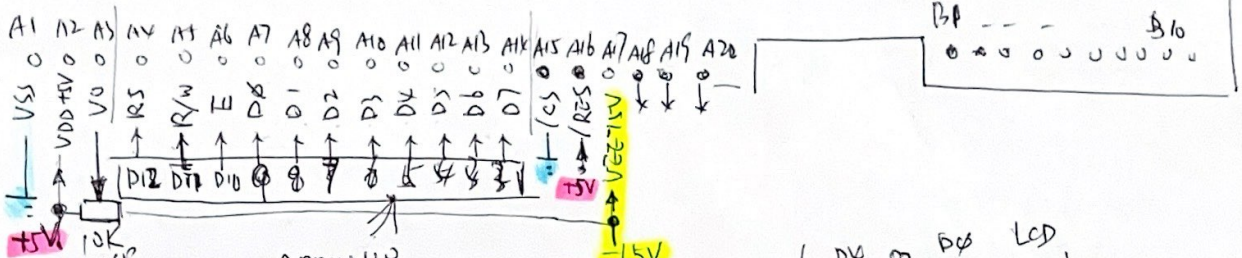
HD61830B ASCII map INTERNAL ROM
0010.0000 space 0x20 ~ 0xFF (GROM

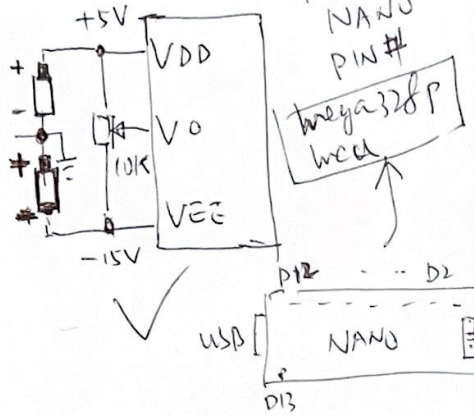
HITACH LMG6401PLGE

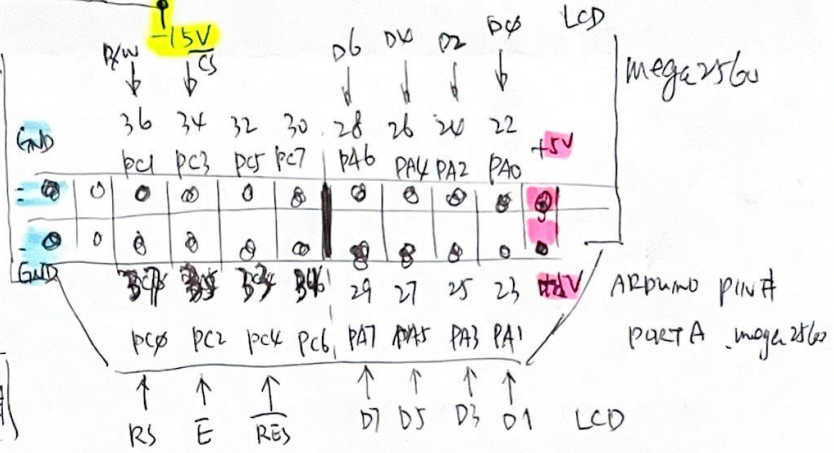
HD61830 / LC7940 / LC7940

240×128 LCM

U8g2 lib







D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	ARDUINO NANO/UNO PIN#
PD0	PD1	PD2	PD3	PD4	PD5	PD6	PD7	PB0	PB1	PB2	PB3	PB4	mega328/168P PIN#
CS	RES	RS	R/W	E	D0	D1	D2	D3	D4	D5	D6	D7	HD61830 PIN#
PB3	PB4	PB0	PB1	PB2	PD0	PD1	PD2	PD3	PD4	PD5	PD6	PD7	~~ARDUINO NANO/UNO PIN#~~
D11	D12	P8	D9	D10	D0	D1	D2	D3	D4	D5	D6	D7	~~mega328P PIN# ARDUINO PIN#~~
		PORT B / DDRB			PORTD / DDRC						MCU PORT		
		LCD_CTRL_PORT			LCD DATA PORT						LCD PORT		

