

User's Guide

NHD-12864EZ-FL-YBW

LCM

(Liquid Crystal Display Graphic Module)

RoHS Compliant

NHD-	Newhaven Display
12864-	128 x 64 pixels
EZ-	Version Line
F-	Transflective
L-	Yellow/Green LED B/L
Y-	STN- Yellow/Green
B-	6:00 View
W-	Wide Temperature (-20 ~ +70c)

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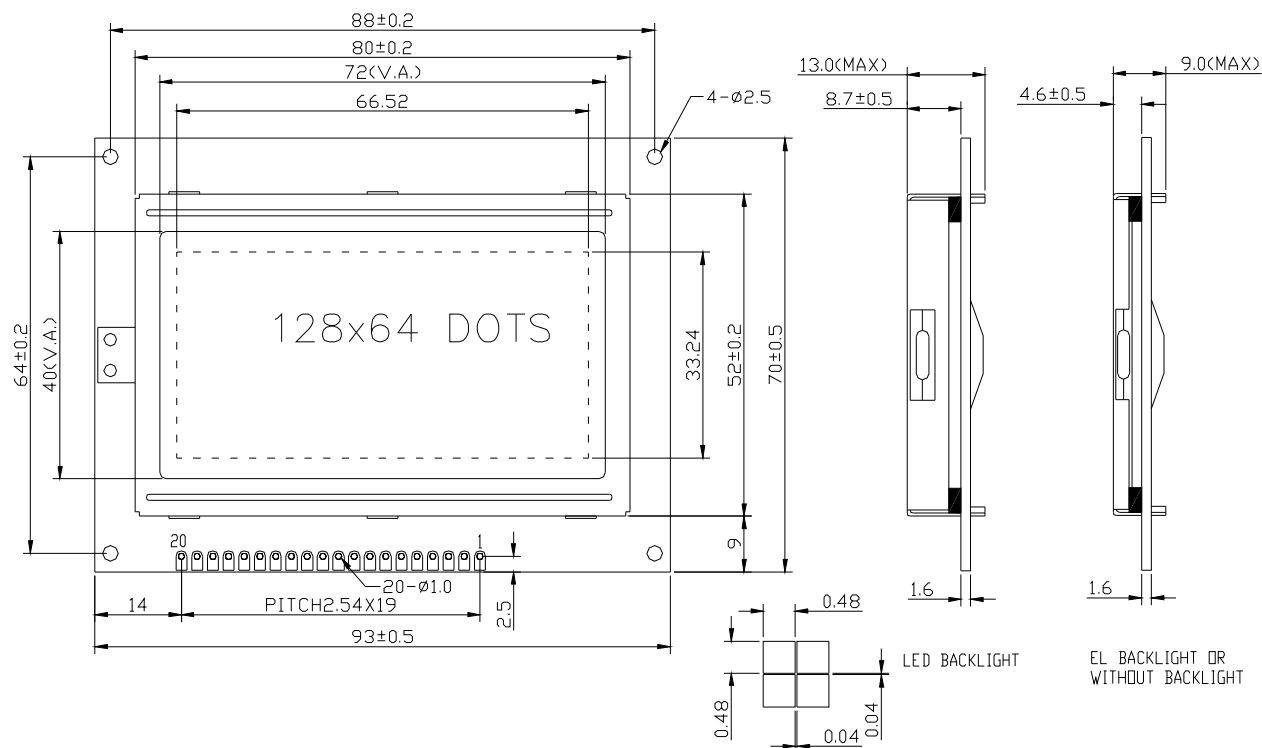
February 29, 2008

NHD-12864EZ

◆ Feature

1. 128X64 dots with 8192 chinese character fonts (16x16)
2. 128 alpha-numerical fonts (16x8)
3. 64X256 bit graphic display RAM
4. Strong display control fuctions: Vertical scroll, horizontal bit scroll, line reverse etc
5. +2.7~ +5.5V power supply
4. STN; 1/64 duty; LED BKL or EL BKL
7. 4bit, 8bit, serial interface

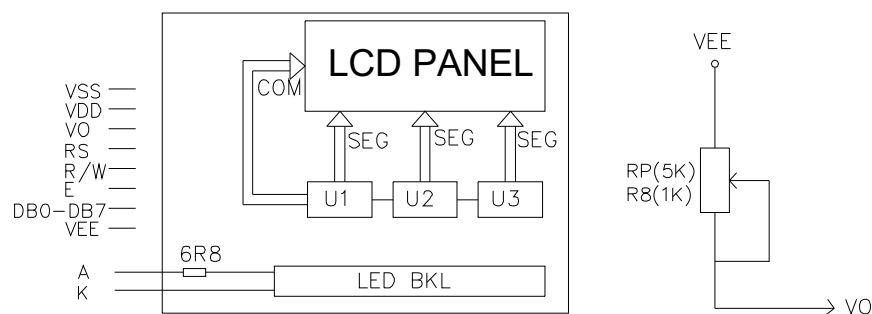
◆ Mechanical diagram



◆ Mechanical data

ITEM	STANDARD	UNIT
MODULE DIMENSION	93X70.0/9.0(EL)/13.0(LED)	mm
VIEWING AREA	72.0X40	mm
DOT SIZE	0.48X0.48	mm
DOT PITCH	0.52X0.52	mm

◆ *Block diagram*



◆ *Absolute Maximum Ratings*

ITEM	SYMBOL	MIN	MAX	UNIT
Power Voltage	$V_{DD}-V_{SS}$	0	5.5	V
Input Voltage	V_I	V_{SS}	V_{DD}	
LCD Voltage	V_{LCD}	4.5	7.0	
Operating temperature range	V_{OP}	-20	+70	°C
Storage temperature range	T_{ST}	-30	+80	

DESCRIPTION OF TERMINALS

PIN NO.	PIN NAME	INPUT/ OUTPUT	EXTERNAL CONNECTION	FUNCTION
1	VSS	INPUT	POWER SUPPLY	VSS: GND
2	VDD	INPUT		VDD: +5V
3	VO	INPUT		V _{LCD} ADJUSTMENT
4	RS(CS*)	INPUT	MPU	REGISTER SELECT SIGNAL “0”:INSTRUCTION REGISTER (WHEN WRITING) BUSY FLAG & ADDRESS COUNTER (WHEN READING) “1”:DATA REGISTER (WHEN WRITING & READING)
5	RW(SID*)	INPUT	MPU	READ/WRITE SELECT SIGNAL “0” FOR WRITING , “1” FOR READING
6	E(SCLK*)	INPUT	MPU	OPERATION (DATA READ/WRITE) ENABLE SIGNAL
7 / 10	DB0-DB3	INPUT	MPU	LOW-ORDER LINES OF DATA BUS WITH 3-STATE, BI-DIRECTIONAL FUNCTION FOR USE IN DATA TRANSACTION WITH THE MPU. THESE LINES ARE NOT USED WHEN INTERFACING WITH A 4-BIT MICROPROCESSOR.
11 / 14	DB4-DB7	INPUT	MPU	HIGH-ORDER LINES OF DATA BUS WITH 3-STATE, BI-DIRECTIONAL FUNCTION FOR USE IN DATA TRANSACTIONS WITH THE MPU. DB7 MAY ALSO BE USED TO CHECK THE BUSY FLAG.
15	A	INPUT	BACKLIGHT	RESET SIGNAL
16	K	INPUT		DOUBLE VOLTAGE BOOSTER OUTPUT
17	/RST	INPUT		
18	VEE	OUTPUT		
19	A	INPUT	BACKLIGHT	
20	K	INPUT		

◆ Optical Characteristics

● FOR STN TYPE DISPLAY MODULE ($T_A=25^{\circ}\text{C}$, $V_{DD}=5.0\text{V}\pm 0.25\text{V}$)

