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# G8D-514H-B

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Receiver, RF Keyless Entry System

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# 1. Constitution of the Radio Frequency Keyless Entry System with Door Lock Controller for vehicle

The radio frequency keyless entry is a system that it controls locking and unlocking the door by wireless remote controller. This system consists of two components. The TRANSMITTER is a device that transmits the signal when the button is pressed. The transmission signal consists of several synchronous codes, unique identification code, security code and function code. The RECEIVER is fixed inside the vehicle. It works intermittently to prevent the battery exhaustion. When the receiver detects the synchronous code, it runs continuously to receive the signals completely. After receiveing the signal, the receiver decides which operation will be performed. The user can select the following operations by pressing the button of the remote transmitter.

OPERATION	ACTION
<b>LOCK</b>	Lock the door and output the signal to security unit
<b>UNLOCK</b>	Unlock the door and output the signal to security unit
<b>BOOT RELEASE</b>	Release the boot
<b>PANIC</b>	Beep the horn and flush the small light. (it continues 30 seconds)

This receiver also controls wired operation. When the key is in the driver's side key cylinder, all doors will Unlock if the key is turned to UNLOCK and hold more than one second. In case of the operation time is shorter, the only diver's side door is mechanically unlocked. It is also available to control the door lock status by using the remote door control switch(both driver's and passenger's side).

Transmitter  
 $f = 313.85\text{MHz}$

## 2. User's manual (provisionally)

### **LOCK**

When you push the LOCK button, all the doors will lock. And output the signal to security unit.

You cannot lock any of the doors with the remote transmitter if any door is open or the key is in the ignition switch.

### **UNLOCK**

When you push the UNLOCK button once, all the doors will unlock. And output the signal to security unit.

You cannot unlock any of the doors with the remote transmitter if the key is in the ignition switch.

### **BOOT RELEASE**

To open the boot, push the BOOT RELEASE button for approximately 0.5 second.

The boot will not open if the key is in the ignition switch.

### **PANIC MODE**

Panic mode allows you to remotely sound your vehicle's horn to attract attention. To activate this mode, press and hold the PANIC button for about one second. Your vehicle's horn will beep for about 30 seconds.

To cancel panic mode before 30 seconds, press any button on the remote transmitter. You can also turn the ignition switch to ON.

Panic mode will not activate if the ignition switch is in ON.

**CAUTION:** Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment

### 3. Block diagram

This is the block diagram concerning to the receiver.

