**Aviation band receiver Suite manual V3.1**

# A simple introduction

This suite is dedicated to receive calls between aircraft and tower, cooperate with the good performance of the antenna (VHF yagi antenna), open within about 190 km in the biggest can receive calls between various types of aircraft with the control tower.



# Main indicators

Power supply: 12 v

Antenna: 50 ohms, is not balanced Typical receiving current: 30 ma

Receive frequency: 118 MHZ to 136 MHZ Working pattern: AM

# Circuit principle

Antenna to receive signals first enter a band-pass filter, the band-pass filter function is to ensure that the 118 MHZ to 136 MHZ signal can be put into

2 sc3355 high, other signal is maximum attenuation. After filtering, the signal amplified by the 25th sc3355 (2), and then enter the NE602 mixing, at the same time NE602 inside a voltage-controlled oscillator, the frequency changes because of the D1 junction capacitance, design covers about 120 MHZ to 150 MHZ.

Native intermediate frequency is 10.7 MHz, after NE602 mixing signal to 10.7 MHz ceramic filter, its function is to filter out irrelevant signals generated by mixing, and then the signal to do into Q2, finally gave MC1350 further intermediate frequency amplifier. MC1350 amplified signal, in the weeks after the T1 frequency selective, D2 for amplitude modulation signal envelope detection.

Check out the audio signal after U4A and U5B, LM386 amplification for headphone output again.

Among them, the AGC function performed by U4A and U4B, mute function by U5A, U5B to cooperate to complete.

# Component selection

All less than 1000 pf the capacitors for high frequency of ceramics, greater than 1 uf capacitance for aluminum electrolytic capacitors, all resistance is a quarter w 5% fixed resistance.

# Production debugging

Control circuit diagram and the identity of the PCB mounting of all components. General compliance installation sequence of low to high. Checked everything is in order, after turn on the juice and the power of positive and negative polarity must not be wrong. Insert the walkman headphones headphone socket, should be white noise could be heard. Touch one end of the detector diode, audio headphones get bigger noise description function is normal. To the antenna connected to a soft line of 60 cm, will hear a noise significantly larger, mean channel essentially normal.

Because of all the inductance walked straight line on the PCB, and high precision, no need to be adjusted. Such as near no carrier signal, advice from C5 to 60 centimeters or so at the end of the software, then short circuit R21, so the vibration of the coverage has reached around 100-150 MHZ, judge machine can listen to the local FM signal.

Native function knob from left to right are: frequency control, noise threshold adjustment, volume adjustment, clockwise. Headphone socket on the right.

