

PI-TEK

MODEL NO. : PHC2004AY-CP

PRODUCT TYPE: STANDARD

OLED Character Module Datasheet

※ IC Equivalent (compatible)

HD44780, KS0066 , SPLC780 , ST7066 , AIP31066

This specification may be changed without any notices in order improve performance or quality etc.

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History of versions and modifications

Attention:

Some specifications of IC are not listed in this datasheet. Please refer to the IC datasheet for more details.

Revision	Date	Description	Changed By
1.0		Preliminary specification	

Coding system

P H C 2004 A Y - CP

P: PI-TEK INC.

H: Characters

C: IC Equivalent (compatible) HD44780, KS0066, SPLC780, ST7066, AIP31066

2004: 4 lines x 20 characters

A: Model

Y: Yellow

CP: English and Cyrillic standard font

Functions and Features

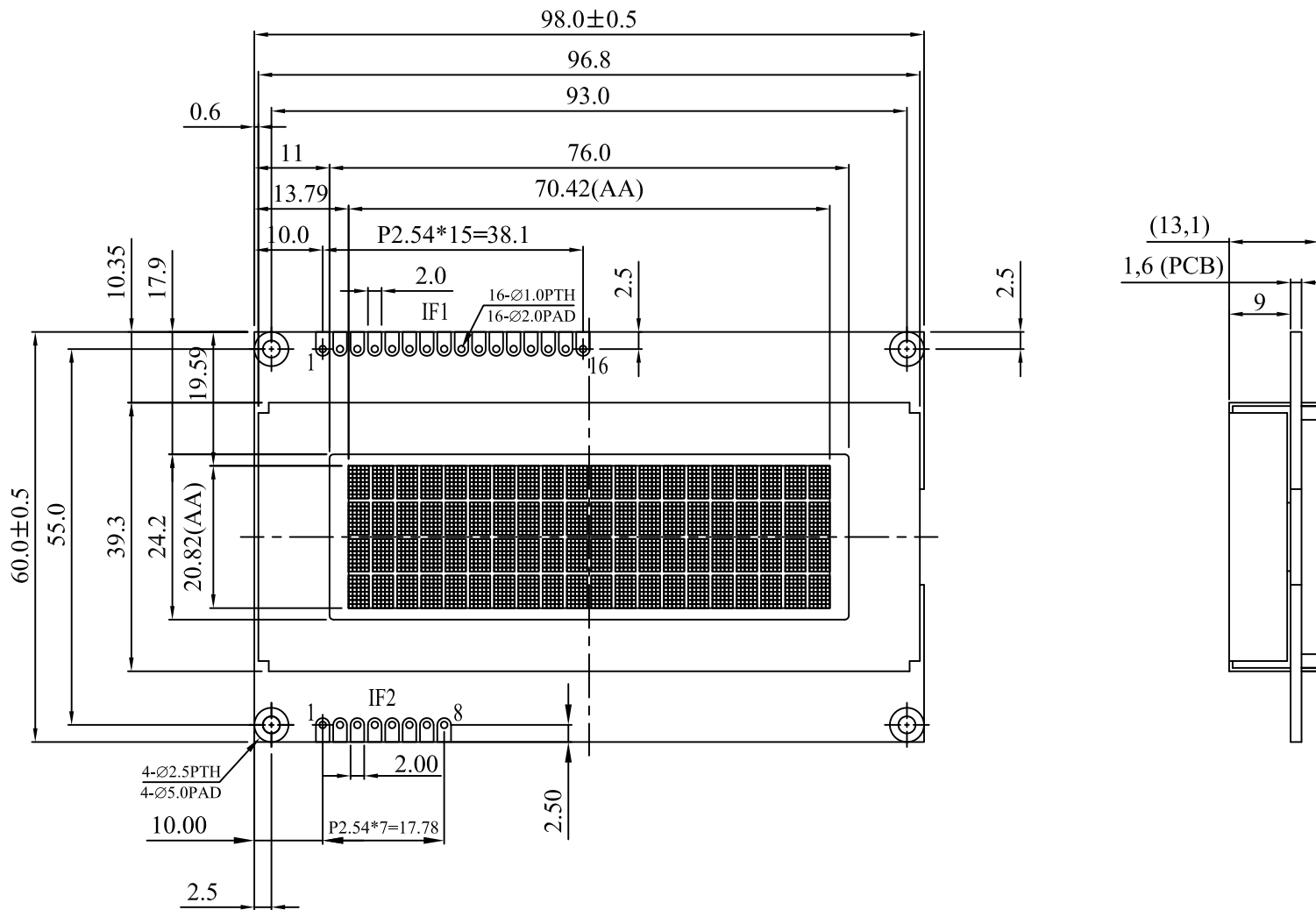
- 4 lines x 20 characters
- Built-in controller
- Parallel or serial MPU interface (Default 6800 MPU parallel)
- +2.8V ~ +5.3V Power Supply
- viewing angle "Free"
- Wide Temperature -40°C ~ +80°C (Operating)
- Sunlight Readable Technology
- RoHS compliant

