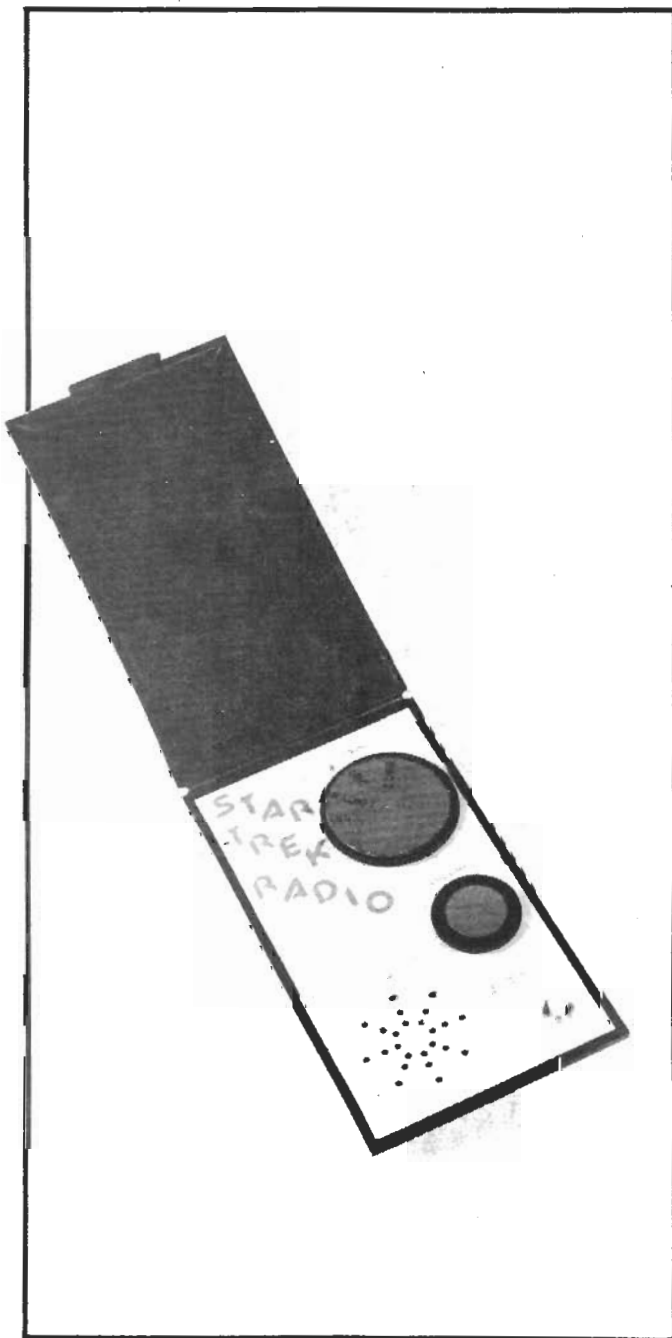


STAR TREK RADIO



MEMO

To: All Starfleet personnel
From: Star Fleet Command
Re: Field Equipment item — Radio

The importance of maintaining the integrity of the star fleet command communications network must once again be stressed. Pursuant to this matter details of an approved personal communications system are appended.

This device, capable of being tuned over the section of the electromagnetic spectrum termed medium wave and possessing an audio output that is adjustable to suit local field conditions, will enable approved star fleet data transmissions to be recieved.

Personnel should note that as an aid to security certain wavelengths will carry data in a code that, to the untrained ear, will sound like a series of loud repetitive off key musical notes not unlike 20th century pop music.

The need to keep in contact with your local command station is important at present with the Intergalactic Pirates Corps (IPC) on the increase. Remember, trek boldly with your Star Trek Radio.

Star Fleet engineers have designed the communications receiver in such a way that the item of equipment can be built with the parts available in most parts of the galaxy.

After securing all the necessary components assemble same according to the PCB overlay appended. Take care that all polarity sensitive devices are installed correctly.

A small size energy rod (that's soldering iron) with a small bit is essential when constructing the radio in view of the small size of the finished unit.

When the receiver is complete, apply power and tune to the command channel you have been assigned.

BUYLINES

See ETI Market Place on page fifty-five for a good deal on the ZN414. The box that "makes" the project is one of a new range from Vero.

The normally closed switch we used was very expensive but there is no reason why a cheaper slide switch cannot be used. But of course, in this case, the radio would not "bleep" automatically as the lid is opened.