~~PB3 PB4 PB0 PB1 PD2~~
~~D3 D4 D0 D1~~ D2
PC3 PC4 PC0 PC1 PC2
A3 A4 A0 A1 A2

PORTC / DDRC 168P/168PA

ATmega328P 16MHz XTAL
efuse : 0x05
hfuse : 0xda
lfuse : 0xff

efuse = 0xF9
hfuse = 0xDE
lfuse = 0x62 8MHz RC

efuse = 0xFF
hfuse = 0xD9
lfuse = 0x62 1MHz RC CPU

LMG6401PLGE 240*128 Dots

FEATURES

- **Blue on Grey STN Type**
- **Transflective Mode**
- **Low Power EL Backlight**
- **Built-in LCD Controller HD61830B**

MECHANICAL DATA

Item	Value	Unit
Module Dimensions	159.4*101*9.5	mm
Viewing Area	126*71	mm
Resolution	240*128	dots
Dot Size	0.47*0.47	mm
Dot Pitch	0.5*0.5	mm
Weight	160	g

OPTICAL DATA

Item	Symbol	Condition	Min	Typ	Max	Unit
Contrast Ratio	K	Ø=10°, θ=0°, Note 1	-	3.0	-	-
Brightness	-	-	-	10	-	cd/m^2
Viewing Direction		-		6		o'clock
Viewing Angle	Ø2 - Ø1	K=1.4, Note 1	-	40	-	degree
Response Time (Rise)	t_R	Ø=10°, θ=0°, Note 1	-	250	400	ms
Response Time (Fall)	t_F	Ø=10°, θ=0°, Note 1	-	300	450	ms

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Min	Max	Unit
Supply Voltage (Logic)	V_{DD} - V_{SS}	-	0	7	V
Supply Voltage (LC Drive)	V_{DD} - V_{EE}	-	0	22	V
Input Voltage	V_I	-	VSS	VDD	V
Operating Temperature	T_{OP}	Note 4,5	0	50	°C
Storage Temperature	T_{ST}	Note 4,5	-20	60	°C

DATA INTERFACE PIN ASSIGNMENT

Pin No	Symbol	Level	Function
A1	VSS (0V)	-	Ground
A2	VDD (+5V)	-	Power supply for logic
A3	V0	-	Power supply for LCD drive
A4	RS	-	Register select
A5	R/W	-	Read / Write
A6	E	-	Enable
A7-A14	DB0 - DB7	-	Data bus
A15	Not CS	-	Chip select
A16	Not RES	-	Reset
A17	VEE (15.0V)	-	Power supply for LCD drive
A18-A20	NC	-	No connection
E1-E2	VEL	-	Power supply for EL driving

ELECTRICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage (Logic)	V_{DD} - V_{SS}	-	4.75	5.0	5.25	V
Supply Voltage (LC Drive)	V_{EE} - V_{SS}	-	-14.5	-15.0	-15.5	V
Supply Current	I_{DD}	Note 2	-	6.0	-	mA
	I_{EE}	Note 2	-	4.0	-	mA
Input Voltage (High Level)	V_{IH}	High Level	0.8* VDD	-	VDD	V
Input Voltage (Low Level)	V_{IL}	Low Level	0	-	0.2* VDD	V
Frame Frequency	f_{FLM}	-	-	75	-	Hz
Duty Ratio		-		1/128		-
Recommended LC Drive Voltage	V_{DD} -V_O	Duty=1/128 T=0°C, Ø=10°, Note 3	-	16.9	-	V
		Duty=1/128 T=25°C, Ø=10°, Note 3	-	15.8	-	V
		Duty=1/128 T=40°C, Ø=10°, Note 3	-	15.4	-	V
Backlight Tile Voltage	V_{EL}	f_{EL}=400Hz	-	100	-	Vrms
Backlight Lamp Frequency	f_{EL}	-	-	400	-	Hz
Backlight Tile Current	I_{EL}	V_{EL}=100Vrms, f_{EL}=400Hz	-	-	160	mArms

TIMING CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit
Enable cycle time	tCYC	1000	-	-	ns
Enable pulse width (High level)	tWEH	450	-	-	ns
Enable pulse width (Low level)	tWEL	450	-	-	ns
Enable rise time	tEr	-	-	25	ns
Enable fall time	tEf	-	-	25	ns
Set up time of CS, R/W, RS	tAS	140	-	-	ns
Set up time of Input Data	tDIS	225	-	-	ns
Data delay time	tDD	-	-	225	ns
Hold time of Data	tH	10	-	-	ns
Hold time of CS, R/W, RS	tAH	10	-	-	ns
Data hold time	tDH	20	-	-	ns

