致尊敬的顾客

关于产品目录等资料中的旧公司名称

NEC电子公司与株式会社瑞萨科技于2010年4月1日进行业务整合（合并），整合后的新公司暨“瑞萨电子公司”继承两家公司的所有业务。因此，本资料中虽还保留有旧公司名称等标识，但是并不妨碍本资料的有效性，敬请谅解。

瑞萨电子公司网址：http://www.renesas.com

2010年4月1日
瑞萨电子公司

【发行】瑞萨电子公司（http://www.renesas.com）

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M37549产品群

24引脚

特性：

- 最短指令执行时间：0.25μs （8MHz，倍速模式）
- 上电复位功能
- 按键唤醒功能：8通道
- LED驱动端口：8通道
- 工作电压：
  - 4.0V – 5.5V（片上4MHz时钟，倍速模式）
  - 1.8V – 5.5V（片上250kHz时钟，倍速模式）
  - 4.0V – 5.5V（8MHz，高速模式）
- 低功耗
  - 使用片上振荡器为时钟源可以降低功耗
  - 进入STOP或WAIT模式
- 温度范围：-20 ～ 85°C

应用：

☑ 小家电

740 CPU	8位定时器：2个
QzROM （2/4/6K字节×8位）	16位定时器：1个
RAM （196/256字节×8位）	输入捕捉：1通道
监视定时器	串行接口 UART/同步：1通道
时钟发生电路： 主时钟电路 高速片上时钟：4MHz 低速片上时钟：250kHz	10位A/D：8通道
	输出比较：3通道
中断： 13个源，13个向量	上电复位电路
I/O：19	

产品扩展：ROM/RAM容量

- M37549G1FP（2K/196）
- M37549G2FP（4K/256）
- M37549G3FP（6K/256）

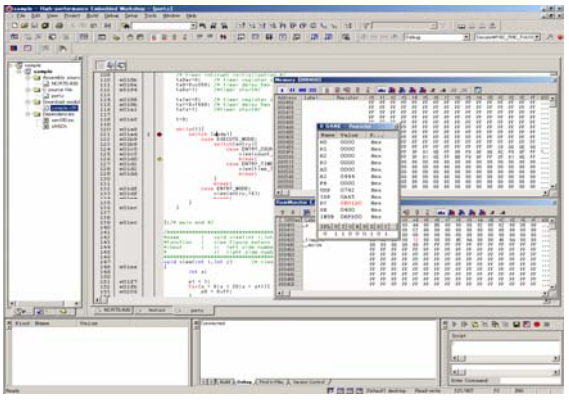
SN：24P2Q-A：24引脚SSOP（管脚间距0.80mm）

开发工具—集成开发环境（IDE）

High-performance Embedded Workshop (**HEW**)：

功能：

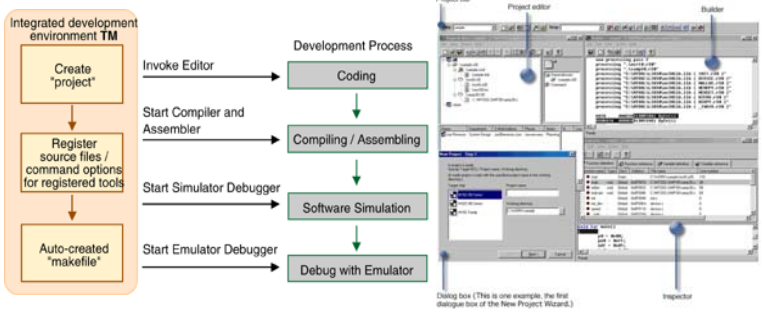
- 项目管理
- 代码编辑、编译-ICC740、汇编-SRA740、链接
- 软件仿真调试—Simulator Debugger
- 外部仿真工具支持，如E8，M38000T2-CPE
- 自动更新等辅助功能



TM ： 瑞萨集成开发环境

功能：

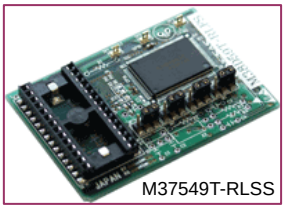
- 项目管理
- 代码编辑、编译、汇编、链接
- 模拟调试程序—M3T-PD38SIM
- 仿真调试程序—M3T-PD38M