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
VIEWING ANGLE	Θ	$C_R \geq 4$	-25	—	—	DEG
	Φ		-30	—	30	
CONTRAST RATIO	C_R		—	2	—	—
RESPONSE TIME(RISE)	T_R	—	—	120	150	mS
RESPONSE TIME(FALL)	T_R	—	—	120	150	mS

● STN TYPE DISPLAY MODULE ($T_A=25^{\circ}\text{C}$, $V_{DD}=5.0\text{V}$)

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
VIEWING ANGLE	Θ	$C_R \geq 2$	-60	—	35	DEG
	Φ		-40	—	40	
CONTRAST RATIO	C_R		—	6	—	—
RESPONSE TIME(RISE)	T_R	—	—	150	250	mS
RESPONSE TIME(FALL)	T_R	—	—	150	250	mS

◆ Electrical Characteristics

● DC Characteristics($T_A=25^{\circ}\text{C}$, $V_{DD}=5.0\text{V}$)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYPE	MAX.	UNIT
SUPPLY VOLTAGE FOR LCD	$V_{DD}-V_O$	$T_A=25^{\circ}\text{C}$	—	6.5	—	V
INPUT VOLTAGE	V_{DD}		3.0	5.0	5.5	V
SUPPLY CURRENT	I_{DD}	$V_{DD}=5.0\text{V}; T_A=25^{\circ}\text{C}$	—	0.5	0.7	mA
INPUT LEAKAGE CURRENT	I_{LKG}		—	—	1.0	μA
“H” LEVEL INPUT VOLTAGE	V_{IH}		3.5	—	V_{DD}	V
“L” LEVEL INPUT VOLTAGE	V_{IL}	TWICE INITIAL VALUE OR LESS	-0.3	—	0.6	V
“H” LEVEL OUTPUT VOLTAGE	V_{OH}	$LOH= -0.25\text{mA}$	4.0	—	—	V
“L” LEVEL OUTPUT VOLTAGE	V_{OL}	$LOL=1.6\text{mA}$	0	—	—	V
BACKLIGHT SUPPLY VOLTAGE	V_F		—	4.2	5.0	V

● DC Characteristics($T_A=25^{\circ}\text{C}$, $V_{DD}=3.0\text{V}$)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYPE	MAX.	UNIT
SUPPLY VOLTAGE FOR LCD	$V_{DD}-V_O$	$T_A=25^{\circ}\text{C}$	—	4.2	—	V
INPUT VOLTAGE	V_{DD}		—	3.0	3.3	V
SUPPLY CURRENT	I_{DD}	$V_{DD}=5.0\text{V}; T_A=25^{\circ}\text{C}$	—	0.4	0.7	mA
INPUT LEAKAGE CURRENT	I_{LKG}		—	—	1.0	μA
“H” LEVEL INPUT VOLTAGE	V_{IH}		3.5	—	V_{DD}	V
“L” LEVEL INPUT VOLTAGE	V_{IL}	TWICE INITIAL VALUE OR LESS	-0.3	—	0.6	V
“H” LEVEL OUTPUT VOLTAGE	V_{OH}	$LOH= -0.25\text{mA}$	4.0	—	—	V
“L” LEVEL OUTPUT VOLTAGE	V_{OL}	$LOL=1.6\text{mA}$	—	—	—	V
BACKLIGHT SUPPLY VOLTAGE	V_F		—	—	—	V

● **AC Characteristics (VDD=5V,TA=25°C) Parallel mode interface**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Internal clock operation						
f _{OSC}	OSC Frequency	R=33k	-	540	-	KHZ
External Clock Operation						
t _{EX}	External Frequency	-	-	540	-	KHZ
	Duty Cycle	-	45	50	55	%
T _R , T _F	Rise/Fall Time	-	-	-	0.2	us
Write Mode (writing data from MPU to LCM)						
T _C	Enable Cycle Time	Pin E	1200	-	-	ns
T _{PW}	Enable Pulse Width	Pin E	140	-	-	
T _r , T _f	Enable rise/fall time	Pin E	-	-	25	ns
T _{AS}	Address setup time	Pins: RS, RW, E	10	-	-	
T _{AH}	Address hold time	Pins: RS, RW, E	20	-	-	
T _{DDR}	Data delay time	Pins; DB0-DB7	40	-	-	
T _H	Data hold time	Pins DB0-DB7	20	-	-	
Read mode (writing data from MPU to LCM)						
T _C	Enable Cycle Time	Pin E	1200	-	-	ns
T _{PW}	Enable Pulse Width	Pin E	140	-	-	
T _r , T _f	Enable rise/fall time	Pin E	-	-	25	ns
T _{AS}	Address setup time	Pins: RS, RW, E	10	-	-	
T _{AH}	Address hold time	Pins: RS, RW, E	20	-	-	
T _{DDR}	Data delay time	Pins; DB0-DB7	-	-	100	
T _H	Data hold time	Pins DB0-DB7	20	-	-	

● **AC Characteristics (VDD=5V,TA=25°C) Serial mode interface**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Internal clock operation						
T _{osc}	OSC Frequency	R=33k	470	540	590	KHZ
External Clock Operation						
T _{EX}	External Frequency	-	470	530	590	KHZ
	Duty Cycle	-	45	50	55	%
T _R , T _F	Rise/Fall Time	-	-	-	0.2	us
T _{SCYC}	Enable Cycle Time	Pin E	600	-	-	ns
T _{SHW}	Enable Pulse Width	Pin E	200	-	-	
T _{SLW}	Enable rise/fall time	Pin E	200	-	-	
T _{SDS}	Address setup time	Pin: RW	40	-	-	
T _{SDH}	Address hold time	Pin: RW	40	-	-	
T _{CSS}	Data delay time	Pin; RS	60	-	-	
T _{CSH}	Data hold time	Pin: RS	60	-	-	

● **AC Characteristics (VDD=3.0V,TA=25°C) Parallel mode interface**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Internal clock operation						
F _{OSC}	OSC Frequency	R=18k	-	530	-	KHZ
External Clock Operation						
T _{EX}	External Frequency	-	-	530	-	KHZ
	Duty Cycle	-	45	50	55	%
T _R , T _F	Rise/Fall Time	-	-	-	0.2	us
Write Mode (writing data from MPU to LCM)						
T _C	Enable Cycle Time	Pin E	1800	-	-	ns
T _{PW}	Enable Pulse Width	Pin E	160	-	-	
T _r , T _f	Enable rise/fall time	Pin E	-	-	25	ns
T _{AS}	Address setup time	Pins: RS, RW, E	10	-	-	
T _{AH}	Address hold time	Pins: RS, RW, E	20	-	-	
T _{DDR}	Data delay time	Pins; DB0-DB7	40	-	-	
T _H	Data hold time	Pins DB0-DB7	20	-	-	
Read mode (reading data form MPU to LCM)						
T _C	Enable Cycle Time	Pin E	1800	-	-	ns
T _{PW}	Enable Pulse Width	Pin E	320	-	-	
T _r , T _f	Enable rise/fall time	Pin E	-	-	25	ns
T _{AS}	Address setup time	Pins: RS, RW, E	10	-	-	
T _{AH}	Address hold time	Pins: RS, RW, E	20	-	-	
T _{DDR}	Data delay time	Pins; DB0-DB7	-	-	260	
T _H	Data hold time	Pins DB0-DB7	20	-	-	