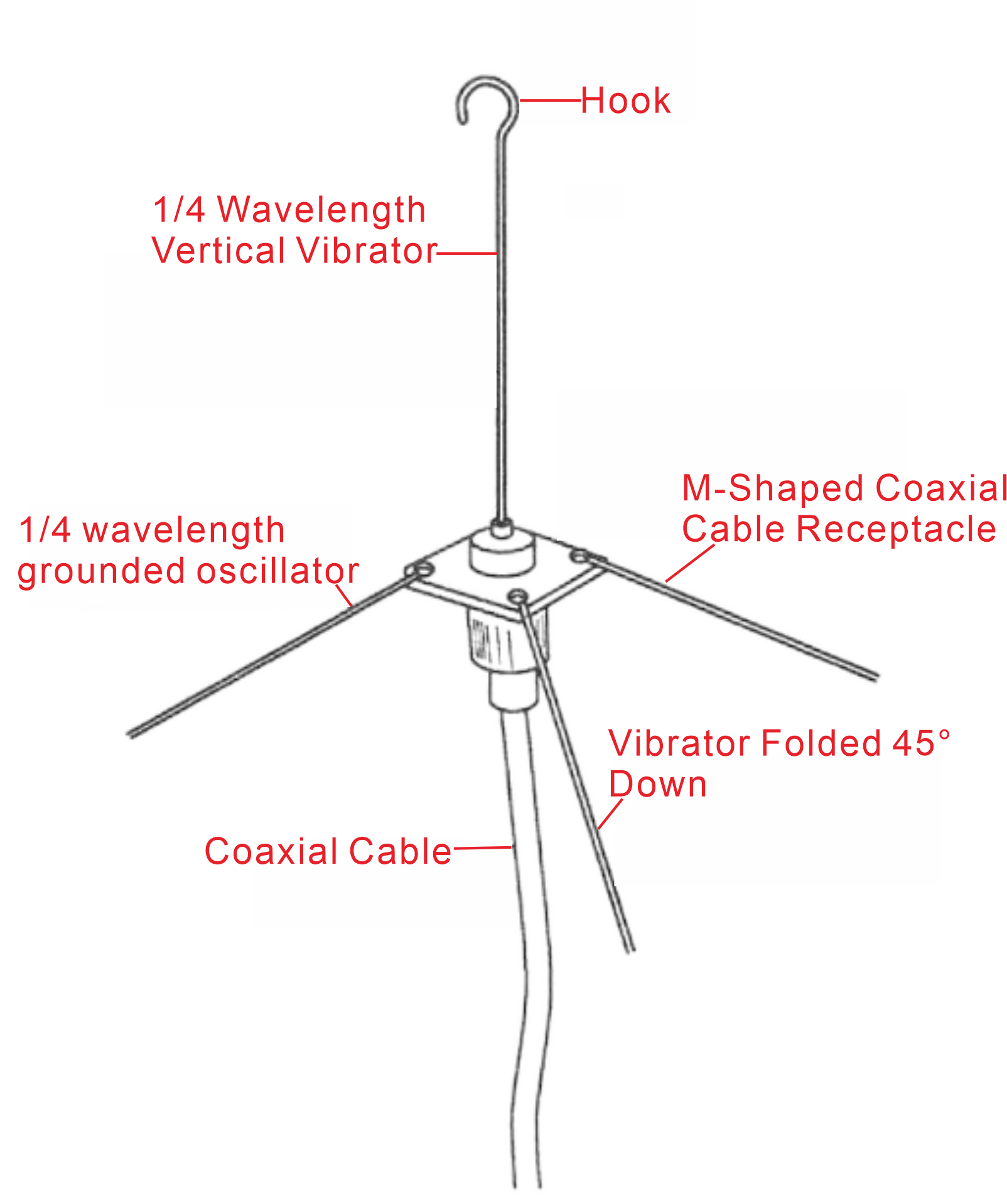


# Method of use

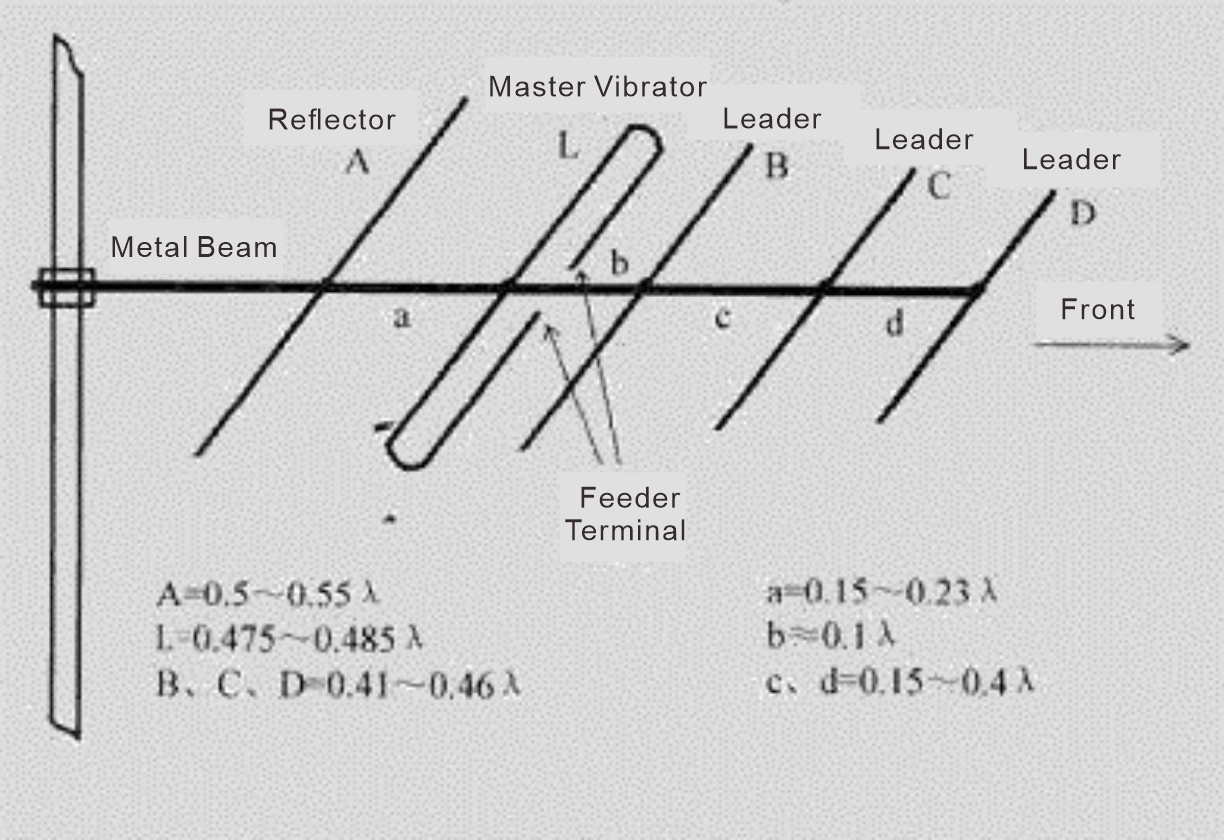
For VHF are close to a straight line transmission, therefore VHF communication cannot be obscured, listening to the tower signal more need to pay attention to it, close to the airport in a plane is apart from the ground height when there are several hundred to several thousand meters high, so the signal can cover a distance. In order to better effect, it is recommended to use external high antenna, such as a quarter wavelength (60 cm) of GP antenna, yagi antenna or using better VHF paragraph. In a word, need according to the practical environment, appropriate cooperates antenna, can obtain good result!

For primary fans, it is recommended to use GP antenna or yagi antenna.

Below is GP antenna, GPS antenna is short for flat ground antenna, the antenna, also known as vertical ground antenna is a kind of common vertical polarization omnidirectional antennas. It consists of a vertical level of radiation oscillator and 3-4 root extension of the oscillator. A few metal rod with a M, made simple.



Below as the yagi antenna, has the very good directivity and high gain.



