

THE PHANTOM 23C

SYNTHESIZER
5 WATT 23 CHANNEL
FULL TRANSISTORIZED
TRANSCEIVER



Specifications

General

- Dimensions ; 185W × 70H × 195D (mm)
- Weight ; approx. 2Kgr.
- DC Power consumption ;
 - a) Receive (stand by) 150mA
 - b) Transmit (100% Mod.) 1.1A
- Channels ; 23
- Semi-conductors; 19 transistors and 11 diodes
- Operating condition ;
 - a) Ambient temperature $-10^{\circ}\text{C} \sim 50^{\circ}\text{C}$
 - b) Relative humidity $+35^{\circ}\text{C}$ 95% or less

Receiver

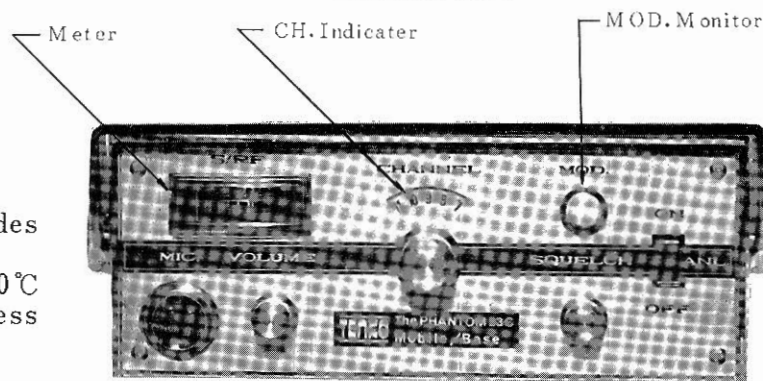
- Receiving system ; Double superheterodyne
- Intermediate freq ; 1st 10.140MHz ~ 10.635MHz, 2nd ... 455KHz
- Sensitivity ; s/n 10db or more at $1\mu\text{V}$ input
- Adjacent channel rejection ; 35db or more
- Image rejection ; 40db or more
- AF output ; 2.5Watt or more (distortion factor 10%)

Transmitter

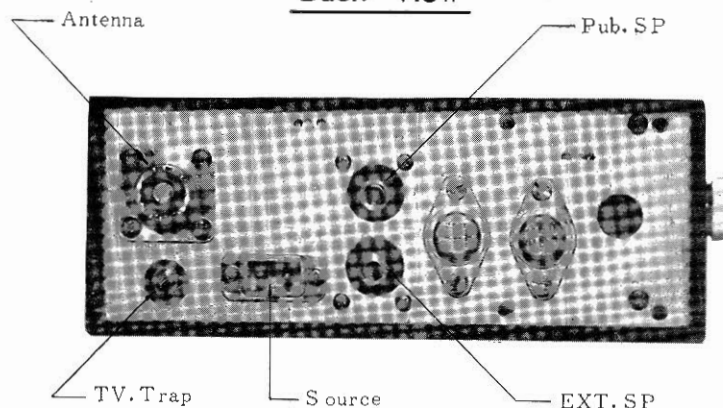
- Final stage input ; 5 watt
- Final efficiency ; 50% or more
- Modulation ; 100%
- Spurious and harmonics ; $30\mu\text{W}$ or less
- Frequency tolerance ; $\pm 0.005\%$ or less
- Antenna coupling ; 50 ohm

Transmit humidity

Front view



Back view



Introduction :

- a) You are now one of the proud owners of our all transistorized 27 Mhz, 23 Channels 5 Watt Transceiver, which is intended for use in your car as well as in the base station.
- b) Built-in Public Address Amplifier enables this transceiver to work as a Loud-Speaker equivalent to that of 3 watts or of higher wattage with available speakers.
- c) The adoption of the synthesizer system has made this transceiver compact, light weight, durable and low cost for the outfit mounted with 23 channels.
- d) Each channel can be consecutively shifted by the channel selector switch from 1 through 23.
- e) The indication of each channel is clearly visible by the virtue of a magnifying lens as well as an inner lamp.
- f) The meter serves as an output gauge in course of transmitting and, as S meter in course of receiving by a automatic semi-permanent electronic mechanism.
- g) As an excellent quality noise-limiter (A.N.L.) being used, high receiving capacity is guaranteed even in the area of weak wave.
- h) Since a highly efficient mechanical filter is being put to use, disturbance caused by other channels can be shut out.
- i) The outfit is so designed as to withstand the circumferential shift of temperature and work with stability.
- j) The outfit is so designed as to fit both + earth and - earth of the car.
- k) The high efficient mechanical filter shut out all neighboring channel interference completely.
- l) A well designed A.C. power adapter of optional attachment is available for using the unit as a base station.