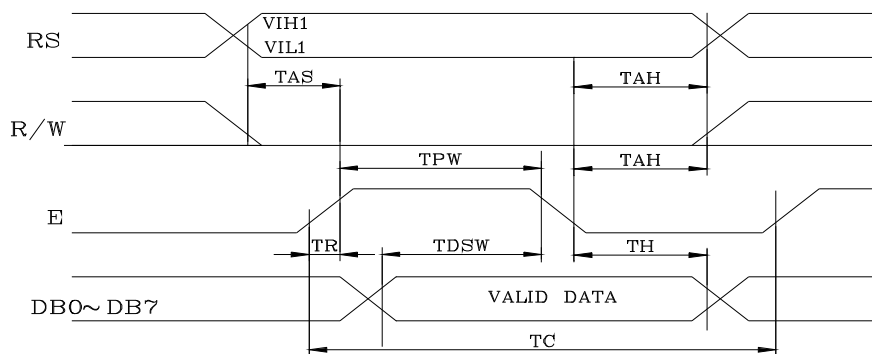
● **AC Characteristics (VDD=3.0V,TA=25°C) Serial mode interface**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Internal clock operation						
T _{osc}	OSC Frequency	RF=18k	470	540	590	KHZ
External Clock Operation						
T _{EX}	External Frequency	-	470	530	590	KHZ
	Duty Cycle	-	45	50	55	%
T _R , T _F	Rise/Fall Time	-	-	-	0.2	us
T _{SCYC}	Enable Cycle Time	Pin E	600	-	-	ns
T _{SHW}	Enable Pulse Width	Pin E	300	-	-	
T _{SLW}	Enable rise/fall time	Pin E	300	-	-	
T _{SDS}	Address setup time	Pin: RW	40	-	-	
T _{SDH}	Address hold time	Pin: RW	40	-	-	
T _{CSS}	Data delay time	Pin; RS	60	-	-	
T _{CSH}	Data hold time	Pin: RS	60	-	-	

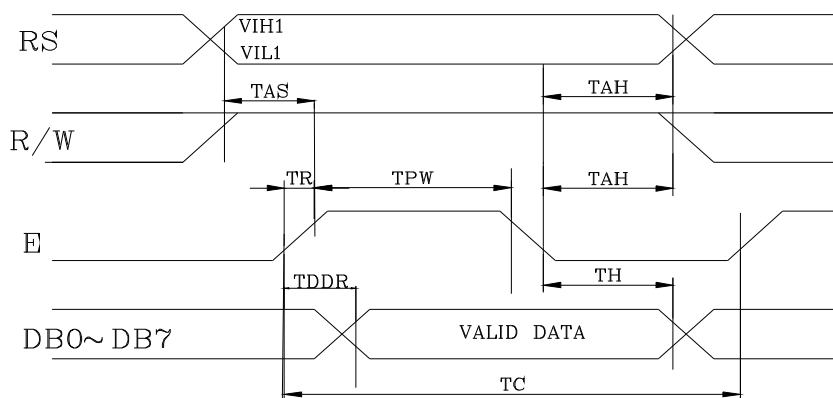
NHD-12864EZ

◆ Timing Characteristics

● Writing data form MPU to LCM

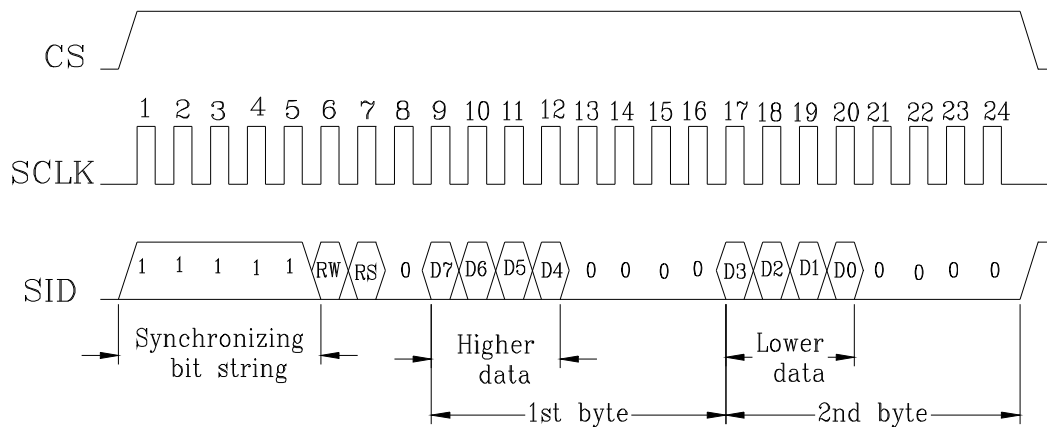


● Reading data from LCM to MPU



serial interface & transferring serial data

● Writing data form MPU to LCM



◆ **CGROM, CGRAM, ICON RAM, AND DDRAM, GDRAM**

● Graphic display data address map

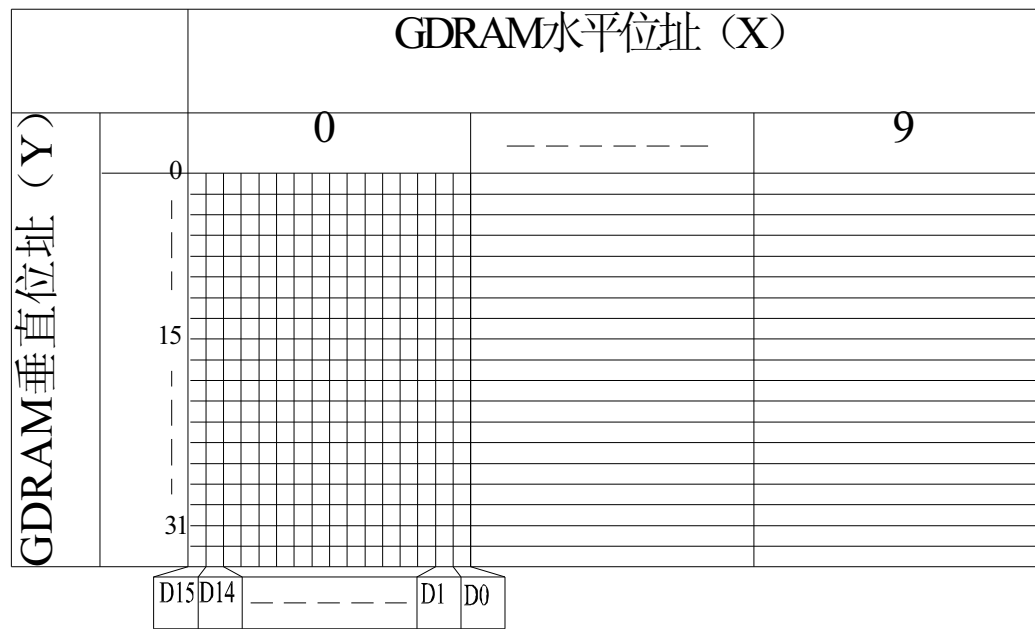


Table 1: 64 x 256-bit map display RAM (GDRAM) for graphic mode display

● **Character generator ROM (CGROM)**

THE CHARACTER GENERATOR ROM GENERATES 16 X 16 DOT OR 16 X 8 DOT CHARACTER PATTERNS FROM TWO 8-BIT CHARACTER CODES. USER-DEFINED CHARACTER PATTERNS ARE ALSO AVAILABLE BY MASK-PROGRAMMED ROM.

● **Character generator RAM (CGRAM)**

IN THE CHARACTER GENERATOR RAM, THE USER CAN REWRITE CHARACTER PATTERNS BY PROGRAM. FOR 16 X 16 DOTS, FOUR CHARACTER PATTERNS CAN BE WRITTEN.

SEE TABLE 1 FOR THE RELATIONSHIP BETWEEN CGRAM ADDRESSES AND DATA AND DISPLAY PATTERNS. AREAS THEY ARE NOT USED FOR DISPLAY CAN BE USED AS GENERAL DATA RAM.

