

EXHIBIT E

Block Diagram

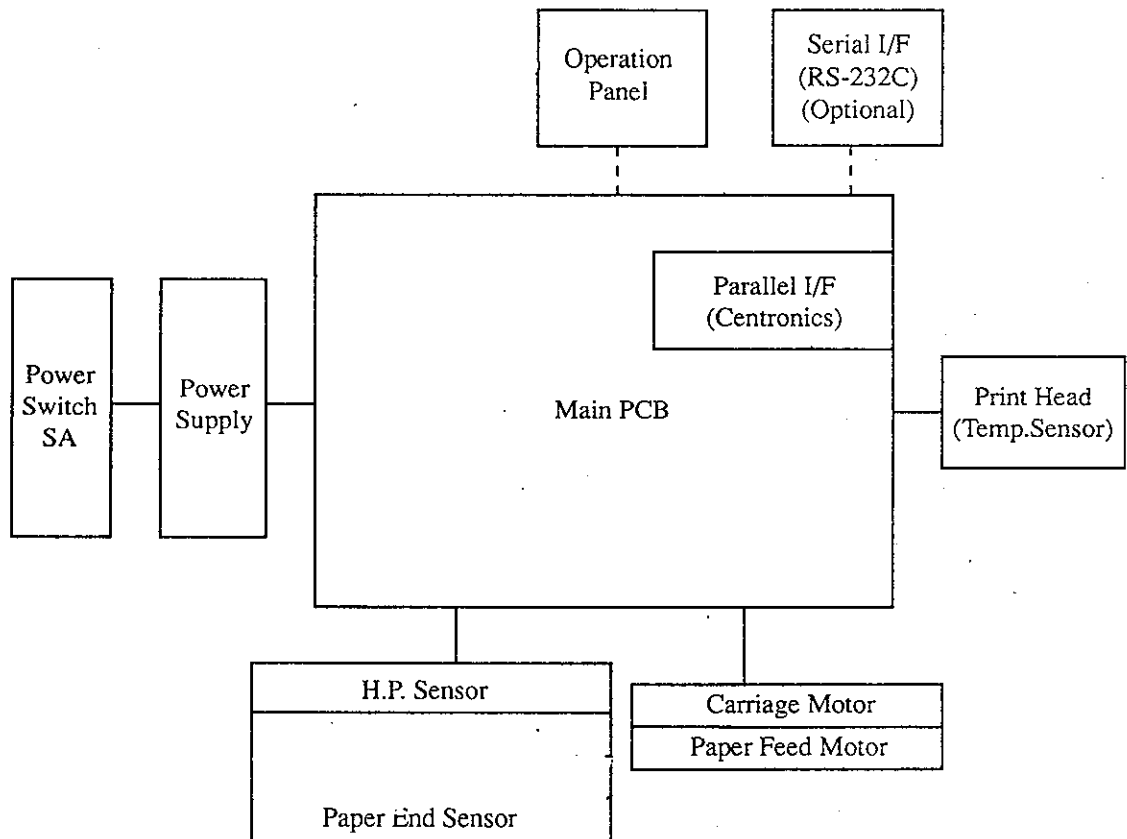
BLOCK DIAGRAM OF MSP 345 CLASSIC

2. Operation of Control Parts

PRINTER

2-1. Configuration of Printer

The following shows major configuration blocks.



Major functions of individual components are described below:

(1) Power switch SA

Consists of a main switch and a filter circuit to eliminate external noise.

(2) Power supply

Transforms AC input to +5V or DC output required to drive the printer. The power supply is controlled with a switching type regulator.

(3) Main PCB

Controls entire operations of the printer. It consists of CPU, ROM, RAM, Custom IC and driver circuit, etc.

(4) Operation panel

A panel used to display the operating status of the printer and to set specifications.

(5) Print Head

The print head consists of two rows of 12 print wires with a diameter of 0.2mm each (staggered arrangement of a total of 24 wires). Each print wire has its own corresponding solenoid and armature. When a solenoid is turned on, it will attract its armature toward it, projecting the print wire forward to strike the ribbon against the platen, producing a dot.

(6) Motors

The motors in this printer include the carriage motor, the paper feed motor and they are all stepping –type motors.

(7) Sensors.

There are two sensors; the HP sensor, and the paper end sensor.