CONNECTORS

Connector	
No special connector required	

Note1: Definition of optical data, see page XXX

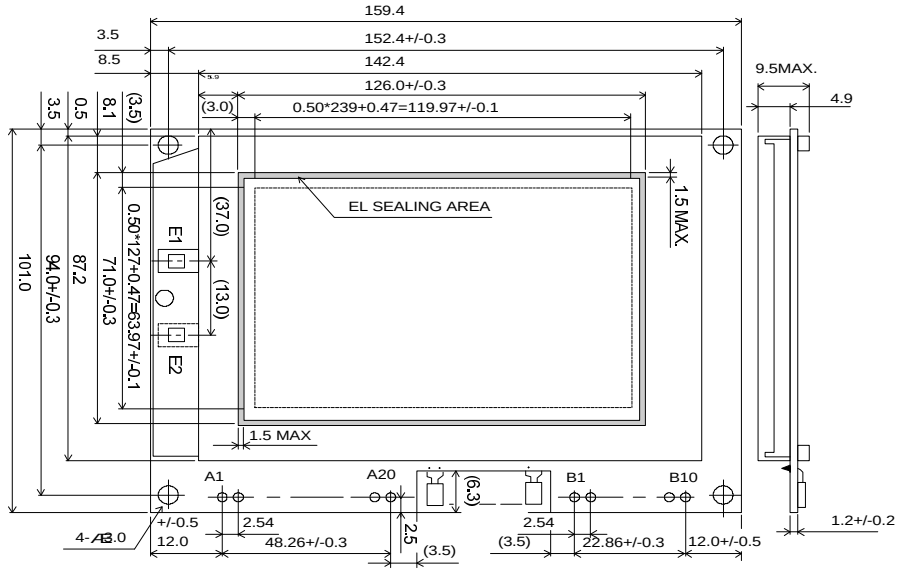
Note 2: fFLM=75Hz, VDD-V0=15.8V, D=GND(VSS)

Note 3: Recommended LC driving voltage may fluctuate about +- 0.5V by each module

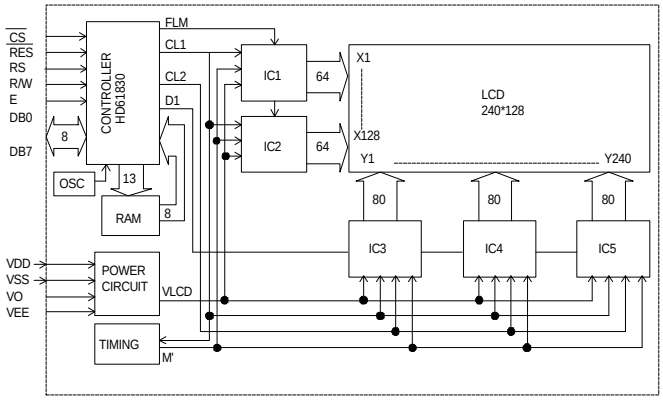
Note 4: Background colour of the LCD changes depending on temperature. Between 40-50°C optical characteristics of the LCD like contrast and viewing angle change but the LCD remains readable.

Note 5: Storage at -20°C < 48 hr.

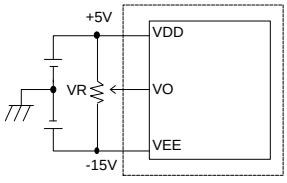
MECHANICAL DIMENSIONS



BLOCK DIAGRAM

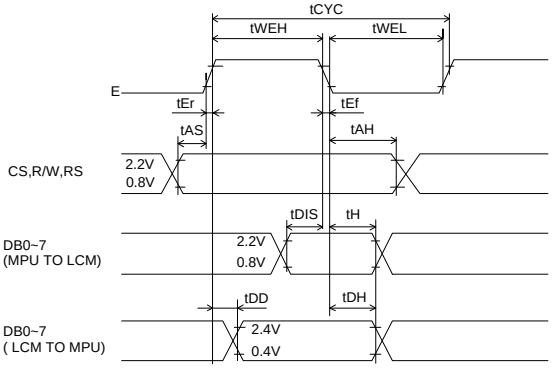


POWER SUPPLY

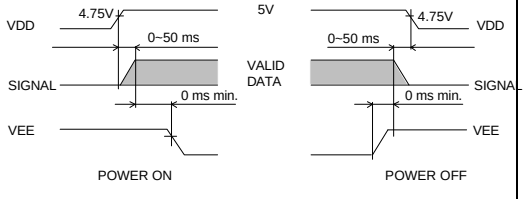


VR: 10~20KΩ

INTERFACE TIMING DIAGRAM



POWER UP TIMING DIAGRAM



HITACHI