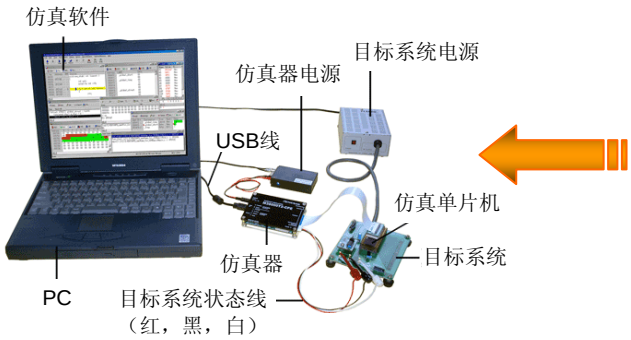
开发工具—仿真和调试

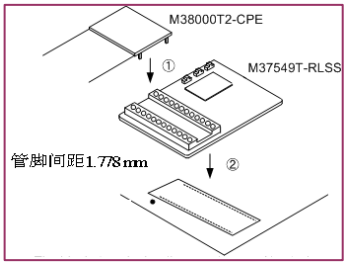
- 小型仿真器-M38000T2-CPE：用于740族MCU的仿真功能
  - 实时跟踪，硬件断点，实时RAM监测
  - USB通讯接口
  - 结构紧凑，价格低廉

- 仿真单片机M37549T-RLSS与M38000T2-CPE组成仿真系统



小型仿真器与仿真单片机的系统构成





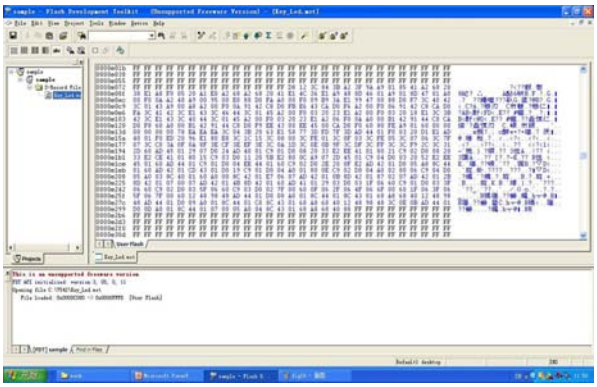
开发工具—Flash Development ToolKit（FDT）

Flash Development ToolKit

是瑞萨公司提供的一款Flash/QzROM单片机专用烧录软件包。

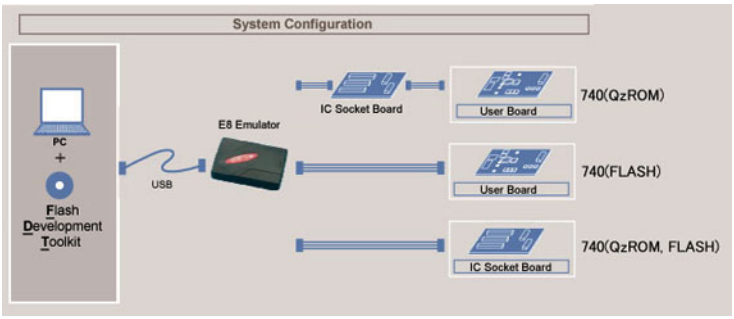
特点：

- 无须单独的编程电源（E8供电）
- 界面友好，操作简单
- 器件保护功能
- 支持文件格式Mot，Bin



FDT烧录系统组成示意图：

- 通过E8和IC-Socket板实现M37549的烧写；
- IC-Socket板提供QzROM烧写电压和芯片插座。



开发工具—彗星编程器

http://www.suisei.co.jp

简单方便的操作

- 把编程器的主体和串行接口单元组合到一起，用连接线缆和用户目标板连接，即可实现程序的在板写入（**On-board Programming**）；
- 结合MCU单元，即使没有用户目标板，同样能够模拟在板写入的工作状态实现芯片的写入。