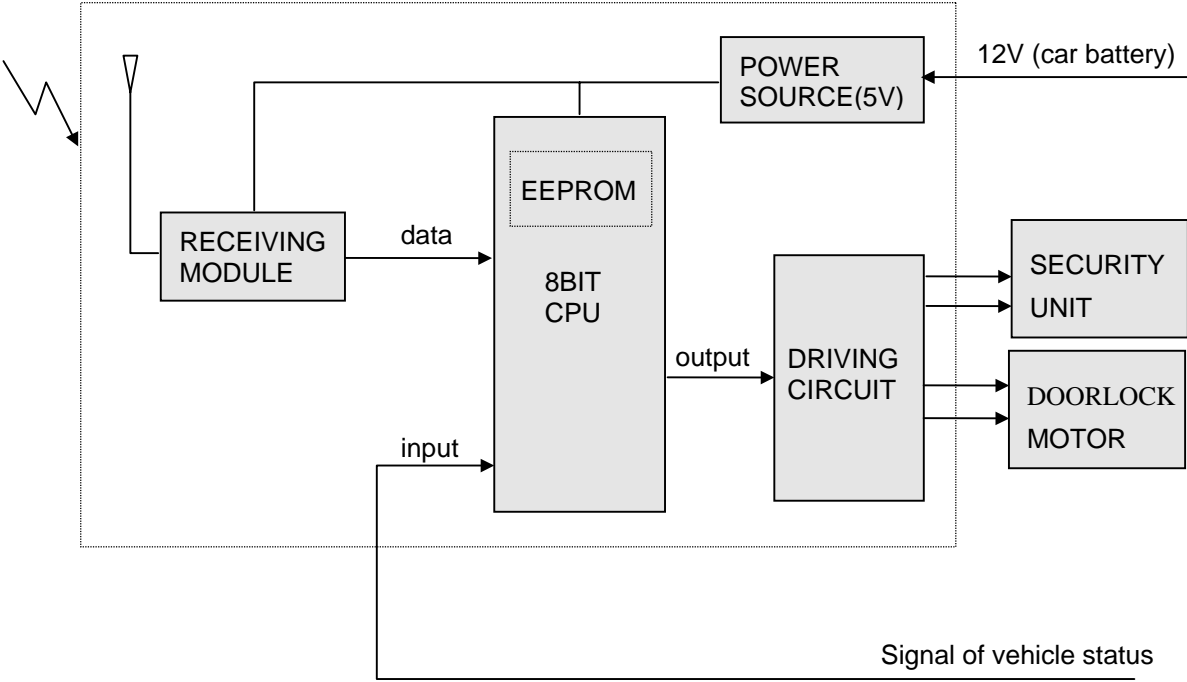


Figure 3.1 block diagram of the receiver

## 4. Specification

### 4.1 CPU

Type	M37540 (8bit) Manufacturer: Mitsubishi
ROM	16K bytes
RAM	512 bytes
Clock frequency	5.00MHz
Clock frequency generation	CERAMIC resonator
Package	32pinLQFP

### 4.2 RF block

Local clock frequency	324.55MHz
Frequency generation	Crystal resonator
Modulation	Single Superheterodyne
Bandwidth	$\pm 200\text{KHz}$
Carrier Detect Sensitivity	30 dBuVemf

### 4.3 Others

Dimension	70 mm $\times$ 80 mm $\times$ 25 mm
Weight	120 g
Battery	Car Battery (DC 12V)
Operation Voltage	DC 12V, 10mA
Operation temperature	-30 ~ +80

# 5. Features

## 5.1 Integrated controller

The controller works both wireless and wired operation.

You can use it remotely as the receiver of the keyless entry system. You can operate the door lock remotely using the remote transmitter. It is also available to release the boot.

When you turn the door lock switch, the controller works as the door lock controller. The controller monitors the switch related to the door lock. In case of the status of the switch changed, the controller will detect and output the signal to the door lock actuator.

/ SIGNAL FORM /

Synchronous code  (324bit)	Header code  (4bit)	Identification code security code function code (56bit)
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## 5.2 Battery saving

The receiver works intermittently to reduce the battery consumption. The microcomputer mounted on the receiver controls the power supply for the RF circuit. In case of the microcomputer detects the wake-up signal during the power supplied, the microcomputer continue supplying the power until the data frame will be received.