DDRAM DATA				CGRAM ADDRESS						CGRAM DATA HIGH BYTE								CGRAM DATA LOW BYTE														
B15~B4	B3	B2	B1	B0	B5	B4	B3	B2	B1	B0	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0						
0	×	0	0	×	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0					
							0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	
							0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	
							0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	
							0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	
							0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0
							0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	
							0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
							1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
							1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
							1	0	1	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
							1	0	1	1	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0	0
							1	1	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0	0
							1	1	0	1	0	0	0	0	1	0	0	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0
							1	1	1	0	0	0	0	0	1	0	0	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0
							0	×	0	1	×	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
0	0	0	1	0	0	0								0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0		
0	0	1	0	0	0	0								0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	
0	0	1	1	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	1	0	0	0	0	0								0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	
0	1	0	1	0	0	0								0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	
0	1	1	0	0	0	0								0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	
0	1	1	1	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0								0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	
1	0	0	1	0	0	0								0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
1	0	1	0	0	0	0								0	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	
1	0	1	1	0	0	0								0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0	
1	1	0	0	0	0	0								0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0	
1	1	0	1	0	0	0								0	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	
1	1	1	0	0	0	0								0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	
1	1	1	1	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Table1

Table 1: Relationship between CGRAM Addresses, Character Codes (DDRAM) and Character patterns (CGRAM Data)

Notes:

1. Character code bits 1 to 2 correspond to CGRAM address bits 4 to 5 (2 bits: 4 types).
2. CGRAM address bits 0 to 3 designate the character pattern line position. The 16th line is the cursor position and a logical OR with the cursor forms its display. Maintain the 16th line data, corresponding to the cursor display position, at 0 as the cursor display. If the 16th line data is 1, 1 bits will light up the 16th line regardless of the cursor presence.
3. Character pattern row positions correspond to CGRAM data bits 0 to 15 (bit 15 being at the left).
- *4. As shown Table, CGRAM character patterns are selected when character code bits 4 to 15 are all 0 and bit 0 and bit 3 are don't care (x).

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	X															
1	▶	◀	⬆	!!	¶	§	-	‡	↑	↓	→	←	L	↔	▼	▲
2		!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	␣	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{		}	~	␣

Table 2: 16K-bit half-size character generator ROM (HCGROM) for a total of 128 alpha-numerical fonts(16x8 dots)

◆ **Control and display command**● **Basic instruction****Instruction Table: (RE=0: Enable basic instruction.)**

Instruction	Instruction Code											Description	Execution Time (450KHZ)
	RS	RW	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0			
Clear Display	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM, and set DDRAM address to "00H" from AC	2.5 ms	
Return Home	0	0	0	0	0	0	0	0	1	X	Set DDRAM address to "00H" from AC and return cursor to its original position if shifted. The contents of DDRAM are not changed.	2.5 ms	
Entry Mode Set	0	0	0	0	0	0	0	1	I/D	S	Sets cursor move direction and specifies display shift. These operations are performed during data write and read.	60us	
Display ON/OFF	0	0	0	0	0	0	1	D	C	B	D=1: entire display on C=1: cursor on B=1: cursor position on	60 us	
Cursor or Display Shift	0	0	0	0	0	1	S/C	R/L	X	X	Set cursor moving and display shift control bit, and the direction, without changing DDRAM data.	60 us	
Function Set (Modify)	0	0	0	0	1	DL	N	0	G	X	DL: interface data is 8/4 bits N=1 & RE=0: 3 Line setting N=1 & RE=1: 4 Line setting G=1: Graphic display on G=0: Graphic display off Others: 2 Line setting RE=1: Extended instruction setting. RE=0: Normal instruction setting.	60 us	
Set CGRAM address	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address in address counter	60 us	
Set DDRAM address	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address counter	60 us	
Read Busy flag and address	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Whether during internal operation or not can be known by reading BF. The contents of address counter can also be read.	0 us	
Write data to RAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM (DDRAM/CGRAM/IRAM/GRAM)	60 us	
Read data from RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM (DDRAM/CGRAM/IRAM/GRAM)	60 us	

● **Extension instruction**

Instruction Table: (RE=1: Enable extension instruction.)

Instruction	Instruction Code											Description	Execution Time (540KHZ)
	RS	RW	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0			
Standby Mode	0	0	0	0	0	0	0	0	0	1	Enter standby mode, only Icon areas display. Standby mode can be released by any other instructions.	60 us	
Start Row Enable	0	0	0	0	0	0	0	0	1	SR	SR=1: Allow change start display Row. SR=0: Disable start display Row change.	60 us	
Reverse Line Select	0	0	0	0	0	0	0	1	R1	R0	Choice one of 4 lines which data is reverse display.	60 us	
Sleep mode and Set GRAM page	0	0	0	0	0	0	1	SL	GD	GW	SL=0: Enter sleep mode. SL=1: Wake-up from sleep mode. GD: Display graphic page 0 or 1 GW: Write data to graphic page 0 or 1. (Effective while GP=1)	60 us	
Display Shift by dot	0	0	0	0	0	1	OA	LR	L1	L0	OA=1: One of 4 lines shift enable. OA=0: All line shift enable. LR=1: Dot by dot shift right. LR=0: Dot by dot shift left. L1, L0: Choice one of 4 lines shift.	60 us	
Function Set (Modify)	0	0	0	0	1	CL	N	1	G	GP	CL=1: Select 16 character line CL=0: Select 8 character line N=1 & RE=1: 4 line display RE=1: Extended instruction setting. RE=0: Normal instruction setting. G=1: Graphic display on G=0: Graphic display off GP=1: Two page GRAM GP=0: One page GRAM	60 us	
Set IRAM or Start Row address	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	SR=1: AC5~AC0 is start row SR=0: AC5~AC0 is ICON RAM address	60 us	
Set Graphic RAM address	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set Graphic RAM address in address counter. Execute once set the address of display row. Execute again set the address of display column. Each address of display column has data of 16 bits. Therefore write data should execute 2 times.	60 us	

Note:

Be sure the LCM is not in the busy state (BF = 0) before sending an instruction from the MPU to the LCM. If an instruction is sent without checking the busy flag, the time between the first instruction and next instruction will take much longer than the instruction time itself. Refer to Instruction Table for the list of each instruction execution time.

◆ Serial Interface & Transferring Serial Data

The LCM enters serial mode when the J8 is set low. A two-line clock synchronous transfer method is used. The LCM receives serial input data(SID) by synchronizing with a transfer clock(SCLK) sent from the master side.

When the MPU interfaces with several LCD MODULES, chip select pin(CS) must be used. The transfer clock(SCLK) input is activated by making chip select(CS) high. In addition, the transfer counter of the LCM can be reset and serial transfer synchronized by making chip select(CS) low. Here, since the data which was being sent at reset is cleared, restart the transfer from the first bit of this data. In a minimum system where a single LCM interfaces to a single MPU, an interface can be constructed from the transfer clock(SCLK) and serial input data(SID). In this case, chip select(CS) should be fixed to high.