灵活的扩展功能

- MCU单元制作简单、经济，因此能够迅速实现对新型MCU的支持。

EFP-RC支持脱机操作

- EFP-RC是在EFP-S2的基础上制作的支持脱机工作的QzROM编程器。
- 内置Flash，结构紧凑，能保存两个以上的.HEX文件，操作简单。

EFP-RC

EFP-S2

EFP-S2V

EFP-I

开发工具—西尔特编程器

http://www.xeltek.com/home.php

功能特点：

- **界面友好易操作**

  —选择芯片后，有关于保留区域和保护位的提示信息。

- **支持多种文件格式**

  —Bin | Hex | Mot | POF | Tektronix | Extern Tektronix

- **适于量产使用**

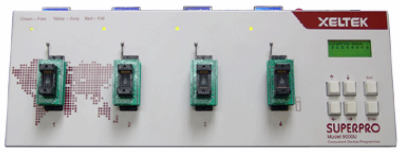
  —量产模式时只需进行插拔芯片的操作即可。

- **程序追加写入**

  —对芯片追加烧写时，首先执行对芯片的读操作，把已有程序读到编程器的Buffer区，再下载要追加的程序也到Buffer区，进行Program操作即可。

- **支持脱机工作方式**

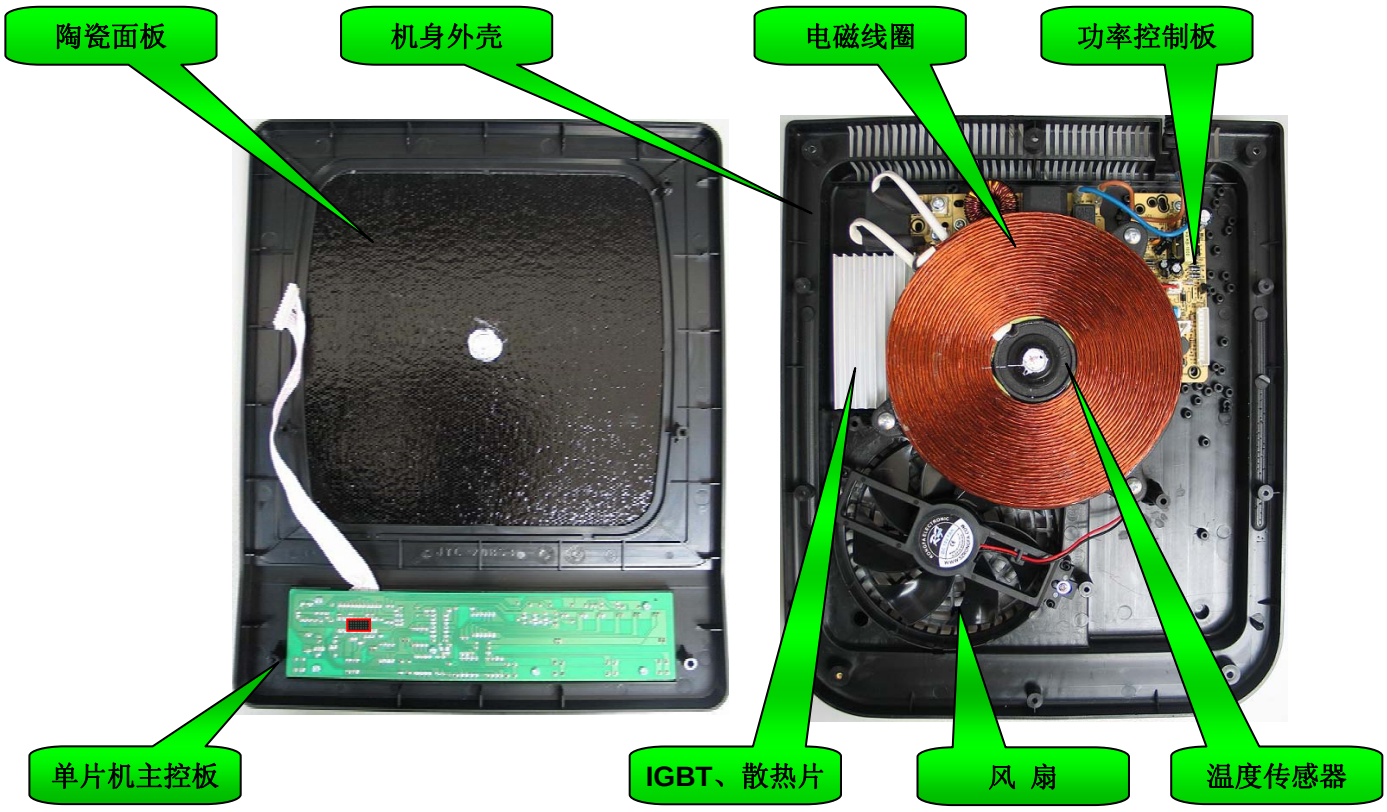
  —适于生产现场编程。



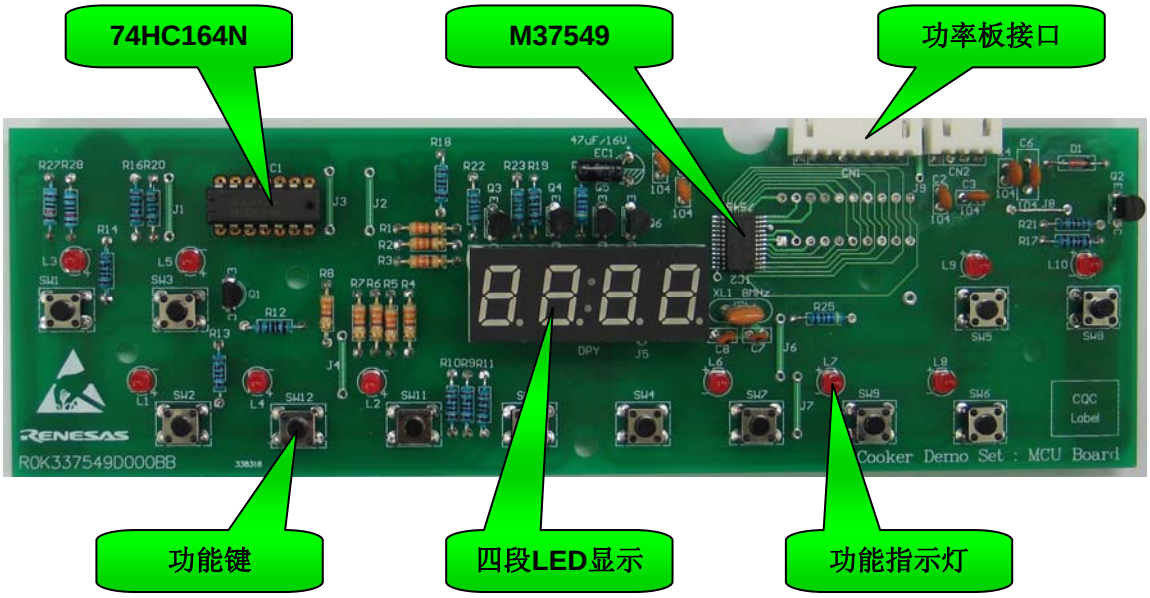
SP9000u

SP3000u

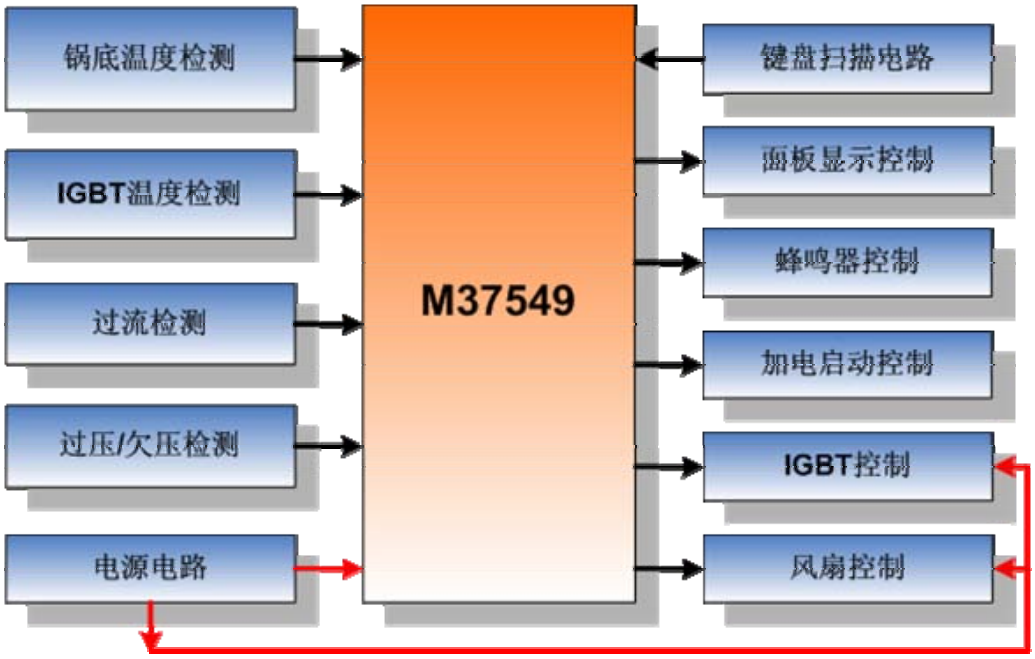
电磁炉产品组成结构



单片机主控板



单片机功能控制框图



单片机硬件资源分配

功能	系统要求	7548资源分配	7549资源分配
IGBT控制	I/O x2 PWM	*K(P06)*, PWM(P10) Timer A(CMP0)	*K(P30)*, PWM(P10) Timer A(CMP0)