# 6. PCB

## 6.1 Circuit diagram

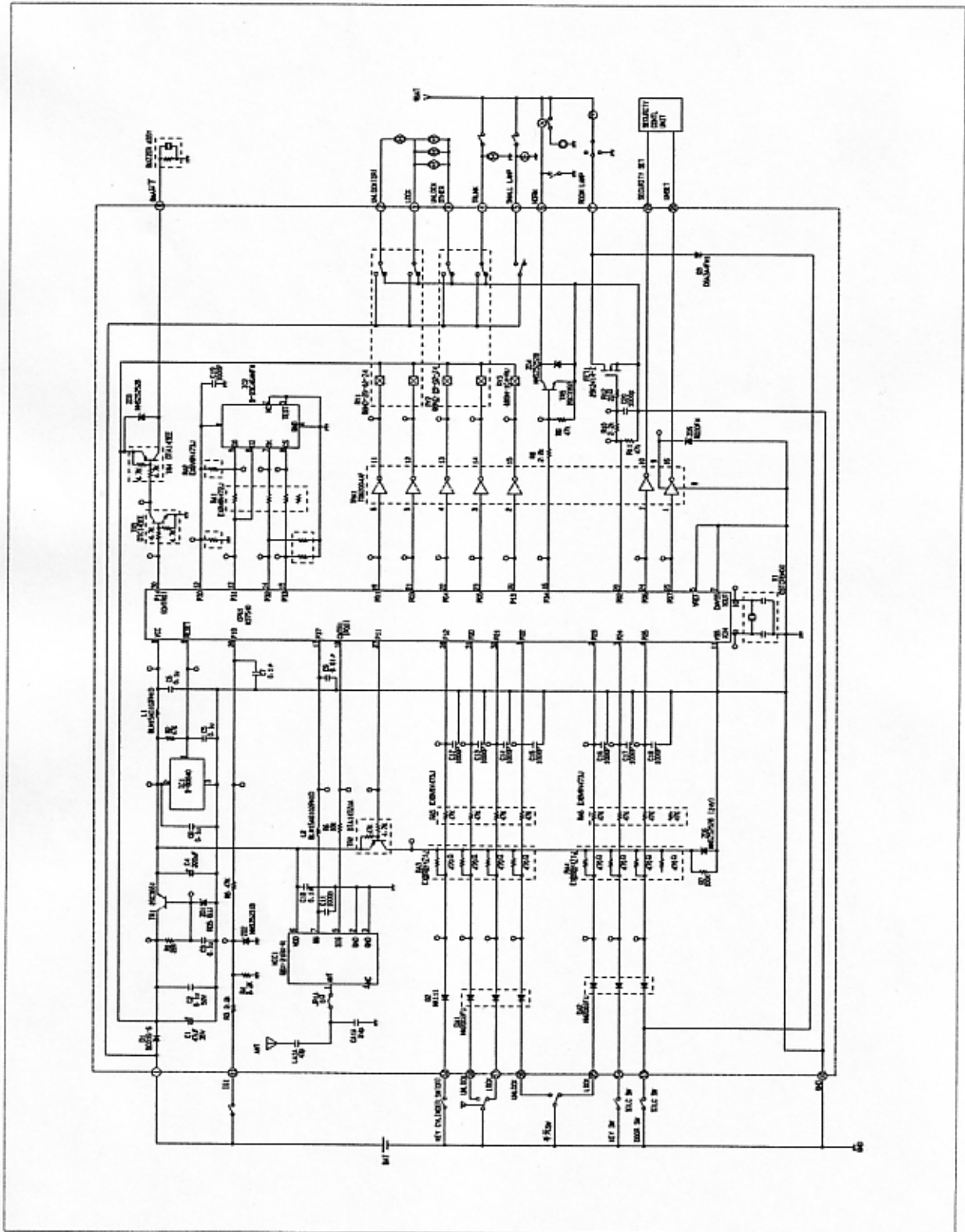


Figure 6.1 Circuit diagram



