CONTROLLER LSI HD63645F · HD64645F · HD64646F

■ Graphic LCD Module Controller LSI

T-52-33-47

■ Applied types:

(1) HD63645F/HD64645F:
   LM246X · LM266XW · LM254XP · LM755CXGP · LM268CXP · LM254XNP · LM272CXGNR · LM384XFR · LM383XFR · LM383CXFR · LM296DXF · LM298DXF

(2) HD64646F:
   LM236XB · LM280XM · LM674XN

The HD63645F/HD64645F/HD64646F LCTC is a control LSI for large size dot matrix liquid crystal displays. The LCTC is software compatible with the HD6845 CRTC, since its programming method of internal registers and memory address is based on the CRTC. A display system can be easily converted from a CRT to an LCD.

The LCTC offers a variety of functions and performance features such as vertical and horizontal scrolling, and various types of character attribute functions such as reverse video, blinking, nondisplay (white or black), and an OR function for simple superimposition of character and graphic displays. The LCTC also provides DRAM refresh address output.
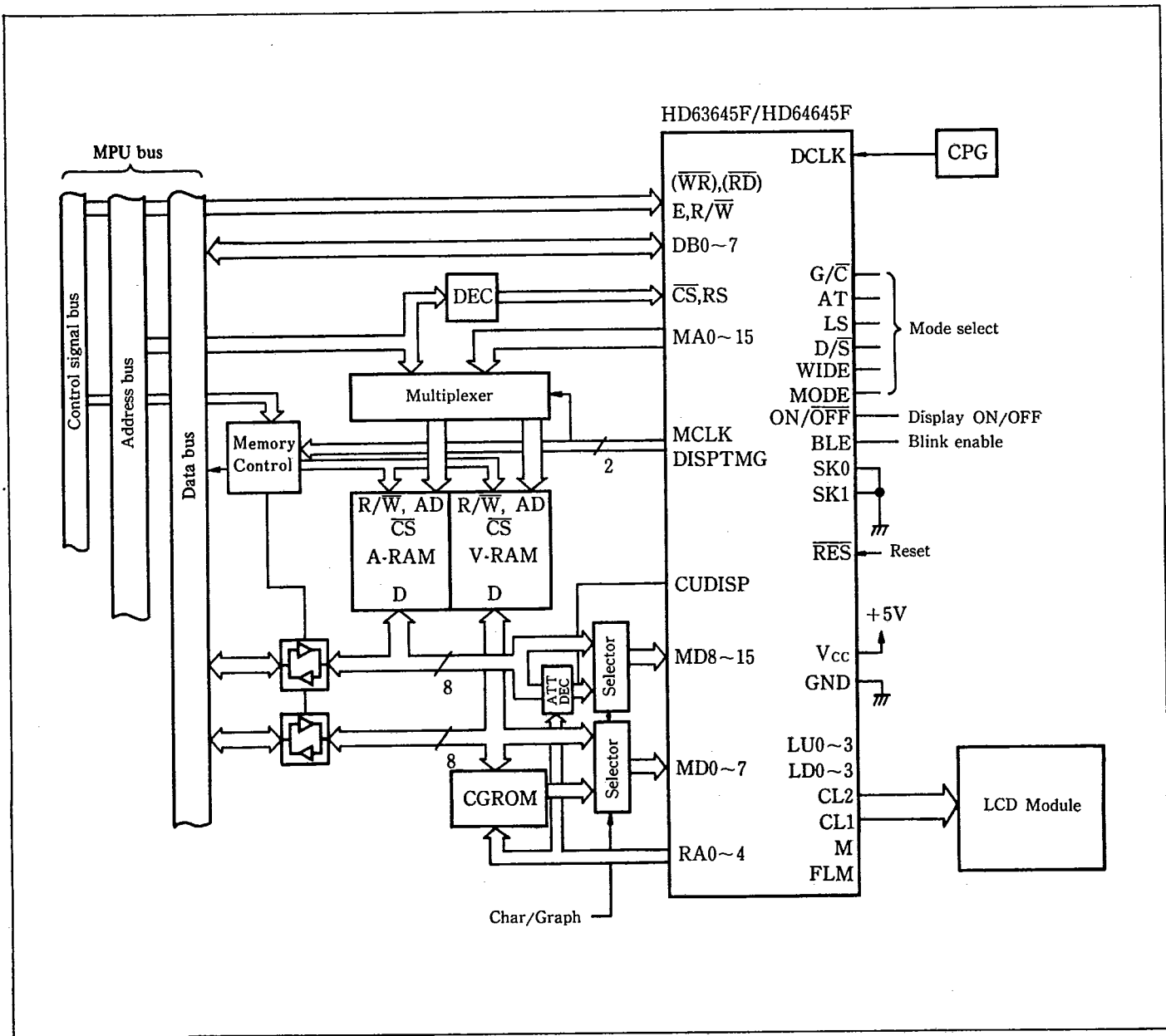
A compact LCD system with a large screen can be configured by connecting the LCTC with the HD61104 (column driver) and the HD61105 (common driver) by utilizing 4-bit X 2 data outputs. Power dissipation has been lowered by adopting the CMOS process.