Mechanical Specification

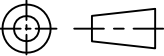
Item	Description	
Product No.	PHC2004AY-CP	
Active Area	70.42(W)×20.82(H)	mm
Module Size	98.0(W)×60.0(H)	mm
Display Format	20 characters (W)×4 lines (H)	
Controller	PT0066 or Equivalent IC Equivalent (compatible) HD44780, KS0066 , SPLC780 , ST7066 , AIP31066	
Interface	6800 8Bit / 4Bit (STD) I2C (Option)	

※Precautions in use of OLED Modules

- ①Don't disassemble , drop, bend or twist the OLED Module.
- ②Don't operate it above the absolute maximum rating.
- ③Don't modify its shape or change the components of OLED module.
- ④Storage: please storage in anti-static electricity container and clean environment.
- ⑤PITEK have the right to change the passive components and PCB Rev.



IF1	SYMBOL
1	VSS
2	VDD
3	NC
4	RS
5	R/W#
6	E
7-14	DB0-7
15-16	NC

Pi-Tek Pro Technology Inc.					Drawing Number		Rev.
							A
Projection Type			Tolerance		MODEL		
			Dimension	±0.3	PHC2004A(STD)		
			Unit	mm	TITLE		
	Drawn	Checked	Approved	PM	OLED Module Drawing		
By	Eco-2048	Eco-1500	Eco-0150	Eco-0097	Scale	Sheet	Size
Note	2048.00	1500.00	0150.00	0097.00	3/2	1 of 1	A4

Pin Description

Parallel Interface (default):

Pin No.	Symbol	Level	Description
1	VSS	0V	Ground
2	VDD	2.8~5.3V	Supply Voltage for OLED and logic
3	NC	—	No Connect
4	RS	H/L	Register select signal. H: DATA, L: Command
5	R/W#	H/L	Read/Write select signal, R/W=1: Read(MPU←Module) R/W: =0: Write(MPU→Module)
6	E	H,H→L	Operation enable signal. Falling edge triggered.
7 14	DB0 DB7	H/L	Data bus lines
15-16	NC	—	No Connect

DC Characteristics

Item	Symbol	Condition	Min.	Type	Max.	Unit
Power Supply for Logic	VDD	(Wide Voltage I/O Application)	2.8	5.0	5.3	Volt
Input Voltage for I/O Pins	Vi	(Wide Voltage I/O Application)	2.8	5.0	5.3	Volt
Input Voltage	VIL	L level	0	-	0.3 VDD	Volt
Input Voltage	VIH	H level	0.7 VDD	-	VDD	Volt
Output Voltage	VOL	L level	0	-	0.3 VDD	
Output Voltage	VOH	H level	0.7 VDD	-	VDD	
Power Supply Current for OLED	IDD	Note	-	40		mA
Sleep Mode Current for VDD	IDD,SLEEP			10		μA

Note:

VDD = 5.0V, 25% Display Area Turn on.100 cd/m²

When random texts pattern is running, averagely, about 1/4 of pixels will be on.

Optical Characteristics

Item	Symbol	Min.	Typ	Max.	Unit
Viewing angle range			Free		Degree
Dark Room Contrast	Cr		>10,000:1		
Brightness	Lbr		100		cd/m ²
Peak Emission Wavelength	C.I.E 1931	X=0.46 Y=0.45	X=0.50 Y=0.49	X=0.54 Y=0.53	

Electrical Absolute Ratings

Item	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply for Logic	VDD	-0.3	5.0	5.5	Volt	1,2
Input Voltage for I/O Pins	VI	-0.3	5.0	5.5	Volt	1,2
Life Time (80 cd/m ²)		---	100,000	---	Hours	3

Note 1: All the above voltages are on the basis of "VSS = 0V".

Note 2: When this module is used beyond the above absolute maximum ratings, permanent breakage of the module may occur.