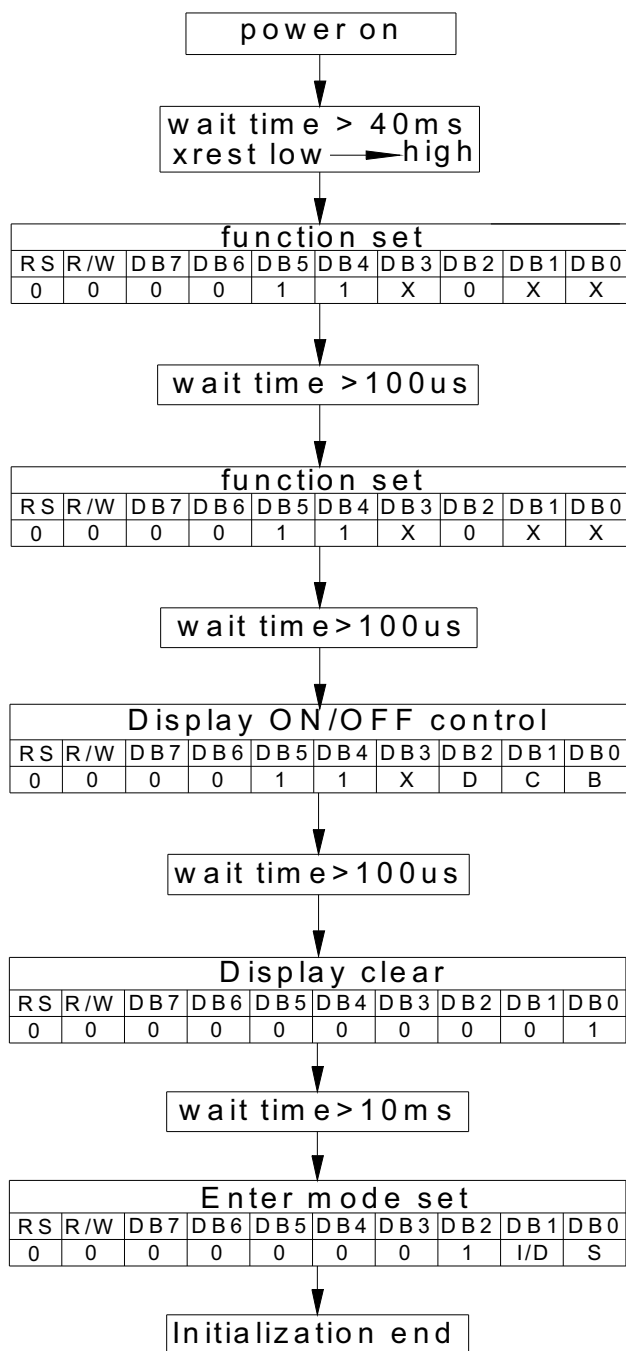
The transfer clock(SCLK) is independent of operational clock of the LCM. However, when several instructions are continuously transferred, the instruction execution time determined by the operational clock must be considered since the LCM does not have an internal transmit/receive buffer.

Following figure shows the basic procedure for transferring serial data. To begin with, transfer the start byte. By receiving five consecutive bits of 1(synchronizing bit string) at the beginning of the start byte, the transfer counter of the LCM is reset and serial transfer is synchronized. The 2 bits following the synchronizing bit string(5 bits) specify transfer direction(RW bit) and register select(RS bit). Be sure to transfer 0 in the 8 th bit.

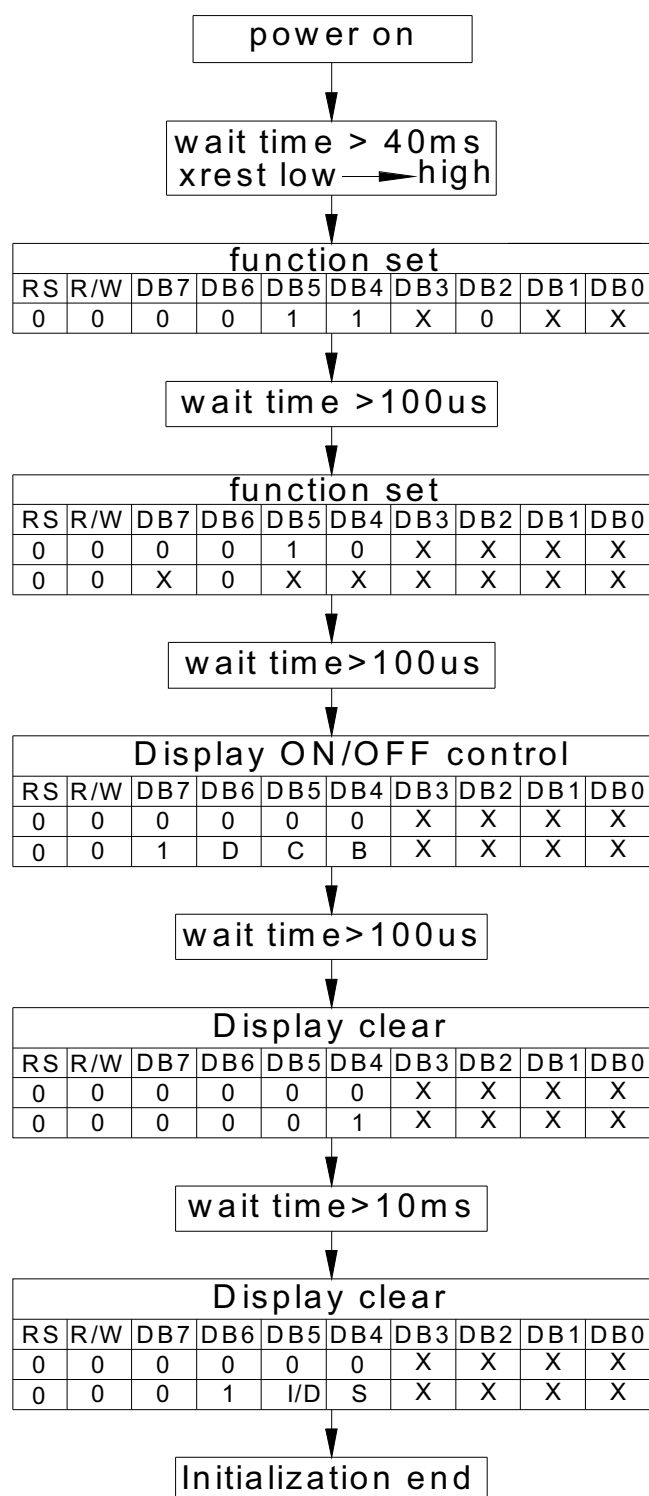
After receiving the start synchronizing bit string, the RW bit(=0), and RS bit in the start byte, an 8-bit instruction is received in 2 bytes: the higher 4 bits of the instruction are placed in the LSB of the first byte, and the lower 4 bits of the instruction are placed in the LSB of the second byte. Be sure to transfer 0 in the following 4 bits of each byte.

◆ Initialization procedure

● 8-bit Interface:



● 4-bit Interface:



