

A Study on a Radio System for Lifesaving in Case of a Falling Accident of the Sea.

*, *
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가 가 가
447 MHz
500 Hz
1.5 km
2,400 bps 가

Absract

Mother ship must be able to know accident occurrence information rapidly to rescue crew who fall in sea.

In this paper, designed and manufactured transceiver of prescribed 447 MHz is operating as low power radio station specified in Radio Regulation. So, it is available without special permission proceedings getting form probation so that the use of this system may be easy. the system has been started for operation when the sensor get in touch with water. The system transmits with modulation by 500Hz square wave, and the receiver alarms when the transmitted signal is received. Therefore, the system can be used for not only saving a life, but also for low speed of data transmission below 2,400 bps, and other purposes.

I. 가 GMDSS
EPIRB
가 가

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: 2002-6-8
: 2002 5 2

가 447 MHz 가 [1], 1997-53

가

2
가

, 500 Hz
(FSK)

DC-DC

가

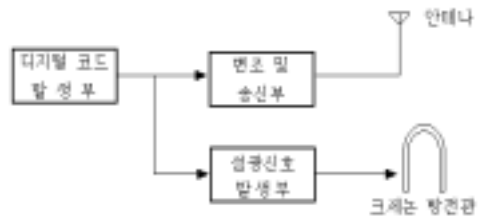
2

가

가

가

GPS



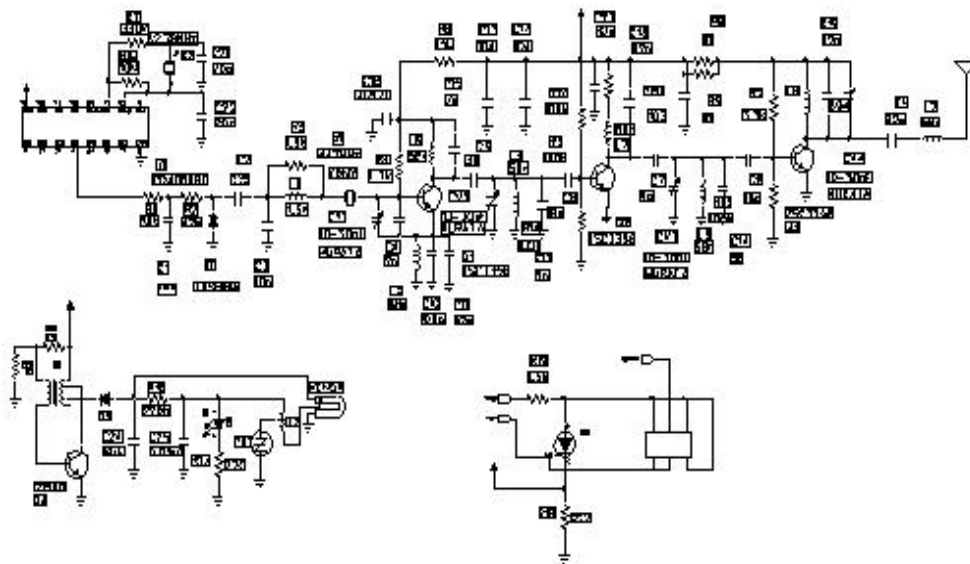
1.

Fig. 1. Block diagram of TX



2.

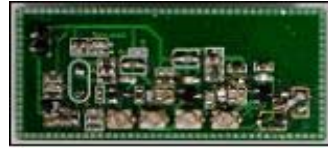
Fig. 2. Block diagram of RX



3.

Fig. 3. Schematic of TX

가
 447.56 MHz , FSK,
 10 mW , 8.5 kHz ,
 7×10^{-6} 가 [2].



() (front)

447.56 MHz
 , $3 \times 3 = 9$
 가
 FSK가
 10 mW가



() (rear)

4.. () ()
 Fig. 4.. TX module(front) (rear)

Ansoft SERENADE

12 dBm
 10 dBm

가 49.72888 MHz

CV1

가 가 가

[3].

Q1

가

3 149.18664 MHz

3 가

. C5 DC

L6 C15

L4 C12 3

[4].

Q2

3 9 447.56

MHz

Q3

10 mW

C

C9 L2

layout

PADS

artwork , 가

1

2

HP



5..