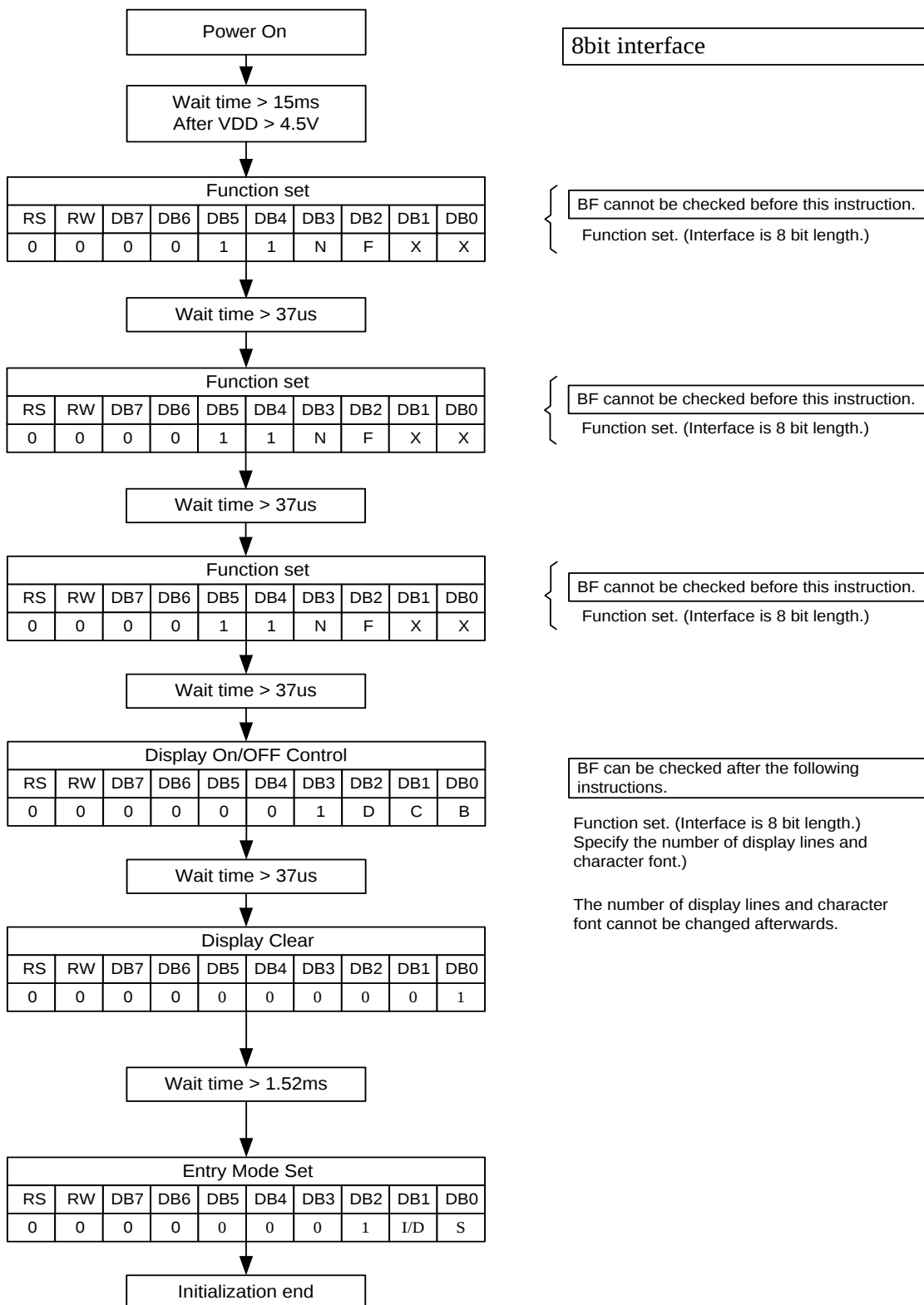
Note 3: Ta = 25°C, 25% Checkerboard.

Software configuration follows Section ACTUAL APPLICATION EXAMPLE Initialization. End of lifetime is specified as 50% of initial brightness reached. The average operating lifetime at room temperature is estimated by the accelerated operation at high temperature conditions.