Also can use insulators metal bar! Diagram for wavelength lambda, director, reflector are calculated respectively and the main oscillator length and a, b, c, d spacing after assembled.

# Chassis to install

This circuit board can be easily in the size of 40 mm \* 97 mm \* 75 mm standard aluminum chassis (this case is not included in this kit, such as the need to please buy).



**Component List**

|  |  |  |
| --- | --- | --- |
| **1/4W Fixed Resistors** | | |
| R1,R6,R11,R16,R29 | 1K |  |
| R2,R7,R9,R14,R17, R20, R24 | 47K |  |
| R3,R27,R28 | 270 |  |
| R4,R8,R10,R15,R22 | 10K |  |
| R5,R18 | 100K |  |
| R12 | 1M |  |
| R13 | 33K |  |
| R19 | 4.7K |  |
| R23,R25,R26,R21 | 10 |  |
|  | | |
| W1,W2,W3 | 10K |  |
| **Beads, Inductors, Transformers** | | |
| T1 | 7X7-10.7MHz |  |
| Z1,Z2 | Inline Magnetic Beads |  |
| **Porcelain Chip Capacitors** | | |
| C1,C16,C21,C22,C23,C24,  C25,C26,C27,C28 | 0.1uF(104) |  |
| C2,C5,C6,C13,C17 | 1000pF(102) |  |
| C3,C4 | 2pF |  |
| C7,C8,C9 | 43p |  |
| C10,C14 | 27pF |  |
| C11 | 10pF |  |
| C12,C15,C18,C19,C20 | 0.01uF(103) |  |
| C29 | 0.47uF(474) |  |
| **Electrolytic Capacitor** | | |
| CP1,CP2,CP5,CP8 | 100uF /25V |  |
| CP3,CP4,CP7,CP9,CP10,CP11 | 10uF /25V |  |