Operation :

- a) Connect D.C. cord to the connector on the back side, and join the red cord with the plus sign of the source of electric power and the black cord with minus
- b) Connect the antenna cable with the antenna receptacle located on the back side.
- c) Bring the microphone to be connected with the mic. receptacle located on the front.
- d) Adjust the channel Knob to the desired channel.
- e) By turning the left-side volume knob clockwise from the "OFF" position, the power will be switched on; and both the channel indicator window and the meter will be lit. As the knob turned further clockwise, the volume will gather.
- f) When using squelch at the right side of front panel, the squelch will not work if the knob were turned anti-clockwise all the way; and a noise will be emitted from speaker when there is no input signal received. By gradually turning the knob clockwise, noise will disappear and the squelch will start to work. Kept at this stage, the squelch will automatically be disengaged as signal comes in, and the receiver will restore its regular receiving condition catching the signal. When signal ceased, the outfit will be driven into the state of catching the squelch to work and noise will disappear. Do not turn the knob too much towards clockwise as weak receiving signal could not be received by over engagement, and therefore you have to adjust it to fit the strength and weakness of the squelch in the area where only a weak input signal is received.
- g) In course of receiving, the guide-needle of the meter will move according to the strength of incoming signal.

h). At the time of transmitting, push the button on the side of the microphone and receiving will be replaced by transmitting. Please use the microphone at a distance of 4 to 8 inches from mouth. Too loud voice will cause obscurity of speech. For your information, both Volume and Squelch Knobs have nothing to do with transmitting.

i) A special caution should be paid to the fact that you may damage transistors if transmitting is continued while the antenna is disconnected with the antenna terminal on the back side

j) In case you would like to use an external speaker, you are advised to connect the external speaker to Jack marked "Ext. Sp." on the back side. The built-in speaker will automatically be disengaged. The use of 8 ohm external speaker is recommendable.

k) In case you would like to use the outfit as the loudspeaker through the medium of the public addresser, you may connect 8 ohm speaker to the Jack of P.A. on the back side and speak while pushing the button located on the side of the microphone adjusting the channel knob to the P.A. (The same procedure is followed as at the time of transmitting.) In this case, the transmitter won't work. The output will be either 3 W with no distortion or 5 W max.

l) The ANL ON-OFF Switch on the right side is for the automatic Noise Limiter. Normal handling will be carried out with Switch at the "ON" position. To be used at the area of comparatively strong wave exists causing noise. While, the sensitivity is increased with the switch at the "OFF" position, and the outfit can be operated even in the area of weak wave with less noise.

m) The Mod. Lamp is set so that you can observe the strength and weakness of the voice when transmitting is going on. The lamp will be brighten when the voice gets louder.

FCC License.

It is prohibited to transmit at all times unless a FCC class D citizens radio service license has been obtained from the F.C.C.

Power supply

This is designed for 12V DC operation. It also can be operated by 117V AC when used as a base station by applying a AC power adapter, which is an optional attachment.

Aerial

Although the antenna terminal of this is adjusted for 50 ohm transmitting output, it is not necessary for adjustment when used for 30-75 ohm antenna unit. When a special antenna unit is being used, be sure to consult your nearest agent of us for readjustment.

Miscellaneous Instructions

This model has been produced under a strict supervision with selected parts which should give no trouble, but, in case of any trouble, call our nearest agent for readjustment and leave it up to an expert on this unit and at all times do not try to handle the internal parts by yourself without complete technical knowledges on this unit.

FREQUENCY SYNTHESIZING SYSTEM

This transceiver employs a method whereby 14 crystals oscillator

FREQUENCY SYNTHESIZING SYSTEM

This transceiver employs a method whereby 14 crystals are used in various arrangements to produce 23 fundamental oscillator frequencies (see Table A) This arrangement, known as frequency synthesis, permits full 23 channel crystal-controlled operation on both transmit and receive using relatively few crystals.

The tables which follow show the particular crystals used for each channel. It should be noted that failure of one crystal will lead to malfunction on a number of channels — not just one. If malfunction on a number of channels is experienced therefore, refer to Table A, B, C, which will offer a quick means of determining which crystal may have failed.