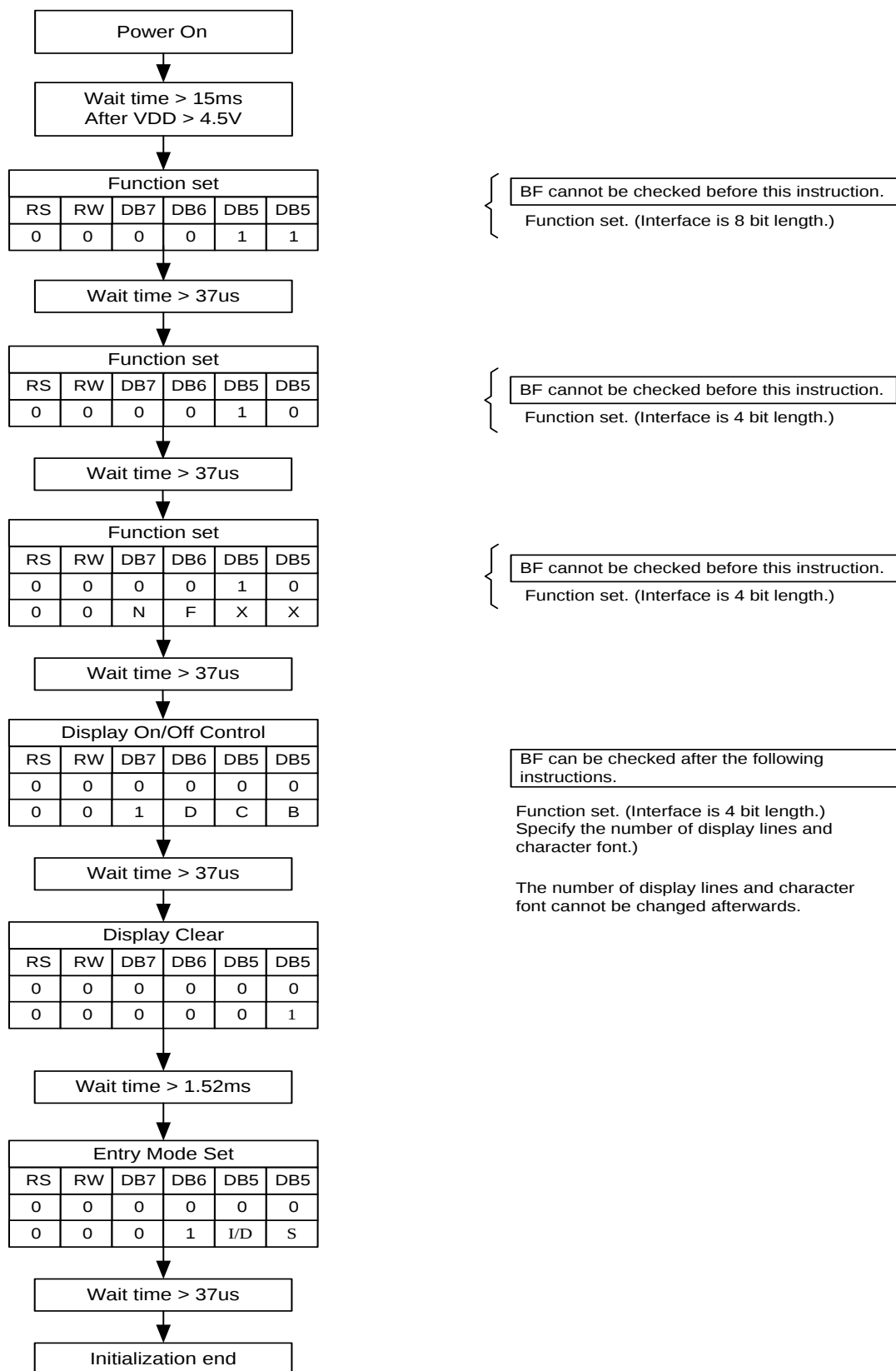
Initializing of OLED Module

1. 8 bit interface mode

After power on, PT0066 starts the internal auto-reset circuit and executes the initial instructions. The initial procedures are shown as follows.



After power on, PT0066 starts the internal auto-reset circuit and executes the initial instructions. The initial procedures are shown as follows.



PT0066 CGROM CHARACTER CODE

JT(English and Japanese standard font)

Upper 4bit Lower 4bit		0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	CG RAM (1)	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0001	CG RAM (2)	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
0010	CG RAM (3)	W	X	Y	Z	a	b	c	d	e	f	g	h	i	j	k	l
0011	CG RAM (4)	m	n	o	p	q	r	s	t	u	v	w	x	y	z	.	,
0100	CG RAM (5)	;	'	!	"	#	\$	%	&	'	(	)	*	+	=	-	_
0101	CG RAM (6)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*
0110	CG RAM (7)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*
0111	CG RAM (8)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*
1000	CG RAM (1)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*
1001	CG RAM (2)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*
1010	CG RAM (3)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*
1011	CG RAM (4)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*
1100	CG RAM (5)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*
1101	CG RAM (6)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*
1110	CG RAM (7)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*
1111	CG RAM (8)	~	^	&	*	~	^	&	*	~	^	&	*	~	^	&	*

ET(English and European standard font I)