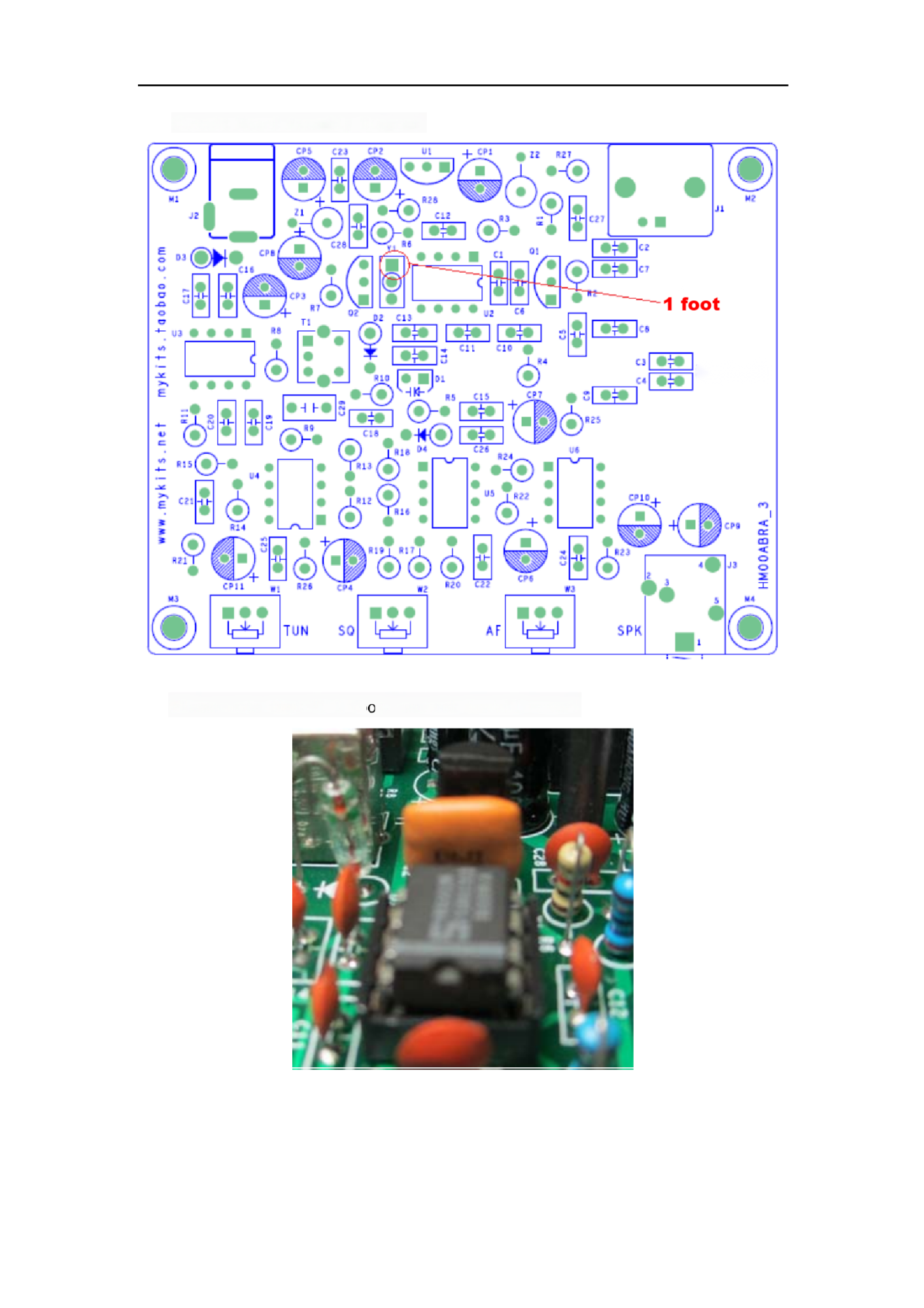
|  |  |  |
| --- | --- | --- |
| CP6 | 10uF |  |
| **Transistors** | | |
| D1 | BB910 | Insert the board in the direction of the silkscreen |
| D2,D4 | AS119 |  |
| D3 | 1N4001 |  |
| Q1,Q2 | 2SC3355 |  |
| **IC** | | |
| U1 | 78L08（TO92） |  |
| U2 | NE602（DIP8） | Mating IC Socket |
| U3 | MC1350（DIP8） | Mating IC Socket |
| U4,U5 | LM358（DIP8） | Mating IC Socket |
| U6 | LM386（DIP8） | Mating IC Socket |
| **Ceramic Filters** | | |
| Y1 | 10.7MHz | Please note the pin orientation: the printed word on the surface of the device faces the reader, and pin 1 is on the right side. |
| **Other components** | | |
| J1 | BNC (Q9) Socket |  |
| J2 | Electric Socket |  |
| J3 | 3.5mm stereo socket | SPK (plug in headset) |
| PCB circuit board × 1 piece | | |
|  | | |