For example;

If you would not be able to operate this frequency synthesis transceiver on channel 1 position only, you might see the Table A CH - No. - 1 which shows CH-1 (26.965MHz) frequency being mixed Q-1 (37.600 MHz) with Q-7 (10.653 MHz) in case of transmitting, and the Table B CH-No-1 show CH-1 frequency being mixed Q-1 with Q-11 in case of receiving. In conclusion, you will find out that one or more crystals of Q-1, Q-7, Q-11 will be defective for operation on channel 1.

TRANSMITTER CHANNEL NO.	TABLE A CHANNEL FREQUENCY	CRYSTAL CONBINATION	SYNTHESIZED FREQUENCY
1.	26.965	$Q_1 - Q_7$	26.965 MHz
2.	26.975	$Q_1 - Q_8$	26.975
3.	26.985	$Q_1 - Q_9$	26.985
4.	27.005	$Q_1 - Q_{10}$	27.005
5.	27.015	$Q_2 - Q_7$	27.015
6.	27.025	$Q_2 - Q_8$	27.025
7.	27.035	$Q_2 - Q_9$	27.035
8.	27.055	$Q_2 - Q_{10}$	27.055
9.	27.065	$Q_3 - Q_7$	27.065
10.	27.075	$Q_3 - Q_8$	27.075
11.	27.085	$Q_3 - Q_9$	27.085
12.	27.105	$Q_3 - Q_{10}$	27.105
13.	27.115	$Q_4 - Q_7$	27.115
14.	27.125	$Q_4 - Q_8$	27.125
15.	27.135	$Q_4 - Q_9$	27.135
16.	27.155	$Q_4 - Q_{10}$	27.155
17.	27.165	$Q_5 - Q_7$	27.165
18.	27.175	$Q_5 - Q_8$	27.175
19.	27.185	$Q_5 - Q_9$	27.185
20.	27.205	$Q_5 - Q_{10}$	27.205
21.	27.215	$Q_6 - Q_7$	27.215
22.	27.225	$Q_6 - Q_8$	27.225
23.	27.255	$Q_7 - Q_{10}$	27.255

RECEIVER TABLE B

CHANNEL NO.	CHANNEL FREQUENCY	1st LOCAL Osc XTAL	2nd LOCAL Osc XTAL	2nd LOCAL Osc XTAL FREQ.	IF-2 FREQ.
1.	26.965 MHz	Q ₁	Q ₁₁	10.180 MHz	455 KHz
2.	26.975	Q ₁	Q ₁₂	10.170	455
3.	26.985	Q ₁	Q ₁₃	10.160	455
4.	27.005	Q ₁	Q ₁₄	10.140	455
5.	27.015	Q ₂	Q ₁₁	10.180	455
6.	27.025	Q ₂	Q ₁₂	10.170	455
7.	27.035	Q ₂	Q ₁₃	10.160	455
8.	27.055	Q ₂	Q ₁₄	10.140	455
9.	27.065	Q ₃	Q ₁₁	10.180	455
10.	27.075	Q ₃	Q ₁₂	10.170	455
11.	27.085	Q ₃	Q ₁₃	10.160	455
12.	27.105	Q ₃	Q ₁₄	10.140	455
13.	27.115	Q ₄	Q ₁₁	10.180	455
14.	27.125	Q ₄	Q ₁₂	10.170	455
15.	27.135	Q ₄	Q ₁₃	10.160	455
16.	27.155	Q ₄	Q ₁₄	10.140	455
17.	27.165	Q ₅	Q ₁₁	10.180	455
18.	27.175	Q ₅	Q ₁₂	10.170	455
19.	27.185	Q ₅	Q ₁₃	10.160	455
20.	27.205	Q ₅	Q ₁₄	10.140	455
21.	27.215	Q ₆	Q ₁₁	10.180	455
22.	27.225	Q ₆	Q ₁₂	10.170	455
23.	27.555	Q ₆	Q ₁₃	10.140	455

TABLE C

CRYSTAL NO.	Osc. FREQUENCY	CHANNELS IN WHICH USED					
Q-1	37.600 MHz	1CH	2	3	4		
Q-2	37.650	5	6	7	8		
Q-3	37.700	9	10	11	12		
Q-4	37.750	13	14	15	16		
Q-5	37.800	17	18	19	20		
Q-6	37.850	21	22	23			
Q-7	10.635	1	5	9	13	17	21
Q-8	10.625	2	6	10	14	18	22
Q-9	10.615	3	7	11	15	19	
Q-10	10.595	4	8	12	16	20	23
Q-11	10.180	1	5	9	13	17	21
Q-12	10.170	2	6	10	14	18	22
Q-13	10.160	3	7	11	15	19	
Q-14	10.140	4	8	12	16	20	23

SCHEMATIC DIAGRAM