A6E0	舟倭	艮伴	色佛	艾何	虫估	血佐	行佑	衣伽	西伺	阡伸	串佃	亨佔	位似	住但	佇佣	佗
A6F0	佞作	伴你	佛伯	何低	估伶	佐余	佑尙	伽佈	伺佚	伸兌	佃克	佔免	似兵	但治	佣冷	別
A740	判呖	利吧	刪呆	低創	伶劫	余助	尙努	佈劬	佚匣	兌即	克卵	免吝	兵吭	治吞	冷吾	否
A750	呖呶	吧吼	呆呀	創呃	劫吳	助呈	呂听	君函	匣吩	告囹	吹囹	吻坊	吸坑	吮吮	吵垓	呐
A760	吠均	吼坎	呀坡	吱坐	含坏	吟圻	壯夾	函妝	囹妒	囹妨	囹妨	坊姁	坑妣	吮妙	垓妖	
A770	均妍	坎好	坡妓	坐妊	坏妥	圻孝	夾孚	妝享	妒完	妨宋	妨廷	姁宏	妣虺	妙局	妖屈	尿
A7B0	妍役	好岐	妓岑	妊岔	妥岌	孝巫	孚希	享悃	完庇	宋戒	廷我	宏弄	虺弟	局形	屈技	仿
A7C0	役捷	岐扭	岑忌	岔扼	岌找	巫批	希快	悃抒	庇扯	戒折	我扮	弄投	弟抓	形抖	技抑	扶
A7D0	捷攻	扭攸	忌旱	扼更	找束	批李	快杏	抒材	扯村	折杜	扮杖	投杞	抓杉	抖杆	抑杠	改
A7E0	攻杓	攸宋	旱步	更每	束求	李永	杏沙	材沁	村沈	杜沉	杖沭	杞沭	杉汪	杆決	杠沐	汰
A840	杓沌	宋汨	步冲	每沒	求汽	永沃	沙汲	沁汾	沈汴	沉沅	沭汶	沭沔	汪洵	決皂	沐汀	灶
A850	沌灼	汨災	冲灸	沒牢	汽牡	沃牠	汲狄	汾狂	汴玖	沅甬	汶甫	沔男	洵育	皂良	汀芒	矣
A860	灼私	災秀	灸禿	牢究	牡系	牠罕	狄肖	狂肯	玖肝	甬肘	甫肛	男肚	育身	良車	芒辛	
A870	私芋	秀芍	禿見	究角	系言	罕谷	肖豆	肯豕	肝貝	肘赤	肛走	肚足	育身	良車	芒辛	
A8A0	芋辰	芍迂	見迪	角迅	言迄	谷巡	豕邑	豕邪	貝邪	赤邦	走那	足西	身采	里侍	辛防	阮
A8B0	辰阡	迂阪	迪阡	迅並	迄乖	巡乳	邑事	邪修	邪亞	邦享	那京	西佯	身依	里侍	防佳	使
A8C0	阡佬	阪供	阡例	並來	乖侃	乳佰	事併	修函	亞佩	享桃	京侖	佯則	依侖	侍侖	佳侖	兔
A8D0	佬効	供兇	例兩	來具	侃卓	佰典	併典	函卷	佩卸	桃券	侖刷	則叔	依侖	侍侖	佳侖	剝
A8E0	効劬	兇兜	兩卒	具協	卓卑	典卑	典卑	卷卦	卸卷	券卸	刷叔	叔叔	叔受	侖味	侖制	
A8F0	劬咖	兜呶	卒咭	協咀	卑呻	卑呶	卑咄	卦咒	咆呶	卑呶	叔呶	叔呶	叔呶	和夜	咳奉	呢
A940	咖周	呶咋	咭命	咀咎	呻固	呶垃	咄珂	咒坪	咆坭	呶坡	呶坦	呶坤	呶坼	夜姓	奉姊	奇
A950	周奈	咋奄	命奔	咎妾	固妻	垃委	珂妹	坪妮	坭姑	坡姆	坦姐	坤姁	坼始	姓屈	姊居	妯
A960	奈妳	奄姁	奔婢	妾孟	妻孤	委季	妹宗	妮定	姑官	姆宜	姐宙	姁宛	始尙	屈帑	居幸	
A970	妳届	姁岷	婢岡	孟岸	孤岩	季岫	宗岱	定岳	官帘	宜帶	宙帖	宛帕	尙帑	帑忒	幸忠	
A9A0	届庚	岷店	岡府	岸底	岩庖	岫延	岱弦	岳弧	帘弩	帶往	帖征	帕佛	帑彼	忒恒	忠或	忽
A9B0	庚念	店忿	府快	底怔	庖怯	延恍	弦怖	弧怪	弩怕	往怡	征性	佛昵	彼佛	恒拓	或拔	戕
A9C0	念房	忿戾	快所	怔承	怯拉	恍拌	怖拄	怪抵	怕拂	怡抹	性拒	昵招	佛披	恒拓	或拔	拋
A9D0	房拈	戾抨	所抽	承押	拉拐	拌拙	拄揭	抵拍	拂抵	抹拈	拒抱	招拘	披拖	拓拗	拔折	抬
A9E0	拈拎	抨抬	抽斧	押旺	拐枋	拙枋	揭東	拍昌	抵昆	拈杷	抱枇	拘枝	拖昏	拗杆	折杰	
A9F0	拎昇	抬服	斧朋	旺杭	枋枋	枋料	東杼	昌果	昆杲	杷杲	枇武	枝歧	昏林	杆殄	杰氛	板
AA40	昇枉	服松	朋析	杭杵	枋泥	料河	杼沽	果沾	杲沼	杷波	枇沫	歧沫	林混	殄泚	氛渚	油
AA50	枉注	松泳	析沱	杵泌	泥泱	河沿	沽治	沾泡	沼泛	波牧	沫物	沫狀	混狎	泚狙	渚狗	
AA60	注况	泳沮	沱泗	泌洳	泱泱	沿爬	治爭	泡爸	泛版	泊牧	沫物	沫狀	混狎	泚狙	渚狗	
AAA0	炕炎	炒炒	炊炊	炙炙	爬爬	爭爬	爸爭	疝疝	疝疝	疥疥	疥疥	疥疥	疥疥	疥疥	疥疥	
AAB0	狐玩	玗玗	玗玗	玗玗	玗玗	玗玗	玗玗	玗玗	玗玗	玗玗	玗玗	玗玗	玗玗	玗玗	玗玗	玗玗
AAC0	社祀	祁祁	秉秉	肩肩	肴肴	肪肪	肯肯	臥臥	與與	舍舍	芳芳	芝芝	芙芙	美美	芭芭	芽芽
AAD0	肱股	芬芬	芥芥	苾苾	苾苾	苾苾	苾苾	苾苾	苾苾	苾苾	苾苾	苾苾	苾苾	苾苾	苾苾	苾苾
AAE0	芹返	近近	邵邵	邱邱	邱邱	邱邱	邱邱	邱邱	邱邱	邱邱	邱邱	邱邱	邱邱	邱邱	邱邱	邱邱
AAF0	返促	侶侶	冠冠	剌剌	剌剌	剌剌	剌剌	剌剌	剌剌	剌剌	剌剌	剌剌	剌剌	剌剌	剌剌	剌剌
AB40	厚叛	咬咬	哀哀	咨咨	咬咬	咻咻	咻咻	咻咻	咻咻	咻咻	咻咻	咻咻	咻咻	咻咻	咻咻	咻咻
AB50	叻叻	哈哈	咯咯	唎唎	唎唎	唎唎	唎唎	唎唎	唎唎	唎唎	唎唎	唎唎	唎唎	唎唎	唎唎	唎唎
AB60	城城	姁姁	威威	姻姻	孩孩	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣
AB70	姚姚	姁姁	威威	姻姻	孩孩	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣	宣宣
AB80	峒峒	後後	佻佻	恤恤	扁扁	拜拜	挑挑	挑挑	挑挑	挑挑	挑挑	挑挑	挑挑	挑挑	挑挑	挑挑
AB90	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
ABA0	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
ABB0	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
ABC0	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
ABD0	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
ABE0	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
ABF0	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
AC40	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
AC50	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
AC60	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
AC70	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈
ACA0	恫恫	括括	拾拾	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈	拈拈