R29 / 1K

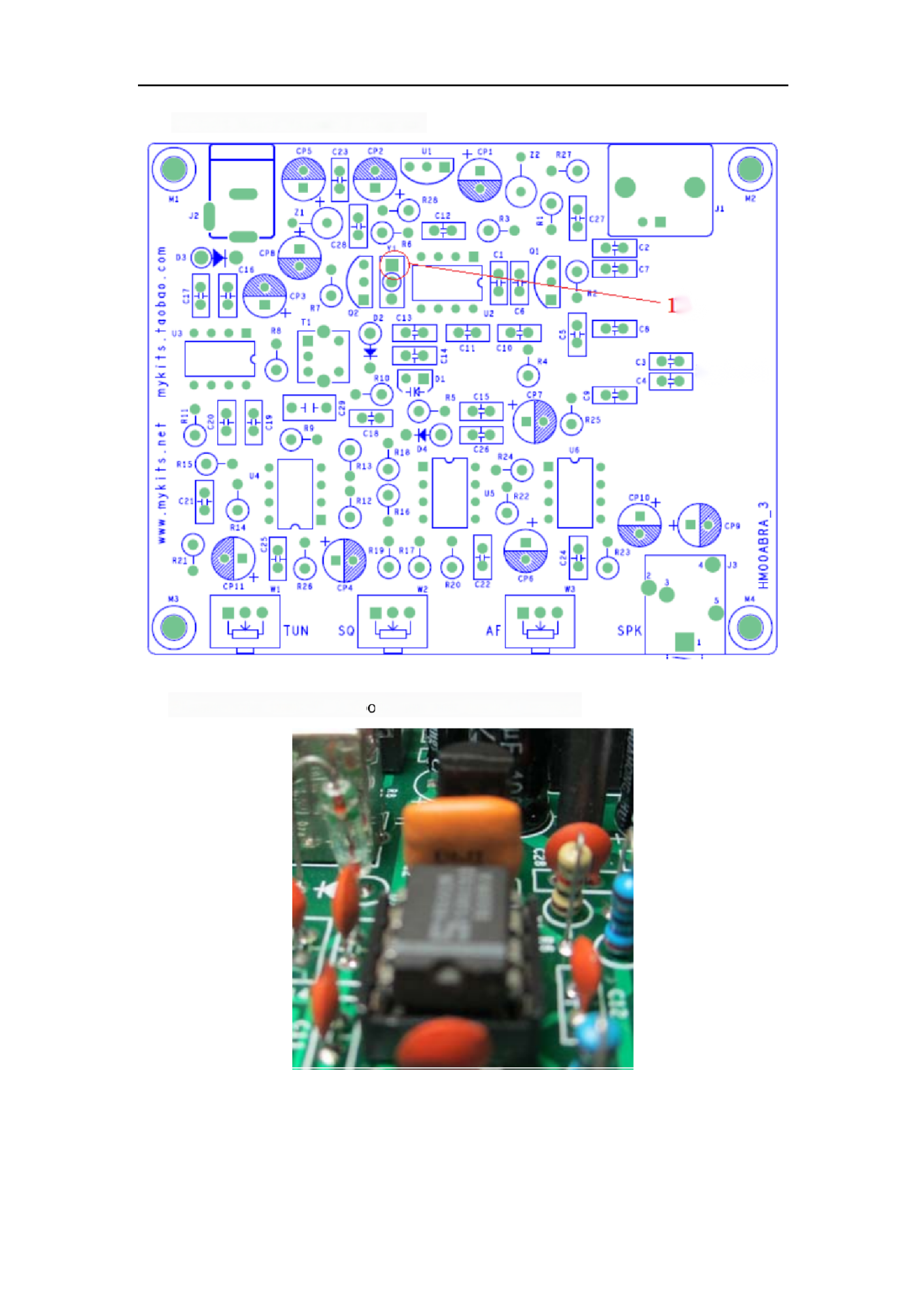
R29 in LM386 3 between foot and ground, Can improve the response speed of noise, Please welding on the back of the PCB.