## 6.2 Parts layout

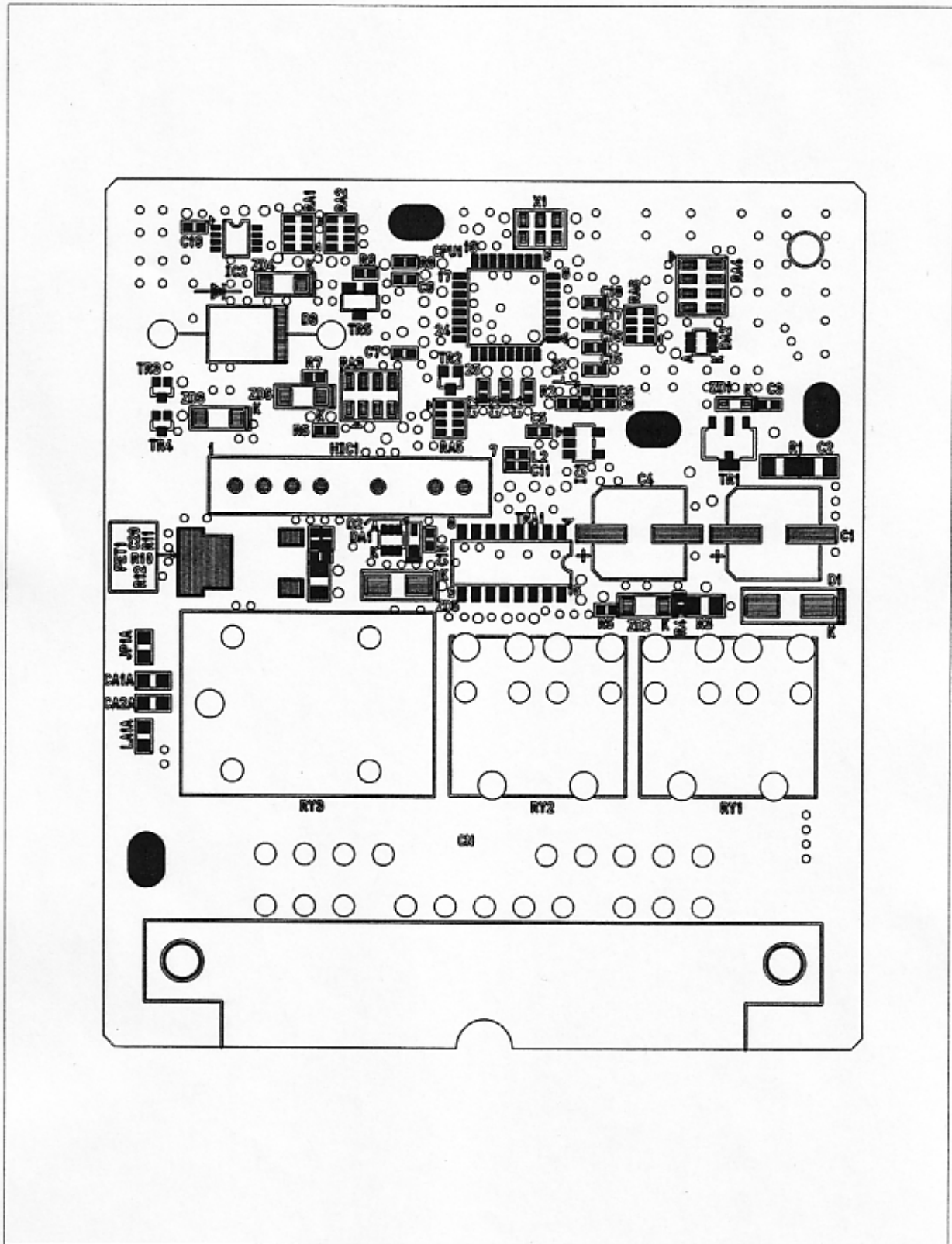


Figure 6.2 Parts layout (front)

