THEORY OF OPERATION

6.2 Circuit Board Components

a) System control section

The system controller is made up of the following components, and controls the entire fax system.

a-1) MPU (Micro Processor Unit) (IC 201)

The main functions of the NEC μPD70433GJ-16-3EB MPU are as follows.

- 16 bit CPU
- 24 bit address bus
- 8 bit data bus
- DMA control
- A/D converter
- Serial interface
- Software CODEC
- Interrupt control unit

a-2) System controller (IC 401)

The system controller is a gate array for controlling MPU peripheral devices. The main functions of the system controller are as follows:

- Printer resolution conversion (Ultra-smoothing)
  This IC converts facsimile data of horizontal resolution of 8 dots/mm and vertical resolution of 3.85 or 7.7 lines/mm to print data of 360 dpi and 360 dpi, respectively.
- BJ printer interface
  8 bit parallel print data sent to the Printer controller.
- OPCNT serial interface (Contains document sensor and document edge sensor signals)
- DRAM/SRAM controller
  Controls DRAM/SRAM read/write and renewal.
- Document feed motor control
- Serial-to-parallel conversion
- Horizontal scaling
- Detection of document edge sensor and ink detection sensor

a-3) RTC (Real Time Clock) IC (IC 203)

RTC4543 is used as the RTC. The RTC IC is backed up by lithium battery, and counts the date and time.

d) Printer control section (On the PCNT board)

d-1) Printer controller (IC4)

The main functions of the printer controller are as follows:

- Bi-centronics interface
- EEP-ROM control
- DRAM control
- Buffer control
- Print head control

d-2) MPU (IC 1)

- 16 bit CPU
- 24 bit address bus
- 16 bit data bus
- Carriage motor / Line feed motor control

  The stepping motor controller outputs the carriage motor's single- and two-phase exciter drive signal, and paper feed motor's two-phase drive signal.

  The stepping motor controller switches the carriage motor with the 5-step peak current value for optimum driving. The stepping motor controller outputs the switching control signal to the carriage motor driver.
- Detection of BJ head temperature
- Detection of printer's internal temperature.
- Detection of Home position sensor, Paper edge sensor and Pickup roller sensor.
- Cartridge detection.
- Ink detection sensor control

d-3) ROM (IC2)

The 8 Mbit control/CG ROM contains the program and bitmap font data for printer control.

d-4) DRAM (IC3)

4 Mbit DRAM is used as the receive buffer, download buffer, print buffer, and working area.

d-5) EEPROM (IC6)

Controlled by the printer controller, the 1 Kbit EEPROM (Electrically Erasable and Programmable ROM) stores various printer emulation settings, and the waste ink amount discharged to the waste ink absorber.

6.3 Flow of Image Signals

a) G3 transmission

(1) With the LED as a light source, the image is scanned by the contact sensor, and analogue image data sent to the SCNT board.

(2) The System controller IC (Internal UHQ unit) converts analogue image data from the contact sensor to digital image data.

(3) The system controller IC converts processed image data from serial data to parallel data, and writes them to the DRAM.

(4) The MPU encodes raw data in the DRAM using a soft codec, and rewrites the encoded data into the DRAM.

(5) The MODEM IC modulates the coded image data.

(6) The modulated data are then sent from the MODEM IC to the NCU board.

(7) The data are returned to the SCNT board and, from there, are sent to the line for transmission.

b) G3 Reception

(1) Image signals received by L1, L2, pass through the hybrid circuit in the NCU, and are amplified. The modem demodulate these images, and writes them to the DRAM.

(2) The MPU decodes the demodulate image data, checks errors, stores them in the DRAM, encodes the data and rewrites them into the DRAM.

(3) The system controller IC converts the decoded data from run-length data to raw data, and converts 8 dot/mm fax data into 360 dpi resolution converted printer data, and writes them to the DRAM.

(4) The system controller IC converts the resolution converted printer data to BJ printer head control signals, and then sends the signals to the BJ print head, via the BJ controller IC. Simultaneously, the printer MPU sends motor control signals to the carriage motor and line feed motor, via the driver IC.