■ Specifications:

● Software compatible with the HD6845 CRTC
● Programmable screen size:
   —Up to 1024 dots (height)
   —Up to 4096 dots (width)
● High-speed data transfer:
   —Up to 20 Mbits/sec in character mode
   —Up to 40 Mbits/sec in graphic mode
● Selectable single or dual screen configuration
● Programmable multiplexing duty ratio: static to 1/512 duty cycle
● Programmable character font:
   —1-32 dots (height)
   —8 dots (width)
● Versatile character attributes: reverse video, blinking, nondisplay (white), nondisplay (black)
● OR function: superimposing characters and graphics display
● Cursor with programmable height, blink rate, display position, and on/off switch
● Vertical smooth scrolling and horizontal scrolling by the character
● Versatile display modes programmable by mode register or external pins: display on/off, graphic or character, normal or wide, attributes, and blink enable
● Refresh address output for dynamic RAM

(Note) If you need detailed information of HD63645F/HD64645F/HD64646F, please refer to "Hitachi MOS LSI data book LCD driver LSI" or contact following office.
Semiconductor & Integrated Circuit Div.
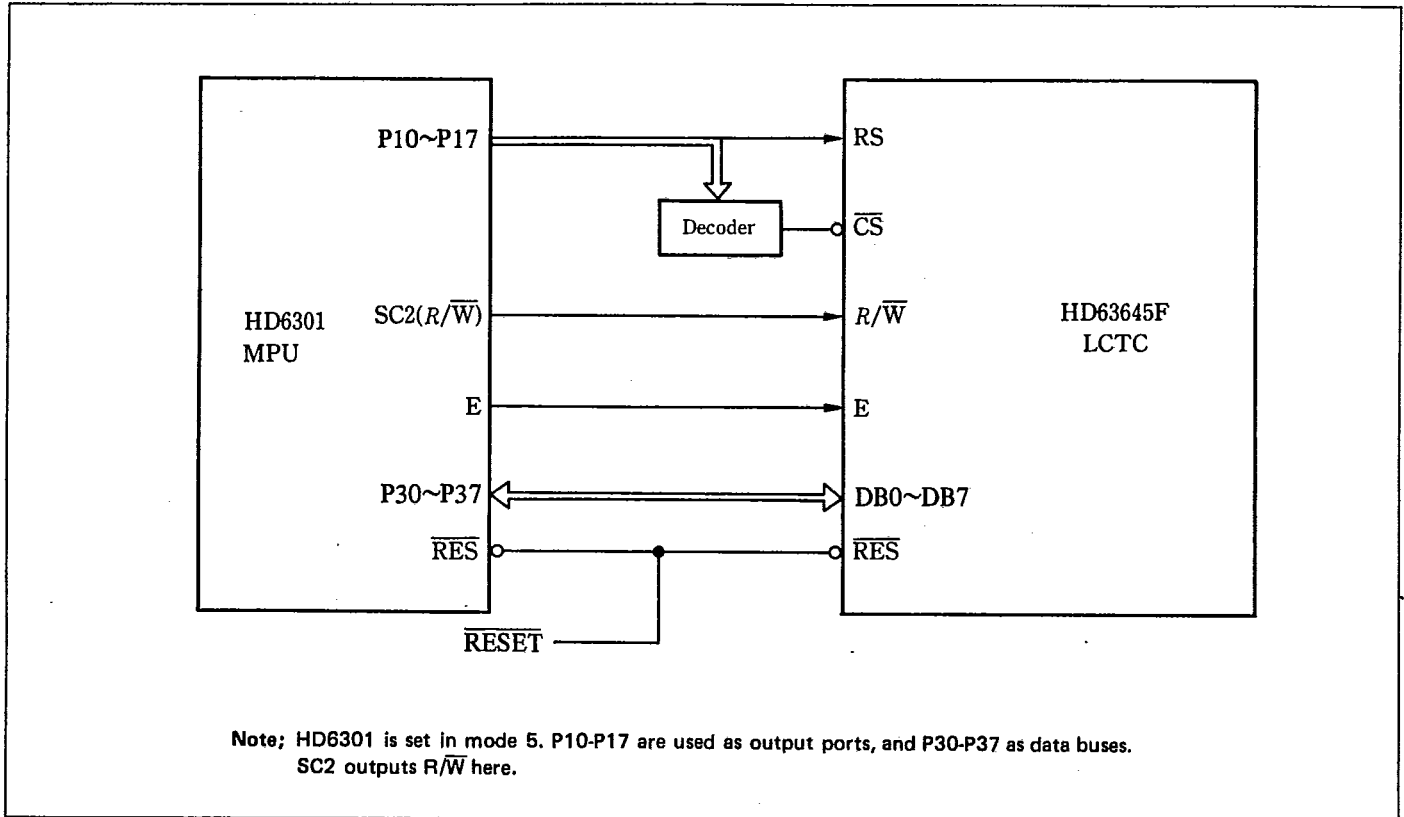Karukozaka MN Bldg., 2-1, Agebacho, Shinjuku-ku, Tokyo 162, Tel: Tokyo (03) 266-9381