6.3 Pattern layout

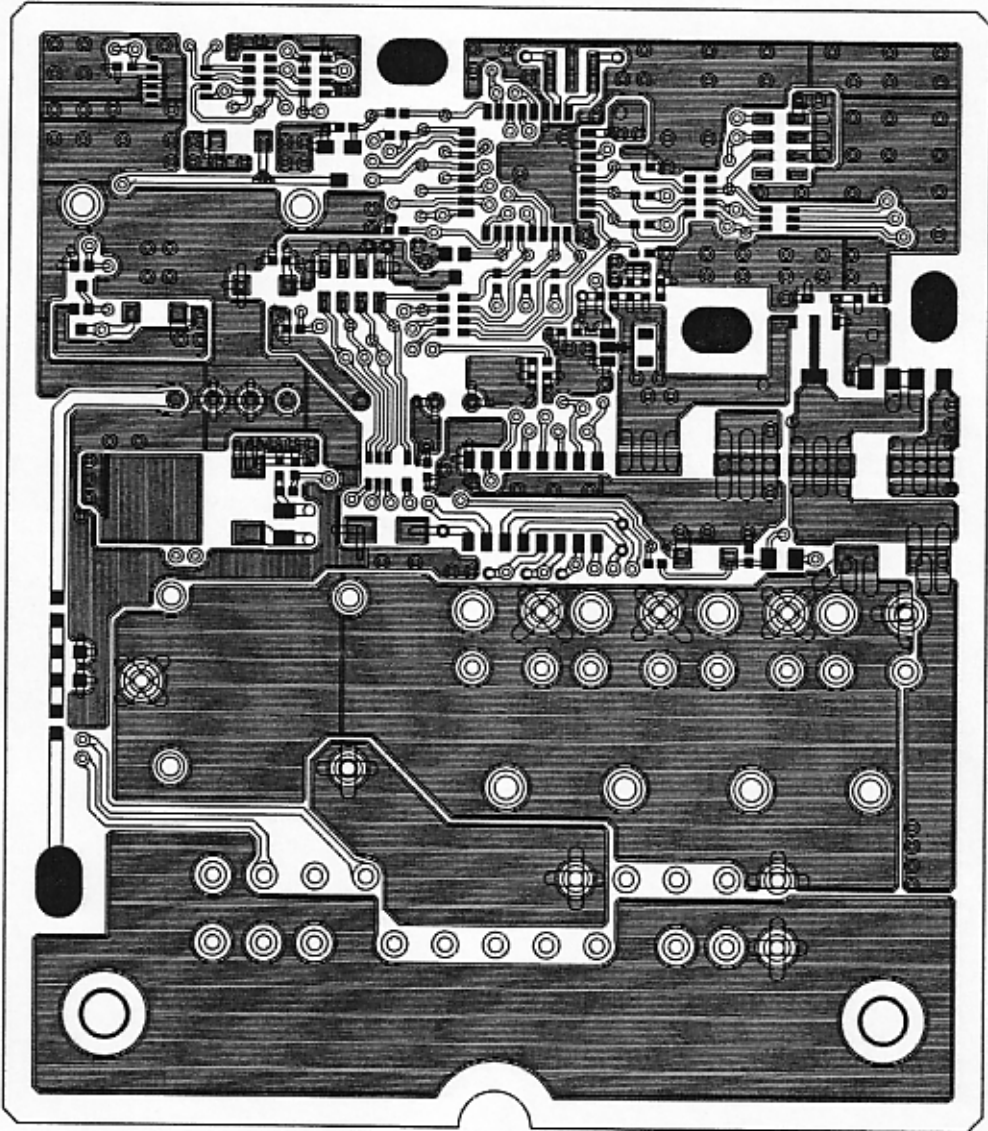


Figure 6.3 Pattern layout (front)