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ACB0 爲炳炬炯炭炸炮炤爰牲牯抵狩狠狡玷
ACC0 珊玻玲珍珀玳甚甬畏界畎畎收疫疤疥
ACD0 疣癸皆皇飯盈盆盃盅省眈相眉看盾盼
ACE0 眇矜砂研砌欣祆社祈祇禹舂科拜秋穿
ACF0 突竿竿籽紂紅紀紉胃背胡胖美胞胤胝
AD40 耐要崑耶胖胥莛苛苦茄若虹虻迺苗英
AD50 致舐亭范茅莛苟苐茆虻迺苗英
AD60 苜苔苑苞苐苟苐茆虻迺苗英
AD70 計訂訃貞負赴起跣躡躡躡躡躡
ADA0 迭迫迤迤迤郊郎郁郤會酃重門限陋陌
ADB0 降面革韋韭音頁風飛食倚倒們僂倍
ADC0 倣俯倦倣倣倣倣倣倣倣倣倣倣倣
ADD0 倨俱倡個候倘俳修倭倪俾倫倉兼冤冥
ADE0 冢凍凌准凋剖剗剔剛剗剔剛剔剛剔剛
ADF0 唐喟喟喟喟喟喟喟喟喟喟喟喟喟
AE40 哦唧唇唇唇唇唇唇唇唇唇唇唇唇唇
AE50 娑娘娜娟娛媚姬娠娣婉娥娉娉娉娉
AE60 峯家宴坎峴峴峴峴峴峴峴峴峴峴峴
AE70 忞恥恐怨恭恩息悄悟悚悍悔悌悅悖
AEB0 扇拳掣掣掣掣掣掣掣掣掣掣掣掣掣
AEC0 挫挨捍捌效救料旁旅時晉晏晃晒响
AED0 晁晁晁晁晁晁晁晁晁晁晁晁晁晁晁
AEE0 桌桑栽柴桐架格桃株桅桎移桁殊殉
AEF0 氣氣氣氣氣氣氣氣氣氣氣氣氣氣氣
AF40 湮涉浮浚浴浩涌忍浹涇涇涇涇涇涇
AF50 烈鳥參特狼狹狽狽狽狽狽狽狽狽狽
AF60 畔畝畝畝畝畝畝畝畝畝畝畝畝畝畝
AF70 咆益盍盍盍盍盍盍盍盍盍盍盍盍盍
AFA0 砵砵砵砵砵砵砵砵砵砵砵砵砵砵砵
AFB0 砵砵砵砵砵砵砵砵砵砵砵砵砵砵砵
AFC0 素素素素素素素素素素素素素素素
AFD0 耘耕耙耗耽耽耽耽耽耽耽耽耽耽耽
AFE0 能脊胼胼胼胼胼胼胼胼胼胼胼胼胼
AFF0 荆茸荐草茵茵茵茵茵茵茵茵茵茵茵
B040 虔蚊蚪蚪蚪蚪蚪蚪蚪蚪蚪蚪蚪蚪蚪
B050 訐訐訐訐訐訐訐訐訐訐訐訐訐訐訐
B060 躬軒軻軻軻軻軻軻軻軻軻軻軻軻軻
B070 郡郝郢酒配酌釘針釧釜針閃院陣陡
B0A0 陸陝除陝陝陝陝陝陝陝陝陝陝陝
B0B0 僞停假偃偃偃偃偃偃偃偃偃偃偃偃
B0C0 偃偃偃偃偃偃偃偃偃偃偃偃偃偃偃
B0D0 匾參曼商啍啍啍啍啍啍啍啍啍啍啍
B0E0 啤唸售啜啜啜啜啜啜啜啜啜啜啜
B0F0 埠埠基堂堵執培夠奢娶婁婁婁婁
B140 娼婢婚婆娼娼娼娼娼娼娼娼娼娼
B150 雁屏崇崕崕崕崕崕崕崕崕崕崕崕崕
B160 常帶帳帷康庸庶庵庚張強彗彬彩
B170 徙徙徙徙徙徙徙徙徙徙徙徙徙徙
B1A0 情悻悻悻悻悻悻悻悻悻悻悻悻悻
B1B0 掠控捲掖探接捷捧掘措捥掩掉掛捥
B1C0 推掄掄掄掄掄掄掄掄掄掄掄掄掄掄
B1D0 教敗啓敏敘救敵斜斛斬族旋旌旌
B1E0 晤晨晦晞晞晞晞晞晞晞晞晞晞晞
B1F0 械械械械械械械械械械械械械械械
B240 毫毯氤氤氤氤氤氤氤氤氤氤氤氤氤
B250 涯淑瀾瀾瀾瀾瀾瀾瀾瀾瀾瀾瀾瀾瀾
B260 深淮淨淆溜涪涪涪涪涪涪涪涪涪涪

B270 犁猜猜猜猜猜猜猜猜猜猜猜猜猜猜
B2A0 盜盜盜盜盜盜盜盜盜盜盜盜盜盜
B2B0 盒盛筌筌筌筌筌筌筌筌筌筌筌筌筌
B2C0 窈窕窈窕窈窕窈窕窈窕窈窕窈窕窈
B2D0 紹紹紹紹紹紹紹紹紹紹紹紹紹紹
B2E0 紹紹紹紹紹紹紹紹紹紹紹紹紹紹
B2F0 莞莞莞莞莞莞莞莞莞莞莞莞莞莞
B340 莆莆莆莆莆莆莆莆莆莆莆莆莆莆
B350 袈袈袈袈袈袈袈袈袈袈袈袈袈袈
B360 訢訢訢訢訢訢訢訢訢訢訢訢訢訢
B370 追通逗逗逗逗逗逗逗逗逗逗逗逗逗
B3A0 部郭都都都都都都都都都都都都都
B3B0 陸陸陸陸陸陸陸陸陸陸陸陸陸陸
B3C0 鹿鹿鹿鹿鹿鹿鹿鹿鹿鹿鹿鹿鹿鹿
B3D0 創創創創創創創創創創創創創創
B3E0 喪喪喪喪喪喪喪喪喪喪喪喪喪喪
B3F0 噉噉噉噉噉噉噉噉噉噉噉噉噉噉
B440 噉噉噉噉噉噉噉噉噉噉噉噉噉噉
B450 嵐嵐嵐嵐嵐嵐嵐嵐嵐嵐嵐嵐嵐嵐
B460 循循循循循循循循循循循循循循
B470 復復復復復復復復復復復復復復
B4A0 插插插插插插插插插插插插插插
B4B0 敦敦敦敦敦敦敦敦敦敦敦敦敦敦
B4C0 替替替替替替替替替替替替替替
B4D0 棣棣棣棣棣棣棣棣棣棣棣棣棣棣
B4E0 後後後後後後後後後後後後後後
B4F0 湘湘湘湘湘湘湘湘湘湘湘湘湘湘
B540 漑漑漑漑漑漑漑漑漑漑漑漑漑漑漑
B550 牌牌牌牌牌牌牌牌牌牌牌牌牌牌
B560 琬琬琬琬琬琬琬琬琬琬琬琬琬琬
B570 琬琬琬琬琬琬琬琬琬琬琬琬琬琬
B5A0 窗窗窗窗窗窗窗窗窗窗窗窗窗窗
B5B0 粥粥粥粥粥粥粥粥粥粥粥粥粥粥
B5C0 盞盞盞盞盞盞盞盞盞盞盞盞盞盞
B5D0 菩菩菩菩菩菩菩菩菩菩菩菩菩菩
B5E0 菽菽菽菽菽菽菽菽菽菽菽菽菽菽菽
B5F0 蛤蛤蛤蛤蛤蛤蛤蛤蛤蛤蛤蛤蛤蛤
B640 詔詔詔詔詔詔詔詔詔詔詔詔詔詔
B650 賀賀賀賀賀賀賀賀賀賀賀賀賀賀
B660 貽貽貽貽貽貽貽貽貽貽貽貽貽貽
B670 酥酥酥酥酥酥酥酥酥酥酥酥酥酥
B6A0 問問問問問問問問問問問問問問
B6B0 集集集集集集集集集集集集集集
B6C0 黃黃黃黃黃黃黃黃黃黃黃黃黃黃
B6D0 剗剗剗剗剗剗剗剗剗剗剗剗剗剗剗
B6E0 嗣嗣嗣嗣嗣嗣嗣嗣嗣嗣嗣嗣嗣嗣
B6F0 塔塔塔塔塔塔塔塔塔塔塔塔塔塔
B740 媳媳媳媳媳媳媳媳媳媳媳媳媳媳
B750 感想感想感想感想感想感想感想
B760 戴戴戴戴戴戴戴戴戴戴戴戴戴戴
B770 構構構構構構構構構構構構構構
B7A0 楚楚楚楚楚楚楚楚楚楚楚楚楚楚
B7B0 楣楣楣楣楣楣楣楣楣楣楣楣楣楣
B7C0 滅滅滅滅滅滅滅滅滅滅滅滅滅滅
B7D0 煩煩煩煩煩煩煩煩煩煩煩煩煩煩
B7E0 獅獅獅獅獅獅獅獅獅獅獅獅獅獅
B7F0 痰痰痰痰痰痰痰痰痰痰痰痰痰痰
B840 睹睹睹睹睹睹睹睹睹睹睹睹睹睹