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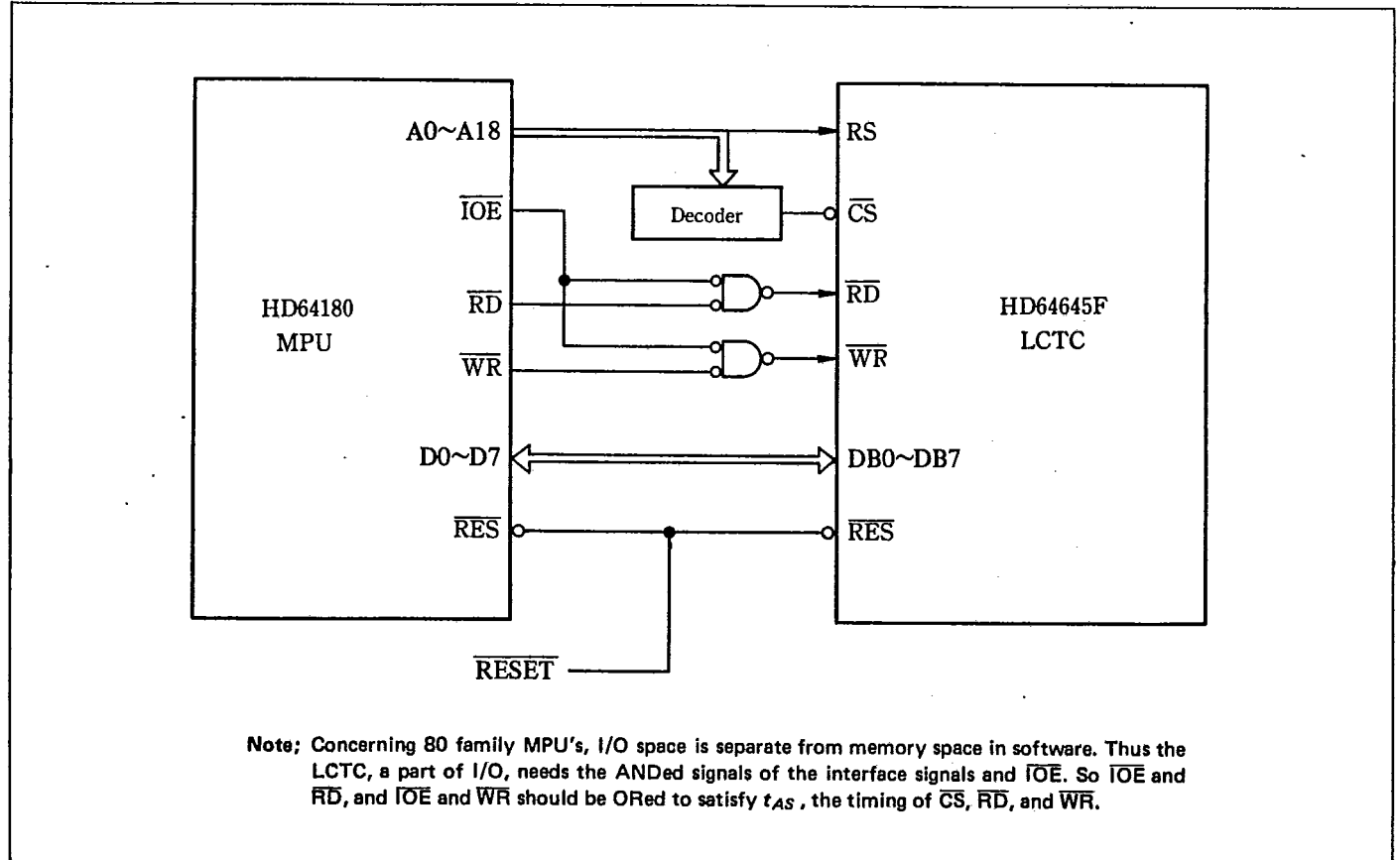## ■ System Block Configuration Examples
● Character/Graphic Display System Example