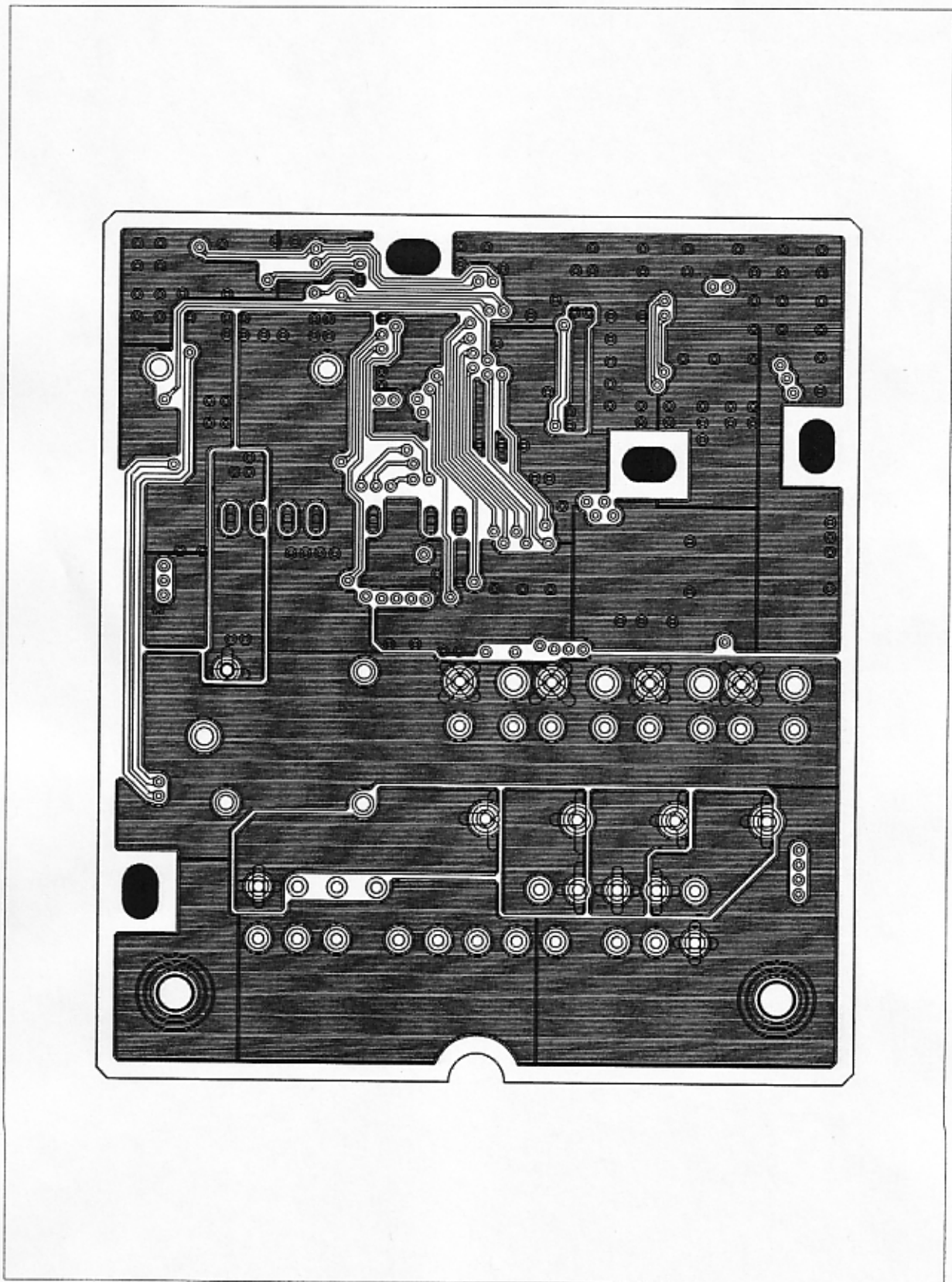


Figure 6.3 pattern layout (back)

## 6.4 Parts list

No	PART NAME	MANUFACTURE	QTY	TYPE	SPECIFICATION	REMARKS
1	CPU	MITSUBISHI	1	M37540M4T-123GP-BTQ	32PIN QFP	CPU1
2	EEPROM	SEIKO ELECTRONICS	1	S-93C46AMFN-TB		IC2
3	VOLTAGE REGULATOR WITH RESET FUNCTION	SEIKO INSTRUMENTS	1	S-80840CNMC-B8Z-T2	RESET 3.904-4.096V	IC1
4	CERAMIC OSCILLATOR	MURATA	1	CSTCR5M00G15A02-R0	5.0MHz	X1
5	DIGITAL TRANSISTOR	ROHM	1	DTA143ZUAT106	100mA 0.2W 4.7k-4.7k	TR2
6	TRANSISTOR ARRAY	TOSHIBA	1	TD62004AF-TP2	500mA 35V hfe=1000	TRA1
7	FET	NEC	1	2SK2414-Z-E2	10A,60V	FET1
8	DIODE	FUJI DENKI	1	SC016-6-TE12RA		D1
9	DIODE ARRAY	TOSHIBA	2	HN2D02FU-TE85L	80mA,80V	DA1,2
10	ZENER DIODE	ON SEMICONDUCTOR	1	MMSZ5231B	500mW,5.1V	ZD2
11	ZENER DIODE	ON SEMICONDUCTOR	3	MMSZ5252B-T1	500mW,24V	ZD3,4,6
12	ZENER DIODE	NEC	1	RD30FMB-T1	1W,30V	ZD5
13	CAPACITOR	NIPPON CHEMI-CON	1	MV35VC-47H63	47uF, ± 20% 35V	C1
14	CAPACITOR	NIPPON CHEMI-CON	1	MV10VC-220H63	220uF ± 20% 10V	C4
15	CERAMIC CAPACITOR	MURATA	1	GRM21BR11H104KA11L	0.1uF,50V 2125SIZE	C2
16	CERAMIC CAPACITOR	*	1		0.01uF,16V 1005SIZE	C9
17	CERAMIC CAPACITOR	MURATA	6	GRP155B11A104KA01E	0.1uF,10V 1005SIZE	C3,5,6,7,8 10
18	CERAMIC CAPACITOR	MURATA	10	GRP155R11H102KA01E	1000pF,50V 1005SIZE	C11,12,13,14,15 16,17,18,19,20
19	ZENER DIODE	NEC	1	RD5.6UJN2-T1	5.6V	ZD1

NOTE :

	• •				DESIGNED	CHECKED	APPROVED
	• •						
	• •						
	• •						
	• •				G8D-514H-B		
	• •				SHEET No ( 1 / 3 )		
A	• •	NEWLY DESIGNED			DETAILED LISTS OF PARTS		
SYM	DATE	E/C CONTENTS	E/C No	SIGN	DWG NO.		