Fig. 5.. Flashing module

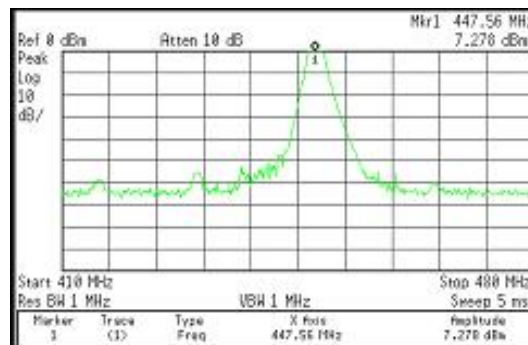
E44007B

4

7.28 dBm

3 dB

10 dBm(10 mW)



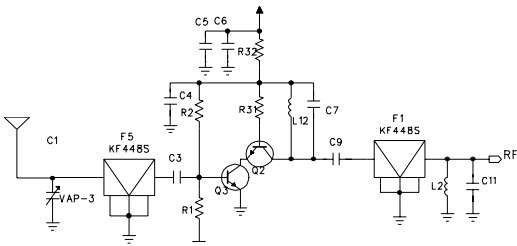
4.

Fig. 4. Characteristic of power amplifier



7.

Fig. 7. Block diagram of RX



8. LNA

Fig. 8. Schematic of LNA

5 double super-heterodyne

6

/4 mono-pole

collinear

SAW filter [5]. SAW filter

KF448AV, 50 ±2.5 MHz, 가, -1.5 dB, LNA

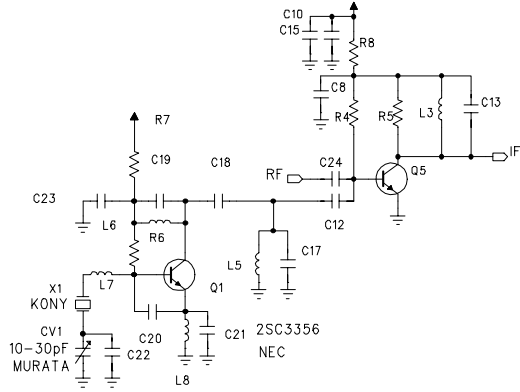
2 filter

LNA Q1 Q2

LNA 10 dB, L12 C7 LNA SAW filter, L2 C11 SAW filter

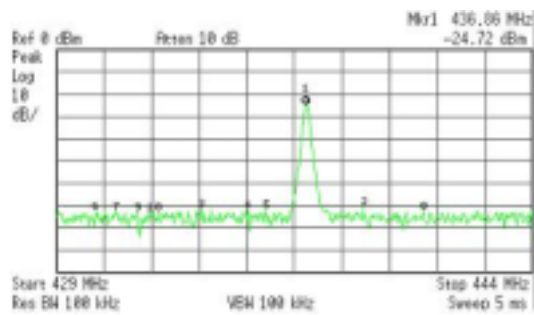
1

9



9.1 LO mixer

Fig. 9. Schematic of 1st LO & mixer

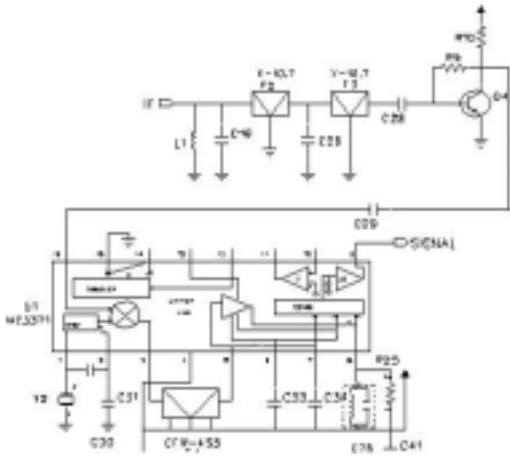


10.

Fig. 10. Characteristic of LO

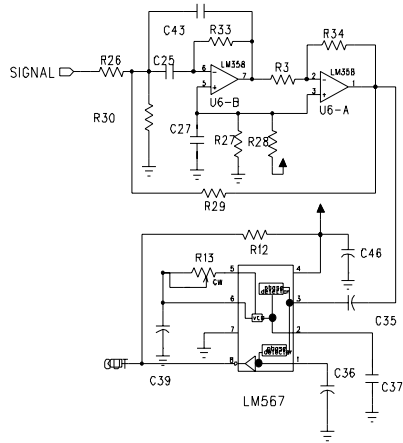
[6].