CT has been welded in T1 weeks inside, no need to install.

Circuit Board Assembly Diagram



Please note that Y1 1 foot，can not install error!



5 4 3 2 1

Aeronautical Band Receiver Circuit Diagram（V3.0）

D

C27

R1 0.1u

R27

270

C1 0.1u

AVCC\_8V Z2 FB

VCC\_8V

+

CP1

U1

**78L08 /TO92**

1 3

VOUT VIN

GND

VCC\_12V D

+ CP2

ANT

J1

C2 1000p

1

2

4

3

C3

2p

C7

43p

C4

2p

C8

43p

C5

1000p

C9

43p

1K

R2

47K

1

C6 1000p

R3 270

3

Q1

U2

1 8

VCC

INA

R4 10K

2 7

OSCE

INB

3 6 C10 27p

OSCB

GND

4 5

OUTA OUTB

C11

100u /25V

100u /25V

VCC\_8V

2

R26 10

78L08 2SC3355

AS119

1N4001

2SC3355

C12 0.01u

2

**NE602**

10p

C13

C14 R5

W1

1000p

27p

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |

100K

1 2

10K

|  |
| --- |
|  |
|  |
|  |
|  |
|  |

C C28

0.1u

R28

R6 270

1K C17

AVCC\_8V

C16

Y1

+

CP3

LT10.7

3

1

C25

2

VCC\_8V

CP4

D1 BB910

C15 0.01u

CP11

+

10u /25V

R21

3.3K

为PCB电感 C

R7 0.1u 10u /25V

+

47K

1000p U3

T1 D2

1 6

4

IN-

VCC

2

1

OUT-

3 +

LM358\_1