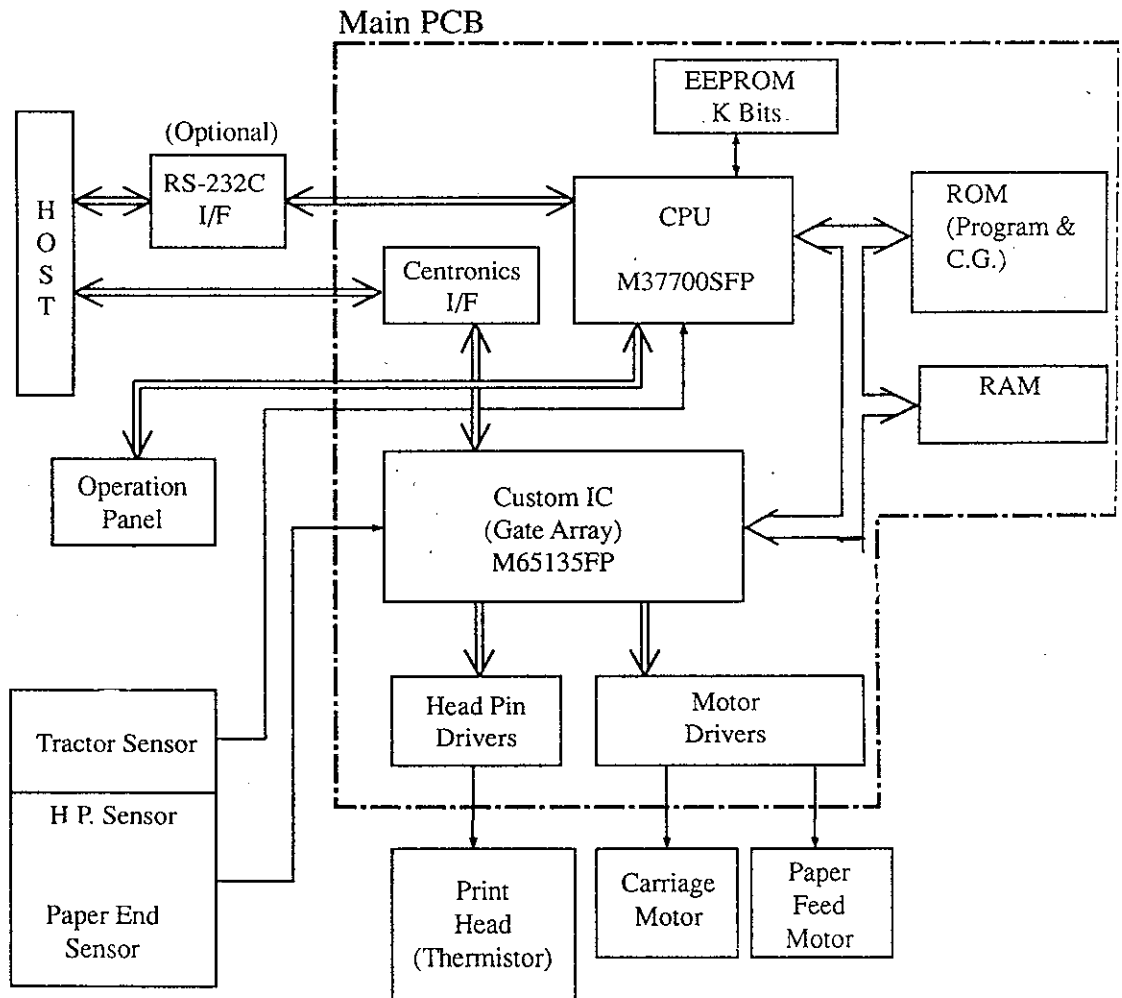
(8) Interfaces.

This is a circuit to transmit and receive data between host and the printer.

Two types, Centronics parallel I/F and RS-232C serial I/F (optional), can be used.

2-2. Operation of Control Unit

(1) Block diagram



The following descriptions are for major functions of the components.

(a) CPU

The CPU is M37700SFP (Mitsubishi) and it is a CMOS microprocessor with 16-bit architectures. The basic clock is 8MHz.

(b) ROM

K bytes ROM for the control program and the C.G. (Character Generator).

(c) RAM

It is used as working area, input buffer and download buffer

(d) EEPROM

It is 2K bits EEPROM.

It is used for storage of various settings

The stored data is retained even if the power is off.

(e) Custom IC

It is a CMOS custom IC incorporating a control circuit for the interface I/O port, current flow time of each motor and head pins, address decoder, etc.

(f) Head pin driver

It is a driving circuit for flowing current to the head pins.

It consists of the transistor array for driving, etc

(g) Motor drivers

It is a circuit to drive the carriage motor, and the paper feed motor.

The carriage motor is driven by the constant current driving system .

The paper feed motor is driven by the constant voltage driving system.