风扇电机控制	I/O x1	*FAN(P13)*	*FAN(P16)*
蜂鸣器控制	I/O x1 Timer	*BUZ(P13)* Timer 2	*BUZ(P16)* Timer 2
电流过流保护	I/O x1 INT	INT(P01) INT1	INT(P01) INT1
无锅检测	I/O x1 INT	PAN(P00) INT0	PAN(P00) INT0
电源电压检测	I/O x1 AD	V-AD(P11) AN1	V-AD(P11) AN1
电源电流检测	I/O x1 AD	I-AD(P12) AN2	I-AD(P12) AN2
炉面温度检测	I/O x1 AD	T-MAIN(P14) AN4	T-MAIN(P14) AN4
IGBT温度检测	I/O x1 AD	T-IGBT(P15) AN5	T-IGBT(P15) AN5
按键/LED/数码管	I/O x5(7) Timer	KEY(P07), DATA(P03), CLK(P02), C3(P04), *C4(P05)* Timer 1	KEY(P17), DATA(P03), CLK(P02), *C1(P06)*, *C2(P05)*, C3(P04), *C4(P07)* Timer 1
看门狗	WDT	WDT	WDT
RAM/ROM	256B/4KB	256B/4KB	256B/6KB

电磁炉产品功能简介

- **工作模式：**
  - 自动功能：火锅、煎炒、烧烤
  - 手动功能：烧水、煮饭、蒸炖、熬粥、煲汤
- **功率调节：**
  - 共8档：200W/400W/800W1000W/1200W/1400W/1600W/1800W
    （其中200W/400W档是800W断续加热）
- **温度控制：**
  - 共8档：80℃/100℃/120℃/160℃/180℃/200℃/240℃/260℃
- **预约/定时功能：**
  - 定时范围：1min – 9h59min（自动功能）