Upper 4bit Lower 4bit	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	CG RAM (1)	士		0	0	P	'	P	E	E	S		f	W	B	T
0001	CG RAM (2)	三	!	1	A	Q	S	9	G	X	I		J	T	Y	U
0010	CG RAM (3)	7	"	2	B	R	B	r	E	E	S		o	S	S	X
0011	CG RAM (4)	△	#	3	C	S	C	S	S	S	G		P	W	E	4
0100	CG RAM (5)	f	*	4	D	T	d	t	S	S	C		4	P	Z	o
0101	CG RAM (6)	l	X	5	E	U	e	u	S	S	E		h	↑	4	W
0110	CG RAM (7)	Y	&	6	F	U	f	u	S	S	Q		W	↓	8	h
0111	CG RAM (8)	J	'	7	G	W	g	w	S	S	R		X	→	A	L
1000	CG RAM (9)	J	C	8	H	X	H	X	S	S	Q		9	*	E	K
1001	CG RAM (2)	U	>	9	I	Y	i	y	S	S	O		i	△	W	4
1010	CG RAM (3)	X	*	:	J	Z	j	z	S	S	O		S	△	W	F
1011	CG RAM (4)	J	+	:	K	L	k	l	S	S	S		X	L	T	4
1100	CG RAM (5)	=	,	<	L	N	l	l	S	S	S		X	U	S	O
1101	CG RAM (6)	W	-	=	M	I	m	i	S	S	S		*	·	W	π
1110	CG RAM (7)	E	.	>	N	^	n	^	S	S	S		J	0	R	P
1111	CG RAM (8)	E	/	?	O	_	o	△	S	S	S		U	α	σ	0

ES(English and European standard font II)

Upper 4bit Lower 4bit	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	CG RAM (1)			0	1	P	Y	F	O	E	3	E	*	1	0	0
0001	CG RAM (2)		!	1	A	Q	a	H	O	E	I	L	T	7	8	9
0010	CG RAM (3)		"	2	B	R	b	r	O	E	1	U	B	T	2	0
0011	CG RAM (4)		#	3	C	S	c	s	O	E	1	T	B	T	8	*
0100	CG RAM (5)		\$	4	D	T	d	t	O	E	I	L	C	T	8	*
0101	CG RAM (6)		%	5	E	U	e	u	O	E	i	*	B	T	8	*
0110	CG RAM (7)		&	6	F	V	f	v	O	E	N	T	B	+	P	0
0111	CG RAM (8)		'	7	G	W	g	w	O	E	N	E	C	*	9	T
1000	CG RAM (9)		(	8	H	X	h	x	O	E	N	N	*	P	*	T
1001	CG RAM (2)		)	9	I	Y	i	y	O	E	N	E	*	T	2	U
1010	CG RAM (3)		*	:	J	Z	j	z	O	E	N	*	T	9	X	E
1011	CG RAM (4)		+	;	K	L	k	l	O	E	N	*	T	*	0	U
1100	CG RAM (5)		,	<	L	M	l	m	O	E	N	*	T	0	0	0
1101	CG RAM (6)		-	=	M	I	m	i	O	E	N	*	T	0	0	U
1110	CG RAM (7)		.	>	N	^	n	^	O	E	N	*	T	0	0	U
1111	CG RAM (8)		/	?	O	_	o	_	O	E	N	*	T	0	0	U

PT0066 CGROM CHARACTER CODE

CP(English and Cyrillic standard font)

Upper 4bit Lower 4bit		0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	CG RAM (1)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
0001	CG RAM (2)	Q	R	S	T	U	V	W	X	Y	Z	a	b	c	d	e	f
0010	CG RAM (3)	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v
0011	CG RAM (4)	w	x	y	z	0	1	2	3	4	5	6	7	8	9	.	,
0100	CG RAM (5)	;	'	~	!@	AB	CD	EF	GH	IK	JL	MO	NP	QR	ST	UV	WX
0101	CG RAM (6)	YZ	[	\	]	^	_	`	a	b	c	d	e	f	g	h	i
0110	CG RAM (7)	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y
0111	CG RAM (8)	z	{	}	~	!	@	A	B	C	D	E	F	G	H	I	J
1000	CG RAM (9)	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1001	CG RAM (10)	[	\	]	^	_	`	a	b	c	d	e	f	g	h	i	j
1010	CG RAM (11)	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
1011	CG RAM (12)	{	}	~	!	@	A	B	C	D	E	F	G	H	I	J	K
1100	CG RAM (13)	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[
1101	CG RAM (14)	\	]	^	_	`	a	b	c	d	e	f	g	h	i	j	k
1110	CG RAM (15)	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	{
1111	CG RAM (16)	}	~	!	@	A	B	C	D	E	F	G	H	I	J	K	L

That's the end of the datasheet