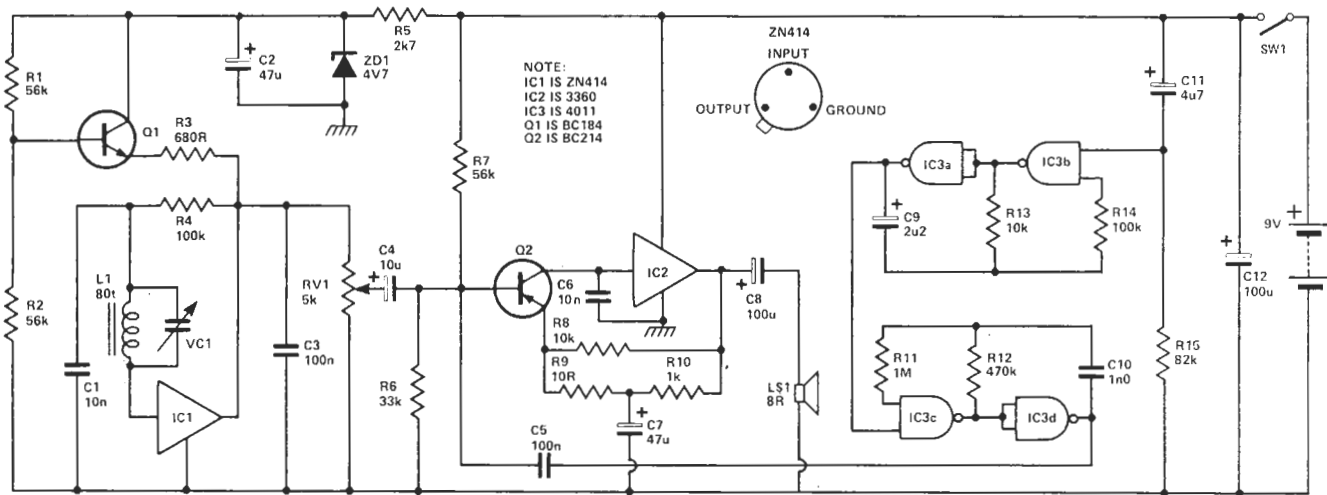


Fig. 1. Circuit diagram of the Star Trek radio.

PARTS LIST

RESISTORS

R1, 2, 7	56k
R3	680R
R4, 14	100k
R5	2k7
R6	33k
R8, 13	10k
R9	10R
R10	1k
R11	1M
R12	470k
R15	82k

POTENTIOMETERS

RV1	5k
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CAPACITORS

C1, 6	10n Polystyrene
C2, 7	47u 10V Tantalum
C3, 5	100n Polyester
C4	10u 10V Tantalum
C8	100u 10V Electrolytic
C9	2u2 10V Tantalum
C10	1n0 Polystyrene
C11	4u7 10V Tantalum

VARIABLE CAPACITOR

VC1	150p
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SEMICONDUCTORS

IC1	ZN414
IC2	3360
IC3	4011
Q1	BC184
Q2	BC214
ZD1	4V7 400mW

MISCELLANEOUS

PCB as pattern, 8R loudspeaker, Vero flip top box, push to break switch, ferrite rod, 32 SWG wire.

HOW IT WORKS

The radio's "front end" is based on Ferranti's ZN414. This is a ten transistor Tuned Radio Frequency (TRF) circuit that contains a complete RF amplifier, detector and AGC circuit.

The ZN414 operates with a supply of between 1.2 and 1.6 volts. This is provided by Q1.

R3 sets the AGC characteristics of the receiver.

To obtain good selectivity it is essential that the input to the ZN414 is fed from a high Q coil and capacitor combination. This requirement is met by the network formed by L1 and CV1 (tuning control)

C3 decouples the audio output at RF frequencies leaving us with an audio signal that is fed, via volume control RV1, the audio amplifier stage.

The audio amplifier consists of IC2, Q2 and related components. Q2 provides gain with a response that is shaped by the feedback loop formed by R8, R9, R10 and C7. The output of the amplifier is fed via DC isolating capacitor C8 to the loudspeaker.

The "bleep" effect produced at switch on is generated by IC3. The gates of this package are configured as two oscillators, one running at a high frequency (IC1c and IC1d), the other at a low frequency (IC1a and IC1b).

The latter is gated on when the junction of C11 and R15 is high. This is the case at the instant of switch on, however, C11 soon "charges down" inhibiting operation.

The slow running oscillator gates the bleep produced by the IC3c and IC3d oscillator. The bleep is fed to the audio output stage via C5.



PROJECT: Star Trek Radio

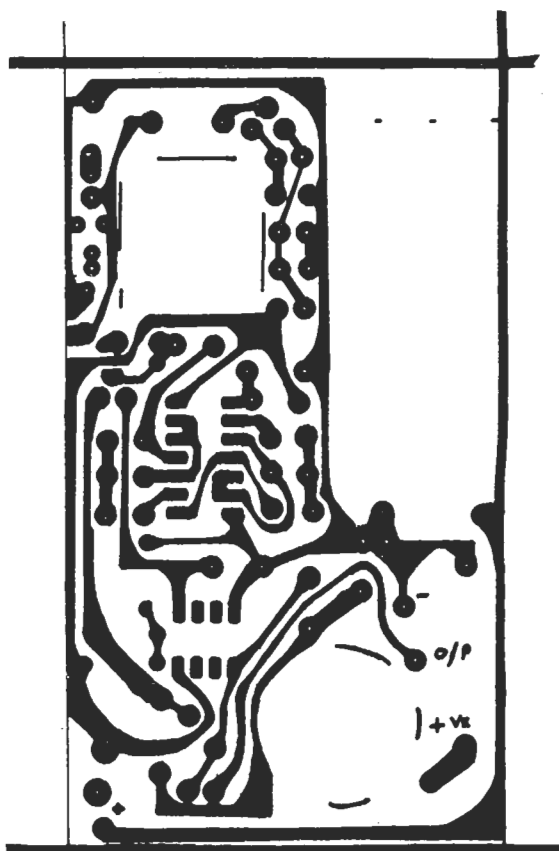


Fig. 2. Foil pattern of radio PCB.

Fig. 3. Component overlay of Star Trek radio.