  - 预约范围：1min – 9h59min（手动功能）
- **保护功能：**
  - 共10项（详见下页）

自动保护与故障分析

故障类型	代码	故障判别条件	故障处理
内部电路故障	E0	中断PAN检测不到振荡波形	显示E0并闪烁, 蜂鸣器鸣叫, 须手动关机才能退出故障报警状态.
无锅(或锅具不符)报警	E1	电磁炉处在上电或加热状态时, 如炉面无锅具或锅具移走	显示E1并闪烁, 闪烁一次停2秒, 蜂鸣器鸣叫, 若30s内锅具恢复正常, 则自动退出故障报警, 恢复加热状态; 若无锅具, 则自动关机.
IGBT过热	E2	IGBT温度超过110℃	停止功率输出, 显示E2并闪烁, 蜂鸣器鸣叫, 须手动关机才能退出故障报警状态.
电源电压过低	E3	当电源电压低于140V	停止功率输出, 显示E3并闪烁, 蜂鸣器鸣叫, 若电压恢复正常, 则自动退出故障报警, 恢复加热状态.
电源电压过高	E4	当电源电压高于280V	停止功率输出, 显示E4并闪烁, 蜂鸣器鸣叫, 若电压恢复正常, 则自动退出故障报警, 恢复加热状态.
炉面温度传感器故障	E5	面板温度传感器出现开路或短路	停止功率输出, 显示E5并闪烁, 蜂鸣器鸣叫, 须手动关机才能退出故障报警状态.
IGBT温度传感器故障	E6	IGBT温度传感器出现开路或短路	停止功率输出, 显示E6并闪烁, 蜂鸣器鸣叫, 须手动关机才能退出故障报警状态.
干烧报警	E7	面板温度超过300℃	停止功率输出, 显示E7并闪烁, 蜂鸣器鸣叫, 须手动关机才能退出故障报警状态.
过流保护	/	当IGBT工作电流异常增大时	硬件电路保护措施使IGBT瞬间降低功率输出, 当电流恢复正常, 恢复正常工作状态
IGBT Vce峰值电压保护	/	当IGBT Vce峰值电压超过设定值时	硬件电路关闭IGBT, 当峰值低于设定值, 恢复正常工作状态

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