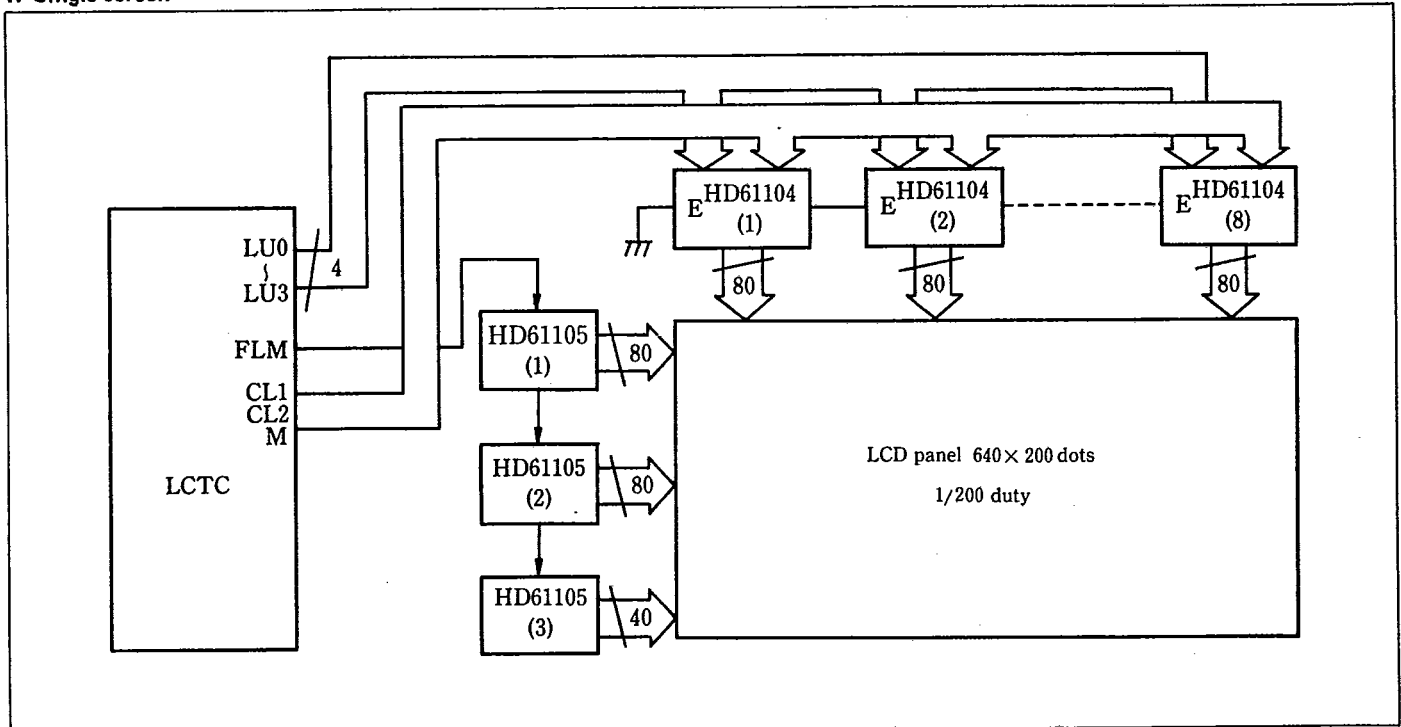CONTROLLER LSI HD63645F · HD64645F · HD64646F

■ Interface to MPU

1. Interface between HD6301 and HD63645F

Note; HD6301 is set in mode 5. P10-P17 are used as output ports, and P30-P37 as data buses.
SC2 outputs R/$\overline{W}$ here.

2. Interface between HD64180 and HD64645F

Note; Concerning 80 family MPU's, I/O space is separate from memory space in software. Thus the
LCTC, a part of I/O, needs the ANDed signals of the interface signals and $\overline{IOE}$. So $\overline{IOE}$ and
$\overline{RD}$, and $\overline{IOE}$ and $\overline{WR}$ should be ORed to satisfy t_{AS}, the timing of $\overline{CS}$, $\overline{RD}$, and $\overline{WR}$.

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■ **LCD Driver Examples**

1. Single screen

2. Dual screen