No	PART NAME	MANUFACTURE	QTY	TYPE	SPECIFICATION	REMARKS
20	CHIP RESISTOR	*	1	RK20CAY22J-T1	22 ,1/8W 2125SIZE	R12
21	CHIP RESISTOR	*	1	RK20CAY22KJ-T1	22K 2125SIZE	R1
22	CHIP RESISTOR	*	1	RK20CAY2.2KJ-T1	2.2K ,1/10W 2125SIZE	R3
23	CHIP RESISTOR	*	1	RK10CAZ100KJ-T1	100K ,1/16W 1005SIZE	R7
24	CHIP RESISTOR	*	3	RK10CAZ2.2KJ-T1	2.2K ,1/16W 1005SIZE	R4,8,10
25	CHIP RESISTOR	*	1	RK10CAZ10KJ-T1	10K ,1/16W 1005SIZE	R6
26	CHIP RESISTOR	*	4	RK10CAZ47KJ-T1	47K ,1/16W 1005SIZE	R2,5,9,11
27	CHIP RESISTOR	MATSUSHITA	1	EXBV8V472JV	4.7K × 4	RA1
28	CHIP RESISTOR ARRAY	MATSUSHITA	2	EXBS8V471J	470 ,1/10W	RA3,4
29	CHIP RESISTOR ARRAY	MATSUSHITA	3	EXBV8V473JV	47K ,1/16W	RA2,5,6
30	CORE, FERRITE	MURATA	2	BLM15AG102PN1D	50mA 1005SIZE	L1,2
31	RF HIC	IAM	1	G8X-21RX-R	313.85MHz	HIC1
32	CERAMIC CAPACITOR	MURATA	1	GRM1881C1H240BZ01D	24pF, 50v 1608SIZE	CA1A
33	CERAMIC CAPACITOR	MURATA	1	GRM1881C1H430BZ01D	43pF, 50v 1608SIZE	LA1A
34	CHIP RESISTOR	*	1	RK16CAY00-T1	0 ,1/10W 1608SIZE	JP1A
35	RELAY	OMRON	2	G8ND-2S-02-Z4	DC12V	RY1,2
36	RELAY		1	G8SN-1C4-RU-Z4	DC12V	RY3
37	CONNECTOR	AMP	1	175785-1	070 TYPE 20P	CN
38	TAPPING, SCREW	*	2	SWCH MFSN-PB	M3 × 8	
39	PWB	SINKO SEISAKUSYO	1	FCL-CEM3		
40	ANNTENA		1		t=1.2	

NOTE :

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SHEET No ( 2 / 3 )  
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DWG NO.

No	PART NAME	MANUFACTURE	QTY	TYPE	SPECIFICATION	REMARKS
41	CASE		1	ABS	BLACK	
42	BASE		1	ABS	BLACK	
43	CERTIFICATE LABEL	AMEMIYA INSATSU	1	HIGH QUALITY PAPER	LETTER:BLACK BACK GROUND:PURPLE	
44	DIODE	HITACHI	1	DSA3A4FM4		D3
45	TRANSISTOR	SANYO	1	2SC3651-0TE-TD	V <sub>ceo</sub> =100V h <sub>fe</sub> =800 OR MORE I <sub>c</sub> =0.2A, P <sub>c</sub> =0.5W	TR1
46	TRANSISTOR	ROHM	1	DTC143EETL	I <sub>c</sub> =100mA	TR3
47	TRANSISTOR	ROHM	1	DTA143EETL	I <sub>c</sub> =100mA	TR4
48	TRANSISTOR	SANYO	1	2SC-3392-6/7-TB	h <sub>fe</sub> =RANK6.7	TR5
49	DIODE	MATSUSHITA	1	MA111-(TX)	100mA	D2

NOTE :

G8D-514H-B  
SHEET No ( 3 / 3 )  
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DWG NO.