R9

8

0.1u

10u /25V

8

3

3

1

Q2 7

2

NK

GND

6

IN+

AGC

R8 2

10K 3

OUT+

AS119

4

R10

8

7

C18

0.01u

1

2 -

4

U4A

47K

C29

5 +

7

6 -

4

U4B

AGC

2SC3355

5

8

10K

0.47u

LM358\_1

**MC1350**

C19

B 0.01u

C20 0.01u

R11 1K

AGC

7X7-10.7MHz

C26

VCC\_8V

R13 33K

R17

R12 1M

R20

10K W3

R15 10K

R14 47K

C21 0.1u

R16 1K

R18

VCC\_8V

B

**12V power input**

CP9

J3

+

2

3

4

5 10u /25V

1

**LM386**

5

CP7

U6

7

1

8

10u /25V

+ 3

+

- 2

4

6

0.1u

7

U5B

47K

+ 5

8

- 6

4

47K C22

0.1u R22

CP6

10u /25V

U5A

1

100K

+ 3

8

- 2

4

LM358\_2

R19 4.7K

W2 10K

J2

3

2

1

POWER

D3 1N4001

+ CP5

Z1

FB

CP8

VCC\_12V

+

C23 0.1u

SPK

A

R23 10

C24 0.1u

R25 10

+

CP10 10u /25V

VCC\_12V

LM358\_2

R24

47K

470K

D4 AS119

100u /25V 100u /25V

A

M1 HOLD\_0

M2 HOLD\_0

M3 HOLD\_0

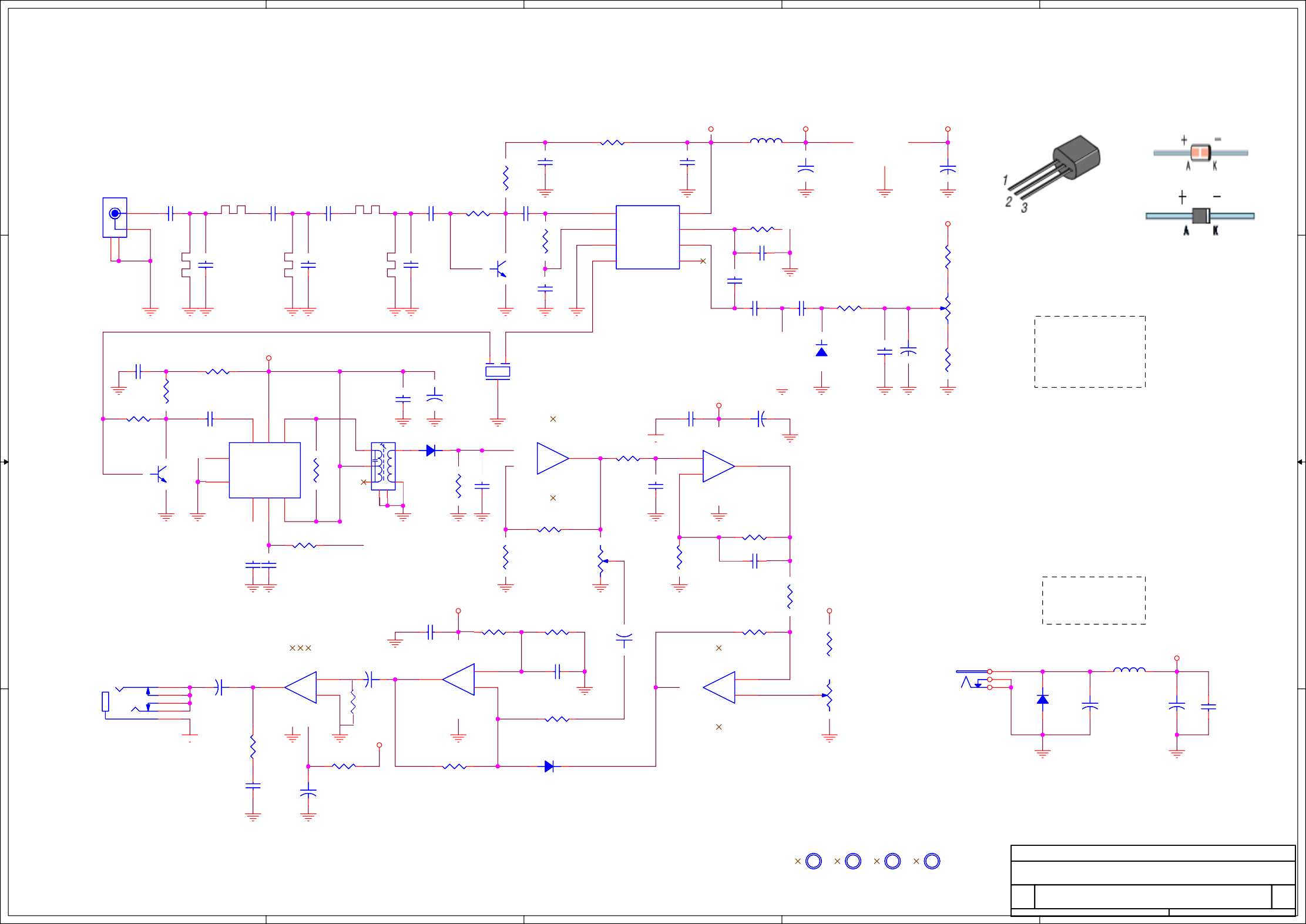
M4 HOLD\_0

1 1 1 1

Title

**01.MAIN**

Size Document Number Rev



5 4 3

A3

Date:

2

**HM00ABRA\_3**

Tuesday, June 25, 2013

Sheet

1

1 of 1

3.0