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BDF0	陽	踏	踈	跣	踉	踞	駒	輝	輻	輟	輩	輦	輪	輶	軛
BE40	輓	適	遮	遨	遭	選	鄉	鄭	鄧	輟	醇	輦	輶	輶	鈇
BE50	銷	鋪	鋤	鋤	鋤	銳	銚	鋒	鄧	鄧	醉	醉	醋	醺	錫
BE60	霧	靠	鞍	鞋	鞏	頰	頰	頰	頰	頰	餒	餒	閑	駝	駐
BE70	駛	駕	駕	駒	駙	貼	髮	髯	鬚	鬚	餒	餒	魯	鳩	鴉
BEA0	馱	馱	鷹	黎	墨	齒	儒	儘	儔	偵	儕	莫	暮	凝	劑
BEB0	剗	動	噲	噫	噍	嵬	嚙	噪	導	導	嘖	嘖	暖	噬	噢
BEC0	壁	墾	墾	墾	奮	嫵	羸	學	哀	導	彊	憲	憑	憩	憊
BED0	憶	憾	悞	悞	戰	擅	擁	擋	捷	撼	據	擄	擇	揠	操
BEE0	擒	檣	檣	檣	整	櫟	樅	機	欒	欒	榨	槩	樺	搢	撿
BEF0	樹	濃	澤	濁	漑	澳	激	澹	渚	湮	還	熾	燉	燒	燥
BF40	燕	烹	燎	燙	烟	燃	燄	獨	瑋	璣	璘	璆	璞	瓢	甌
BF50	瘴	癘	痛	盧	盪	瞪	瞞	瞥	磨	磚	礐	礐	糕	糖	縊
BF60	穆	穌	穆	窺	簞	簞	策	篤	篳	篳	筵	笥	糕	糖	縊
BFA0	縑	縑	縑	縑	縑	縑	縑	縑	義	翰	翽	翽	翻	捥	膳
BFB0	膩	膨	臻	興	艘	舡	蕊	蕙	蕙	蕙	蕙	蕃	蕉	蕭	蕙
BFC0	螃	螟	螞	螢	融	衡	褪	裨	褊	褊	搭	親	覬	諦	諺
BFD0	諱	謀	課	諧	詒	諾	謁	謂	諷	論	詰	謚	諼	豫	貓
BFE0	賴	蹄	跛	踴	蹂	蹠	踵	輻	輻	輻	辨	辦	邊	遴	選
BFF0	邈	遼	遣	鄰	醒	錠	鉅	鉅	錯	錯	鋼	鋼	錄	錚	覓
C040	隼	銘	靜	銀	銅	銅	頻	隨	領	頭	頰	頰	霄	霜	覓
C050	霏	銘	靜	銀	銅	銅	頻	隨	領	頭	頰	頰	霄	霜	覓
C060	飴	餉	駭	駭	駭	駭	優	僂	戲	勵	嚙	嚙	嚙	嚙	嚇
C070	鴛	默	黔	龍	龜	龜	優	僂	戲	勵	嚙	嚙	嚙	嚙	嚇
C0A0	噍	壕	壓	壑	壑	壑	嬰	嬀	戴	檻	屢	嶼	嶺	嶺	嶺
C0B0	幫	彌	微	應	懂	愬	愬	懋	戴	檻	擊	擊	擠	擠	擦
C0C0	擬	攔	攔	攔	斂	斂	斂	暖	檀	楷	檢	檢	檜	檜	檜
C0D0	槩	檣	檣	歎	歎	殲	殲	營	濟	濠	濠	濠	濠	濠	濠
C0E0	溶	濡	洩	濕	濮	灘	燧	營	燦	燥	燭	燭	燭	燭	燭
C0F0	牆	寧	獲	環	環	環	環	環	燭	燭	燭	燭	燭	燭	燭
C140	瞧	瞭	矯	磷	磧	磧	磧	磧	禪	禪	禪	禪	簇	簇	叢
C150	簌	條	練	糜	糝	糝	糝	糝	綰	綰	綰	綰	縷	縷	縷
C160	聯	縱	縊	縊	縊	縊	縊	縊	縊	縊	縊	縊	縊	縊	縊
C170	薄	蝨	蝨	蝨	蝨	蝨	蝨	蝨	褊	褊	褊	褊	蛭	蛭	蟻
C1A0	薄	蝨	蝨	蝨	蝨	蝨	蝨	蝨	褊	褊	褊	褊	蛭	蛭	蟻
C1B0	蝨	蝨	蝨	蝨	蝨	蝨	蝨	蝨	褊	褊	褊	褊	蛭	蛭	蟻
C1C0	荒	謠	謝	膳	謚	謚	謚	謚	賺	賽	購	賁	賁	趨	蹉
C1D0	蹈	蹊	轄												

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D5A0	掎	揜	振	棋	棍	擗	斂	旆	睨	晡	睨	暖	梟	暫	駿	稅
D5B0	根	樅	桂	枰	枰	振	柁	侵	柳	柳	柳	柳	柳	柳	柳	柳
D5C0	梏	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤
D5D0	稀	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤	桤
D5E0	淀	渚	渚	渚	渚	渚	渚	渚	渚	渚	渚	渚	渚	渚	渚	渚
D640	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪
D650	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪	涪
D660	猝	猝	猝	猝	猝	猝	猝	猝	猝	猝	猝	猝	猝	猝	猝	猝
D670	珽	珽	珽	珽	珽	珽	珽	珽	珽	珽	珽	珽	珽	珽	珽	珽
D6A0	痘	痘	痘	痘	痘	痘	痘	痘	痘	痘	痘	痘	痘	痘	痘	痘
D6B0	皆	皆	皆	皆	皆	皆	皆	皆	皆	皆	皆	皆	皆	皆	皆	皆
D6C0	旅	旅	旅	旅	旅	旅	旅	旅	旅	旅	旅	旅	旅	旅	旅	旅
D6D0	簋	簋	簋	簋	簋	簋	簋	簋	簋	簋	簋	簋	簋	簋	簋	簋
D6E0	秣	秣	秣	秣	秣	秣	秣	秣	秣	秣	秣	秣	秣	秣	秣	秣
D6F0	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉
D740	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉
D750	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉	紉
D760	扶	扶	扶	扶	扶	扶	扶	扶	扶	扶	扶	扶	扶	扶	扶	扶
D770	莖	莖	莖	莖	莖	莖	莖	莖	莖	莖	莖	莖	莖	莖	莖	莖
D7A0	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊
D7B0	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊	蚊
D7C0	裘	裘	裘	裘	裘	裘	裘	裘	裘	裘	裘	裘	裘	裘	裘	裘
D7D0	犯	犯	犯	犯	犯	犯	犯	犯	犯	犯	犯	犯	犯	犯	犯	犯
D7E0	軋	軋	軋	軋	軋	軋	軋	軋	軋	軋	軋	軋	軋	軋	軋	軋
D7F0	鄱	鄱	鄱	鄱	鄱	鄱	鄱	鄱	鄱	鄱	鄱	鄱	鄱	鄱	鄱	鄱
D840	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞
D850	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞	鈞
D860	魈	魈	魈	魈	魈	魈	魈	魈	魈	魈	魈	魈	魈	魈	魈	魈
D870	喙	喙	喙	喙	喙	喙	喙	喙	喙	喙	喙	喙	喙	喙	喙	喙
D8A0	堙	堙	堙	堙	堙	堙	堙	堙	堙	堙	堙	堙	堙	堙	堙	堙
D8B0	颯	颯	颯	颯	颯	颯	颯	颯	颯	颯	颯	颯	颯	颯	颯	颯
D8C0	娉	娉	娉	娉	娉	娉	娉	娉	娉	娉	娉	娉	娉	娉	娉	娉
D8D0	鴛	鴛	鴛	鴛	鴛	鴛	鴛	鴛	鴛	鴛	鴛	鴛	鴛	鴛	鴛	鴛
D8E0	謁	謁	謁	謁	謁	謁	謁	謁	謁	謁	謁	謁	謁	謁	謁	謁
D8F0	惺	惺	惺	惺	惺</											

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