1	447.56 MHz
10.7 MHz	436.86 MHz
가	X-tal 48.54 MHz
Q3	9 436.86 MHz
	L5 C17 436.86 MHz
	, Q5 mixer, L3
C13	10.7 MHz 1
	10
	9
	, 1 BPF X-tal
	10.7 MHz
	. L1 C16
1	X-tal
2	Motorola



11. BPF

Fig. 11. Schematic of BPF & detector

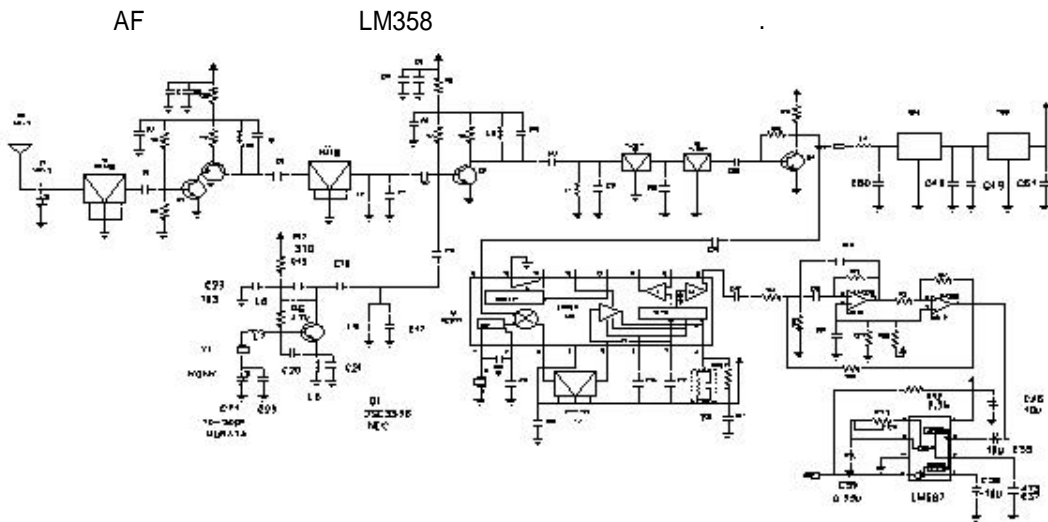


12. tone decoder

Fig. 12. Schematic of active filter & tone decoder

MC3371 MC3371 2 mixer,
 , Quadrature , 2
 . 1
 가 2 10.245 MHz 455
 kHz 2 455 kHz
 Quadrature 가
 . Quadrature
 FM IF /2

(+)
 R30, R25 가 C43 R33,
 LM567
 R13 C39
 0

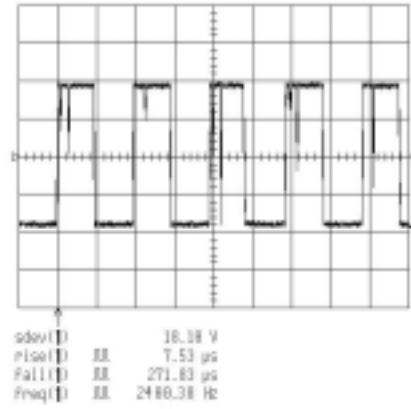


13.

Fig. 13. Schematic of RX



14.
Fig. 14.. RX module



16.
Fig. 16. Demodulation pulse

가 가

- 93 dBm 13

artwork

- 93 dBm

14

, 2,400 bps

가

, 2

가

1.5 km

가

10 mW

가

4

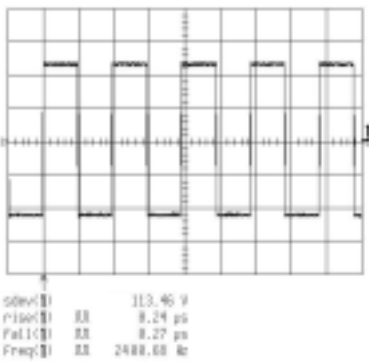
2 m

1

2

가

2,400 Hz



447 MHz

가

가

500 Hz

FSK

15.

Fig. 15. Modulation pulse

500 Hz

GPS

가

1.5 km
 2,400 bps
 ID
 가

[1] , “ 1998-90 ”.
 [2] , “ ”, pp. 323-348, . 1997.11.
 [3] Joseph J. Carr, *RF Circuit Design*, pp.309-310, McGraw-Hill, 2001.
 [4] Mihai Albulet, *RF Power Amplifiers*, pp.111-113, Noble, 2001.
 [5] Richard C. Drof, *The RF and Microwave Handbook*, pp.6-7 ~ 6-82, CRC Press,2001.
 [6] Reinhold Ludwig, Pavel Bretchko, *RF Circuit Design*, pp.550-552, Prentice-Hall, 2000.

(崔炳夏)



1945 6 10
 1969 2 :
 ()
 1983 8 :
 ()
 1987 12 :
 1992 2 :
 ()

1969 4 ~ 1972 7 :
 1972 9 ~ :
 :

(金奎喆)



1975 2 28
 2000 2 :
 ()
 2000 3 ~ :
 2001 2 ~ :

: