000 Hz or between 300 and 7000 Hz according to S2 position).

S4 - AUDIO SIGNAL LEVEL.

S4 is generally short-circuited ; in such a case, the standard level of the modulation signal input at J1 "AIN" terminal no. 4 is 3 mV_{RMS} (10 mVpp) and can be adjusted by RV2 between 2 mV and 100 mV_{RMS}. If the tin spatter is removed from S4, the level changes to 245 mV_{RMS}. (700 mVpp, i.e. -10 dBm) and can be adjusted between 50 mV and 2.5 V_{RMS}.

The input impedance at "AIN" terminal is always 600 Ohm.

N.B.: By standard level we mean the audio signal level (with 1 KHz frequency) which causes the standard deviation, that is a 3 KHz deviation for 25 KHz channel spacing or a 1.5 KHz deviation for 12.5 KHz channel spacing.

S5 - MODULATOR SUPPLY.

In standard position with a jumper in "A" the modulator supply is removed under stand-by condition.

In such a condition, consumption is as low as possible (8 mA). Switching from stand-by position to transmission, it is necessary to wait approximately 100 ms before the operating point of the various modulator stages is stabilized.

If it is necessary to increase the speed of the transmission switching (for example in case of digital data transmission) it is suggested to move the jumper to "B". In such a case, supply to the modulator is constant and the setting time to switch to transmission decreases to 5 ms. The stand-by consumption becomes 15 mA.

S6 - SUPPLY OF THE RF POWER STAGE.

In standard position with jumper in "A". the RF output stage (Q5 transistor) is fed by the Q8 Transistor with transmission/stand-by switching. By moving the jumper to "B", Q5 supply is available at J1 terminal no. 10. Therefore, it is possible to change voltage at the RF output stage to change the output power level either by external resistances or automatically ("APC" circuit - Automatic Power Control Circuit).

S1 - X1 CRYSTAL TEMPERATURE DRIFT COMPENSATION.

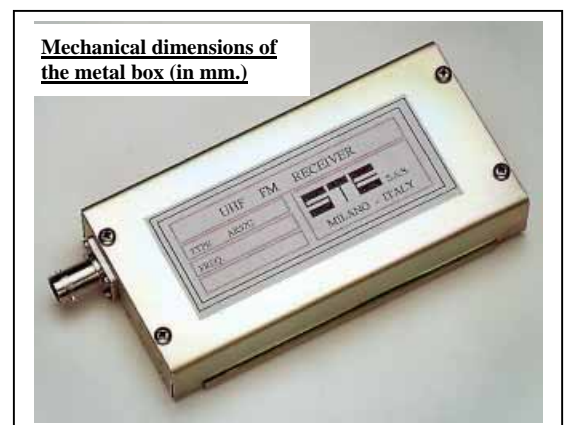
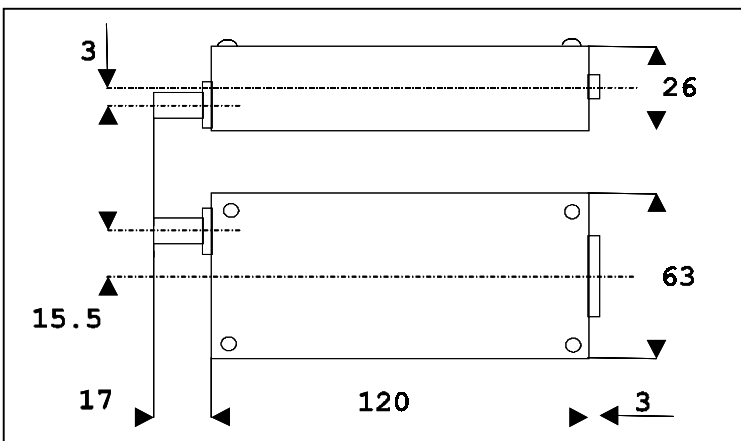
A) The double D2 diode (see figure 3) is used for the compensation of X1 crystal frequency temperature drift.

In case of approximately 4° angle "AT" cut crystal the frequency - operating temperature curve is as shown in the [graph](#) (X curve). By short-circuiting with a jumper one of the two diodes a variation of the bias voltage of D1 varicap diode is obtained according to the temperature as shown by curve "A". with a whole transmission frequency drift as shown by the "R" hatched curve.

B) If temperature compensation is not required, it is necessary to short-circuit both S1 bump contacts.

C) A temperature compensation according to "B" curve can be obtained without short-circuiting any bump contacts.

See also [Sizes, component positions, "S" selectors and test points](#) and [Block Diagram](#).



AT52x Features

Single Channel Receivers	VHF	VHF
TRANSMITTER TYPE	AT52N	AT52C
Frequency range	136 -175 MHz	136 -175 MHz
RF Output power	0.8 W	0.8 W
RF Output power (-B models)	4 W	4 W
Channel Spacing	12.5 KHz	25 KHz
Frequency Stability (1)	± 5 ppm	± 7 ppm
Adjacent Channel Power	- 60 dBc	- 70 dBc
Spurious Emissions (Cond.-rad.)(2)	< - 36 dBm	< - 36 dBm
Modulation Type	FM - PM	FM - PM
Max. Deviation	± 2.5 KHz	± 5 KHz
Audio Frq. Response ("AIN" term.)	300 - 3000 Hz (- 3 dB)	300 - 3300 Hz (- 3 dB)
Frequency Response("TXD" term.)	DC - 3500 Hz	DC - 7000 Hz
Audio Input Level("AIN" term.)	3 mV - 245 mV nom.	3 mV - 245 mV nom.
Audio Input Imped. ("AIN" term.)	600 Ohm	600 Ohm
Modulation distorsion (3)	< 2%	< 5%

AT57x Features

Single Channel Receivers	UHF	UHF
TRANSMITTER TYPE	AT57N	AT57C
Frequency range	400 - 470 MHz	400 - 470 MHz
RF Output power	0.75 W	0.75 W
RF Output power (-B models)	3 W	3 W
Channel Spacing	12.5 KHz	25 KHz
Frequency Stability (1)	± 4 ppm	± 5 ppm
Adjacent Channel Power	- 60 dBc	- 70 dBc
Spurious Emissions (Cond.-rad.)(2)	< - 36 dBm	< - 36 dBm
Modulation Type	FM - PM	FM - PM
Max. Deviation	± 2.5 KHz	± 5 KHz
Audio Frq. Response ("AIN" term.)	300 - 3000 Hz (- 3 dB)	300 - 3300 Hz (- 3 dB)
Frequency Response ("TXD" term.)	DC - 3500 Hz	DC - 7000 Hz
Audio Input Level ("AIN" term.)	3 mV - 245 mV nom.	3 mV - 245 mV nom.
Audio Input Imped. ("AIN" term.)	600 Ohm	600 Ohm
Modulation Distorsion (3)	< 2%	< 3%
Note 1	Over operating temperature - dependent on crystal char..	
Note 2	Radiated emission limit valid only for enclosed modules.	
Note 3	1 KHz PM standard modulation	

